



**YAMAHA**

**2011**

**SERVICE MANUAL**

**FZ8NA(C)**

***FZ8***

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EAS20050

**FZ8NA(C)  
SERVICE MANUAL**  
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**IMPORTANT**

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

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.

**TIP**

- 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 notations.

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

# HOW TO USE THIS MANUAL

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

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

**1**  
↓  
**CLUTCH**

**CLUTCH**

**Removing the clutch cover**

**3** →

**5** →

**4** →

**6** →

| Order | Job/Parts to remove | Q'ty | Remarks   |
|-------|---------------------|------|---|
|       | Engine oil          |      | Drain. Refer to "CHANGING THE ENGINE OIL" on page 9-24. |
| 1     | Clutch cable        | 1    | Disconnect.   |
| 2     | Clutch cover        | 1    |   |
| 3     | Clutch cover gasket | 1    |   |
| 4     | Dowel pin           | 2    |   |
| 5     | Oil filler cap      | 1    |   |

For installation, reverse the removal procedure.

**CLUTCH**

**7. Remove:**

- Clutch boss nut
- Washer
- Clutch boss assembly
- Thrust plate

**8. Remove:**

- Wire circlip "1"

**TIP**  
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"

**7** →

**2** →

**7**

**CLUTCH**

**8A32970**

**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.

**TIP**  
Measure the friction plate at four places.

**Friction plate thickness**  
2.92-3.08 mm (0.115-0.121 in)  
**Wear limit**  
2.82 mm (0.1110 in)

**A** **B**

**2**

**8A32911**

**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.

## SYMBOLS

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

### TIP

The following symbols are not relevant to every vehicle.

| SYMBOL  | DEFINITION                      | SYMBOL  | DEFINITION                       |
|---|---------------------------------|---|----------------------------------|
|    | Serviceable with engine mounted |    | Gear oil                         |
|    | Filling fluid                   |    | Molybdenum disulfide oil         |
|    | Lubricant                       |    | Brake fluid                      |
|   | Special tool                    |    | Wheel bearing grease             |
|  | Tightening torque               |  | Lithium-soap-based grease        |
|  | Wear limit, clearance           |  | Molybdenum disulfide grease      |
|  | Engine speed                    |  | Silicone grease                  |
|  | Electrical data                 |  | Apply locking agent (LOCTITE®).  |
|  | Engine oil                      |  | Replace the part with a new one. |



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## GENERAL INFORMATION

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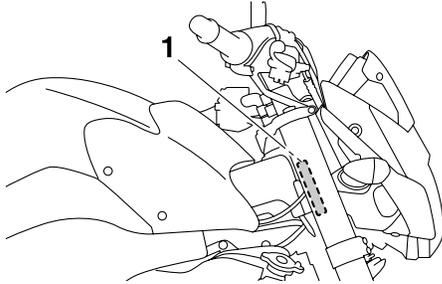
EAS20130

## IDENTIFICATION

EAS20140

### VEHICLE IDENTIFICATION NUMBER

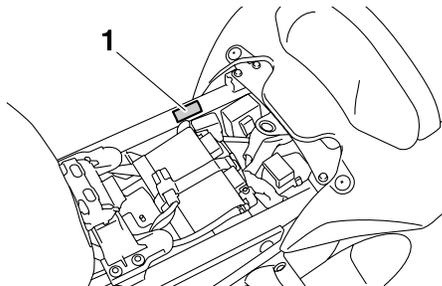
The vehicle identification number "1" is stamped into the right side of the steering head pipe.



EAS20150

### MODEL LABEL

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



EAS20170

## FEATURES

EAS39P1101

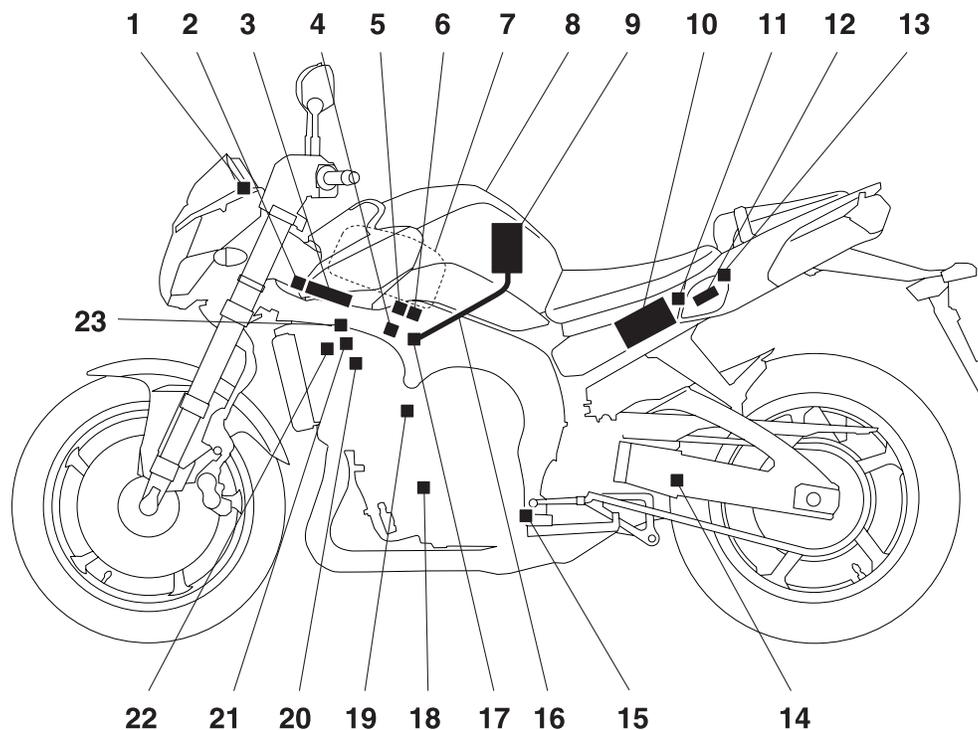
### OUTLINE OF THE FI SYSTEM

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

EAS39P1102

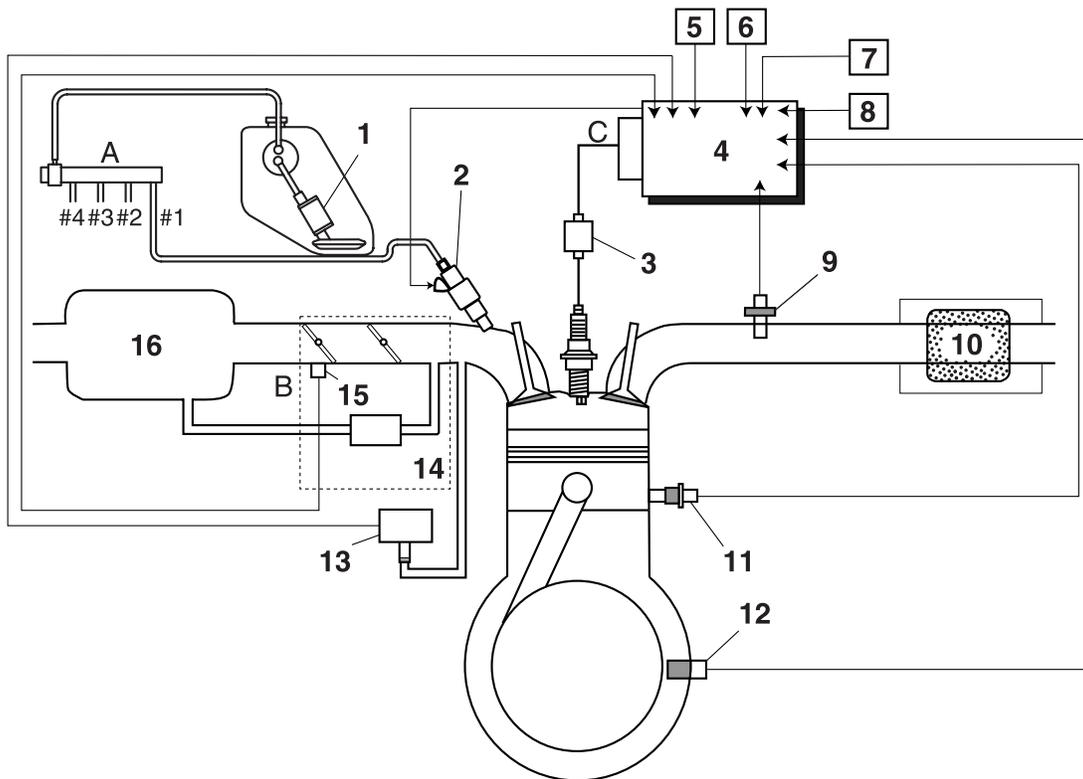
## FI SYSTEM

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 kgf/cm<sup>2</sup>, 47.0 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, sub-throttle position sensor, crankshaft position sensor, intake air pressure sensor, atmospheric pressure sensor, intake 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.**

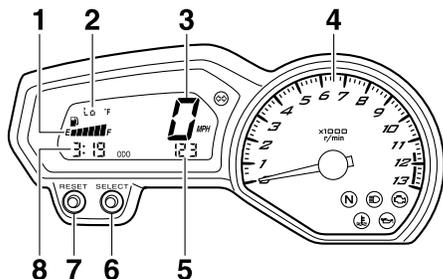


- |                                  |                                  |
|----------------------------------|----------------------------------|
| 1. Fuel pump                     | 13. Intake air pressure sensor   |
| 2. Fuel injector                 | 14. Throttle body                |
| 3. Ignition coil                 | 15. Sub-throttle position sensor |
| 4. ECU (engine control unit)     | 16. Air filter case              |
| 5. Intake air temperature sensor |                                  |
| 6. Speed sensor                  | A. Fuel system                   |
| 7. Throttle position sensor      | B. Air system                    |
| 8. Atmospheric pressure sensor   | C. Control system                |
| 9. O <sub>2</sub> sensor         |                                  |
| 10. Catalytic converter          |                                  |
| 11. Coolant temperature sensor   |                                  |
| 12. Crankshaft position sensor   |                                  |

EAS39P1103

## INSTRUMENT FUNCTIONS

### Multi-function meter unit



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

EWA12422



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

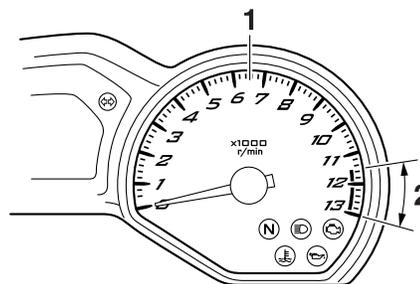
The multi-function meter unit is equipped with the following:

- A speedometer
- A tachometer
- An odometer
- 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
- A self-diagnosis device

#### TIP

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

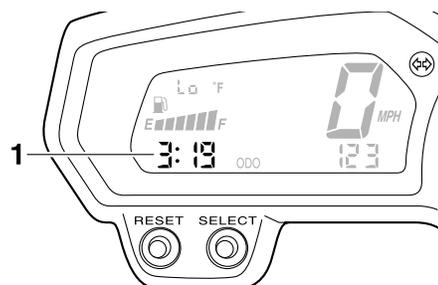
ECA10031

#### NOTICE

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

**Red zone: 11500 r/min and above**

### Clock



1. Clock

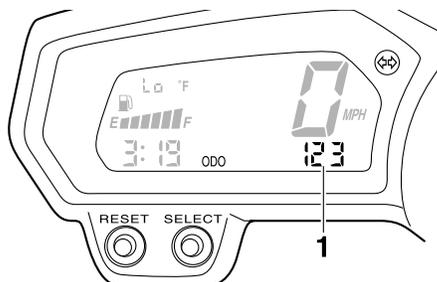
The clock displays when the key is turned to "ON". In addition, the clock can be displayed for 10 seconds by pushing the "SELECT" button when the main switch is in the "OFF" or "LOCK" position.

#### To set the clock

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

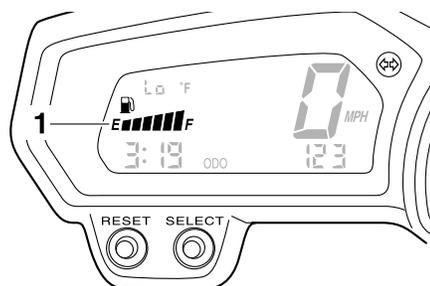
TRIP A → TRIP B → ODO → TRIP A

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 “F-TRIP” and start counting the distance traveled from that point. In that case, push the “SELECT” button to switch the display between the various tripmeter 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



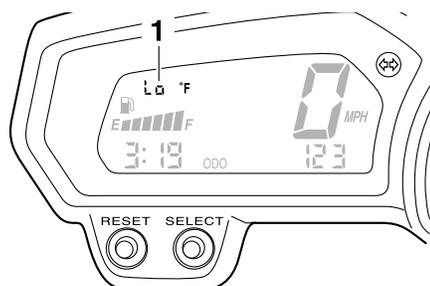
### 1. Fuel meter

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 the last segment on the left starts flashing, refuel as soon as possible.

### TIP

This fuel meter is equipped with a self-diagnosis system. If a problem is detected in the electrical circuit, the following cycle is repeated until the malfunction is corrected: fuel level segments and symbol “” flash eight times, then go off for approximately 3 seconds.

## Coolant temperature display



### 1. Coolant temperature display

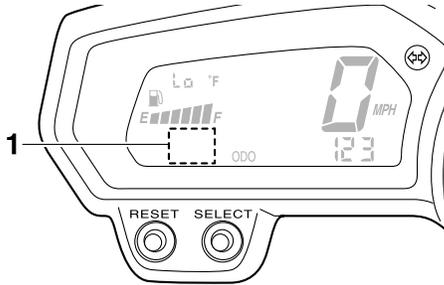
The coolant temperature display indicates the temperature of the coolant.

ECA10021

### NOTICE

**Do not continue to operate the engine if it is overheating.**

## Self-diagnosis device



### 1. Error code display

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

If a problem is detected in any of those circuits, the engine trouble warning light will come on and the display will indicate an error code.

ECA11590

#### **NOTICE**

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

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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 1-14.
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.

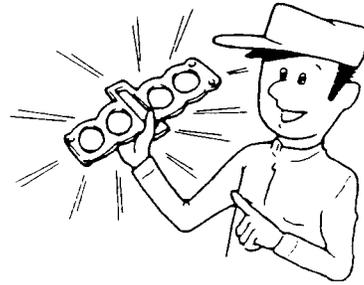


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS20200

### REPLACEMENT PARTS

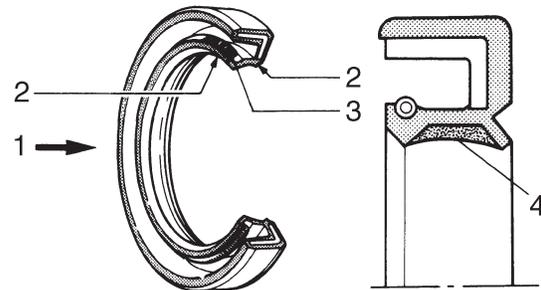
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



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.

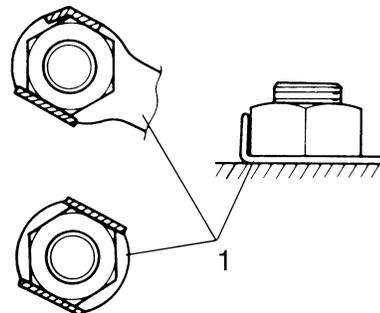


1. Oil
2. Lip
3. Spring
4. Grease

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.



EAS20231

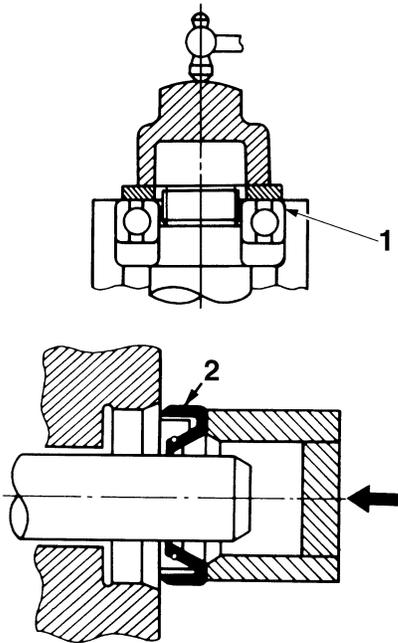
## BEARINGS AND OIL SEALS

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

ECA13300

### NOTICE

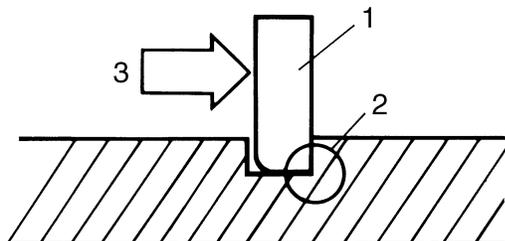
**Do not spin the bearing with compressed air because this will damage the bearing surfaces.**



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.



EAS30380

## BASIC SERVICE INFORMATION

EAS30390

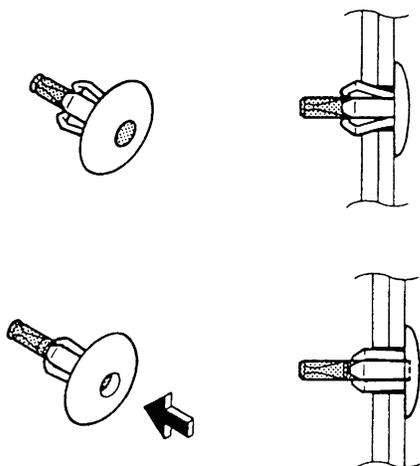
### QUICK FASTENERS

#### Rivet type

- Remove:
  - Quick fastener

#### TIP

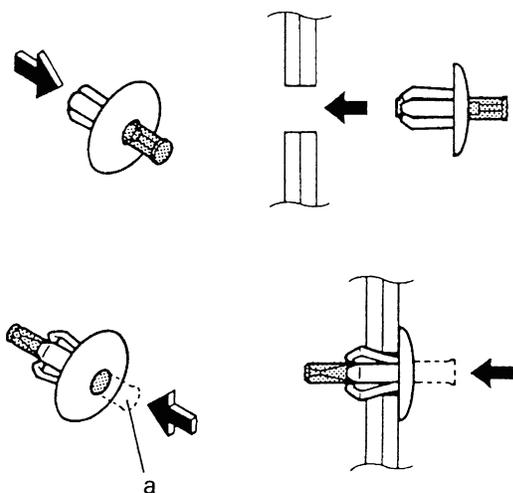
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.



- Install:
  - Quick fastener

#### TIP

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

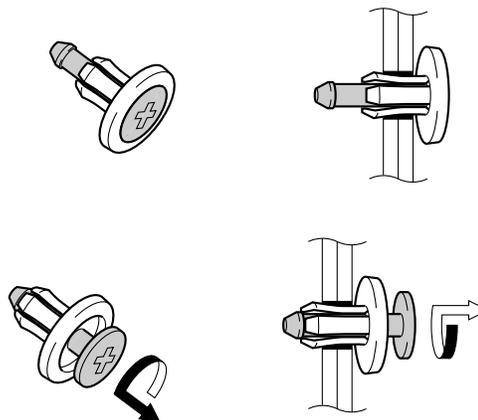


#### Screw type

- Remove:
  - Quick fastener

#### TIP

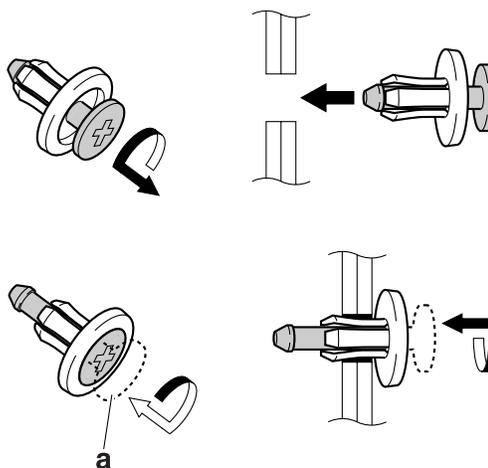
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.



- Install:
  - Quick fastener

#### TIP

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



EAS30401

## ELECTRICAL SYSTEM

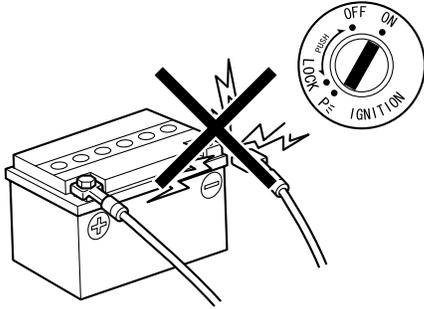
### Electrical parts handling

ECA16600

#### NOTICE

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

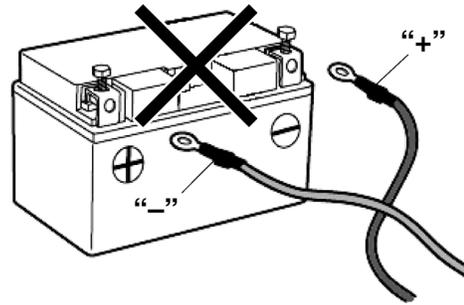
# BASIC SERVICE INFORMATION



ECA16750

## NOTICE

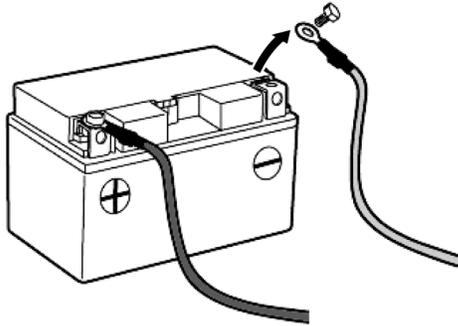
When disconnecting the battery leads from the battery, be sure to disconnect the negative battery lead first, then the positive battery lead. If a tool or similar item contacts the vehicle while only the negative battery lead is connected, a spark could be generated, which is extremely dangerous.



ECA16770

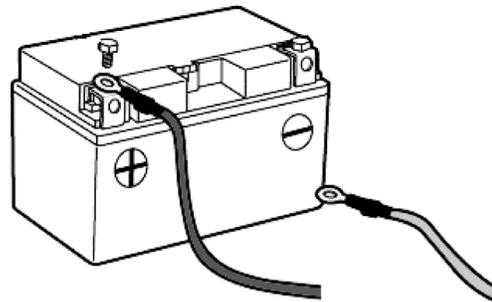
## NOTICE

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



## TIP

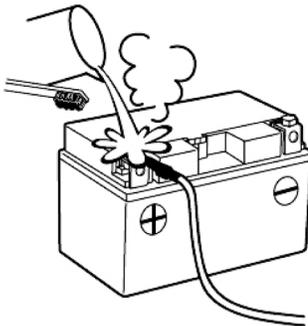
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16610

## NOTICE

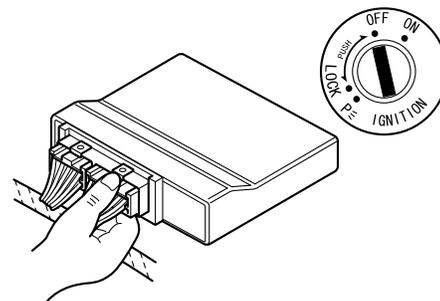
Turn the main switch to "OFF" before disconnecting or connecting an electrical component.



ECA16760

## NOTICE

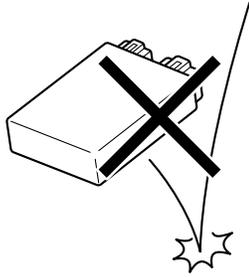
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16620

## NOTICE

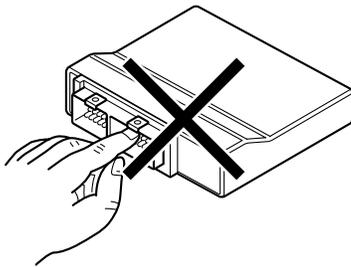
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

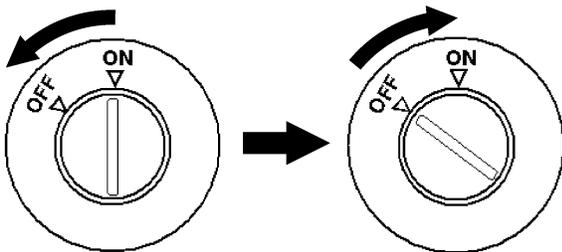
**NOTICE**

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



**TIP**

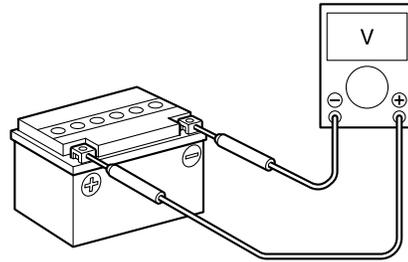
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



### Checking the electrical system

**TIP**

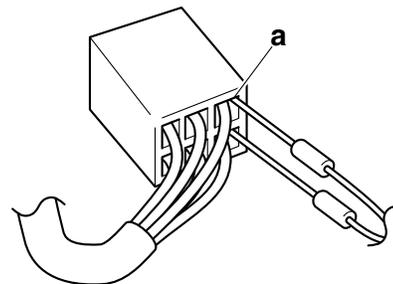
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

**NOTICE**

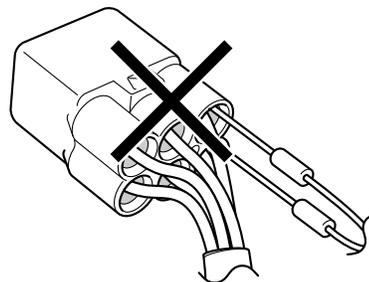
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

**NOTICE**

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



### Checking the connections

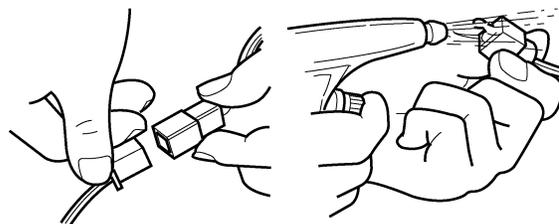
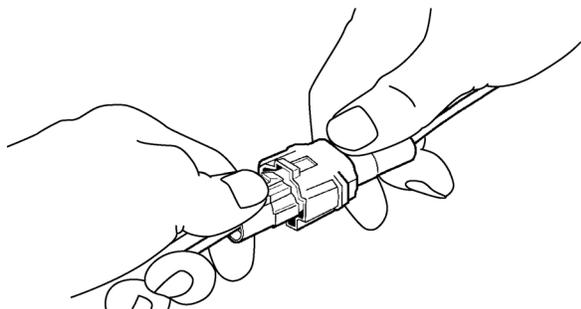
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
  - Lead
  - Coupler
  - Connector

ECA16780

## NOTICE

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



### 3. Check:

- All connections  
Loose connection → Connect properly.

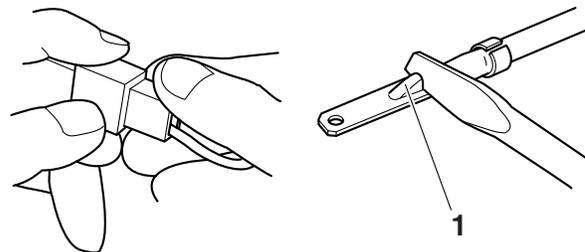
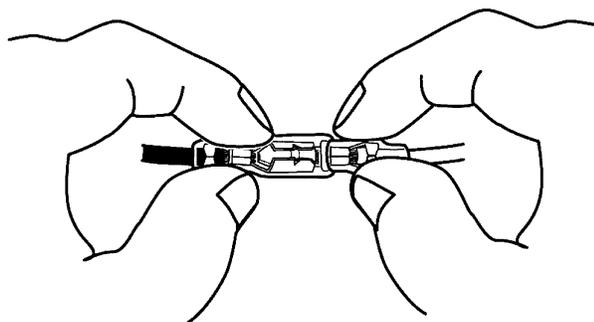
### TIP

- If the pin "1" on the terminal is flattened, bend it up.
- After disassembling and assembling a coupler, pull on the leads to make sure that they are installed securely.

ECA16790

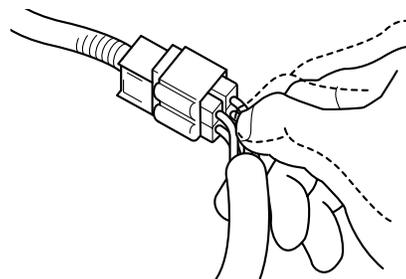
## NOTICE

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



### 2. Check:

- Lead
  - Coupler
  - Connector
- Moisture → Dry with an air blower.  
Rust/stains → Connect and disconnect several times.

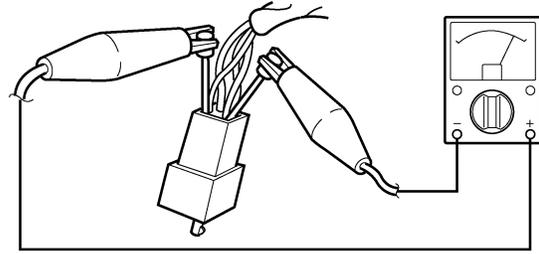
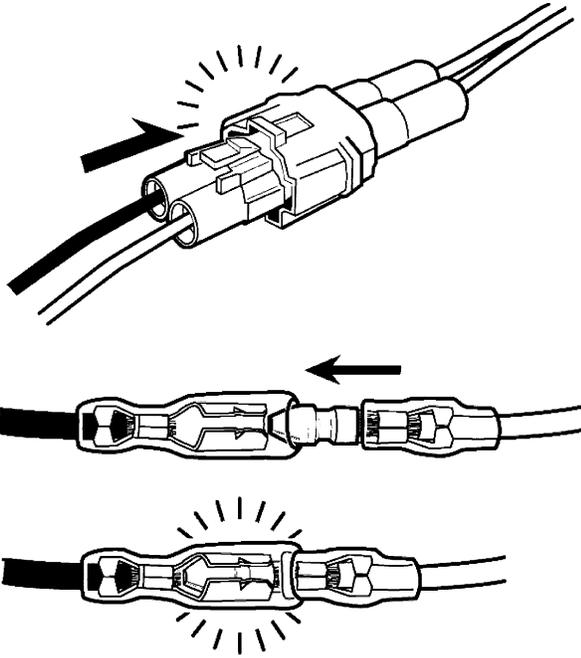


### 4. Connect:

- Lead
- Coupler
- Connector

### TIP

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



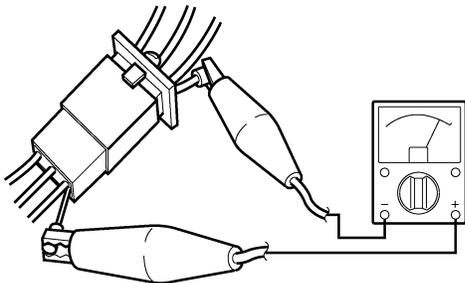
5. Check:
- Continuity  
(with the pocket tester)



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

#### TIP

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



EAS20260

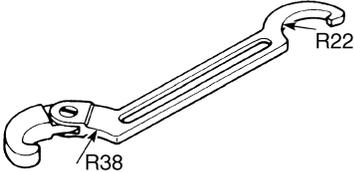
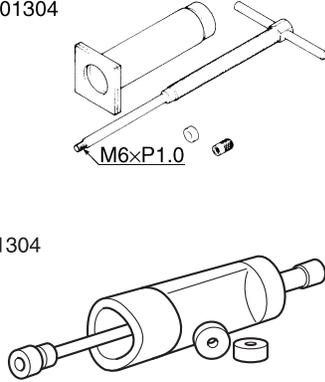
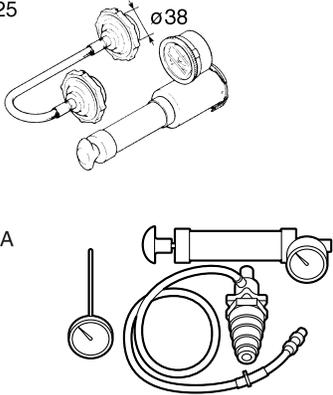
## SPECIAL TOOLS

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.

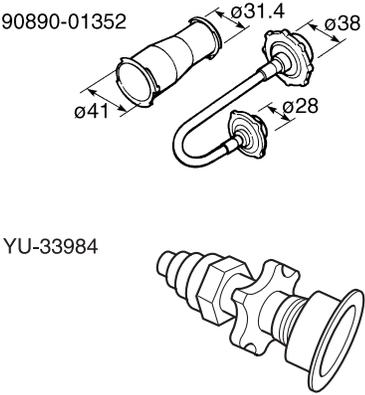
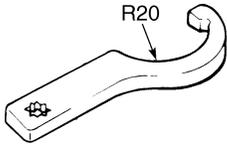
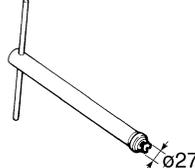
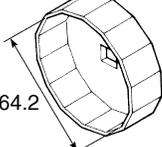
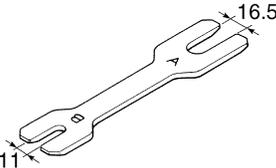
When placing an order, refer to the list provided below to avoid any mistakes.

### TIP

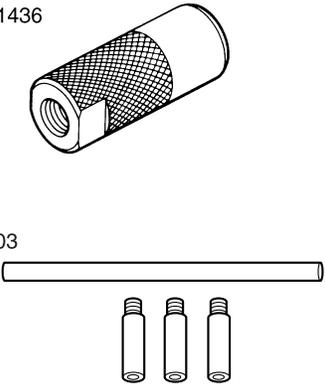
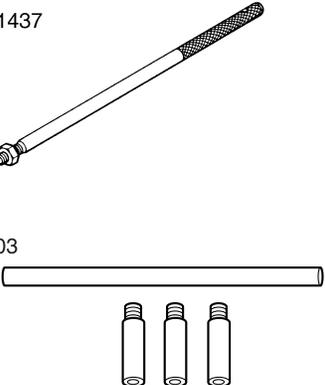
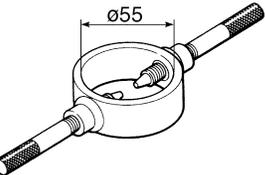
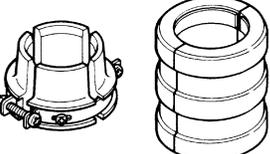
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

| Tool name/Tool No.  | Illustration   | Reference pages |
|---|--|-----------------|
| Ring nut wrench<br>90890-01268<br>Spanner wrench<br>YU-01268                          |    | 4-60            |
| Piston pin puller set<br>90890-01304<br>Piston pin puller<br>YU-01304                 |   | 5-70            |
| Radiator cap tester<br>90890-01325<br>Mityvac cooling system tester kit<br>YU-24460-A |  | 6-3             |

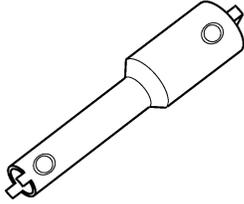
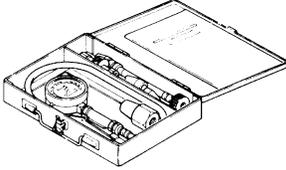
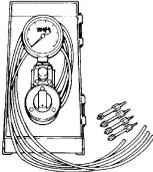
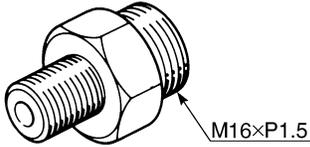
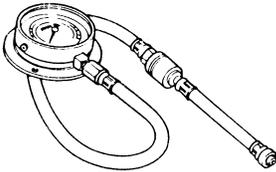
# SPECIAL TOOLS

| Tool name/Tool No.  | Illustration  | Reference pages |
|---|---|-----------------|
| Radiator cap tester adapter<br>90890-01352<br>Pressure tester adapter<br>YU-33984 |  <p>90890-01352</p> <p>YU-33984</p>   | 6-3             |
| Steering nut wrench<br>90890-01403<br>Exhaust flange nut wrench<br>YU-A9472       |  <p>R20</p>                           | 3-20, 4-60      |
| Damper rod holder<br>90890-01423<br>Damping rod holder<br>YM-01423                |  <p>90890-01423</p> <p>YM-01423</p>  | 4-52, 4-53      |
| Oil filter wrench<br>90890-01426<br>YU-38411                                      |  <p>90890-01426</p> <p>YU-38411</p> | 3-24            |
| Rod holder<br>90890-01434<br>Damper rod holder double ended<br>YM-01434           |  <p>90890-01434</p> <p>YM-01434</p> | 4-51, 4-56      |

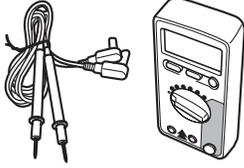
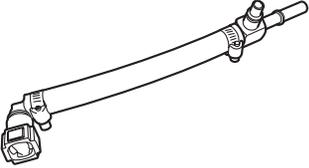
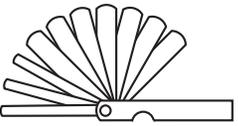
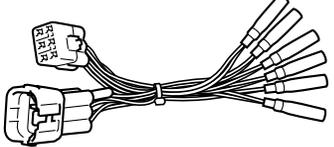
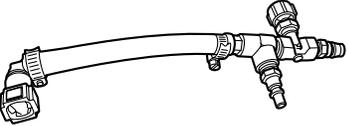
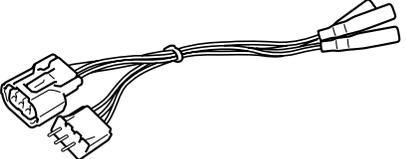
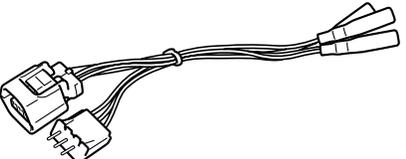
# SPECIAL TOOLS

| Tool name/Tool No.  | Illustration   | Reference pages |
|---|--|-----------------|
| Rod puller attachment (M10)<br>90890-01436<br>Universal damping rod bleeding tool set<br>YM-A8703 | 90890-01436<br>  | 4-54, 4-56      |
| Rod puller<br>90890-01437<br>Universal damping rod bleeding tool set<br>YM-A8703                  | 90890-01437<br> | 4-54, 4-56      |
| Fork spring compressor<br>90890-01441<br>YM-01441   |                | 4-51, 4-56      |
| Fork seal driver<br>90890-01442<br>Adjustable fork seal driver (36-46 mm)<br>YM-01442             |                | 4-54            |
| Pivot shaft wrench adapter<br>90890-01476   |                | 5-9             |

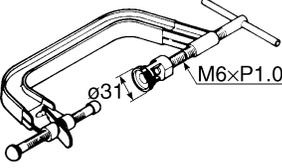
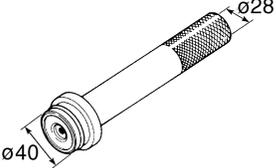
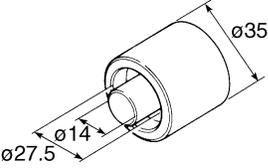
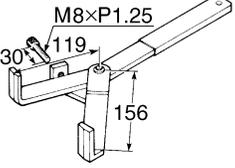
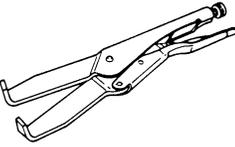
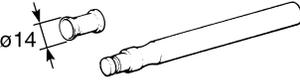
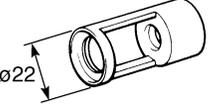
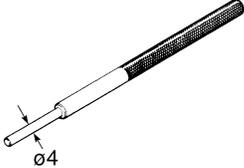
# SPECIAL TOOLS

| Tool name/Tool No.  | Illustration   | Reference pages   |
|---|--|---|
| Pivot shaft wrench<br>90890-01518<br>Frame spanner socket<br>YM-01518     |    | 5-9   |
| Compression gauge<br>90890-03081<br>Engine compression tester<br>YU-33223 |    | 5-1   |
| Vacuum gauge<br>90890-03094<br>Vacuummate<br>YU-44456                     | 90890-03094<br><br><br>YU-44456<br> | 3-9   |
| Pocket tester<br>90890-03112<br>Analog pocket tester<br>YU-03112-C        |    | 1-13, 8-99, 8-100, 8-101, 8-105, 8-106, 8-107, 8-108, 8-109, 8-111, 8-112, 8-113, 8-114, 8-115, 8-116, 8-117, 8-118 |
| Oil pressure adapter H<br>90890-03139                                     |    | 3-25  |
| Pressure gauge<br>90890-03153<br>YU-03153                                 |    | 3-25, 7-5, 7-10   |

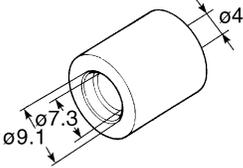
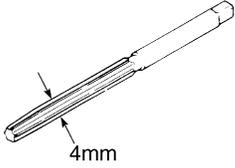
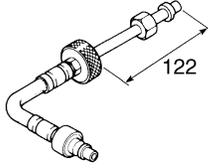
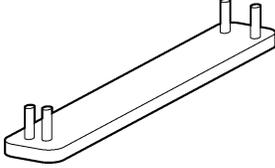
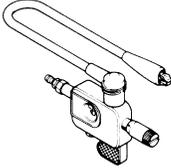
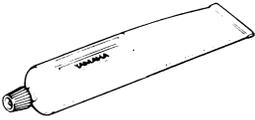
# SPECIAL TOOLS

| Tool name/Tool No.   | Illustration   | Reference pages                        |
|--|--|--|
| Digital circuit tester<br>90890-03174<br>Model 88 Multimeter with tachometer<br>YU-A1927 |    | 5-43, 7-13, 8-110, 8-112, 8-117, 8-118 |
| Fuel pressure adapter<br>90890-03176<br>YM-03176   |    | 7-5                                    |
| Thickness gauge<br>90890-03180<br>Feeler gauge set<br>YU-26900-9                         |    | 3-5, 5-21, 5-51                        |
| Test harness- speed sensor (3P)<br>90890-03208<br>YU-03208                               |   | 8-113, 8-117                           |
| Test harness- lean angle sensor (6P)<br>90890-03209<br>YU-03209                          |  | 8-109                                  |
| Fuel injector pressure adapter<br>90890-03210<br>YU-03210                                |  | 7-10                                   |
| Test harness S- pressure sensor 5S7 (3P)<br>90890-03211<br>YU-03211                      |  | 8-117, 8-118                           |
| Test harness (3P) -sub throttle position sensor<br>90890-03214<br>YU-03214               |  | 7-13                                   |

# SPECIAL TOOLS

| Tool name/Tool No.   | Illustration  | Reference pages |
|--|---|-----------------|
| Valve spring compressor<br>90890-04019<br>YM-04019   |   | 5-25, 5-31      |
| Middle driven shaft bearing driver<br>90890-04058<br>Middle drive bearing installer 40 & 50 mm<br>YM-04058 |   | 6-13            |
| Mechanical seal installer<br>90890-04078<br>Water pump seal installer<br>YM-33221-A                        |   | 6-13            |
| Universal clutch holder<br>90890-04086<br>YM-91042   | <br> | 5-49, 5-53      |
| Valve lapper<br>90890-04101<br>Valve lapping tool<br>YM-A8998  |   | 3-6             |
| Valve spring compressor attachment<br>90890-04108<br>Valve spring compressor adapter 22 mm<br>YM-04108     |   | 5-25, 5-31      |
| Valve guide remover (ø4)<br>90890-04111<br>Valve guide remover (4.0 mm)<br>YM-04111                        |   | 5-27            |

# SPECIAL TOOLS

| Tool name/Tool No.  | Illustration   | Reference pages  |
|---|--|------------------|
| Valve guide installer (ø4)<br>90890-04112<br>Valve guide installer (4.0 mm)<br>YM-04112 |    | 5-27             |
| Valve guide reamer (ø4)<br>90890-04113<br>Valve guide reamer (4.0 mm)<br>YM-04113       |    | 5-27             |
| Extension<br>90890-04136  |    | 5-1              |
| Camshaft wrench<br>90890-04162<br>YM-04162  |   | 5-14, 5-17       |
| Ignition checker<br>90890-06754<br>Oppama pet-4000 spark checker<br>YM-34487            |  | 8-109            |
| Yamaha bond No.1215<br>(Three bond No.1215®)<br>90890-85505                             |  | 5-19, 5-34, 5-67 |



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# SPECIFICATIONS

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| <b>ENGINE SPECIFICATIONS</b> .....                  | 2-2  |
| <b>CHASSIS SPECIFICATIONS</b> .....                 | 2-9  |
| <b>ELECTRICAL SPECIFICATIONS</b> .....              | 2-12 |
| <b>TIGHTENING TORQUES</b> .....                     | 2-14 |
| GENERAL TIGHTENING TORQUE SPECIFICATIONS .....      | 2-14 |
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| LUBRICATION DIAGRAMS .....                          | 2-27 |
| <b>COOLING SYSTEM DIAGRAMS</b> .....                | 2-37 |
| <b>CABLE ROUTING</b> .....                          | 2-41 |

# GENERAL SPECIFICATIONS

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EAS20280

## GENERAL SPECIFICATIONS

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### Model

|       |                                 |
|-------|---------------------------------|
| Model | 39P2 (USA)<br>39P3 (California) |
|-------|---------------------------------|

---

### Dimensions

|                        |                    |
|------------------------|--------------------|
| Overall length         | 2140 mm (84.3 in)  |
| Overall width          | 770 mm (30.3 in)   |
| Overall height         | 1065 mm (41.9 in)  |
| Seat height            | 815 mm (32.1 in)   |
| Wheelbase              | 1460 mm (57.5 in)  |
| Ground clearance       | 140 mm (5.51 in)   |
| Minimum turning radius | 3000 mm (118.1 in) |

---

### Weight

|              |                              |
|--------------|------------------------------|
| Curb weight  | 212 kg (467 lb) (USA)        |
|              | 213 kg (470 lb) (California) |
| Maximum load | 198 kg (437 lb) (USA)        |
|              | 197 kg (434 lb) (California) |

# ENGINE SPECIFICATIONS

EAS20290

## ENGINE SPECIFICATIONS

### Engine

|  |   |
|--|---|
| Engine type                                  | Liquid cooled 4-stroke, DOHC  |
| Displacement                                 | 779 cm <sup>3</sup>   |
| Cylinder arrangement                         | Forward-inclined parallel 4-cylinder  |
| Bore × stroke                                | 68.0 × 53.6 mm (2.68 × 2.11 in)   |
| Compression ratio                            | 12.0 : 1  |
| Standard compression pressure (at sea level) | 1480 kPa/350 r/min (14.8 kgf/cm <sup>2</sup> /350 r/min, 210.5 psi/350 r/min)                 |
| Minimum–Maximum                              | 1290–1660 kPa/350 r/min (12.9–16.6 kgf/cm <sup>2</sup> /350 r/min, 187.1–240.8 psi/350 r/min) |
| Starting system                              | Electric starter  |

### Fuel

|                     |  |
|---------------------|--|
| Recommended fuel    | Regular unleaded gasoline or gasohol (E10) |
| Fuel tank capacity  | 17.0 L (4.49 US gal, 3.74 Imp.gal)         |
| Fuel reserve amount | 3.4 L (0.90 US gal, 0.75 Imp.gal)          |

### Engine oil

|  |  |
|--|--|
| Recommended brand                        | YAMALUBE   |
| Type                                     | SAE 10W-30, SAE 10W-40, SAE 10W-50, SAE 15W-40, SAE 20W-40 or SAE 20W-50 |
| Recommended engine oil grade             | API service SG type or higher, JASO standard MA                          |
| Lubrication system                       | Wet sump   |
| 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 | Cartridge |
|-----------------|-----------|

### Oil pump

|   |   |
|---|---|
| Oil pump type                                       | Trochoid  |
| Inner-rotor-to-outer-rotor-tip clearance            | Less than 0.12 mm (0.0047 in)   |
| Limit   | 0.20 mm (0.0079 in)   |
| Outer-rotor-to-oil-pump-housing clearance           | 0.09–0.19 mm (0.0035–0.0075 in)   |
| Limit   | 0.26 mm (0.0102 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)   |
| Oil pressure  | 230.0 kPa/5000 r/min (2.30 kgf/cm <sup>2</sup> /5000 r/min, 33.4 psi/5000 r/min) at 75.0–95.0 °C (167.00–203.00 °F) |
| Bypass valve opening pressure                       | 78.4–117.6 kPa (0.78–1.18 kgf/cm <sup>2</sup> , 11.4–17.1 psi)  |
| Relief valve operating pressure                     | 600.0–680.0 kPa (6.00–6.80 kgf/cm <sup>2</sup> , 87.0–98.6 psi)   |

### Cooling system

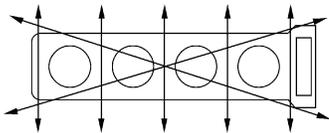
|   |  |
|---|--|
| Radiator capacity (including all routes)                  | 2.50 L (2.64 US qt, 2.20 Imp.qt)                               |
| Coolant reservoir capacity (up to the maximum level mark) | 0.25 L (0.26 US qt, 0.22 Imp.qt)                               |
| Radiator cap opening pressure                             | 93.3–122.7 kPa (0.93–1.23 kgf/cm <sup>2</sup> , 13.5–17.8 psi) |

# ENGINE SPECIFICATIONS

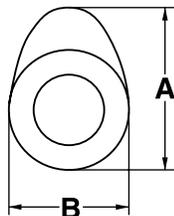
|                           |                                 |
|---------------------------|---------------------------------|
| <b>Radiator core</b>      |                                 |
| Width                     | 222.6 mm (8.76 in)              |
| Height                    | 360.0 mm (14.17 in)             |
| Depth                     | 22.0 mm (0.87 in)               |
| <b>Water pump</b>         |                                 |
| Water pump type           | Single suction centrifugal pump |
| Reduction ratio           | 65/43 × 25/32 (1.181)           |
| Impeller shaft tilt limit | 0.15 mm (0.006 in)              |

|                      |                             |
|----------------------|-----------------------------|
| <b>Spark plug(s)</b> |                             |
| Manufacturer/model   | NGK/CR9E                    |
| Spark plug gap       | 0.7–0.8 mm (0.028–0.031 in) |

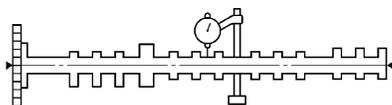
|                      |   |
|----------------------|---|
| <b>Cylinder head</b> |   |
| Volume               | 11.94–12.74 cm <sup>3</sup> (0.73–0.78 cu.in) |
| Warpage limit        | 0.10 mm (0.0039 in)                           |



|  |                                     |
|--|-------------------------------------|
| <b>Camshaft</b>                            |                                     |
| Drive system                               | Chain drive (right)                 |
| Camshaft cap inside diameter               | 24.500–24.521 mm (0.9646–0.9654 in) |
| Camshaft journal diameter                  | 24.459–24.472 mm (0.9630–0.9635 in) |
| Camshaft-journal-to-camshaft cap clearance | 0.028–0.062 mm (0.0011–0.0024 in)   |
| Limit                                      | 0.080 mm (0.0032 in)                |
| <b>Camshaft lobe dimensions</b>            |                                     |
| Intake A                                   | 35.750–35.850 mm (1.4075–1.4114 in) |
| Limit                                      | 35.650 mm (1.4035 in)               |
| Intake B                                   | 27.950–28.050 mm (1.1004–1.1043 in) |
| Limit                                      | 27.850 mm (1.0965 in)               |
| Exhaust A                                  | 34.750–34.850 mm (1.3681–1.3720 in) |
| Limit                                      | 34.650 mm (1.3642 in)               |
| Exhaust B                                  | 27.950–28.050 mm (1.1004–1.1043 in) |
| Limit                                      | 27.850 mm (1.0965 in)               |



|                       |                      |
|-----------------------|----------------------|
| Camshaft runout limit | 0.030 mm (0.0012 in) |
|-----------------------|----------------------|



|                     |           |
|---------------------|-----------|
| <b>Timing chain</b> |           |
| Tensioning system   | Automatic |

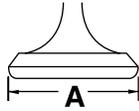
## Valve, valve seat, valve guide

### Valve clearance (cold)

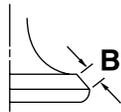
|         |                                 |
|---------|---------------------------------|
| Intake  | 0.10–0.17 mm (0.0039–0.0067 in) |
| Exhaust | 0.25–0.29 mm (0.0098–0.0114 in) |

### Valve dimensions

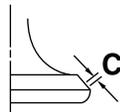
|                                 |                                   |
|---------------------------------|-----------------------------------|
| Valve head diameter A (intake)  | 25.90–26.10 mm (1.0197–1.0276 in) |
| Valve head diameter A (exhaust) | 21.90–22.10 mm (0.8622–0.8701 in) |



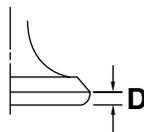
|                              |                                   |
|------------------------------|-----------------------------------|
| Valve face width B (intake)  | 1.210–2.490 mm (0.0476–0.0980 in) |
| Valve face width B (exhaust) | 1.210–2.490 mm (0.0476–0.0980 in) |



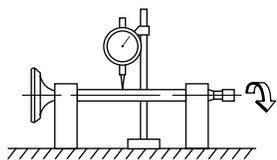
|                              |                                 |
|------------------------------|---------------------------------|
| Valve seat width C (intake)  | 0.90–1.10 mm (0.0354–0.0433 in) |
| Limit                        | 1.60 mm (0.06 in)               |
| Valve seat width C (exhaust) | 0.90–1.10 mm (0.0354–0.0433 in) |
| Limit                        | 1.60 mm (0.06 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)                 | 3.960–3.975 mm (0.1559–0.1565 in) |
| Limit   | 3.930 mm (0.1547 in)              |
| Valve guide inside diameter (intake)          | 4.000–4.012 mm (0.1575–0.1580 in) |
| Limit   | 4.050 mm (0.1595 in)              |
| Valve guide inside diameter (exhaust)         | 4.000–4.012 mm (0.1575–0.1580 in) |
| Limit   | 4.050 mm (0.1595 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)              |

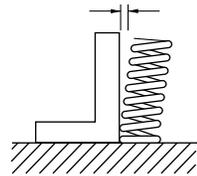


## Valve spring

|                      |                    |
|----------------------|--------------------|
| Free length (intake) | 38.62 mm (1.52 in) |
| Limit                | 36.69 mm (1.44 in) |

# ENGINE SPECIFICATIONS

|  |  |
|--|--|
| Free length (exhaust)                        | 38.62 mm (1.52 in)                                 |
| Limit  | 36.69 mm (1.44 in)                                 |
| Installed length (intake)                    | 33.00 mm (1.30 in)                                 |
| Installed length (exhaust)                   | 33.00 mm (1.30 in)                                 |
| Spring rate K1 (intake)                      | 24.99 N/mm (2.55 kgf/mm, 142.69 lb/in)             |
| Spring rate K2 (intake)                      | 37.28 N/mm (3.80 kgf/mm, 212.87 lb/in)             |
| Spring rate K1 (exhaust)                     | 24.99 N/mm (2.55 kgf/mm, 142.69 lb/in)             |
| Spring rate K2 (exhaust)                     | 37.28 N/mm (3.80 kgf/mm, 212.87 lb/in)             |
| Installed compression spring force (intake)  | 130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf) |
| Installed compression spring force (exhaust) | 130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf) |
| Spring tilt (intake)                         | 2.5°/1.7 mm (0.067 in)                             |
| Spring tilt (exhaust)                        | 2.5°/1.7 mm (0.067 in)                             |



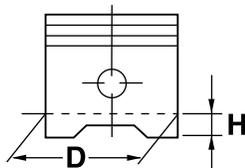
|                             |           |
|-----------------------------|-----------|
| Winding direction (intake)  | Clockwise |
| Winding direction (exhaust) | Clockwise |

## Cylinder

|                    |                                     |
|--------------------|-------------------------------------|
| Bore               | 68.000–68.010 mm (2.6772–2.6776 in) |
| Taper limit        | 0.050 mm (0.0020 in)                |
| Out of round limit | 0.050 mm (0.0020 in)                |

## Piston

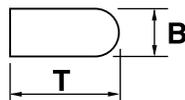
|                              |                                     |
|------------------------------|-------------------------------------|
| Piston-to-cylinder clearance | 0.010–0.035 mm (0.0004–0.0014 in)   |
| Limit                        | 0.150 mm (0.0059 in)                |
| Diameter D                   | 67.975–67.990 mm (2.6762–2.6768 in) |
| Height H                     | 11.5 mm (0.45 in)                   |



|   |                                     |
|---|-------------------------------------|
| Offset                                  | 0.25 mm (0.0098 in)                 |
| Offset direction                        | Intake side                         |
| Piston pin bore inside diameter         | 17.002–17.013 mm (0.6694–0.6698 in) |
| Limit                                   | 17.043 mm (0.6710 in)               |
| Piston pin outside diameter             | 16.990–16.995 mm (0.6689–0.6691 in) |
| Limit                                   | 16.970 mm (0.6681 in)               |
| Piston-pin-to-piston-pin-bore clearance | 0.007–0.023 mm (0.0003–0.0009 in)   |
| Limit                                   | 0.073 mm (0.0029 in)                |

## Piston ring

|                    |                                 |
|--------------------|---------------------------------|
| Top ring           |                                 |
| Ring type          | Barrel                          |
| Dimensions (B × T) | 0.90 × 2.60 mm (0.04 × 0.10 in) |

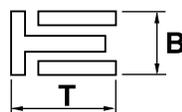


# ENGINE SPECIFICATIONS

|                     |                                   |
|---------------------|-----------------------------------|
| End gap (installed) | 0.25–0.35 mm (0.0098–0.0138 in)   |
| Limit               | 0.60 mm (0.0236 in)               |
| Ring side clearance | 0.030–0.065 mm (0.0012–0.0026 in) |
| Limit               | 0.115 mm (0.0045 in)              |
| 2nd ring            |                                   |
| Ring type           | Taper                             |
| Dimensions (B × T)  | 0.80 × 2.50 mm (0.03 × 0.10 in)   |



|                     |                                   |
|---------------------|-----------------------------------|
| End gap (installed) | 0.35–0.50 mm (0.0138–0.0197 in)   |
| Limit               | 0.85 mm (0.0335 in)               |
| Ring side clearance | 0.020–0.055 mm (0.0008–0.0022 in) |
| Limit               | 0.115 mm (0.0045 in)              |
| Oil ring            |                                   |
| Dimensions (B × T)  | 1.50 × 2.00 mm (0.06 × 0.08 in)   |



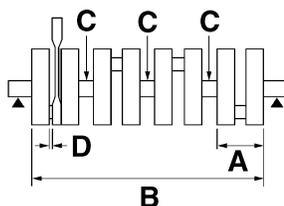
|                     |                                 |
|---------------------|---------------------------------|
| End gap (installed) | 0.10–0.35 mm (0.0039–0.0138 in) |
|---------------------|---------------------------------|

## Connecting rod

|   |                                    |
|---|------------------------------------|
| Crankshaft-pin-to-big-end-bearing clearance | 0.034–0.058 mm (0.0013–0.0023 in)  |
| Limit                                       | 0.09 mm (0.0035 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) |



|                       |  |
|-----------------------|--|
| Journal oil clearance | 0.013–0.037 mm (0.0005–0.0015 in)      |
| Limit                 | 0.10 mm (0.0039 in)                    |
| Bearing color code    | 0.White 1.Blue 2.Black 3.Brown 4.Green |

## Clutch

|                          |                                  |
|--------------------------|----------------------------------|
| Clutch type              | Wet, multiple-disc coil spring   |
| Clutch release method    | Outer pull, rack and pinion pull |
| Clutch cable free play   | 10.0–15.0 mm (0.39–0.59 in)      |
| Friction plate thickness | 2.92–3.08 mm (0.115–0.121 in)    |
| Wear limit               | 2.82 mm (0.1110 in)              |
| Plate quantity           | 8 pcs                            |
| Clutch plate thickness   | 1.90–2.10 mm (0.075–0.083 in)    |
| Warpage limit            | 0.10 mm (0.0039 in)              |

# ENGINE SPECIFICATIONS

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|                           |                    |
|---------------------------|--------------------|
| Plate quantity            | 7 pcs              |
| Clutch spring free length | 52.50 mm (2.07 in) |
| Limit                     | 49.88 mm (1.96 in) |
| Spring quantity           | 6 pcs              |

---

|                            |                       |
|----------------------------|-----------------------|
| <b>Transmission</b>        |                       |
| Transmission type          | Constant mesh 6-speed |
| Primary reduction system   | Gear                  |
| Primary reduction ratio    | 1.512 (65/43)         |
| Secondary reduction system | Chain                 |
| Secondary reduction ratio  | 2.875 (46/16)         |
| Operation                  | Left foot operation   |
| Gear ratio                 |                       |
| 1st                        | 2.692 (35/13)         |
| 2nd                        | 2.063 (33/16)         |
| 3rd                        | 1.762 (37/21)         |
| 4th                        | 1.522 (35/23)         |
| 5th                        | 1.350 (27/20)         |
| 6th                        | 1.208 (29/24)         |
| Main axle runout limit     | 0.08 mm (0.0032 in)   |
| Drive axle runout limit    | 0.08 mm (0.0032 in)   |

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|                                    |                                 |
|------------------------------------|---------------------------------|
| <b>Shifting mechanism</b>          |                                 |
| Shift mechanism type               | Shift drum and guide bar        |
| Shift fork guide bar bending limit | 0.050 mm (0.0020 in)            |
| Shift fork thickness               | 5.76–5.89 mm (0.2268–0.2319 in) |

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|                    |                          |
|--------------------|--------------------------|
| <b>Air filter</b>  |                          |
| Air filter element | Oil-coated paper element |

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|                              |   |
|------------------------------|---|
| <b>Fuel pump</b>             |   |
| Pump type                    | Electrical                                      |
| Maximum consumption amperage | 6.0 A   |
| Fuel pressure                | 324.0 kPa (3.24 kgf/cm <sup>2</sup> , 47.0 psi) |

---

|                      |               |
|----------------------|---------------|
| <b>Fuel injector</b> |               |
| Model/quantity       | 297500-1720/4 |

---

|                                 |                      |
|---------------------------------|----------------------|
| <b>Throttle position sensor</b> |                      |
| Resistance                      | 2.64–6.16 k $\Omega$ |
| Output voltage (at idle)        | 0.63–0.73 V          |

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|                                     |                |
|-------------------------------------|----------------|
| <b>Sub-throttle position sensor</b> |                |
| Resistance                          | 3–7 k $\Omega$ |
| Output voltage (full close)         | 0.3–0.4 V      |

---

|   |  |
|---|--|
| <b>Fuel injection sensor</b>                        |  |
| Crankshaft position sensor resistance               | 336–504 $\Omega$ at 20 °C (68 °F)  |
| Cylinder identification sensor output voltage (ON)  | More than 4.8 V  |
| Cylinder identification sensor output voltage (OFF) | Less than 0.8 V  |
| Atmospheric pressure sensor output voltage          | 3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)                                     |
| Intake air pressure sensor output voltage           | 3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)                                     |
| Intake air temperature sensor resistance            | 5.40–6.60 k $\Omega$ at 0 °C (32 °F)<br>0.29–0.39 k $\Omega$ at 80 °C (176 °F) |

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# ENGINE SPECIFICATIONS

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## Air induction system

|                          |                                 |
|--------------------------|---------------------------------|
| Reed valve bending limit | 0.4 mm (0.016 in)               |
| Solenoid resistance      | 18–22 $\Omega$ at 20 °C (68 °F) |

---

## Idling condition

|                          |                                  |
|--------------------------|----------------------------------|
| Engine idling speed      | 1150–1250 r/min                  |
| CO%                      | 4.0–5.0 %                        |
| Intake vacuum            | 30.0 kPa (225 mmHg, 8.9 inHg)    |
| Water temperature        | 90.0–110.0 °C (194.00–230.00 °F) |
| Oil temperature          | 75.0–95.0 °C (167.00–203.00 °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 × 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 × MT5.50     |
| 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)   |

### Front tire

|                    |                       |
|--------------------|-----------------------|
| Type               | Tubeless              |
| Size               | 120/70 ZR17M/C (58W)  |
| Manufacturer/model | BRIDGESTONE/BT021F BB |
| Wear limit (front) | 1.0 mm (0.04 in)      |

### Rear tire

|                    |                       |
|--------------------|-----------------------|
| Type               | Tubeless              |
| Size               | 180/55 ZR17M/C (73W)  |
| Manufacturer/model | BRIDGESTONE/BT021R BB |
| Wear limit (rear)  | 1.0 mm (0.04 in)      |

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

|                   |   |
|-------------------|---|
| Loading condition | 0–90 kg (0–198 lb)                          |
| Front             | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi) |
| Rear              | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) |
| Loading condition | 90–198 kg (198–437 lb) (USA)                |
|                   | 90–197 kg (198–434 lb) (California)         |
| Front             | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi) |
| Rear              | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) |
| High-speed riding |   |
| Front             | 250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi) |
| Rear              | 290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi) |

### Front brake

|                                    |                                  |
|------------------------------------|----------------------------------|
| Type                               | Hydraulic dual disc brake        |
| Operation                          | Right hand operation             |
| Front brake lever free play        | 7.5–16.5 mm (0.30–0.65 in)       |
| Front disc brake                   |                                  |
| Disc outside diameter × thickness  | 310.0 × 4.5 mm (12.20 × 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)                 |

# CHASSIS SPECIFICATIONS

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|                                    |                    |
|------------------------------------|--------------------|
| Brake pad lining thickness (outer) | 4.5 mm (0.18 in)   |
| Limit                              | 0.5 mm (0.02 in)   |
| Master cylinder inside diameter    | 16.00 mm (0.63 in) |
| Caliper cylinder inside diameter   | 30.20 mm (1.19 in) |
|                                    | 27.00 mm (1.06 in) |
| Recommended fluid                  | DOT 4              |

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**Rear brake**

|                                    |                                  |
|------------------------------------|----------------------------------|
| Type                               | Hydraulic single disc brake      |
| Operation                          | Right foot operation             |
| Brake pedal free play              | 4.1–11.1 mm (0.16–0.44 in)       |
| Rear disc brake                    |                                  |
| Disc outside diameter × thickness  | 267.0 × 5.0 mm (10.51 × 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 |
| Center to lock angle (left)  | 33.0°           |
| Center to lock angle (right) | 33.0°           |

---

**Front suspension**

|                            |   |
|----------------------------|---|
| Type                       | Telescopic fork                                   |
| Spring/shock absorber type | Coil spring/oil                                   |
| Front fork travel          | 130.0 mm (5.12 in)                                |
| Fork spring free length    | 286.1 mm (11.26 in)                               |
| Limit                      | 280.4 mm (11.04 in)                               |
| Collar length              | 100.0 mm (3.94 in)                                |
| Installed length           | 278.6 mm (10.97 in)                               |
| Spring rate K1             | 8.82 N/mm (0.90 kgf/mm, 50.36 lb/in)              |
| 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                                 |
| Quantity                   |   |
| Left                       | 563.0 cm <sup>3</sup> (19.04 US oz, 19.86 Imp.oz) |
| Right                      | 555.0 cm <sup>3</sup> (18.77 US oz, 19.57 Imp.oz) |
| Level                      |   |
| Left                       | 82.0 mm (3.23 in)                                 |
| Right                      | 85.0 mm (3.35 in)                                 |

---

**Rear suspension**

|                                     |  |
|-------------------------------------|--|
| Type                                | Swingarm (link. suspension)            |
| Spring/shock absorber type          | Coil spring/gas-oil                    |
| Rear shock absorber assembly travel | 60.0 mm (2.36 in)                      |
| Spring free length                  | 191.0 mm (7.52 in)                     |
| Installed length                    | 173.0 mm (6.81 in)                     |
| Spring rate K1                      | 78.40 N/mm (7.99 kgf/mm, 447.66 lb/in) |
| Spring stroke K1                    | 0.0–60.0 mm (0.00–2.36 in)             |

# CHASSIS SPECIFICATIONS

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|                                    |   |
|------------------------------------|---|
| Optional spring available          | No  |
| Enclosed gas/air pressure (STD)    | 1200 kPa (12.0 kgf/cm <sup>2</sup> , 170.7 psi) |
| Spring preload adjusting positions |   |
| Minimum                            | 1   |
| Standard                           | 5   |
| Maximum                            | 9   |

---

## Drive chain

|                      |                             |
|----------------------|-----------------------------|
| Type/manufacturer    | 525V10/DAIDO                |
| Number of links      | 122                         |
| Drive chain slack    | 20.0–30.0 mm (0.79–1.18 in) |
| 15-link length limit | 239.3 mm (9.42 in)          |

---

## Shift pedal

|                            |                                 |
|----------------------------|---------------------------------|
| Installed shift rod length | 304.1–306.1 mm (11.97–12.05 in) |
|----------------------------|---------------------------------|

# ELECTRICAL SPECIFICATIONS

EAS20310

## ELECTRICAL SPECIFICATIONS

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### Voltage

System voltage 12 V

---

### Ignition system

Ignition system TCI  
Ignition timing (B.T.D.C.) 5.0 °/1200 r/min

---

### Engine control unit

Model/manufacture TBDFD0/DENSO

---

### Ignition coil

Minimum ignition spark gap 6.0 mm (0.24 in)  
Primary coil resistance 1.19–1.61 Ω  
Secondary coil resistance 8.50–11.50 kΩ

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### AC magneto

Standard output 14.0 V, 40.0 A at 6500 r/min  
Stator coil resistance 0.144–0.176 Ω at 20 °C (68 °F) (W–W)

---

### Rectifier/regulator

Regulator type Semi conductor-short circuit  
Rectifier/regulator output voltage 14.2–14.8 V  
Rectifier capacity 50.0 A

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### Battery

Model YTZ10S  
Voltage, capacity 12 V, 8.6 Ah  
Specific gravity 1.310  
Manufacturer GS YUASA  
Ten hour rate amperage 0.86 A

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### Headlight

Bulb type Halogen bulb

---

### Bulb voltage, wattage × quantity

Headlight 12 V, 60 W/55 W × 1  
Tail/brake light 12 V, 5.0 W/21.0 W × 1  
Front turn signal/position light 12 V, 21.0 W/5 W × 2  
Rear turn signal light 12 V, 21.0 W × 2  
License plate light 12 V, 5.0 W × 1

---

### Indicator light

Neutral indicator light LED  
Turn signal indicator light LED  
Oil level warning light LED  
High beam indicator light LED  
Coolant temperature warning light LED  
Engine trouble warning light LED

---

### Electric starting system

System type Constant mesh

---

### Starter motor

Power output 0.70 kW

# ELECTRICAL SPECIFICATIONS

---

|                       |   |
|-----------------------|---|
| Armature coil         |   |
| Commutator resistance | 0.0100–0.2000 $\Omega$ at 20 °C (68 °F)   |
| Insulation resistance | Above 1 M $\Omega$ at 20 °C (68 °F)       |
| Brush overall length  | 12.0 mm (0.47 in)                         |
| Limit                 | 6.50 mm (0.26 in)                         |
| Brush spring force    | 6.02–6.51 N (614–664 gf, 21.65–23.41 ozf) |
| Mica undercut (depth) | 0.70 mm (0.03 in)                         |

---

## Starter relay

|                 |                                     |
|-----------------|-------------------------------------|
| Amperage        | 180.0 A                             |
| Coil resistance | 4.18–4.62 $\Omega$ at 20 °C (68 °F) |

---

## Horn

|                  |                                       |
|------------------|---------------------------------------|
| Horn type        | Plane                                 |
| Quantity         | 1 pcs                                 |
| Maximum amperage | 3.0 A                                 |
| Coil resistance  | 1.066–1.114 $\Omega$ at 20 °C (68 °F) |

---

## Turn signal relay

|                                 |                 |
|---------------------------------|-----------------|
| Relay type                      | Full transistor |
| Built-in, self-canceling device | No              |

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## Oil level switch

|                                   |                  |
|-----------------------------------|------------------|
| Maximum level position resistance | 484–536 $\Omega$ |
| Minimum level position resistance | 114–126 $\Omega$ |

---

## Speed sensor

|                              |                                  |
|------------------------------|----------------------------------|
| Output voltage reading cycle | 0.6 V to 4.8 V to 0.6 V to 4.8 V |
|------------------------------|----------------------------------|

---

## Coolant temperature sensor

|            |  |
|------------|--|
| Resistance | 2.45 k $\Omega$ at 20 °C (68 °F)<br>290–354 $\Omega$ at 80 °C (176 °F) |
|------------|--|

---

## Fuses

|                            |                   |
|----------------------------|-------------------|
| Main fuse                  | 50.0 A            |
| Headlight fuse             | 15.0 A            |
| Signaling system fuse      | 10.0 A            |
| Ignition fuse              | 10.0 A            |
| Radiator fan fuse          | 10.0 A $\times$ 2 |
| Fuel injection system fuse | 15.0 A            |
| Backup fuse                | 7.5 A             |
| Spare fuse                 | 15.0 A $\times$ 2 |
| Spare fuse                 | 10.0 A            |
| Spare fuse                 | 7.5 A             |

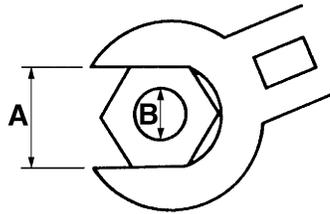
EAS20320

## TIGHTENING TORQUES

EAS20331

### 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·kgf | ft·lbf |
| 10 mm   | 6 mm     | 6                          | 0.6   | 4.3    |
| 12 mm   | 8 mm     | 15                         | 1.5   | 11     |
| 14 mm   | 10 mm    | 30                         | 3.0   | 22     |
| 17 mm   | 12 mm    | 55                         | 5.5   | 40     |
| 19 mm   | 14 mm    | 85                         | 8.5   | 61     |
| 22 mm   | 16 mm    | 130                        | 13    | 94     |

# TIGHTENING TORQUES

EAS20340

## ENGINE TIGHTENING TORQUES

| Item   | Thread size | Q'ty | Tightening torque               | Remarks |
|--|-------------|------|---------------------------------|---------|
| Spark plug                                     | M10         | 4    | 13 Nm (1.3 m·kgf, 9.4 ft·lbf)   |         |
| Cylinder head nut                              | M10         | 10   | See TIP.                        |         |
| Cylinder head bolt                             | M6          | 2    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |         |
| Cylinder head plug                             | M18         | 3    | 42 Nm (4.2 m·kgf, 30 ft·lbf)    |         |
| Camshaft caps bolt                             | M6          | 20   | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Cylinder head cover bolt                       | M6          | 6    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Cylinder head stud bolt (exhaust pipe)         | M8          | 8    | 15 Nm (1.5 m·kgf, 11 ft·lbf)    |         |
| Reed valve cover bolt                          | M6          | 4    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Camshaft sprocket bolt                         | M7          | 4    | 24 Nm (2.4 m·kgf, 17 ft·lbf)    |         |
| Throttle body joint bolt                       | M6          | 6    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Connecting rod cap bolt                        | M8          | 8    | See TIP.                        |         |
| Timing chain drive sprocket bolt               | M10         | 1    | 60 Nm (6.0 m·kgf, 43 ft·lbf)    |         |
| Timing chain tensioner bolt                    | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Water pump outlet pipe bolt                    | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Water pump inlet pipe bolt (water pump side)   | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Water pump inlet pipe bolt (front side)        | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Oil/water pump drive sprocket bolt             | M6          | 1    | 15 Nm (1.5 m·kgf, 11 ft·lbf)    |         |
| Oil pump bolt                                  | M6          | 2    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |         |
| Water pump cover bolt                          | M6          | 5    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |         |
| Thermostat housing cover nut                   | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Thermostat inlet pipe bolt                     | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Oil cooler bolt                                | M20         | 1    | 63 Nm (6.3 m·kgf, 46 ft·lbf)    |         |
| Engine oil drain bolt                          | M14         | 1    | 43 Nm (4.3 m·kgf, 31 ft·lbf)    |         |
| Oil pipe bolt                                  | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Oil strainer bolt                              | M6          | 3    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Oil delivery pipe bolt                         | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Oil filter union bolt                          | M20         | 1    | 80 Nm (8.0 m·kgf, 58 ft·lbf)    |         |
| Oil filter                                     | M20         | 1    | 17 Nm (1.7 m·kgf, 12 ft·lbf)    |         |
| Oil pan bolt                                   | M6          | 14   | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |         |
| Oil/water pump assembly drive chain guide bolt | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Air filter case cover screw                    | —           | 11   | 2.0 Nm (0.20 m·kgf, 1.5 ft·lbf) |         |
| Throttle body joint clamp                      | M5          | 4    | 2.3 Nm (0.23 m·kgf, 1.7 ft·lbf) |         |
| Funnel bolt                                    | M5          | 6    | 4.2 Nm (0.42 m·kgf, 3.0 ft·lbf) |         |
| Air filter case stay bolt                      | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |         |
| Throttle cable bolt                            | M6          | 2    | 4.5 Nm (0.45 m·kgf, 3.3 ft·lbf) |         |
| Cylinder head and exhaust pipe nut             | M8          | 8    | 20 Nm (2.0 m·kgf, 14 ft·lbf)    |         |

# TIGHTENING TORQUES

| Item                                       | Thread size | Q'ty | Tightening torque               | Remarks  |
|--|-------------|------|---------------------------------|--|
| Exhaust pipe and muffler bolt              | M8          | 1    | 20 Nm (2.0 m·kgf, 14 ft·lbf)    |  |
| Exhaust pipe and exhaust pipe bracket bolt | M8          | 1    | 20 Nm (2.0 m·kgf, 14 ft·lbf)    |  |
| Muffler and muffler bracket bolt           | M10         | 1    | 48 Nm (4.8 m·kgf, 35 ft·lbf)    |  |
| Crankcase stud bolt                        | M10         | 10   | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |                         |
| Crankcase bolt (main journal)              | M9          | 10   | See TIP.                        |                         |
| Crankcase bolt                             | M6          | 10   | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                         |
| Crankcase bolt                             | M8          | 1    | 24 Nm (2.4 m·kgf, 17 ft·lbf)    | L = 60 mm (2.36 in)<br> |
| Crankcase bolt                             | M8          | 5    | 24 Nm (2.4 m·kgf, 17 ft·lbf)    |                         |
| Generator rotor cover bolt                 | M6          | 4    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |  |
| Generator rotor cover bolt                 | M8          | 3    | 24 Nm (2.4 m·kgf, 17 ft·lbf)    |  |
| Drive sprocket cover bolt                  | M6          | 3    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |                         |
| Left crankcase cover bolt                  | M6          | 3    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Clutch cover bolt                          | M6          | 7    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |  |
| Clutch cover bolt                          | M6          | 1    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |                         |
| Pickup rotor cover bolt                    | M6          | 6    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |  |
| Ventilation chamber cover bolt             | M6          | 4    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |  |
| Oil baffle plate bolt                      | M6          | 3    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                       |
| Plate bolt (drive sprocket cover)          | M6          | 2    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |                       |
| Pickup rotor cover blind bolt              | M8          | 1    | 15 Nm (1.5 m·kgf, 11 ft·lbf)    |  |
| Oil filler cap                             | M20         | 1    | 1.5 Nm (0.15 m·kgf, 1.1 ft·lbf) |  |
| Main gallery plug (oil return)             | M16         | 3    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |  |
| Main gallery plug                          | M20         | 1    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |  |
| Oil return pipe bolt                       | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                       |
| Oil return plug                            | M12         | 2    | 32 Nm (3.2 m·kgf, 23 ft·lbf)    |                       |
| AC magneto lead bolt                       | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                       |
| Stator coil bolt                           | M6          | 3    | 14 Nm (1.4 m·kgf, 10 ft·lbf)    |                       |
| Generator rotor bearing housing bolt       | M6          | 3    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Generator rotor cover plug                 | M20         | 1    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |  |
| Thermostat assembly stay bolt              | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Starter clutch idler gear bolt             | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                       |
| Starter motor bolt                         | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Starter motor lead nut                     | M6          | 1    | 5 Nm (0.5 m·kgf, 3.6 ft·lbf)    |  |
| Clutch boss nut                            | M20         | 1    | 95 Nm (9.5 m·kgf, 69 ft·lbf)    | Stake  |
| Clutch spring bolt                         | M6          | 6    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Drive sprocket nut                         | M22         | 1    | 85 Nm (8.5 m·kgf, 61 ft·lbf)    | Stake<br>             |
| Main axle retainer bolt                    | M6          | 3    | 12 Nm (1.2 m·kgf, 8.7 ft·lbf)   |                       |
| Shift fork guide bar retainer bolt         | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |                       |
| Stopper screw                              | M8          | 1    | 22 Nm (2.2 m·kgf, 16 ft·lbf)    |                       |

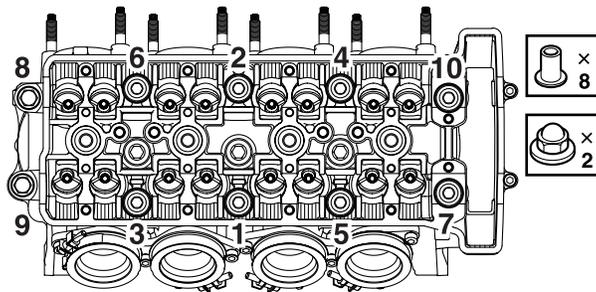
# TIGHTENING TORQUES

| Item                                | Thread size | Q'ty | Tightening torque               | Remarks   |
|-------------------------------------|-------------|------|---------------------------------|---|
| Shift rod locknut (front)           | M6          | 1    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |   |
| Shift rod locknut (rear)            | M6          | 1    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    | Left thread   |
| Shift rod joint bolt                | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Shift arm bolt                      | M6          | 1    | 14 Nm (1.4 m·kgf, 10 ft·lbf)    |   |
| Neutral switch                      | M10         | 1    | 17 Nm (1.7 m·kgf, 12 ft·lbf)    |   |
| Coolant temperature sensor          | M12         | 1    | 18 Nm (1.8 m·kgf, 13 ft·lbf)    |   |
| Cylinder identification sensor bolt | M6          | 1    | 8 Nm (0.8 m·kgf, 5.8 ft·lbf)    |  |
| Atmospheric pressure sensor screw   | M5          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Crankshaft position sensor bolt     | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Speed sensor bolt                   | M6          | 1    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |  |
| Oil level switch bolt               | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |   |
| Throttle position sensor screw      | M5          | 2    | 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf) |   |
| Sub-throttle position sensor screw  | M5          | 1    | 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf) |   |

## TIP

### Cylinder head nut

1. Tighten the nut to 25 Nm (2.5 m·kgf, 18 ft·lbf).
2. Tighten the nut to 25 Nm (2.5 m·kgf, 18 ft·lbf).
3. Tighten the nuts 1–7 and 10 to 80° and nuts 8 and 9 to 100°.



## TIP

### Connecting rod cap bolt

1. Tighten the bolts to 20 Nm (2.0 m·kgf, 14 ft·lbf)
2. Tighten the bolts further to reach the specified angle 145–155°.

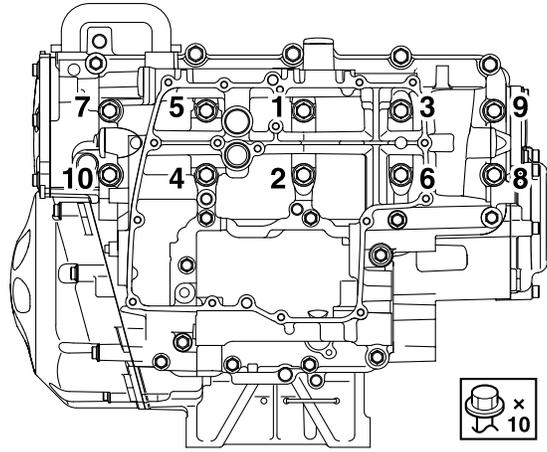
## TIP

### Crankcase bolt (main journal)

1. Tighten the bolts to approximately 20 Nm (2.0 m·kgf, 14 ft·lbf) 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·kgf, 14 ft·lbf) again.
3. Tighten the bolts further to reach the specified angle 56–61°.

# TIGHTENING TORQUES

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# 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·kgf, 19 ft·lbf)    |   |
| Steering stem nut                               | M28         | 1    | 115 Nm (11.5 m·kgf, 83 ft·lbf)  |   |
| Upper handlebar holder bolt                     | M8          | 4    | 24 Nm (2.4 m·kgf, 17 ft·lbf)    |   |
| Lower handlebar holder nut                      | M10         | 2    | 32 Nm (3.2 m·kgf, 23 ft·lbf)    |   |
| Lower bracket pinch bolt                        | M8          | 4    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |   |
| Lower ring nut                                  | M30         | 1    | See TIP.                        |   |
| Cap bolt  | M46         | 2    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |   |
| Cap bolt locknut                                | M10         | 2    | 15 Nm (1.5 m·kgf, 11 ft·lbf)    |   |
| Damper rod assembly bolt                        | M10         | 2    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |    |
| Front brake master cylinder holder bolt         | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |   |
| Front brake master cylinder reservoir cap screw | M4          | 2    | 1.5 Nm (0.15 m·kgf, 1.1 ft·lbf) |   |
| Front brake hose union bolt                     | M10         | 3    | 30 Nm (3.0 m·kgf, 22 ft·lbf)    |   |
| Front brake hose holder bolt                    | M6          | 2    | 6 Nm (0.6 m·kgf, 4.3 ft·lbf)    |   |
| Left rear view mirror                           | M10         | 1    | 17 Nm (1.7 m·kgf, 12 ft·lbf)    |   |
| Right rear view mirror                          | M10         | 1    | 17 Nm (1.7 m·kgf, 12 ft·lbf)    | Left thread   |
| Grip end and handlebar bolt                     | M6          | 2    | 10 Nm (1.0 m·kgf, 7.2 ft·lbf)   |   |
| Horn bolt                                       | M6          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Lower headlight stay and lower bracket bolt     | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Lower headlight stay and brake hose nut         | M6          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Upper headlight stay and upper bracket bolt     | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Front fender bolt                               | M6          | 4    | 6 Nm (0.6 m·kgf, 4.3 ft·lbf)    |   |
| Clutch lever holder pinch bolt                  | M6          | 1    | 11 Nm (1.1 m·kgf, 8.0 ft·lbf)   |   |
| Right front engine mounting bolt 1              | M10         | 1    | 45 Nm (4.5 m·kgf, 33 ft·lbf)    |  |
| Right front engine mounting bolt 2              | M10         | 1    | 50 Nm (5.0 m·kgf, 36 ft·lbf)    |  |
| Left front engine mounting bolt                 | M10         | 1    | 45 Nm (4.5 m·kgf, 33 ft·lbf)    |  |
| Upper self-locking nut                          | M10         | 1    | 51 Nm (5.1 m·kgf, 37 ft·lbf)    |  |
| Lower self-locking nut                          | M10         | 1    | 51 Nm (5.1 m·kgf, 37 ft·lbf)    |  |
| Engine mounting adjust bolt (upper)             | M16         | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Engine mounting adjust bolt (lower)             | M16         | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |
| Pivot shaft nut                                 | M18         | 1    | 105 Nm (10.5 m·kgf, 76 ft·lbf)  |   |
| Connecting arm nut (connecting arm and frame)   | M10         | 1    | 40 Nm (4.0 m·kgf, 29 ft·lbf)    |   |
| Relay arm nut (relay arm and swingarm)          | M10         | 1    | 40 Nm (4.0 m·kgf, 29 ft·lbf)    |   |

# TIGHTENING TORQUES

| Item   | Thread size | Q'ty | Tightening torque                | Remarks   |
|--|-------------|------|----------------------------------|---|
| Relay arm nut (relay arm and connecting arm)                       | M10         | 1    | 40 Nm (4.0 m·kgf, 29 ft·lbf)     |   |
| Main frame and rear frame nut                                      | M10         | 4    | 42 Nm (4.2 m·kgf, 30 ft·lbf)     |   |
| Clutch cable locknut   | M8          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Throttle cable locknut   | M6          | 2    | 4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)  |   |
| Rear shock absorber assembly upper nut                             | M10         | 1    | 40 Nm (4.0 m·kgf, 29 ft·lbf)     |   |
| Rear shock absorber assembly lower nut                             | M10         | 1    | 40 Nm (4.0 m·kgf, 29 ft·lbf)     |   |
| Drive chain guard bolt   | M6          | 3    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Drive chain guide bolt   | M6          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Rear fender bolt   | M6          | 3    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Fuel tank bolt (front)   | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Fuel tank bolt (rear)  | M6          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Fuel tank bracket bolt   | M6          | 4    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Fuel tank cap bolt   | M5          | 3    | 6 Nm (0.6 m·kgf, 4.3 ft·lbf)     |   |
| Fuel pump bolt   | M5          | 6    | 4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)  |   |
| Fuel tank cover and fuel tank bolt                                 | M5          | 4    | 1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)  |   |
| Fuel rail screw  | M5          | 4    | 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)  |   |
| Rider seat and seat bracket bolt                                   | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Seat lock rotor bolt   | M6          | 2    | 3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)  |  |
| Seat lock assembly nut   | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Mud guard assembly bolt  | M8          | 4    | 15 Nm (1.5 m·kgf, 11 ft·lbf)     |  |
| License plate light bolt   | M5          | 2    | 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)  |   |
| Rear reflector nut   | M5          | 1    | 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)  |   |
| Rear side reflector bracket and mud guard assembly                 | M4          | 4    | 1.3 Nm (0.13 m·kgf, 0.94 ft·lbf) |   |
| Rear side reflector nut  | M5          | 2    | 2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)  |   |
| Mud guard assembly bracket screw                                   | M5          | 6    | 2.3 Nm (0.23 m·kgf, 1.7 ft·lbf)  |   |
| Tail/brake light bracket bolt                                      | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Seat bracket bolt  | M6          | 4    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Exhaust pipe bracket and frame bolt                                | M8          | 2    | 30 Nm (3.0 m·kgf, 22 ft·lbf)     |   |
| Side cover bolt  | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Battery box and rear frame bolt                                    | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Rectifier/regulator bracket and rear frame bolt                    | M6          | 4    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Rectifier/regulator bolt   | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Canister bolt (for California only)                                | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Canister purge hose stay and main frame bolt (for California only) | M6          | 2    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)     |   |
| Lean angle sensor bolt   | M4          | 2    | 2.0 Nm (0.2 m·kgf, 1.5 ft·lbf)   |   |
| Coolant reservoir tank bolt  | M6          | 1    | 4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)  |  |

# TIGHTENING TORQUES

| Item  | Thread size | Q'ty | Tightening torque               | Remarks   |
|---|-------------|------|---------------------------------|---|
| Front wheel axle                            | M16         | 1    | 65 Nm (6.5 m·kgf, 47 ft·lbf)    |   |
| Front wheel axle pinch bolt                 | M8          | 1    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |   |
| Front brake caliper bolt                    | M10         | 4    | 40 Nm (4.0 m·kgf, 29 ft·lbf)    |   |
| Front side reflector nut                    | M5          | 2    | 1.5 Nm (0.15 m·kgf, 1.1 ft·lbf) |   |
| Front brake disc bolt                       | M6          | 10   | 18 Nm (1.8 m·kgf, 13 ft·lbf)    |    |
| Brake caliper bleed screw                   | M8          | 3    | 5 Nm (0.5 m·kgf, 3.6 ft·lbf)    |   |
| Rear wheel axle nut                         | M24         | 1    | 150 Nm (15 m·kgf, 108 ft·lbf)   |   |
| Rear brake disc bolt                        | M8          | 5    | 20 Nm (2.0 m·kgf, 14 ft·lbf)    |    |
| Rear brake caliper retaining bolt (front)   | M12         | 1    | 27 Nm (2.7 m·kgf, 20 ft·lbf)    |    |
| Rear brake caliper retaining bolt (rear)    | M8          | 1    | 22 Nm (2.2 m·kgf, 16 ft·lbf)    |    |
| Rear brake pad retaining bolt               | M10         | 1    | 17 Nm (1.7 m·kgf, 12 ft·lbf)    |   |
| Rear brake caliper screw plug               | M10         | 1    | 2.5 Nm (0.25 m·kgf, 1.8 ft·lbf) |   |
| Rear wheel sprocket nut                     | M10         | 6    | 80 Nm (8.0 m·kgf, 58 ft·lbf)    |   |
| Drive chain adjusting locknut               | M8          | 2    | 16 Nm (1.6 m·kgf, 12 ft·lbf)    |   |
| Rear brake hose union bolt                  | M10         | 2    | 30 Nm (3.0 m·kgf, 22 ft·lbf)    |   |
| Sidestand nut                               | M10         | 1    | 48 Nm (4.8 m·kgf, 35 ft·lbf)    |   |
| Sidestand bracket bolt                      | M10         | 2    | 63 Nm (6.3 m·kgf, 46 ft·lbf)    |    |
| Sidestand switch bolt                       | M5          | 2    | 4.3 Nm (0.43 m·kgf, 3.1 ft·lbf) |   |
| Footrest bracket bolt                       | M8          | 4    | 30 Nm (3.0 m·kgf, 22 ft·lbf)    |   |
| Rear brake fluid reservoir tank bolt        | M5          | 1    | 3.8 Nm (0.38 m·kgf, 2.8 ft·lbf) |   |
| Rear brake master cylinder bolt             | M8          | 2    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |   |
| Footrest bolt                               | M10         | 2    | 55 Nm (5.5 m·kgf, 40 ft·lbf)    |  |
| Passenger footrest and rear frame bolt      | M8          | 4    | 28 Nm (2.8 m·kgf, 20 ft·lbf)    |   |
| Passenger footrest and muffler bracket bolt | M8          | 2    | 23 Nm (2.3 m·kgf, 17 ft·lbf)    |   |
| Throttle cable adjusting nut                | M6          | 1    | 4.3 Nm (0.43 m·kgf, 3.1 ft·lbf) |   |
| Clutch cable adjusting nut                  | M8          | 1    | 7 Nm (0.7 m·kgf, 5.1 ft·lbf)    |   |

## TIP

### Lower ring nut

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

# LUBRICATION POINTS AND LUBRICANT TYPES

EAS20360

## LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370

### ENGINE

| Lubrication point  | Lubricant   |
|--|---|
| Oil seal lips  |    |
| O-rings  |    |
| Coolant hose insertion part                              | Water or silicone fluid   |
| Bearings   |    |
| Camshaft lobes and journals (intake and exhaust)         |    |
| Valve stem seals (intake and exhaust)                    | Silicone fluid  |
| Valve lifter outer surface (intake and exhaust)          |    |
| Valve stems and stem ends (intake and exhaust)           |    |
| Crankshaft big ends                                      |    |
| Piston surfaces  |    |
| Piston pins  |    |
| Connecting rod bolts                                     |    |
| Crankshaft journals                                      |    |
| Generator rotor assembly                                 |    |
| Water pump impeller shaft                                |    |
| Oil pump rotors (inner and outer)                        |   |
| O-ring (oil nozzle)                                      |  |
| O-ring (main gallery plug)                               |  |
| Damper (crankcase left side)                             | Water or silicone fluid   |
| Idler gear and idler gear shaft                          |  |
| Starter clutch assembly                                  |  |
| Starter clutch gear thrust surface                       |  |
| Primary driven gear                                      |  |
| Pull rod   |  |
| Oil/water pump assembly drive sprocket inner surface     |  |
| Oil/water pump assembly drive sprocket collar and washer |  |
| Transmission gears (wheel and pinion)                    |  |
| Main axle and drive axle                                 |  |
| Shift forks and shift fork guide bars                    |  |
| Cylinder head cover mating surface                       | Three bond No.1541C®  |
| Cylinder head cover semicircular                         | Yamaha bond No.1215 (Three bond No.1215®)   |
| Crankcase mating surface                                 | Yamaha bond No.1215 (Three bond No.1215®)   |
| Crankcase mating surface (right portion)                 | Three bond No. 1280B®   |

## LUBRICATION POINTS AND LUBRICANT TYPES

| Lubrication point                           | Lubricant                                       |
|---|---|
| Left crankcase cover (three mating surface) | Yamaha bond<br>No.1215 (Three bond<br>No.1215®) |
| Crankcase cover (lead grommet)              | Yamaha bond<br>No.1215 (Three bond<br>No.1215®) |

# LUBRICATION POINTS AND LUBRICANT TYPES

EAS20380

## CHASSIS

| Lubrication point   | Lubricant   |
|---|---|
| Steering bearings, seal lip and bearing lip                               |    |
| Tube guide (throttle grip) inner surface and throttle cables              |    |
| Brake lever pivot bolt and metal-to-metal moving parts                    |    |
| Clutch lever pivot bolt, metal-to-metal moving parts and clutch cable end |    |
| 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 head pipe end, bush and dust cover lips                          |    |
| Oil seal (relay arm, connecting arm and rear shock absorber)              |    |
| 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                        |   |
| Front wheel oil seal (left and right)                                     |  |
| Rear wheel oil seal   |  |
| Rear wheel drive hub oil seal   |  |
| Rear wheel drive hub mating surface                                       |  |
| Brake caliper piston seal   |  |
| Master cylinder inside  |  |
| Brake caliper piston dust seal  |  |
| Caliper bracket slide pins and/or retaining bolts                         |  |

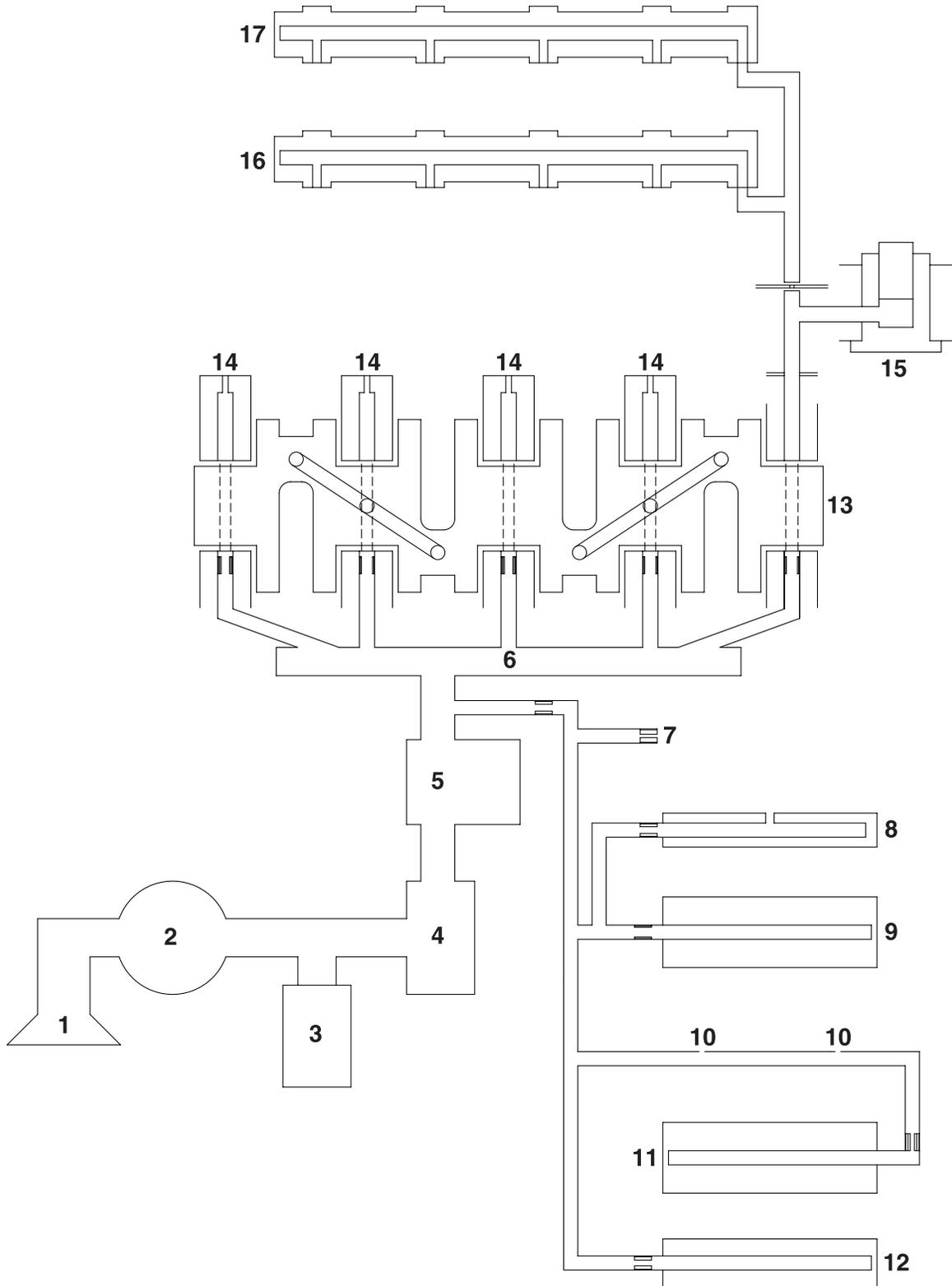
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20390

## LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

### ENGINE OIL LUBRICATION CHART



# LUBRICATION SYSTEM CHART AND DIAGRAMS

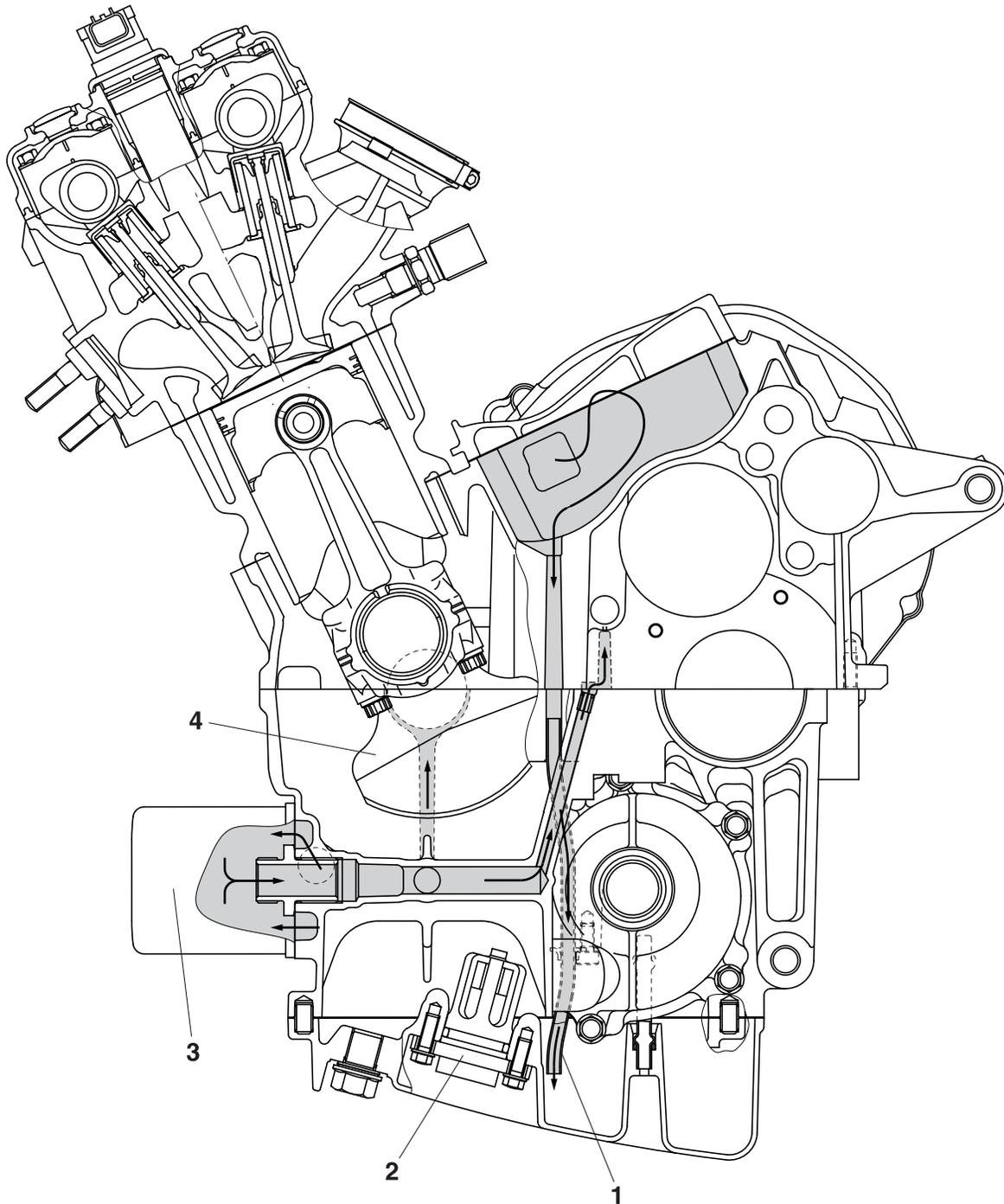
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1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter
6. Main gallery
7. AC magneto drive gear shower
8. Shift fork (upper)
9. Main axle
10. Mission shower
11. Drive axle
12. AC magneto axle
13. Crankshaft
14. Piston cooler
15. Timing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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410

## LUBRICATION DIAGRAMS



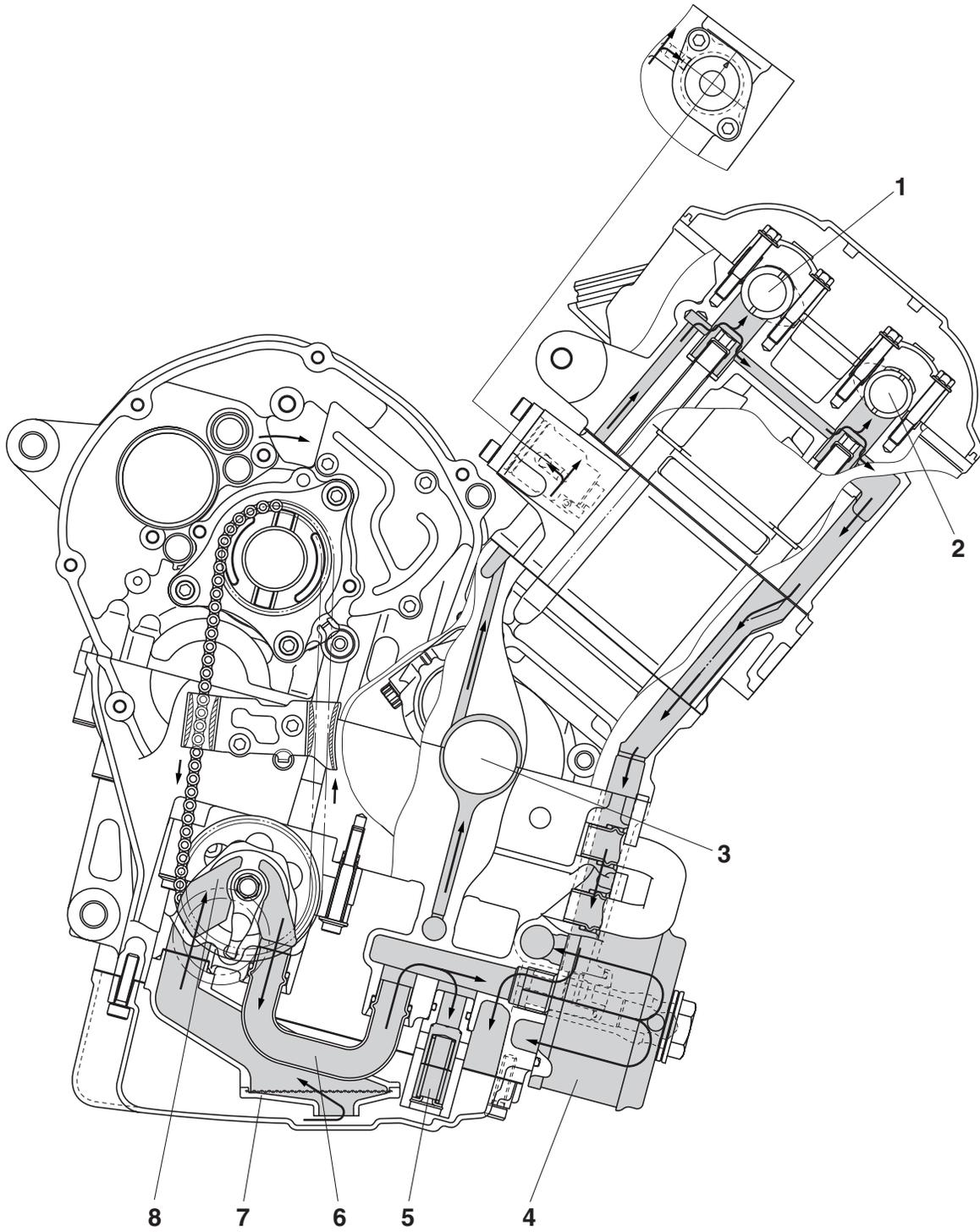
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Oil delivery pipe
2. Oil level switch
3. Oil filter cartridge
4. Crankshaft

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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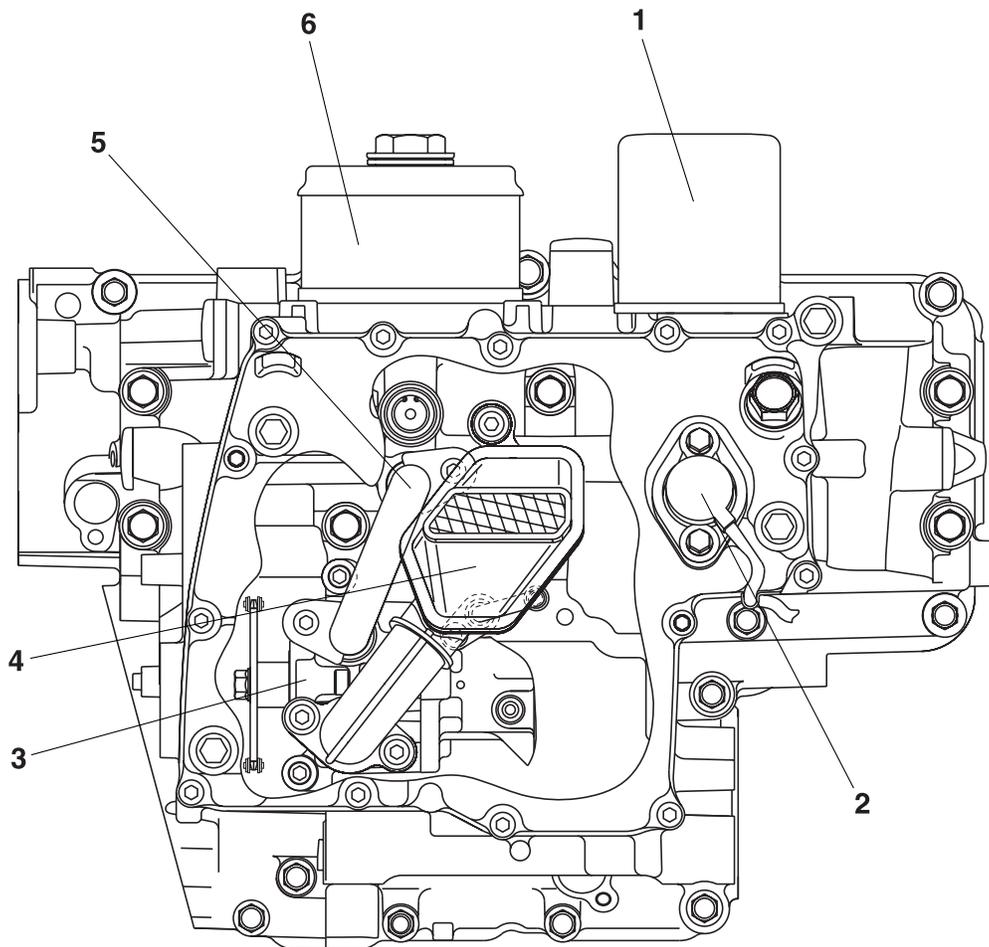
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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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

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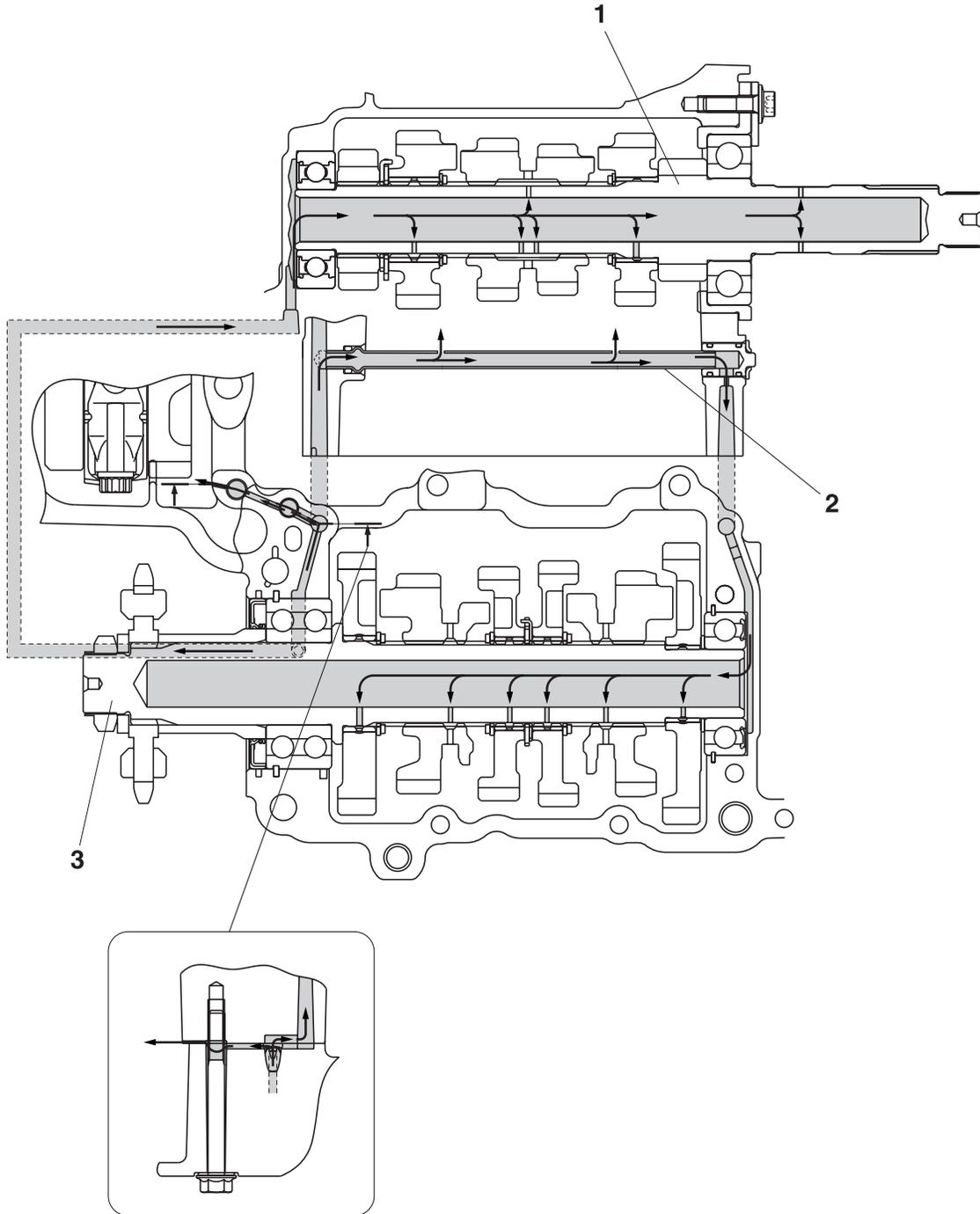
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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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

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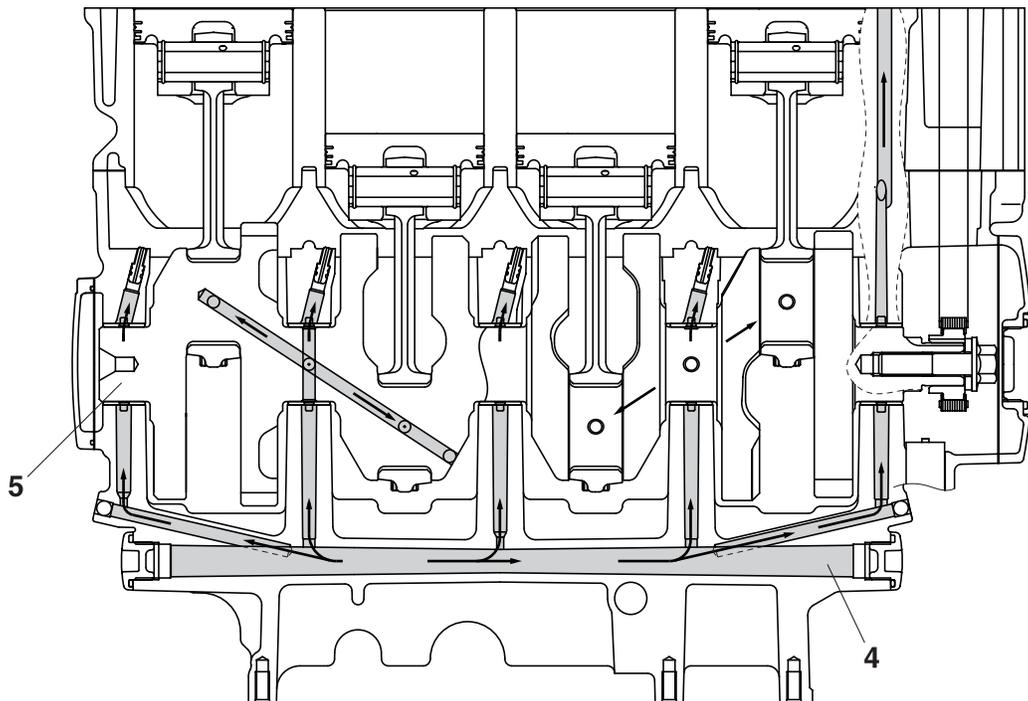
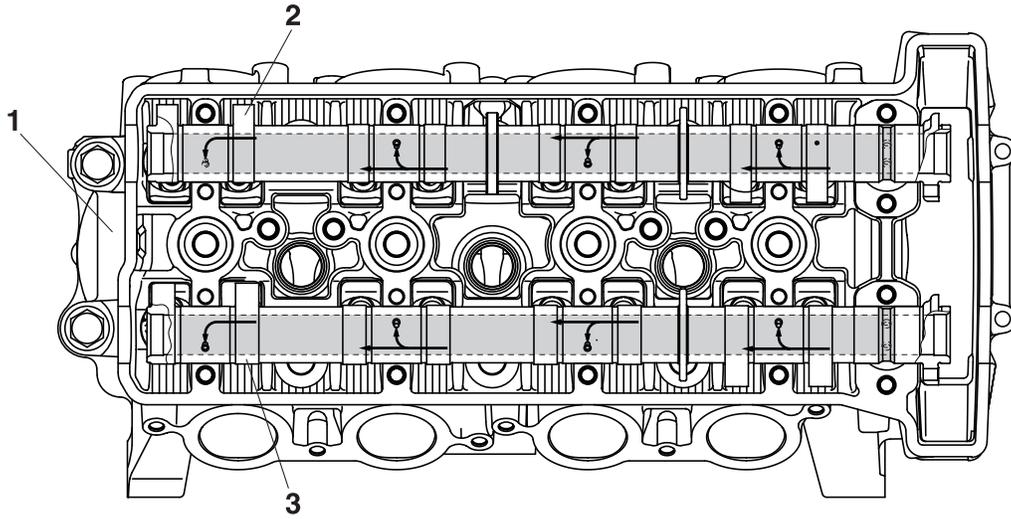
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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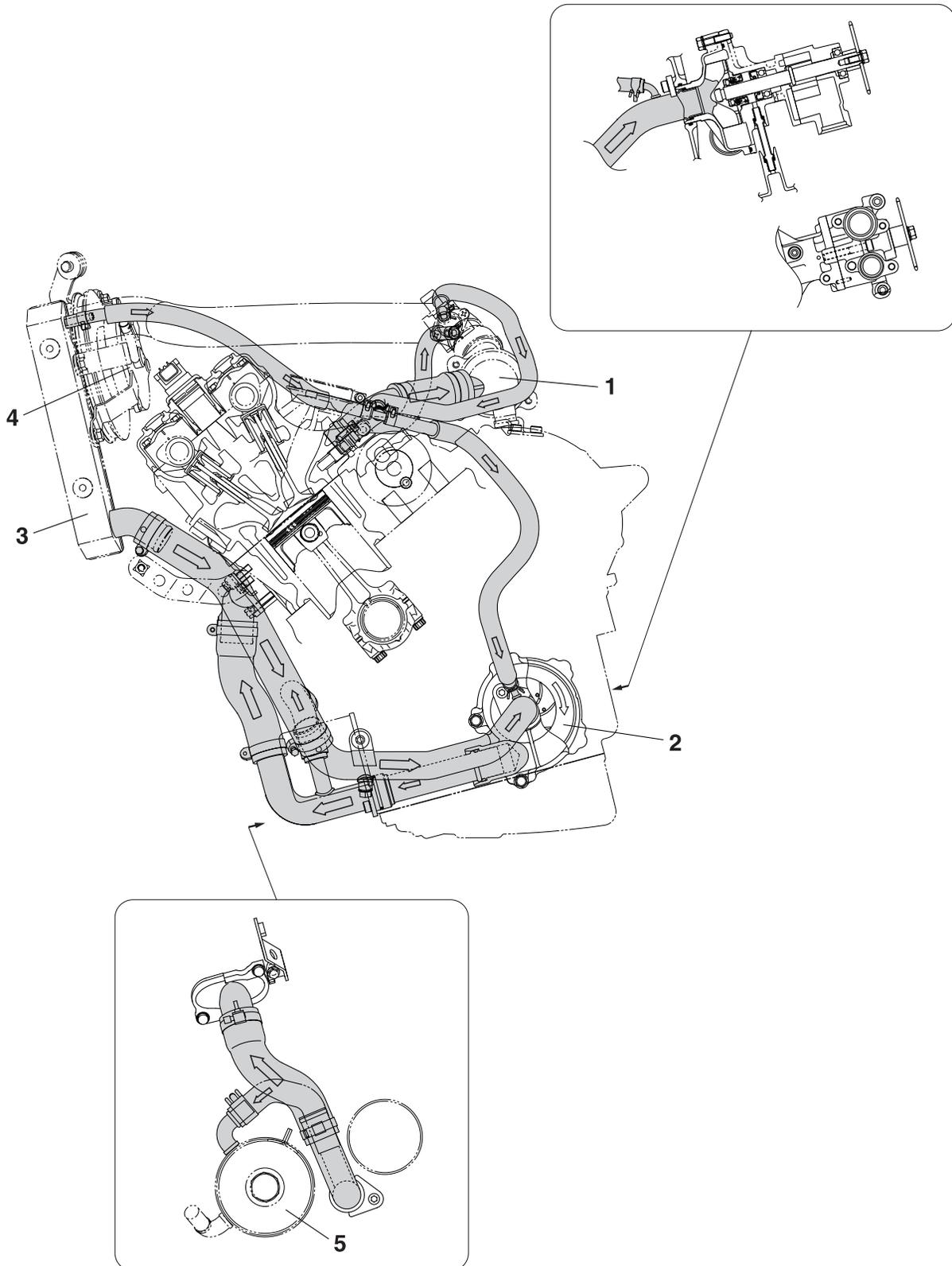
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Cylinder head
2. Exhaust camshaft
3. Intake camshaft
4. Main gallery
5. Crankshaft

EAS20420

## COOLING SYSTEM DIAGRAMS



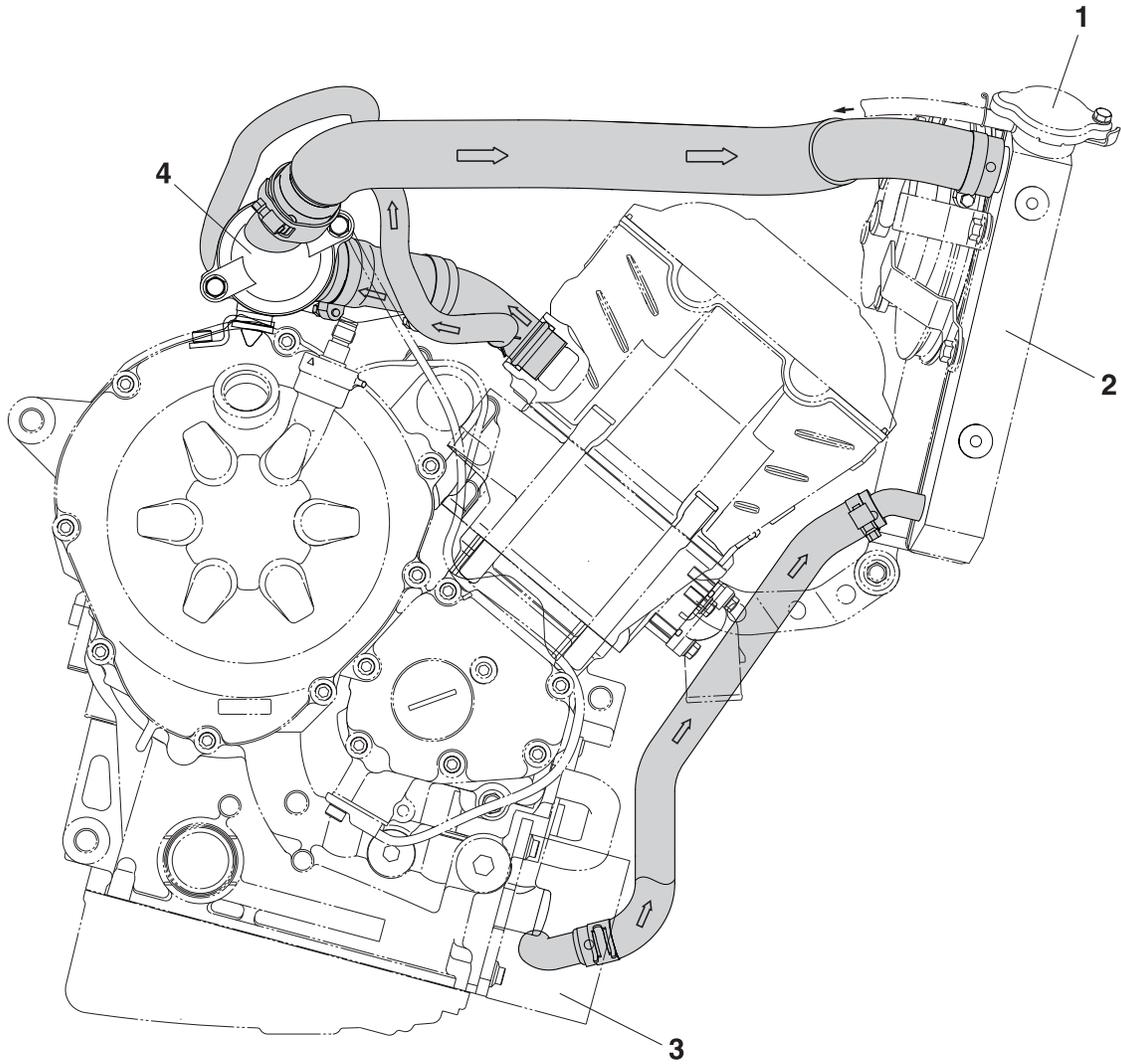
# COOLING SYSTEM DIAGRAMS

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1. Thermostat
2. Water pump
3. Radiator
4. Radiator fan
5. Oil cooler

# COOLING SYSTEM DIAGRAMS

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# COOLING SYSTEM DIAGRAMS

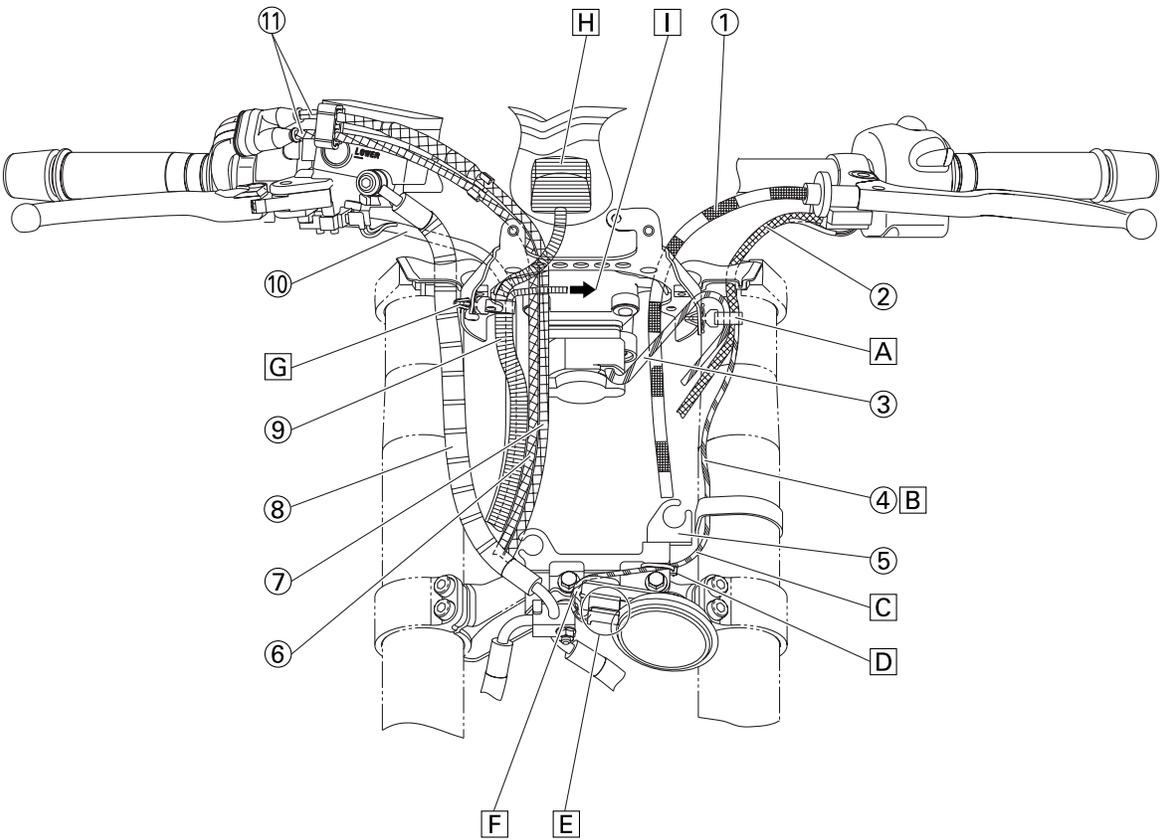
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1. Radiator cap
2. Radiator
3. Oil cooler
4. Thermostat

EAS20430

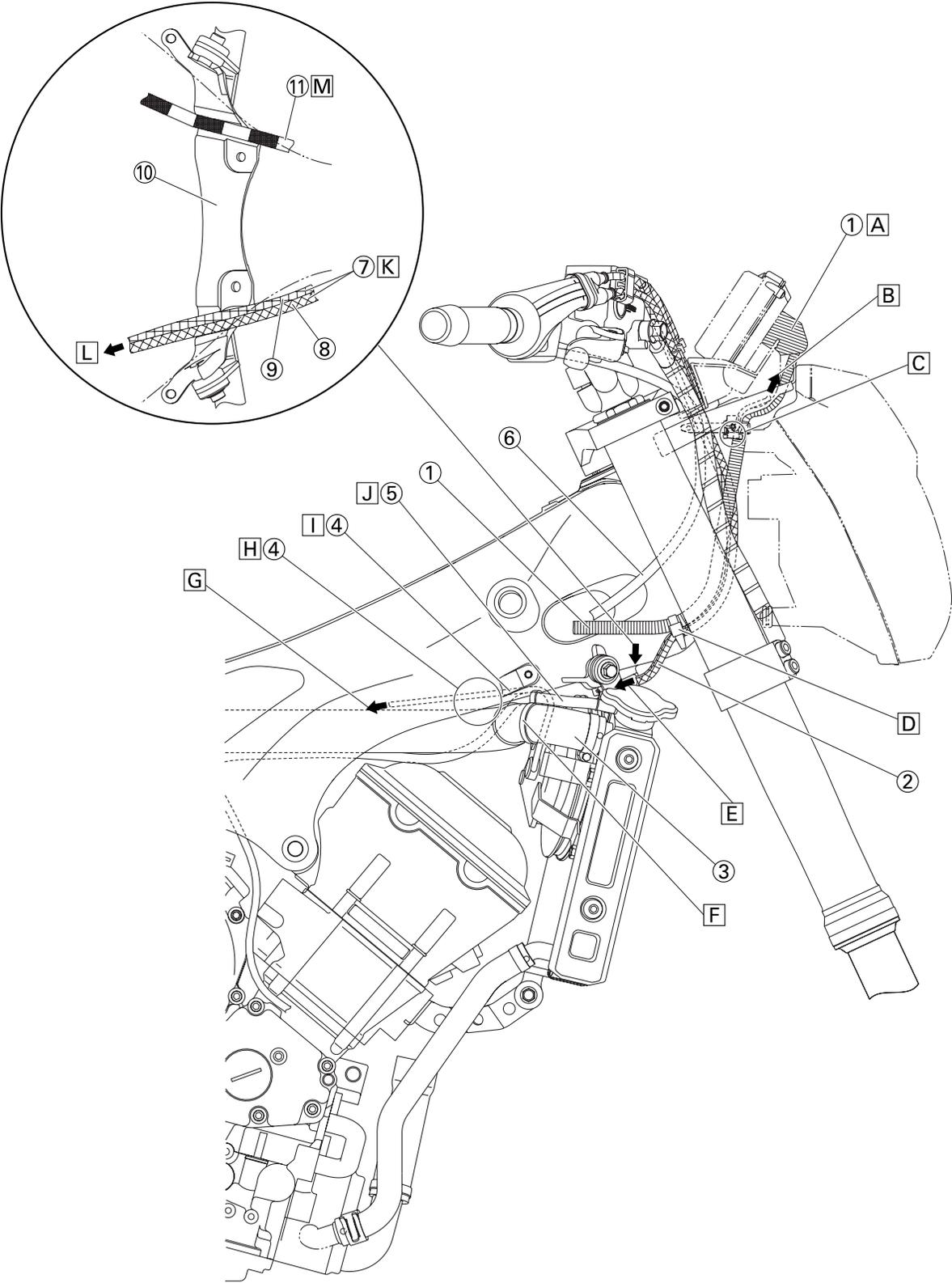
CABLE ROUTING

Handlebar (front view)



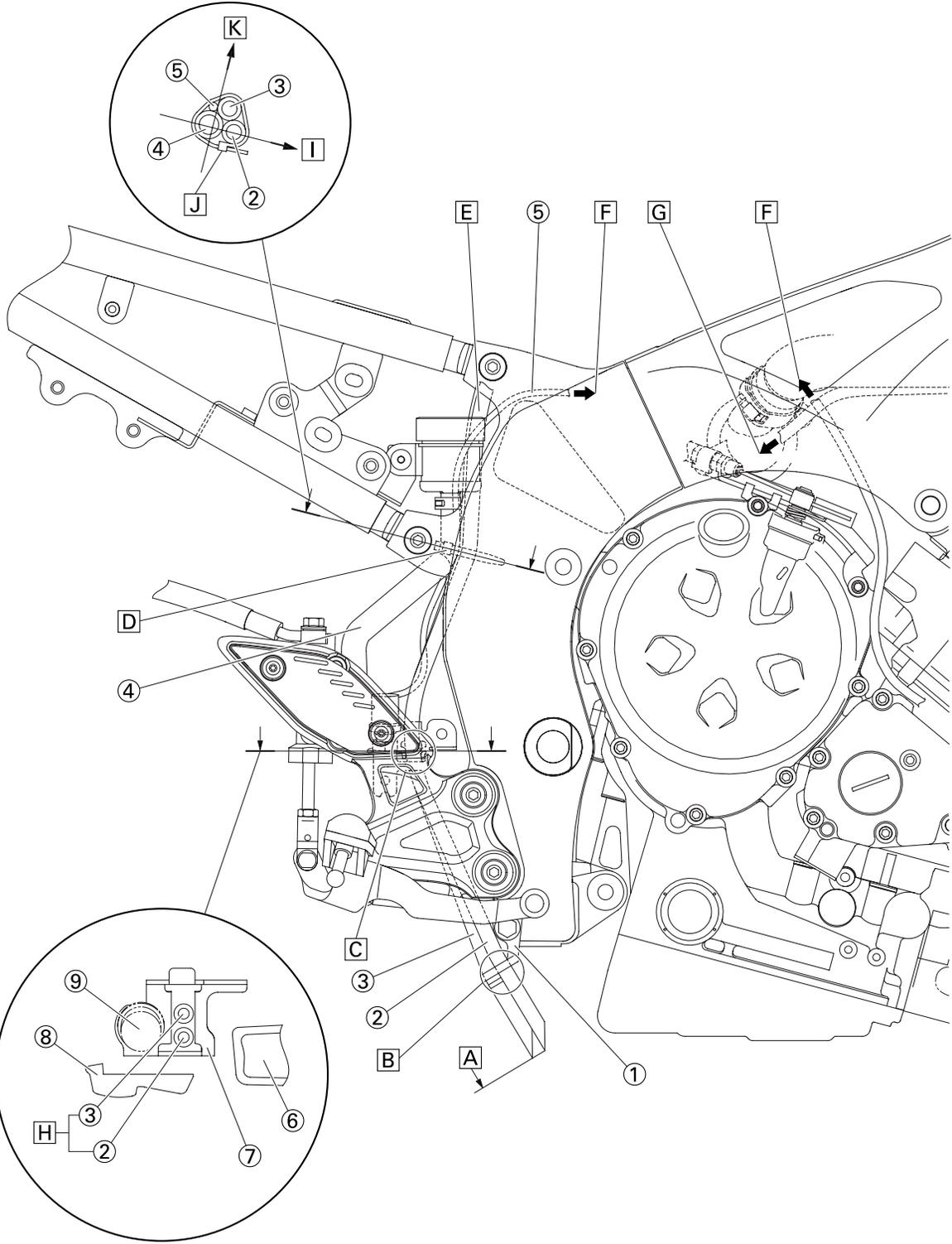
1. Clutch cable
  2. Left handlebar switch lead
  3. Main switch lead
  4. Horn lead
  5. Lower headlight stay
  6. Throttle cable (return side)
  7. Throttle cable (pull side)
  8. Brake hose
  9. Wire harness
  10. Right handlebar switch lead
  11. Throttle cables
- 
- A. Clamp the white tape mark of main switch lead, and branches of left handlebar switch lead, then insert the clamp into the upper headlight stay. Face the end of the clamp to the rear of the vehicle.
  - B. Route the horn lead further inward of the vehicle than the center of the front fork. The headlight side cover and front fork must not be pinched.
  - C. The horn lead and lower bracket must not interfere with each other.
  - D. Clamp the horn lead to the Lower headlight stay and face the head of the clamp to outside of the vehicle and the end of the clamp to the rear of the vehicle. Cut off the excess end of the clamp, leaving 2–4 mm (0.08–0.16 in).
  - E. Insert the bullet terminal of the horn lead in the direction shown in the illustration.
  - F. The horn lead should not protrude out.
  - G. Clamp the wire harness at the branch and insert it into the upper headlight stay. Face the end of the clamp to the rear of the vehicle.
  - H. Connect the meter coupler to the meter.
  - I. To the headlight lead coupler

Handlebar (right side view)



1. Wire harness
  2. Throttle cable
  3. Radiator inlet hose
  4. Right radiator fan motor lead
  5. Coolant reservoir hose
  6. Right handlebar switch lead
  7. Throttle cables
  8. Throttle cable (return side)
  9. Throttle cable (pull side)
  10. Radiator stay
  11. Clutch cable
- 
- A. Connect the meter coupler to the meter.
  - B. To the headlight
  - C. Install the clamp so that the seating face is positioned between the claws of the upper headlight stay.
  - D. Clamp the wire harness and throttle cable between the rubber damper and frame opening. Face the head of the clamp to outside of the vehicle and the end of the clamp to the bottom of the vehicle.
  - E. To the throttle body
  - F. Clamp the coolant reservoir hose and radiator inlet hose and face the head of the clamp to the inside of the vehicle and the end of the clamp to the top of the vehicle. Be careful that the end of the clamp does not protrude out of the radiator upper cover.
  - G. To the wire harness
  - H. Route the right radiator fan motor lead such that it is as taut as possible, within the area shown in the illustration.
  - I. Route the right radiator fan motor lead above the coolant reservoir hose and into the frame.
  - J. Route the coolant reservoir hose further inward of the vehicle than the radiator inlet hose and further bottom-outward of the vehicle than the thermostat assembly.
  - K. Route the throttle cable to the radiator stay concave (No kinks in the cable).
  - L. To the throttle body
  - M. Route the clutch cable to the radiator stay concave.

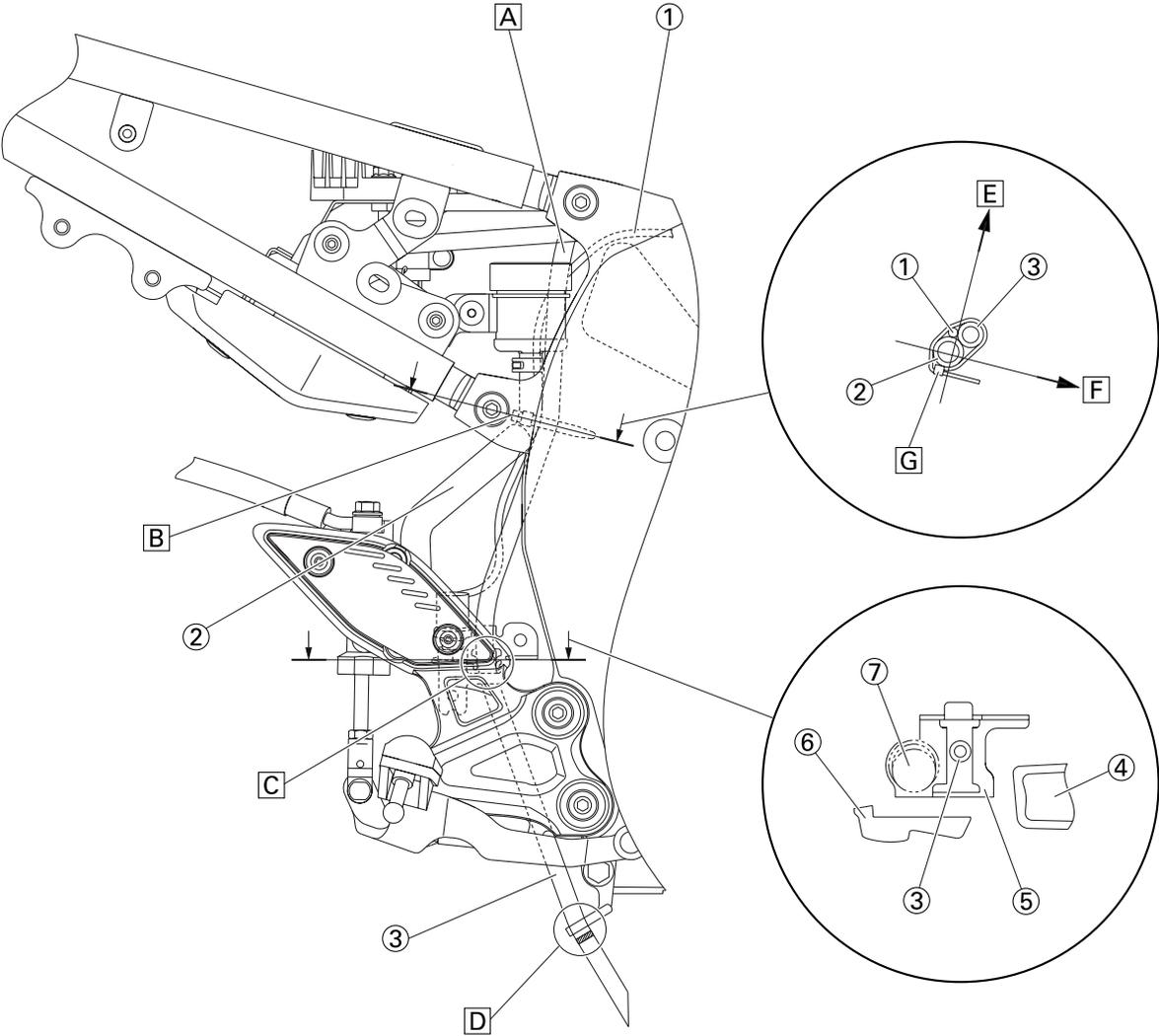
Engine (right side view)



1. Cable guide
  2. Fuel tank breather hose
  3. Fuel tank drain hose
  4. Brake fluid reservoir hose
  5. Rear brake light switch lead
  6. Frame
  7. Rear brake light switch stay
  8. Right rider footrest bracket
  9. Rear brake light switch
- 
- A. For the position of the end of the fuel tank breather hose, use the end of the fuel tank drain hose as a guide.
  - B. Pass the fuel tank breather hose and fuel tank drain hose through the cable guide. The paint mark on the fuel tank drain hose should be under the cable guide.
  - C. Route the fuel tank breather hose and fuel tank drain hose through the opening of the rear brake light switch stay.
  - D. The clamp position should be at the center of bending of the brake fluid reservoir hose as shown in the illustration.
  - E. Route the fuel tank breather hose and fuel tank drain hose further inward of the vehicle than the brake fluid reservoir.
  - F. To the wire harness
  - G. To the coolant reservoir
  - H. Order insignificant-fuel tank breather hose and fuel tank drain hose.
  - I. Front of the vehicle
  - J. Install the clamp, facing the head of the clamp to outside of the vehicle and the end of the clamp to the front of the vehicle.
  - K. Inside of the vehicle

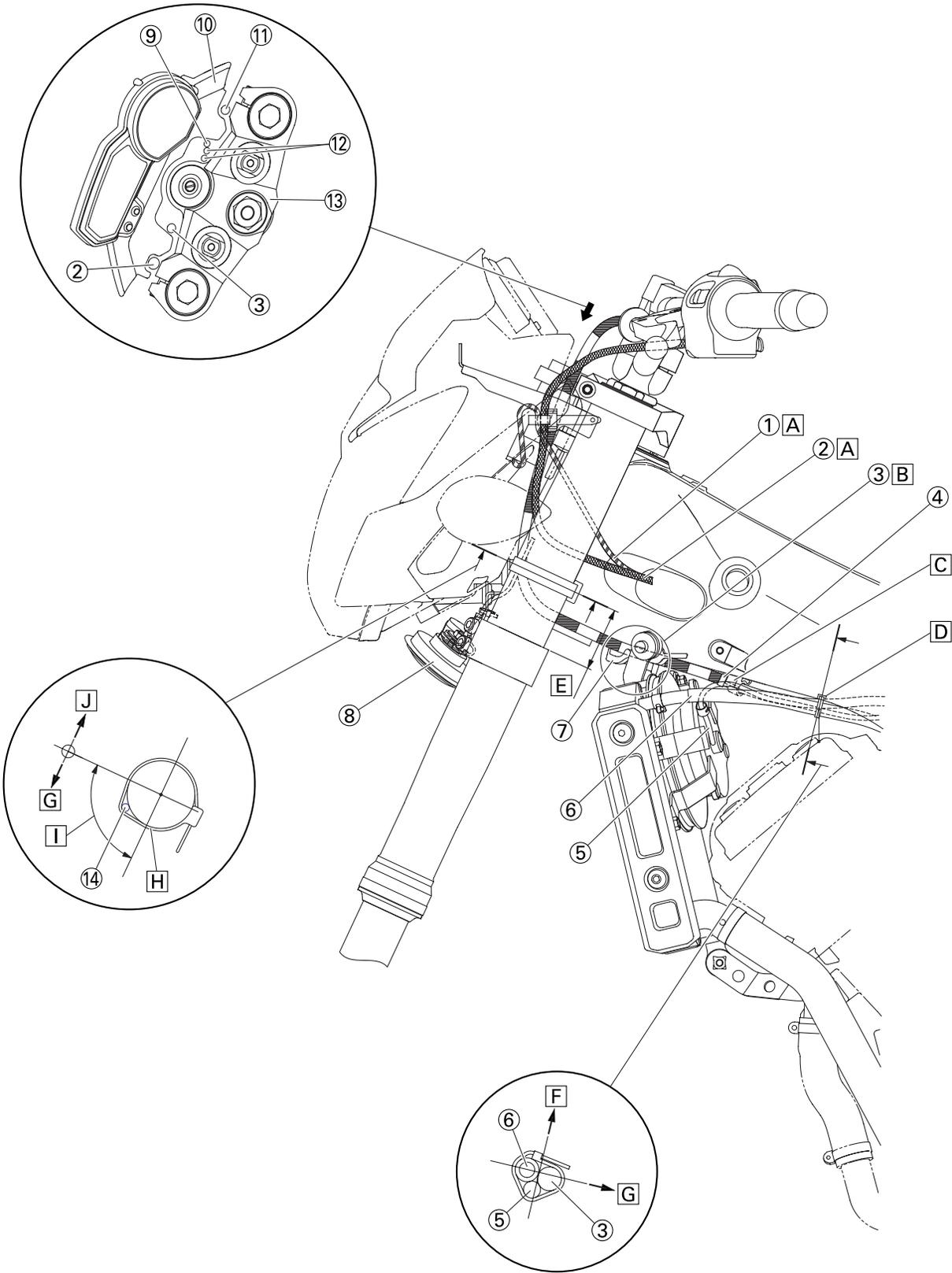
# CABLE ROUTING

Engine (right side view)  
For California only



1. Rear brake light switch lead
  2. Brake fluid reservoir hose
  3. Fuel tank drain hose
  4. Frame
  5. Rear brake light switch stay
  6. Right rider footrest bracket
  7. Rear brake light switch
- 
- A. Route the fuel tank drain hose further inward of the vehicle than the brake fluid reservoir.
  - B. The clamp position should be at the center of bending of the brake fluid reservoir hose as shown in the illustration.
  - C. Route the fuel tank drain hose through the opening of the rear brake light switch stay.
  - D. Pass the fuel tank drain hose through the cable guide. The paint mark on the fuel tank drain hose should be under the cable guide.
  - E. Inside of the vehicle
  - F. Front of the vehicle
  - G. Install the clamp, facing the head of the clamp to outside of the vehicle and the end of the clamp to the front of the vehicle.

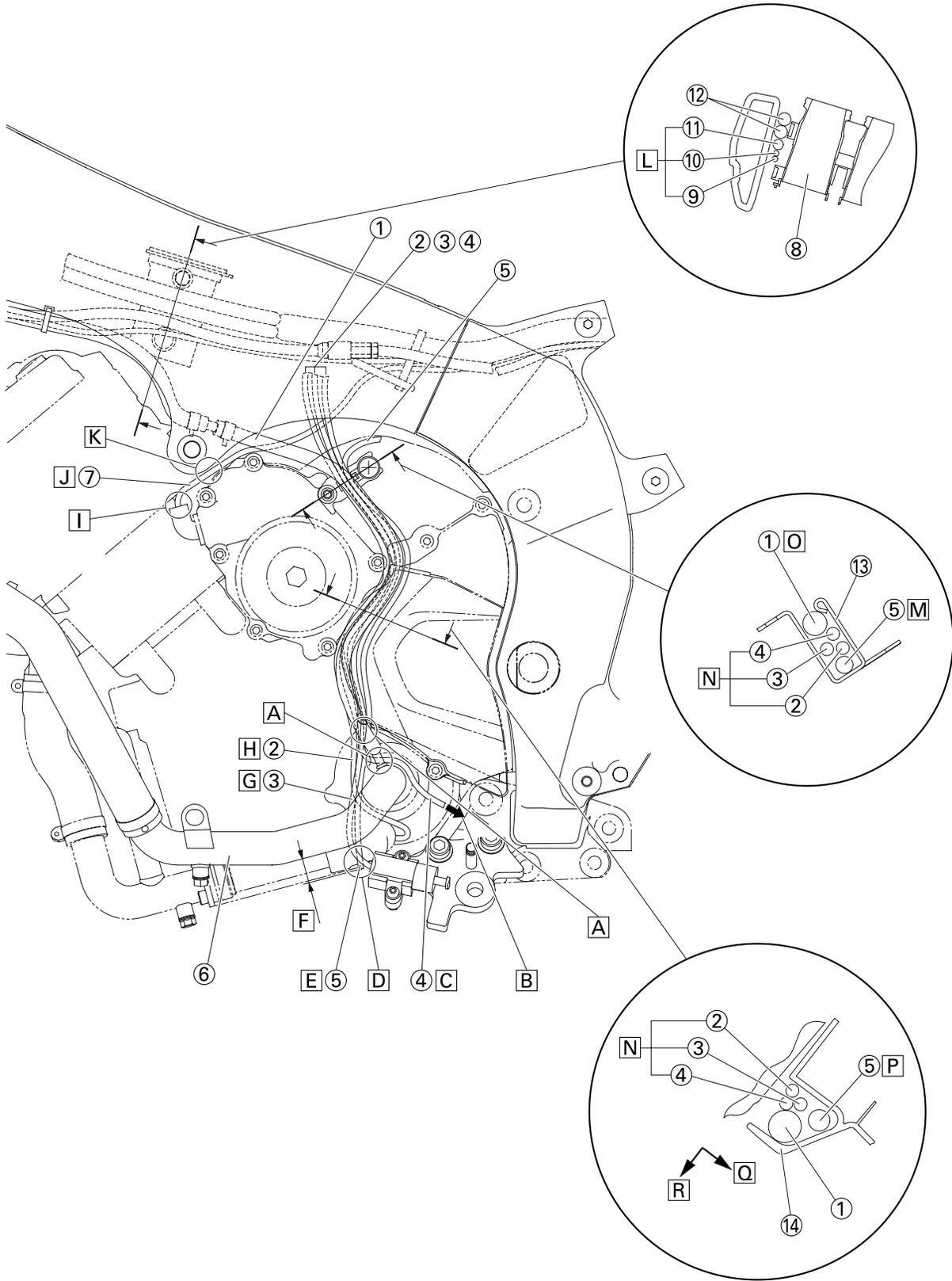
Handlebar (left side view)



1. Main switch lead
  2. Left handlebar switch lead
  3. Clutch cable
  4. Clutch cable swaging metal
  5. Left radiator fan motor lead
  6. Water pump breather hose
  7. Radiator stay
  8. Horn
  9. Right handlebar switch lead
  10. Meter bracket
  11. Brake hose
  12. Throttle cables
  13. Upper bracket
  14. Horn lead
- 
- A. Order insignificant-main switch lead and left handlebar switch lead.
  - B. Route the clutch cable to the radiator stay concave.
  - C. Insert the clamp into the frame and clamp the clutch cable. Position the clutch cable swaging metal further to the front of the vehicle than the clamp and face the clamp opening to outside of the vehicle.
  - D. Clamp the clutch cable, left radiator fan motor lead, and water pump breather hose and face the head of the clamp to the top of the vehicle and the end of the clamp to the inside of the vehicle. Use the position of the cylinder head cover shown in the illustration as a guide to install the clamp.
  - E. 45–65 mm (1.77–2.56 in)
  - F. Upper side of the vehicle
  - G. Inside of the vehicle
  - H. Clamp the horn lead to the front fork and face the head of the clamp to rear of the vehicle and the end of the clamp to the inside of the vehicle.
  - I. The horn lead should be positioned in the 90° area.
  - J. Outside of the vehicle

# CABLE ROUTING

Engine (left side view)

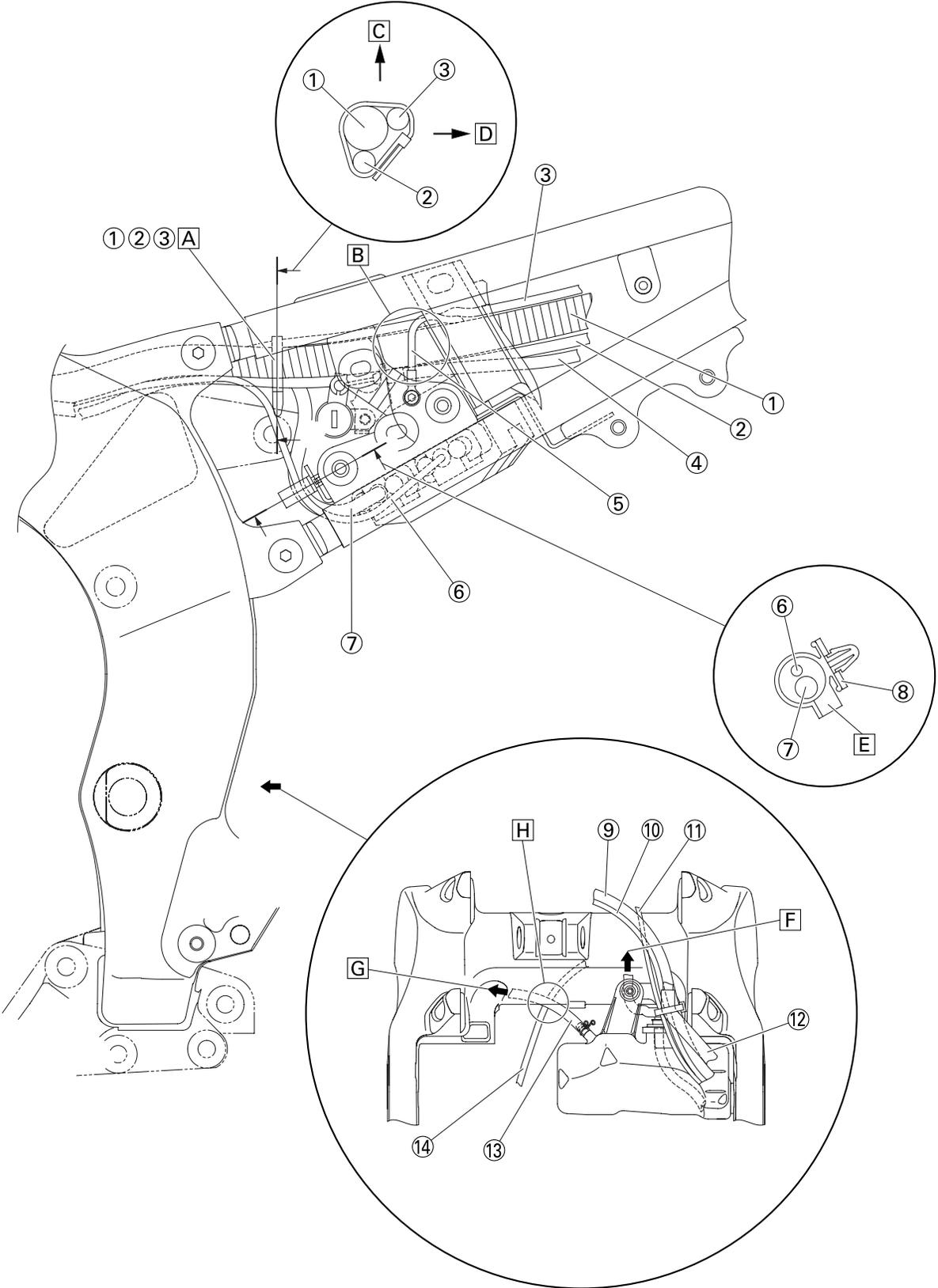


1. Water pump breather hose
2. Oil level switch lead
3. Sidestand switch lead
4. O<sub>2</sub> sensor lead
5. Coolant reservoir tank drain hose
6. Water pump inlet pipe
7. AC magneto lead
8. Throttle body
9. Ignition coil sub-wire harness
10. Left radiator fan motor lead
11. Clutch cable
12. Wire harness
13. Idle adjust screw holder
14. Drive sprocket cover

- Q. Back of the vehicle
- R. Outside of the vehicle

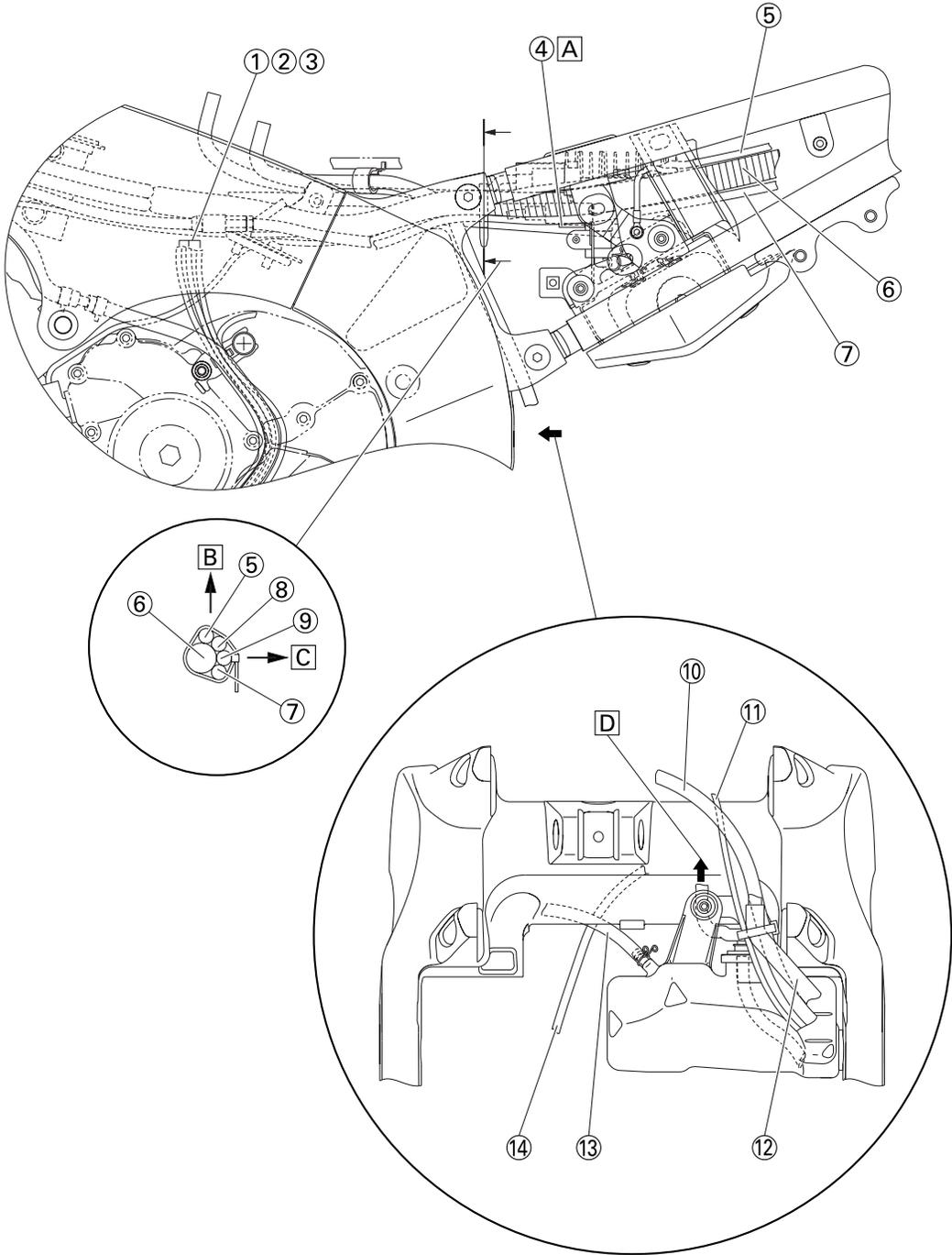
- A. Route the O<sub>2</sub> sensor lead further inward of the vehicle than the branch pipe of the water pump breather hose, then further bottom-outward than the water pump breather hose, and finally toward the top of the vehicle as shown in the illustration.
- B. To the exhaust
- C. Route the O<sub>2</sub> sensor lead further to the rear of the vehicle than the water pump inlet pipe.
- D. Order insignificant-the positions of the end of the coolant reservoir tank drain hose and the sidestand switch lead.
- E. Route the coolant reservoir tank drain hose further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
- F. More than 10 mm (0.39 in)
- G. Route the sidestand switch lead further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
- H. Route the oil level switch lead further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
- I. There should be no exposure of bare conductors due to the misalignment of tubes.
- J. Route the AC magneto lead further inward of the vehicle than the water pump breather hose.
- K. Route the AC magneto lead further inward of the vehicle than the frame.
- L. Order insignificant-clutch cable, left radiator fan motor lead, and ignition coil sub-wire harness.
- M. Innermost section of the vehicle.
- N. Order insignificant-O<sub>2</sub> sensor lead, sidestand switch lead, and oil level switch lead.
- O. Route the water pump breather hose at the last so that the hose is positioned outside of the vehicle after other hoses are routed to the Idle adjust screw holder.
- P. Route the coolant reservoir tank drain hose further to the rear of the vehicle than other hoses and leads.

Rear frame (left side view)



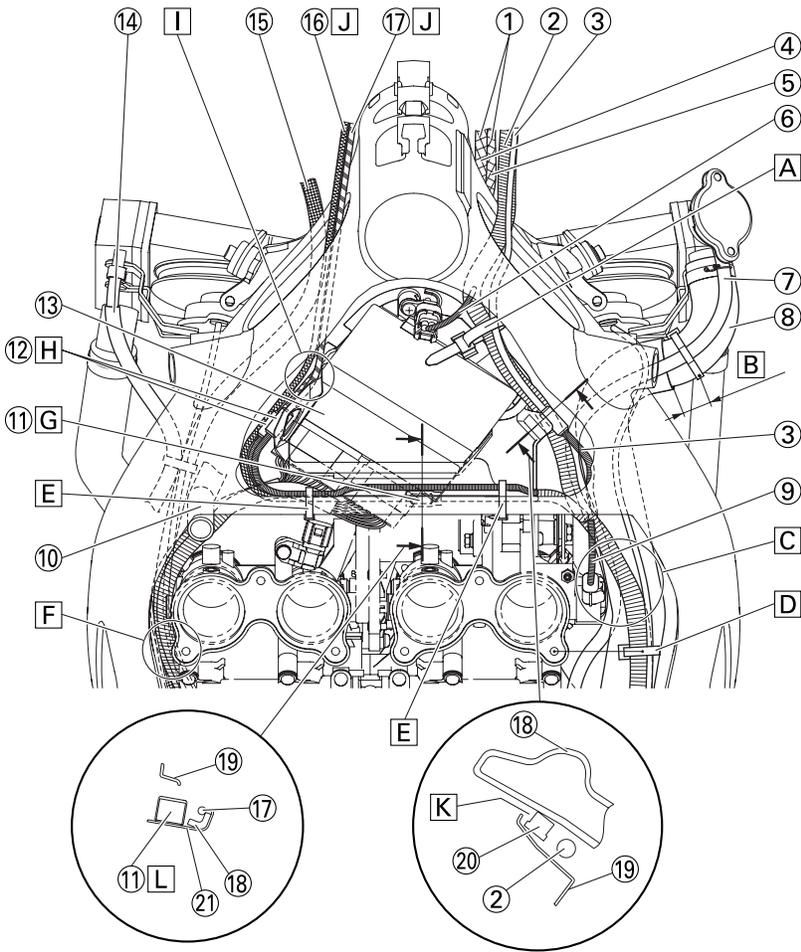
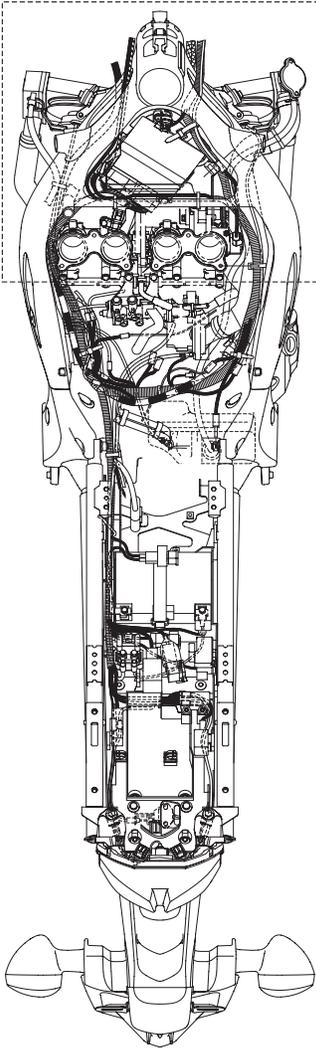
1. Wire harness
  2. Starter motor lead
  3. Battery negative lead
  4. Seat lock cable
  5. Ground lead
  6. AC magneto lead
  7. Rectifier/regulator lead
  8. Rectifier/regulator bracket
  9. Fuel tank drain hose
  10. Fuel tank breather hose
  11. Rear brake light switch lead
  12. Brake fluid reservoir hose
  13. Coolant reservoir tank drain hose
  14. Speed sensor lead
- 
- A. Clamp the wire harness, starter motor lead, and battery negative lead further to the front than the branch of the waterproof coupler lead. Face the head of the clamp to the inside of the vehicle and the end of the clamp down.
  - B. Route the ground lead between the rear frame bracket and battery box. The ground rivet on the wire harness stem side should not be caught with the rear frame bracket.
  - C. Upper side of the vehicle
  - D. Inside of the vehicle
  - E. Clamp the AC magneto lead and rectifier/regulator lead and then insert the clamp into the rectifier/regulator bracket. Face the clamp opening to the inside of the vehicle.
  - F. To the radiator
  - G. Atmospheric opening
  - H. Cross the coolant reservoir tank drain hose and speed sensor lead under the swingarm bracket. The coolant reservoir tank drain hose should be on the top of the vehicle.

**Rear frame (left side view)  
For California only**



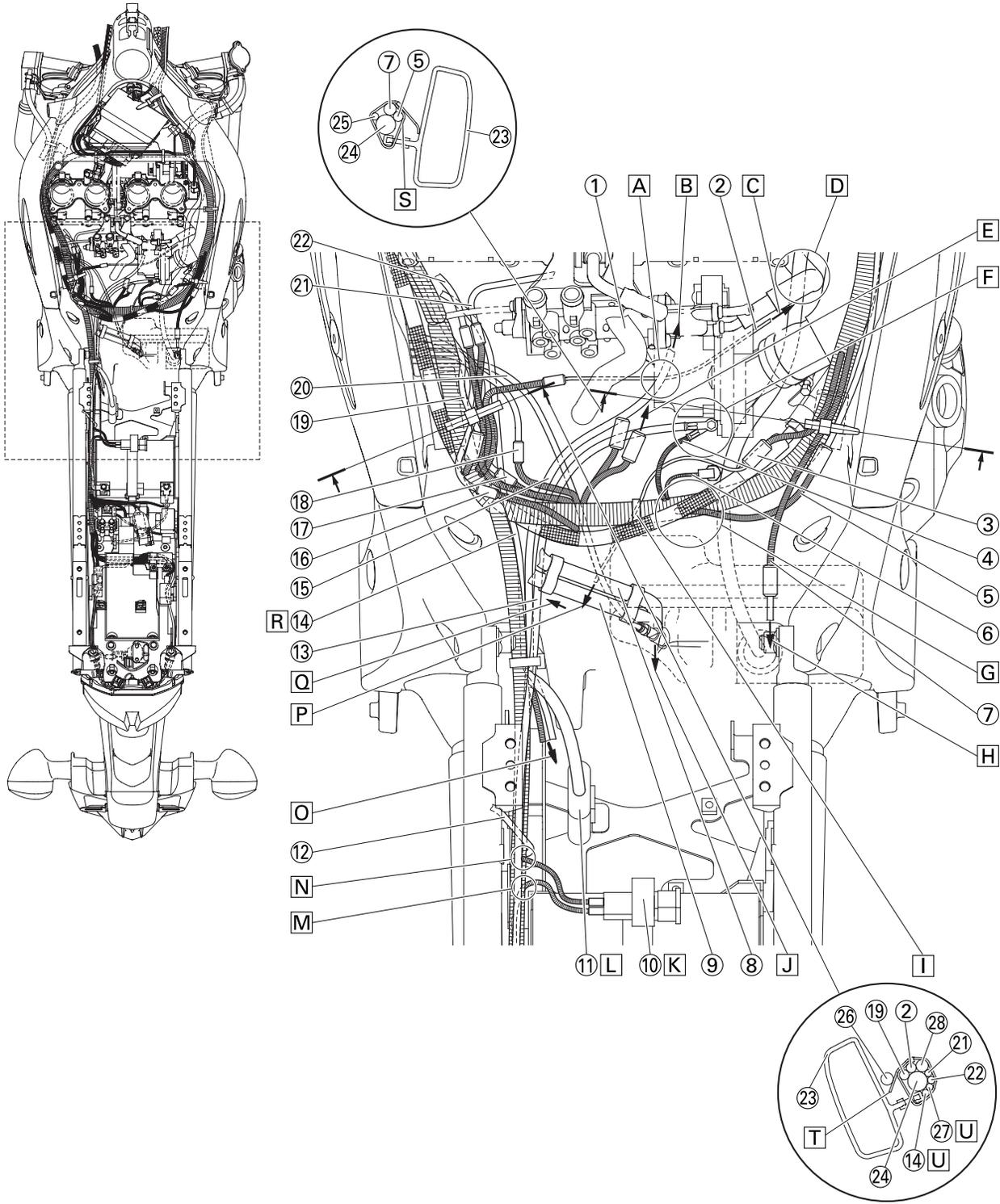
1. Oil level switch lead
  2. Sidestand switch lead
  3. O<sub>2</sub> sensor lead
  4. Waterproof coupler
  5. Battery negative lead
  6. Wire harness
  7. Starter motor lead
  8. Rectifier/regulator lead
  9. AC magneto lead
  10. Fuel tank drain hose
  11. Rear brake light switch lead
  12. Brake fluid reservoir hose
  13. Coolant reservoir tank drain hose
  14. Speed sensor lead
- 
- A. Install the waterproof coupler to the rectifier/regulator bracket.
  - B. Upper side of the vehicle
  - C. Inside of the vehicle
  - D. To the radiator

Frame (top view)



1. Throttle cables
  2. Wire harness
  3. Right handlebar switch lead
  4. Throttle cable (pull side)
  5. Throttle cable (return side)
  6. Intake air temperature sensor lead
  7. Coolant reservoir hose
  8. Radiator inlet hose
  9. Sub-throttle position sensor lead
  10. Air cut-off valve hose
  11. Left handlebar switch lead coupler
  12. Main switch lead coupler
  13. ECU (engine control unit)
  14. Water pump breather hose
  15. Clutch cable
  16. Left handlebar switch lead
  17. Main switch lead
  18. Frame
  19. ECU (engine control unit) holder
  20. Right handlebar switch lead coupler
  21. Rubber protector
- A. Clamp the wire harness at the white tape marks and the right handlebar switch lead at the red tape marks. Face the end of the clamp to the inside of the vehicle (Order insignificant).
  - B. 10–30 mm (0.39–1.18 in)
  - C. Check that each lead is routed further outward of the vehicle than the throttle body side cover and then install the air filter case.
  - D. Clamp the wire harness and right radiator fan motor lead, using the position of the throttle body shown in the illustration as a guide. (Order insignificant) Face the head of the clamp to the inside of the vehicle and the end of the clamp to the bottom of the vehicle.
  - E. Clamp the left handlebar switch lead and main switch lead at the white tape marks. (Order insignificant) Face the head of the clamp to the rear of the vehicle and the end of the clamp to the bottom of the vehicle. Cut off the excess end of the clamp, leaving 2–4 mm (0.08–0.16 in).
  - F. Route each lead under the air filter case mounting surface on the throttle body.
  - G. Connect the left handlebar switch lead coupler and then put the rubber cover of the wire harness.
  - H. Route the main switch lead coupler between outside of ECU (engine control unit) holder and frame so that the white coupler comes to the top.
  - I. Each lead should not be pinched.
  - J. Order insignificant-left handlebar switch lead and main switch lead.
  - K. Route each lead between the frame and ECU (engine control unit) holder.
  - L. Route the left handlebar switch lead coupler under the main switch lead and between ECU (engine control unit) holder and rubber protector.

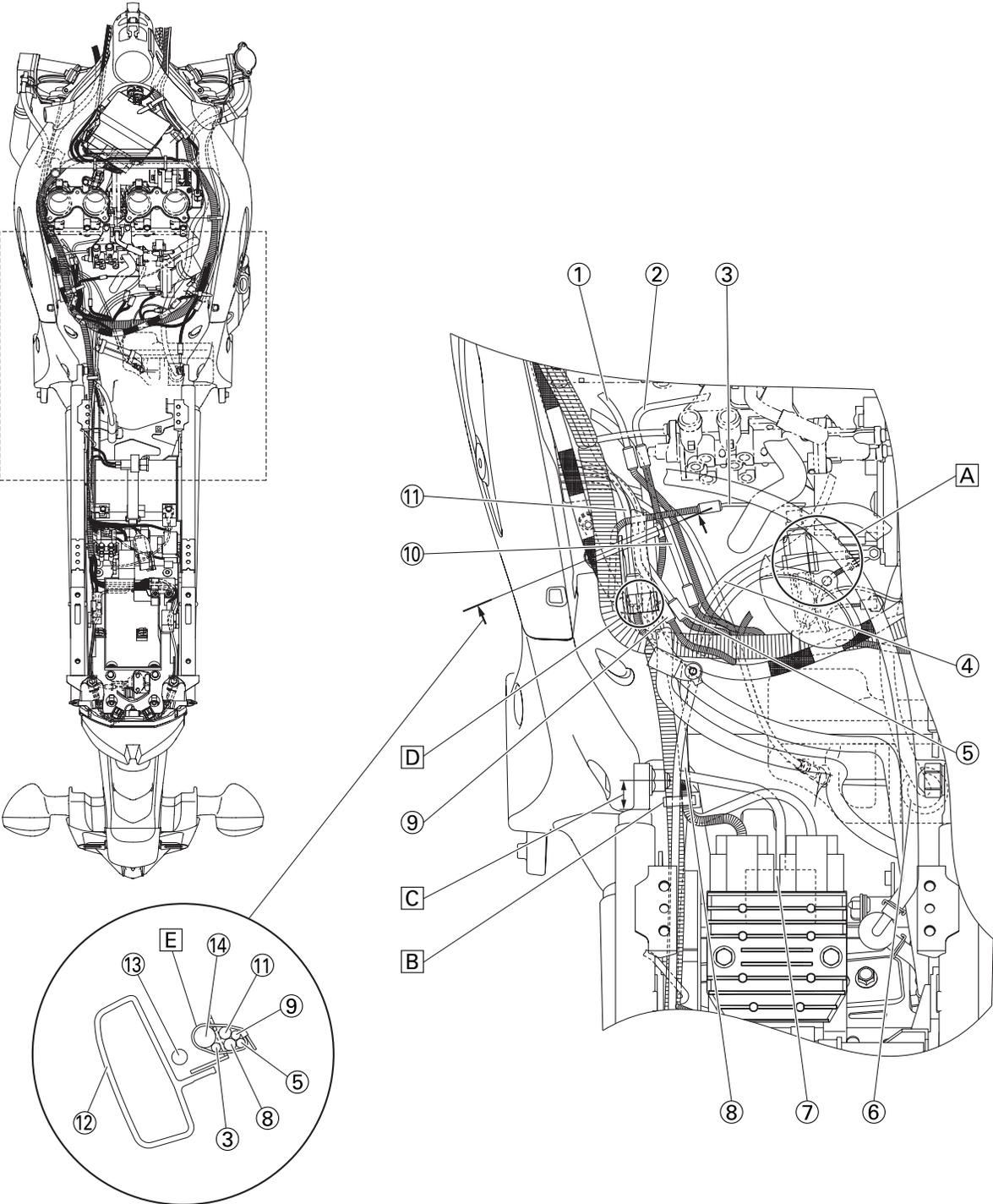
Frame (top view)



1. Air filter case drain hose
  2. Pickup coil lead
  3. Speed sensor lead coupler
  4. Engine ground lead
  5. Right radiator fan motor lead
  6. Neutral switch lead
  7. Rear brake light switch lead
  8. Fuel tank breather hose
  9. Fuel tank drain hose
  10. Main fuse
  11. Waterproof coupler
  12. Ground lead
  13. Battery negative lead
  14. AC magneto lead
  15. Starter motor lead
  16. Sidestand switch lead coupler
  17. Oil level switch lead coupler
  18. O<sub>2</sub> sensor lead coupler
  19. Left radiator fan motor lead
  20. Coolant reservoir tank drain hose
  21. Fuel injection system sub-wire harness
  22. Ignition coil sub-wire harness
  23. Frame
  24. Wire harness
  25. Speed sensor lead
  26. Clutch cable
  27. Oil level switch lead
  28. Sidestand switch lead
- A. Route the pickup coil lead under the starter motor lead.
  - B. To the starter motor
  - C. To the engine
  - D. Route the coolant reservoir hose inside the fast idle plunger outlet hose.
  - E. To the fuel pump
  - F. Bring the engine ground lead down and the battery negative lead up. Install each lead so that the lead convex comes to the top of the vehicle.
  - G. Route the wire harness under the clutch cable.
  - H. To the rear brake light switch
  - I. Insert the wire harness wrapping clamp to the hole of the frame.
  - J. Atmospheric opening
  - K. Insert the main fuse to the battery band. Soapy water can be spread.
  - L. Install the waterproof coupler to the rectifier/regulator bracket.
  - M. Route the battery positive lead from inside the vehicle to under the wire harness. (It should not be routed above the wire harness.)
  - N. Route the main fuse lead so that the branch of the lead comes to the top of the vehicle.
  - O. To the rectifier/regulator
  - P. To the speed sensor
  - Q. To the fuel tank
  - R. Route the AC magneto lead under the clutch cable.
  - S. Route each lead above the frame plate and through the opening into the vehicle. Also, route the wire harness and rear brake light switch lead as shown in the illustration. For any other lead, order insignificant. Face the head of the clamp to the top of the vehicle and the end of the clamp to outside of the vehicle. If the end of the clamp makes contact with the frame, face the end down.
  - T. Route the wire harness, AC magneto lead and oil level switch lead as shown in the illustration. For any other leads, order insignificant. Face the head of the clamp to the top of the vehicle and insert the end of the clamp under the clutch cable, facing it to the bottom-outside of the vehicle.
  - U. Order insignificant-oil level switch lead and AC magneto lead.

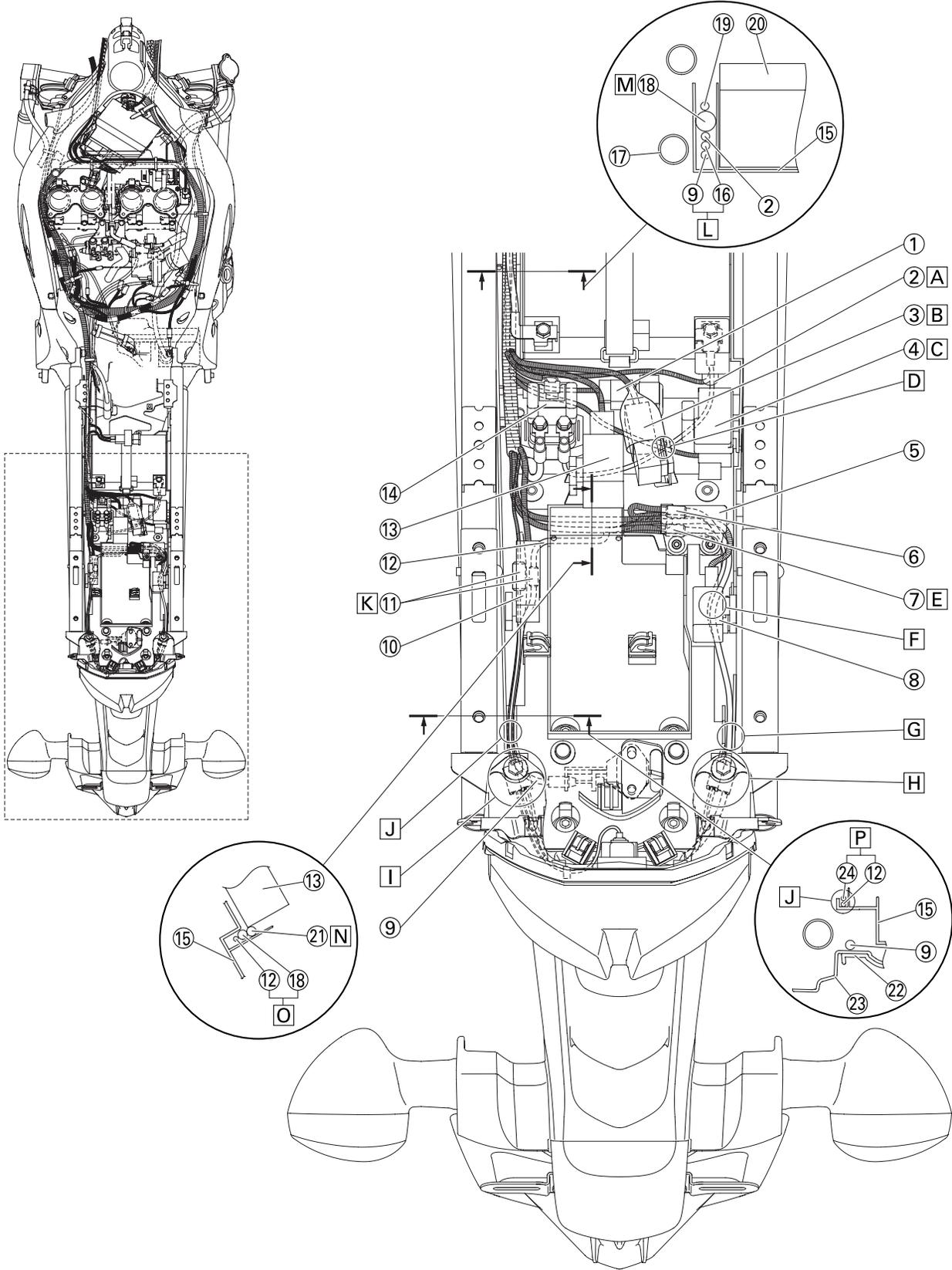
# CABLE ROUTING

Frame (top view)  
For California only



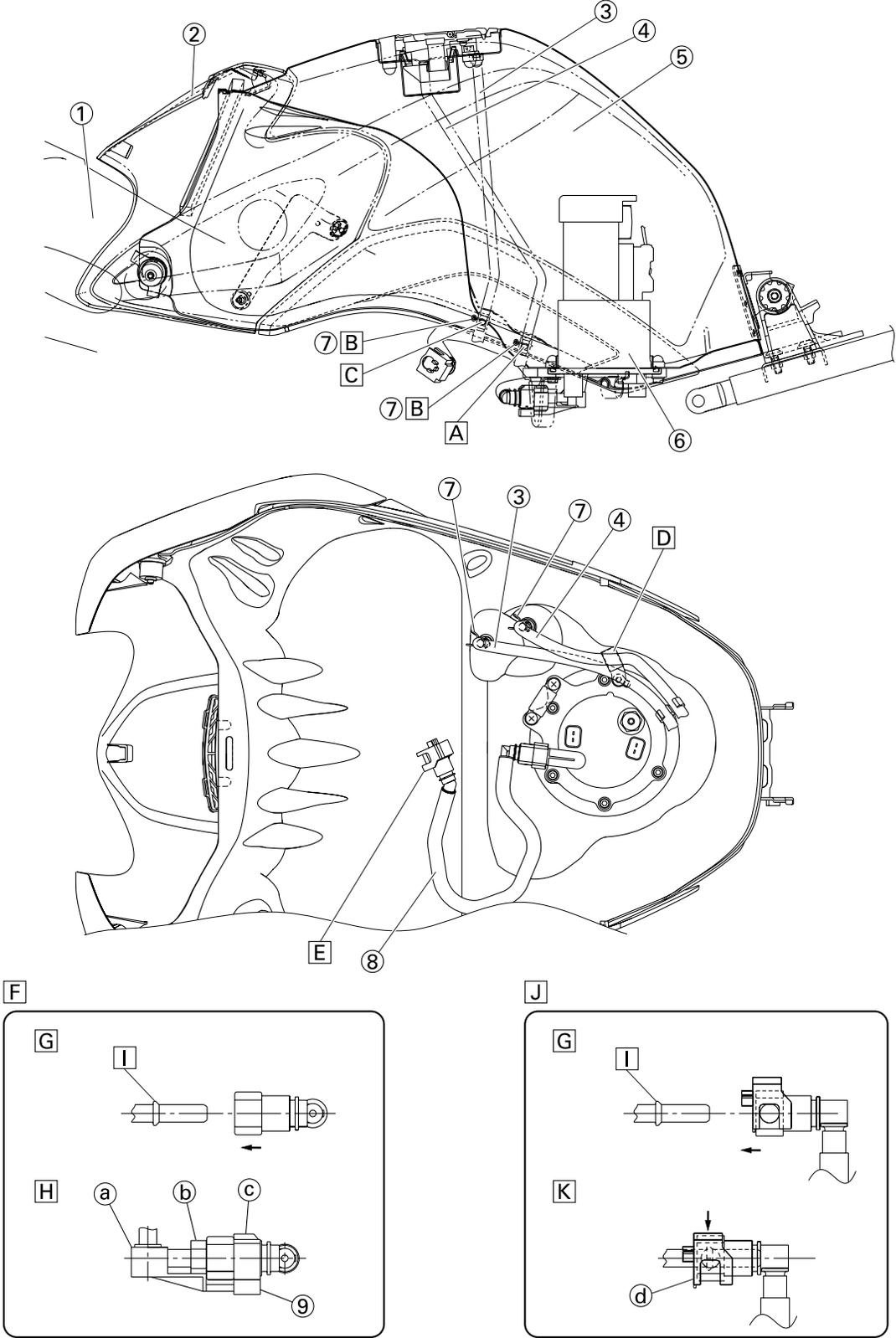
1. Ignition coil sub-wire harness
  2. Fuel injection system sub-wire harness
  3. Pickup coil lead
  4. Starter motor lead
  5. Oil level switch lead
  6. Fuel tank breather hose (fuel tank to rollover valve)
  7. Waterproof coupler
  8. AC magneto lead
  9. Sidestand switch lead
  10. O<sub>2</sub> sensor lead
  11. Left radiator fan motor lead
  12. Frame
  13. Clutch cable
  14. Wire harness
- A. The fuel tank breather hose (fuel tank to rollover valve) should not be caught between the fuel hose and fuel pump bracket.
- B. Clamp the wire harness, rectifier/regulator lead, starter motor lead, battery negative lead, and AC magneto lead. Face the head of the clamp to the inside of the vehicle and the end of the clamp down.
- C. For the clamp position, use the illustration as a guide.
- D. Clamp the canister purge hose, facing the clamp opening to the top of the vehicle.
- E. When clamping, route the wire harness and pickup coil lead further outward of the vehicle than the rectifier/regulator bracket and route the sidestand switch lead, AC magneto lead, left radiator fan motor lead, and oil level switch lead further inward of the vehicle than the rectifier/regulator bracket. Face the head of the clamp to the inside of the vehicle and the end of the clamp down.

Frame (top view)



1. Atmospheric pressure sensor
  2. Battery positive lead
  3. Radiator fan motor relay
  4. Fuse box
  5. Lean angle sensor
  6. Right turn signal light lead
  7. License plate light lead
  8. Turn signal relay
  9. Seat lock cable
  10. Headlight relay
  11. Tail/brake light coupler
  12. Left turn signal light lead
  13. Starting circuit cut-off relay
  14. Starter relay
  15. Battery box
  16. Starter motor lead
  17. Rear frame
  18. Wire harness
  19. Battery negative lead
  20. Battery
  21. Engine stop switch lead
  22. Mudguard
  23. Rear fender
  24. Tail/brake light lead
- 
- A. Route the battery positive lead under each relay.
  - B. For the radiator fan motor relay, connect the coupler and then put the rubber cover of the wire harness.
  - C. Route the fuse box lead under the radiator fan motor relay.
  - D. Route the battery positive lead under the fuse box lead.
  - E. Connect the bullet terminals of the gray tube and blue lead.
  - F. Route the license plate light lead and right turn signal light lead under the turn signal relay.
  - G. Route the license plate light lead and rear right turn signal light lead between the ribs of the battery box.
  - H. Route the license plate light lead and rear right turn signal light lead under the rubber cover.
  - I. Route the tail/brake light lead and rear left turn signal light lead under the rubber cover.
  - J. Route the tail/brake light lead and rear left turn signal light lead between the ribs of the battery box.
  - K. Route the tail/brake light lead coupler and rear left turn signal light lead coupler under the headlight relay. Order insignificant-tail/brake light lead coupler and rear left turn signal light lead. Push the headlight relay fully to the end.
  - L. Order insignificant-starter motor lead and seat lock cable.
  - M. Push the wire harness firmly to the end.
  - N. Route the engine stop switch lead on the top of the vehicle.
  - O. Order insignificant-wire harness and left turn signal light lead.
  - P. Order insignificant-tail/brake light lead and rear left turn signal light lead.

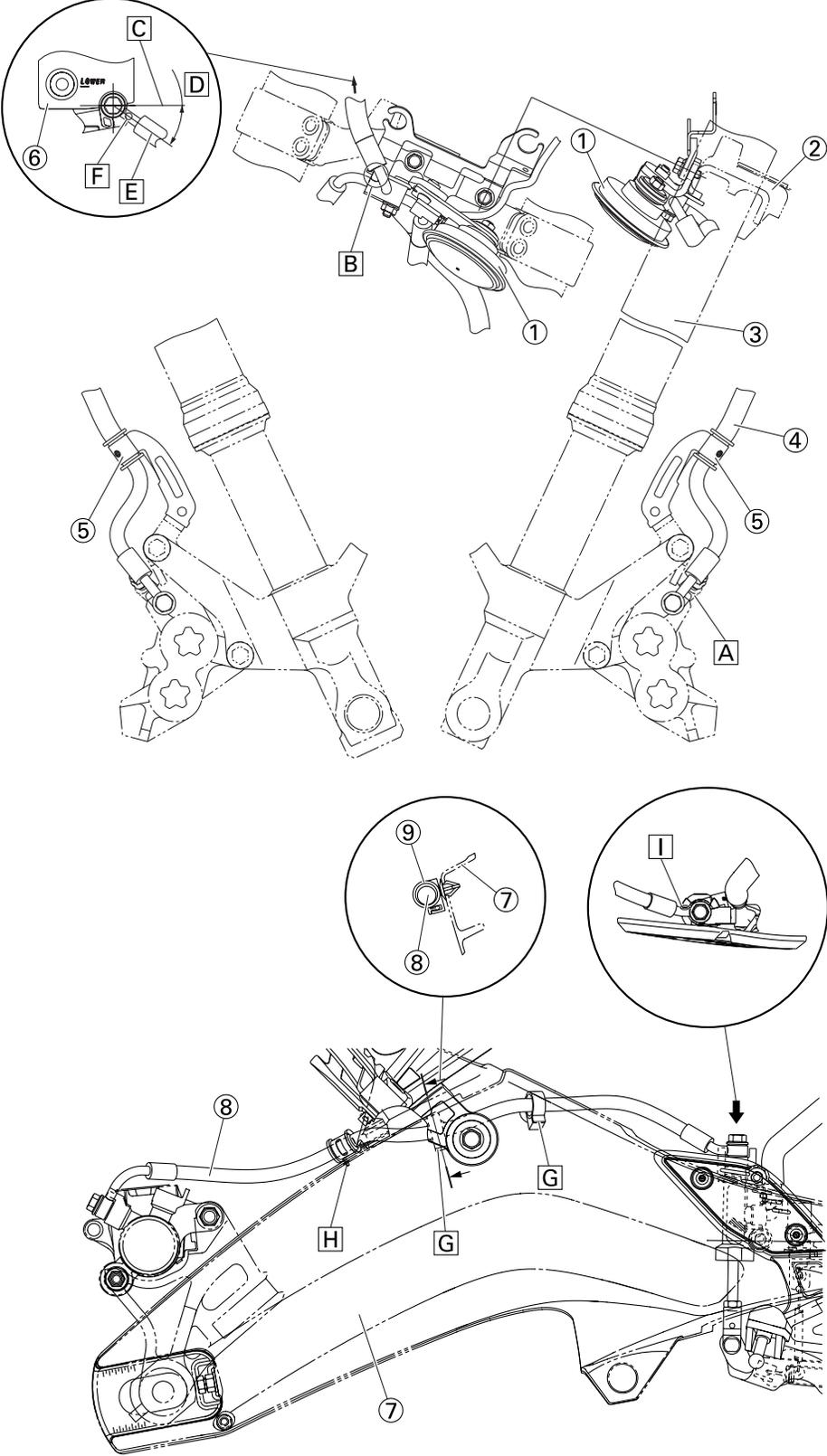
Fuel tank (left and bottom view)



1. Frame
  2. Fuel tank cover
  3. Fuel tank breather hose
  4. Fuel tank drain hose
  5. Fuel tank
  6. Fuel pump
  7. Clip
  8. Fuel hose
  9. Fuel hose connector cover
- 
- A. Install the fuel tank drain hose with the white paint marks facing to the left of the vehicle.
  - B. For the knob of the clip, any direction is acceptable. The clip should not be run onto the spool.
  - C. Install the fuel tank breather hose with the yellow paint marks facing to the left of the vehicle.
  - D. Pass the fuel tank drain hose through the fuel tank bracket clamp. There should be no bend of the hose between the fuel tank nipple and clamp.
  - E. Fit the black double lock side to the engine side.
  - F. Fuel pump side
  - G. 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.)
  - H. After item "G" mentioned above is finished, check that the fuel hose connector cover is inserted from the down side, and that "a", "b" and "c" sections are perfectly equipped.
  - I. This part works as a dropout stopper
  - J. Fuel injector side
  - K. After Step "G" as above is finished, check that the connector is completely attached by sliding the double lock (black part) "d" on the connector as shown in the illustration and seeing if it touches firmly or not.

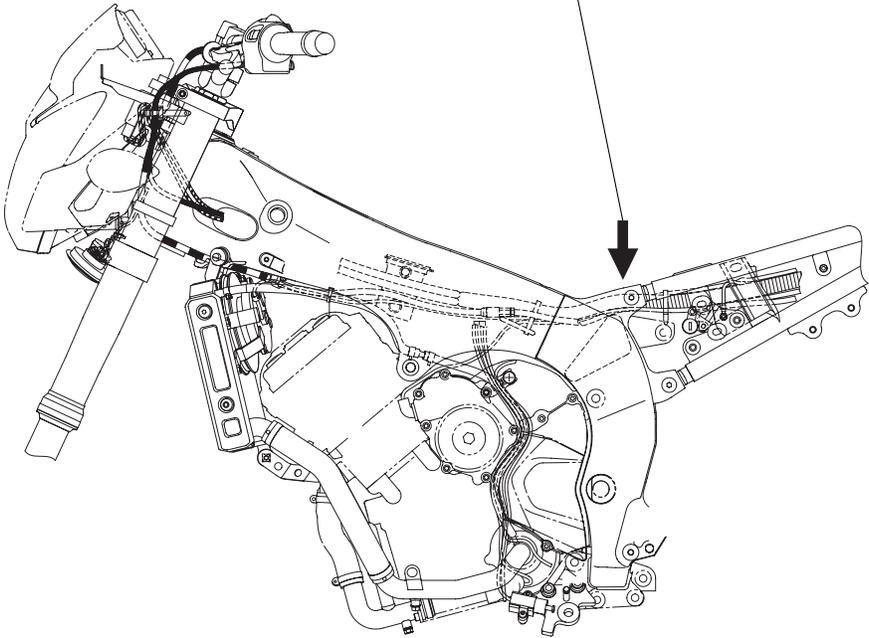
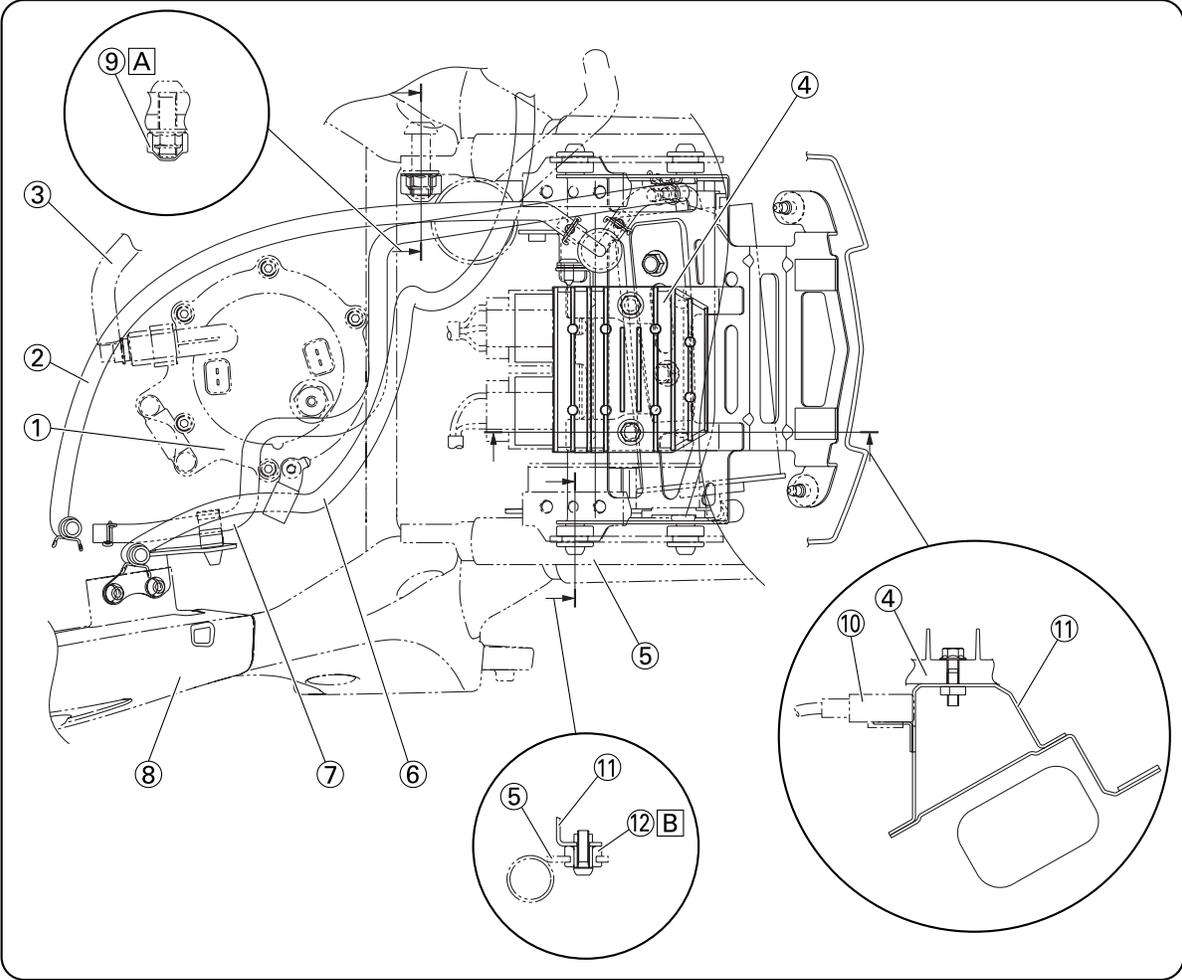
# CABLE ROUTING

## Front brake, rear brake



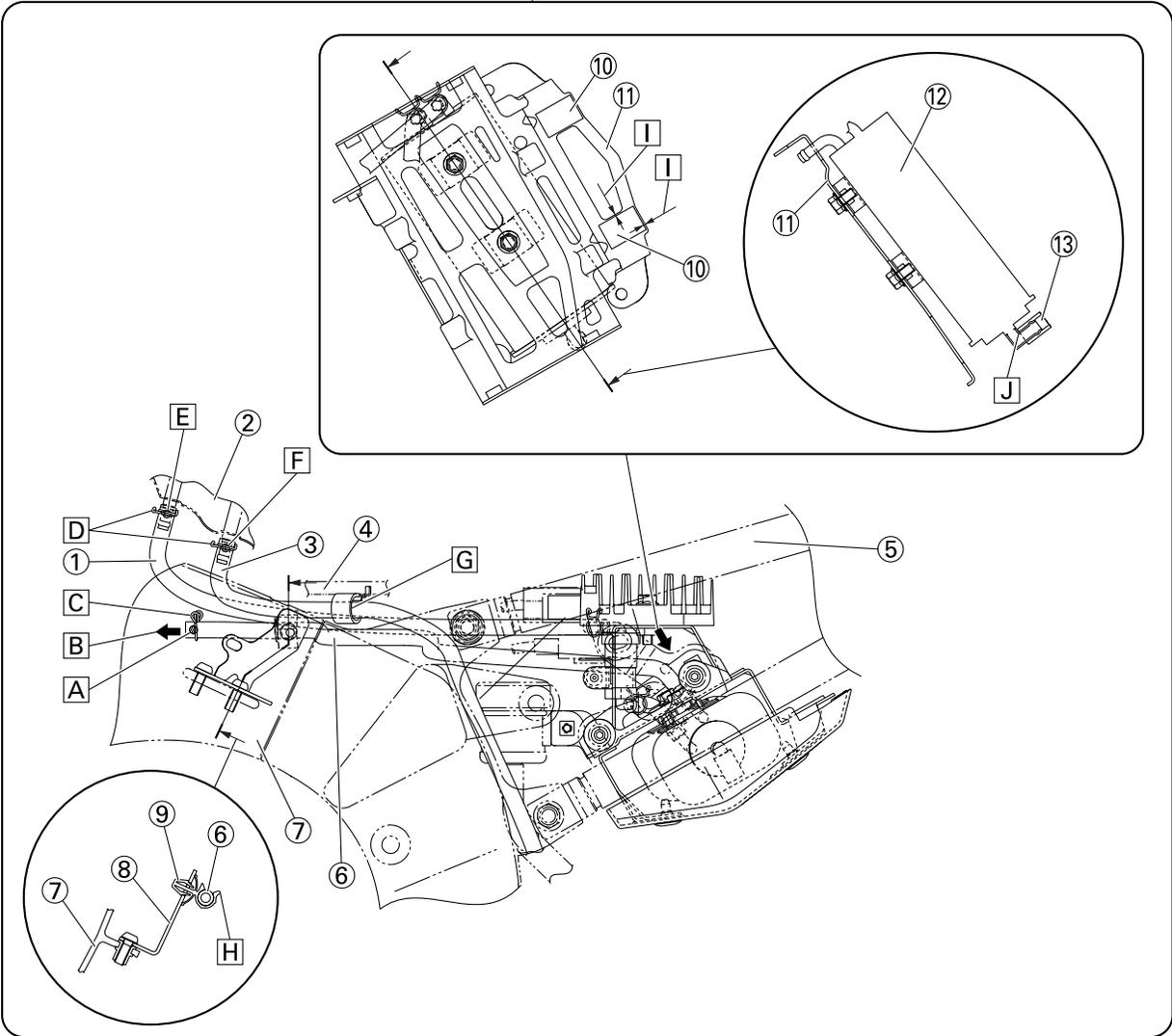
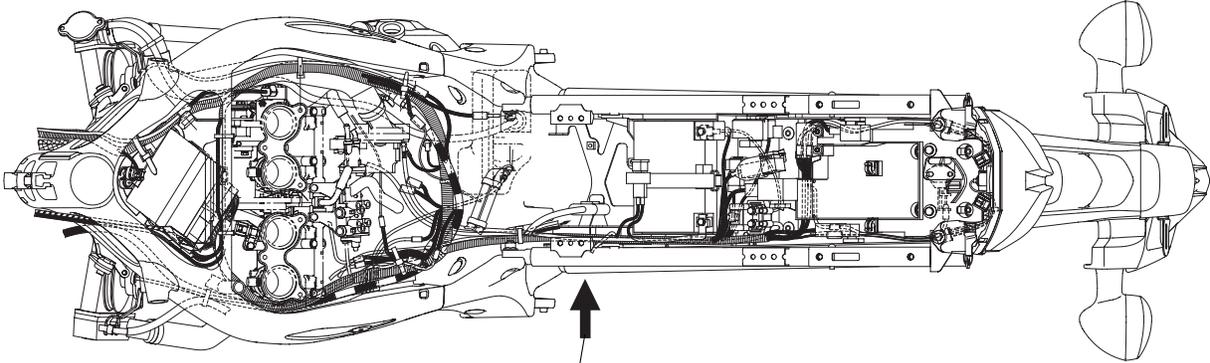
1. Horn
  2. Lower bracket
  3. Front fork assembly
  4. Front brake hose
  5. Brake hose holder
  6. Front brake master cylinder
  7. Swingarm
  8. Rear brake hose
  9. Clamp
- 
- A. Install the brake pipe to touch the projection on the brake caliper (both left and right).
  - B. Install the brake hose, pushing it against the lower headlight stay.
  - C. A parallel line to the front brake master cylinder ceiling surface
  - D. 30–40°
  - E. Center line
  - F. Install the brake pipe so that the white paint mark on the pipe faces to the front of the vehicle.
  - G. Clamp the brake hose, facing the clamp latch to the bottom of the vehicle.
  - H. Insert the brake hose holder claw firmly into the swingarm.
  - I. Install the brake pipe, pushing it in the direction shown in the illustration.

**Canister (top view)  
For California only**



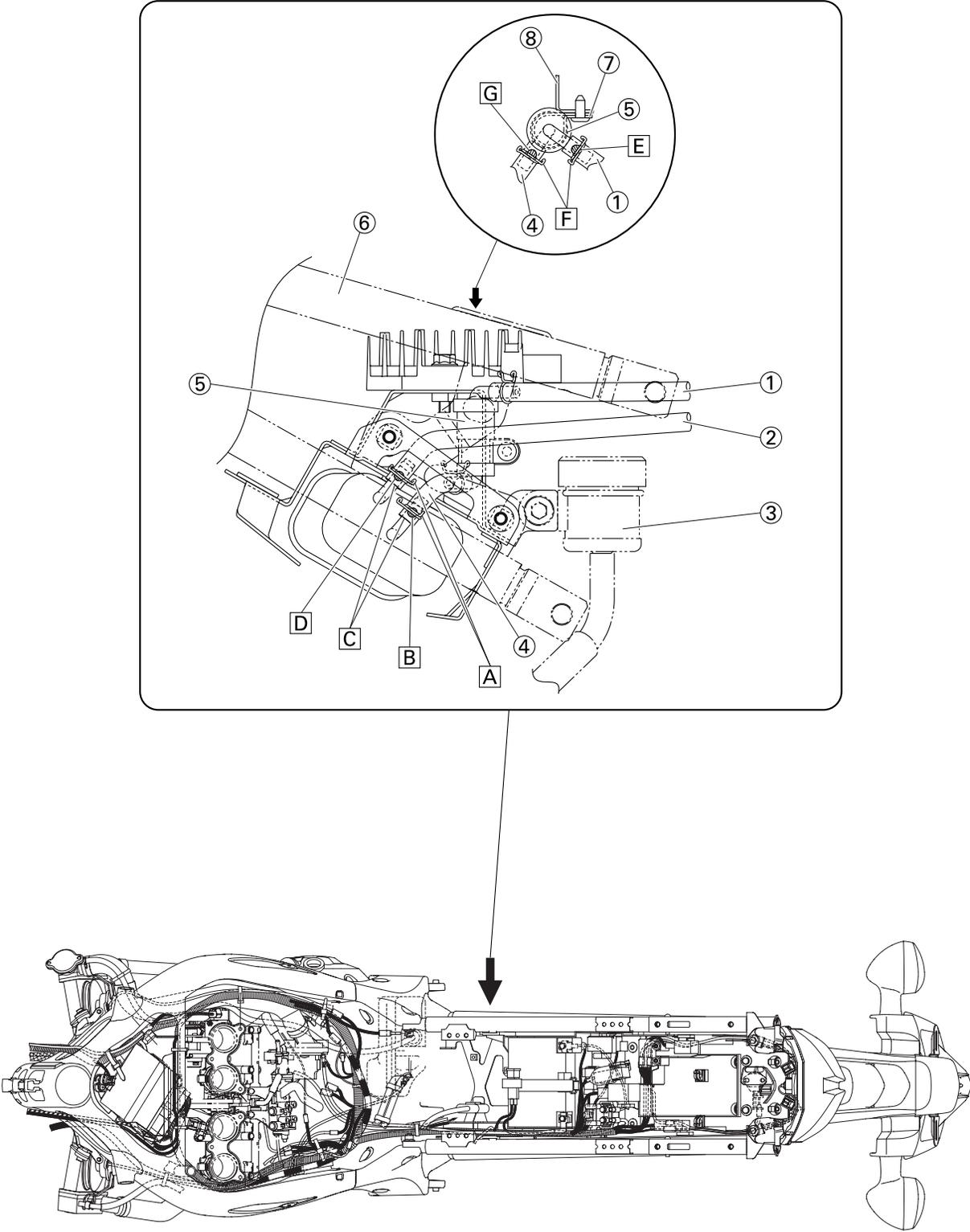
1. Fuel pump bracket
  2. Fuel tank breather hose (fuel tank to roll-over valve)
  3. Fuel hose
  4. Rectifier/regulator
  5. Rear frame
  6. Fuel tank drain hose
  7. Canister purge hose
  8. Frame
  9. Cap
  10. Waterproof coupler
  11. Rectifier/regulator bracket
  12. Grommet
- A. Install the cap to the nut, aligning the outer groove of the cap with the edge of the nut.
- B. Soapy water may be applied during installation.

Canister (left side view)  
For California only



1. Fuel tank breather hose (fuel tank to roll-over valve)
  2. Fuel tank
  3. Fuel tank drain hose
  4. Fuel pump bracket
  5. Rear frame
  6. Canister purge hose
  7. Frame
  8. Canister purge hose stay
  9. Clamp
  10. Damper
  11. Rectifier/regulator bracket
  12. Canister
  13. Canister breather hose
- 
- A. Yellow paint mark
  - B. To the throttle body
  - C. Direct the knob of the clip to the top of the vehicle.
  - D. For the knob of the clip, any direction is acceptable. The clip should not be run onto the spool.
  - E. Install the fuel tank breather hose (fuel tank to rollover valve) with the yellow paint marks facing to the left of the vehicle.
  - F. Install the fuel tank drain hose with the white paint marks facing to the left of the vehicle.
  - G. Pass the fuel tank drain hose through the clamp. The fuel tank drain hose between the fuel tank and clamp should not be bent.
  - H. Clamp the canister purge hose, facing the clamp opening to the top of the vehicle.
  - I. Apply the damper in the area 0–2 mm (0–0.08 in) from the end of the rectifier/regulator bracket (both left and right).
  - J. Push the canister breather hose fully to the end.

**Canister (right side view)  
For California only**



1. Fuel tank breather hose (fuel tank to rollover valve)
  2. Canister purge hose
  3. Brake fluid reservoir
  4. Fuel tank breather hose (rollover valve to canister)
  5. Rollover valve
  6. Rear frame
  7. Clamp
  8. Rectifier/regulator bracket
- 
- A. Direct the knob of the clip to the right of the vehicle.
  - B. Install the fuel tank breather hose (rollover valve to canister) with the white paint marks facing to the right of the vehicle.
  - C. Insert the hose to the end of the bending part of the pipe.
  - D. Install the canister purge hose with the yellow paint marks facing to the right of the vehicle.
  - E. Install the fuel tank breather hose (fuel tank to rollover valve) to the rollover valve with the white paint marks facing to the top. Insert the hose until it touches the rollover valve.
  - F. Direct the knob of the clip to the top of the vehicle. The clip should not be run onto the spool.
  - G. Install the fuel tank breather hose (rollover valve to canister) to the rollover valve with the yellow paint marks facing to the top. Insert the hose until it touches the rollover valve.



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## PERIODIC CHECKS AND ADJUSTMENTS

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# 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.

### TIP

- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

EAS39P2301

### PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

| No. | ITEM  | ROUTINE  | INITIAL                              | ODOMETER READINGS                      |  |   |   |   |   |
|-----|---|--|--------------------------------------|--|--|---|---|---|---|
|     |   |  | 600 mi<br>(1000 km)<br>or<br>1 month | 4000 mi<br>(7000 km)<br>or<br>6 months | 8000 mi<br>(13000 km)<br>or<br>12 months | 12000 mi<br>(19000 km)<br>or<br>18 months | 16000 mi<br>(25000 km)<br>or<br>24 months | 20000 mi<br>(31000 km)<br>or<br>30 months |   |
| 1   | * Fuel line   | <ul style="list-style-type: none"> <li>• Check fuel hoses for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>  |                                      | √                                      | √  | √   | √   | √   | √ |
| 2   | * Spark plugs   | <ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Adjust gap and clean.</li> <li>• Replace every 8000 mi (13000 km) or 12 months.</li> </ul>      |                                      | √                                      | Replace.                                 | √   | Replace.                                  | √   | √ |
| 3   | * Valve clearance   | <ul style="list-style-type: none"> <li>• Check and adjust valve clearance when engine is cold.</li> </ul>  | Every 26600 mi (42000 km)            |  |  |   |   |   |   |
| 4   | * Crankcase breather system                                 | <ul style="list-style-type: none"> <li>• Check breather hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>                                       |                                      | √                                      | √  | √   | √   | √   | √ |
| 5   | * Fuel injection  | <ul style="list-style-type: none"> <li>• Check and adjust engine idle speed and synchronization.</li> </ul>  | √                                    | √                                      | √  | √   | √   | √   | √ |
| 6   | * Exhaust system  | <ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Tighten if necessary.</li> <li>• Replace gasket(s) if necessary.</li> </ul>                   |                                      | √                                      | √  | √   | √   | √   | √ |
| 7   | * Evaporative emission control system (for California only) | <ul style="list-style-type: none"> <li>• Check control system for damage.</li> <li>• Replace if necessary.</li> </ul>  |                                      |  |  | √   |   |   | √ |
| 8   | * Air induction system                                      | <ul style="list-style-type: none"> <li>• Check the air cut-off valve, reed valve, and hose for damage.</li> <li>• Replace any damaged parts if necessary.</li> </ul> |                                      |  |  | √   |   |   | √ |

# PERIODIC MAINTENANCE

EAS39P2302

## GENERAL MAINTENANCE AND LUBRICATION CHART

| No. | ITEM                      | ROUTINE   | INITIAL   | ODOMETER READINGS                      |  |   |   |   |
|-----|---------------------------|---|---|--|--|---|---|---|
|     |                           |   | 600 mi<br>(1000 km)<br>or<br>1 month  | 4000 mi<br>(7000 km)<br>or<br>6 months | 8000 mi<br>(13000 km)<br>or<br>12 months | 12000 mi<br>(19000 km)<br>or<br>18 months | 16000 mi<br>(25000 km)<br>or<br>24 months | 20000 mi<br>(31000 km)<br>or<br>30 months |
| 1   | Air filter element        | <ul style="list-style-type: none"> <li>Replace.</li> </ul>  | Every 24000 mi (37000 km)   |  |  |   |   |   |
| 2   | * Clutch                  | <ul style="list-style-type: none"> <li>Check operation.</li> <li>Adjust or replace cable.</li> </ul>  | √   | √                                      | √  | √   | √   | √   |
| 3   | * Front brake             | <ul style="list-style-type: none"> <li>Check operation, fluid level, and for fluid leakage.</li> <li>Replace brake pads if necessary.</li> </ul>                                    | √   | √                                      | √  | √   | √   | √   |
| 4   | * Rear brake              | <ul style="list-style-type: none"> <li>Check operation, fluid level, and for fluid leakage.</li> <li>Replace brake pads if necessary.</li> </ul>                                    | √   | √                                      | √  | √   | √   | √   |
| 5   | * Brake hoses             | <ul style="list-style-type: none"> <li>Check for cracks or damage.</li> <li>Check for correct routing and clamping.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
|     |                           | <ul style="list-style-type: none"> <li>Replace.</li> </ul>  | Every 4 years   |  |  |   |   |   |
| 6   | * Wheels                  | <ul style="list-style-type: none"> <li>Check runout and for damage.</li> <li>Replace if necessary.</li> </ul>   |   | √                                      | √  | √   | √   | √   |
| 7   | * Tires                   | <ul style="list-style-type: none"> <li>Check tread depth and for damage.</li> <li>Replace if necessary.</li> <li>Check air pressure.</li> <li>Correct if necessary.</li> </ul>      |   | √                                      | √  | √   | √   | √   |
| 8   | * Wheel bearings          | <ul style="list-style-type: none"> <li>Check bearings for smooth operation.</li> <li>Replace if necessary.</li> </ul>   |   | √                                      | √  | √   | √   | √   |
| 9   | * Swingarm pivot bearings | <ul style="list-style-type: none"> <li>Check bearing assemblies for looseness.</li> </ul>   |   | √                                      | √  | √   | √   | √   |
| 10  | 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 500 mi (800 km) and after washing the motorcycle, riding in the rain or riding in wet areas |  |  |   |   |   |
| 11  | * Steering bearings       | <ul style="list-style-type: none"> <li>Check bearing assemblies for looseness.</li> </ul>   | √   | √                                      | √  | √   | √   | √   |
|     |                           | <ul style="list-style-type: none"> <li>Moderately repack with lithium-soap-based grease.</li> </ul>   | Every 12000 mi (19000 km)   |  |  |   |   |   |
| 12  | * Chassis fasteners       | <ul style="list-style-type: none"> <li>Check all chassis fitting and fasteners.</li> <li>Correct if necessary.</li> </ul>   |   | √                                      | √  | √   | √   | √   |
| 13  | Brake lever pivot shaft   | <ul style="list-style-type: none"> <li>Apply silicone grease lightly.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
| 14  | Brake pedal pivot shaft   | <ul style="list-style-type: none"> <li>Apply lithium-soap-based grease lightly.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
| 15  | Clutch lever pivot shaft  | <ul style="list-style-type: none"> <li>Apply lithium-soap-based grease lightly.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
| 16  | Shift pedal pivot shaft   | <ul style="list-style-type: none"> <li>Apply lithium-soap-based grease lightly.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
| 17  | Sidestand pivot           | <ul style="list-style-type: none"> <li>Check operation.</li> <li>Apply lithium-soap-based grease lightly.</li> </ul>  |   | √                                      | √  | √   | √   | √   |
| 18  | * Sidestand switch        | <ul style="list-style-type: none"> <li>Check operation and replace if necessary.</li> </ul>   | √   | √                                      | √  | √   | √   | √   |
| 19  | * Front fork              | <ul style="list-style-type: none"> <li>Check operation and for oil leakage.</li> <li>Replace if necessary.</li> </ul>   |   | √                                      | √  | √   | √   | √   |

# PERIODIC MAINTENANCE

| No. | ITEM                            | ROUTINE  | INITIAL                              | ODOMETER READINGS                      |  |   |   |   |   |
|-----|---------------------------------|--|--------------------------------------|--|--|---|---|---|---|
|     |                                 |  | 600 mi<br>(1000 km)<br>or<br>1 month | 4000 mi<br>(7000 km)<br>or<br>6 months | 8000 mi<br>(13000 km)<br>or<br>12 months | 12000 mi<br>(19000 km)<br>or<br>18 months | 16000 mi<br>(25000 km)<br>or<br>24 months | 20000 mi<br>(31000 km)<br>or<br>30 months |   |
| 20  | * Shock absorber assembly       | <ul style="list-style-type: none"> <li>Check operation and for oil leakage.</li> <li>Replace if necessary.</li> </ul>  |                                      | √                                      | √  | √   | √   | √   | √ |
| 21  | * Rear suspension link pivots   | <ul style="list-style-type: none"> <li>Check operation.</li> <li>Correct if necessary.</li> </ul>  |                                      |  | √  |   |   | √   |   |
| 22  | Engine oil                      | <ul style="list-style-type: none"> <li>Change (warm engine before draining).</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 hoses for cracks or damage.</li> <li>Replace if necessary.</li> </ul>   |                                      | √                                      | √  | √   | √   | √   | √ |
|     |                                 | <ul style="list-style-type: none"> <li>Change with ethylene glycol antifreeze coolant every 24 months.</li> </ul>  |                                      |  |  |   |   | Change.                                   |   |
| 25  | * Front and rear brake switches | <ul style="list-style-type: none"> <li>Check operation.</li> </ul>   | √                                    | √                                      | √  | √   | √   | √   | √ |
| 26  | * Control cables                | <ul style="list-style-type: none"> <li>Apply Yamaha chain and cable lube or engine oil thoroughly.</li> </ul>  | √                                    | √                                      | √  | √   | √   | √   | √ |
| 27  | * Throttle grip                 | <ul style="list-style-type: none"> <li>Check operation.</li> <li>Check throttle grip free play, and adjust if necessary.</li> <li>Lubricate cable and grip housing.</li> </ul> |                                      | √                                      | √  | √   | √   | √   | √ |
| 28  | * Lights, signals and switches  | <ul style="list-style-type: none"> <li>Check operation.</li> <li>Adjust headlight beam.</li> </ul>   | √                                    | √                                      | √  | √   | √   | √   | √ |

## TIP

- Air filter
  - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
  - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
  - After disassembling the brake master cylinders and calipers, always change the fluid. Regularly check the brake fluid levels and fill the reservoirs as required.
  - 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.

EAS21030

## CHECKING THE FUEL LINE

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

1. Remove:
  - Rider 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"
  - Fuel tank drain hose "4"

Cracks/damage → Replace.  
Loose connection → Connect properly.

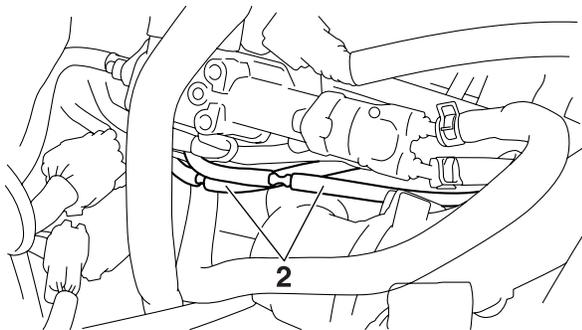
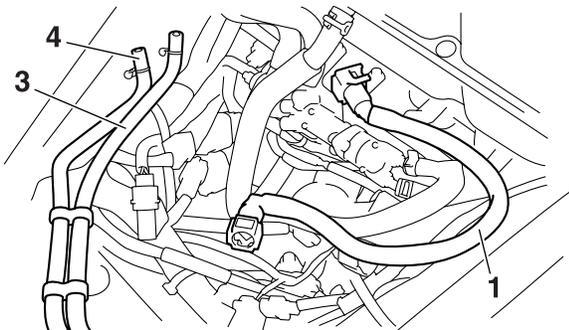
ECA14940

### NOTICE

**Make sure the fuel tank breather hose is routed correctly.**

### TIP

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



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

EAS20680

## CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

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

ECA13320

### NOTICE

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

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

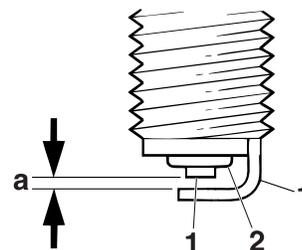


**Manufacturer/model  
NGK/CR9E**

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

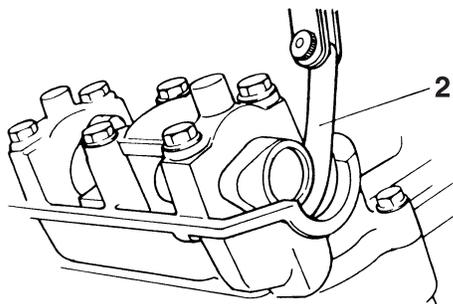


**Spark plug gap  
0.7–0.8 mm (0.028–0.031 in)**





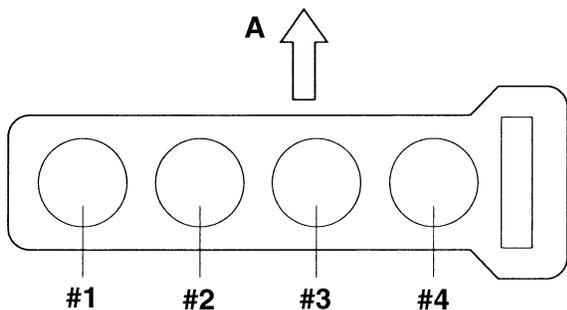
# PERIODIC MAINTENANCE



**TIP**

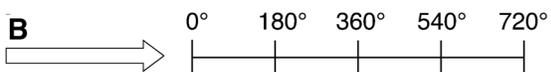
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

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



A. Front

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



|          |    |          |          |          |  |
|----------|----|----------|----------|----------|--|
| <b>C</b> | #1 | <b>D</b> |          |          |  |
|          | #2 |          | <b>D</b> |          |  |
|          | #3 |          |          | <b>D</b> |  |
|          | #4 |          |          | <b>D</b> |  |

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

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



5. Remove:
- Camshaft

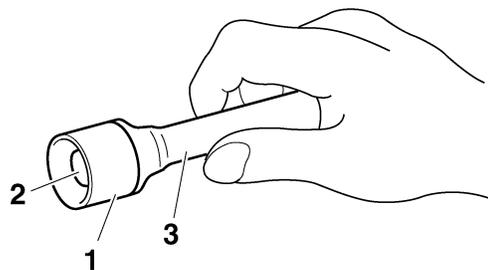
**TIP**

- Refer to “CAMSHAFTS” on page 5-11.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

6. Adjust:
- Valve clearance



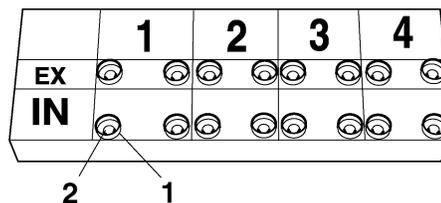
- a. Remove the valve lifter “1” and the valve pad “2” with a valve lapper “3”.



**Valve lapper**  
**90890-04101**  
**Valve lapping tool**  
**YM-A8998**

**TIP**

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



# PERIODIC MAINTENANCE

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

Example:

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

Measured valve clearance = 0.25 mm (0.010 in)

$0.25 \text{ mm (0.010 in)} - 0.20 \text{ mm (0.008 in)} = 0.05 \text{ mm (0.002 in)}$

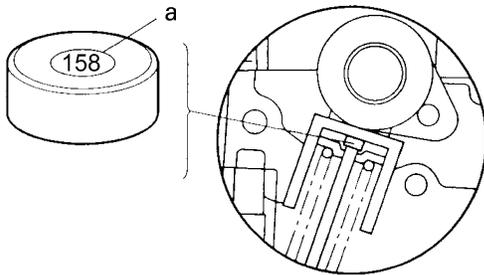
- c. Check the thickness of the current valve pad.

**TIP**

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

Example:

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



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

Example:

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

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            |

**TIP**

Refer to the following table for the available valve pads.

|                      |   |
|----------------------|---|
| Valve pad range      | Nos. 120–240                                    |
| Valve pad thickness  | 1.20–2.40 mm (0.047–0.094 in)                   |
| Available valve pads | 25 thicknesses in 0.05 mm (0.002 in) increments |

Example:

Valve pad number = 163

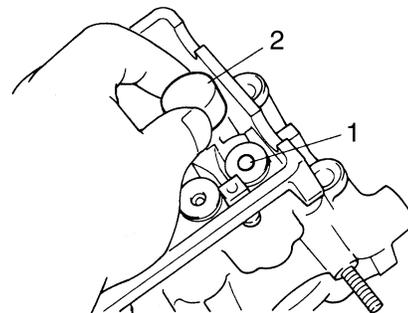
Rounded value = 165

New valve pad number = 165

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

**TIP**

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



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

|   |  |
|---|--|
|  | <b>Camshaft cap bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b> |
|---|--|

**TIP**

- Refer to “CAMSHAFTS” on page 5-11.
- 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

**TIP**

For installation, reverse the removal procedure.

EAS21070

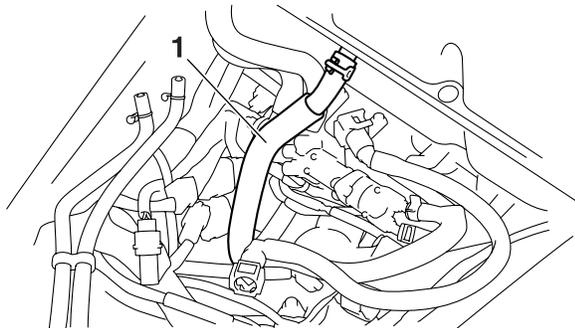
**CHECKING THE CRANKCASE BREATHER HOSE**

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

ECA13450

**NOTICE**

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



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

EAS20610

**ADJUSTING THE ENGINE IDLING SPEED**

**TIP**

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

1. Start the engine and let it warm up for several minutes.
2. Install:
  - Digital tachometer  
(Use goods on the market)
3. Check:
  - Engine idling speed  
Out of specification → Adjust.

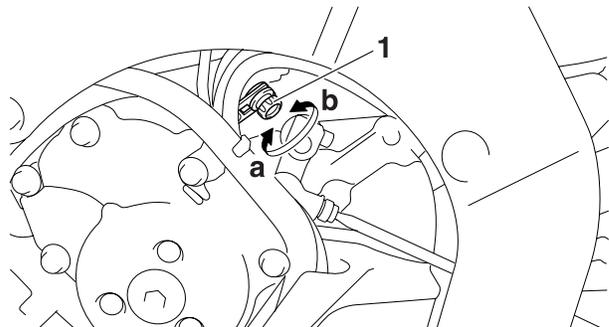
|  |  |
|--|--|
|  | <b>Engine idling speed</b><br><b>1150–1250 r/min</b> |
|--|--|

4. Adjust:
  - Engine idling speed



- a. Turn the idle adjusting screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

|   |
|---|
| <b>Direction "a"</b><br>Engine idling speed is increased. |
| <b>Direction "b"</b><br>Engine idling speed is decreased. |

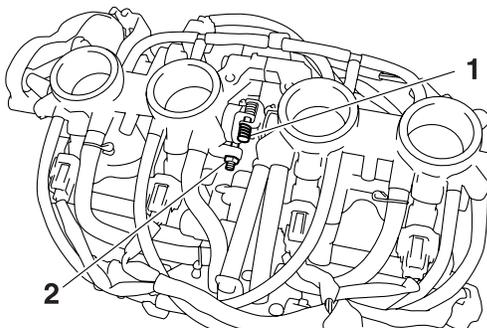


ECA39P1302

**NOTICE**

- **Do not touch synchronizing screw "1". Could affect the engine idling speed or cause malfunction in other related parts.**
- **Do not touch the throttle adjust screw "2". Could affect the engine idling speed or cause malfunction in other related parts.**

- Clean the throttle bodies only if they cannot be synchronized using the air screw. Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-10.
- If they cannot be synchronized, replace the throttle body assembly.



5. Adjust:
  - Throttle cable free play  
Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-29.



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

EAS20571

## SYNCHRONIZING THE THROTTLE BODIES

### TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body hoses
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Breather hoses
- Vacuum hoses
- Canister purge hoses (for California only)
- Fast idle plunger outlet hose
- Fast idle plunger inlet hose

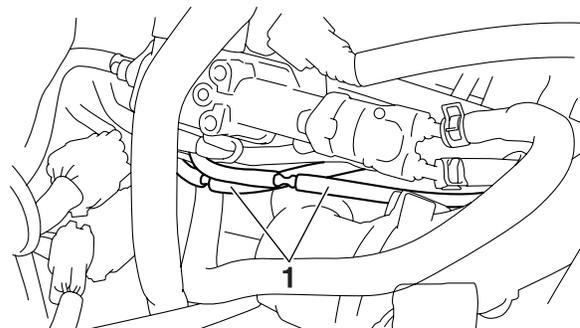
### Checking the throttle bodies synchronization

1. Stand the vehicle on a level surface.

### TIP

Place the vehicle on a suitable stand.

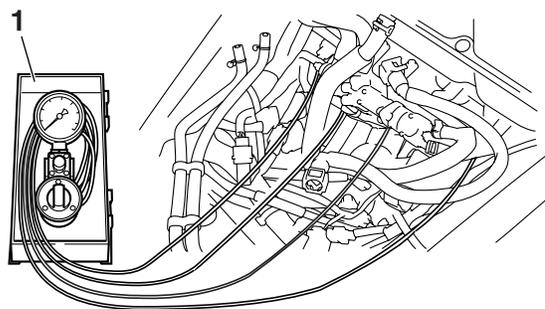
2. Remove:
  - Rider seat  
Refer to “GENERAL CHASSIS” on page 4-1.
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
  - Air filter case  
Refer to “GENERAL CHASSIS” on page 4-1.
3. Remove:
  - Synchronizing hoses “1”



4. Install:
  - Vacuum gauge “1”  
(onto the synchronizing hose)
  - Digital tachometer  
(Use goods on the market)

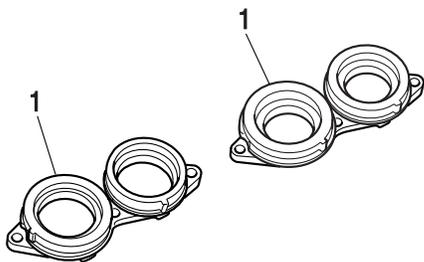


**Vacuum gauge**  
90890-03094  
**Vacuummate**  
YU-44456



5. Install:
  - Air filter case  
Refer to “GENERAL CHASSIS” on page 4-1.
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
6. Check:
  - Throttle bodies synchronization





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

EAS21081

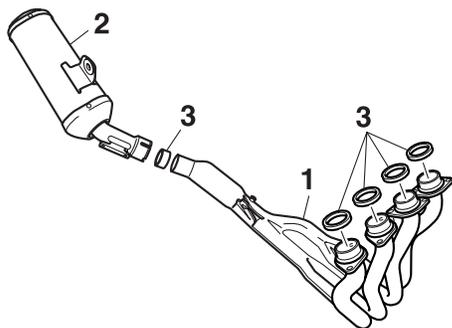
## CHECKING THE EXHAUST SYSTEM

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

1. Remove:
  - Radiator lower bracket
 Refer to "RADIATOR" on page 6-1.
2. Check:
  - Exhaust pipe "1"
  - Muffler "2"
 Cracks/damage → Replace.
  - Gaskets "3"
 Exhaust gas leaks → Replace the gasket.
3. Check:
  - Tightening torque



|   |
|---|
| <b>Exhaust pipe nut</b>                           |
| 20 Nm (2.0 m·kgf, 14 ft·lbf)                      |
| <b>Exhaust pipe and muffler bolt</b>              |
| 20 Nm (2.0 m·kgf, 14 ft·lbf)                      |
| <b>Exhaust pipe and exhaust pipe bracket bolt</b> |
| 20 Nm (2.0 m·kgf, 14 ft·lbf)                      |
| <b>Muffler and muffler bracket bolt</b>           |
| 48 Nm (4.8 m·kgf, 35 ft·lbf)                      |

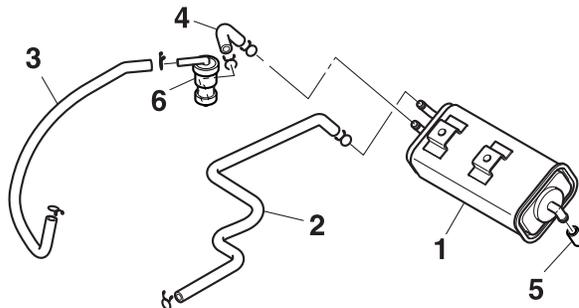


4. Install:
  - Radiator lower bracket
 Refer to "RADIATOR" on page 6-1.

EAS21090

## CHECKING THE CANISTER (for California only)

1. Remove:
  - Rider seat
  - Left side cover
  - Right side cover
 Refer to "GENERAL CHASSIS" on page 4-1.
  - Fuel tank
 Refer to "FUEL TANK" on page 7-1.
2. Check:
  - Canister "1"
  - Canister purge hose "2"
  - Fuel tank breather hose (fuel tank to rollover valve) "3"
  - Fuel tank breather hose (rollover valve to canister) "4"
  - Canister breather hose "5"
 Cracks/damage → Replace.
  - Rollover valve "6"
 Refer to "CHECKING THE ROLLOVER VALVE (for California only)" on page 7-4.



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

EAS39P1306

## CHECKING THE AIR INDUCTION SYSTEM

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

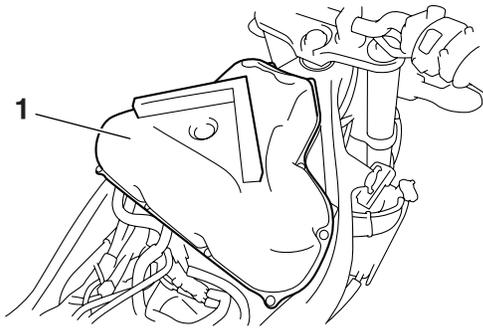
EAS20961

## REPLACING THE AIR FILTER ELEMENT

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

2. Remove:

- Air filter case cover “1”  
Refer to “GENERAL CHASSIS” on page 4-1.

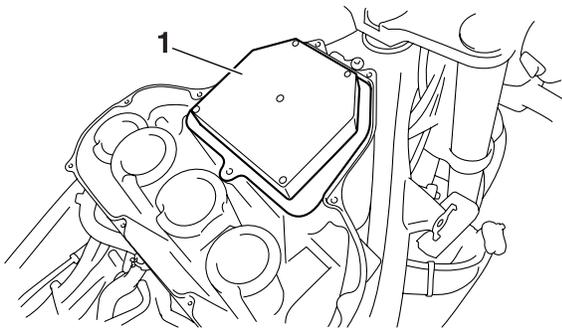


3. Check:

- Air filter element “1”
- Air filter seal  
Damage → Replace.

**TIP**

- Replace the air filter element every 37000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.



4. Install:

- Air filter element
- Air filter case cover

ECA14401

**NOTICE**

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

**TIP**

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

5. Install:

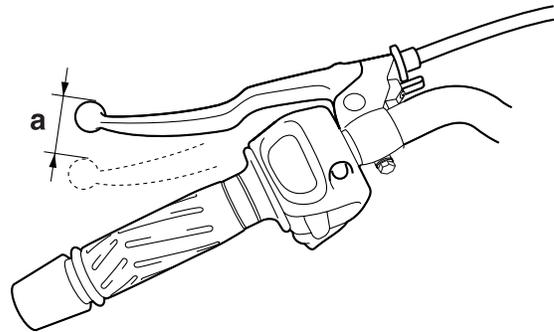
- Fuel tank  
Refer to “FUEL TANK” on page 7-1.
- Rider seat  
Refer to “GENERAL CHASSIS” on page 4-1.

EAS20870

**ADJUSTING THE CLUTCH CABLE FREE PLAY**

1. Check:

- Clutch cable free play “a”  
Out of specification → Adjust.



2. Adjust:

- Clutch cable free play

**Handlebar side**

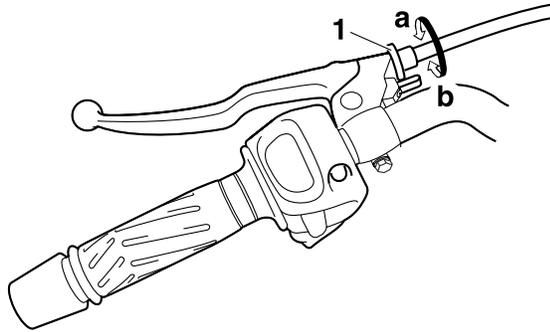
- a. Turn the adjusting bolt “1” in direction “a” or “b” until the specified clutch cable free play is obtained.

**Direction “a”**

Clutch cable free play is increased.

**Direction “b”**

Clutch cable free play is decreased.



**TIP**

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**

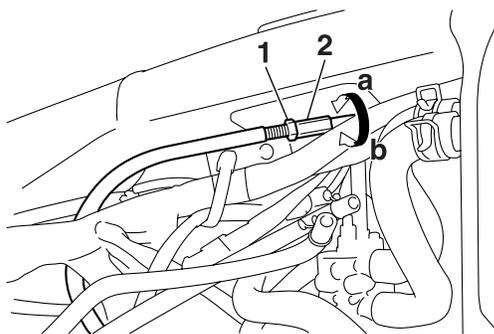
- a. Loosen the locknut "1".
- b. Turn the adjusting nut "2" in direction "a" or "b" until the specified clutch cable free play is obtained.

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

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

- c. Tighten the locknut "1".

**Locknut**  
7 Nm (0.7 m·kgf, 5.1 ft·lbf)



EAS39P1307

**CHECKING THE BRAKE OPERATION**

1. Check:
  - Brake operation  
Brake not working properly → Check the brake system.  
Refer to "FRONT BRAKE" on page 4-18 and "REAR BRAKE" on page 4-31.

**TIP**

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

EAS21240

**CHECKING THE BRAKE FLUID LEVEL**

1. Stand the vehicle on a level surface.

**TIP**

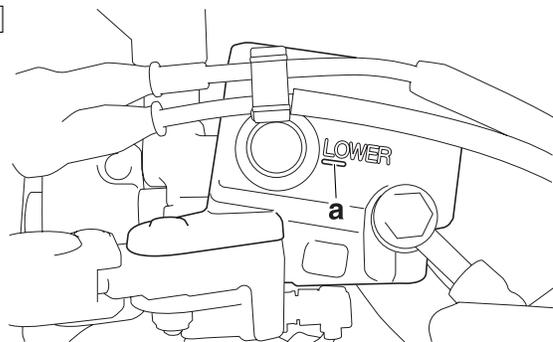
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

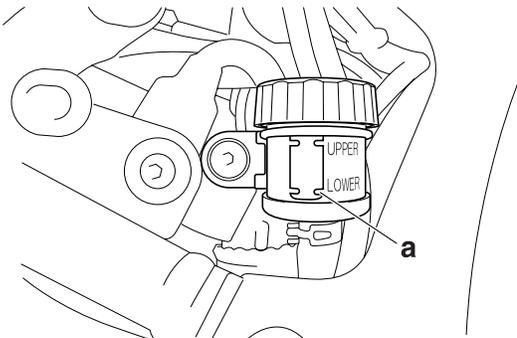
- Brake fluid level  
Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.

**Recommended fluid**  
DOT 4

A



B



- 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

### NOTICE

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

### TIP

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

EAS21160

## ADJUSTING THE FRONT DISC BRAKE

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

### TIP

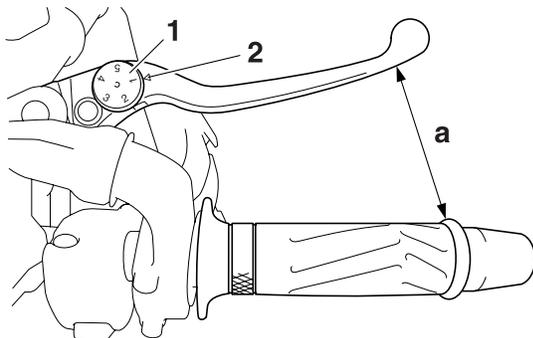
- While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark "2" on the brake lever holder.

#### Position #1

Distance "a" is the largest.

#### Position #5

Distance "a" is the smallest.



EWA39P2301

### WARNING

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

ECA13490

### NOTICE

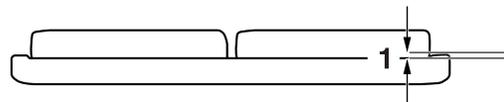
After adjusting the brake lever position, make sure there is no brake drag.

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 "1" almost touch the brake disc → Replace the brake pads as a set.  
Refer to "FRONT BRAKE" on page 4-18.



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·kgf, 13 ft·lbf)

EWA39P1302

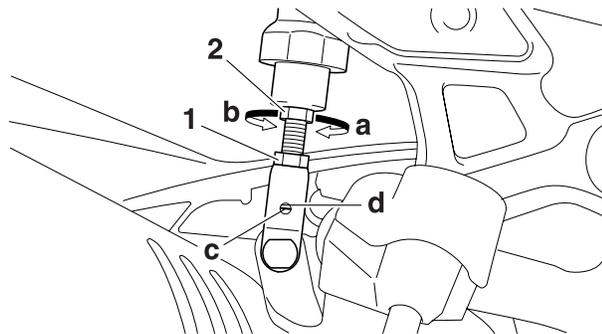
**WARNING**

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

ECA13510

**NOTICE**

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



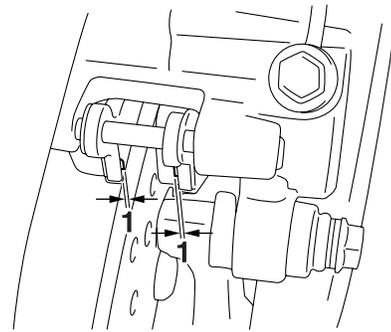
2. Adjust:
  - Rear brake light switch
 Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-28.

EAS21260

**CHECKING THE REAR BRAKE PADS**

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
  - Rear brake pad
 Wear indicators “1” almost touch the brake disc → Replace the brake pads as a set.  
Refer to “REAR BRAKE” on page 4-31.



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.

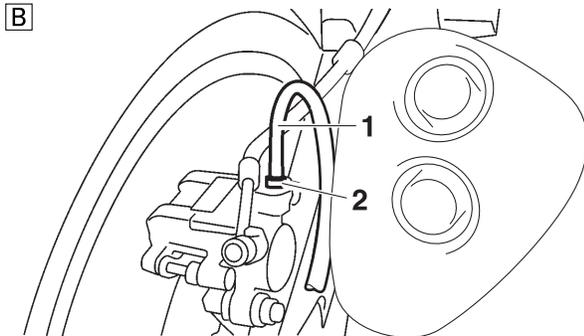
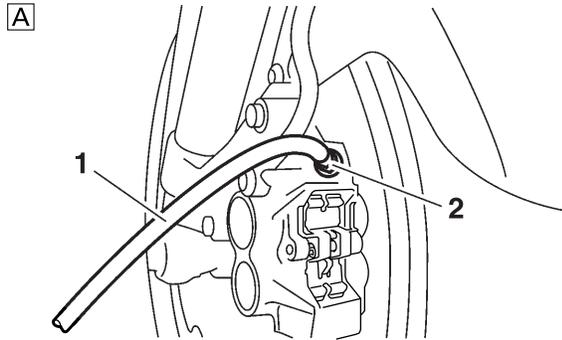
**TIP**

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the 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
- B. Rear

- 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.

**TIP**

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

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- 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·kgf, 3.6 ft·lbf)

- k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.

EWA13110

**WARNING**

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

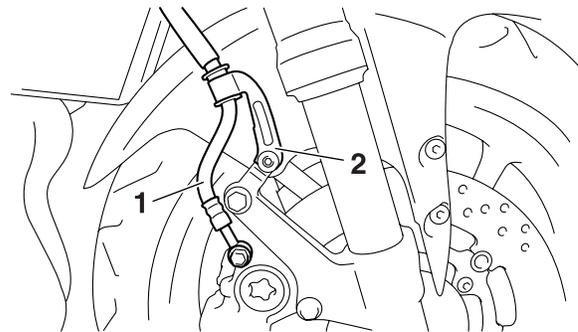


EAS21280

**CHECKING THE FRONT BRAKE HOSES**

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

1. Check:
  - Brake hose "1"
  - Cracks/damage/wear → Replace.
2. Check:
  - Brake hose holder "2"
  - Loose → Tighten the holder bolt.

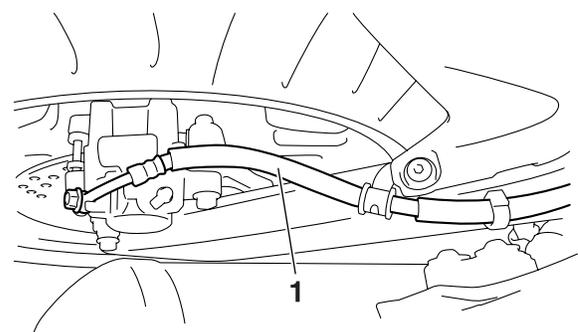


3. Hold the vehicle upright and apply the brake several times.
4. Check:
  - Brake hose
  - Brake fluid leakage → Replace the damaged hose.
  - Refer to "FRONT BRAKE" on page 4-18.

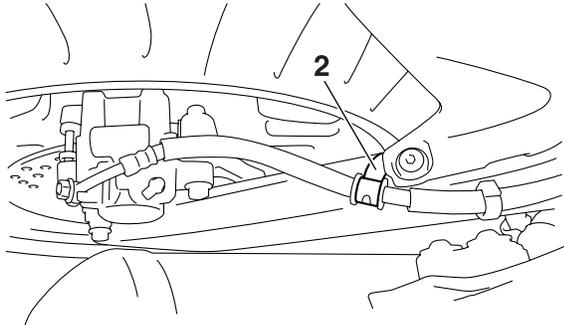
EAS21290

**CHECKING THE REAR BRAKE HOSE**

1. Check:
  - Brake hose "1"
  - Cracks/damage/wear → Replace.



2. Check:
  - Brake hose holder “2”  
Loose → Tighten the holder bolt.



3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
  - Brake hose  
Brake fluid leakage → Replace the damaged hose.  
Refer to “REAR BRAKE” on page 4-31.

EAS21670

## CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260



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

### TIP

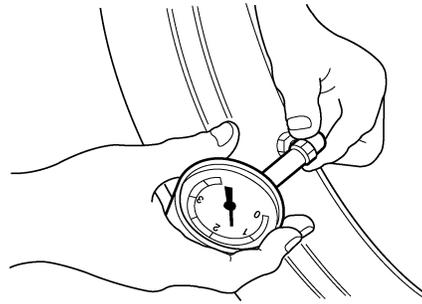
After a tire or wheel has been changed or replaced, always balance the wheel.

EAS21650

## CHECKING THE TIRES

The following procedure applies to both of the tires.

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



EWA13180



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

**NEVER OVERLOAD THE VEHICLE.**



Tire air pressure (measured on cold tires)

Loading condition  
0–90 kg (0–198 lb)

Front  
250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

Rear  
290 kPa (2.90 kgf/cm<sup>2</sup>, 42 psi)

Loading condition  
90–198 kg (198–437 lb) (USA)  
90–197 kg (198–434 lb) (California)

Front  
250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

Rear  
290 kPa (2.90 kgf/cm<sup>2</sup>, 42 psi)

High-speed riding

Front  
250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

Rear  
290 kPa (2.90 kgf/cm<sup>2</sup>, 42 psi)

Maximum load  
198 kg (437 lb) (USA)  
197 kg (434 lb) (California)

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

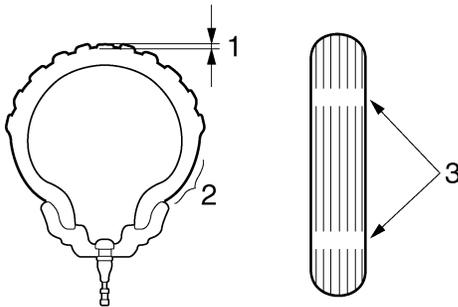
2. Check:

- Tire surfaces  
Damage/wear → Replace the tire.

EWA13190

**WARNING**

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



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



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

EWA14090

**WARNING**

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



**Front tire**  
**Size**  
120/70 ZR17M/C (58W)  
**Manufacturer/model**  
BRIDGESTONE/BT021F BB



**Rear tire**  
**Size**  
180/55 ZR17M/C (73W)  
**Manufacturer/model**  
BRIDGESTONE/BT021R BB

EWA13210

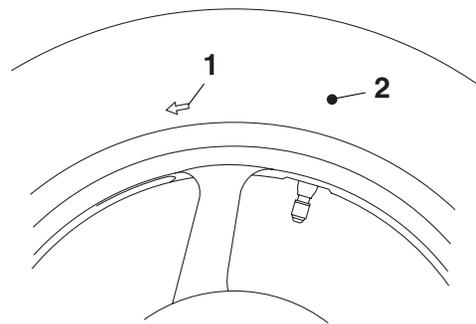
**WARNING**

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.

**TIP**

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

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



EAS39P1308

**CHECKING THE WHEEL BEARINGS**

The following procedure applies to all of the wheel bearings.

1. Check:
  - Wheel bearings  
Refer to "CHECKING THE FRONT WHEEL" on page 4-7 and "CHECKING THE REAR WHEEL" on page 4-14.

EAS39P1309

**CHECKING THE SWINGARM OPERATION**

1. Check:
  - Swingarm operation  
Swingarm not working properly → Check the swingarm.  
Refer to "SWINGARM" on page 4-66.
2. Check:
  - Swingarm excessive play  
Refer to "SWINGARM" on page 4-66.

EAS21390

**ADJUSTING THE DRIVE CHAIN SLACK**

ECA13550

**NOTICE**

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

# PERIODIC MAINTENANCE

keep the drive chain slack within the specified limits.

**TIP**

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

1. Stand the vehicle on a level surface.

EWA13120

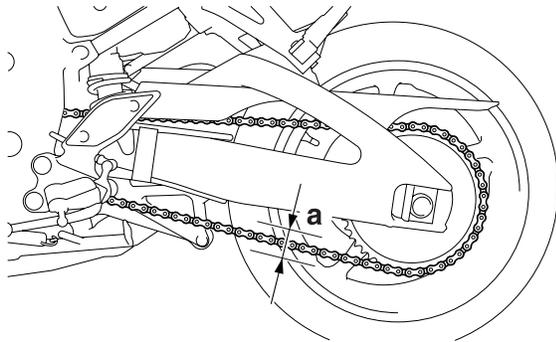


Securely support the vehicle so that there is no danger of it falling over.

**TIP**

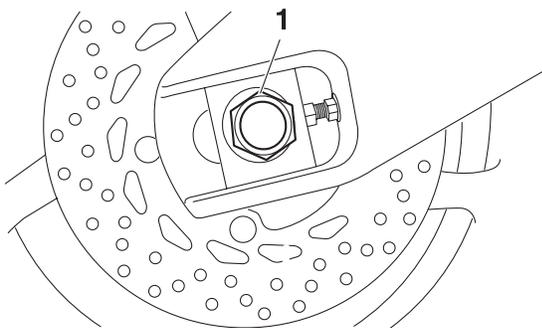
Place the vehicle on a suitable stand so that the rear wheel is elevated.

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



|  |   |
|--|---|
|  | <p><b>Drive chain slack</b><br/>20.0–30.0 mm (0.79–1.18 in)</p> |
|--|---|

4. Loosen:
  - Wheel axle nut "1"

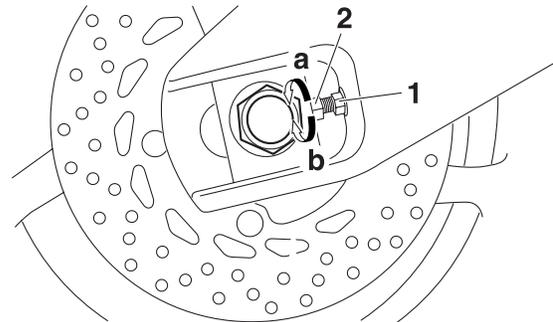


5. Adjust:
  - Drive chain slack



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

|  |
|--|
| <p><b>Direction "a"</b><br/>Drive chain is tightened.</p> <p><b>Direction "b"</b><br/>Drive chain is loosened.</p> |
|--|



**TIP**

- To maintain the proper wheel alignment, adjust both sides evenly.
- The difference of the adjusting block should be 0.5 mm (0.02 in) or less.
- There should be no clearance between the adjusting block and adjusting bolt.

- c. Tighten the wheel axle nut to specification.

|  |  |
|--|--|
|  | <p><b>Wheel axle nut</b><br/>150 Nm (15 m·kgf, 108 ft·lbf)</p> |
|--|--|

- d. Tighten the locknuts to specification.

|  |  |
|--|--|
|  | <p><b>Locknut</b><br/>16 Nm (1.6 m·kgf, 12 ft·lbf)</p> |
|--|--|



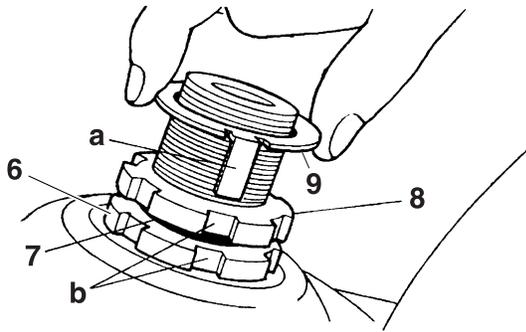
EAS21440

**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





5. Install:
- Upper bracket  
Refer to "HANDLEBAR" on page 4-44.

EAS39P1303

### LUBRICATING THE BRAKE LEVER

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



**Recommended lubricant**  
**Silicone grease**

EAS39P1304

### LUBRICATING THE CLUTCH LEVER

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



**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**

EAS21380

### ADJUSTING THE SHIFT PEDAL

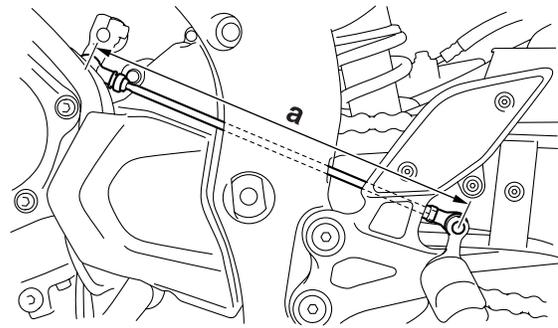
#### TIP

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

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



**Installed shift rod length**  
**304.1–306.1 mm (11.97–12.05 in)**

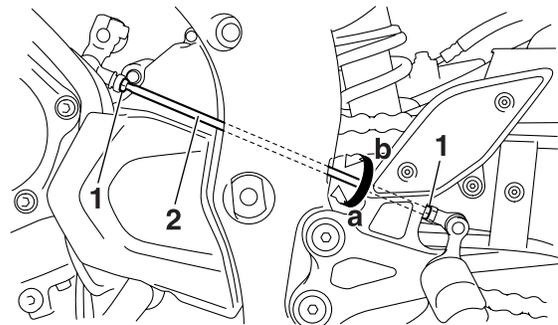


2. Adjust:
- Installed shift rod length



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

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



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



EAS21720

### LUBRICATING THE SIDESTAND

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



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

EAS39P1310

### CHECKING THE SIDESTAND SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-93.

EAS21531

## CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

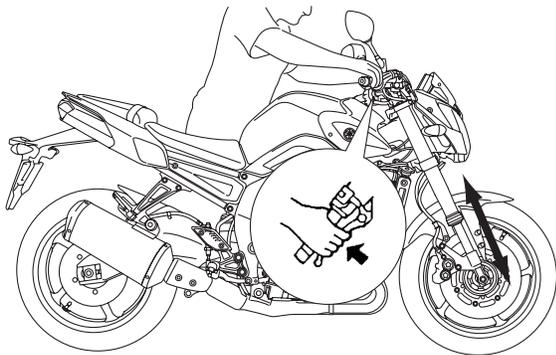
EWA13120



**WARNING**

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

2. Check:
  - Inner tube  
Damage/scratches → Replace.
  - Front fork leg  
Oil leaks between inner tube and outer tube → Replace the oil seal.
3. Hold the vehicle upright and apply the front brake.
4. Check:
  - Front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.  
Rough movement → Repair.  
Refer to “FRONT FORK” on page 4-49.



EAS21740

## LUBRICATING THE REAR SUSPENSION

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



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

EAS39P1311

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to “CHECKING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-63.

EAS21590

## 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

#### NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Spring preload



- a. Adjust the spring preload with the special wrench “1” and extension bar “2” included in the owner’s tool kit.
- b. Turn the adjusting ring “3” in direction “a” or “b”.
- c. Align the desired position on the adjusting ring with the stopper “4”.

#### Direction “a”

Spring preload is increased (suspension is harder).

#### Direction “b”

Spring preload is decreased (suspension is softer).



#### Spring preload adjusting positions

Minimum

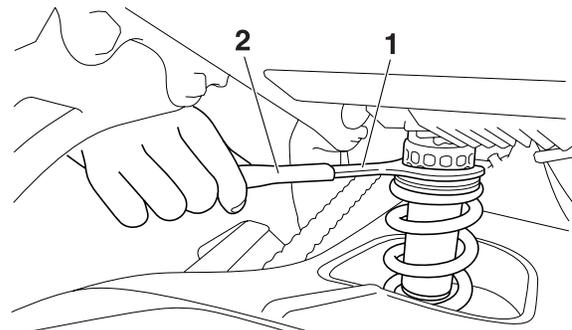
1

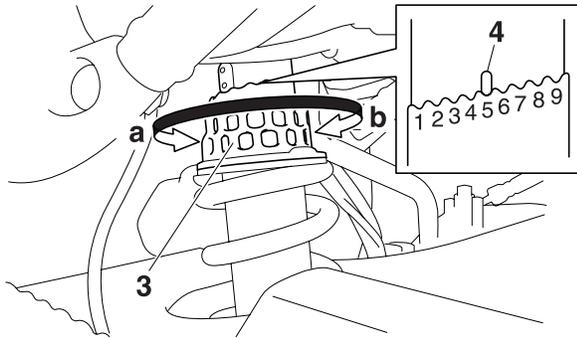
Standard

5

Maximum

9





EAS39P1312

## CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 4-64.

EAS20731

## CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

### TIP

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

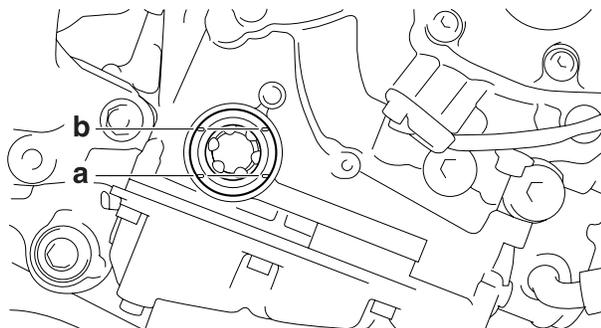
2. Start the engine, warm it up for several minutes, and then turn it off.

3. 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.

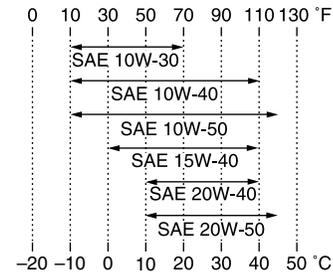


Recommended brand  
**YAMALUBE**

Type

SAE 10W-30, SAE 10W-40,  
SAE 10W-50, SAE 15W-40,  
SAE 20W-40 or SAE 20W-50

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



ECA13361

### NOTICE

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

### TIP

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

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

5. Check the engine oil level again.

### TIP

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

EAS20791

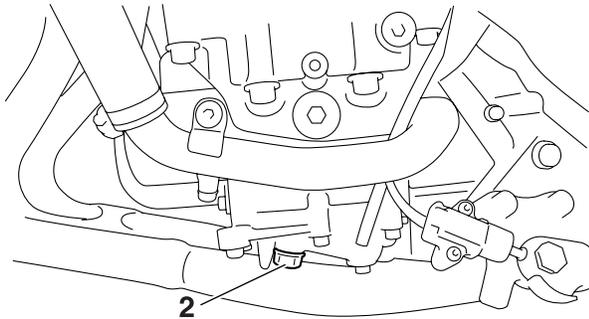
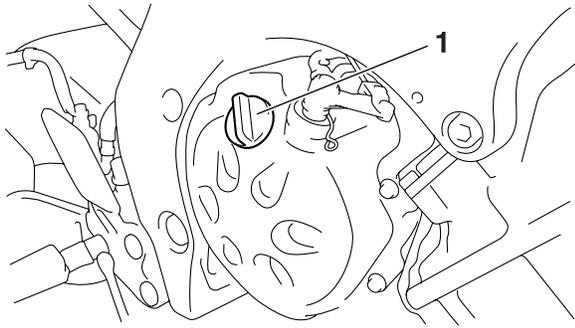
## CHANGING THE ENGINE OIL

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)

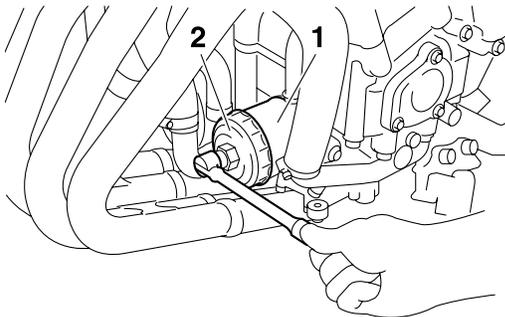


4. Drain:
  - Engine oil (completely from the crankcase)
5. If the oil filter cartridge is also to be replaced, perform the following procedure.

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



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

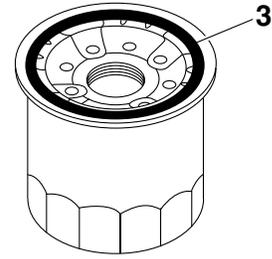


- b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of lithium-soap-based grease.

ECA13390

**NOTICE**

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



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



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

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



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

7. Fill:
  - Crankcase (with the specified amount of the recommended engine oil)



**Engine oil quantity**  
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)

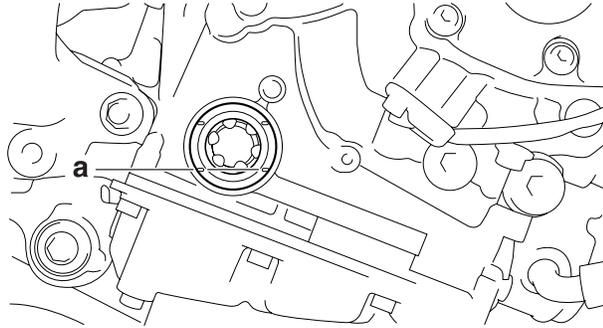
8. Install:
  - Engine oil filler cap (along with the O-ring **New**)
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
  - Engine (for engine oil leaks)
11. Check:
  - Engine oil level (Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-23.)

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

#### NOTICE

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

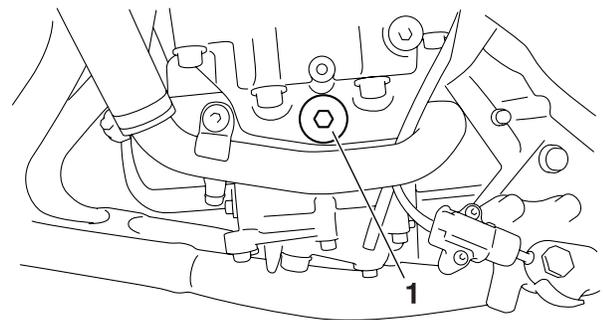
### 3. Remove:

- Oil gallery bolt “1”

EWA12980

#### WARNING

The engine, muffler and engine oil are extremely hot.

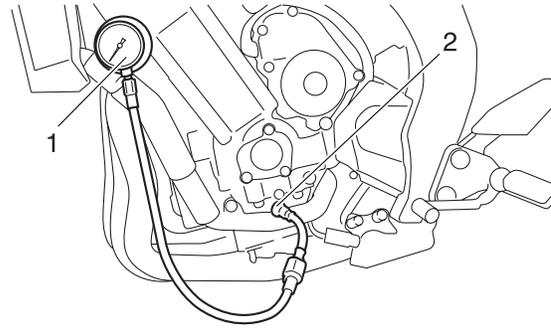


### 4. Install:

- 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)



**Oil pressure**  
230.0 kPa/5000 r/min (2.30 kgf/cm<sup>2</sup>/5000 r/min, 33.4 psi/5000 r/min)  
**Oil temperature**  
75.0–95.0 °C (167.00–203.00 °F)

Out of specification → Check.

| 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



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

ECA39P1301

#### NOTICE

Be careful not to tighten too much.

EAS21110

## CHECKING THE COOLANT LEVEL

### 1. Stand the vehicle on a level surface.

#### TIP

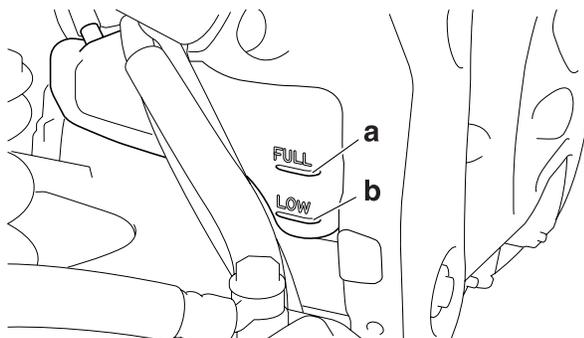
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

## 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

### NOTICE

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

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

## 4. Check:

- Coolant level

### TIP

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

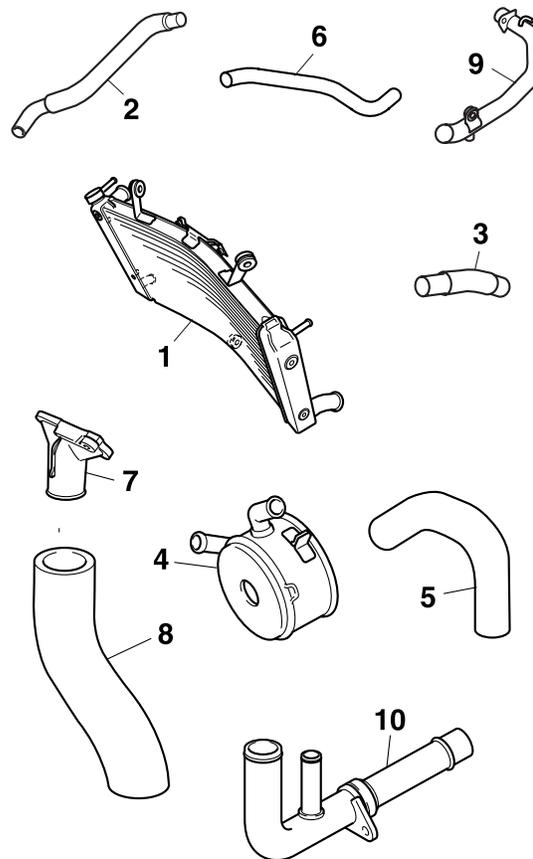
EAS21120

### 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, “OIL COOLER” on page 6-5, “THERMOSTAT” on page 6-7 and “WATER PUMP” on page 6-11.



EAS21131

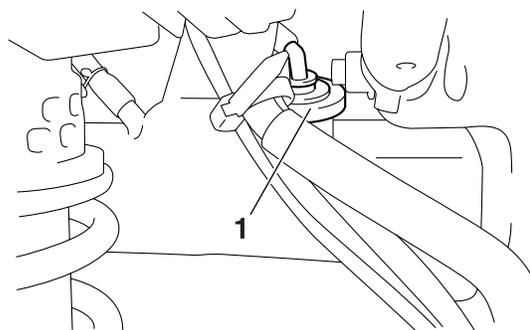
### CHANGING THE COOLANT

#### 1. Remove:

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

#### 2. Remove:

- Coolant reservoir cap “1”

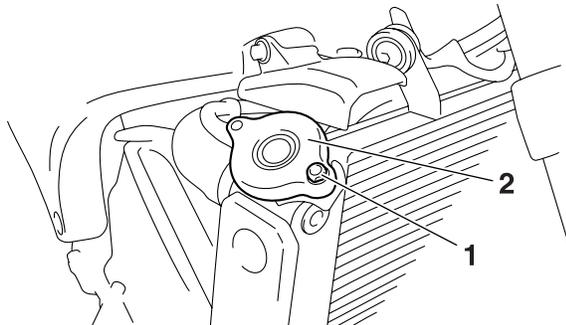


3. Remove:
  - Coolant reservoir tank
4. Disconnect:
  - Coolant reservoir hose
5. Drain:
  - Coolant  
(from the coolant reservoir)
6. Remove:
  - Radiator cap bolt "1"
  - Radiator cap "2"

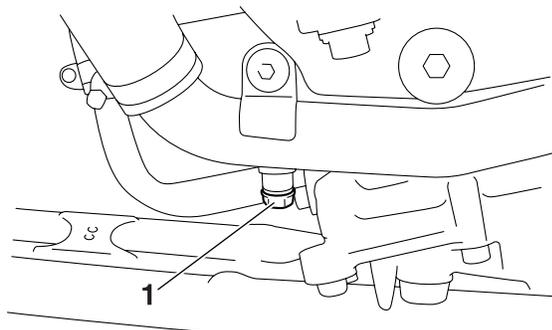
EWA13030

**⚠ 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.**



7. Remove:
  - Coolant drain bolt "1"  
(along with the copper washer)



8. Drain:
  - Coolant  
(from the engine and radiator)
9. Install:
  - Coolant drain bolt  
(along with the copper washer **New**)



**Coolant drain bolt**  
**7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

10. Connect:
  - Coolant reservoir hose
11. Install:
  - Coolant reservoir tank
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)  
**Radiator capacity (including all routes)**  
2.50 L (2.64 US qt, 2.20 Imp.qt)  
**Coolant reservoir capacity (up to the maximum level mark)**  
0.25 L (0.26 US qt, 0.22 Imp.qt)

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

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

**NOTICE**

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

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

13. Install:

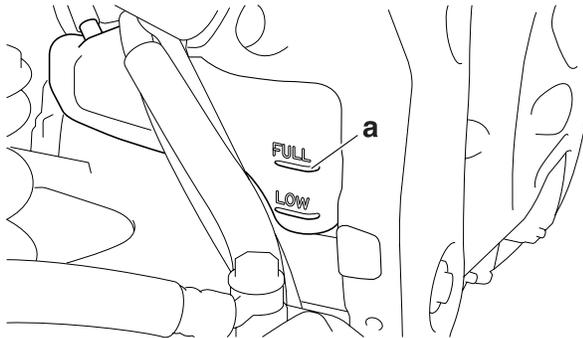
- Radiator cap
- Radiator cap bolt



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

14. Fill:

- Coolant reservoir (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 3-25.

### TIP

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

18. Install:

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

EAS39P1313

## CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to “ELECTRICAL COMPONENTS” on page 8-93.

EAS21330

## ADJUSTING THE REAR BRAKE LIGHT SWITCH

### TIP

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

1. Check:

- Rear brake light operation timing  
Incorrect → Adjust.

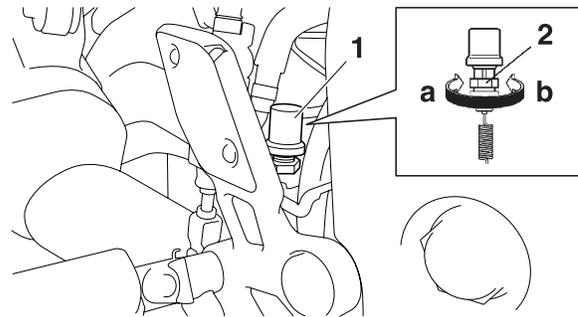
2. Adjust:

- Rear brake light operation timing



- a. Hold the main body “1” of the rear brake light switch so that it does not rotate and turn the adjusting nut “2” in direction “a” or “b” until the rear brake light comes on at the proper time.

**Direction “a”**  
Brake light comes on sooner.  
**Direction “b”**  
Brake light comes on later.



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**

**TIP**

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

EAS20630

## ADJUSTING THE THROTTLE CABLE FREE PLAY

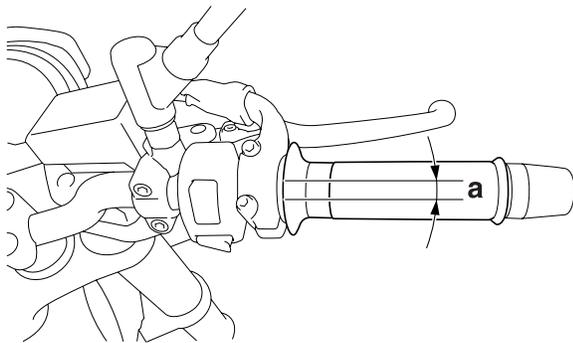
**TIP**

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

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



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



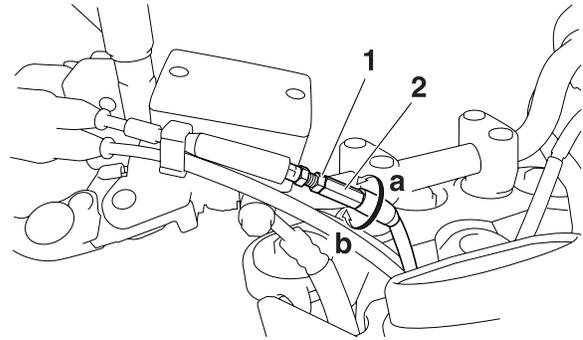
2. Adjust:
  - Throttle cable free play



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

**Direction “a”**  
**Throttle cable free play is increased.**  
**Direction “b”**  
**Throttle cable free play is decreased.**

- c. Tighten the locknut “1”.



EWA39P1301



**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.



EAS21760

## CHECKING AND CHARGING THE BATTERY

Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-102.

EAS21770

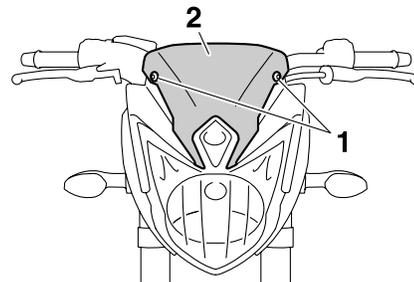
## CHECKING THE FUSES

Refer to “CHECKING THE FUSES” on page 8-101.

EAS21790

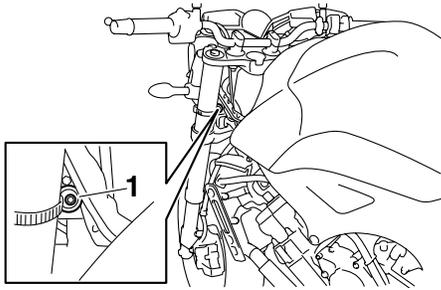
## REPLACING THE HEADLIGHT BULB

1. Remove:
  - Headlight top cover bolts “1”
  - Headlight top cover “2”

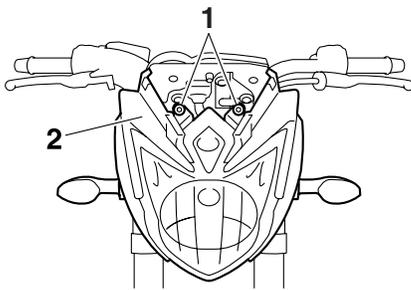


# PERIODIC MAINTENANCE

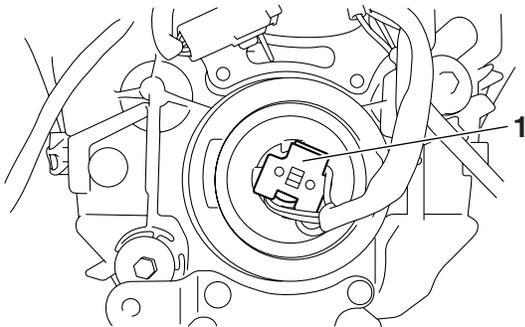
- Remove:
  - Headlight bolt "1"



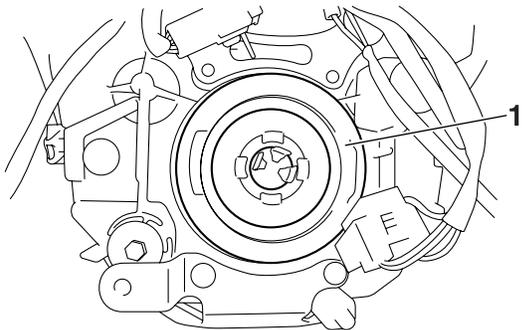
- Remove:
  - Headlight bolts "1"
  - Headlight unit "2"



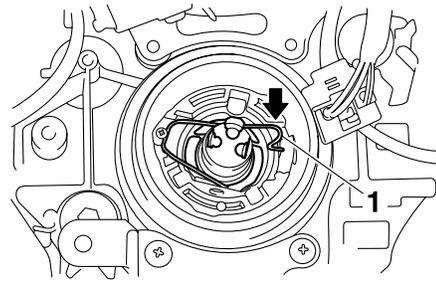
- Remove:
  - Headlight coupler "1"



- Remove:
  - Headlight bulb cover "1"



- Remove:
  - Headlight bulb holder "1"



EWA13320

## **WARNING**

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

- Install:

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

ECA13690

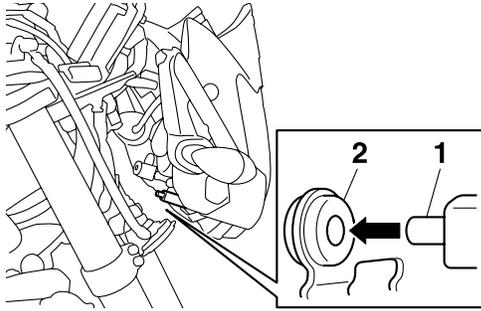
## **NOTICE**

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

- Install:
  - Headlight bulb holder
- Install:
  - Headlight bulb cover
- Connect:
  - Headlight coupler
- Install:
  - Headlight unit

## **TIP**

Connect the coupler, then insert the projection "1" on the headlight unit into the grommet "2" on the vehicle to fit the headlight unit in its original position.



12. Install:
- Headlight bolts

|   |  |
|---|--|
|  | <b>Headlight bolt</b><br><b>7 Nm (0.7 m·kgf, 5.1 ft·lbf)</b> |
|---|--|

13. Install:
- Headlight side covers
  - Headlight side cover bolts

|   |  |
|---|--|
|  | <b>Headlight side cover bolt</b><br><b>3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)</b> |
|---|--|

14. Install:
- Headlight side panels
  - Headlight side panel bolts

|   |   |
|---|---|
|  | <b>Headlight side panel bolt</b><br><b>8 Nm (0.8 m·kgf, 5.8 ft·lbf)</b> |
|---|---|

15. Install:
- Headlight top cover
  - Headlight top cover bolts

|   |   |
|---|---|
|  | <b>Headlight top cover bolt</b><br><b>1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)</b> |
|---|---|

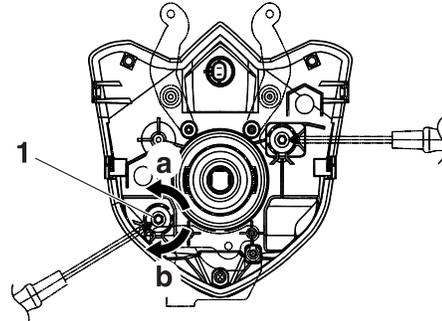
EAS21810

## ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
- Headlight beam (vertically)

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

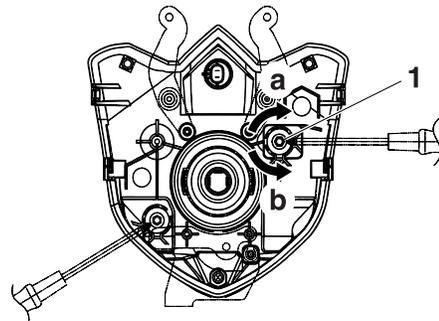
|   |
|---|
| <b>Direction "a"</b><br><b>Headlight beam is raised.</b>  |
| <b>Direction "b"</b><br><b>Headlight beam is lowered.</b> |



2. Adjust:
- Headlight beam (horizontally)

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

|   |
|---|
| <b>Direction "a"</b><br><b>Headlight beam moves to the right.</b> |
| <b>Direction "b"</b><br><b>Headlight beam moves to the left.</b>  |



---

# CHASSIS

|  |      |
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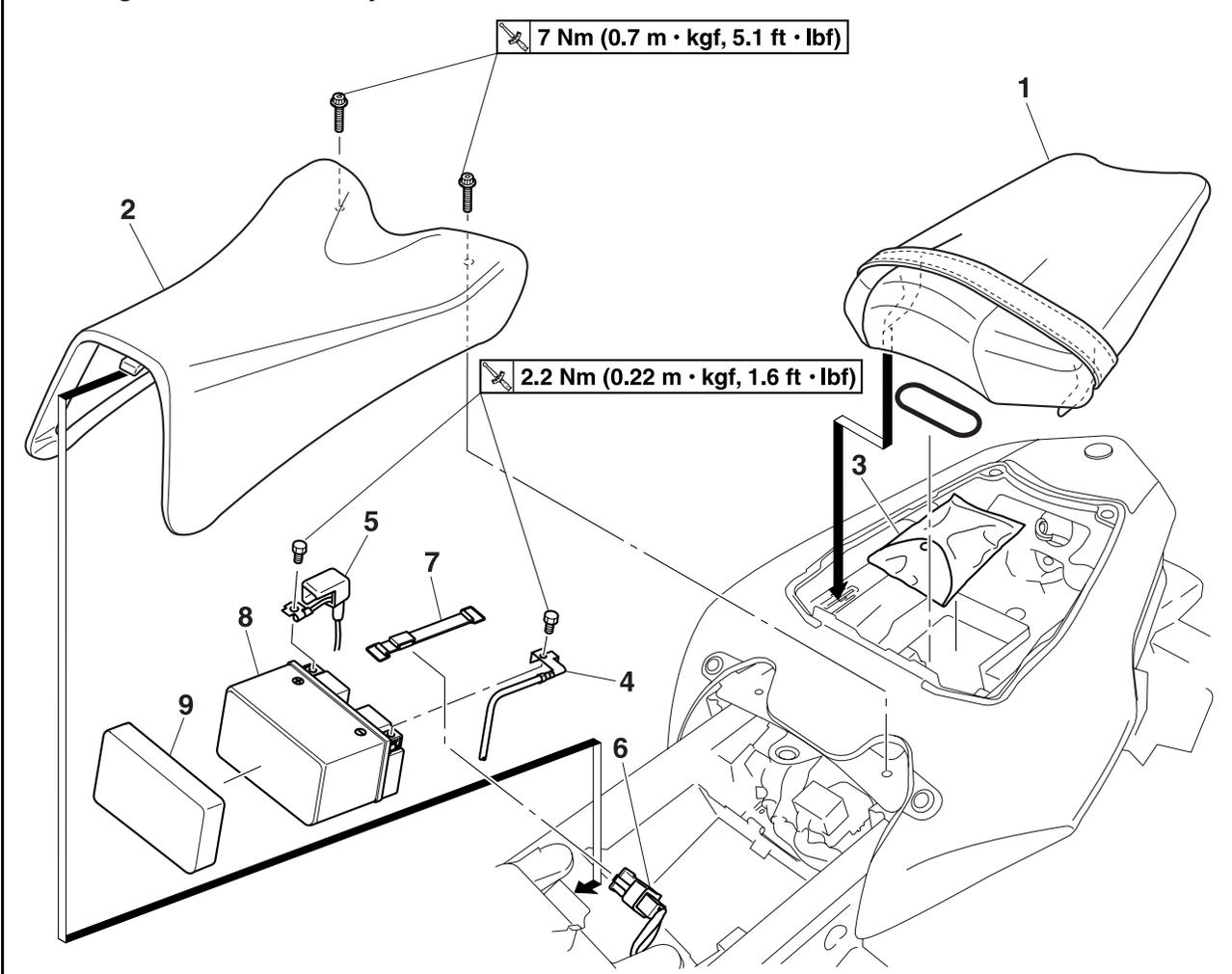
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EAS21830

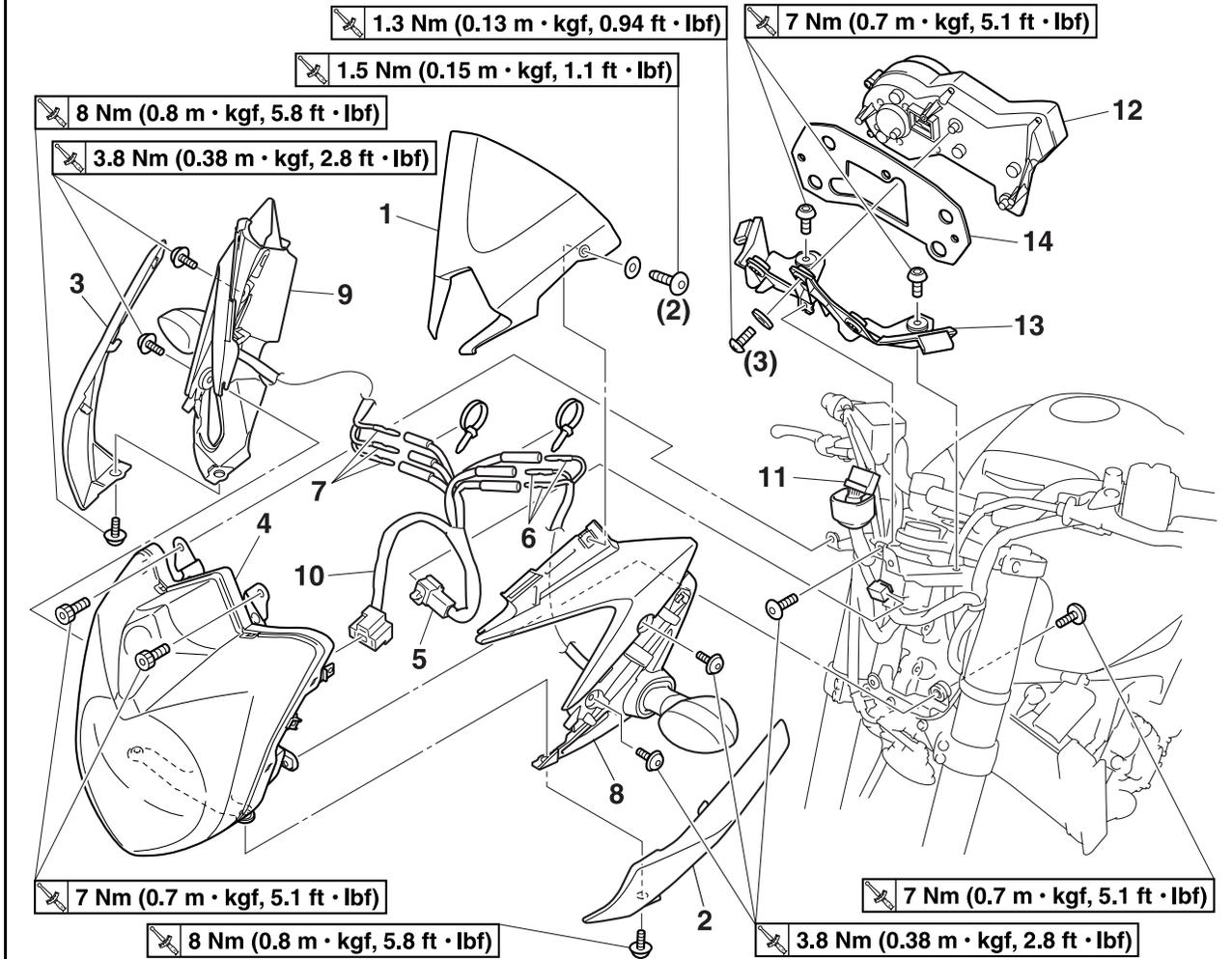
## GENERAL CHASSIS

### Removing the seat and battery



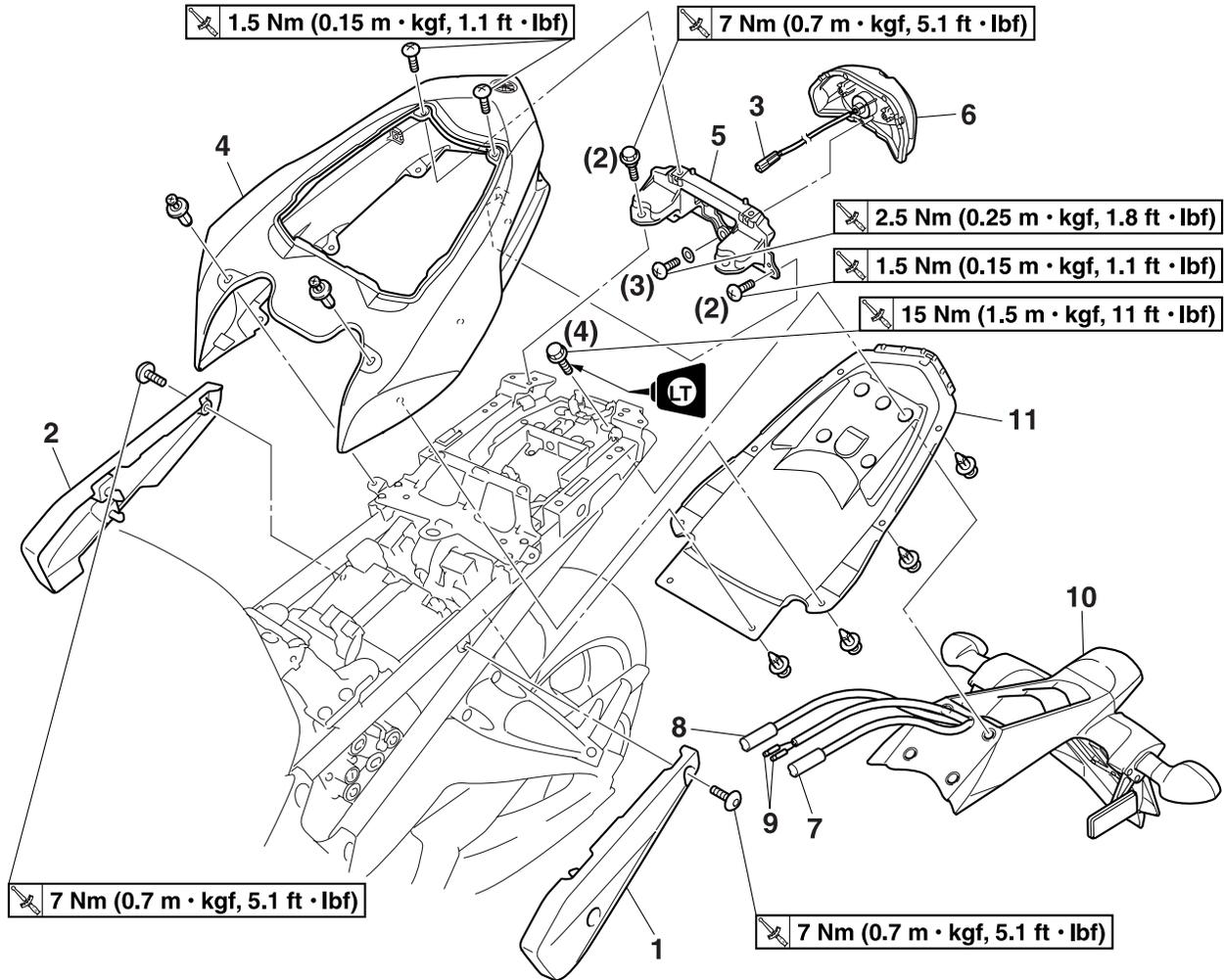
| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
| 1     | Passenger seat        | 1    |  |
| 2     | Rider seat            | 1    |  |
| 3     | Tool kit              | 1    |  |
| 4     | Battery negative lead | 1    |  |
| 5     | Battery positive lead | 1    |  |
| 6     | Main fuse             | 1    |  |
| 7     | Battery band          | 1    |  |
| 8     | Battery               | 1    |  |
| 9     | Battery seat          | 1    |  |
|       |                       |      | For installation, reverse the removal procedure. |

## Removing the headlight and meter assembly



| Order | Job/Parts to remove                             | Q'ty | Remarks  |
|-------|---|------|--|
| 1     | Headlight top cover                             | 1    |  |
| 2     | Left headlight side panel                       | 1    |  |
| 3     | Right headlight side panel                      | 1    |  |
| 4     | Headlight assembly                              | 1    |  |
| 5     | Headlight sub-wire harness coupler              | 1    | Disconnect.                                      |
| 6     | Left turn signal/position light lead connector  | 3    | Disconnect.                                      |
| 7     | Right turn signal/position light lead connector | 3    | Disconnect.                                      |
| 8     | Left headlight side cover                       | 1    |  |
| 9     | Right headlight side cover                      | 1    |  |
| 10    | Headlight sub-wire harness                      | 1    |  |
| 11    | Meter coupler                                   | 1    | Disconnect.                                      |
| 12    | Meter assembly                                  | 1    |  |
| 13    | Meter bracket                                   | 1    |  |
| 14    | Meter seat                                      | 1    |  |
|       |   |      | For installation, reverse the removal procedure. |

## Removing the rear cover



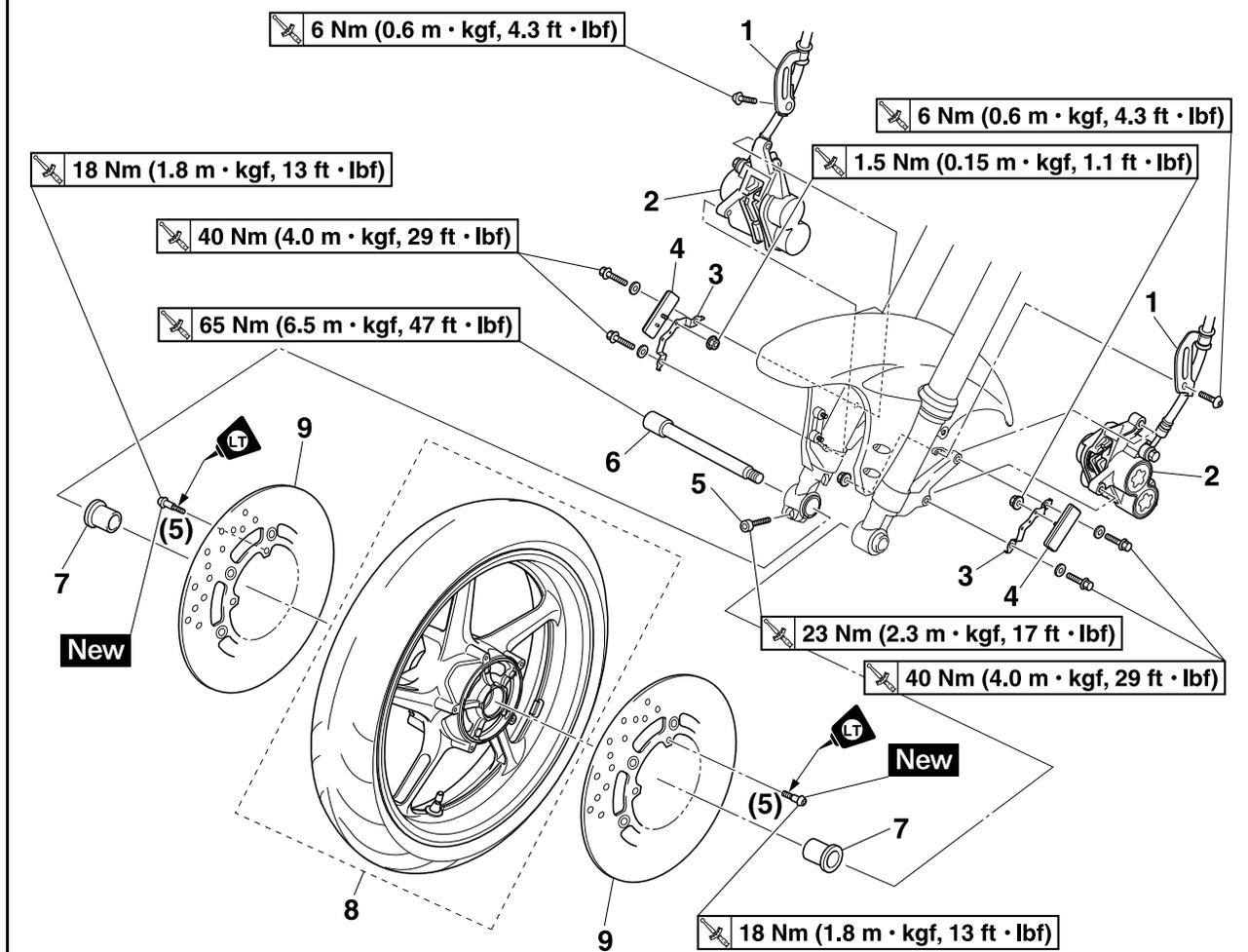
| Order | Job/Parts to remove                  | Q'ty | Remarks  |
|-------|--------------------------------------|------|--|
|       | Passenger seat/rider seat            |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
| 1     | Left side cover                      | 1    |  |
| 2     | Right side cover                     | 1    |  |
| 3     | Tail/brake light lead coupler        | 1    | Disconnect.                                      |
| 4     | Upper tail cover                     | 1    |  |
| 5     | Tail/brake light bracket             | 1    |  |
| 6     | Tail/brake light assembly            | 1    |  |
| 7     | Left turn signal light lead coupler  | 1    | Disconnect.                                      |
| 8     | Right turn signal light lead coupler | 1    | Disconnect.                                      |
| 9     | License plate light lead connector   | 2    | Disconnect.                                      |
| 10    | Mud guard assembly                   | 1    |  |
| 11    | Lower tail cover                     | 1    |  |
|       |                                      |      | For installation, reverse the removal procedure. |



EAS21870

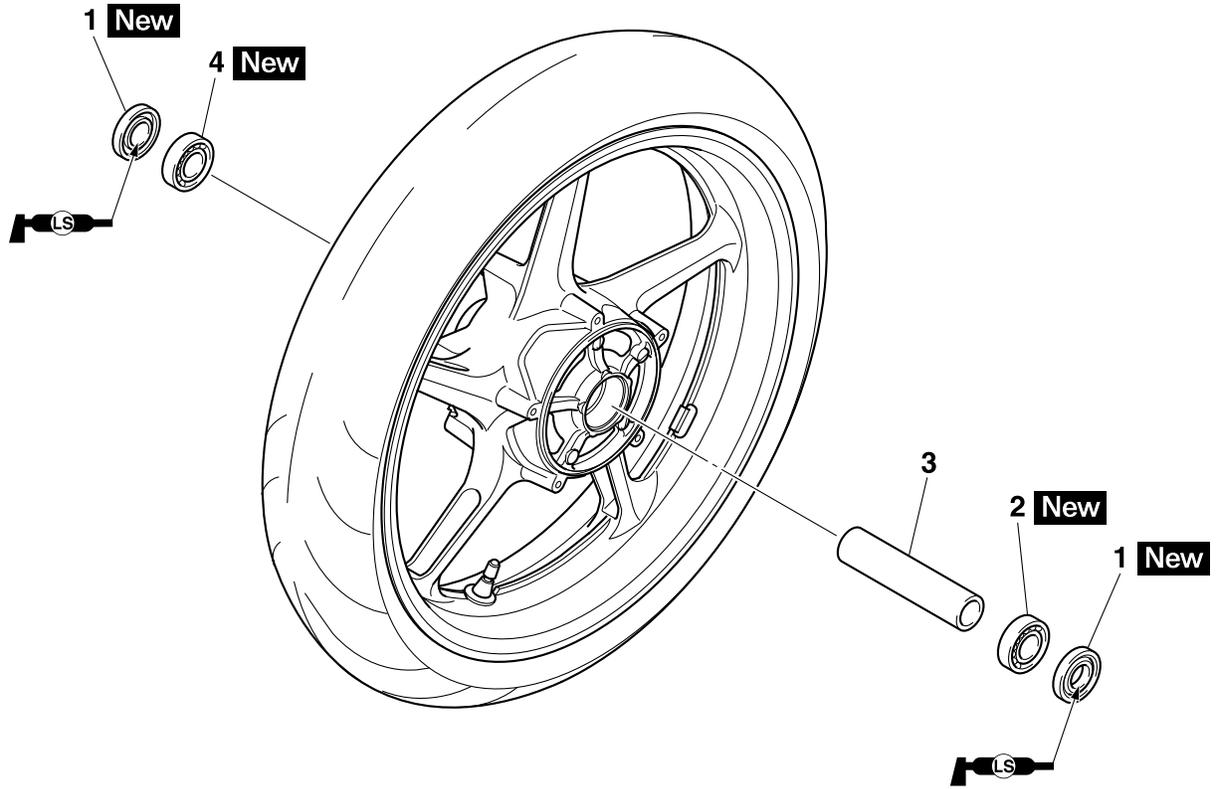
## FRONT WHEEL

### Removing the front wheel and brake discs



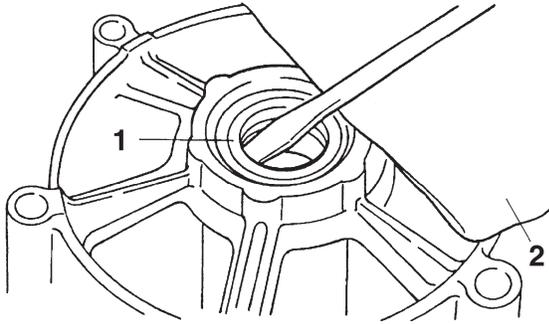
| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
| 1     | Brake hose holder     | 2    |  |
| 2     | Front brake caliper   | 2    |  |
| 3     | Reflector bracket     | 2    |  |
| 4     | Reflector             | 2    |  |
| 5     | Wheel axle pinch bolt | 1    | Loosen.  |
| 6     | Wheel axle            | 1    |  |
| 7     | Collar                | 2    |  |
| 8     | Front wheel           | 1    |  |
| 9     | Front brake disc      | 2    |  |
|       |                       |      | For installation, reverse the removal procedure. |

## Disassembling the front wheel

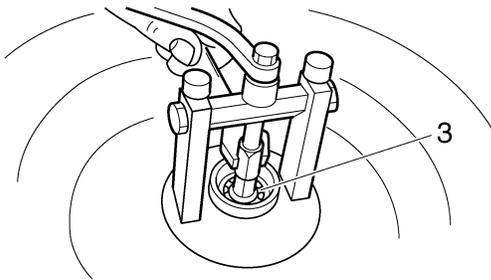


| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 1     | Oil seal            | 2    |  |
| 2     | Wheel bearing       | 1    |  |
| 3     | Spacer              | 1    |  |
| 4     | Wheel bearing       | 1    |  |
|       |                     |      | For assembly, reverse the disassembly procedure. |





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



EAS21960

## ASSEMBLING THE FRONT WHEEL

1. Install:

- Wheel bearings **New**
- Oil seals **New**



- a. Install the new wheel bearing (right side).

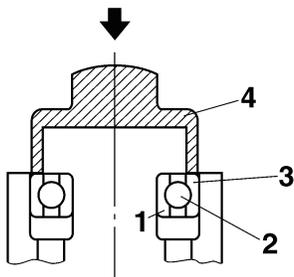
ECA2S31011

### NOTICE

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

### TIP

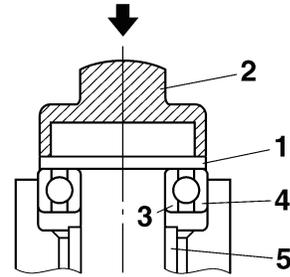
Use a socket “4” that matches the diameter of the wheel bearing outer race.



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

### TIP

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



- d. Install the new oil seals.



EAS21970

## ADJUSTING THE FRONT WHEEL STATIC BALANCE

### TIP

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

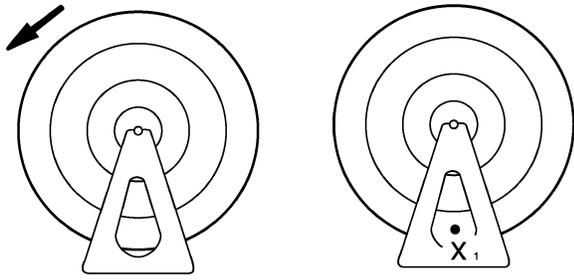
1. Remove:
  - Balancing weight(s)
2. Find:
  - Front wheel’s heavy spot

### TIP

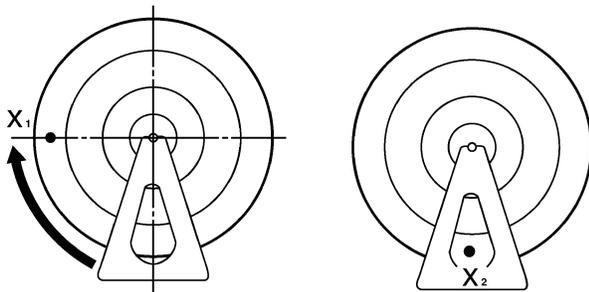
Place the front wheel on a suitable balancing stand.



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



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



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

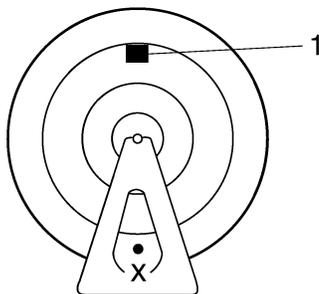


- 3. Adjust:
  - Front wheel static balance

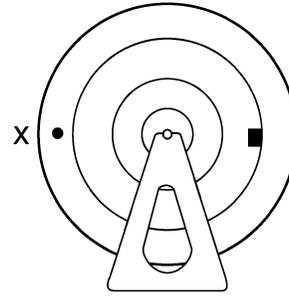


- a. Install a balancing weight “1” onto the rim exactly opposite the heavy spot “X”.

**TIP** \_\_\_\_\_  
Start with the lightest weight.



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



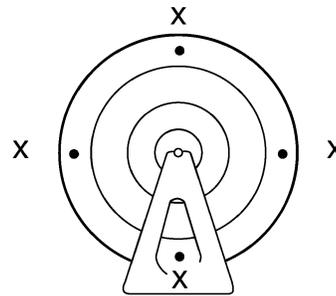
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.



- 4. Check:
  - Front wheel static balance



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



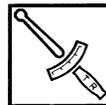
- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



EAS22000

## INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

- 1. Install:
  - Front brake discs



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

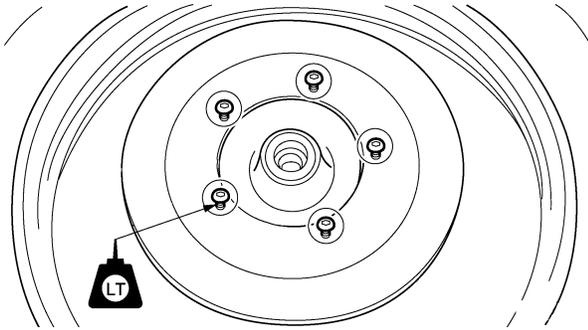
ECA1CW1401

**NOTICE** \_\_\_\_\_

**Replace the brake disc bolts with new ones.**

**TIP** \_\_\_\_\_

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



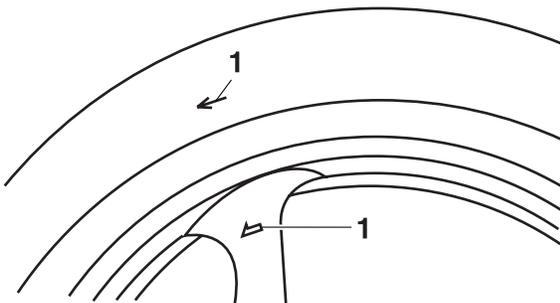
2. Check:
  - Front brake discs  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-23.
3. Lubricate:
  - Oil seal lips

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

4. Install:
  - Collars
  - Front wheel
  - Wheel axle

**TIP**

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



5. Tighten:
  - Wheel axle
  - Wheel axle pinch bolt

|   |   |
|---|---|
|  | <b>Wheel axle</b><br><b>65 Nm (6.5 m·kgf, 47 ft·lbf)</b><br><b>Wheel axle pinch bolt</b><br><b>23 Nm (2.3 m·kgf, 17 ft·lbf)</b> |
|---|---|

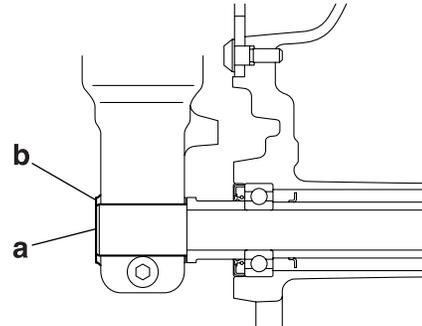
ECA39P1401

**NOTICE**

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

**TIP**

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



6. Install:
  - Front brake caliper

|   |  |
|---|--|
|  | <b>Front brake caliper bolt</b><br><b>40 Nm (4.0 m·kgf, 29 ft·lbf)</b> |
|---|--|

EWA13500

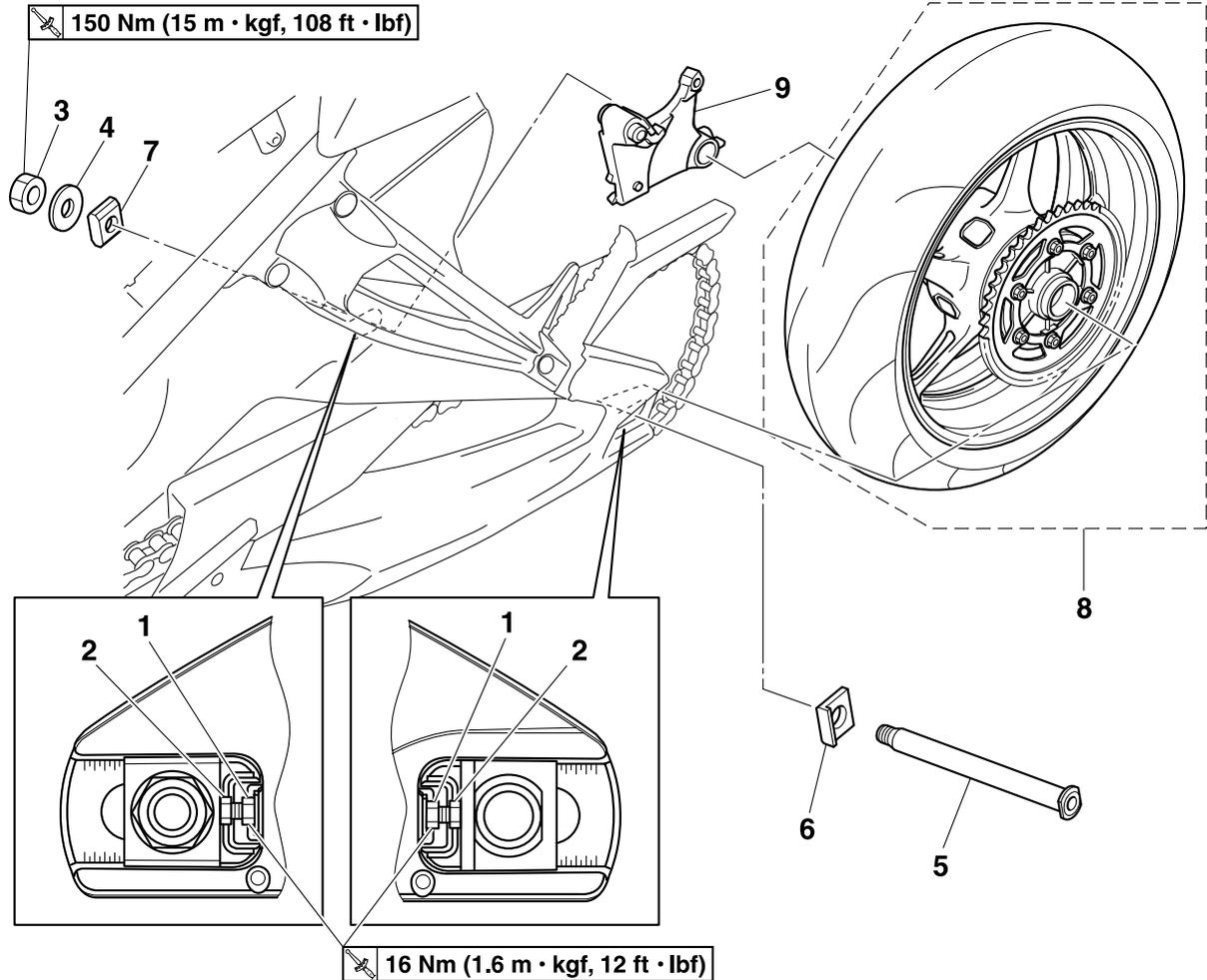
**WARNING**

Make sure the brake hose is routed properly.

EAS22020

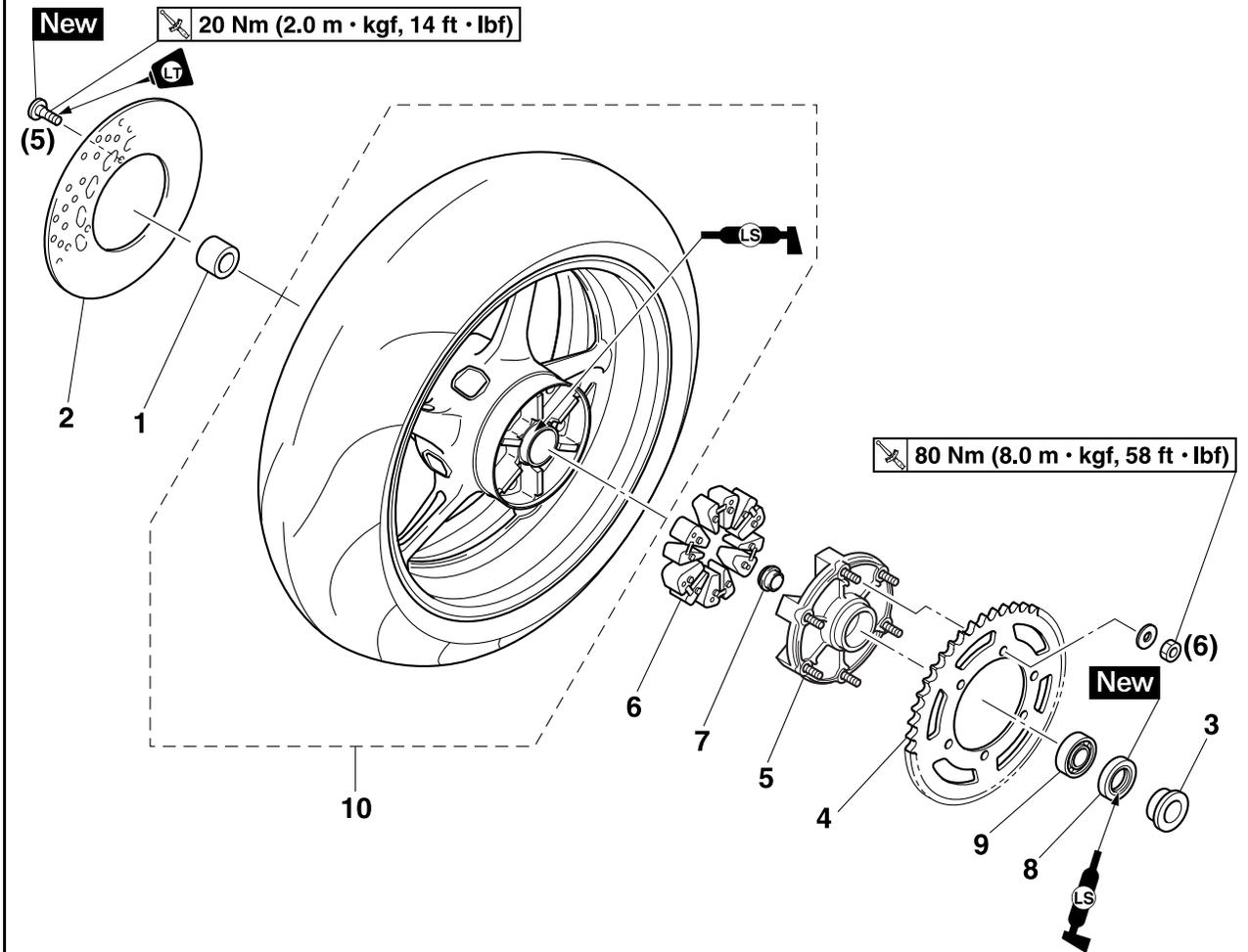
## REAR WHEEL

### Removing the rear wheel



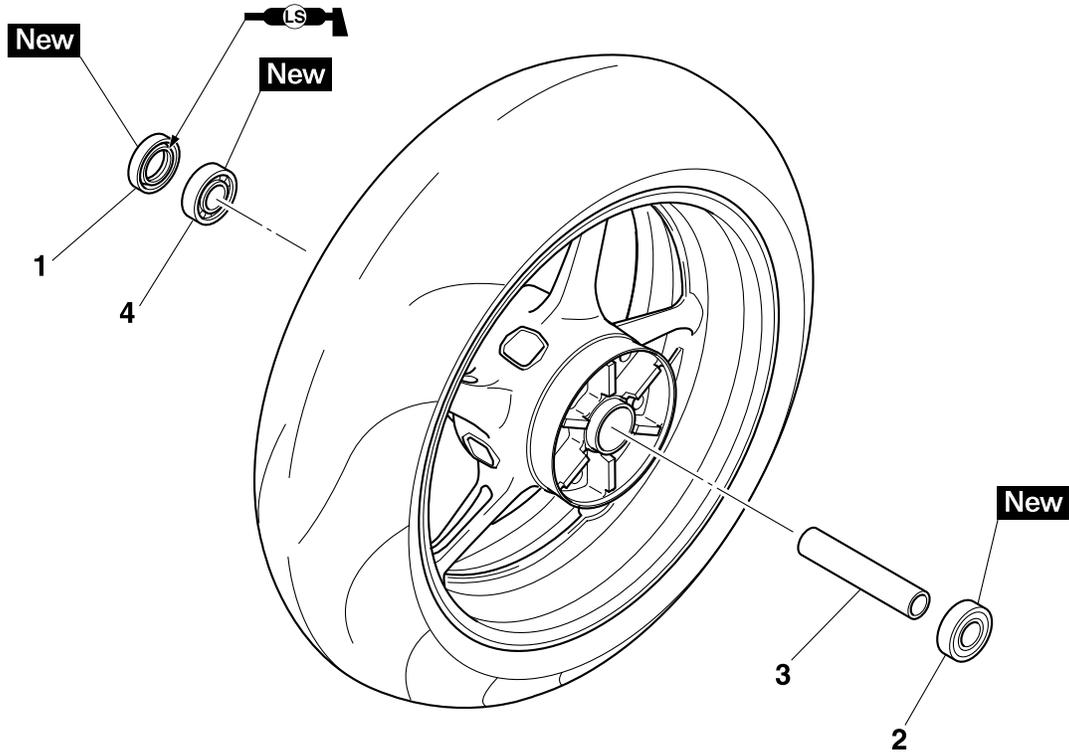
| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
|       | Rear brake caliper    |      | Refer to "REAR BRAKE" on page 4-31.              |
| 1     | Locknut               | 2    | Loosen.  |
| 2     | Adjusting bolt        | 2    | Loosen.  |
| 3     | Wheel axle nut        | 1    |  |
| 4     | Washer                | 1    |  |
| 5     | Wheel axle            | 1    |  |
| 6     | Left adjusting block  | 1    |  |
| 7     | Right adjusting block | 1    |  |
| 8     | Rear wheel            | 1    |  |
| 9     | Brake caliper bracket | 1    |  |
|       |                       |      | For installation, reverse the removal procedure. |

## Removing the brake disc and rear wheel sprocket



| Order | Job/Parts to remove         | Q'ty | Remarks  |
|-------|-----------------------------|------|--|
| 1     | Collar                      | 1    |  |
| 2     | Rear brake disc             | 1    |  |
| 3     | Collar                      | 1    |  |
| 4     | Rear wheel sprocket         | 1    |  |
| 5     | Rear wheel drive hub        | 1    |  |
| 6     | Rear wheel drive hub damper | 6    |  |
| 7     | Collar                      | 1    |  |
| 8     | Oil seal                    | 1    |  |
| 9     | Bearing                     | 1    |  |
| 10    | Rear wheel                  | 1    |  |
|       |                             |      | For installation, reverse the removal procedure. |

## Disassembling the rear wheel



| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 1     | Oil seal            | 1    |  |
| 2     | Wheel bearing       | 1    |  |
| 3     | Spacer              | 1    |  |
| 4     | Wheel bearing       | 1    |  |
|       |                     |      | For assembly, reverse the disassembly procedure. |

EAS22040

## REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### **TIP**

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

2. Remove:

- Rear brake caliper "1"

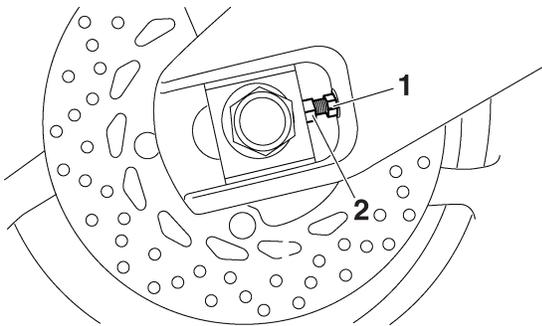
### **TIP**

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



3. Loosen:

- Locknuts "1"
- Adjusting bolts "2"

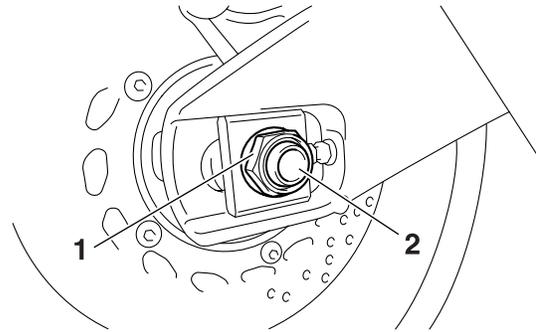


4. Remove:

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

### **TIP**

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



EAS22091

## CHECKING THE REAR WHEEL

1. Check:

- Wheel axle
- Wheel bearings
- Oil seals

Refer to "CHECKING THE FRONT WHEEL" on page 4-7.

2. Check:

- Tire
- Rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.

3. Measure:

- Radial wheel runout
- Lateral wheel runout

Refer to "CHECKING THE FRONT WHEEL" on page 4-7.

EAS22080

## DISASSEMBLING THE REAR WHEEL

1. Remove:

- Oil seal
- Wheel bearings

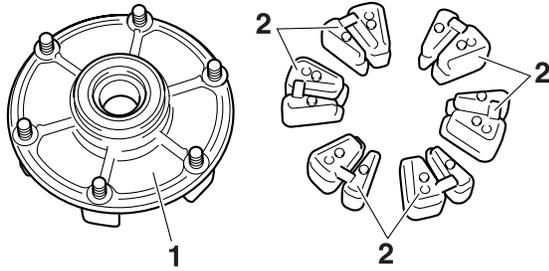
Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-7.

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.

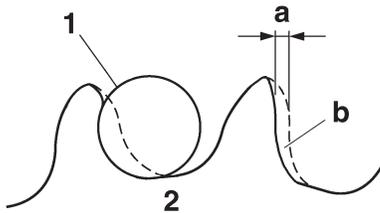


EAS14B1003

## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

### 1. Check:

- Rear wheel sprocket  
More than 1/4 tooth “a” wear → Replace the drive chain sprockets as a set.  
Bent teeth → Replace the drive chain sprockets as a set.



b. Correct

1. Drive chain roller
2. Rear wheel sprocket

### 2. Replace:

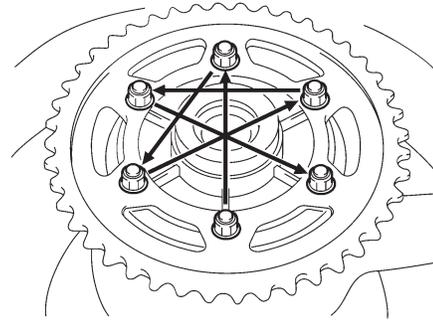
- Rear wheel sprocket

- a. Remove the rear wheel sprocket 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.

|   |  |
|---|--|
|  | <b>Rear wheel sprocket nut</b><br>80 Nm (8.0 m·kgf, 58 ft·lbf) |
|---|--|

### TIP

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



EAS22140

## ASSEMBLING THE REAR WHEEL

### 1. Install:

- Wheel bearings **New**
- Oil seal **New**  
Refer to “ASSEMBLING THE FRONT WHEEL” on page 4-8.

EAS22150

## ADJUSTING THE REAR WHEEL STATIC BALANCE

### TIP

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

### 1. Adjust:

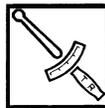
- Rear wheel static balance  
Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-8.

EAS22160

## INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

### 1. Install:

- Rear brake disc

|   |   |
|---|---|
|  | <b>Rear brake disc bolt</b><br>20 Nm (2.0 m·kgf, 14 ft·lbf)<br>LOCTITE® |
|---|---|

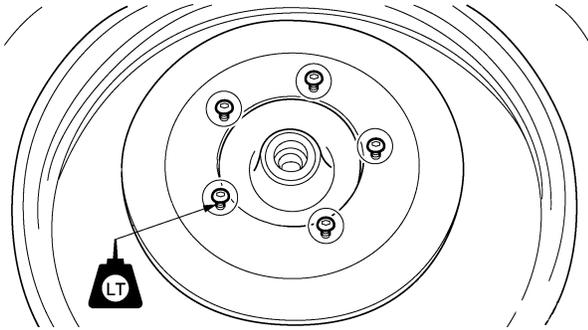
ECA1CW1401

### NOTICE

Replace the brake disc bolts with new ones.

### TIP

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



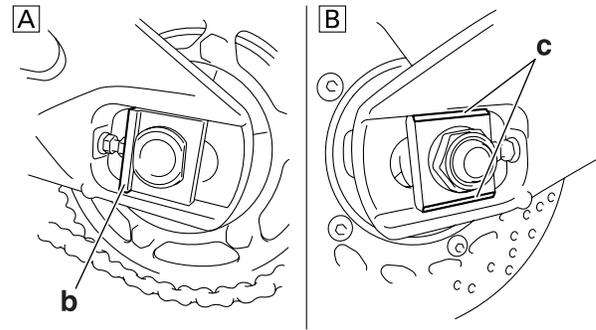
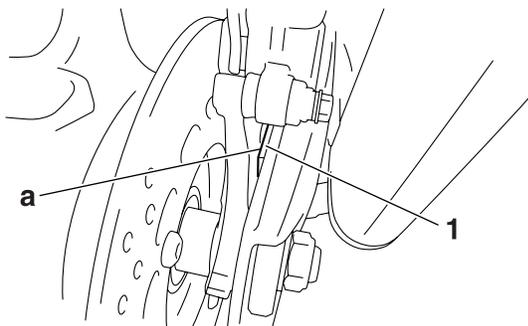
2. Check:
  - Rear brake disc
 Refer to "CHECKING THE REAR BRAKE DISC" on page 4-37.
3. Lubricate:
  - Oil seal lips

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

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

**TIP**

- Do not install the brake caliper.
- Fit the brake torque stop pin "1" on the swingarm into the slot "a" on the brake caliper bracket.
- Install the left adjusting block so that projection "b" faces to the front of the vehicle.
- Install the right adjusting block so that upper chamfer "c" faces to the top of the vehicle and lower chamfer "c" faces to the bottom of the vehicle.



- A. Left side
- B. Right side

5. Install:
  - Rear brake caliper
  - Rear brake caliper retaining bolts
6. Adjust:
  - Drive chain slack
 Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-18.

|   |  |
|---|--|
|  | <b>Drive chain slack</b><br><b>20.0–30.0 mm (0.79–1.18 in)</b> |
|---|--|

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

|   |   |
|---|---|
|  | <b>Wheel axle nut</b><br><b>150 Nm (15 m·kgf, 108 ft·lbf)</b><br><b>Rear brake caliper retaining bolt (front)</b><br><b>27 Nm (2.7 m·kgf, 20 ft·lbf)</b><br><b>Rear brake caliper retaining bolt (rear)</b><br><b>22 Nm (2.2 m·kgf, 16 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|---|

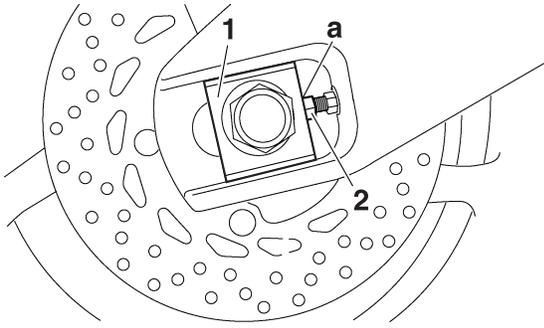
EWA13500

**WARNING**

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

**TIP**

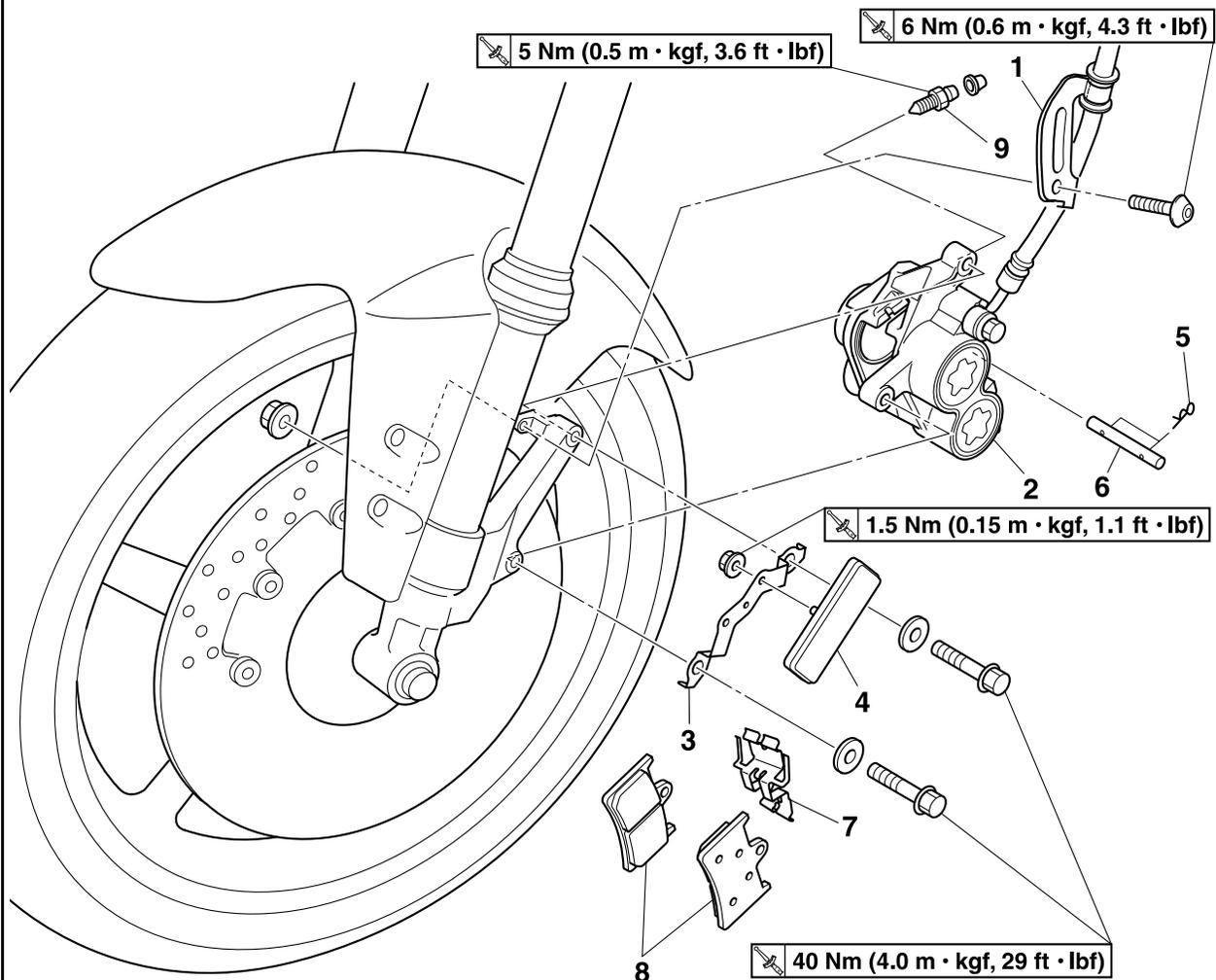
When tightening the wheel axle nut, there should be no clearance "a" between the adjusting block "1" and adjusting bolt "2".



EAS22210

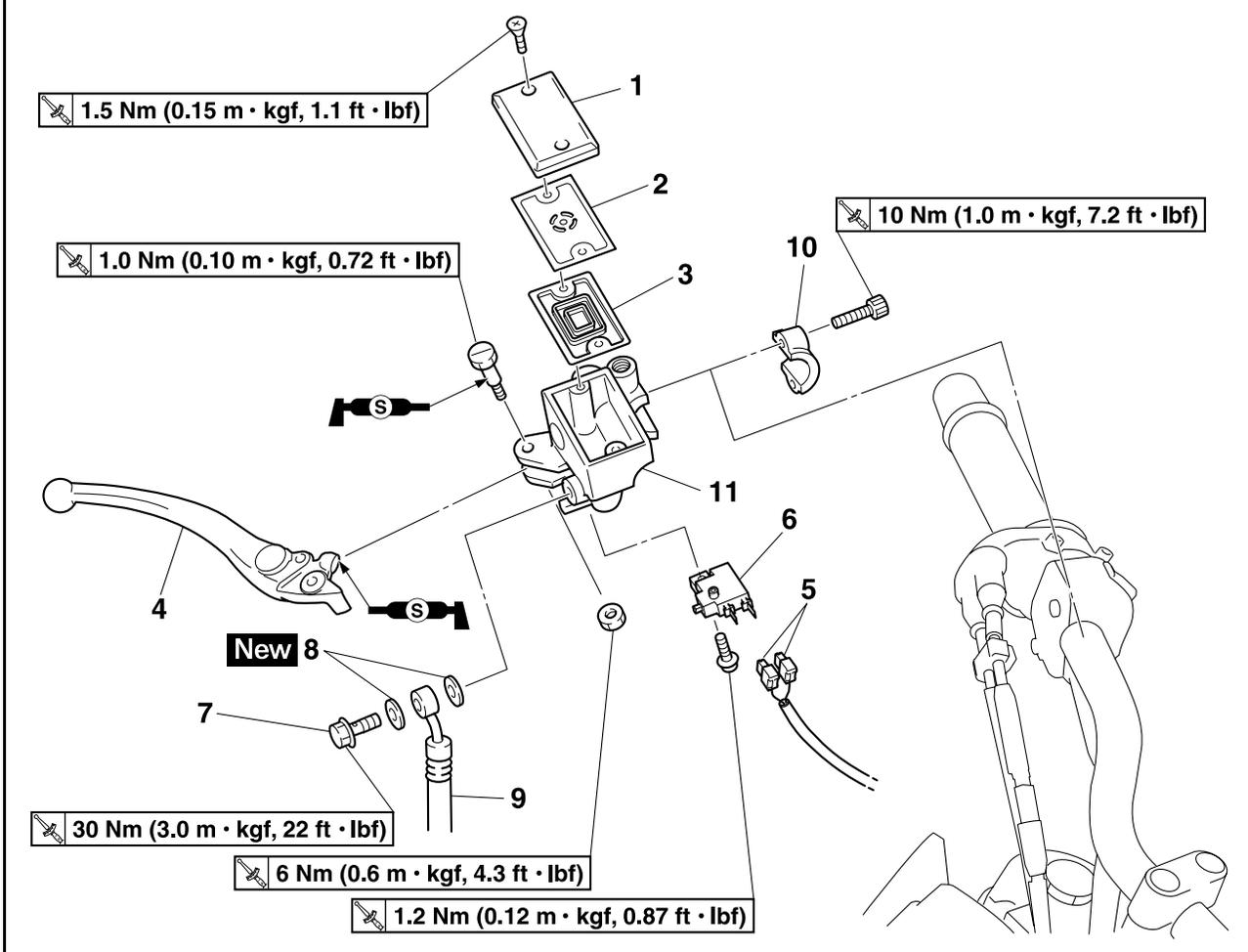
## FRONT BRAKE

### Removing the front brake pads



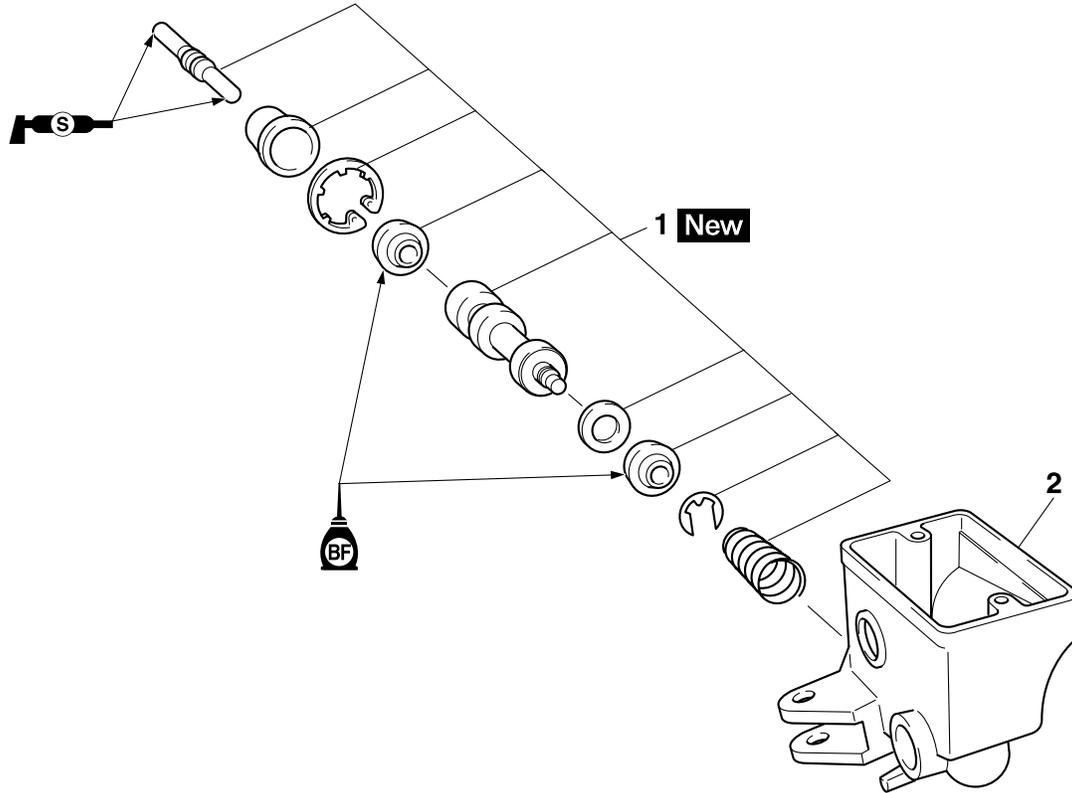
| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
|       |                     |      | The following procedure applies to both of the front brake calipers. |
| 1     | Brake hose holder   | 1    |  |
| 2     | Front brake caliper | 1    |  |
| 3     | Reflector bracket   | 1    |  |
| 4     | Reflector           | 1    |  |
| 5     | Brake pad clip      | 2    |  |
| 6     | Brake pad pin       | 1    |  |
| 7     | Brake pad spring    | 1    |  |
| 8     | Brake pad           | 2    |  |
| 9     | Bleed screw         | 1    |  |
|       |                     |      | For installation, reverse the removal procedure.                     |

## Removing the front brake master cylinder



| Order | Job/Parts to remove                              | Q'ty | Remarks  |
|-------|--|------|--|
|       | Right rear view mirror                           |      | Refer to "HANDLEBAR" on page 4-44.                                     |
|       | Brake fluid                                      |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-15. |
| 1     | Brake master cylinder reservoir cap              | 1    |  |
| 2     | Brake master cylinder reservoir diaphragm holder | 1    |  |
| 3     | Brake master cylinder reservoir diaphragm        | 1    |  |
| 4     | Brake lever                                      | 1    |  |
| 5     | Front brake light switch lead connector          | 2    | Disconnect.  |
| 6     | Front brake light switch                         | 1    |  |
| 7     | Brake hose union bolt                            | 1    |  |
| 8     | Brake hose gasket                                | 2    |  |
| 9     | Brake hose                                       | 1    |  |
| 10    | Front brake master cylinder holder               | 1    |  |
| 11    | Front brake master cylinder assembly             | 1    |  |
|       |  |      | For assembly, reverse the disassembly procedure.                       |

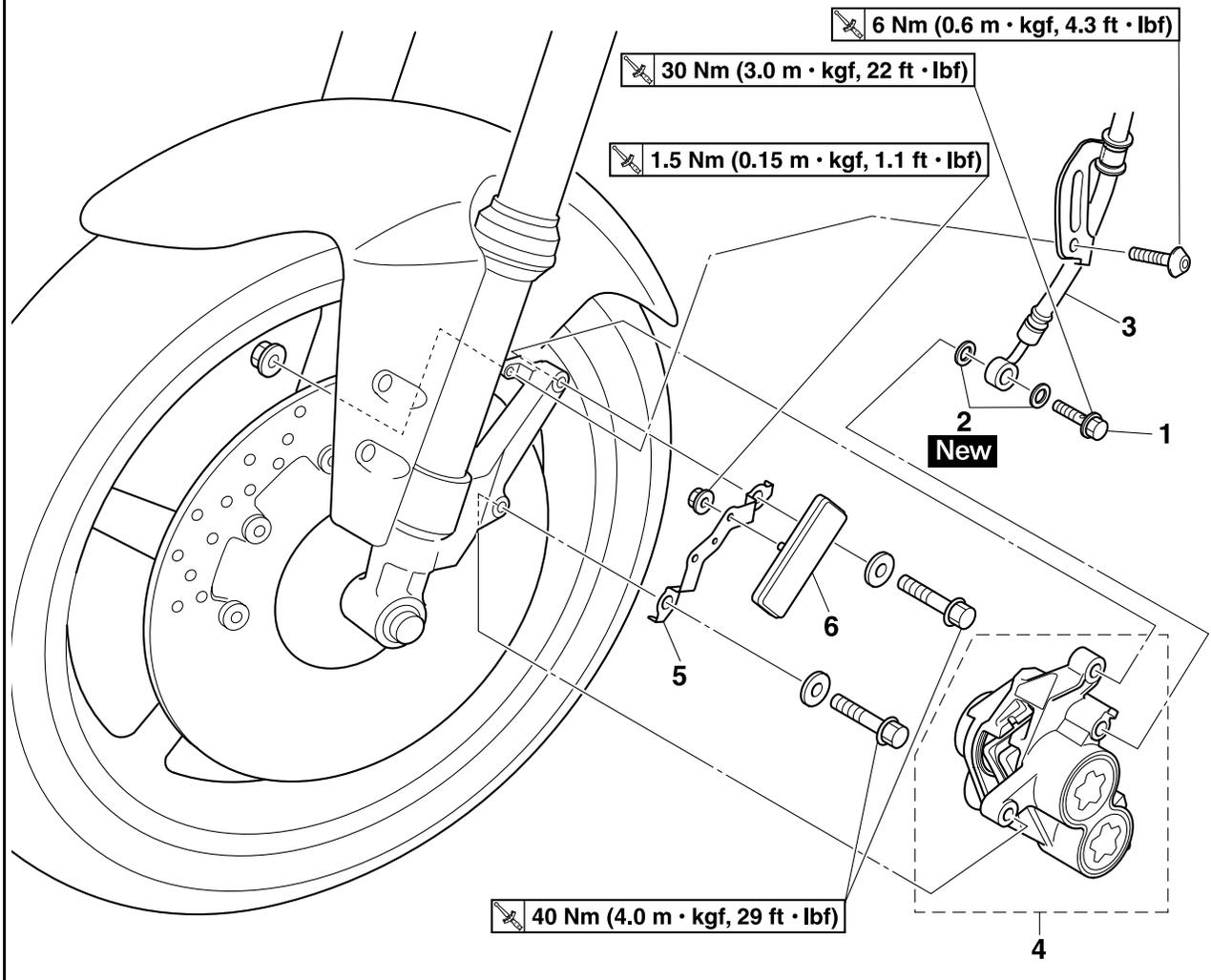
## Disassembling the front brake master cylinder



| 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. |

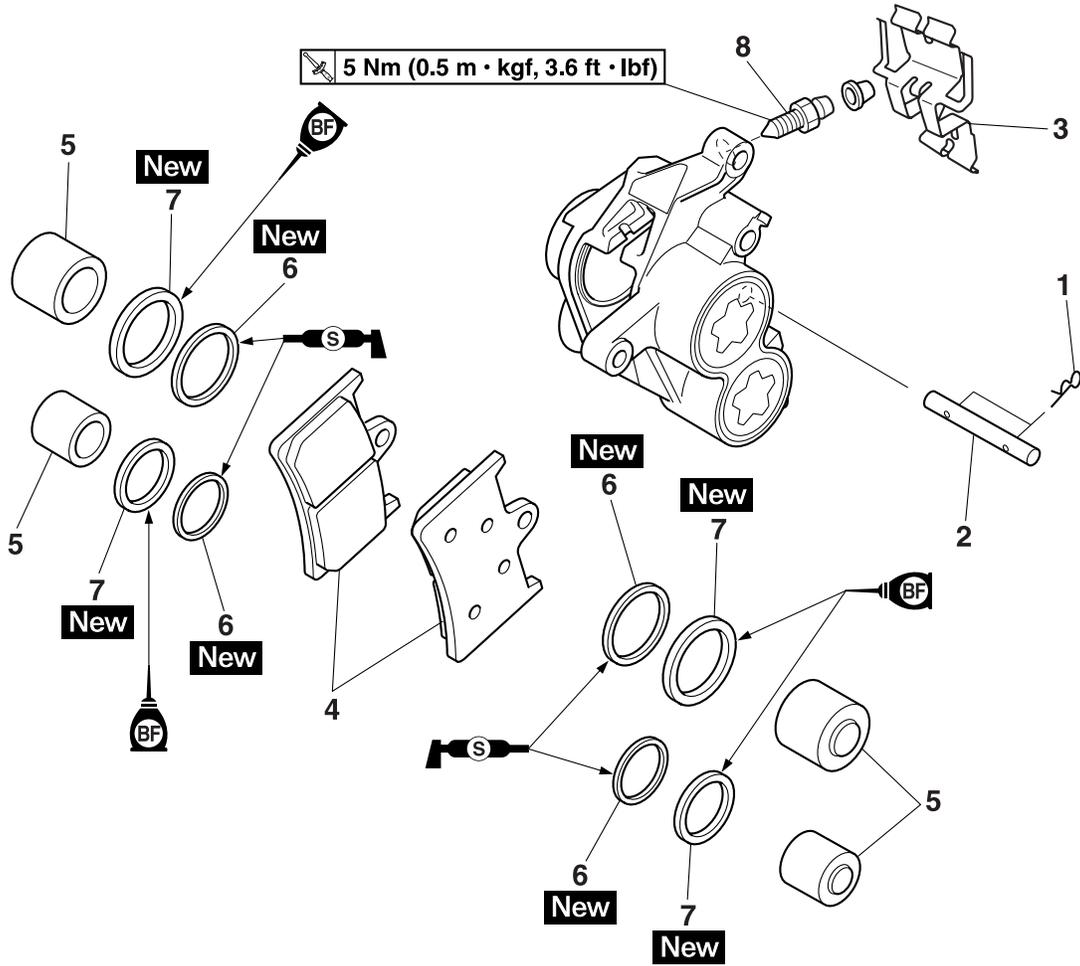
# FRONT BRAKE

## Removing the front brake calipers



| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
|       |                       |      | The following procedure applies to both of the front brake calipers.   |
|       | Brake fluid           |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-15. |
| 1     | Brake hose union bolt | 1    |  |
| 2     | Brake hose gasket     | 2    |  |
| 3     | Brake hose            | 1    |  |
| 4     | Front brake caliper   | 1    |  |
| 5     | Reflector bracket     | 1    |  |
| 6     | Reflector             | 1    |  |
|       |                       |      | For installation, reverse the removal procedure.                       |

## Disassembling the front brake calipers



| Order | Job/Parts to remove            | Q'ty | Remarks  |
|-------|--------------------------------|------|--|
|       |                                |      | The following procedure applies to both of the front brake calipers. |
| 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 dust seal | 4    |  |
| 7     | Brake caliper piston seal      | 4    |  |
| 8     | Bleed screw                    | 1    |  |
|       |                                |      | For assembly, reverse the disassembly procedure.                     |

EAS22220

## 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.

EAS22240

## CHECKING THE FRONT BRAKE DISCS

The following procedure applies to both brake discs.

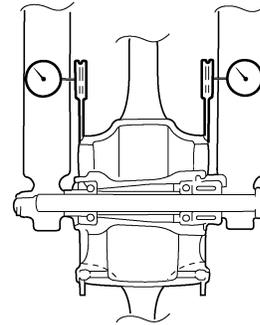
1. Remove:
  - Front wheel  
Refer to "FRONT WHEEL" on page 4-5.
2. Check:
  - Front brake disc  
Damage/galling → Replace.
3. Measure:
  - Brake disc deflection  
Out of specification → Correct the brake disc deflection or replace the brake disc.



**Brake disc deflection limit**  
0.10 mm (0.0039 in)

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

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

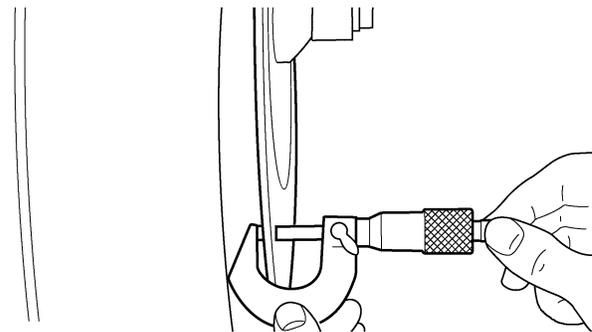


4. Measure:

- Brake disc thickness  
Measure the brake disc thickness at a few different locations.  
Out of specification → Replace.



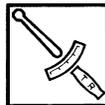
**Brake disc thickness limit**  
4.0 mm (0.16 in)



5. Adjust:

- Brake disc deflection

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



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

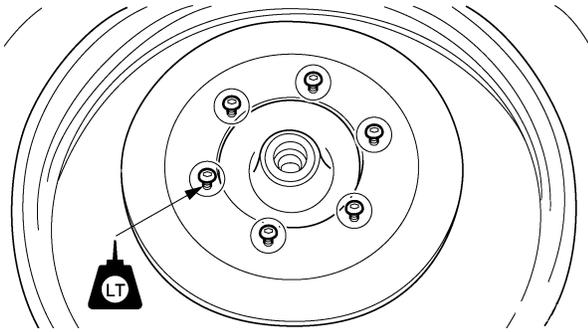
ECA1CW1401

**NOTICE**

**Replace the brake disc bolts with new ones.**

**TIP**

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



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



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

EAS22271

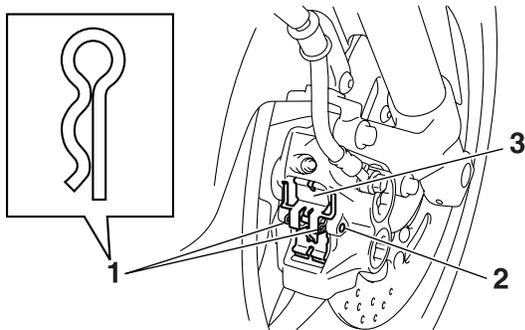
## REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

### TIP

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

1. Remove:
  - Brake hose holder
  - Front brake caliper
  - Brake pad clips "1"
  - Brake pad pin "2"
  - Brake pad spring "3"



2. Remove:
  - Brake pads

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



**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)



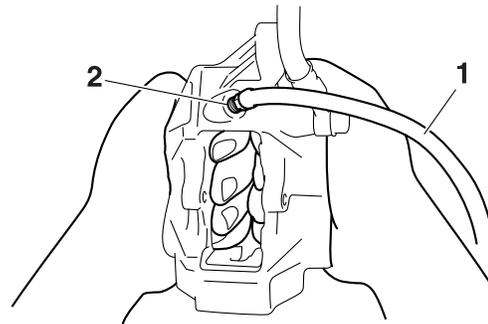
4. Install:
  - Brake pads
  - Brake pad spring

### TIP

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



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



- c. Tighten the bleed screw.



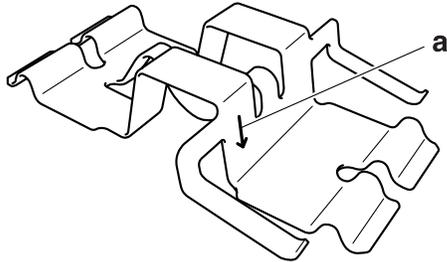
**Bleed screw**

5 Nm (0.5 m·kgf, 3.6 ft·lbf)

- d. Install the brake pads and brake pad spring.

**TIP**

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



5. Install:

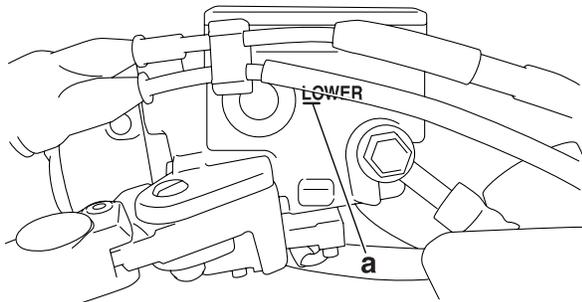
- Brake pad pin
- Brake pad clips
- Front brake caliper



**Front brake caliper bolt**  
40 Nm (4.0 m·kgf, 29 ft·lbf)

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 3-13.



7. Check:

- Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

EAS22300

## REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

**TIP**

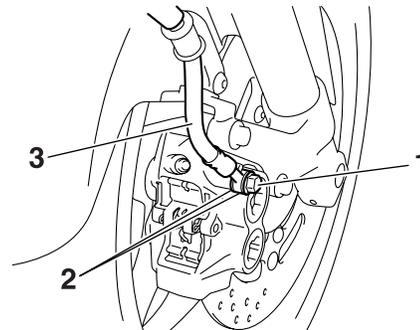
Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Brake hose union bolt “1”
- Brake hose gaskets “2”
- Brake hose “3”

**TIP**

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



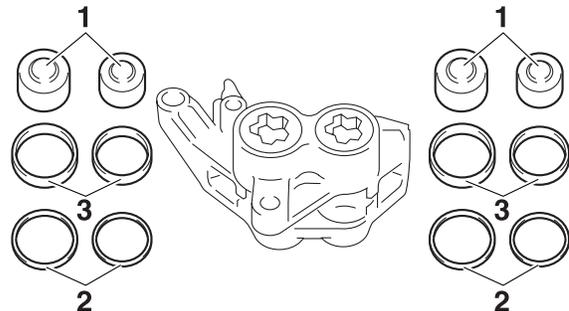
EAS22361

## DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Remove:

- Brake caliper pistons “1”
- Brake caliper piston dust seals “2”
- Brake caliper piston seals “3”

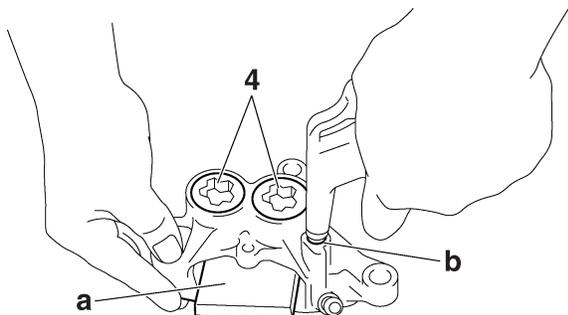


- a. Secure the right side brake caliper pistons with a piece of wood “a”.
- b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWA39P1401

**WARNING**

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



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



EAS22391

**CHECKING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

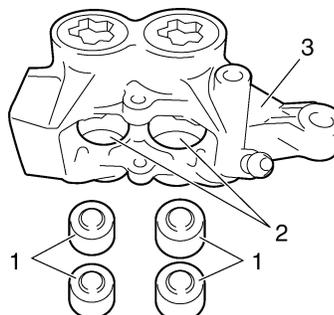
| Recommended brake component replacement schedule |  |
|--|--|
| Brake pads                                       | If necessary   |
| Piston seals                                     | Every two years  |
| Piston dust seals                                | Every two years  |
| Brake hoses         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

- 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.

EWA13611

**WARNING**

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



EAS22411

**ASSEMBLING THE FRONT BRAKE CALIPERS**

EWA13621

**WARNING**

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

|   |                                    |
|---|------------------------------------|
|  | <b>Recommended fluid<br/>DOT 4</b> |
|---|------------------------------------|

EAS22440

**INSTALLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

- Install:
  - Front brake caliper “1” (temporarily)
  - Brake hose gaskets **New**
  - Brake hose “2”
  - Brake hose union bolt “3”

|   |   |
|---|---|
|  | <b>Brake hose union bolt<br/>30 Nm (3.0 m·kgf, 22 ft·lbf)</b> |
|---|---|

EWA13530

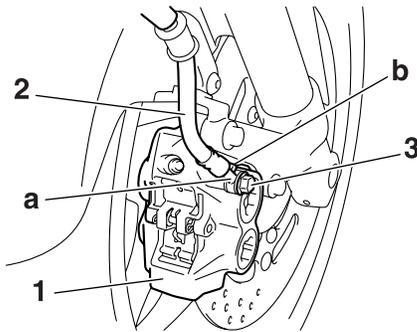
**WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

ECA14170

**NOTICE**

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



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



**Front brake caliper bolt**  
 40 Nm (4.0 m·kgf, 29 ft·lbf)  
**Brake hose holder bolt**  
 6 Nm (0.6 m·kgf, 4.3 ft·lbf)

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-24.

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



**Recommended fluid**  
 DOT 4

EWA13090

**WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.

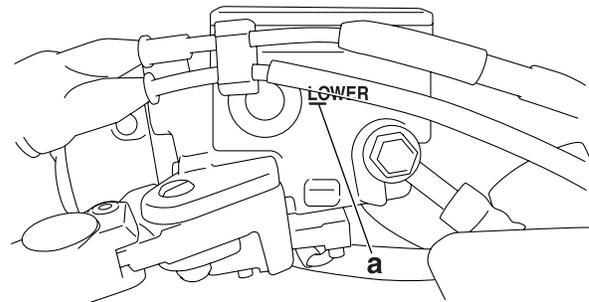
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point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

ECA13540

**NOTICE**

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

5. Bleed:
  - Brake system  
 Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.
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 3-13.



7. Check:
  - Brake lever operation  
 Soft or spongy feeling → Bleed the brake system.  
 Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

EAS22490

**REMOVING THE FRONT BRAKE MASTER CYLINDER**

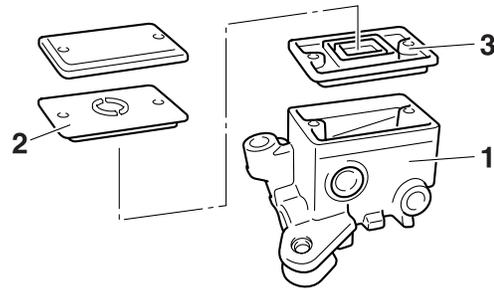
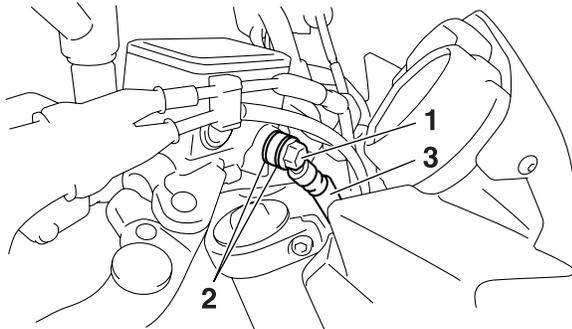
**TIP**

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

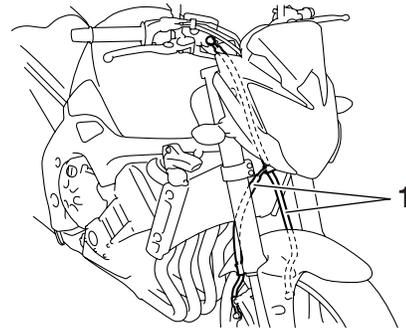
1. Disconnect:
  - Brake light switch connectors  
(from the front brake light switch)
2. Remove:
  - Brake hose union bolt "1"
  - Brake hose gaskets "2"
  - Brake hose "3"

## TIP

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



4. Check:
  - Brake hose "1"  
Cracks/damage/wear → Replace.



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 "1"
  - Brake master cylinder reservoir diaphragm holder "2"  
Cracks/damage → Replace.
  - Brake master cylinder reservoir diaphragm "3"  
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**  
**DOT 4**

EAS22530

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

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

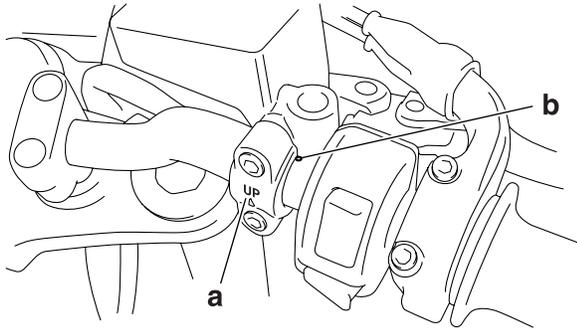


**Front brake master cylinder holder bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

## TIP

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

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



## 2. Install:

- Brake hose gaskets **New**
- Brake hose
- Brake hose union bolt



**Brake hose union bolt**  
30 Nm (3.0 m·kgf, 22 ft·lbf)

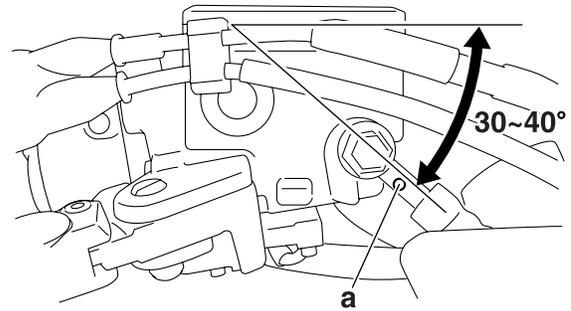
EWA13530

### **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

### TIP

- Install the brake pipe so that white paint mark “a” on the pipe faces to the front of the vehicle.
- Attach the brake hose so that its angle is 30° to 40° against the straight line in parallel with the ceiling plane of the master cylinder.
- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



## 3. Fill:

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



**Recommended fluid**  
DOT 4

EWA13540

### **WARNING**

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

ECA13540

### **NOTICE**

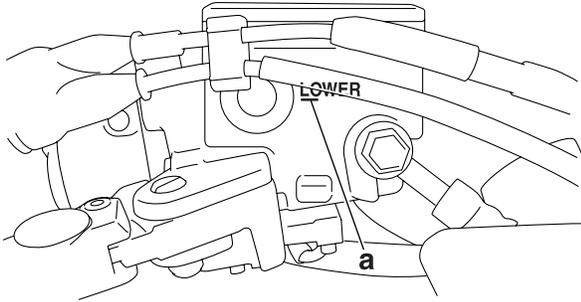
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

## 4. Bleed:

- Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

## 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 3-13.



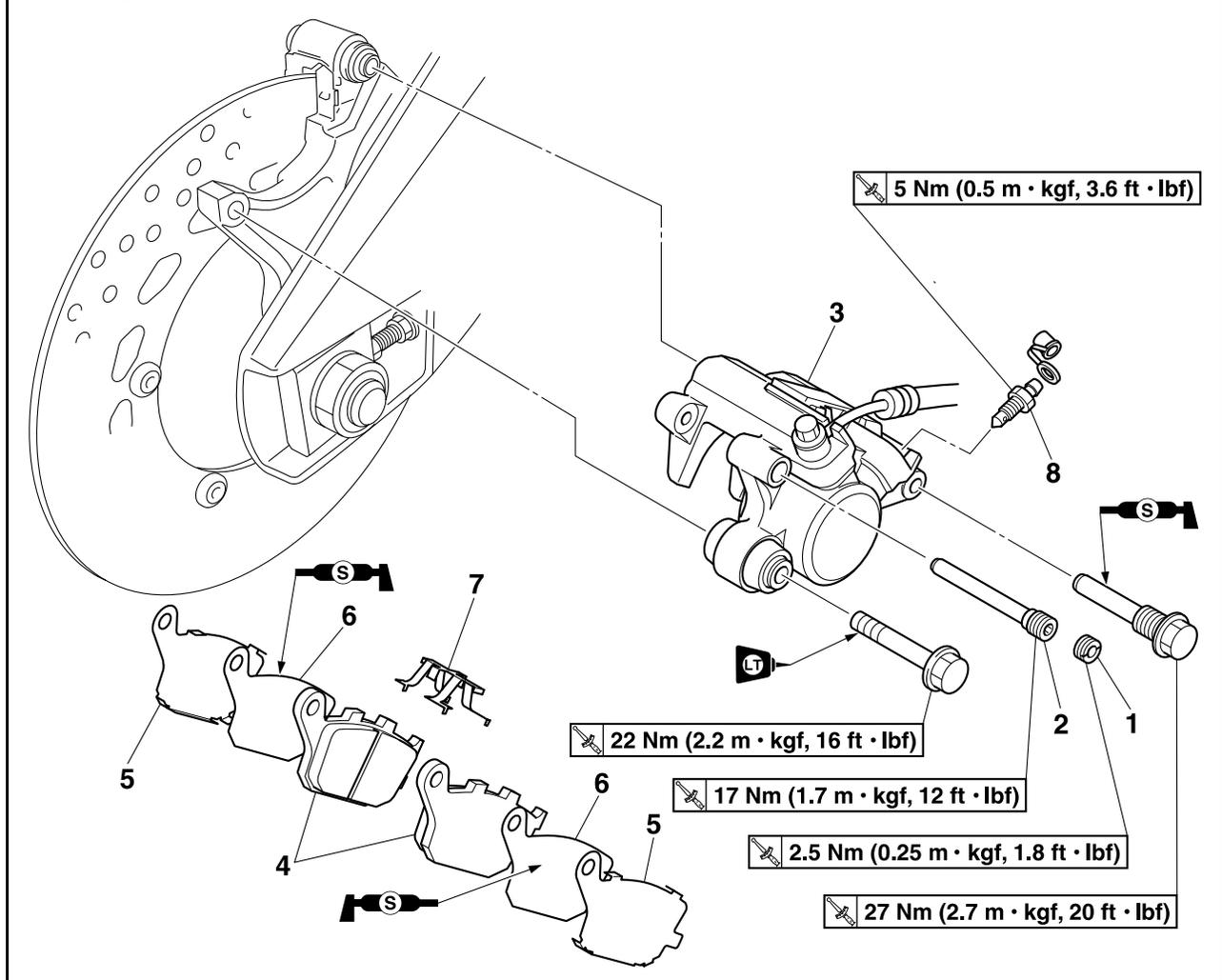
6. Check:

- Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

EAS22550

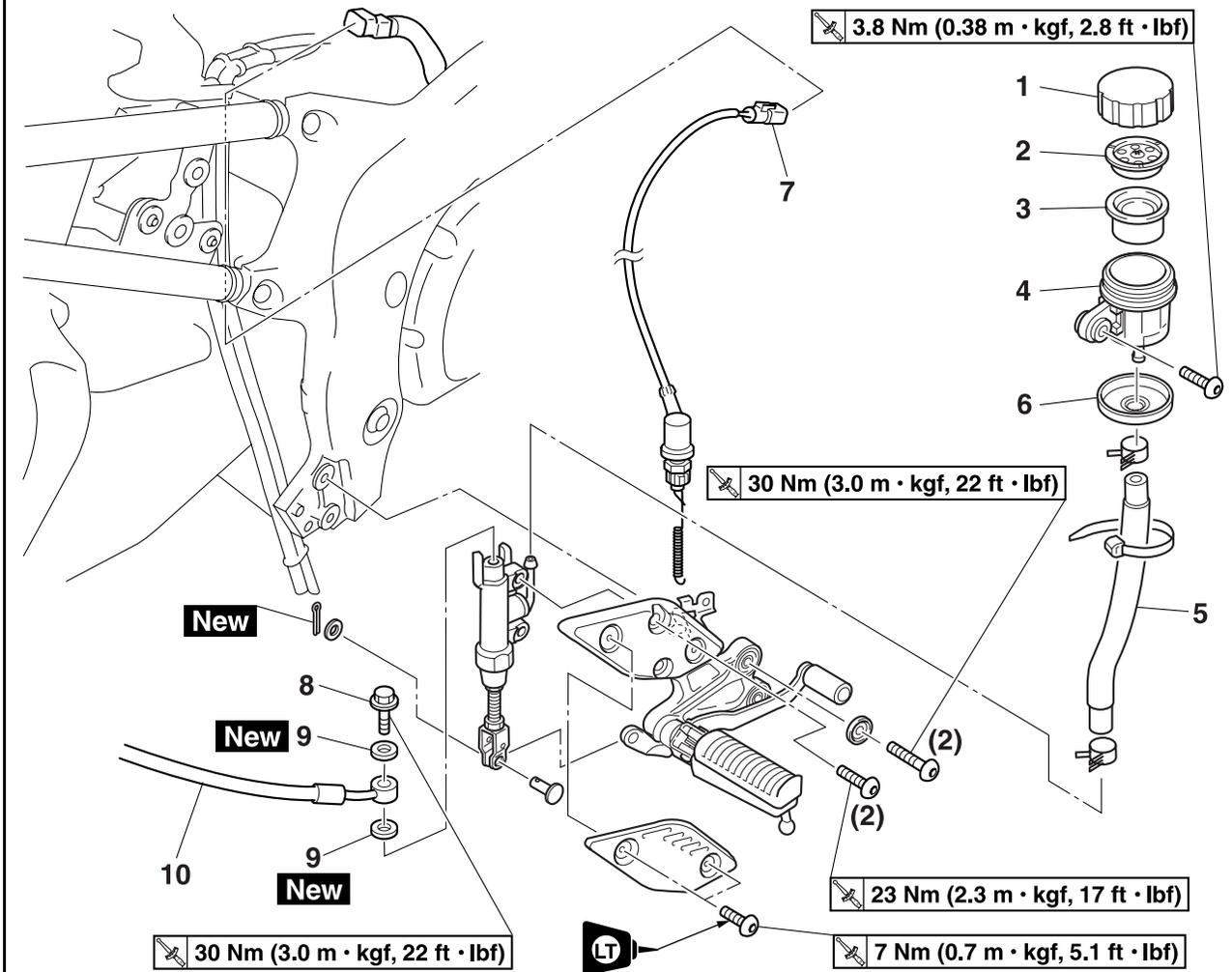
## REAR BRAKE

### Removing the rear brake pads



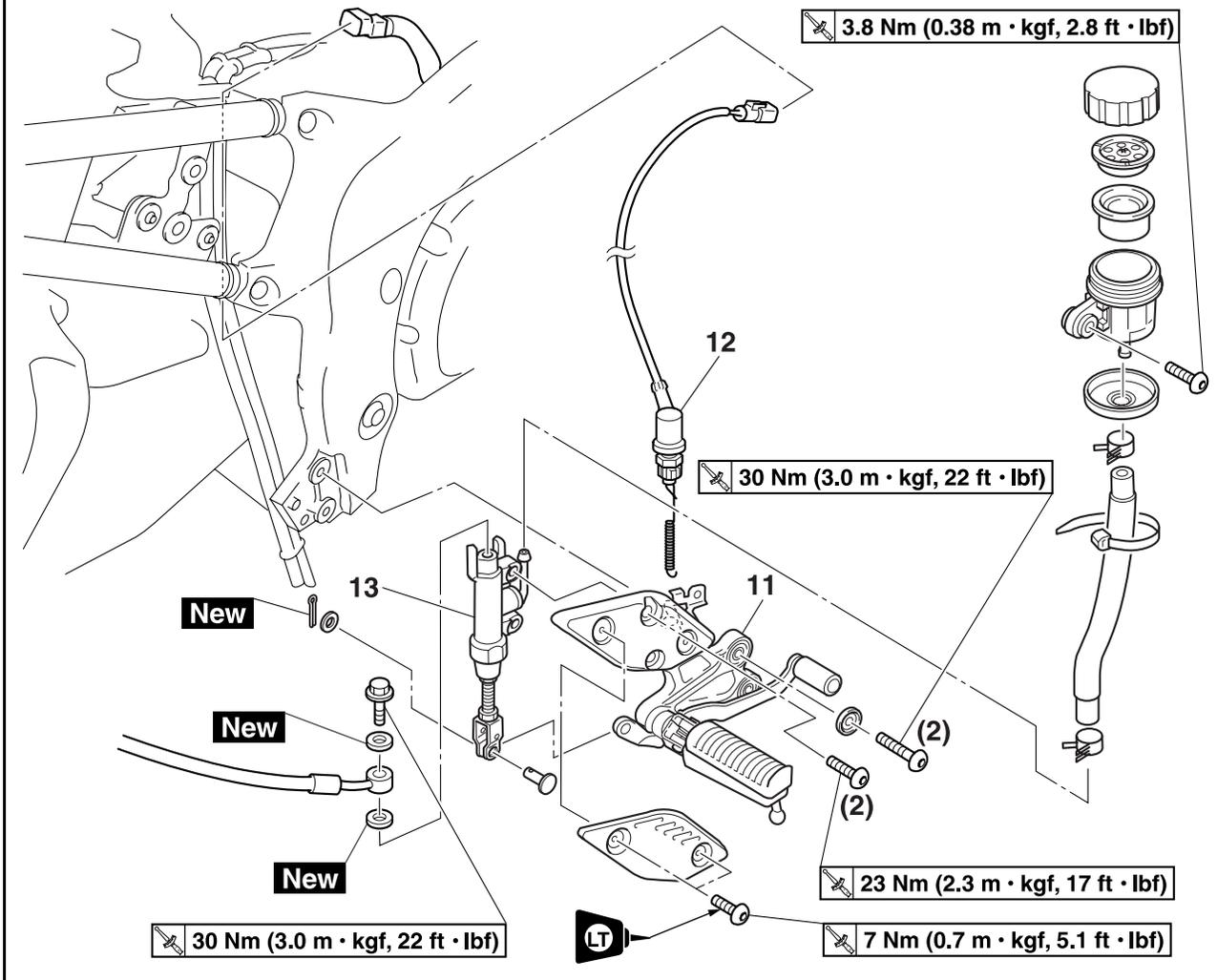
| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 1     | Screw plug          | 1    |  |
| 2     | Brake pad pin       | 1    |  |
| 3     | Rear brake caliper  | 1    |  |
| 4     | Brake pad           | 2    |  |
| 5     | Brake pad shim      | 2    |  |
| 6     | Brake pad insulator | 2    |  |
| 7     | Brake pad spring    | 1    |  |
| 8     | Bleed screw         | 1    |  |
|       |                     |      | For installation, reverse the removal procedure. |

## Removing the rear brake master cylinder



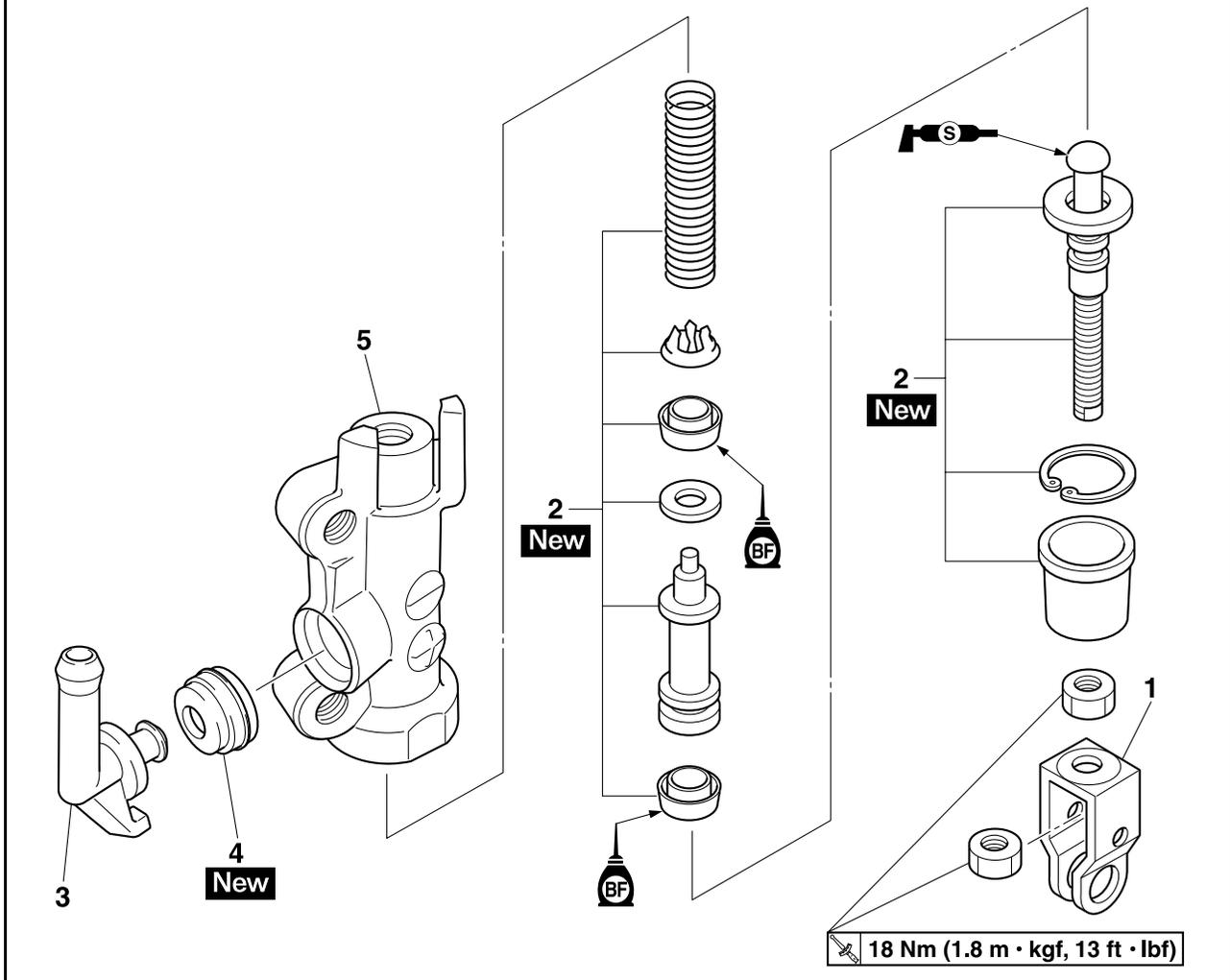
| Order | Job/Parts to remove                    | Q'ty | Remarks  |
|-------|--|------|--|
|       | Rider seat                             |      | Refer to "GENERAL CHASSIS" on page 4-1.                                |
|       | Fuel tank                              |      | Refer to "FUEL TANK" on page 7-1.                                      |
|       | Right side cover                       |      | Refer to "GENERAL CHASSIS" on page 4-1.                                |
|       | Brake fluid                            |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-15. |
| 1     | Brake fluid reservoir cap              | 1    |  |
| 2     | Brake fluid reservoir diaphragm holder | 1    |  |
| 3     | Brake fluid reservoir diaphragm        | 1    |  |
| 4     | Brake fluid reservoir                  | 1    |  |
| 5     | Brake fluid reservoir hose             | 1    |  |
| 6     | Brake fluid reservoir cover            | 1    |  |
| 7     | Rear brake light switch coupler        | 1    | Disconnect.  |
| 8     | Brake hose union bolt                  | 1    |  |
| 9     | Brake hose gasket                      | 2    |  |
| 10    | Brake hose                             | 1    |  |

## Removing the rear brake master cylinder



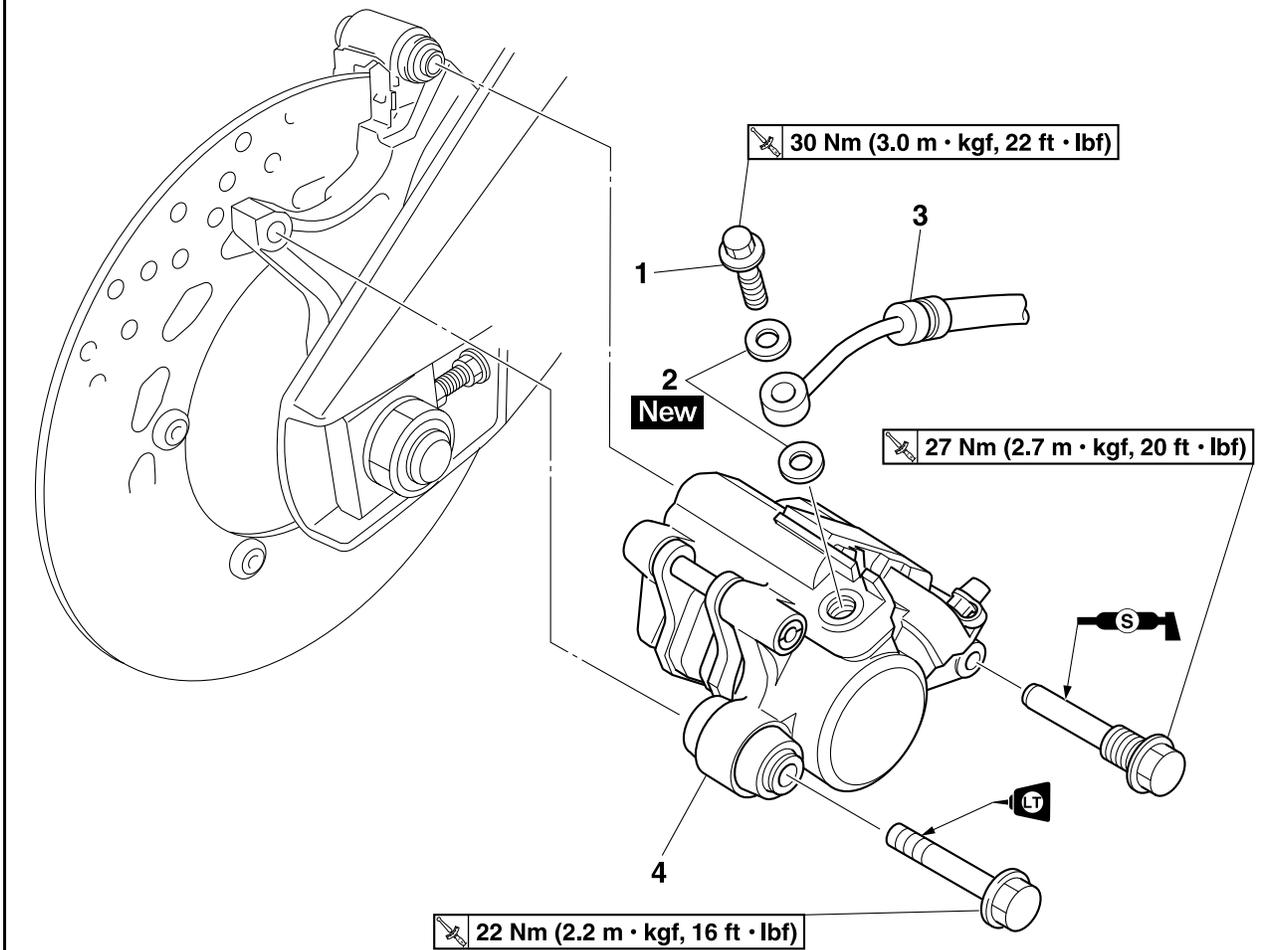
| Order | Job/Parts to remove                 | Q'ty | Remarks  |
|-------|-------------------------------------|------|--|
| 11    | Right footrest assembly             | 1    |  |
| 12    | Rear brake light switch             | 1    |  |
| 13    | Rear brake master cylinder assembly | 1    |  |
|       |                                     |      | For installation, reverse the removal procedure. |

## Disassembling the rear brake master cylinder



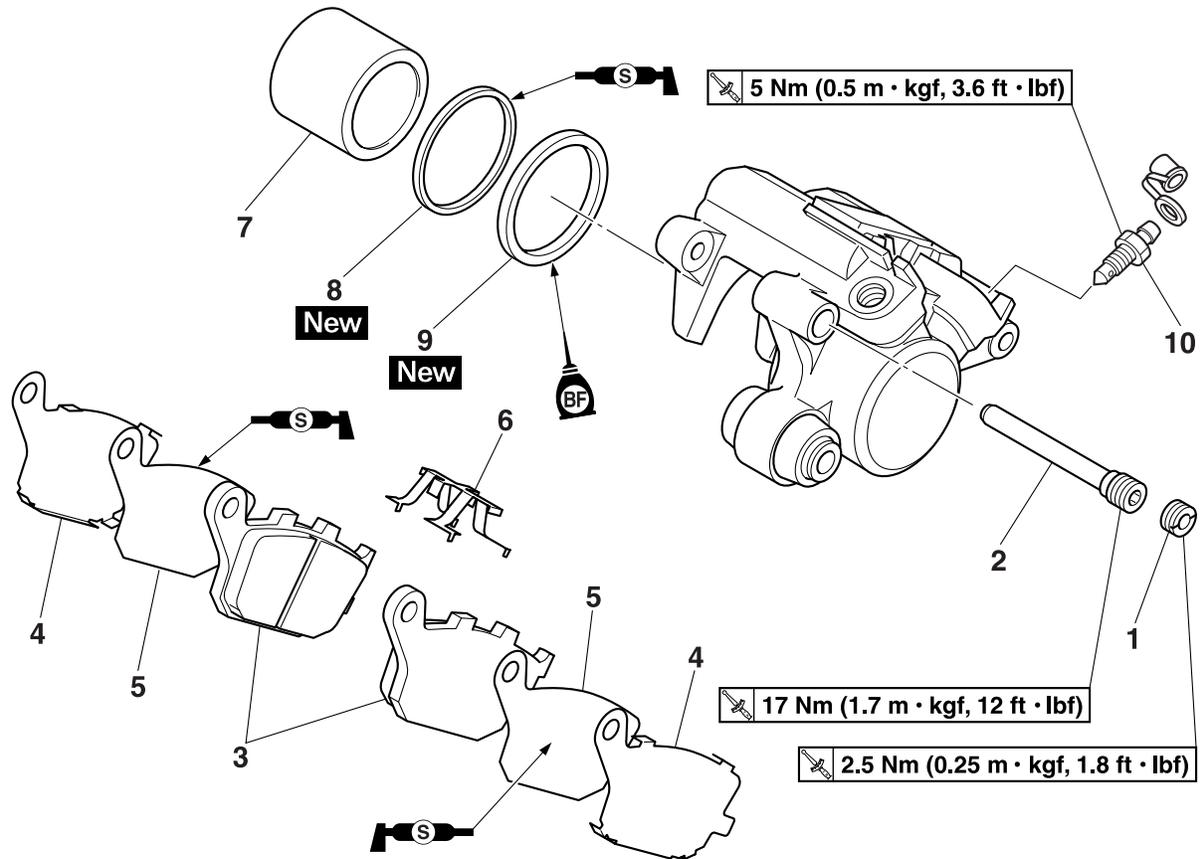
| Order | Job/Parts to remove        | Q'ty | Remarks  |
|-------|----------------------------|------|--|
| 1     | Brake master cylinder yoke | 1    |  |
| 2     | Brake master cylinder kit  | 1    |  |
| 3     | Hose joint                 | 1    |  |
| 4     | Bushing                    | 1    |  |
| 5     | Brake master cylinder body | 1    |  |
|       |                            |      | For assembly, reverse the disassembly procedure. |

## Removing the rear brake caliper



| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
| 1     | Brake hose union bolt | 1    |  |
| 2     | Brake hose gasket     | 2    |  |
| 3     | Brake hose            | 1    |  |
| 4     | Rear brake caliper    | 1    |  |
|       |                       |      | For installation, reverse the removal procedure. |

## 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                 | 2    |  |
| 5     | Brake pad insulator            | 2    |  |
| 6     | Brake pad spring               | 1    |  |
| 7     | Brake caliper piston           | 1    |  |
| 8     | Brake caliper piston dust seal | 1    |  |
| 9     | Brake caliper piston seal      | 1    |  |
| 10    | Bleed screw                    | 1    |  |
|       |                                |      | For assembly, reverse the disassembly procedure. |

EAS22561

## INTRODUCTION

EWA14101



**WARNING**

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

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

### FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

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

EAS22570

## CHECKING THE REAR BRAKE DISC

1. Remove:
  - Rear wheel  
Refer to "REAR WHEEL" on page 4-11.
2. Check:
  - Rear 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 4-23.



**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 4-23.



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

5. Adjust:
  - Brake disc deflection  
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-23.



**Rear brake disc bolt**  
**20 Nm (2.0 m·kgf, 14 ft·lbf)**  
**LOCTITE®**

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

EAS22581

## REPLACING THE REAR BRAKE PADS

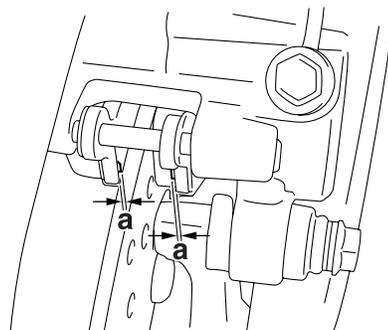
### TIP

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

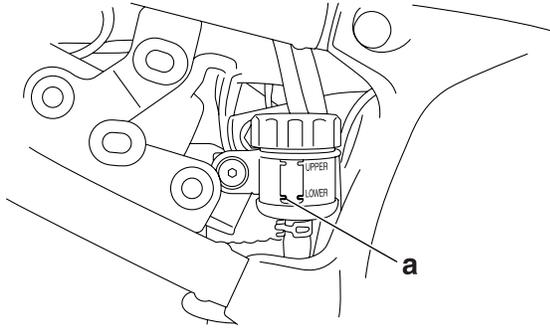
1. Measure:
  - Brake pad wear limit "a"  
Out of specification → Replace the brake pads as a set.



**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)**







6. Check:
- Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

EAS22590

## REMOVING THE REAR BRAKE CALIPER

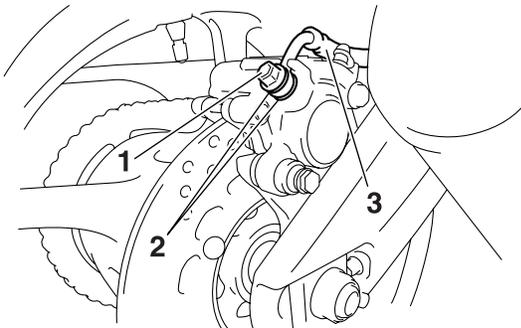
### TIP

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

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

### TIP

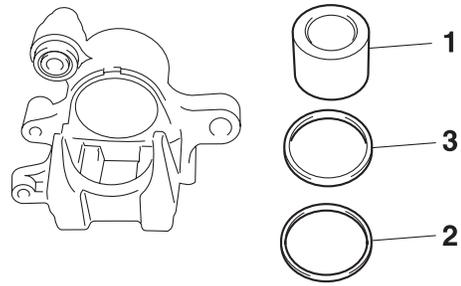
Put the end of the brake hose into a container and pump out the brake fluid carefully.



EAS22601

## DISASSEMBLING THE REAR BRAKE CALIPER

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

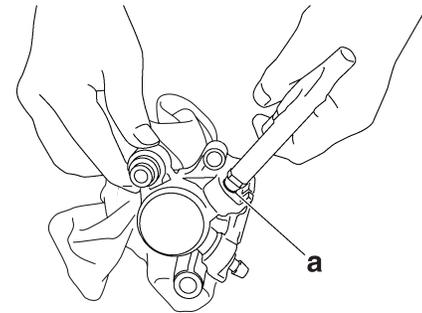


- a. Blow compressed air into the brake hose joint opening “a” to force out the piston from the brake caliper.

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.



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



EAS22642

## CHECKING THE REAR BRAKE CALIPER

### Recommended brake component replacement schedule

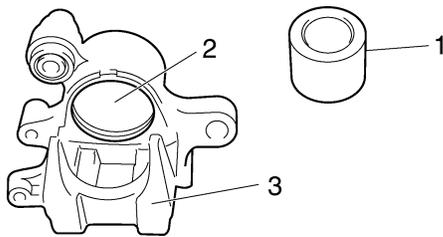
|                  |  |
|------------------|--|
| Brake pads       | If necessary   |
| Piston seal      | Every two years  |
| Piston dust seal | Every two years  |
| Brake hoses      | Every four years                                       |
| Brake fluid      | Every two years and whenever the brake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

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

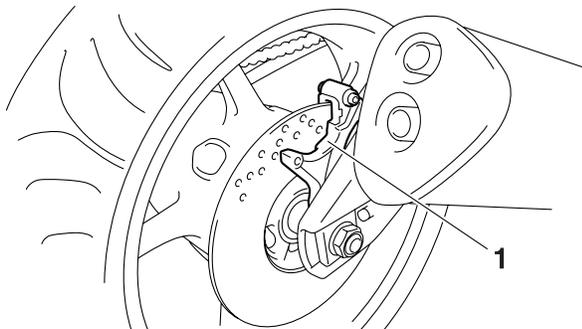
EWA39P1402

**⚠ WARNING**

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



- Check:
  - Rear brake caliper bracket “1”  
Cracks/damage → Replace.  
Refer to “REAR WHEEL” on page 4-11.



EAS22651

## ASSEMBLING THE REAR BRAKE CALIPER

EWA39P1403

**⚠ WARNING**

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

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



**Recommended fluid  
DOT 4**

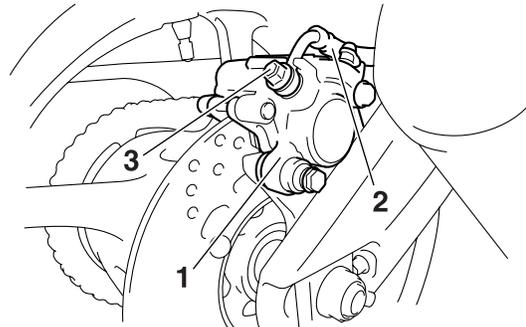
EAS22670

## INSTALLING THE REAR BRAKE CALIPER

- Install:
  - Rear brake caliper “1”  
(temporarily)
  - Brake hose gaskets **New**
  - Brake hose “2”
  - Brake hose union bolt “3”



**Brake hose union bolt  
30 Nm (3.0 m·kgf, 22 ft·lbf)**



EWA13530

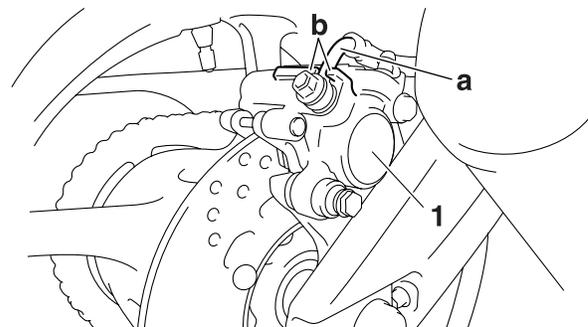
**⚠ WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

ECA39P1402

**NOTICE**

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



2. Remove:
  - Rear brake caliper
3. Install:
  - Brake pad insulators
  - Brake pad shims  
(onto the brake pads)
  - Brake pad spring  
(into the rear brake caliper)
  - Brake pads
  - Rear brake caliper

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



**Rear brake caliper retaining bolt (front)**

**27 Nm (2.7 m·kgf, 20 ft·lbf)**

**Rear brake caliper retaining bolt (rear)**

**22 Nm (2.2 m·kgf, 16 ft·lbf)**

**LOCTITE®**

**Brake pad retaining bolt**

**17 Nm (1.7 m·kgf, 12 ft·lbf)**

**Screw plug**

**2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)**

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



**Recommended fluid**  
**DOT 4**

EWA13090

## **WARNING**

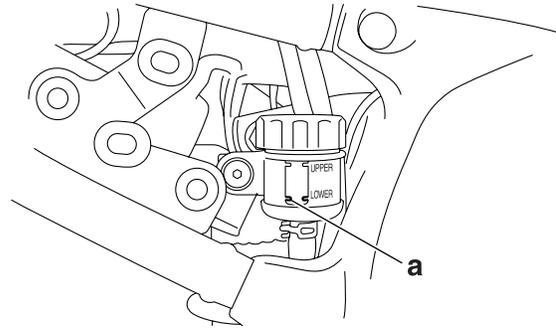
- **Use only the designated brake fluid.** Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- **Refill with the same type of brake fluid that is already in the system.** Mixing brake fluids may result in a harmful chemical reaction, leading to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

ECA13540

## **NOTICE**

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

5. Bleed:
  - Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.
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 3-13.



7. Check:
  - Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.

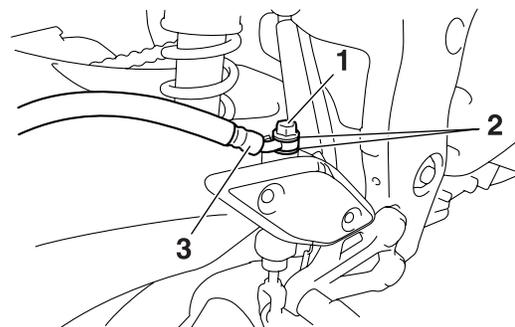
EAS22700

## **REMOVING THE REAR BRAKE MASTER CYLINDER**

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

### **TIP**

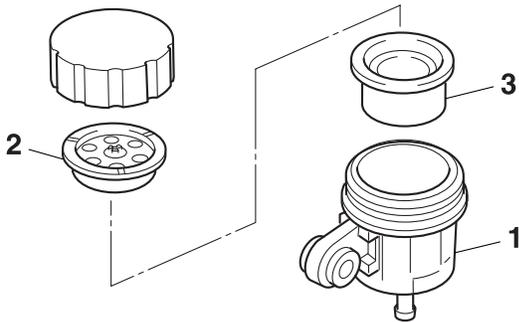
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



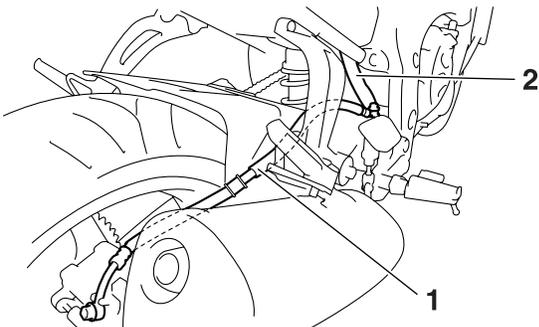
EAS22720

## 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 “1”
  - Brake fluid reservoir diaphragm holder “2”  
Cracks/damage → Replace.
  - Brake fluid reservoir diaphragm “3”  
Damage/wear → Replace.



4. Check:
  - Brake hose “1”
  - Brake fluid reservoir hose “2”  
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.



**Recommended fluid  
DOT 4**

1. Install:
  - Brake master cylinder kit **New**

EAS22740

## INSTALLING THE REAR BRAKE MASTER CYLINDER

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



**Brake hose union bolt  
30 Nm (3.0 m·kgf, 22 ft·lbf)**

EWA13530



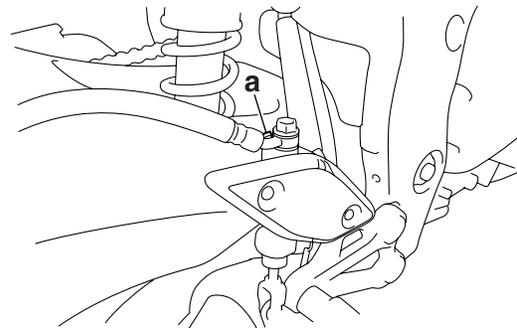
**WARNING**

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-41.

ECA14160



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



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



**Recommended fluid  
DOT 4**

EWA13090

## **WARNING**

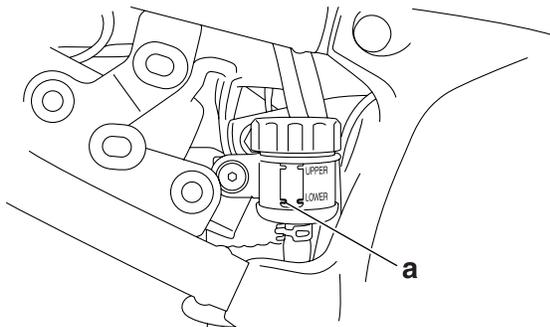
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

ECA13540

## **NOTICE**

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

3. Bleed:
  - Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-15.
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 3-13.

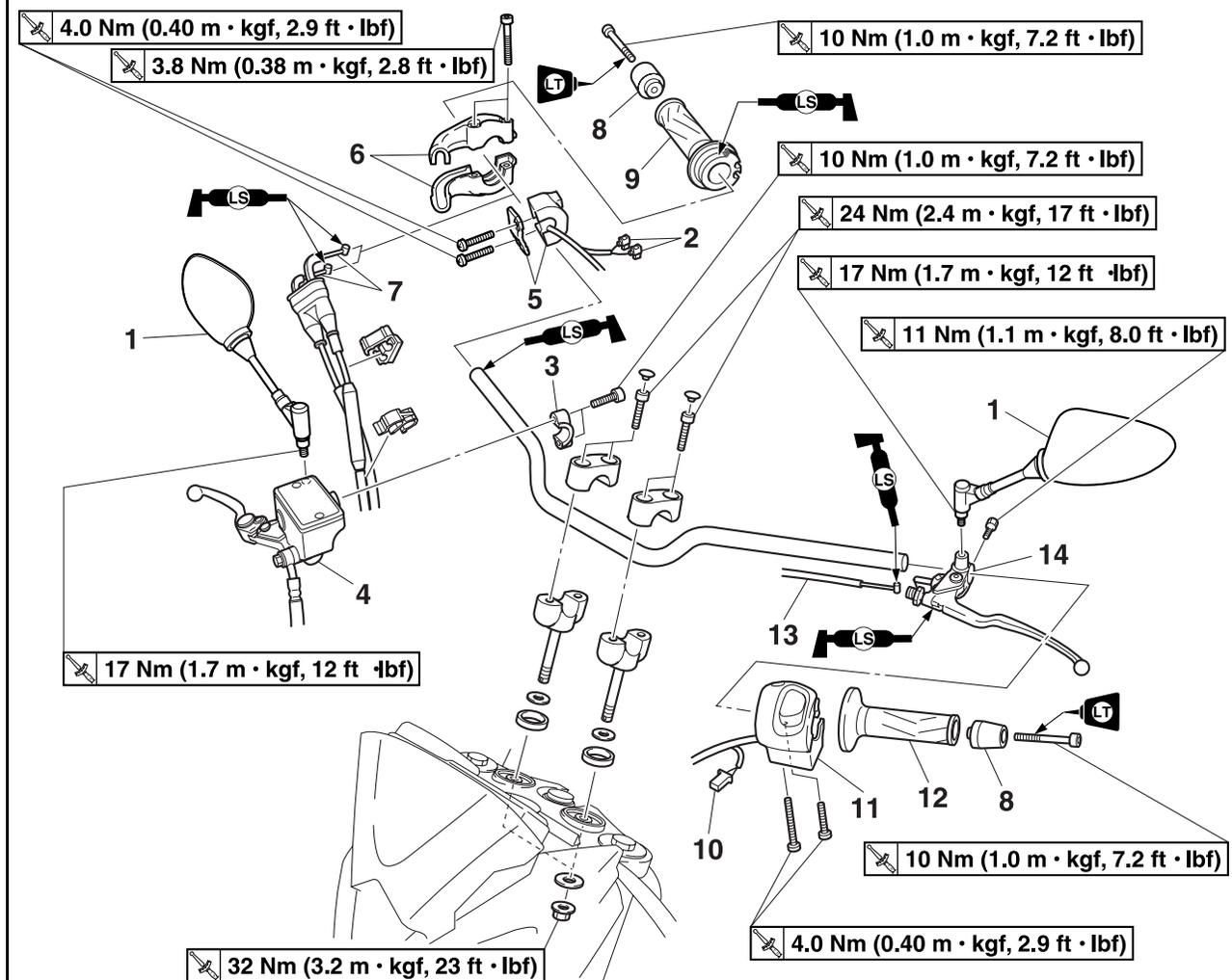


5. Adjust:
  - Brake pedal position  
Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-14.
6. Adjust:
  - Rear brake light operation timing  
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-28.

EAS22840

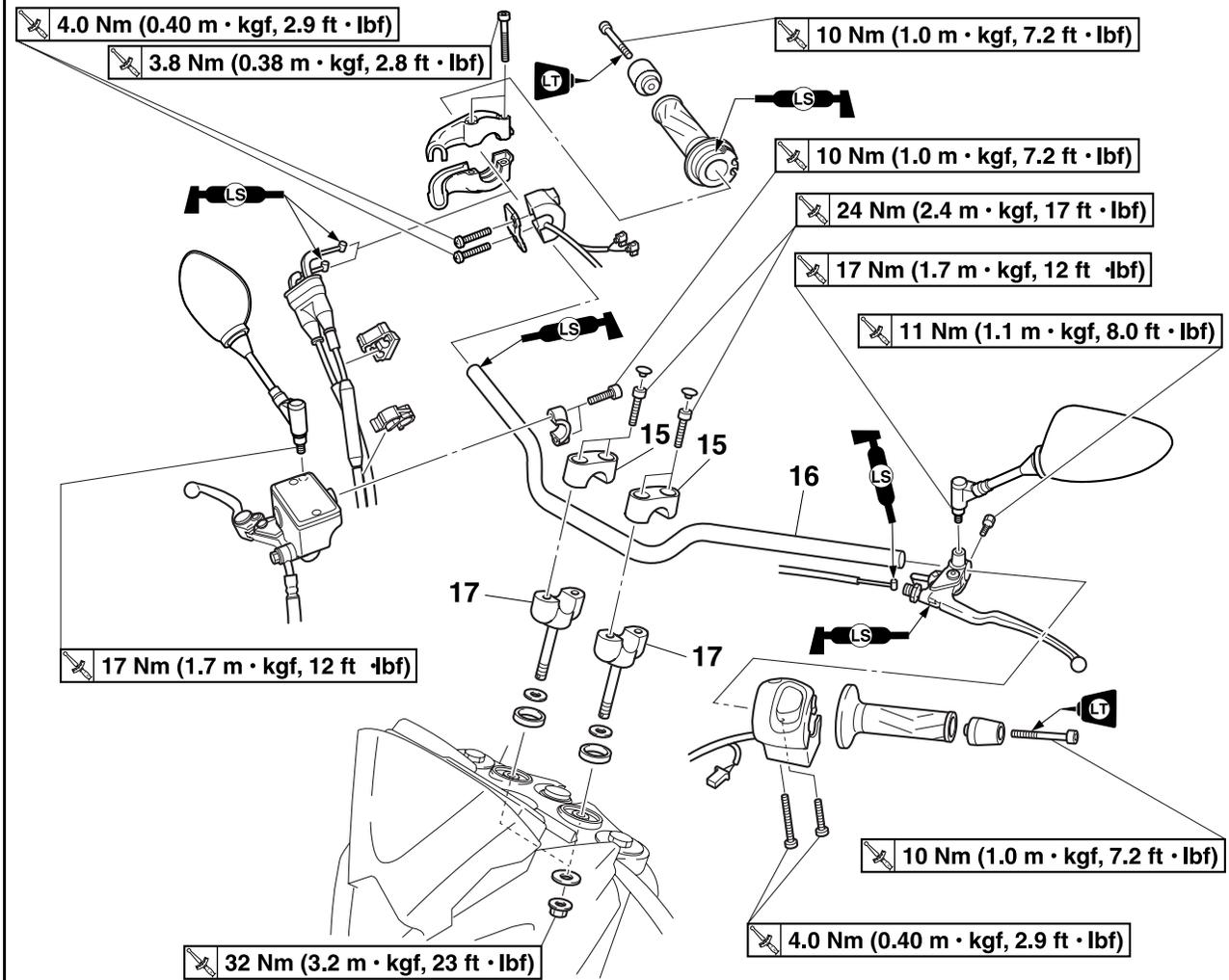
## HANDLEBAR

### Removing the handlebar



| Order | Job/Parts to remove                  | Q'ty | Remarks     |
|-------|--------------------------------------|------|-------------|
| 1     | Rear view mirror                     | 2    |             |
| 2     | Front brake light switch connector   | 2    | Disconnect. |
| 3     | Front master cylinder holder         | 1    |             |
| 4     | Front brake master cylinder assembly | 1    |             |
| 5     | Right handlebar switch               | 1    |             |
| 6     | Throttle cable housing               | 2    |             |
| 7     | Throttle cable                       | 2    | Disconnect. |
| 8     | Grip end                             | 2    |             |
| 9     | Throttle grip                        | 1    |             |
| 10    | Clutch switch coupler                | 1    | Disconnect. |
| 11    | Left handlebar switch                | 1    |             |
| 12    | Handlebar grip                       | 1    |             |
| 13    | Clutch cable                         | 1    | Disconnect. |
| 14    | Clutch lever holder                  | 1    |             |

## Removing the handlebar



| Order | Job/Parts to remove    | Q'ty | Remarks  |
|-------|------------------------|------|--|
| 15    | Upper handlebar holder | 2    |  |
| 16    | Handlebar              | 1    |  |
| 17    | Lower handlebar holder | 2    |  |
|       |                        |      | For installation, reverse the removal procedure. |

EAS22860

## REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

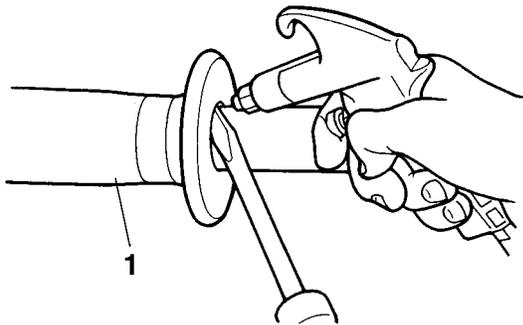
### **WARNING**

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

2. Remove:
  - Handlebar grip "1"

### TIP

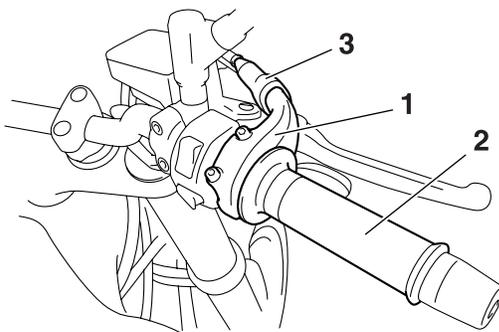
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



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

### TIP

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



EAS22880

## CHECKING THE HANDLEBAR

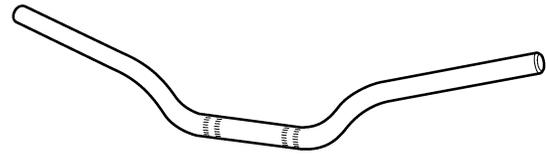
1. Check:
  - Handlebar

Bends/cracks/damage → Replace.

EWA13690

### **WARNING**

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



EAS22931

## 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 (temporarily)
  - Handlebar "1"
  - Upper handlebar holders "2"



**Upper handlebar holder bolt**  
24 Nm (2.4 m·kgf, 17 ft·lbf)

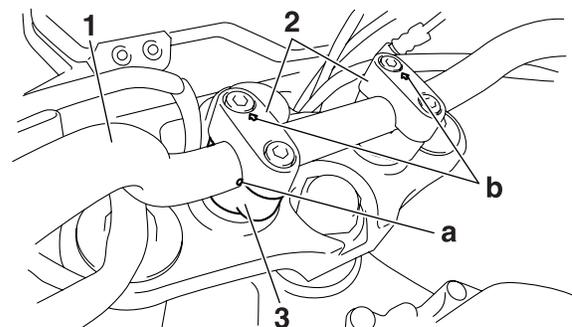
ECA39P1407

### **NOTICE**

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

### TIP

- Align the punch mark "a" on the handlebar with the left side upper surface of the left lower handlebar holder "3".
- The upper handlebar holders should be installed with the arrow marks "b" facing forward.



3. Tighten:
- Lower handlebar holder nuts



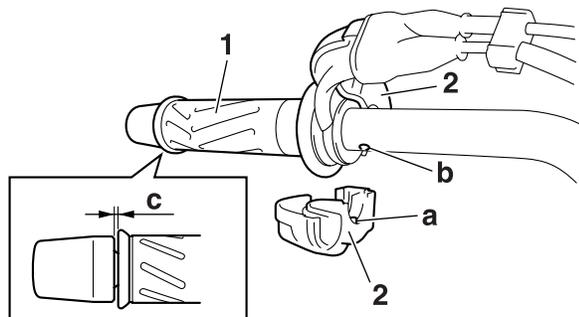
**Lower handlebar holder nut**  
**32 Nm (3.2 m·kgf, 23 ft·lbf)**

4. Install:
- Throttle grip "1"
  - Throttle cables
  - Throttle cable housings "2"
  - Grip end



**Grip end bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**

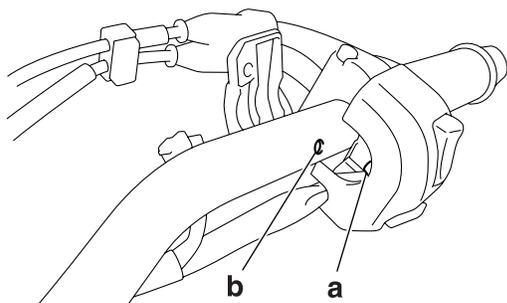
- TIP**
- Align the projection "a" on the throttle cable housing with the hole "b" in the handlebar.
  - There should be 1–3 mm (0.04–0.12 in) of clearance "c" between the throttle grip and the grip end.



5. Install:
- Right handlebar switch

**TIP**

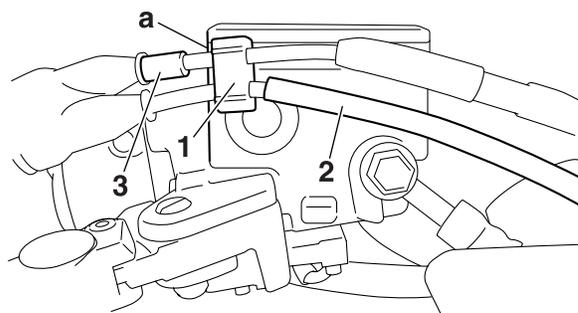
Align the projection "a" on the right handlebar switch with the hole "b" in the handlebar.



6. Install:
- Front brake master cylinder assembly
- Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-28.

7. Install:
- Throttle cable clamp "1"

- TIP**
- Using side "a" of the master cylinder as a guide, install the clamp between side "a" and protector "2" of the throttle cable (decelerator cable) with the claw down and the damper facing to the master cylinder.
  - When clamping, protector "3" of the throttle cable (accelerator cable) should be on the throttle grip side.

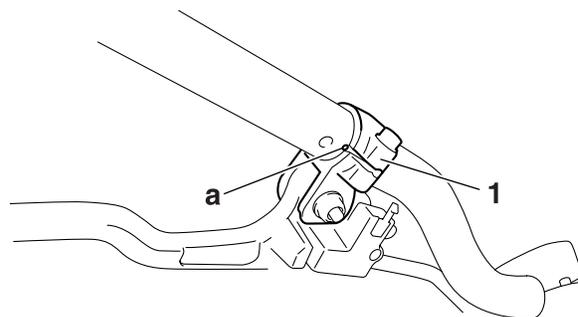


8. Install:
- Clutch lever holder "1"
  - Clutch cable



**Clutch lever holder pinch bolt**  
**11 Nm (1.1 m·kgf, 8.0 ft·lbf)**

- TIP**
- Align the center of slit on the clutch lever holder with the punch mark "a" on the handlebar.



9. Install:
- Handlebar grip "1"
  - Grip end "2"



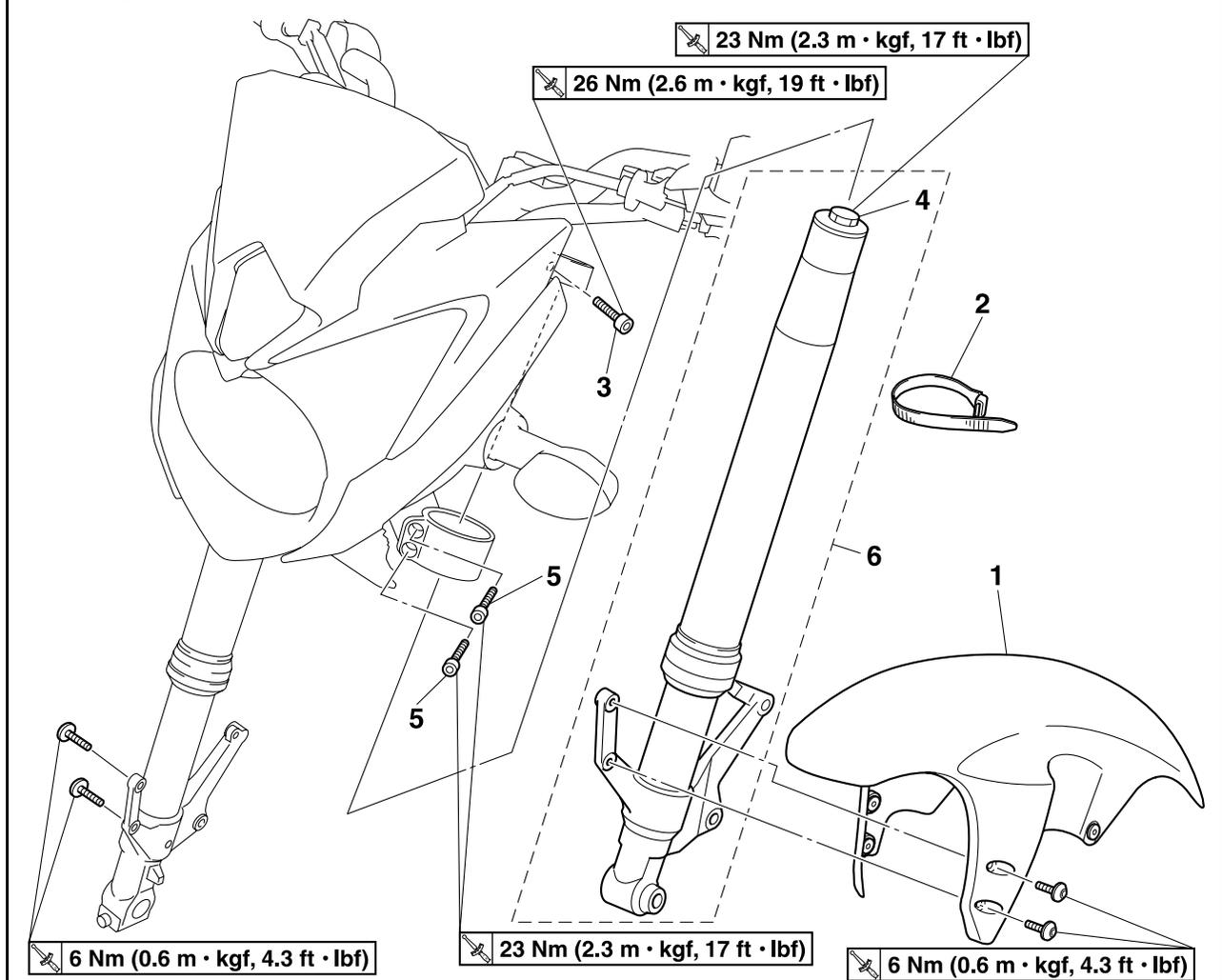
**Grip end bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**



EAS22950

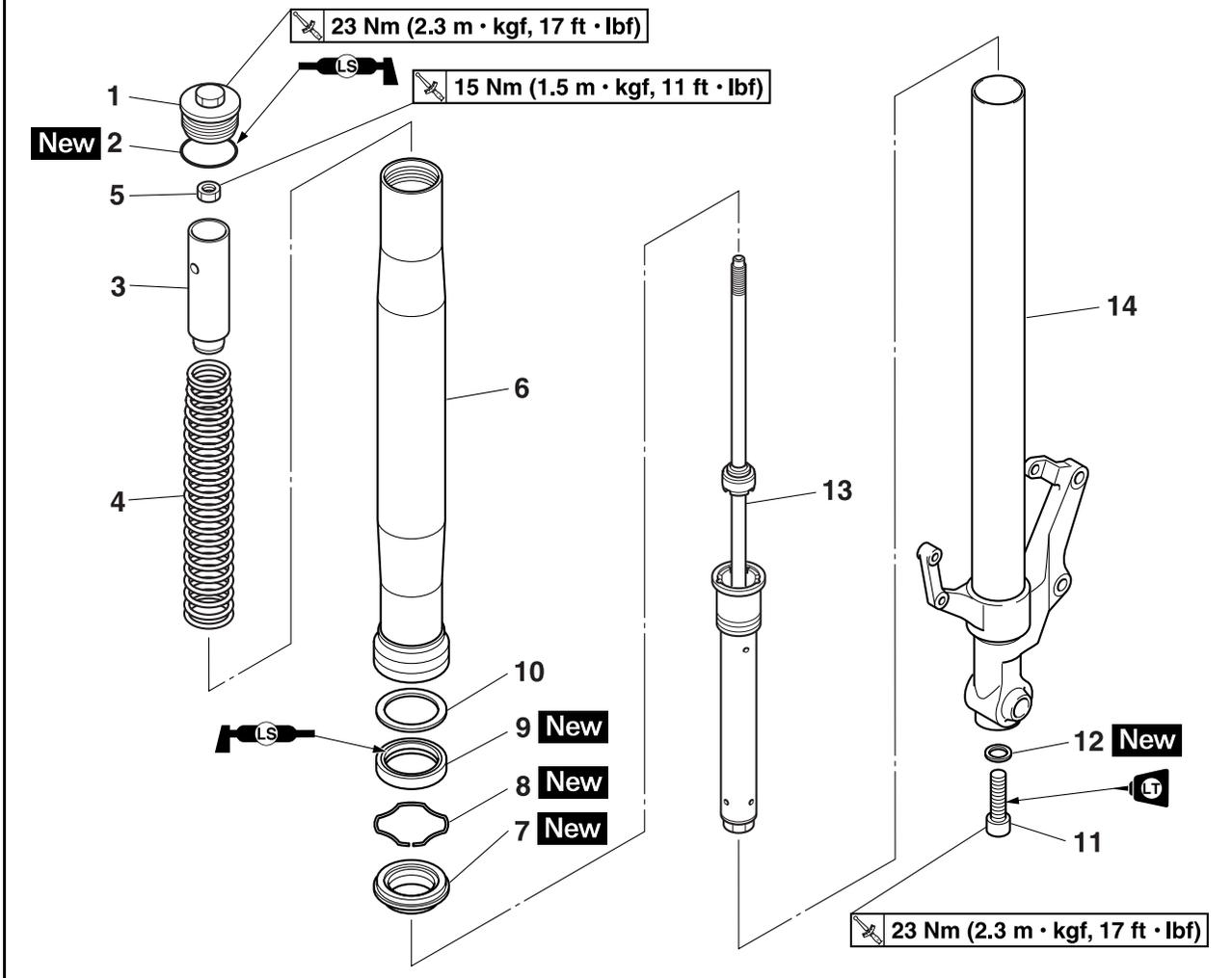
## FRONT FORK

### Removing the front fork legs



| Order | Job/Parts to remove      | Q'ty | Remarks   |
|-------|--------------------------|------|---|
|       |                          |      | The following procedure applies to both of the front fork legs. |
|       | Front wheel              |      | Refer to "FRONT WHEEL" on page 4-5.                             |
| 1     | Front fender             | 1    |   |
| 2     | Band                     | 1    | Left side only.   |
| 3     | Upper bracket pinch bolt | 1    | Loosen.   |
| 4     | Cap bolt                 | 1    | Loosen.   |
| 5     | Lower bracket pinch bolt | 2    | Loosen.   |
| 6     | Front fork leg           | 1    |   |
|       |                          |      | For installation, reverse the removal procedure.                |

## Disassembling the front fork legs



| Order | Job/Parts to remove      | Q'ty | Remarks   |
|-------|--------------------------|------|---|
|       |                          |      | The following procedure applies to both of the front fork legs. |
| 1     | Cap bolt                 | 1    |   |
| 2     | O-ring                   | 1    |   |
| 3     | Spacer                   | 1    |   |
| 4     | Fork spring              | 1    |   |
| 5     | Locknut                  | 1    |   |
| 6     | Outer tube               | 1    |   |
| 7     | Dust seal                | 1    |   |
| 8     | Oil seal clip            | 1    |   |
| 9     | Oil seal                 | 1    |   |
| 10    | Washer                   | 1    |   |
| 11    | Damper rod assembly bolt | 1    |   |
| 12    | Copper washer            | 1    |   |
| 13    | Damper rod assembly      | 1    |   |
| 14    | Inner tube               | 1    |   |
|       |                          |      | For assembly, reverse the disassembly procedure.                |

EAS22960

## REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### TIP

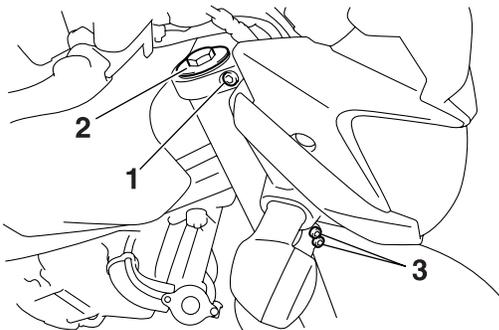
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Loosen:
  - Upper bracket pinch bolt "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 rod assembly)
  - Spacer "2"
  - Locknut "3"

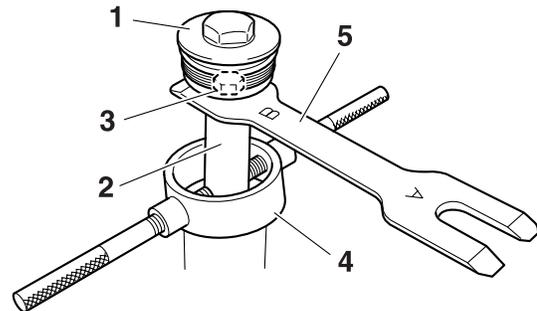
- a. Press down on the spacer with the fork spring compressor "4".
- b. Install the rod holder "5" between the locknut "3" and the spacer "2".



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

### TIP

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



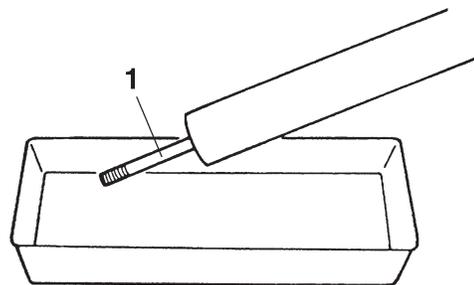
- c. Hold the cap bolt and loosen the locknut.
- d. Remove the cap bolt.
- e. Remove the rod holder and fork spring compressor.
- f. Remove the spacer and locknut.



2. Drain:
  - Fork oil

### TIP

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

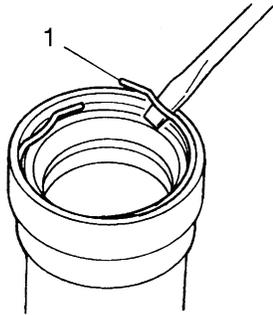


3. Remove:
  - Dust seal
  - Oil seal clip "1" (with a flat-head screwdriver)
  - Oil seal
  - Washer

ECA39P1404

**NOTICE**

**Do not scratch the outer tube.**



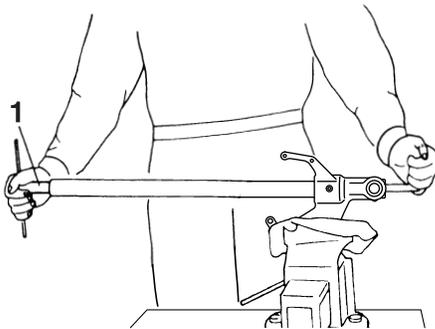
4. Remove:
- Damper rod assembly bolt
  - Damper rod assembly

**TIP**

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



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



EAS23011

**CHECKING THE FRONT FORK LEGS**

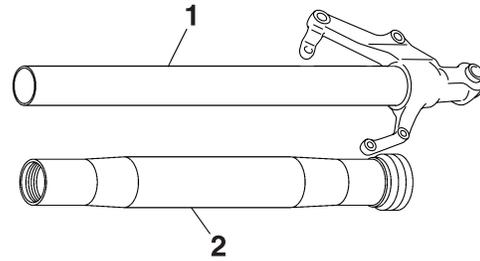
The following procedure applies to both of the front fork legs.

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

EWA13650

**WARNING**

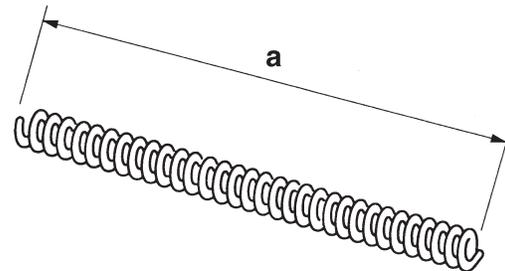
**Do not attempt to straighten a bent inner tube as this may dangerously weaken it.**



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



**Fork spring free length**  
286.1 mm (11.26 in)  
**Limit**  
280.4 mm (11.04 in)

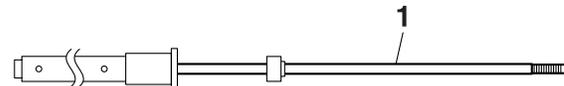


3. Check:
- Damper rod "1"
- Damage/wear → Replace.  
Obstruction → Blow out all of the oil passages with compressed air.

ECA39P1405

**NOTICE**

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



EAS23031

**ASSEMBLING THE FRONT FORK LEGS**

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

**TIP**

- When assembling the front fork leg, be sure to replace the following parts:
  - Oil seal

- Oil seal clip
  - Dust seal
  - Copper washer
  - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:

- Damper rod assembly "1"

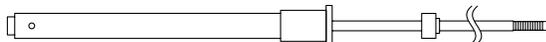
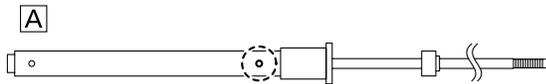
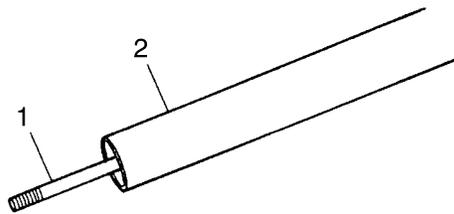
ECA39P1406

**NOTICE**

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

**TIP**

The left side damper rod assembly has the two holes of oil path, unlike the right side.



- A. Left side
- B. Right side

2. Tighten:

- Damper rod assembly bolt  
(along with the copper washer **New**)



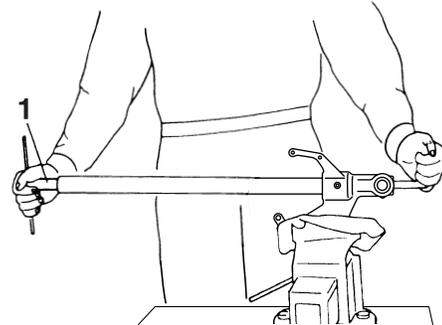
**Damper rod assembly bolt**  
23 Nm (2.3 m·kgf, 17 ft·lbf)  
LOCTITE®

**TIP**

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

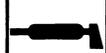


**Damper rod holder**  
90890-01423  
**Damping rod holder**  
YM-01423



3. Lubricate:

- Inner tube's outer surface



**Recommended oil**  
Suspension oil 01

4. Install:

- Dust seal "1" **New**
- Oil seal clip "2" **New**
- Oil seal "3" **New**
- Washer "4"  
(to the inner tube)

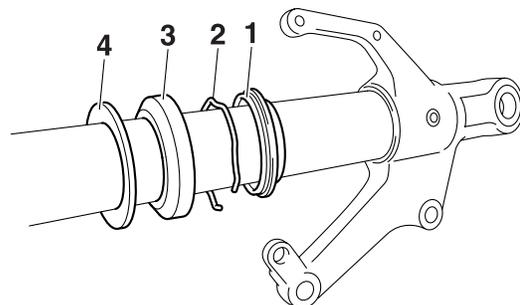
ECA14B1007

**NOTICE**

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

**TIP**

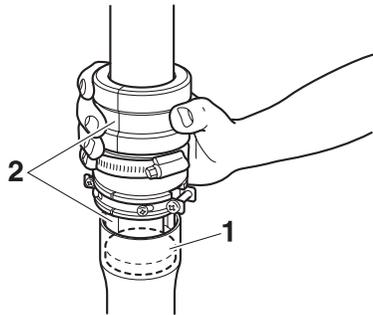
- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.



5. Install:
  - Outer tube  
(to the inner tube)
6. Install:
  - Washer
  - Oil seal "1"  
(with the fork seal driver "2")



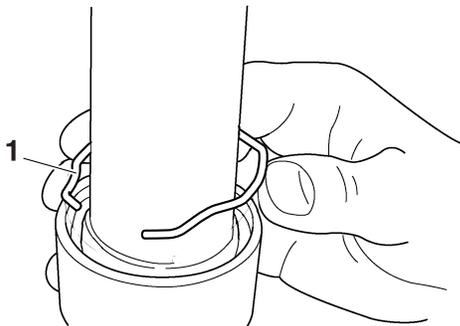
**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**



7. Install:
  - Oil seal clip "1"

**TIP**

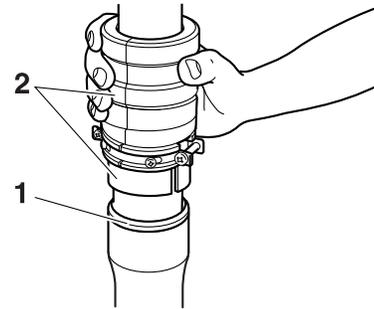
Adjust the oil seal clip so that it fits into the outer tube's groove.



8. Install:
  - Dust seal "1"  
(with the fork seal driver "2")



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



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



**Recommended oil**  
**Suspension oil 01**  
**Quantity**  
**Left**  
 563.0 cm<sup>3</sup> (19.04 US oz, 19.86 Imp.oz)  
**Right**  
 555.0 cm<sup>3</sup> (18.77 US oz, 19.57 Imp.oz)

ECA14230

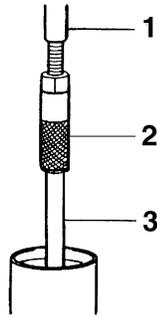
**NOTICE**

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

10. Install:
  - Rod puller "1"
  - Rod puller attachment (M10) "2"  
(onto the damper rod "3")



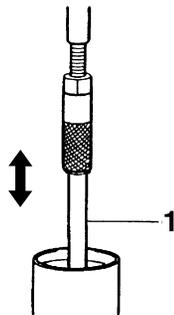
**Rod puller**  
**90890-01437**  
**Universal damping rod bleeding tool set**  
**YM-A8703**  
**Rod puller attachment (M10)**  
**90890-01436**  
**Universal damping rod bleeding tool set**  
**YM-A8703**



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

**TIP**

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



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

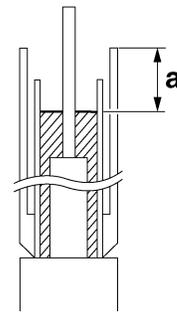
**TIP**

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

13. 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.

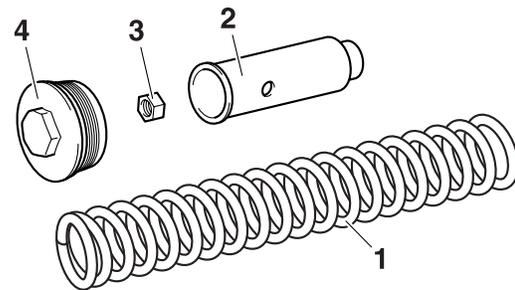
|  |                                   |
|--|-----------------------------------|
|  | <b>Level</b>                      |
|  | <b>Left</b><br>82.0 mm (3.23 in)  |
|  | <b>Right</b><br>85.0 mm (3.35 in) |



14. Install:

- Fork spring "1"
- Spacer "2"
- Locknut "3"
- Cap bolt "4"

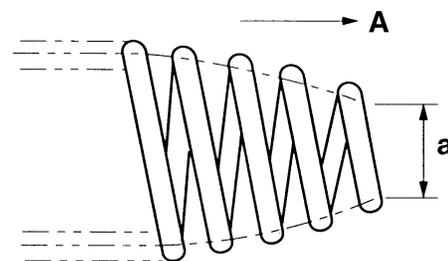
(along with the O-ring **New**)



- Remove the rod puller and rod puller attachment.
- Install the fork spring.

**TIP**

Install the fork spring with the smaller diameter "a" facing up "A".



- Install the locknut all the way onto the damper rod assembly.
- Install the spacer.
- Install the rod puller, rod puller attachment, and fork spring compressor.
- Press down on the spacer with the fork spring compressor "1".

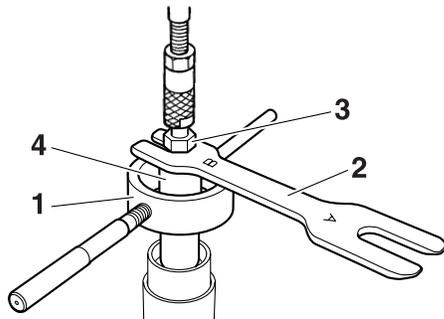
- g. Pull up the rod puller and install the rod holder "2" between the locknut "3" and the spacer "4".



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

**TIP**

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



- h. Remove the rod puller and rod puller attachment.  
i. Install the cap bolt all the way onto the damper rod assembly, and finger tighten it.

EWA13670

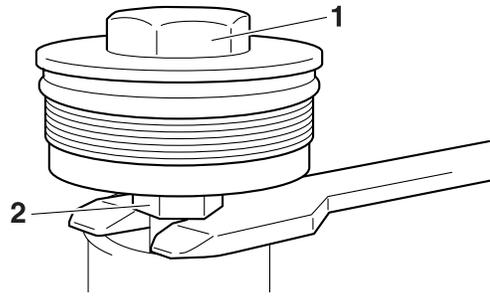


**Always use a new cap bolt O-ring.**

- j. Hold the cap bolt "1" and tighten the locknut "2" to specification.



**Locknut**  
15 Nm (1.5 m·kgf, 11 ft·lbf)



- k. Remove the rod holder and fork spring compressor.



15. Install:
- Cap bolt (to the outer tube)

**TIP**

- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS23050

**INSTALLING THE FRONT FORK LEGS**

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

1. Install:
- Front fork leg
- Temporarily tighten the upper and lower bracket pinch bolts.

**TIP**

Make sure the outer tube is flush with the top of the upper bracket.

2. Tighten:
- Lower bracket pinch bolts "1"



**Lower bracket pinch bolt**  
23 Nm (2.3 m·kgf, 17 ft·lbf)

- Cap bolt "2"



**Cap bolt**  
23 Nm (2.3 m·kgf, 17 ft·lbf)

- Upper bracket pinch bolt "3"

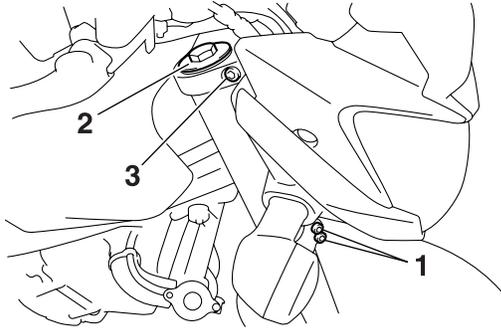


**Upper bracket pinch bolt**  
26 Nm (2.6 m·kgf, 19 ft·lbf)

EWA13680



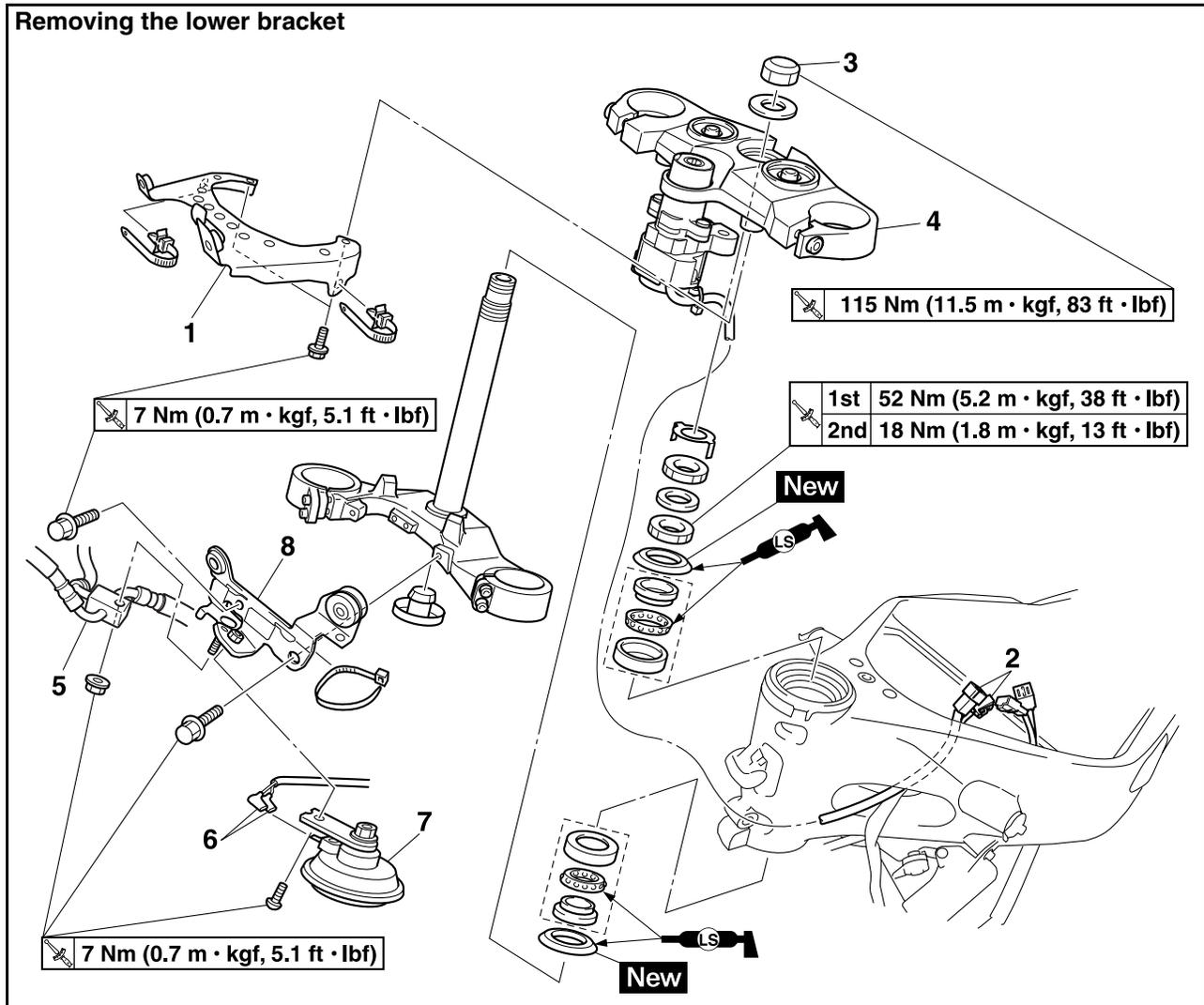
**Make sure the brake hoses are routed properly.**



EAS23090

## STEERING HEAD

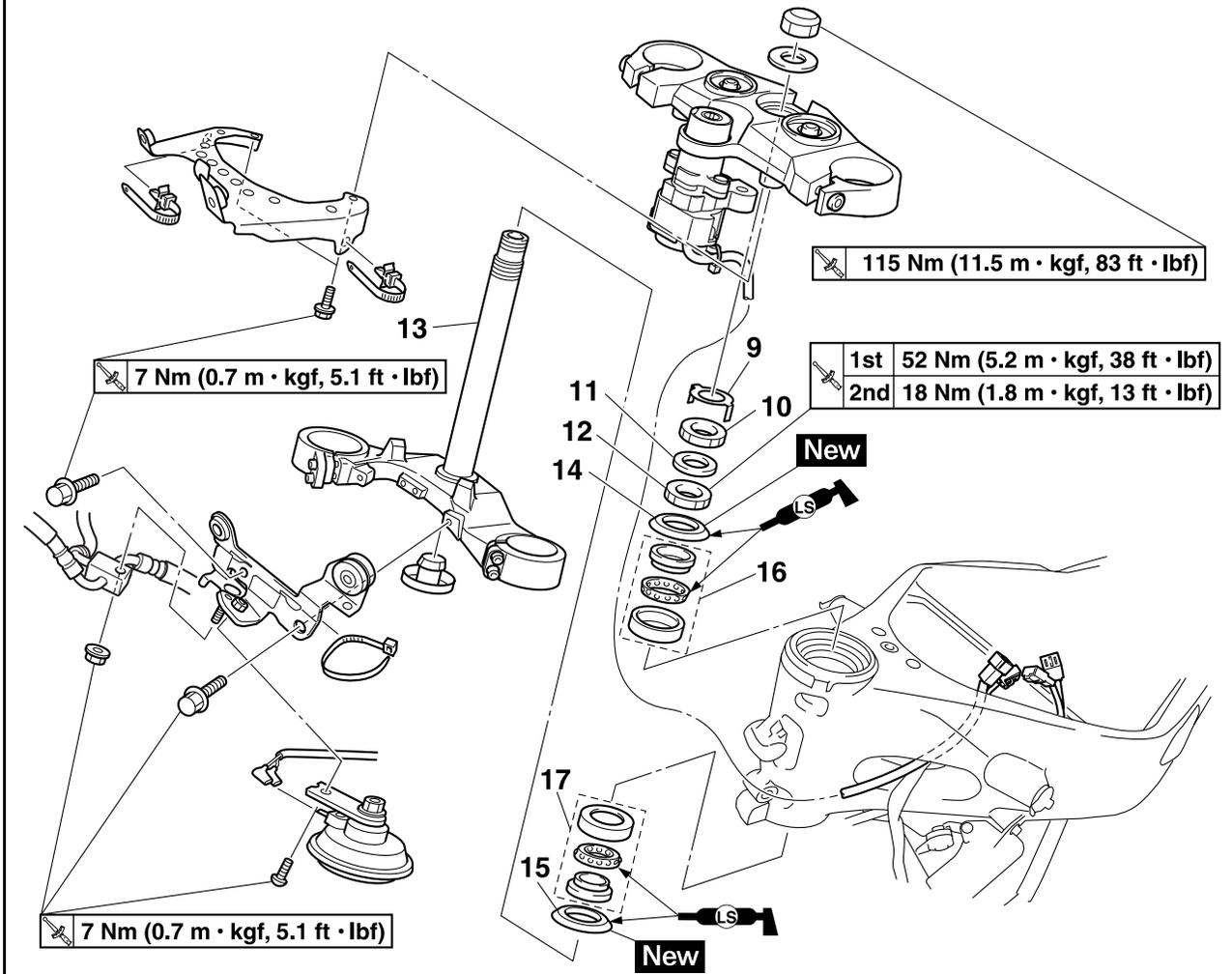
### Removing the lower bracket



| 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. |
|       | Meter assembly         |      | Refer to "GENERAL CHASSIS" on page 4-1. |
|       | Handlebar              |      | Refer to "HANDLEBAR" on page 4-44.      |
|       | Front fork legs        |      | Refer to "FRONT FORK" on page 4-49.     |
| 1     | Upper headlight stay   | 1    |   |
| 2     | Main switch coupler    | 2    | Disconnect.                             |
| 3     | Steering stem nut      | 1    |   |
| 4     | Upper bracket          | 1    |   |
| 5     | Front brake hose joint | 1    | Disconnect.                             |
| 6     | Horn lead connector    | 2    | Disconnect.                             |
| 7     | Horn                   | 1    |   |
| 8     | Lower headlight stay   | 1    |   |

# STEERING HEAD

## Removing the lower bracket



| Order | Job/Parts to remove     | Q'ty | Remarks  |
|-------|-------------------------|------|--|
| 9     | Lock washer             | 1    |  |
| 10    | Upper ring nut          | 1    |  |
| 11    | Rubber washer           | 1    |  |
| 12    | Lower ring nut          | 1    |  |
| 13    | Lower bracket           | 1    |  |
| 14    | Bearing cover           | 1    |  |
| 15    | Lower bearing dust seal | 1    |  |
| 16    | Upper bearing           | 1    |  |
| 17    | Lower bearing           | 1    |  |
|       |                         |      | For installation, reverse the removal procedure. |

EAS23110

## REMOVING THE LOWER BRACKET

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:

- Upper ring nut
- Rubber washer
- Lower ring nut "1"
- Lower bracket

EWA13730



**WARNING**

**Securely support the lower bracket so that there is no danger of it falling.**

### TIP

- Hold the lower ring nut with steering nut wrench, and then remove the upper ring nut with the ring nut wrench.
- Remove the lower ring nut with the steering nut wrench "2".



**Ring nut wrench**

**90890-01268**

**Spanner wrench**

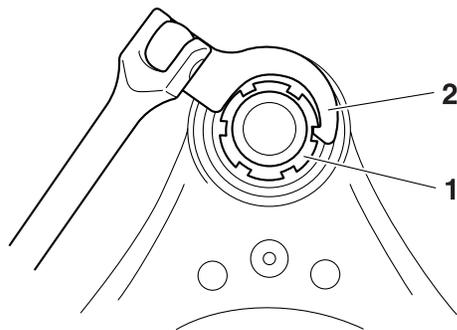
**YU-01268**

**Steering nut wrench**

**90890-01403**

**Exhaust flange nut wrench**

**YU-A9472**

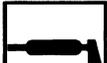


EAS23120

## CHECKING THE STEERING HEAD

1. Wash:

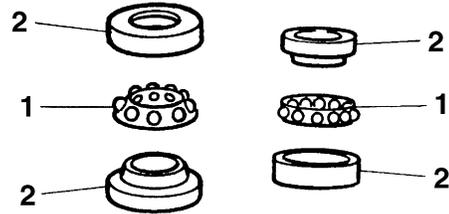
- Bearings
- Bearing races



**Recommended cleaning solvent**  
**Kerosene**

2. Check:

- Bearings "1"
  - Bearing races "2"
- Damage/pitting → Replace the bearings and bearing races as a set.



3. Replace:

- Bearings
- Bearing races



- Remove the bearing races from the steering head pipe "1" with a long rod "2" and hammer.
- Remove the bearing race "3" from the lower bracket with a floor chisel "4" and hammer.
- Install a new dust seal and new bearing races.

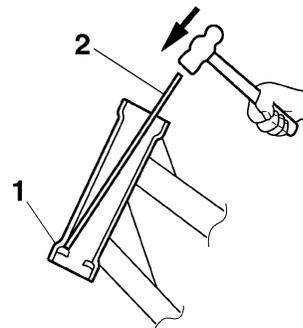
ECA14270

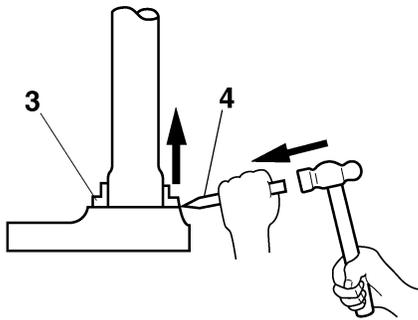
### NOTICE

**If the bearing race is not installed properly, the steering head pipe could be damaged.**

### TIP

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.





**TIP**

Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
  - Steering stem nut

|   |  |
|---|--|
|  | <p><b>Steering stem nut</b><br/> <b>115 Nm (11.5 m·kgf, 83 ft·lbf)</b></p> |
|---|--|



4. Check:
  - Upper bracket
  - Lower bracket  
(along with the steering stem)

Bends/cracks/damage → Replace.

EAS23140

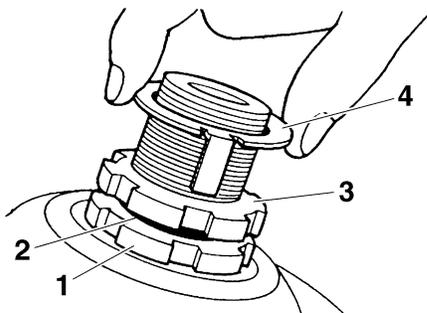
## INSTALLING THE STEERING HEAD

1. Lubricate:
  - Upper bearing
  - Lower bearing

|   |   |
|---|---|
|  | <p><b>Recommended lubricant</b><br/> <b>Lithium-soap-based grease</b></p> |
|---|---|

2. Install:
  - Lower ring nut "1"
  - Rubber washer "2"
  - Upper ring nut "3"
  - Lock washer "4"

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-20.



3. Install:
  - Upper bracket
  - Steering stem nut

**TIP**

Temporarily tighten the steering stem nut.

4. Install:
  - Front fork legs

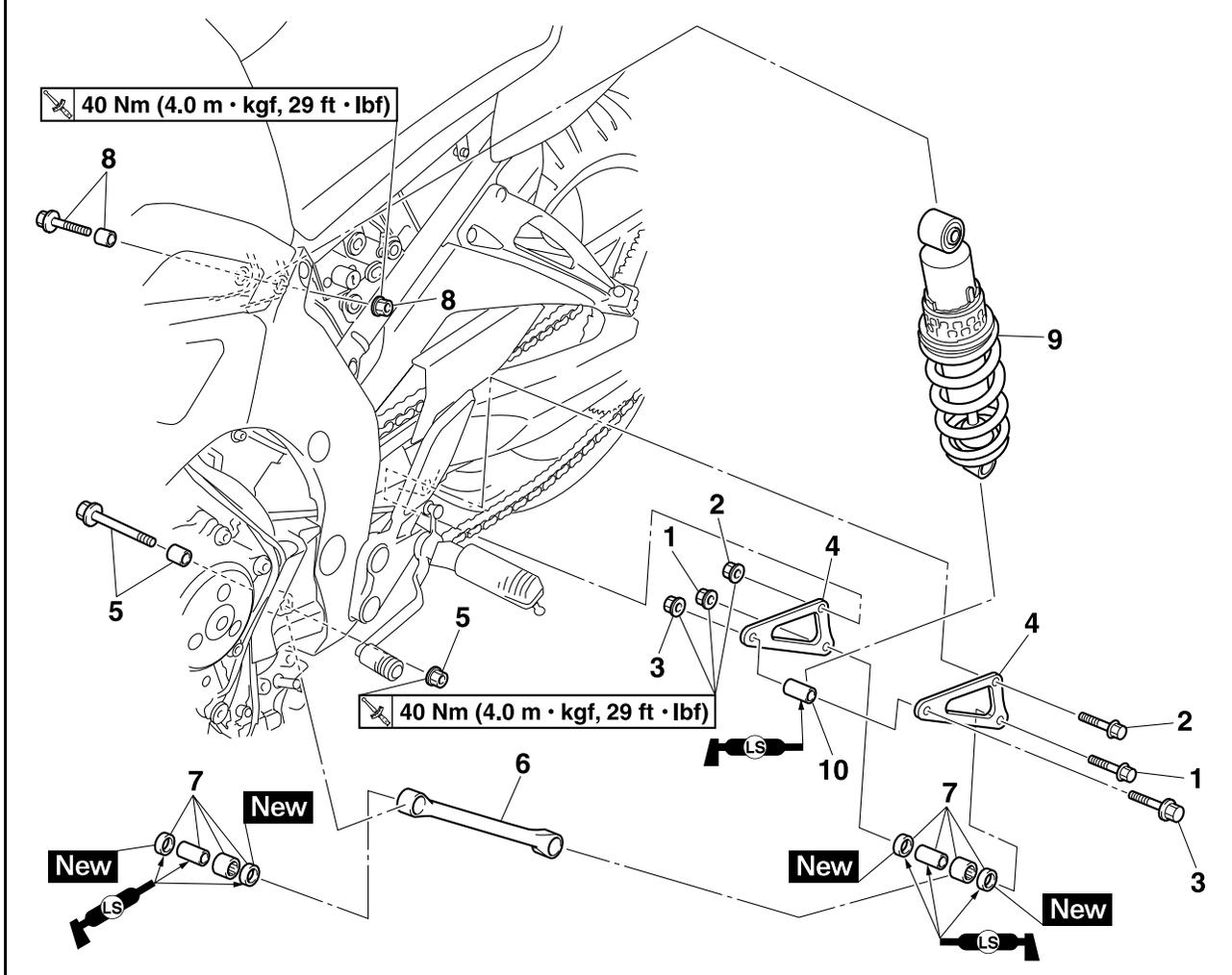
Refer to "FRONT FORK" on page 4-49.

# REAR SHOCK ABSORBER ASSEMBLY

EAS23160

## REAR SHOCK ABSORBER ASSEMBLY

### Removing the rear shock absorber assembly



| Order | Job/Parts to remove          | Q'ty  | Remarks  |
|-------|------------------------------|-------|--|
|       | Left side cover              |       | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Right side cover             |       | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Brake fluid reservoir bolt   |       | Refer to "REAR BRAKE" on page 4-31.              |
| 1     | Self-locking nut/bolt        | 1/1   |  |
| 2     | Self-locking nut/bolt        | 1/1   |  |
| 3     | Self-locking nut/bolt        | 1/1   |  |
| 4     | Relay arm                    | 2     |  |
| 5     | Self-locking nut/bolt/collar | 1/1/1 |  |
| 6     | Connecting arm               | 1     |  |
| 7     | Collar/oil seal/bearing      | 2/4/2 |  |
| 8     | Self-locking nut/bolt/collar | 1/1/1 |  |
| 9     | Rear shock absorber assembly | 1     |  |
| 10    | Collar                       | 1     |  |
|       |                              |       | 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

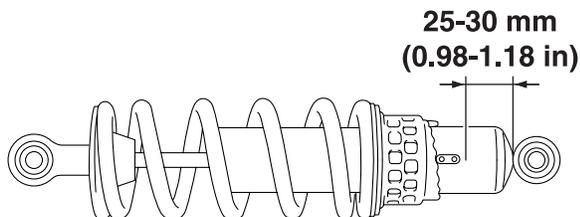
## DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 25–30 mm (0.98–1.18 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.

### TIP

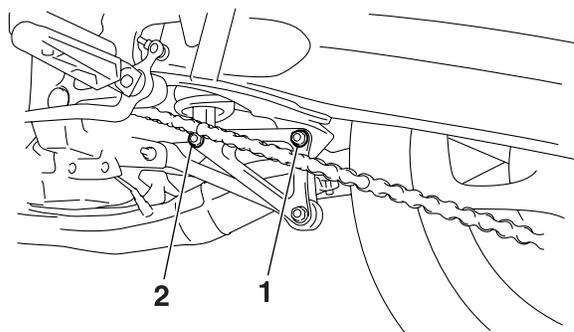
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Relay arm and swingarm bolt “1”
- Rear shock absorber assembly lower bolt “2”

### TIP

When removing the bolt, hold the swingarm so that it does not drop down.



3. Remove:

- Rear shock absorber assembly upper bolt
- Rear shock absorber assembly

### TIP

Remove the rear shock absorber assembly from between the swingarm and frame.

EAS23240

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

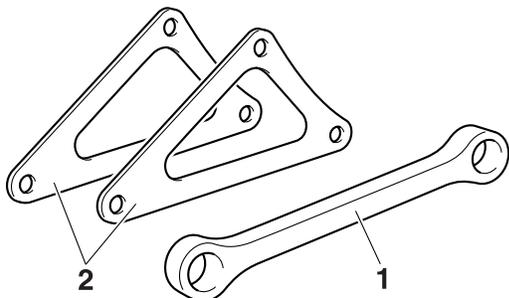
- Rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.
- Rear shock absorber  
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- Spring  
Damage/wear → Replace the rear shock absorber assembly.
- Bolts  
Bends/damage/wear → Replace.

# REAR SHOCK ABSORBER ASSEMBLY

EAS23261

## CHECKING THE CONNECTING ARM AND RELAY ARM

- Check:
  - Connecting arm "1"
  - Relay arms "2"
 Damage/wear → Replace.

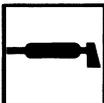


- Check:
  - Bearings
  - Oil seals
 Damage/pitting → Replace.
- Check:
  - Collars
 Damage/scratches → Replace.

EAS23311

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

- Lubricate:
  - Collars
  - Oil seals



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

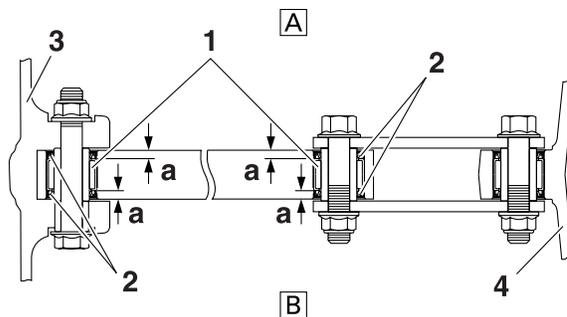
- Install:
  - Bearings "1"  
(to the connecting arm)
  - Oil seals "2" **New**  
(to the connecting arm)



**Installed depth of bearing "a"**  
4.0 mm (0.16 in)

### TIP

When installing the oil seals to the connecting arm, face the character stamp of the oil seals outside.



- Frame
- Swingarm

- Left side
- Right side

- Install:
  - Rear shock absorber assembly
  - Connecting arm "1"
  - Relay arms "2"

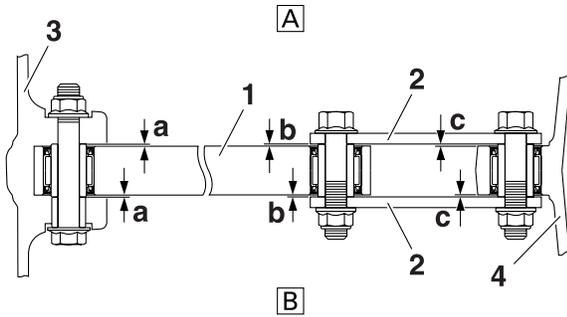


**Frame and connecting arm clearance "a"**  
1.0 mm (0.04 in)  
**Relay arm and connecting arm clearance "b"**  
1.0 mm (0.04 in)  
**Relay arm and swingarm clearance "c"**  
1.0 mm (0.04 in)

### TIP

- Install the rear shock absorber upper bolt and frame and connecting arm bolt from the right.
- Install the rear shock absorber lower bolt, relay arm and connecting arm bolt, and relay arm and swingarm bolt from the left.
- When installing the rear shock absorber assembly, lift up the swingarm.

# REAR SHOCK ABSORBER ASSEMBLY



- 3. Frame
- 4. Swingarm

- A. Left side
- B. Right side

- 4. Tighten:
  - Rear shock absorber assembly upper nut
  - Rear shock absorber assembly lower nut
  - Frame and connecting arm nut
  - Relay arm and swingarm nut
  - Relay arm and connecting arm nut



## **Rear shock absorber assembly upper nut**

**40 Nm (4.0 m·kgf, 29 ft·lbf)**

## **Rear shock absorber assembly lower nut**

**40 Nm (4.0 m·kgf, 29 ft·lbf)**

## **Frame and connecting arm nut**

**40 Nm (4.0 m·kgf, 29 ft·lbf)**

## **Relay arm and swingarm nut**

**40 Nm (4.0 m·kgf, 29 ft·lbf)**

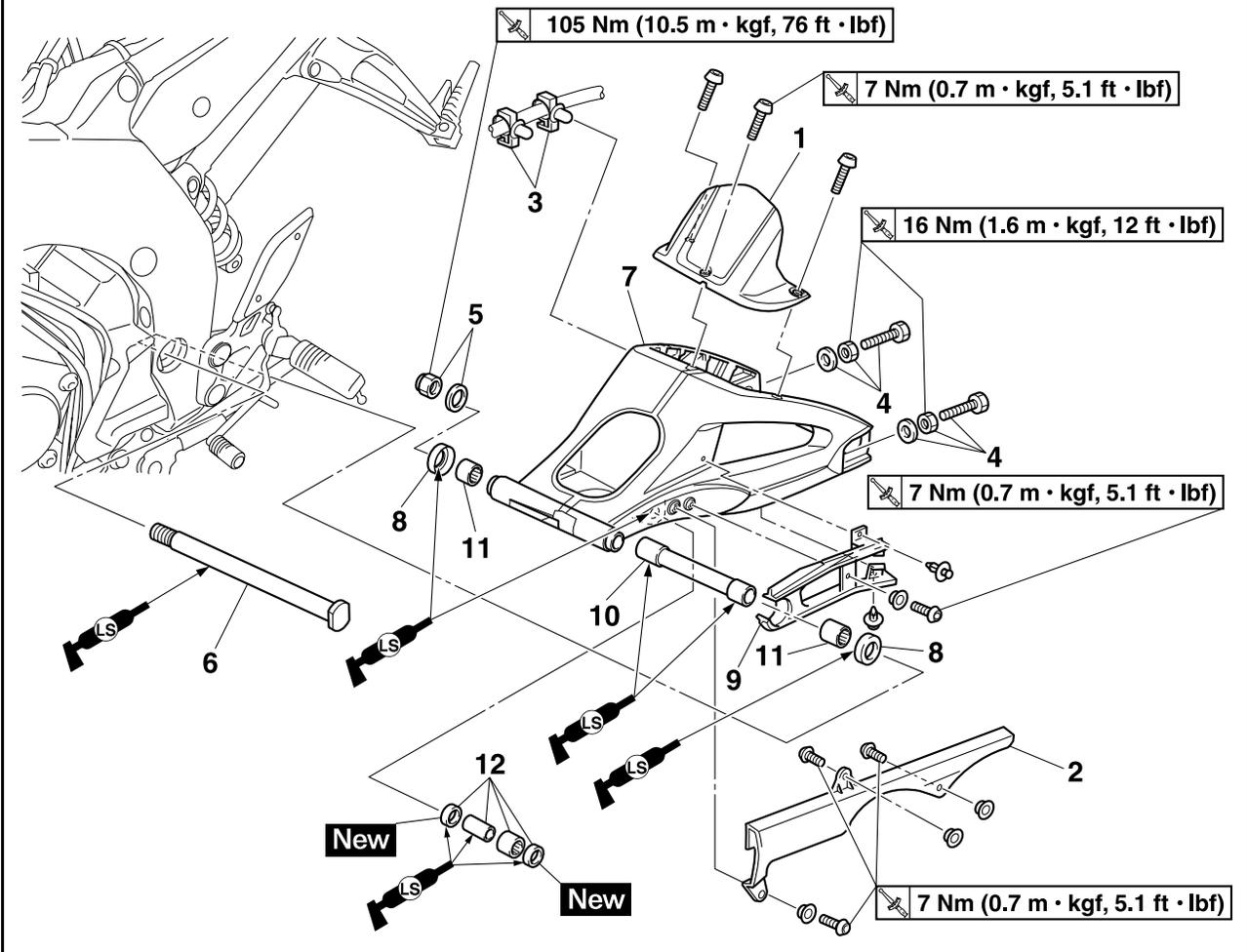
## **Relay arm and connecting arm nut**

**40 Nm (4.0 m·kgf, 29 ft·lbf)**

EAS23330

## SWINGARM

### Removing the swingarm



| Order | Job/Parts to remove                       | Q'ty  | Remarks   |
|-------|---|-------|---|
|       | Rear brake caliper                        |       | Refer to "REAR BRAKE" on page 4-31.                   |
|       | Rear wheel                                |       | Refer to "REAR WHEEL" on page 4-11.                   |
|       | Relay arm                                 |       | Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-62. |
|       | Drive chain                               |       | Refer to "CHAIN DRIVE" on page 4-69.                  |
| 1     | Rear fender                               | 1     |   |
| 2     | Drive chain guard                         | 1     |   |
| 3     | Brake hose holder                         | 2     |   |
| 4     | Drive chain adjusting bolt/locknut/washer | 2/2/2 |   |
| 5     | Pivot shaft nut/washer                    | 1/1   |   |
| 6     | Pivot shaft                               | 1     |   |
| 7     | Swingarm                                  | 1     |   |
| 8     | Dust cover                                | 2     |   |
| 9     | Drive chain guide                         | 1     |   |
| 10    | Spacer                                    | 1     |   |
| 11    | Bearing                                   | 2     |   |
| 12    | Collar/oil seal/bearing                   | 1/2/1 |   |
|       |   |       | For installation, reverse the removal procedure.      |

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.**

### **TIP**

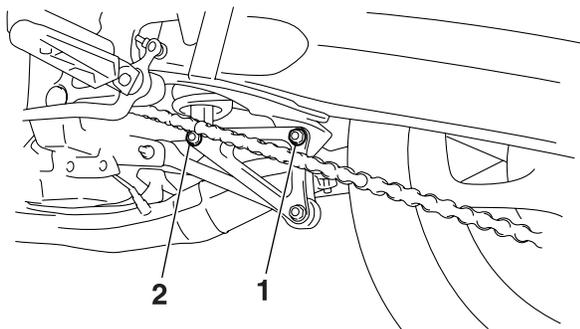
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- Relay arm and swingarm bolt "1"
- Rear shock absorber assembly lower bolt "2"

### **TIP**

When removing the bolt, hold the swingarm so that it does not drop down.



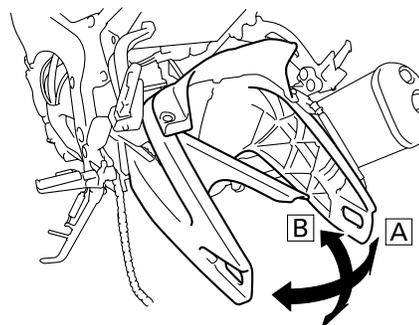
3. Measure:

- Swingarm side play
- Swingarm vertical movement

- a. Measure the tightening torque of the pivot shaft nut.

|   |  |
|---|--|
|  | <p><b>Pivot shaft nut</b><br/>105 Nm (10.5 m·kgf, 76 ft·lbf)</p> |
|---|--|

- b. Check the swingarm side play "A" by moving the swingarm from side to side. If the swingarm has side-to-side play, check the spacer, bearings, and dust covers.
- c. Check the swingarm vertical movement "B" by moving the swingarm up and down. If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, spacer, bearings, and dust covers.



4. Remove:

- Drive chain  
Refer to "REMOVING THE DRIVE CHAIN" on page 4-70.
- Swingarm

EAS23361

## CHECKING THE SWINGARM

1. Check:

- Swingarm  
Bends/cracks/damage → Replace.

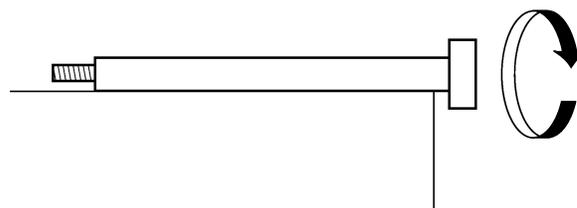
2. Check:

- Pivot shaft  
Roll the pivot shaft on a flat surface.  
Bends → Replace.

EWA13770

### **WARNING**

**Do not attempt to straighten a bent pivot shaft.**



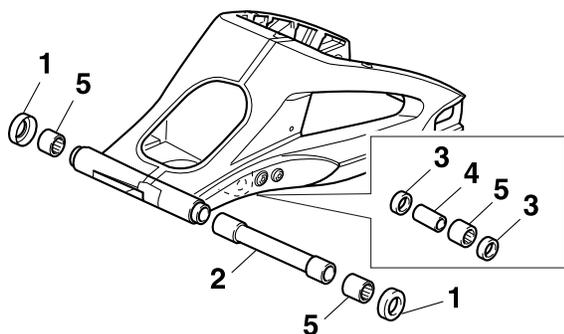
3. Wash:

- Pivot shaft
- Dust covers
- Spacer
- Washer

|   |   |
|---|---|
|  | <p><b>Recommended cleaning solvent</b><br/>Kerosene</p> |
|---|---|

## 4. Check:

- Dust covers “1”
- Spacer “2”
- Oil seals “3”  
Damage/wear → Replace.
- Collar “4”  
Damage/scratches → Replace.
- Bearings “5”  
Damage/pitting → Replace.



EAS23380

## INSTALLING THE SWINGARM

### 1. Lubricate:

- Spacer
- Dust covers
- Pivot shaft
- Oil seals
- Collar



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

### 2. Install:

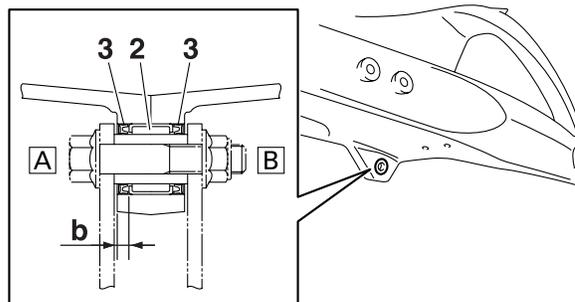
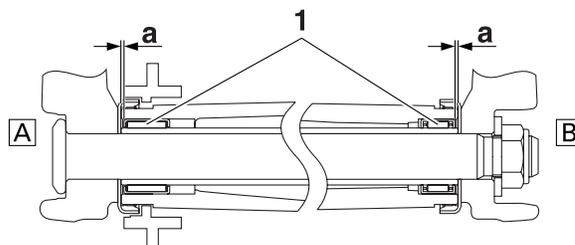
- Bearings “1”, “2”  
(to the swingarm)
- Oil seals “3” **New**  
(to the swingarm)



**Installed depth of bearing “a”**  
**0–1.0 mm (0–0.04 in)**  
**Installed depth of bearing “b”**  
**4.0 mm (0.16 in)**

### TIP

When installing the oil seals to the swingarm, face the character stamp of the oil seals outside.



- A. Left side  
B. Right side

### 3. Install:

- Swingarm
- Pivot shaft



**Pivot shaft nut**  
**105 Nm (10.5 m·kgf, 76 ft·lbf)**

### 4. Install:

- Drive chain  
Refer to “INSTALLING THE DRIVE CHAIN” on page 4-71.
- Rear shock absorber assembly
- Connecting arm
- Relay arms
- Rear wheel  
Refer to “REAR SHOCK ABSORBER ASSEMBLY” on page 4-62 and “REAR WHEEL” on page 4-11.

### 5. Adjust:

- Drive chain slack  
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.

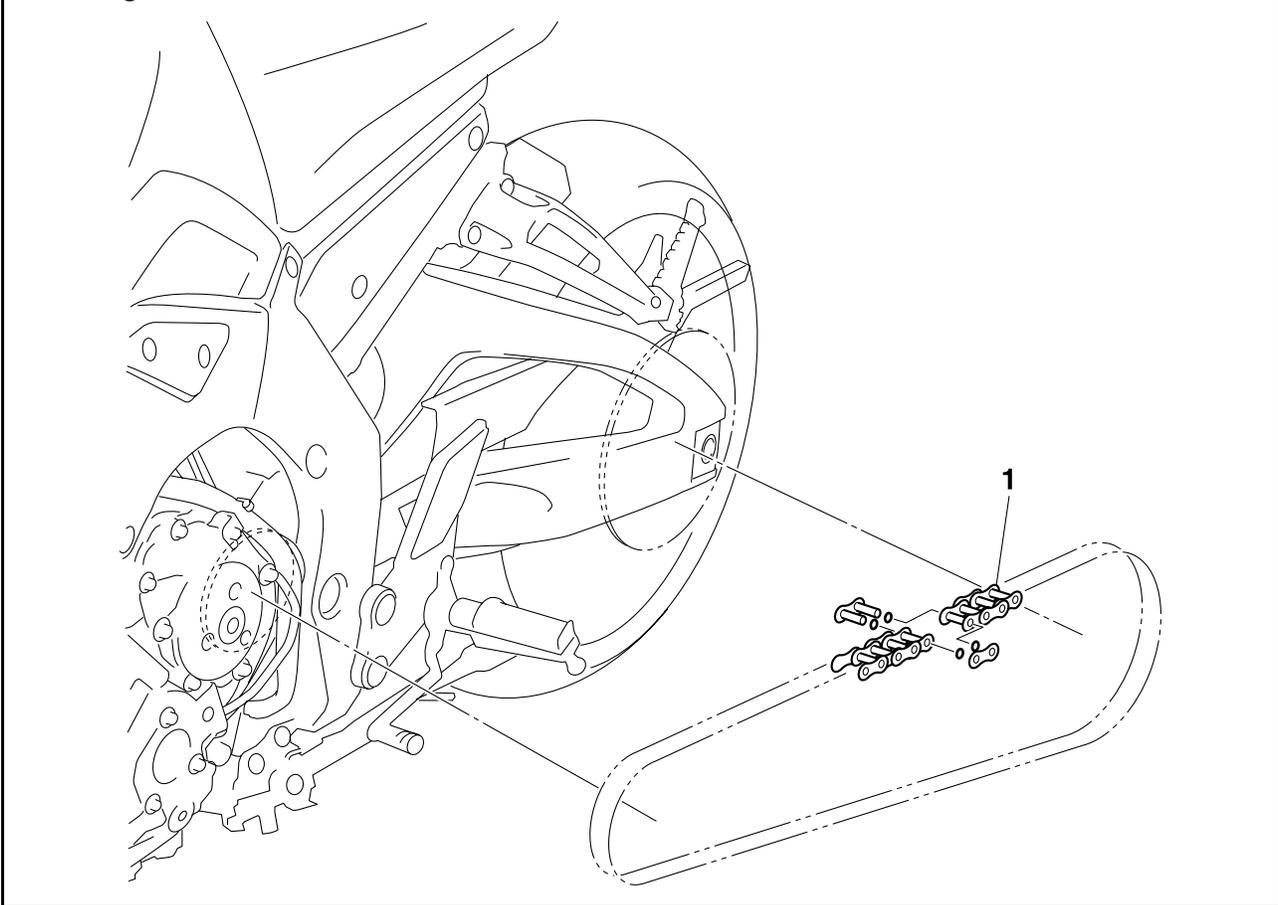


**Drive chain slack**  
**20.0–30.0 mm (0.79–1.18 in)**

EAS23400

**CHAIN DRIVE**

**Removing the drive chain**



| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
|       | Drive sprocket      |      | Refer to "ENGINE REMOVAL" on page 5-3.           |
| 1     | Drive chain         | 1    |  |
|       |                     |      | For installation, reverse the removal procedure. |

EAS23410

## REMOVING THE DRIVE CHAIN

- Stand the vehicle on a level surface.

EWA13120

### WARNING

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

### TIP

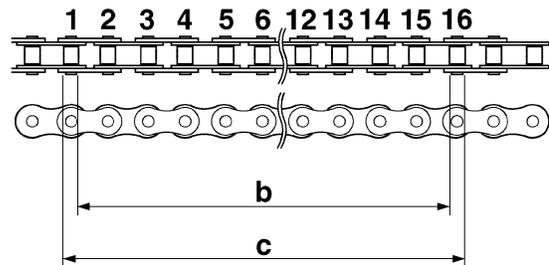
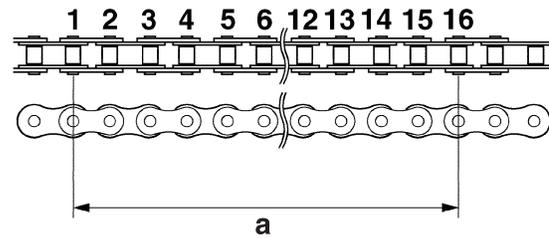
Place the vehicle on a suitable stand so that the rear wheel is elevated.

- Remove:

- Drive chain

### TIP

Cut the drive chain with the drive chain cut & rivet tool. (Use goods on the market)



EAS23441

## CHECKING THE DRIVE CHAIN

- Measure:

- 15-link section "a" of the drive chain  
Out of specification → Replace the drive chain.



**15-link length limit  
239.3 mm (9.42 in)**

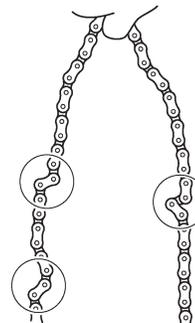
- Measure the length "b" between the inner sides of the pins and the length "c" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
- Calculate the length "a" of the 15-link section of the drive chain using the following formula.  
Drive chain 15-link section length "a" =  
(length "b" between pin inner sides + length "c" between pin outer sides)/2

### TIP

- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.

- Check:

- Drive chain  
Stiffness → Clean and lubricate or replace.



- 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.

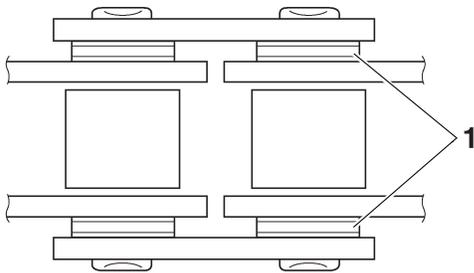
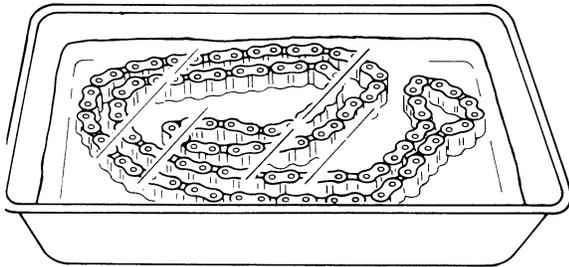
ECA39P1403

### NOTICE

- This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush

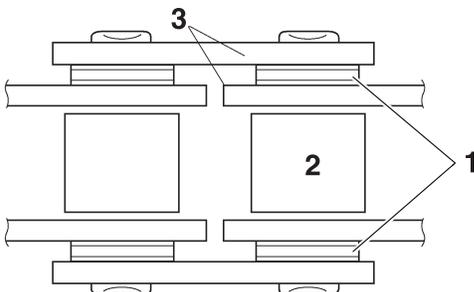
to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.

- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.

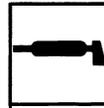


4. Check:

- O-rings "1"  
Damage → Replace the drive chain.
- Drive chain rollers "2"  
Damage/wear → Replace the drive chain.
- Drive chain side plates "3"  
Damage/wear/cracks → Replace the drive chain.



5. Lubricate:
- Drive chain



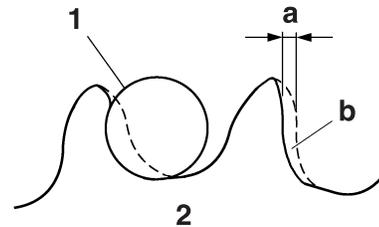
**Recommended lubricant**  
Chain lubricant suitable for O-ring chains

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.



b. Correct

1. Drive chain roller
2. Drive sprocket

EAS23470

### CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-15.

EAS23480

### CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-14.

EAS39P1403

### INSTALLING THE DRIVE CHAIN

1. Install:

- Drive chain

**TIP**

Install the drive chain joint with the drive chain cut & rivet tool. (Use goods on the market)

- When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).





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# ENGINE

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EAS14B1052

ENGINE INSPECTION

EAS20710

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

- 1. Measure:
• Valve clearance
Out of specification -> Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
• Ignition coils
• Spark plugs

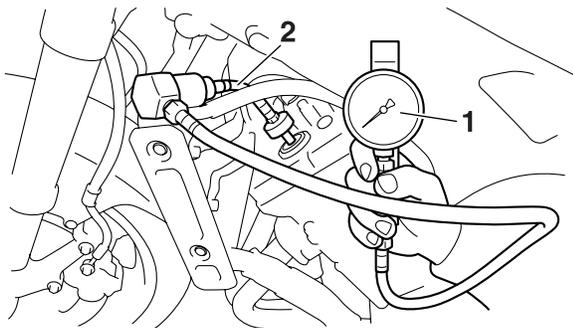
ECA13340

NOTICE

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

- 4. Install:
• Compression gauge "1"
• Extension "2"

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



- 5. Measure:
• Compression pressure
Out of specification -> Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1480 kPa/350 r/min (14.8 kgf/cm^2/350 r/min, 210.5 psi/350 r/min)
Minimum-Maximum
1290-1660 kPa/350 r/min (12.9-16.6 kgf/cm^2/350 r/min, 187.1-240.8 psi/350 r/min)

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

EWA39P1501

WARNING

To prevent sparking the plug, remove all ignition coil couplers and fuel injector couplers before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kgf/cm^2, 15 psi).

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

Table with 2 columns: Reading, Diagnosis. Rows include: Higher than without oil (Piston ring(s) wear or damage -> Repair), Same as without oil (Piston, valves, cylinder head gasket possibly defective -> Repair).

6. Install:
- Spark plug



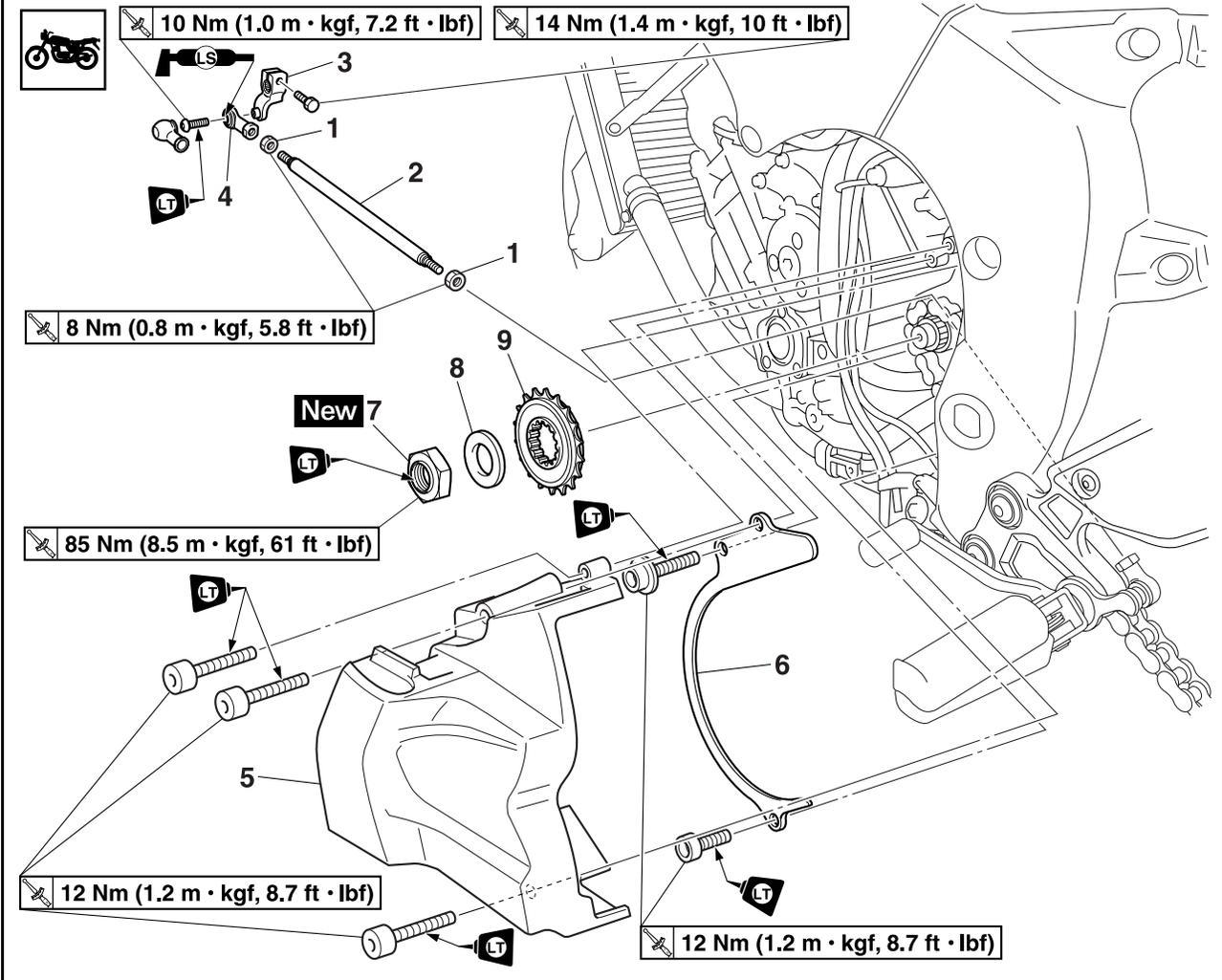
**Spark plug**  
**13 Nm (1.3 m·kgf, 9.4 ft·lbf)**

7. Install:
- Ignition coils

EAS23711

## ENGINE REMOVAL

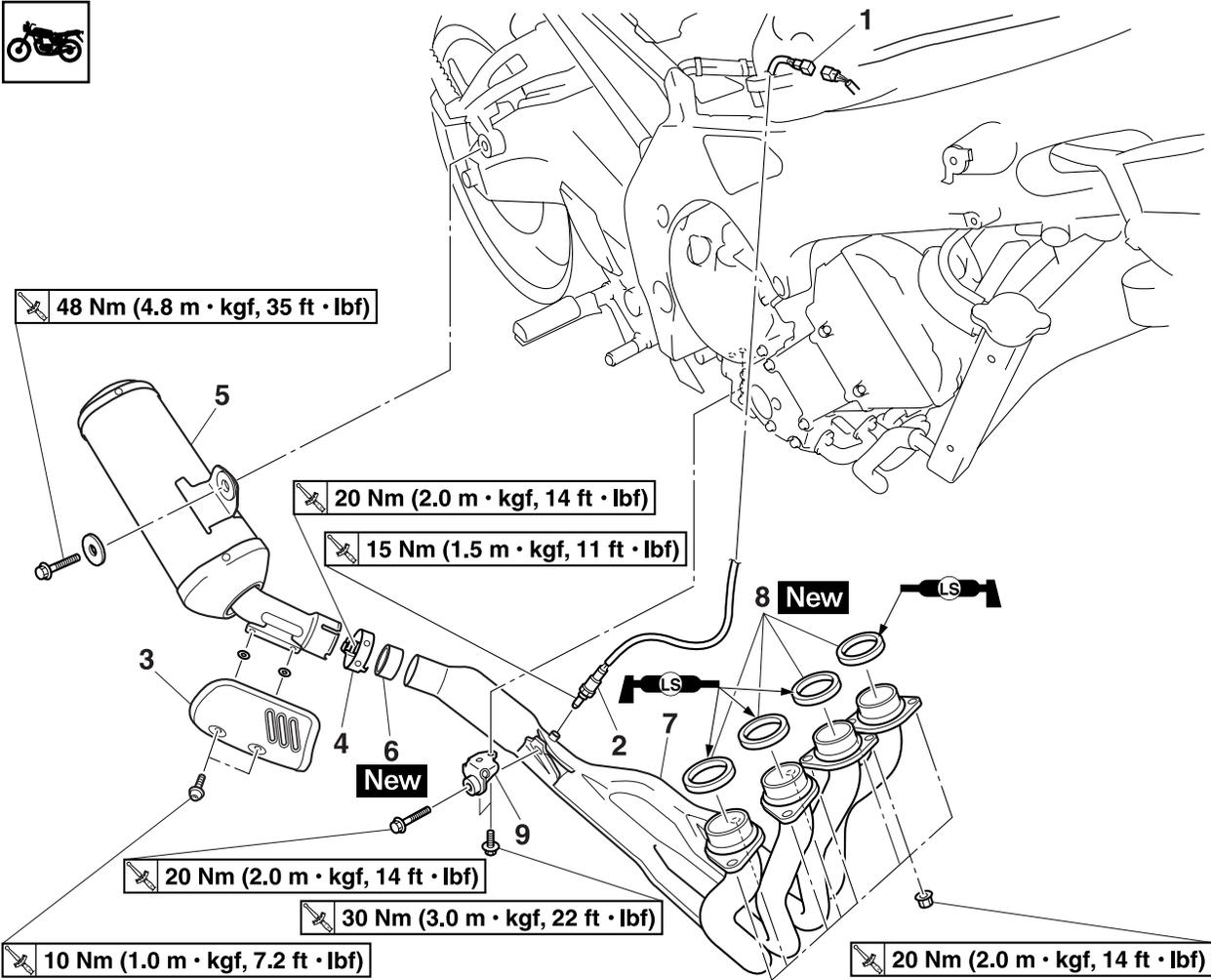
### Removing the drive sprocket



| Order | Job/Parts to remove  | Q'ty | Remarks   |
|-------|----------------------|------|---|
|       | Drive chain          |      | Loosen.<br>Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-18. |
| 1     | Locknut              | 2    |   |
| 2     | Shift rod            | 1    |   |
| 3     | Shift arm            | 1    |   |
| 4     | Joint                | 1    |   |
| 5     | Drive sprocket cover | 1    |   |
| 6     | Plate                | 1    |   |
| 7     | Drive sprocket nut   | 1    |   |
| 8     | Washer               | 1    |   |
| 9     | Drive sprocket       | 1    |   |
|       |                      |      | For installation, reverse the removal procedure.                    |

# ENGINE REMOVAL

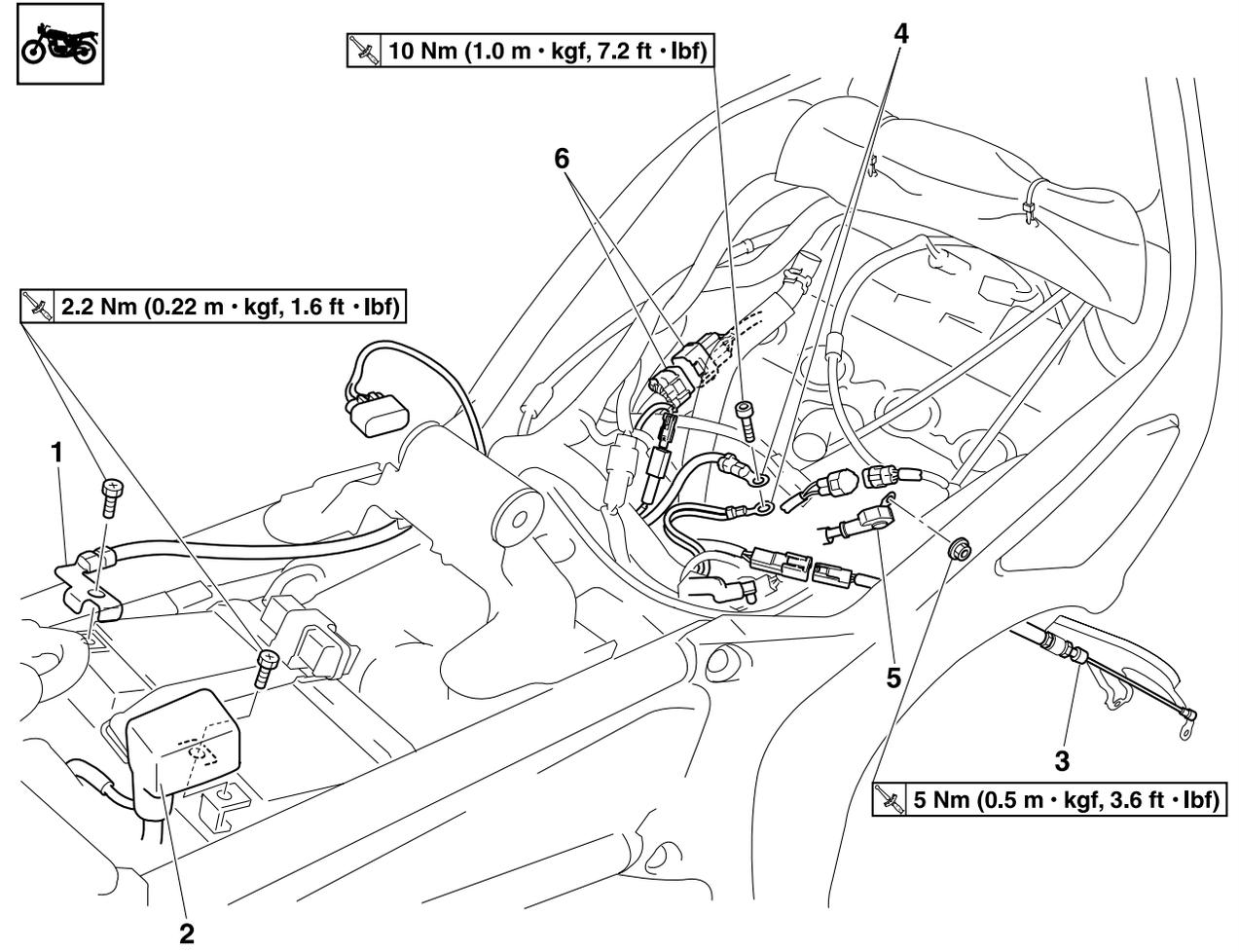
## Removing the muffler and exhaust pipe



| Order | Job/Parts to remove           | Q'ty | Remarks  |
|-------|-------------------------------|------|--|
|       | Rider seat                    |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Fuel tank                     |      | Refer to "FUEL TANK" on page 7-1.                |
|       | Drive sprocket cover          |      | Refer to "ENGINE REMOVAL" on page 5-3.           |
| 1     | O <sub>2</sub> sensor coupler | 1    | Disconnect.                                      |
| 2     | O <sub>2</sub> sensor         | 1    |  |
| 3     | Muffler cover                 | 1    |  |
| 4     | Muffler clamp                 | 1    | Loosen.  |
| 5     | Muffler                       | 1    |  |
| 6     | Muffler gasket                | 1    |  |
| 7     | Exhaust pipe                  | 1    |  |
| 8     | Exhaust pipe gasket           | 1    |  |
| 9     | Exhaust pipe bracket          | 1    |  |
|       |                               |      | For installation, reverse the removal procedure. |

# ENGINE REMOVAL

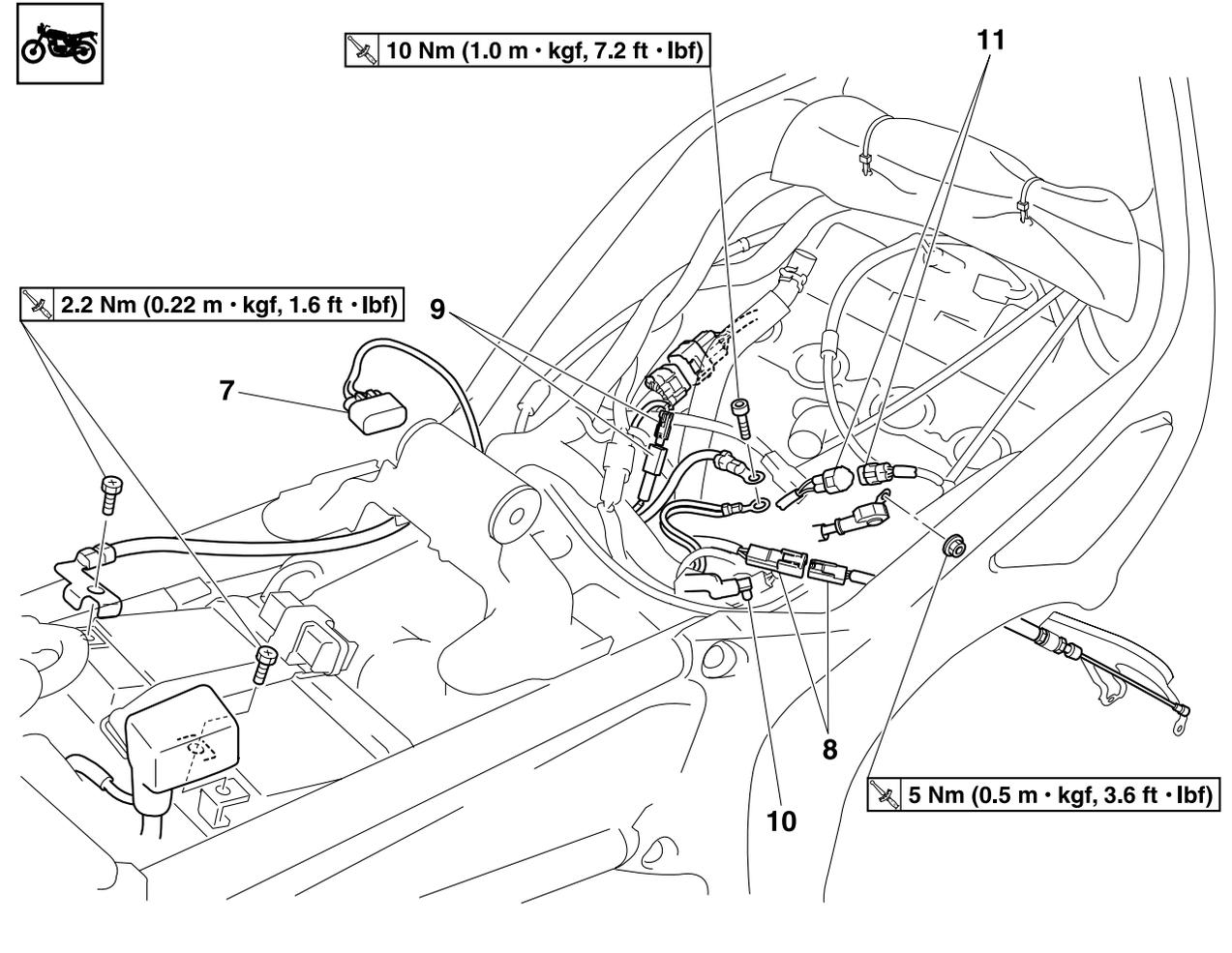
## Disconnecting the leads and hoses



| Order | Job/Parts to remove                    | Q'ty | Remarks                                       |
|-------|--|------|---|
|       | Fuel tank                              |      | Refer to "FUEL TANK" on page 7-1.             |
|       | Throttle bodies                        |      | Refer to "THROTTLE BODIES" on page 7-6.       |
|       | Thermostat assembly                    |      | Refer to "THERMOSTAT" on page 6-7.            |
|       | Oil cooler                             |      | Refer to "OIL COOLER" on page 6-5.            |
|       | Air cut-off valve                      |      | Refer to "AIR INDUCTION SYSTEM" on page 7-15. |
| 1     | Battery negative lead                  | 1    | Disconnect.                                   |
| 2     | Battery positive lead                  | 1    | Disconnect.                                   |
| 3     | Clutch cable                           | 1    | Disconnect.                                   |
| 4     | Ground lead                            | 2    | Disconnect.                                   |
| 5     | Starter motor lead                     | 1    | Disconnect.                                   |
| 6     | Ignition coil sub-wire harness coupler | 1    | Disconnect.                                   |

# ENGINE REMOVAL

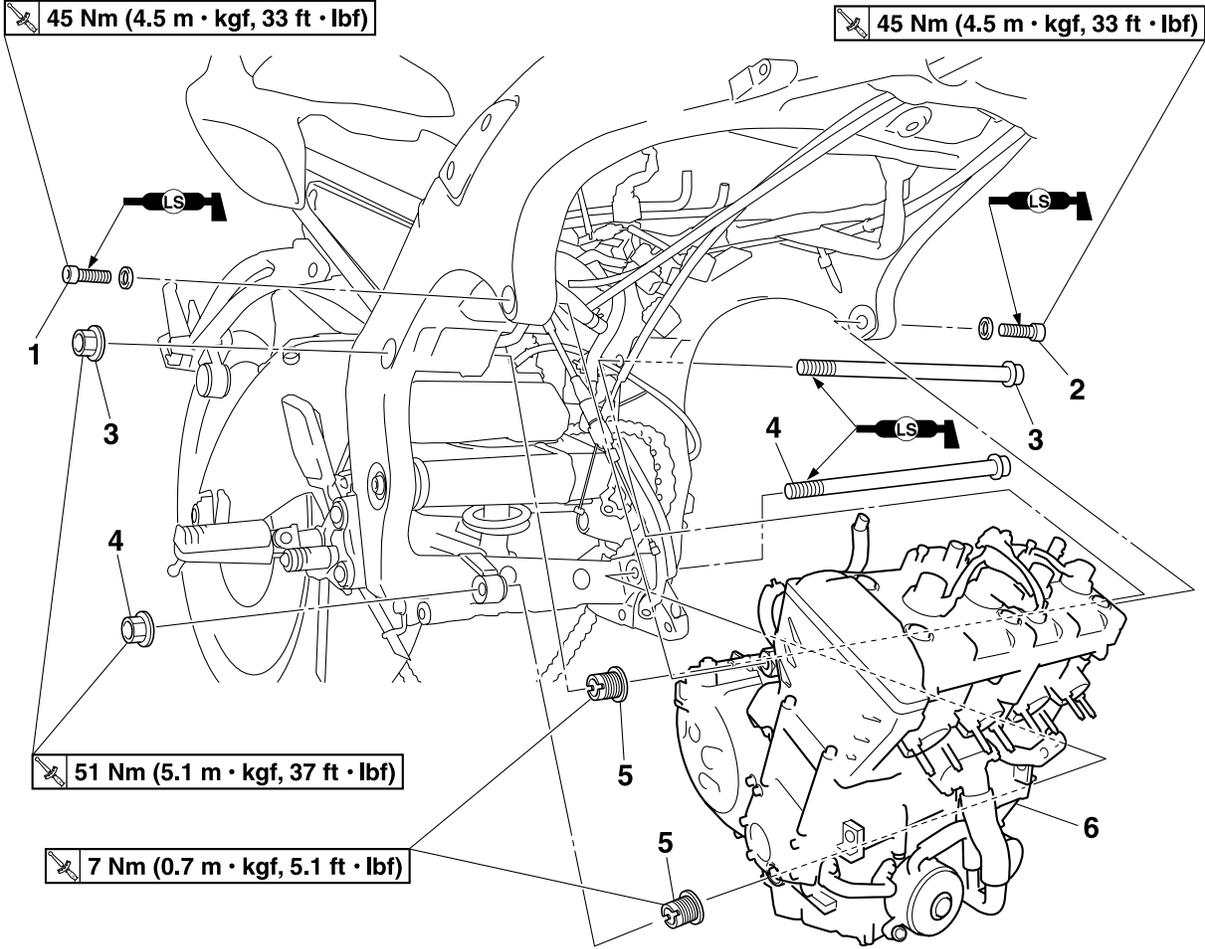
## Disconnecting the leads and hoses



| Order | Job/Parts to remove                     | Q'ty | Remarks  |
|-------|---|------|--|
| 7     | Stator coil assembly lead coupler       | 1    | Disconnect.                                      |
| 8     | Crankshaft position sensor lead coupler | 1    | Disconnect.                                      |
| 9     | Oil level switch lead coupler           | 1    | Disconnect.                                      |
| 10    | Neutral switch connector                | 1    | Disconnect.                                      |
| 11    | Speed sensor coupler                    | 1    | Disconnect.                                      |
|       |   |      | For installation, reverse the removal procedure. |

# ENGINE REMOVAL

## Removing the engine



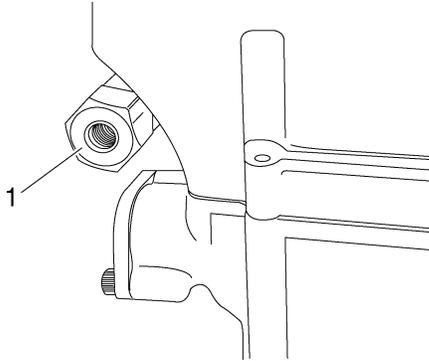
| Order | Job/Parts to remove                | Q'ty | Remarks  |
|-------|------------------------------------|------|--|
| 1     | Right front engine mounting bolt 1 | 1    |  |
| 2     | Left front engine mounting bolt    | 1    |  |
| 3     | Upper engine mounting bolt/nut     | 1/1  |  |
| 4     | Lower engine mounting bolt/nut     | 1/1  |  |
| 5     | Engine mounting adjust bolt        | 2    | Loosen.  |
| 6     | Engine                             | 1    |  |
|       |                                    |      | For installation, reverse the removal procedure. |

EAS23720

## INSTALLING THE ENGINE

### 1. Install:

- Right front engine mounting bolt 2 “1”  
Refer to “CYLINDER HEAD” on page 5-20.



### 2. Tighten:

- Right front engine mounting bolt 2



**Right front engine mounting  
bolt 2**  
**50 Nm (5.0 m·kgf, 36 ft·lbf)**  
**LOCTITE®**

### 3. Install:

- Engine mounting adjust bolts  
(temporarily tighten)

### 4. Install:

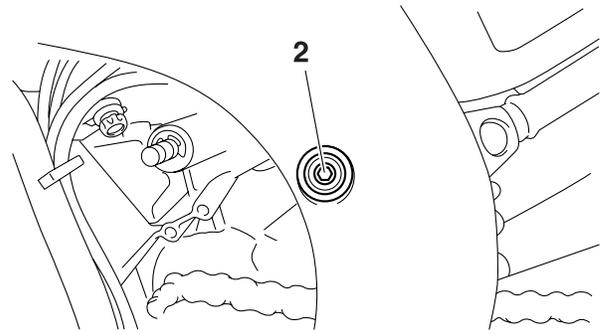
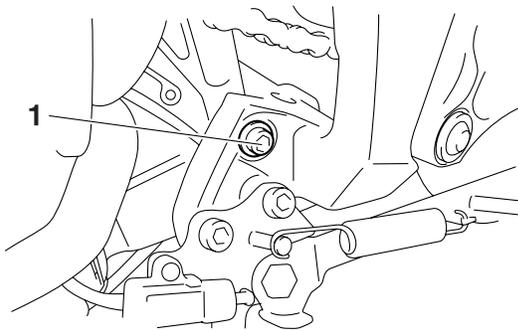
- Engine

### 5. Install:

- Lower engine mounting bolt “1”
- Upper engine mounting bolt “2”

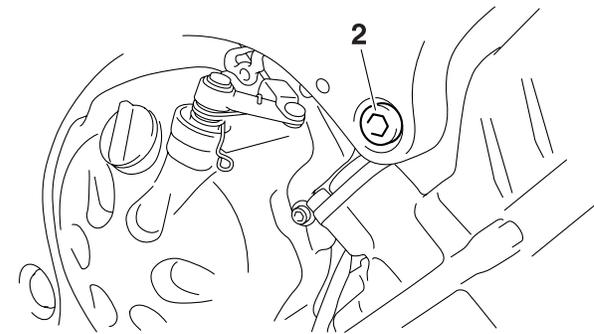
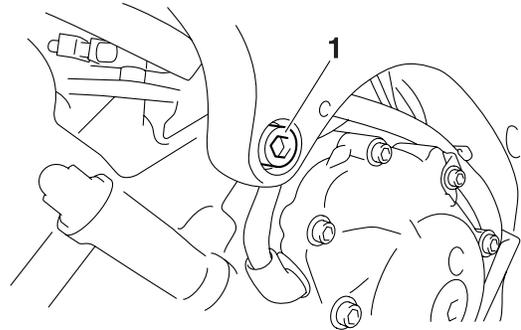
### TIP

Do not install the engine mounting nuts.



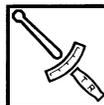
### 6. Install:

- Left front engine mounting bolt “1”  
(temporarily tighten)
- Right front engine mounting bolt 1 “2”  
(temporarily tighten)



### 7. Tighten:

- Engine mounting adjust bolts



**Engine mounting adjust bolt**  
**7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

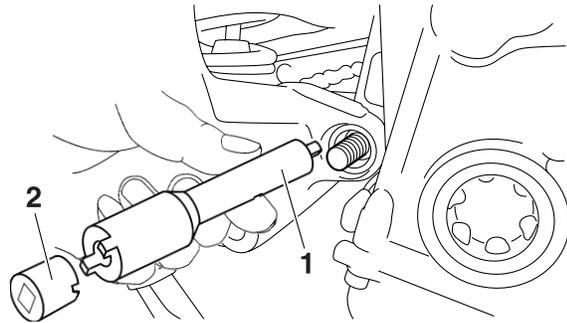
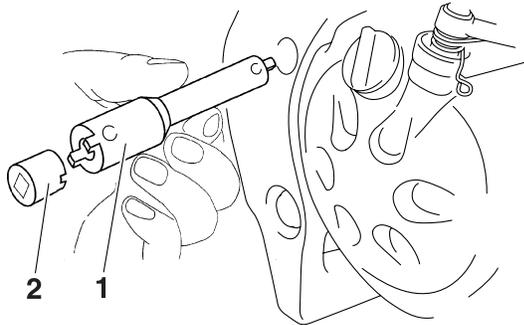
### TIP

Use the pivot shaft wrench “1” and pivot shaft wrench adapter “2” to tighten the engine mounting adjust bolts.

# ENGINE REMOVAL



**Pivot shaft wrench**  
90890-01518  
**Frame spanner socket**  
YM-01518  
**Pivot shaft wrench adapter**  
90890-01476



## 8. Install:

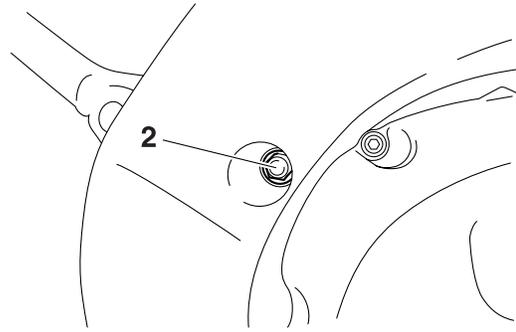
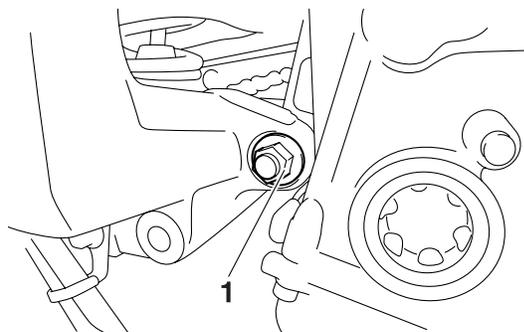
- Lower engine mounting nut "1"
- Upper engine mounting nut "2"



**Lower engine mounting nut**  
51 Nm (5.1 m·kgf, 37 ft·lbf)  
**Upper engine mounting nut**  
51 Nm (5.1 m·kgf, 37 ft·lbf)

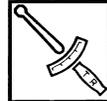
## TIP

First tighten the lower engine mounting nut, and then tighten the upper engine mounting nut.



## 9. Tighten:

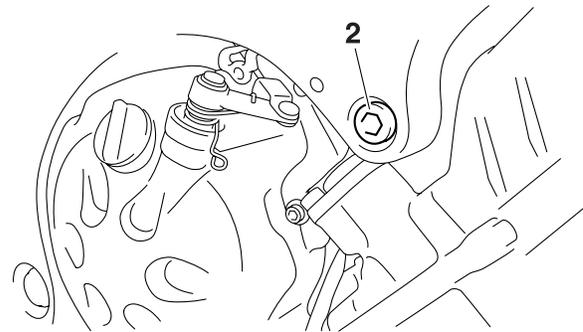
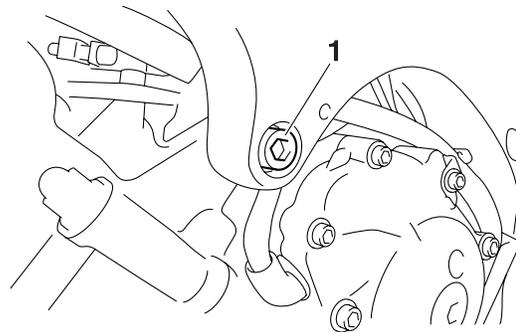
- Left front engine mounting bolt "1"
- Right front engine mounting bolt 1 "2"



**Left front engine mounting bolt**  
45 Nm (4.5 m·kgf, 33 ft·lbf)  
**Right front engine mounting bolt 1**  
45 Nm (4.5 m·kgf, 33 ft·lbf)

## TIP

First tighten the left front engine mounting bolt "1", and then tighten the right front engine mounting bolt 1 "2".



## 10. Install:

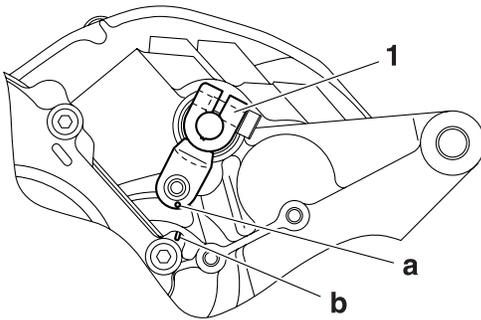
- Shift arm "1"



**Shift arm bolt**  
14 Nm (1.4 m·kgf, 10 ft·lbf)

## TIP

Align punch mark “a” of the shift arm “1” with alignment mark “b” of the crankcase.



EAS39P1501

## INSTALLING THE DRIVE SPROCKET

1. Install:

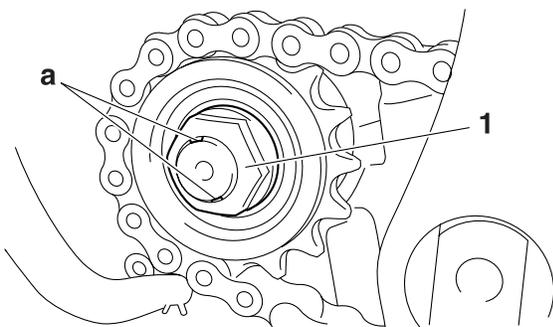
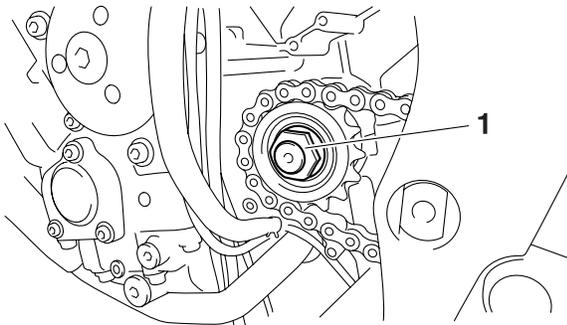
- Drive sprocket
- Washer
- Drive sprocket nut “1” **New**



**Drive sprocket nut**  
**85 Nm (8.5 m·kgf, 61 ft·lbf)**  
**LOCTITE®**

## TIP

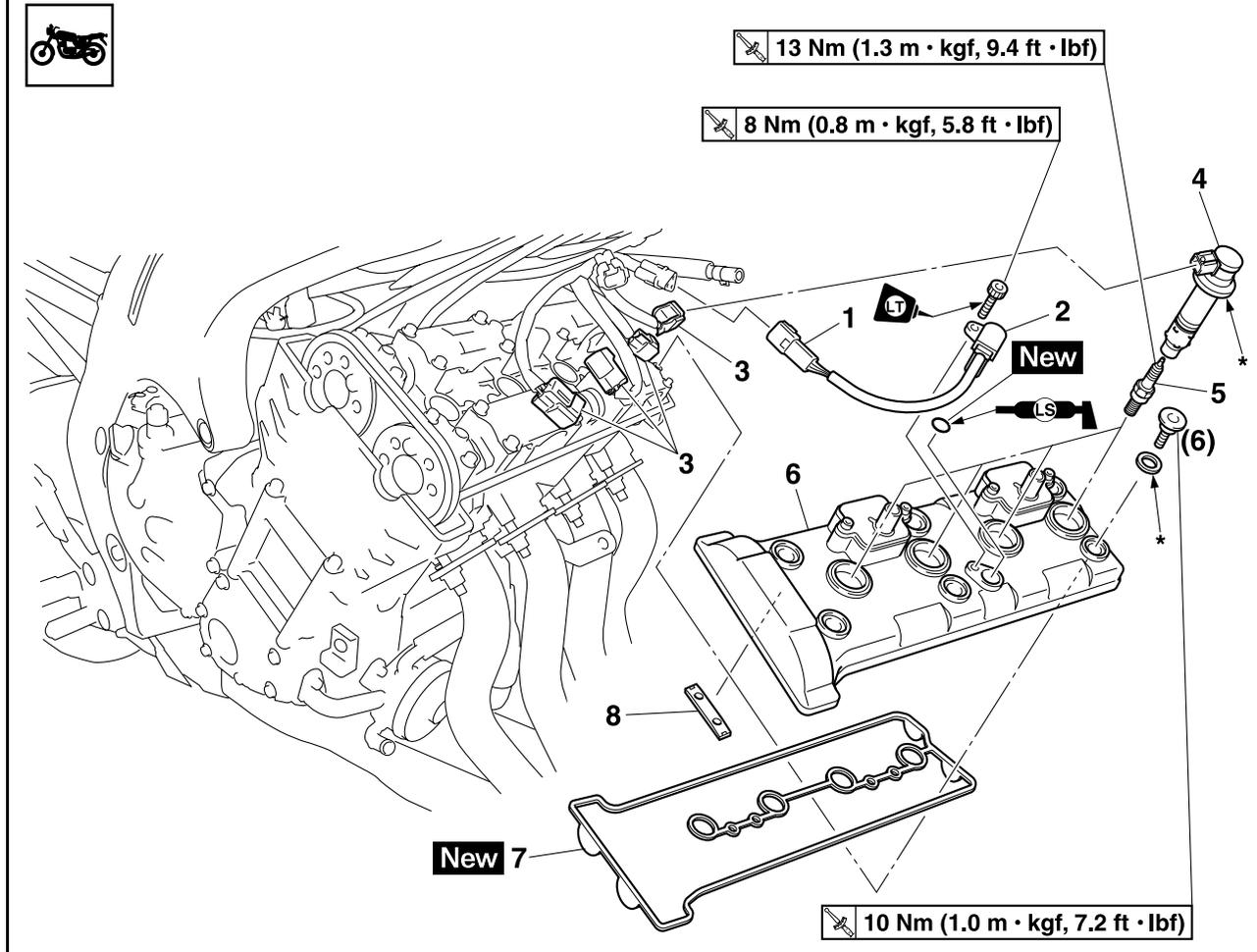
- While applying the rear brake, tighten the drive sprocket nut.
- Stake the drive sprocket nut “1” at a cutout “a” in the drive axle.



EAS23760

## CAMSHAFTS

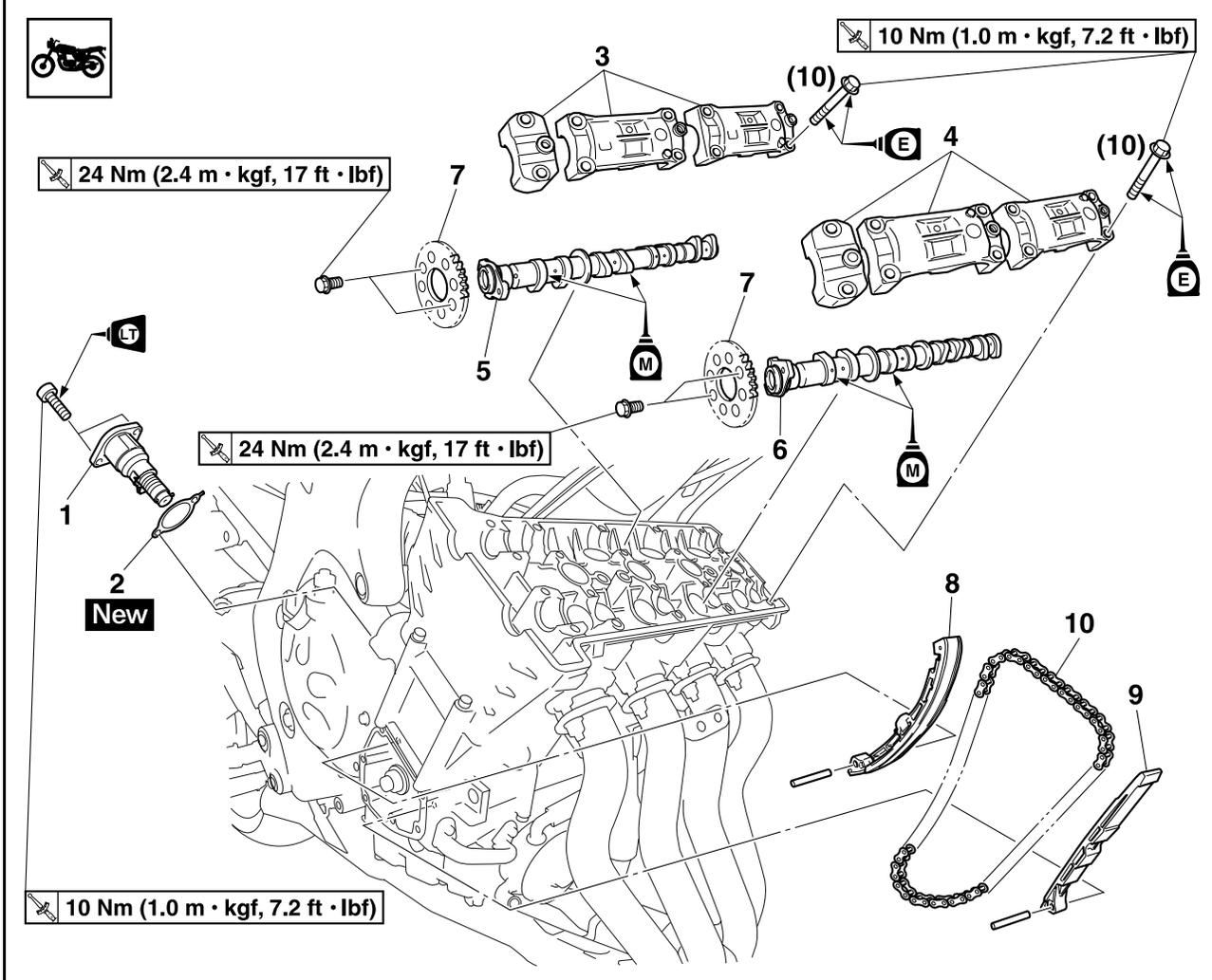
### Removing the cylinder head cover



| Order | Job/Parts to remove                    | Q'ty | Remarks  |
|-------|--|------|--|
|       | Fuel tank                              |      | Refer to "FUEL TANK" on page 7-1.                |
|       | Throttle bodies                        |      | Refer to "THROTTLE BODIES" on page 7-6.          |
|       | Air cut-off valve                      |      | Refer to "AIR INDUCTION SYSTEM" on page 7-15.    |
| 1     | Cylinder identification sensor coupler | 1    | Disconnect.                                      |
| 2     | Cylinder identification sensor         | 1    |  |
| 3     | Ignition coil coupler                  | 4    | Disconnect.                                      |
| 4     | Ignition coil                          | 4    |  |
| 5     | Spark plug                             | 4    |  |
| 6     | Cylinder head cover                    | 1    |  |
| 7     | Cylinder head cover gasket             | 1    |  |
| 8     | Timing chain guide (top side)          | 1    |  |
|       |  |      | For installation, reverse the removal procedure. |

\* Silicone fluid

## Removing the camshafts



| Order | Job/Parts to remove               | Q'ty | Remarks   |
|-------|-----------------------------------|------|---|
|       | Pickup rotor cover                |      | Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39. |
|       | Clutch cable (engine side)        |      | Disconnect.<br>Refer to "CLUTCH" on page 5-45.      |
| 1     | Timing chain tensioner            | 1    |   |
| 2     | Timing chain tensioner gasket     | 1    |   |
| 3     | Intake camshaft cap               | 3    |   |
| 4     | Exhaust camshaft cap              | 3    |   |
| 5     | Intake camshaft                   | 1    |   |
| 6     | Exhaust camshaft                  | 1    |   |
| 7     | Camshaft sprocket                 | 2    |   |
| 8     | Timing chain guide (intake side)  | 1    |   |
| 9     | Timing chain guide (exhaust side) | 1    |   |
| 10    | Timing chain                      | 1    |   |
|       |                                   |      | For installation, reverse the removal procedure.    |

EAS23810

## REMOVING THE CAMSHAFTS

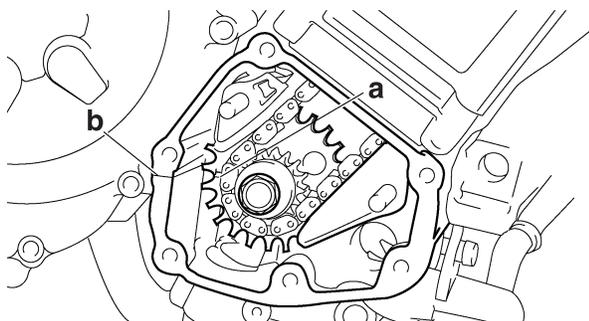
1. Remove:
  - Pickup rotor cover  
Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39.
2. Align:
  - "T" mark "a" on the pickup rotor  
(with the crankcase mating surface "b")



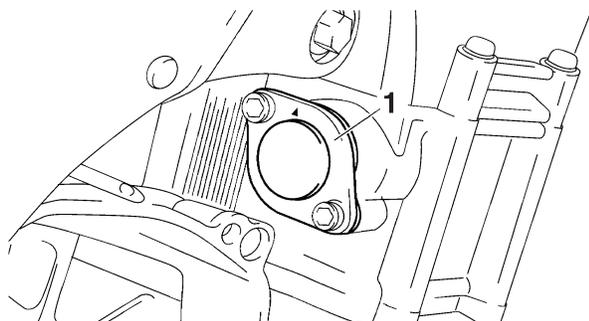
- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".

### TIP

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



3. Remove:
  - Timing chain tensioner "1"
  - Timing chain tensioner gasket

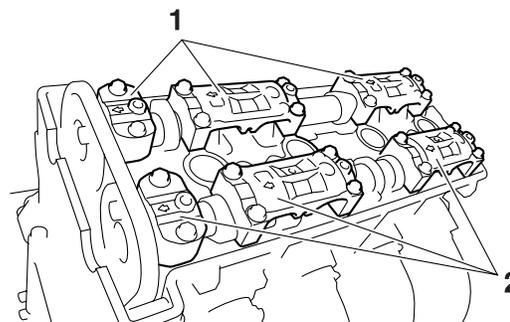


4. Remove:
  - Intake camshaft caps "1"
  - Exhaust camshaft caps "2"

ECA13720

### NOTICE

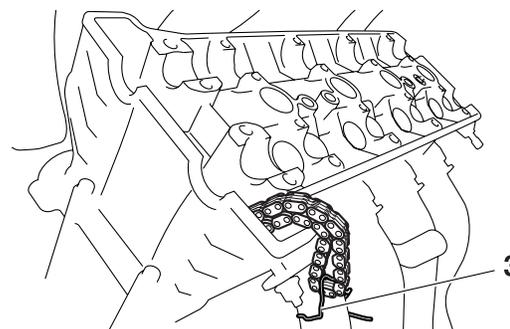
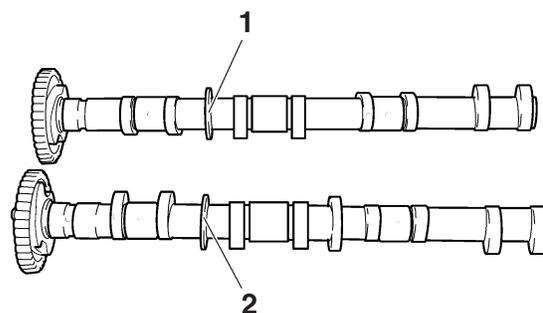
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



5. Remove:
  - Intake camshaft "1"
  - Exhaust camshaft "2"

### TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".



6. Remove:
  - Camshaft sprocket "1"

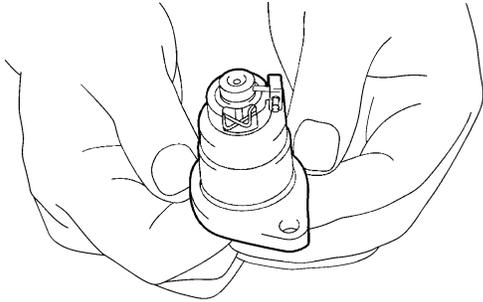
### TIP

Use the camshaft wrench "2" and loosen the camshaft sprocket bolt.

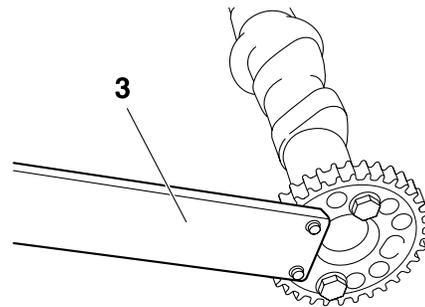
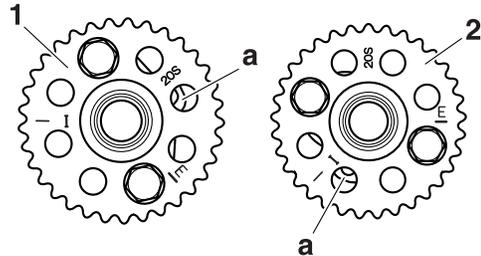








**Camshaft wrench**  
90890-04162  
YM-04162



EAS24000

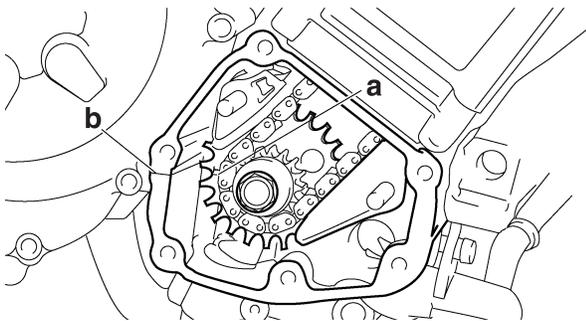
## INSTALLING THE CAMSHAFTS

### 1. Align:

- “T” mark “a” on the pickup rotor  
(with the crankcase mating surface “b”)

### a. Turn the crankshaft clockwise.

- ### b. When piston #1 is at TDC, align the “T” mark “a” with the crankcase mating surface “b”.

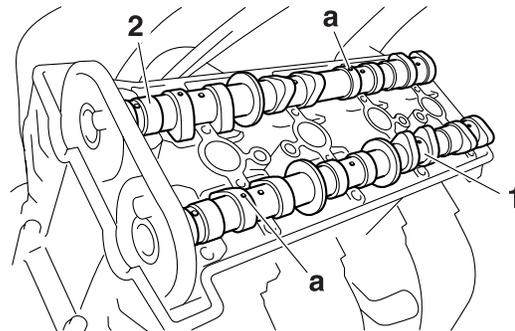


### 3. Install:

- Exhaust camshaft “1”
- Intake camshaft “2”

### TIP

Make sure the punch mark “a” on each camshaft faces up.



### 2. Install:

- Intake camshaft sprocket “1”
- Exhaust camshaft sprocket “2”



**Camshaft sprocket bolt**  
24 Nm (2.4 m·kgf, 17 ft·lbf)

ECA14B1012

### NOTICE

**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.**

### TIP

- Install the camshaft projection “a” at the position shown in the illustration.
- Tighten the camshaft sprocket bolt with the camshaft wrench “3”.

### 4. Install:

- Intake camshaft caps
- Exhaust camshaft caps

### TIP

• Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:

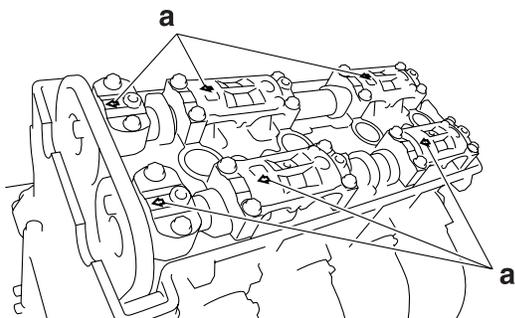
“I”: Intake side camshaft cap mark

“E”: Exhaust side camshaft cap mark

“IL”: Intake left side camshaft cap mark

“IR”: Intake right side camshaft cap mark

- “EL”: Exhaust left side camshaft cap mark  
 “ER”: Exhaust right side camshaft cap mark
- Make sure the arrow mark “a” on each camshaft points towards the right side of the engine.



5. Tighten:
- Camshaft cap bolts

|   |   |
|---|---|
|  | <b>Camshaft cap bolt</b><br>10 Nm (1.0 m·kgf, 7.2 ft·lbf) |
|---|---|

**TIP**

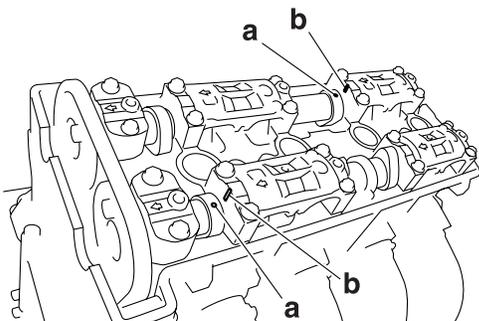
Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

ECA5D01009

**NOTICE**

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.

6. Check:
- Camshaft punch mark “a”  
 Make sure the punch mark “a” on the camshaft is aligned with the camshaft cap alignment mark “b”.



7. Install:
- Timing chain tensioner gasket **New**
  - Timing chain tensioner “1”
  - Timing chain tensioner bolts “2”

|   |   |
|---|---|
|  | <b>Timing chain tensioner bolt</b><br>10 Nm (1.0 m·kgf, 7.2 ft·lbf)<br>LOCTITE® |
|---|---|

EWA39P1502

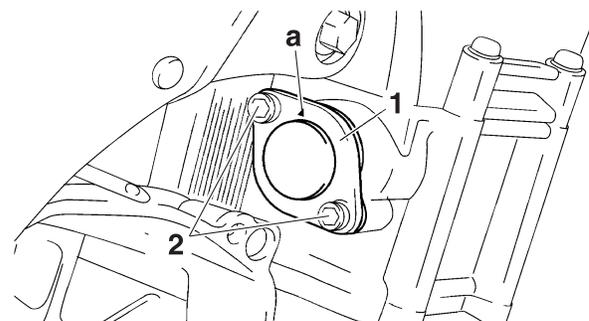
**WARNING**

Always use a new timing chain tensioner gasket.

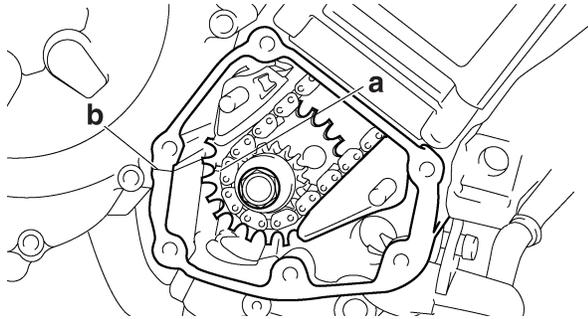
ECA5D01011

**NOTICE**

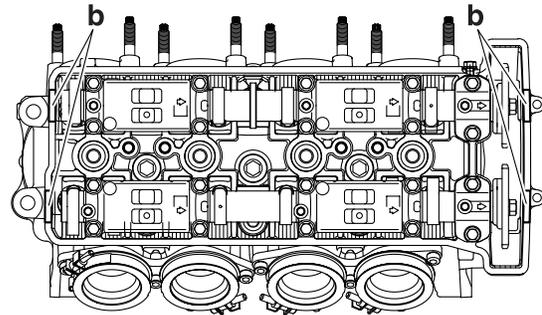
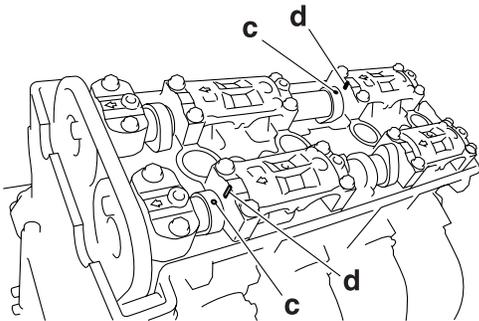
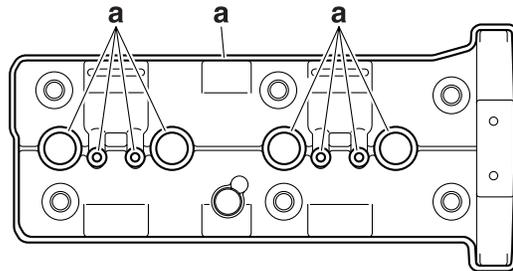
The arrow mark “a” on the timing chain tensioner should face up.



8. Turn:
- Crankshaft  
 (several turns clockwise)
9. 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 alignment mark “d”.  
 Out of alignment → Adjust.  
 Refer to the installation steps above.



**Yamaha bond No.1215  
(Three bond No.1215®)  
90890-85505**



**10. Measure:**

- Valve clearance  
Out of specification → Adjust.  
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-5.

**11. Install:**

- Pickup rotor cover  
Refer to “CRANKSHAFT POSITION SENSOR” on page 5-39.

**12. Install:**

- Timing chain guide (top side)
- Cylinder head cover gasket **New**
- Cylinder head cover

**13. Install:**

- Spark plugs
- Ignition coils “1”



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

**TIP**

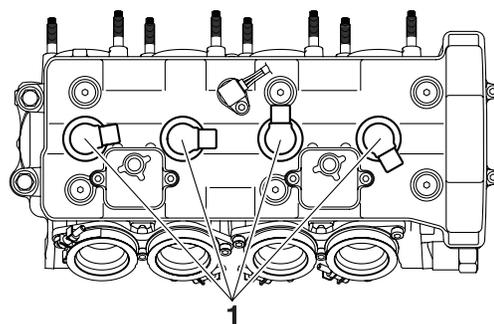
Assemble ignition coils “1” in the direction shown in the illustration.



**Cylinder head cover bolt  
10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

**TIP**

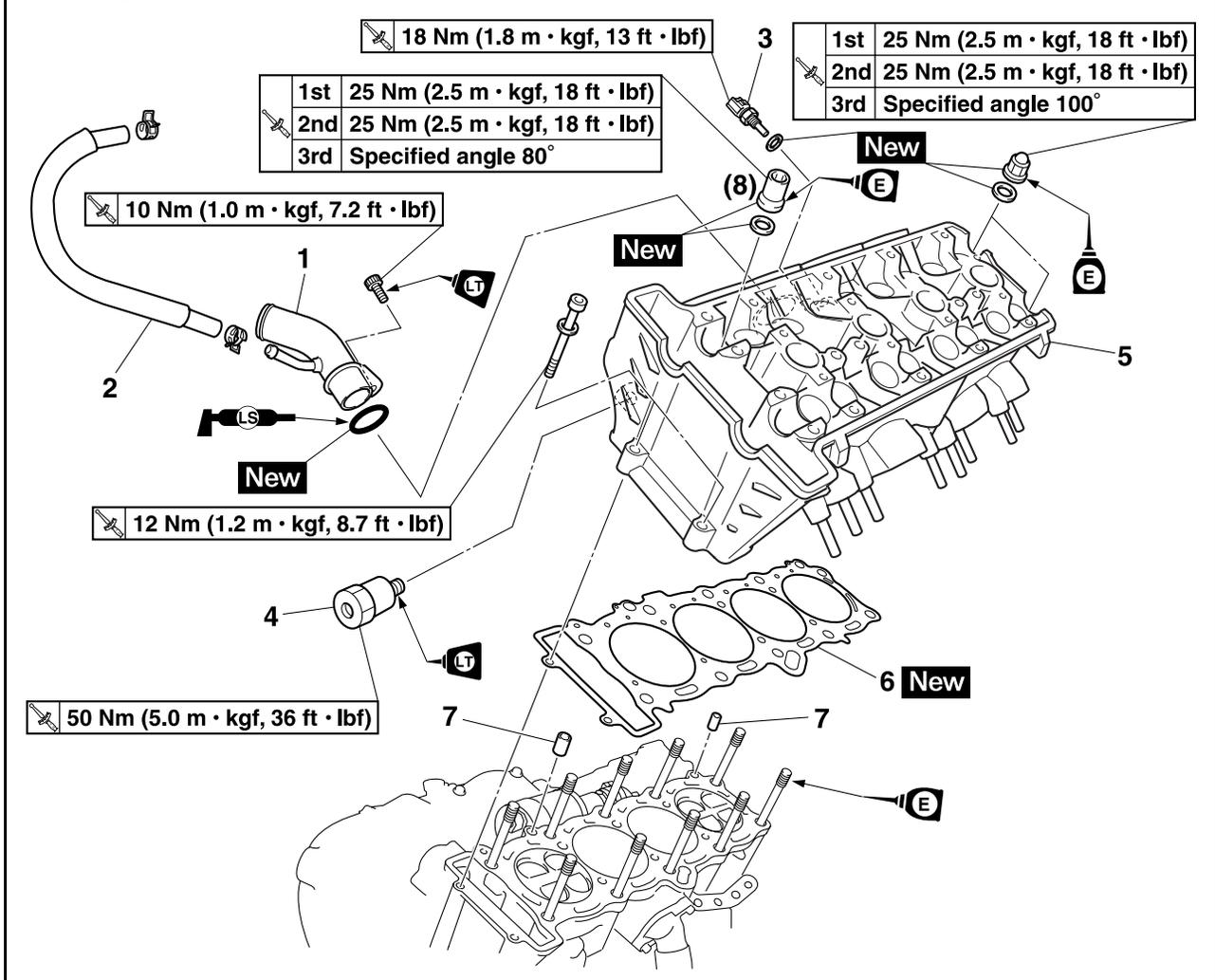
- Apply bond TB1541C® onto the mating surfaces “a” of the cylinder head cover and cylinder head cover gasket.
- Apply bond Yamaha bond No.1215 (Three bond No.1215®) onto the mating surfaces “b” of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts in stages and in a crisscross pattern.



EAS24100

## CYLINDER HEAD

### Removing the cylinder head



| Order | Job/Parts to remove                | Q'ty | Remarks  |
|-------|------------------------------------|------|--|
|       | Engine                             |      | Refer to "ENGINE REMOVAL" on page 5-3.           |
|       | Intake camshaft                    |      | Refer to "CAMSHAFTS" on page 5-11.               |
|       | Exhaust camshaft                   |      | Refer to "CAMSHAFTS" on page 5-11.               |
| 1     | Coolant pipe                       | 1    |  |
| 2     | Fast idle plunger inlet hose       | 1    |  |
| 3     | Coolant temperature sensor         | 1    |  |
| 4     | Right front engine mounting bolt 2 | 1    |  |
| 5     | Cylinder head                      | 1    |  |
| 6     | Cylinder head gasket               | 1    |  |
| 7     | Dowel pin                          | 2    |  |
|       |                                    |      | For installation, reverse the removal procedure. |

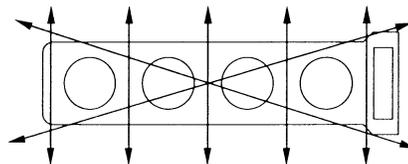
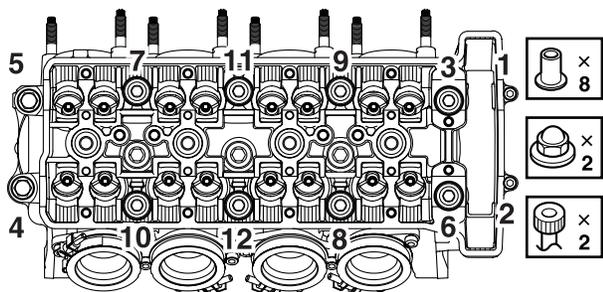
EAS24120

## REMOVING THE CYLINDER HEAD

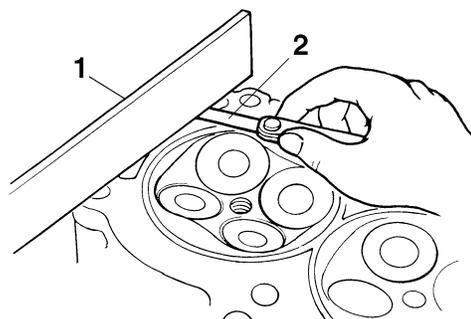
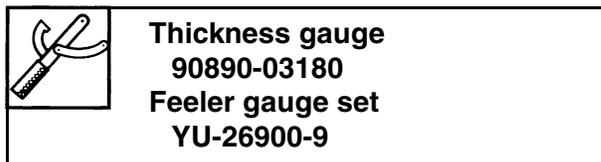
1. Remove:
  - Intake camshaft
  - Exhaust camshaft
 Refer to "REMOVING THE CAM-SHAFTS" on page 5-13.
2. Remove:
  - Cylinder head nuts
  - Cylinder head bolts

### TIP

- 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.



- a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



EAS24160

## CHECKING THE CYLINDER HEAD

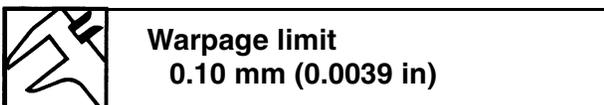
1. Eliminate:
  - Combustion chamber carbon deposits (with a rounded scraper)

### TIP

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats

2. Check:
  - Cylinder head  
Damage/scratches → Replace.
  - Cylinder head water jacket  
Mineral deposits/rust → Eliminate.
3. Measure:
  - Cylinder head warpage  
Out of specification → Resurface the cylinder head.



- b. Measure the warpage.
- c. If the limit is exceeded, resurface the cylinder head as follows.
- d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

### TIP

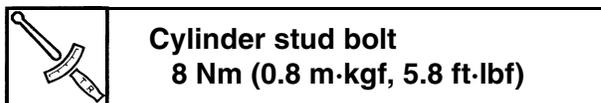
To ensure an even surface, rotate the cylinder head several times.



EAS24240

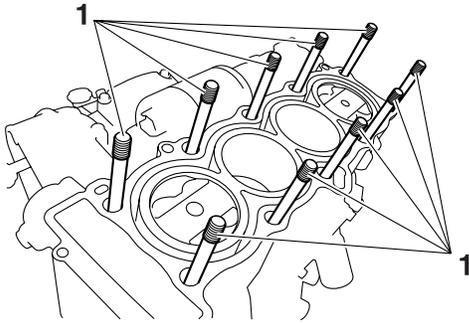
## INSTALLING THE CYLINDER HEAD

1. Check:
  - Cylinder stud bolts "1"



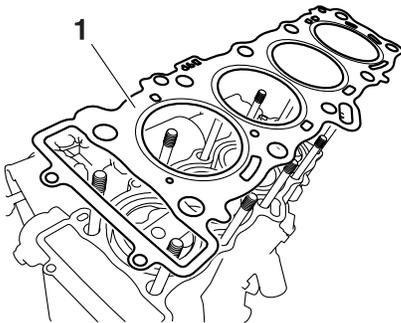
### TIP

Retighten the cylinder stud bolts to specification, before installing the cylinder head.



2. Install:

- Cylinder head gasket “1” **New**
- Dowel pins



3. Install:

- Cylinder head
- Washers **New**
- Cylinder head nuts **New**
- Cylinder head bolts

**TIP**

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head nut thread and mating surface with engine oil.

4. Tighten:

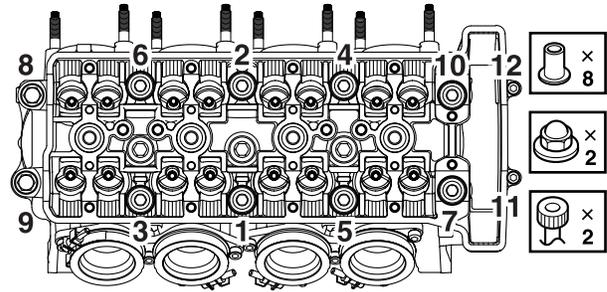
- Cylinder head nuts “1”–“10”
- Cylinder head bolts “11”, “12”



**Cylinder head nut**  
 1st: 25 Nm (2.5 m·kgf, 18 ft·lbf)  
 2nd: 25 Nm (2.5 m·kgf, 18 ft·lbf)  
 3rd: Nut “1”–“7”, “10” +80°  
 Nut “8”, “9” +100°  
**Cylinder head bolt**  
 12 Nm (1.2 m·kgf, 8.7 ft·lbf)

**TIP**

Tighten the cylinder head nuts in the tightening sequence as shown and torque them in 3 stages.



5. Install:

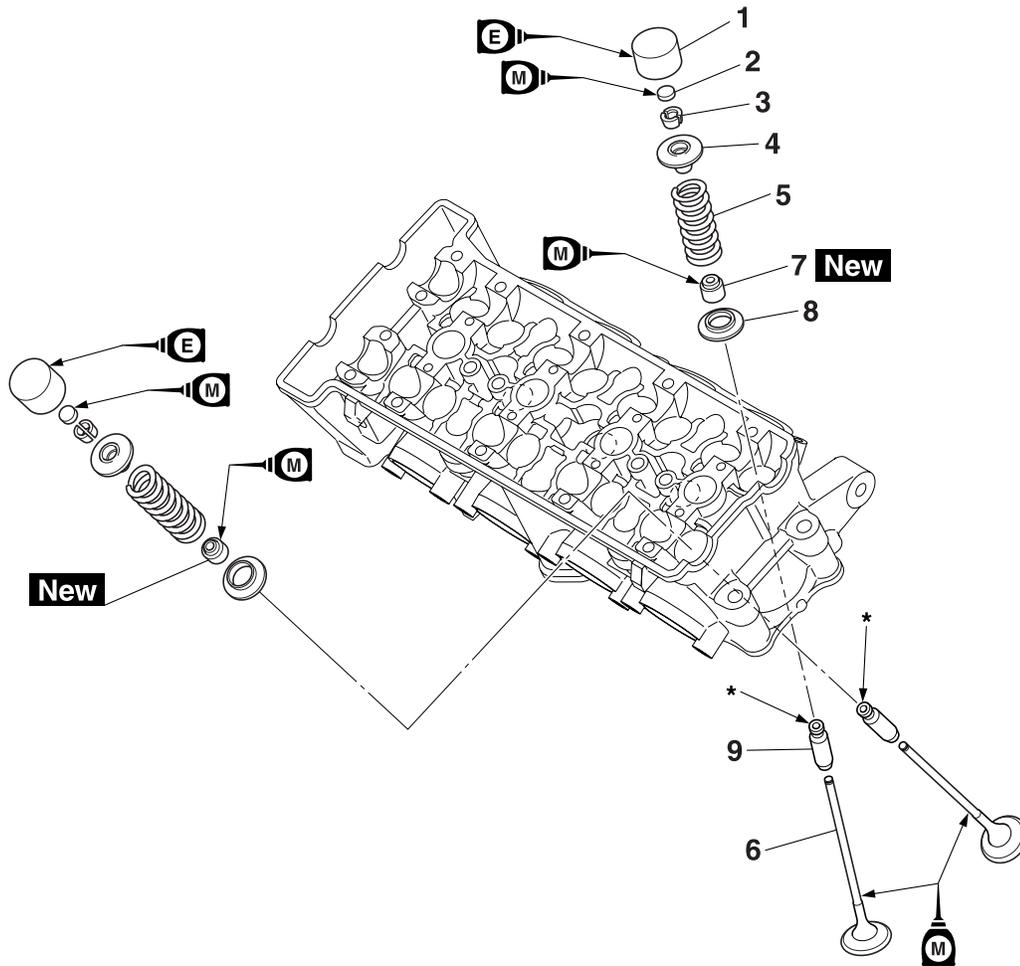
- Exhaust camshaft
- Intake camshaft

Refer to “INSTALLING THE CAM-SHAFTS” on page 5-17.

EAS24270

## VALVES AND VALVE SPRINGS

### Removing the valves and valve springs

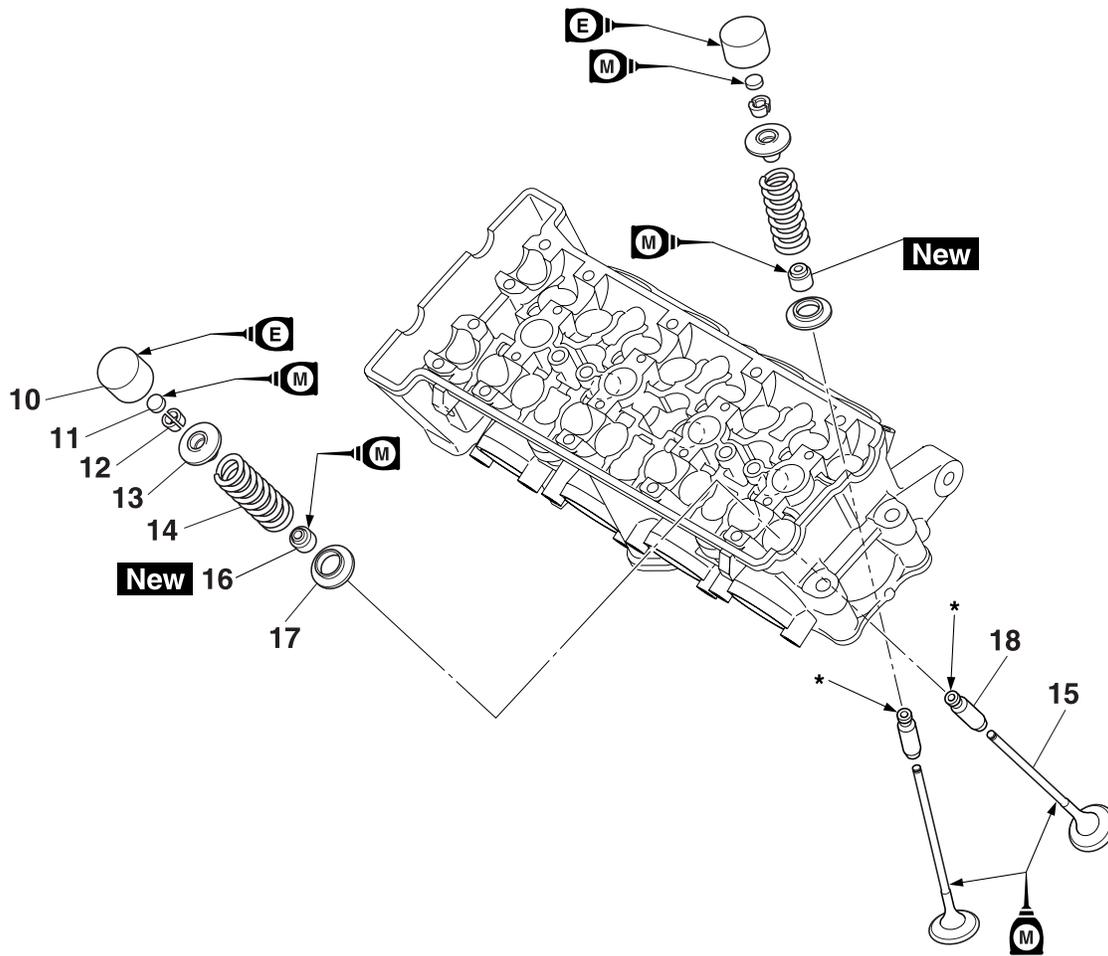


| Order | Job/Parts to remove          | Q'ty | Remarks                                |
|-------|------------------------------|------|--|
|       | Cylinder head                |      | Refer to "CYLINDER HEAD" on page 5-20. |
| 1     | Intake valve lifter          | 8    |  |
| 2     | Intake valve pad             | 8    |  |
| 3     | Intake valve cotter          | 16   |  |
| 4     | Intake valve spring retainer | 8    |  |
| 5     | Intake valve spring          | 8    |  |
| 6     | Intake valve                 | 8    |  |
| 7     | Intake valve stem seal       | 8    |  |
| 8     | Intake valve spring seat     | 8    |  |
| 9     | Intake valve guide           | 8    |  |

\* Silicone fluid

# VALVES AND VALVE SPRINGS

## Removing the valves and valve springs



| Order | Job/Parts to remove           | Q'ty | Remarks  |
|-------|-------------------------------|------|--|
| 10    | Exhaust valve lifter          | 8    |  |
| 11    | Exhaust valve pad             | 8    |  |
| 12    | Exhaust valve cotter          | 16   |  |
| 13    | Exhaust valve spring retainer | 8    |  |
| 14    | Exhaust valve spring          | 8    |  |
| 15    | Exhaust valve                 | 8    |  |
| 16    | Exhaust valve stem seal       | 8    |  |
| 17    | Exhaust valve spring seat     | 8    |  |
| 18    | Exhaust valve guide           | 8    |  |
|       |                               |      | For installation, reverse the removal procedure. |

\* Silicone fluid

EAS24280

## REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

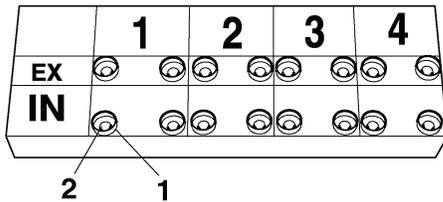
### TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
  - Valve lifter "1"
  - Valve pad "2"

### TIP

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

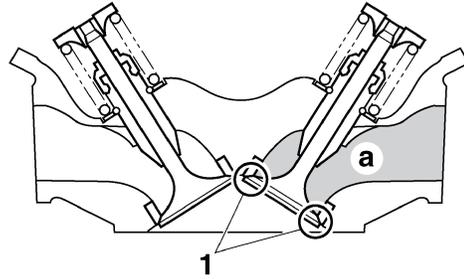


2. Check:
  - Valve sealing  
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.  
Refer to "CHECKING THE VALVE SEATS" on page 5-27.

- a. Pour a clean solvent "a" into the intake and exhaust ports.
- b. Check that the valves properly seal.

### TIP

There should be no leakage at the valve seat "1".



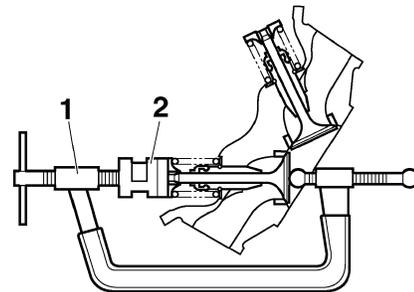
3. Remove:
  - Valve cotters

### TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



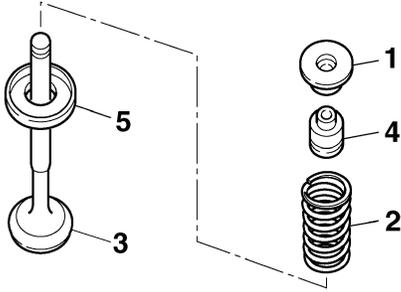
**Valve spring compressor**  
**90890-04019**  
**YM-04019**  
**Valve spring compressor**  
**attachment**  
**90890-04108**  
**Valve spring compressor**  
**adapter 22 mm**  
**YM-04108**



4. Remove:
  - Valve spring retainer "1"
  - Valve spring "2"
  - Valve "3"
  - Valve stem seal "4"
  - Valve spring seat "5"

### TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



EAS24290

## CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

### 1. Measure:

- Valve-stem-to-valve-guide clearance  
Out of specification → Replace the valve guide.

- Valve-stem-to-valve-guide clearance =  
Valve guide inside diameter "a" -  
Valve stem diameter "b"



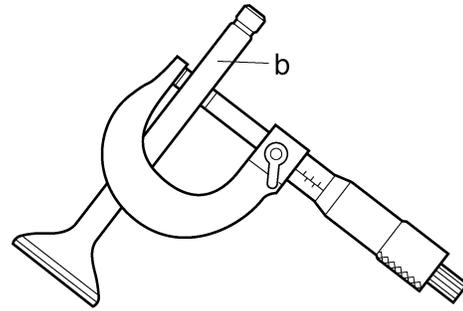
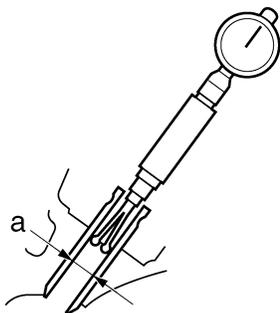
### Valve-stem-to-valve-guide clearance

**Valve-stem-to-valve-guide clearance (intake)**  
0.010–0.037 mm (0.0004–0.0015 in)

**Limit**  
0.080 mm (0.0032 in)

**Valve-stem-to-valve-guide clearance (exhaust)**  
0.025–0.052 mm (0.0010–0.0020 in)

**Limit**  
0.100 mm (0.0039 in)



### 2. Replace:

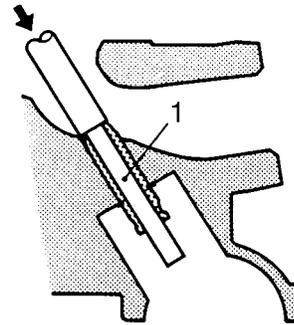
- Valve guide

### TIP

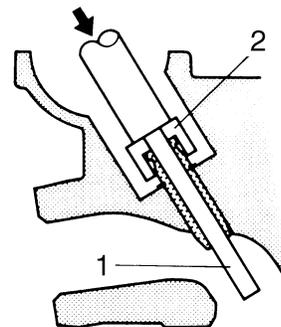
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.



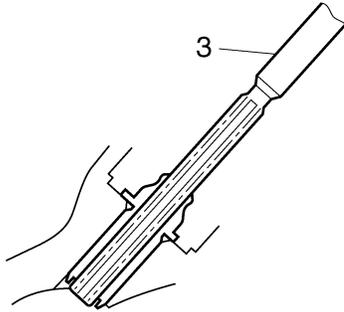
- Remove the valve guide with the valve guide remover "1".



- Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



- After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



**TIP**

After replacing the valve guide, reface the valve seat.



**Valve guide remover (ø4)**  
90890-04111  
**Valve guide remover (4.0 mm)**  
YM-04111  
**Valve guide installer (ø4)**  
90890-04112  
**Valve guide installer (4.0 mm)**  
YM-04112  
**Valve guide reamer (ø4)**  
90890-04113  
**Valve guide reamer (4.0 mm)**  
YM-04113

3. Eliminate:

- Carbon deposits (from the valve face and valve seat)

4. Check:

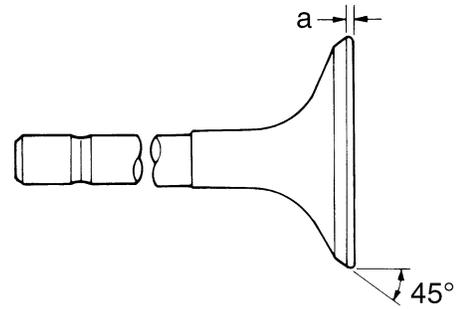
- Valve face  
Pitting/wear → Grind the valve face.
- Valve stem end  
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

5. Measure:

- Valve margin thickness “a”  
Out of specification → Replace the valve.



**Valve margin thickness**  
**Valve margin thickness (intake)**  
0.50–0.90 mm (0.0197–0.0354 in)  
**Valve margin thickness (exhaust)**  
0.50–0.90 mm (0.0197–0.0354 in)



6. Measure:

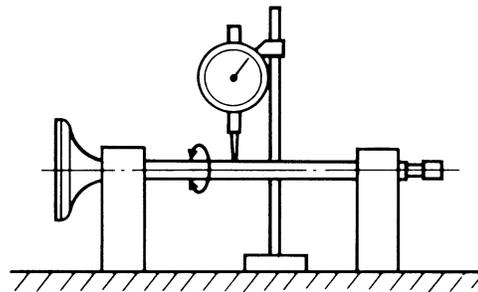
- Valve stem runout  
Out of specification → Replace the valve.

**TIP**

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



**Valve stem runout**  
0.010 mm (0.0004 in)



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:

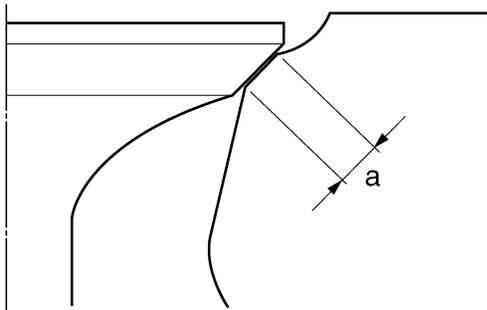
- Valve seat  
Pitting/wear → Replace the cylinder head.

3. Measure:

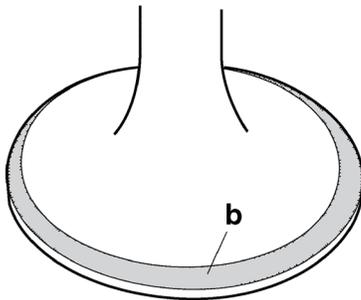
- Valve seat width “a”  
Out of specification → Replace the cylinder head.



**Valve seat width**  
**Valve seat width (intake)**  
 0.90–1.10 mm (0.0354–0.0433 in)  
**Limit**  
 1.60 mm (0.06 in)  
**Valve seat width (exhaust)**  
 0.90–1.10 mm (0.0354–0.0433 in)  
**Limit**  
 1.60 mm (0.06 in)



- a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- b. Install the valve into the cylinder head.  
 c. Press the valve through the valve guide and onto the valve seat to make a clear impression.  
 d. Measure the valve seat width.

**TIP**

Where the valve seat and valve face contacted one another, the blueing will have been removed.

4. Lap:
- Valve face
  - Valve seat

**TIP**

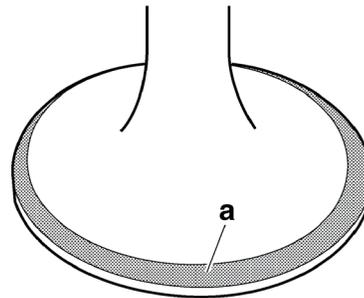
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

**NOTICE**

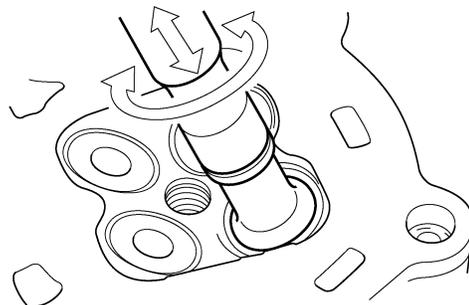
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



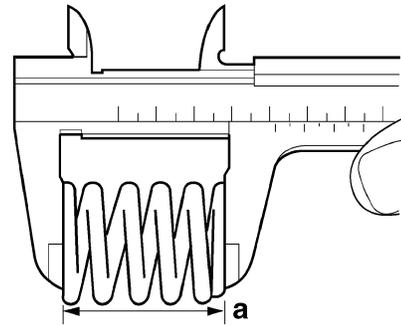
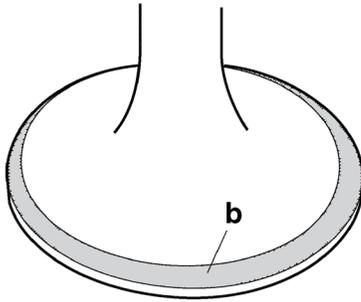
- b. Apply molybdenum disulfide oil onto the valve stem.  
 c. Install the valve into the cylinder head.  
 d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

**TIP**

For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

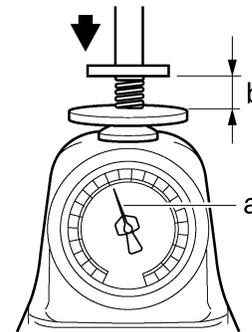
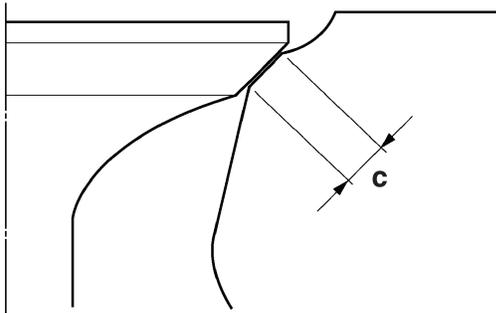


- e. Apply a fine lapping compound to the valve face and repeat the above steps.  
 f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.  
 g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.

2. Measure:
  - Compressed valve spring force "a"
 Out of specification → Replace the valve spring.



b. Installed length



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.



### Valve spring free length

**Free length (intake)**

38.62 mm (1.52 in)

**Limit**

36.69 mm (1.44 in)

**Free length (exhaust)**

38.62 mm (1.52 in)

**Limit**

36.69 mm (1.44 in)



### Installed compression spring force (intake)

130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)

### Installed compression spring force (exhaust)

130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)

### Installed length (intake)

33.00 mm (1.30 in)

### Installed length (exhaust)

33.00 mm (1.30 in)

3. Measure:
  - Valve spring tilt "a"
 Out of specification → Replace the valve spring.



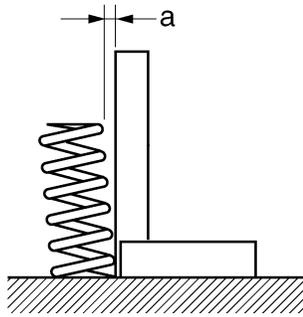
### Spring tilt limit

**Spring tilt (intake)**

2.5°/1.7 mm (0.067 in)

**Spring tilt (exhaust)**

2.5°/1.7 mm (0.067 in)



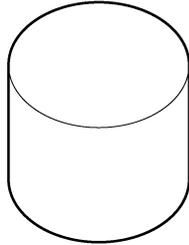
EAS24320

## CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

### 1. Check:

- Valve lifter  
Damage/scratches → Replace the valve lifters and cylinder head.



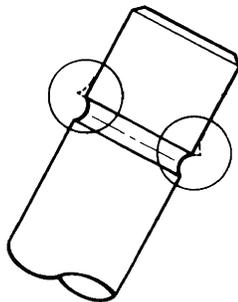
EAS24340

## INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

### 1. Deburr:

- Valve stem end  
(with an oil stone)

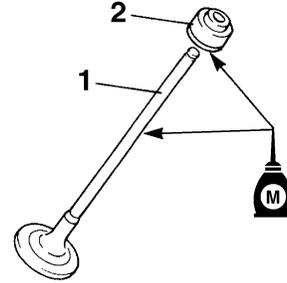


### 2. Lubricate:

- Valve stem "1"
- Valve stem seal "2"  
(with the recommended lubricant)



**Recommended lubricant**  
Molybdenum disulfide oil

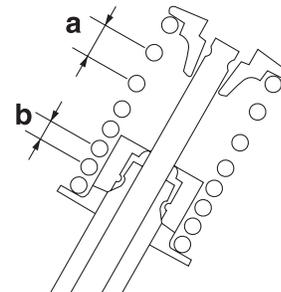
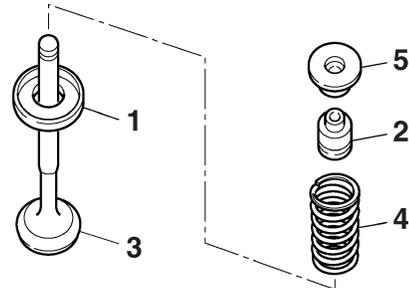


### 3. Install:

- Valve spring seat "1"
- Valve stem seal "2" **New**
- Valve "3"
- Valve spring "4"
- Valve spring retainer "5"  
(into the cylinder head)

### TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.



b. Smaller pitch

### 4. Install:

- Valve cotteners "1"

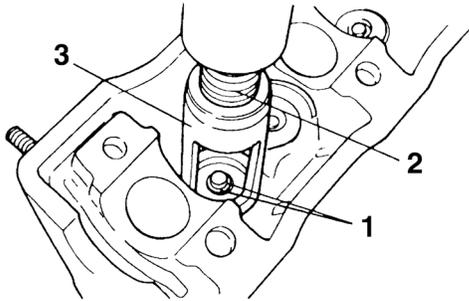
### TIP

Install the valve cotteners by compressing the valve spring with the valve spring compressor

“2” and the valve spring compressor attachment “3”.



**Valve spring compressor**  
90890-04019  
YM-04019  
**Valve spring compressor attachment**  
90890-04108  
**Valve spring compressor adapter 22 mm**  
YM-04108

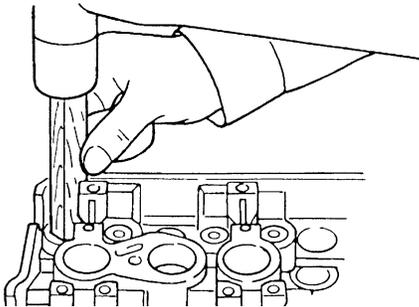


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

**NOTICE**

**Hitting the valve tip with excessive force could damage the valve.**



6. Lubricate:  
• Valve pad  
(with the recommended lubricant)



**Recommended lubricant**  
Molybdenum disulfide oil

• Valve lifter  
(with the recommended lubricant)



**Recommended lubricant**  
Engine oil

7. Install:  
• Valve pad  
• Valve lifter

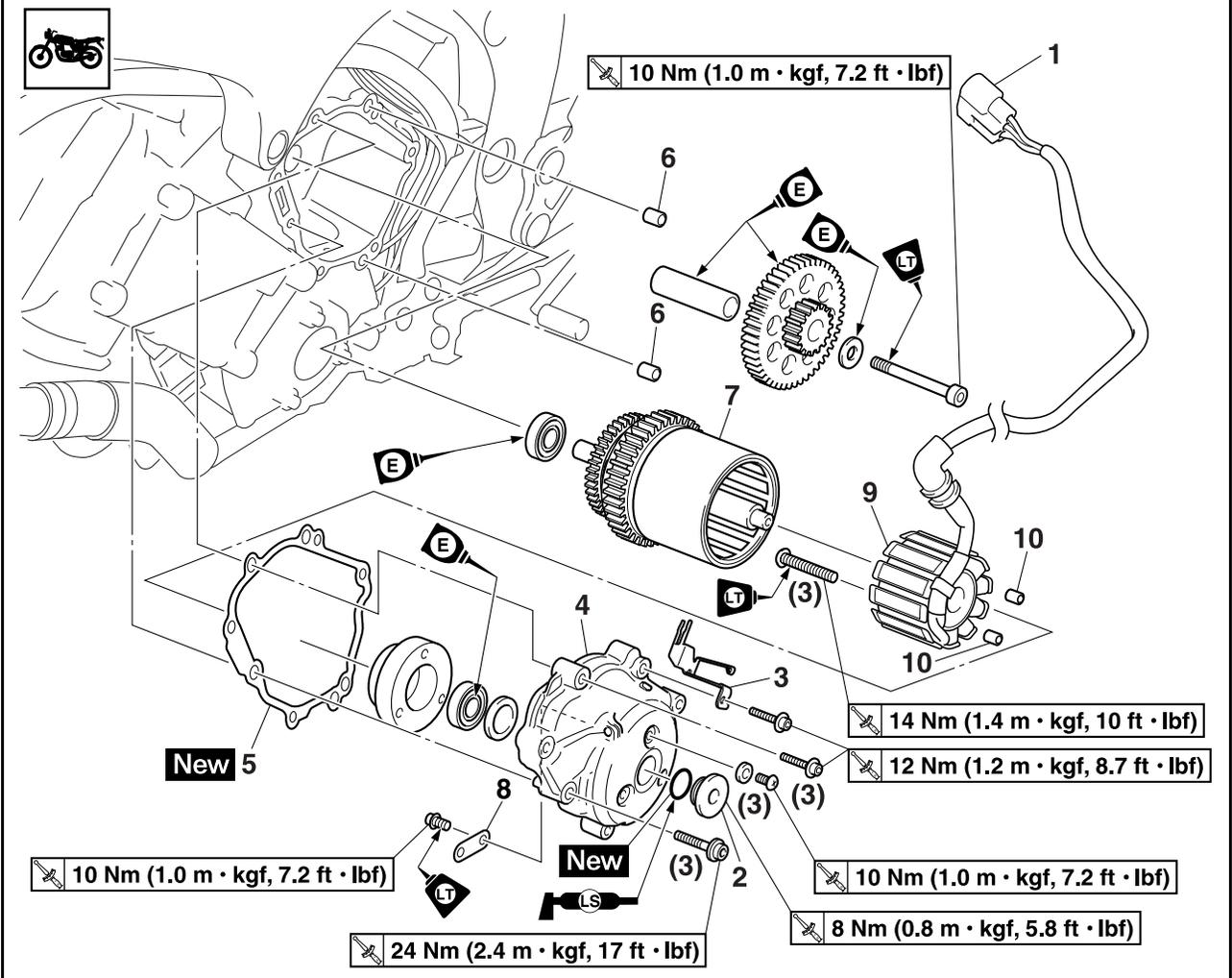
**TIP**

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

EAS24480

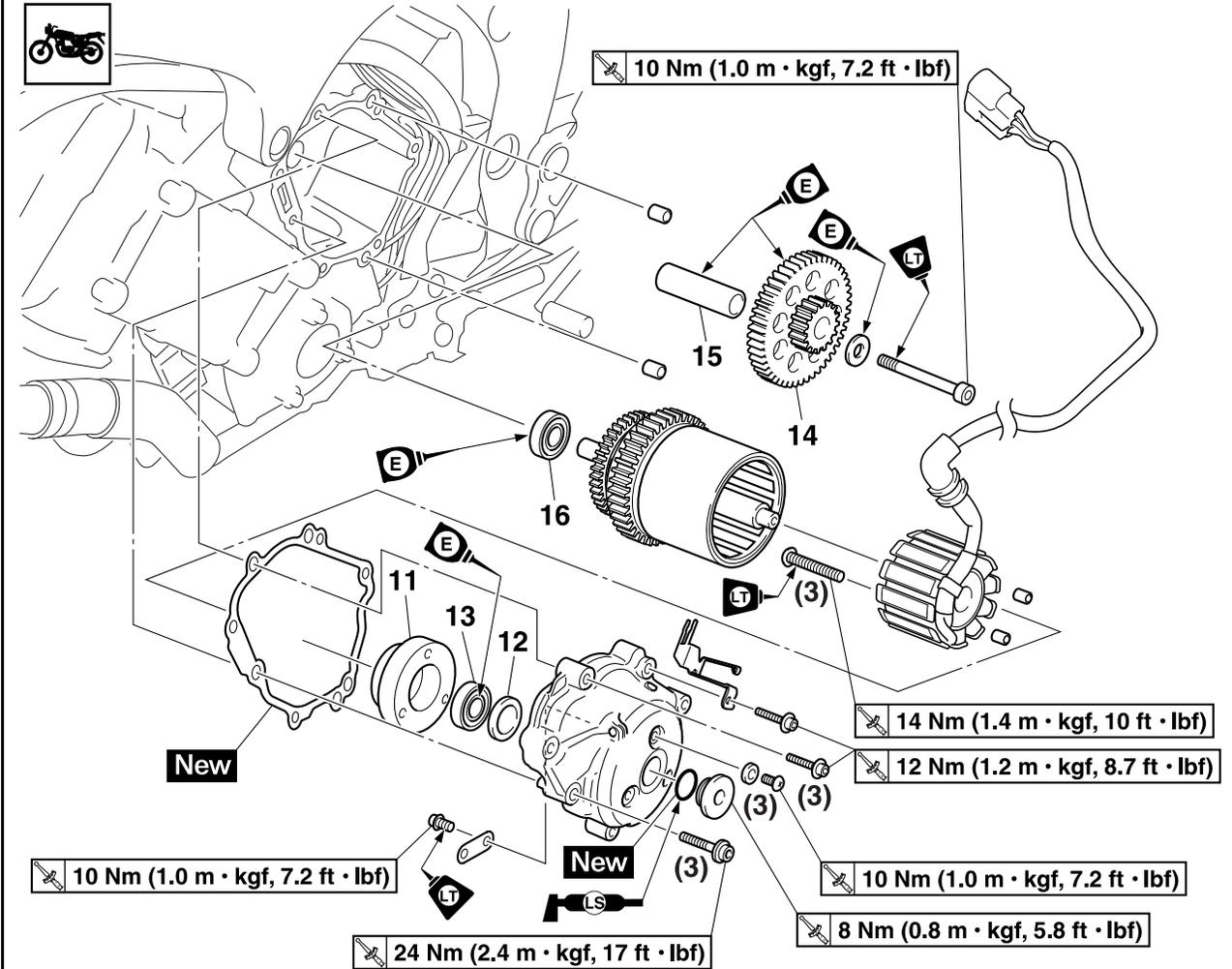
## GENERATOR

### Removing the generator



| Order | Job/Parts to remove               | Q'ty | Remarks  |
|-------|-----------------------------------|------|--|
|       | Rider seat                        |      | Refer to "GENERAL CHASSIS" on page 4-1.                    |
|       | Left side cover                   |      | Refer to "GENERAL CHASSIS" on page 4-1.                    |
|       | Fuel tank                         |      | Refer to "FUEL TANK" on page 7-1.                          |
|       | Engine oil                        |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Stator coil assembly lead coupler | 1    | Disconnect.  |
| 2     | Plug                              | 1    |  |
| 3     | Idle adjust screw holder          | 1    |  |
| 4     | Generator rotor cover             | 1    |  |
| 5     | Gasket                            | 1    |  |
| 6     | Dowel pin                         | 2    |  |
| 7     | Generator rotor assembly          | 1    |  |
| 8     | Stator coil assembly lead holder  | 1    |  |
| 9     | Stator coil assembly              | 1    |  |
| 10    | Dowel pin                         | 2    |  |

## Removing the generator



| Order | Job/Parts to remove       | Q'ty | Remarks  |
|-------|---------------------------|------|--|
| 11    | Bearing housing           | 1    |  |
| 12    | Collar                    | 1    |  |
| 13    | Bearing                   | 1    |  |
| 14    | Starter clutch idler gear | 1    |  |
| 15    | Idler gear shaft          | 1    |  |
| 16    | Bearing                   | 1    |  |
|       |                           |      | For installation, reverse the removal procedure. |

# GENERATOR

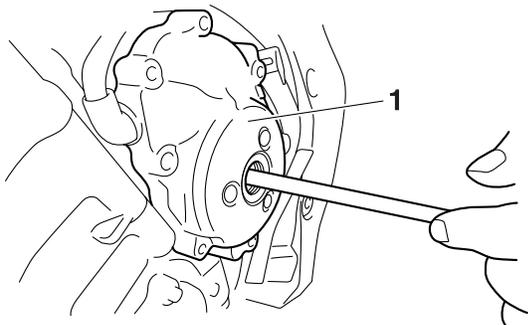
EAS24490

## REMOVING THE GENERATOR

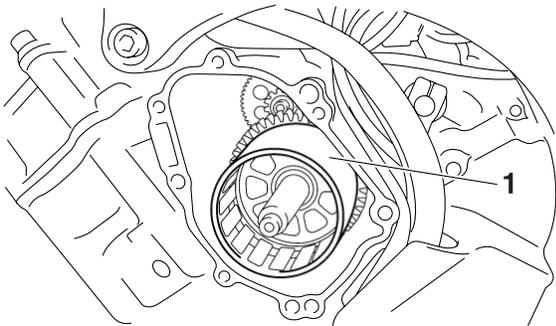
1. Remove:
  - Plug
  - Generator rotor cover "1"

### TIP

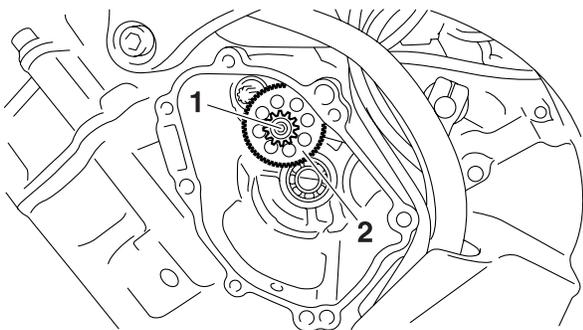
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.



2. Remove:
  - Generator rotor and starter clutch assembly "1"



3. Remove:
  - Idle gear shaft bolt "1"
  - Washer
  - Idle shaft
  - Idle gear "2"

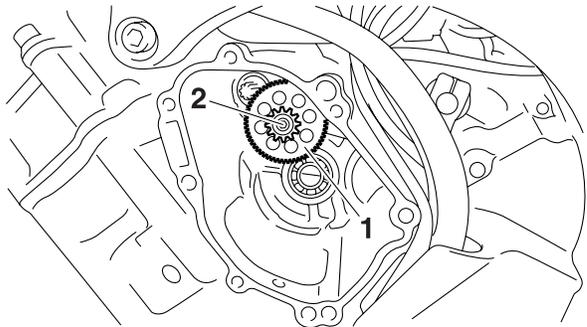


EAS24500

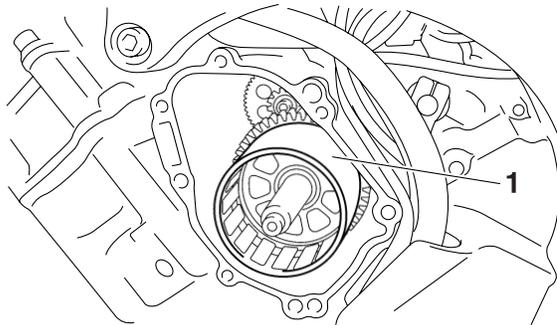
## INSTALLING THE GENERATOR

1. Install:
  - Idle gear shaft
  - Idle gear "1"
  - Washer
  - Idle gear shaft bolt "2"

|   |  |
|---|--|
|  | <b>Idle gear shaft bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|--|

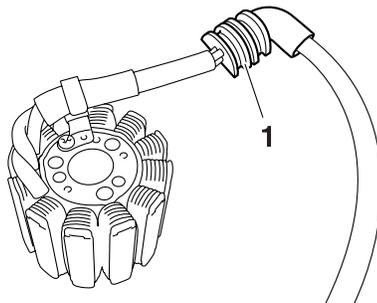


2. Install:
  - Generator rotor and starter clutch assembly "1"



3. Apply:
  - Sealant (onto the stator coil lead grommet "1")

|   |  |
|---|--|
|  | <b>Yamaha bond No.1215</b><br><b>(Three bond No.1215®)</b><br><b>90890-85505</b> |
|---|--|



## 4. Install:

- Generator rotor cover gasket **New**
- Generator rotor cover "1"



**Generator rotor cover bolt (M8)**

**22 Nm (2.2 m·kgf, 16 ft·lbf)**

**Generator rotor cover bolt (M6)**

**12 Nm (1.2 m·kgf, 8.7 ft·lbf)**



### **TIP**

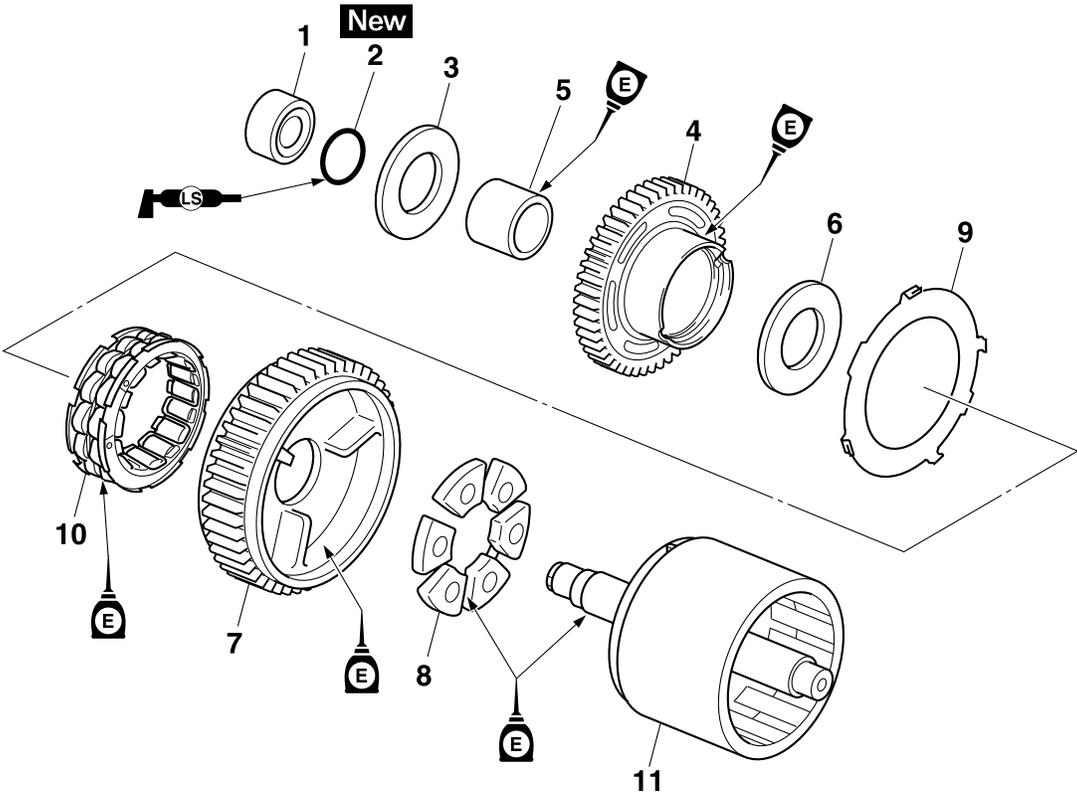
- First tighten the M8 bolts and then tighten the M6 bolts.
  - Tighten the generator rotor cover bolts in stages and in a crisscross pattern.
-

# STARTER CLUTCH

EAS24550

## STARTER CLUTCH

### Removing the starter clutch



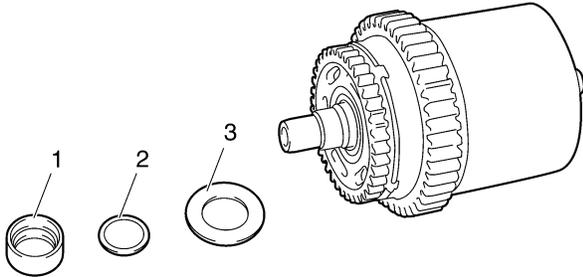
| Order | Job/Parts to remove           | Q'ty | Remarks  |
|-------|-------------------------------|------|--|
| 1     | Spacer                        | 1    |  |
| 2     | O-ring                        | 1    |  |
| 3     | Washer                        | 1    |  |
| 4     | Starter clutch drive gear     | 1    |  |
| 5     | Collar                        | 1    |  |
| 6     | Washer                        | 1    |  |
| 7     | Driven gear                   | 1    |  |
| 8     | Damper                        | 3    |  |
| 9     | Starter clutch assembly plate | 1    |  |
| 10    | Starter clutch assembly       | 1    |  |
| 11    | Generator rotor               | 1    |  |
|       |                               |      | For installation, reverse the removal procedure. |

# STARTER CLUTCH

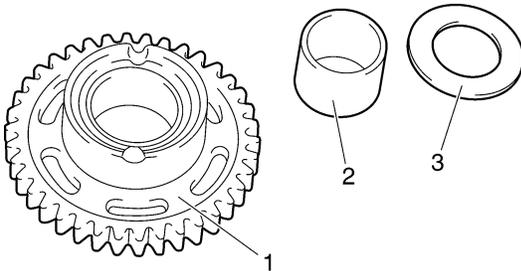
EAS24560

## REMOVING THE STARTER CLUTCH

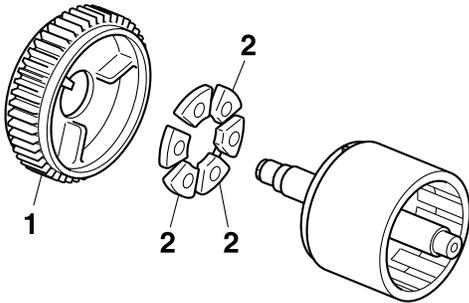
1. Remove:
  - Spacer "1"
  - O-ring "2"
  - Washer "3"



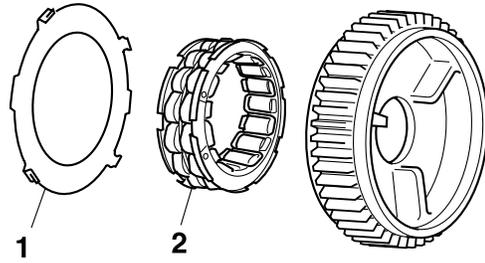
2. Remove:
  - Starter clutch drive gear "1"
  - Collar "2"
  - Washer "3"



3. Remove:
  - Driven gear "1"
  - Dampers "2"



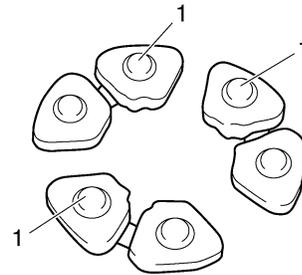
4. Remove:
  - Starter clutch assembly plate "1"
  - Starter clutch assembly "2"



EAS5D01018

## CHECKING THE DAMPER

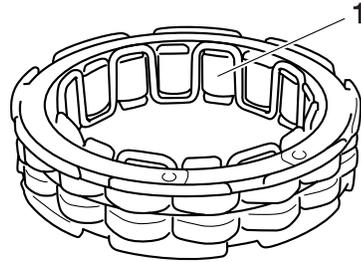
1. Check:
  - Dampers "1"Damage/wear → Replace.



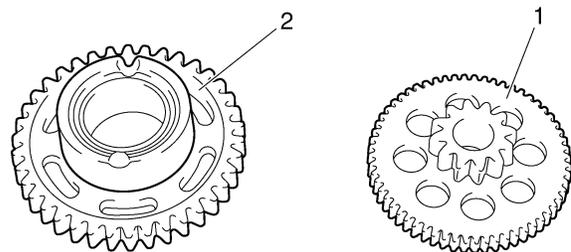
EAS24570

## CHECKING THE STARTER CLUTCH

1. Check:
  - Starter clutch rollers "1"Damage/wear → Replace.



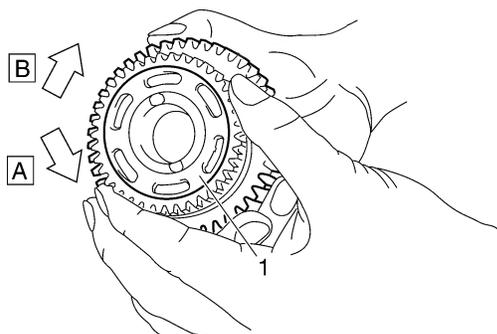
2. Check:
  - Starter clutch idle gear "1"
  - Starter clutch drive gear "2"Burrs/chips/roughness/wear → Replace the defective part(s).



3. Check:
  - Starter clutch gear's contacting surfaces  
Damage/pitting/wear → Replace the starter clutch gear.

4. Check:
  - Starter clutch operation

- 
- a. Install the starter clutch drive gear "1" onto the starter clutch and hold the driven gear.
  - b. When turning the starter clutch drive gear counterclockwise "A", the driven gear and the starter clutch drive gear should engage, 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.



EAS24600

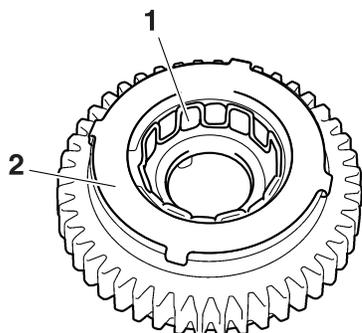
## INSTALLING THE STARTER CLUTCH

1. Install:
  - Starter clutch assembly "1"
  - Starter clutch assembly plate "2"

EAS24590

### NOTICE

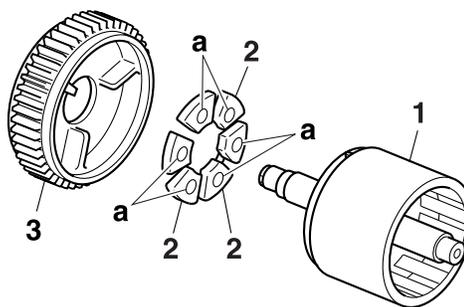
**Be sure to install the starter clutch assembly to the driven gear so that the white paint mark is outside.**



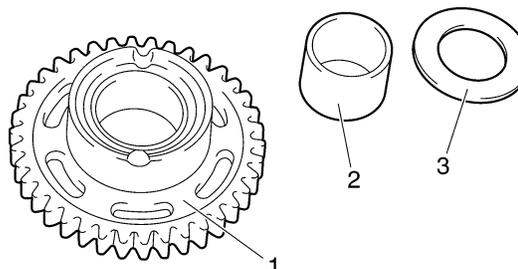
2. Install:
  - Generator rotor "1"
  - Dampers "2"
  - Driven gear "3"

### TIP

- Be sure to install the damper to the driven gear so that the projections "a" is generator side.
- Lubricate the engine oil to damper.



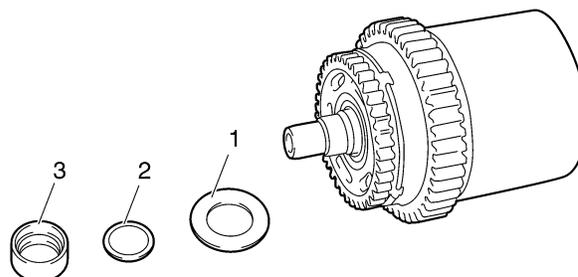
3. Install:
  - Starter clutch drive gear "1"
  - Collar "2"
  - Washer "3"



4. Install:
  - Washer "1"
  - O-ring "2" **New**
  - Spacer "3"

### TIP

Lubricate the lithium-soap-based grease to O-ring.



# CRANKSHAFT POSITION SENSOR

EAS24520

## CRANKSHAFT POSITION SENSOR

### Removing the crankshaft position sensor

**10 Nm (1.0 m · kgf, 7.2 ft · lbf)**

**15 Nm (1.5 m · kgf, 11 ft · lbf)**

**12 Nm (1.2 m · kgf, 8.7 ft · lbf)**

**12 Nm (1.2 m · kgf, 8.7 ft · lbf)**

| Order | Job/Parts to remove                     | Q'ty | Remarks  |
|-------|---|------|--|
|       | Rider seat                              |      | Refer to "GENERAL CHASSIS" on page 4-1.                    |
|       | Fuel tank                               |      | Refer to "FUEL TANK" on page 7-1.                          |
|       | Engine oil                              |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Crankshaft position sensor lead coupler | 1    | Disconnect.  |
| 2     | Crankshaft position sensor              | 1    |  |
| 3     | Plug                                    | 1    |  |
| 4     | Pickup rotor cover                      | 1    |  |
| 5     | Gasket                                  | 1    |  |
|       |   |      | For installation, reverse the removal procedure.           |

# CRANKSHAFT POSITION SENSOR

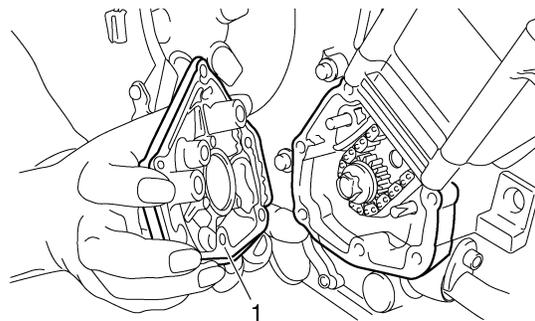
EAS24530

## REMOVING THE CRANKSHAFT POSITION SENSOR

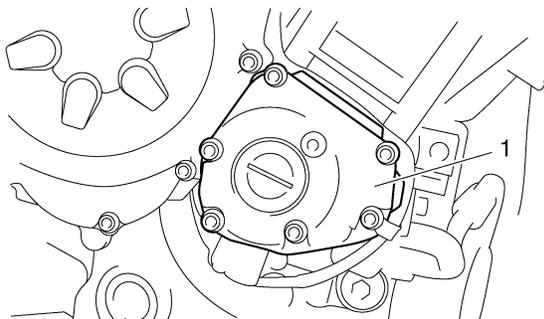
1. Disconnect:
  - Crankshaft position sensor lead coupler
2. Remove:
  - Crankshaft position sensor
  - O-rings
  - Pickup rotor cover "1"

### TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



2. Connect:
  - Crankshaft position sensor lead coupler



EAS24540

## INSTALLING THE CRANKSHAFT POSITION SENSOR

1. Install:
  - Gasket **New**
  - Pickup rotor cover "1"



**Pickup rotor cover bolt**  
**12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

- O-rings **New**
- Crankshaft position sensor

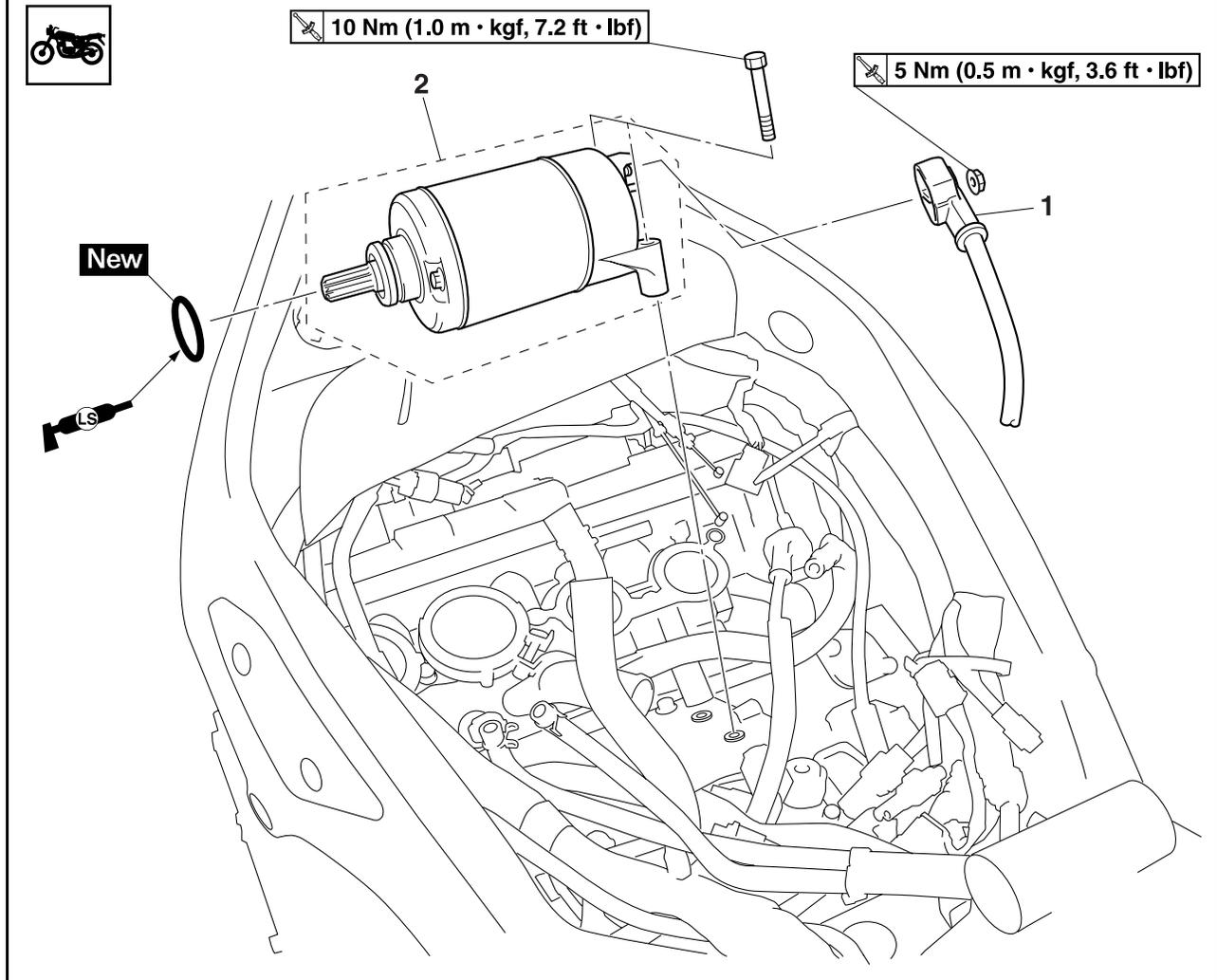


**Crankshaft position sensor bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**

EAS24780

## ELECTRIC STARTER

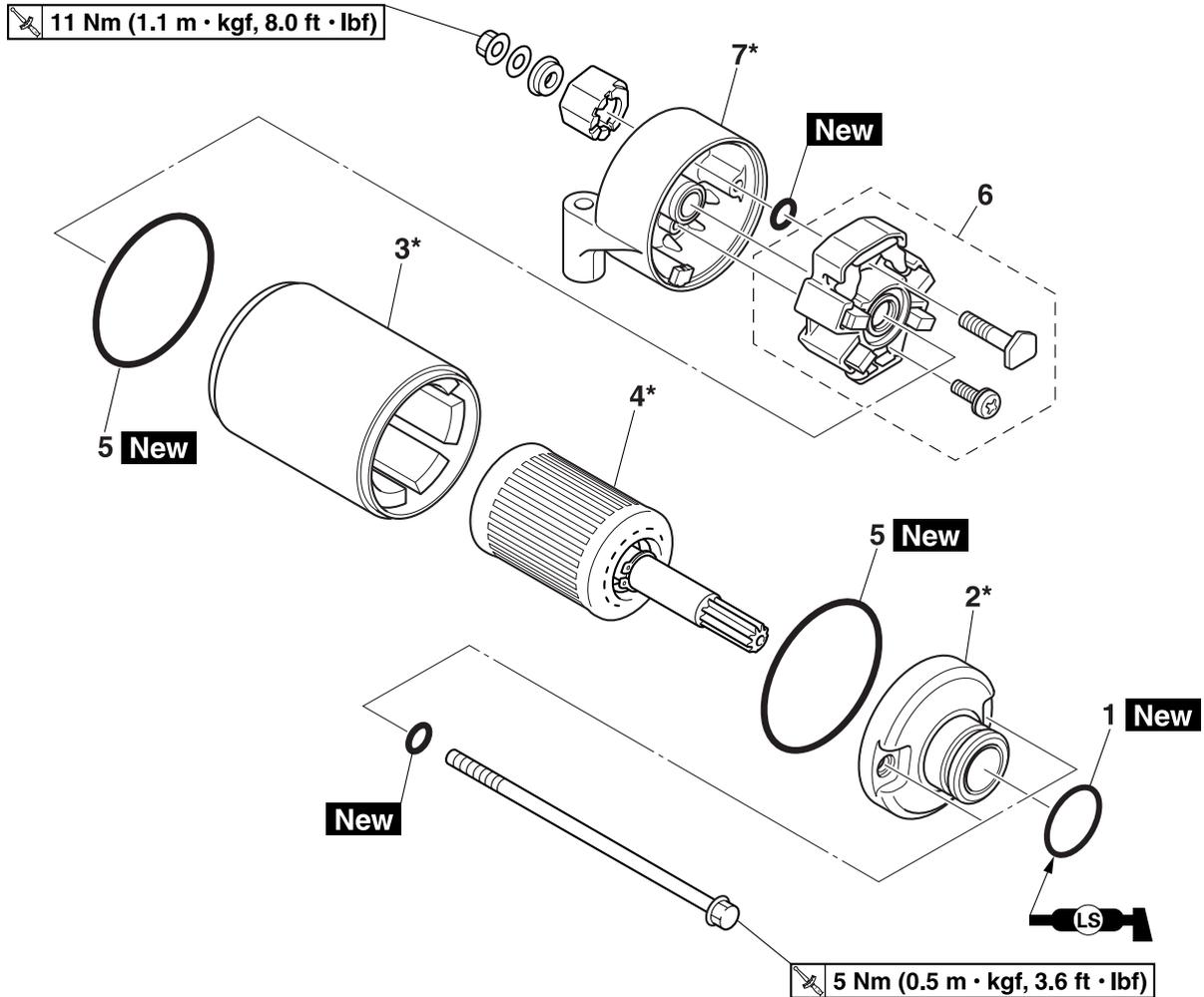
### Removing the starter motor



| Order | Job/Parts to remove       | Q'ty | Remarks  |
|-------|---------------------------|------|--|
|       | Rider seat                |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Fuel tank                 |      | Refer to "FUEL TANK" on page 7-1.                |
|       | Throttle bodies           |      | Refer to "THROTTLE BODIES" on page 7-6.          |
|       | Right throttle body joint |      | Refer to "THROTTLE BODIES" on page 7-6.          |
| 1     | Starter motor lead        | 1    | Disconnect.                                      |
| 2     | Starter motor             | 1    |  |
|       |                           |      | For installation, 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     | Starter motor yoke  | 1    |  |
| 4     | Armature assembly   | 1    |  |
| 5     | Gasket              | 2    |  |
| 6     | Brush holder set    | 1    |  |
| 7     | Rear cover          | 1    |  |
|       |                     |      | For assembly, reverse the disassembly procedure. |

\* When replacing any of the front cover, starter motor yoke, armature assembly, and rear cover, replace the starter motor assembly.

EAS24791

## CHECKING THE STARTER MOTOR

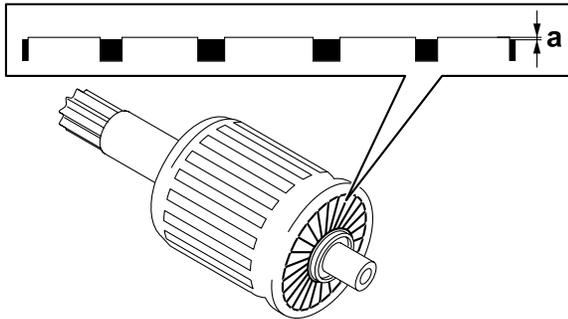
1. Check:
  - Commutator  
Dirt → Clean with 600 grit sandpaper.
2. Measure:
  - Mica undercut "a"  
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



**Mica undercut (depth)**  
**0.70 mm (0.03 in)**

### TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



3. Measure:
  - Armature assembly resistances (commutator and insulation)  
Out of specification → Replace the starter motor.

- a. Measure the armature assembly resistances with the digital circuit tester.

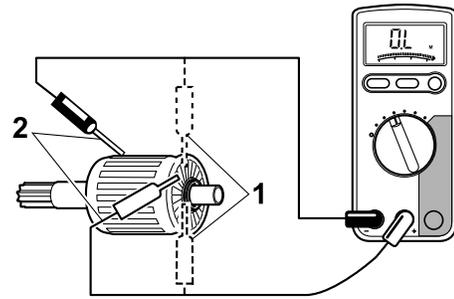


**Digital circuit tester**  
**90890-03174**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**



**Armature coil**  
**Commutator resistance**  
**0.0100–0.2000 Ω at 20 °C (68 °F)**  
**Insulation resistance**  
**Above 1 MΩ at 20 °C (68 °F)**

- b. If any resistance is out of specification, replace the starter motor.



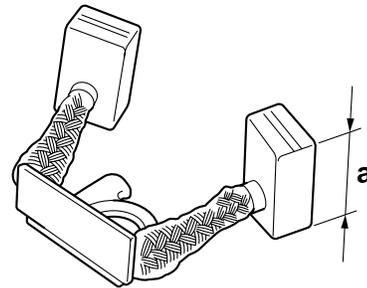
1. Commutator resistance
2. Insulation resistance

4. Measure:

- Brush length "a"  
Out of specification → Replace the brush holder set.



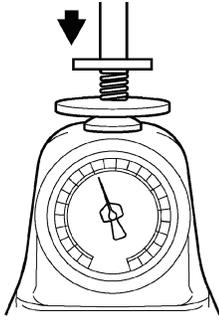
**Brush overall length**  
**12.0 mm (0.47 in)**  
**Limit**  
**6.50 mm (0.26 in)**



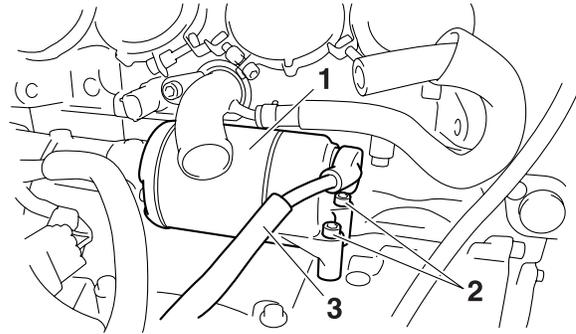
5. Measure:
  - Brush spring force  
Out of specification → Replace the brush holder set.



**Brush spring force**  
**6.02–6.51 N (614–664 gf,**  
**21.65–23.41 ozf)**



2. Connect:
  - Starter motor lead “3”



6. Check:
  - Gear teeth  
Damage/wear → Replace the starter motor.
7. Check:
  - Bearing
  - Oil seal  
Damage/wear → Replace the starter motor.

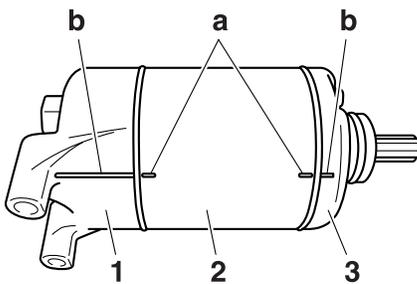
EAS24800

## ASSEMBLING THE STARTER MOTOR

1. Install:
  - Brush holder set
2. Install:
  - Rear cover “1”
  - Starter motor yoke “2”
  - Front cover “3”

### TIP

Align the match marks “a” on the starter motor yoke with the match marks “b” on the front and rear cover.



EAS24810

## INSTALLING THE STARTER MOTOR

1. Install:
  - Starter motor “1”
  - Starter motor bolts “2”

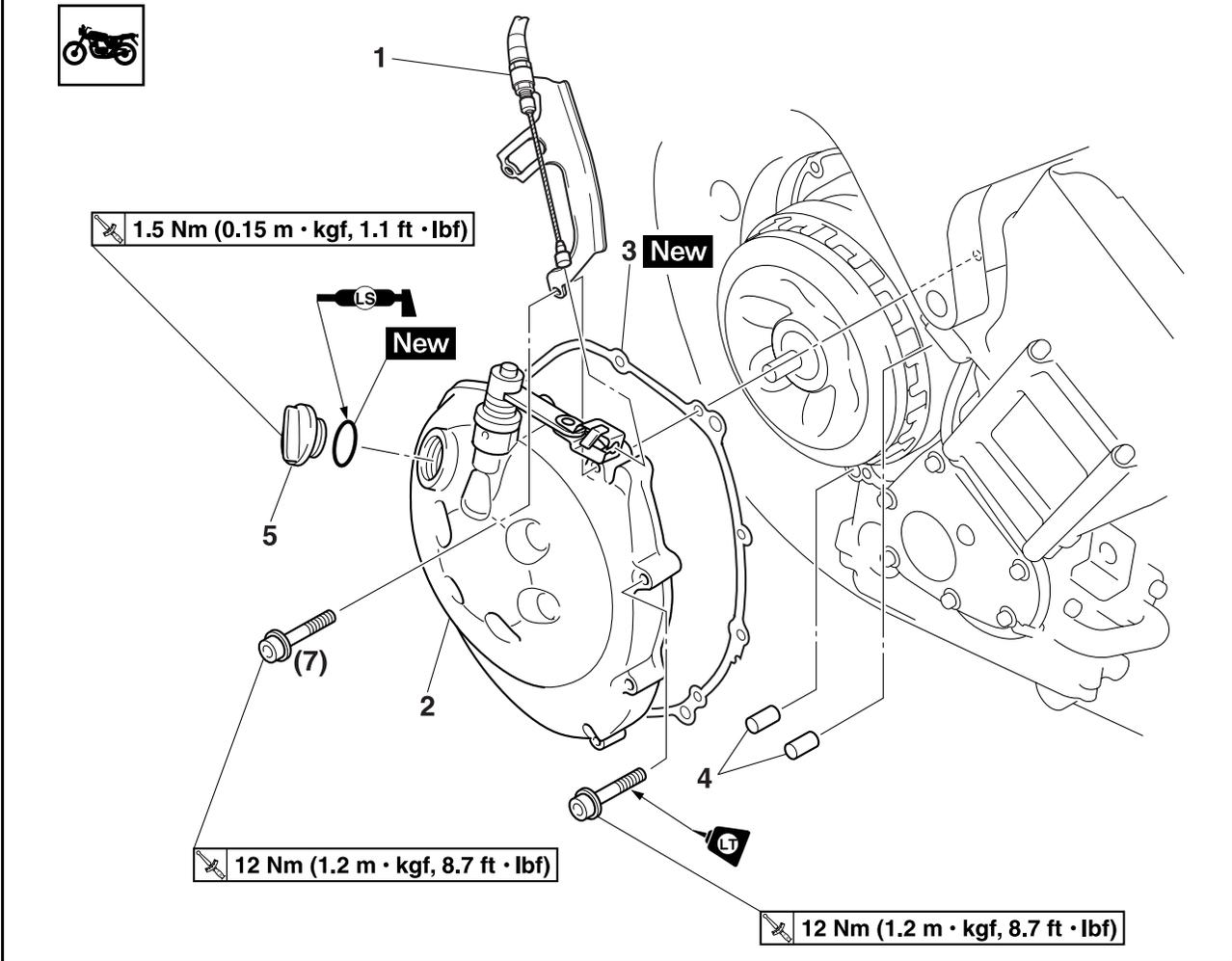


**Starter motor bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

EAS25061

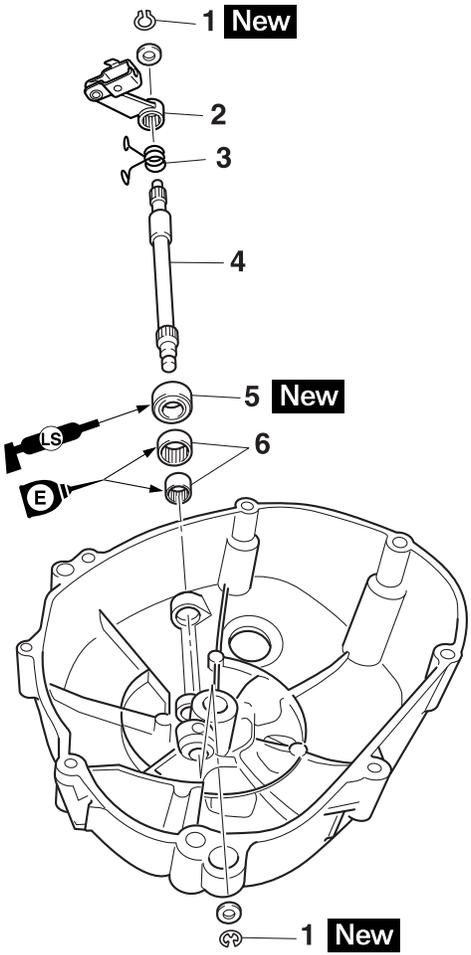
**CLUTCH**

**Removing the clutch cover**



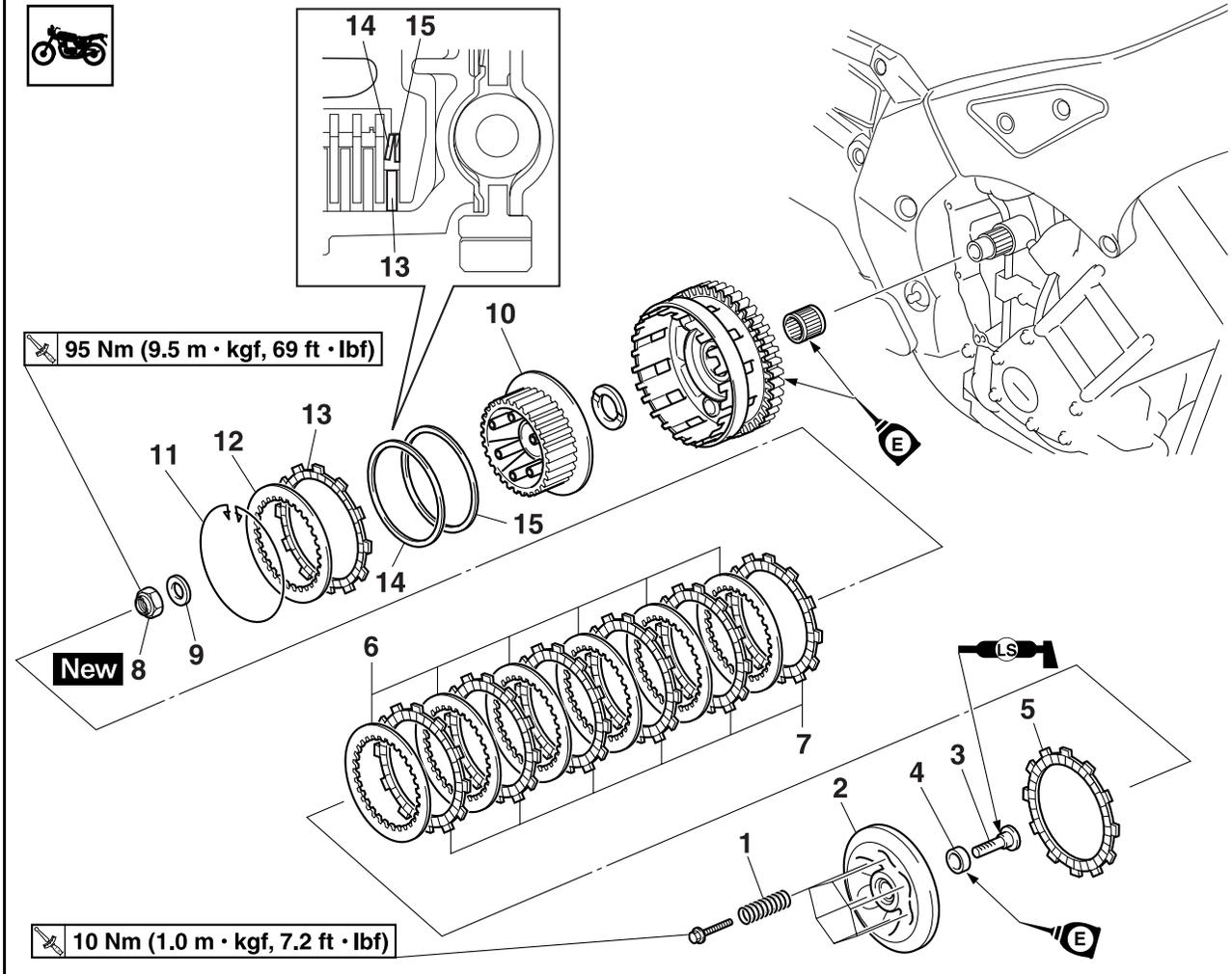
| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
|       | Engine oil          |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Clutch cable        | 1    | Disconnect.  |
| 2     | Clutch cover        | 1    |  |
| 3     | Clutch cover gasket | 1    |  |
| 4     | Dowel pin           | 2    |  |
| 5     | Oil filler cap      | 1    |  |
|       |                     |      | For installation, reverse the removal procedure.           |

**Removing the pull lever shaft**



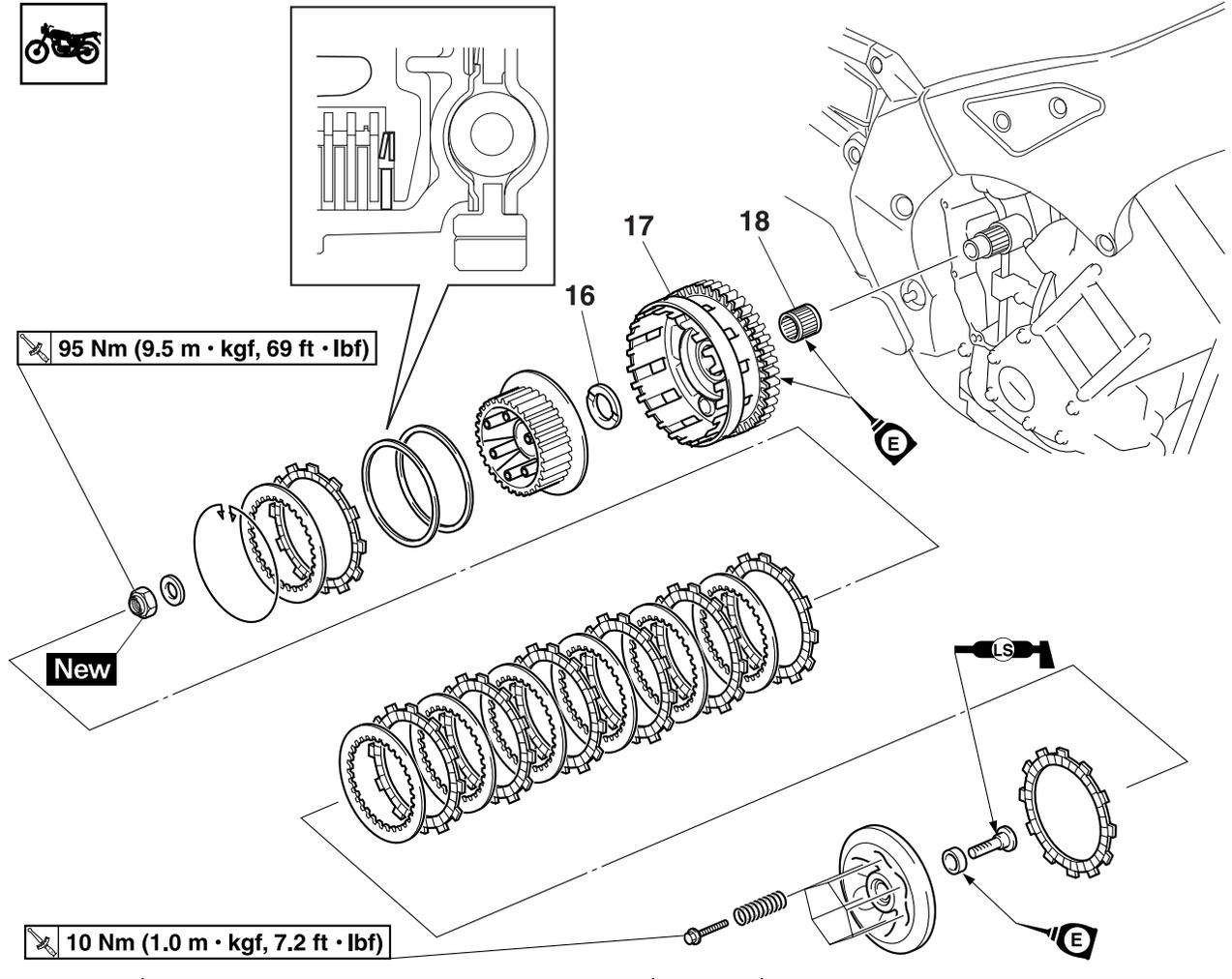
| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 1     | Circlip             | 2    |  |
| 2     | Pull lever          | 1    |  |
| 3     | Pull lever spring   | 1    |  |
| 4     | Pull lever shaft    | 1    |  |
| 5     | Oil seal            | 1    |  |
| 6     | Bearing             | 2    |  |
|       |                     |      | For installation, reverse the removal procedure. |

## 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    | Green paint mark.  |
| 6     | Clutch plate 1            | 6    |                    |
| 7     | Friction plate 2          | 6    | Purple paint mark. |
| 8     | Clutch boss nut           | 1    |                    |
| 9     | Washer                    | 1    |                    |
| 10    | Clutch boss               | 1    |                    |
| 11    | Wire circlip              | 1    |                    |
| 12    | Clutch plate 2            | 1    |                    |
| 13    | Friction plate 3          | 1    |                    |
| 14    | Clutch damper spring      | 1    |                    |
| 15    | Clutch damper spring seat | 1    |                    |

## Removing the clutch



| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 16    | Thrust plate        | 1    |  |
| 17    | Clutch housing      | 1    |  |
| 18    | Bearing             | 1    |  |
|       |                     |      | For installation, reverse the removal procedure. |

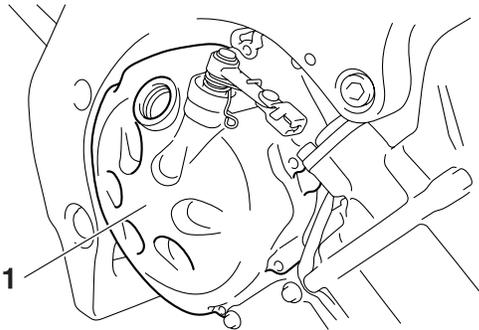
EAS30712

## REMOVING THE CLUTCH

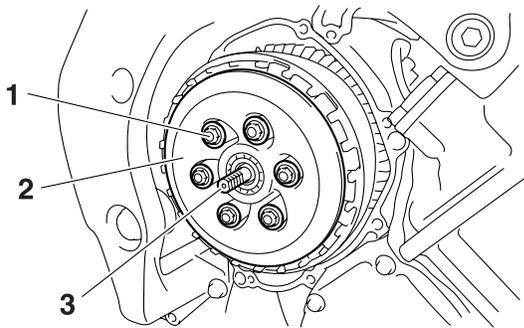
1. Remove:
  - Clutch cover "1"
  - Gasket

### TIP

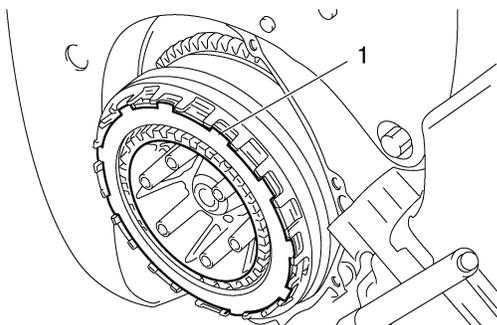
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



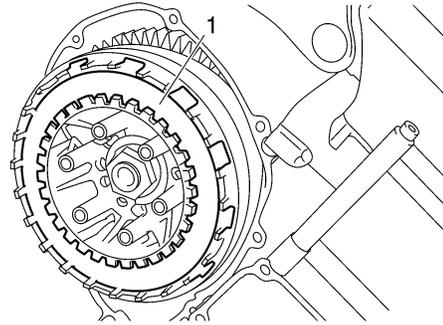
2. Remove:
  - Compression spring bolts "1"
  - Compression springs
  - Pressure plate "2"
  - Pull rod "3"



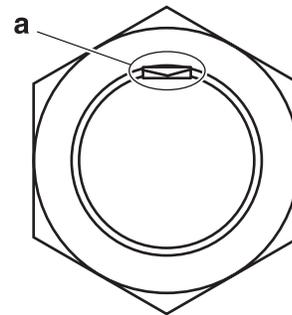
3. Remove:
  - Friction plate 1 "1"



4. Remove:
  - Clutch plate 1 "1"
  - Friction plate 2



5. Straighten the clutch boss nut rib "a".



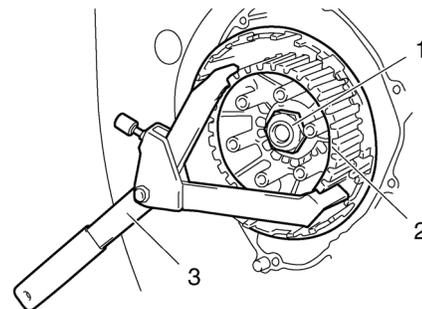
6. Loosen:
  - Clutch boss nut "1"

### TIP

While holding the clutch boss "2" with the universal clutch holder "3", loosen the clutch boss nut.



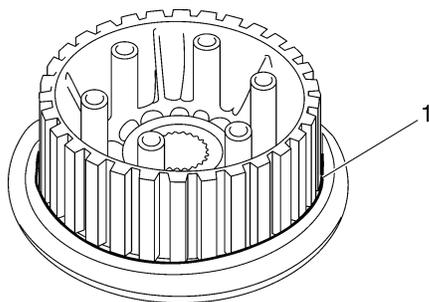
**Universal clutch holder**  
**90890-04086**  
**YM-91042**



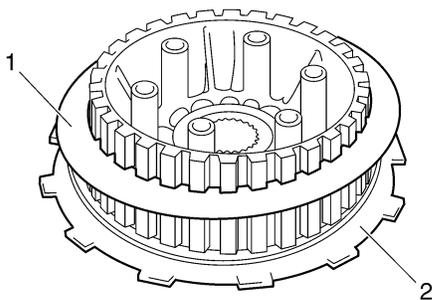
7. Remove:
  - Clutch boss nut
  - Washer
  - Clutch boss assembly
  - Thrust plate
8. Remove:
  - Wire circlip "1"

**TIP**

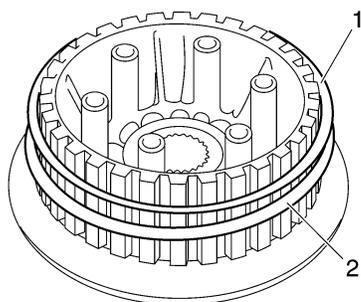
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip "1" and disassemble the built-in damper unless there is serious clutch chattering.



9. Remove:
  - Clutch plate 2 "1"
  - Friction plate 3 "2"



10. Remove:
  - Clutch damper spring "1"
  - Clutch damper spring seat "2"



EAS25100

## CHECKING THE FRICTION PLATES

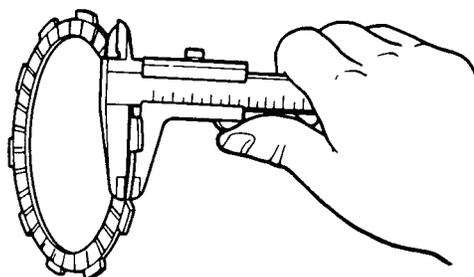
The following procedure applies to all of the friction plates.

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

**TIP**

Measure the friction plate at four places.

|  |                                 |
|--|---------------------------------|
|  | <b>Friction plate thickness</b> |
|  | 2.92–3.08 mm (0.115–0.121 in)   |
|  | <b>Wear limit</b>               |
|  | 2.82 mm (0.1110 in)             |



A



B



- A. Friction plate 1 and friction plate 2
- B. Friction plate 3

EAS25111

## 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:

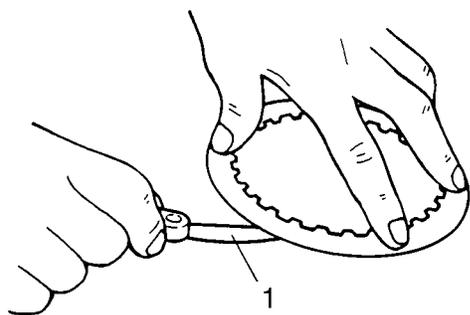
- Clutch plate warpage  
(with a surface plate and thickness gauge "1")  
Out of specification → Replace the clutch plates as a set.



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



**Warpage limit**  
0.10 mm (0.0039 in)



EAS25140

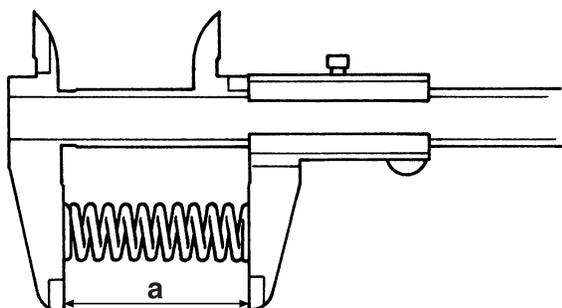
## CHECKING THE CLUTCH SPRINGS

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**  
52.50 mm (2.07 in)  
**Limit**  
49.88 mm (1.96 in)



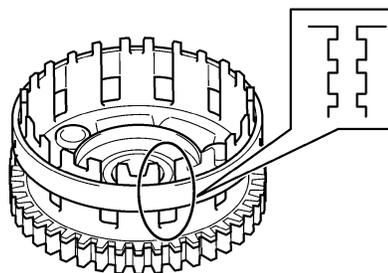
EAS25150

## CHECKING THE CLUTCH HOUSING

1. Check:
  - Clutch housing dogs  
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

### TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.



2. Check:
  - Bearing  
Damage/wear → Replace the bearing and clutch housing.

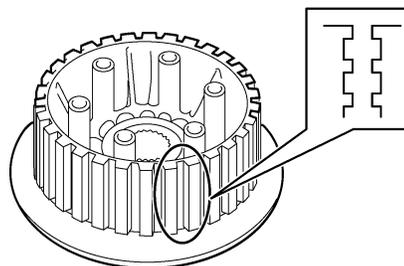
EAS25160

## CHECKING THE CLUTCH BOSS

1. Check:
  - Clutch boss splines  
Damage/pitting/wear → Replace the clutch boss.

### TIP

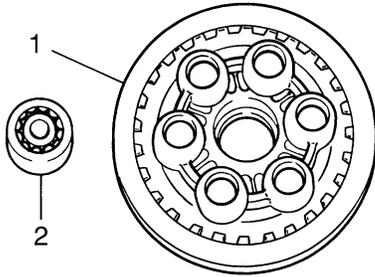
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS25170

## CHECKING THE PRESSURE PLATE

1. Check:
  - Pressure plate "1"  
Cracks/damage → Replace.
  - Bearing "2"  
Damage/wear → Replace.

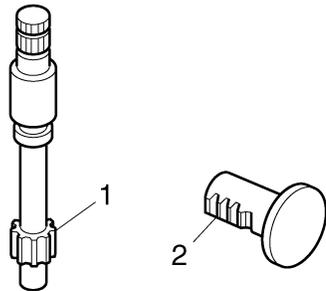


EAS25220

## 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 as a set.



### 2. Check:

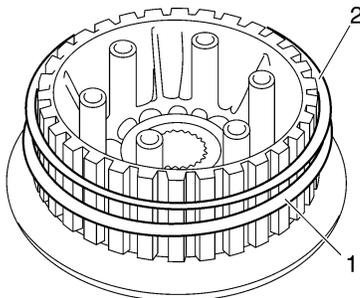
- Pull rod bearing
- Damage/wear → Replace.

EAS25240

## INSTALLING THE CLUTCH

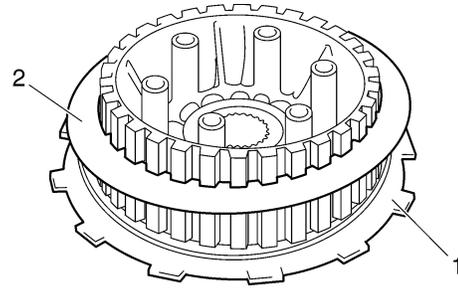
### 1. Install:

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



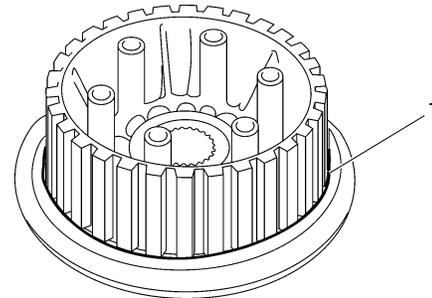
### 2. Install:

- Friction plate 3 "1"
- Clutch plate 2 "2"



### 3. Install:

- Wire circlip "1"

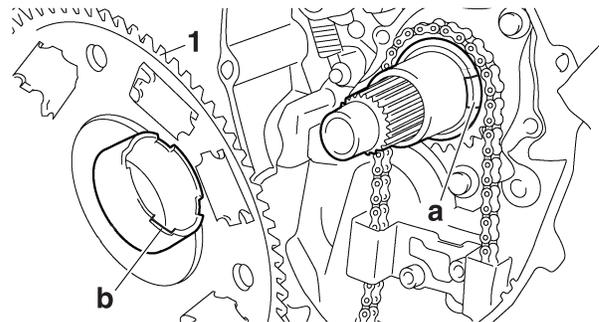


### 4. Install:

- Clutch housing "1"

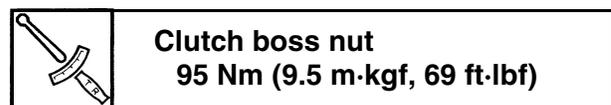
### TIP

Make sure to fit the projections "a" of the oil/water pump assembly drive sprocket to the concave "b" of the clutch housing.



### 5. Install:

- Thrust plate
- Clutch boss assembly "1"
- Washer
- Clutch boss nut "2" **New**



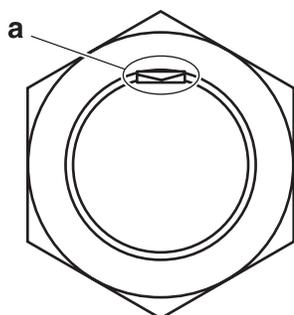
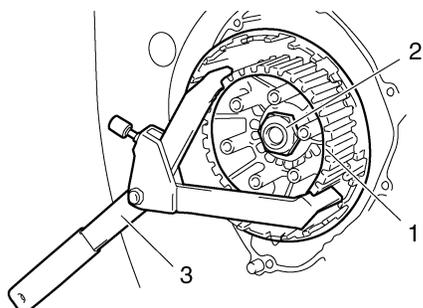
### TIP

- Install the washer on the main axle with the "OUT" mark facing away from the vehicle.

- Stake the clutch boss nut at a cutout “a” in the main axle.
- While holding the clutch boss assembly “1” with the universal clutch holder “3”, tighten the clutch boss nut.



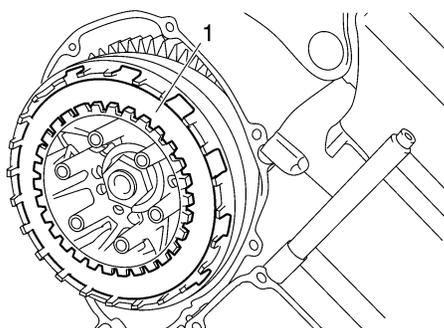
**Universal clutch holder**  
90890-04086  
YM-91042



6. Install:
- Friction plate 2
  - Clutch plate 1 “1”

**TIP**

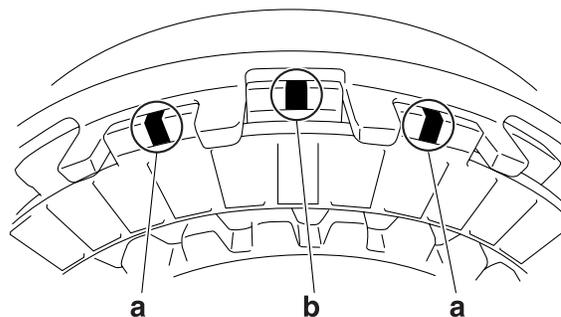
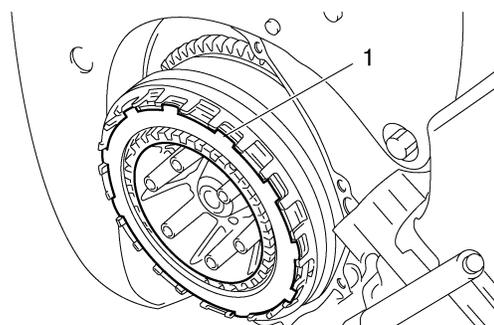
Assemble friction plate 2 to the clutch boss assembly so that the red paint marks on friction plate 2 and friction plate 3 are aligned.



7. Install:
- Friction plate 1 “1”

**TIP**

- Install the last friction plate shifting half phase.
- Assemble friction plate 1 to the clutch boss assembly so that red paint marks “a” on friction plate 1 is aligned with red paint mark “b” of friction plates 2 and 3 as shown in the illustration.



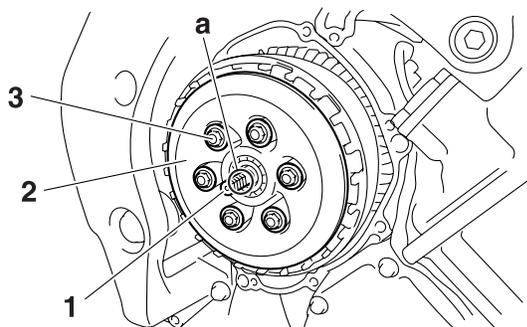
8. Install:
- Bearing
  - Pull rod “1”
  - Pressure plate “2”
  - Clutch springs
  - Clutch spring bolts “3”



**Clutch spring bolt**  
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

**TIP**

- Apply lithium-soap-based grease onto the pull rod.
- Position the pull rod so that the teeth “a” face towards the front of the vehicle. Then, install the clutch cover.
- Tighten the clutch spring bolts in stages and in a crisscross pattern.



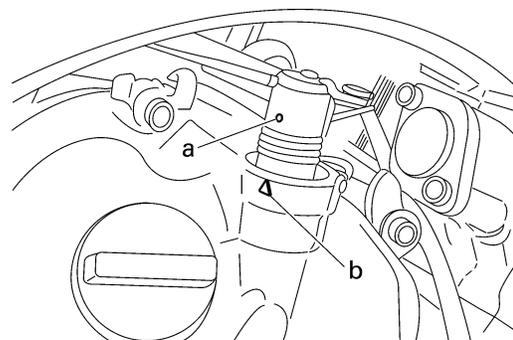
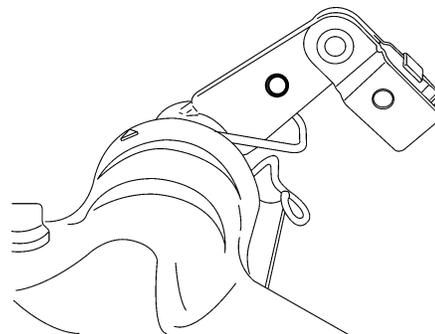
9. Install:

- Dowel pins
- Clutch cover gasket **New**
- Clutch cover "1"

|   |  |
|---|--|
|  | <b>Clutch cover bolt</b><br><b>12 Nm (1.2 m·kgf, 8.7 ft·lbf)</b> |
|---|--|

**TIP**

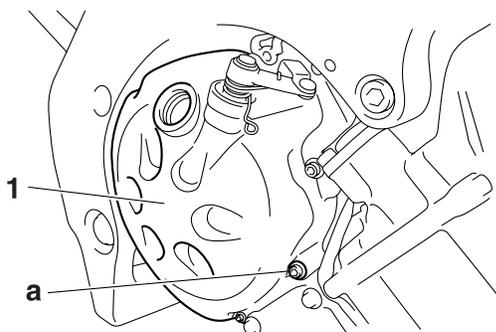
- Apply engine oil onto the bearing.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cover bolt "a" shown in the illustration.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



11. Adjust:

- Clutch cable free play  
Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-12.

|   |   |
|---|---|
|  | <b>Clutch cable free play</b><br><b>10.0–15.0 mm (0.39–0.59 in)</b> |
|---|---|



10. Install:

- Pull lever

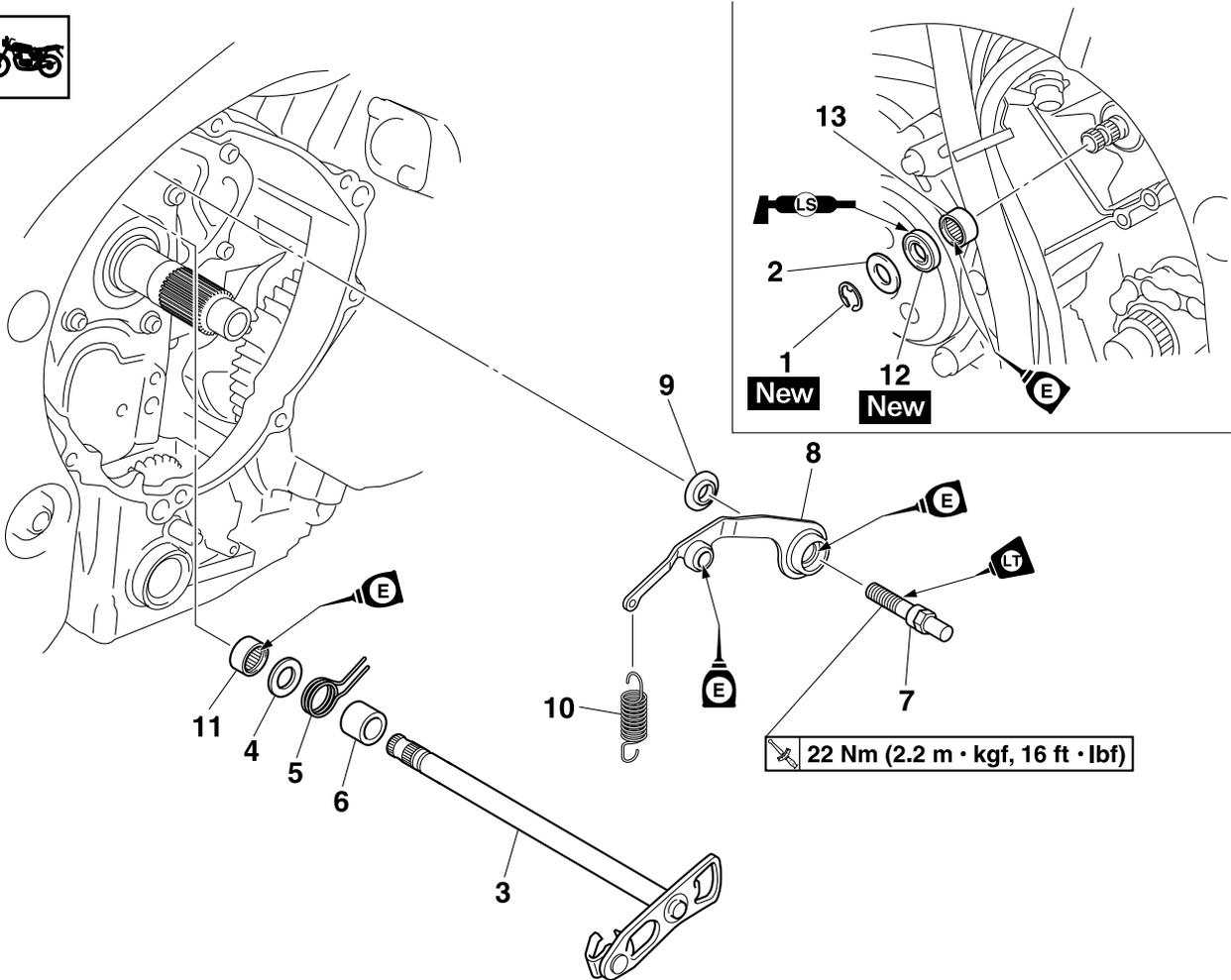
**TIP**

- Install the pull lever with the "O" mark facing towards lower side.
- When installing the pull lever, push the pull lever and check that the punch mark "a" on the pull lever aligns with the mark "b" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.

EAS25410

## SHIFT SHAFT

### Removing the shift shaft and stopper lever

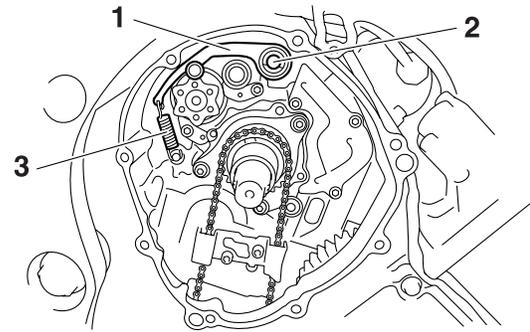
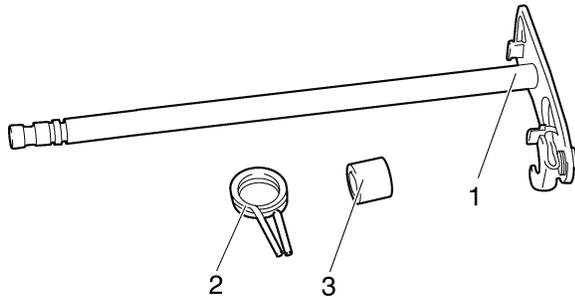


| Order | Job/Parts to remove        | Q'ty | Remarks  |
|-------|----------------------------|------|--|
|       | Clutch assembly            |      | Refer to "CLUTCH" on page 5-45.                  |
|       | Shift arm and shift rod    |      | Refer to "ENGINE REMOVAL" on page 5-3.           |
| 1     | Circlip                    | 1    |  |
| 2     | Washer                     | 1    |  |
| 3     | Shift shaft                | 1    |  |
| 4     | Washer                     | 1    |  |
| 5     | Shift shaft spring         | 1    |  |
| 6     | Collar                     | 1    |  |
| 7     | Shift shaft spring stopper | 1    |  |
| 8     | Stopper lever              | 1    |  |
| 9     | Washer                     | 1    |  |
| 10    | Stopper lever spring       | 1    |  |
| 11    | Bearing                    | 1    |  |
| 12    | Oil seal                   | 1    |  |
| 13    | Bearing                    | 1    |  |
|       |                            |      | For installation, reverse the removal procedure. |

EAS25420

## CHECKING THE SHIFT SHAFT

- Check:
  - Shift shaft "1"  
Bends/damage/wear → Replace.
  - Shift shaft spring "2"
  - Collar "3"  
Damage/wear → Replace.



- Install:
  - Bearing
  - Washer
  - Collar
  - Shift shaft spring "1"
  - Shift shaft "2"

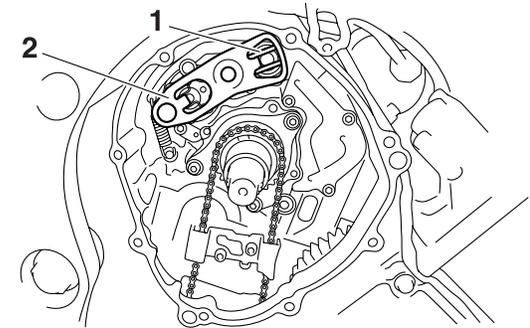
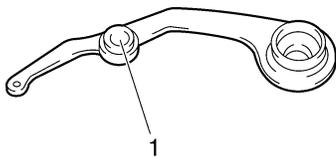
### TIP

Hook the end of the shift shaft spring onto the shift shaft spring stopper.

EAS25430

## CHECKING THE STOPPER LEVER

- Check:
  - Stopper lever "1"  
Bends/damage → Replace.  
Roller turns roughly → Replace the stopper lever.



- Install:
  - Bearing
  - Oil seal
  - Washer "1"
  - Circlip "2" **New**

### TIP

Lubricate the oil seal lips with lithium-soap-based grease.

EAS25451

## INSTALLING THE SHIFT SHAFT

- Install:
  - Washer
  - Stopper lever "1"
  - Shift shaft spring stopper "2"
  - Stopper lever spring "3"

### TIP

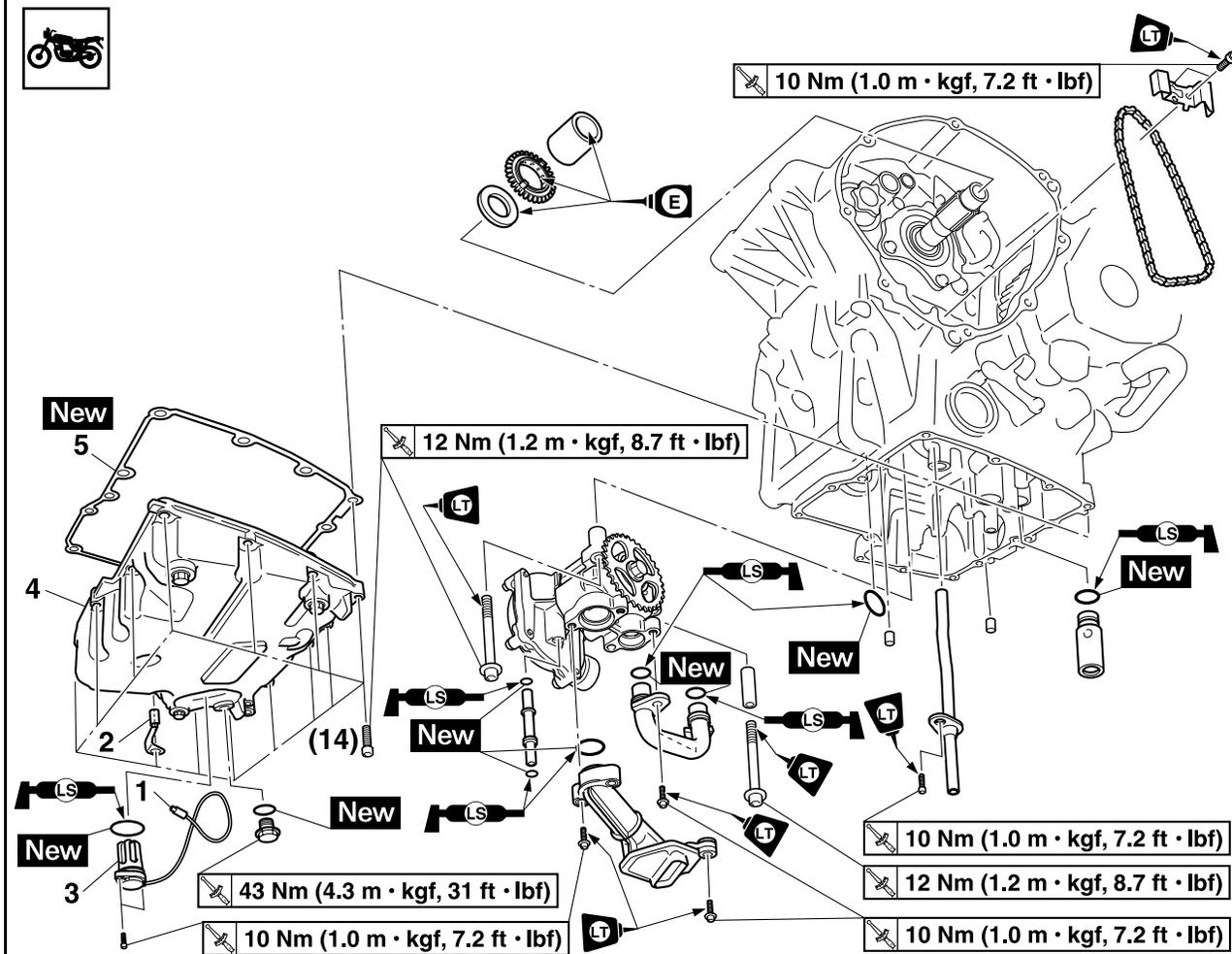
- Hook the ends of the stopper lever spring onto the stopper lever and the spring hook.
- Mesh the stopper lever with the shift drum segment assembly.



EAS24921

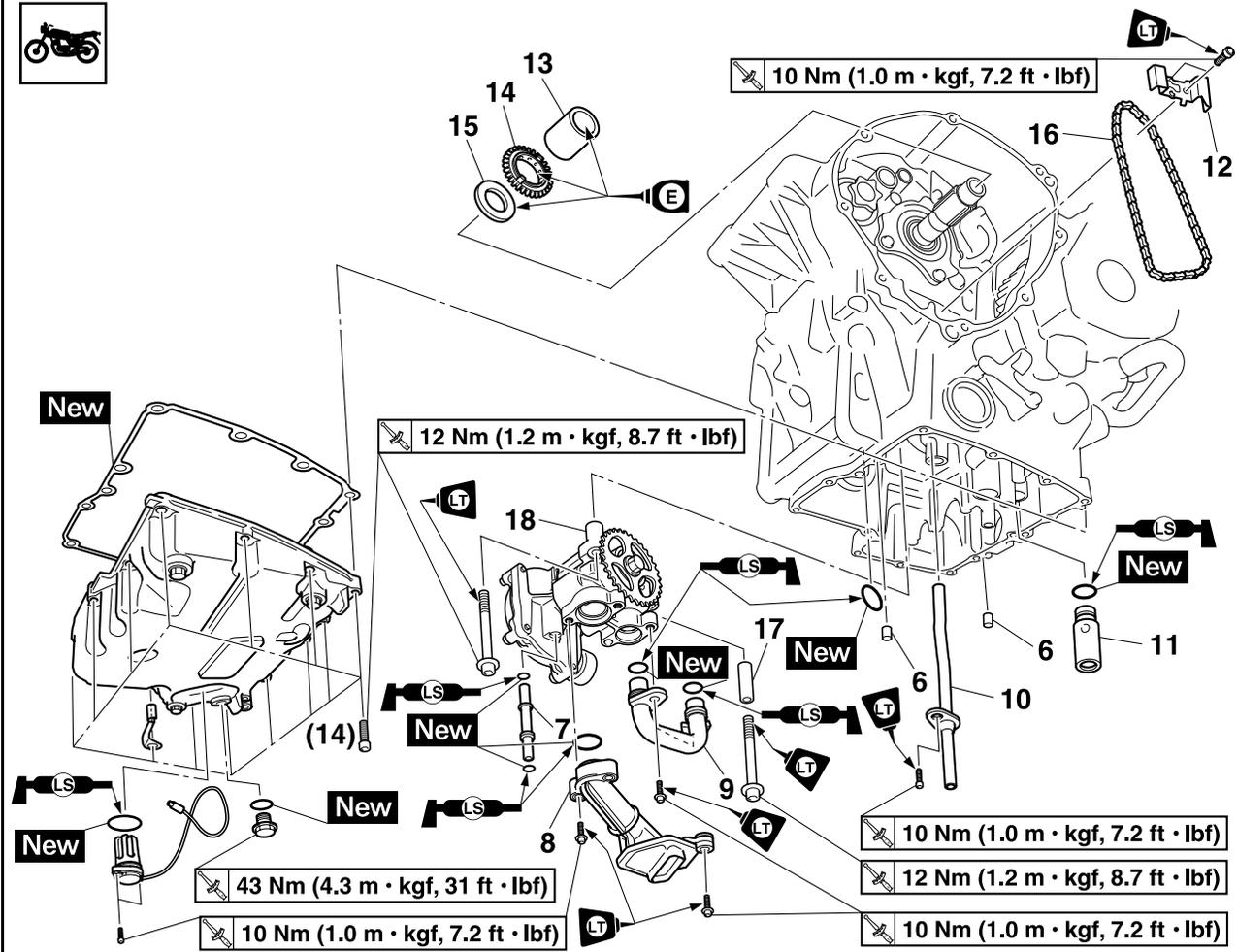
## OIL PUMP

### Removing the oil pan and oil pump



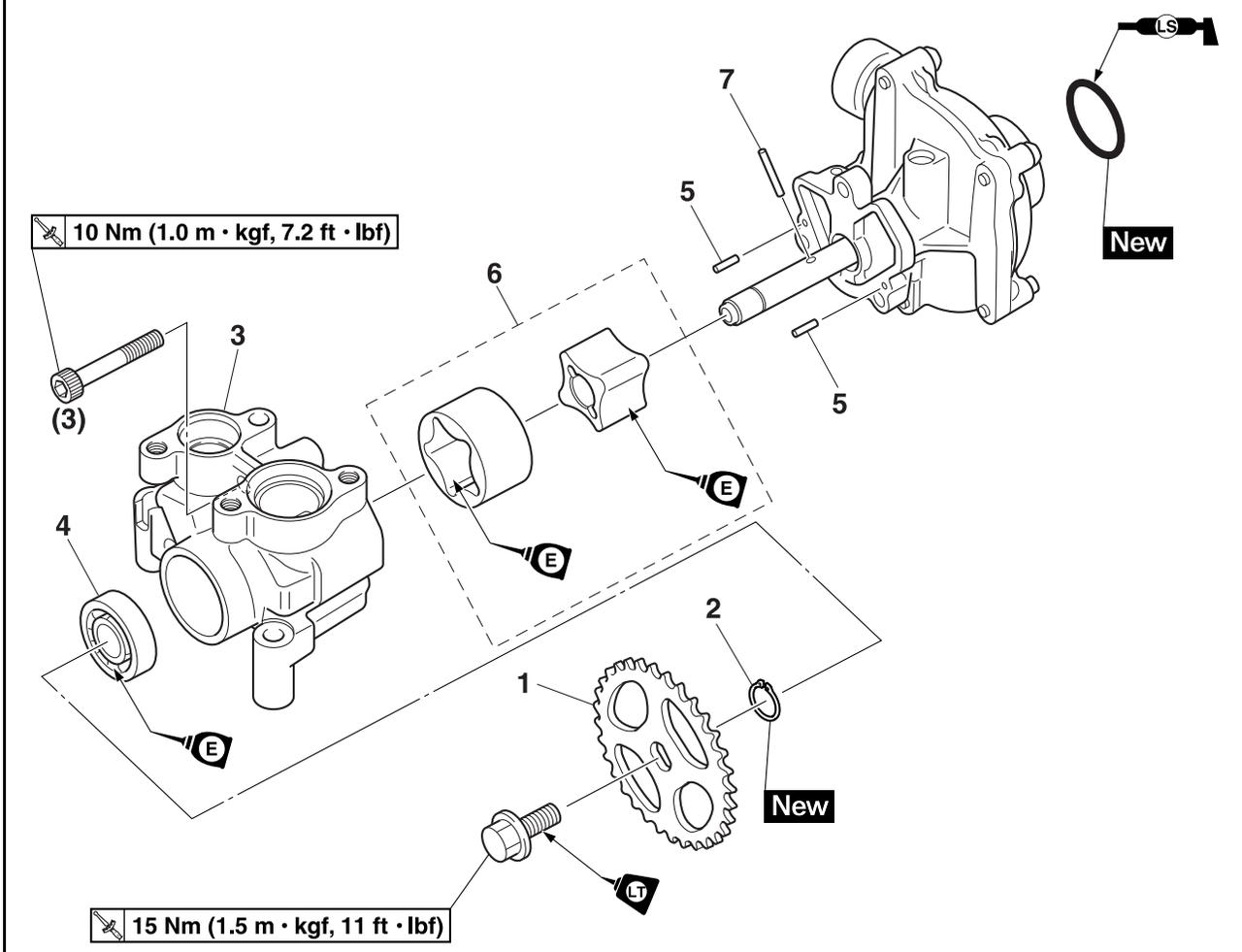
| Order | Job/Parts to remove           | Q'ty | Remarks  |
|-------|-------------------------------|------|--|
|       | Fuel tank                     |      | Refer to "FUEL TANK" on page 7-1.                          |
|       | Drive sprocket cover          |      | Refer to "ENGINE REMOVAL" on page 5-3.                     |
|       | Engine oil                    |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
|       | O <sub>2</sub> sensor         |      | Refer to "ENGINE REMOVAL" on page 5-3.                     |
|       | Muffler                       |      | Refer to "ENGINE REMOVAL" on page 5-3.                     |
|       | Exhaust pipe assembly         |      | Refer to "ENGINE REMOVAL" on page 5-3.                     |
|       | Clutch assembly               |      | Refer to "CLUTCH" on page 5-45.                            |
|       | Water pump inlet pipe         |      | Refer to "RADIATOR" on page 6-1.                           |
|       | Water pump outlet pipe        |      | Refer to "OIL COOLER" on page 6-5.                         |
| 1     | Oil level switch lead coupler | 1    | Disconnect.  |
| 2     | Oil level switch lead holder  | 1    |  |
| 3     | Oil level switch              | 1    |  |
| 4     | Oil pan                       | 1    |  |
| 5     | Oil pan gasket                | 1    |  |

## Removing the oil pan and oil pump



| Order | Job/Parts to remove                       | Q'ty | Remarks  |
|-------|---|------|--|
| 6     | Dowel pin                                 | 2    |  |
| 7     | Drain pipe                                | 1    |  |
| 8     | Oil strainer                              | 1    |  |
| 9     | Oil pipe                                  | 1    |  |
| 10    | Oil delivery pipe                         | 1    |  |
| 11    | Relief valve assembly                     | 1    |  |
| 12    | Oil/water pump assembly drive chain guide | 1    |  |
| 13    | Collar                                    | 1    |  |
| 14    | Oil/water pump assembly drive sprocket    | 1    |  |
| 15    | Washer                                    | 1    |  |
| 16    | Oil/water pump assembly drive chain       | 1    |  |
| 17    | Dowel pin                                 | 1    |  |
| 18    | Oil/water pump assembly                   | 1    |  |
|       |   |      | For installation, reverse the removal procedure. |

## Disassembling the oil pump



| Order | Job/Parts to remove            | Q'ty | Remarks  |
|-------|--------------------------------|------|--|
| 1     | Oil/water pump driven sprocket | 1    |  |
| 2     | Circlip                        | 1    |  |
| 3     | Oil pump housing               | 1    |  |
| 4     | Bearing                        | 1    |  |
| 5     | Pin                            | 2    |  |
| 6     | Oil pump rotor assembly        | 1    |  |
| 7     | Pin                            | 1    |  |
|       |                                |      | For assembly, reverse the disassembly procedure. |

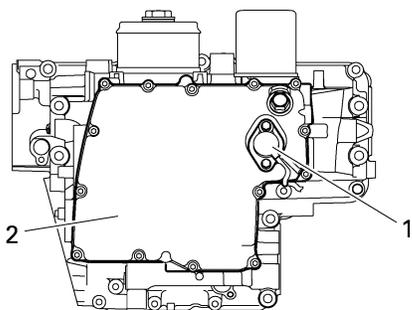
EAS24930

## REMOVING THE OIL PAN

- Remove:
  - Oil level switch "1"
  - Oil pan "2"
  - Oil pan gasket
  - Dowel pins

### TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

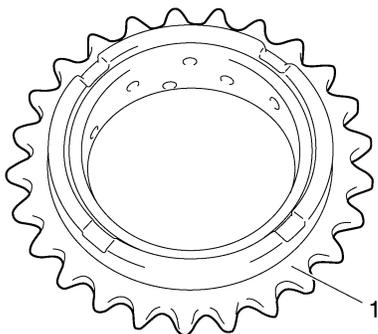


EAS25620

## CHECKING THE SPROCKET AND CHAIN

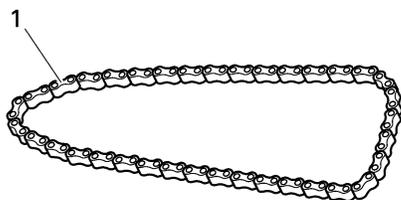
- Check:
  - Oil/water pump assembly drive sprocket "1"

Cracks/damage/wear → Replace.



- Check:
  - Oil/water pump assembly drive chain "1"

Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.

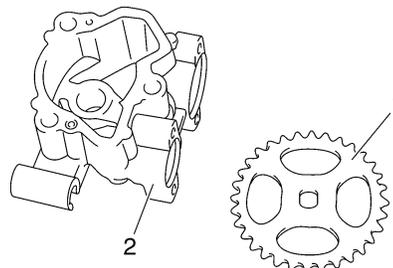


EAS24960

## CHECKING THE OIL PUMP

- Check:
  - Oil pump driven gear "1"
  - Oil pump housing "2"

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"
  - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance "c"

Out of specification → Replace the defective part(s).



### Inner-rotor-to-outer-rotor-tip clearance

Less than 0.12 mm (0.0047 in)  
Limit

0.20 mm (0.0079 in)

### Outer-rotor-to-oil-pump-housing clearance

0.09–0.19 mm (0.0035–0.0075 in)

Limit

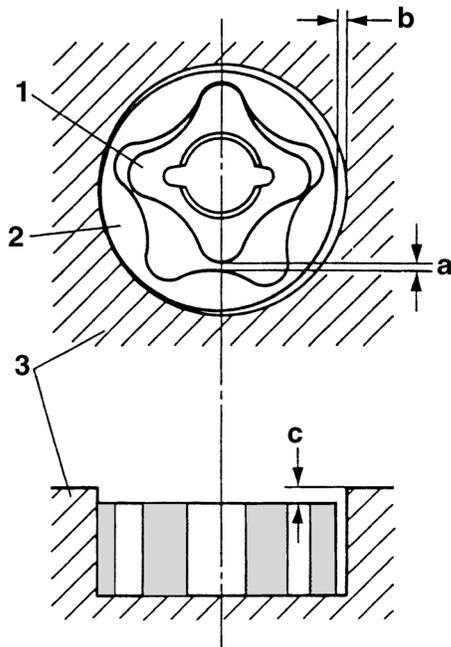
0.26 mm (0.0102 in)

### Oil-pump-housing-to-inner-and-outer-rotor clearance

0.06–0.13 mm (0.0024–0.0051 in)

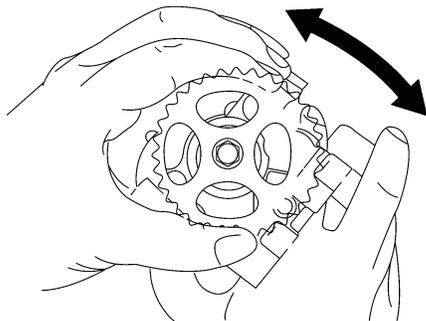
Limit

0.20 mm (0.0079 in)



1. Inner rotor
2. Outer rotor
3. Oil pump housing

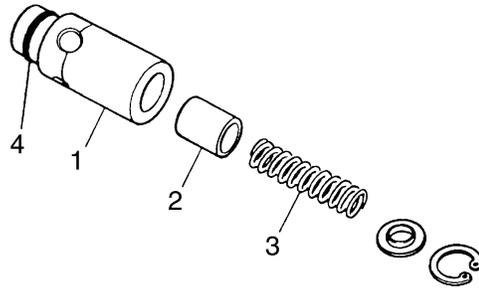
3. Check:
  - Oil pump operation
 Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS24971

## CHECKING THE RELIEF VALVE

1. Check:
  - Relief valve body "1"
  - Relief valve "2"
  - Spring "3"
  - O-ring "4"
 Damage/wear → Replace the relief valve assembly.

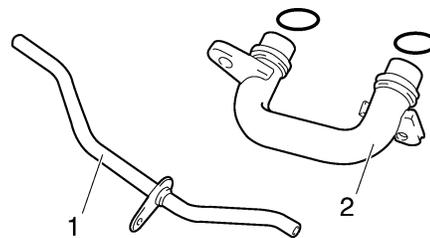


EAS24980

## CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

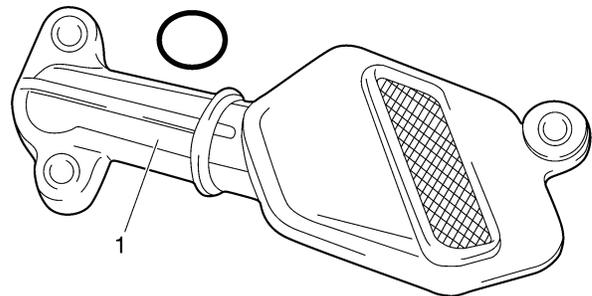
1. Check:
  - Oil delivery pipe "1"
  - Oil pipe "2"
 Damage → Replace.  
 Obstruction → Wash and blow out with compressed air.



EAS24990

## CHECKING THE OIL STRAINER

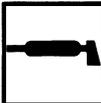
1. Check:
  - Oil strainer "1"
 Damage → Replace.  
 Contaminants → Clean with solvent.



EAS25010

## ASSEMBLING THE OIL PUMP

1. Lubricate:
  - Inner rotor
  - Outer rotor
  - Oil pump shaft
 (with the recommended lubricant)



**Recommended lubricant**  
**Engine oil**

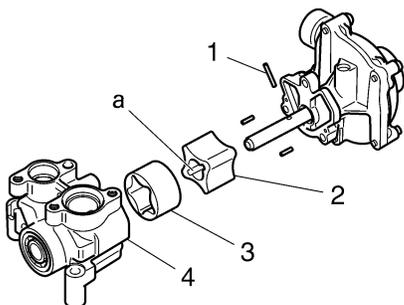
2. Install:
  - Pin "1"
  - Inner rotor "2"
  - Outer rotor "3"
  - Oil pump housing "4"
  - Oil pump housing bolt



**Oil pump housing bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

**TIP**

When installing the inner rotor, align the pin "1" in the oil pump shaft with the groove "a" in the inner rotor "2".



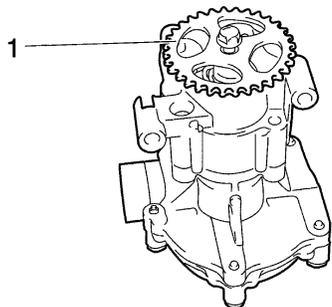
3. Install:
  - Oil/water pump driven sprocket "1"



**Oil/water pump driven sprocket bolt**  
**15 Nm (1.5 m·kgf, 11 ft·lbf)**  
**LOCTITE®**

**TIP**

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 5-60.

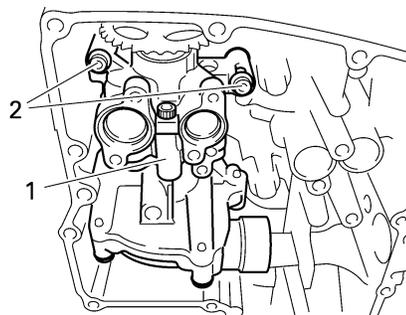
EAS25030

**INSTALLING THE OIL/WATER PUMP**

1. Install:
  - O-ring **New**
  - Oil/water pump assembly "1"
  - Dowel pin
  - Bolts "2"



**Oil/water pump assembly bolt**  
**12 Nm (1.2 m·kgf, 8.7 ft·lbf)**  
**LOCTITE®**



2. Install:
  - Washer
  - Oil/water pump assembly drive chain "1"
  - Oil/water pump assembly drive sprocket "2"
  - Collar

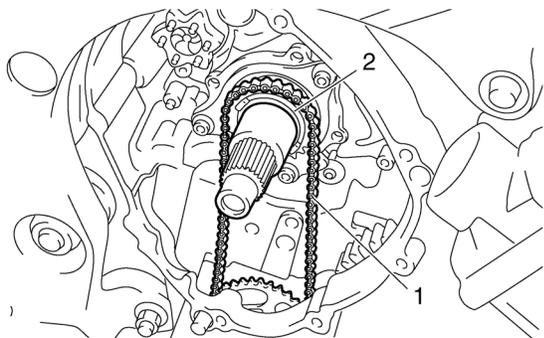
ECA5D01016

**NOTICE**

**After installing the oil/water pump assembly drive chain and drive sprocket, make sure the oil/water pump turns smoothly.**

**TIP**

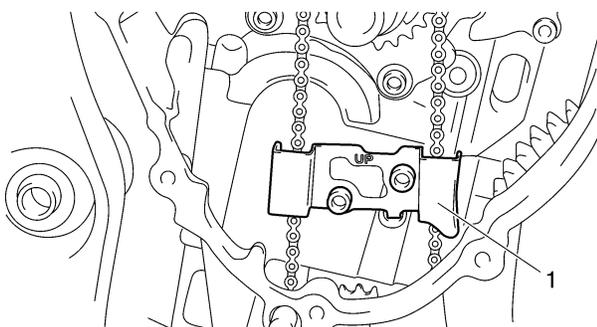
Install the oil/water pump assembly drive chain "1" onto the oil/water pump assembly drive sprocket "2".



3. Install:
- Oil/water pump assembly drive chain guide "1"

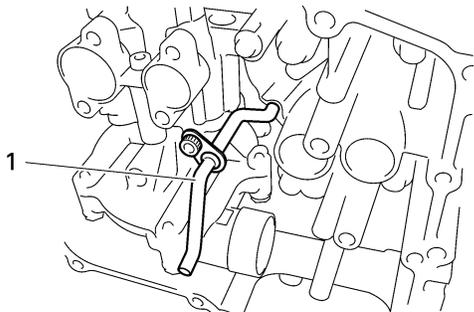
|   |  |
|---|--|
|  | <b>Oil/water pump assembly drive chain guide bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|--|

**TIP**  
 "UP" mark of the oil/water pump assembly drive chain guide is upward.



4. Install:
- Oil delivery pipe "1"

|   |  |
|---|--|
|  | <b>Oil delivery pipe bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|--|



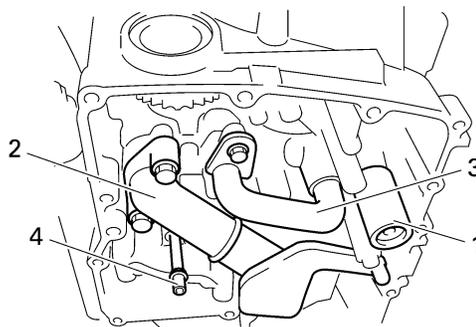
5. Install:
- Relief valve assembly "1"
  - O-ring **New**
  - Oil strainer "2"
  - O-ring **New**

|   |   |
|---|---|
|  | <b>Oil strainer bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|---|

- Oil pipe "3"
- O-rings **New**

|   |   |
|---|---|
|  | <b>Oil pipe bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b><br><b>LOCTITE®</b> |
|---|---|

- Drain pipe "4"
- O-rings **New**



EAS25050  
**INSTALLING THE OIL PAN**

1. Install:
- Dowel pins
  - Gasket **New**
  - Oil pan "1"

|   |   |
|---|---|
|  | <b>Oil pan bolt</b><br><b>12 Nm (1.2 m·kgf, 8.7 ft·lbf)</b> |
|---|---|

- Oil level switch "2"

|   |  |
|---|--|
|  | <b>Oil level switch bolt</b><br><b>10 Nm (1.0 m·kgf, 7.2 ft·lbf)</b> |
|---|--|

- Engine oil drain bolt "3"

|   |   |
|---|---|
|  | <b>Engine oil drain bolt</b><br><b>43 Nm (4.3 m·kgf, 31 ft·lbf)</b> |
|---|---|

EWA12820

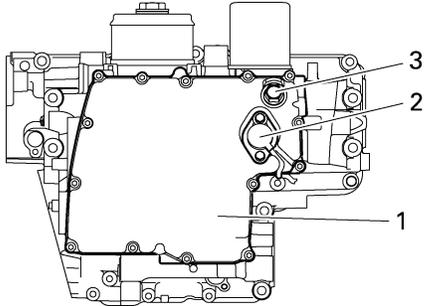
**⚠ WARNING**

**Always use new copper washers.**

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**TIP**

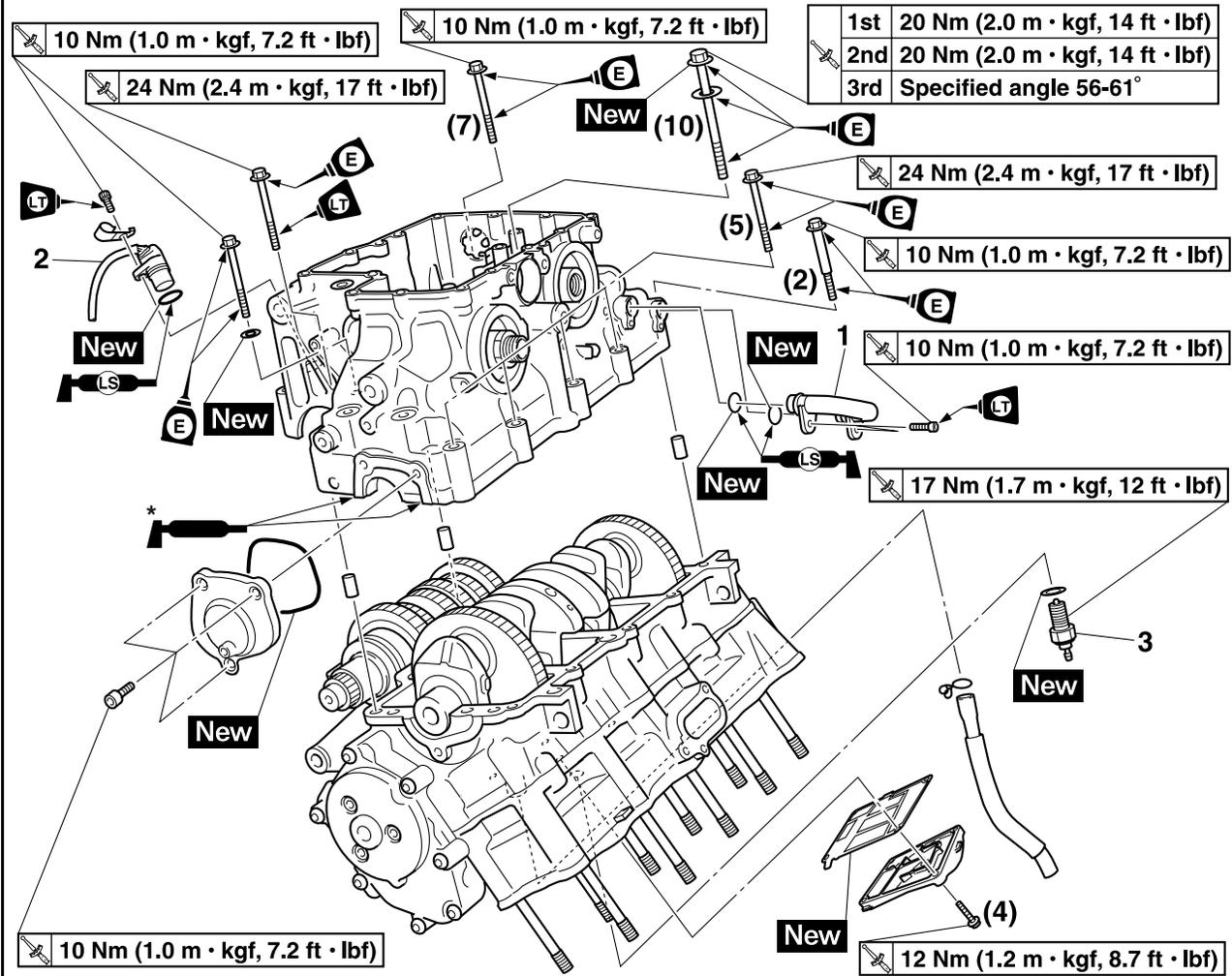
- Tighten the oil pan bolts in stages and in a crisscross pattern.
  - Lubricate the oil level switch O-ring with lithium-soap-based grease.
- 



EAS25540

## CRANKCASE

### Separating the crankcase

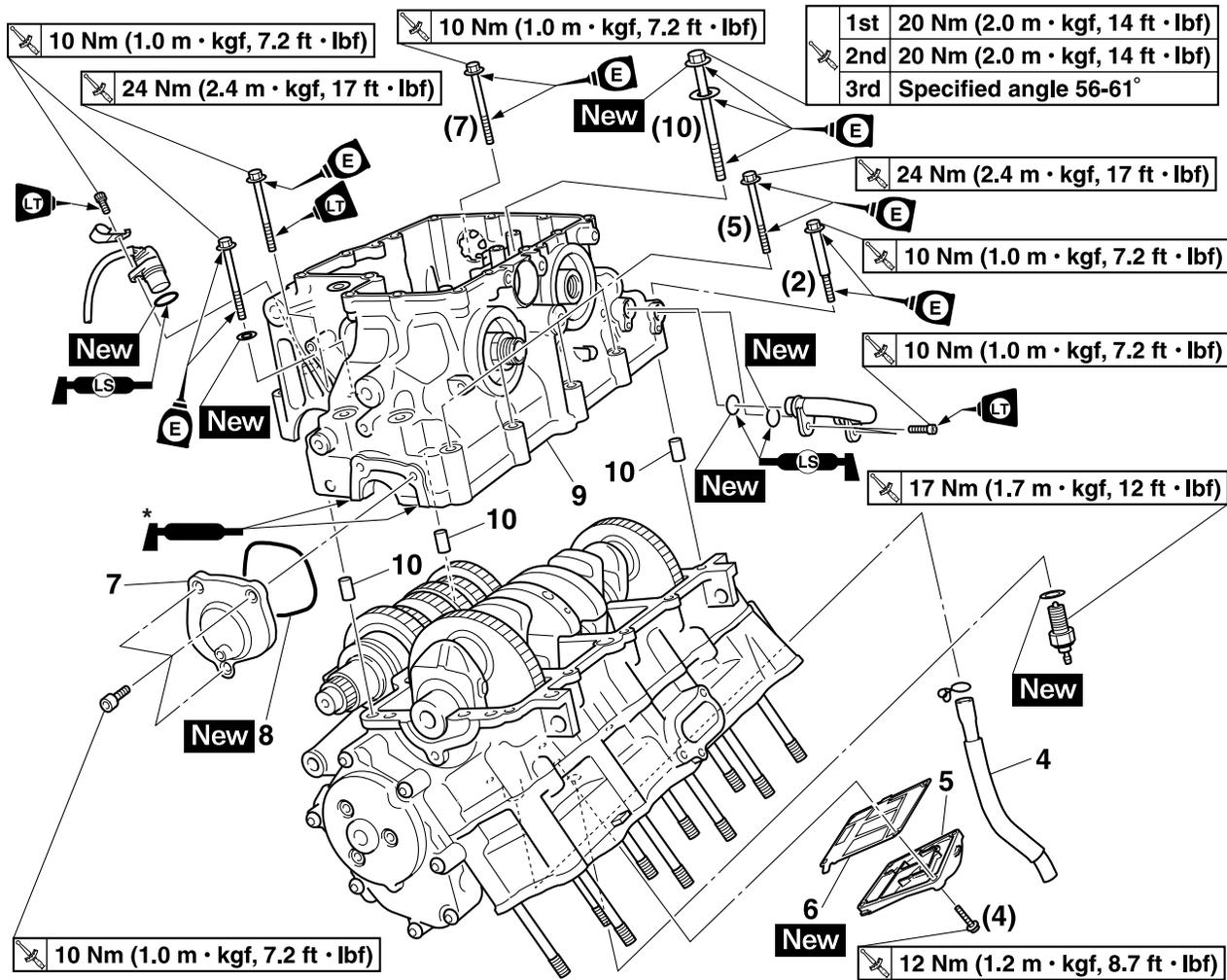


| Order | Job/Parts to remove        | Q'ty | Remarks   |
|-------|----------------------------|------|---|
|       | Engine                     |      | Refer to "ENGINE REMOVAL" on page 5-3.              |
|       | Cylinder head              |      | Refer to "CYLINDER HEAD" on page 5-20.              |
|       | Shift shaft assembly       |      | Refer to "SHIFT SHAFT" on page 5-55.                |
|       | Crankshaft position sensor |      | Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39. |
|       | Oil/water pump assembly    |      | Refer to "OIL PUMP" on page 5-57.                   |
|       | Starter motor              |      | Refer to "ELECTRIC STARTER" on page 5-41.           |
| 1     | Oil return pipe            | 1    |   |
| 2     | Speed sensor               | 1    |   |
| 3     | Neutral switch             | 1    |   |

\* Yamaha bond No.1215 (Three bond No.1215®)

# CRANKCASE

## Separating the crankcase



| Order | Job/Parts to remove              | Q'ty | Remarks  |
|-------|----------------------------------|------|--|
| 4     | Crankcase breather hose          | 1    |  |
| 5     | Ventilation chamber cover        | 1    |  |
| 6     | Ventilation chamber cover gasket | 1    |  |
| 7     | Left side cover                  | 1    |  |
| 8     | O-ring                           | 1    |  |
| 9     | Lower crankcase                  | 1    |  |
| 10    | Dowel pin                        | 3    |  |
|       |                                  |      | For installation, reverse the removal procedure. |

\* Yamaha bond No.1215 (Three bond No.1215®)

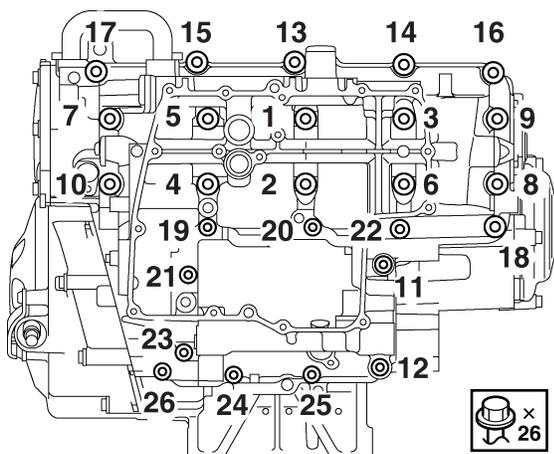
EAS25550

## DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
  - Crankcase bolts

### TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.



3. Remove:
  - Lower crankcase

ECA13900

### NOTICE

**Tap on one side of the crankcase with a 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)

### TIP

Identify the position of each part very carefully 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.

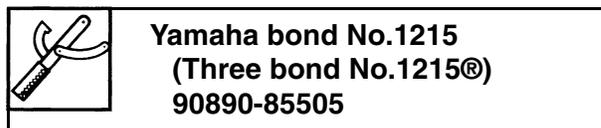
EAS25650

## ASSEMBLING THE CRANKCASE

1. Lubricate:
  - Crankshaft journal bearing inner surface (with the recommended lubricant)

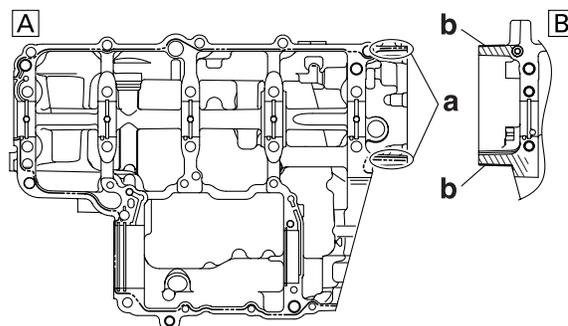


2. Apply:
  - Sealant (onto the crankcase mating surfaces)



### TIP

- 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.
- For area “a”, apply Yamaha bond No.1215 (Three Bond No.1215®) twice. For shaded area “b”, degrease the area and then apply Three Bond No.1280B.



- A. Lower crankcase
- B. Upper crankcase

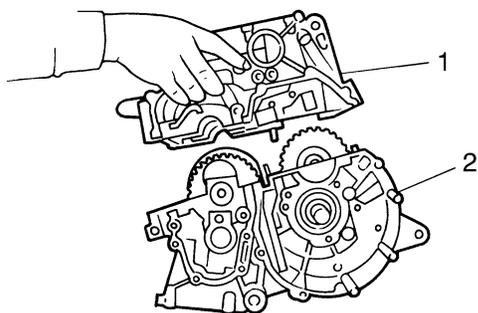
3. Install:
  - Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.

5. Install:
- Lower crankcase "1"  
(onto the upper crankcase "2")

ECA13980

**NOTICE**

**Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.**

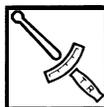


6. Install:
- Crankcase bolts

**TIP**

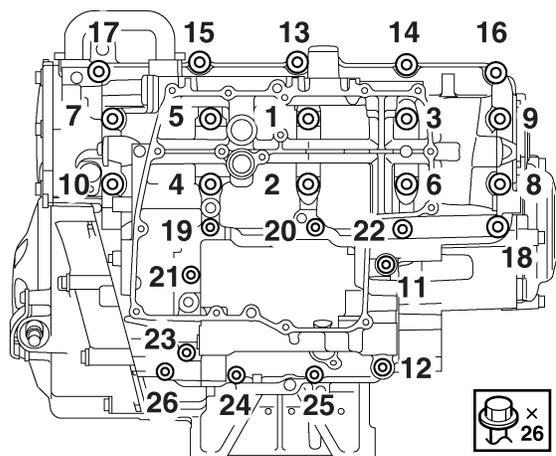
- Lubricate the bolts "1"–"10" thread, mating surfaces and washers with engine oil.
- Lubricate the bolts "11"–"26" thread and mating surfaces with engine oil (except "11").
- Apply LOCTITE® to the screw of the bolt "11" and engine oil to the bearing surface.
- Tighten the bolts in the tightening sequence cast on the crankcase.

- M9 × 105 mm (4.1 in) bolts with washers:  
"1"–"10" **New**
- M8 × 60 mm (2.4 in) bolt: "11"
- M8 × 60 mm (2.4 in) bolts: "12", "16"
- M8 × 50 mm (2.0 in) bolts: "13"–"15"
- M6 × 70 mm (2.8 in) bolts: "19", "21", "23"
- M6 × 65 mm (2.5 in) shoulder bolts: "17", "18"
- M6 × 60 mm (2.4 in) bolt and copper washer: "22"
- M6 × 60 mm (2.4 in) bolts: "24", "25"
- M6 × 50 mm (2.0 in) bolts: "20", "26"



**Crankcase bolt "1"–"10"**  
**1st: 20 Nm (2.0 m·kgf, 14 ft·lbf)**  
**2nd\*: 20 Nm (2.0 m·kgf, 14 ft·lbf)**  
**3rd: 56–61°**  
**Crankcase bolt "11"–"16"**  
**24 Nm (2.4 m·kgf, 17 ft·lbf)**  
**Crankcase bolt "17"–"26"**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

\* Following the tightening order, loosen the bolt one by one and then retighten it to the specified torque.

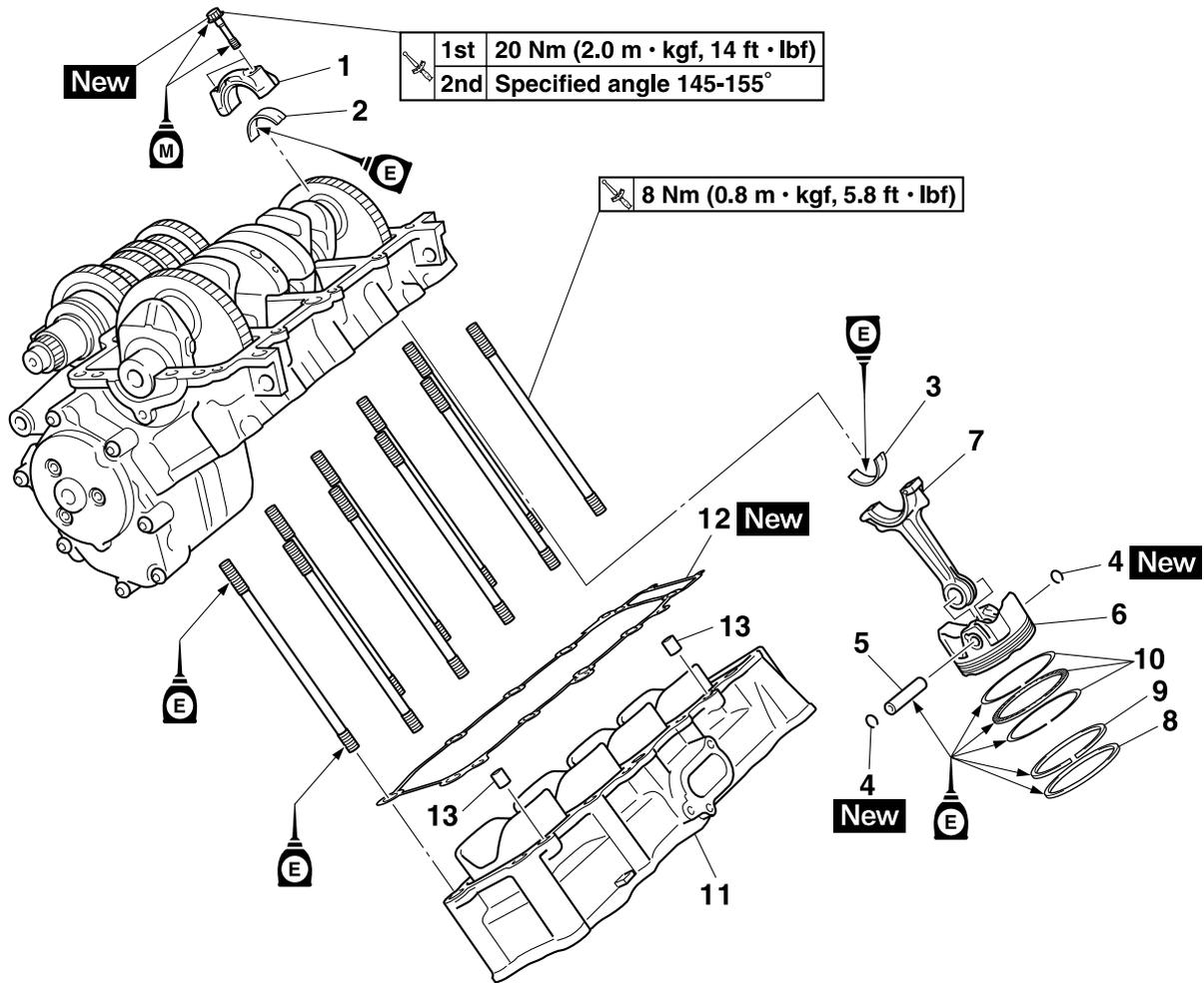


# CONNECTING RODS AND PISTONS

EAS39P1503

## CONNECTING RODS AND PISTONS

### Removing the connecting rods and pistons



| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|-----------------------|------|--|
|       | Lower crankcase       |      | Refer to "CRANKCASE" on page 5-65.               |
| 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    |  |
| 13    | Dowel pin             | 2    |  |
|       |                       |      | For installation, reverse the removal procedure. |

# CONNECTING RODS AND PISTONS

EAS26030

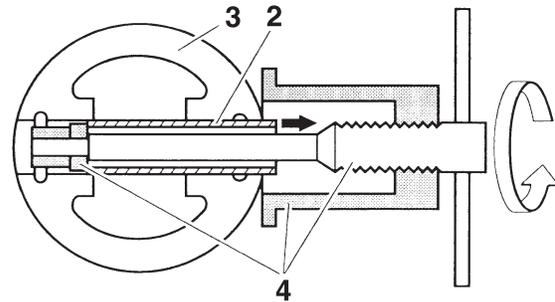
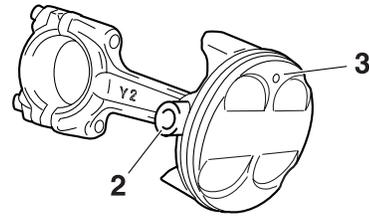
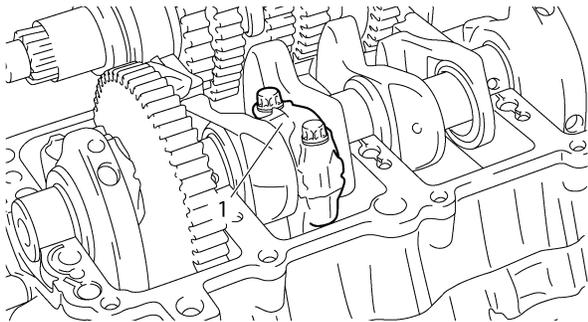
## REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
  - Connecting rod cap "1"
  - Connecting rod
  - Big end bearings

### TIP

- 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.



3. Remove:
  - Top ring
  - 2nd ring
  - Oil ring

### TIP

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

2. Remove:
  - Piston pin clips "1"
  - Piston pin "2"
  - Piston "3"

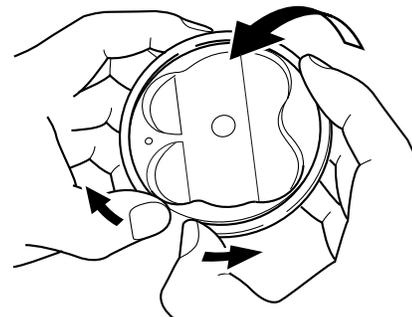
ECA39P1504

### NOTICE

**Do not use a hammer to drive the piston pin out.**

### TIP

- 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".



4. Remove:
  - Cylinder
  - Cylinder gasket
  - Cylinder stud bolts

EAS24390

## CHECKING THE CYLINDER AND PISTON

1. Check:
  - Piston wall
  - Cylinder wallVertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.



**Piston pin puller set**  
**90890-01304**  
**Piston pin puller**  
**YU-01304**



# CONNECTING RODS AND PISTONS



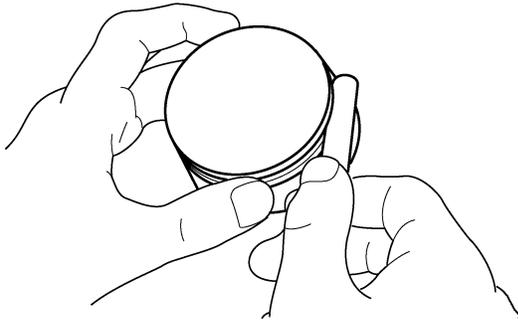
## Piston ring side clearance

**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)



## 2. Install:

- Piston ring (into the cylinder)

### TIP

Level the piston ring into the cylinder with the piston crown.

## 3. Measure:

- Piston ring end gap  
Out of specification → Replace the piston ring.

### TIP

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



## Piston ring end gap

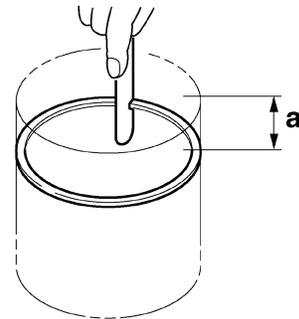
**Top ring**  
0.25–0.35 mm (0.0098–0.0138 in)

**Limit**  
0.60 mm (0.0236 in)

**2nd ring**  
0.35–0.50 mm (0.0138–0.0197 in)

**Limit**  
0.85 mm (0.0335 in)

**Oil ring**  
0.10–0.35 mm (0.0039–0.0138 in)



a. 5 mm (0.20 in)

EAS24440

## CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

### 1. Check:

- Piston pin  
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

### 2. Measure:

- Piston pin outside diameter "a"  
Out of specification → Replace the piston pin.



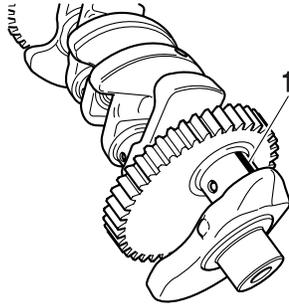
## Piston pin outside diameter

16.990–16.995 mm (0.6689–0.6691 in)

**Limit**  
16.970 mm (0.6681 in)



# CONNECTING RODS AND PISTONS



d. Assemble the connecting rod halves.

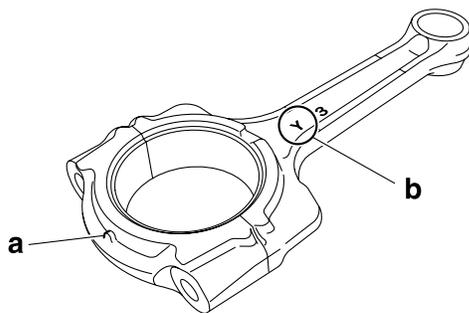
ECA39P1501

## NOTICE

**Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.**

## TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



## TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

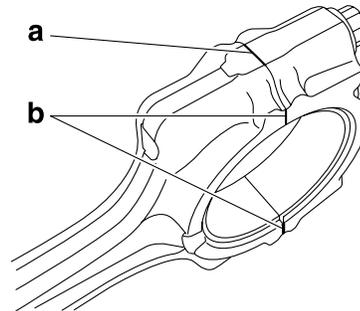
- e. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



**Connecting rod bolt**  
30 Nm (3.0 m·kgf, 22 ft·lbf)

## TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

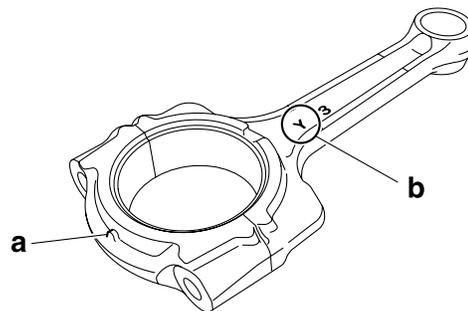


- a. Side machined face  
b. Thrusting faces

- f. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

## TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- Make sure the “Y” marks “b” on the connecting rods face towards the left side of the crankshaft.



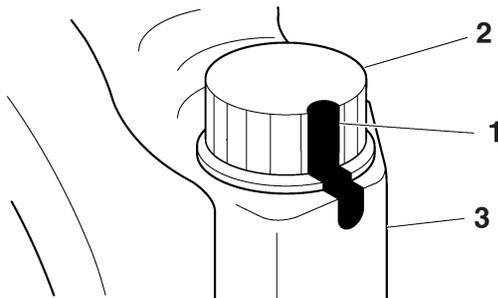
- g. Tighten the connecting rod bolts with a torque wrench.



**Connecting rod bolt (1st)**  
20 Nm (2.0 m·kgf, 14 ft·lbf)

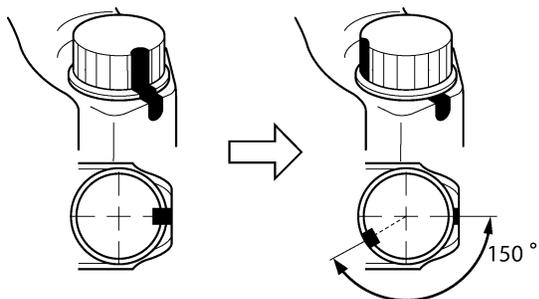
# CONNECTING RODS AND PISTONS

- h. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



- i. Tighten the connecting rod bolts further to reach the specified angle 145–155°.

**Connecting rod bolt (final)**  
Specified angle 145–155°



EWA13400

**WARNING**

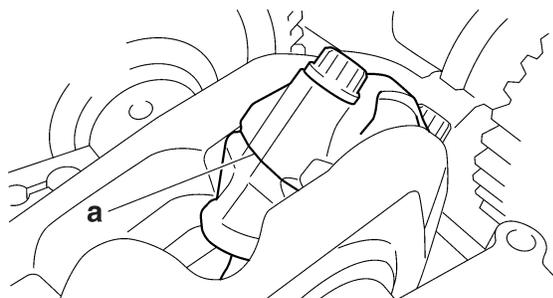
If the connecting rod bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the connecting rod bolt with a new one and perform the procedure again.

ECA13950

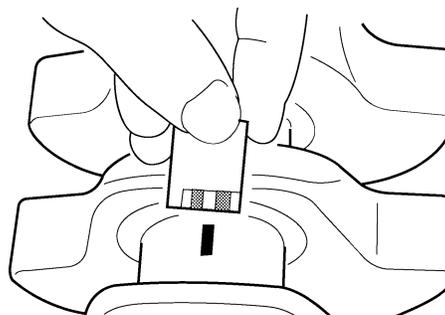
**NOTICE**

Do not use a torque wrench to tighten the connecting rod bolt to the specified angle.

- j. After the installation, check that the section shown "a" is flush with each other by touching the surface.



- k. Remove the connecting rod and big end bearings.
- l. 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.



2. Select:
- Big end bearings (P<sub>1</sub>–P<sub>4</sub>)

**TIP**

- The numbers "A" stamped into the crankshaft web and the numbers "1" on the connecting rods are used to determine the replacement big end bearings sizes.
- "P<sub>1</sub>"–"P<sub>4</sub>" refer to the bearings shown in the crankshaft illustration.

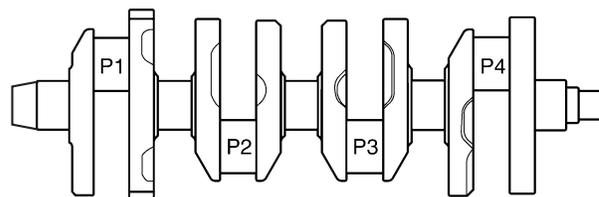
For example, if the connecting rod "P<sub>1</sub>" and the crankshaft web "P<sub>1</sub>" numbers are "5" and "2" respectively, then the bearing size for "P<sub>1</sub>" is:

$$"P_1" \text{ (connecting rod)} - "P_1" \text{ (crankshaft)} = 5 - 2 = 3 \text{ (brown)}$$

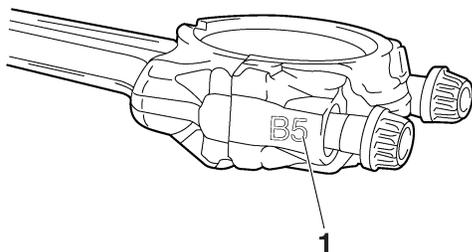
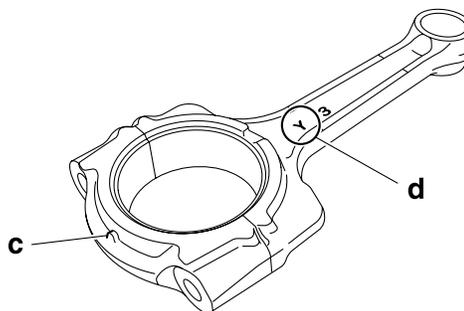
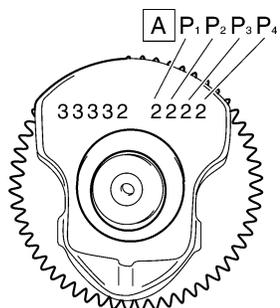


**Bearing color code**

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



# CONNECTING RODS AND PISTONS



EAS26190

## INSTALLING THE CONNECTING ROD AND PISTON

The following procedure applies to all of the connecting rods and pistons.

### 1. Install:

- Big end bearings
- Connecting rod cap (onto the connecting rod)

### TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.

### 2. Tighten:

- Connecting rod bolts **New**

ECA14B1042

### NOTICE

**Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.**

### TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.



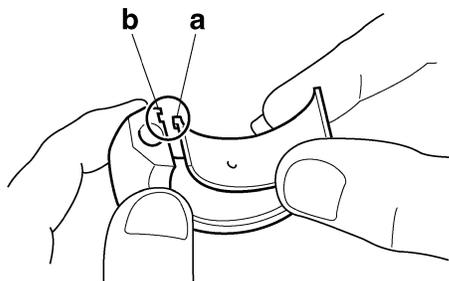
- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
- Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



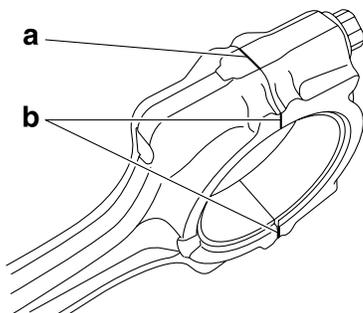
**Connecting rod bolt  
30 Nm (3.0 m·kgf, 22 ft·lbf)**

### TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



# CONNECTING RODS AND PISTONS



- a. Side machined face
- b. Thrusting faces

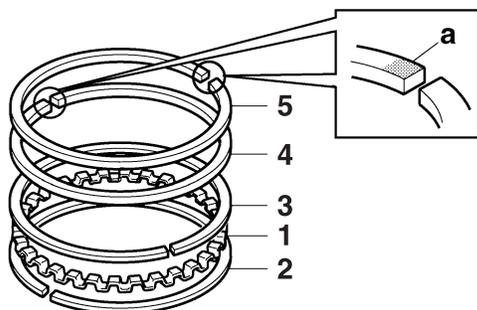
e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.



3. Install:
- Oil ring expander "1"
  - Lower oil ring rail "2"
  - Upper oil ring rail "3"
  - 2nd ring "4"
  - Top ring "5"  
(into the piston)

**TIP**

Be sure to install the piston rings so that the manufacturer's marks or numbers "a" face up.

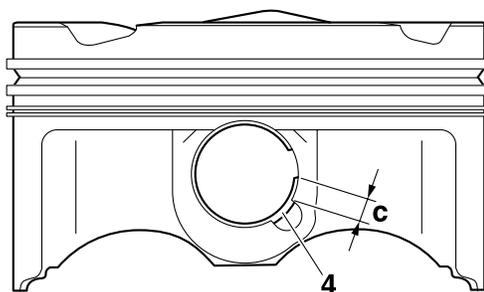
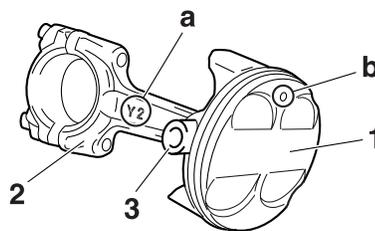


4. Install:
- Piston "1"  
(onto the respective connecting rod "2")
  - Piston pin "3"
  - Piston pin clips "4" **New**

**TIP**

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the punch mark "b" on the piston is pointing up as shown.

- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) "c" or more from the cutout in the piston.
- Reinstall each piston into its original cylinder.



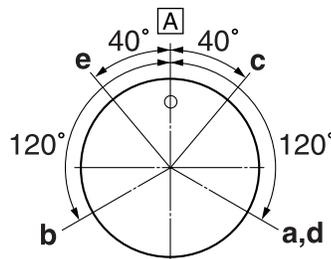
5. Lubricate:

- Piston
- Piston rings
- Cylinder  
(with the recommended lubricant)

|  |   |
|--|---|
|  | <b>Recommended lubricant<br/>Engine oil</b> |
|--|---|

6. Offset:

- Piston ring end gaps



- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail
  
- A. Exhaust side

# CONNECTING RODS AND PISTONS

## 7. Lubricate:

- Crankshaft pins
- Connecting rod big end bearing inner surface  
(with the recommended lubricant)



## 8. Check:

- Cylinder stud bolts

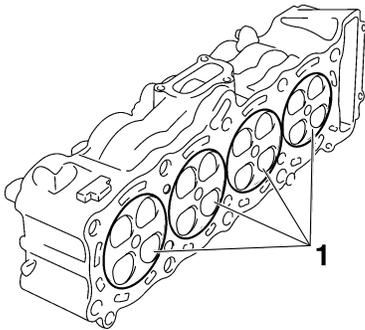


## 9. Install:

- Piston assemblies “1”  
(into the cylinder)

### TIP

While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.

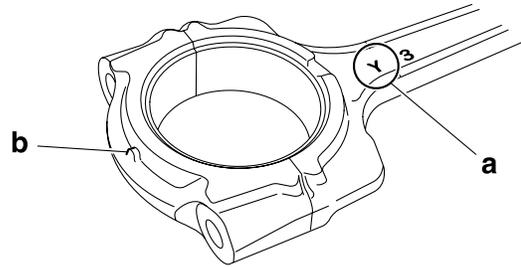


## 10. Install:

- Cylinder gasket **New**
- Dowel pins
- Cylinder assembly
- Connecting rod caps
- Connecting rod bolts

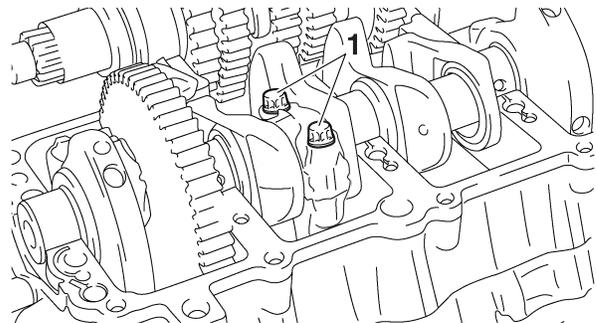
### TIP

- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection “b” on the connecting rod cap faces the same direction as the “Y” mark “a” on the connecting rod.
- Apply Molybdenum disulfide oil to the bolt threads and bearing surface of the connecting rod bolt and connecting rod cap.



## 11. Tighten:

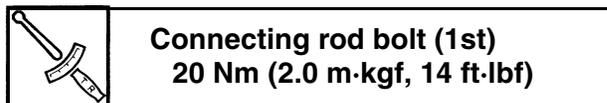
- Connecting rod bolts “1”



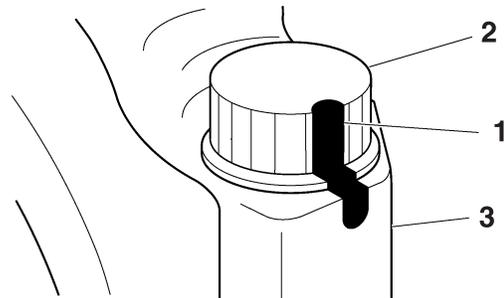
### TIP

Tighten the connecting rod bolts using the following procedure.

- Tighten the connecting rod bolts with a torque wrench.

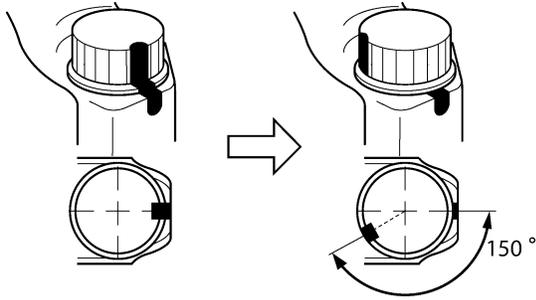


- Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



- Tighten the connecting rod bolts further to reach the specified angle 145–155°.





EWA13400

**WARNING**

If the connecting rod bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the connecting rod bolt with a new one and perform the procedure again.

ECA13950

**NOTICE**

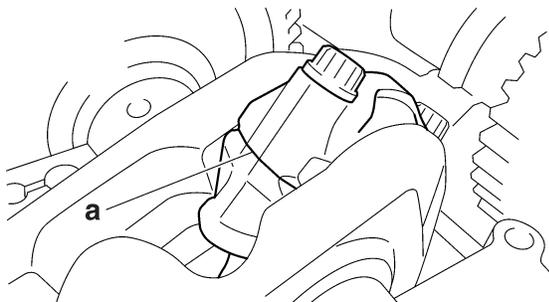
Do not use a torque wrench to tighten the connecting rod bolt to the specified angle.

- d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA39P1503

**WARNING**

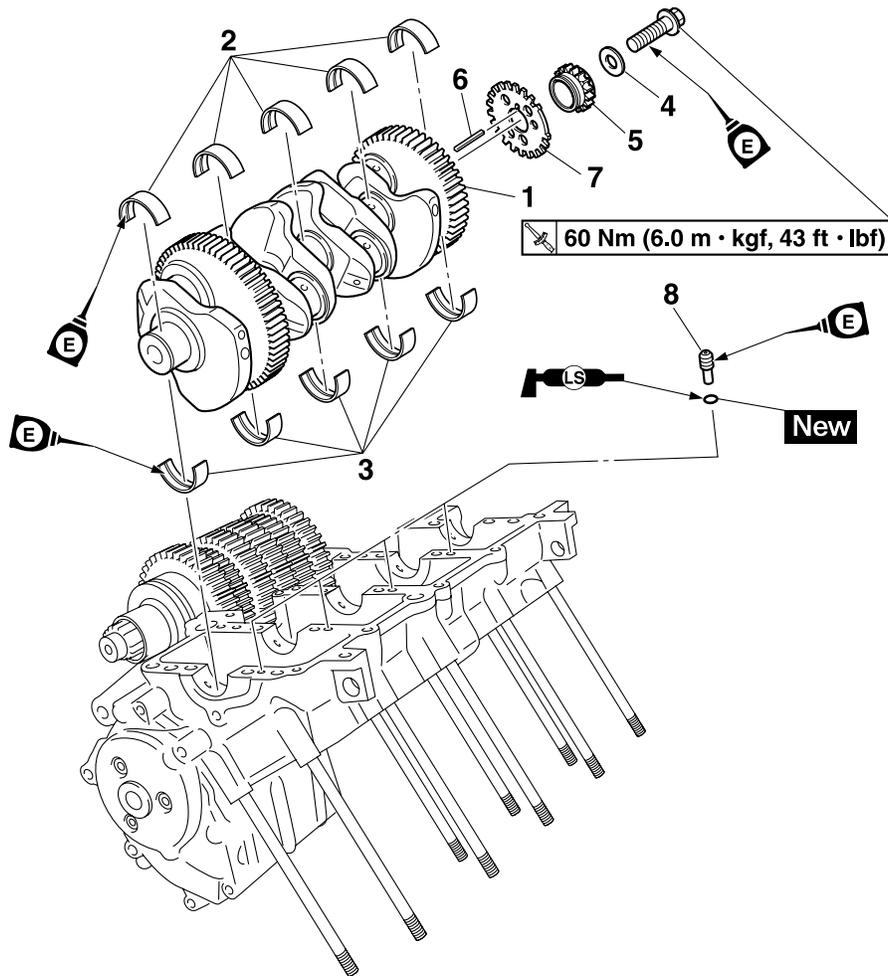
If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.



EAS25950

## CRANKSHAFT

### Removing the crankshaft

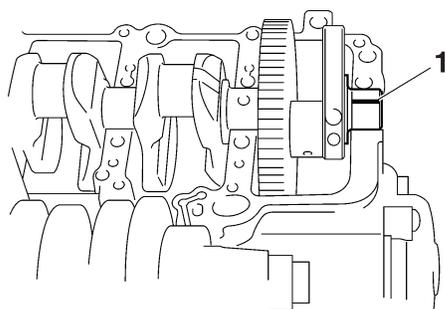


| Order | Job/Parts to remove              | Q'ty | Remarks   |
|-------|----------------------------------|------|---|
|       | Lower crankcase                  |      | Separate.<br>Refer to "CRANKCASE" on page 5-65.                   |
|       | Connecting rod                   |      | Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-70. |
| 1     | Crankshaft                       | 1    |   |
| 2     | Crankshaft journal lower bearing | 5    |   |
| 3     | Crankshaft journal upper bearing | 5    |   |
| 4     | Washer                           | 1    |   |
| 5     | Timing chain drive sprocket      | 1    |   |
| 6     | Straight key                     | 1    |   |
| 7     | Pickup rotor                     | 1    |   |
| 8     | Oil nozzle                       | 4    |   |
|       |                                  |      | For installation, reverse the removal procedure.                  |



**TIP**

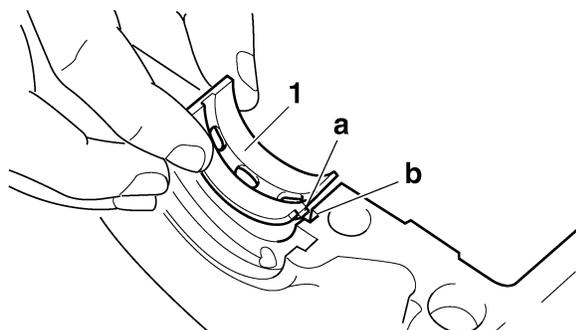
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



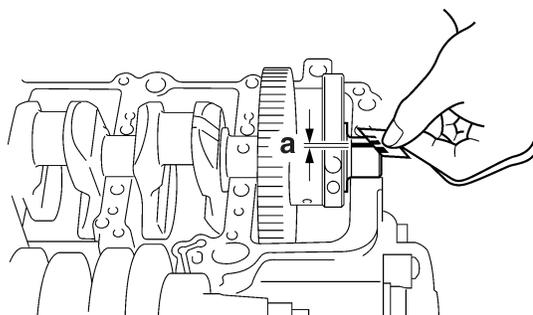
- e. Install the crankshaft journal lower bearings “1” into the lower crankcase and assemble the crankcase halves.

**TIP**

- Align the projections “a” of the crankshaft journal lower bearings with the notches “b” in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to “CRANKCASE” on page 5-65.
- g. Remove the lower crankcase and the crankshaft journal lower bearings.
- h. Measure the compressed Plastigauge® width “a” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



4. Select:
- Crankshaft journal bearings (J<sub>1</sub>–J<sub>5</sub>)

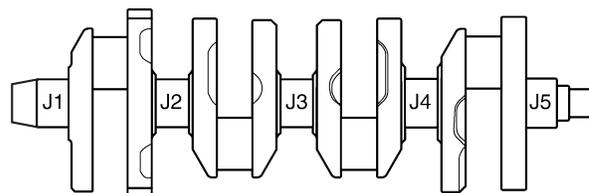
**TIP**

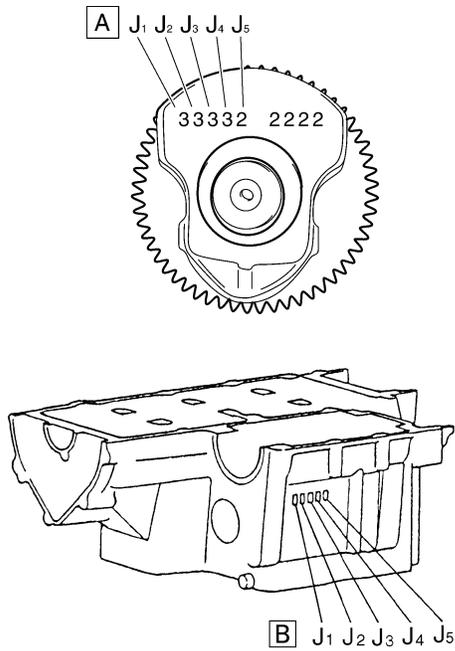
- The numbers “A” stamped into the crankshaft web and the numbers “B” stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- “J<sub>1</sub>”–“J<sub>5</sub>” refer to the bearings shown in the crankshaft illustration.
- If “J<sub>1</sub>”–“J<sub>5</sub>” are the same, use the same size for all of the bearings.

For example, if the crankcase “J<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:

$$\text{“J}_1\text{” (crankcase) - “J}_1\text{” (crankshaft web) = 6 - 2 = 4 (green)}$$

|  |                           |                |                |
|--|---------------------------|----------------|----------------|
|  | <b>Bearing color code</b> |                |                |
|  | <b>0.White</b>            | <b>1.Blue</b>  | <b>2.Black</b> |
|  | <b>3.Brown</b>            | <b>4.Green</b> |                |





EAS26200

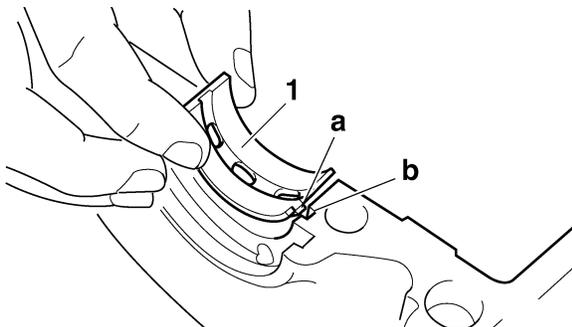
## INSTALLING THE CRANKSHAFT

### 1. Install:

- Crankshaft journal upper bearings (into the upper crankcase)
- Crankshaft journal lower bearings (into the lower crankcase)
- Crankshaft

### TIP

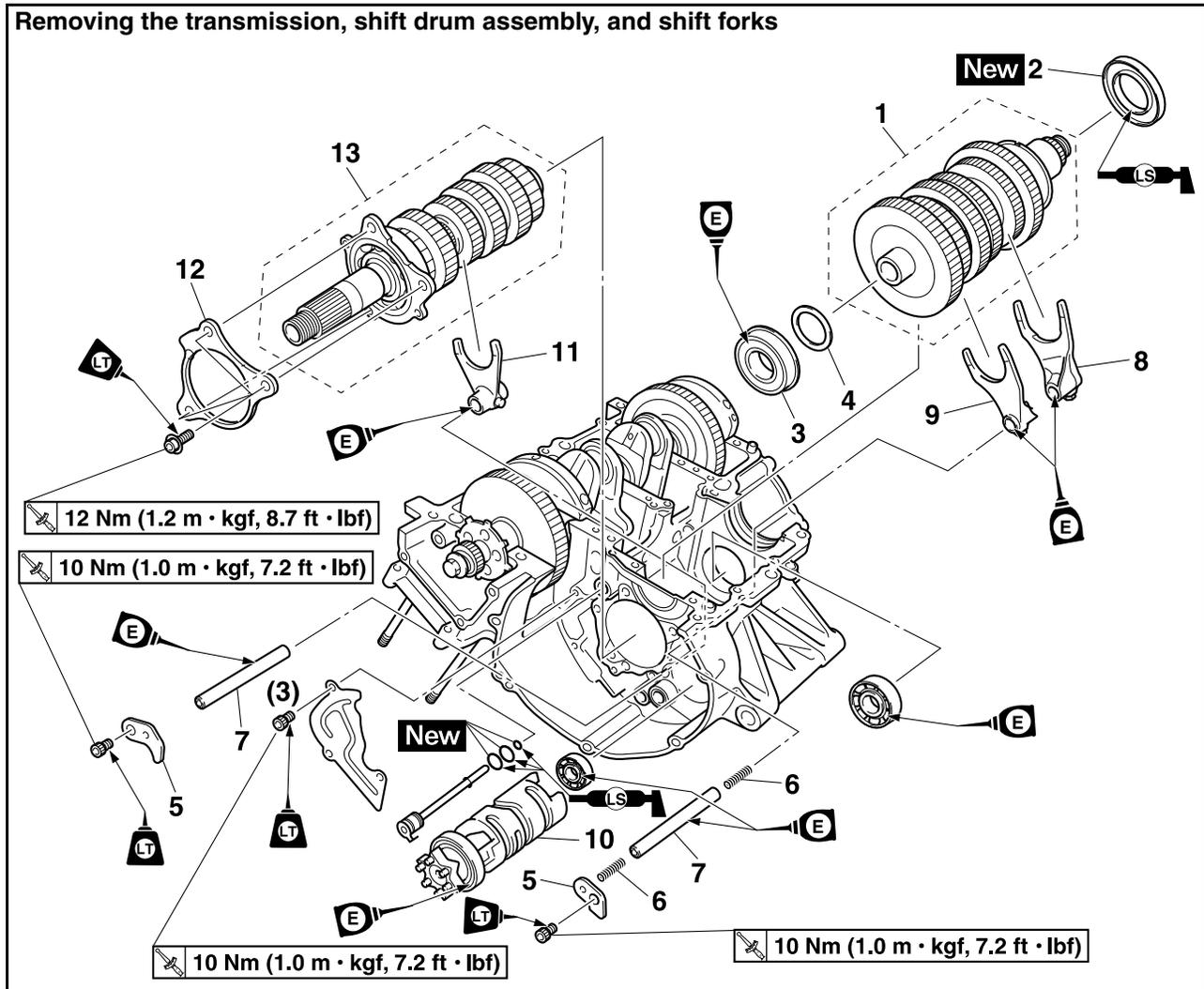
- Align the projections "a" on the crankshaft journal bearings "1" with the notches "b" in the crankcase.
- Be sure to install each crankshaft journal bearings in its original place.



EAS26241

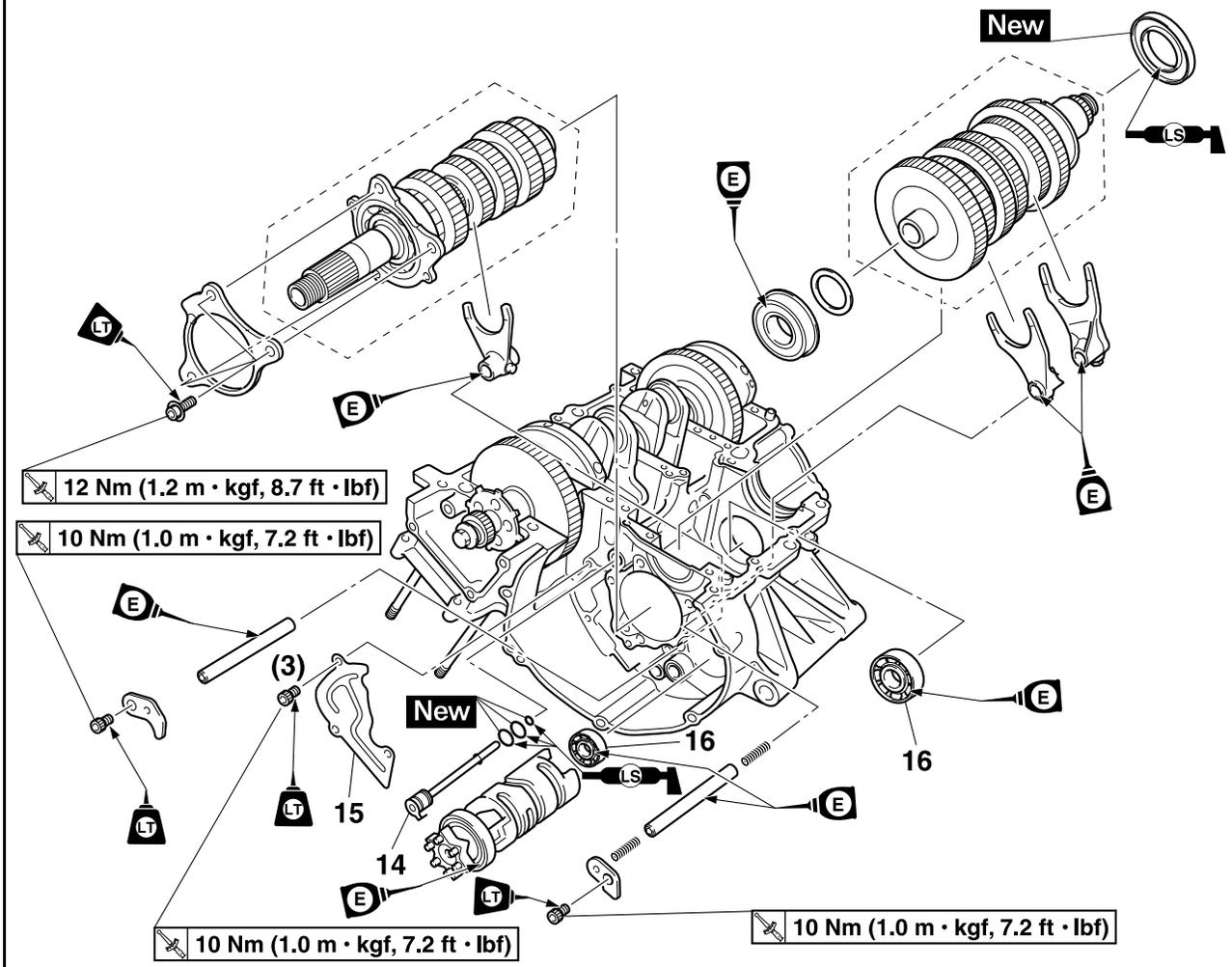
## TRANSMISSION

### Removing the transmission, shift drum assembly, and shift forks



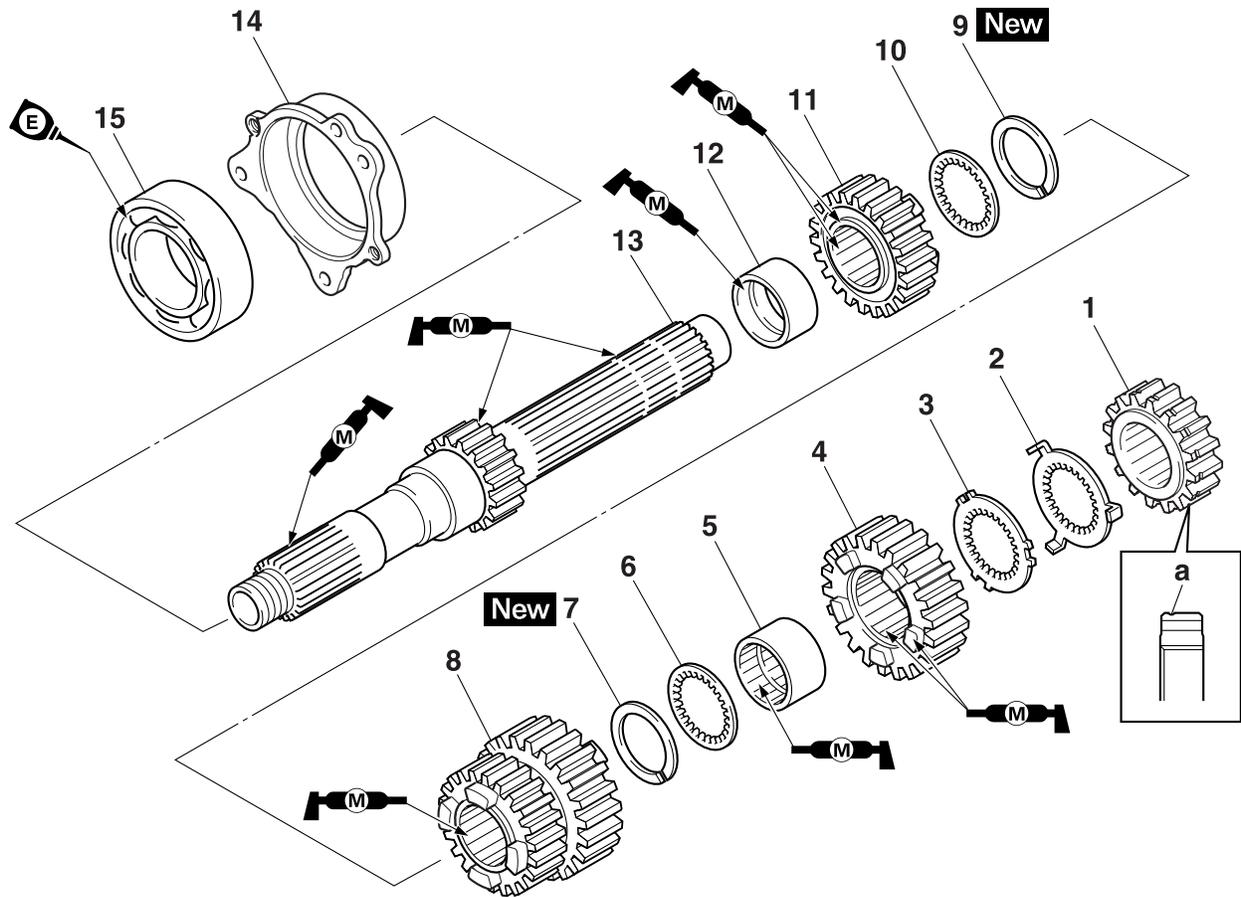
| Order | Job/Parts to remove           | Q'ty | Remarks   |
|-------|-------------------------------|------|---|
|       | Lower crankcase               |      | Separate.<br>Refer to "CRANKCASE" on page 5-65. |
| 1     | Drive axle assembly           | 1    |   |
| 2     | Oil seal                      | 1    |   |
| 3     | Bearing                       | 1    |   |
| 4     | Washer                        | 1    |   |
| 5     | Shift fork guide bar retainer | 2    |   |
| 6     | Spring                        | 2    |   |
| 7     | Shift fork guide bar          | 2    |   |
| 8     | Shift fork "L"                | 1    |   |
| 9     | Shift fork "R"                | 1    |   |
| 10    | Shift drum assembly           | 1    |   |
| 11    | Shift fork "C"                | 1    |   |
| 12    | Main axle retainer            | 1    |   |
| 13    | Main axle assembly            | 1    |   |

## Removing the transmission, shift drum assembly, and shift forks



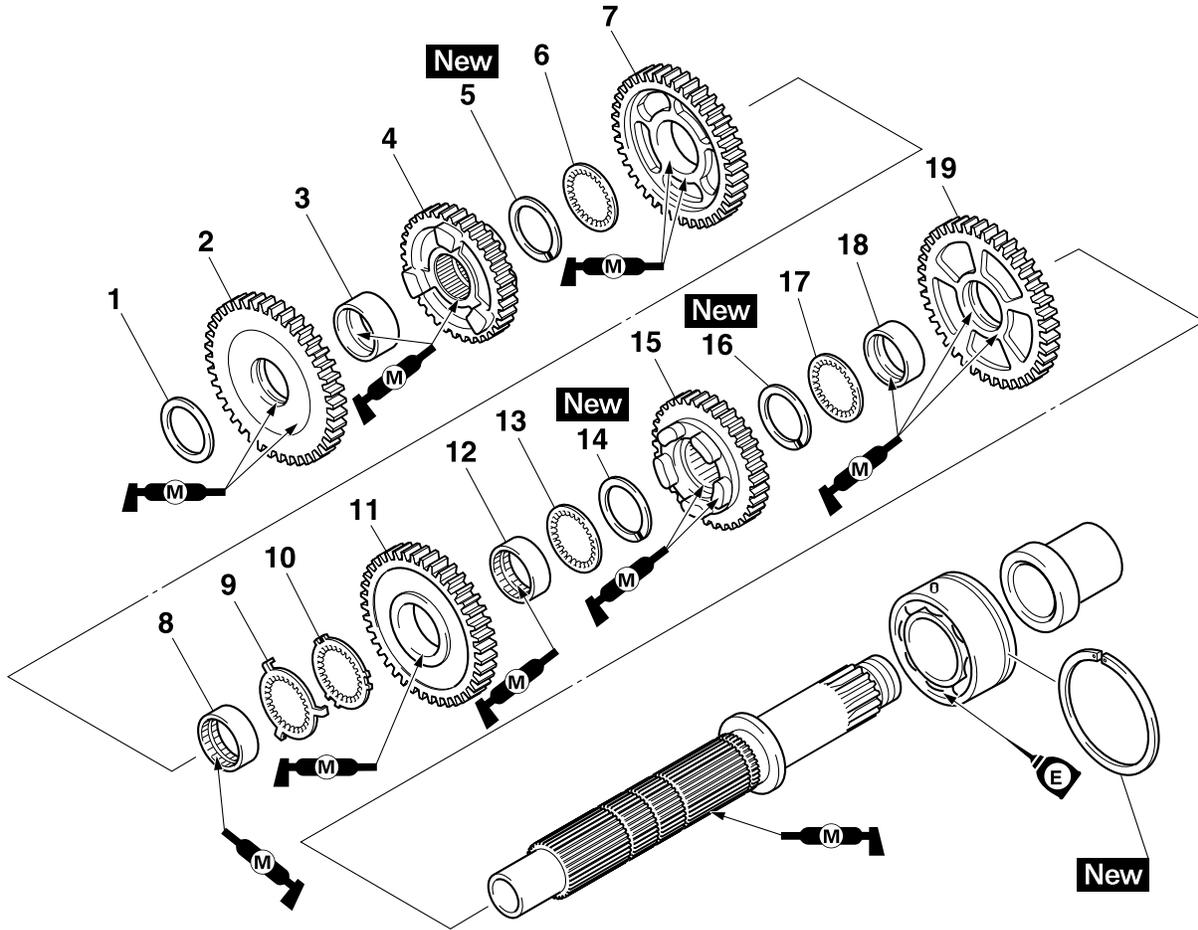
| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 14    | Oil pipe            | 1    |  |
| 15    | Oil baffle plate    | 1    |  |
| 16    | Bearing             | 2    |  |
|       |                     |      | For installation, reverse the removal procedure. |

## Disassembling the main axle assembly



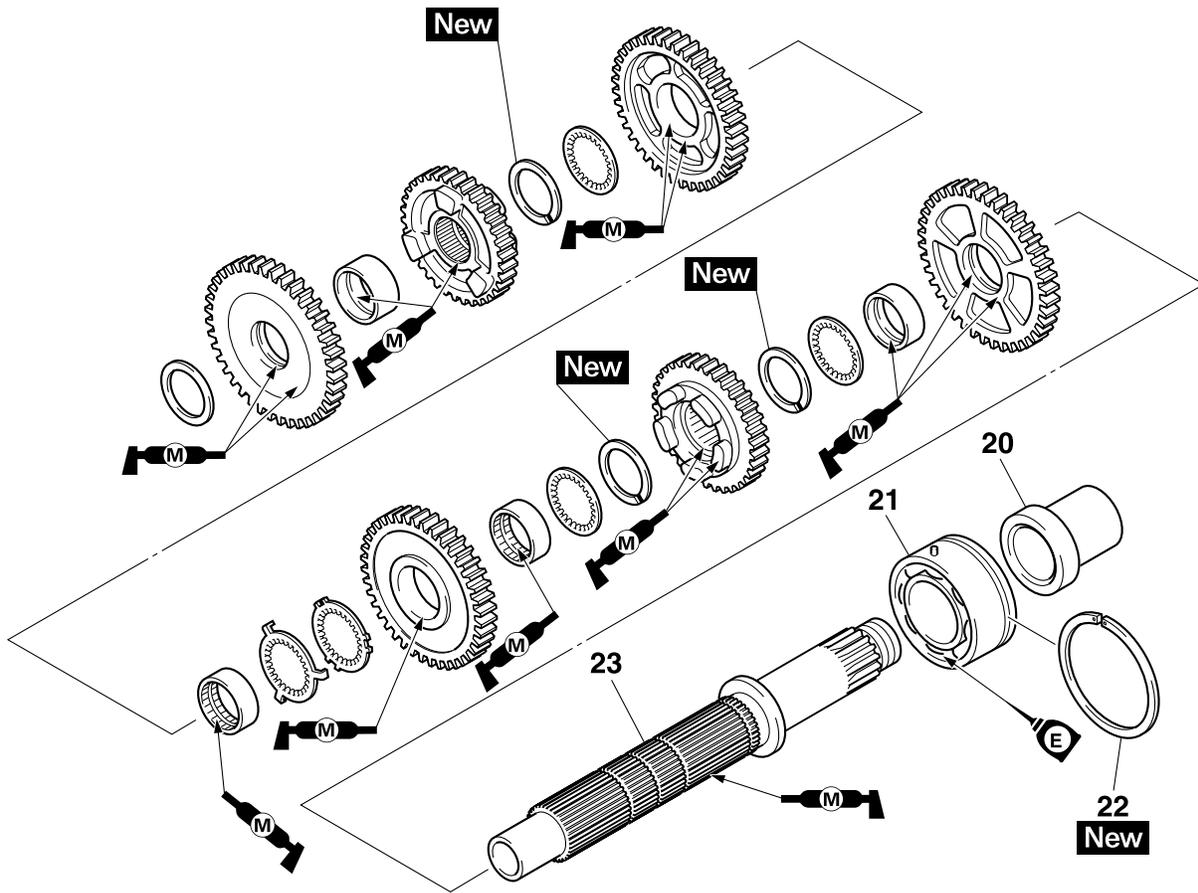
| Order | Job/Parts to remove          | Q'ty | Remarks  |
|-------|------------------------------|------|--|
| 1     | 2nd pinion gear              | 1    | <b>TIP</b><br>When installing secondary pinion gear "1", install the gear with groove "a" facing to the toothed lock washer. |
| 2     | Toothed lock washer          | 1    |  |
| 3     | Toothed lock washer retainer | 1    |  |
| 4     | 6th pinion gear              | 1    |  |
| 5     | Collar                       | 1    |  |
| 6     | Washer                       | 1    |  |
| 7     | Circlip                      | 1    |  |
| 8     | 3rd pinion gear              | 1    |  |
| 9     | Circlip                      | 1    |  |
| 10    | Washer                       | 1    |  |
| 11    | 5th pinion gear              | 1    |  |
| 12    | Collar                       | 1    |  |
| 13    | Main axle                    | 1    |  |
| 14    | Bearing housing              | 1    |  |
| 15    | Bearing                      | 1    |  |
|       |                              |      | For assembly, reverse the disassembly procedure.   |

## 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    |         |

## Disassembling the drive axle assembly

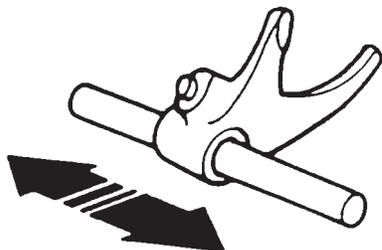


| Order | Job/Parts to remove | Q'ty | Remarks  |
|-------|---------------------|------|--|
| 20    | Collar              | 1    |  |
| 21    | Bearing             | 1    |  |
| 22    | Circlip             | 1    |  |
| 23    | Drive axle          | 1    |  |
|       |                     |      | For assembly, reverse the disassembly procedure. |



### 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.



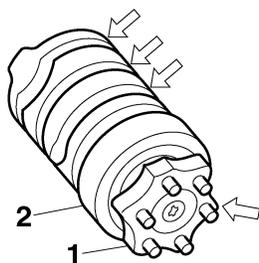
319-011

EAS26270

### CHECKING THE SHIFT DRUM ASSEMBLY

#### 1. Check:

- Shift drum groove  
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "1"  
Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2"  
Damage/pitting → Replace the shift drum assembly.



EAS26280

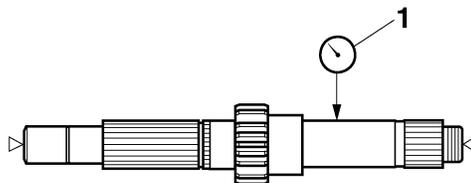
### CHECKING THE TRANSMISSION

#### 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)**

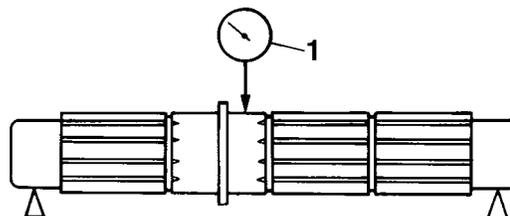


#### 2. Measure:

- Drive axle runout  
(with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.

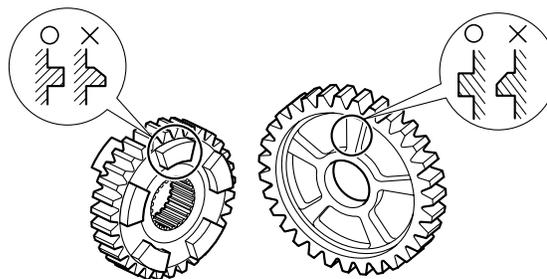


**Drive axle runout limit**  
**0.08 mm (0.0032 in)**



#### 3. Check:

- Transmission gears  
Blue discoloration/pitting/wear → Replace the defective gear(s).
- Transmission gear dogs  
Cracks/damage/rounded edges → Replace the defective gear(s).



4. Check:
  - Transmission gear engagement (each pinion gear to its respective wheel gear)  
Incorrect → Reassemble the transmission axle assemblies.
5. Check:
  - Transmission gear movement  
Rough movement → Replace the defective part(s).
6. Check:
  - Circlips  
Bends/damage/looseness → Replace.

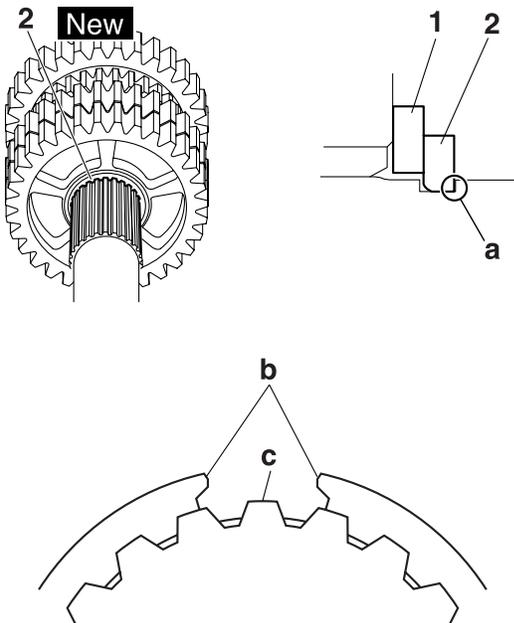
EAS29020

## ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
  - Toothed washer “1”
  - Circlip “2” **New**

### TIP

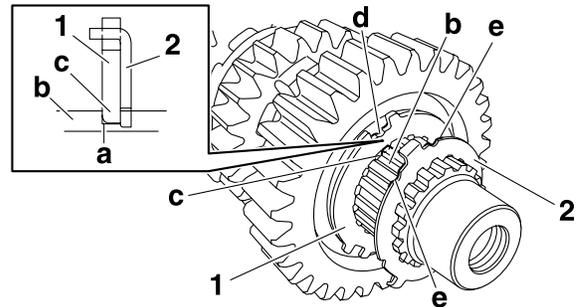
- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends “b” of the circlip with a groove “c” in the axle.



2. Install:
  - Toothed lock washer retainer “1”
  - Toothed lock washer “2”

### TIP

- With the toothed lock washer retainer “1” in the groove “a” in the axle, align the projection “c” on the retainer with an axle spline “b”, and then install the toothed lock washer “2”.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks “e” with the alignment mark “d” on the retainer.



EAS26350

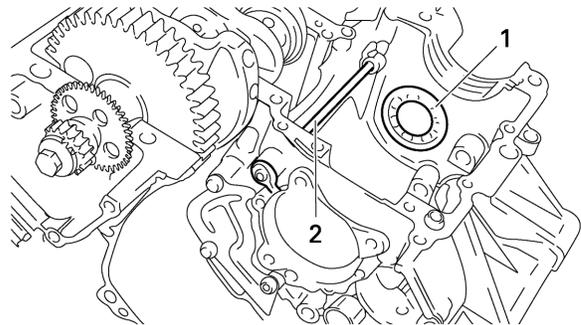
## INSTALLING THE TRANSMISSION

1. Install:
  - Bearing “1”

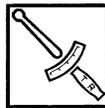
### TIP

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·kgf, 8.7 ft·lbf)**  
**LOCTITE®**

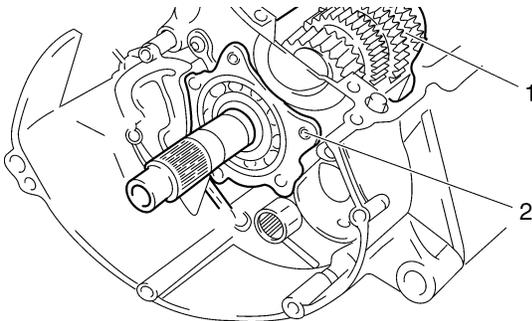
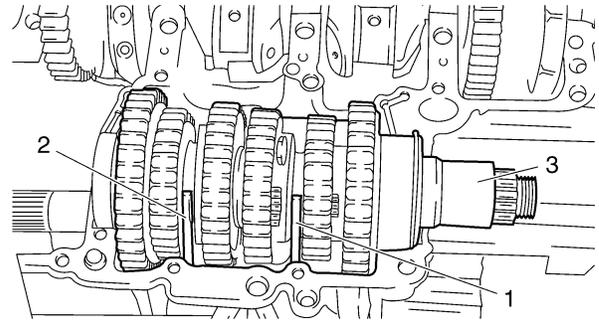
- Shift fork “C”
- Shift drum assembly
- Shift fork guide bar
- Shift fork guide bar retainer



**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**

**TIP**

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork “C” into the groove in the 3rd and 4th pinion gear on the main axle.



3. Install:

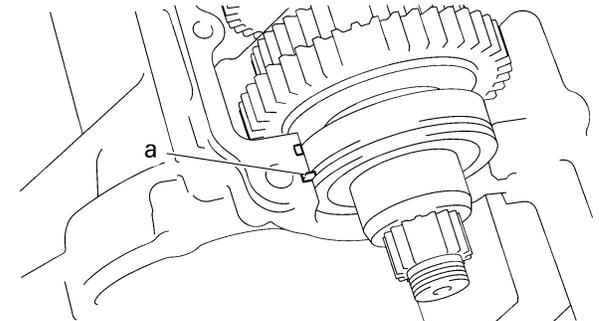
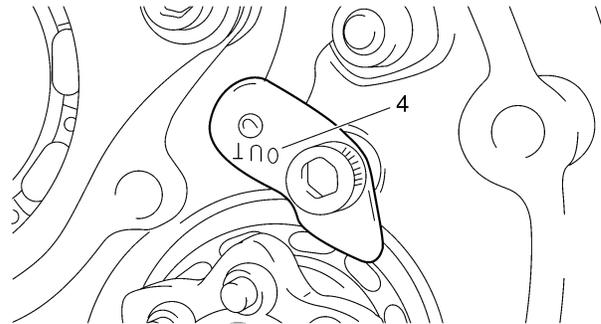
- Shift fork “L” “1” and “R” “2”
- Drive axle assembly “3”
- Shift fork guide bar
- Shift fork guide bar retainer “4”



**Shift fork guide bar retainer bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**

**TIP**

- 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.

**TIP**

Oil each gear, shaft, and bearing thoroughly.



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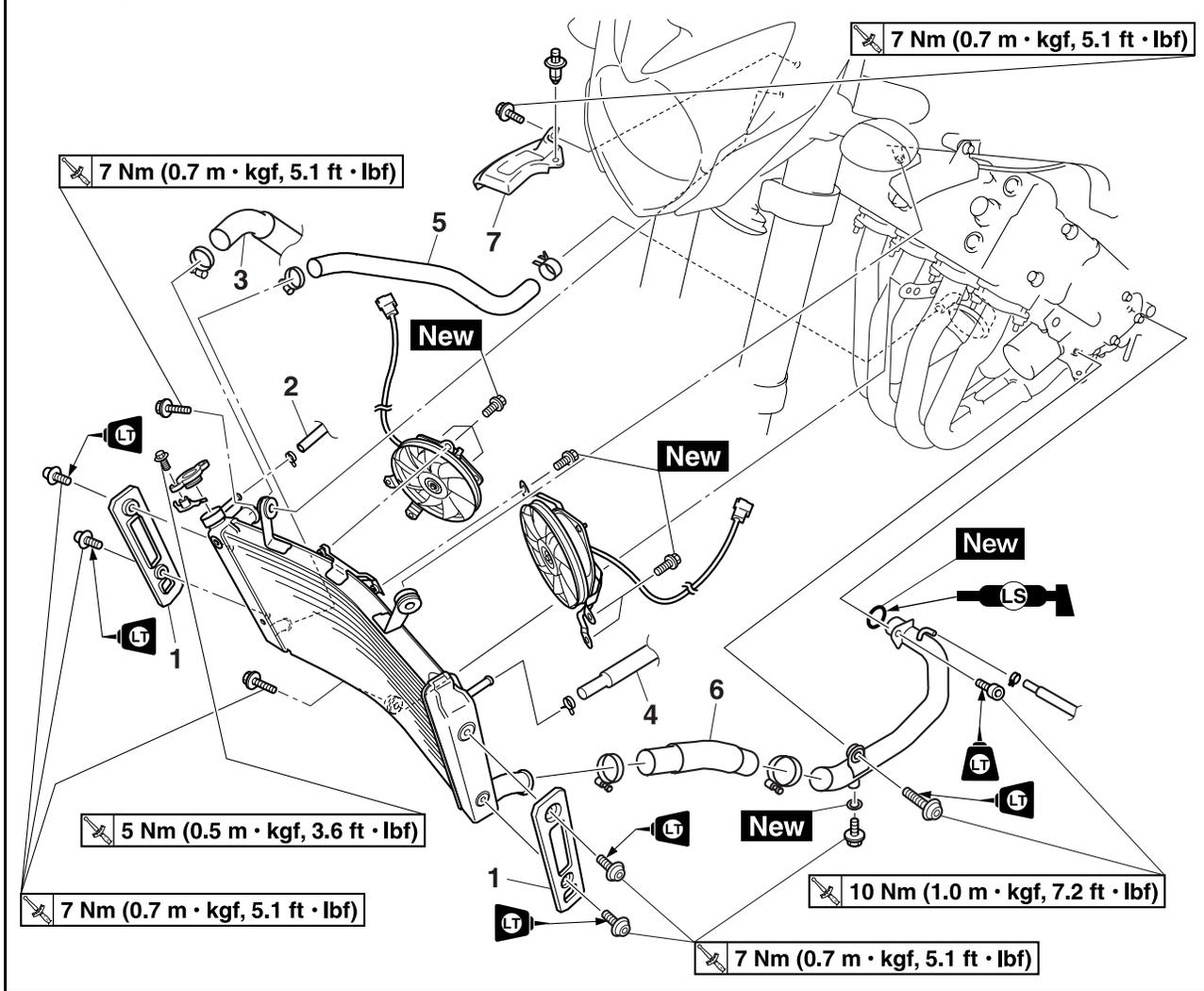
## COOLING SYSTEM

|   |      |
|---|------|
| <b>RADIATOR</b> .....                   | 6-1  |
| CHECKING THE RADIATOR.....              | 6-3  |
| INSTALLING THE RADIATOR.....            | 6-3  |
| <br>                                    |      |
| <b>OIL COOLER</b> .....                 | 6-5  |
| CHECKING THE OIL COOLER.....            | 6-6  |
| INSTALLING THE OIL COOLER.....          | 6-6  |
| <br>                                    |      |
| <b>THERMOSTAT</b> .....                 | 6-7  |
| CHECKING THE THERMOSTAT.....            | 6-9  |
| ASSEMBLING THE THERMOSTAT ASSEMBLY..... | 6-9  |
| INSTALLING THE THERMOSTAT ASSEMBLY..... | 6-10 |
| <br>                                    |      |
| <b>WATER PUMP</b> .....                 | 6-11 |
| DISASSEMBLING THE WATER PUMP.....       | 6-12 |
| CHECKING THE WATER PUMP.....            | 6-12 |
| ASSEMBLING THE WATER PUMP.....          | 6-12 |

EAS26380

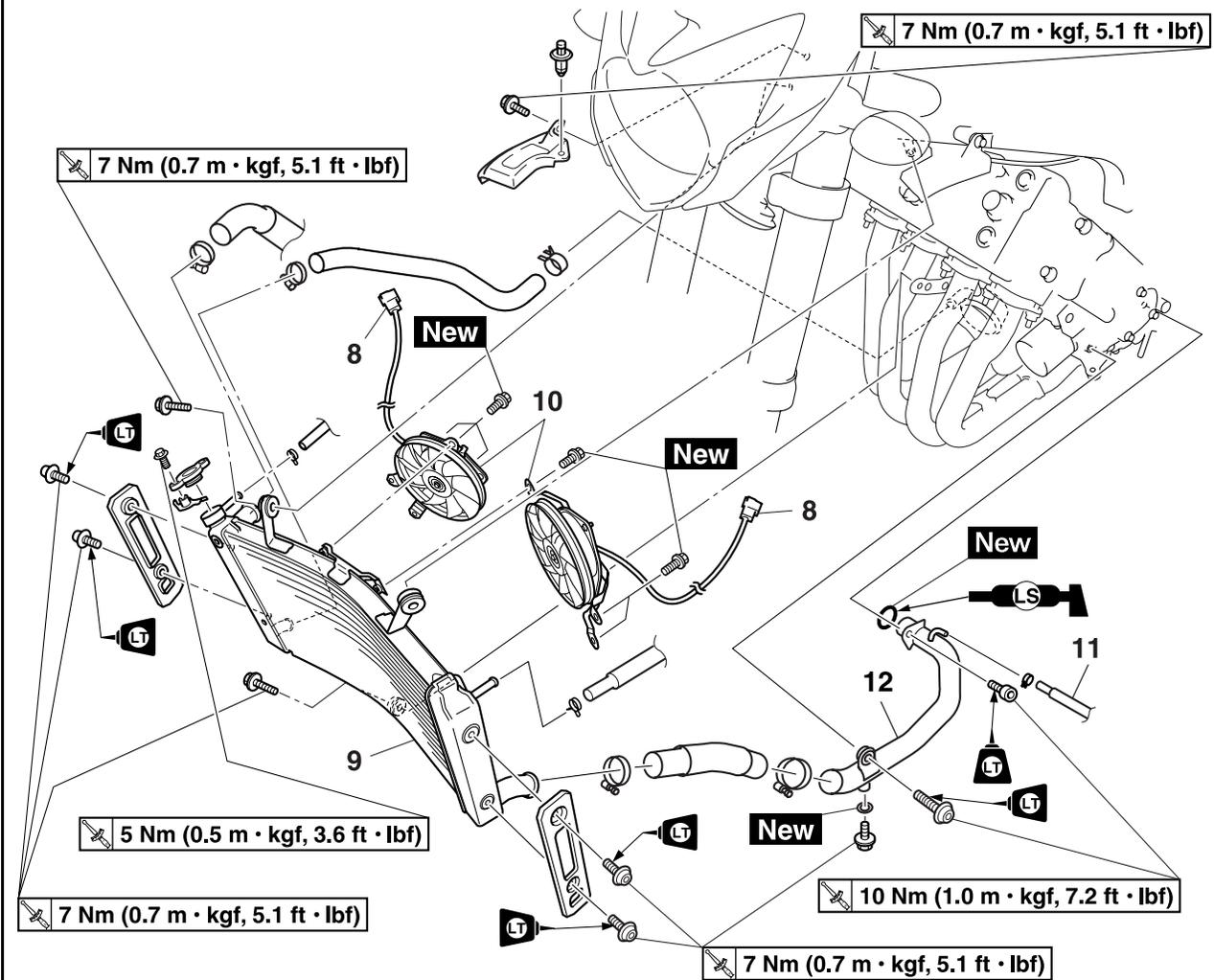
## RADIATOR

### Removing the radiator



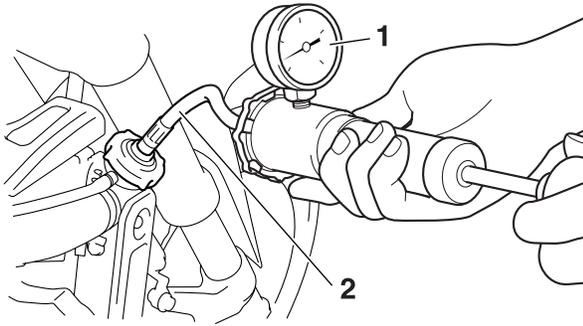
| Order | Job/Parts to remove        | Q'ty | Remarks   |
|-------|----------------------------|------|---|
|       | Rider seat                 |      | Refer to "GENERAL CHASSIS" on page 4-1.                 |
|       | Fuel tank                  |      | Refer to "FUEL TANK" on page 7-1.                       |
|       | Air filter case            |      | Refer to "GENERAL CHASSIS" on page 4-1.                 |
|       | Drive sprocket cover       |      | Refer to "ENGINE REMOVAL" on page 5-3.                  |
|       | Coolant                    |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-26. |
| 1     | Radiator side cover        | 2    |   |
| 2     | Coolant reservoir hose     | 1    | Disconnect.   |
| 3     | Radiator inlet hose        | 1    | Disconnect.   |
| 4     | Water pump breather hose 1 | 1    | Disconnect.   |
| 5     | Oil cooler outlet hose     | 1    |   |
| 6     | Radiator outlet hose       | 1    |   |
| 7     | Radiator upper cover       | 1    |   |

## Removing the radiator



| Order | Job/Parts to remove        | Q'ty | Remarks  |
|-------|----------------------------|------|--|
| 8     | Radiator fan motor coupler | 2    | Disconnect.                                      |
| 9     | Radiator                   | 1    |  |
| 10    | Radiator fan motor         | 2    |  |
| 11    | Water pump breather hose 2 | 1    | Disconnect.                                      |
| 12    | Water pump inlet pipe      | 1    |  |
|       |                            |      | For installation, reverse the removal procedure. |





- b. Apply 122.7 kPa (1.23 kgf/cm<sup>2</sup>, 17.8 psi) of pressure.
- c. Measure the indicated pressure with the gauge.

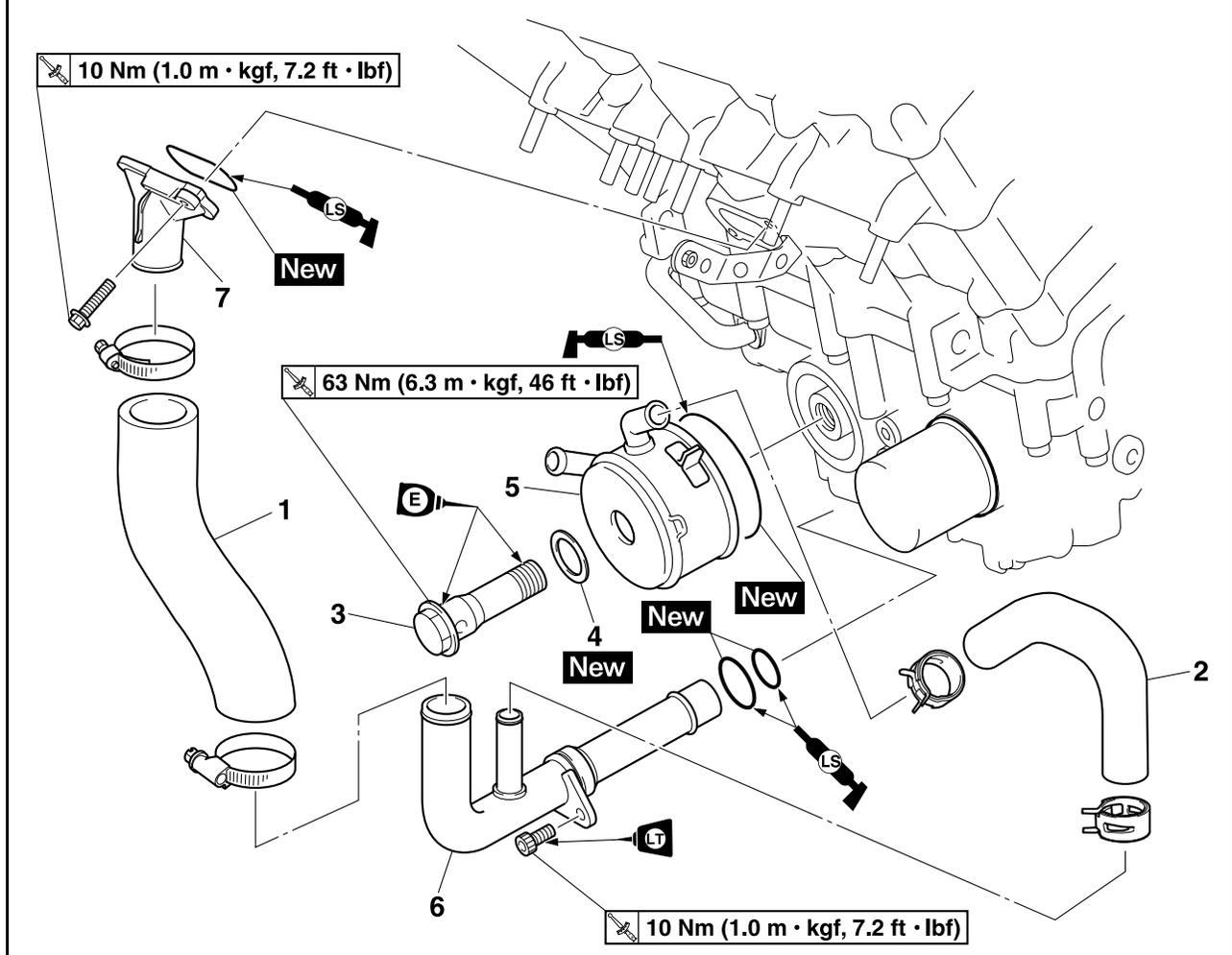


3. Measure:
  - Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS26410

## OIL COOLER

### Removing the oil cooler



| Order | Job/Parts to remove           | Q'ty | Remarks  |
|-------|-------------------------------|------|--|
|       | Coolant                       |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-26.    |
|       | Engine oil                    |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-23. |
| 1     | Water jacket joint inlet hose | 1    |  |
| 2     | Oil cooler inlet hose         | 1    |  |
| 3     | Oil cooler union bolt         | 1    |  |
| 4     | Washer                        | 1    |  |
| 5     | Oil cooler                    | 1    |  |
| 6     | Water pump outlet pipe        | 1    |  |
| 7     | Water jacket joint            | 1    |  |
|       |                               |      | For installation, 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

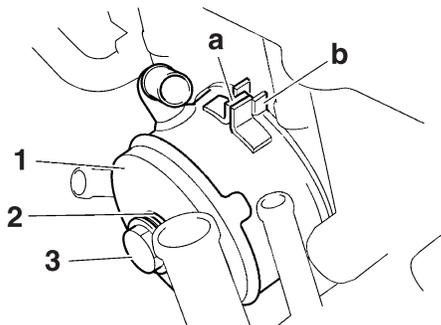
1. Clean:
  - Mating surfaces of the oil cooler and the crankcase  
(with a cloth dampened with lacquer thinner)
2. Install:
  - O-ring **New**
  - Oil cooler "1"
  - Washer "2" **New**
  - Oil cooler union bolt "3"



**Oil cooler union bolt**  
**63 Nm (6.3 m·kgf, 46 ft·lbf)**

### TIP

- Before installing the oil cooler, apply engine oil lightly to the oil cooler union bolt and apply lithium-soap-based grease to the O-ring.
- Make sure the O-ring is positioned properly.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.



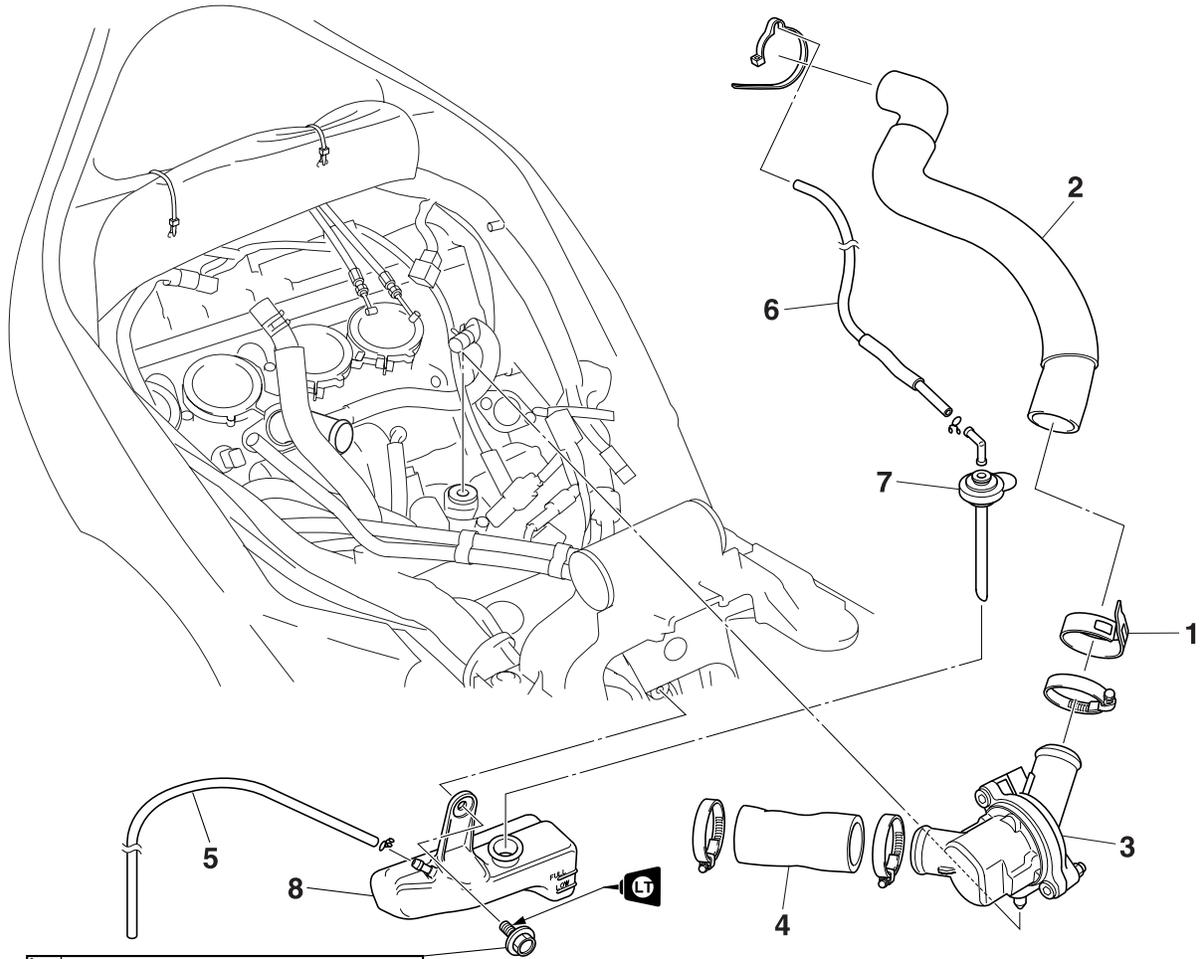
3. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "CHANGING THE COOLANT"  
on page 3-26.

- Crankcase  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL"  
on page 3-23.
4. Check:
  - Cooling system  
Leaks → Repair or replace any faulty part.  
Refer to "INSTALLING THE RADIATOR"  
on page 6-3.
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

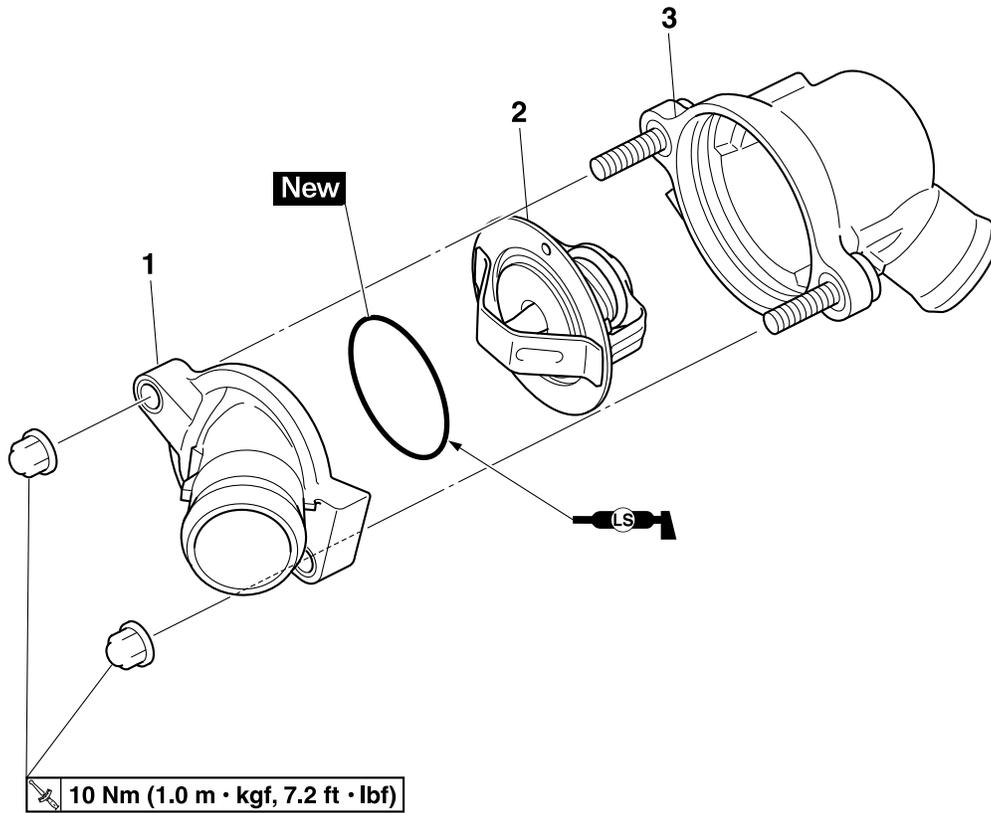
### Removing the thermostat assembly



4.5 Nm (0.45 m · kgf, 3.3 ft · lbf)

| Order | Job/Parts to remove             | Q'ty | Remarks   |
|-------|---------------------------------|------|---|
|       | Rider seat                      |      | Refer to "GENERAL CHASSIS" on page 4-1.                 |
|       | Fuel tank                       |      | Refer to "FUEL TANK" on page 7-1.                       |
|       | Air filter case                 |      | Refer to "GENERAL CHASSIS" on page 4-1.                 |
|       | Throttle body assembly          |      | Refer to "THROTTLE BODIES" on page 7-6.                 |
|       | Coolant                         |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-26. |
| 1     | Band                            | 1    |   |
| 2     | Radiator inlet hose             | 1    |   |
| 3     | Thermostat assembly             | 1    |   |
| 4     | Thermostat assembly inlet hose  | 1    |   |
| 5     | Coolant reservoir breather hose | 1    |   |
| 6     | Coolant reservoir hose          | 1    |   |
| 7     | Coolant reservoir cap           | 1    |   |
| 8     | Coolant reservoir tank          | 1    |   |
|       |                                 |      | For installation, reverse the removal procedure.        |

## Disassembling the thermostat assembly



| Order | Job/Parts to remove      | Q'ty | Remarks  |
|-------|--------------------------|------|--|
| 1     | Thermostat housing cover | 1    |  |
| 2     | Thermostat               | 1    |  |
| 3     | Thermostat housing       | 1    |  |
|       |                          |      | For assembly, reverse the disassembly procedure. |



EAS26480

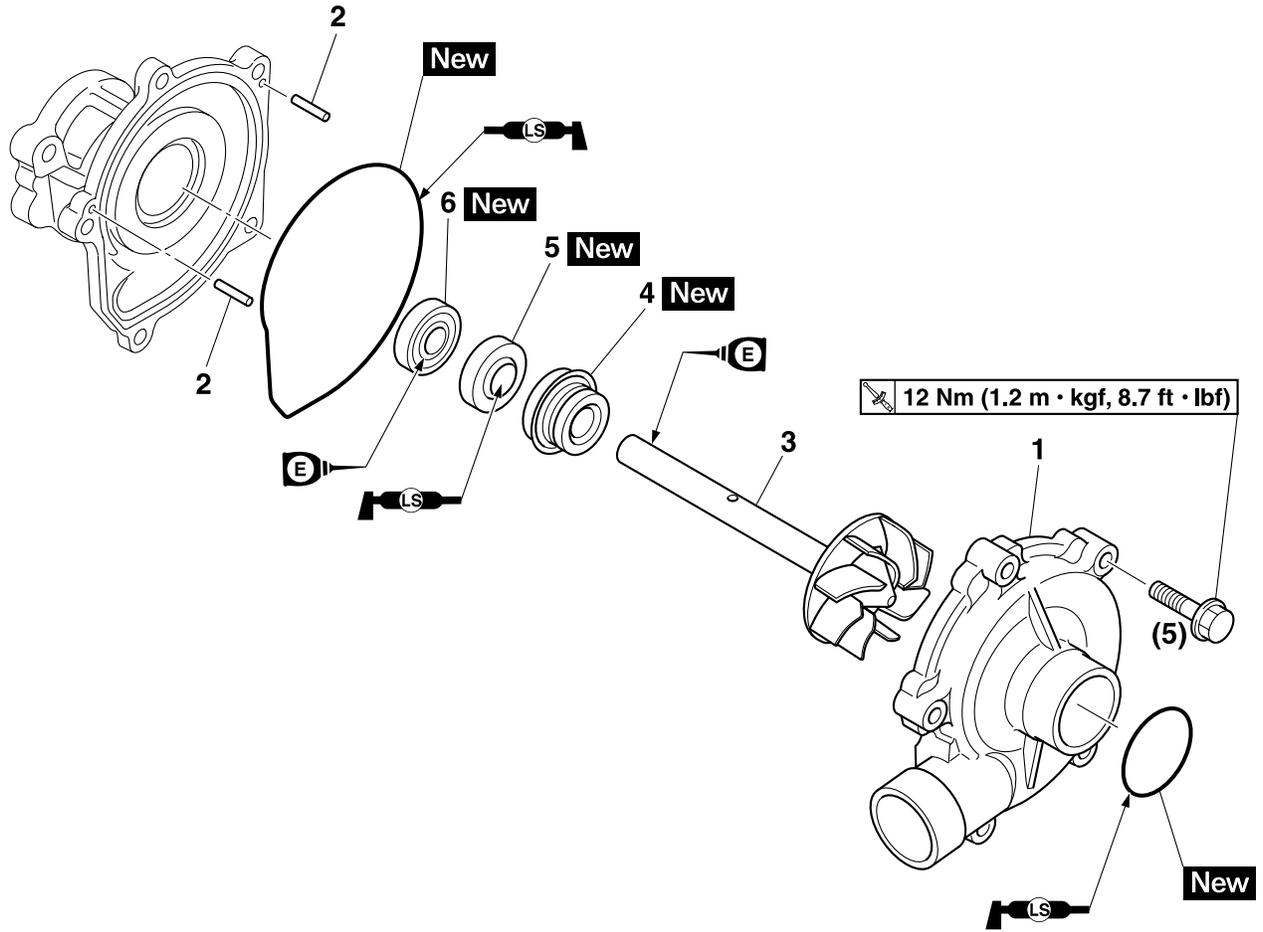
## **INSTALLING THE THERMOSTAT ASSEMBLY**

1. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)  
Refer to “CHANGING THE COOLANT” on page 3-26.
2. Check:
  - Cooling system  
Leaks → Repair or replace any faulty part.  
Refer to “INSTALLING THE RADIATOR” on page 6-3.
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

### Disassembling the water pump



| Order | Job/Parts to remove                      | Q'ty | Remarks  |
|-------|--|------|--|
|       | Oil/water pump assembly                  |      | Refer to "OIL PUMP" on page 5-57.                |
|       | Oil pump rotor                           |      | Refer to "OIL PUMP" on page 5-57.                |
| 1     | Water pump cover                         | 1    |  |
| 2     | Pin                                      | 2    |  |
| 3     | Impeller shaft (along with the impeller) | 1    |  |
| 4     | Water pump seal                          | 1    |  |
| 5     | Oil seal                                 | 1    |  |
| 6     | Bearing                                  | 1    |  |
|       |  |      | For assembly, reverse the disassembly procedure. |

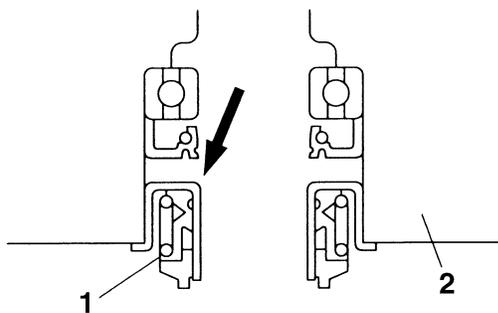
EAS26520

## DISASSEMBLING THE WATER PUMP

- Remove:
  - Water pump seal "1"

### TIP

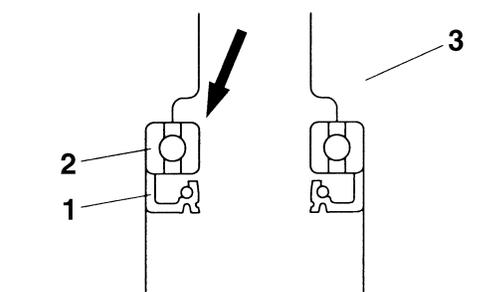
Remove the water pump seal from the inside of the water pump housing "2".



- Remove:
  - Oil seal "1"
  - Bearing "2"

### TIP

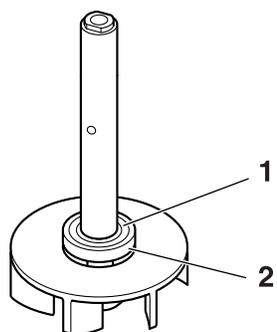
Remove the oil seal and bearing from the outside of the water pump housing "3".



- Remove:
  - Rubber damper holder "1"
  - Rubber damper "2"
 (from the impeller, with a thin, flat-head screwdriver)

### TIP

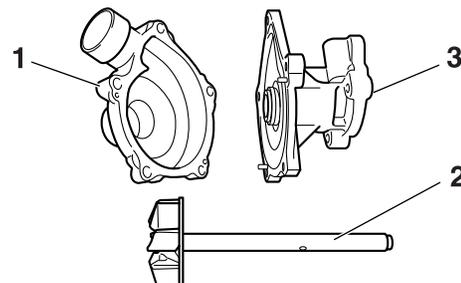
Do not scratch the impeller shaft.



EAS26541

## CHECKING THE WATER PUMP

- Check:
  - Water pump housing cover "1"
  - Impeller "2"
 Cracks/damage/wear → Replace.
  - Water pump housing "3"
 Cracks/damage/wear → Replace the oil/water pump assembly.



- Check:
  - Bearing
 Rough movement → Replace.
- Check:
  - Water pump outlet pipe
  - Water pump inlet pipe
 Cracks/damage/wear → Replace.

EAS26560

## ASSEMBLING THE WATER PUMP

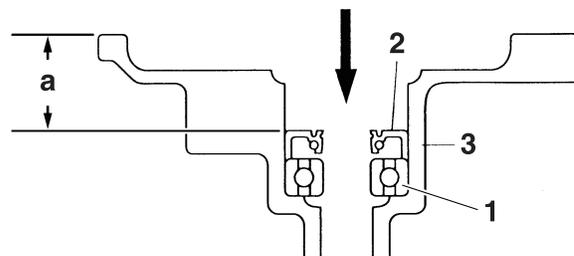
- Install:
  - Bearing "1" **New**
  - Oil seal "2" **New**
 (into the water pump housing "3")



Installed depth "a"  
17.2 mm (0.68 in)

### TIP

Install the oil seal with a socket that matches its outside diameter.



- Install:
  - Water pump seal "1" **New**

ECA14080

**NOTICE**

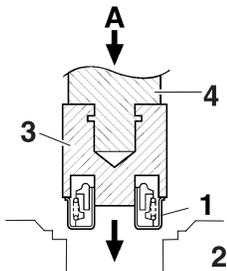
Never lubricate the water pump seal surface with oil or grease.

**TIP**

Install the water pump seal with the special tools.



**Mechanical seal installer**  
90890-04078  
**Water pump seal installer**  
YM-33221-A  
**Middle driven shaft bearing driver**  
90890-04058  
**Middle drive bearing installer 40 & 50 mm**  
YM-04058



- 2. Water pump housing
- 3. Mechanical seal installer
- 4. Middle driven shaft bearing driver

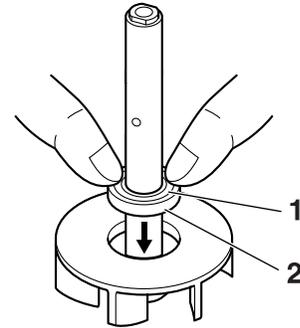
A. Push down

3. Install:

- Rubber damper holder "1" **New**
- Rubber damper "2" **New**

**TIP**

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).

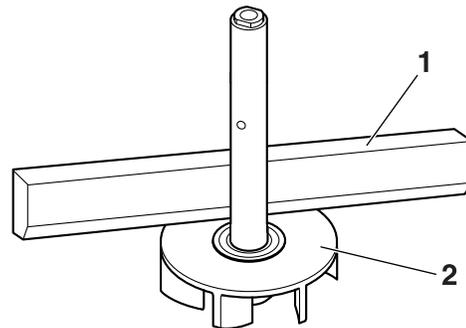
ECA14090

**NOTICE**

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

---

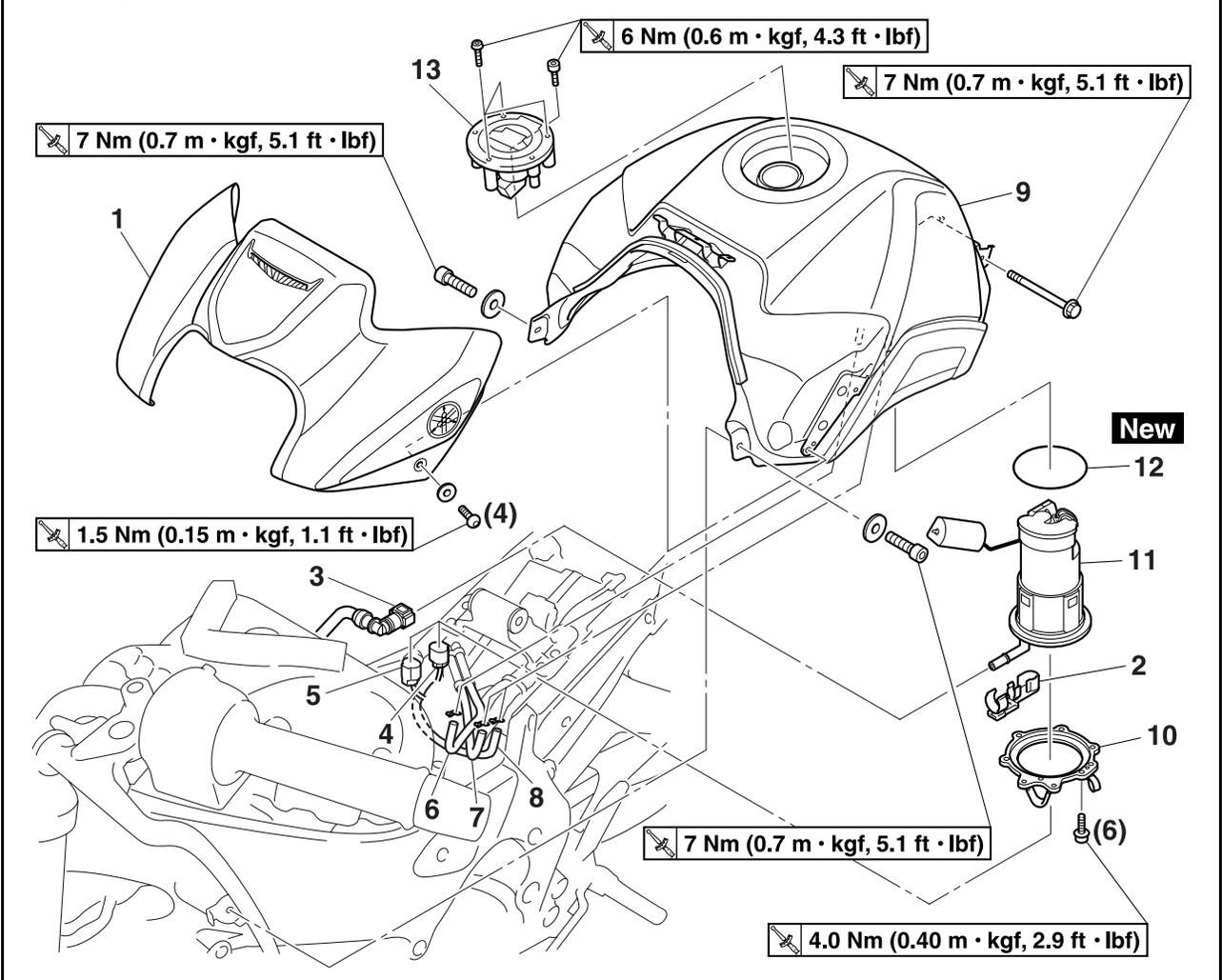
## FUEL SYSTEM

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EAS26620

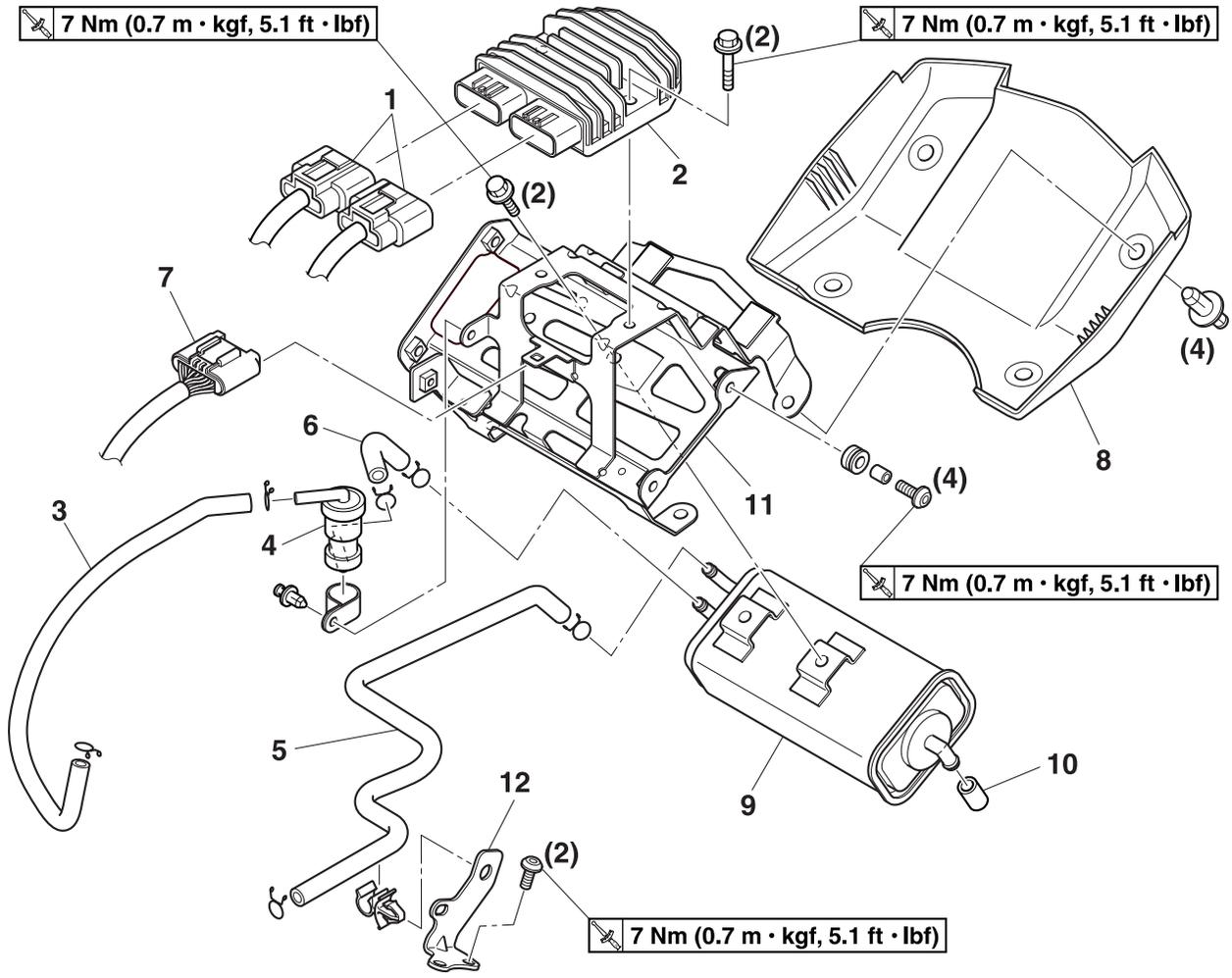
## FUEL TANK

### Removing the fuel tank



| Order | Job/Parts to remove                                   | Q'ty | Remarks  |
|-------|---|------|--|
|       | Rider seat  |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
| 1     | Fuel tank cover                                       | 1    |  |
| 2     | Fuel hose connector cover                             | 1    |  |
| 3     | Fuel hose connector                                   | 1    | Disconnect.                                      |
| 4     | Fuel sender coupler                                   | 1    | Disconnect.                                      |
| 5     | Fuel pump coupler                                     | 1    | Disconnect.                                      |
| 6     | Fuel tank drain hose                                  | 1    | Disconnect.                                      |
| 7     | Fuel tank breather hose                               | 1    | Disconnect.<br>Except for California             |
| 8     | Fuel tank breather hose (fuel tank to rollover valve) | 1    | Disconnect.<br>For California only               |
| 9     | Fuel tank   | 1    |  |
| 10    | Fuel pump bracket                                     | 1    |  |
| 11    | Fuel pump   | 1    |  |
| 12    | Fuel pump gasket                                      | 1    |  |
| 13    | Filler cap assembly                                   | 1    |  |
|       |   |      | For installation, reverse the removal procedure. |

## Removing the canister (for California only)



| Order | Job/Parts to remove                                   | Q'ty | Remarks  |
|-------|---|------|--|
|       | Fuel tank   |      | Refer to "FUEL TANK" on page 7-1.                |
|       | Left side cover                                       |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Right side cover                                      |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Brake fluid reservoir bolt                            |      | Refer to "REAR BRAKE" on page 4-31.              |
| 1     | Rectifier/regulator coupler                           | 2    | Disconnect.                                      |
| 2     | Rectifier/regulator                                   | 1    |  |
| 3     | Fuel tank breather hose (fuel tank to rollover valve) | 1    |  |
| 4     | Rollover valve  | 1    |  |
| 5     | Canister purge hose                                   | 1    |  |
| 6     | Fuel tank breather hose (rollover valve to canister)  | 1    |  |
| 7     | Waterproof coupler                                    | 1    | Disconnect.                                      |
| 8     | Canister cover  | 1    |  |
| 9     | Canister  | 1    |  |
| 10    | Canister breather hose                                | 1    |  |
| 11    | Rectifier/regulator bracket                           | 1    |  |
| 12    | Canister purge hose stay                              | 1    |  |
|       |   |      | For installation, reverse the removal procedure. |



EAS26690

## CHECKING THE FUEL PUMP OPERATION

### 1. Check:

- Fuel pump operation  
Refer to “CHECKING THE FUEL PRES-  
SURE” on page 7-5.

EAS39P2701

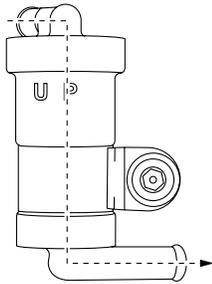
## CHECKING THE ROLLOVER VALVE (for California only)

### 1. Check:

- Rollover valve  
Damage/faulty → Replace.

### TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.



EAS39P1703

## INSTALLING THE FUEL PUMP

### 1. Install:

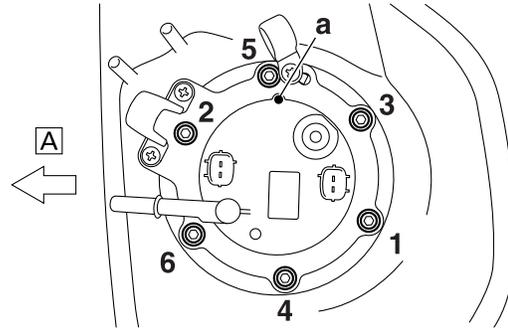
- Fuel pump gasket **New**
- Fuel pump
- Fuel pump bracket
- Fuel pump bolts



**Fuel pump bolt**  
4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)

### TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump gasket so that the lip side turns to the inside of the fuel tank.
- Install the fuel pump as shown in the illustration.
- Align the projection “a” on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



A. Forward

EAS39P1704

## INSTALLING THE FUEL TANK

### 1. Connect:

- Fuel hose (fuel tank side)
- Fuel hose connector cover

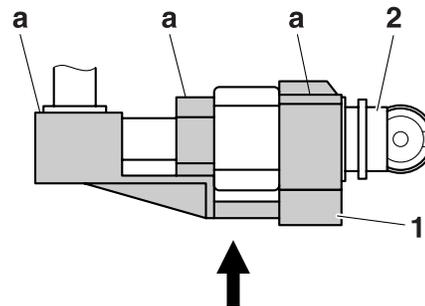
ECA14B1033

### NOTICE

**When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.**

### TIP

- Install the fuel hose securely onto the fuel pump until a distinct “click” is heard.
- It is prohibited to wear the cotton work gloves or equivalent coverings.
- Attach the fuel hose connector cover “1” to the fuel hose connector “2” from the bottom. Make sure that parts “a” are firmly attached to the fuel hose connector.



### 2. Connect:

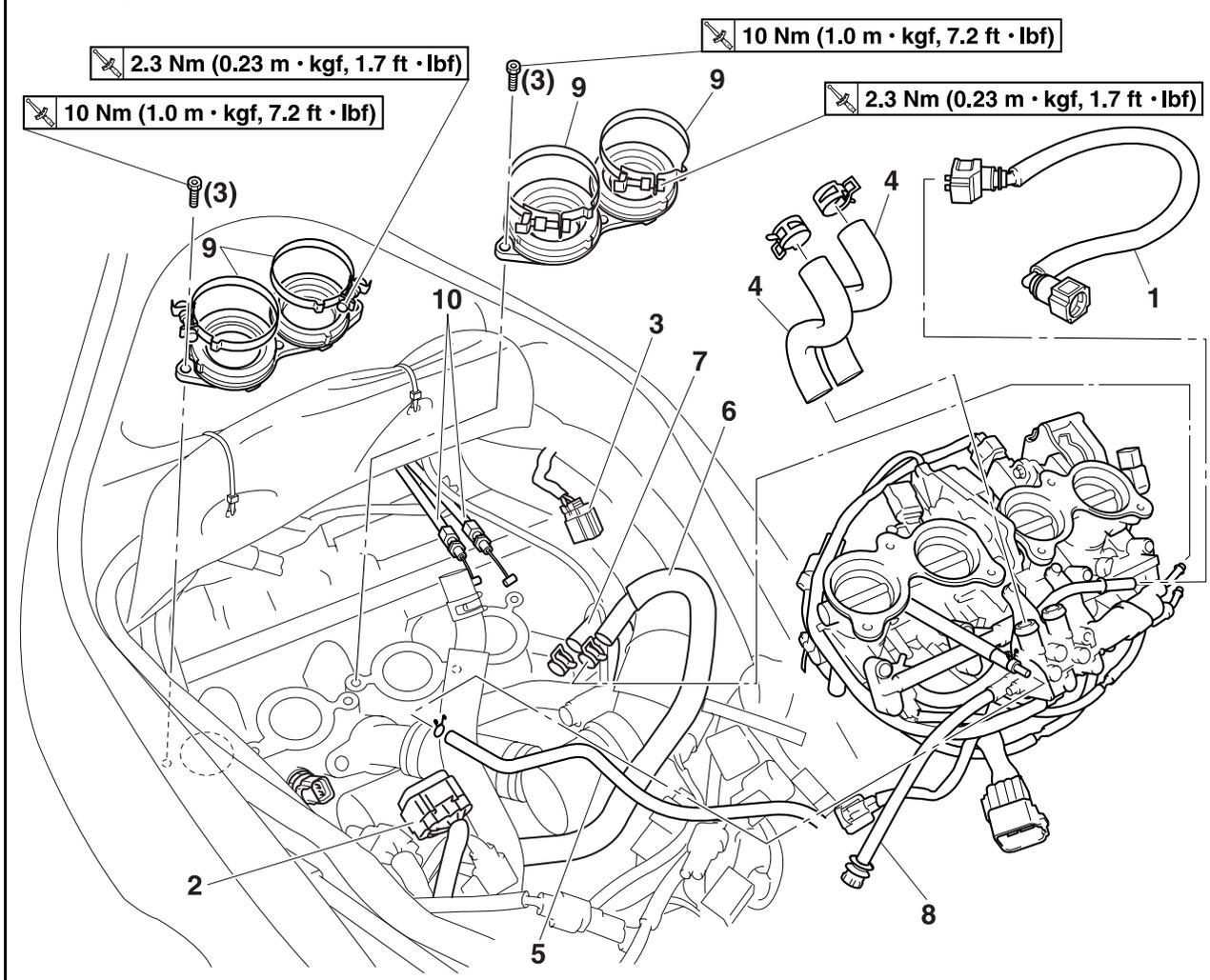
- Fuel tank breather hose
- Fuel tank drain hose
- Fuel pump coupler
- Fuel sender coupler



EAS26970

## THROTTLE BODIES

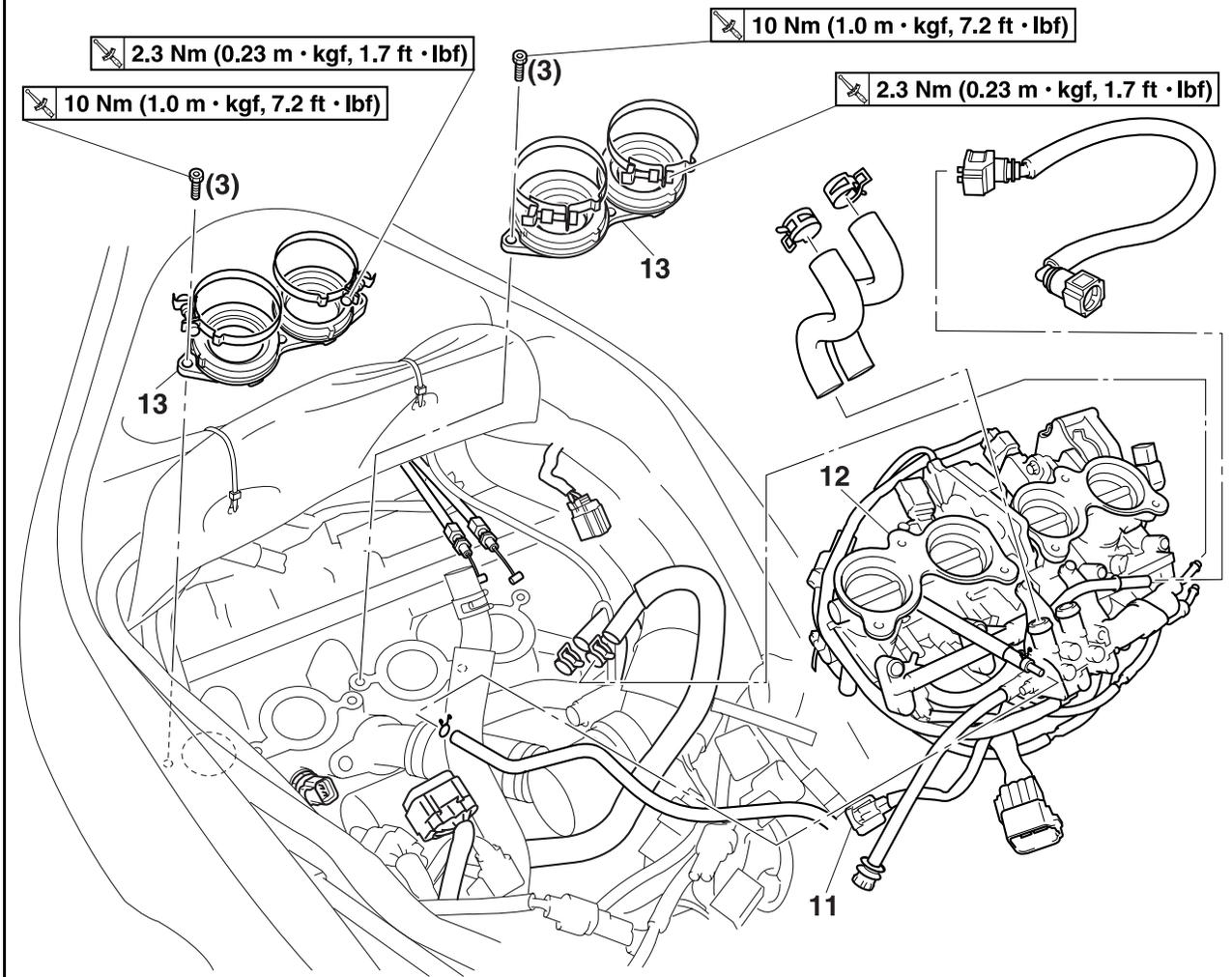
### Removing the throttle bodies



| Order | Job/Parts to remove                            | Q'ty | Remarks   |
|-------|--|------|---|
|       | Rider seat                                     |      | Refer to "GENERAL CHASSIS" on page 4-1.           |
|       | Fuel tank                                      |      | Refer to "FUEL TANK" on page 7-1.                 |
|       | Air filter case                                |      | Refer to "GENERAL CHASSIS" on page 4-1.           |
|       | Throttle cable (handlebar side)                |      | Disconnect.<br>Refer to "HANDLEBAR" on page 4-44. |
| 1     | Fuel hose                                      | 1    |   |
| 2     | Fuel injection system sub-wire harness coupler | 1    | Disconnect.                                       |
| 3     | Sub-throttle position sensor coupler           | 1    | Disconnect.                                       |
| 4     | Throttle body hose                             | 2    |   |
| 5     | Canister purge hose                            | 1    | Disconnect.<br>For California only                |
| 6     | Fast idle plunger outlet hose                  | 1    | Disconnect.                                       |
| 7     | Fast idle plunger inlet hose                   | 1    | Disconnect.                                       |
| 8     | Idle adjust screw wire                         | 1    |   |
| 9     | Throttle body joint clamp                      | 4    | Loosen.   |
| 10    | Throttle cable (throttle body side)            | 2    | Disconnect.                                       |

# THROTTLE BODIES

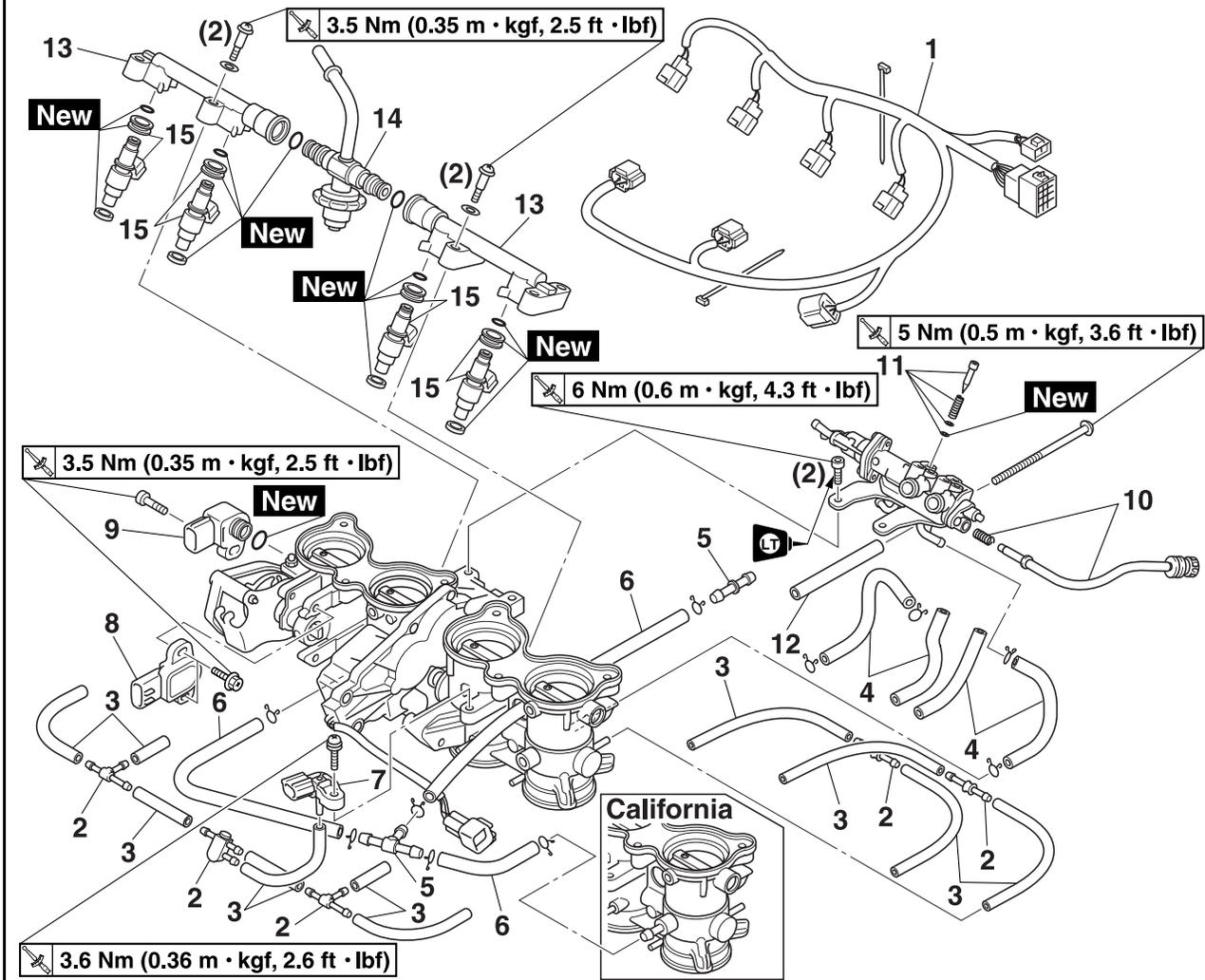
## Removing the throttle bodies



| Order | Job/Parts to remove                | Q'ty | Remarks  |
|-------|------------------------------------|------|--|
| 11    | Coolant temperature sensor coupler | 1    | Disconnect.                                      |
| 12    | Throttle bodies                    | 1    |  |
| 13    | Throttle body joint                | 2    |  |
|       |                                    |      | For installation, reverse the removal procedure. |

# THROTTLE BODIES

## Removing the injectors



| Order | Job/Parts to remove                    | Q'ty | Remarks  |
|-------|--|------|--|
| 1     | Fuel injection system sub-wire harness | 1    |  |
| 2     | Hose joint                             | 5    |  |
| 3     | Negative pressure hose (Thin)          | 11   |  |
| 4     | Negative pressure hose (Thick)         | 4    |  |
| 5     | Hose joint                             | 2    | For California only                              |
| 6     | Canister purge hose                    | 3    | For California only                              |
| 7     | Intake air pressure sensor             | 1    |  |
| 8     | Throttle position sensor               | 1    |  |
| 9     | Sub-throttle position sensor           | 1    |  |
| 10    | Idle adjust screw wire                 | 1    |  |
| 11    | Air screw set                          | 4    |  |
| 12    | Collar                                 | 1    |  |
| 13    | Fuel rail                              | 2    |  |
| 14    | Fuel rail joint                        | 1    |  |
| 15    | Fuel injector                          | 4    |  |
|       |  |      | For installation, reverse the removal procedure. |

EAS39P1710

## REMOVING THE FUEL HOSE (THROTTLE BODY SIDE)

1. Remove:
  - Fuel tank  
Refer to “REMOVING THE FUEL TANK” on page 7-3.
2. Remove:
  - Fuel hose (throttle body side)

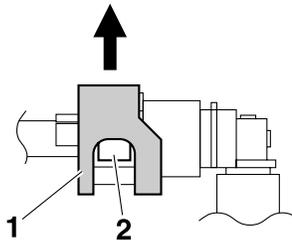
ECA14B1003

### NOTICE

**Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.**

### TIP

- To remove the fuel hose from the fuel rail joint, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS26980

## CHECKING THE FUEL INJECTORS

EWA39P1703

### WARNING

- Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.
- Be careful when disconnecting the fuel hoses. Any remaining pressure in the fuel hoses may cause the fuel to spray out. Place a container or rag under the hoses to catch any fuel that spills. Always clean up any spilt fuel immediately.
- Set the main switch to “OFF” and disconnect the negative battery lead from the

battery terminal before checking the injectors.

ECA39P1701

### NOTICE

- When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.
- If an injector is subject to strong shocks or excessive force, replace it.

1. Check:
  - Injectors  
Damage/defective → Replace.  
Refer to “FUEL INJECTION SYSTEM” on page 8-31.

EAS39P1705

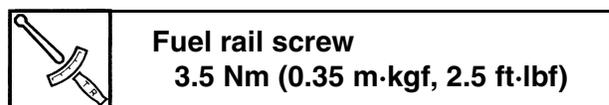
## INSTALLING THE INJECTORS

ECA39P1702

### NOTICE

- Always use new O-rings.
- When installing the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rails, or O-rings.
- Be careful not to twist or pinch the O-rings when installing the injectors.
- When installing the injector, install it at the same position as the removed cylinder.
- If an injector is subject to strong shocks or excessive force, replace it.

1. Install a new seal onto the end of each injector.
2. Install the injectors to the fuel rail, making sure to install them in the correct direction.
3. Install a seal onto the end of each injector.
4. Install the injector assemblies to the throttle bodies.



5. Check the injector pressure after the injectors are installed to the throttle bodies. Refer to “CHECKING THE INJECTOR PRESSURE” on page 7-9.

EAS2S31098

## CHECKING THE INJECTOR PRESSURE

### TIP

- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

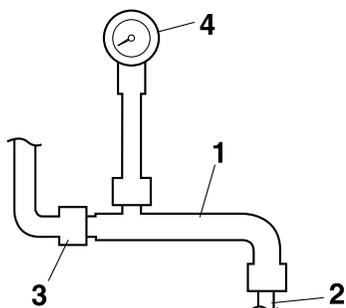
1. Check:
  - Injector pressure



- a. Connect the injector pressure adapter “1” to the fuel rail joint “2”, and then connect an air compressor “3” to the adapter.
- b. Connect the pressure gauge “4” to the injector pressure adapter “1”.



**Pressure gauge**  
 90890-03153  
 YU-03153  
**Fuel injector pressure adapter**  
 90890-03210  
 YU-03210



- c. Close the valve on the injector pressure adapter.
- d. Apply air pressure with the air compressor.
- e. Open the valve on the injector pressure adapter until the specified pressure is reached.



**Specified air pressure**  
 490 kPa (5.0 kgf/cm<sup>2</sup>, 71.1 psi)

ECA2S31073

**NOTICE**

**Never exceed the specified air pressure or damage could occur.**

- f. Close the valve on the injector pressure adapter.
- g. Check that the specified air pressure is held at least one minute.  
 Pressure drops → Check the pressure gauge and adapter.  
 Check the seals and O-rings and then re-install.  
 Out of specification → Replace the fuel injectors.



EAS39P1706

**CHECKING AND CLEANING THE THROTTLE BODIES**

**TIP**

Before cleaning the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Compression pressure
- Air filter element
- Throttle body joints
- Fuel hose
- Air induction system
- Exhaust system
- Breather hoses
- Vacuum hoses
- Throttle body hoses
- Canister purge hoses (for California only)
- Fast idle plunger inlet hose
- Fast idle plunger outlet hose

EWA14B1021

**WARNING**

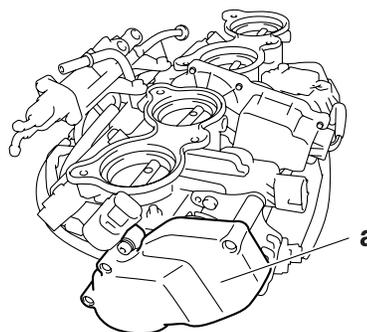
- If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.
- Before removing the throttle bodies to clean them, check the operation of the throttle bodies, refer to “FUEL INJECTION SYSTEM” on page 8-31.

1. Check:

- Throttle bodies  
 Cracks/damage → Replace the throttle bodies as a set.

**TIP**

If the protector “a” is scratched or damaged, replace the throttle bodies as a set.



2. Clean:

- Throttle bodies







- Positive tester probe  
Green/yellow (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)

- d. Set the main switch to “ON” and fully close the sub-throttle valves.
- e. Measure the sub-throttle position sensor voltage.
- f. Adjust the sub-throttle position sensor angle so that the voltage is within the specified range.

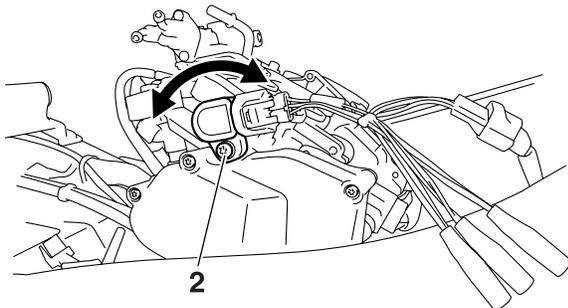


**Output voltage**  
**0.3–0.4 V**

- g. After adjusting the sub-throttle position sensor angle, tighten the sub-throttle position sensor screw “2”.



**Sub-throttle position sensor screw**  
**3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)**

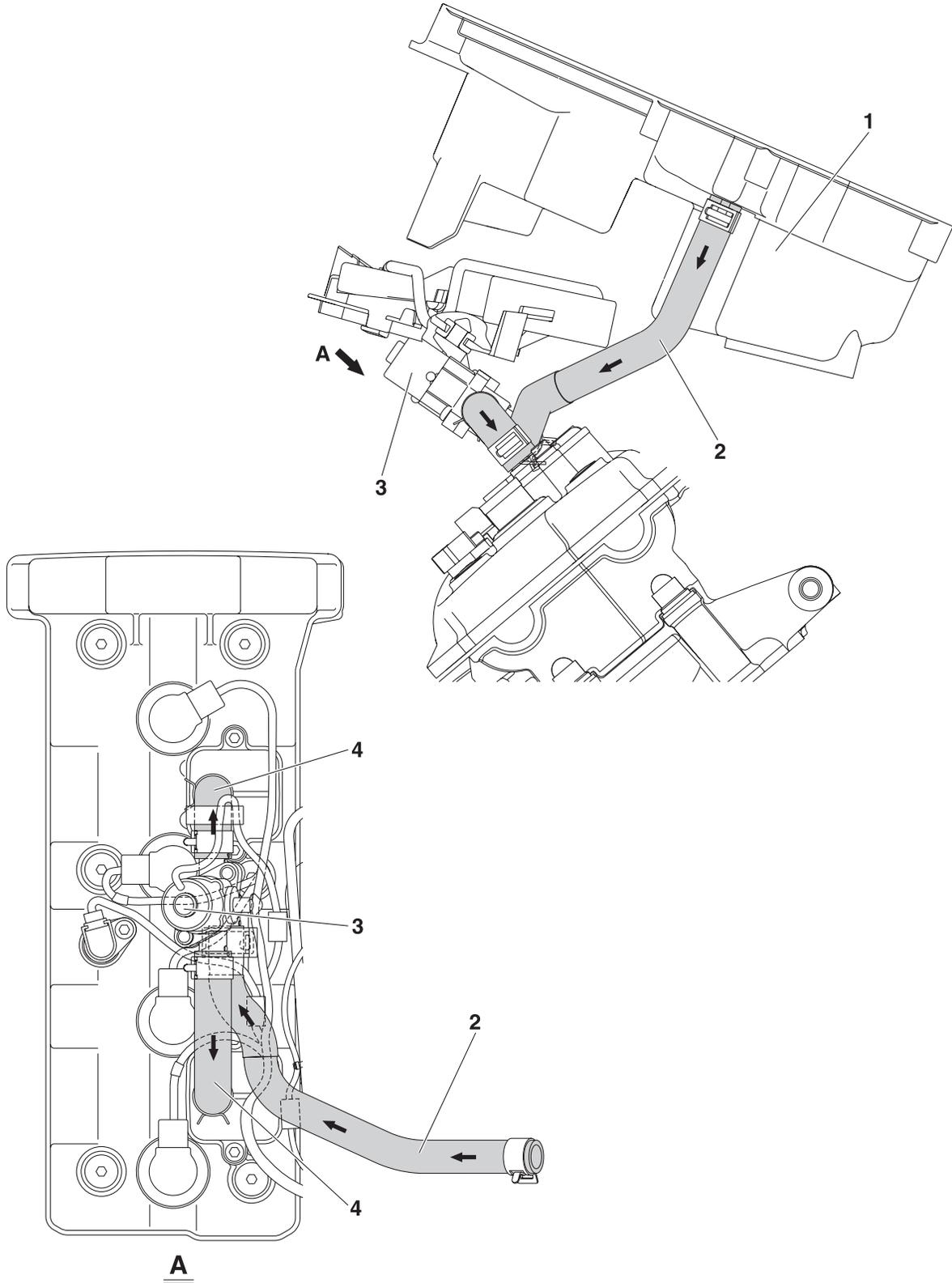


- h. Remove the test harness (3P) -sub throttle position sensor and install the throttle bodies.



EAS27040

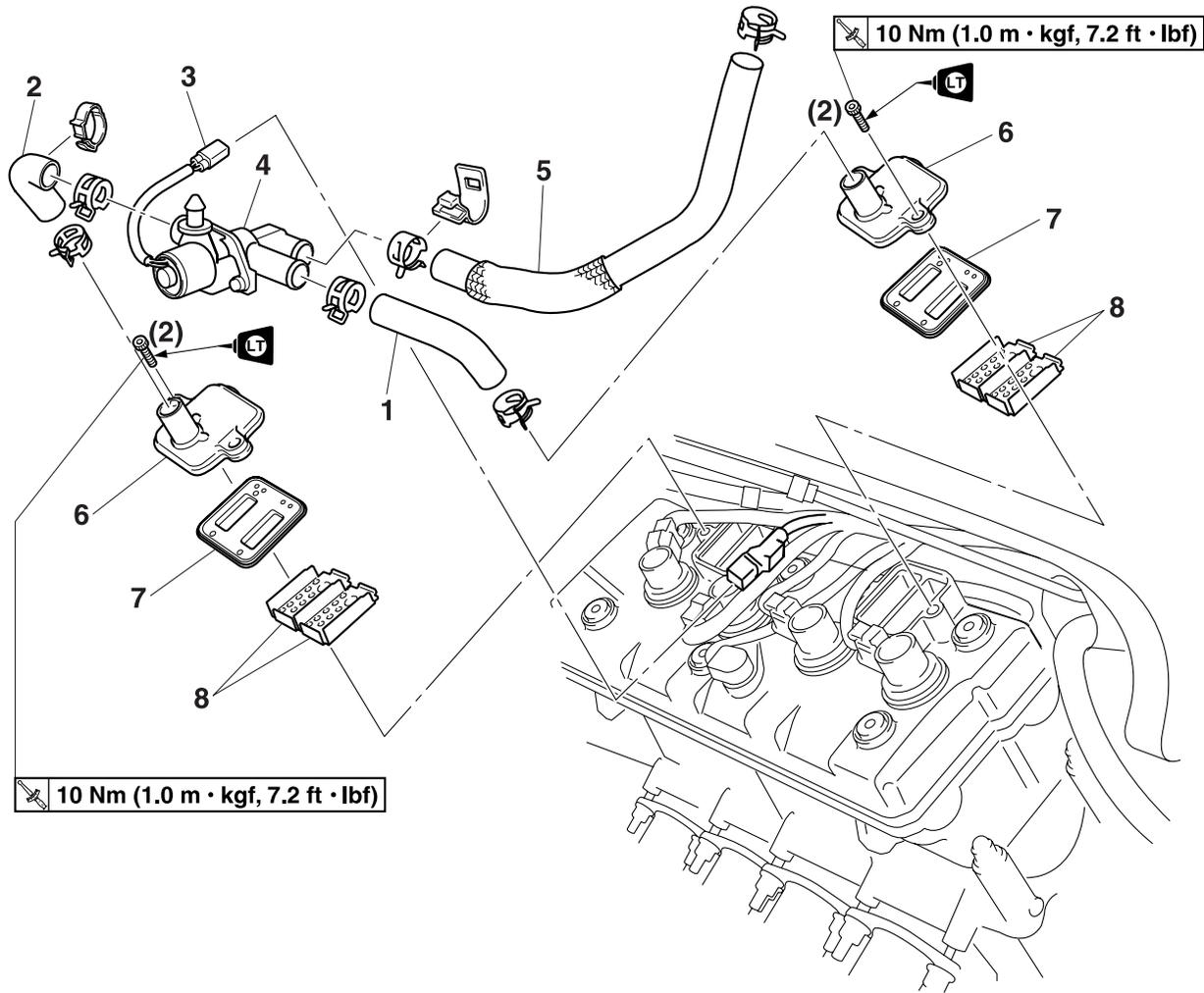
## AIR INDUCTION SYSTEM



1. Air filter case
2. Air induction system hose (air filter case to air cut-off valve)
3. Air cut-off valve
4. Air induction system hose (air cut-off valve to reed valve cover)

# AIR INDUCTION SYSTEM

## Removing the air cut-off valve assembly and reed valves



| Order | Job/Parts to remove   | Q'ty | Remarks  |
|-------|---|------|--|
|       | Rider seat  |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Fuel tank   |      | Refer to "FUEL TANK" on page 7-1.                |
|       | Air filter case   |      | Refer to "GENERAL CHASSIS" on page 4-1.          |
|       | Radiator  |      | Refer to "RADIATOR" on page 6-1.                 |
| 1     | Air induction system hose (air cut-off valve to reed valve cover) | 1    |  |
| 2     | Air induction system hose (air cut-off valve to reed valve cover) | 1    |  |
| 3     | Air cut-off valve coupler   | 1    | Disconnect.                                      |
| 4     | Air cut-off valve   | 1    |  |
| 5     | Air induction system hose (air filter case to air cut-off valve)  | 1    |  |
| 6     | Reed valve cover  | 2    |  |
| 7     | Reed valve assembly   | 2    |  |
| 8     | Reed valve plate  | 4    |  |
|       |   |      | For installation, reverse the removal procedure. |

EAS27060

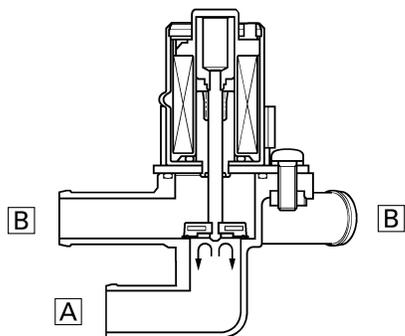
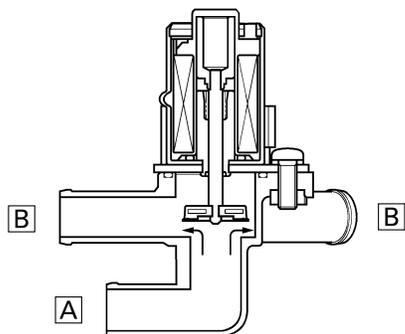
## CHECKING THE AIR INDUCTION SYSTEM

### 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 (1112 to 1292 °F).

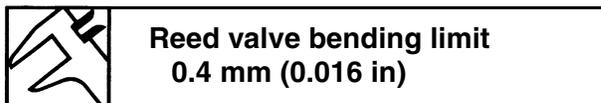
### Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.

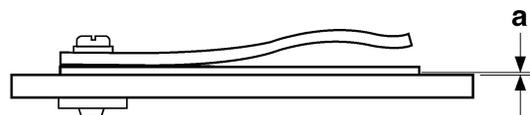


- A. From the air filter case
- B. To the cylinder head

1. Check:
  - Hoses  
Loose connections → Connect properly.  
Cracks/damage → Replace.
2. Check:
  - Reed valve
  - Reed valve stopper
  - Reed valve seat  
Cracks/damage → Replace the reed valve assembly.
3. Measure:
  - Reed valve bending limit "a"  
Out of specification → Replace the reed valve assembly.



**Reed valve bending limit  
0.4 mm (0.016 in)**



4. Check:
  - Air cut-off valve  
Cracks/damage → Replace.
5. Check
  - Air induction system solenoid  
Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-116.

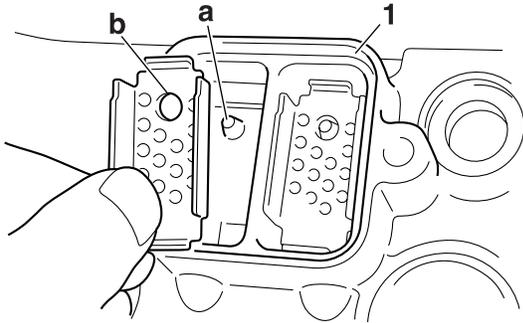
EAS39P1712

## INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
  - Reed valve plate

### TIP

Align the projection "a" on the cylinder head cover "1" with the hole "b" in the reed valve plate.



- Reed valve assembly

## TIP

Install the reed valve assembly so that the open side turns to the exhaust side of the engine.



A. Exhaust side

## 2. Install:

- Reed valve cover



**Reed valve cover bolt**  
**10 Nm (1.0 m·kgf, 7.2 ft·lbf)**  
**LOCTITE®**

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# ELECTRICAL SYSTEM

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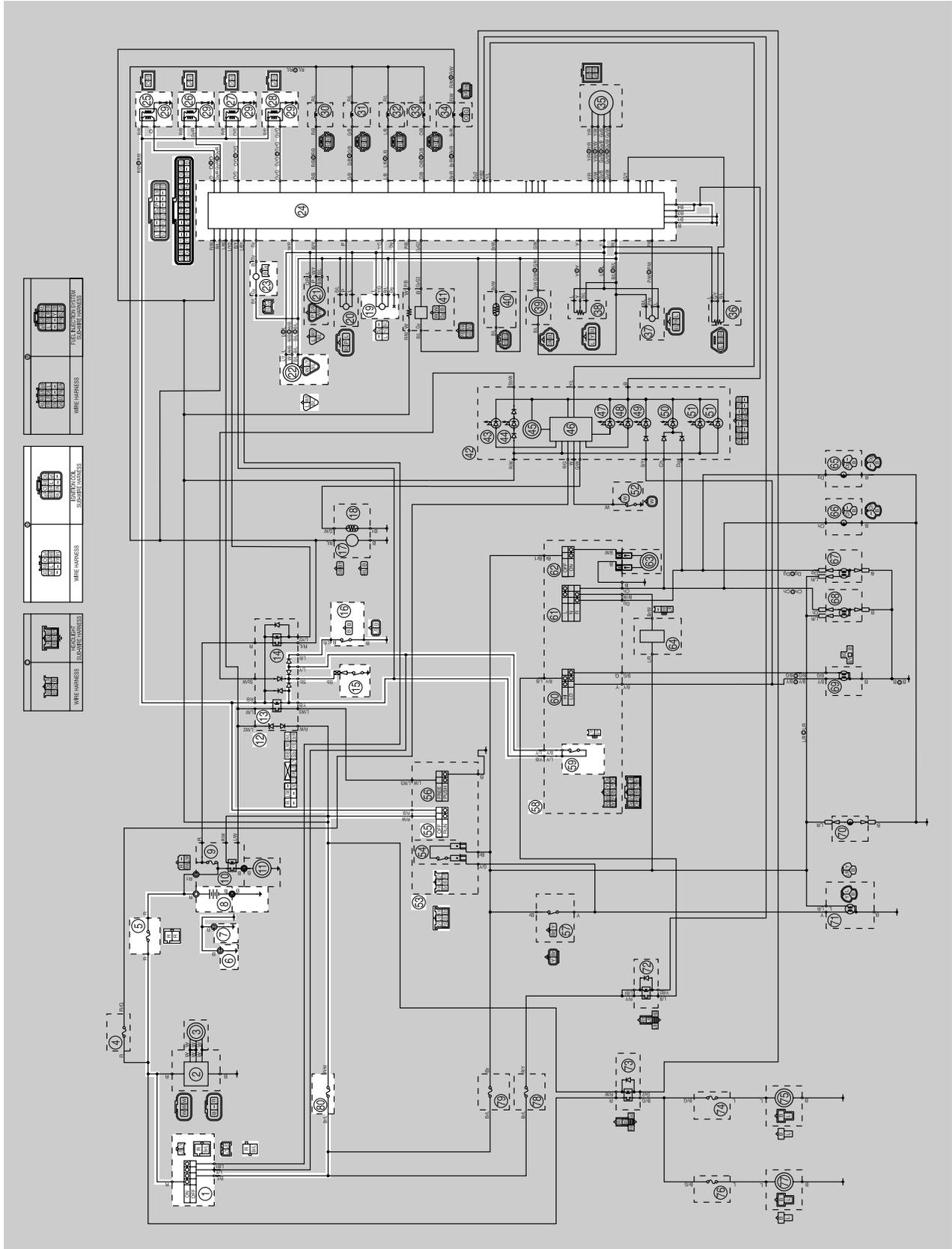


EAS27090

## IGNITION SYSTEM

EAS27110

## CIRCUIT DIAGRAM



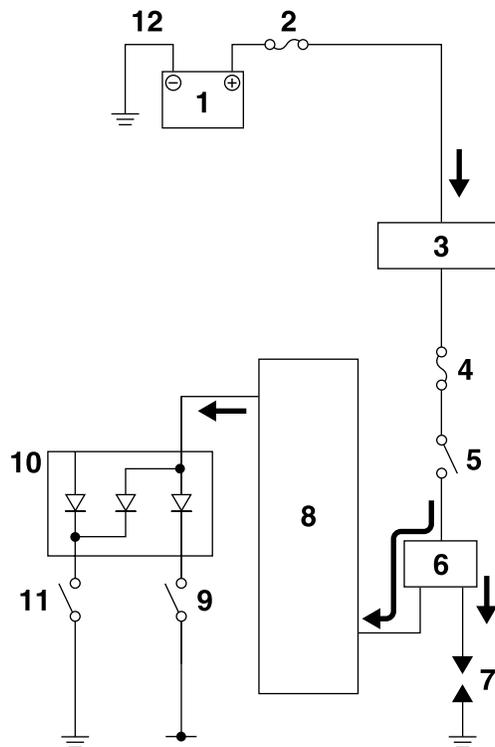
1. Main switch
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery
12. Relay unit
13. Starting circuit cut-off relay
15. Neutral switch
16. Sidestand switch
19. Lean angle sensor
22. Cylinder identification sensor
23. Crankshaft position sensor
24. ECU (engine control unit)
25. Ignition coil #1
26. Ignition coil #2
27. Ignition coil #3
28. Ignition coil #4
29. Spark plug
53. Right handlebar switch
55. Engine stop switch
58. Left handlebar switch
59. Clutch switch
80. Ignition fuse

EAS39P1804

## ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the neutral switch and sidestand switch are set to "OFF", thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral switch circuit is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral switch circuit is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (engine control unit)
9. Sidestand switch
10. Relay unit (diode)
11. Neutral switch
12. Battery negative lead

EAS27150

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Fuel tank
4. Radiator

|   |     |  |
|---|-----|--|
| <p>1. Check the fuses.<br/>(Main and ignition)<br/>Refer to "CHECKING THE FUSES"<br/>on page 8-101.</p>                                     | NG→ | <p>Replace the fuse(s).</p>  |
| OK↓   |     |  |
| <p>2. Check the battery.<br/>Refer to "CHECKING AND<br/>CHARGING THE BATTERY" on<br/>page 8-102.</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 spark plugs.<br/>Refer to "CHECKING THE SPARK<br/>PLUGS" on page 3-4.</p>   | NG→ | <p>Re-gap or replace the spark plugs.</p>  |
| OK↓   |     |  |
| <p>4. Check the ignition spark gap.<br/>Refer to "CHECKING THE IGNI-<br/>TION COILS" on page 8-108.</p>                                     | OK→ | <p>Ignition system is OK.</p>  |
| NG↓   |     |  |
| <p>5. Check the ignition coils.<br/>Refer to "CHECKING THE IGNI-<br/>TION COILS" on page 8-108.</p>   | NG→ | <p>Replace the ignition coils.</p>   |
| OK↓   |     |  |
| <p>6. Check the crankshaft position sen-<br/>sor.<br/>Refer to "CHECKING THE<br/>CRANKSHAFT POSITION SEN-<br/>SOR" on page 8-109.</p>       | NG→ | <p>Replace the crankshaft position sen-<br/>sor.</p>   |
| OK↓   |     |  |
| <p>7. Check the cylinder identification<br/>sensor.<br/>Refer to "CHECKING THE CYLIN-<br/>DER IDENTIFICATION SENSOR"<br/>on page 8-117.</p> | NG→ | <p>Replace the cylinder identification<br/>sensor.</p>   |
| OK↓   |     |  |

# IGNITION SYSTEM

|   |     |  |
|---|-----|--|
| 8. Check the main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                                 | NG→ | Replace the main switch.                                 |
| OK↓   |     |  |
| 9. Check the engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                          | NG→ | Replace the right handlebar switch.                      |
| OK↓   |     |  |
| 10. Check the neutral switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                             | NG→ | Replace the neutral switch.                              |
| OK↓   |     |  |
| 11. Check the sidestand switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                           | NG→ | Replace the sidestand switch.                            |
| OK↓   |     |  |
| 12. Check the clutch switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                              | NG→ | Replace the clutch switch.                               |
| OK↓   |     |  |
| 13. Check the relay unit (starting circuit cut-off relay).<br>Refer to "CHECKING THE RELAYS" on page 8-105. | NG→ | Replace the relay unit.                                  |
| OK↓   |     |  |
| 14. Check the relay unit (diode).<br>Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-107.              | NG→ | Replace the relay unit.                                  |
| OK↓   |     |  |
| 15. Check the lean angle sensor.<br>Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-109.                | NG→ | Replace the lean angle sensor.                           |
| OK↓   |     |  |
| 16. Check the entire ignition system's wiring.<br>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

---

1. Main switch
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery
10. Starter relay
11. Starter motor
12. Relay unit
13. Starting circuit cut-off relay
15. Neutral switch
16. Sidestand switch
53. Right handlebar switch
55. Engine stop switch
56. Start switch
58. Left handlebar switch
59. Clutch switch
80. Ignition fuse

# ELECTRIC STARTING SYSTEM

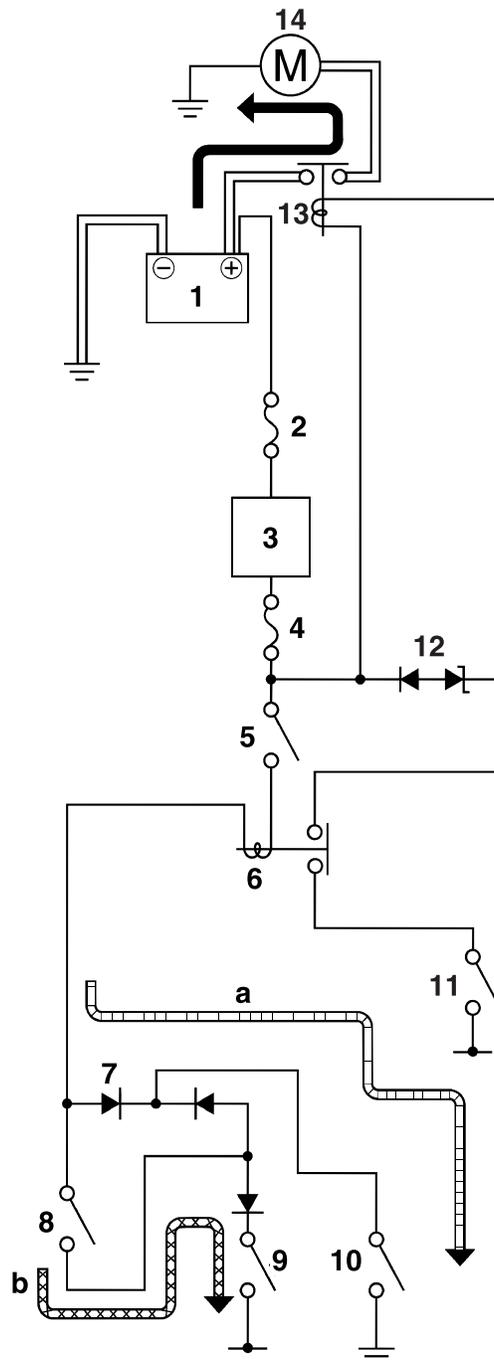
EAS27180

## STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to “○” and the main switch is set to “ON” (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the starter switch.



# 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. Diode
- 13. Starter relay
- 14. Starter motor

EAS27190

## TROUBLESHOOTING

The starter motor fails to turn.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Fuel tank
4. Air filter case
5. Throttle bodies

|  |            |  |
|--|------------|--|
| <p>1. Check the fuses.<br/>(Main and ignition)<br/>Refer to "CHECKING THE FUSES"<br/>on page 8-101.</p>                    | <p>NG→</p> | <p>Replace the fuse(s).</p>  |
| <p>OK↓</p>   |            |  |
| <p>2. Check the battery.<br/>Refer to "CHECKING AND<br/>CHARGING THE BATTERY" on<br/>page 8-102.</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 starter motor operation.<br/>Refer to "CHECKING THE<br/>STARTER MOTOR OPERATION"<br/>on page 8-110.</p>    | <p>OK→</p> | <p>Starter motor is OK. Perform the elec-<br/>tric starting system troubleshooting,<br/>starting with step 5.</p>            |
| <p>NG↓</p>   |            |  |
| <p>4. Check the starter motor.<br/>Refer to "CHECKING THE<br/>STARTER MOTOR" on page 5-43.</p>                             | <p>NG→</p> | <p>Repair or replace the starter motor.</p>  |
| <p>OK↓</p>   |            |  |
| <p>5. Check the relay unit (starting circuit<br/>cut-off relay).<br/>Refer to "CHECKING THE<br/>RELAYS" on page 8-105.</p> | <p>NG→</p> | <p>Replace the relay unit.</p>   |
| <p>OK↓</p>   |            |  |
| <p>6. Check the relay unit (diode).<br/>Refer to "CHECKING THE RELAY<br/>UNIT (DIODE)" on page 8-107.</p>                  | <p>NG→</p> | <p>Replace the relay unit.</p>   |
| <p>OK↓</p>   |            |  |
| <p>7. Check the starter relay.<br/>Refer to "CHECKING THE<br/>RELAYS" on page 8-105.</p>                                   | <p>NG→</p> | <p>Replace the starter relay.</p>  |
| <p>OK↓</p>   |            |  |

# ELECTRIC STARTING SYSTEM

|   |     |  |
|---|-----|--|
| 8. Check the main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.               | NG→ | Replace the main switch.                                 |
| OK↓   |     |  |
| 9. Check the engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.        | NG→ | Replace the right handlebar switch.                      |
| OK↓   |     |  |
| 10. Check the neutral switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.           | NG→ | Replace the neutral switch.                              |
| OK↓   |     |  |
| 11. Check the sidestand switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.         | NG→ | Replace the sidestand switch.                            |
| OK↓   |     |  |
| 12. Check the clutch switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.            | NG→ | Replace the clutch switch.                               |
| OK↓   |     |  |
| 13. Check the start switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.             | NG→ | Replace the right handlebar switch.                      |
| OK↓   |     |  |
| 14. Check the entire starting system's wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-7. | NG→ | Properly connect or repair the starting system's wiring. |
| OK↓   |     |  |
| The starting system circuit is OK.  |     |  |



2. Rectifier/regulator
3. AC magneto
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery

EAS27230

## TROUBLESHOOTING

The battery is not being charged.

### TIP

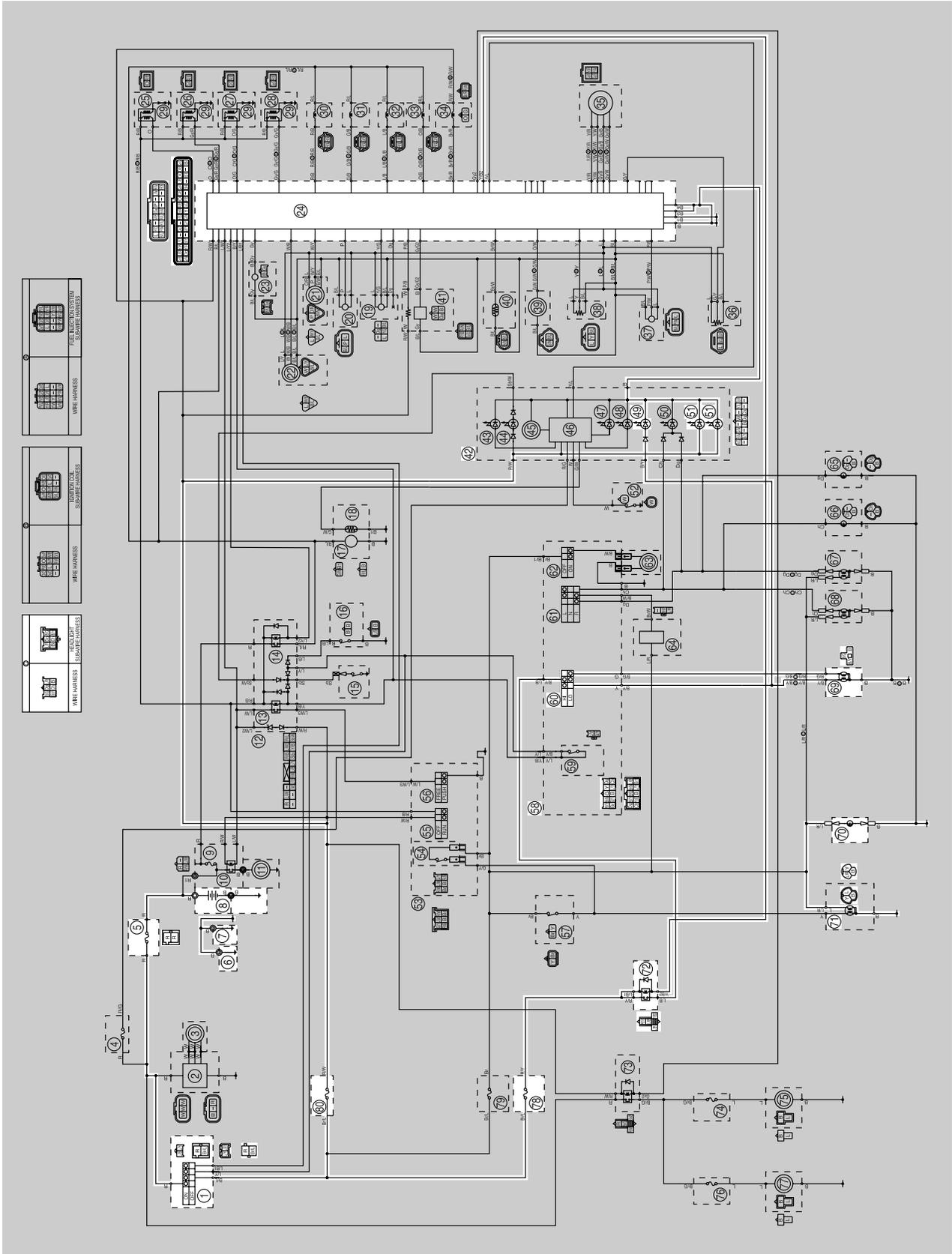
- Before troubleshooting, remove the following part(s):
  1. Rider seat
  2. Passenger seat

|  |     |  |
|--|-----|--|
| <p>1. Check the fuse.<br/>(Main)<br/>Refer to "CHECKING THE FUSES"<br/>on page 8-101.</p>                          | NG→ | <p>Replace the fuse.</p>   |
| OK↓  |     |  |
| <p>2. Check the battery.<br/>Refer to "CHECKING AND<br/>CHARGING THE BATTERY" on<br/>page 8-102.</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 stator coil.<br/>Refer to "CHECKING THE STATOR<br/>COIL" on page 8-110.</p>                        | NG→ | <p>Replace the stator coil assembly.</p>   |
| OK↓  |     |  |
| <p>4. Check the rectifier/regulator.<br/>Refer to "CHECKING THE RECTI-<br/>FIER/REGULATOR" on page 8-<br/>111.</p> | NG→ | <p>Replace the rectifier/regulator.</p>  |
| OK↓  |     |  |
| <p>5. Check the entire charging system's<br/>wiring.<br/>Refer to "CIRCUIT DIAGRAM" on<br/>page 8-13.</p>          | NG→ | <p>Properly connect or repair the charg-<br/>ing system's wiring.</p>  |
| OK↓  |     |  |
| <p>The charging system circuit is OK.</p>  |     |  |



EAS27240  
**LIGHTING SYSTEM**

EAS27250  
**CIRCUIT DIAGRAM**



- 1. Main switch
- 5. Main fuse
- 6. Frame ground
- 7. Engine ground
- 8. Battery
- 24. ECU (engine control unit)
- 42. Meter assembly
- 49. High beam indicator light
- 51. Meter light
- 58. Left handlebar switch
- 60. Dimmer switch
- 69. Headlight
- 70. License plate light
- 71. Tail/brake light
- 72. Headlight relay (on/off)
- 78. Headlight fuse
- 80. Ignition fuse

EAS27260

## TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license light or meter light.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Headlight assembly
4. Fuel tank

|  |            |  |
|--|------------|--|
| <p>1. Check the each bulbs and bulb sockets condition.<br/>Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-100.</p> | <p>NG→</p> | <p>Replace the bulb(s) and bulb socket(s).</p>   |
| <p>OK↓</p>   |            |  |
| <p>2. Check the fuses.<br/>(Main, headlight and ignition)<br/>Refer to "CHECKING THE FUSES" on page 8-101.</p>               | <p>NG→</p> | <p>Replace the fuse(s).</p>  |
| <p>OK↓</p>   |            |  |
| <p>3. Check the battery.<br/>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-102.</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>4. Check the main switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>  | <p>NG→</p> | <p>Replace the main switch.</p>  |
| <p>OK↓</p>   |            |  |
| <p>5. Check the dimmer switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>  | <p>NG→</p> | <p>The dimmer switch is faulty. Replace the left handlebar switch.</p>   |
| <p>OK↓</p>   |            |  |
| <p>6. Check the headlight relay (on/off).<br/>Refer to "CHECKING THE RELAYS" on page 8-105.</p>                              | <p>NG→</p> | <p>Replace the headlight relay.</p>  |
| <p>OK↓</p>   |            |  |

7. Check the entire lighting system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-17.

NG→

Properly connect or repair the lighting system's wiring.

OK↓

Replace the ECU or meter assembly.



1. Main switch
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery
12. Relay unit
15. Neutral switch
18. Fuel sender
21. Speed sensor
24. ECU (engine control unit)
39. Coolant temperature sensor
42. Meter assembly
43. Oil level warning light
44. Neutral indicator light
45. Tachometer
46. Multi-function meter
50. Turn signal indicator light
52. Oil level switch
53. Right handlebar switch
54. Front brake light switch
57. Rear brake light switch
58. Left handlebar switch
61. Turn signal switch
62. Horn switch
63. Horn
64. Turn signal relay
65. Rear right turn signal light
66. Rear left turn signal light
67. Front right turn signal/position light
68. Front left turn signal/position light
71. Tail/brake light
79. Signaling system fuse
80. Ignition fuse

EAS27290

## TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

### TIP

- Before troubleshooting, remove the following part(s):
  1. Rider seat
  2. Passenger seat
  3. Fuel tank
  4. Air filter case
  5. Throttle bodies

|  |     |  |
|--|-----|--|
| 1. Check the fuses.<br>(Main, ignition and signal)<br>Refer to "CHECKING THE FUSES" on page 8-101. | NG→ | Replace the fuse(s).   |
| OK↓  |     |  |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-102.               | 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.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                        | NG→ | Replace the main switch.   |
| OK↓  |     |  |
| 4. Check the entire signaling system's wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-21.         | NG→ | Properly connect or repair the signaling system's wiring.  |
| OK↓  |     |  |
| This circuit is OK.  |     |  |

### Check the signaling system

The horn fails to sound.

|   |     |                                    |
|---|-----|------------------------------------|
| 1. Check the horn switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97. | NG→ | Replace the left handlebar switch. |
| OK↓   |     |                                    |
| 2. Check the horn.<br>Refer to "CHECKING THE HORN" on page 8-112.           | NG→ | Replace the horn.                  |
| OK↓   |     |                                    |

|  |     |  |
|--|-----|--|
| <p>3. Check the entire signaling system's wiring.<br/>Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>                       | NG→ | <p>Properly connect or repair the signaling system's wiring.</p> |
| OK↓  |     |  |
| <p>This circuit is OK.</p>   |     |  |
| <p>The tail/brake light fails to come on.</p>  |     |  |
| <p>1. Check the tail/brake light bulb and socket.<br/>Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-100.</p>  | NG→ | <p>Replace the tail/brake light bulb, socket or both.</p>        |
| OK↓  |     |  |
| <p>2. Check the front brake light switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>                         | NG→ | <p>Replace the front brake light switch.</p>                     |
| OK↓  |     |  |
| <p>3. Check the rear brake light switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>                          | NG→ | <p>Replace the rear brake light switch.</p>                      |
| OK↓  |     |  |
| <p>4. Check the entire signaling system's wiring.<br/>Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>                       | NG→ | <p>Properly connect or repair the signaling system's wiring.</p> |
| OK↓  |     |  |
| <p>This circuit is OK.</p>   |     |  |
| <p>The turn signal light, turn signal indicator light or both fail to blink.</p>   |     |  |
| <p>1. Check the turn signal light bulb and socket.<br/>Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-100.</p> | NG→ | <p>Replace the turn signal light bulb(s), socket(s) or both.</p> |
| OK↓  |     |  |
| <p>2. Check the turn signal switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>                               | NG→ | <p>Replace the left handlebar switch.</p>                        |
| OK↓  |     |  |

|   |     |  |
|---|-----|--|
| <p>3. Check the turn signal relay.<br/>Refer to "CHECKING THE TURN SIGNAL RELAY" on page 8-106.</p>   | NG→ | <p>Replace the turn signal relay.</p>                            |
| OK↓   |     |  |
| <p>4. Check the entire signaling system's wiring.<br/>Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>    | NG→ | <p>Properly connect or repair the signaling system's wiring.</p> |
| OK↓   |     |  |
| <p>This circuit is OK.</p>  |     |  |
| <p>The neutral indicator light fails to come on.</p>  |     |  |
| <p>1. Check the neutral switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>                | NG→ | <p>Replace the neutral switch.</p>                               |
| OK↓   |     |  |
| <p>2. Check the relay unit (diode).<br/>Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-107.</p> | NG→ | <p>Replace the relay unit.</p>                                   |
| OK↓   |     |  |
| <p>3. Check the entire signaling system's wiring.<br/>Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>    | NG→ | <p>Properly connect or repair the signaling system's wiring.</p> |
| OK↓   |     |  |
| <p>Replace the meter assembly.</p>  |     |  |
| <p>The oil level warning light fails to come on.</p>  |     |  |
| <p>1. Check the oil level switch.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>              | NG→ | <p>Replace the oil level switch.</p>                             |
| OK↓   |     |  |
| <p>2. Check the entire signaling system's wiring.<br/>Refer to "CIRCUIT DIAGRAM" on page 8-21.</p>    | NG→ | <p>Properly connect or repair the signaling system's wiring.</p> |
| OK↓   |     |  |
| <p>Replace the meter assembly.</p>  |     |  |

The fuel level warning light fails to come on.

1. Check the fuel sender.  
Refer to "CHECKING THE FUEL SENDER" on page 8-112.

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 signaling system's wiring.

OK↓

Replace the ECU or meter assembly.

The speedometer fails to operate.

1. Check the speed sensor.  
Refer to "CHECKING THE SPEED SENSOR" on page 8-113.

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 signaling system's wiring.

OK↓

Replace the ECU or meter assembly.

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor.  
Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-114.

NG→

Replace the coolant temperature sensor.

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↓

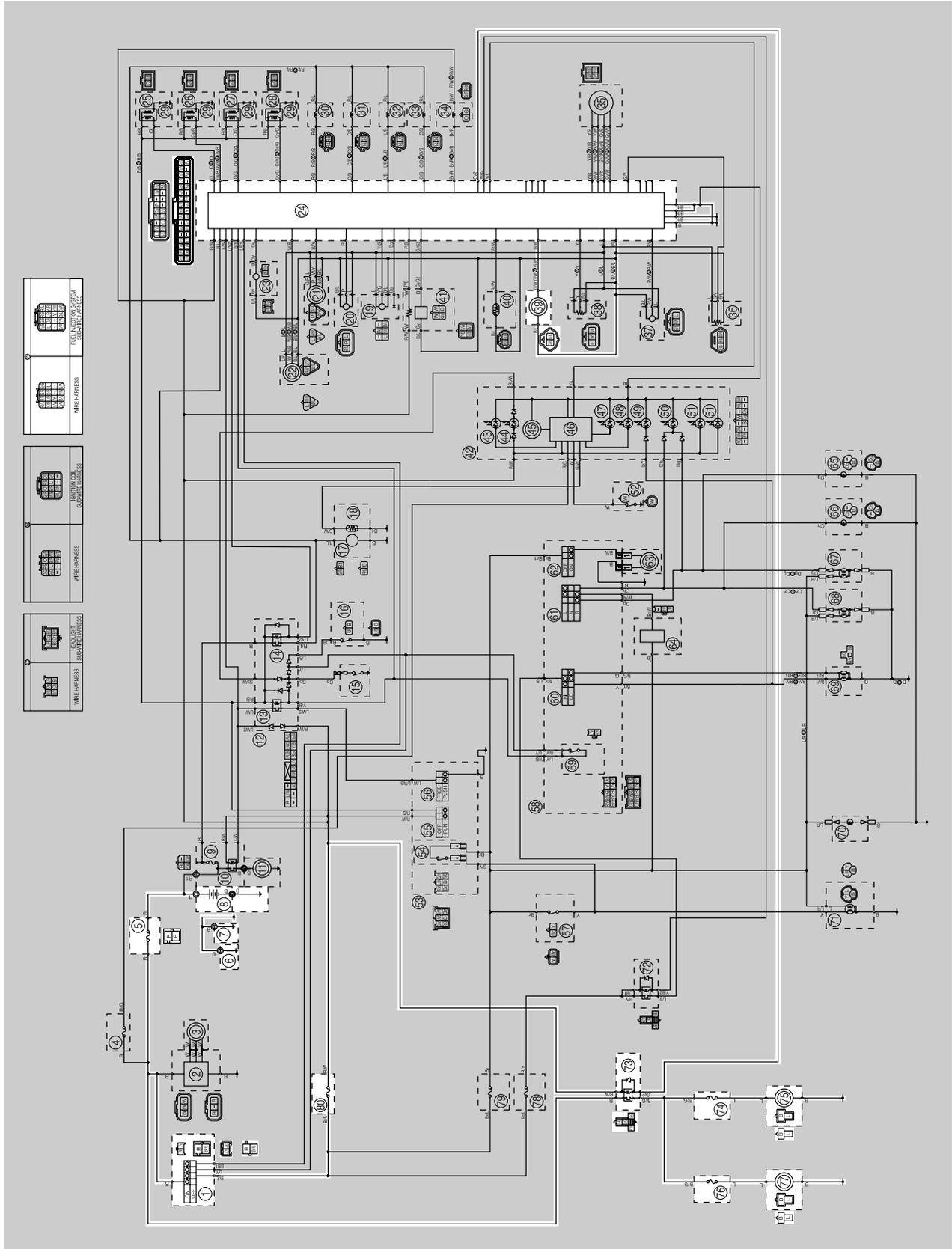
Replace the ECU or meter assembly.

EAS27300

## COOLING SYSTEM

EAS27310

## CIRCUIT DIAGRAM



- 1. Main switch
- 5. Main fuse
- 6. Frame ground
- 7. Engine ground
- 8. Battery
- 24. ECU (engine control unit)
- 39. Coolant temperature sensor
- 73. Radiator fan motor relay
- 74. Right radiator fan motor fuse
- 75. Right radiator fan motor
- 76. Left radiator fan motor fuse
- 77. Left radiator fan motor
- 80. Ignition fuse

EAS27320

## TROUBLESHOOTING

### TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Fuel tank
4. Air filter case
5. Throttle bodies

|   |     |  |
|---|-----|--|
| <p>1. Check the fuses.<br/>(Main, ignition and radiator fan motor)<br/>Refer to "CHECKING THE FUSES" on page 8-101.</p> | NG→ | <p>Replace the fuse(s).</p>  |
| OK↓   |     |  |
| <p>2. Check the battery.<br/>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-102.</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.<br/>Refer to "CHECKING THE SWITCHES" on page 8-97.</p>                                     | NG→ | <p>Replace the main switch.</p>  |
| OK↓   |     |  |
| <p>4. Check the radiator fan motor.<br/>Refer to "CHECKING THE RADIATOR FAN MOTORS" on page 8-114.</p>                  | NG→ | <p>Replace the radiator fan motor(s).</p>  |
| OK↓   |     |  |
| <p>5. Check the radiator fan motor relay.<br/>Refer to "CHECKING THE RELAYS" on page 8-105.</p>                         | NG→ | <p>Replace the radiator fan motor relay.</p>   |
| OK↓   |     |  |
| <p>6. Check the coolant temperature sensor.<br/>Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-114.</p>   | NG→ | <p>Replace the coolant temperature sensor.</p>   |
| OK↓   |     |  |

7. Check the entire cooling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-27.

NG→

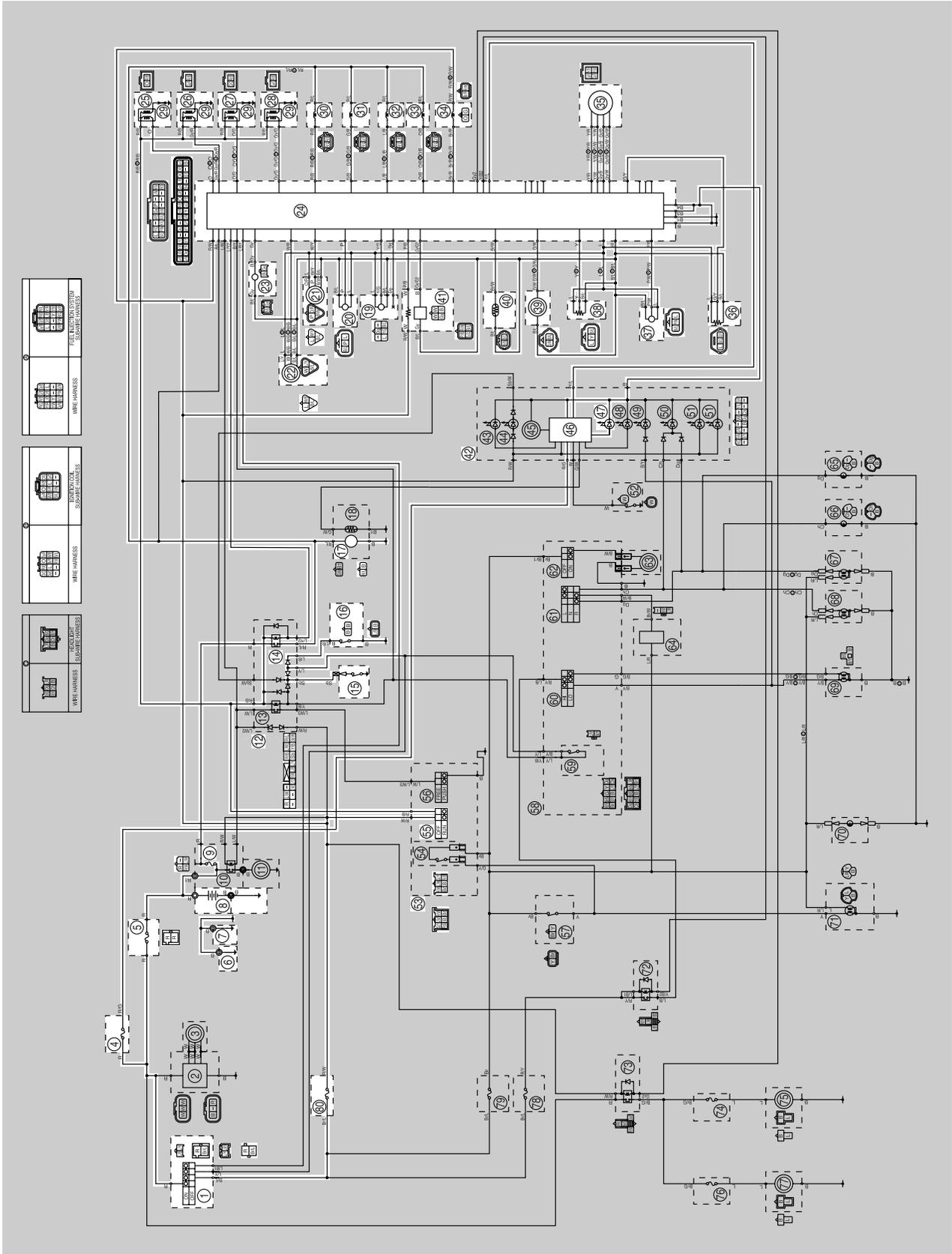
Properly connect or repair the cooling system's wiring.

OK↓

Replace the ECU.

EAS27331  
**FUEL INJECTION SYSTEM**

EAS27340  
**CIRCUIT DIAGRAM**



1. Main switch
4. Backup fuse
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery
9. Fuel injection system fuse
12. Relay unit
14. Fuel pump relay
15. Neutral switch
16. Sidestand switch
17. Fuel pump
19. Lean angle sensor
20. Atmospheric pressure sensor
21. Speed sensor
22. Cylinder identification sensor
23. Crankshaft position sensor
24. ECU (engine control unit)
25. Ignition coil #1
26. Ignition coil #2
27. Ignition coil #3
28. Ignition coil #4
29. Spark plug
30. Injector #1
31. Injector #2
32. Injector #3
33. Injector #4
34. Air induction system solenoid
35. Sub-throttle servo motor
36. Sub-throttle position sensor
37. Intake air pressure sensor
38. Throttle position sensor
39. Coolant temperature sensor
40. Intake air temperature sensor
41. O<sub>2</sub> sensor
42. Meter assembly
46. Multi-function meter
47. Engine trouble warning light
53. Right handlebar switch
55. Engine stop switch
80. Ignition fuse

EAS27351

## ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code number is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes while 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 clock/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 fuel injection system operation

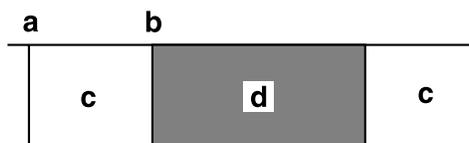
| Warning light indication | ECU operation                                | Fuel injection operation   | Vehicle operation                                     |
|--------------------------|--|--|---|
| Flashing*                | Warning provided when unable to start engine | Operation stopped  | Cannot 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 following conditions 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 around 2 seconds after the main switch has been set 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.



- Main switch "OFF"
- Main switch "ON"
- Engine trouble warning light off
- Engine trouble warning light on for around 2 seconds

## **ECU detects an abnormal signal from a sensor**

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue operating or stop operating, depending on the conditions.

EAS30580

## TROUBLESHOOTING METHOD

**The engine operation is not normal and the engine trouble warning light comes on.**

1. Check:
  - Fault code number



- a. Check the fault code number displayed on the meter.
- b. Identify the faulty system with the fault code number.
- c. Identify the probable cause of the malfunction.



2. Check and repair the probable cause of the malfunction.

| Fault code No.   | No fault code No. |
|--|-------------------|
| Check and repair.<br>Refer to "TROUBLESHOOTING DETAILS" on page 8-37.<br>Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS" on page 8-37. | Check and repair. |

3. Perform the reinstatement action for the fuel injection system.  
Refer to "Reinstatement method" in the appropriate table in "TROUBLESHOOTING DETAILS" on page 8-37.
4. Set the main switch to "OFF", then to "ON" again, and then check that no fault code number is displayed.

**TIP**

If another fault code number is displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS" on page 8-37.

**TIP**

Setting the main switch to "OFF" will not erase the malfunction history.

**The engine operation is not normal, but the engine trouble warning light does not come on.**

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS" on page 8-37.

|   |
|---|
| d:01: Throttle position sensor (throttle angle) |
| d:02: Atmospheric pressure sensor               |
| d:03: Intake air pressure sensor                |
| d:05: Intake air temperature sensor             |
| d:06: Coolant temperature sensor                |
| d:07: Speed sensor                              |
| d:08: Lean angle sensor                         |
| d:30: Cylinder-#1 ignition coil                 |
| d:31: Cylinder-#2 ignition coil                 |
| d:32: Cylinder-#3 ignition coil                 |
| d:33: Cylinder-#4 ignition coil                 |
| d:36: Injector #1                               |
| d:37: Injector #2                               |
| d:38: Injector #3                               |
| d:39: Injector #4                               |
| d:48: Air induction system solenoid             |
| d:56: Sub-throttle servo motor                  |

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

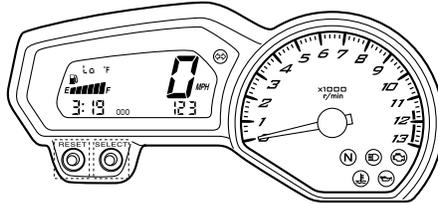
If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS27411

## DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “ON”.
2. Disconnect the wire harness coupler from the fuel pump.
3. Simultaneously press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.



### TIP

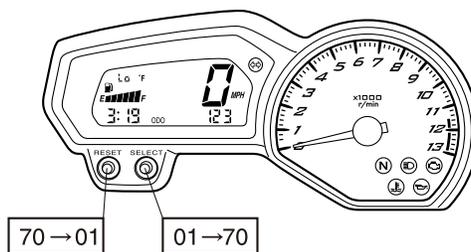
- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.
- “dl” appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

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.

### TIP

The diagnostic code number appears on the clock LCD (d01–d70).

- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button for 1 second or longer to automatically increase the diagnostic code numbers.



8. Verify the operation of the sensor or actuator.
  - Sensor operation  
The data representing the operating conditions of the sensor appears on the odometer/tripmeter/fuel reserve tripmeter LCD.
  - Actuator operation  
Set the engine stop switch to “” to operate the actuator.

### TIP

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.

EAS27462

## 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 have been completed, reset the meter display according to the reinstatement method.

Fault code No.:

Fault code number displayed on the meter when the engine failed to work normally.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE" on page 8-36.

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | 11  |  |   |
| <b>Item</b>                | <b>Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.</b>  |  |   |
| <b>Fail-safe system</b>    | Unable to start engine  |  |   |
|                            | Able to drive vehicle   |  |   |
| <b>Diagnostic code No.</b> | —   |  |   |
| <b>Meter display</b>       | —   |  |   |
| <b>Procedure</b>           | —   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of cylinder identification sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).   | Poor connection → Connect it securely, or repair/replace the wire harness.   | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                 | Poor connection → Connect it securely, or repair/replace the wire harness.   | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of ignition system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the ignition system sub-wire harness.                     | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>White/black–White/black<br>Black/blue–Black/blue<br>Blue–Blue | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>11</b>  |   |   |
| <b>Item</b>                | <b>Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.</b> |   |   |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>  |   |   |
|                            | <b>Able to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 5                          | Sensor installation status<br>- Check the mounting section for loose or pinched mounting.                      | Incorrect installation → Reinstall or repair the sensor.  | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | Cylinder identification sensor malfunction   | Sensor inspection procedure<br>Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-117.<br>Replace if defective. | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction  | Replace the ECU.  |   |

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>12</b>   |  |   |
| <b>Item</b>                | <b>Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.</b>  |  |   |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>   |  |   |
|                            | <b>Unable to drive vehicle</b>  |  |   |
| <b>Diagnostic code No.</b> | —   |  |   |
| <b>Meter display</b>       | —   |  |   |
| <b>Procedure</b>           | —   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of crankshaft position sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness. | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).           | Poor connection → Connect it securely, or repair/replace the wire harness. | Crank the engine, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>12</b>  |   |   |
| <b>Item</b>                | <b>Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.</b>   |   |   |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>  |   |   |
|                            | <b>Unable to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 3                          | Continuity of wire harness   | Open or short circuit →<br>Replace the wire harness.<br>Gray–Gray<br>Black/blue–Black/blue                                | Crank the engine, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 4                          | Sensor installation status<br>- Check the mounting section for loose or pinched mounting.<br>- Check the sensor and pickup rotor clearance (0.5 mm (0.02 in)). | Incorrect installation → Rein-stall or repair the sensor.   | Crank the engine, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 5                          | Crankshaft position sensor malfunction   | Sensor inspection procedure<br>Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-109.<br>Replace if defective. | Crank the engine, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 6                          | ECU malfunction  | Replace the ECU.  |   |

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>13</b>   |  |   |
| <b>Item</b>                | <b>Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)</b>                                      |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>   |  |   |
|                            | <b>Able to drive vehicle</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:03</b>   |  |   |
| <b>Meter display</b>       | <b>Displays the intake air pressure.</b>  |  |   |
| <b>Procedure</b>           | <b>Set the engine stop switch to “○”, and then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.)</b>            |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of intake air pressure sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | <b>13</b>  |  |   |
| <b>Item</b>                | <b>Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)</b>   |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |  |   |
|                            | <b>Able to drive vehicle</b>   |  |   |
| <b>Diagnostic code No.</b> | <b>d:03</b>  |  |   |
| <b>Meter display</b>       | <b>Displays the intake air pressure.</b>   |  |   |
| <b>Procedure</b>           | <b>Set the engine stop switch to “○”, and then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.)</b>                       |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler and check each pin (for bending, wear, or locking).                       | Poor connection → Connect it securely, or repair/replace the wire harness.                                       | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of fuel injection system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                       | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness   | Open or short circuit → Replace the wire harness.<br>Black/blue–Black/blue<br>Pink/white–Pink/white<br>Blue–Blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Sensor installation status<br>- Check the mounting section for loose or pinched mounting.  | Incorrect installation → Reinstall or repair the sensor.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      | 13  |  |  |
| <b>Item</b>                | Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)                           |  |  |
| <b>Fail-safe system</b>    | Able to start engine  |  |  |
|                            | Able to drive vehicle   |  |  |
| <b>Diagnostic code No.</b> | d:03  |  |  |
| <b>Meter display</b>       | Displays the intake air pressure.   |  |  |
| <b>Procedure</b>           | Set the engine stop switch to “○”, and then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.) |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 6                          | Intake air pressure sensor malfunction  | <p>Check in the diagnostic mode (Code No. d03).</p> <p>When engine is stopped:<br/>           Atmospheric pressure at the current altitude and weather conditions is indicated.<br/>           0 m above sea level: Approx. 101 kPa<br/>           1000 m above sea level: Approx. 90 kPa<br/>           2000 m above sea level: Approx. 80 kPa<br/>           3000 m above sea level: Approx. 70 kPa</p> <p>When engine is cranking:<br/>           Make sure that the indication value changes.<br/>           Incorrect indication → Sensor malfunction → Replace the intake air pressure sensor.<br/>           Sensor inspection procedure<br/>           Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-117.</p> | <p>Place the main switch to the ON position, and check the fault code indication.</p> <p>No fault code indicated. → Recovered.<br/>           Fault code indicated. → Check the next step.</p> |
| 7                          | ECU malfunction   | Replace the ECU.   |  |

## TIP

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

# FUEL INJECTION SYSTEM

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      | 14  |  |  |
| <b>Item</b>                | Intake air pressure sensor: hose system malfunction (clogged or detached hose).   |  |  |
| <b>Fail-safe system</b>    | Able to start engine  |  |  |
|                            | Able to drive vehicle   |  |  |
| <b>Diagnostic code No.</b> | d:03  |  |  |
| <b>Meter display</b>       | Displays the intake air pressure.   |  |  |
| <b>Procedure</b>           | Set the engine stop switch to “○”, and then operate the throttle while pushing the start switch “⊗”. (If the display value changes, the performance is OK.) |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 1                          | The intake air pressure sensor hose is damaged, disconnected, clogged, twisted or bent.   | Repair or replace the sensor hose.   | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Intake air pressure sensor malfunction  | Check in the diagnostic mode (Code No. d03).<br>When engine is stopped:<br>Atmospheric pressure at the current altitude and weather conditions is indicated.<br>0 m above sea level: Approx. 101 kPa<br>1000 m above sea level: Approx. 90 kPa<br>2000 m above sea level: Approx. 80 kPa<br>3000 m above sea level: Approx. 70 kPa<br>When engine is cranking:<br>Make sure that the indication value changes.<br>The value does not change when engine is cranking. → Replace the intake air pressure sensor.<br>Sensor inspection procedure<br>Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-117. |  |
| 3                          | ECU malfunction   | Replace the ECU.   |  |

## TIP

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

# FUEL INJECTION SYSTEM

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | 15   |  |   |
| <b>Item</b>                | Throttle position sensor: open or short circuit detected. (no normal signals are received from the throttle position sensor.)  |  |   |
| <b>Fail-safe system</b>    | Able to start engine   |  |   |
|                            | Able to drive vehicle  |  |   |
| <b>Diagnostic code No.</b> | d:01   |  |   |
| <b>Meter display</b>       | Throttle position sensor<br>• 14–20 (fully closed position)  |  |   |
| <b>Procedure</b>           | <ul style="list-style-type: none"> <li>• Check with throttle valves fully closed.</li> <li>• Check with throttle valves fully open.</li> </ul>   |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of throttle position sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).              | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                      | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of fuel injection system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness   | Open or short circuit → Replace the wire harness.<br>Black/blue–Black/blue<br>Yellow–yellow<br>Blue–Blue   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Sensor installation status   | Check for loose mounting, pinched mounting, or hard mounting.<br>Make sure that the mounting position is correct.<br>Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-12. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |   |                |   |
|----------------------------|--|---|----------------|---|
| <b>Fault code No.</b>      | 15   |   |                |   |
| <b>Item</b>                | Throttle position sensor: open or short circuit detected. (no normal signals are received from the throttle position sensor.)                  |   |                |   |
| <b>Fail-safe system</b>    | Able to start engine   |   |                |   |
|                            | Able to drive vehicle  |   |                |   |
| <b>Diagnostic code No.</b> | d:01   |   |                |   |
| <b>Meter display</b>       | Throttle position sensor<br>• 14–20 (fully closed position)  |   |                |   |
| <b>Procedure</b>           | <ul style="list-style-type: none"> <li>• Check with throttle valves fully closed.</li> <li>• Check with throttle valves fully open.</li> </ul> |   |                |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   |                | <b>Sensor inspection procedure</b>  |
| 6                          | Supply voltage of throttle position sensor lead  | Check the supply voltage.<br>Black/blue–Yellow<br>Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-115.   |                | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
|                            |  | Line disconnection points   | Output voltage |   |
|                            |  | Disconnection of ground lead  | 5 V            |   |
|                            |  | Disconnection of output line  | 0 V            |   |
|                            |  | Disconnection of power supply line  | 0 V            |   |
| 7                          | Throttle position sensor malfunction   | Check the diagnostic mode (Code No. d01).<br>When throttle is fully closed:<br>A value of 14–20 is indicated.<br>If the indication is outside of range: Replace the throttle position sensor. |                | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 8                          | ECU malfunction  | Replace the ECU.  |                |   |

## TIP

If fault codes 15 and 16 are indicated simultaneously, take the actions specified for fault code 15 first.

# FUEL INJECTION SYSTEM

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | 16   |  |  |
| <b>Item</b>                | Throttle position sensor: stuck throttle position sensor detected. (signal from throttle position sensor will not change.)                     |  |  |
| <b>Fail-safe system</b>    | Able to start engine   |  |  |
|                            | Able to drive vehicle  |  |  |
| <b>Diagnostic code No.</b> | d:01   |  |  |
| <b>Meter display</b>       | Throttle position sensor<br>• 14–20 (fully closed position)  |  |  |
| <b>Procedure</b>           | <ul style="list-style-type: none"> <li>• Check with throttle valves fully closed.</li> <li>• Check with throttle valves fully open.</li> </ul> |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 1                          | Sensor installation status   | Check for loose mounting, pinched mounting, or hard mounting.<br>Make sure that the mounting position is correct.<br>Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-12.       | Place the main switch to the ON position, and then open and close the throttle.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Throttle position sensor malfunction   | Check in the diagnostic mode (Code No. d01).<br>When throttle is fully closed: A value of 14–20 is indicated. If the indication is outside of range: Replace the throttle position sensor. | Place the main switch to the ON position, and then open and close the throttle.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | ECU malfunction  | Replace the ECU.   |  |

## TIP

If fault codes 15 and 16 are indicated simultaneously, take the actions specified for fault code 15 first.

# FUEL INJECTION SYSTEM

|                            |   |   |  |
|----------------------------|---|---|--|
| <b>Fault code No.</b>      | 19  |   |  |
| <b>Item</b>                | Sidestand switch: a break or disconnection of the blue/yellow lead of the ECU is detected. (no normal signals are received from the sidestand switch.)              |   |  |
| <b>Fail-safe system</b>    | Unable to start engine  |   |  |
|                            | Unable to drive vehicle   |   |  |
| <b>Diagnostic code No.</b> | d:20  |   |  |
| <b>Meter display</b>       | <b>Sidestand switch</b> <ul style="list-style-type: none"> <li>• ON (sidestand retracted)</li> <li>• OFF (sidestand extended)</li> </ul>                            |   |  |
| <b>Procedure</b>           | Extend and retract the sidestand (with the transmission in gear).   |   |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>   |
| 1                          | Connection of sidestand switch coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                            | Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                            | Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of main switch coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).      | Poor connection → Connect it securely, or repair/replace the wire harness.                            | Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Blue/yellow–Blue/yellow<br>Blue/black–Blue/black | Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |   |  |
|----------------------------|---|---|--|
| <b>Fault code No.</b>      | <b>19</b>   |   |  |
| <b>Item</b>                | <b>Sidestand switch: a break or disconnection of the blue/yellow lead of the ECU is detected. (no normal signals are received from the sidestand switch.)</b> |   |  |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>   |   |  |
|                            | <b>Unable to drive vehicle</b>  |   |  |
| <b>Diagnostic code No.</b> | <b>d:20</b>   |   |  |
| <b>Meter display</b>       | <b>Sidestand switch</b> <ul style="list-style-type: none"> <li>• <b>ON (sidestand retracted)</b></li> <li>• <b>OFF (sidestand extended)</b></li> </ul>        |   |  |
| <b>Procedure</b>           | <b>Extend and retract the sidestand (with the transmission in gear).</b>  |   |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>   |
| 5                          | Sidestand switch malfunction  | Diagnostic mode (Code No. d20).<br>The transmission is in gear<br>Sidestand retracted: ON indication<br>Sidestand extended: OFF indication<br>Indication is incorrect. →<br>Replace the sidestand switch. | Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | ECU malfunction   | Replace the ECU.  |  |

# FUEL INJECTION SYSTEM

|                            |   |   |   |
|----------------------------|---|---|---|
| <b>Fault code No.</b>      |   | 20  |   |
| <b>Item</b>                |   | Intake air pressure sensor or atmospheric pressure sensor: when the main switch is set to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.  |   |
| <b>Fail-safe system</b>    |   | Able to start engine<br>Able to drive vehicle   |   |
| <b>Diagnostic code No.</b> |   | d:02, d:03  |   |
| d:02                       | <b>Meter display</b>                      | Displays the atmospheric pressure.  |   |
|                            | <b>Procedure</b>                          | Compare the actually measured atmospheric pressure with the meter display value.  |   |
| d:03                       | <b>Meter display</b>                      | Displays the intake air pressure.   |   |
|                            | <b>Procedure</b>                          | Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "⊕". (If the display value changes, the performance is OK.)   |   |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Intake air pressure sensor malfunction    | Check in the diagnostic mode (Code No. d03).<br>When engine is stopped:<br>Atmospheric pressure at the current altitude and weather conditions is indicated.<br>0 m above sea level: Approx. 101 kPa<br>3000 m above sea level: Approx. 70 kPa<br>Incorrect indication → Sensor malfunction → Replace the intake air pressure sensor.<br>Sensor inspection procedure<br>Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-117.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Atmospheric pressure sensor malfunction   | Check in the diagnostic mode (Code No. d02).<br>When engine is stopped:<br>Atmospheric pressure at the current altitude and weather conditions is indicated.<br>0 m above sea level: Approx. 101 kPa<br>3000 m above sea level: Approx. 70 kPa<br>Incorrect indication → Sensor malfunction → Replace the atmospheric pressure sensor.<br>Sensor inspection procedure<br>Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-116. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |                                    |
|----------------------------|---|--|------------------------------------|
| <b>Fault code No.</b>      |   | 20   |                                    |
| <b>Item</b>                |   | Intake air pressure sensor or atmospheric pressure sensor: when the main switch is set to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly. |                                    |
| <b>Fail-safe system</b>    |   | Able to start engine   |                                    |
|                            |   | Able to drive vehicle  |                                    |
| <b>Diagnostic code No.</b> |   | d:02, d:03   |                                    |
| d:02                       | <b>Meter display</b>                      | Displays the atmospheric pressure.   |                                    |
|                            | <b>Procedure</b>                          | Compare the actually measured atmospheric pressure with the meter display value.   |                                    |
| d:03                       | <b>Meter display</b>                      | Displays the intake air pressure.  |                                    |
|                            | <b>Procedure</b>                          | Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "⊗". (If the display value changes, the performance is OK.)                                    |                                    |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b> |
| 3                          | ECU malfunction                           | Replace the ECU.   |                                    |

|                            |   |   |   |
|----------------------------|---|---|---|
| <b>Fault code No.</b>      |   | 21  |   |
| <b>Item</b>                |   | Coolant temperature sensor: open or short circuit detected. (no normal signals are received from the coolant temperature sensor.) |   |
| <b>Fail-safe system</b>    |   | Able to start engine  |   |
|                            |   | Able to drive vehicle   |   |
| <b>Diagnostic code No.</b> |   | d:06  |   |
| <b>Meter display</b>       |   | Displays the coolant temperature.   |   |
| <b>Procedure</b>           |   | Compare the actually measured coolant temperature with the meter display value.   |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of coolant temperature sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).           | Poor connection → Connect it securely, or repair/replace the wire harness.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | 21  |  |   |
| <b>Item</b>                | Coolant temperature sensor: open or short circuit detected. (no normal signals are received from the coolant temperature sensor.)   |  |   |
| <b>Fail-safe system</b>    | Able to start engine  |  |   |
|                            | Able to drive vehicle   |  |   |
| <b>Diagnostic code No.</b> | d:06  |  |   |
| <b>Meter display</b>       | Displays the coolant temperature.   |  |   |
| <b>Procedure</b>           | Compare the actually measured coolant temperature with the meter display value.   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 3                          | Connection of fuel injection system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit →<br>Replace the wire harness<br>Black/blue–Black/blue<br>Green/white–Green/white  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Installation status of coolant temperature sensor<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | Coolant temperature sensor malfunction  | Check in the diagnostic mode (Code No. d06).<br>During cold starting: A temperature close to the ambient temperature is indicated.<br>Indication is incorrect. → Replace the coolant temperature sensor.<br>Sensor inspection procedure<br>Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-114. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction   | Replace the ECU.   |   |

# FUEL INJECTION SYSTEM

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>22</b>  |   |   |
| <b>Item</b>                | <b>Intake air temperature sensor: open or short circuit detected. (no normal signals are received from the intake air temperature sensor.)</b>                                   |   |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |   |   |
|                            | <b>Able to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | <b>d:05</b>  |   |   |
| <b>Meter display</b>       | <b>Displays the intake air temperature.</b>  |   |   |
| <b>Procedure</b>           | <b>Compare the actually measured intake air temperature with the meter display value.</b>  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of intake air temperature sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                            | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).              | Poor connection → Connect it securely, or repair/replace the wire harness.                            | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Replace the wire harness.<br>Black/blue–Black/blue<br>Brown/white–Brown/white | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Installation status of intake air temperature sensor<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | 22  |  |   |
| <b>Item</b>                | Intake air temperature sensor: open or short circuit detected. (no normal signals are received from the intake air temperature sensor.) |  |   |
| <b>Fail-safe system</b>    | Able to start engine  |  |   |
|                            | Able to drive vehicle   |  |   |
| <b>Diagnostic code No.</b> | d:05  |  |   |
| <b>Meter display</b>       | Displays the intake air temperature.  |  |   |
| <b>Procedure</b>           | Compare the actually measured intake air temperature with the meter display value.  |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 5                          | Intake air temperature sensor malfunction   | Check in the diagnostic mode (Code No. d05).<br>Sensor inspection procedure<br>Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-118.<br>During cold starting: A temperature close to the ambient temperature is indicated.<br>After the engine has warmed up, the ambient temperature +20 °C (68 °F) is indicated in the meter display.<br>Indication is incorrect. →<br>Replace the intake air temperature sensor. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 6                          | ECU malfunction   | Replace the ECU  |   |

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | 23   |   |   |
| <b>Item</b>                | Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)  |   |   |
| <b>Fail-safe system</b>    | Able to start engine   |   |   |
|                            | Able to drive vehicle  |   |   |
| <b>Diagnostic code No.</b> | d:02   |   |   |
| <b>Meter display</b>       | Displays the atmospheric pressure.   |   |   |
| <b>Procedure</b>           | Compare the actually measured atmospheric pressure with the meter display value.   |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>                                     | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of atmospheric pressure sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or replace the wire harness. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | <b>23</b>  |  |   |
| <b>Item</b>                | <b>Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)</b>                         |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |  |   |
|                            | <b>Able to drive vehicle</b>   |  |   |
| <b>Diagnostic code No.</b> | <b>d:02</b>  |  |   |
| <b>Meter display</b>       | <b>Displays the atmospheric pressure.</b>  |  |   |
| <b>Procedure</b>           | <b>Compare the actually measured atmospheric pressure with the meter display value.</b>  |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or replace the wire harness.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or replace the wire harness.<br>Black/blue–Black/blue<br>Pink–Pink<br>Blue–Blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Installation status of atmospheric pressure sensor<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | <b>23</b>  |  |  |
| <b>Item</b>                | <b>Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)</b> |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |  |  |
|                            | <b>Able to drive vehicle</b>   |  |  |
| <b>Diagnostic code No.</b> | <b>d:02</b>  |  |  |
| <b>Meter display</b>       | <b>Displays the atmospheric pressure.</b>  |  |  |
| <b>Procedure</b>           | <b>Compare the actually measured atmospheric pressure with the meter display value.</b>  |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 5                          | Atmospheric pressure sensor malfunction  | <p>Check in the diagnostic mode (Code No. d02). Atmospheric pressure at the current altitude and weather conditions is indicated.</p> <p>0 m above sea level: Approx. 101 kPa<br/>           1000 m above sea level: Approx. 90 kPa<br/>           2000 m above sea level: Approx. 80 kPa<br/>           3000 m above sea level: Approx. 70 kPa</p> <p>Incorrect indication → Sensor malfunction → Replace the atmospheric pressure sensor.<br/>           Sensor inspection procedure<br/>           Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-116.</p> | <p>Place the main switch to the ON position, and check the fault code indication.</p> <p>No fault code indicated. → Recovered.<br/>           Fault code indicated. → Check the next step.</p> |
| 6                          | ECU malfunction  | Replace the ECU.   |  |

# FUEL INJECTION SYSTEM

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | 24   |  |   |
| <b>Item</b>                | O <sub>2</sub> sensor: no normal signals are received from the O <sub>2</sub> sensor.  |  |   |
| <b>Fail-safe system</b>    | Able to start engine   |  |   |
|                            | Able to drive vehicle  |  |   |
| <b>Diagnostic code No.</b> | —  |  |   |
| <b>Meter display</b>       | —  |  |   |
| <b>Procedure</b>           | —  |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | O <sub>2</sub> sensor installation status  | Check the sensor for a loose mounting or a pinch   | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of O <sub>2</sub> sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).      | Poor connection → Connect it securely, or repair/replace the wire harness.   | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Black/blue–Black/blue<br>Pink/black–Pink/black<br>Red/white–Red/white<br>Gray/green–Gray/green | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Check the fuel pressure.   | Refer to “CHECKING THE FUEL PRESSURE” on page 7-5.   | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |   |   |
|----------------------------|---|---|---|
| <b>Fault code No.</b>      | 24  |   |   |
| <b>Item</b>                | O <sub>2</sub> sensor: no normal signals are received from the O <sub>2</sub> sensor. |   |   |
| <b>Fail-safe system</b>    | Able to start engine  |   |   |
|                            | Able to drive vehicle   |   |   |
| <b>Diagnostic code No.</b> | —   |   |   |
| <b>Meter display</b>       | —   |   |   |
| <b>Procedure</b>           | —   |   |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 6                          | O <sub>2</sub> sensor malfunction   | Check the O <sub>2</sub> sensor for an abnormality.<br>Refer to “ENGINE REMOVAL” on page 5-3.<br>O <sub>2</sub> sensor malfunction →<br>Replace the O <sub>2</sub> sensor | Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 7                          | ECU malfunction   | Replace the ECU.  |   |

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      | 30  |  |  |
| <b>Item</b>                | Latch up detected.<br>No normal signals are received from the lean angle sensor.  |  |  |
| <b>Fail-safe system</b>    | Unable to start engine  |  |  |
|                            | Unable to drive vehicle   |  |  |
| <b>Diagnostic code No.</b> | d:08  |  |  |
| <b>Meter display</b>       | Lean angle sensor output voltage<br>• 0.4–1.4 (upright)<br>• 3.7–4.4 (overturned) |  |  |
| <b>Procedure</b>           | Remove the lean angle sensor and incline it more than 65 degrees.                 |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 1                          | Turnover of vehicle   | Raise the vehicle to the upright position  | Place the main switch to the ON position.<br>(however, the engine cannot be restarted unless the main switch is first turned OFF)<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 2                          | Sensor installation status  | Check for a loose mounting, pinched mounting, or sensor mounting direction (up or down).<br>Make sure that the mounting position is correct. | Place the main switch to the ON position.<br>(however, the engine cannot be restarted unless the main switch is first turned OFF)<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | <b>30</b>  |  |  |
| <b>Item</b>                | <b>Latch up detected.<br/>No normal signals are received from the lean angle sensor.</b> |  |  |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>  |  |  |
|                            | <b>Unable to drive vehicle</b>   |  |  |
| <b>Diagnostic code No.</b> | <b>d:08</b>  |  |  |
| <b>Meter display</b>       | <b>Lean angle sensor output voltage</b><br>• 0.4–1.4 (upright)<br>• 3.7–4.4 (overturned) |  |  |
| <b>Procedure</b>           | <b>Remove the lean angle sensor and incline it more than 65 degrees.</b>                 |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 3                          | Lean angle sensor malfunction  | Diagnostic mode (Code No. d08).<br>Sensor inspection procedure<br>Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-109.<br>In vertical position:<br>0.4–1.4 V<br>When turned over:<br>3.7–4.4 V<br>Indication is incorrect. →<br>Replace the lean angle sensor. | Place the main switch to the ON position.<br>(however, the engine cannot be restarted unless the main switch is first turned OFF)<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 4                          | ECU malfunction  | Replace the ECU.   |  |

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | <b>33</b>  |  |   |
| <b>Item</b>                | <b>Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.</b>   |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |  |   |
| <b>Diagnostic code No.</b> | <b>d:30</b>  |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#1 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>                              |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• Connect an ignition checker.   |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>                                    | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of ignition coil coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely or replace the wire harness. | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>33</b>   |  |   |
| <b>Item</b>                | <b>Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.</b>  |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:30</b>   |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#1 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>   |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                 | Poor connection → Connect it securely or replace the wire harness.         | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of ignition system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness. | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Orange–Orange         | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Ignition coil installation status<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.                           | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      | <b>33</b>   |  |  |
| <b>Item</b>                | <b>Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.</b>              |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |  |
| <b>Diagnostic code No.</b> | <b>d:30</b>   |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#1 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b> |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 6                          | Ignition coil malfunction<br>(Check the continuity of primary coil.)  | Ignition coil inspection method<br>Refer to "CHECKING THE IGNITION COILS" on page 8-108.   | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction   | Check in the diagnostic mode (Code No. d30).<br>If not ignited, replace the defective ECU. |  |

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | <b>34</b>  |  |  |
| <b>Item</b>                | <b>Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.</b>   |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |  |  |
| <b>Diagnostic code No.</b> | <b>d:31</b>  |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#2 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>                              |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>  |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>                                    | <b>Sensor inspection procedure</b>   |
| 1                          | Connection of ignition coil coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely or replace the wire harness. | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>34</b>   |  |   |
| <b>Item</b>                | <b>Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.</b>  |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:31</b>   |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#2 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>   |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                 | Poor connection → Connect it securely or replace the wire harness.     | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of ignition system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or replace the wire harness.    | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Gray/red–Gray/red | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Ignition coil installation status<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.                       | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

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|----------------------------|---|--|--|
| <b>Fault code No.</b>      | <b>34</b>   |  |  |
| <b>Item</b>                | <b>Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.</b>              |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |  |
| <b>Diagnostic code No.</b> | <b>d:31</b>   |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#2 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b> |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 6                          | Ignition coil malfunction<br>(Check the continuity of primary coil.)  | Ignition coil inspection method<br>Refer to "CHECKING THE IGNITION COILS" on page 8-108.   | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction   | Check in the diagnostic mode (Code No. d31).<br>If not ignited, replace the defective ECU. |  |

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | <b>35</b>  |  |  |
| <b>Item</b>                | <b>Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.</b>   |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |  |  |
| <b>Diagnostic code No.</b> | <b>d:32</b>  |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#3 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>                              |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>  |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>                                    | <b>Sensor inspection procedure</b>   |
| 1                          | Connection of ignition coil coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely or replace the wire harness. | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>35</b>   |  |   |
| <b>Item</b>                | <b>Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.</b>  |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:32</b>   |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#3 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>   |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                 | Poor connection → Connect it securely or replace the wire harness.             | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of ignition system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or replace the wire harness.            | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Orange/green–Orange/green | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Ignition coil installation status<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.                               | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      | <b>35</b>   |  |  |
| <b>Item</b>                | <b>Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.</b>              |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |  |
| <b>Diagnostic code No.</b> | <b>d:32</b>   |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#3 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b> |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |  |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 6                          | Ignition coil malfunction<br>(Check the continuity of primary coil.)  | Ignition coil inspection method<br>Refer to "CHECKING THE IGNITION COILS" on page 8-108.   | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction   | Check in the diagnostic mode (Code No. d32).<br>If not ignited, replace the defective ECU. |  |

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      | <b>36</b>  |  |  |
| <b>Item</b>                | <b>Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.</b>   |  |  |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |  |  |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |  |  |
| <b>Diagnostic code No.</b> | <b>d:33</b>  |  |  |
| <b>Actuation</b>           | <b>Actuates the cylinder-#4 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>                              |  |  |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>  |  |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>                                    | <b>Sensor inspection procedure</b>   |
| 1                          | Connection of ignition coil coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely or replace the wire harness. | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>36</b>   |  |   |
| <b>Item</b>                | <b>Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.</b>  |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:33</b>   |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#4 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b>   |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).                 | Poor connection → Connect it securely or replace the wire harness.         | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of ignition system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or replace the wire harness.        | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Gray/green–Gray/green | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Ignition coil installation status<br>Check the mounting section for a loose or pinched mounting.  | Make sure that the mounting position is correct.                           | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | <b>36</b>   |  |   |
| <b>Item</b>                | <b>Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.</b>              |  |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (depending on the number of faulty cylinders)</b>   |  |   |
|                            | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>  |  |   |
| <b>Diagnostic code No.</b> | <b>d:33</b>   |  |   |
| <b>Actuation</b>           | <b>Actuates the cylinder-#4 ignition coil five times at one-second intervals.<br/>Illuminates the engine trouble warning light.</b> |  |   |
| <b>Procedure</b>           | <b>Check that a spark is generated five times.</b><br>• <b>Connect an ignition checker.</b>   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 6                          | Ignition coil malfunction<br>(Check the continuity of primary coil.)  | Ignition coil inspection method<br>Refer to "CHECKING THE IGNITION COILS" on page 8-108.   | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction   | Check in the diagnostic mode (Code No. d33).<br>If not ignited, replace the defective ECU. |   |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      |   | <b>39</b>  |   |
| <b>Item</b>                |   | <b>Injector: open circuit detected. (no normal signals are received from the injector.)</b>  |   |
| <b>Fail-safe system</b>    |   | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |   |
|                            |   | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |   |
| <b>Diagnostic code No.</b> |   | <b>d:36, d:37, d:38, d:39</b>  |   |
| <b>d:36</b>                | <b>Actuation</b>  | <b>Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |   |
|                            | <b>Procedure</b>  | <b>Check that injector #1 is actuated five times by listening for the operating sound.</b>   |   |
| <b>d:37</b>                | <b>Actuation</b>  | <b>Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |   |
|                            | <b>Procedure</b>  | <b>Check that injector #2 is actuated five times by listening for the operating sound.</b>   |   |
| <b>d:38</b>                | <b>Actuation</b>  | <b>Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |   |
|                            | <b>Procedure</b>  | <b>Check that injector #3 is actuated five times by listening for the operating sound.</b>   |   |
| <b>d:39</b>                | <b>Actuation</b>  | <b>Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |   |
|                            | <b>Procedure</b>  | <b>Check that injector #4 is actuated five times by listening for the operating sound.</b>   |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Locate the malfunction  | Check in the diagnostic mode (Code No. d36, d37, d38, d39).<br>Locate the injector with no operating noise.<br>Carry out the following checks to the defective injector coupler, wire harness, and injector. | —   |
| 2                          | Connection of injector coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Injector malfunction  | Check the fuel injector resistance. → Approx. 12.0 Ω<br>Replace if defective.  | Start and idle the engine for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |   |  |
|----------------------------|--|---|--|
| <b>Fault code No.</b>      |  | <b>39</b>   |  |
| <b>Item</b>                |  | <b>Injector: open circuit detected. (no normal signals are received from the injector.)</b>                   |  |
| <b>Fail-safe system</b>    |  | <b>Able to start engine (depending on the number of faulty cylinders)</b>                                     |  |
|                            |  | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>                                    |  |
| <b>Diagnostic code No.</b> |  | <b>d:36, d:37, d:38, d:39</b>   |  |
| <b>d:36</b>                | <b>Actuation</b>   | <b>Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.</b> |  |
|                            | <b>Procedure</b>   | <b>Check that injector #1 is actuated five times by listening for the operating sound.</b>                    |  |
| <b>d:37</b>                | <b>Actuation</b>   | <b>Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.</b> |  |
|                            | <b>Procedure</b>   | <b>Check that injector #2 is actuated five times by listening for the operating sound.</b>                    |  |
| <b>d:38</b>                | <b>Actuation</b>   | <b>Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.</b> |  |
|                            | <b>Procedure</b>   | <b>Check that injector #3 is actuated five times by listening for the operating sound.</b>                    |  |
| <b>d:39</b>                | <b>Actuation</b>   | <b>Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.</b> |  |
|                            | <b>Procedure</b>   | <b>Check that injector #4 is actuated five times by listening for the operating sound.</b>                    |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>   |
| 4                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler and check each pin (for bending, wear, or locking).                       | Poor connection → Connect it securely, or repair/replace the wire harness.                                    | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Connection of fuel injection system sub-wire harness coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking) | Poor connection → Connect it securely, or repair/replace the wire harness.                                    | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |  |
|----------------------------|---|--|--|
| <b>Fault code No.</b>      |   | <b>39</b>  |  |
| <b>Item</b>                |   | <b>Injector: open circuit detected. (no normal signals are received from the injector.)</b>  |  |
| <b>Fail-safe system</b>    |   | <b>Able to start engine (depending on the number of faulty cylinders)</b>  |  |
|                            |   | <b>Able to drive vehicle (depending on the number of faulty cylinders)</b>   |  |
| <b>Diagnostic code No.</b> |   | <b>d:36, d:37, d:38, d:39</b>  |  |
| <b>d:36</b>                | <b>Actuation</b>                          | <b>Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |  |
|                            | <b>Procedure</b>                          | <b>Check that injector #1 is actuated five times by listening for the operating sound.</b>   |  |
| <b>d:37</b>                | <b>Actuation</b>                          | <b>Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |  |
|                            | <b>Procedure</b>                          | <b>Check that injector #2 is actuated five times by listening for the operating sound.</b>   |  |
| <b>d:38</b>                | <b>Actuation</b>                          | <b>Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |  |
|                            | <b>Procedure</b>                          | <b>Check that injector #3 is actuated five times by listening for the operating sound.</b>   |  |
| <b>d:39</b>                | <b>Actuation</b>                          | <b>Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.</b>  |  |
|                            | <b>Procedure</b>                          | <b>Check that injector #4 is actuated five times by listening for the operating sound.</b>   |  |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 6                          | Continuity of wire harness                | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Fuel injector #1<br>Red/blue–Red/blue<br>Red/black–Red/black<br>Fuel injector #2<br>Red/blue–Red/blue<br>Green/black–Green/black<br>Fuel injector #3<br>Red/blue–Red/blue<br>Blue/black–Blue/black<br>Fuel injector #4<br>Red/blue–Red/blue<br>Orange/black–Orange/black | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7                          | ECU malfunction                           | Replace the ECU.   |  |

# FUEL INJECTION SYSTEM

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | 41   |  |   |
| <b>Item</b>                | Lean angle sensor: open or short circuit detected. (no normal signals are received from the lean angle sensor.)  |  |   |
| <b>Fail-safe system</b>    | Unable to start engine   |  |   |
|                            | Unable to drive vehicle  |  |   |
| <b>Diagnostic code No.</b> | d:08   |  |   |
| <b>Meter display</b>       | Lean angle sensor output voltage<br><ul style="list-style-type: none"> <li>• 0.4–1.4 (upright)</li> <li>• 3.7–4.4 (overtuned)</li> </ul>                             |  |   |
| <b>Procedure</b>           | Remove the lean angle sensor and incline it more than 65 degrees.  |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of lean angle sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Rotate the main switch to the OFF position first, and then rotate it to the ON position again.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).  | Poor connection → Connect it securely, or repair/replace the harness.  | Rotate the main switch to the OFF position first, and then rotate it to the ON position again.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Replace the wire harness.<br>Black/blue–Black/blue<br>Yellow/green–Yellow/green<br>Blue–Blue | Rotate the main switch to the OFF position first, and then rotate it to the ON position again.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |  |   |
|----------------------------|---|--|---|
| <b>Fault code No.</b>      | 41  |  |   |
| <b>Item</b>                | Lean angle sensor: open or short circuit detected. (no normal signals are received from the lean angle sensor.)                           |  |   |
| <b>Fail-safe system</b>    | Unable to start engine  |  |   |
|                            | Unable to drive vehicle   |  |   |
| <b>Diagnostic code No.</b> | d:08  |  |   |
| <b>Meter display</b>       | Lean angle sensor output voltage<br><ul style="list-style-type: none"> <li>• 0.4–1.4 (upright)</li> <li>• 3.7–4.4 (overturned)</li> </ul> |  |   |
| <b>Procedure</b>           | Remove the lean angle sensor and incline it more than 65 degrees.   |  |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 4                          | Lean angle sensor malfunction   | Diagnostic mode (Code No. d08).<br>Sensor inspection procedure<br>Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-109. | Rotate the main switch to the OFF position first, and then rotate it to the ON position again.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | ECU malfunction   | Replace the ECU.   |   |

# FUEL INJECTION SYSTEM

|                       |   |  |                                    |
|-----------------------|---|--|------------------------------------|
| <b>Fault code No.</b> |   | <b>42</b>  |                                    |
| <b>Item</b>           |   | <b>A. no normal signals are received from the speed sensor.</b>  |                                    |
|                       |   | <b>B. open or short circuit is detected in the neutral circuit of the neutral switch.</b>  |                                    |
|                       |   | <b>C. open or short circuit is detected in the clutch circuit of the clutch switch.</b>  |                                    |
| <b>A</b>              | <b>Fail-safe system</b>                   | <b>Able to start engine</b>  |                                    |
|                       |   | <b>Able to drive vehicle</b>   |                                    |
|                       | <b>Diagnostic code No.</b>                | <b>d:07</b>  |                                    |
|                       | <b>Meter display</b>                      | <b>Vehicle speed pulses: 0–999</b>   |                                    |
|                       | <b>Procedure</b>                          | <b>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.</b>   |                                    |
| <b>B</b>              | <b>Fail-safe system</b>                   | <b>Able to start engine</b>  |                                    |
|                       |   | <b>Able to drive vehicle</b>   |                                    |
|                       | <b>Diagnostic code No.</b>                | <b>d:21</b>  |                                    |
|                       | <b>Meter display</b>                      | <b>Neutral switch</b><br><ul style="list-style-type: none"> <li>• ON (neutral)</li> <li>• OFF (in gear)</li> </ul>   |                                    |
|                       | <b>Procedure</b>                          | <b>Shift the transmission and clutch lever.</b>  |                                    |
| <b>C</b>              | <b>Fail-safe system</b>                   | <b>Able to start engine</b>  |                                    |
|                       |   | <b>Able to drive vehicle</b>   |                                    |
|                       | <b>Diagnostic code No.</b>                | <b>d:21</b>  |                                    |
|                       | <b>Meter display</b>                      | <b>Clutch switch</b><br><b>ON (Gear is in other than neutral, operating clutch and storing side-stand.)</b><br><b>OFF (Gear is in other than neutral, operating clutch and using side-stand.)</b>  |                                    |
|                       | <b>Procedure</b>                          | <b>Shift the transmission, clutch lever and sidestand.</b>   |                                    |
|                       | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b> |
|                       | Locate the malfunction.                   | Check in the diagnostic mode (Code No. d07). Rotate the rear wheel and make sure that the indication value increases. Malfunction → Go to the “Speed sensor system malfunction” section below.<br>Check in the diagnostic mode (Code No. d21).<br>1. When the gear is in neutral position: ON indication<br>2. When the gear is not in neutral position: OFF indication<br>Malfunction step 1 or 2 → Go to the “Neutral switch system malfunction” section below.<br>When the gear is in other than neutral, the clutch is operated, and the sidestand is stored:<br>Malfunction step 3 → Go to the “Clutch system malfunction” section below. | —                                  |

# FUEL INJECTION SYSTEM

## A. Speed sensor system malfunction

|   | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
|---|---|--|---|
| 1 | Connection of speed sensor (meter) coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2 | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).     | Poor connection → Connect it securely, or repair/replace the wire harness.   | Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3 | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Black/blue–Black/blue<br>Blue–Blue<br>White/yellow–White/yellow | Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4 | Speed sensor malfunction  | Sensor inspection procedure<br>Refer to “CHECKING THE SPEED SENSOR” on page 8-113.<br>Replace if defective.          | Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5 | ECU malfunction   | Replace the ECU.   |   |

# FUEL INJECTION SYSTEM

## B. Neutral switch sensor system malfunction

|   | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
|---|---|--|---|
| 1 | Connection of neutral switch coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).   | Poor connection → Reconnect or repair the coupler.   | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2 | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Reconnect or repair the coupler.   | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3 | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Blue/yellow–Blue/yellow                           | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4 | Continuity of leads between neutral switch and relay unit coupler   | Open or short circuit → Replace the wire harness.<br>Sky blue–Sky blue                                 | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5 | Neutral switch malfunction  | Switch inspection procedure<br>Refer to “CHECKING THE SWITCHES” on page 8-97.<br>Replace if defective. | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|   | Item/components and probable cause                         | Check or maintenance job   | Sensor inspection procedure   |
|---|--|--|---|
| 6 | Shift drum (that detects the neutral position) malfunction | Check the gear shift drum (that detects the neutral position).<br>Refer to "CHECKING THE SHIFT DRUM ASSEMBLY" on page 5-90.<br>Malfunction → Replace the shift drum. | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 7 | ECU malfunction  | Replace the ECU.   |   |

## C. Clutch switch system malfunction

|   | Item/components and probable cause  | Check or maintenance job  | Sensor inspection procedure   |
|---|---|---|---|
| 1 | Adjusting the clutch lever free play  | Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-12.   | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2 | Connection of clutch switch coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).    | Poor connection → Reconnect or repair the coupler.  | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3 | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4 | Continuity of wire harness  | Open or short circuit → Replace the wire harness.<br>Yellow/black–Yellow/black<br>Blue/yellow–Blue/yellow | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|   | Item/components and probable cause                               | Check or maintenance job  | Sensor inspection procedure   |
|---|--|---|---|
| 5 | Continuity of leads between clutch switch and relay unit coupler | Open or short circuit →<br>Replace the wire harness.<br>Yellow/black–Yellow/black                   | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 6 | Clutch switch malfunction  | Check the clutch switch.<br>Refer to “CHECKING THE SWITCHES” on page 8-97.<br>Replace if defective. | Start the engine.<br>Ride the vehicle at a low speed (approx. 20–30 km/h).<br>Then, check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |
| 7 | ECU malfunction  | Replace the ECU.  |   |

| <b>Fault code No.</b>      |   | <b>43</b>  |  |
|----------------------------|---|--|--|
| <b>Item</b>                |   | <b>Fuel system voltage: incorrect voltage supplied to the fuel injector, fuel pump and main relay.</b>   |  |
| <b>Fail-safe system</b>    |   | <b>Able to start engine</b>  |  |
|                            |   | <b>Able to drive vehicle</b>   |  |
| <b>Diagnostic code No.</b> |   | <b>d:09, d:50</b>  |  |
| <b>d:09</b>                | <b>Meter display</b>  | <b>Fuel system voltage (battery voltage)<br/>Approximately 12.0</b>  |  |
|                            | <b>Procedure</b>  | <b>Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)</b>  |  |
| <b>d:50</b>                | <b>Actuation</b>  | <b>Actuates the main relay five times at one-second intervals.<br/>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.)</b> |  |
|                            | <b>Procedure</b>  | <b>Check that the main relay is actuated five times by listening for the operating sound.</b>  |  |
|                            | Item/components and probable cause  | Check or maintenance job   | Sensor inspection procedure  |
| 1                          | Connection of main relay coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. →<br>Recovered.<br>Fault code indicated. →<br>Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |  |  |
|----------------------------|--|--|--|
| <b>Fault code No.</b>      |  | 43   |  |
| <b>Item</b>                |  | Fuel system voltage: incorrect voltage supplied to the fuel injector, fuel pump and main relay.  |  |
| <b>Fail-safe system</b>    |  | Able to start engine   |  |
|                            |  | Able to drive vehicle  |  |
| <b>Diagnostic code No.</b> |  | d:09, d:50   |  |
| d:09                       | <b>Meter display</b>   | Fuel system voltage (battery voltage)<br>Approximately 12.0  |  |
|                            | <b>Procedure</b>   | Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)   |  |
| d:50                       | <b>Actuation</b>   | Actuates the main relay five times at one-second intervals.<br>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.) |  |
|                            | <b>Procedure</b>   | Check that the main relay is actuated five times by listening for the operating sound.   |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>   |
| 2                          | Connection of wire harness<br>ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.   | Place the main switch to the ON position for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness between the battery, fuel injection system fuse, relay unit and ECU   | Open or short circuit →<br>Replace the wire harness.<br>Red–Red<br>Red/blue–Red/blue   | Place the main switch to the ON position for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Fuel pump relay malfunction  | Check in the diagnostic mode (Code No. d50).<br>No operation sound of fuel pump relay is heard. →<br>Replace the relay unit.   | Place the main switch to the ON position for approximately 5 seconds.<br>Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |   |   |
|----------------------------|---|---|---|
| <b>Fault code No.</b>      |   | 43  |   |
| <b>Item</b>                |   | Fuel system voltage: incorrect voltage supplied to the fuel injector, fuel pump and main relay.   |   |
| <b>Fail-safe system</b>    |   | Able to start engine  |   |
|                            |   | Able to drive vehicle   |   |
| <b>Diagnostic code No.</b> |   | d:09, d:50  |   |
| d:09                       | <b>Meter display</b>                      | Fuel system voltage (battery voltage)<br>Approximately 12.0   |   |
|                            | <b>Procedure</b>                          | Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)  |   |
| d:50                       | <b>Actuation</b>                          | Actuates the main 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.) |   |
|                            | <b>Procedure</b>                          | Check that the main relay is actuated five times by listening for the operating sound.  |   |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 5                          | Fuel pump relay malfunction               | Check in the diagnostic mode (Code No. d09).<br>Fuel-related voltage: 3 V or less → Replace the relay unit.   | Place the main switch to the ON position for approximately 5 seconds. Then, check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | ECU malfunction                           | Replace the ECU.  |   |

|                            |   |   |                                    |
|----------------------------|---|---|------------------------------------|
| <b>Fault code No.</b>      |   | 44  |                                    |
| <b>Item</b>                |   | EEPROM cylinder fault code number: an error is detected while reading or writing on EEPROM (CO adjustment value).   |                                    |
| <b>Fail-safe system</b>    |   | Under certain conditions  |                                    |
|                            |   | Under certain conditions  |                                    |
| <b>Diagnostic code No.</b> |   | d:60  |                                    |
| <b>Meter display</b>       |   | EEPROM fault code display <ul style="list-style-type: none"> <li>• 00 (no history)</li> <li>• 01–04: Cylinder fault code number (history exists)</li> </ul> If more than one cylinder is defective, the display switches every two seconds to show the cylinder fault code numbers of all defective cylinders in a repeating cycle. |                                    |
| <b>Procedure</b>           |   | —   |                                    |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b> |
| 1                          | ECU malfunction                           | Replace the ECU   |                                    |

# FUEL INJECTION SYSTEM

|                            |   |   |  |
|----------------------------|---|---|--|
| <b>Fault code No.</b>      | 46  |   |  |
| <b>Item</b>                | Incorrect voltage is supplied to the ECU. |   |  |
| <b>Fail-safe system</b>    | Able to start engine                      |   |  |
|                            | Able to drive vehicle                     |   |  |
| <b>Diagnostic code No.</b> | —   |   |  |
| <b>Meter display</b>       | —   |   |  |
| <b>Procedure</b>           | —   |   |  |
|                            | <b>Item/components and probable cause</b> | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>   |
| 1                          | Charging system malfunction               | Check the charging system. Refer to "CHARGING SYSTEM" on page 8-13. Check the rectifier/regulator, AC magneto and wire harness. → Replace if defective. | Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Recheck. |

|                            |  |  |   |
|----------------------------|--|--|---|
| <b>Fault code No.</b>      | 47   |  |   |
| <b>Item</b>                | Sub-throttle position sensor: open or short circuit detected. (no normal signals are received from the sub-throttle position sensor.)  |  |   |
| <b>Fail-safe system</b>    | Able to start engine   |  |   |
|                            | Able to drive vehicle  |  |   |
| <b>Diagnostic code No.</b> | —  |  |   |
| <b>Meter display</b>       | —  |  |   |
| <b>Procedure</b>           | —  |  |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>  | <b>Sensor inspection procedure</b>  |
| 1                          | Installation status of sub-throttle position sensor  | Check the mounting section for a loose or pinched mounting.                | Place the main switch to the ON position, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step. |
| 2                          | Connection of sub-throttle position sensor coupler<br>Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness. | Place the main switch to the ON position, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step. |
| 3                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).             | Poor connection → Connect it securely, or repair/replace the wire harness. | Place the main switch to the ON position, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>47</b>  |   |   |
| <b>Item</b>                | <b>Sub-throttle position sensor: open or short circuit detected. (no normal signals are received from the sub-throttle position sensor.)</b> |   |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |   |   |
|                            | <b>Able to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 4                          | Continuity of wire harness   | Open or short circuit →<br>Replace the wire harness<br>Black/blue–Black/blue<br>Green/yellow–Green/yellow<br>Blue–Blue  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | Sub-throttle position sensor malfunction   | Check the sub-throttle position sensor.<br>Refer to “CHARGING SYSTEM” on page 8-13.<br>Sub-throttle position sensor malfunction → Replace the sub-throttle position sensor. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | ECU malfunction  | Replace the ECU.  |   |

**TIP**

If fault codes 47 and 48 are indicated simultaneously, take the actions specified for fault code 47 first.

# FUEL INJECTION SYSTEM

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | 48   |   |   |
| <b>Item</b>                | Sub-throttle servo motor: stuck sub-throttle servo motor detected. signal from sub-throttle position sensor will not change. (sub-throttle servo motor will not start.)  |   |   |
| <b>Fail-safe system</b>    | Able to start engine   |   |   |
|                            | Able to drive vehicle  |   |   |
| <b>Diagnostic code No.</b> | d:56   |   |   |
| <b>Actuation</b>           | Sub-throttle valve will close and stop at standard position after fully opened.<br>This operation takes about 3 seconds and engine trouble warning light will be turning on during operation.  |   |   |
| <b>Procedure</b>           | Check the operating sound of the sub-throttle servo motor.   |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Installation status of sub-throttle position sensor  | Check the mounting section for a loose or pinched mounting.   | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of sub-throttle position sensor coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).<br>Check in the diagnostic code (Code No. d55). Check the sub-throttle servo motor for proper operation. | Poor connection → Connect it securely, or repair/replace the wire harness.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Connection of wire harness ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).  | Poor connection → Connect it securely, or repair/replace the wire harness.  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 4                          | Sub-throttle servo motor malfunction   | Check in the diagnostic mode (Code No. d56).<br>No operation sound of sub-throttle servo motor. → Replace the sub-throttle servo motor. | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |   |   |
|----------------------------|---|---|---|
| <b>Fault code No.</b>      | <b>48</b>   |   |   |
| <b>Item</b>                | <b>Sub-throttle servo motor: stuck sub-throttle servo motor detected. signal from sub-throttle position sensor will not change. (sub-throttle servo motor will not start.)</b>                        |   |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>   |   |   |
|                            | <b>Able to drive vehicle</b>  |   |   |
| <b>Diagnostic code No.</b> | <b>d:56</b>   |   |   |
| <b>Actuation</b>           | <b>Sub-throttle valve will close and stop at standard position after fully opened.<br/>This operation takes about 3 seconds and engine trouble warning light will be turning on during operation.</b> |   |   |
| <b>Procedure</b>           | <b>Check the operating sound of the sub-throttle servo motor.</b>   |   |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 5                          | Continuity of wire harness  | Open or short circuit →<br>Replace the wire harness<br>Yellow/red–Yellow/red<br>Yellow/white–Yellow/white<br>Gray/black–Gray/black<br>Gray/white–Gray/white | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 6                          | ECU malfunction   | Replace the ECU.  |   |

## TIP

If fault codes 47 and 48 are indicated simultaneously, take the actions specified for fault code 47 first.

|                            |  |                                 |  |
|----------------------------|--|---------------------------------|--|
| <b>Fault code No.</b>      | <b>50</b>  |                                 |  |
| <b>Item</b>                | <b>Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)</b> |                                 |  |
| <b>Fail-safe system</b>    | <b>Unable to start engine</b>  |                                 |  |
|                            | <b>Unable to drive vehicle</b>   |                                 |  |
| <b>Diagnostic code No.</b> | —  |                                 |  |
| <b>Meter display</b>       | —  |                                 |  |
| <b>Procedure</b>           | —  |                                 |  |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b>   |
| 1                          | ECU malfunction  | Replace the ECU.                | Place the main switch to the ON position.<br>Then, check that no fault code indicated. |

# FUEL INJECTION SYSTEM

|                            |  |                                 |                                    |
|----------------------------|--|---------------------------------|------------------------------------|
| <b>Fault code No.</b>      | 70   |                                 |                                    |
| <b>Item</b>                | Engine idling stop: engine has been left idling. (The ECU automatically stops the engine after 20 minutes if it is left idling.) |                                 |                                    |
| <b>Fail-safe system</b>    | Able to start engine   |                                 |                                    |
|                            | Able to drive vehicle  |                                 |                                    |
| <b>Diagnostic code No.</b> | —  |                                 |                                    |
| <b>Meter display</b>       | —  |                                 |                                    |
| <b>Procedure</b>           | —  |                                 |                                    |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b> |
|                            | Engine idling stop   |                                 |                                    |

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | Er-1   |   |   |
| <b>Item</b>                | ECU internal malfunction (output signal error): no signals are received from the ECU.  |   |   |
| <b>Fail-safe system</b>    | Able to start engine (Unable if ECU Failure)   |   |   |
|                            | Able to drive vehicle (Unable if ECU Failure)  |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of meter coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).               | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness<br>ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Yellow/blue—Yellow/blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |                                 |   |
|----------------------------|--|---------------------------------|---|
| <b>Fault code No.</b>      | <b>Er-1</b>  |                                 |   |
| <b>Item</b>                | <b>ECU internal malfunction (output signal error): no signals are received from the ECU.</b> |                                 |   |
| <b>Fail-safe system</b>    | <b>Able to start engine (Unable if ECU Failure)</b>  |                                 |   |
|                            | <b>Able to drive vehicle (Unable if ECU Failure)</b>   |                                 |   |
| <b>Diagnostic code No.</b> | —  |                                 |   |
| <b>Meter display</b>       | —  |                                 |   |
| <b>Procedure</b>           | —  |                                 |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b>  |
| 4                          | Abnormal meter unit operation  | Replace the meter unit.         | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | ECU malfunction  | Replace the ECU                 |   |

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>Er-2</b>  |   |   |
| <b>Item</b>                | <b>ECU internal malfunction (output signal error): no signals are received from the ECU within the specified duration.</b>   |   |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |   |   |
|                            | <b>Able to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of meter coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).               | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness<br>ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Yellow/blue—Yellow/blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |                                 |   |
|----------------------------|--|---------------------------------|---|
| <b>Fault code No.</b>      | <b>Er-2</b>  |                                 |   |
| <b>Item</b>                | <b>ECU internal malfunction (output signal error): no signals are received from the ECU within the specified duration.</b> |                                 |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |                                 |   |
|                            | <b>Able to drive vehicle</b>   |                                 |   |
| <b>Diagnostic code No.</b> | —  |                                 |   |
| <b>Meter display</b>       | —  |                                 |   |
| <b>Procedure</b>           | —  |                                 |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b>  |
| 4                          | Abnormal meter unit operation  | Replace the meter unit.         | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | ECU malfunction  | Replace the ECU.                |   |

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | <b>Er-3</b>  |   |   |
| <b>Item</b>                | <b>ECU internal malfunction (output signal error): data from the ECU cannot be received correctly.</b>   |   |   |
| <b>Fail-safe system</b>    | <b>Able to start engine</b>  |   |   |
|                            | <b>Able to drive vehicle</b>   |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of meter coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).               | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness<br>ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Yellow/blue—Yellow/blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |   |                                 |   |
|----------------------------|---|---------------------------------|---|
| <b>Fault code No.</b>      | Er-3  |                                 |   |
| <b>Item</b>                | ECU internal malfunction (output signal error): data from the ECU cannot be received correctly. |                                 |   |
| <b>Fail-safe system</b>    | Able to start engine  |                                 |   |
|                            | Able to drive vehicle   |                                 |   |
| <b>Diagnostic code No.</b> | —   |                                 |   |
| <b>Meter display</b>       | —   |                                 |   |
| <b>Procedure</b>           | —   |                                 |   |
|                            | <b>Item/components and probable cause</b>   | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b>  |
| 4                          | Abnormal meter unit operation   | Replace the meter unit.         | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | ECU malfunction   | Replace the ECU.                |   |

|                            |  |   |   |
|----------------------------|--|---|---|
| <b>Fault code No.</b>      | Er-4   |   |   |
| <b>Item</b>                | ECU internal malfunction (input signal error): non-registered data has been received from the meter.   |   |   |
| <b>Fail-safe system</b>    | Able to start engine   |   |   |
|                            | Able to drive vehicle  |   |   |
| <b>Diagnostic code No.</b> | —  |   |   |
| <b>Meter display</b>       | —  |   |   |
| <b>Procedure</b>           | —  |   |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b>   | <b>Sensor inspection procedure</b>  |
| 1                          | Connection of meter coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking).               | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 2                          | Connection of wire harness<br>ECU coupler<br>Check the connection of the coupler is secure.<br>Remove the coupler, and check each pin (for bending, wear, or locking). | Poor connection → Connect it securely, or repair/replace the wire harness.                                  | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 3                          | Continuity of wire harness   | Open or short circuit → Connect it securely, or repair/replace the wire harness.<br>Yellow/blue—Yellow/blue | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |

# FUEL INJECTION SYSTEM

|                            |  |                                 |   |
|----------------------------|--|---------------------------------|---|
| <b>Fault code No.</b>      | Er-4   |                                 |   |
| <b>Item</b>                | ECU internal malfunction (input signal error): non-registered data has been received from the meter. |                                 |   |
| <b>Fail-safe system</b>    | Able to start engine   |                                 |   |
|                            | Able to drive vehicle  |                                 |   |
| <b>Diagnostic code No.</b> | —  |                                 |   |
| <b>Meter display</b>       | —  |                                 |   |
| <b>Procedure</b>           | —  |                                 |   |
|                            | <b>Item/components and probable cause</b>  | <b>Check or maintenance job</b> | <b>Sensor inspection procedure</b>  |
| 4                          | Abnormal meter unit operation  | Replace the meter unit.         | Place the main switch to the ON position, and check the fault code indication.<br>No fault code indicated. → Recovered.<br>Fault code indicated. → Check the next step. |
| 5                          | ECU malfunction  | Replace the ECU.                |   |

# FUEL INJECTION SYSTEM

EAS30660

## DIAGNOSTIC CODE TABLE

### TIP

The following tables contain information about diagnostic code numbers that do not have a corresponding fault code number. (These items are not listed in "TROUBLESHOOTING DETAILS".)

| Diagnostic code No. | Item  | Meter display/Actuation   | Procedure  |
|---------------------|---|---|--|
| d:48                | Air induction system solenoid   | Actuates the air induction system solenoid five times at one-second intervals.<br>Illuminates the engine trouble warning light.   | Check the operating sound of the air induction system solenoid five times. |
| d:51                | Radiator fan motor relay  | Actuates the radiator fan motor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds)<br>Illuminates the engine trouble warning light.   | Check the operating sound of the radiator fan motor relay five times.      |
| d:52                | Headlight relay   | Actuates the headlight relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds)<br>Illuminates the engine trouble warning light.  | Check the operating sound of the headlight relay five times.               |
| d:61                | Malfunction history code display <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul> | 00<br>Fault code Nos. d11–70 <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> | —  |
| d:62                | Malfunction history code erasure <ul style="list-style-type: none"> <li>• No history</li> <li>• History exists</li> </ul> | 0 <ul style="list-style-type: none"> <li>• Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, "03" is displayed.)</li> </ul>                  | —<br>To erase the history, set the engine stop switch from "⊗" to "○".     |

# FUEL INJECTION SYSTEM

| Diagnostic code No. | Item  | Meter display/Actuation   | Procedure  |
|---------------------|---|---|--|
| d:63                | Malfunction code reinstatement (for fault code No. d24 only) <ul style="list-style-type: none"> <li>• No malfunction code</li> <li>• Malfunction code exists</li> </ul> | 00<br>Fault code No. d24 <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> | —<br>To reinstate, set the engine stop switch from “⊗” to “○”. |
| d:70                | Control number  | 0–254 [-]   | —  |

Set the main switch to “OFF” to cancel the diagnostic mode.

**TIP**

Information about each diagnostic code No. is organized in this manual as follows:

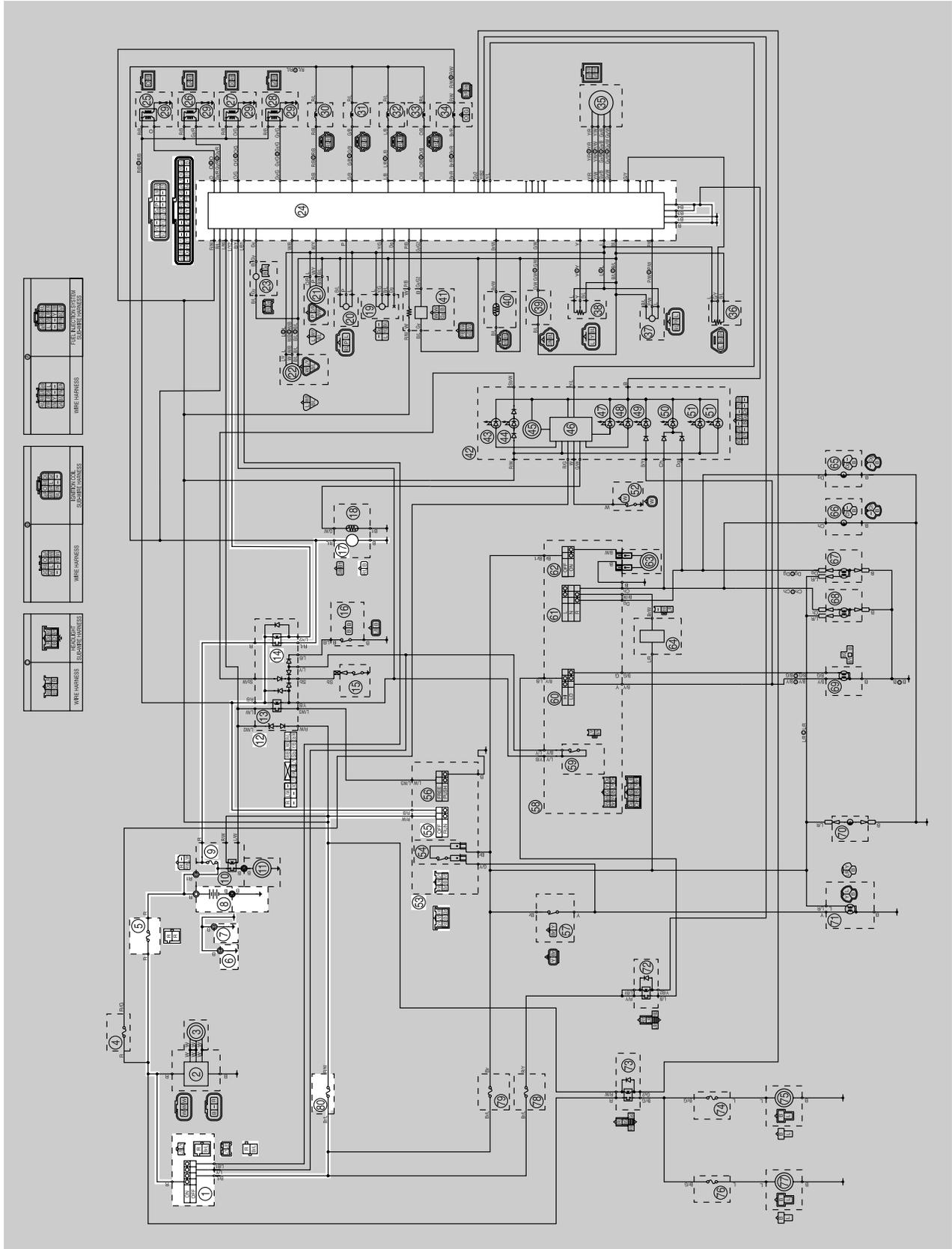
- If a diagnostic code No. has a corresponding fault code No., the information is shown in TROUBLESHOOTING DETAILS. (Refer to “TROUBLESHOOTING DETAILS” on page 8-37)
- If a diagnostic code No. does not have a corresponding fault code No., the information is shown in DIAGNOSTIC CODE TABLE. (Refer to “DIAGNOSTIC CODE TABLE” on page 8-87)

EAS27550

## FUEL PUMP SYSTEM

EAS27560

## CIRCUIT DIAGRAM



- 1. Main switch
- 5. Main fuse
- 6. Frame ground
- 7. Engine ground
- 8. Battery
- 9. Fuel injection system fuse
- 12. Relay unit
- 14. Fuel pump relay
- 17. Fuel pump
- 24. ECU (engine control unit)
- 53. Right handlebar switch
- 55. Engine stop switch
- 80. Ignition fuse

EAS27570

## TROUBLESHOOTING

If the fuel pump fails to operate.

### TIP

- Before troubleshooting, remove the following part(s):
  1. Rider seat
  2. Passenger seat
  3. Fuel tank
  4. Air filter case

|   |     |   |
|---|-----|---|
| 1. Check the fuses.<br>(Main, ignition and fuel injection system)<br>Refer to "CHECKING THE FUSES" on page 8-101. | NG→ | Replace the fuse(s).  |
| OK↓   |     |   |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-102.                              | 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.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                                       | NG→ | Replace the main switch.  |
| OK↓   |     |   |
| 4. Check the engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-97.                                | NG→ | Replace the right handlebar switch.   |
| OK↓   |     |   |
| 5. Check the relay unit (fuel pump relay).<br>Refer to "CHECKING THE RELAYS" on page 8-105.                       | NG→ | Replace the relay unit.   |
| OK↓   |     |   |
| 6. Check the fuel pump.<br>Refer to "CHECKING THE FUEL PUMP OPERATION" on page 7-4.                               | NG→ | Replace the fuel pump.  |
| OK↓   |     |   |

7. Check the entire fuel pump system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-89.

NG→

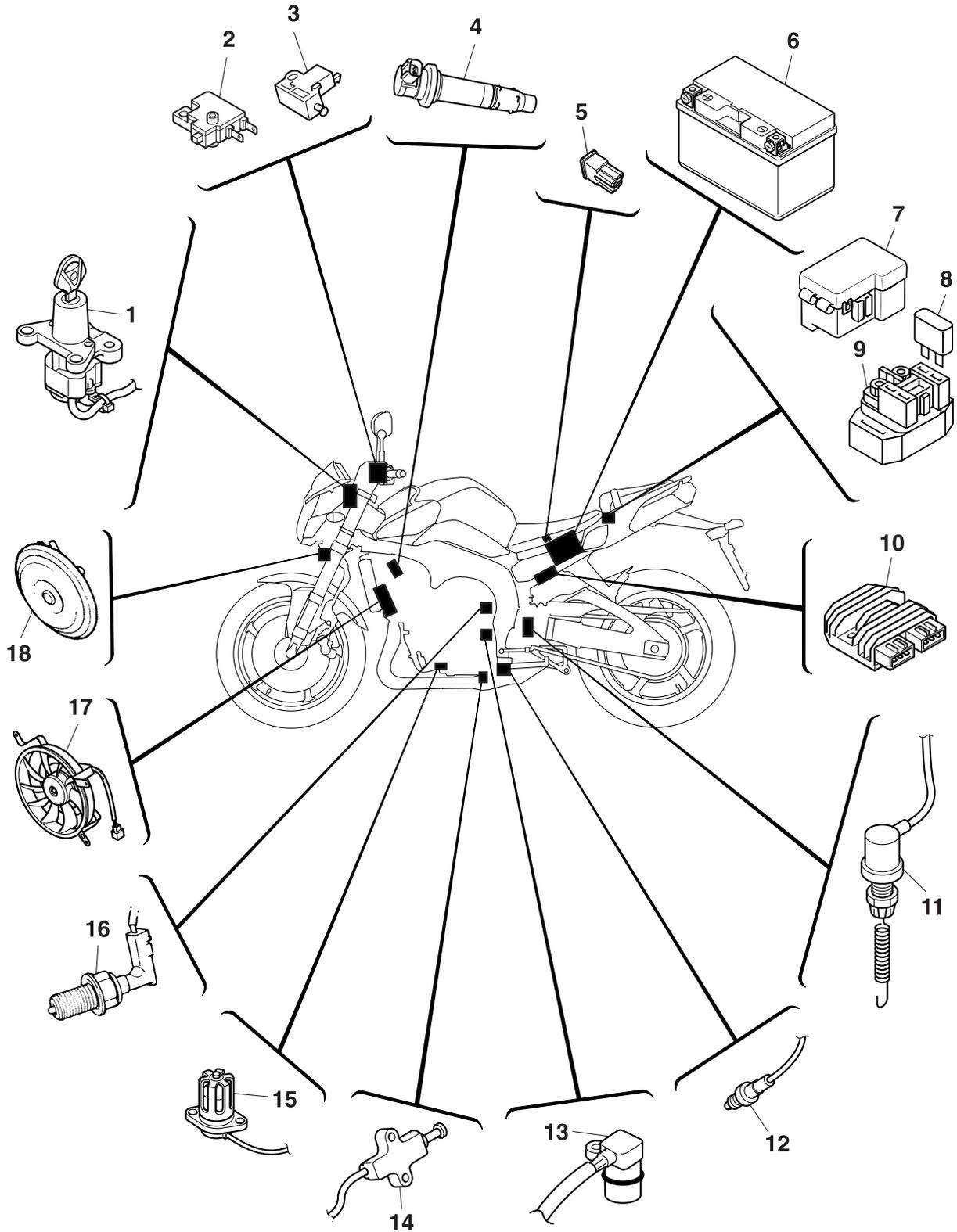
Properly connect or repair the fuel pump system's wiring.

OK↓

Replace the ECU.

EAS27973

## ELECTRICAL COMPONENTS

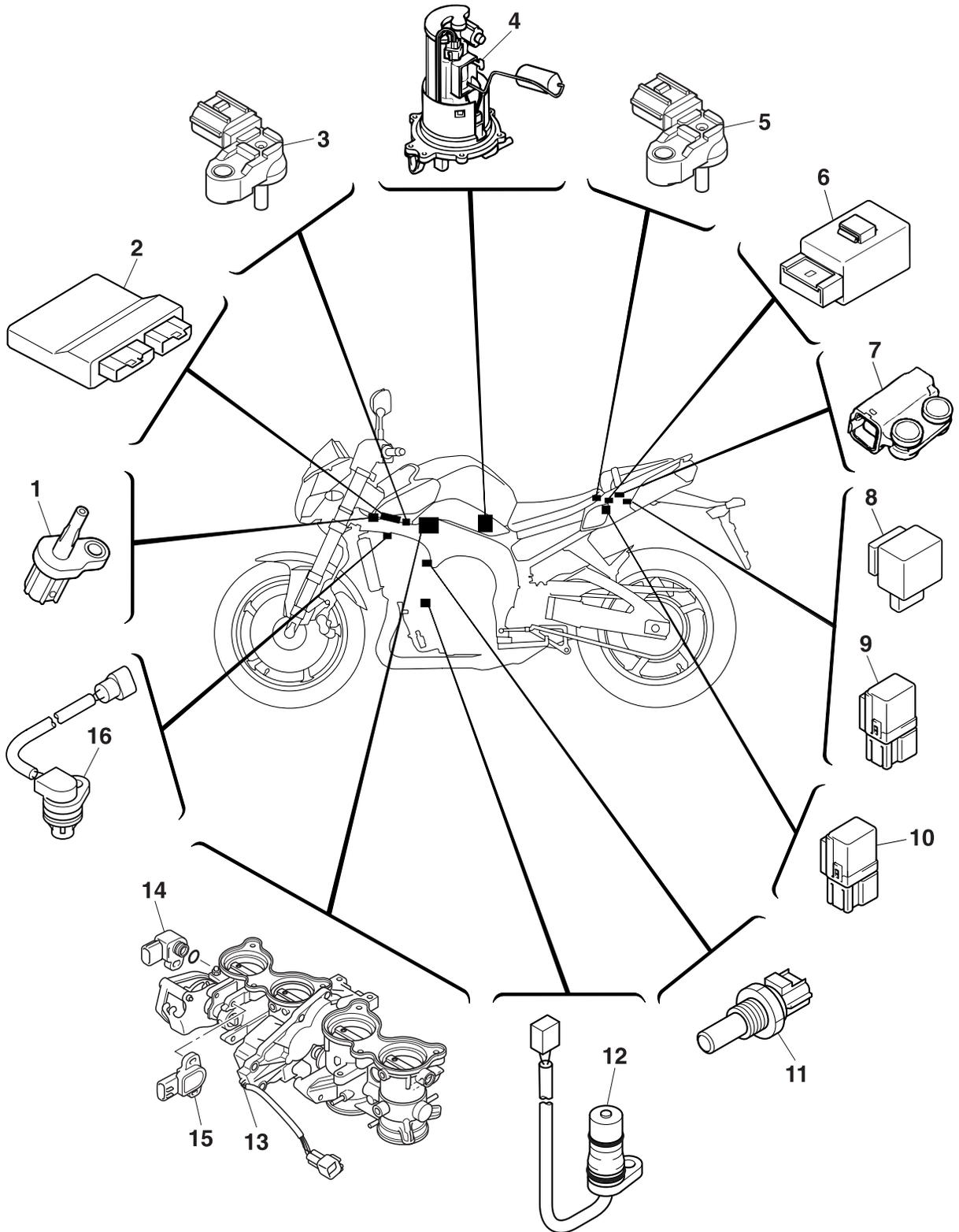


# ELECTRICAL COMPONENTS

---

1. Main switch
2. Front brake light switch
3. Clutch switch
4. Ignition coil
5. Main fuse
6. Battery
7. Fuse box
8. Fuel injection system fuse
9. Starter relay
10. Rectifier/regulator
11. Rear brake light switch
12. O<sub>2</sub> sensor
13. Speed sensor
14. Sidestand switch
15. Oil level switch
16. Neutral switch
17. Radiator fan motor
18. Horn

# ELECTRICAL COMPONENTS



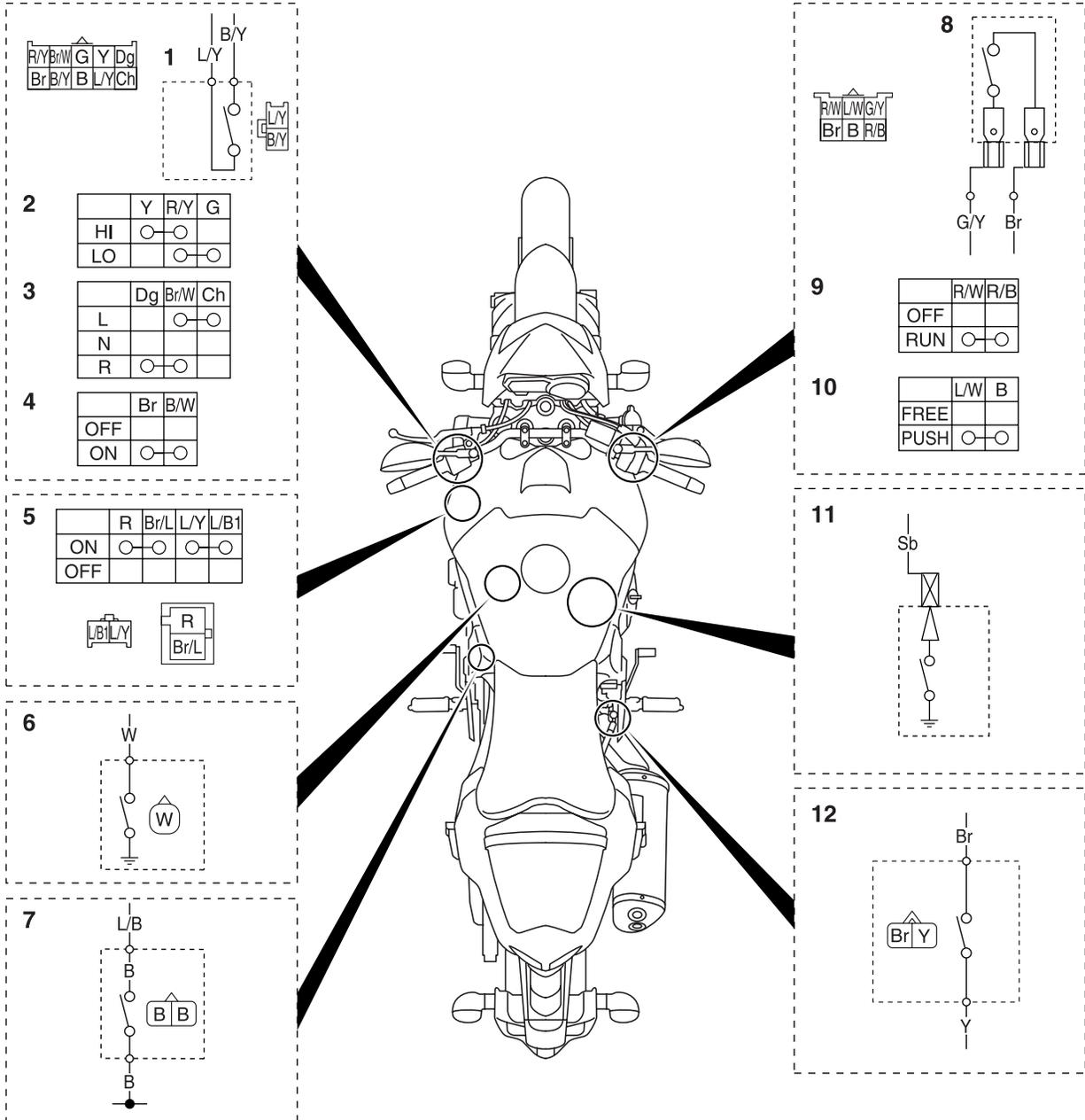
# ELECTRICAL COMPONENTS

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1. Intake air temperature sensor
2. ECU (engine control unit)
3. Intake air pressure sensor
4. Fuel pump
5. Atmospheric pressure sensor
6. Relay unit
7. Lean angle sensor
8. Turn signal relay
9. Headlight relay
10. Radiator fan motor relay
11. Coolant temperature sensor
12. Crankshaft position sensor
13. Sub-throttle servo motor
14. Sub-throttle position sensor
15. Throttle position sensor
16. Cylinder identification sensor

EAS27981

## CHECKING THE SWITCHES



# ELECTRICAL COMPONENTS

---

1. Clutch switch
2. Dimmer switch
3. Turn signal switch
4. Horn switch
5. Main switch
6. Oil level switch
7. Sidestand switch
8. Front brake light switch
9. Engine stop switch
10. Start switch
11. Neutral switch
12. Rear brake light switch

# 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

**NOTICE**

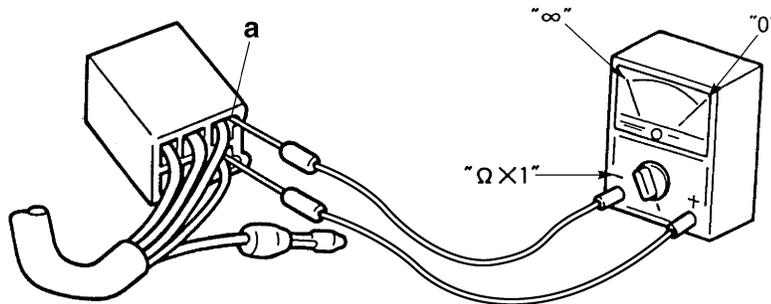
Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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

**TIP**

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



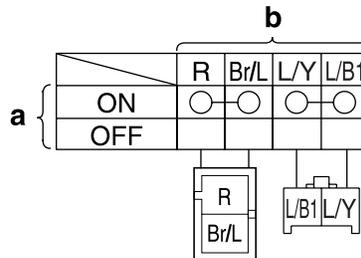
The switches and their terminal connections are illustrated as in the following example of the main switch.

The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.

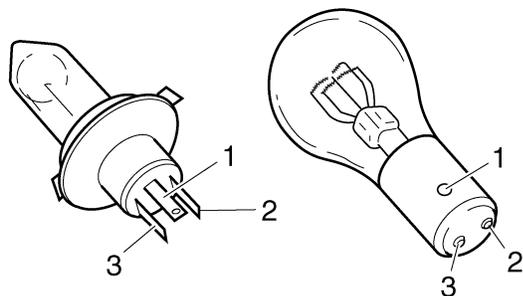
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by "○—○".

There is continuity between red and brown/blue when the switch is set to "ON".

There is continuity between blue/yellow and blue/black 1 when the switch is set to "ON".







## Checking the condition of the bulb sockets

The following procedure applies to all of the bulb sockets.

1. Check:
  - Bulb socket (for continuity) (with the pocket tester)
 No continuity → Replace.



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

### TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

EAS28000

## CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

### NOTICE

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

1. Remove:
  - Rider seat
 Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
  - Fuse



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

### TIP

Set the pocket tester selector to “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             | 15 A            | 1    |
| Signaling system      | 10 A            | 1    |
| Ignition              | 10 A            | 1    |
| Backup                | 7.5 A           | 1    |
| Fuel injection system | 15 A            | 1    |
| Radiator fan motor    | 10 A            | 2    |
| Spare                 | 15 A            | 2    |
| Spare                 | 10 A            | 1    |
| Spare                 | 7.5 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.**



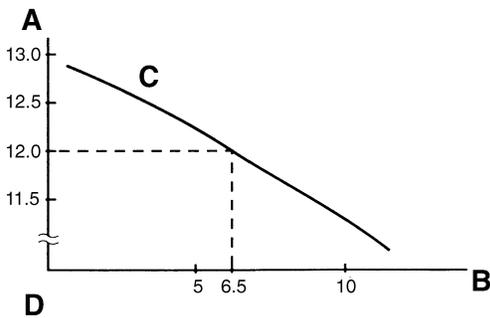


# ELECTRICAL COMPONENTS

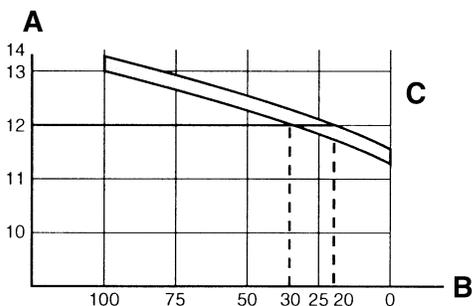
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example  
 Open-circuit voltage = 12.0 V  
 Charging time = 6.5 hours  
 Charge of the battery = 20–30%



- A. Open-circuit voltage (V)
- B. Charging time (hours)
- C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
- D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



- A. Open-circuit voltage (V)
- B. Charging condition of the battery (%)
- C. Ambient temperature 20 °C (68 °F)



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

EWA13300

**⚠ WARNING**

**Do not quick charge a battery.**

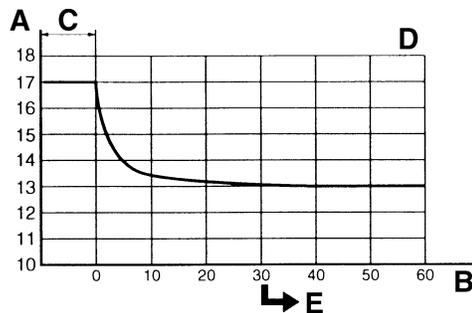
ECA13671

**NOTICE**

- Do not use a high-rate battery charger since it forces a high-amperage current

into the battery quickly and can cause battery overheating and battery plate damage.

- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Regulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- A. Open-circuit voltage (V)
- B. Time (minutes)
- C. Charging
- D. Ambient temperature 20 °C (68 °F)
- E. Check the open-circuit voltage.



## Charging method using a variable-current (voltage) charger

- a. Measure the open-circuit voltage prior to charging.

### TIP

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.

### TIP

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- c. Make sure that the current is higher than the standard charging current written on the battery.

### TIP

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached  
Battery is good.
- Standard charging current is not reached  
Replace the battery.

- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

- 12.8 V or more --- Charging is complete.  
12.7 V or less --- Recharging is required.  
Under 12.0 V --- Replace the battery.



## Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

### TIP

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.

### TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regulated Lead Acid) battery. A variable voltage charger is recommended.

- d. Charge the battery until the battery's charging voltage is 15 V.

### TIP

Set the charging time at 20 hours (maximum).

- e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

- 12.8 V or more --- Charging is complete.  
12.7 V or less --- Recharging is required.  
Under 12.0 V --- Replace the battery.

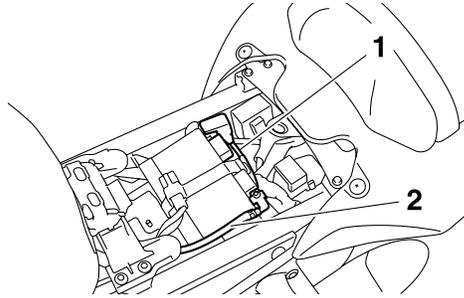


6. Install:
  - Battery  
Refer to "GENERAL CHASSIS" on page 4-1.
7. Connect:
  - Battery leads  
(to the battery terminals)

ECA13630

### NOTICE

**First, connect the positive battery lead "1", and then the negative battery lead "2".**



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



**Recommended lubricant**  
**Dielectric grease**

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

EAS28040

## CHECKING THE RELAYS

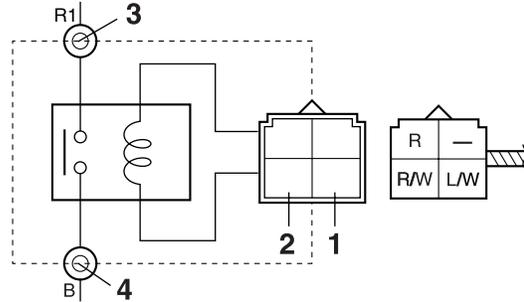
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.



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

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminal as shown. Check the relay operation. Out of specification → Replace.

## Starter relay

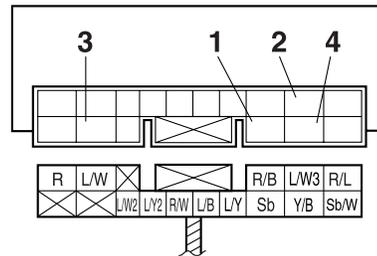


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

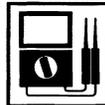


**Relay operation**  
**Continuity**  
**(between "3" and "4")**

## Relay unit (starting circuit cut-off relay)

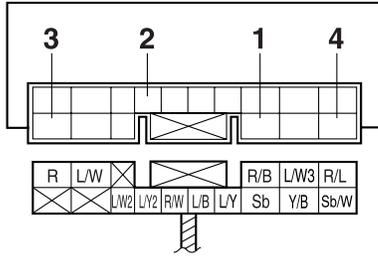


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity**  
**(between "3" and "4")**

## Relay unit (fuel pump relay)

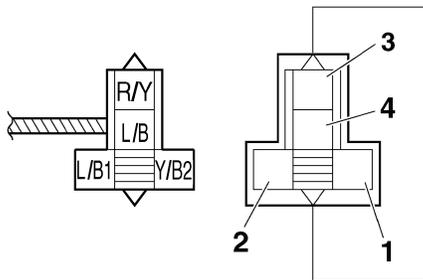


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity**  
(between "3" and "4")

## Headlight relay

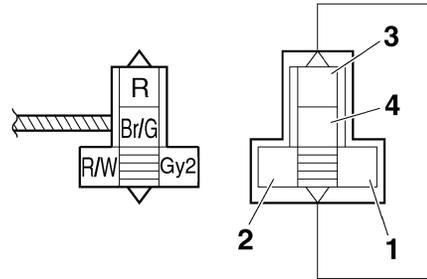


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

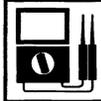


**Result**  
**Continuity**  
(between "3" and "4")

## Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

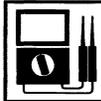


**Result**  
**Continuity**  
(between "3" and "4")

EAS39P1801

## CHECKING THE TURN SIGNAL RELAY

1. Check:
  - Turn signal relay input voltage  
Out of specification → The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.



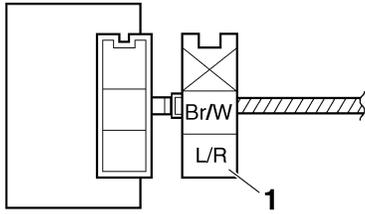
**Turn signal relay input voltage**  
**DC 12 V**

- a. Connect the pocket tester (DC 20 V) to the turn signal relay terminal as shown.



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

- Positive tester probe  
Blue/red "1"
- Negative tester probe  
Ground



- b. Turn the main switch to "ON".
- c. Measure the turn signal relay input voltage.



2. Check:

- Turn signal relay output voltage  
Out of specification → Replace.



**Turn signal relay output voltage  
DC 12 V**

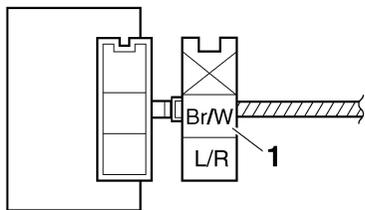


- a. Connect the pocket tester (DC 20 V) to the turn signal relay terminal as shown.



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

- Positive tester probe  
Brown/white "1"
- Negative tester probe  
Ground



- b. Turn the main switch to "ON".
- c. Measure the turn signal relay output voltage.



EAS28050

## CHECKING THE RELAY UNIT (DIODE)

1. Check:

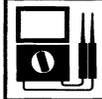
- Relay unit (diode)  
Out of specification → Replace.



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

**TIP**

The pocket tester or the analog pocket tester readings are shown in the following table.



**Continuity**

**Positive tester probe**

**Sky blue "1"**

**Negative tester probe**

**Yellow/black "2"**

**No continuity**

**Positive tester probe**

**Yellow/black "2"**

**Negative tester probe**

**Sky blue "1"**

**Continuity**

**Positive tester probe**

**Sky blue "1"**

**Negative tester probe**

**Blue/yellow "3"**

**No continuity**

**Positive tester probe**

**Blue/yellow "3"**

**Negative tester probe**

**Sky blue "1"**

**Continuity**

**Positive tester probe**

**Sky blue "1"**

**Negative tester probe**

**Sky blue/white "4"**

**No continuity**

**Positive tester probe**

**Sky blue/white "4"**

**Negative tester probe**

**Sky blue "1"**

**Continuity**

**Positive tester probe**

**Blue/black "5"**

**Negative tester probe**

**Blue/yellow "3"**

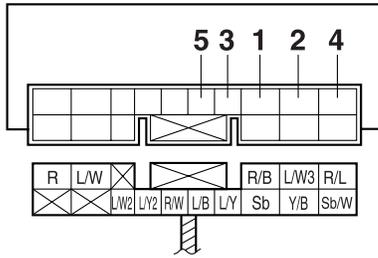
**No continuity**

**Positive tester probe**

**Blue/yellow "3"**

**Negative tester probe**

**Blue/black "5"**



- a. Disconnect the relay unit coupler from the wire harness.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the relay unit terminal as shown.
- c. Check the relay unit (diode) for continuity.
- d. Check the relay unit (diode) for no continuity.

EAS28100

## CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

1. Check:
  - Primary coil resistance  
Out of specification → Replace.



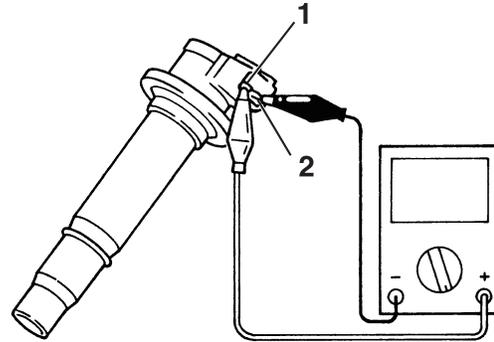
**Primary coil resistance**  
1.19–1.61  $\Omega$

- a. Disconnect the ignition coil connectors from the ignition coil terminals.
- b. Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.



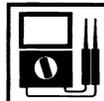
**Pocket tester**  
90890-03112  
**Analog pocket tester**  
YU-03112-C

- Positive tester probe  
Red/black "1"
- Negative tester probe  
Orange or Gray/red or Orange/green or Gray/green "2"



- c. Measure the primary coil resistance.

2. Check:
  - Secondary coil resistance  
Out of specification → Replace.



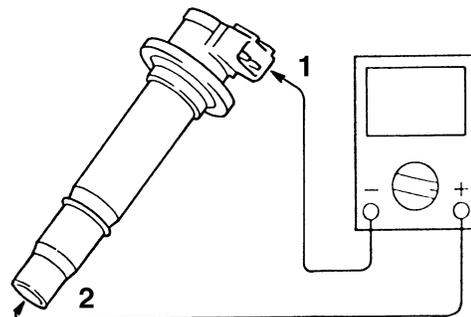
**Secondary coil resistance**  
8.50–11.50 k $\Omega$

- a. Connect the pocket tester ( $\Omega \times 1$  k) to the ignition coil as shown.



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

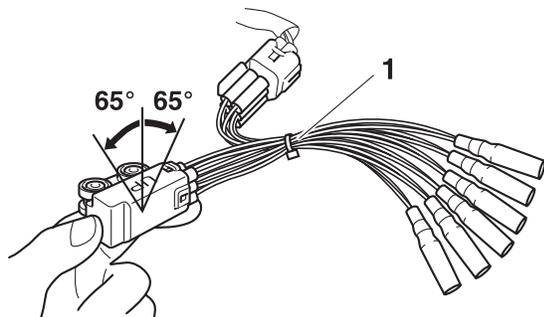
- Negative tester probe  
Red/black "1"
- Positive tester probe  
Spark plug terminal "2"



- b. Measure the secondary coil resistance.



- Positive tester probe  
Yellow/green (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)



- Set the main switch to "ON".
- Turn the lean angle sensor to 65°.
- Measure the lean angle sensor output voltage.



EAS28940

## CHECKING THE STARTER MOTOR OPERATION

- Check:
  - Starter motor operation  
Does not operate → Perform the electric starting system troubleshooting, starting with step 4.  
Refer to "TROUBLESHOOTING" on page 8-11.

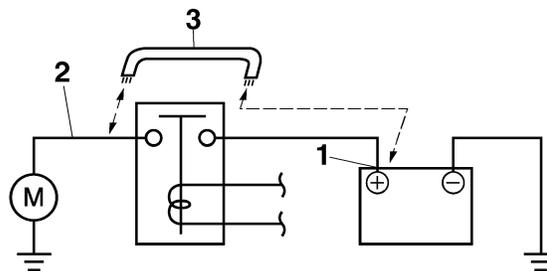


- Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810

### **WARNING**

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



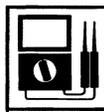
- Check the starter motor operation.



EAS28150

## CHECKING THE STATOR COIL

- Disconnect:
  - Stator coil coupler (from the wire harness)
- Check:
  - Stator coil resistance  
Out of specification → Replace the stator coil.



**Stator coil resistance**  
0.144–0.176 Ω at 20 °C (68 °F)  
(W–W)



- Connect the digital circuit tester to the stator coil coupler as shown.

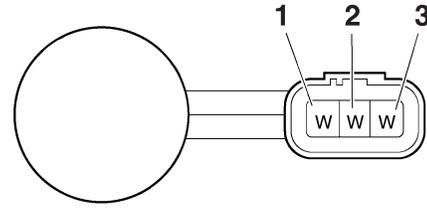
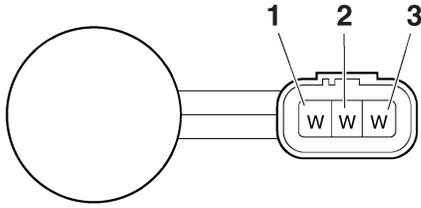


**Digital circuit tester**  
90890-03174  
**Model 88 Multimeter with tachometer**  
YU-A1927

- Positive tester probe  
White "1"
- Negative tester probe  
White "2"

- Positive tester probe  
White "1"
- Negative tester probe  
White "3"

- Positive tester probe  
White "2"
- Negative tester probe  
White "3"



b. Measure the stator coil resistance.



EAS28170

## CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Rectifier/regulator input voltage  
Out of specification → Correct the stator coil condition.  
Refer to “CHECKING THE STATOR COIL” on page 8-110.



**Rectifier/regulator input voltage  
above 14 V at 5000 r/min**



- Set the engine tachometer to the ignition coil of cylinder #1.
- Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.



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

- Positive tester probe  
White “1”
- Negative tester probe  
White “2”

- Positive tester probe  
White “1”
- Negative tester probe  
White “3”

- Positive tester probe  
White “2”
- Negative tester probe  
White “3”

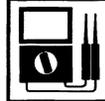
c. Start the engine and let it run at approximately 5000 r/min.

d. Measure the rectifier/regulator input voltage.



2. Check:

- Rectifier/regulator output voltage  
Out of specification → Replace the rectifier/regulator.



**Rectifier/regulator output voltage  
14.2–14.8 V**

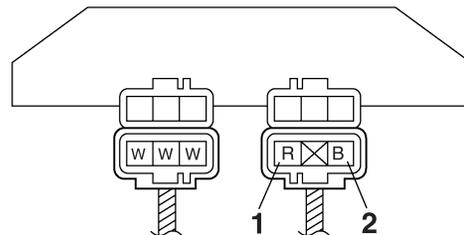


- Set the engine tachometer to the ignition coil of cylinder #1.
- Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.



**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 rectifier/regulator output voltage.

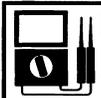


EAS28180

## CHECKING THE HORN

### 1. Check:

- Horn resistance  
Out of specification → Replace.



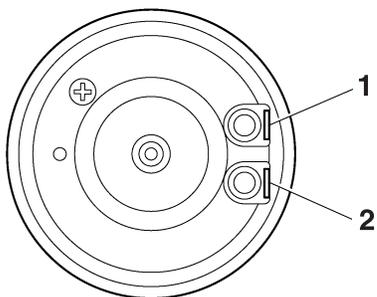
**Horn resistance**  
1.066–1.114 Ω at 20 °C (68 °F)

- Disconnect the horn leads from the horn terminals.
- Connect the digital circuit tester to the horn terminals.



**Digital circuit tester**  
90890-03174  
**Model 88 Multimeter with tachometer**  
YU-A1927

- Positive tester probe  
Horn terminal “1”
- Negative tester probe  
Horn terminal “2”



### c. Measure the horn resistance.

### 2. Check:

- Horn sound  
Faulty sound → Replace.

EAS28190

## CHECKING THE ENGINE OIL LEVEL SWITCH

### 1. Drain:

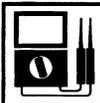
- Engine oil

### 2. Remove:

- Oil level switch  
(from the oil pan)

### 3. Check:

- Oil level switch resistance



**Oil level switch resistance**  
**Maximum level position resistance**  
484–536 Ω  
**Minimum level position resistance**  
114–126 Ω

- Connect the pocket tester (Ω × 100) to the oil level switch terminal as shown.



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

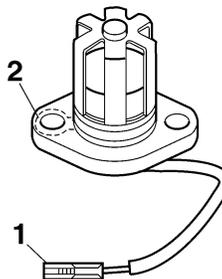
### Minimum level position “A”

- Positive tester probe  
Connector (white) “1”
- Negative tester probe  
Body earth “2”

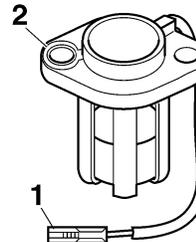
### Maximum level position “B”

- Positive tester probe  
Connector (white) “1”
- Negative tester probe  
Body earth “2”

A



B



- Measure the oil level switch resistance.

EAS39P1802

## CHECKING THE FUEL SENDER

### 1. Disconnect:

- Fuel pump coupler
- Fuel sender coupler  
(from the wire harness)

### 2. Remove:

- Fuel tank

3. Remove:
  - Fuel pump  
(from the fuel tank)
4. Check:
  - Fuel sender resistance  
Out of specification → Replace the fuel pump assembly.



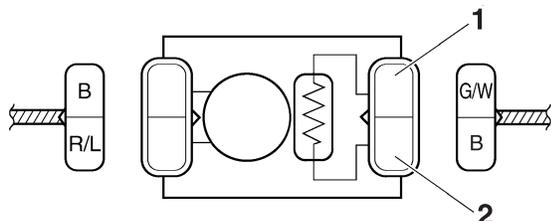
**Sender unit resistance (full)**  
19.0–21.0 Ω  
**Sender unit resistance (empty)**  
139.0–141.0 Ω

- a. Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender terminals as shown.

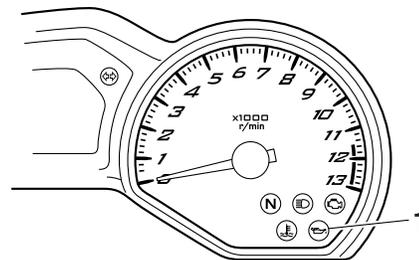


**Pocket tester**  
90890-03112  
**Analog pocket tester**  
YU-03112-C

- Positive tester probe →  
Green/white “1”
- Negative tester probe →  
Black “2”



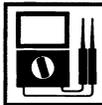
- b. Measure the fuel sender resistance.



EAS28241

## CHECKING THE SPEED SENSOR

1. Check:
  - Speed sensor output voltage  
Out of specification → Replace.



**Output voltage reading cycle**  
0.6 V to 4.8 V to 0.6 V to 4.8 V

- a. Connect the test harness-speed sensor (3P) “1” to the speed sensor coupler and wire harness as shown.
- b. Connect the pocket tester (DC 20 V) to the test harness-speed sensor (3P).



**Pocket tester**  
90890-03112  
**Analog pocket tester**  
YU-03112-C  
**Test harness- speed sensor (3P)**  
90890-03208  
YU-03208

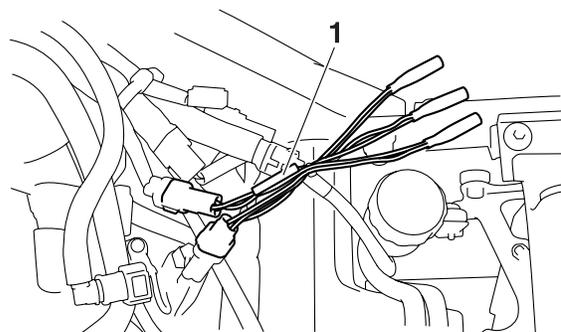
- Positive tester probe  
White/yellow (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)

EAS29050

## CHECKING THE OIL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the oil level detection circuit.

1. Check:
  - Oil level warning light “1”  
(Turn the main switch to “ON”.)  
Warning light comes on for a few seconds, then goes off → Warning light is OK.  
Warning light does not come on → Replace the meter assembly.  
Warning light flashes ten times, then goes off for 2.5 seconds in a repeated cycle (malfunction detected in oil level switch) → Replace the oil level switch.



- c. Set the main switch to “ON”.
- d. Elevate the rear wheel and slowly rotate it.

- e. Measure the voltage. 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.

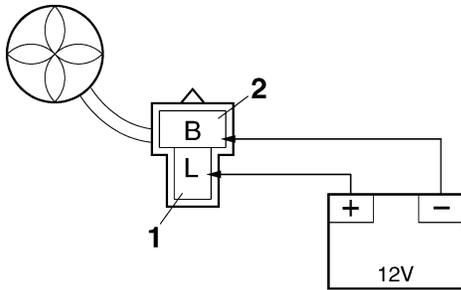


EAS28250

## CHECKING THE RADIATOR FAN MOTORS

1. Check:
- Radiator fan motor  
Faulty/rough movement → Replace.
- a. Disconnect the radiator fan motor coupler from the wire harness.
- b. Connect the battery (DC 12 V) as shown.

- Positive tester probe  
Blue “1”
- Negative tester probe  
Black “2”



- c. Measure the radiator fan motor movement.



EAS28261

## CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
- Coolant temperature sensor  
Refer to “CYLINDER HEAD” on page 5-20.

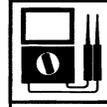
EWA14130



**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.

2. Check:
- Coolant temperature sensor resistance  
Out of specification → Replace.



### Coolant temperature sensor resistance

2.45 k $\Omega$  at 20 °C (68 °F)

290–354  $\Omega$  at 80 °C (176 °F)



- a. Connect the pocket tester ( $\Omega \times 1 \text{ k} \times 100$ ) to the coolant temperature sensor as shown.



### Pocket tester

90890-03112

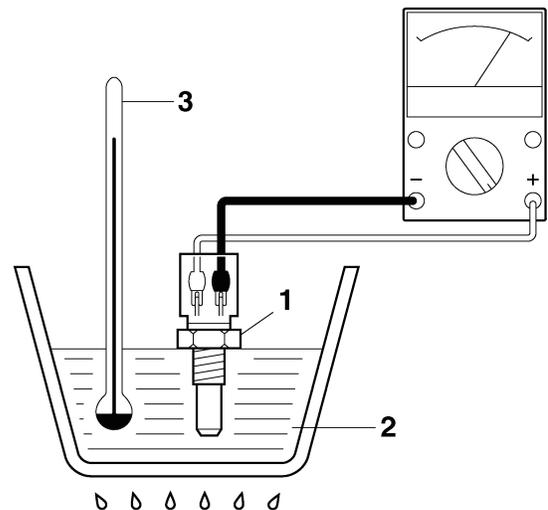
### Analog pocket tester

YU-03112-C

- b. Immerse the coolant temperature sensor “1” in a container filled with coolant “2”.

**TIP**  
Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer “3” in the coolant.



- d. Heat the coolant or let it cool down to the specified temperatures.
- e. Measure the coolant temperature sensor resistance.



3. Install:
  - Coolant temperature sensor



**Coolant temperature sensor**  
**18 Nm (1.8 m·kgf, 13 ft·lbf)**

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 ( $\Omega \times 1 \text{ k}$ ) 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"

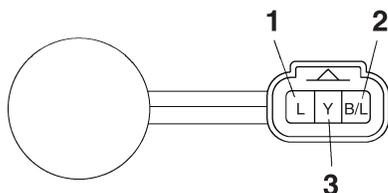
- b. Measure the throttle position sensor maximum resistance.  
 Out of specification → Replace the throttle position sensor.



**Throttle position sensor maximum resistance**  
**2.64–6.16 k $\Omega$**

- c. Connect the pocket tester ( $\Omega \times 1 \text{ k}$ ) to the throttle position sensor as shown.

- Tester positive lead → Yellow "3"
- Tester negative lead → Black/blue "2"



- d. While slowly turning the throttle position sensor shaft, 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**  
**0–6.16 k $\Omega$**



3. Install:
  - Throttle position sensor

### TIP

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-12.

EAS39P1803

## CHECKING THE SUB-THROTTLE POSITION SENSOR

1. Remove:
  - Sub-throttle position sensor (from the throttle body)
2. Check:
  - Sub-throttle position sensor



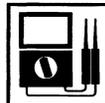
- a. Connect the pocket tester ( $\Omega \times 1 \text{ k}$ ) to the sub-throttle position sensor as shown.



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

- Tester positive lead → Blue "1"
- Tester negative lead → Black/blue "2"

- b. Measure the sub-throttle position sensor maximum resistance.  
 Out of specification → Replace the sub-throttle position sensor.



**Sub-throttle position sensor maximum resistance**  
**3–7 k $\Omega$**

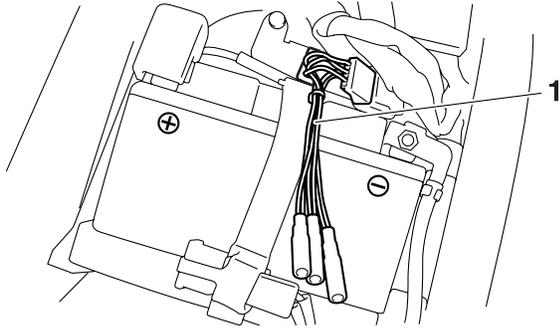


- b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor 5S7 (3P).



**Digital circuit tester**  
**90890-03174**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**  
**Test harness S- pressure sensor 5S7 (3P)**  
**90890-03211**  
**YU-03211**

- Positive tester probe  
Pink (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)



- c. Set the main switch to "ON".  
d. 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 (ON)**  
**More than 4.8 V**  
**Cylinder identification sensor output voltage (OFF)**  
**Less than 0.8 V**



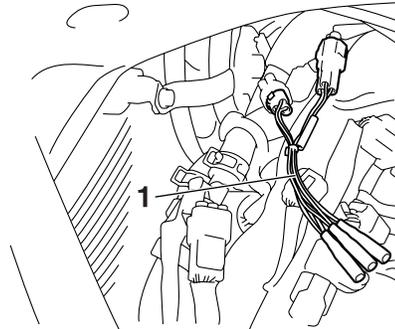
- a. Connect the test harness-speed sensor (3P) "1" to the speed sensor coupler and wire harness as shown.

- b. Connect the pocket tester (DC 20 V) to the test harness-speed sensor (3P).



**Pocket tester**  
**90890-03112**  
**Analog pocket tester**  
**YU-03112-C**  
**Test harness- speed sensor (3P)**  
**90890-03208**  
**YU-03208**

- Positive tester probe  
White/black (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)



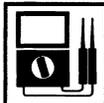
- c. Set the main switch to "ON".  
d. Rotate the crankshaft.  
e. Measure the voltage. With each full rotation of the crankshaft, the voltage reading should cycle from 0.8 V to 4.8 V to 0.8 V to 4.8 V.



EAS28411

## CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
- Intake air pressure sensor output voltage  
Out of specification → Replace.



**Intake air pressure output voltage**  
**3.594–3.684 V at 101.32 kPa,**  
**25 °C (77 °F)**



- a. Connect the test harness S-pressure sensor 5S7 (3P) "1" to the intake air pressure sensor and wire harness as shown.

# ELECTRICAL COMPONENTS

ECA16730

**NOTICE**

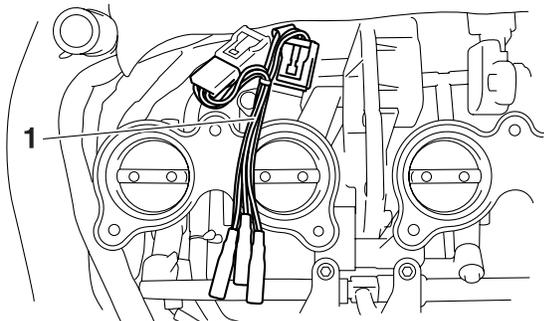
Pay attention to the installing direction of the test harness S-pressure sensor 5S7 (3P) coupler.

- b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor 5S7 (3P).



**Digital circuit tester**  
**90890-03174**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**  
**Test harness S- pressure sensor 5S7 (3P)**  
**90890-03211**  
**YU-03211**

- Positive tester probe  
Pink/white (wire harness color)
- Negative tester probe  
Black/blue (wire harness color)



- c. Set the main switch to "ON".
- d. Measure the intake air pressure sensor output voltage.

EAS28421

**CHECKING THE INTAKE AIR TEMPERATURE SENSOR**

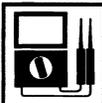
1. Remove:
  - Intake air temperature sensor

EWA14110

**WARNING**

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.

2. Check:
  - Intake air temperature sensor resistance  
Out of specification → Replace.



**Intake air temperature sensor resistance**  
**5.40–6.60 kΩ at 0 °C (32 °F)**  
**0.29–0.39 kΩ at 80 °C (176 °F)**

- a. Connect the pocket tester ( $\Omega \times 1 \text{ k} \times 100$ ) to the intake air temperature sensor terminal as shown.

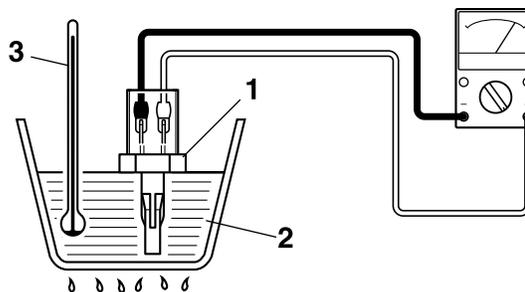


**Pocket tester**  
**90890-03112**  
**Analog pocket tester**  
**YU-03112-C**

- b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

**TIP**  
 Make sure that the intake air temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the water.



- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the intake air temperature sensor resistance.

3. Install:
  - Intake air temperature sensor



**Intake air temperature sensor bolt**  
**1.2 Nm (0.12 m·kgf, 0.87 ft·lbf)**



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## TROUBLESHOOTING

|  |     |
|--|-----|
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EAS28451

## TROUBLESHOOTING

EAS28460

### GENERAL INFORMATION

#### TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS30410

### 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 tank cap breather hole
  - Clogged rollover valve (for California only)
  - Clogged rollover valve hose (for California only)
  - Deteriorated or contaminated fuel
  - Clogged or damaged fuel hose
2. Fuel pump
  - Faulty fuel pump
  - Faulty fuel pump relay

3. Throttle body (-ies)
  - Deteriorated or contaminated fuel
  - Sucked-in air

#### Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Fuse(s)
  - Blown, damaged or incorrect fuse
  - Improperly installed fuse
3. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
4. Ignition coil(s)
  - Cracked or broken ignition coil body
  - Broken or shorted primary or secondary coils
5. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
  - Faulty cylinder identification sensor
  - Broken pickup rotor straight key
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

EAS30440

### 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)
  - Improper throttle cable free play
  - Flooded throttle body
  - Faulty air induction system

## Electrical system

1. Battery
  - Discharged battery
  - Faulty battery
2. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
3. Ignition coil(s)
  - Broken or shorted primary or secondary coils
  - Cracked or broken ignition coil
4. Ignition system
  - Faulty ECU
  - Faulty crankshaft position sensor
  - Faulty cylinder identification sensor
  - Broken pickup rotor straight key

EAS30450

## POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 9-1.

## Engine

1. Air filter
  - Clogged air filter element

## Fuel system

1. Throttle body (-ies)
  - Faulty throttle body
2. Fuel pump
  - Faulty fuel pump

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 pull rod
  - Broken clutch boss
  - Burnt primary driven gear bushing
  - Match marks not aligned

2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (high)
  - Deteriorated oil

EAS30480

## 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
4. Thermostat
  - Thermostat stays closed
5. Oil cooler
  - Clogged or damaged oil cooler
6. Hose(s) and pipe(s)
  - Damaged hose
  - Improperly connected hose
  - Damaged pipe
  - Improperly connected pipe

### Fuel system

1. Throttle body (-ies)
  - Damaged or loose throttle body joint
2. Air filter
  - Clogged air filter element

### Chassis

1. Brake(s)
  - Dragging brake

### Electrical system

1. Spark plug(s)
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
2. Ignition system
  - Faulty ECU

EAS28610

## OVERCOOLING

### Cooling system

1. Thermostat
  - Thermostat stays open

EAS28620

## POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

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)
  - Incorrect oil level
  - 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 dimmer switch)
- Burnt-out headlight bulb

### **Headlight bulb burnt out**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty dimmer switch
- Headlight bulb life expired

### **Tail/brake light does not come on**

- 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**

- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS28740

## WIRING DIAGRAM

### FZ8NA(C) 2011

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Backup fuse
5. Main fuse
6. Frame ground
7. Engine ground
8. Battery
9. Fuel injection system fuse
10. Starter relay
11. Starter motor
12. Relay unit
13. Starting circuit cut-off relay
14. Fuel pump relay
15. Neutral switch
16. Sidestand switch
17. Fuel pump
18. Fuel sender
19. Lean angle sensor
20. Atmospheric pressure sensor
21. Speed sensor
22. Cylinder identification sensor
23. Crankshaft position sensor
24. ECU (engine control unit)
25. Ignition coil #1
26. Ignition coil #2
27. Ignition coil #3
28. Ignition coil #4
29. Spark plug
30. Injector #1
31. Injector #2
32. Injector #3
33. Injector #4
34. Air induction system solenoid
35. Sub-throttle servo motor
36. Sub-throttle position sensor
37. Intake air pressure sensor
38. Throttle position sensor
39. Coolant temperature sensor
40. Intake air temperature sensor
41. O<sub>2</sub> sensor
42. Meter assembly
43. Oil level warning light
44. Neutral indicator light
45. Tachometer
46. Multi-function meter
47. Engine trouble warning light
48. Coolant temperature warning light
49. High beam indicator light
50. Turn signal indicator light
51. Meter light
52. Oil level switch
53. Right handlebar switch
54. Front brake light switch
55. Engine stop switch
56. Start switch

57. Rear brake light switch
58. Left handlebar switch
59. Clutch switch
60. Dimmer switch
61. Turn signal switch
62. Horn switch
63. Horn
64. Turn signal relay
65. Rear right turn signal light
66. Rear left turn signal light
67. Front right turn signal/position light
68. Front left turn signal/position light
69. Headlight
70. License plate light
71. Tail/brake light
72. Headlight relay (on/off)
73. Radiator fan motor relay
74. Right radiator fan motor fuse
75. Right radiator fan motor
76. Left radiator fan motor fuse
77. Left radiator fan motor
78. Headlight fuse
79. Signaling system fuse
80. Ignition fuse

|      |                |
|------|----------------|
| 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/R  | Orange/Red     |
| 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/Y  | White/Yellow   |
| Y/B  | Yellow/Black   |
| Y/G  | Yellow/Green   |
| Y/L  | Yellow/Blue    |
| Y/R  | Yellow/Red     |
| Y/W  | Yellow/White   |

EAS28750

### COLOR CODE

|      |              |
|------|--------------|
| B    | Black        |
| Br   | Brown        |
| Ch   | Chocolate    |
| Dg   | Dark green   |
| G    | Green        |
| Gy   | Gray         |
| L    | Blue         |
| O    | Orange       |
| P    | Pink         |
| R    | Red          |
| Sb   | Sky blue     |
| W    | White        |
| Y    | Yellow       |
| B/G  | Black/Green  |
| B/L  | Black/Blue   |
| B/W  | Black/White  |
| B/Y  | Black/Yellow |
| Br/G | Brown/Green  |
| Br/L | Brown/Blue   |
| Br/R | Brown/Red    |
| Br/W | Brown/White  |
| G/B  | Green/Black  |
| G/W  | Green/White  |
| G/Y  | Green/Yellow |
| Gy/B | Gray/Black   |
| Gy/G | Gray/Green   |
| Gy/R | Gray/Red     |
| Gy/W | Gray/White   |







# WIRING DIAGRAM FZ8NA(C)

