YAMAHA

2022

OWNER'S SERVICE MANUAL

YZ450F

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

YZ450FN

LIT-11626-35-03

B2W-2819U-12

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

⚠ **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).

EAM20080

YZ450FN
OWNER'S SERVICE MANUAL
©2022 by Yamaha Motor Corporation, U.S.A.
First edition, March 2021
All rights reserved.
Any reproduction or unauthorized use
without the written permission of
Yamaha Motor Corporation, U.S.A.
is expressly prohibited.
P/N. LIT-11626-35-03

EAM20180

IMPORTANT

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.

EWA20270

⚠ WARNING

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 SAFETY ENJOY THE CAPABILITIES AND THE RELIABILITY OF THIS MACHINE.

EAM30001

IMPORTANT MANUAL INFORMATION

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

⚠	**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.**

⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**

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

EAM20162

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 materiel 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:

a. Installation of parts or accessories that are not qualitatively equivalent to genuine Yamaha parts.
b. Abnormal strain, neglect, or abuse.
c. Accident or collision damage.
d. Modification to original parts.
e. Lack of proper maintenance.
f . 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:

1. Operate and maintain the YZ as specified in the appropriate Owner's Service Manual, and
2. 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:

1. Completely set up every new machine before sale.
2. 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 deale'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

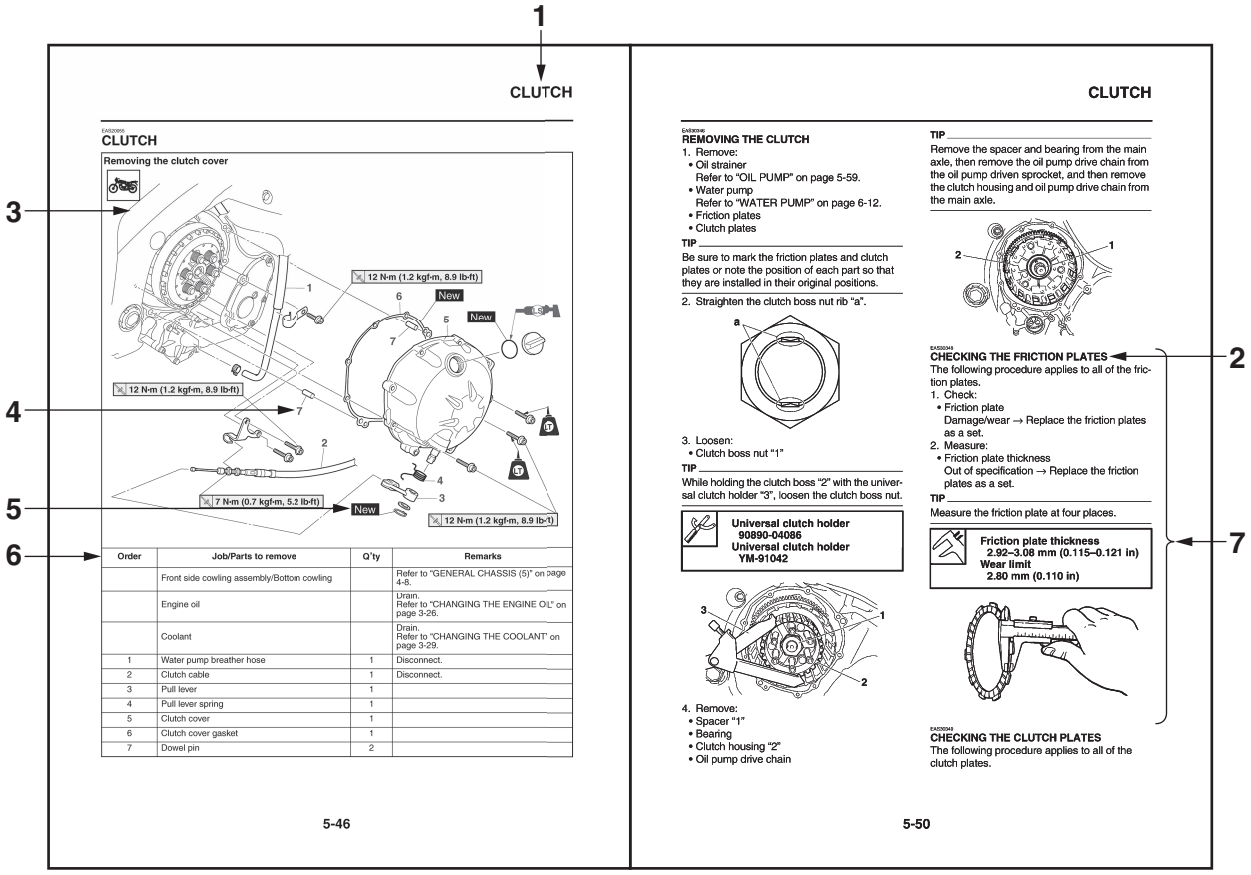
This will ensure that Yamaha Motor Corporation, U.S.A. has an up-to-date registration record in accordance with federal law.

EAM20082

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.



G088877

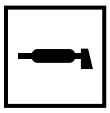
EAM20083

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.

EAM10003

TABLE OF CONTENTS

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

GENERAL INFORMATION

SAFETY INFORMATION 1-1
FOR SAFETY, BE SURE TO OBEY THE FOLLOWING: 1-1

LOCATION OF IMPORTANT LABELS 1-4

DESCRIPTION 1-5

IDENTIFICATION 1-6
VEHICLE IDENTIFICATION NUMBER 1-6
ENGINE SERIAL NUMBER 1-6

INCLUDED PARTS 1-7
SIDESTAND 1-7
NIPPLE WRENCH 1-7
HANDLEBAR PROTECTOR 1-7
FUEL HOSE JOINT COVER 1-7
POWER TUNER 1-7

IMPORTANT INFORMATION 1-9
PREPARATION FOR REMOVAL AND DISASSEMBLY 1-9
REPLACEMENT PARTS 1-9
GASKETS, OIL SEALS AND O-RINGS 1-9
LOCK WASHERS/PLATES AND COTTER PINS 1-10
BEARINGS AND OIL SEALS 1-10
CIRCLIPS 1-10

BASIC SERVICE INFORMATION 1-11
ELECTRICAL SYSTEM 1-11

SPECIAL TOOLS 1-15

INSTRUMENT AND CONTROL FUNCTIONS 1-21
ENGINE STOP SWITCH 1-21
START SWITCH 1-21
LAUNCH CONTROL SWITCH 1-21
MODE SWITCH 1-21
SHIFT PEDAL 1-22
FRONT BRAKE LEVER 1-22
REAR BRAKE PEDAL 1-22
STARTER KNOB 1-22
FUEL TANK CAP 1-23

STARTING AND BREAK-IN 1-24
FUEL 1-24
STARTING A COLD ENGINE 1-24

STARTING A WARM ENGINE 1-25
BREAK-IN PROCEDURES 1-25
ENGINE STARTING PRECAUTION 1-25

MAINTENANCE AFTER BREAK-IN 1-26
MAJOR MAINTENANCE 1-26
AIR FILTER MAINTENANCE 1-26

TORQUE-CHECK POINTS.....1-27

MOTORCYCLE CARE AND STORAGE.....1-29
CARE.....1-29
STORAGE 1-30

EAM20168

SAFETY INFORMATION

Be sure to read this manual carefully and completely in order to operate the machine safely and correctly prior to riding the Yamaha machine, and take care to maintain it properly and operate it safely.

EAM30401

FOR SAFETY, BE SURE TO OBEY THE FOLLOWING:

Be a Responsible Owner

As the vehicle's owner, you are responsible for the safe and proper operation of your motorcycle.

Motorcycles are single-track vehicles.

Their safe use and operation are dependent upon the use of proper riding techniques as well as the expertise of the operator. Every operator should know the following requirements before riding this motorcycle.

He or she should:

1. Obtain thorough instructions from a competent source on all aspects of motorcycle operation.
2. Observe the warnings and maintenance requirements in this manual.
3. Obtain qualified training in safe and proper riding techniques.
4. Obtain professional technical service as indicated in this manual and/or when made necessary by mechanical conditions.
5. Never operate a motorcycle without proper training or instruction. Take a training course. Beginners should receive training from a certified instructor. Contact an authorized motorcycle dealer to find out about the training courses nearest you.

Safe Riding

Perform the pre-operation checks each time you use the vehicle to make sure it is in safe operating condition. Failure to inspect or maintain the vehicle properly increases the possibility of an accident or equipment damage. Refer to "PRE-OPERATION INSPECTION AND MAINTENANCE" on page 3-5 for a list of pre-operation checks.

1. This motorcycle is designed for off-road use only, therefore, it is illegal to operate it on public streets, roads, or highways, even a dirt or gravel one. Off-road use on public lands may be illegal. Please check local regulations before riding.
2. This motorcycle is designed to carry the operator only. No passengers.
3. The failure of motorists to detect and recognize motorcycles in traffic is the predominating cause of automobile/motorcycle accidents. Many accidents have been caused by an automobile driver who did not see the motorcycle. Making yourself conspicuous appears to be very effective in reducing the chance of this type of accident.

   Therefore:

   - Wear a brightly colored jacket.
   - Use extra caution when you are approaching and passing through intersections, since intersections are the most likely places for motorcycle accidents to occur.
   - Ride where other motorists can see you. Avoid riding in another motorist's blind spot.
   - Never maintain a motorcycle without proper knowledge. Contact an authorized motorcycle dealer to inform you on basic motorcycle maintenance. Certain maintenance can only be carried out by certified staff.
4. Many accidents involve inexperienced operators.
   - Make sure that you are qualified and that you only lend your motorcycle to other qualified operators.
   - Know your skills and limits. Staying within your limits may help you to avoid an accident.
   - We recommend that you practice riding your motorcycle until you have become thoroughly familiar with the motorcycle and all of its controls.
5. Many accidents have been caused by error of the motorcycle operator. A typical error made by the operator is veering wide on a turn due to excessive speed or under cornering (insufficient lean angle for the speed). Never travel faster than warranted by conditions.
6. Ride cautiously in unfamiliar areas. You may encounter hidden obstacles that could cause an accident.
7. The posture of the operator is important for proper control. The operator should keep both hands on the handlebar and both feet on the operator footrests during operation to maintain control of the motorcycle.
8. Never ride under the influence of alcohol or other drugs.
9. Be sure the transmission is in neutral before starting the engine.

Protective Apparel

The majority of fatalities from motorcycle acci-

dents are the result of head injuries. The use of a safety helmet is the single most critical factor in the prevention or reduction of head injuries.

1. Always wear an approved helmet.
2. Wear a face shield or goggles. Wind in your unprotected eyes could contribute to an impairment of vision that could delay seeing a hazard.
3. The use of a jacket, heavy boots, trousers, gloves, etc., is effective in preventing or reducing abrasions or lacerations.
4. Never wear loose-fitting clothes, otherwise they could catch on the control levers, footrests, or wheels and cause injury or an accident.
5. Always wear protective clothing that covers your legs, ankles, and feet. The engine or exhaust system become very hot during or after operation and can cause burns.

Avoid Carbon Monoxide Poisoning

All engine exhaust contains carbon monoxide, a deadly gas. Breathing carbon monoxide can cause headaches, dizziness, drowsiness, nausea, confusion, and eventually death.

Carbon Monoxide is a colorless, odorless, tasteless gas which may be present even if you do not see or smell any engine exhaust. Deadly levels of carbon monoxide can collect rapidly and you can quickly be overcome and unable to save yourself. Also, deadly levels of carbon monoxide can linger for hours or days in enclosed or poorly ventilated areas. If you experience any symptoms of carbon monoxide poisoning, leave the area immediately, get fresh air, and SEEK MEDICAL TREATMENT.

1. Do not run engine indoors. Even if you try to ventilate engine exhaust with fans or open windows and doors, carbon monoxide can rapidly reach dangerous levels.
2. Do not run engine in poorly ventilated or partially enclosed areas such as barns, garages, or carports.
3. Do not run engine outdoors where engine exhaust can be drawn into a building through openings such as windows and doors.

Genuine Yamaha Accessories

Choosing accessories for your vehicle is an important decision. Genuine Yamaha accessories, which are available only from a Yamaha dealer, have been designed, tested, and approved by Yamaha for use on your vehicle.

Many companies with no connection to Yamaha manufacture parts and accessories or offer other modifications for Yamaha vehicles. Yamaha is not in a position to test the products that these aftermarket companies produce. Therefore, Yamaha can neither endorse nor recommend the use of accessories not sold by Yamaha or modifications not specifically recommended by Yamaha, even if sold and installed by a Yamaha dealer.

Aftermarket Parts, Accessories, and Modifications

While you may find aftermarket products similar in design and quality to genuine Yamaha accessories, recognize that some aftermarket accessories or modifications are not suitable because of potential safety hazards to you or others. Installing aftermarket products or having other modifications performed to your vehicle that change any of the vehicle's design or operation characteristics can put you and others at greater risk of serious injury or death. You are responsible for injuries related to changes in the vehicle. Keep the following guidelines in mind, as well as those provided under "Loading" when mounting accessories.

1. Never install accessories that would impair the performance of your motorcycle. Carefully inspect the accessory before using it to make sure that it does not in any way reduce ground clearance or cornering clearance, limit suspension travel, steering travel or control operation.
   - Accessories fitted to the handlebar or the front fork area can create instability due to improper weight distribution. If accessories are added to the handlebar or front fork area, they must be as lightweight as possible and should be kept to a minimum.
   - Bulky or large accessories may seriously affect the stability of the motorcycle. Wind may attempt to lift the motorcycle, or the motorcycle may become unstable in cross winds.
   - Certain accessories can displace the operator from his or her normal riding position. This improper position limits the freedom of movement of the operator and may limit control ability, therefore, such accessories are not recommended.
2. Use caution when adding electrical accessories. If electrical accessories exceed the capacity of the motorcycle's electrical system, an electric failure could result, which could cause a dangerous loss of lights or engine power.

Aftermarket Tires and Rims

The tires and rims that came with your motorcycle were designed to match the performance capabilities and to provide the best combination of handling, braking, and comfort. Other tires, rims, sizes, and combinations may not be appropriate. Refer to "CHECKING THE TIRES" on page 3-32 for tire specifications and more information on replacing your tires.

Transporting the Motorcycle

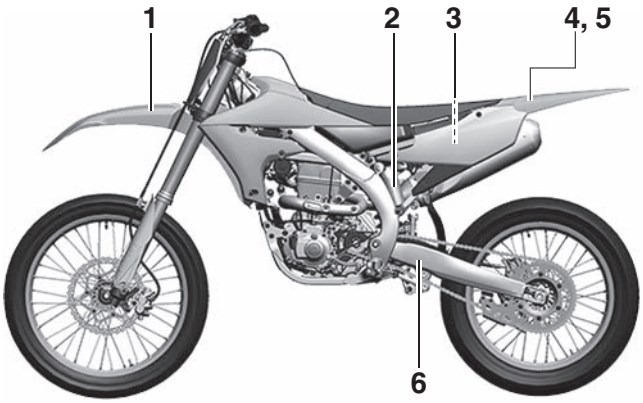
Be sure to observe following instructions before transporting the motorcycle in another vehicle.

1. Remove all loose items from the motorcycle.
2. Check that the fuel cock (if equipped) is in the "OFF" position and that there are no fuel leaks.
3. Point the front wheel straight ahead on the trailer or in the truck bed, and choke it in a rail to prevent movement.
4. Shift the transmission in gear (for models with a manual transmission).
5. Secure the motorcycle with tie-downs or suitable straps that are attached to solid parts of the motorcycle, such as the frame or upper front fork triple clamp (and not, for example, to rubber-mounted handlebars or turn signals, or parts that could break). Choose the location for the straps carefully so the straps will not rub against painted surfaces during transport.
6. The suspension should be compressed somewhat by the tie-downs, if possible, so that the motorcycle will not bounce excessively during transport.

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.

RECYCLE RBRC Li-Ion 1.800.822.8837

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

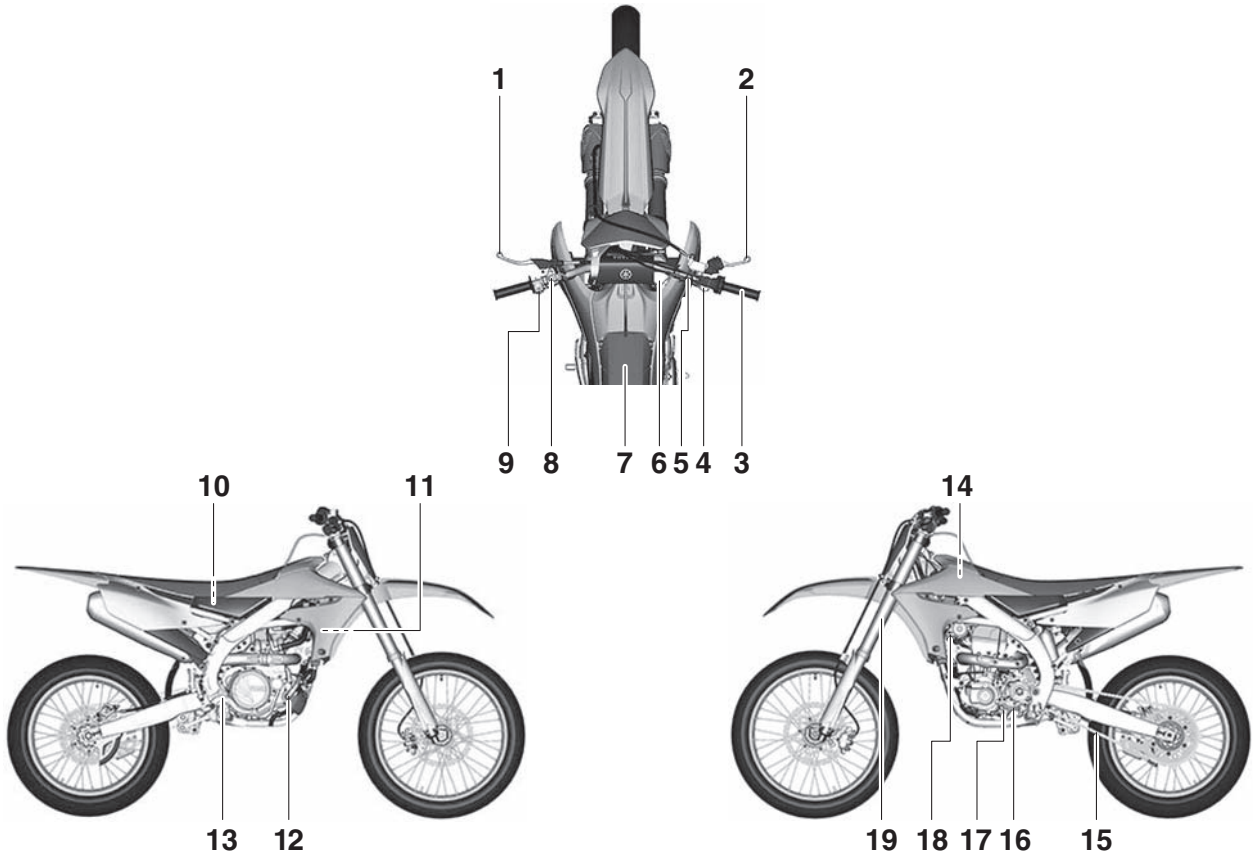
6

TIRE INFORMATION

Cold tire normal pressure should be set as follows.
FRONT : 100kPa, {1.00kgf/cm^2}, 15psi
REAR : 100kPa, {1.00kgf/cm^2}, 15psi

3RV-21668-A0

EAM20086
DESCRIPTION



1. Clutch lever
2. Front brake lever
3. Throttle grip
4. Start switch
5. Launch control switch
6. Radiator cap
7. Fuel tank cap
8. Mode switch
9. Engine stop switch
10. Fuel tank
11. Radiator
12. Coolant drain bolt
13. Rear brake pedal
14. Air filter
15. Drive chain
16. Shift pedal
17. Oil level check window
18. Starter knob
19. 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.

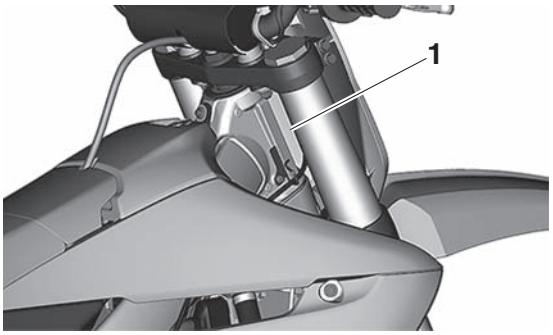
EAM20087
IDENTIFICATION

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.

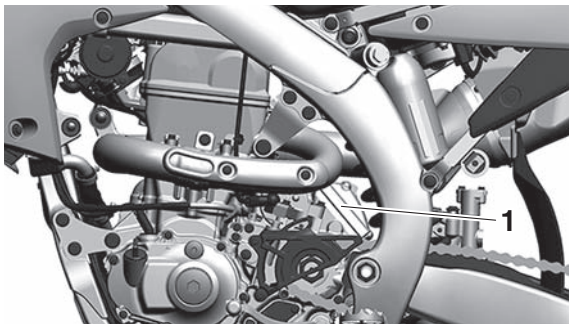
EAM30002
VEHICLE IDENTIFICATION NUMBER

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



EAM30003
ENGINE SERIAL NUMBER

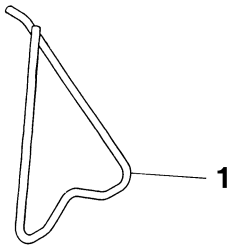
The engine serial number “1” is stamped into the elevated part of the right-side of the engine.



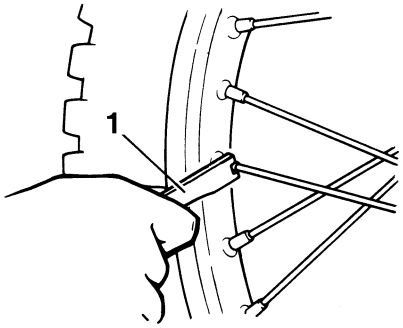
EAM20088
INCLUDED PARTS

EAM30190
SIDESTAND
This sidestand “1” is used to support only the machine when standing or transporting it.

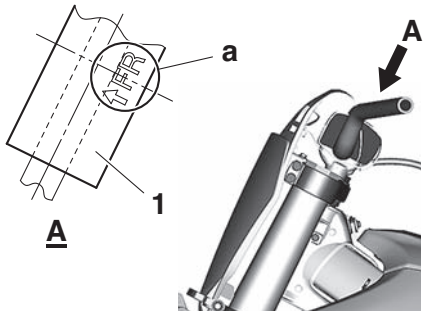
EWA20260
⚠ WARNING
- **Never apply additional force to the sidestand.**
- **Remove this sidestand before starting out.**



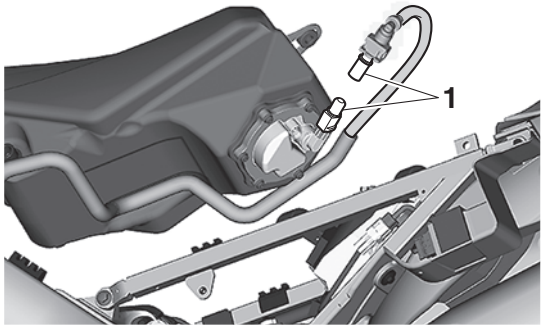
EAM30005
NIPPLE WRENCH
The nipple wrench “1” is used to tighten the spoke.



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.



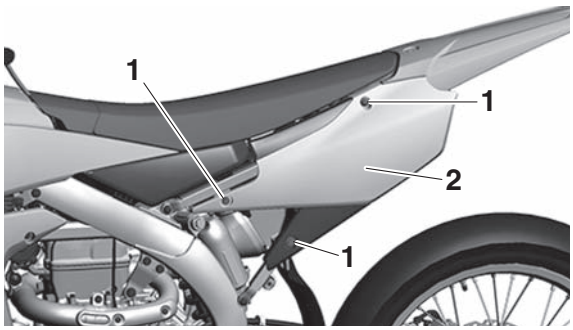
EAM30443
POWER TUNER
By downloading the Power Tuner app to your smartphone and wirelessly connecting to the CCU wireless network, you can adjust various vehicle settings.

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.**

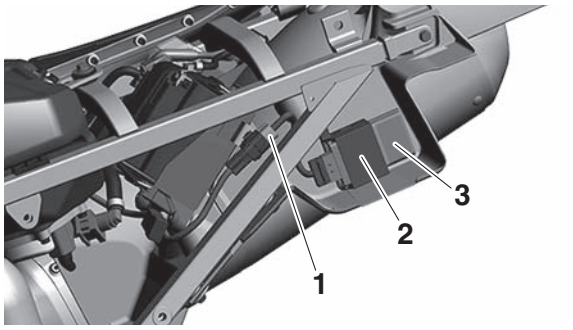
TIP
- Download the Power Tuner app from the Google© or Apple© store.
- For details about handling the smartphone, read the owner’s manual of the smartphone.

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).

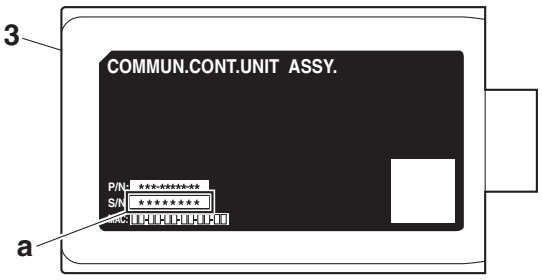


1. Bolt
2. Side cover (left)

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.

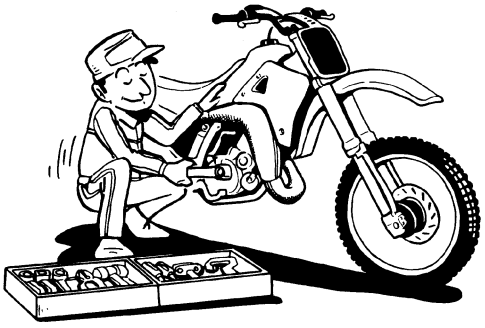
EAM20089
IMPORTANT INFORMATION

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.
   Refer to “CARE” on page 1-29.



2. Use proper special tools and equipment. Refer to “SPECIAL TOOLS” on page 1-15.



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.**

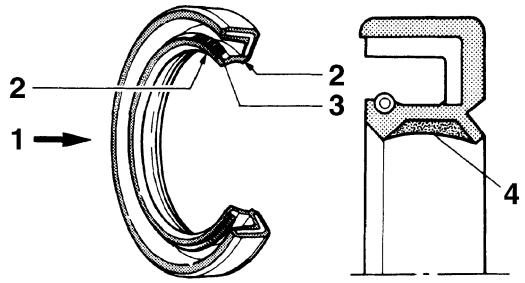
EAM30010
REPLACEMENT PARTS

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.

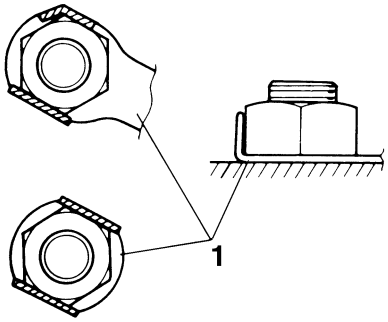


1. Oil
2. Lip
3. Spring
4. Grease

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

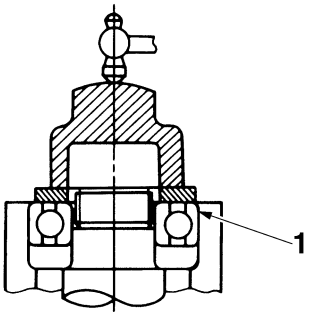
BEARINGS AND OIL SEALS

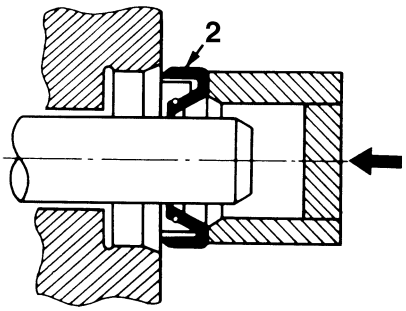
Install bearings “1” and oil seals “2” with their manufacturer’s marks or size symbols facing outward. During installation of an oil seal, make sure that its main lip faces the oil chamber (the target to be sealed). Before installation, always apply a light coat of grease to the oil seal lip.

ECA13300

NOTICE

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

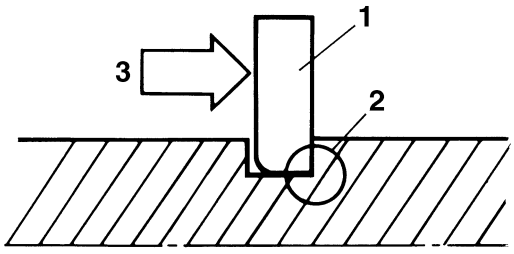




EAM30014

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.

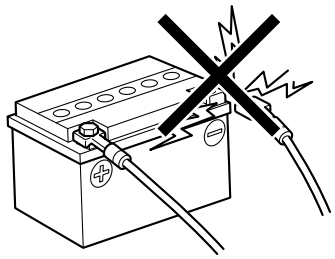


EAM20120
BASIC SERVICE INFORMATION

EAM30181
ELECTRICAL SYSTEM
Electrical parts handling

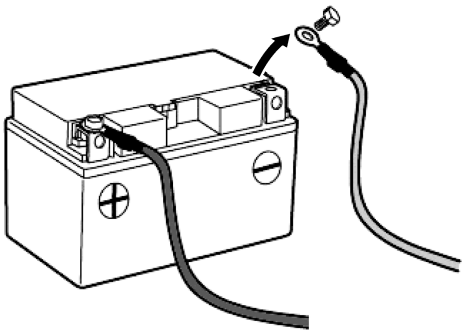
ECA16600
NOTICE

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

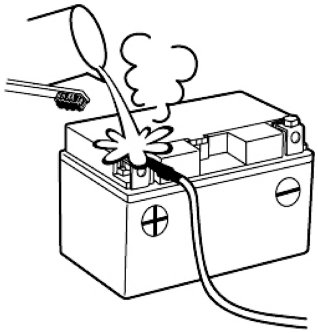


ECA16751
NOTICE

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.

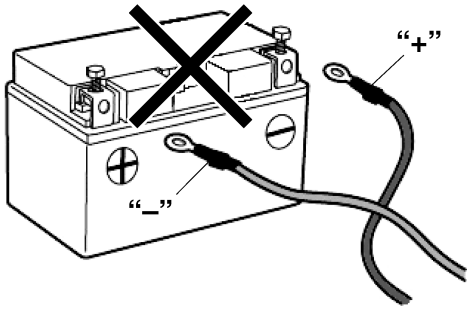


TIP
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



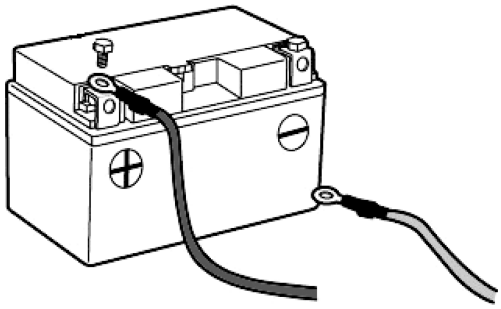
ECA16760
NOTICE

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



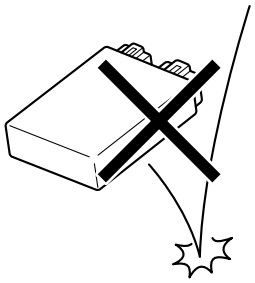
ECA16771
NOTICE

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

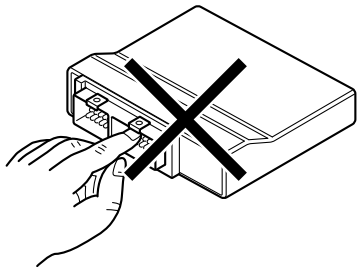
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

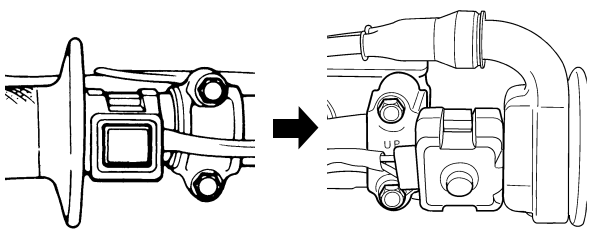
NOTICE

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

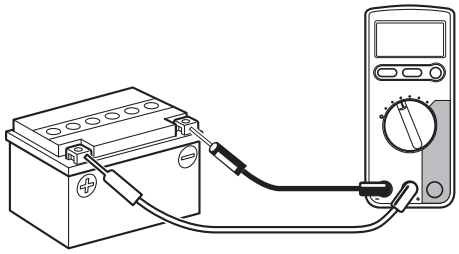
Push and hold the engine stop switch to turn off the multi-function display when resetting the ECU (Engine Control Unit). Disconnect the starter motor lead of the starter relay, and then push the starter switch. Be sure to wait for five seconds or longer before pushing the start switch after the multi-function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



Checking the electrical system

TIP

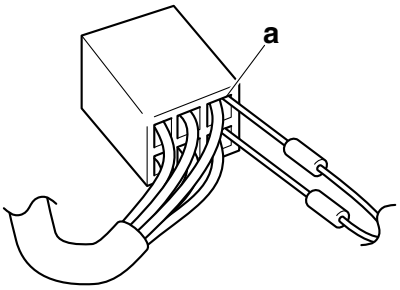
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

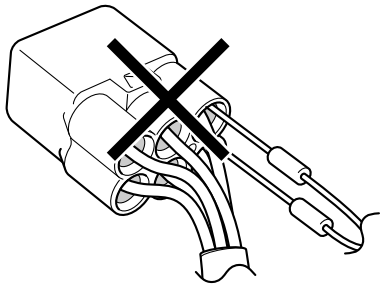
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



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

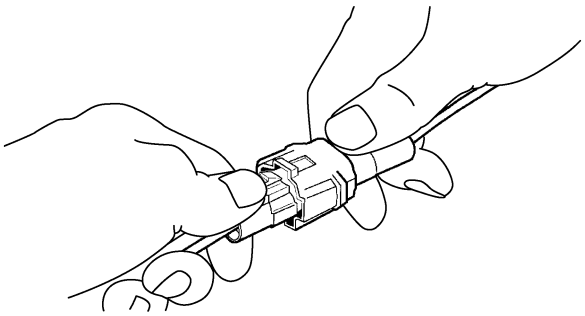
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - Lead
   - Coupler
   - Connector

ECA16780

NOTICE

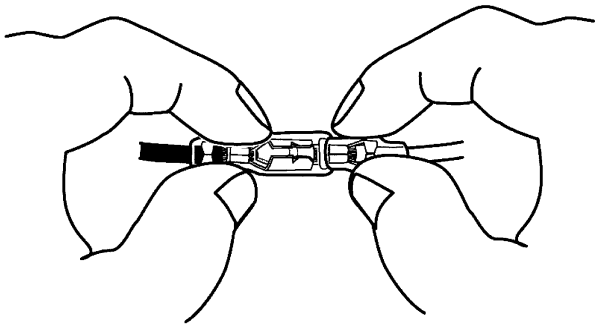
• When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
• There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



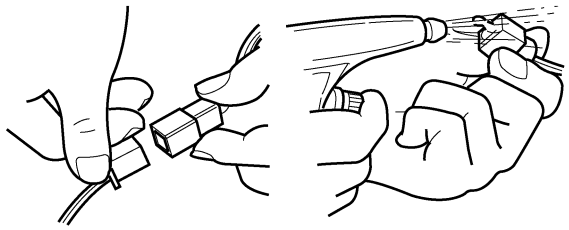
ECA16790

NOTICE

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



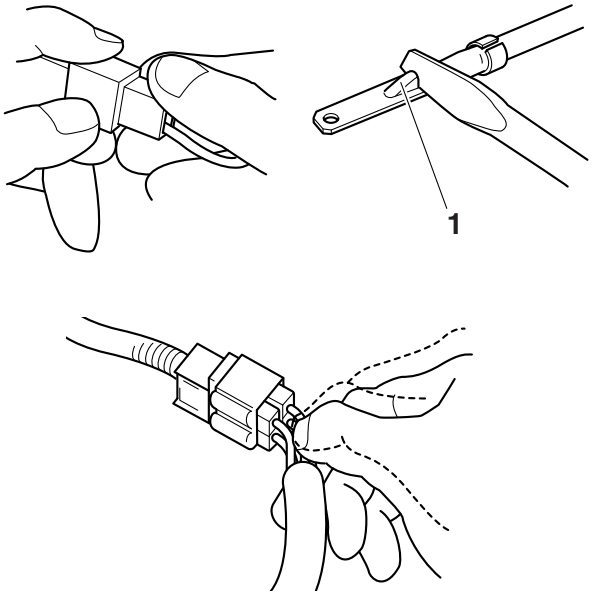
2. Check:
   • Lead
   • Coupler
   • Connector
   Moisture → Dry with compressed air.
   Rust/stains → Connect and disconnect several times.



3. Check:
   • All connections
   Loose connection → Connect properly.

TIP

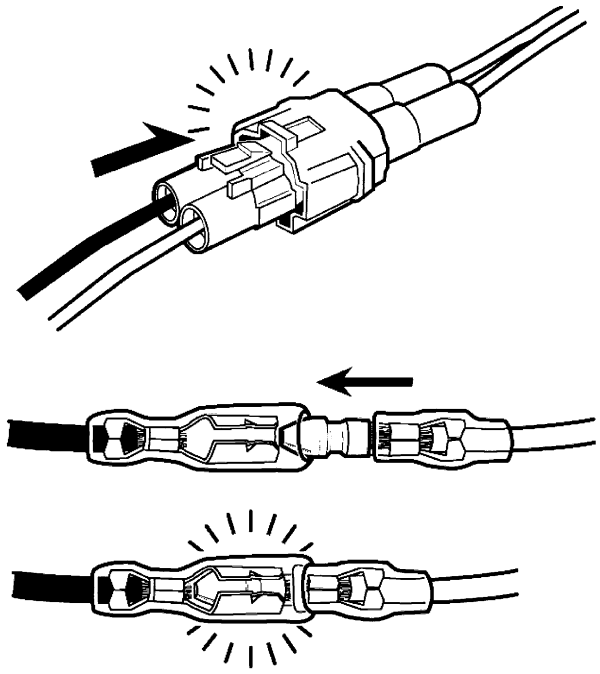
• If the pin "1" on the terminal is flattened, bend it up.
• After disassembling or assembling a coupler, pull on the leads to make sure that they are installed securely.

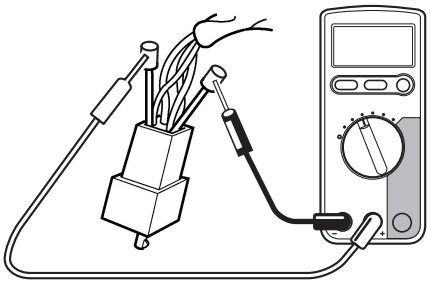


4. Connect:
   • Lead
   • Coupler
   • Connector

TIP

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



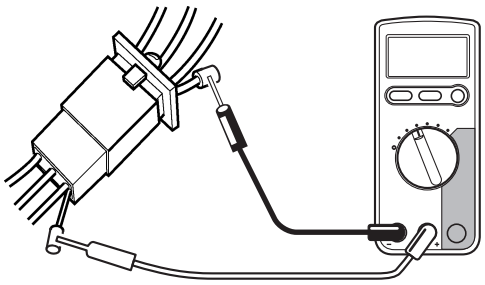


5. Check:
   • No continuity

	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.



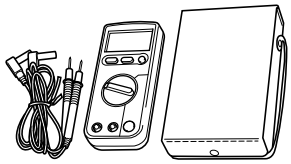
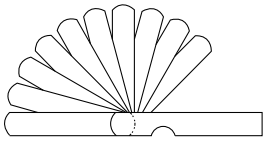
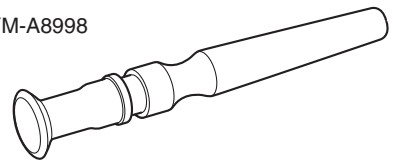
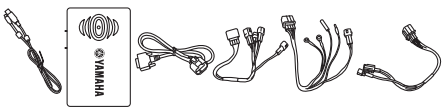
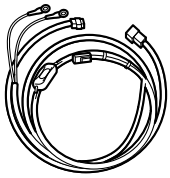
EAM20121

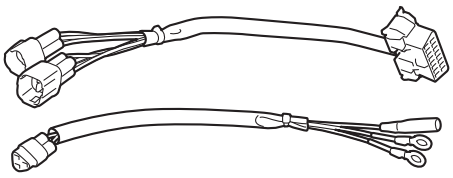
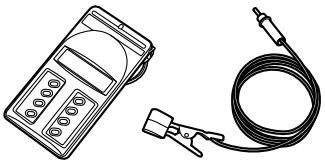
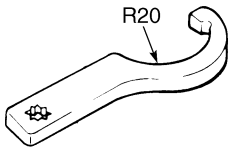
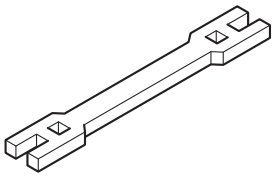
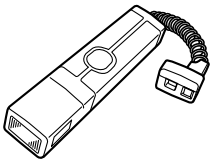
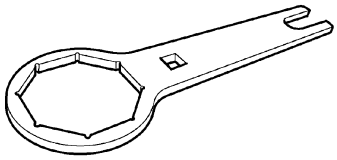
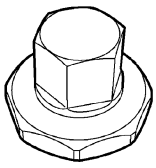
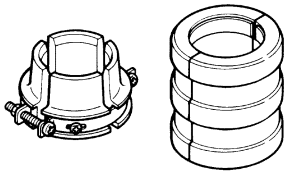
SPECIAL TOOLS

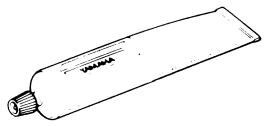
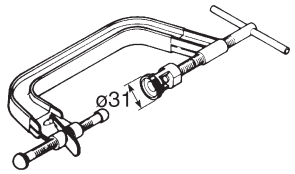
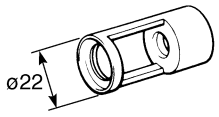
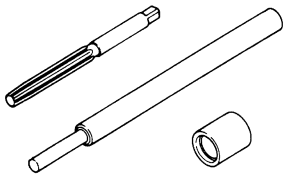
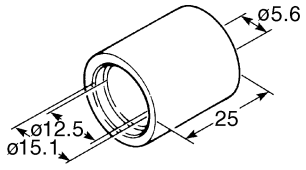
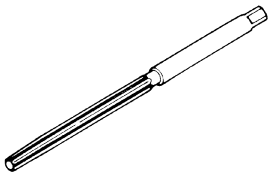
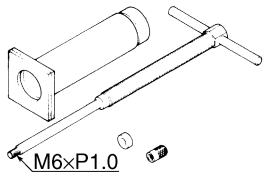
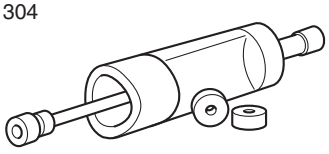
The following special tools are required for accurate and complete adjustment and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and tool number used for the special tool differ by country, so two types are provided.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

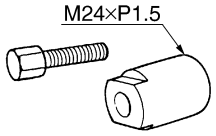
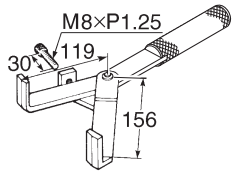
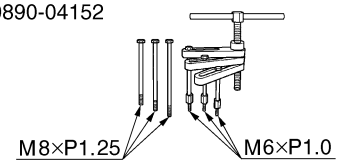
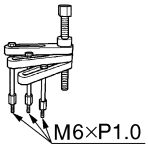
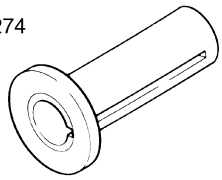
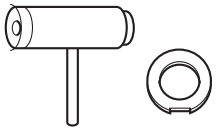
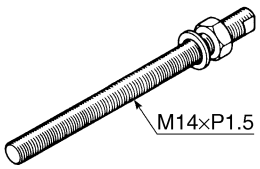
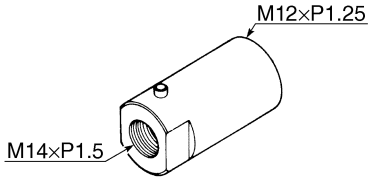
TIP

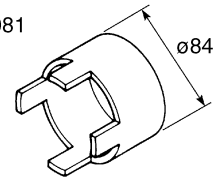
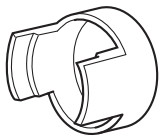
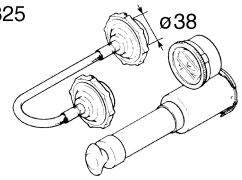
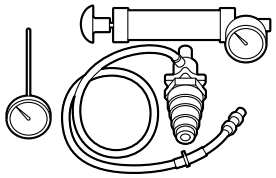
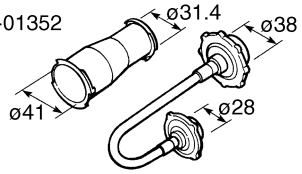
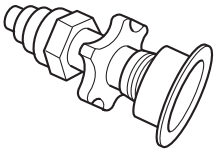
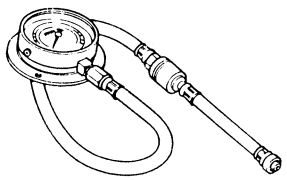
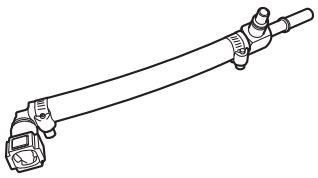
- For U.S.A. and Canada, use tool number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use tool number starting with “90890-”.

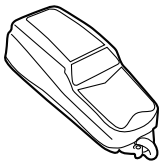
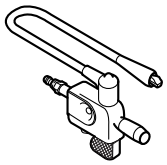
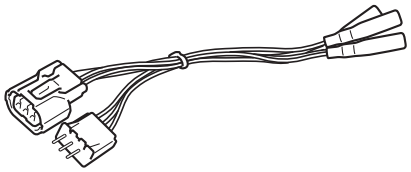
Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		1-14, 5-44, 8-44, 8-45, 8-47, 8-47, 8-49, 8-49, 8-49, 8-49, 8-50, 8-51, 8-51, 8-52, 8-52, 8-53, 8-53
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-6, 5-49
Valve lapper (ø14) 90890-04101 Valve lapper (ø14) YM-A8998	90890-04101  YM-A8998 	3-7, 5-26
Yamaha diagnostic tool USB (US) 90890-03269		3-11, 7-8, 8-17
Yamaha diagnostic tool (A/I) 90890-03264		3-11, 7-8, 8-17
FI diagnostic tool sub–lead 90890-03212 FI diagnostic tool sub–lead YU-03212		3-11, 7-8, 8-17

Tool name/Tool No.	Illustration	Reference pages
OBD/ GST Leadwire kit 90890-03249		3-11, 7-8, 8-17
Digital tachometer 90890-06760 Digital tachometer YU-39951-B		3-11, 3-35, 8-51
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-27, 4-56
Spoke nipple wrench (6–7) 90890-01521 Spoke nipple wrench (6–7) YM-01521		3-33
Timing light 90890-03141 Timing light YU-03141		3-35
Cap bolt ring wrench 90890-01501 Cap bolt ring wrench YM-01501		4-44, 4-44, 4-45, 4-48, 4-51, 4-53
Cap bolt wrench 90890-01500 Cap bolt wrench YM-01500		4-45, 4-48
Fork seal driver 90890-01502 Fork seal driver (48) YM-A0948		4-49, 4-50

Tool name/Tool No.	Illustration	Reference pages
Yamaha bond No. 1215 90890-85505 Three bond No. 1215®		5-19, 5-38, 5-66
Valve spring compressor 90890-04200 Valve spring compressor YM-04019		5-26, 5-30
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-26, 5-30
Valve guide remover & installer set (ø5.5) 90890-04016 Valve guide remover (5.5 mm) YM-01122		5-28
Valve guide installer (ø5.5) 90890-04015 Valve guide installer (5.5 mm) YM-04015		5-28
Valve guide reamer (5.5 mm) 90890-01196 Valve guide reamer (5.5 mm) YM-01196		5-28
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-33

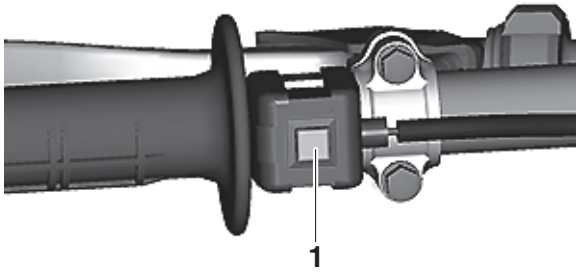
Tool name/Tool No.	Illustration	Reference pages
Rotor puller 90890-04151 Rotor puller YM-04151		5-38
Clutch holder 90890-04199 Universal clutch holder YM-91042		5-49, 5-52
Crankcase separating tool 90890-04152 Crankcase separating tool YU-A9642	90890-04152  YU-A9642 	5-68
Crankshaft installer pot 90890-01274 Installing pot YU-90058	90890-01274  YU-90058/YU-90059 	5-69
Crankshaft installer bolt 90890-01275 Bolt YU-90060		5-69
Adapter (M12) 90890-01278 Adapter #3 YU-90063		5-69

Tool name/Tool No.	Illustration	Reference pages
Spacer (crankshaft installer) 90890-04081 Pot spacer YM-91044	90890-04081  YM-91044 	5-69
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	6-4, 6-4
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984 	6-4, 6-4
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-8
Fuel pressure adapter 90890-03186 Fuel pressure adapter YM-03186		7-8

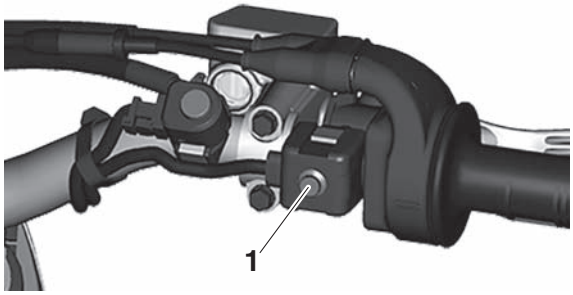
Tool name/Tool No.	Illustration	Reference pages
Lithium battery charger 90890-05376 Lithium battery charger DBY-ACC51-70-02		8-46, 8-46
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-48
Test harness S– pressure sensor (3P) 90890-03207 Test harness S– pressure sensor (3P) YU-03207		8-52

EAM20181
INSTRUMENT AND CONTROL FUNCTIONS

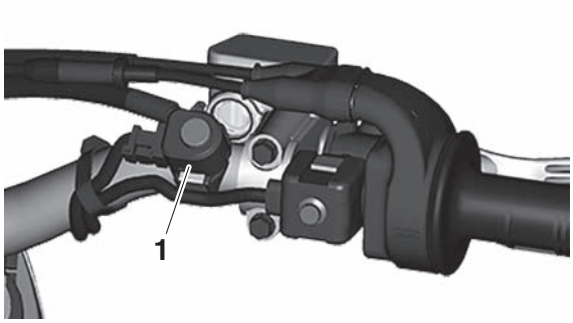
EAM30182
ENGINE STOP SWITCH
The engine stop switch “1” is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.



EAM30183
START SWITCH
The start switch “1” is located on the right handlebar. Push this switch to crank the engine with the starter.



EAM30384
LAUNCH CONTROL SWITCH
The launch control switch “1” is located on top of the right handlebar.
When the launch control switch is pressed, the ignition timing is delayed to reduce slipping at the rear wheel which occurs when the vehicle accelerates from a stationary position.
This can be used to starting off in a stable manner on a slippery road surface.
However, the effect may not be adequate depending on the rider’s operations and road surface conditions.



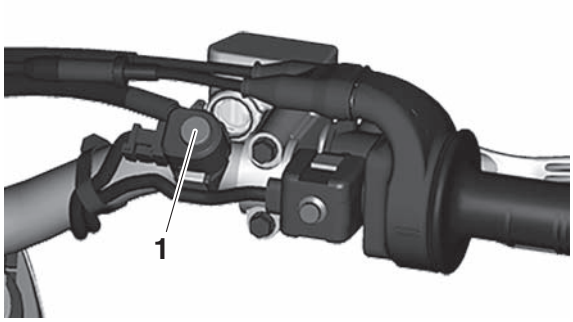
How to operate
1. Put the gear into the neutral position.
2. Start the engine.
3. Push the launch control switch for more than one second to turn on the launch control switch.

TIP
When the launch control switch is turned on, button “1” will flash.

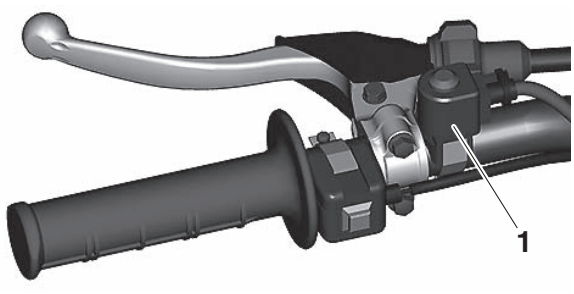
4. Put the gear into the 1st or 2nd gear for starting off.
5. After starting off, the launch control switch will turn off automatically when the gear is shifted into the 3rd gear.

The launch control switch will also turn off when the engine is stopped or the gear is shifted into the 3rd gear or higher.

TIP
When the launch control switch is turned off, button “1” will stop flashing.



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.

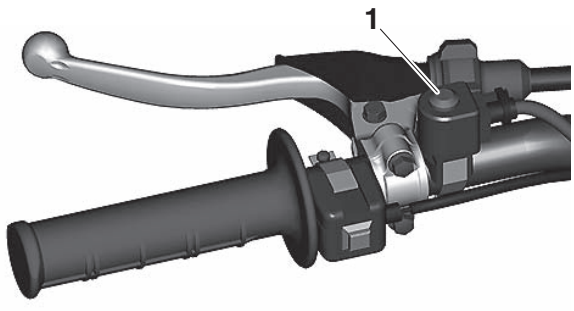


To change the mode

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

TIP

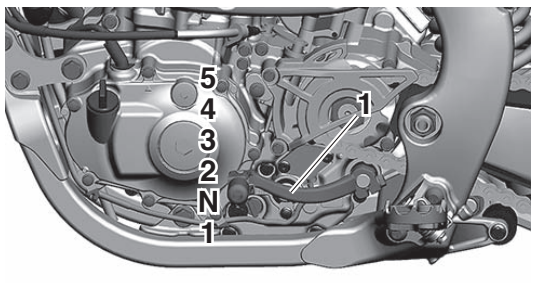
As shipped from the factory, maps 1 and 2 are the same. You must use the Power Tuner app to adjust the map settings.
When the mode switch "1" is illuminated, map 2 is selected.



EAM30185

SHIFT PEDAL

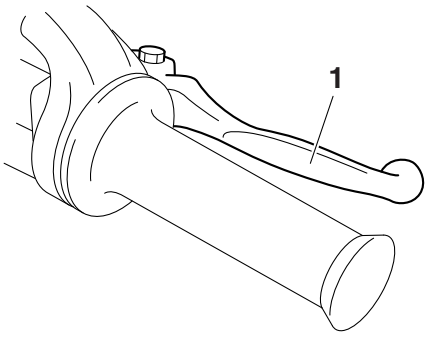
The shift pedal "1" has adopted a method of 1 down & 4 ups (press-down & kick-ups).
Press it down for N (neutral) to 1st, and kick it up for 2nd to 5th.



EAM30188

FRONT BRAKE LEVER

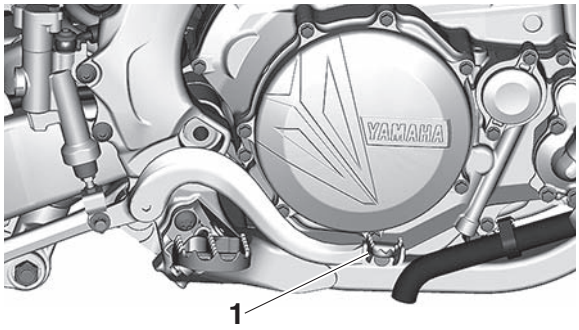
The front brake lever "1" is located on the right handlebar. Pull it toward the handlebar to activate the front brake.



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.



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.

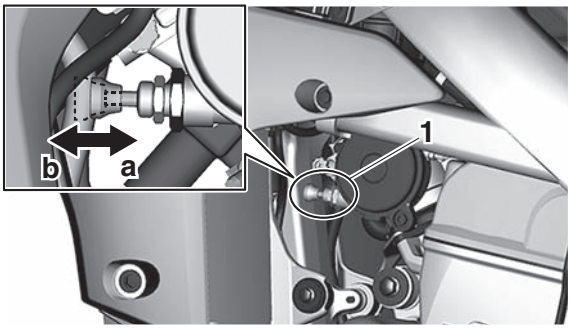
TIP

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

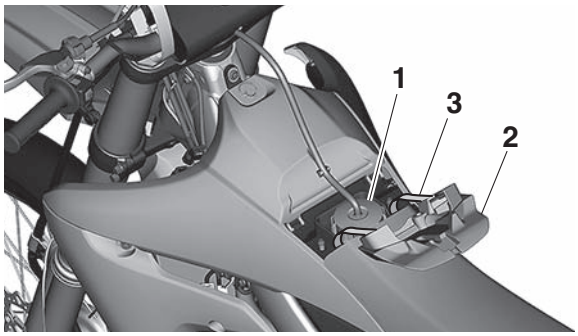
FUEL TANK CAP

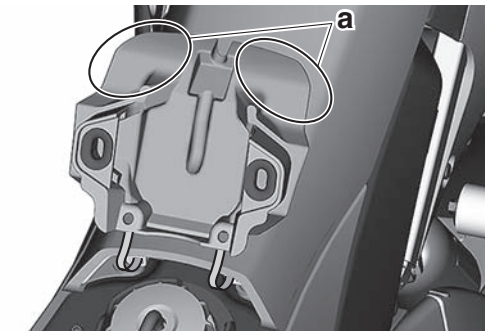
Fuel tank cap “1” is located under the fuel tank cap cover “2”.

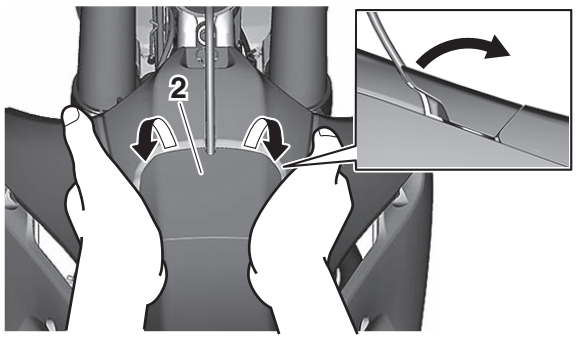
Remove the fuel tank cap cover to open the fuel tank cap.

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
Unleaded gasoline (E10 acceptable)
Octane number (R+M)/2
91 or higher
Fuel tank capacity
6.2 L (1.6 US gal, 1.4 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.

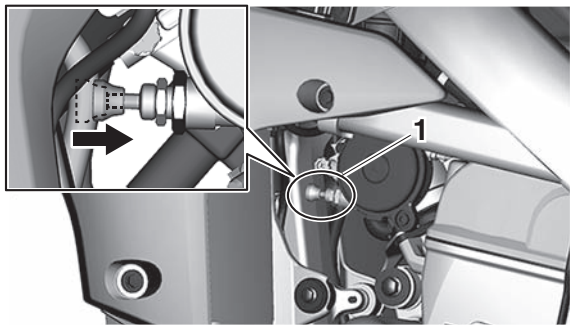
TIP
Your Yamaha engine has been designed to use unleaded gasoline with a pump octane number [(R+M)/2] of 91 or higher, or a research octane number of 95 or higher. If knocking (or pinging) occurs, use a gasoline of a different brand.

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.

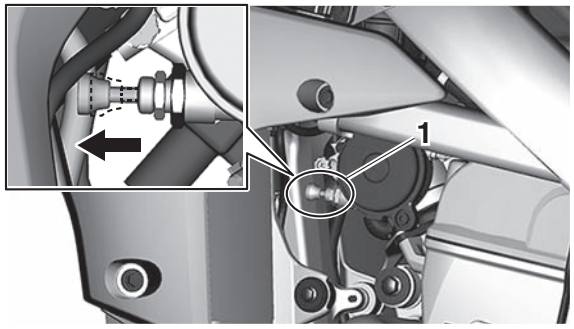
EAM30196
STARTING A COLD ENGINE
1. Press the shift pedal to neutral.
2. Push the starter knob “1” completely.

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.

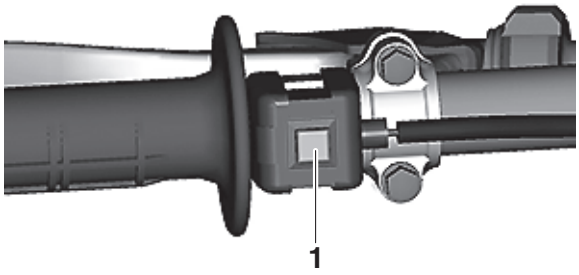
TIP
When operating the throttle grip in the closing direction, the starter knob “1” moves in the direction as shown and returns to its original position.



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.
   - Generator
     Check for looseness in mounted areas of the generator rotor and the stator coil assembly.
     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.

EAM30195
AIR FILTER MAINTENANCE

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.) Refer to “CLEANING THE AIR FILTER ELEMENT” on page 3-15.

EAM20125

TORQUE-CHECK POINTS

Frame construction		Combined seat and fuel tank		Fuel tank to frame
				Frame to rear frame
				Frame to engine protector
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

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 2-9.

EAM20126

MOTORCYCLE CARE AND STORAGE

EAM30200

CARE

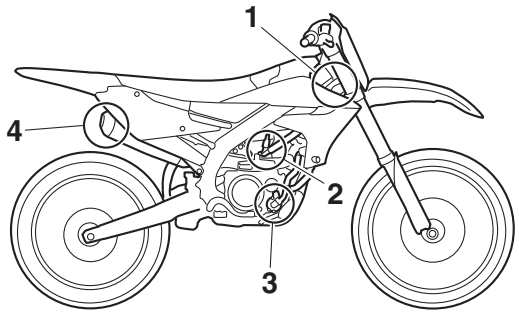
While the open design of a motorcycle reveals the attractiveness of the technology, it also makes it more vulnerable. Rust and corrosion can develop even if high-quality components are used. A rusty exhaust pipe may go unnoticed on a car, however, it detracts from the overall appearance of a motorcycle. 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

TIP

Be sure to confirm that the vehicle is completely cooled.

1. Block or cover the following parts with suitable measures.
   - Air duct "1"
   - Drain hole on the cylinder head (right side) "2"
   - Hole under the water pump housing "3"
   - Muffler outlet "4"



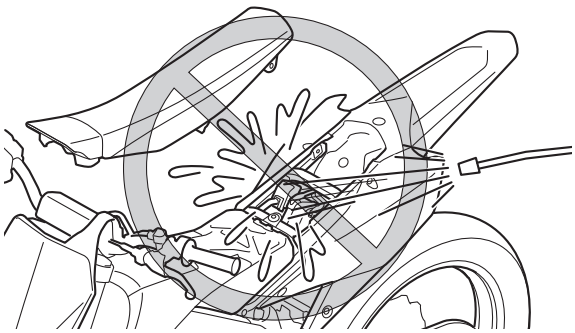
2. Make sure that all caps and covers as well as all electrical couplers and connectors, including the spark plug cap, are tightly installed.
3. Remove extremely stubborn dirt, like oil burnt onto the crankcase, with a degreasing agent and a brush, but never apply such products onto seals, gaskets, sprockets,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

Cleaning

ECA26730

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.**
- **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.**
- **When cleaning using either a high-pressure cleaning machine or a water hose, do not direct the water jet toward the following areas:(Otherwise, it could cause either damage due to the water pressure or malfunction due to water entry.)**
  Wheels or swing arm bearings
  Fork seals or brake seals
  Electrical parts, such as couplers, switches, battery, etc.
  Muffler or hoses
  Air cleaner intake port
- **Do not clean using a water jet with the seat or cover removed.**



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 motorcycle.

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” on page 1-29.
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 8-45.

TIP

Make any necessary repairs before storing the motorcycle.

SPECIFICATIONS

GENERAL SPECIFICATIONS 2-1

ENGINE SPECIFICATIONS 2-2

CHASSIS SPECIFICATIONS 2-5

ELECTRICAL SPECIFICATIONS 2-8

TIGHTENING TORQUES 2-9
- GENERAL TIGHTENING TORQUE SPECIFICATIONS 2-9
- ENGINE TIGHTENING TORQUES 2-10
- CHASSIS TIGHTENING TORQUES 2-13

CABLE ROUTING DIAGRAM 2-17

EAM20127

GENERAL SPECIFICATIONS

Model	
Model	B2WC B2WG
Dimensions	
Overall length	2185 mm (86.0 in)
Overall width	825 mm (32.5 in)
Overall height	1285 mm (50.6 in)
Seat height	965 mm (38.0 in)
Wheelbase	1485 mm (58.5 in)
Ground clearance	330 mm (12.99 in)
Weight	
Curb weight	111 kg (245 lb)
Riding capacity	1 person

EAM20128
ENGINE SPECIFICATIONS

Engine	
Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	450 cm³
Number of cylinders	Single cylinder
Bore × stroke	97.0 × 60.8 mm (3.82 × 2.39 in)
Compression ratio	13.0 : 1
Starting system	Electric starter
Fuel	
Recommended fuel	Unleaded gasoline (E10 acceptable)
Octane number (RON)	95
Fuel tank capacity	6.2 L (1.6 US gal, 1.4 Imp.gal)
Engine oil	
Recommended brand	YAMALUBE
SAE viscosity grades	10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Oil change	0.63 L (0.67 US qt, 0.55 Imp.qt)
With oil filter removal	0.65 L (0.69 US qt, 0.57 Imp.qt)
Quantity (disassembled)	0.90 L (0.95 US qt, 0.79 Imp.qt)
Oil filter	
Oil filter type	Cartridge
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/cm², 15.6–19.9 psi)
Spark plug(s)	
Manufacturer/model	NGK/LMAR8G
Spark plug gap	0.7–0.8 mm (0.028–0.031 in)
Cylinder head	
Warpage limit	0.05 mm (0.0020 in)
Camshaft	
Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
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)
Camshaft lobe dimensions	
Lobe height limit (Intake)	38.030 mm (1.4972 in)
Lobe height limit (Exhaust)	34.170 mm (1.3453 in)
Valve, valve seat, valve guide	
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 limit (intake)	1.5 mm (0.06 in)
Valve seat contact width limit (exhaust)	1.5 mm (0.06 in)
Valve stem diameter limit (intake)	5.445 mm (0.2144 in)
Valve stem diameter limit (exhaust)	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 limit (intake)	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance limit (exhaust)	0.100 mm (0.0039 in)
Valve stem runout	0.020 mm (0.0008 in)
Valve spring	
Free length limit (intake)	36.65 mm (1.44 in)
Free length limit (exhaust)	35.55 mm (1.40 in)
Cylinder	
Bore	97.000–97.010 mm (3.8189–3.8193 in)
Wear limit	97.060 mm (3.8213 in)
Piston	
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 limit	18.045 mm (0.7104 in)
Piston pin outside diameter limit	17.981 mm (0.7079 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.0002–0.0009 in)
Piston ring	
Top ring	
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 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)
Crankshaft	
Crank assembly width	61.93–62.00 mm (2.438–2.441 in)
Runout limit	0.030 mm (0.0012 in)
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	5 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	3 pcs
Clutch plate thickness	1.50–1.70 mm (0.059–0.067 in)
Plate quantity	7 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch spring free length	48.00 mm (1.89 in)

Clutch spring free length 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	1.929 (27/14)
2nd	1.533 (23/15)
3rd	1.300 (26/20)
4th	1.091 (24/22)
5th	0.952 (20/21)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	3.769 (49/13)
Final drive	Chain
Air filter	
Air filter element	Wet element
Air filter oil grade	Yamaha foam air filter oil or other quality foam air filter oil
Fuel pump	
Maximum consumption amperage	2.4 A
Fuel injector	
Resistance	12.0 Ω
Throttle body	
ID mark	BR91
Idling condition	
Engine idling speed	1900–2100 r/min
Coolant temperature	70–80 °C (158–176 °F)
Fuel line pressure (at idle)	300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)
Throttle grip free play	3.0–6.0 mm (0.12–0.24 in)

EAM20129
CHASSIS SPECIFICATIONS

Chassis	
Caster angle	26.9 °
Trail	120 mm (4.7 in)
Front wheel	
Wheel type	Spoke wheel
Rim size	21x1.6
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	19x2.15
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/MX33
Rear tire	
Type	With tube
Size	120/80-19 63M
Manufacturer/model	DUNLOP/MX33
Tire air pressure (measured on cold tires)	
Front	100 kPa (1.00 kgf/cm², 15 psi)
Rear	100 kPa (1.00 kgf/cm², 15 psi)
Front brake	
Type	Hydraulic single disc brake
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)	25.40 mm, 25.40 mm (1.00 in, 1.00 in)
Specified brake fluid	DOT 4
Rear brake	
Type	Hydraulic single disc brake
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	25.40 mm (1.00 in)
Specified brake fluid	DOT 4
Front suspension	
Type	Telescopic fork
Spring	Coil spring

Shock absorber	Hydraulic damper
Wheel travel	310 mm (12.2 in)
Fork spring free length 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)	501.0 cm³ (16.94 US oz, 17.67 Imp.oz)
Quantity (right)	501.0 cm³ (16.94 US oz, 17.67 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)	9
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Unit for compression damping adjustment	Click
Adjustment value from the start position (Soft)	20
Adjustment value from the start position (STD)	9
Adjustment value from the start position (Hard)	0

Rear suspension

Type	Swingarm (link suspension)
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Wheel travel	317 mm (12.5 in)
Spring preload	
Adjusting system	Mechanical adjustable type
Adjustment value (Soft)	1.5 mm (0.06 in)
Adjustment value (STD)	7.0 mm (0.28 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)	12
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Fast compression damping	
Unit for adjustment	Turn
Adjustment value from the start position (Soft)	2
Adjustment value from the start position (STD)	7/8

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)	6
Adjustment value from the start position (Hard)	0

Drive chain	
Size	520
Chain type	Non-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	242.9 mm (9.56 in)

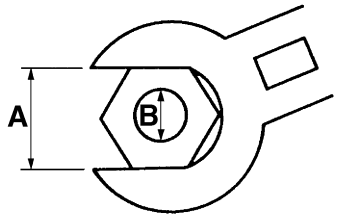
EAM20130
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI
Ignition timing (B.T.D.C.)	8.0–12.0 °/2000 r/min
Engine control unit	
Model	B2W0
Ignition coil	
Primary coil resistance	2.16–2.64 Ω
Secondary coil resistance	8.64–12.96 kΩ
Spark plug cap	
Resistance	7.50–12.50 kΩ
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 Ω
Rectifier/regulator	
Regulator type	Single-phase
Regulated voltage (DC)	14.0–14.8 V
Battery	
Model	BR98
Voltage, capacity	12 V, 2.4 Ah (5 HR)
Starter motor	
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)
Mica undercut (depth)	2.40 mm (0.09 in)
Fuel injection sensor	
Crankshaft position sensor resistance	228–342 Ω
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 at 80 °C (290–390 Ω at 176 °F)
Coolant temperature sensor resistance	2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)
Coolant temperature sensor resistance	210–221 Ω at 100 °C (210–221 Ω at 212 °F)
Fuse(s)	
Main fuse	15.0 A
Spare fuse	15.0 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

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	7	10 N·m (1.0 kgf·m, 7.4 lb·ft)	E
Spark plug	M10	1	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Oil passage plug (cylinder head)	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T
Cylinder head bolt	M10	4	See TIP.	M
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 head stud bolt (exhaust pipe)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Stud bolt (cylinder head cover)	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T
Cylinder head cover breather plate bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T
Oil nozzle	M6	1	3.0 N·m (0.30 kgf·m, 2.2 lb·ft)	
Cylinder bolt	M6	1	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)	T
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)	T
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)	
Water pump housing cover bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil pump assembly bolt	M5	2	5 N·m (0.5 kgf·m, 3.7 lb·ft)	T
Oil pump cover bolt	M4	1	6 N·m (0.6 kgf·m, 4.4 lb·ft)	T
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)	

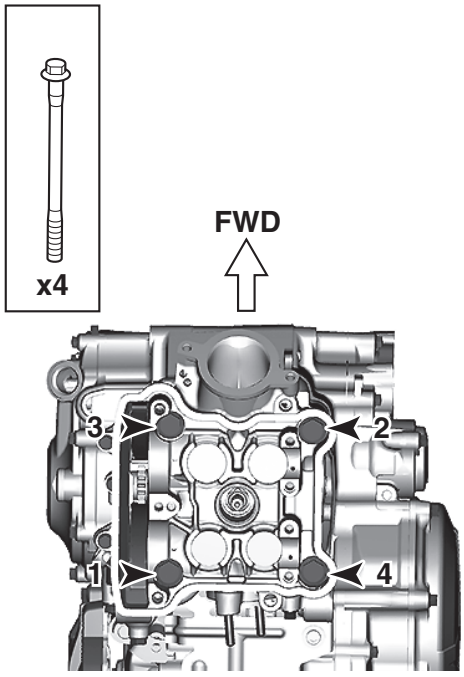
Item	Thread size	Q'ty	Tightening torques	Remarks
Clutch cable locknut (clutch cable adjuster)	M6	1	4.3 N·m (0.43 kgf·m, 3.2 lb·ft)	
Clutch cable locknut (engine side)	M8	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Exhaust pipe nut	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Exhaust pipe protector screw	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T
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)	T
Oil nozzle bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T
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)	T
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)	T
Bearing plate cover bolt (left side of the drive axle)	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	T
Plate bolt	M6	4	12 N·m (1.2 kgf·m, 8.9 lb·ft)	T
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	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	T
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. E
Drive sprocket nut	M20	1	90 N·m (9.0 kgf·m, 66 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)	T
Stopper lever bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	T

Item	Thread size	Q'ty	Tightening torques	Remarks
Shift pedal bolt	M6	1	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△
Generator 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)	
Stator coil assembly 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)	
Bolt (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 23 N·m (2.3 kgf·m, 17 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 (60°) 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.)



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)	
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)	LT
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)	△
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)	△/LT

Item	Thread size	Q'ty	Tightening torques	Remarks
Rear brake disc bolt	M6	6	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△/LT
Footrest bracket bolt	M10	4	55 N·m (5.5 kgf·m, 41 lb·ft)	LT
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	M22	1	135 N·m (13.5 kgf·m, 100 lb·ft)	△
Drive chain puller locknut	M8	2	21 N·m (2.1 kgf·m, 15 lb·ft)	
Rear wheel sprocket nut	M8	6	42 N·m (4.2 kgf·m, 31 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 (right side)	M6	1	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 nut	M10	1	56 N·m (5.6 kgf·m, 41 lb·ft)	△
Rear shock absorber assembly lower nut	M10	1	53 N·m (5.3 kgf·m, 39 lb·ft)	△
Relay arm nut (swingarm side)	M14	1	70 N·m (7.0 kgf·m, 52 lb·ft)	△
Connecting arm nut (relay arm side)	M14	1	80 N·m (8.0 kgf·m, 59 lb·ft)	△
Connecting arm nut (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)	△
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)	

Item	Thread size	Q'ty	Tightening torques	Remarks
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)	
Fuel tank bolt (front side)	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	6	4.0 N·m (0.40 kgf·m, 3.0 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 (negative battery lead)	M5	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	

TIP

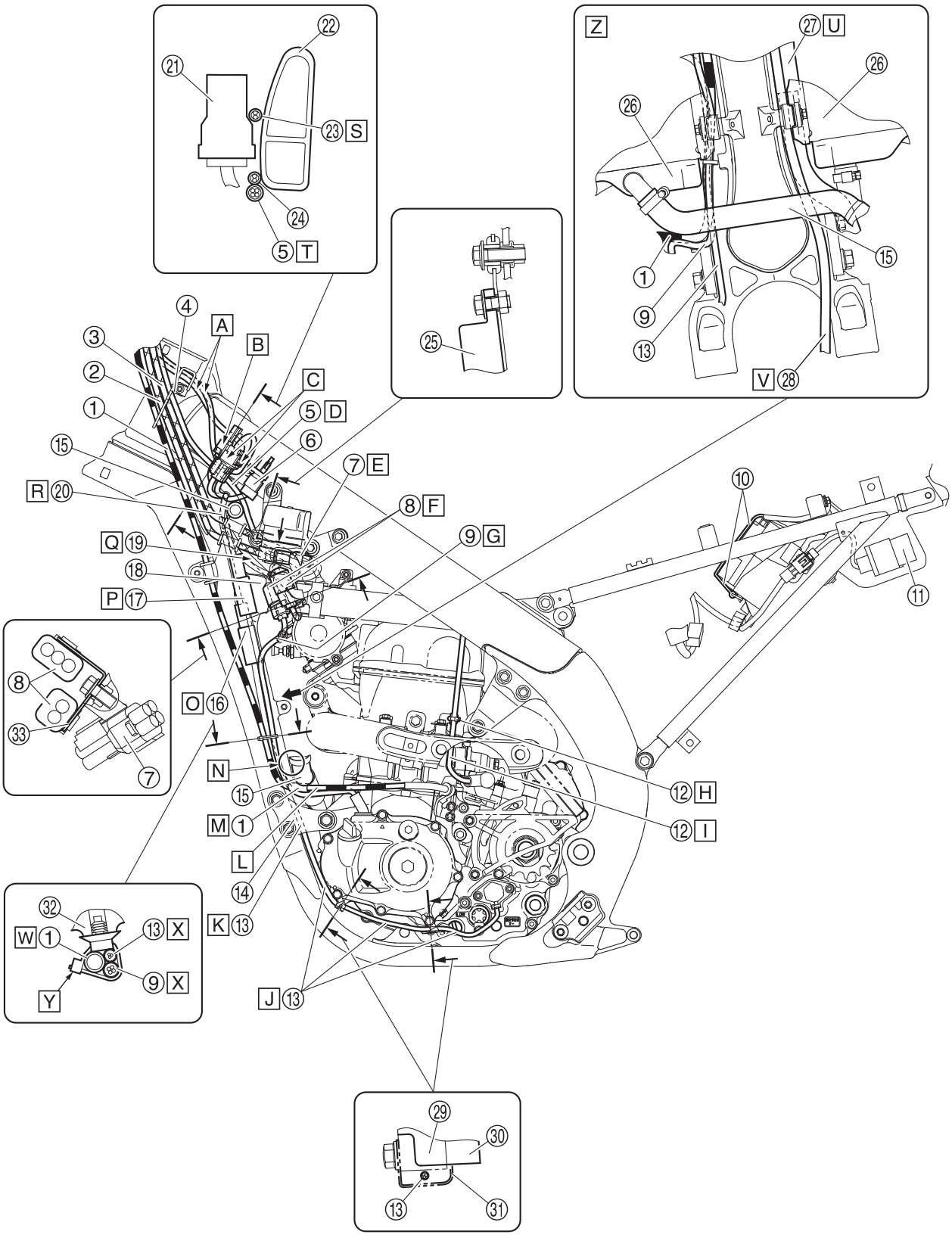
Lower ring nut

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).

EAM20152

CABLE ROUTING DIAGRAM

Frame and engine (left side view)



1. Clutch cable
2. Throttle cable (return)
3. Throttle cable (pull)
4. Cable holder
5. Launch control switch lead
6. Intake air temperature sensor coupler (black, 2-pin)
7. Launch control switch coupler (black, 4-pin)
8. Rectifier/regulator coupler
9. Stator coil assembly lead
10. Battery band
11. CCU (Communication Control Unit)
12. Starter motor lead
13. Gear position switch lead
14. Lower engine bracket
15. Radiator hose
16. Gear position switch coupler (white, 3-pin)
17. Stator coil assembly coupler (gray, 2-pin)
18. Tension arm
19. Rectifier/regulator lead
20. Wire harness
21. Yamaha diagnostic tool coupler
22. Tank rail
23. Engine stop switch lead
24. Mode switch lead
25. Rectifier/regulator
26. Radiator
27. Cylinder head breather hose
28. Radiator breather hose
29. Crankcase cover
30. Crankcase
31. Clamp
32. Frame
33. Plate

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. Pass the mode switch lead above the engine stop switch lead.

B. Insert the Yamaha diagnostic tool 3-pin coupler (black) into the connector, and secure it to the bracket.

C. Insert the engine stop switch 2-pin coupler (red) into the inside of the bracket, and secure it.
Insert the mode switch 4-pin coupler (black) into the outside of the bracket, and secure it.
Pass the mode switch lead under the bracket.

D. Pass the launch control switch lead through the inside of the air filter case and intake air temperature sensor.

E. Insert the launch control switch 4-pin coupler (black) into the bracket and secure it.

F. Insert the rectifier/regulator 2-pin coupler (not colored) and rectifier/regulator 3-pin coupler (not colored) into the bracket and secure them.
After securing, install the cover over them.

G. Pass the stator coil assembly lead behind the radiator.
Be sure the lead will not be pinched 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 switch lead along the crankcase without slack.

K. Pass the gear position switch lead to the inside of the front 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 gear position switch lead and the stator coil assembly 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 3-pin coupler, attach the coupler cover.

P. After connecting the stator coil assembly coupler, attach the coupler cover.

Q. Pass the rectifier/regulator lead (wire harness side) to the inside of the tension arm (the side of the vehicle).

R. Pass the main harness to the front of the radiator breather 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 launch control switch lead under the mode switch lead.

U. Pass the cylinder head breather hose between the down tube and radiator, and front of the radiator under boss.

V. Pass the radiator breather hose through the down tube.

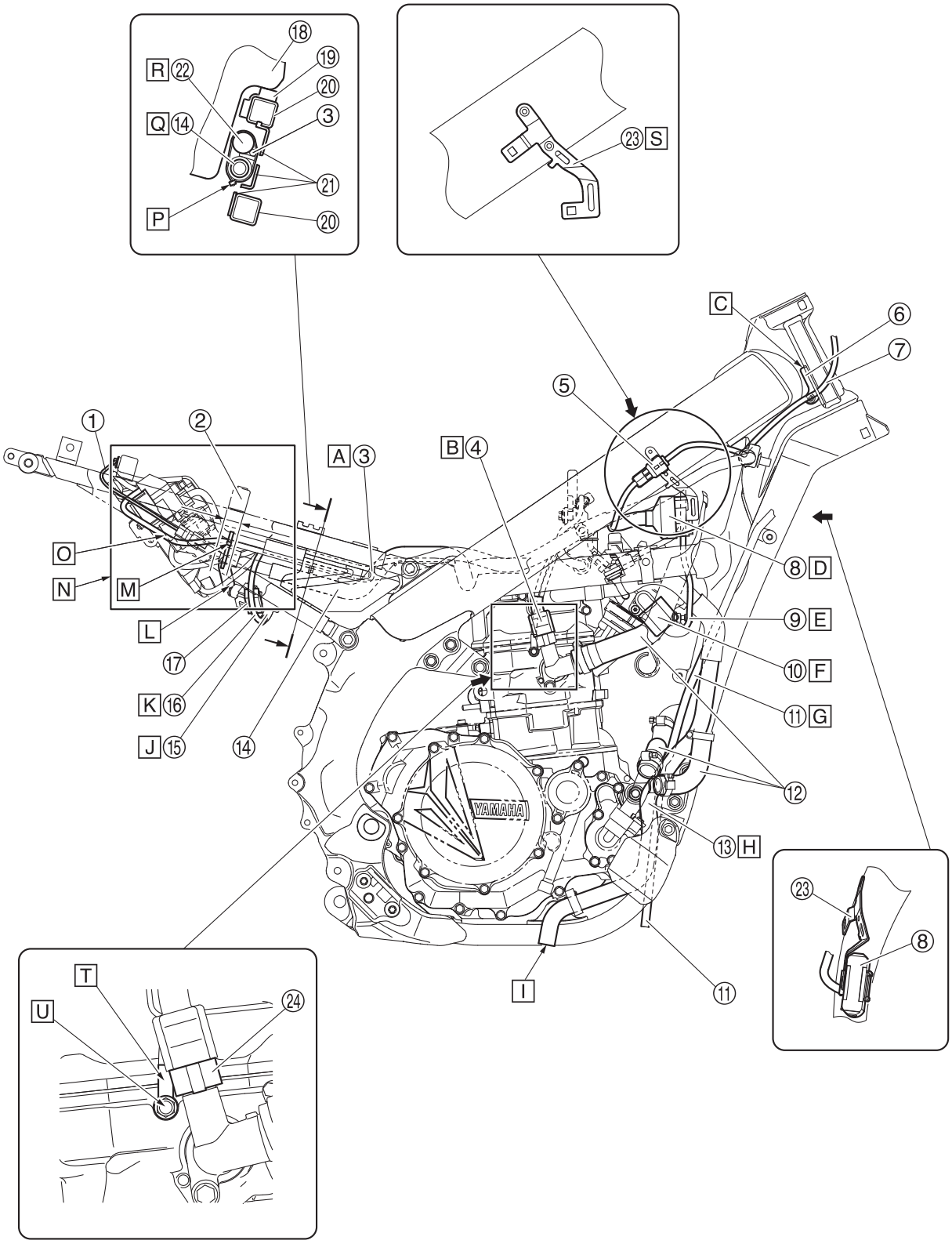
W. Clamp the clutch cable at the front of the lead (the front of the vehicle).

X. The routing order of the gear position switch lead and stator coil assembly lead does not matter.

Y. Insert the clip portion of the clamp into the frame.
The lock part should face toward the front of the vehicle.
Cut off the end of the remaining portion.

Z. Diagram for routing the radiator hose, cylinder head breather hose, and radiator breather hose.

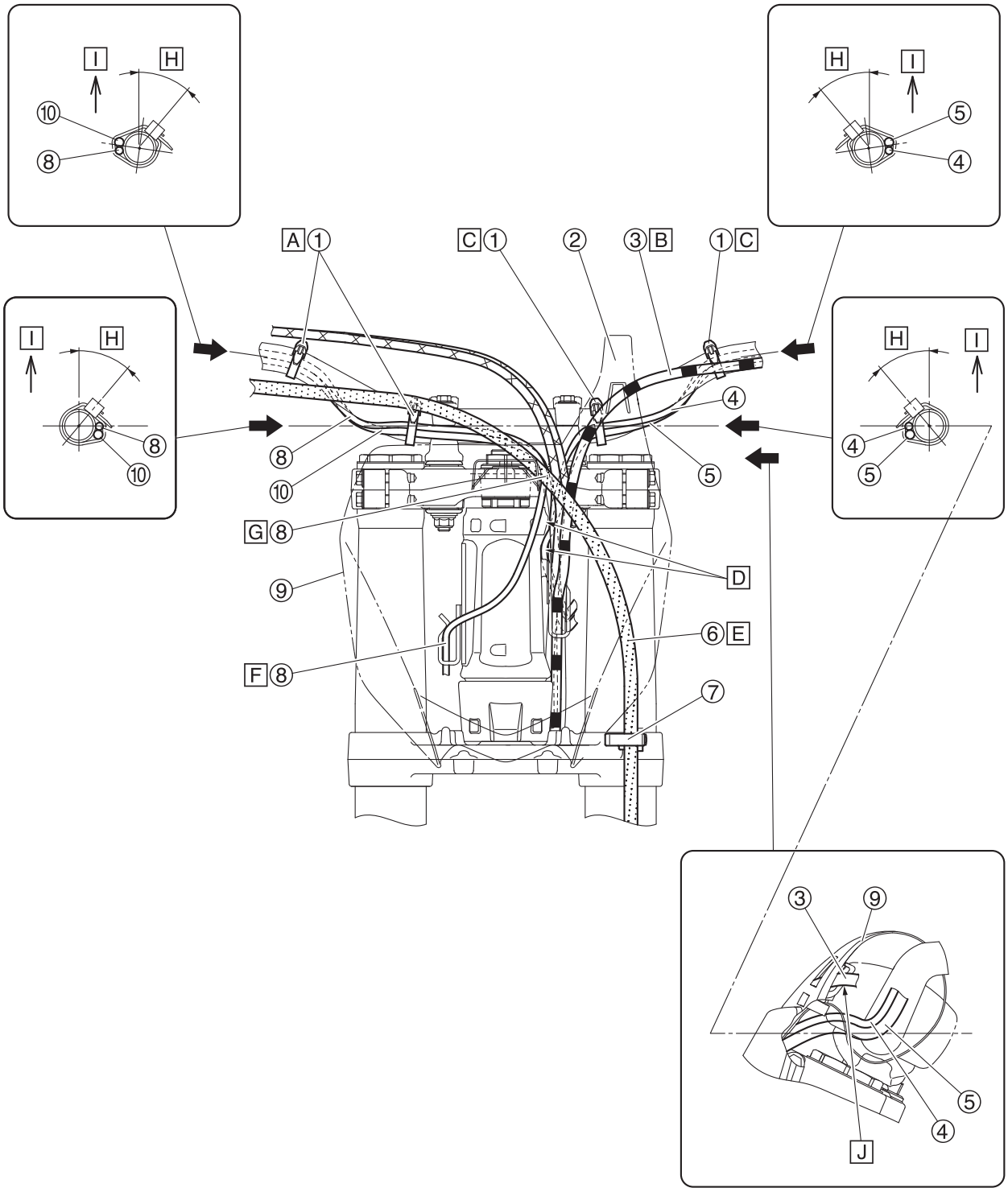
Frame and engine (right side view)



1. Negative battery lead
2. Cross tube
3. Starter motor lead
4. Coolant temperature sensor coupler (black, 2-pin)
5. Start switch coupler (black, 2-pin)
6. Cable guide
7. Start switch lead
8. Joint coupler
9. Throttle position sensor lead
10. Throttle position sensor coupler (black, 3-pin)
11. Radiator breather hose
12. Radiator hose
13. Cylinder head breather hose
14. Fuel hose
15. Fuel pump coupler (white, 2-pin)
16. Fuel pump lead
17. Diode
18. Fuel tank
19. Rubber damper
20. Rear frame
21. Side cover
22. Wire harness
23. Bracket
24. Holder

A. Adjust any slack between the rear shock absorber bracket and the clamp of the side cover.
B. After connecting the water temperature sensor 2-pin coupler (black), install the coupler cover over the holder securely.
C. Make sure the cable guide has contact with the stamped location of the vehicle identification number, and install it.
D. Insert the joint coupler into the plate and secure it. After securing, install the cover over the joint coupler.
The inserted portion of the coupler should be hidden with the cover.
E. Pass the throttle position sensor lead through the outside of the cylinder head breather hose.
F. After connecting the throttle position sensor 3-pin coupler (black), install the cover over it.
G. The radiator breather hose should be routed in the following order and via each mentioned point.
The upper radiator boss at the rear of the vehicle →
The cylinder head breather hose at the rear of the vehicle →
The lower radiator boss at the front of the vehicle →
The radiator hose at the front of the vehicle →
For routing the remaining leads, refer to the diagram “Z” under “Frame and engine (left side view)”.
H. Pass the cylinder head breather hose between the radiator hose and the engine bracket.
I. Install the cylinder head breather hose so that the outlet faces downward. Align the outlet with the lower side of the down tube.
J. After connecting, install the cover over the fuel pump 2-pin coupler (white).
K. Pass the fuel pump lead through the outside of the fuel hose.
L. Pass the fuel hose through the front of the battery.
M. Secure the starter relay lead and starter motor lead using the plastic locking tie within the cross tube width (20 mm (0.79 in)).
Position the lock part of the plastic locking tie toward the lower side of the vehicle.
Place the tie of the plastic locking tie inside the rear frame without cutting its end.
N. The order in which the other unspecified leads are routed within the area shown does not matter.
O. Route the starter motor lead inside of the rear frame and along the rear fender.
P. Position the lock part of the plastic locking tie to downward of the vehicle. Cut the end of the plastic locking tie.
Q. Fasten the fuel hose at the pink dot position using the plastic locking tie.
R. Fasten the wire harness at the white tape position using the plastic locking tie.
S. Fasten the bracket to the tank rail (right) using the rivet.
T. Upward
U. When installing the engine ground lead terminal, it can face either way.

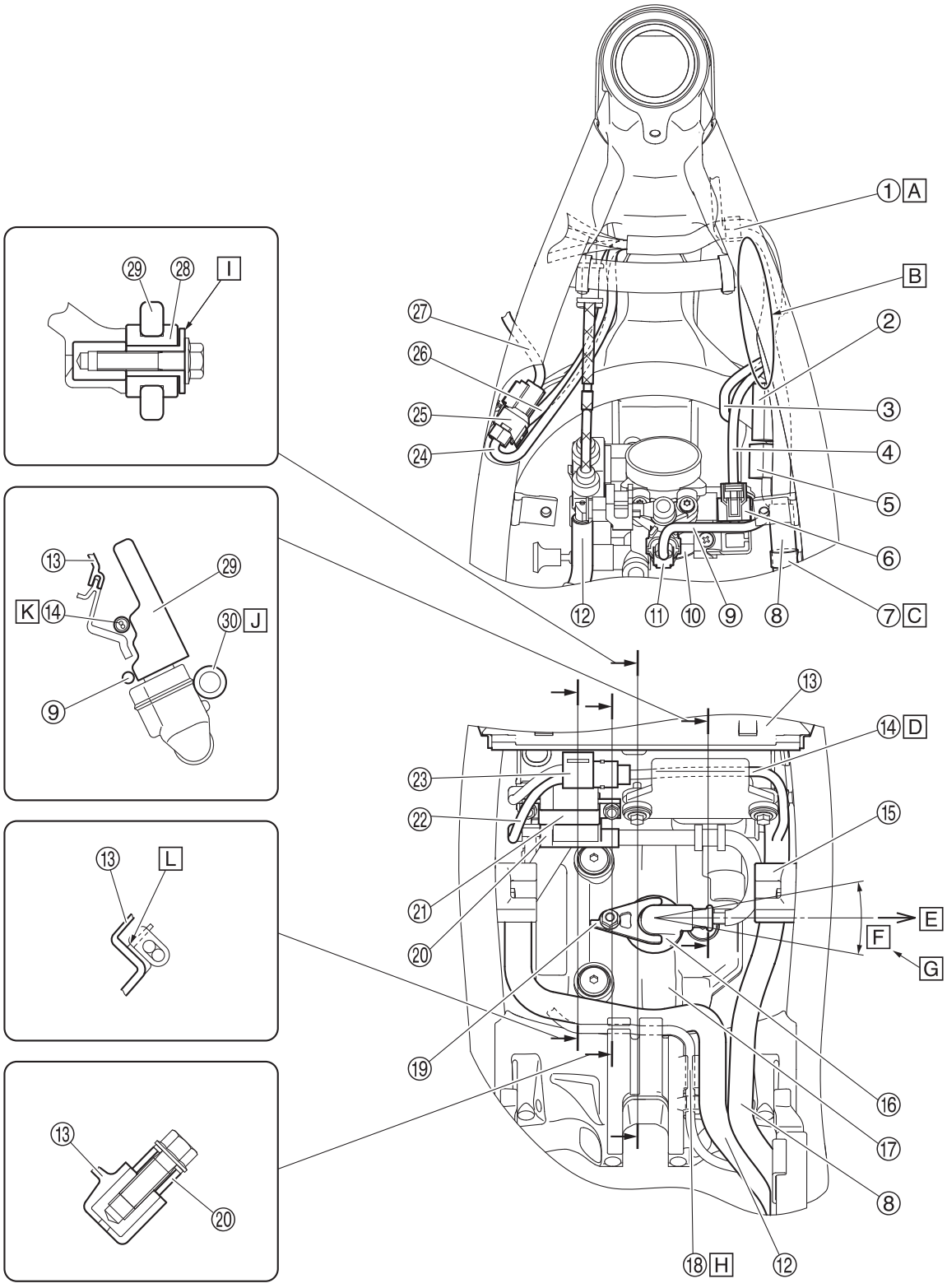
Handlebar (front view)



1. Plastic locking tie
2. Number plate band
3. Clutch cable
4. Engine stop switch lead
5. Mode switch lead
6. Front brake hose
7. Cable guide
8. Start switch lead
9. Number plate
10. Launch control switch lead

A. Secure the start switch lead and launch control switch lead to the handlebar using the plastic locking tie.
   Do not cut off the end of the plastic locking tie.
B. Pass the clutch cable through the rear side of the number plate band.
C. Secure the engine stop switch lead and mode switch lead to the handlebar using the plastic locking tie.
   Do not cut off the end of the plastic locking tie.
D. Pass the engine stop switch lead and mode switch lead between the frame and the cable guide.
E. Pass the front brake hose through the front side of the number plate.
F. Pass the start switch lead between the frame and the cable guide.
G. Pass the start switch lead and launch control switch lead through the left side of the number plate mounting bracket.
H. 30–50°
I. Vertical direction of vehicle
J. Pass the clutch cable through the guide of the number plate.

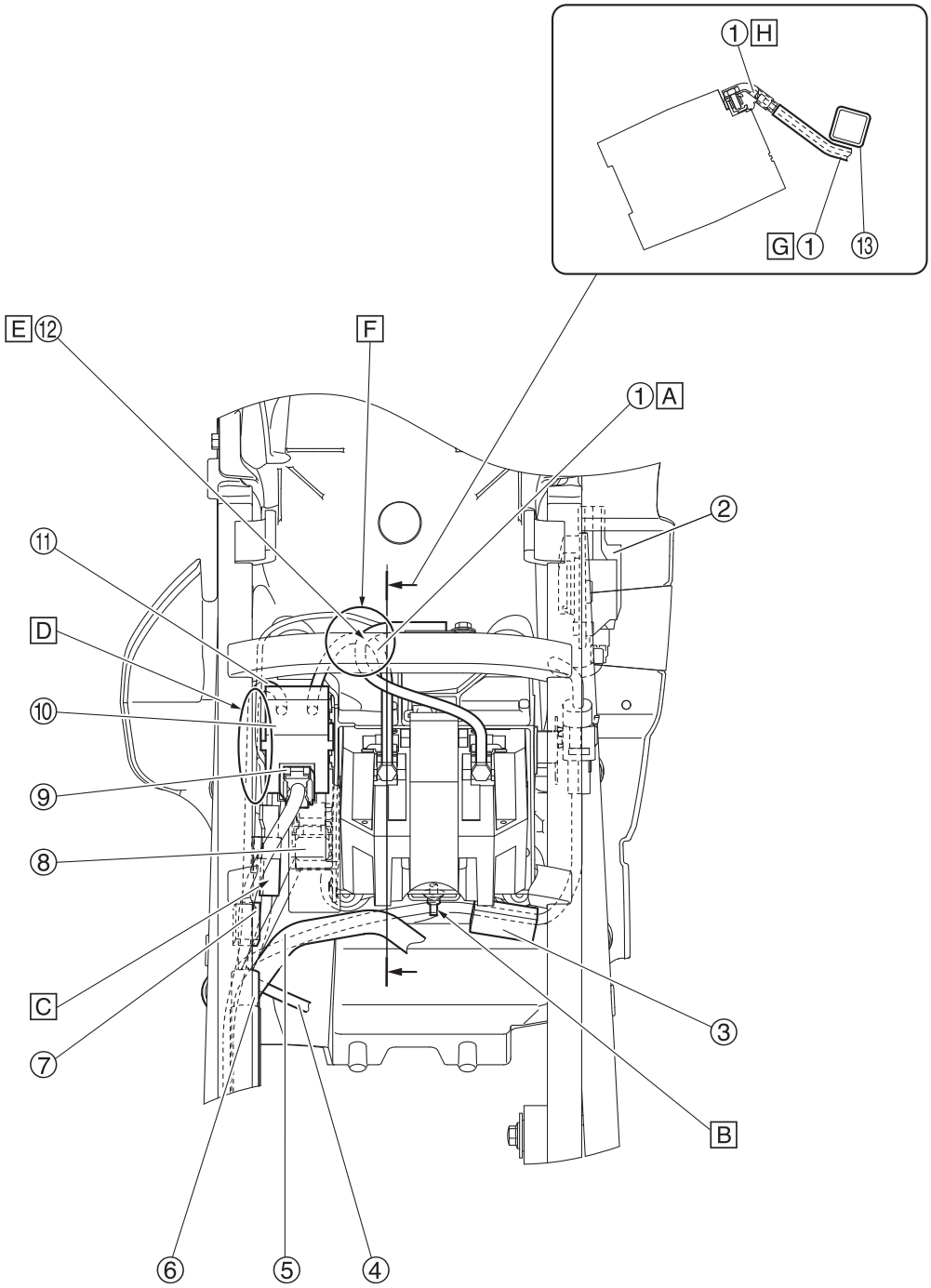
Frame and engine (top view)



1. Clamp
2. Diode
3. Throttle position sensor lead
4. Intake air pressure sensor lead
5. Joint coupler
6. Intake air pressure sensor coupler (dark blue, 3-pin)
7. Clamp (wire harness)
8. Wire harness
9. Fuel injector lead
10. Throttle body
11. Fuel injector coupler (gray, 2-pin)
12. Fuel hose
13. Air filter assembly
14. Sub-lead wire
15. Fuel tank bracket
16. Plug cap
17. Cylinder head cover
18. Starter motor lead
19. Cable guide
20. Ignition coil
21. Side core
22. Sub-lead wire
23. Sub-lead wire coupler (black, 2-pin)
24. Launch control switch lead (wire harness)
25. Launch control switch coupler
26. Rectifier/regulator lead (wire harness)
27. Launch control switch lead
28. Grommet
29. ECU (Engine Control Unit)
30. High tension cord

A. Fasten the main harness and start switch lead using 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. When assembling, 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. To sub-lead wire 2-pin coupler (black)
E. Right side of the vehicle.
F. ±10°
G. Install the plug cap so it faces to the right side of the vehicle.
H. Route the starter motor lead along the damper and clamp it.
I. Face the flange of the collar toward the bolt head and install it.
J. It does not matter if the high tension cord and grommet do not contact the ECU.
K. Pass the sub-lead wire between the ECU and air filter assembly.
L. Insert the clamp into the rib so that it contacts the rib.

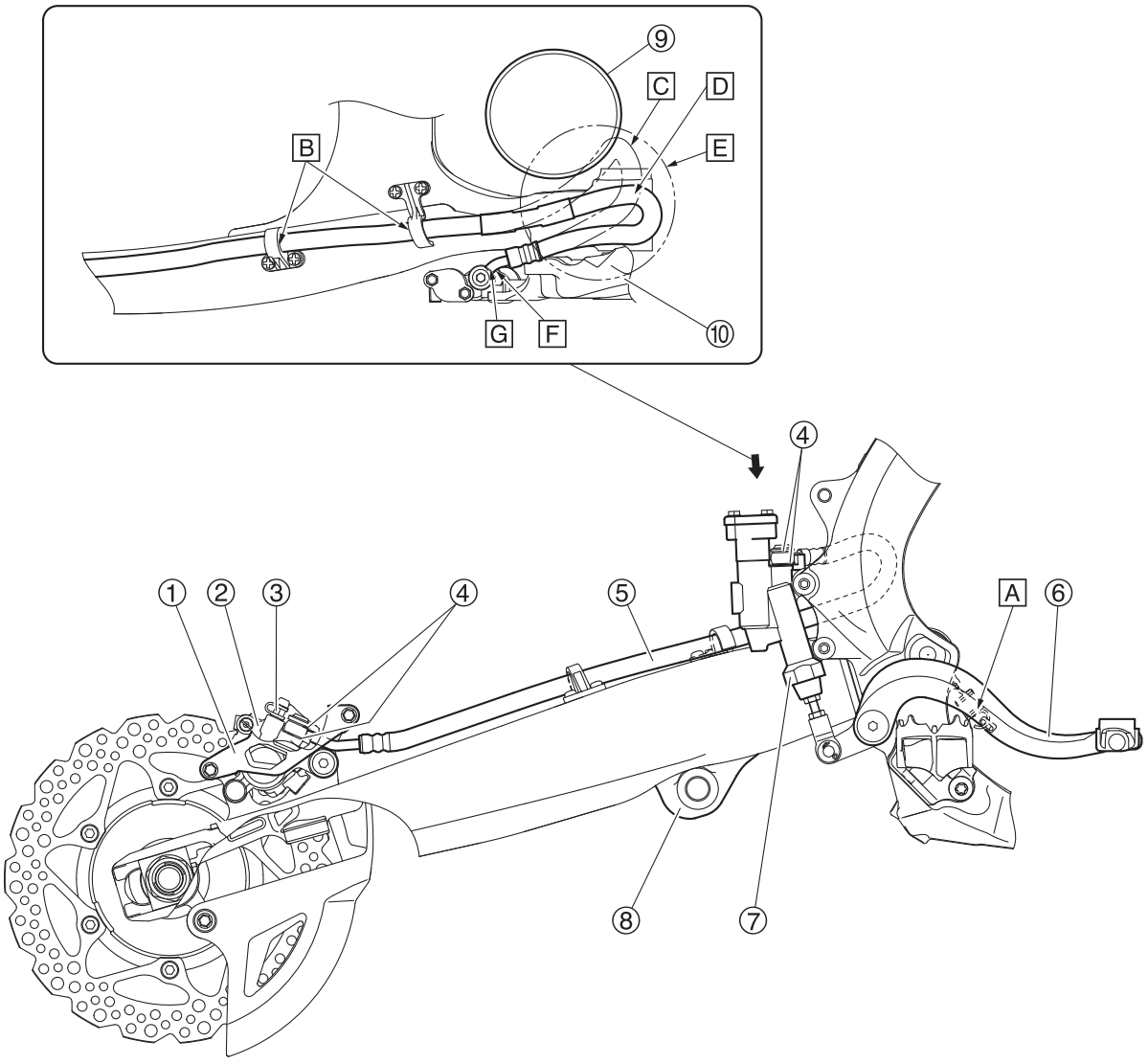
Frame and battery (top view)



1. Positive battery lead
2. CCU (Communication Control Unit)
3. Diode
4. Fuel pump lead
5. Fuel hose
6. Wire harness (to the negative battery coupler)
7. Joint connector
8. Main relay
9. Starter relay coupler (black, 4-pin)
10. Starter relay
11. Starter motor lead
12. Negative battery lead
13. Cross member

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

Rear brake (right side view)



1. Protector
2. Rear brake caliper
3. Bleed screw
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 rear brake hose into the rear 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.

PERIODIC CHECKS AND ADJUSTMENTS

MAINTENANCE INTERVALS 3-1
MAINTENANCE INTERVALS 3-1

PRE-OPERATION INSPECTION AND MAINTENANCE 3-5
GENERAL INSPECTION AND MAINTENANCE 3-5

ENGINE 3-6
ADJUSTING THE VALVE CLEARANCE 3-6
VALVE CLEARANCE SHIM CHART 3-9
CHECKING THE ENGINE IDLING SPEED 3-11
CHECKING THE THROTTLE GRIP 3-11
CHECKING THE SPARK PLUG 3-12
CHECKING THE ENGINE OIL LEVEL 3-13
CHANGING THE ENGINE OIL 3-13
ADJUSTING THE CLUTCH LEVER FREE PLAY 3-15
ADJUSTING THE CLUTCH LEVER POSITION 3-15
CLEANING THE AIR FILTER ELEMENT 3-15
CHECKING THE THROTTLE BODY JOINT 3-17
CHECKING THE FUEL LINE 3-17
CHECKING THE CYLINDER HEAD BREATHER HOSE 3-18
CHECKING THE EXHAUST SYSTEM 3-18
CHECKING THE COOLANT LEVEL 3-20
CHECKING THE COOLING SYSTEM 3-21
CHANGING THE COOLANT 3-21

CHASSIS 3-23
ADJUSTING THE FRONT DISC BRAKE 3-23
ADJUSTING THE REAR DISC BRAKE 3-23
CHECKING THE BRAKE FLUID LEVEL 3-23
CHECKING THE FRONT BRAKE PADS 3-24
CHECKING THE REAR BRAKE PADS 3-24
CHECKING THE FRONT BRAKE HOSE 3-24
CHECKING THE REAR BRAKE HOSE 3-24
CHECKING THE BRAKE OPERATION 3-25
BLEEDING THE HYDRAULIC BRAKE SYSTEM 3-25
DRIVE CHAIN SLACK 3-26
CHECKING AND ADJUSTING THE STEERING HEAD 3-27
LUBRICATING THE STEERING HEAD 3-27
CHECKING THE FRONT FORK LEGS 3-28
ADJUSTING THE FRONT FORK LEGS 3-28
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY 3-30
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY 3-30
CHECKING THE SWINGARM OPERATION 3-32
LUBRICATING THE SWINGARM PIVOT 3-32
CHECKING THE CONNECTING ARM AND RELAY ARM 3-32
CHECKING THE TIRES 3-32
CHECKING AND TIGHTENING THE SPOKES 3-33
CHECKING THE WHEELS 3-33

CHECKING THE WHEEL BEARINGS 3-33
CHECKING THE CHASSIS FASTENERS 3-33
CHECKING AND LUBRICATING THE CABLES.....3-33
LUBRICATING THE BRAKE LEVER 3-34
LUBRICATING THE CLUTCH LEVER 3-34
LUBRICATING THE PEDAL.....3-34

ELECTRICAL SYSTEM.....3-35
CHECKING AND CHARGING THE BATTERY 3-35
CHECKING THE FUSES.....3-35
CHECKING THE IGNITION TIMING 3-35

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.

TIP

Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

No.		Item	Routine	After break-in	Every race (about 2.5 hours)	Every third race (about 7.5 hours)	Every fifth race (about 12.5 hours)	As required
1	*	Valve	• Check the valve clearances.	√		√		
			• Check the valve seats and the valve faces for wear.				√	
			• Replace.					√
2	*	Valve spring	• Check the free length.				√	
			• Replace.					√
3	*	Valve lifter	• Check for scratches and wear.				√	
			• Replace.					√
4	*	Camshaft	• Inspect the camshaft surface. • Inspect the decompression system.				√	
			• Replace.					√
5	*	Timing chain	• Check for damage and sticking.					√
			• Replace.				√	√
6	*	Timing chain tensioner	• Replace.				√	√
7	*	Camshaft sprocket	• Check for wear on the teeth and for damage.				√	
			• Replace.					√
8	*	Piston	• Inspect crack.					√
			• Inspect carbon deposits and eliminate them.					√
			• Replace the piston, piston pin, piston pin clip, and piston ring all as a set.				√	√
9	*	Piston ring	• Check the end gap of the piston ring.					√
			• Replace the piston, piston pin, piston pin clip, and piston ring all as a set.				√	√
10	*	Piston pin	• Inspect.					√
			• Replace the piston, piston pin, piston pin clip, and piston ring all as a set.				√	√

No.		Item	Routine	After break-in	Every race (about 2.5 hours)	Every third race (about 7.5 hours)	Every fifth race (about 12.5 hours)	As required
11	*	Cylinder head	• Check the coolant passages for corrosion. • Inspect carbon deposits and eliminate them. • Check for warpage, and replace the gasket.				√	
12	*	Cylinder	• Inspect score marks.				√	
			• Inspect wear.					√
13		Engine oil	• Check the engine oil amount.		√			√
			• Replace.	√		√		
14		Oil filter element	• Replace.	√			√	
15	*	Oil strainer	• Clean.				√	
16	*	Clutch	• Inspect housing, friction plate, clutch plate and spring.	√	√			
			• Replace.					√
17	*	Transmission	• Inspect.					√
			• Replace bearings.					√
18	*	Shift fork, shift cam, guide bar	• Inspect wear.					√
19	*	Nut (generator rotor)	• Check for tightening torques.	√			√	
20	*	Exhaust pipe, silencer, protector	• Check for exhaust leaks, and tightening torques.	√	√			
			• Clean.				√	
			• Replace fiver. (When the exhaust sound becomes louder or when a performance drop is felt.)			√		√
21	*	Crankshaft	• Inspect and clean.				√	√
22	*	Throttle body	• Inspect.					√
23		Air filter	• Clean and lubricate.	√	√			
			• Replace.					√
24		Spark plug	• Check the electrodes and the terminals for wear.	√		√		
			• Replace.					√
25	*	Cooling system	• Check coolant level and leakage.	√	√			
			• Check radiator cap operation.					√
			• Check radiator cap attached.	√	√			
			• Change the coolant.	Every two years				√
			• Inspect hoses.		√			
26	*	Engine guard	• Replace.					√
27	*	Frame	• Clean and inspect.	√	√			
28	*	Fuel tank, fuel pump	• Inspect.	√		√		
29	*	Fuel hose	• Inspect.					√
			• Replace.	Every four years				√

No.		Item	Routine	After break-in	Every race (about 2.5 hours)	Every third race (about 7.5 hours)	Every fifth race (about 12.5 hours)	As required
30	*	Front fork leg(s)	• Clean.	√	√			
			• Inspect and adjust.	√	√			
			• Replace oil.	√			√	
			• Replace oil seal.					√
			• Clean and grease oil seals and dust seals.	√	√			√
31		Protector guide	• Replace.					√
32	*	Rear shock absorber	• Inspect and adjust.	√	√			
			• Grease pillow balls and bearings. (After rain ride)			√		√
			• Check for tightening torques.	√	√			
33	*	Brake(s)	• Adjust lever position and pedal position.	√	√			
			• 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				√
34	*	Swingarm	• Inspect, lube and retighten.	√	√			
35	*	Relay arm, connecting rod	• Inspect, lube and retighten.	√	√			
36	*	Steering head	• Inspect free play and retighten. (Check for tightening torques.)	√	√			
			• Clean and lube. (After rain ride)				√	
			• Replace bearings.					√
37	*	Tire, wheels	• Inspect air pressure, wheel run-out, tire wear and spoke looseness.	√	√			
			• Retighten sprocket bolt.	√	√			
			• Check the bearing.			√		
			• Replace bearings.					√
			• Lubricate.			√		
38	*	Drive chain	• Clean, lubricate, slack, alignment.	√	√			
			• Replace.					√
39	*	Drive chain guide	• Inspect wear.		√			
40	*	Drive chain guide and drive chain support	• Replace.					√
41		Cables	• Routing (Connection)	√	√			
			• Check and grease.	√	√			
			• Check throttle cables on the throttle body for dirt and wear.	√	√			
42		Levers	• Adjust clutch lever free play.					√

No.		Item	Routine	After break-in	Every race (about 2.5 hours)	Every third race (about 7.5 hours)	Every fifth race (about 12.5 hours)	As required
43		Brake pedal, footrest	• Lubricate.	√	√			
44	*	Outside nuts and bolts	• Retighten.	√	√			
45	*	Battery	• Check terminal for looseness and corrosion.					√

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.	3-20, 3-21, 3-21, 6-4, 6-4
Fuel	Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage.	1-24
Engine oil	Check that the oil level is correct. Check the crankcase and oil line for leakage.	3-13, 3-13
Gear shifter and clutch	Check that gears can be shifted correctly in order and that the clutch operates smoothly.	3-15, 3-15
Throttle grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary.	3-11, 3-33
Brakes	Check the play of front brake and effect of front and rear brake.	3-23, 3-23, 3-23, 3-24, 3-24, 3-24, 3-24, 3-25
Drive chain	Check drive chain slack and alignment. Check that the drive chain is lubricated properly.	3-26, 4-69, 4-69, 4-70, 4-70, 4-70
Wheels	Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.	3-32, 3-33, 3-33, 3-33
Steering	Check that the handlebar can be turned smoothly and have no excessive play.	3-27
Front forks and rear shock absorber	Check that they operate smoothly and there is no oil leakage.	3-28, 3-28, 3-32, 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.	3-18
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.	3-33, 3-34, 3-34, 3-34
Bolts and nuts	Check the chassis and engine for loose bolts and nuts.	1-27
Lead connectors	Check that the stator coil assembly, ECU and ignition coil are connected tightly.	1-11
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 maintenance completely done?	10-1, 10-1, 10-1, 10-2, 10-2, 10-3, 10-3, 10-4, 10-4, 10-6, 10-7

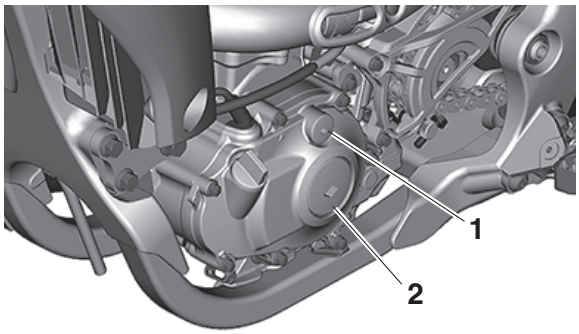
TIP
Perform usual maintenance enough so that, in the race course, a confirmation of that and simple setting adjustments may only be left, in order to get enough time to use effectively.

EAM20135
ENGINE

EAM30226
ADJUSTING THE VALVE CLEARANCE

TIP
- This section 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.
- Make sure that the valve clearance is checked or adjusted while the engine is cold (at room temperature).
- While the valve clearance is checked or adjusted, make sure that the piston is positioned in the top dead center (TDC).

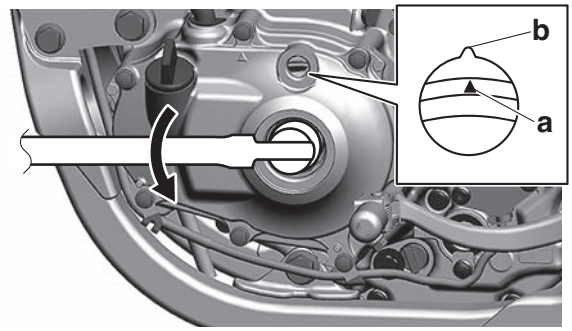
1. Remove:
   - Seat
   - Side cover (left/right)
   - Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   - ECU (Engine Control Unit)
2. Remove:
   - Spark plug
   - Cylinder head cover
   Refer to "CAMSHAFT" on page 5-13.
3. Remove:
   - Timing mark accessing screw "1"
   - Crankshaft end accessing screw "2"
   - O-ring



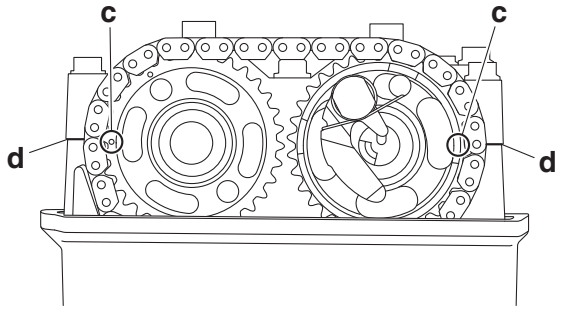
4. Check:
   - Valve clearance
   Out of specification → Regulate.

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)

a. Turn the crankshaft counterclockwise with a wrench.
b. Align the top dead center (TDC) mark "a" on the generator rotor with the alignment mark "b" on the crankcase cover.



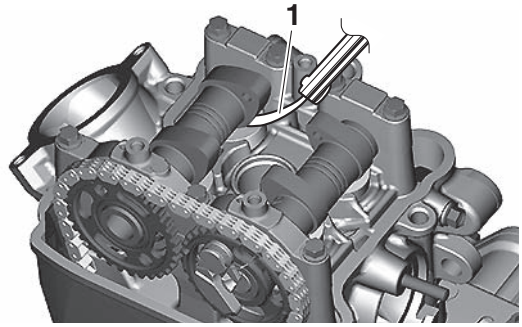
TIP
Check that the alignment marks "c" on the camshaft sprockets are aligned with the edge of the camshaft cap surfaces "d".



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

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

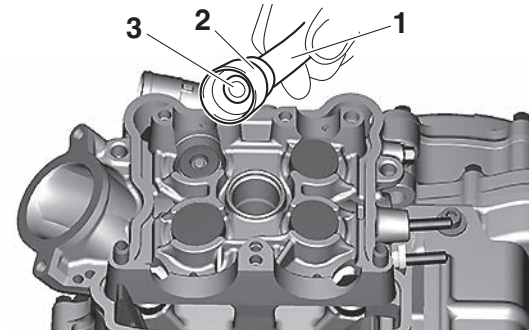
TIP
Record the measured reading if the clearance is incorrect.

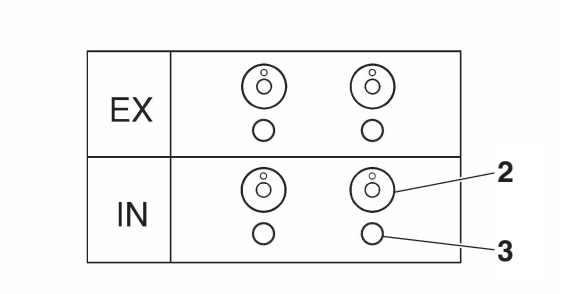


5. Adjust:
   • Valve clearance
   a. Remove the camshaft (intake and exhaust).
      Refer to "CAMSHAFT" on page 5-13.
   b. Remove the valve lifter "2" and the adjusting pad "3" with a valve lapper "1".

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

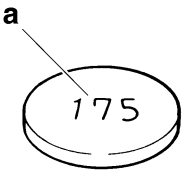
Valve lapper (ø14)
90890-04101
Valve lapper (ø14)
YM-A8998





   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 value
0, 1 or 2	0
4, 5 or 6	5
8 or 9	10

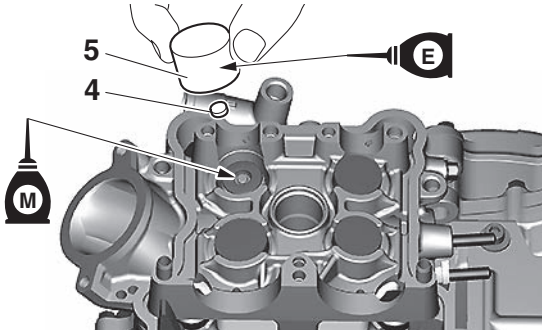
Example:
Pad number = 148
Rounded value = 150

   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 5-13.
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
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
0.07 – 0.09		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.10 – 0.17	C																								
0.18 – 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
B. Installed pad number
C. Standard clearance

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
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
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
0.12 – 0.14		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.15 – 0.22	C																								
0.23 – 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
B. Installed pad number
C. Standard clearance

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)

EAM30412
CHECKING 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.

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

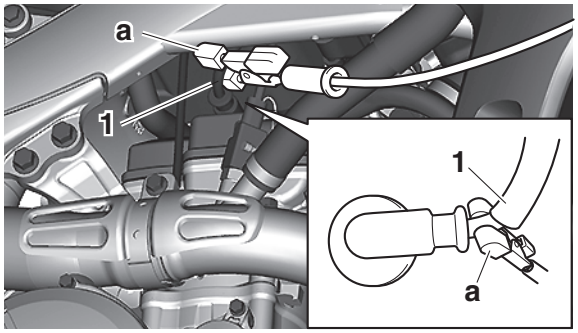
Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264
FI diagnostic tool sub–lead
90890-03212
FI diagnostic tool sub–lead
YU-03212
OBD/ GST Leadwire kit
90890-03249

Coolant temperature
70–80 °C (158–176 °F)

3. Install:
   - Digital tachometer

Digital tachometer
90890-06760
Digital tachometer
YU-39951-B

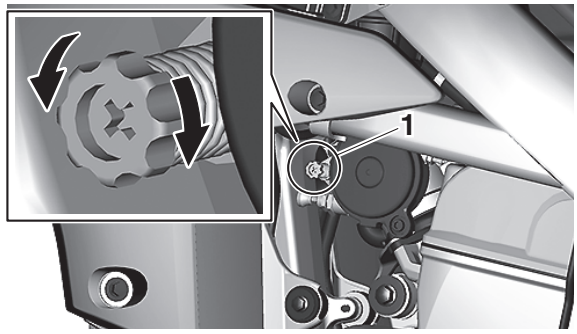
TIP
Get the high tension cord “1” of the ignition coil pinched in the detector “a” of the digital tachometer.



4. Measure:
   - Engine idling speed
   Out of specification → Regulate.

Engine idling speed
1900–2100 r/min

5. Adjust:
   - Engine idling speed
     a. Turn the idle screw “1” to make an adjustment.

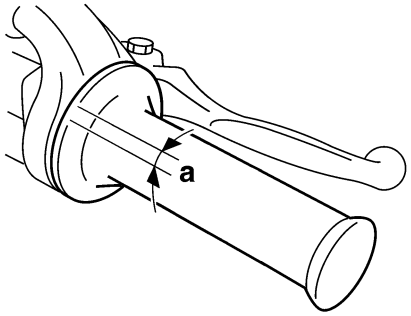


EAM30475
CHECKING THE THROTTLE GRIP

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.

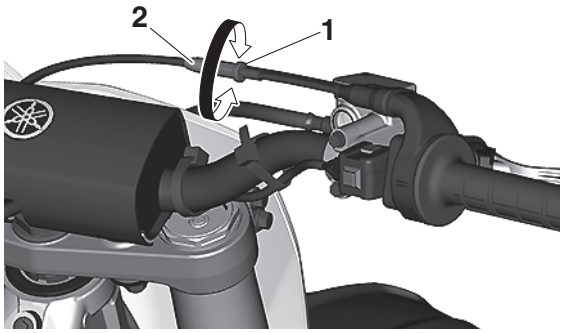
Throttle grip free play
3.0–6.0 mm (0.12–0.24 in)



2. Adjust:
   • Throttle grip free play
     a. Loosen the locknut “1”.
     b. Turn the adjuster “2” until the specified throttle grip free play is obtained.
     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.



EAM30254
CHECKING THE SPARK PLUG

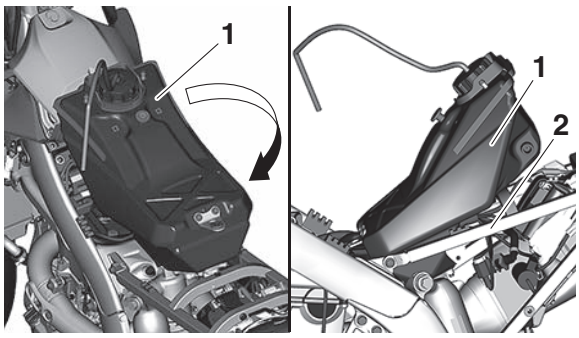
1. Remove:
   • Seat
   • Air scoop (left/right)
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank “1”
   Refer to “FUEL TANK” on page 7-1.

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 5-13.

ECA24410
NOTICE

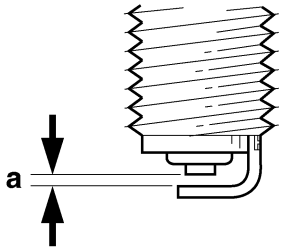
In order not to allow the dirt accumulated around the spark plug to drop from the spark plug hole into the cylinder, clean it before removing the spark plug.

3. Check:
   • Spark plug type
   Wrong type → Replace.

	Manufacturer/model **NGK/LMAR8G**

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.

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



7. Install:
   • Spark plug

	Spark plug **13 N·m (1.3 kgf·m, 9.6 lb·ft)**

TIP

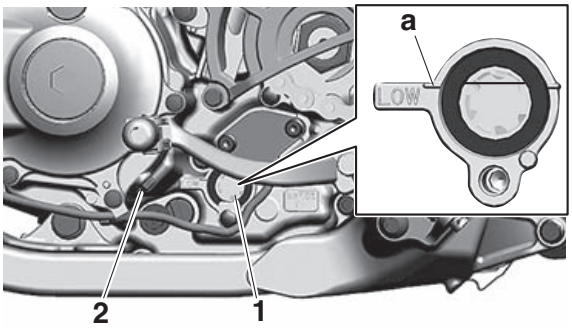
Before installing the spark plug, clean the spark plug and gasket surface.

8. Install:
   • Spark plug cap
   • Fuel tank
   • Air scoop (left/right)
   • Seat

• Side cover (left/right)
Refer to “GENERAL CHASSIS” on page 4-1.

EAM30224
CHECKING THE ENGINE OIL LEVEL

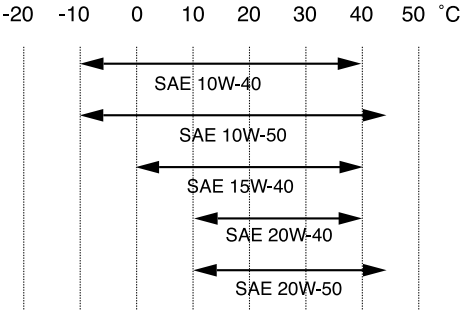
1. Stand the vehicle upright on a level surface.
2. Start the engine, warm this up for 2–3 minutes, and then stop the engine and wait about 1 minute.
3. Check:
   • Oil level
   Make sure that the engine oil level is above the minimum level mark “a” shown for the oil level check window “1”, and that 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
10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade
API service SG type or higher, JASO standard MA



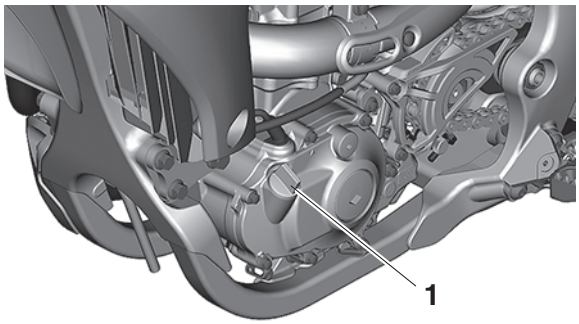
EAM30225
CHANGING THE ENGINE OIL

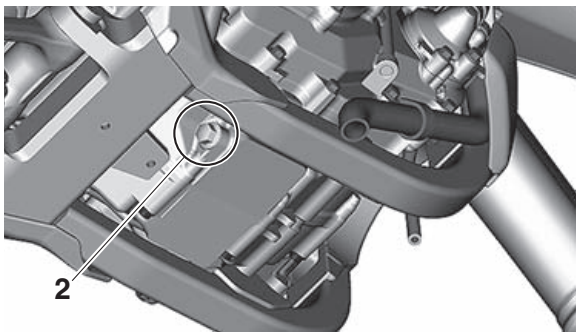
Stand the vehicle upright on a level surface.

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

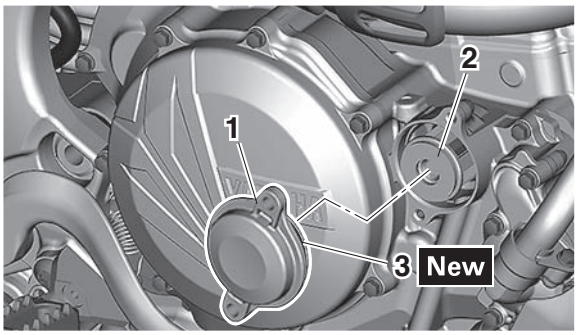
TIP
This model is equipped with an engine auto-stop system. The engine stops automatically if left idling for 7 minutes. If the engine stops, push the start switch to restart the engine.

2. Place an oil pan under the drain bolt.
3. Remove:
   • Oil filler cap “1”
   • Drain bolt (with gasket) “2”





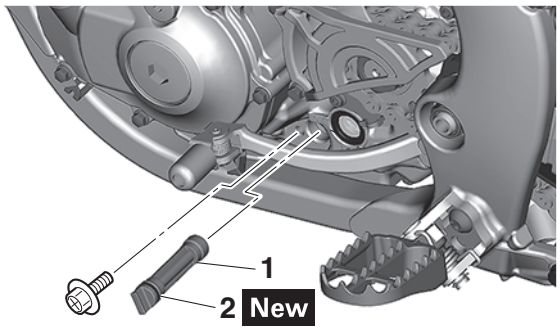
4. If the oil filter element is also to be replaced, perform the following procedure.
   a. Remove the oil filter element cover “1” and oil filter element “2”.
   b. Replace the new O-ring “3”.



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.

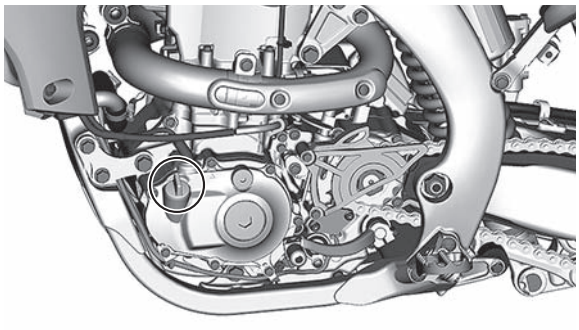
Oil strainer bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

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
0.63 L (0.67 US qt, 0.55 Imp.qt)
With oil filter removal
0.65 L (0.69 US qt, 0.57 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
   a. Start the engine.

EWA19130

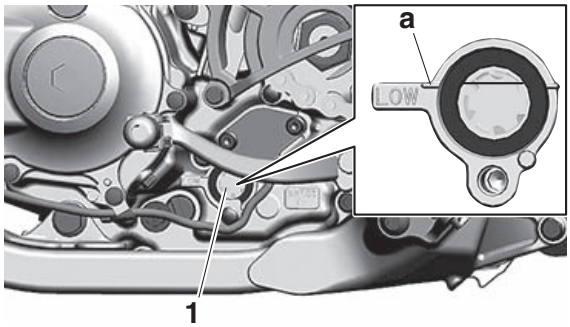
⚠ WARNING

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

b. Look at the oil level check window "1", and then make sure that the engine oil flows and that the engine oil level decreases.

TIP

Check the engine oil level while the engine is at idling speed.



a. Minimum level mark

ECA26740

NOTICE

If the engine oil level does not decrease after the engine has been started, immediately turn the engine off. Otherwise, the engine could seize.

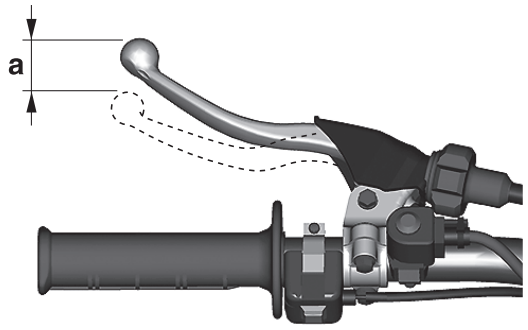
c. If the engine oil level does not decrease at the specified level mark, check the engine oil system for leaks, and the engine oil passages and oil pump for damage.
d. Check the oil pressure again.

EAM30216

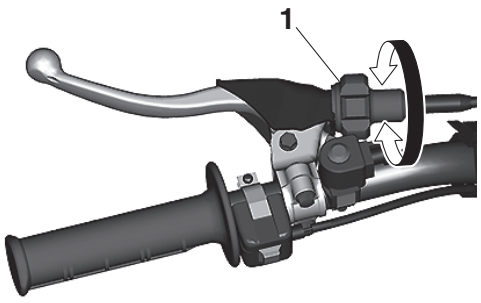
ADJUSTING THE CLUTCH LEVER FREE PLAY

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" until the specified clutch lever free play is obtained.



TIP

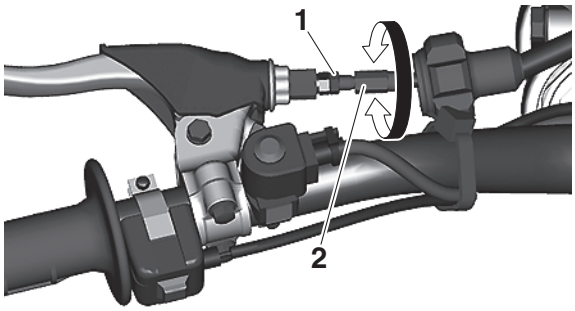
If the clutch lever free play cannot be obtained on the handlebar side, use the adjuster on the clutch cable side.

Clutch cable side

a. Slide the clutch cable cover.
b. Loosen the locknut "1".
c. Turn the adjuster "2" until the specified clutch lever free play is obtained.
d. Tighten the locknut "1".

	Clutch cable locknut **4.3 N·m (0.43 kgf·m, 3.2 lb·ft)**

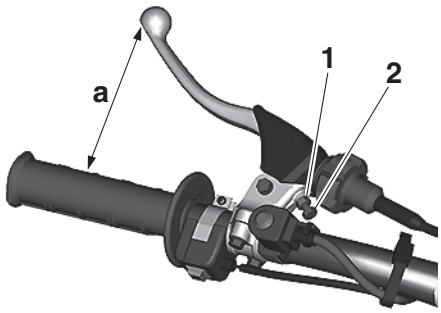
e. Return the clutch cable cover to its original position.



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)**

EAM30219

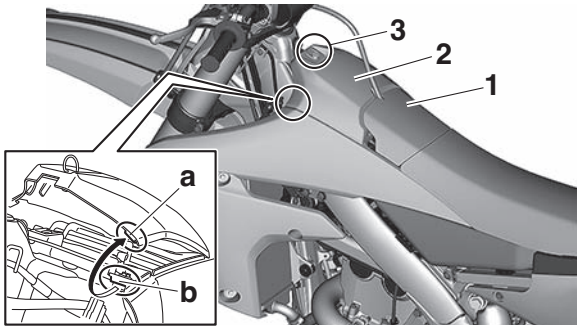
CLEANING THE AIR FILTER ELEMENT

1. Remove:
   • Fuel tank cap cover "1"
   Refer to "FUEL TANK CAP" on page 1-23.
   • Air filter case cover "2"

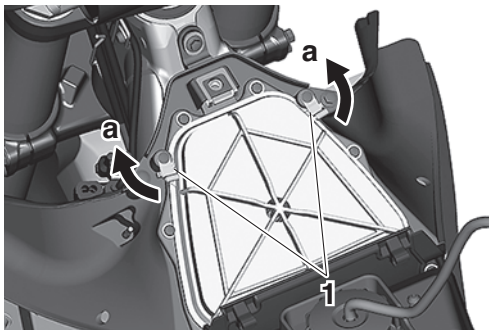
TIP

• 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

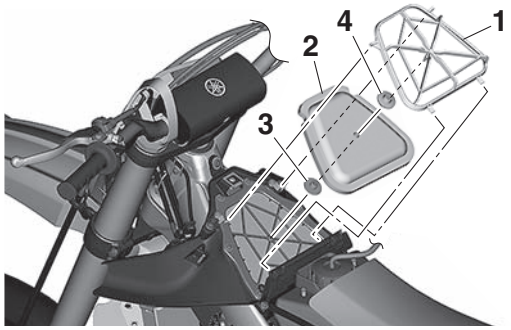
scoop, and slide the air filter case cover toward the front of the vehicle to remove it.



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

EWA19110

⚠ WARNING

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

ECA24280

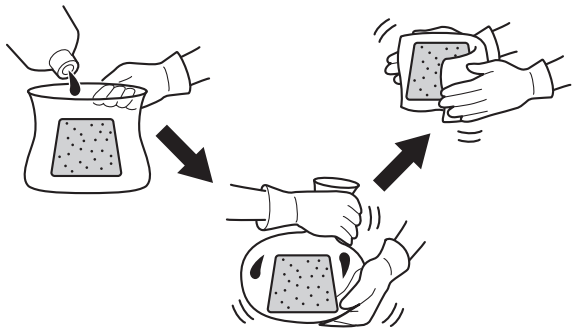
NOTICE

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
     a. Put the air filter element into a plastic bag and drip the filter oil into the bag.
     b. With the element inside the bag, rub it thoroughly so that the element is evenly permeated with the oil.
     c. Wrap the element in a clean cloth, rub the element gently, and wipe off any excess oil.

TIP

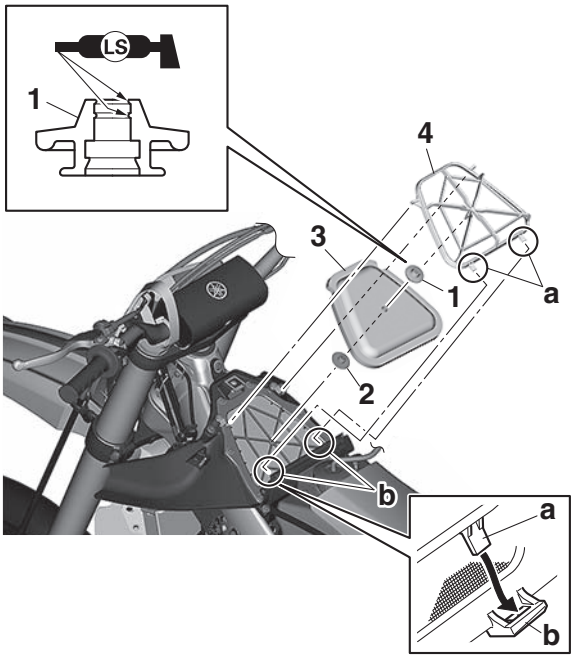
- The element should be permeated with oil so that it is wet but not dripping.
- When replacing the element, permeate the element in oil by using the same procedure as when cleaning.



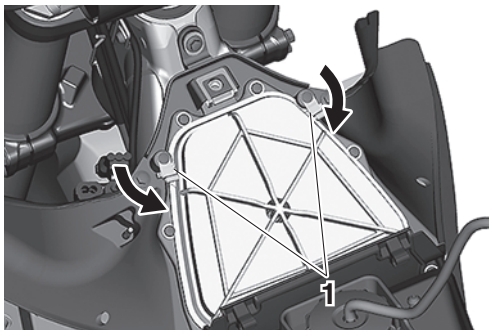
7. Install:
   - Seal “1” (to the air filter element)
   - Guide “2” (to the air filter element)
   - Air filter element “3” (to the air filter guide)
   - Air filter guide “4”

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.



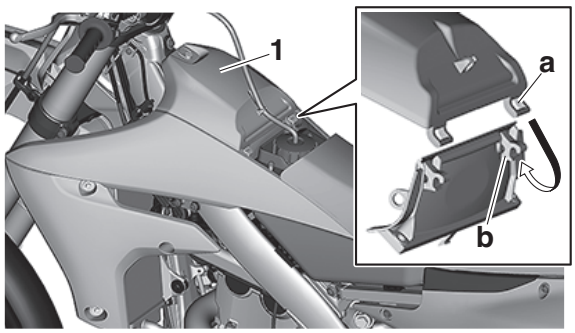
8. Turn the plates “1” to the original position.

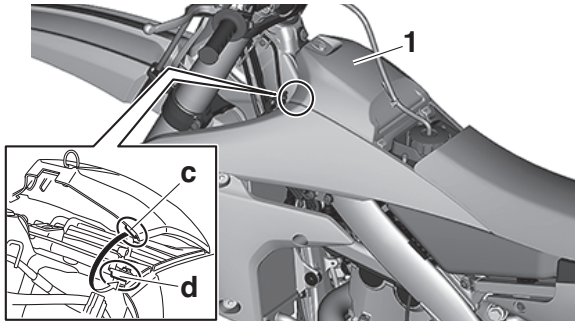


9. Install:
   - Air filter case cover “1”
   - Fuel tank breather hose (to the air filter case cover)

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 filter 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.



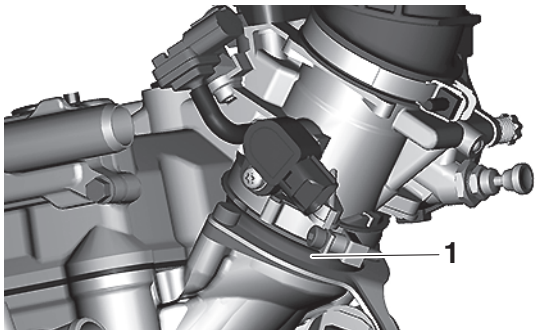


10. Install:
    - Fuel tank cap cover

EAM30335

CHECKING THE THROTTLE BODY JOINT

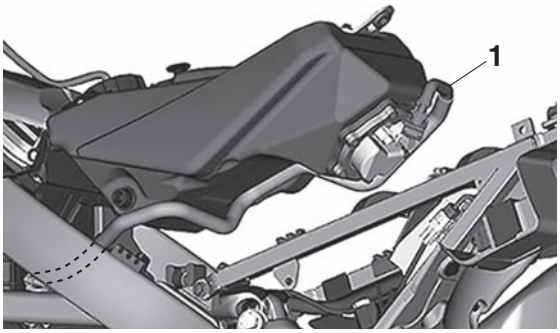
1. Check:
   - Throttle body joint “1”
     Crack/damage → Replace.



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.



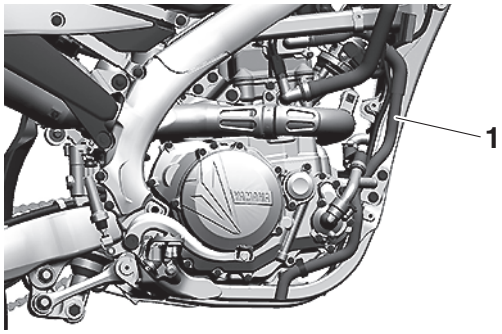
3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air scoop (left/right)
   - Seat
   - Side cover (left/right)
     Refer to "GENERAL CHASSIS" on page 4-1.

EAM30476
CHECKING THE CYLINDER HEAD BREATHER HOSE

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

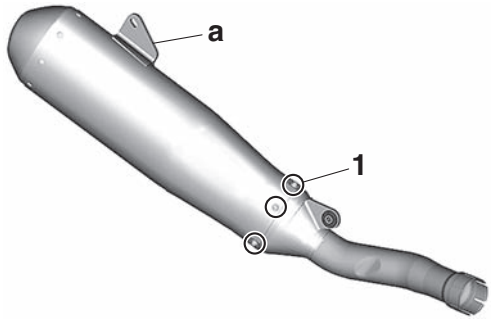
1. Remove:
   - Exhaust pipe 1
   - Exhaust pipe 2
     Refer to "ENGINE REMOVAL" on page 5-6.
2. Remove:
   - Exhaust pipe protector
3. Check:
   - Exhaust pipe 1
   - Exhaust pipe 2
   - Silencer
     Crack/damage → Replace.
4. Check:
   - Silencer fiber
     Damage → Replace.
5. Replace:
   - Silencer fiber
     a. Remove the bolts "1" and silencer body "2".

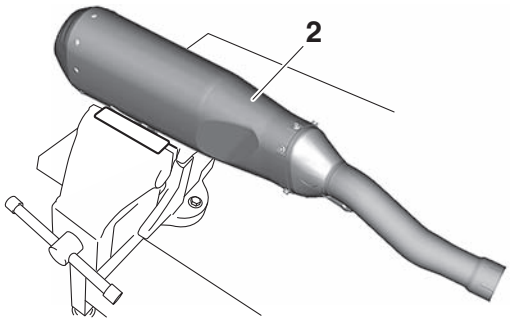
ECA25800
NOTICE

Do not hit the silencer stay "a" as it may do damage to the silencer.

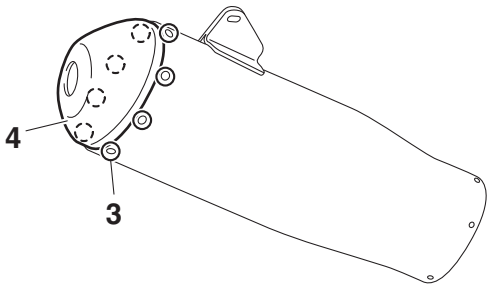
TIP

Remove the inner pipe while holding the silencer in place with a vise etc.

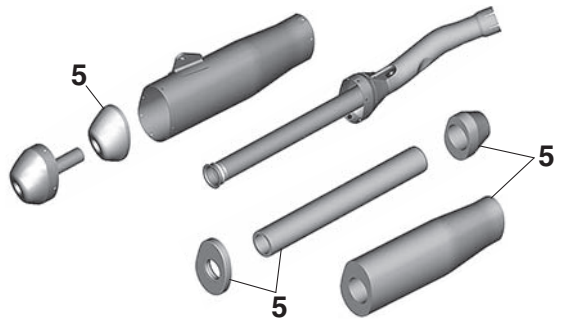




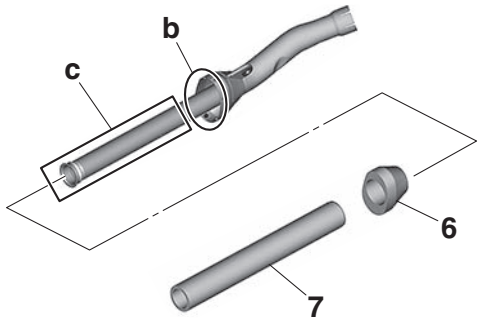
b. Remove the rivets "3" and silencer cap "4".



c. Replace the fiber inserts "5".



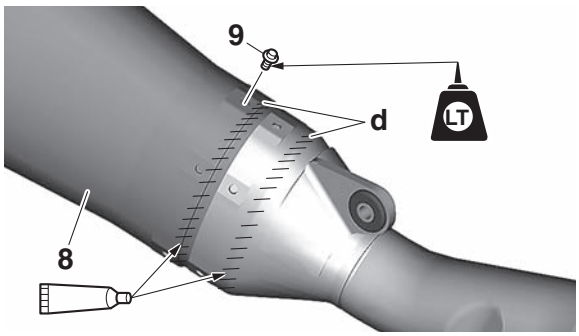
d. Install the fiber insert “6” to the part “b”.
e. Twist the fiber insert “7” onto the inner pipe “c”.



f. Install the silencer body “8” and bolts “9”.

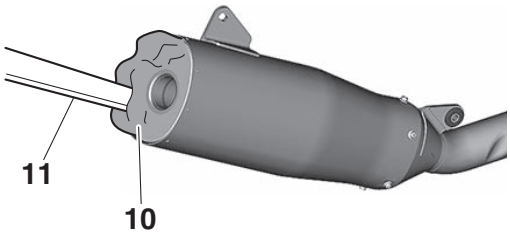
Silencer body bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)
LOCTITE®

TIP
Apply heat-resistant sealant to the areas “d” shown, making sure that there are no gaps in the beads of sealant.



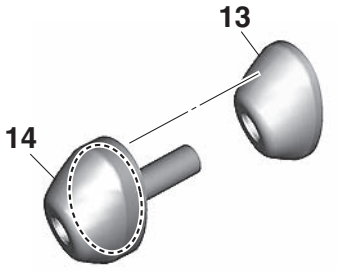
g. Install the fiber “10”.

TIP
Stuff the fiber into the silencer body by using a flat board “11”.



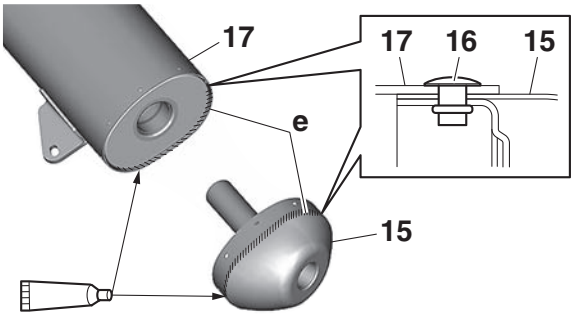
h. Install the fiber insert “12” to the inner pipe.
i. Install the fiber insert “13” to the inside of the silencer cap “14”.



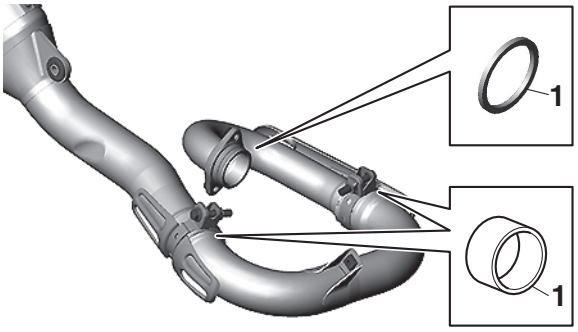


j. Install the silencer cap “15” and rivet “16”.

TIP
- Apply heat-resistant sealant to the areas “e” 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 “17”.

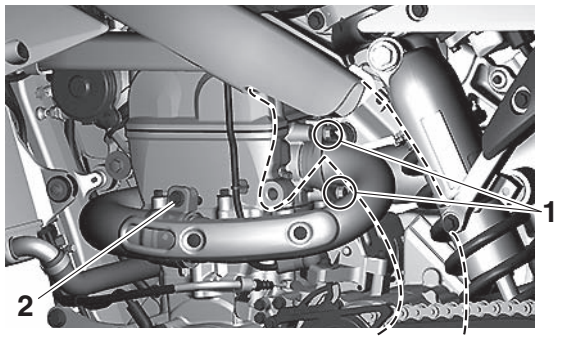


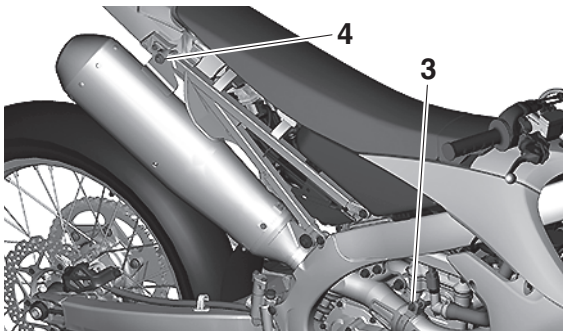
6. Check:
   • Gasket “1”
   Damage → Replace.



7. 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 clamp 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)





8. Install:
   • Exhaust pipe protector

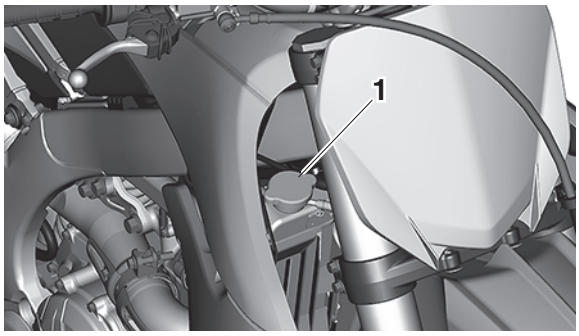
Exhaust pipe protector screw
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

EAM30210
CHECKING THE COOLANT LEVEL

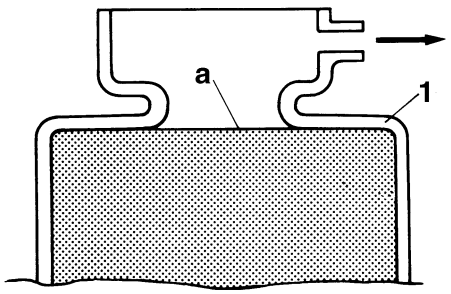
EWA13030
⚠ WARNING

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

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 dis-**

tilled 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

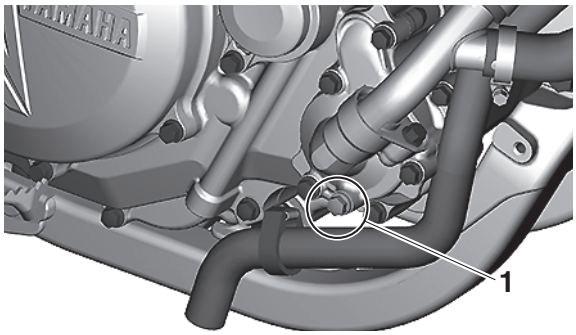
1. Remove:
   • Seat
   • Side cover (left/right)
   • Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   • Radiator
   • Radiator hose
   Crack/damage → Replace.
   Refer to "RADIATOR" on page 6-2.
3. Install:
   • Air scoop (left/right)
   • Seat
   • Side cover (left/right)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

EAM30212
CHANGING THE COOLANT

EWA13030
⚠ WARNING

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

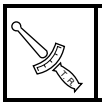
1. Place a container under the engine.
2. Remove:
   • Coolant drain bolt "1"



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.
5. Install:
   • Copper washer New
   • Coolant drain bolt

	**Coolant drain bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

6. Pour coolant.

	**Recommended coolant** **High quality ethylene glycol anti-freeze containing anti-corrosion for aluminum engine** **Radiator (including all routes)** **1.03 L (1.09 US qt, 0.91 Imp.qt)** **Coolant mixing ratio** **1:1 (Coolant:Water)**

EWA13040
⚠ WARNING

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

ECA13481
NOTICE

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

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

7. Install:
   - Radiator cap
8. Start the engine, warm this up for several minutes, stop it, and then wait for it to cool down.
9. Check:
   - Coolant level
     Refer to “CHECKING THE COOLANT LEVEL” on page 3-20.

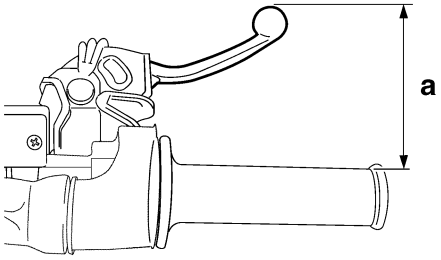
EAM20136
CHASSIS

EAM30479
ADJUSTING THE FRONT DISC BRAKE

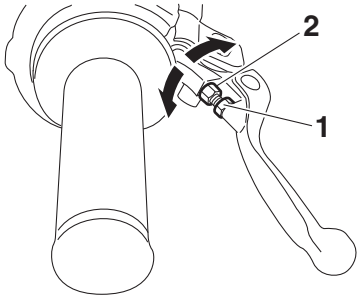
TIP
There should be no free play at the brake lever end.

1. Check:
   • Brake lever position “a”

Brake lever position
100 mm (3.94 in)
Extent of adjustment
86–105 mm (3.39–4.13 in)



2. Remove:
   • Brake lever cover
3. Adjust:
   • Brake lever position
   a. Loosen the locknut “1”.
   b. Turn the adjusting bolt “2” until the specified brake lever position is obtained.



   c. Tighten the locknut.

Locknut
5 N·m (0.5 kgf·m, 3.7 lb·ft)

EWA13050
⚠ WARNING

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

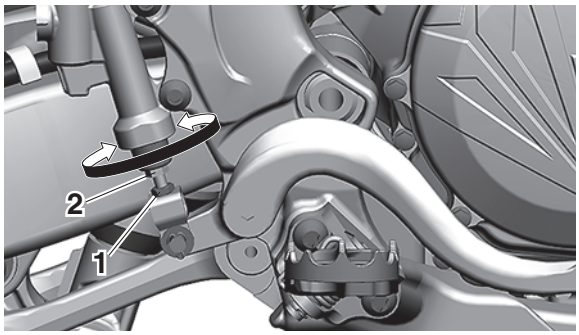
ECA13490
NOTICE

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

4. Install:
   • Brake lever cover

EAM30480
ADJUSTING THE REAR DISC BRAKE

1. Adjust:
   • Brake pedal position
   a. Loosen the locknut “1”.
   b. Turn the adjusting bolt “2” until the brake pedal is in the correct position.



   c. Tighten the locknut.

Locknut
6 N·m (0.6 kgf·m, 4.4 lb·ft)

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.

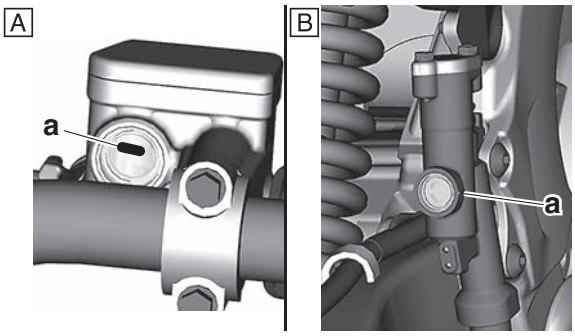
EAM30234
CHECKING THE BRAKE FLUID LEVEL

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.

Specified brake fluid
DOT 4



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

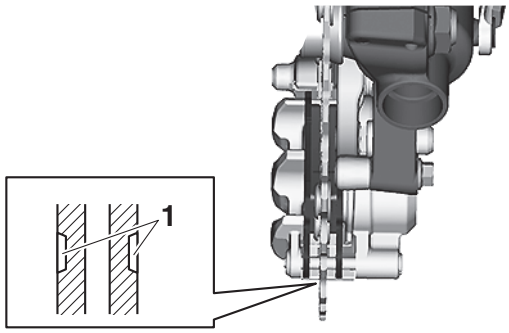
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

EAM30231

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicator grooves "1" almost touch the brake disc → Replace the brake pads as a set.
     Refer to "FRONT BRAKE" on page 4-13.

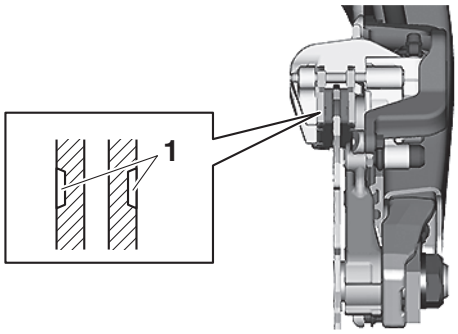


EAM30232

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Rear brake pad
     Wear indicator grooves "1" almost disappeared → Replace the brake pads as a set.
     Refer to "REAR BRAKE" on page 4-24.



EAM30478

CHECKING THE FRONT BRAKE HOSE

1. Check:
   - Brake hose
     Cracks/damage/wear → Replace.
2. Check:
   - Brake hose clamp
     Loose connection → Tighten the clamp bolt.
3. Stand the vehicle upright and apply the front brake several times.
4. Check:
   - Brake hose
     Brake fluid leaks → Replace the damaged brake hose.
     Refer to "FRONT BRAKE" on page 4-13.

EAM30498

CHECKING THE REAR BRAKE HOSE

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

Loose connection → Tighten the holder bolt.
3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to "REAR BRAKE" on page 4-24.

EAM30499
CHECKING THE BRAKE OPERATION
1. Check:
   • Brake operation
   Brake not working properly → Check the brake system.
   Refer to "FRONT BRAKE" on page 4-13 and "REAR BRAKE" on page 4-24.

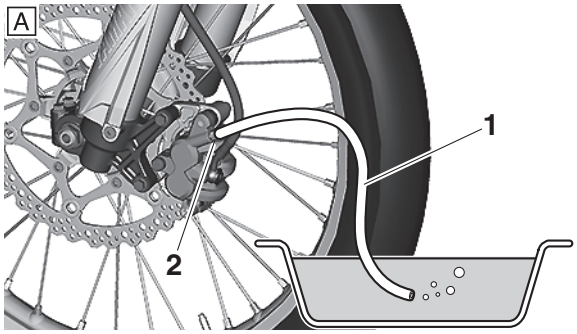
TIP
Drive on the dry road, operate the front and rear brakes separately and check to see if the brakes are operating properly.

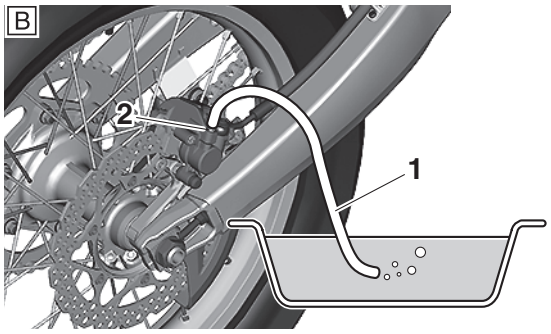
EAM30477
BLEEDING THE HYDRAULIC BRAKE SYSTEM
EWA19140
⚠ WARNING
Bleed the brake system whenever:
- **The system is disassembled.**
- **A brake hose is loosened, disconnected, or replaced.**
- **The brake fluid level is very low.**
- **Brake operation is faulty.**

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.
   a. Fill the reservoir to the proper level with the recommended brake fluid.
   b. Install the reservoir diaphragm.
   c. 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

   d. Slowly apply the brake several times.
   e. Fully pull the brake lever or fully press down the brake pedal and hold it in position.
   f. 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.

   g. Tighten the bleed screw and then release the brake lever or brake pedal.
   h. 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.

i. Tighten the bleed screw.

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

j. Pour brake fluid to the reservoir up to the specified level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.

EWA13110

⚠ WARNING

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

EAM30481

DRIVE CHAIN SLACK

ECA13550

NOTICE

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

Checking the drive chain slack

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

EWA13120

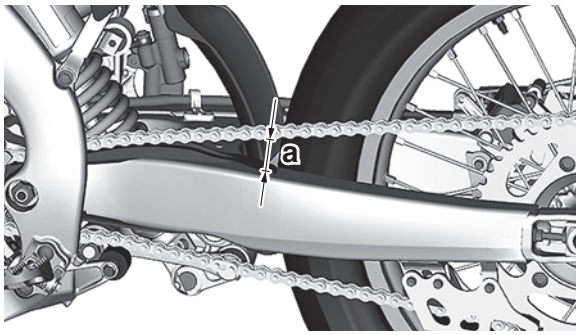
⚠ WARNING

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, 37 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)**

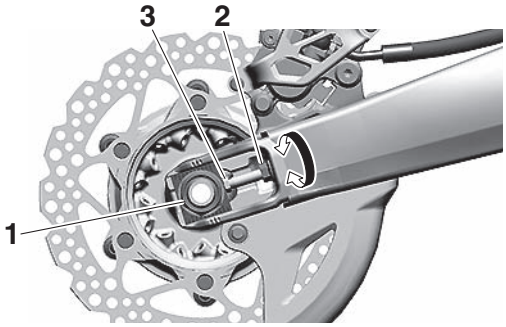
Adjusting the drive chain slack

EWA13120

⚠ WARNING

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

1. Adjust:
   - Drive chain slack
     a. Loosen the wheel axle nut "1".
     b. Loosen both locknuts "2".
     c. Turn the adjusting bolt "3" until the specified drive chain slack is obtained.



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 **135 N·m (13.5 kgf·m, 100 lb·ft)**

e. Tighten the drive chain puller locknut.

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

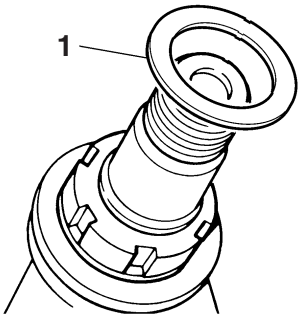
EAM30247
CHECKING AND ADJUSTING THE STEERING HEAD

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

EWA13120
⚠ WARNING

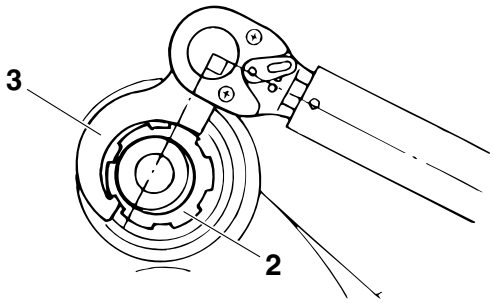
Securely support the vehicle so that there is no danger of it falling over.

2. 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 4-35.
   - Upper bracket
     Refer to "STEERING HEAD" on page 4-55.
4. Adjust:
   - Steering head
     a. Remove the washer "1".

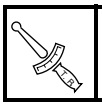


     b. After loosening the ring nut "2" with a steering nut wrench "3", tighten it to the specified torque.

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.



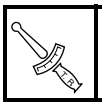
	**Steering nut wrench 90890-01403** **Exhaust flange nut wrench YU-A9472**

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

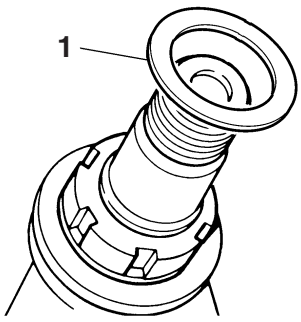
     c. Turn the front fork to the right and left a few times, and make sure that the steering rotates smoothly. If it does not turn smoothly, remove the lower bracket and check the upper and lower bearings.
     Refer to "STEERING HEAD" on page 4-55.
     d. Loosen the ring nut fully turn and then tighten 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 4-55.
     f. Install the washer "1".



5. Install:
   - Upper bracket
     Refer to "STEERING HEAD" on page 4-55.
   - Handlebar
     Refer to "HANDLEBAR" on page 4-35.

EAM30502
LUBRICATING THE STEERING HEAD

1. Lubricate:
   - Upper bearing

- Lower bearing
- Bearing race

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

EAM30338
CHECKING THE FRONT FORK LEGS

1. Stand the vehicle upright on a level surface.

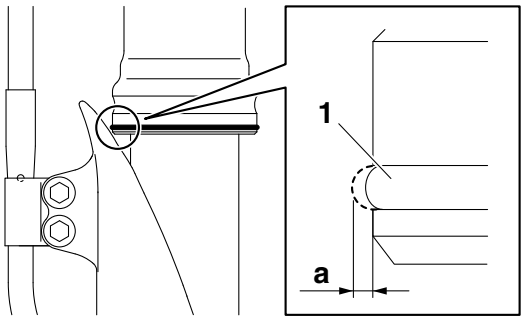
EWA13120
WARNING

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 4-42.
5. Check:
   - Protector guide "1"
     Out of specification → Replace.

TIP

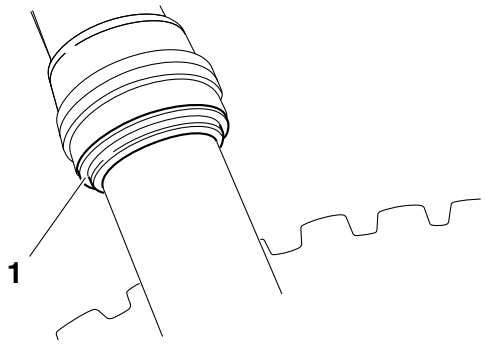
The protector guide reaches the limit of its use when it is worn down to the same height "a" as of the outer tube circumference.



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

ECA24330
NOTICE

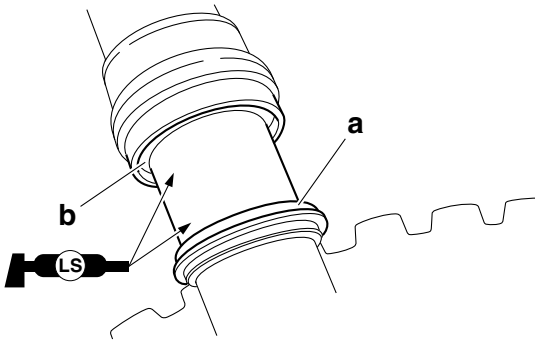
Be careful not to damage the dust seal and the inner tube by a driver.



7. 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.



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

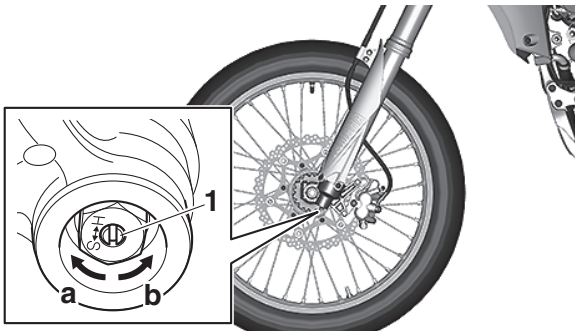
Do not turn the adjuster forcibly beyond its adjusting range.

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
9 click(s) in direction “b”*
Maximum (hard)
0 click(s) in direction “b”*
***With the adjusting screw fully turned in direction “a”**

TIP
Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



Compression damping

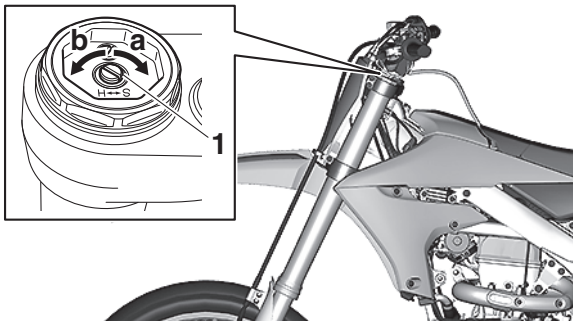
ECA24350
NOTICE
Do not turn the adjuster forcibly beyond its adjusting range.

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
9 click(s) in direction “b”*
Maximum (hard)
0 click(s) in direction “b”*
***With the adjusting screw fully turned in direction “a”**

TIP
Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



Air bleeding from front fork

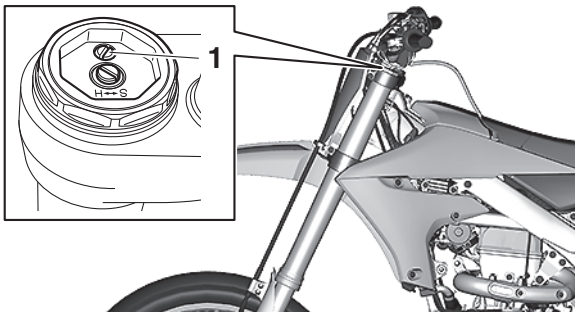
TIP
If the front fork initial movement feels stiff during a run, relieve the front fork internal pressure.

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)



EAM30482
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

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 4-59.
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 4-59.

EAM30242
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

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

EWA13120
⚠ WARNING

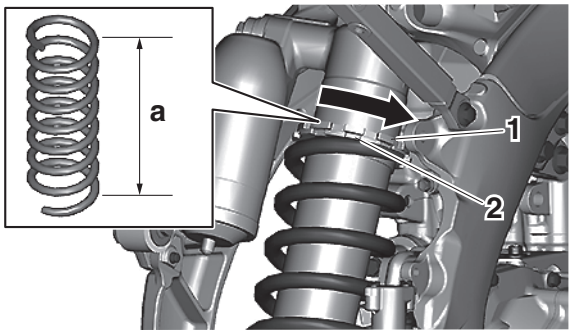
Securely support the vehicle so that there is no danger of it falling over.

Spring preload

ECA24360
NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

1. 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".

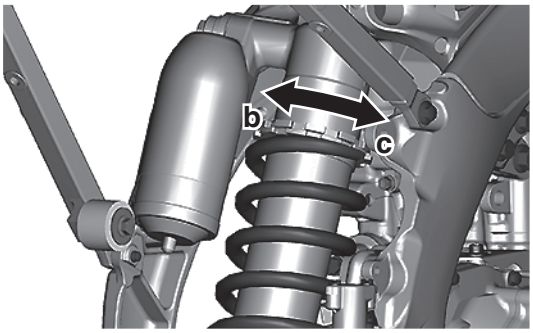


     d. Turn the adjuster in the direction of "b" or "c" to make an adjustment.

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 7.0 mm (0.28 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.

Rebound damping

ECA24370

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

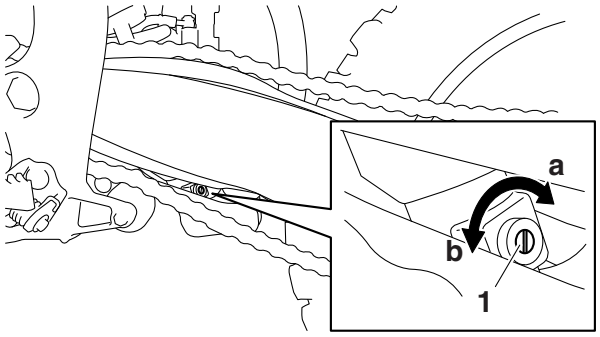
1. Adjust:
   - Rebound damping
     a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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
12 click(s) in direction "b"*
Maximum (hard)
0 click(s) in direction "a"
***With the adjusting screw fully turned in direction "a"**

TIP

Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



Compression damping (for fast compression damping)

ECA24370

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

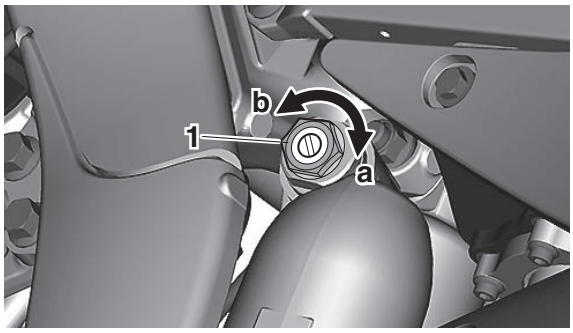
1. Adjust:
   - Compression damping (for fast compression damping)
     a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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
7/8 turn(s) in direction "b"*
Maximum (hard)
0 turn(s) in direction "b"*
***With the adjusting screw fully turned in direction "a"**

TIP

To obtain a precise adjustment, it is advisable to check the actual total number of turns of the damping force adjusting mechanism. This adjustment range may not exactly match the specifications listed due to small differences in production.



Compression damping (for slow compression damping)

ECA24390

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

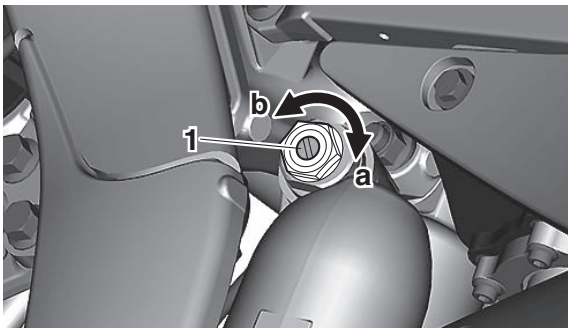
1. Adjust:
   - Compression damping (for slow compression damping)
     a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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
6 click(s) in direction "b"*
Maximum (hard)
0 click(s) in direction "b"*
***With the adjusting screw fully turned in direction "a"**

TIP

Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.



EAM30240

CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm smooth action
   - Swingarm free play
     Refer to "SWINGARM" on page 4-65.

EAM30500

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
   - Oil seal
   - Collar

Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-66.

EAM30501

CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 4-63.

EAM30243

CHECKING THE TIRES

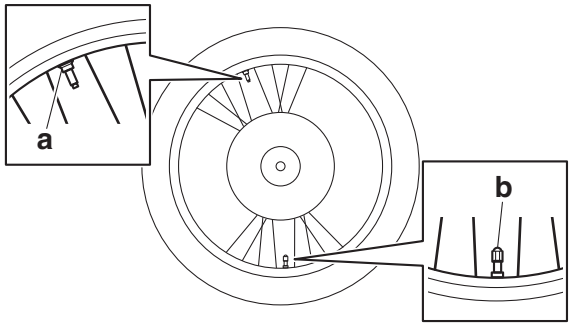
1. Measure:
   - Tire pressure
     Out of specification → Regulate.

Tire air pressure (measured on cold tires)
Front
100 kPa (1.00 kgf/cm², 15 psi)
Rear
100 kPa (1.00 kgf/cm², 15 psi)

TIP

- Check the tire while it is cold.
- Because if the bead stopper tightening nut is loose when the tire pressure is low, the tire could slip off the rim, thus be sure to check and tighten the bead stopper tightening nut "a".
- If the tire valve stem "b" is found tilted, the tire is considered to be slipping off its position. Cor-

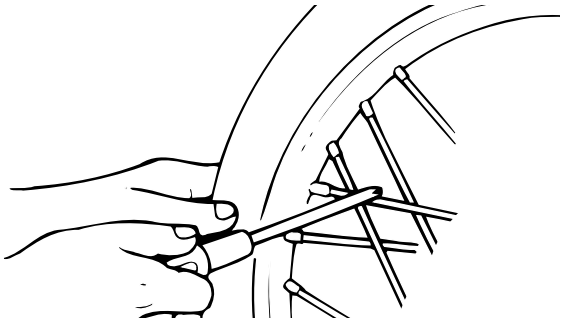
rect the tire position.



a. Bead stopper tightening nut
b. Tire valve stem

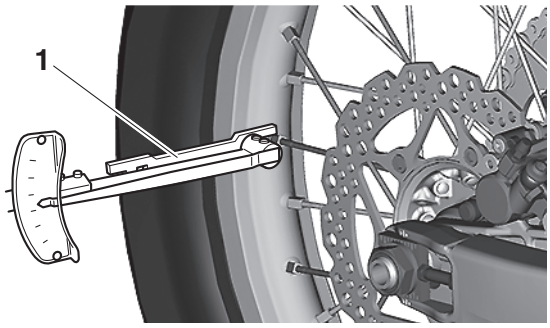
EAM30244
CHECKING AND TIGHTENING THE SPOKES

1. Check:
   • Spoke
   Bend/damage → Replace.
   Loose → Tighten.
   Tap the spoke with a screwdriver.



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

2. Tighten:
   • Spoke
   (with a spoke nipple wrench "1")



	Spoke nipple wrench (6–7) **90890-01521** **Spoke nipple wrench (6–7)** **YM-01521**

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

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.

EAM30245
CHECKING THE WHEELS

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

EWA13260
⚠ WARNING
Never attempt to make any repairs to the wheel.

EAM30246
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.

EAM30253
CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.
Refer to "CHASSIS TIGHTENING TORQUES" on page 2-13.

EAM30248
CHECKING AND LUBRICATING THE CABLES

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

EWA13270
⚠ WARNING
Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

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

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

TIP

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

EAM30483

LUBRICATING THE BRAKE LEVER

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

	Recommended lubricant **Silicone grease**

EAM30503

LUBRICATING THE CLUTCH LEVER

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

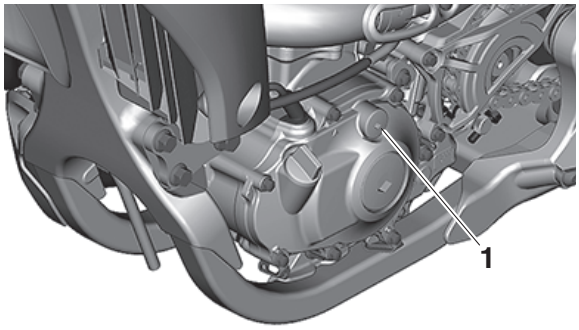
	Recommended lubricant **Lithium-soap-based grease**

EAM20137
ELECTRICAL SYSTEM

EAM30256
CHECKING AND CHARGING THE BATTERY
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-45.

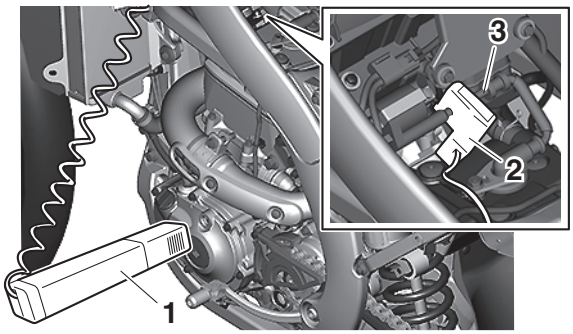
EAM30505
CHECKING THE FUSES
Refer to “CHECKING THE FUSES” on page 8-45.

EAM30255
CHECKING THE IGNITION TIMING
1. Remove:
   • Timing mark accessing screw “1”



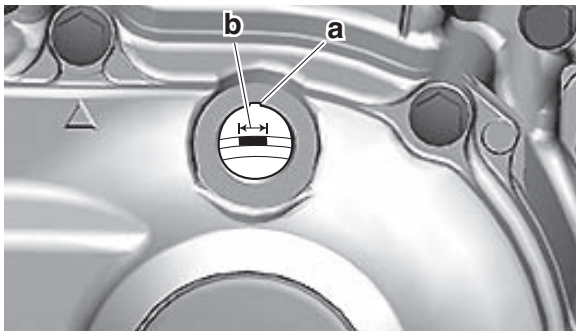
2. Attach:
   • Timing light “1”
   • Digital tachometer “2”
   (to the high tension cord “3”)

Timing light
90890-03141
Timing light
YU-03141
Digital tachometer
90890-06760
Digital tachometer
YU-39951-B



3. Adjust:
   • Engine idling speed
   Refer to “CHECKING THE ENGINE IDLING SPEED” on page 3-11.

4. Check:
   • Ignition timing
   Check whether the alignment mark “a” on the left crankcase cover is within the firing range “b” on the generator rotor.
   Incorrect firing range → Check generator rotor and crankshaft position sensor.



5. Install:
   • Timing mark accessing screw

Timing mark accessing screw
6 N·m (0.6 kgf·m, 4.4 lb·ft)

CHASSIS

GENERAL CHASSIS 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

FRONT WHEEL 4-5
- REMOVING THE FRONT WHEEL 4-6
- DISASSEMBLING THE FRONT WHEEL 4-6
- CHECKING THE FRONT WHEEL 4-6
- ASSEMBLING THE FRONT WHEEL 4-6
- INSTALLING THE FRONT WHEEL 4-7

REAR WHEEL 4-9
- REMOVING THE REAR WHEEL 4-10
- DISASSEMBLING THE REAR WHEEL 4-10
- CHECKING 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

FRONT BRAKE 4-13
- INTRODUCTION 4-17
- CHECKING THE FRONT BRAKE DISC 4-17
- REPLACING THE FRONT BRAKE PADS 4-17
- REMOVING THE FRONT BRAKE CALIPER 4-19
- DISASSEMBLING THE FRONT BRAKE CALIPER 4-19
- CHECKING THE FRONT BRAKE CALIPER 4-19
- ASSEMBLING THE FRONT BRAKE CALIPER 4-19
- INSTALLING THE FRONT BRAKE CALIPER 4-20
- REMOVING THE FRONT BRAKE MASTER CYLINDER 4-21
- CHECKING THE FRONT BRAKE MASTER CYLINDER 4-21
- ASSEMBLING THE FRONT BRAKE MASTER CYLINDER 4-21
- INSTALLING THE FRONT BRAKE MASTER CYLINDER 4-22

REAR BRAKE 4-24
- INTRODUCTION 4-28
- CHECKING THE REAR BRAKE DISC 4-28
- REPLACING THE REAR BRAKE PADS 4-28
- REMOVING THE REAR BRAKE CALIPER 4-30
- DISASSEMBLING THE REAR BRAKE CALIPER 4-30
- CHECKING THE REAR BRAKE CALIPER 4-30
- ASSEMBLING THE REAR BRAKE CALIPER 4-31
- INSTALLING THE REAR BRAKE CALIPER 4-31
- REMOVING THE REAR BRAKE MASTER CYLINDER 4-32
- CHECKING THE REAR BRAKE MASTER CYLINDER 4-32
- ASSEMBLING THE REAR BRAKE MASTER CYLINDER 4-32

INSTALLING THE REAR BRAKE MASTER CYLINDER 4-33

HANDLEBAR.....4-35
REMOVING THE HANDLEBAR 4-37
CHECKING THE HANDLEBAR.....4-37
INSTALLING THE HANDLEBAR.....4-37

FRONT FORK.....4-42
REMOVING THE FRONT FORK LEGS 4-44
DISASSEMBLING THE FRONT FORK LEGS 4-44
CHECKING THE FRONT FORK LEGS.....4-45
ASSEMBLING THE FRONT FORK LEGS 4-46
INSTALLING THE FRONT FORK LEGS.....4-53

STEERING HEAD.....4-55
REMOVING THE LOWER BRACKET 4-56
CHECKING THE STEERING HEAD 4-56
INSTALLING THE STEERING HEAD 4-56

REAR SHOCK ABSORBER ASSEMBLY 4-59
HANDLING THE REAR SHOCK ABSORBER 4-62
DISPOSING OF A REAR SHOCK ABSORBER.....4-62
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY 4-62
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY.....4-62
CHECKING THE CONNECTING ARM AND RELAY ARM 4-63
INSTALLING THE RELAY ARM.....4-63
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY.....4-63

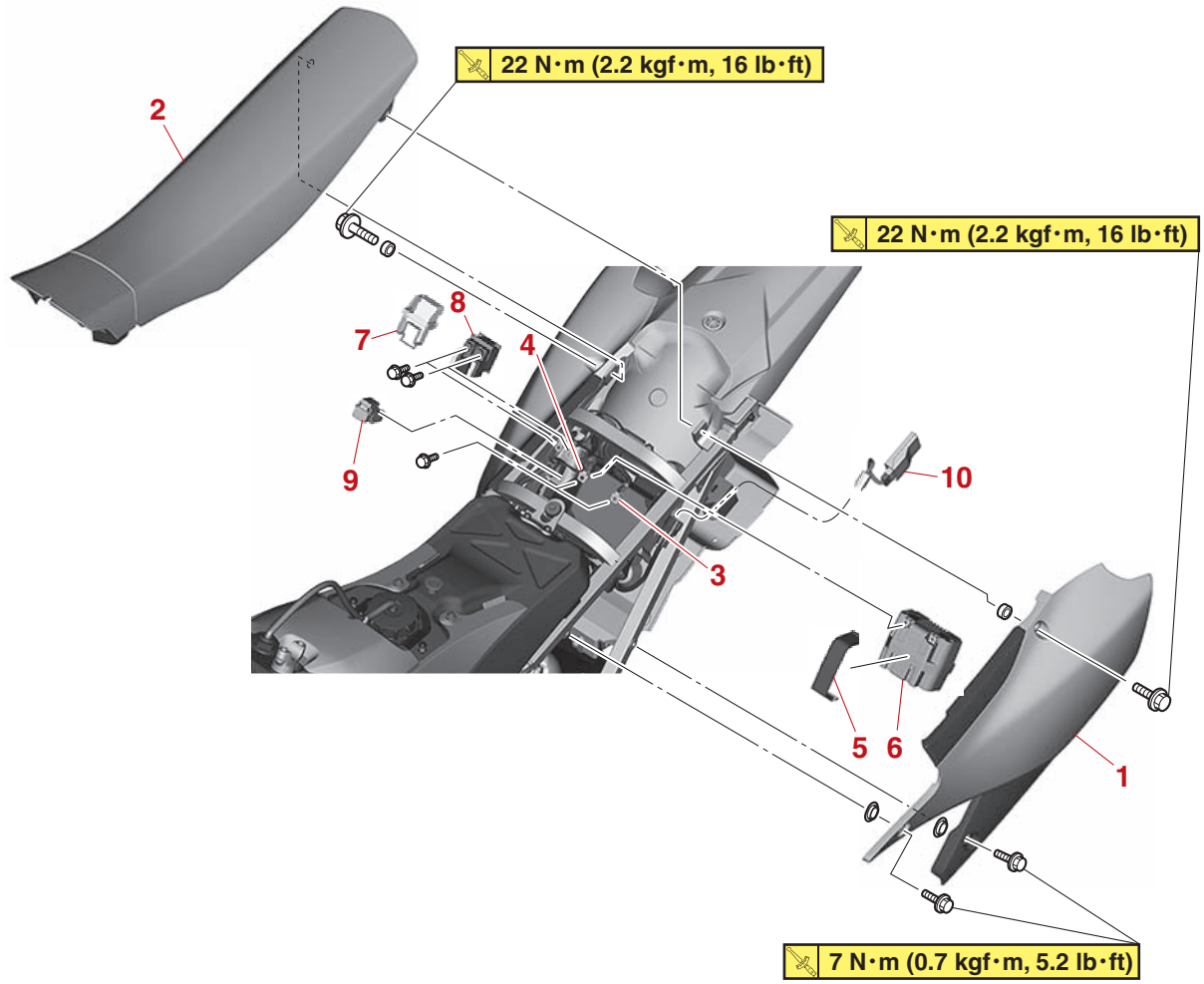
SWINGARM.....4-65
REMOVING THE SWINGARM.....4-66
CHECKING THE SWINGARM 4-66
INSTALLING THE SWINGARM 4-66

CHAIN DRIVE.....4-68
REMOVING THE DRIVE CHAIN.....4-69
CHECKING THE DRIVE CHAIN 4-69
CHECKING THE DRIVE SPROCKET 4-70
CHECKING THE REAR WHEEL SPROCKET 4-70
INSTALLING THE DRIVE CHAIN 4-70

EAM20094

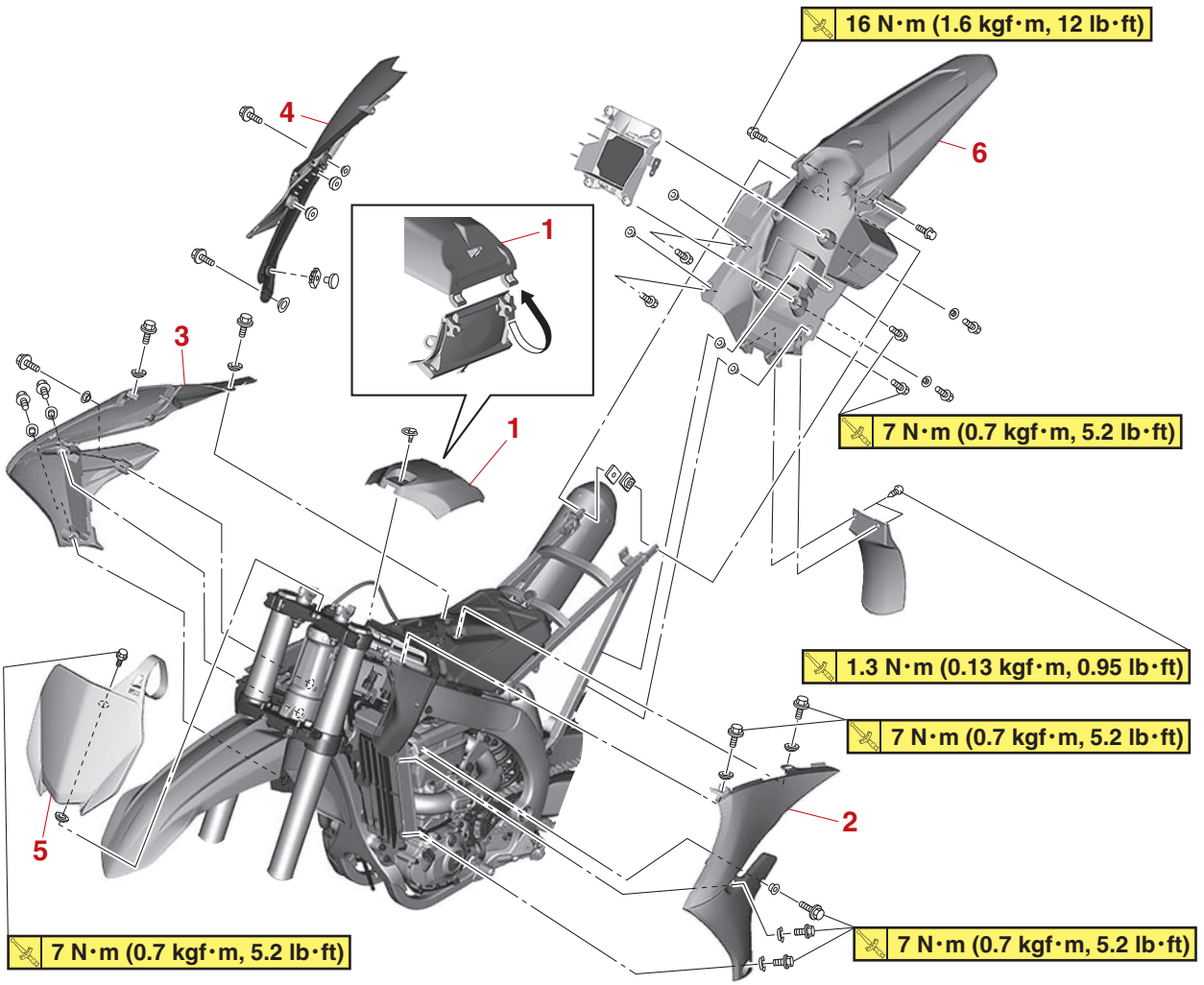
GENERAL CHASSIS

Removing the seat and battery



Order	Job/Parts to remove	Q'ty	Remarks
1	Side cover (left)	1	
2	Seat	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	CCU (Communication Control Unit)	1	

Removing the side cover



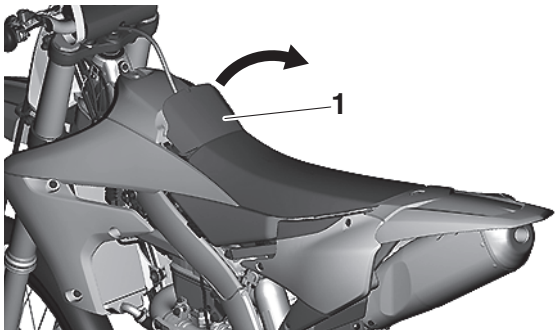
Order	Job/Parts to remove	Q'ty	Remarks
1	Air filter case cover	1	Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-15.
2	Air scoop (left)	1	
3	Air scoop (right)	1	
4	Side cover (right)	1	
5	Number plate	1	
6	Rear fender	1	

EAM30016
REMOVING THE SEAT

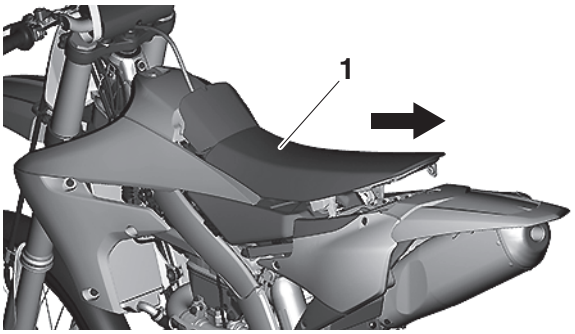
TIP

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 1-23.



2. Remove:
   • Seat “1”

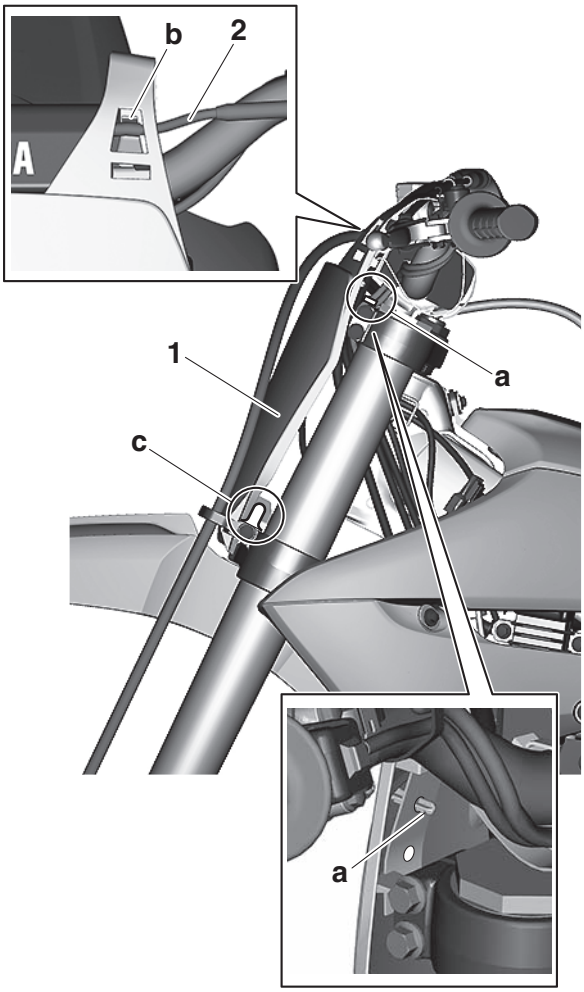


EAM30371
REMOVING THE NUMBER PLATE

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.

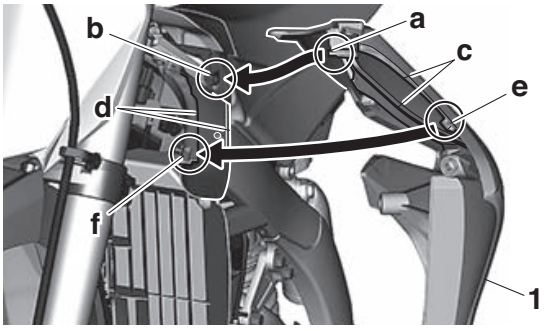


EAM30458
INSTALLING THE AIR SCOOP

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.

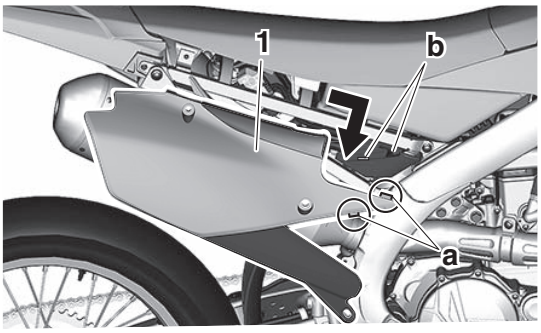


EAM30459
REMOVING THE SIDE COVER

1. Remove:
   • Side cover (right) “1”

TIP

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



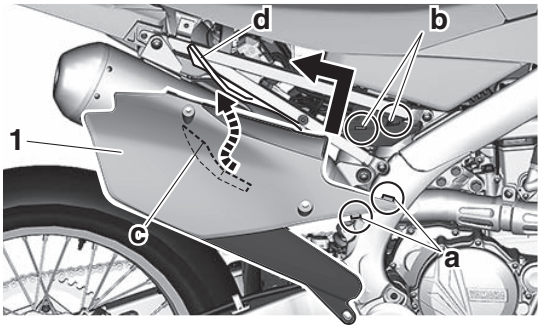
a. Projection
b. Slot

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.

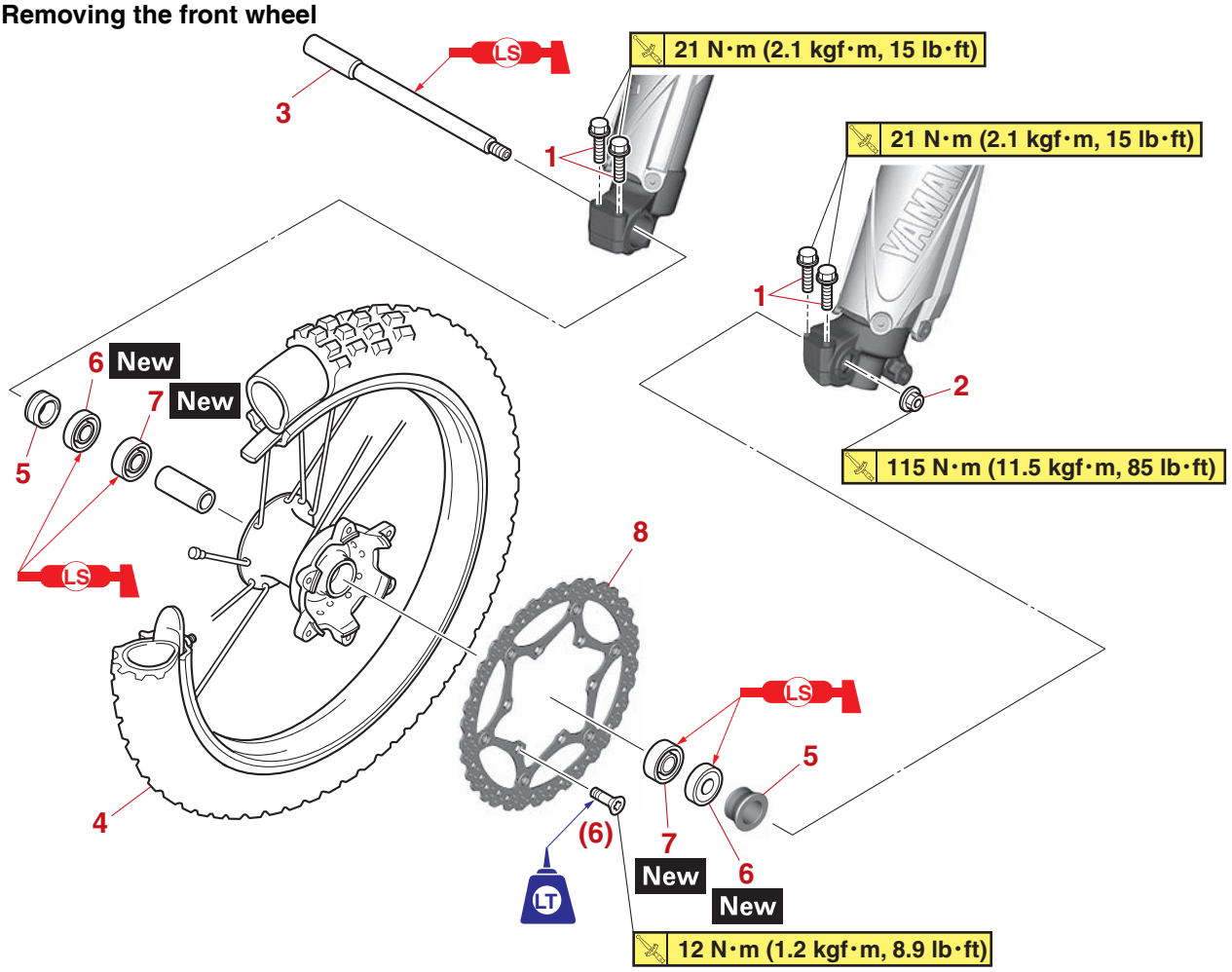


a. Projection
b. Slot
c. Rib (side cover)
d. Rib (rear fender)

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

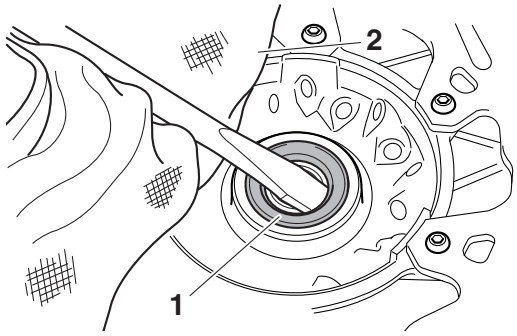
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   • Front wheel

EAM30019
DISASSEMBLING THE FRONT WHEEL

1. Remove:
   • Oil seal
   • Bearing
   a. Clean the outside of the front wheel hub.
   b. 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.



   c. Remove the bearings with a bearing puller.

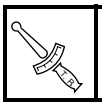
EAM30018
CHECKING THE FRONT WHEEL

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

EWA13460
⚠ WARNING

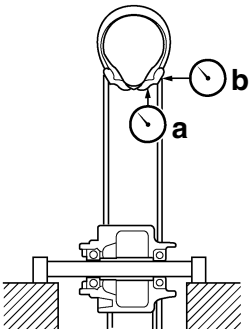
Do not attempt to straighten a bent wheel axle.

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
   Refer to “CHECKING AND TIGHTENING THE SPOKES” on page 3-33.
4. Tighten:
   • Spoke
   Refer to “CHECKING AND TIGHTENING THE SPOKES” on page 3-33.

	**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.

EAM30020
ASSEMBLING THE FRONT WHEEL

1. Install:
   • Bearing (left side) “1” New
   • Spacer “2”
   • Bearing (right side) “3” New
   • Oil seal “4” New

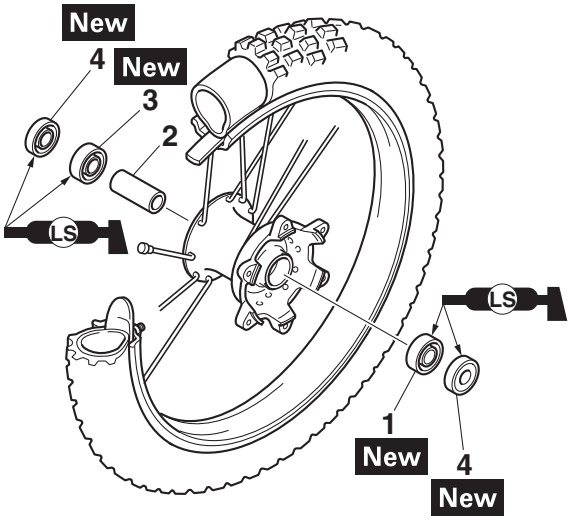
TIP
• Apply the lithium-soap-based grease to the bearing and the oil seal lip when installing.

- Left side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

ECA24420

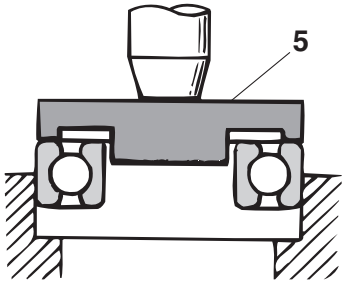
NOTICE

Install the bearing by pressing its outer race parallel.



TIP

Use a socket "5" that matches the diameter of the bearing outer race and that of the oil seal.



2. Install:
   - Brake disc
   - Brake disc bolt

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

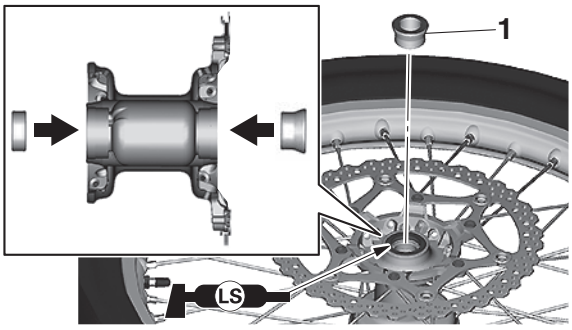
TIP

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.



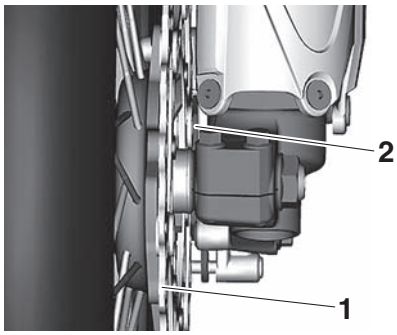
EAM30617

INSTALLING THE FRONT WHEEL

1. Install:
   - Front wheel

TIP

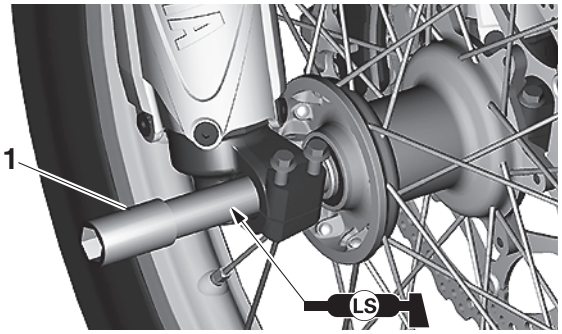
Install the brake disc "1" between the brake pads "2" correctly.



2. Install:
   - Front wheel axle "1"

TIP

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



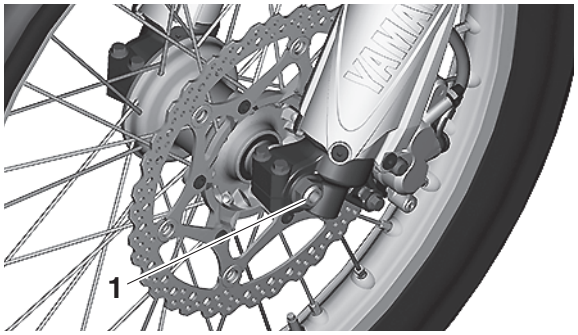
3. Tighten:
   - Front wheel axle nut "1"

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

ECA24430

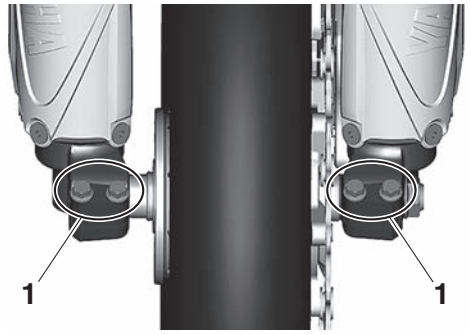
NOTICE

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”

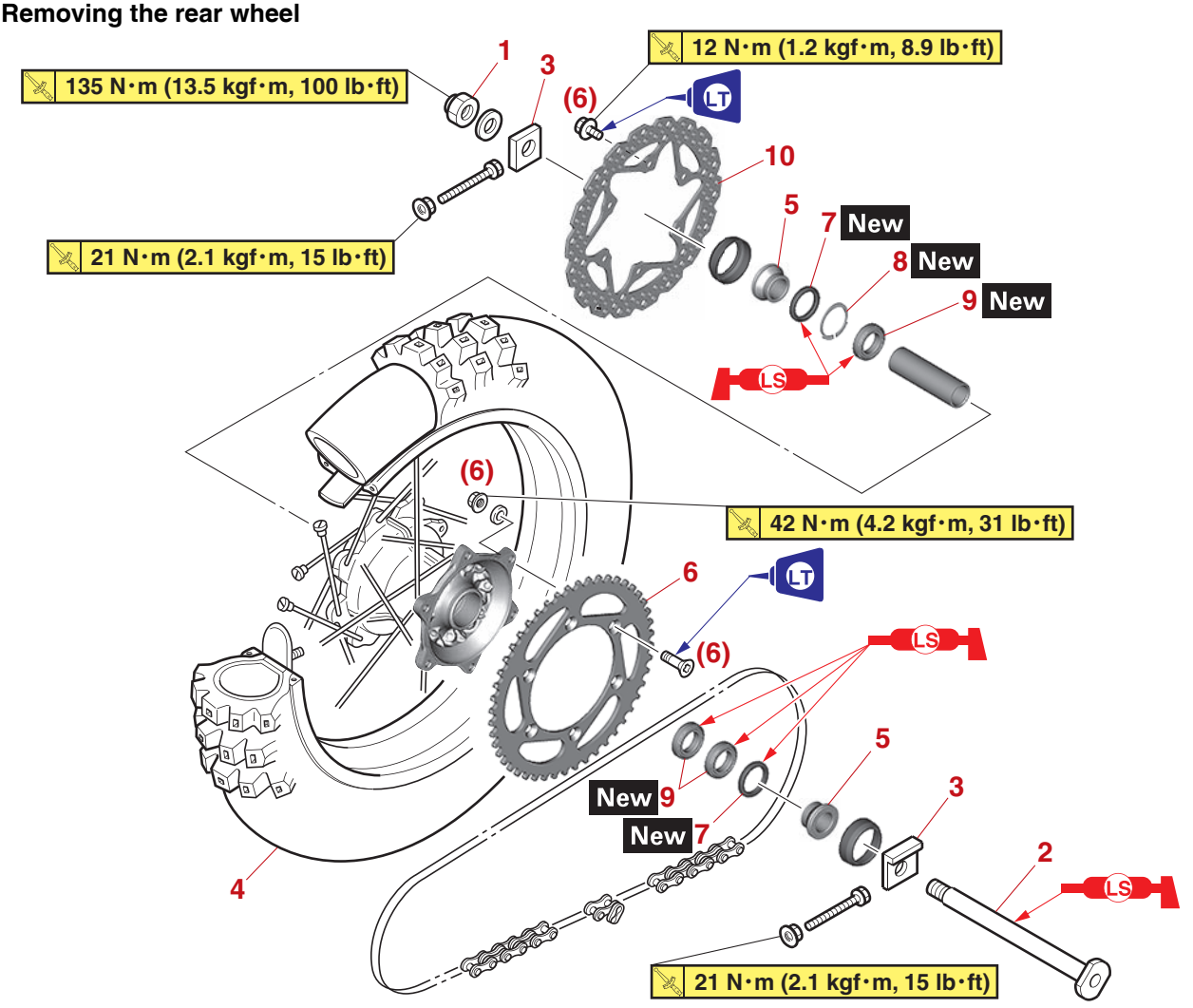
	Front wheel axle pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**



EAM20096

REAR WHEEL

Removing the rear wheel



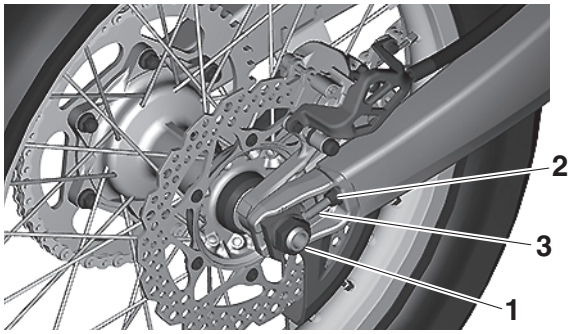
Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the rear wheel off the ground.
1	Rear wheel axle nut	1	
2	Rear wheel axle	1	
3	Drive chain puller	2	
4	Rear wheel	1	
5	Collar	2	
6	Rear wheel sprocket	1	
7	Oil seal	2	
8	Circlip	1	
9	Bearing	3	
10	Brake disc	1	

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

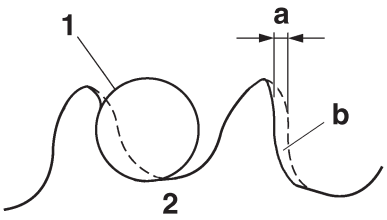
TIP
- Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.
- Do not depress the brake pedal with the rear wheel removed.

EAM30024
DISASSEMBLING THE REAR WHEEL
1. Remove:
   • Oil seal
   • Bearing
   Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-6.

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 AND TIGHTENING THE SPOKES” on page 3-33.
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)

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
42 N·m (4.2 kgf·m, 31 lb·ft)

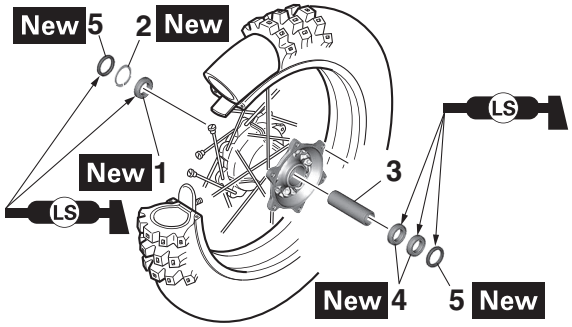
TIP
Tighten the self-locking nuts in stages and in a crisscross pattern.

EAM30026
ASSEMBLING THE REAR WHEEL

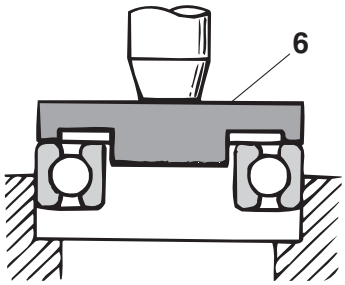
1. Install:
   - Bearing (right side) "1" New
   - Circlip "2" New
   - Spacer "3"
   - Bearing (left side) "4" New
   - Oil seal "5" New

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 "6" that matches the diameter of the bearing outer race and that of the oil seal.



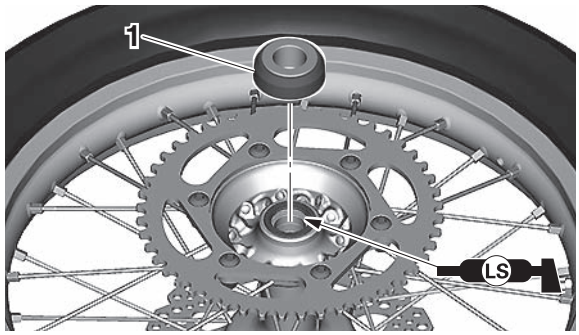
2. Install:
   - Brake disc
   - Brake disc bolt

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"

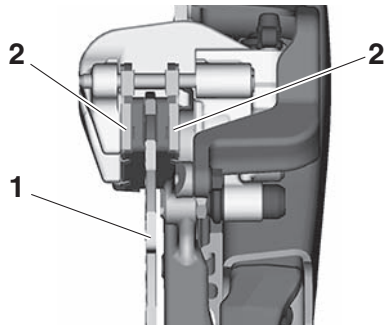
TIP
Apply the lithium-soap-based grease on the oil seal lip.



EAM30027
INSTALLING THE REAR WHEEL

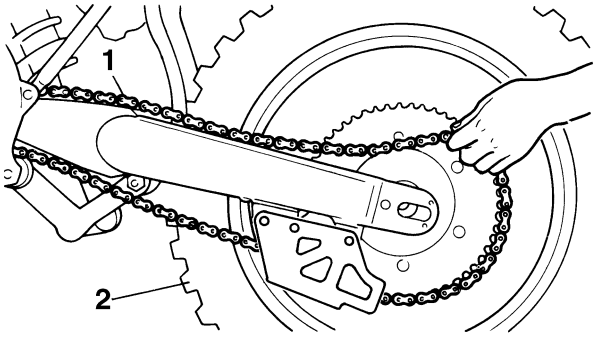
1. Install:
   - Rear wheel

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



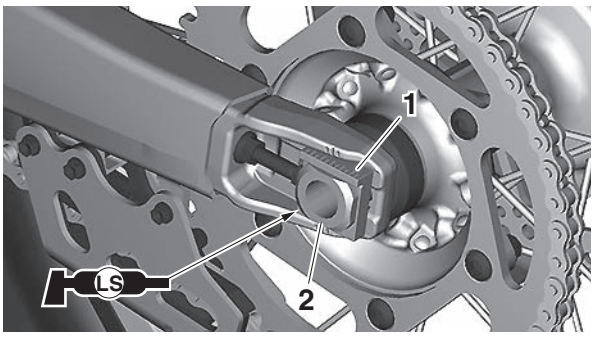
2. Install:
   - Drive chain "1"

TIP
Push the rear wheel "2" forward and install the drive chain.



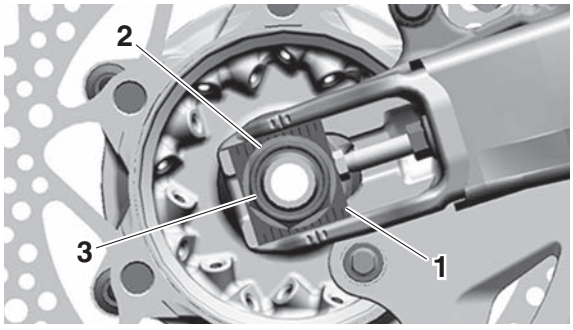
3. Install:
   • Drive chain puller (left) “1”
   • Rear wheel axle “2”

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



4. Install:
   • Drive chain puller (right) “1”
   • Washer “2”
   • Rear wheel axle nut “3”

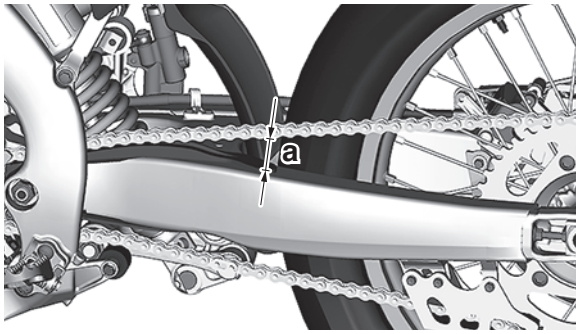
TIP
Temporarily tighten the rear wheel axle nut at this point.



5. Adjust:
   • Drive chain slack “a”

	Drive chain slack (Maintenance stand) **50.0–60.0 mm (1.97–2.36 in)**

Refer to “DRIVE CHAIN SLACK” on page 3-26.

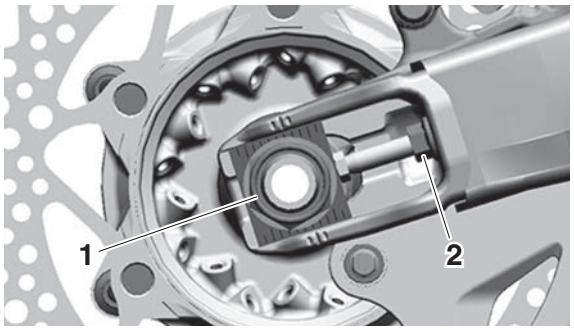


6. Tighten:
   • Rear wheel axle nut “1”

	Wheel axle nut **135 N·m (13.5 kgf·m, 100 lb·ft)**

   • Locknut “2”

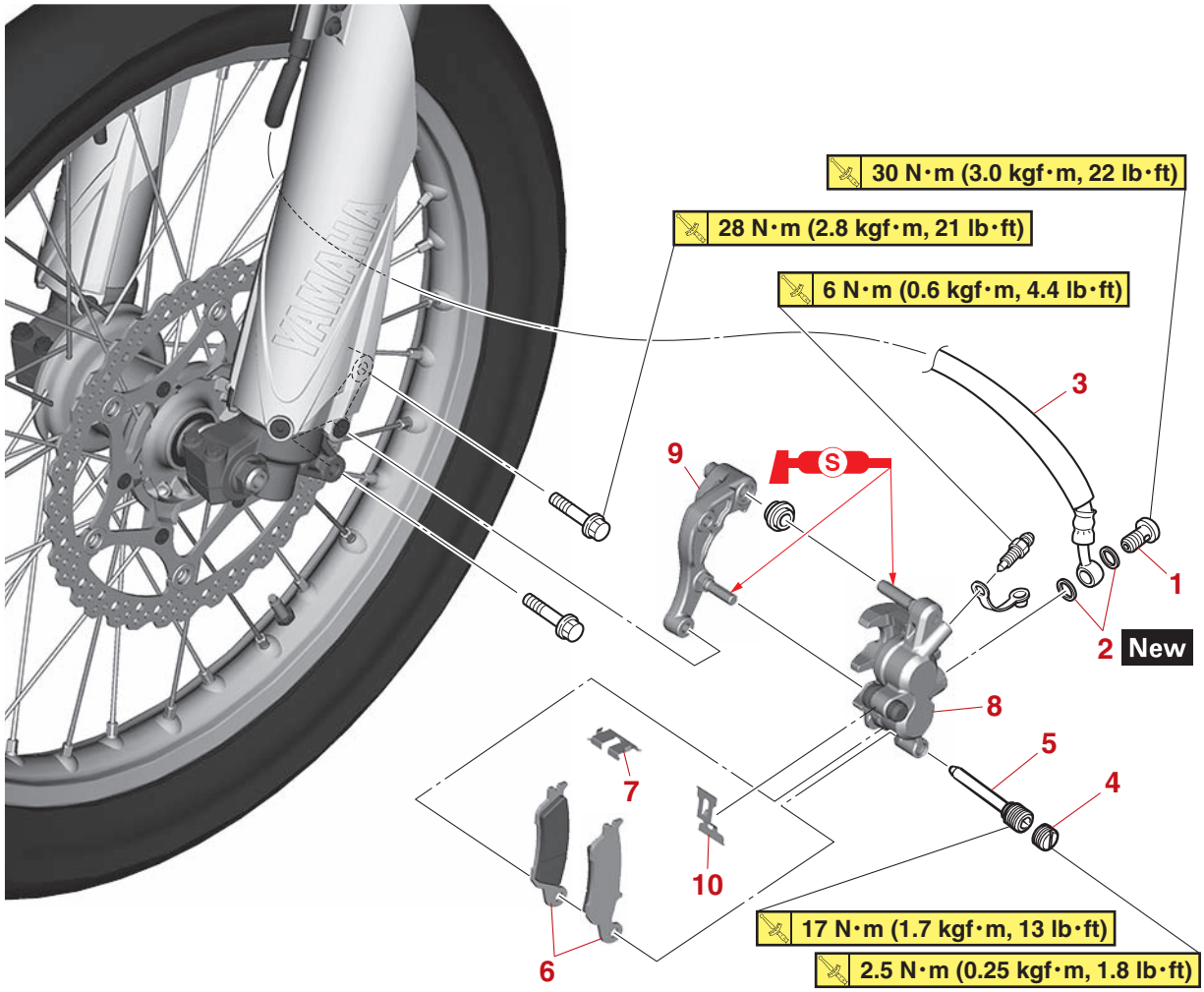
	Locknut **21 N·m (2.1 kgf·m, 15 lb·ft)**



EAM20097

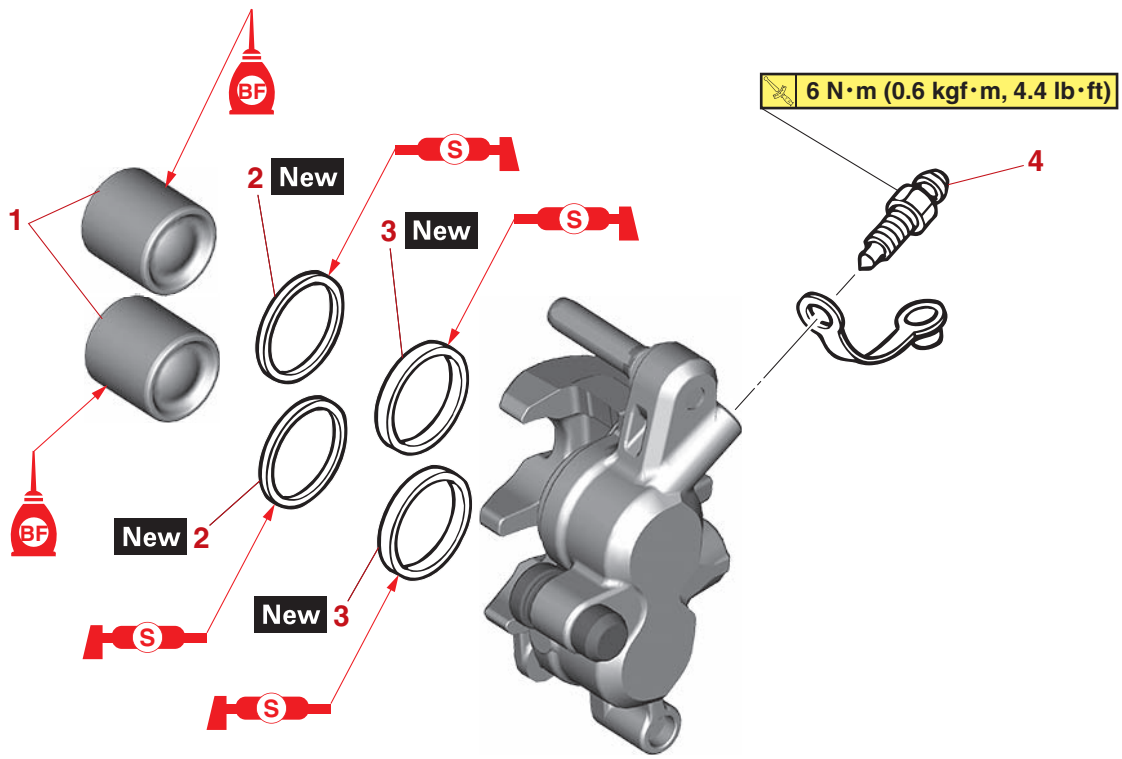
FRONT BRAKE

Removing the front brake caliper



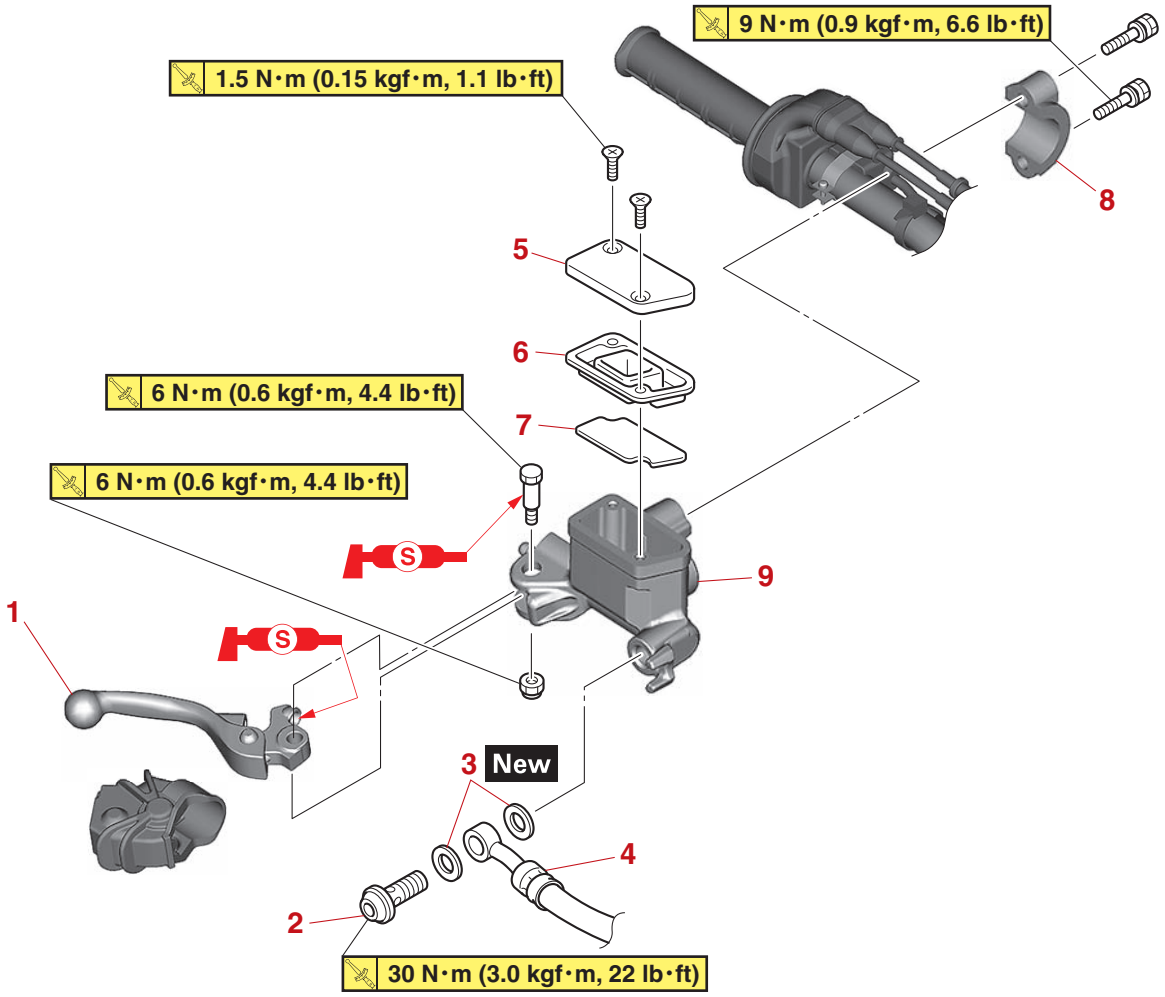
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Union bolt	1	
2	Copper washer	2	
3	Front brake hose	1	
4	Brake pad pin plug	1	
5	Brake pad pin	1	
6	Brake pad	2	
7	Brake pad spring	1	
8	Front brake caliper assembly	1	
9	Front brake caliper bracket	1	
10	Brake pad spring	1	

Disassembling the front brake caliper



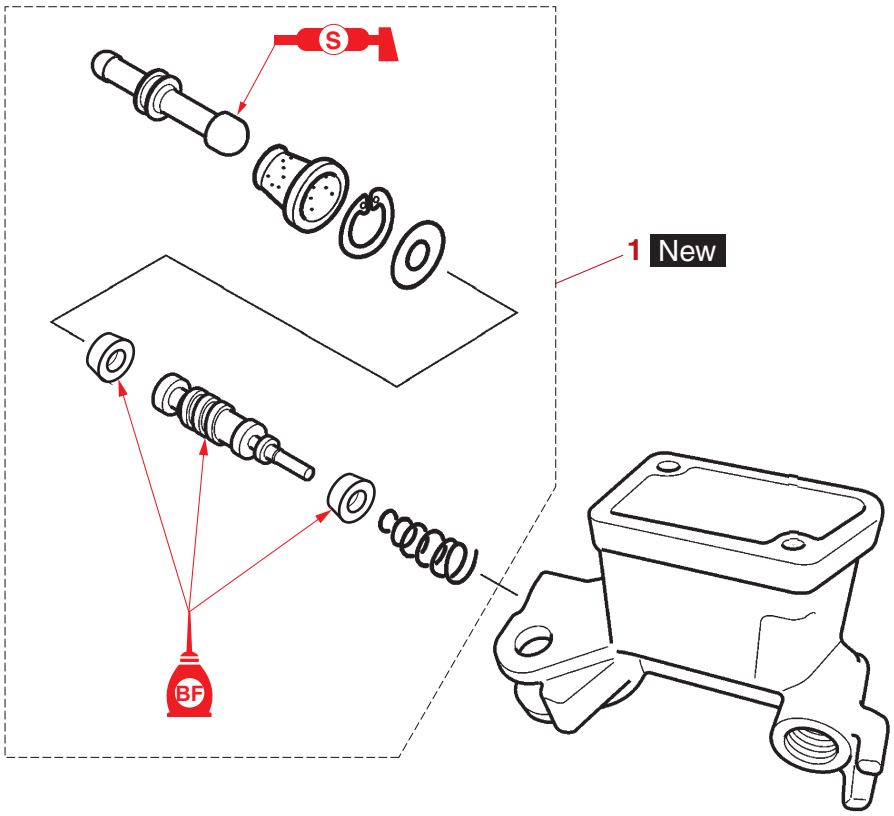
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	2	
2	Brake caliper piston dust seal	2	
3	Brake caliper piston seal	2	
4	Bleed screw	1	

Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
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



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	

EAM30028
INTRODUCTION
EWA19210
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 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 lost your eyesight.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

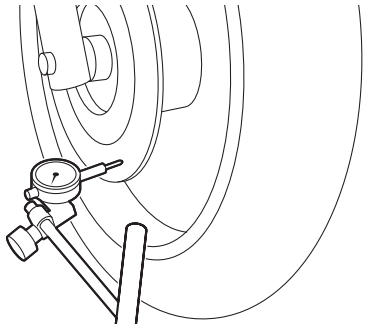
EAM30029
CHECKING THE FRONT BRAKE DISC
1. Check:
   - Front brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

Brake disc thickness limit
2.5 mm (0.10 in)

3. Measure:
   - Brake disc runout
     Out of specification → Replace the brake disc.

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

   a. Place the vehicle on a maintenance stand so that the front wheel is elevated.
   b. Remove the brake caliper.
   c. Hold the dial gauge at a right angle against the brake disc surface.
   d. Measure the runout 1.5 mm (0.06 in) above the brake disc edge.

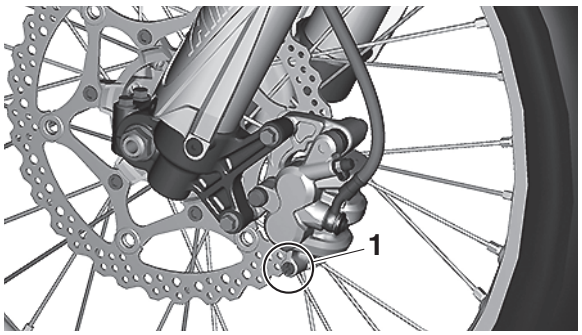


G098641

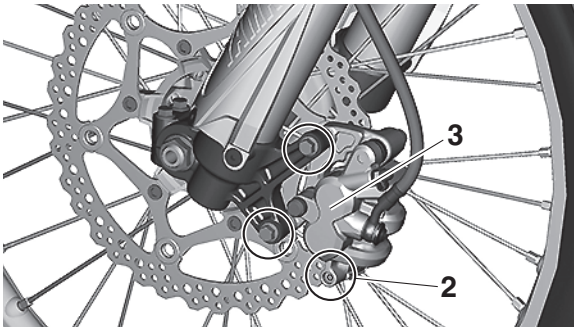
4. Replace:
   - Brake disc
     Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-6.

EAM30519
REPLACING THE FRONT BRAKE PADS
TIP
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

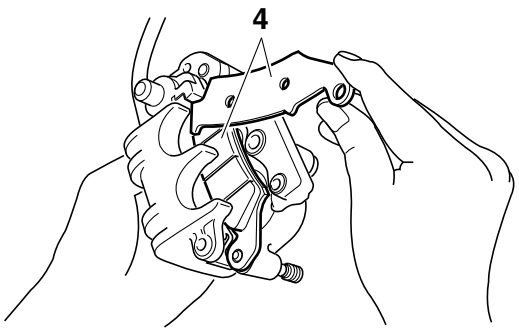
1. Remove:
   - Brake pad
     a. Remove the pad pin plug "1".



     b. Loosen the pad pin "2".
     c. Remove the brake caliper "3" from the front fork.

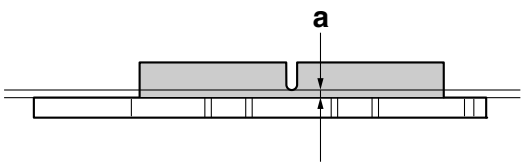


d. Remove the pad pin and brake pads “4”.

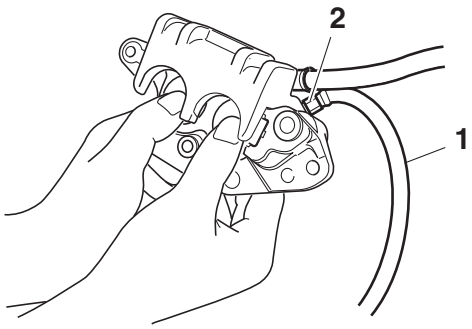


2. Measure:
   • Brake pad wear limit “a”
   Out of specification → Replace the brake pads as a set.

	Brake pad lining thickness limit **1.0 mm (0.04 in)**



3. Install:
   • Brake pad
   a. Connect the plastic hose “1” to the bleed screw “2” and place a container under the end of the plastic hose.



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

EWA19160

⚠ WARNING

Do not reuse the drained brake fluid.

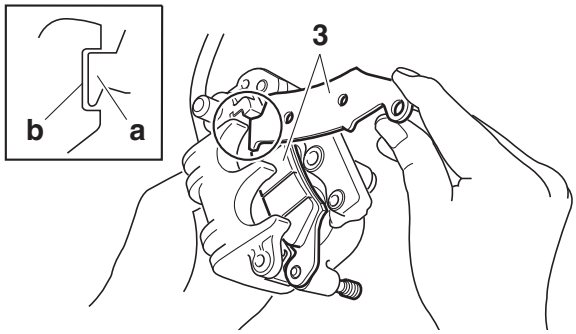
   c. Tighten the bleed screw.

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

   d. Install the brake pads “3” and the pad pin.

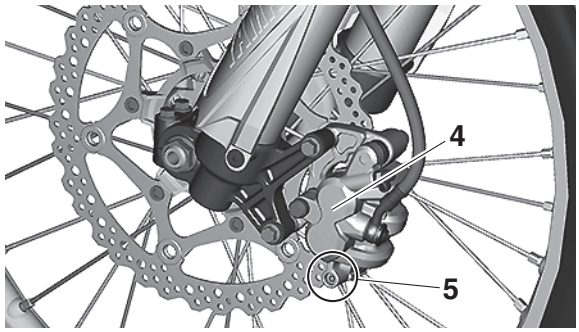
TIP

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



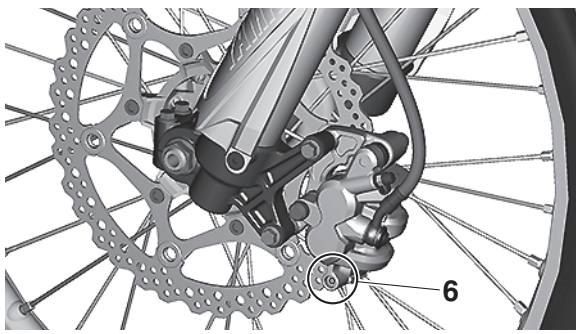
   e. Install the brake caliper “4” and tighten the pad pin “5”.

	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)**



   f. Install the pad pin plug “6”.

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



4. Check:
   • Brake fluid level
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
5. Check:
   • Brake lever operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

EAM30030
REMOVING THE FRONT BRAKE CALIPER

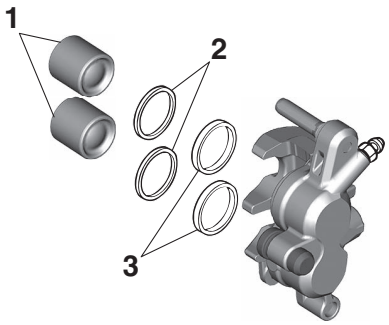
TIP
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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.

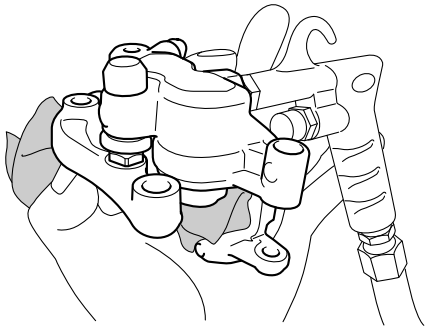
EAM30031
DISASSEMBLING THE FRONT BRAKE CALIPER

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.

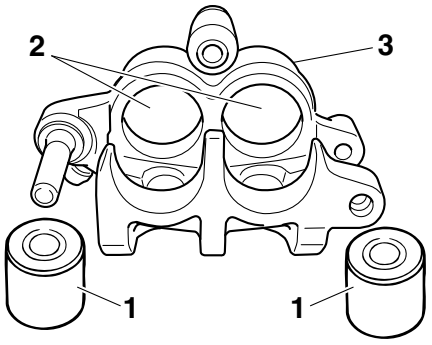
EWA13550
⚠ WARNING
- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



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

EAM30035
INSTALLING THE FRONT BRAKE CALIPER

1. Install:
   - Front brake caliper bracket
   - Front brake caliper (temporarily)
   - Copper washer New
   - Brake hose
   - Union bolt

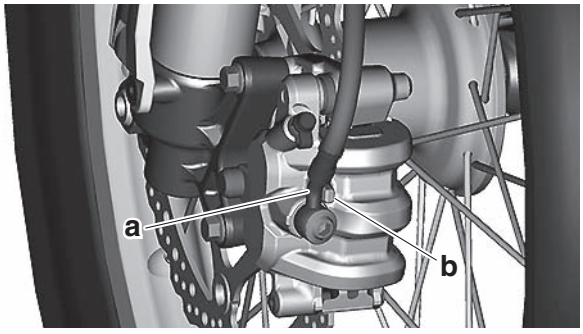
	Front brake caliper bracket **28 N·m (2.8 kgf·m, 21 lb·ft)** **Brake hose union bolt** **30 N·m (3.0 kgf·m, 22 lb·ft)**

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

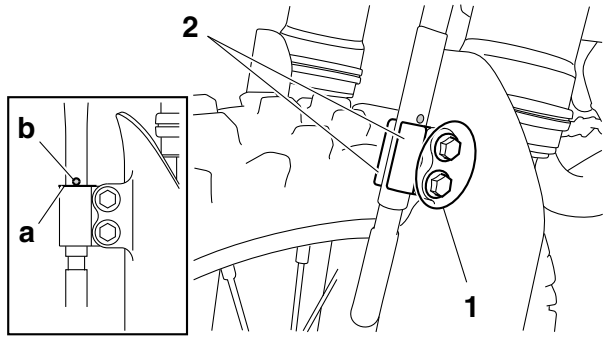
	Brake pad pin **17 N·m (1.7 kgf·m, 13 lb·ft)**

   Refer to "CHECKING THE FRONT BRAKE PADS" on page 3-24.
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 HYDRAULIC BRAKE SYSTEM" on page 3-25.

6. Check:
   • Brake fluid level
   The minimum level mark or below → Add.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
7. Check:
   • Brake lever operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

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

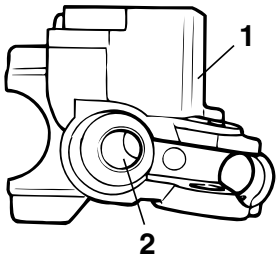
TIP

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 the brake master cylinder assembly.
   • Brake fluid delivery passages "2"
   (brake master cylinder body)
   Obstruction → Blow out with compressed air.



2. Check:
   • Brake master cylinder reservoir cap
   Damage/scratches/wear → Replace.
3. 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.

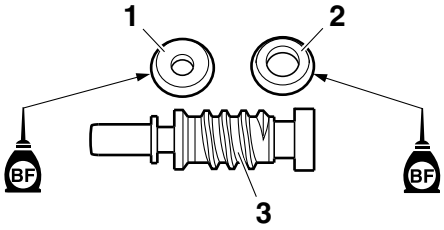
	Specified brake fluid **DOT 4**

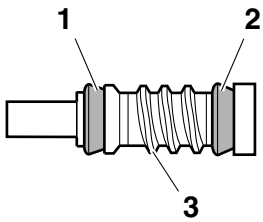
1. Wash the brake master cylinder with brake fluid.
2. Install:
   • Primary cylinder cup "1"
   • Secondary cylinder cup "2"
   (to the brake master cylinder piston "3")

EWA20240

⚠ WARNING

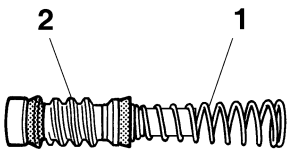
Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.





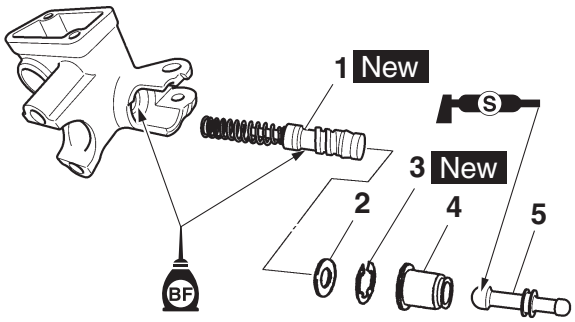
3. Install:
   • Spring "1"
   (to the brake master cylinder piston "2")

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



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

TIP
- Before installation, apply brake fluid to the components of the brake master cylinder piston assembly.
- Before installation, apply silicone grease to the push rod end.
- Before installation, apply brake fluid to the inside of the brake master cylinder.

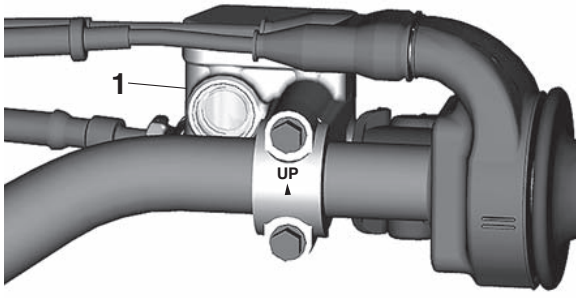


EAM30039
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   - Brake master cylinder "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.



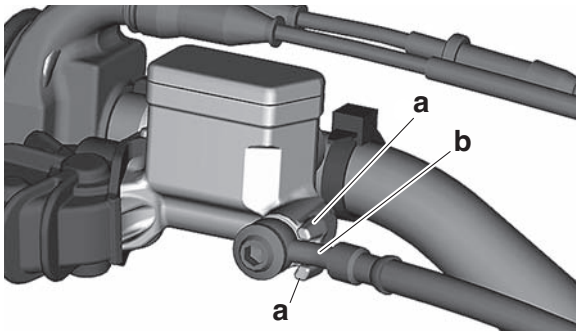
2. Install:
   - Copper washer New
   - Brake hose
   - Union bolt

	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

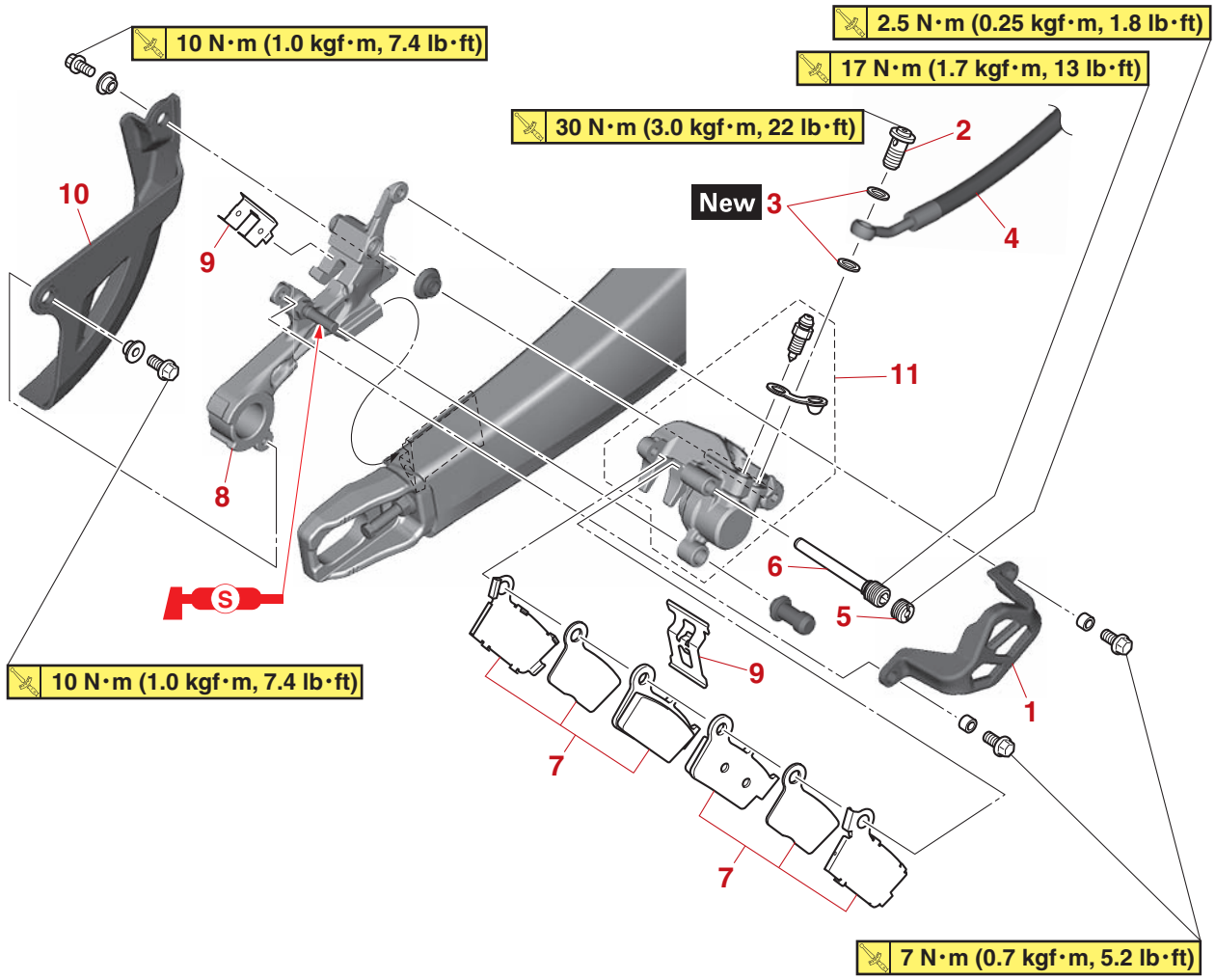
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
5. Check:
   - Brake fluid level
     The minimum level mark or below → Add.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
6. Check:
   - Brake lever operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

EAM20098

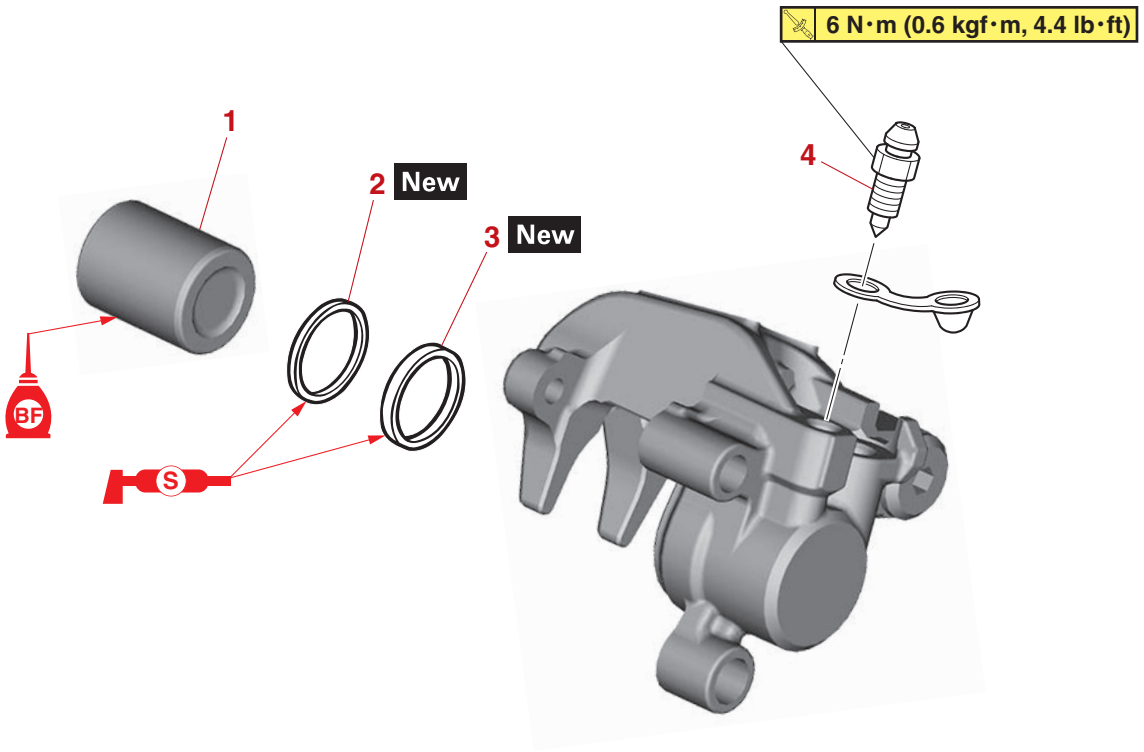
REAR BRAKE

Removing the rear brake caliper



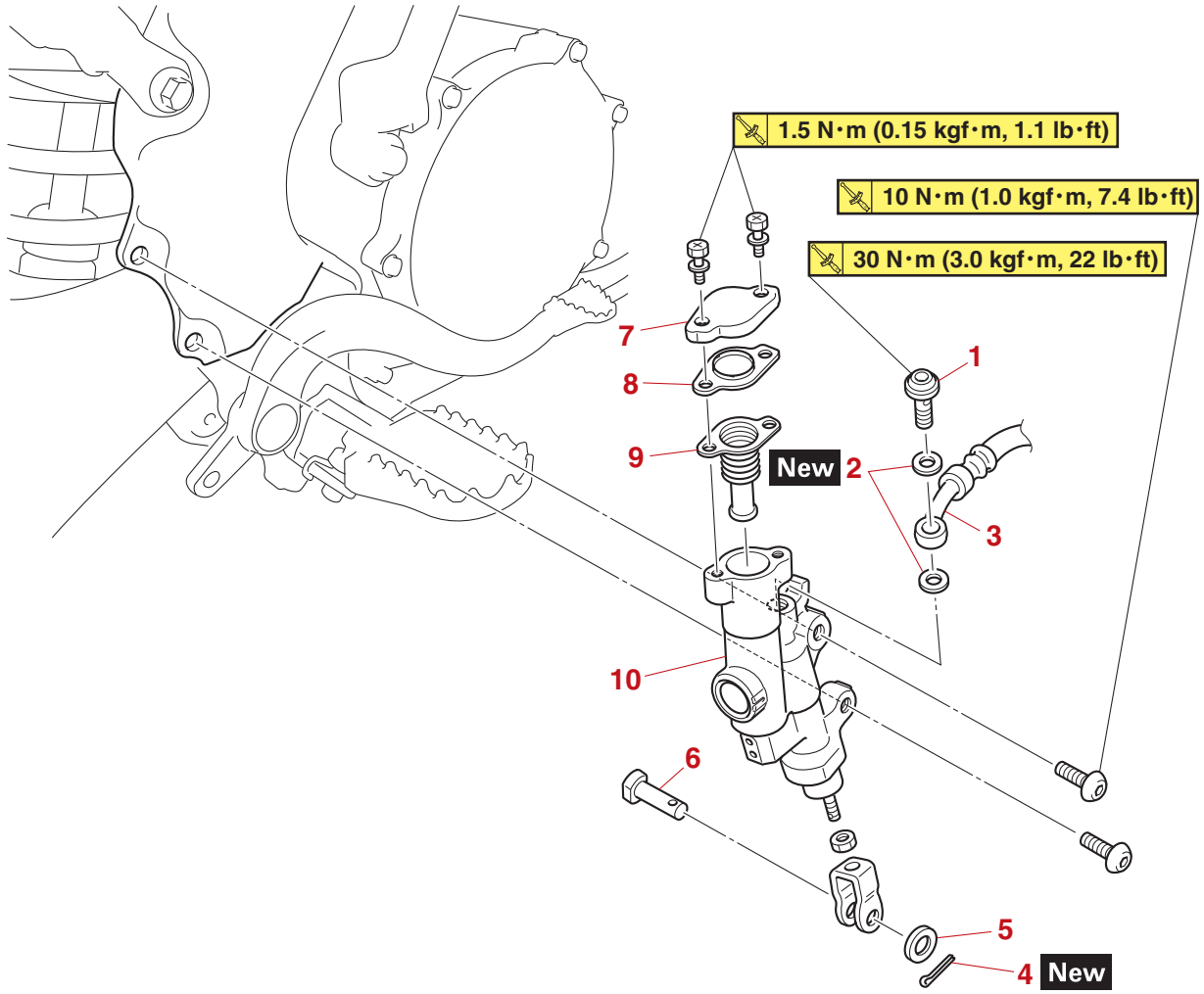
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
1	Protector	1	
2	Union bolt	1	
3	Copper washer	2	
4	Rear brake hose	1	
5	Brake pad pin plug	1	
6	Brake pad pin	1	
7	Rear brake pad assembly	2	
8	Rear brake caliper bracket	1	
9	Brake pad spring	2	
10	Rear brake disc cover	1	
11	Rear brake caliper assembly	1	

Disassembling the rear brake caliper



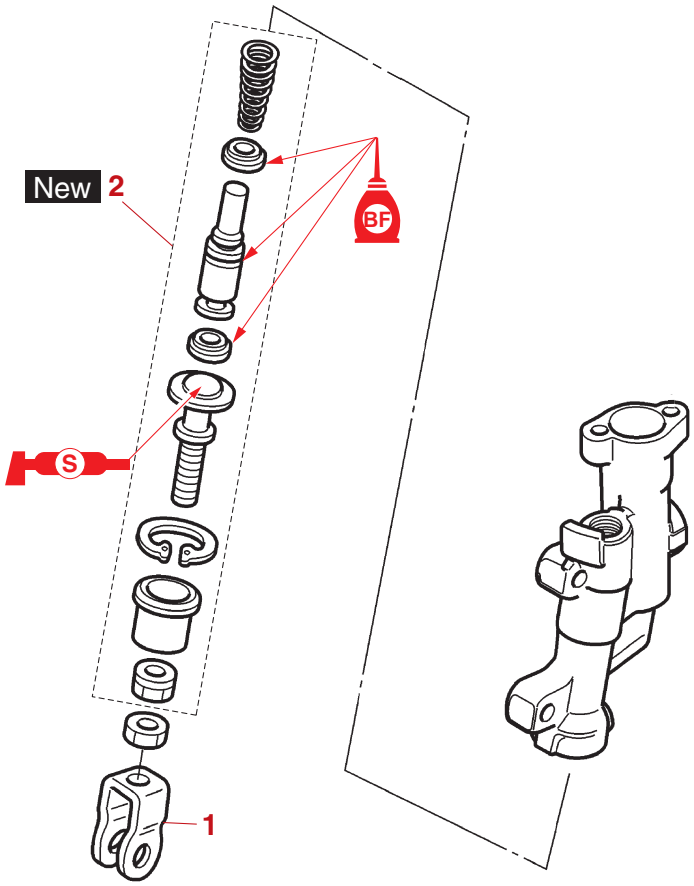
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	1	
2	Brake caliper piston dust seal	1	
3	Brake caliper piston seal	1	
4	Bleed screw	1	

Removing the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
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	Brake master cylinder joint	1	
2	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 lost your eyesight.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAM30041
CHECKING THE REAR BRAKE DISC
1. Check:
   - Brake disc
     Damage/galling → Replace.
2. 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)

3. Measure:
   - Brake disc runout
     Out of specification → Replace the brake disc.
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-17.

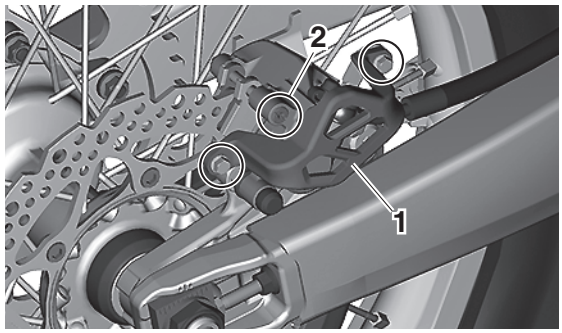
Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

4. Replace:
   - Brake disc
     Refer to "ASSEMBLING THE REAR WHEEL" on page 4-11.

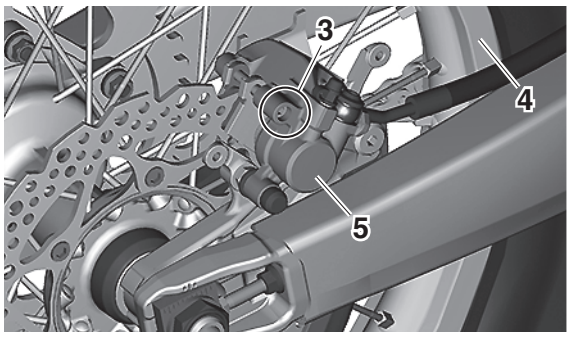
EAM30523
REPLACING THE REAR BRAKE PADS
TIP

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

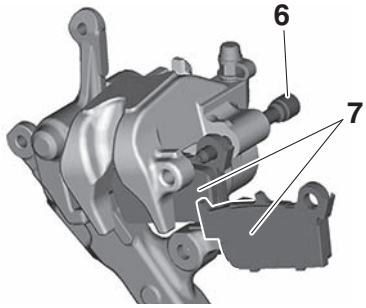
1. Remove:
   - Brake pad
     a. Remove the protector "1" and the pad pin plug "2".



     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.

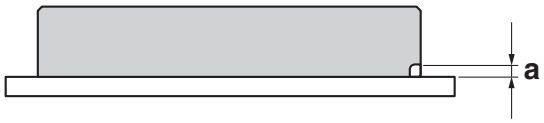


     d. Remove the pad pin "6" and the brake pads "7".

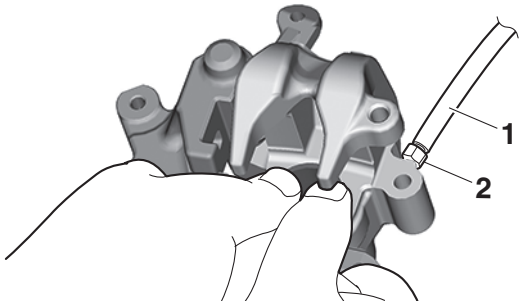


2. Measure:
   • Brake pad wear limit “a”
   Out of specification → Replace the brake pads as a set.

	Brake pad lining thickness limit **1.0 mm (0.04 in)**



3. Install:
   • Brake pad
   a. Connect the plastic hose “1” to the bleed screw “2” and place a container under the end of the plastic hose.



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

EWA19170

⚠ WARNING

Do not reuse the drained brake fluid.

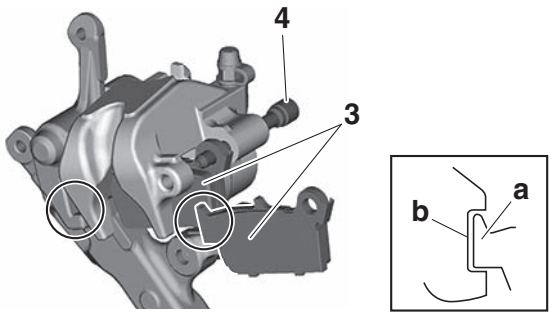
   c. Tighten the bleed screw.

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

   d. Install the brake pads “3” and the pad pin “4”.

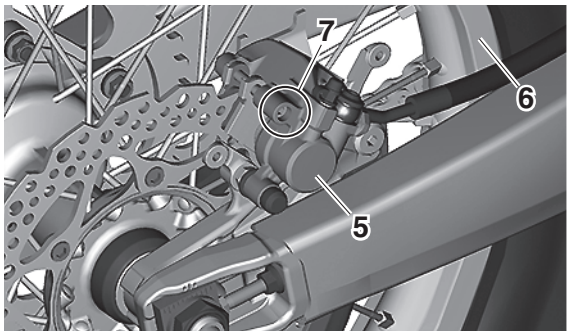
TIP

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



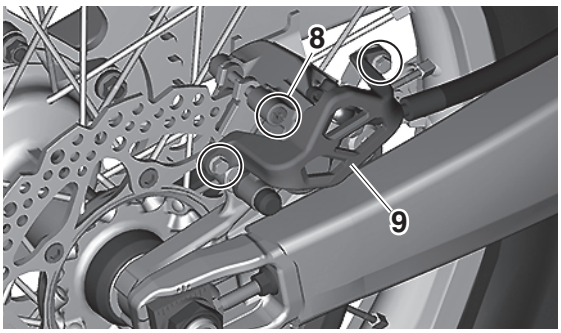
   e. Install the brake caliper “5” and the rear wheel “6”.
   Refer to “REAR WHEEL” on page 4-9.
   f. Tighten the pad pin “7”.

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



   g. Install the pad pin plug “8” and the protector “9”.

	Pad pin plug **2.5 N·m (0.25 kgf·m, 1.8 lb·ft)** **Bolt (protector)** **7 N·m (0.7 kgf·m, 5.2 lb·ft)**



4. Check:
   • Brake fluid level
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
5. Check:
   • Brake pedal operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

EAM30042
REMOVING THE REAR BRAKE CALIPER

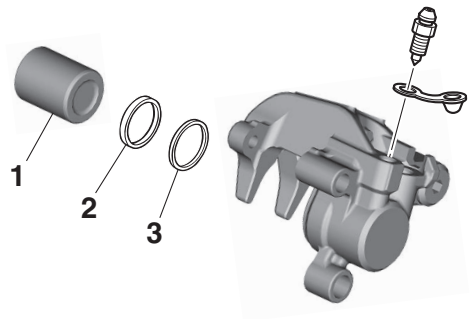
TIP
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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.

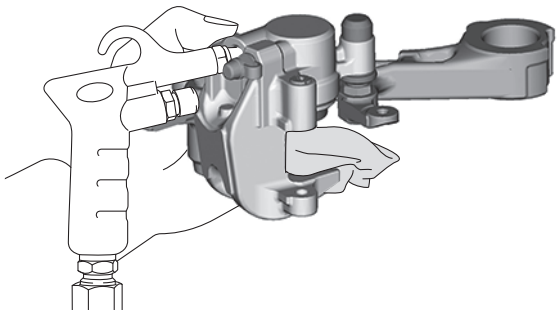
EAM30043
DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:
   • Brake caliper piston "1"
   • Brake caliper piston dust seal "2"
   • Brake caliper piston seal "3"



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

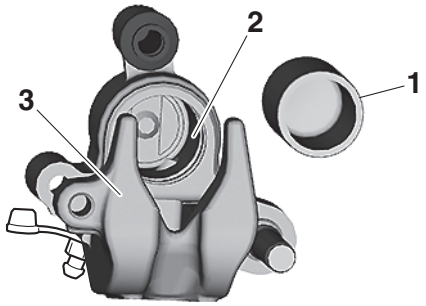
EWA13550
WARNING
- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



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

EAM30044
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.

EAM30045
ASSEMBLING THE REAR BRAKE CALIPER

EWA19280
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

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

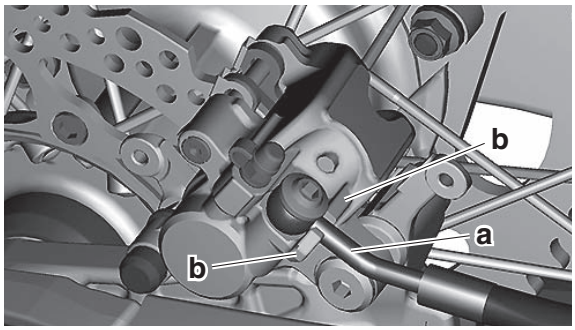
Brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

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 3-24.
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 HYDRAULIC BRAKE SYSTEM" on page 3-25.

6. Check:
   • Brake fluid level
   The minimum level mark or below → Add.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
7. Check:
   • Brake pedal operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.

EAM30048
REMOVING THE REAR BRAKE MASTER CYLINDER

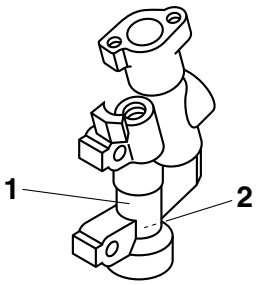
TIP
Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

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:
   • Master cylinder reservoir cap
   Crack/damage → Replace.
   • Brake master cylinder reservoir diaphragm holder
   • Brake master cylinder reservoir diaphragm
   Crack/damage → Replace.
3. Check:
   • Brake hose
   Cracks/damage/wear → Replace.

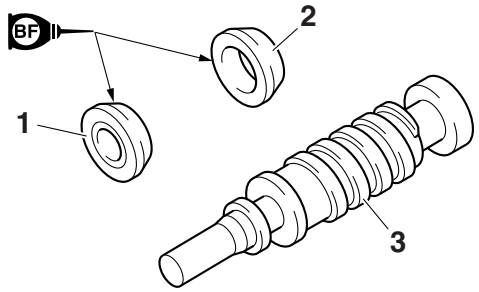
EAM30050
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

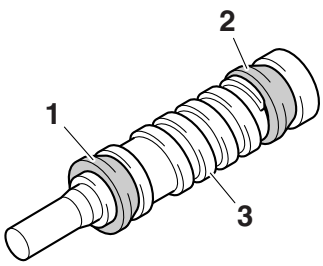
EWA13520
⚠ WARNING
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

Specified brake fluid
DOT 4

1. Wash the brake master cylinder with brake fluid.
2. Install:
   • Primary cylinder cup "1"
   • Secondary cylinder cup "2"
   (to the brake master cylinder piston "3")

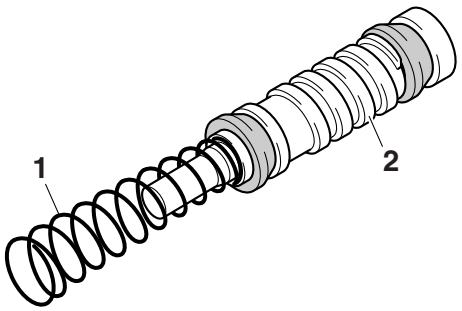
EWA19300
⚠ WARNING
Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.





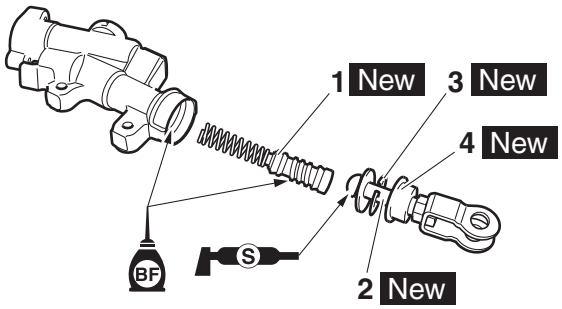
3. Install:
   • Spring "1"
   (to the brake master cylinder piston "2")

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



4. Install:
   - Brake master cylinder piston assembly "1" New
   - Push rod "2" New
   - Circlip "3" New
   - Dust boot "4" New

TIP
- Before installation, apply brake fluid to the brake master cylinder piston assembly.
- Before installation, apply silicone grease to the push rod end.
- Before installation, apply brake fluid to the inside of the brake master cylinder.



EAM30051
INSTALLING THE REAR BRAKE MASTER CYLINDER

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

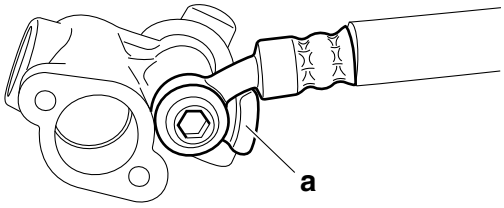
	Brake hose union bolt **30 N·m (3.0 kgf·m, 22 lb·ft)**

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.

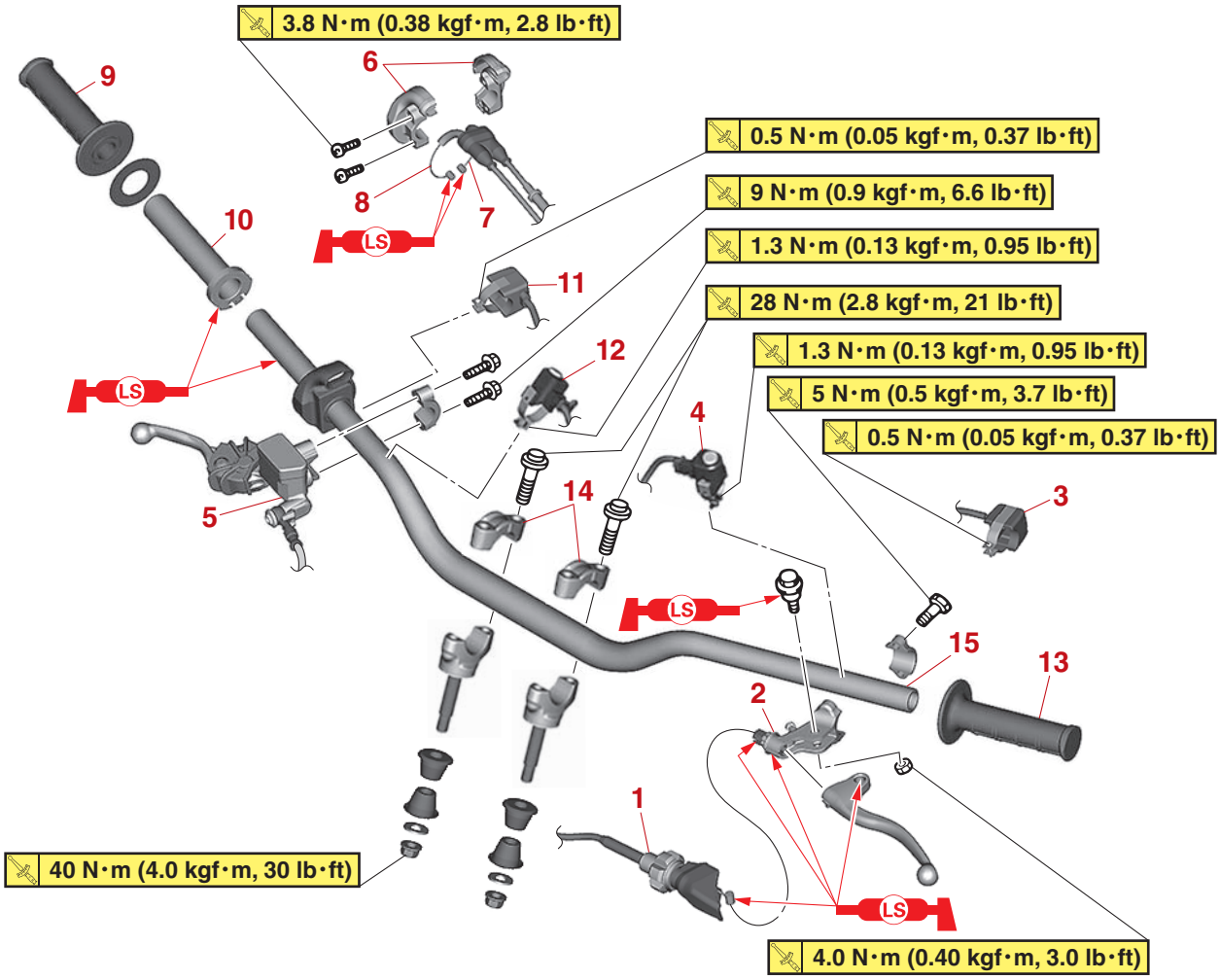
3. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-25.
4. Check:
   - Brake fluid level
     The minimum level mark or below → Add.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-23.
5. Check:
   - Brake pedal operation
     A softy or spongy feeling → Bleed the brake

system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-25.

EAM20099

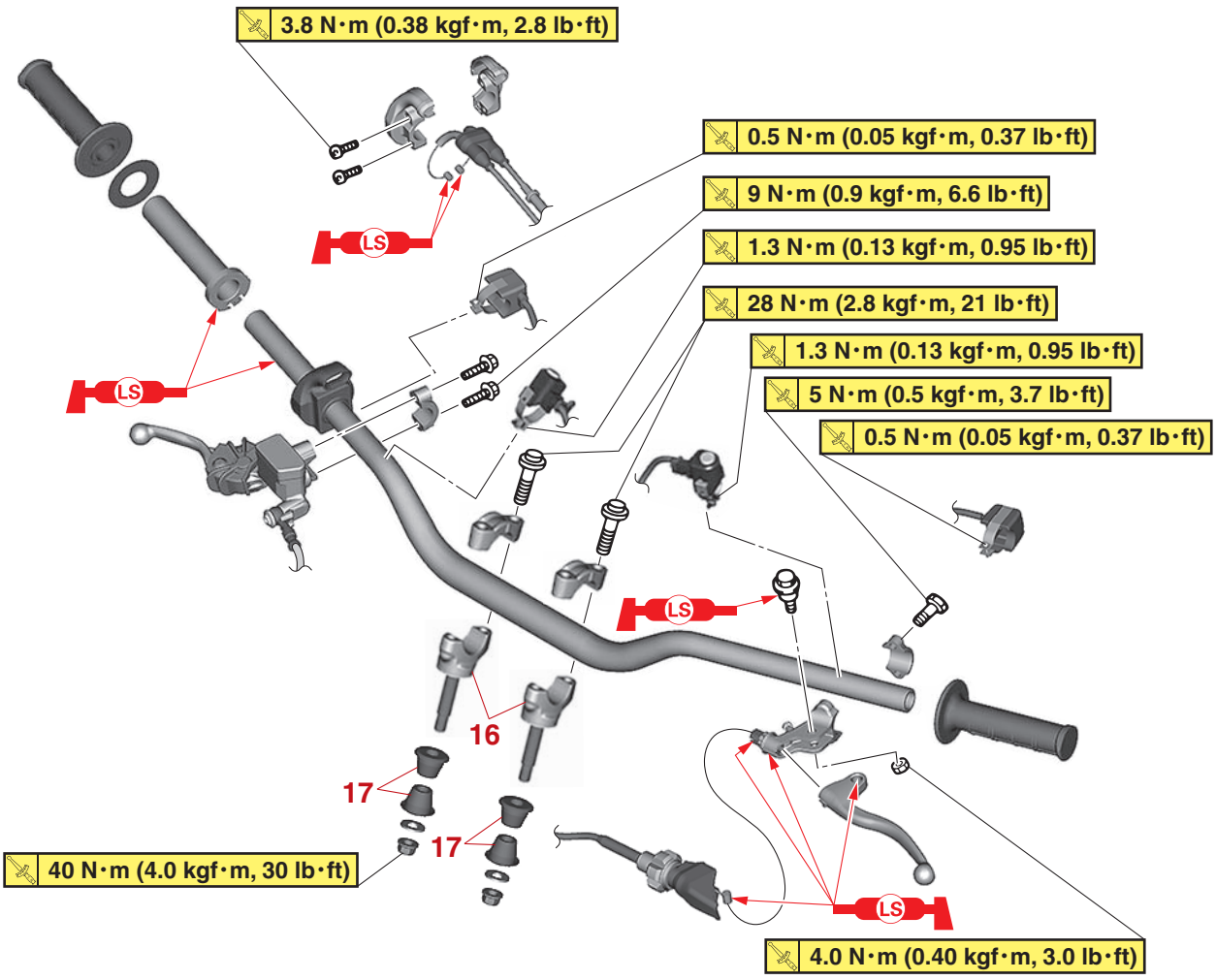
HANDLEBAR

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	Launch control switch	1	
13	Left grip	1	
14	Upper handlebar holder	2	
15	Handlebar	1	

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
16	Lower handlebar holder	2	
17	Damper	4	

EAM30052
REMOVING THE HANDLEBAR

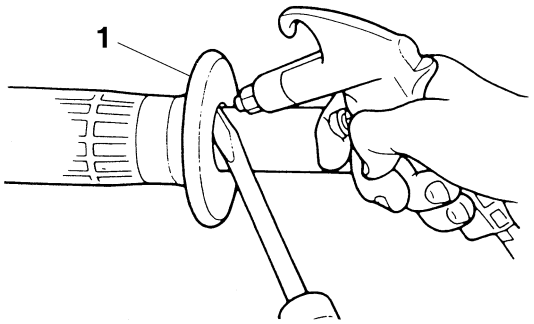
1. Stand the vehicle upright on a level surface.

EWA13120
⚠ WARNING

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

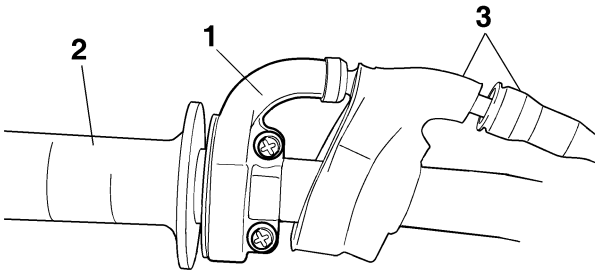
2. Remove:
   • Grip “1”

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 housing “ 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.

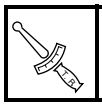
EAM30054
INSTALLING THE HANDLEBAR

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.

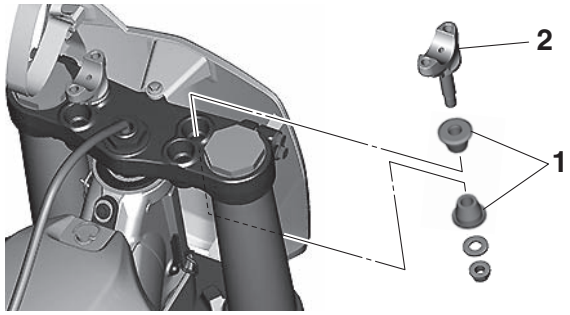
2. Install:
   • Damper “1”
   • Lower handlebar holder “2” (temporarily)
   • Handlebar “3”
   • Upper handlebar holder “4”

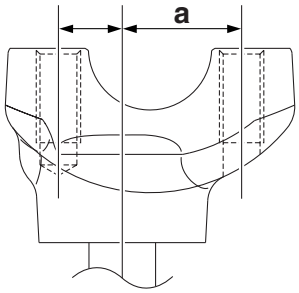
	**Upper handlebar holder bolt 28 N·m (2.8 kgf·m, 21 lb·ft)**

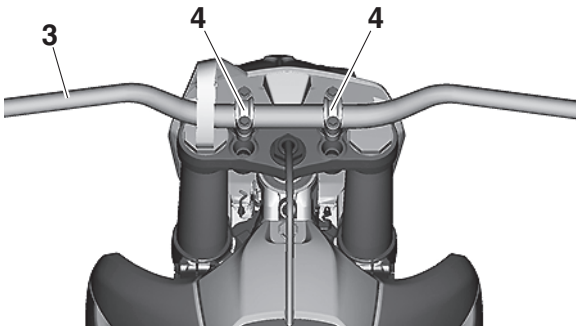
TIP
- Install the lower handlebar holders with the side having the longer distance “a” from the mounting bolt center facing towards the rear side of the vehicle.
- Installing the lower handlebar holders in the reverse direction allow the front-to-rear offset amount of the handlebar position to be changed.
- 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.

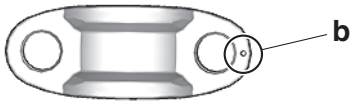
ECA14250
NOTICE

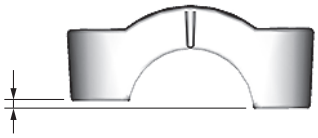
- **First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.**
- **Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

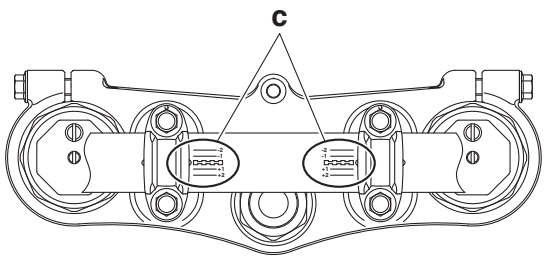


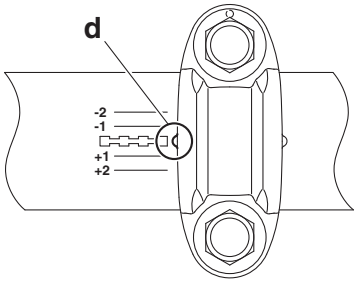












3. Tighten:
   - Lower handlebar holder nut

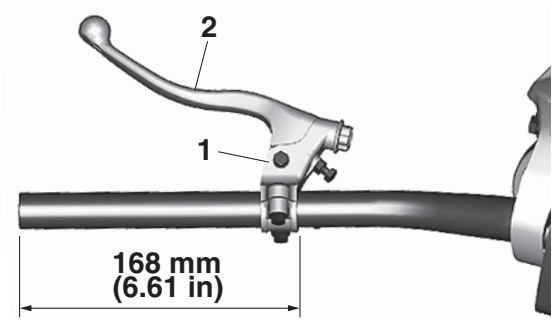
	Lower handlebar holder nut **40 N·m (4.0 kgf·m, 30 lb·ft)**

4. Install:
   - Clutch lever holder “1”
   - Clutch lever “2”

	Clutch lever holder bolt **5 N·m (0.5 kgf·m, 3.7 lb·ft)** **Clutch lever nut** **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

TIP

The clutch lever holder “1” should be installed according to the dimensions shown.

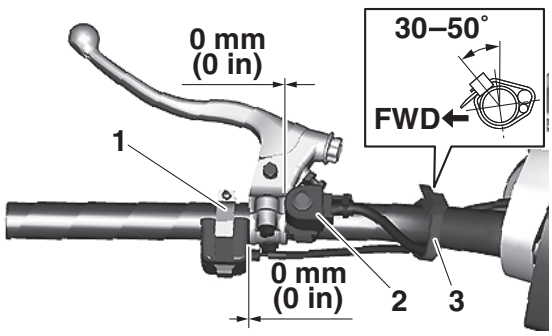


5. Install:
   - Engine stop switch “1”
   - Mode switch “2”
   - Clamp “3”

	Engine stop switch screw **0.5 N·m (0.05 kgf·m, 0.37 lb·ft)** **Screw (mode switch)** **1.3 N·m (0.13 kgf·m, 0.95 lb·ft)**

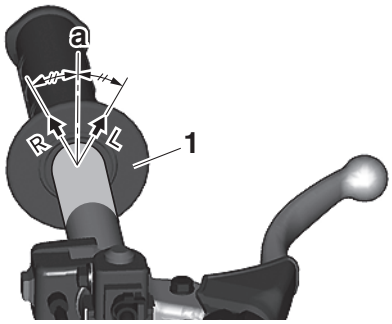
TIP

- The engine stop switch “1” and the mode switch “2” should be installed according to the dimensions shown.
- Pass the engine stop switch lead through the middle of the clutch lever holder.



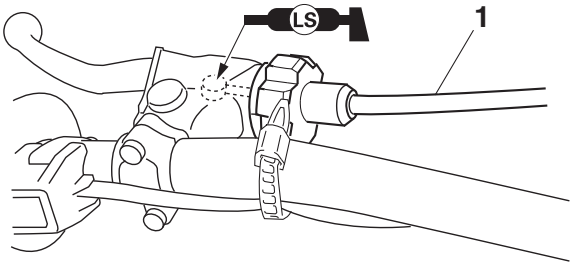
6. Install:
   • Handlebar grip “1”
     a. Slightly coat the handlebar left end with a rubber adhesive.
     b. Install the handlebar grip on the handlebar by pressing the grip from the left side.
     c. Wipe off any excess adhesive with a clean cloth.

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



7. Install:
   • Clutch cable “1”

TIP
Before installation, apply the lithium-soap-based grease to the clutch cable end.

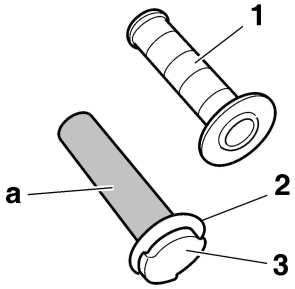


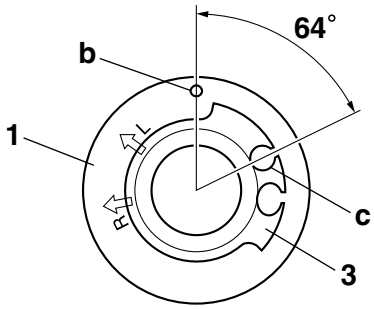
8. Adjust:
   • Clutch lever free play
   Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-15.

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

9. Install:
   • Right grip “1”
   • Collar “2”
   Apply adhesive to the tube guide “3”.

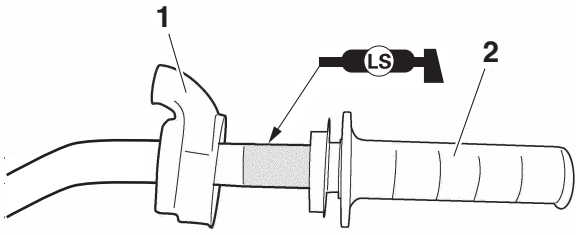
TIP
• Before applying the adhesive, wipe off grease or oil on the tube guide surface “a” with a lacquer thinner.
• Install the grip to the tube guide so that the grip match mark “b” and tube guide slot “c” form the angle as shown.





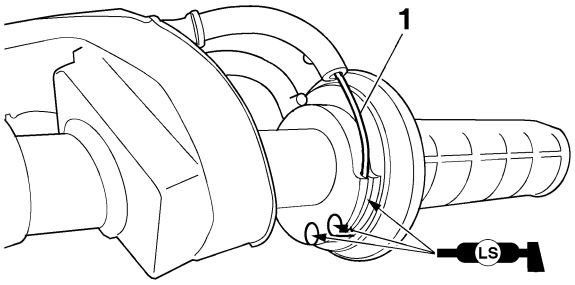
10. Install:
    • Rubber cover “1”
    • Throttle grip “2”

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



11. Install:
    • Throttle cable “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.



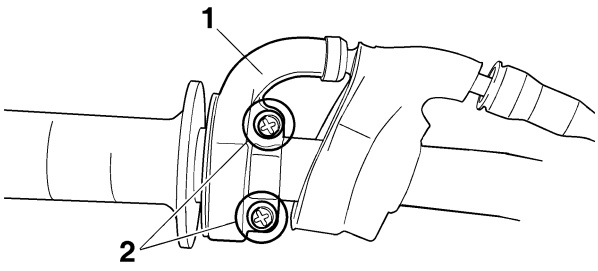
12.Install:
- Throttle cable housing “1”
- Screw (throttle cable housing) “2”

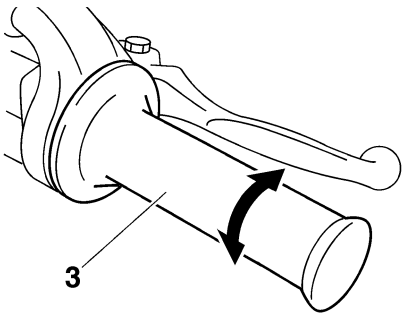
	Screw (throttle cable housing) 3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

EWA19310

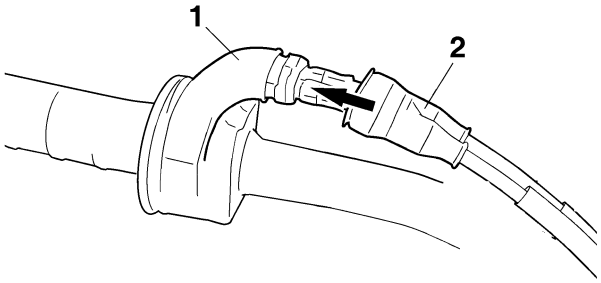
⚠ WARNING

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





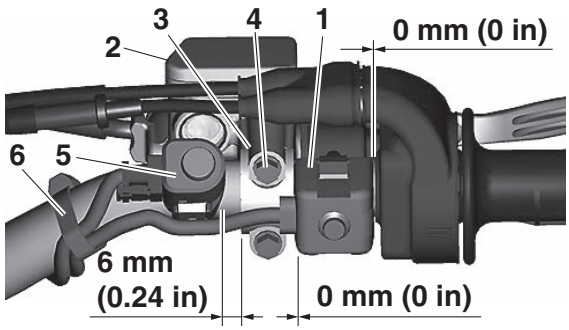
13.Install:
- Rubber cover “1”
- Cover (throttle cable housings) “2”

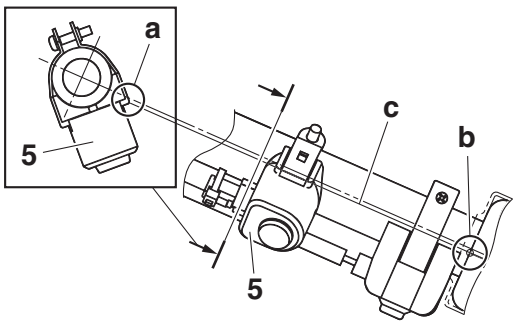


14.Install:
- Start switch “1”
- Front brake master cylinder assembly “2”
- Front brake master cylinder holder “3”
- Front brake master cylinder holder bolt “4”
- Launch control switch “5”
- Clamp “6”

	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.
- Align the installation portion “a” of the clamp with the line “c” on the painted portion “b” of the handlebar, and then install the launch control switch “5”.





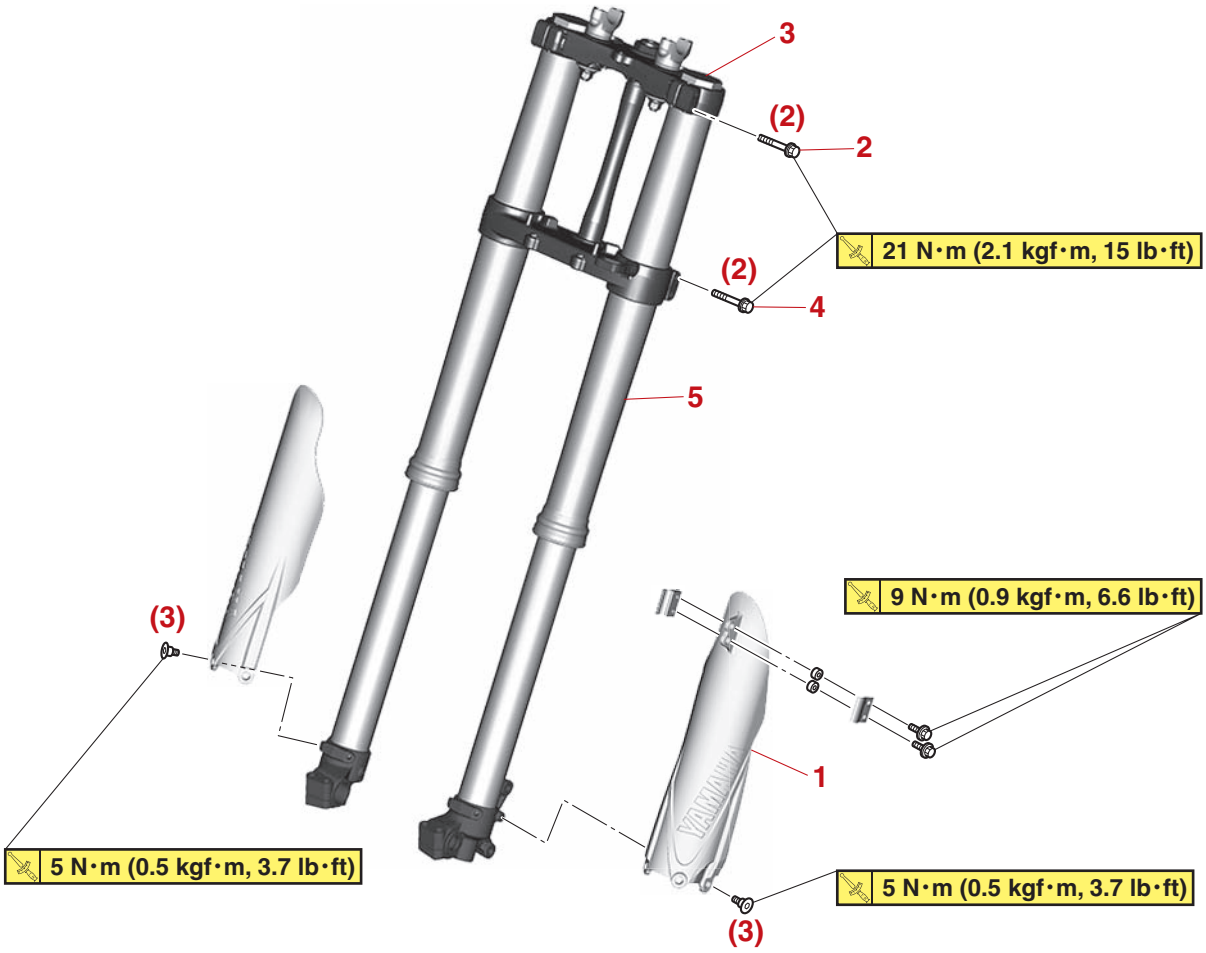
15.Adjust:
- Throttle grip free play
  Refer to "CHECKING THE THROTTLE GRIP" on page 3-11.



Throttle grip free play
3.0–6.0 mm (0.12–0.24 in)

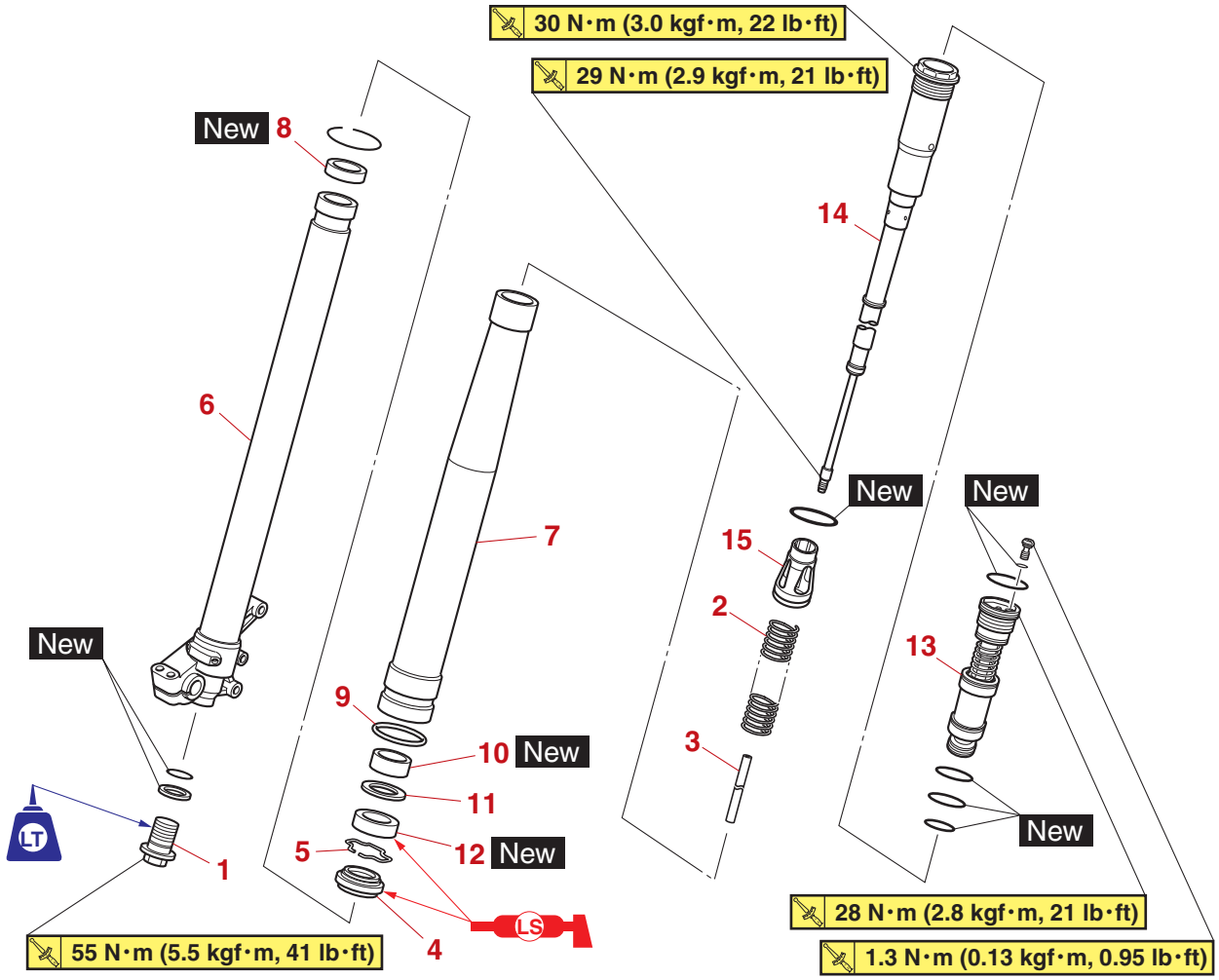
EAM20100
FRONT FORK

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.
	Lower handlebar holder		Refer to "HANDLEBAR" on page 4-35 (with the handlebar holder).
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	Damper adjusting rod	1	
4	Dust seal	1	
5	Stopper ring	1	
6	Inner tube	1	
7	Outer tube	1	
8	Piston metal	1	
9	Protector guide	1	
10	Slide metal	1	
11	Washer	1	
12	Oil seal	1	
13	Base valve	1	
14	Damper assembly	1	
15	Upper spring seat	1	

EAM30055
REMOVING THE FRONT FORK LEGS

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.

TIP
Record the adjusting screw setting position before loosening the adjuster and the base valve.

2. Remove:
   • Lower handlebar holder (with the handlebar)
3. Loosen:
   • Upper bracket pinch bolt
   • Damper assembly
   • Lower bracket pinch bolt

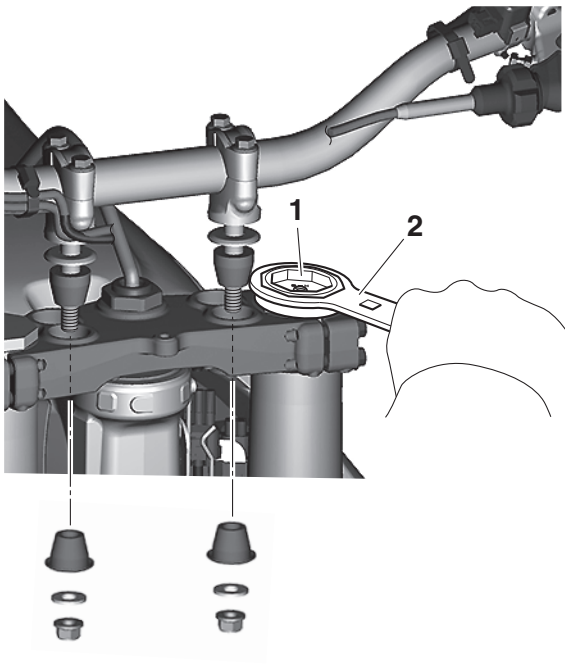
EWA20350
⚠ WARNING

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

TIP
- Before removing the front fork leg from the vehicle, loosen the damper assembly "1" with the cap bolt ring wrench "2".
- It is allowed to remove the lower handlebar holder with the handlebar installed as shown. When doing so, make sure that the handlebar is secured so that it does not move.



Cap bolt ring wrench
90890-01501
Cap bolt ring wrench
YM-01501



4. Remove:
   • Front fork leg

EAM30056
DISASSEMBLING THE FRONT FORK LEGS

1. Drain:
   • Fork oil
2. Remove:
   • Adjuster "1"
   (from the inner tube)

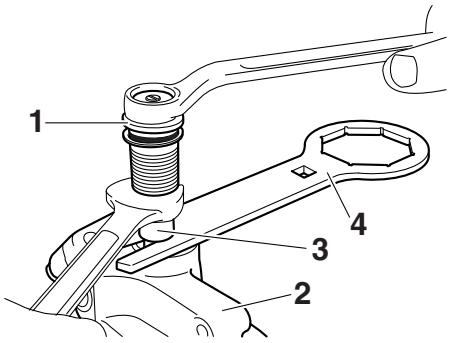
TIP
- While compressing the inner tube "2", set the cap bolt ring wrench "4" between the inner tube and locknut "3".
- Hold the locknut and remove the adjuster.

ECA24520
NOTICE

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

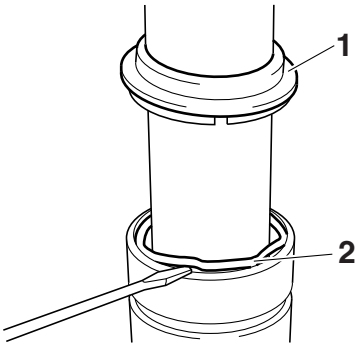


3. Remove:
   • Dust seal “1”
   • Stopper ring “2”
   (with a flat-head screwdriver)

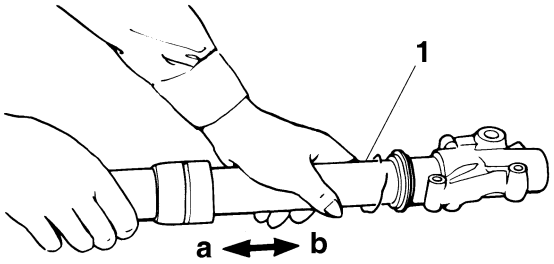
ECA14180

NOTICE

Do not scratch the inner tube.



4. Remove:
   • Inner tube “1”
   a. Push in slowly “a” the inner tube just before it bottoms out and then pull it back quickly “b”.
   b. Repeat this step until the inner tube can be pulled out from the outer tube.

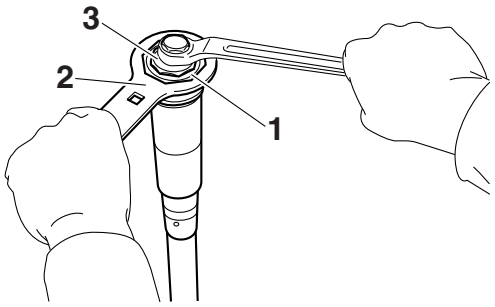


5. Remove:
   • Base valve “1”
   (from the damper assembly)

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



EAM30057

CHECKING THE FRONT FORK LEGS

1. Check:
   • Inner tube surface
   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.

Inner tube bending limit
0.2 mm (0.01 in)

TIP

The bending value is shown by one half of the dial gauge reading.

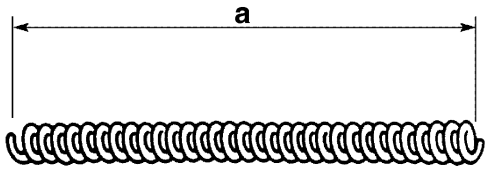
EWA13650

⚠ WARNING

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

2. Check:
   • Outer tube
   Scratches/wear/damage → Replace.
3. Measure:
   • Fork spring free length “a”
   Out of specification → Replace.

Fork spring free length limit
492.0 mm (19.37 in)

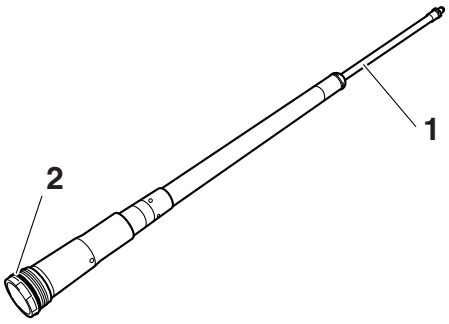


4. Check:
   • Damper assembly “1”
     Bend/damage → Replace.
   • O-ring “2”
     Wear/damage → Replace.

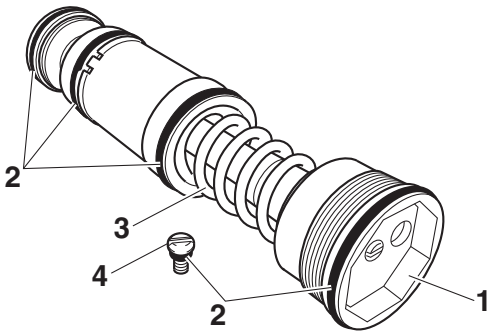
ECA14200

NOTICE

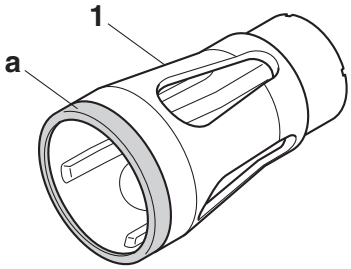
- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**



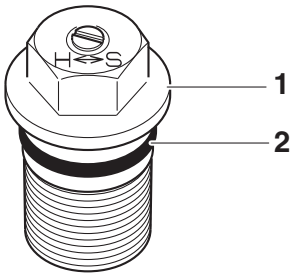
5. Check:
   • Base valve “1”
     Wear/damage → Replace.
     Contamination → Clean.
   • O-ring “2”
     Wear/damage → Replace.
   • Base valve bushing
     Wear/damage → Replace.
   • Fork spring “3”
     Damage/fatigue → Replace the base valve.
   • Bleed screw “4”
     Wear/damage → Replace.



6. Check:
   • Upper spring seat “1”
     (contacting surface “a”)
     Wear/damage → Replace.



7. Check:
   • Adjuster “1”
   • O-ring “2”
     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
  - Slide metal

- 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 cm³ (7.30 US oz, 7.62 Imp.oz)

ECA24530

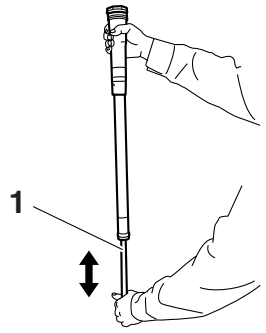
NOTICE

• 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.

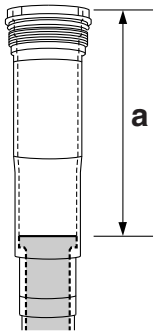
TIP

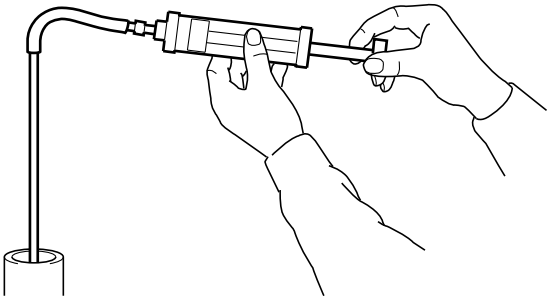
Avoid excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps (1) to (3).



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.

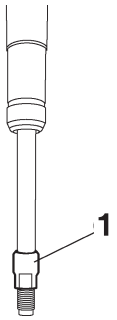




5. Tighten:
   • Locknut "1"

TIP

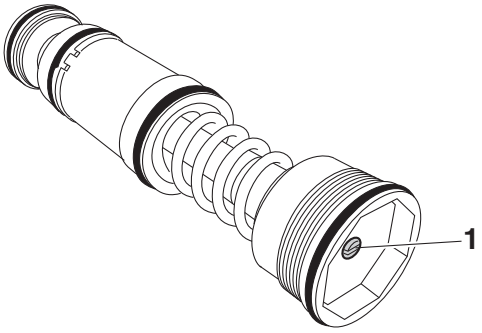
Fully finger tighten the locknut onto the damper assembly.



6. Loosen:
   • Compression damping force adjuster "1"

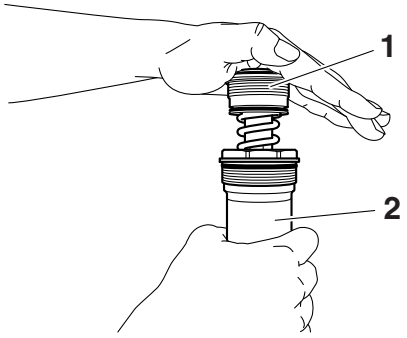
TIP

• 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.

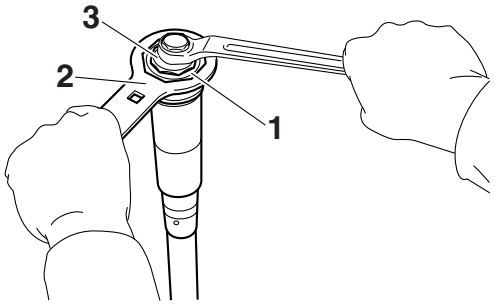


8. Check:
   • Damper assembly
   Not fully stretched → Repeat the steps (1) to (7).
9. Tighten:
   • Base valve “1”

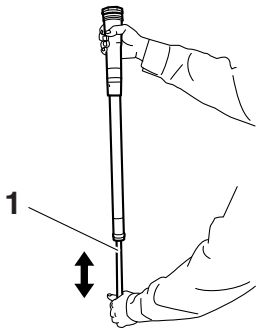
	Base valve **28 N·m (2.8 kgf·m, 21 lb·ft)**

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**

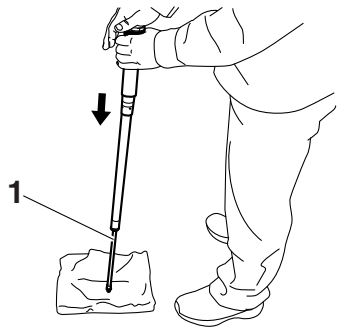


10. After filling, pump the damper assembly “1” slowly up and down more than 10 times to distribute the fork oil.



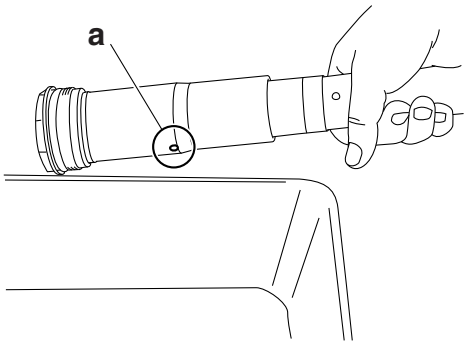
11. While protecting the damper assembly “1” with a cloth and compressing fully, allow excessive oil to overflow on the base valve side.

ECA24540
NOTICE
Take care not to damage the damper assembly.

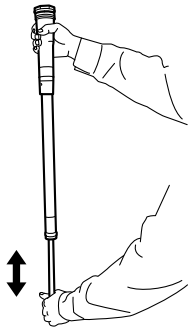


12. Allow the overflowing oil to escape at the hole “a” in the damper assembly.

TIP
The overflow measures about 10 cm^3 (0.34 US oz, 0.35 Imp.oz).



13.Check:
- Damper assembly smooth movement
  Tightness/binding/rough spots → Repeat the steps (1) to (12).



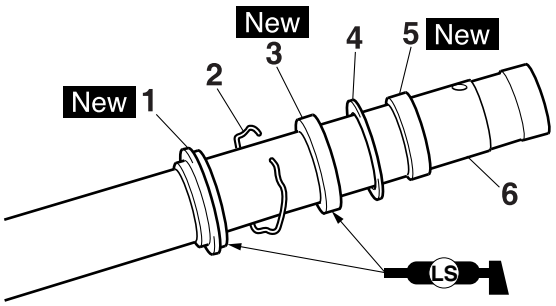
14.Install:
- Dust seal “1” New
- Stopper ring “2”
- Oil seal “3” New
- Washer “4”
- Slide metal “5” New
  (to the inner tube “6”)

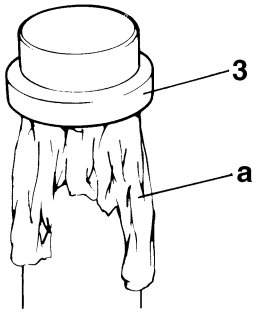
ECA24550

NOTICE

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

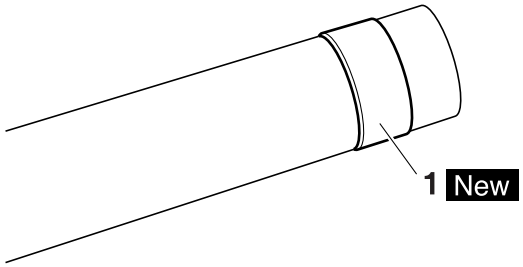
TIP
- Apply the lithium-soap-based grease on the dust seal lip and oil seal lip.
- Apply the fork oil on the inner tube.
- When installing the oil seal, use vinyl seat “a” with fork oil applied to protect the oil seal lip.



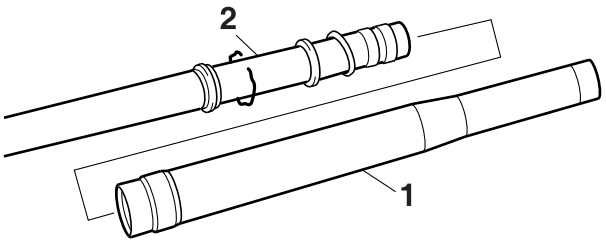


15.Install:
- Piston metal “1” New

TIP
Install the piston metal onto the slot on inner tube.



16.Install:
- Outer tube “1”
  (to the inner tube “2”)

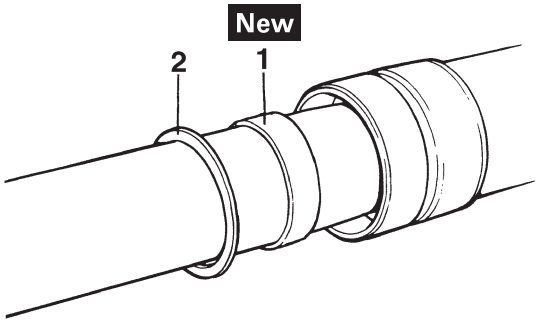


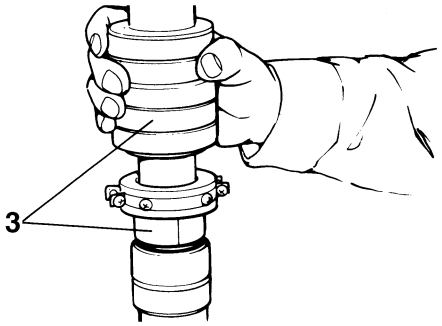
17.Install:
- Slide metal “1” New
- Washer “2”
  (to the outer tube)

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

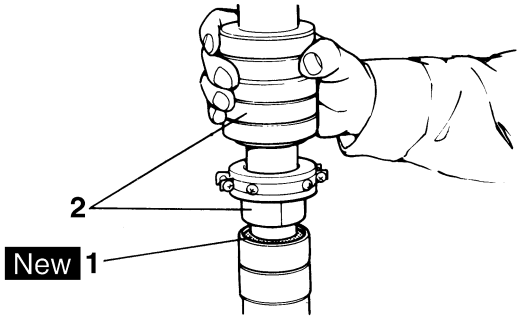




18.Install:
- Oil seal "1" New

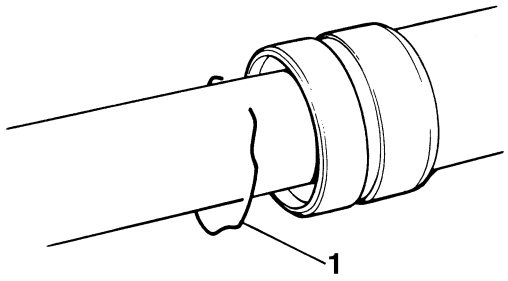
TIP
Using a fork seal driver "2", press the oil seal in until the stopper ring groove fully appears.

Fork seal driver
90890-01502
Fork seal driver (48)
YM-A0948



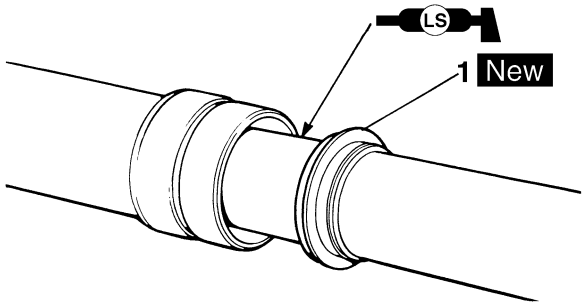
19.Install:
- Stopper ring "1"

TIP
Fit the stopper ring correctly in the groove in the outer tube.

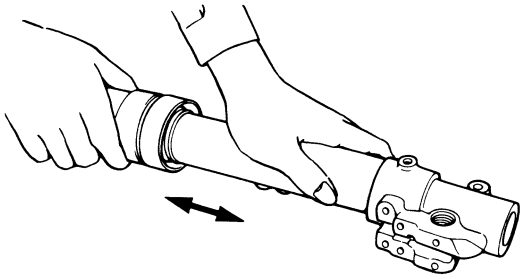


20.Install:
- Dust seal "1" New

TIP
Apply lithium-soap-based grease on the inner tube.

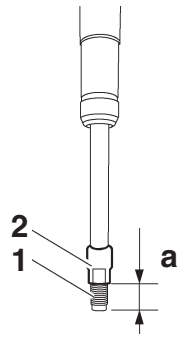


21.Check:
- Inner tube smooth movement
  Tightness/binding/rough spots → Repeat the steps (14) to (20).



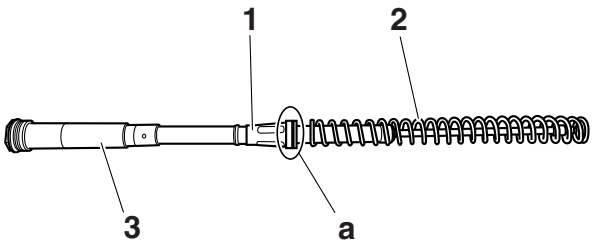
22.Measure:
- Distance "a"
  Out of specification → Turn the locknut to specification.

Distance "a"
16 mm (0.63 in) or more
Between the damper assembly "1" bottom and locknut "2" bottom.



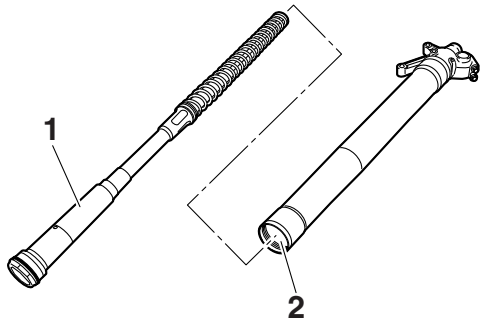
23.Install:
- Upper spring seat "1"
- Fork spring "2"
  (to the damper assembly "3")

TIP
Install the upper spring seat with its larger dia. end "a" facing the fork spring.



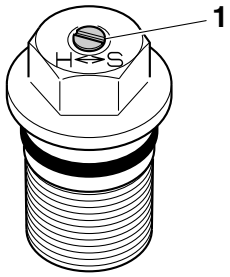
24.Install:
- Damper assembly "1"
  (to the inner tube "2")

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"

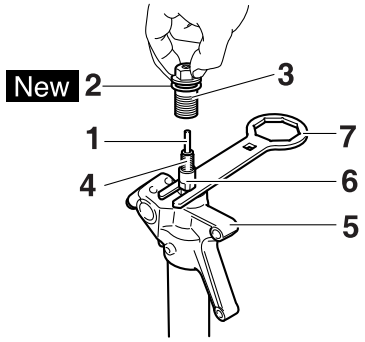
TIP
- Before loosening the damping force adjuster, record the setting position.
- Unless the damping force adjuster is fully loosened, correct damping characteristic cannot be obtained after installation.



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

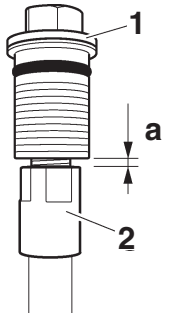


27.Measure:
- Gap "a" between the adjuster "1" and the locknut "2"
  Out of specification → Retighten and readjust the locknut.

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,

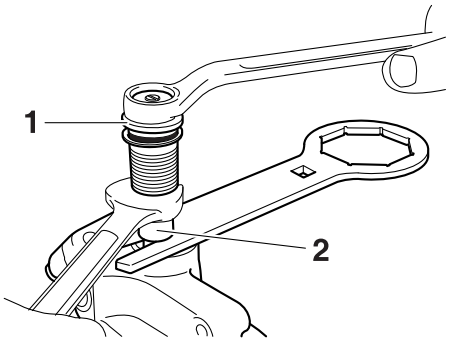
correct damping force cannot be obtained.



28.Tighten:
- Adjuster (damper assembly) “1”

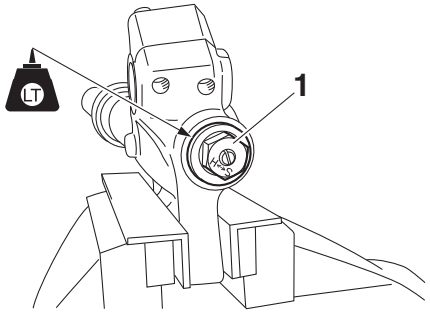
	Adjuster (damper assembly) **29 N·m (2.9 kgf·m, 21 lb·ft)**

TIP
Hold the locknut “2” and tighten the adjuster.



29.Install:
- Adjuster “1”
  (to the inner tube)

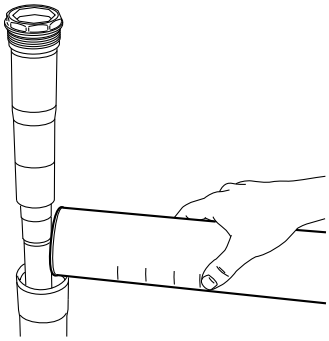
	Adjuster **55 N·m (5.5 kgf·m, 41 lb·ft)** **LOCTITE®**



30.Fill:
- Front fork leg

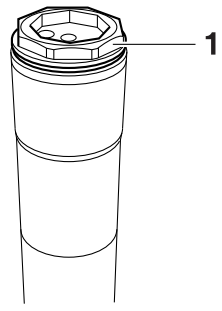
	Recommended oil **Yamaha Suspension Oil S1** **Standard oil amount** **295 cm³ (9.97 US oz, 10.40 Imp.oz)** **Extent of adjustment** **260–365 cm³ (8.79–12.34 US oz, 9.17–12.87 Imp.oz)**

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.**

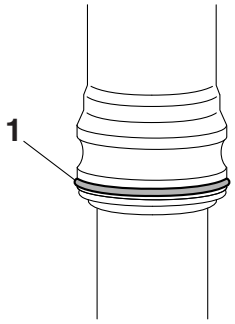


31.Install:
- Damper assembly “1”
  (to the outer tube)

TIP
Temporarily tighten the damper assembly.



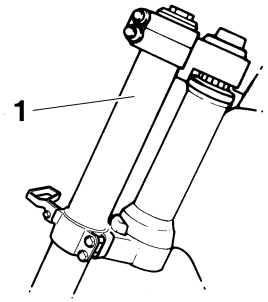
32.Install:
- Protector guide “1”



EAM30059
INSTALLING THE FRONT FORK LEGS

1. Install:
   • Front fork "1"

TIP
- Temporarily tighten the lower bracket pinch bolts.
- Do not tighten the upper bracket pinch bolts yet.

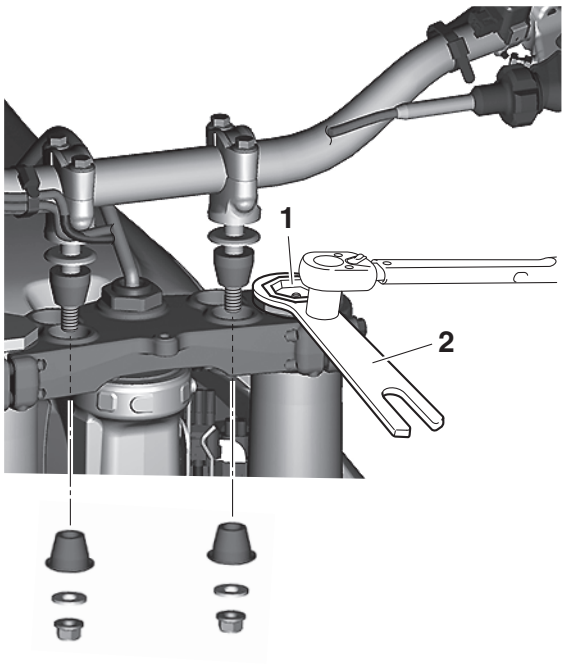


2. Tighten:
   • Damper assembly "1"

	Damper assembly **30 N·m (3.0 kgf·m, 22 lb·ft)**

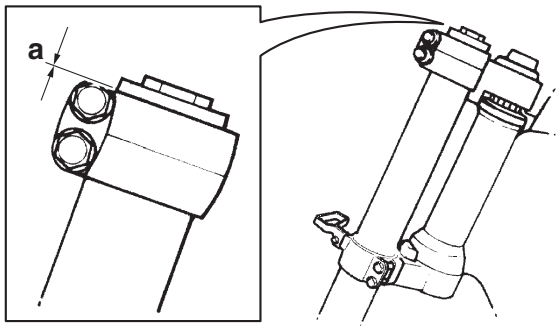
TIP
Use the cap bolt ring wrench "2" to tighten the damper assembly.

	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 (0.20 in)**



4. Install:
   • Lower handlebar holder (with the handlebar)

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

5. Tighten:
   • Upper bracket pinch bolt "1"

	Upper bracket pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**

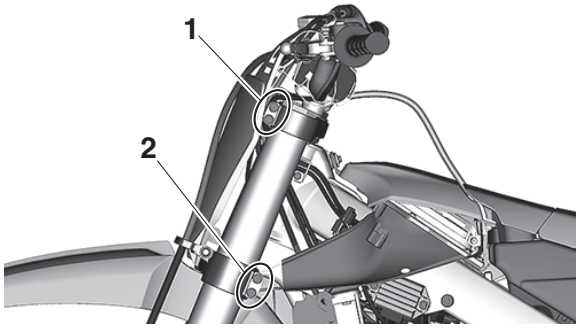
   • Lower bracket pinch bolt "2"

	Lower bracket pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**

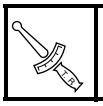
EWA19320

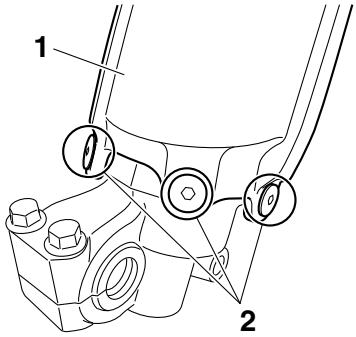
⚠ WARNING

Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



6. Install:
   • Protector “1”
   • Bolt (protector) “2”

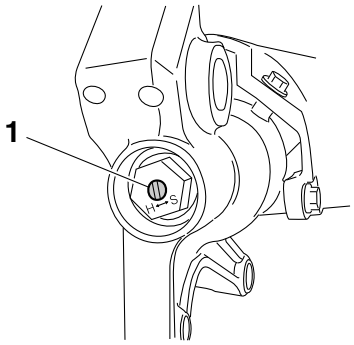
	**Bolt (protector)** **5 N·m (0.5 kgf·m, 3.7 lb·ft)**



7. Adjust:
   • Rebound damping force

TIP

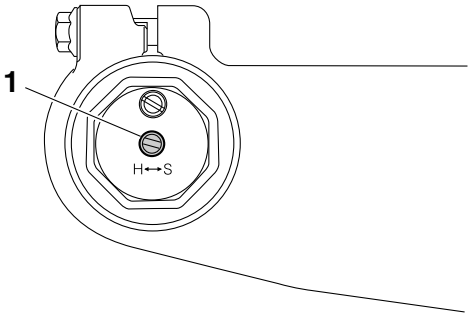
Turn in the damping adjuster “1” finger-tight and then turn out to the originally set position.



8. Adjust:
   • Compression damping force

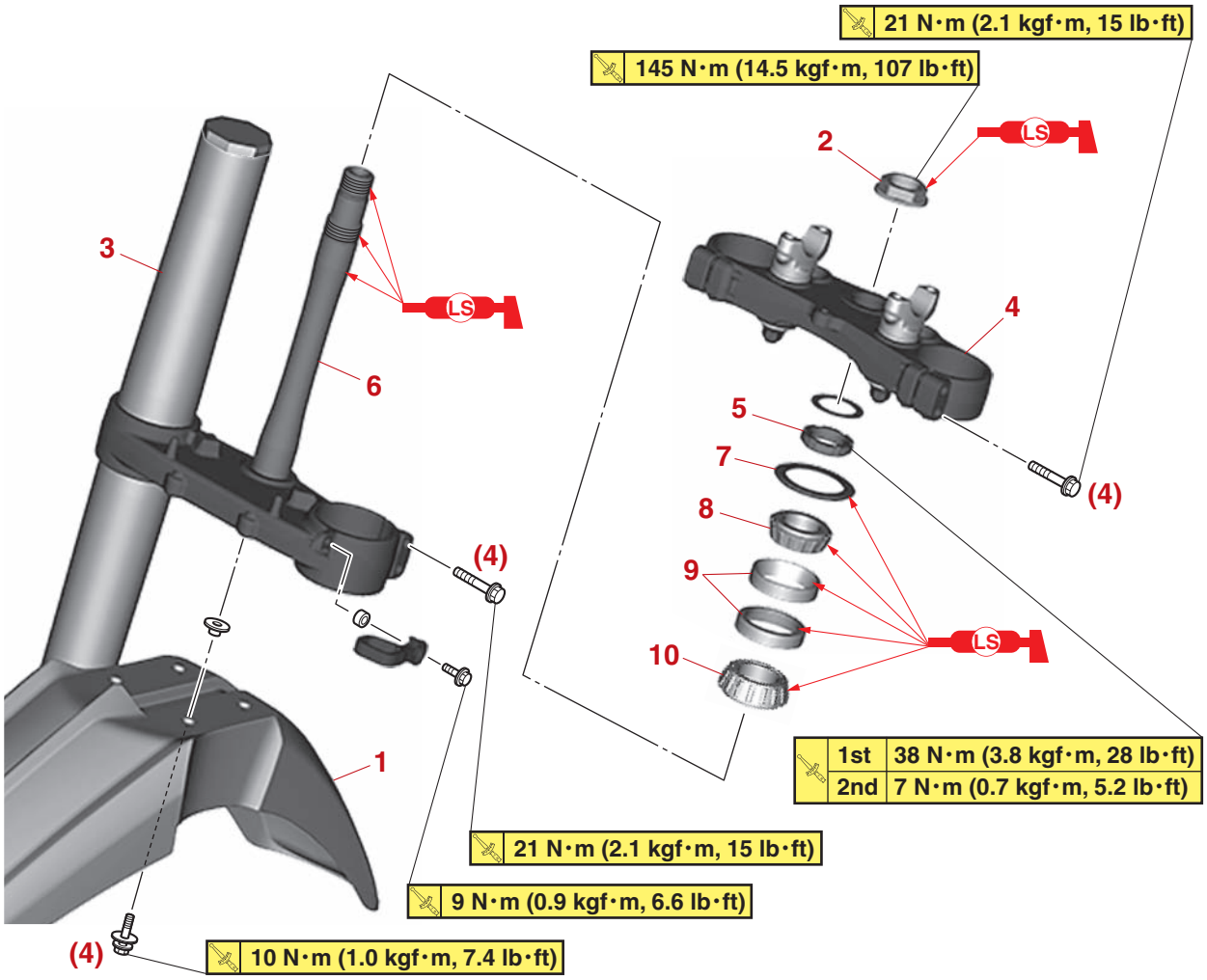
TIP

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 3-27.
			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 4-35.
1	Front fender	1	
2	Steering stem nut	1	
3	Front fork leg	2	Refer to "FRONT FORK" on page 4-42.
4	Upper bracket	1	
5	Steering ring nut	1	
6	Lower bracket	1	
7	Bearing race cover	1	
8	Upper bearing	1	
9	Bearing race	2	
10	Lower bearing	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”

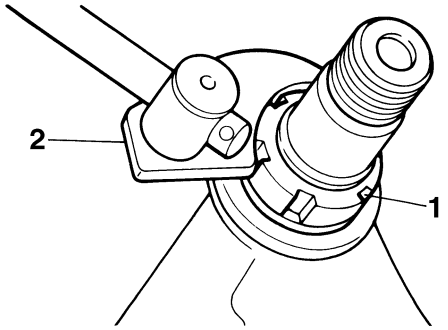
TIP
Remove the ring nut with the steering nut wrench “2”.



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.

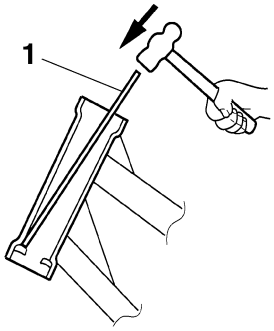


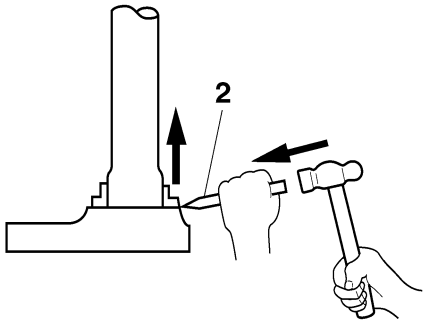
EAM30061
CHECKING THE STEERING HEAD
1. Wash with kerosene:
   • Bearing
   • Bearing race
2. Check:
   • Bearing
   • Bearing race
   Damage/pitting → Replace.
3. Replace:
   • Bearing
   • Bearing race
   a. Remove the bearing race from the steering head pipe with a long rod “1” and a hammer.
   b. 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.

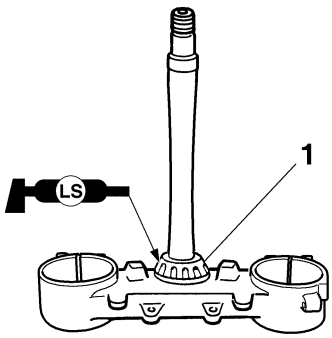




4. Check:
   • Upper bracket
   • Lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

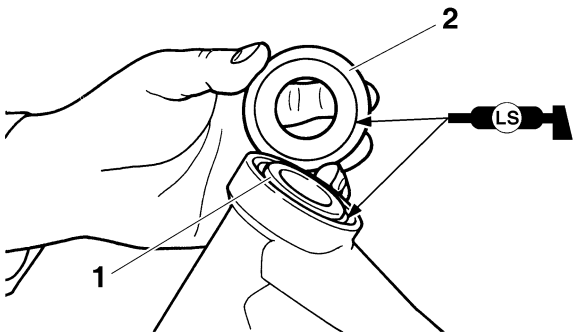
EAM30062
INSTALLING THE STEERING HEAD
1. Install:
   • Lower bearing “1”

TIP
Apply the lithium-soap-based grease on the dust seal lip and bearing inner circumference.



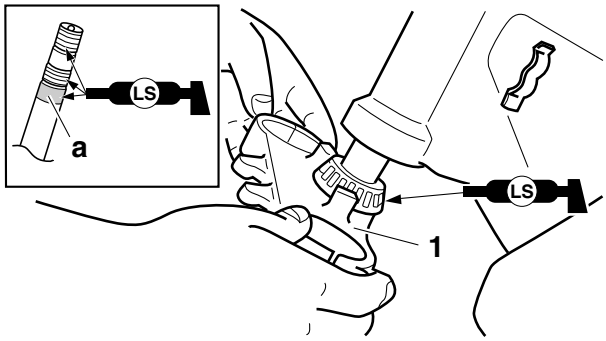
2. Install:
   • Bearing race
   • Upper bearing “1”
   • Bearing race cover “2”

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.

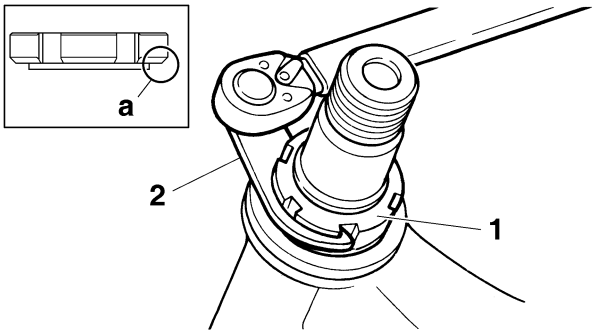


4. Install:
   • Steering ring nut “1”

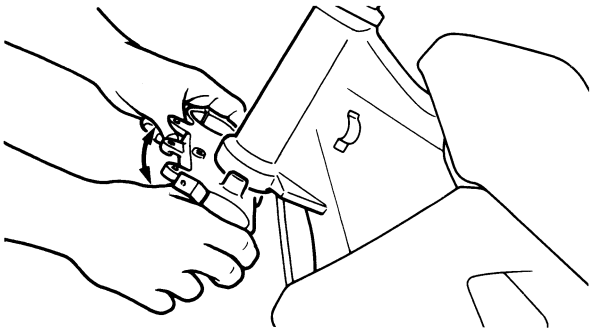
	Steering ring nut **7 N·m (0.7 kgf·m, 5.2 lb·ft)**

TIP
Install the steering ring nut with its stepped side “a” facing downward.

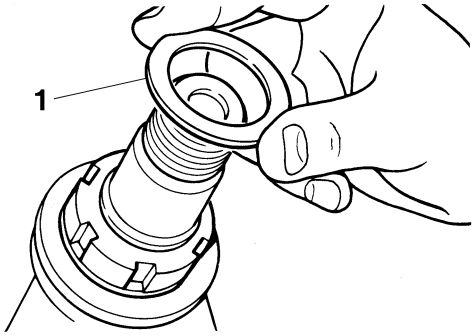
Tighten the steering ring nut with a steering nut wrench “2”.
Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-27.



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.

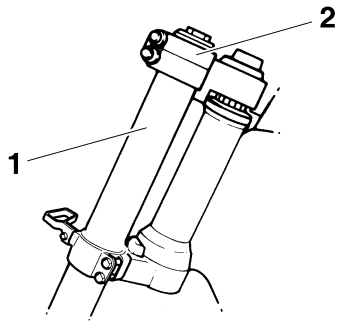


6. Install:
   • Washer “1”



7. Install:
   • Front fork “1”
   • Upper bracket “2”

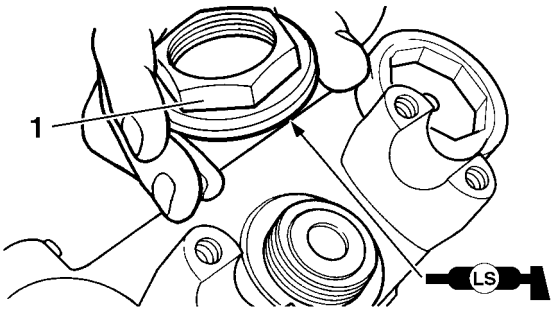
TIP
- Temporarily tighten the lower bracket pinch bolts.
- Do not tighten the upper bracket pinch bolts yet.



8. Install:
   • Steering stem nut “1”

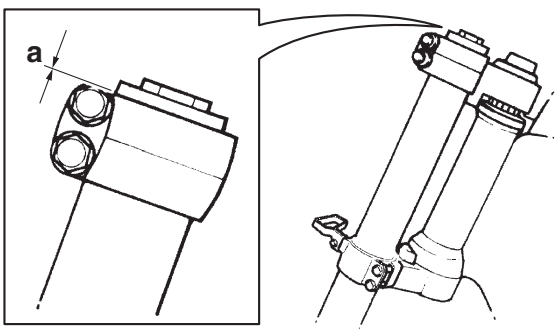
	Steering stem nut **145 N·m (14.5 kgf·m, 107 lb·ft)**

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 (0.20 in)**



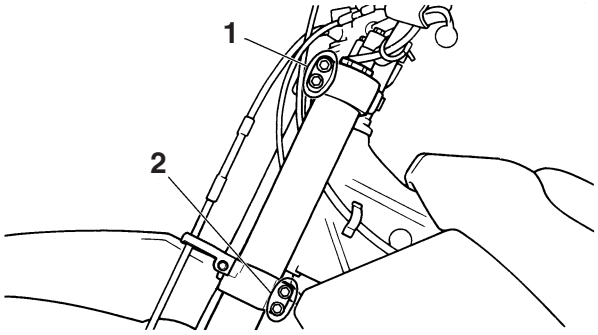
11. Tighten:
   • Upper bracket pinch bolt “1”

	Upper bracket pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**

   • Lower bracket pinch bolt “2”

	Lower bracket pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**

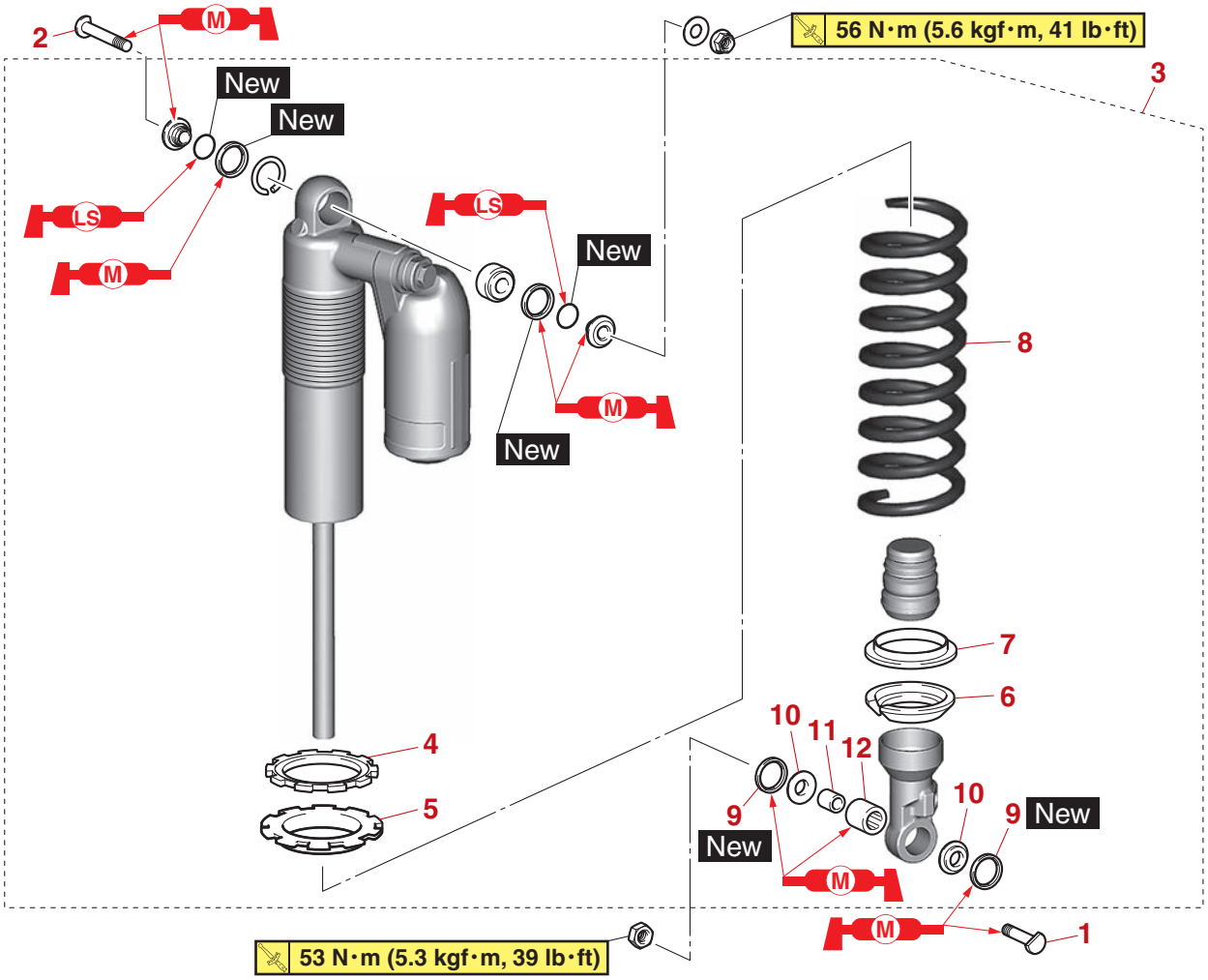
EWA19330
⚠ WARNING
Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



EAM20102

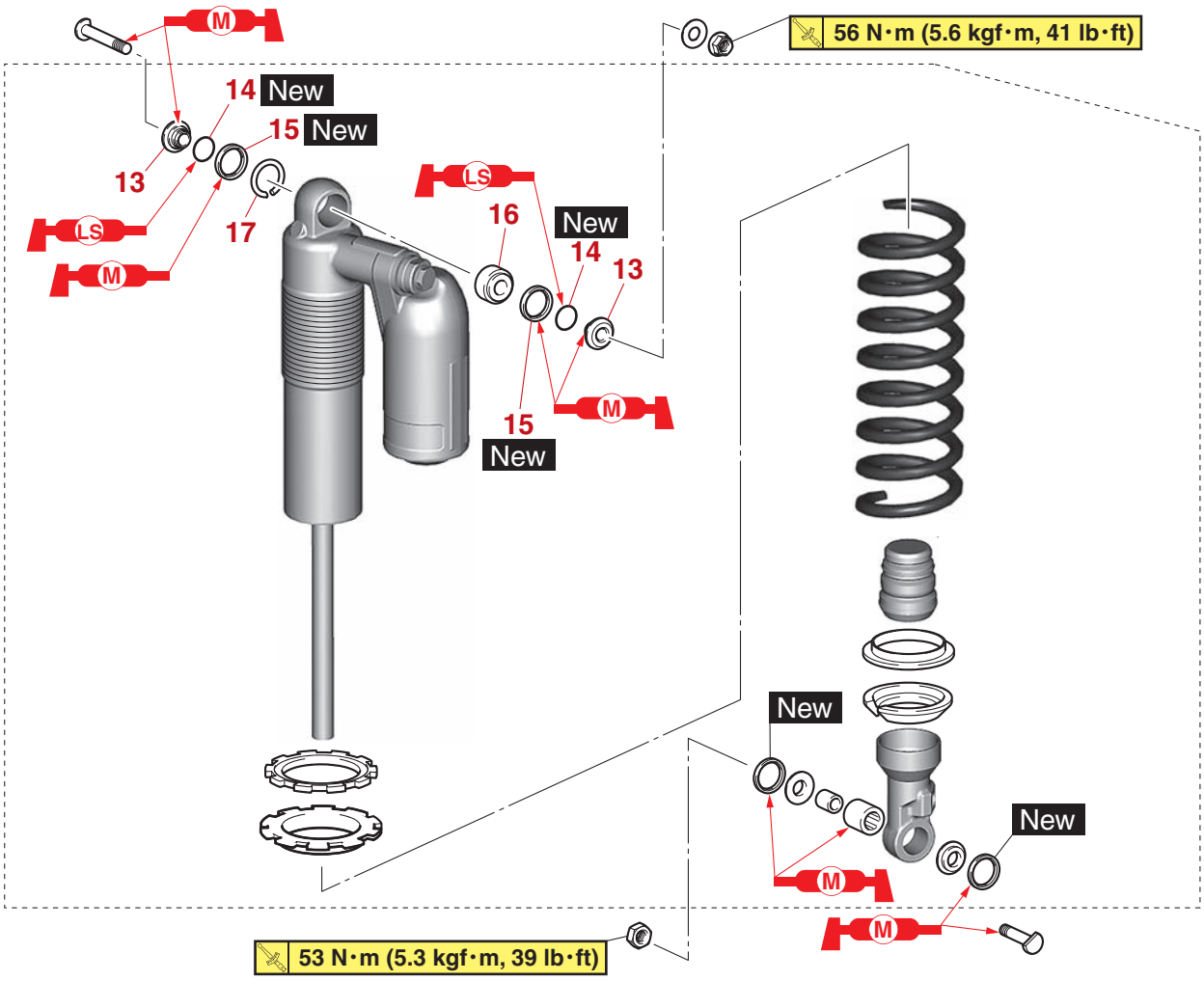
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



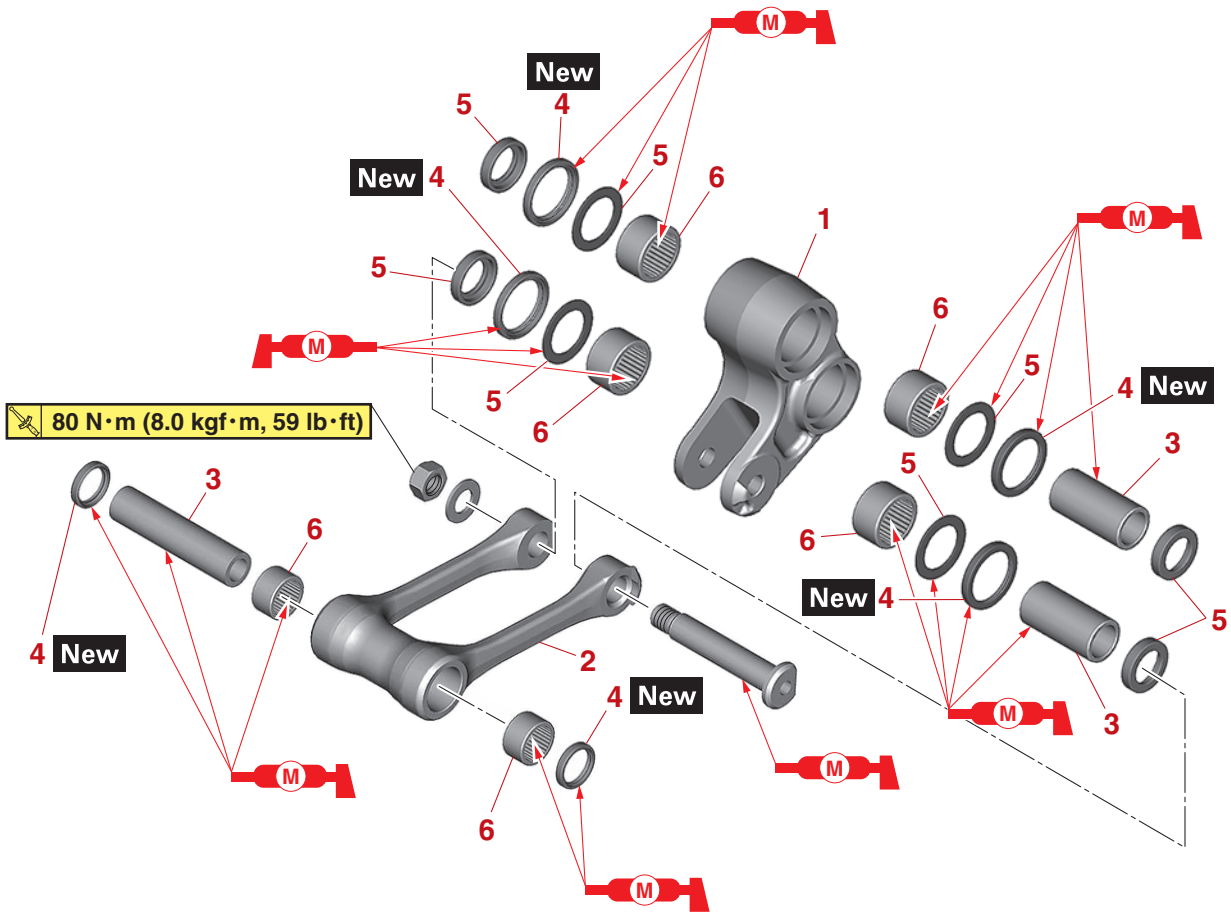
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Rear shock absorber assembly lower bolt	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	Bearing	1	

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
13	Collar	2	
14	O-ring	2	
15	Dust seal	2	
16	Bushing	1	
17	Stopper ring	1	

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	

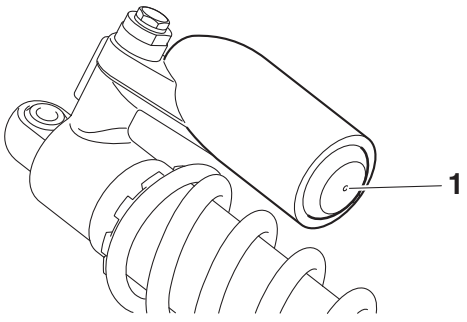
EAM30063
HANDLING THE REAR SHOCK ABSORBER
EWA13740
⚠ WARNING

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.

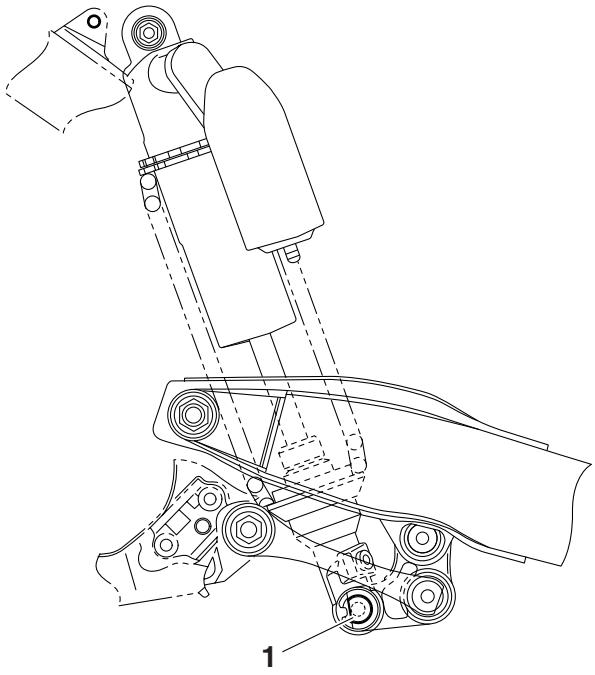
EWA13120
⚠ WARNING

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

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.

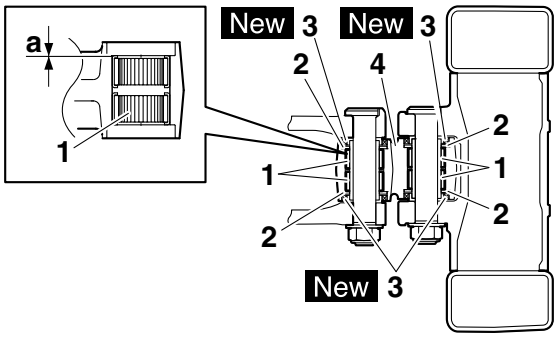
EAM30068
CHECKING THE CONNECTING ARM AND RELAY ARM
1. Check:
   • Connecting arm
   • Relay arm
   Damage/wear → Replace.
2. Check:
   • Bearing
   • Collar
   Damage/pitting/scratches → Replace the bearings and collars as a set.
3. Check:
   • Oil seal
   Damage/pitting → Replace.

EAM30069
INSTALLING THE RELAY ARM
1. Lubricate:
   • Oil seal
   • Bearing
   • Washer
   • Collar

	Recommended lubricant **Molybdenum disulfide grease**

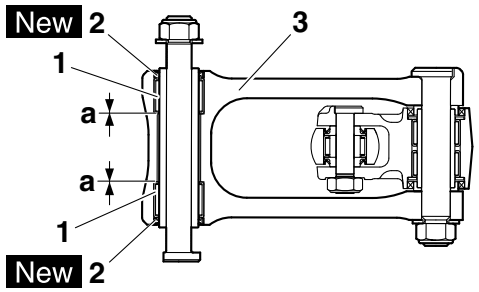
2. Install:
   • Bearing “1”
   • Washer “2”
   • Oil seal “3” New
   (into the relay arm “4”)

	Installed depth “a” **0 mm (0 in)**



3. Install:
   • Bearing “1”
   • Oil seal “2” New
   (into the connecting arm “3”)

	Installed depth “a” **0 mm (0 in)**



EAM30070
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY
1. Lubricate:
   • Bearing (lower side)
   • Dust seal

	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 **Lithium-soap-based grease**

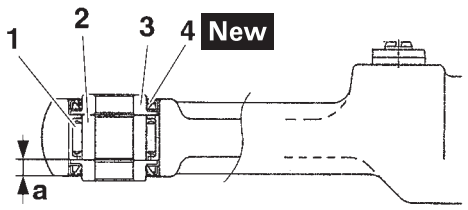
3. Install:
   • Bushing
   • Stopper ring
   (into the rear shock absorber assembly (upper side))

TIP
- Install the bushing parallel until the stopper ring groove appears by pressing its outer race.
- After installing the stopper ring, push back the bushing until it contacts the stopper ring.

4. Install:
   • Bearing “1”
   • Bushing “2”
   • Collar “3”
   • Dust seal “4” New
   (into the 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 nut

	Rear shock absorber assembly upper nut **56 N·m (5.6 kgf·m, 41 lb·ft)**

   - Connecting arm nut (frame side)

	Connecting arm nut (frame side) **80 N·m (8.0 kgf·m, 59 lb·ft)**

   - Connecting arm nut (relay arm side)

	Connecting arm nut (relay arm side) **80 N·m (8.0 kgf·m, 59 lb·ft)**

   - Relay arm nut (swingarm side)

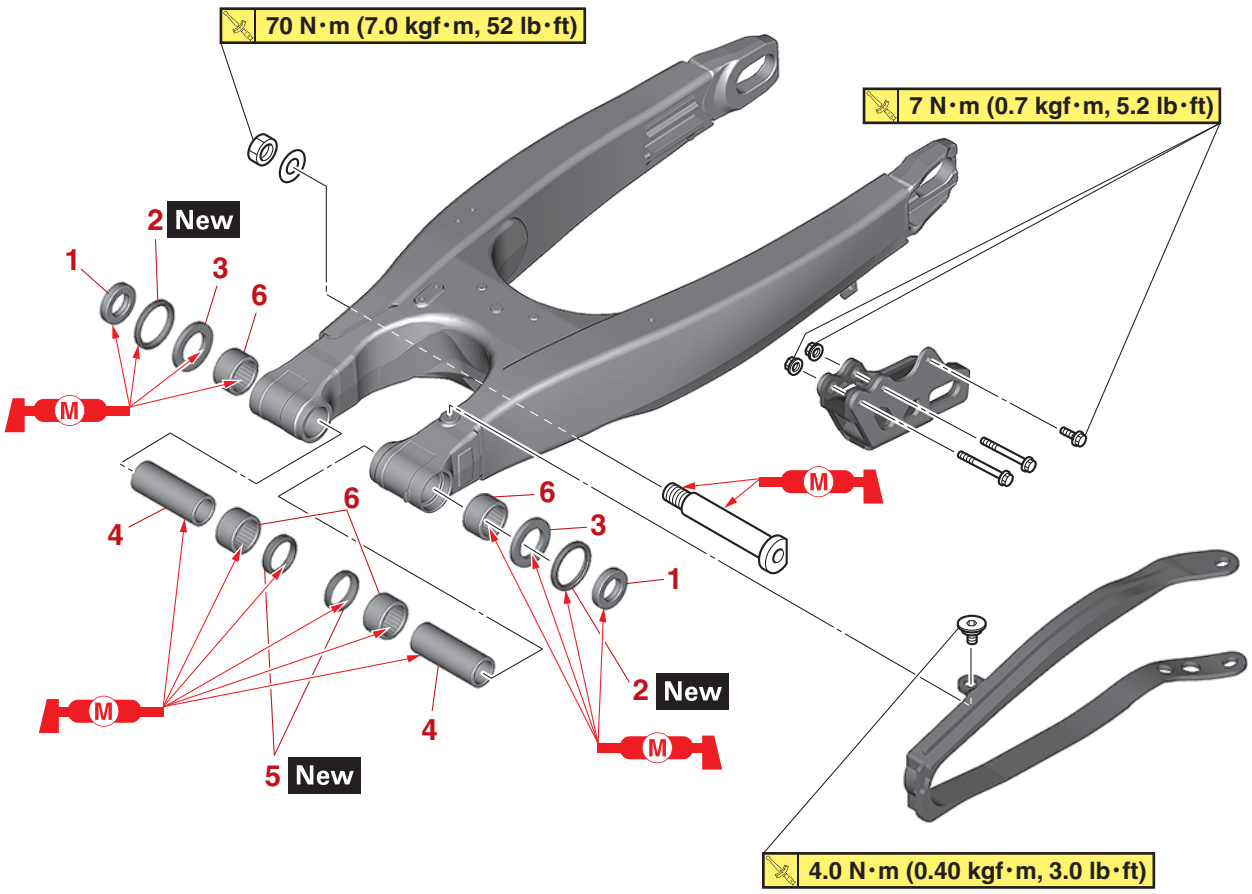
	Relay arm nut (swingarm side) **70 N·m (7.0 kgf·m, 52 lb·ft)**

   - Rear shock absorber assembly lower nut

	Rear shock absorber assembly lower nut **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 rear wheel off the ground.
	Brake hose holder		Refer to "REAR BRAKE" on page 4-24.
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-24.
	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.

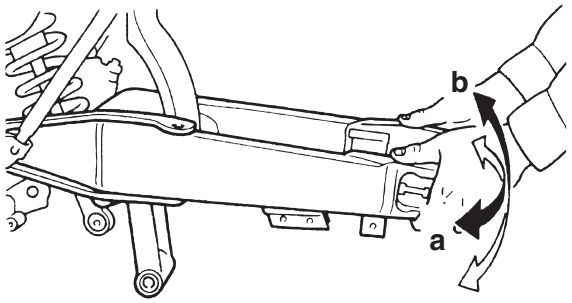
EWA13120
⚠ WARNING

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.

	Pivot shaft nut **85 N·m (8.5 kgf·m, 63 lb·ft)**

     b. Check the swingarm side play "a" by moving the swingarm from side to side. If the swingarm has side-to-side play, check the bushings, the bearings, and the collars.
     c. 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 bushings, the bearings, and the collars.



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
   - Bushing
   - Collar
   - Bearing
4. Check:
   - Oil seal
     Damage → Replace.
   - Bearing
   - Bushing
     Free play exists/unsmooth revolution/rust → Replace bearing and bushing as a set.

EAM30074
INSTALLING THE SWINGARM
1. Lubricate:
   - Bearing
   - Thrust bearing
   - Collar
   - Bushing
   - Oil seal
   - Pivot shaft

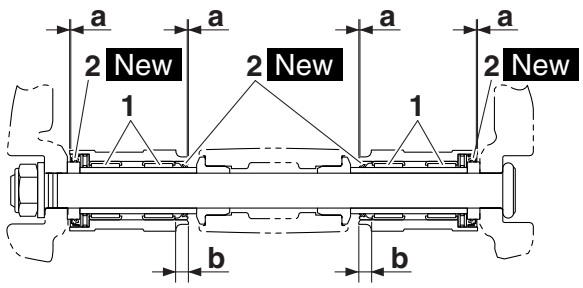
	Recommended lubricant **Molybdenum disulfide grease**

2. Install:
   - Bearing "1"
   - Oil seal "2" New
     (to the swingarm)

	Installed depth "a" **0–0.5 mm (0–0.02 in)** **Installed depth "b"** **6.5 mm (0.26 in)**

TIP

First install the outer and then the inner bearings to a specified depth from inside.



3. Install:
   - Swingarm

	Pivot shaft nut **85 N·m (8.5 kgf·m, 63 lb·ft)**

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 “DRIVE CHAIN SLACK” on page 3-26.

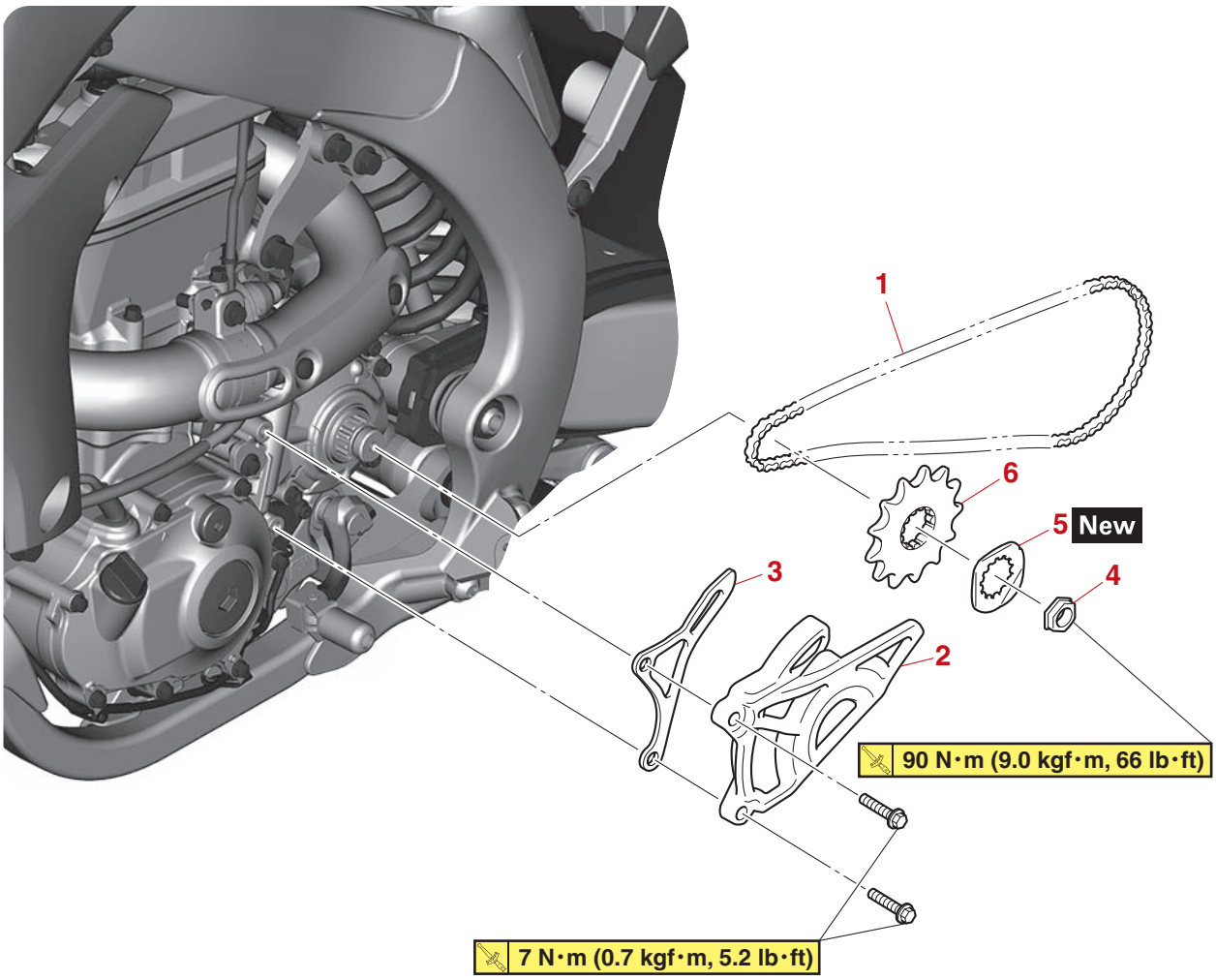


Drive chain slack (Maintenance stand)
50.0–60.0 mm (1.97–2.36 in)

EAM20104

CHAIN DRIVE

Removing the drive chain



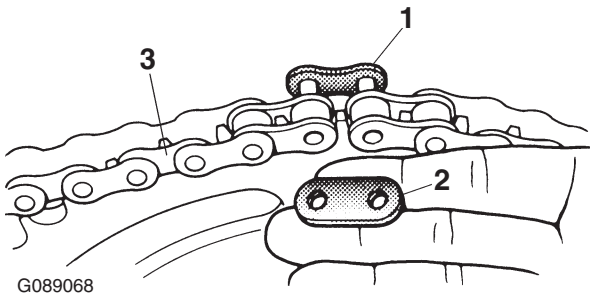
Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-6.
1	Drive chain	1	
2	Drive sprocket cover	1	
3	Bracket	1	
4	Drive sprocket nut	1	
5	Lock washer	1	
6	Drive sprocket	1	

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.

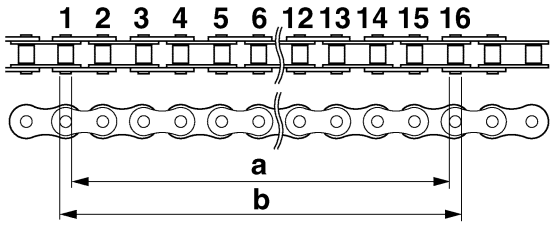
2. Remove:
   - Master link clip
   - Master link "1"
   - Master link plate "2"
   - Drive chain "3"



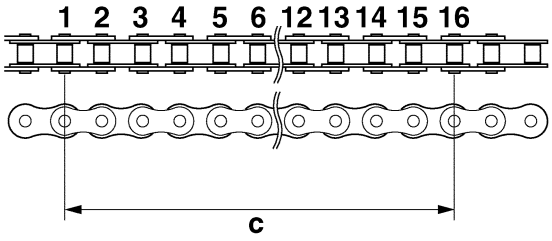
EAM30076
CHECKING THE DRIVE CHAIN
1. Measure:
   - 15-link section of the drive chain
     Out of specification → Replace the drive chain.

	15-link length limit **242.9 mm (9.56 in)**

   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.

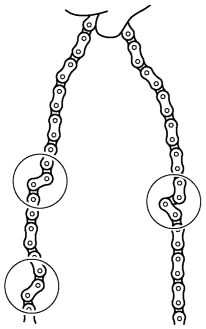


   b. Calculate the length "c" of the 15-link section of the drive chain using the following formula.
      Drive chain 15-link section length "c" = (length "a" between pin inner sides + length "b" between pin outer sides)/2

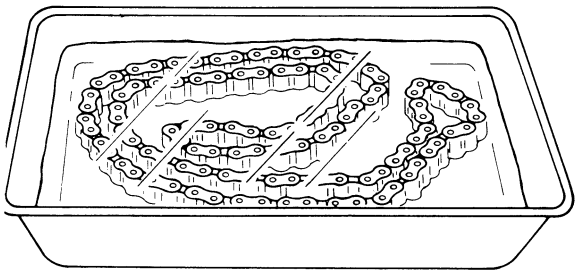


TIP
- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.

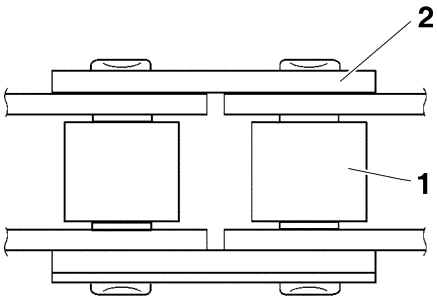
2. Check:
   - Drive chain
     Stiffness → Clean, lubricate, or replace.



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.

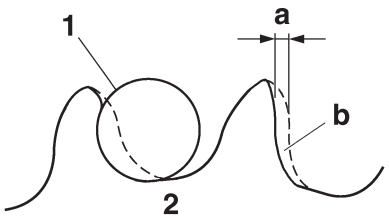


4. Check:
   - Drive chain roller "1"
     Damage/wear → Replace the drive chain.
   - Drive chain side plate "2"
     Damage/wear → Replace the drive chain.



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

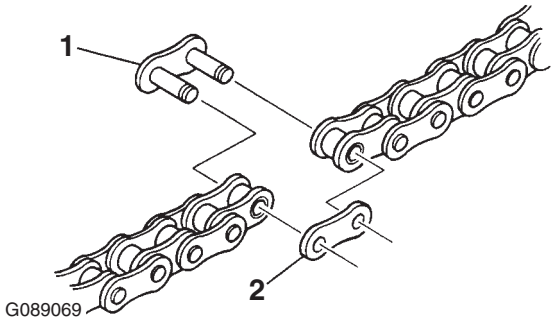
1. Drive chain roller
2. Drive sprocket

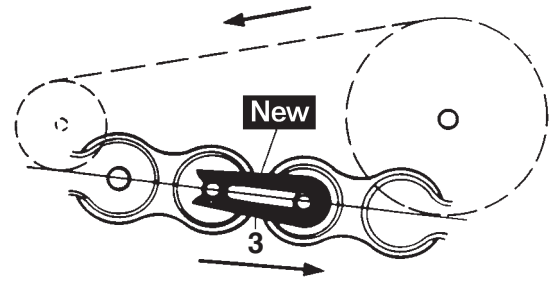
EAM30078
CHECKING THE REAR WHEEL SPROCKET
Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-10.

EAM30079
INSTALLING THE DRIVE CHAIN
1. Install:
   • Master link "1"
   • Master link plate "2"
   • Master link clip "3" New

EWA20250
⚠ WARNING

When installing the joint clip, always keep the direction as shown in the figure.





2. Lubricate:
   • Drive chain
3. Install:
   • Drive sprocket
   • Lock washer New
   • Drive sprocket nut
   Refer to "ENGINE REMOVAL" on page 5-6.

	Drive sprocket nut **90 N·m (9.0 kgf·m, 66 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 "DRIVE CHAIN SLACK" on page 3-26.

	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 swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

ENGINE

LUBRICATION SYSTEM CHART AND DIAGRAMS 5-1
ENGINE OIL LUBRICATION CHART.....5-1
LUBRICATION DIAGRAMS 5-2

ENGINE REMOVAL.....5-6
REMOVING THE ENGINE 5-10
INSTALLING THE ENGINE.....5-10
INSTALLING THE EXHAUST PIPE AND MUFFLER.....5-11

CAMSHAFT 5-13
REMOVING THE CAMSHAFT 5-15
CHECKING THE CAMSHAFT.....5-16
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET.....5-17
CHECKING THE TIMING CHAIN TENSIONERS.....5-17
CHECKING THE DECOMPRESSION SYSTEM.....5-17
INSTALLING THE CAMSHAFTS 5-17

CYLINDER HEAD.....5-20
REMOVING THE CYLINDER HEAD.....5-22
CHECKING THE TIMING CHAIN GUIDE (INTAKE SIDE).....5-22
CHECKING THE CYLINDER HEAD 5-22
INSTALLING THE CYLINDER HEAD 5-22

VALVES AND VALVE SPRINGS 5-25
REMOVING THE VALVES 5-26
CHECKING THE VALVES AND VALVE GUIDES.....5-27
CHECKING THE VALVE SEATS 5-28
CHECKING THE VALVE SPRINGS.....5-29
CHECKING THE VALVE LIFTERS 5-30
INSTALLING THE VALVES.....5-30

CYLINDER AND PISTON.....5-32
REMOVING THE PISTON.....5-33
CHECKING THE CYLINDER AND PISTON.....5-33
CHECKING THE PISTON RINGS.....5-34
CHECKING THE PISTON PIN 5-35
INSTALLING THE PISTON AND CYLINDER 5-35

GENERATOR.....5-37
REMOVING THE GENERATOR 5-38
CHECKING THE GENERATOR.....5-38
CHECKING THE WOODRUFF KEY 5-38
INSTALLING THE GENERATOR.....5-38

STARTER CLUTCH.....5-40
CHECKING THE STARTER CLUTCH 5-41

ELECTRIC STARTER 5-42
CHECKING THE STARTER MOTOR 5-44
ASSEMBLING THE STARTER MOTOR 5-44

CLUTCH 5-46
REMOVING THE CLUTCH 5-49
CHECKING THE FRICTION PLATES 5-49
CHECKING THE CLUTCH PLATES 5-49
CHECKING THE CLUTCH SPRINGS 5-49
CHECKING THE CLUTCH HOUSING 5-49
CHECKING THE CLUTCH BOSS 5-49
CHECKING THE PRESSURE PLATE 5-50
CHECKING THE PUSH LEVER SHAFT 5-50
CHECKING THE PUSH RODS 5-50
CHECKING THE PRIMARY DRIVE GEAR 5-50
CHECKING THE PRIMARY DRIVEN GEAR 5-50
INSTALLING THE CLUTCH 5-50

SHIFT SHAFT 5-54
REMOVING THE SEGMENT 5-55
CHECKING THE SHIFT SHAFT 5-55
CHECKING THE STOPPER LEVER 5-55
INSTALLING THE SHIFT SHAFT 5-55

OIL PUMP 5-58
REMOVING THE BALANCER 5-60
CHECKING THE OIL PUMP 5-60
ASSEMBLING THE OIL PUMP 5-60
INSTALLING THE OIL PUMP 5-61

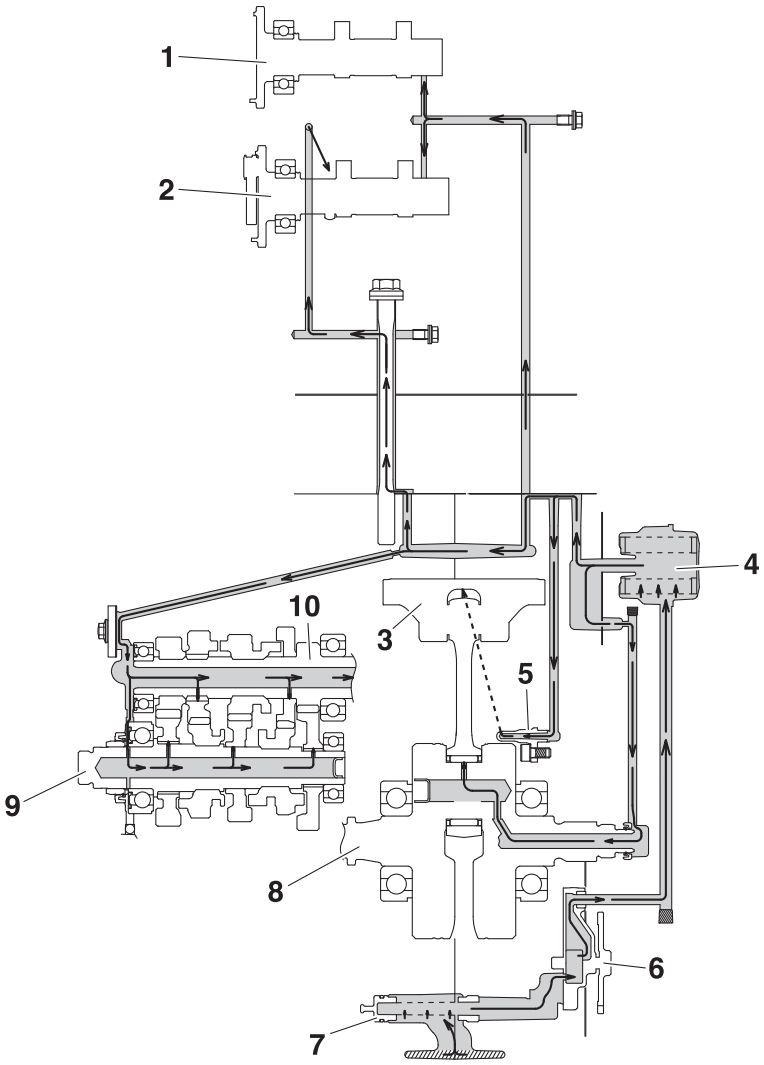
CRANKCASE 5-63
DISASSEMBLING THE CRANKCASE 5-65
CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE) 5-65
CHECKING THE CRANKCASE 5-65
ASSEMBLING THE CRANKCASE 5-66

CRANKSHAFT AND BALANCER SHAFT 5-67
REMOVING THE CRANKSHAFT 5-68
CHECKING THE CRANKSHAFT 5-68
INSTALLING THE CRANKSHAFT 5-69

TRANSMISSION 5-70
REMOVING THE TRANSMISSION 5-71
CHECKING THE SHIFT FORKS 5-71
CHECKING THE SHIFT DRUM ASSEMBLY 5-71
CHECKING THE TRANSMISSION 5-71
INSTALLING THE TRANSMISSION 5-72

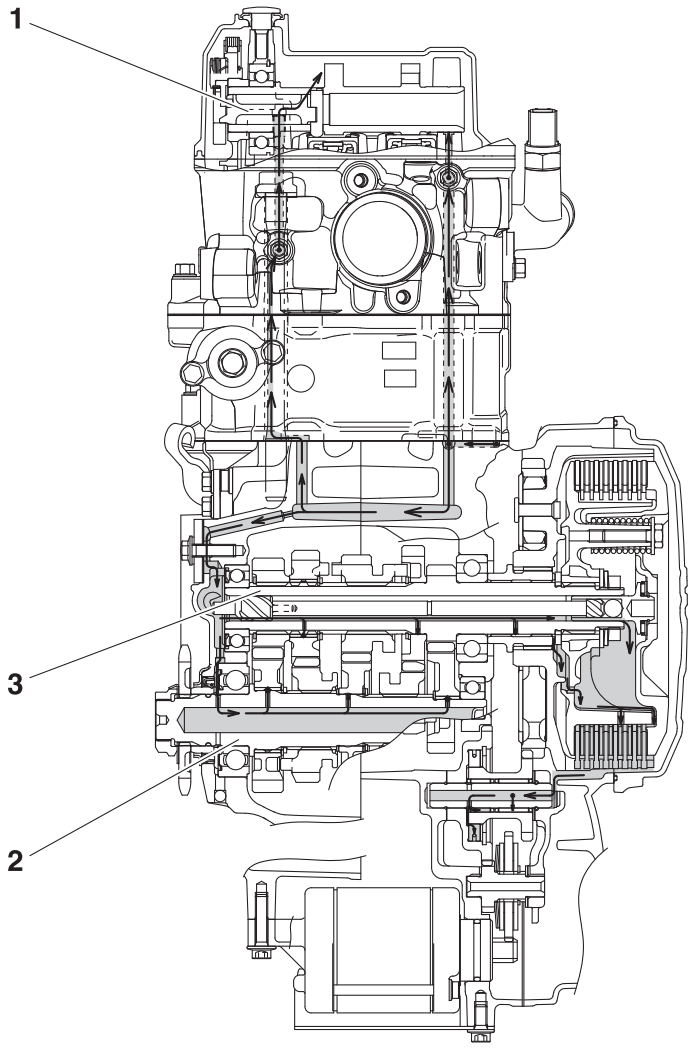
EAM20185
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAM30526
ENGINE OIL LUBRICATION CHART

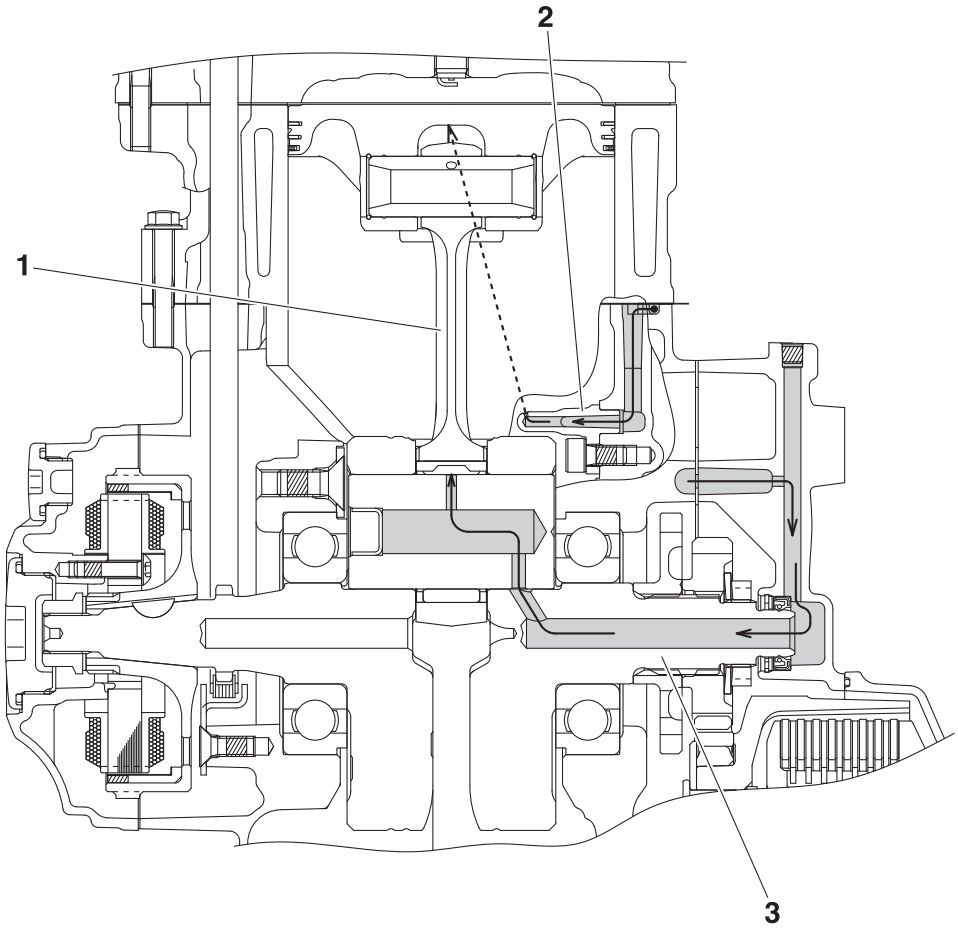


1. Intake camshaft
2. Exhaust camshaft
3. Piston
4. Oil filter element
5. Oil nozzle
6. Oil pump
7. Oil strainer
8. Crankshaft
9. Drive axle
10. Main axle

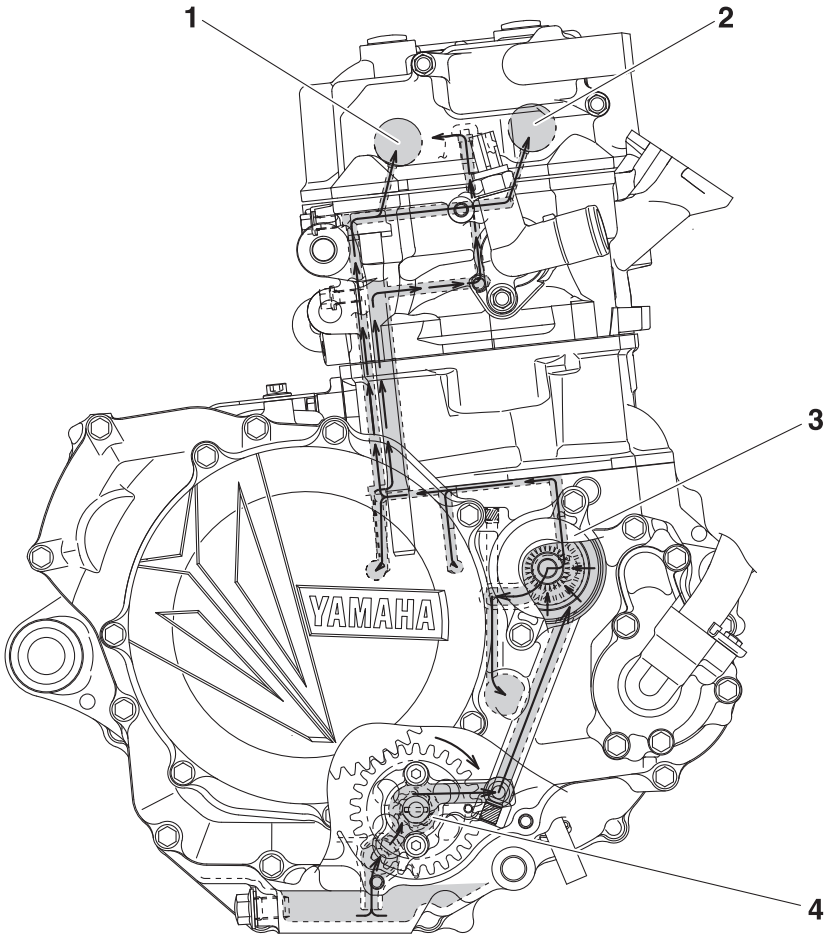
EAM30507
LUBRICATION DIAGRAMS



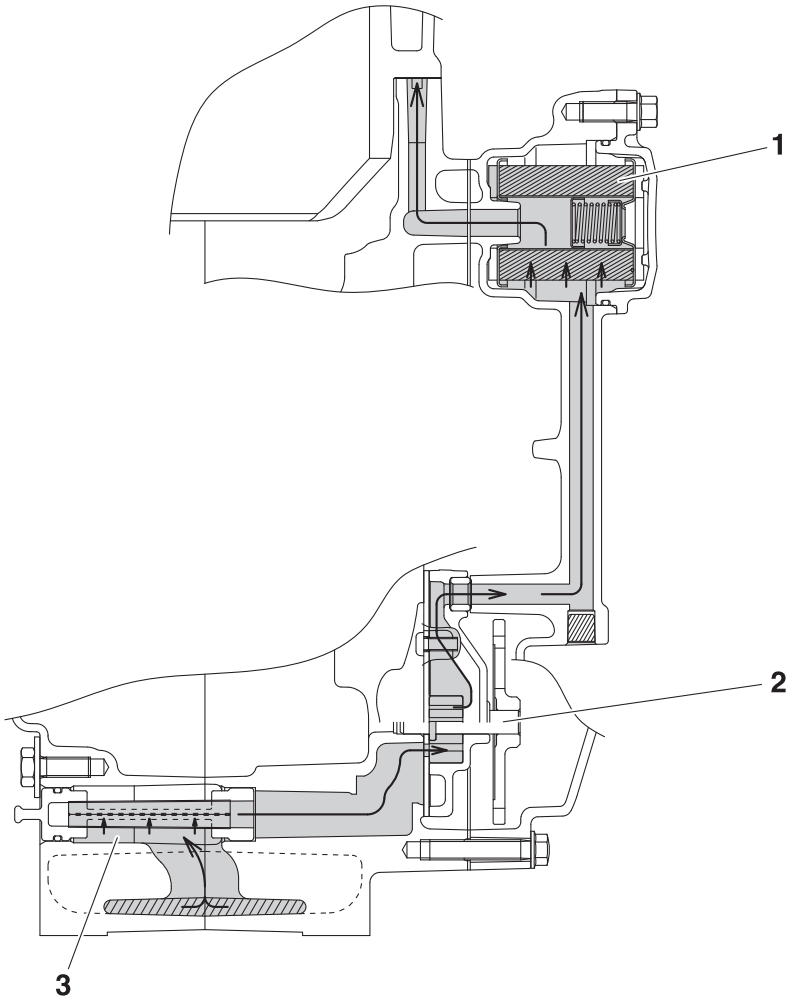
1. Camshaft
2. Drive axle
3. Main axle



1. Connecting rod
2. Oil nozzle
3. Crankshaft



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

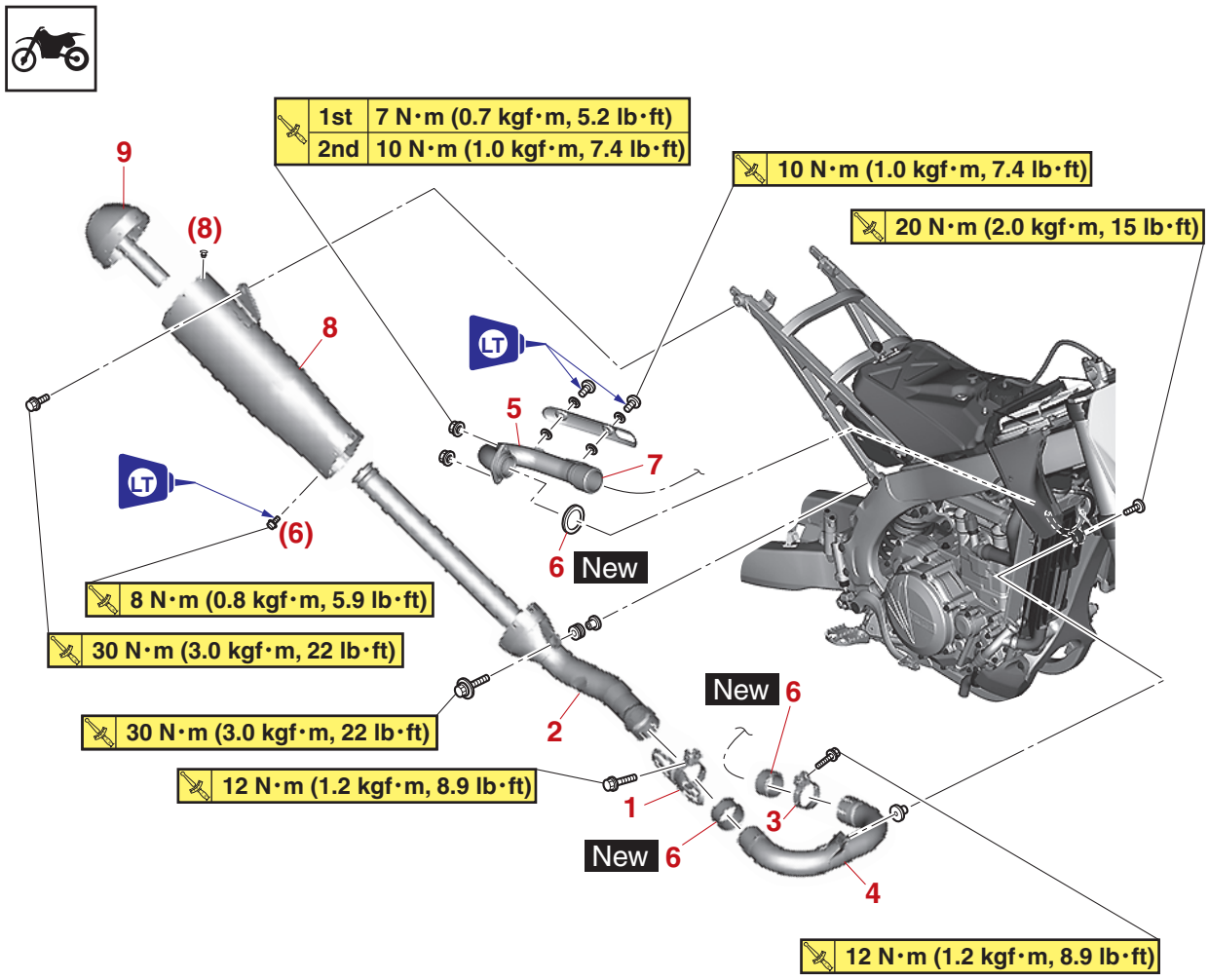


1. Oil filter element
2. Oil pump
3. Oil strainer

EAM20105

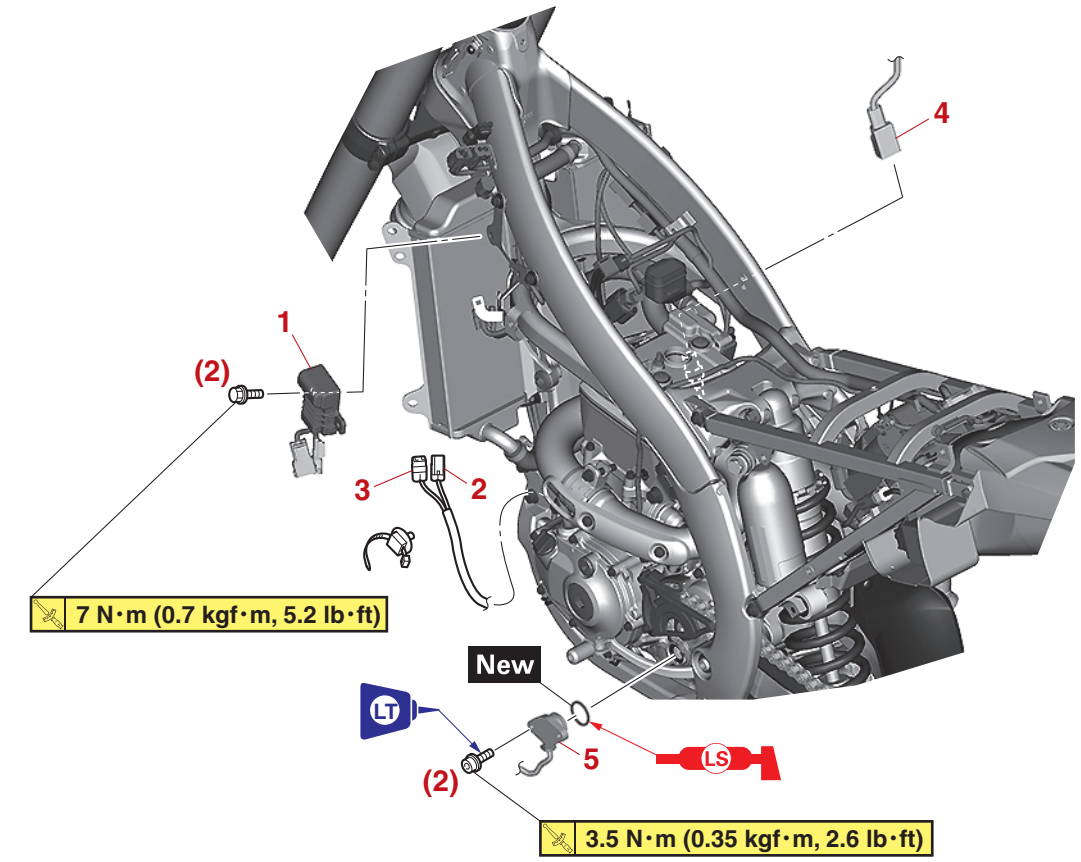
ENGINE REMOVAL

Removing the exhaust pipe



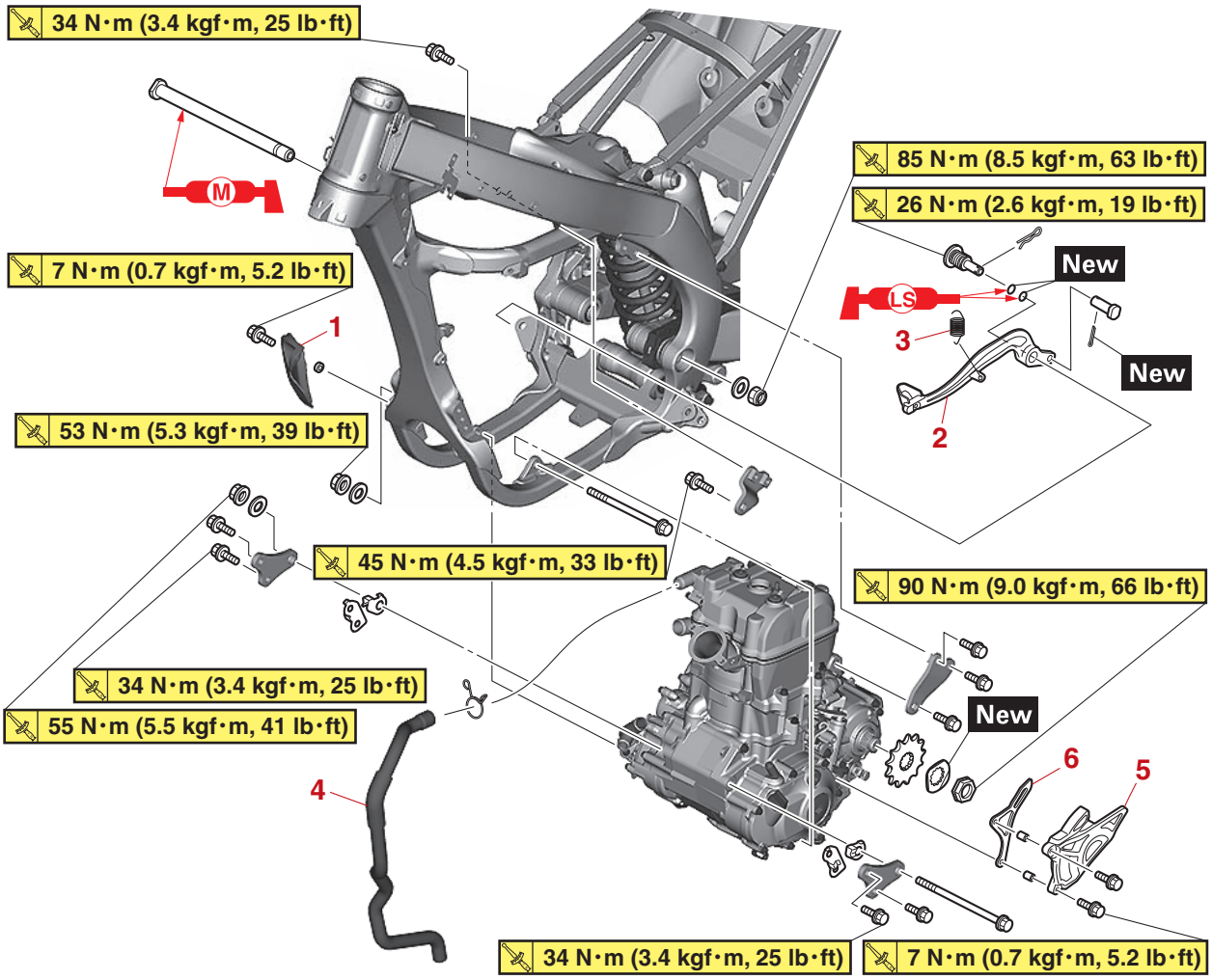
Order	Job/Parts to remove	Q'ty	Remarks
	Side cover (right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear shock absorber assembly lower bolt		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-59.
	Connecting arm bolt (frame side)		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-59.
1	Silencer clamp	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



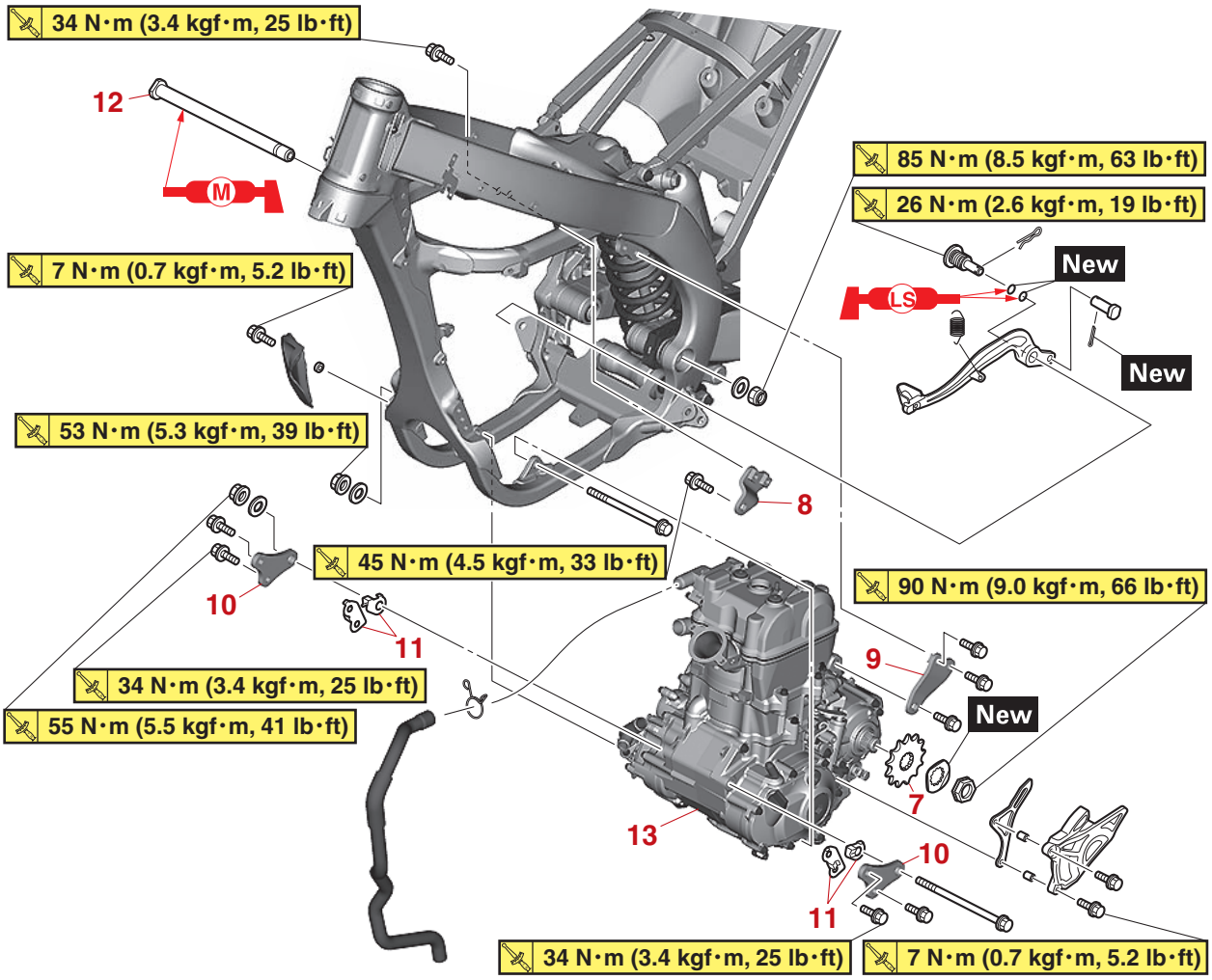
Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case cover		Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-15.
	Intake air temperature sensor coupler		Refer to "THROTTLE BODY" on page 7-4.
	ECU (Engine Control Unit)		Refer to "THROTTLE BODY" on page 7-4.
	Ignition coil		Refer to "THROTTLE BODY" on page 7-4.
1	Rectifier/regulator	1	
2	Stator coil assembly 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/Silencer		Refer to "ENGINE REMOVAL" on page 5-6.
	Air filter case		Refer to "THROTTLE BODY" on page 7-4.
	Throttle body		Refer to "THROTTLE BODY" on page 7-4.
	Clutch cable		Refer to "CLUTCH" on page 5-46.
	Shift pedal/Drive chain		Refer to "SHIFT SHAFT" on page 5-54. Refer to "CHAIN DRIVE" on page 4-68.
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	

Removing the engine

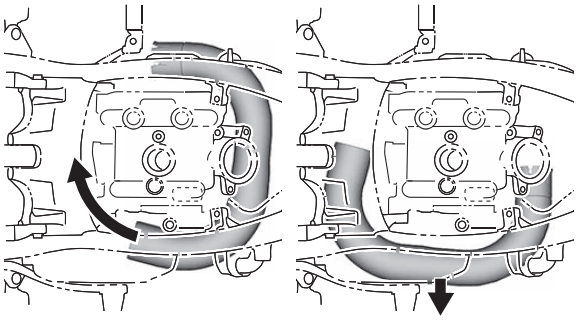


Order	Job/Parts to remove	Q'ty	Remarks
7	Drive sprocket	1	
8	Upper engine bracket (right)	1	
9	Upper engine bracket (left)	1	
10	Lower engine bracket	2	
11	Shim	4	
12	Pivot shaft	1	
13	Engine	1	

EAM30161
REMOVING THE ENGINE

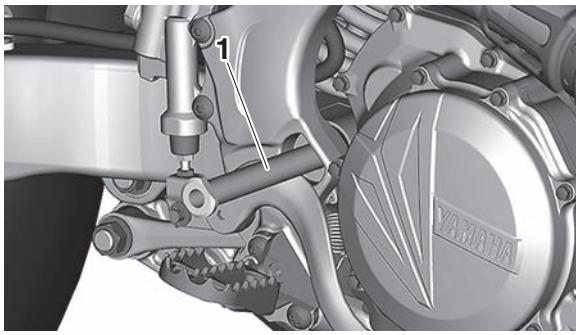
1. Remove:
   • Exhaust pipe 2

TIP
Put the exhaust pipe 2 into the state as shown by moving this, and then remove it.



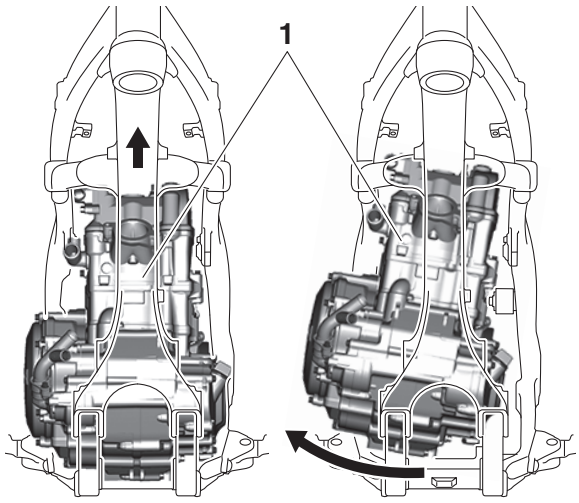
2. Remove:
   • Pivot shaft “1”

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.



3. 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.



EAM30164
INSTALLING THE ENGINE

1. Install:
   • Engine “1”
   (from the right side)
   • Pivot shaft “2”

	Pivot shaft nut **85 N·m (8.5 kgf·m, 63 lb·ft)**

   • Engine mounting bolt (lower side) “3”

	Engine mounting bolt (lower side) **53 N·m (5.3 kgf·m, 39 lb·ft)**

   • Lower engine bracket “4”
   • Shim “5”
   • Engine bracket bolt (front side) “6”

	Engine bracket bolt (front side) **34 N·m (3.4 kgf·m, 25 lb·ft)**

   • Engine mounting bolt (front side) “7”

	Engine mounting bolt (front side) **55 N·m (5.5 kgf·m, 41 lb·ft)**

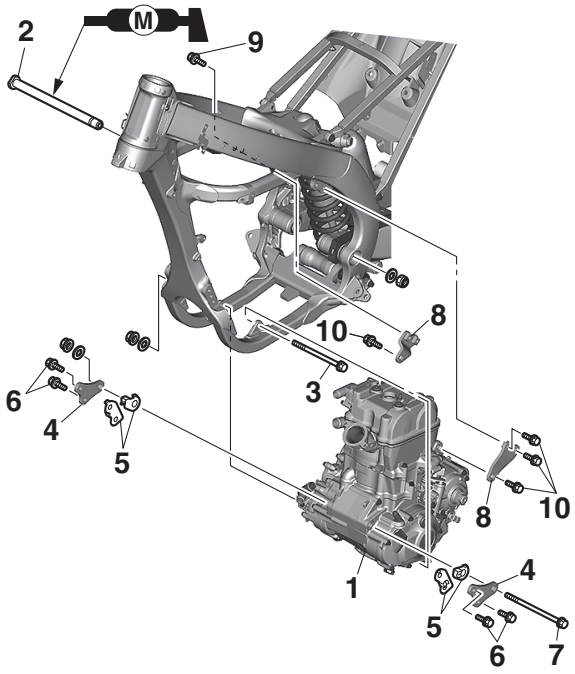
   • Upper engine bracket “8”
   • Engine bracket bolt (upper side) “9”

	Engine bracket bolt (upper side) **34 N·m (3.4 kgf·m, 25 lb·ft)**

   • Engine mounting bolt (upper side) “10”

	Engine mounting bolt (upper side) **45 N·m (4.5 kgf·m, 33 lb·ft)**

TIP
- Apply molybdenum disulfide grease to the pivot shaft.
- Place the projection of the shims to the outside of the vehicle.

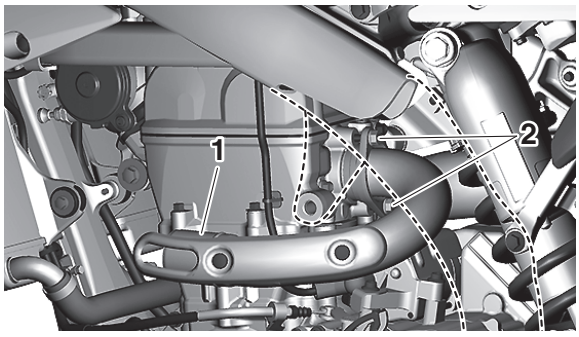


EAM30167
INSTALLING THE EXHAUST PIPE AND MUFFLER

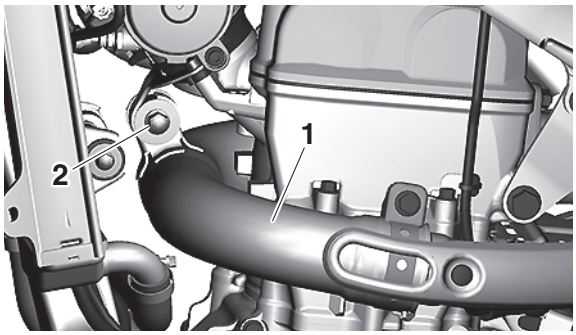
1. Install:
   - Gasket New
   - Exhaust pipe 1 “1”
   - Nut (exhaust pipe 1) “2”

	Nut (exhaust pipe 1) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

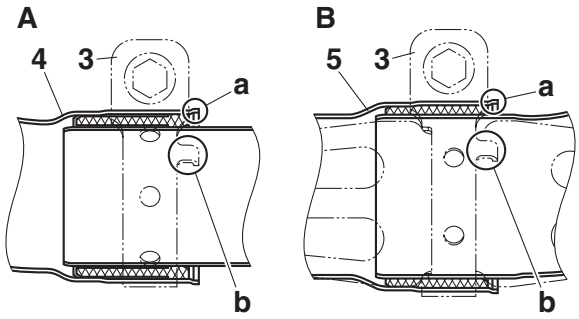
TIP
First temporarily tighten all nuts to 7 N·m (0.7 kgf·m, 5.2 lb·ft). Then retighten them to 10 N·m (1.0 kgf·m, 7.4 lb·ft).



2. Install:
   - Clamp
   - Exhaust pipe 2 “1”
   - Bolt (exhaust pipe 2) “2”



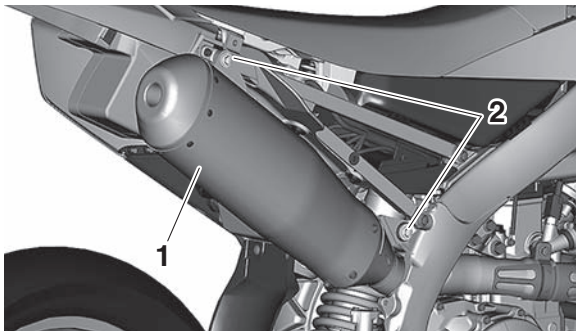
TIP
Make sure that the exhaust pipe band “3” does not ride on the projection “a” on the exhaust pipe “4” or silencer “5”. Be sure to insert the projection “b” into the slot in the exhaust pipe (or silencer).



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)**

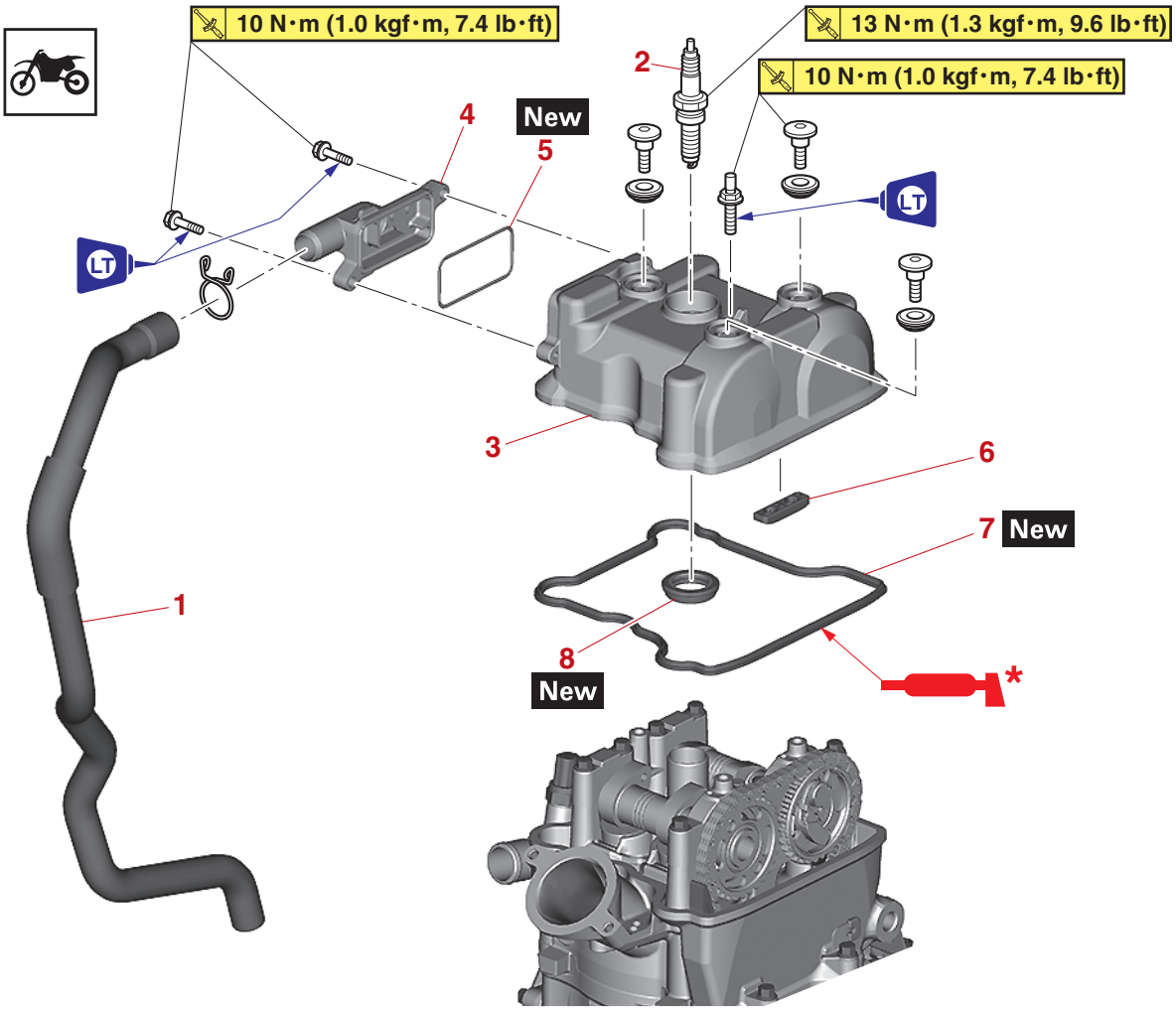
   • Clamp

	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

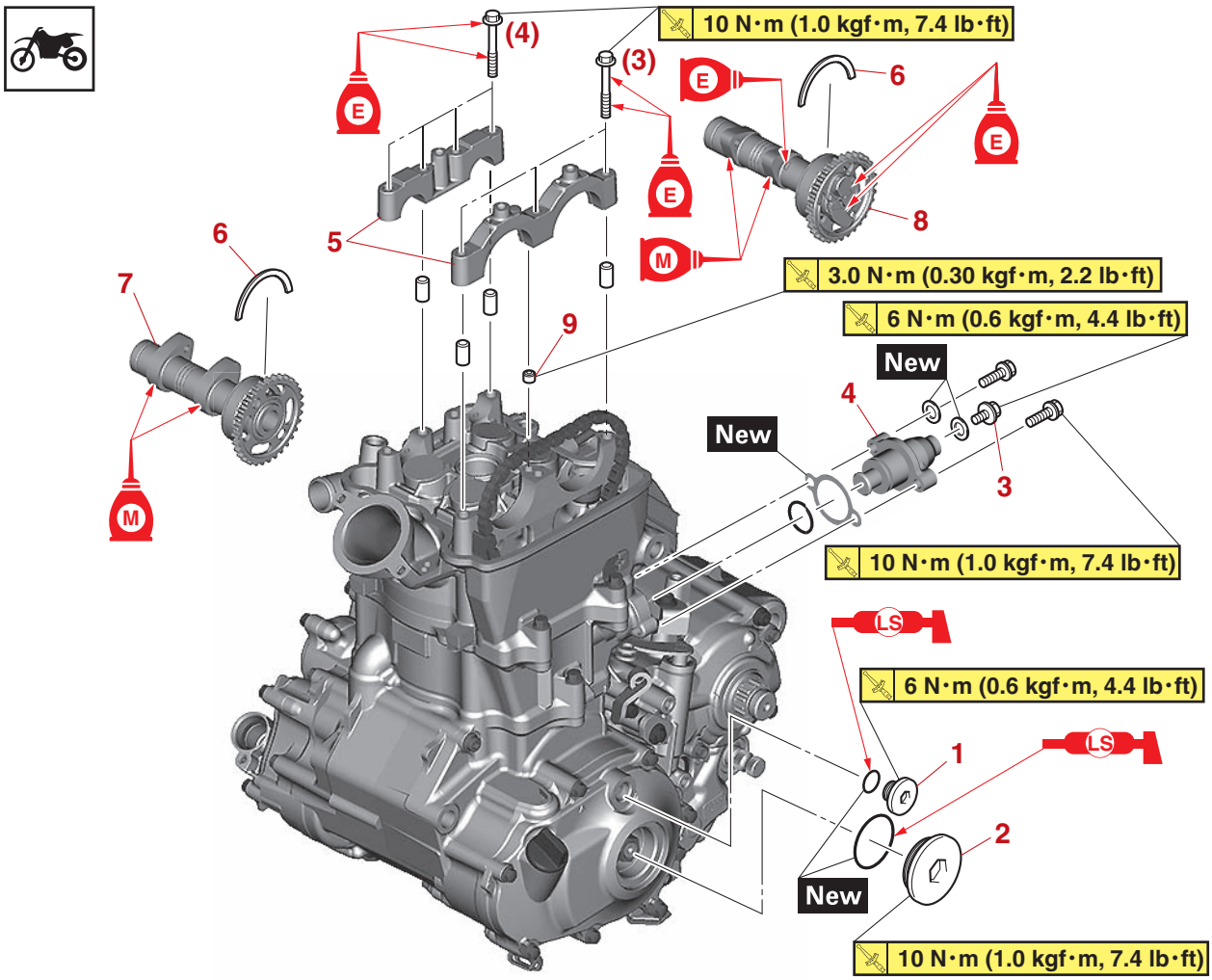
Removing the cylinder head cover



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 5-6.
1	Cylinder head breather hose	1	
2	Spark plug	1	
3	Cylinder head cover	1	
4	Cylinder head cover breather plate	1	
5	Gasket	1	
6	Timing chain guide (top side)	1	
7	Cylinder head cover gasket	1	
8	Gasket	1	

* Yamaha bond No. 1215 (Three bond No.1215®)

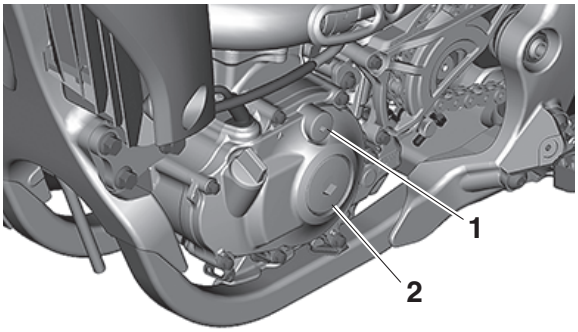
Removing the camshaft



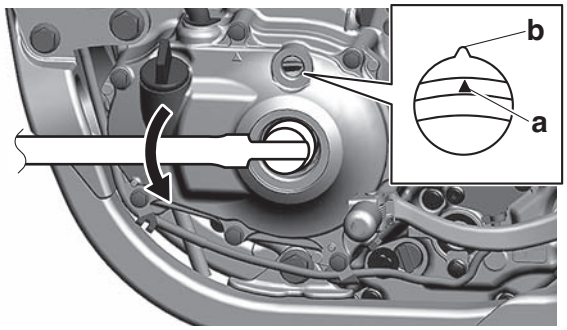
Order	Job/Parts to remove	Q'ty	Remarks
1	Timing mark accessing screw	1	
2	Crankshaft end accessing screw	1	
3	Timing chain tensioner cap bolt	1	
4	Timing chain tensioner	1	
5	Camshaft cap	2	
6	Clip	2	
7	Intake camshaft	1	
8	Exhaust camshaft	1	
9	Oil nozzle	1	

EAM30080
REMOVING THE CAMSHAFT

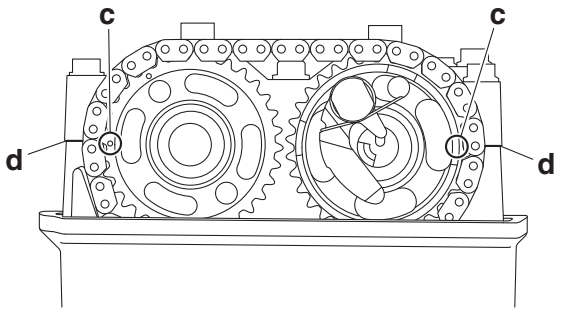
1. Remove:
   - Timing mark accessing screw “1”
   - Crankshaft end accessing screw “2”



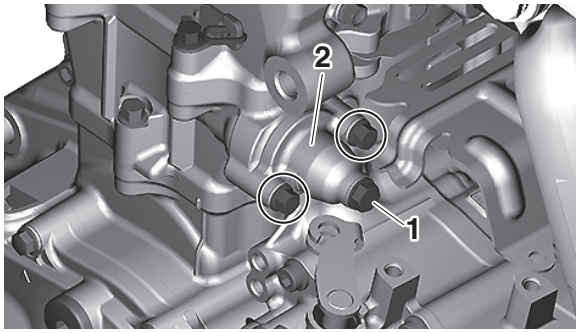
2. Align:
   - Alignment mark
     a. Turn the crankshaft counterclockwise with a wrench.
     b. Align the top dead center (TDC) mark “a” on the generator rotor with the alignment mark “b” on the crankcase cover.



TIP
Check that the alignment marks “c” on the camshaft sprockets are aligned with the edge of the camshaft cap surfaces “d”.



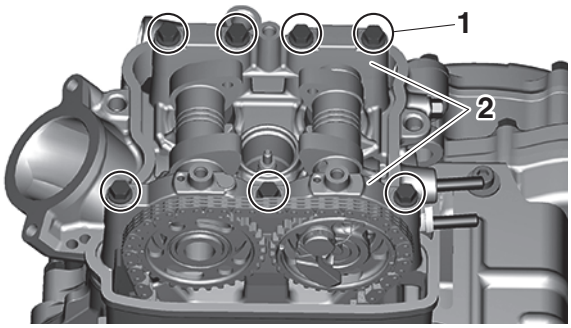
3. Remove:
   - Timing chain tensioner cap bolt “1”
   - Timing chain tensioner “2”
   - Gasket

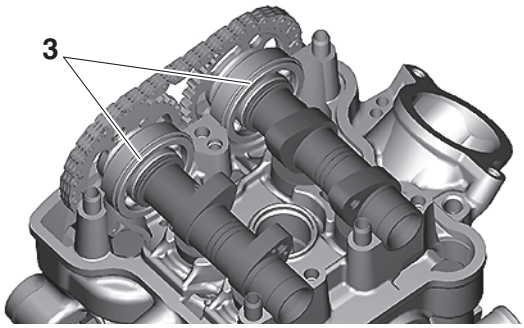


4. Remove:
   - Bolt (camshaft cap) “1”
   - Camshaft cap “2”
   - Clip “3”

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.

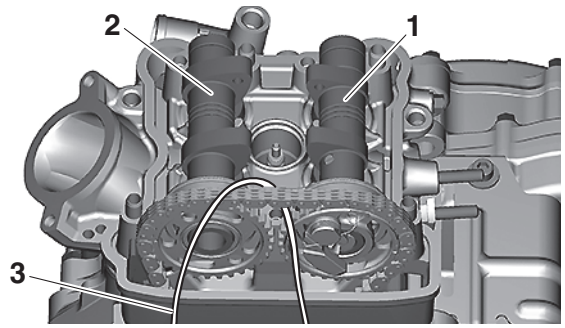
ECA24610
NOTICE
The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.





5. Remove:
   - Exhaust camshaft “1”
   - Intake camshaft “2”

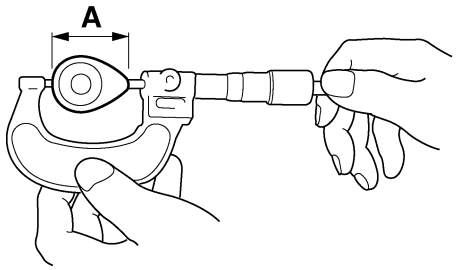
TIP
Attach a wire “3” to the timing chain to prevent it from falling into the crankcase.



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.

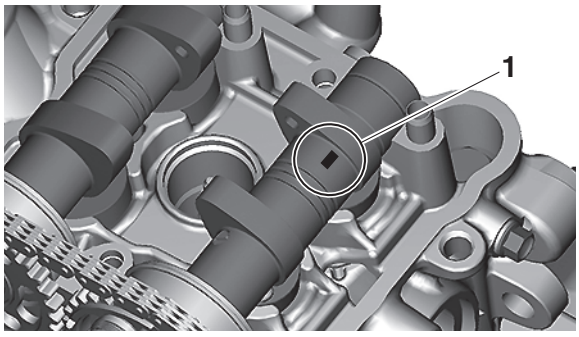
Camshaft lobe dimensions
Lobe height limit (Intake)
38.030 mm (1.4972 in)
Lobe height limit (Exhaust)
34.170 mm (1.3453 in)



3. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance
0.028–0.062 mm (0.0011–0.0024 in)

   a. Install the camshaft into the cylinder head.
   b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.

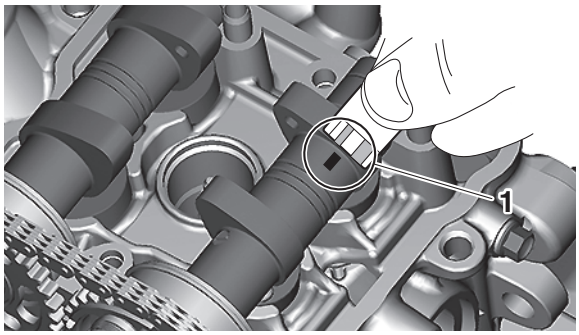


   c. Install the dowel pins and the camshaft caps.

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.

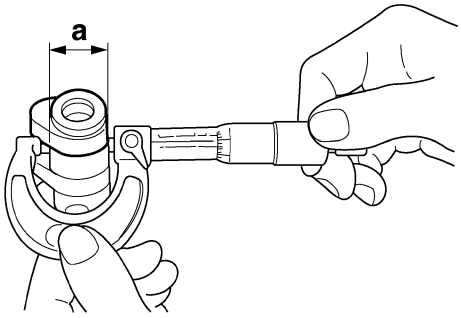
Camshaft cap bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

   d. Remove the camshaft caps and then measure the width of the Plastigauge® “1”.



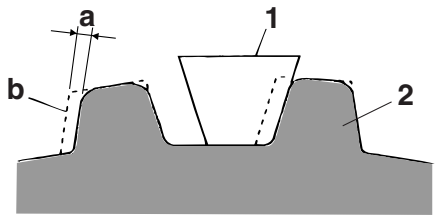
4. Measure:
   • Camshaft journal diameter “a”
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

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.

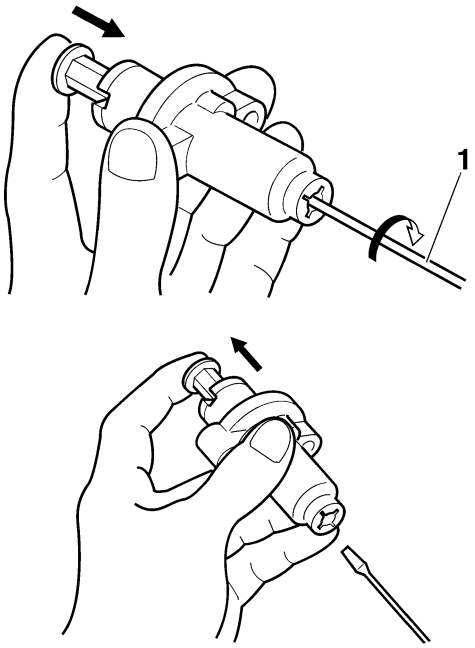


a. 1/4 tooth
b. Correct

1. Timing chain roller
2. Camshaft sprocket

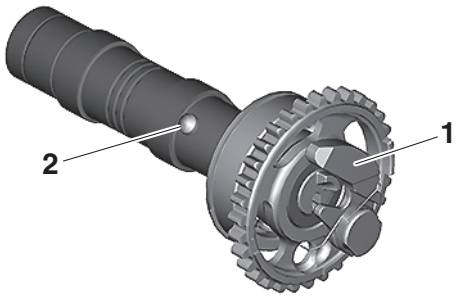
EAM30083
CHECKING THE TIMING CHAIN TENSIONERS

1. Check:
   • Timing chain tensioner
   Crack/damage → Replace.
   a. While pressing the tensioner rod lightly with your fingers, use a thin screwdriver “1” to wind the tensioner rod up fully clockwise.
   b. When releasing the screwdriver by pressing lightly with your fingers, make sure that the tensioner rod will come out smoothly.
   c. If not, replace the tensioner assembly.



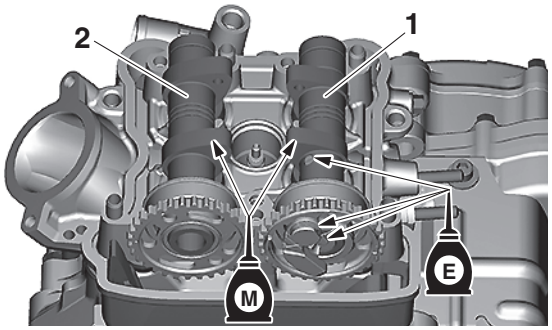
EAM30084
CHECKING THE DECOMPRESSION SYSTEM

1. Check:
   • Decompression system
   a. Check that the decompressor cam “1” moves smoothly.
   b. Check that the decompressor lever pin “2” projects from the camshaft.



EAM30085
INSTALLING THE CAMSHAFTS

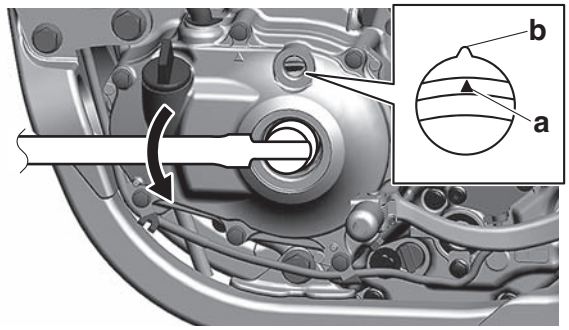
1. Install:
   • Exhaust camshaft “1”
   • Intake camshaft “2”



a. Turn the crankshaft counterclockwise with a wrench.

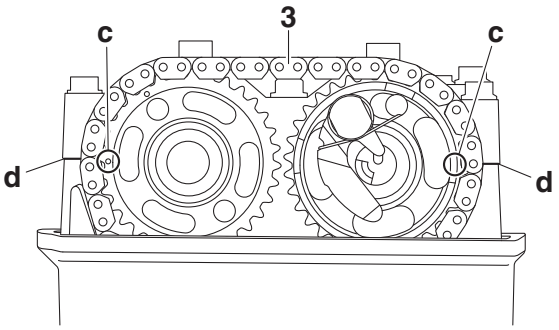
TIP
- Apply molybdenum disulfide oil to the camshafts.
- Apply the engine oil on the decompression system.

b. Align the top dead center (TDC) mark "a" on the generator rotor with the alignment mark "b" on the crankcase cover.



c. Fit the timing chain "3" onto both camshaft sprockets and install the camshafts on the cylinder head.

TIP
Check that the alignment marks "c" on the camshaft sprockets are aligned with the edge of the camshaft cap surfaces "d".



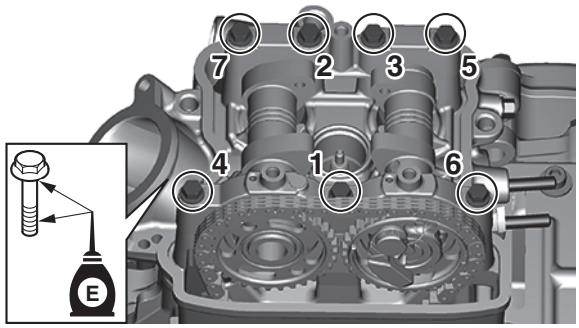
ECA24620
NOTICE
Do not turn the crankshaft during the camshaft installation. Damage or improper valve timing will result.

d. 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)**

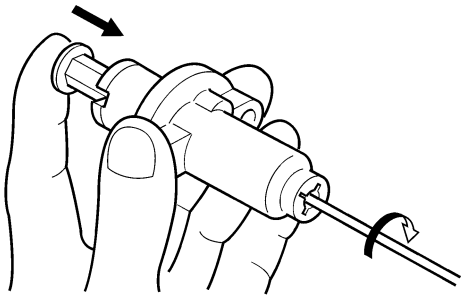
TIP
- Before installing the clips, cover the cylinder head with a clean cloth to prevent the clips from coming off into the cylinder head cavity.
- Apply the engine oil to the threads and contact surfaces.
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

ECA24630
NOTICE
The bolts (camshaft cap) must be tightened evenly, or damage to the cylinder head, camshaft caps, and camshaft will result.



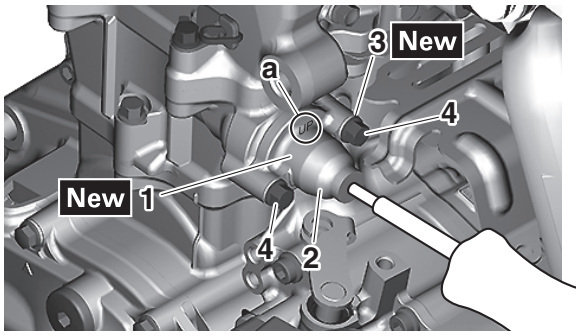
2. Install:
- Timing chain tensioner

a. While pressing the tensioner rod lightly with your fingers, use a thin screwdriver to wind the tensioner rod up fully clockwise.



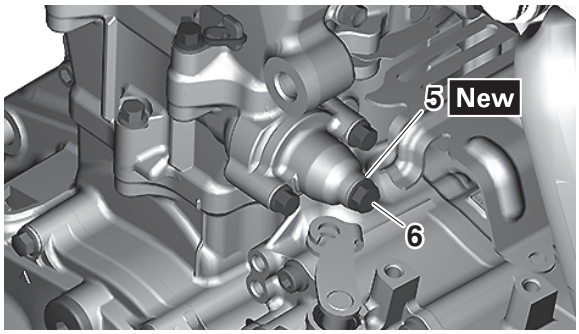
b. With the tensioner rod fully wound and the chain tensioner "UP" mark "a" facing upward, install the gasket "1", the timing chain tensioner "2", and the gasket "3", and tighten the bolts "4".

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".

Timing chain tensioner cap bolt
6 N·m (0.6 kgf·m, 4.4 lb·ft)

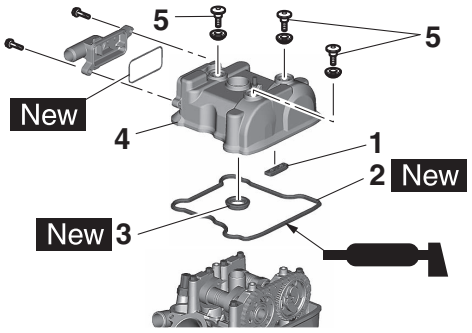


3. Turn:
   • Crankshaft
   Counterclockwise several turns.
4. Check:
   • Top dead center (TDC) mark on the generator rotor
   Align with the crankcase alignment mark.
   • Camshaft match marks
   Align with the cylinder head surface.
   Out of alignment → Adjust.
5. Install:
   • Timing chain guide (top side) "1"
   • Cylinder head cover gasket "2" New
   • Gasket (spark plug hole) "3" New
   • Cylinder head cover "4"
   • Bolt (cylinder head cover) "5"

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.

Yamaha bond No. 1215
90890-85505
Three bond No. 1215®



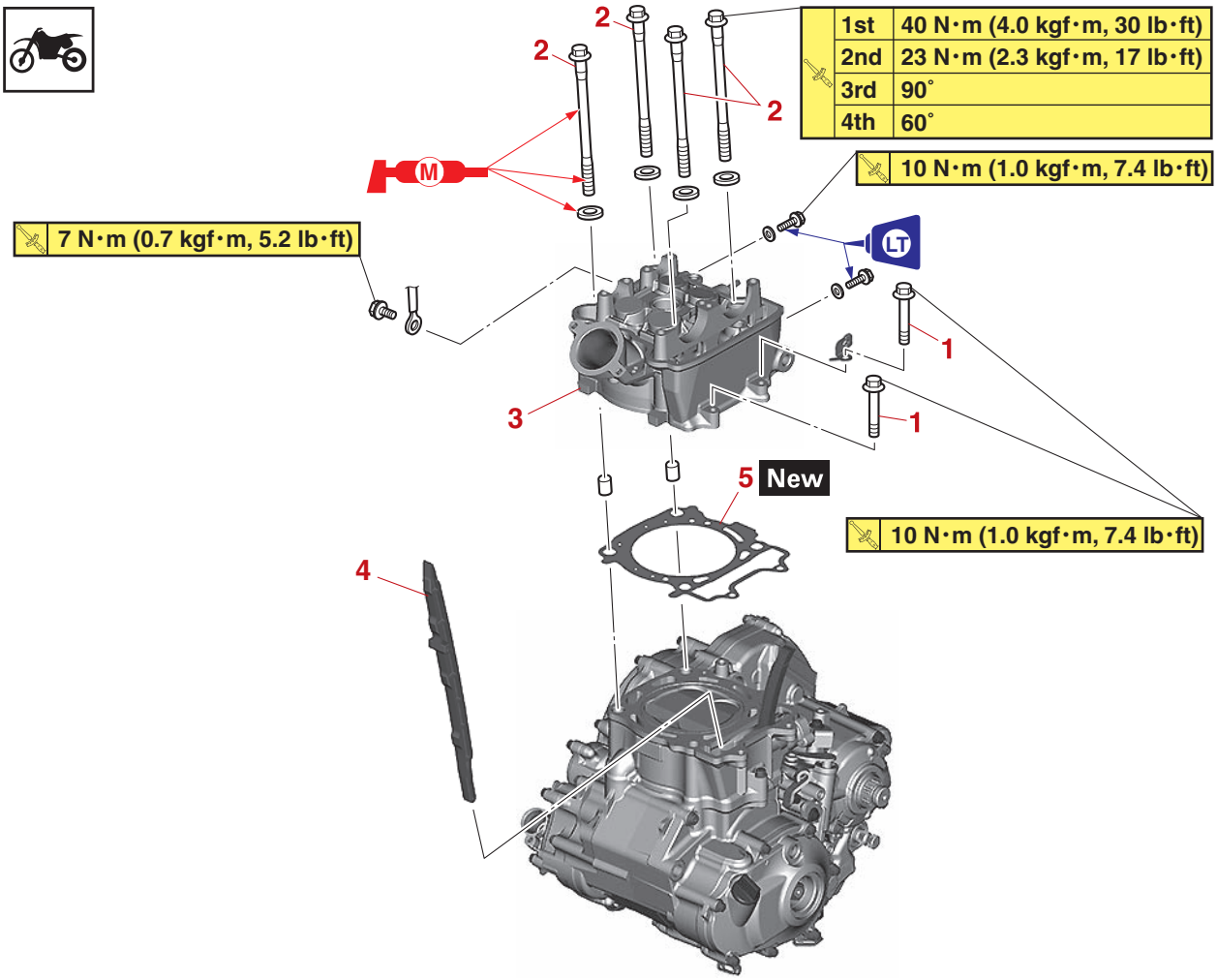
6. Install:
   • Cylinder head breather hose
   • Spark plug

Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

EAM20107

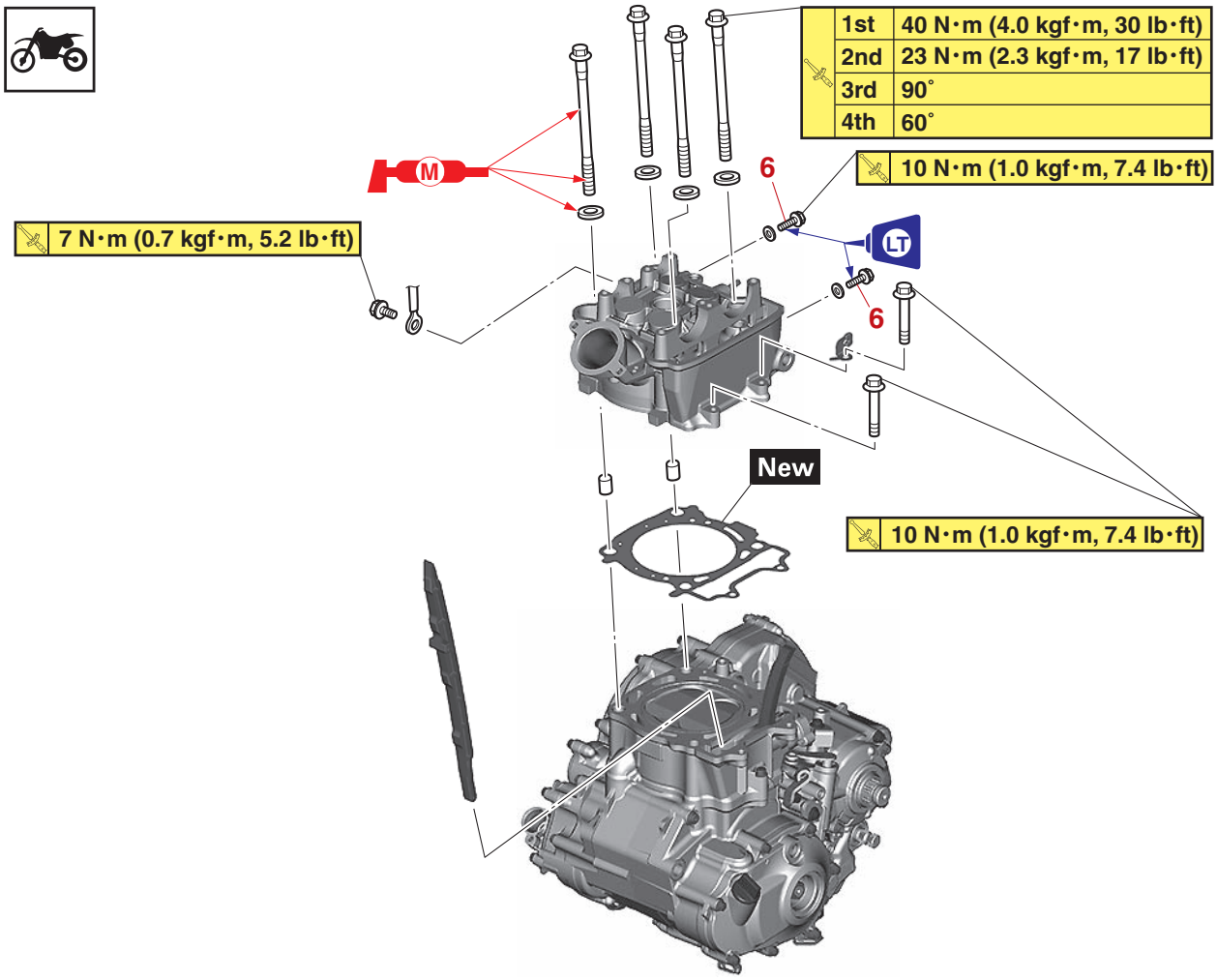
CYLINDER HEAD

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/Silencer		Refer to "ENGINE REMOVAL" on page 5-6.
	Radiator hose		Disconnect.
	Coolant temperature sensor coupler		Disconnect.
	Throttle body		Refer to "THROTTLE BODY" on page 7-4.
	Camshaft		Refer to "CAMSHAFT" on page 5-13.
	Upper engine bracket		Refer to "ENGINE REMOVAL" on page 5-6.
1	Bolt (cylinder head)	2	
2	Bolt (cylinder head)	4	
3	Cylinder head	1	
4	Timing chain guide (intake side)	1	
5	Cylinder head gasket	1	

Removing the cylinder head



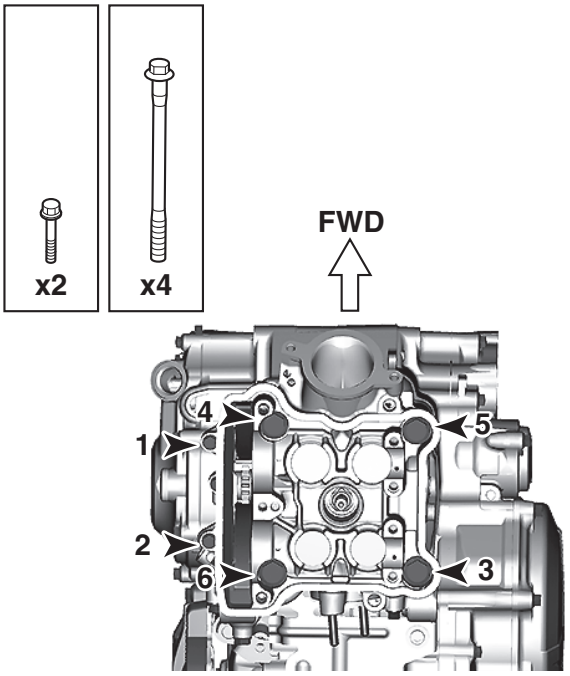
Order	Job/Parts to remove	Q'ty	Remarks
6	Oil passage plug	2	

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): [3], [4], [5], [6]



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.

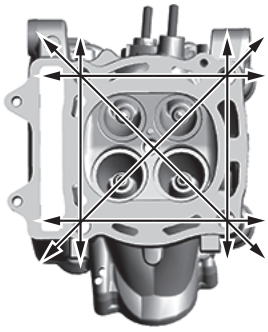
TIP
When replacing the cylinder head, replace also the valve.
Refer to "CHECKING THE VALVE SEATS" on page 5-28.

   • 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)**

   a. Place a straightedge and a thickness gauge across the cylinder head.
   b. Measure the warpage.
   c. If the limit is exceeded, resurface the cylinder head as follows.
   d. Place a 400–600 grit wet sandpaper on a surface plate, and resurface the cylinder head using a figure-eight sanding pattern.

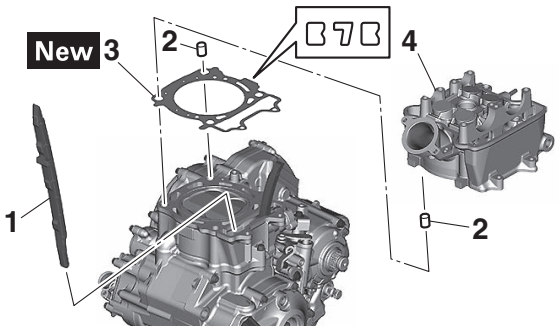
TIP
To ensure an even surface, turn the cylinder head several times.



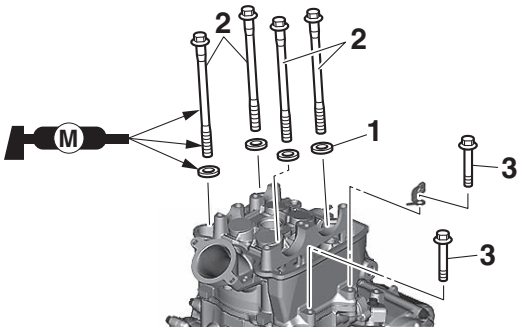
EAM30089
INSTALLING THE CYLINDER HEAD

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.
- Install the cylinder head gasket as shown in the illustration.



2. Install:
   - Washer “1”
   - Bolt “2”
   - Bolt “3”

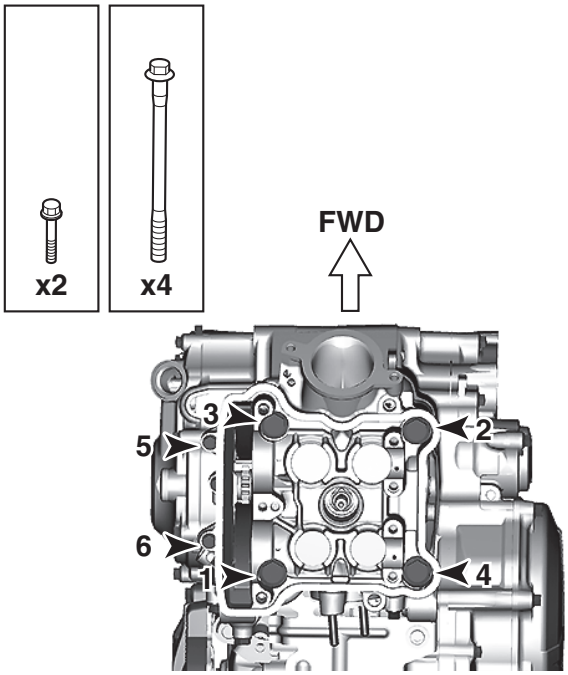


TIP

Tighten the bolts using the following procedure.

a. 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.
b. Apply molybdenum disulfide grease to the threads and contact surfaces of the bolts and to both contact surfaces of the washers.
c. Install the washers and the bolts.
d. Install the bolts in the tightening sequence shown until the bolt and washer are lightly seated against the cylinder head.
e. 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)



f. Loosen the bolt [1].

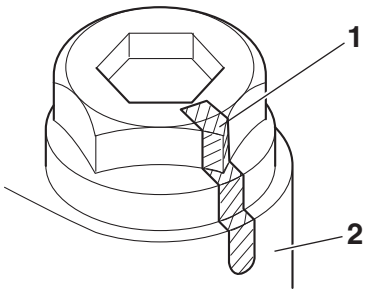
TIP

Loosen the bolt [1] only without loosening any other bolt.

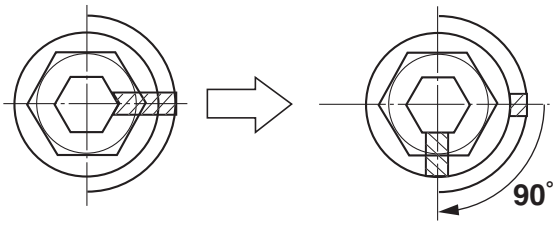
g. Again apply molybdenum disulfide grease to the thread and contact surface of the bolts and to both contact surface of the washer.
h. Retighten the bolt.

Bolt [1]
2nd
23 N·m (2.3 kgf·m, 17 lb·ft)

i. Put a mark on the corner “1” of the bolt (cylinder head) and the cylinder head “2” as shown.



j. Retighten the bolt (cylinder head) in the proper tightening sequence.



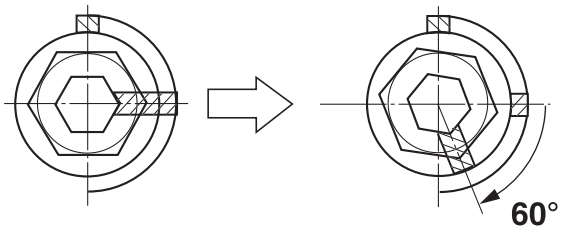
Bolt [1]
3rd
Specified angle
90°

k. Perform the same procedure with the bolts [2]–[4] one by one and applying the tightening sequence (f)–(j) as shown for the bolt [1].

TIP
Do not loosen any other bolt until one bolt is completely tightened.

Bolt [2]–[4]
2nd
23 N·m (2.3 kgf·m, 17 lb·ft)
3rd
Specified angle
90°

l. Put a mark on the corner of the bolt (cylinder head) and the cylinder head.
m. Retighten the bolt (cylinder head) in the proper tightening sequence.



Final
Specified angle
60°

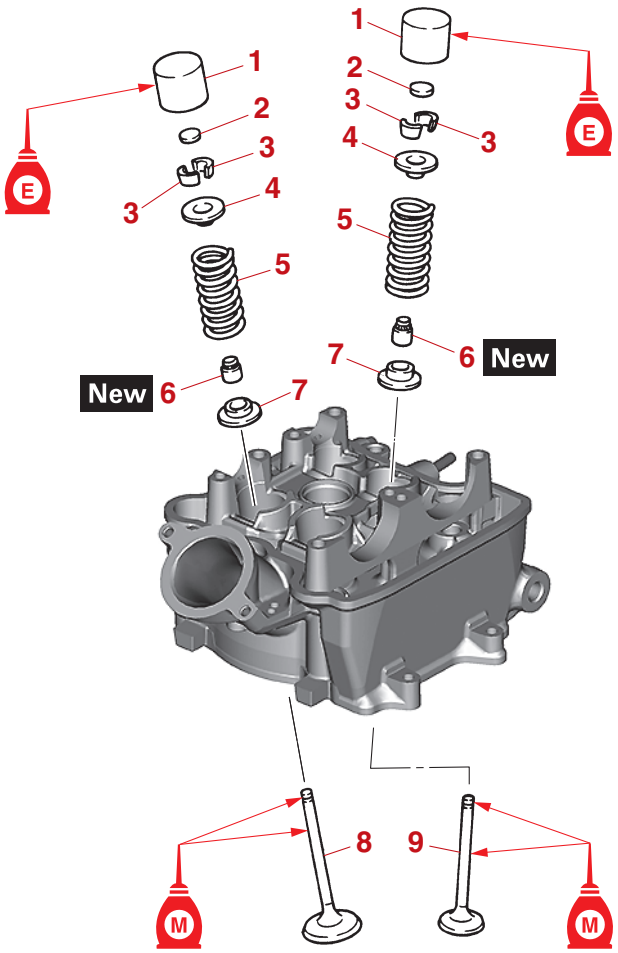
n. Tighten the bolts to the specified torque.

Bolt [5], [6]
10 N·m (1.0 kgf·m, 7.4 lb·ft)

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 5-20.
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	

EAM30090
REMOVING THE VALVES

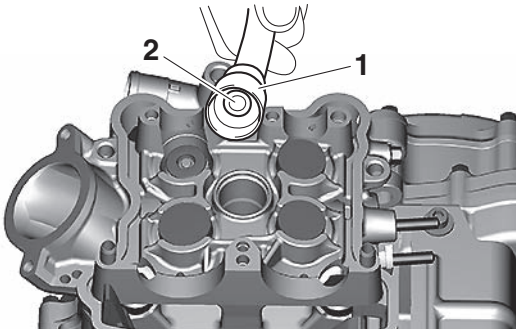
TIP
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves are properly sealed.

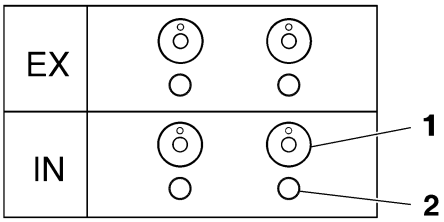
1. Remove:
   • Valve lifter "1"
   • Adjusting pad "2"

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.



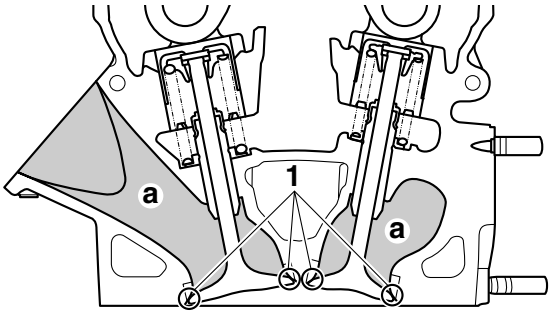
Valve lapper (ø14)
90890-04101
Valve lapper (ø14)
YM-A8998





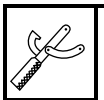
2. Check:
   • Valve sealing
   Leakage at the valve seat → Check the valve face, the valve seat, and the valve seat contact width.
   Refer to "CHECKING THE VALVE SEATS" on page 5-28.
   a. Pour a clean solvent "a" into the intake and exhaust ports.
   b. Check that the valves are properly sealed.

TIP
Check that there are no kerosene leaks from the valve seat "1".

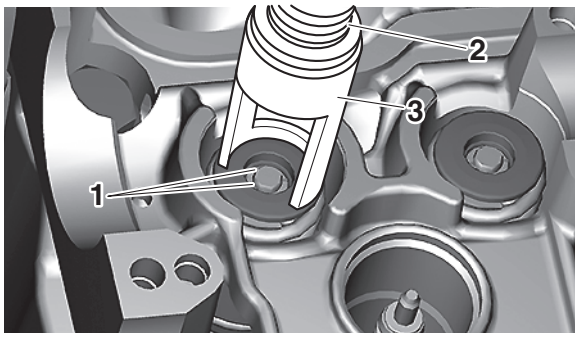


3. Remove:
   • Valve cotter "1"

TIP
Remove the valve cotters by compressing the valve spring with the valve spring compressor "2" and the valve spring compressor attachment "3".

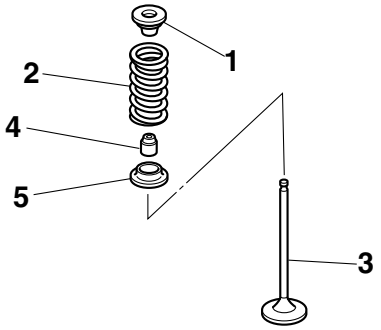


Valve spring compressor
90890-04200
Valve spring compressor
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



4. Remove:
   • Valve spring retainer "1"
   • Valve spring "2"
   • Valve "3"
   • Valve stem seal "4"
   • Valve spring seat "5"

TIP
Identify the position of each part very carefully so that it can be reinstalled in its original place.



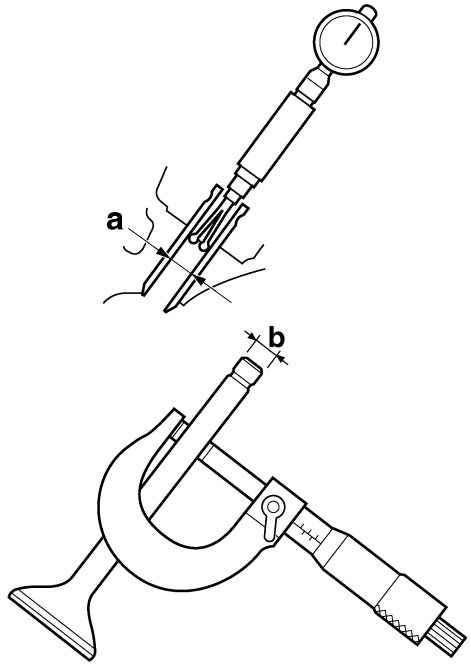
EAM30091

CHECKING THE VALVES AND VALVE GUIDES

1. Measure:
   - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" - Valve stem diameter "b"

Valve-stem-to-valve-guide clearance limit (intake)
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance limit (exhaust)
0.100 mm (0.0039 in)

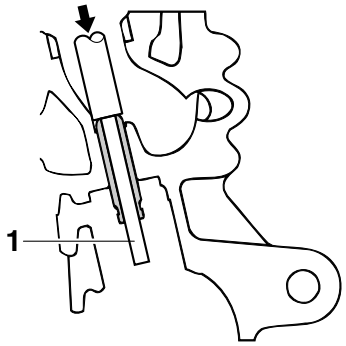


2. Replace:
   - Valve guide

TIP

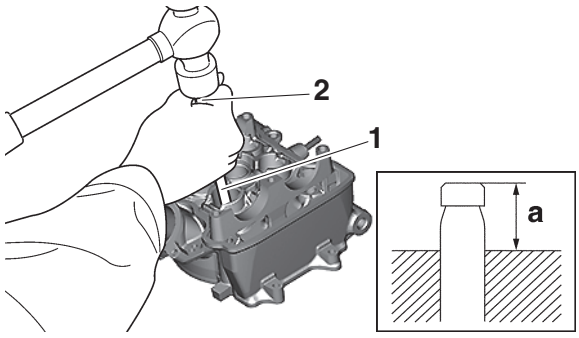
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

a. Remove the valve guide with the valve guide remover "1".

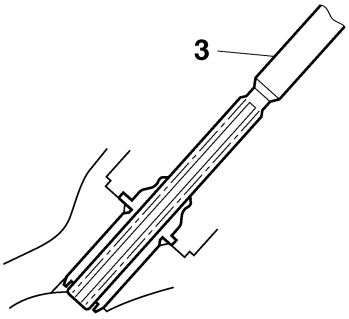


b. Install the new valve guide with the valve guide installer "1" and the valve guide remover "2".

Valve guide installation height "a"
Intake
13.5–13.9 mm (0.53–0.55 in)
Exhaust
12.2–12.6 mm (0.48–0.50 in)



c. After installing the valve guide, expand the hole in the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



TIP

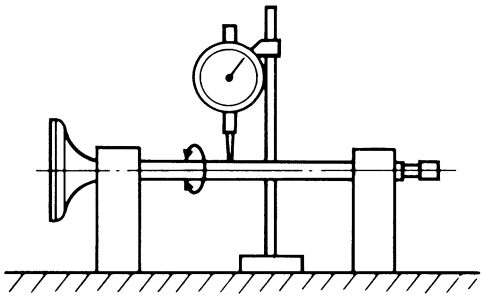
After replacing the valve guide, reface the valve seat.

Valve guide remover & 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.

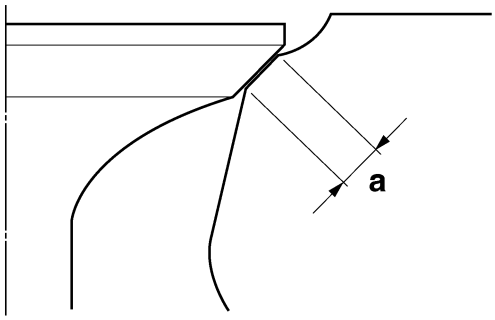
Valve stem runout
0.020 mm (0.0008 in)



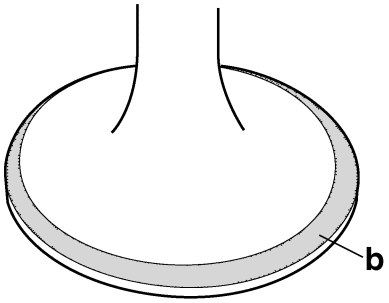
EAM30092
CHECKING THE VALVE SEATS

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 limit (intake)
1.5 mm (0.06 in)
Valve seat contact width limit (exhaust)
1.5 mm (0.06 in)

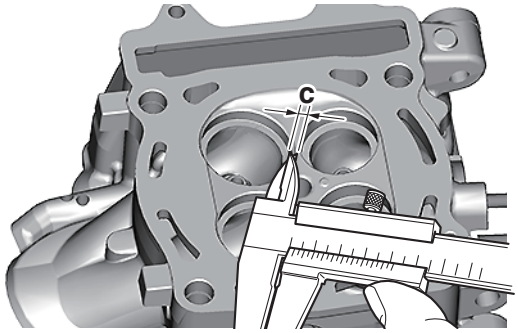


a. Apply blue layout fluid “b” onto the valve face.



b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
d. Measure the valve seat contact width “c”.

TIP
Where the valve seat and the valve face are in contact with each other, the blueing will have been removed.



4. Lap:
   • Valve face
   • Valve seat

ECA24640

NOTICE

This model uses titanium intake and exhaust valves.
Do not use the valves used for lapping the valve seat. Always replace the valves used for lapping with new ones.

TIP

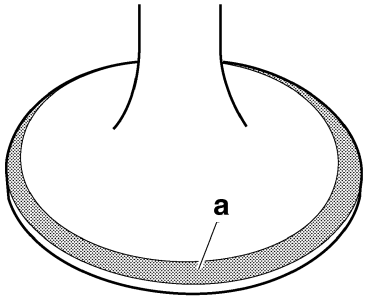
- When replacing the cylinder head, replace also the valves with new ones without them.
- When replacing the valves or the valve guides, use new valves to lap the valve seats, and then replace them with new valves.

a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

NOTICE

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

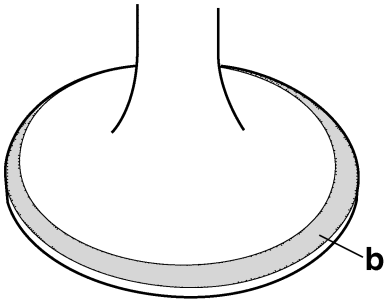


b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and the valve seat are evenly polished, then clean off all of the lapping compound.

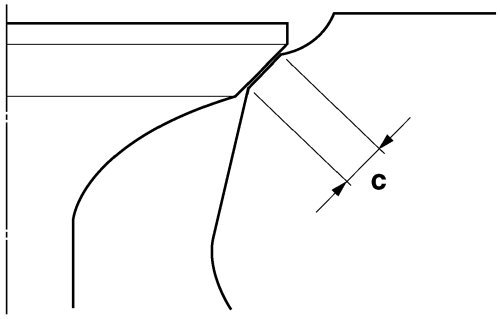
TIP

While turning the valve lapper, tap and lap the valve seat.

e. Apply a fine lapping compound to the valve face, and repeat the above steps.
f. After every lapping step, be sure to clean off all of the lapping compound from the valve face and the valve seat.
g. Apply blue layout fluid “b” onto the valve face.



h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat contact width “c” again. If the valve seat contact width is out of specification, reface and lap the valve seat.

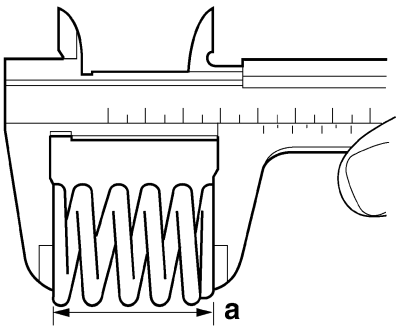


EAM30093

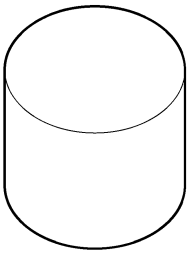
CHECKING THE VALVE SPRINGS

1. Measure:
   • Valve spring free length “a”
   Out of specification → Replace the valve spring.

Free length limit (intake)
36.65 mm (1.44 in)
Free length limit (exhaust)
35.55 mm (1.40 in)

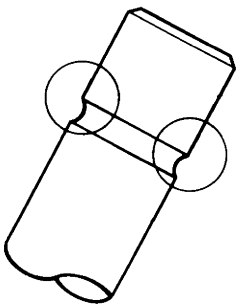


EAM30094
CHECKING THE VALVE LIFTERS
1. Check:
   • Valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.



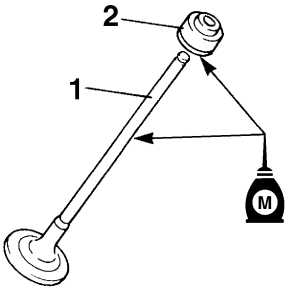
I1170701

EAM30095
INSTALLING THE VALVES
1. Clean:
   • Valve stem end



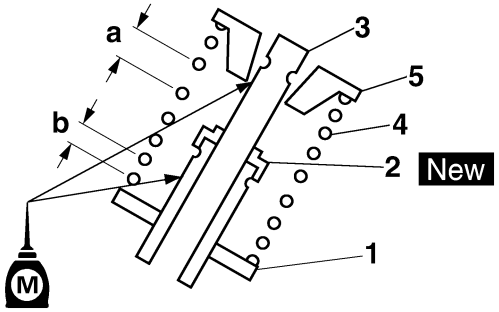
2. Lubricate:
   • Valve stem “1”
   • Valve stem seal “2”

	Recommended lubricant **Molybdenum disulfide oil**



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.

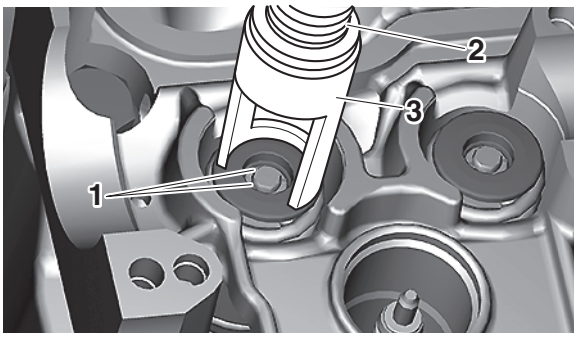


b. Smaller pitch

4. Install:
   • Valve cotter “1”

TIP
Install the valve cotters by compressing the valve spring with the valve spring compressor “2” and the valve spring compressor attachment “3”.

	Valve spring compressor **90890-04200** **Valve spring compressor** **YM-04019** **Valve spring compressor attachment** **90890-04108** **Valve spring compressor adapter 22 mm** **YM-04108**

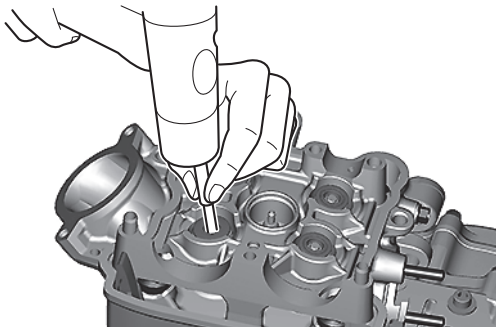


5. To fasten the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

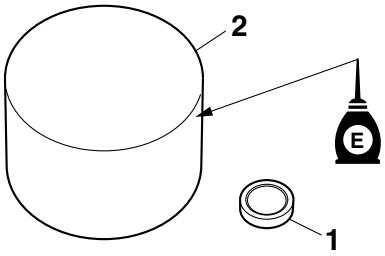
ECA13800

NOTICE

Hitting the valve tip with excessive force could damage the valve.



6. Lubricate:
   - Adjusting pad “1”
   - Valve lifter “2”



7. Install:
   - Adjusting pad
   - Valve lifter

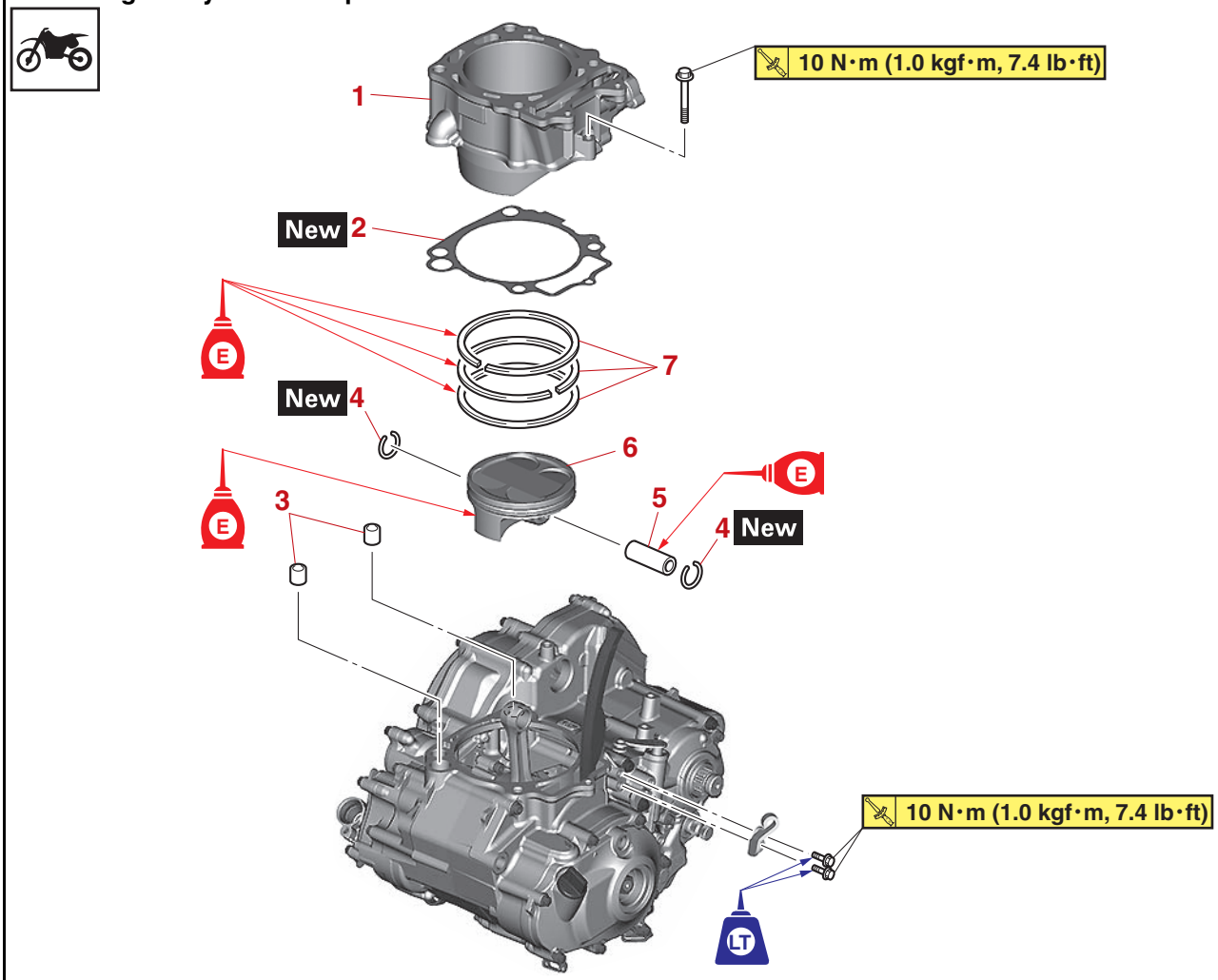
TIP

- 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.

EAM20109

CYLINDER AND PISTON

Removing the cylinder and piston



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-20.
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	

EAM30096
REMOVING THE PISTON

1. Remove:
   - Piston pin clip “1”
   - Piston pin “2”
   - Piston “3”

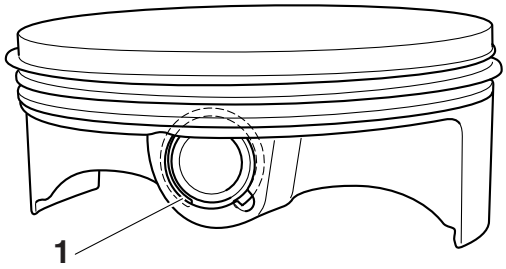
ECA13810
NOTICE

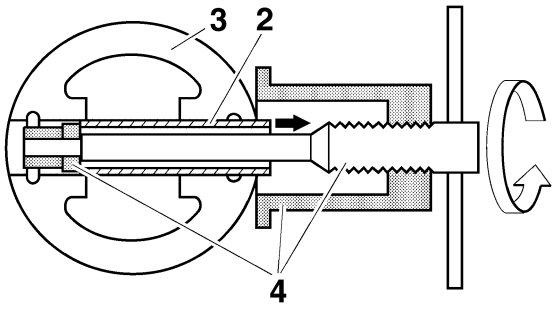
Do not use a hammer to drive the piston pin out.

TIP
- Before removing the piston pin clip, cover the crankcase opening with a cloth to prevent the piston pin clip from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip’s groove and the piston pin’s bore area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller set “4”.



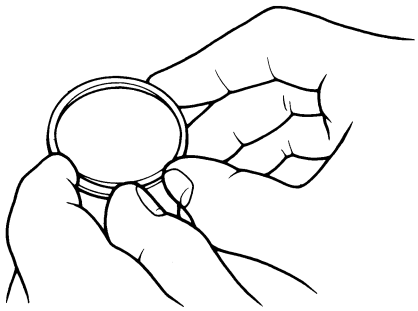
Piston pin puller set
90890-01304
Piston pin puller
YU-01304





2. Remove:
   - Top ring
   - 2nd ring
   - Oil ring

TIP
When removing a piston ring, open the end gap with your fingers and lift the opposite end gap of the piston ring over the piston crown.



EAM30097
CHECKING THE CYLINDER AND PISTON

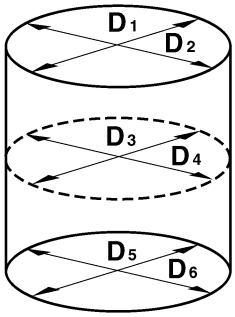
1. Check:
   - Piston wall (Sidewall)
   - Cylinder wall
     Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance
     a. Measure the cylinder bore “C” with the cylinder bore gauge.

TIP
Measure the cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder.



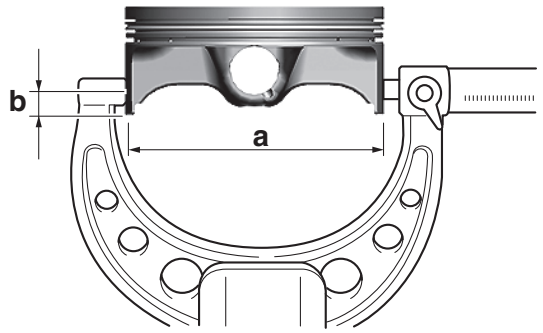
Bore
97.000–97.010 mm (3.8189–3.8193 in)
Wear limit
97.060 mm (3.8213 in)

“C” = maximum of D_1, D_2, D_3, D_4, D_5, D_6



   b. If out of specification, rebore or replace the cylinder, and replace the piston and the piston rings as a set.
   c. Measure the piston outside diameter “a” at the measuring point (from piston skirt bottom) “b” with the micrometer.

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)

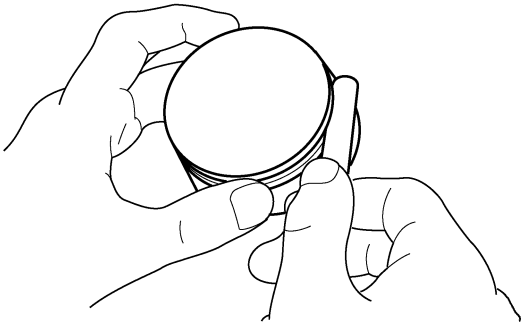
f. If out of specification, replace the cylinder, the piston, and the piston rings as a set.

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)



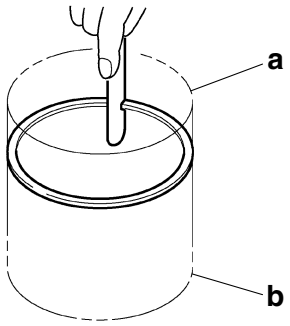
2. Install:
   • Piston ring
   (into the cylinder)

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 the oil ring as a set.

Top ring
End gap limit
0.55 mm (0.0217 in)
2nd ring
End gap limit
0.85 mm (0.0335 in)



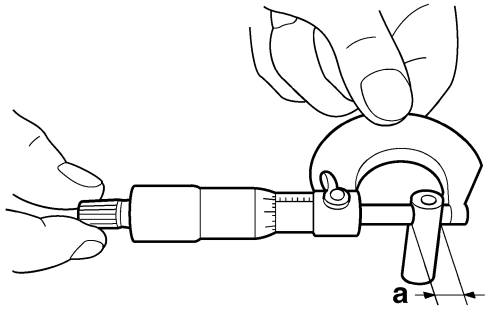
b. Upper of cylinder

EAM30099

CHECKING THE PISTON PIN

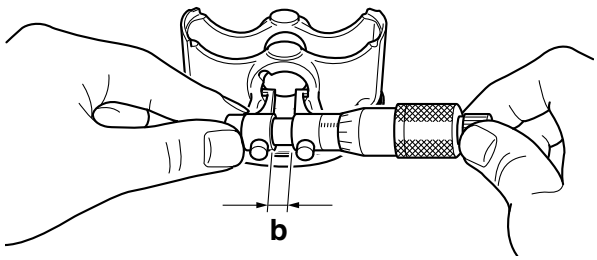
1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

	Piston pin outside diameter 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 limit **18.045 mm (0.7104 in)**



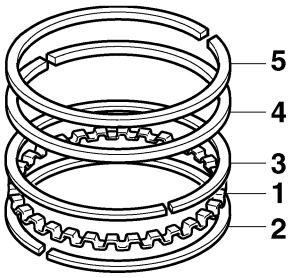
EAM30100

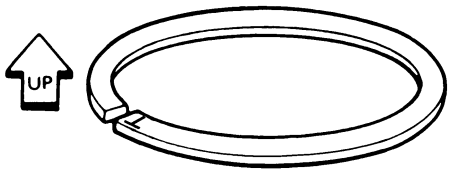
INSTALLING THE PISTON AND CYLINDER

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.

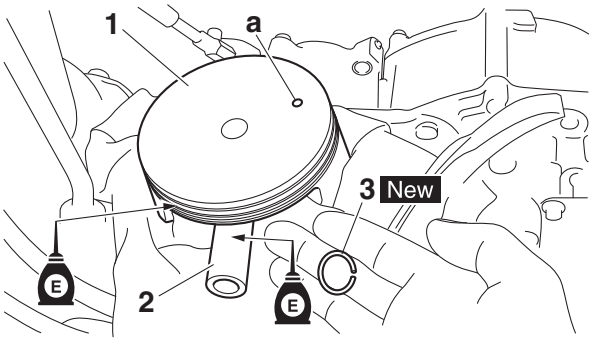


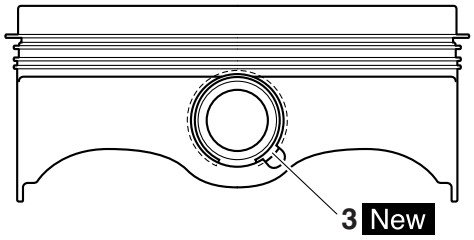


2. Install:
   - Piston "1"
   - Piston pin "2"
   - Piston pin clip "3" New

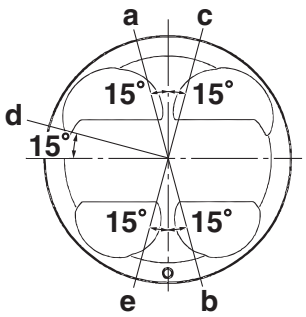
TIP

- Apply the engine 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.





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:
   • Gasket New
   • Dowel pin
   • Cylinder

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

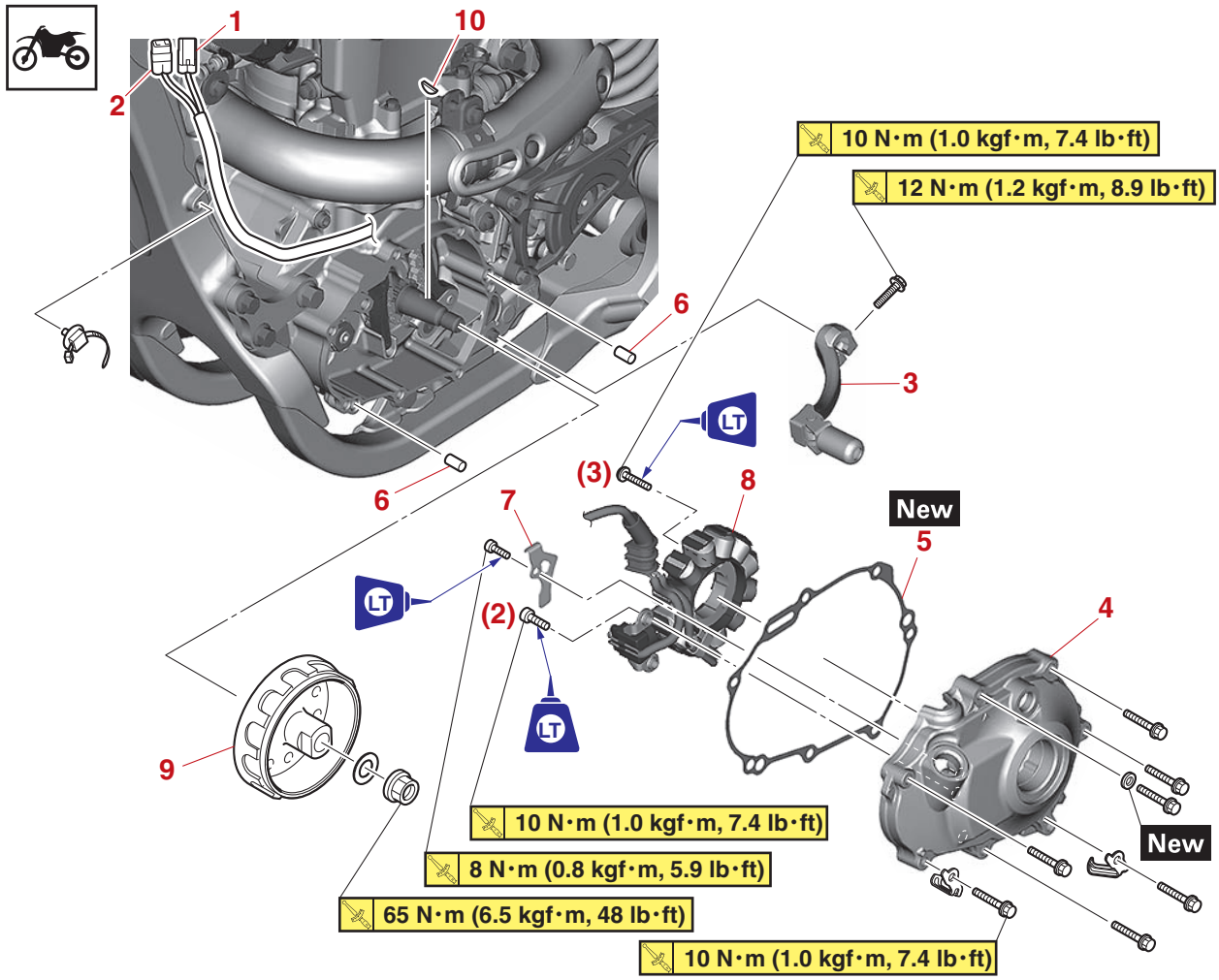
TIP
• While compressing the piston rings with one hand, install the cylinder with the other hand.

• Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

EAM20183

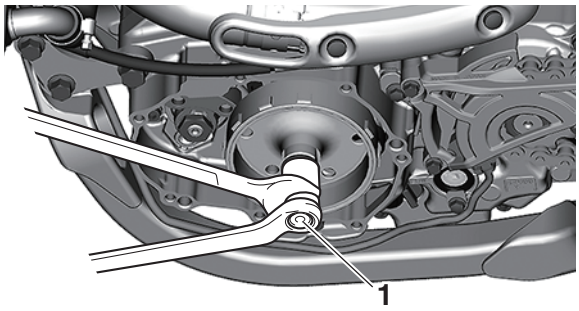
GENERATOR

Removing the stator coil assembly



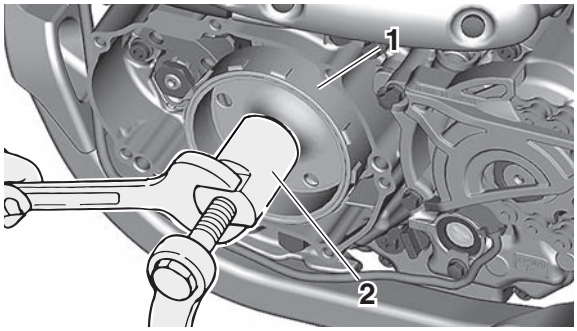
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left)		Refer to "GENERAL CHASSIS" on page 4-1.
1	Stator coil assembly coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Shift pedal	1	
4	Crankcase cover (left)	1	
5	Gasket	1	
6	Dowel pin	2	
7	Holder	1	
8	Stator coil assembly	1	
9	Generator rotor	1	
10	Woodruff key	1	

EAM30487
REMOVING THE GENERATOR
1. Remove:
   • Nut (generator rotor) “1”
   • Washer

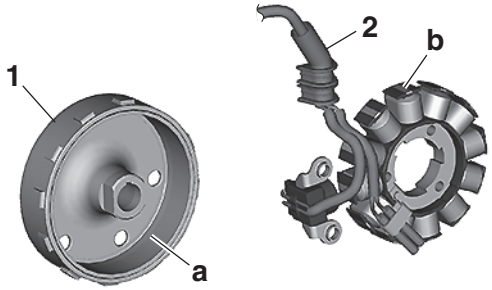


2. Remove:
   • Generator rotor “1”
   (with the rotor puller “2”)
   • Woodruff key

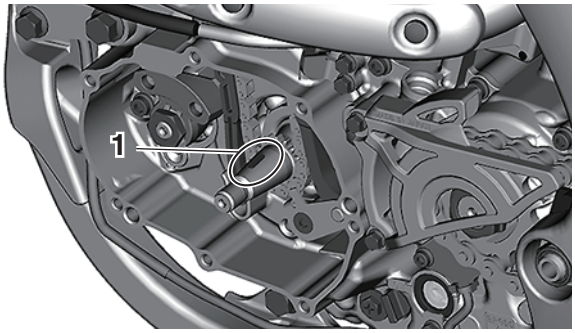
Rotor puller
90890-04151
Rotor puller
YM-04151



EAM30488
CHECKING THE GENERATOR
1. Check:
   • Generator rotor “1” inner surface “a”
   • Stator coil assembly “2” outer surface “b”
   Damage → Inspect the crankshaft runout and crankshaft bearing.



EAM30377
CHECKING THE WOODRUFF KEY
1. Check:
   • Woodruff key “1”
   Damage → Replace.



EAM30489
INSTALLING THE GENERATOR
1. Install:
   • Stator coil assembly “1”
   • Screw (stator coil assembly) “2”

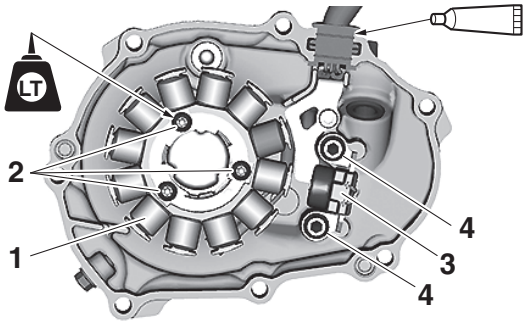
Screw (stator coil assembly)
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

   • 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®
Bolt (holder)
8 N·m (0.8 kgf·m, 5.9 lb·ft)
LOCTITE®

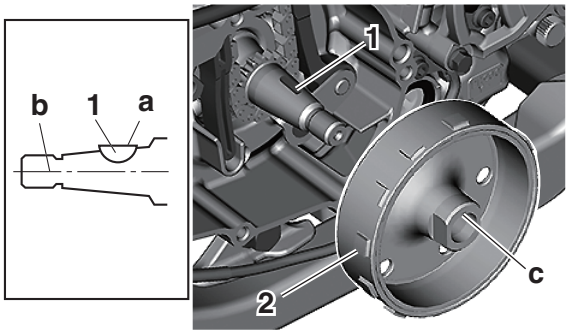
TIP
- Apply the sealant to the grommet of the stator coil assembly lead.
- Tighten the stator coil assembly screws using the T25 bit.
- Pass the stator coil assembly lead through the crankcase cover side.

Yamaha bond No. 1215
90890-85505
Three bond No. 1215®



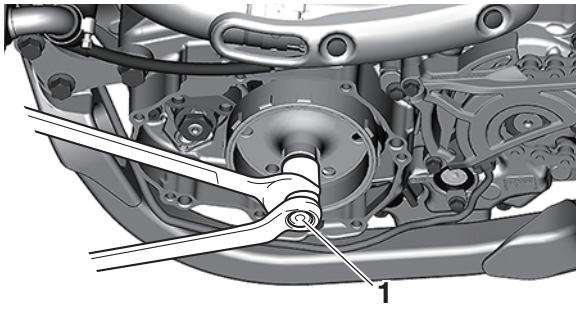
2. Install:
   • Woodruff key “1”
   • Generator rotor “2”

TIP
- Clean the contact surfaces of the tapered portions of the crankshaft and generator 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 generator rotor, align the keyway “c” of the generator rotor with the woodruff key.



3. Install:
   • Washer
   • Nut (generator rotor) “1”

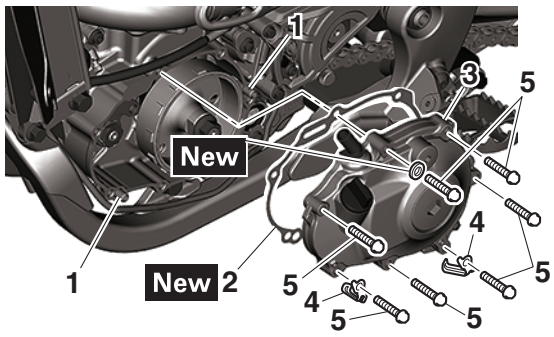
	Nut (generator rotor) **65 N·m (6.5 kgf·m, 48 lb·ft)**



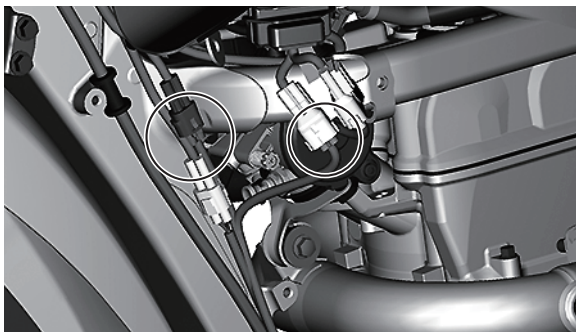
4. Install:
   • Dowel pin “1”
   • Gasket (left crankcase cover) “2” New
   • Crankcase cover (left) “3”
   • Lead holder “4”
   • Bolt (left crankcase cover) “5”

	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.



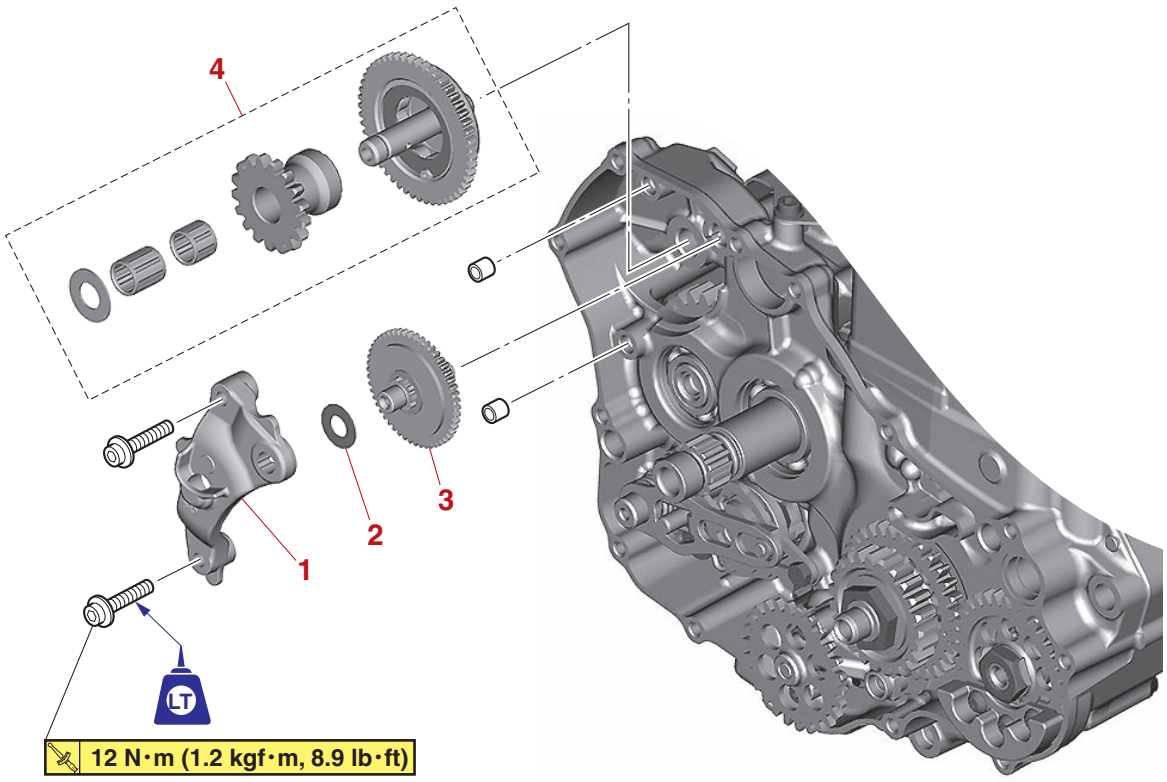
5. Connect:
   • Stator coil assembly lead
   Refer to “CABLE ROUTING DIAGRAM” on page 2-17.



EAM20175

STARTER CLUTCH

Removing the starter clutch



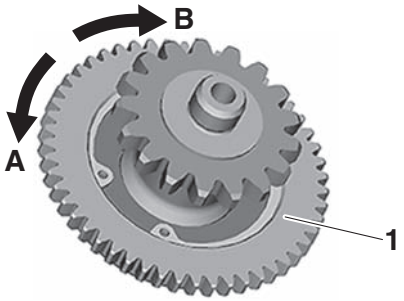
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Clutch		Refer to "CLUTCH" on page 5-46.
1	Holder	1	
2	Washer	1	
3	Damper assembly	1	
4	Starter clutch assembly	1	

EAM30140
CHECKING THE STARTER CLUTCH

1. Check:
   - Starter clutch assembly
   - Starter clutch drive gear
     Burrs/chips/roughness/wear → Replace the starter clutch.

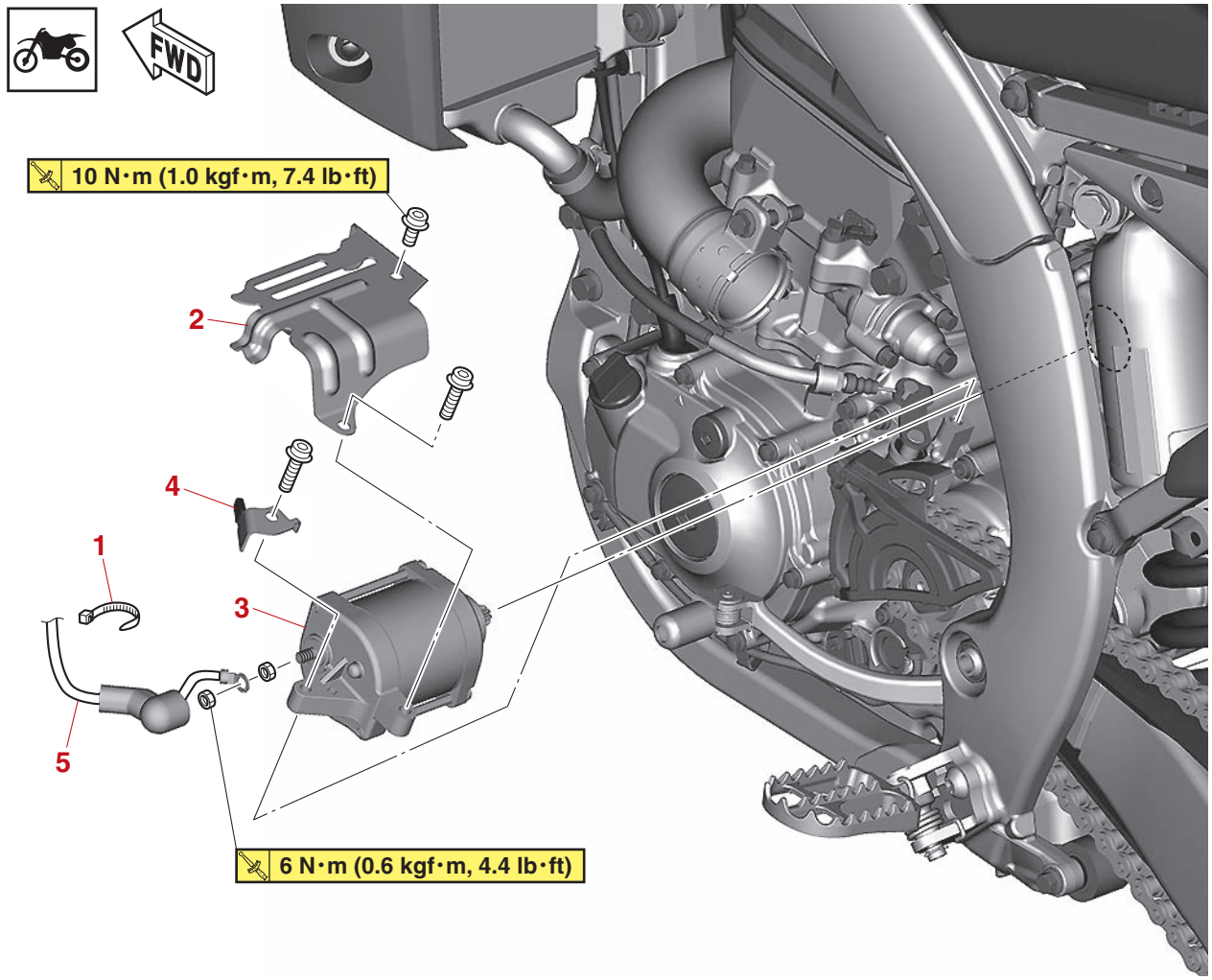


2. Check:
   - Starter clutch assembly gear
     Damage/pitting/wear → Replace the starter clutch assembly.
3. Check:
   - Starter clutch operation
     a. Install the starter clutch drive gear "1" onto the starter clutch and hold the starter clutch.
     b. When turning the starter clutch drive gear counterclockwise "A", it should turn freely, otherwise the starter clutch is faulty and must be replaced.
     c. 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.



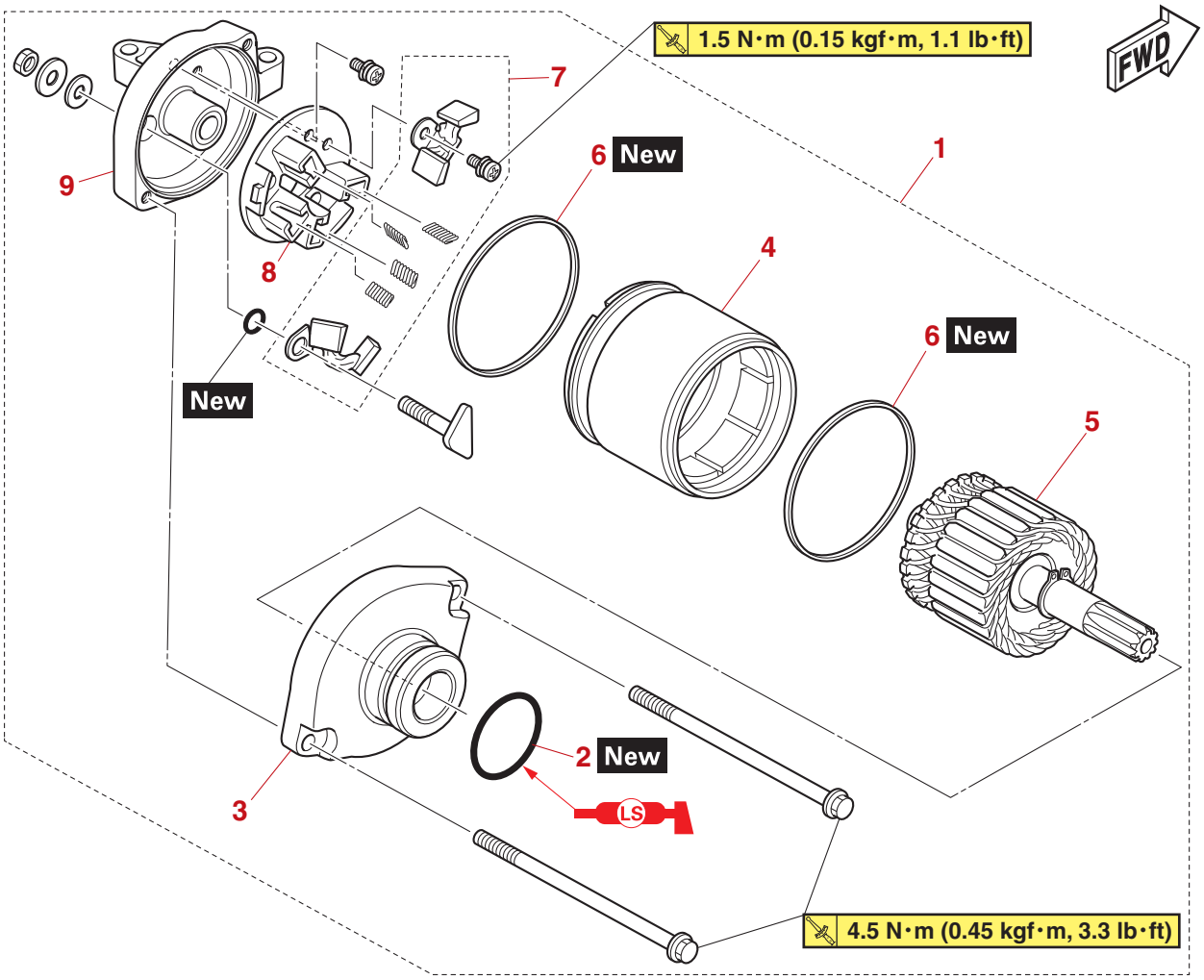
EAM20110
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-6.
1	Plastic locking tie	1	
2	Starter motor cover (upper)	1	
3	Starter motor	1	
4	Starter motor cover (lower)	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



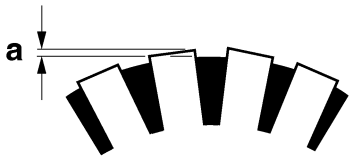
Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor assembly	1	
2	O-ring	1	
3	Starter motor front cover	1	
4	Starter motor yoke	1	
5	Armature assembly	1	
6	Gasket	2	
7	Brush set	1	
8	Brush holder	1	
9	Starter motor rear cover	1	

EAM30106
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600 grit sandpaper.
2. Measure:
   • Mica undercut “a”
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
2.40 mm (0.09 in)

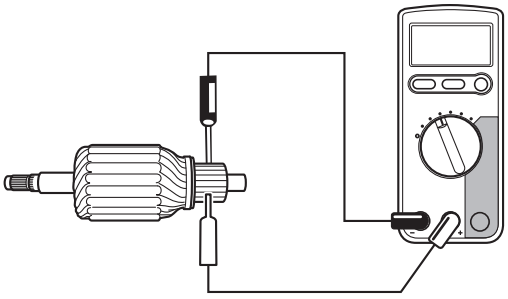
TIP
The mica of the commutator must be undercut to ensure proper operation of the commutator.



3. Check:
   • Armature assembly
   a. Connect the digital circuit tester to the armature coil and check the continuity.

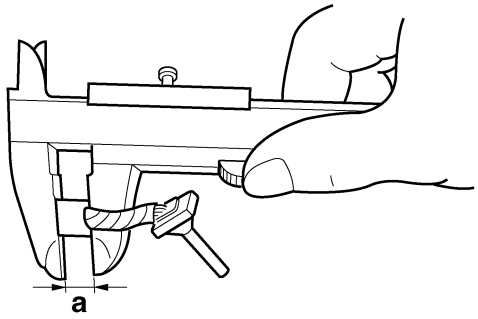
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

   b. If there is no continuity, replace the starter motor.



4. Measure:
   • Brush length “a”
   Out of specification → Replace the brush set.

Brush overall length limit
5.5 mm (0.22 in)



5. Measure:
   • Brush spring force
   Out of specification → Replace the brush set.

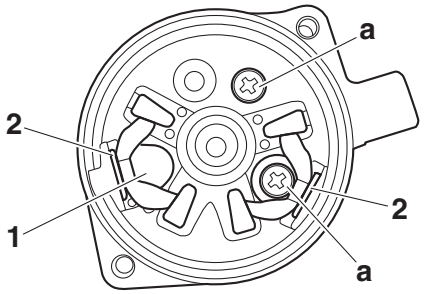
Brush spring force
4.80–7.20 N (489–734 gf, 17.28–25.92 oz)

6. Check:
   • Gear teeth
   Damage/wear → Replace the starter motor.
7. Check:
   • Oil seal
   Damage/wear → Replace the defective part(s).

EAM30107
ASSEMBLING THE STARTER MOTOR

1. Install:
   • Brush spring “1”
   • Brush “2”

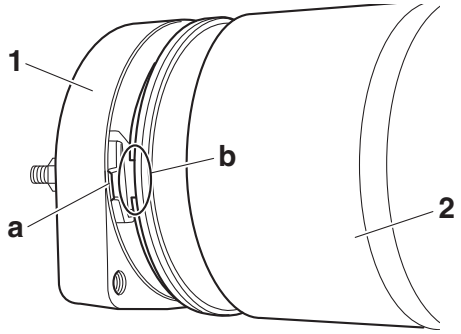
TIP
Install the brush holder using the screws “a”.



2. Install:
   • Starter motor rear cover “1”
   • O-ring New
   • Starter motor yoke “2”

TIP
Install the starter motor rear cover with its projec-

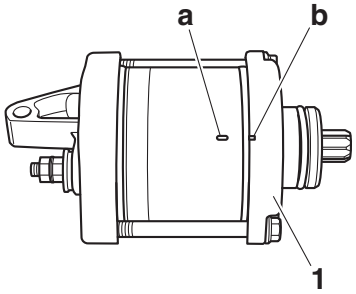
tion “a” facing the groove “b” of the starter motor yoke.



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

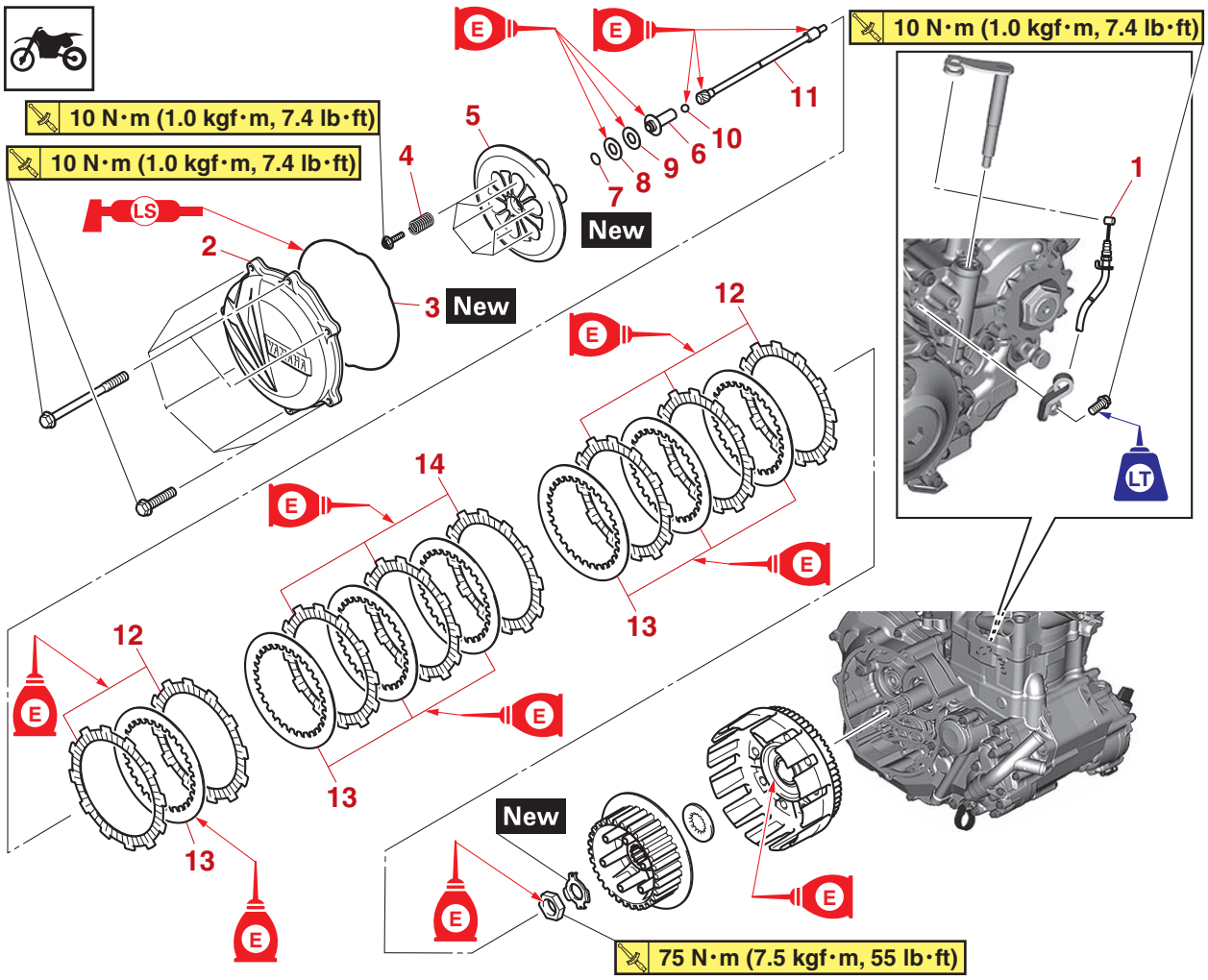
Apply the lithium-soap-based grease on the O-ring.

5. Install:
   - Starter motor
   - Starter motor cover
   - 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)**

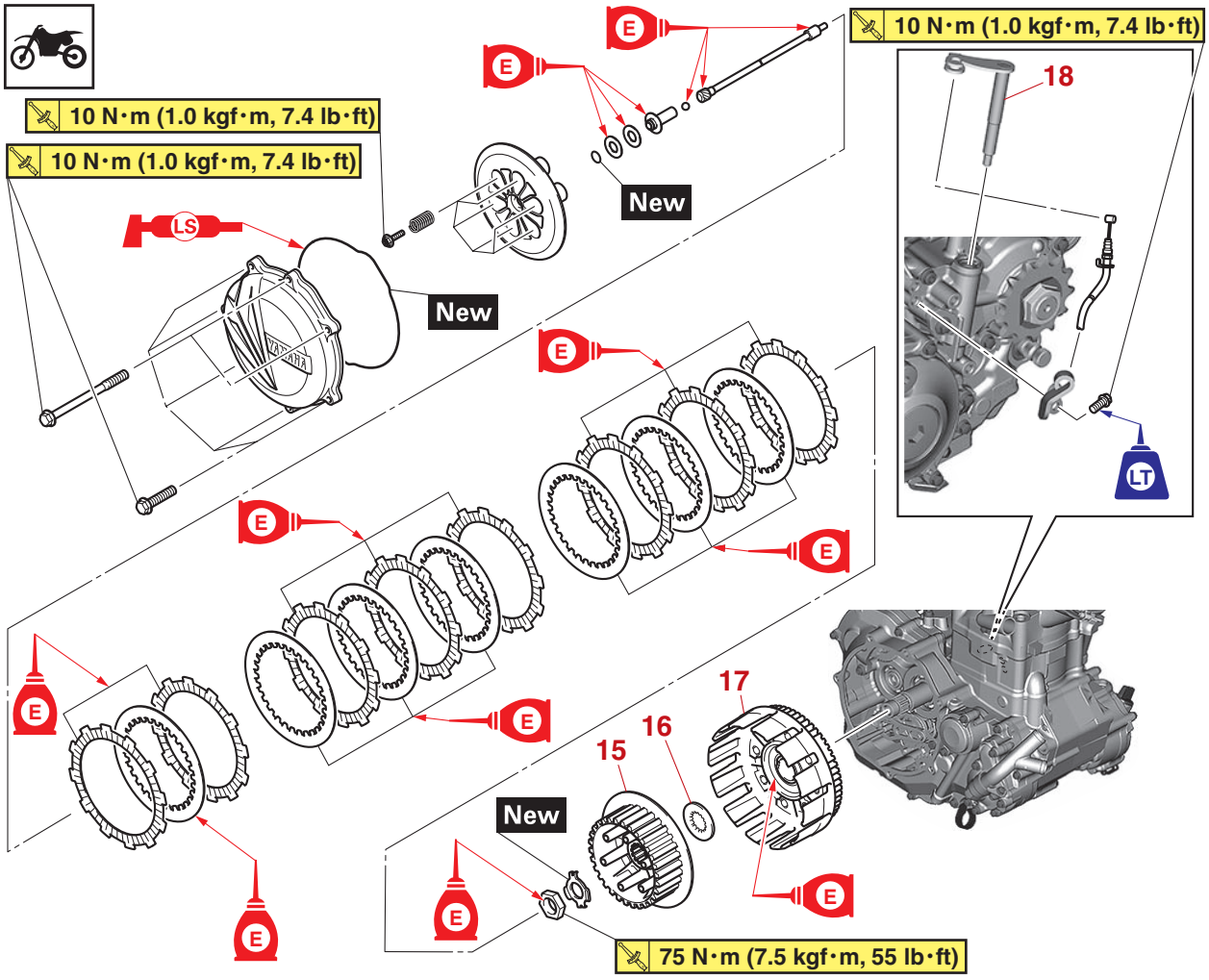
EAM20111
CLUTCH

Removing the clutch



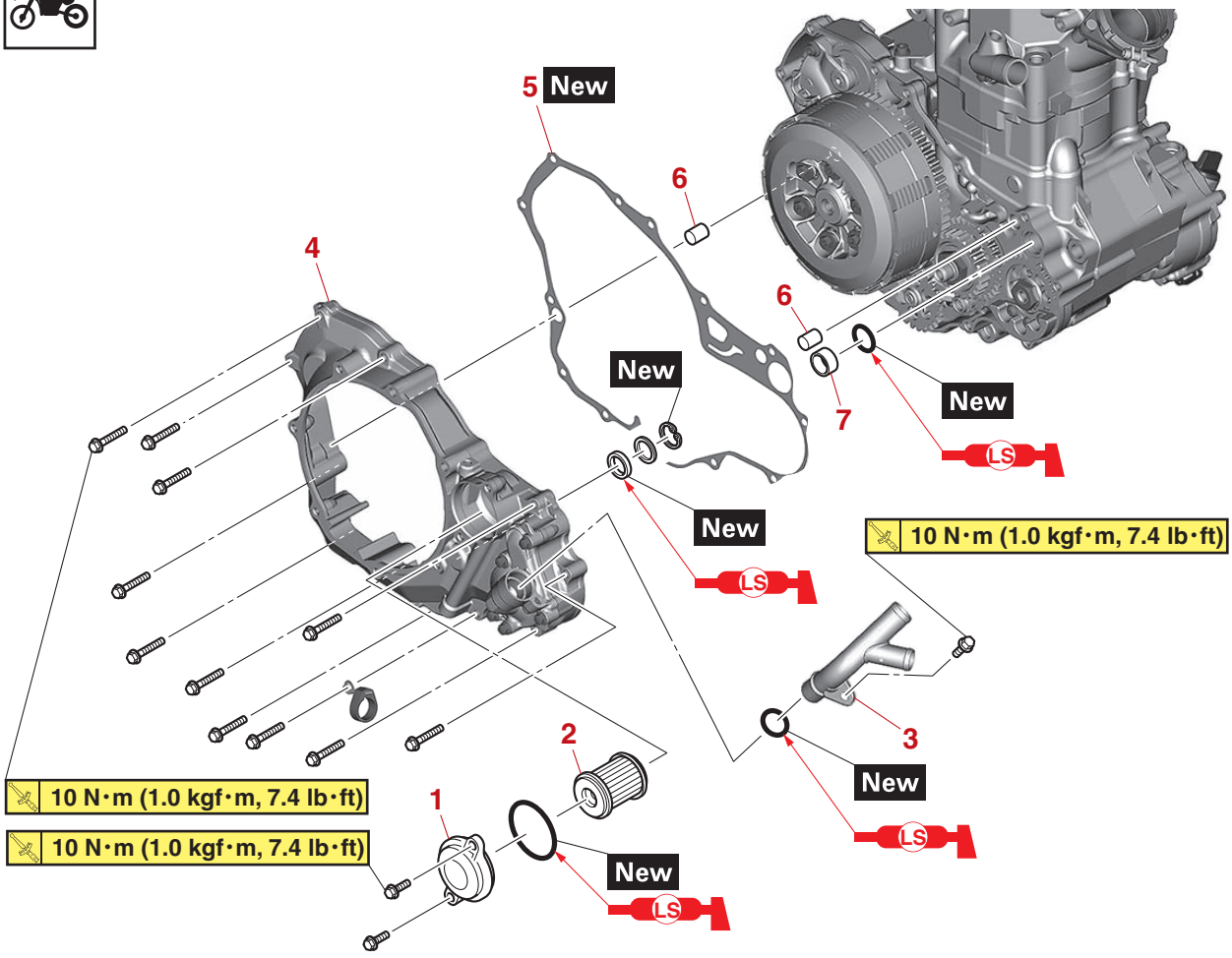
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-6.
1	Clutch cable	1	Disconnect.
2	Clutch cover	1	
3	O-ring	1	
4	Clutch spring	6	
5	Pressure plate	1	
6	Push rod 1	1	
7	Circlip	1	
8	Washer	1	
9	Bearing	1	
10	Ball	1	
11	Push rod 2	1	
12	Friction plate 1	5	Identification color (black)
13	Clutch plate	7	
14	Friction plate 2	3	Identification color (purple)

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
15	Clutch boss	1	
16	Thrust washer	1	
17	Primary driven gear	1	
18	Push lever shaft	1	

Removing the right crankcase cover

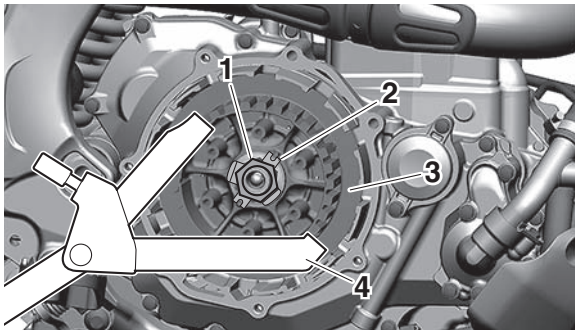


Order	Job/Parts to remove	Q'ty	Remarks
	Right engine guard		Refer to "ENGINE REMOVAL" on page 5-6.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-21.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-6.
	Clutch cover		Refer to "CLUTCH" on page 5-46.
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 clutch holder “4”, loosen the clutch boss nut.

Clutch holder
90890-04199
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)
   Out of specification → Replace the clutch plates as a set.

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

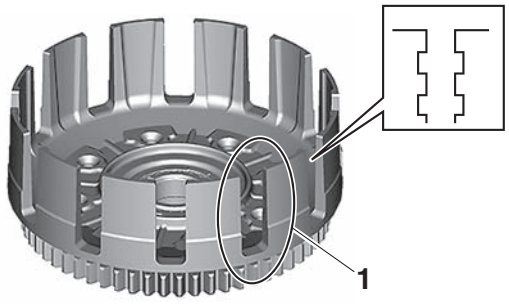
Warpage limit
0.10 mm (0.004 in)

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)
Clutch spring free length limit
45.60 mm (1.80 in)

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.

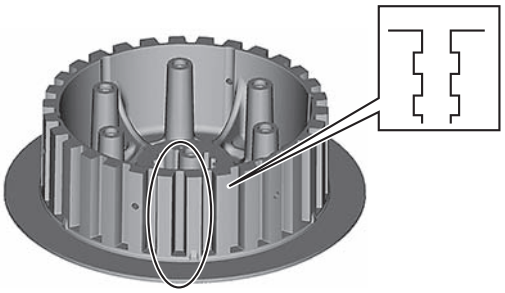


EAM30113
CHECKING THE CLUTCH BOSS
1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch

boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



EAM30114

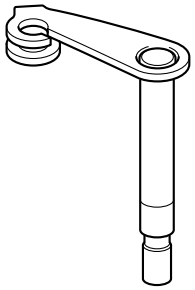
CHECKING THE PRESSURE PLATE

1. Check:
   - Pressure plate
     Crack/damage → Replace.

EAM30115

CHECKING THE PUSH LEVER SHAFT

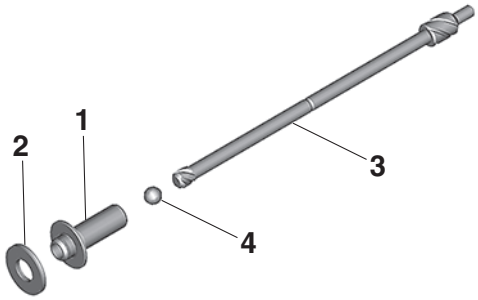
1. Check:
   - Push lever shaft
     Wear/damage → Replace.



EAM30484

CHECKING THE PUSH RODS

1. Check:
   - Push rod 1 “1”
   - Bearing/Washer “2”
   - Push rod 2 “3”
   - Ball “4”
     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.

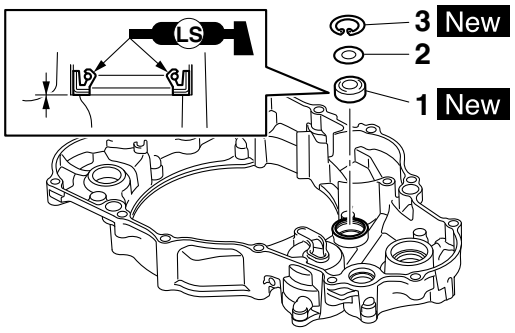
EAM30121

INSTALLING THE CLUTCH

1. Install:
   - Oil seal “1” New
   - Washer “2”
   - Circlip “3” New

TIP

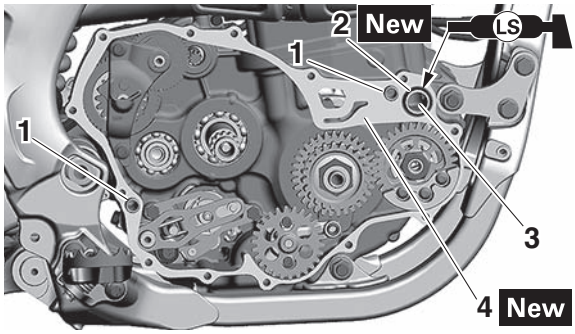
- Apply the lithium-soap-based grease on the oil seal lip.
- Install the oil seal in parallel with its manufacture’s marks or numbers facing inward.



2. Install:
   - Dowel pin “1”
   - O-ring “2” New
   - Collar “3”
   - Gasket “4” New

TIP

Apply the lithium-soap-based grease on the O-ring.

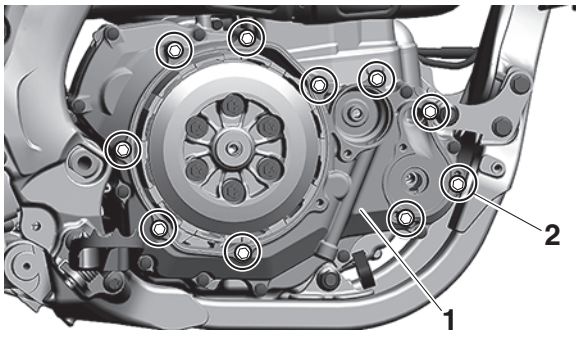


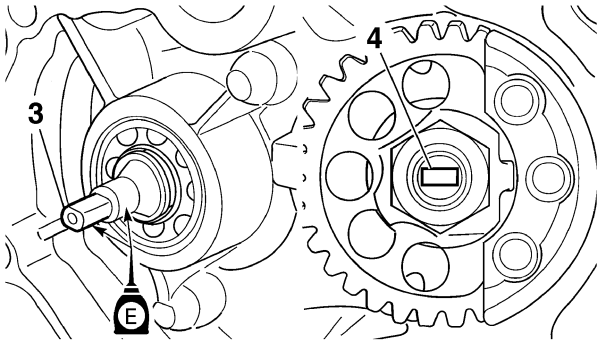
3. Install:
   - Right crankcase cover “1”
   - Right crankcase cover bolt “2”

	Right crankcase cover bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

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.

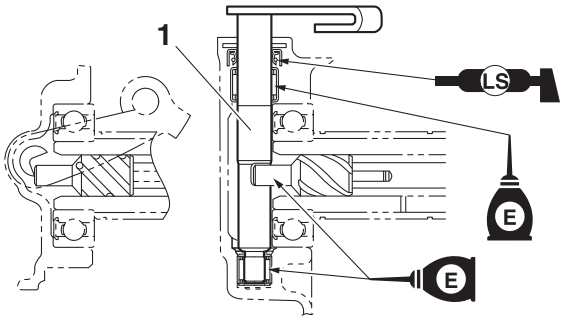




4. Install:
   - Push lever shaft “1”

TIP

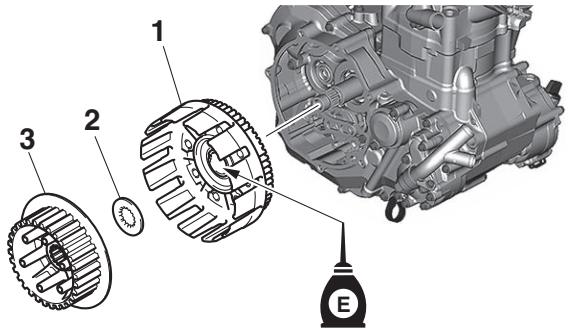
- Apply the lithium-soap-based grease on the oil seal lip.
- Before installation, apply the engine oil to the bearings (upper side and lower side).



5. Install:
   - Primary driven gear “1”
   - Thrust washer “2”
   - Clutch boss “3”

TIP

Apply the engine oil on the primary driven gear inner circumference.



6. Install:
   - Lock washer “1” New
   - Clutch boss nut “2”

	Clutch boss nut **75 N·m (7.5 kgf·m, 55 lb·ft)**

ECA24660

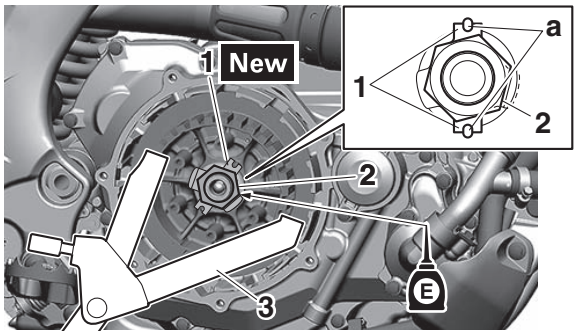
NOTICE

Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.

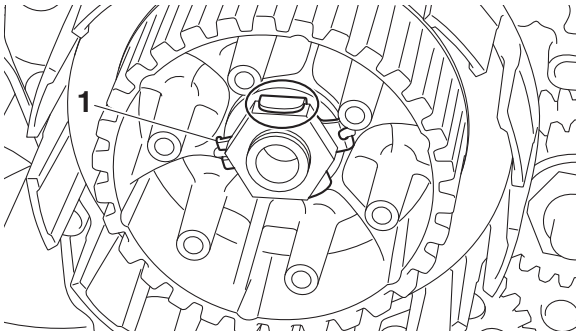
TIP

- 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 clutch holder “3” to hold the clutch boss.

	Clutch holder **90890-04199** **Universal clutch holder** **YM-91042**



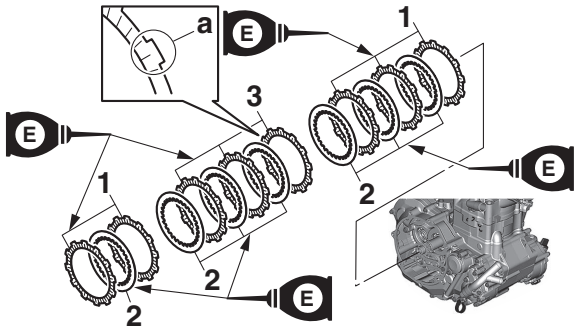
7. Bend the lock washer “1” tab.



8. 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 (identification color: black) × 3, friction plate 2 (identification color: purple) × 3, and friction plate 1 (identification color: black) × 2.
- Apply the engine oil on the friction plates and clutch plates.

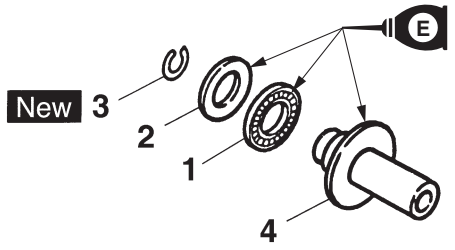


a. Identification color

9. Install:
   - Bearing “1”
   - Washer “2”
   - Circlip “3” New
     (to the push rod 1 “4”)

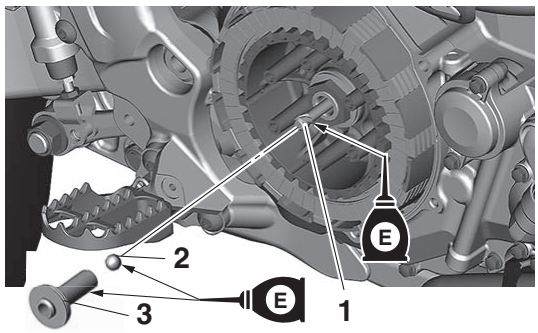
TIP

Apply the engine oil on the bearing, washer and push rod 1.

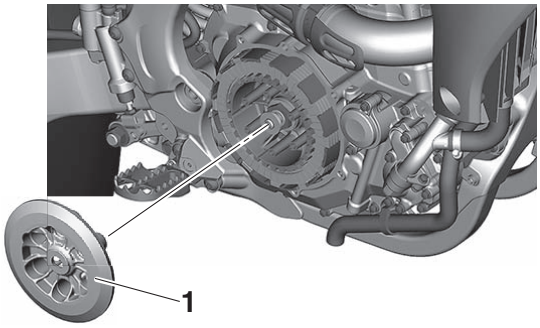


10.Install:
- Push rod 2 “1”
- Ball “2”
- Push rod 1 “3”

TIP
Apply the engine oil on the push rod 1, 2 and ball.



11.Install:
- Pressure plate “1”



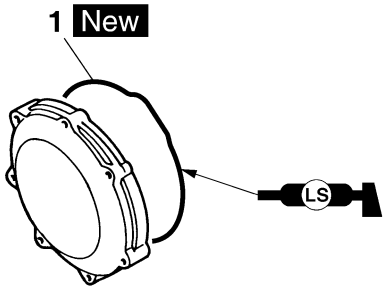
12.Install:
- Clutch spring
- Clutch spring bolt

	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.

13.Install:
- O-ring “1” New

TIP
Apply the lithium-soap-based grease to the O-ring.



14.Install:
- Clutch cover
- Clutch cover bolt

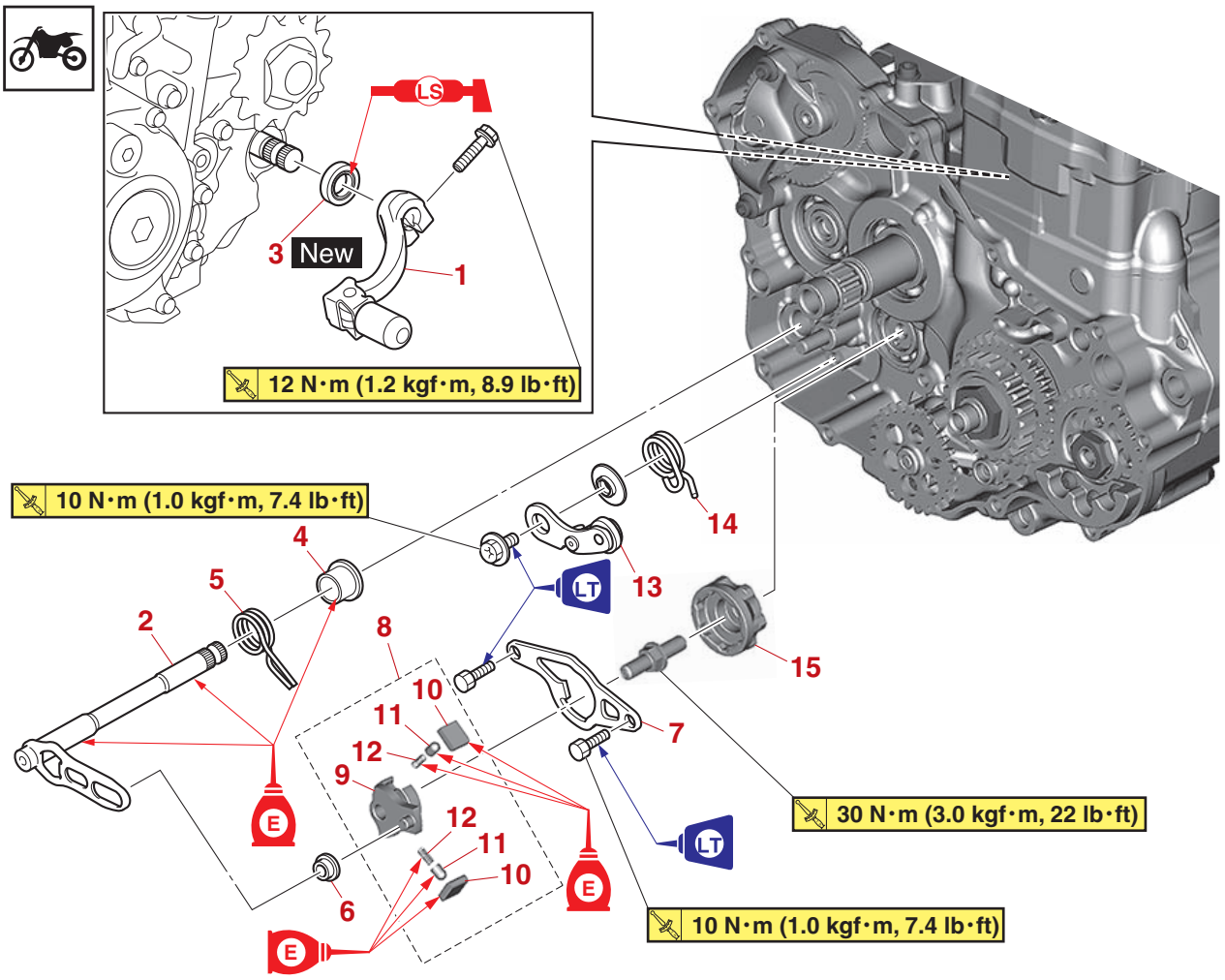
	Clutch cover bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP
Tighten the bolts in stages and in a crisscross pattern.

EAM20113

SHIFT SHAFT

Removing the shift shaft and stopper lever

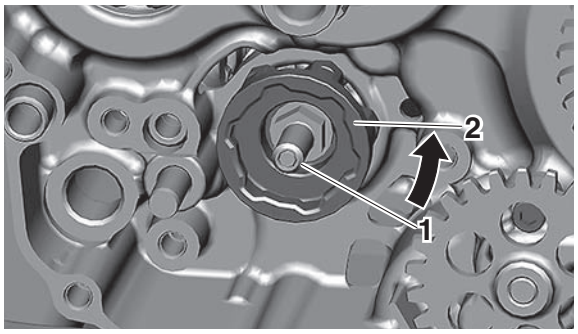


Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-46.
1	Shift pedal	1	
2	Shift shaft	1	
3	Oil seal	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Roller	1	
7	Shift guide	1	
8	Shift lever assembly	1	
9	Shift lever	1	
10	Pawl	2	
11	Pawl pin	2	
12	Spring	2	
13	Stopper lever	1	
14	Stopper lever spring	1	
15	Segment	1	

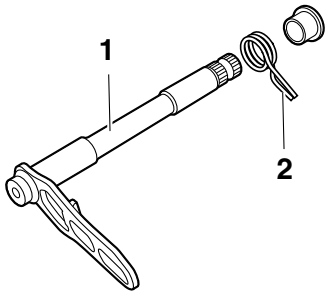
EAM30124
REMOVING THE SEGMENT
1. Remove:
   • Bolt (segment) “1”
   • Segment “2”

TIP
Turn the segment counterclockwise until it stops and loosen the bolt.

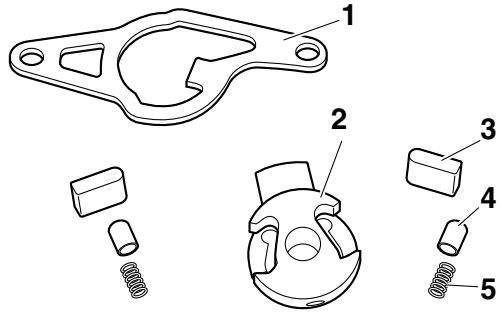
ECA24670
NOTICE
If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when removing the bolt.



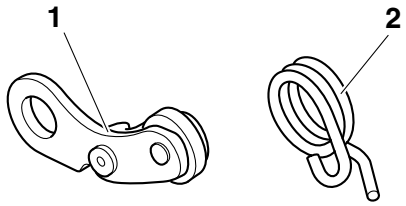
EAM30125
CHECKING THE SHIFT SHAFT
1. Check:
   • Shift shaft “1”
   Bends/damage/wear → Replace.
   • Shift shaft spring “2”
   Damage/wear → Replace.



2. Check:
   • Shift guide “1”
   • Shift lever “2”
   • Pawl “3”
   • Pawl pin “4”
   • Spring “5”
   Wear/damage → Replace.

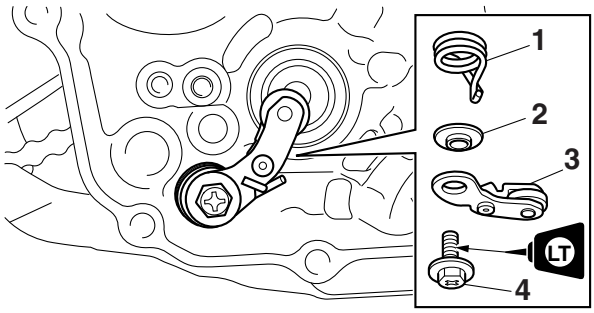


EAM30127
CHECKING THE STOPPER LEVER
1. Check:
   • Stopper lever “1”
   Wear/damage → Replace.
   • Stopper lever spring “2”
   Broken → Replace.



EAM30131
INSTALLING THE SHIFT SHAFT
1. Install:
   • Stopper lever 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®**



2. Install:
   • Segment “1”
   • Segment bolt

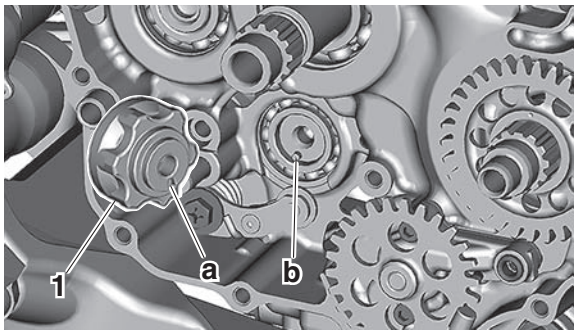
	Segment bolt **30 N·m (3.0 kgf·m, 22 lb·ft)**

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

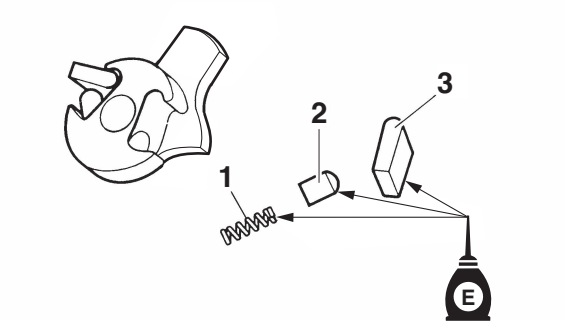
NOTICE

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.



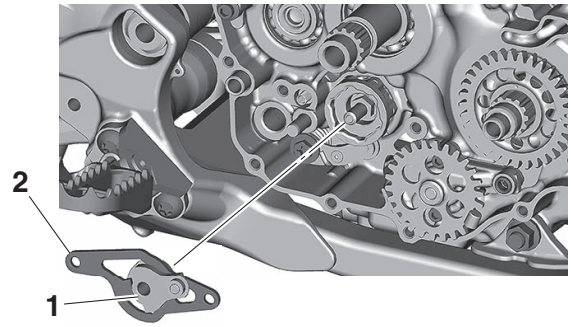
3. Install:
   - Spring "1"
   - Pawl pin "2"
   - Pawl "3"
     (to the shift lever)

TIP
Apply the engine oil on the spring, pawl pin and pawl.



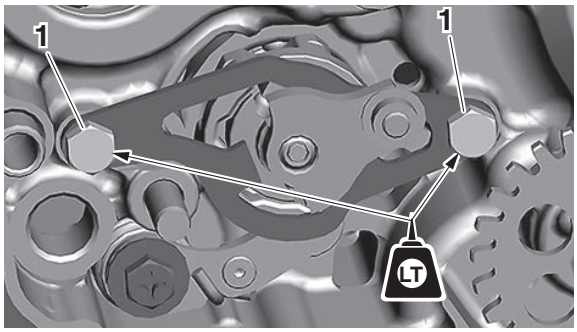
4. Install:
   - Shift lever assembly
     (to the shift guide)
5. Install:
   - Shift lever assembly "1"
   - Shift guide "2"

TIP
The shift lever assembly is installed at the same time as the shift guide.



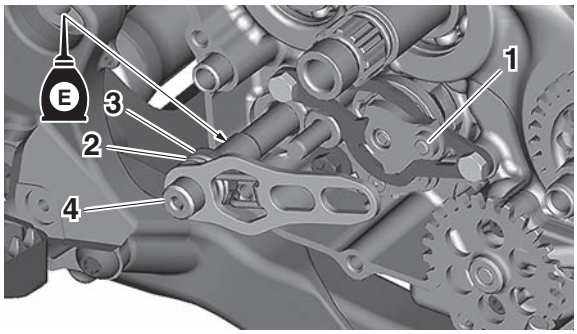
6. Tighten:
   - Shift guide bolt "1"

	Shift guide bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)** **LOCTITE®**



7. Install:
   - Roller "1"
   - Shift shaft spring "2" (to the shift shaft)
   - Collar "3" (to the shift shaft)
   - Shift shaft "4"

TIP
Apply the engine oil on the shift shaft.

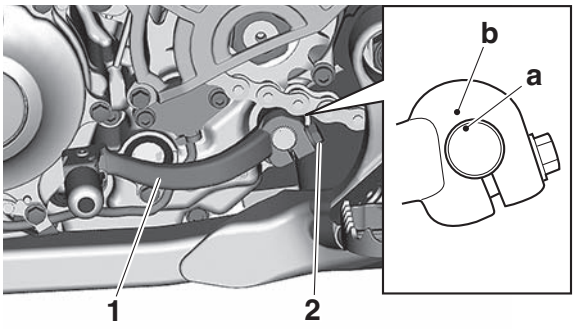


8. Install:
   - Oil seal New
9. Install:
   - Shift pedal "1"
   - Shift pedal bolt "2"

	Shift pedal bolt **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

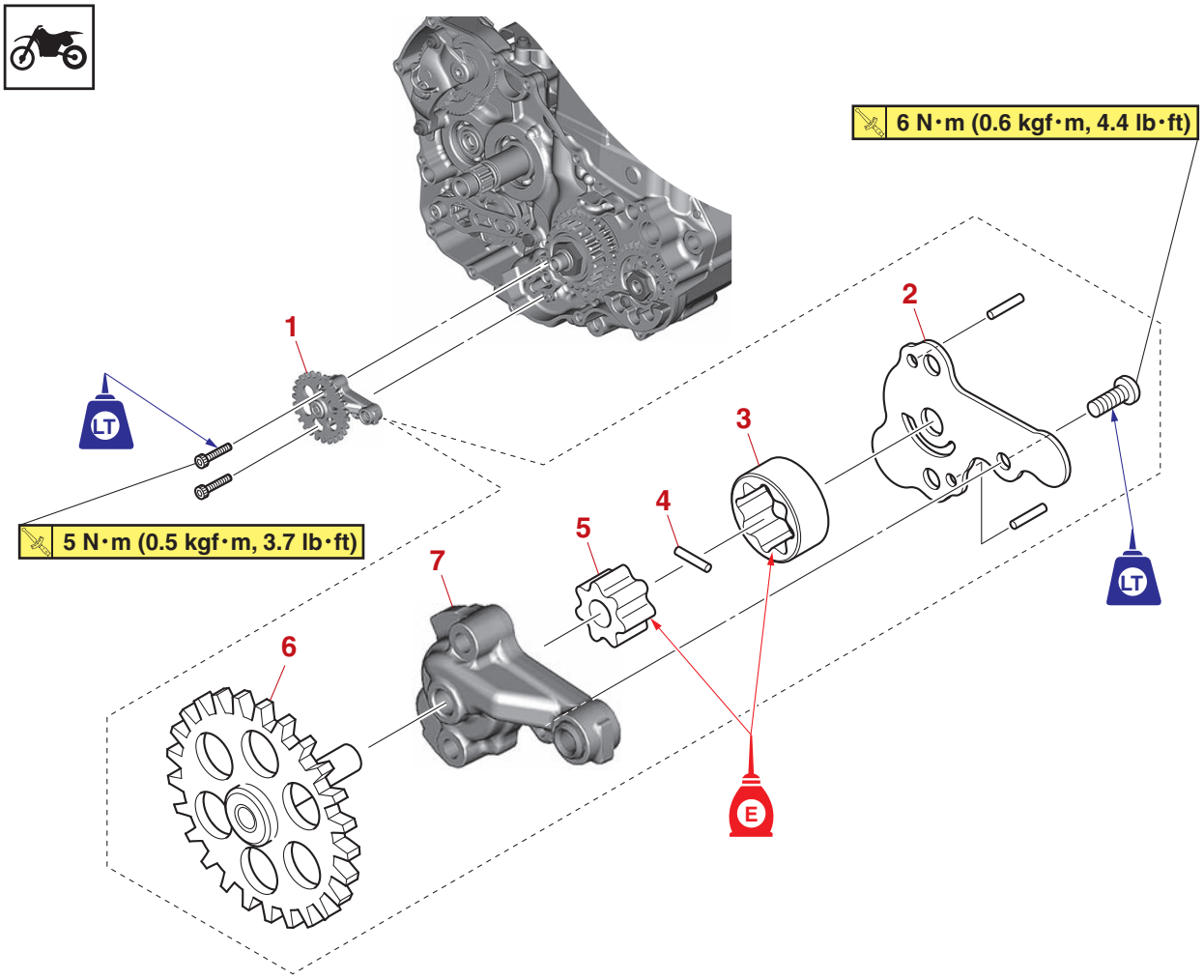
TIP

Align the punch mark “a” on the shift shaft with the punch mark “b” in the shift pedal.



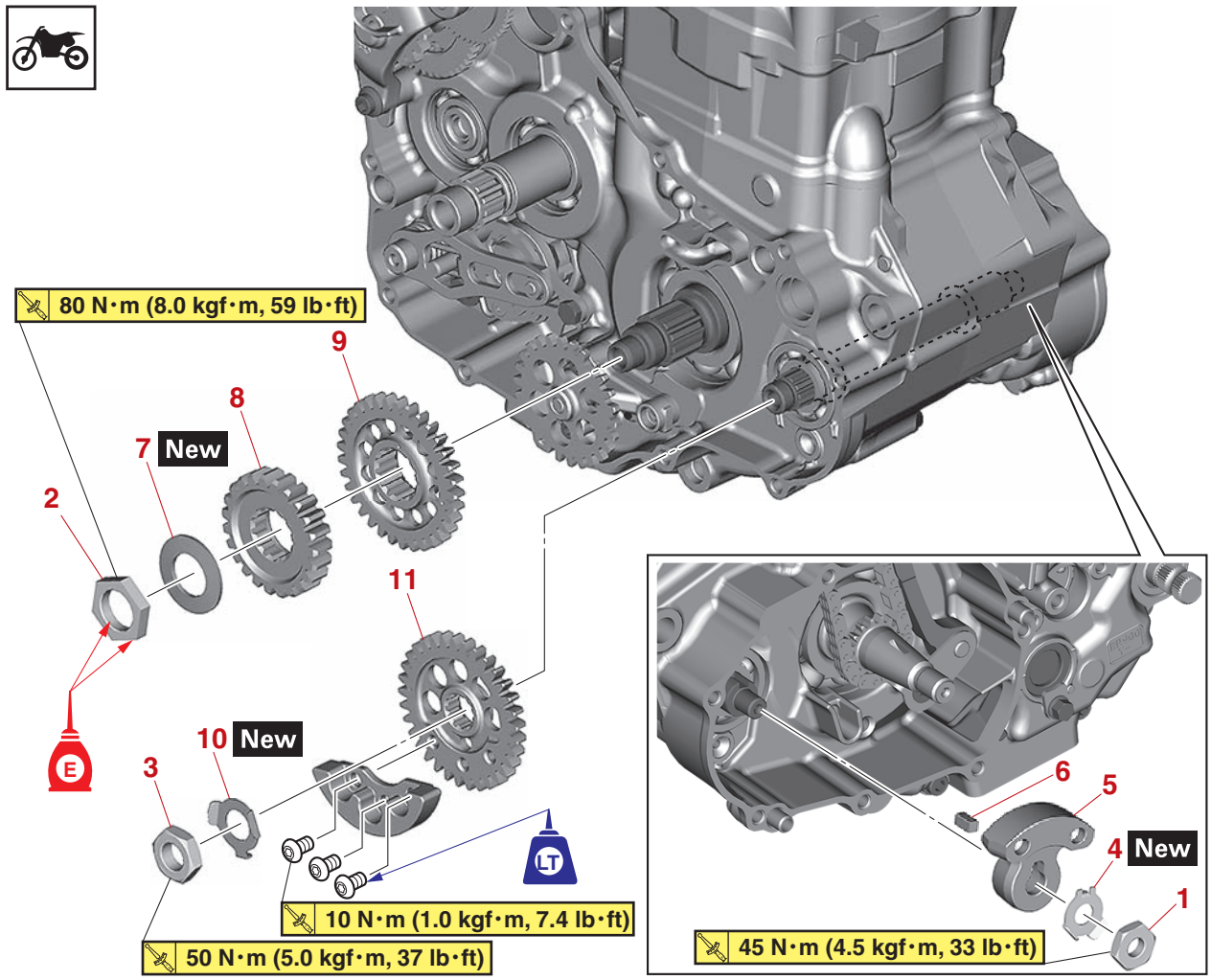
EAM20182
OIL PUMP

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-46.
	Right crankcase cover		Refer to "CLUTCH" on page 5-46.
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	

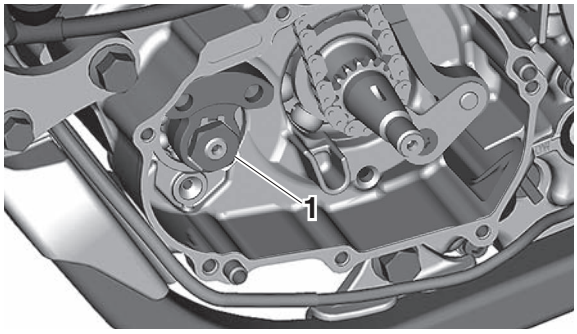
Removing the balancer

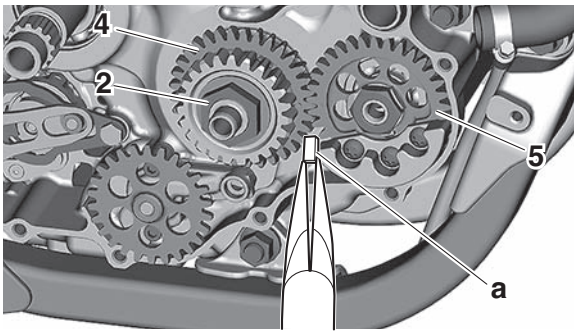


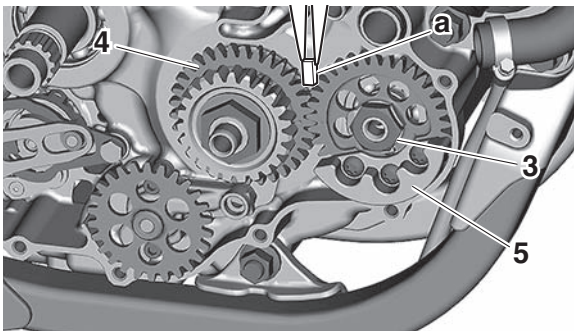
Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-46.
	Right crankcase cover		Refer to "CLUTCH" on page 5-46.
	Stator coil assembly		Refer to "GENERATOR" on page 5-37.
1	Nut (balancer)	1	
2	Nut (primary drive gear)	1	
3	Nut (balancer weight gear)	1	
4	Lock washer	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	

EAM30624
REMOVING THE BALANCER
1. Straighten the lock washer tab.
2. Loosen:
   - Balancer nut “1”
   - Primary drive gear nut “2”
   - Balancer weight gear nut “3”

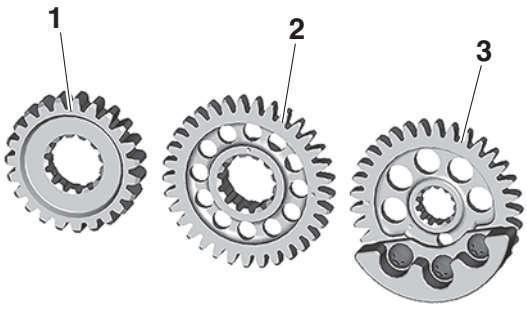
TIP
Place an aluminum plate “a” between the teeth of the balancer drive gear “4” and balancer weight gear “5”.



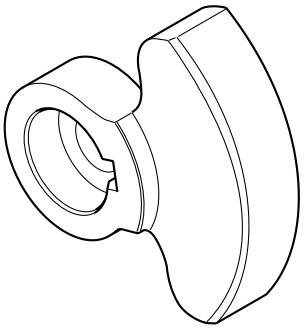




3. Check:
   - Primary drive gear “1”
   - Balancer drive gear “2”
   - Balancer weight gear “3”
     Wear/damage → Replace.



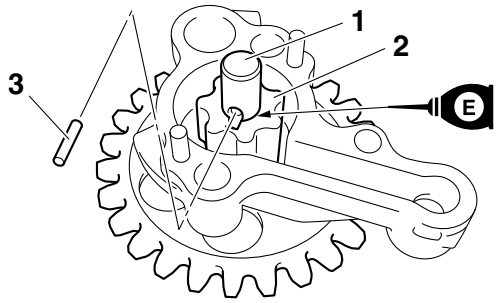
4. Check:
   - Balancer
     Crack/damage → Replace.



EAM30136
CHECKING THE OIL PUMP
1. Check:
   - Oil pump cover
   - Oil pump drive shaft
   - Oil pump housing
     Cracks/damage/wear → Replace the oil pump assembly.
2. Check:
   - Oil pump operation
     Rough movement → Repeat step (1) or replace the oil pump assembly.

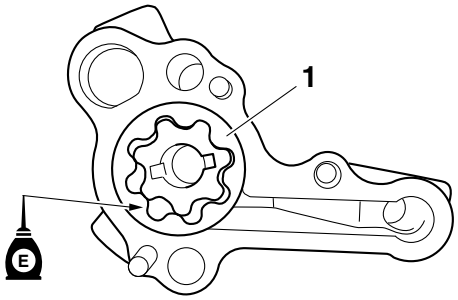
EAM30137
ASSEMBLING THE OIL PUMP
1. Install:
   - Oil pump drive shaft “1”
   - Inner rotor “2”
   - Dowel pin “3”

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.



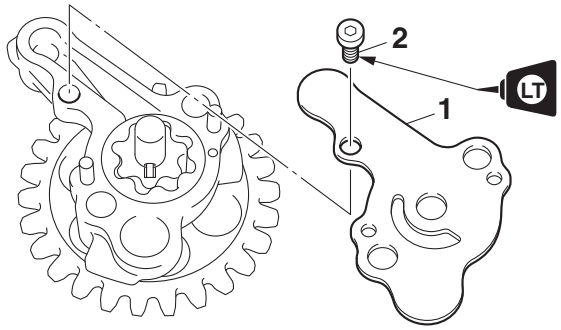
2. Install:
   • Outer rotor “1”

TIP
Apply the engine oil on the outer rotor.



3. Install:
   • Oil pump cover “1”
   • Oil pump cover bolt “2”

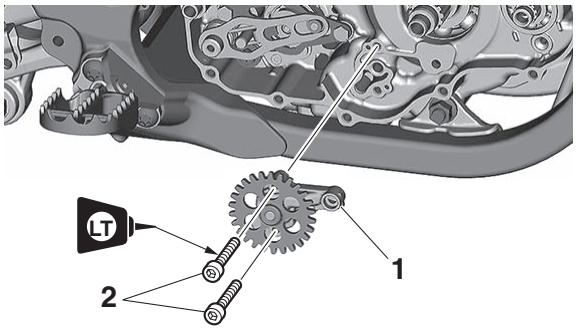
	Oil pump cover bolt **6 N·m (0.6 kgf·m, 4.4 lb·ft)** **LOCTITE®**



EAM30486
INSTALLING THE OIL PUMP

1. Install:
   • Oil pump assembly “1”
   • Oil pump assembly bolt “2”

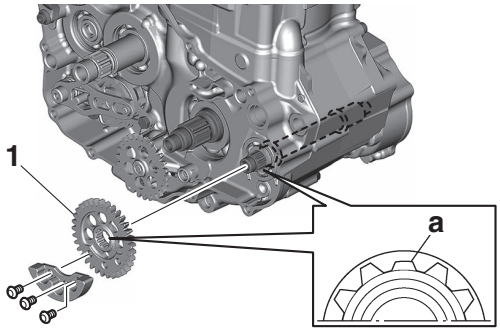
	Oil pump assembly bolt **5 N·m (0.5 kgf·m, 3.7 lb·ft)** **LOCTITE®**



ECA13890
NOTICE
After tightening the bolts, make sure the oil pump turns smoothly.

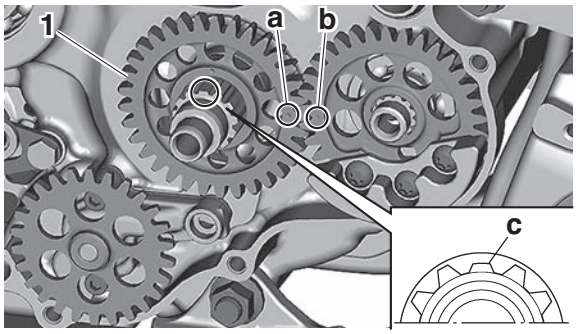
2. Install:
   • Balancer weight gear “1”

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)**

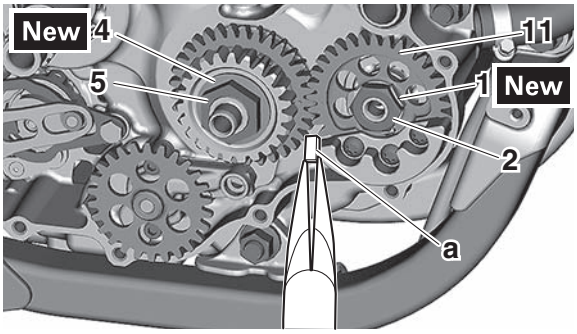
   - Primary drive gear “3”
   - Conical washer “4” New
   - Primary drive gear nut “5”

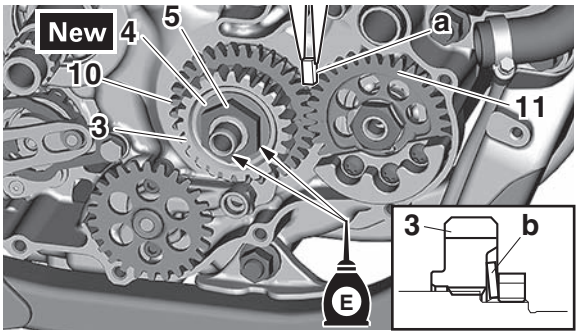
	Primary drive gear nut **80 N·m (8.0 kgf·m, 59 lb·ft)**

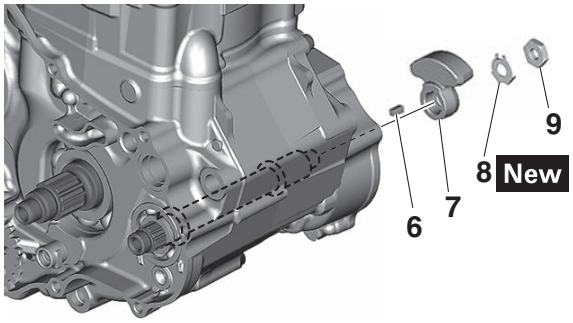
   - Straight key “6”
   - Balancer “7”
   - Lock washer “8” New
   - Balancer nut “9”

	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.





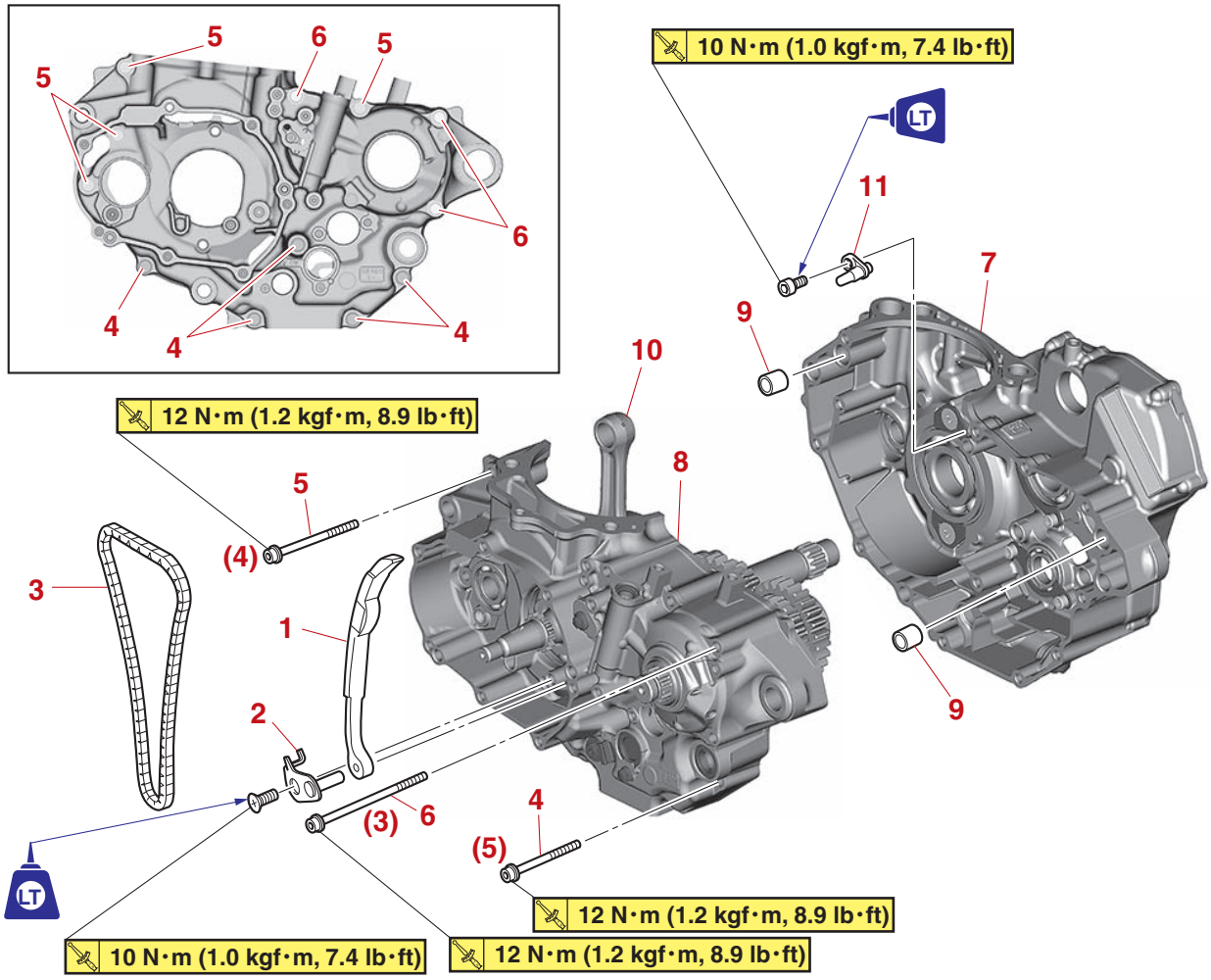


5. Bend the lock washer tab.

EAM20116

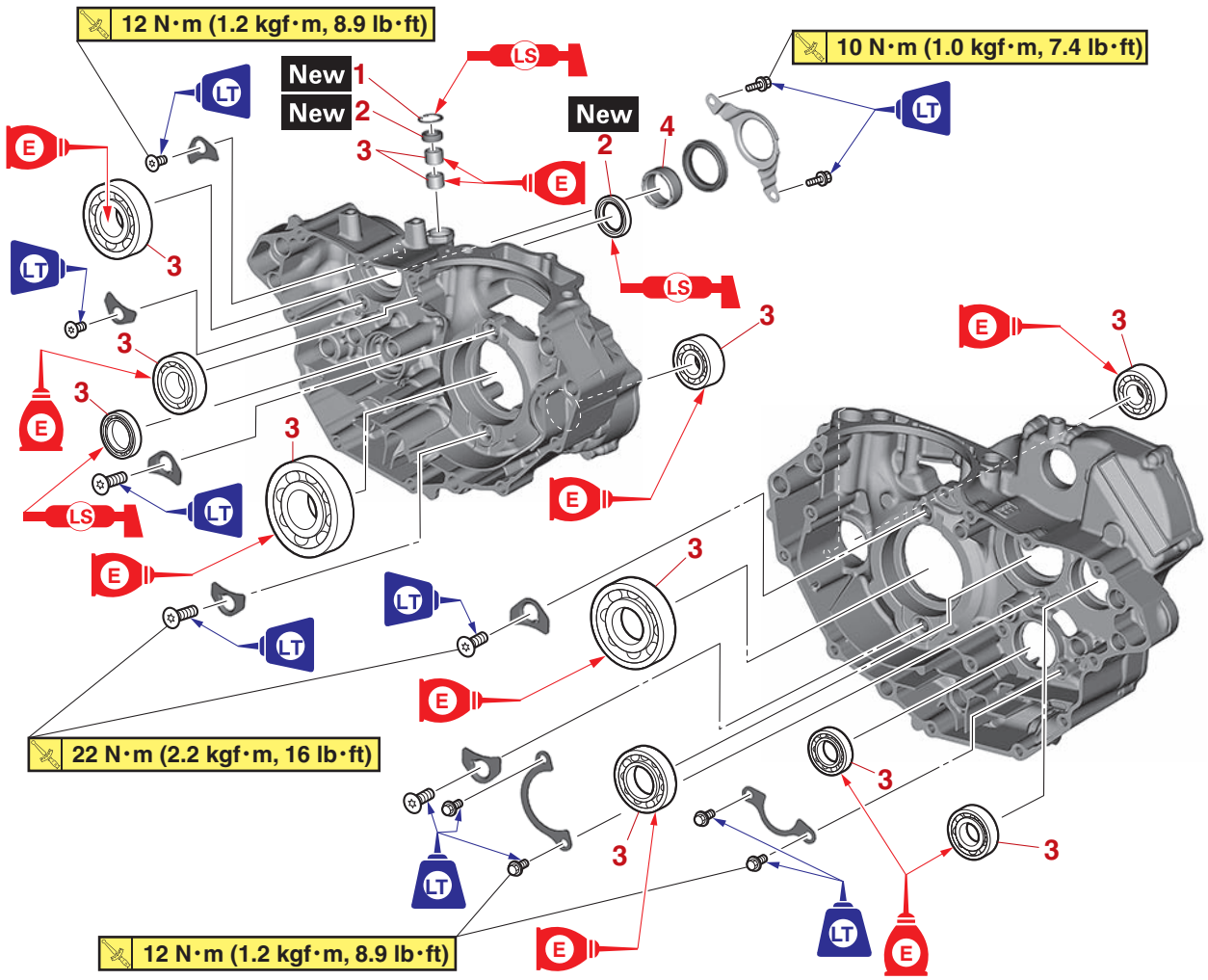
CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-6.
	Piston		Refer to "CYLINDER AND PISTON" on page 5-32.
	Balancer		Refer to "OIL PUMP" on page 5-58.
	Segment		Refer to "SHIFT SHAFT" on page 5-54.
	Stator coil assembly		Refer to "GENERATOR" on page 5-37.
1	Timing chain guide (exhaust side)	1	
2	Timing chain guide stopper plate	1	
3	Timing chain	1	
4	Bolt	5	[L = 45 mm (1.77 in)]
5	Bolt	4	[L = 60 mm (2.36 in)]
6	Bolt	3	[L = 75 mm (2.95 in)]
7	Right crankcase	1	
8	Left crankcase	1	
9	Dowel pin	2	
10	Crankshaft	1	
11	Oil nozzle	1	

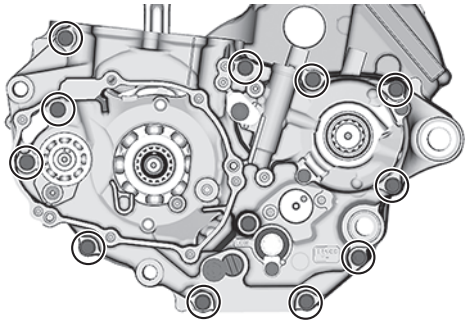
Removing the bearing and oil seal



Order	Job/Parts to remove	Q'ty	Remarks
	Transmission		Refer to "TRANSMISSION" on page 5-70.
	Shift cam/Shift fork		Refer to "TRANSMISSION" on page 5-70.
1	Circlip	1	
2	Oil seal	2	
3	Bearing	12	
4	Collar	1	

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".

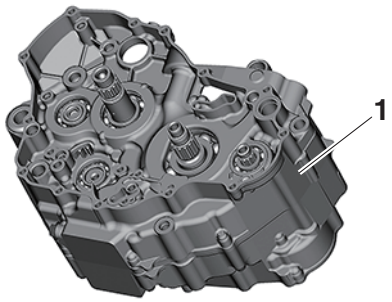
TIP

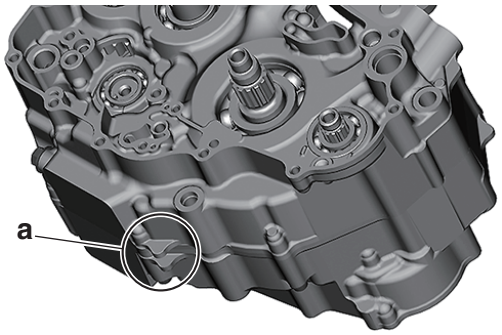
- Place the crankcase with its left side downward and split it by inserting a screwdriver tip into the splitting slit "a" in the crankcase.
- Lift the right crankcase horizontally while lightly patting the crankcase splitting slit and the engine mounting boss using a soft hammer, and leave the crankshaft 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.

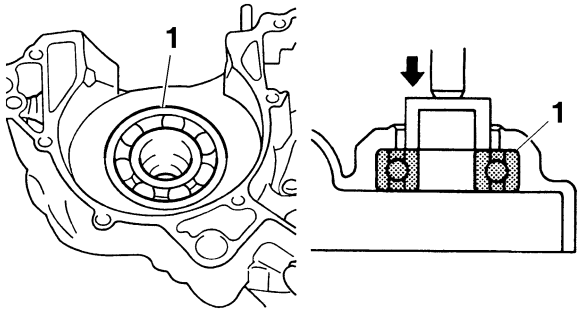




   c. Remove the dowel pins and O-ring.
2. Remove:
   - Bearing "1"

TIP

- Remove the bearing from the crankcase by pressing its inner race.
- Do not use the removed bearing.



EAM30490
CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

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

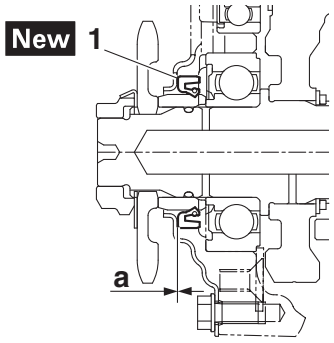
- Wash the crankcase in a mild solvent.
- Remove any remaining gasket from the crankcase mating surface.

2. Check:
   - Crankcase
     Crack/damage → Replace.
   - Oil delivery passages
     Obstruction → Blow out with compressed air.

EAM30152
ASSEMBLING THE CRANKCASE

1. Install:
   • Oil seal “1” New
   (to the left crankcase)

Installed depth “a”
0.0–0.5 mm (0.00–0.02 in)



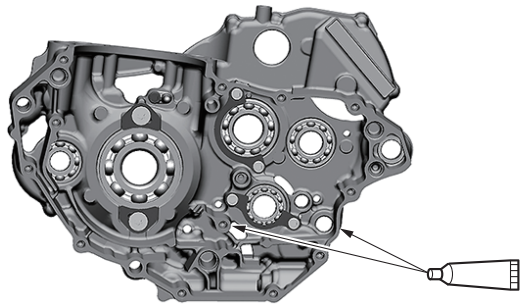
2. Install:
   • Bearing cover plate

Bearing cover plate
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®
Bearing cover plate (crankshaft)
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®

TIP
Install the bearing by pressing its outer race parallel.

3. Apply:
   • Sealant
   (to the crankcase mating surface)

Yamaha bond No. 1215
90890-85505
Three bond No. 1215®



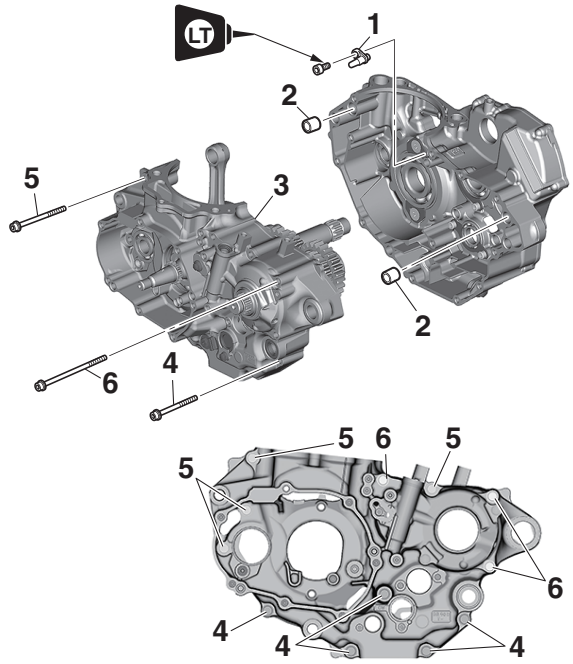
4. Install:
   • Oil nozzle “1”

Oil nozzle bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

   • Dowel pin “2”
   • Crankcase “3”
   (to the left crankcase)

Crankcase bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)

TIP
- 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.

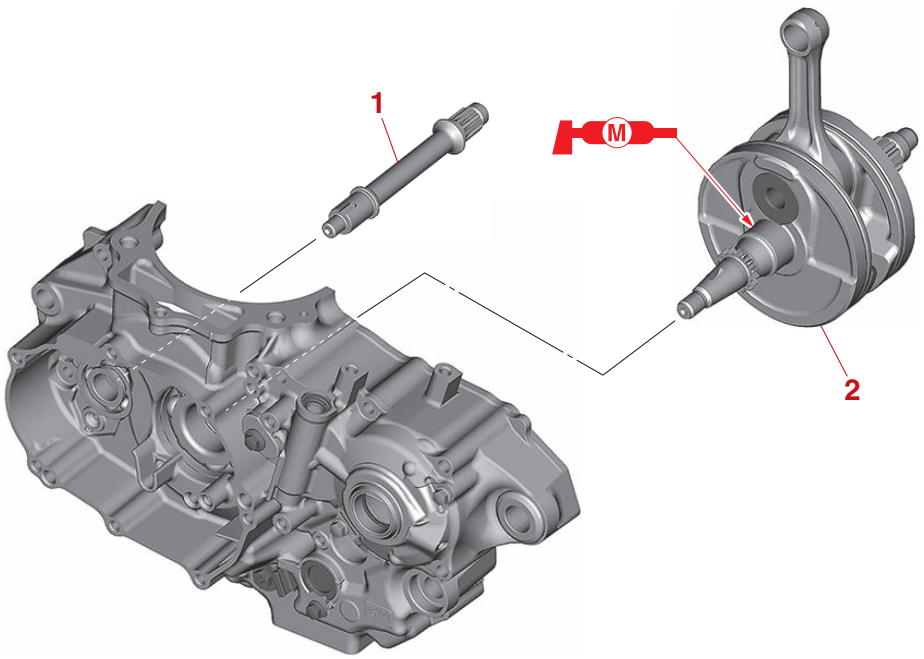


4. 45 mm (1.77 in)
5. 60 mm (2.36 in)
6. 75 mm (2.95 in)

EAM20184

CRANKSHAFT AND BALANCER SHAFT

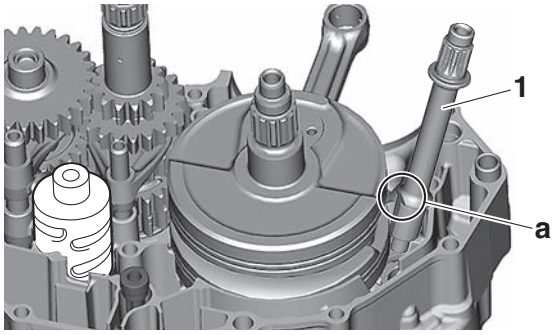
Removing the crankshaft assembly and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-63.
	Transmission		Refer to "TRANSMISSION" on page 5-70.
1	Balancer shaft	1	
2	Crankshaft assembly	1	

EAM30491
REMOVING THE CRANKSHAFT
1. Remove:
   • Balancer shaft “1”

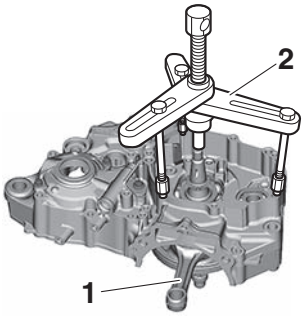
TIP
Remove the balancer shaft with its flat side “a” facing the crankshaft.

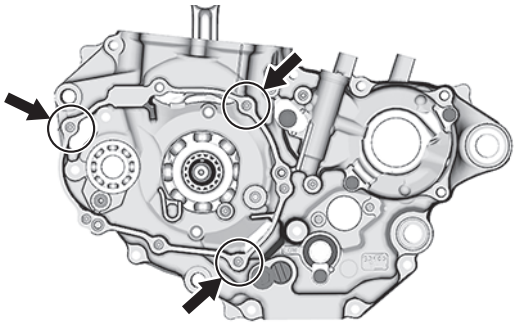


2. Remove:
   • Crankshaft assembly “1”

TIP
Remove the crankshaft assembly by using the crankcase separating tool “2”.

	Crankcase separating tool **90890-04152** **Crankcase separating tool** **YU-A9642**

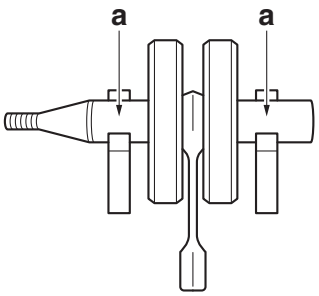




EAM30492
CHECKING THE CRANKSHAFT
1. Measure:
   • Crankshaft runout “a”
   Out of specification → Replace the crankshaft.

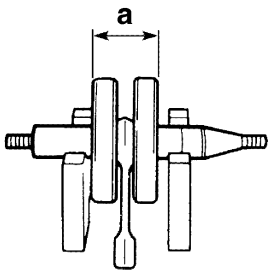
TIP
Turn the crankshaft slowly.

	Runout limit **0.030 mm (0.0012 in)**

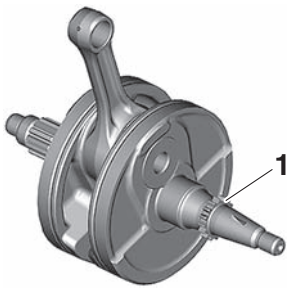


2. Measure:
   • Crank assembly width “a”
   Out of specification → Replace the crankshaft.

	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.

EAM30493

INSTALLING THE CRANKSHAFT

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

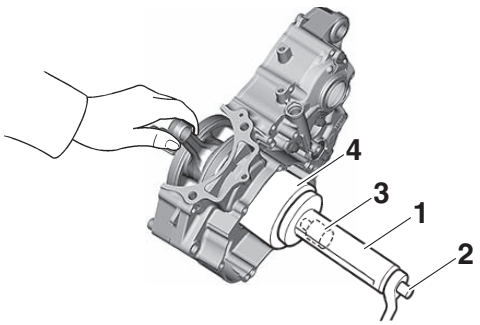
ECA24700

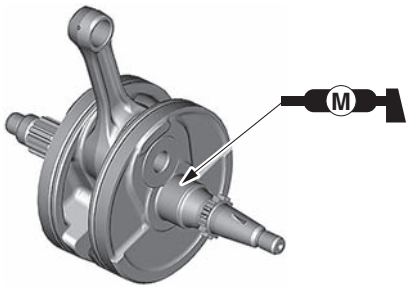
NOTICE

- **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.

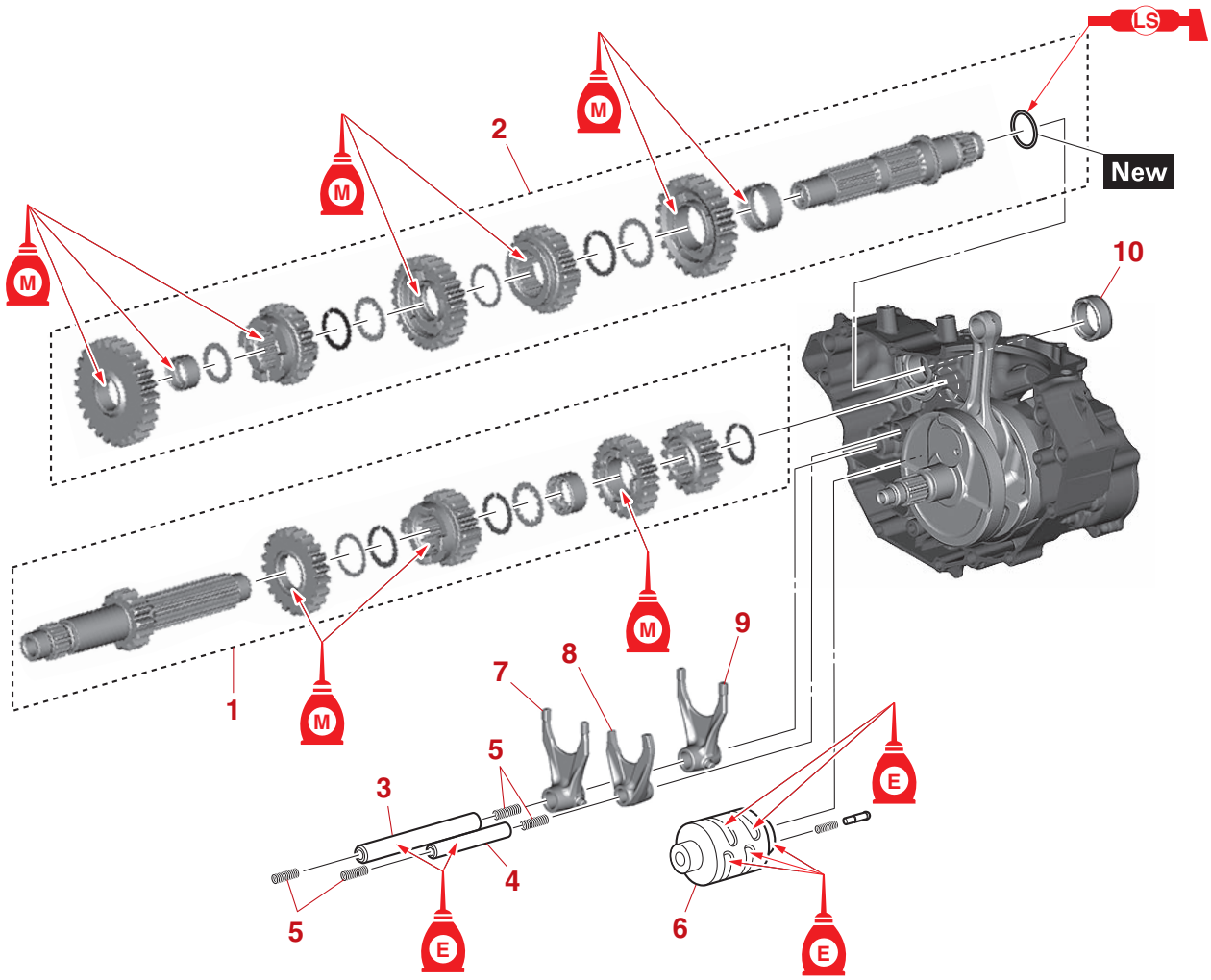




EAM20118

TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



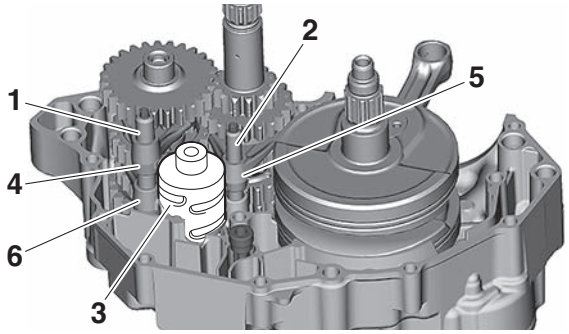
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-6.
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-63.
1	Main axle	1	
2	Drive axle	1	
3	Long shift fork guide bar	1	
4	Short shift fork guide bar	1	
5	Spring	4	
6	Shift cam	1	
7	Shift fork 3 (R)	1	
8	Shift fork 2 (C)	1	
9	Shift fork 1 (L)	1	
10	Collar	1	

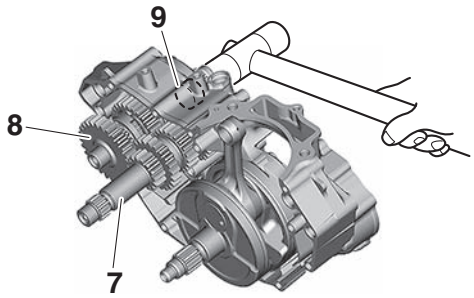
EAM30153
REMOVING THE TRANSMISSION

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

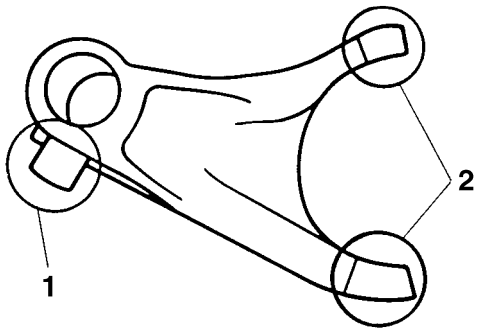
- Remove assembly with the collar “9” installed to the crankcase.
- Make a note of the position of each part. Pay particular attention to the location and direction of shift forks.
- Remove the main axle and the drive axle all together by tapping the drive axle lightly with a soft hammer.





EAM30154
CHECKING THE SHIFT FORKS

1. Check:
   - Shift fork cam follower “1”
   - Shift fork pawl “2”
     Bends/damage/scoring/wear → Replace the shift fork.



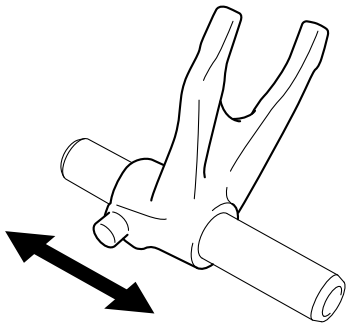
2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA12840

⚠ 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.



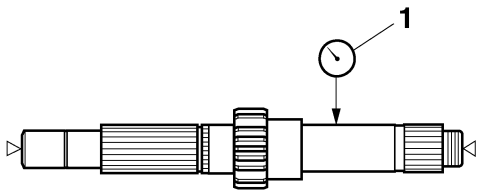
EAM30155
CHECKING THE SHIFT DRUM ASSEMBLY

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

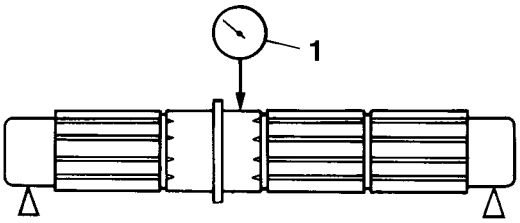
1. Measure:
   - Main axle runout
     (with a centering device and dial gauge “1”)
     Out of specification → Replace the main axle.

	Main axle runout limit **0.08 mm (0.0032 in)**



2. Measure:
   • Drive axle runout
   (with a centering device and dial gauge "1")
   Out of specification → Replace the drive axle.

	Drive axle runout limit **0.08 mm (0.0032 in)**



3. Check:
   • Transmission gear
   Blue discoloration/pitting/wear → Replace the defective gear(s).
   • Transmission gear dog
   Cracks/damage/rounded edges → Replace the defective gear(s).
4. Check:
   • Transmission gear movement
   Rough movement → Replace the defective gear(s).

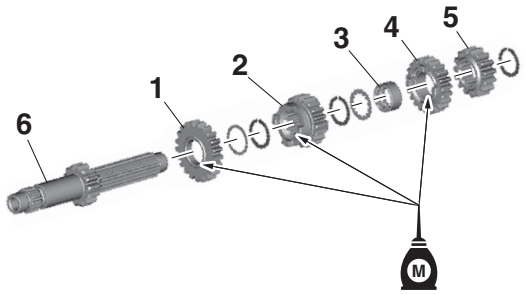
EAM30157

INSTALLING THE TRANSMISSION

1. Install:
   • 5th pinion gear (21T) "1"
   • 3rd pinion gear (20T) "2"
   • Collar "3"
   • 4th pinion gear (22T) "4"
   • 2nd pinion gear (15T) "5"
   (to the main axle "6")

TIP

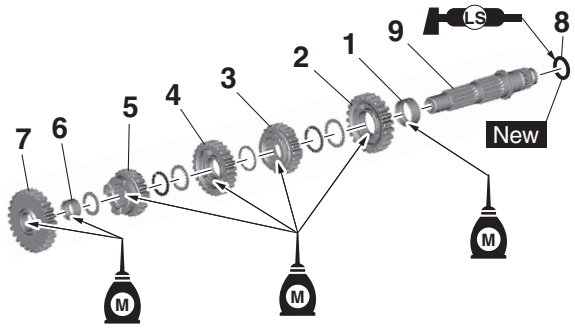
Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and to the inner surface of the sliding gear, then install.



2. Install:
   • Collar "1"
   • 2nd wheel gear (23T) "2"
   • 4th wheel gear (24T) "3"
   • 3rd wheel gear (26T) "4"
   • 5th wheel gear (20T) "5"
   • Collar "6"
   • 1st wheel gear (27T) "7"
   • O-ring "8" New
   (to the drive axle "9")

TIP

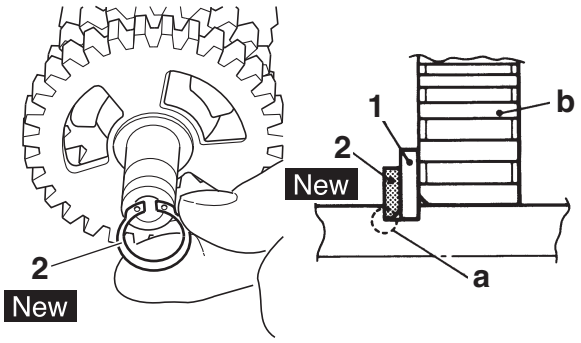
- Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and the collar and to the inner surface of the sliding gear, then install.
- Apply the lithium-soap-based grease on the O-ring.

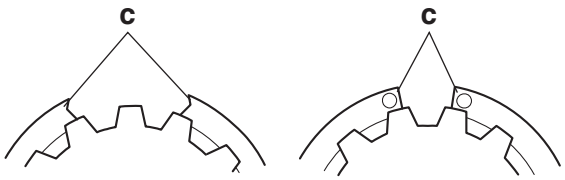


3. Install:
   • Washer "1"
   • Circlip "2" New

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.

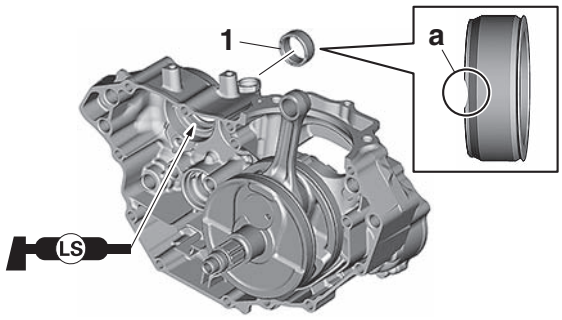




4. Install:
   • Collar “1”

TIP

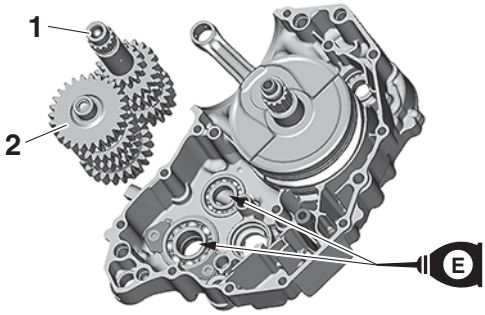
- Apply the lithium-soap-based grease on the oil seal lip.
- When installing the collar into the crankcase, pay careful attention to the crankcase oil seal lip.
- Install the collar “1” so that the slit “a” faces to the crankcase side.



5. Install:
   • Main axle “1”
   • Drive axle “2”

TIP

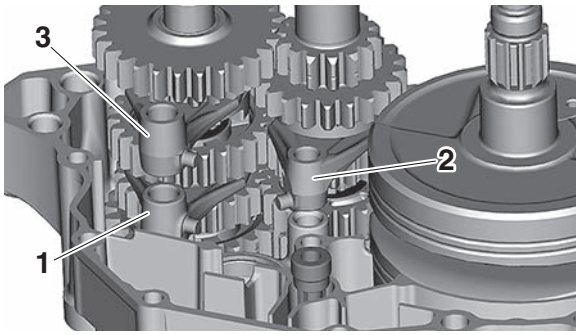
- Install to the left crankcase simultaneously.
- Apply engine oil to the main axle and the drive axle bearing.

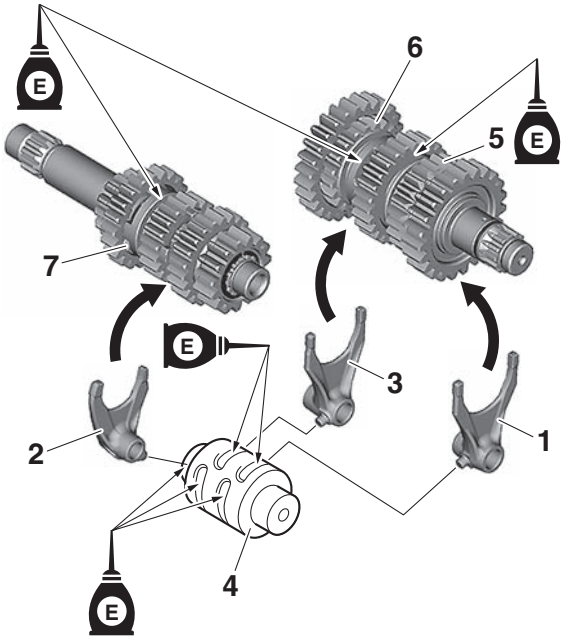


6. Install:
   • Shift fork 1 (L) “1”
   • Shift fork 2 (C) “2”
   • Shift fork 3 (R) “3”
   • Shift cam “4”
   (to the main axle and the drive axle)

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 shift fork 3 (R) with the 5th wheel gear “6” on the drive axle.
- Mesh the shift fork 2 (C) with the 3rd pinion gear “7” on the main axle.

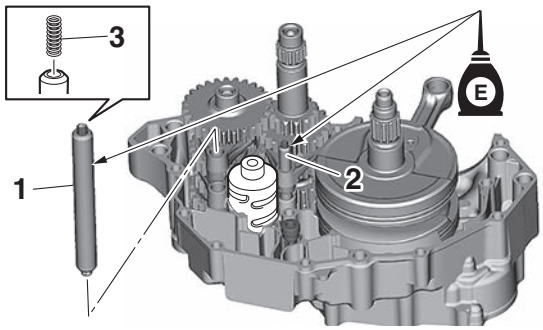




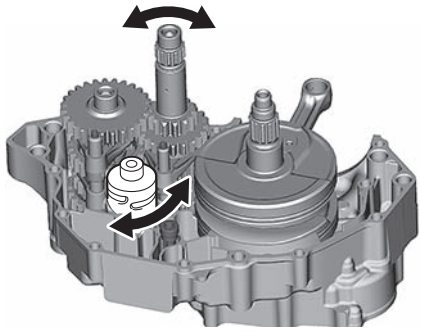
7. Install:
   - Long shift fork guide bar "1"
   - Short shift fork guide bar "2"
   - Spring "3"

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.



COOLING SYSTEM

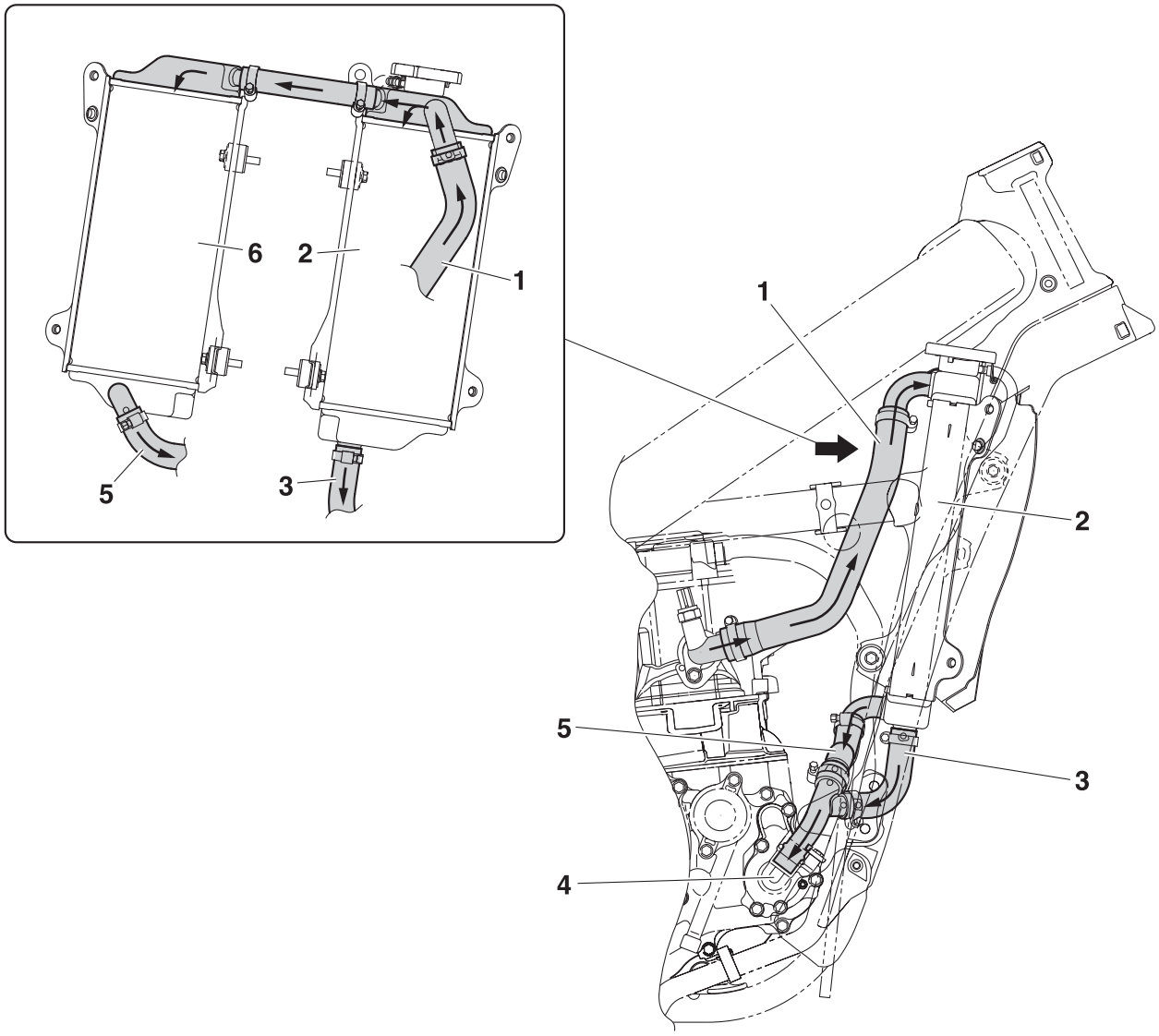
COOLING SYSTEM DIAGRAMS 6-1

RADIATOR.....6-2
CHECKING THE RADIATOR 6-4
INSTALLING THE RADIATOR 6-4

WATER PUMP 6-6
DISASSEMBLING THE WATER PUMP 6-7
CHECKING THE WATER PUMP 6-7
ASSEMBLING THE WATER PUMP 6-7

EAM20186

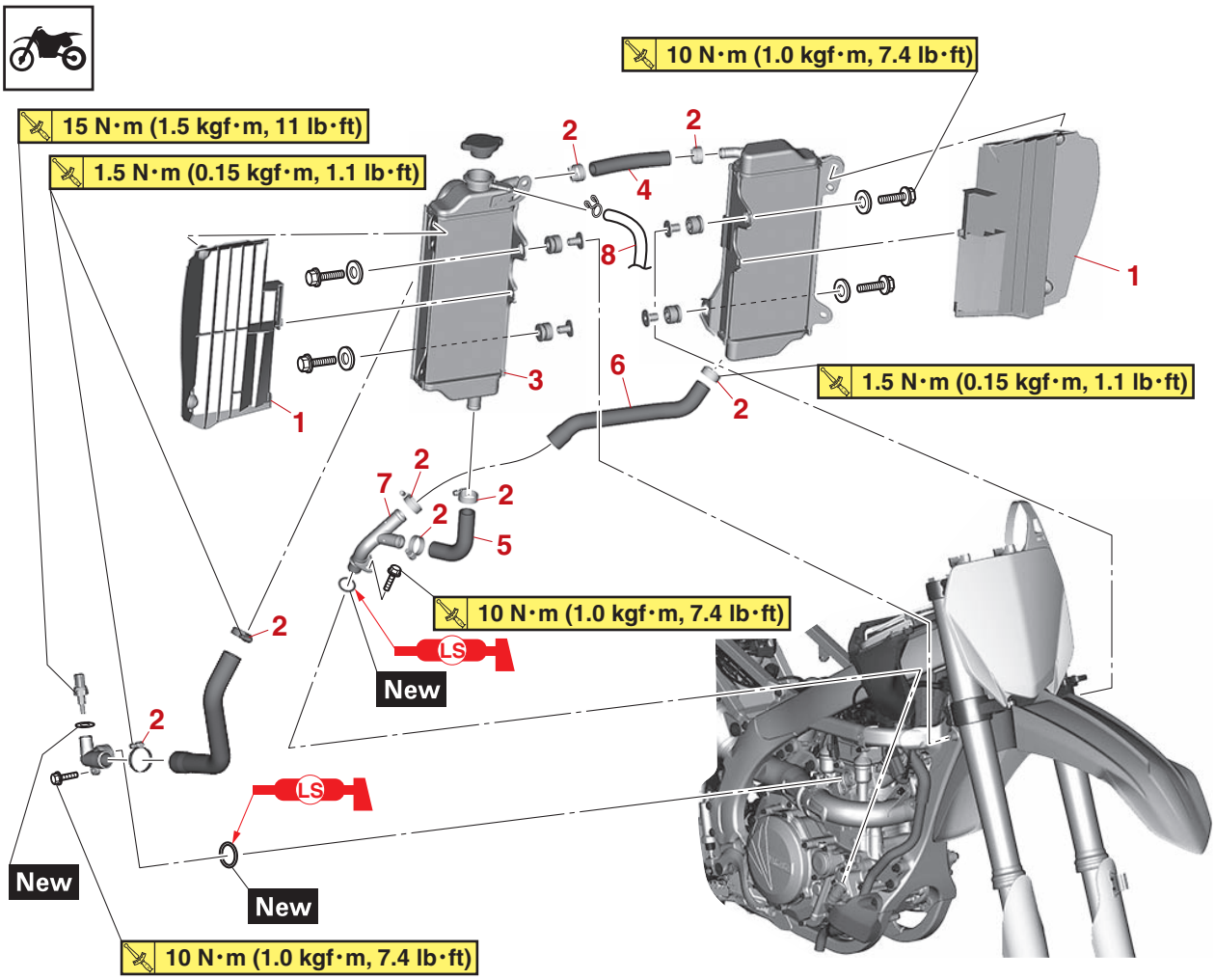
COOLING SYSTEM DIAGRAMS



1. Radiator hose 1
2. Radiator (right)
3. Radiator hose 4
4. Water pump
5. Radiator hose 3
6. Radiator (left)

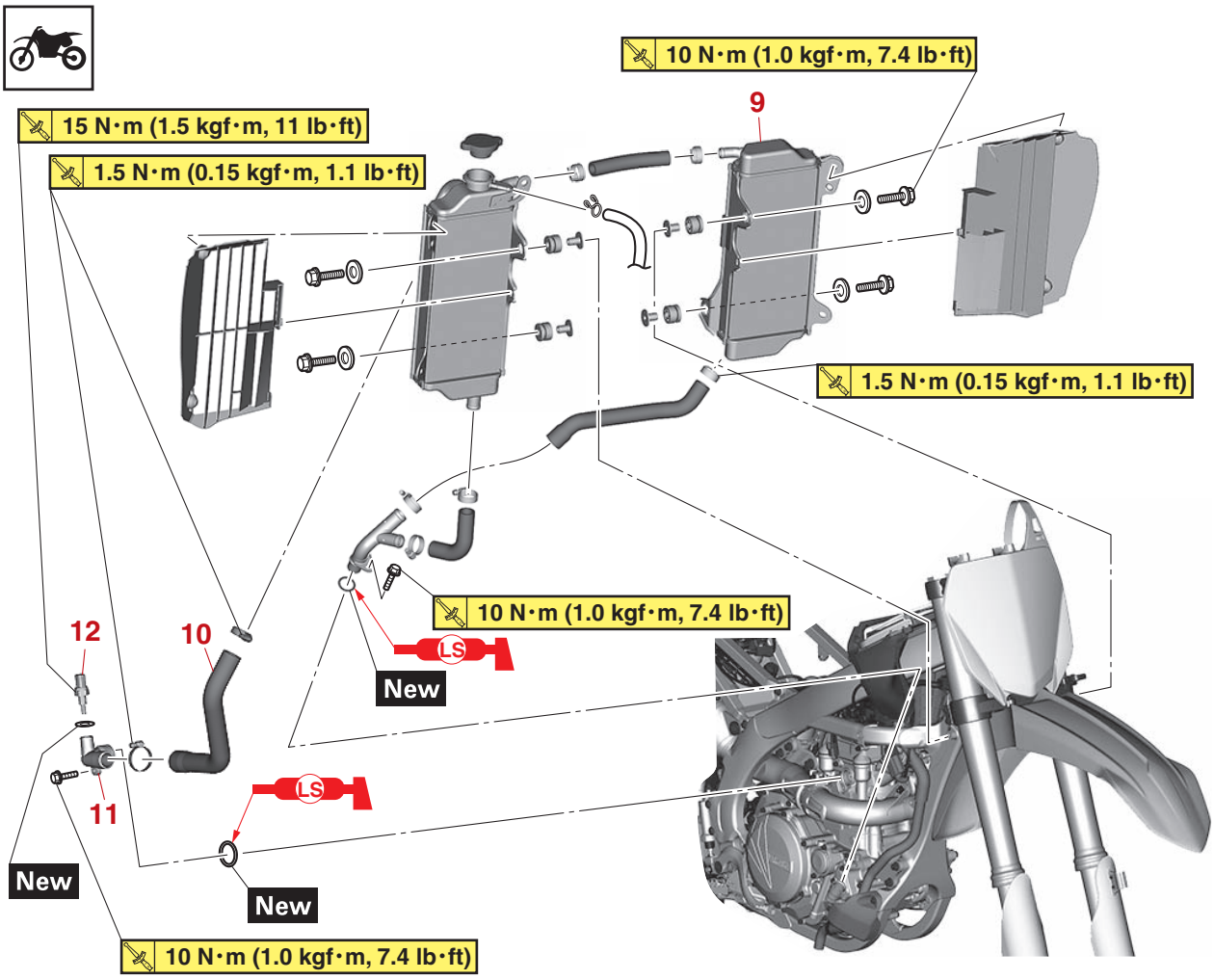
EAM20138
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-21.
	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 7-4.
1	Radiator guard	2	
2	Radiator hose clamp	8	Loosen.
3	Radiator (right)	1	
4	Radiator hose 2	1	
5	Radiator hose 4	1	
6	Radiator hose 3	1	
7	Radiator pipe 2	1	
8	Radiator breather hose	1	

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
9	Radiator (left)	1	
10	Radiator hose 1	1	
11	Radiator pipe 1	1	
12	Coolant temperature sensor	1	

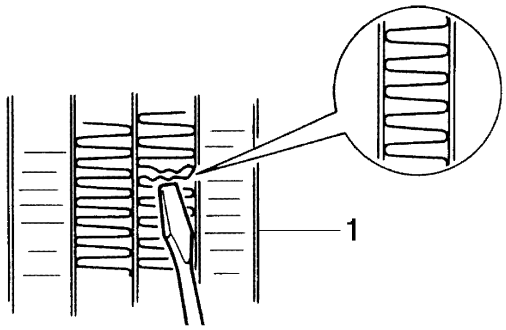
EAM30341
CHECKING THE RADIATOR

EWA13030
⚠ WARNING

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

1. Check:
   - Radiator fin "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.



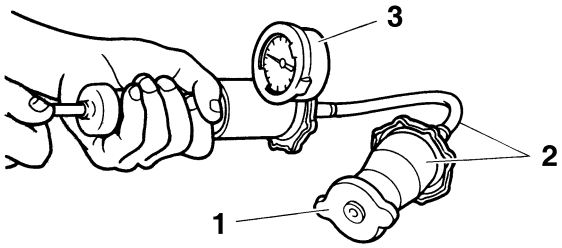
2. Check:
   - Radiator hose
   - Radiator pipe
     Crack/damage → Replace.
3. Check:
   - Radiator cap valve opening pressure
     a. Install the radiator cap tester adapter "2" and the radiator cap tester "3" to the radiator cap "1", and activate the tester to check whether it can stay for 5 to 10 seconds within standard pressure values.

TIP
Before attaching the cap to the tester, apply water to its sealing surface.

Radiator cap valve opening pressure
107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

No stay → Replace.

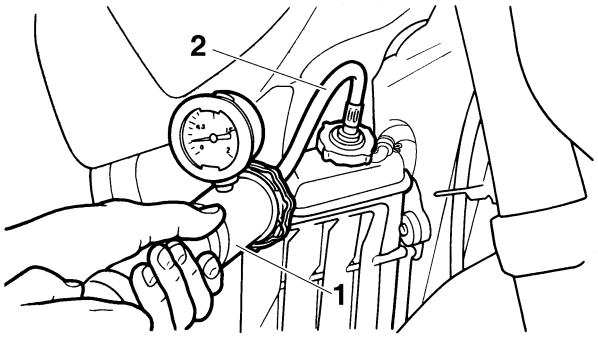
Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
Pressure tester adapter
YU-33984



EAM30506
INSTALLING THE RADIATOR

1. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-21.
2. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
3. 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



4. Activate the tester to apply the test pressure.

	Test pressure value **137.3 kPa (1.37 kgf/cm², 19.9 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.**

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

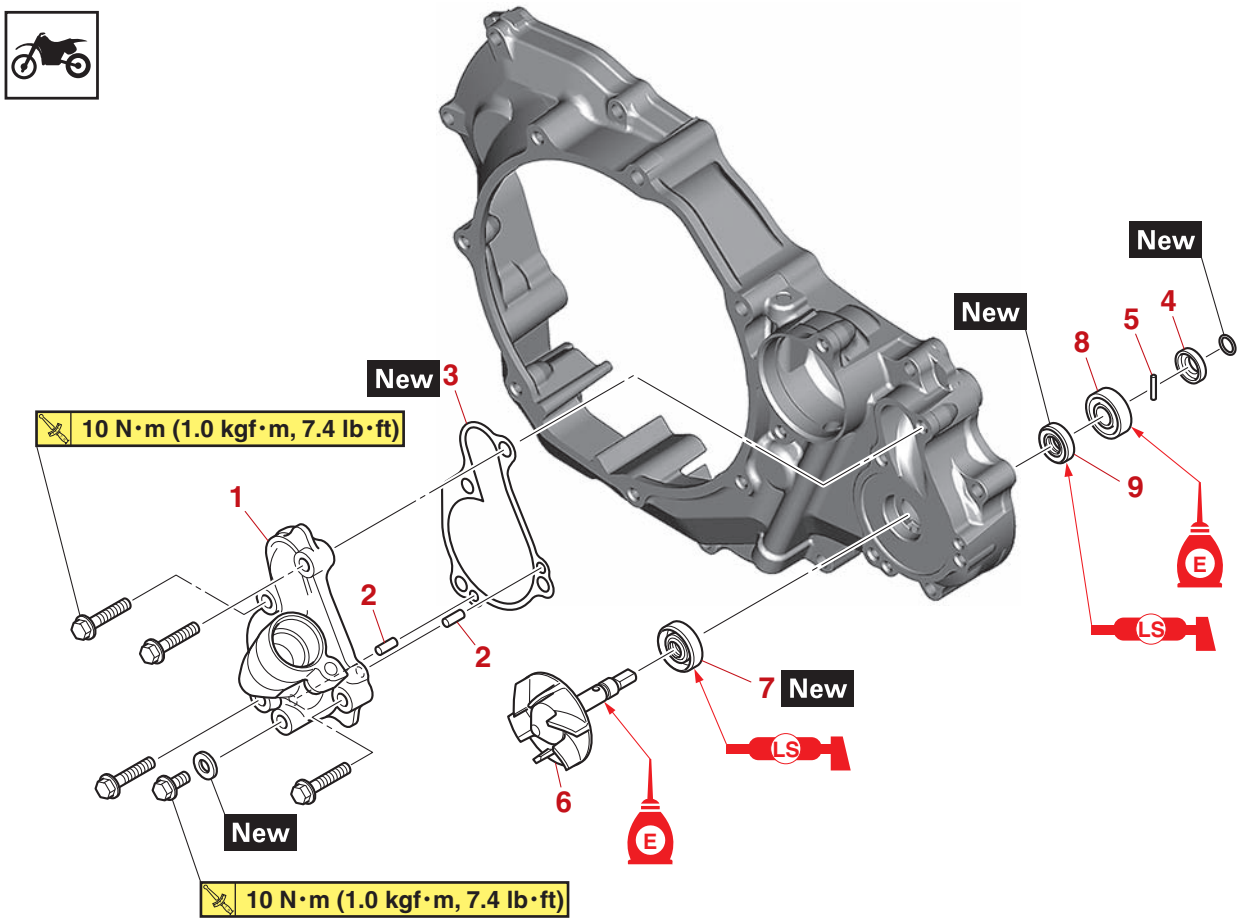
EWA19090

⚠ WARNING

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

EAM20139
WATER PUMP

Removing the water pump

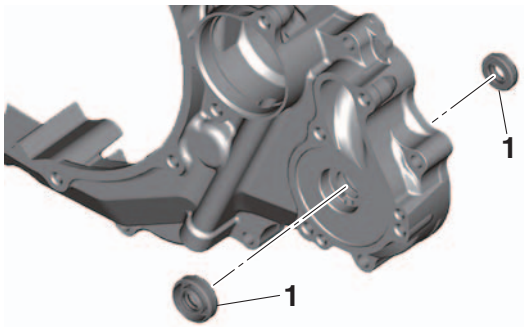


Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-21.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Right crankcase cover		Refer to "CLUTCH" on page 5-46.
1	Water pump housing	1	
2	Dowel pin	2	
3	Gasket	1	
4	Collar	1	
5	Pin	1	
6	Impeller shaft assembly	1	
7	Oil seal	1	
8	Bearing	1	
9	Oil seal	1	

EAM30494
DISASSEMBLING THE WATER PUMP

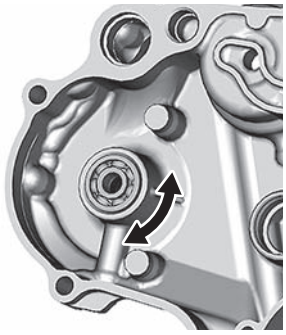
TIP
- Remove the oil seal when the coolant level changes frequently more than usual, coolant has discolored, or engine oil has become milky.
- Do not use the removed oil seal.

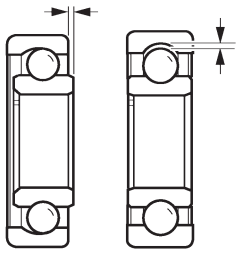
1. Remove:
   - Oil seal “1”



EAM30259
CHECKING THE WATER PUMP

1. Check:
   - Water pump housing cover
   - Impeller shaft
     Cracks/damage/wear → Replace.
2. Check:
   - Bearing
     Rotate the inner race with your finger.
     Rough spot/seizure → Replace.

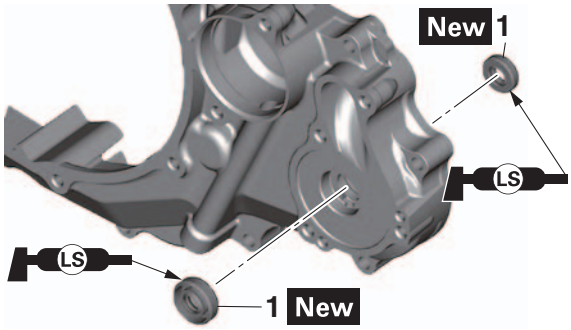




EAM30262
ASSEMBLING THE WATER PUMP

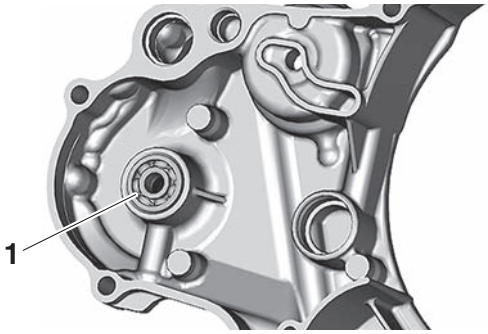
1. Install:
   - Oil seal “1” New

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.



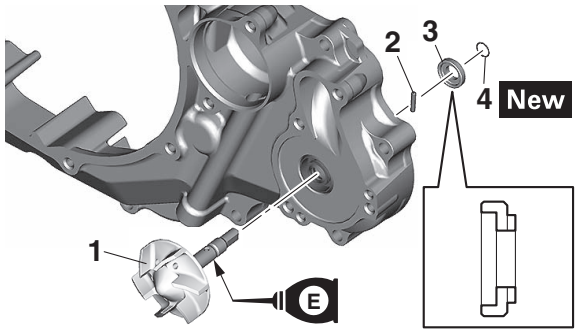
2. Install:
   - Bearing “1”

TIP
Install the bearing by pressing its outer race parallel.

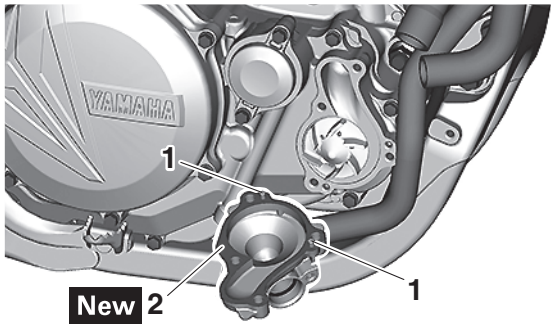


3. Install:
   - Impeller shaft assembly “1”
   - Pin “2”
   - Collar “3”
   - Circlip “4” New

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.



4. Install:
   - Dowel pin “1”
   - Gasket “2” New

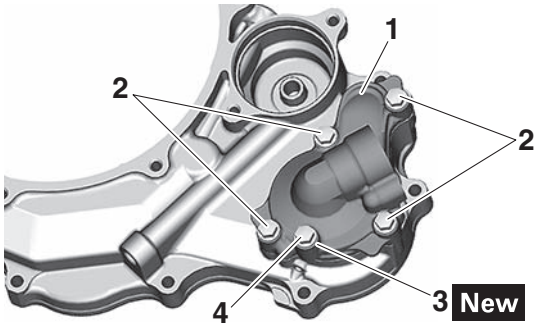


5. Install:
   • Water pump housing “1”
   • Water pump housing bolt “2”

	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)**



FUEL SYSTEM

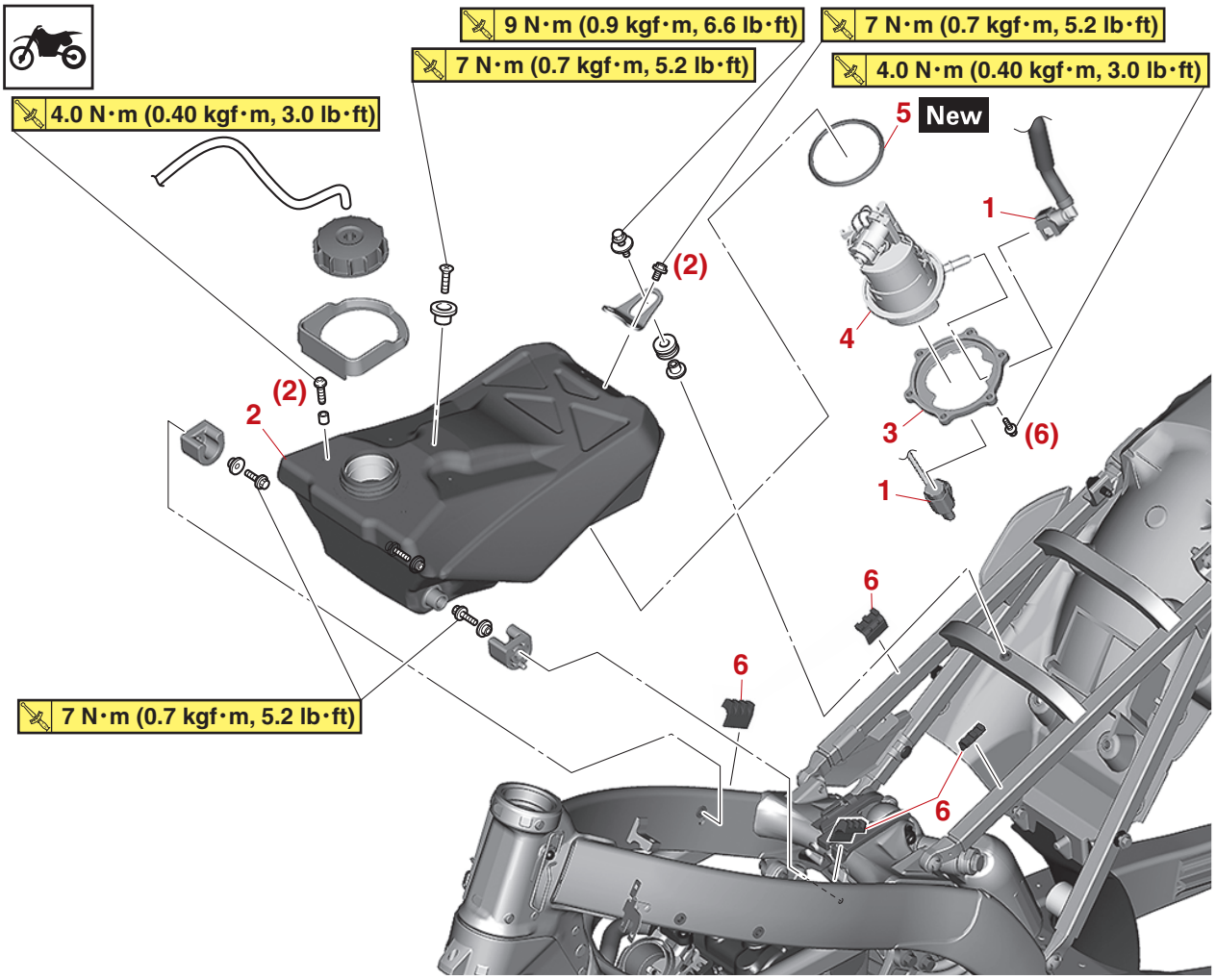
FUEL TANK 7-1
REMOVING THE FUEL TANK 7-2
REMOVING THE FUEL PUMP 7-2
CHECKING THE FUEL PUMP BODY 7-2
CHECKING THE FUEL PUMP OPERATION 7-2
INSTALLING THE FUEL PUMP 7-2
INSTALLING THE FUEL TANK 7-3

THROTTLE BODY 7-4
CHECKING THE INJECTOR 7-7
CHECKING THE THROTTLE BODY 7-7
CHECKING THE FUEL PRESSURE 7-7
ADJUSTING THE THROTTLE POSITION SENSOR 7-8

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 pump gasket	1	
6	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

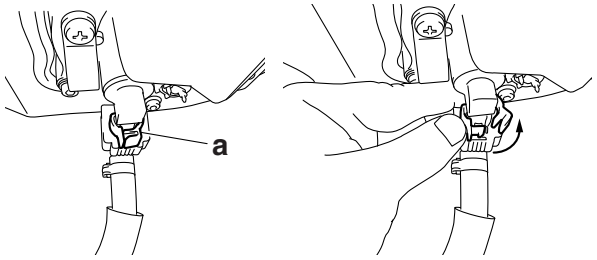
EWA19370
⚠ WARNING

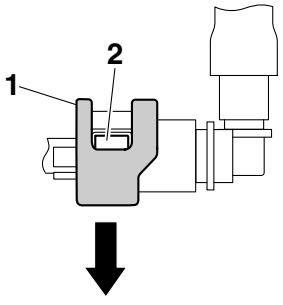
Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.

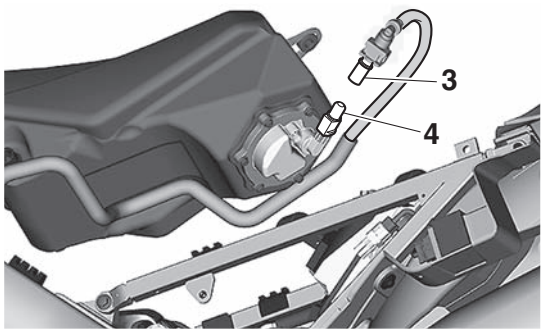
ECA24710
NOTICE

Make sure that the fuel hose is disconnected by hand. Do not forcefully disconnect the hose with tools.

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.

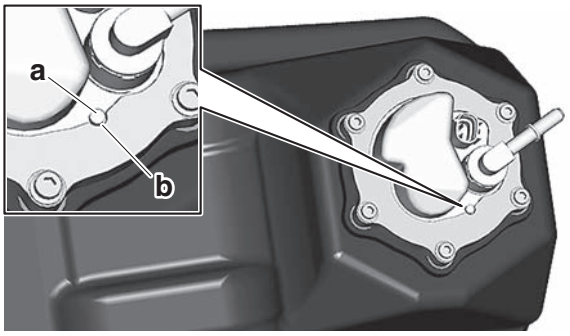
EAM30265
CHECKING THE FUEL PUMP BODY
1. Check:
   • Fuel pump body
   Obstructions → Clean.
   Cracks/damage → Replace the fuel pump assembly.

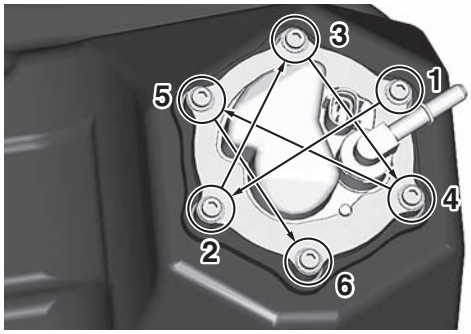
EAM30508
CHECKING THE FUEL PUMP OPERATION
1. Check:
   • Fuel pump operation
   Refer to "CHECKING THE FUEL PRESSURE" on page 7-7.

EAM30266
INSTALLING THE FUEL PUMP
1. Install:
   • Fuel pump gasket New
   • Fuel pump
   • Fuel pump bracket

	Fuel pump bolt **4.0 N·m (0.40 kgf·m, 3.0 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.

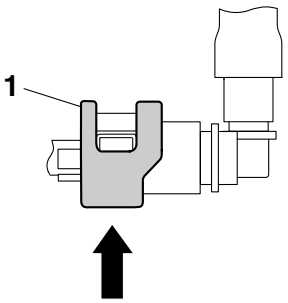


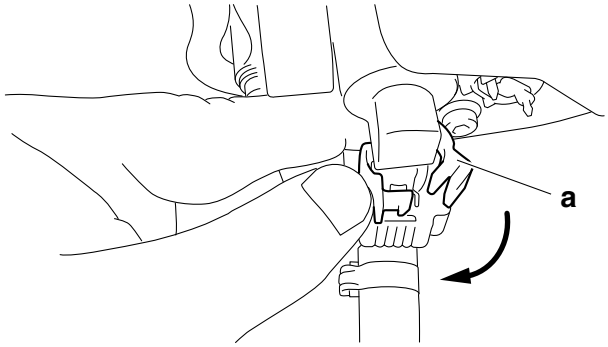


EAM30267
INSTALLING THE FUEL TANK
1. Install:
   - Fuel tank
2. Connect:
   - Fuel hose

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.



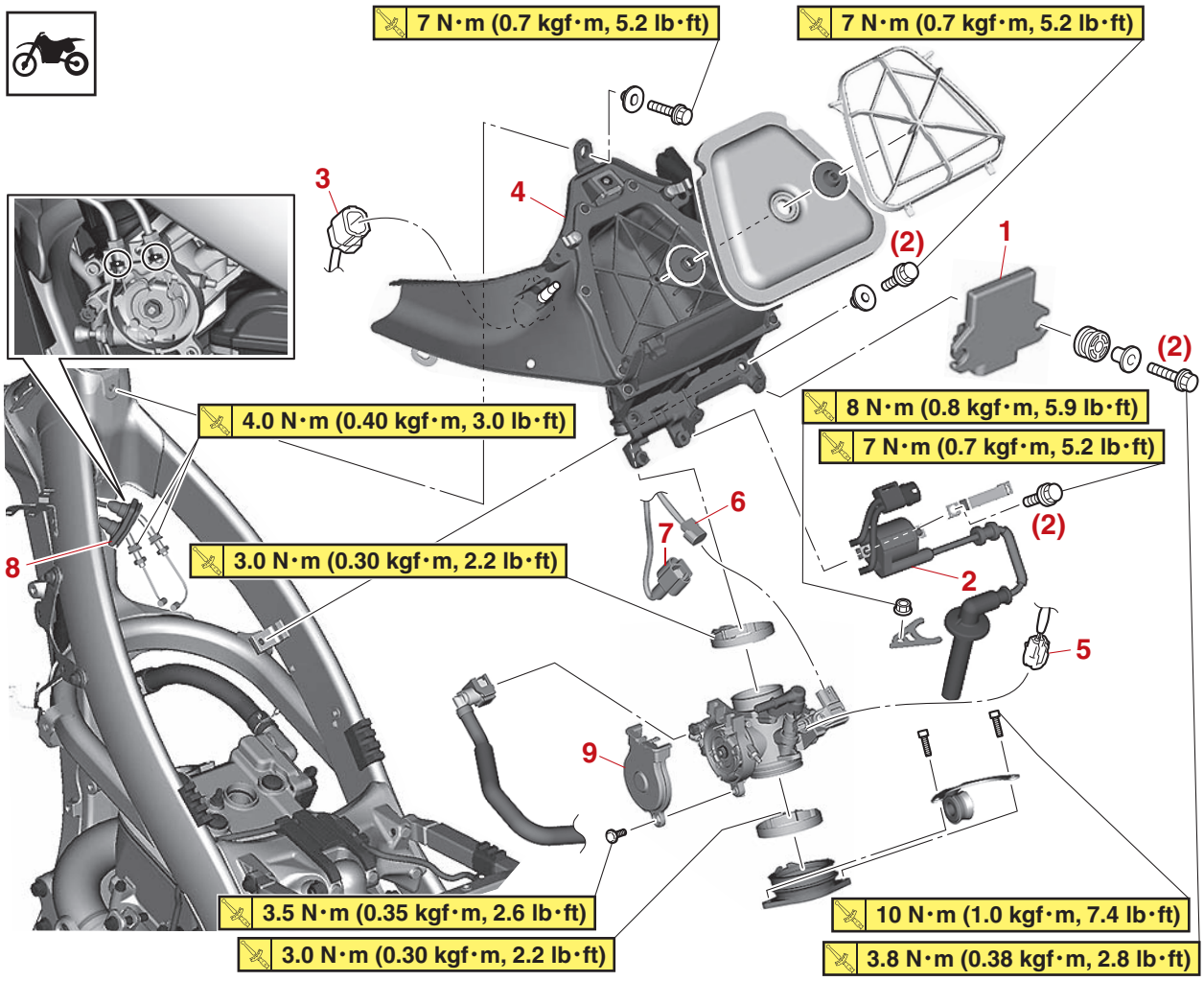


3. Connect:
   - Fuel pump coupler
4. Install:
   - Air scoop (left/right)
   - Seat
   - Side cover (left/right)
   Refer to “GENERAL CHASSIS” on page 4-1.

EAM20141

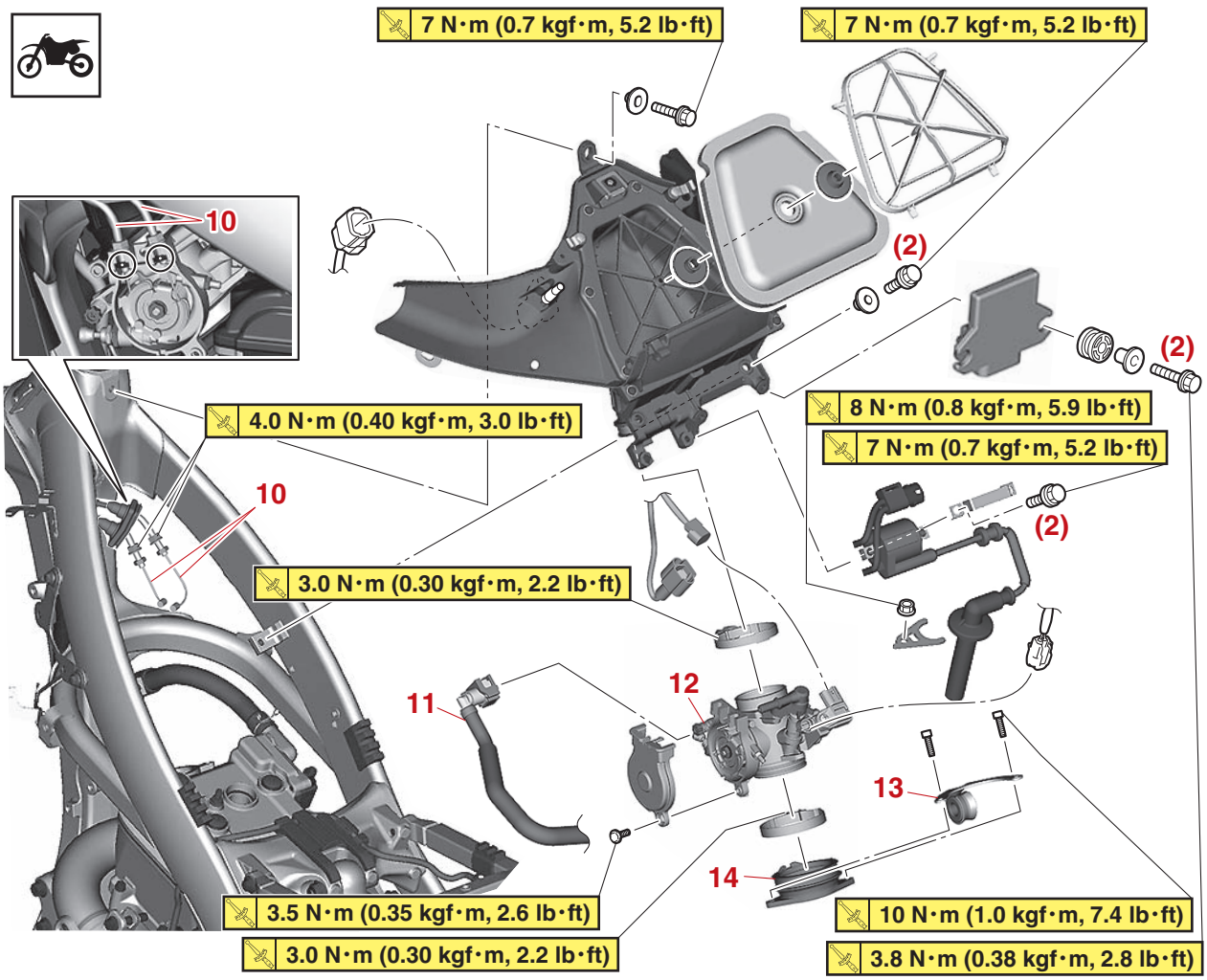
THROTTLE BODY

Removing the throttle body



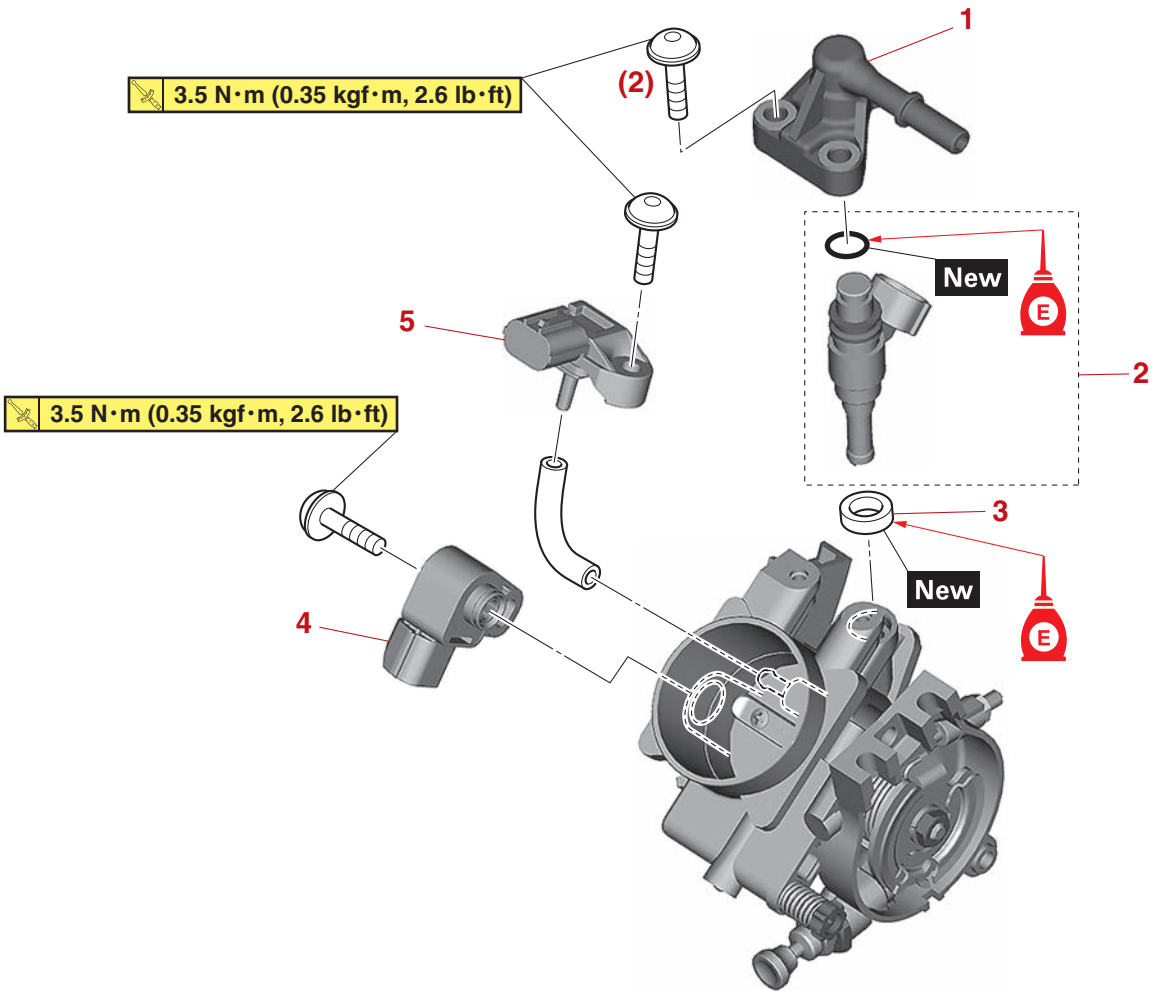
Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Air filter case cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	ECU (Engine Control Unit)	1	
2	Ignition coil	1	
3	Intake air temperature sensor coupler	1	Disconnect.
4	Air filter case	1	
5	Fuel injector coupler	1	Disconnect.
6	Intake air pressure sensor coupler	1	Disconnect.
7	Throttle position sensor coupler	1	Disconnect.
8	Cover	1	
9	Throttle cable cover	1	

Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
10	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.
11	Fuel hose	1	
12	Throttle body	1	
13	Exhaust pipe bracket	1	
14	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

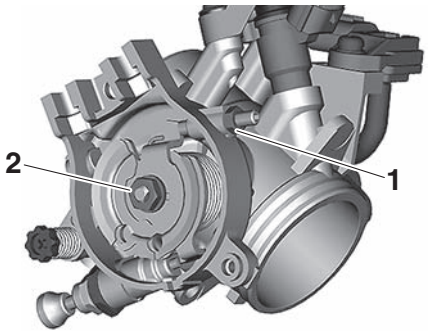
1. Check:
   • Injector
   Obstruction → Replace, and check the fuel pump and the fuel injection system.
   Refer to "FUEL INJECTION SYSTEM" on page 8-15.
   Deposits → Replace.
   Damage → Replace.
2. Check:
   • Injector resistance
   Refer to "CHECKING THE INJECTOR" on page 8-53.

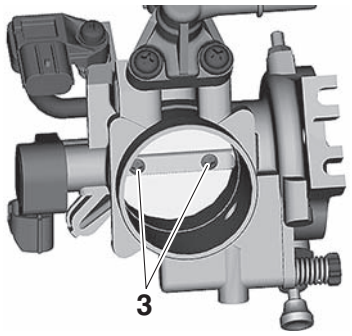
EAM30272
CHECKING THE THROTTLE BODY

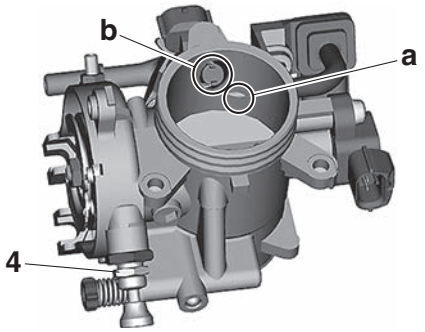
1. Check:
   • Throttle body
   Cracks/damage → Replace.
2. Check:
   • Fuel passages
   Obstructions → Clean.

ECA26070
NOTICE

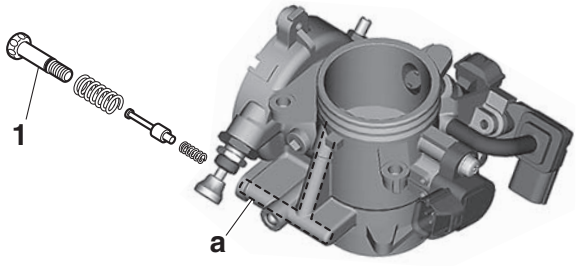
• Before removing the throttle body, clean the area around the throttle body to prevent dirt and other foreign material from falling into the engine.
• If the throttle body is subject to strong shocks or dropped during cleaning, replace it.
• Do not use any caustic carburetor cleaning solution.
• Do 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 "a"
   Obstruction → Blow out with compressed air.



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.

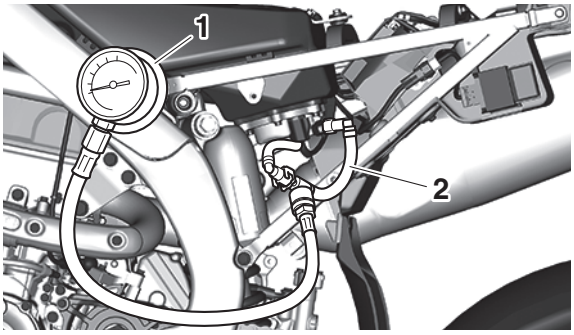
b. Remove the fuel tank bolt and lift the fuel tank.
c. Disconnect the fuel hose from the fuel pump.
Refer to "REMOVING THE FUEL TANK" on page 7-2.

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/cm², 43.5–56.6 psi)

EAM30273
ADJUSTING THE THROTTLE POSITION SENSOR

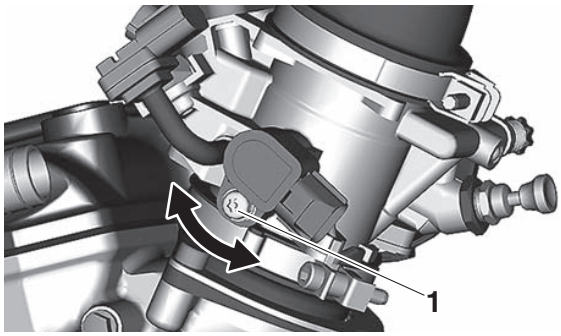
EWA15950
WARNING
• Handle the throttle position sensor with special care.
• Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

1. Check:
   • Throttle position sensor
   Refer to "CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE" on page 8-52.
2. Adjust:
   • Throttle position sensor angle
   a. Connect the Yamaha diagnostic tool.
   Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-17.

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264
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 screw "1".

Throttle position sensor screw
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)



ELECTRICAL SYSTEM

IGNITION SYSTEM 8-1
CIRCUIT DIAGRAM 8-1
TROUBLESHOOTING 8-3

ELECTRIC STARTING SYSTEM 8-7
CIRCUIT DIAGRAM 8-7
TROUBLESHOOTING 8-9

CHARGING SYSTEM 8-11
CIRCUIT DIAGRAM 8-11
TROUBLESHOOTING 8-13

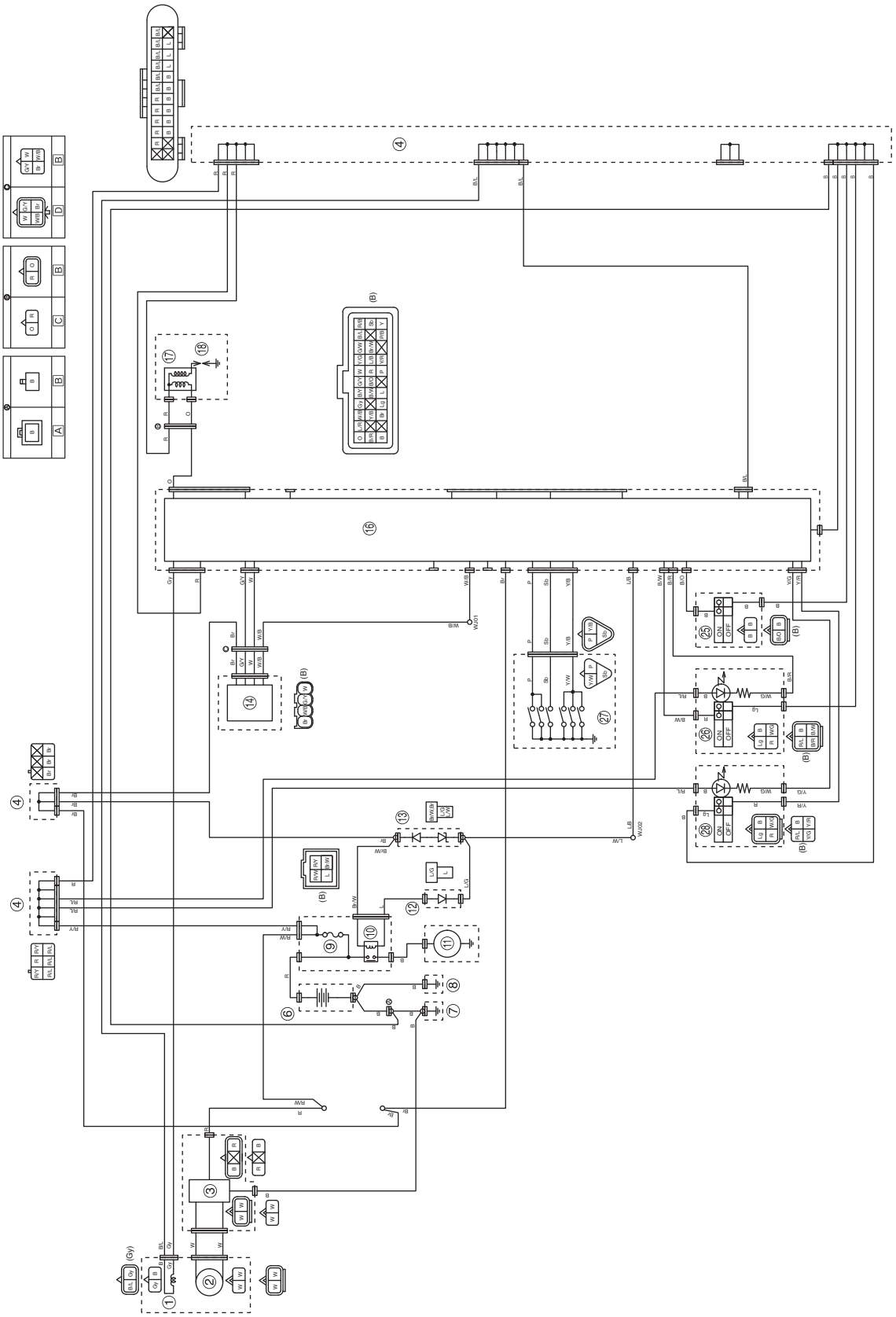
FUEL INJECTION SYSTEM 8-15
CIRCUIT DIAGRAM 8-15
YAMAHA DIAGNOSTIC TOOL 8-17
CONNECTING THE YAMAHA DIAGNOSTIC TOOL 8-17
TROUBLESHOOTING DETAILS (FAULT CODE) 8-19

FUEL PUMP SYSTEM 8-39
CIRCUIT DIAGRAM 8-39
TROUBLESHOOTING 8-41

ELECTRICAL COMPONENTS 8-42
CHECKING THE SWITCHES 8-43
CHECKING THE FUSES 8-45
CHECKING AND CHARGING THE BATTERY 8-45
CHECKING THE RELAYS 8-47
CHECKING THE RELAY UNIT (DIODE) 8-47
CHECKING THE IGNITION SPARK GAP 8-48
CHECKING THE SPARK PLUG CAP 8-48
CHECKING THE IGNITION COIL 8-49
CHECKING THE CRANKSHAFT POSITION SENSOR 8-49
CHECKING THE LEAN ANGLE SENSOR 8-50
CHECKING THE STARTER MOTOR OPERATION 8-50
CHECKING THE STATOR COIL 8-50
CHECKING THE RECTIFIER/REGULATOR 8-50
CHECKING THE COOLANT TEMPERATURE SENSOR 8-51
CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE 8-52
CHECKING THE INTAKE AIR TEMPERATURE SENSOR 8-52
CHECKING THE GEAR POSITION SWITCH 8-53
CHECKING THE INJECTOR 8-53

EAM20142
IGNITION SYSTEM

EAM30277
CIRCUIT DIAGRAM



1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Battery
7. Engine ground
8. Frame ground
9. Fuse
10. Starter relay
11. Starter motor
12. Diode 1
13. Diode 2
14. CCU (Communication Control Unit)
16. ECU (Engine Control Unit)
17. Ignition coil
18. Spark plug
25. Engine stop switch
26. Mode switch
27. Gear position switch
28. Launch control 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 8-45.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-45.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the spark plug. Refer to “CHECKING THE SPARK PLUG” on page 3-12.	NG→	Correct or replace the spark plug.
OK↓		
5. Check the ignition spark gap. Refer to “CHECKING THE IGNITION SPARK GAP” on page 8-48.	OK→	The ignition system circuit is OK.
NG↓		
6. Check the ignition coil. Refer to “CHECKING THE IGNITION COIL” on page 8-49.	NG→	Replace the ignition coil.
OK↓		
7. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-43.	NG→	Replace the engine stop switch.
OK↓		
8. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-49.	NG→	Replace the crankshaft position sensor.
OK↓		

9. Check the stator coil assembly. Refer to "CHECKING THE STATOR COIL" on page 8-50.	NG→	Replace the stator coil assembly.
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 launch control indicator light fail to blink.

TIP

Before troubleshooting, remove the following part(s):
1. Seat
2. Air scoop (left)

1. Check the launch control switch coupler connections.	NG→	Reconnect.
OK↓		
2. Check the gear position switch coupler connections.	NG→	Reconnect.
OK↓		
3. Check the launch control switch. Refer to "CHECKING THE SWITCHES" on page 8-43.	NG→	Replace the launch control switch.
OK↓		
4. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-53.	NG→	Replace the gear position switch.
OK↓		
5. Check the fuel 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 8-43.

NG→ Replace the mode switch.

OK↓

3. Check the ignition system wire harness.
   Refer to “CIRCUIT DIAGRAM” on page 8-1.

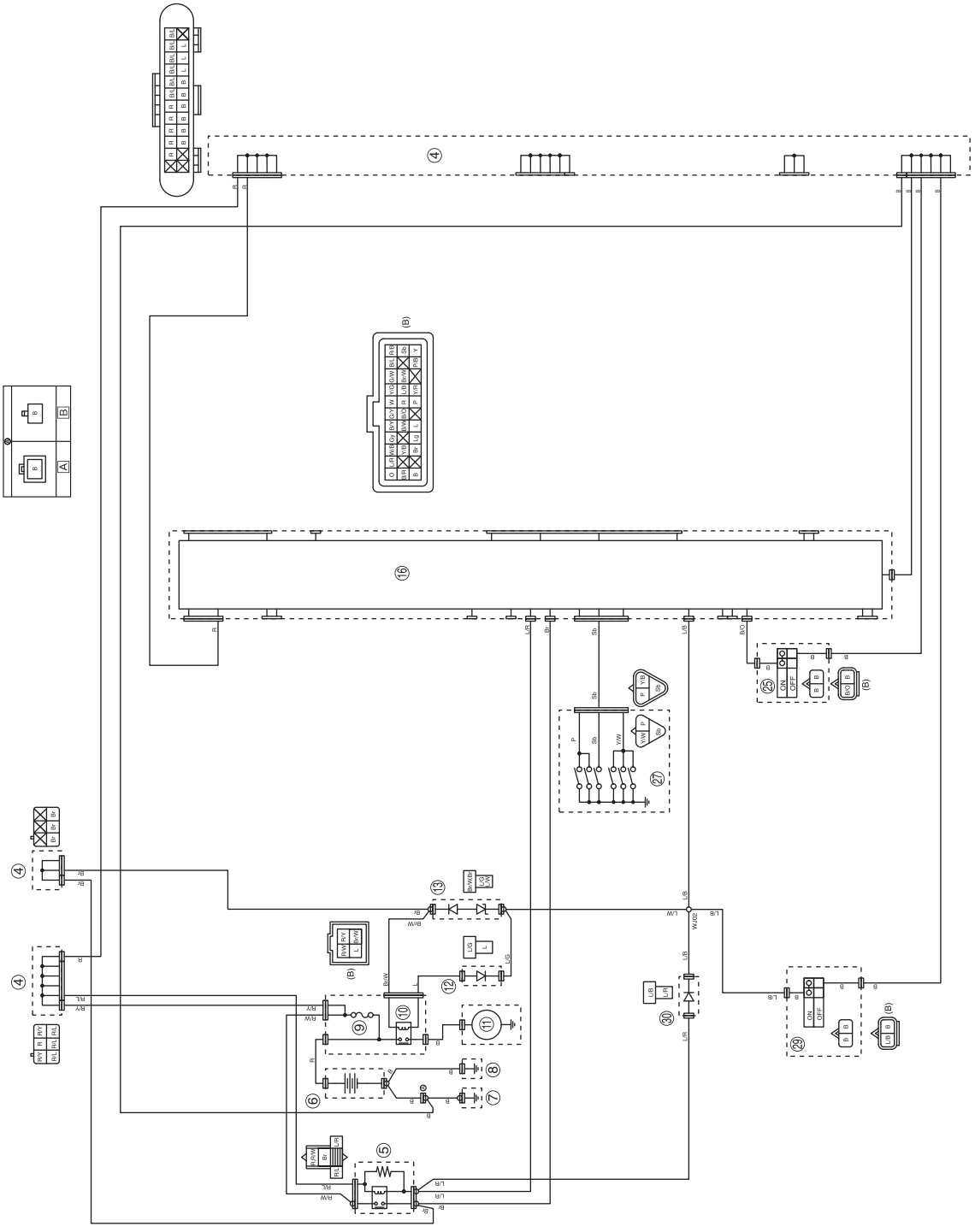
NG→ Repair or replace the wire harness.

OK↓

Replace the ECU.

EAM20143
ELECTRIC STARTING SYSTEM

EAM30279
CIRCUIT DIAGRAM



4. Joint connector
5. Main relay
6. Battery
7. Engine ground
8. Frame ground
9. Fuse
10. Starter relay
11. Starter motor
12. Diode 1
13. Diode 2
16. ECU (Engine Control Unit)
25. Engine stop switch
27. Gear position switch
29. Start switch
30. 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 8-45.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-45.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main relay. Refer to “CHECKING THE RELAYS” on page 8-47.	NG→	Replace the main relay.
OK↓		
4. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 8-50.	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 5-44.	NG→	Repair or replace the starter motor.
OK↓		
6. Check the diodes. (Diode 1, diode 2, diode 3) Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-47.	NG→	Replace the diodes.
OK↓		
7. Check the starter relay. Refer to “CHECKING THE RELAYS” on page 8-47.	NG→	Replace the starter relay.
OK↓		
8. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-43.	NG→	Replace the engine stop switch.
OK↓		

9. Check the start switch.
   Refer to "CHECKING THE SWITCHES" on page 8-43.

NG→ Replace the start switch.

OK↓

10. Check the entire starting system's wiring.
    Refer to "CIRCUIT DIAGRAM" on page 8-7.

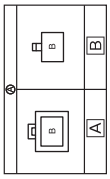
NG→ Properly connect or repair the starting system's wiring.

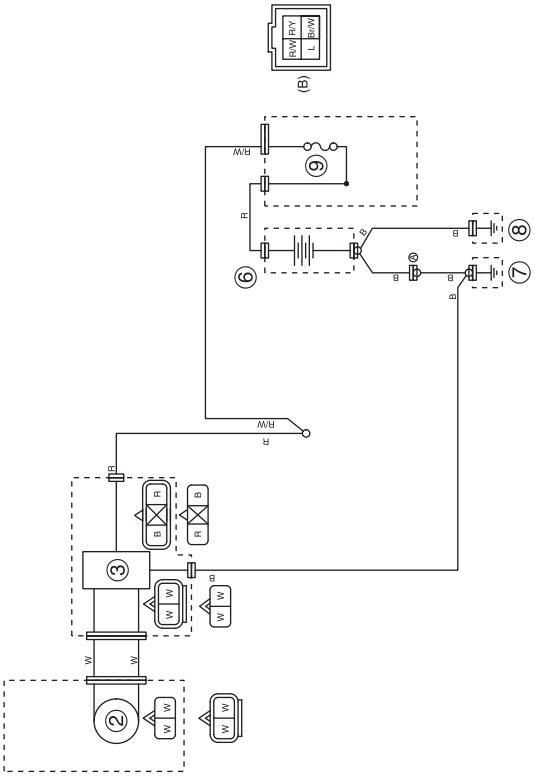
OK↓

Replace the ECU.

EAM20144
CHARGING SYSTEM

EAM30282
CIRCUIT DIAGRAM





2. AC magneto
3. Rectifier/regulator
6. Battery
7. Engine ground
8. Frame ground
9. Fuse

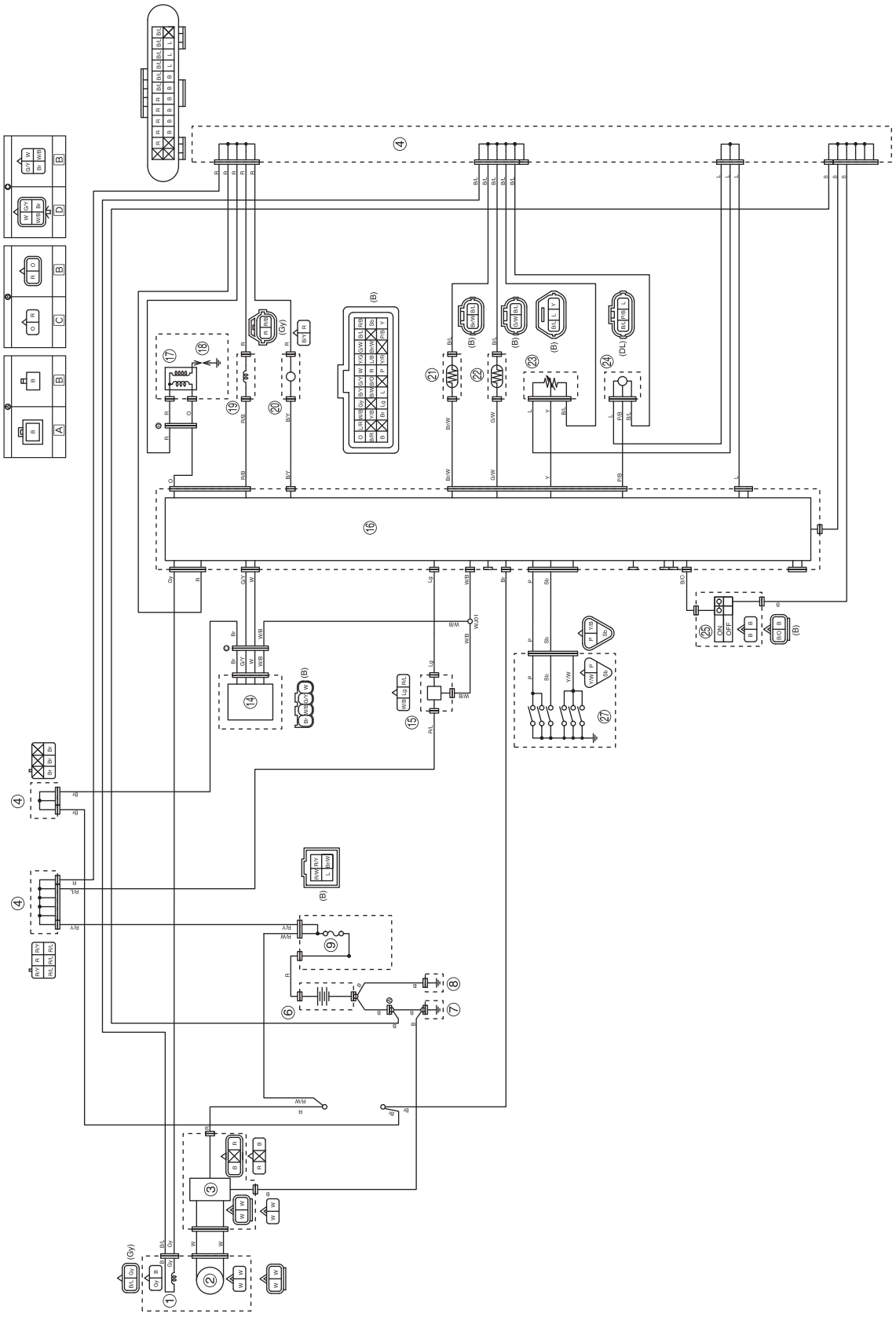
A. Battery sub-lead
B. Wire harness

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 8-45.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-45.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-50.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the stator coil assembly. Refer to "CHECKING THE STATOR COIL" on page 8-50.	NG→	Replace the stator coil assembly.
OK↓		
6. Check the charging system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-11.	NG→	Repair or replace the wire harness.
OK↓		
This circuit is OK.		

EAM20145
FUEL INJECTION SYSTEM

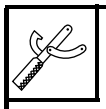
EAM30284
CIRCUIT DIAGRAM



1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Battery
7. Engine ground
8. Frame ground
9. Fuse
14. CCU (Communication Control Unit)
15. Yamaha diagnostic tool coupler
16. ECU (Engine Control Unit)
17. Ignition coil
18. Spark plug
19. Fuel injector
20. Fuel pump
21. Intake air temperature sensor
22. Coolant temperature sensor
23. Throttle position sensor
24. Intake air pressure sensor
25. Engine stop switch
27. Gear position switch

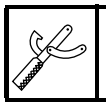
A. Battery sub-lead
B. Wire harness
C. Ignition coil sub-lead
D. CCU sub-lead

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.



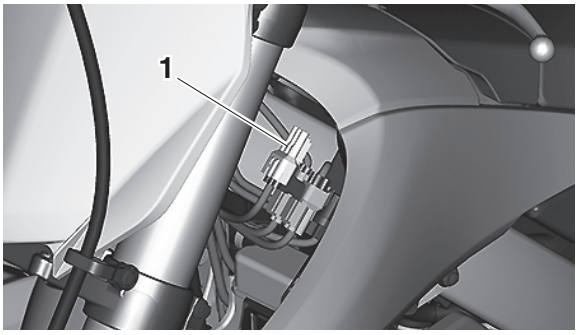
Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP
A generic scan tool can also be used to identify malfunctions.



OBD/ GST Leadwire kit
90890-03249

EAM30356
CONNECTING THE YAMAHA DIAGNOSTIC TOOL
1. Remove the coupler for connecting setting tool “1”.



2. Connect the FI diagnostic tool sub-lead.



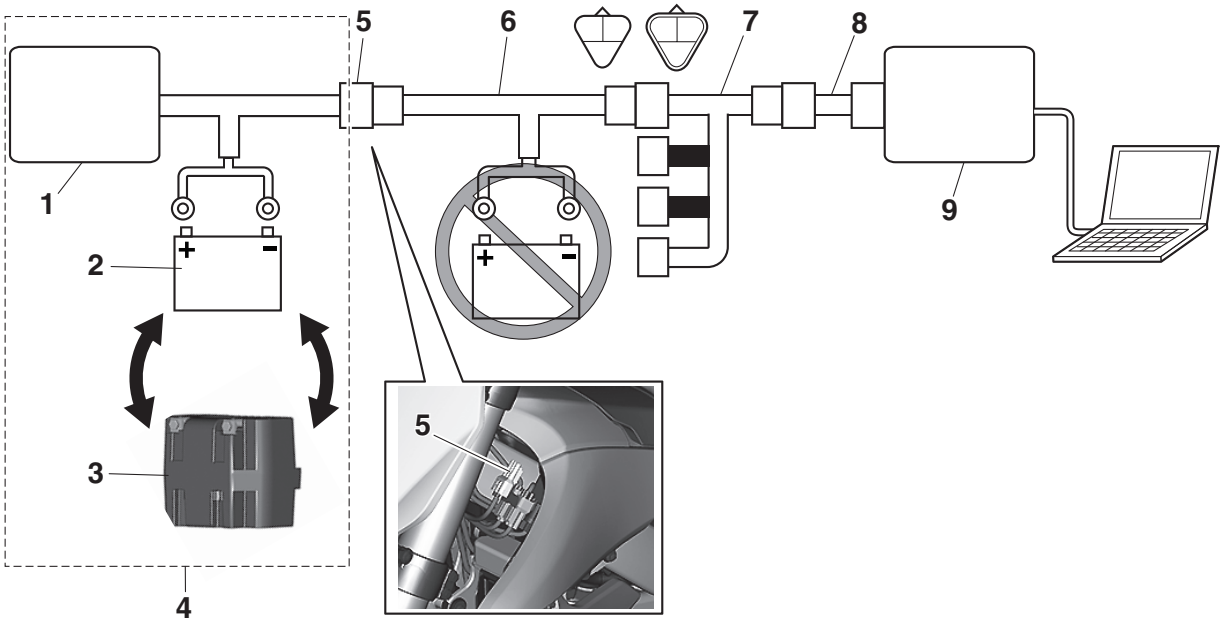
FI diagnostic tool sub–lead
90890-03212
FI diagnostic tool sub–lead
YU-03212

3. Connect the FI diagnostic tool sub-lead to the Yamaha diagnostic tool.

EWA20450
⚠ WARNING

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 "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-12.

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

Fault code No.	**12**
Item	**Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	—
Diagnostic tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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.

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
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 (0.85 mm (0.0335 in)) between the crankshaft position sensor and the pickup rotor.	Improperly mounted sensor → Remount or replace the sensor. Refer to “GENERATOR” on page 5-37.	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 8-49.	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.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Diagnostic tool display		Displays the intake air pressure.	
Procedure		The atmospheric pressure is displayed on the Yamaha diagnostic tool.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

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) Abnormal display → Intake air pressure sensor is defective → Replace the intake air pressure 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. 14

TIP

If fault code numbers 13 and 14 are both displayed, perform checkup and repair jobs for fault code number 13 first.

Fault code No.	**14**
Item	**Intake air pressure sensor: hose system malfunction (clogged or detached hose).**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	03
Diagnostic tool display	Displays the intake air pressure.
Procedure	The atmospheric pressure is displayed on the Yamaha diagnostic tool.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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) Value does not change during cranking → Intake air pressure sensor replacement.	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

Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.	**15**
Item	**Throttle position sensor: open or short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	01
Diagnostic tool display	Displays the throttle angle. • 11–14 (throttle in fully closed position) • 86–92 (throttle in fully opened position)
Procedure	• Check with throttle fully closed. • Check with throttle fully opened.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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 7-8.	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.

<table>
<tr><td colspan="2">Fault code No.</td><td colspan="2">15</td></tr>
<tr><td colspan="2">Item</td><td colspan="2">Throttle position sensor: open or short circuit detected.</td></tr>
<tr><td>5</td><td>Applied voltage of throttle position sensor lead.</td><td>Check the applied voltage. (black/blue–blue)
Location of disconnected lead: Output voltage
Disconnected ground lead: 5 V
Disconnected output lead: 0 V
Disconnected power supply lead: 0 V</td><td>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.</td></tr>
<tr><td>6</td><td>Defective throttle position sensor.</td><td>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.</td><td>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.</td></tr>
<tr><td>7</td><td>Faulty ECU.</td><td>Replace the ECU.</td><td>Service is finished.</td></tr>
<tr><td>8</td><td>Delete the fault code.</td><td>Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.</td><td></td></tr>
</table>

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.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

<table>
<tr><td colspan="2">Fault code No.</td><td colspan="2">16</td></tr>
<tr><td colspan="2">Item</td><td colspan="2">Throttle position sensor: stuck throttle position sensor is detected.</td></tr>
<tr><td colspan="2" rowspan="2">Fail-safe system</td><td colspan="2">Able to start engine</td></tr>
<tr><td colspan="2">Able to drive vehicle</td></tr>
<tr><td colspan="2">Diagnostic code No.</td><td colspan="2">01</td></tr>
<tr><td colspan="2">Diagnostic tool display</td><td colspan="2">Displays the throttle angle.
• 11–14 (throttle in fully closed position)
• 86–92 (throttle in fully opened position)</td></tr>
<tr><td colspan="2">Procedure</td><td colspan="2">• Check with throttle fully closed.
• Check with throttle fully opened.</td></tr>
<tr><td>Item</td><td>Probable cause of malfunction and check</td><td>Maintenance job</td><td>Confirmation of service completion</td></tr>
</table>

Fault code No.		16	
Item		Throttle position sensor: stuck throttle position sensor is detected.	
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 7-8.	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.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		06	
Diagnostic tool display		Displays the coolant temperature.	
Procedure		Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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.

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. Refer to “RADIATOR” on page 6-2.	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.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.	**22**
Item	**Intake air temperature sensor: open or short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	05
Diagnostic tool display	Displays the intake air temperature.
Procedure	Compare the actually measured intake air temperature with the Yamaha diagnostic tool display value.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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.

Fault code No.		22	
Item		**Intake air temperature sensor: open or short circuit detected.**	
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

TIP

Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.		30	
Item		**The vehicle has overturned.**	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	
Diagnostic tool display		Displays the lean angle sensor output voltage. • 0.4–1.4 (V) (upright) • 3.7–4.4 (V) (overturned)	
Procedure		Remove the ECU, and incline it 45° or more.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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.

Fault code No.		30	
Item		**The vehicle has overturned.**	
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

Fault code No.		33	
Item		**Ignition coil: open or short circuit detected in the primary lead of the ignition coil.**	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		30	
Actuation		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.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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.

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	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 8-49.	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.

Fault code No.	**39**
Item	**Injector: open or short circuit detected.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	36
Actuation	Actuates injector five times at one-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the injector is actuated.
Procedure	Check that injector is actuated five times by listening for the operating sound.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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 INJECTOR" on page 8-53.	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–red red/yellow–red/yellow 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.
5	Faulty ECU.	Replace the ECU.	Service is finished.

Fault code No.		39	
Item		Injector: open or short circuit detected.	
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

Fault code No.		41	
Item		ECU: built-in lean angle sensor malfunction.	
Fail-safe system		Unable to start engine	
		Able to drive vehicle	
Diagnostic code No.		08	
Diagnostic tool display		Displays the lean angle sensor output voltage. • 0.4–1.4 (V) (upright) • 3.7–4.4 (V) (overturned)	
Procedure		Remove the ECU, and incline it 45° or more.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Faulty ECU.	Replace the ECU.	Service is finished.

Fault code No. 43

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the main relay and CCU.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		09	
Diagnostic tool display		Fuel system voltage Approximately 12.0 (V)	
Procedure		Disconnect the main relay, and push the start switch.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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.

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 main relay. 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. Or 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.	

Fault code No. 44

TIP

Before troubleshooting, disconnect the starter motor lead from the starter relay.

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. • 00: No fault • 01: CO adjustment valve • 07: Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8
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 push the start 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 5 and finish the service. Condition is “Detected” → Repeat item 1. If the same number is indicated, go to item 4.
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.	

Fault code No. 46

Fault code No.	**46**
Item	**Vehicle system power supply: normal voltage is not supplied to the ECU.**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—
Diagnostic tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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 STATOR COIL” on page 8-50.	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.

Fault code No.		**46**	
Item		**Vehicle system power supply: normal voltage is not supplied to the ECU.**	
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

TIP

Before troubleshooting, disconnect the starter motor lead from the starter relay.

Fault code No.		**50**	
Item		**ECU: faulty ECU memory.**	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		—	
Diagnostic tool display		—	
Procedure		—	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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.

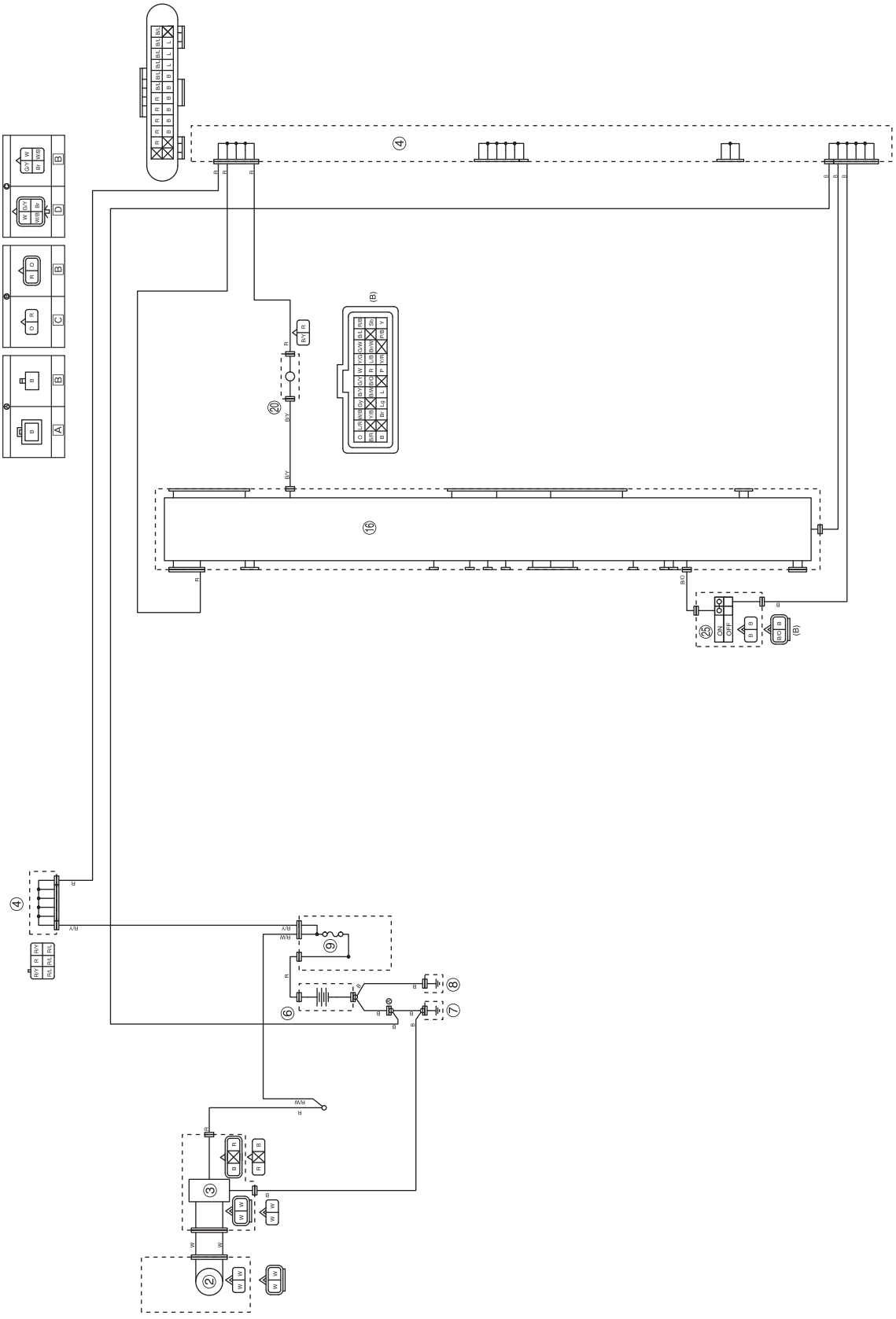
If the engine is forcibly stopped by leaving idle, the recovered state is recorded by malfunction mode.

Fault code No.		**70**	
Item		**Engine forcibly stops when the vehicle is left idling for a long period of time.**	
Fail-safe system		—	
		Unable to drive vehicle	
Diagnostic code No.		—	
Diagnostic tool display		—	
Procedure		—	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

Fault code No.		70	
Item		Engine forcibly stops when the vehicle is left idling for a long period of time.	
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



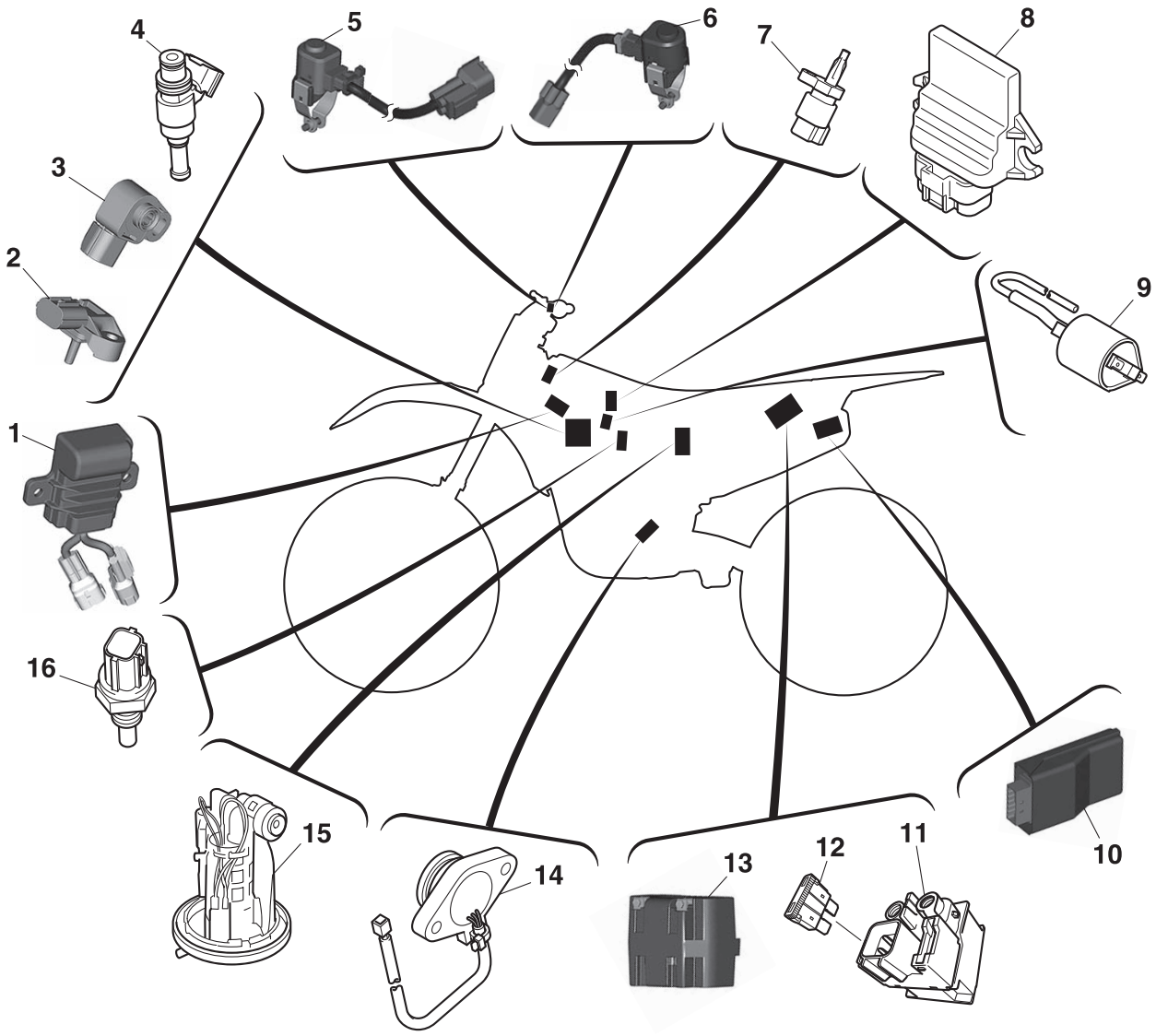
2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Battery
7. Engine ground
8. Frame ground
9. Fuse
16. ECU (Engine Control Unit)
20. Fuel pump
25. Engine stop switch

A. Battery sub-lead
B. Wire harness
C. Ignition coil sub-lead
D. CCU sub-lead

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

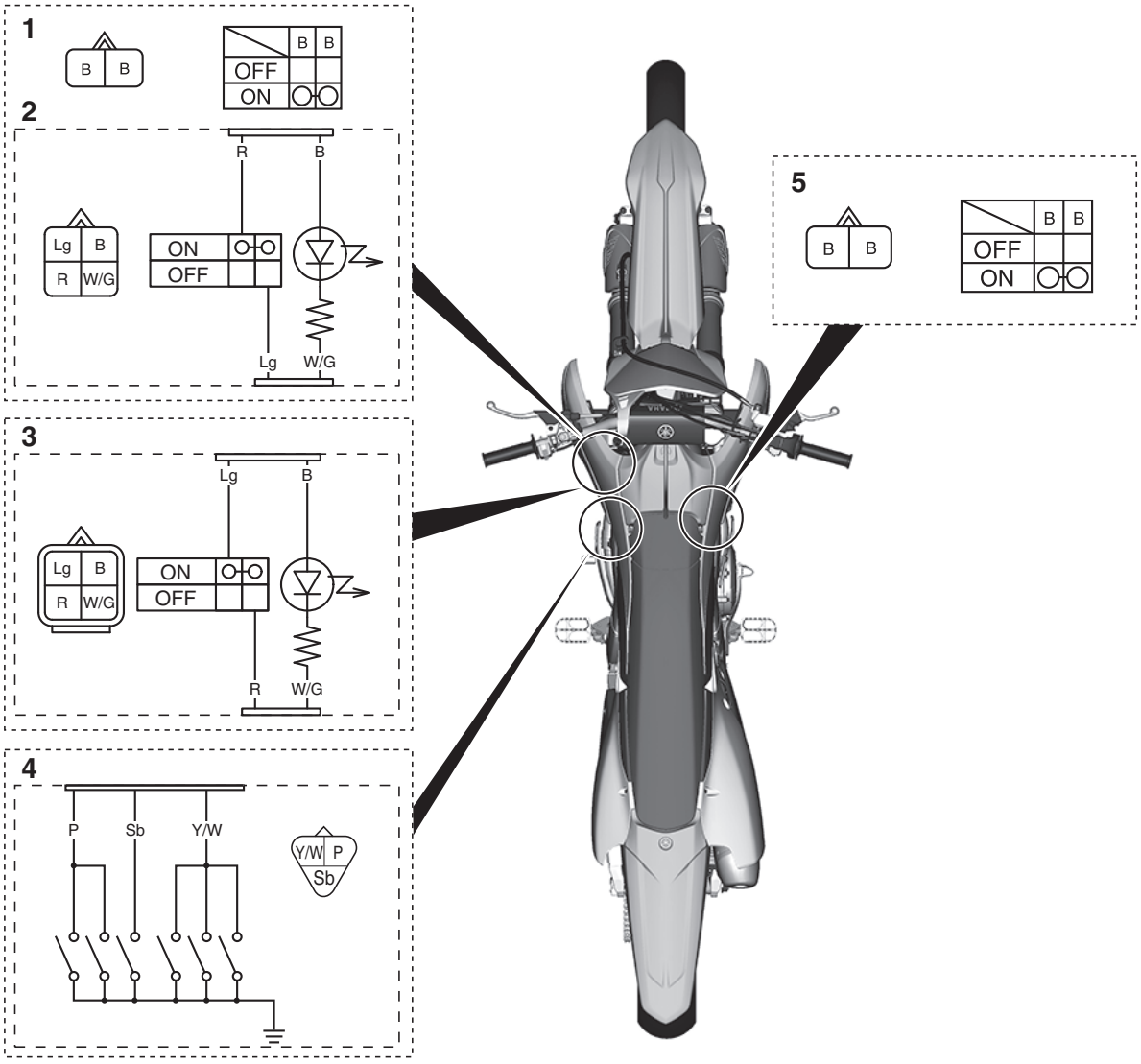
1. Check the fuel pump system wire harness connections.	NG→	Reconnect.
OK↓		
2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-45.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-45.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-43.	NG→	Replace the engine stop switch.
OK↓		
5. Check fuel pressure. Refer to "CHECKING THE FUEL PRESSURE" on page 7-7.	NG→	Replace the fuel pump.
OK↓		
6. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 8-39.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

EAM20147
ELECTRICAL COMPONENTS



1. Rectifier/regulator
2. Intake air pressure sensor
3. Throttle position sensor
4. Injector
5. Launch control switch
6. Mode switch
7. Intake air temperature sensor
8. ECU (Engine Control Unit)
9. Ignition coil
10. CCU (Communication Control Unit)
11. Starter relay
12. Fuse
13. Battery
14. Gear position switch
15. Fuel pump
16. Coolant temperature sensor

EAM30289
CHECKING THE SWITCHES



1. Engine stop switch
2. Mode switch
3. Launch control switch
4. Gear position switch
5. Engine start switch

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

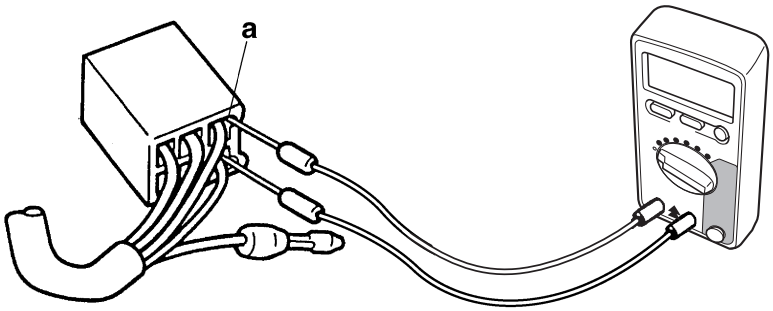
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



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.

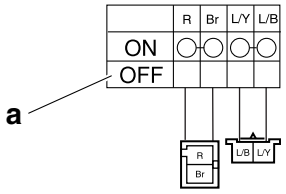


Terminal connections of the switch are shown in the terminal connection diagram below.
The switch positions "a" are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

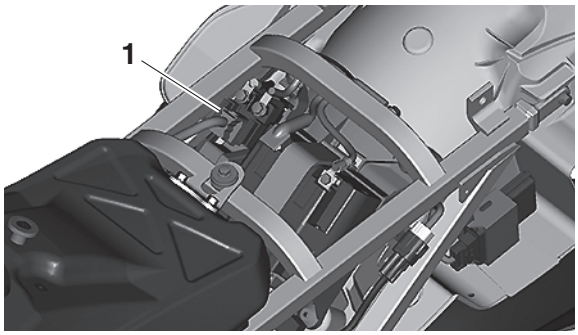
TIP

" ○——○ " 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".



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:
   • Fuse "1"



   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

   b. If the digital circuit tester indicates "O.L", replace the fuse.
3. Replace:
   • Fuse
   a. Install a new fuse of the correct amperage rating.
   b. Push the start switch to verify if the electrical circuit is operational.
   c. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	15 A	1
Spare	15 A	1

EWA13310
WARNING
Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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

EAM30291
CHECKING AND CHARGING THE BATTERY
EWA20430
WARNING
To avoid sparking, burns, fire, and explosion:
- **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.**

ECA26041
NOTICE
To prevent damage to the battery and battery malfunction:
- **Be sure to charge the battery using only the specified battery charger. Do not use a charger designed for lead-acid batteries. Otherwise, the battery could be damaged, such as from a long period of excessive current or voltage exceeding 16 V.**
- **Avoid excessive current discharge, such as pressing the starter switch for a long time. Wait for more than 10 seconds before attempting to start again. Charge the battery again as soon as possible. A long state of discharge below 10 V will damage the battery.**
- **Do not use the specified battery charger to charge a battery other than the lithium-ion battery. Otherwise, the battery or charger could be damaged.**
- **Be careful not to drop the battery or subject it to strong impacts.**
- **Avoid charging the battery at high temperatures of 65 °C (149 °F) or more or low temperatures under 0 °C (32 °F). A control feature preventing battery charging and discharging will temporarily intervene. The battery will discharge at 65 °C (149 °F) or more or low temperatures under -10 °C (14 °F).**
- **If the battery is charged between 0 °C (32 °F)and 10 °C (50 °F), battery charging may stop halfway without the battery becoming**

fully charged even when the specified battery charger is used. If this occurs, disconnect the battery charger, and then resume charging again.

TIP

This model uses a lithium-ion battery. When new, the battery is supplied in sleep mode to minimize current discharging until first-time use. In the sleep mode, a voltage as low as approximately 0.1 V can be measured if voltage measurement is performed. As such the battery cannot be used, but this is not a malfunction. By activating the battery as follows, the sleep mode will be canceled and the battery can be used normally.

Charging (activation) steps

1. Remove:
   - Side cover (left/right)
   - Seat

   Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery leads

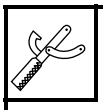
   (from the battery terminals)

ECA13700

NOTICE

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

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 terminal
7. Connect:
   - Battery lead

   (to the battery terminals)

ECA26980

NOTICE

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

8. Check:
   - Battery terminal

   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
9. Lubricate:
   - Battery terminal



Recommended lubricant
Dielectric grease

10. Install:
    - Seat
    - Side cover (left/right)

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

Checking the battery

ECA26080

NOTICE

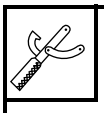
The battery has a limited service life. If the battery cannot be charged or it is determined that the battery cannot be used after checking the battery, it should be replaced. When replacing the battery, be sure to use a Yamaha genuine lithium-ion battery.

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 battery terminals.
   13.25 V or more → The battery is normal. Checking is finished.
   10 V or more and less than 13.25 V → Perform from step (c) again.
   Less than 10 V → Replace the battery.

TIP

Before replacing the battery, make sure that the battery temperature is proper (temperature not more than 65 °C (149 °F) or less than 0 °C (32 °F)). Otherwise, wait until the battery temperature is proper and perform the procedure from step (c) again.

EAM30292

CHECKING THE RELAYS

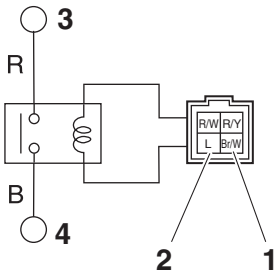
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



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

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester (Ω) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

Starter relay

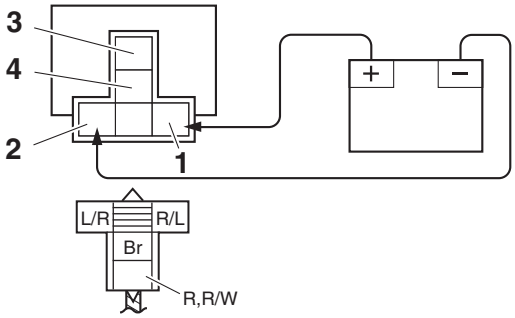


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

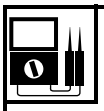


Result
Continuity
(between “3” to “4”)

Main relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity
(between “3” to “4”)

EAM30495

CHECKING THE RELAY UNIT (DIODE)

1. Check:
   • Diode
   Out of specification → Replace.



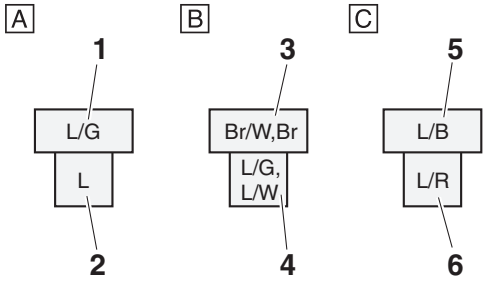
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

The digital circuit tester and the multimeter with tachometer readings are shown in the following table.

No continuity
Positive tester probe → Blue/Green "1"
Negative tester probe → Blue "2"
Continuity
Positive tester probe → Blue "2"
Negative tester probe → Blue/Green "1"
No continuity
Positive tester probe → Brown/White, Brown "3"
Negative tester probe → Blue/Green, Blue/White "4"
Continuity
Positive tester probe → Blue/Green, Blue/White "4"
Negative tester probe → Brown/White, Brown "3"
No continuity
Positive tester probe → Blue/Black "5"
Negative tester probe→ Blue/Red "6"
Continuity
Positive tester probe → Blue/Red "6"
Negative tester probe → Blue/Black "5"

a. Disconnect the diode from the wire harness.
b. Connect the digital circuit tester (Ω) to the diode coupler as shown.
c. Check the diode for continuity.
d. Check the diode for no continuity.



A. Diode 1
B. Diode 2
C. Diode 3

EAM30294
CHECKING THE IGNITION SPARK GAP

1. Check:
• Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step (5). Refer to "TROUBLESHOOTING" on page 8-3.

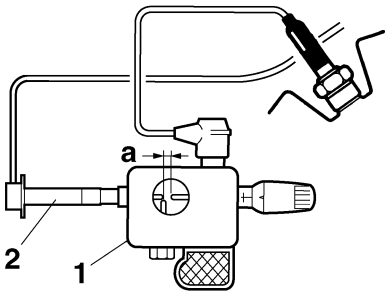
Minimum ignition spark gap
6.0 mm (0.24 in)

TIP
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

a. Remove the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Oppama pet–4000 spark checker
YM-34487

c. Crank the engine, and measure the ignition spark gap "a".



2. Spark plug cap

d. Crank the engine, and gradually increase the spark gap until a misfire occurs.

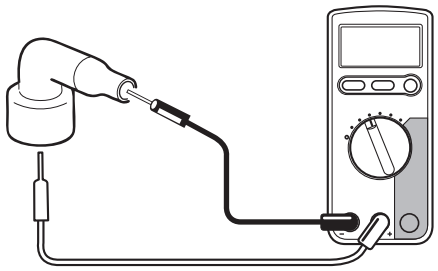
EAM30295
CHECKING THE SPARK PLUG CAP

1. Remove:
• Spark plug cap
(from the spark plug lead)
2. Check:
• Spark plug cap resistance
Out of specification → Replace.

Resistance
7.50–12.50 kΩ

a. Connect the digital circuit tester (Ω) to the spark plug cap.

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



b. Measure the spark plug cap resistance.

EAM30296
CHECKING THE IGNITION COIL

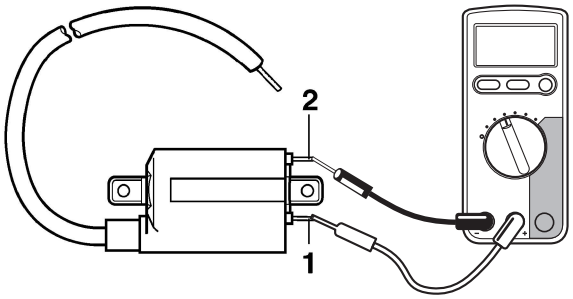
1. Disconnect:
   - Ignition coil terminal (from the sub wire harness)
   - Spark plug cap (from the ignition coil)
2. Check:
   - Primary coil resistance
     Out of specification → Replace.

Primary coil resistance
2.16–2.64 Ω

a. Connect the digital circuit tester (Ω) to the ignition coil.

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

- Positive tester probe → Ignition coil terminal 1 "1"
- Negative tester probe → Ignition coil terminal 2 "2"



b. Measure the primary coil resistance.

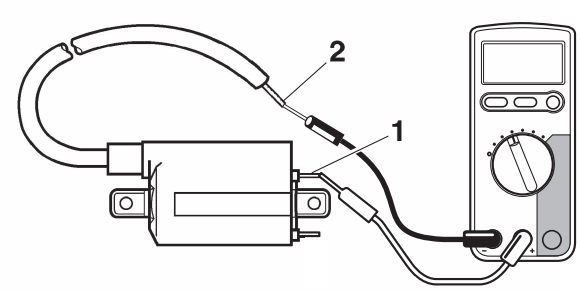
3. Check:
   - Secondary coil resistance
     Out of specification → Replace.

Secondary coil resistance
8.64–12.96 kΩ

a. Connect the digital circuit tester (Ω) to the ignition coil.

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

- Positive tester probe → Ignition coil terminal 1 "1"
- Negative tester probe → Spark plug lead "2"



b. Measure the secondary coil resistance.

EAM30297
CHECKING THE CRANKSHAFT POSITION SENSOR

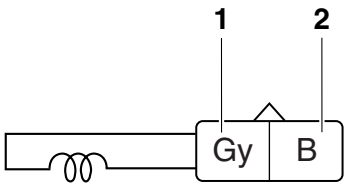
1. Disconnect:
   - Crankshaft position sensor coupler (from the wire harness)
2. Check:
   - Crankshaft position sensor resistance
     Out of specification → Replace.

Crankshaft position sensor resistance
228–342 Ω

a. Connect the digital circuit tester (Ω) to the crankshaft position sensor coupler.

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

• Positive tester probe → Gray “1” • Negative tester probe → Black “2”



b. Measure the crankshaft position sensor resistance.

EAM30298

CHECKING THE LEAN ANGLE SENSOR

1. Check:
   • Mounted condition of ECU
   Improperly mounted → Remount.

TIP

- The lean angle sensor is built into the ECU.
- The lean angle sensor stops the engine in case of a turnover.
- To ensure that the lean angle sensor operates correctly, do not change the installed condition of the ECU.

EAM30299

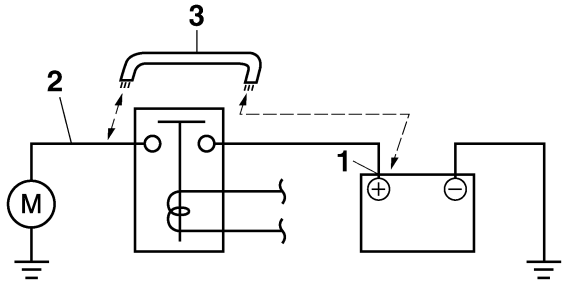
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   • Starter motor operation
   Does not operate → Perform the electric starting system troubleshooting, starting with step (4).
   Refer to “TROUBLESHOOTING” on page 8-9.
   a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

EWA13810

⚠ WARNING

- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**

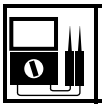


b. Check the starter motor operation.

EAM30300

CHECKING THE STATOR COIL

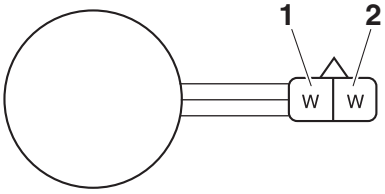
1. Disconnect:
   • Stator coil assembly coupler (from the wire harness)
2. Check:
   • Stator coil assembly resistance
   Out of specification → Replace.

	**Stator coil resistance** **0.512–0.768 Ω**

a. Connect the digital circuit tester (Ω) to the stator coil assembly coupler.

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

• Positive tester probe → White “1” • Negative tester probe → White “2”



b. Measure the stator coil assembly resistance.

EAM30301

CHECKING THE RECTIFIER/REGULATOR

1. Check:
   • Rectifier/regulator output voltage
   Out of specification → Replace.

Regulated voltage (DC)
14.0–14.8 V

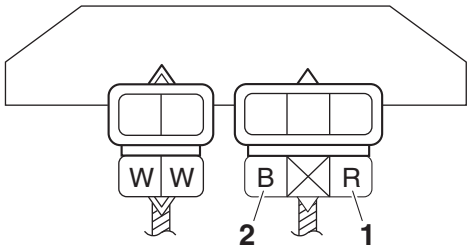
a. Set the digital tachometer to the ignition coil.

Digital tachometer
90890-06760
Digital tachometer
YU-39951-B

b. Connect the digital circuit tester (DCV) to the rectifier/regulator coupler.

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

- Positive tester probe → Red "1"
- Negative tester probe → Black "2"



c. Start the engine and let it run at about 5000 r/min.
d. Measure the output voltage.

EAM30303
CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   - Coolant temperature sensor

EWA14130
WARNING

- **Handle the coolant temperature sensor with special care.**
- **Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.**

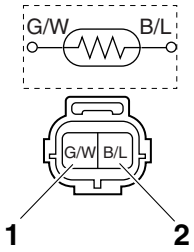
2. Check:
   - Coolant temperature sensor resistance
     Out of specification → Replace.

Coolant temperature sensor resistance
2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)
Coolant temperature sensor resistance
210–221 Ω at 100 °C (210–221 Ω at 212 °F)

a. Connect the digital circuit tester (Ω) to the coolant temperature sensor.

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

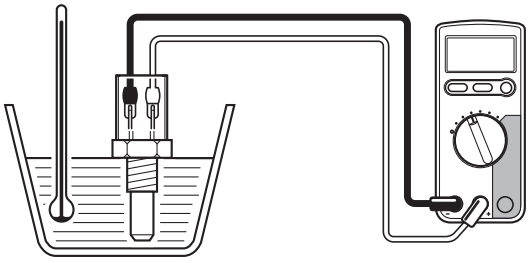
- Positive tester probe → Green/White "1"
- Negative tester probe → Black/Blue "2"



b. Immerse the coolant temperature sensor in a container filled with coolant.

TIP
Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer in the coolant.
d. Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
e. Check the coolant temperature sensor for continuity at the temperatures indicated in the table.



EAM30305
CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE

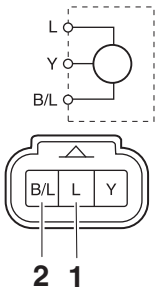
1. Check:
   - Throttle position sensor input voltage
     Out of specification → Replace the ECU.

Throttle position sensor input voltage
4–6 V

a. Connect the test harness S– pressure sensor (3P) to the throttle position sensor coupler and the wire harness.
b. 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”



c. Start the engine.
d. 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.**

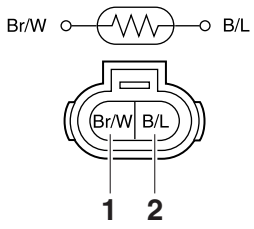
2. Check:
   - Intake air temperature sensor resistance
     Out of specification → Replace.

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 at 80 °C (290–390 Ω at 176 °F)

a. 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”

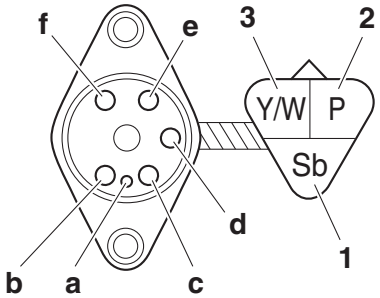


EAM30467
CHECKING THE GEAR POSITION SWITCH

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"



EAM30496
CHECKING THE INJECTOR

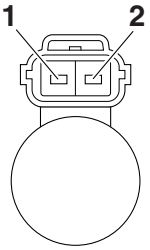
1. Remove:
   - Fuel injector
     Refer to "THROTTLE BODY" on page 7-4.
2. Check:
   - Fuel injector resistance
     Out of specification → Replace.

Resistance
12.0 Ω

a. Disconnect the fuel injector coupler from the fuel injector.
b. Connect the digital circuit tester (Ω) to the fuel injector coupler.

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

- Positive tester probe →
  Injector terminal "1"
- Negative tester probe →
  Injector terminal "2"



c. Measure the fuel injector resistance.

TROUBLESHOOTING

TROUBLESHOOTING 9-1
GENERAL INFORMATION 9-1
TROUBLESHOOTING OF ENGINE (fault code not detected) 9-1
TROUBLESHOOTING OF CLUTCH 9-4
TROUBLESHOOTING OF TRANSMISSION 9-6
TROUBLESHOOTING OF COOLING SYSTEM 9-7
TROUBLESHOOTING OF BRAKE 9-8
TROUBLESHOOTING OF SUSPENSION 9-8
TROUBLESHOOTING OF STEERING/HANDLING 9-10
TROUBLESHOOTING OF CHARGING SYSTEM 9-11

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE 9-12
SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM) 9-12
DIAGNOSTIC CODE: SENSOR OPERATION TABLE 9-12
DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE 9-14

EAM20148
TROUBLESHOOTING

EAM30309
GENERAL INFORMATION

TIP

Troubleshooting information provided here does not cover all the trouble symptoms, possible causes, and remedial actions. Some items may not apply depending on the model. Use this information as a guide and quick reference matrix when performing basic troubleshooting. Refer to the each chapter for detailed information on checking, adjustment, and replacement.

EAM30509
TROUBLESHOOTING OF ENGINE (fault code not detected)

TIP

If a fault code is detected, refer to the “FUEL INJECTION SYSTEM” on page 8-15.

Engine does not crank.

Symptom	Possible cause	Actions
Starter motor does not operate	Refer to “TROUBLESHOOTING” under “ELECTRIC STARTING SYSTEM” on page 8-7.	
Starter motor operates, but the engine does not crank.	Starter clutch malfunction	Replace the starter clutch.
	Improper oil grade (starter clutch slipping)	Change to recommended engine oil.
	Stuck piston or seized crankshaft	Disassemble and check the engine. Replace defective parts.

Engine will not start or is difficult to start, but it cranks.

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Refer to “TROUBLESHOOTING” under “IGNITION SYSTEM” on page 8-1.	
Fuel not supplied	—	Measure the fuel pressure.
	Empty fuel tank	Fill the fuel tank with fuel.
	Clogged fuel tank cap breather hole	Clean the fuel tank cap.
	Clogged or damaged fuel hose	Clean, repair, or replace the fuel hose.
	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged fuel pump	Clean or replace the fuel pump.
	Cracks or damage in fuel pump	Replace the fuel pump.
	Fuel pump malfunction	Refer to “TROUBLESHOOTING” under “FUEL PUMP SYSTEM” on page 8-39.
	Failed or clogged fuel injector	Replace the fuel injector.
	ECU failure	Replace the ECU.

Symptom	Possible cause	Actions
—	Water or foreign material in fuel, degraded fuel	Change fuel.
	Loose spark plug	Tighten the spark plug to the specified torque.
	Loose cylinder head or cylinder	Tighten bolts or nuts on cylinder head and cylinder to the specified torque.
	Damaged cylinder head gasket	Replace the cylinder head gasket.
	Incorrect valve timing	Adjust the valve timing.
	Incorrect valve clearance	Adjust the valve clearance.
	Worn valve guide	Replace the valve guide.
	Bent, damaged, or stuck valve	Replace the valve.
	Poor contact between valve and valve seat	Reface the valve-to-valve-seat contact.
	Fatigued or broken valve spring	Replace the valve spring.
	Worn, damaged, or stuck piston ring	Replace the piston and piston rings as a set.
	Seized or damaged piston	Replace the piston and piston rings as a set.
	Worn or damaged cylinder bore	Replace the cylinder, piston, and piston rings as a set.

Incorrect idling speed or mid-to-high speed

Symptom	Possible cause	Actions
Spark plug does not produce a spark	Incorrect spark plug gap	Adjust the spark plug gap.
	Worn or damaged spark plug	Replace the spark plug.
	Defective spark plug cap	Replace the spark plug cap.
	Defective ignition coil	Replace the ignition coil.
	ECU failure	Replace the ECU.
Low fuel pressure	—	Measure the fuel pressure.
	Fuel leakage	Check the fuel passage. Repair or replace as necessary.
	Clogged fuel pump	Clean or replace the fuel pump.
	Cracks or damage in fuel pump	Replace the fuel pump.
	Fuel pump malfunction	Refer to “TROUBLESHOOTING” under “FUEL PUMP SYSTEM” on page 8-39.
Fuel not supplied	Failed or clogged fuel injector	Replace the fuel injector.
	ECU failure	Replace the ECU.

Symptom	Possible cause	Actions
—	Worn camshaft lobe	Replace the camshaft.
	Water or foreign material in fuel, degraded fuel	Change fuel.
	Contaminated throttle body or clogged internal passage	Clean the throttle body.
	Incorrectly adjusted throttle cable	Adjust the throttle grip free play.
	Incorrectly adjusted idling speed (idle screw)	Adjust the idle screw.
	Incorrect throttle position sensor angle	Adjust the throttle position sensor angle.
	Incorrect acceleration position sensor angle	Adjust the acceleration position sensor angle.
	Faulty ECU	Replace the ECU.
	Clogged vacuum hose	Clean the vacuum hose.
	Cracks and damage in vacuum hose	Replace the vacuum hose.
	Damaged throttle body joint	Replace the throttle body joint.
	Loose throttle body joint	Tighten the throttle body joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Incorrect oil level (high)	Adjust the oil level to the specified level.

Excessive noise from engine

Symptom	Possible cause	Actions
Noise heard from around cylinder head	Incorrect valve clearance (too wide)	Adjust the valve clearance.
	Fatigued or broken valve spring	Replace the valve spring.
	Worn or damaged camshaft lobe	Replace the camshaft.
	Worn or damaged valve lifter	Replace the valve lifter and cylinder head as a set.
	Worn or damaged camshaft journal	Replace the camshaft.
	Worn or damaged cylinder head (camshaft journal)	Replace the cylinder head.
Noise heard from around timing chain	Worn or damaged timing chain	Replace the timing chain and camshaft sprocket as a set.
	Worn or damaged camshaft sprocket	Replace the timing chain and camshaft sprocket as a set.
	Worn or damaged timing chain guide	Replace the timing chain guide.
	Cracked, damaged, or faulty timing chain tensioner	Replace the timing chain tensioner.

Symptom	Possible cause	Actions
Noise heard from around piston	Worn or damaged piston ring	Replace the piston and piston rings as a set.
	Worn or damaged piston	Replace the piston and piston rings as a set.
	Worn piston (piston pin hole)	Replace the piston and piston pin as a set.
	Worn or damaged piston pin	Replace the piston pin.
	Worn or damaged cylinder bore	Replace the cylinder, piston, and piston rings as a set.
	Carbon buildup in piston head and combustion chamber	Clean the piston head and combustion chamber.
Noise heard from around crankshaft	Worn or damaged crankshaft journal or crank pin	Replace the crankshaft.
	Cracked, worn, or damaged balancer shaft	Replace the balancer drive gear and balancer shaft as a set.
	Worn or damaged balancer drive gear	Replace the balancer drive gear and balancer shaft as a set.
	Worn or damaged big end bearing	Replace the big end bearing.
	Worn or damaged crankshaft journal bearing	Replace the crankshaft journal bearing.
	Worn or damaged balancer shaft journal bearing	Replace the balancer shaft journal bearing.

EAM30510

TROUBLESHOOTING OF CLUTCH

Manual clutch

Symptom	Possible cause	Actions
Clutch slippage	Improperly assembled clutch	Reassemble the clutch.
	Improperly adjusted clutch cable	Adjust the clutch lever free play.
	Loose clutch spring	Tighten the clutch spring bolts to the specified torque.
	Fatigued clutch spring	Replace the clutch springs as a set.
	Warped pressure plate	Replace the pressure plate.
	Worn friction plate	Replace the friction plates as a set.
	Warped or worn clutch plate	Replace the clutch plates as a set.
	Incorrect oil level	Adjust the engine oil level to the specified level.
	Incorrect oil viscosity (low)	Change to recommended engine oil.
	Deteriorated oil	Change to recommended engine oil.

Symptom	Possible cause	Actions
Clutch drags	Faulty clutch spring	Replace the clutch springs as a set.
	Warped pressure plate	Replace the pressure plate.
	Swollen friction plate	Replace the friction plates as a set.
	Warped clutch plate	Replace the clutch plates as a set.
	Bent pull rod (outer pull type)	Replace the pull rod.
	Worn pull rod tooth (outer pull type)	Replace the pull rod and pull lever shaft as a set.
	Bent push rod (inner push type)	Replace the push rod.
	Damaged or worn clutch boss	Replace the clutch boss.
	Seized clutch housing bushing	Replace the clutch housing.
	Improperly installed pull lever	Align the match mark on the pull lever before installation.
	Incorrect oil level	Adjust the engine oil level to the specified level.
	Incorrect oil viscosity (high)	Change to recommended engine oil.
	Deteriorated oil	Change to recommended engine oil.
Clutch noise	Damaged or worn primary driven gear	Replace the primary drive gear or crankshaft, and the clutch housing as a set.
	Loose clutch boss nut	Tighten the clutch boss nut to the specified torque.
	Fatigued clutch damper	Replace the clutch housing.
	Worn clutch housing bearing	Replace the clutch housing bearing.
	Worn pressure plate bearing	Replace the pressure plate bearing.

EAM30511
TROUBLESHOOTING OF TRANSMISSION

Symptom	Possible cause	Actions
Difficult or impossible to shift transmission gear	Clutch drags	Refer to “Clutch drags”.
	Improperly adjusted shift rod	Adjust the shift rod installation length.
	Bent shift shaft	Replace the shift shaft.
	Foreign object in a shift drum groove	Remove foreign object from shift drum groove.
	Damaged shift drum	Replace the shift drum.
	Seized shift fork	Replace the shift fork and shift fork guide bar as a set.
	Bent shift fork guide bar	Replace the shift fork guide bar.
	Foreign object between transmission gears	Remove foreign object from transmission gears.
	Seized transmission gear	Replace the seized gear and the axle as a set.
	Improperly assembled transmission	Reassemble the transmission axle assembly.
Jumps out of gear	Incorrect shift pedal position	Adjust the shift pedal position.
	Improperly returned stopper lever	Replace the stopper lever spring.
	Bent or worn shift fork	Replace the shift fork.
	Shift drum incorrect axial play	Replace the shift drum.
	Worn shift drum groove	Replace the shift drum.
	Worn transmission gear dog	Replace the transmission gear.
Transmission noise	Damaged or worn transmission gear	Replace the transmission gear.
	Worn main axle spline	Replace the main axle.
	Worn drive axle spline	Replace the drive axle.
	Worn bearing	Replace the bearing.

EAM30512
TROUBLESHOOTING OF COOLING SYSTEM

Symptom	Possible cause	Actions
Overheating	Carbon buildup in piston head and combustion chamber	Clean the piston head and combustion chamber.
	Clogged engine cooling water passages	Check and clean the engine cooling water passages.
	Incorrect oil level	Adjust the oil level to the specified level.
	Incorrect oil viscosity	Change to recommended engine oil.
	Inferior oil quality	Change to recommended engine oil.
	Low coolant level	Add recommended coolant to the specified level.
	Damaged or leaking radiator	Replace the radiator.
	Faulty radiator cap	Replace the radiator cap.
	Clogged radiator fin	Clean the radiator fin.
	Bent or damaged radiator fin	Repair the radiator fin or replace the radiator.
	Damaged or faulty water pump	Replace the water pump.
	Damaged hoses or pipes	Replace the hose or pipe.
	Improperly connected hoses or pipes	Connect the hoses and pipes properly.
	Damaged throttle body joint	Replace the throttle body joint.
	Loose throttle body joint	Tighten the throttle body joint bolts to the specified torque.
	Clogged air filter element	Clean or replace the air filter element.
	Brake drags	Check the brake system and repair or replace faulty parts as necessary.
	Incorrect spark plug gap	Adjust to the specified spark plug gap.
	Incorrect spark plug heat range	Replace the spark plug with the one of the specified type.
	Faulty ECU	Replace the ECU.
Noise from water pump	Contact between the water pump housing cover and impeller	Disassemble the water pump and replace faulty parts.
	Worn water pump housing bearing	Replace the water pump housing bearing.

EAM30513
TROUBLESHOOTING OF BRAKE

Symptom	Possible cause	Actions
Poor performance of disc brake	Worn brake pad	Replace the brake pads as a set.
	Worn or deflected brake disc	Replace the brake disc.
	Air in hydraulic brake system	Bleed the hydraulic brake system.
	Brake fluid leakage	Check the hydraulic brake system and repair or replace faulty parts as necessary.
	Incorrect brake fluid level (low)	Add brake fluid to the specified level.
	Stuck brake caliper piston	Replace the caliper piston seal.
	Stuck brake caliper and slide pin	Lubricate the caliper slide pin.
	Loose union bolt	Tighten the union bolt to the specified torque.
	Damaged brake hose and brake pipe	Replace the brake hose and brake pipe.
	Oil or grease on the brake disc or brake pad	Clean the brake disc or brake pad.
	Insufficient lubrication of brake lever or brake pedal pivot	Lubricate the brake lever or brake pedal pivot.

EAM30514
TROUBLESHOOTING OF SUSPENSION

Symptom	Possible cause	Actions
Front fork is hard	Bent or damaged inner tube	Replace the inner tube.
	Bent or damaged outer tube	Replace the outer tube.
	Damaged or worn slide metal	Replace the slide metal.
	Bent or damaged damper rod	Replace the damper rod.
	Bent wheel axle	Replace the wheel axle.
	Incorrect oil viscosity (high)	Change to recommended fork oil.
	Incorrect oil level (high)	Adjust to the specified oil level.
	Improperly adjusted spring preload (hard)	Adjust the spring preload.
	Improperly adjusted rebound damping (hard)	Adjust the rebound damping.
	Improperly adjusted compression damping (hard)	Adjust the compression damping.

Symptom	Possible cause	Actions
Front fork is soft	Fatigued or broken fork spring	Replace the fork spring.
	Incorrect oil viscosity (low)	Change to recommended fork oil.
	Incorrect oil level (low)	Adjust to the specified oil level.
	Improperly adjusted spring preload (soft)	Adjust the spring preload.
	Improperly adjusted rebound damping (soft)	Adjust the rebound damping.
	Improperly adjusted compression damping (soft)	Adjust the compression damping.
Leaking oil from front fork	Bent, damaged, or corroded inner tube	Replace the inner tube.
	Cracked or damaged outer tube	Replace the outer tube.
	Improperly installed oil seal	Replace the oil seal.
	Damaged oil seal lip	Replace the oil seal.
	Incorrect oil level (high)	Adjust to the specified oil level.
	Loose damper rod assembly bolt	Tighten the damper rod assembly bolt to the specified torque.
	Damaged damper rod assembly bolt copper washer	Replace the damper rod assembly bolt copper washer.
	Cracked or damaged cap bolt O-ring	Replace the cap bolt O-ring.
Rear suspension is hard	Bent or damaged rear shock absorber rod	Replace the rear shock absorber.
	Bent swingarm pivot shaft	Replace the swingarm pivot shaft.
	Damaged or worn swingarm bearing or bushing	Replace the swingarm bearing or bushing.
	Damaged or worn relay arm bearing	Replace the relay arm bearing.
	Damaged or worn connecting arm bearing	Replace the connecting arm bearing.
	Improperly adjusted rear shock absorber spring preload (hard)	Adjust the spring preload.
	Improperly adjusted rear shock absorber rebound damping (hard)	Adjust the rebound damping.
	Improperly adjusted rear shock absorber compression damping (hard)	Adjust the compression damping.

Symptom	Possible cause	Actions
Rear suspension is soft	Oil leaking from rear shock absorber	Replace the rear shock absorber.
	Gas leaking from rear shock absorber	Replace the rear shock absorber.
	Fatigued or damaged rear shock absorber spring	Replace the rear shock absorber.
	Improperly adjusted rear shock absorber spring preload (soft)	Adjust the spring preload.
	Improperly adjusted rear shock absorber rebound damping (soft)	Adjust the rebound damping.
	Improperly adjusted rear shock absorber compression damping (soft)	Adjust the compression damping.
Oil leaking from rear shock absorber	Bent, damaged, or corroded rear shock absorber rod	Replace the rear shock absorber.
	Damaged oil seal lip	Replace the rear shock absorber.

EAM30515
TROUBLESHOOTING OF STEERING/HANDLING

Symptom	Possible cause	Actions
Handlebar wobble	Loose lower ring nut	Tighten the lower ring nut to the specified torque.
	Worn bearing or bearing race	Replace the bearing and bearing race as a set.
	Warped front fork	Repair or replace the front fork.
	Bent front wheel axle	Replace the front wheel axle.
	Incorrect tire pressure	Adjust to the specified tire pressure.
	Worn, deformed, or incorrect tire	Replace the tire.
Heavy steering	Lower ring nut is tightened too tight	Tighten the lower ring nut to the specified torque.
	Bent lower bracket	Replace the lower bracket.
	Broken bearing or bearing race	Replace the bearing and bearing race as a set.
	Incorrect tire pressure	Adjust to the specified tire pressure.
Front wheel vibration	Loose spoke	Tighten the spoke and adjust the runout.
	Damaged or worn wheel bearing	Replace the wheel bearing.
	Worn, deformed, or incorrect tire	Replace the tire.
	Loose wheel axle or wheel axle nut	Tighten the wheel axle or wheel axle nut to the specified torque.
	Loose wheel axle pinch bolt	Tighten the wheel axle pinch bolt to the specified torque.
	Incorrect front fork oil level	Adjust to the specified front fork oil level.

Symptom	Possible cause	Actions
Rear wheel vibration	Loose spoke	Tighten the spoke and adjust the runout.
	Damaged or worn wheel bearing	Replace the wheel bearing.
	Worn, deformed, or incorrect tire	Replace the tire.
	Loose wheel axle nut	Tighten the wheel axle nut to the specified torque.
	Loose swingarm pivot shaft	Tighten the swingarm pivot shaft to the specified torque.
	Bent or damaged swingarm	Replace the swingarm bearing.
	Damaged or worn swingarm bearing or bushing	Replace the swingarm bearing or bushing.

EAM30516
TROUBLESHOOTING OF CHARGING SYSTEM

Symptom	Possible cause	Actions
Battery is not charged	Refer to “TROUBLESHOOTING” under “CHARGING SYSTEM” on page 8-11.	

EAM20174
SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAM30497
SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

Fault code	Item	Page
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	8-19
13	Intake air pressure sensor: open or short circuit detected.	8-20
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	8-22
15	Throttle position sensor: open or short circuit detected.	8-23
16	Throttle position sensor: stuck throttle position sensor is detected.	8-24
21	Coolant temperature sensor: open or short circuit detected.	8-25
22	Intake air temperature sensor: open or short circuit detected.	8-27
30	The vehicle has overturned.	8-28
33	Ignition coil: open or short circuit detected in the primary lead of the ignition coil.	8-29
39	Injector: open or short circuit detected.	8-31
41	ECU: built-in lean angle sensor malfunction.	8-32
43	Fuel system voltage: incorrect voltage supplied to the main relay and CCU.	8-32
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.	8-34
46	Vehicle system power supply: normal voltage is not supplied to the ECU.	8-35
50	ECU: faulty ECU memory.	8-36
70	Engine forcibly stops when the vehicle is left idling for a long period of time.	8-36

EAM30425
DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Display	Procedure
01	Throttle angle	Displays the throttle angle.	
	• Fully closed position	• 11–14	• Check with throttle fully closed.
	• Fully opened position	• 86–92	• Check with throttle fully opened.
03	Pressure of suction pipe	Displays the intake air pressure. • Check the change of the intake pressure valve when the starter switch is pushed.	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.

Diagnostic code No.	Item	Display	Procedure
06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value.
08	Lean angle sensor • Upright • Overturn	Displays the output voltage. • 0.4–1.4 (V) • 3.7–4.4 (V)	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. • Approximately 12.0 (V)	—
21	Neutral switch • Gear in neutral • Gear not in neutral	 • ON • OFF	Operate the shift pedal.
25	Gear position switch • Gear in 1st or 2nd • Gear in other than 1st or 2nd	 • ON • OFF	Operate the shift pedal.
60	EEPROM fault code display • No fault • CO adjustment valve • Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8	 • 00 • 01 • 07	—
61	Malfunction history (△) code display *1 • There is no history. • There is some history.	 • 00 • Other: Displays the fault code of (△).	—
62	Malfunction history (△) code erasure *1 • There is no history. • There is some history.	 • 00 • Other: Displays the total number of (×) and (△).	Replace all (△) with (○) by the operation start processing.
64	Setting history display • There is no history. • There is some history. • History is unknown (History data is damaged).	Displays the presence or absence of the setting history by Power Tuner. • 00 • 01 • 02	—

Diagnostic code No.	Item	Display	Procedure
65	Setting map erasure • There is no setting. • There is some setting.	Displays the presence or absence of the setting history by Power Tuner. • 00 • 01	Erase all setting maps by the operation start processing.
70	Program version number	Displays a program version No.	—
79	Gear position switch 2 • Gear in 3–5th • Gear in other than 3–5th	 • ON • OFF	Operate the shift pedal.

*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.

EAM30426
DIAGNOSTIC CODE: 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. • Connect an ignition checker.
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.	**TIP: Before performing this operation, be sure to disconnect the fuel pump coupler.** Check that injector is actuated five times by listening for the operating sound.

TUNING

CHASSIS 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
3.769 (49/13)

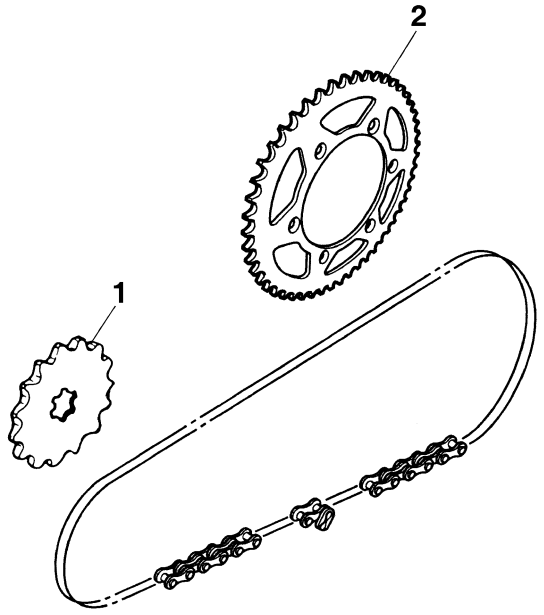
<Requirement for selection of secondary gear reduction ratio>
- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition 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
(STD)	49T	B2W-25449-00
	50T	B2W-25450-00
	51T	B2W-25451-00
	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/cm², 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/cm², 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/cm², 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.

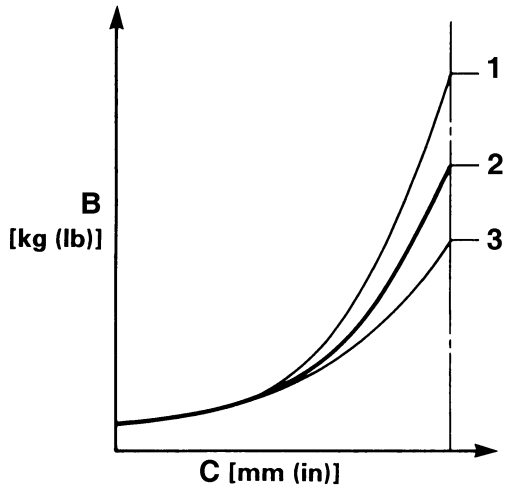
EAM30172
CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

Damping characteristic near the final stroke can be changed by changing the fork oil amount.

EWA19190
⚠ WARNING

Adjust the oil amount in 5 cm³ (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
295 cm³ (9.97 US oz, 10.40 Imp.oz)
Extent of adjustment
260–365 cm³ (8.79–12.34 US oz, 9.17–12.87 Imp.oz)



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.

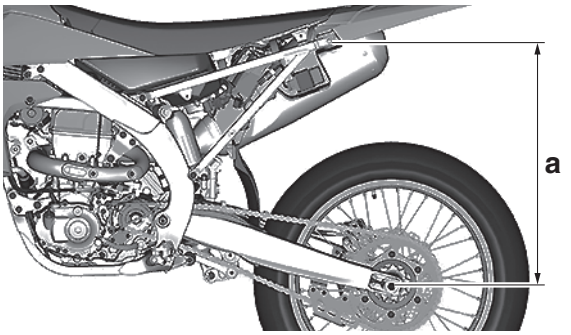
EAM30174
FRONT FORK SETTING PARTS
• Front fork spring

STD Spring rate N/mm		5.0	
Type	**Spring rate N/mm**	**Part number**	**I.D. mark (slits)**
SOFT	4.5	BR9-23141-20	I-II
↑	4.6	BR9-23141-30	I-III
	4.7	BR9-23141-40	I-IIII
	4.8	BR9-23141-50	I-IIIII
	4.9	BR9-23141-60	II-II
↓	5.0	BR9-23141-70	II-III
STIFF	5.1	BR9-23141-80	II-IIII

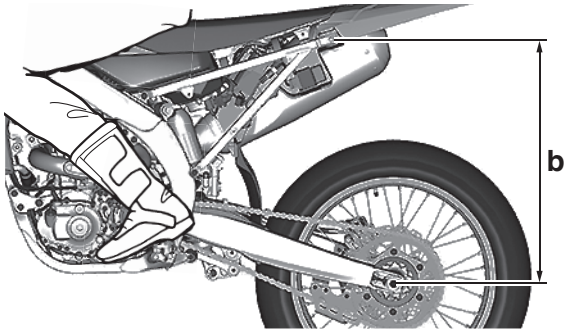
TIP
The I.D. mark (slits) is proved on the end of the spring.

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.



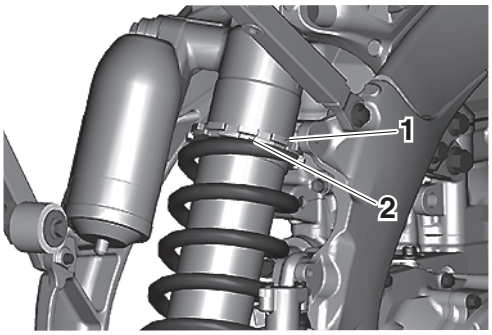
2. Remove the stand or block from the engine and, with a rider astride the seat, measure the sunken length "b" between the rear wheel axle center and the rear fender holding bolt.



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.

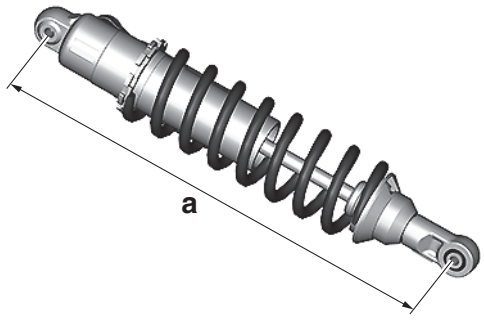
TIP

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"

B2WC

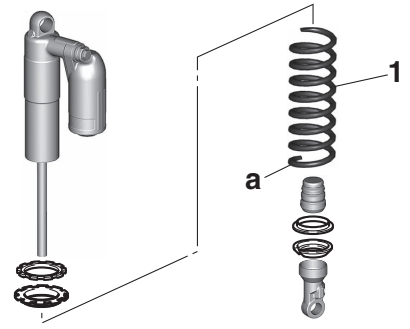
STD Spring rate N/mm		58	
Type	**Spring rate N/mm**	**Part number**	**I.D. mark**
SOFT	52	BR9-22212-00 (Blue)	Yellow
↑	54	BR9-22212-10 (Blue)	Pink
	56	BR9-22212-A0 (Silver)	White
↓	58	BR9-22212-B0 (Silver)	Gold
STIFF	60	BR9-22212-40 (Blue)	Brown

B2WG

STD Spring rate N/mm		58	
Type	**Spring rate N/mm**	**Part number**	**I.D. mark**
SOFT	52	BR9-22212-00 (Blue)	Yellow
↑	54	BR9-22212-10 (Blue)	Pink
	56	BR9-22212-20 (Blue)	White
↓	58	BR9-22212-30 (Blue)	Silver
STIFF	60	BR9-22212-40 (Blue)	Brown

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 7.0 mm (0.28 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	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Oil amount	Decrease oil amount by about 5–10 cm³ (0.2–0.3 US oz, 0.2–0.4 Imp.oz).
					Spring	Replace with soft spring.
Unsmooth movement over entire range	√	√	√	√	Outer tube Inner tube	Check for any bends, dents, other noticeable scars, etc. If any, replace affected parts.
					Slide metal	Replace with a new one for extended use.
					Piston metal	Replace with a new one for extended use.
					Lower bracket tightening torque	Retighten to specified torque.
Poor initial movement				√	Rebound damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Oil seals	Apply grease in oil seal wall.
Soft over entire range, bottoming out	√	√			Compression damping force	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Oil amount	Increase oil amount by about 5–10 cm³ (0.2–0.3 US oz, 0.2–0.4 Imp.oz).
					Spring	Replace with stiff spring.
Stiff toward stroke end	√				Oil amount	Decrease oil amount by about 5 cm³ (0.2 US oz, 0.2 Imp.oz).
Soft toward stroke end, bottoming out	√				Oil amount	Increase oil amount by about 5 cm³ (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 cm³ (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 cm³ (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	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Spring	Replace with soft spring.
Poor road gripping				√	Rebound damping force	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Low compression damping	Turn adjuster clockwise (about 1 click) to increase damping.
					High compression damping	Turn adjuster clockwise (about 1/6 turn) to increase damping.
					Spring set length	Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.
					Spring	Replace with soft spring.
Bottoming out	√	√			High compression damping	Turn adjuster clockwise (about 1/6 turn) to increase damping.
					Spring set length	Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.
					Spring	Replace with stiff spring.
Bouncing	√	√			Rebound damping force	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Spring	Replace with soft spring.
Stiff travel	√	√			High compression damping	Turn adjuster counterclockwise (about 1/6 turn) to decrease damping.
					Spring set length	Set sunken length for 90–100 mm (3.5–3.9 in) when one passenger is astride seat.
					Spring	Replace with soft spring.

EAM20149

WIRING DIAGRAM

YZ450FN 2022

1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
5. Main relay
6. Battery
7. Engine ground
8. Frame ground
9. Fuse
10. Starter relay
11. Starter motor
12. Diode 1
13. Diode 2
14. CCU (Communication Control Unit)
15. Yamaha diagnostic tool coupler
16. ECU (Engine Control Unit)
17. Ignition coil
18. Spark plug
19. Fuel injector
20. Fuel pump
21. Intake air temperature sensor
22. Coolant temperature sensor
23. Throttle position sensor
24. Intake air pressure sensor
25. Engine stop switch
26. Mode switch
27. Gear position switch
28. Launch control switch
29. Start switch
30. Diode 3

A. Battery sub-lead
B. Wire harness
C. Ignition coil sub-lead
D. CCU sub-lead

EAM30323

COLOR CODE

B	Black
Br	Brown
Dl	Dark blue
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
P/B	Pink/Black
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/B	Yellow/Black
Y/G	Yellow/Green
Y/R	Yellow/Red
Y/W	Yellow/White

For your best ownership experience, think **Genuine Yamaha!**

Genuine Yamaha Parts – Genuine Yamaha replacement parts are the exact same parts as the ones originally equipped on your vehicle, providing you with the performance and durability you have come to expect. Why settle for aftermarket parts that may not provide full confidence and satisfaction?

Genuine Yamaha Accessories – Yamaha only offers accessories that meet our high standards for quality and performance. Buy with confidence, knowing your Genuine Yamaha Accessories will fit right and perform right – right out of the box.

Yamalube – Take care of your Yamaha with legendary Yamalube oils, lubricants, and care products. They're formulated and approved by the toughest judges we know: the Yamaha engineering teams that know your Yamaha from the inside out.

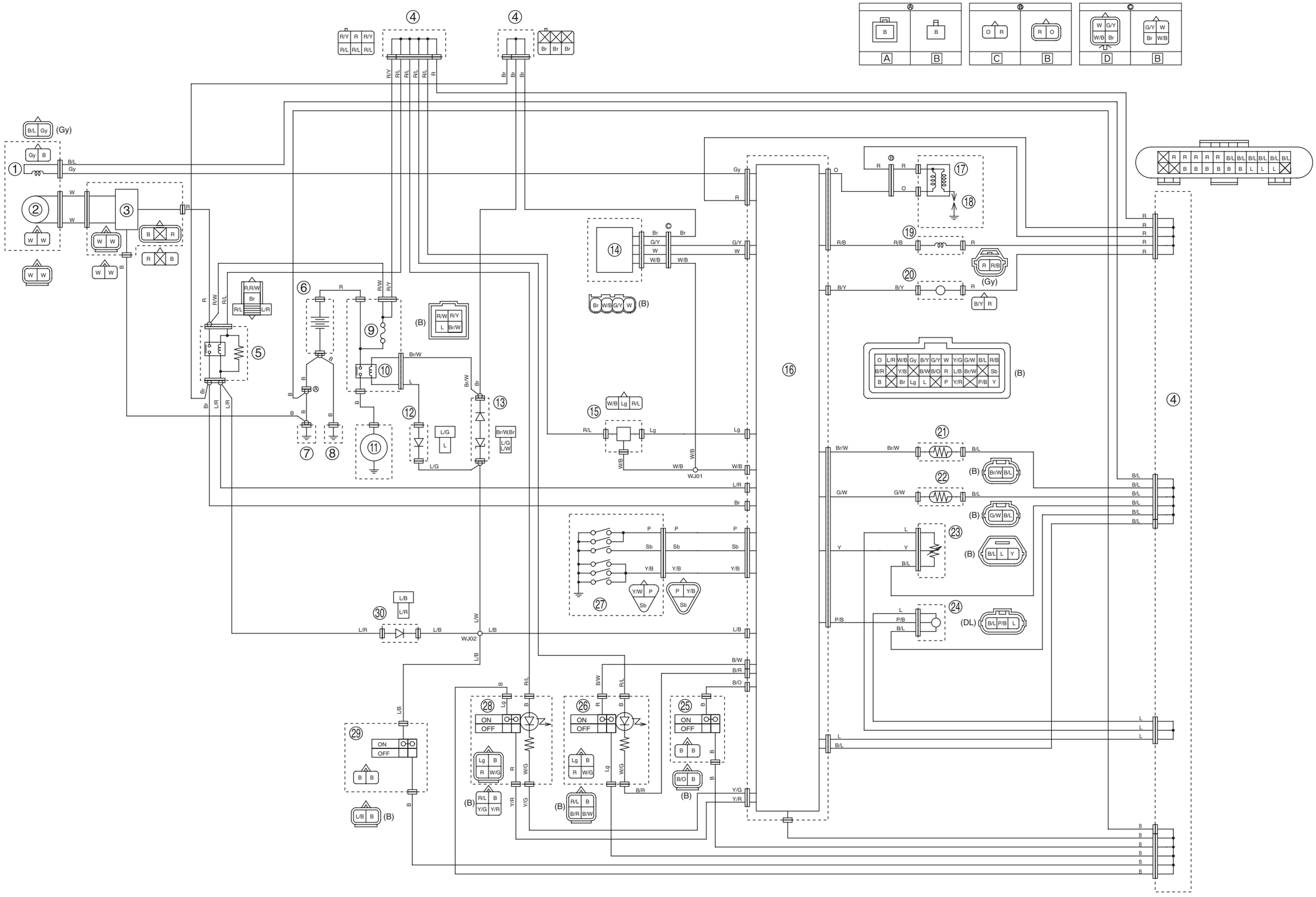
Genuine Yamaha Service Manuals – Get the same factory manual for your vehicle that the technicians at your authorized Yamaha dealer use. Service manuals are available through your Yamaha dealer or you can order them directly through yamahapubs.com.

Genuine Yamaha products are available only from your Yamaha dealer.

Find out more at yamaha-motor.com



YZ450FN 2022
WIRING DIAGRAM



YZ450FN 2022
WIRING DIAGRAM

