



**2019**

**OWNER'S SERVICE MANUAL**

**YZ450FX**

 **Read this manual carefully before operating this vehicle.**

***YZ450FXK***



**WARNING:** Operating, servicing and maintaining a passenger vehicle or off-road vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to [www.P65Warnings.ca.gov/passenger-vehicle](http://www.P65Warnings.ca.gov/passenger-vehicle)





**Read this manual carefully before operating this vehicle. This manual should stay with this vehicle if it is sold.**

#### FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that is deemed to comply without maximum permissive exposure evaluation (MPE).

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EAM20080

**YZ450FXK**  
**OWNER'S SERVICE MANUAL**  
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## INTRODUCTION

Congratulations on your purchase of a Yamaha YZ series. This model is the culmination of Yamaha's vast experience in the production of pacesetting racing machines. It represents the highest grade of craftsmanship and reliability that have made Yamaha a leader.

This manual explains operation, inspection, basic maintenance and tuning of your machine. If you have any questions about this manual or your machine, please contact your Yamaha dealer.

### TIP

- Yamaha continually seeks advancements in product design and quality. Therefore, while this manual contains the most current product information available at the time of printing, there may be minor discrepancies between your machine and this manual. If you have any questions concerning this manual, please consult your Yamaha dealer.
- This manual is intended for those who have basic knowledge and skill concerning the servicing of Yamaha motorcycles (e.g., Yamaha dealers, service engineers, etc.). Those who have little knowledge and skill concerning servicing are requested not to undertake inspection, adjustment, disassembly, or reassembly only by reference to this manual. It may lead to servicing trouble and mechanical damage.



**PLEASE READ THIS MANUAL CAREFULLY AND COMPLETELY BEFORE OPERATING THIS MACHINE. DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE ATTAINED A SATISFACTORY KNOWLEDGE OF ITS CONTROLS AND OPERATING FEATURES AND UNTIL YOU HAVE BEEN TRAINED IN SAFE AND PROPER RIDING TECHNIQUES. REGULAR INSPECTIONS AND CAREFUL MAINTENANCE, ALONG WITH GOOD RIDING SKILLS, WILL ENSURE THAT YOU SAFELY ENJOY THE CAPABILITIES AND THE RELIABILITY OF THIS MACHINE.**

## 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>WARNING</b>	<b>A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</b>
<b>NOTICE</b>	<b>A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.</b>
<b>TIP</b>	<b>A TIP provides key information to make procedures easier or clearer.</b>

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## **SAFETY INFORMATION**

THIS MACHINE IS DESIGNED STRICTLY FOR COMPETITION USE, ONLY ON A CLOSED COURSE. It is illegal for this machine to be operated on any public street, road, or highway. Off-road use on public lands may also be illegal. Please check local regulations before riding.

- **THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.**

Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.

- **THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY.**

Do not carry passengers on this machine.

- **ALWAYS WEAR PROTECTIVE APPAREL.**

When operating this machine, always wear an approved helmet with goggles or a face shield. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.

- **ALWAYS MAINTAIN YOUR MACHINE IN PROPER WORKING ORDER.**

For safety and reliability, the machine must be properly maintained. Always perform the pre-operation checks indicated in this manual.

Correcting a mechanical problem before you ride may prevent an accident.

- **GASOLINE IS HIGHLY FLAMMABLE.**

Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.

- **GASOLINE CAN CAUSE INJURY.**

If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.

- **ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION.**

Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconsciousness or can be lethal.

- **PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE.**

Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.

- **THE ENGINE, EXHAUST PIPE AND MUFFLER WILL BE VERY HOT AFTER THE ENGINE HAS BEEN RUN.**

Be careful not to touch them or to allow any clothing item to contact them during inspection or repair.

- **PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT.**

For safety, drain the gasoline from the fuel tank before transporting the vehicle.

# YAMAHA MOTOR CORPORATION, U.S.A. YZ MOTORCYCLE LIMITED WARRANTY

Yamaha Motor Corporation, U.S.A. hereby warrants to the original retail purchaser that the following components equipped on new Yamaha YZ motorcycles purchased from an authorized Yamaha motorcycle dealer in the continental United States will be free from defects in material and workmanship for the period of time stated herein, subject to certain stated limitations. YZ components included under this warranty are the engine, frame, swingarm, and monoshock. It is understood that the balance of the YZ components are not covered by any warranty, expressed or implied. The balance of the components equipped on the unit are sold on an "as is" basis. This warranty applies to the original purchaser only and is not transferable.

**THE PERIOD OF WARRANTY** for the above-listed Yamaha YZ components as originally installed on the unit shall be thirty (30) days from the date of purchase.

**MODELS EXCLUDED FROM WARRANTY** include those used for non-Yamaha-authorized renting, leasing, or other commercial purposes.

**DURING THE PERIOD OF WARRANTY** any authorized Yamaha motorcycle dealer will, free of charge, repair or replace, at Yamaha's option, any part adjudged defective by Yamaha due to faulty workmanship or material from the factory. Parts used in warranty repairs will be warranted for the balance of the product's warranty period. All parts replaced under warranty become property of Yamaha Motor Corporation, U.S.A.

**GENERAL EXCLUSIONS** from this warranty shall include any failures caused by:

- Installation of parts or accessories that are not qualitatively equivalent to genuine Yamaha parts.
- Abnormal strain, neglect, or abuse.
- Accident or collision damage.
- Modification to original parts.
- Lack of proper maintenance.
- Damage due to improper transportation.

**SPECIFIC EXCLUSIONS** from this warranty shall include parts replaced due to normal wear or routine maintenance.

**THE CUSTOMER'S RESPONSIBILITY** under this warranty shall be to:

- Operate and maintain the YZ as specified in the appropriate Owner's Service Manual, and
- Give notice to an authorized Yamaha motorcycle dealer of any and all apparent defects within ten (10) days after discovery, and make the machine available at that time for inspection and repairs at such dealer's place of business.

**YAMAHA MOTOR CORPORATION, U.S.A. MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE OBLIGATIONS AND TIME LIMITS STATED IN THIS WARRANTY ARE HEREBY DISCLAIMED BY YAMAHA MOTOR CORPORATION, U.S.A. AND EXCLUDED FROM THIS WARRANTY.**

**SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. ALSO EXCLUDED FROM THIS WARRANTY ARE**

**ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING LOSS OF USE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.**

**THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.**

YAMAHA MOTOR CORPORATION, U.S.A.  
Post Office Box 6555  
Cypress, California 90630

## WARRANTY QUESTIONS AND ANSWERS

- Q. What costs are my responsibility during the warranty period?
- A. The customer's responsibility includes all costs of normal maintenance services, non-warranty repairs, accident and collision damage, and oil, oil filters, air filters, spark plugs, and brake shoes or pads.
- Q. What are some examples of "abnormal" strain, neglect, or abuse?
- A. These terms are general and overlap each other in areas. Specific examples include: Running the machine without oil; operating the machine with a broken or damaged part which causes another part to fail, damage or failure due to improper or careless transportation and or tie down; and so on. If you have any specific questions on operation or maintenance, please contact your dealer for advice.
- Q. Does the warranty cover incidental costs such as towing or transportation due to a failure?
- A. No. The warranty is limited to repair of the machine itself.
- Q. May I perform any or all of the recommended maintenance shown in the Owner's Service Manual instead of having the dealer do them?
- A. Yes, if you are a qualified mechanic and follow the procedures specified in the Owner's Service Manual. We do recommend, however, that items requiring special tools or equipment be done by a Yamaha motorcycle dealer.
- Q. Will the warranty be void or canceled if I do not operate or maintain my new YZ exactly as specified in the Owner's Service Manual?
- A. No. The warranty on a new motorcycle cannot be "voided" or "cancelled." **However, if a particular failure is caused by operation or maintenance other than as shown in the Owner's Service Manual, that failure may not be covered under warranty.**
- Q. What responsibility does my dealer have under this warranty?
- A. Each Yamaha motorcycle dealer is expected to:
- Completely set up every new machine before sale.
  - Explain the operation, maintenance, and warranty requirements to your satisfaction at the time of sale, and upon your request at any later date.  
In addition, each Yamaha motorcycle dealer is held responsible for his setup, service and warranty repair work.
- Q. Does the warranty on the engine include the carburetor, air filter, air box, and exhaust pipe?
- A. No. The warranty covers only the engine components.

## CUSTOMER SERVICE

If your machine requires warranty service, you must take it to any authorized Yamaha motorcycle dealer within the continental United States. Be sure to bring your warranty registration identification or other valid proof of the original date of purchase. If a question or problem arises regarding warranty, first contact the owner of the dealer-ship. Since all warranty matters are handled at the dealer level, this person is in the best position to help you. If you are still not satisfied and require additional assistance, please write:

YAMAHA MOTOR CORPORATION U.S.A.  
CUSTOMER RELATIONS DEPARTMENT  
P.O. Box 6555  
Cypress, California 90630

When contacting Yamaha Motor Corporation, U.S.A. don't forget to include any important information such as names, addresses, model, V.I.N. (frame number), dates, and receipts.

## CHANGE OF ADDRESS

The federal government requires each manufacturer of a motor vehicle to maintain a complete, up-to-date list of all first purchasers against the possibility of a safety-related defect and recall. This list is compiled from the purchase registrations sent to Yamaha Motor Corporation, U.S.A. by the selling dealer at the time of your purchase.

If you should move after you have purchased your new motorcycle, please advise us of your new address by sending a postcard listing your motorcycle model name, V.I.N. (frame number), dealer number (or dealer's name) as it is shown on your warranty identification, your name and new mailing address. Mail to:

YAMAHA MOTOR CORPORATION, U.S.A.  
WARRANTY DEPARTMENT  
P.O. Box 6555  
Cypress, California 90630

This will ensure that Yamaha Motor Corporation, U.S.A. has an up-to-date registration record in accordance with federal law.

## HOW TO USE THIS MANUAL

In this manual, descriptions of installation, removal, disassembly, assembly, check, and adjustment 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 removal or a disassembly step.
- Symbols “5” indicate parts to be lubricated or replaced.
- Refer to “SYMBOLS”.
- A job instruction chart “6” accompanies the exploded diagram, providing the order of jobs, the names of parts, the notes in jobs, etc. This step explains removal and disassembly procedure only. For installation and assembly procedure, reverse the steps.
- Jobs “7” requiring more information (such as special tools and technical data) are described sequentially.

**CLUTCH**

1

5

**CLUTCH**

Removing the clutch

4

3

6

Order	Part name	Qty	Remarks
	Engine oil		Drain. Refer to “CHANGING THE ENGINE OIL” on page 3-17.
1	Clutch cable	1	Refer to “ENGINE REMOVAL” on page 6-1.
2	Clutch cover	1	Disconnect.
3	O-ring	1	
4	Clutch spring	5	
5	Pressure plate	1	
6	Push rod 1	1	
7	Circclip	1	
8	Washer	1	
9	Bearing	1	
10	Ball	1	
11	Push rod 2	1	
12	Friction plate 1	3	
13	Clutch plate 1	4	Thickness: 2.0 mm (0.079 in)

6-41

**CLUTCH**

2

**REMOVING THE CLUTCH**

1. Remove:

- Clutch boss nut “1”
- Conical washer “2”
- Clutch boss “3”

**TIP**

While holding the clutch boss with the clutch holder “4”, loosen the clutch boss nut.

Universal clutch holder  
90890-04086  
Universal clutch holder  
YM-91042

**CHECKING THE CLUTCH PLATES**

1. Check:

- Clutch plate
- Damage/wear → Replace the clutch plates as a set.

2. Measure:

- Friction plate thickness
- Out of specification → Replace the friction plates as a set.

**TIP**

Measure it at four points on the friction plate.

Friction plate thickness  
2.92–3.08 mm (0.115–0.121 in)  
Wear limit  
2.85 mm (0.112 in)

**CHECKING THE CLUTCH SPRINGS**

1. Check:

- Clutch spring
- Damage → Replace the clutch springs as a set.

2. Measure:

- Clutch spring free length
- Out of specification → Replace the clutch springs as a set.

Clutch spring free length  
50.00 mm (1.97 in)  
Limit  
47.50 mm (1.87 in)

7













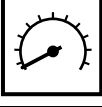

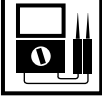



6-44

## 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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# TABLE OF CONTENTS

<b>GENERAL INFORMATION</b>	<b>1</b>
<b>SPECIFICATIONS</b>	<b>2</b>
<b>PERIODIC CHECKS AND ADJUSTMENTS</b>	<b>3</b>
<b>CHASSIS</b>	<b>4</b>
<b>ENGINE</b>	<b>5</b>
<b>COOLING SYSTEM</b>	<b>6</b>
<b>FUEL SYSTEM</b>	<b>7</b>
<b>ELECTRICAL SYSTEM</b>	<b>8</b>
<b>TROUBLESHOOTING</b>	<b>9</b>
<b>TUNING</b>	<b>10</b>

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## GENERAL INFORMATION

<b>LOCATION OF IMPORTANT LABELS</b> .....	1-1
<b>DESCRIPTION</b> .....	1-2
<b>IDENTIFICATION</b> .....	1-3
VEHICLE IDENTIFICATION NUMBER .....	1-3
ENGINE SERIAL NUMBER.....	1-3
<b>INCLUDED PARTS</b> .....	1-4
NIPPLE WRENCH.....	1-4
HANDLEBAR PROTECTOR .....	1-4
FUEL HOSE JOINT COVER .....	1-4
POWER TUNER.....	1-4
<b>IMPORTANT INFORMATION</b> .....	1-6
PREPARATION FOR REMOVAL AND DISASSEMBLY .....	1-6
REPLACEMENT PARTS.....	1-6
GASKETS, OIL SEALS AND O-RINGS .....	1-7
LOCK WASHERS/PLATES AND COTTER PINS .....	1-7
BEARINGS AND OIL SEALS .....	1-7
CIRCLIPS .....	1-7
<b>BASIC SERVICE INFORMATION</b> .....	1-8
ELECTRICAL SYSTEM.....	1-8
<b>SPECIAL TOOLS</b> .....	1-12
<b>CONTROL FUNCTIONS</b> .....	1-18
WARNING LIGHTS .....	1-18
ENGINE STOP SWITCH .....	1-18
START SWITCH.....	1-18
MODE SWITCH.....	1-18
CLUTCH LEVER .....	1-19
SHIFT PEDAL.....	1-19
THROTTLE GRIP .....	1-19
FRONT BRAKE LEVER .....	1-19
REAR BRAKE PEDAL.....	1-19
SIDESTAND .....	1-19
STARTER KNOB.....	1-20
FUEL TANK CAP .....	1-20
<b>STARTING AND BREAK-IN</b> .....	1-21
FUEL.....	1-21
AIR FILTER MAINTENANCE .....	1-21
STARTING A COLD ENGINE .....	1-21
STARTING A WARM ENGINE .....	1-22

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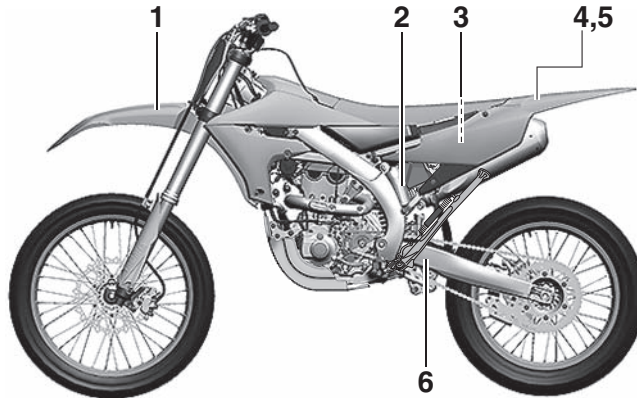
BREAK-IN PROCEDURES .....	1-22
ENGINE STARTING PRECAUTION .....	1-22
 <b>MAINTENANCE AFTER BREAK-IN</b> .....	 1-23
MAJOR MAINTENANCE .....	1-23
 <b>TORQUE-CHECK POINTS</b> .....	 1-24
 <b>MOTORCYCLE CARE AND STORAGE</b> .....	 1-26
CARE .....	1-26
STORAGE .....	1-27

# LOCATION OF IMPORTANT LABELS

EAM20085

## LOCATION OF IMPORTANT LABELS

Please read the following important labels carefully before operating this vehicle.



1

Premium unleaded  
gasoline only.

3FB-2415E-02

2

### ⚠ WARNING

This unit contains high pressure nitrogen gas.  
Mishandling can cause explosion.

- Read owner's manual for instructions.
- Do not incinerate, puncture or open.

4AA-22259-80

3

### ⚠ WARNING

To avoid sparking, burns, fire, and explosion:

- Read owner's manual before use.
- Charge battery only with specified charger.
- Use battery only for specified product – no other use.
- Do not place near fire or immerse in water.
- Do not use battery if it has been dropped, subject to impact, or visibly damaged.
- Do not disassemble or modify the battery, or short across its terminals.



4

### ⚠ WARNING

- BEFORE YOU OPERATE THIS VEHICLE, READ THE OWNER'S MANUAL AND ALL LABELS.
- NEVER CARRY A PASSENGER. You increase your risk of losing control if you carry a passenger.
- NEVER OPERATE THIS VEHICLE ON PUBLIC ROADS. You can collide with another vehicle if you operate this vehicle on a public road.
- ALWAYS WEAR AN APPROVED MOTORCYCLE HELMET, eye protection, and protective clothing.
- EXPERIENCED RIDER ONLY.

5PA-2118K-00

5

For use only on a closed course  
in sanctioned competition.

This motorcycle does not meet  
EPA noise and emissions  
standards and is not for general  
off-road recreational riding.

17D-2812P-00

6

### TIRE INFORMATION

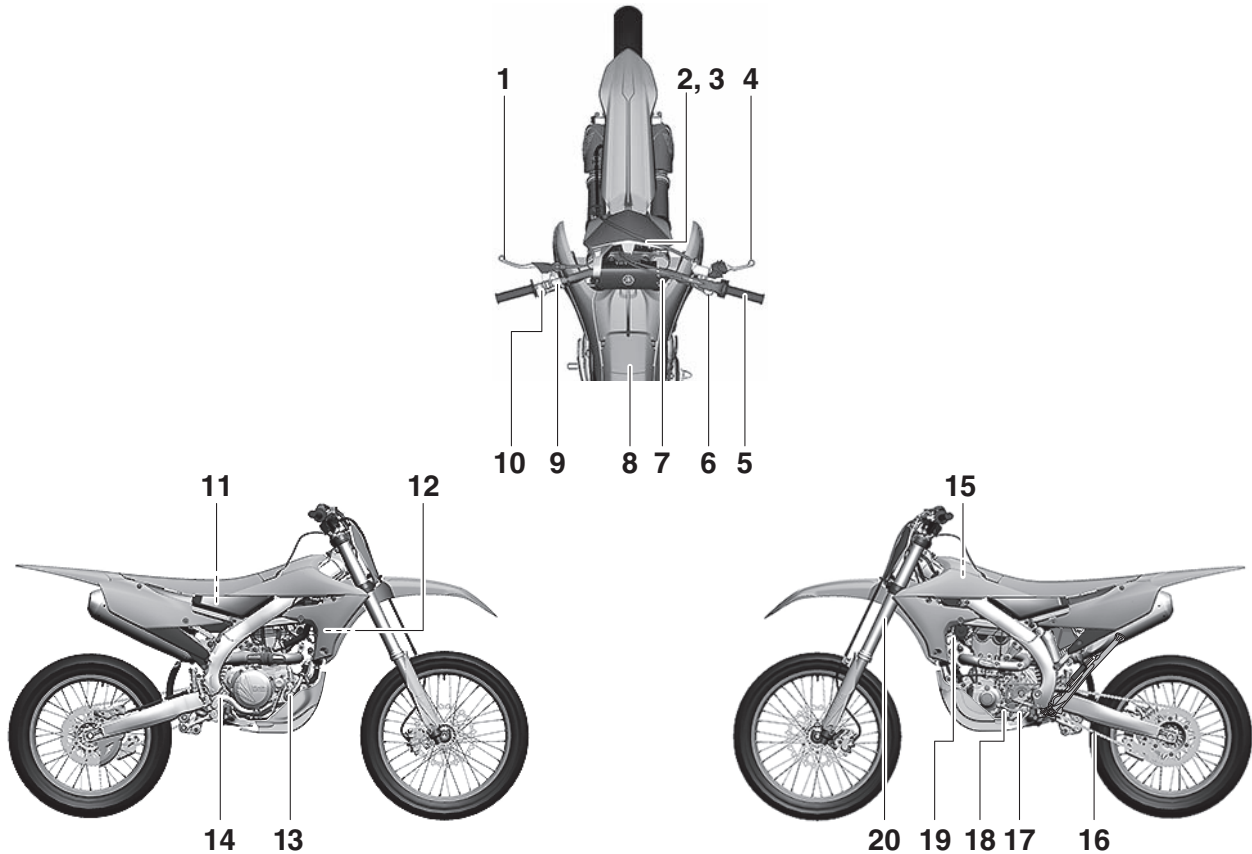
Cold tire normal pressure should be set as follows.



FRONT: 100kPa, {1.00kgf/cm<sup>2</sup>}, 15psi  
REAR : 100kPa, {1.00kgf/cm<sup>2</sup>}, 15psi

3RV-21668-A0

EAM20086

## DESCRIPTION



1. Clutch lever
2. Engine trouble warning light “”
3. Fuel level warning light “”
4. Front brake lever
5. Throttle grip
6. Start switch
7. Radiator cap
8. Fuel tank cap
9. Mode switch
10. Engine stop switch

11. Fuel tank
12. Radiator
13. Coolant drain bolt
14. Rear brake pedal
15. Air filter
16. Drive chain
17. Shift pedal
18. Oil level check window
19. Starter knob
20. Front fork

### TIP

Designs and specifications of the vehicle are subject to change without notice. Therefore, please note that the descriptions in this manual may be different from those for the vehicle you have purchased.

EAM20087

## IDENTIFICATION

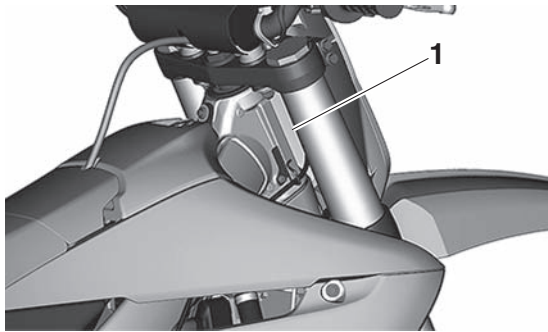
There are two significant reasons for knowing the serial number of your vehicle:

1. When ordering parts, you can give the number to your Yamaha dealer for positive identification of the model you own.
2. If your vehicle is stolen, the authorities will need the number to search for and identify your vehicle.

EAM30002

### VEHICLE IDENTIFICATION NUMBER

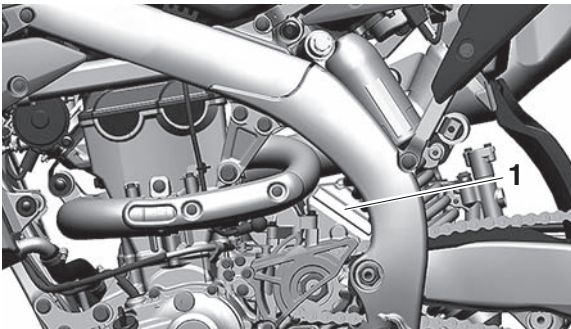
The vehicle identification number “1” is stamped into the right side of the frame.



EAM30003

### ENGINE SERIAL NUMBER

The engine serial number “1” is stamped into the elevated part of the right-side of the engine.



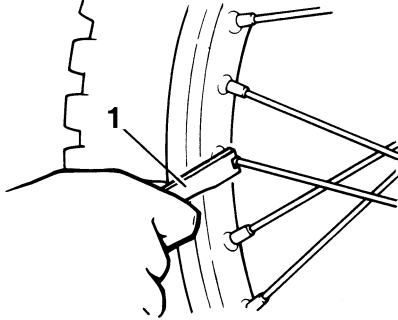
EAM20088

## INCLUDED PARTS

EAM30005

### NIPPLE WRENCH

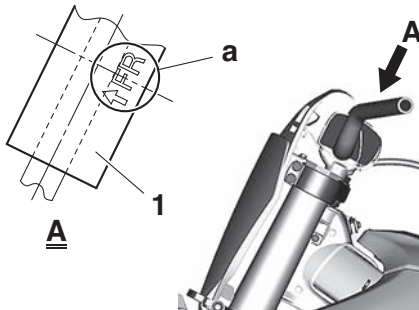
The nipple wrench “1” is used to tighten the spoke.



EAM30006

### HANDLEBAR PROTECTOR

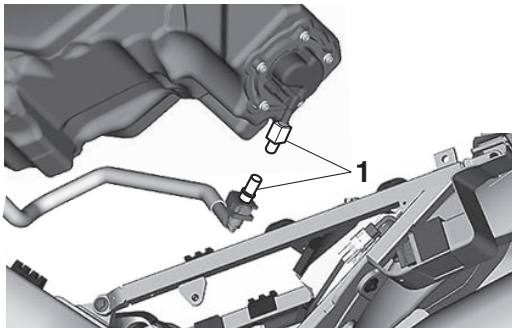
Install the handlebar protector “1” with the mark “a” facing forward.



EAM30007

### FUEL HOSE JOINT COVER

The fuel hose joint covers “1” are used to prevent mud, dust, and other foreign materials from entering the inside when the fuel hose is disconnected.



EAM30443

### POWER TUNER

By downloading the Power Tuner app to your smartphone and wirelessly connecting to the CCU wireless network, you can adjust various vehicle settings.

EWA20460

## WARNING

- Do not operate the engine in a closed area. The exhaust gas is poisonous.
- Never let flames near the servicing area.

ECA26050

## NOTICE

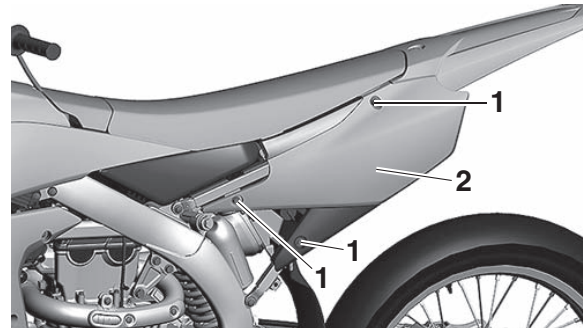
- This application is designed for adjusting the settings on a standard vehicle. In case the engine specifications (muffler, compression ratio, etc.) have been changed, the performance may not match to the actual settings.
- Do not run the engine with the smartphone carried with you. Otherwise, the smartphone could be damaged.

## TIP

- Download the Power Tuner app from the Google© or Apple© store.
- For details about handling the smartphone, read the owner's manual of the smartphone.

**Before connecting to the CCU wireless network (in case of initial use of the Power Tuner app)**

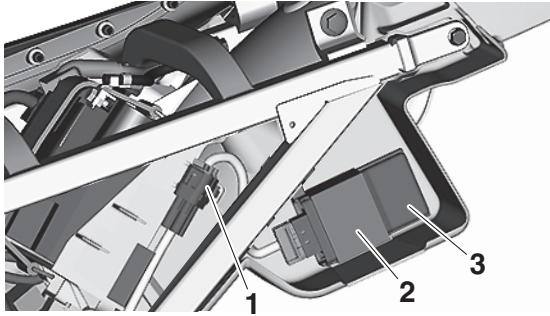
1. Remove the bolts and side cover (left).



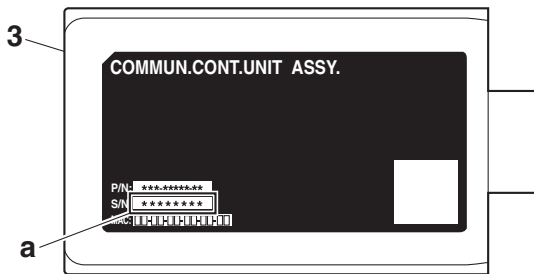
1. Bolt
2. Side cover (left)

2. Remove the CCU and record the CCU serial number.





1. CCU coupler
2. Holder
3. CCU (Communication Control Unit)



3. CCU (Communication Control Unit)
- a. CCU serial number

3. Install the removed CCU and side cover (left).

## Connecting to the CCU wireless network

ECA26060

### NOTICE

The CCU (Communication Control Unit) uses weak radio waves. The CCU may not work in the following situations.

- The CCU is placed in a location exposed to strong radio waves or other electromagnetic noise
- There are facilities nearby that are emitting strong radio waves (TV or radio towers, power plants, broadcasting stations, airports, etc.)
- You are carrying or using communication equipment such as radios or mobile phones in close proximity of the CCU
- The CCU is in contact with or covered by a metallic object
- Other vehicles equipped with a CCU are nearby

In such situations, move the CCU to another location and perform the operation again.

1. Turn on the smartphone.
2. For two minutes after the start switch is

pressed or while the engine is running (the CCU is activated), input the CCU serial number into your smartphone and establish a wireless connection.

3. Activate the Power Tuner app.

### TIP

If the CCU wireless network cannot be detected, operate the start switch again.

EAM20089

## IMPORTANT INFORMATION

EAM30009

### PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before the jobs, completely remove mud, dust, and the like in order to prevent the entry of them into the inside during the jobs.



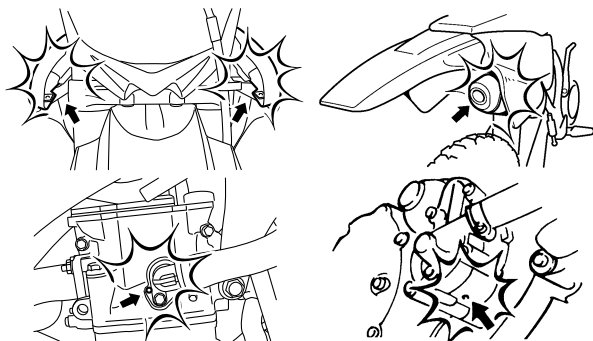
- Before cleaning with high-pressure water of washers, cover the following parts.

Air duct

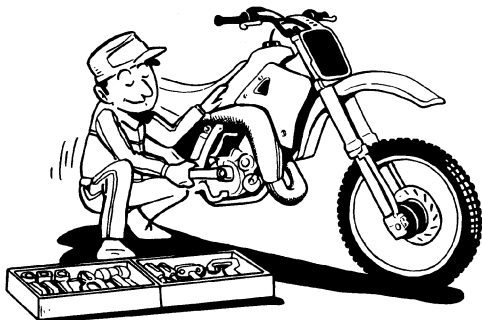
Silencer exhaust port

Drain hole on the cylinder head (right side)

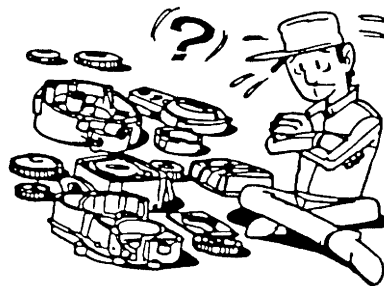
Hole under the water pump housing



2. Use proper special tools and equipment. Refer to "SPECIAL TOOLS" on page 1-12.



3. During disassembly, check and measure the required parts, and make a record of them so that you may refer to the record when installing them. Moreover, arrange gears, cylinders, pistons, and other parts for each section so as not to confuse or lose them.



4. During disassembly, clean each of the parts, and store them in trays for each section.
5. Flammable. Keep servicing areas away from any source of fire.
6. During servicing, take special care not to receive an injury or a burn on the engine, the exhaust pipe, the silencer, or the like.
7. If coolant is left adhered to the chassis, paint and plating will be damaged. Therefore, rinse it out with water in good time.

EWA18970

### **WARNING**

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

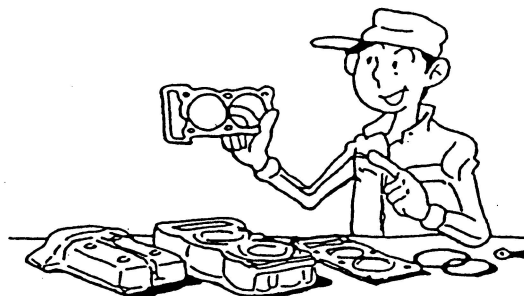
- If it enters your eyes, wash it away with water enough and then get medical attention
- If it splashes on your skin or clothes, quickly wash it away with water and then with soapy water.
- If it is swallowed, immediately induce vomiting and get medical attention.

EAM30010

### REPLACEMENT PARTS

Make sure that the parts and grease or oil to be used for repair of the vehicle, including periodic replacement parts, are new YAMAHA genuine parts and recommended parts.

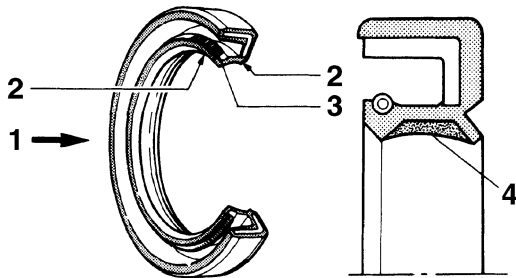
Do not use any used parts, because these may not be genuine though they have similar appearances or because the quality may be changed by aging.



EAM30011

## GASKETS, OIL SEALS AND O-RINGS

1. When overhauling the engine, replace all gaskets and O-rings. All gasket surfaces, oil seal lips, and O-rings must be cleaned so that there may be no dust on them.
2. During assembly, always apply proper oil to bearings and proper grease to oil seal lips before installation.

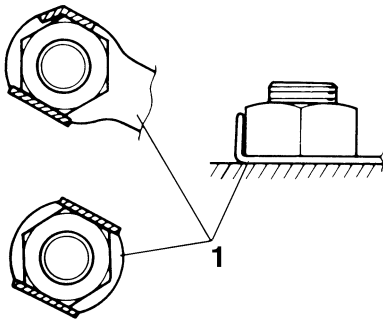


1. Oil
2. Lip
3. Spring
4. Grease

EAM30012

## LOCK WASHERS/PLATES AND COTTER PINS

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



EAM30013

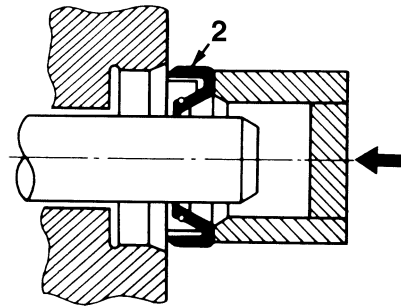
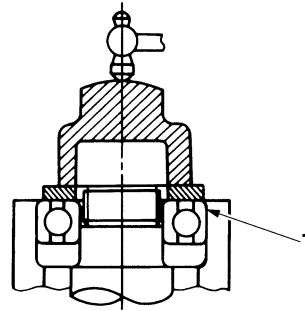
## BEARINGS AND OIL SEALS

Install bearings "1" and oil seals "2" with their manufacturer's marks or size symbols facing outward. During installation of an oil seal, make sure that its main lip faces the oil chamber (the target to be sealed). Before installation, always apply a light coat of grease to the oil seal lip.

ECA13300

### NOTICE

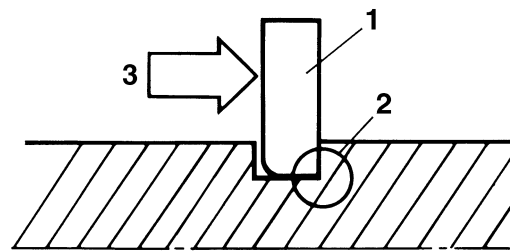
**Do not spin the bearing with compressed air because this will damage the bearing surfaces.**



EAM30014

## CIRCLIPS

When assembling parts, always use new circlips. During installation of a circlip, make sure that the edge "2" of the circlip "1" is positioned opposite to the force "3" that the circlip receives. Install the circlip with its end aligned with the center of the spline, without opening the circlip more than necessary.



EAM20120

## BASIC SERVICE INFORMATION

EAM30181

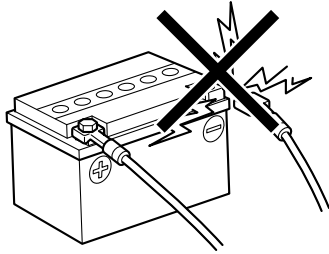
### ELECTRICAL SYSTEM

#### Electrical parts handling

ECA16600

#### NOTICE

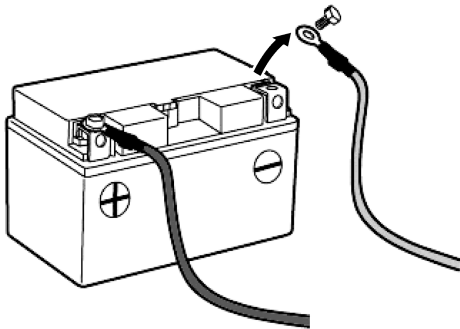
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

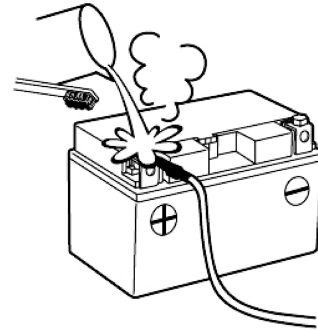
#### NOTICE

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



#### TIP

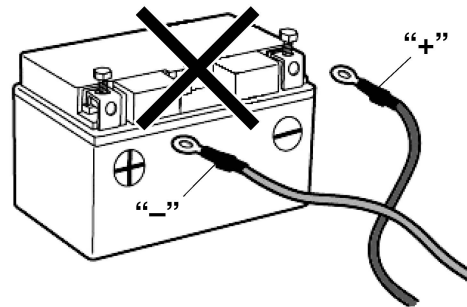
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

#### NOTICE

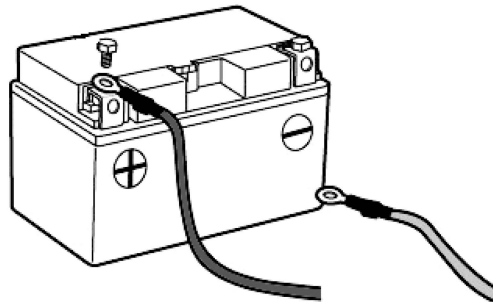
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16771

#### NOTICE

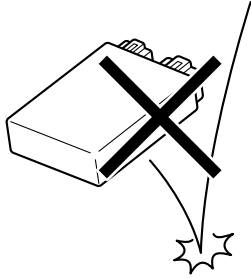
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated,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



ECA16620

#### NOTICE

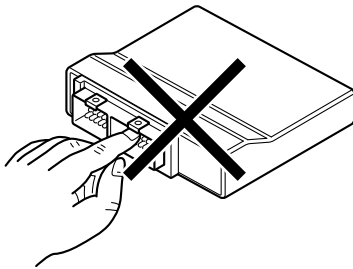
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

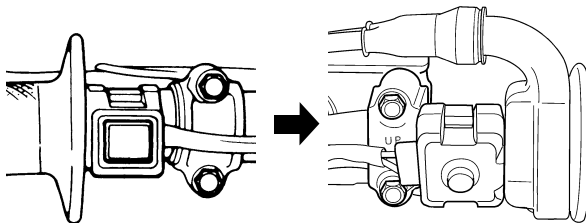
## NOTICE

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

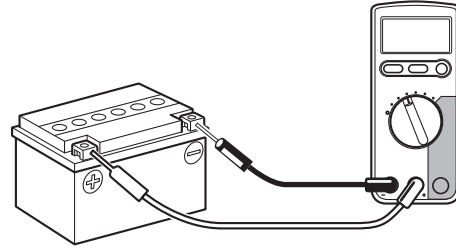
Push and hold the engine stop switch to turn off the multi-function display when resetting the ECU (Engine Control Unit). Disconnect the starter motor lead of the starter relay, and then push the starter switch. Be sure to wait for five seconds or longer before pushing the start switch after the multi-function display goes off.



## Checking the electrical system

### TIP

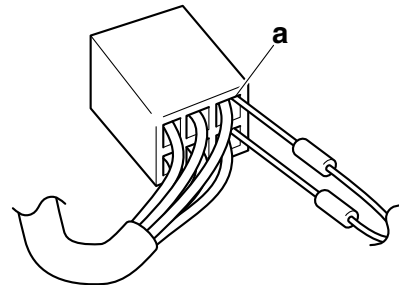
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

## NOTICE

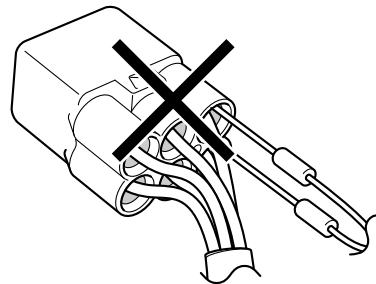
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.



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.

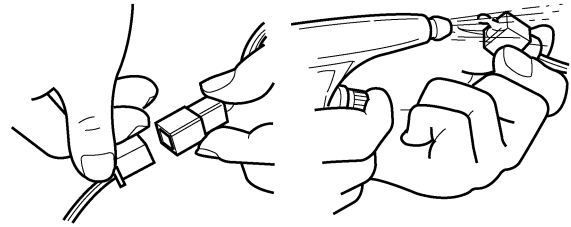
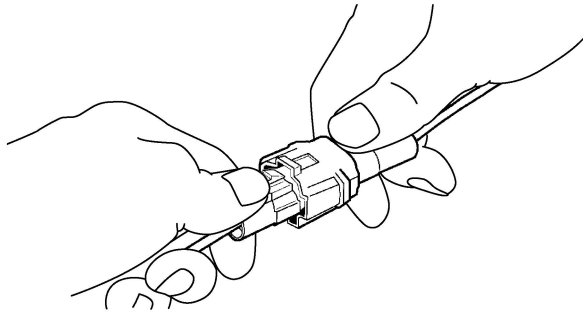
### 1. Disconnect:

- 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.

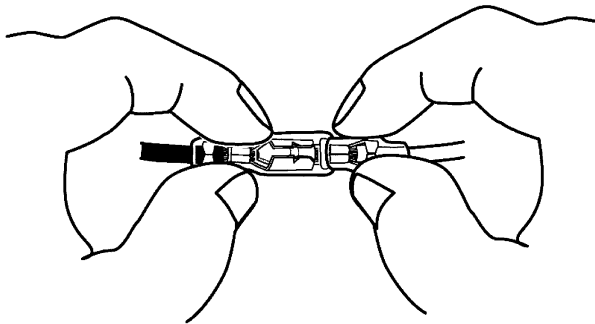
### TIP

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

ECA16790

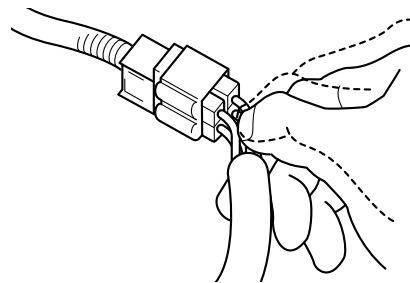
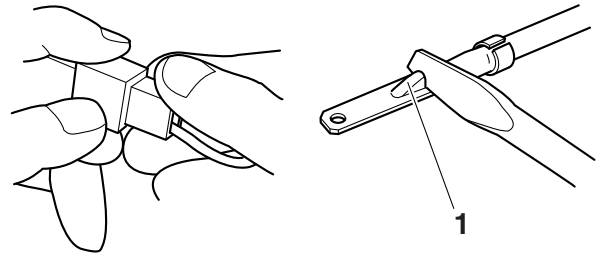
## NOTICE

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 compressed air.  
Rust/stains → Connect and disconnect several times.

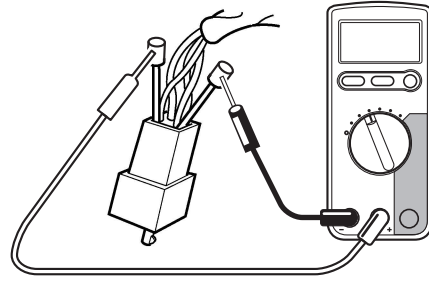
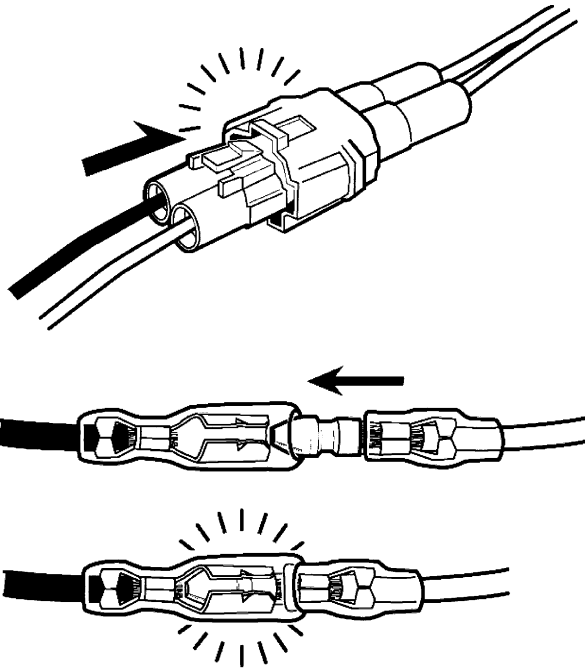


### 4. Connect:

- Lead
- Coupler
- Connector

### TIP

- When connecting a coupler or connector, make sure that both terminals are connected securely.
- Make sure all connections are tight.



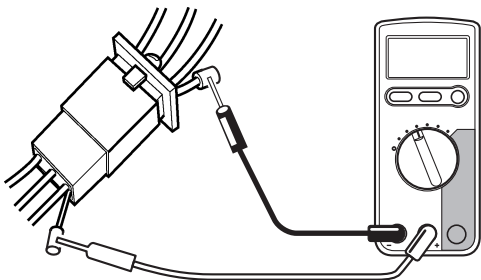
5. Check:
- No continuity



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

## TIP

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (4).
- As a quick remedy, use a contact revitalizer available at most part stores.



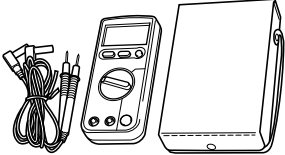
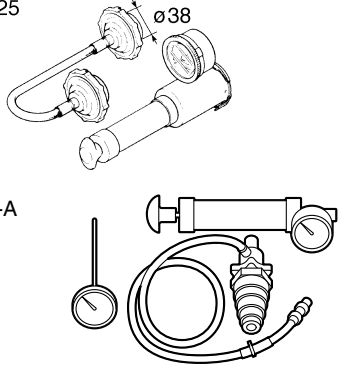
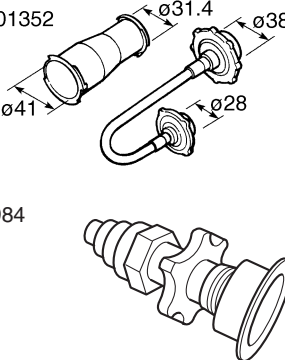

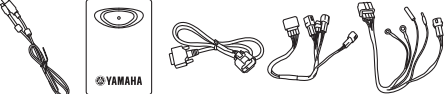
EAM20121

## SPECIAL TOOLS

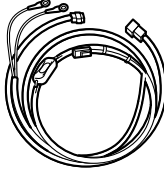
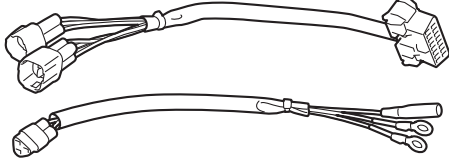
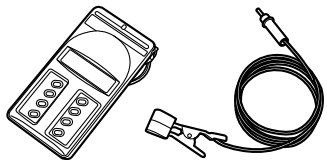
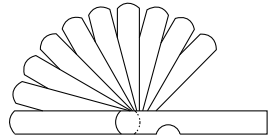
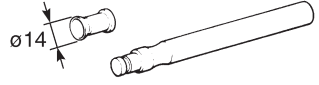
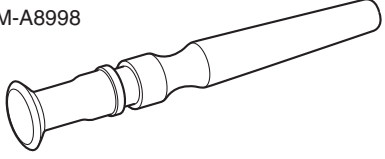
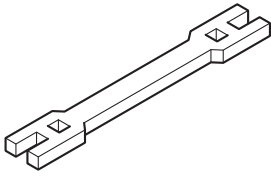
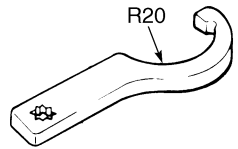
The following special tools are required for accurate and complete adjustment and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and tool number used for the special tool differ by country, so two types are provided. Refer to the list provided to avoid errors when placing an order.

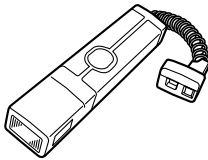
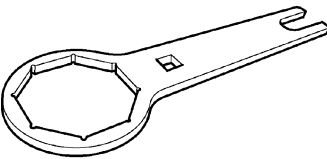
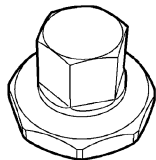
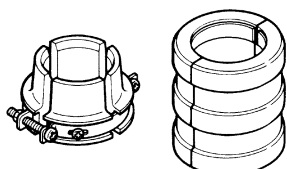
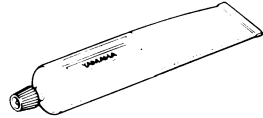
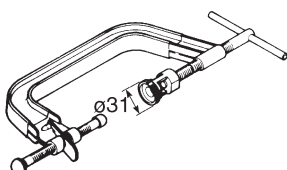
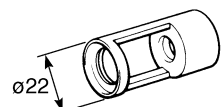
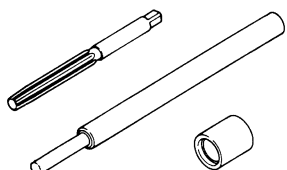
### TIP

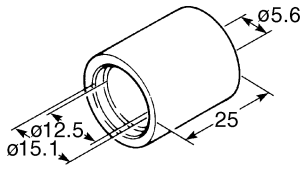
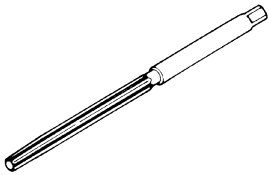
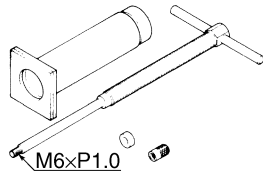
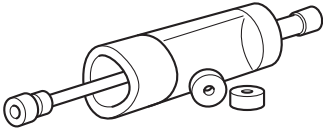
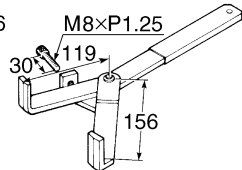
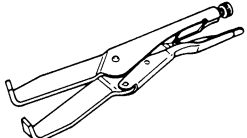
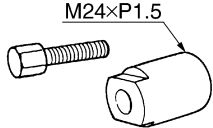
- For U.S.A. and Canada, use tool number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use tool number starting with “90890-”.

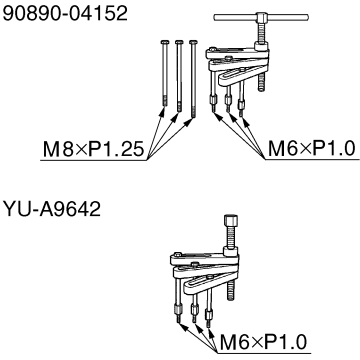
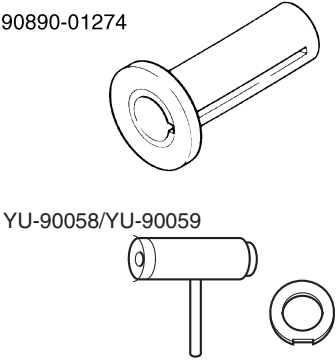
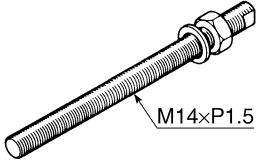
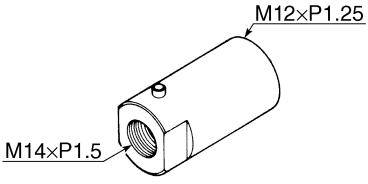
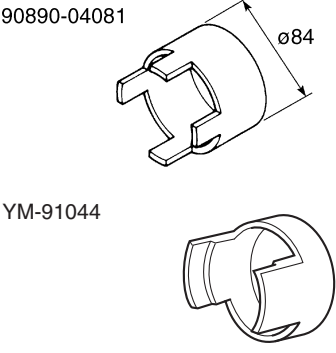
Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		1-11, 5-38, 8-57, 8-58, 8-58, 8-58, 8-61, 8-61, 8-63, 8-63, 8-63, 8-64, 8-64, 8-65, 8-65, 8-66, 8-67, 8-67, 8-68, 8-69
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A	3-7, 3-8
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984	3-7, 3-8
Yamaha diagnostic tool USB (US) 90890-03257		3-15, 7-9, 8-25
Yamaha diagnostic tool (A/I) 90890-03262		3-15, 7-9, 8-25



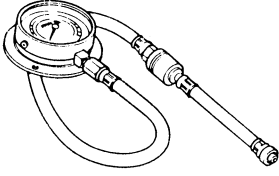
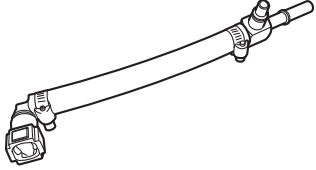
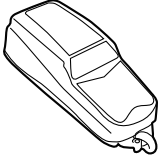
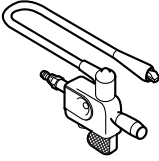
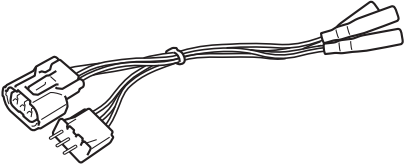
Tool name/Tool No.	Illustration	Reference pages
FI diagnostic tool sub-lead 90890-03212 FI diagnostic tool sub-lead YU-03212		3-15, 7-9, 8-26
OBD/ GST Leadwire kit 90890-03249		3-15, 7-9, 8-25
Digital tachometer 90890-06760 Digital tachometer YU-39951-B		3-16, 3-37, 8-65
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-17, 5-43
Valve lapper (ø14) 90890-04101 Valve lapping tool (14mm) YM-A8998	<p>90890-04101</p>  <p>ø14</p> <p>YM-A8998</p> 	3-17, 5-25
Spoke nipple wrench (6-7) 90890-01521 Spoke nipple wrench (6-7) YM-01521		3-33
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-34, 4-52

Tool name/Tool No.	Illustration	Reference pages
Timing light 90890-03141 Timing light YU-03141		3-37
Cap bolt ring wrench 90890-01501 Cap bolt ring wrench YM-01501		4-40, 4-40, 4-41, 4-44, 4-47, 4-49
Cap bolt wrench 90890-01500 Cap bolt wrench YM-01500		4-41, 4-44
Fork seal driver 90890-01502 Fork seal driver (48) YM-A0948		4-45, 4-46
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-18, 5-58, 5-65
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-25, 5-30
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-25, 5-30
Valve guide remover & installer set (ø5.5) 90890-04016 Valve guide remover (5.5 mm) YM-01122		5-27

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø5.5) 90890-04015 Valve guide installer (5.5 mm) YM-04015		5-27
Valve guide reamer (5.5 mm) 90890-01196 Valve guide reamer (5.5 mm) YM-01196		5-27
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-32
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	90890-04086  YM-91042 	5-43, 5-46
Rotor puller 90890-04151 Rotor puller YM-04151		5-58

Tool name/Tool No.	Illustration	Reference pages
Crankcase separating tool 90890-04152 Crankcase separating tool YU-A9642	 <p>90890-04152</p> <p>M8×P1.25 M6×P1.0</p> <p>YU-A9642</p> <p>M6×P1.0</p>	5-68
Crankshaft installer pot 90890-01274 Installing pot YU-90058	 <p>90890-01274</p> <p>YU-90058/YU-90059</p>	5-69
Crankshaft installer bolt 90890-01275 Bolt YU-90060	 <p>M14×P1.5</p>	5-69
Adapter (M12) 90890-01278 Adapter #3 YU-90063	 <p>M12×P1.25</p> <p>M14×P1.5</p>	5-69
Spacer (crankshaft installer) 90890-04081 Pot spacer YM-91044	 <p>90890-04081</p> <p>ø84</p> <p>YM-91044</p>	5-69

# SPECIAL TOOLS

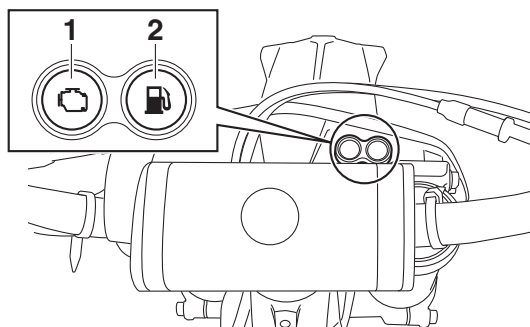
Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-4
Fuel pressure adapter 90890-03186 Fuel pressure adapter YM-03186		7-4
Lithium battery charger 90890-05376 Lithium battery charger DBY-ACC51-70-02		8-60, 8-60
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-62
Test harness S- pressure sensor (3P) 90890-03207 Test harness S- pressure sensor (3P) YU-03207		8-67



EAM20122

## CONTROL FUNCTIONS

EAM30400

### WARNING LIGHTS



1. Engine trouble warning light “”
2. Fuel level warning light “”

#### Engine trouble warning light “”

This warning light comes on or flashes if a problem is detected in the electrical circuit monitoring the engine. If this occurs, have a Yamaha dealer check the vehicle.

The electrical circuit of the warning light can be checked by pushing the start switch. The warning light should come on for a few seconds, and then go off.

If the warning light does not come on initially when the start switch is pushed, or if the warning light remains on, have a Yamaha dealer check the electrical circuit.

#### Fuel level warning light “”

This warning light comes on when the fuel level drops below approximately 2.0 L (0.53 US gal, 0.44 Imp.gal). When this occurs, refuel as soon as possible.

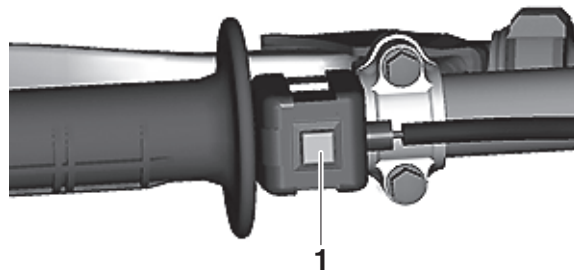
The electrical circuit of the warning light can be checked by pushing the start switch. The warning light should come on for a few seconds, and then go off.

If the warning light does not come on initially when the start switch is pushed, or if the warning light remains on, have a Yamaha dealer check the electrical circuit.

EAM30182

### ENGINE STOP SWITCH

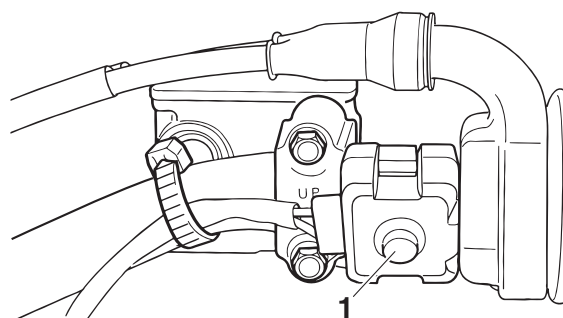
The engine stop switch “1” is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.



EAM30183

### START SWITCH

The start switch “1” is located on the right handlebar. Push this switch to crank the engine with the starter.

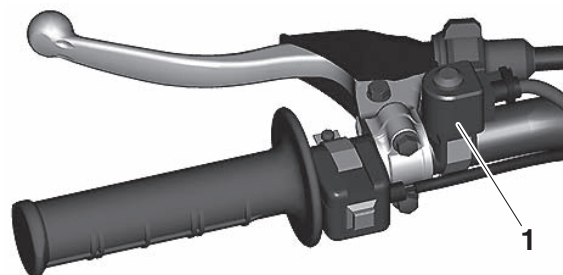


EAM30471

### MODE SWITCH

The mode switch “1” is located on the left handlebar.

Press the mode switch to change between map 1 and map 2.



#### To change the mode

1. Shift to neutral.
2. Start the engine.
3. Press the mode switch.

#### Map 1

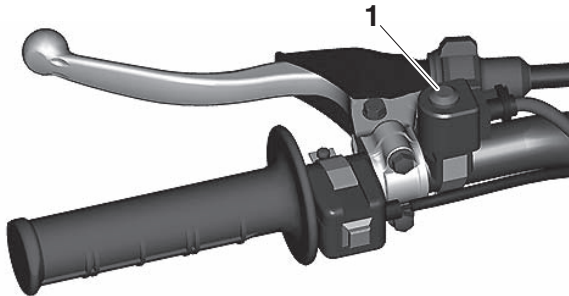
All-around good engine power and throttle response.

#### Map 2

Milder throttle response for riding technical sections.

## TIP

You can use the Power Tuner app to adjust the map settings.  
When the mode switch “1” is illuminated, map 2 is selected.

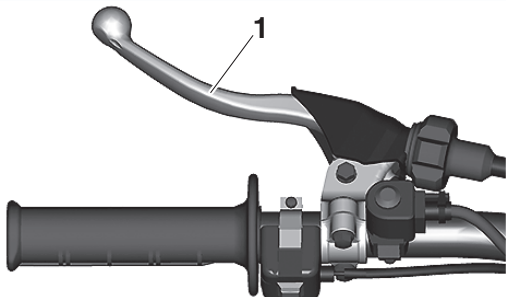


EAM30184

## CLUTCH LEVER

The clutch lever “1” is located on the left handlebar. The clutch lever disengages or engages the clutch.

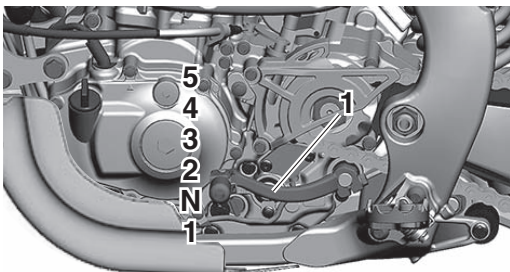
Pull the clutch lever toward the handlebar to disengage the clutch, and release the lever to engage the clutch.



EAM30185

## SHIFT PEDAL

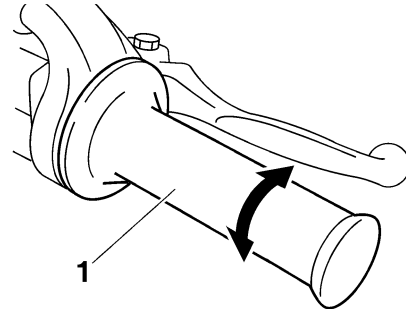
The shift pedal “1” has adopted a method of 1 down & 4 ups (press-down & kick-ups). Press it down for N (neutral) to 1st, and kick it up for 2nd to 5th.



EAM30187

## THROTTLE GRIP

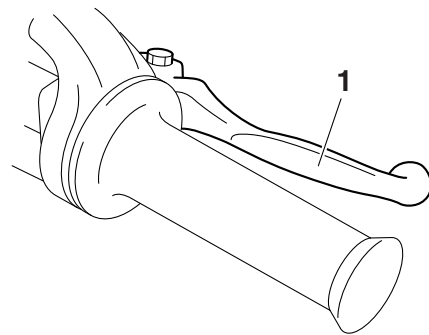
The throttle grip “1” is located on the right handlebar. The throttle grip accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.



EAM30188

## FRONT BRAKE LEVER

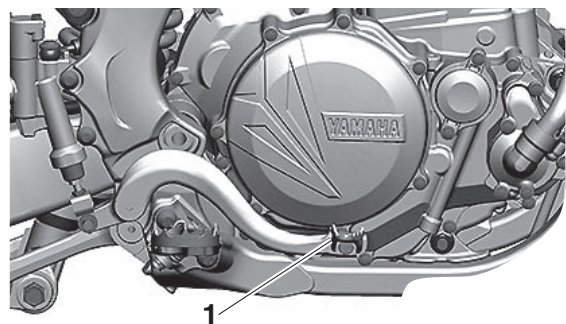
The front brake lever “1” is located on the right handlebar. Pull it toward the handlebar to activate the front brake.



EAM30189

## REAR BRAKE PEDAL

The rear brake pedal “1” is in the right of the chassis. Press down on the brake pedal to activate the rear brake.



EAM30190

## SIDESTAND

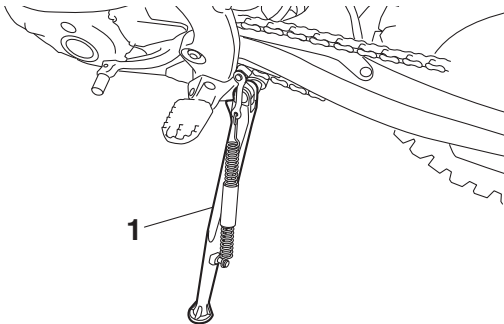
This sidestand “1” is used to support only the machine when standing.



EWA18980

## **WARNING**

- Never apply additional force to the sidestand.
- Hold up the sidestand before starting out.



EAM30444

## **STARTER KNOB**

Starting a cold engine requires a larger amount of intake air, which is supplied by the starter knob "1".

Pushing the knob toward "a" turns ON the starter, resulting in a larger angle of throttle valve.

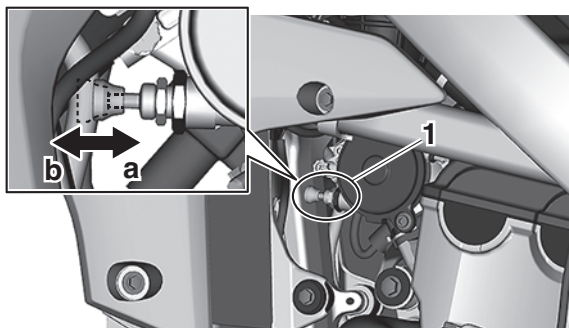
### **TIP**

When operating the throttle grip in the closing direction, the starter knob "1" moves in the direction "b" as shown and returns to its original position.

EWA20470

## **WARNING**

While handling the starter knob, take care not to burn yourself on exhaust pipes.



EAM30192

## **FUEL TANK CAP**

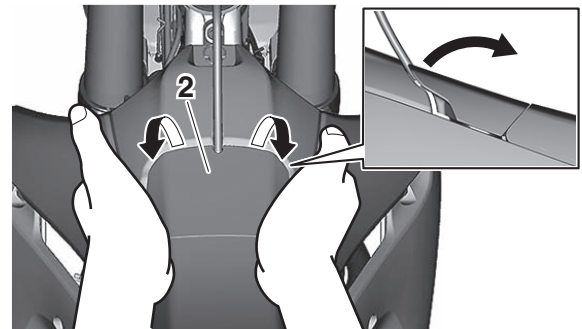
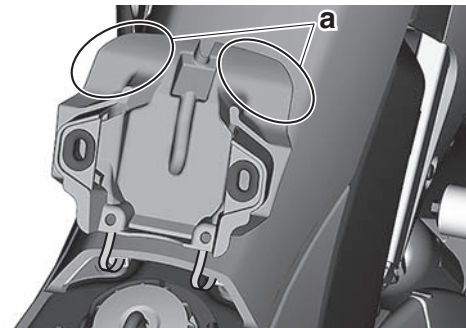
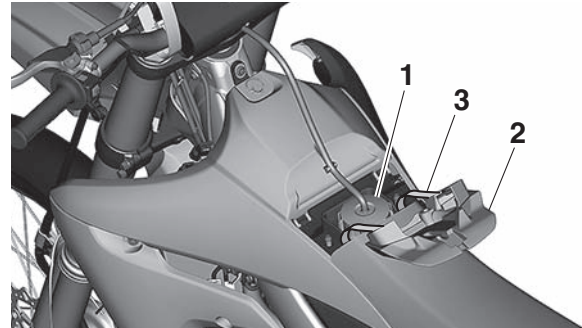
Fuel tank cap "1" is located under the fuel tank cap cover "2".

Remove the fuel tank cap cover to open the fuel tank cap.

### **TIP**

- To remove the fuel tank cap cover, insert fingers under part "a", and then use both hands to lift it up towards the rear of the vehicle.

- Install the fuel tank cap cover after placing the bands "3" all the way in under the seat.





EAM20123

## STARTING AND BREAK-IN

EAM30193

### FUEL

Always use the recommended fuel as stated below. Also, be sure to use new gasoline the day of a race.



**Recommended fuel**  
**Premium unleaded gasoline**  
**(Gasohol [E10] acceptable)**  
**Fuel tank capacity**  
**8.2 L (2.2 US gal, 1.8 Imp.gal)**  
**Fuel reserve amount**  
**2.0 L (0.53 US gal, 0.44 Imp.gal)**

ECA24180

### NOTICE

**Use only unleaded gasoline. The use of leaded gasoline will cause severe damage to the engine internal parts such as valves, piston rings, and exhaust system, etc.**

### TIP

Your Yamaha engine has been designed to use premium unleaded gasoline with a pump octane number  $[(R+M)/2]$  of 91 or higher, or a research octane number of 95 or higher. If knocking (or pinging) occurs, use a gasoline of a different brand.

EWA19010



### WARNING

- For refueling, be sure to stop the engine and use enough care not to spill any fuel. Also be sure to avoid refueling close to a fire.
- Refuel after the engine, exhaust pipe, etc. have cooled off.

### Gasohol

There are two types of gasohol: gasohol containing ethanol and that containing methanol. Gasohol containing ethanol can be used if the ethanol content does not exceed 10 %. Gasohol containing methanol is not recommended by Yamaha because it can cause damage to the fuel system or vehicle performance problems.

EAM30195

### AIR FILTER MAINTENANCE

According to "CLEANING THE AIR FILTER ELEMENT" section in the CHAPTER 3, apply the Yamaha foam air filter oil or other quality foam air filter oil to the element. (Excess oil in the element may adversely affect engine starting.)

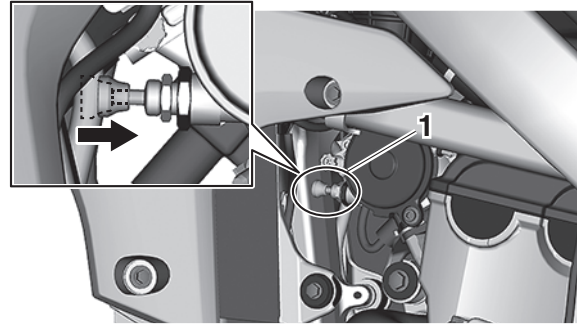
EAM30196

## STARTING A COLD ENGINE

1. Press the shift pedal to neutral.
2. Push the starter knob "1" completely.

### TIP

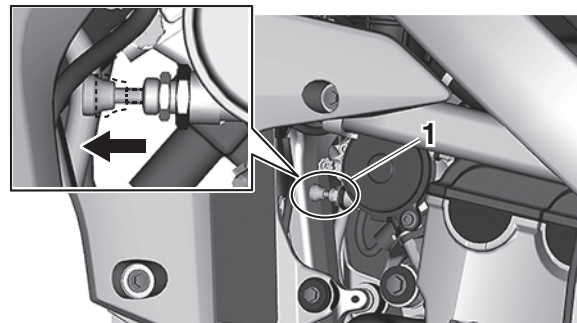
- When the ambient temperature is 15 °C (59 °F) or below, use the starter knob.
- Do not operate the throttle grip when operating the starter knob.



3. Start the engine by pushing the start switch. If the engine fails to start when using the start switch, release it, wait a few seconds, and then try again.  
 Each starting attempt should be as short as possible to preserve the battery. Do not crank the engine more than 10 seconds on any one attempt.
4. When the engine starts running, warm this up one or two minutes at a steady speed (of 3000 to 5000 r/min), and then return the starter knob to its original position.

### TIP

When operating the throttle grip in the closing direction, the starter knob "1" moves in the direction as shown and returns to its original position.



EWA19030



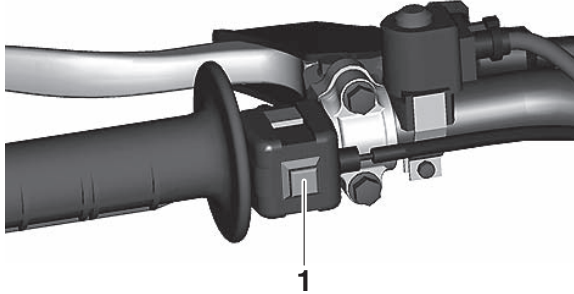
### WARNING

**Since exhaust gas contains harmful ingredients, do not start or warm it up at an illventilated place or a closed narrow place.**

5. To stop the engine, push the engine stop switch "1".

## TIP

Continue pushing the engine stop switch till the engine comes to a full stop.



EAM30197

## STARTING A WARM ENGINE

Follow the same procedure as for starting a cold engine with the exception that the starter is not required when the engine is warm.

## TIP

If the engine fail to start, fully open the throttle grip and push the start switch few seconds to clear the engine of the rich air-fuel mixture retained in it.

EAM30198

## BREAK-IN PROCEDURES

A break-in is important so that rotating portion, sliding surfaces, and mounted areas may fit one another, and that the rider may become accustomed to the machine.

ECA25811

## NOTICE

**Before running, do maintenance on the air filter element.**

1. After warming up the engine, drive it for about 20 minutes at a throttle opening of 1/2 or less.

## TIP

This model is equipped with an engine auto-stop system. The engine stops automatically if left idling for 7 minutes. If the engine stops, push the start switch to restart the engine.

2. Make a pit stop, and check mounted areas for looseness, oil leaks, or other problems.
3. Then, drive it for about 40 minutes at a throttle opening of 3/4 or less.
4. Make a pit stop again, and thoroughly check mounted areas for looseness, oil leaks, or other problems. Thorough checks and adjustments are required in particular for stretch of cables, free play of the brake, stretch of the

drive chain, looseness of the spoke, and so on.

ECA25821

## NOTICE

**After a break-in or after each race, always check the points shown in "TORQUE-CHECK POINTS" for tightening torques and retighten them.**

**Also when the following parts are replaced, a break-in is required.**

- **Cylinder and Crankshaft:** A break-in is required for about an hour.
- **Piston, Piston ring, Valve, Camshaft, and Gear:** A break-in is required for about 30 minutes at a throttle opening of 1/2 or less. Observe the condition of the engine carefully during a break-in.

**For checkpoints for a break-in, see "MAINTENANCE AFTER BREAK-IN". If any problem is found, immediately stop the engine and make a checkup.**

EAM30468

## ENGINE STARTING PRECAUTION

- Make sure the transmission is in neutral or be sure to pull the clutch lever before pressing the start switch.

EWA20540

## WARNING

**If the clutch lever is not pulled and the start switch is pressed with the transmission in gear, the starter motor will cause the rear wheel to spin, which may cause injury.**

- When starting the engine, if only the starter motor is turning but the engine does not crank, this is a malfunction most likely due to a worn-out starter clutch. Replace the starter clutch.

EAM20124

## MAINTENANCE AFTER BREAK-IN

After a break-in, perform careful maintenance to get ready for the next practice or race.

Refer to “PRE-OPERATION INSPECTION AND MAINTENANCE” on page 3-5.

EAM30199

## MAJOR MAINTENANCE

### 1. For the engine

- Leaks around the engine  
Check for pressure leaks from the cylinder head or the cylinder, oil leaks from the crankcase or the case cover, leaks from the coolant system, and other leaks.
- Check that the valve, the cylinder head, the cylinder, the piston, and the piston ring fit one another, and that contact between the valve and the cylinder head, and that between the cylinder and the piston are correct.
- Engine oil change  
Drain the oil, and check for dirt and foreign materials such as metal chips. (If any foreign material is mixed, disassemble and check the crankcase.)  
Pour the specified amount of the recommended oil.
- AC magneto  
Check for looseness in mounted areas of the rotor and the stator.  
Check that the connector is not being disconnected.
- Silencer  
Check the main body and stay for cracks.  
Check for leaks.
- Mounting bolts and nuts  
Check for looseness in mounted areas of parts, as well as engine mounting bolts and engine brackets.

### 2. For the chassis

- Check welds and mounted areas of the frame, the swingarm, the link, the bracket, and so on, for looseness and cracks.
- Wheel(s)  
Check the wheel for runout. Check the spoke for looseness.
- Brake(s)  
Check the brake disc mounting bolt for looseness.  
Check that the reservoir contains the specified amount of brake fluid. Check for leaks.
- Cable  
Grease and adjust cables.
- Drive chain

Lubricate the drive chain and adjust its tension.

- Fuel tank  
Clean the inside of the fuel tank. Check for leaks.
- Suspension  
Check for oil leaks in the front fork or the rear shock absorber. Check that the mounted conditions are good.
- Sprocket  
Check for looseness in the sprocket mounted on the rear wheel.
- Mounting bolts and nuts  
Check mounted areas for looseness.

ECA25831

## NOTICE

**After a break-in or before each race, always check the points shown in “TORQUE-CHECK POINTS” for tightening torques and retighten them.**

- Greasing and oiling  
Always grease or oil the specified points.

EAM20125

## TORQUE-CHECK POINTS

Frame construction				Frame to rear frame		
				Frame to engine protector		
		Combined seat and fuel tank		Fuel tank to frame		
Engine mounting				Frame to engine		
				Engine bracket to engine		
				Engine bracket to frame		
Seat				Seat to frame		
Steering		Steering stem to handlebar		Steering stem to frame		
				Steering stem to upper bracket		
				Upper bracket to handlebar		
Suspension	Front	Steering stem to front fork		Front fork to upper bracket		
				Front fork to lower bracket		
	Rear	Link		Assembly of links		
				Link to frame		
				Link to rear shock absorber		
				Link to swingarm		
		Mounting of rear shock absorber		Rear shock absorber and frame		
		Mounting of swingarm		Tightening of pivot shaft		
Wheel(s)		Mounting of wheel		Front	Tightening of wheel axle	
					Tightening of axle holder	
					Tightening of spoke nipple	
				Rear	Tightening of wheel axle	
					Wheel to rear wheel sprocket	
					Tightening of spoke nipple	
Brake(s)				Front	Brake caliper to front fork	
					Brake disc to wheel	
					Tightening of union bolt	
					Brake master cylinder to handlebar	
					Tightening of bleed screw	
					Tightening of brake hose holder	
				Rear	Brake pedal to frame	
					Brake disc to wheel	
					Tightening of union bolt	
					Brake master cylinder to frame	
					Tightening of bleed screw	
					Tightening of brake hose holder	
Fuel system				Fuel pump to fuel tank		

## TORQUE-CHECK POINTS

Shift pedal	Shift pedal to shift shaft
Plastic cover	Tightening of front fender
	Tightening of fork leg protector
	Tightening of air scoop
	Left cover to rear frame
	Tightening of side cover
	Tightening of rear fender
	Tightening of mud flap
	Tightening of rear brake disc cover
	Tightening of rear brake caliper cover

**TIP**

Concerning the tightening torque, refer to “TIGHTENING TORQUES” on page 2-10.

EAM20126

## MOTORCYCLE CARE AND STORAGE

EAM30200

### CARE

While the open design of a motorcycle reveals the attractiveness of the technology, it also makes it more vulnerable. Rust and corrosion can develop even if high-quality components are used. A rusty exhaust pipe may go unnoticed on a car, however, it detracts from the overall appearance of a motorcycle. Frequent and proper care does not only comply with the terms of the warranty, but it will also keep your motorcycle looking good, extend its life and optimize its performance.

#### Before cleaning

1. Cover the muffler outlet with a plastic bag after the engine has cooled down.
2. Make sure that all caps and covers as well as all electrical couplers and connectors, including the spark plug cap, are tightly installed.
3. Remove extremely stubborn dirt, like oil burnt onto the crankcase, with a degreasing agent and a brush, but never apply such products onto seals, gaskets, sprockets, the drive chain and wheel axles. Always rinse the dirt and degreaser off with water.

#### Cleaning

ECA24220

#### NOTICE

- **Avoid using strong acidic wheel cleaners, especially on spoked wheels. If such products are used on hard-to-remove dirt, do not leave the cleaner on the affected area any longer than instructed. Also, thoroughly rinse the area off with water, immediately dry it, and then apply a corrosion protection spray.**
- **Improper cleaning can damage plastic parts (such as cowlings, panels, windshields, headlight lenses, meter lenses, etc.) and the mufflers. Use only a soft, clean cloth or sponge with water to clean plastic. However, if the plastic parts cannot be thoroughly cleaned with water, diluted mild detergent with water may be used. Be sure to rinse off any detergent residue using plenty of water, as it is harmful to plastic parts.**
- **Do not use any harsh chemical products on plastic parts. Be sure to avoid using cloths or sponges which have been in contact with strong or abrasive cleaning products,**

**solvent or thinner, fuel (gasoline), rust removers or inhibitors, brake fluid, antifreeze or electrolyte.**

- **Do not use high-pressure washers or steam-jet cleaners since they cause water seepage and deterioration in the following areas: seals (of wheel and swingarm bearings, fork and brakes), electric components (couplers, connectors, instruments, switches and lights), breather hoses and vents.**
- **For motorcycles equipped with a windshield: Do not use strong cleaners or hard sponges as they will cause dulling or scratching. Some cleaning compounds for plastic may leave scratches on the windshield. Test the product on a small hidden part of the windshield to make sure that it does not leave any marks. If the windshield is scratched, use a quality plastic polishing compound after washing.**

#### After normal use

Remove dirt with warm water, a mild detergent, and a soft, clean sponge, and then rinse thoroughly with clean water. Use a toothbrush or bottlebrush for hard-to-reach areas. Stubborn dirt and insects will come off more easily if the area is covered with a wet cloth for a few minutes before cleaning.

#### After riding in the rain, near the sea or on salt-sprayed roads

Since sea salt or salt sprayed on roads during winter are extremely corrosive in combination with water, carry out the following steps after each ride in the rain, near the sea or on salt-sprayed roads.

#### TIP

Salt sprayed on roads in the winter may remain well into spring.

1. Clean the motorcycle with cold water and a mild detergent, after the engine has cooled down.

**NOTICE: Do not use warm water since it increases the corrosive action of the salt.**

2. Apply a corrosion protection spray on all metal, including chrome- and nickel-plated, surfaces to prevent corrosion.

#### After cleaning

1. Dry the motorcycle with a chamois or an absorbing cloth.
2. Immediately dry the drive chain and lubricate it to prevent it from rusting.

3. Use a chrome polish to shine chrome, aluminum and stainless- steel parts, including the exhaust system. (Even the thermally induced discoloring of stainless- steel exhaust systems can be removed through polishing.)
4. To prevent corrosion, it is recommended to apply a corrosion protection spray on all metal, including chrome- and nickel-plated, surfaces.
5. Use spray oil as a universal cleaner to remove any remaining dirt.
6. Touch up minor paint damage caused by stones, etc.
7. Wax all painted surfaces.
8. Let the motorcycle dry completely before storing or covering it.

EWA19050



## WARNING

**Contaminants on the brakes or tires can cause loss of control.**

- **Make sure that there is no oil or wax on the brakes or tires.**
- **If necessary, clean the brake discs and brake linings with a regular brake disc cleaner or acetone, and wash the tires with warm water and a mild detergent. Before riding at higher speeds, test the motorcycle's braking performance and cornering behavior.**

ECA24240

## NOTICE

- **Apply spray oil and wax sparingly and make sure to wipe off any excess.**
- **Never apply oil or wax to any rubber and plastic parts, but treat them with a suitable care product.**
- **Avoid using abrasive polishing compounds as they will wear away the paint.**

## TIP

- Consult a Yamaha dealer for advice on what products to use.
- Washing, rainy weather or humid climates can cause the headlight lens to fog. Turning the headlight on for a short period of time will help remove the moisture from the lens.

EAM30201

## STORAGE

### Short-term

Always store your motorcycle in a cool, dry place and, if necessary, protect it against dust with a porous cover. Be sure the engine and the exhaust system are cool before covering the mo-

torcycle.

ECA24250

## NOTICE

- **Storing the motorcycle in a poorly ventilated room or covering it with a tarp, while it is still wet, will allow water and humidity to seep in and cause rust.**
- **To prevent corrosion, avoid damp cellars, stables (because of the presence of ammonia) and areas where strong chemicals are stored.**

## Long-term

Before storing your motorcycle for several months:

1. Follow all the instructions in the "CARE" section of this chapter.
2. Fill up the fuel tank and add fuel stabilizer (if available) to prevent the fuel tank from rusting and the fuel from deteriorating.
3. Perform the following steps to protect the cylinder, piston rings, etc. from corrosion.



- a. Remove the spark plug cap and spark plug.
- b. Pour a teaspoonful of engine oil into the spark plug bore.
- c. Install the spark plug cap onto the spark plug, and then place the spark plug on the cylinder head so that the electrodes are grounded. (This will limit sparking during the next step.)
- d. Turn the engine over several times with the starter. (This will coat the cylinder wall with oil.)
- e. Remove the spark plug cap from the spark plug, and then install the spark plug and the spark plug cap. **WARNING! To prevent damage or injury from sparking, make sure to ground the spark plug electrodes while turning the engine over.**



4. Lubricate all control cables and the pivoting points of all levers and pedals as well as of the sidestand/centerstand.
5. Check and, if necessary, correct the tire air pressure, and then lift the motorcycle so that both of its wheels are off the ground. Alternatively, turn the wheels a little every month in order to prevent the tires from becoming degraded in one spot.
6. Cover the muffler outlet with a plastic bag to prevent moisture from entering it.
7. Remove the battery and fully charge it. Store it in a cool, dry place and charge it once a

month. Do not store the battery in an excessively cold or warm place [less than 0 °C (32 °F) or more than 65 °C (149 °F)]. For more information on storing the battery, “CHECKING AND CHARGING THE BATTERY” on page 8-59.

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**TIP**

Make any necessary repairs before storing the motorcycle.

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## SPECIFICATIONS

GENERAL SPECIFICATIONS .....	2-1
ENGINE SPECIFICATIONS .....	2-2
CHASSIS SPECIFICATIONS .....	2-6
ELECTRICAL SPECIFICATIONS .....	2-9
TIGHTENING TORQUES .....	2-10
GENERAL TIGHTENING TORQUE SPECIFICATIONS .....	2-10
ENGINE TIGHTENING TORQUES .....	2-11
CHASSIS TIGHTENING TORQUES .....	2-14
LUBRICATION POINTS AND LUBRICANT TYPES .....	2-17
ENGINE .....	2-17
CHASSIS .....	2-18
LUBRICATION SYSTEM CHART AND DIAGRAMS .....	2-21
LUBRICATION DIAGRAMS .....	2-21
CABLE ROUTING DIAGRAM .....	2-31

# GENERAL SPECIFICATIONS

EAM20127

## GENERAL SPECIFICATIONS

<b>Model</b>	
Model	B3J1
<b>Dimensions</b>	
Overall length	2175 mm (85.6 in)
Overall width	825 mm (32.5 in)
Overall height	1270 mm (50.0 in)
Seat height	955 mm (37.6 in)
Wheelbase	1480 mm (58.3 in)
Ground clearance	320 mm (12.60 in)
<b>Weight</b>	
Curb weight	116 kg (256 lb)
Riding capacity	1 person

EAM20128

## ENGINE SPECIFICATIONS

### Engine

Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	450 cm <sup>3</sup>
Number of cylinders	Single cylinder
Bore × stroke	97.0 × 60.9 mm (3.82 × 2.40 in)
Compression ratio	12.8 : 1
Starting system	Electric starter

### Fuel

Recommended fuel	Premium unleaded gasoline (Gasohol [E10] acceptable)
Fuel tank capacity	8.2 L (2.2 US gal, 1.8 Imp.gal)
Fuel reserve amount	2.0 L (0.53 US gal, 0.44 Imp.gal)

### Engine oil

Recommended brand	YAMALUBE
SAE viscosity grades	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	
Oil change	0.62 L (0.66 US qt, 0.55 Imp.qt)
With oil filter removal	0.64 L (0.68 US qt, 0.56 Imp.qt)
Quantity (disassembled)	0.90 L (0.95 US qt, 0.79 Imp.qt)

### Oil filter

Oil filter type	Paper
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### Oil pump

Inner-rotor-to-outer-rotor-tip clearance	0.000–0.150 mm (0.0000–0.0059 in)
Limit	0.23 mm (0.0091 in)
Outer-rotor-to-oil-pump-housing clearance	0.13–0.18 mm (0.0051–0.0071 in)
Limit	0.25 mm (0.0098 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.11 mm (0.0024–0.0043 in)
Limit	0.18 mm (0.0071 in)

### Cooling system

Coolant quantity	
Radiator (including all routes)	1.03 L (1.09 US qt, 0.91 Imp.qt)
Radiator cap valve opening pressure	107.9–137.3 kPa (1.08–1.37 kgf/cm <sup>2</sup> , 15.6–19.9 psi)

### Spark plug(s)

Manufacturer/model	NGK/CPR8EA-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)

### Cylinder head

Warping limit	0.05 mm (0.0020 in)
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### Camshaft

Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
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# ENGINE SPECIFICATIONS

Camshaft journal diameter	21.959–21.972 mm (0.8645–0.8650 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	38.130–38.230 mm (1.5012–1.5051 in)
Limit	38.030 mm (1.4972 in)
Lobe height (Exhaust)	34.270–34.370 mm (1.3492–1.3531 in)
Limit	34.170 mm (1.3453 in)
Camshaft runout limit	0.030 mm (0.0012 in)
<b>Valve, valve seat, valve guide</b>	
Valve clearance (cold)	
Intake	0.10–0.17 mm (0.0039–0.0067 in)
Exhaust	0.15–0.22 mm (0.0059–0.0087 in)
Valve dimensions	
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.5 mm (0.06 in)
Valve seat contact width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.5 mm (0.06 in)
Valve stem diameter (intake)	5.475–5.490 mm (0.2156–0.2161 in)
Limit	5.445 mm (0.2144 in)
Valve stem diameter (exhaust)	5.465–5.480 mm (0.2152–0.2157 in)
Limit	5.435 mm (0.2140 in)
Valve guide inside diameter (intake)	5.500–5.512 mm (0.2165–0.2170 in)
Valve guide inside diameter (exhaust)	5.500–5.512 mm (0.2165–0.2170 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)	0.020–0.047 mm (0.0008–0.0019 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)
<b>Valve spring</b>	
Free length (intake)	40.57 mm (1.60 in)
Limit	38.54 mm (1.52 in)
Free length (exhaust)	37.42 mm (1.47 in)
Limit	35.55 mm (1.40 in)
<b>Cylinder</b>	
Bore	97.000–97.010 mm (3.8189–3.8193 in)
Wear limit	97.060 mm (3.8213 in)
<b>Piston</b>	
Piston-to-cylinder clearance	0.010–0.045 mm (0.0004–0.0018 in)
Diameter	96.955–96.970 mm (3.8171–3.8177 in)
Measuring point (from piston skirt bottom)	9.0 mm (0.35 in)
Piston pin bore inside diameter	18.004–18.015 mm (0.7088–0.7093 in)
Limit	18.045 mm (0.7104 in)
Piston pin outside diameter	17.991–18.000 mm (0.7083–0.7087 in)
Limit	17.981 mm (0.7079 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.0002–0.0009 in)

# ENGINE SPECIFICATIONS

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## Piston ring

Top ring	
End gap (installed)	0.20–0.30 mm (0.0079–0.0118 in)
End gap limit	0.55 mm (0.0217 in)
Ring side clearance	0.015–0.065 mm (0.0006–0.0026 in)
Side clearance limit	0.120 mm (0.0047 in)
2nd ring	
End gap (installed)	0.35–0.50 mm (0.0138–0.0197 in)
End gap limit	0.85 mm (0.0335 in)
Ring side clearance	0.020–0.060 mm (0.0008–0.0024 in)
Side clearance limit	0.100 mm (0.0039 in)

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## Crankshaft

Crank assembly width	61.93–62.00 mm (2.438–2.441 in)
Runout limit	0.030 mm (0.0012 in)

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## Clutch

Clutch type	Wet, multiple-disc
Clutch lever free play	7.0–12.0 mm (0.28–0.47 in)
Friction plate 1 thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.111 in)
Plate quantity	6 pcs
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.111 in)
Plate quantity	2 pcs
Clutch plate thickness	1.50–1.70 mm (0.059–0.067 in)
Plate quantity	7 pcs
Warping limit	0.10 mm (0.004 in)
Clutch spring free length	48.00 mm (1.89 in)
Limit	45.60 mm (1.80 in)
Push rod bending limit	0.10 mm (0.004 in)

---

## Drivetrain

Primary reduction ratio	2.609 (60/23)
Transmission type	Constant mesh 5-speed
Gear ratio	
1st	2.416 (29/12)
2nd	1.733 (26/15)
3rd	1.312 (21/16)
4th	1.050 (21/20)
5th	0.840 (21/25)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	3.846 (50/13)
Final drive	Chain

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## Air filter

Air filter element	Wet element
Air filter oil grade	Yamaha foam air filter oil or other quality foam air filter oil

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## Fuel pump

Pump type	Electrical
Maximum consumption amperage	2.4 A

# ENGINE SPECIFICATIONS

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**Fuel injector**

Resistance	12.0 $\Omega$
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**Throttle body**

ID mark	BR91 00
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**Idling condition**

Engine idling speed	1900–2100 r/min
Coolant temperature	70–90 °C (158–194 °F)
Engine oil temperature	70–80 °C (158–176 °F)
Fuel line pressure (at idle)	300–390 kPa (3.0–3.9 kgf/cm <sup>2</sup> , 43.5–56.6 psi)
Throttle grip free play	3.0–6.0 mm (0.12–0.24 in)

EAM20129

## CHASSIS SPECIFICATIONS

### Chassis

Frame type	Semi double cradle
Caster angle	27.2 °
Trail	116 mm (4.6 in)

### Front wheel

Wheel type	Spoke wheel
Rim size	21 x 1.60
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.50 mm (0.02 in)

### Rear wheel

Wheel type	Spoke wheel
Rim size	18 x 2.15
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.50 mm (0.02 in)

### Front tire

Type	With tube
Size	80/100-21 51M
Manufacturer/model	DUNLOP/MX3SF

### Rear tire

Type	With tube
Size	120/90-18 65M
Manufacturer/model	DUNLOP/MX3S

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

Front	100 kPa (1.00 kgf/cm <sup>2</sup> , 15 psi)
Rear	100 kPa (1.00 kgf/cm <sup>2</sup> , 15 psi)

### Front brake

Type	Hydraulic single disc brake
Disc outside diameter × thickness	270.0 × 3.0 mm (10.63 × 0.12 in)
Brake disc thickness limit	2.5 mm (0.10 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	9.52 mm (0.37 in)
Caliper cylinder inside diameter (Left)	22.65 mm, 22.65 mm (0.89 in, 0.89 in)
Specified brake fluid	DOT 4

### Rear brake

Type	Hydraulic single disc brake
Disc outside diameter × thickness	245.0 × 4.0 mm (9.65 × 0.16 in)
Brake disc thickness limit	3.5 mm (0.14 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	11.0 mm (0.43 in)
Caliper cylinder inside diameter (Left)	25.40 mm (1.00 in)
Specified brake fluid	DOT 4

# CHASSIS SPECIFICATIONS

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## Front suspension

Type	Telescopic fork
Spring	Coil spring
Shock absorber	Hydraulic damper
Wheel travel	310 mm (12.2 in)
Fork spring free length	497.0 mm (19.57 in)
Limit	492.0 mm (19.37 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil S1
Quantity (left)	497.0 cm <sup>3</sup> (16.80 US oz, 17.53 Imp.oz)
Quantity (right)	497.0 cm <sup>3</sup> (16.80 US oz, 17.53 Imp.oz)
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	20
Adjustment value from the start position (STD)	10
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	20
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0

---

## Rear suspension

Type	Swingarm (link suspension)
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Spring preload	
Adjusting system	Mechanical adjustable type
Adjustment value (Soft)	1.5 mm (0.06 in)
Adjustment value (STD)	6.0 mm (0.24 in)
Adjustment value (Hard)	18.0 mm (0.71 in)
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	30
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Fast compression damping	
Unit for adjustment	Turn



## CHASSIS SPECIFICATIONS

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Adjustment value from the start position (Soft)	2
Adjustment value from the start position (STD)	1-1/2
Adjustment value from the start position (Hard)	0
Slow compression damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	20
Adjustment value from the start position (STD)	12
Adjustment value from the start position (Hard)	0

---

<b>Swingarm</b>	
Swingarm end free play limit (radial)	1.0 mm (0.04 in)
Swingarm end free play limit (axial)	0.2–0.9 mm (0.01–0.04 in)

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<b>Drive chain</b>	
Size	DID520MXV5
Chain type	Sealed type
Number of links	114
Drive chain slack (Maintenance stand)	50.0–60.0 mm (1.97–2.36 in)
15-link length limit	239.3 mm (9.42 in)

EAM20130

**ELECTRICAL SPECIFICATIONS****Voltage**

System voltage 12 V

**Ignition system**

Ignition system TCI  
 Ignition timing (B.T.D.C.) 10.0 °/2000 r/min

**Engine control unit**

Model B3J0

**Ignition coil**

Primary coil resistance 2.16–2.64  $\Omega$   
 Secondary coil resistance 8.64–12.96 k $\Omega$

**Spark plug cap**Resistance 7.50–12.50 k $\Omega$ **Lean angle sensor**

Operating angle 45 °

**Charging system**

Charging system AC magneto  
 Standard output 14.0 V, 5.4 A at 5000 r/min  
 Stator coil resistance 0.512–0.768  $\Omega$

**Rectifier/regulator**

Regulator type Single-phase  
 Regulated voltage (DC) 14.0–14.8 V  
 Rectifier capacity (DC) 11.0 A

**Battery**

Model BR98  
 Voltage, capacity 12 V, 2.4 Ah (5 HR)

**Indicator light**

Fuel level warning light 1.7 W  
 Engine trouble warning light 1.7 W

**Starter motor**

Power output 0.85 kW  
 Armature coil resistance 0.008–0.010  $\Omega$   
 Brush overall length 11.0 mm (0.43 in)  
 Brush overall length limit 5.5 mm (0.22 in)  
 Brush spring force 4.80–7.20 N (489–734 gf, 17.28–25.92 oz)  
 Commutator diameter 80.6 mm (3.17 in)  
 Commutator diameter limit 79.6 mm (3.13 in)  
 Mica undercut (depth) 2.40 mm (0.09 in)

**Fuel injection sensor**

Crankshaft position sensor resistance 228–342  $\Omega$   
 Intake air temperature sensor resistance 5400–6600  $\Omega$  at 0 °C (5400–6600  $\Omega$  at 32 °F)  
 Intake air temperature sensor resistance 290–390  $\Omega$   
 Coolant temperature sensor resistance 2512–2777  $\Omega$   
 Coolant temperature sensor resistance 210–220  $\Omega$

**Fuse(s)**

Main fuse 15.0 A  
 Radiator fan motor fuse 5.0 A

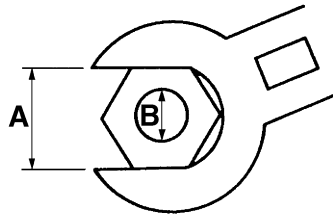
EAM20131

## TIGHTENING TORQUES

EAM30205

### 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		
		N·m	kgf·m	lb·ft
10 mm	6 mm	6	0.6	4.4
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	41
19 mm	14 mm	85	8.5	63
22 mm	16 mm	130	13.0	96







# TIGHTENING TORQUES

EAM30203












## ENGINE TIGHTENING TORQUES

### TIP





△- marked portion shall be checked for torque tightening after break-in or before each race.

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Camshaft cap bolt	M6	8	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder head blind plug	M12	1	28 N·m (2.8 kgf·m, 21 lb·ft)	
Spark plug	M10	1	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Cylinder head stud bolt (exhaust pipe)	M6	3	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Oil passage plug (cylinder head)	M8	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder head bolt	M10	4	See TIP.	
Cylinder head bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder head cover bolt	M6	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil pressure check bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Balancer weight plate screw	M6	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Balancer weight gear nut	M14	1	50 N·m (5.0 kgf·m, 37 lb·ft)	Use a lock washer.
Balancer nut	M10	1	45 N·m (4.5 kgf·m, 33 lb·ft)	Use a lock washer.
Timing chain guide stopper plate (exhaust side)	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Timing chain tensioner cap bolt	M6	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	
Timing chain tensioner bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Coolant drain bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Radiator hose clamp screw	M6	8	1.5 N·m (0.15 kgf·m, 1.1 lb·ft)	
Radiator bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Radiator pipe joint bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Radiator fan bolt (For JPN)	M6	3	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Water pump housing cover bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil pump bolt	M5	2	5 N·m (0.5 kgf·m, 3.7 lb·ft)	
Oil pump cover screw	M4	1	2.0 N·m (0.20 kgf·m, 1.5 lb·ft)	
Oil strainer bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Throttle cable cover bolt	M5	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Throttle body joint bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Throttle body joint clamp screw	M5	1	3.0 N·m (0.30 kgf·m, 2.2 lb·ft)	
Air filter case joint clamp screw	M5	1	3.0 N·m (0.30 kgf·m, 2.2 lb·ft)	
Air filter case bolt	M6	3	7 N·m (0.7 kgf·m, 5.2 lb·ft)	

# TIGHTENING TORQUES

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Clutch cable locknut (clutch cable adjuster)	M6	1	4.3 N·m (0.43 kgf·m, 3.2 lb·ft)	
Clutch cable locknut (engine side)	M8	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Exhaust pipe nut	M6	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Exhaust pipe protector screw	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Exhaust pipe bracket bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Silencer bolt (front)	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Silencer bolt (rear)	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Exhaust pipe clamp bolt	M8	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Silencer body bolt	M5	6	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Oil nozzle bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Engine oil drain bolt	M10	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Crankcase bolt	M6	12	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Clutch cable holder bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Crankshaft end accessing screw	M36	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Timing mark accessing screw	M14	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	
Drive sprocket cover bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Crankcase bearing cover plate screw	M8	4	22 N·m (2.2 kgf·m, 16 lb·ft)	
Bearing plate cover bolt (left side of the drive axle)	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Plate bolt	M6	4	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Starter motor cover bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Clutch cover bolt	M6	7	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Crankcase cover bolt (left)	M6	7	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Crankcase cover bolt (right)	M6	11	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil filter element cover bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Starter clutch idle gear holder bolt	M6	3	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Primary drive gear nut	M20	1	80 N·m (8.0 kgf·m, 59 lb·ft)	
Clutch spring bolt	M6	6	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Clutch boss nut	M20	1	75 N·m (7.5 kgf·m, 55 lb·ft)	Use a lock washer. 
Drive sprocket nut	M20	1	75 N·m (7.5 kgf·m, 55 lb·ft)	Use a lock washer.
Segment	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Shift guide bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Stopper lever bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	

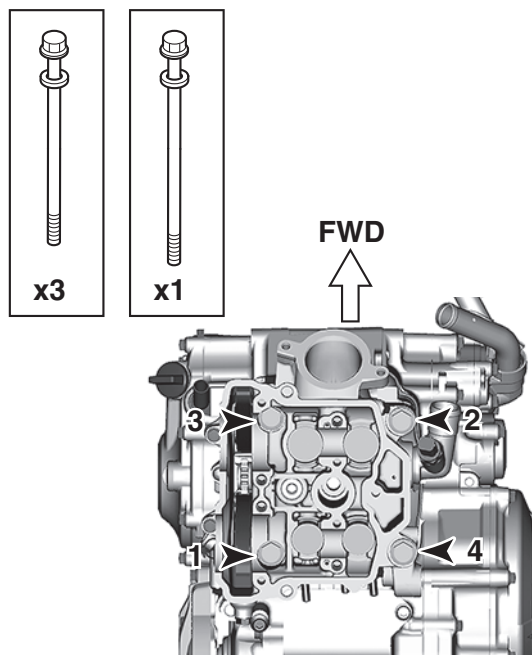
# TIGHTENING TORQUES

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Shift pedal bolt	M6	1	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△
AC magneto rotor nut	M12	1	65 N·m (6.5 kgf·m, 48 lb·ft)	
Stator coil screw	M5	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Crankshaft position sensor bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
AC magneto lead holder bolt	M5	1	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Coolant temperature sensor	M10	1	15 N·m (1.5 kgf·m, 11 lb·ft)	
Gear position switch bolt	M5	2	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Rectifier/regulator bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
ECU bolt	M5	2	3.8 N·m (0.38 kgf·m, 2.8 lb·ft)	
Ignition coil bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Starter motor bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Nut (holder)	M6	1	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Throttle position sensor screw	M5	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Intake air pressure sensor screw	M6	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	

## TIP

### Cylinder head bolt

First, tighten the cylinder head bolts to 40 N·m (4.0 kgf·m, 30 lb·ft) in the proper tightening sequence and remove them. Retighten the cylinder head bolts to 22 N·m (2.2 kgf·m, 16 lb·ft) in the proper tightening sequence. Tighten all bolts to reach the specified angle (90°) in a diagonal sequence, and then tighten the cylinder head bolts further to reach the specified angle (No. 1, 2, 3: 60°/No. 4 90°) in the proper tightening sequence. (The first and second time, be sure to apply molybdenum disulfide grease to the bolt threads and seats as well as to both sides of the washers.)




# TIGHTENING TORQUES

EAM30204





## CHASSIS TIGHTENING TORQUES

### TIP

△- marked portion shall be checked for torque tightening after break-in or before each race.

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Upper bracket pinch bolt	M8	4	21 N·m (2.1 kgf·m, 15 lb·ft)	△
Lower bracket pinch bolt	M8	4	21 N·m (2.1 kgf·m, 15 lb·ft)	△
Steering stem nut	M24	1	145 N·m (14.5 kgf·m, 107 lb·ft)	△
Upper handlebar holder bolt	M8	4	28 N·m (2.8 kgf·m, 21 lb·ft)	△
Lower handlebar holder nut	M10	2	40 N·m (4.0 kgf·m, 30 lb·ft)	△
Engine stop switch screw	M3	1	0.5 N·m (0.05 kgf·m, 0.37 lb·ft)	
Start switch	M3	1	0.5 N·m (0.05 kgf·m, 0.37 lb·ft)	
Mode switch	M3	1	1.3 N·m (0.13 kgf·m, 0.95 lb·ft)	
Lower ring nut	M28	1	See TIP.	△
Damper assembly (front fork)	M51	2	30 N·m (3.0 kgf·m, 22 lb·ft)	
Inner tube and Adjuster	M22	2	55 N·m (5.5 kgf·m, 41 lb·ft)	
Base valve (front fork)	M42	2	28 N·m (2.8 kgf·m, 21 lb·ft)	
Adjuster (damper assembly)	M12	2	29 N·m (2.9 kgf·m, 21 lb·ft)	
Bleed screw (front fork)	M5	2	1.3 N·m (0.13 kgf·m, 0.95 lb·ft)	
Front fork protector bolt	M6	6	5 N·m (0.5 kgf·m, 3.7 lb·ft)	△
Brake hose holder bolt	M6	2	9 N·m (0.9 kgf·m, 6.6 lb·ft)	△
Throttle grip cap screw	M5	2	3.8 N·m (0.38 kgf·m, 2.8 lb·ft)	
Clutch lever holder bolt	M6	2	5 N·m (0.5 kgf·m, 3.7 lb·ft)	
Clutch lever nut	M6	1	4.0 N·m (0.40 kgf·m, 3.0 lb·ft)	
Clutch lever position locknut	M5	1	4.8 N·m (0.48 kgf·m, 3.5 lb·ft)	
Front brake master cylinder holder bolt	M6	2	9 N·m (0.9 kgf·m, 6.6 lb·ft)	△
Front brake master cylinder reservoir cap screw	M4	2	1.5 N·m (0.15 kgf·m, 1.1 lb·ft)	
Front brake lever pivot bolt	M6	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	
Front brake lever pivot nut	M6	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	
Locknut (front brake lever position)	M6	1	5 N·m (0.5 kgf·m, 3.7 lb·ft)	
Front brake hose holder bolt	M6	1	9 N·m (0.9 kgf·m, 6.6 lb·ft)	△
Front brake hose union bolt	M10	2	30 N·m (3.0 kgf·m, 22 lb·ft)	△
Front brake caliper bolt	M8	2	28 N·m (2.8 kgf·m, 21 lb·ft)	△
Front brake pad pin	M10	1	17 N·m (1.7 kgf·m, 13 lb·ft)	
Front brake pad pin plug	M10	1	2.5 N·m (0.25 kgf·m, 1.8 lb·ft)	
Front brake caliper bleed screw	M8	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	△
Front wheel axle nut	M18	1	115 N·m (11.5 kgf·m, 85 lb·ft)	△

# TIGHTENING TORQUES

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Front wheel axle pinch bolt	M8	4	21 N·m (2.1 kgf·m, 15 lb·ft)	△
Front brake disc bolt	M6	6	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△/ 
Rear brake disc bolt	M6	6	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△/ 
Footrest bracket bolt	M10	4	55 N·m (5.5 kgf·m, 41 lb·ft)	
Sidestand bolt	M10	1	35 N·m (3.5 kgf·m, 26 lb·ft)	
Rear brake pedal bolt	M8	1	26 N·m (2.6 kgf·m, 19 lb·ft)	△
Rear brake pedal adjusting locknut	M6	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	
Rear brake master cylinder bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	△
Rear brake master cylinder reservoir cap bolt	M4	2	1.5 N·m (0.15 kgf·m, 1.1 lb·ft)	
Rear brake hose union bolt	M10	2	30 N·m (3.0 kgf·m, 22 lb·ft)	△
Rear brake caliper bleed screw	M8	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	△
Rear brake pad pin	M10	1	17 N·m (1.7 kgf·m, 13 lb·ft)	
Rear brake pad pin plug	M10	1	2.5 N·m (0.25 kgf·m, 1.8 lb·ft)	
Rear wheel axle nut	M20	1	125 N·m (12.5 kgf·m, 92 lb·ft)	△
Drive chain puller locknut	M8	2	21 N·m (2.1 kgf·m, 15 lb·ft)	
Rear wheel sprocket nut	M8	6	50 N·m (5.0 kgf·m, 37 lb·ft)	△
Nipple (spoke)	—	72	2.5 N·m (0.25 kgf·m, 1.8 lb·ft)	△
Bolt (rear brake disc cover)	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	△
Rear brake caliper protector bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Engine mounting bolt (upper side)	M10	2	45 N·m (4.5 kgf·m, 33 lb·ft)	△
Engine mounting bolt (front side)	M10	1	55 N·m (5.5 kgf·m, 41 lb·ft)	△
Engine mounting bolt (lower side)	M10	1	53 N·m (5.3 kgf·m, 39 lb·ft)	△
Engine bracket bolt (upper side)	M8	4	34 N·m (3.4 kgf·m, 25 lb·ft)	△
Engine bracket bolt (front side)	M8	4	34 N·m (3.4 kgf·m, 25 lb·ft)	△
Rear frame bolt	M8	4	38 N·m (3.8 kgf·m, 28 lb·ft)	△
Engine guard bolt	M6	3	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Pivot shaft nut	M16	1	85 N·m (8.5 kgf·m, 63 lb·ft)	△
Rear shock absorber assembly upper bolt	M10	1	56 N·m (5.6 kgf·m, 41 lb·ft)	△
Rear shock absorber assembly lower bolt	M10	1	53 N·m (5.3 kgf·m, 39 lb·ft)	△
Locknut (rear shock absorber lock-nut)	M60	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Relay arm bolt (swingarm side)	M14	1	70 N·m (7.0 kgf·m, 52 lb·ft)	△
Connecting arm bolt (relay arm side)	M14	1	80 N·m (8.0 kgf·m, 59 lb·ft)	△
Connecting arm bolt (frame side)	M14	1	80 N·m (8.0 kgf·m, 59 lb·ft)	△
Brake hose holder screw	M5	4	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	△



## TIGHTENING TORQUES

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Drive chain tensioner bolt (upper side)	M8	1	16 N·m (1.6 kgf·m, 12 lb·ft)	
Drive chain tensioner bolt (lower side)	M8	1	16 N·m (1.6 kgf·m, 12 lb·ft)	
Bolt (drive chain support)	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Drive chain support nut	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Drive chain guide bolt	M5	3	4.0 N·m (0.40 kgf·m, 3.0 lb·ft)	
Bolt (rear frame cover) (left)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Fuel tank bolt (front side)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Fuel tank bolt (boss)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Fuel tank bolt (rear side)	M6	1	9 N·m (0.9 kgf·m, 6.6 lb·ft)	
Fuel tank bracket bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Fuel pump bolt	M5	5	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Screw (fuel inlet pipe)	M5	2	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Bolt (fuel tank cap cover)	M6	2	4.0 N·m (0.40 kgf·m, 3.0 lb·ft)	
Seat set bracket screw	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Seat bolt	M8	2	22 N·m (2.2 kgf·m, 16 lb·ft)	△
Side cover bolt (left)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Side cover bolt (right)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Air scoop bolt (frame)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Air scoop bolt (fuel tank)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Air scoop bolt (radiator guard)	M6	4	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Front fender bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	△
Rear fender bolt (front side)	M6	4	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Rear fender bolt (rear side)	M6	2	16 N·m (1.6 kgf·m, 12 lb·ft)	△
Screw (mud flap)	—	2	1.3 N·m (0.13 kgf·m, 0.95 lb·ft)	△
Number plate bolt	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Frame ground bolt (battery negative lead)	M5	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	

### TIP

#### Lower ring nut

1. First, tighten the lower ring nut approximately 38 N·m (3.8 kgf·m, 28 lb·ft) by using the steering nut wrench, then loosen the lower ring nut one turn.
2. Retighten the lower ring nut 7 N·m (0.7 kgf·m, 5.2 lb·ft).
































# LUBRICATION POINTS AND LUBRICANT TYPES

EAM20132




## LUBRICATION POINTS AND LUBRICANT TYPES

EAM30206

### ENGINE



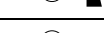

Lubrication point	Lubricant types
Oil seal lips	
Bearing	
O-ring	
Camshaft cap bolt threads and contacting surface	
Cylinder head bolt threads, seats, washers	
Valve stems	
Valve stem ends	
Valve lifter outer surface	
Camshaft lobe and journal	
Valve lifter top surface	
Crankshaft journal	
Crankshaft big end thrust surfaces	
Piston outer surface	
Piston pin outer surface	
Decompression system moving parts	
Water pump impeller shaft	
Oil pump rotors (inner and outer)	
Oil passage gasket	
Oil pump shaft	
Primary drive gear nut threads and contacting surface	
Clutch boss nut threads and contacting surface	
Primary driven gear inner surface and end surface	
Clutch push rod washer	
Clutch push rod 1 outer surface	
Clutch push rod 1 thrust surface	
Clutch push rod 2 outer surface	
Push lever shaft washer outer surface	
Transmission gear inner surface (wheel and pinion) and collar	
Transmission gears (shift fork groove)	
Shift cam grooves	
Shift fork and shift fork guide outer surface	

# LUBRICATION POINTS AND LUBRICANT TYPES





















Lubrication point	Lubricant types
Shift shaft and collar	
Shift lever assembly moving parts	
Cylinder head cover gasket	Yamaha bond No. 1215 (Three bond No.1215®)
Crankcase mating surface	Yamaha bond No. 1215 (Three bond No.1215®)
Stator assembly lead grommet	Yamaha bond No. 1215 (Three bond No.1215®)
Entire seal lip (air filter element)	

EAM30207

## CHASSIS

Lubrication point	Lubricant types
Upper bearings (steering head)	
Upper bearings and bearing race cover (steering head)	
Lower bearings and oil seal lip (steering head)	
Steering stem threads and nut contacting surface	
Pivot shaft bearing	
Swingarm pivot portion (collar side surface and thrust bearing)	
Swingarm pivot portion (collar outer surface)	
Swingarm pivot portion (oil seal lip)	
Pivot shaft outer surface	
Relay arm bearing and oil seal lip	
Relay arm thrust washer surface (both sides)	
Relay arm collar outer surface and bolt outer surface	
Relay arm bolt threads (swingarm side)	
Connecting arm bearing and oil seal lip	
Connecting arm collar outer surface and bolt outer surface	
Rear shock absorber assembly collar outer surface and dust seal lip (upper side)	
Rear shock absorber assembly bearing and dust seal lip (lower side)	
Brake pedal pivot portion (O-ring and bolt outer surface)	
Front wheel oil seal lip	
Front wheel axle outer surface	
Rear wheel oil seal lip	
Rear wheel axle outer surface	
Sidestand pivot portion and collar outer surface	
Push rod contacting portion (front brake master cylinder)	

# LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant types
Front brake lever bolt outer surface	
Clutch lever sliding surface and bolt outer surface	
Clutch lever position adjuster end	
Clutch lever adjuster rubber lip	
Clutch cable end (clutch lever side)	
Tube guide (throttle grip) inner surface and throttle cable end	
Front brake caliper piston	
Front brake caliper piston seal	
Front brake caliper dust seal	
Front brake caliper piston outer surface	
Front brake caliper pin bolt and boot	
Front brake master cylinder push rod end	
Front brake master cylinder kit	
Rear brake caliper piston	
Rear brake caliper piston seal	
Rear brake caliper dust seal	
Rear brake caliper piston outer surface	
Rear brake caliper pin bolt and boot	
Rear brake master cylinder push rod end	
Rear brake master cylinder kit	

## LUBRICATION POINTS AND LUBRICANT TYPES

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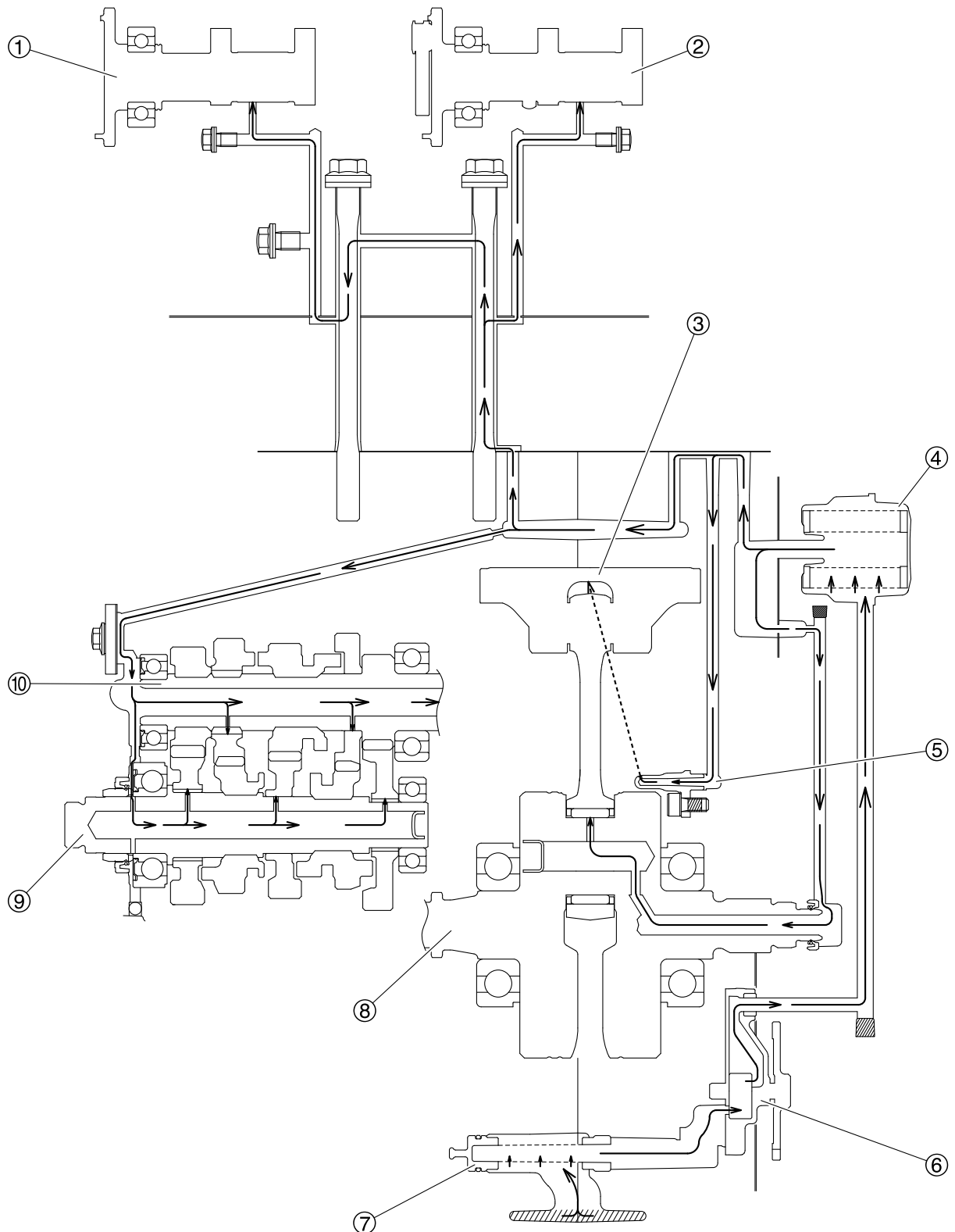
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAM20151

## LUBRICATION SYSTEM CHART AND DIAGRAMS

EAM30331

### LUBRICATION DIAGRAMS



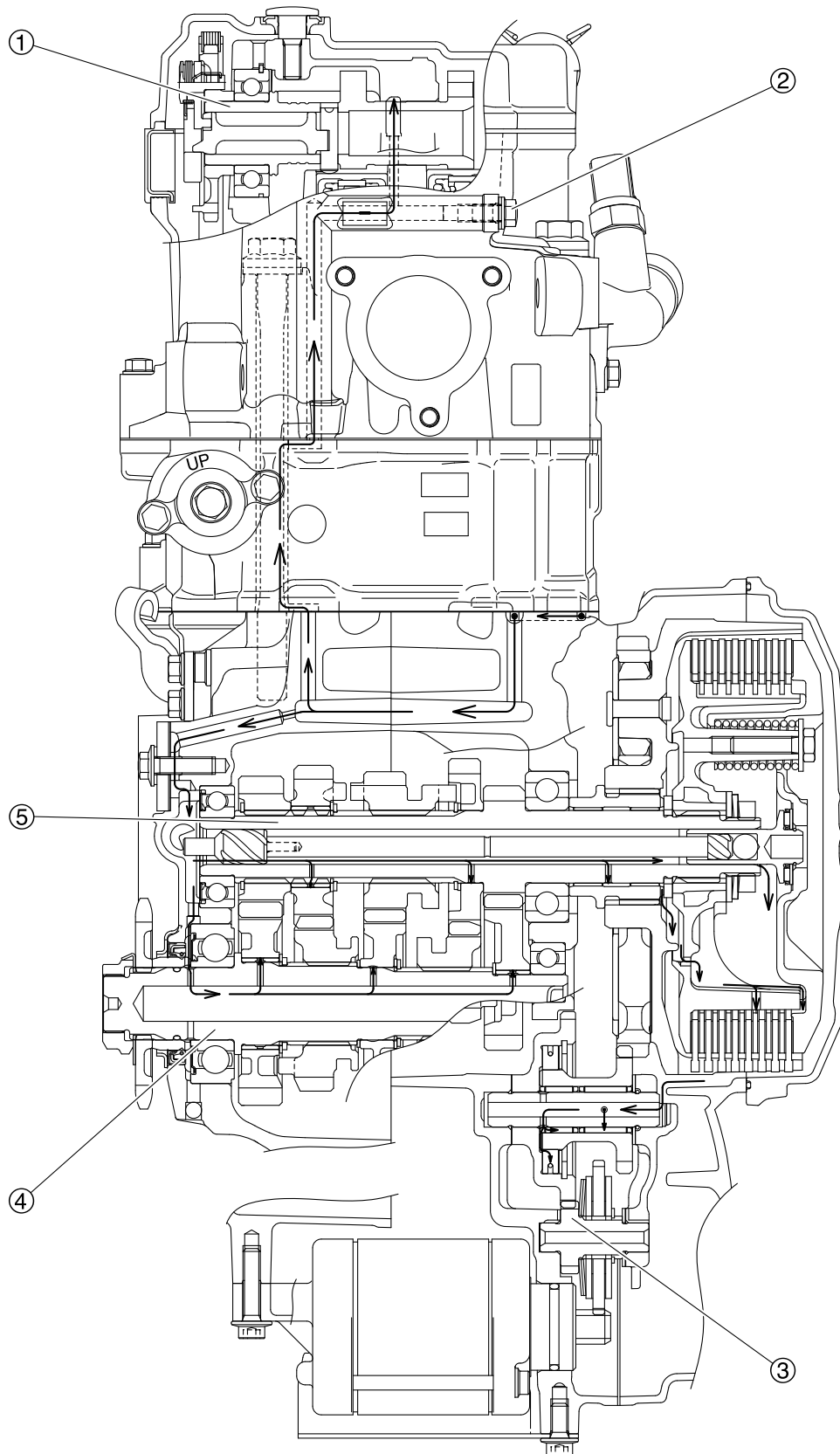
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Intake camshaft
2. Exhaust camshaft
3. Piston
4. Oil filter element
5. Oil nozzle
6. Oil pump
7. Oil strainer
8. Crankshaft
9. Drive axle
10. Main axle

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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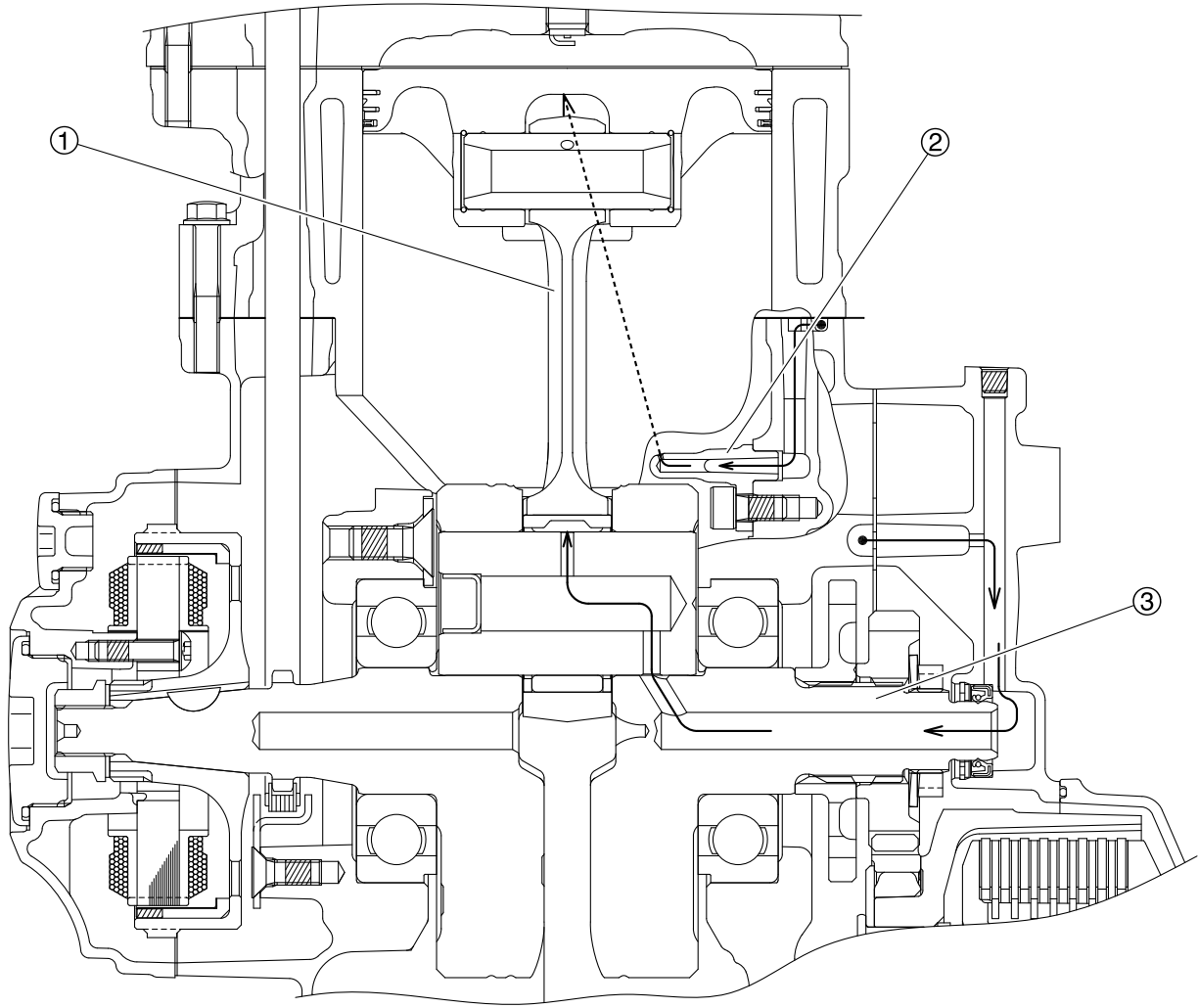
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Exhaust camshaft
2. Intake camshaft
3. Oil filter element
4. Oil pump
5. Drive axle

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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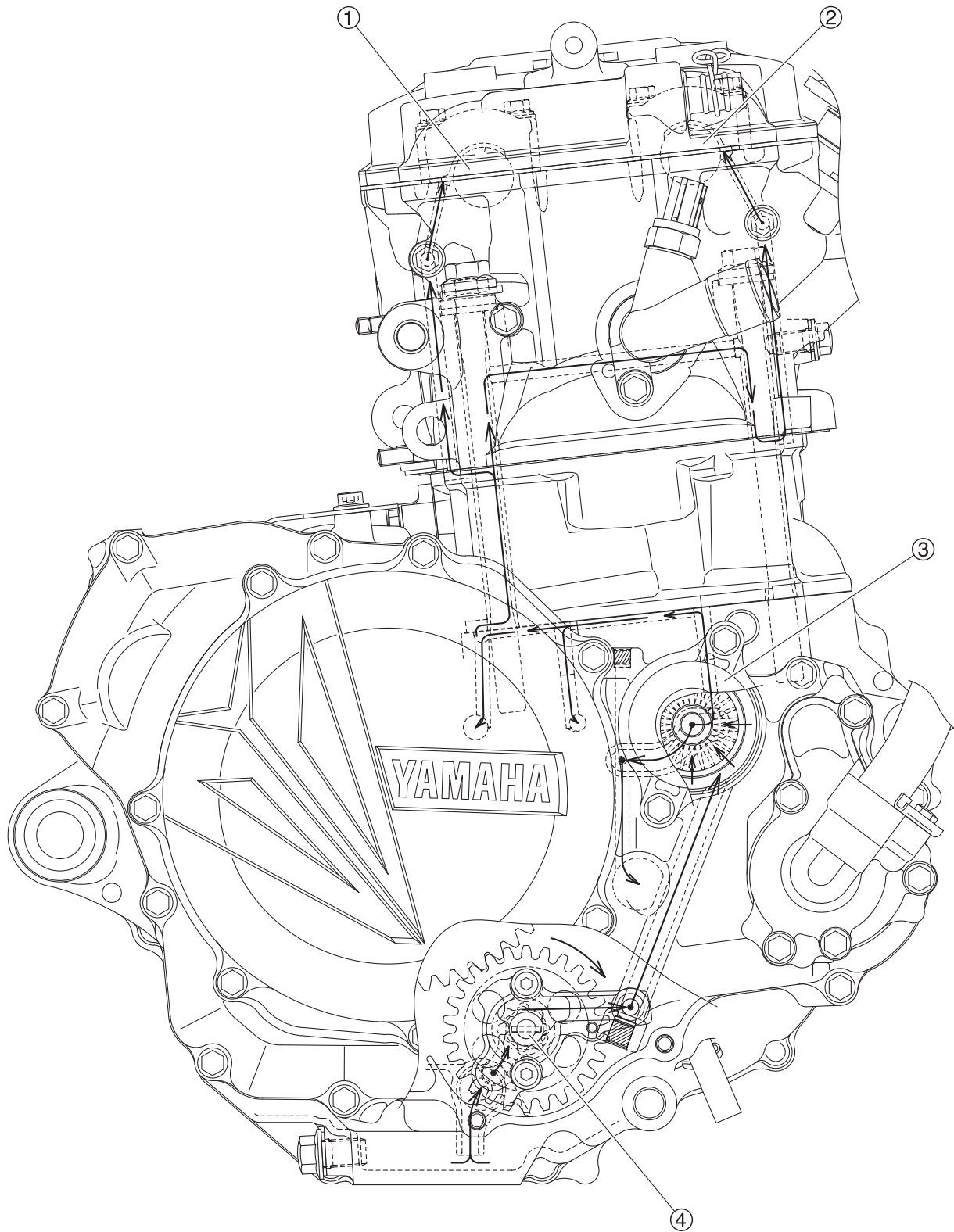
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Connecting rod
2. Oil nozzle
3. Crankshaft

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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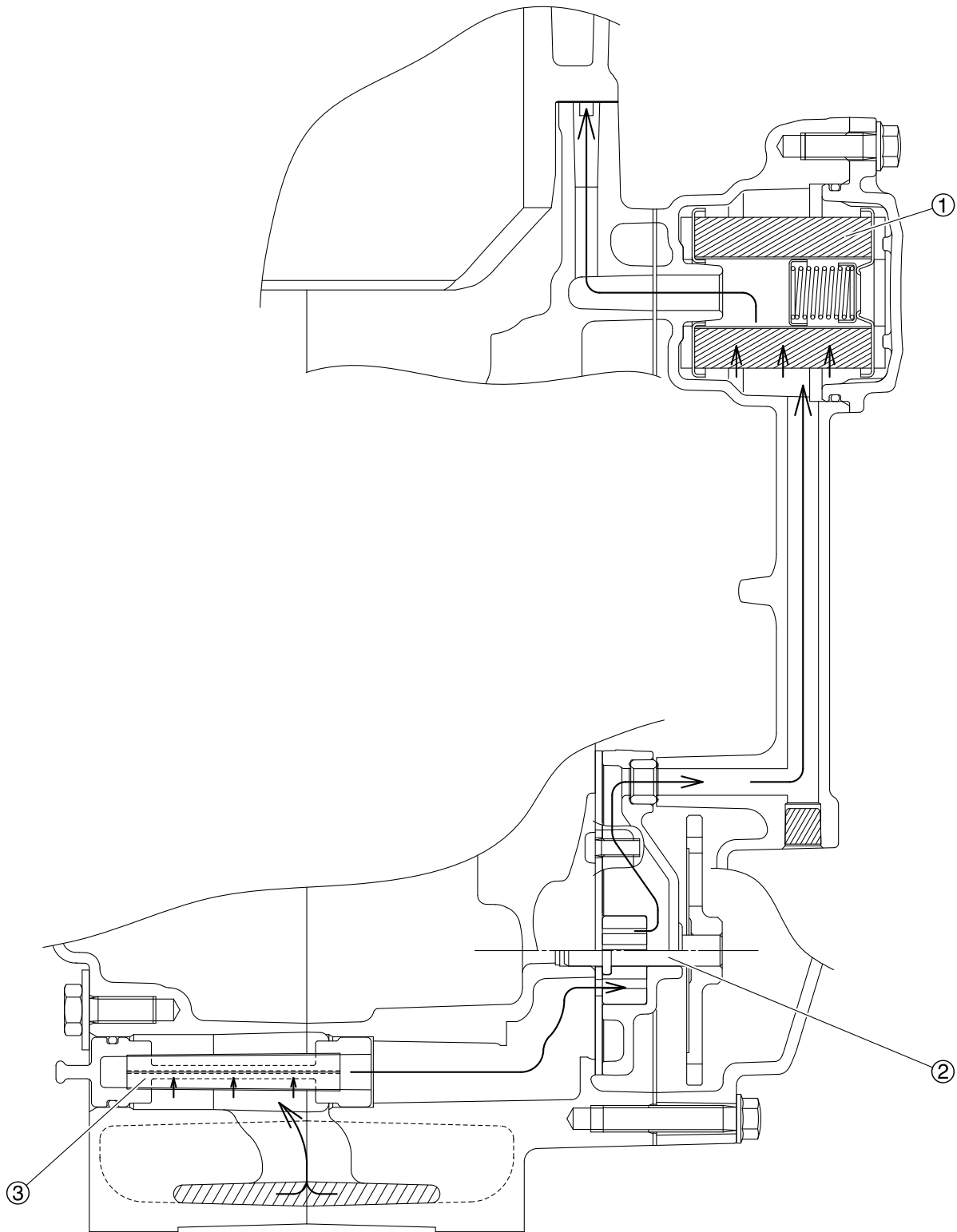
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Connecting rod
2. Engine oil check bolt
3. Crankshaft
4. Oil pump

# LUBRICATION SYSTEM CHART AND DIAGRAMS

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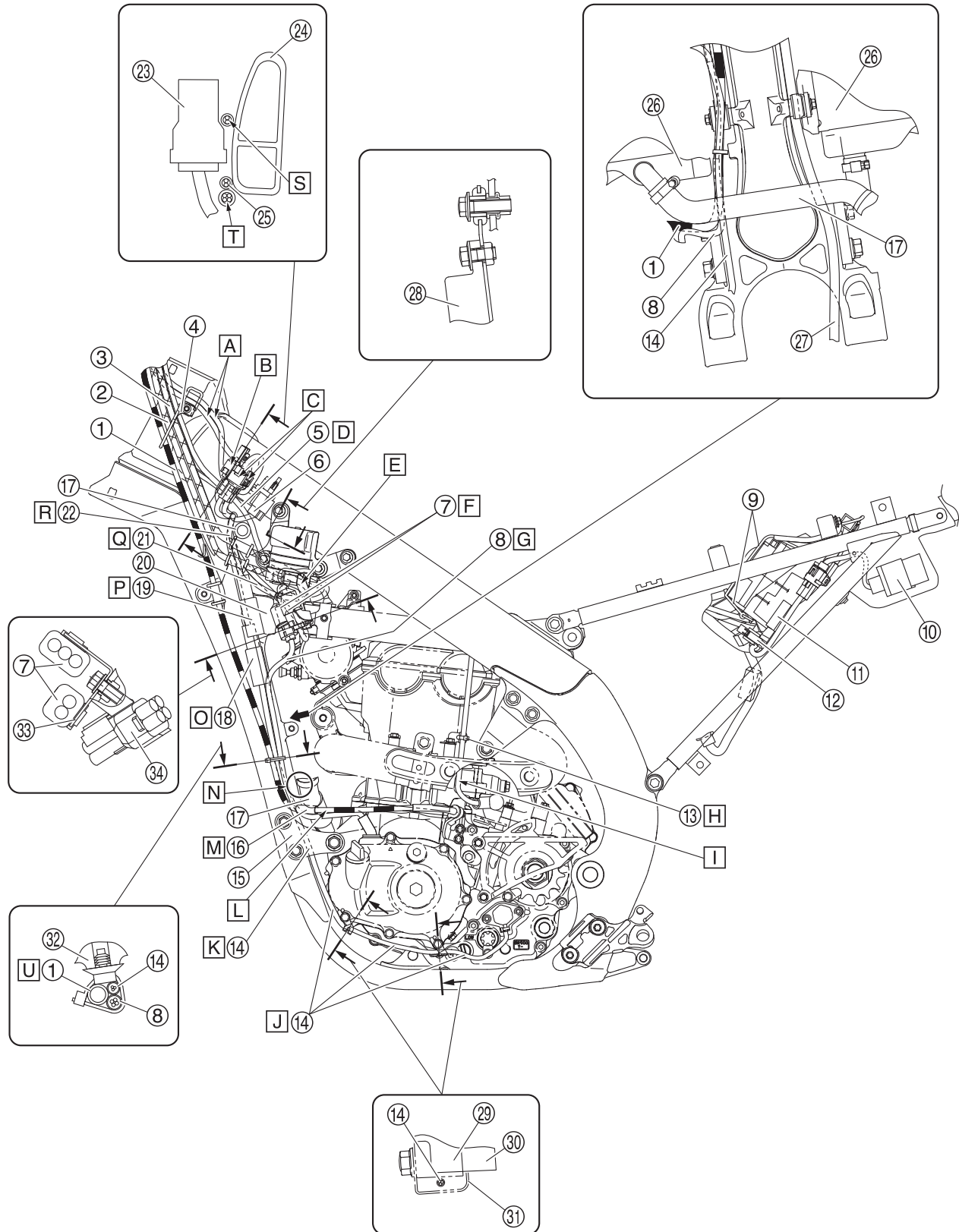
# LUBRICATION SYSTEM CHART AND DIAGRAMS

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1. Oil filter element
2. Oil pump
3. Oil strainer

EAM20152

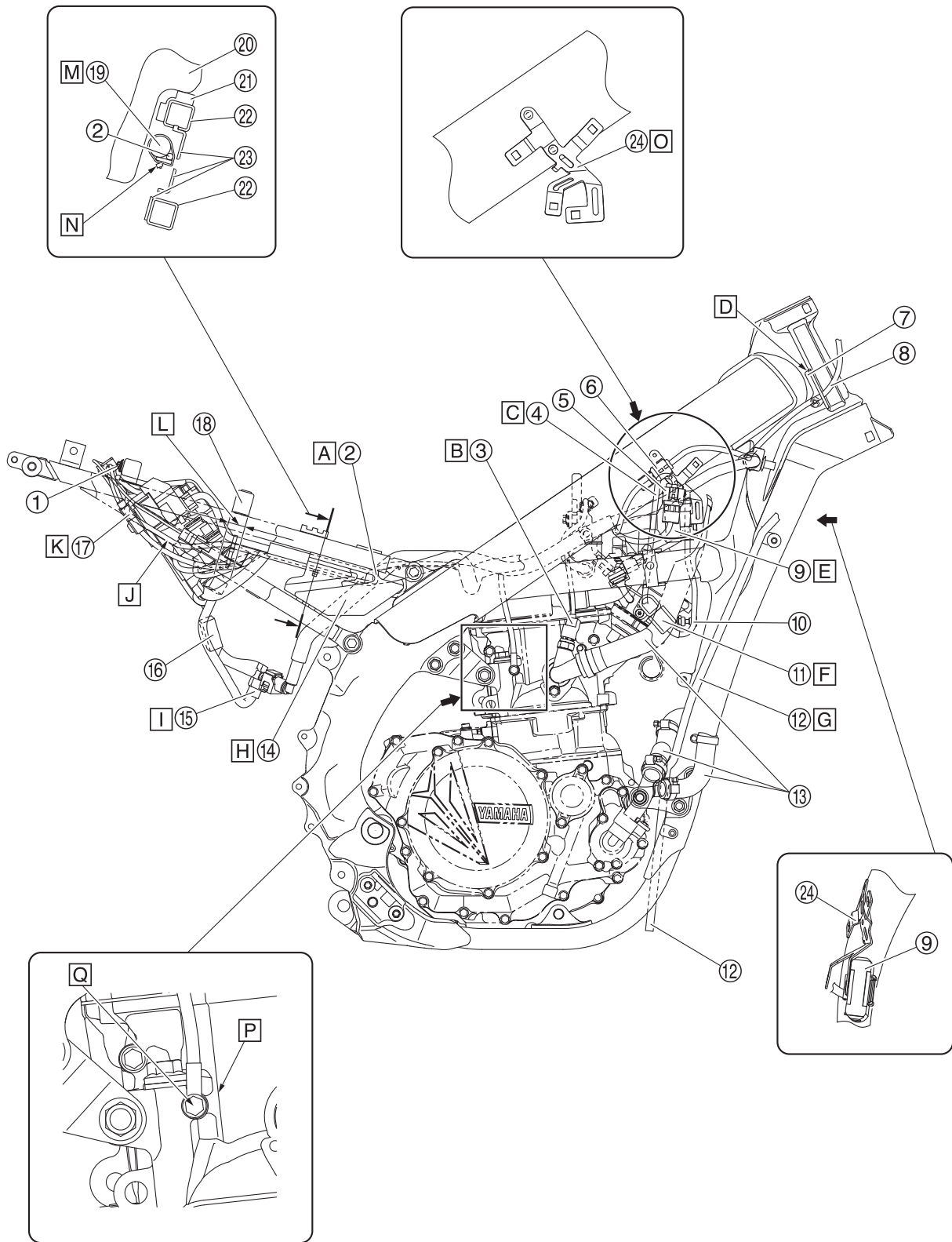
## CABLE ROUTING DIAGRAM





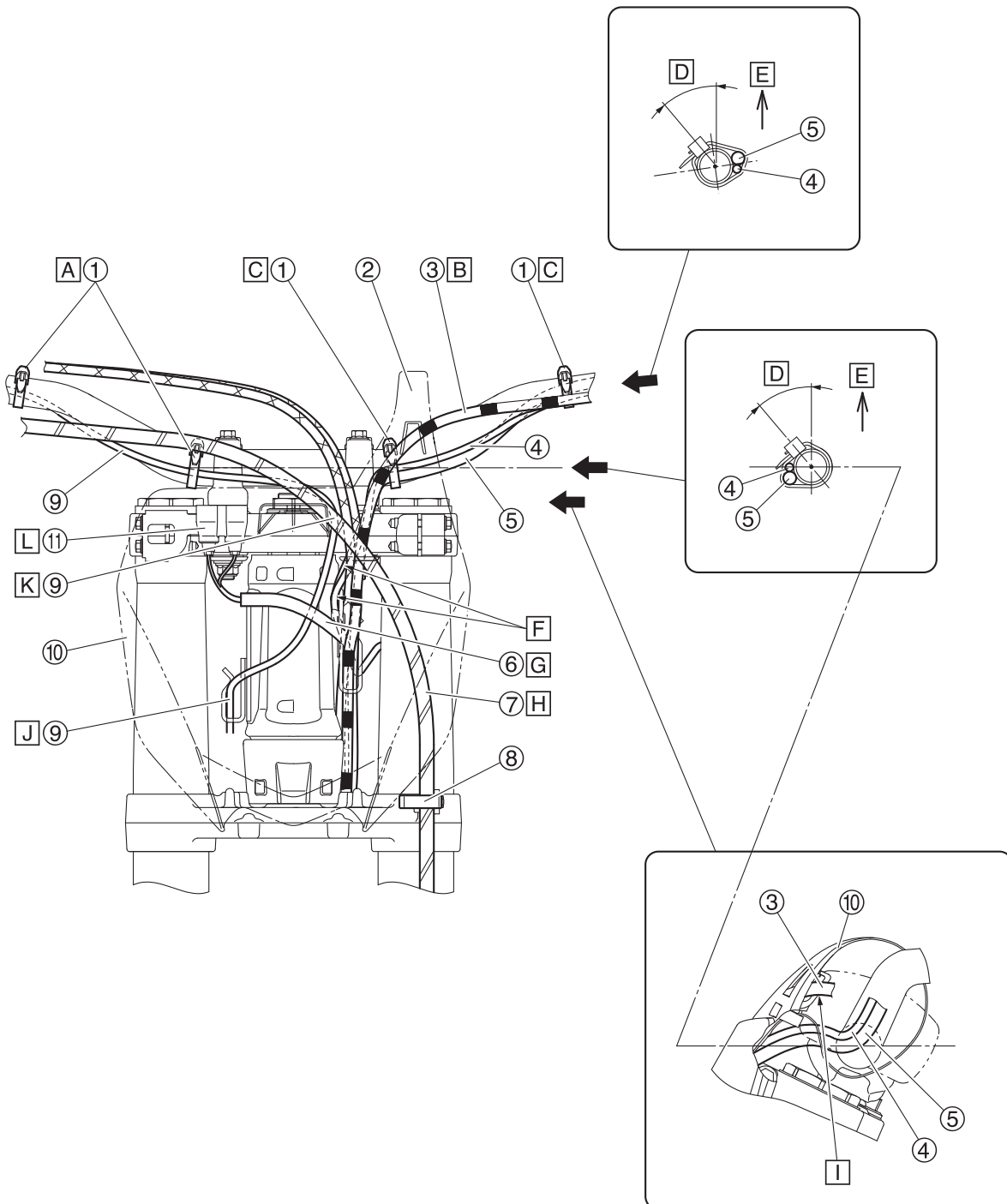
- 
1. Clutch cable
  2. Throttle cable (return)
  3. Throttle cable (pull)
  4. Cable holder
  5. Warning light lead
  6. Intake air temperature sensor coupler (black)
  7. Rectifier/regulator coupler
  8. AC magneto lead
  9. Battery band
  10. CCU (Communication Control Unit)
  11. Starter relay diode
  12. Radiator fan motor fuse
  13. Starter motor lead
  14. Gear position switch lead
  15. Lower engine bracket
  16. Protector (clutch cable)
  17. Radiator hose
  18. Gear position switch coupler
  19. AC magneto coupler
  20. Tension arm
  21. Rectifier/regulator lead
  22. Wire harness
  23. Yamaha diagnostic tool coupler
  24. Tank rail
  25. Mode switch lead
  26. Radiator
  27. Cylinder head breather hose
  28. Rectifier/regulator
  29. Crankcase cover
  30. Crankcase
  31. Clamp
  32. Frame
  33. Plate
  34. Warning light coupler
- A. Pass the engine stop switch lead and the mode switch lead between the frame and the cable holder. Route engine stop switch lead and the mode switch lead above of the vehicle.
  - B. Insert the Yamaha diagnostic tool coupler into the connector, and fix it to the bracket.
  - C. Fasten the engine stop switch coupler to the bracket of the inside. Fasten the coupler (not used) to the bracket of the outside. Route the mode switch lead under the bracket.
  - D. Pass the warning light lead over the wire harness and radiator hose.
  - E. Fasten the warning light coupler to the bracket.
  - F. Fasten the rectifier/regulator coupler to the bracket. Attach the coupler cover.
  - G. Pass the AC magneto lead through rear side of the vehicle. No pinch is allowed between the radiator and the tension arm.
  - H. Fasten the starter motor lead to the bracket using the plastic locking tie. Position the lock part of the plastic locking tie to rear side of the vehicle. Cut the end of the plastic locking tie.
  - I. Route the starter motor lead along the cylinder body without slack.
  - J. Route the gear position sensor along the crankcase without slack.
  - K. Pass the gear position switch lead to the inside of the lower engine bracket (the side of the vehicle).
  - L. Pass the clutch cable with no downward sag allowed.
  - M. Bring the protector of the clutch cable into contact with the radiator hose, and pass it to the outside of the neutral switch lead and the AC magneto lead (the outside of the vehicle).
  - N. No pinch is allowed the leads between the radiator and the tension arm.
  - O. After connecting the gear position switch coupler, attach the coupler cover.
  - P. After connecting the AC magneto coupler, attach the coupler cover.
  - Q. Pass the rectifier/regulator lead to the inside of the tension arm (the side of the vehicle).
  - R. Pass the main harness to the front of the radiator hose (the front of the vehicle), and to the inside of the throttle cable (the side of the vehicle).
  - S. Pass the engine stop switch lead between the Yamaha diagnostic tool coupler and the tank rail.
  - T. Pass the warning light lead under the mode switch lead.
  - U. Clamp the clutch cable at the front of the lead (the front of the vehicle).

# CABLE ROUTING DIAGRAM



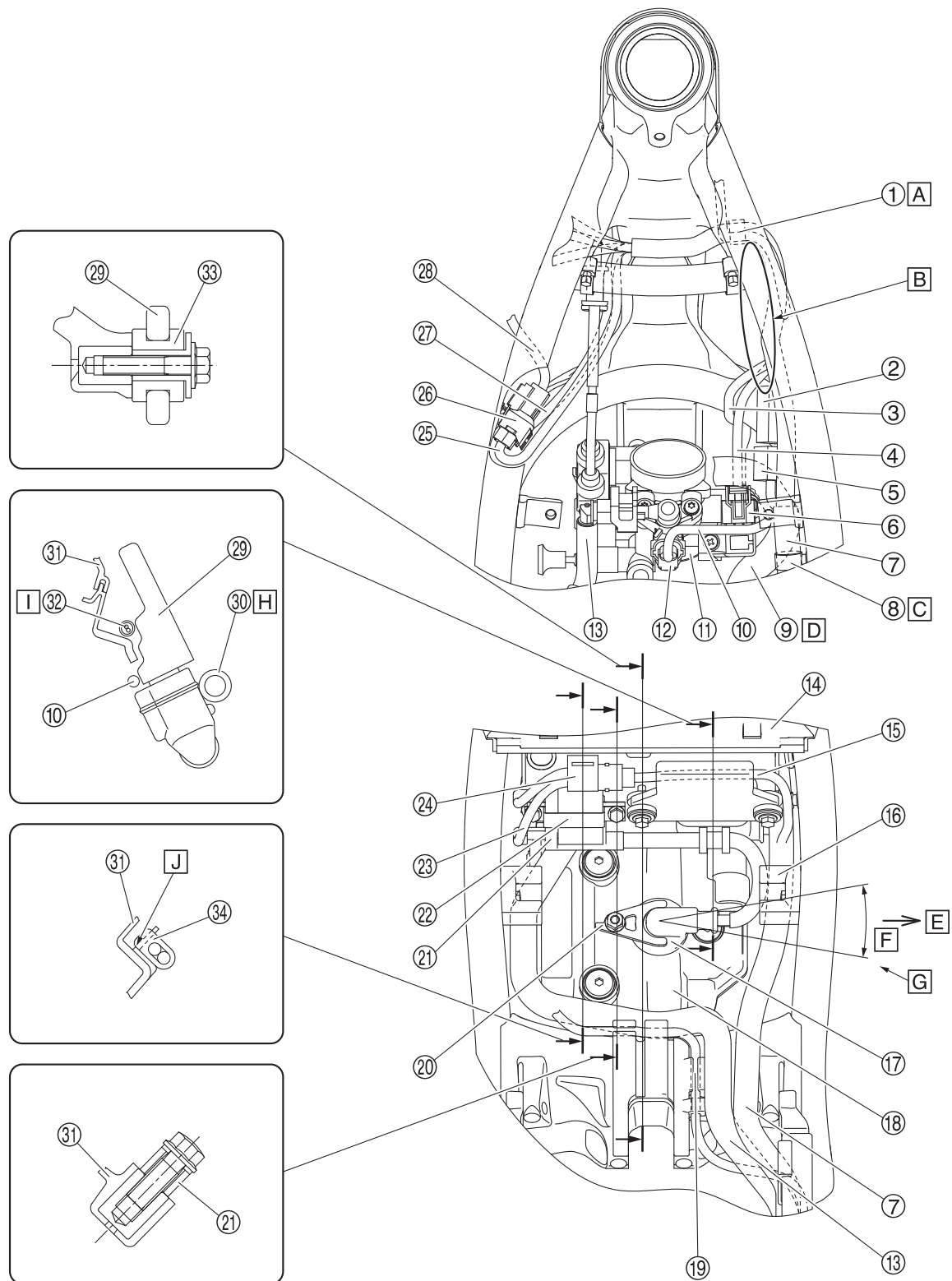
- 
1. Battery negative lead
  2. Starter motor lead
  3. Coolant temperature sensor coupler
  4. Radiator fan motor lead (For JPN)
  5. Radiator fan motor coupler (For JPN)
  6. Start switch coupler
  7. Cable guide
  8. Start switch lead
  9. Joint coupler
  10. Throttle position sensor lead
  11. Throttle position sensor coupler
  12. Radiator breather hose
  13. Radiator hose
  14. Fuel hose
  15. Fuel pump coupler
  16. Diode
  17. Resistor coupler
  18. Cross tube
  19. Wire harness
  20. Fuel tank
  21. Rubber damper
  22. Rear frame
  23. Side cover
  24. Bracket
- A. Adjust any slack between the rear shock absorber and the clamp of the side cover.
  - B. Attach the coupler cover to the coolant temperature sensor coupler.
  - C. Pass the radiator fan motor lead to the inside of the tension arm (the side of the vehicle). Either the radiator fan motor lead or the harness side can face the outside where they cross each other.
  - D. Make sure the cable guide has contact with the stamped location of the vehicle identification number, and install it.
  - E. Insert the joint coupler into the plate and secure it. After securing it, put the cover over the joint coupler. It is allowed that the insert portion of the coupler is hidden with the cover.
  - F. After connecting the throttle position sensor coupler, attach the cover.
  - G. Route the radiator breather hose as follows:  
Route it over the boss of the upper side of the radiator toward the rear of the vehicle →  
Route it over the boss on the lower side of the radiator toward the front of the vehicle →  
Route it over the radiator hose toward the front of the vehicle
  - H. Route the fuel hose in front of the fuel pump.
  - I. After connecting the fuel pump coupler, attach the cover.
  - J. Route the starter motor lead inside of the rear frame and along the rear fender.
  - K. Place the resistor coupler under the starter relay.
  - L. Fasten the starter relay lead and motor lead with the plastic locking tie within the range of the cross tube width (approximately 39 mm). Make sure that the locking portion of the plastic locking tie faces to the lower side of the vehicle and put it inside the rear frame without cutting off the end.
  - M. Fasten the wire harness at the white tape position using the plastic locking tie.
  - N. Position the lock part of the plastic locking tie to downward of the vehicle. Cut the end of the plastic locking tie.
  - O. Fasten the bracket to the tank rail (right) using the rivet.
  - P. Cylinder head ridge line
  - Q. When installing the engine ground lead terminal, it can face either way. Make sure that the terminal does not contact the cylinder head bolt and that it faces to the rear beyond the cylinder ridge line.

# CABLE ROUTING DIAGRAM



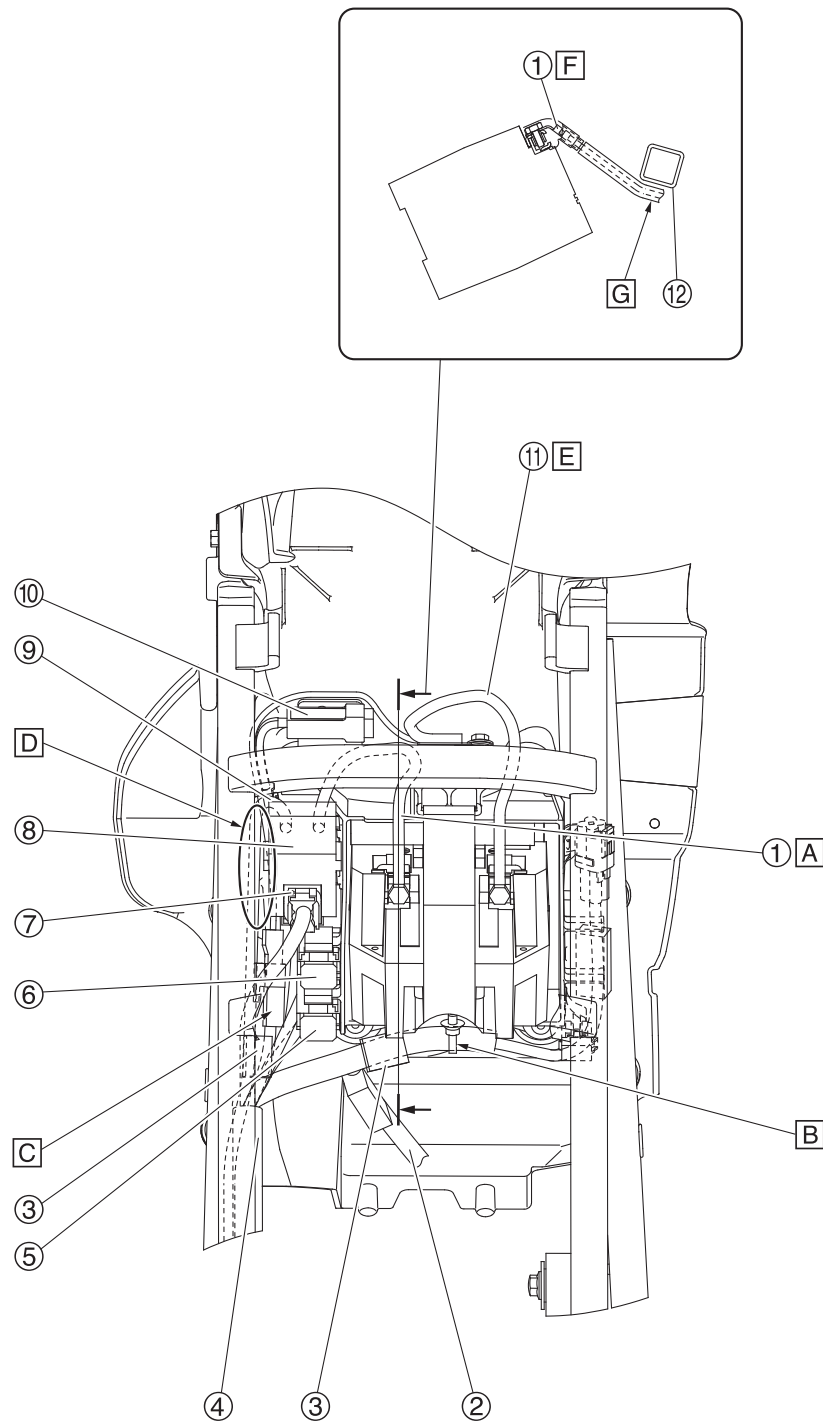
1. Plastic locking tie
  2. Number plate band
  3. Clutch cable
  4. Engine stop switch lead
  5. Mode switch lead
  6. Warning light lead
  7. Front brake hose
  8. Cable guide
  9. Start switch lead
  10. Number plate
  11. Warning light
- 
- A. Fasten the start switch lead to the handlebar using the plastic locking tie. Do not cut the end of the plastic locking tie.
  - B. Pass the clutch cable through the rear side of the number plate band.
  - C. Fasten the engine stop switch lead and mode switch lead to the handlebar using the plastic locking tie. Do not cut the end of the plastic locking tie.
  - D. 30–50°
  - E. Vertical direction of vehicle
  - F. Pass the engine stop switch lead and mode switch lead between the frame and the cable guide.
  - G. Pass the warning light lead through the cable guide.
  - H. Pass the front brake hose through the front side of the number plate.
  - I. Pass the clutch cable through the guide of the number plate.
  - J. Pass the start switch lead through the cable guide.
  - K. Pass the start switch lead through the left side of the number plate bolt.
  - L. Insert the warning light into the bracket and fasten it.

# CABLE ROUTING DIAGRAM



1. Clamp
  2. Diode
  3. Throttle position sensor lead
  4. Intake air pressure sensor lead
  5. Joint coupler
  6. Intake air pressure sensor coupler
  7. Wire harness
  8. Clamp (wire harness)
  9. Cylinder head breather hose
  10. Fuel injector lead
  11. Throttle body
  12. Fuel injector coupler
  13. Fuel hose
  14. Air filter assembly
  15. Wire harness
  16. Fuel tank bracket
  17. Plug cap
  18. Cylinder head cover
  19. Starter motor lead
  20. Cable guide
  21. Ignition coil
  22. Side core
  23. Sub-lead wire
  24. Sub-lead wire coupler
  25. Warning light lead (wire harness)
  26. Warning light coupler
  27. Rectifier/regulator lead
  28. Warning light lead
  29. ECU
  30. High tension cord
  31. Air filter assembly
  32. Wire harness
  33. Grommet
  34. Clamp
- A. Fasten the main harness by the clamp, and insert the clamp projection into the hole in the sheet metal of the radiator. The direction of the clamp lock portion does not matter. It is allowed to run the leads near the radiator cap on the inside.
- B. No pinch is allowed the leads between the tank rail and the air filter joint.
- C. Insert the projection of the main harness into the hole in the frame.
- D. Route the cylinder head breather hose behind or in front of the fuel injector lead.
- E. Right side of the vehicle.
- F.  $\pm 10^\circ$
- G. Install the plug cap so it faces to the right side of the vehicle.
- H. It does not matter if the high tension cord and grommet do not contact the ECU.
- I. Pass the wire harness between the ECU and air filter assembly.
- J. Insert the clamp into the rib so that it contacts the rib.

# CABLE ROUTING DIAGRAM

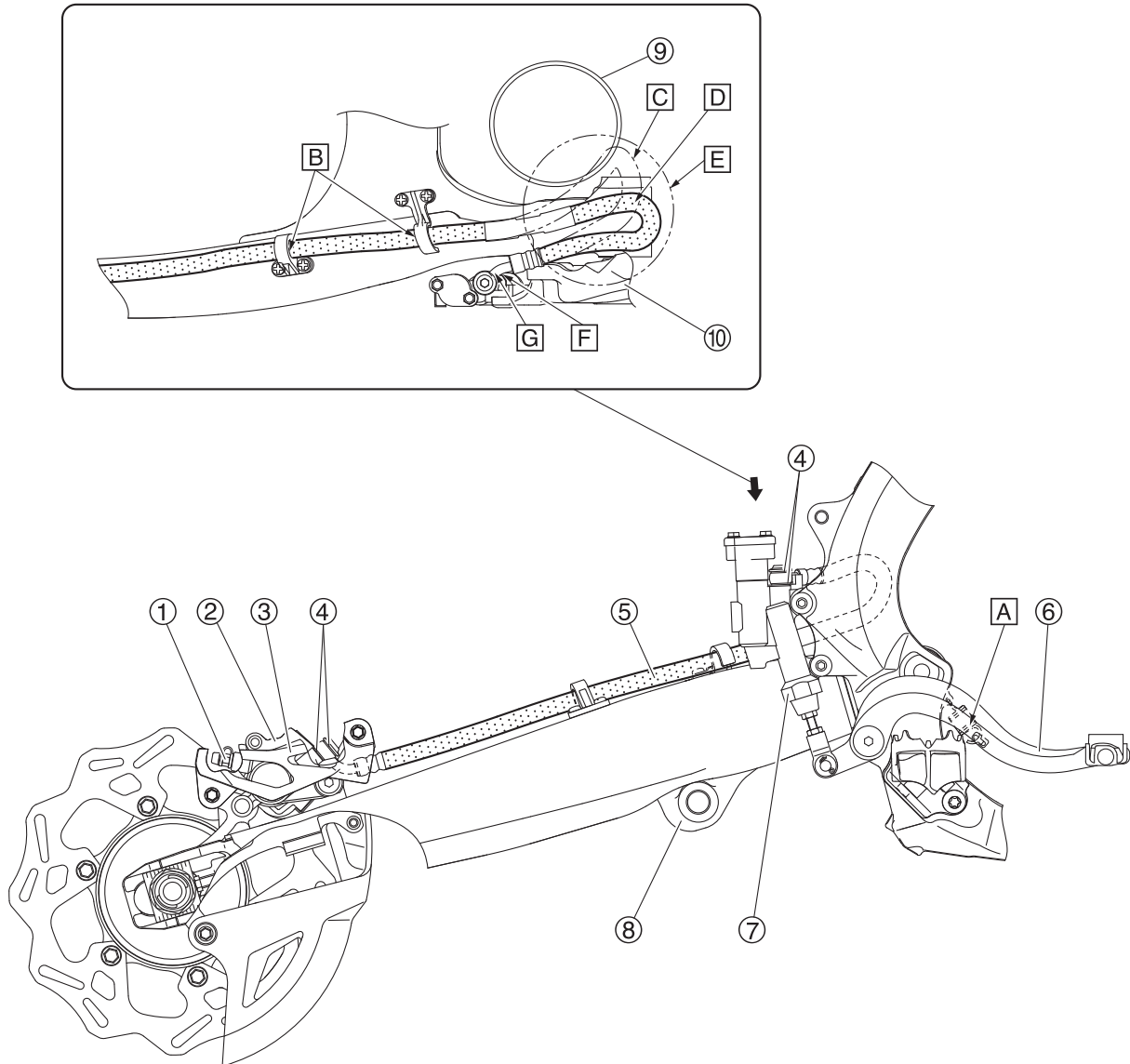




1. Battery positive lead
2. Fuel pump lead
3. Joint coupler
4. Wire harness
5. Main relay (red tape)
6. Radiator fan motor relay
7. Starter relay coupler
8. Starter relay
9. Starter motor lead
10. Resistor
11. Battery negative lead
12. Cross member

- A. Connect the battery positive lead and starter relay terminal.
- B. Install the clamp (wire harness) to the hole of the battery bracket.
- C. After connecting the battery negative coupler, position to the right side of the starter relay.
- D. The position of the starter motor lead and battery negative lead does not matter.
- E. Pass the battery negative lead through lower side of the cross member.
- F. After connecting the battery positive lead in the direction shown in the illustration, put the cover over it.
- G. Pass the battery positive lead through the lower side of the cross member.

# CABLE ROUTING DIAGRAM



1. Bleed screw
  2. Rear brake caliper
  3. Protector
  4. Gasket
  5. Rear brake hose
  6. Brake pedal
  7. Rear brake master cylinder assembly
  8. Swingarm
  9. Spring
  10. Frame
- 
- A. It does not matter whether the spring is installed upward or downward.
  - B. Pass the brake hose into the brake hose holders.
  - C. Route the rear brake hose so that it is not bent as shown by the double-dash line.
  - D. Route the rear brake hose and spring so that they do not interfere with each other.
  - E. Make sure that the rear brake hose is not excessively twisted.
  - F. Make sure that the metal part of the rear brake hose contacts the stopper of the rear brake master cylinder.
  - G. Install the rear brake hose so that the bended portion of the metal part of the rear brake hose faces as shown in the illustration.



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## PERIODIC CHECKS AND ADJUSTMENTS

<b>MAINTENANCE INTERVALS</b> .....	3-1
MAINTENANCE INTERVALS .....	3-1
 <b>PRE-OPERATION INSPECTION AND MAINTENANCE</b> .....	3-5
GENERAL INSPECTION AND MAINTENANCE .....	3-5
 <b>ENGINE</b> .....	3-6
CHECKING THE COOLANT LEVEL .....	3-6
CHECKING THE COOLING SYSTEM .....	3-6
CHANGING THE COOLANT .....	3-6
CHECKING THE RADIATOR CAP .....	3-7
CHECKING THE RADIATOR CAP VALVE OPENING PRESSURE .....	3-7
CHECKING THE COOLANT CIRCULATORY SYSTEM FOR LEAKS .....	3-8
ADJUSTING THE CLUTCH LEVER POSITION .....	3-8
ADJUSTING THE CLUTCH LEVER FREE PLAY .....	3-8
ADJUSTING THE THROTTLE GRIP FREE PLAY .....	3-9
LUBRICATING THE THROTTLE CABLE .....	3-10
CLEANING THE AIR FILTER ELEMENT .....	3-10
CHECKING THE THROTTLE BODY JOINT .....	3-12
CHECKING THE BREATHER HOSES .....	3-12
CHECKING THE EXHAUST SYSTEM .....	3-12
CHECKING THE FUEL LINE .....	3-13
CHECKING THE ENGINE OIL LEVEL .....	3-13
CHANGING THE ENGINE OIL .....	3-14
ADJUSTING THE ENGINE IDLING SPEED .....	3-15
ADJUSTING THE VALVE CLEARANCE .....	3-16
VALVE CLEARANCE SHIM CHART .....	3-19
 <b>CHASSIS</b> .....	3-21
BLEEDING THE BRAKE SYSTEM .....	3-21
CHECKING THE BRAKE HOSES .....	3-22
ADJUSTING THE FRONT BRAKE .....	3-22
ADJUSTING THE REAR BRAKE .....	3-23
CHECKING THE FRONT BRAKE PADS .....	3-23
CHECKING THE REAR BRAKE PADS .....	3-25
CHECKING THE REAR BRAKE PAD INSULATOR .....	3-26
CHECKING THE BRAKE FLUID LEVEL .....	3-26
ADJUSTING THE DRIVE CHAIN SLACK .....	3-27
CHECKING THE FRONT FORK LEGS .....	3-28
CHECKING THE FRONT FORK PROTECTOR GUIDE .....	3-28
CLEANING THE FRONT FORK OIL SEAL AND DUST SEAL .....	3-28
AIR BLEEDING FROM FRONT FORK .....	3-28
ADJUSTING THE FRONT FORK LEGS .....	3-29
CHECKING THE SWINGARM OPERATION .....	3-30
CHECKING THE REAR SUSPENSION .....	3-30
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY .....	3-30
CHECKING THE TIRES .....	3-32
CHECKING AND TIGHTENING THE SPOKES .....	3-32

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CHECKING THE WHEELS .....	3-33
CHECKING THE WHEEL BEARINGS .....	3-33
CHECKING AND ADJUSTING THE STEERING HEAD .....	3-33
LUBRICATING THE LEVERS .....	3-34
LUBRICATING THE PEDAL.....	3-34
LUBRICATING THE DRIVE CHAIN .....	3-34
LUBRICATING THE SIDESTAND .....	3-34
CHECKING THE CHASSIS FASTENERS .....	3-35
 <b>ELECTRICAL SYSTEM</b> .....	 3-36
CHECKING THE SPARK PLUG.....	3-36
CHECKING THE IGNITION TIMING .....	3-36
CHECKING AND CHARGING THE BATTERY .....	3-37

EAM20157

## MAINTENANCE INTERVALS

EAM30369

## MAINTENANCE INTERVALS

ECA25871

### NOTICE

- After a break-in or before each race, always check the points shown in “TORQUE-CHECK POINTS” for tightening torques and retighten them.
- Periodic inspection is essential in making full use of the machine performance. The life of parts varies significantly according to the environment in which the machine runs (e.g., rain, dirt, etc.). Therefore, earlier inspection is required by reference to the list below.

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Valve	Check the valve clearances	√		√			The engine must be cold.
	Inspect				√		Check the valve seats and the valve faces for wear.
	Replace					√	
Valve spring	Inspect				√		Check the free length and the tilt.
	Replace					√	
Valve lifter	Inspect				√		Check for scratches and wear.
	Replace					√	
Camshaft	Inspect				√		<ul style="list-style-type: none"> <li>• Inspect the camshaft surface.</li> <li>• Inspect the decompression system.</li> </ul>
	Replace					√	
Camshaft sprocket	Inspect				√		Check for wear on the teeth and for damage.
	Replace					√	
Piston	Inspect					√	Inspect crack.
	Clean					√	Inspect carbon deposits and eliminate them.
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.
Piston ring	Inspect					√	Check the end gap of the piston ring.
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.
Piston pin	Inspect					√	
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.
Cylinder head	Inspect and clean				√		<ul style="list-style-type: none"> <li>• Check the coolant passages for corrosion.</li> <li>• Inspect carbon deposits and eliminate them.</li> <li>• Check for warpage, and replace the gasket.</li> </ul>
Cylinder	Inspect and clean				√		Inspect score marks.
	Replace					√	Inspect wear.

# MAINTENANCE INTERVALS

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Engine oil	Inspect		√			√	Check the engine oil amount.
	Replace	√		√			
Oil filter element	Replace	√			√		
Oil strainer	Clean				√		
Clutch	Inspect and adjust	√	√				Inspect housing, friction plate, clutch plate and spring.
	Replace					√	
Transmission	Inspect					√	
	Replace bearings					√	
Shift fork, shift cam, guide bar	Inspect					√	Inspect wear.
Nut (rotor)	Retighten	√			√		Check for tightening torques.
Exhaust pipe, silencer, protector	Inspect and retighten	√	√				Check for exhaust leaks, and tightening torques.
	Clean				√		
	Replace fiver			√		√*	* When the exhaust sound becomes louder or when a performance drop is felt.
Crankshaft	Inspect and clean				√	√	
Throttle body	Inspect					√	
Air filter	Clean and lubricate	√	√				Use Yamaha foam air filter oil or other quality foam air filter oil.
	Replace					√	
Spark plug	Inspect and clean	√		√			Check the electrodes and the terminals for wear.
	Replace					√	
Cooling system	Check coolant level and leakage	√	√				
	Check radiator cap operation					√	Use the radiator cap tester for a checkup.
	Check radiator cap attached	√	√				
	Change the coolant					√	Every two years
	Inspect hoses		√				
Engine guard	Replace					√	Breakage
Frame	Clean and inspect	√	√				
Fuel tank, fuel pump	Inspect	√		√			
Fuel hose	Inspect					√	
	Replace					√	Every four years
Front fork legs	Clean	√	√				Dust seal
	Inspect and adjust	√	√				
	Replace oil	√			√		
	Replace oil seal					√	
	Clean and grease oil seals and dust seals	√	√			√	Lithium-soap-based grease



# MAINTENANCE INTERVALS

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Protector guide	Replace					√	
Rear shock absorber	Inspect and adjust	√	√				
	Lubricate			√		√*	Grease pillow balls and bearings. *After rain ride
	Retighten	√	√				Check for tightening torques.
Brakes	Adjust lever position and pedal height	√	√				
	Lubricate pivot point	√	√				
	Check brake disc surface	√	√				
	Check fluid level and leakage	√	√				
	Retighten brake disc bolts, caliper bolts, master cylinder bolts and union bolts	√	√				Check for tightening torques.
	Replace pads					√	
	Replace brake fluid					√	Every one year
Swingarm	Inspect, lube and retighten	√	√				Molybdenum disulfide grease
Relay arm, connecting rod	Inspect, lube and retighten	√	√				Molybdenum disulfide grease
Sidestand	Lubricate					√	Lithium-soap-based grease
Steering head	Inspect free play and retighten	√	√				Check for tightening torques.
	Clean and lube				√		After rain ride
	Replace bearings					√	
Tire, wheels	Inspect air pressure, wheel run-out, tire wear and spoke looseness	√	√				
	Retighten sprocket bolt	√	√				
	Check the bearing			√			
	Replace bearings					√	
	Lubricate			√			Lithium-soap-based grease
Drive chain	Clean, lubricate, slack, alignment	√	√				Use chain oil.
	Replace					√	Use chain oil.
Drive chain guide	Inspect		√				Inspect wear.
Drive chain guide and drive chain support	Replace					√	
Cables	Routing (Connection)	√	√				
	Check and grease	√	√				
	Check and clean throttle cable	√	√				Check throttle cables on the throttle body for dirt and wear.
Levers	Adjust clutch lever free play					√	

# MAINTENANCE INTERVALS

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Brake pedal, foot-rest	Lubricate	√	√				
Outside nuts and bolts	Retighten	√	√				Refer to "TORQUE-CHECK POINTS" on page 1-24.
Battery	Inspect					√	Check terminal for looseness and corrosion.

# PRE-OPERATION INSPECTION AND MAINTENANCE

EAM20134

## PRE-OPERATION INSPECTION AND MAINTENANCE

Before riding for break-in operation, practice or a race, make sure the machine is in good operating condition.

Before using this machine, check the following points.

EAM30209

## GENERAL INSPECTION AND MAINTENANCE

ITEM	Inspect	Page
Coolant	Check that coolant is filled up to the radiator cap. Check the cooling system for leakage.	3-6, 3-6, 3-6, 3-7, 3-7, 3-8
Fuel	Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage.	1-21
Engine oil	Check that the oil level is correct. Check the crankcase and oil line for leakage.	3-13, 3-14
Gear shifter and clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	3-8, 3-8
Throttle grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary.	3-9, 3-10
Brakes	Check the play of front brake and effect of front and rear brake.	3-21, 3-22, 3-22, 3-23, 3-23, 3-25, 3-26, 3-26
Drive chain	Check drive chain slack and alignment. Check that the drive chain is lubricated properly.	3-27, 4-65, 4-65, 4-66, 4-66, 4-66
Wheels	Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.	3-32, 3-32, 3-33, 3-33
Steering	Check that the handlebar can be turned smoothly and have no excessive play.	3-33
Front forks and rear shock absorber	Check that they operate smoothly and there is no oil leak- age.	3-28, 3-28, 3-28, 3-28, 3-29, 3-30, 3-30, 3-30
Cables (wires)	Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the front forks travel up and down.	—
Exhaust pipe	Check that the exhaust pipe is tightly mounted and has no cracks.	3-12
Rear wheel sprocket	Check that the rear wheel sprocket tightening bolt is not loose.	4-10, 4-10, 4-10, 4-10, 4-11, 4-11
Lubrication	Check for smooth operation. Lubricate if necessary.	3-10, 3-34
Bolts and nuts	Check the chassis and engine for loose bolts and nuts.	1-24
Lead connectors	Check that the AC magneto, ECU and ignition coil are connected tightly.	1-8
Settings	Is the machine set suitably for the condition of the racing course and weather or by taking into account the results of test runs before racing? Are inspection and mainte- nance completely done?	10-1, 10-1, 10-1, 10-2, 10-2, 10-3, 10-3, 10-4, 10-4, 10-6, 10-7

### TIP

Perform usual maintenance enough so that, in the race course, a confirmation of that and simple setting adjustments may only be left, in order to get enough time to use effectively.

EAM20135

## ENGINE

EAM30210

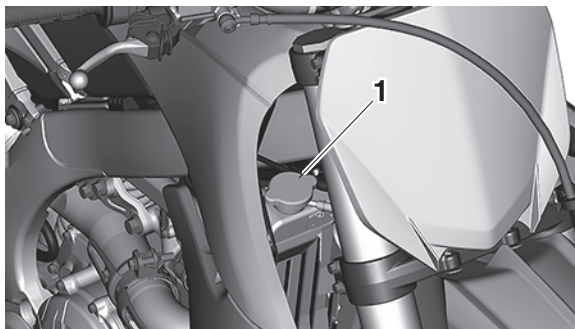
### CHECKING THE COOLANT LEVEL

EWA19070

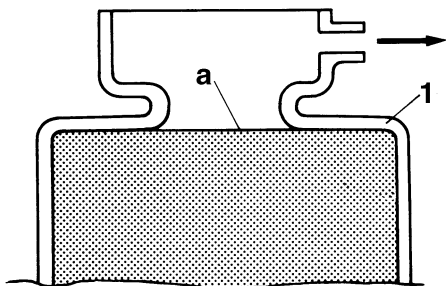
#### **WARNING**

**If coolant seems hot, do not remove the radiator cap.**

1. Stand the vehicle upright on a level surface.
2. Remove:
  - Radiator cap "1"



3. Check:
  - Coolant level
 Maximum level "a" or below → Add coolant up to the maximum level.



1. Radiator

ECA24260

#### **NOTICE**

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

4. Start the engine, warm this up for several minutes, and then stop it.
5. Check:
  - Coolant level

#### **TIP**

Before checking the coolant level, wait a few

minutes until the coolant has settled.

EAM30211

### CHECKING THE COOLING SYSTEM

1. Remove:
  - Seat
  - Side cover (left/right)
  - Air scoop (left/right)
 Refer to "GENERAL CHASSIS" on page 4-1.
  - Air filter case cover
 Refer to "THROTTLE BODY" on page 7-5.
2. Check:
  - Radiator
  - Radiator hose
 Crack/damage → Replace.  
 Refer to "RADIATOR" on page 6-1.
3. Install:
  - Air filter case cover
 Refer to "THROTTLE BODY" on page 7-5.
  - Air scoop (left/right)
  - Seat
  - Side cover (left/right)
 Refer to "GENERAL CHASSIS" on page 4-1.

EAM30212

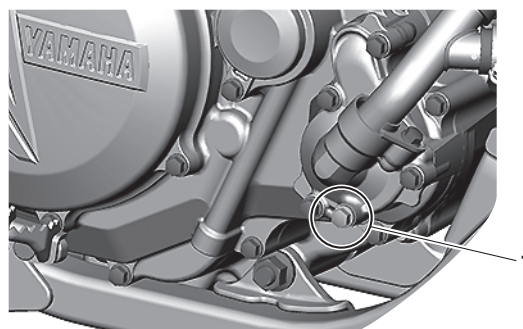
### CHANGING THE COOLANT

EWA19080

#### **WARNING**

**If coolant seems hot, do not remove the radiator cap.**

1. Place a container under the engine.
2. Remove:
  - Coolant drain bolt "1"



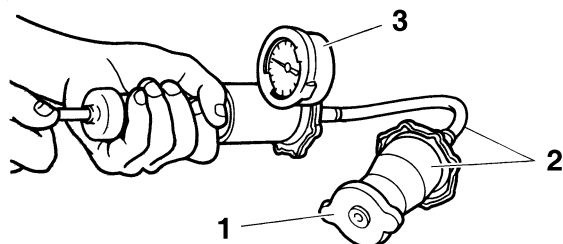
3. Remove:
  - Radiator cap
 Slowly loosen the radiator cap to drain coolant.

#### **TIP**

When the radiator cap is loosened, coolant will gush out transversely; therefore, bring the container near to the outlet.

4. Thoroughly flush the cooling system with clean tap water.





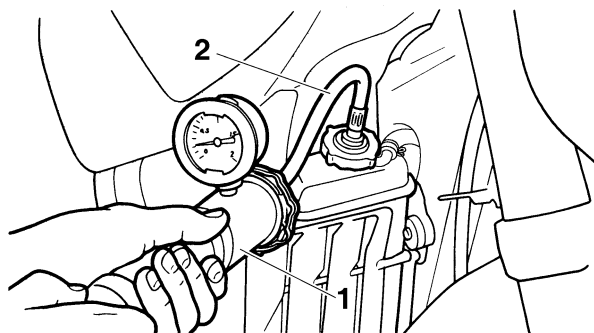
EAM30215

## CHECKING THE COOLANT CIRCULATORY SYSTEM FOR LEAKS

1. Check:
  - Coolant level
2. Install:
  - Radiator cap tester "1"
  - Radiator cap tester adapter "2"



**Radiator cap tester**  
**90890-01325**  
**Mityvac cooling system tester kit**  
**YU-24460-A**  
**Radiator cap tester adapter**  
**90890-01352**  
**Pressure tester adapter**  
**YU-33984**



3. Activate the tester to apply the test pressure.



**Test pressure value**  
**196 kPa (1.96 kg/cm<sup>2</sup>, 27.9 psi)**

ECA24270

### NOTICE

- Do not apply such a high pressure as exceeds the test pressure.
- Make sure that a checkup after the cylinder head gasket is replaced is made after 3 minutes of warm-up.
- Make sure that coolant is filled up to the upper level beforehand.

4. Check:

- Pressure value  
 No stay for 5 to 10 seconds at the test pressure value → Correct.
- Radiator
- Radiator hose connections  
 Coolant leaks → Correct or replace.
- Radiator hoses  
 Bulges → Replace.

EWA19090

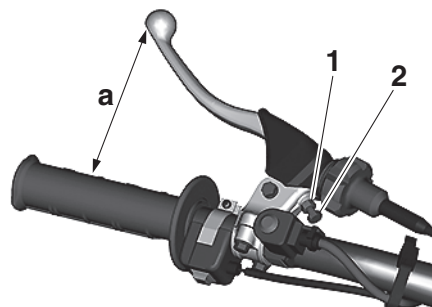
### WARNING

When the radiator cap tester is removed, coolant will spout; therefore, cover it with a cloth beforehand.

EAM30370

## ADJUSTING THE CLUTCH LEVER POSITION

1. Adjust:
  - Clutch lever position "a"  
 Loosen the locknut "1" and use the adjuster "2" to adjust the clutch lever position "a" as desired.



2. Tighten:
  - Locknut



**Locknut (clutch lever position)**  
**4.8 N·m (0.48 kgf·m, 3.5 lb·ft)**

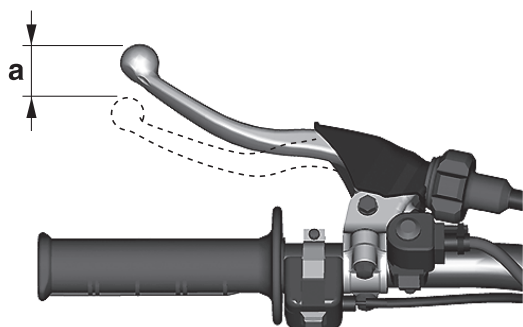
EAM30216

## ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Check:
  - Clutch lever free play "a"  
 Out of specification → Regulate.



**Clutch lever free play**  
**7.0–12.0 mm (0.28–0.47 in)**



2. Adjust:
- Clutch lever free play

## Handlebar side

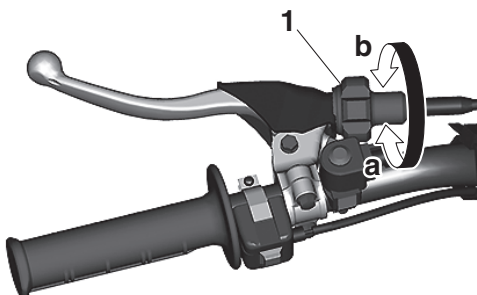
- a. Turn the adjuster "1" in direction "a" or "b" until the specified clutch lever free play is obtained.

### Direction "a"

Clutch lever free play is increased.

### Direction "b"

Clutch lever free play is decreased.



### TIP

If the clutch lever free play cannot be obtained on the handlebar side, use the adjuster on the clutch cable side.

## Clutch cable side

- a. Slide the clutch cable cover.  
b. Loosen the locknut "1".  
c. Turn the adjuster "2" in direction "a" or "b" until the specified clutch lever free play is obtained.

### Direction "a"

Clutch lever free play is increased.

### Direction "b"

Clutch lever free play is decreased.

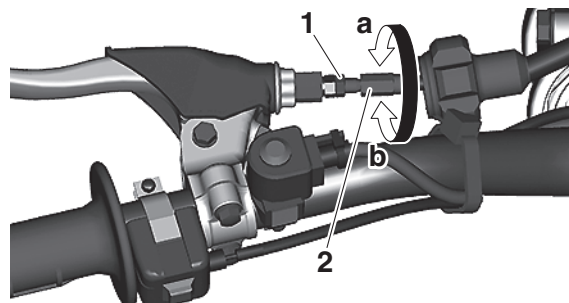
- d. Tighten the locknut "1".



### Clutch cable locknut

4.3 N·m (0.43 kgf·m, 3.2 lb·ft)

- e. Return the clutch cable cover to its original position.



EAM30217

## ADJUSTING THE THROTTLE GRIP FREE PLAY

### TIP

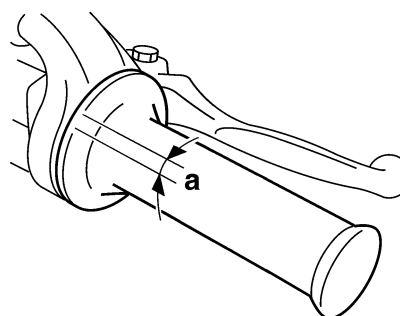
Prior to adjusting throttle grip free play, the engine idling speed should be adjusted.

1. Check:
- Throttle grip free play "a"
- Out of specification → Regulate.



### Throttle grip free play

3.0–6.0 mm (0.12–0.24 in)



2. Adjust:
- Throttle grip free play

- a. Loosen the locknut "1".  
b. Turn the adjuster "2" in direction "a" or "b" until the specified throttle grip free play is obtained.

### Direction "a"

Throttle grip free play is increased.

### Direction "b"

Throttle grip free play is decreased.

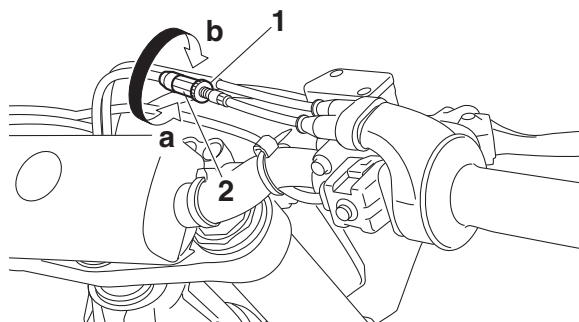
c. Tighten the locknut.

EWA18470



**WARNING**

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

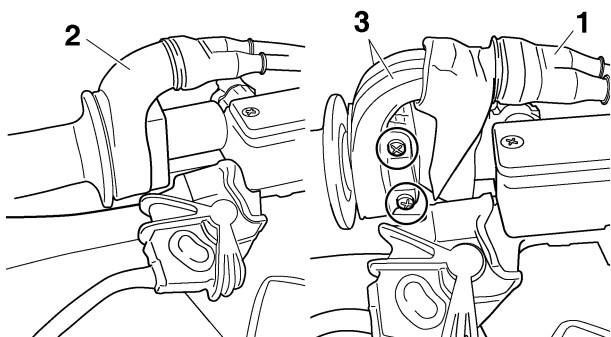


EAM30218

## LUBRICATING THE THROTTLE CABLE

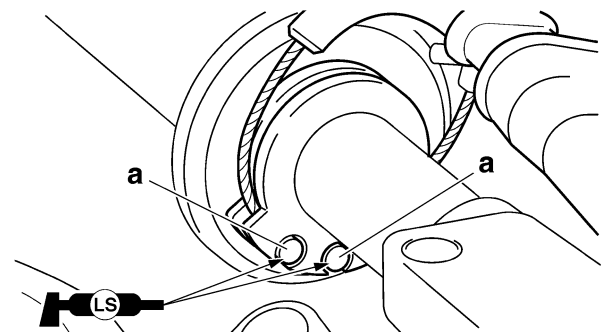
1. Remove:

- Cover (throttle cable cap) "1"
- Cover (grip cap) "2"
- Throttle grip cap "3"



2. Lubricate:

- Throttle cable end "a"



3. Install:

- Throttle grip cap
- Screw (throttle grip cap)



**Screw (throttle grip cap)**  
**3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

4. Install:

- Cover (grip cap)
- Cover (throttle cable cap)

EWA19100



**WARNING**

Check that the throttle grip moves smoothly. If this does not move smoothly, correct the installed positions.

EAM30219

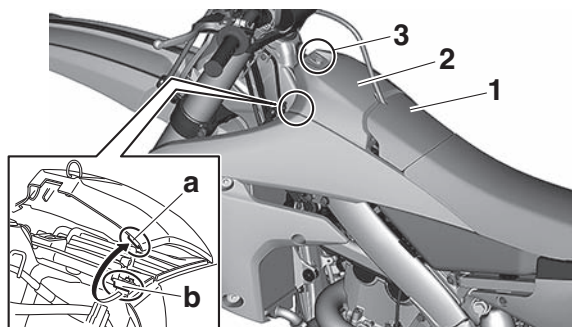
## CLEANING THE AIR FILTER ELEMENT

1. Remove:

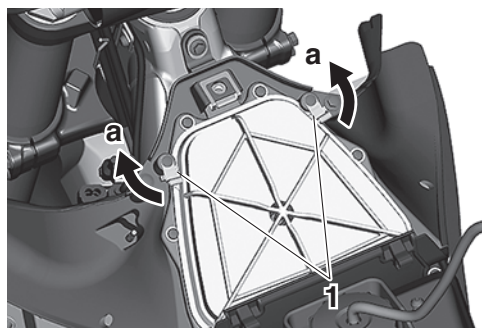
- Fuel tank cap cover "1"
- Refer to "FUEL TANK CAP" on page 1-20.
- Air filter case cover "2"

**TIP**

- Loosen the quick fastener screw "3" and remove the air filter case cover.
- Remove the two ribs "a" located on the left and right sides of the projections "b" on the air scoop, and slide the air filter case cover toward the front of the vehicle to remove it.



2. Turn the plates "1" in direction "a".

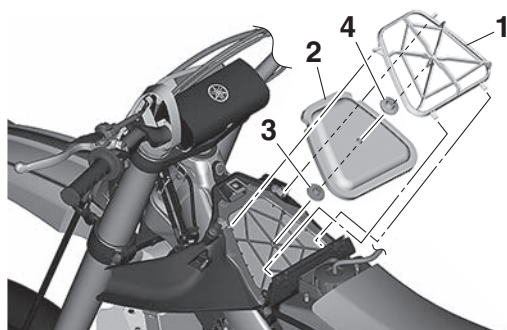


3. Remove:

- Air filter guide "1"
- Air filter element "2" (from the air filter guide)



- Guide “3” (from the air filter element)
- Seal “4” (from the air filter element)



## 4. Wash:

- Air filter element

EWA19110

### **WARNING**

**Do not use gasoline or organic (acid/alkaline) volatile oil for washing.**

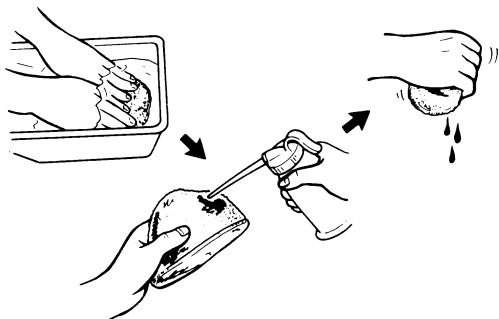
### **TIP**

After washing the element with air filter cleaner or kerosene, squeeze and dry it completely.

ECA24280

### **NOTICE**

**Do not twist the element when squeezing the element.**



## 5. Check:

- Air filter element
- Damage → Replace.

## 6. Apply:

Yamaha foam air filter oil or other quality foam air filter oil.



**Oil application quantify**  
**30 cm<sup>3</sup>**

### **TIP**

Squeeze out the excess oil. Element should be wet but not dripping.

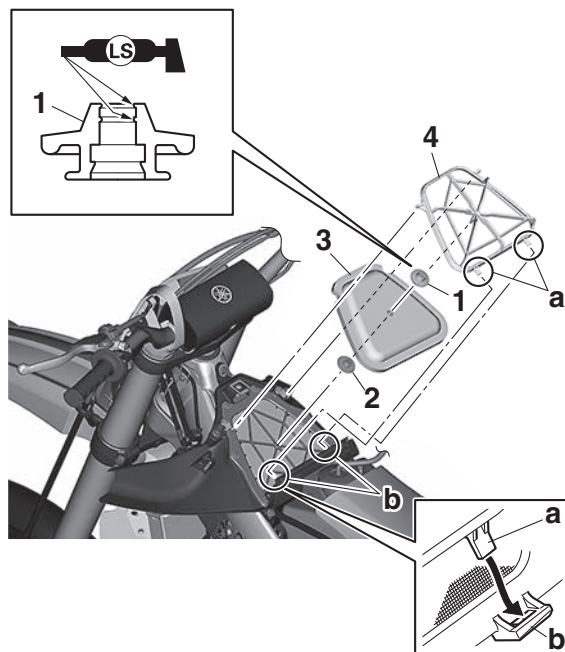
## 7. Install:

- Seal “1” (to the air filter element)
- Guide “2” (to the air filter element)

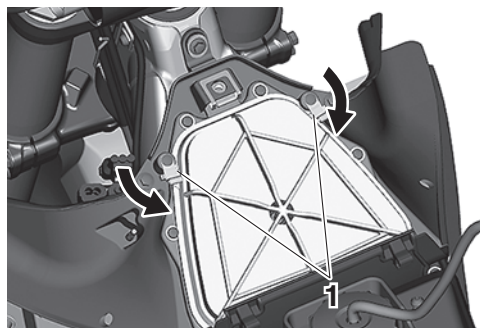
- Air filter element “3” (to the air filter guide)
- Air filter guide “4”

### **TIP**

- Apply lithium soap-based grease on the entire seal lips when installing the air filter guide.
- Make sure that the two projections “a” at the rear side of the vehicle on the air filter guide are securely fitted into the two slots “b” in the air filter case.
- Check that the air filter element is turned up between the air filter guide and air filter case and that there is no gap.  
Gap → Reinstall.



## 8. Turn the plates “1” to the original position.



## 9. Install:

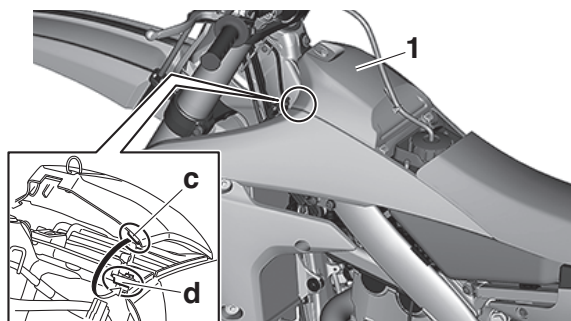
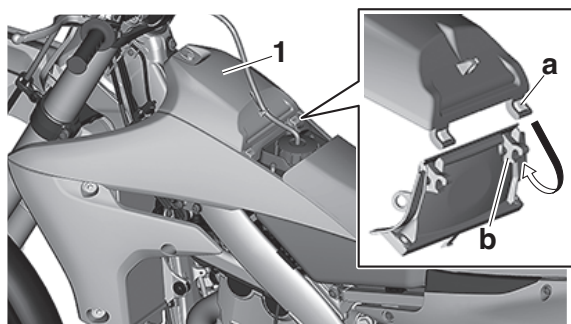
- Air filter case cover “1”
- Fuel tank breather hose (to the air filter case cover)

### **TIP**

- Make sure that the two slots “a” at the rear side of the vehicle in the air filter case cover are securely fitted into the two edges “b” on the air fil-

ter case.

- Be sure to carefully align the two ribs “c” located on the left and right sides of the air filter case cover with the projections “d” on the air scoop, and then install the air filter case cover.



10. Install:
- Fuel tank cap cover

EAM30335

## CHECKING THE THROTTLE BODY JOINT

1. Check:
- Throttle body joint  
Refer to “CHECKING THE THROTTLE BODY JOINT” on page 7-8.

EAM30220

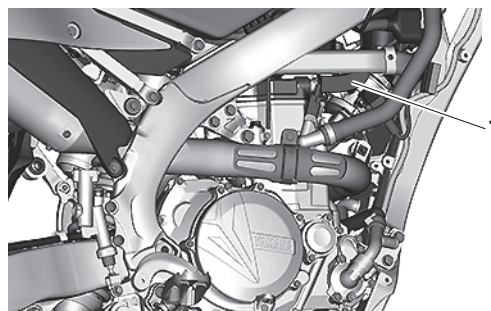
## CHECKING THE BREATHER HOSES

1. Check:
- Breather hose “1”  
Crack/damage → Replace.  
Loose connection → Connect properly.

ECA14920

### NOTICE

**Make sure the cylinder head breather hose is routed correctly.**



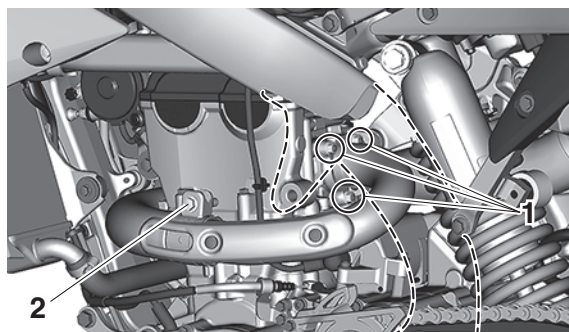
EAM30221

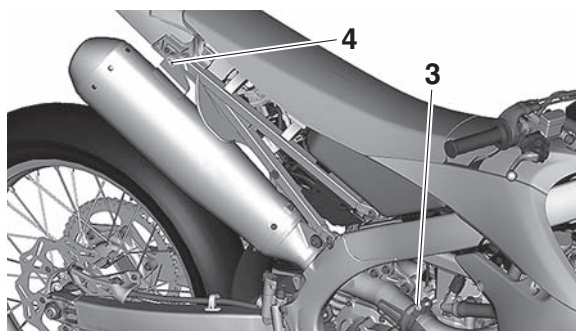
## CHECKING THE EXHAUST SYSTEM

1. Remove:
- Exhaust pipe protector
2. Check:
- Exhaust pipe 1
  - Exhaust pipe 2
  - Silencer  
Crack/damage → Replace.  
Refer to “ENGINE REMOVAL” on page 5-1.
  - Exhaust gas  
Leaks → Replace the gasket.  
Refer to “ENGINE REMOVAL” on page 5-1.
3. Check:
- Tightening torques



**Exhaust pipe nut “1”**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
**Exhaust pipe clamp bolt “2”**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
**Exhaust pipe bolt “3”**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
**Silencer bolt (rear) “4”**  
30 N·m (3.0 kgf·m, 22 lb·ft)





## 4. Install:

- Exhaust pipe protector



**Exhaust pipe protector screw**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**  
**LOCTITE®**

EAM30222

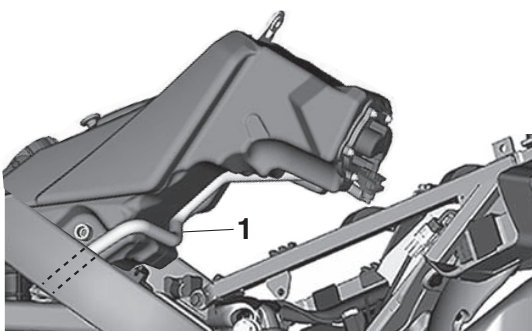
## CHECKING THE FUEL LINE

### 1. Remove:

- Seat
- Side cover (left/right)
- Air scoop (left/right)  
Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank  
Refer to "FUEL TANK" on page 7-1.

### 2. Check:

- Fuel hose "1"  
Crack/damage → Replace.  
Loose connection → Connect properly.



### 3. Install:

- Fuel tank  
Refer to "FUEL TANK" on page 7-1.
- Air scoop (left/right)
- Seat
- Side cover (left/right)  
Refer to "GENERAL CHASSIS" on page 4-1.

EAM30224

## CHECKING THE ENGINE OIL LEVEL

- Stand the vehicle upright on a level surface.
- Start the engine, warm this up for 2–3 minutes, and then stop the engine and wait about

1 minute.

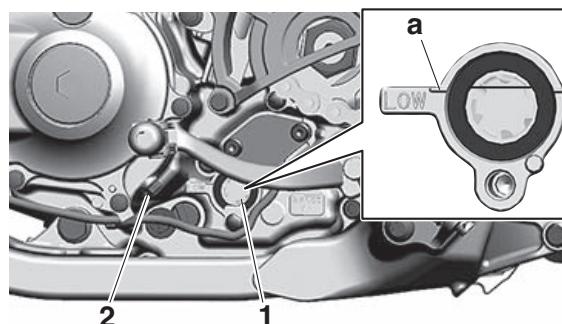
### 3. Check:

- Oil level

Make sure that the engine oil level is above the minimum level mark "a" shown for the oil level check window "1", and that the engine oil does not come out by removing the oil check bolt "2".

The minimum level mark "a" or below → Add the engine oil until its level exceeds the minimum level mark "a".

Engine oil coming out of the oil check bolt → Drain it until its last drop is out.



ECA24290

## NOTICE

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



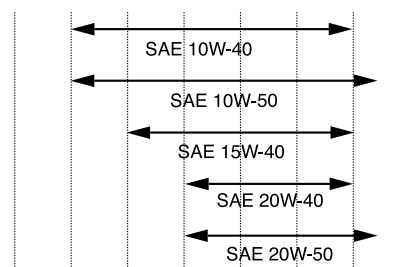
**Recommended brand**  
**YAMALUBE**

**SAE viscosity grades**

**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**

-20 -10 0 10 20 30 40 50 °C





EAM30225

## CHANGING THE ENGINE OIL

Stand the vehicle upright on a level surface.

1. Start the engine, warm this up for several minutes, and then stop the engine and wait about 5 minutes.

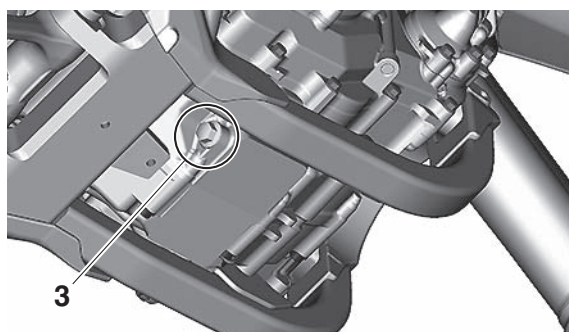
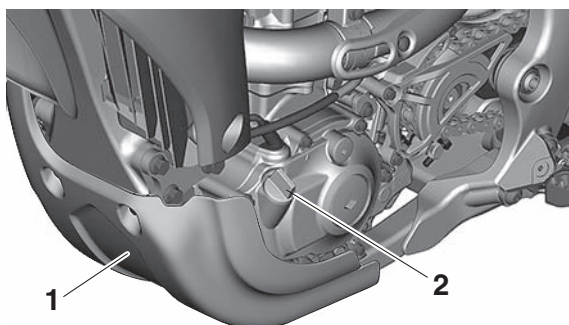
### TIP

This model is equipped with an engine auto-stop system. The engine stops automatically if left idling for 7 minutes. If the engine stops, push the start switch or push the start switch to restart the engine.

2. Place an oil pan under the drain bolt.

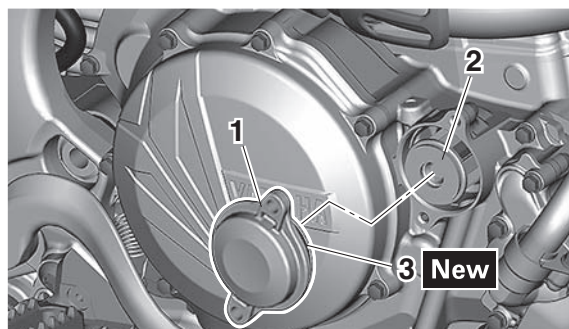
3. Remove:

- Engine guard "1"
- Oil filler cap "2"
- Drain bolt (with gasket) "3"



4. If the oil filter element is also to be replaced, perform the following procedure.

- a. Remove the oil filter element cover "1" and oil filter element "2".
- b. Replace the new O-ring "3".



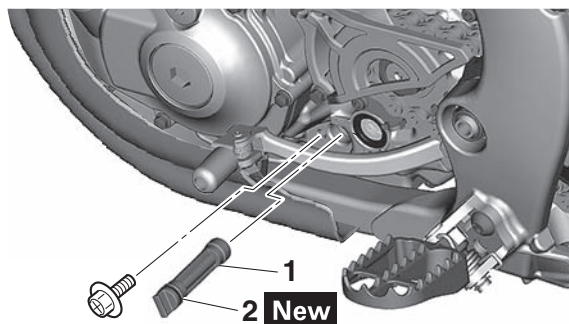
- c. Install the new oil filter element and the oil filter element cover.



**Oil filter element cover bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

5. To check the oil strainer, perform the following procedure.

- a. Remove the oil strainer "1".
- b. Check the oil strainer.  
Damage → Replace.  
Clogging due to dirt → Wash with kerosene.
- c. Replace the new O-ring "2".



- d. Install the oil strainer.



**Oil strainer bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

6. Install:

- Gasket **New**
- Drain bolt



**Drain bolt**  
20 N·m (2.0 kgf·m, 15 lb·ft)

7. Pour the specified amount of engine oil into the oil filler cap hole.



## Engine oil quantity

### Oil change

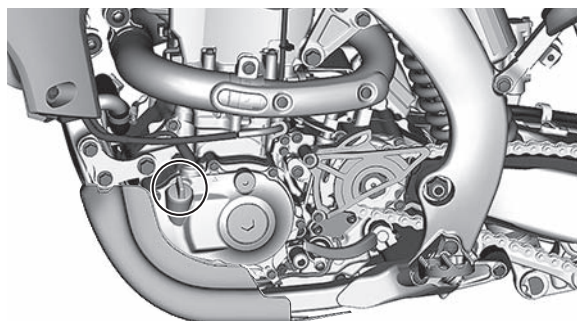
0.62 L (0.66 US qt, 0.55 Imp.qt)

### With oil filter removal

0.64 L (0.68 US qt, 0.56 Imp.qt)

### Quantity (disassembled)

0.90 L (0.95 US qt, 0.79 Imp.qt)



### 8. Install:

- Oil filler cap

### 9. Check:

- Oil level

Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-13.

### 10. Check:

- Engine oil pressure

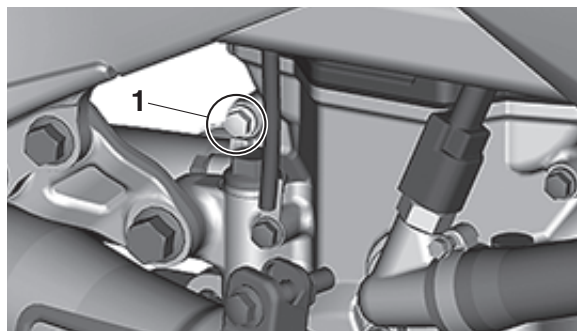
- Slightly loosen the oil pressure check bolt "1".

EWA19120



## WARNING

When the engine is started with the check bolt removed, oil will spout; therefore, always loosen it before the checkup.



- Start the engine and keep it idling until oil starts to seep from the oil pressure check bolt.

EWA19130



## WARNING

Always keep the engine idling speed during the checkup without increasing the engine speed.

ECA25840

## NOTICE

If no engine oil seeps out after one minute, immediately turn the engine off so it will not seize.

- If no engine oil seeps out, check the engine oil for leaks, and the engine oil passage and the oil pump for damage.
- Check the oil pressure again.
- Tighten the oil pressure check bolt.



## Oil pressure check bolt

10 N·m (1.0 kgf·m, 7.4 lb·ft)

EAM30336

## ADJUSTING THE ENGINE IDLING SPEED

### TIP

- Because the air pressure is lower at high altitudes, the air-fuel mixture will become richer. If the idling speed is low, turn the idle screw clockwise to increase the speed before the adjustment.
- Before adjusting the engine idling speed, make sure that the air filter element is not clogged, the engine compression is proper, and the throttle grip free play is proper.
- Adjust the engine idling speed with the starter knob pulled in completely.

- Start the engine, and warm this up until the oil has reached the specified temperature.
- Measure the coolant temperature using the Yamaha diagnostic tool.



## Yamaha diagnostic tool USB (US)

90890-03257

## Yamaha diagnostic tool (A/I)

90890-03262

## FI diagnostic tool sub-lead

90890-03212

## FI diagnostic tool sub-lead

YU-03212

## OBD/ GST Leadwire kit

90890-03249



## Coolant temperature

70–90 °C (158–194 °F)

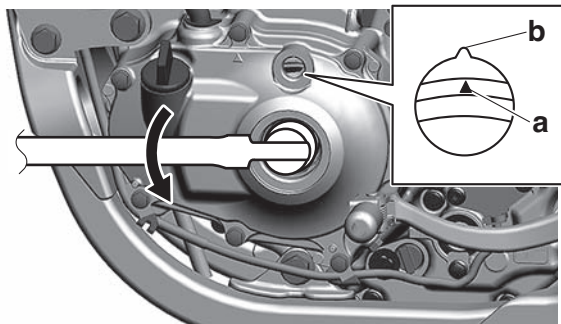
### 3. Install:

- Digital tachometer



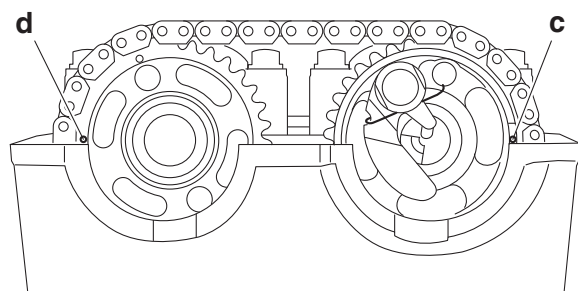


- b. Align the top dead center (TDC) mark “a” on the rotor with the alignment mark “b” on the crankcase cover.



## TIP

Check that the alignment mark “c” on the camshaft sprocket and the alignment mark “d” on the intake camshaft sprocket are aligned with the edge of the cylinder head.



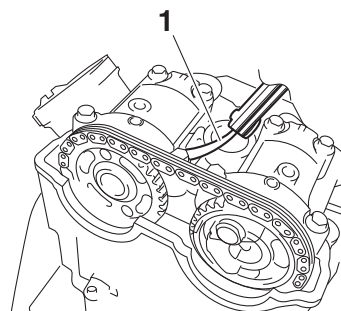
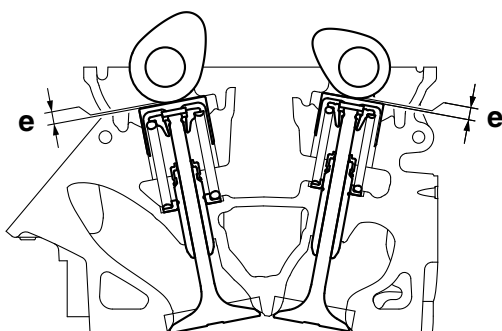
- c. Measure the valve clearance “e” using a thickness gauge “1”.



**Thickness gauge**  
90890-03268  
**Feeler gauge set**  
YU-26900-9

## TIP

Record the measured reading if the clearance is incorrect.



## 5. Adjust:

- Valve clearance

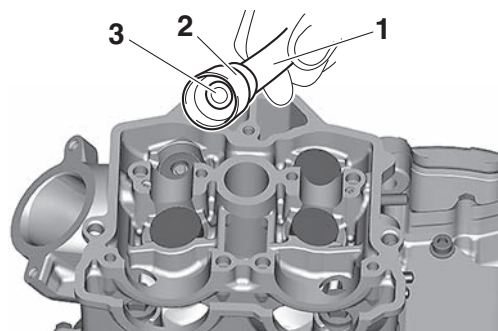
- a. Remove the camshaft (intake and exhaust). Refer to “CAMSHAFT” on page 5-11.  
b. Remove the valve lifter “2” and the adjusting pad “3” with a valve lapper “1”.

## TIP

- Place a cloth in the timing chain space to prevent adjusting pads from falling into the crankcase.
- Identify each valve lifter and adjusting pad position very carefully so that they can be reinstalled in their original place.



**Valve lapper (ø14)**  
90890-04101  
**Valve lapping tool (14mm)**  
YM-A8998

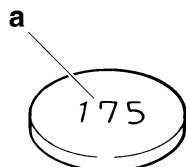


EX		
IN		

- c. Check the number on the originally installed adjusting pad.

## TIP

- The adjusting pad number “a” is indicated on the top of the adjusting pad.
- For the number on the originally installed adjusting pad, convert the last digit of adjusting pad number as per the below table.



- d. Select an adjusting pad with a proper valve clearance from the adjusting pad selection table.

## TIP

- There are 25 types of adjusting pads, ranging from 1.20 mm (0.0472 in) to 2.40 mm (0.0945 in), in increments of 0.05 mm (0.0020 in).
- The field where the number on the originally installed adjusting pad and the measured valve clearance intersect shows the adjusting pad number to replace.

Last digit of pad number	Rounded valve
0, 1 or 2	0
4, 5 or 6	5
8 or 9	10

Example:

Pad number = 148

Rounded value = 150

- e. Install the new adjusting pads “4” and the valve lifters “5”.

ECA24310

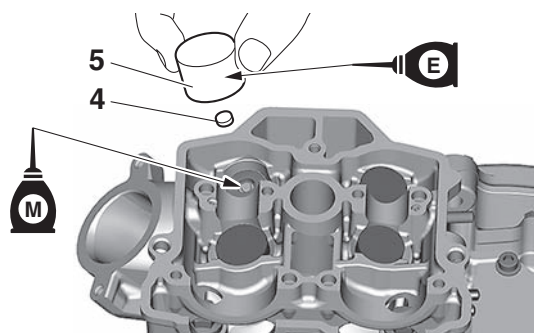
## NOTICE

**Do not twist adjusting pads and valve lifters forcibly during installation.**

## TIP

- Apply the engine oil on the valve lifters.
- Apply molybdenum disulfide oil to the valve stem ends.
- Check that the valve lifters turn smoothly when rotated with your finger.

- Make sure that valve lifters and adjusting pads are installed in place.
- Make sure that adjusting pads are installed with their numbers facing upward.



- f. Install the camshafts (exhaust and intake). Refer to “CAMSHAFT” on page 5-11.
- g. Measure the valve clearance again.
- h. If the valve clearance is out of specification, repeat adjusting the valve clearance until it is within specification.





EAM30383

# **VALVE CLEARANCE SHIM CHART** **INTAKE**

A	B																									
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.00 – 0.01				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.02 – 0.06			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.07 – 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.11 – 0.16	C																									
0.17 – 0.24	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.25 – 0.29	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.30 – 0.34	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.35 – 0.39	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.40 – 0.44	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.45 – 0.49	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.50 – 0.54	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.55 – 0.59	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.60 – 0.64	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.65 – 0.69	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.70 – 0.74	175	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.75 – 0.79	180	185	190	195	200	205	210	215	220	225	230	235	240													
0.80 – 0.84	185	190	195	200	205	210	215	220	225	230	235	240														
0.85 – 0.89	190	195	200	205	210	215	220	225	230	235	240															
0.90 – 0.94	195	200	205	210	215	220	225	230	235	240																
0.95 – 0.99	200	205	210	215	220	225	230	235	240																	
1.00 – 1.04	205	210	215	220	225	230	235	240																		
1.05 – 1.09	210	215	220	225	230	235	240																			
1.10 – 1.14	215	220	225	230	235	240																				
1.15 – 1.19	220	225	230	235	240																					
1.20 – 1.24	225	230	235	240																						
1.25 – 1.29	230	235	240																							
1.30 – 1.34	235	240																								
1.35 – 1.39	240																									

A. Measured clearance

C. Standard clearance

B. Installed pad number

Example:

Valve clearance (cold) 0.10–0.17 mm (0.0039–0.0067 in)

Installed is 175.

Measured clearance 0.25 mm (0.0098 in)

Replace 175 pad with 185 pad.

Pad No. 175 = 1.75 mm (0.0689 in)

Pad No. 185 = 1.85 mm (0.0728 in)

## EXHAUST

A	B																												
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.00 – 0.01					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.02 – 0.06				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.07 – 0.11			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.12 – 0.15		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.16 – 0.21	C																												
0.22 – 0.29	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.30 – 0.34	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.35 – 0.39	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.40 – 0.44	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.45 – 0.49	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.50 – 0.54	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.55 – 0.59	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.60 – 0.64	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.65 – 0.69	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240													
0.70 – 0.74	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240														
0.75 – 0.79	175	180	185	190	195	200	205	210	215	220	225	230	235	240															
0.80 – 0.84	180	185	190	195	200	205	210	215	220	225	230	235	240																
0.85 – 0.89	185	190	195	200	205	210	215	220	225	230	235	240																	
0.90 – 0.94	190	195	200	205	210	215	220	225	230	235	240																		
0.95 – 0.99	195	200	205	210	215	220	225	230	235	240																			
1.00 – 1.04	200	205	210	215	220	225	230	235	240																				
1.05 – 1.09	205	210	215	220	225	230	235	240																					
1.10 – 1.14	210	215	220	225	230	235	240																						
1.15 – 1.19	215	220	225	230	235	240																							
1.20 – 1.24	220	225	230	235	240																								
1.25 – 1.29	225	230	235	240																									
1.30 – 1.34	230	235	240																										
1.35 – 1.39	235	240																											
1.40 – 1.44	240																												

A. Measured clearance

C. Standard clearance

B. Installed pad number

Example:

Valve clearance (cold) 0.15–0.22 mm (0.0059–0.0087 in)

Installed is 175.

Measured clearance 0.30 mm (0.0118 in)

Replace 175 pad with 185 pad.

Pad No. 175 = 1.75 mm (0.0689 in)

Pad No. 185 = 1.85 mm (0.0728 in)

EAM20136

**CHASSIS**

EAM30227

**BLEEDING THE BRAKE SYSTEM**

EWA19140

**WARNING****Bleed the 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.

**1. Remove:**

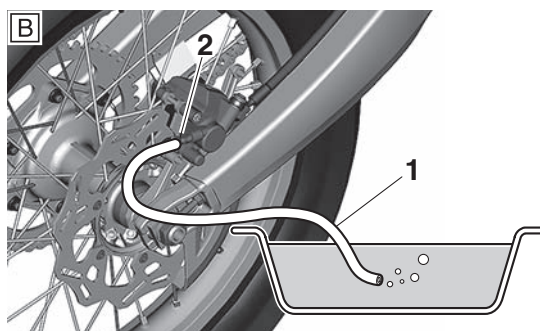
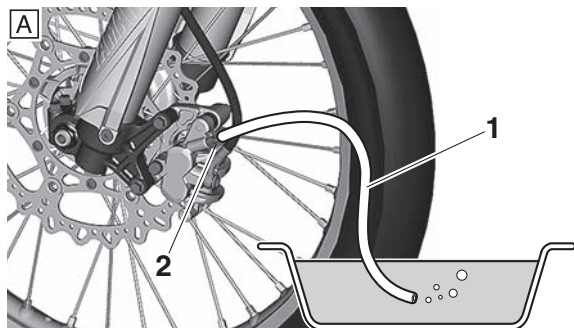
- Brake master cylinder cap
- Reservoir diaphragm
- Reservoir float (front brake)
- Protector (rear brake)

**TIP**

- Be careful not to spill any brake fluid or allow the reservoir to overflow.
- Make sure that there is enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the 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.

**2. Bleed the brake system.**

- Fill the reservoir to the proper level with the recommended brake fluid.
- Install the reservoir diaphragm.
- Connect the plastic hose "1" to the bleed screw "2" securely, and place a container under the end of the plastic hose.



A. Front

B. Rear

- Slowly apply the brake several times.
- Fully pull the brake lever or fully press down the brake pedal and hold it in position.
- Loosen the bleed screw.

**TIP**

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

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

**TIP**

During the procedure, keep adding brake fluid to the reservoir.

ECA24320

**NOTICE**

- Wipe off any brake fluid on the brake discs, tires, wheels, etc.
- Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

- Tighten the bleed screw.



**Bleed screw**  
6 N·m (0.6 kgf·m, 4.4 lb·ft)

- Pour brake fluid to the reservoir up to the specified level.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-26.

EWA13110

**WARNING**

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

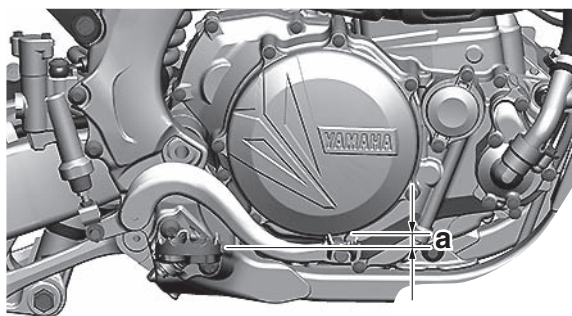
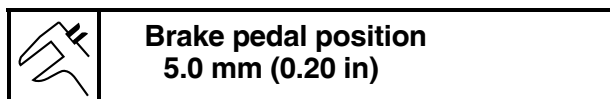


4. Install:
  - Brake lever cover

EAM30230

## ADJUSTING THE REAR BRAKE

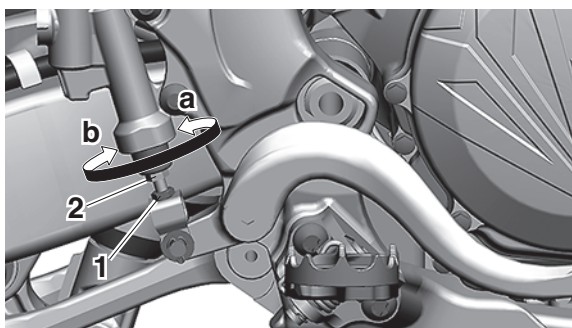
1. Check:
  - Brake pedal position “a”  
(distance from the top of the rider footrest to the top of the brake pedal)  
Out of specification → Regulate.



2. Adjust:
  - Brake pedal position

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

**Direction “a”**  
Brake pedal is raised.  
**Direction “b”**  
Brake pedal is lowered.



- c. Tighten the locknut.



EWA19150

**WARNING**

A soft or spongy feeling in the brake pedal

can indicate the presence of air in the brake system. Before running, bleed the brake system. Air in the brake system will cause braking performance to be reduced.

ECA13510

## NOTICE

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



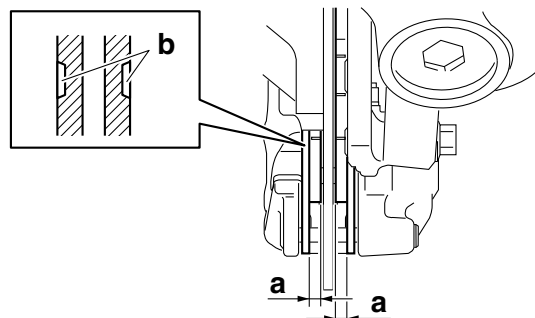
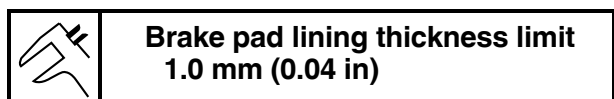
EAM30231

## CHECKING THE FRONT BRAKE PADS

1. Measure:
  - Brake pad thickness “a”  
Out of specification → Replace as a set.

## TIP

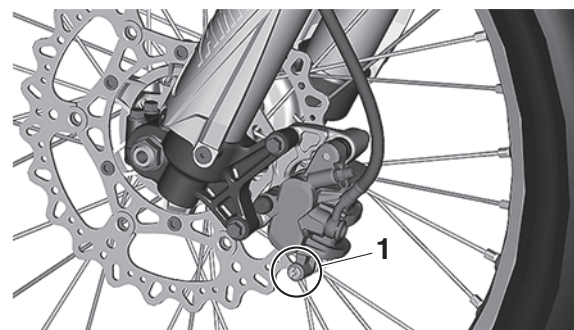
The pads worn up to the indicator “b” grooves mean that the brake pad thickness limit is reached.



2. Replace:
  - Brake pad

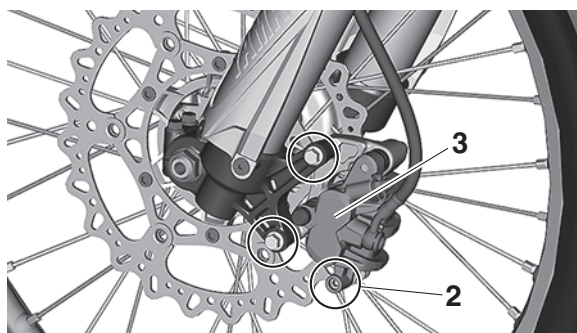


- a. Remove the pad pin plug “1”.

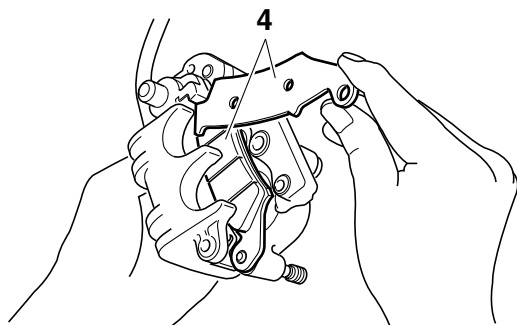


- b. Loosen the pad pin “2”.
- c. Remove the brake caliper “3” from the front fork.

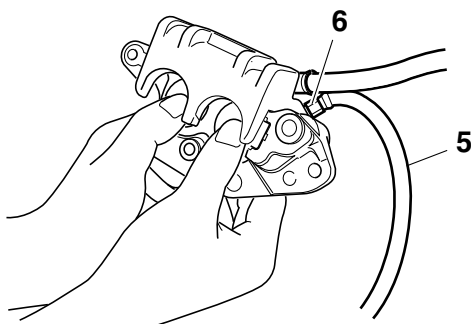




d. Remove the pad pin and brake pads “4”.



e. Connect the plastic hose “5” to the bleed screw “6” and place a container under the end of the plastic hose.



f. Loosen the bleed screw and push the brake caliper piston in.

EWA19160



**WARNING**

**Do not reuse the drained brake fluid.**

g. Tighten the bleed screw.

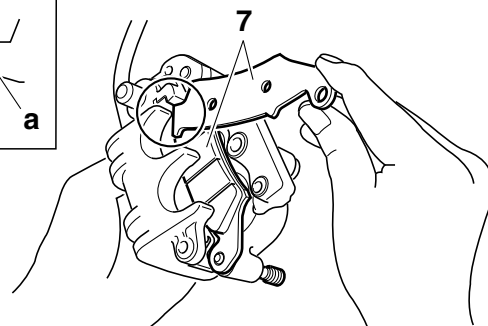
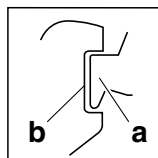


**Bleed screw**  
**6 N·m (0.6 kgf·m, 4.4 lb-ft)**

h. Install the brake pads “7” and the pad pin.

**TIP**

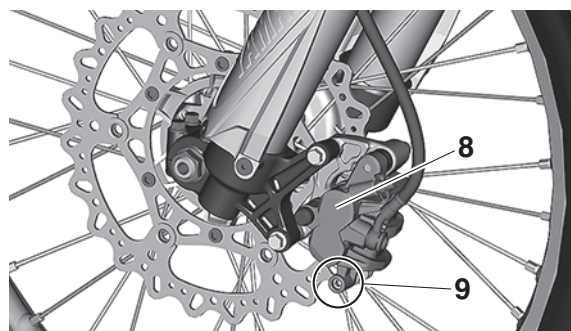
- Install the brake pads with their projections “a” into the brake caliper recesses “b”.
- Temporarily tighten the pad pin at this point.



i. Install the brake caliper “8” and tighten the pad pin “9”.



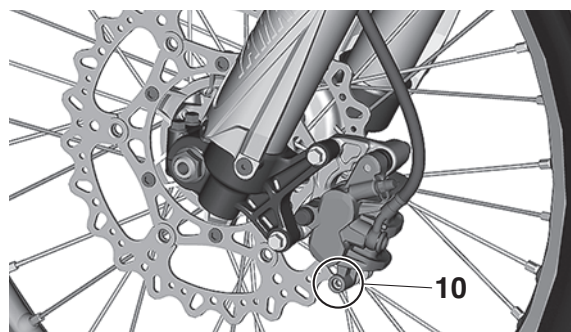
**Bolt (brake caliper)**  
**28 N·m (2.8 kgf·m, 21 lb-ft)**  
**Pad pin**  
**17 N·m (1.7 kgf·m, 13 lb-ft)**



j. Install the pad pin plug “10”.



**Pad pin plug**  
**2.5 N·m (0.25 kgf·m, 1.8 lb-ft)**



3. Check:

- Brake fluid level  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.

4. Check:

- Brake lever operation  
A softy or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE BRAKE SYSTEM”

on page 3-21.

EAM30232

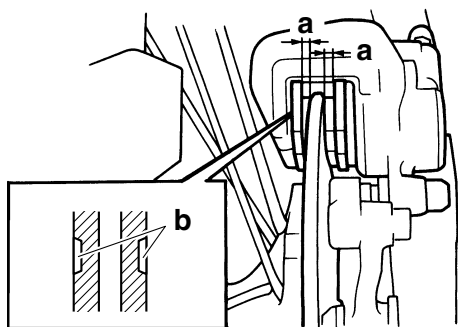
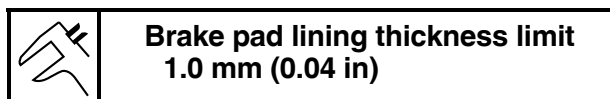
## CHECKING THE REAR BRAKE PADS

### 1. Measure:

- Brake pad thickness “a”
- Out of specification → Replace as a set.

### TIP

The pads worn up to the indicator “b” grooves mean that the brake pad thickness limit is reached.

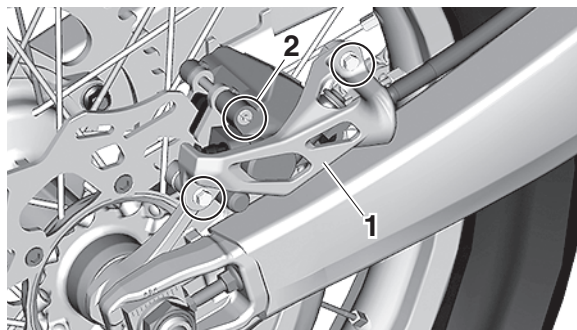


### 2. Replace:

- Brake pad



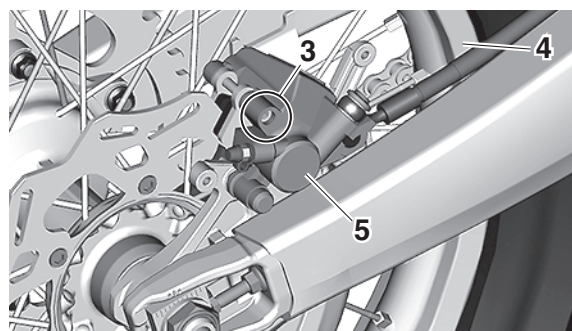
### a. Remove the protector “1” and the pad pin plug “2”.



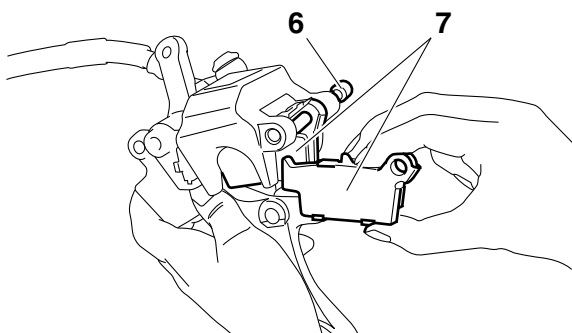
### b. Loosen the pad pin “3”.

### c. Remove the rear wheel “4” and the brake caliper “5”.

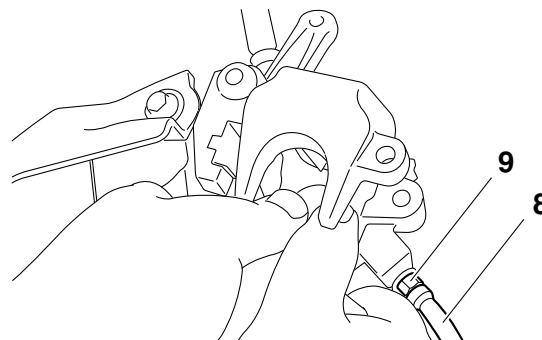
Refer to “REAR WHEEL” on page 4-9.



### d. Remove the pad pin “6” and the brake pads “7”.



### e. Connect the plastic hose “8” to the bleed screw “9” and place a container under the end of the plastic hose.



### f. Loosen the bleed screw and push the brake caliper piston in.

EWA19170



**WARNING**

**Do not reuse the drained brake fluid.**

### g. Tighten the bleed screw.

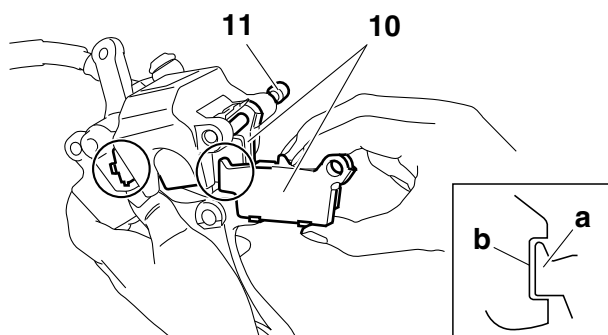


**Bleed screw**  
6 N·m (0.6 kgf·m, 4.4 lb·ft)

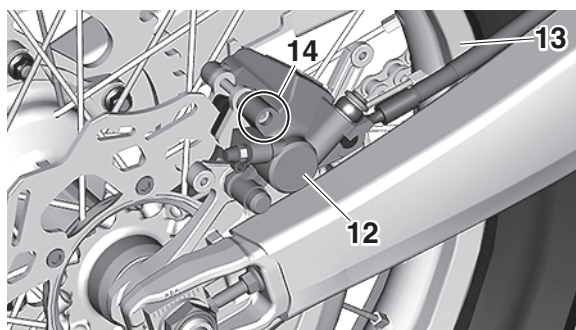
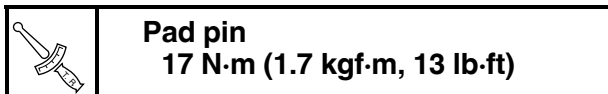
### h. Install the brake pad “10” and the pad pin “11”.

### TIP

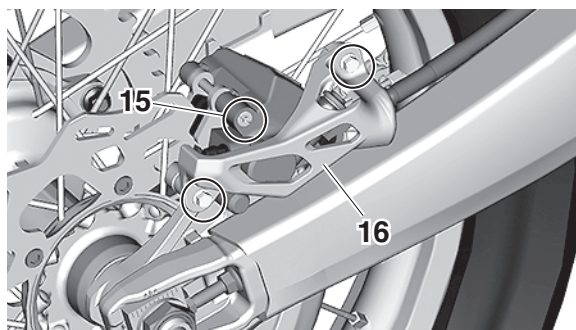
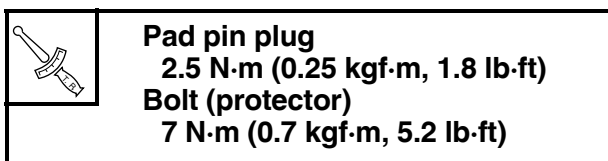
- Install the brake pads with their projections “a” into the brake caliper recesses “b”.
- Temporarily tighten the pad pin at this point.



- i. Install the brake caliper "12" and the rear wheel "13".  
Refer to "REAR WHEEL" on page 4-9.
- j. Tighten the pad pin "14".



- k. Install the pad pin plug "15" and the protector "16".



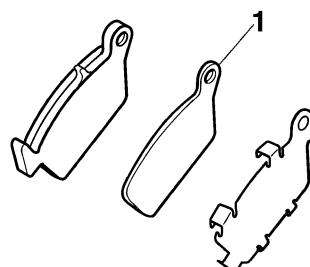
3. Check:
  - Brake fluid level  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-26.
4. Check:
  - Brake pedal operation

A softy or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.

EAM30233

## CHECKING THE REAR BRAKE PAD INSULATOR

1. Remove:
  - Brake pad  
Refer to "REAR BRAKE" on page 4-23.
2. Check:
  - Rear brake pad insulator "1"  
Damage → Replace.



EAM30234

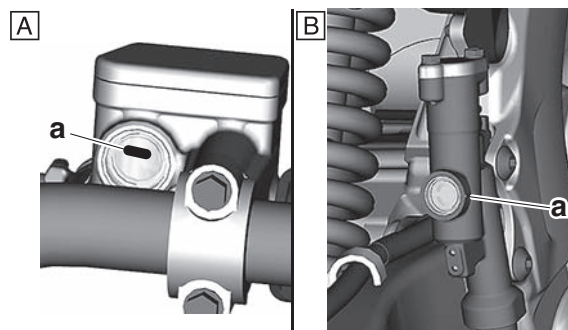
## CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle upright on a level surface.

### TIP

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

2. Check:
  - Brake fluid level  
The minimum level mark "a" or below → Add.



- 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.**

EAM30235

## 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 swing-arm or cause an accident. Therefore, keep the drive chain slack within the specified limits.**

1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120

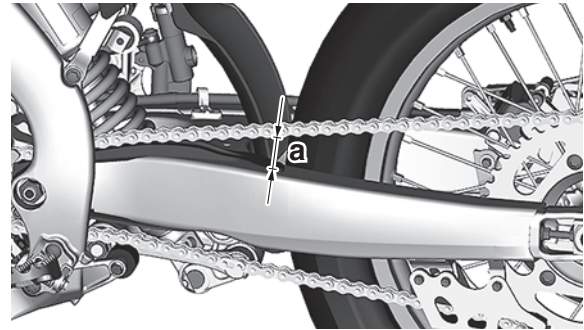
**⚠ WARNING**

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

2. Shift the transmission into the neutral position.
3. Pull the drive chain up above the drive chain guide installation bolt with a force of about 50 N (5.0 kgf, 36 lbf).
4. Check:
  - Drive chain slack “a”  
Out of specification → Regulate.

**TIP**

Measure drive chain slack between the drive chain guide and the bottom of the chain as shown.



### Drive chain slack (Maintenance stand)

**50.0–60.0 mm (1.97–2.36 in)**

- 5. Adjust:
  - Drive chain slack



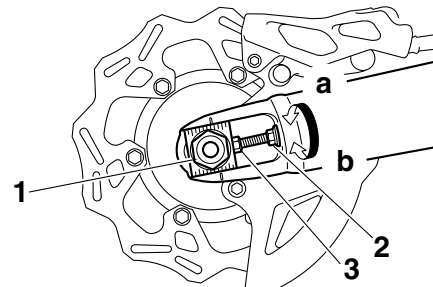
- Loosen the wheel axle nut “1”.
- Loosen both locknuts “2”.
- Turn the adjusting bolt “3” in direction “a” or “b” until the specified drive chain slack is obtained.

### Direction “a”

**The drive chain slack decreases.**

### Direction “b”

**The drive chain slack increases.**



**TIP**

- To maintain the proper wheel alignment, adjust both sides evenly.
- Push the rear wheel forward to make sure that there is no clearance between the swingarm end plates and the ends of the swingarm.

- d. Tighten the wheel axle nut.



### Wheel axle nut

**125 N·m (12.5 kgf·m, 92 lb·ft)**

- e. Tighten the drive chain puller locknut.



**Drive chain puller locknut**  
21 N·m (2.1 kgf·m, 15 lb·ft)



EAM30338

## CHECKING THE FRONT FORK LEGS

1. Stand the vehicle upright on a level surface.

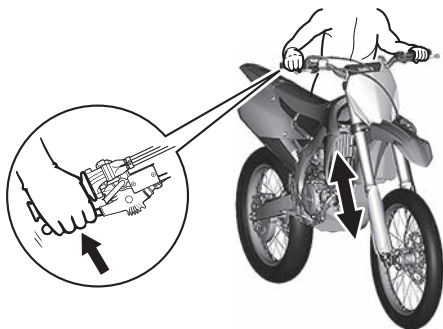
EWA13120



**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.  
Unsmooth operation → Correct or replace.  
Refer to "FRONT FORK" on page 4-38.



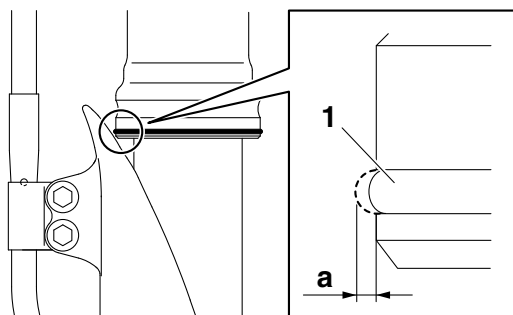
EAM30236

## CHECKING THE FRONT FORK PROTECTOR GUIDE

1. Check:
  - Protector guide "1"  
Out of specification → Replace.

### TIP

The protector guide reaches the limit of its use when it is worn down to the same height "a" as of the outer tube circumference.



EAM30237

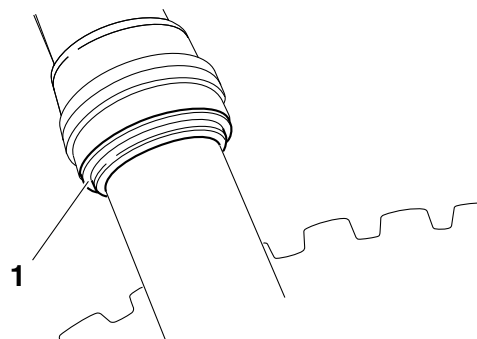
## CLEANING THE FRONT FORK OIL SEAL AND DUST SEAL

1. Remove:
  - Protector
  - Dust seal "1"

ECA24330

### NOTICE

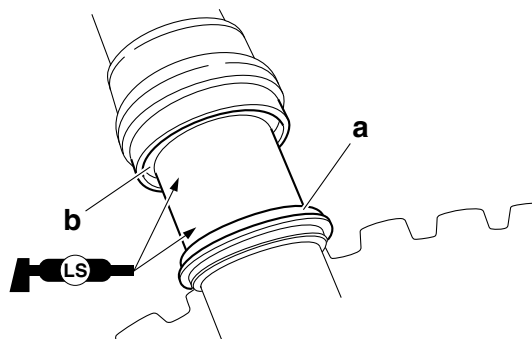
**Be careful not to damage the dust seal and the inner tube by a driver.**



2. Clean:
  - Dust seal "a"
  - Oil seal "b"

### TIP

- Clean the dust seal and oil seal after every run.
- Apply lithium-soap-based grease on the inner tube.



EAM30238

## AIR BLEEDING FROM FRONT FORK

### TIP

If the front fork initial movement feels stiff during

a run, relieve the front fork internal pressure.

1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120

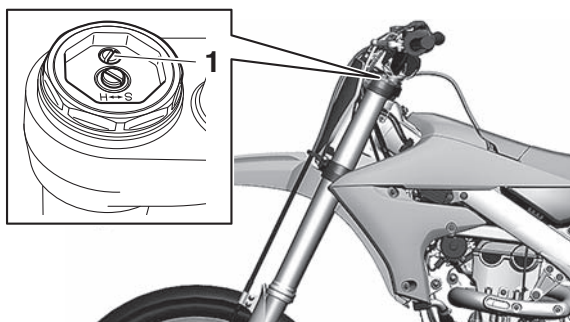
### **WARNING**

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

2. Remove the bleed screw "1" and release the internal pressure from the front fork.
3. Tighten:
  - Bleed screw



**Bleed screw**  
1.3 N·m (0.13 kgf·m, 0.95 lb·ft)



EAM30239

## ADJUSTING THE FRONT FORK LEGS

EWA19180

### **WARNING**

- Always adjust the left and right front forks evenly. If this is not done, the vehicle may have poor stability.
- Securely support the vehicle so that there is no danger of it falling over.

### Rebound damping

ECA24340

#### **NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

1. Adjust:
  - Rebound damping



- a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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

Rebound damping is increased (suspension is harder).

#### **Direction "b"**

Rebound damping is decreased (suspension is softer).



### Rebound damping

**Minimum (soft)**

20 click(s) in direction "b"\*

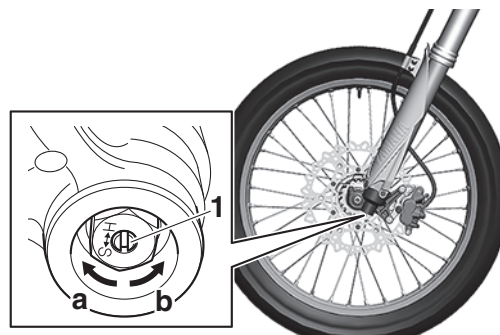
**Standard**

10 click(s) in direction "b"\*

**Maximum (hard)**

0 click(s) in direction "b"\*

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



### Compression damping

ECA24350

#### **NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

1. Adjust:
    - Compression damping
- a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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

Compression damping is increased (suspension is harder).

#### **Direction "b"**

Compression damping is decreased (suspension is softer).



### Compression damping

**Minimum (soft)**

20 click(s) in direction "b"\*

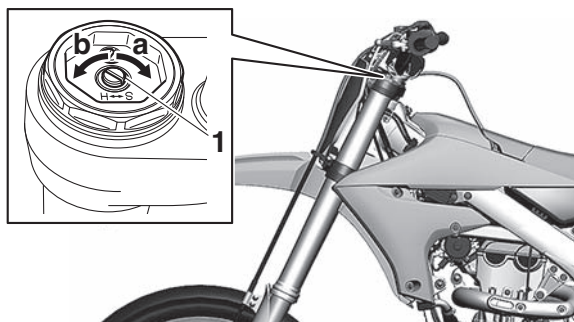
**Standard**

11 click(s) in direction "b"\*

**Maximum (hard)**

0 click(s) in direction "b"\*

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



EAM30240

## CHECKING THE SWINGARM OPERATION

1. Check:
  - Swingarm smooth action
  - Swingarm free play
 Refer to "SWINGARM" on page 4-61.

EAM30241

## CHECKING THE REAR SUSPENSION

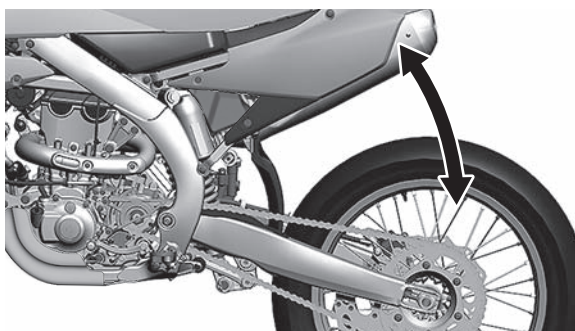
1. Stand the vehicle upright on a level surface.

EWA13120

### **WARNING**

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

2. Check:
  - Rear shock absorber assembly  
Gas leaks/oil leaks → Replace the rear shock absorber assembly.  
Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.
3. Check:
  - Rear shock absorber assembly smooth action
  - Rear suspension link smooth action  
Sit astride the seat and shake your body up and down several times to check whether the rear shock absorber assembly operates smoothly.  
Unsmooth operation → Correct or replace.  
Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.



EAM30242

## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

Use a maintenance stand to raise the rear wheel off the ground.

EWA13120

### **WARNING**

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

### Spring preload

ECA24360

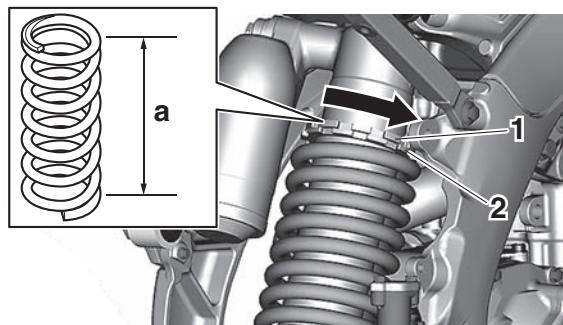
### **NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

1. Remove:
  - Rear frame  
Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.

2. Adjust:
  - Spring preload

- a. Loosen the locknut "1".
- b. Loosen the adjuster "2" until there is some clearance between the spring and the adjuster.
- c. Measure the spring free length "a".



- d. Turn the adjuster in the direction of "b" or "c" to make an adjustment.

### **Direction "b"**

**Spring preload is increased (suspension is harder).**

### **Direction "c"**

**Spring preload is decreased (suspension is softer).**

**Spring preload adjusting positions****Minimum**

Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.

**Standard**

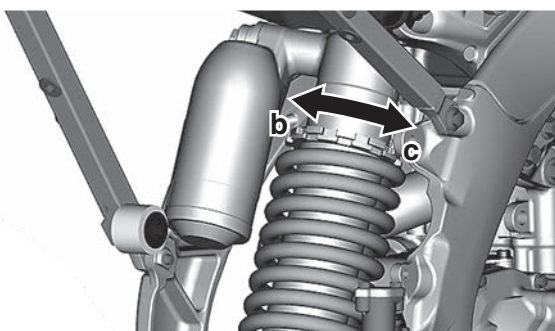
Position in which the spring is turned in 6.0 mm (0.24 in) from its free length.

**Maximum**

Position in which the spring is turned in 18.0 mm (0.71 in) from its free length.

**TIP**

- Be sure to remove all dirt and mud from around the locknut and adjusting ring before adjustment.
- The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjusting ring.



e. Tighten the locknut.

**Locknut**

10 N·m (1.0 kgf·m, 7.4 lb·ft)

3. Install:

- Rear frame

Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.

**Rebound damping**

ECA24370

**NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

1. Adjust:

- Rebound damping

a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

**Direction "a"**

Rebound damping is increased (suspension is harder).

**Direction "b"**

Rebound damping is decreased (suspension is softer).

**Rebound damping****Minimum (soft)**

30 click(s) in direction "b"\*

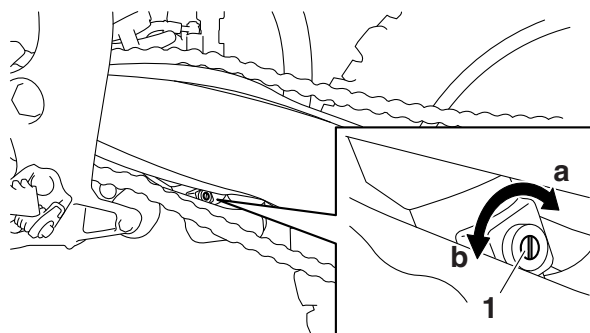
**Standard**

11 click(s) in direction "b"\*

**Maximum (hard)**

0 click(s) in direction "a"

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

**Compression damping (for fast compression damping)**

ECA24370

**NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

1. Adjust:

- Compression damping (for fast compression damping)

a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

**Direction "a"**

Compression damping is increased (suspension is harder).

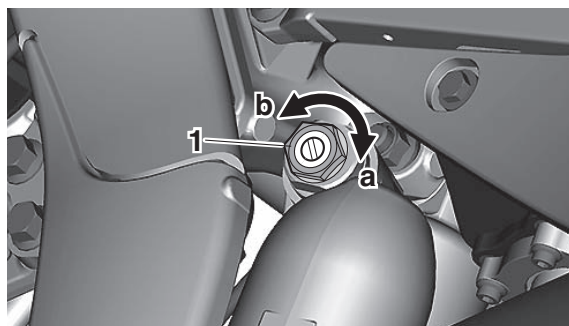
**Direction "b"**

Compression damping is decreased (suspension is softer).



**Fast compression damping****Minimum (soft)****2 turn(s) in direction "b"\*****Standard****1-1/2 turn(s) in direction "b"\*****Maximum (hard)****0 turn(s) in direction "b"\***

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



Compression damping (for slow compression damping)

ECA24390

**NOTICE**

**Do not turn the adjuster forcibly beyond its adjusting range.**

## 1. Adjust:

- Compression damping (for slow compression damping)

a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

**Direction "a"**

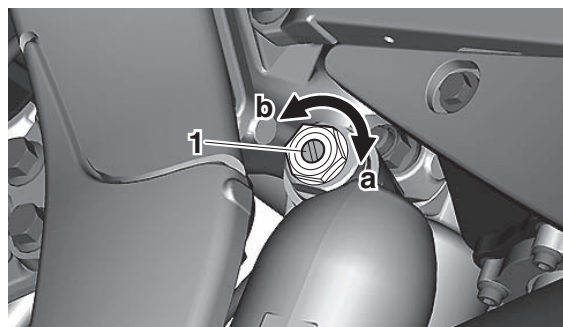
**Compression damping is increased  
(suspension is harder).**

**Direction "b"**

**Compression damping is decreased  
(suspension is softer).**

**Slow compression damping****Minimum (soft)****20 click(s) in direction "b"\*****Standard****12 click(s) in direction "b"\*****Maximum (hard)****0 click(s) in direction "b"\***

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



EAM30243

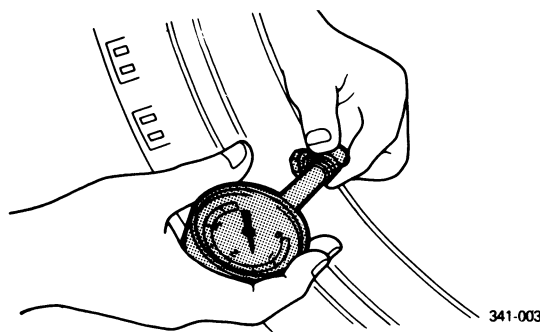
**CHECKING THE TIRES**

## 1. Measure:

- Tire pressure  
Out of specification → Regulate.

**Tire air pressure (measured on cold tires)****Front****100 kPa (1.00 kgf/cm<sup>2</sup>, 15 psi)****Rear****100 kPa (1.00 kgf/cm<sup>2</sup>, 15 psi)****TIP**

- Check the tire while it is cold.
- Loose bead stoppers allow the tire to slip off its position on the rim when the tire pressure is low.
- If the tire valve stem is found tilted, the tire is considered to be slipping off its position. Correct the tire position.



EAM30244

**CHECKING AND TIGHTENING THE SPOKES**

## 1. Check:

- Spoke  
Bend/damage → Replace.  
Loose → Tighten.

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

- 



**TIP**

- Do not give a half turn (180°) or more for one tightening.
- Make sure that tightening after a break-in is done until the initial looseness in nipples disappears.
- Make sure that tightening is done in stages, not at a time.

## CHECKING THE WHEELS

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

 **WA**

**TIP**

After replacing a tire or a wheel, always balance the wheel.

## CHECKING THE WHEEL BEARINGS

1. Check:
  - Wheel bearing  
Refer to “CHECKING THE FRONT WHEEL” on page 4-6 and “CHECKING THE REAR WHEEL” on page 4-10.

## CHECKING AND ADJUSTING THE STEERING HEAD

1. Use a maintenance stand to raise the front wheel off the ground.

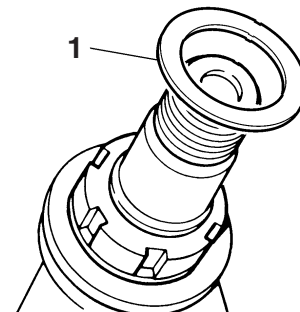
**⚠ WARNING**

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

2. Check:
  - Steering head  
Grasp the bottom of the front fork legs and gently rock the front fork.  
Blinding/looseness → Adjust the steering head.
3. Remove:
  - Handlebar  
Refer to “HANDLEBAR” on page 4-33.
  - Upper bracket  
Refer to “STEERING HEAD” on page 4-51.
4. Adjust:
  - Steering head



- a. Remove the washer “1”.

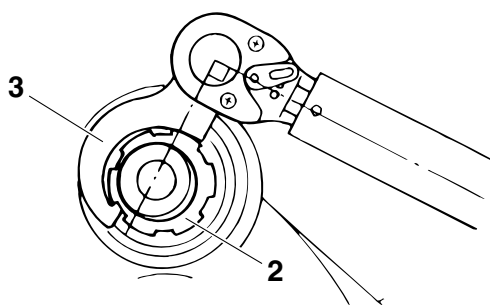


- b. After loosening the ring nut “2” with a steering nut wrench “3”, tighten it to the specified torque.

**TIP**

- Set the torque wrench at a right angle to the steering nut wrench.
- Move the steering to the left and right a couple

of times to check that it moves smoothly.



**Steering nut wrench**  
90890-01403  
**Exhaust flange nut wrench**  
YU-A9472



**Ring nut (initial tightening torque)**  
38 N·m (3.8 kgf·m, 28 lb·ft)

- c. Turn the front fork to the right and left a few times, and make sure that the steering rotates smoothly. If it does not turn smoothly, remove the lower bracket and check the upper and lower bearings.

Refer to “STEERING HEAD” on page 4-51.

- d. Loosen the ring nut fully turn and then tighten it to specification with a steering nut wrench.

EWA13140



**WARNING**

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

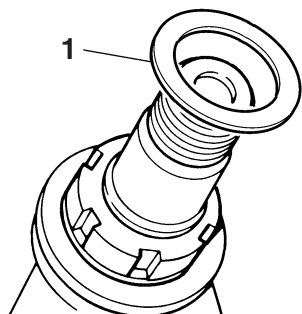


**Ring nut (final tightening torque)**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

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

Refer to “STEERING HEAD” on page 4-51.

- f. Install the washer “1”.



5. Install:

- Upper bracket  
Refer to “STEERING HEAD” on page 4-51.
- Handlebar  
Refer to “HANDLEBAR” on page 4-33.

EAM30249

### LUBRICATING THE LEVERS

1. Lubricate the pivoting points and metal-to-metal moving parts of the following parts.
- Brake lever



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

- Clutch lever



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

EAM30250

### LUBRICATING THE PEDAL

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



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

EAM30251

### LUBRICATING THE DRIVE CHAIN

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

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



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

EAM30252

### LUBRICATING THE SIDESTAND

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







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

EAM30253

## **CHECKING THE CHASSIS FASTENERS**

Make sure that all nuts, bolts, and screws are properly tightened.

Refer to “CHASSIS TIGHTENING TORQUES” on page 2-14.

EAM20137

## ELECTRICAL SYSTEM

EAM30254

### CHECKING THE SPARK PLUG

#### 1. Remove:

- Seat
- Air scoop (left/right)  
Refer to "GENERAL CHASSIS" on page 4-1.
- Fuel tank "1"  
Refer to "FUEL TANK" on page 7-1.

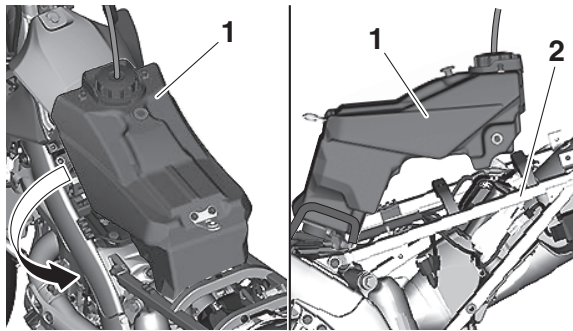
ECA24400

#### NOTICE

**Do not use too much force to pull the hose.**

#### TIP

Remove the fuel tank, turn this 180° clockwise, and put it in the frame "2" as shown.



#### 2. Remove:

- Spark plug cap
- Spark plug  
Refer to "CAMSHAFT" on page 5-11.

ECA24410

#### NOTICE

**In order not to allow the dirt accumulated around the spark plug to drop from the spark plug hole into the cylinder, clean it before removing the spark plug.**

#### 3. Check:

- Spark plug type  
Wrong type → Replace.

	<b>Manufacturer/model</b> <b>NGK/CPR8EA-9</b>
--	--

#### 4. Check:

- Electrode  
Damage/wear → Replace the spark plug.
- Insulator  
Abnormal color → Replace the spark plug.  
Normal color is medium-to-light tan.

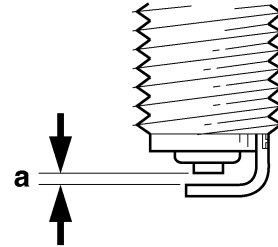
#### 5. Clean:

- Spark plug  
(with a spark plug cleaner or a wire brush)

#### 6. Measure:

- Spark plug gap "a"  
Out of specification → Adjust the spark plug gap.

	<b>Spark plug gap</b> <b>0.8–0.9 mm (0.031–0.035 in)</b>
--	---



#### 7. Install:

- Spark plug

	<b>Spark plug</b> <b>13 N·m (1.3 kgf·m, 9.6 lb·ft)</b>
--	---

#### TIP

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

#### 8. Install:

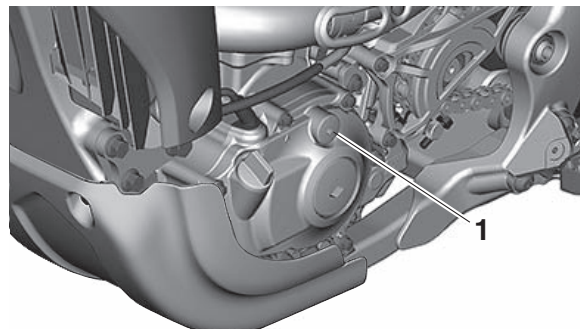
- Spark plug cap
- Fuel tank
- Air scoop (left/right)
- Seat
- Side cover (left/right)  
Refer to "GENERAL CHASSIS" on page 4-1.

EAM30255

### CHECKING THE IGNITION TIMING


#### 1. Remove:

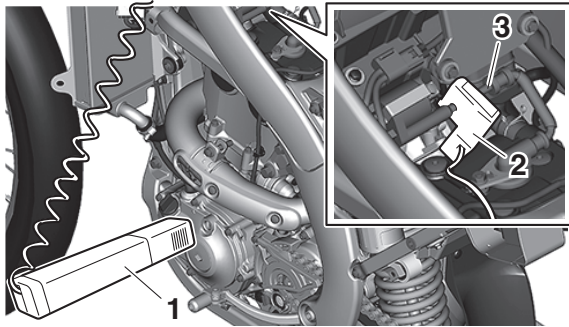
- Timing mark accessing screw "1"



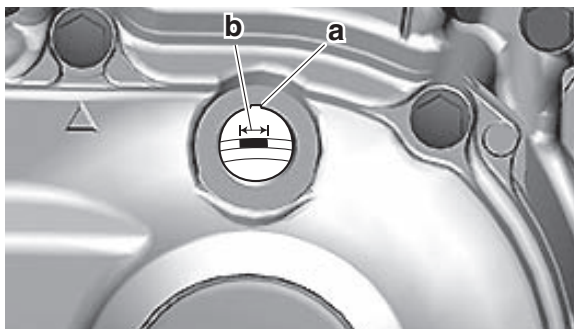
#### 2. Attach:

- Timing light "1"
- Digital tachometer "2"  
To the high tension cord "3".

	<p><b>Timing light</b> 90890-03141</p> <p><b>Timing light</b> YU-03141</p> <p><b>Digital tachometer</b> 90890-06760</p> <p><b>Digital tachometer</b> YU-39951-B</p>
---	---



3. Adjust:
  - Engine idling speed  
Refer to “ADJUSTING THE ENGINE IDLING SPEED” on page 3-15.
4. Check:
  - Ignition timing  
Check whether the alignment mark “a” on the left crankcase cover is within the firing range “b” on the rotor.  
Incorrect firing range → Check rotor and crankshaft position sensor.



5. Install:
  - Timing mark accessing screw

	<p><b>Timing mark accessing screw</b> 6 N·m (0.6 kgf·m, 4.4 lb·ft)</p>
---	--

EAM30256

**CHECKING AND CHARGING THE BATTERY**  
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-59.



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## CHASSIS

<b>GENERAL CHASSIS</b> .....	4-1
REMOVING THE SEAT.....	4-3
REMOVING THE NUMBER PLATE.....	4-3
INSTALLING THE AIR SCOOP.....	4-3
REMOVING THE SIDE COVER.....	4-4
INSTALLING THE SIDE COVER.....	4-4
 <b>FRONT WHEEL</b> .....	4-5
REMOVING THE FRONT WHEEL.....	4-6
CHECKING THE FRONT WHEEL.....	4-6
DISASSEMBLING THE FRONT WHEEL.....	4-7
ASSEMBLING THE FRONT WHEEL.....	4-7
INSTALLING THE FRONT WHEEL.....	4-8
 <b>REAR WHEEL</b> .....	4-9
REMOVING THE REAR WHEEL.....	4-10
CHECKING THE REAR WHEEL.....	4-10
DISASSEMBLING THE REAR WHEEL.....	4-10
CHECKING AND REPLACING THE REAR WHEEL SPROCKET.....	4-10
ASSEMBLING THE REAR WHEEL.....	4-11
INSTALLING THE REAR WHEEL.....	4-11
 <b>FRONT BRAKE</b> .....	4-13
INTRODUCTION.....	4-17
CHECKING THE FRONT BRAKE DISC.....	4-17
REMOVING THE FRONT BRAKE CALIPER.....	4-17
DISASSEMBLING THE FRONT BRAKE CALIPER.....	4-17
CHECKING THE FRONT BRAKE CALIPER.....	4-18
ASSEMBLING THE FRONT BRAKE CALIPER.....	4-18
INSTALLING THE BRAKE CALIPER PISTON.....	4-18
INSTALLING THE FRONT BRAKE CALIPER.....	4-19
REMOVING THE FRONT BRAKE MASTER CYLINDER.....	4-20
CHECKING THE FRONT BRAKE MASTER CYLINDER.....	4-20
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER.....	4-20
INSTALLING THE FRONT BRAKE MASTER CYLINDER.....	4-21
 <b>REAR BRAKE</b> .....	4-23
INTRODUCTION.....	4-27
CHECKING THE REAR BRAKE DISC.....	4-27
REMOVING THE REAR BRAKE CALIPER.....	4-28
DISASSEMBLING THE REAR BRAKE CALIPER.....	4-28
CHECKING THE REAR BRAKE CALIPER.....	4-28
ASSEMBLING THE REAR BRAKE CALIPER.....	4-28
INSTALLING THE BRAKE CALIPER PISTON.....	4-29
INSTALLING THE REAR BRAKE CALIPER.....	4-29
REMOVING THE REAR BRAKE MASTER CYLINDER.....	4-30
CHECKING THE REAR BRAKE MASTER CYLINDER.....	4-30
ASSEMBLING THE REAR BRAKE MASTER CYLINDER.....	4-31

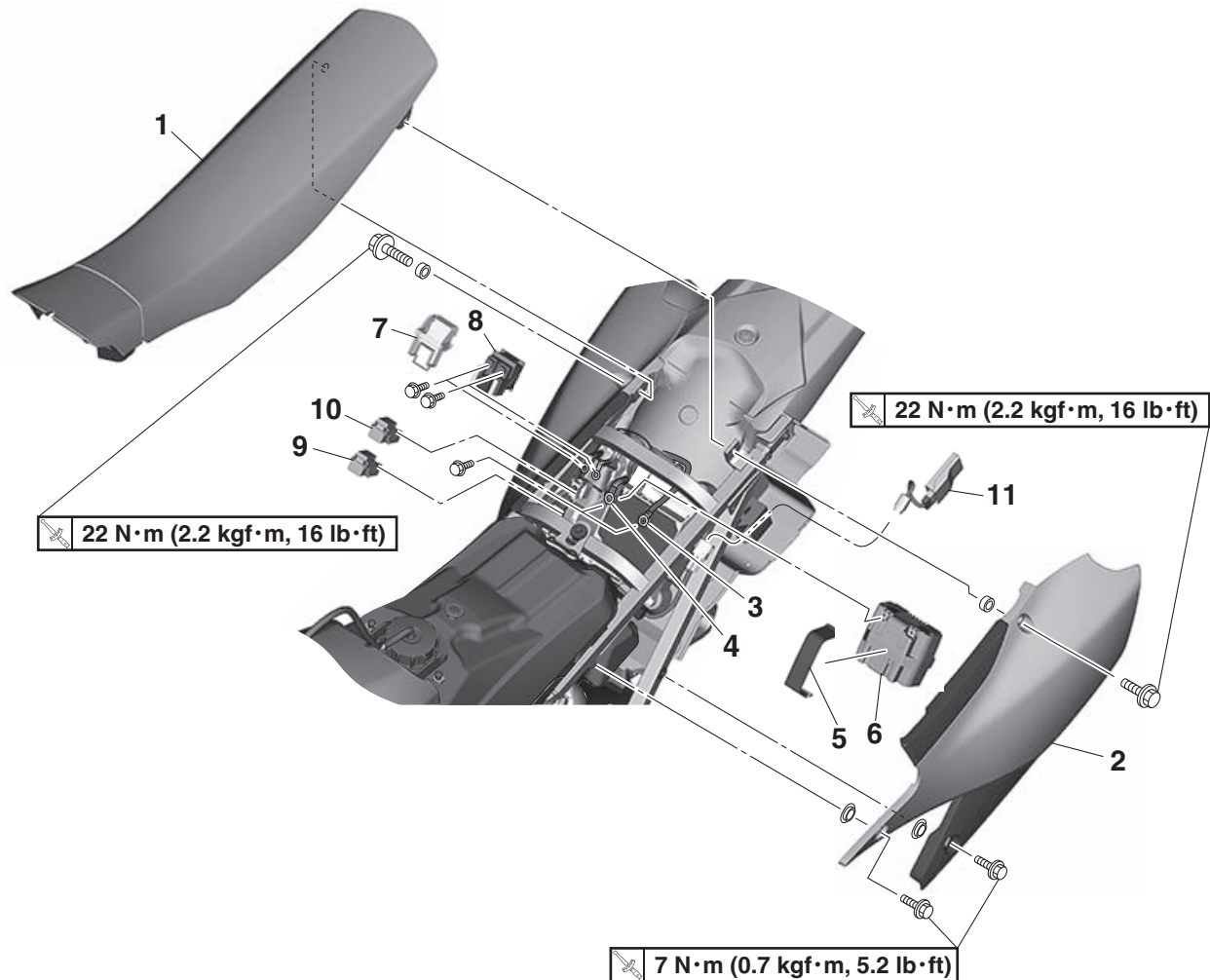
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INSTALLING THE REAR BRAKE MASTER CYLINDER .....	4-31
<b>HANDLEBAR</b> .....	4-33
REMOVING THE HANDLEBAR .....	4-34
CHECKING THE HANDLEBAR .....	4-34
INSTALLING THE HANDLEBAR .....	4-34
<b>FRONT FORK</b> .....	4-38
REMOVING THE FRONT FORK LEGS .....	4-40
DISASSEMBLING THE FRONT FORK LEGS .....	4-40
CHECKING THE FRONT FORK LEGS .....	4-41
ASSEMBLING THE FRONT FORK LEGS .....	4-42
INSTALLING THE FRONT FORK LEGS .....	4-48
<b>STEERING HEAD</b> .....	4-51
REMOVING THE LOWER BRACKET .....	4-52
CHECKING THE STEERING HEAD .....	4-52
INSTALLING THE STEERING HEAD .....	4-52
<b>REAR SHOCK ABSORBER ASSEMBLY</b> .....	4-55
HANDLING THE REAR SHOCK ABSORBER .....	4-57
DISPOSING OF A REAR SHOCK ABSORBER .....	4-57
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY .....	4-57
REMOVING THE BEARING .....	4-57
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY .....	4-58
CHECKING THE CONNECTING ARM AND RELAY ARM .....	4-58
INSTALLING THE RELAY ARM .....	4-58
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY .....	4-59
<b>SWINGARM</b> .....	4-61
REMOVING THE SWINGARM .....	4-62
REMOVING THE BEARING .....	4-62
CHECKING THE SWINGARM .....	4-62
INSTALLING THE SWINGARM .....	4-62
<b>CHAIN DRIVE</b> .....	4-64
REMOVING THE DRIVE CHAIN .....	4-65
CHECKING THE DRIVE CHAIN .....	4-65
CHECKING THE DRIVE SPROCKET .....	4-66
CHECKING THE REAR WHEEL SPROCKET .....	4-66
INSTALLING THE DRIVE CHAIN .....	4-66

EAM20094

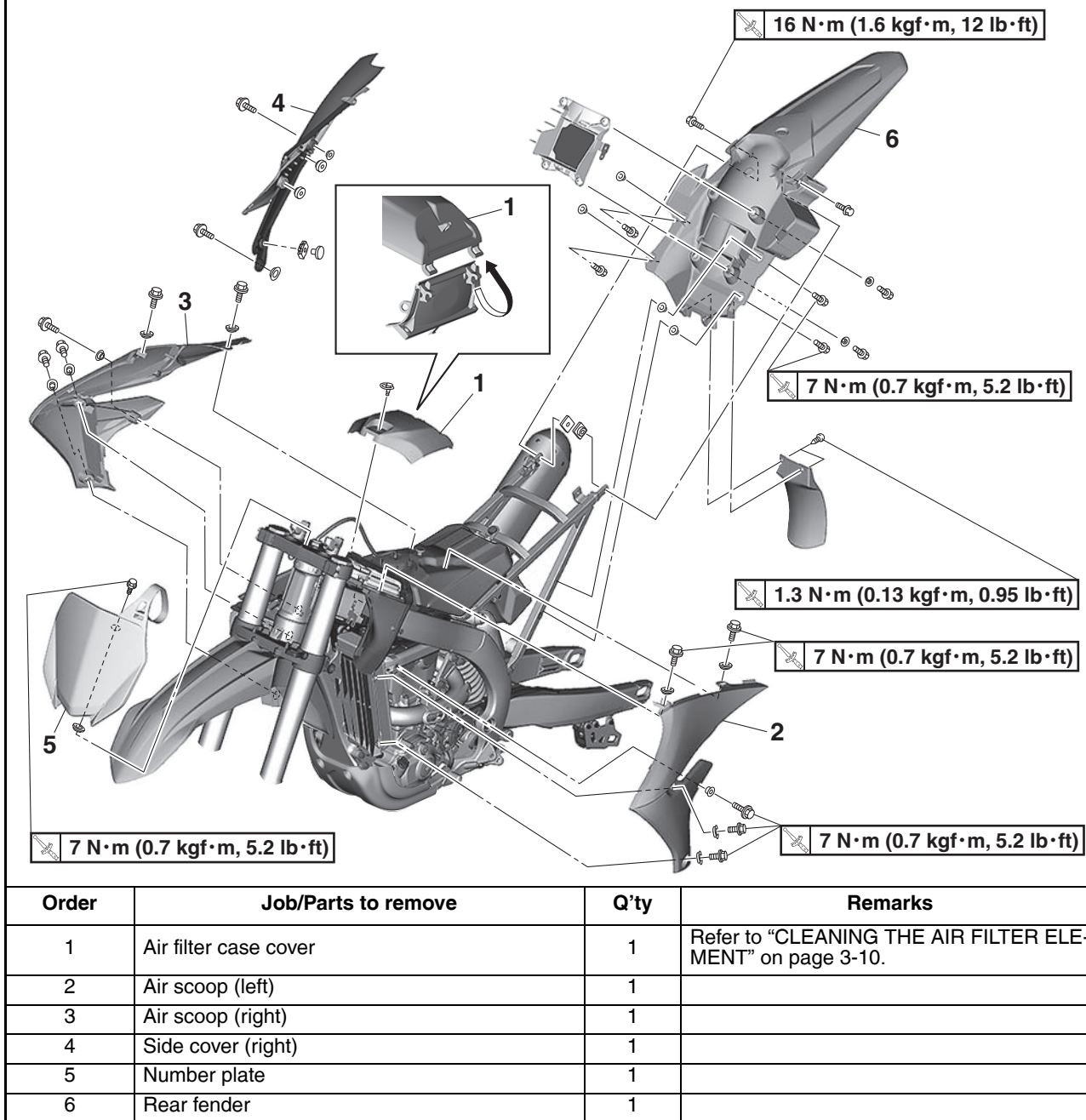
GENERAL CHASSIS

Removing the seat and battery



Order	Job/Parts to remove	Q'ty	Remarks
1	Seat	1	
2	Side cover (left)	1	
3	Negative battery lead	1	Disconnect.
4	Positive battery lead	1	Disconnect.
5	Battery band	1	
6	Battery	1	
7	Cover	1	
8	Starter relay	1	
9	Main relay	1	
10	Radiator fan motor relay	1	
11	CCU (Communication Control Unit)	1	

## Removing the side cover





EAM30016

## REMOVING THE SEAT

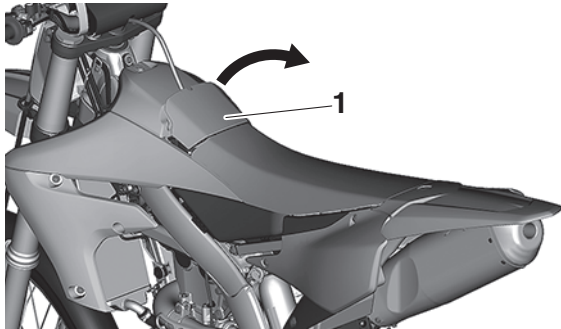
### TIP

The fuel tank cap cover and the seat are coupled with each other with a plastic band.

When removing the seat, always remove the fuel tank cap cover beforehand.

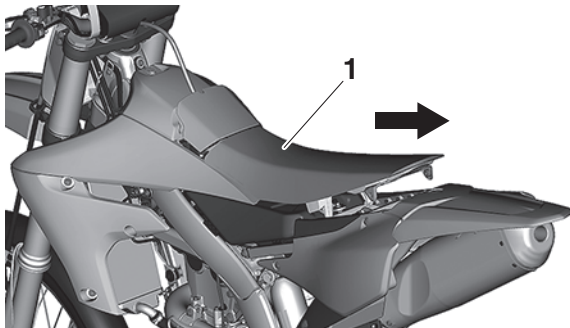
#### 1. Remove:

- Fuel tank cap cover "1"
- Refer to "FUEL TANK CAP" on page 1-20.



#### 2. Remove:

- Seat "1"



EAM30371

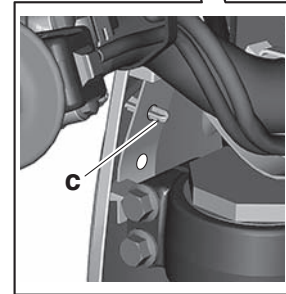
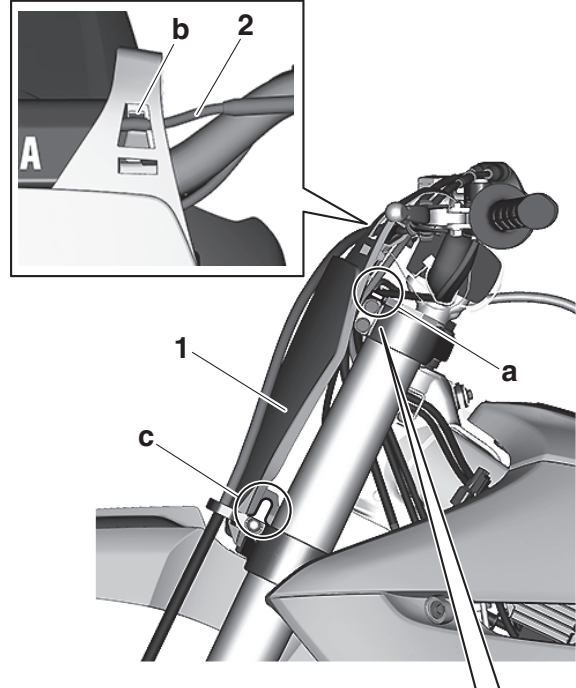
## REMOVING THE NUMBER PLATE

#### 1. Remove:

- Bolt (number plate)
- Number plate "1"

### TIP

- The projection "a" is inserted into the band of the number plate. Pull the band off the projection before removal.
- Remove the clutch cable "2" from the cable guide "b" on the number plate.
- The projection "c" on the lower bracket is inserted into the number plate. Remove the number plate by pulling it off the projection.
- When installing the number plate, insert the projection on the number plate into the hole in the upper side of the band.



EAM30458

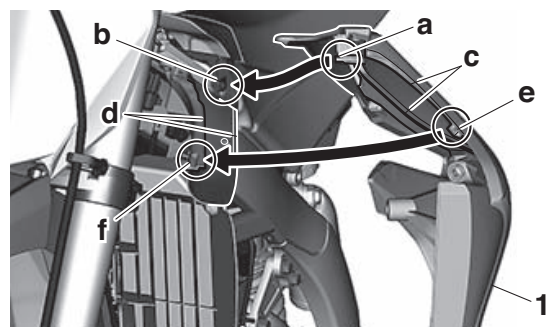
## INSTALLING THE AIR SCOOP

#### 1. Install:

- Air scoop (left "1"/right)

### TIP

After inserting the projection "a" on the air scoop (left/right) into the hole "b" in the air filter case, inserting the grooves "c" into the ribs "d" of the air filter case, and inserting the projection "e" into the slot "f" in the air filter case, install the air scoop and secure it with the bolts.



EAM30459

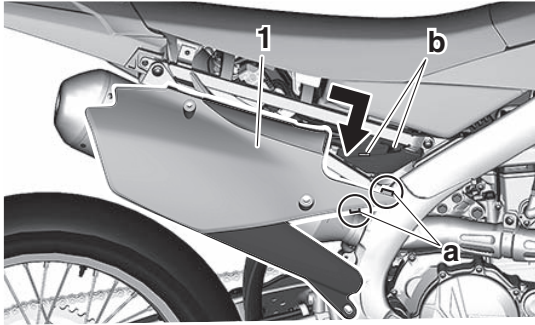
## REMOVING THE SIDE COVER

1. Remove:

- Side cover (right) “1”

### TIP

Remove the side cover (right) from the vehicle by removing the bolts and sliding it as shown.



- a. Projection
- b. Slot

EAM30460

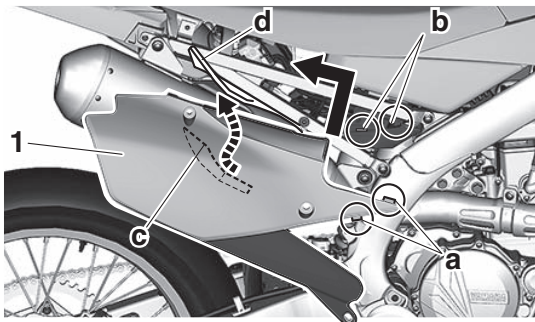
## INSTALLING THE SIDE COVER

1. Install:

- Side cover (right) “1”

### TIP

- Install the side cover (right) by sliding it as shown and secure it with the bolts to fit it to the vehicle.
- Install the side cover (right) so that the rib is located under the rib of the rear fender.

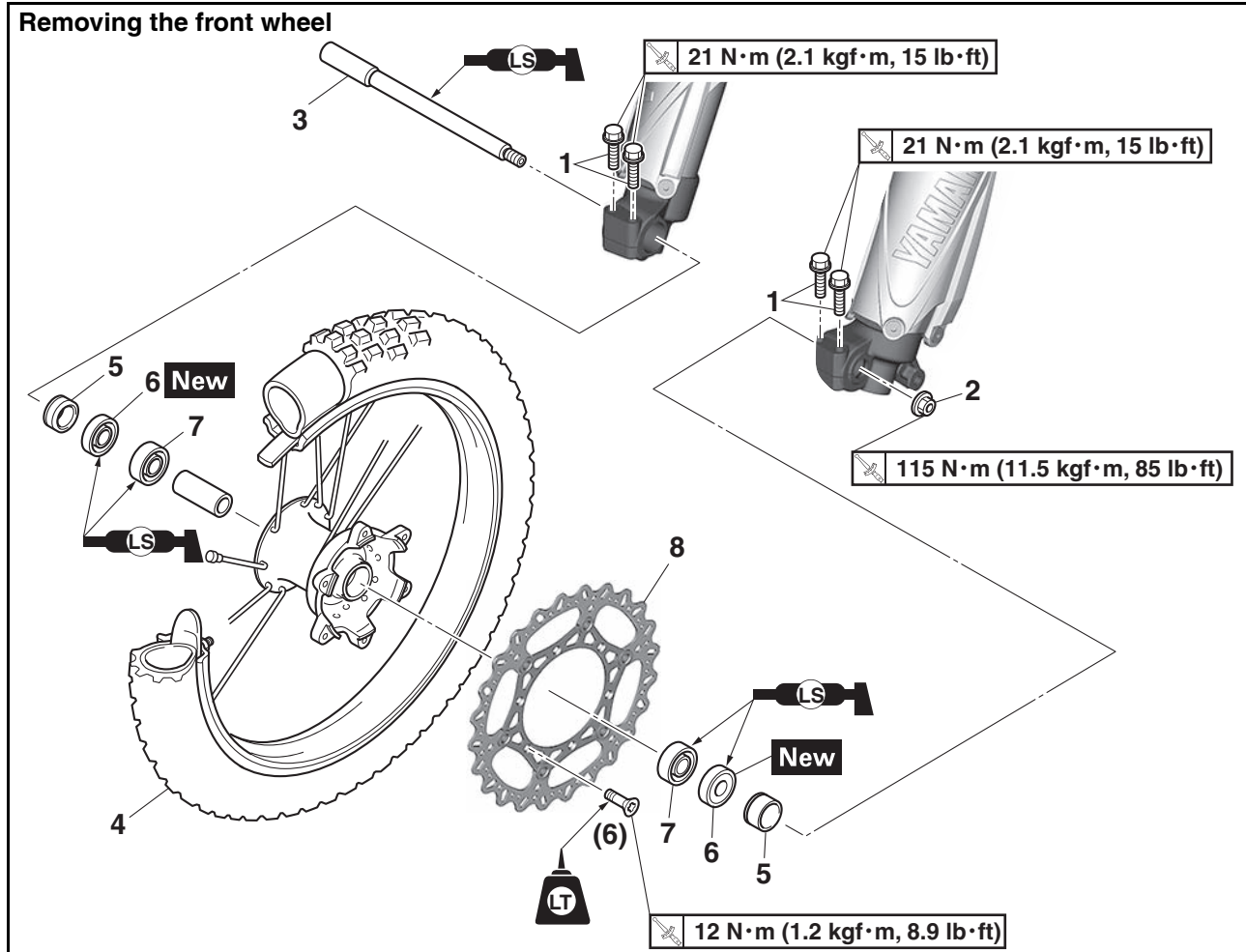


- a. Projection
- b. Slot
- c. Rib (side cover)
- d. Rib (rear fender)

EAM20095

## FRONT WHEEL

### Removing the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
1	Front wheel axle pinch bolt	4	Loosen.
2	Front wheel axle nut	1	
3	Front wheel axle	1	
4	Front wheel	1	
5	Collar	2	
6	Oil seal	2	
7	Bearing	2	
8	Brake disc	1	

EAM30017

## REMOVING THE FRONT WHEEL

1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120

### **WARNING**

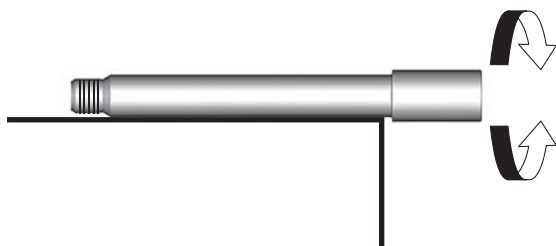
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
  - Front wheel

EAM30018

## CHECKING THE FRONT WHEEL

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

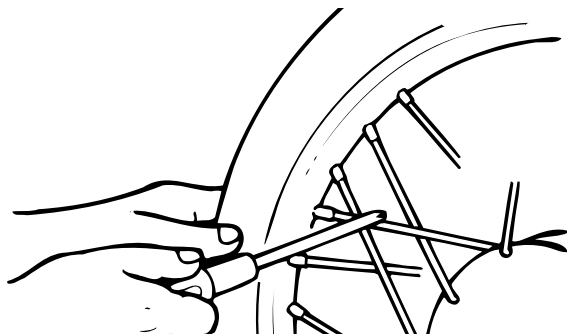


EWA13460

### **WARNING**

Do not attempt to straighten a bent wheel axle.

2. Check:
  - Tire
  - Front wheel
 Damage/wear → Replace.  
 Refer to “CHECKING THE TIRES” on page 3-32 and “CHECKING THE WHEELS” on page 3-33.
3. Check:
  - Spoke
 Bend/damage → Replace.  
 Loose → Tighten.  
 Tap the spokes with a screwdriver.



### **TIP**

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

4. Tighten:
  - Spoke
 Refer to “CHECKING AND TIGHTENING THE SPOKES” on page 3-32.

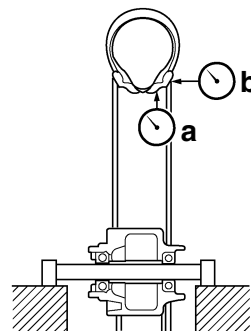


**Spoke**  
**2.5 N·m (0.25 kgf·m, 1.8 lb·ft)**

### **TIP**

After tightening the spokes, measure the wheel runout.

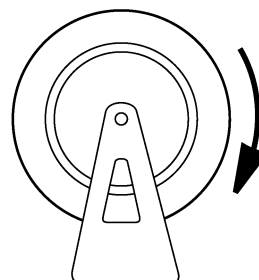
5. Measure:
  - Radial wheel runout “a”
  - Lateral wheel runout “b”
 Out of specification → Repair/replace.



**Radial wheel runout limit**  
**2.0 mm (0.08 in)**  
**Lateral wheel runout limit**  
**2.0 mm (0.08 in)**

6. Check:
  - Collar
 Damage/wear → Replace.
7. Check:
  - Bearing
 Front wheel turns roughly or is loose → Replace the wheel bearings.
- Oil seal

 Damage/wear → Replace.
 



EAM30019

## DISASSEMBLING THE FRONT WHEEL

### 1. Remove:

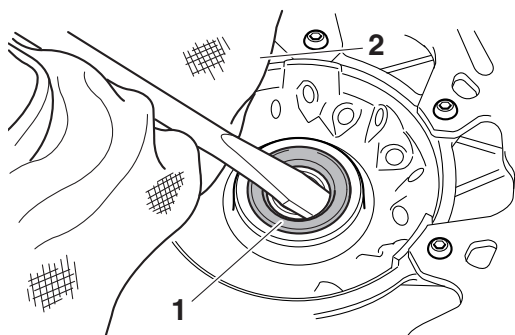
- Oil seal
- Bearing



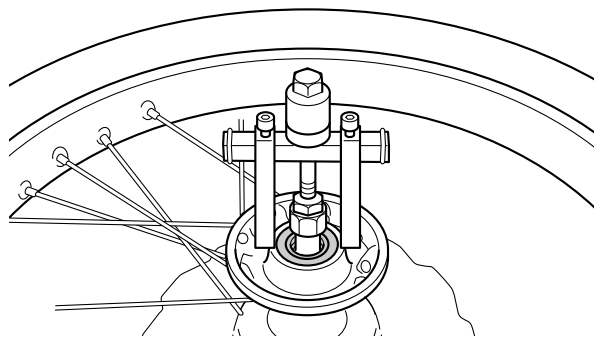
- Clean the outside of the front wheel hub.
- Remove the oil seals "1" with a flat-head screwdriver.

### TIP

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



- Remove the bearings with a bearing puller.



EAM30020

## ASSEMBLING THE FRONT WHEEL

### 1. Install:

- Bearing (left side) "1"
- Spacer "2"
- Bearing (right side) "3"
- Oil seal "4" **New**

### TIP

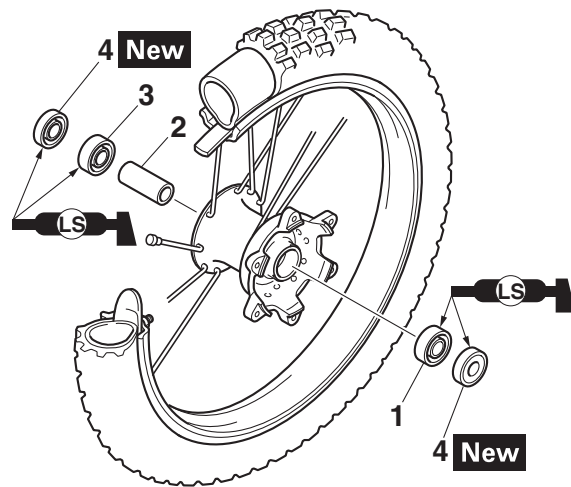
- Apply the lithium-soap-based grease to the bearing and the oil seal lip when installing.
- Left side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

ECA24420

### NOTICE

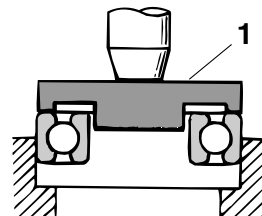
Install the bearing by pressing its outer race

parallel.



### TIP

Use a socket "1" that matches the diameter of the bearing outer race and that of the oil seal.



### 2. Install:

- Brake disc "1"
- Brake disc bolt "2"

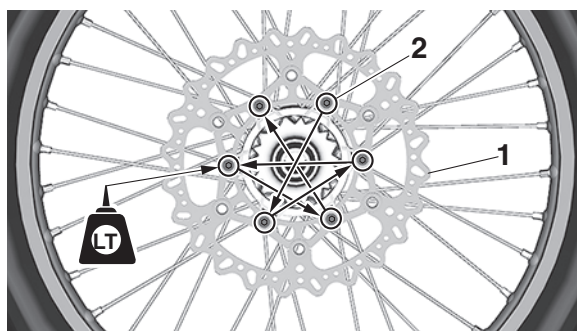


**Brake disc bolt**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
LOCTITE®

### TIP

Tighten the bolts in stages and in a crisscross pattern.

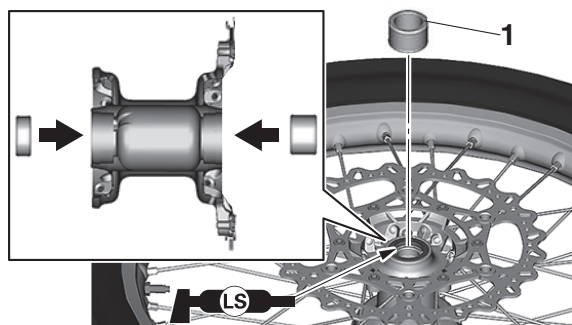




3. Install:
- Collar "1"

## TIP

Apply the lithium-soap-based grease on the oil seal lip.



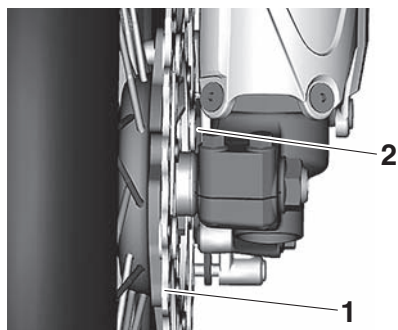
EAM30021

## INSTALLING THE FRONT WHEEL

1. Install:
- Front wheel

## TIP

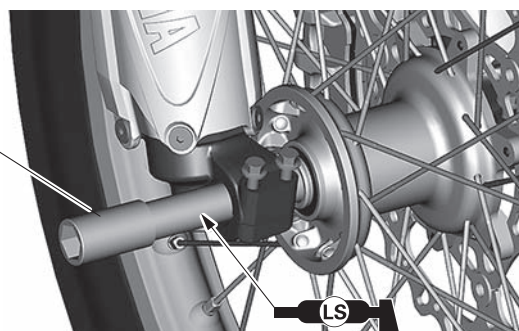
Install the brake disc "1" between the brake pads "2" correctly.



2. Install:
- Front wheel axle "1"

## TIP

Apply the lithium-soap-based grease to the front wheel axle.



3. Tighten:
- Front wheel axle nut "1"



**Front wheel axle nut**  
115 N·m (11.5 kgf·m, 85 lb·ft)

ECA24430

## NOTICE

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



4. Tighten:
- Front wheel axle pinch bolt "1"



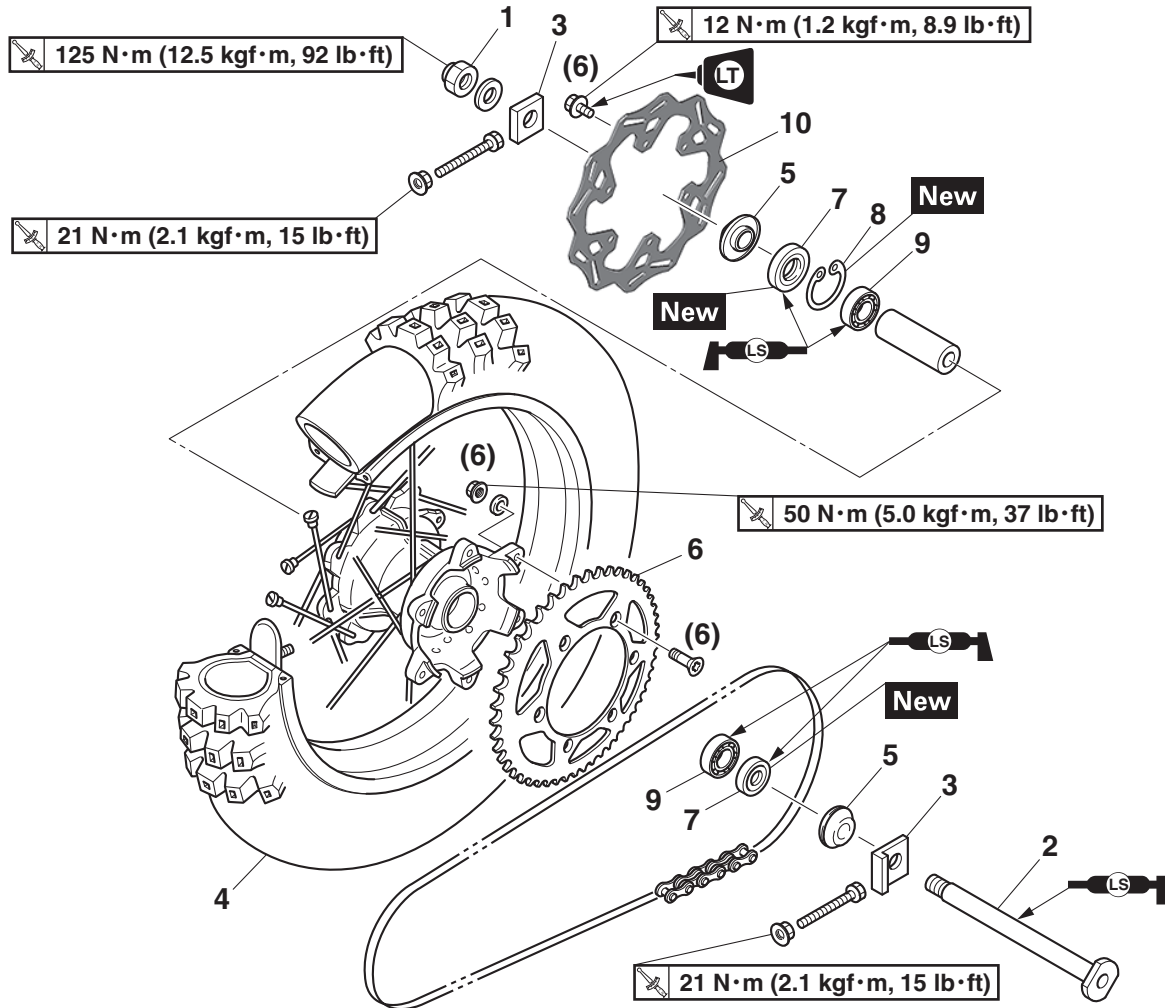
**Front wheel axle pinch bolt**  
21 N·m (2.1 kgf·m, 15 lb·ft)



EAM20096

## REAR WHEEL

### Removing the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the rear wheel off the ground.
1	Nut (rear wheel axle)	1	
2	Rear wheel axle	1	
3	Drive chain puller	2	
4	Rear wheel	1	
5	Collar	2	
6	Rear wheel sprocket	1	
7	Oil seal	2	
8	Circlip	1	
9	Bearing	2	
10	Brake disc	1	

EAM30022

## REMOVING THE REAR WHEEL

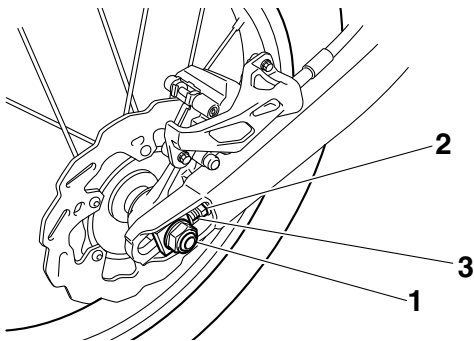
1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120

### **WARNING**

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

2. Remove:
  - Rear wheel axle nut “1”
3. Loosen:
  - Locknut “2”
4. Tighten:
  - Adjusting bolt “3”



5. Remove:
  - Rear wheel axle
  - Rear wheel

### **TIP**

- Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.
- Do not depress the brake pedal with the rear wheel removed.

EAM30023

## CHECKING THE REAR WHEEL

1. Check:
  - Rear wheel axle
  - Rear wheel
  - Bearing
  - Oil seal

Refer to “CHECKING THE FRONT WHEEL” on page 4-6.
2. Check:
  - Tire
  - Rear wheel

Damage/wear → Replace.

Refer to “CHECKING THE TIRES” on page 3-32 and “CHECKING THE WHEELS” on page 3-33.
3. Check:
  - Spoke

Refer to “CHECKING THE FRONT WHEEL” on page 4-6.

4. Measure:
  - Radial wheel runout
  - Lateral wheel runout

Refer to “CHECKING THE FRONT WHEEL” on page 4-6.



**Radial wheel runout limit**  
2.0 mm (0.08 in)  
**Lateral wheel runout limit**  
2.0 mm (0.08 in)

EAM30024

## DISASSEMBLING THE REAR WHEEL

1. Remove:
  - Oil seal
  - Bearing

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

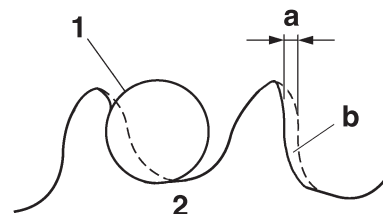
EAM30025

## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
  - Rear wheel sprocket

More than 1/4 tooth wear “a” → Replace the rear wheel sprocket and the drive sprocket as a set.

Bent tooth → Replace the rear wheel sprocket and the drive sprocket as a set.



b. Correct

1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
  - Rear wheel sprocket

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

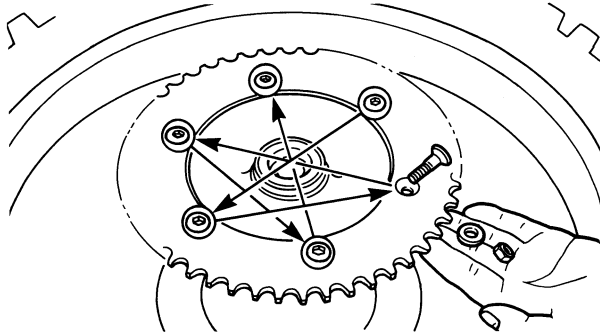




**Rear wheel sprocket self-locking nut**  
50 N·m (5.0 kgf·m, 37 lb·ft)

## TIP

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



EAM30026

## ASSEMBLING THE REAR WHEEL

### 1. Install:

- Bearing (right side) "1"
- Circlip "2" **New**
- Spacer "3"
- Bearing (left side) "4"
- Oil seal "5" **New**

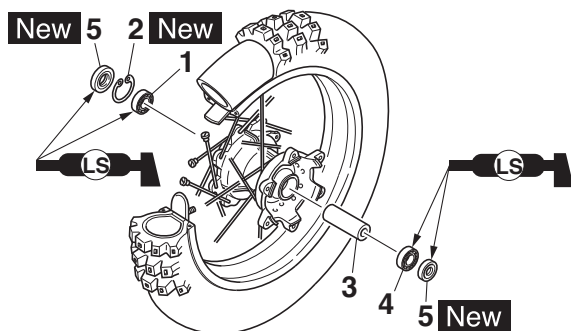
## TIP

- Apply the lithium-soap-based grease to the bearing and the oil seal lip when installing.
- Install the bearing with seal facing outward.
- Right side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

ECA24440

## NOTICE

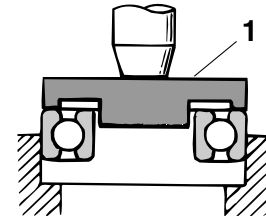
Install the bearing by pressing its outer race parallel.



## TIP

Use a socket "1" that matches the diameter of

the bearing outer race and that of the oil seal.



### 2. Install:

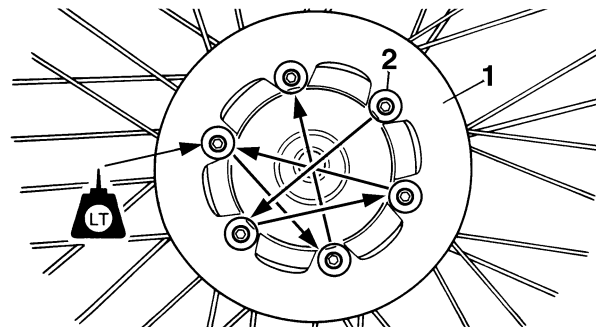
- Brake disc "1"
- Brake disc bolt "2"



**Brake disc bolt**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
LOCTITE®

## TIP

Tighten the bolts in stages and in a crisscross pattern.

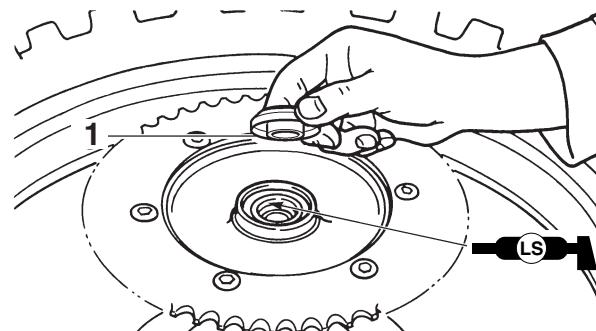


### 3. Install:

- Collar "1"

## TIP

Apply the lithium-soap-based grease on the oil seal lip.



EAM30027

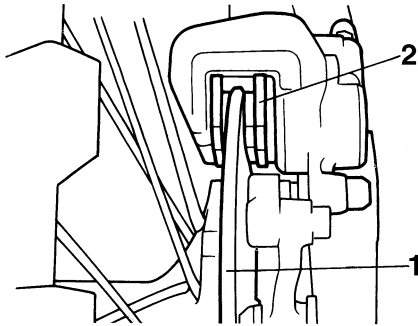
## INSTALLING THE REAR WHEEL

### 1. Install:

- Rear wheel

## TIP

Install the brake disc “1” between the brake pads “2” correctly.

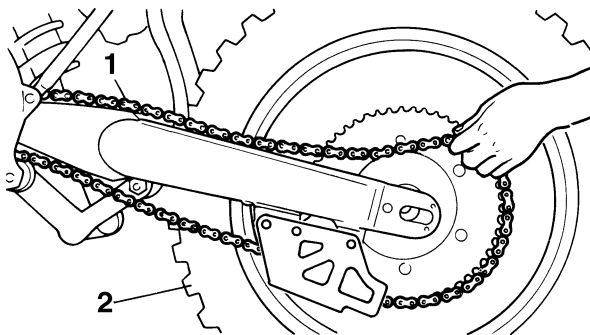


## 2. Install:

- Drive chain “1”

## TIP

Push the rear wheel “2” forward and install the drive chain.

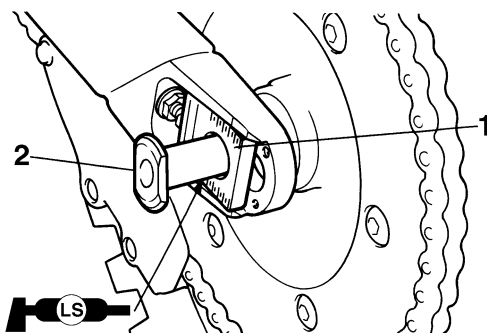


## 3. Install:

- Left drive chain puller “1”
- Rear wheel axle “2”

## TIP

- Install the left drive chain puller, and insert the rear wheel axle from the left side.
- Apply the lithium-soap-based grease to the rear wheel axle.

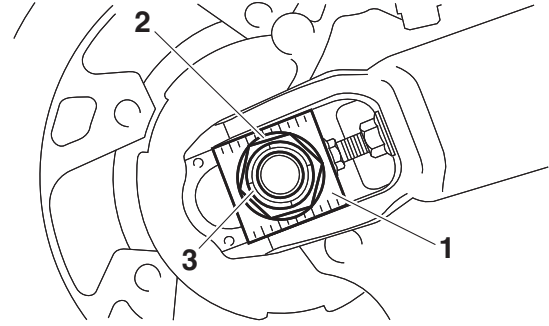


## 4. Install:

- Right drive chain puller “1”
- Washer “2”
- Rear wheel axle nut “3”

## TIP

Temporarily tighten the nut (rear wheel axle) at this point.



## 5. Adjust:

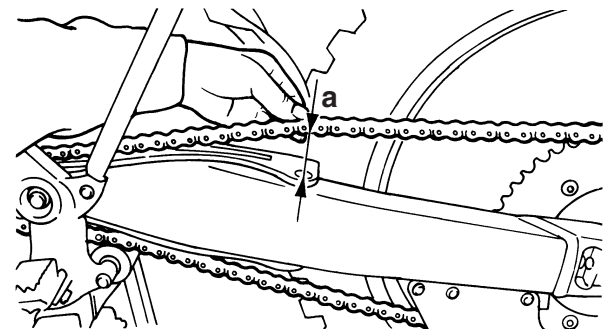
- Drive chain slack “a”



## Drive chain slack (Maintenance stand)

50.0–60.0 mm (1.97–2.36 in)

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-27.



## 6. Tighten:

- Rear wheel axle nut “1”



## Wheel axle nut

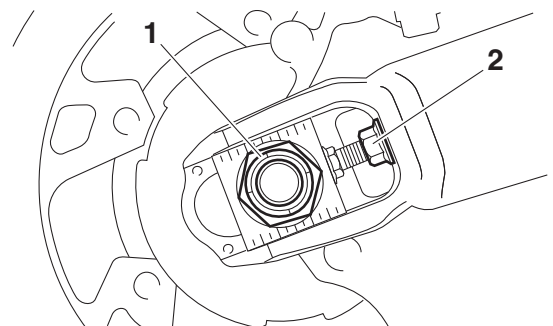
125 N·m (12.5 kgf·m, 92 lb·ft)

- Locknut “2”



## Locknut

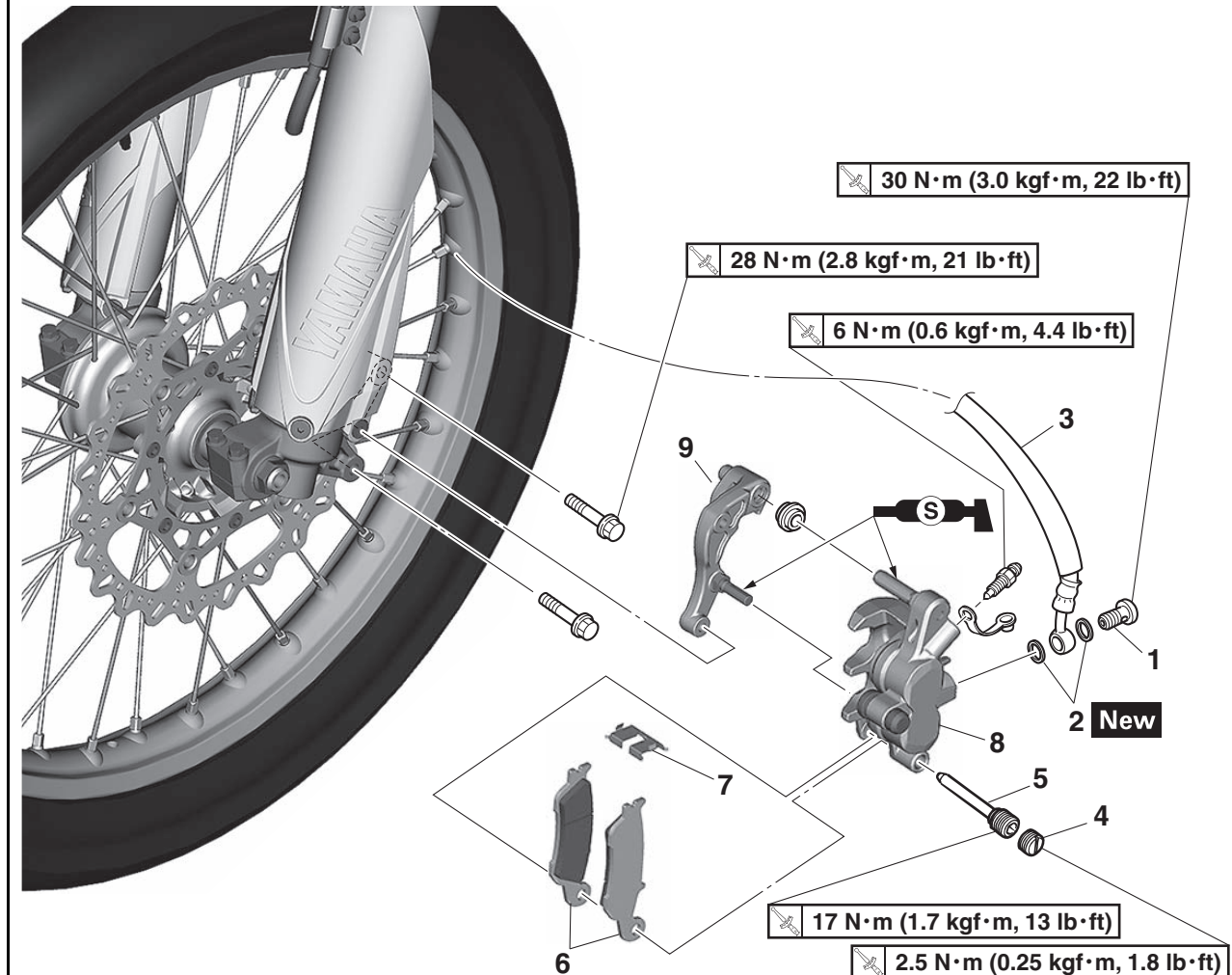
21 N·m (2.1 kgf·m, 15 lb·ft)



EAM20097

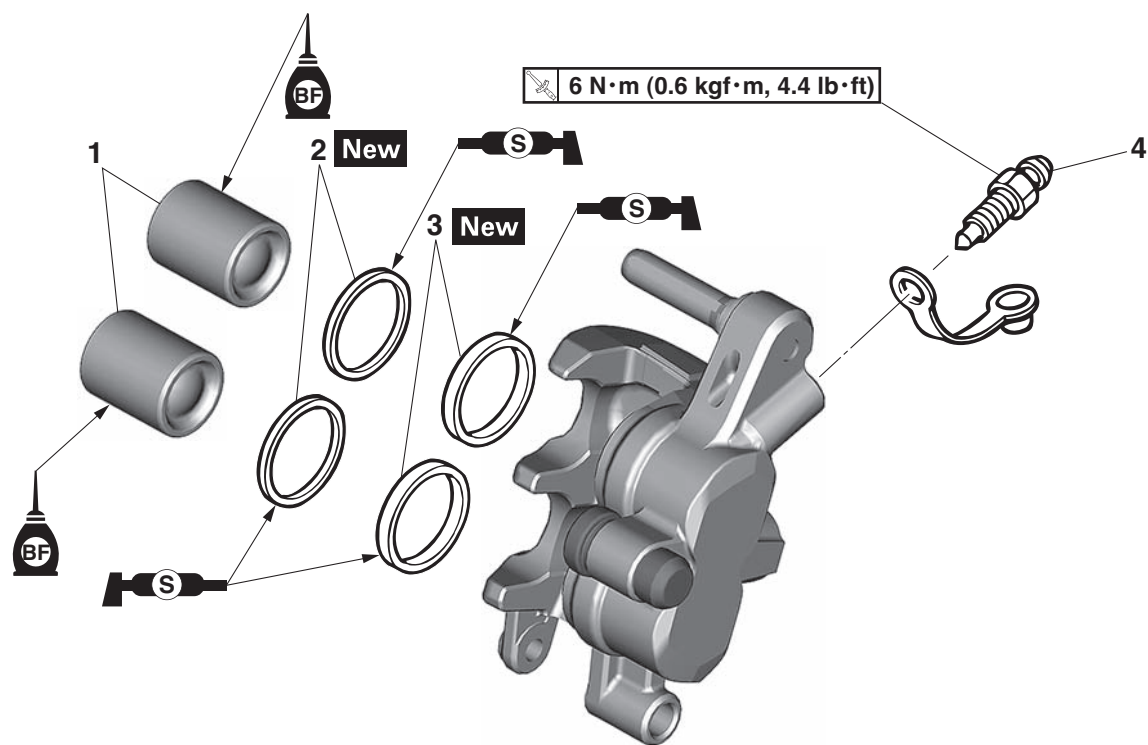
## FRONT BRAKE

### Removing the front brake caliper



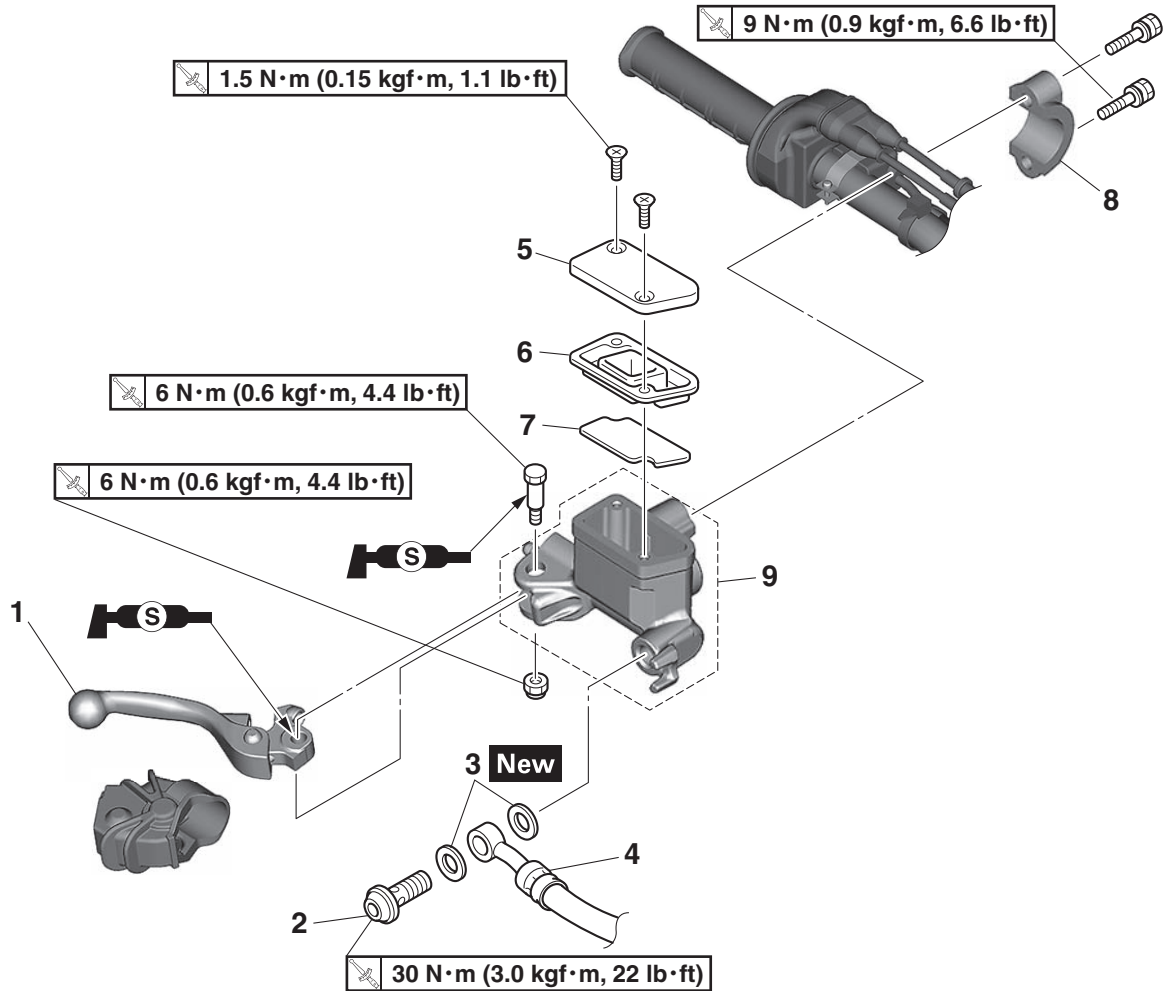
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Union bolt	1	
2	Copper washer	2	
3	Front brake hose	1	
4	Brake pad pin plug	1	
5	Brake pad pin	1	
6	Brake pad	2	
7	Brake pad spring	1	
8	Front brake caliper assembly	1	
9	Front brake caliper bracket	1	

Disassembling the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	2	
2	Brake caliper piston dust seal	2	
3	Brake caliper piston seal	2	
4	Bleed screw	1	

## Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Brake lever	1	
2	Union bolt	1	
3	Copper washer	2	
4	Front brake hose	1	
5	Brake master cylinder reservoir cap	1	
6	Brake master cylinder reservoir diaphragm	1	
7	Front brake master cylinder float	1	
8	Front brake master cylinder holder	1	
9	Front brake master cylinder	1	

Disassembling the front brake master cylinder

1

2

3 New

4

5 New

BF

Order	Job/Parts to remove	Q'ty	Remarks
1	Push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Washer	1	
5	Brake master cylinder kit	1	

## INTRODUCTION

EWA19210



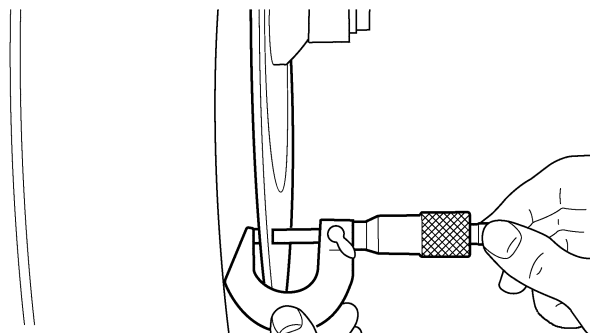
**If you need to disassemble the disc brake components, observe the following precautions.**

- Never disassemble the brake components unless absolutely necessary.
- If there is any problem with connections on the hydraulic brake system, perform the following jobs. Disassemble the brake system, drain the brake fluid, and clean it. After that, add a suitable amount of brake fluid. Then, bleed it after reassembly.
- Use only brake fluid for washing brake components.
- Use new brake fluid for cleaning the brake components.
- Immediately wipe off the spilled brake fluid to avoid damage to painted surfaces or plastic parts.
- Handle brake fluid with special care not to let it enter your eyes so that you may not lose your eyesight.
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- Flush with water for 15 minutes and get immediate medical attention.

EAM30029

## CHECKING THE FRONT BRAKE DISC

1. Remove:
  - Front wheelRefer to “FRONT WHEEL” on page 4-5.
2. Check:
  - Front brake discDamage/galling → Replace.
3. Measure:
  - Brake disc thicknessMeasure the brake disc thickness at a few different locations.  
Out of specification → Replace.



**Brake disc thickness limit**  
**2.5 mm (0.10 in)**

4. Install:
- Front wheel
- Refer to “FRONT WHEEL” on page 4-5.

EAM30030

## REMOVING THE FRONT BRAKE CALIPER

**TIP**

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

1. Remove:
  - Union bolt
  - Copper washer
  - Brake hose

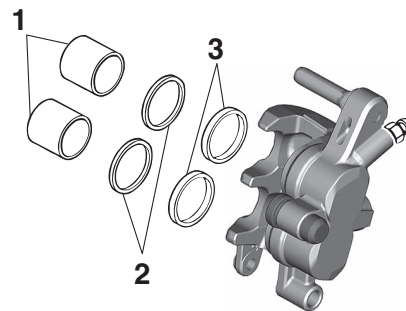
**TIP**

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

EAM30031

## DISASSEMBLING THE FRONT BRAKE CALIPER

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



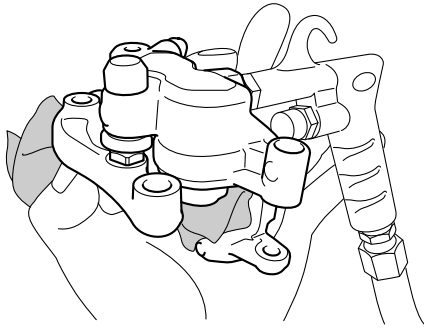
- a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

EWA13550



- 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 the brake caliper piston seal.

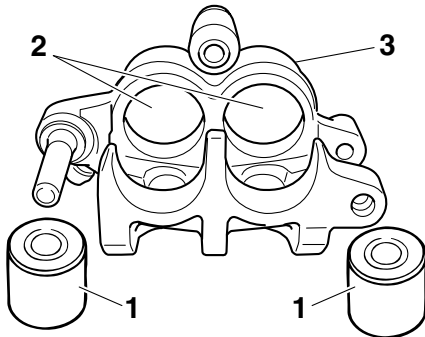


EAM30032

## CHECKING THE FRONT BRAKE CALIPER

### 1. 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.



EWA19220

## WARNING

When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.

### 2. Check:

- Brake caliper bracket  
Crack/damage → Replace.

EAM30033

## ASSEMBLING THE FRONT BRAKE CALIPER

EWA19230

## WARNING

- Before installation, clean and lubricate the

internal parts. Use new brake fluid for cleaning and lubricating.

- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.



Specified brake fluid  
DOT 4

EAM30034

## INSTALLING THE BRAKE CALIPER PISTON

### 1. Clean:

- Brake caliper
- Brake caliper piston seal
- Brake caliper piston dust seal
- Brake caliper piston  
Use brake fluid for cleaning.

### 2. Install:

- Brake caliper piston seal “1” **New**
- Brake caliper piston dust seal “2” **New**

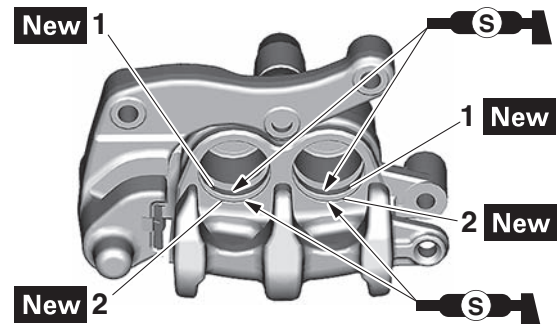
EWA19240

## WARNING

Always use new brake caliper piston seal and brake caliper piston dust seal.

### TIP

- Apply the silicone grease on the brake caliper piston seal and brake caliper piston dust seal.
- Fit the brake caliper piston seal and the brake caliper piston dust seal into the grooves in the brake caliper correctly.



### 3. Install:

- Brake caliper piston “1”

### TIP

Apply the brake fluid on the piston outer surface.

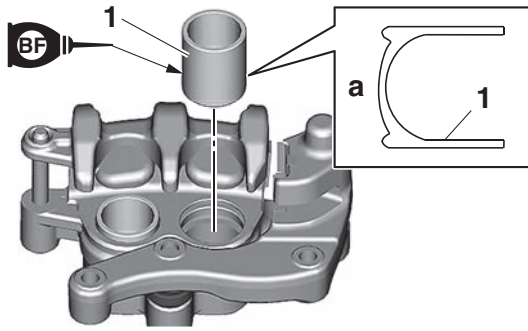
ECA24450

## NOTICE

- Install the piston with its side “a” facing the brake caliper.



- Never force to insert.



EAM30035

## INSTALLING THE FRONT BRAKE CALIPER

### 1. Install:

- Front brake caliper bracket
- Front brake caliper (temporarily)
- Copper washer **New**
- Brake hose
- Union bolt



**Front brake caliper bracket**  
28 N·m (2.8 kgf·m, 21 lb·ft)  
**Brake hose union bolt**  
30 N·m (3.0 kgf·m, 22 lb·ft)

EWA13531

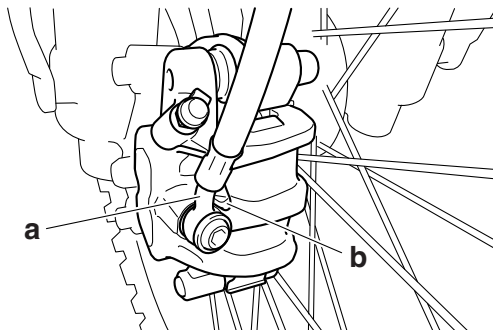
### **WARNING**

Proper brake hose routing is essential to insure safe vehicle operation.

ECA24460

### **NOTICE**

Make sure that the pipe portion "a" of the brake hose touches the projection "b" on the brake caliper.



### 2. Install:

- Front brake caliper
- Brake pad spring
- Brake pad
- Brake pad pin
- Brake hose holder



**Brake pad pin**  
17 N·m (1.7 kgf·m, 13 lb·ft)

Refer to "CHECKING THE FRONT BRAKE PADS" on page 3-23.

### 3. Tighten:

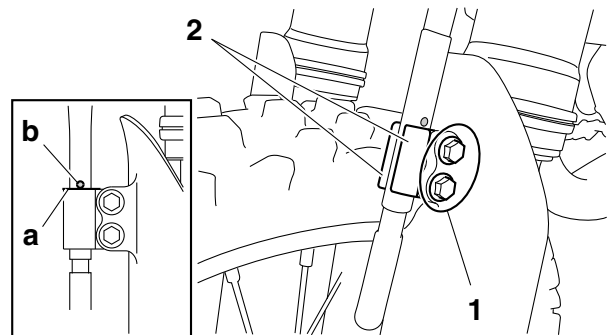
- Brake hose holder bolt "1"



**Brake hose holder bolt**  
9 N·m (0.9 kgf·m, 6.6 lb·ft)

### **TIP**

Make sure that the brake hose holder "2" is installed with its upper end "a" aligned with the paint "b" on the brake hose.



### 4. Pour brake fluid to the brake master cylinder reservoir up to the specified level.



**Specified brake 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 BRAKE SYSTEM” on page 3-21.

## 6. Check:

- Brake fluid level  
The minimum level mark or below → Add.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.

## 7. Check:

- Brake lever free play  
Refer to “ADJUSTING THE FRONT BRAKE” on page 3-22.
- Brake lever operation  
A softy or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.

EAM30036

## REMOVING THE FRONT BRAKE MASTER CYLINDER

### TIP

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

## 1. Remove:

- Union bolt
- Copper washer
- Brake hose

### TIP

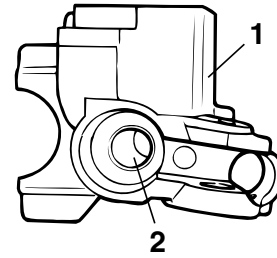
To drain any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

EAM30037

## CHECKING THE FRONT BRAKE MASTER CYLINDER

## 1. Check:

- Brake master cylinder “1”  
Damage/scratches/wear → Replace.
- Brake fluid delivery passages “2”  
(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 cap

## 4. Check:

- Brake hose  
Cracks/damage/wear → Replace.

EAM30038

## 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.



**Specified brake fluid  
DOT 4**

1. Wash the brake master cylinder and the brake master cylinder kit with brake fluid.

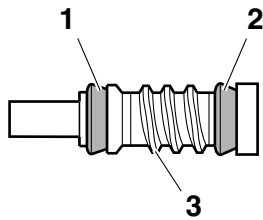
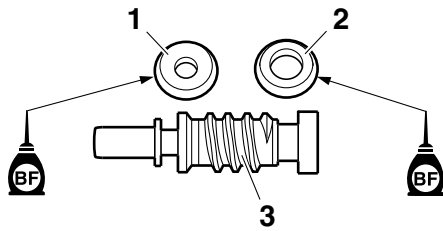
## 2. Install:

- Primary cylinder cup “1”
- Secondary cylinder cup “2”  
Install to the brake master cylinder piston “3”.

EWA20240

### ⚠ WARNING

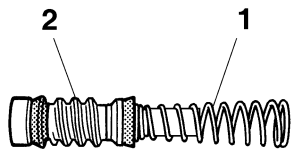
**Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.**



3. Install:
- Spring "1"
- Install to the brake master cylinder piston "2".

#### TIP

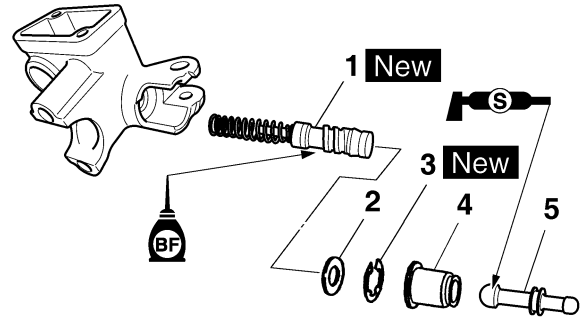
Install the spring with a smaller inside diameter to the brake master cylinder piston.



4. Install:
- Brake master cylinder kit "1" **New**
  - Washer "2"
  - Circlip "3" **New**
  - Dust boot "4"
  - Push rod "5"

#### TIP

- Before installation, apply brake fluid to the brake master cylinder kit.
- Before installation, apply silicone grease to the push rod end.
- Use circlip pliers to install the circlip.



EAM30039

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

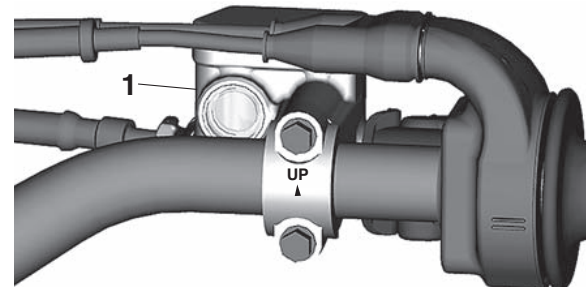
1. Install:
- Brake master cylinder holder "1"



**Brake master cylinder holder bolt**  
9 N·m (0.9 kgf·m, 6.6 lb·ft)

#### TIP

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



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



**Brake hose union bolt**  
30 N·m (3.0 kgf·m, 22 lb·ft)

EWA13531

#### WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

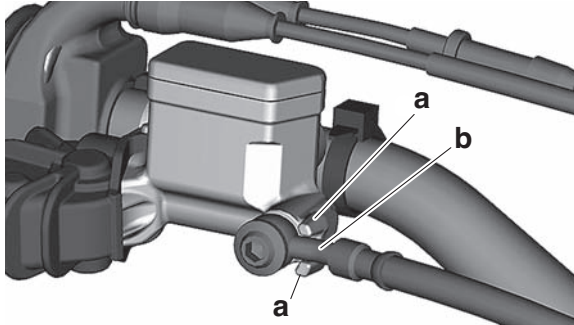
ECA24470

#### NOTICE

During installation, bring the brake hose into contact with the brake master cylinder projection "a" and make its bent portion "b" face downward.

## TIP

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



3. Pour brake fluid to the brake master cylinder reservoir up to the specified level.



**Specified brake fluid  
DOT 4**

EWA13090



## WARNING

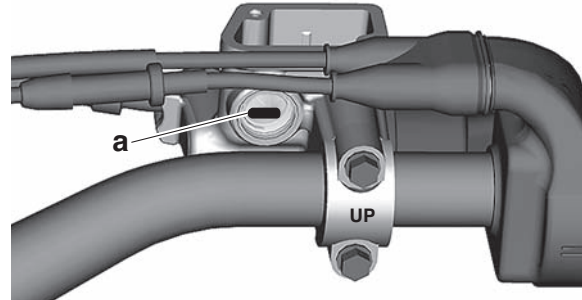
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

4. Bleed:
  - Brake system  
Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.
5. Check:
  - Brake fluid level  
The minimum level mark “a” or below → Add.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.

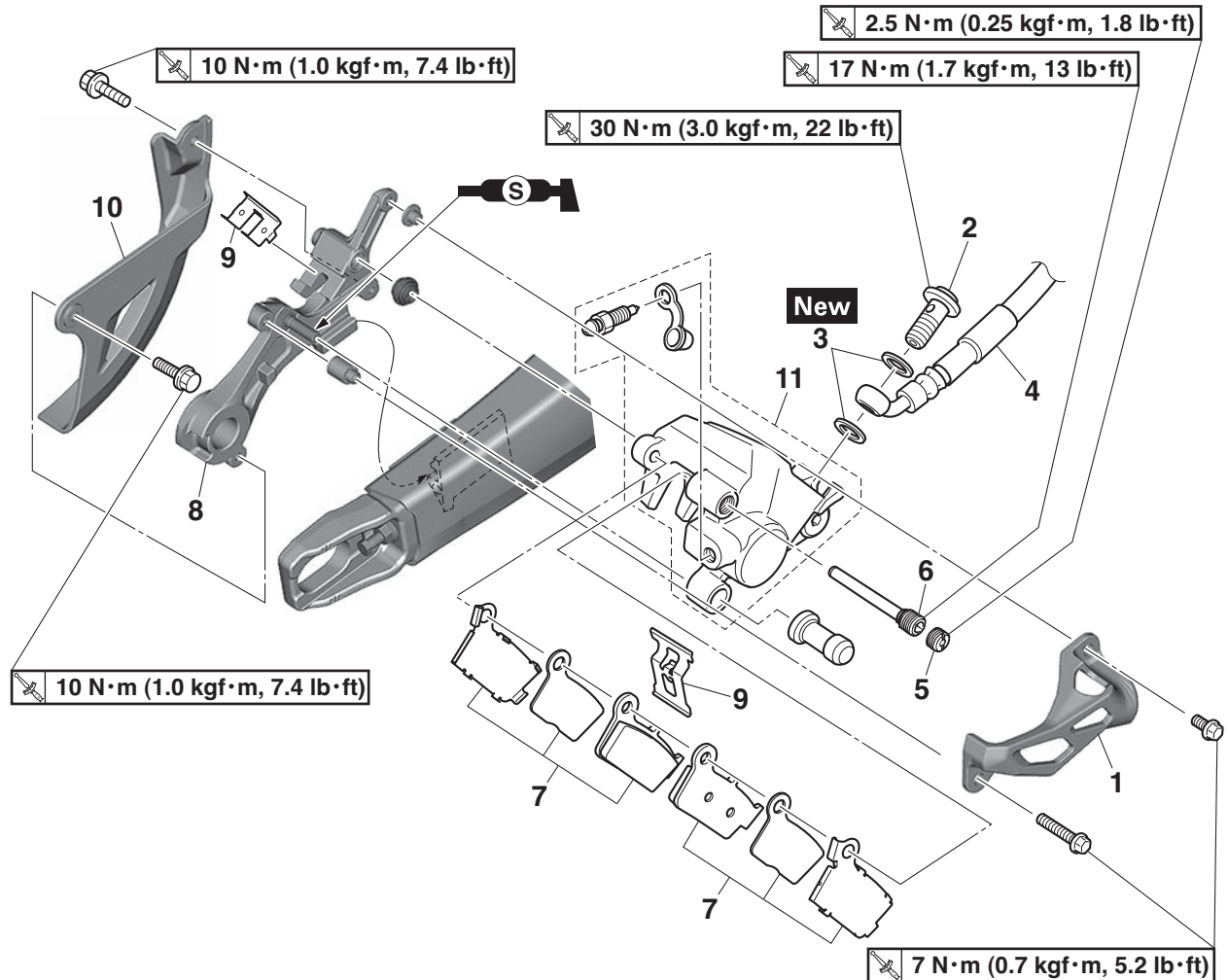


6. Check:
  - Brake lever free play  
Refer to “ADJUSTING THE FRONT BRAKE” on page 3-22.
  - Brake lever operation  
A softy or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.

EAM20098

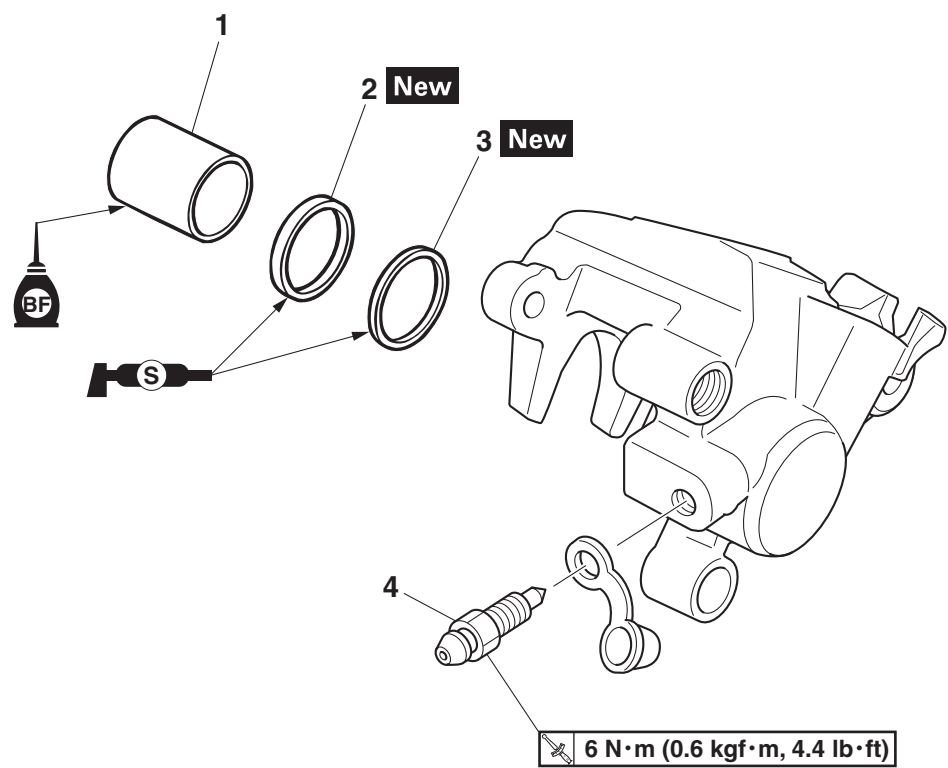
## REAR BRAKE

### Removing the rear brake caliper



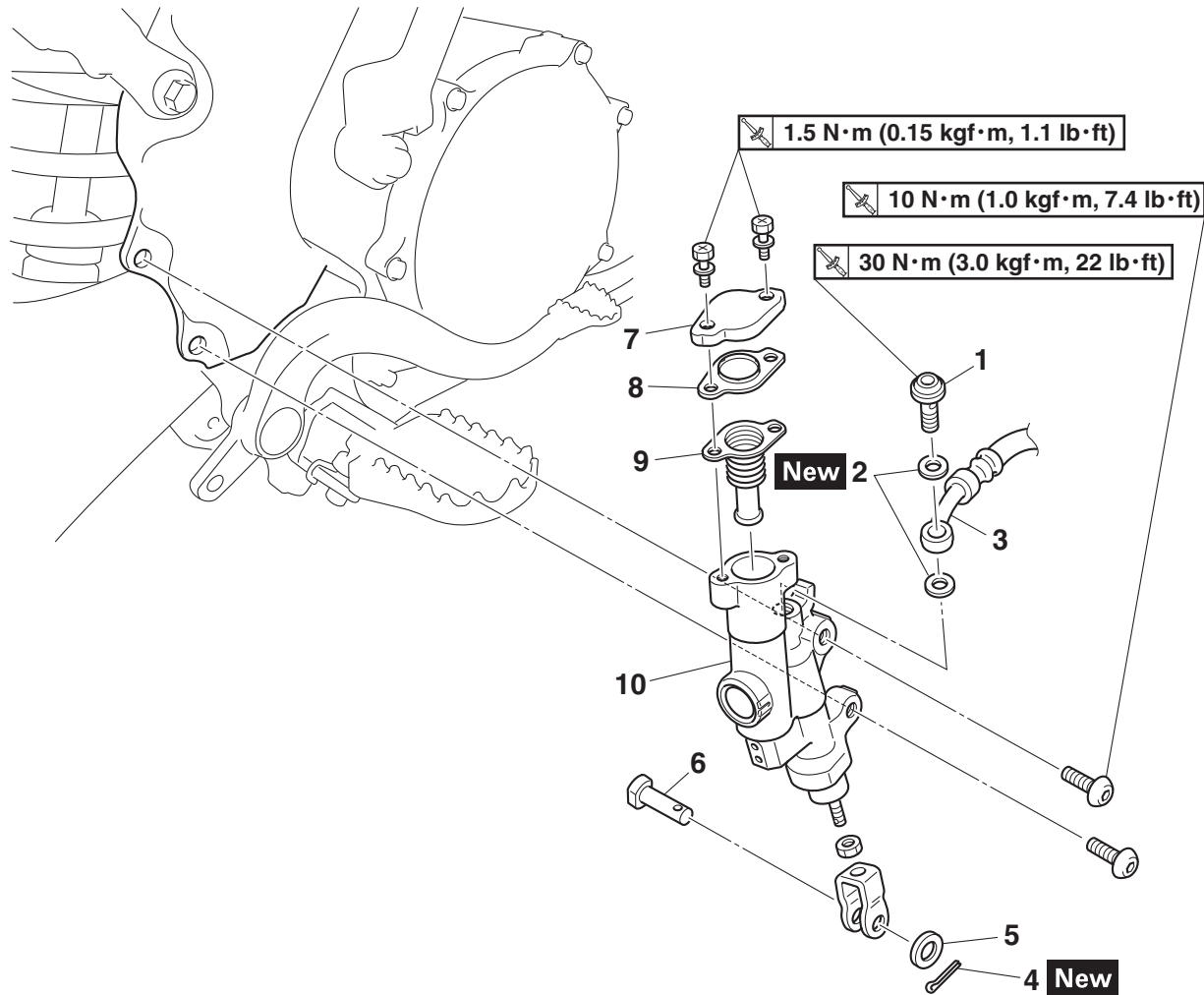
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Protector	1	
2	Union bolt	1	
3	Copper washer	2	
4	Rear brake hose	1	
5	Brake pad pin plug	1	
6	Brake pad pin	1	
7	Rear brake pad assembly	2	
8	Rear brake caliper bracket	1	
9	Brake pad spring	2	
10	Rear brake disc cover	1	
11	Rear brake caliper assembly	1	

Disassembling the rear brake caliper



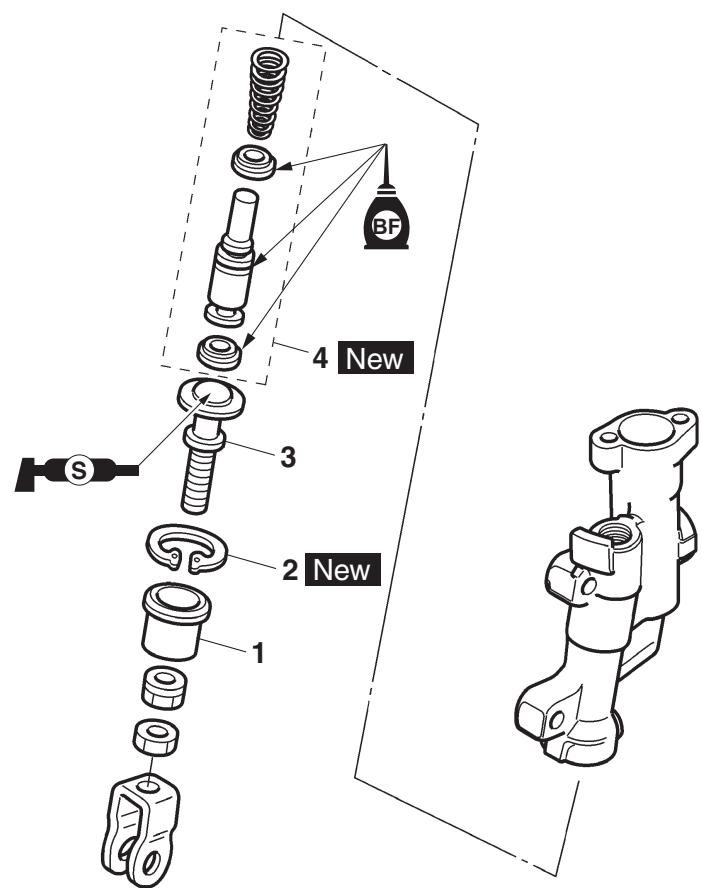
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	1	
2	Brake caliper piston dust seal	1	
3	Brake caliper piston seal	1	
4	Bleed screw	1	

## Removing the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Split pin	1	
5	Washer	1	
6	Pin	1	
7	Brake master cylinder reservoir cap	1	
8	Brake master cylinder reservoir diaphragm plate	1	
9	Brake master cylinder reservoir diaphragm	1	
10	Rear brake master cylinder	1	

Disassembling the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Dust boot	1	
2	Circlip	1	
3	Push rod	1	
4	Brake master cylinder kit	1	



EAM30040

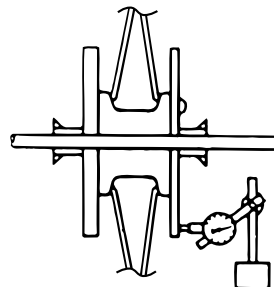
## INTRODUCTION

EWA19260

### **WARNING**

If you need to disassemble the disc brake components, observe the following precautions.

- Never disassemble the brake components unless absolutely necessary.
- If there is any problem with connections on the hydraulic brake system, perform the following jobs. Disassemble the brake system, drain the brake fluid, and clean it. After that, add a suitable amount of brake fluid. Then, bleed it after reassembly.
- Use only brake fluid for washing internal brake components.
- Use new brake fluid for cleaning the brake components.
- Immediately wipe off the spilled brake fluid to avoid damage to painted surfaces or plastic parts.
- Handle brake fluid with special care not to let it enter your eyes so that you may not lose your eyesight.
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- Flush with water for 15 minutes and get immediate medical attention.



**Brake disc runout limit (as measured on wheel)**  
**0.15 mm (0.0059 in)**

5. Adjust:
  - Brake disc deflection



- a. Remove the brake disc.
- b. Turn the mounted position of the brake disc by one bolt hole.
- c. Install the brake disc.

### **TIP**

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



**Brake disc bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**  
**LOCTITE®**

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



6. Install:
  - Rear wheel
 Refer to "REAR WHEEL" on page 4-9.

EAM30041

## CHECKING THE REAR BRAKE DISC

1. Remove:
  - Rear wheel
 Refer to "REAR WHEEL" on page 4-9.
2. Check:
  - Brake disc
 Damage/galling → Replace.
3. Measure:
  - Brake disc thickness
 Measure the brake disc thickness at a few different locations.  
Out of specification → Replace.  
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-17.



**Brake disc thickness limit**  
**3.5 mm (0.14 in)**

4. Measure:
  - Brake disc deflection
 Out of specification → Correct the brake disc deflection or replace the brake disc.

**TIP**

1. Remove:

- Union bolt
- Copper washer
- Brake hose

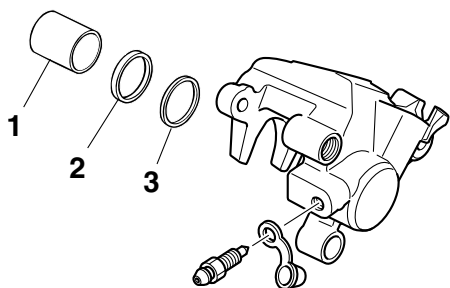
**TIP**

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

EAM30043

1. Remove:

- Brake caliper piston “1”
- Brake caliper piston dust seal “2”
- Brake caliper piston seal “3”

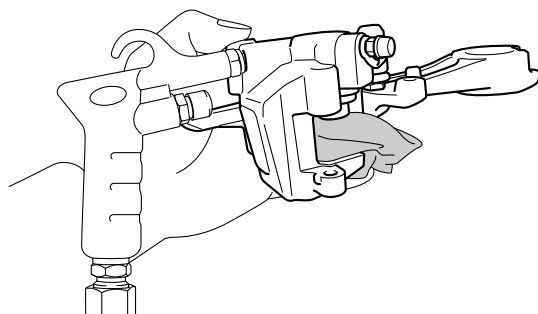


- a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

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.**



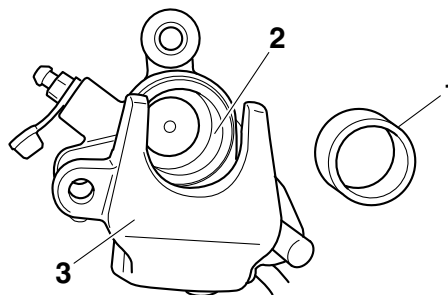
and the brake caliper piston seal.

FAM30044

## CHECKING THE REAR BRAKE CALIPER

1. 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.



EWA19270

**WARNING**

**When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.**

2. Check:

- Brake caliper bracket  
Crack/damage → Replace.

FAM30045

## ASSEMBLING THE REAR BRAKE CALIPER

FWA19280

**WARNING**

- Before installation, clean and lubricate the internal parts. Use new brake fluid for cleaning and lubricating.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.



**Specified brake fluid  
DOT 4**

EAM30046

## INSTALLING THE BRAKE CALIPER PISTON

### 1. Clean:

- Brake caliper
- Brake caliper piston seal
- Brake caliper piston dust seal
- Brake caliper piston

Use brake fluid for cleaning.

### 2. Install:

- Brake caliper piston seal “1” **New**
- Brake caliper piston dust seal “2” **New**

EWA19290

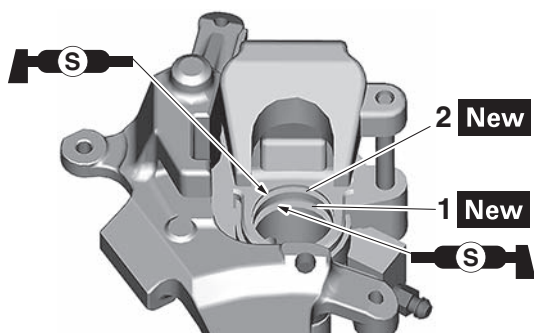


**WARNING**

**Always use new brake caliper piston seal and brake caliper piston dust seal.**

### TIP

- Apply the silicone grease on the brake caliper piston seal and brake caliper piston dust seal.
- Fit the brake caliper piston seals and brake caliper piston dust seals onto the slot on brake caliper correctly.



### 3. Install:

- Brake caliper piston “1”

### TIP

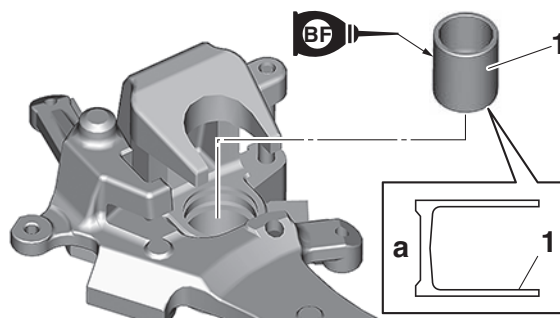
Apply the brake fluid on the piston outer surface.

ECA24480



**NOTICE**

- Install the piston with its side “a” facing the brake caliper.
- Never force to insert.



EAM30047

## INSTALLING THE REAR BRAKE CALIPER

### 1. Install:

- Rear brake caliper
- Rear brake caliper bracket

### 2. Install:

- Rear wheel
- Refer to “REAR WHEEL” on page 4-9.
- Copper washer **New**
- Brake hose
- Union bolt



**Brake hose union bolt  
30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA13531



**WARNING**

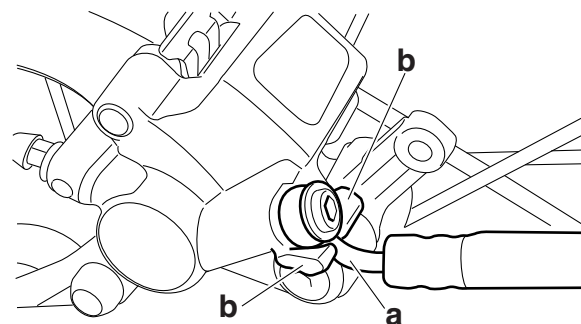
**Proper brake hose routing is essential to insure safe vehicle operation.**

ECA24490



**NOTICE**

**Make sure that a bend in its pipe portion “a” is directed as shown and the brake hose touches the projection “b” on the brake caliper.**



### 3. Install:

- Brake pad spring
- Brake pad
- Brake pad pin
- Brake pad pin plug



**Brake pad pin**  
17 N·m (1.7 kgf·m, 13 lb·ft)  
**Brake pad pin plug**  
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)

Refer to "CHECKING THE REAR BRAKE PADS" on page 3-25.

4. Pour brake fluid to the brake fluid reservoir up to the specified level.



**Specified brake fluid**  
DOT 4

EWA13090



## WARNING

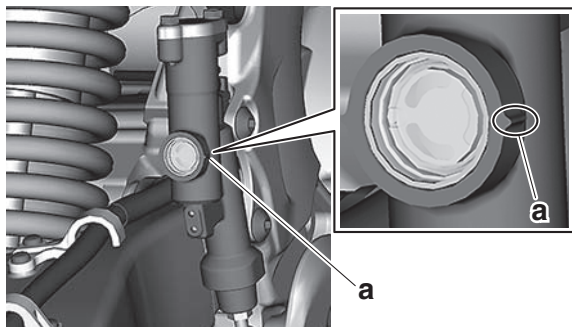
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake 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 BRAKE SYSTEM" on page 3-21.
6. Check:
  - Brake fluid level  
The minimum level mark "a" or below → Add.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-26.



7. Check:
  - Brake pedal operation  
A softy or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.

EAM30048

## REMOVING THE REAR BRAKE MASTER CYLINDER

### TIP

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

1. Remove:
  - Union bolt
  - Copper washer
  - Brake hose

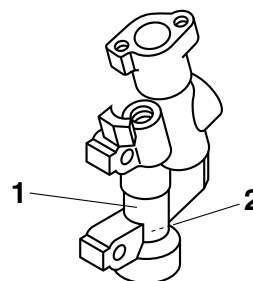
### TIP

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

EAM30049

## CHECKING THE REAR BRAKE MASTER CYLINDER

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



2. Check:
  - Brake master cylinder kit  
Damage/wear → Replace.
3. Check:
  - Master cylinder reservoir cap  
Crack/damage → Replace.
  - Brake master cylinder reservoir diaphragm holder
  - Brake master cylinder reservoir diaphragm  
Crack/damage → Replace.

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

EAM30050

## 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.

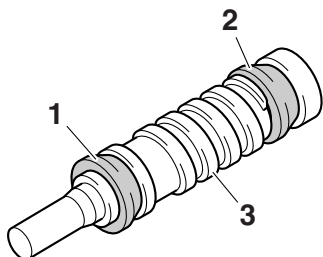
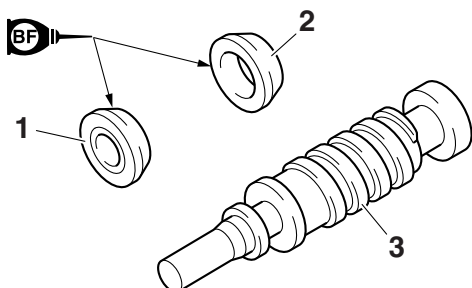
	<b>Specified brake fluid DOT 4</b>
---	--

1. Wash the brake master cylinder and the brake master cylinder kit with brake fluid.
2. Install:
  - Primary cylinder cup “1”
  - Secondary cylinder cup “2”
 Install to the brake master cylinder piston “3”.

EWA19300

### **WARNING**

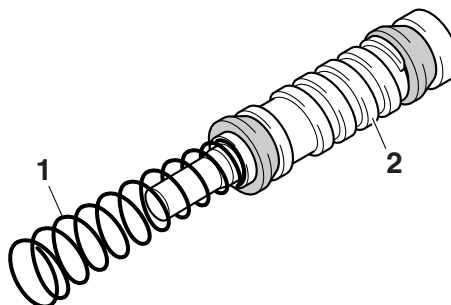
**Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.**



3. Install:
  - Spring “1”
 Install to the brake master cylinder piston “2”.

### **TIP**

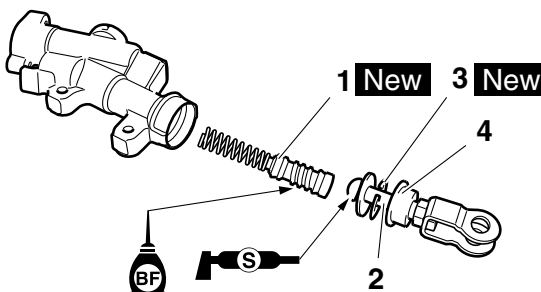
Install the spring with a smaller inside diameter to the brake master cylinder piston.



4. Install:
  - Master cylinder kit “1” **New**
  - Push rod “2”
  - Circlip “3” **New**
  - Dust boot “4”

### **TIP**

- Before installation, apply brake fluid to the brake master cylinder kit.
- Before installation, apply silicone grease to the push rod end.
- Use circlip pliers to install the circlip.



EAM30051

## INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
  - Copper washer **New**
  - Brake hose
  - Union bolt



**Brake hose union bolt  
30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA13531

### **WARNING**

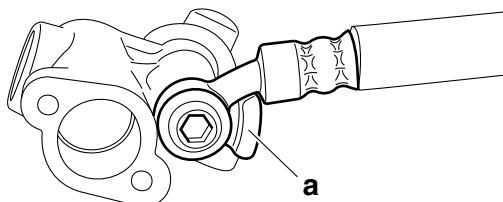
**Proper brake hose routing is essential to insure safe vehicle operation.**

ECA24500

### **NOTICE**

**Make sure that the pipe portion of the brake**

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



2. Pour brake fluid to the brake fluid reservoir up to the specified level.



**Specified brake 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.

ECA24510

## **NOTICE**

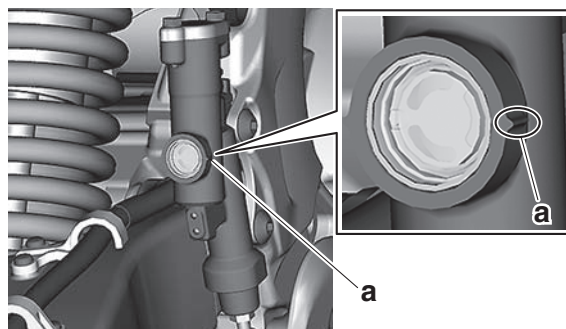
**Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**

3. Bleed:

- Brake system  
Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.

4. Check:

- Brake fluid level  
The minimum level mark “a” or below → Add.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.

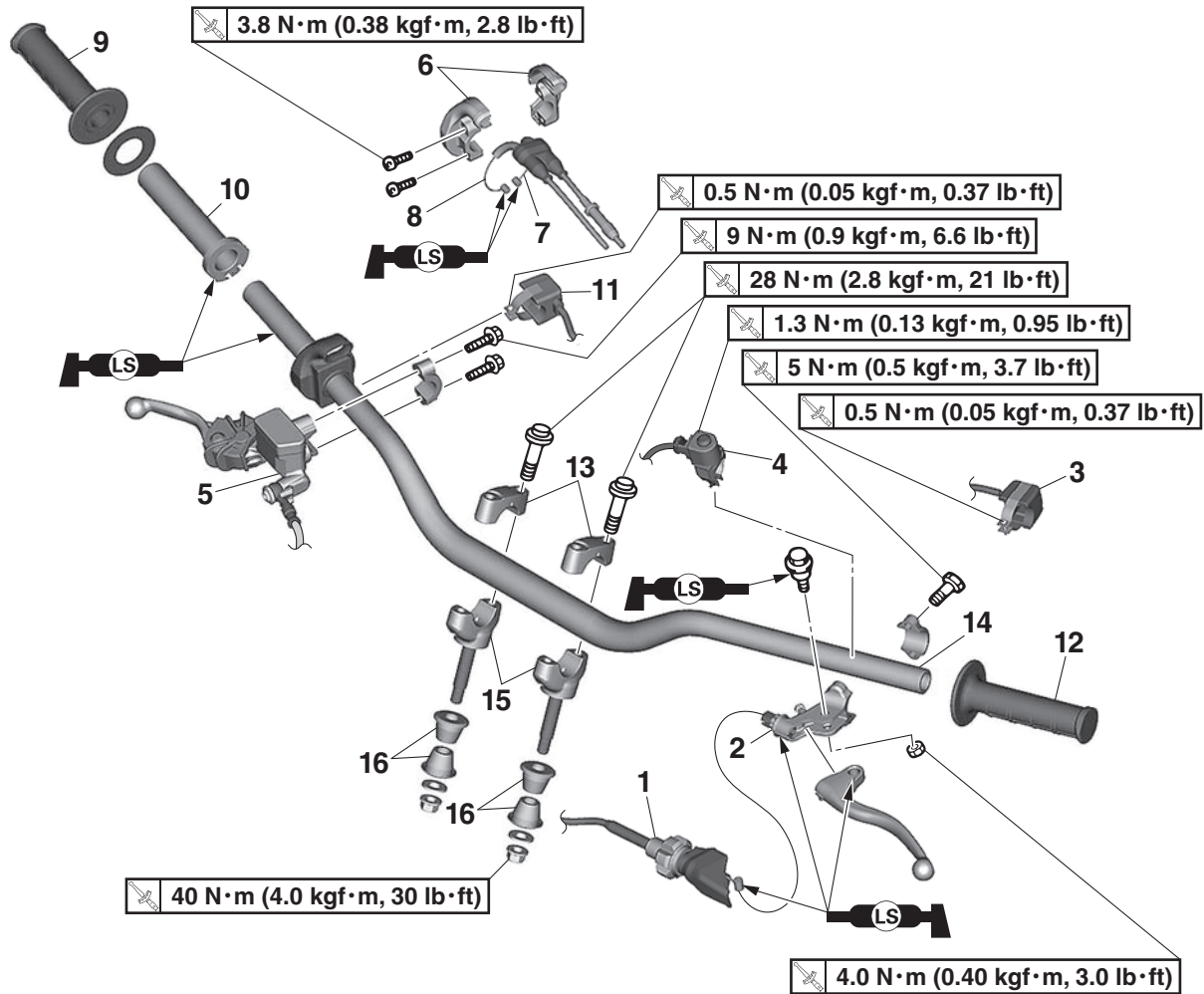


5. Check:

- Brake pedal operation  
A softy or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.



EAM20099

**HANDLEBAR****Removing the handlebar**

Order	Job/Parts to remove	Q'ty	Remarks
	Number plate		Refer to "GENERAL CHASSIS" on page 4-1.
1	Clutch cable	1	Disconnect.
2	Clutch lever holder	1	
3	Engine stop switch	1	
4	Mode switch	1	
5	Brake master cylinder	1	
6	Throttle cable cap	1	
7	Throttle cable (pull)	1	Disconnect.
8	Throttle cable (return)	1	Disconnect.
9	Right grip	1	
10	Tube guide	1	
11	Start switch	1	
12	Left grip	1	
13	Upper handlebar holder	2	
14	Handlebar	1	
15	Lower handlebar holder	2	
16	Damper	4	

EAM30052

## REMOVING THE HANDLEBAR

1. Stand the vehicle upright on a level surface.

EWA13120

### **WARNING**

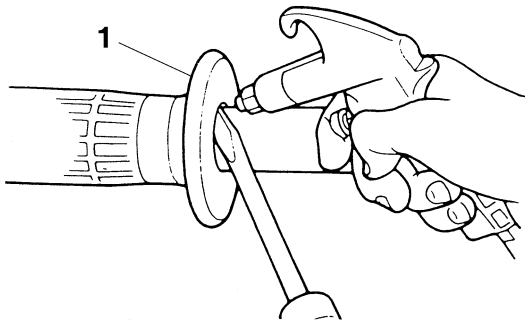
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- Grip "1"

### **TIP**

Blow in compressed air between the handlebar or tube guide and the grip. Then remove the grip which has become loose.

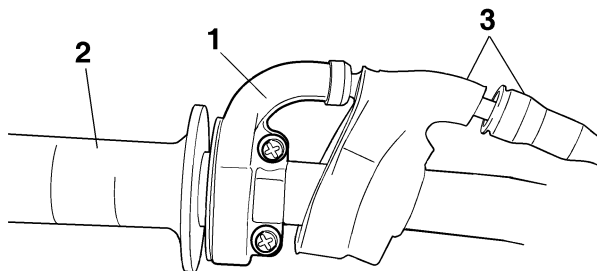


3. Remove:

- Throttle cable housings "1"
- Throttle grip "2"

### **TIP**

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



EAM30053

## 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.

EAM30054

## INSTALLING THE HANDLEBAR

1. Stand the vehicle upright on a level surface.

EWA13120

### **WARNING**

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

2. Install:

- Damper "1"
- Lower handlebar holder "2" (temporarily)
- Handlebar "3"
- Upper handlebar holder "4"



**Upper handlebar holder bolt**  
28 N·m (2.8 kgf·m, 21 lb·ft)

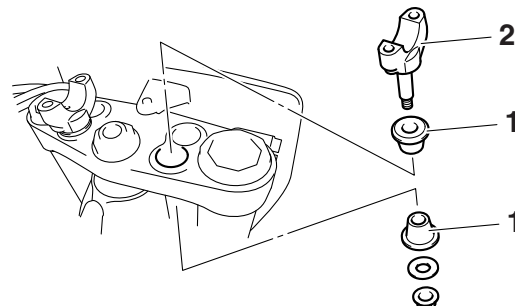
### **TIP**

- Install the lower handlebar holders with them side having the greater distance "a" from the mounting bolt center facing forward.
- Installing the lower handlebar holders in the reverse direction allow the front-to-rear offset amount of the handlebar position to be changed.
- The upper handlebar holders should be installed with the punch marks "b" facing forward.
- When installing the handlebar, make sure that right and left marks "c" are in place identically on both sides.
- Install the handlebar so that the projection "d" of the upper handlebar holders is positioned at the mark on the handlebar as shown.

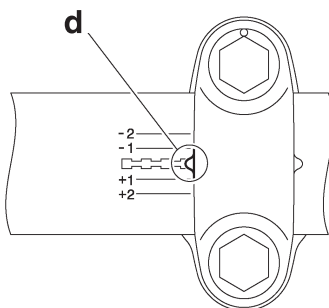
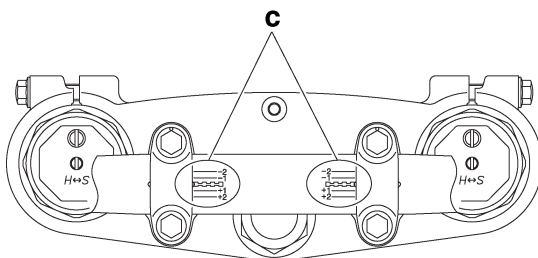
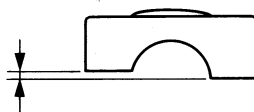
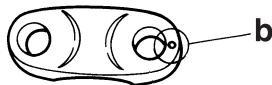
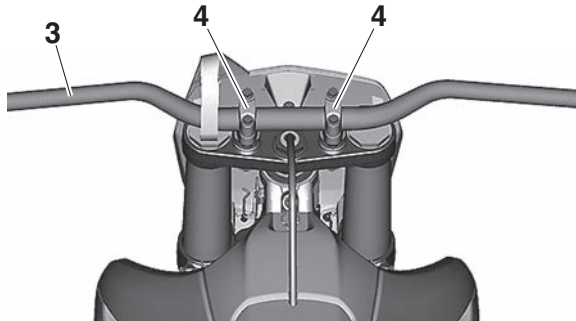
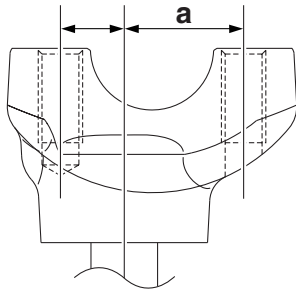
ECA14250

### **NOTICE**

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







3. Tighten:

- Lower handlebar holder nut



**Lower handlebar holder nut**  
40 N·m (4.0 kgf·m, 30 lb·ft)

4. Install:

- Handlebar grip “1”



- Slightly coat the handlebar left end with a rubber adhesive.
- Install the handlebar grip on the handlebar by pressing the grip from the left side.
- Wipe off any excess adhesive with a clean cloth.

EWA13120

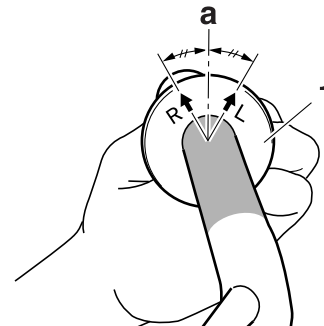


**WARNING**

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

**TIP**

Install the handlebar grip to the handlebar so that the line “a” between the two arrow marks faces straight upward.



5. Install:

- Engine stop switch “1”
- Clutch lever “2”
- Clutch lever holder “3”
- Mode switch “4”
- Clamp “5”

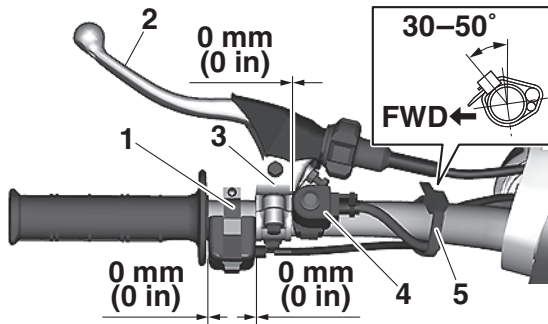


**Engine stop switch screw**  
0.5 N·m (0.05 kgf·m, 0.37 lb·ft)  
**Clutch lever holder bolt**  
5 N·m (0.5 kgf·m, 3.7 lb·ft)  
**Screw (mode switch)**  
1.3 N·m (0.13 kgf·m, 0.95 lb·ft)

**TIP**

- The engine stop switch, the clutch lever, the clutch lever holder and the mode switch should be installed according to the dimensions shown.

- Pass the engine stop switch lead through the middle of the clutch lever holder.



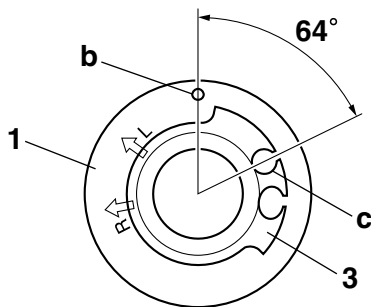
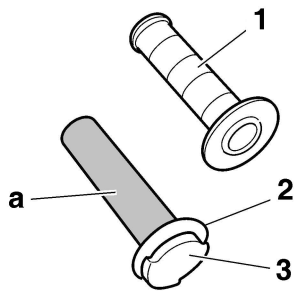
6. Install:

- Right grip "1"
- Collar "2"

Apply adhesive to the tube guide "3".

## TIP

- Before applying the adhesive, wipe off grease or oil on the tube guide surface "a" with a lacquer thinner.
- Install the grip to the tube guide so that the grip match mark "b" and tube guide slot "c" form the angle as shown.

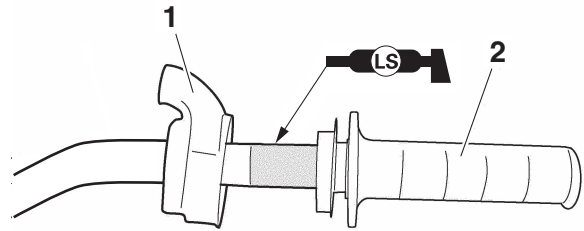


7. Install:

- Start switch
- Rubber cover "1"
- Throttle grip "2"

## TIP

Apply the lithium-soap-based grease on the throttle grip sliding surface.

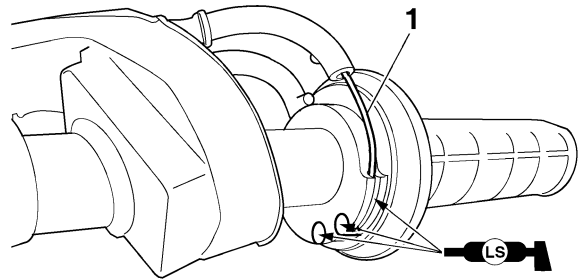


8. Install:

- Throttle cables "1"

## TIP

Slightly coat the end of throttle cable and inside of throttle grip with lithium-soap-based grease. Then, mount the throttle grip onto the handlebar.



9. Install:

- Throttle cable housing "1"
- Screw (throttle cable housings) "2"

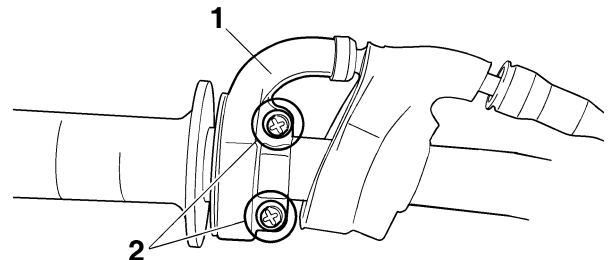


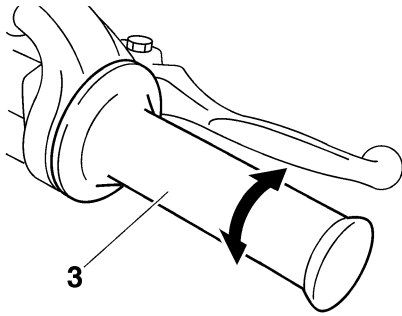
**Screw (throttle cable housings)**  
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

EWA19310

## WARNING

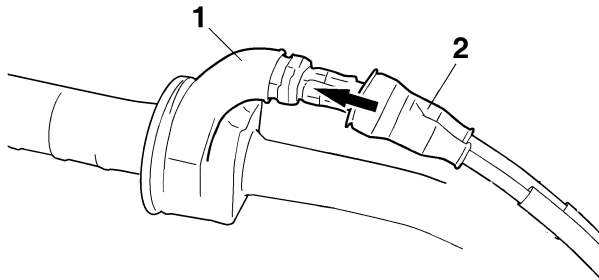
After tightening the throttle cable housing screws, check that the throttle grip "3" moves smoothly. If it does not, retighten the screws for adjustment.





## 10. Install:

- Rubber cover “1”
- Cover (throttle cable housings) “2”



## 11. Install:

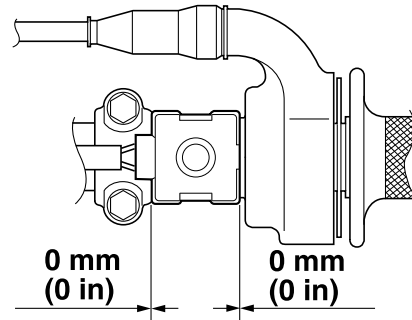
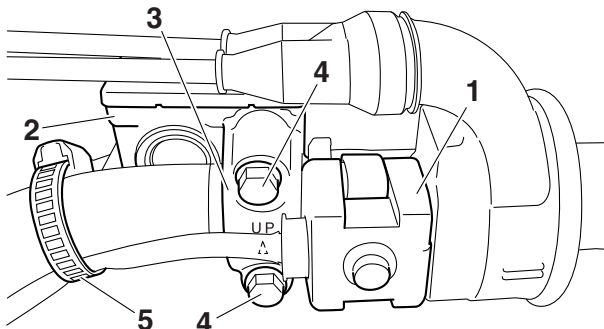
- Start switch “1”
- Front brake master cylinder assembly “2”
- Front brake master cylinder holder “3”
- Bolt (brake master cylinder holder) “4”
- Clamp “5”



**Front brake master cylinder holder bolt**  
9 N·m (0.9 kgf·m, 6.6 lb·ft)

## TIP

- Install the brake master cylinder holder with the “UP” mark facing up.
- Install in order for the top of the front brake master cylinder assembly to be level.
- First, tighten the upper bolt, then the lower bolt.

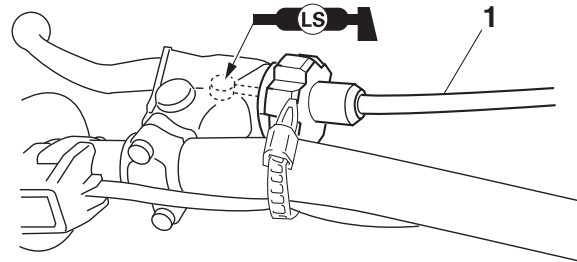


## 12. Install:

- Clutch cable “1”

## TIP

Before installation, apply the lithium-soap-based grease to the clutch cable end.



## 13. Adjust:

- Clutch lever free play

Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-8.



**Clutch lever free play**  
7.0–12.0 mm (0.28–0.47 in)

## 14. Adjust:

- Throttle grip free play

Refer to “ADJUSTING THE THROTTLE GRIP FREE PLAY” on page 3-9.

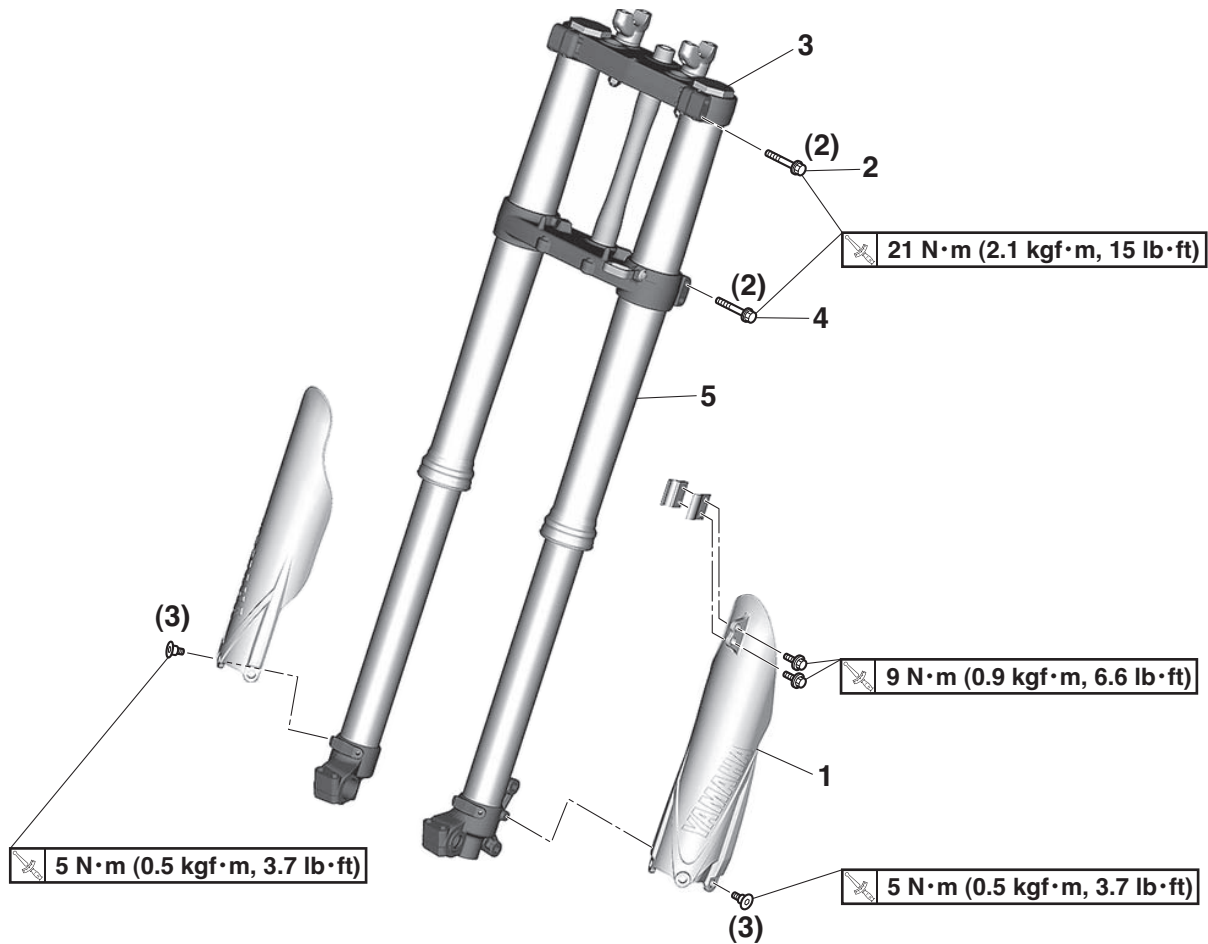


**Throttle grip free play**  
3.0–6.0 mm (0.12–0.24 in)

EAM20100

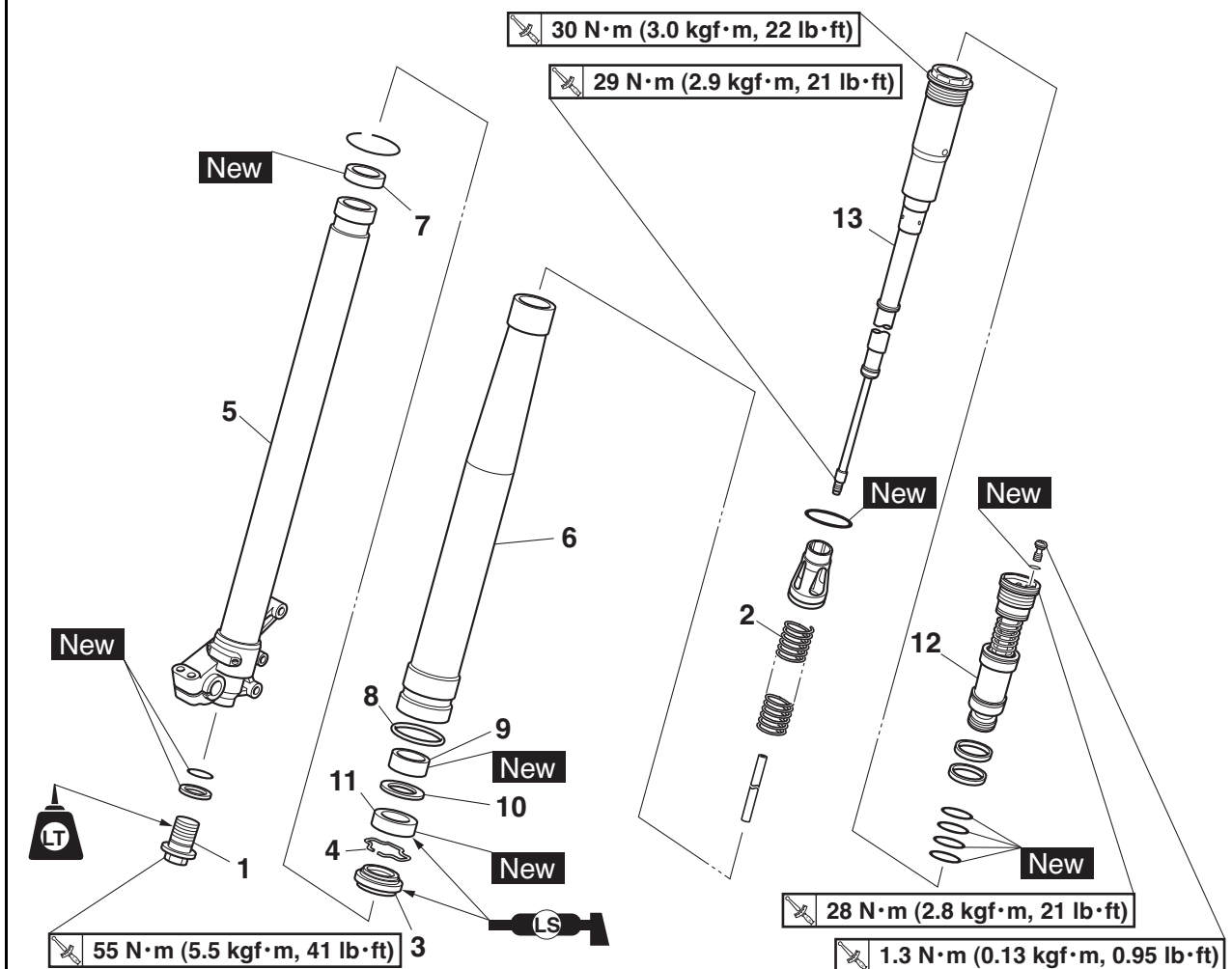
## FRONT FORK

### Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Front wheel		Refer to "FRONT WHEEL" on page 4-5.
	Front brake caliper		Refer to "FRONT BRAKE" on page 4-13.
	Number plate		Refer to "GENERAL CHASSIS" on page 4-1.
1	Protector	1	
2	Upper bracket pinch bolt	2	Loosen.
3	Damper assembly	1	Loosen.
4	Lower bracket pinch bolt	2	Loosen.
5	Front fork leg	1	

## Disassembling the front fork leg



Order	Job/Parts to remove	Q'ty	Remarks
1	Adjuster	1	
2	Fork spring	1	
3	Dust seal	1	
4	Stopper ring	1	
5	Inner tube	1	
6	Outer tube	1	
7	Piston metal	1	
8	Protector guide	1	
9	Slide metal	1	
10	Washer	1	
11	Oil seal	1	
12	Base valve	1	
13	Damper assembly	1	

1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120



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

Record the adjusting screw setting position before loosening the adjuster and the base valve.

- Upper bracket pinch bolt
- Damper assembly
- Lower bracket pinch bolt

EWA20350



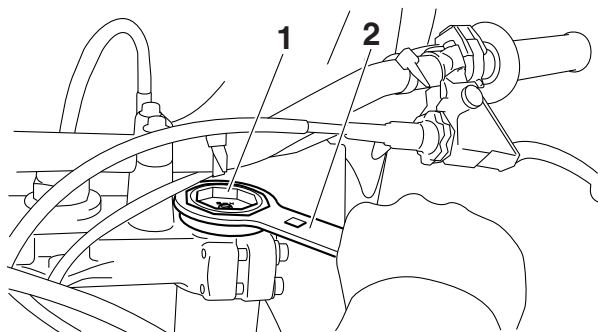
**Before loosening the upper and lower bracket pinch bolts, support the front fork leg.**

Before removing the front fork leg from the vehicle, loosen the damper assembly "1" with the cap bolt ring wrench "2".



**Cap bolt ring wrench  
90890-01501**

**Cap bolt ring wrench  
YM-01501**



- Front fork leg

EAM30056

(from the inner tube)

- While compressing the inner tube “2”, set the cap bolt ring wrench “4” between the inner tube and locknut “3”.

- Hold the locknut and remove the adjuster.

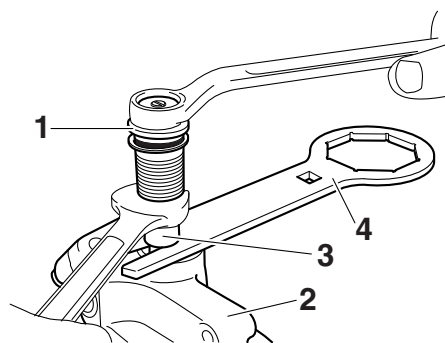
ECA24520

**Do not remove the locknut as the damper rod may go into the damper assembly and not be taken out.**



**Cap bolt ring wrench**  
**90890-01501**

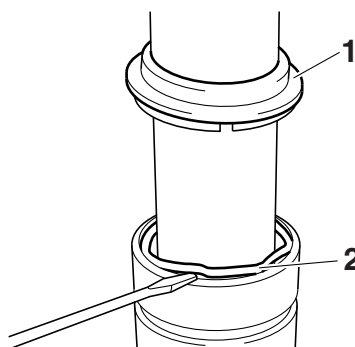
**Cap bolt ring wrench**  
**YM-01501**



- Dust seal “1”
- Oil seal clip “2”  
(with a flat-head screwdriver)

ECA14180

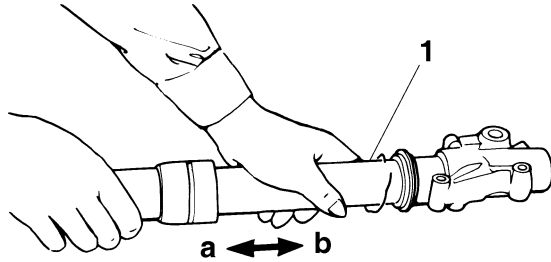
**Do not scratch the inner tube.**



- Inner tube “1”



- Push in slowly “a” the inner tube just before it bottoms out and then pull it back quickly “b”.
- Repeat this step until the inner tube can be pulled out from the outer tube.



## TIP

The bending value is shown by one half of the dial gauge reading.

EWA13650

## WARNING

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



## 5. Remove:

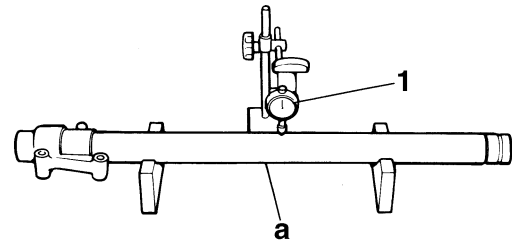
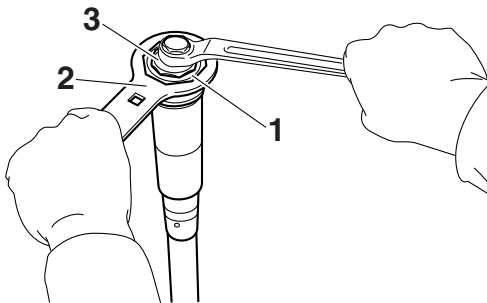
- Base valve "1"  
(from the damper assembly)

## TIP

Hold the damper assembly with the cap bolt ring wrench "2" and use the cap bolt wrench "3" to remove the base valve.



**Cap bolt wrench**  
90890-01500  
**Cap bolt wrench**  
YM-01500  
**Cap bolt ring wrench**  
90890-01501  
**Cap bolt ring wrench**  
YM-01501



## 2. Check:

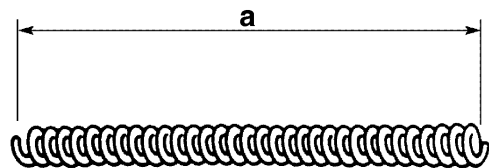
- Outer tube  
Scratches/wear/damage → Replace.

## 3. Measure:

- Fork spring free length "a"  
Out of specification → Replace.



**Fork spring free length**  
497.0 mm (19.57 in)  
**Limit**  
492.0 mm (19.37 in)



EAM30057

## CHECKING THE FRONT FORK LEGS

### 1. Check:

- Inner tube surface "a"  
Scratches → Repair or replace.  
Use #1000 grit wet sandpaper.  
Damaged oil lock piece → Replace.
- Inner tube bends  
Out of specification → Replace.  
Use the dial gauge "1".



**Inner tube bending limit**  
0.2 mm (0.01 in)

### 4. Check:

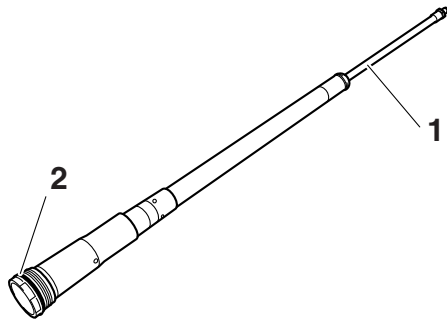
- Damper assembly "1"  
Bend/damage → Replace.
- O-ring "2"  
Wear/damage → Replace.

ECA14200

## NOTICE

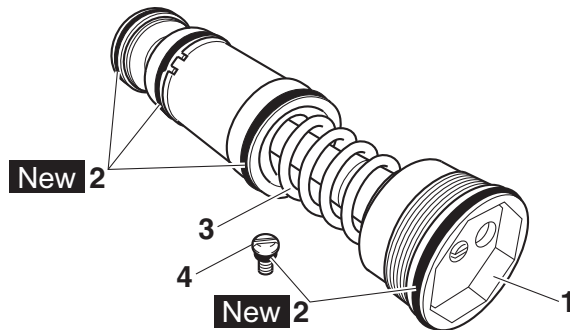
- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign ma-

terial to enter the front fork.



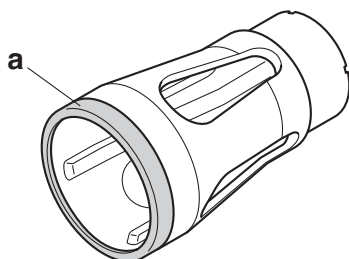
## 5. Check:

- Base valve "1"  
Wear/damage → Replace.  
Contamination → Clean.
- O-ring "2" **New**  
Wear/damage → Replace.
- Base valve bushing  
Wear/damage → Replace.
- Spring "3"  
Damage/fatigue → Replace the base valve.
- Air bleed screw "4"  
Wear/damage → Replace.



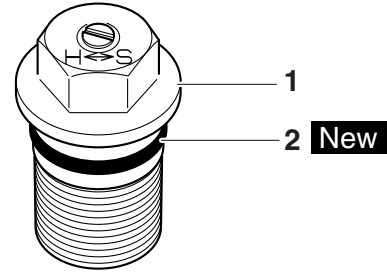
## 6. Check:

- Contacting surface "a"  
Wear/damage → Replace.



## 7. Check:

- Adjuster "1"
- O-ring "2" **New**  
Wear/damage → Replace.



EAM30058

## ASSEMBLING THE FRONT FORK LEGS

EWA13660

### **WARNING**

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

### TIP

- When assembling the front fork leg, be sure to replace the following parts:
  - Inner tube bushing
  - Outer tube bushing
  - Oil seal
  - Copper washer
- Before assembling the front fork leg, make sure that all of the components are clean.

1. Stretch the damper assembly fully.
2. Fill:
  - Damper assembly



**Recommended oil**  
Yamaha Suspension Oil S1  
**Standard oil amount**  
216 cm<sup>3</sup> (7.30 US oz, 7.62 Imp.oz)

ECA24530

### **NOTICE**

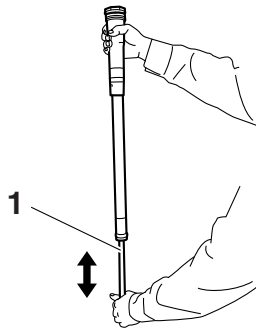
- Be sure to use the recommended oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, take care not to allow any foreign material to enter the front fork.

3. After filling, pump the damper assembly "1" slowly up and down (about 200 mm (7.9 in) stroke) several times to bleed the damper assembly of air.

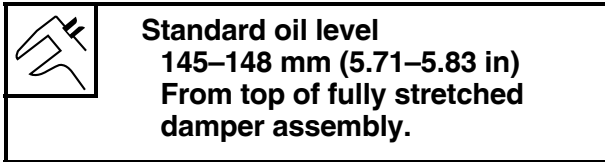
### TIP

Avoid excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps (1) to (3).

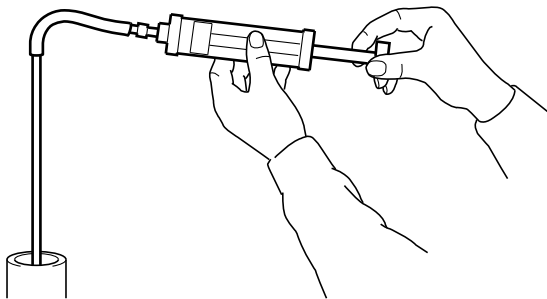
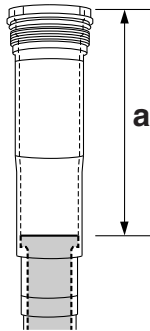




4. Measure:
- Oil level (left and right) “a”
- Out of specification → Regulate.

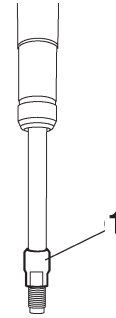


**Standard oil level**  
**145–148 mm (5.71–5.83 in)**  
**From top of fully stretched**  
**damper assembly.**



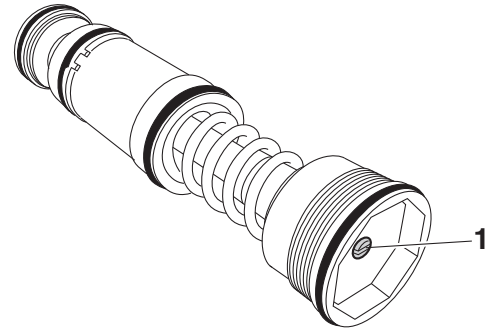
5. Tighten:
- Locknut “1”

**TIP**  
 Fully finger tighten the locknut onto the damper assembly.



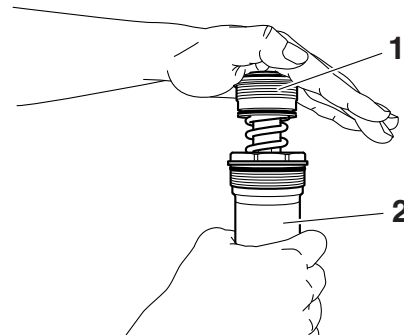
6. Loosen:
- Compression damping force adjuster “1”

**TIP**  
 • Before loosening the damping force adjuster, record the setting position.  
 • Unless the damping force adjuster is fully loosened, correct damping characteristic cannot be obtained after installation.



7. Install:
- Base valve “1”  
 (to the damper assembly “2”)

**TIP**  
 First bring the damper rod pressure to a maximum. Then install the base valve while releasing the damper rod pressure.



8. Check:
- Damper assembly  
 Not fully stretched → Repeat the steps (1) to (7).
9. Tighten:
- Base valve “1”



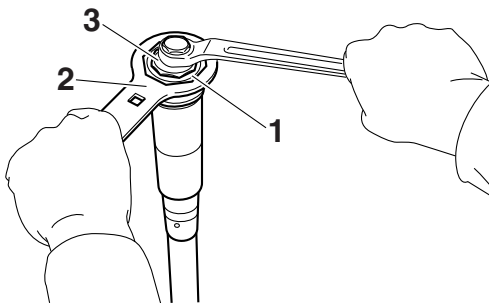
**Base valve**  
**28 N·m (2.8 kgf·m, 21 lb·ft)**

## TIP

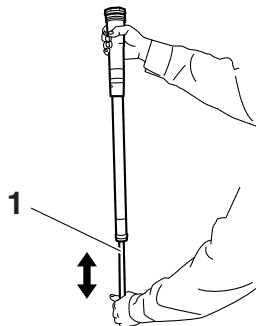
Hold the damper assembly with the cap bolt ring wrench "2" and use the cap bolt wrench "3" to tighten the base valve.



**Cap bolt wrench**  
**90890-01500**  
**Cap bolt wrench**  
**YM-01500**  
**Cap bolt ring wrench**  
**90890-01501**  
**Cap bolt ring wrench**  
**YM-01501**



10. After filling, pump the damper assembly "1" slowly up and down more than 10 times to distribute the fork oil.

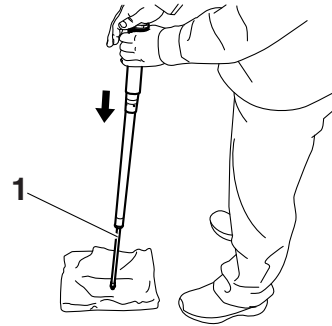


11. While protecting the damper assembly "1" with a cloth and compressing fully, allow excessive oil to overflow on the base valve side.

ECA24540

## NOTICE

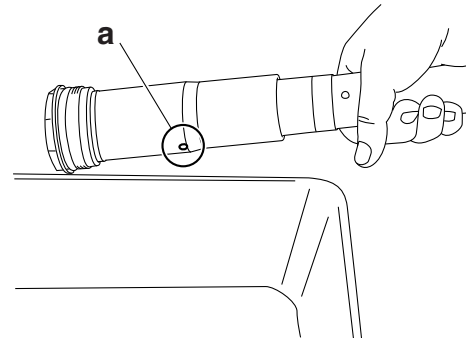
**Take care not to damage the damper assembly.**



12. Allow the overflowing oil to escape at the hole "a" in the damper assembly.

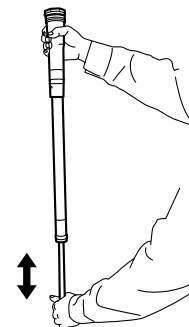
## TIP

The overflow measures about 10 cm<sup>3</sup> (0.34 US oz, 0.35 Imp.oz).



13. Check:

- Damper assembly smooth movement
- Tightness/binding/rough spots → Repeat the steps (1) to (12).



14. Install:

- Dust seal "1" **New**
- Oil seal clip "2"
- Oil seal "3" **New**
- Washer "4"
- Outer tube bushing "5" **New**  
(to the inner tube "6")

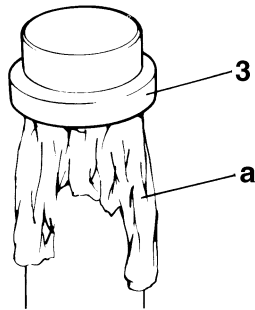
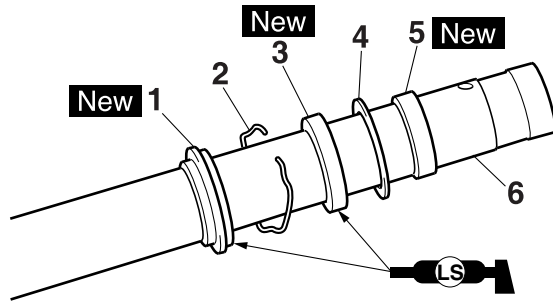
ECA24550

## NOTICE

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

## TIP

- Apply the lithium-soap-based grease on the dust seal lip and oil seal lip.
- Apply the fork oil on the inner tube.
- When installing the oil seal, use vinyl seat "a" with fork oil applied to protect the oil seal lip.

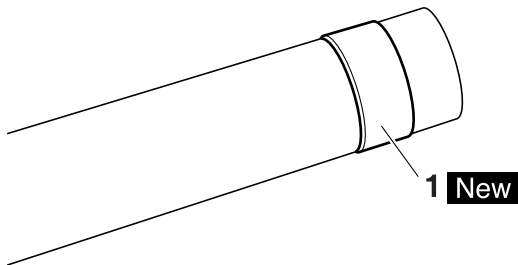


## 15.Install:

- Piston metal "1" **New**

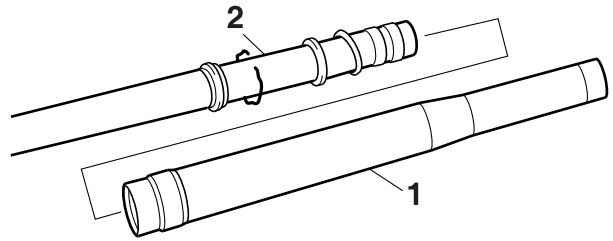
## TIP

Install the piston metal onto the slot on inner tube.



## 16.Install:

- Outer tube "1"  
(to the inner tube "2")



## 17.Install:

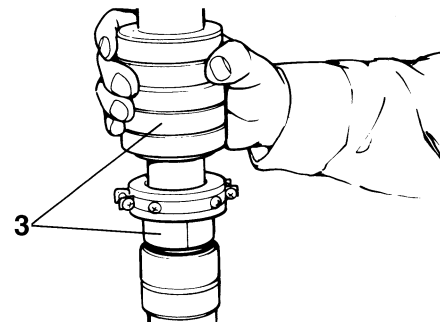
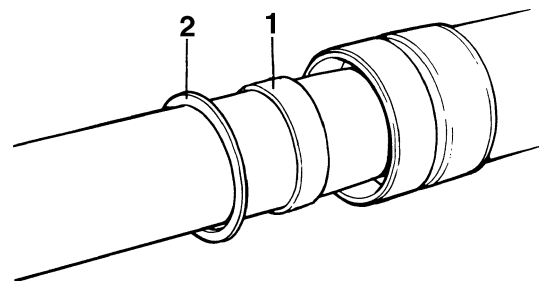
- Slide metal "1"
- Washer "2"  
(to the outer tube)

## TIP

Press the slide metal into the outer tube with fork seal driver "3".



**Fork seal driver**  
**90890-01502**  
**Fork seal driver (48)**  
**YM-A0948**



## 18.Install:

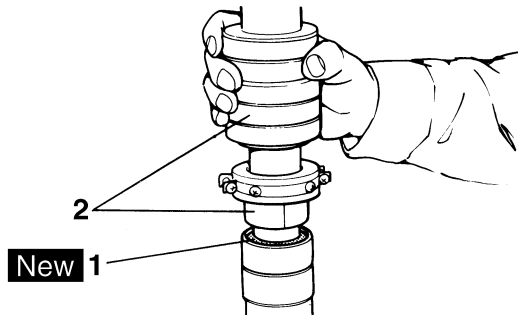
- Oil seal "1" **New**

## TIP

Using a fork seal driver "2", press the oil seal in until the stopper ring groove fully appears.



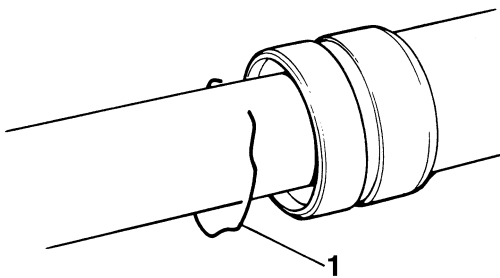
Fork seal driver  
90890-01502  
Fork seal driver (48)  
YM-A0948



19. Install:
- Stopper ring "1"

#### TIP

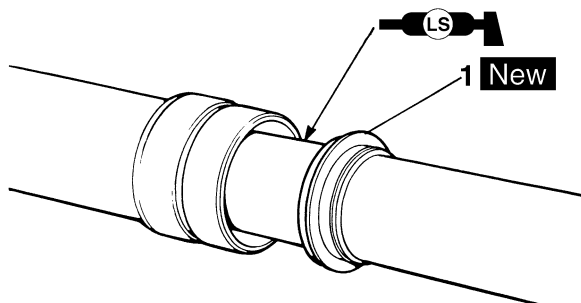
Fit the stopper ring correctly in the groove in the outer tube.



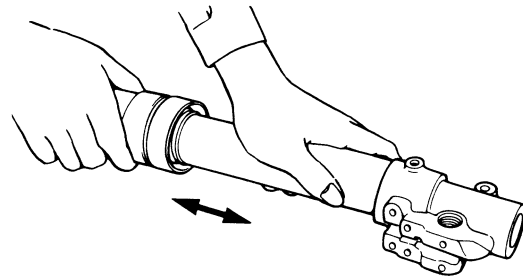
20. Install:
- Dust seal "1" **New**

#### TIP

Apply lithium-soap-based grease on the inner tube.



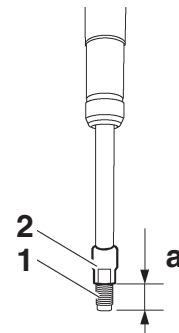
21. Check:
- Inner tube smooth movement
  - Tightness/binding/rough spots → Repeat the steps (14) to (20).



22. Measure:
- Distance "a"
  - Out of specification → Turn into the locknut.



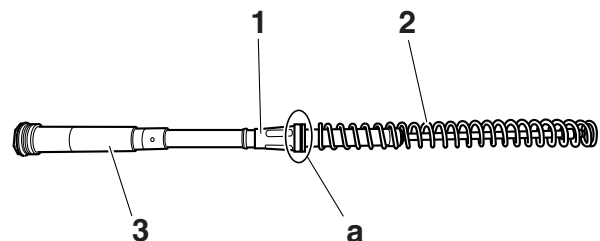
Distance "a"  
16 mm (0.63 in) or more  
Between the damper assembly  
"1" bottom and locknut "2" bot-  
tom.



23. Install:
- Collar "1"
  - Fork spring "2"
  - (to the damper assembly "3")

#### TIP

Install the collar with its larger dia. end "a" facing the fork spring.

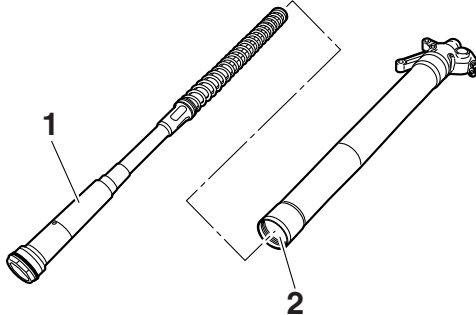


24. Install:
- Damper assembly "1"
  - (to the inner tube "2")

ECA24560

## NOTICE

Allow the damper assembly to slide slowly down the inner tube until it contacts the bottom of the inner tube. Be careful not to damage the inner tube.

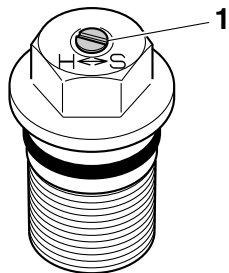


25. Loosen:

- Rebound damping force adjuster "1"

## TIP

- Before loosening the damping force adjuster, record the setting position.
- Unless the damping force adjuster is fully loosened, correct damping characteristic cannot be obtained after installation.



26. Install:

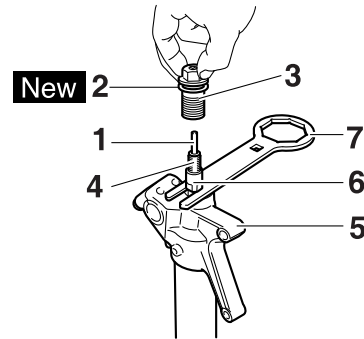
- Damper adjusting rod "1"
  - Copper washer "2" **New**
  - Adjuster "3"
- (to the damper assembly "4")

## TIP

- While compressing the inner tube "5", set the cap bolt ring wrench "7" between the inner tube and locknut "6".
- Fully finger tighten the adjuster onto the damper assembly.



**Cap bolt ring wrench**  
90890-01501  
**Cap bolt ring wrench**  
YM-01501



27. Measure:

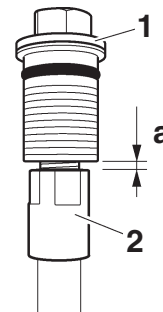
- Gap "a" between the adjuster "1" and the locknut "2"
- Out of specification → Retighten and readjust the locknut.



**Gap "a" between the adjuster and the locknut**  
0.5–1.0 mm (0.02–0.04 in)

## TIP

If it is installed with a gap out of specification, correct damping force cannot be obtained.



28. Tighten:

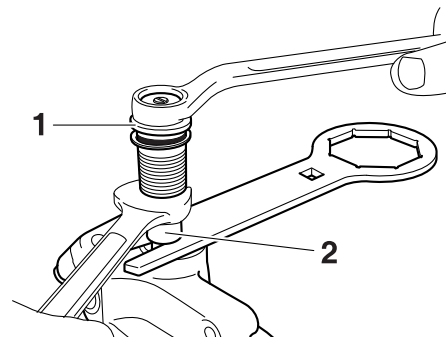
- Adjuster (locknut) "1"



**Adjuster (locknut)**  
29 N·m (2.9 kgf·m, 21 lb·ft)

## TIP

Hold the locknut "2" and tighten the adjuster.

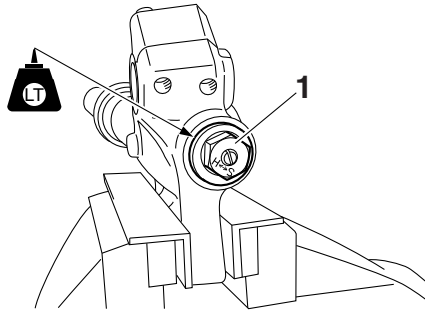


## 29. Install:

- Adjuster “1”  
(to the inner tube)



**Adjuster**  
**55 N·m (5.5 kgf·m, 41 lb·ft)**  
**LOCTITE®**



## 30. Fill:

- Front fork leg

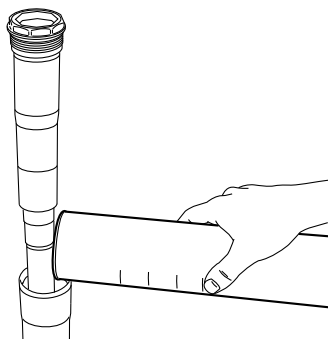


**Recommended oil**  
**Yamaha Suspension Oil S1**  
**Standard oil amount**  
**290 cm<sup>3</sup> (9.80 US oz, 10.23**  
**Imp.oz)**  
**Extent of adjustment**  
**260–365 cm<sup>3</sup> (8.79–12.34 US oz,**  
**9.17–12.87 Imp.oz)**

ECA24570

### NOTICE

- Be sure to use the recommended 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.

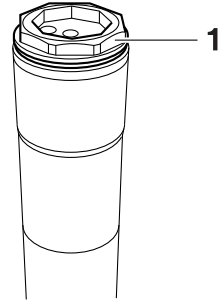


## 31. Install:

- Damper assembly “1”  
(to the outer tube)

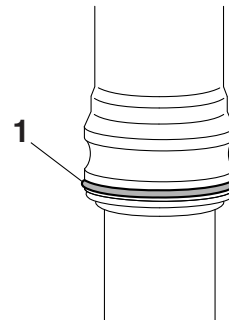
### TIP

Temporarily tighten the damper assembly.



## 32. Install:

- Protector guide “1”



EAM30059

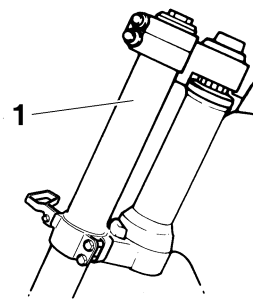
## INSTALLING THE FRONT FORK LEGS

### 1. Install:

- Front fork “1”

### TIP

- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



### 2. Tighten:

- Damper assembly “1”



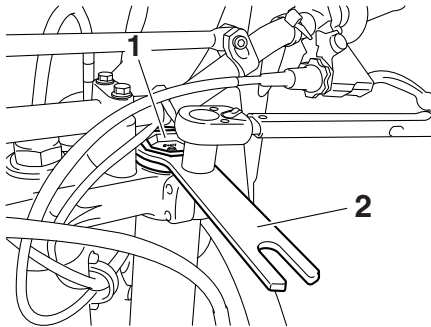
**Damper assembly**  
**30 N·m (3.0 kgf·m, 22 lb·ft)**

### TIP

Use the cap bolt ring wrench “2” to tighten the damper assembly.



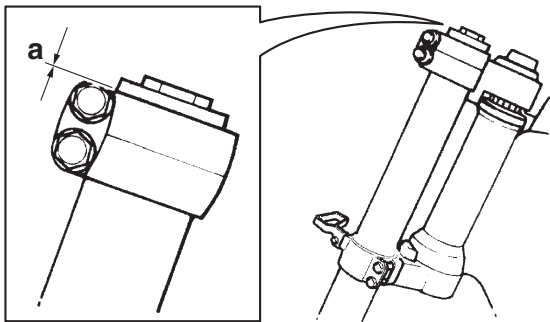
**Cap bolt ring wrench**  
90890-01501  
**Cap bolt ring wrench**  
YM-01501



3. Adjust:
- Front fork top end "a"



**Front fork top end (standard) "a"**  
5 mm (0.02 in)



4. Tighten:
- Pinch bolt (upper bracket) "1"



**Upper bracket pinch bolt**  
21 N·m (2.1 kgf·m, 15 lb·ft)

- Pinch bolt (lower bracket) "2"

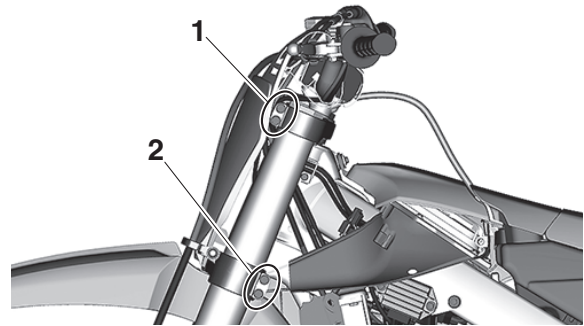


**Lower bracket pinch bolt**  
21 N·m (2.1 kgf·m, 15 lb·ft)

EWA19320



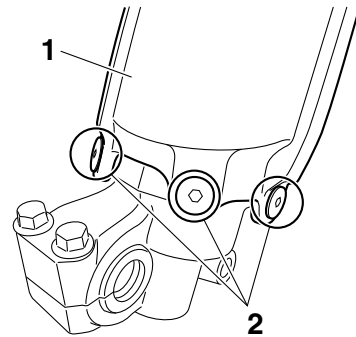
**WARNING**  
Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



5. Install:
- Protector "1"
  - Bolt (protector) "2"



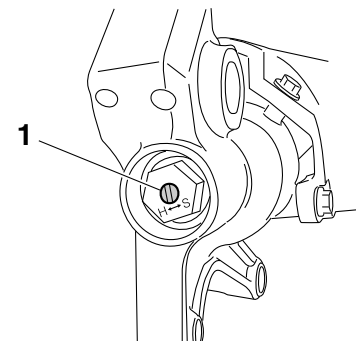
**Bolt (protector)**  
5 N·m (0.5 kgf·m, 3.7 lb·ft)



6. Adjust:
- Rebound damping force

## TIP

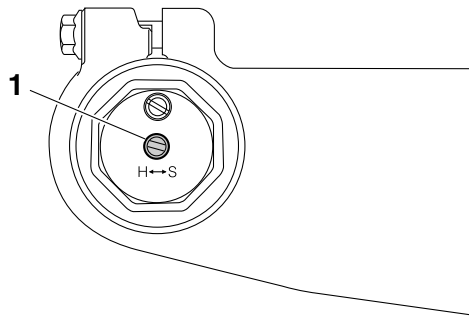
Turn in the damping adjuster "1" finger-tight and then turn out to the originally set position.



7. Adjust:
- Compression damping force

## TIP

Turn in the damping adjuster "1" finger-tight and then turn out to the originally set position.

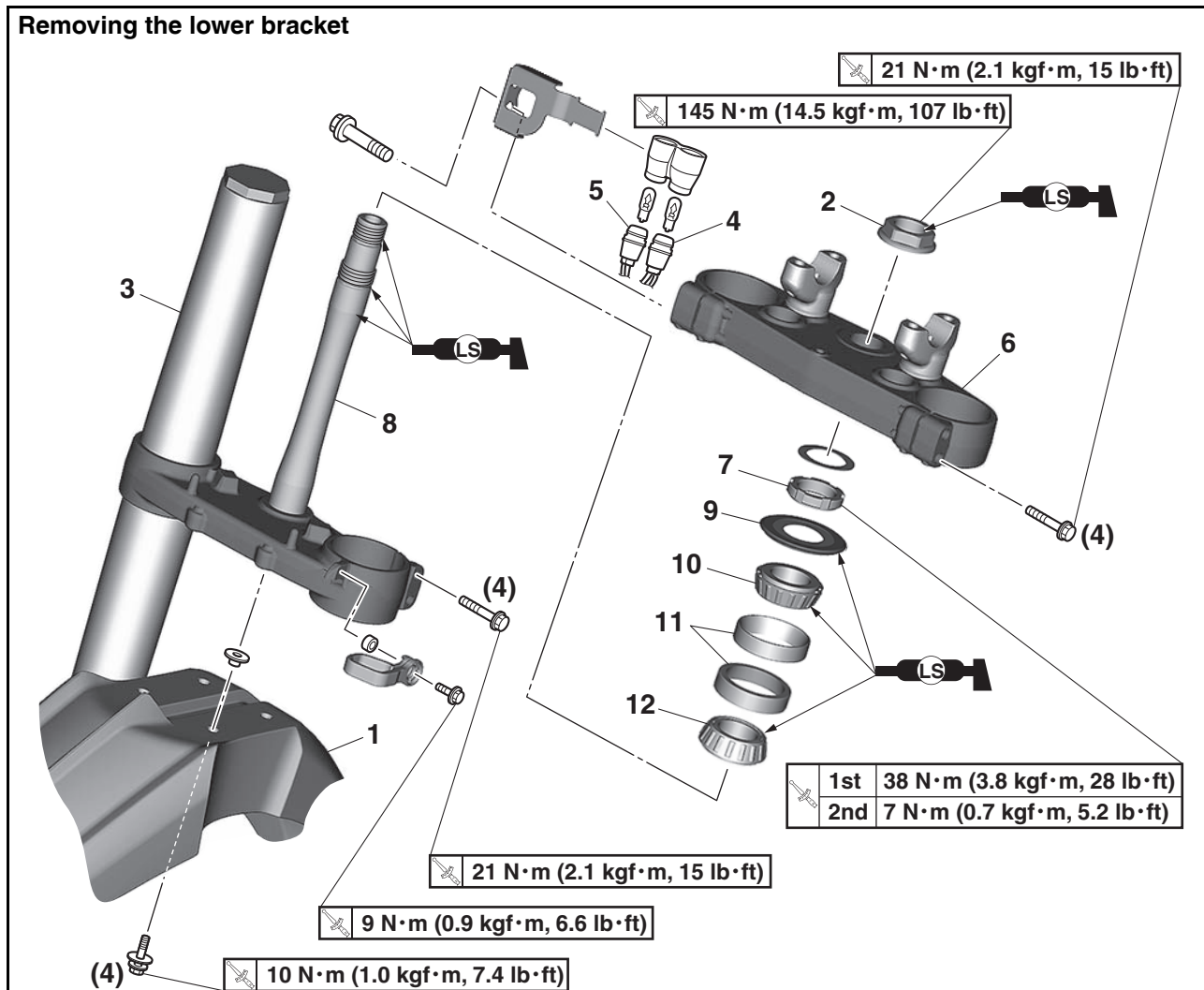




EAM20101

## STEERING HEAD

### Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
			Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-33.
			Use a maintenance stand to raise the front wheel off the ground.
	Number plate		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-33.
1	Front fender	1	
2	Steering stem nut	1	
3	Front fork leg	2	Refer to "FRONT FORK" on page 4-38.
4	Warning light (engine trouble)	1	Br-Y/W
5	Warning light (fuel level)	1	Br-L/Y
6	Upper bracket	1	
7	Steering ring nut	1	
8	Lower bracket	1	
9	Bearing race cover	1	
10	Upper bearing	1	
11	Bearing race	2	
12	Bearing (lower side)	1	

EAM30060

## REMOVING THE LOWER BRACKET

1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120

### **WARNING**

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

2. Remove:
  - Ring nut "1"

### TIP

Remove the ring nut with the steering nut wrench "2".

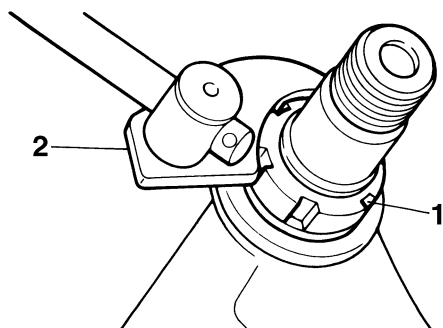


**Steering nut wrench**  
**90890-01403**  
**Exhaust flange nut wrench**  
**YU-A9472**

EWA13730

### **WARNING**

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



EAM30061

## CHECKING THE STEERING HEAD

1. Wash with kerosene:
  - Bearing
  - Bearing race
2. Check:
  - Bearing
  - Bearing race
 Damage/pitting → Replace.
3. Replace:
  - Bearing
  - Bearing race

- a. Remove the bearing race from the steering head pipe with a long rod "1" and a hammer.
- b. Remove the bearing race from the lower bracket with a chisel "2" and a hammer.
- c. Install a new bearing race.

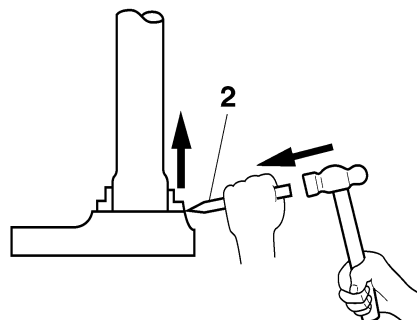
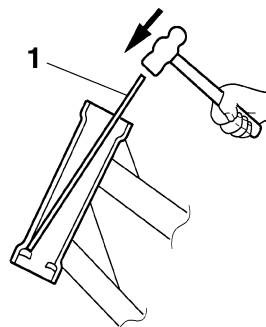
ECA14270

### **NOTICE**

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

### TIP

Always replace the bearing and the bearing race as a set.



4. Check:
  - Upper bracket
  - Lower bracket
 (along with the steering stem)  
Bends/cracks/damage → Replace.

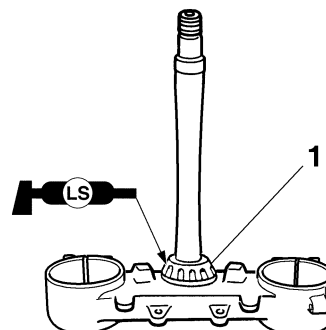
EAM30062

## INSTALLING THE STEERING HEAD

1. Install:
  - Lower bearing "1"

### TIP

Apply the lithium-soap-based grease on the dust seal lip and bearing inner circumference.

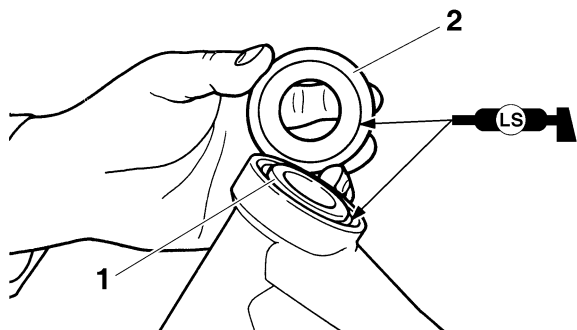


## 2. Install:

- Bearing race
- Upper bearing "1"
- Bearing race cover "2"

### TIP

Apply the lithium-soap-based grease on the bearing and bearing race cover lip.

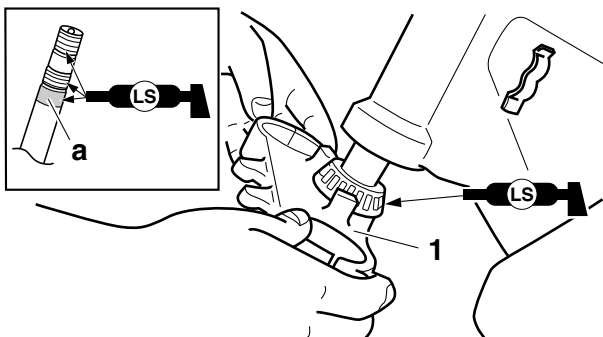


## 3. Install:

- Lower bracket "1"

### TIP

Apply the lithium-soap-based grease on the bearing, the portion "a" and thread of the steering stem.



## 4. Install:

- Steering ring nut "1"



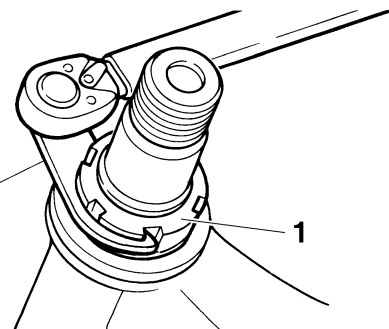
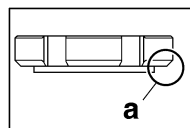
**Steering ring nut**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

### TIP

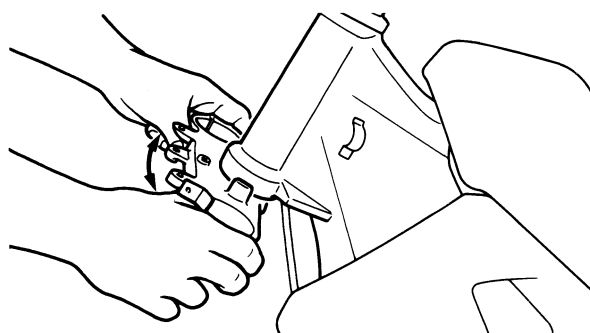
Install the steering ring nut with its stepped side "a" facing downward.

Tighten the steering ring nut with a steering nut wrench "2".

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-33.

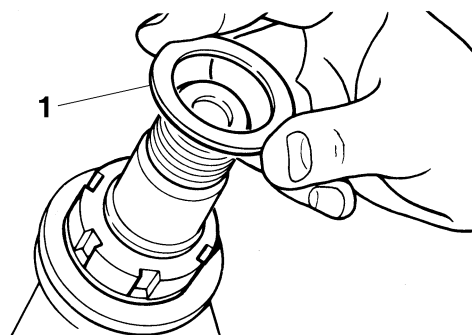


5. Check the steering stem by turning this lock to lock. If there is any binding, remove the steering stem and check the steering bearing.



## 6. Install:

- Washer "1"

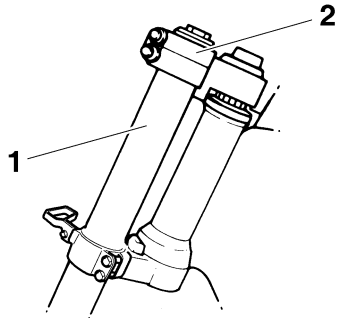


## 7. Install:

- Front fork "1"
- Upper bracket "2"

### TIP

- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



8. Install:

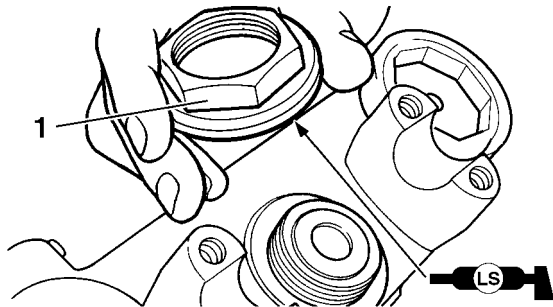
- Steering stem nut “1”



**Steering stem nut**  
145 N·m (14.5 kgf·m, 107 lb·ft)

## TIP

Apply the lithium-soap-based grease to the contact surface of the steering stem nut when installing.



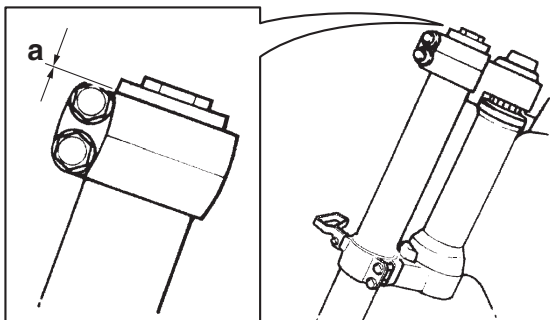
9. After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the steering ring nut little by little.

10. Adjust:

- Front fork top end “a”



**Front fork top end (standard) “a”**  
5 mm (0.02 in)



11. Tighten:

- Pinch bolt (upper bracket) “1”



**Upper bracket pinch bolt**  
21 N·m (2.1 kgf·m, 15 lb·ft)

- Pinch bolt (lower bracket) “2”

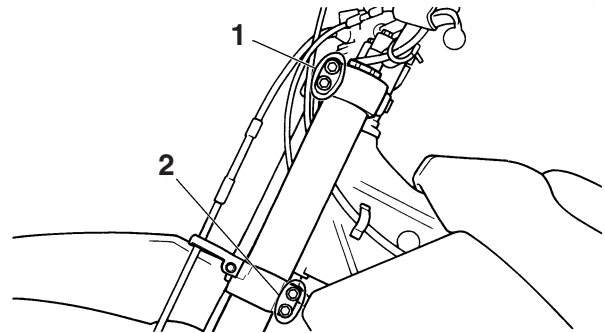


**Lower bracket pinch bolt**  
21 N·m (2.1 kgf·m, 15 lb·ft)

EWA19330

## WARNING

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.

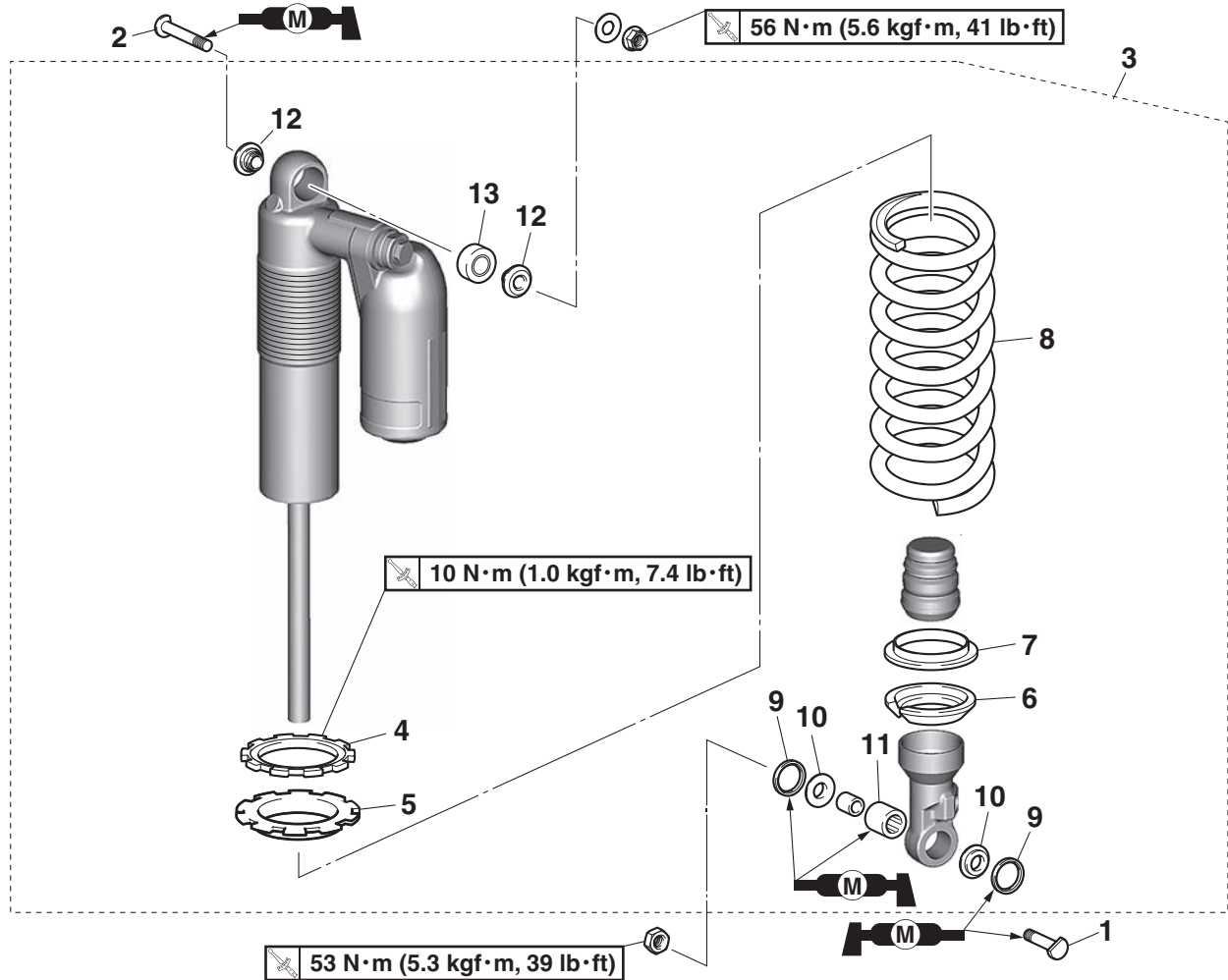


# REAR SHOCK ABSORBER ASSEMBLY

EAM20102

## REAR SHOCK ABSORBER ASSEMBLY

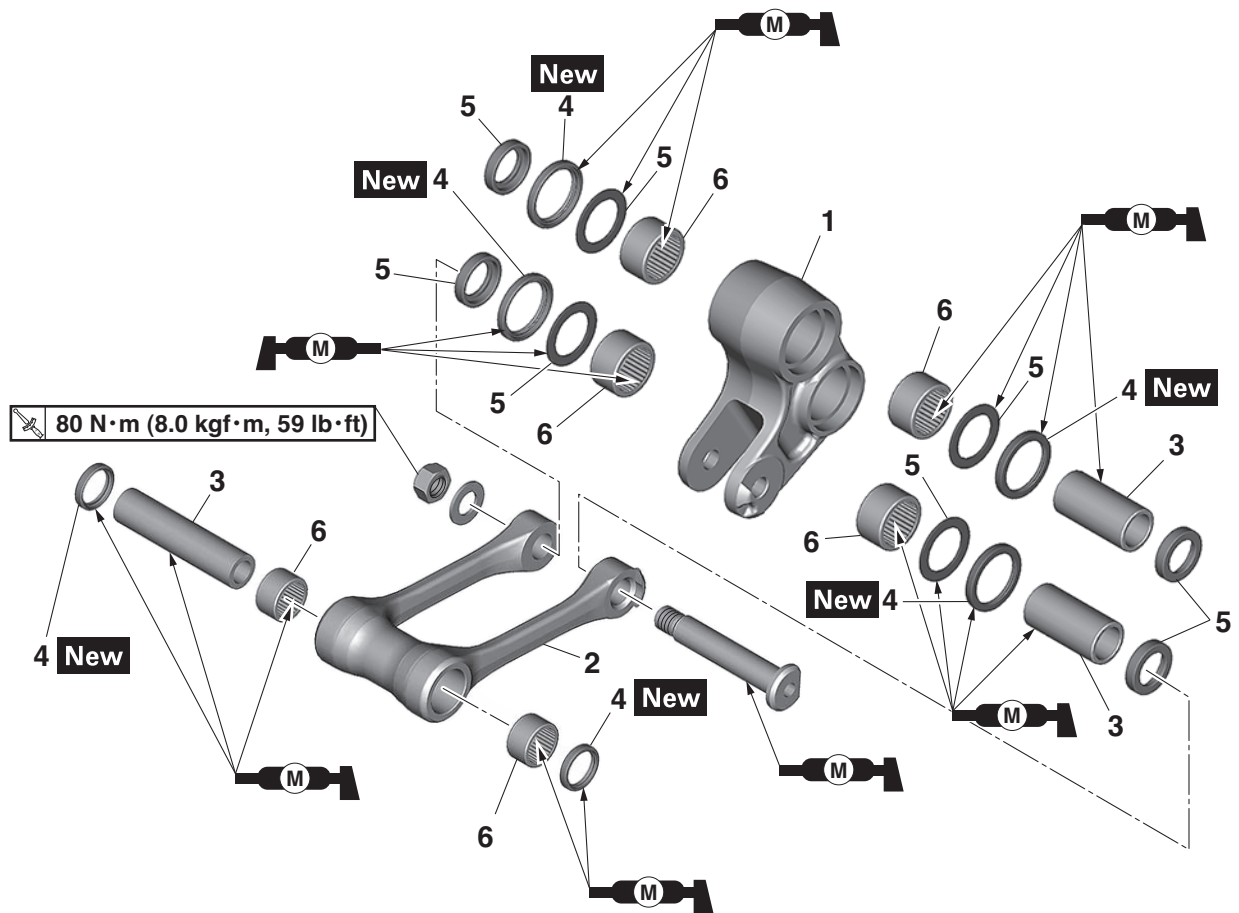
### Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Rear shock absorber assembly lower bolt	1	
2	Rear shock absorber assembly upper bolt	1	
3	Rear shock absorber assembly	1	
4	Locknut	1	
5	Adjusting nut	1	
6	Lower spring guide	1	
7	Upper spring guide	1	
8	Spring	1	
9	Dust seal	2	
10	Collar	2	
11	Bushing	1	
12	Collar	2	
13	Bearing	1	

## REAR SHOCK ABSORBER ASSEMBLY

## Disassembling the relay arm



Order	Job/Parts to remove	Q'ty	Remarks
1	Relay arm	1	
2	Connecting arm	1	
3	Collar	3	
4	Oil seal	6	
5	Washer	8	
6	Bearing	6	

# REAR SHOCK ABSORBER ASSEMBLY

EAM30063

## 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.

### **TIP**

A break-in is required up to about 50 km of running.

EAM30064

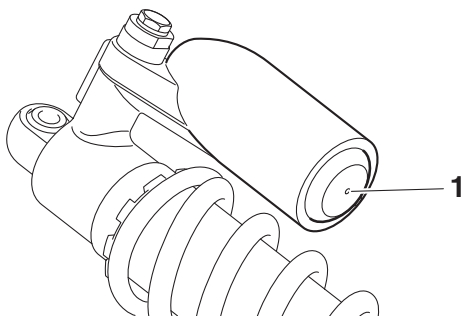
## DISPOSING OF A REAR SHOCK ABSORBER

Before disposing the rear shock absorber, be sure to extract the nitrogen gas from valve "1".

EWA19340

### **WARNING**

- Wear protective glasses to prevent your eyes from damage due to possible gas or metal chips scattered.
- To dispose of a damaged or a worn-out rear shock absorber, take the unit to your Yamaha dealer for this disposal procedure.



EAM30065

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120

### **WARNING**

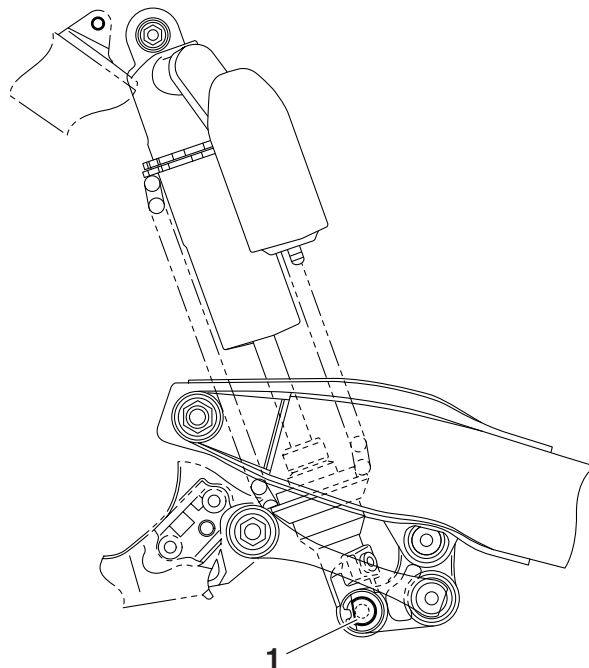
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:

- Rear shock absorber assembly lower bolt "1"

### **TIP**

While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.



3. Remove:

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

EAM30066

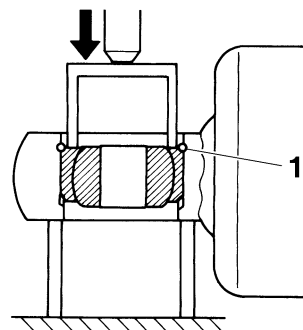
## REMOVING THE BEARING

1. Remove:

- Stopper ring (upper bearing) "1"

### **TIP**

Press in the bearing while pressing its outer race and remove the stopper ring.



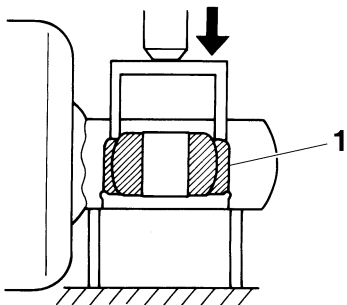
# REAR SHOCK ABSORBER ASSEMBLY

## 2. Remove:

- Upper bearing "1"

### TIP

Remove the bearing by pressing its outer race.

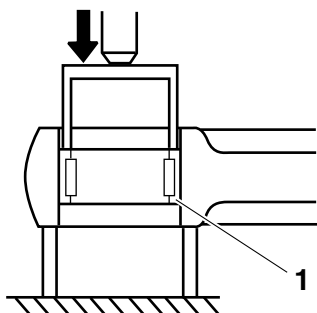


## 3. Remove:

- Lower bearing "1"

### TIP

Remove the bearing by pressing its outer race.



EAM30067

## 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.
- Spring guide  
Damage/wear → Replace.
- Bearing  
Damage/wear → Replace.
- Bolt  
Bends/damage/wear → Replace.

EAM30068

## CHECKING THE CONNECTING ARM AND RELAY ARM

### 1. Check:

- Connecting arm

- Relay arm

Damage/wear → Replace.

### 2. Check:

- Bearing
- Spacer

Damage/pitting/scratches → Replace the bearings and spacers as a set.

### 3. Check:

- Oil seal

Damage/pitting → Replace.

EAM30069

## INSTALLING THE RELAY ARM

### 1. Lubricate:

- Oil seal
- Bearing
- Spacer
- Washer
- Collar



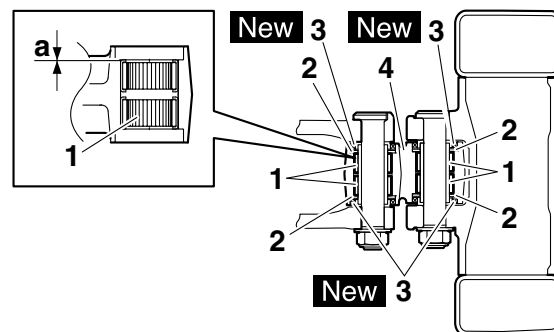
**Recommended lubricant**  
**Molybdenum disulfide grease**

### 2. Install:

- Bearing "1"
- Washer "2"
- Oil seal "3" **New**  
(to relay arm "4")



**Installed depth "a"**  
**0 mm (0 in)**



### 3. Install:

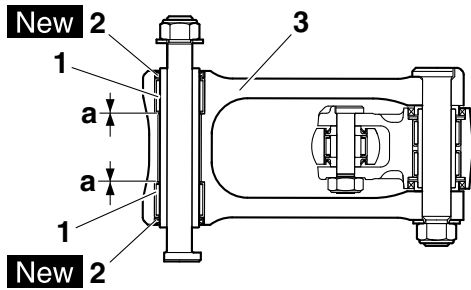
- Bearing "1"
- Oil seal "2" **New**  
(to connecting arm "3")



**Installed depth "a"**  
**0 mm (0 in)**



# REAR SHOCK ABSORBER ASSEMBLY



EAM30070

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

### 1. Lubricate:

- Bearing (lower side)
- Dust seal
- Collar
- Bushing



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

ECA24580

### NOTICE

**Do not apply the grease to the bearing outer race because it will wear the rear shock absorber surface on which the bearing is press fitted.**

### 2. Lubricate:

- O-ring



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

### 3. Install:

- Bearing
- Stopper ring **New**  
(to rear shock absorber assembly (upper side))

### TIP

- Install the bearing parallel until the stopper ring groove appears by pressing its outer race.
- After installing the stopper ring, push back the bearing unit it contacts the stopper ring.

### 4. Install:

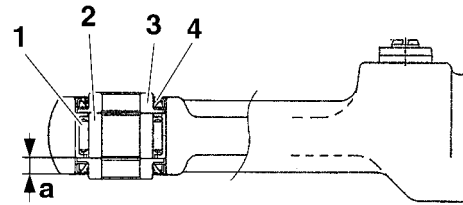
- Bearing "1"
- Bushing "2"
- Collar "3"
- Dust seal "4"  
(to rear shock absorber assembly (lower side))

### TIP

Install the dust seals with their lips facing inward.



**Installed depth "a"**  
**4.25 mm (0.17 in)**



### 5. Lubricate:

- Connecting arm and frame bolt
- Relay arm and connecting arm bolt
- Relay arm and swingarm bolt  
(circumference and threaded portion)
- Rear shock absorber assembly upper bolt
- Rear shock absorber assembly lower bolt



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

### 6. Install:

- Rear shock absorber assembly

### TIP

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

### 7. Tighten:

- Rear shock absorber assembly upper bolt



**Rear shock absorber assembly upper bolt**  
**56 N·m (5.6 kgf-m, 41 lb-ft)**

- Connecting arm bolt (frame side)



**Connecting arm bolt (frame side)**  
**80 N·m (8.0 kgf-m, 59 lb-ft)**

- Connecting arm bolt (relay arm side)



**Connecting arm bolt (relay arm side)**  
**80 N·m (8.0 kgf-m, 59 lb-ft)**

- Relay arm bolt (swingarm side)

# REAR SHOCK ABSORBER ASSEMBLY

---



**Relay arm bolt (swingarm side)**  
**70 N·m (7.0 kgf·m, 52 lb·ft)**

- Rear shock absorber assembly lower bolt

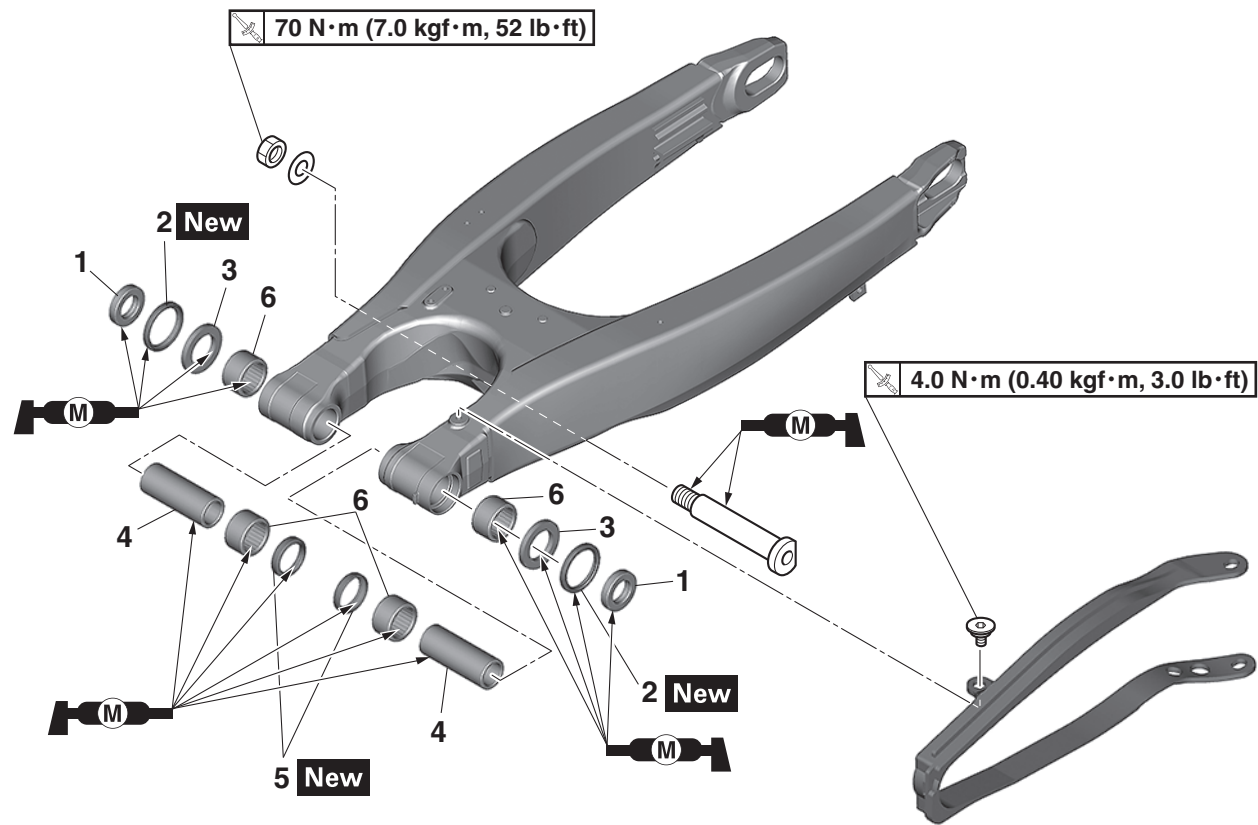


**Rear shock absorber assembly  
lower bolt**  
**53 N·m (5.3 kgf·m, 39 lb·ft)**

EAM20103

SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Brake hose holder		Refer to "REAR BRAKE" on page 4-23.
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-23.
	Bolt (brake pedal)		
	Drive chain		
1	Collar	2	
2	Oil seal	2	
3	Thrust bearing	2	
4	Bushing	2	
5	Oil seal	2	
6	Bearing	4	

EAM30071

## REMOVING THE SWINGARM

1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120

### **WARNING**


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

2. Measure:


- Swingarm side play
- Swingarm vertical movement

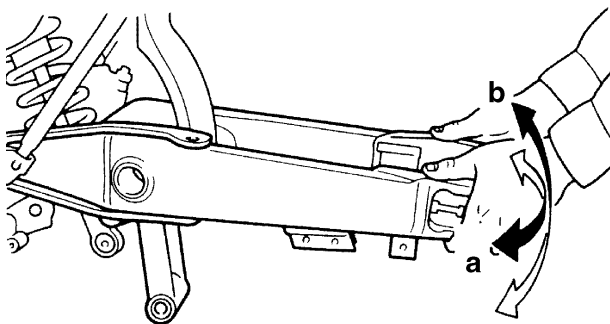


- a. Measure the tightening torque of the pivot shaft nut.

	<b>Pivot shaft nut</b> <b>85 N·m (8.5 kgf·m, 63 lb·ft)</b>
---	---

- b. Measure the swingarm side play "a" by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, the bearings, and the collars.
- d. Check the swingarm vertical movement "b" by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers, the bearings, and the collars.

	<b>Swingarm end free play limit (radial)</b> <b>1.0 mm (0.04 in)</b>
---	---



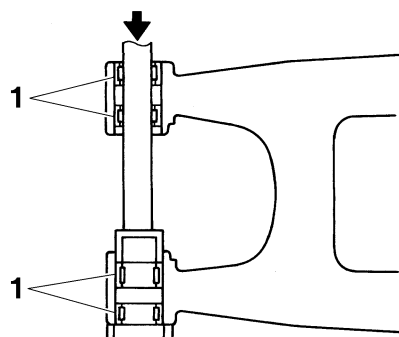
EAM30072

## REMOVING THE BEARING

1. Remove:
  - Bearing "1"

### **TIP**

Remove the bearing by pressing its outer race.



EAM30073

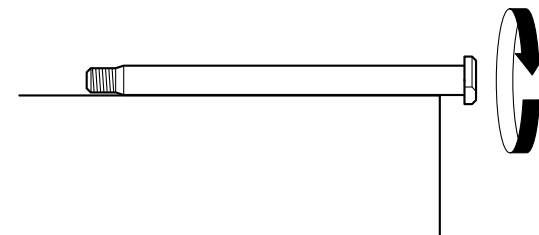
## CHECKING THE SWINGARM

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 with kerosene:

- Pivot shaft
- Spacer
- Collar
- Bearing

4. Check:

- Oil seal  
Damage → Replace.
- Bearing
- Spacer  
Free play exists/unsmooth revolution/rust → Replace bearing and bushing as a set.

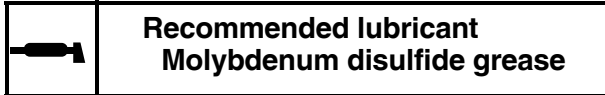
EAM30074

## INSTALLING THE SWINGARM

1. Lubricate:

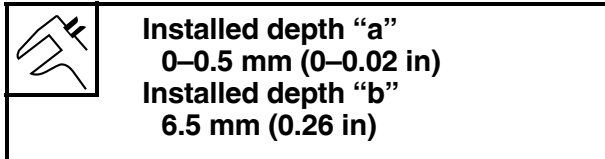
- Bearing
- Collar
- Spacer
- Oil seal **New**

- Pivot shaft



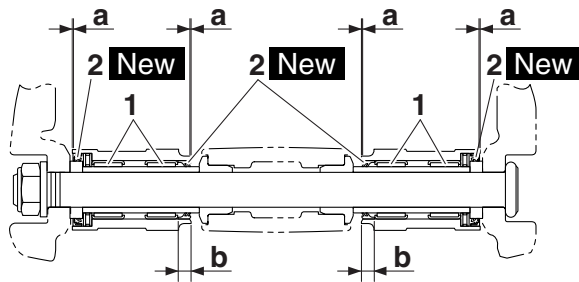
2. Install:

- Bearing “1”
- Oil seal “2” **New**  
(to the swingarm)



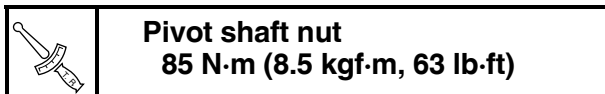
## TIP

First install the outer and then the inner bearings to a specified depth from inside.



3. Install:

- Swingarm



## TIP

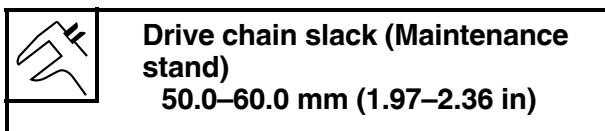
Install the pivot shaft from the right.

4. Install:

- Rear wheel  
Refer to “REAR WHEEL” on page 4-9.

5. Adjust:

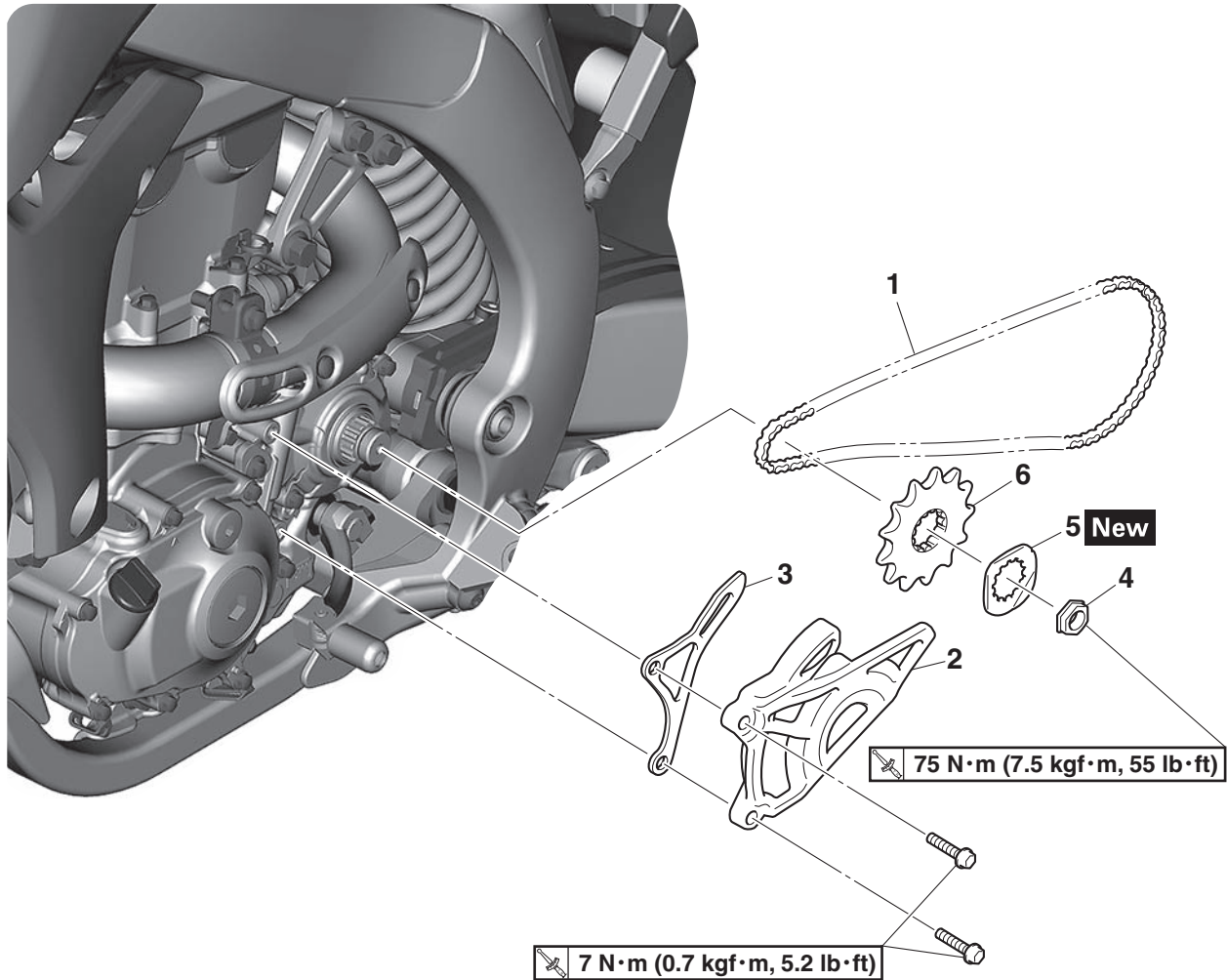
- Drive chain slack  
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-27.



EAM20104

CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Drive chain	1	
2	Drive sprocket cover	1	
3	Bracket	1	
4	Drive sprocket nut	1	
5	Lock washer	1	
6	Drive sprocket	1	

EAM30075

## REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### **TIP**

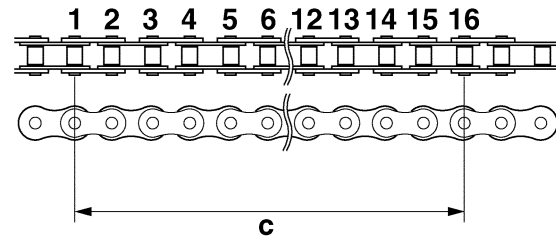
Place the vehicle on a maintenance stand so that the rear wheel is elevated.

2. Remove:

- Drive chain

### **TIP**

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



### **TIP**

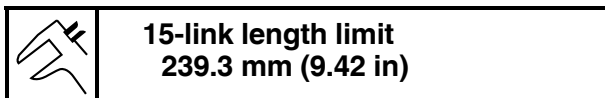
- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.

EAM30076

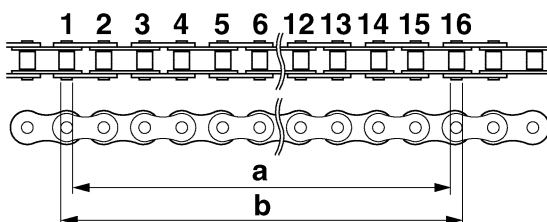
## CHECKING THE DRIVE CHAIN

1. Measure:

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



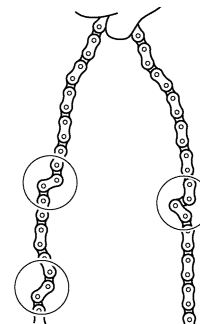
- a. Measure the length “a” between the inner sides of the pins and the length “b” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.



- b. Calculate the length “c” of the 15-link section of the drive chain using the following formula.  
Drive chain 15-link section length “c” = (length “a” between pin inner sides + length “b” between pin outer sides)/2

2. Check:

- Drive chain  
Stiffness → Clean, lubricate, or replace.



3. Clean:

- Drive chain

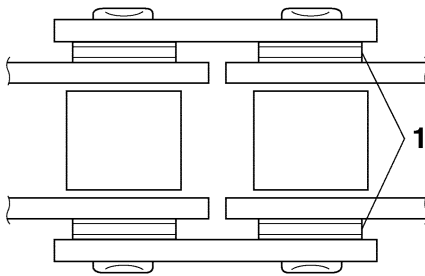
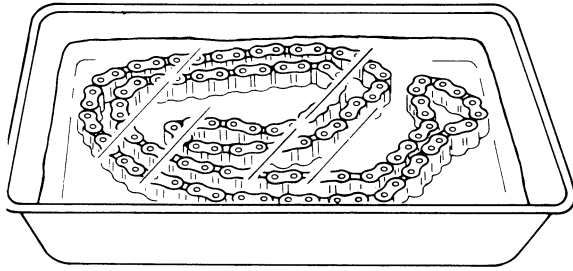
- a. Wipe the drive chain with a clean cloth.
- b. Put the drive chain in kerosene and remove any remaining dirt.
- c. Remove the drive chain from the kerosene and completely dry it.

ECA19090

### **NOTICE**

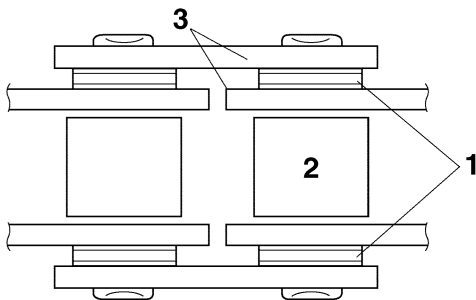
- This vehicle has a drive chain with small rubber O-rings “1” between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain’s 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 → Replace the drive chain.



#### 5. Lubricate:

- Drive chain



EAM30077

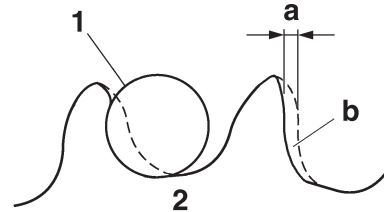
### CHECKING THE DRIVE SPROCKET

#### 1. Check:

- Drive sprocket  
More than 1/4 tooth wear "a" → Replace the

drive sprocket and the rear wheel sprocket as a set.

Bent tooth → Replace the drive sprocket and the rear wheel sprocket as a set.



b. Correct

- 1. Drive chain roller
- 2. Drive sprocket

EAM30078

### CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-10.

EAM30079

### INSTALLING THE DRIVE CHAIN

#### 1. Install:

- Drive chain

ECA17410

#### NOTICE

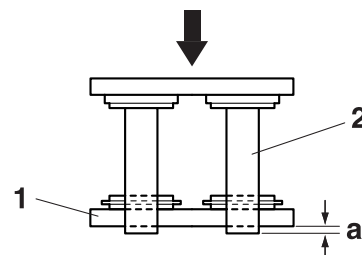
**Be sure to put on safety goggles when working.**

#### TIP

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

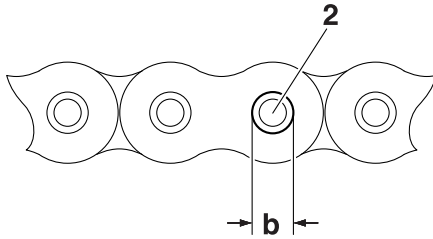


- a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).

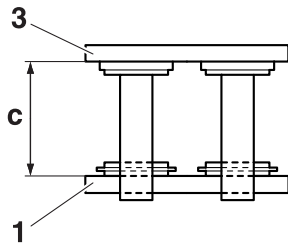


- b. After riveting, make sure the diameter between the edges "b" of the connecting pin "2" is 5.5–5.8 mm (0.22–0.23 in).





- c. After riveting, make sure the space “c”, which is inside of the connecting link “3” and inside of the connecting plate “1”, is 12.1–12.3 mm (0.476–0.484 in).



**Drive chain slack (Maintenance stand)**  
50.0–60.0 mm (1.97–2.36 in)

ECA24590

## 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 swing-arm or cause an accident. Therefore, keep the drive chain slack within the specified limits.



2. Lubricate:
- Drive chain



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

3. Install:

- Drive sprocket
- Lock washer **New**
- Drive sprocket nut

Refer to “ENGINE REMOVAL” on page 5-1.



**Drive sprocket nut**  
75 N·m (7.5 kgf·m, 55 lb·ft)

ECA14300

## NOTICE

**Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain’s life.**

4. Adjust:

- Drive chain slack

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-27.



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## ENGINE

<b>ENGINE REMOVAL</b> .....	5-1
REMOVING THE SILENCER .....	5-5
REMOVING THE EXHAUST PIPE 2 .....	5-5
REMOVING THE DRIVE SPROCKET .....	5-5
REMOVING THE ENGINE .....	5-5
CHECKING THE SILENCER AND EXHAUST PIPE .....	5-6
CHANGING THE SILENCER FIBER .....	5-6
INSTALLING THE ENGINE .....	5-8
INSTALLING THE BRAKE PEDAL .....	5-8
INSTALLING THE DRIVE SPROCKET .....	5-8
INSTALLING THE EXHAUST PIPE AND MUFFLER .....	5-9
 <b>CAMSHAFT</b> .....	5-11
REMOVING THE CAMSHAFT .....	5-13
CHECKING THE CAMSHAFT .....	5-14
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET .....	5-15
CHECKING THE TIMING CHAIN TENSIONERS .....	5-15
CHECKING THE DECOMPRESSION SYSTEM .....	5-16
INSTALLING THE CAMSHAFTS .....	5-16
 <b>CYLINDER HEAD</b> .....	5-19
REMOVING THE CYLINDER HEAD .....	5-21
CHECKING THE TIMING CHAIN GUIDE (INTAKE SIDE) .....	5-21
CHECKING THE CYLINDER HEAD .....	5-21
INSTALLING THE CYLINDER HEAD .....	5-22
 <b>VALVES AND VALVE SPRINGS</b> .....	5-24
REMOVING THE VALVES .....	5-25
CHECKING THE VALVES AND VALVE GUIDES .....	5-26
CHECKING THE VALVE SEATS .....	5-27
CHECKING THE VALVE SPRINGS .....	5-29
CHECKING THE VALVE LIFTERS .....	5-29
INSTALLING THE VALVES .....	5-29
 <b>CYLINDER AND PISTON</b> .....	5-31
REMOVING THE PISTON .....	5-32
CHECKING THE CYLINDER AND PISTON .....	5-32
CHECKING THE PISTON RINGS .....	5-33
CHECKING THE PISTON PIN .....	5-34
INSTALLING THE PISTON AND CYLINDER .....	5-34
 <b>ELECTRIC STARTER</b> .....	5-36
CHECKING THE STARTER MOTOR .....	5-38
ASSEMBLING THE STARTER MOTOR .....	5-39
 <b>CLUTCH</b> .....	5-40
REMOVING THE CLUTCH .....	5-43

---

CHECKING THE FRICTION PLATES .....	5-43
CHECKING THE CLUTCH PLATES .....	5-43
CHECKING THE CLUTCH SPRINGS .....	5-43
CHECKING THE CLUTCH HOUSING .....	5-44
CHECKING THE CLUTCH BOSS .....	5-44
CHECKING THE PRESSURE PLATE .....	5-44
CHECKING THE PUSH LEVER SHAFT .....	5-44
CHECKING THE CLUTCH PUSH RODS .....	5-44
CHECKING THE PRIMARY DRIVE GEAR .....	5-44
CHECKING THE PRIMARY DRIVEN GEAR .....	5-45
INSTALLING THE OIL SEAL .....	5-45
INSTALLING THE RIGHT CRANKCASE COVER .....	5-45
INSTALLING THE CLUTCH .....	5-45
 <b>SHIFT SHAFT</b> .....	 5-48
REMOVING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY .....	5-49
REMOVING THE SEGMENT .....	5-49
CHECKING THE SHIFT SHAFT .....	5-49
CHECKING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY .....	5-49
CHECKING THE STOPPER LEVER .....	5-49
INSTALLING THE STOPPER LEVER .....	5-49
INSTALLING THE SEGMENT .....	5-50
INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY .....	5-50
INSTALLING THE SHIFT SHAFT .....	5-51
INSTALLING THE SHIFT PEDAL .....	5-51
 <b>OIL PUMP AND BALANCER GEAR</b> .....	 5-52
REMOVING THE BALANCER .....	5-54
CHECKING THE PRIMARY DRIVE GEAR, BALANCER DRIVE GEAR, AND BALANCER WEIGHT GEAR .....	5-54
CHECKING THE BALANCER .....	5-54
CHECKING THE OIL PUMP .....	5-54
ASSEMBLING THE OIL PUMP .....	5-55
INSTALLING THE OIL PUMP AND BALANCER GEAR .....	5-55
 <b>AC MAGNETO</b> .....	 5-57
REMOVING THE AC MAGNETO .....	5-58
CHECKING THE AC MAGNETO .....	5-58
CHECKING THE WOODRUFF KEY .....	5-58
INSTALLING THE AC MAGNETO .....	5-58
 <b>STARTER CLUTCH</b> .....	 5-60
CHECKING THE STARTER CLUTCH .....	5-61
 <b>CRANKCASE</b> .....	 5-62
DISASSEMBLING THE CRANKCASE .....	5-64
REMOVING THE CRANKCASE BEARING .....	5-64
CHECKING THE TIMING CHAIN, TIMING CHAIN GUIDE, OIL STRAINER .....	5-64
CHECKING THE CRANKCASE .....	5-64

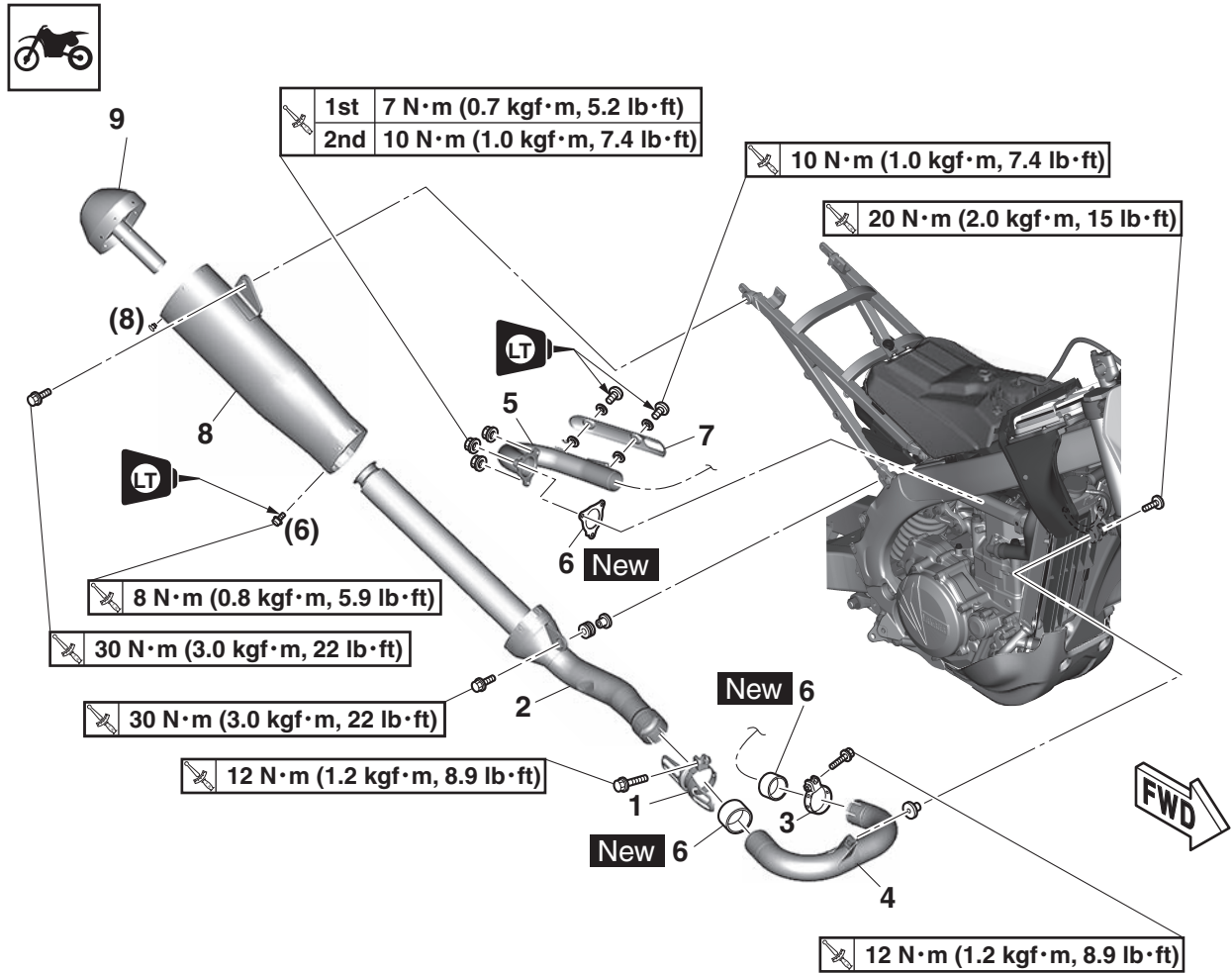
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INSTALLING THE OIL SEAL.....	5-65
ASSEMBLING THE CRANKCASE .....	5-65
 <b>CRANKSHAFT ASSEMBLY AND BALANCER SHAFT .....</b>	 5-67
REMOVING THE BALANCER SHAFT .....	5-68
REMOVING THE CRANKSHAFT ASSEMBLY .....	5-68
CHECKING THE CRANKSHAFT ASSEMBLY .....	5-68
INSTALLING THE CRANKSHAFT ASSEMBLY .....	5-69
 <b>TRANSMISSION.....</b>	 5-70
REMOVING THE TRANSMISSION.....	5-71
CHECKING THE SHIFT FORKS .....	5-71
CHECKING THE SHIFT DRUM ASSEMBLY .....	5-71
CHECKING THE TRANSMISSION .....	5-72
INSTALLING THE TRANSMISSION .....	5-72

EAM20105

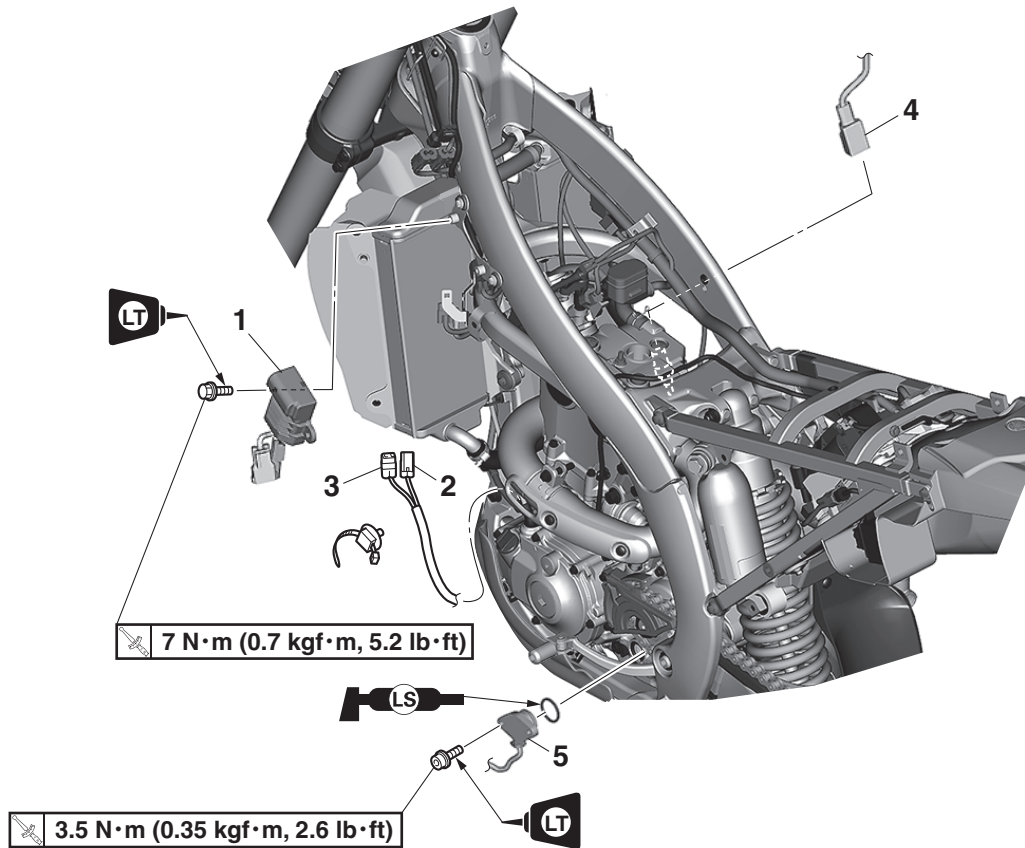
## ENGINE REMOVAL

### Removing the exhaust pipe



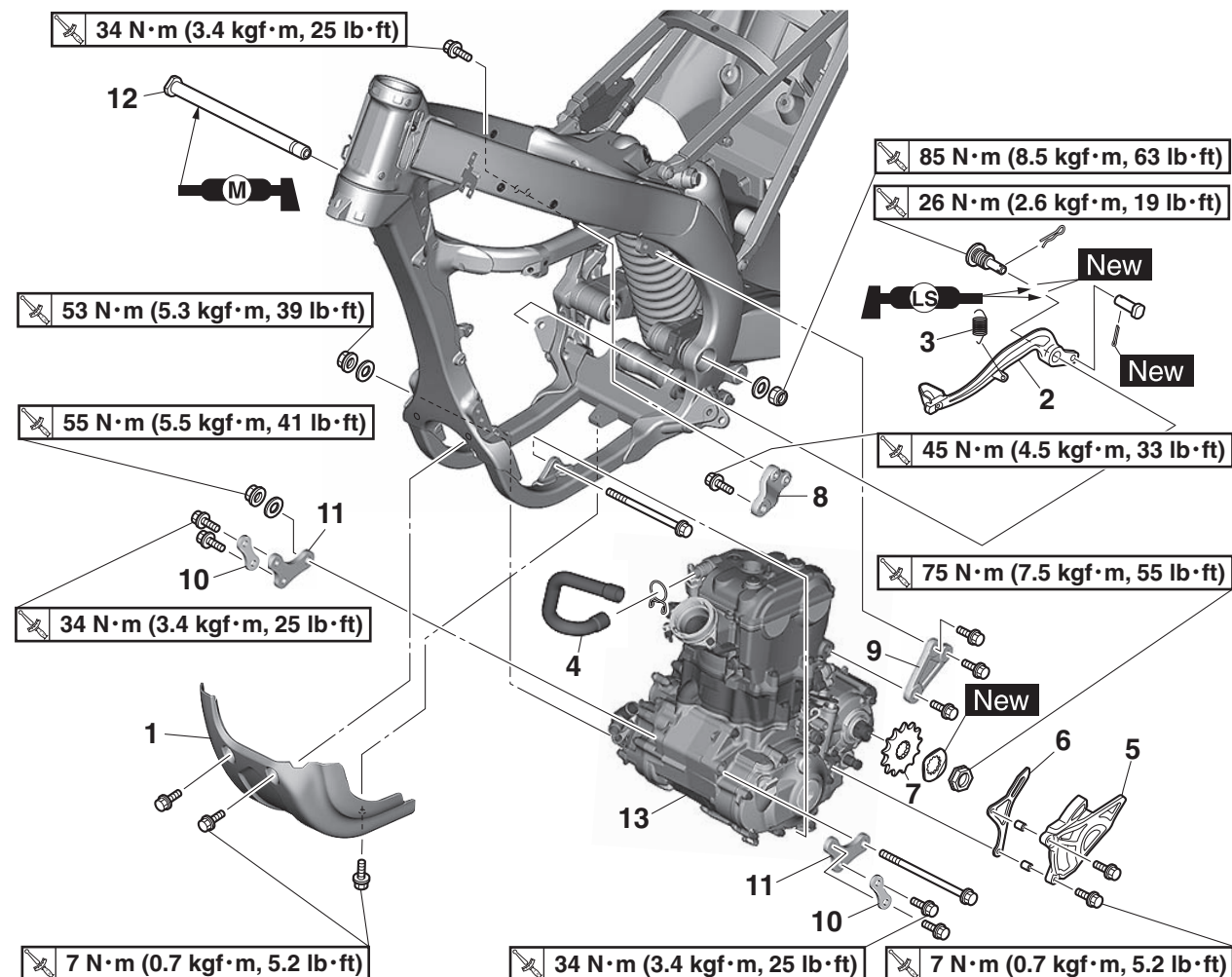
Order	Job/Parts to remove	Q'ty	Remarks
	Side cover (right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear shock absorber assembly lower bolt		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.
	Connecting arm bolt (frame side)		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.
1	Silencer clamp	1	Loosen.
2	Silencer	1	
3	Exhaust pipe 2 clamp	1	Loosen.
4	Exhaust pipe 2	1	
5	Exhaust pipe 1	1	
6	Gasket	3	
7	Exhaust pipe 1 protector	1	
8	Silencer body	1	
9	Silencer cap	1	

## Removing the electronic parts



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case cover		Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-10.
	Intake air temperature sensor coupler		Refer to "THROTTLE BODY" on page 7-5.
	ECU		Refer to "THROTTLE BODY" on page 7-5.
	Ignition coil		Refer to "THROTTLE BODY" on page 7-5.
1	Rectifier/regulator	1	
2	AC magneto coupler	1	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Coolant temperature sensor coupler	1	
5	Gear position switch	1	

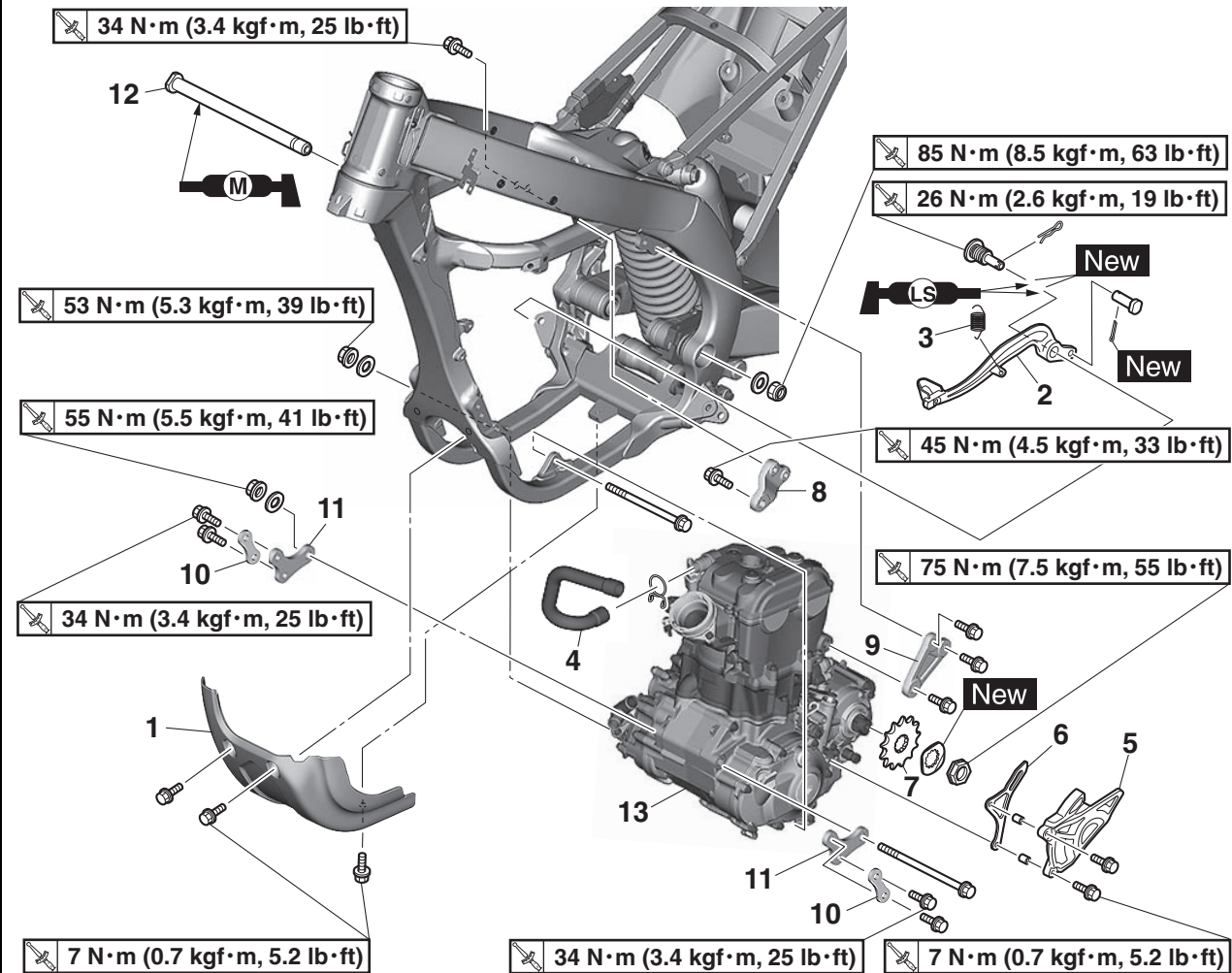
## Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Exhaust pipe and silencer		Refer to "ENGINE REMOVAL" on page 5-1.
	Air filter case		Refer to "THROTTLE BODY" on page 7-5.
	Throttle body		Refer to "THROTTLE BODY" on page 7-5.
	Clutch cable		Refer to "CLUTCH" on page 5-40.
	Shift pedal/Drive chain		Refer to "SHIFT SHAFT" on page 5-48. Refer to "CHAIN DRIVE" on page 4-64.
1	Engine guard	1	
2	Brake pedal	1	
3	Spring	1	
4	Cylinder head breather hose	1	
5	Drive sprocket cover	1	
6	Drive chain guide	1	
7	Drive sprocket	1	



## Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
8	Upper engine bracket (right)	1	
9	Upper engine bracket (left)	1	
10	Lower engine bracket (outside)	2	
11	Lower engine bracket (inside)	2	
12	Pivot shaft	1	
13	Engine	1	

EAM30158

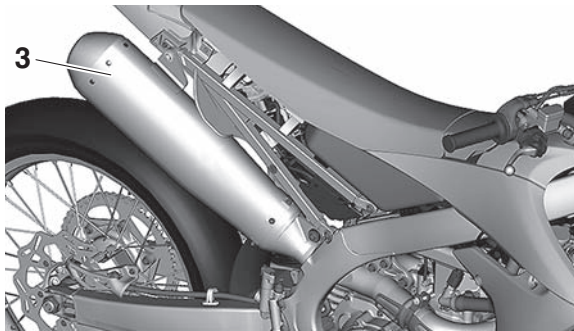
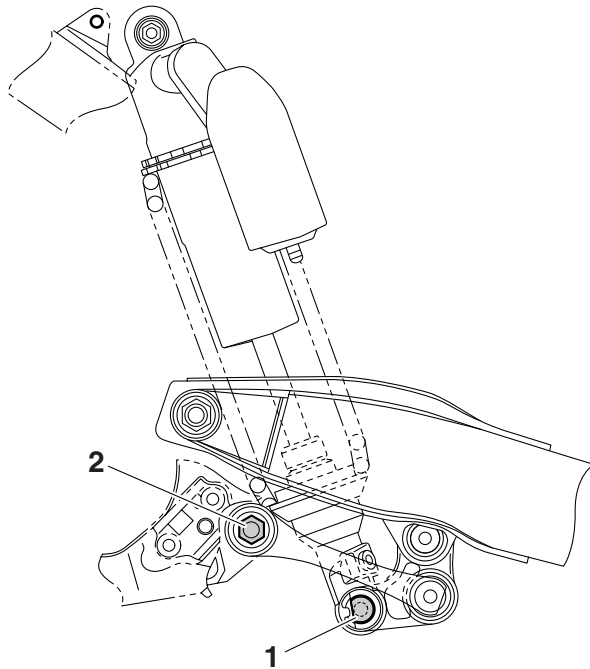
## REMOVING THE SILENCER

### 1. Remove:

- Rear shock absorber assembly lower bolt "1"
- Connecting arm bolt (frame side) "2"
- Silencer "3"

### TIP

Move the rear shock absorber to the left side of the chassis, and remove the silencer.



EAM30159

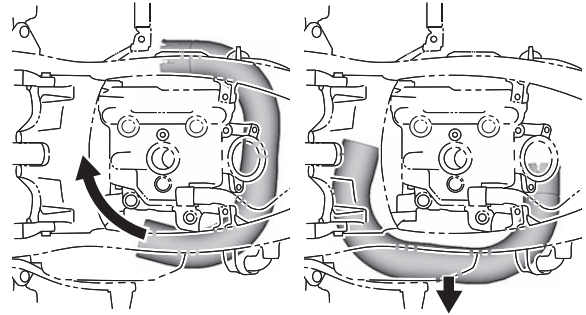
## REMOVING THE EXHAUST PIPE 2

### 1. Remove:

- Exhaust pipe 2

### TIP

Put the exhaust pipe 2 into the state as shown by moving this, and then remove it.



EAM30160

## REMOVING THE DRIVE SPROCKET

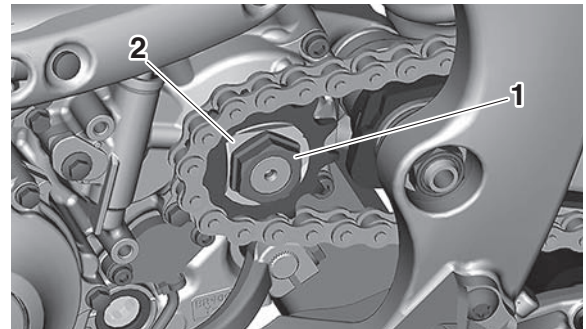
### 1. Straighten the lock washer tab.

### 2. Remove:

- Nut (drive sprocket) "1"
- Lock washer "2"

### TIP

Loosen the nut while applying the rear brake.

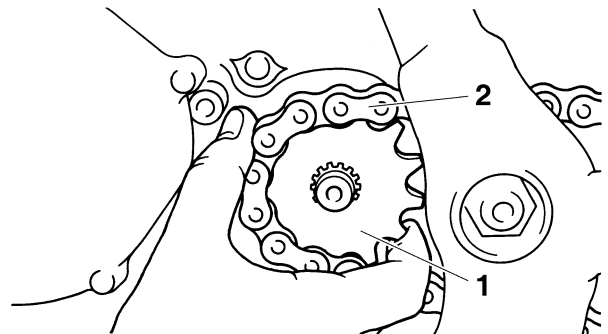


### 3. Remove:

- Drive sprocket "1"
- Drive chain "2"

### TIP

Remove the drive sprocket together with the drive chain.



EAM30161

## REMOVING THE ENGINE

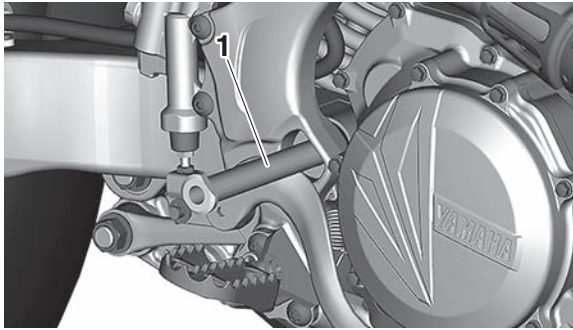
### 1. Remove:

- Pivot shaft "1"

### TIP

If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a

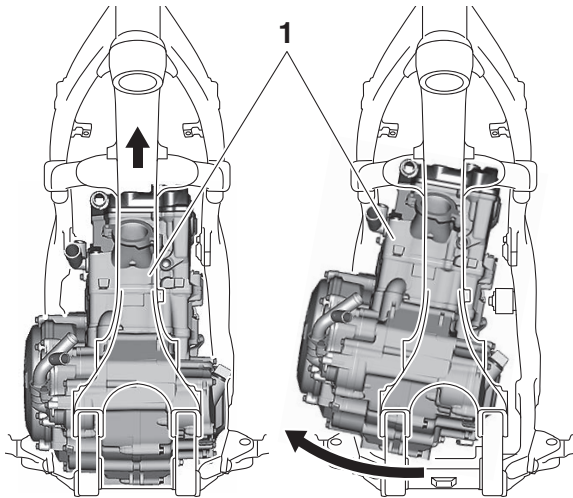
shaft of similar diameter into the other side of the swingarm to support it.



2. Remove:
  - Engine “1”
 From the right side.

### TIP

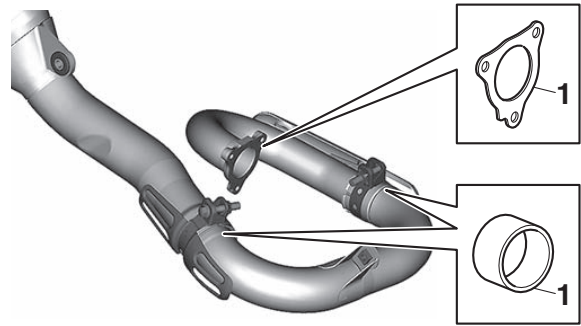
- Make sure that the couplers, the hoses, and the cables are disconnected.
- Lift up the engine, and remove this from its lower part toward the right of the chassis.



EAM30163

## CHECKING THE SILENCER AND EXHAUST PIPE

1. Check:
  - Gasket “1”
 Damage → Replace.



EAM30373

## CHANGING THE SILENCER FIBER

1. Remove:
  - Bolt “1”
  - Silencer body “2”

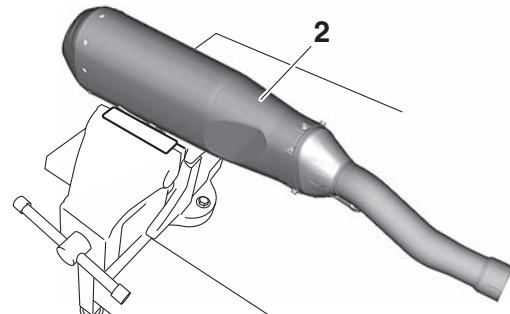
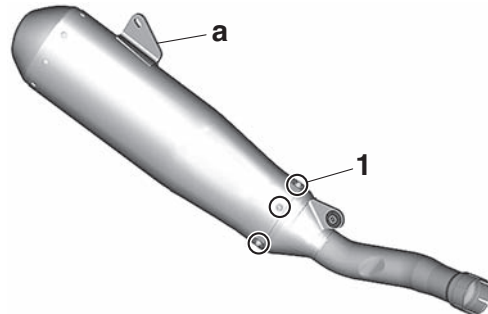
ECA25800

### NOTICE

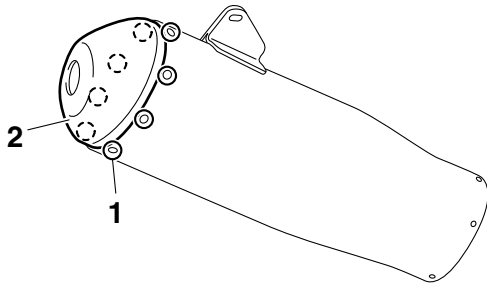
**Do not hit the silencer stay “a” as it may do damage to the silencer.**

### TIP

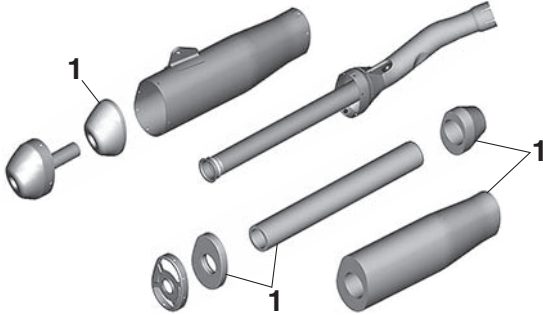
Remove the inner pipe while holding the silencer in place with a vise etc.



2. Remove:
  - Rivet “1”
  - Silencer cap “2”



3. Replace:
- Fiber "1"



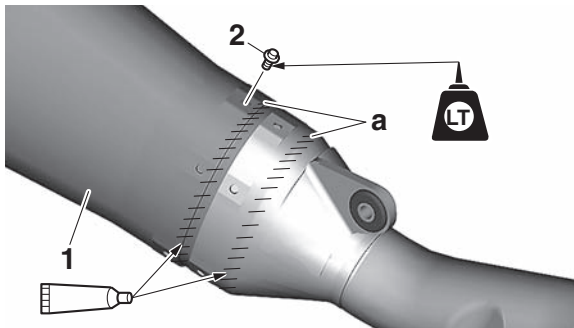
4. Install:
- Silencer body "1"
  - Bolt "2"



**Silencer body bolt**  
**8 N·m (0.8 kgf·m, 5.9 lb·ft)**  
**LOCTITE®**

**TIP**

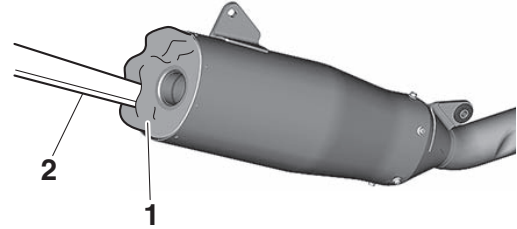
Apply heat-resistant sealant to the areas "a" shown, making sure that there are no gaps in the beads of sealant.



5. Replace:
- Fiber "1"

**TIP**

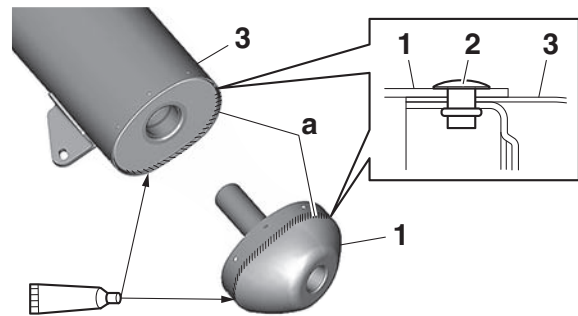
Stuff the fiber into the silencer body by using a flat board "2".



6. Install:
- Silencer cap "1"
  - Rivet "2"

**TIP**

- Apply heat-resistant sealant to the areas "a" shown, making sure that there are no gaps in the beads of sealant.
- Take care not to allow the fiber out of place when installing the silencer body "3".



EAM30164

## INSTALLING THE ENGINE

### 1. Install:


- Engine “1”  
Install the engine from the right side.
- Pivot shaft “2”

	<b>Pivot shaft</b> <b>85 N·m (8.5 kgf·m, 63 lb·ft)</b>
---	---


- Engine mounting bolt (lower side) “3”

	<b>Engine mounting bolt (lower side)</b> <b>53 N·m (5.3 kgf·m, 39 lb·ft)</b>
---	---


- Lower engine bracket (inside) “4”
- Lower engine bracket (outside) “5”
- Engine bracket bolt (front side) “6”

	<b>Engine bracket bolt (front side)</b> <b>34 N·m (3.4 kgf·m, 25 lb·ft)</b>
---	--


- Engine mounting bolt (front side) “7”

	<b>Engine mounting bolt (front side)</b> <b>55 N·m (5.5 kgf·m, 41 lb·ft)</b>
---	---

- Upper engine bracket “8”
- Engine bracket bolt (upper side) “9”

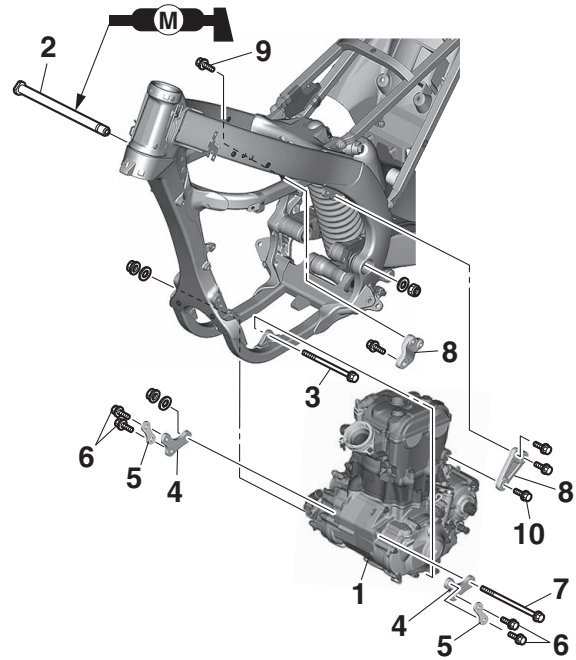
	<b>Engine bracket bolt (upper side)</b> <b>34 N·m (3.4 kgf·m, 25 lb·ft)</b>
---	--

- Engine mounting bolt (upper side) “10”

	<b>Engine mounting bolt (upper side)</b> <b>45 N·m (4.5 kgf·m, 33 lb·ft)</b>
---	---

### TIP

Apply molybdenum disulfide grease to the pivot shaft.




EAM30165

## INSTALLING THE BRAKE PEDAL

### 1. Install:

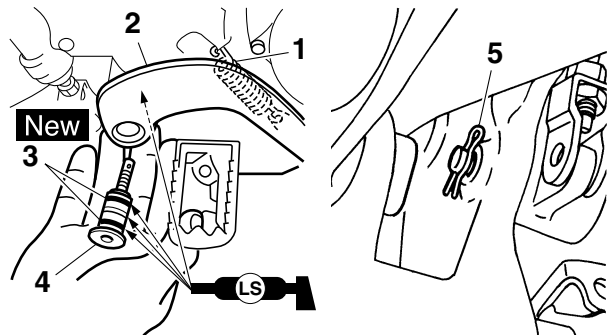
- Spring “1”
- Brake pedal “2”
- O-ring “3” **New**
- Bolt (brake pedal) “4”

	<b>Bolt (brake pedal)</b> <b>26 N·m (2.6 kgf·m, 19 lb·ft)</b>
---	--

- Clip “5”

### TIP

Apply the lithium-soap-based grease on the bolt, O-rings and brake pedal bracket.



EAM30166

## INSTALLING THE DRIVE SPROCKET

### 1. Install:

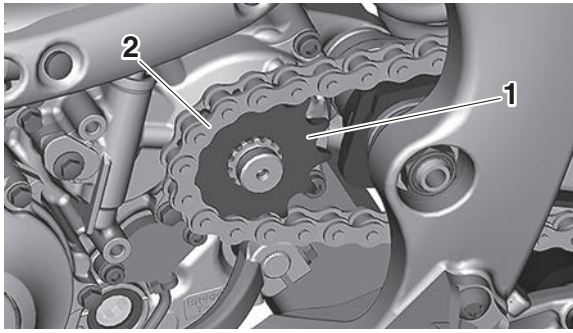
- Drive sprocket “1”
- Drive chain “2”

### TIP

Install the drive sprocket together with the drive



chain.



2. Install:

- Lock washer “1” **New**
- Nut (drive sprocket) “2”



**Nut (drive sprocket)**  
75 N·m (7.5 kgf·m, 55 lb·ft)

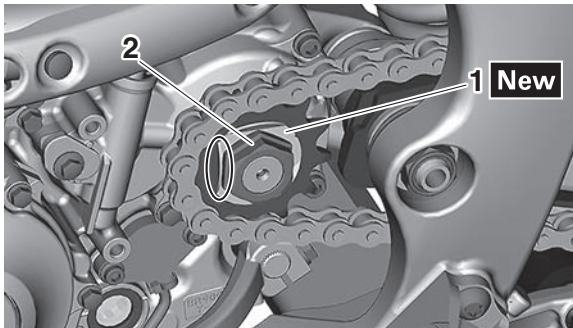
#### TIP

Tighten the nut while applying the rear brake.

ECA24600

#### NOTICE

**Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.**



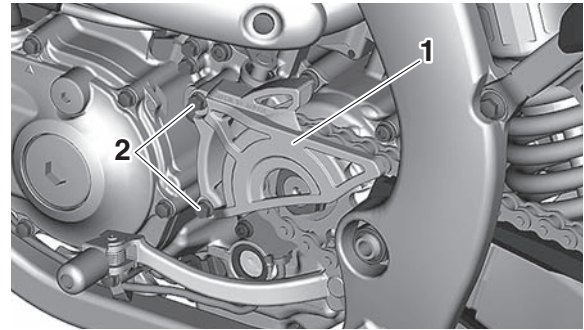
3. Bend the lock washer tab to lock the nut.

4. Install:

- Drive sprocket guide
- Drive sprocket cover “1”
- Bolt (drive sprocket cover) “2”



**Bolt (drive sprocket cover)**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)



EAM30167

#### INSTALLING THE EXHAUST PIPE AND MUFFLER

1. Install:

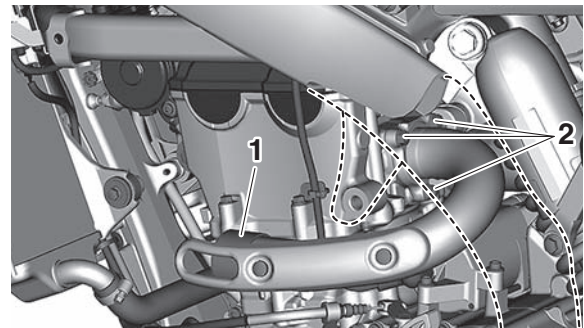
- Gasket **New**
- Exhaust pipe 1 “1”
- Nut (exhaust pipe 1) “2”



**Nut (exhaust pipe)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

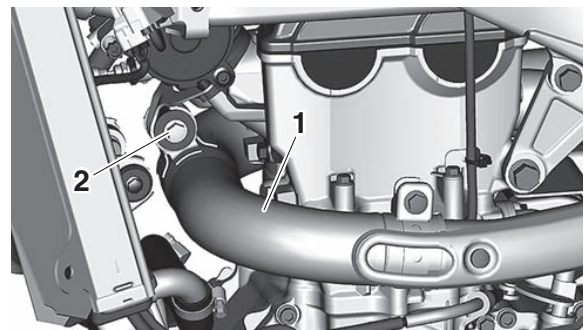
#### TIP

First temporarily tighten all nuts to 7 N·m (0.7 kgf·m, 5.2 lb·ft). Then retighten them to 10 N·m (1.0 kgf·m, 7.4 lb·ft).



2. Install:

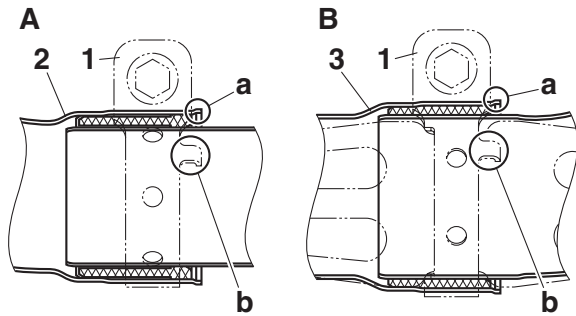
- Clamp
- Exhaust pipe 2 “1”
- Bolt (exhaust pipe 2) “2”



#### TIP

Make sure that the exhaust pipe band “1” does not ride on the projection “a” on the exhaust pipe

“2” or silencer “3”. Be sure to insert the projection “b” into the slot in the exhaust pipe (or silencer).



A. Exhaust pipe 1 and exhaust pipe 2

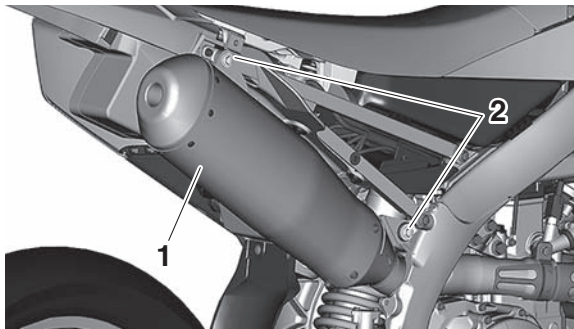
B. Exhaust pipe 2 and silencer

3. Install:

- Clamp
- Silencer “1”
- Bolt (silencer) “2”



**Bolt (silencer)**  
30 N·m (3.0 kgf·m, 22 lb·ft)



4. Tighten:

- Bolt (exhaust pipe 2)



**Bolt (exhaust pipe 2)**  
20 N·m (2.0 kgf·m, 15 lb·ft)

- Clamp



**Clamp**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)

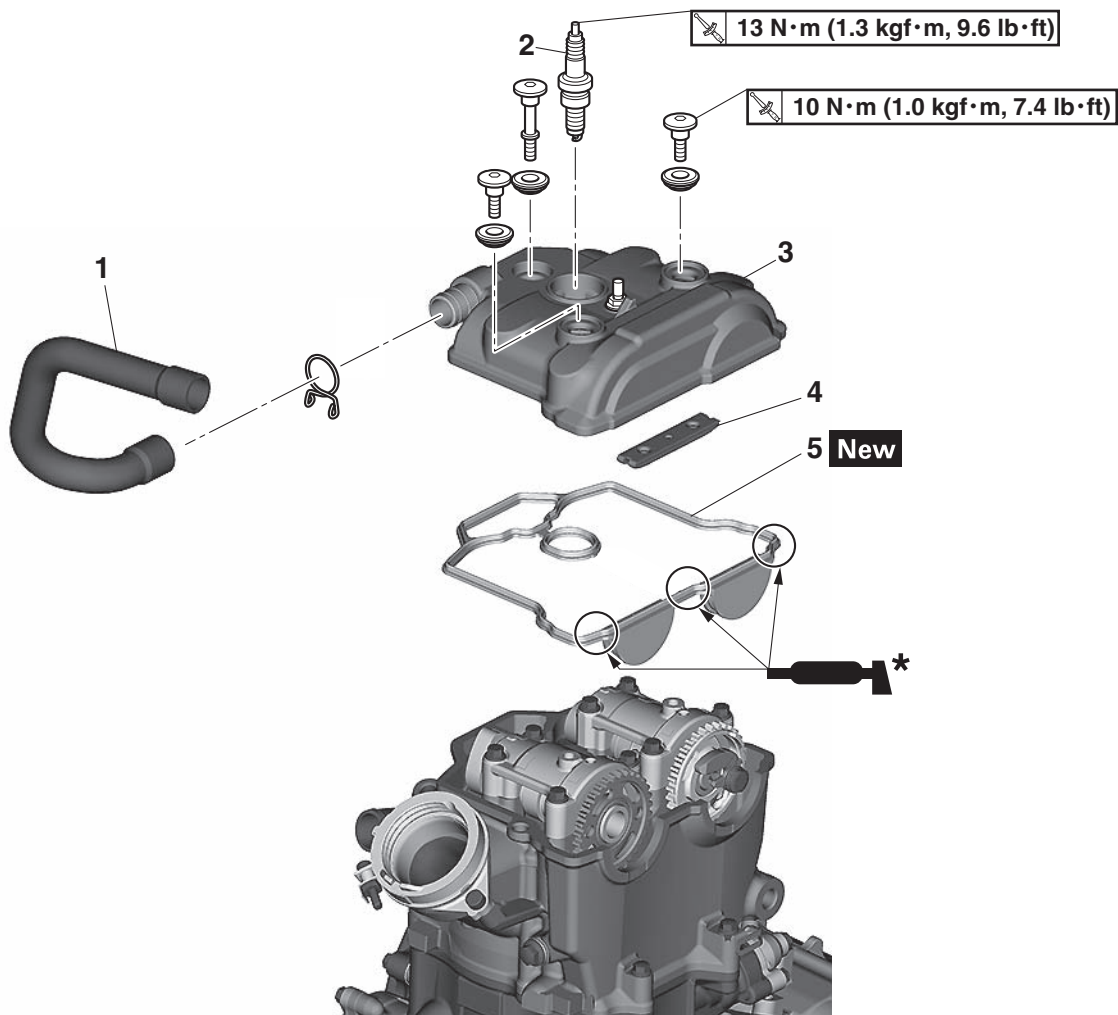
## TIP

Tighten while checking that their front and rear joints are inserted in position.

EAM20106

## CAMSHAFT

## Removing the cylinder head cover

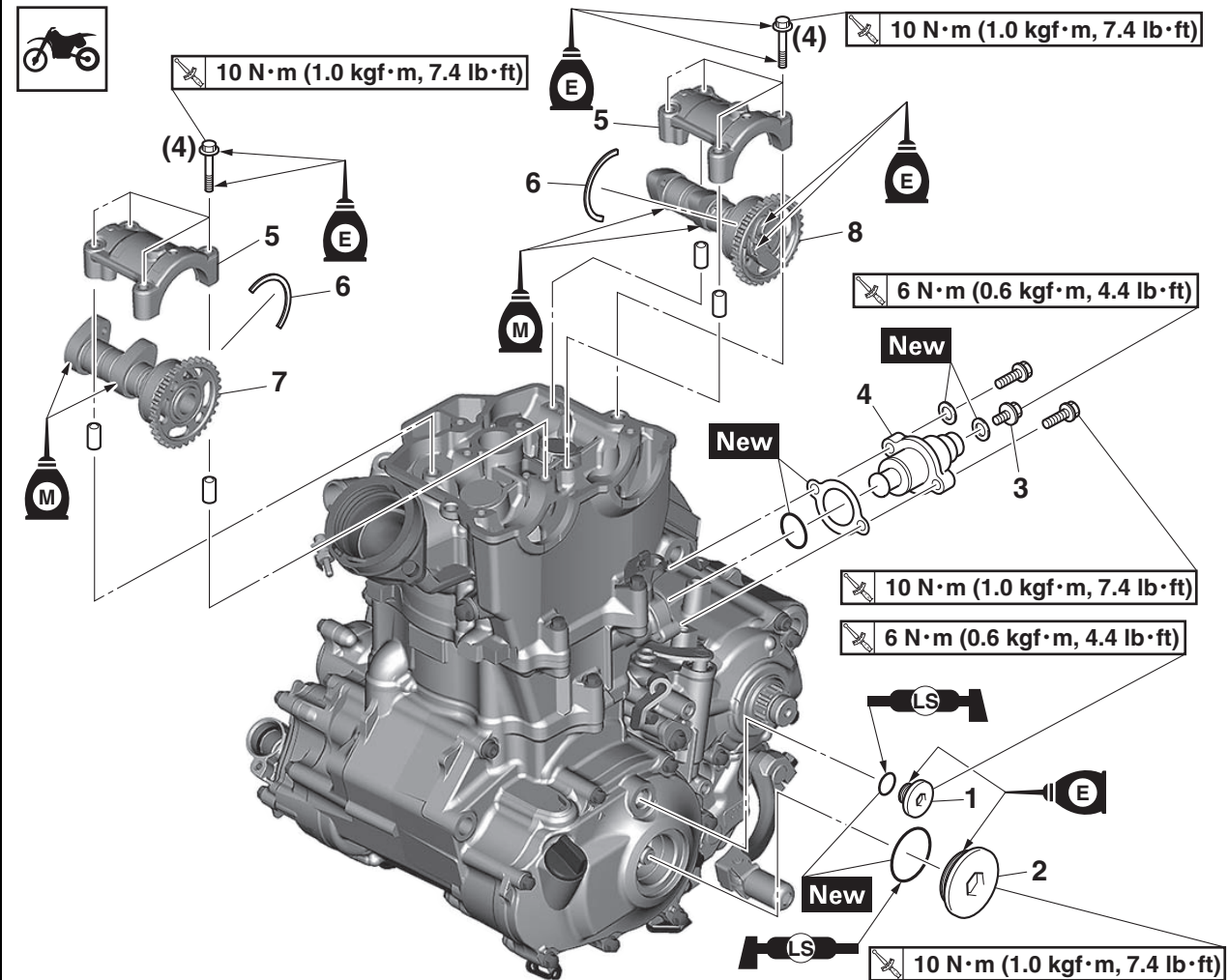


Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Ignition coil		Refer to "ENGINE REMOVAL" on page 5-1.
1	Cylinder head breather hose	1	
2	Spark plug	1	
3	Cylinder head cover	1	
4	Timing chain guide (top side)	1	
5	Cylinder head cover gasket	1	

\* Yamaha bond No. 1215 (Three bond No.1215®)



## Removing the camshaft



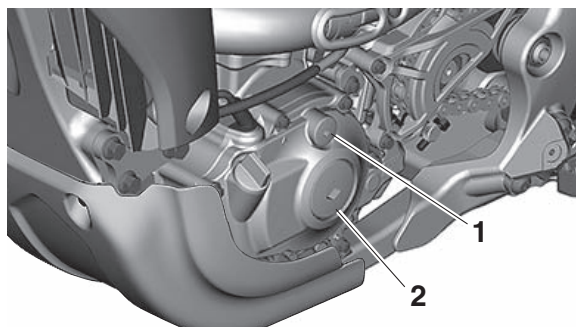
Order	Job/Parts to remove	Q'ty	Remarks
1	Timing mark accessing screw	1	
2	Crankshaft end accessing screw	1	
3	Timing chain tensioner cap bolt	1	
4	Timing chain tensioner	1	
5	Camshaft cap	2	
6	Clip	2	
7	Intake camshaft	1	
8	Exhaust camshaft	1	

EAM30080

## REMOVING THE CAMSHAFT

### 1. Remove:

- Timing mark accessing screw "1"
- Crankshaft end accessing screw "2"



### 2. Align:

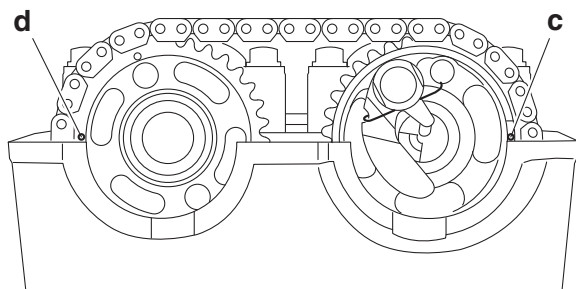
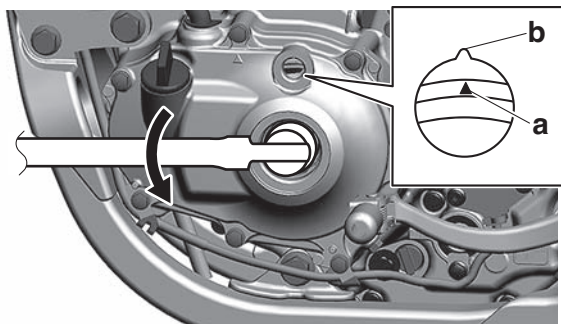
- Alignment mark



- Turn the crankshaft counterclockwise with a wrench.
- Align the top dead center (TDC) mark "a" on the rotor with the alignment mark "b" on the crankcase cover.

### TIP

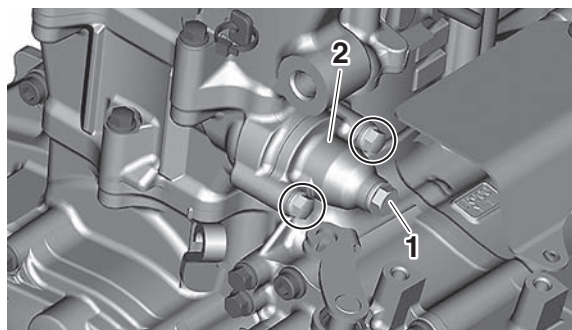
Align the alignment mark "c" on the exhaust camshaft sprocket and the alignment mark "d" on the intake camshaft sprocket with the edge of the cylinder head.



### 3. Remove:

- Timing chain tensioner cap bolt "1"

- Timing chain tensioner "2"
- Gasket



### 4. Remove:

- Bolt (camshaft cap) "1"
- Camshaft cap "2"
- Clip "3"

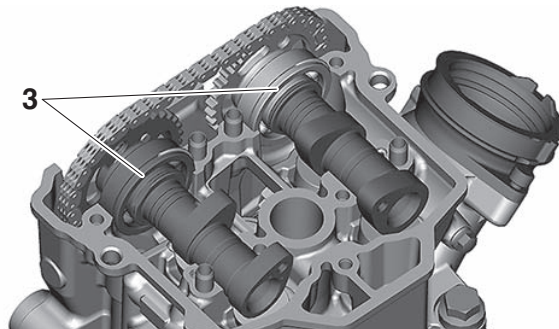
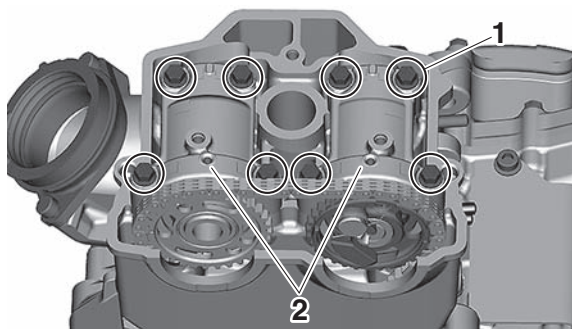
### TIP

- Remove the bolts (camshaft cap) in a criss-cross pattern, working from the outside in.
- In order to prevent the clip from falling into the crankcase, remove the camshaft cap.

ECA24610

### NOTICE

The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.



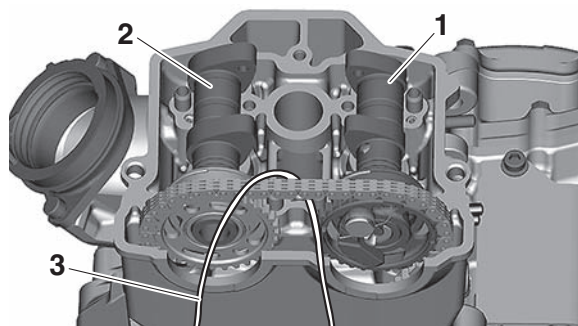
### 5. Remove:

- Exhaust camshaft "1"
- Intake camshaft "2"

### TIP

Attach a wire "3" to the timing chain to prevent it

from falling into the crankcase.



EAM30081

## CHECKING THE CAMSHAFT

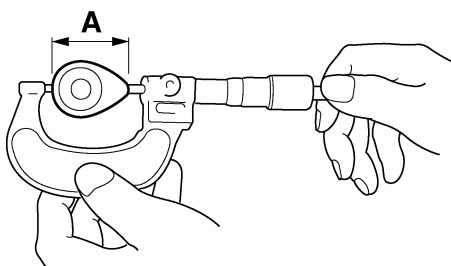
### 1. Check:

- Camshaft lobe  
Blue discoloration/pitting/scratches → Replace the camshaft.

### 2. Measure:

- Camshaft lobe dimensions “A”  
Out of specification → Replace the camshaft.

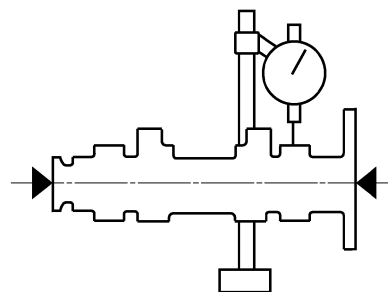
	<b>Camshaft lobe dimensions</b>
	<b>Lobe height (Intake)</b>
	38.130–38.230 mm (1.5012–1.5051 in)
	<b>Limit</b>
	38.030 mm (1.4972 in)
	<b>Lobe height (Exhaust)</b>
	34.270–34.370 mm (1.3492–1.3531 in)
	<b>Limit</b>
	34.170 mm (1.3453 in)



### 3. Measure:

- Camshaft runout  
Out of specification → Replace.

	<b>Camshaft runout limit</b>
	0.030 mm (0.0012 in)



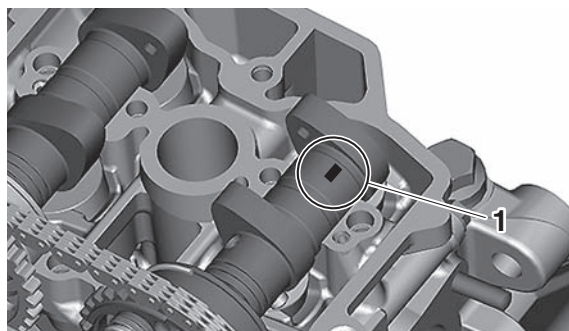
11151402

### 4. Measure:

- Camshaft-journal-to-camshaft-cap clearance  
Out of specification → Measure the camshaft journal diameter.

	<b>Camshaft-journal-to-camshaft-cap clearance</b>
	0.028–0.062 mm (0.0011–0.0024 in)

- Install the camshaft into the cylinder head.
- Position a strip of Plastigauge® “1” onto the camshaft journal as shown.



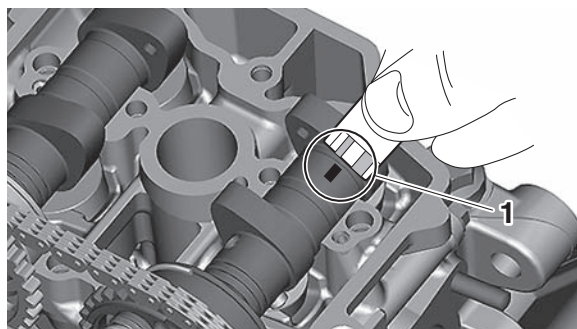
- Install the dowel pins and the camshaft caps.

### TIP

- Tighten the camshaft cap bolts in a crisscross pattern from innermost to outer caps.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance.

	<b>Camshaft cap bolt</b>
	10 N·m (1.0 kgf·m, 7.4 lb·ft)

- Remove the camshaft caps and then measure the width of the Plastigauge® “1”.

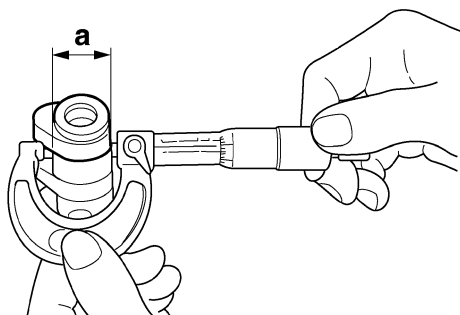


## 5. Measure:

- Camshaft journal diameter “a”  
Out of specification → Replace the camshaft.  
Within specification → Replace the cylinder head and the camshaft caps as a set.



**Camshaft journal diameter**  
**21.959–21.972 mm (0.8645–0.8650 in)**



EAM30082

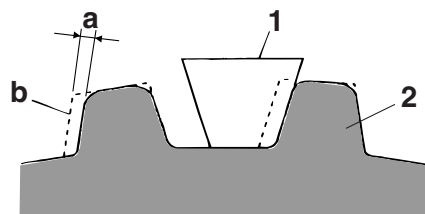
## CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

### 1. Check:

- Timing chain “1”  
Damage/stiffness → Replace the timing chain and camshaft as a set.

### 2. Check:

- Camshaft sprocket  
More than 1/4 tooth wear “a” → Replace the camshaft and the timing chain as a set.



a. 1/4 tooth

b. Correct

1. Timing chain roller

2. Camshaft sprocket

EAM30083

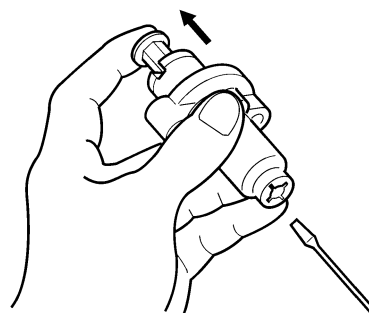
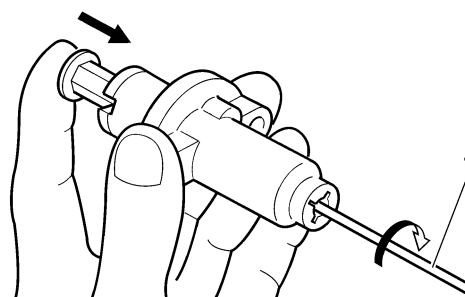
## CHECKING THE TIMING CHAIN TENSIONERS

### 1. Check:

- Timing chain tensioner  
Crack/damage → Replace.



- While pressing the tensioner rod lightly with your fingers, use a thin screwdriver “1” to wind the tensioner rod up fully clockwise.
- When releasing the screwdriver by pressing lightly with your fingers, make sure that the tensioner rod will come out smoothly.
- If not, replace the tensioner assembly.





EAM30084

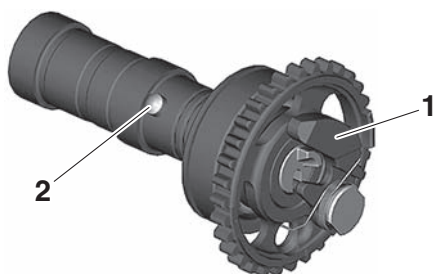
## CHECKING THE DECOMPRESSION SYSTEM

### 1. Check:

- Decompression system



- Check that the decompressor cam "1" moves smoothly.
- Check that the decompressor lever pin "2" projects from the camshaft.

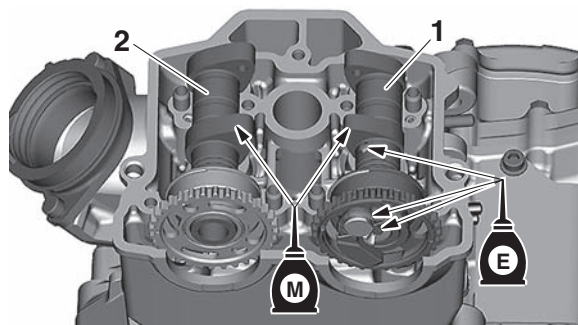


EAM30085

## INSTALLING THE CAMSHAFTS

### 1. Install:

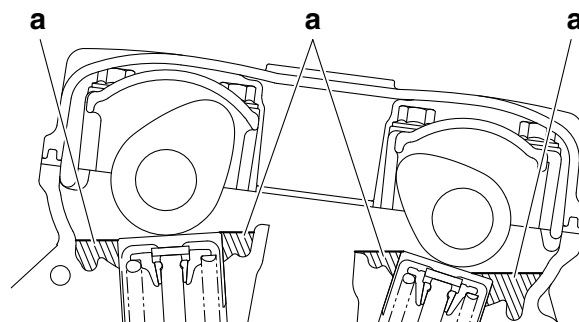
- Exhaust camshaft "1"
- Intake camshaft "2"



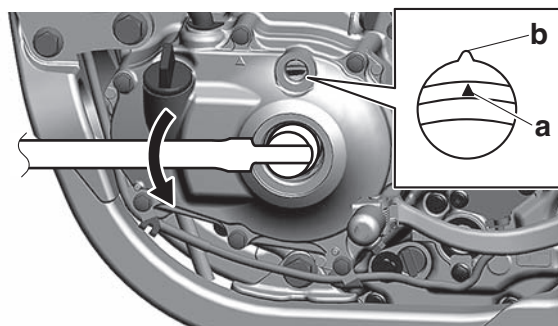
- Turn the crankshaft counterclockwise with a wrench.

### TIP

- Apply molybdenum disulfide oil to the camshafts.
- Apply the engine oil on the decompression system.
- Fill the cylinder head with engine oil up to the tops "a" of the valve lifters.



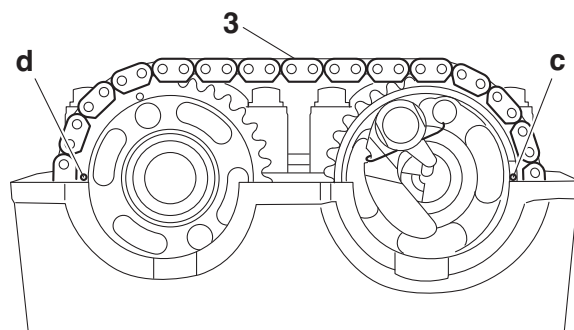
- Align the top dead center (TDC) mark "a" on the rotor with the alignment mark "b" on the crankcase cover.



- Fit the timing chain "3" onto both camshaft sprockets and install the camshafts on the cylinder head.

### TIP

Make sure that the alignment mark "c" on the exhaust camshaft sprocket and the alignment mark "d" on the intake camshaft sprocket are aligned with the edge of the cylinder head.



ECA24620

### NOTICE

**Do not turn the crankshaft during the camshaft installation. Damage or improper valve timing will result.**

- Install the clips, the camshaft caps and the bolts (camshaft cap).



**Bolt (camshaft cap)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

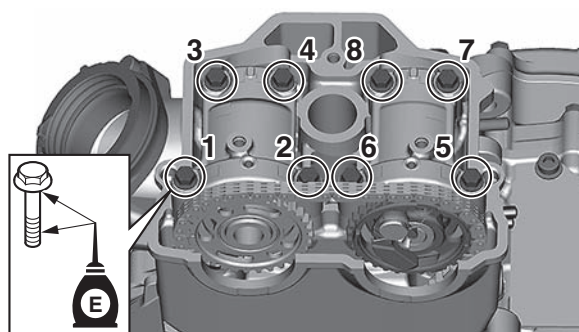
**TIP**

- Before installing the clips, cover the cylinder head with a clean cloth to prevent the clips from coming off into the cylinder head cavity.
- Apply the engine oil to the threads and contact surfaces.
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

ECA24630

**NOTICE**

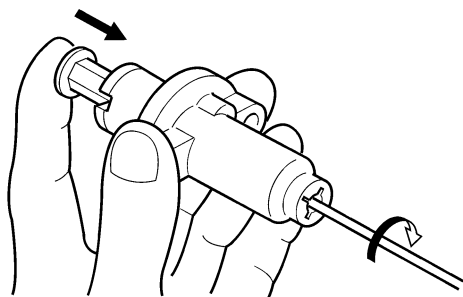
**The bolts (camshaft cap) must be tightened evenly, or damage to the cylinder head, camshaft caps, and camshaft will result.**



## 2. Install:

- Timing chain tensioner

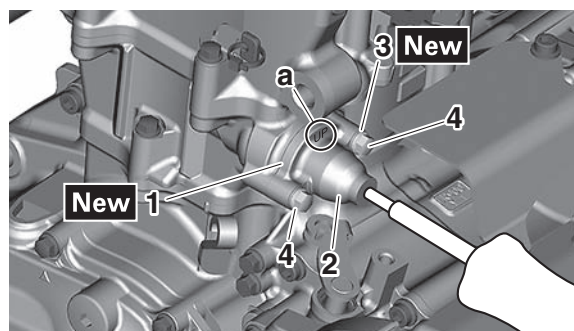
- a. While pressing the tensioner rod lightly with your fingers, use a thin screwdriver to wind the tensioner rod up fully clockwise.



- b. With the tensioner rod fully wound and the chain tensioner "UP" mark "a" facing upward, install the gasket "1", the timing chain tensioner "2", and the gasket "3", and tighten the bolt "4".



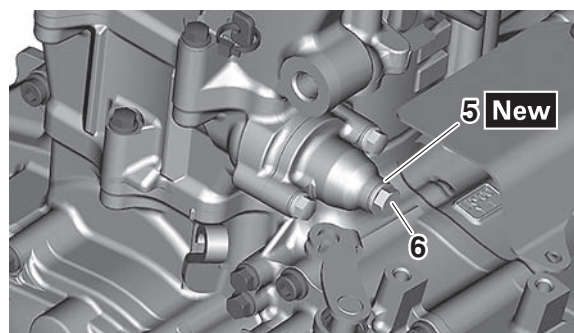
**Bolt (timing chain tensioner)**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**



- c. Release the screwdriver, check that the tensioner rod comes out smoothly, and tighten the gasket "5" and the cap bolt "6".



**Tensioner cap bolt**  
**6 N·m (0.6 kgf·m, 4.4 lb·ft)**



## 3. Turn:

- Crankshaft  
Counterclockwise several turns.

## 4. Check:

- Top dead center (TDC) mark on the rotor  
Align with the crankcase alignment mark.
- Camshaft match marks  
Align with the cylinder head surface.  
Out of alignment → Adjust.

## 5. Install:

- Timing chain guide (top side) "1"
- Cylinder head cover gasket "2" **New**
- Cylinder head cover "3"
- Bolt (cylinder head cover) "4"



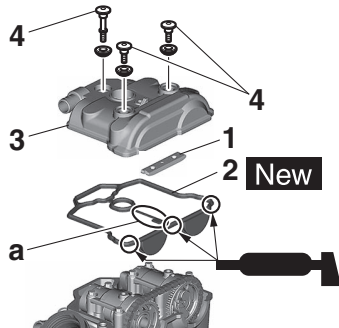
**Bolt (cylinder head cover)**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

**TIP**

- Before installation, apply the sealant to the cylinder head cover gasket.
- After installing the cylinder head cover gasket "2" to the cylinder head cover, cut off the "a" section.



**Yamaha bond No. 1215**  
**90890-85505**  
**(Three bond No.1215®)**



6. Install:

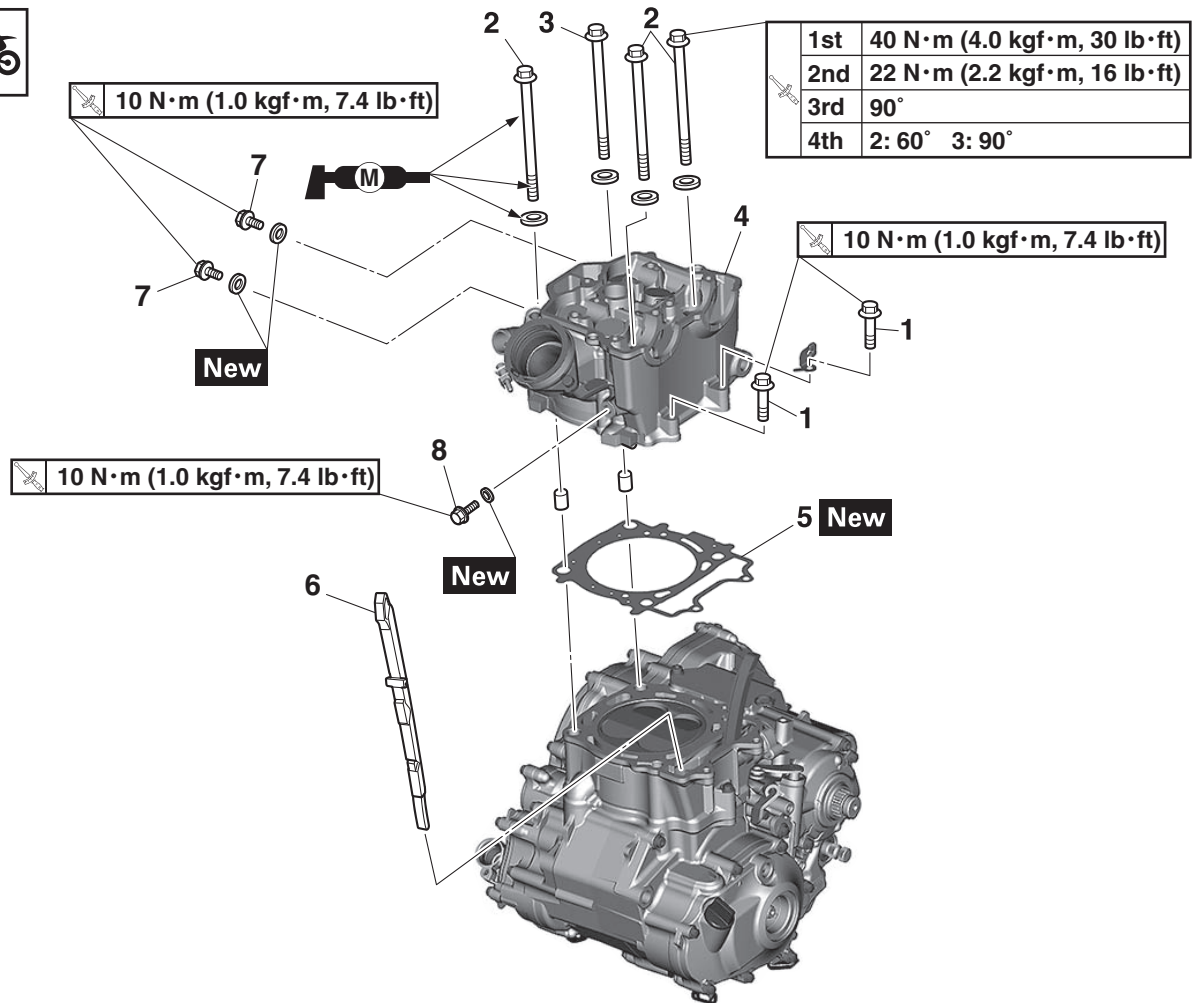
- Cylinder head breather hose
- Spark plug



**Spark plug**  
**13 N·m (1.3 kgf·m, 9.6 lb·ft)**

## CYLINDER HEAD

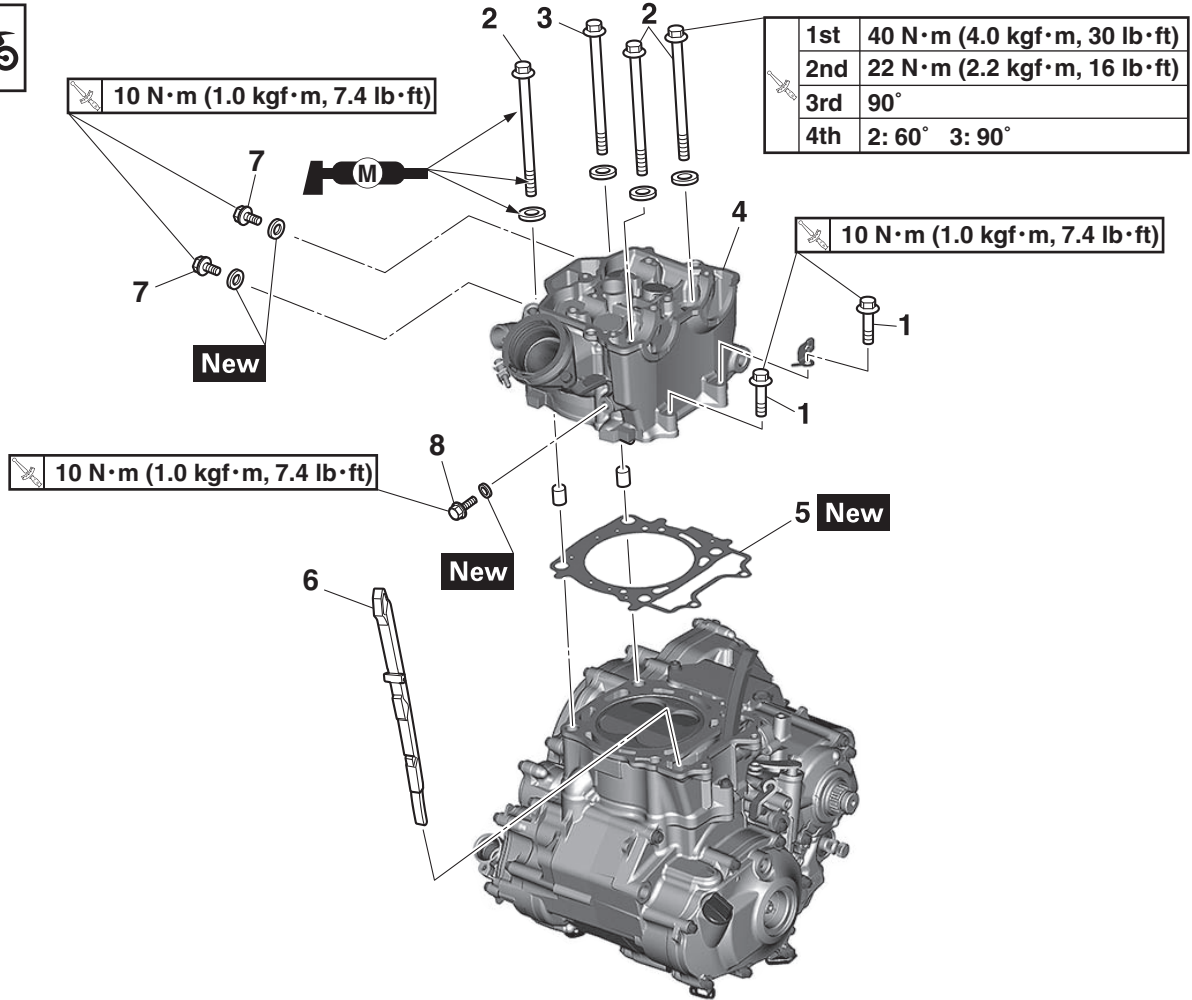
## Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Exhaust pipe and silencer		Refer to "ENGINE REMOVAL" on page 5-1.
	Radiator hose		Disconnect.
	Coolant temperature sensor coupler		Disconnect.
	Throttle body		Refer to "THROTTLE BODY" on page 7-5.
	Camshaft		Refer to "CAMSHAFT" on page 5-11.
	Upper engine bracket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Bolt (cylinder head)	2	
2	Bolt (cylinder head)	3	
3	Bolt (cylinder head)	1	
4	Cylinder head	1	
5	Cylinder head gasket	1	
6	Timing chain guide (intake side)	1	



## Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
7	Oil check bolt	2	
8	Oil passage plug	1	

EAM30086

## REMOVING THE CYLINDER HEAD

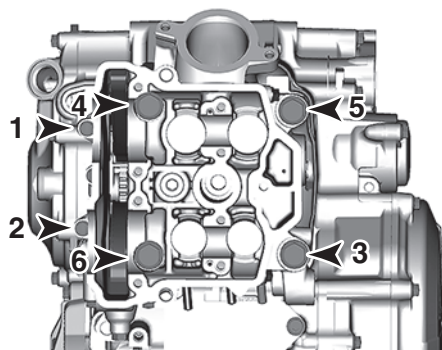
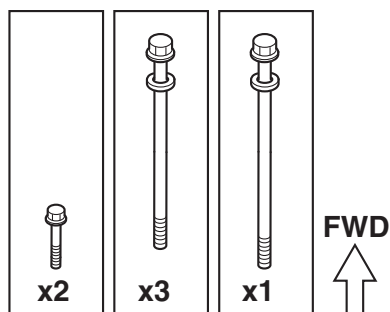
### 1. Remove:

- Cylinder head bolt

### TIP

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After fully loosening all the bolts, remove them.

- M6 × 35 mm (1.38 in): “1”–“2”
- M10 × 149 mm (5.87 in): “4”, “5”, “6”
- M10 × 165 mm (6.49 in): “3”



EAM30087

## CHECKING THE TIMING CHAIN GUIDE (INTAKE SIDE)

### 1. Check:

- Timing chain guide (intake side)  
Damage/wear → Replace.

EAM30088

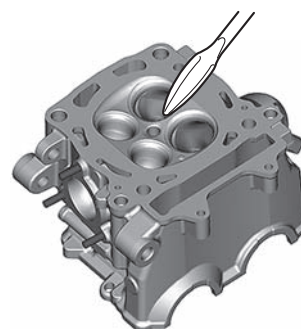
## CHECKING THE CYLINDER HEAD

### 1. Eliminate:

- Combustion chamber carbon deposits

### TIP

Use a rounded scraper, not a sharp instrument, in order not to damage or scratch the spark plug bore threads.



### 2. Check:

- Cylinder head  
Damage/scratches → Replace.

### TIP

When replacing the cylinder head, replace also the valve.

Refer to “CHECKING THE VALVE SEATS” on page 5-27.

- Cylinder head coolant passages  
Mineral deposits/rust → Eliminate.
- ### 3. Measure:
- Cylinder head warpage  
Out of specification → Resurface the cylinder head.

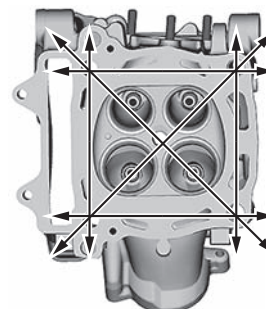


**Warpage limit**  
**0.05 mm (0.0020 in)**

- Place a straightedge and a thickness gauge across the cylinder head.
- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place a 400–600 grit wet sandpaper on a surface plate, and resurface the cylinder head using a figure-eight sanding pattern.

### TIP

To ensure an even surface, turn the cylinder head several times.



EAM30089

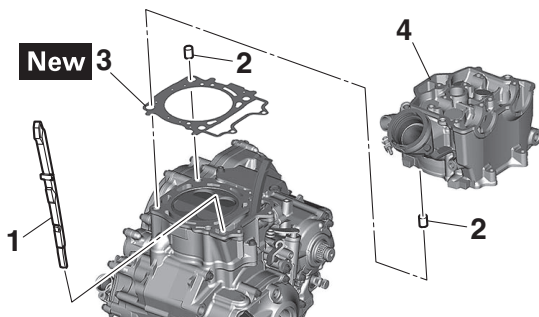
## INSTALLING THE CYLINDER HEAD

### 1. Install:

- Timing chain guide (intake side) "1"
- Dowel pin "2"
- Cylinder head gasket "3" **New**
- Cylinder head "4"

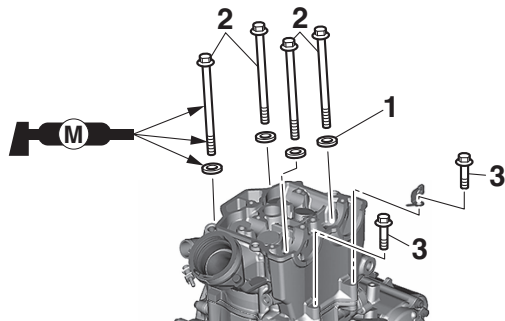
### TIP

While pulling up the timing chain, install the timing chain guide (intake side) and the cylinder head.



### 2. Install:

- Washer "1"
- Bolt "2"
- Bolt "3"



### TIP

Tighten the bolts using the following procedure.



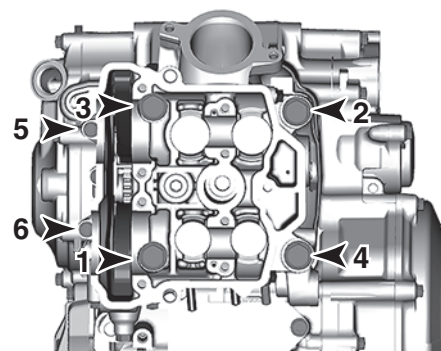
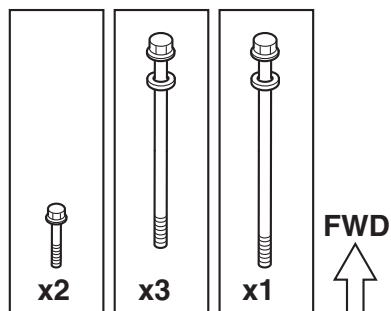
- Wash the threads and contact surfaces of the bolts, the contact surfaces of the washers, the contact surface of the cylinder head, and the threads of the crankcase.
- Apply molybdenum disulfide grease to the threads and contact surfaces of the bolts and to both contact surfaces of the washers "1".
- Install the washers and the bolts.
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.



### Bolt "1" – "4"

#### 1st

40 N·m (4.0 kgf·m, 30 lb·ft)



e. Remove the bolts.

f. Again apply molybdenum disulfide grease to the threads and contact surfaces of the bolts and to both contact surfaces of the washers.

g. Retighten the bolts.

### TIP

Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

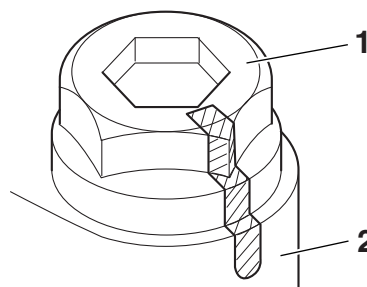


### Bolt "1" – "4"

#### 2nd

22 N·m (2.2 kgf·m, 16 lb·ft)

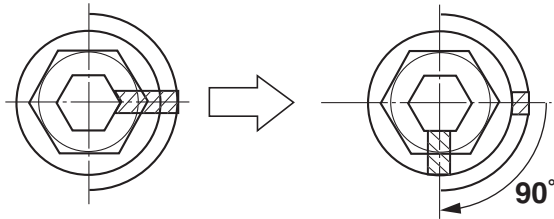
h. Put a mark on the corner "1" of the bolt (cylinder head) and the cylinder head "2" as shown.



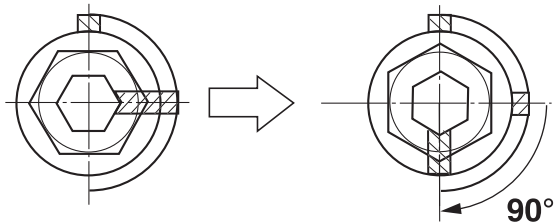
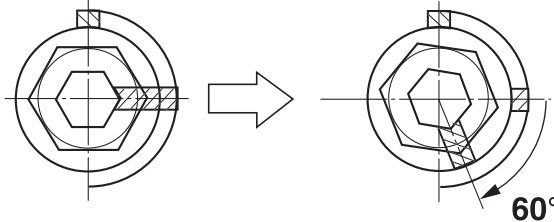
- i. Retighten the cylinder head mounting bolts in the proper tightening sequence.



**Bolt “5”, “6”**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**



- j. Put a mark on the corner of the bolt (cylinder head) and the cylinder head.  
 k. Retighten the cylinder head mounting bolts in the proper tightening sequence.



## TIP

Tighten the bolts in two steps (90° and 60°) to reach the specified angle in the proper tightening sequence.



**Bolt “1”–“4”**

**3rd**

**Specified angle**

**90°**

**Final**

**Specified angle**

**Bolt “1”, “2”, “3”: 60° (149 mm (5.87 in))**

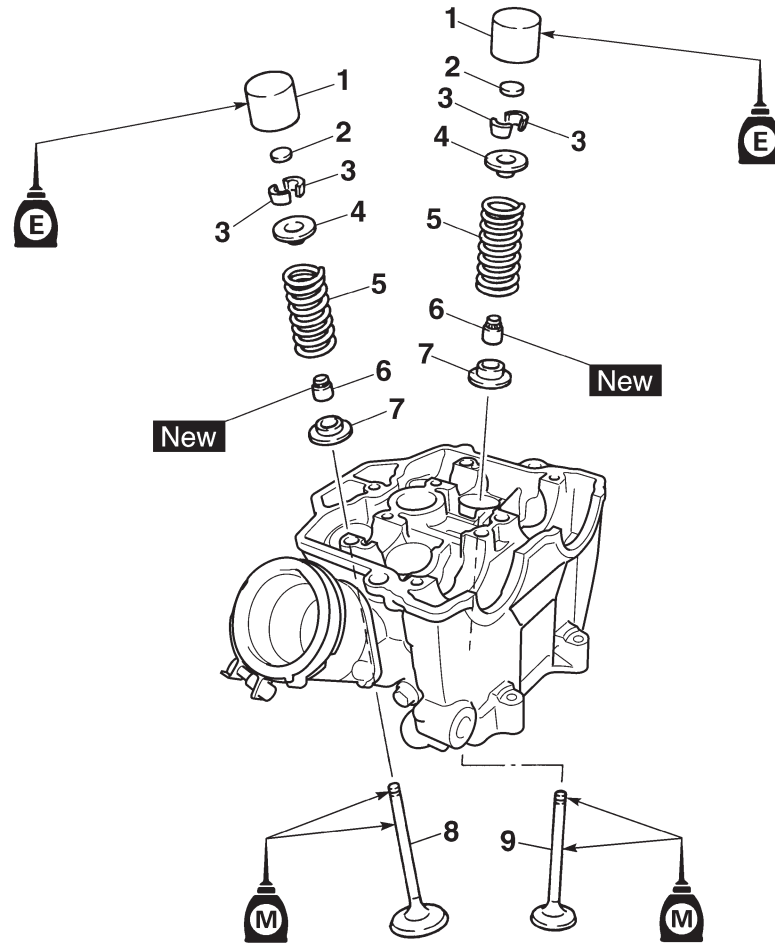
**Bolt “4”: 90° (165 mm (6.49 in))**

- l. Tighten the bolts to the specified torque.

EAM20108

## VALVES AND VALVE SPRINGS

### Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-19.
1	Valve lifter	4	
2	Adjusting pad	4	
3	Valve cotter	8	
4	Valve spring retainer	4	
5	Valve spring	4	
6	Valve stem seal	4	
7	Valve spring seat	4	
8	Intake valve	2	
9	Exhaust valve	2	

## REMOVING THE VALVES

### TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves are properly sealed.

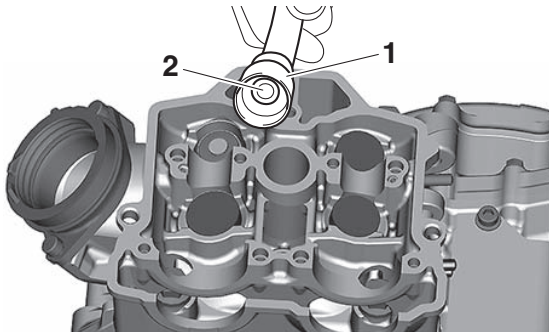
1. Remove:
  - Valve lifter “1”
  - Adjusting pad “2”





### TIP

- Place a cloth in the timing chain space to prevent adjusting pads from falling into the crankcase.
- Make a note of the positions of valve lifters and adjusting pads so that they can be reinstalled in their original places.



**Valve lapper (ø14)**  
**90890-04101**  
**Valve lapping tool (14mm)**  
**YM-A8998**



EX		
IN		 <div style="position: absolute; left: 450px; top: 250px;">1</div> <div style="position: absolute; left: 450px; top: 350px;">2</div>

2. Check:
- Valve sealing  
Leakage at the valve seat → Check the valve face, the valve seat, and the valve seat contact width.  
Refer to “CHECKING THE VALVE SEATS” on page 5-27.

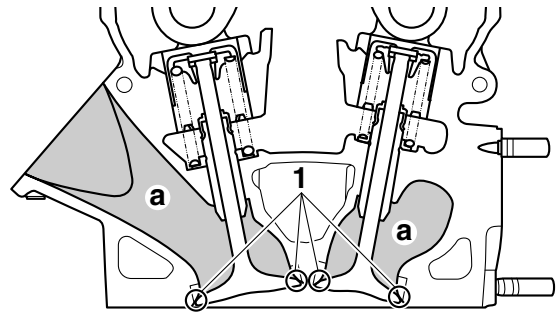


- a. Pour a clean solvent “a” into the intake and exhaust ports.

- b. Check that the valves are properly sealed.

### TIP

Check that there are no kerosene leaks from the valve seat “1”.



3. Remove:
- Valve cotter “1”

**TIP**

Remove the valve cotters by compressing the valve spring with the valve spring compressor "2" and the valve spring compressor attachment "3".

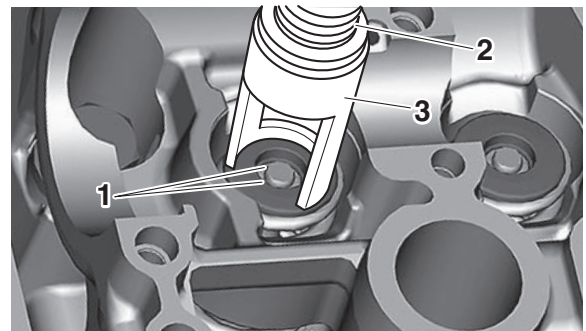


**Valve spring compressor**  
**90890-04019**

**Valve spring compressor**  
**YM-04019**

**Valve spring compressor attach-  
ment**  
**90890-04108**

**Valve spring compressor adapter**  
**22 mm**  
**YM-04108**



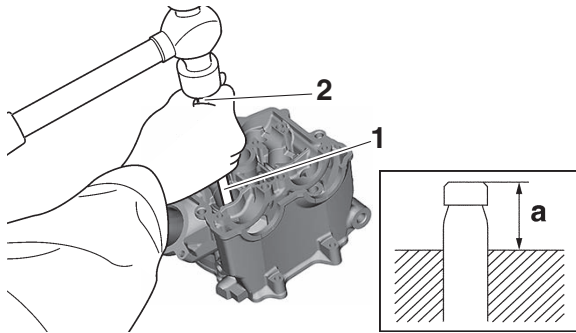
4. Remove:
- Valve spring retainer “1”
  - Valve spring “2”
  - Valve “3”
  - Valve stem seal “4”
  - Valve spring seat “5”

**TIP**

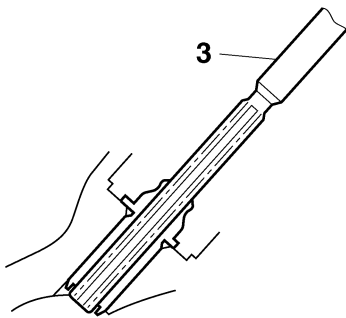
Identify the position of each part very carefully so







- c. After installing the valve guide, expand the hole in the valve guide with the valve guide remover & installer set (ø5.5) “3” to obtain the proper valve-stem-to-valve-guide clearance.



## TIP

After replacing the valve guide, reface the valve seat.



**Valve guide remover & installer set (ø5.5)**  
**90890-04016**

**Valve guide remover (5.5 mm)**  
**YM-01122**

**Valve guide installer (ø5.5)**  
**90890-04015**

**Valve guide installer (5.5 mm)**  
**YM-04015**

**Valve guide reamer (5.5 mm)**  
**90890-01196**

**Valve guide reamer (5.5 mm)**  
**YM-01196**



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:

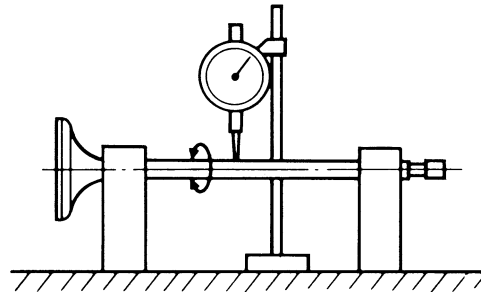
- Valve stem runout  
Out of specification → Replace the valve.

## 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)**



EAM30092

## CHECKING THE 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 contact width “a”  
Out of specification → Replace the cylinder head.



**Valve seat contact width (intake)**  
**0.90–1.10 mm (0.0354–0.0433 in)**

**Limit**

**1.5 mm (0.06 in)**

**Valve seat contact width (exhaust)**

**0.90–1.10 mm (0.0354–0.0433 in)**

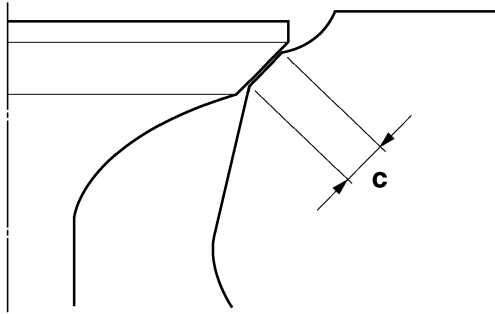
**Limit**

**1.5 mm (0.06 in)**





- 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 contact width "c" again. If the valve seat contact width is out of specification, reface and lap the valve seat.

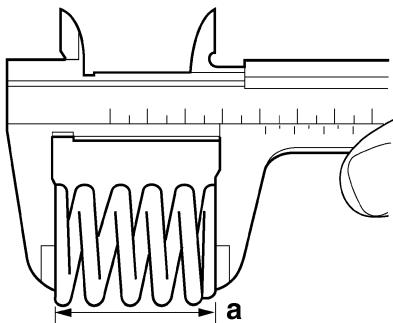


EAM30093

## CHECKING THE VALVE SPRINGS

1. Measure:
  - Valve spring free length "a"
 Out of specification → Replace the valve spring.

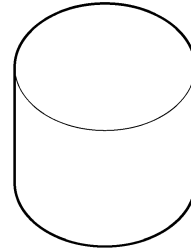
	<b>Free length (intake)</b>
	<b>40.57 mm (1.60 in)</b>
	<b>Limit</b>
	<b>38.54 mm (1.52 in)</b>
	<b>Free length (exhaust)</b>
	<b>37.42 mm (1.47 in)</b>
	<b>Limit</b>
	<b>35.55 mm (1.40 in)</b>



EAM30094

## CHECKING THE VALVE LIFTERS

1. Check:
  - Valve lifter
 Damage/scratches → Replace the valve lifters and cylinder head.

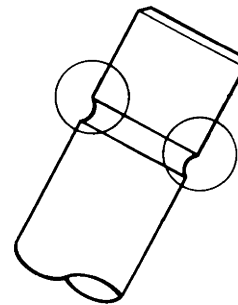


I1170701

EAM30095

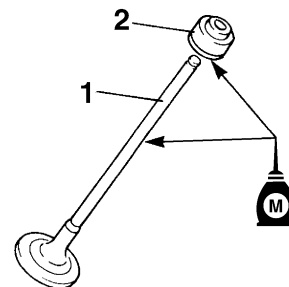
## INSTALLING THE VALVES

1. Clean:
  - Valve stem end



2. Lubricate:
  - Valve stem "1"
  - Valve stem seal "2"

	<b>Recommended lubricant</b> <b>Molybdenum disulfide oil</b>
--	---

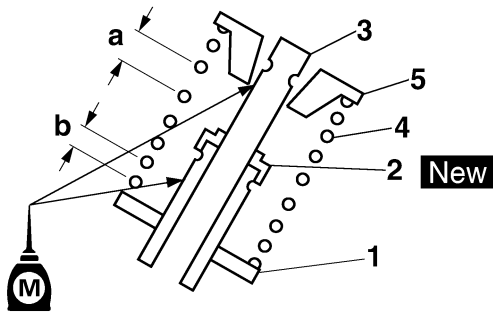


3. Install:
  - Spring seat "1"
  - Valve stem seal "2" **New**
  - Valve "3"
  - Valve spring "4"
  - Valve spring retainer "5" (to the cylinder head)

### 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 cotter "1"

## TIP

Install the valve coppers by compressing the valve spring with the valve spring compressor "2" and the valve spring compressor attachment "3".



**Valve spring compressor**  
**90890-04019**

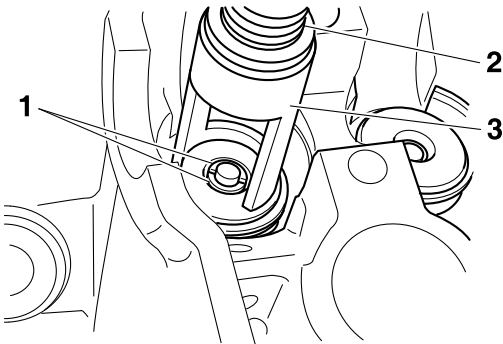
**Valve spring compressor**  
**YM-04019**

**Valve spring compressor attach-**  
**ment**

**90890-04108**

**Valve spring compressor adapter**  
**22 mm**

**YM-04108**

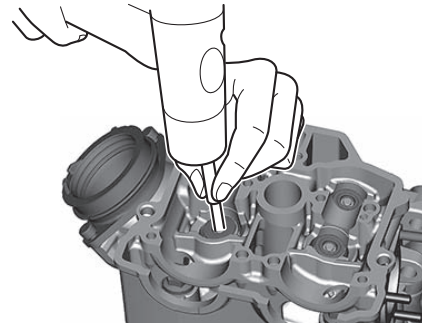


5. To fasten the valve coppers onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

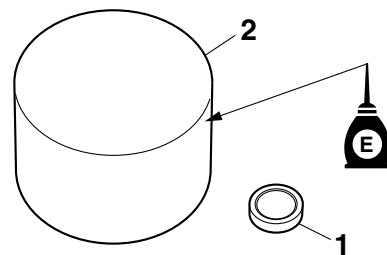
## NOTICE

Hitting the valve tip with excessive force could damage the valve.



6. Lubricate:

- Adjusting pad "1"
- Valve lifter "2"



7. Install:

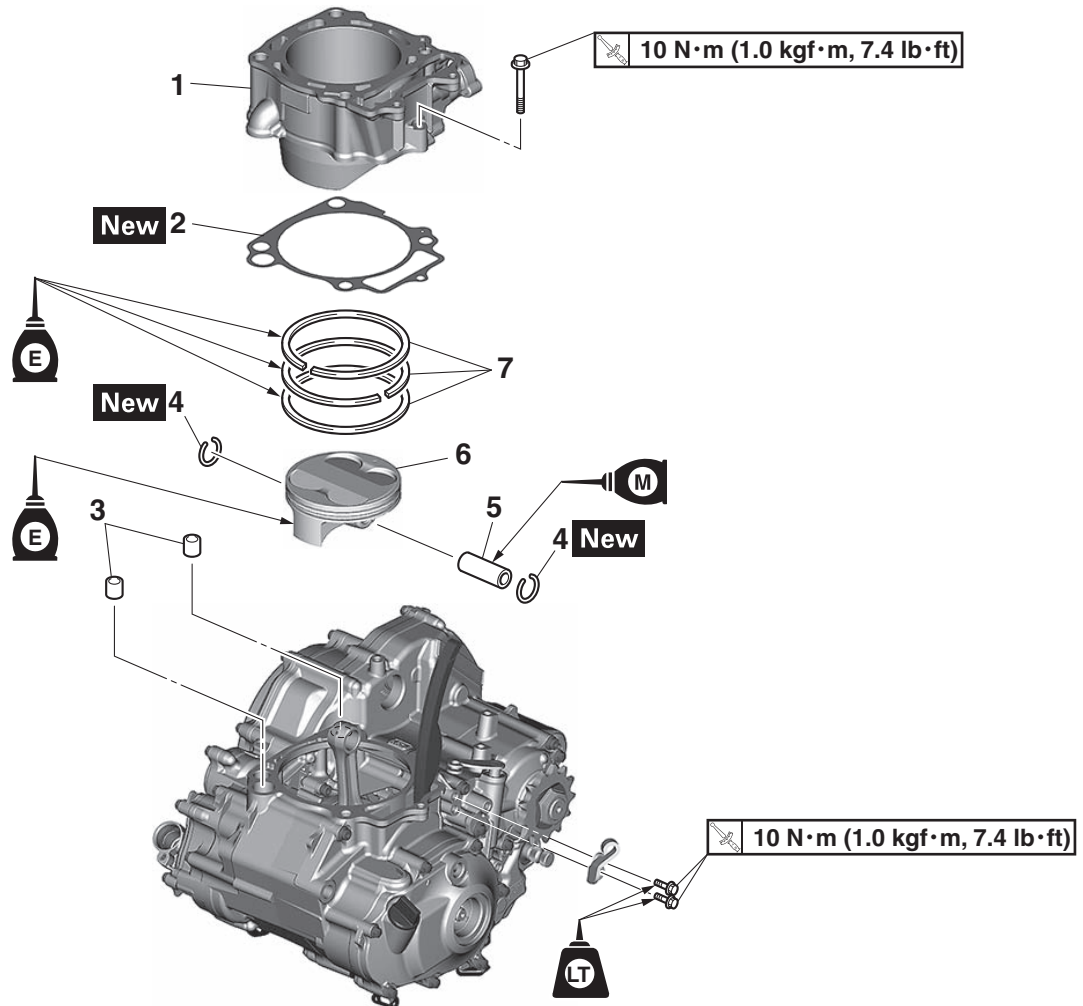
- Adjusting pad
- Valve lifter

## TIP

- Check that the valve lifter turns smoothly when rotated with your finger.
- Make sure that the valve lifter and the adjusting pad are reinstalled in their original positions.

## CYLINDER AND PISTON

## Removing the cylinder and piston

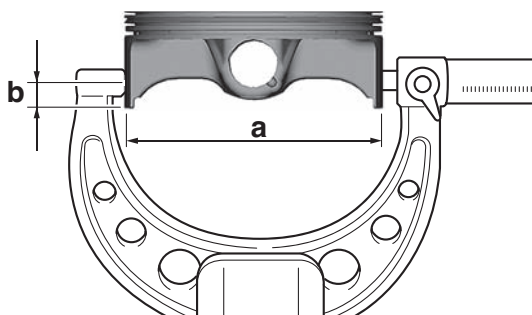


Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-19.
1	Cylinder body	1	
2	Gasket	1	
3	Dowel pin	2	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Piston ring set	1	





**Diameter**  
96.955–96.970 mm (3.8171–3.8177 in)  
**Measuring point (from piston skirt bottom)**  
9.0 mm (0.35 in)



- d. If out of specification, replace the cylinder, the piston, and the piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =  
Cylinder bore "C" - Piston diameter



**Piston-to-cylinder clearance**  
0.010–0.045 mm (0.0004–0.0018 in)  
**Limit**  
0.15 mm (0.006 in)

- f. If out of specification, replace the cylinder, the piston, and the piston rings as a set.



EAM30098

## CHECKING THE PISTON RINGS

1. Measure:

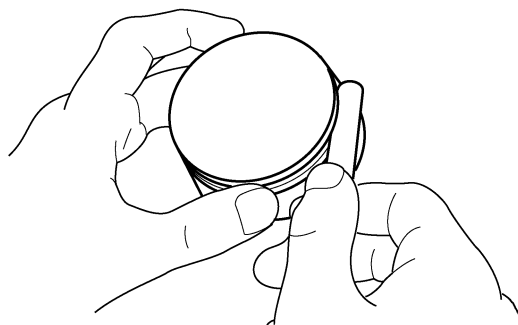
- Piston ring side clearance  
Out of specification → Replace the piston and piston rings as a set.

### TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



**Top ring**  
**Ring side clearance**  
0.015–0.065 mm (0.0006–0.0026 in)  
**Side clearance limit**  
0.120 mm (0.0047 in)  
**2nd ring**  
**Ring side clearance**  
0.020–0.060 mm (0.0008–0.0024 in)  
**Side clearance limit**  
0.100 mm (0.0039 in)



2. Install:

- Piston ring  
(into the cylinder)

### TIP

Use the piston crown to level the piston ring near bottom of cylinder "a", where cylinder wear is lowest.

3. Measure:

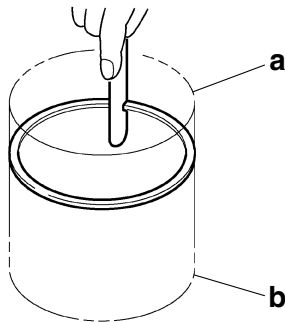
- Piston ring end gap  
Out of specification → Replace the piston ring.

### 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.



**Top ring**  
**End gap limit**  
0.55 mm (0.0217 in)  
**2nd ring**  
**End gap limit**  
0.85 mm (0.0335 in)



b. Upper of cylinder

EAM30099


## CHECKING THE PISTON PIN

### 1. Check:

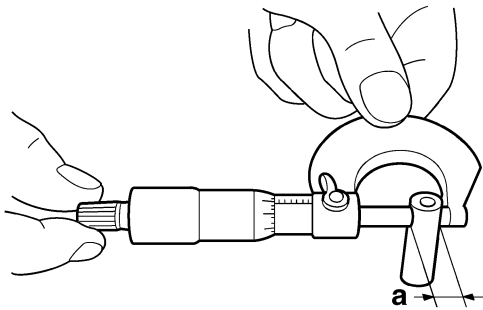
- Piston pin  
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

### 2. Measure:

- Piston pin outside diameter "a"  
Out of specification → Replace the piston pin.




**Piston pin outside diameter**  
**17.991–18.000 mm (0.7083–0.7087 in)**  
**Limit**  
**17.981 mm (0.7079 in)**

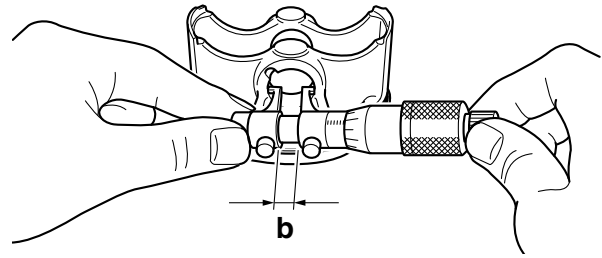


### 3. Measure:

- Piston pin bore inside diameter "b"  
Out of specification → Replace the piston.



**Piston pin bore inside diameter**  
**18.004–18.015 mm (0.7088–0.7093 in)**  
**Limit**  
**18.045 mm (0.7104 in)**



EAM30100

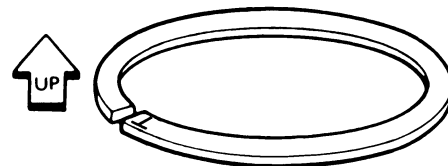
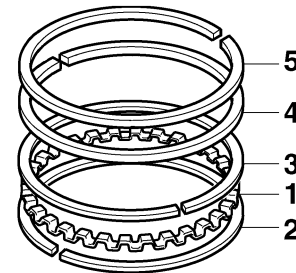
## INSTALLING THE PISTON AND CYLINDER

### 1. Install:

- Oil ring expander "1"
- Lower oil ring rail "2"
- Upper oil ring rail "3"
- 2nd ring "4"
- Top ring "5"

### TIP

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



### 2. Install:

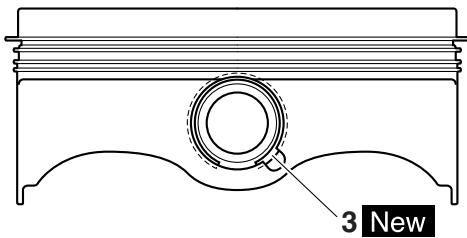
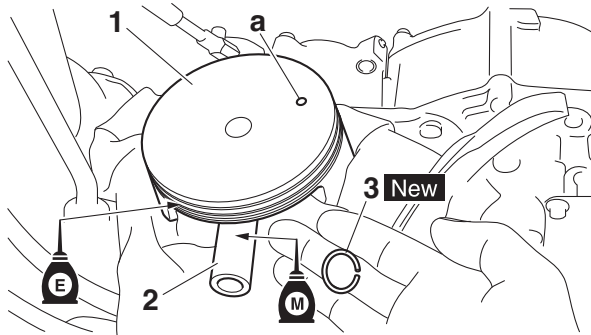
- Piston "1"
- Piston pin "2"
- Piston pin clip "3" **New**

### TIP

- Apply molybdenum disulfide oil to the piston pin.
- Install the piston with the mark "a" on it pointing to its exhaust (rear) side.
- Before installing the piston pin clip, cover the crankcase opening with a cloth to prevent the

clip from falling into the crankcase.

- Make sure that the end of the piston pin clip is not positioned at the cutout in the piston.



## TIP

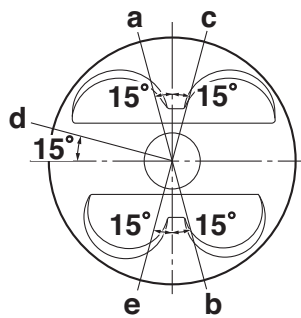
- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

## 3. Lubricate:

- Piston
- Piston ring
- Cylinder

## 4. Offset:

- Piston ring end gap



- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail

## 5. Install:

- Cylinder gasket **New**
- Dowel pin
- Cylinder



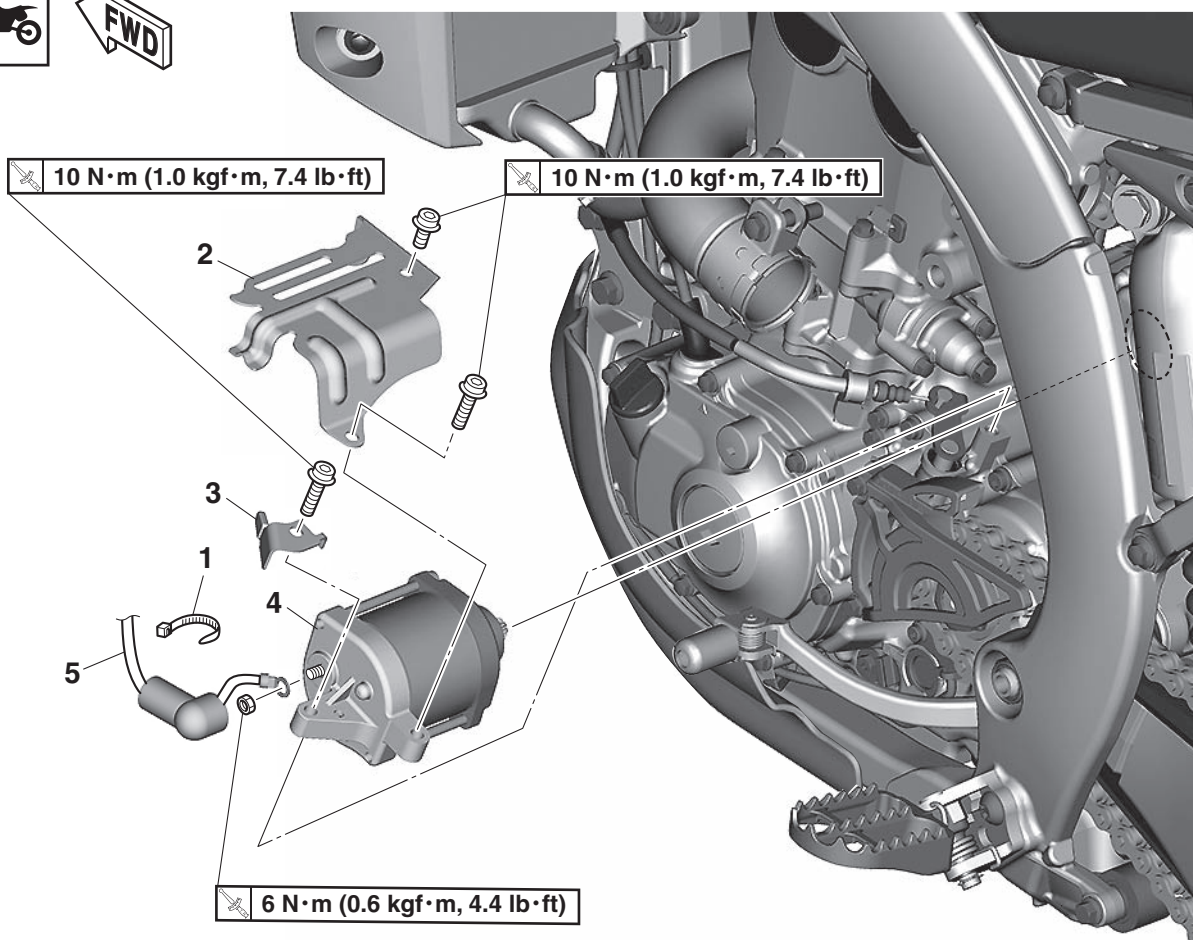
**Cylinder bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)



EAM20110

## ELECTRIC STARTER

## Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-1.
1	Plastic locking tie	1	
2	Starter motor cover (upper)	1	
3	Starter motor cover (lower)	1	
4	Starter motor	1	
5	Starter motor lead	1	When removing or installing the installation nut of the starter motor lead, be sure to hold the nut on the starter motor side firmly in place using a spanner.

Disassembling the starter motor

1.5 N·m (0.15 kgf·m, 1.1 lb·ft)

4.5 N·m (0.45 kgf·m, 3.3 lb·ft)

New

New

New

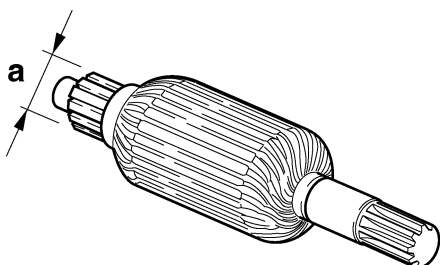
LS


FWD

Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor assembly	1	
2	O-ring	1	
3	Starter motor front cover	1	
4	Starter motor yoke	1	
5	Armature assembly	1	
6	Gasket	2	
7	Brush set	1	
8	Brush holder	1	
9	Starter motor rear cover	1	

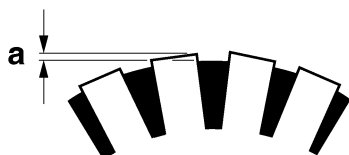
1. Check:

- |   |  |
|---|--|
|  | <b>Commutator diameter</b><br><b>80.6 mm (3.17 in)</b> |
|---|--|



- |   |  |
|---|--|
|  | <b>Mica undercut (depth)</b><br><b>2.40 mm (0.09 in)</b> |
|---|--|

The mica of the commutator must be undercut to ensure proper operation of the commutator.



- a. Measure the armature assembly resistances “1” with the digital circuit tester.



**90890-03243**


**Model 88 Multimeter with tachometer**  
**YU-A1927**

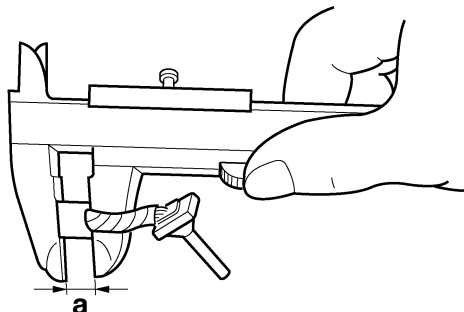



**0.008–0.010 Ω**

**Above 1 M $\Omega$**

- 

- |   |  |
|---|--|
|  | <b>Brush overall length limit</b><br><b>5.5 mm (0.22 in)</b> |
|---|--|



- |   |  |
|---|--|
|  | <b>Brush spring force</b><br><b>4.80–7.20 N (489–734 gf, 17.28–25.92 oz)</b> |
|---|--|

- 5-38**

## 8. Check:

- Oil seal  
Damage/wear → Replace the defective part(s).

EAM30107

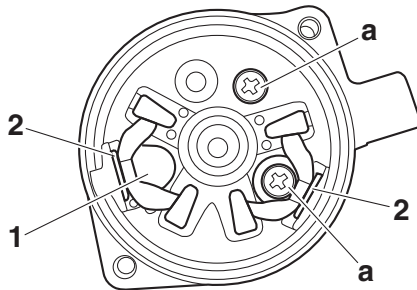
## ASSEMBLING THE STARTER MOTOR

### 1. Install:

- Brush spring "1"
- Brush "2"

#### TIP

Install the brush holder using the screws "a".

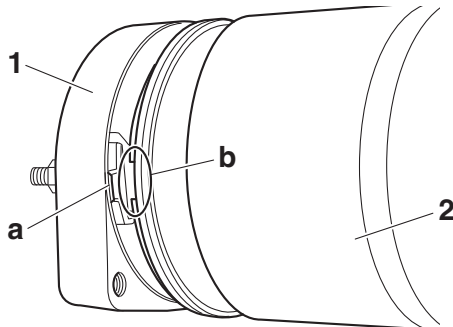


### 2. Install:

- Starter motor rear cover "1"
- O-ring **New**
- Starter motor yoke "2"

#### TIP

Install the starter motor rear cover with its projection "a" facing the groove "b" of the starter motor yoke.

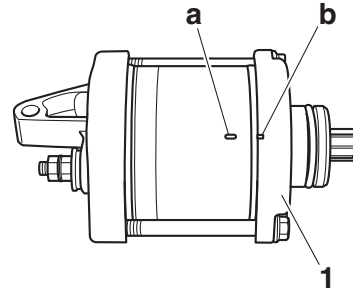


### 3. Install:

- Circlip
- Plain washer
- O-ring **New**
- Washer (starter motor front cover)
- Starter motor front cover "1"

#### TIP

Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor front cover.



### 4. Install:

- Bolt
- O-ring **New**

#### TIP

Apply the lithium-soap-based grease on the O-ring.

### 5. Install:

- Starter motor
- Starter motor cover (upper/lower)
- Starter motor bolt
- Starter motor cover bolt



#### Starter motor bolt

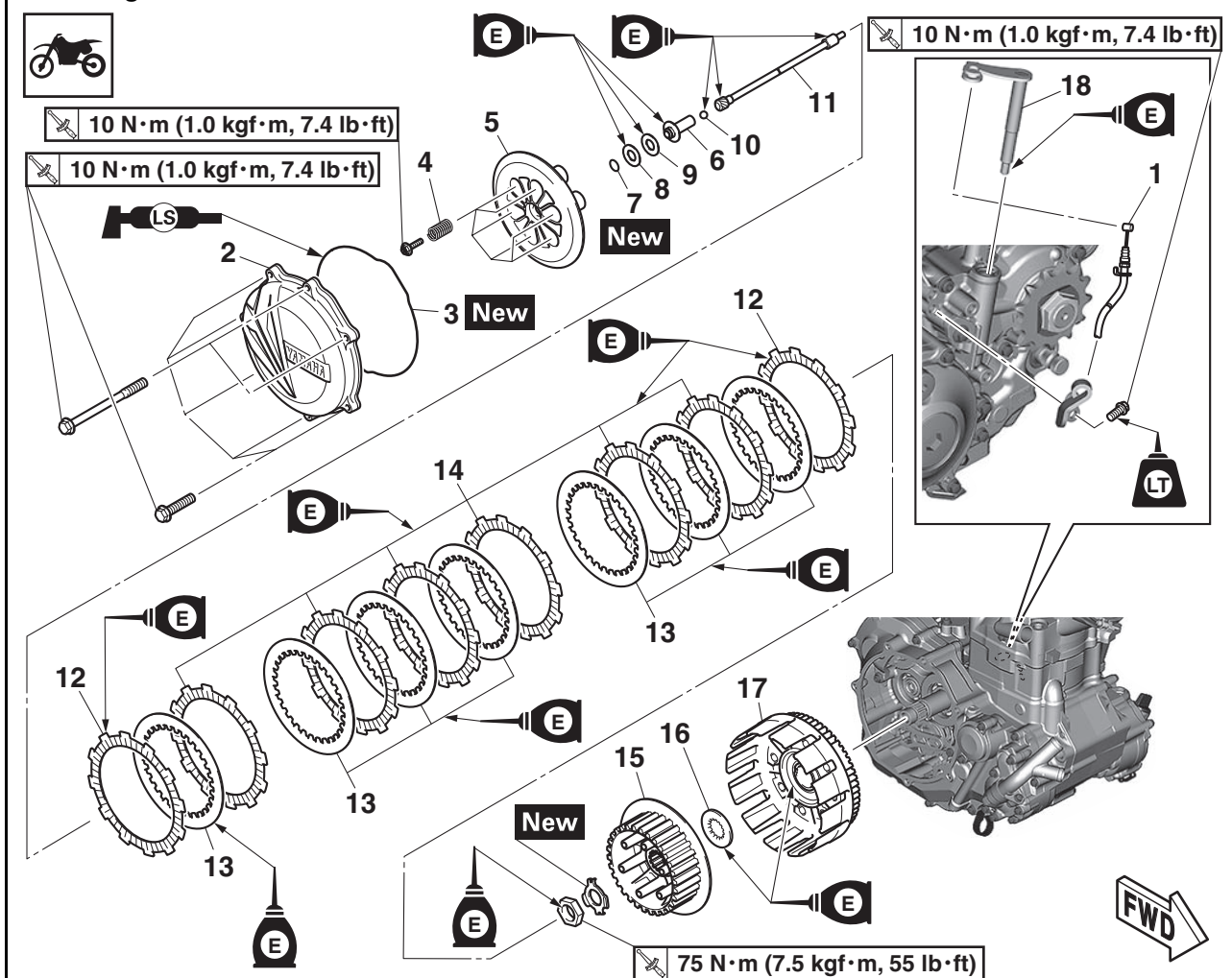
10 N·m (1.0 kgf·m, 7.4 lb·ft)

#### Starter motor cover bolt

10 N·m (1.0 kgf·m, 7.4 lb·ft)

## CLUTCH

## Removing the clutch

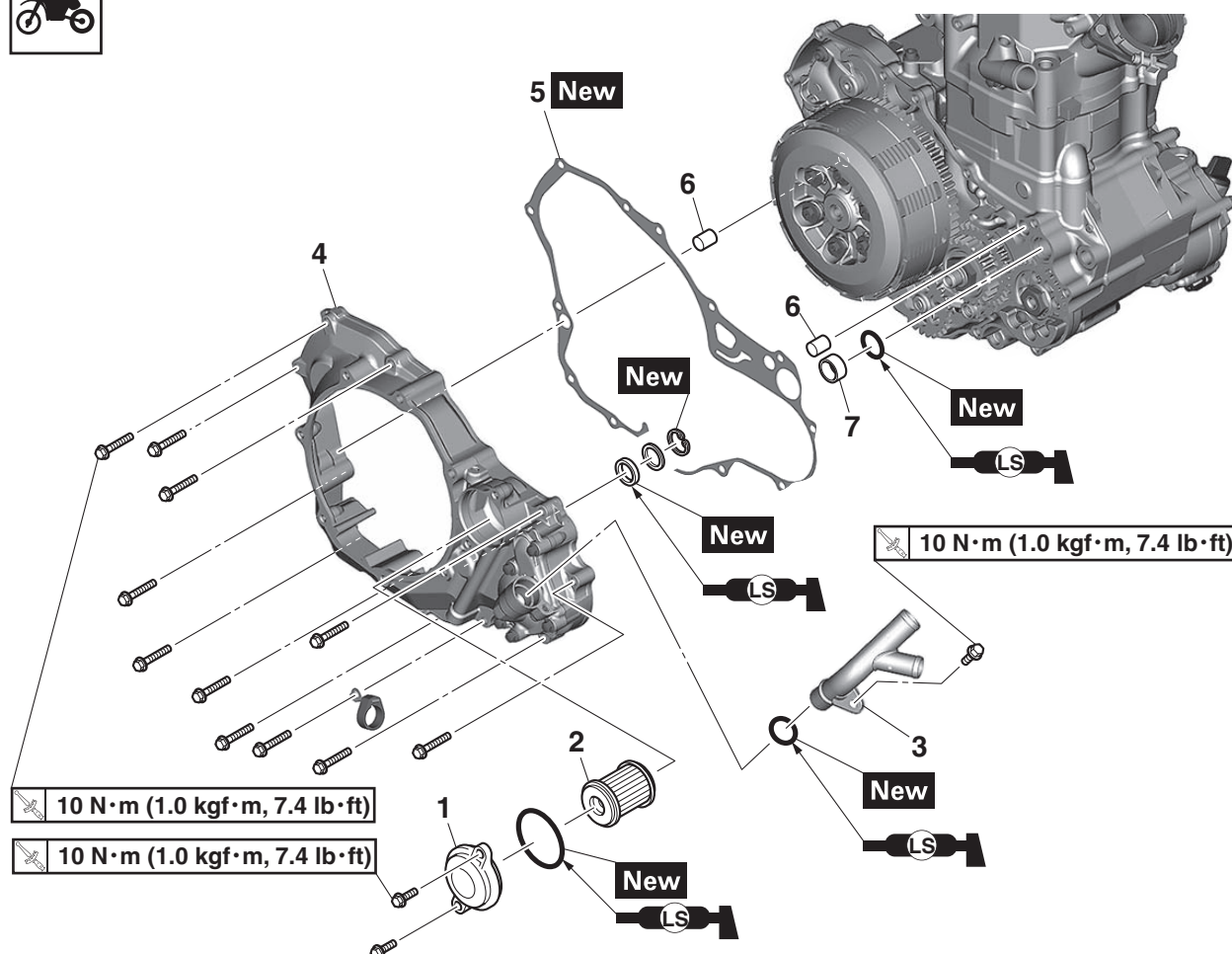


Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-14.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-1.
1	Clutch cable	1	Disconnect.
2	Clutch cover	1	
3	O-ring	1	
4	Clutch spring	6	
5	Pressure plate	1	
6	Push rod 1	1	
7	Circlip	1	
8	Washer	1	
9	Bearing	1	
10	Ball	1	
11	Push rod 2	1	
12	Friction plate 1	2	
13	Clutch plate	7	
14	Friction plate 2	6	Identification color (purple)
15	Clutch boss	1	





## Removing the right crankcase cover



Order	Job/Parts to remove	Q'ty	Remarks
	Engine guard		Refer to "ENGINE REMOVAL" on page 5-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-14.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-1.
	Clutch cover		Refer to "CLUTCH" on page 5-40.
1	Oil filter element cover	1	
2	Oil filter element	1	
3	Radiator pipe 2	1	
4	Right crankcase cover	1	
5	Gasket	1	
6	Dowel pin	2	
7	Collar	1	

EAM30108

## REMOVING THE CLUTCH

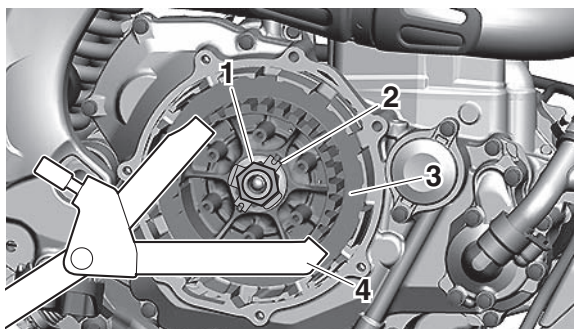
1. Remove:
  - Clutch boss nut “1”
  - Lock washer “2”
  - Clutch boss “3”

### TIP

- Straighten the lock washer tab.
- While holding the clutch boss with the universal clutch holder “4”, loosen the clutch boss nut.



**Universal clutch holder**  
**90890-04086**  
**Universal clutch holder**  
**YM-91042**



EAM30109

## CHECKING THE FRICTION PLATES

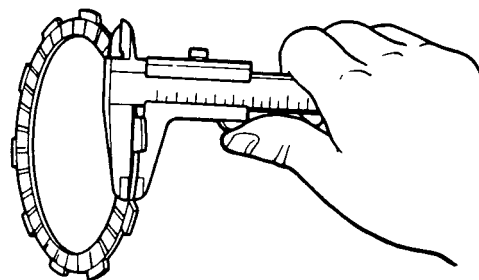
1. Check:
  - Friction plate
 Damage/wear → Replace the friction plates as a set.
2. Measure:
  - Friction plate thickness
 Out of specification → Replace the friction plates as a set.

### TIP

Measure it at four points on the friction plate.



**Friction plate 1 thickness**  
**2.92–3.08 mm (0.115–0.121 in)**  
**Wear limit**  
**2.82 mm (0.111 in)**  
**Friction plate 2 thickness**  
**2.92–3.08 mm (0.115–0.121 in)**  
**Wear limit**  
**2.82 mm (0.111 in)**



EAM30110

## CHECKING THE CLUTCH PLATES

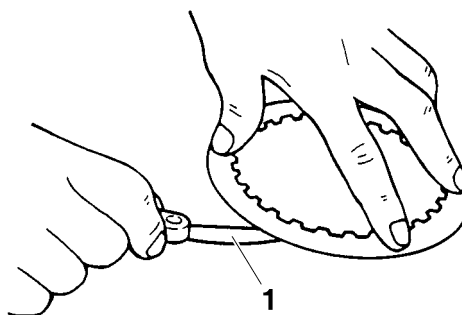
1. Check:
  - Clutch plate
 Damage → Replace the clutch plates as a set.
2. Measure:
  - Clutch plate warpage
 (with a surface plate and thickness gauge “1”)
 Out of specification → Replace the clutch plates as a set.



**Thickness gauge**  
**90890-03268**  
**Feeler gauge set**  
**YU-26900-9**



**Warpage limit**  
**0.10 mm (0.004 in)**



EAM30111

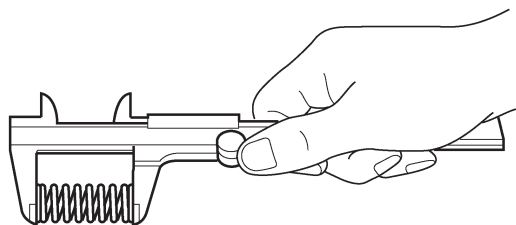
## CHECKING THE CLUTCH SPRINGS

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





**Clutch spring free length**  
**48.00 mm (1.89 in)**  
**Limit**  
**45.60 mm (1.80 in)**



I1412901

EAM30112

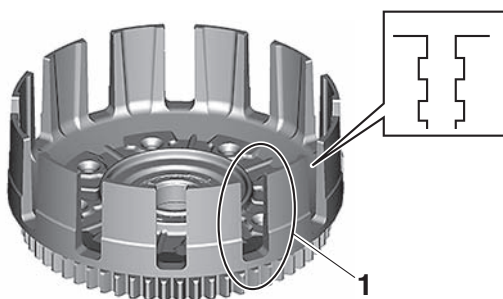
## CHECKING THE CLUTCH HOUSING

### 1. Check:

- Clutch housing dogs “1”  
 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.



EAM30113

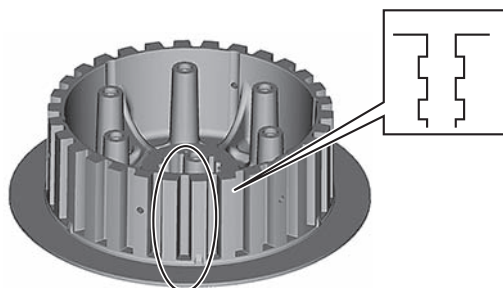
## CHECKING THE CLUTCH BOSS

### 1. Check:

- Clutch boss splines  
 Damage/pitting/wear → Replace the clutch boss.

### TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



EAM30114

## CHECKING THE PRESSURE PLATE

### 1. Check:

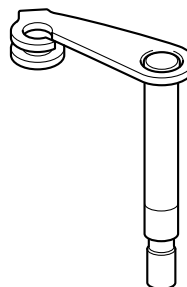
- Pressure plate  
 Crack/damage → Replace.

EAM30115

## CHECKING THE PUSH LEVER SHAFT

### 1. Check:

- Push lever shaft  
 Wear/damage → Replace.

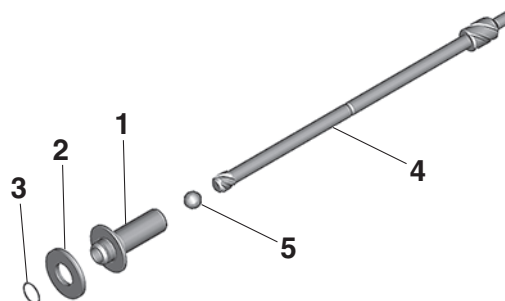


EAM30116

## CHECKING THE CLUTCH PUSH RODS

### 1. Check:

- Push rod 1 “1”
- Bearing “2”
- Washer “3”
- Push rod 2 “4”
- Ball “5”
- Cracks/damage/wear → Replace.



### 2. Measure:

- Push rod 2 bending limit  
 Out of specification → Replace.



**Push rod bending limit**  
**0.10 mm (0.004 in)**

EAM30117

## CHECKING THE PRIMARY DRIVE GEAR

### 1. Check:

- Primary drive gear  
 Damage/wear → Replace the primary drive and primary driven gears as a set.  
 Excessive noise during operation → Replace

the primary drive and primary driven gears as a set.

## 2. Check:

- Primary-drive-gear-to-primary-driven-gear free play

Free play exists → Replace the primary drive and primary driven gears as a set.

EAM30118

## CHECKING THE PRIMARY DRIVEN GEAR

### 1. Check:

- Primary driven gear

Damage/wear → Replace the primary drive and primary driven gears as a set.

Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAM30119

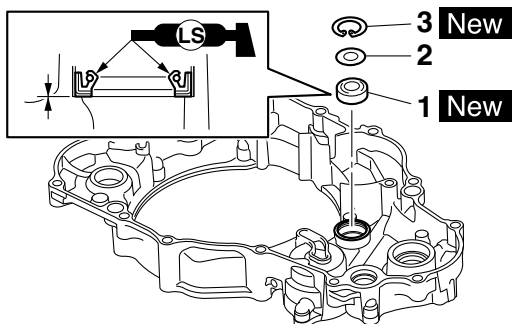
## INSTALLING THE OIL SEAL

### 1. Install:

- Oil seal “1” **New**
- Washer “2”
- Circlip “3” **New**

### TIP

- Apply the lithium-soap-based grease on the oil seal lip.
- Install the oil seal in parallel with its manufacture’s marks or numbers facing inward.



EAM30120

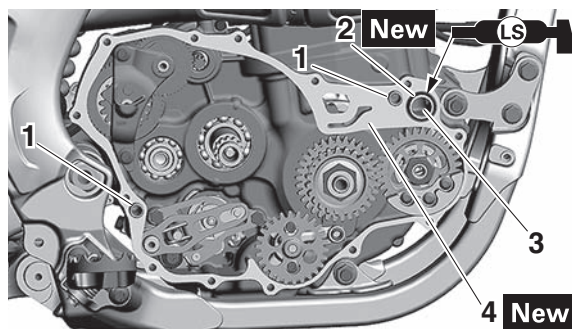
## INSTALLING THE RIGHT CRANKCASE COVER

### 1. Install:

- Dowel pin “1”
- O-ring “2” **New**
- Collar “3”
- Gasket “4” **New**

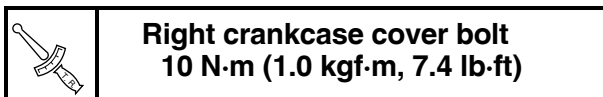
### TIP

Apply the lithium-soap-based grease on the O-ring.



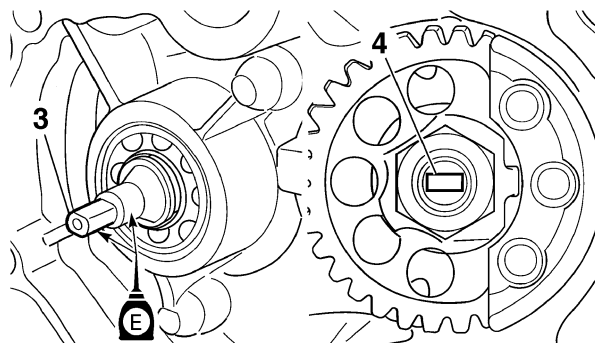
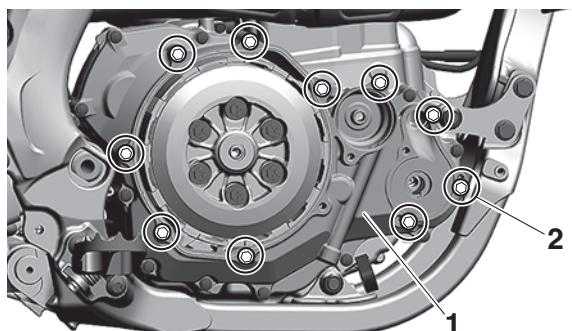
### 2. Install:

- Right crankcase cover “1”
- Right crankcase cover bolt “2”



### TIP

- Apply the engine oil on the impeller shaft end.
- When installing the crankcase cover onto the crankcase, make sure that the impeller shaft end “3” aligns with the balancer end slot “4”.
- Tighten the right crankcase cover bolts in stages and in a crisscross pattern.



EAM30121

## INSTALLING THE CLUTCH

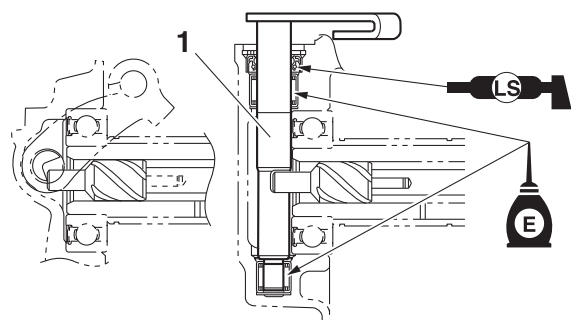
### 1. Install:

- Push lever shaft “1”

### TIP

- Apply the lithium-soap-based grease on the oil seal lip.
- Before installation, apply the engine oil to the

push lever shaft sliding surface.

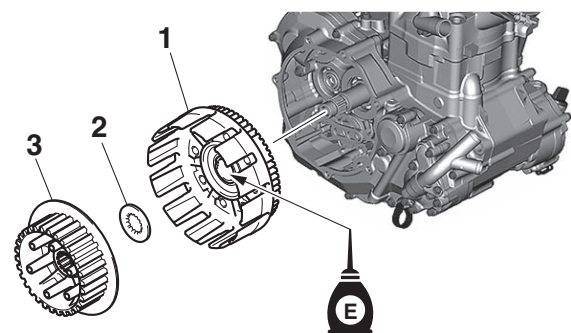


2. Install:

- Primary driven gear “1”
- Thrust washer “2”
- Clutch boss “3”

### TIP

Apply the engine oil on the primary driven gear inner circumference.



3. Install:

- Lock washer “1” **New**
- Clutch boss nut “2”



**Clutch boss nut**  
75 N·m (7.5 kgf·m, 55 lb·ft)

ECA24660

### NOTICE

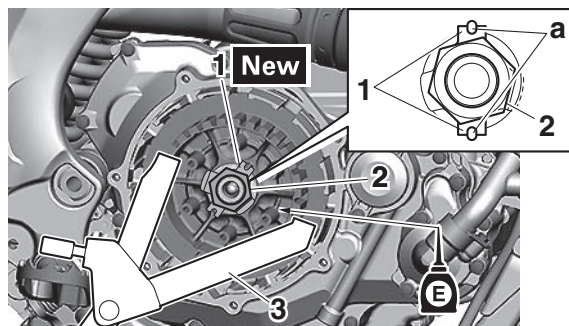
**Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.**

### TIP

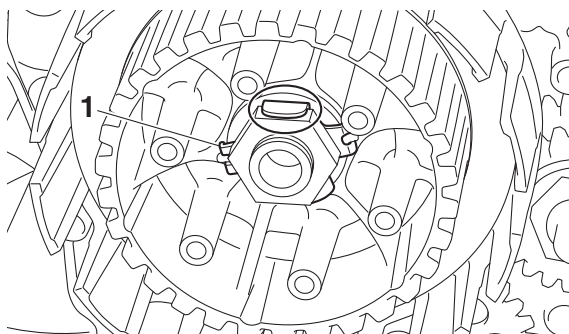
- Align the notch in the lock washer “1” with the detent rib “a” of the clutch boss.
- Apply engine oil to the threads and contact surface of the clutch boss nut.
- Use the universal clutch holder “3” to hold the clutch boss.



**Universal clutch holder**  
90890-04086  
**Universal clutch holder**  
YM-91042



4. Bend the lock washer “1” tab.

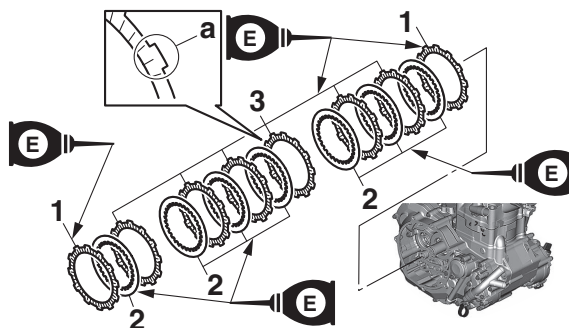


5. Install:

- Friction plate 1 “1”
- Clutch plate “2”
- Friction plate 2 “3”

### TIP

- Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.
- From the clutch boss side, install the friction plates in order: friction plate 1 × 1, friction plate 2 (identification color: purple) × 6, and friction plate 1 × 1.
- Apply the engine oil on the friction plates and clutch plates.



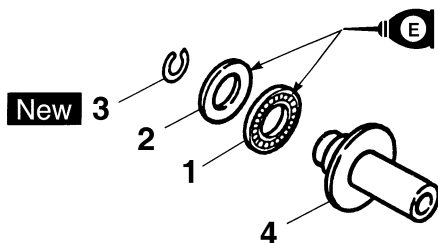
a. Identification color

## 6. Install:

- Bearing "1"
  - Washer "2"
  - Circlip "3" **New**
- To push rod 1 "4".

### TIP

Apply the engine oil on the bearing and washer.

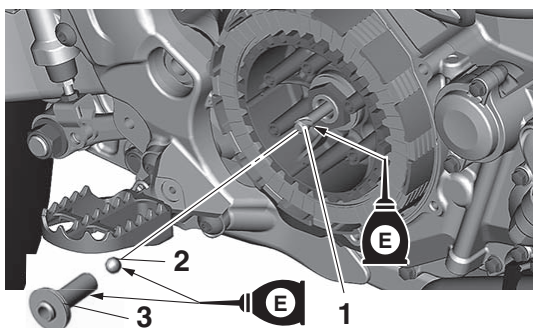


## 7. Install:

- Push rod 2 "1"
- Ball "2"
- Push rod 1 "3"

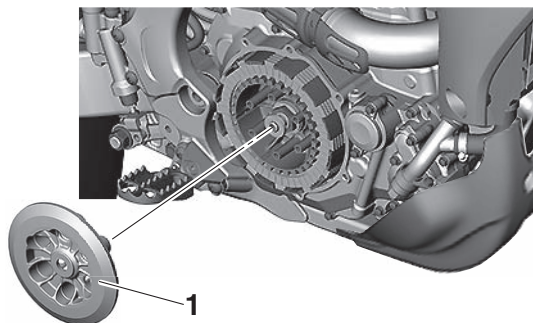
### TIP

Apply the engine oil on the push rod 1, 2 and ball.



## 8. Install:

- Pressure plate "1"



## 9. Install:

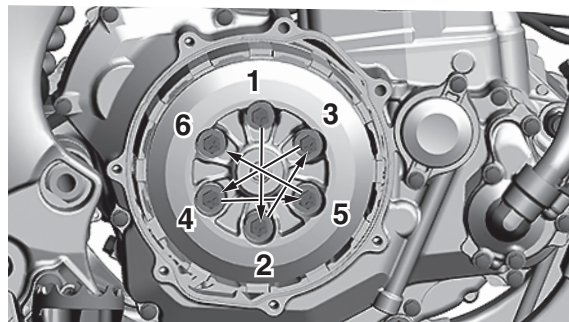
- Clutch spring
- Clutch spring bolt



**Clutch spring bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

### TIP

Tighten the bolts in stages and in a crisscross pattern.

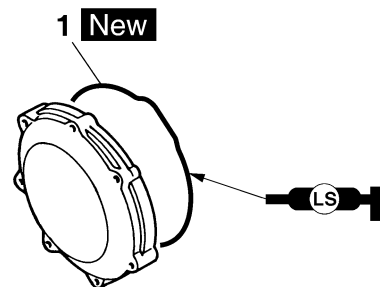


## 10. Install:

- O-ring "1" **New**

### TIP

Apply the lithium-soap-based grease to the O-ring.



## 11. Install:

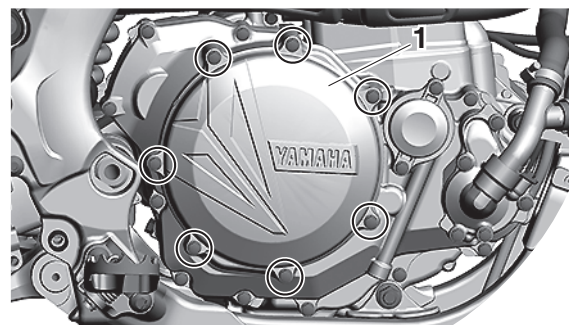
- Clutch cover "1"
- Clutch cover bolt



**Clutch cover bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

### TIP

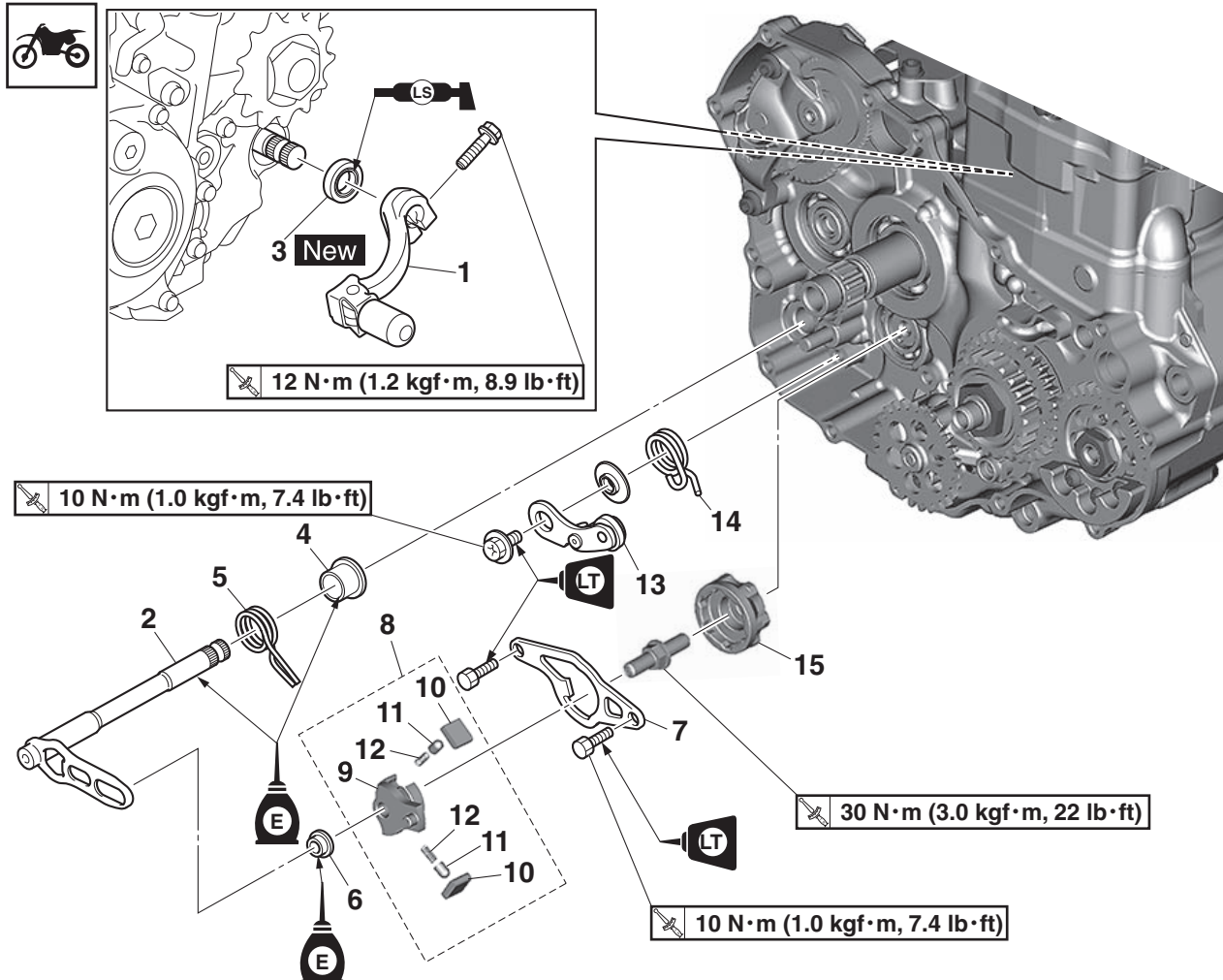
Tighten the bolts in stages and in a crisscross pattern.





## SHIFT SHAFT

## Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-40.
1	Shift pedal	1	
2	Shift shaft	1	
3	Oil seal	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Roller	1	
7	Shift guide	1	
8	Shift lever assembly	1	
9	Shift lever	1	
10	Pawl	2	
11	Pawl pin	2	
12	Spring	2	
13	Stopper lever	1	
14	Stopper lever spring	1	
15	Segment	1	

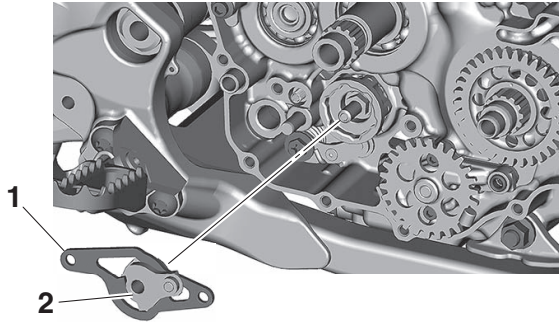
EAM30123

## REMOVING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

1. Remove:
  - Bolt (shift guide)
  - Shift guide "1"
  - Shift lever assembly "2"

### TIP

Make sure that the shift lever assembly is removed together with the shift guide.



EAM30124

## REMOVING THE SEGMENT

1. Remove:
  - Bolt (segment) "1"
  - Segment "2"

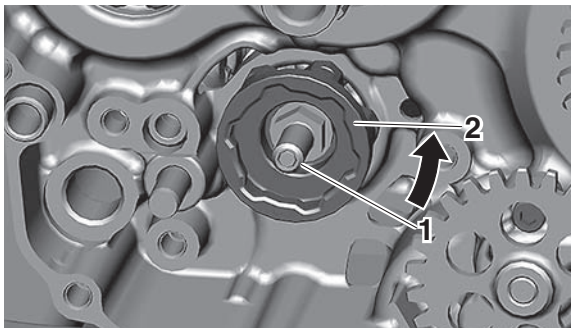
### TIP

Turn the segment counterclockwise until it stops and loosen the bolt.

ECA24670

### NOTICE

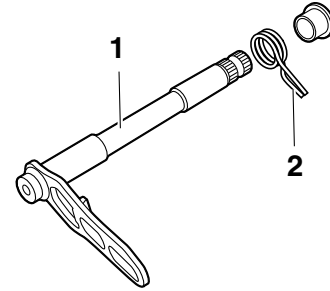
If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when removing the bolt.



EAM30125

## CHECKING THE SHIFT SHAFT

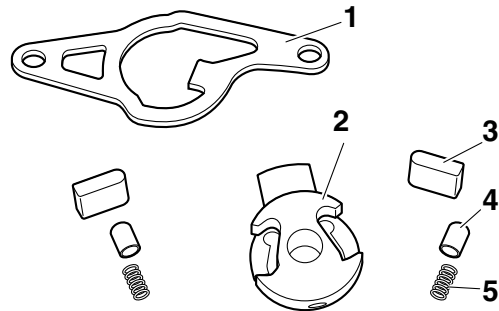
1. Check:
  - Shift shaft "1"
  - Bends/damage/wear → Replace.
  - Shift shaft spring "2"
  - Damage/wear → Replace.



EAM30126

## CHECKING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

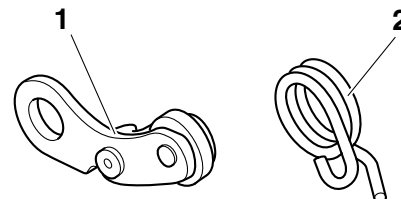
1. Check:
  - Shift guide "1"
  - Shift lever "2"
  - Pawl "3"
  - Pawl pin "4"
  - Spring "5"
 Wear/damage → Replace.



EAM30127

## CHECKING THE STOPPER LEVER

1. Check:
  - Stopper lever "1"
  - Wear/damage → Replace.
  - Torsion spring "2"
  - Broken → Replace.



EAM30128

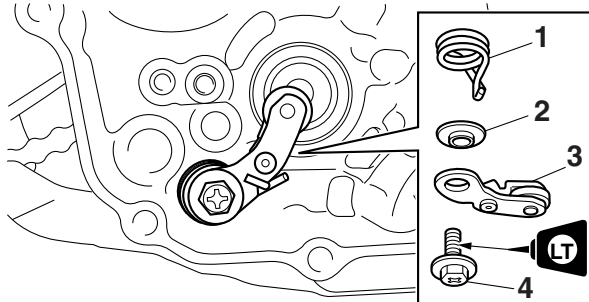
## INSTALLING THE STOPPER LEVER

1. Install:
  - Torsion spring "1"
  - Collar "2"

- Stopper lever "3"
- Bolt (stopper lever) "4"



**Bolt (stopper lever)**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**  
**LOCTITE®**



EAM30129

## INSTALLING THE SEGMENT

1. Install:
  - Segment "1"
  - Segment bolt



**Segment bolt**  
**30 N·m (3.0 kgf·m, 22 lb·ft)**

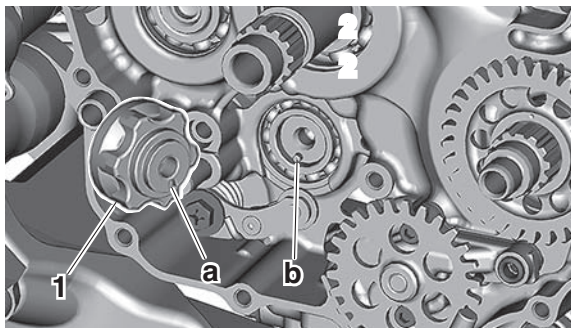
### TIP

- Align the notch "a" on the segment with the pin "b" on the shift cam.
- With the stopper lever pushed down, install the segment.

ECA24680

### NOTICE

**If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when tightening the bolt.**



EAM30130

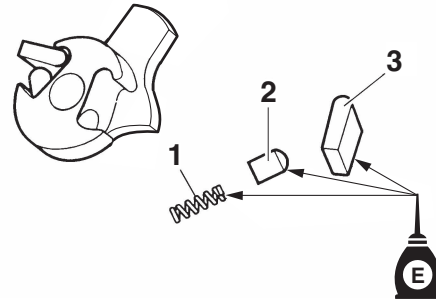
## INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

1. Install:
  - Spring "1"
  - Pawl pin "2"
  - Pawl "3"

(to the shift lever)

### TIP

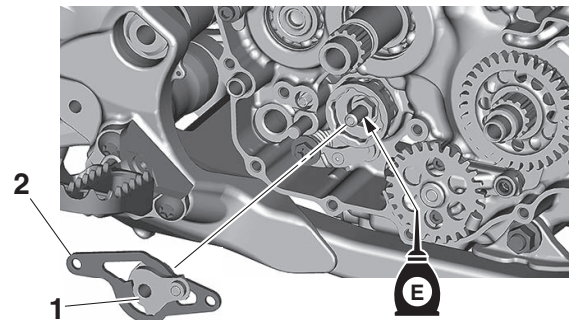
Apply the engine oil on the spring, pawl pin and pawl.



2. Install:
  - Shift lever assembly (to the shift guide)
3. Install:
  - Shift lever assembly "1"
  - Shift guide "2"

### TIP

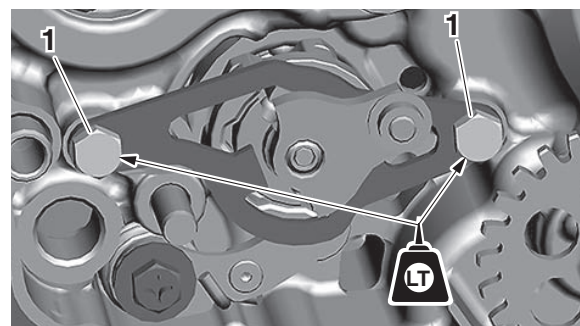
- The shift lever assembly is installed at the same time as the shift guide.
- Apply the engine oil on the segment bolt shaft.



4. Tighten:
  - Shift guide bolt "1"



**Shift guide bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**  
**LOCTITE®**



EAM30131

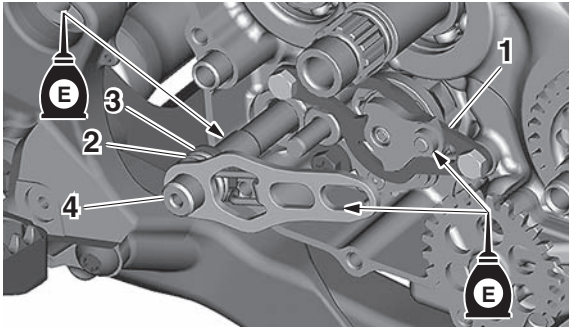
## INSTALLING THE SHIFT SHAFT

### 1. Install:

- Roller “1”
- Shift shaft spring “2” (to shift shaft)
- Collar “3” (to shift shaft)
- Shift shaft “4”

### TIP

Apply the engine oil on the roller and shift shaft.



### 2. Install:

- Oil seal **New**

EAM30132

## INSTALLING THE SHIFT PEDAL

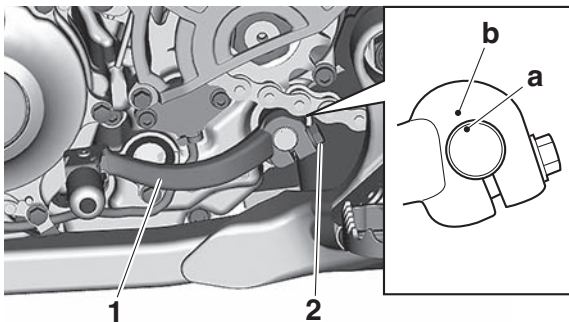
### 1. Install:

- Shift pedal “1”
- Shift pedal bolt “2”

	<b>Shift pedal bolt</b> <b>12 N·m (1.2 kgf·m, 8.9 lb·ft)</b>
--	---

### TIP

Align the punch mark “a” on the shift shaft with the punch mark “b” in the shift pedal.

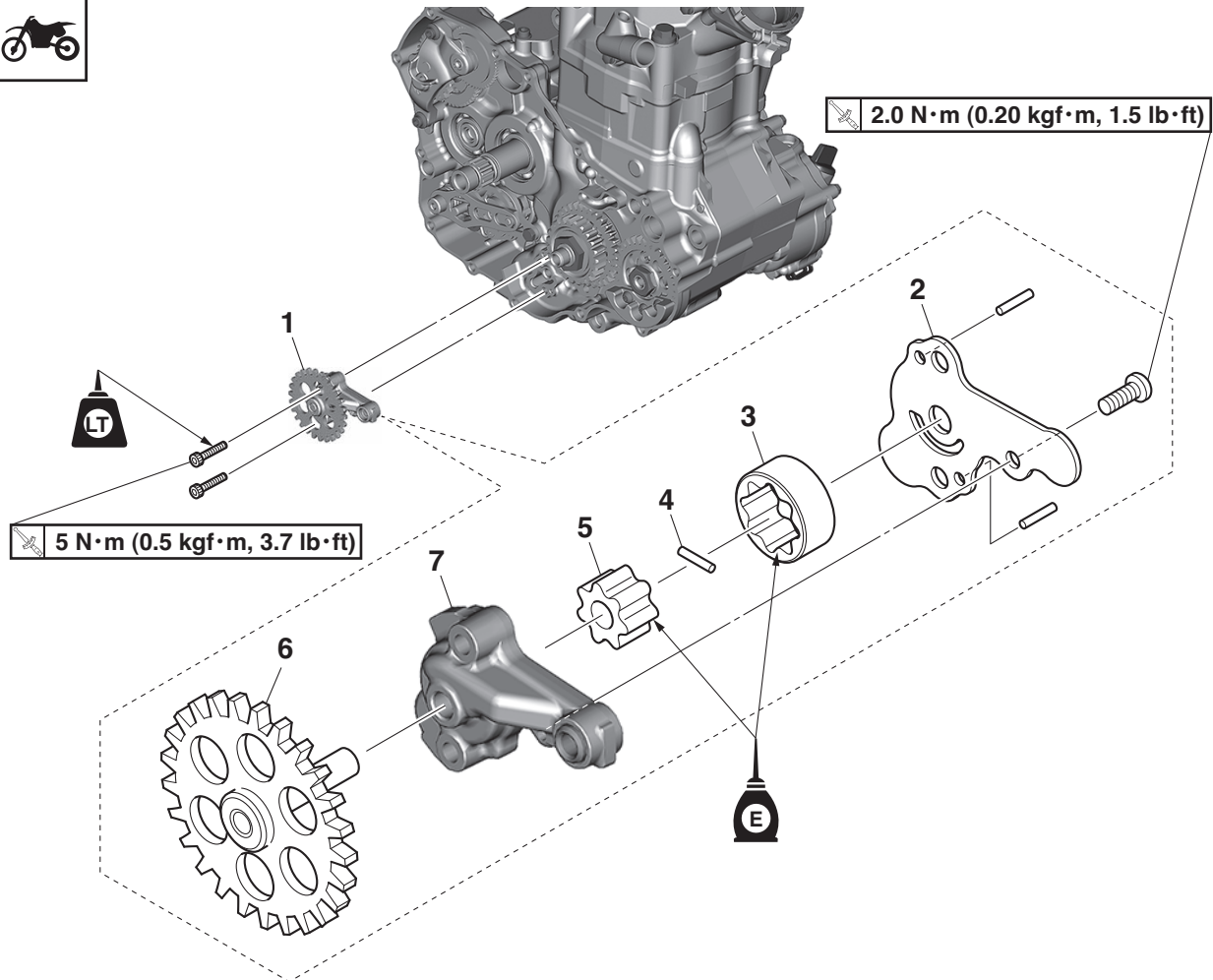




EAM20114

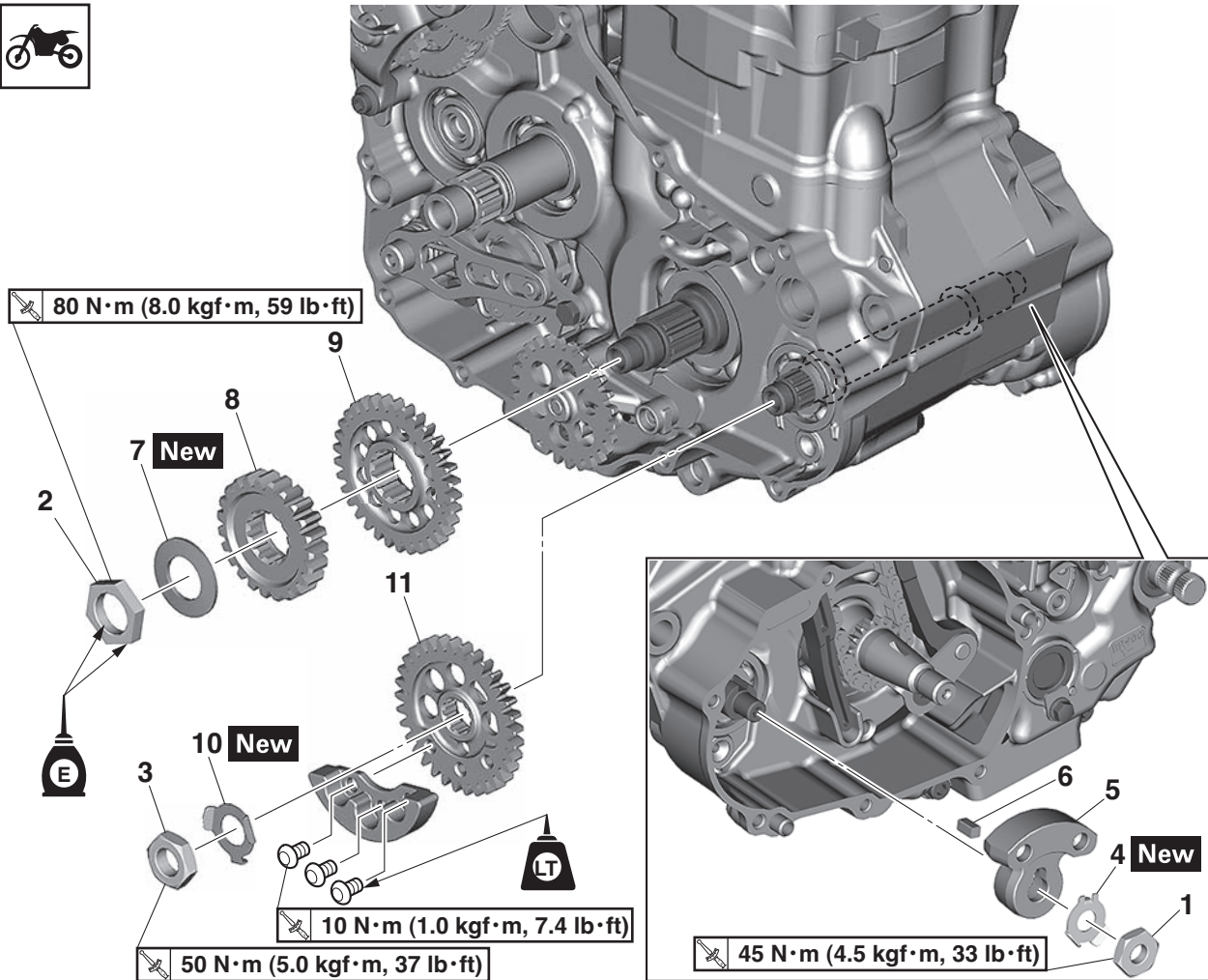
## OIL PUMP AND BALANCER GEAR

### Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-40.
	Right crankcase cover		Refer to "CLUTCH" on page 5-40.
1	Oil pump assembly	1	
2	Oil pump cover	1	
3	Outer rotor	1	
4	Dowel pin	1	
5	Inner rotor	1	
6	Oil pump drive shaft	1	
7	Oil pump housing	1	

## Removing the balancer



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-40.
	Right crankcase cover		Refer to "CLUTCH" on page 5-40.
	Stator		Refer to "AC MAGNETO" on page 5-57.
1	Nut (balancer)	1	
2	Nut (primary drive gear)	1	
3	Nut (balancer weight gear)	1	
4	Lock washer	1	
5	Balancer	1	
6	Straight key	1	
7	Conical washer	1	
8	Primary drive gear	1	
9	Balancer drive gear	1	
10	Lock washer	1	
11	Balancer weight gear	1	

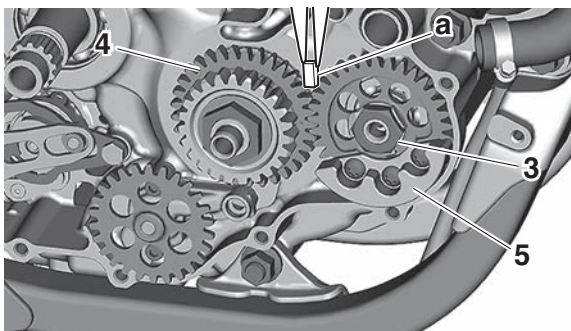
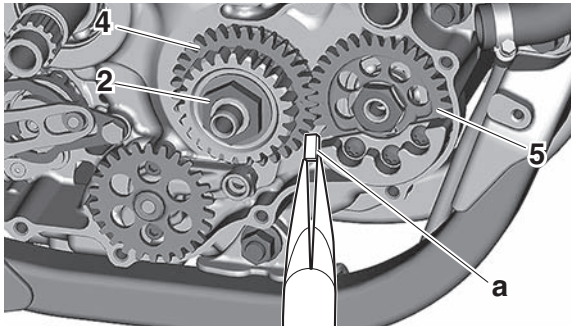
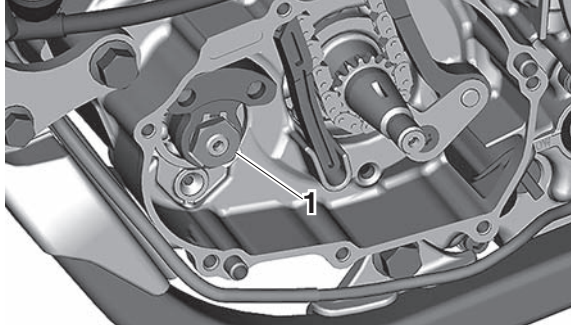
EAM30133

## REMOVING THE BALANCER

1. Straighten the lock washer tab.
2. Loosen:
  - Balancer nut “1”
  - Primary drive gear nut “2”
  - Balancer weight gear nut “3”

### TIP

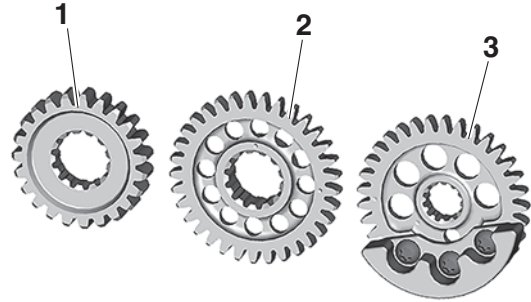
Place an aluminum plate “a” between the teeth of the balancer drive gear “4” and balancer weight gear “5”.



EAM30134

## CHECKING THE PRIMARY DRIVE GEAR, BALANCER DRIVE GEAR, AND BALANCER WEIGHT GEAR

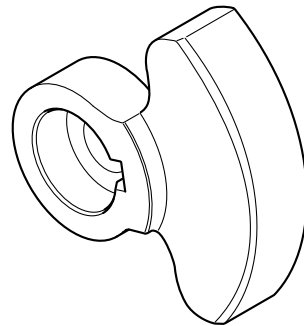
1. Check:
    - Primary drive gear “1”
    - Balancer drive gear “2”
    - Balancer weight gear “3”
- Wear/damage → Replace.



EAM30135

## CHECKING THE BALANCER

1. Check:
    - Balancer
- Crack/damage → Replace.



EAM30136

## CHECKING THE OIL PUMP

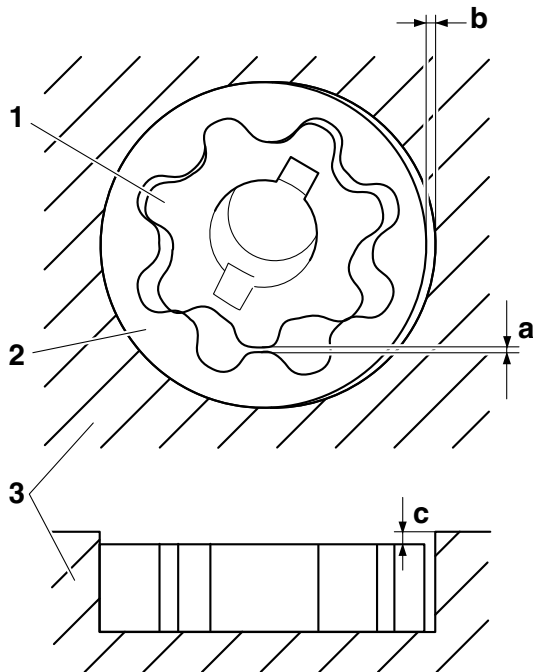
1. Check:
  - Oil pump cover
  - Oil pump drive shaft
  - Oil pump housing

Cracks/damage/wear → Replace the defective part(s).
2. Measure:
  - Inner-rotor-to-outer-rotor-tip clearance “a”
  - Outer-rotor-to-oil-pump-housing clearance “b”
  - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance “c”

Out of specification → Replace the oil pump.



**Inner-rotor-to-outer-rotor-tip clearance**  
 0.000–0.150 mm (0.0000–0.0059 in)  
**Oil-pump-housing-to-inner-and-outer-rotor clearance**  
 0.06–0.11 mm (0.0024–0.0043 in)  
**Limit**  
 0.18 mm (0.0071 in)



- 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).

EAM30137

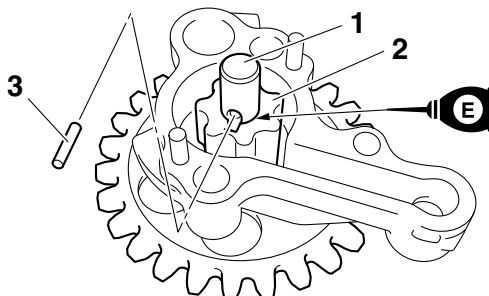
## ASSEMBLING THE OIL PUMP

### 1. Install:

- Oil pump drive shaft "1"
- Inner rotor "2"
- Dowel pin "3"

### TIP

- Apply the engine oil on the oil pump drive shaft and inner rotor.
- Fit the dowel pin into the groove in the inner rotor.

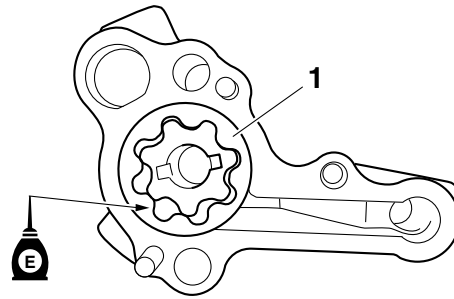


### 2. Install:

- Outer rotor "1"

### TIP

Apply the engine oil on the outer rotor.

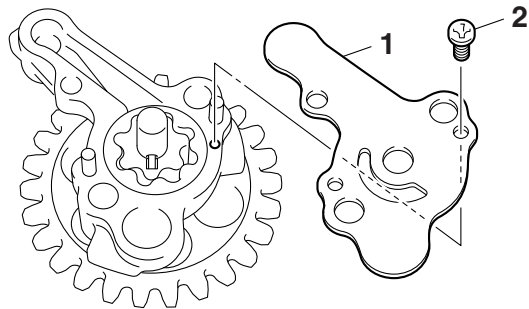


### 3. Install:

- Oil pump cover "1"
- Oil pump cover screw "2"



**Oil pump cover screw**  
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)



EAM30138

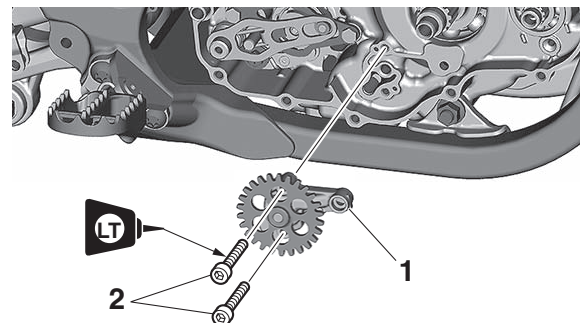
## INSTALLING THE OIL PUMP AND BALANCER GEAR

### 1. Install:

- Oil pump assembly "1"
- Oil pump assembly bolt "2"



**Oil pump assembly bolt**  
5 N·m (0.5 kgf·m, 3.7 lb·ft)  
LOCTITE®



ECA13890

### NOTICE

After tightening the bolts, make sure the oil



# OIL PUMP AND BALANCER GEAR

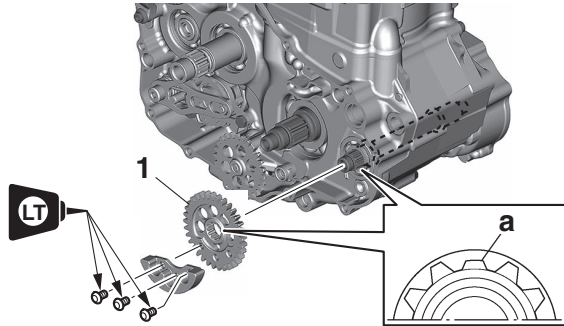
**pump turns smoothly.**

2. Install:

- Balancer weight gear “1”

**TIP**

Install the balancer weight gear and balancer shaft with their lower splines “a” aligning with each other.

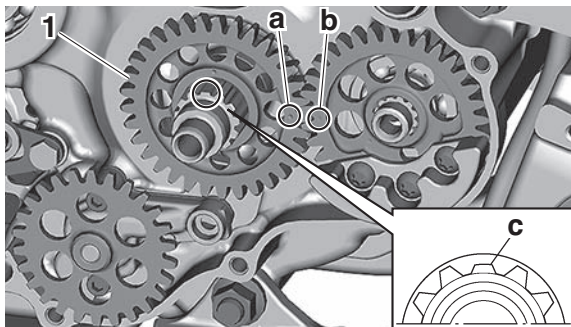


3. Install:

- Balancer drive gear “1”

**TIP**

- Align the punched mark “a” on the balancer drive gear with the punched mark “b” on the balancer weight gear.
- Install the balancer drive gear and crankshaft with the lower splines “c” aligning with each other.



4. Install:

- Lock washer “1” **New**
- Balancer weight gear nut “2”



**Balancer weight gear nut**  
50 N·m (5.0 kgf·m, 37 lb·ft)

- Primary drive gear “3”
- Conical washer “4” **New**
- Primary drive gear nut “5”



**Primary drive gear nut**  
80 N·m (8.0 kgf·m, 59 lb·ft)

- Straight key “6”
- Balancer “7”

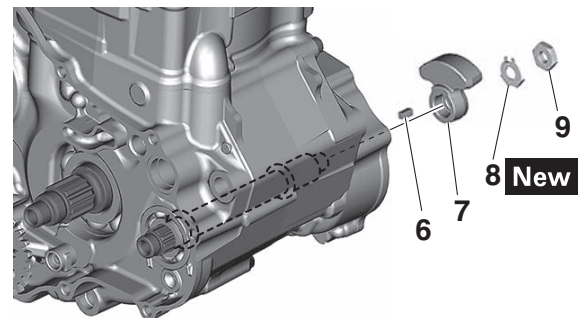
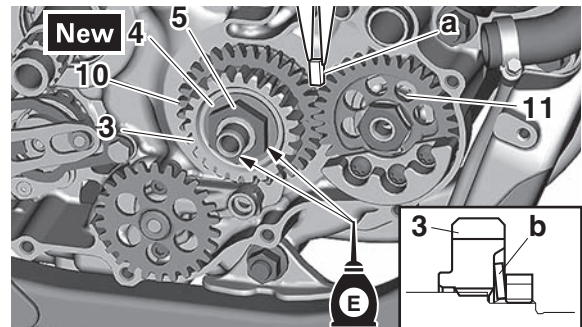
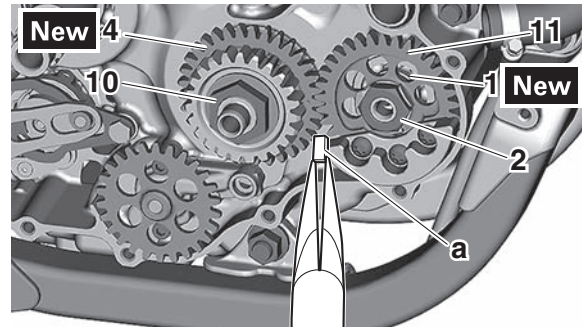
- Lock washer “8” **New**
- Balancer nut “9”



**Balancer nut**  
45 N·m (4.5 kgf·m, 33 lb·ft)

**TIP**

- Apply engine oil to the contact surface and threaded portion of the primary drive gear nut.
- Apply engine oil to the contact surfaces of the conical washer.
- Place an aluminum plate “a” between the teeth of the balancer drive gear “10” and balancer weight gear “11”.
- Install the conical washer with its convex surface “b” outward.

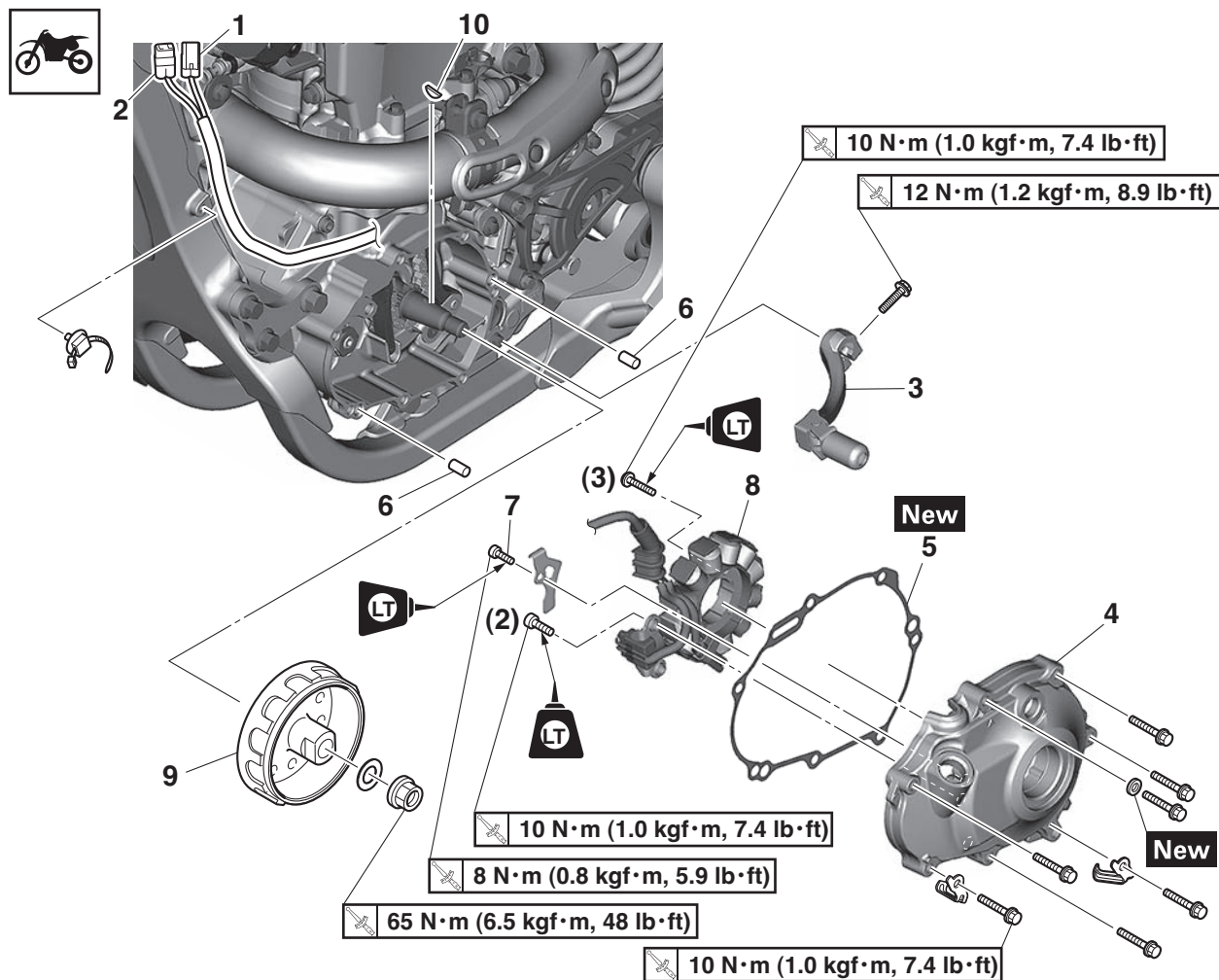


5. Bend the lock washer tab.

EAM20158

## AC MAGNETO

## Removing the AC magneto

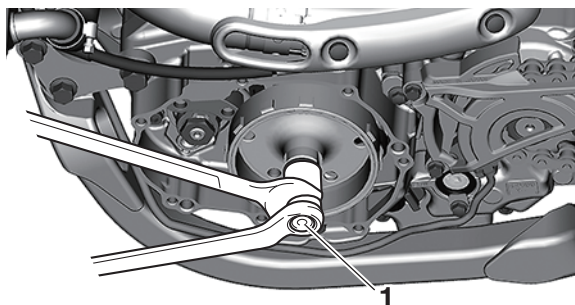


Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-14.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left)		Refer to "GENERAL CHASSIS" on page 4-1.
1	AC magneto coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Shift pedal	1	
4	Crankcase cover (left)	1	
5	Gasket	1	
6	Dowel pin	2	
7	Holder	1	
8	Stator assembly	1	
9	Rotor	1	
10	Woodruff key	1	

EAM30375

## REMOVING THE AC MAGNETO

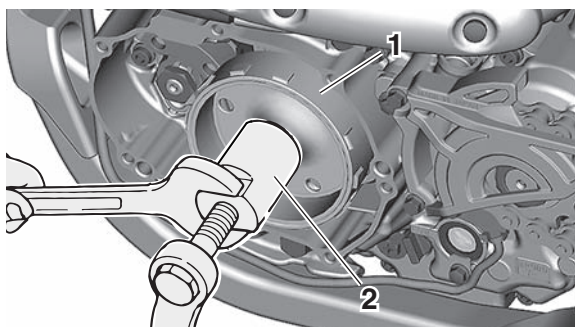
- Remove:
  - Nut (rotor) "1"
  - Washer



- Remove:
  - Rotor "1"
 Use the rotor puller "2" to remove the rotor.
  - Woodruff key



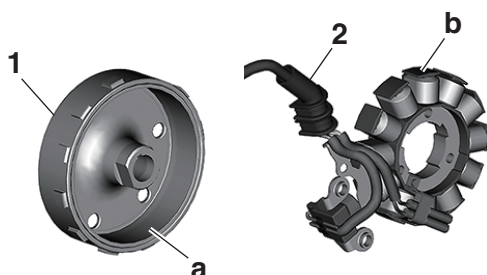
**Rotor puller**  
90890-04151  
**Rotor puller**  
YM-04151



EAM30376

## CHECKING THE AC MAGNETO

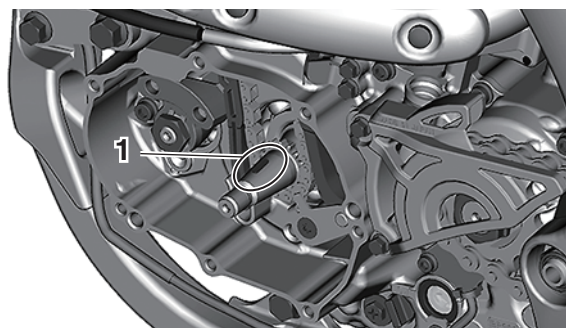
- Check:
  - Rotor "1" inner surface "a"
  - Stator "2" outer surface "b"
 Damage → Inspect the crankshaft runout and crankshaft bearing.



EAM30377

## CHECKING THE WOODRUFF KEY

- Check:
  - Woodruff key "1"
 Damage → Replace.



EAM30378

## INSTALLING THE AC MAGNETO

- Install:
  - Stator "1"
  - Screw (stator) "2"



**Screw (stator)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
LOCTITE®

- Crankshaft position sensor "3"
- Bolt (crankshaft position sensor) "4"
- Holder
- Bolt (holder)



**Bolt (crankshaft position sensor)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
LOCTITE®  
**Holder**  
8 N·m (0.8 kgf·m, 5.9 lb·ft)  
LOCTITE®

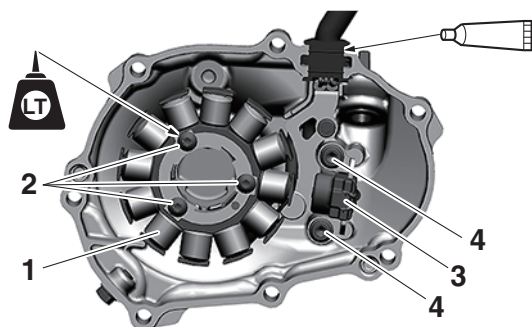
### TIP

- Apply the sealant to the grommet of the AC magneto lead.
- Tighten the stator coil screws using the T25 bit.
- Pass the AC magneto lead through the crankcase cover side.



**Yamaha bond No. 1215**  
90890-85505  
(Three bond No.1215®)





- Lead holder “4”
- Bolt (left crankcase cover) “5”



**Bolt (left crankcase cover)**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

## TIP

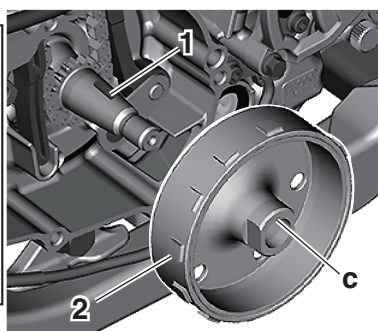
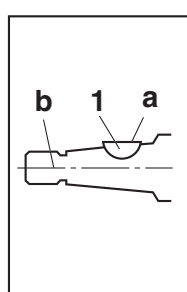
Tighten the bolts in stages and in a crisscross pattern.

## 2. Install:

- Woodruff key “1”
- Rotor “2”

## TIP

- Clean the contact surfaces of the tapered portions of the crankshaft and rotor.
- When installing the woodruff key, make sure that its flat surface “a” is in parallel with the crankshaft center line “b”.
- When installing the rotor, align the keyway “c” of the rotor with the woodruff key.

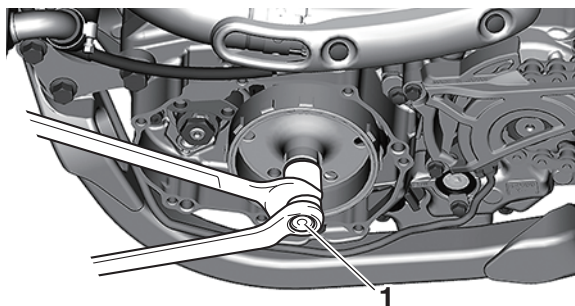


## 3. Install:

- Washer
- Nut (rotor) “1”

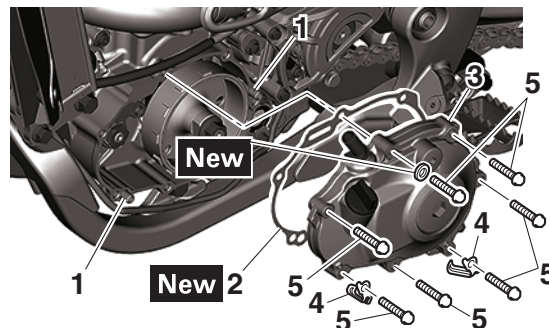


**Nut (rotor)**  
**65 N·m (6.5 kgf·m, 48 lb·ft)**



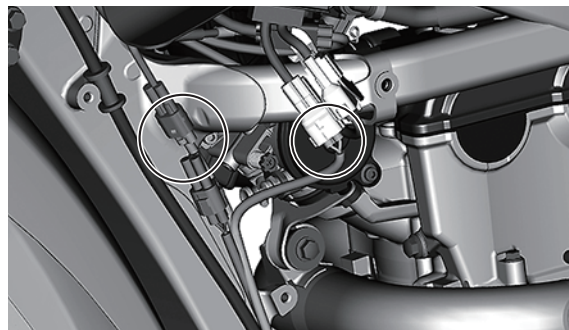
## 4. Install:

- Dowel pin “1”
- Gasket (left crankcase cover) “2” **New**
- Crankcase cover (left) “3”



## 5. Connect:

- AC magneto lead
- Refer to “CABLE ROUTING DIAGRAM” on page 2-31.

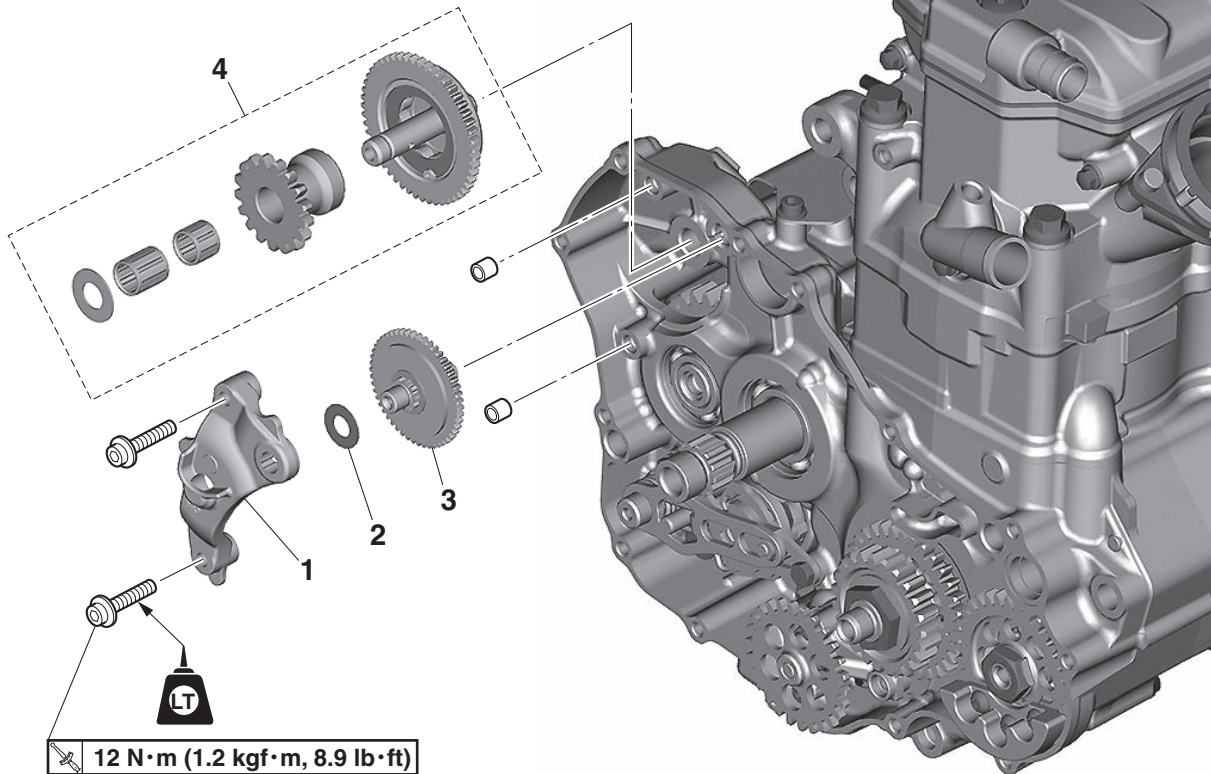




EAM20175

## STARTER CLUTCH

### Removing the starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Refer to "CHANGING THE ENGINE OIL" on page 3-14.
	Clutch		Refer to "CLUTCH" on page 5-40.
1	Holder	1	
2	Washer	1	
3	Damper assembly	1	
4	Starter clutch assembly	1	

EAM30140

## CHECKING THE STARTER CLUTCH

### 1. Check:

- Starter clutch assembly
- Starter clutch drive gear  
Burrs/chips/roughness/wear → Replace the starter clutch.



### 2. Check:

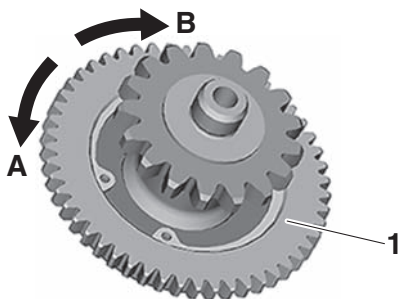
- Starter clutch assembly gear  
Damage/pitting/wear → Replace the starter clutch assembly.

### 3. Check:

- Starter clutch operation



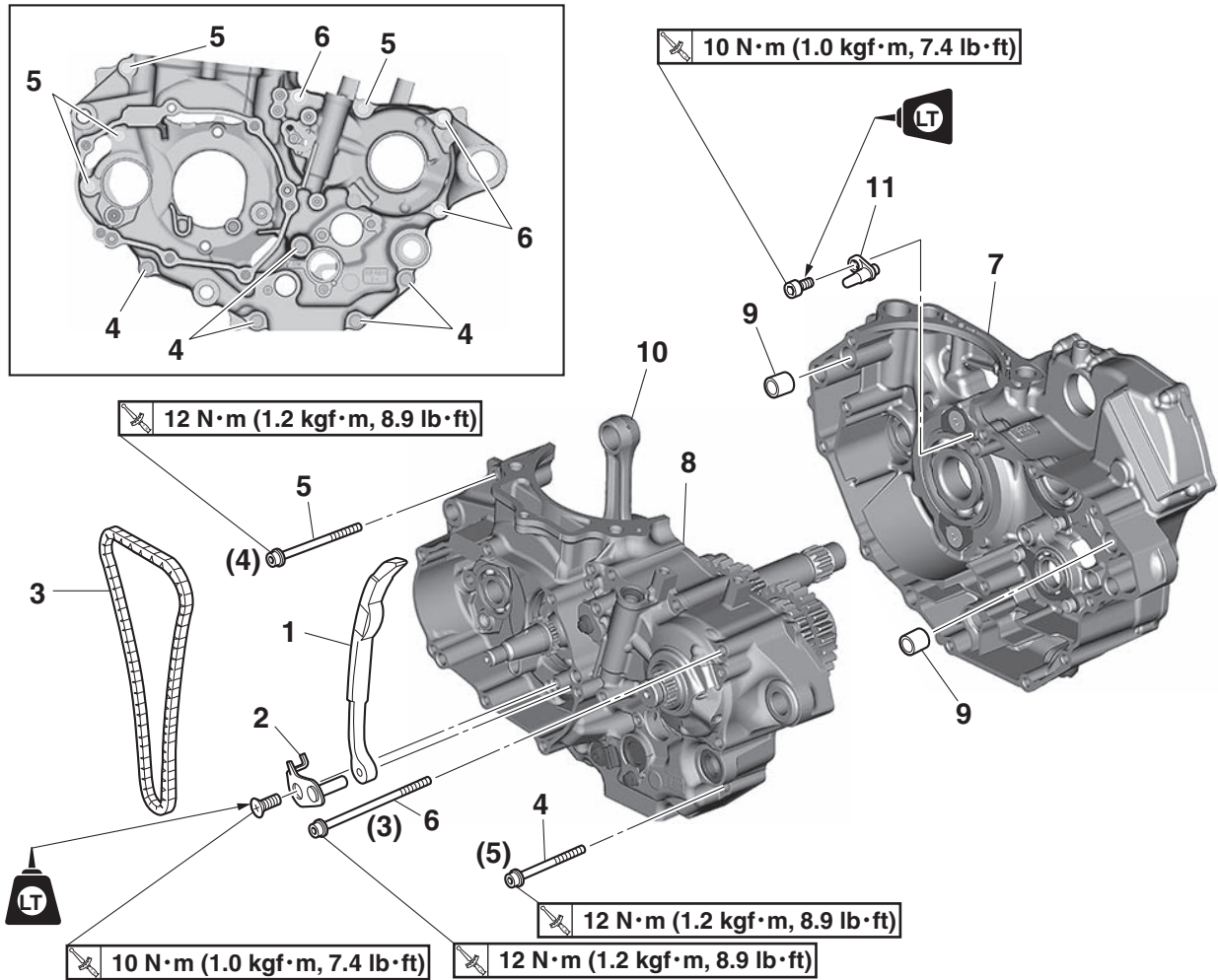
- Install the starter clutch drive gear “1” onto the starter clutch and hold the starter clutch.
- When turning the starter clutch drive gear counterclockwise “A”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch drive gear clockwise “B”, the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.



EAM20116

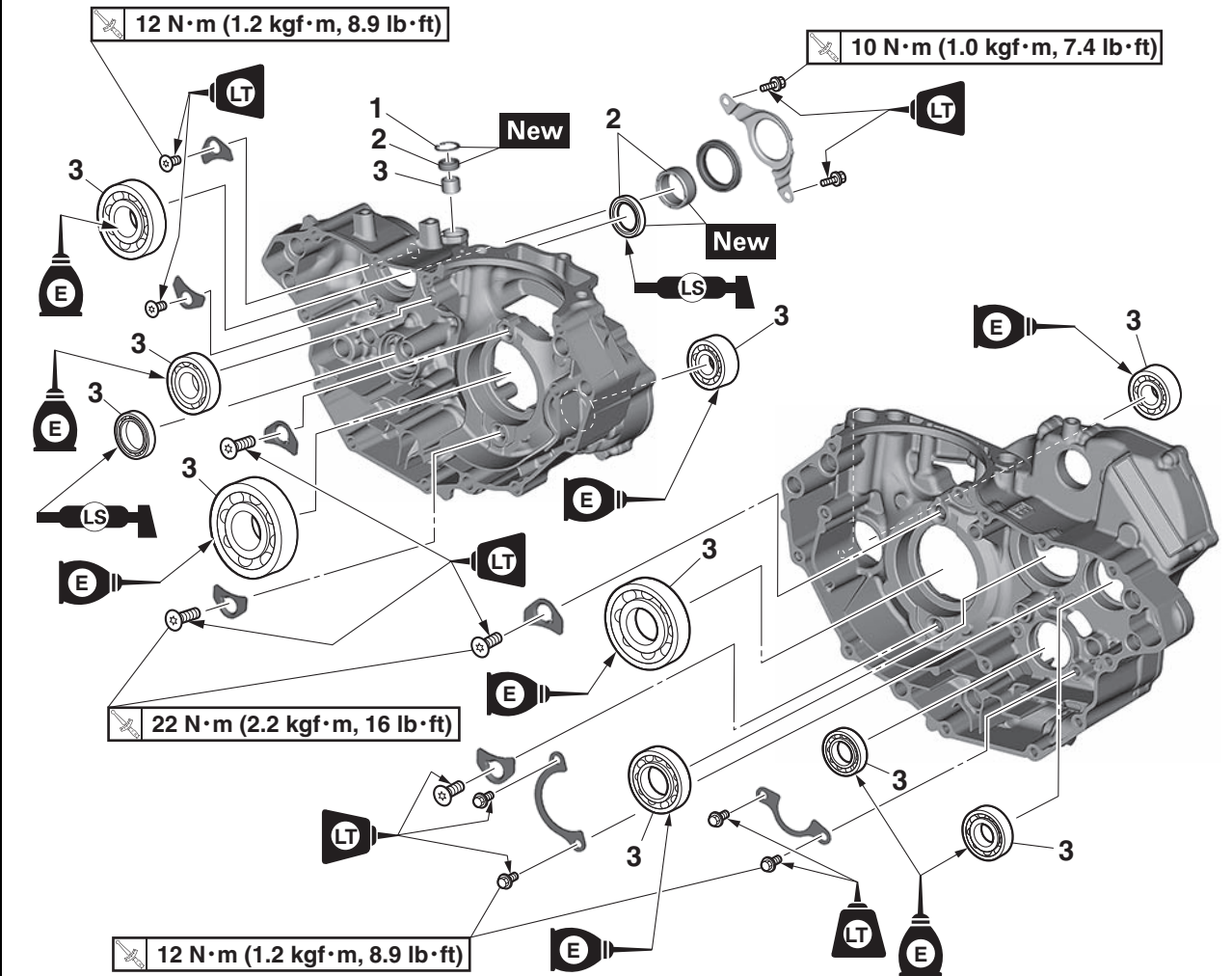
## CRANKCASE

### Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Piston		Refer to "CYLINDER AND PISTON" on page 5-31.
	Balancer		Refer to "OIL PUMP AND BALANCER GEAR" on page 5-52.
	Segment		Refer to "SHIFT SHAFT" on page 5-48.
	Stator		Refer to "AC MAGNETO" on page 5-57.
1	Timing chain guide (exhaust side)	1	
2	Timing chain guide stopper plate	1	
3	Timing chain	1	
4	Bolt [L = 45 mm (1.77 in)]	5	
5	Bolt [L = 60 mm (2.36 in)]	4	
6	Bolt [L = 75 mm (2.95 in)]	3	
7	Right crankcase	1	
8	Left crankcase	1	
9	Dowel pin	2	
10	Crankshaft	1	
11	Oil nozzle	1	

## Removing the bearing and oil seal



Order	Job/Parts to remove	Q'ty	Remarks
	Transmission		Refer to "TRANSMISSION" on page 5-70.
	Shift cam and shift fork		Refer to "TRANSMISSION" on page 5-70.
1	Circlip	1	
2	Oil seal	3	
3	Bearing	11	

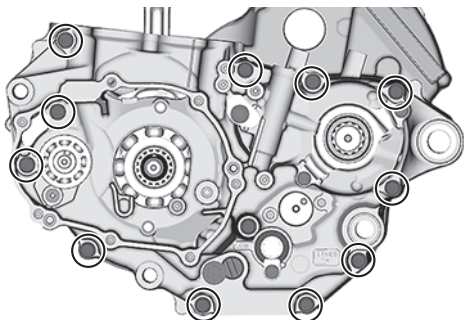
EAM30147

## DISASSEMBLING THE CRANKCASE

1. Separate:
  - Right crankcase
  - Left crankcase



- a. Remove the crankcase bolts.



### TIP

Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.

- b. Remove the right crankcase "1".

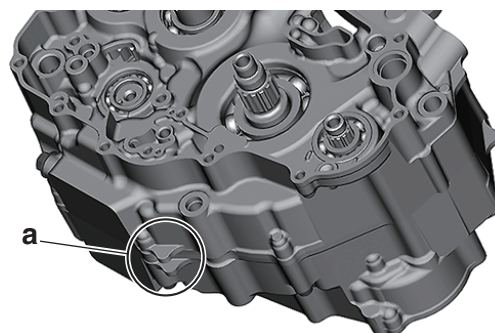
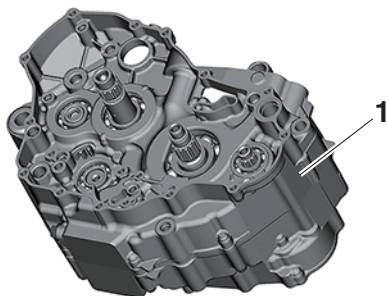
### TIP

- Place the crankcase with its left side downward and split it by inserting a screwdriver tip into the splitting slit "a" in the crankcase.
- Lift the right crankcase horizontally while lightly patting the crankcase splitting slit and the engine mounting boss using a soft hammer, and leave the crankshaft and the transmission with the left crankcase.

ECA24690

### NOTICE

Use soft hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface. Work slowly and carefully. Make sure the case halves separate evenly. If the cases do not separate, check for a remaining case bolt or fitting. Do not force.



- c. Remove the dowel pins and O-ring.



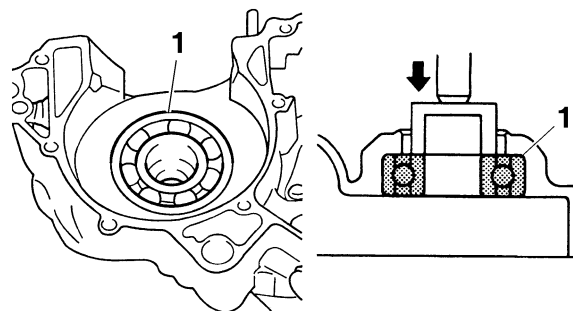
EAM30148

## REMOVING THE CRANKCASE BEARING

1. Remove:
  - Bearing "1"

### TIP

- Remove the bearing from the crankcase by pressing its inner race.
- Do not use the removed bearing.



EAM30149

## CHECKING THE TIMING CHAIN, TIMING CHAIN GUIDE, OIL STRAINER

1. Check:
  - Timing chain
    - Stiffness → Replace the camshaft sprocket, timing chain and crankshaft sprocket as a set.
2. Check:
  - Timing chain guide
    - Damage/wear → Replace.

EAM30150

## CHECKING THE CRANKCASE

1. Wash:
  - Crankcase

### TIP

- Wash the crankcase in a mild solvent.
- Remove any remaining gasket from the crankcase mating surface.



## 2. Check:

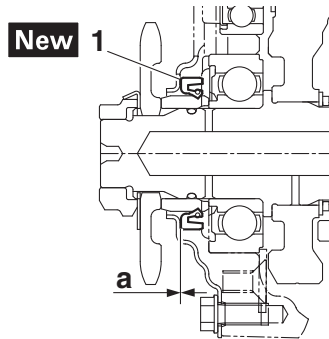
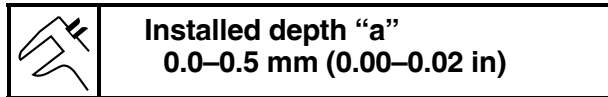
- Crankcase  
Crack/damage → Replace.
- Oil delivery passages  
Obstruction → Blow out with compressed air.

EAM30151

## INSTALLING THE OIL SEAL

### 1. Install:

- Oil seal “1” **New**  
(to left crankcase)



EAM30152

## ASSEMBLING THE CRANKCASE

### 1. Install:

- Bearing cover plate

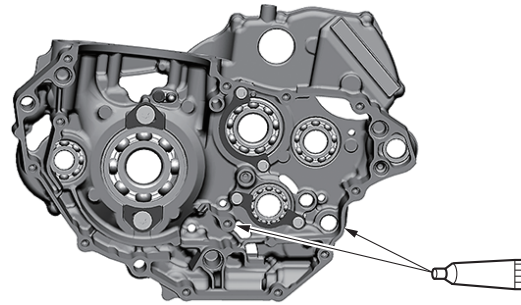
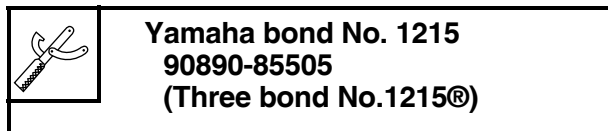


### TIP

Install the bearing by pressing its outer race parallel.

### 2. Apply:

- Sealant  
(to the crankcase mating surface)

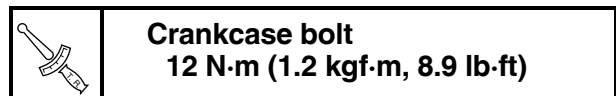


### 3. Install:

- Oil nozzle “1”

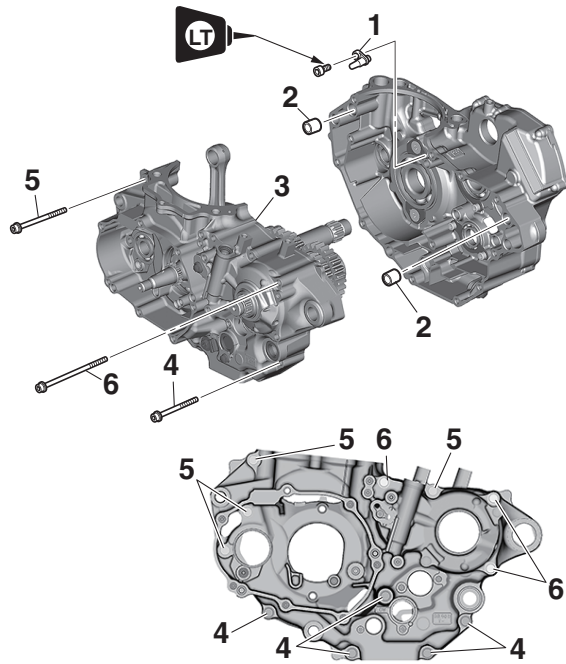


- Dowel pin “2”
- Crankcase “3”  
(to the left crankcase)



### TIP

- Apply the lithium-soap-based grease on the O-ring.
- Fit the right crankcase onto the left crankcase. Tap lightly on the case with soft hammer.
- When installing the crankcase, the connecting rod should be positioned at top dead center (TDC).
- Tighten the bolts in a crisscross pattern in two stages, with 1/4 turn each.



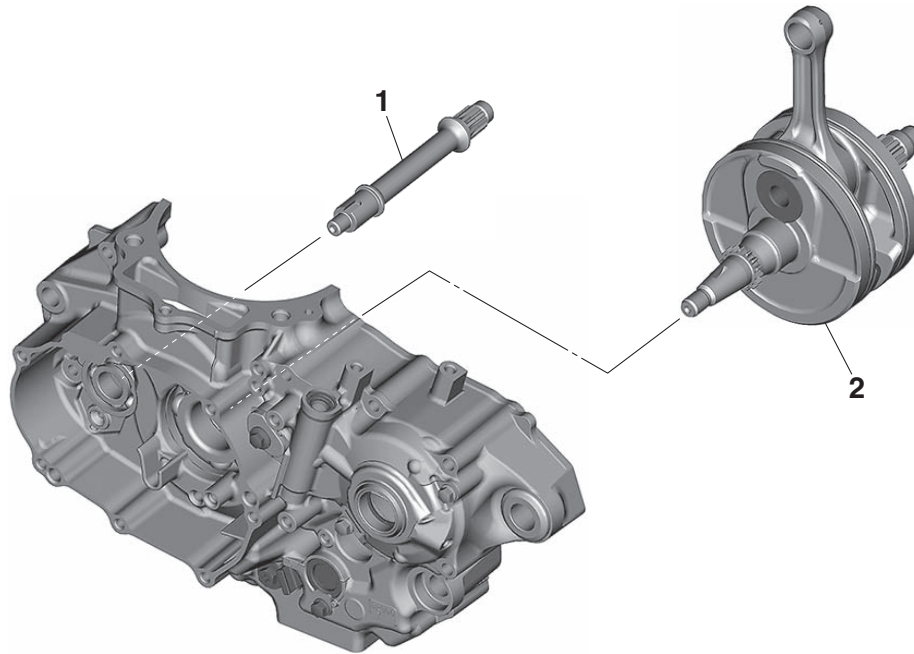
- 4. 45 mm (1.77 in)
- 5. 60 mm (2.36 in)
- 6. 75 mm (2.95 in)

# CRANKSHAFT ASSEMBLY AND BALANCER SHAFT

EAM20117

## CRANKSHAFT ASSEMBLY AND BALANCER SHAFT

### Removing the crankshaft assembly and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-62.
	Transmission		Refer to "TRANSMISSION" on page 5-70.
1	Balancer shaft	1	
2	Crankshaft assembly	1	



# CRANKSHAFT ASSEMBLY AND BALANCER SHAFT

EAM30143

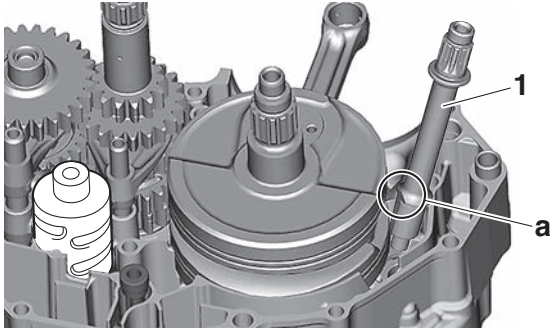
## REMOVING THE BALANCER SHAFT

1. Remove:

- Balancer shaft "1"

### TIP

Remove the balancer shaft with its flat side "a" facing the crankshaft.



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## REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:

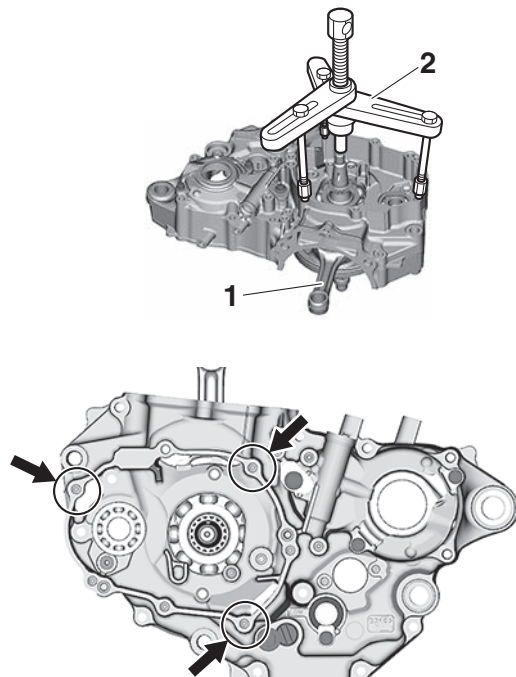
- Crankshaft assembly "1"

### TIP

Remove the crankshaft assembly by using the crankcase separating tool "2".



**Crankcase separating tool  
90890-04152**  
**Crankcase separating tool  
YU-A9642**



EAM30145

## CHECKING THE CRANKSHAFT ASSEMBLY

1. Measure:

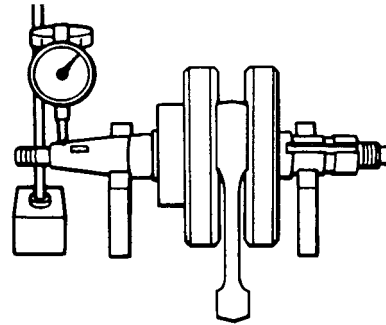
- Crankshaft runout  
Out of specification → Replace the crankshaft, bearing or both.

### TIP

Turn the crankshaft slowly.



**Runout limit  
0.030 mm (0.0012 in)**

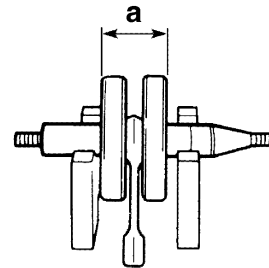


2. Measure:

- Crank assembly width "a"  
Out of specification → Replace the crankshaft.

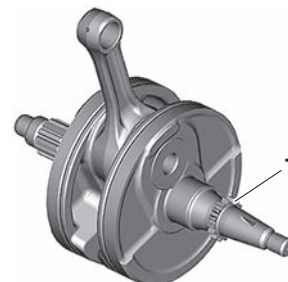


**Crank assembly width  
61.93–62.00 mm (2.438–2.441 in)**



3. Check:

- Crankshaft sprocket "1"  
Damage → Replace the crankshaft.



## 4. Check:

- Crankshaft journal oil passage  
Obstruction → Blow out with compressed air.

EAM30146

## INSTALLING THE CRANKSHAFT ASSEMBLY

### 1. Install:

- Crankshaft assembly

### TIP

Install the crankshaft assembly with the crankshaft installer pot "1", crankshaft installer bolt "2", adapter (M12) "3" and spacer "4".



**Crankshaft installer pot**

**90890-01274**

**Installing pot**

**YU-90058**

**Crankshaft installer bolt**

**90890-01275**

**Bolt**

**YU-90060**

**Adapter (M12)**

**90890-01278**

**Adapter #3**

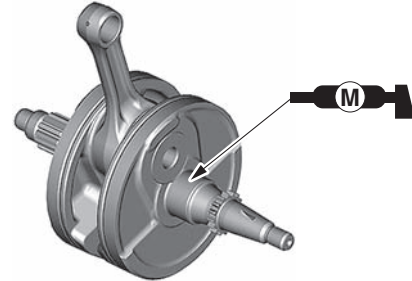
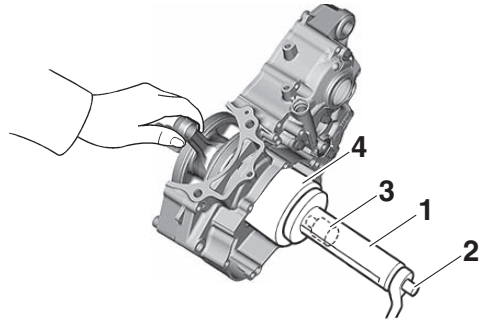
**YU-90063**

**Spacer (crankshaft installer)**

**90890-04081**

**Pot spacer**

**YM-91044**



ECA24700

### NOTICE

- To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease.
- In order to prevent the crankshaft seizure, apply molybdenum disulfide grease.

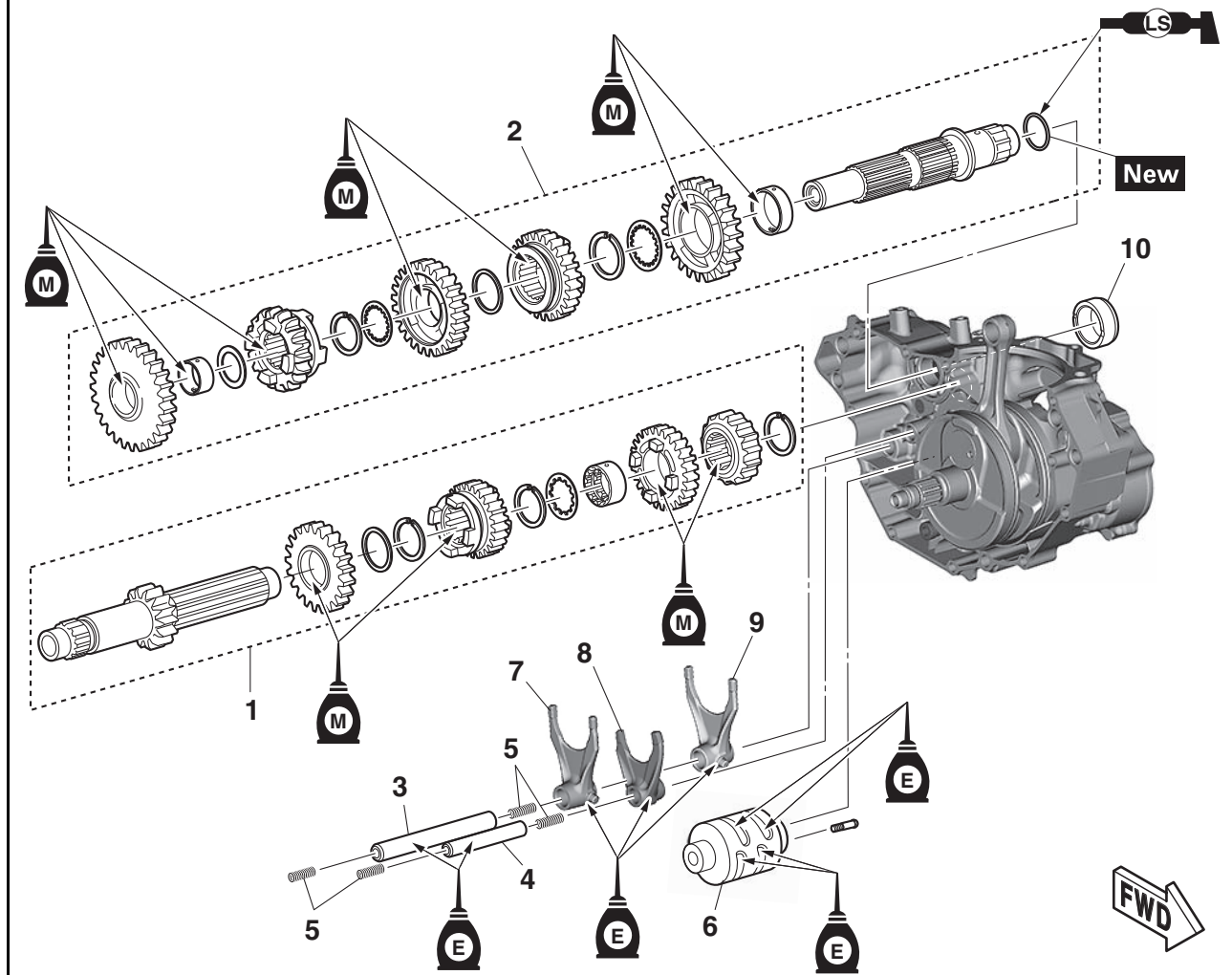
### TIP

Hold the connecting rod at top dead center (TDC) with one hand while turning the nut of the crankshaft installer bolt with the other. Turn the crankshaft installer bolt until the crankshaft assembly bottoms against the bearing.

EAM20118

## TRANSMISSION

### Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-62.
1	Main axle	1	
2	Drive axle	1	
3	Long shift fork guide bar	1	
4	Short shift fork guide bar	1	
5	Spring	4	
6	Shift cam	1	
7	Shift fork 3 (R)	1	
8	Shift fork 2 (C)	1	
9	Shift fork 1 (L)	1	
10	Collar	1	

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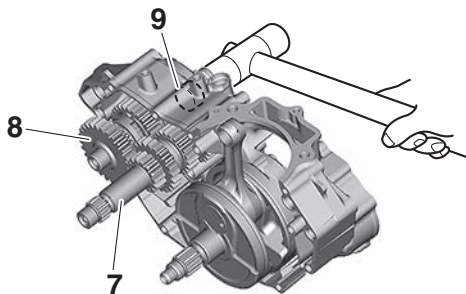
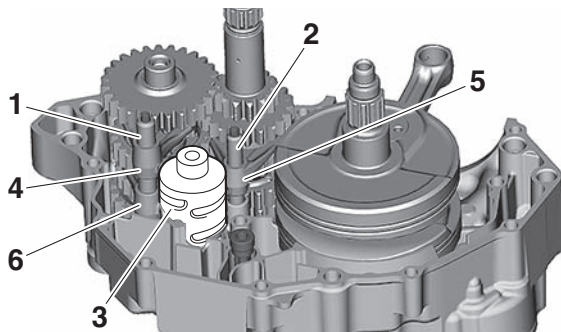
## REMOVING THE TRANSMISSION

### 1. Remove:

- Long shift fork guide bar "1"
- Short shift fork guide bar "2"
- Shift cam "3"
- Shift fork 3 "4"
- Shift fork 2 "5"
- Shift fork 1 "6"
- Main axle "7"
- Drive axle "8"
- Collar "9"

### TIP

- Remove assembly with the collar "9" installed to the crankcase.
- Make a note of the position of each part. Pay particular attention to the location and direction of shift forks.
- Remove the main axle and the drive axle all together by tapping the drive axle lightly with a soft hammer.

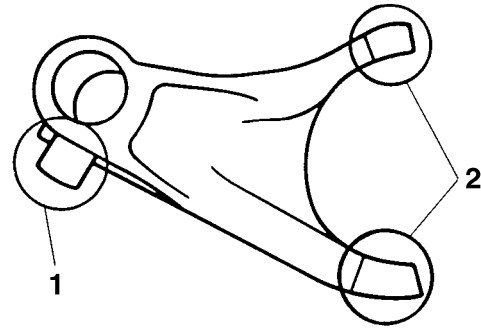


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## CHECKING THE SHIFT FORKS

### 1. Check:

- Shift fork cam follower "1"
  - Shift fork pawl "2"
- Bends/damage/scoring/wear → Replace the shift fork.



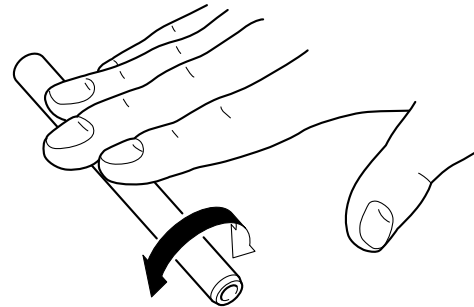
### 2. Check:

- Shift fork guide bar  
Roll the shift fork guide bar on a flat surface.  
Bends → Replace.

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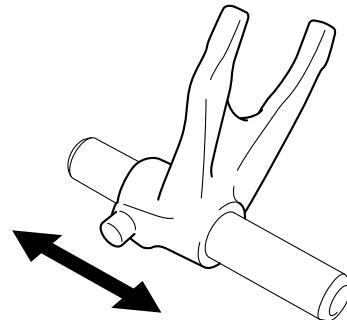
### ⚠ WARNING

**Do not attempt to straighten a bent shift fork guide bar.**



### 3. Check:

- Shift fork movement  
(along the shift fork guide bar)  
Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAM30155

## CHECKING THE SHIFT DRUM ASSEMBLY

### 1. Check:

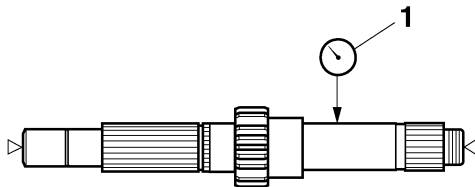
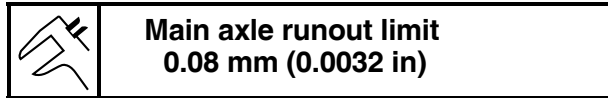
- Shift drum groove  
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment  
Damage/wear → Replace the shift drum assembly.

EAM30156

## CHECKING THE TRANSMISSION

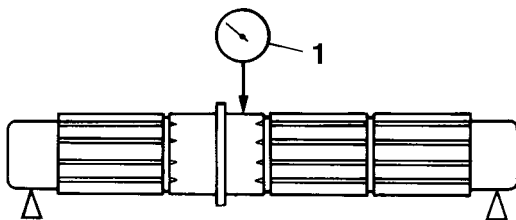
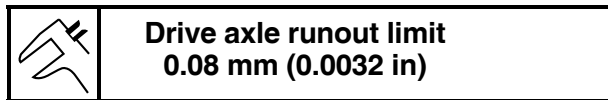
### 1. Measure:

- Main axle runout  
(with a centering device and dial gauge "1")  
Out of specification → Replace the main axle.



### 2. Measure:

- Drive axle runout  
(with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.



### 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 movement  
Rough movement → Replace the defective gear(s).

EAM30157

## INSTALLING THE TRANSMISSION

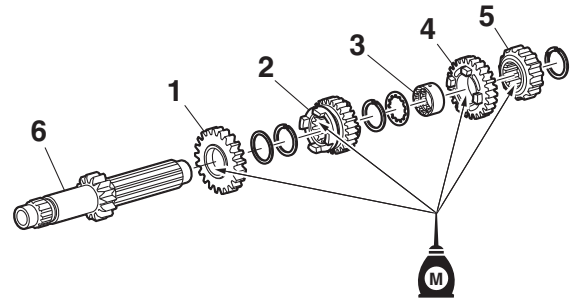
### 1. Install:

- 5th pinion gear (25T) "1"

- 3rd pinion gear (16T) "2"
- Collar "3"
- 4th pinion gear (20T) "4"
- 2nd pinion gear (15T) "5"  
(to the main axle "6")

### TIP

Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and to the inner surface of the sliding gear, then install.

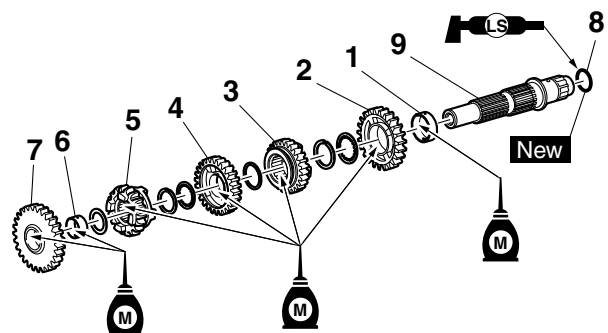


### 2. Install:

- Collar "1"
- 2nd wheel gear (26T) "2"
- 4th wheel gear (21T) "3"
- 3rd wheel gear (21T) "4"
- 5th wheel gear (21T) "5"
- Collar "6"
- 1st wheel gear (29T) "7"
- O-ring "8" **New**  
(to the drive axle "9")

### TIP

- Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and the collar and to the inner surface of the sliding gear, then install.
- Apply the lithium-soap-based grease on the O-ring.



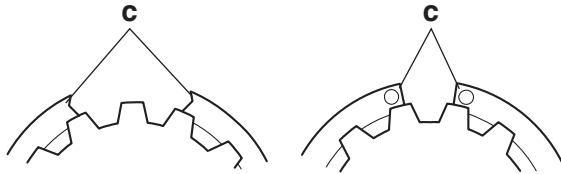
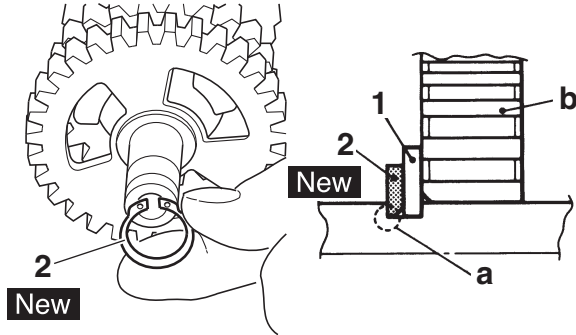
### 3. Install:

- Washer "1"
- Circlip "2" **New**



## TIP

- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the washer and gear “b”.
- Install the circlip with its ends “c” settled evenly on the spline crests.

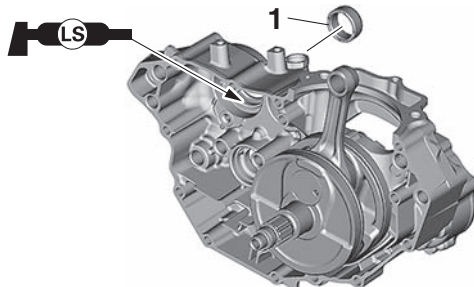


## 4. Install:

- Collar “1”

## TIP

- Apply the lithium-soap-based grease on the oil seal lip.
- When installing the collar into the crankcase, pay careful attention to the crankcase oil seal lip.



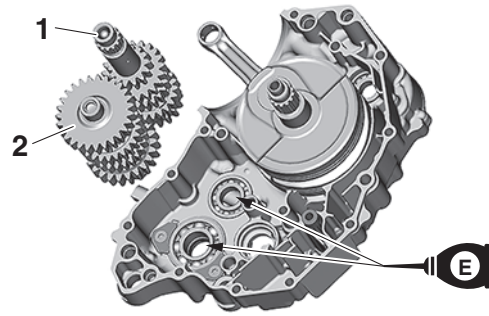
## 5. Install:

- Main axle “1”
- Drive axle “2”

## TIP

- Install to the left crankcase simultaneously.
- Apply engine oil to the main axle and the drive

axle bearing.

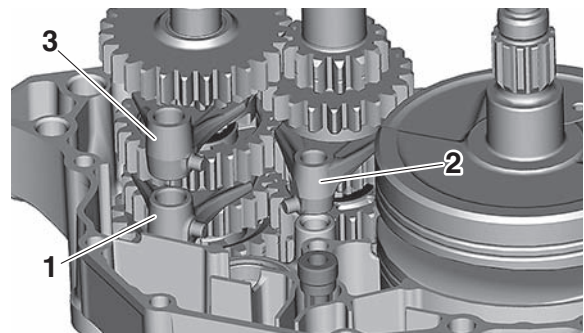


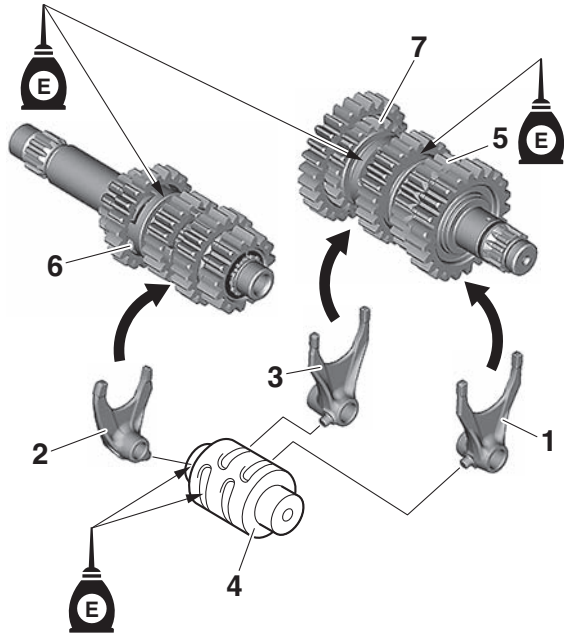
## 6. Install:

- Shift fork 1 (L) “1”
- Shift fork 2 (C) “2”
- Shift fork 3 (R) “3”
- Shift cam “4”  
(to the main axle and the drive axle)

## TIP

- Apply engine oil to the shift fork grooves.
- Apply engine oil to the shift cam groove and the bearing contact surface.
- Mesh the shift fork 1 (L) with the 4th wheel gear “5” and 3 (R) with the 5th wheel gear “7” on the drive axle.
- Mesh the shift fork 2 (C) with the 3rd pinion gear “6” on the main axle.



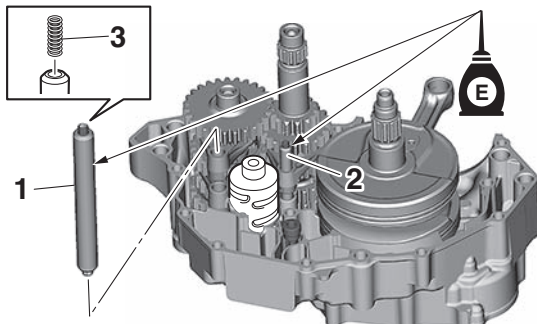


7. Install:

- Long shift fork guide bar "1"
- Short shift fork guide bar "2"
- Spring "3"

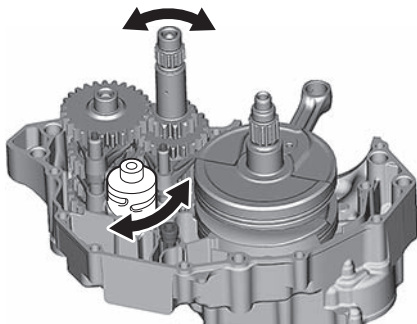
#### TIP

- Screw the spring into the shift fork guide bar lightly beforehand.
- Apply the engine oil on the shift fork guide bars.



8. Check:

- Operation of shift cam and shift fork
  - Transmission operation
- Unsmooth operation → Repair.







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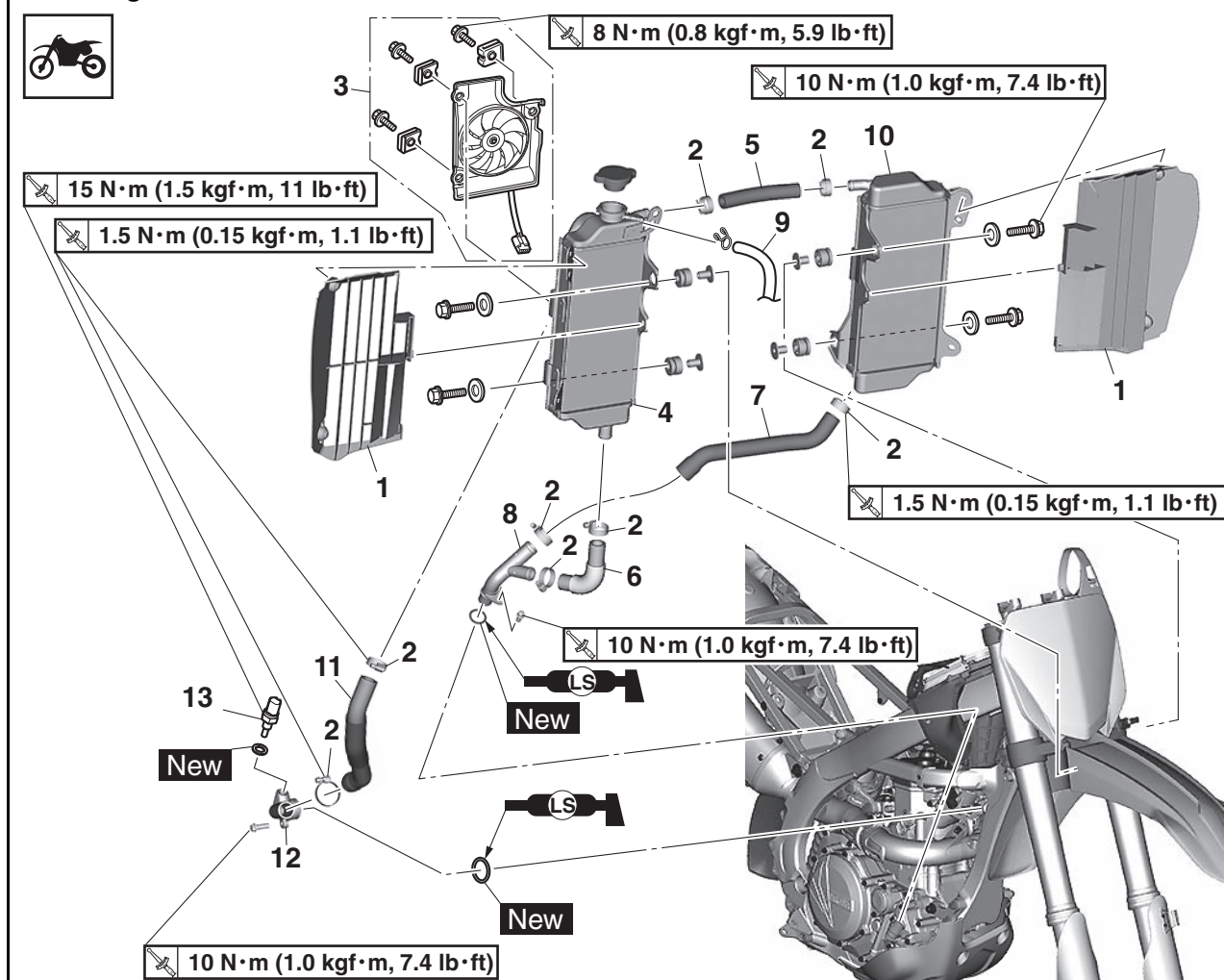
## COOLING SYSTEM

<b>RADIATOR</b> .....	6-1
HANDLING NOTE .....	6-3
CHECKING THE RADIATOR .....	6-3
 <b>WATER PUMP</b> .....	6-4
REMOVING THE OIL SEAL .....	6-5
CHECKING THE WATER PUMP .....	6-5
CHECKING THE BEARING .....	6-5
INSTALLING THE OIL SEAL .....	6-5
ASSEMBLING THE WATER PUMP .....	6-5

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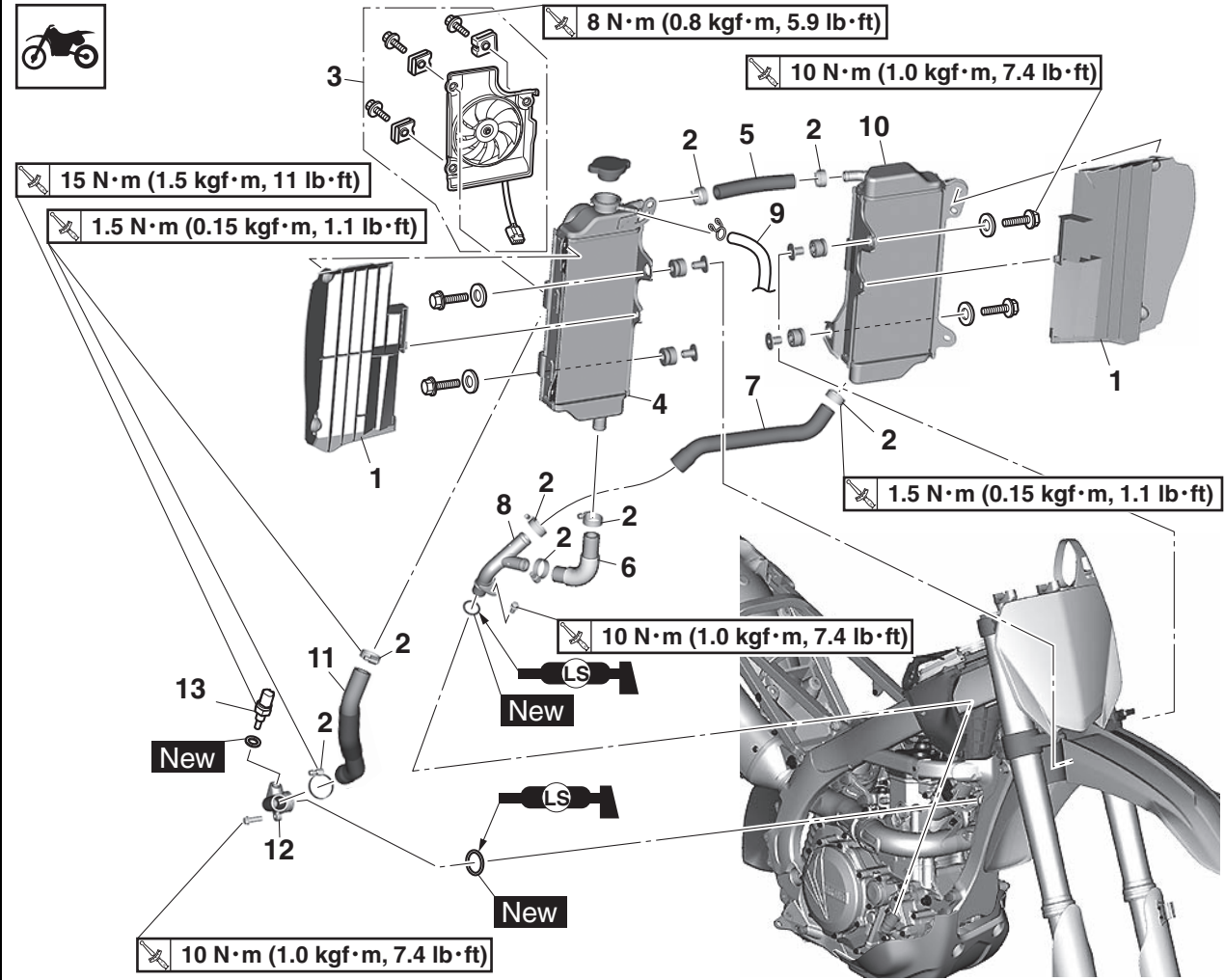
## RADIATOR

### Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "THROTTLE BODY" on page 7-5.
1	Radiator guard	2	
2	Radiator hose clamp	8	Loosen.
3	Radiator fan	1	For JPN
4	Radiator (right)	1	
5	Radiator hose 2	1	
6	Radiator hose 4	1	
7	Radiator hose 3	1	
8	Radiator pipe 2	1	
9	Radiator breather hose	1	

## Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
10	Radiator (left)	1	
11	Radiator hose 1	1	
12	Radiator pipe 1	1	
13	Coolant temperature sensor	1	

EAM30257

## HANDLING NOTE

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**If coolant seems hot, do not remove the radiator cap.**

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## CHECKING THE RADIATOR

### 1. Check:

- Radiator fins “1”

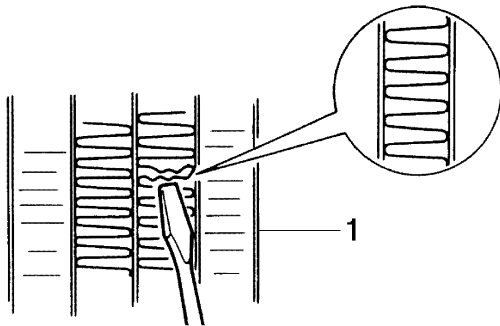
Obstructions → Clean.

Apply compressed air to the rear of the radiator.

Damage → Repair or replace.

### TIP

Correct any flattened fins with a thin, flat-head screwdriver.



### 2. Check:

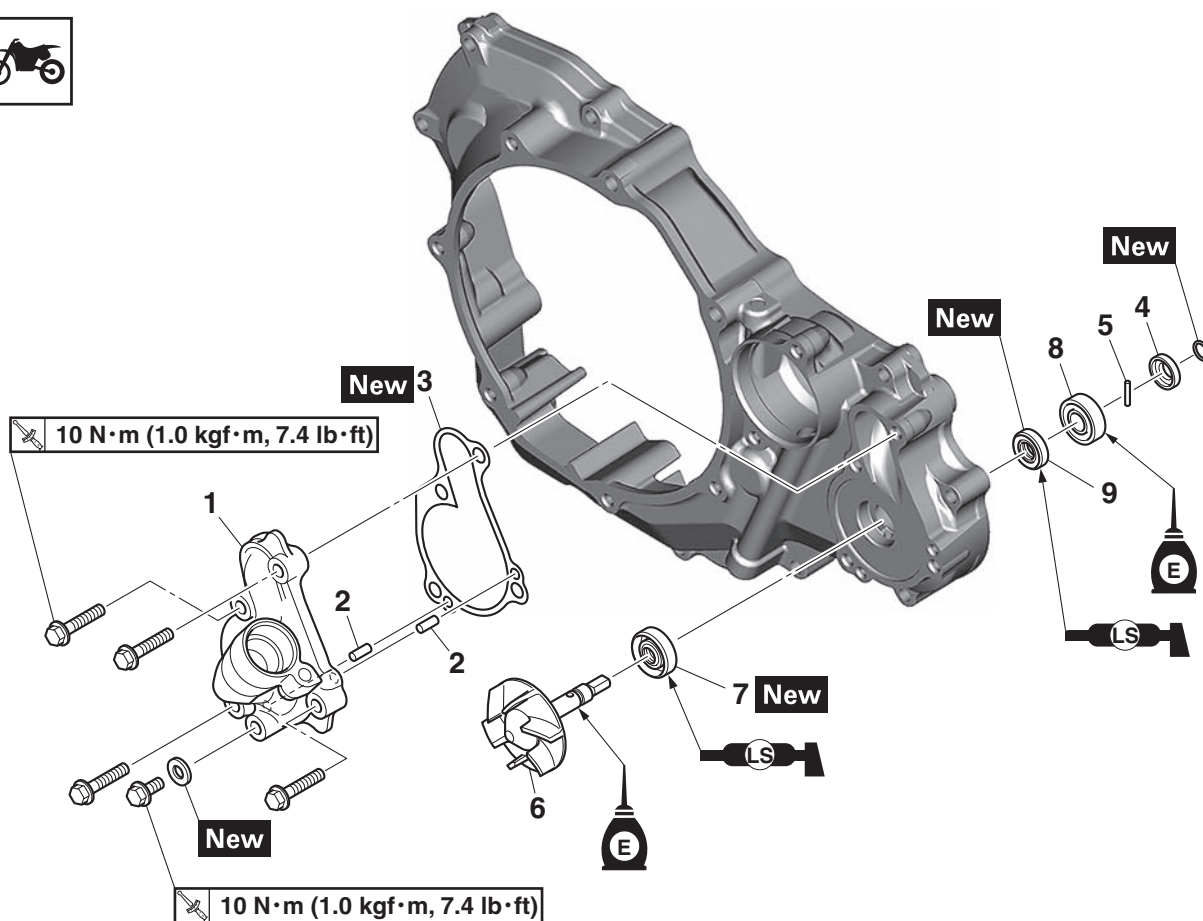
- Radiator hoses
- Radiator pipes

Crack/damage → Replace.

EAM20139

## WATER PUMP

### Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-14.
	Right crankcase cover		Refer to "CLUTCH" on page 5-40.
1	Water pump housing	1	
2	Dowel pin	2	
3	Gasket	1	
4	Collar	1	
5	Pin	1	
6	Impeller shaft assembly	1	
7	Oil seal	1	
8	Bearing	1	
9	Oil seal	1	

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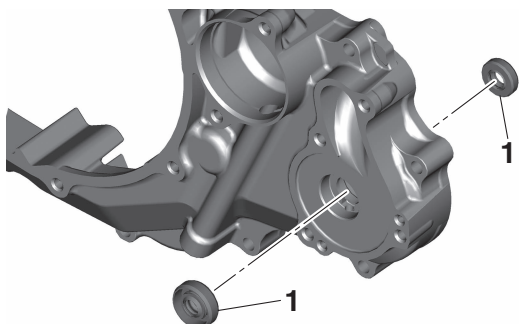
## REMOVING THE OIL SEAL

### TIP

- Remove the oil seal when the coolant level changes frequently more than usual, coolant has discolored, or engine oil has become milky.
- Do not use the removed oil seal.

### 1. Remove:

- Oil seal "1"

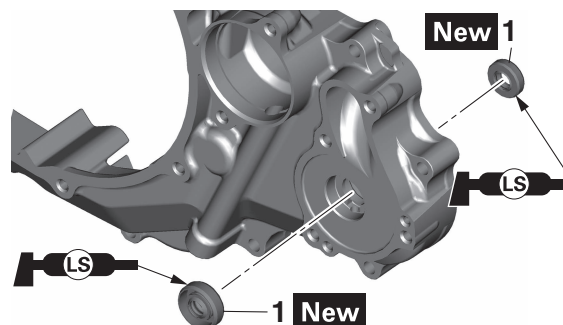


EAM30259

## CHECKING THE WATER PUMP

### 1. Check:

- Water pump housing cover
  - Impeller shaft
- Cracks/damage/wear → Replace.

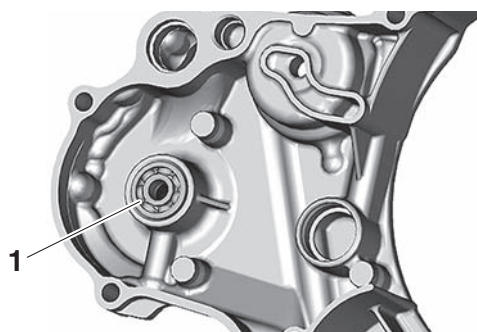


### 2. Install:

- Bearing "1"

### TIP

Install the bearing by pressing its outer race parallel.

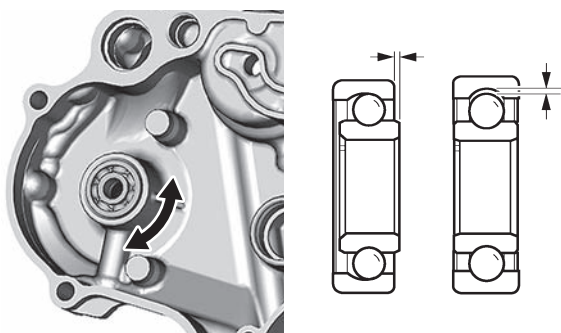


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## CHECKING THE BEARING

### 1. Check:

- Bearing
- Rotate the inner race with your finger.  
Rough spot/seizure → Replace.



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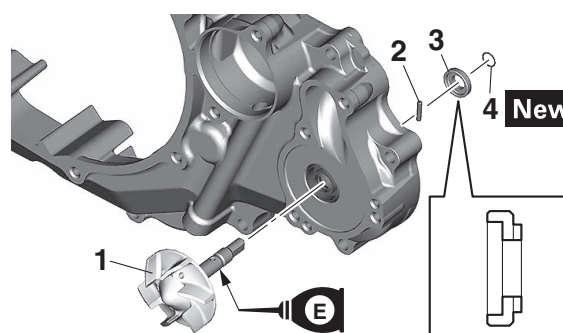
## ASSEMBLING THE WATER PUMP

### 1. Install:

- Impeller shaft assembly "1"
- Pin "2"
- Collar "3"
- Circlip "4" **New**

### TIP

- Take care so that the oil seal lip is not damaged or the spring does not slip off its position.
- When installing the impeller shaft, apply the engine oil to the oil seal lip, the bearing, and the impeller shaft.



EAM30261

## INSTALLING THE OIL SEAL

### 1. Install:

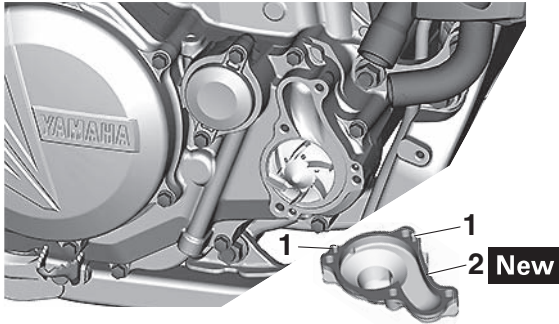
- Oil seal "1" **New**

### TIP

- Apply the lithium-soap-based grease on the oil seal lip.
- Install the oil seal with its manufacture's marks or numbers facing the right crankcase cover.

### 2. Install:

- Dowel pin "1"
- Gasket "2" **New**



3. Install:

- Water pump housing “1”
- Water pump housing bolt “2”

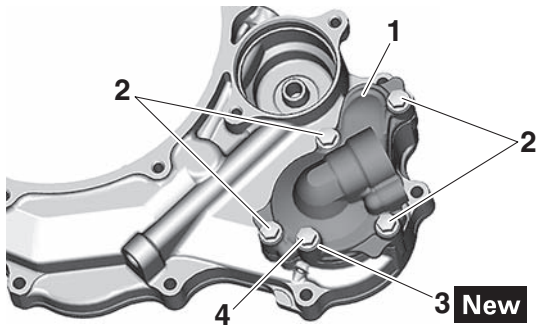


**Water pump housing bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

- Washer “3” **New**
- Coolant drain bolt “4”



**Coolant drain bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**







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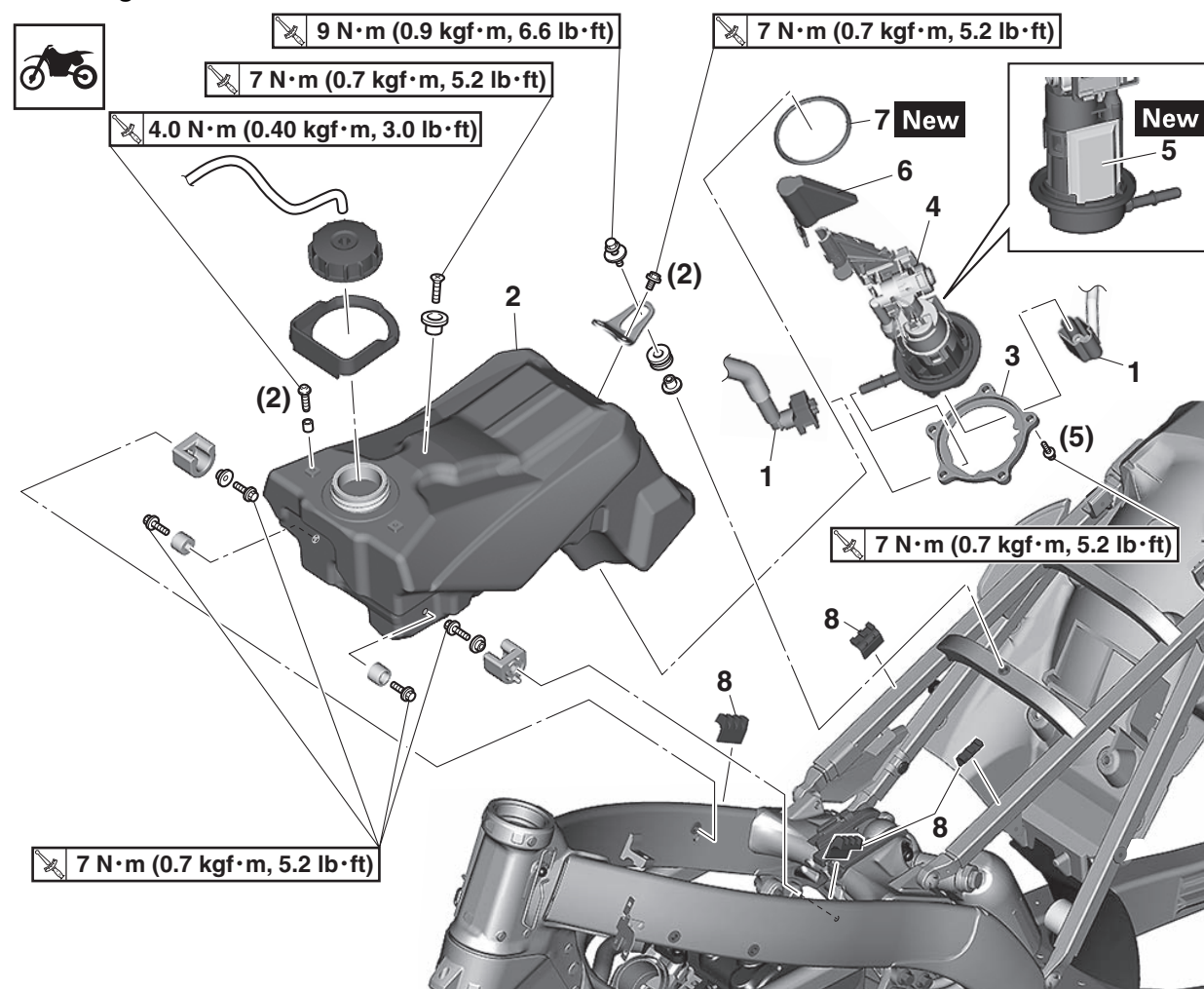
## FUEL SYSTEM

<b>FUEL TANK</b> .....	7-1
REMOVING THE FUEL TANK .....	7-2
REMOVING THE FUEL PUMP .....	7-2
CHECKING THE FUEL PUMP BODY .....	7-2
INSTALLING THE FUEL PUMP .....	7-2
INSTALLING THE FUEL TANK .....	7-3
CHECKING THE FUEL PRESSURE .....	7-3
CHECKING THE DAMPER .....	7-4
 <b>THROTTLE BODY</b> .....	7-5
CHECKING THE INJECTOR .....	7-8
CHECKING THE THROTTLE BODY .....	7-8
CHECKING THE THROTTLE BODY JOINT .....	7-8
ADJUSTING THE THROTTLE POSITION SENSOR .....	7-9

EAM20140

## FUEL TANK

### Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		
	Air scoop (left/right)		
1	Fuel pump coupler/Fuel hose	1/1	Disconnect.
2	Fuel tank	1	
3	Fuel pump bracket	1	
4	Fuel pump	1	
5	Fuel filter	1	
6	Thermistor cover	1	
7	Fuel pump gasket	1	
8	Rubber damper	4	

EAM30263

## REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
  - Fuel hose coupler

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### WARNING

Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.

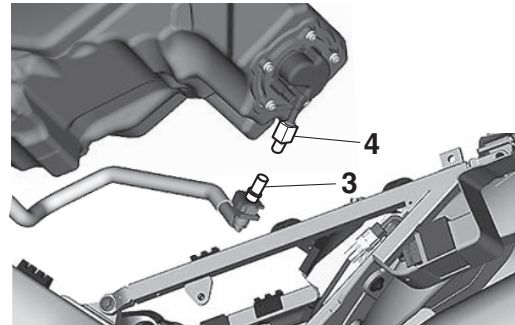
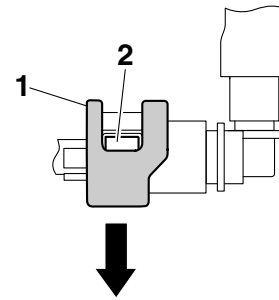
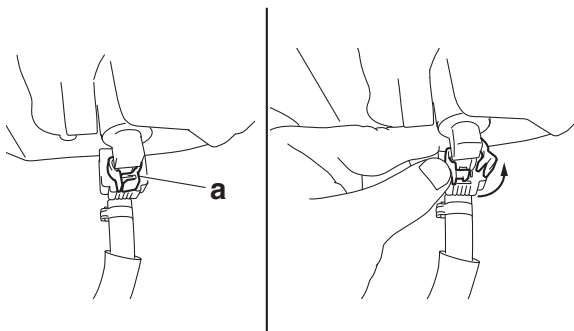
ECA26520

### NOTICE

- Make sure that the fuel hose is disconnected by hand. Do not forcefully disconnect the hose with tools.
- When removing the fuel tank, handle it carefully. If the discharge port of the fuel pump touches the ground or other objects, the discharge port could be damaged.

### TIP

- To disconnect the fuel hose from the fuel tank, remove the fuel hose connector holder “a”, and then slide the fuel hose connector cover.
- To remove the fuel hose from the fuel rail, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few cloths in the area under where it will be removed.
- To prevent sand, dust, and other foreign materials from entering the fuel pump, install the included fuel hose joint cover 1 “3” and the fuel hose joint cover 2 “4” onto the disconnected fuel hose and the fuel pump.



3. Remove:

- Side cover (left/right)
- Seat
- Air scoop (left/right)
- Fuel tank

### TIP

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAM30264

## REMOVING THE FUEL PUMP

1. Remove:

- Fuel pump

ECA24720

### NOTICE

Do not drop the fuel pump or give it a strong shock.

EAM30265

## CHECKING THE FUEL PUMP BODY

1. Check:

- Fuel pump body
  - Obstructions → Clean.
  - Cracks/damage → Replace the fuel pump assembly.

EAM30266

## INSTALLING THE FUEL PUMP

1. Install:

- Fuel pump gasket **New**
- Fuel filter **New**
- Fuel pump

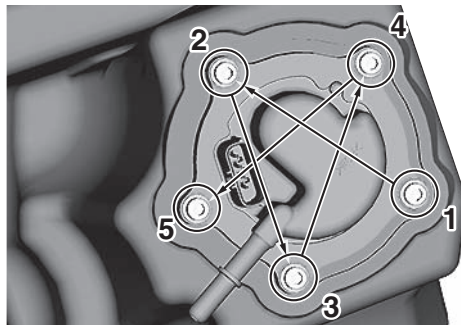
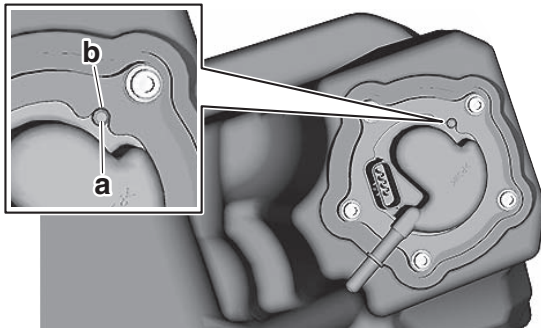
- Fuel pump bracket



**Fuel pump bolt**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

## TIP

- Take care not to damage the installation surfaces of the fuel tank.
- Always use a new fuel pump gasket.
- Install the lip on the fuel pump gasket upward.
- Install the fuel pump as shown in the figure.
- Align the projection “a” on the fuel pump with the slot “b” in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



EAM30267

## INSTALLING THE FUEL TANK

1. Install:
  - Fuel tank
2. Connect:
  - Fuel hose

ECA24740

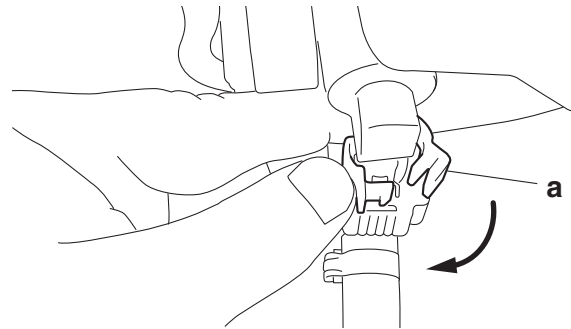
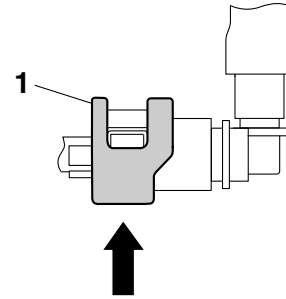
## NOTICE

- Connect the fuel hose securely, and check that the orientation of the installed fuel hose holder is correct.
- Take care not to kink or pinch the fuel hose.

## TIP

- Insert the fuel hose into the fuel pipe securely until you hear a “click”.
- Slide the fuel hose connector cover “1” at the hose end in the direction of the arrow.

- Install the fuel hose connector holder “a”.
- Check that the fuel hose and the fuel pump lead are routed through the guide on the cover.



3. Connect:
    - Fuel pump coupler
  4. Install:
    - Air scoop (left/right)
    - Seat
    - Side cover (left/right)
- Refer to “GENERAL CHASSIS” on page 4-1.

EAM30268

## CHECKING THE FUEL PRESSURE

1. Check:
  - Fuel pressure



- a. Remove the side cover (left/right), the seat and the air scoop (left/right).  
Refer to “GENERAL CHASSIS” on page 4-1.
- b. Remove the fuel tank bolt and lift the fuel tank.
- c. Disconnect the fuel hose from the fuel pump.  
Refer to “REMOVING THE FUEL TANK” on page 7-2.

EWA19380

## WARNING


Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.

ECA24750

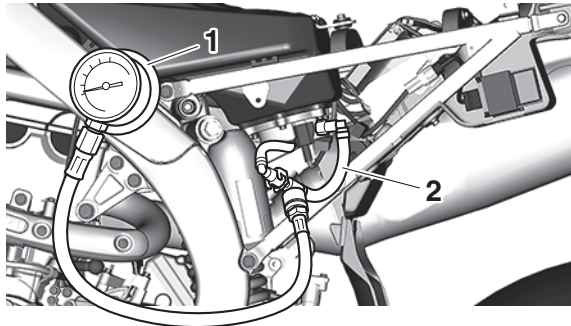
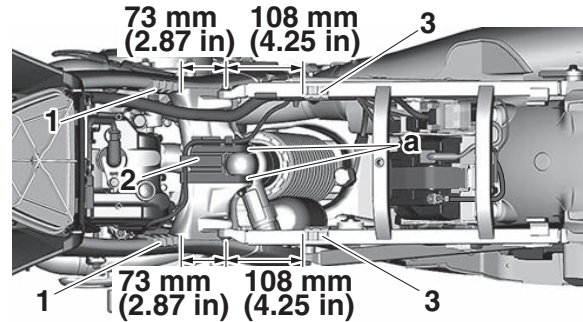
## NOTICE

**Make sure that the fuel hose is disconnected by hand. Do not forcibly disconnect the hose with tools.**


- d. Connect the pressure gauge “1” and the fuel pressure adapter “2” to the fuel hose.



**Pressure gauge**  
**90890-03153**  
**Pressure gauge**  
**YU-03153**  
**Fuel pressure adapter**  
**90890-03186**  
**Fuel pressure adapter**  
**YM-03186**



- e. Start the engine.
- f. Measure the fuel line pressure.  
Out of specification → Replace the fuel pump.



**Fuel line pressure (at idle)**  
**300–390 kPa (3.0–3.9 kgf/cm<sup>2</sup>,**  
**43.5–56.6 psi)**



EAM30269

## CHECKING THE DAMPER

1. Check:
  - Damper 1 “1”
  - Damper 2 “2”
  - Damper 3 “3”
 Wear/damage → Replace.

## TIP

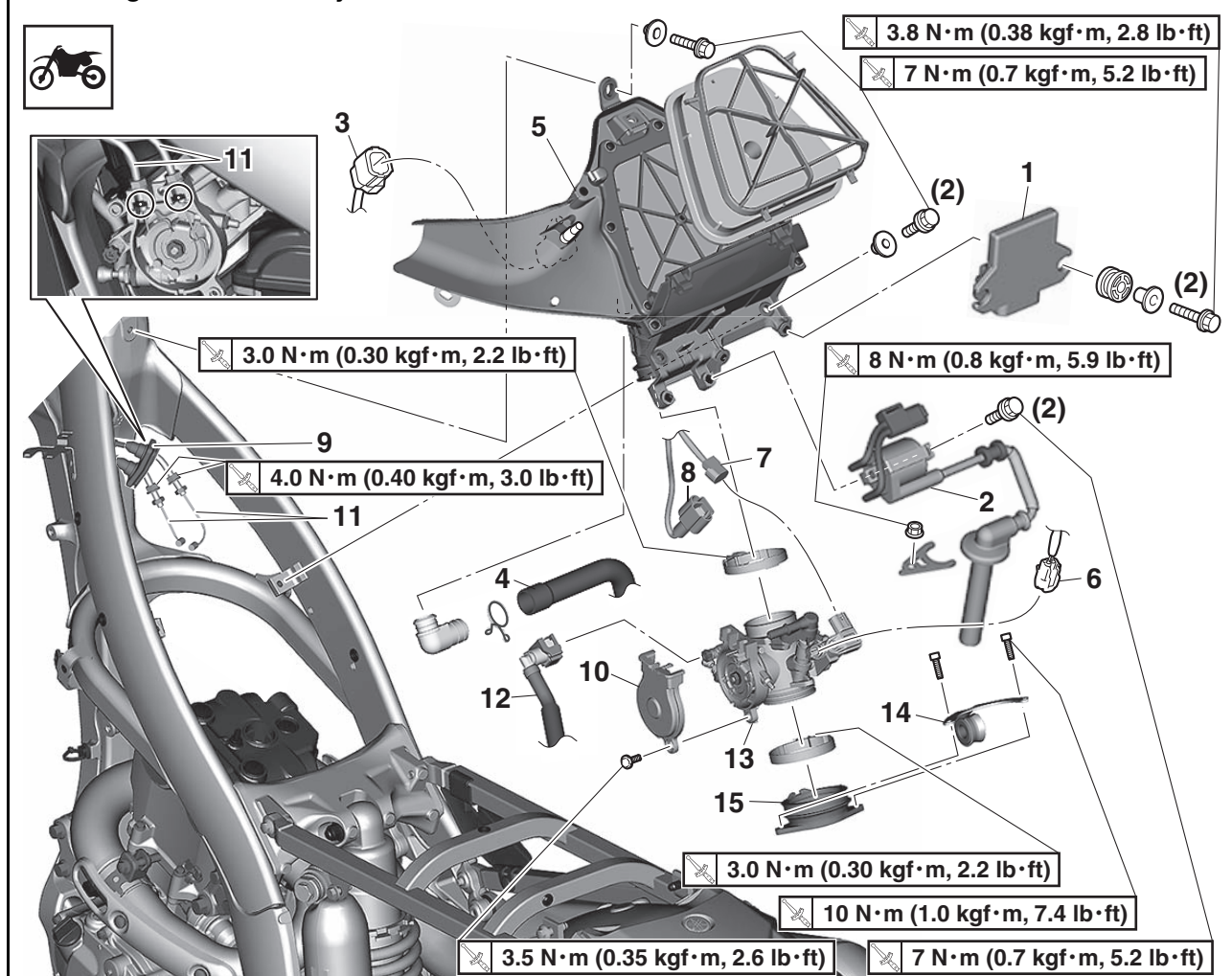
- Affix dampers 1 and 3 with the arrow on each damper pointing outward.
- Affix the damper 2 with its projection “a” facing the rear of the vehicle.



EAM20141

## THROTTLE BODY

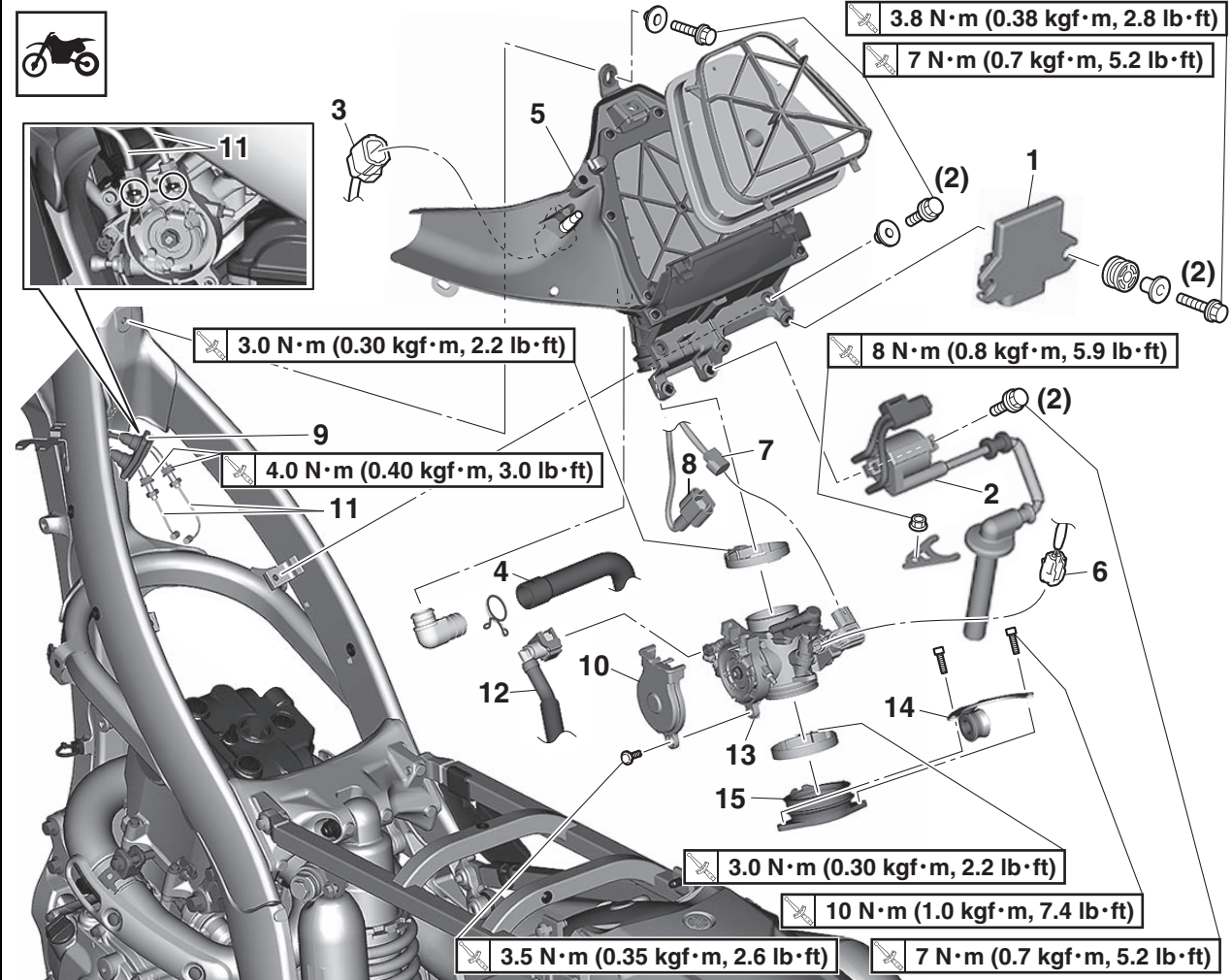
### Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Air filter case cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	ECU	1	
2	Ignition coil	1	
3	Intake air temperature sensor coupler	1	Disconnect.
4	Breather hose	1	
5	Air filter case	1	
6	Fuel injector coupler	1	Disconnect.
7	Intake air pressure sensor coupler	1	Disconnect.
8	Throttle position sensor coupler	1	Disconnect.
9	Cover	1	
10	Throttle cable cover	1	

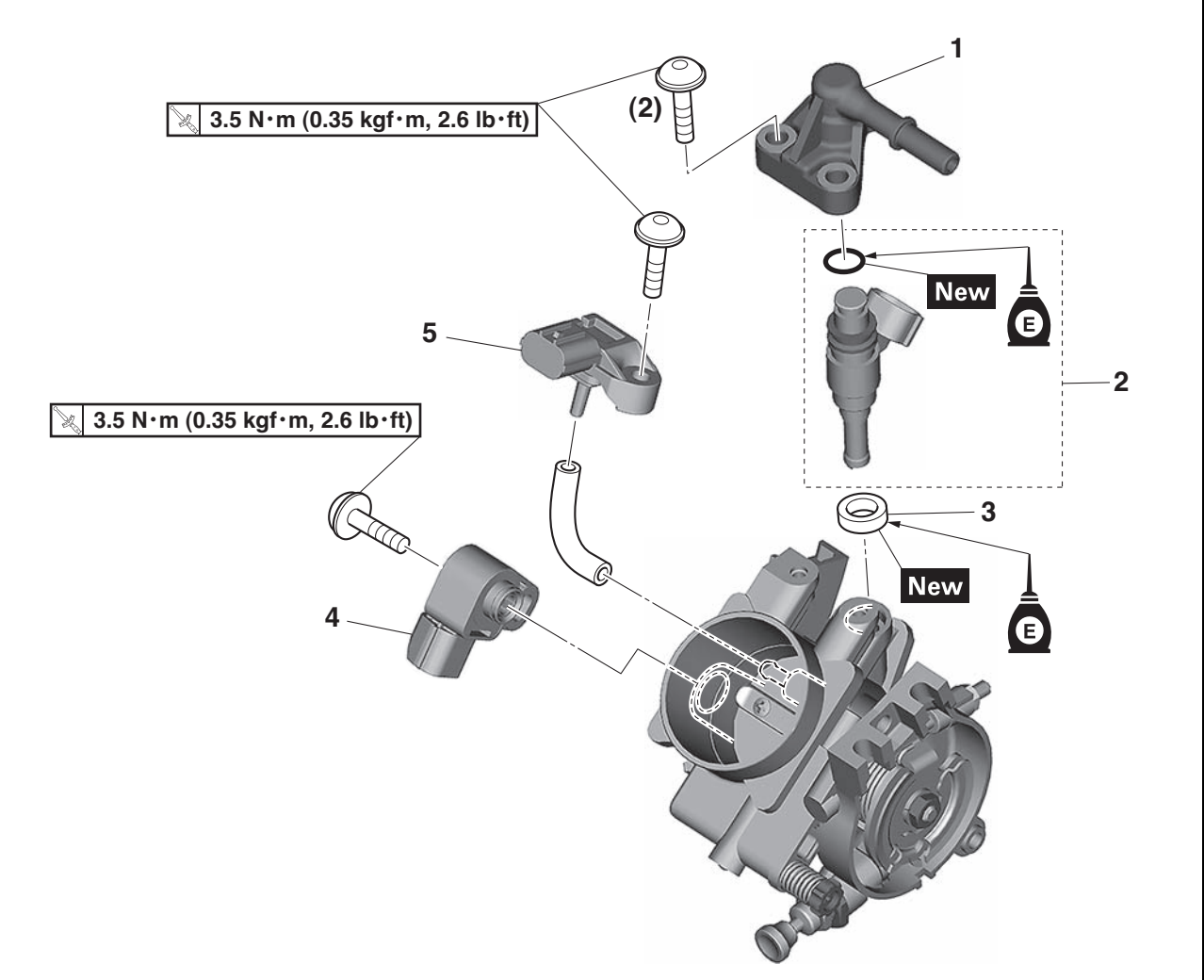


## Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
11	Throttle cable	2	Install the throttle body so that the paint marks on the fixed nuts of the throttle cables face to the outside of the vehicle, and then install the cover.
12	Fuel hose	1	
13	Throttle body	1	
14	Exhaust pipe bracket	1	
15	Throttle body joint	1	

Removing the injector



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel inlet pipe	1	
2	Injector	1	
3	Gasket	1	
4	Throttle position sensor	1	
5	Intake air pressure sensor	1	

EAM30271

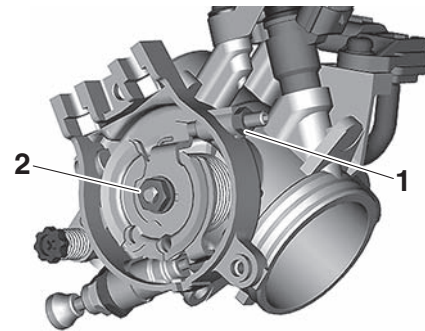
## CHECKING THE INJECTOR

### 1. Check:

- Injectors  
Obstruction → Replace, and check the fuel pump and the fuel injection system.  
Refer to “FUEL INJECTION SYSTEM” on page 8-21.  
Deposits → Replace.  
Damage → Replace.

### 2. Check:

- Injector resistance  
Refer to “CHECKING THE FUEL INJECTOR” on page 8-68.



EAM30272

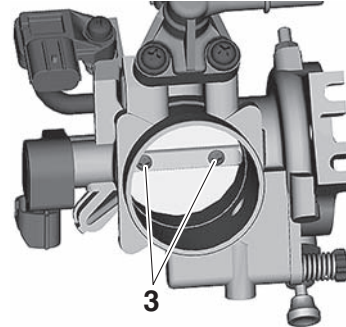
## CHECKING THE THROTTLE BODY

### 1. Check:

- Throttle body  
Cracks/damage → Replace.

### 2. Check:

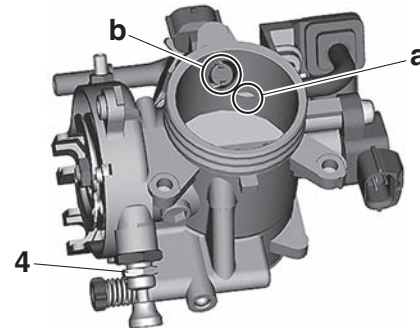
- Fuel passages  
Obstructions → Clean.



ECA26070

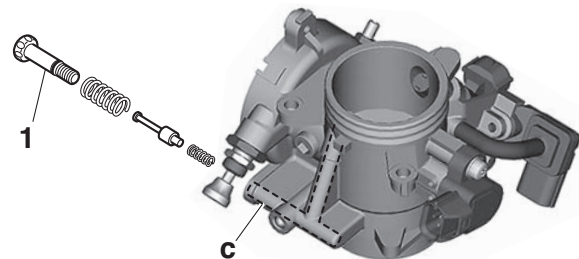
## NOTICE

- Before removing the throttle body, clean the area around the throttle body to prevent dirt and other foreign material from falling into the engine.
- If the throttle body is subject to strong shocks or dropped during cleaning, replace it.
- Do not use any caustic carburetor cleaning solution.
- Do not directly push the throttle valves to open them.
- Do not loosen the throttle valve stopper screw “1”, throttle valve pulley nut “2”, throttle valve screw “3” or starter knob nut “4”. A loss of performance may occur.
- Do not use compressed air to clean the throttle body. Foreign materials may adhere to the intake air pressure sensor passage “a” and fuel injector “b” in the throttle body.



### 3. Check:

- Idle screw “1” passage “c”  
Obstruction → Blow out with compressed air.

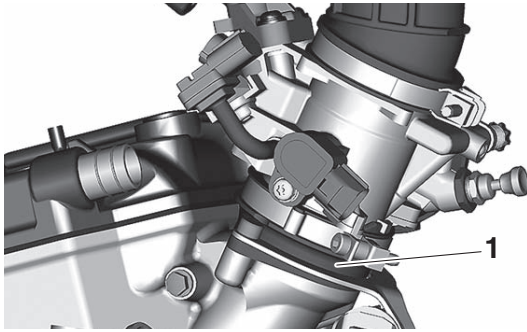


EAM30345

## CHECKING THE THROTTLE BODY JOINT

### 1. Check:

- Throttle body joint “1”  
Crack/damage → Replace.



EAM30273

## ADJUSTING THE THROTTLE POSITION SENSOR

EWA15950

### **WARNING**

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

#### 1. Check:

- Throttle position sensor

Refer to “CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE” on page 8-67.

#### 2. Adjust:

- Throttle position sensor angle

#### a. Connect the Yamaha diagnostic tool.

Refer to “YAMAHA DIAGNOSTIC TOOL” on page 8-25.



**Yamaha diagnostic tool USB (US)**

**90890-03257**

**Yamaha diagnostic tool (A/I)**

**90890-03262**

**FI diagnostic tool sub-lead**

**90890-03212**

**FI diagnostic tool sub-lead**

**YU-03212**

**OBD/ GST Leadwire kit**

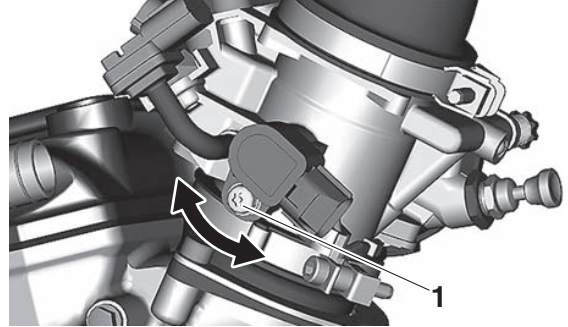
**90890-03249**

- b. Temporary tighten the throttle position sensor.
- c. Check that the throttle grip is fully closed.
- d. Connect the throttle position sensor to the wire harness.
- e. Set the Yamaha diagnostic tool to “diagnostic mode”.
- f. Choose the diagnostic code No. “01”.
- g. Adjust the throttle position sensor mounted angle until “11”–“14” appears on the Yamaha diagnostic tool.

- h. After adjusting the throttle position sensor mounted angle, tighten the throttle position sensor screws “1”.



**Throttle position sensor screw**  
**3.5 N·m (0.35 kgf·m, 2.6 lb·ft)**



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## ELECTRICAL SYSTEM

<b>IGNITION SYSTEM</b> .....	8-1
CIRCUIT DIAGRAM .....	8-1
TROUBLESHOOTING.....	8-3
<b>ELECTRIC STARTING SYSTEM</b> .....	8-5
CIRCUIT DIAGRAM .....	8-5
TROUBLESHOOTING.....	8-7
<b>CHARGING SYSTEM</b> .....	8-9
CIRCUIT DIAGRAM .....	8-9
TROUBLESHOOTING.....	8-11
<b>SIGNALING SYSTEM</b> .....	8-13
CIRCUIT DIAGRAM .....	8-13
TROUBLESHOOTING.....	8-15
<b>COOLING SYSTEM (For JPN)</b> .....	8-17
CIRCUIT DIAGRAM .....	8-17
TROUBLESHOOTING.....	8-19
<b>FUEL INJECTION SYSTEM</b> .....	8-21
CIRCUIT DIAGRAM .....	8-21
ECU SELF-DIAGNOSTIC FUNCTION .....	8-23
TROUBLESHOOTING METHOD .....	8-24
YAMAHA DIAGNOSTIC TOOL .....	8-25
FEATURES OF THE YAMAHA DIAGNOSTIC TOOL .....	8-26
FUNCTIONS OF THE YAMAHA DIAGNOSTIC TOOL .....	8-26
CONNECTING THE YAMAHA DIAGNOSTIC TOOL .....	8-26
TROUBLESHOOTING DETAILS (FAULT CODE).....	8-28
<b>FUEL PUMP SYSTEM</b> .....	8-47
CIRCUIT DIAGRAM .....	8-47
TROUBLESHOOTING.....	8-49
<b>ELECTRICAL COMPONENTS</b> .....	8-51
CHECKING THE SWITCHES.....	8-55
CHECKING THE BULBS AND BULB SOCKETS.....	8-58
CHECKING THE FUSES.....	8-58
CHECKING AND CHARGING THE BATTERY .....	8-59
CHECKING THE RELAYS .....	8-61
CHECKING THE DIODE .....	8-61
CHECKING THE IGNITION SPARK GAP .....	8-62
CHECKING THE SPARK PLUG CAP .....	8-62
CHECKING THE IGNITION COIL .....	8-63
CHECKING THE CRANKSHAFT POSITION SENSOR.....	8-63
CHECKING THE ECU .....	8-64

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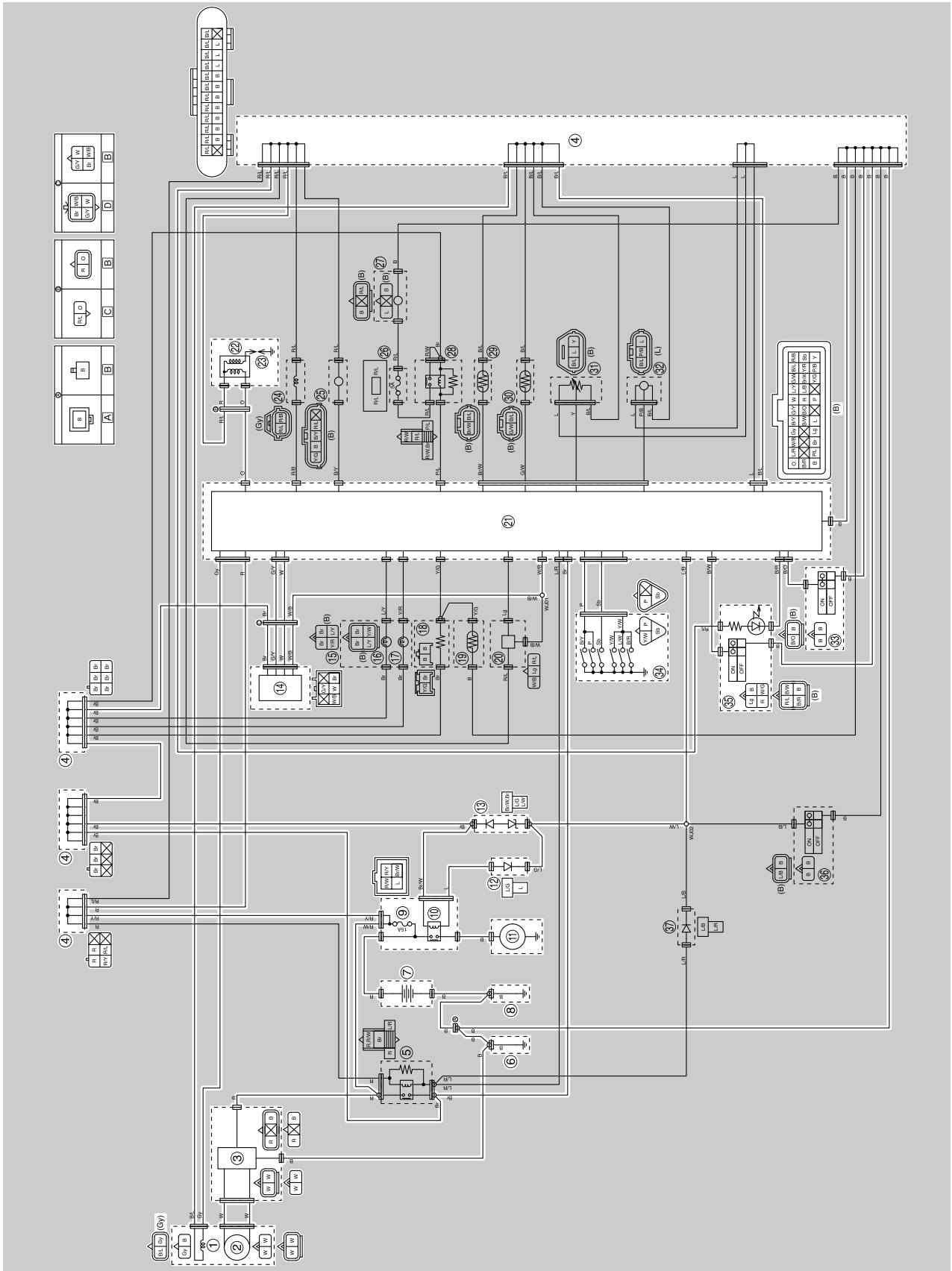
CHECKING THE STARTER MOTOR OPERATION .....	8-64
CHECKING THE STATOR COIL.....	8-64
CHECKING THE RECTIFIER/REGULATOR .....	8-65
CHECKING THE FUEL SENDER .....	8-65
CHECKING THE RESISTOR .....	8-65
CHECKING THE RADIATOR FAN MOTOR (For JPN).....	8-66
CHECKING THE COOLANT TEMPERATURE SENSOR.....	8-66
CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE...	8-67
CHECKING THE INTAKE AIR TEMPERATURE SENSOR .....	8-67
CHECKING THE GEAR POSITION SWITCH .....	8-68
CHECKING THE FUEL INJECTOR .....	8-68

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EAM20142  
IGNITION SYSTEM

EAM30277  
CIRCUIT DIAGRAM



1. Crankshaft position sensor
  2. AC magneto
  3. Rectifier/regulator
  4. Joint connector
  6. Engine ground
  7. Battery
  8. Frame ground
  9. Main fuse
  10. Starter relay
  11. Starter motor
  12. Diode 1
  13. Diode 2
  14. CCU (Communication Control Unit)
  21. ECU (Engine Control Unit)
  22. Ignition coil
  23. Spark plug
  33. Engine stop switch
  34. Gear position switch
  35. Mode switch
- 
- A. Battery sub-lead
  - B. Wire harness
  - C. Ignition coil sub-lead
  - D. CCU sub-lead

EAM30278

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### TIP

Before troubleshooting, remove the following part(s):

1. Side cover (left/right)
2. Seat
3. Fuel tank
4. Air scoop (left/right)
5. Air filter case cover

1. Check the ignition system wire harness connections.	NG→	Reconnect.
OK↓		
2. Check the fuse(s). Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	NG→	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK↓		
4. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-36.	NG→	Correct or replace the spark plug.
OK↓		
5. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-62.	OK→	The ignition system circuit is OK.
NG↓		
6. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 8-63.	NG→	Replace the ignition coil.
OK↓		
7. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-55.	NG→	Replace the engine stop switch.
OK↓		
8. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-63.	NG→	Replace the crankshaft position sensor.
OK↓		

9. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-64.	NG→	Replace the stator coil.
OK↓		
10. Check the ignition system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

The mode switch to blink.

## TIP

Before troubleshooting, remove the following part(s):

1. Seat
2. Air scoop (left)

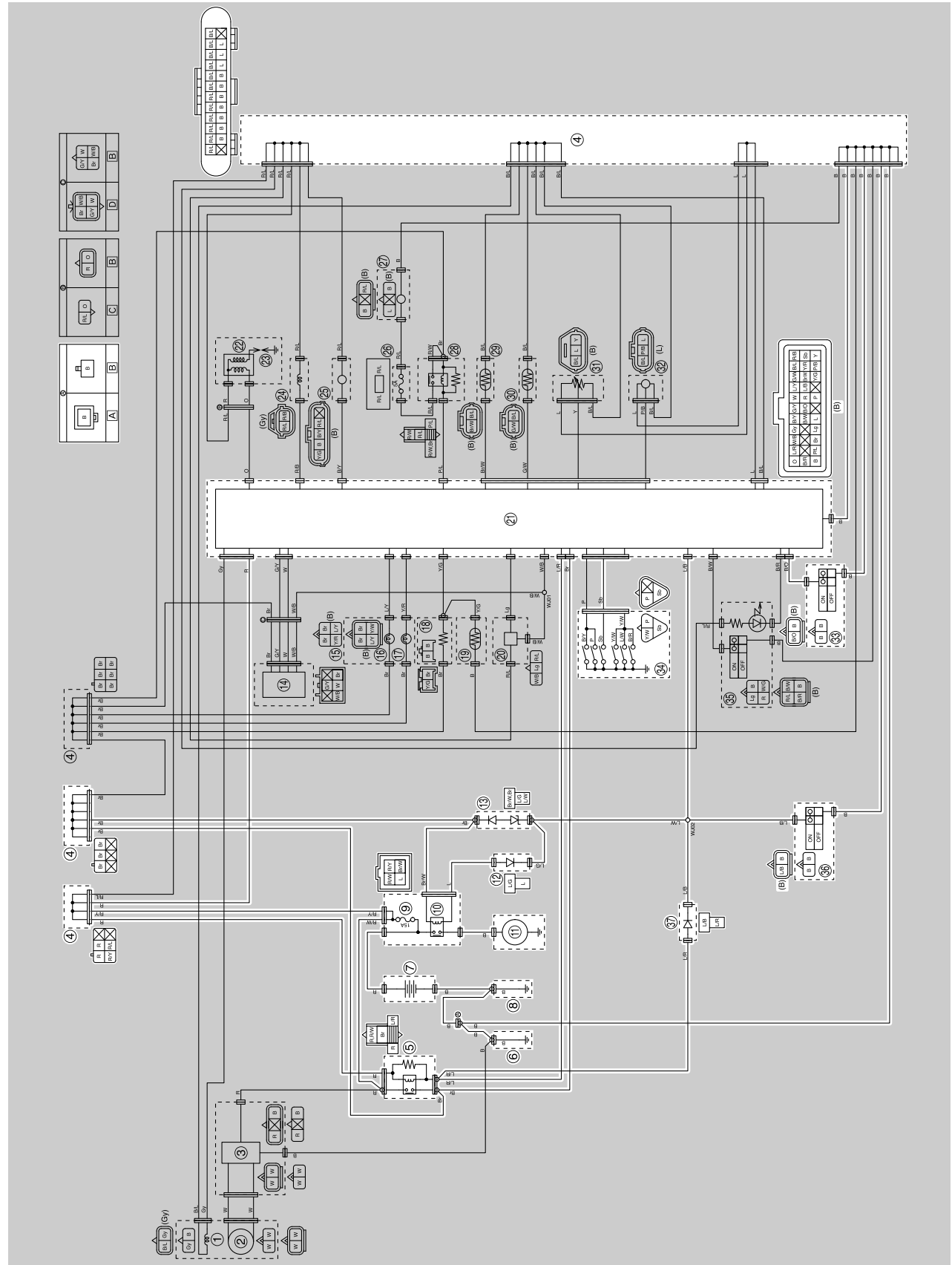
1. Check the mode switch coupler connections.	NG→	Reconnect.
OK↓		
2. Check the mode switch. Refer to "CHECKING THE SWITCHES" on page 8-55.	NG→	Replace the mode switch.
OK↓		
3. Check the ignition system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

EAM20143

ELECTRIC STARTING SYSTEM

EAM30279

CIRCUIT DIAGRAM



- 4. Joint connector
- 5. Main relay
- 6. Engine ground
- 7. Battery
- 8. Frame ground
- 9. Main fuse
- 10. Starter relay
- 11. Starter motor
- 12. Diode 1
- 13. Diode 2
- 21. ECU (Engine Control Unit)
- 33. Engine stop switch
- 34. Gear position switch
- 36. Start switch
- 37. Diode 3
  
- A. Battery sub-lead
- B. Wire harness

EAM30281

## TROUBLESHOOTING

The starter motor fails to turn.

### TIP

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank
5. Air filter case cover

1. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	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 relay. Refer to "CHECKING THE RELAYS" on page 8-61.	NG→	Replace the main relay.
OK↓		
4. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-64.	OK→	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step (6).
NG↓		
5. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-38.	NG→	Repair or replace the starter motor.
OK↓		
6. Check the diodes. (Diode 1, diode 2, diode 3) Refer to "CHECKING THE DIODE" on page 8-61.	NG→	Replace the diodes.
OK↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-61.	NG→	Replace the starter relay.
OK↓		
8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-55.	NG→	Replace the engine stop switch.
OK↓		



# ELECTRIC STARTING SYSTEM

9. Check the start switch.  
Refer to “CHECKING THE SWITCHES” on page 8-55.

NG→

Replace the start switch.

OK↓

10. Check the entire starting system’s wiring.  
Refer to “CIRCUIT DIAGRAM” on page 8-5.

NG→

Properly connect or repair the starting system’s wiring.

OK↓

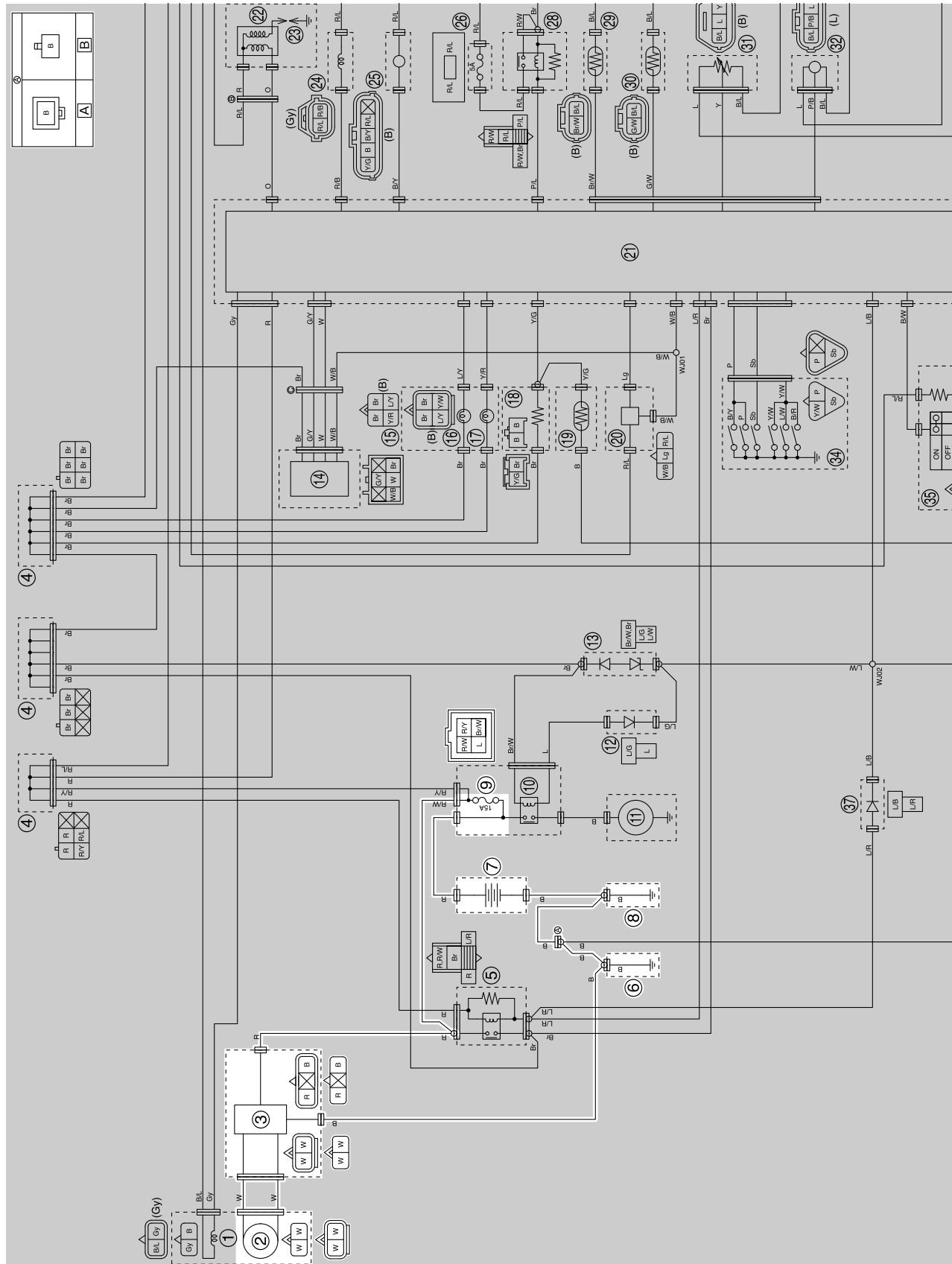
Replace the ECU.

EAM20144

## CHARGING SYSTEM

EAM30282

## CIRCUIT DIAGRAM



- 2. AC magneto
- 3. Rectifier/regulator
- 6. Engine ground
- 7. Battery
- 8. Frame ground
- 9. Main fuse
  
- A. Battery sub-lead
- B. Wire harness

EAM30283

## TROUBLESHOOTING

The battery is not being charged.

### TIP

Before troubleshooting, remove the following part(s):

1. Seat
2. Air scoop (left)

1. Check the entire charging system's wiring.	NG→	Reconnect.
OK↓		
2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	NG→	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-65.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-64.	NG→	Replace the stator coil.
OK↓		
6. Check the charging system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-9.	NG→	Repair or replace the wire harness.
OK↓		
This circuit is OK.		

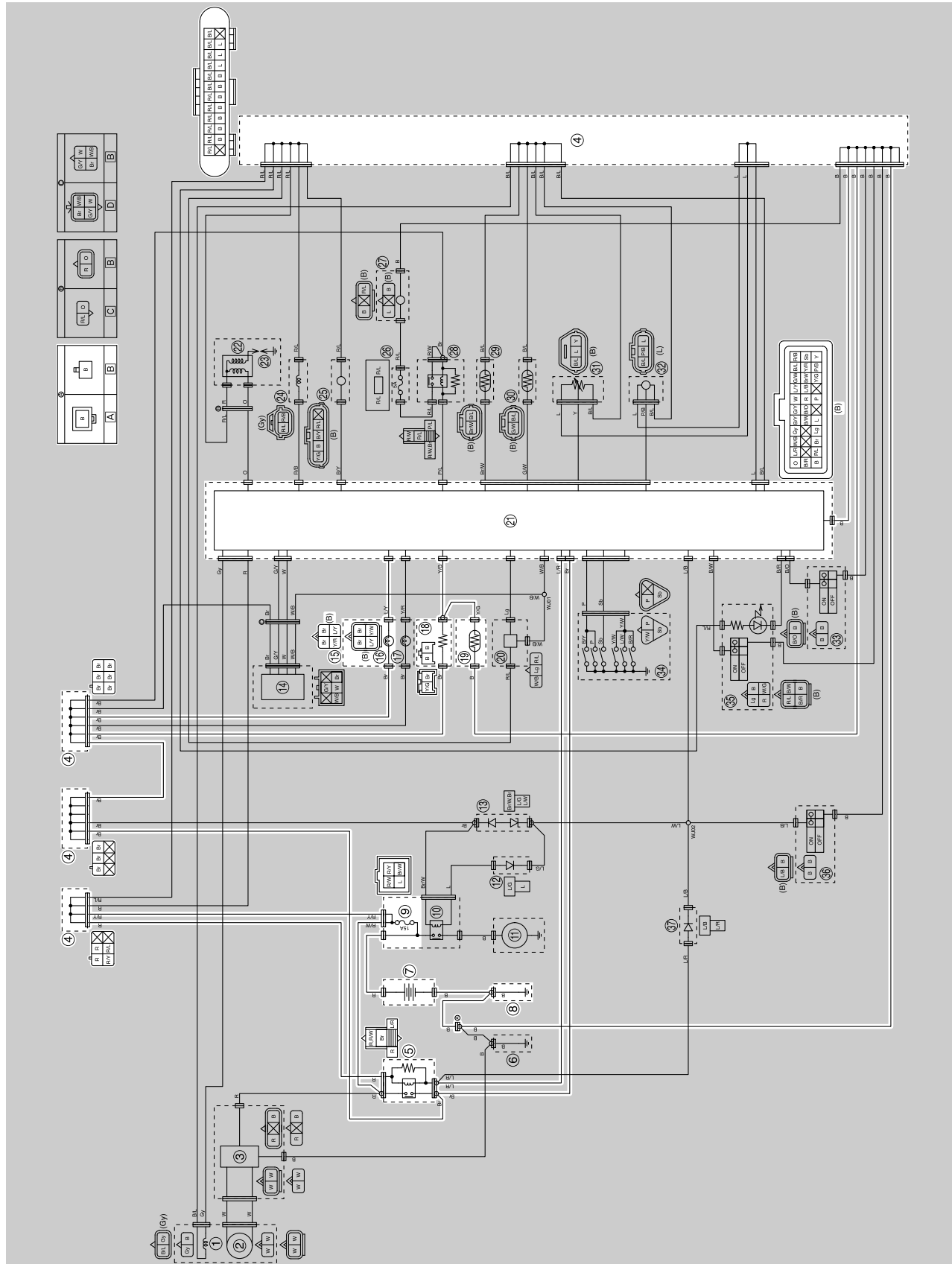


EAM20154

## SIGNALING SYSTEM

EAM30348

## CIRCUIT DIAGRAM



- 4. Joint connector
- 5. Main relay
- 7. Battery
- 8. Frame ground
- 9. Main fuse
- 15. Warning light
- 16. Fuel level warning light
- 18. Resistor
- 19. Fuel sender
- 21. ECU (Engine Control Unit)
  
- A. Battery sub-lead
- B. Wire harness

EAM30349

## TROUBLESHOOTING

- The fuel level warning light does not come on.

### TIP

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	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 relay. Refer to "CHECKING THE RELAYS" on page 8-61.	NG→	Replace the main relay.
OK↓		
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-13.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

### Check the signaling system

The fuel level warning light fails to come on.

1. Check the fuel level warning light bulb and socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-58.	NG→	Replace the fuel level warning light bulb, socket or both.
OK↓		
2. Check the fuel sender. Refer to "CHECKING THE FUEL SENDER" on page 8-65.	NG→	Replace the fuel pump assembly.
OK↓		
3. Check the resistor. Refer to "CHECKING THE RESISTOR" on page 8-65.	NG→	Replace the resistor.
OK↓		



4. Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-13.

OK↓

Replace the ECU.

NG→

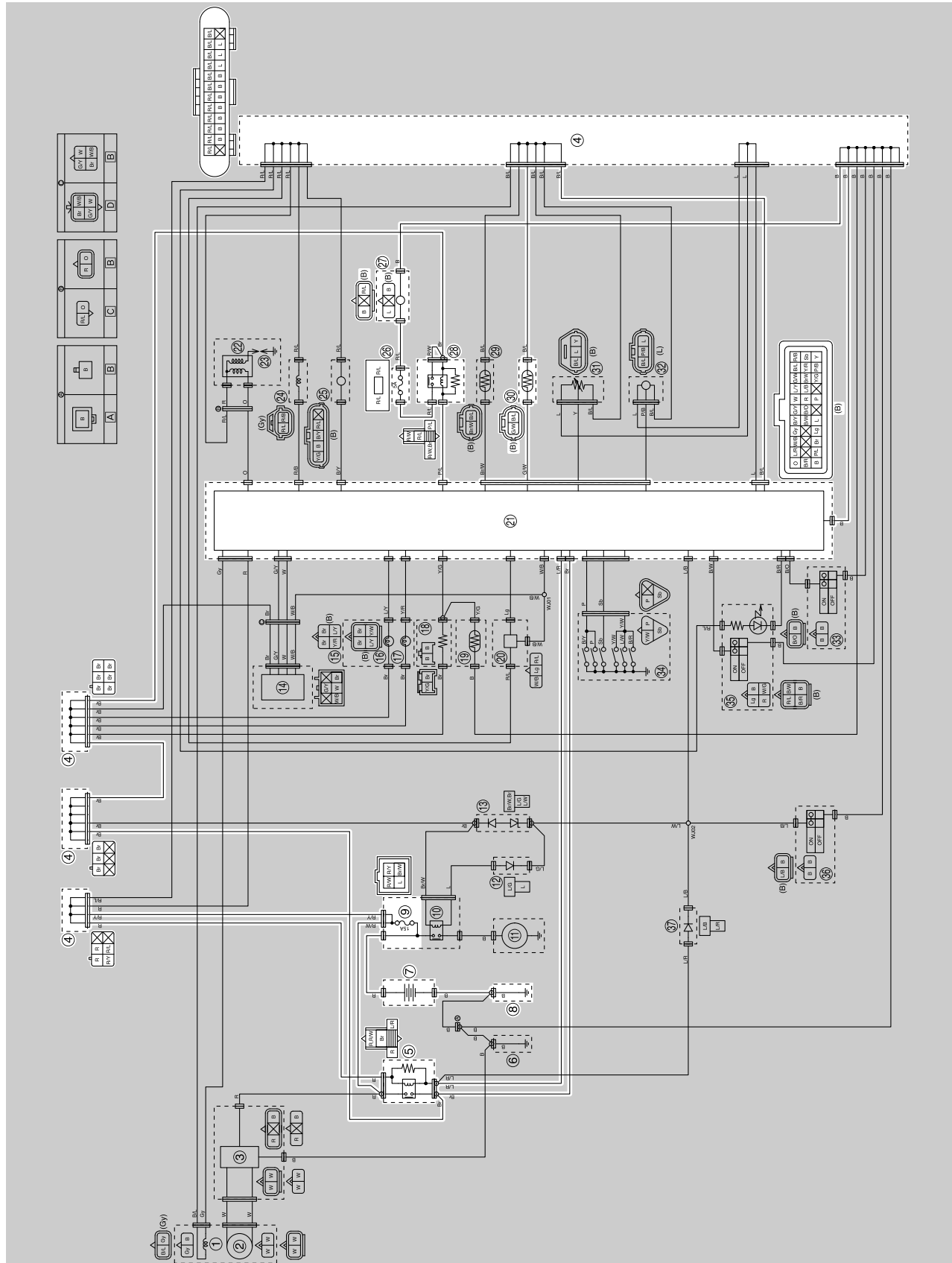
Properly connect or repair the signaling system's wiring.

EAM20155

## COOLING SYSTEM (For JPN)

EAM30350

### CIRCUIT DIAGRAM



- 4. Joint connector
- 5. Main relay
- 7. Battery
- 8. Frame ground
- 9. Main fuse
- 21. ECU (Engine Control Unit)
- 26. Radiator fan motor fuse
- 27. Radiator fan motor
- 28. Radiator fan motor relay
- 30. Coolant temperature sensor

EAM30351

## TROUBLESHOOTING

The radiator fan motor fails to turn.

### TIP

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left)
3. Air scoop (left/right)
4. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	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 relay. Refer to "CHECKING THE RELAYS" on page 8-61.	NG→	Replace the main relay.
OK↓		
4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR (For JPN)" on page 8-66.	NG→	Replace the radiator fan motor.
OK↓		
5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-61.	NG→	Replace the radiator fan motor relay.
OK↓		
6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-66.	NG→	Replace the coolant temperature sensor.
OK↓		
7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-17.	NG→	Properly connect or repair the cooling system's wiring.
OK↓		
Replace the ECU.		

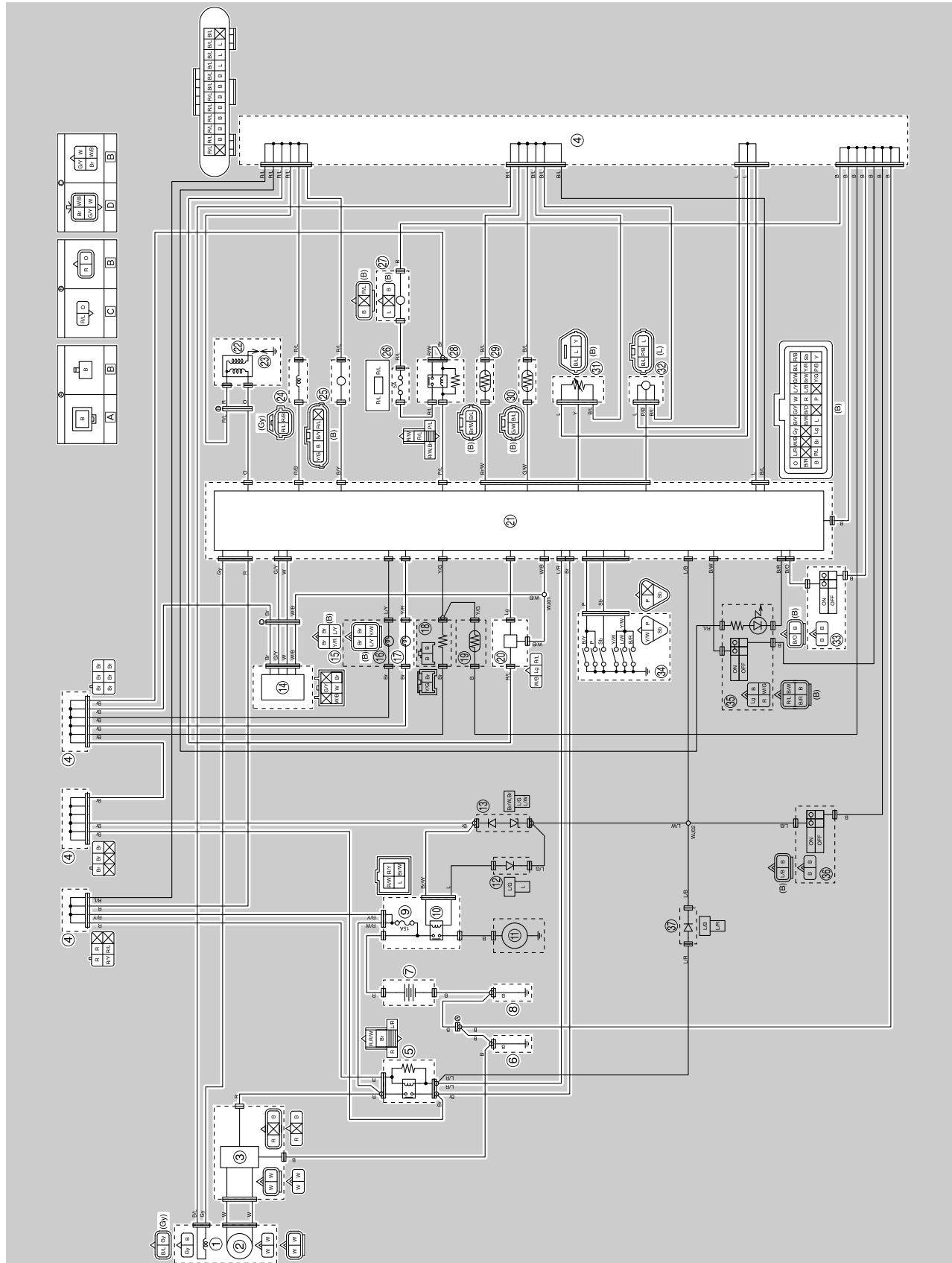


EAM20145

## FUEL INJECTION SYSTEM

EAM30284

### CIRCUIT DIAGRAM



1. Crankshaft position sensor
  2. AC magneto
  3. Rectifier/regulator
  4. Joint connector
  5. Main relay
  6. Engine ground
  7. Battery
  8. Frame ground
  9. Main fuse
  10. Starter relay
  14. CCU (Communication Control Unit)
  15. Warning light
  17. Engine trouble warning light
  20. Yamaha diagnostic tool coupler
  21. ECU (Engine Control Unit)
  22. Ignition coil
  23. Spark plug
  24. Fuel injector
  25. Fuel pump
  26. Radiator fan motor fuse
  27. Radiator fan motor (For JPN)
  28. Radiator fan motor relay
  29. Intake air temperature sensor
  30. Coolant temperature sensor
  31. Throttle position sensor
  32. Intake air pressure sensor
  33. Engine stop switch
  34. Gear position switch
- 
- A. Battery sub-lead
  - B. Wire harness
  - C. Ignition coil sub-lead
  - D. CCU sub-lead

EAM30352

## 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.

### Engine trouble warning light indication and fuel injection system operation

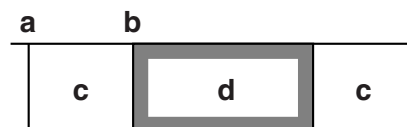
Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

\* The engine trouble warning light flashes when any one of the following conditions is present and the start switch is pushed:

- |     |   |     |  |
|-----|---|-----|--|
| 12: | Crankshaft position sensor  | 41: | Lean angle sensor (open or short circuit)    |
| 30: | Lean angle sensor (latch up detected)   | 50: | ECU internal malfunction (faulty ECU memory) |
| 33: | Ignition coil (Malfunction detected in the primary wire of the ignition coil) |     |  |

### Checking the engine trouble warning light

The engine trouble warning light comes on for around 2 seconds when pushing the start switch to turn on the engine. The engine trouble warning light comes on while the start switch is being pushed.



- Start switch is not being pushed.
- Start switch is being pushed.
- Engine trouble warning light goes off
- Engine trouble warning light comes on for around 2 seconds



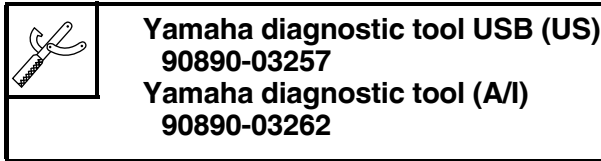


EAM30285

## YAMAHA DIAGNOSTIC TOOL

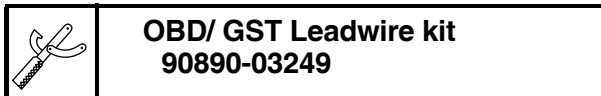
This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



### TIP

A generic scan tool can also be used to identify malfunctions.



### Features of the Yamaha diagnostic tool

You can use the Yamaha diagnostic tool to identify malfunctions quicker than with conventional methods.

By connecting the adapter interface, which is connected to the USB port of a computer, to a vehicle's ECU using the communication cable, you can display information that is necessary for identifying malfunctions and for maintenance to display on the computer. The displayed information includes the sensor output data and information recorded in the ECU.

### Functions of the Yamaha diagnostic tool

Diagnosis of malfunction:	Fault codes recorded on the ECU are read, and the contents are displayed. The freeze frame data (FFD) is the operation data when a malfunction was detected. This data can be used to identify when the malfunction occurred and check the engine conditions and running conditions when it occurred.
Diagnosis of function:	Check the operation of the output value of each sensor and actuator.
Dynamic inspection:	Check the electric component condition automatically.
Active test:	Manually adjust injection duration and/or switch some actuators for troubleshooting.
Maintenance record:	Store the inspection history into the Yamaha diagnostic tool application.
Recall search:	Search the recall campaign information.
Monitoring:	Displays a graph of sensor output values for actual operating conditions.
Logging:	Records and saves the sensor output value in actual driving conditions.
CO adjustment:	Adjust the concentration of CO admissions during idling.
Reprogram ECU:	If necessary, the ECU is rewritten using ECU rewrite data provided by Yamaha. Ignition timing adjustment, etc. cannot be changed from the vehicle's original state.
Writing VIN/frame number:	Write the VIN/frame number in the ECU.
View logs:	Displays the logging data.

However, the Yamaha diagnostic tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

EAM30354

## FEATURES OF THE YAMAHA DIAGNOSTIC TOOL

A diagnosis can be made more quickly than traditional methods with the Yamaha diagnostic tool. Using this software, ECU and sensor data, as well as fault diagnosis, vehicle maintenance, and any necessary information can be recorded and displayed on your computer screen through a USB adapter connected to the computer interface with a communication cable connected to the vehicle's ECU. Data obtained in various functions can be saved as vehicle history, and can be accumulated.

EAM30355

## FUNCTIONS OF THE YAMAHA DIAGNOSTIC TOOL

Fault diagnosis mode	Fault codes recorded on the ECU are read, and the contents are displayed.
Function diagnostic mode	Check the operation of the output value of each sensor and actuator.
Inspection mode	Determine whether each sensor or actuator is functioning properly.
CO adjustment mode	Adjust the concentration of CO admissions during idling.
Monitoring mode	Displays a graph of sensor output values for actual operating conditions.
Logging mode	Records and saves the sensor output value in actual driving conditions.
View log	Displays the logging data.
ECU rewrite	If necessary, the ECU is rewritten using the ECU rewrite data provided by Yamaha. Ignition timing adjustment, etc. cannot be changed from the vehicle's original state.

However, the diagnostic tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

EAM30356

## CONNECTING THE YAMAHA DIAGNOSTIC TOOL

1. Remove the coupler for connecting setting tool.



2. Connect the FI diagnostic tool sub-lead.



**FI diagnostic tool sub-lead  
90890-03212  
FI diagnostic tool sub-lead  
YU-03212**

3. Connect the FI diagnostic tool sub-lead to the Yamaha diagnostic tool.

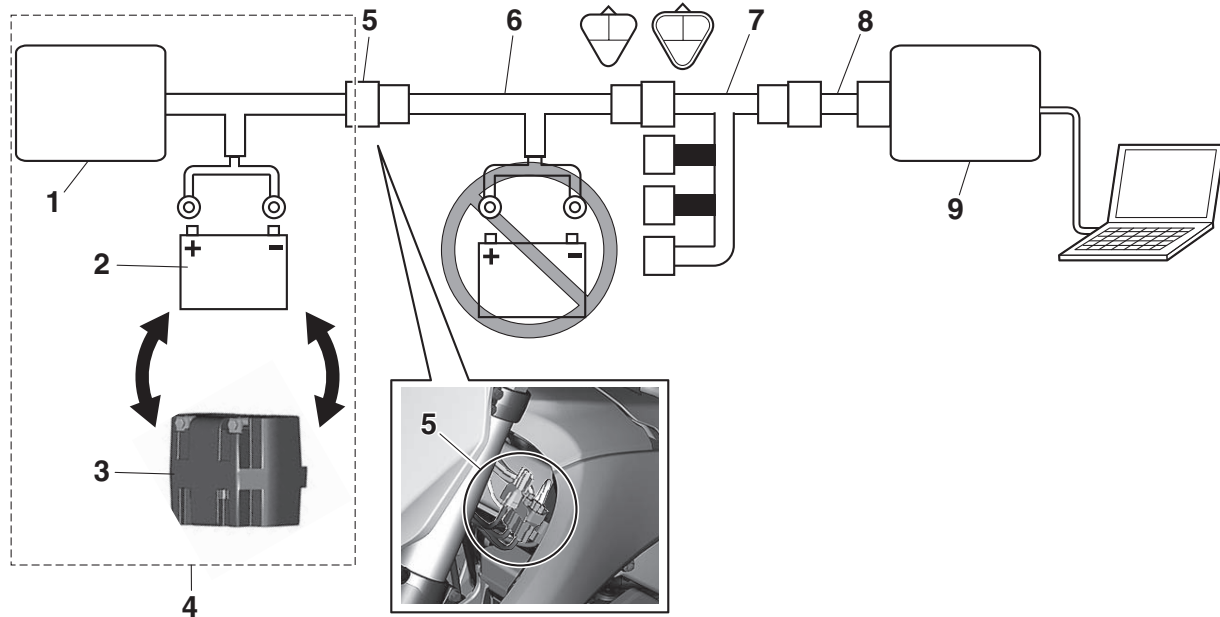
EWA20450



**Never connect the sub-lead (special tool) to the battery. Otherwise, because of excessive current flow, the sub-lead can catch fire and the battery could be damaged.**

## TIP

- Prepare the fully charged 12 V lead battery for yourself.
- Replace the vehicle battery with a lead battery (12 V).
- For information on how to connect and use the Yamaha diagnostic tool, refer to “YAMAHA DIAGNOSTIC TOOL OPERATION MANUAL”.



1. ECU (Engine Control Unit)
2. Lead battery (12 V)
3. Vehicle battery
4. Vehicle
5. Coupler for connecting optional part
6. FI diagnostic tool sub-lead
7. Sub-harness (included with the Yamaha diagnostic tool)
8. Vehicle communication cable (included with the Yamaha diagnostic tool)
9. Yamaha diagnostic tool

EAM30286

## TROUBLESHOOTING DETAILS (FAULT CODE)

This section describes the measures per fault code number displayed on the Yamaha diagnostic tool. 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, delete the fault codes displayed on the Yamaha diagnostic tool according to the reinstatement method.

Fault code No.:

Fault code number displayed on the Yamaha diagnostic tool when the engine failed to work normally.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SENSOR OPERATION TABLE" on page 9-5.

### Parts connected to the ECU

The following parts are connected to the ECU.

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Fuel injector
- Ignition coil
- Throttle position sensor
- Intake air pressure sensor
- Coolant temperature sensor
- Intake air temperature sensor

### Fault code No. 12

<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>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Diagnostic tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of crankshaft position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.

# 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>	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between the crankshaft position sensor coupler and ECU coupler. gray-gray black/blue-black/blue	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.
4	Mounted condition of crankshaft position sensor. Check for looseness or pinching. Check the gap between the crankshaft position sensor and the pickup rotor.	Improperly mounted sensor → Remount or replace the sensor. Refer to "AC MAGNETO" on page 5-57.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-63.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6.
6	Faulty ECU.	Replace the ECU.	Service is finished.
7	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 13

### TIP

If fault code numbers 13 and 14 are both displayed, perform checkup and repair jobs for fault code number 13 first.

<b>Fault code No.</b>		<b>13</b>	
<b>Item</b>		<b>Intake air pressure sensor: open or short circuit detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		03	
<b>Diagnostic tool display</b>		Displays the intake air pressure.	
<b>Procedure</b>		The atmospheric pressure is displayed on the Yamaha diagnostic tool.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

# FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
1	Connection of intake air pressure sensor coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air pressure sensor coupler and ECU coupler. pink/black–pink/black blue–blue black/blue–black/blue	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.
4	Mounted condition of intake air pressure sensor. Check for looseness or pinching. Check the mounted position for correctness.	Improperly mounted sensor → Remount or replace the sensor.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.
5	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: About 101 kPa (about 3.63 V) 1000 m above sea level: About 90 kPa (about 3.30 V) 2000 m above sea level: About 80 kPa (about 3.00 V) 3000 m above sea level: About 70 kPa (about 2.70 V)	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6.
6	Faulty ECU.	Replace the ECU.	Service is finished.
7	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 14

### TIP

If fault code numbers 13 and 14 are both displayed, perform checkup and repair jobs for fault code number 13 first.

<b>Fault code No.</b>		<b>14</b>	
<b>Item</b>		<b>Intake air pressure sensor: hose system malfunction (clogged or detached hose).</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		03	
<b>Diagnostic tool display</b>		Displays the intake air pressure.	
<b>Procedure</b>		The atmospheric pressure is displayed on the Yamaha diagnostic tool.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	The intake air pressure sensor hose is damaged, disconnected, clogged, twisted or bent.	Repair or replace the sensor hose.	Start the engine and let it idle for approximately 5 seconds (fully close the throttle valve). Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 3 and finish the service. Condition is "Detected" → Go to item 2.
2	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: About 101 kPa (about 3.63 V) 1000 m above sea level: About 90 kPa (about 3.30 V) 2000 m above sea level: About 80 kPa (about 3.00 V) 3000 m above sea level: About 70 kPa (about 2.70 V)	Service is finished.
3	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	



## Fault code No. 15

### TIP

If fault code numbers 15 and 16 are both displayed, perform checkup and repair jobs for fault code number 15 first.

<b>Fault code No.</b>		<b>15</b>	
<b>Item</b>		<b>Throttle position sensor: open or short circuit detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		01	
<b>Diagnostic tool display</b>		Displays the throttle angle. • 11–14 (throttle in fully closed position) • 86–92 (throttle in fully opened position)	
<b>Procedure</b>		• Check with throttle fully closed. • Check with throttle fully opened.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of throttle position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 2.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle position sensor coupler and ECU coupler. yellow–yellow blue–blue black/blue–black/blue	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 4.
4	Mounted condition of throttle position sensor. Check for looseness or pinching. Check the mounted position for correctness.	Improperly mounted sensor → Remount or replace the sensor. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-9.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 5.

# FUEL INJECTION SYSTEM

Fault code No.		15		
Item		Throttle position sensor: open or short circuit detected.		
5	Applied voltage of throttle position sensor lead.	Check the applied voltage. (black/blue–blue)		Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 6.
		Location of disconnected lead	Output voltage	
		Disconnected ground lead	5 V	
		Disconnected output lead	0 V	
		Disconnected power supply lead	0 V	
6	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. 01) When the throttle is fully closed, 11–14 displays. When the throttle is fully opened, 86–92 displays. Incorrect display range → Replace the throttle position sensor.		Disconnect the starter relay lead (to the starter motor), and then push the starter switch. Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 7.
7	Faulty ECU.	Replace the ECU.		Service is finished.
8	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.		

## Fault code No. 16

### TIP

If fault code numbers 15 and 16 are both displayed, perform checkup and repair jobs for fault code number 15 first.

<b>Fault code No.</b>		<b>16</b>	
<b>Item</b>		<b>Throttle position sensor: stuck throttle position sensor is detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		01	
<b>Diagnostic tool display</b>		Displays the throttle angle. • 11–14 (throttle in fully closed position) • 86–92 (throttle in fully opened position)	
<b>Procedure</b>		<ul style="list-style-type: none"> <li>• Check with throttle fully closed.</li> <li>• Check with throttle fully opened.</li> </ul>	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>		<b>16</b>	
<b>Item</b>		<b>Throttle position sensor: stuck throttle position sensor is detected.</b>	
1	Mounted condition of throttle position sensor. Check for looseness or pinching. Check the mounted condition for correctness.	Improperly mounted sensor → Remount or replace the sensor. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-9.	Start switch to ON (main relay ON) and open and close the throttle several times. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 4 and finish the service. Condition is “Detected” → Go to item 2.
2	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. 01) When the throttle is fully closed, 11–14 displays. When the throttle is fully opened, 86–92 displays. Incorrect display range → Replace the throttle position sensor.	Start switch to ON (main relay ON) and open and close the throttle several times. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 4 and finish the service. Condition is “Detected” → Go to item 3.
3	Faulty ECU.	Replace the ECU.	Service is finished.
4	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 21

### TIP

Make sure that the machine is completely cold before checking the coolant temperature sensor.

<b>Fault code No.</b>		<b>21</b>	
<b>Item</b>		<b>Coolant temperature sensor: open or short circuit detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		06	
<b>Diagnostic tool display</b>		Displays the coolant temperature.	
<b>Procedure</b>		Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of coolant temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 7 and finish the service. Condition is “Detected” → Go to item 2.

# FUEL INJECTION SYSTEM

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between coolant temperature sensor coupler and ECU coupler. green/white–green/white black/blue–black/blue	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.
4	Mounted condition of coolant temperature sensor. Check for looseness or pinching. Check the mounted position for correctness.	Improperly mounted sensor → Remount or replace the sensor.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When the machine is cold, displayed temperature is close to the ambient temperature. Improper display → Replace the coolant temperature sensor.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6.
6	Faulty ECU.	Replace the ECU.	Service is finished.
7	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 22

### TIP

Make sure that the machine is completely cold before checking the intake air temperature sensor.

<b>Fault code No.</b>		<b>22</b>	
<b>Item</b>		<b>Intake air temperature sensor: open or short circuit detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		05	
<b>Diagnostic tool display</b>		Displays the intake air temperature.	
<b>Procedure</b>		Compare the actually measured intake air temperature with the Yamaha diagnostic tool display value.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 2.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air temperature sensor coupler and ECU coupler. brown/white–brown/white black/blue–black/blue	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 4.
4	Mounted condition of intake air temperature sensor. Check for looseness or pinching. Check the mounted position for correctness.	Improperly mounted sensor → Remount or replace the sensor.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 5.

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>		<b>22</b>	
<b>Item</b>		<b>Intake air temperature sensor: open or short circuit detected.</b>	
5	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. 05) When the machine is cold, displayed temperature is close to the ambient temperature. Improper display → Replace the intake air temperature sensor.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 7 and finish the service. Condition is "Detected" → Go to item 6.
6	Faulty ECU.	Replace the ECU.	Service is finished.
7	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 30

<b>Fault code No.</b>		<b>30</b>	
<b>Item</b>		<b>The vehicle has overturned.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		08	
<b>Diagnostic tool display</b>		Displays the lean angle sensor output voltage. • 0.4–1.4 (V) (upright) • 3.7–4.4 (V) (overturned)	
<b>Procedure</b>		Remove the ECU, and incline it 45° or more.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	The vehicle has overturned.	Raise the vehicle upright.	Start switch to ON (main relay ON), wait 10 seconds, then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 4 and finish the service. Condition is "Detected" → Go to item 2.
2	Mounted condition of ECU. Check for looseness or pinching. Check the mounted condition for correctness.	Improperly mounted ECU → Remount the ECU.	Start switch to ON (main relay ON), wait 10 seconds, then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 4 and finish the service. Condition is "Detected" → Go to item 3.

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>		<b>30</b>	
<b>Item</b>		<b>The vehicle has overturned.</b>	
3	Faulty ECU.	Execute the diagnostic mode. (Code No. 08) When the vehicle is upright: 0.4–1.4 (V) When the vehicle is overturned: 3.7–4.4 (V) Improper display → Replace the ECU.	Service is finished.
4	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 33

<b>Fault code No.</b>		<b>33</b>	
<b>Item</b>		<b>Ignition coil: open or short circuit detected in the primary lead of the ignition coil.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		30	
<b>Actuation</b>		Actuates the ignition coil five times at one-second intervals. “WARNING” on the Yamaha diagnostic tool blinks five times when the ignition coil is actuated.	
<b>Procedure</b>		Check that a spark is generated five times. • Connect an ignition checker.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 2.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 3.

# FUEL INJECTION SYSTEM

Fault code No.		33	
Item		Ignition coil: open or short circuit detected in the primary lead of the ignition coil.	
3	Connection of sub wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the sub wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ignition coil coupler and ECU coupler. orange–orange red–red/blue	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 5.
5	Mounted condition of ignition coil. Check for looseness or pinching. Check the mounted condition for correctness.	Improperly mounted sensor → Remount or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 6.
6	Defective ignition coil. (test the primary coils for continuity)	Check the primary resistance of the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 8-63.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 8 and finish the service. Condition is "Detected" → Go to item 7.
7	Faulty ECU.	Execute the diagnostic mode. (Code No. 30) No spark → Replace the ECU.	Service is finished.
8	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	



## Fault code No. 39

### TIP

Disconnect the fuel pump coupler when this diagnostic tool is used.

<b>Fault code No.</b>		<b>39</b>	
<b>Item</b>		<b>Injector: open or short circuit detected.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		36	
<b>Actuation</b>		Actuates injector five times at one-second intervals. “WARNING” on the Yamaha diagnostic tool blinks five times when the injector is actuated.	
<b>Procedure</b>		Check that injector is actuated five times by listening for the operating sound.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of injector coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 2.
2	Defective injector.	Check the injector. Refer to “CHECKING THE FUEL INJECTOR” on page 8-68.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 3.
3	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between injector coupler and ECU coupler. red/black–red/black Between injector coupler and joint coupler. red/blue–red/blue red/yellow–red/yellow red/white–red/white red–red	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 5.

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>		<b>39</b>	
<b>Item</b>		<b>Injector: open or short circuit detected.</b>	
5	Faulty ECU.	Replace the ECU.	Service is finished.
6	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 41

<b>Fault code No.</b>		<b>41</b>	
<b>Item</b>		<b>ECU: built-in lean angle sensor malfunction.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		08	
<b>Diagnostic tool display</b>		Displays the lean angle sensor output voltage. • 0.4–1.4 (V) (upright) • 3.7–4.4 (V) (overturned)	
<b>Procedure</b>		Remove the ECU, and incline it 45° or more.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Faulty ECU.	Replace the ECU.	Service is finished.

## Fault code No. 43

<b>Fault code No.</b>		<b>43</b>	
<b>Item</b>		<b>Fuel system voltage: incorrect voltage supplied to the main relay and CCU.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		09	
<b>Diagnostic tool display</b>		Fuel system voltage Approximately 12.0 (V)	
<b>Procedure</b>		Disconnect the main relay, and push the start switch.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of main relay coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 2.

# FUEL INJECTION SYSTEM

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the main relay and CCU.	
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between battery terminal and ECU coupler. red-red red-red/white Between main relay coupler and ECU coupler. brown-brown blue/red-blue/red	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 4.
4	Defective main relay.	No operating sound → Replace the main relay. Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the main relay.	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	Service is finished.
6	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

# FUEL INJECTION SYSTEM

## Fault code No. 44

Fault code No.		44	
Item		EEPROM fault code number: an error is detected while reading or writing on EEPROM.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		60	
Diagnostic tool display		Displays the location of the abnormal portion of the EEPROM data. <ul style="list-style-type: none"> <li>• 00: No fault</li> <li>• 01: CO adjustment valve</li> <li>• 07: Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8</li> </ul>	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Identification of malfunctioning point.	Execute the diagnostic mode. (Code No. 60) 00: Go to item 4. 01: Go to item 2. 07: Go to item 3.	
2	“01” is indicated in diagnostic mode. (Code No. 60) EEPROM data error for adjustment of CO concentration.	Change the CO concentration, and rewrite in EEPROM. After this adjustment, push the engine stop switch, and then.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 5 and finish the service. Condition is “Detected” → Repeat item 1. If the same number is indicated, go to item 3.
3	“07” is indicated in diagnostic mode. (Code No. 60) EEPROM data error for setting tool adjustment values for fuel injection amount or ignition timing.	Erase the setting map in the diagnostic mode. (Code No. 65)	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 5 and finish the service. Condition is “Detected” → Repeat item 1. If the same number is indicated, go to item 4.
4	Faulty ECU.	Replace the ECU.	Service is finished.
5	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

# FUEL INJECTION SYSTEM

## Fault code No. 46

<b>Fault code No.</b>		<b>46</b>	
<b>Item</b>		<b>Vehicle system power supply: normal voltage is not supplied to the ECU.</b>	
<b>Fail-safe system</b>		Able/Unable to start engine	
		Able/Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Diagnostic tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of rectifier/regulator coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 2.
2	Connection of AC magneto coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between rectifier/regulator coupler and battery terminal. red–red black–black Between rectifier/regulator coupler and AC magneto coupler. white–white	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 4.
4	Defective AC magneto.	Check the AC magneto. Refer to “CHECKING THE AC MAGNETO” on page 5-58.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 5.
5	Faulty ECU.	Replace the ECU.	Service is finished.

# FUEL INJECTION SYSTEM

<b>Fault code No.</b>		<b>46</b>	
<b>Item</b>		<b>Vehicle system power supply: normal voltage is not supplied to the ECU.</b>	
6	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

## Fault code No. 50

<b>Fault code No.</b>		<b>50</b>	
<b>Item</b>		<b>ECU: faulty ECU memory.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Diagnostic tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Faulty ECU.	Replace the ECU.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Check that the fault code number is not displayed.

## Fault code No. 70

### TIP

It is not a malfunction.

If the engine is forcibly stopped by leaving idle, the recovered state is recorded by malfunction mode.

<b>Fault code No.</b>		<b>70</b>	
<b>Item</b>		<b>Engine forcibly stops when the vehicle is left idling for a long period of time.</b>	
<b>Fail-safe system</b>		—	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Diagnostic tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

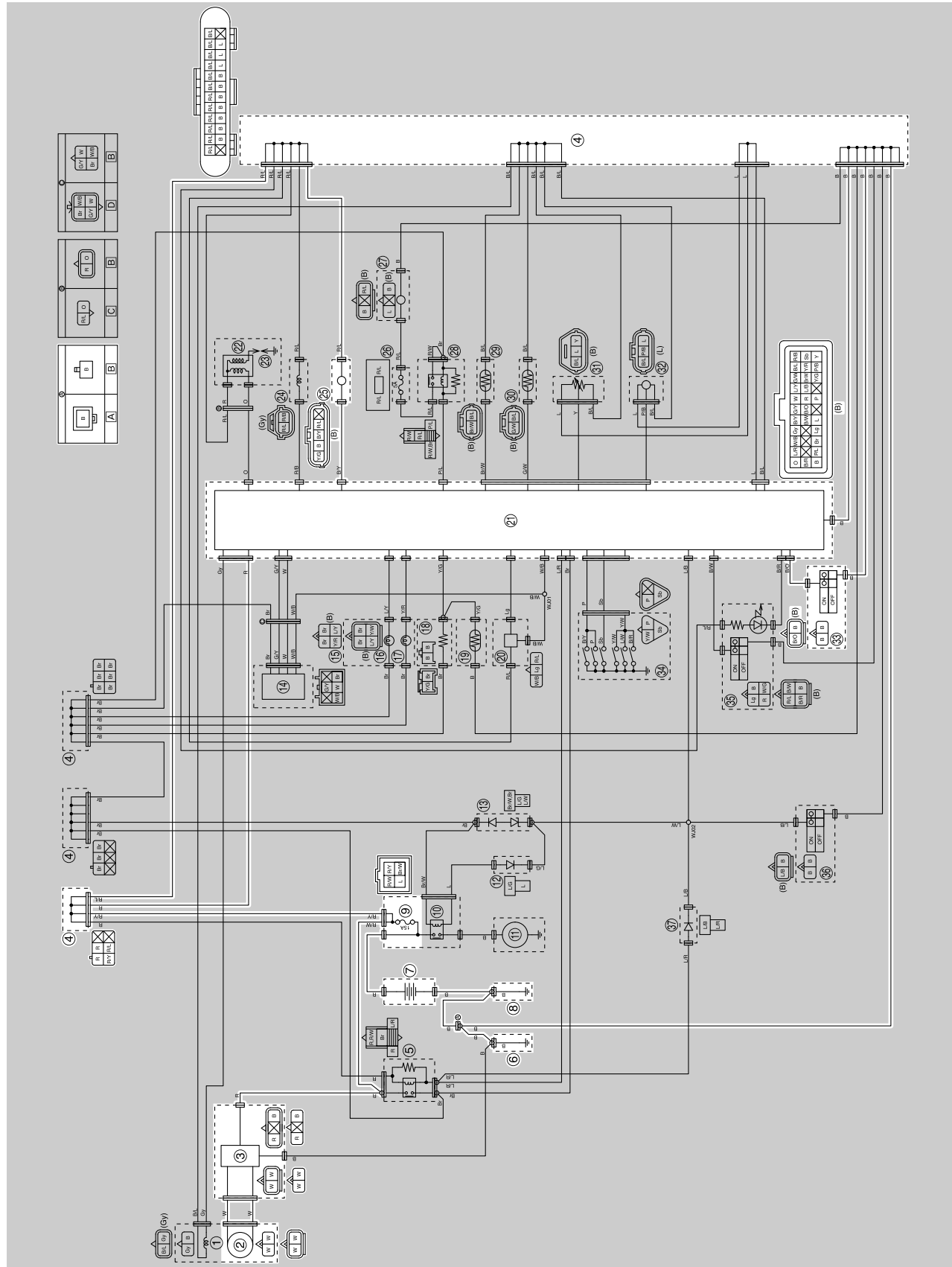


EAM20146

FUEL PUMP SYSTEM

EAM30287

CIRCUIT DIAGRAM





- 2. AC magneto
- 3. Rectifier/regulator
- 4. Joint connector
- 6. Engine ground
- 7. Battery
- 8. Frame ground
- 9. Main fuse
- 21. ECU (Engine Control Unit)
- 25. Fuel pump
- 33. Engine stop switch
  
- A. Battery sub-lead
- B. Wire harness

EAM30288

## TROUBLESHOOTING

The fuel pump fails to operate.

### TIP

Before troubleshooting, remove the following part(s):

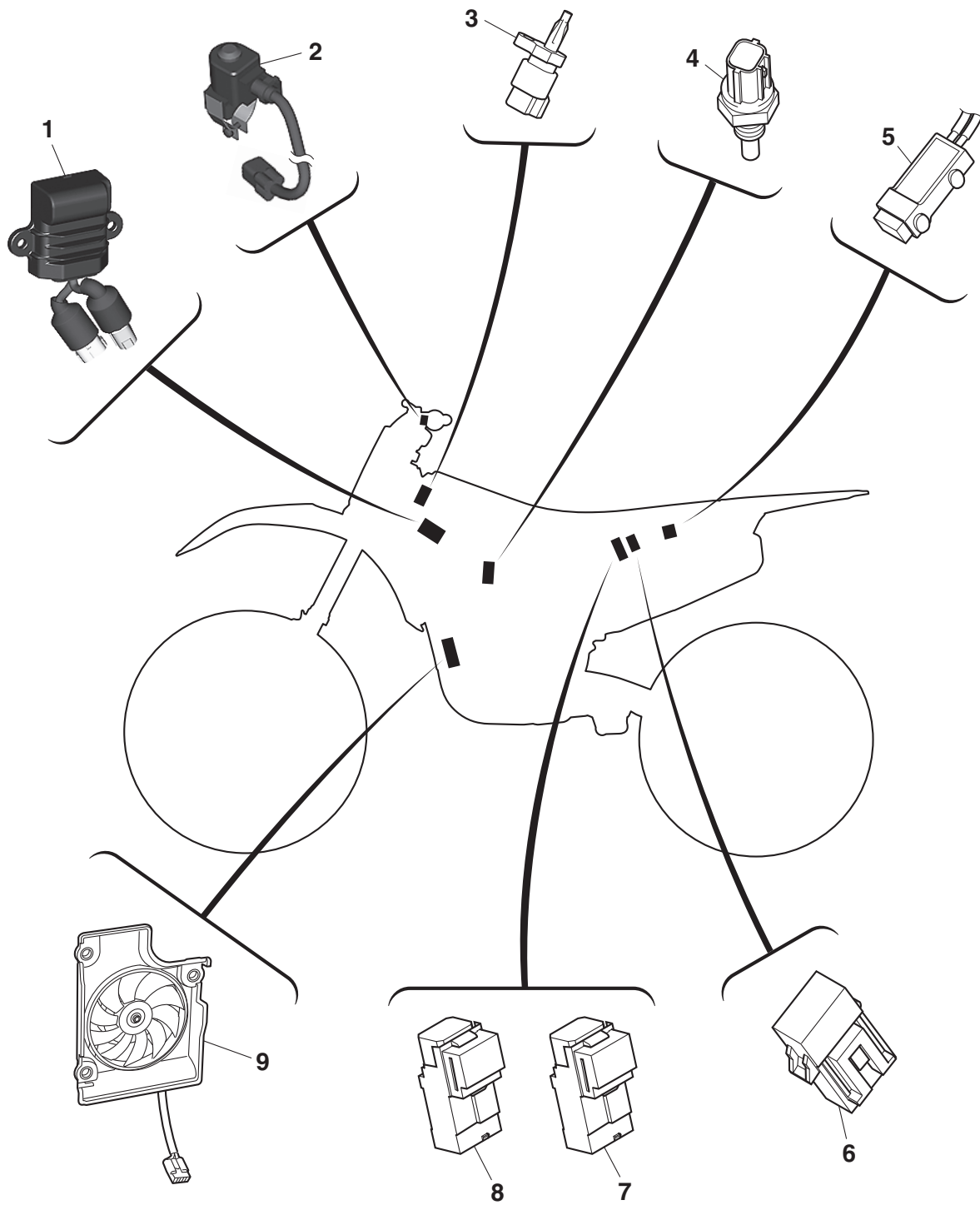
1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank
5. Air filter case cover

1. Check the fuel pump system wire harness connections.	NG→	Reconnect.
OK↓		
2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-58.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-59.	NG→	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-55.	NG→	Replace the engine stop switch.
OK↓		
5. Check fuel pressure. Refer to "CHECKING THE FUEL PRESSURE" on page 7-3.	NG→	Replace the fuel pump.
OK↓		
6. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 8-47.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

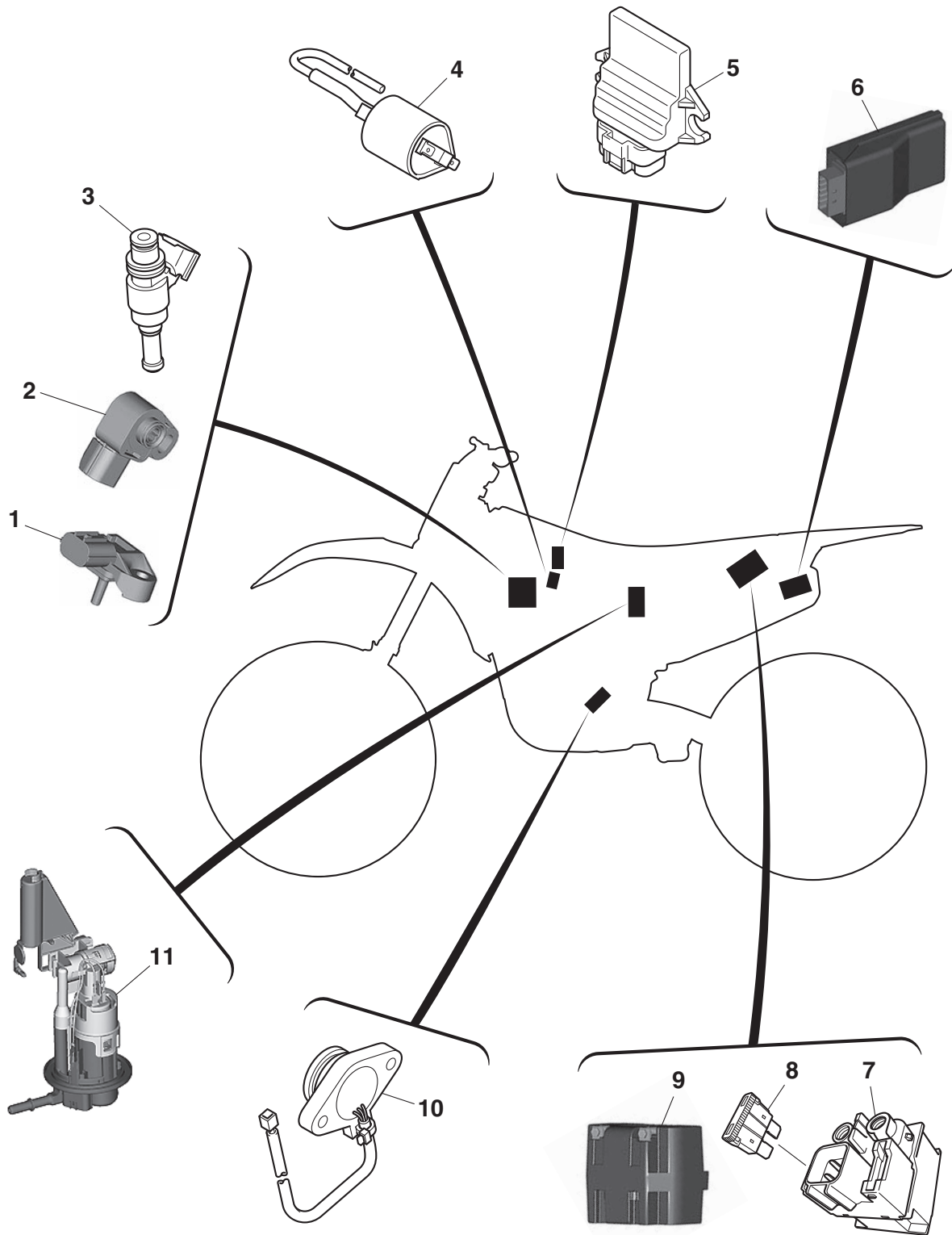


EAM20147

## ELECTRICAL COMPONENTS



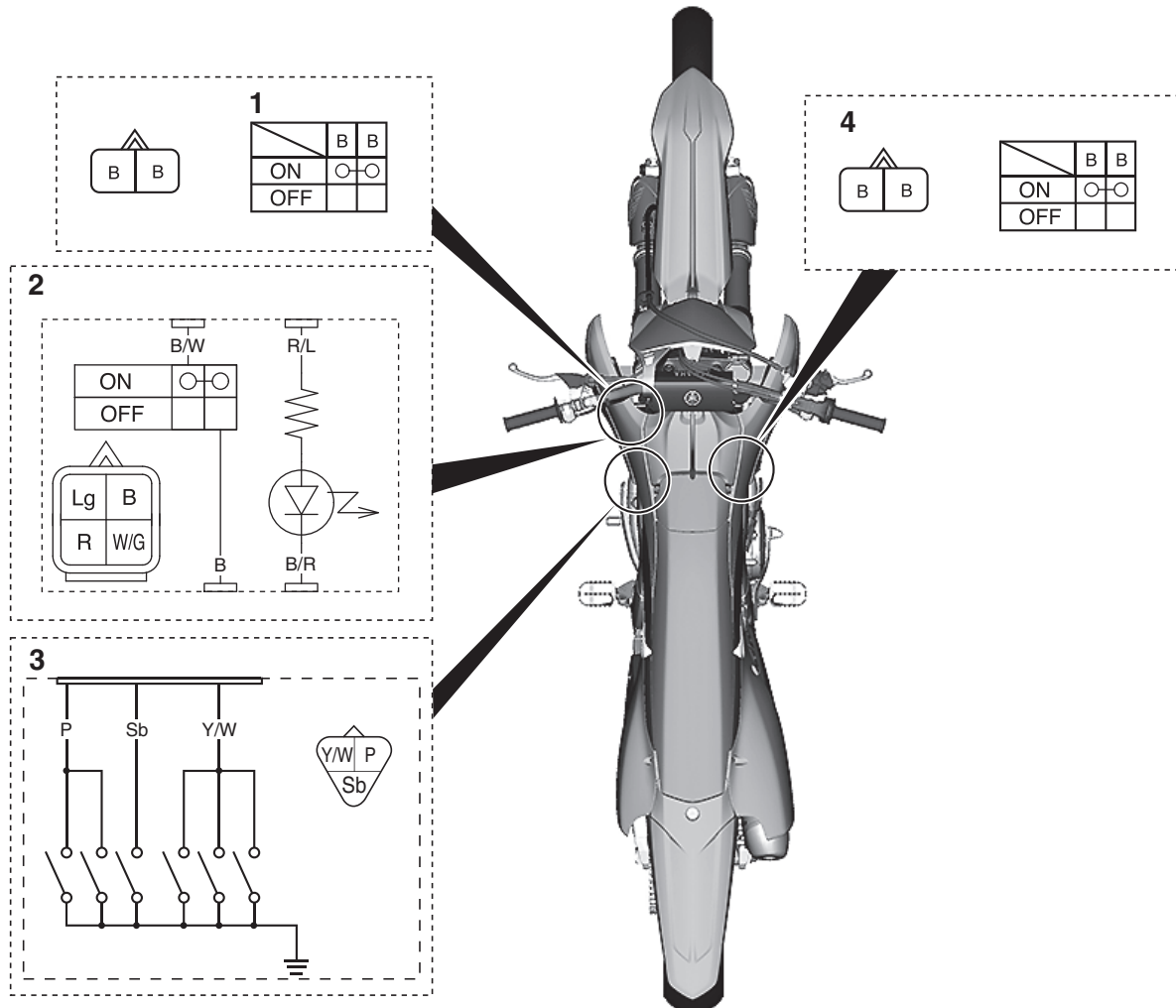
1. Rectifier/regulator
2. Mode switch
3. Intake air temperature sensor
4. Coolant temperature sensor
5. Resistor
6. Radiator fan motor fuse
7. Radiator fan motor relay
8. Main relay
9. Radiator fan motor (For JPN)



1. Intake air pressure sensor
2. Throttle position sensor
3. Injector
4. Ignition coil
5. ECU (Engine Control Unit)
6. CCU (Communication Control Unit)
7. Starter relay
8. Main fuse
9. Battery
10. Gear position switch
11. Fuel pump

EAM30289

## CHECKING THE SWITCHES





1. Engine stop switch
2. Mode switch
3. Gear position switch
4. Engine start switch

# ELECTRICAL COMPONENTS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14371

## NOTICE

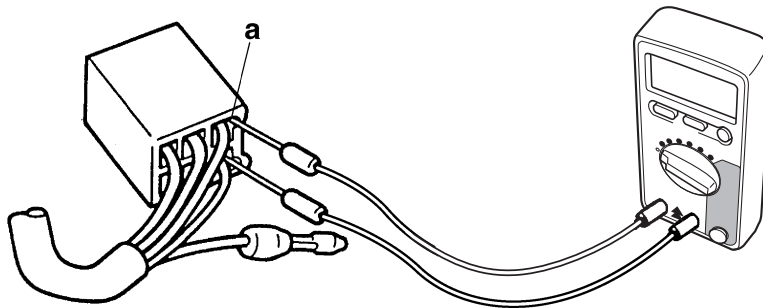
**Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.**



**Digital circuit tester (CD732)  
90890-03243  
Model 88 Multimeter with tachometer  
YU-A1927**

## TIP

When checking for continuity, switch back and forth between the switch positions a few times.



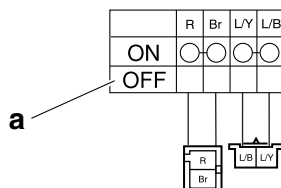
Terminal connections of the switch are shown in the terminal connection diagram below. The switch positions “a” are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

## TIP

“○—○” indicates continuity between switch terminals (i.e., a closed circuit at each switch position).

**The example illustration below shows that:**

There is continuity between red and brown when the switch is “ON”.



EAM30357

## CHECKING THE BULBS AND BULB SOCKETS

1. Remove:
  - Bulb

ECA25930

### NOTICE

Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.

### TIP

Bulbs “a” is used for warning light and can be removed from their respective socket by carefully pulling them out.



2. Check:
  - Bulb (for continuity)  
(with the digital circuit tester)  
No continuity → Replace.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

### TIP

Before checking for continuity, set the digital circuit tester to “Ω” range.

3. Check:
  - Bulb socket (for continuity)  
(with the digital circuit tester)  
No continuity → Replace.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

### TIP

Check each bulb socket for continuity in the same manner as described in the bulb section;

however, note the following.

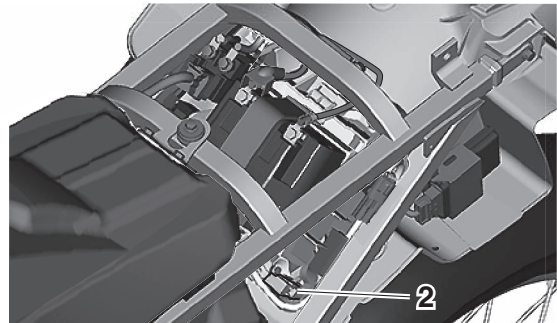
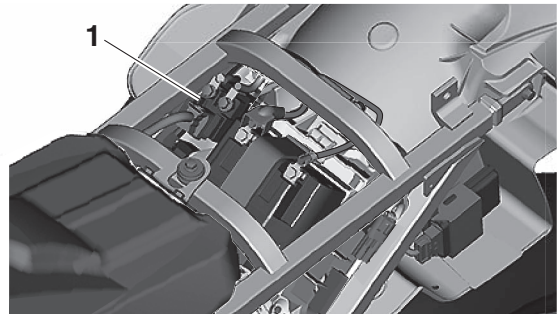
- a. Install a good bulb into the bulb socket.
- b. Connect the digital circuit tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

EAM30290

## CHECKING THE FUSES

The following procedure applies to all of the fuses.

1. Remove:
  - Seat  
Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
  - Main fuse “1”
  - Radiator fan motor fuse “2”



- a. Connect the digital circuit tester to the fuse and check the continuity.

### TIP

Set the digital circuit tester selector to “Ω”.



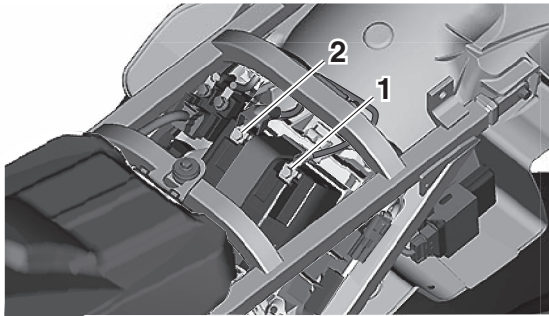
**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**



ECA13640

## NOTICE

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



3. Remove:
  - Battery
4. Connect the battery charger (special tool) to the battery.



**Lithium battery charger  
90890-05376  
Lithium battery charger  
DBY-ACC51-70-02**

## TIP

- For instructions on charging and handling the battery charger, refer to the battery charger’s instruction manual.
- Once battery charging starts, the sleep mode is canceled.

5. Charge the battery until it is fully charged.

6. Install:

- Battery terminals

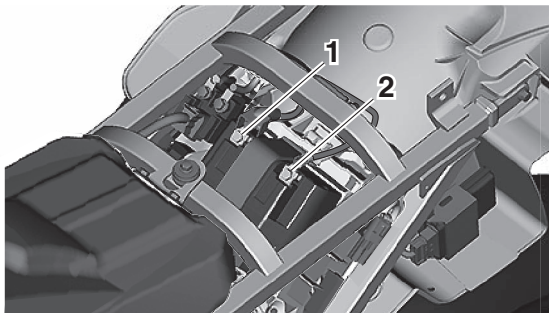
7. Connect:

- 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:

- Seat
- Side cover (left/right)

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

## Checking the battery

ECA26080

## NOTICE

**The battery has a limited service life. If the battery cannot be charged or it is determined that the battery cannot be used after checking the battery, it should be replaced. When replacing the battery, be sure to use a Yamaha genuine lithium-ion battery.**

## TIP

Do not check the battery at high temperature of 65 °C (149 °F) or more or low temperatures below 10 °C (50 °F). Otherwise, the control feature preventing battery charging and discharging will temporarily intervene.

1. Check:

- Battery



- a. If the battery is hot, wait until the battery has cooled down to the ambient temperature.
- b. Measure the voltage between the battery terminals.  
13.25 V or more → The battery is normal. Checking is finished.  
Less than 13.25 V → Go to step (c).
- c. Connect the battery charger (special tool) to the battery and charge it.



**Lithium battery charger  
90890-05376  
Lithium battery charger  
DBY-ACC51-70-02**

## TIP

For instructions on charging and handling the battery charger, refer to the battery charger’s instruction manual.

- d. If the battery is hot, wait until the battery has cooled down to the ambient temperature.
- e. Measure the voltage between the terminals of the battery.



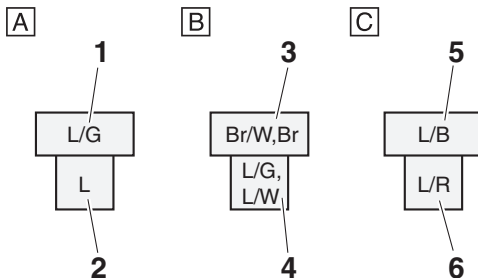
## TIP

The digital circuit tester and the multimeter with tachometer readings are shown in the following table.



**No continuity**  
 Tester positive lead → Blue/Green “1”  
 Tester negative lead → Blue “2”  
**Continuity**  
 Tester positive lead → Blue “2”  
 Tester negative lead → Blue/Green “1”  
**No continuity**  
 Tester positive lead → Brown/White, Brown “3”  
 Tester negative lead → Blue/Green, Blue/White “4”  
**Continuity**  
 Tester positive lead → Blue/Green, Blue/White “4”  
 Tester negative lead → Brown/White, Brown “3”  
**No continuity**  
 Tester positive probe → Blue/Black “5”  
 Tester negative probe → Blue/Red “6”  
**Continuity**  
 Tester positive probe → Blue/Red “6”  
 Tester negative probe → Blue/Black “5”

- Disconnect the diode from the wire harness.
- Connect the digital circuit tester ( $\Omega$ ) to the diode coupler as shown.
- Check the diode for continuity.
- Check the diode for no continuity.



- Diode 1
- Diode 2
- Diode 3

EAM30294

## CHECKING THE IGNITION SPARK GAP

- Check:
  - Ignition spark gap  
 Out of specification → Perform the ignition system troubleshooting, starting with step (5). Refer to “TROUBLESHOOTING” on page 8-3.



**Minimum ignition spark gap**  
 6.0 mm (0.24 in)

## TIP

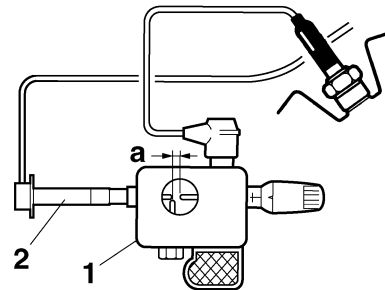
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- Remove the spark plug cap from the spark plug.
- Connect the ignition checker “1” as shown.



**Ignition checker**  
 90890-06754  
 Oppama pet-4000 spark checker  
 YM-34487

- Crank the engine, and measure the ignition spark gap “a”.



- Spark plug cap
- Crank the engine, and gradually increase the spark gap until a misfire occurs.

EAM30295

## CHECKING THE SPARK PLUG CAP

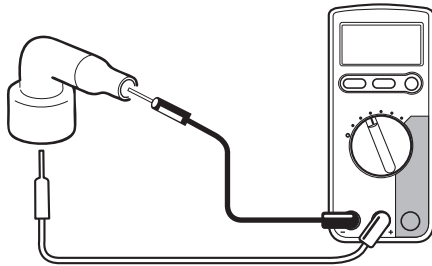
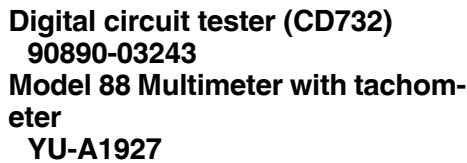
- Remove:
  - Spark plug cap  
 (from the spark plug lead)
- Check:
  - Spark plug cap resistance  
 Out of specification → Replace.



**Resistance**  
 7.50–12.50 k $\Omega$



a. Connect the digital circuit tester ( $\Omega$ ) to the spark plug cap.



b. Measure the spark plug cap resistance.

EAM30296

## CHECKING THE IGNITION COIL

### 1. Disconnect:

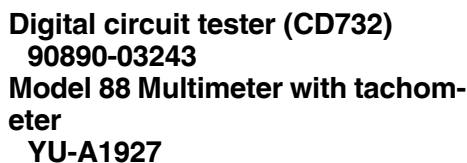
- Ignition coil terminal  
(from the sub wire harness)
- Spark plug cap  
(from the ignition coil)

2. Check:

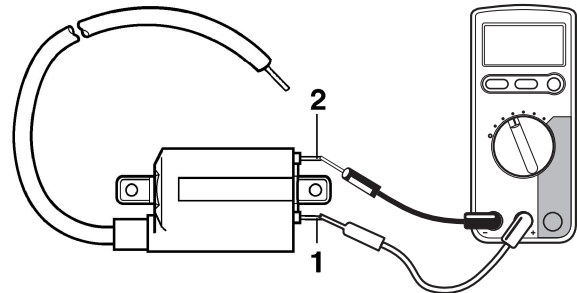
- Primary coil resistance  
Out of specification → Replace.



- a. Connect the digital circuit tester ( $\Omega$ ) to the ignition coil.



- Positive tester probe → Ignition coil terminal 1 “1”
- Negative tester probe → Ignition coil terminal 2 “2”



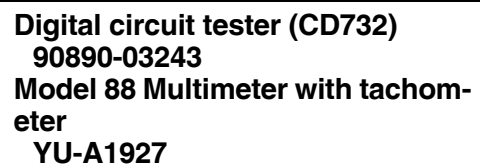
b. Measure the primary coil resistance.

### 3. Check:

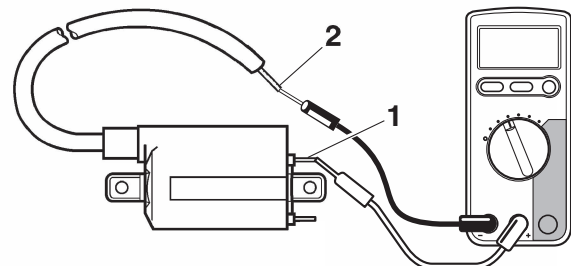
- Secondary coil resistance  
Out of specification → Replace.



- a. Connect the digital circuit tester ( $\Omega$ ) to the ignition coil.



- Positive tester probe → Ignition coil terminal 1 “1”
- Negative tester probe → Spark plug lead “2”



b. Measure the secondary coil resistance.

FAM30297

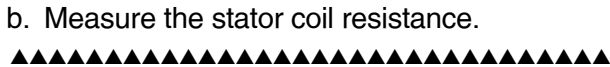
## CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:


- Crankshaft position sensor coupler (from the wire harness)
2. Check:
- Crankshaft position sensor resistance








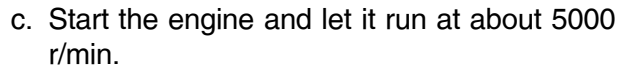
## CHECKING THE RECTIFIER/REGULATOR

- |   |   |
|---|---|
|  | <b>Regulated voltage (DC)</b><br><b>14.0–14.8 V</b> |
|---|---|



- |   |  |
|---|--|
|  | <p><b>Digital tachometer</b><br/> <b>90890-06760</b></p> <p><b>Digital tachometer</b><br/> <b>YU-39951-B</b></p> |
|---|--|

-  **Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**




- [illegible]


## CHECKING THE FUEL SENDER

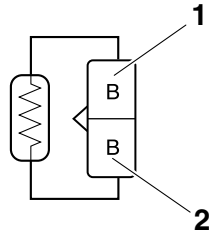
- Fuel pump is atmosphere “A”**  
→ **Fuel level warning light is come on**  
**Fuel pump is soaked in fuel “B”**  
→ **Fuel level warning light is goes off**



- |   |  |
|---|--|
|  | <b>Resistor resistance</b><br>64.6–71.4 $\Omega$ |
|---|--|

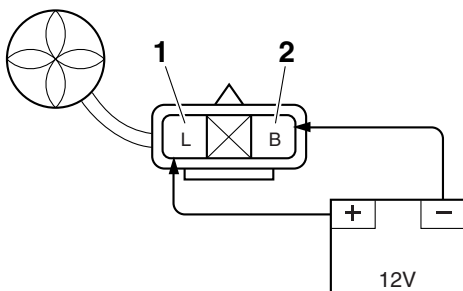


-  **Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**



- Radiator fan motor  
Faulty/rough movement → Replace.

- Positive battery terminal → Blue "1"
- Negative battery terminal → Black "2"

[illegible]

- Coolant temperature sensor

**WARNING**

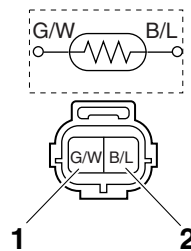


**210–220  $\Omega$**

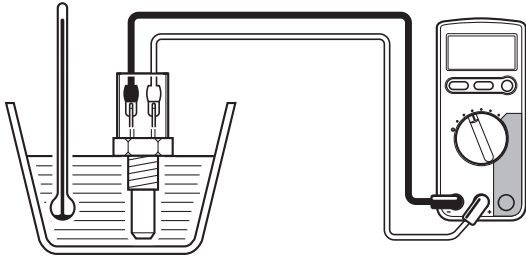


**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → Green/White "1"
- Negative tester probe → Black/Blue "2"



**8-66**



EAM30305

## CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE

### 1. Check:

- Throttle position sensor input voltage  
Out of specification → Replace the ECU.



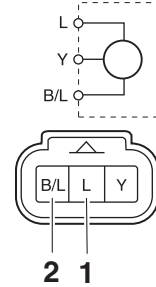
**Throttle position sensor input voltage**  
4–6 V

- Connect the test harness S– pressure sensor (3P) to the throttle position sensor coupler and the wire harness.
- Connect the digital circuit tester (DCV) to the test harness S– pressure sensor (3P).



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**  
**Test harness S– pressure sensor (3P)**  
**90890-03207**  
**Test harness S– pressure sensor (3P)**  
**YU-03207**

- Positive tester probe → Blue “1”
- Negative tester probe → Black/Blue “2”



- Start the engine.
- Measure the throttle position sensor input voltage.

EAM30307

## CHECKING THE INTAKE AIR TEMPERATURE SENSOR

### 1. Remove:

- Intake air temperature sensor (from the air filter case)

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.



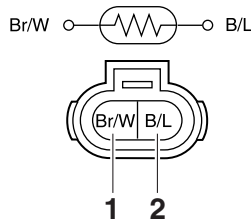
**Intake air temperature sensor resistance**  
5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)  
**Intake air temperature sensor resistance**  
290–390 Ω

- Connect the digital circuit tester (Ω) to the intake air temperature sensor terminal.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → Brown/White “1”
- Negative tester probe → Black/Blue “2”



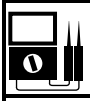
EAM30467

## CHECKING THE GEAR POSITION SWITCH

1. Remove:
  - Gear position switch
2. Check:
  - Gear position switch
 Out of specification → Replace.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**



### Continuity

Positive tester probe → Sky blue "1"  
 Negative tester probe → Sensor terminal "a"

### Continuity

Positive tester probe → Pink "2"  
 Negative tester probe → Sensor terminal "b"

### Continuity

Positive tester probe → Pink "2"  
 Negative tester probe → Sensor terminal "c"

### Continuity

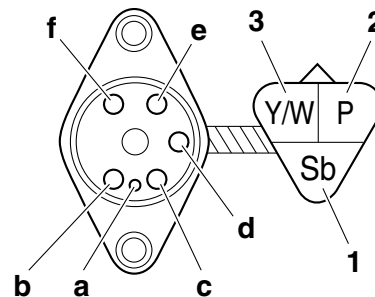
Positive tester probe → Yellow/White "3"  
 Negative tester probe → Sensor terminal "d"

### Continuity

Positive tester probe → Yellow/White "3"  
 Negative tester probe → Sensor terminal "e"

### Continuity

Positive tester probe → Yellow/White "3"  
 Negative tester probe → Sensor terminal "f"



EAM30308

## CHECKING THE FUEL INJECTOR

1. Remove:
  - Fuel injector
 Refer to "THROTTLE BODY" on page 7-5.
2. Check:
  - Fuel injector resistance
 Out of specification → Replace.



**Resistance**  
**12.0 Ω**

- a. Disconnect the fuel injector coupler from the



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## TROUBLESHOOTING

<b>TROUBLESHOOTING</b> .....	9-1
GENERAL INFORMATION .....	9-1
STARTING FAILURE .....	9-1
INCORRECT ENGINE IDLING SPEED .....	9-1
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE .....	9-2
SHIFTING IS DIFFICULT .....	9-2
SHIFT PEDAL DOES NOT MOVE .....	9-2
JUMPS OUT OF GEAR .....	9-2
CLUTCH SLIPS .....	9-2
CLUTCH DRAGS .....	9-2
OVERHEATING .....	9-2
OVERCOOLING .....	9-3
POOR BRAKING PERFORMANCE .....	9-3
FRONT FORK OIL LEAKING .....	9-3
FAULTY FRONT FORK LEGS .....	9-3
UNSTABLE HANDLING .....	9-3
 <b>LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS</b> .....	9-4
LIST OF DIAGNOSTIC CODES .....	9-4
SENSOR OPERATION TABLE .....	9-5
ACTUATOR OPERATION TABLE .....	9-6

EAM20148

## TROUBLESHOOTING

EAM30309

### 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.

EAM30310

### STARTING FAILURE

#### Engine

1. Cylinder and cylinder head
  - Loose spark plug
  - Loose cylinder head or cylinder
  - Damaged cylinder head gasket
  - Damaged cylinder gasket
  - Worn or damaged cylinder
  - Incorrect valve clearance
  - Improperly sealed valve
  - Incorrect valve-to-valve-seat contact
  - Incorrect valve timing
  - Faulty valve spring
  - Seized valve
2. Piston 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 breather hose
  - Deteriorated or contaminated fuel
  - Clogged or damaged fuel hose
2. Fuel pump
  - Faulty fuel pump
3. Throttle body
  - Deteriorated or contaminated fuel
  - Sucked-in air

#### Electrical system

1. Battery
  - Discharged battery
  - Faulty battery

- Short main relay
2. Fuse
    - Blown, damaged or incorrect fuse
    - Improperly installed fuse
  3. Spark plug
    - Incorrect spark plug gap
    - Incorrect spark plug heat range
    - Fouled spark plug
    - Worn or damaged electrode
    - Worn or damaged insulator
  4. Ignition coil
    - Cracked or broken ignition coil body
    - Broken or shorted primary or secondary coils
  5. Ignition system
    - Faulty ECU
    - Faulty crankshaft position sensor
    - Broken generator rotor woodruff key
  6. Switches and wiring
    - Faulty ECU
    - Faulty engine stop switch
    - Broken or shorted wiring
    - Faulty neutral switch
    - Improperly grounded circuit
    - Loose connections
  7. Starting system
    - Faulty starter motor
    - Faulty starter relay
    - Faulty main relay
    - Faulty starter clutch

EAM30311

### INCORRECT ENGINE IDLING SPEED

#### Engine

1. Cylinder and cylinder head
  - Incorrect valve clearance
  - Damaged valve train components
2. Air filter
  - Clogged air filter element

#### Fuel system

1. Throttle body
  - Damaged or loose throttle body joint
  - Improperly synchronized throttle bodies
  - Improper throttle cable free play
  - Flooded throttle body

#### Electrical system

1. Spark plug
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
  - Fouled spark plug
  - Worn or damaged electrode
  - Worn or damaged insulator
  - Faulty spark plug cap
2. Ignition coil
  - Broken or shorted primary or secondary coil



- Cracked or broken ignition coil
3. Ignition system
    - Faulty ECU (Engine Control Unit)
    - Faulty crankshaft position sensor
    - Broken generator rotor woodruff key

EAM30312

## **POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE**

Refer to “STARTING FAILURE” on page 9-1.

### **Engine**

1. Air filter
  - Clogged air filter element

### **Fuel system**

1. Fuel pump
  - Faulty fuel pump
2. Throttle body
  - Defective throttle body
3. ECU (Engine Control Unit)
  - Faulty ECU (Engine Control Unit)

EAM30313

## **SHIFTING IS DIFFICULT**

Refer to “CLUTCH” on page 5-40.

EAM30314

## **SHIFT PEDAL DOES NOT MOVE**

### **Engine**

1. Shift shaft
  - Bent shift shaft
2. Shift drum and shift forks
  - Foreign object in a shift drum groove
  - Seized shift fork
  - Bent shift fork guide bar
3. Transmission
  - Seized transmission gear
  - Foreign object between transmission gears
  - Improperly assembled transmission

EAM30315

## **JUMPS OUT OF GEAR**

### **Engine**

1. Shift shaft
  - Incorrect shift pedal position
  - Improperly returned stopper lever
2. Shift forks
  - Worn shift fork
3. Shift drum
  - Incorrect axial play
  - Worn shift drum groove
4. Transmission
  - Worn gear dog

EAM30316

## **CLUTCH SLIPS**

### **Engine**

1. Clutch
  - Improperly assembled clutch
  - Loose or fatigued clutch spring
  - Worn friction plate
  - Worn clutch plate
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (low)
  - Deteriorated oil

EAM30317

## **CLUTCH DRAGS**

### **Engine**

1. Clutch
  - Unevenly tensioned clutch springs
  - Warped pressure plate
  - Bent clutch plate
  - Swollen friction plate
  - Bent clutch push rod
  - Damaged clutch boss
  - Burnt primary driven gear bushing
2. Engine oil
  - Incorrect oil level
  - Incorrect oil viscosity (high)
  - Deteriorated oil

EAM30318

## **OVERHEATING**

### **Engine**

1. Cylinder head and piston
  - Heavy carbon buildup
  - Clogged coolant passages
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
  - Damaged hose
  - Improperly connected hose
  - Damaged pipe
  - Improperly connected pipe

## Fuel system

1. Throttle body
  - Damaged or loose throttle body joint
2. Air filter
  - Clogged air filter element

## Chassis

1. Brake(s)
  - Dragging brake

## Electrical system

1. Spark plug
  - Incorrect spark plug gap
  - Incorrect spark plug heat range
2. Ignition system
  - Faulty ECU (Engine Control Unit)
  - Faulty coolant temperature sensor

EAM30319

## OVERCOOLING

### Cooling system

1. Coolant temperature sensor
  - Faulty coolant temperature sensor

EAM30320

## POOR BRAKING PERFORMANCE

### Chassis

1. Brake(s)
  - Worn brake pad
  - Worn brake disc
  - Air in hydraulic brake system
  - Leaking brake fluid
  - Defective master cylinder kit
  - 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

EAM30361

## FRONT FORK OIL LEAKING

### Chassis

1. Front fork
  - 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

EAM30321

## FAULTY FRONT FORK LEGS

### Chassis

1. Front fork
  - Bent or damaged inner tube
  - Bent or damaged outer tube
  - Broken fork spring
  - Bent or damaged damper rod
  - Incorrect oil viscosity
  - Incorrect oil level

EAM30322

## UNSTABLE HANDLING

### Chassis

1. Handlebar
  - Bent or improperly installed handlebar
2. Steering head components
  - Improperly installed upper bracket
  - Improperly installed lower bracket (improperly tightened ring nut)
  - Bent steering stem
  - Damaged ball bearing or bearing race
3. Front fork leg(s)
  - Uneven oil levels (both front fork legs)
  - Unevenly tensioned fork spring (both front fork legs)
  - Broken fork spring
  - Bent or damaged inner tube
  - Bent or damaged outer tube
4. Swingarm
  - Worn bearing or bushing
  - Bent or damaged swingarm
5. Rear shock absorber assembly(-ies)
  - Faulty rear shock absorber spring
  - Leaking oil or gas
6. Tire(s)
  - Uneven tire pressures (front and rear)
  - Incorrect tire pressure
  - Uneven tire wear
7. Wheel(s)
  - Incorrect wheel balance
  - Broken or loose spoke
  - Damaged wheel bearing
  - Bent or loose wheel axle
  - Excessive wheel runout
8. Frame
  - Bent frame
  - Damaged steering head pipe
  - Improperly installed bearing race

# LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

EAM20156

## LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

EAM30365

### LIST OF DIAGNOSTIC CODES

<b>Fault code</b>	<b>Item</b>	<b>Page</b>
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	8-28
13	Intake air pressure sensor: open or short circuit detected.	8-29
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	8-31
15	Throttle position sensor: open or short circuit detected.	8-32
16	Throttle position sensor: stuck throttle position sensor is detected.	8-33
21	Coolant temperature sensor: open or short circuit detected.	8-34
22	Intake air temperature sensor: open or short circuit detected.	8-36
30	The vehicle has overturned.	8-37
33	Ignition coil: open or short circuit detected in the primary lead of the ignition coil.	8-38
39	Injector: open or short circuit detected.	8-40
41	ECU: built-in lean angle sensor malfunction.	8-41
43	Fuel system voltage: incorrect voltage supplied to the main relay.	8-41
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.	8-43
46	Vehicle system power supply: normal voltage is not supplied to the ECU.	8-44
50	ECU: faulty ECU memory.	8-45
70	Engine forcibly stops when the vehicle is left idling for a long period of time.	8-45

# LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

EAM30367

**SENSOR OPERATION TABLE**

Diagnostic code No.	Item	Display	Procedure
01	Throttle angle <ul style="list-style-type: none"> <li>Fully closed position</li> <li>Fully opened position</li> </ul>	Displays the throttle angle. <ul style="list-style-type: none"> <li>11–14</li> <li>86–92</li> </ul>	<ul style="list-style-type: none"> <li>Check with throttle fully closed.</li> <li>Check with throttle fully opened.</li> </ul>
03	Pressure of suction pipe	Displays the intake air pressure. <ul style="list-style-type: none"> <li>Check the change of the intake pressure valve when the starter switch is pushed.</li> </ul>	The atmospheric pressure is displayed on the Yamaha diagnostic tool.
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured intake air temperature with the Yamaha diagnostic tool display value.
06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value.
08	Lean angle sensor <ul style="list-style-type: none"> <li>Upright</li> <li>Overturn</li> </ul>	Displays the output voltage. <ul style="list-style-type: none"> <li>0.4–1.4 (V)</li> <li>3.7–4.4 (V)</li> </ul>	Remove the ECU, and incline it 45° or more.
09	Monitor voltage	Displays the voltage of the external battery connected to the Yamaha diagnostic tool. <ul style="list-style-type: none"> <li>Approximately 12.0 (V)</li> </ul>	—
21	Neutral switch <ul style="list-style-type: none"> <li>Gear in neutral</li> <li>Gear not in neutral</li> </ul>	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> </ul>	Operate the shift pedal.
25	Gear position switch <ul style="list-style-type: none"> <li>Gear in 1st or 2nd</li> <li>Gear in other than 1st or 2nd</li> </ul>	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> </ul>	Operate the shift pedal.
60	EEPROM fault code display <ul style="list-style-type: none"> <li>No fault</li> <li>CO adjustment valve</li> <li>Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8</li> </ul>	<ul style="list-style-type: none"> <li>00</li> <li>01</li> <li>07</li> </ul>	—
61	Malfunction history (△) code display *1 <ul style="list-style-type: none"> <li>There is no history.</li> <li>There is some history.</li> </ul>	<ul style="list-style-type: none"> <li>00</li> <li>Other: Displays the fault code of (△).</li> </ul>	—

# LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

Diagnostic code No.	Item	Display	Procedure
62	Malfunction history (△) code erasure *1 <ul style="list-style-type: none"> <li>• There is no history.</li> <li>• There is some history.</li> </ul>	<ul style="list-style-type: none"> <li>• 00</li> <li>• Other: Displays the total number of (×) and (△).</li> </ul>	Replace all (△) with (○) by the operation start processing.
64	Setting history display <ul style="list-style-type: none"> <li>• There is no history.</li> <li>• There is some history.</li> <li>• History is unknown (History data is damaged).</li> </ul>	Displays the presence or absence of the setting history by Power Tuner. <ul style="list-style-type: none"> <li>• 00</li> <li>• 01</li> <li>• 02</li> </ul>	—
65	Setting map erasure <ul style="list-style-type: none"> <li>• There is no setting.</li> <li>• There is some setting.</li> </ul>	Displays the presence or absence of the setting history by Power Tuner. <ul style="list-style-type: none"> <li>• 00</li> <li>• 01</li> </ul>	Erase all setting maps by the operation start processing.
70	Program version number	Displays a program version No.	—

\*1: Symbols used in the explanations of the malfunction history

○: Normal

×: There is currently a malfunction or abnormal condition.

△: A malfunction or abnormal condition occurred previously, but the affected system or component is currently operating normally.

EAM30368

## ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Ignition coil	Actuates the ignition coil five times at one-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the ignition coil is actuated.	Check that a spark is generated five times. <ul style="list-style-type: none"> <li>• Connect an ignition checker.</li> </ul>
36	Injector	Actuates the injector five times at one-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the injector is actuated.	<b>TIP: Before performing this operation, be sure to disconnect the fuel pump coupler.</b> Check that injector is actuated five times by listening for the operating sound.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at five-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the radiator fan motor relay is actuated.	Check that the radiator fan motor relay is actuated five times by listening for the operating sound.

## LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

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## TUNING

<b>CHASSIS</b> .....	10-1
SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET) .....	10-1
DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS .....	10-1
TIRE PRESSURE .....	10-1
FRONT FORK SETTING .....	10-2
CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL .....	10-2
SETTING OF SPRING AFTER REPLACEMENT .....	10-2
FRONT FORK SETTING PARTS .....	10-3
REAR SUSPENSION SETTING .....	10-3
CHOOSING SET LENGTH .....	10-3
SETTING OF SPRING AFTER REPLACEMENT .....	10-4
REAR SHOCK ABSORBER SETTING PARTS .....	10-4
SUSPENSION SETTING (FRONT FORK) .....	10-6
SUSPENSION SETTING (REAR SHOCK ABSORBER) .....	10-7

EAM20119

**CHASSIS**

EAM30168

**SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET)**

**Secondary reduction ratio = Number of rear wheel sprocket teeth/Number of drive sprocket teeth**



**Secondary reduction ratio  
3.846 (50/13)**

<Requirement for selection of secondary gear reduction ratio>

- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition of the day of the race, be sure to run through the circuit to set the machine suitable for the entire course.
- In actuality, it is very difficult to achieve settings suitable for the entire course and some settings may be sacrificed. Thus, the settings should be matched to the portion of the course that has the greatest effect on the race result. In such a case, run through the entire course while making notes of lap times to find the best balance; then, determine the secondary reduction ratio.
- If a course has a long straight portion where a machine can run at maximum speed, the machine is generally set such that it can develop its maximum revolutions toward the end of the straight line, with care taken to avoid the engine over-revving.

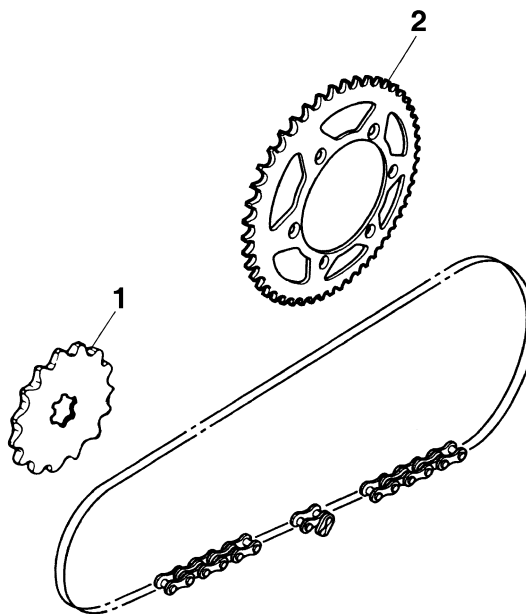
**TIP**

Riding technique varies from rider to rider and the performance of a machine also vary from machine to machine. Therefore, do not imitate other rider's settings from the beginning but choose your own setting according to the level of your riding technique.

EAM30169

**DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS**

Part name	Type	Part number
Drive sprocket "1"		
(STD)	13T	9383E-13233
Rear wheel sprocket "2"		
	47T	17D-25447-50
	48T	17D-25448-50
	49T	17D-25449-50
(STD)	50T	17D-25450-50
	51T	17D-25451-50
	52T	17D-25452-50



EAM30170

**TIRE PRESSURE**

Tire pressure should be adjusted to suit the road surface condition of the circuit.



**Standard tire pressure  
100 kPa (1.00 kgf/cm<sup>2</sup>, 15 psi)**

- Under a rainy, a muddy, a sandy, or a slippery condition, the tire pressure should be lower for a larger area of contact with the road surface.



**Extent of adjustment  
60–80 kPa (0.60–0.80 kgf/cm<sup>2</sup>, 9–12 psi)**



- Under a stony or a hard road condition, the tire pressure should be higher to prevent a flat tire.



**Extent of adjustment**  
 100–120 kPa (1.00–1.20 kgf/cm<sup>2</sup>,  
 15–18 psi)

EAM30171

### FRONT FORK SETTING

The front fork setting should be made depending on the rider's feeling of an actual run and the circuit conditions.

The front fork setting includes the following three factors:

1. Setting of air spring characteristics
    - Change the fork oil amount.
  2. Setting of spring preload
    - Change the spring.
  3. Setting of damping force
    - Change the compression damping force.
    - Change the rebound damping force.
- The spring acts on the load and the damping force acts on the cushion travel speed.

EAM30172

### CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

Damping characteristic near the final stroke can be changed by changing the fork oil amount.

EWA19190



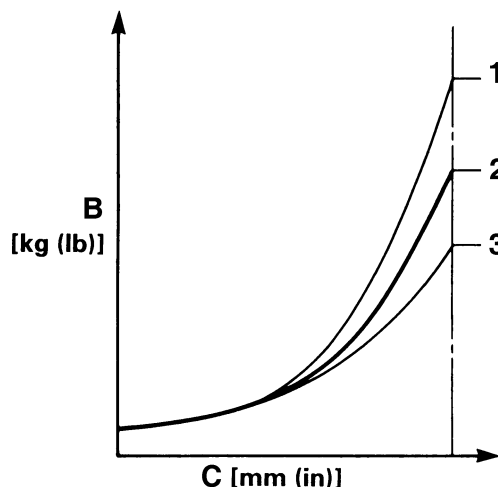
#### WARNING

Adjust the oil amount in 5 cm<sup>3</sup> (0.2 US oz, 0.2 Imp.oz) increments or decrements. Too small oil amount causes the front fork to produce a noise at full rebound or the rider to feel some pressure on his hands or body. Alternatively, too large oil amount will cause the air spring characteristics to have a tendency to be stiffer with the consequent deteriorated performance and characteristics. Therefore, adjust the front fork within the specified range.



**Recommended oil**  
 Yamaha Suspension Oil S1  
**Standard oil amount**  
 290 cm<sup>3</sup> (9.80 US oz, 10.23 Imp.oz)  
**Extent of adjustment**  
 260–365 cm<sup>3</sup> (8.79–12.34 US oz,  
 9.17–12.87 Imp.oz)

A



A. Air spring characteristics in relation to oil amount change

B. Load

C. Stroke

1. Max. oil amount
2. Standard oil amount
3. Min. oil amount

EAM30173

### SETTING OF SPRING AFTER REPLACEMENT

As the front fork setting can be easily affected by the rear suspension, take care so that the front and the rear are balanced (in position etc.) when setting the front fork.

1. Use of soft spring
  - Change the rebound damping force.  
Turn out one or two clicks.
  - Change the compression damping force.  
Turn in one or two clicks.

#### TIP

Generally a soft spring gives a soft riding feeling. Rebound damping tends to become stronger and the front fork may sink deeply over a series of gaps.

2. Use of stiff spring
  - Change the rebound damping force.  
Turn in one or two clicks.
  - Change the compression damping force.  
Turn out one or two clicks.

**TIP**

Generally a stiff spring gives a stiff riding feeling. Rebound damping tends to become weaker, resulting in lack of a sense of contact with the road surface or in a vibrating handlebar.

EAM30174

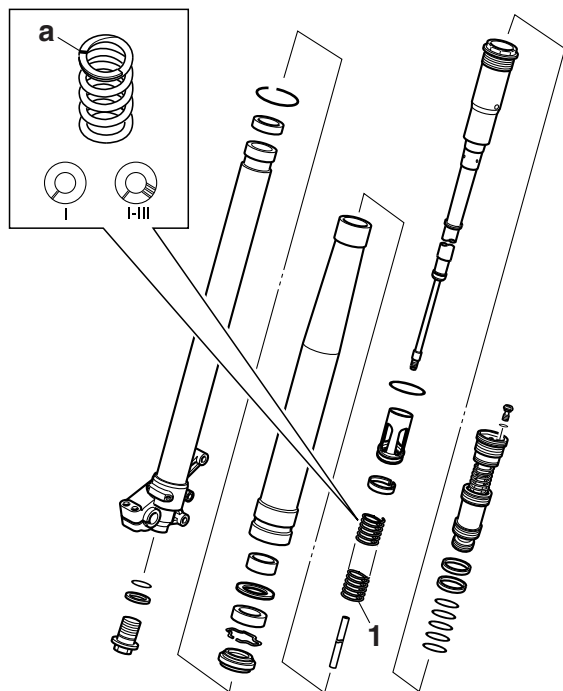
**FRONT FORK SETTING PARTS**

- Front fork spring “1”

Type	Spring rate N/mm	Part number	I.D. Mark (slits)
SOFT	4.5	BR9-23141-20	I-II
STD	4.6	BR9-23141-A0	—
	4.6	BR9-23141-30	I-III
STIFF	4.7	BR9-23141-40	I-III
	4.8	BR9-23141-50	I-III
	4.9	BR9-23141-60	II-II
	5.0	BR9-23141-70	II-III
	5.1	BR9-23141-80	II-III

**TIP**

The I.D. mark (slits) “a” is proved on the end of the spring.



EAM30175

**REAR SUSPENSION SETTING**

The rear shock absorber setting should be made depending on the rider's feeling of an actual run and the circuit conditions.

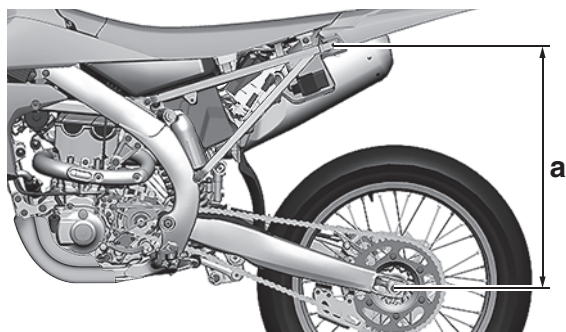
The rear suspension setting includes the following two factors:

1. Setting of spring preload
  - Change the set length of the spring.
  - Change the spring.
2. Setting of damping force
  - Change the rebound damping force.
  - Change the compression damping force.

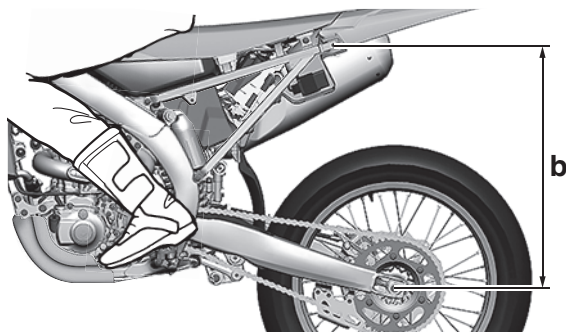
EAM30176

**CHOOSING SET LENGTH**

1. Place a stand or a block under the engine to put the rear wheel above the floor, and measure the length “a” between the rear wheel axle center and the rear fender holding bolt.



2. Remove the stand or block from the engine and, with a rider astride the seat, measure the sunken length “b” between the rear wheel axle center and the rear fender holding bolt.



3. Loosen the locknut “1” and make adjustment by turning the adjuster “2” to achieve the standard figure from the subtraction of the length “b” from the length “a”.

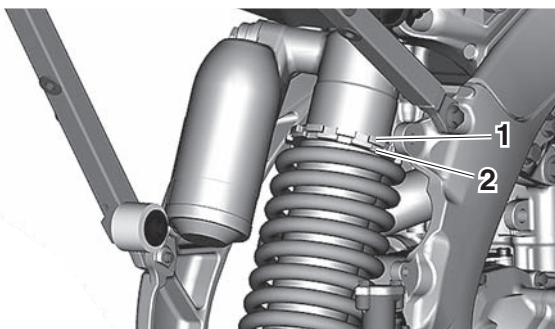


**Standard figure**  
90–100 mm (3.5–3.9 in)

**TIP**

- If the machine is new and after it is broken in, the same set length of the spring may change because of the initial fatigue, etc. of the spring. Therefore, be sure to make reevaluation.
- If the standard figure cannot be achieved by

adjusting the adjuster and changing the set length, replace the spring with an optional one and make readjustment.



EAM30177

### SETTING OF SPRING AFTER REPLACEMENT

After replacement, be sure to adjust the spring to the set length [sunken length 90–100 mm (3.5–3.9 in)] and set it.

#### 1. Use of soft spring

- Adjust to decrease rebound damping force to compensate for less spring load. Run with the rebound damping force adjuster one or two clicks turned out, and readjust it to suit your preference.

#### 2. Use of stiff spring

- Adjust to increase rebound damping force to compensate for greater spring load. Run with the rebound damping force adjuster one or two clicks turned in, and readjust it to suit your preference.

#### TIP

Adjusting the rebound damping force will be followed more or less by a change in the compression damping force. For correction, adjust to decrease compression damping force.

EWA19200

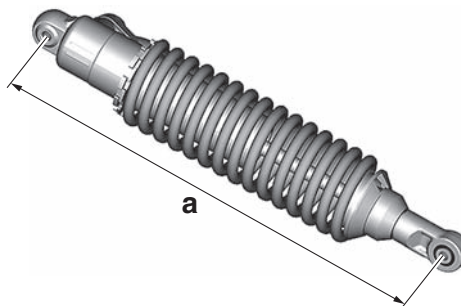


#### WARNING

When using a rear shock absorber other than currently installed, use the one whose overall length “a” does not exceed the standard as it may result in faulty performance. Never use one whose overall length is greater than standard.



Length “a” of standard shock  
460.5 mm (18.1 in)



EAM30178

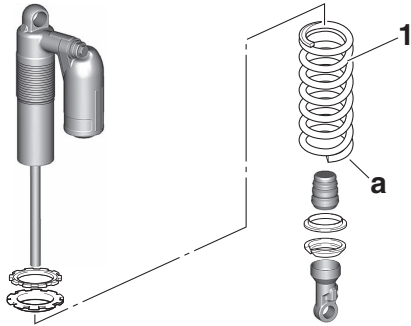
### REAR SHOCK ABSORBER SETTING PARTS

- Rear shock spring “1”

Type	Spring rate N/mm	Part number	I.D. Mark
SOFT	52	BR9-22212-00 (Blue)	Yellow
		BR9-22212-50 (Black)	
	54	BR9-22212-10 (Blue)	Pink
		BR9-22212-60 (Black)	
STD	56	BR9-22212-20 (Blue)	White
		BR9-22212-70 (Black)	
STIFF	58	BR9-22212-30 (Blue)	Silver
		BR9-22212-80 (Black)	
	60	BR9-22212-40 (Blue)	Brown
		BR9-22212-90 (Black)	

#### TIP

- The I.D. mark “a” is marked at the end of the spring.
- Spring specification varies according to the color of I.D. marks.



- Spring preload adjusting positions

**Spring preload adjusting positions****Minimum**

Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.

**Standard**

Position in which the spring is turned in 6.0 mm (0.24 in) from its free length.

**Maximum**

Position in which the spring is turned in 18.0 mm (0.71 in) from its free length.

**TIP**

For the spring preload adjustment, refer to “ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY” on page 3-30.

EAM30179

**SUSPENSION SETTING (FRONT FORK)****TIP**

- If any of the following symptoms is experienced with the standard position as the base, make resetting by reference to the adjustment procedure given in the same chart.
- Before any change, set the rear shock absorber sunken length to the standard figure 90–100 mm (3.5–3.9 in).

Symptom	Section				Check	Adjust
	Jump	Large gap	Medium gap	Small gap		
Stiff over entire range	√	√	√		Compression damping force Oil amount Spring	Turn adjuster counterclockwise (about 2 clicks) to decrease damping. Decrease oil amount by about 5–10 cm <sup>3</sup> (0.2–0.3 US oz, 0.2–0.4 Imp.oz). Replace with soft spring.
Unsmooth movement over entire range	√	√	√	√	Outer tube Inner tube Slide metal Piston metal Lower bracket tightening torque	Check for any bends, dents, other noticeable scars, etc. If any, replace affected parts. Replace with a new one for extended use. Replace with a new one for extended use. Retighten to specified torque.
Poor initial movement				√	Rebound damping force Oil seals	Turn adjuster counterclockwise (about 2 clicks) to decrease damping. Apply grease in oil seal wall.
Soft over entire range, bottoming out	√	√			Compression damping force Oil amount Spring	Turn adjuster clockwise (about 2 clicks) to increase damping. Increase oil amount by about 5–10 cm <sup>3</sup> (0.2–0.3 US oz, 0.2–0.4 Imp.oz). Replace with stiff spring.
Stiff toward stroke end	√				Oil amount	Decrease oil amount by about 5 cm <sup>3</sup> (0.2 US oz, 0.2 Imp.oz).
Soft toward stroke end, bottoming out	√				Oil amount	Increase oil amount by about 5 cm <sup>3</sup> (0.2 US oz, 0.2 Imp.oz).
Stiff initial movement	√	√	√	√	Compression damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.

Symptom	Section				Check	Adjust
	Jump	Large gap	Medium gap	Small gap		
Low front, tending to lower front posture			√	√	Compression damping force	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Rebound damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Balance with rear end	Set sunken length for 95–100 mm (3.7–3.9 in) when one passenger is astride seat (lower rear posture).
					Oil amount	Increase oil amount by about 5 cm <sup>3</sup> (0.2 US oz, 0.2 Imp.oz).
“Obtrusive” front, tending to upper front posture			√	√	Compression damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Balance with rear end	Set sunken length for 90–95 mm (3.5–3.7 in) when one passenger is astride seat (upper rear posture).
					Spring	Replace with soft spring.
					Oil amount	Decrease oil amount by about 5–10 cm <sup>3</sup> (0.2–0.3 US oz, 0.2–0.4 Imp.oz).

EAM30180

## SUSPENSION SETTING (REAR SHOCK ABSORBER)

### TIP

- If any of the following symptoms is experienced with the standard position as the base, make resetting by reference to the adjustment procedure given in the same chart.
- Adjust the rebound damping in 2-click increments or decrements.
- Adjust the low compression damping in 1-click increments or decrements.
- Adjust the high compression damping in 1/6 turn increments or decrements.

Symptom	Section				Check	Adjust
	Jump	Large gap	Medium gap	Small gap		
Stiff, tending to sink			√	√	Rebound damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Spring set length	Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.
Spongy and unstable			√	√	Rebound damping force	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Low compression damping	Turn adjuster clockwise (about 1 click) to increase damping.
					Spring	Replace with stiff spring.

Symptom	Section				Check	Adjust
	Jump	Large gap	Medium gap	Small gap		
Heavy and dragging			√	√	Rebound damping force Spring	Turn adjuster counterclockwise (about 2 clicks) to decrease damping. Replace with soft spring.
Poor road gripping				√	Rebound damping force Low compression damping High compression damping Spring set length Spring	Turn adjuster counterclockwise (about 2 clicks) to decrease damping. Turn adjuster clockwise (about 1 click) to increase damping. Turn adjuster clockwise (about 1/6 turn) to increase damping. Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. Replace with soft spring.
Bottoming out	√	√			High compression damping Spring set length Spring	Turn adjuster clockwise (about 1/6 turn) to increase damping. Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. Replace with stiff spring.
Bouncing	√	√			Rebound damping force Spring	Turn adjuster clockwise (about 2 clicks) to increase damping. Replace with soft spring.
Stiff travel	√	√			High compression damping Spring set length Spring	Turn adjuster counterclockwise (about 1/6 turn) to decrease damping. Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat. Replace with soft spring.





**WIRING DIAGRAM****YZ450FXK 2019**

1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
5. Main relay
6. Engine ground
7. Battery
8. Frame ground
9. Main fuse
10. Starter relay
11. Starter motor
12. Diode 1
13. Diode 2
14. CCU (Communication Control Unit)
15. Warning light
16. Fuel level warning light
17. Engine trouble warning light
18. Resistor
19. Fuel sender
20. Yamaha diagnostic tool coupler
21. ECU (Engine Control Unit)
22. Ignition coil
23. Spark plug
24. Fuel injector
25. Fuel pump
26. Radiator fan motor fuse
27. Radiator fan motor (For JPN)
28. Radiator fan motor relay
29. Intake air temperature sensor
30. Coolant temperature sensor
31. Throttle position sensor
32. Intake air pressure sensor
33. Engine stop switch
34. Gear position switch
35. Mode switch
36. Start switch
37. Diode 3

- A. Battery sub-lead
- B. Wire harness
- C. Ignition coil sub-lead
- D. CCU sub-lead

**COLOR CODE**

B	Black
Br	Brown
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/L	Black/Blue
B/O	Black/Orange
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/W	Brown/White
G/W	Green/White
G/Y	Green/Yellow
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/B	Pink/Black
P/L	Pink/Blue
R/B	Red/Black
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
W/B	White/Black
W/G	White/Green
Y/G	Yellow/Green
Y/R	Yellow/Red
Y/W	Yellow/White



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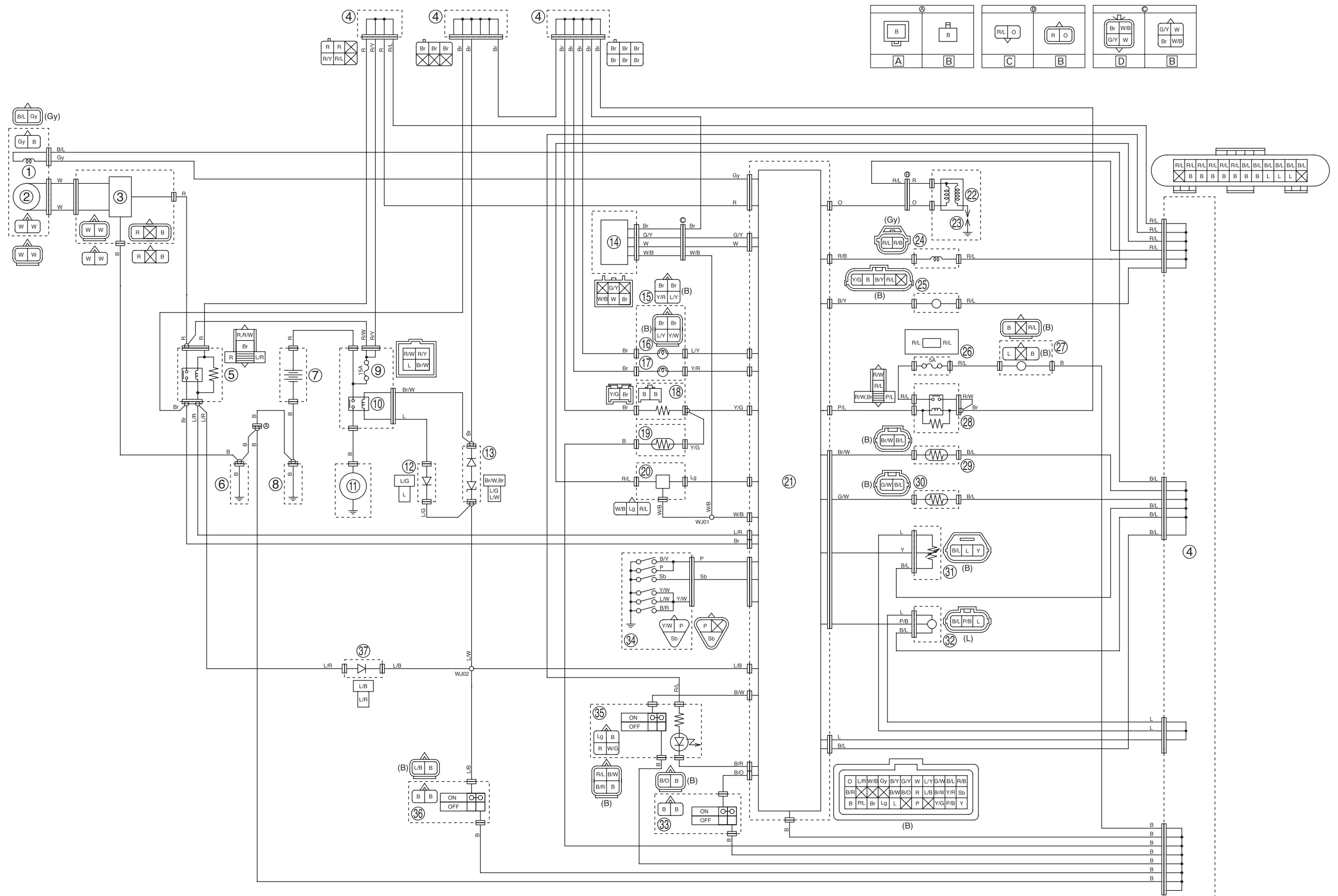
Find out more at [yamaha-motor.com](http://yamaha-motor.com)



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## YZ450FXK 2019 WIRING DIAGRAM



YZ450FXK 2019  
WIRING DIAGRAM

