YAMAHA

2019

OWNER'S SERVICE MANUAL

YZ250F

⚠ Read this manual carefully before operating this vehicle.

YZ250FK

LIT-11626-32-16

B7B-28199-10

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

YZ250FK
OWNER'S SERVICE MANUAL
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P/N. LIT-11626-32-16

EAM20081
INTRODUCTION

Congratulations on your purchase of a Yamaha YZ series. This model is the culmination of Yamaha's vast experience in the production of pacesetting racing machines. It represents the highest grade of craftsmanship and reliability that have made Yamaha a leader.
This manual explains operation, inspection, basic maintenance and tuning of your machine. If you have any questions about this manual or your machine, please contact your Yamaha dealer.

TIP

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

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.

EAM20092

SAFETY INFORMATION

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

- THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.
  Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.
- THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY.
  Do not carry passengers on this machine.
- ALWAYS WEAR PROTECTIVE APPAREL.
  When operating this machine, always wear an approved helmet with goggles or a face shield. Also wear heavy boots, gloves, and protective clothing. Always wear proper fitting clothing that will not be caught in any of the moving parts or controls of the machine.
- ALWAYS MAINTAIN YOUR MACHINE IN PROPER WORKING ORDER.
  For safety and reliability, the machine must be properly maintained. Always perform the pre-operation checks indicated in this manual.
  Correcting a mechanical problem before you ride may prevent an accident.
- GASOLINE IS HIGHLY FLAMMABLE.
  Always turn off the engine while refueling. Take care to not spill any gasoline on the engine or exhaust system. Never refuel in the vicinity of an open flame, or while smoking.
- GASOLINE CAN CAUSE INJURY.
  If you should swallow some gasoline, inhale excess gasoline vapors, or allow any gasoline to get into your eyes, contact a doctor immediately. If any gasoline spills onto your skin or clothing, immediately wash skin areas with soap and water, and change your clothes.
- ONLY OPERATE THE MACHINE IN AN AREA WITH ADEQUATE VENTILATION.
  Never start the engine or let it run for any length of time in an enclosed area. Exhaust fumes are poisonous. These fumes contain carbon monoxide, which by itself is odorless and colorless. Carbon monoxide is a dangerous gas which can cause unconsciousness or can be lethal.
- PARK THE MACHINE CAREFULLY; TURN OFF THE ENGINE.
  Always turn off the engine if you are going to leave the machine. Do not park the machine on a slope or soft ground as it may fall over.
- THE ENGINE, EXHAUST PIPE AND MUFFLER WILL BE VERY HOT AFTER THE ENGINE HAS BEEN RUN.
  Be careful not to touch them or to allow any clothing item to contact them during inspection or repair.
- PROPERLY SECURE THE MACHINE BEFORE TRANSPORTING IT.
  For safety, drain the gasoline from the fuel tank before transporting the vehicle.

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

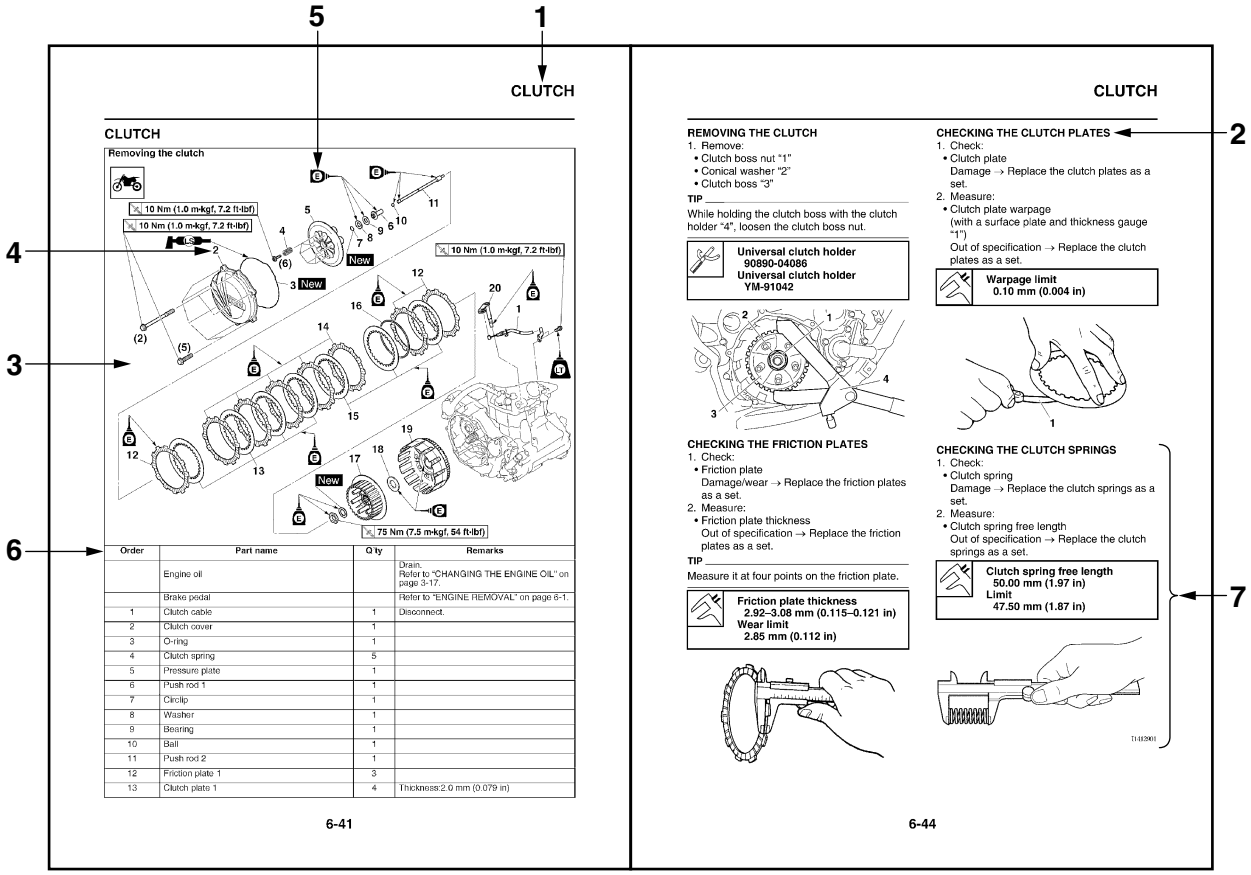
This will ensure that Yamaha Motor Corporation, U.S.A. has an up-to-date registration record in accordance with federal law.

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.



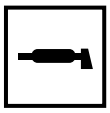
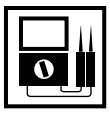
EAM20083

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

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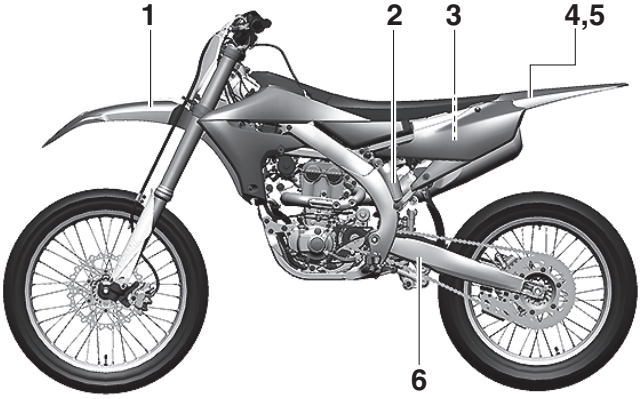
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EAM20085

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

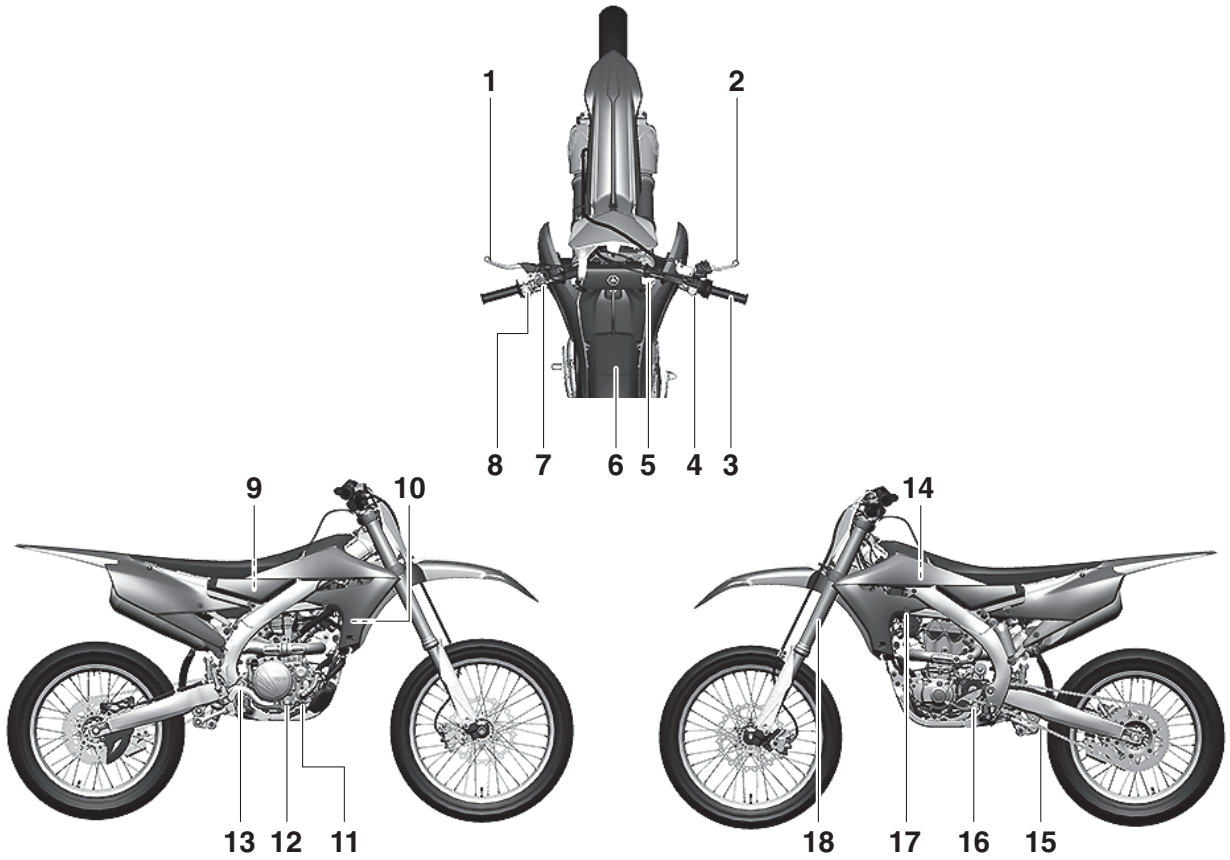
6

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. Radiator cap
6. Fuel tank cap
7. Mode switch
8. Engine stop switch
9. Fuel tank
10. Radiator
11. Coolant drain bolt
12. Oil level check window
13. Rear brake pedal
14. Air filter
15. Drive chain
16. Shift pedal
17. Starter knob
18. 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.

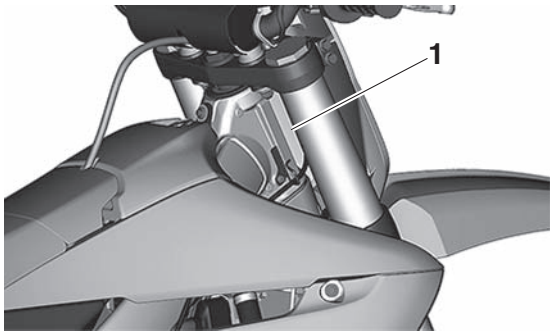
EAM20087
IDENTIFICATION

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.

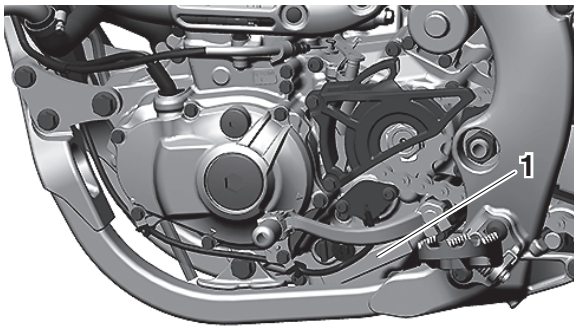
EAM30002
VEHICLE IDENTIFICATION NUMBER

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



EAM30003
ENGINE SERIAL NUMBER

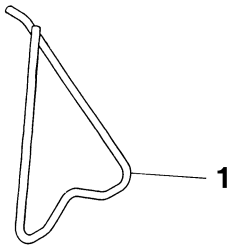
The engine serial number “1” is stamped into the elevated part of the right-side of the engine.



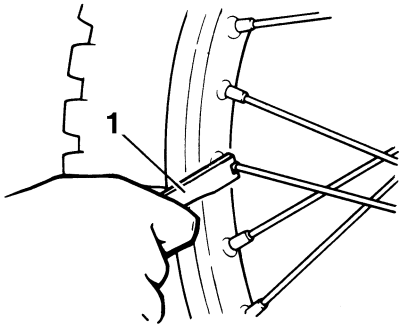
EAM20088
INCLUDED PARTS

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

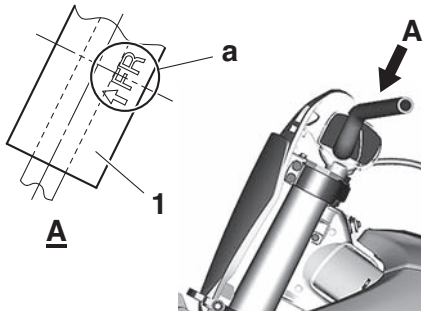
EWA20260
⚠ WARNING
- **Never apply additional force to the sidestand.**
- **Remove this sidestand before starting out.**



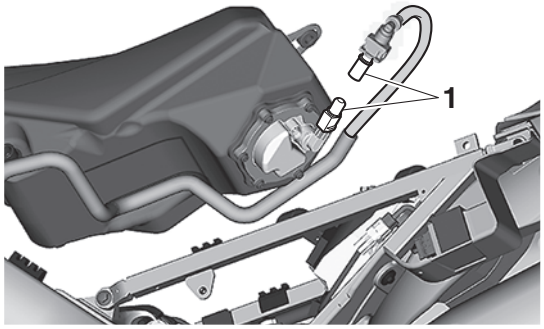
EAM30005
NIPPLE WRENCH
The nipple wrench “1” is used to tighten the spoke.



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.



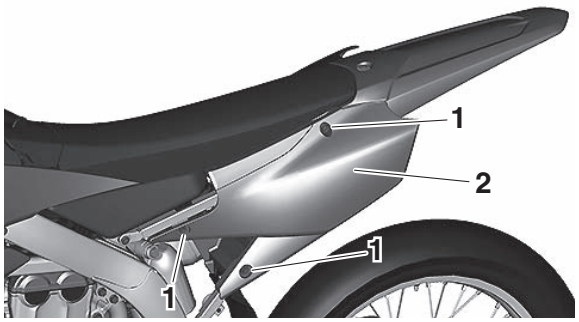
EAM30443
POWER TUNER
By downloading the Power Tuner app to your smartphone and wirelessly connecting to the CCU wireless network, you can adjust various vehicle settings.

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.**

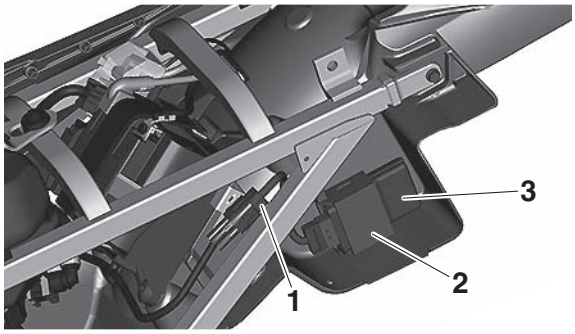
TIP
- Download the Power Tuner app from the Google© or Apple© store.
- For details about handling the smartphone, read the owner’s manual of the smartphone.

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).

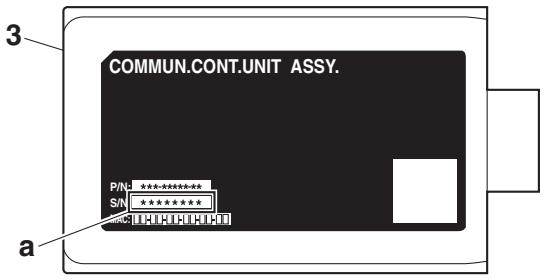


1. Bolt
2. Side cover (left)

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.

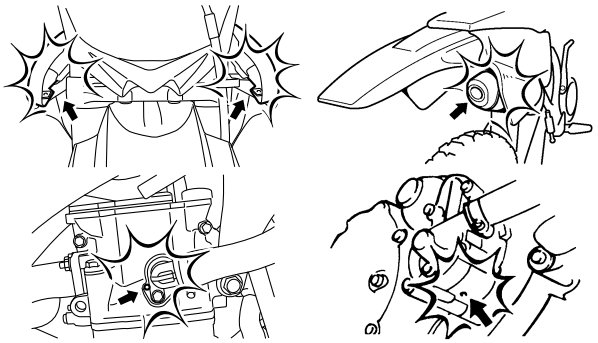
EAM20089
IMPORTANT INFORMATION

EAM30009
PREPARATION FOR REMOVAL AND DISASSEMBLY

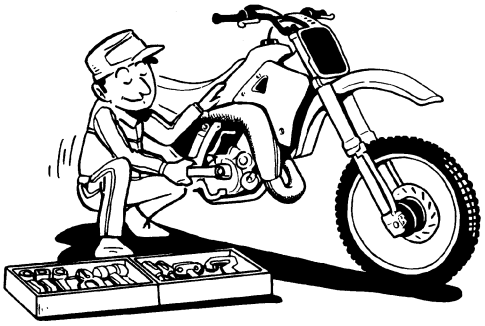
1. Before the jobs, completely remove mud, dust, and the like in order to prevent the entry of them into the inside during the jobs.



- Before cleaning with high-pressure water of washers, cover the following parts.
  Air duct
  Silencer exhaust port
  Drain hole on the cylinder head (right side)
  Hole under the water pump housing



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



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



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

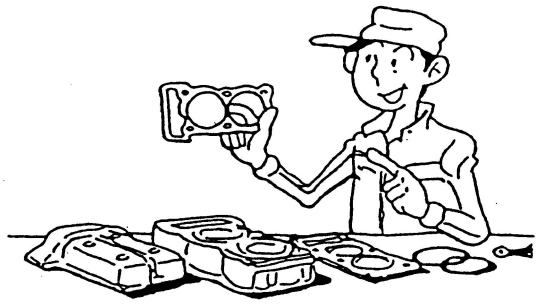
EWA18970

⚠ WARNING

Coolant is potentially harmful and should be handled with special care.
- **If it enters your eyes, wash it away with water enough and then get medical attention**
- **If it splashes on your skin or clothes, quickly wash it away with water and then with soapy water.**
- **If it is swallowed, immediately induce vomiting and get medical attention.**

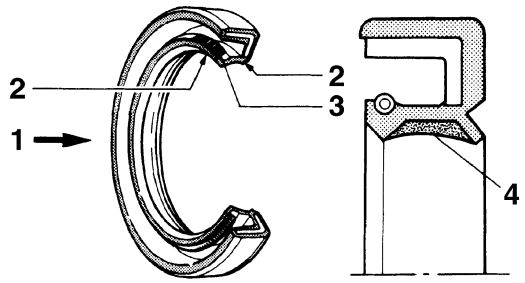
EAM30010
REPLACEMENT PARTS

Make sure that the parts and grease or oil to be used for repair of the vehicle, including periodic replacement parts, are new YAMAHA genuine parts and recommended parts.
Do not use any used parts, because these may not be genuine though they have similar appearances or because the quality may be changed by aging.



EAM30011
GASKETS, OIL SEALS AND O-RINGS

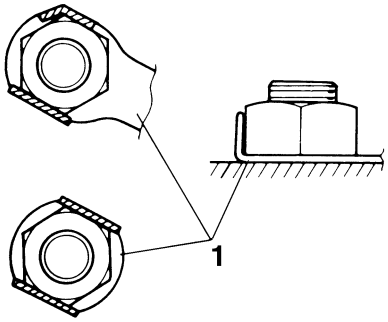
1. When overhauling the engine, replace all gaskets and O-rings. All gasket surfaces, oil seal lips, and O-rings must be cleaned so that there may be no dust on them.
2. During assembly, always apply proper oil to bearings and proper grease to oil seal lips before installation.



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

EAM30012
LOCK WASHERS/PLATES AND COTTER PINS

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



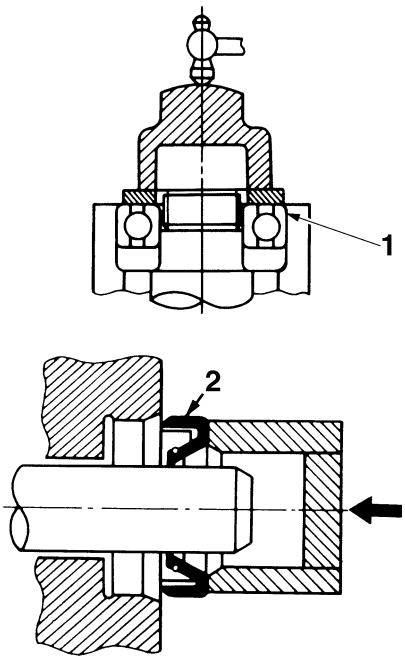
EAM30013
BEARINGS AND OIL SEALS

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

ECA13300

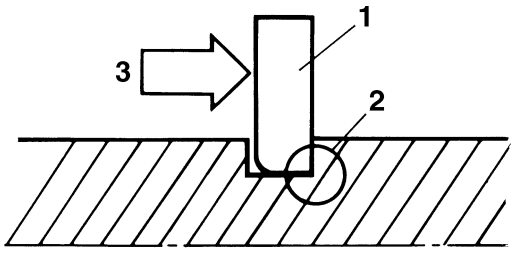
NOTICE

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



EAM30014
CIRCLIPS

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

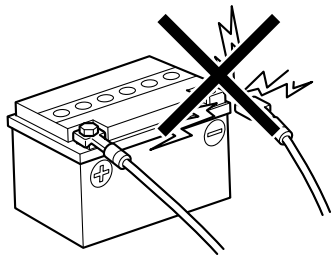


EAM20120
BASIC SERVICE INFORMATION

EAM30181
ELECTRICAL SYSTEM
Electrical parts handling

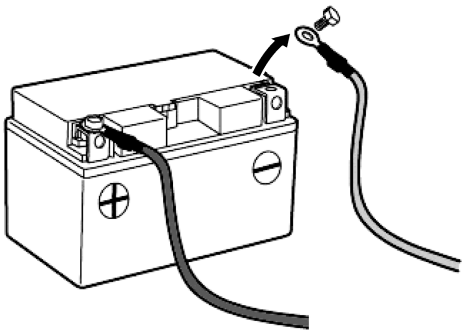
ECA16600
NOTICE

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

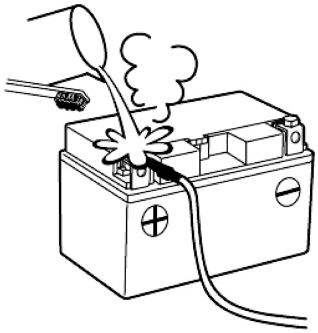


ECA16751
NOTICE

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

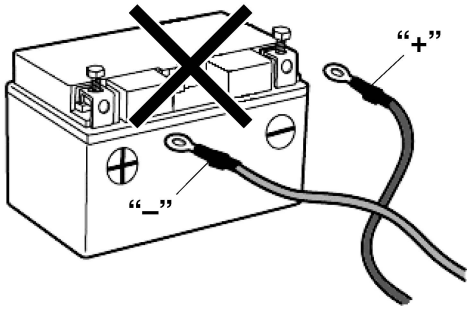


TIP
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



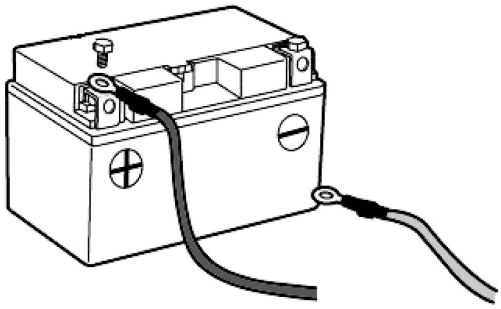
ECA16760
NOTICE

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



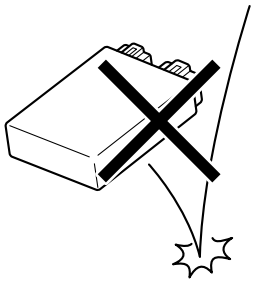
ECA16771
NOTICE

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



ECA16620
NOTICE

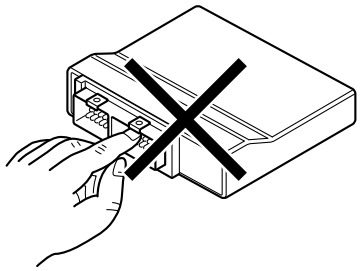
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

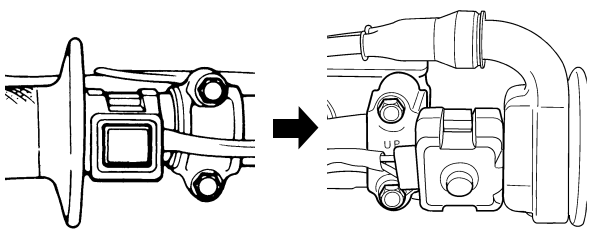
NOTICE

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



TIP

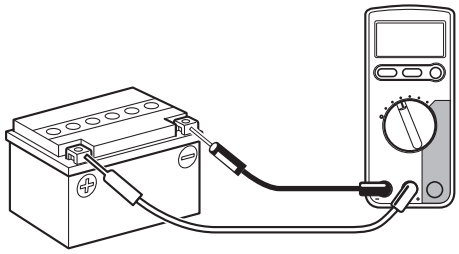
Push and hold the engine stop switch to turn off the multi-function display when resetting the ECU (Engine Control Unit). Disconnect the starter motor lead of the starter relay, and then push the starter switch. Be sure to wait for five seconds or longer before pushing the start switch after the multi-function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



Checking the electrical system

TIP

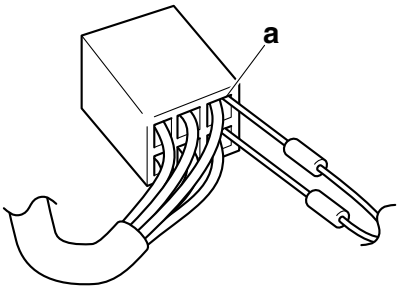
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

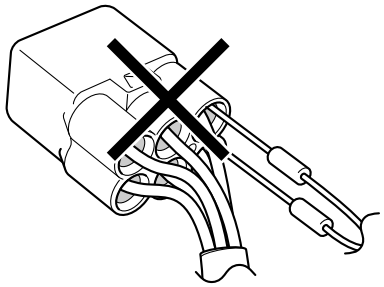
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

NOTICE

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



Checking the connections

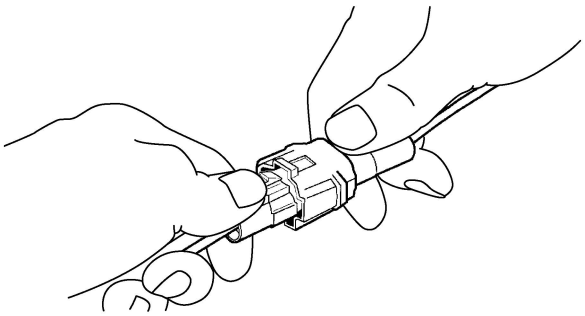
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - Lead
   - Coupler
   - Connector

ECA16780

NOTICE

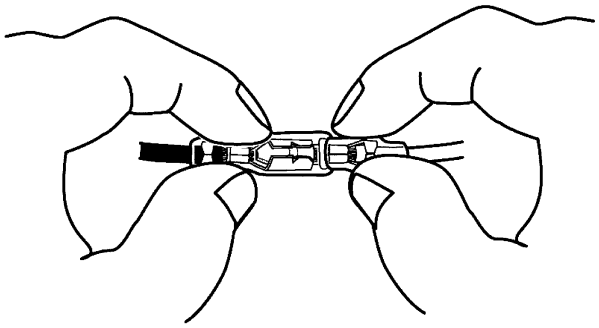
• When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
• There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



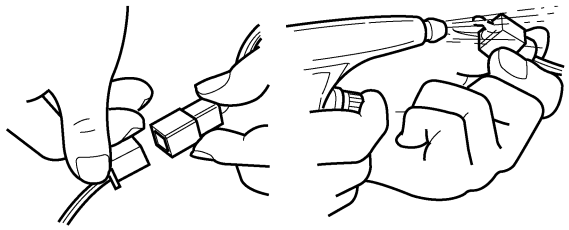
ECA16790

NOTICE

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



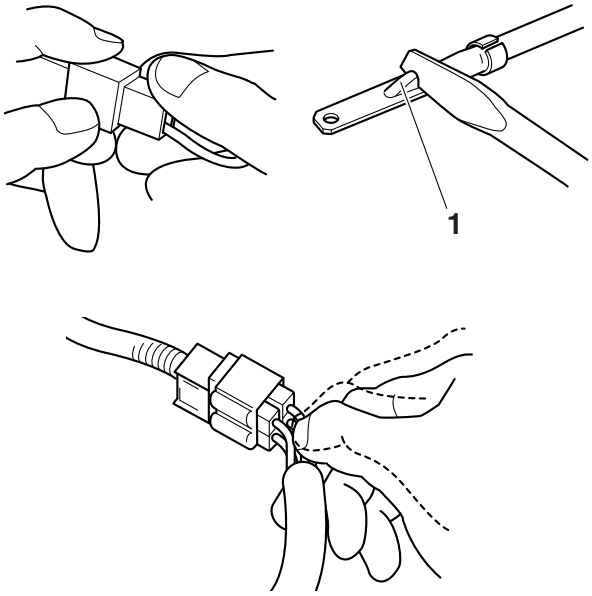
2. Check:
   • Lead
   • Coupler
   • Connector
   Moisture → Dry with compressed air.
   Rust/stains → Connect and disconnect several times.



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

TIP

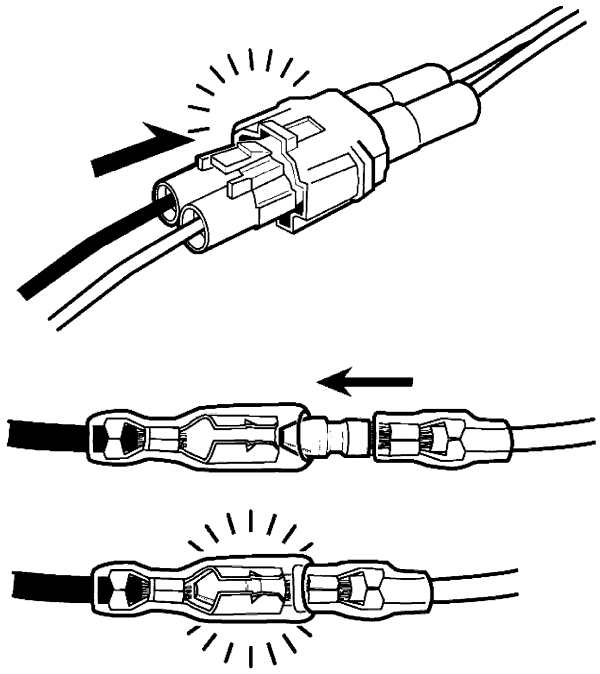
• If the pin "1" on the terminal is flattened, bend it up.
• After disassembling or assembling a coupler, pull on the leads to make sure that they are installed securely.

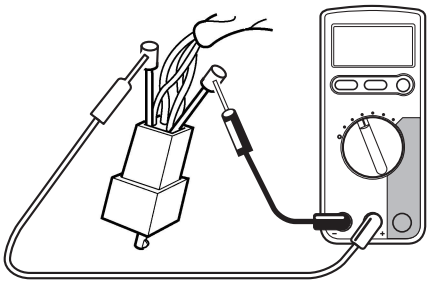


4. Connect:
   • Lead
   • Coupler
   • Connector

TIP

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



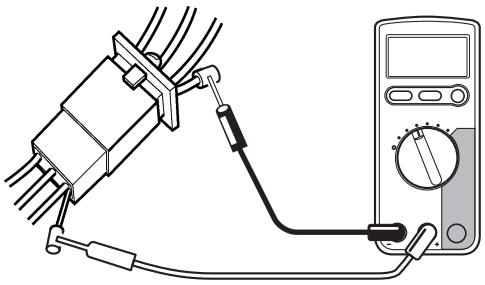


5. Check:
   • No continuity

	**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.



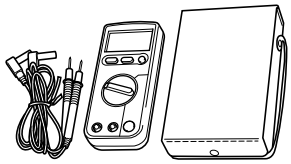
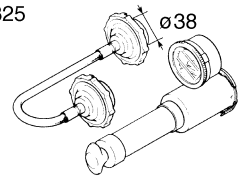
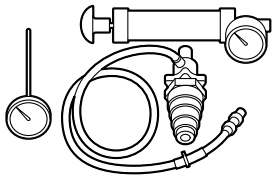
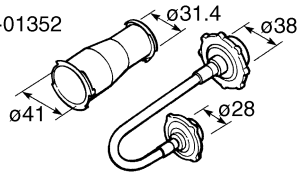
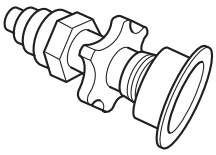
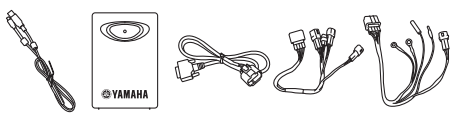
EAM20121

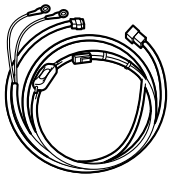
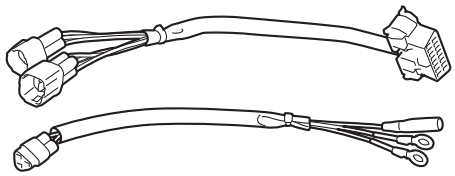
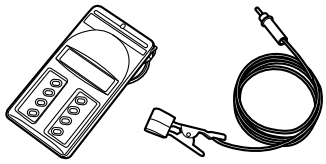
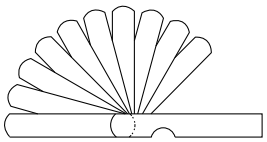
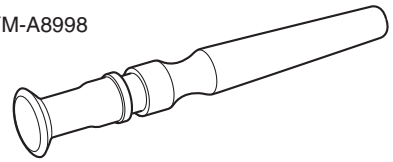
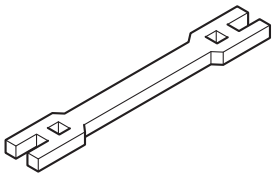
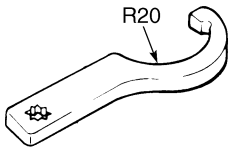
SPECIAL TOOLS

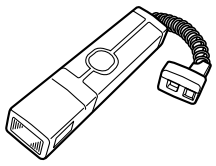
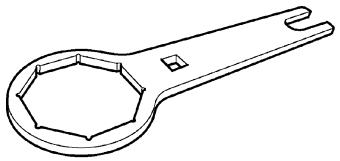
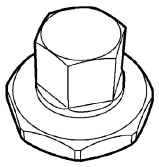
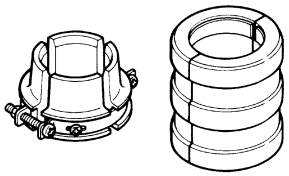
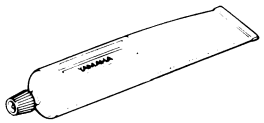
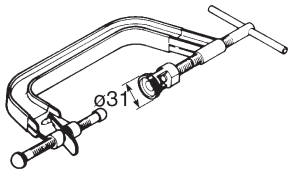
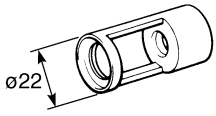
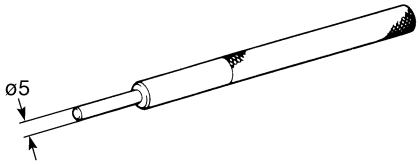
The following special tools are required for accurate and complete adjustment and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and tool number used for the special tool differ by country, so two types are provided.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

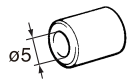
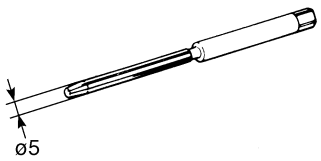
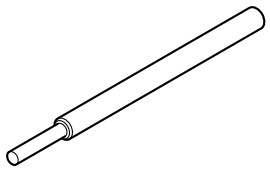
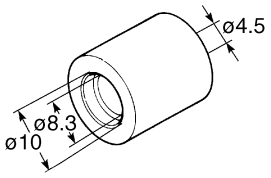
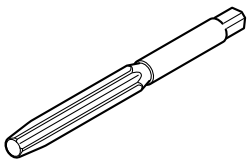
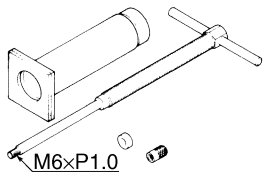
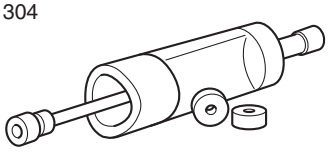
TIP

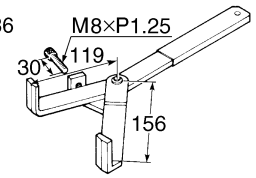
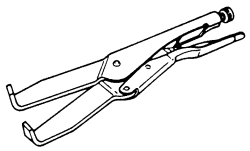
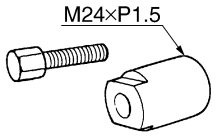
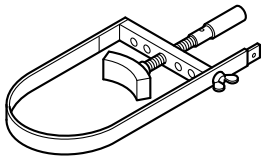
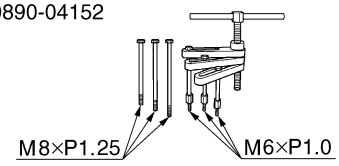
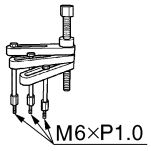
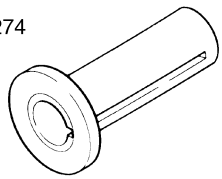
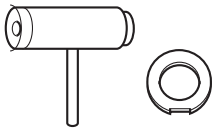
- For U.S.A. and Canada, use tool number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use tool number starting with “90890-”.

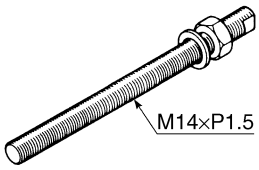
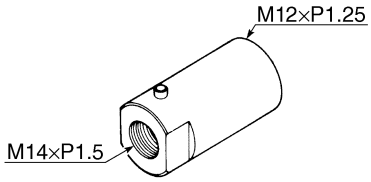
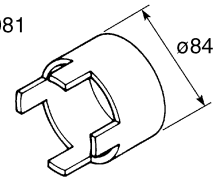
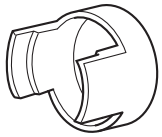
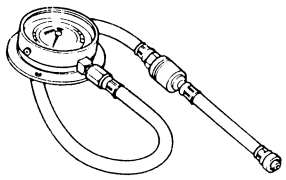
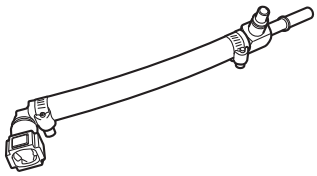
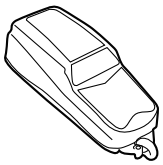
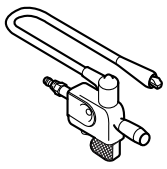
Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		1-11, 5-38, 8-45, 8-46, 8-48, 8-49, 8-50, 8-50, 8-50, 8-51, 8-52, 8-52, 8-52, 8-53, 8-54, 8-54, 8-55
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	3-7, 3-8
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984 	3-7, 3-8
Yamaha diagnostic tool USB (US) 90890-03257		3-15, 7-9, 8-15
Yamaha diagnostic tool (A/I) 90890-03262		3-15, 7-9, 8-15

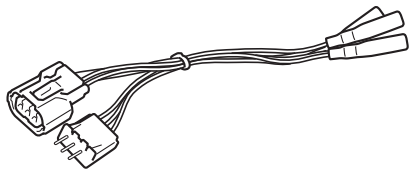
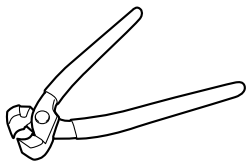
Tool name/Tool No.	Illustration	Reference pages
FI diagnostic tool sub–lead 90890-03212 FI diagnostic tool sub–lead YU-03212		3-15, 7-9, 8-16
OBD/ GST Leadwire kit 90890-03249		3-15, 7-9, 8-15
Digital tachometer 90890-06760 Digital tachometer YU-39951-B		3-15, 3-37, 8-52
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-17, 5-44
Valve lapper (ø14) 90890-04101 Valve lapping tool (14mm) YM-A8998	90890-04101  YM-A8998 	3-17, 5-25
Spoke nipple wrench (6–7) 90890-01521 Spoke nipple wrench (6–7) YM-01521		3-33
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-34, 4-52

Tool name/Tool No.	Illustration	Reference pages
Timing light 90890-03141 Timing light YU-03141		3-37
Cap bolt ring wrench 90890-01501 Cap bolt ring wrench YM-01501		4-40, 4-40, 4-41, 4-44, 4-47, 4-49
Cap bolt wrench 90890-01500 Cap bolt wrench YM-01500		4-41, 4-44
Fork seal driver 90890-01502 Fork seal driver (48) YM-A0948		4-45, 4-46
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-18, 5-61, 5-69
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-25, 5-30
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-25, 5-30
Valve guide remover (ø5) 90890-04097 Valve guide remover (5.0 mm) YM-04097		5-27

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø5) 90890-04098 Valve guide installer (5.0 mm) YM-04098		5-27
Valve guide reamer (ø5) 90890-04099 Valve guide reamer (5.0 mm) YM-04099		5-27
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-27
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-27
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-27
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-32

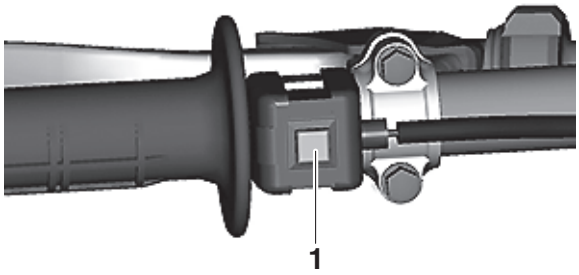
Tool name/Tool No.	Illustration	Reference pages
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	90890-04086  YM-91042 	5-44, 5-47
Rotor puller 90890-04151 Rotor puller YM-04151		5-61
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-64, 5-65
Crankcase separating tool 90890-04152 Crankcase separating tool YU-A9642	90890-04152  YU-A9642 	5-72
Crankshaft installer pot 90890-01274 Installing pot YU-90058	90890-01274  YU-90058/YU-90059 	5-73

Tool name/Tool No.	Illustration	Reference pages
Crankshaft installer bolt 90890-01275 Bolt YU-90060		5-73
Adapter (M12) 90890-01278 Adapter #3 YU-90063		5-73
Spacer (crankshaft installer) 90890-04081 Pot spacer YM-91044	90890-04081  YM-91044 	5-73
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-4
Fuel pressure adapter 90890-03186 Fuel pressure adapter YM-03186		7-4
Lithium battery charger 90890-05376 Lithium battery charger DBY-ACC51-70-02		8-47, 8-48
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-49

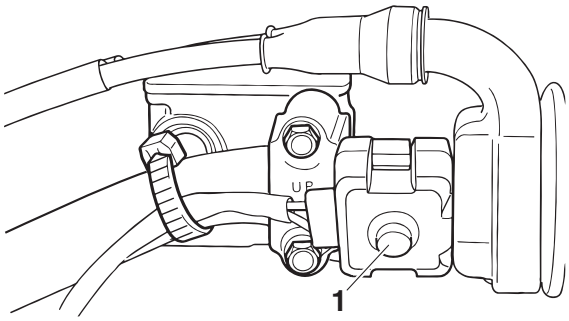
Tool name/Tool No.	Illustration	Reference pages
Test harness S– pressure sensor (3P) 90890-03207 Test harness S– pressure sensor (3P) YU-03207		8-53
Boots band installation tool 90890-01526 Boots band installation tool YM-01526		5-1

EAM20122
CONTROL FUNCTIONS

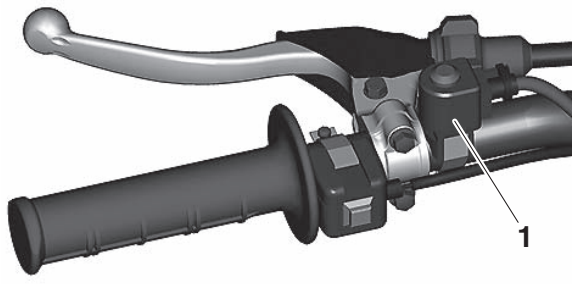
EAM30182
ENGINE STOP SWITCH
The engine stop switch “1” is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.



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

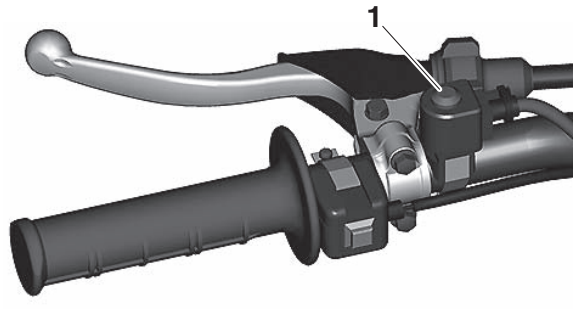


EAM30471
MODE SWITCH
The mode switch “1” is located on the left handlebar.
Press the mode switch to change between map 1 and map 2.

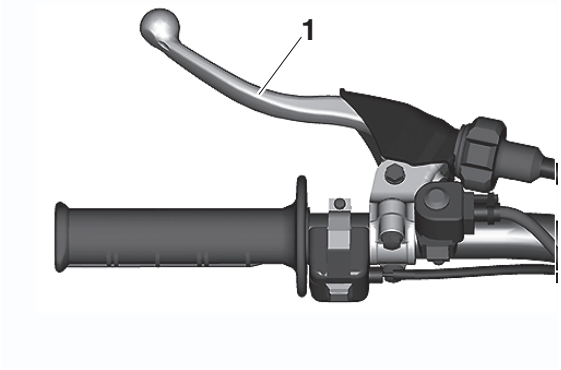


To change the mode
1. Shift to neutral.
2. Start the engine.
3. Press the mode switch.

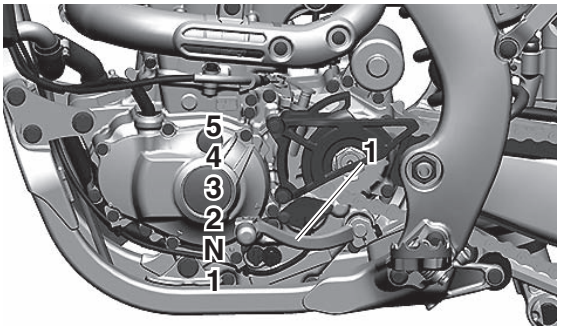
TIP
As shipped from the factory, maps 1 and 2 are the same. You must use the Power Tuner app to adjust the map settings.
When the mode switch “1” is illuminated, map 2 is selected.



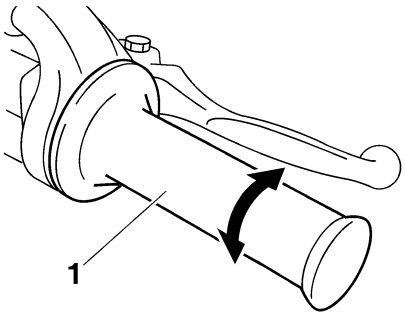
EAM30184
CLUTCH LEVER
The clutch lever “1” is located on the left handlebar. The clutch lever disengages or engages the clutch.
Pull the clutch lever toward the handlebar to disengage the clutch, and release the lever to engage the clutch.



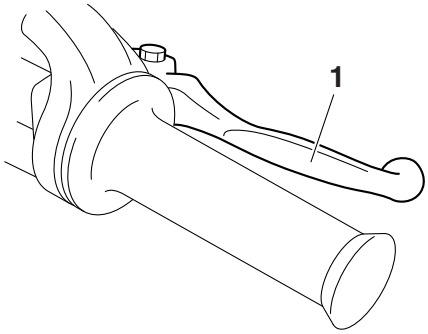
EAM30185
SHIFT PEDAL
The shift pedal “1” has adopted a method of 1 down & 4 ups (press-down & kick-ups).
Press it down for N (neutral) to 1st, and kick it up for 2nd to 5th.



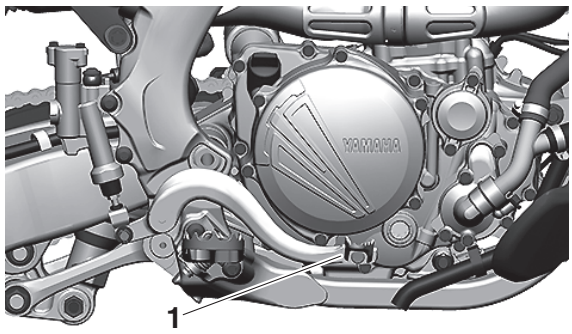
EAM30187
THROTTLE GRIP
The throttle grip “1” is located on the right handlebar. The throttle grip accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.



EAM30188
FRONT BRAKE LEVER
The front brake lever “1” is located on the right handlebar. Pull it toward the handlebar to activate the front brake.



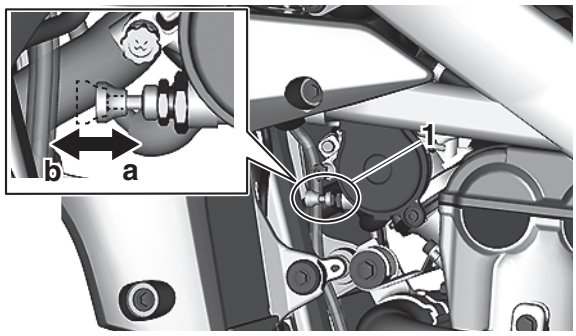
EAM30189
REAR BRAKE PEDAL
The rear brake pedal “1” is in the right of the chassis. Press down on the brake pedal to activate the rear brake.



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.

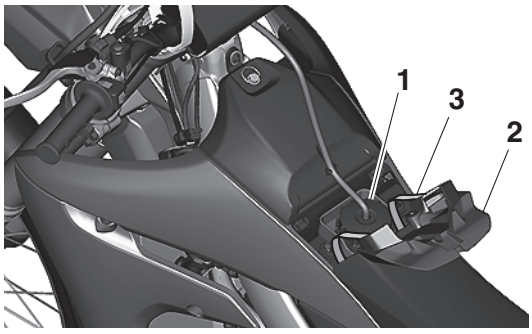
TIP
When operating the throttle grip in the closing direction, the starter knob “1” moves in the direction “b” as shown and returns to its original position.

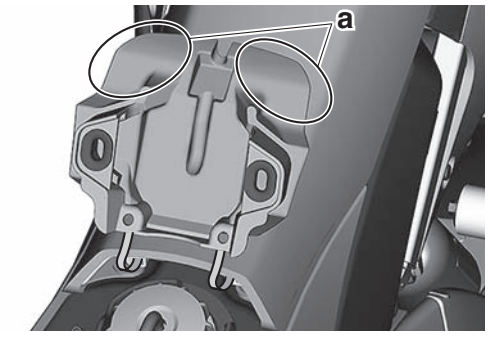
EWA20470
⚠ WARNING
While handling the starter knob, take care not to burn yourself on exhaust pipes.

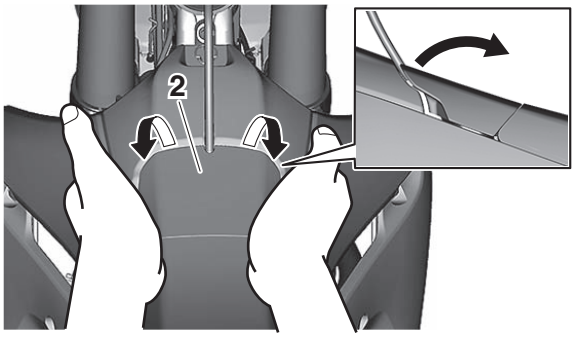


EAM30192
FUEL TANK CAP
Fuel tank cap “1” is located under the fuel tank cap cover “2”.
Remove the fuel tank cap cover to open the fuel tank cap.

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.




a


2

EAM20123
STARTING AND BREAK-IN

EAM30193
FUEL
Always use the recommended fuel as stated below. Also, be sure to use new gasoline the day of a race.

Recommended fuel
Premium unleaded gasoline
(Gasohol [E10] acceptable)
Fuel tank capacity
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 premium unleaded gasoline with a pump octane number [(R+M)/2] of 91 or higher, or a research octane number of 95 or higher. If knocking (or pinging) occurs, use a gasoline of a different brand.

EWA19010
⚠ WARNING

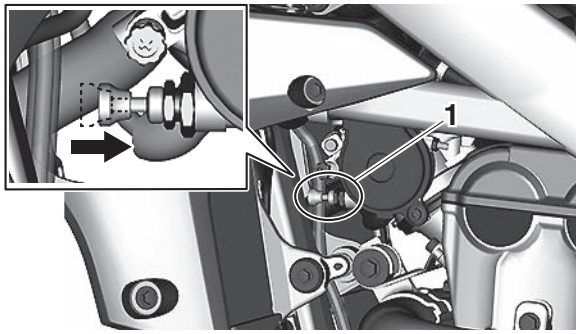
- **For refueling, be sure to stop the engine and use enough care not to spill any fuel. Also be sure to avoid refueling close to a fire.**
- **Refuel after the engine, exhaust pipe, etc. have cooled off.**

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

EAM30195
AIR FILTER MAINTENANCE
According to “CLEANING THE AIR FILTER ELEMENT” section in the CHAPTER 3, apply the Yamaha foam air filter oil or other quality foam air filter oil to the element. (Excess oil in the element may adversely affect engine starting.)

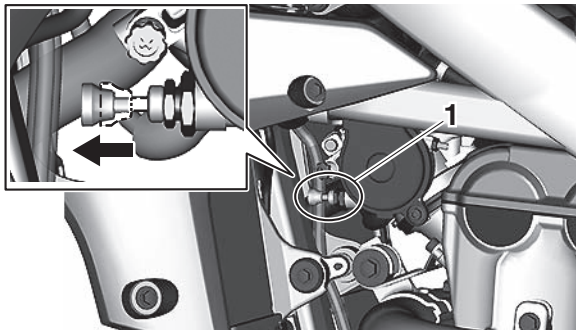
EAM30196
STARTING A COLD ENGINE
1. Press the shift pedal to neutral.
2. Push the starter knob “1” completely.

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



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

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



EWA19030
⚠ WARNING

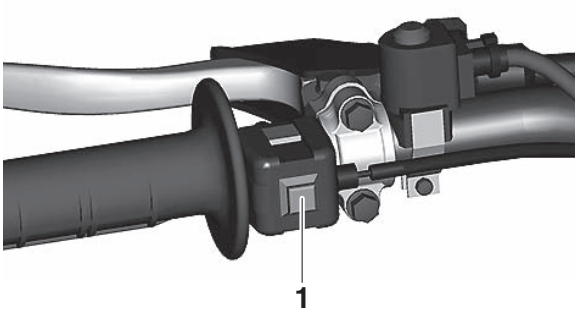
Since exhaust gas contains harmful ingredients, do not start or warm it up at an illventilated place or a closed narrow place.

5. To stop the engine, push the engine stop

switch “1”.

TIP

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



EAM30197

STARTING A WARM ENGINE

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

TIP

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

EAM30198

BREAK-IN PROCEDURES

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

ECA25811

NOTICE

Before running, do maintenance on the air filter element.

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

TIP

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

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

ECA25821

NOTICE

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

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

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

Observe the condition of the engine carefully during a break-in.

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

EAM30468

ENGINE STARTING PRECAUTION

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

EWA20540

⚠ WARNING

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

EAM20124
MAINTENANCE AFTER BREAK-IN

After a break-in, perform careful maintenance to get ready for the next practice or race.
Refer to “PRE-OPERATION INSPECTION AND MAINTENANCE” on page 3-5.

EAM30199
MAJOR MAINTENANCE

1. For the engine
   - Leaks around the engine
     Check for pressure leaks from the cylinder head or the cylinder, oil leaks from the crankcase or the case cover, leaks from the coolant system, and other leaks.
   - Check that the valve, the cylinder head, the cylinder, the piston, and the piston ring fit one another, and that contact between the valve and the cylinder head, and that between the cylinder and the piston are correct.
   - Engine oil change
     Drain the oil, and check for dirt and foreign materials such as metal chips. (If any foreign material is mixed, disassemble and check the crankcase.)
     Pour the specified amount of the recommended oil.
   - AC magneto
     Check for looseness in mounted areas of the rotor and the stator.
     Check that the connector is not being disconnected.
   - Silencer
     Check the main body and stay for cracks. Check for leaks.
   - Mounting bolts and nuts
     Check for looseness in mounted areas of parts, as well as engine mounting bolts and engine brackets.
2. For the chassis
   - Check welds and mounted areas of the frame, the swingarm, the link, the bracket, and so on, for looseness and cracks.
   - Wheel(s)
     Check the wheel for runout. Check the spoke for looseness.
   - Brake(s)
     Check the brake disc mounting bolt for looseness.
     Check that the reservoir contains the specified amount of brake fluid. Check for leaks.
   - Cable
     Grease and adjust cables.
   - Drive chain
     Lubricate the drive chain and adjust its tension.
   - Fuel tank
     Clean the inside of the fuel tank. Check for leaks.
   - Suspension
     Check for oil leaks in the front fork or the rear shock absorber. Check that the mounted conditions are good.
   - Sprocket
     Check for looseness in the sprocket mounted on the rear wheel.
   - Mounting bolts and nuts
     Check mounted areas for looseness.

ECA25831
NOTICE

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

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

EAM20125
TORQUE-CHECK POINTS

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

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

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

Cleaning

ECA24220

NOTICE

- **Avoid using strong acidic wheel cleaners, especially on spoked wheels. If such products are used on hard-to-remove dirt, do not leave the cleaner on the affected area any longer than instructed. Also, thoroughly rinse the area off with water, immediately dry it, and then apply a corrosion protection spray.**
- **Improper cleaning can damage plastic parts (such as cowlings, panels, windshields, headlight lenses, meter lenses, etc.) and the mufflers. Use only a soft, clean cloth or sponge with water to clean plastic. However, if the plastic parts cannot be thoroughly cleaned with water, diluted mild detergent with water may be used. Be sure to rinse off any detergent residue using plenty of water, as it is harmful to plastic parts.**
- **Do not use any harsh chemical products on plastic parts. Be sure to avoid using cloths or sponges which have been in contact with strong or abrasive cleaning products, solvent or thinner, fuel (gasoline), rust removers or inhibitors, brake fluid, antifreeze or electrolyte.**
- **Do not use high-pressure washers or steam-jet cleaners since they cause water seepage and deterioration in the following areas: seals (of wheel and swingarm bearings, fork and brakes), electric components (couplers, connectors, instruments, switches and lights), breather hoses and vents.**
- **For motorcycles equipped with a windshield: Do not use strong cleaners or hard sponges as they will cause dulling or scratching. Some cleaning compounds for plastic may leave scratches on the windshield. Test the product on a small hidden part of the windshield to make sure that it does not leave any marks. If the windshield is scratched, use a quality plastic polishing compound after washing.**

After normal use

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

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

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

TIP

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

1. Clean the motorcycle with cold water and a mild detergent, after the engine has cooled down.
   NOTICE: **Do not use warm water since it increases the corrosive action of the salt.**
2. Apply a corrosion protection spray on all metal, including chrome- and nickel-plated, surfaces to prevent corrosion.

After cleaning

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

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

EWA19050

⚠ WARNING

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

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

ECA24240

NOTICE

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

TIP

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

EAM30201

STORAGE

Short-term

Always store your motorcycle in a cool, dry place and, if necessary, protect it against dust with a porous cover. Be sure the engine and the exhaust system are cool before covering the 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" section of this chapter.
2. Fill up the fuel tank and add fuel stabilizer (if available) to prevent the fuel tank from rusting and the fuel from deteriorating.
3. Perform the following steps to protect the cylinder, piston rings, etc. from corrosion.

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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.**

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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 8-46.

TIP

Make any necessary repairs before storing the motorcycle.

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EAM20127

GENERAL SPECIFICATIONS

Model	
Model	B7B1
Dimensions	
Overall length	2175 mm (85.63 in)
Overall width	825 mm (32.5 in)
Overall height	1285 mm (50.59 in)
Seat height	970 mm (38.19 in)
Wheelbase	1475 mm (58.1 in)
Ground clearance	335 mm (13.19 in)
Weight	
Curb weight	106 kg (234 lb)
Riding capacity	1 person

EAM20128
ENGINE SPECIFICATIONS

Engine	
Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	250 cm³
Number of cylinders	Single cylinder
Bore × stroke	77.0 × 53.6 mm (3.03 × 2.11 in)
Compression ratio	13.8 : 1
Starting system	Electric starter
Fuel	
Recommended fuel	Premium unleaded gasoline (Gasohol [E10] acceptable)
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	0.73 L (0.77 US qt, 0.64 Imp.qt)
With oil filter removal	0.75 L (0.79 US qt, 0.66 Imp.qt)
Quantity (disassembled)	0.95 L (1.00 US qt, 0.84 Imp.qt)
Oil filter	
Oil filter type	Paper
Oil pump	
Inner-rotor-to-outer-rotor-tip clearance	0.000–0.150 mm (0.0000–0.0059 in)
Limit	0.23 mm (0.0091 in)
Outer-rotor-to-oil-pump-housing clearance	0.13–0.18 mm (0.0051–0.0071 in)
Limit	0.25 mm (0.0098 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.11 mm (0.0024–0.0043 in)
Limit	0.18 mm (0.0071 in)
Cooling system	
Coolant quantity	
Radiator (including all routes)	0.93 L (0.98 US qt, 0.82 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/LMAR9E-J
Spark plug gap	0.6–0.7 mm (0.024–0.028 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)

Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	32.230–32.330 mm (1.2689–1.2728 in)
Limit	32.130 mm (1.2650 in)
Lobe height (Exhaust)	33.850–33.950 mm (1.3327–1.3366 in)
Limit	33.750 mm (1.3287 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.12–0.19 mm (0.0047–0.0075 in)
Exhaust	0.17–0.24 mm (0.0067–0.0094 in)
Valve dimensions	
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve seat contact width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve stem diameter (intake)	4.975–4.990 mm (0.1959–0.1965 in)
Limit	4.945 mm (0.1947 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	5.000–5.012 mm (0.1969–0.1973 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)
Valve spring	
Free length (intake)	36.78 mm (1.45 in)
Limit	34.94 mm (1.38 in)
Free length (exhaust)	35.60 mm (1.40 in)
Limit	33.82 mm (1.33 in)
Cylinder	
Bore	77.000–77.010 mm (3.0315–3.0319 in)
Wear limit	77.060 mm (3.0339 in)
Piston	
Piston-to-cylinder clearance	0.030–0.055 mm (0.0012–0.0022 in)
Diameter	76.955–76.970 mm (3.0297–3.0303 in)
Measuring point (from piston skirt bottom)	4.0 mm (0.16 in)
Piston pin bore inside diameter	16.002–16.013 mm (0.6300–0.6304 in)
Limit	16.043 mm (0.6316 in)
Piston pin outside diameter	15.991–16.000 mm (0.6296–0.6299 in)
Limit	15.971 mm (0.6288 in)
Piston-pin-to-piston-pin-bore clearance	0.002–0.022 mm (0.0001–0.0009 in)
Piston ring	
Top ring	
End gap (installed)	0.15–0.25 mm (0.0059–0.0098 in)
End gap limit	0.50 mm (0.0197 in)

Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Side clearance limit	0.115 mm (0.0045 in)
Crankshaft	
Crank assembly width	55.93–56.00 mm (2.202–2.205 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 thickness	2.70–2.80 mm (0.106–0.181 in)
Wear limit	2.60 mm (0.102 in)
Plate quantity	8 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	46.20 mm (1.82 in)
Limit	43.89 mm (1.73 in)
Push rod bending limit	0.30 mm (0.012 in)
Drivetrain	
Primary reduction ratio	3.353 (57/17)
Transmission type	Constant mesh 5-speed
Gear ratio	
1st	2.143 (30/14)
2nd	1.750 (28/16)
3rd	1.444 (26/18)
4th	1.222 (22/18)
5th	1.042 (25/24)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	3.846 (50/13)
Final drive	Chain
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	
Pump type	Electrical
Maximum consumption amperage	2.4 A
Fuel injector	
Resistance	12.0 Ω
Throttle body	
ID mark	B7B1 00
Idling condition	
Engine idling speed	1900–2100 r/min
Coolant temperature	70–80 °C (158–176 °F)
Engine oil temperature	55–65 °C (131–149 °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	
Frame type	Semi double cradle
Caster angle	26.45°
Trail	119 mm (4.69 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	19x1.85
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	BRIDGESTONE/X20F
Rear tire	
Type	With tube
Size	100/90-19 57M
Manufacturer/model	BRIDGESTONE/X20R
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
Front brake lever free play	2.7–11.1 mm (0.11–0.44 in)
Disc outside diameter × thickness	270.0 × 3.0 mm (10.63 × 0.12 in)
Brake disc thickness limit	2.5 mm (0.10 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	9.52 mm (0.37 in)
Caliper cylinder inside diameter (Left)	22.65 mm, 22.65 mm (0.89 in, 0.89 in)
Specified brake fluid	DOT 4
Rear brake	
Type	Hydraulic single disc brake
Brake pedal position	0.0 mm (0.00 in)
Disc outside diameter × thickness	245.0 × 4.0 mm (9.65 × 0.16 in)
Brake disc thickness limit	3.5 mm (0.14 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	1.0 mm (0.04 in)
Master cylinder inside diameter	11.0 mm (0.43 in)

Caliper cylinder inside diameter (Left)	25.40 mm (1.00 in)
Specified brake fluid	DOT 4
Front suspension	
Type	Telescopic fork
Spring	Coil spring
Shock absorber	Hydraulic damper
Wheel travel	310 mm (12.2 in)
Fork spring free length	497.0 mm (19.57 in)
Limit	492.0 mm (19.37 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil S1
Quantity (left)	491.0 cm³ (16.60 US oz, 17.32 Imp.oz)
Quantity (right)	491.0 cm³ (16.60 US oz, 17.32 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 adjustment	Click
Adjustment value from the start position (Soft)	20
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0
Rear suspension	
Type	Swingarm (link suspension)
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Spring preload	
Adjusting system	Mechanical adjustable type
Adjustment value (Soft)	1.5 mm (0.06 in)
Adjustment value (STD)	4.0 mm (0.16 in)
Adjustment value (Hard)	18.0 mm (0.71 in)
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	30
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type

Fast compression damping	
Unit for adjustment	Turn
Adjustment value from the start position (Soft)	2
Adjustment value from the start position (STD)	1
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)	10
Adjustment value from the start position (Hard)	0

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

Drive chain	
Size	DID520DMA4K SDH G&B
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	242.8 mm (9.56 in)

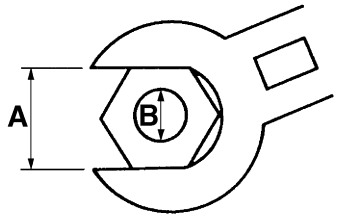
EAM20130
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI
Advancer type	Digital
Ignition timing (B.T.D.C.)	10.0 °/2000 r/min
Engine control unit	
Model	B7B1
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
Lean angle sensor	
Operating angle	45°
Charging system	
Charging system	AC magneto
Standard output	14.0 V, 5.4 A at 5000 r/min
Stator coil resistance	0.512–0.768 Ω
Rectifier/regulator	
Regulator type	Single-phase
Regulated voltage (DC)	14.0–14.8 V
Rectifier capacity (DC)	11.0 A
Battery	
Model	BR9
Voltage, capacity	12 V, 2.4 Ah (5 HR)
Starter motor	
Power output	0.39 kW
Armature coil resistance	0.0189–0.0231 Ω
Brush overall length limit	3.5 mm (0.14 in)
Brush spring force	3.92–5.88 N (400–600 gf, 14.11–21.17 oz)
Commutator diameter	17.6 mm (0.69 in)
Commutator diameter limit	16.6 mm (0.65 in)
Mica undercut (depth)	1.50 mm (0.06 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	210–220 Ω at 100 °C (210–220 Ω at 212 °F)
Fuses	
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	8	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)	
Cylinder head stud bolt (exhaust pipe)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Oil passage plug (cylinder head)	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder head bolt	M9	4	See TIP.	M
Cylinder head nut	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder head cover bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Cylinder bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil pressure check bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Balancer weight plate screw	M6	2	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)	
Balancer nut	M10	1	38 N·m (3.8 kgf·m, 28 lb·ft)	
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)	
Water pump impeller	M8	1	14 N·m (1.4 kgf·m, 10 lb·ft)	
Oil pump bolt	M5	2	5 N·m (0.5 kgf·m, 3.7 lb·ft)	T
Oil pump cover screw	M4	1	2.0 N·m (0.20 kgf·m, 1.5 lb·ft)	
Oil strainer bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Throttle cable cover bolt	M5	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Throttle body joint bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Throttle body joint clamp screw	M5	1	3.0 N·m (0.30 kgf·m, 2.2 lb·ft)	
Air filter case joint clamp screw	M5	1	3.0 N·m (0.30 kgf·m, 2.2 lb·ft)	
Air filter case bolt	M6	3	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
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)	

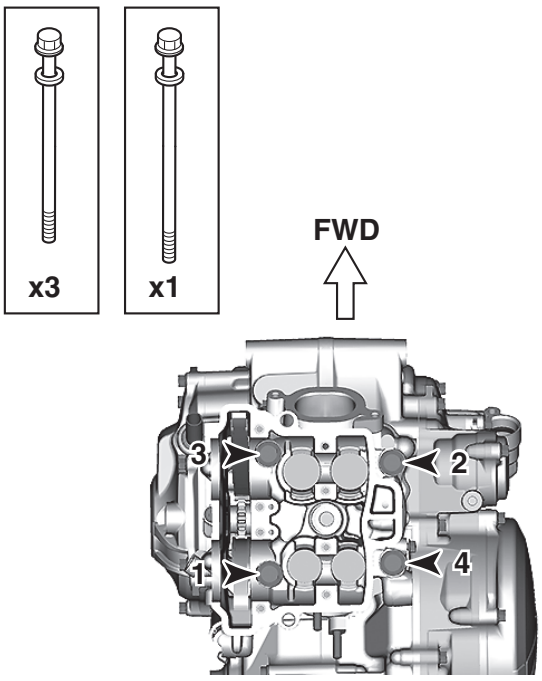
ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Exhaust pipe nut	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Exhaust pipe protector screw	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	LT
Exhaust pipe bracket bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Silencer bolt (front)	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Silencer bolt (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)	LT
Oil nozzle bolt	M5	1	5 N·m (0.5 kgf·m, 3.7 lb·ft)	LT
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)	LT
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)	LT
Bearing plate cover bolt (left side of the drive axle)	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Plate bolt	M6	4	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Clutch cover bolt	M6	6	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	9	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 screw	M6	8	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Primary drive gear nut	M16	1	95 N·m (9.5 kgf·m, 70 lb·ft)	LT
Clutch spring bolt	M6	6	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Clutch boss nut	M20	1	95 N·m (9.5 kgf·m, 70 lb·ft)	Stake. E
Drive sprocket nut	M18	1	75 N·m (7.5 kgf·m, 55 lb·ft)	Use a lock washer.
Segment	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Shift guide bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	LT
Stopper lever bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	LT
Shift pedal bolt	M6	1	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△
AC magneto rotor nut	M12	1	65 N·m (6.5 kgf·m, 48 lb·ft)	
Stator coil screw	M5	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	LT
Crankshaft position sensor bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	LT

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
AC magneto lead holder bolt	M5	1	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Coolant temperature sensor	M10	1	14 N·m (1.4 kgf·m, 10 lb·ft)	
Gear position switch bolt	M5	2	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Rectifier/regulator bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
ECU bolt	M5	2	3.8 N·m (0.38 kgf·m, 2.8 lb·ft)	
Ignition coil bolt	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Starter motor bolt	M6	2	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Nut (holder)	M6	1	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Throttle position sensor screw	M5	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	
Intake air pressure sensor screw	M6	1	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	

TIP

Cylinder head bolt

Tighten all the cylinder head tightening bolts evenly in the tightening order to 30 N·m (3.0 kgf·m, 22 lb·ft). Remove the one bolt according to the tightening order. When doing so, do not remove the other bolts. Retighten the bolt to 15 N·m (1.5 kgf·m, 11 lb·ft), and then tighten it further to reach the specified angle (60°). Remove the remaining bolts one by one in the same manner and retighten them. Finally, tighten all the bolts to reach the specified angle (60°). Total tightening angle: 60° + 60° = 120° (The first and second time, be sure to apply molybdenum disulfide oil to the bolt threads and seats as well as to both sides of the lock 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)	
Start switch	M3	1	0.5 N·m (0.05 kgf·m, 0.37 lb·ft)	
Mode switch	M3	1	1.3 N·m (0.13 kgf·m, 0.95 lb·ft)	
Lower ring nut	M28	1	See TIP.	△
Damper assembly (front fork)	M51	2	30 N·m (3.0 kgf·m, 22 lb·ft)	
Inner tube and Adjuster	M22	2	55 N·m (5.5 kgf·m, 41 lb·ft)	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)	△

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Front wheel axle pinch bolt	M8	4	21 N·m (2.1 kgf·m, 15 lb·ft)	△
Front brake disc bolt	M6	6	12 N·m (1.2 kgf·m, 8.9 lb·ft)	△/LT
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 (lower 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 bolt	M10	1	56 N·m (5.6 kgf·m, 41 lb·ft)	△
Rear shock absorber assembly lower bolt	M10	1	53 N·m (5.3 kgf·m, 39 lb·ft)	△
Locknut (rear shock absorber lock-nut)	M60	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Relay arm bolt (swingarm side)	M14	1	70 N·m (7.0 kgf·m, 52 lb·ft)	△
Connecting arm bolt (relay arm side)	M14	1	80 N·m (8.0 kgf·m, 59 lb·ft)	△
Connecting arm bolt (frame side)	M14	1	80 N·m (8.0 kgf·m, 59 lb·ft)	△
Brake hose holder screw	M5	4	3.5 N·m (0.35 kgf·m, 2.6 lb·ft)	△

ITEM	Thread size	Q'ty	TIGHTENING TORQUES	Remarks
Drive chain tensioner bolt (upper side)	M8	1	16 N·m (1.6 kgf·m, 12 lb·ft)	
Drive chain tensioner bolt (lower side)	M8	1	16 N·m (1.6 kgf·m, 12 lb·ft)	
Bolt (drive chain support)	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Drive chain support nut	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Drive chain guide bolt	M5	3	4.0 N·m (0.40 kgf·m, 3.0 lb·ft)	
Bolt (rear frame cover) (left)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Fuel tank bolt (front side)	M6	2	7 N·m (0.7 kgf·m, 5.2 lb·ft)	△
Fuel tank bolt (rear side)	M6	1	9 N·m (0.9 kgf·m, 6.6 lb·ft)	
Fuel tank bracket bolt (rear side)	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 (battery negative lead)	M6	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).

EAM20132
LUBRICATION POINTS AND LUBRICANT TYPES

EAM30206
ENGINE

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

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

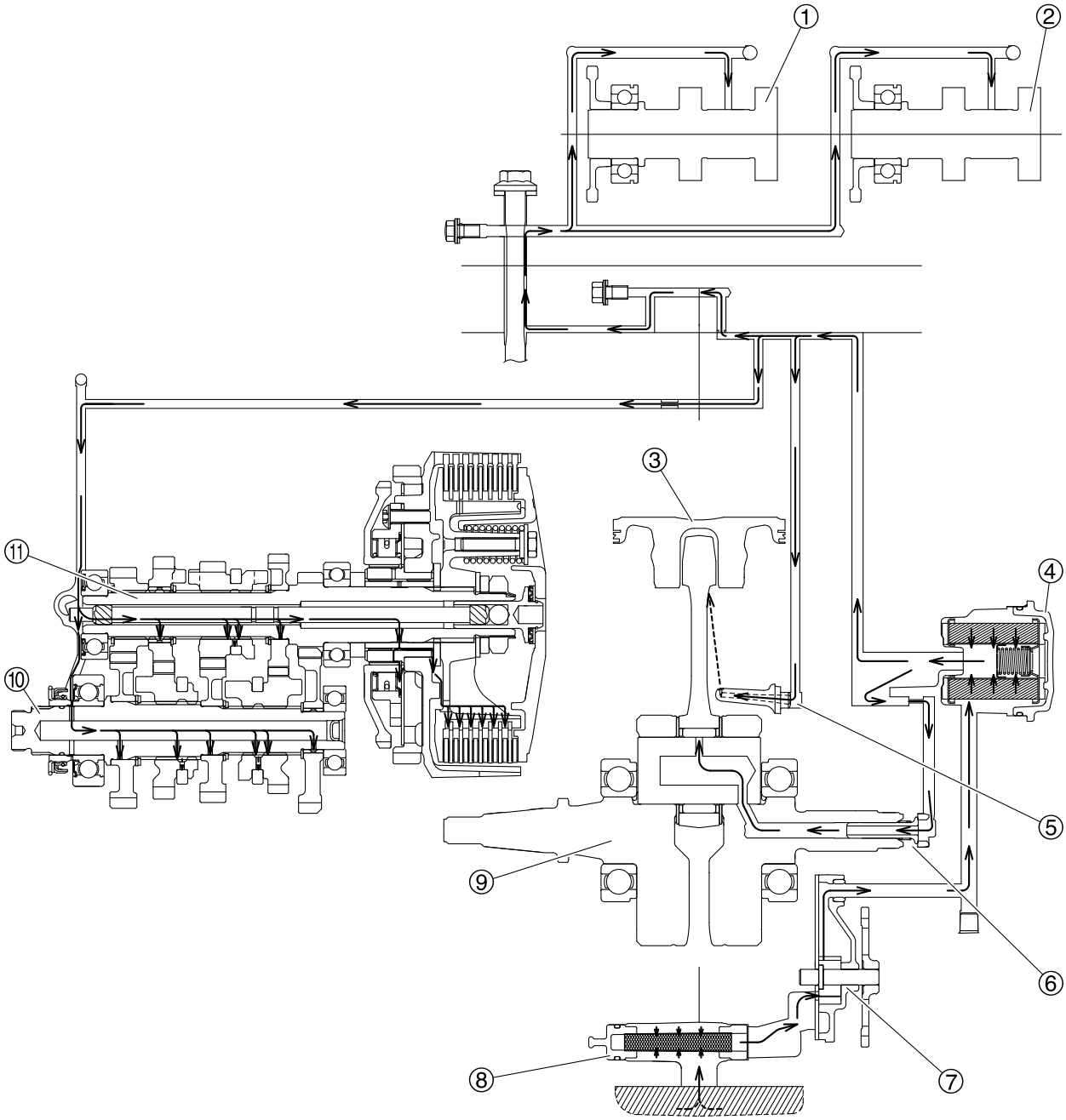
EAM30207
CHASSIS

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

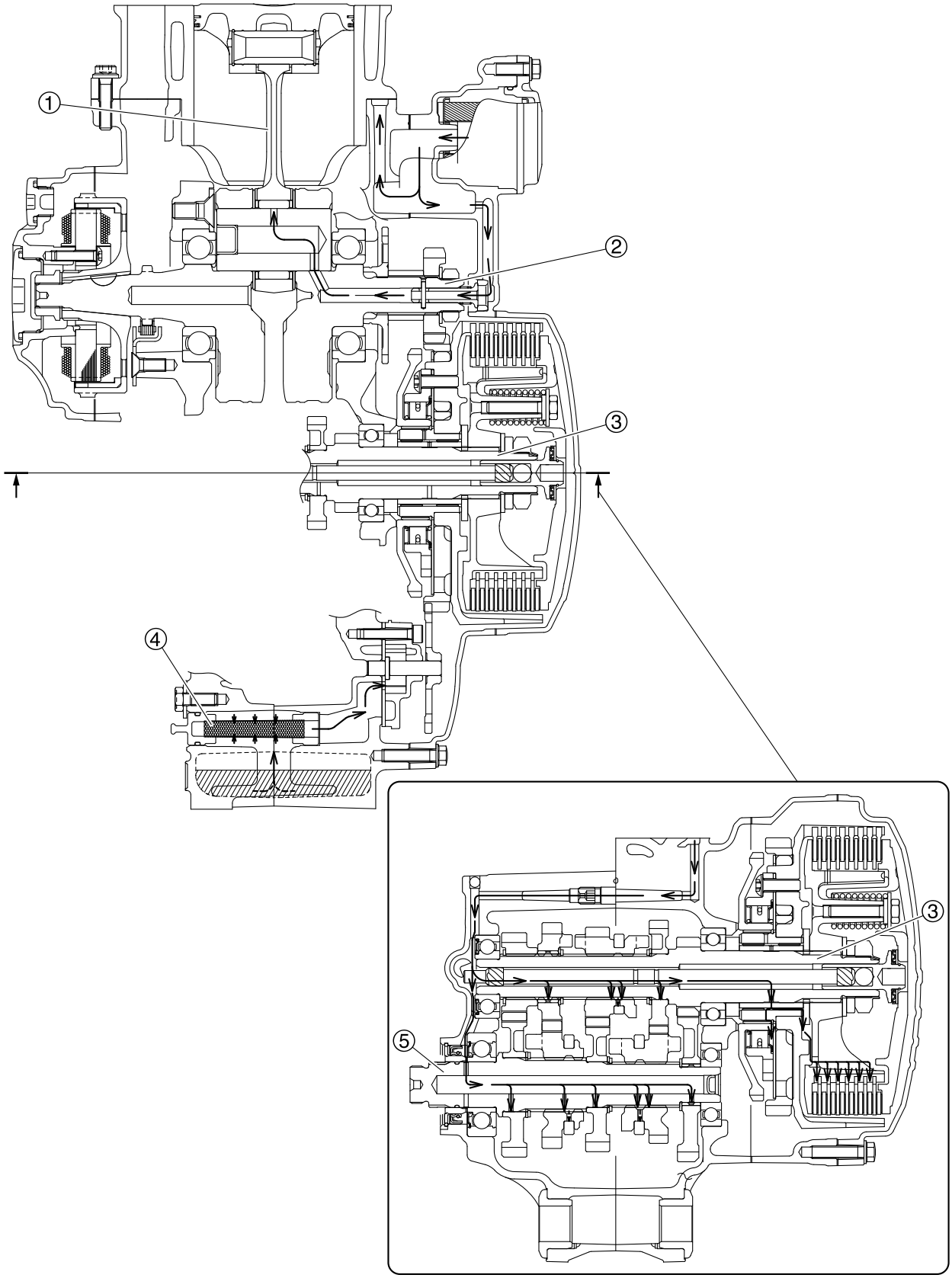
Lubrication point	Lubricant types
Clutch lever position adjuster end	
Clutch lever adjuster rubber lip	
Clutch cable end (clutch lever side)	
Tube guide (throttle grip) inner surface and throttle cable end	
Front brake caliper piston	
Front brake caliper piston seal	
Front brake caliper dust seal	
Front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

EAM20151
LUBRICATION SYSTEM CHART AND DIAGRAMS

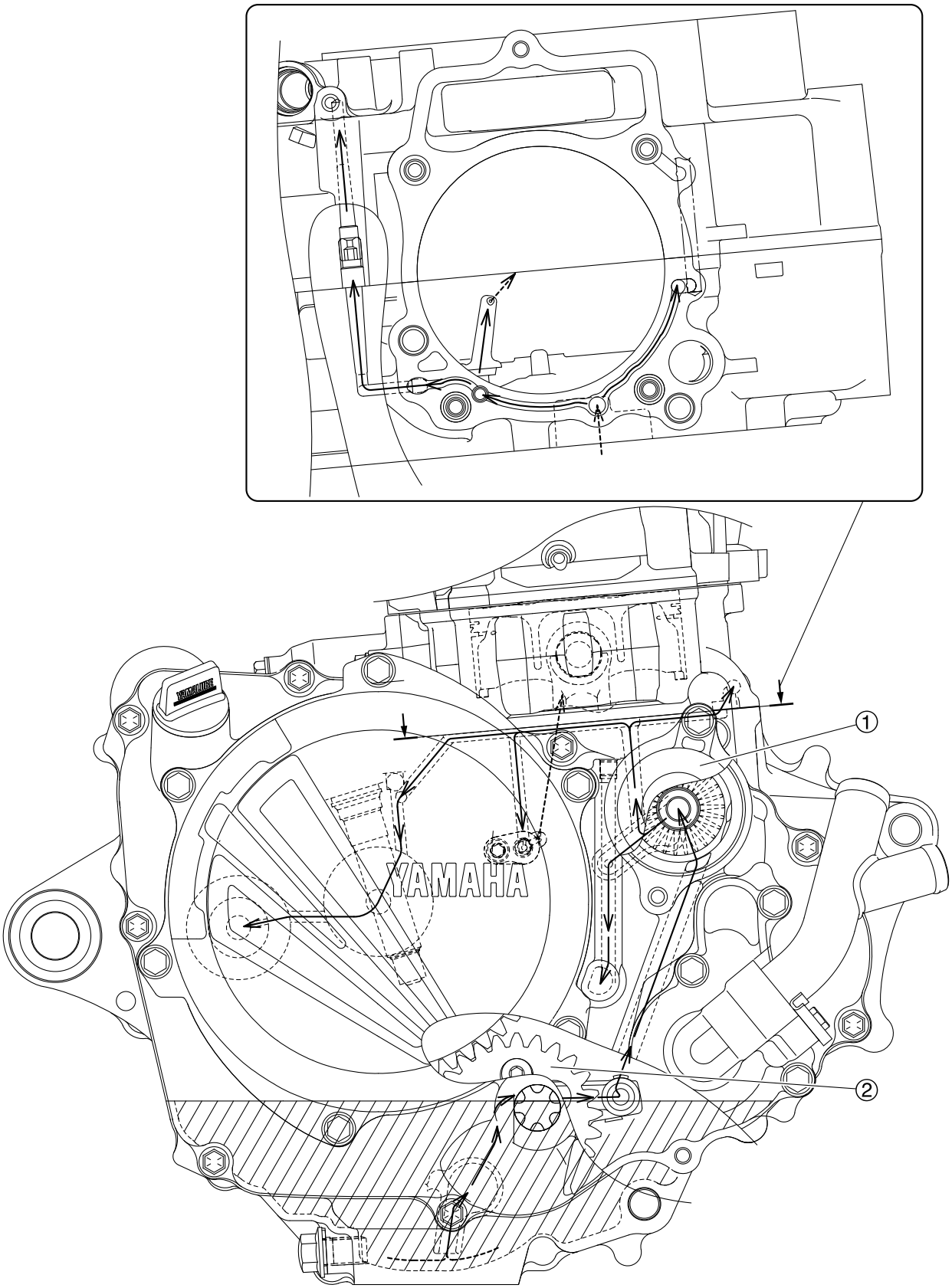
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LUBRICATION DIAGRAMS



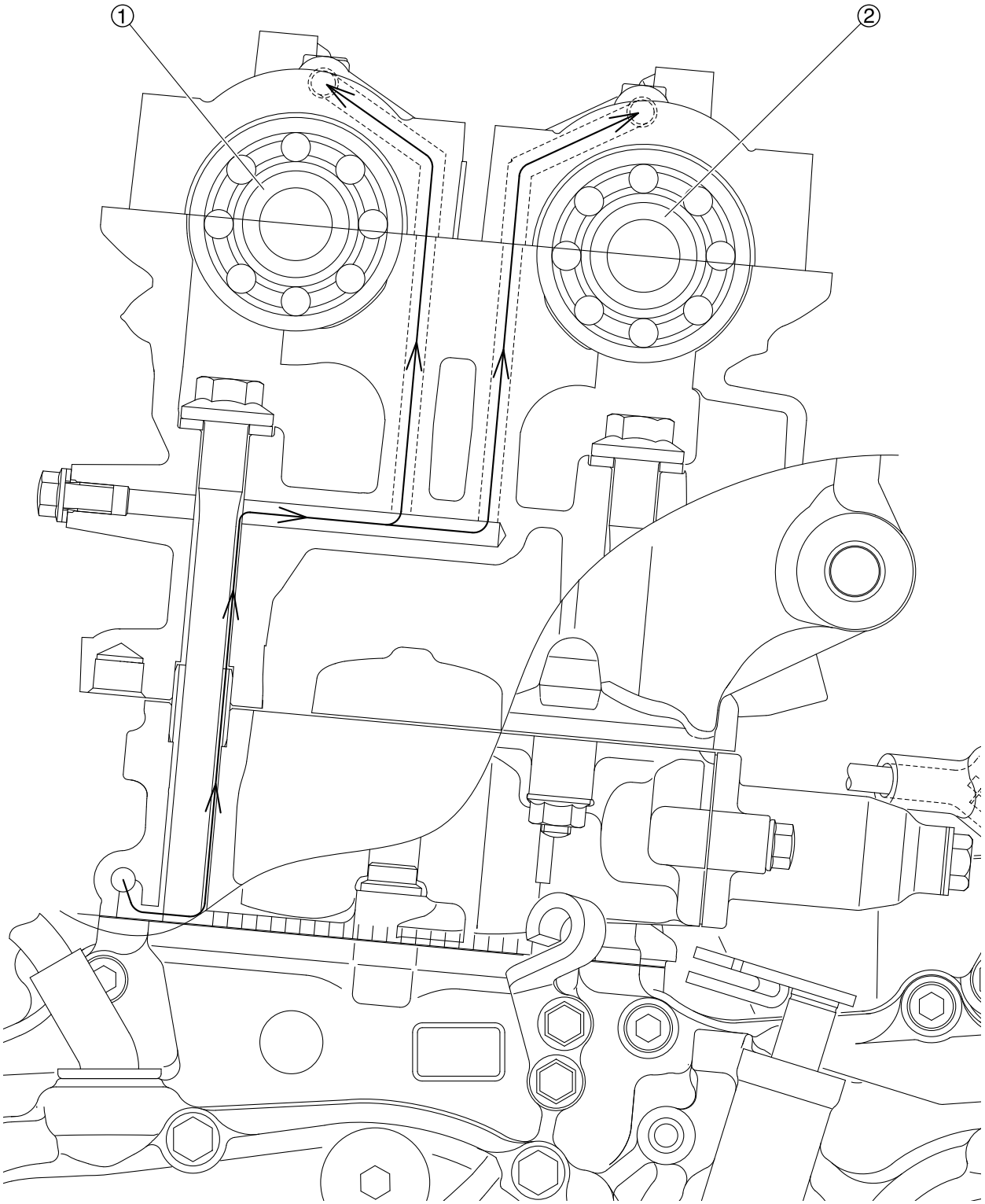
1. Intake camshaft
2. Exhaust camshaft
3. Piston
4. Oil filter element
5. Oil nozzle
6. Relief valve
7. Oil pump
8. Oil strainer
9. Crankshaft
10. Drive axle
11. Main axle


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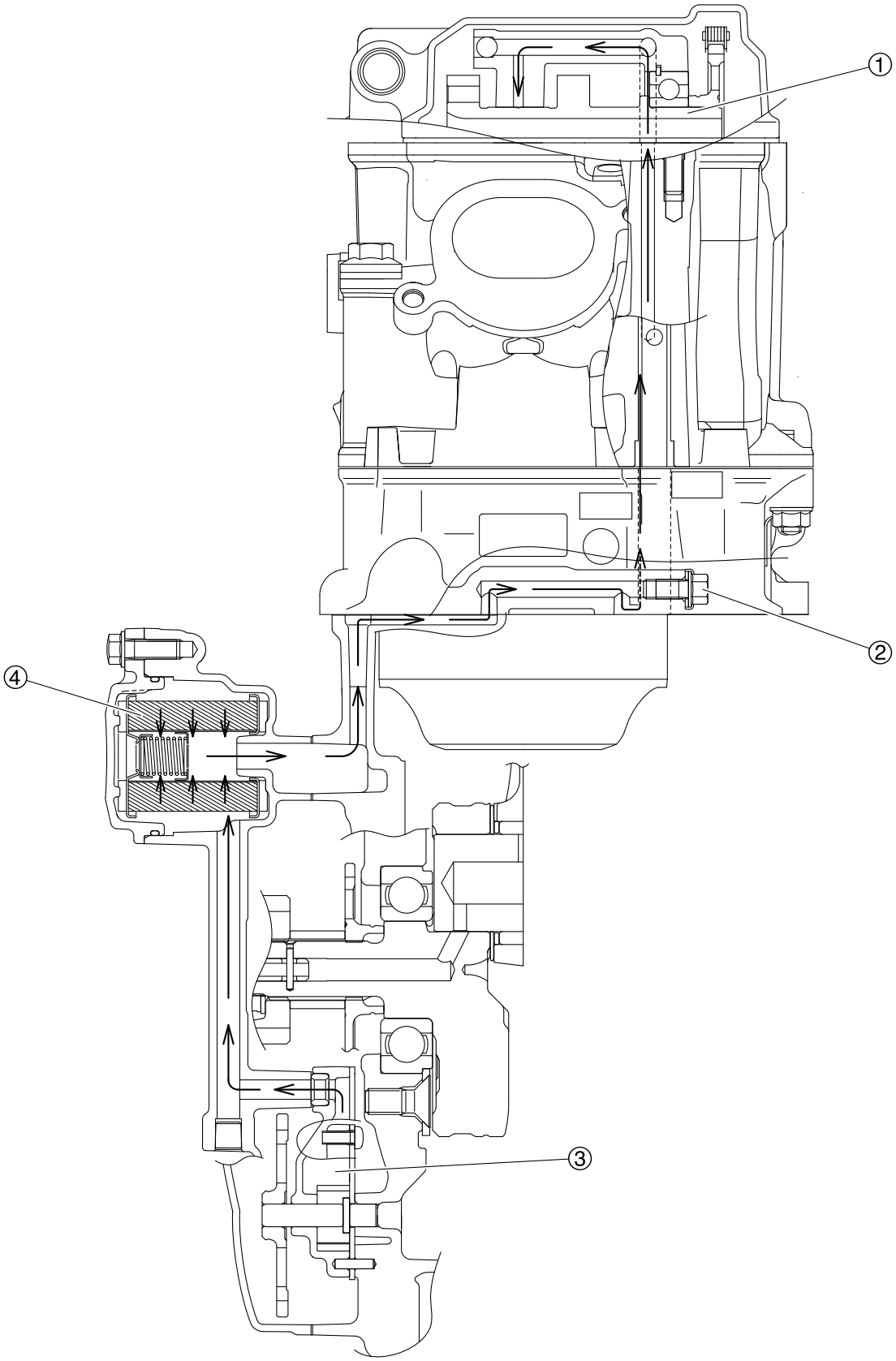
1. Connecting rod
2. Crankshaft
3. Main axle
4. Oil strainer
5. Drive axle


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YAMAHA

1. Oil filter element
2. Oil pump


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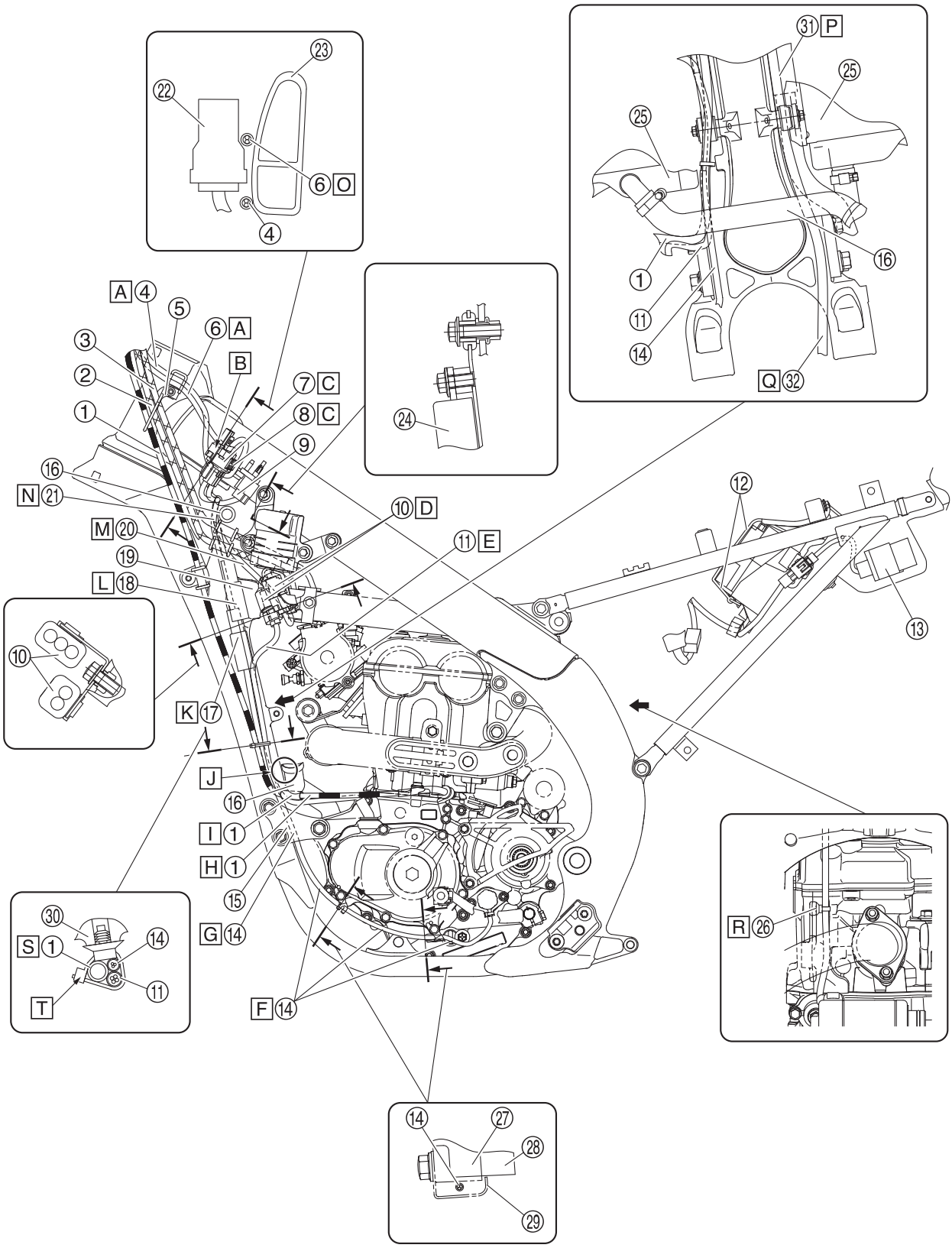
1. Intake camshaft
2. Exhaust camshaft


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1. Camshaft
2. Oil pressure check bolt
3. Oil pump
4. Oil filter element

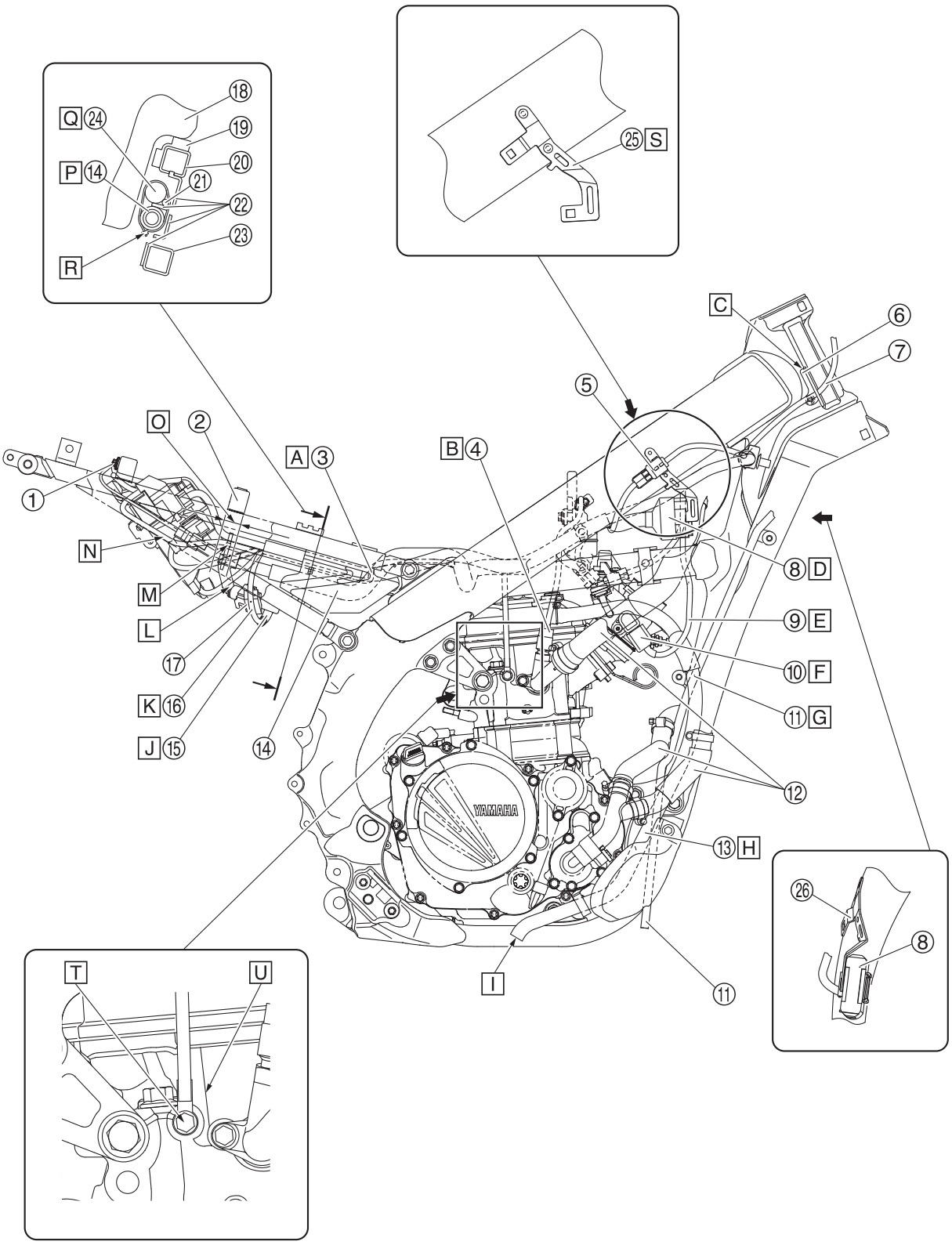
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CABLE ROUTING DIAGRAM



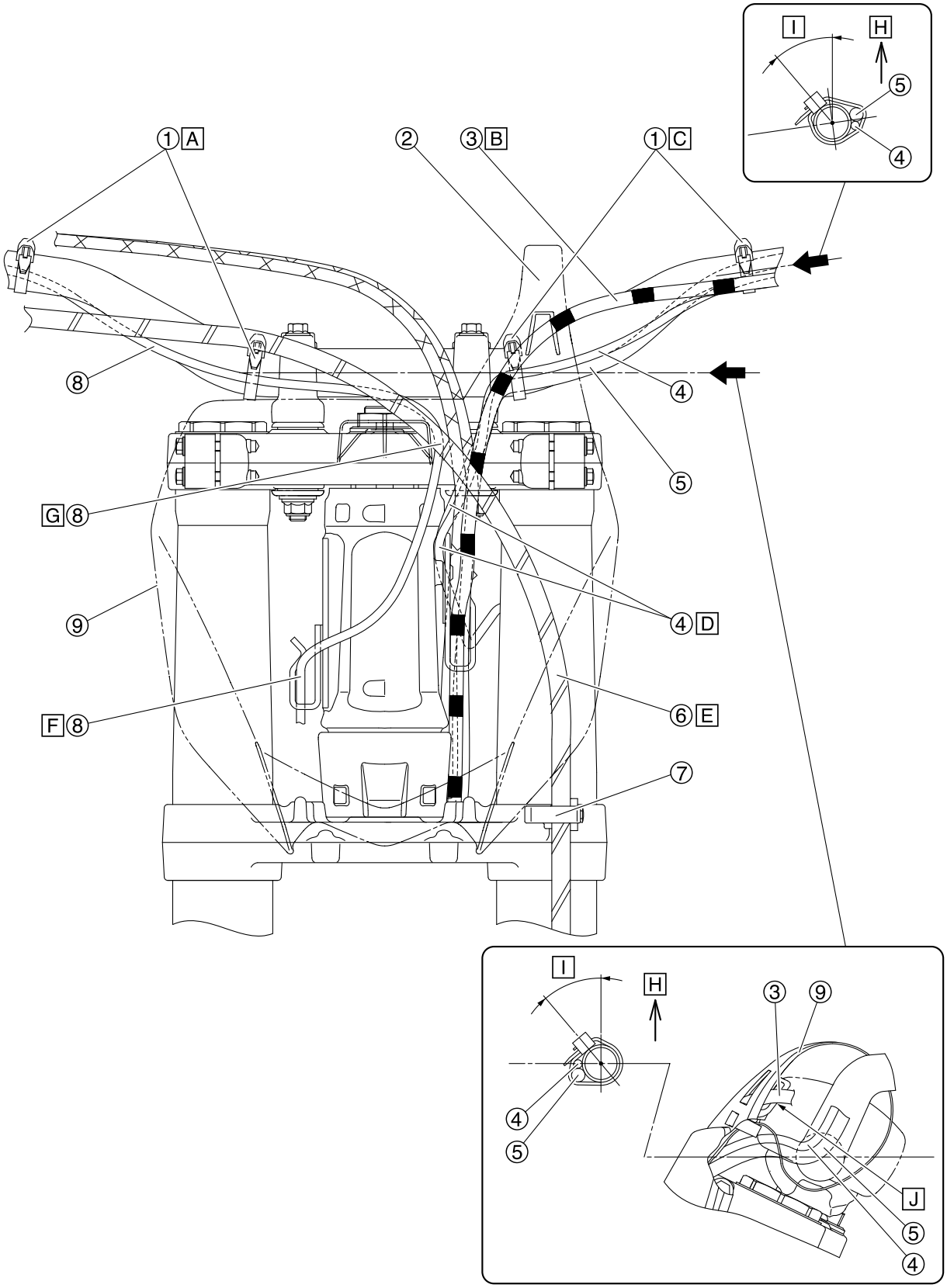
1. Clutch cable
2. Throttle cable (return)
3. Throttle cable (pull)
4. Mode switch lead
5. Cable holder
6. Engine stop switch lead
7. Mode switch coupler
8. Engine stop switch coupler
9. Intake air temperature sensor coupler
10. Rectifier/regulator coupler
11. AC magneto lead
12. Battery band
13. CCU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

A. Pass the engine stop switch lead and the mode switch lead between the frame and the cable holder. Route engine stop switch lead and the mode switch lead above of the vehicle.
B. Insert the Yamaha diagnostic tool coupler into the connector, and fix it to the bracket.
C. Fasten the engine stop switch coupler to the bracket of the inside. Fasten the mode switch coupler to the bracket of the outside. Route the mode switch lead under the bracket.
D. Fasten the rectifier/regulator coupler to the bracket. Attach the coupler cover.
E. Pass the AC magneto lead through rear side of the vehicle. No pinch is allowed between the radiator and the tension arm.
F. Route the gear position sensor along the crankcase without slack.
G. Pass the gear position switch lead to the inside of the lower engine bracket (the side of the vehicle).
H. Pass the clutch cable with no downward sag allowed.
I. 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 AC magneto lead (the outside of the vehicle).
J. No pinch is allowed the leads between the radiator and the tension arm.
K. After connecting the gear position switch coupler, attach the coupler cover.
L. After connecting the AC magneto coupler, attach the coupler cover.
M. Pass the rectifier/regulator lead to the inside of the tension arm (the side of the vehicle).
N. Pass the main harness to the front of the radiator hose (the front of the vehicle), and to the inside of the throttle cable (the side of the vehicle).
O. Pass the engine stop switch lead and mode switch lead between the Yamaha diagnostic tool coupler and the tank rail.
P. Pass the cylinder head breather hose between the down tube and radiator, and front of the radiator under boss.
Q. Route the radiator breather hose between the down tubes.
R. Insert the clamp into the hole in the cylinder head. When doing so, the stator motor lead should not be twisted.
S. Clamp the clutch cable at the front of the lead (the front of the vehicle).
T. Insert the clamp into the hole in the frame. Do not cut off the excess end of the locking portion, and the locking portion should face toward the front of the vehicle.


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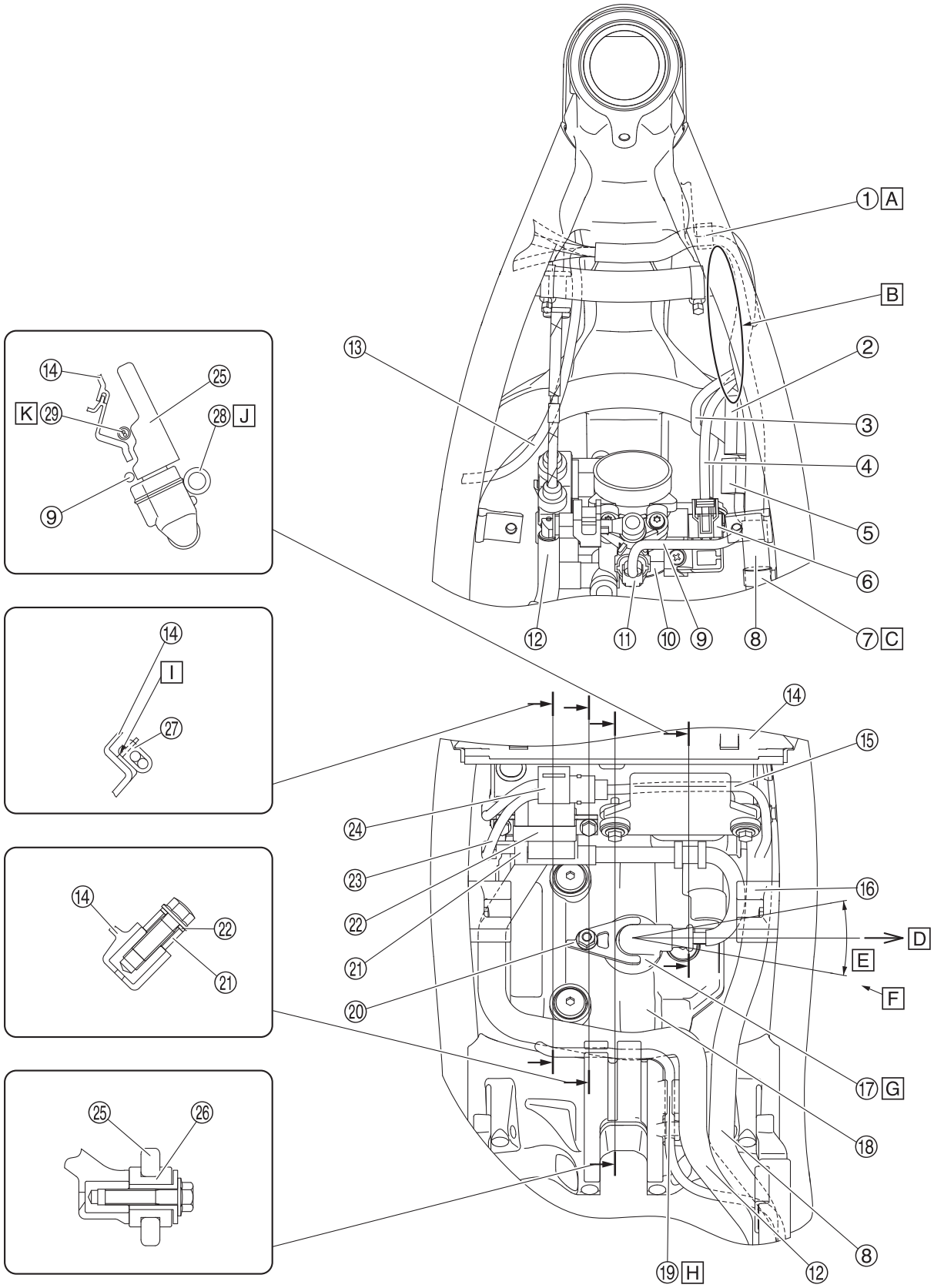
1. Battery negative lead
2. Cross tube
3. Starter motor lead
4. Coolant temperature sensor coupler
5. Start switch coupler
6. Cable guide
7. Start switch lead
8. Joint coupler
9. Throttle position sensor lead
10. Throttle position sensor coupler
11. Radiator breather hose
12. Radiator hose
13. Cylinder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

A. Adjust any slack between the rear shock absorber and the clamp of the side cover.
B. Attach the coupler cover to the coolant temperature sensor coupler.
C. 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 it, put the cover over the joint coupler. It is allowed that the insert portion of the coupler is 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 coupler, attach the cover.
G. Route the radiator breather hose as follows: Route it over the boss of the upper side of the radiator toward the rear of the vehicle → Route it over the engine breather hose toward the rear of the vehicle → Route it over the boss on the lower side of the radiator toward the front of the vehicle → Route it over the radiator hose toward the front of the vehicle
H. 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 the fuel pump coupler, attach the cover.
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. Fasten the starter relay lead and motor lead with the plastic locking tie within the range of the cross tube width. Make sure that the locking portion of the plastic locking tie faces to the lower side of the vehicle and put it inside the rear frame without cutting off the end.
N. Route the starter motor lead inside of the rear frame and along the rear fender.
O. 20 mm (0.7874 in)
P. Fasten the fuel hose at the pink dot position using the plastic locking tie.
Q. Fasten the wire harness at the white tape position using the plastic locking tie.
R. Position the lock part of the plastic locking tie to downward of the vehicle. Cut the end of the plastic locking tie.
S. Fasten the bracket to the tank rail (right) using the rivet.
T. When installing the engine ground lead terminal, it can face either way. Make sure that the terminal does not contact the cylinder head bolt and that it faces to the rear beyond the cylinder ridge line.
U. Cylinder head ridge line


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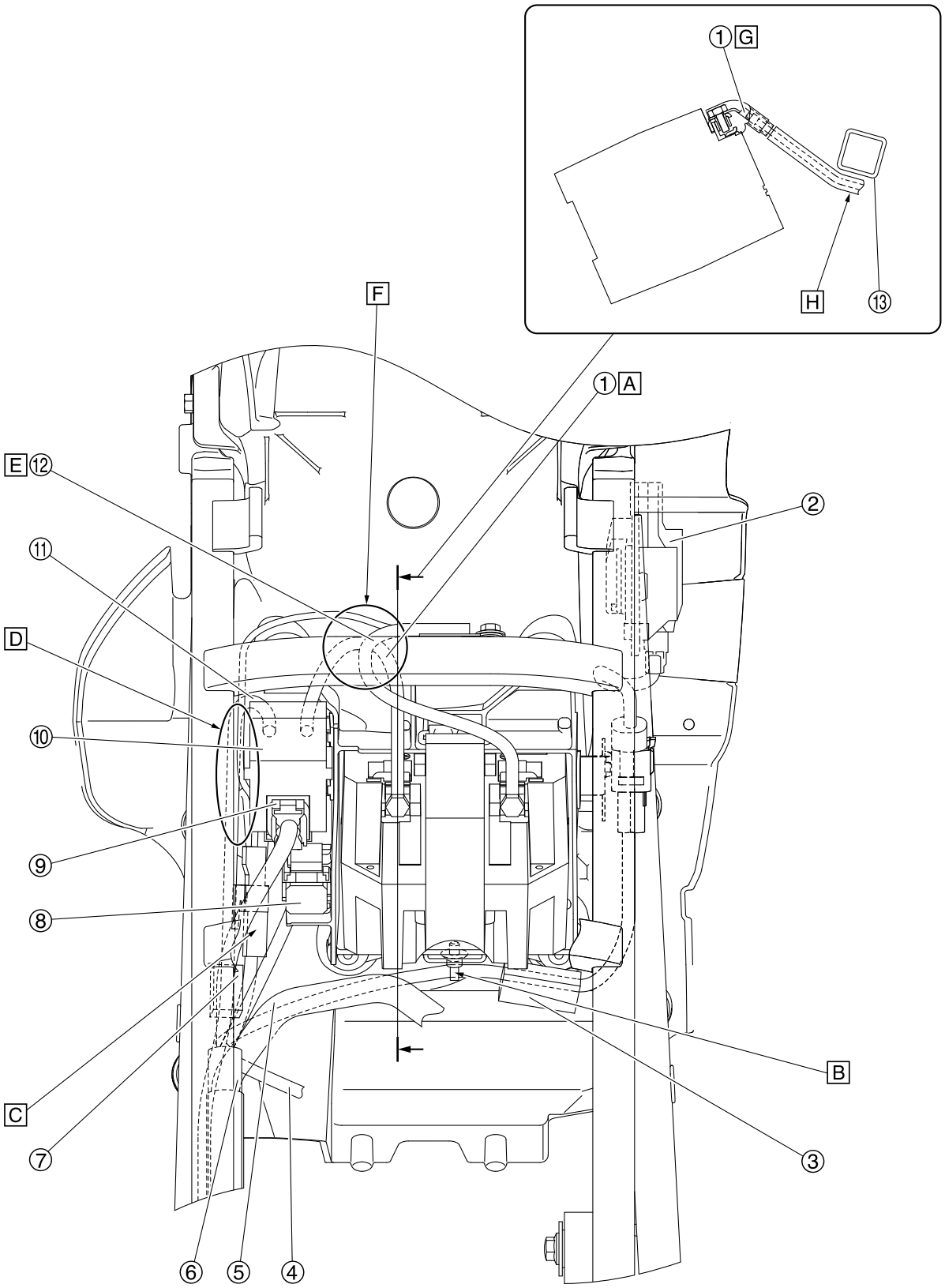
1. Plastic locking tie
2. Number plate band
3. Clutch cable
4. Engine stop switch lead
5. Mode switch lead
6. Front brake hose
7. Cable guide
8. Start switch lead
9. Number plate

A. Fasten the start switch lead to the handlebar using the plastic locking tie. Do not cut the end of the plastic locking tie.
B. Pass the clutch cable through the rear side of the number plate band.
C. Fasten the engine stop switch lead and mode switch lead to the handlebar using the plastic locking tie. Do not cut the end of the plastic locking tie.
D. 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 through the left side of the number plate bolt.
H. Vertical direction of vehicle
I. 30–50°
J. Pass the clutch cable through the guide of the number plate.


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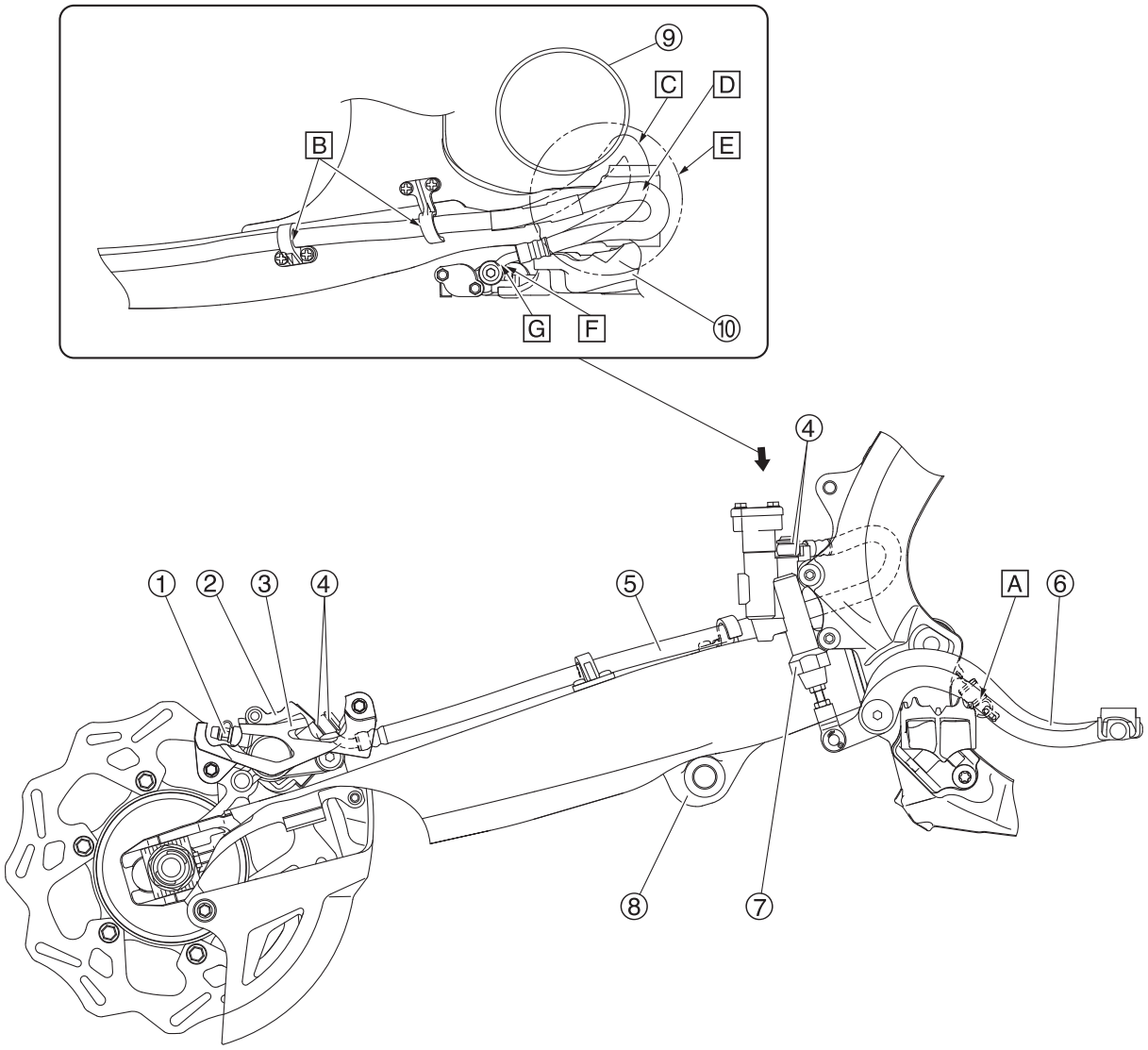
1. Clamp
2. Diode
3. Throttle position sensor lead
4. Intake air pressure sensor lead
5. Joint coupler
6. Intake air pressure sensor coupler
7. Clamp (wire harness)
8. Wire harness
9. Fuel injector lead
10. Throttle body
11. Fuel injector coupler
12. Fuel hose
13. Rectifier/regulator lead
14. Air filter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

A. Fasten the main harness and start switch lead by the clamp, and insert the clamp projection into the hole in the sheet metal of the radiator. The direction of the clamp lock portion does not matter. It is allowed to run the leads near the radiator cap on the inside.
B. No pinch is allowed the leads between the tank rail and the air filter joint.
C. Insert the projection of the main harness into the hole in the frame.
D. Right side of the vehicle.
E. ±10°
F. Install the plug cap so it faces to the right side of the vehicle.
G. Push the spark plug cap home, where there shall be no gap between it and the cylinder head cover.
H. Fasten the starter motor lead along the locating damper.
I. Insert the clamp into the rib so that it contacts the rib.
J. It does not matter if the high tension cord and grommet do not contact the ECU.
K. Pass the wire harness between the ECU and air filter assembly.


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1. Battery positive lead
2. CCU (Communication Control Unit)
3. Diode
4. Fuel pump lead
5. Fuel hose
6. Wire harness
7. Joint coupler
8. Main relay
9. Starter relay coupler
10. Starter relay
11. Starter motor lead
12. Battery negative lead
13. Cross member

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


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1. Bleed screw
2. Rear brake caliper
3. Protector
4. Gasket
5. Rear brake hose
6. Brake pedal
7. Rear brake master cylinder assembly
8. Swingarm
9. Spring
10. Frame

A. It does not matter whether the spring is installed upward or downward.
B. Pass the brake hose into the brake hose holders.
C. Route the rear brake hose so that it is not bent as shown by the double-dash line.
D. Route the rear brake hose and spring so that they do not interfere with each other.
E. Make sure that the rear brake hose is not excessively twisted.
F. Make sure that the metal part of the rear brake hose contacts the stopper of the rear brake master cylinder.
G. Install the rear brake hose so that the bended portion of the metal part of the rear brake hose faces as shown in the illustration.

PERIODIC CHECKS AND ADJUSTMENTS

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MAINTENANCE INTERVALS 3-1

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GENERAL INSPECTION AND MAINTENANCE 3-5

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EAM20157
MAINTENANCE INTERVALS

EAM30369
MAINTENANCE INTERVALS

ECA25871
NOTICE

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

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Valve	Check the valve clearances	√		√			The engine must be cold.
	Inspect				√		Check the valve seats and the valve faces for wear.
	Replace					√	
Valve spring	Inspect				√		Check the free length and the tilt.
	Replace					√	
Valve lifter	Inspect				√		Check for scratches and wear.
	Replace					√	
Camshaft	Inspect				√		• Inspect the camshaft surface. • Inspect the decompression system.
	Replace					√	
Timing chain	Inspect					√	Check for damage and sticking.
	Replace				√	√	Replace the timing chain and timing chain tensioner as a set.
Timing chain tensioner	Replace				√	√	Replace the timing chain and timing chain tensioner as a set.
Camshaft sprocket	Inspect				√		Check for wear on the teeth and for damage.
	Replace					√	
Piston	Inspect					√	Inspect crack.
	Clean					√	Inspect carbon deposits and eliminate them.
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.
Piston ring	Inspect					√	Check the end gap of the piston ring.
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.
Piston pin	Inspect					√	
	Replace				√	√	Replace the piston, piston pin, piston pin clip, and piston ring all as a set.

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

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

Item	Check or maintenance job	After break-in	Every race (about 2.5 hours)	Every third (about 7.5 hours)	Every fifth (about 12.5 hours)	As required	Remarks
Cables	Routing (Connection)	√	√				
	Check and grease	√	√				
	Check and clean throttle cable	√	√				Check throttle cables on the throttle body for dirt and wear.
Levers	Adjust clutch lever free play					√	
Brake pedal, foot-rest	Lubricate	√	√				
Outside nuts and bolts	Retighten	√	√				Refer to “TORQUE-CHECK POINTS” on page 1-25.
Battery	Inspect					√	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.	3-6, 3-6, 3-6, 3-7, 3-7, 3-8
Fuel	Check that a fresh gasoline is filled in the fuel tank. Check the fuel line for leakage.	1-22
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.	3-8, 3-8
Throttle grip/Housing	Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary.	3-9, 3-10
Brakes	Check the play of front brake and effect of front and rear brake.	3-21, 3-22, 3-22, 3-23, 3-23, 3-25, 3-26, 3-26
Drive chain	Check drive chain slack and alignment. Check that the drive chain is lubricated properly.	3-27, 4-66, 4-66, 4-67, 4-67, 4-67
Wheels	Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play.	3-32, 3-32, 3-33, 3-33
Steering	Check that the handlebar can be turned smoothly and have no excessive play.	3-33
Front forks and rear shock absorber	Check that they operate smoothly and there is no oil leakage.	3-28, 3-28, 3-28, 3-28, 3-29, 3-30, 3-30, 3-30
Cables (wires)	Check that the clutch and throttle cables move smoothly. Check that they are not caught when the handlebars are turned or when the front forks travel up and down.	—
Exhaust pipe	Check that the exhaust pipe is tightly mounted and has no cracks.	3-12
Rear wheel sprocket	Check that the rear wheel sprocket tightening bolt is not loose.	4-10, 4-10, 4-10, 4-10, 4-11, 4-11
Lubrication	Check for smooth operation. Lubricate if necessary.	3-10, 3-34
Bolts and nuts	Check the chassis and engine for loose bolts and nuts.	1-25
Lead connectors	Check that the AC magneto, ECU and ignition coil are connected tightly.	1-8
Settings	Is the machine set suitably for the condition of the racing course and weather or by taking into account the results of test runs before racing? Are inspection and 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.

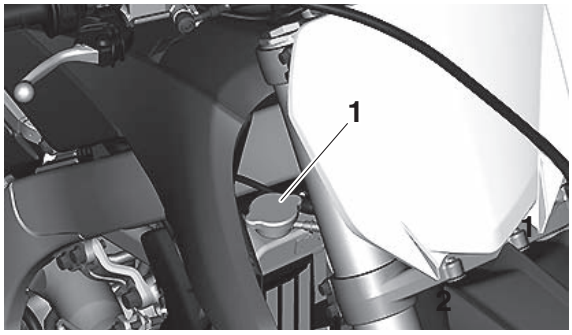
EAM20135
ENGINE

EAM30210
CHECKING THE COOLANT LEVEL

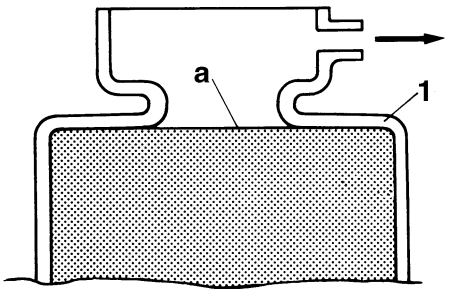
EWA19070
⚠ WARNING

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

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



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



1. Radiator

ECA24260
NOTICE

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

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

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

EAM30211
CHECKING THE COOLING SYSTEM

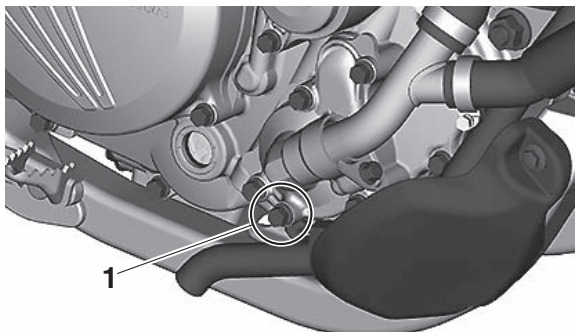
1. Remove:
   • Seat
   • Side cover (left/right)
   • Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.
   • Air filter case cover
   Refer to "THROTTLE BODY" on page 7-5.
2. Check:
   • Radiator
   • Radiator hoses
   Crack/damage → Replace.
   Refer to "RADIATOR" on page 6-1.
3. Install: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

EAM30212
CHANGING THE COOLANT

EWA19080
⚠ WARNING

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

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



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

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

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

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)
0.93 L (0.98 US qt, 0.82 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

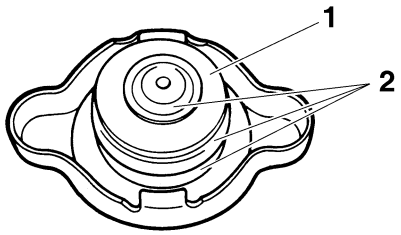
- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.**
- **Use only distilled water. However, if distilled water is not available, soft water may be used.**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

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 3-6.

EAM30213

CHECKING THE RADIATOR CAP

1. Check:
   • Seal (radiator cap) "1"
   • Valve and valve seat "2"
   Crack/damage → Replace.
   Exist fur deposits → Clean or replace.



EAM30214

CHECKING THE RADIATOR CAP VALVE OPENING PRESSURE

1. Check:
   • Radiator cap valve opening pressure

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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.

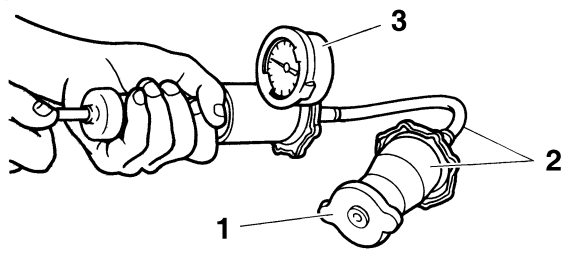
TIP

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



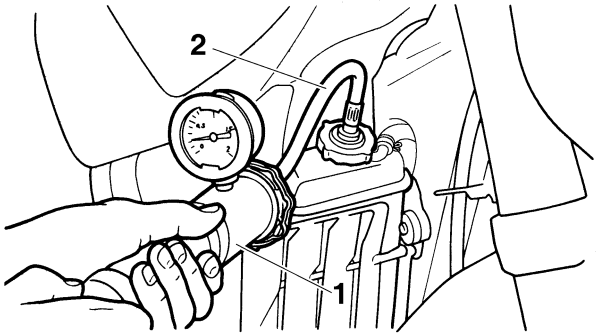
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EAM30215

CHECKING THE COOLANT CIRCULATORY SYSTEM FOR LEAKS

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

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



3. Activate the tester to apply the test pressure.

Test pressure value
196 kPa (1.96 kg/cm^2, 27.9 psi)

ECA24270

NOTICE

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

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

EWA19090

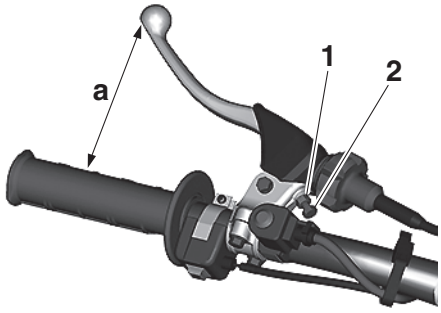
⚠ WARNING

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

EAM30370

ADJUSTING THE CLUTCH LEVER POSITION

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



2. Tighten:
   - Locknut

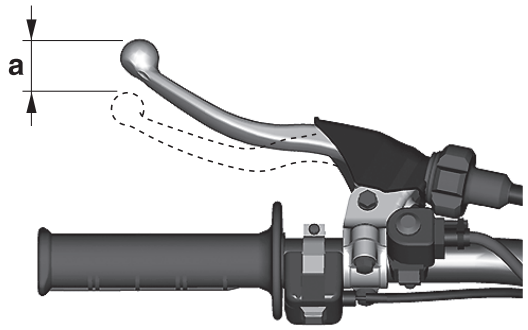
Locknut (clutch lever position)
4.8 N·m (0.48 kgf·m, 3.5 lb·ft)

EAM30216

ADJUSTING THE CLUTCH LEVER FREE PLAY

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

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



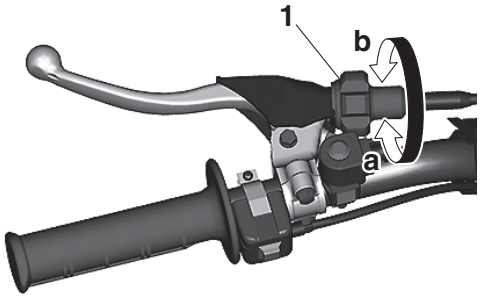
2. Adjust:
   • Clutch lever free play

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Handlebar side

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

Direction "a"
Clutch lever free play is increased.
Direction "b"
Clutch lever free play is decreased.



TIP

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

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Clutch cable side

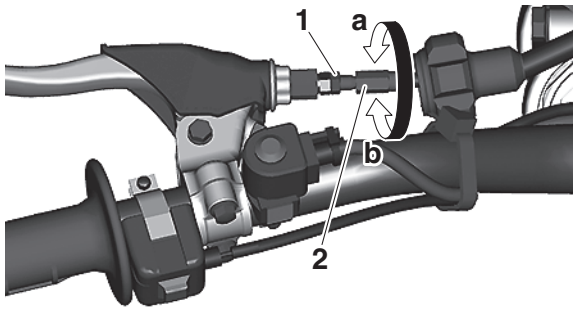
a. Slide the clutch cable cover.
b. Loosen the locknut "1".
c. Turn the adjuster "2" in direction "a" or "b" until the specified clutch lever free play is obtained.

Direction "a"
Clutch lever free play is increased.
Direction "b"
Clutch lever free play is decreased.

d. Tighten the locknut "1".

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

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



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EAM30217

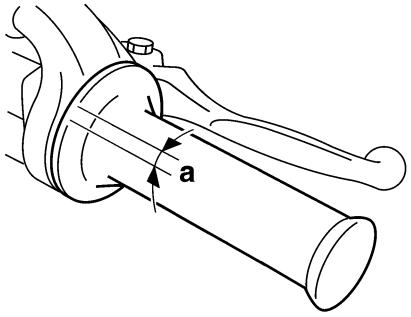
ADJUSTING THE THROTTLE GRIP FREE PLAY

TIP

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

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

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



2. Adjust:
   • Throttle grip free play

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

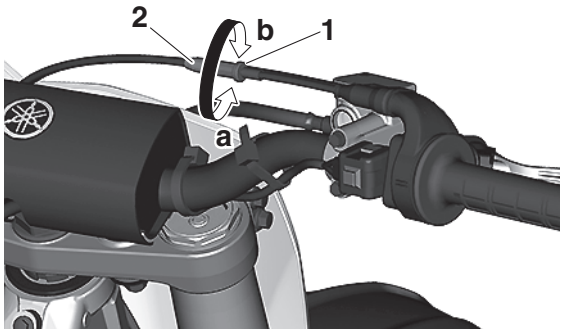
Direction "a"
Throttle grip free play is increased.
Direction "b"
Throttle grip free play is decreased.

c. Tighten the locknut.

EWA18470

⚠ WARNING

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

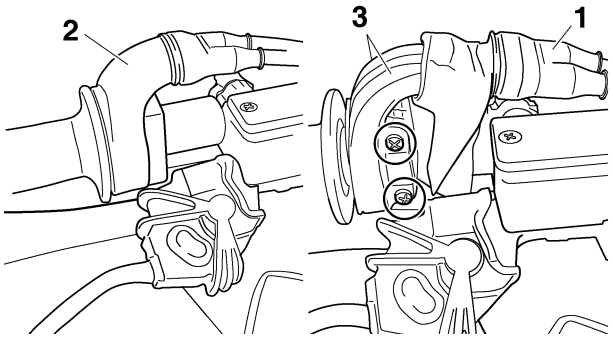


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EAM30218

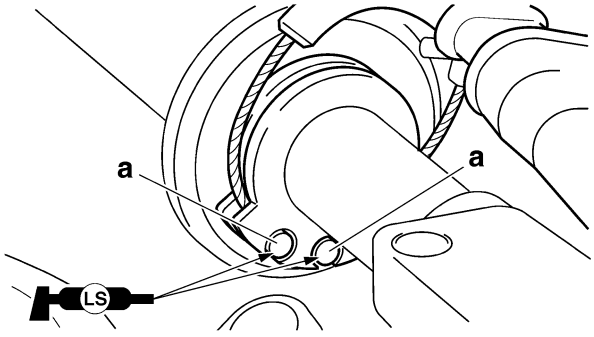
LUBRICATING THE THROTTLE CABLE

1. Remove:
   - Cover (throttle cable cap) “1”
   - Cover (grip cap) “2”
   - Throttle grip cap “3”



2. Lubricate:
   - Throttle cable end “a”

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



3. Install:
   - Throttle grip cap
   - Screw (throttle grip cap)

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

4. Install:
   - Cover (grip cap)
   - Cover (throttle cable cap)

EWA19100

⚠ WARNING

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

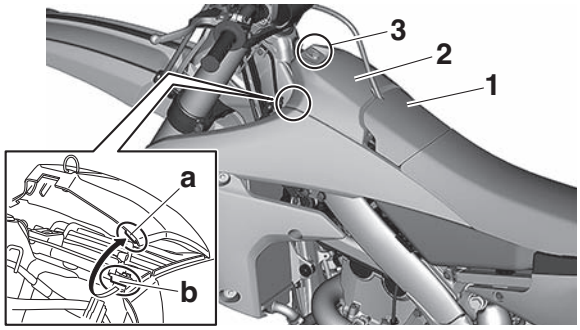
EAM30219

CLEANING THE AIR FILTER ELEMENT

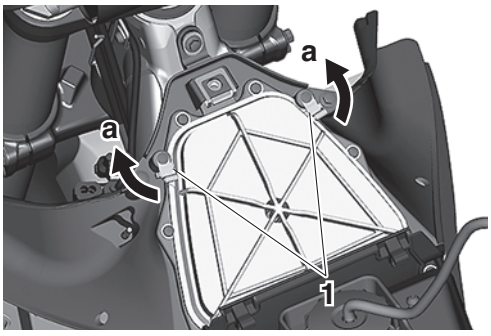
1. Remove:
   - Fuel tank cap cover “1”
     Refer to “FUEL TANK CAP” on page 1-20.
   - Air filter case cover “2”

TIP

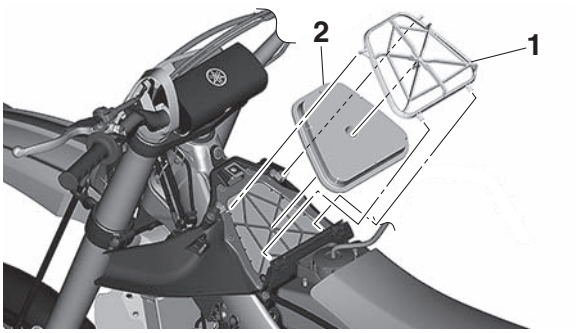
- Loosen the quick fastener screw “3” and remove the air filter case cover.
- Remove the two ribs “a” located on the left and right sides of the projections “b” on the air scoop, and slide the air filter case cover toward the front of the vehicle to remove it.



2. Turn the plates “1” in direction “a”.



3. Remove:
   - Air filter guide “1”
   - Air filter element “2” (from the air filter guide)



4. Wash:
   • Air filter element

EWA19110

⚠ WARNING

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

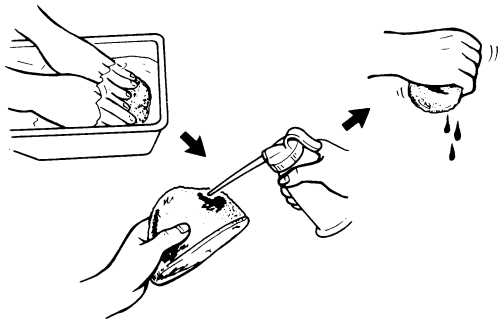
TIP

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

ECA24280

NOTICE

Do not twist the element when squeezing the element.



5. Check:
   • Air filter element
   Damage → Replace.
6. Apply:
   Yamaha foam air filter oil or other quality foam air filter oil.

	Oil application quantify **30 cm³**

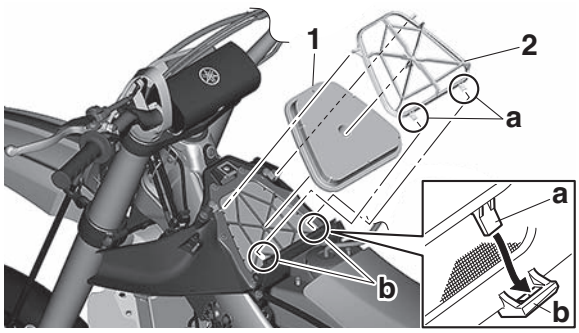
TIP

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

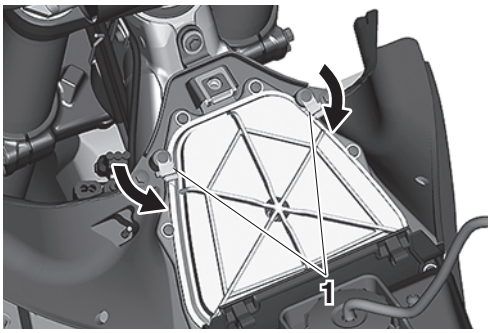
7. Install:
   • Air filter element "1" (to the air filter guide)
   • Air filter guide "2"

TIP

• 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.



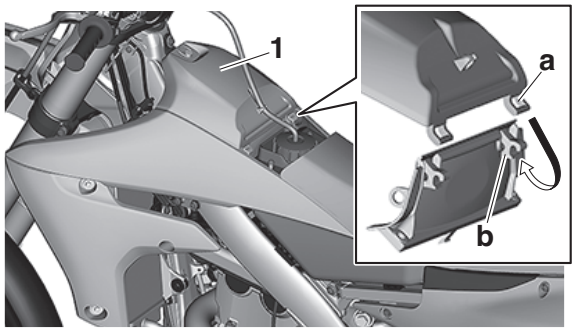
8. Turn the plates "1" to the original position.

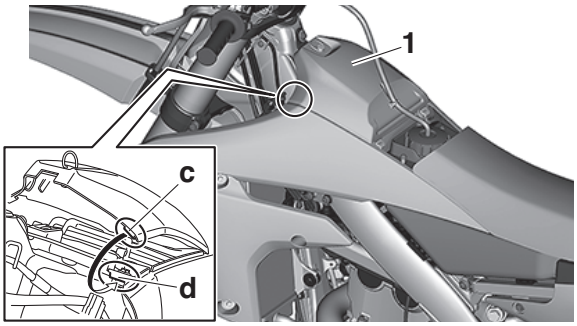


9. Install:
   • Air filter case cover "1"
   • Fuel tank breather hose
   (to the air filter case cover)

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.





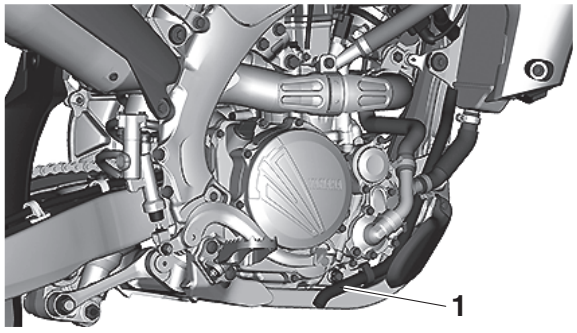
10.Install:
- Fuel tank cap cover

EAM30335
CHECKING THE THROTTLE BODY JOINT
1. Check:
   - Throttle body joint
     Refer to "CHECKING THE THROTTLE BODY JOINT" on page 7-8.

EAM30220
CHECKING THE BREATHER HOSES
1. Check:
   - Breather hose "1"
     Crack/damage → Replace.
     Loose connection → Connect properly.

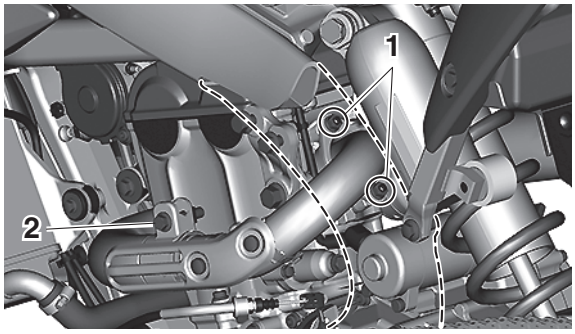
ECA14920
NOTICE

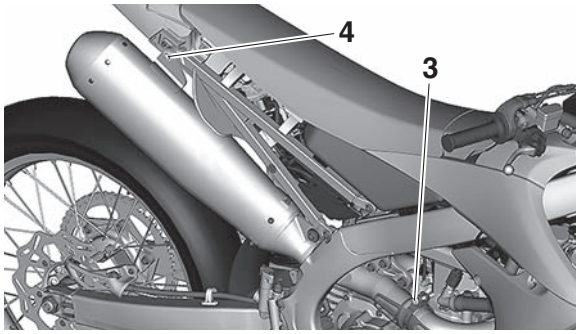
Make sure the cylinder head breather hose is routed correctly.



EAM30221
CHECKING THE EXHAUST SYSTEM
1. Remove:
   - Exhaust pipe protector
2. Check:
   - Exhaust pipe 1
   - Exhaust pipe 2
   - Silencer
     Crack/damage → Replace.
     Refer to "ENGINE REMOVAL" on page 5-1.
   - Exhaust gas
     Leaks → Replace the gasket.
     Refer to "ENGINE REMOVAL" on page 5-1.
3. Check:
   - Tightening torques

Exhaust pipe nut "1"
10 N·m (1.0 kgf·m, 7.4 lb·ft)
Exhaust pipe clamp bolt "2"
12 N·m (1.2 kgf·m, 8.9 lb·ft)
Exhaust pipe 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)

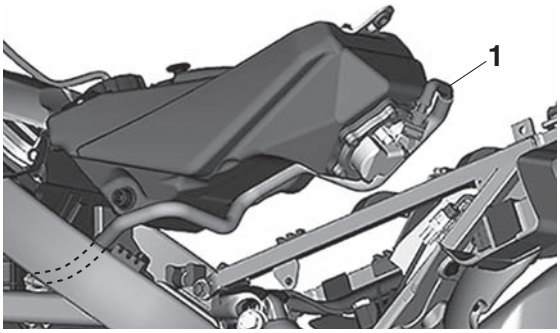




4. Install:
   - Exhaust pipe protector

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

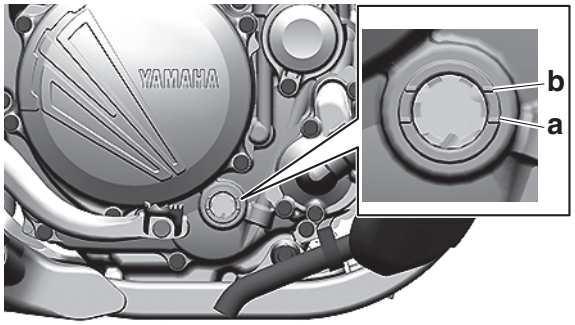
EAM30222
CHECKING THE FUEL LINE
1. Remove:
   - Seat
   - Side cover (left/right)
   - Air scoop (left/right)
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Fuel hose "1"
     Crack/damage → Replace.
     Loose connection → Connect properly.



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

EAM30224
CHECKING THE ENGINE OIL LEVEL

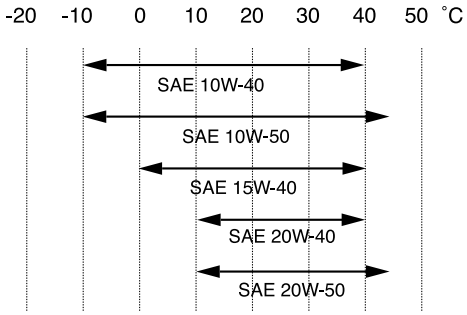
1. Stand the vehicle upright on a level surface.
2. Start the engine, warm this up for 2–3 minutes, and then stop the engine and wait about 1 minute.
3. Check:
   - Oil level
     The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
     Below the minimum level mark → Add the recommended engine oil to the proper level.



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

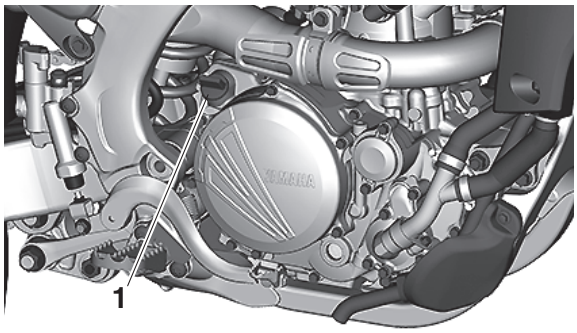
Stand the vehicle upright on a level surface.

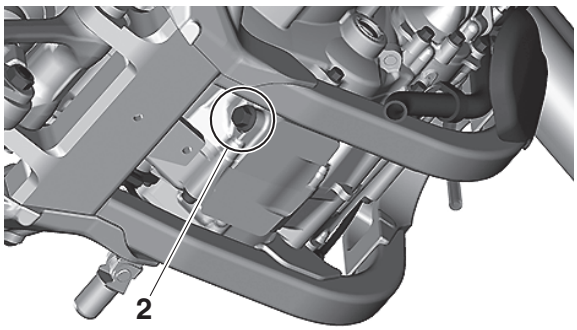
1. Start the engine, warm this up for several minutes, and then stop the engine and wait about 5 minutes.

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 or 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”

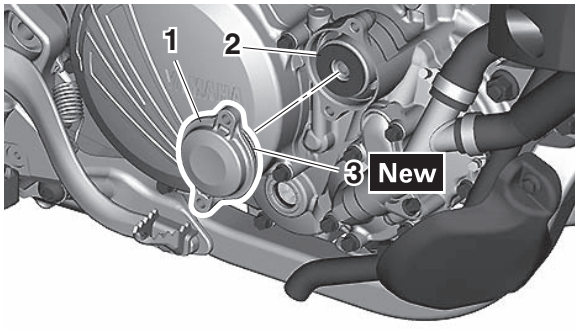




4. If the oil filter element is also to be replaced, perform the following procedure.

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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.

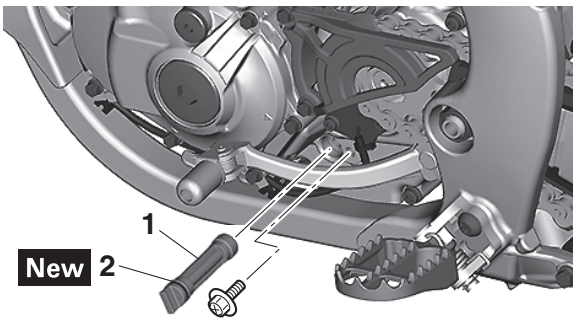
	Oil filter element cover bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

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

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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)**

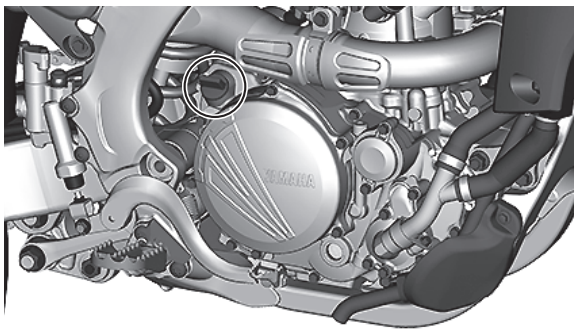
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6. Install:
   • Gasket New
   • Drain bolt

	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** **0.73 L (0.77 US qt, 0.64 Imp.qt)** **With oil filter removal** **0.75 L (0.79 US qt, 0.66 Imp.qt)** **Quantity (disassembled)** **0.95 L (1.00 US qt, 0.84 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

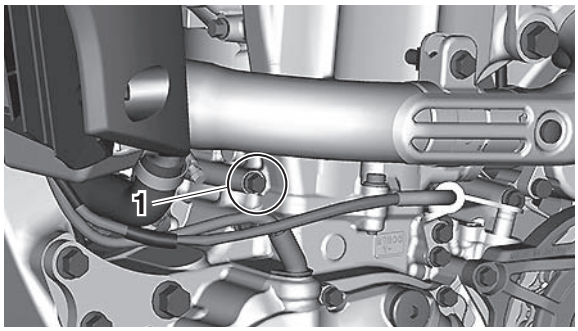
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a. Slightly loosen the oil pressure check bolt "1".

EWA19120

⚠ WARNING

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



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

EWA19130

⚠ WARNING

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

ECA25840

NOTICE

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

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

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

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EAM30336

ADJUSTING THE ENGINE IDLING SPEED

TIP

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

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) **90890-03257** **Yamaha diagnostic tool (A/I)** **90890-03262** **FI diagnostic tool sub–lead** **90890-03212** **FI diagnostic tool sub–lead** **YU-03212** **OBD/ GST Leadwire kit** **90890-03249**

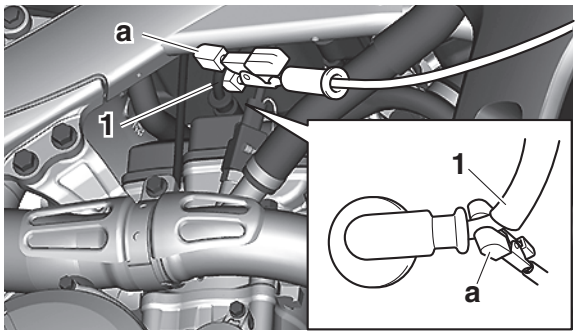
	Coolant temperature **70–80 °C (158–176 °F)**

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.



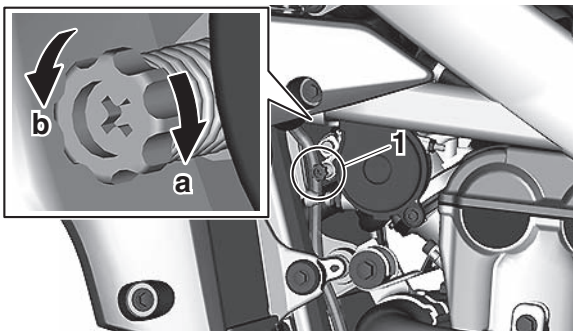
4. Measure:
   - Engine idling speed
     Out of specification → Regulate.

	Engine idling speed **1900–2100 r/min**

5. Adjust:
   - Engine idling speed

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a. Turn the idle screw “1” in the direction of “a” or “b” to make an adjustment.



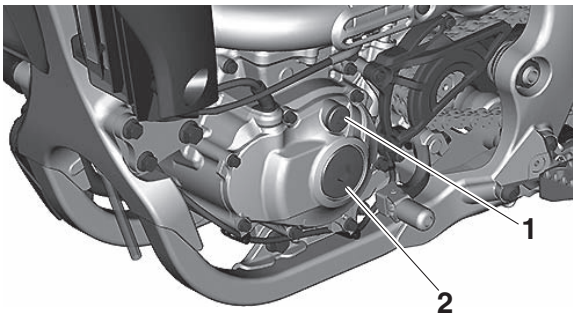
Direction “a”	Engine idling speed → Increases.
Direction “b”	Engine idling speed → Decreases.

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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
2. Remove:
   - Spark plug
   - Cylinder head cover
   Refer to “CAMSHAFT” on page 5-11.
3. Remove:
   - Timing mark accessing screw “1”
   - Crankshaft end accessing screw “2”
   - O-ring

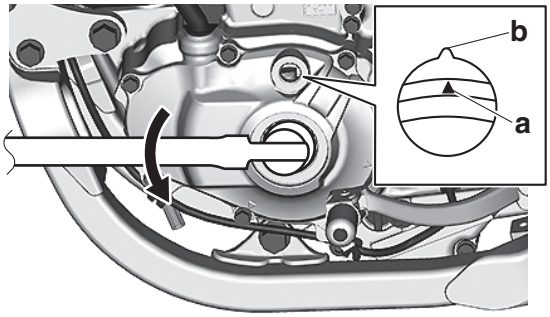


4. Check:
   - Valve clearance
   Out of specification → Regulate.

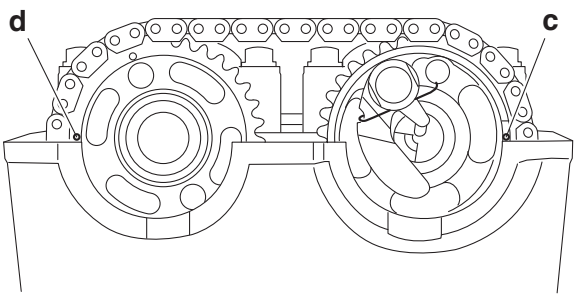
Valve clearance (cold)
Intake
0.12–0.19 mm (0.0047–0.0075 in)
Exhaust
0.17–0.24 mm (0.0067–0.0094 in)

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



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

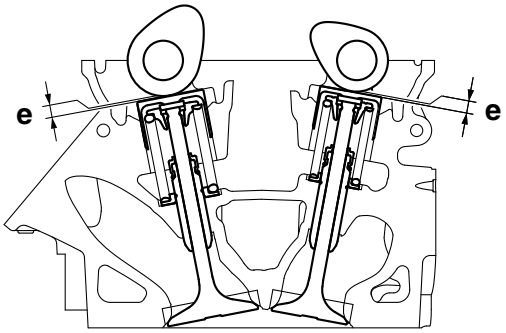


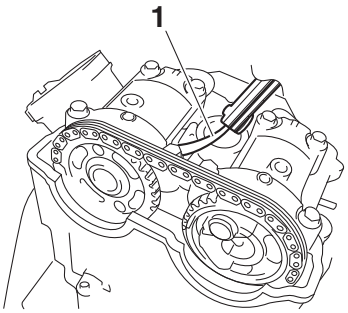
c. Measure the valve clearance “e” using a

thickness gauge “1”.

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

TIP
Record the measured reading if the clearance is incorrect.





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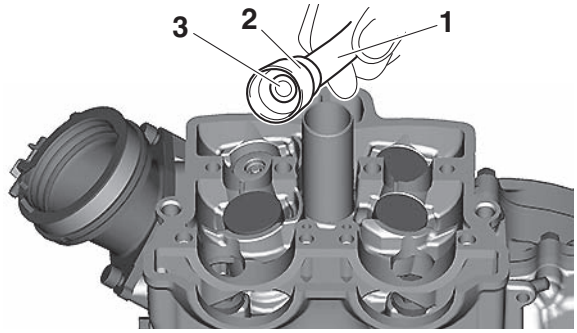
5. Adjust:
   • Valve clearance

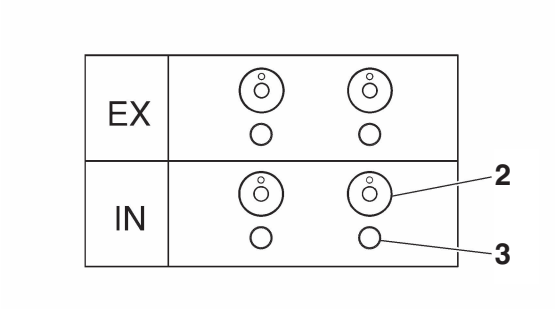
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a. Remove the camshaft (intake and exhaust). Refer to “CAMSHAFT” on page 5-11.
b. Remove the valve lifter “2” and the adjusting pad “3” with a valve lapper “1”.

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

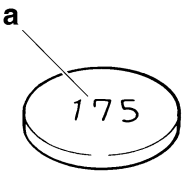
Valve lapper (ø14)
90890-04101
Valve lapping tool (14mm)
YM-A8998





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

Example:
Pad number = 148
Rounded value = 150

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

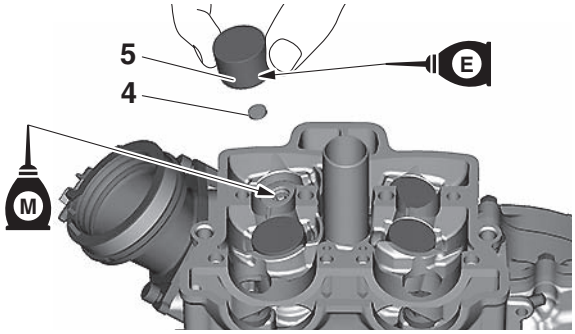
ECA24310

NOTICE

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

TIP

- Apply the engine oil on the valve lifters.
- Apply molybdenum disulfide oil to the valve stem ends.
- Check that the valve lifters turn smoothly when rotated with your finger.
- Make sure that valve lifters and adjusting pads are installed in place.
- Make sure that adjusting pads are installed with their numbers facing upward.



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

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

A. Measured clearance
B. Installed pad number
C. Standard clearance

Example:
Valve clearance (cold) 0.12–0.19 mm (0.0047–0.0075 in)
Installed is 175.
Measured clearance 0.27 mm (0.0106 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 – 0.15		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.16 – 0.21	C																								
0.22 – 0.29	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.30 – 0.34	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.35 – 0.39	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.40 – 0.44	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.45 – 0.49	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.50 – 0.54	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.55 – 0.59	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.60 – 0.64	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.65 – 0.69	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.70 – 0.74	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.75 – 0.79	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.80 – 0.84	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.85 – 0.89	185	190	195	200	205	210	215	220	225	230	235	240													
0.90 – 0.94	190	195	200	205	210	215	220	225	230	235	240														
0.95 – 0.99	195	200	205	210	215	220	225	230	235	240															
1.00 – 1.04	200	205	210	215	220	225	230	235	240																
1.05 – 1.09	205	210	215	220	225	230	235	240																	
1.10 – 1.14	210	215	220	225	230	235	240																		
1.15 – 1.19	215	220	225	230	235	240																			
1.20 – 1.24	220	225	230	235	240																				
1.25 – 1.29	225	230	235	240																					
1.30 – 1.34	230	235	240																						
1.35 – 1.39	235	240																							
1.40 – 1.44	240																								

A. Measured clearance
B. Installed pad number
C. Standard clearance

Example:
Valve clearance (cold) 0.17–0.24 mm (0.0067–0.0094 in)
Installed is 175.
Measured clearance 0.32 mm (0.0126 in)
Replace 175 pad with 185 pad.
Pad No. 175 = 1.75 mm (0.0689 in)
Pad No. 185 = 1.85 mm (0.0728 in)

EAM20136
CHASSIS

EAM30227
BLEEDING THE BRAKE SYSTEM

EWA19140
⚠ WARNING

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

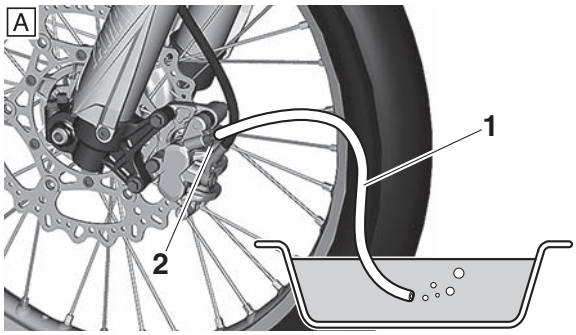
1. Remove:
   - Brake master cylinder cap
   - Reservoir diaphragm
   - Reservoir float (front brake)
   - Protector (rear brake)

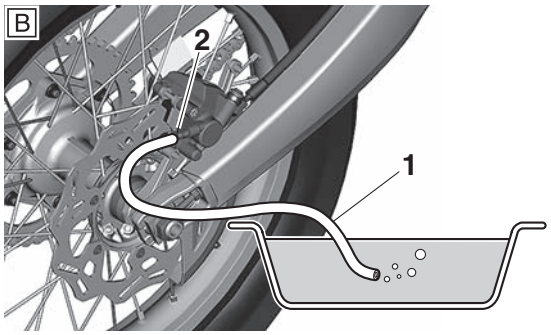
TIP
- Be careful not to spill any brake fluid or allow the reservoir to overflow.
- Make sure that there is enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the brake system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it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

2. Bleed the brake system.

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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 3-26.

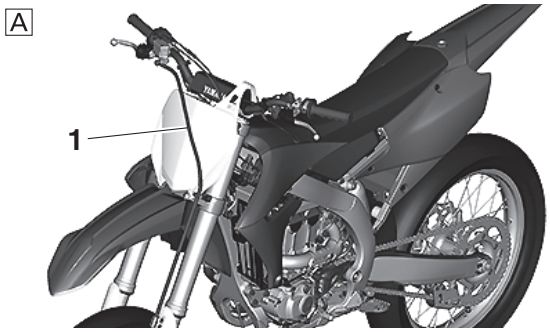
EWA13110
⚠ WARNING

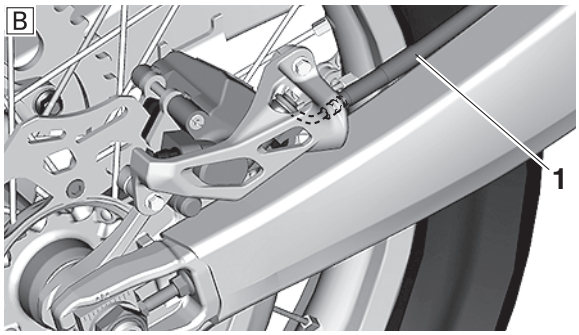
After bleeding the hydraulic brake system, check the brake operation.

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EAM30228
CHECKING THE BRAKE HOSES

1. Check:
   • Brake hose “1”
   Cracks/damage/wear → Replace.





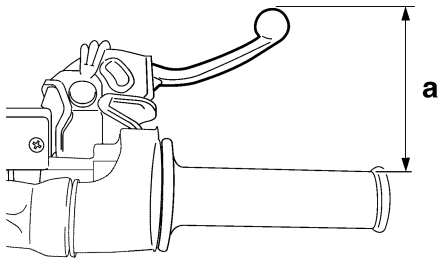
A. Front
B. Rear

2. Check:
   • Brake hose clamp
   Loose connection → Tighten the clamp bolt.
3. Stand the vehicle upright and apply the front brake and the rear brake several times.
4. Check:
   • Brake hose
   Brake fluid leaks → Replace the damaged brake hose.
   Refer to “FRONT BRAKE” on page 4-13.
   Refer to “REAR BRAKE” on page 4-23.

EAM30229
ADJUSTING THE FRONT BRAKE

1. Check:
   • Brake lever position “a”

	Brake lever position **95 mm (3.74 in)** **Extent of adjustment** **86–105 mm (3.39–4.13 in)**

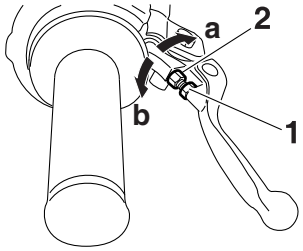


2. Remove:
   • Brake lever cover
3. Adjust:
   • Brake lever position

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

Direction “a”
Brake lever position is increased.
Direction “b”
Brake lever position is decreased.



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.

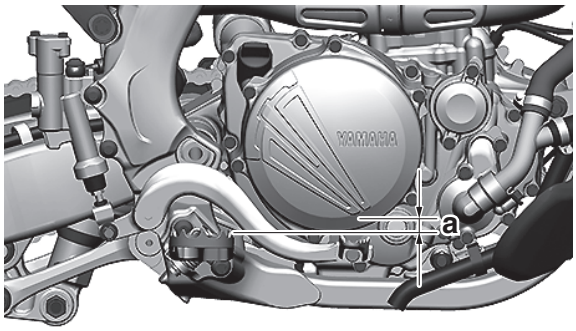
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4. Install:
   • Brake lever cover

EAM30230
ADJUSTING THE REAR BRAKE

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

	Brake pedal position **0.0 mm (0.00 in)**

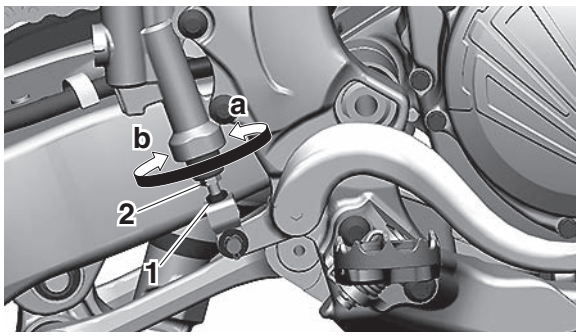


2. Adjust:
   • Brake pedal position

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

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



c. Tighten the locknut.

	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.

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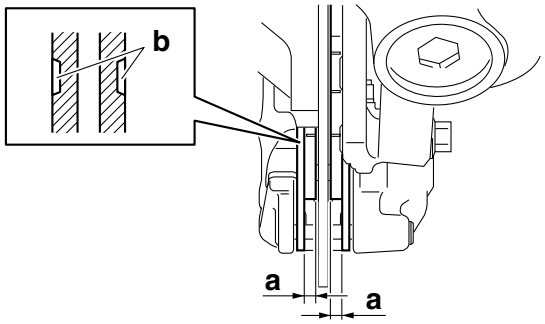
EAM30231
CHECKING THE FRONT BRAKE PADS

1. Measure:
   • Brake pad thickness "a"
   Out of specification → Replace as a set.

TIP

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

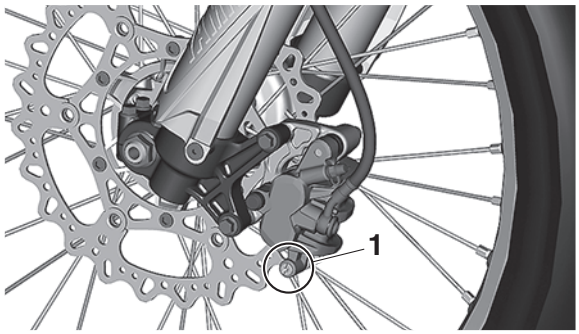
	Brake pad lining thickness limit **1.0 mm (0.04 in)**



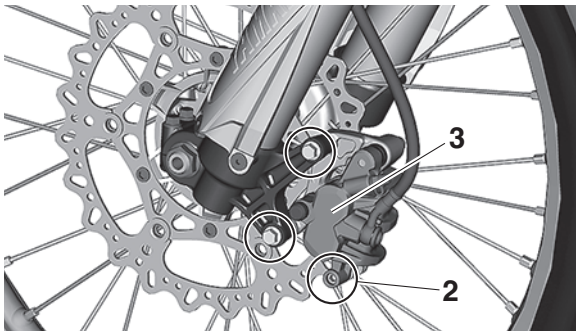
2. Replace:
   • Brake pad

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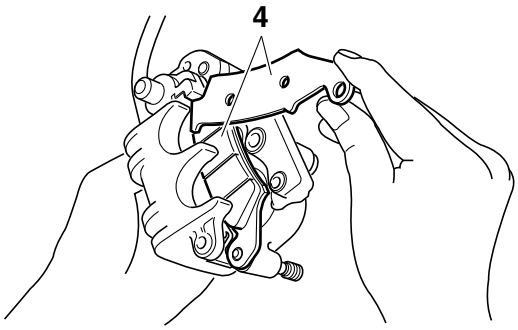
a. Remove the pad pin plug "1".



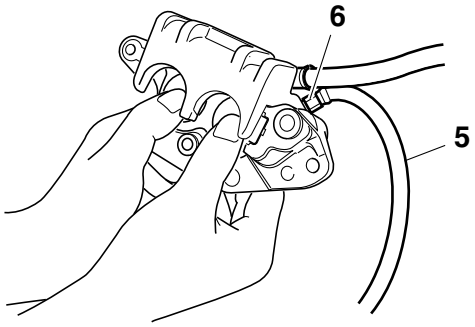
b. Loosen the pad pin "2".
c. Remove the brake caliper "3" from the front fork.



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



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



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

EWA19160

⚠ WARNING

Do not reuse the drained brake fluid.

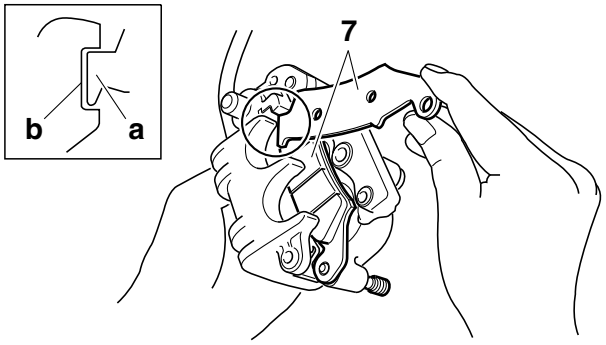
g. Tighten the bleed screw.

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

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

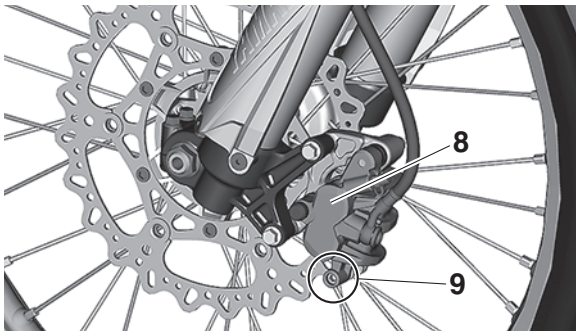
TIP

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



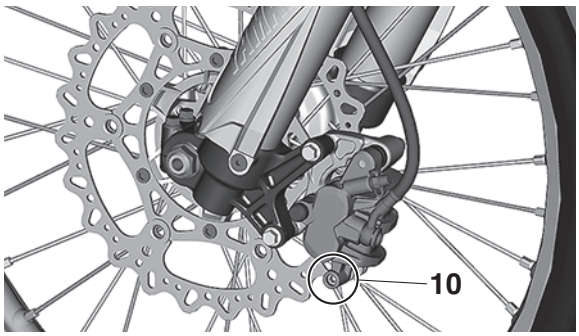
i. Install the brake caliper “8” and tighten the pad pin “9”.

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



j. Install the pad pin plug “10”.

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



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3. Check:
   - Brake fluid level
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.
4. Check:
   - Brake lever operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE BRAKE SYSTEM”

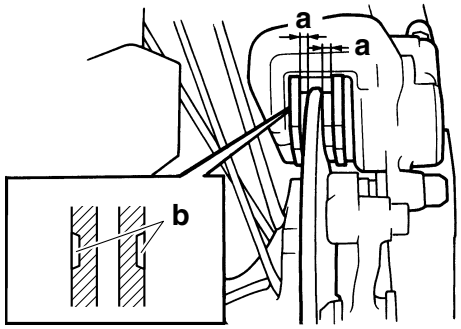
on page 3-21.

EAM30232
CHECKING THE REAR BRAKE PADS

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

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

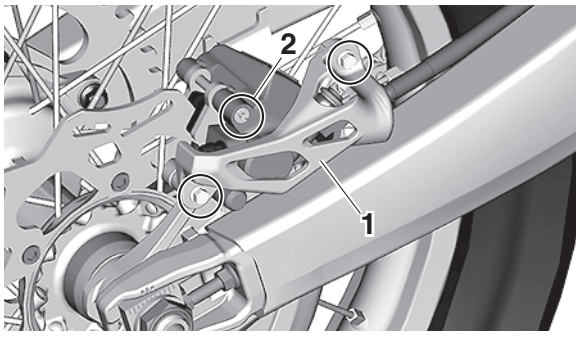
	Brake pad lining thickness limit **1.0 mm (0.04 in)**



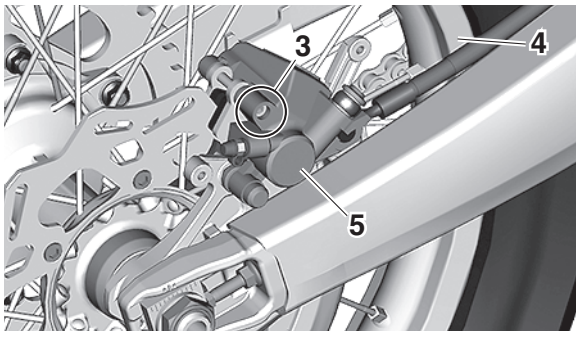
2. Replace:
   • Brake pad

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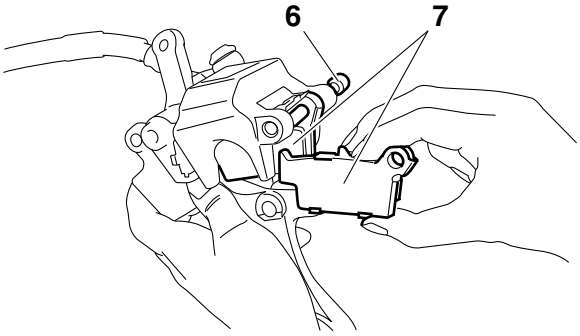
a. Remove the protector “1” and the pad pin plug “2”.



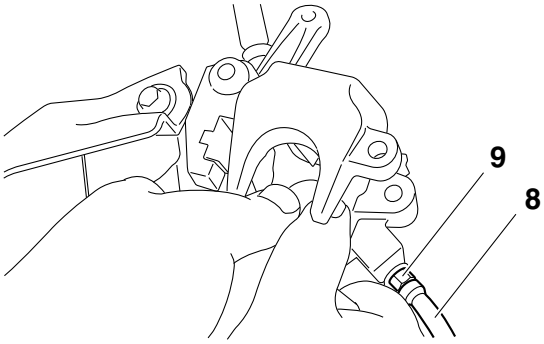
b. Loosen the pad pin “3”.
c. Remove the rear wheel “4” and the brake caliper “5”.
   Refer to “REAR WHEEL” on page 4-9.



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



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



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

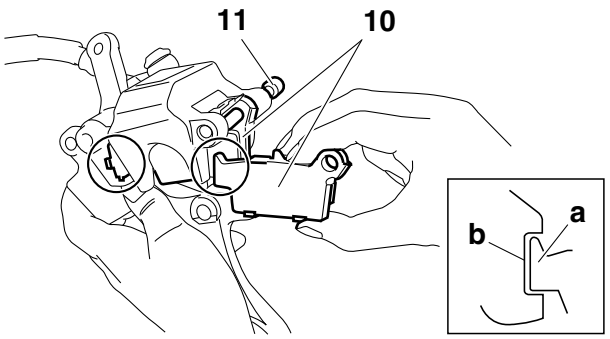
EWA19170
⚠ WARNING
Do not reuse the drained brake fluid.

g. Tighten the bleed screw.

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

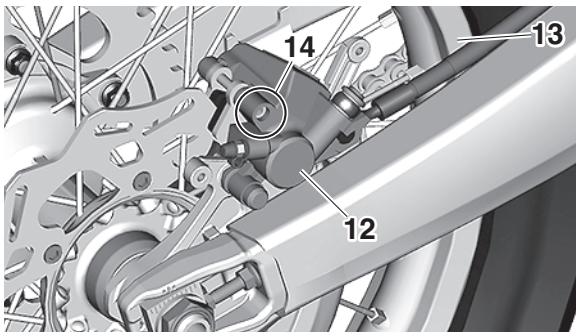
h. Install the brake pad “10” and the pad pin “11”.

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



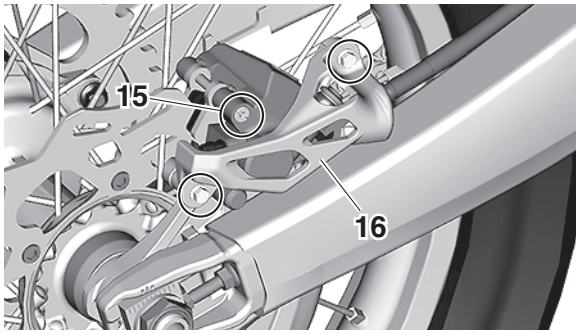
i. Install the brake caliper “12” and the rear wheel “13”.
   Refer to “REAR WHEEL” on page 4-9.
j. Tighten the pad pin “14”.

Pad pin
17 N·m (1.7 kgf·m, 13 lb·ft)



k. Install the pad pin plug “15” and the protector “16”.

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)

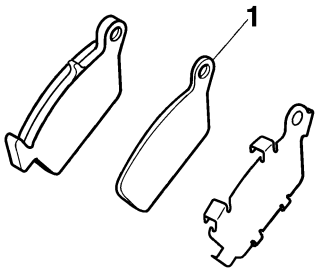


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3. Check:
   • Brake fluid level
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-26.
4. Check:
   • Brake pedal operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE BRAKE SYSTEM” on page 3-21.

EAM30233
CHECKING THE REAR BRAKE PAD INSULATOR

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



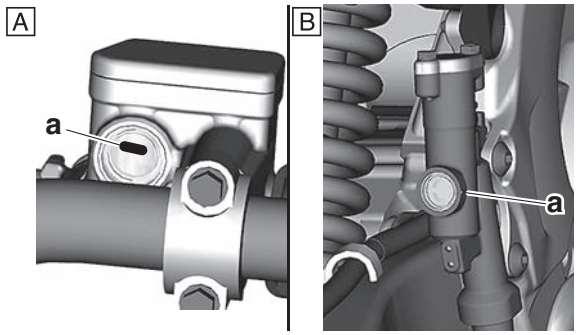
EAM30234
CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle upright on a level surface.

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

2. Check:
   • Brake fluid level
   The minimum level mark “a” or below → Add.

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.

EAM30235
ADJUSTING THE DRIVE CHAIN SLACK

ECA13550
NOTICE

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

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

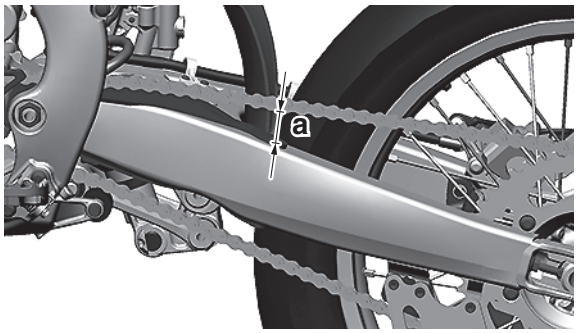
EWA13120
⚠ WARNING

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

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

TIP

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



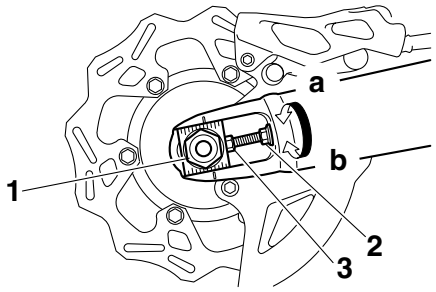
Drive chain slack (Maintenance stand)
50.0–60.0 mm (1.97–2.36 in)

5. Adjust:
   - Drive chain slack

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

Direction “a”
The drive chain slack decreases.
Direction “b”
The drive chain slack increases.



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

d. Tighten the wheel axle nut.

Wheel axle nut
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)

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EAM30338

CHECKING THE FRONT FORK LEGS

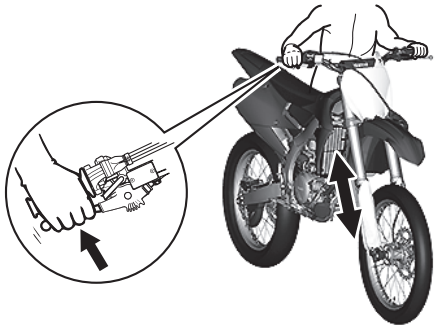
1. Stand the vehicle upright on a level surface.

EWA13120

⚠ WARNING

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

2. Check:
   - Inner tube
     Damage/scratches → Replace.
   - Front fork leg
     Oil leaks between inner tube and outer tube → Replace the oil seal.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   - Front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Unsmooth operation → Correct or replace.
     Refer to "FRONT FORK" on page 4-38.



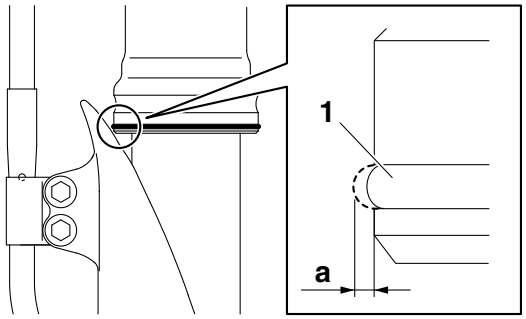
EAM30236

CHECKING THE FRONT FORK PROTECTOR GUIDE

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

TIP

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



EAM30237

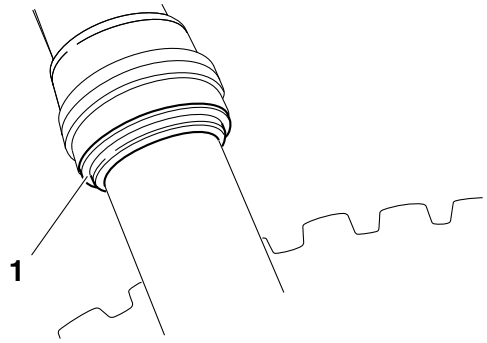
CLEANING THE FRONT FORK OIL SEAL AND DUST SEAL

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

ECA24330

NOTICE

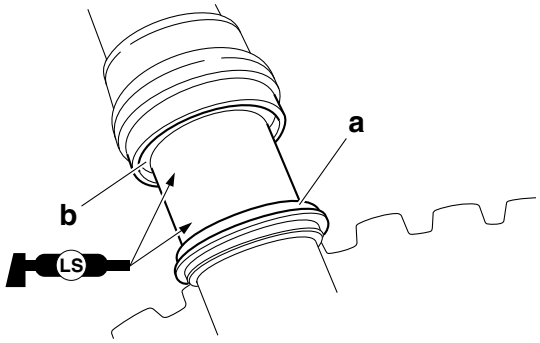
Be careful not to damage the dust seal and the inner tube by a driver.



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

TIP

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



EAM30238

AIR BLEEDING FROM FRONT FORK

TIP

If the front fork initial movement feels stiff during

a run, relieve the front fork internal pressure.

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

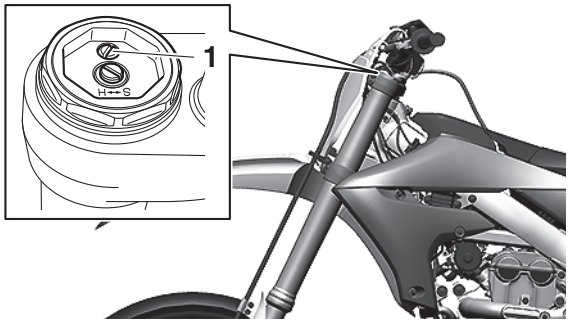
EWA13120

⚠ WARNING

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

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

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



EAM30239

ADJUSTING THE FRONT FORK LEGS

EWA19180

⚠ WARNING

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

Rebound damping

ECA24340

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

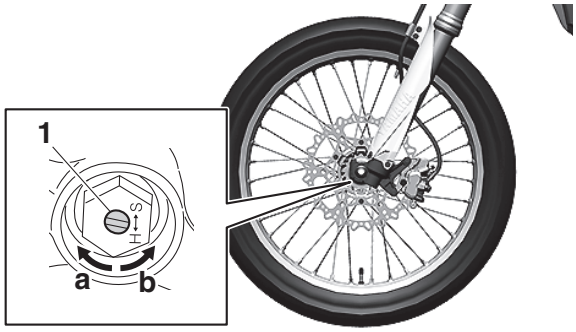
1. Adjust:
   • Rebound damping

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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"**



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Compression damping

ECA24350

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

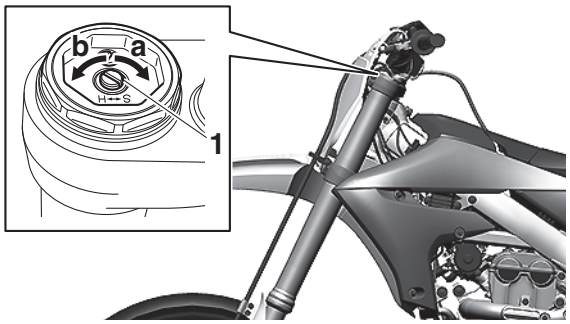
1. Adjust:
   • Compression damping

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

Direction "a"
Compression damping is increased (suspension is harder).
Direction "b"
Compression damping is decreased (suspension is softer).

	Compression damping **Minimum (soft)** **20 click(s) in direction "b"*** **Standard** **11 click(s) in direction "b"*** **Maximum (hard)** **0 click(s) in direction "b"*** ***With the adjusting screw fully turned in direction "a"**



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EAM30240
CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm smooth action
   - Swingarm free play
     Refer to "SWINGARM" on page 4-62.

EAM30241
CHECKING THE REAR SUSPENSION

1. Stand the vehicle upright on a level surface.

EWA13120
WARNING

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

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



EAM30242
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

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

EWA13120
WARNING

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

Spring preload

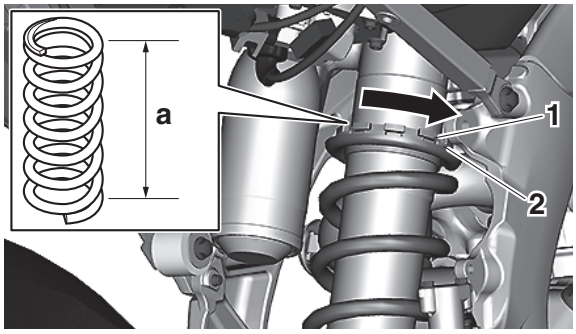
ECA24360
NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

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

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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".

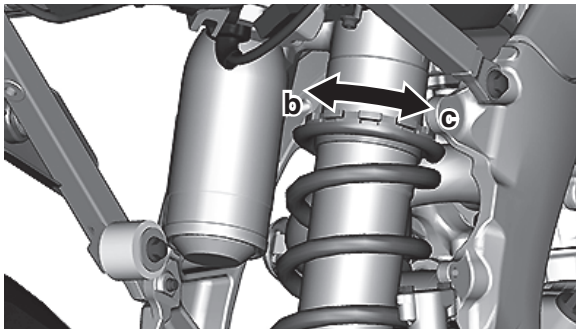


d. Turn the adjuster in the direction of "b" or "c" to make an adjustment.

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 4.0 mm (0.16 in) from its free length.
Maximum
Position in which the spring is turned in 18.0 mm (0.71 in) from its free length.

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



e. Tighten the locknut.

Locknut
10 N·m (1.0 kgf·m, 7.4 lb·ft)

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

Rebound damping

ECA24370

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

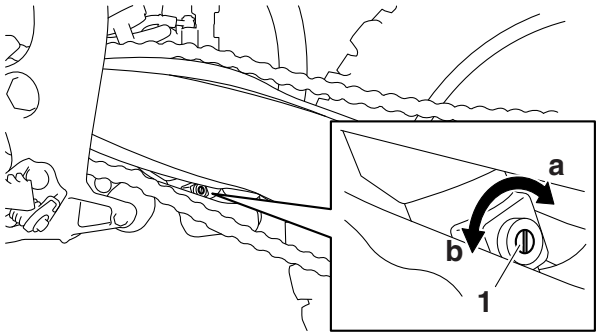
1. Adjust:
- Rebound damping

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

Direction "a"
Rebound damping is increased (suspension is harder).
Direction "b"
Rebound damping is decreased (suspension is softer).

Rebound damping
Minimum (soft)
30 click(s) in direction "b"*
Standard
11 click(s) in direction "b"*
Maximum (hard)
0 click(s) in direction "a"
***With the adjusting screw fully turned in direction "a"**



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Compression damping (for fast compression damping)

ECA24370

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

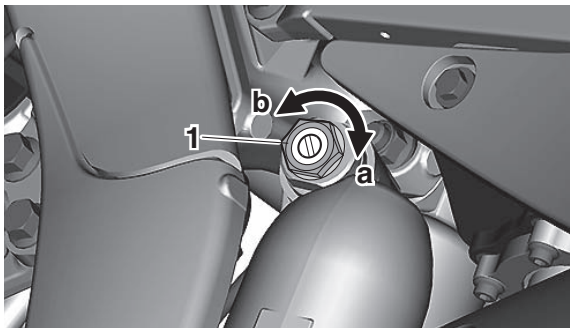
1. Adjust:
- Compression damping (for fast compression damping)

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

Direction "a"
Compression damping is increased (suspension is harder).
Direction "b"
Compression damping is decreased (suspension is softer).

Fast compression damping
Minimum (soft)
2 turn(s) in direction "b"*
Standard
1 turn(s) in direction "b"*
Maximum (hard)
0 turn(s) in direction "b"*
***With the adjusting screw fully turned in direction "a"**



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Compression damping (for slow compression damping)

ECA24390

NOTICE

Do not turn the adjuster forcibly beyond its adjusting range.

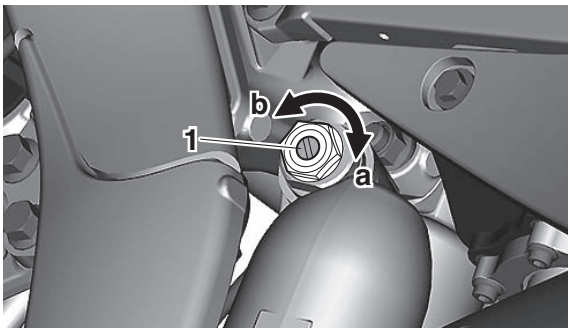
1. Adjust:
   • Compression damping (for slow compression damping)

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



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EAM30243

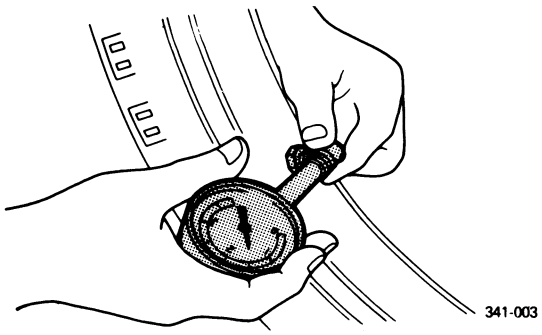
CHECKING THE TIRES

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

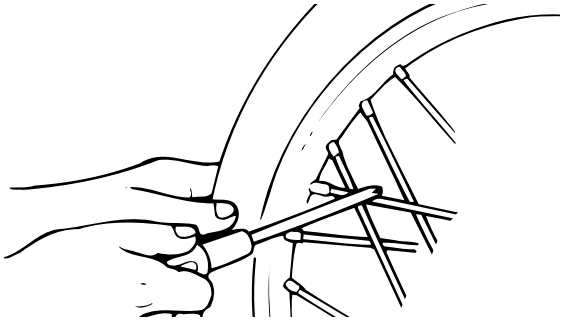
- Check the tire while it is cold.
- Loose bead stoppers allow the tire to slip off its position on the rim when the tire pressure is low.
- If the tire valve stem is found tilted, the tire is considered to be slipping off its position. Correct the tire position.



EAM30244

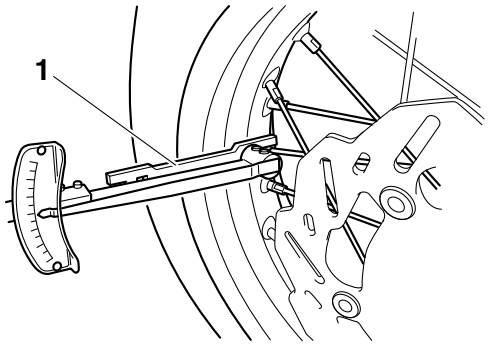
CHECKING AND TIGHTENING THE SPOKES

1. Check:
   • Spoke
   Bend/damage → Replace.
   Loose → Tighten.



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

2. Tighten:
   • Spoke
   Use a spoke nipple wrench "1" for tightening.



	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.

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

EAM30247
CHECKING AND ADJUSTING THE STEERING HEAD

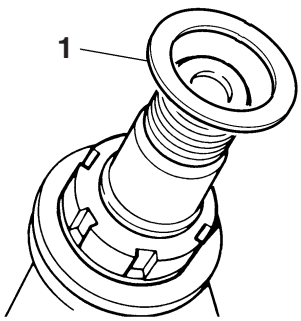
1. Use a maintenance stand to raise the front wheel off the ground.

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 4-33.
   • Upper bracket
   Refer to "STEERING HEAD" on page 4-51.
4. Adjust:
   • Steering head

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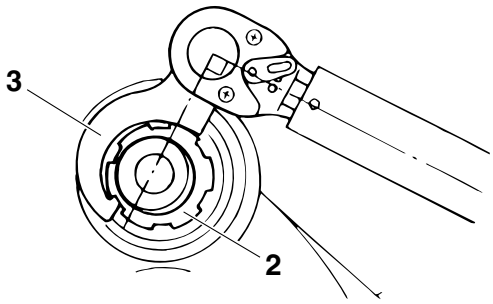
a. Remove the washer "1".



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

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

• Move the steering to the left and right a couple of times to check that it moves smoothly.



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

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

c. Turn the front fork to the right and left a few times, and make sure that the steering rotates smoothly. If it does not turn smoothly, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-51.
d. Loosen the ring nut fully turn and then tighten it to specification with a steering nut wrench.

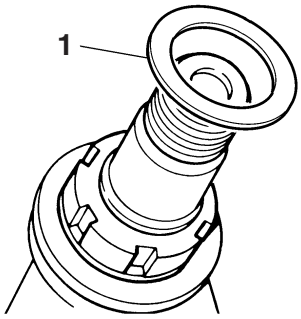
EWA13140

⚠ WARNING

Do not overtighten the lower ring nut.

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

e. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-51.
f. Install the washer "1".



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5. Install:
   • Upper bracket
     Refer to "STEERING HEAD" on page 4-51.
   • Handlebar
     Refer to "HANDLEBAR" on page 4-33.

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.

EAM30249

LUBRICATING THE LEVERS

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

Recommended lubricant
Silicone grease

   • Clutch lever

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

EAM30250

LUBRICATING THE PEDAL

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

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

EAM30251

LUBRICATING THE DRIVE CHAIN

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

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

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

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.

EAM20137
ELECTRICAL SYSTEM

EAM30254
CHECKING THE SPARK PLUG

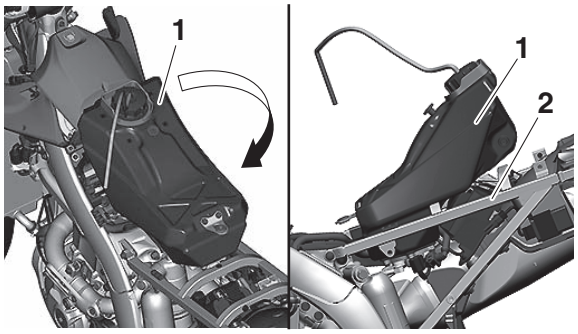
1. Remove:
   - Seat
   - Air scoop (left/right)
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank "1"
     Refer to "FUEL TANK" on page 7-1.

ECA24400
NOTICE

Do not use too much force to pull the hose.

TIP

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



2. Remove:
   - Holder
   - Spark plug cap
   - Spark plug
     Refer to "CAMSHAFT" on page 5-11.

ECA24410
NOTICE

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

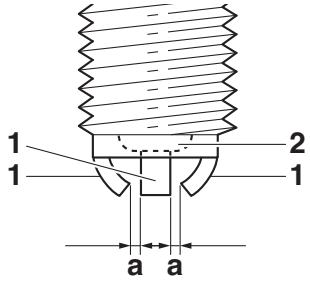
3. Check:
   - Spark plug type
     Wrong type → Replace.

	Manufacturer/model **NGK/LMAR9E-J**

4. Check:
   - Electrode "1"
     Damage/wear → Replace the spark plug.
   - Insulator "2"
     Abnormal color → Replace the spark plug.
     Normal color is medium-to-light tan.

5. Clean:
   - Spark plug
     (with a spark plug cleaner or a wire brush)
6. Measure:
   - Spark plug gap "a"
     Out of specification → Adjust the spark plug gap.

	Spark plug gap **0.6–0.7 mm (0.024–0.028 in)**



7. Install:
   - Spark plug

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

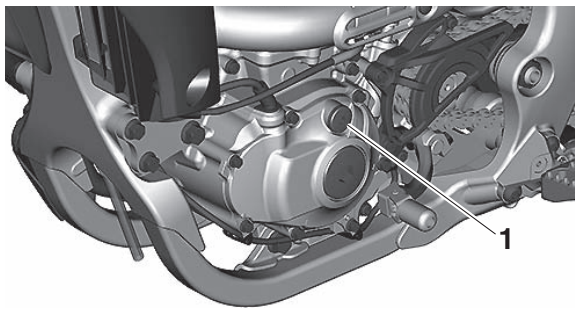
TIP

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

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

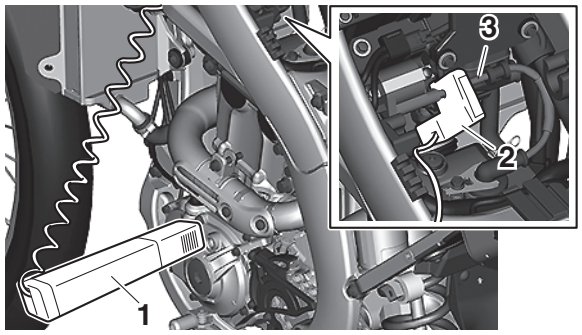
EAM30255
CHECKING THE IGNITION TIMING

1. Remove:
   - Timing mark accessing screw "1"

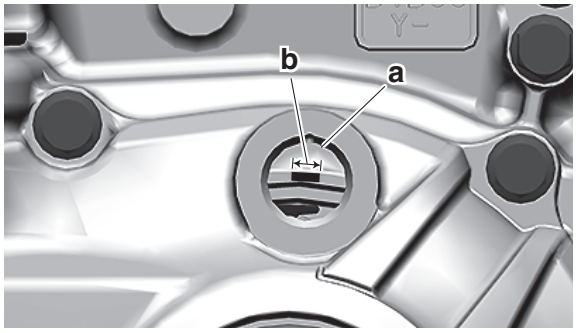


2. Attach:
   • Timing light “1”
   • Digital tachometer “2”
   To the high tension cord “3”.

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



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



5. Install:
   • Timing mark accessing screw

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

EAM30256
CHECKING AND CHARGING THE BATTERY
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-46.

CHASSIS

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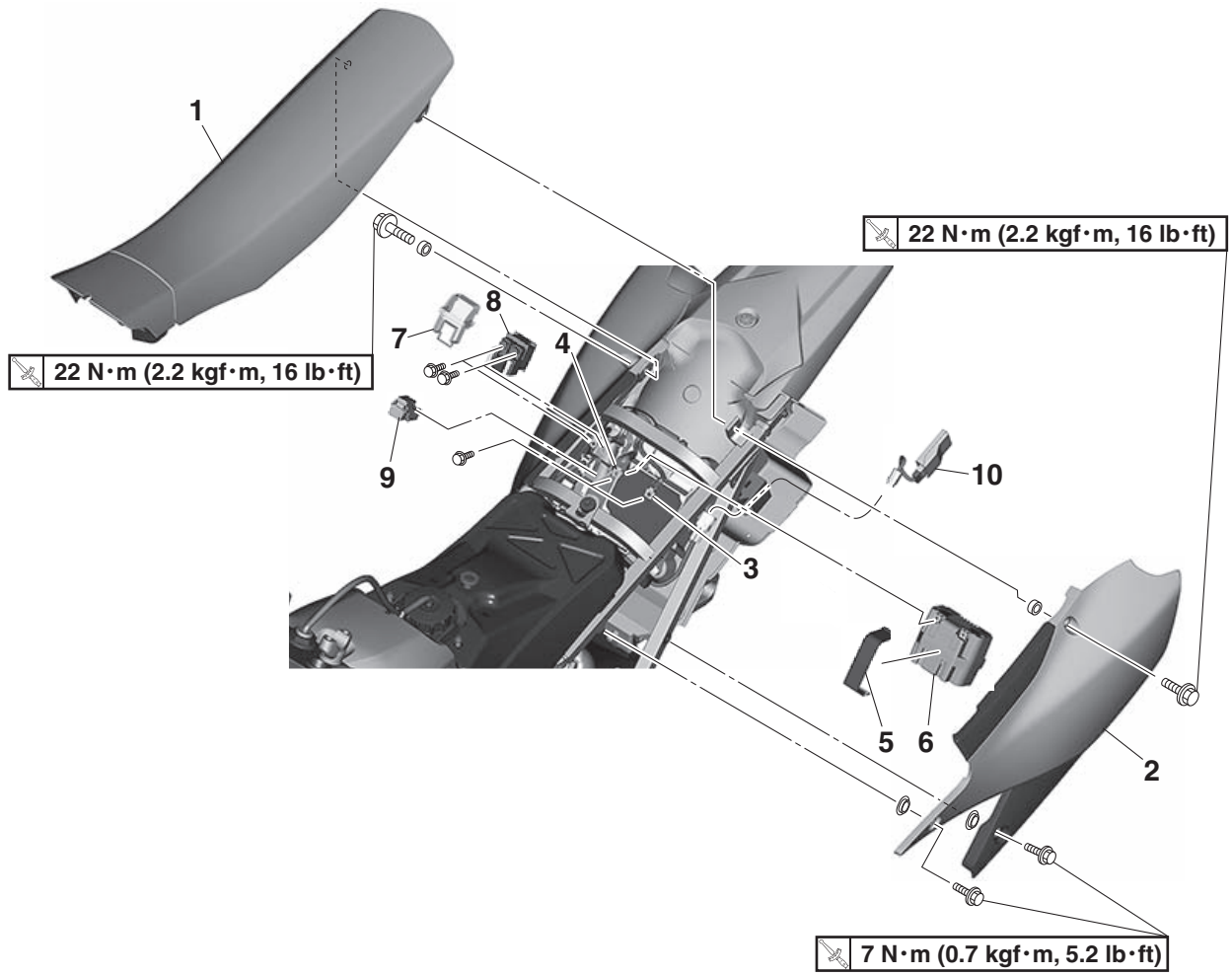
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EAM20094

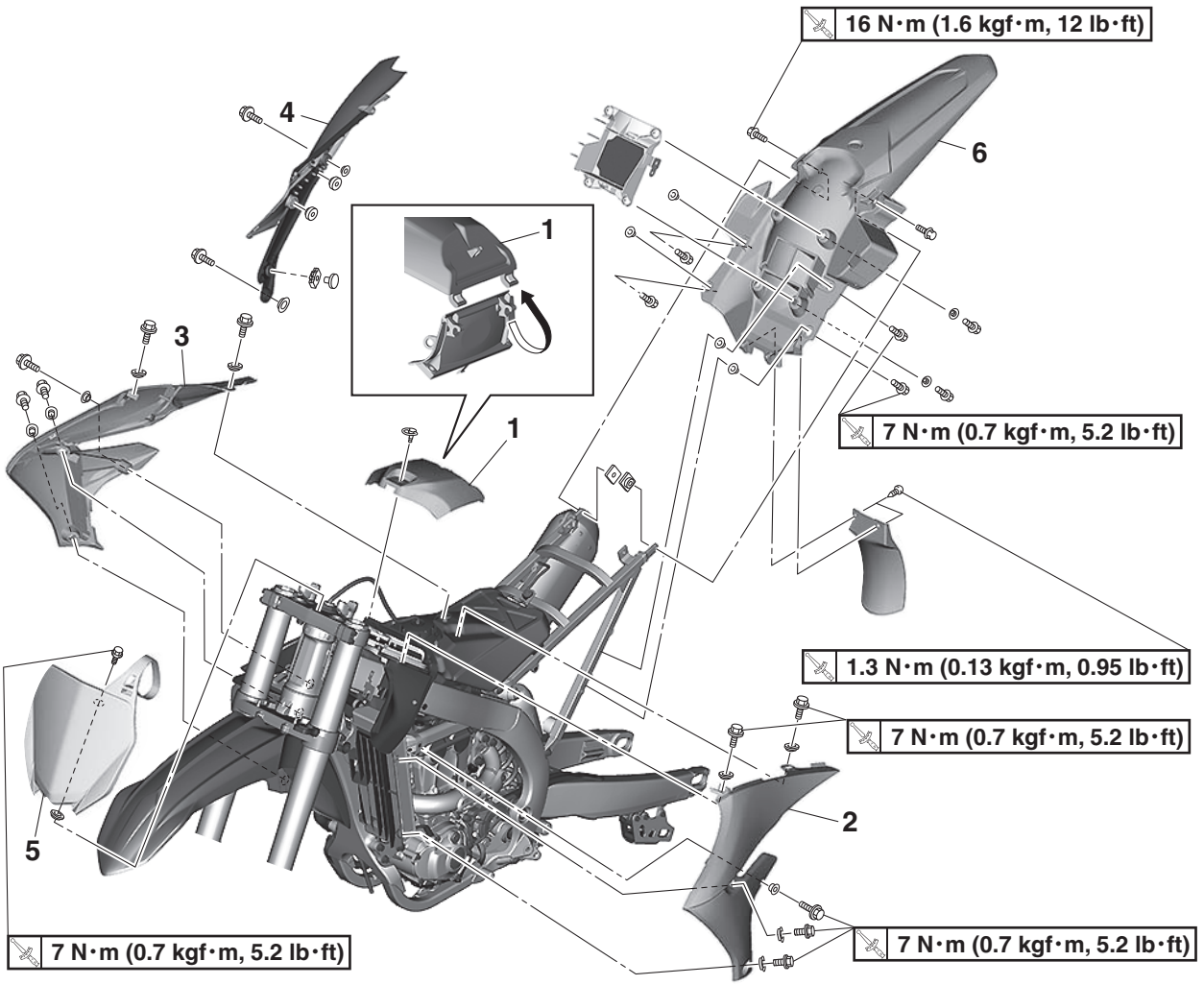
GENERAL CHASSIS

Removing the seat and battery



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

Removing the side cover



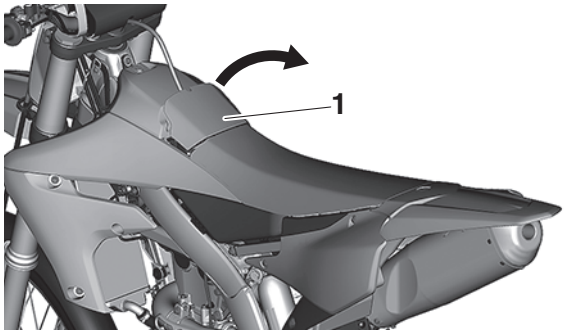
Order	Job/Parts to remove	Q'ty	Remarks
1	Air filter case cover	1	Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-10.
2	Air scoop (right)	1	
3	Air scoop (left)	1	
4	Side cover (right)	1	
5	Number plate	1	
6	Rear fender	1	

EAM30016
REMOVING THE SEAT

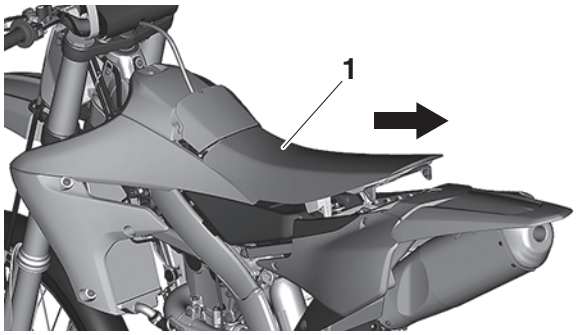
TIP

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 1-20.



2. Remove:
   • Seat “1”

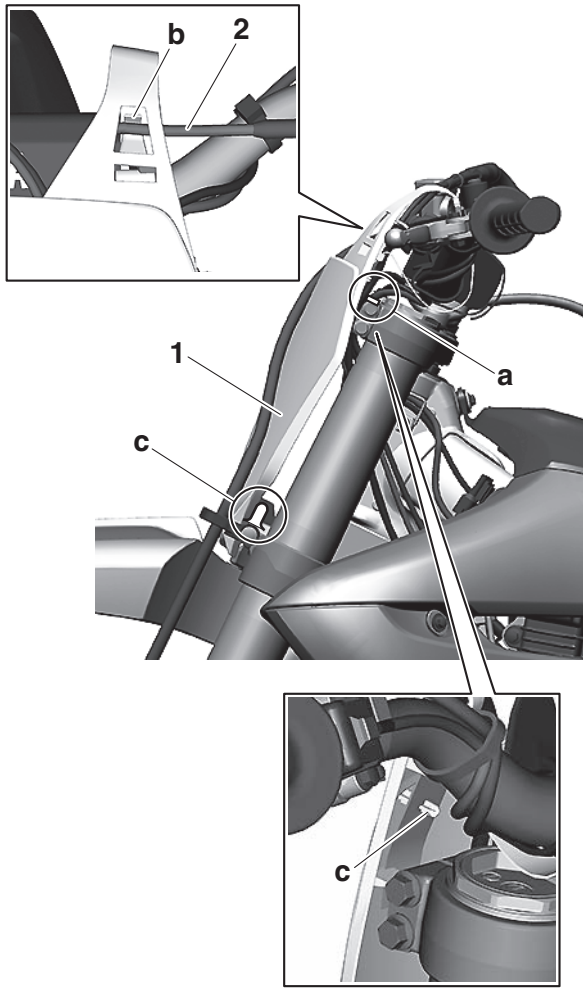


EAM30371
REMOVING THE NUMBER PLATE

1. Remove:
   • Bolt (number plate)
   • Number plate “1”

TIP

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

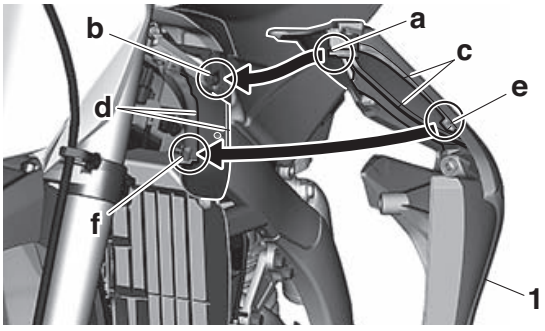


EAM30458
INSTALLING THE AIR SCOOP

1. Install:
   • Air scoop (left “1”/right)

TIP

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

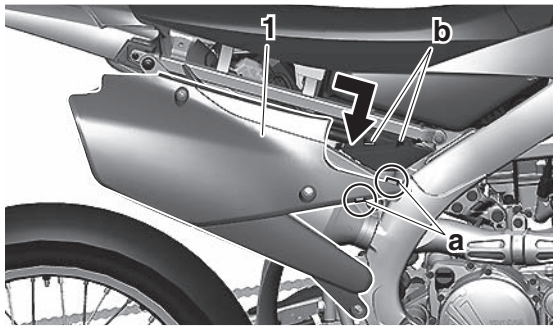


EAM30459
REMOVING THE SIDE COVER

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

TIP

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



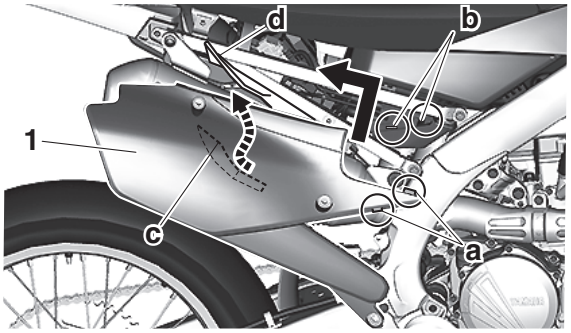
a. Projection
b. Slot

EAM30460
INSTALLING THE SIDE COVER

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

TIP

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

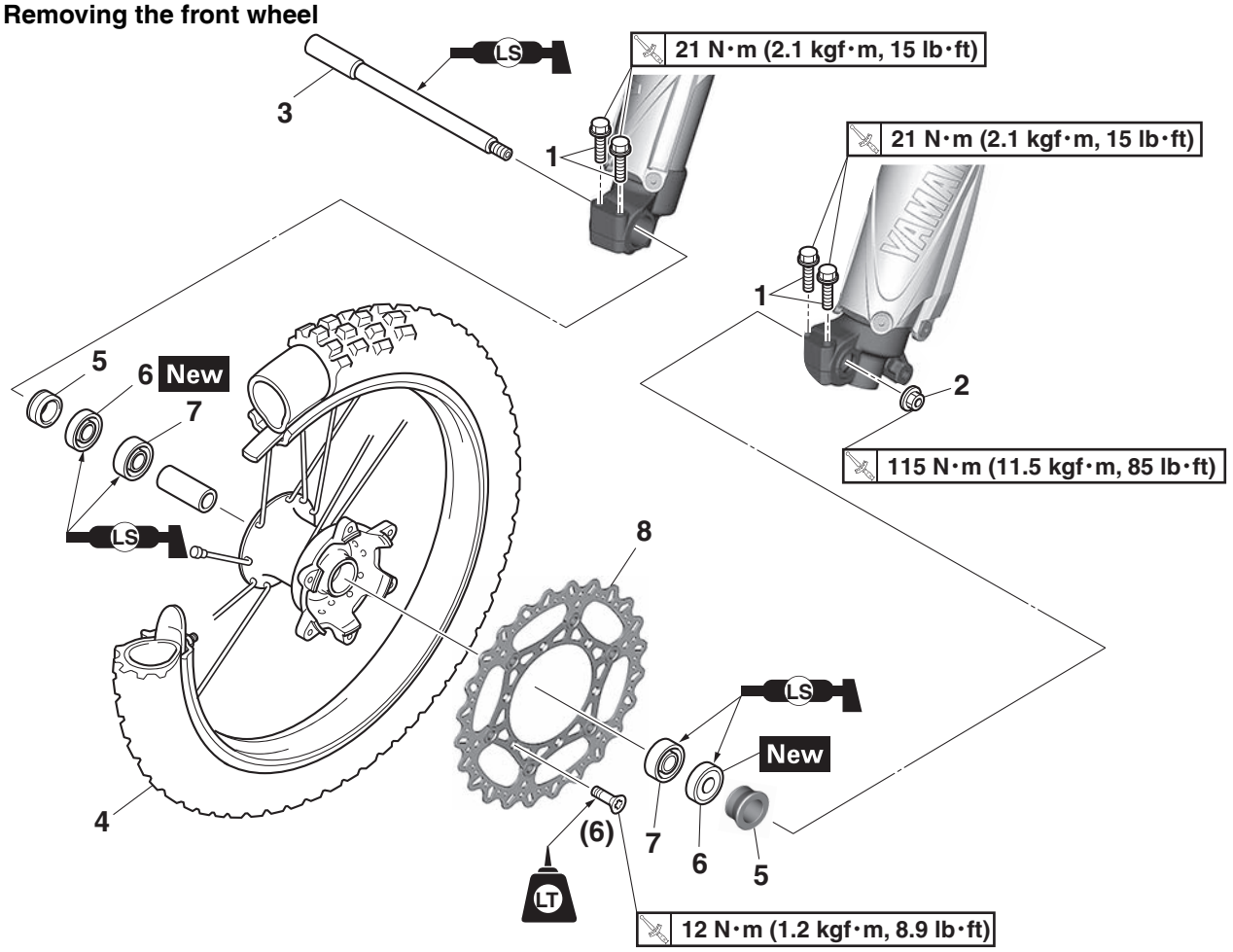


a. Projection
b. Slot
c. Rib (side cover)
d. Rib (rear fender)

EAM20095

FRONT WHEEL

Removing the front wheel



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

EAM30017
REMOVING THE FRONT WHEEL

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

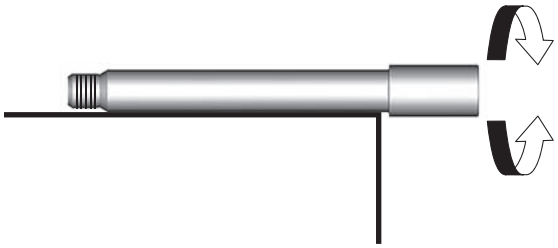
EWA13120
⚠ WARNING

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

2. Remove:
   • Front wheel

EAM30018
CHECKING THE FRONT WHEEL

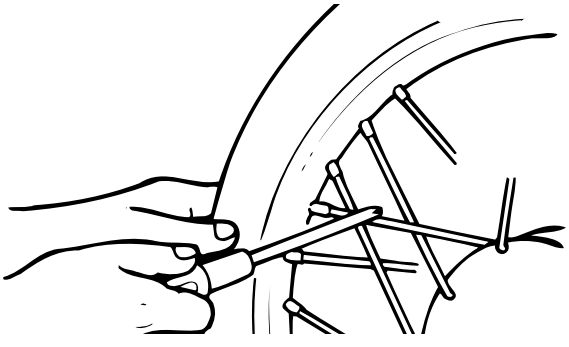
1. Check:
   • Front wheel axle
   Roll the front wheel axle on a flat surface.
   Bends → Replace.



EWA13460
⚠ WARNING

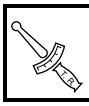
Do not attempt to straighten a bent wheel axle.

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



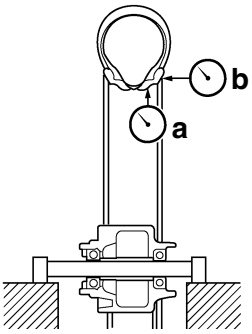
TIP
A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

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

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

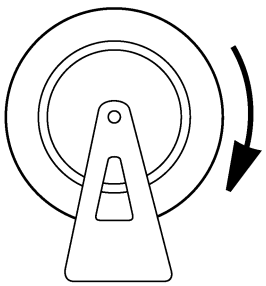
TIP
After tightening the spokes, measure the wheel runout.

5. Measure:
   • Radial wheel runout "a"
   • Lateral wheel runout "b"
   Out of specification → Repair/replace.



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

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



EAM30019
DISASSEMBLING THE FRONT WHEEL

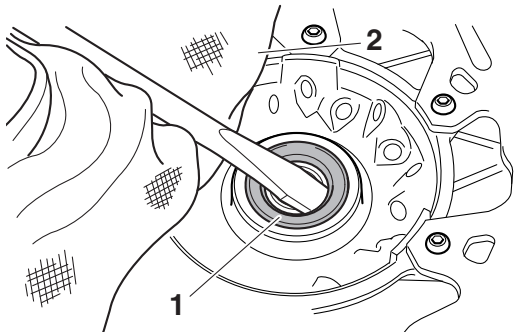
1. Remove:
   - Oil seal
   - Bearing

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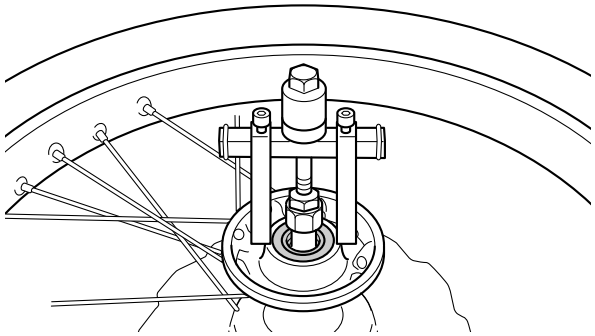
a. Clean the outside of the front wheel hub.
b. Remove the oil seals "1" with a flat-head screwdriver.

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.



▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAM30020
ASSEMBLING THE FRONT WHEEL

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

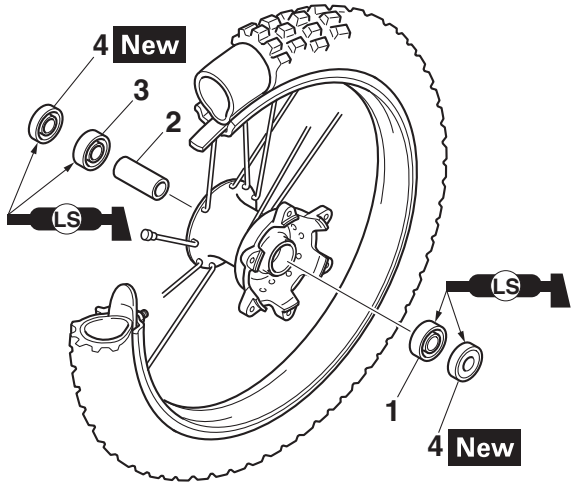
TIP

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

ECA24420

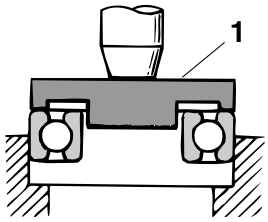
NOTICE

Install the bearing by pressing its outer race parallel.



TIP

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



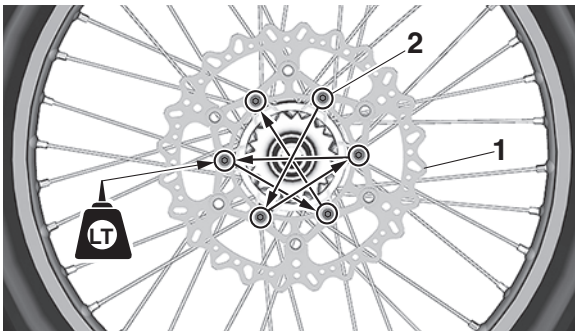
2. Install:
   - Brake disc "1"
   - Brake disc bolt "2"



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

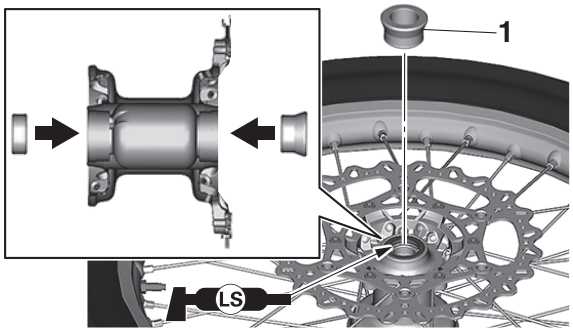
TIP

Tighten the bolts in stages and in a crisscross pattern.



3. Install:
   • Collar “1”

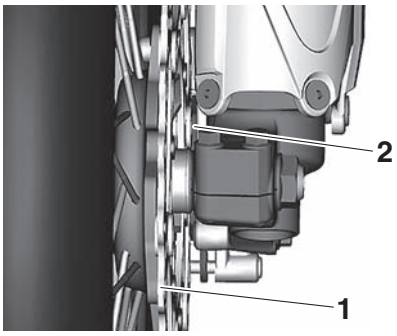
TIP
Apply the lithium-soap-based grease on the oil seal lip.



EAM30021
INSTALLING THE FRONT WHEEL

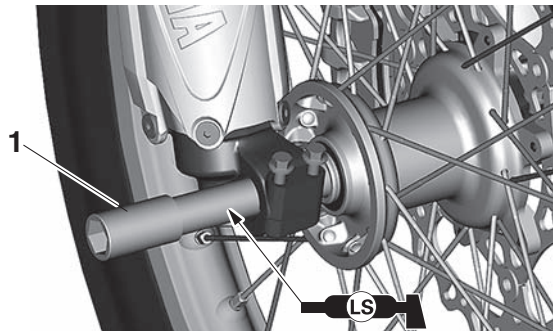
1. Install:
   • Front wheel

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



2. Install:
   • Front wheel axle “1”

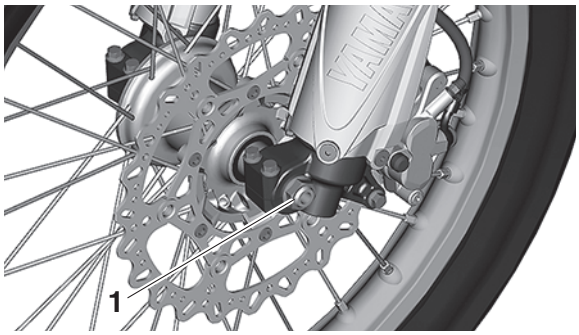
TIP
Apply the lithium-soap-based grease to the front wheel axle.



3. Tighten:
   • Front wheel axle nut “1”

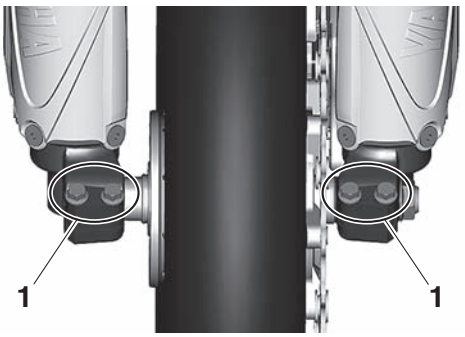
	Front wheel axle nut **115 N·m (11.5 kgf·m, 85 lb·ft)**

ECA24430
NOTICE
Before tightening the front wheel axle nut, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.



4. Tighten:
   • Front wheel axle pinch bolt “1”

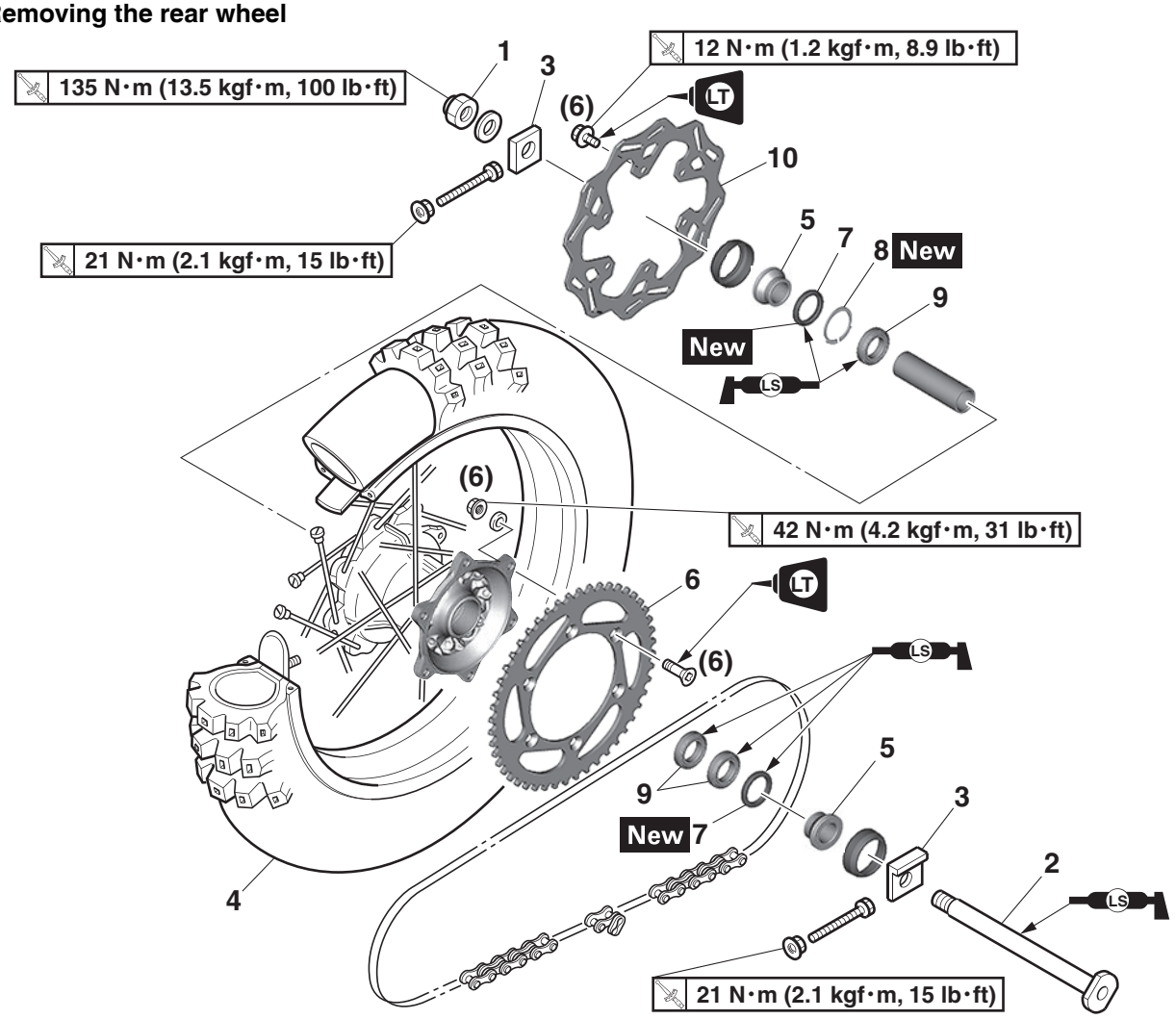
	Front wheel axle pinch bolt **21 N·m (2.1 kgf·m, 15 lb·ft)**



EAM20096

REAR WHEEL

Removing the rear wheel



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

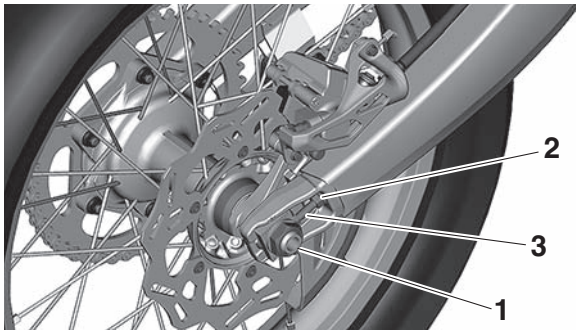
EAM30022
REMOVING THE REAR WHEEL

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.

EAM30023
CHECKING THE REAR WHEEL

1. Check:
   • Rear wheel axle
   • Rear wheel
   • Bearing
   • Oil seal
   Refer to “CHECKING THE FRONT WHEEL” on page 4-6.
2. Check:
   • Tire
   • Rear wheel
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” on page 3-32 and “CHECKING THE WHEELS” on page 3-33.
3. Check:
   • Spoke
   Refer to “CHECKING THE FRONT WHEEL” on page 4-6.
4. Measure:
   • Radial wheel runout
   • Lateral wheel runout
   Refer to “CHECKING THE FRONT WHEEL” on page 4-6.

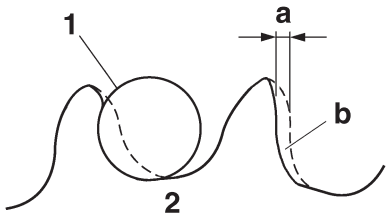
Radial wheel runout limit
2.0 mm (0.08 in)
Lateral wheel runout limit
2.0 mm (0.08 in)

EAM30024
DISASSEMBLING THE REAR WHEEL

1. Remove:
   • Oil seal
   • Bearing
   Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-7.

EAM30025
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

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



b. Correct

1. Drive chain roller
2. Rear wheel sprocket

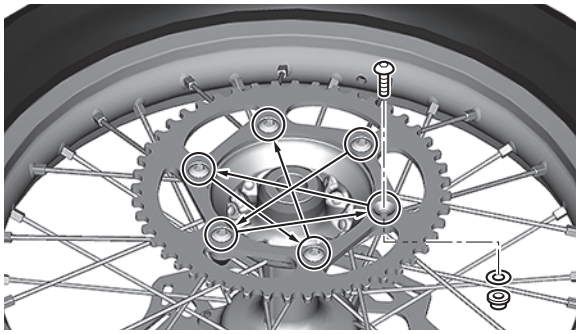
2. Replace:
   • Rear wheel sprocket

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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.



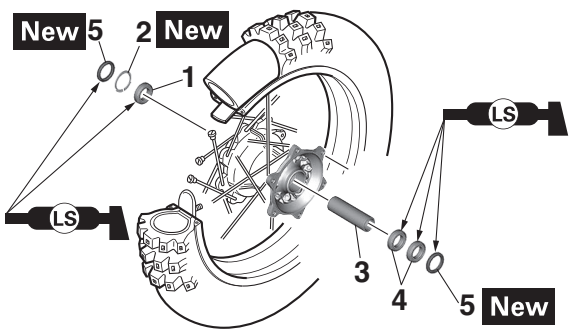
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EAM30026
ASSEMBLING THE REAR WHEEL

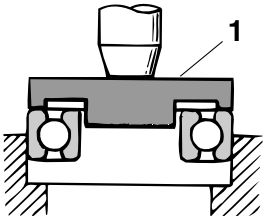
1. Install:
   - Bearing (right side) “1”
   - Circlip “2” New
   - Spacer “3”
   - Bearing (left side) “4”
   - Oil seal “5” New

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

ECA24440
NOTICE
Install the bearing by pressing its outer race parallel.



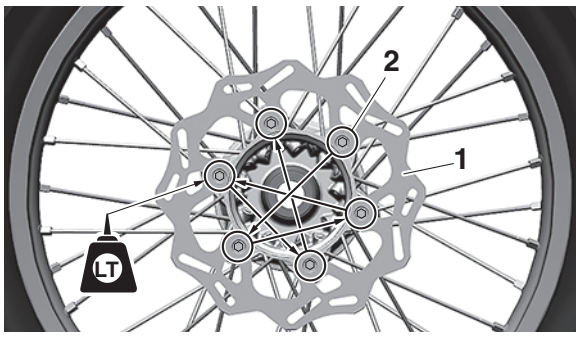
TIP
Use a socket “1” that matches the diameter of the bearing outer race and that of the oil seal.



2. Install:
   - Brake disc “1”
   - Brake disc bolt “2”

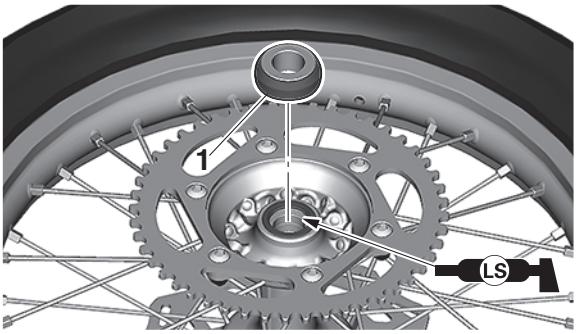
Brake disc bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP
Tighten the bolts in stages and in a crisscross pattern.



3. Install:
   - Collar “1”

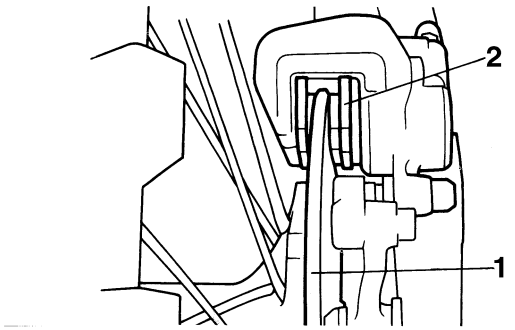
TIP
Apply the lithium-soap-based grease on the oil seal lip.



EAM30027
INSTALLING THE REAR WHEEL

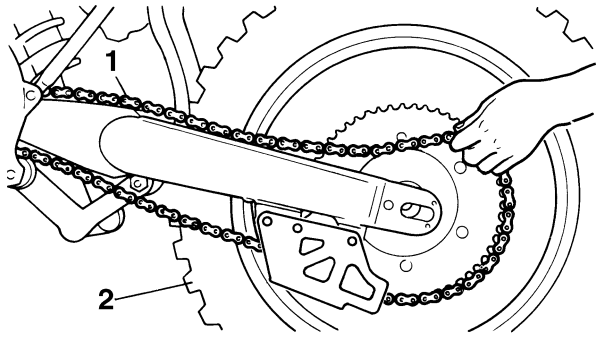
1. Install:
   - Rear wheel

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



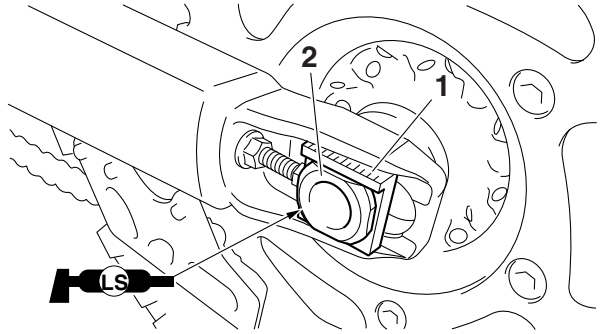
2. Install:
   • Drive chain "1"

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



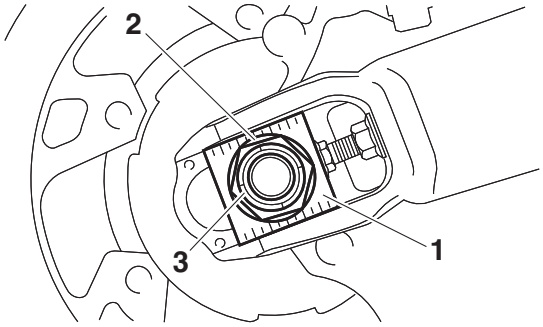
3. Install:
   • Left drive chain puller "1"
   • Rear wheel axle "2"

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



4. Install:
   • Right drive chain puller "1"
   • Washer "2"
   • Rear wheel axle nut "3"

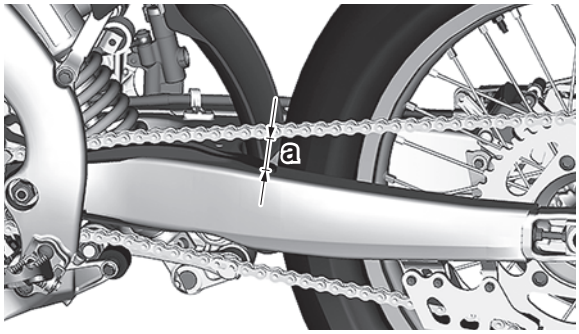
TIP
Temporarily tighten the nut (rear wheel axle) at this point.



5. Adjust:
   • Drive chain slack "a"

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

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

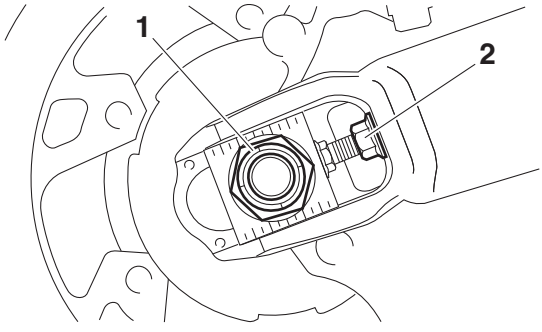


6. Tighten:
   • Rear wheel axle nut "1"

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

   • Locknut "2"

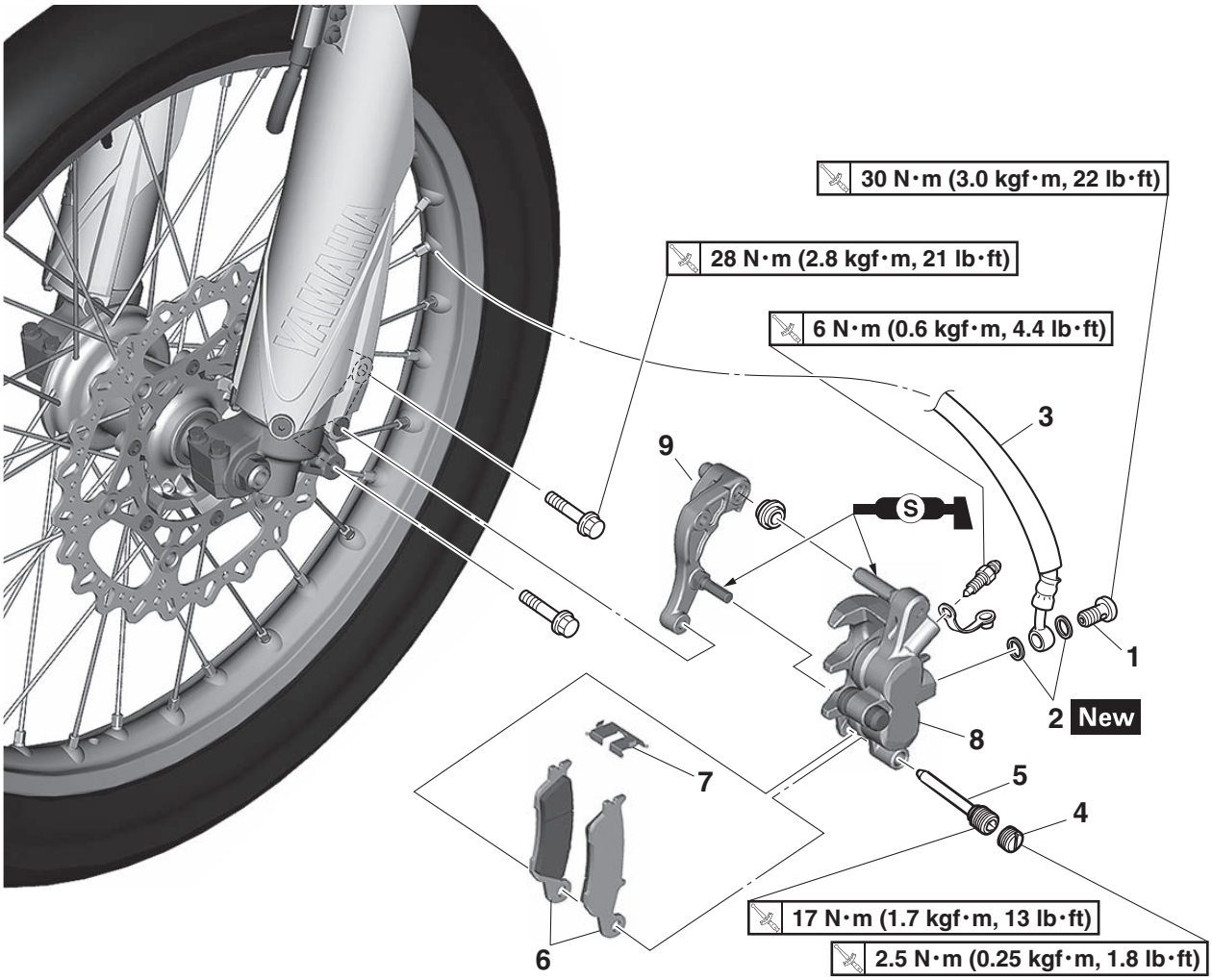
	Locknut **21 N·m (2.1 kgf·m, 15 lb·ft)**



EAM20097

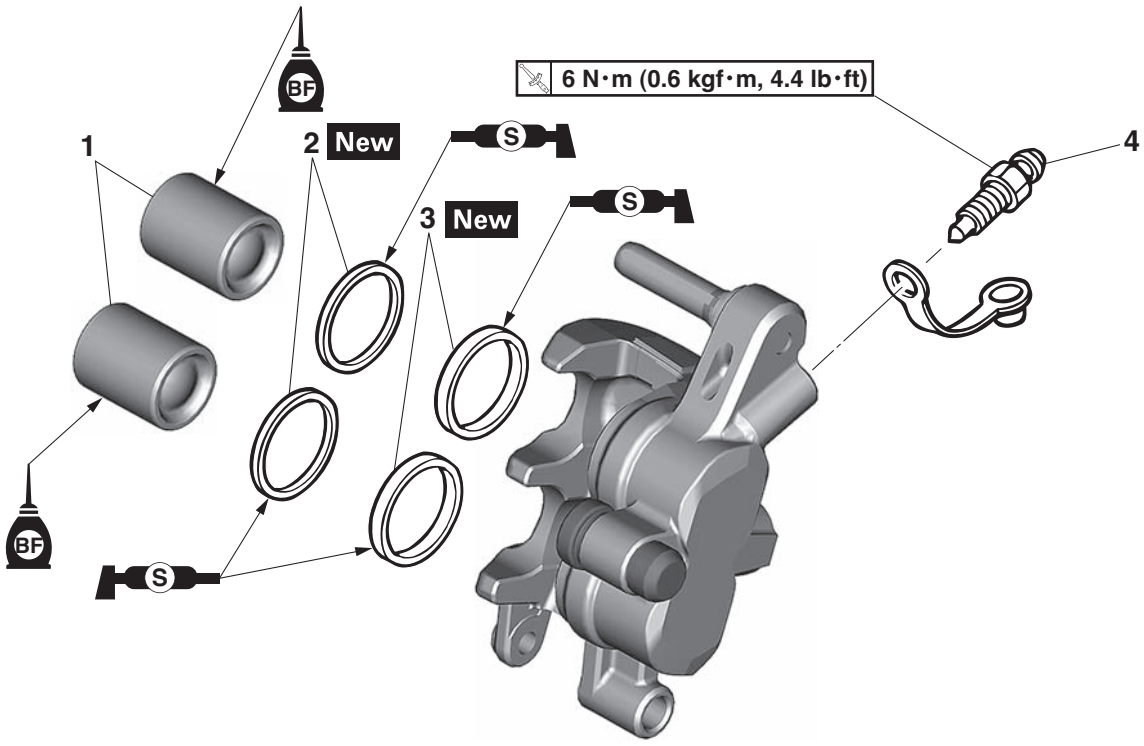
FRONT BRAKE

Removing the front brake caliper



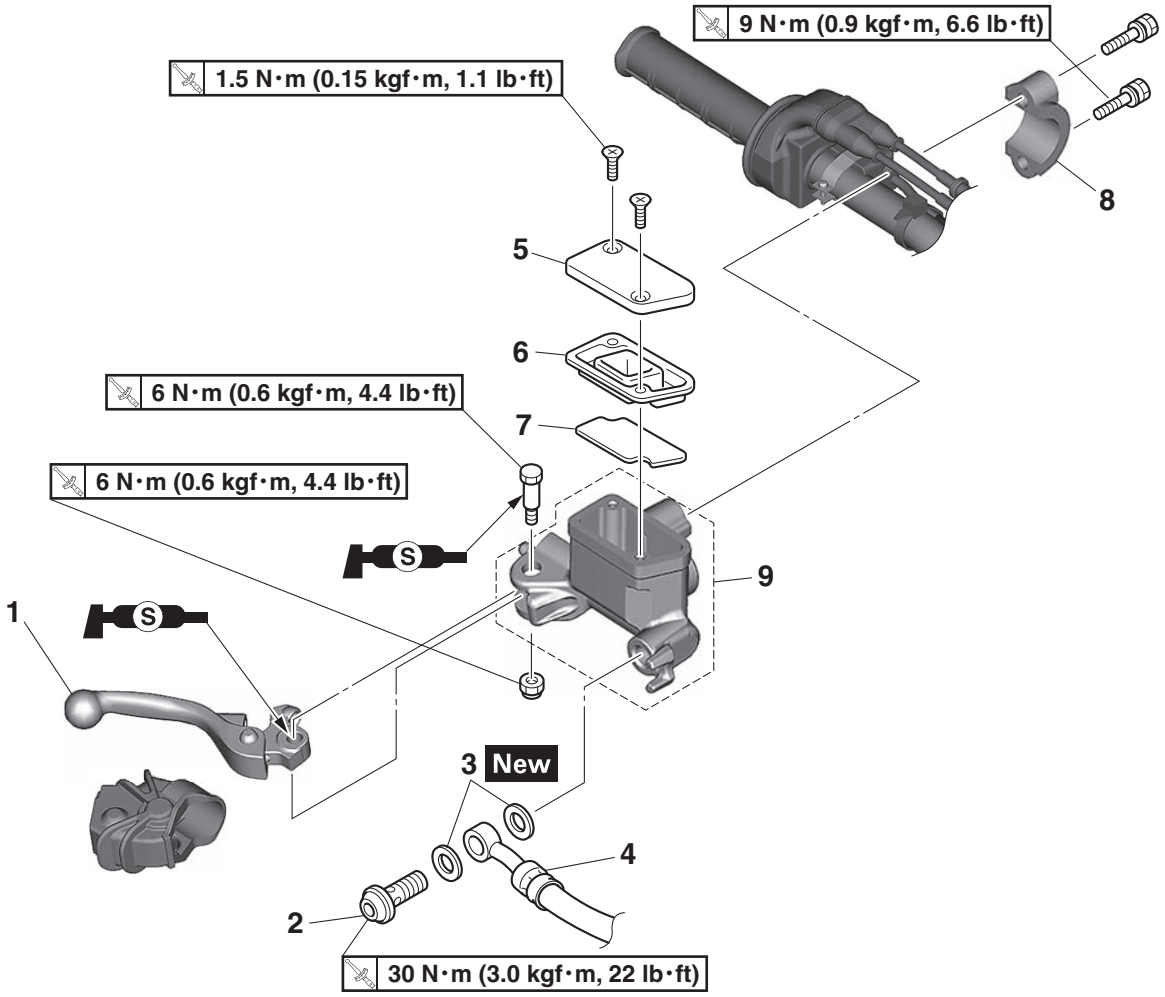
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Union bolt	1	
2	Copper washer	2	
3	Front brake hose	1	
4	Brake pad pin plug	1	
5	Brake pad pin	1	
6	Brake pad	2	
7	Brake pad spring	1	
8	Front brake caliper assembly	1	
9	Front brake caliper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

Disassembling the front brake caliper



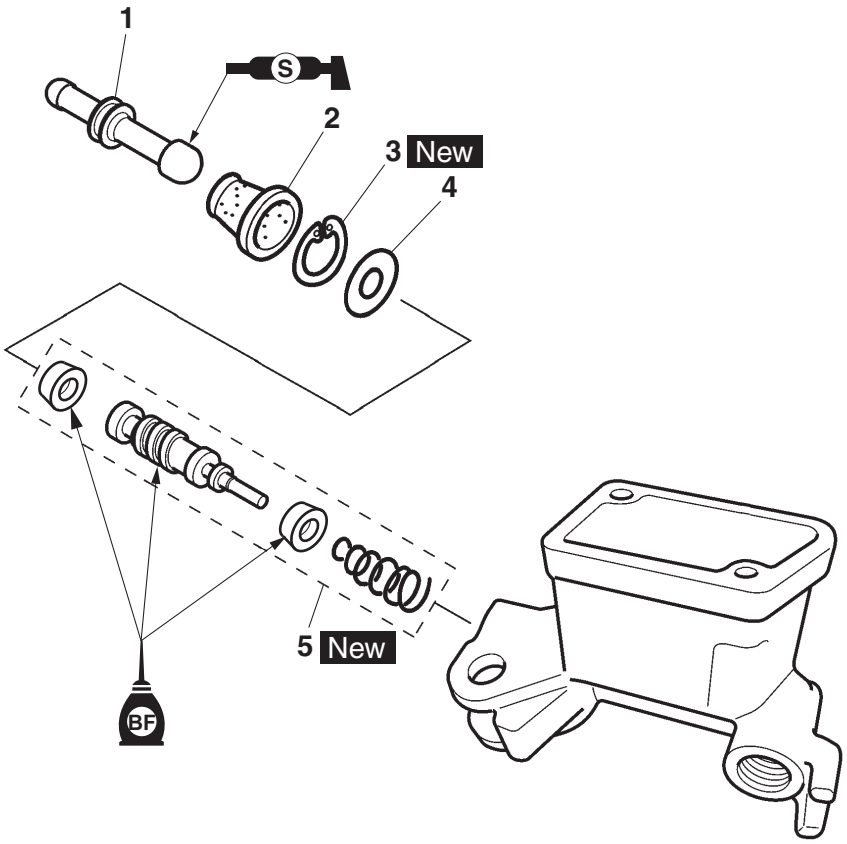
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	2	
2	Brake caliper piston dust seal	2	
3	Brake caliper piston seal	2	
4	Bleed screw	1	

Removing the front brake master cylinder



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

Disassembling the front brake master cylinder

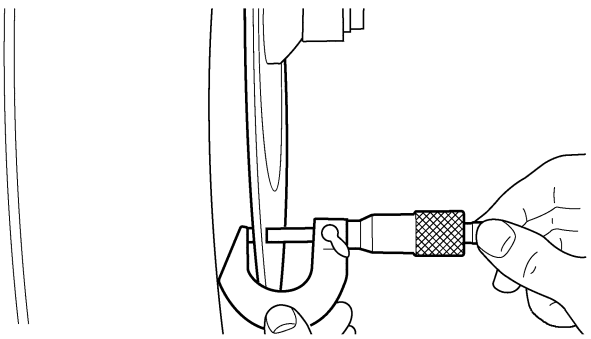


Order	Job/Parts to remove	Q'ty	Remarks
1	Push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Washer	1	
5	Brake master cylinder kit	1	

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. Remove:
   - Front wheel
     Refer to "FRONT WHEEL" on page 4-5.
2. Check:
   - Front brake disc
     Damage/galling → Replace.
3. 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)

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

EAM30030
REMOVING THE FRONT BRAKE CALIPER
TIP

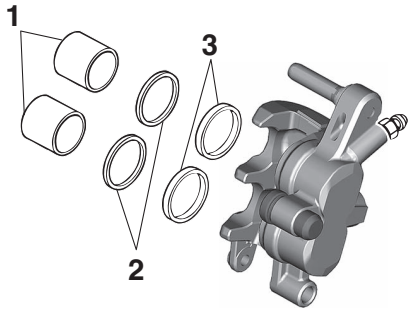
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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

TIP

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

EAM30031
DISASSEMBLING THE FRONT BRAKE CALIPER
1. Remove:
   - Brake caliper piston "1"
   - Brake caliper piston dust seal "2"
   - Brake caliper piston seal "3"

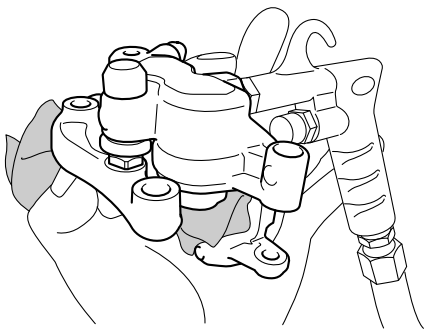


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a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

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.**



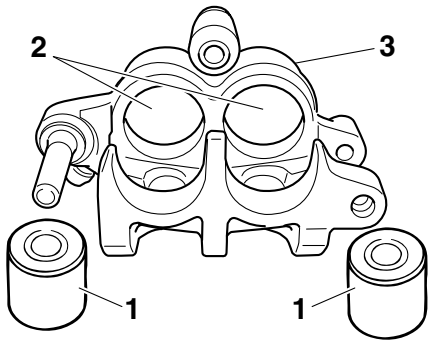
b. Remove the brake caliper piston dust seal and the brake caliper piston seal.

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EAM30032

CHECKING THE FRONT BRAKE CALIPER

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



EWA19220

⚠ WARNING

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

2. Check:
   - Brake caliper bracket
     Crack/damage → Replace.

EAM30033

ASSEMBLING THE FRONT BRAKE CALIPER

EWA19230

⚠ WARNING

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

Specified brake fluid
DOT 4

EAM30034

INSTALLING THE BRAKE CALIPER PISTON

1. Clean:
   - Brake caliper
   - Brake caliper piston seal
   - Brake caliper piston dust seal
   - Brake caliper piston
     Use brake fluid for cleaning.
2. Install:
   - Brake caliper piston seal "1" New
   - Brake caliper piston dust seal "2" New

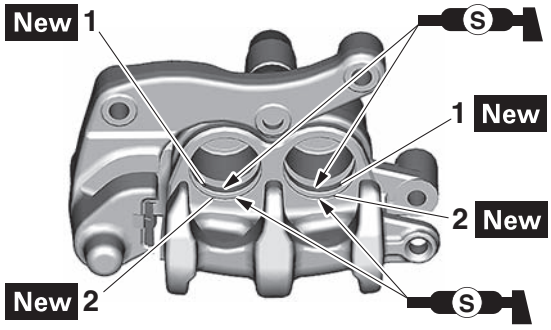
EWA19240

⚠ WARNING

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

TIP

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



3. Install:
   - Brake caliper piston "1"

TIP

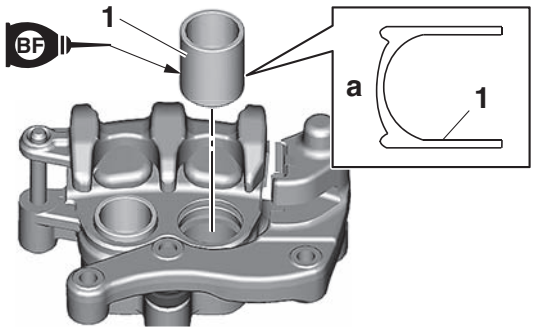
Apply the brake fluid on the piston outer surface.

ECA24450

NOTICE

• Install the piston with its side "a" facing the brake caliper.

• Never force to insert.



EAM30035

INSTALLING THE FRONT BRAKE CALIPER

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

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

EWA13531

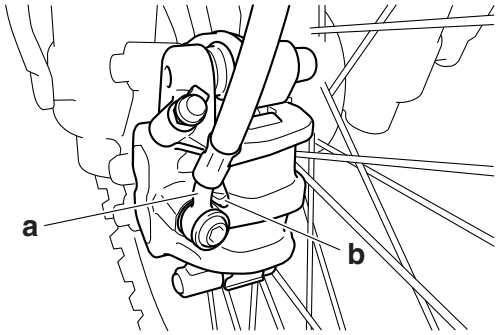
⚠ WARNING

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

ECA24460

NOTICE

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



2. Install:
   - Front brake caliper
   - Brake pad spring
   - Brake pad
   - Brake pad pin
   - Brake hose holder

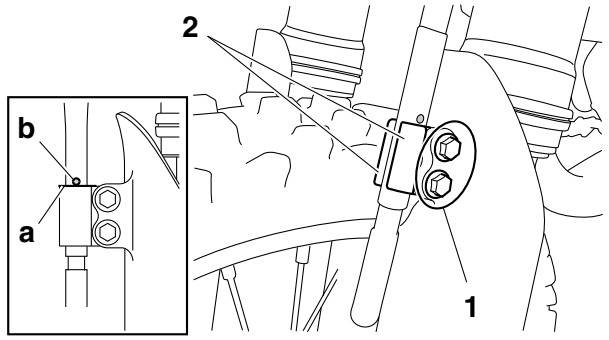
	Brake pad pin **17 N·m (1.7 kgf·m, 13 lb·ft)**

   Refer to "CHECKING THE FRONT BRAKE PADS" on page 3-23.
3. Tighten:
   - Brake hose holder bolt "1"

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

TIP

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



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

	Specified brake fluid **DOT 4**

EWA13090

⚠ WARNING

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

ECA13540

NOTICE

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

5. Bleed:
   - Brake system

Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
6. Check:
   • Brake fluid level
   The minimum level mark or below → Add.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-26.
7. Check:
   • Brake lever free play
   Refer to "ADJUSTING THE FRONT BRAKE" on page 3-22.
   • Brake lever operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.

EAM30036
REMOVING THE FRONT BRAKE MASTER CYLINDER

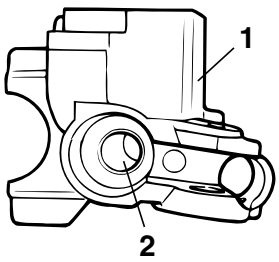
TIP
Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

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

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

EAM30037
CHECKING THE FRONT BRAKE MASTER CYLINDER

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



2. Check:
   • Brake master cylinder kit
   Damage/scratches/wear → Replace.
3. Check:
   • Brake master cylinder reservoir cap
4. Check:
   • Brake hose
   Cracks/damage/wear → Replace.

EAM30038
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520
WARNING

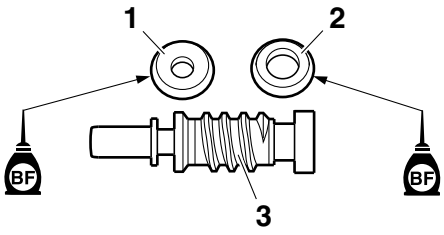
• Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
• Never use solvents on internal brake components.

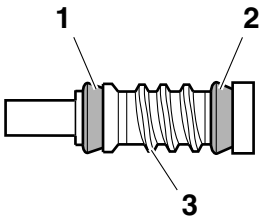
Specified brake fluid
DOT 4

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

EWA20240
WARNING

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

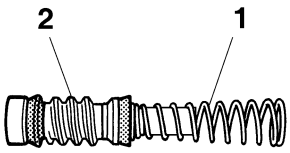




3. Install:
   • Spring “1”
   Install to the brake master cylinder piston “2”.

TIP

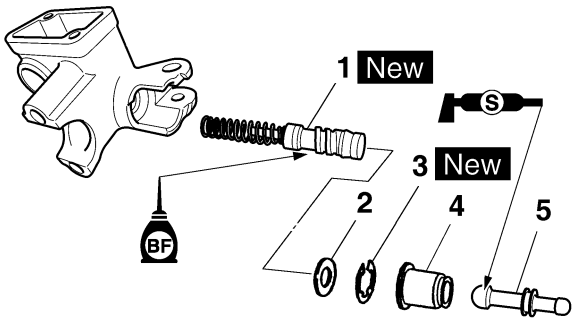
Install the spring with a smaller inside diameter to the brake master cylinder piston.



4. Install:
   • Brake master cylinder kit “1” New
   • Washer “2”
   • Circlip “3” New
   • Dust boot “4”
   • Push rod “5”

TIP

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



EAM30039

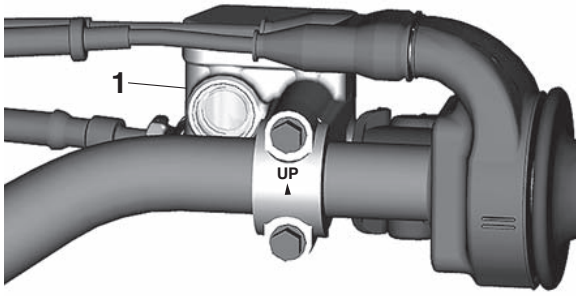
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   • Brake master cylinder “1”

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

TIP

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



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

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

EWA13531

⚠ WARNING

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

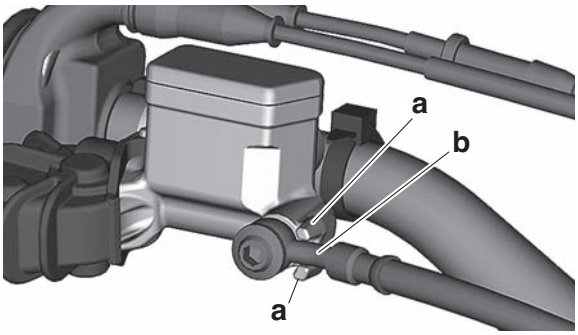
ECA24470

NOTICE

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

TIP

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



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

Specified brake fluid
DOT 4

EWA13090

WARNING

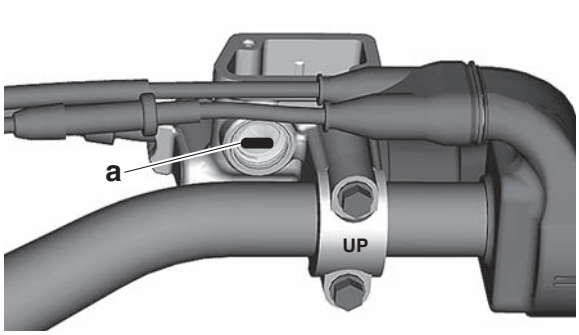
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

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

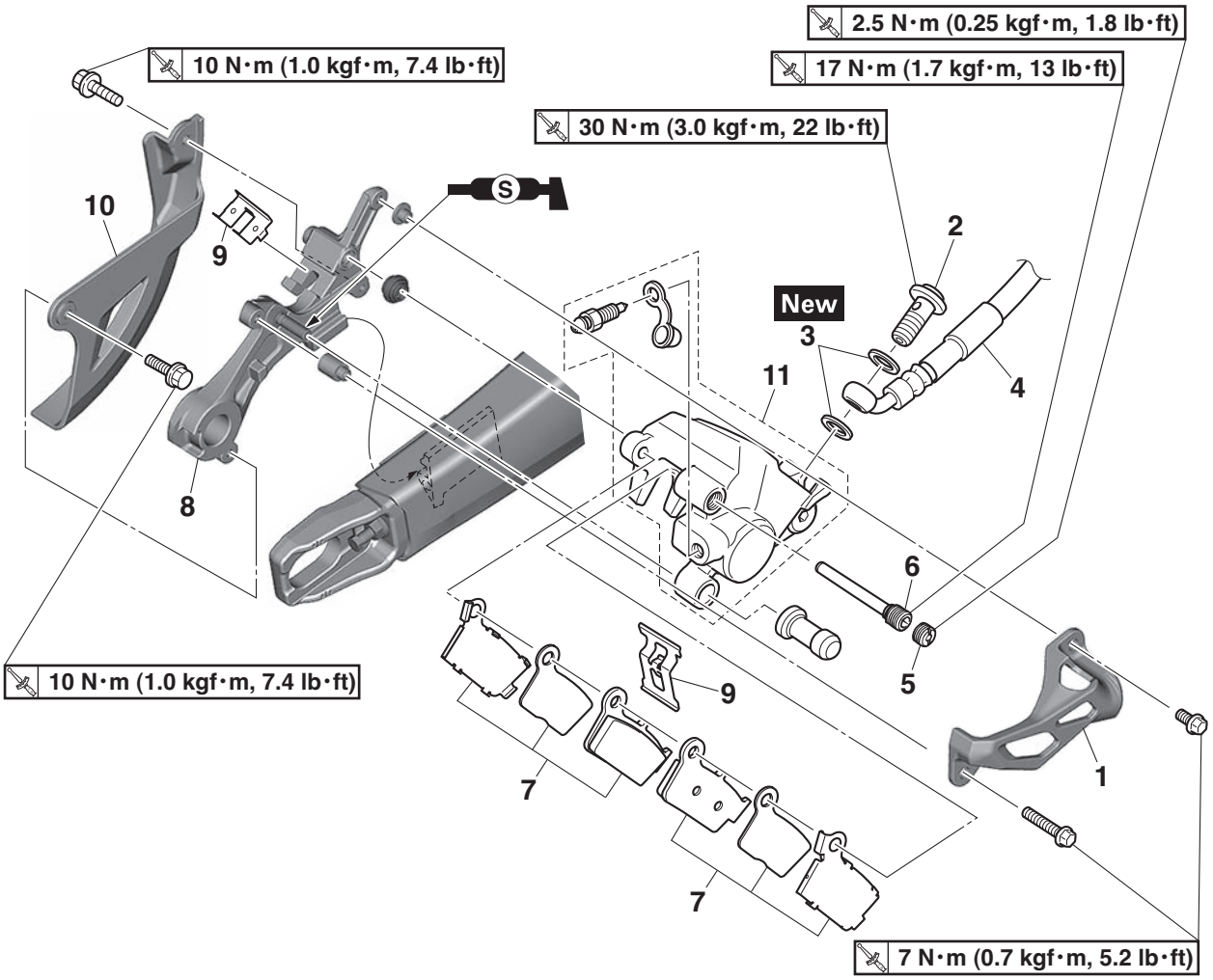


6. Check:
   - Brake lever free play
     Refer to "ADJUSTING THE FRONT BRAKE" on page 3-22.
   - Brake lever operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.

EAM20098

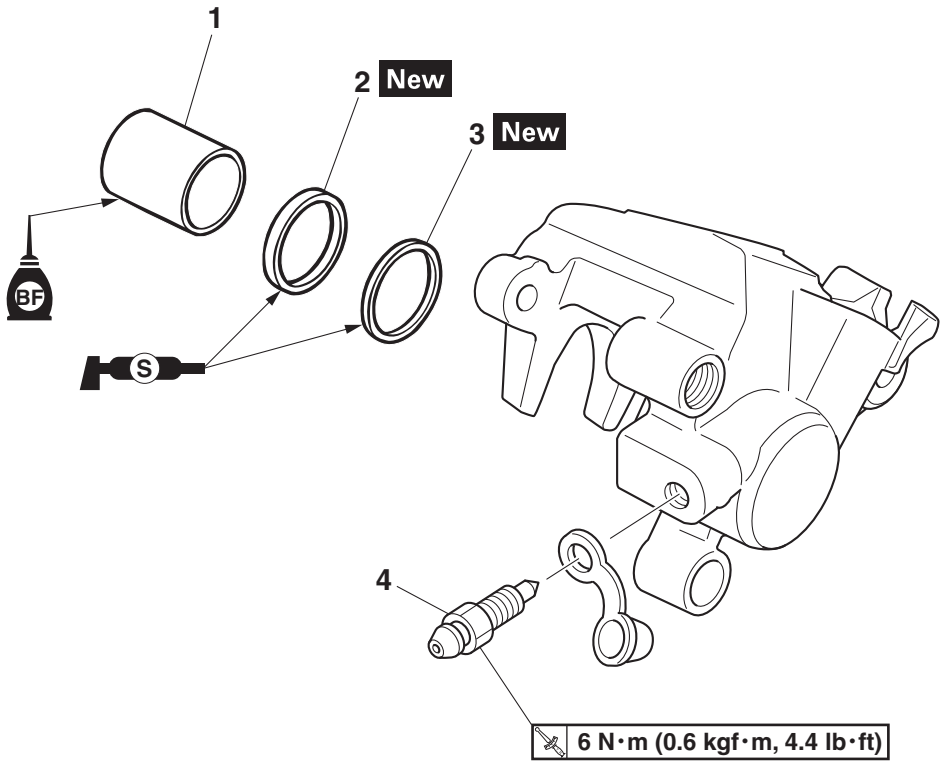
REAR BRAKE

Removing the rear brake caliper



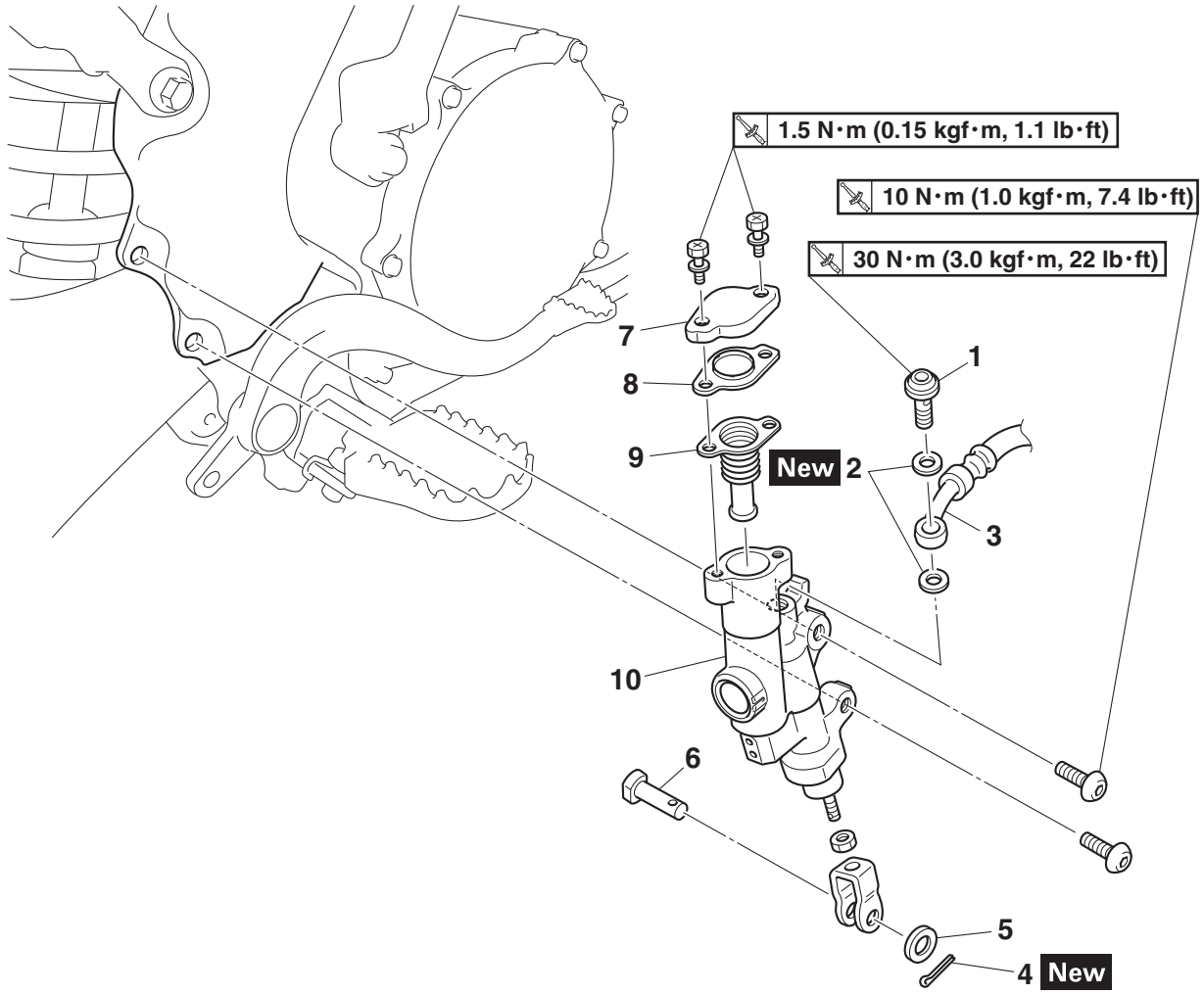
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.
1	Protector	1	
2	Union bolt	1	
3	Copper washer	2	
4	Rear brake hose	1	
5	Brake pad pin plug	1	
6	Brake pad pin	1	
7	Rear brake pad assembly	2	
8	Rear brake caliper bracket	1	
9	Brake pad spring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

Disassembling the rear brake caliper



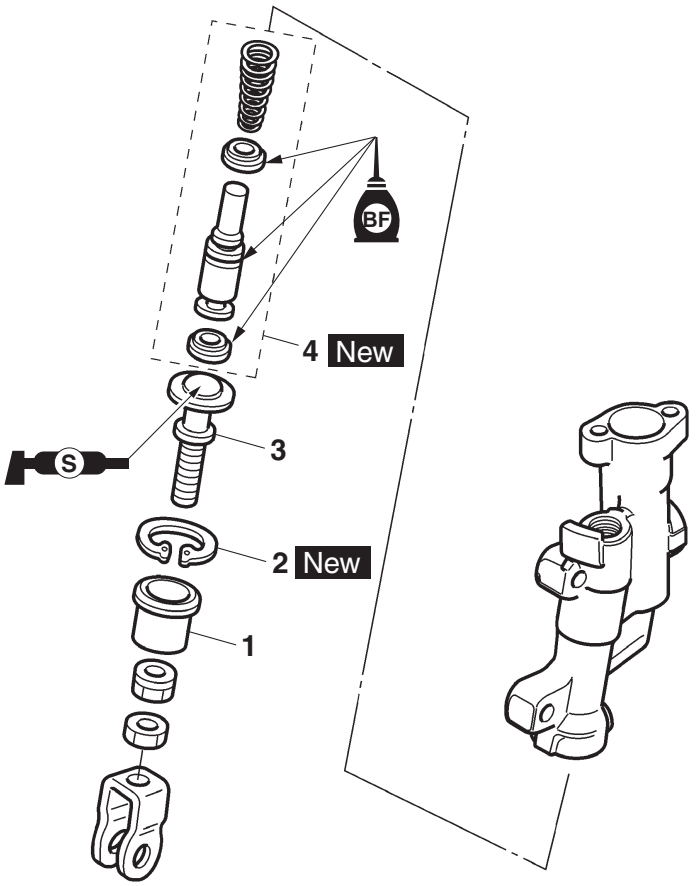
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	1	
2	Brake caliper piston dust seal	1	
3	Brake caliper piston seal	1	
4	Bleed screw	1	

Removing the rear brake master cylinder



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

Disassembling the rear brake master cylinder



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

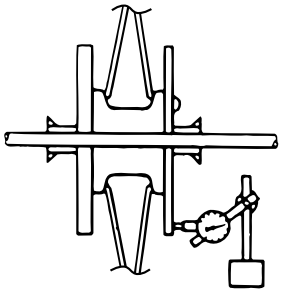
EAM30040
INTRODUCTION
EWA19260
⚠ WARNING

If you need to disassemble the disc brake components, observe the following precautions.
- **Never disassemble the brake components unless absolutely necessary.**
- **If there is any problem with connections on the hydraulic brake system, perform the following jobs. Disassemble the brake system, drain the brake fluid, and clean it. After that, add a suitable amount of brake fluid. Then, bleed it after reassembly.**
- **Use only brake fluid for washing internal brake components.**
- **Use new brake fluid for cleaning the brake components.**
- **Immediately wipe off the spilled brake fluid to avoid damage to painted surfaces or plastic parts.**
- **Handle brake fluid with special care not to let it enter your eyes so that you may not 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. Remove:
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-9.
2. Check:
   - Brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to “CHECKING THE FRONT BRAKE DISC” on page 4-17.

Brake disc thickness limit
3.5 mm (0.14 in)

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



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

5. Adjust:
   - Brake disc deflection

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

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



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

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

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

EAM30042
REMOVING THE REAR BRAKE CALIPER

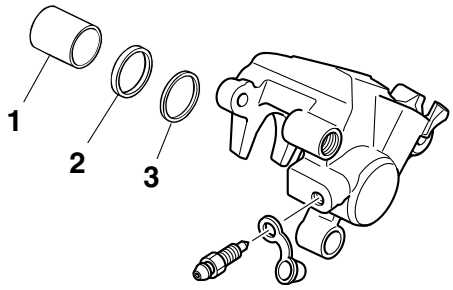
TIP
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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"

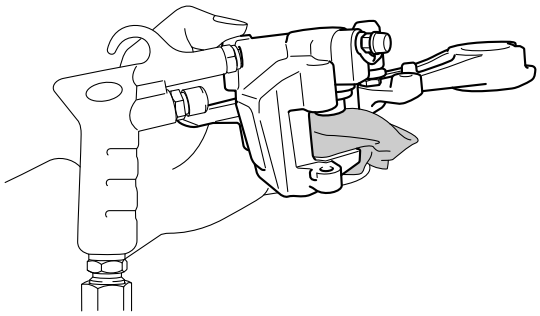


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a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

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.

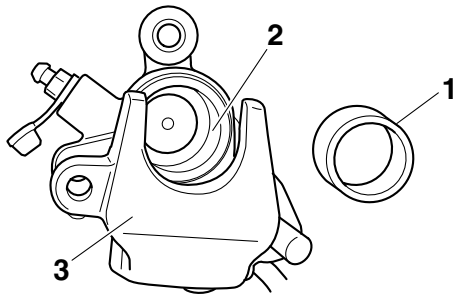


b. Remove the brake caliper piston dust seal and the brake caliper piston seal.

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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**

EAM30046

INSTALLING THE BRAKE CALIPER PISTON

1. Clean:
   - Brake caliper
   - Brake caliper piston seal
   - Brake caliper piston dust seal
   - Brake caliper piston
   Use brake fluid for cleaning.
2. Install:
   - Brake caliper piston seal "1" New
   - Brake caliper piston dust seal "2" New

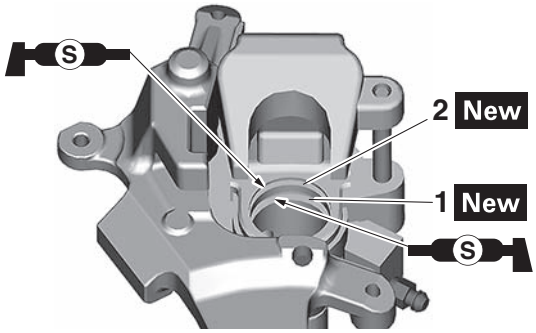
EWA19290

WARNING

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

TIP

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



3. Install:
   - Brake caliper piston "1"

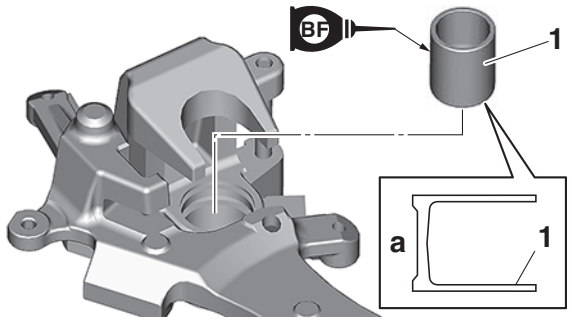
TIP

Apply the brake fluid on the piston outer surface.

ECA24480

NOTICE

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



EAM30047

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Rear brake caliper
   - Rear brake caliper bracket
2. Install:
   - Rear wheel
   Refer to "REAR WHEEL" on page 4-9.
   - Copper washer New
   - Brake hose
   - Union bolt

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

EWA13531

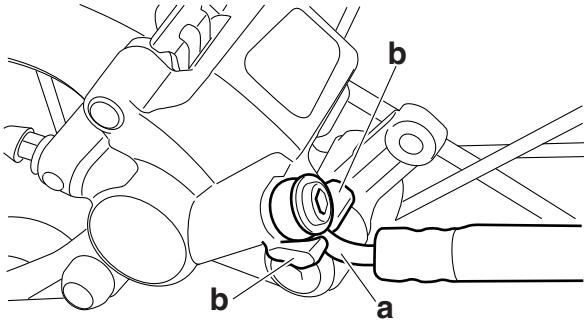
WARNING

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

ECA24490

NOTICE

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



3. Install:
   - Brake pad spring
   - Brake pad
   - Brake pad pin
   - Brake pad pin plug

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

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

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

Specified brake fluid
DOT 4

EWA13090

WARNING

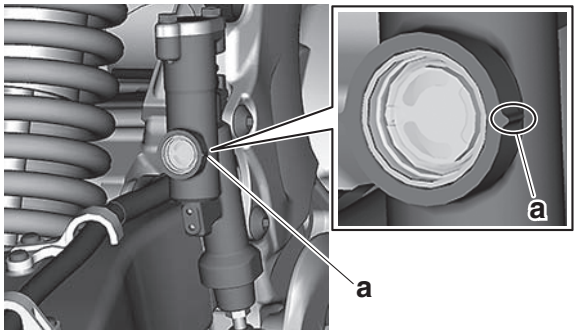
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

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



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

EAM30048

REMOVING THE REAR BRAKE MASTER CYLINDER

TIP

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

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

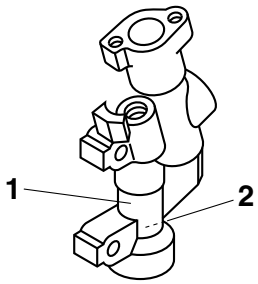
TIP

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

EAM30049

CHECKING THE REAR BRAKE MASTER CYLINDER

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



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

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

EAM30050
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520
⚠ WARNING

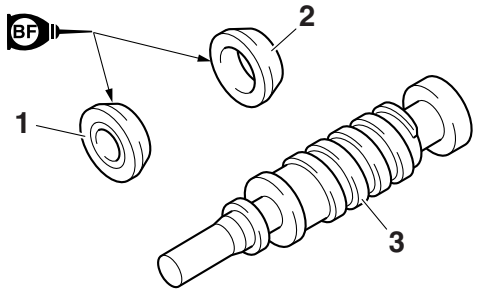
• Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
• Never use solvents on internal brake components.

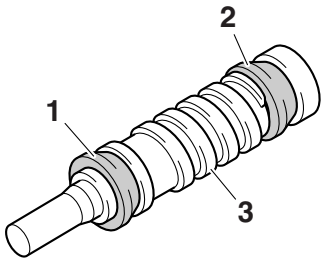
	Specified brake fluid **DOT 4**

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

EWA19300
⚠ WARNING

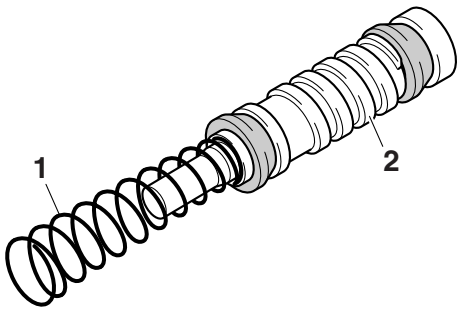
Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.





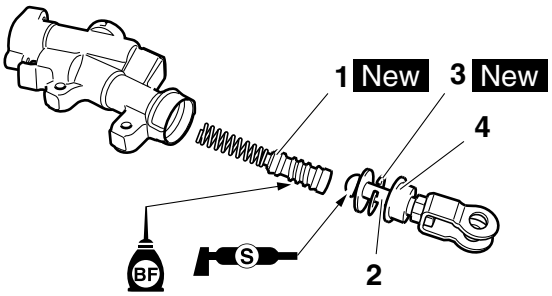
3. Install:
   • Spring “1”
   Install to the brake master cylinder piston “2”.

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



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

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



EAM30051
INSTALLING THE REAR BRAKE MASTER CYLINDER

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

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

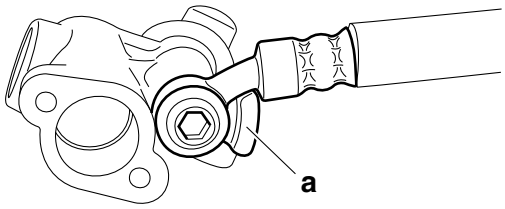
EWA13531
⚠ WARNING

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

ECA24500
NOTICE

Make sure that the pipe portion of the brake

hose touches the projection "a" on the brake caliper.



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

Specified brake fluid
DOT 4

EWA13090

WARNING

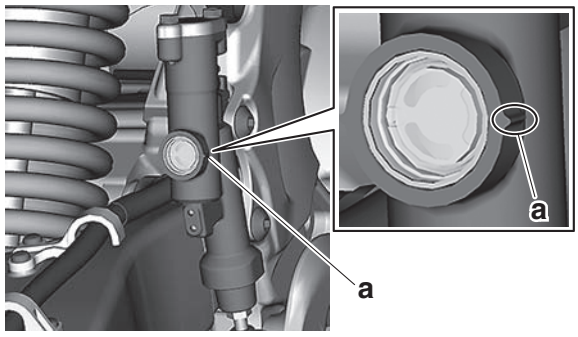
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA24510

NOTICE

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

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

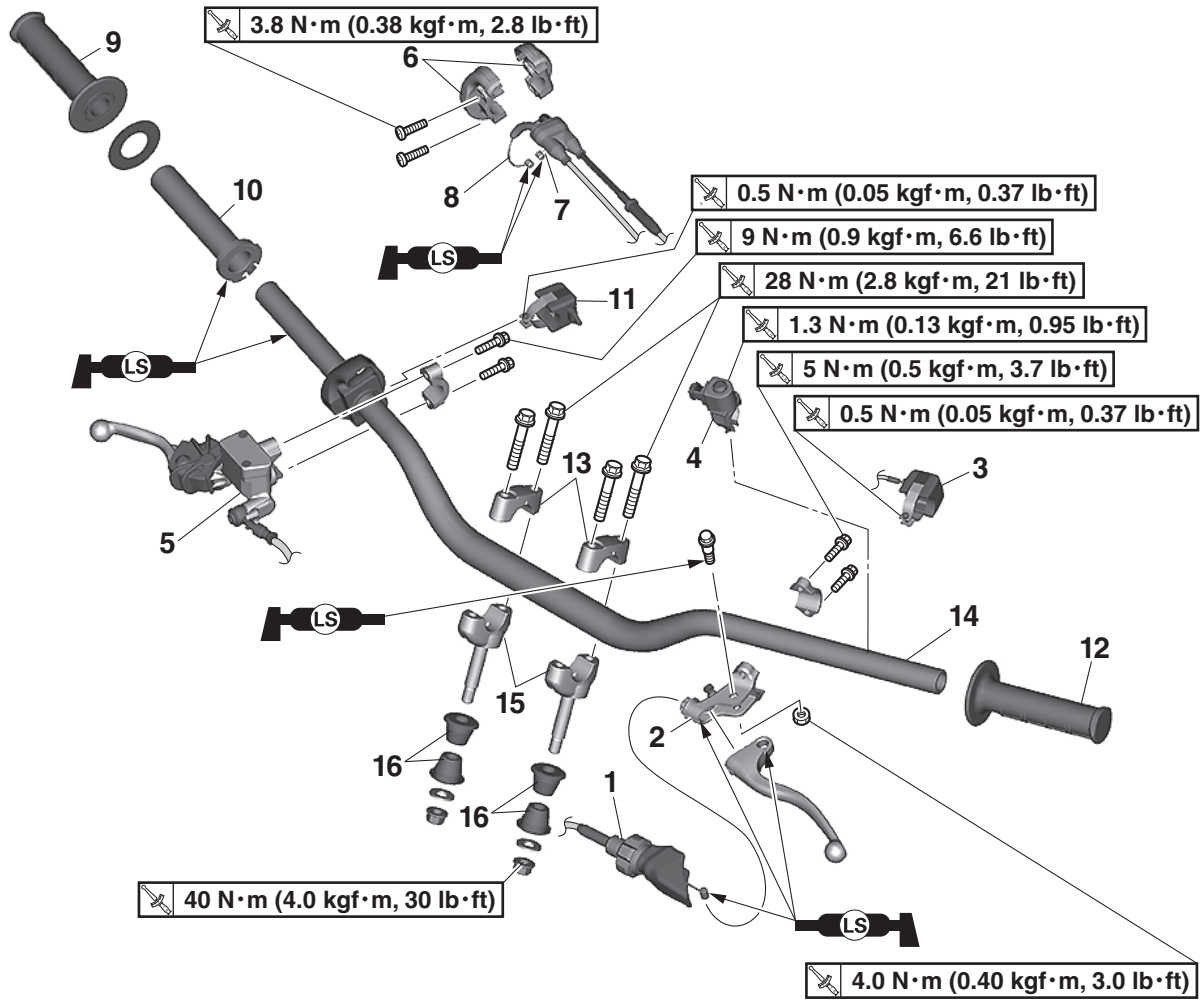


5. Check:
   - Brake pedal operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE BRAKE SYSTEM" on page 3-21.

EAM20099

HANDLEBAR

Removing the handlebar



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

EAM30052
REMOVING THE HANDLEBAR

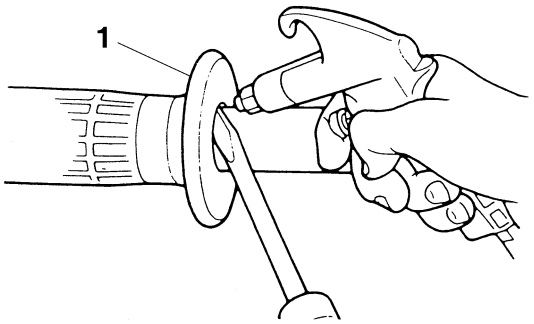
1. Stand the vehicle upright on a level surface.

EWA13120
⚠ WARNING

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

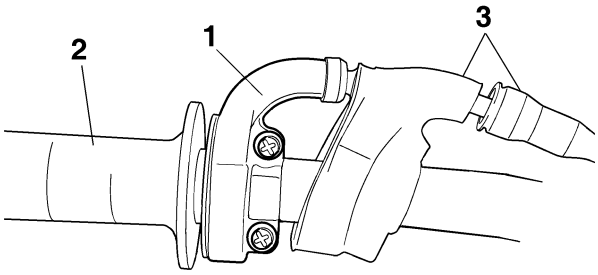
2. Remove:
   • Grip “1”

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



3. Remove:
   • Throttle cable housings “1”
   • Throttle grip “2”

TIP
While removing the throttle cable housing, pull back the rubber cover “3”.



EAM30053
CHECKING THE HANDLEBAR

1. Check:
   • Handlebar
   Bends/cracks/damage → Replace.

EWA13690
⚠ WARNING

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

EAM30054
INSTALLING THE HANDLEBAR

1. Stand the vehicle upright on a level surface.

EWA13120
⚠ WARNING

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

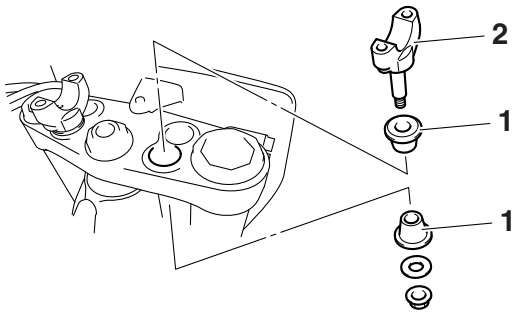
2. Install:
   • Damper “1”
   • Lower handlebar holder “2” (temporarily)
   • Handlebar “3”
   • Upper handlebar holder “4”

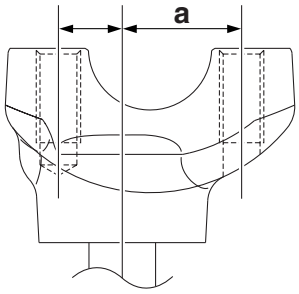
	Upper handlebar holder bolt 28 N·m (2.8 kgf·m, 21 lb·ft)

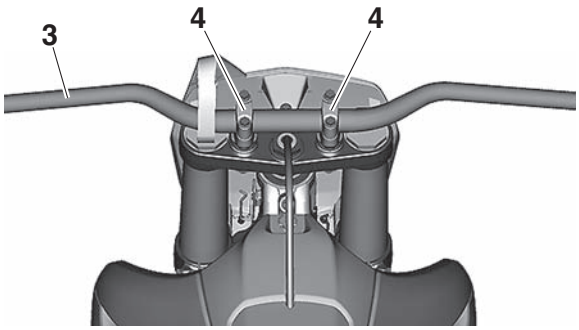
TIP
- Install the lower handlebar holders with them side having the greater distance “a” from the mounting bolt center facing forward.
- Installing the lower handlebar holders in the reverse direction allow the front-to-rear offset amount of the handlebar position to be changed.
- The upper handlebar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

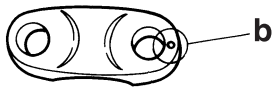
ECA14250
NOTICE

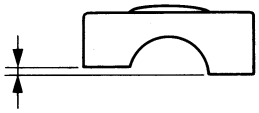
- **First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.**
- **Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

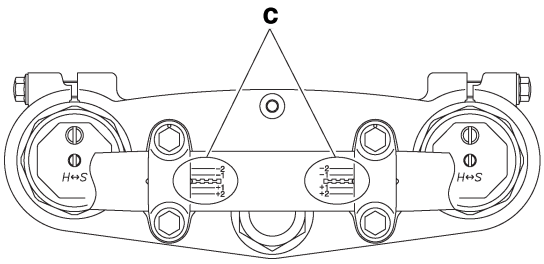


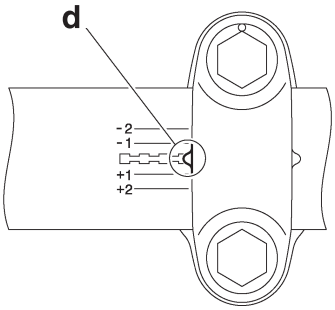












3. Tighten:
   • Lower handlebar holder nut

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

4. Install:
   • Handlebar grip “1”

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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.

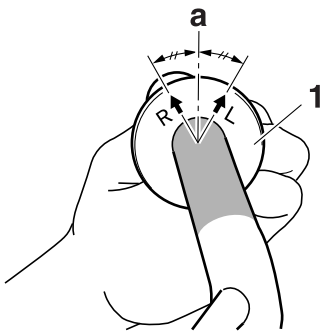
EWA13120

⚠ WARNING

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

TIP

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



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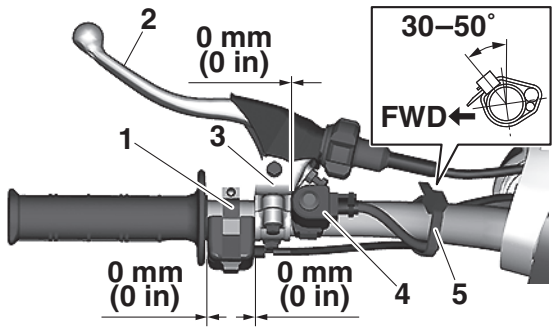
5. Install:
   • Engine stop switch “1”
   • Clutch lever “2”
   • Clutch lever holder “3”
   • Mode switch “4”
   • Clamp “5”

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

TIP

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

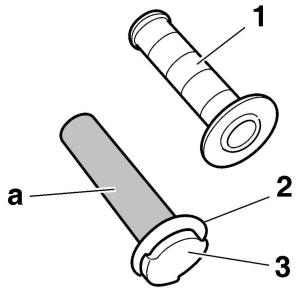
• Pass the engine stop switch lead through the middle of the clutch lever holder.

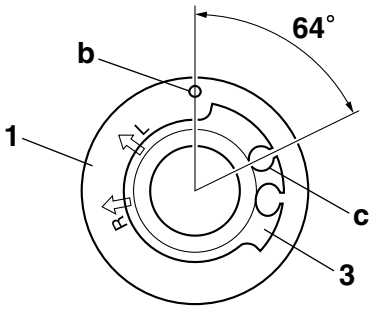


6. Install:
   • Right grip “1”
   • Collar “2”
     Apply adhesive to the tube guide “3”.

TIP

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

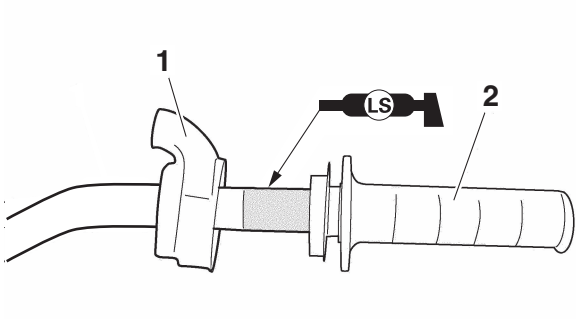




7. Install:
   • Start switch
   • Rubber cover “1”
   • Throttle grip “2”

TIP

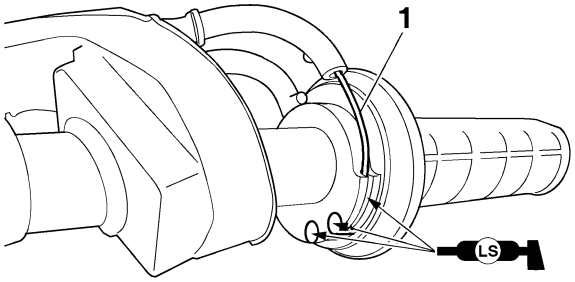
Apply the lithium-soap-based grease on the throttle grip sliding surface.



8. Install:
   • Throttle 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.



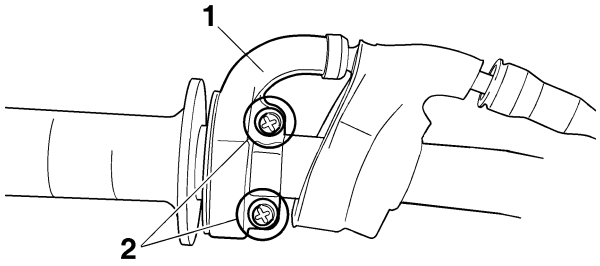
9. Install:
   • Throttle cable housing “1”
   • Screw (throttle cable housings) “2”

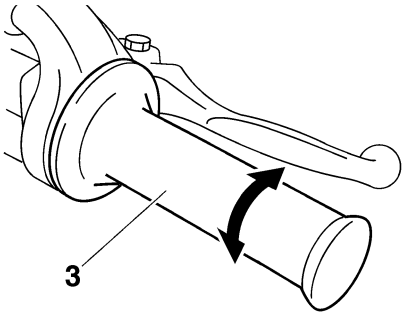
	Screw (throttle cable housings) 3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

EWA19310

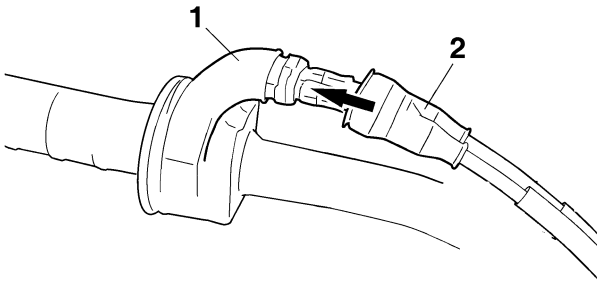
⚠ WARNING

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





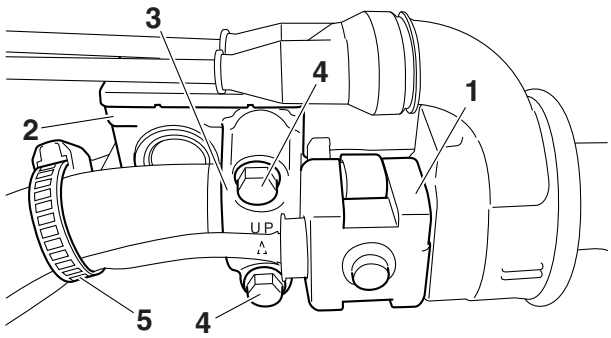
10.Install:
- Rubber cover “1”
- Cover (throttle cable housings) “2”

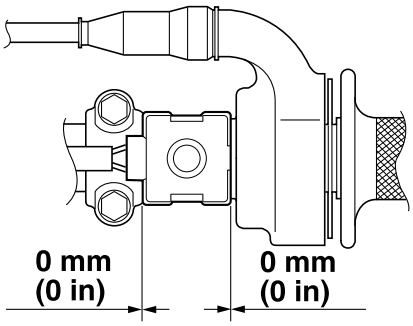


11.Install:
- Start switch “1”
- Front brake master cylinder assembly “2”
- Front brake master cylinder holder “3”
- Bolt (brake master cylinder holder) “4”
- Clamp “5”

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

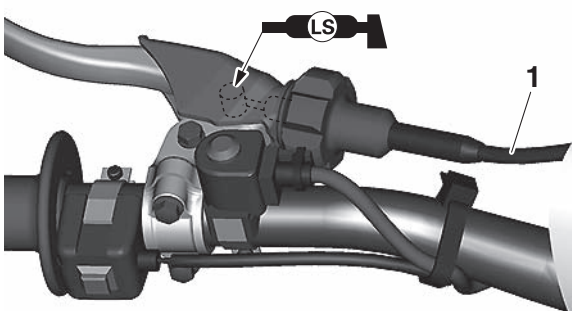
TIP
- Install the brake master cylinder holder with the “UP” mark facing up.
- Install in order for the top of the front brake master cylinder assembly to be level.
- First, tighten the upper bolt, then the lower bolt.





12.Install:
- Clutch cable “1”

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



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

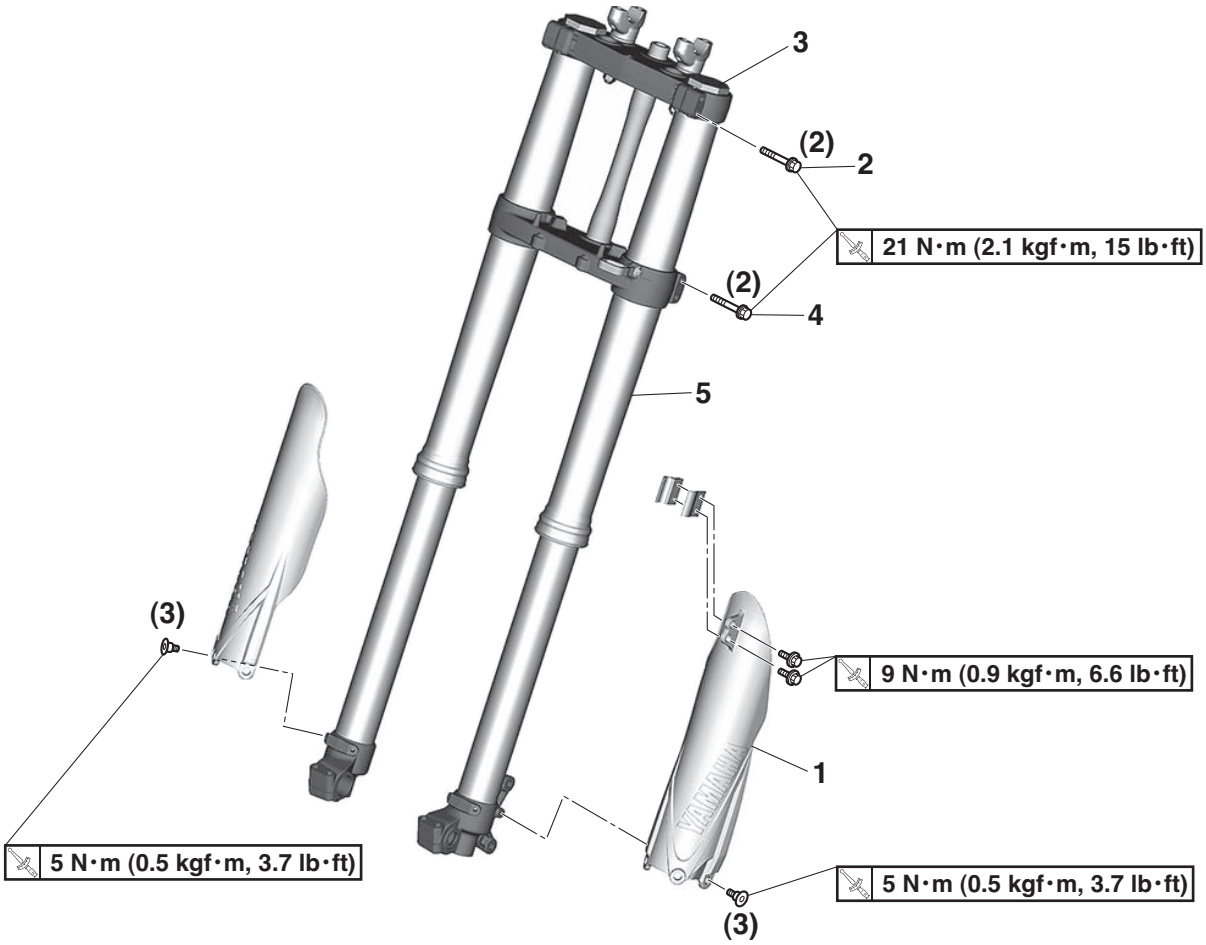
Clutch lever free play
7.0–12.0 mm (0.28–0.47 in)

14.Adjust:
- Throttle grip free play
  Refer to “ADJUSTING THE THROTTLE GRIP FREE PLAY” on page 3-9.

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

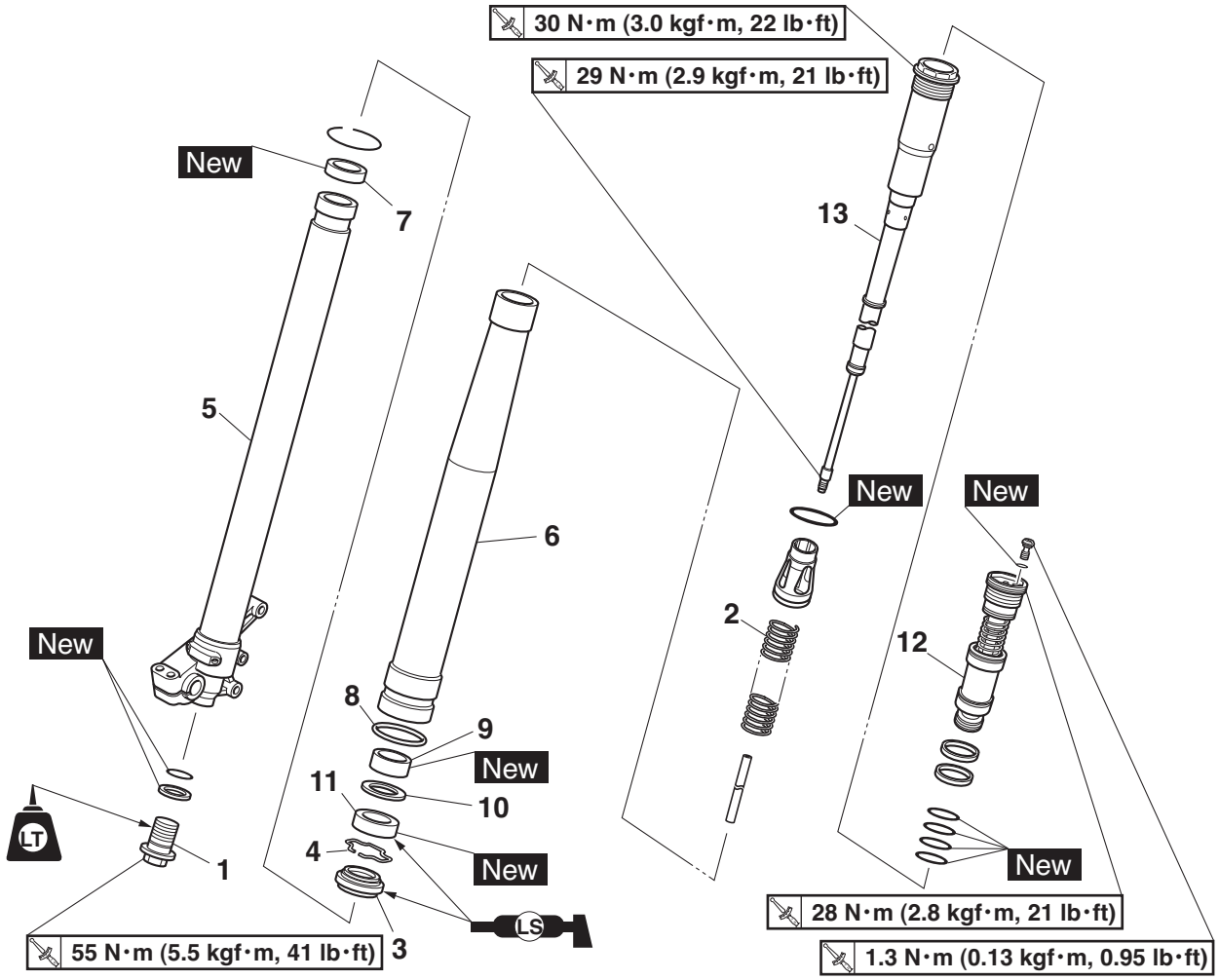
EAM20100
FRONT FORK

Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Front wheel		Refer to "FRONT WHEEL" on page 4-5.
	Front brake caliper		Refer to "FRONT BRAKE" on page 4-13.
	Number plate		Refer to "GENERAL CHASSIS" on page 4-1.
1	Protector	1	
2	Upper bracket pinch bolt	2	Loosen.
3	Damper assembly	1	Loosen.
4	Lower bracket pinch bolt	2	Loosen.
5	Front fork leg	1	

Disassembling the front fork leg



Order	Job/Parts to remove	Q'ty	Remarks
1	Adjuster	1	
2	Fork spring	1	
3	Dust seal	1	
4	Stopper ring	1	
5	Inner tube	1	
6	Outer tube	1	
7	Piston metal	1	
8	Protector guide	1	
9	Slide metal	1	
10	Washer	1	
11	Oil seal	1	
12	Base valve	1	
13	Damper assembly	1	

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. Loosen:
   - Upper bracket pinch bolt
   - Damper assembly
   - Lower bracket pinch bolt

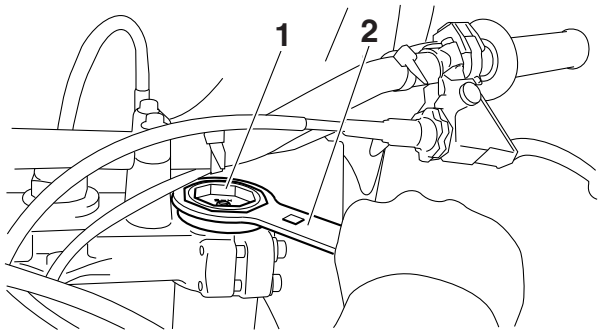
EWA20350
⚠ WARNING

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".



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



3. Remove:
   - Front fork leg

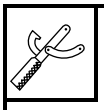
EAM30056
DISASSEMBLING THE FRONT FORK LEGS

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

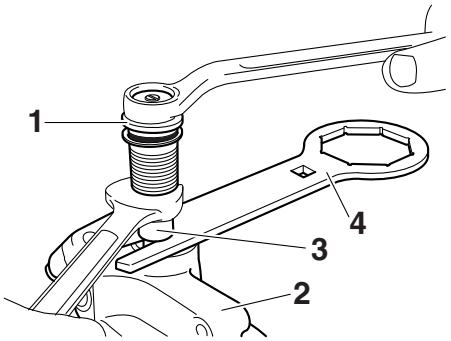
TIP
- While compressing the inner tube "2", set the cap bolt ring wrench "4" between the inner tube and locknut "3".
- Hold the locknut and remove the adjuster.

ECA24520
NOTICE

Do not remove the locknut as the damper rod may go into the damper assembly and not be taken out.



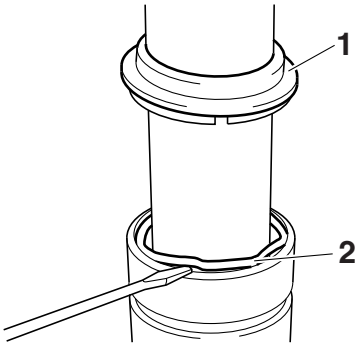
Cap bolt ring wrench
90890-01501
Cap bolt ring wrench
YM-01501



3. Remove:
   - Dust seal "1"
   - Oil seal clip "2"
     (with a flat-head screwdriver)

ECA14180
NOTICE

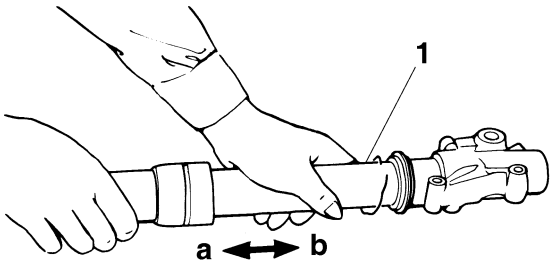
Do not scratch the inner tube.



4. Remove:
   - Inner tube "1"

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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.



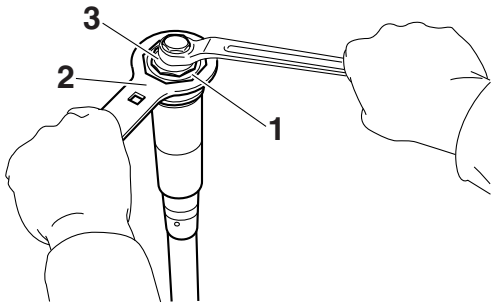
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5. Remove:
   • Base valve "1"
   (from the damper assembly)

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 "a"
   Scratches → Repair or replace.
   Use #1000 grit wet sandpaper.
   Damaged oil lock piece → Replace.
   • Inner tube bends
   Out of specification → Replace.
   Use the dial gauge "1".

Inner tube bending limit
0.2 mm (0.01 in)

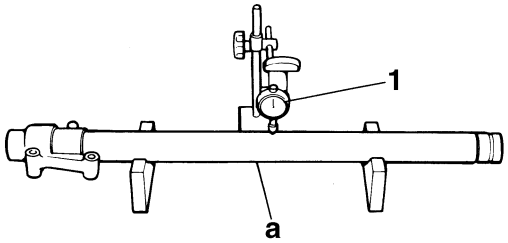
TIP

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

EWA13650

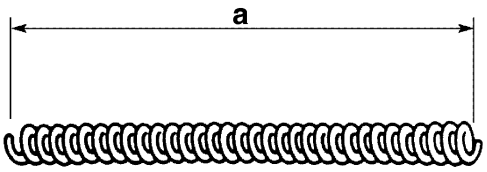
⚠ WARNING

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
497.0 mm (19.57 in)
Limit
492.0 mm (19.37 in)



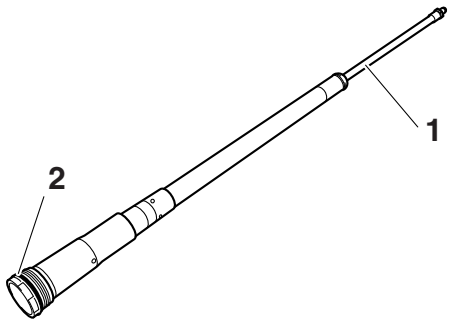
4. Check:
   • Damper assembly "1"
   Bend/damage → Replace.
   • O-ring "2"
   Wear/damage → Replace.

ECA14200

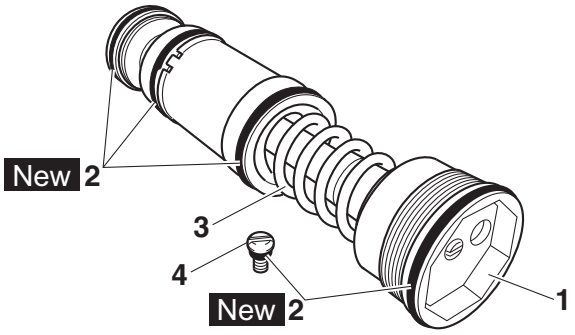
NOTICE

- **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 ma-**

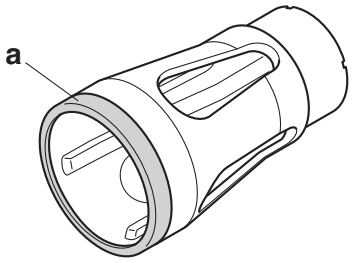
terial to enter the front fork.



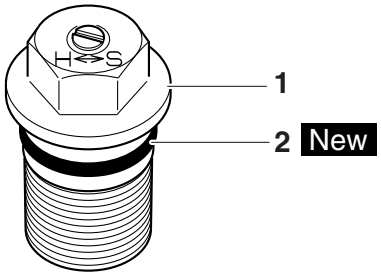
5. Check:
   - Base valve "1"
     Wear/damage → Replace.
     Contamination → Clean.
   - O-ring "2" New
     Wear/damage → Replace.
   - Base valve bushing
     Wear/damage → Replace.
   - Spring "3"
     Damage/fatigue → Replace the base valve.
   - Air bleed screw "4"
     Wear/damage → Replace.



6. Check:
   - Contacting surface "a"
     Wear/damage → Replace.



7. Check:
   - Adjuster "1"
   - O-ring "2" New
     Wear/damage → Replace.



EAM30058

ASSEMBLING THE FRONT FORK LEGS

EWA13660

⚠ WARNING

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

TIP

- When assembling the front fork leg, be sure to replace the following parts:
  - Inner tube bushing
  - Outer tube bushing
  - Oil seal
  - Copper washer
- Before assembling the front fork leg, make sure that all of the components are clean.

1. Stretch the damper assembly fully.
2. Fill:
   - Damper assembly

Recommended oil
Yamaha Suspension Oil S1
Standard oil amount
216 cm³ (7.30 US oz, 7.62 Imp.oz)

ECA24530

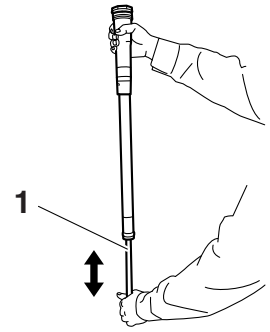
NOTICE

- **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.

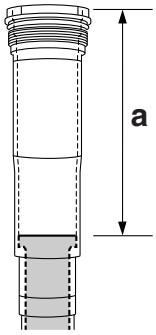
TIP

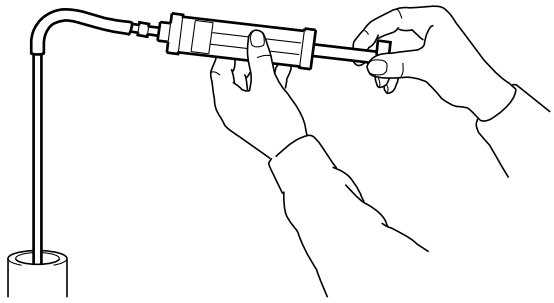
Avoid excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps (1) to (3).



4. Measure:
   • Oil level (left and right) “a”
   Out of specification → Regulate.

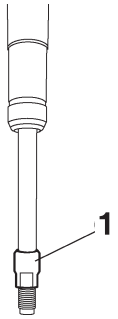
Standard oil level
145–148 mm (5.71–5.83 in)
From top of fully stretched damper assembly.





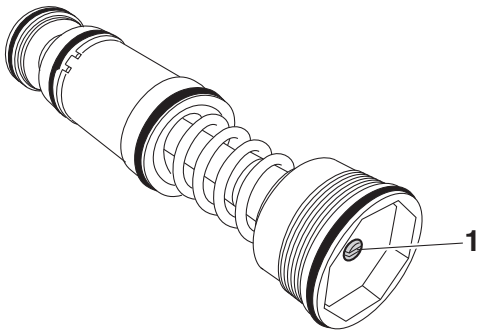
5. Tighten:
   • Locknut “1”

TIP
Fully finger tighten the locknut onto the damper assembly.



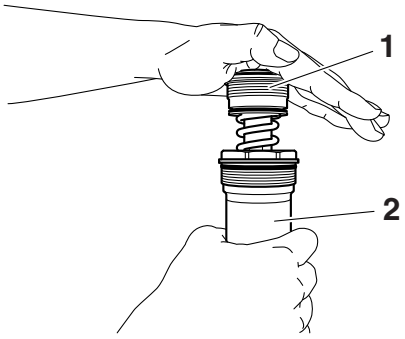
6. Loosen:
   • Compression damping force adjuster “1”

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.



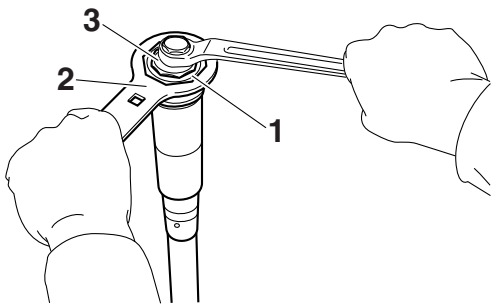
8. Check:
   • Damper assembly
   Not fully stretched → Repeat the steps (1) to (7).
9. Tighten:
   • Base valve “1”

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

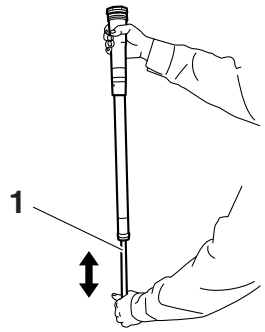
TIP

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.

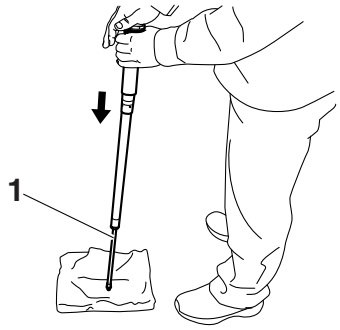


11. While protecting the damper assembly "1" with a cloth and compressing fully, allow excessive oil to overflow on the base valve side.

ECA24540

NOTICE

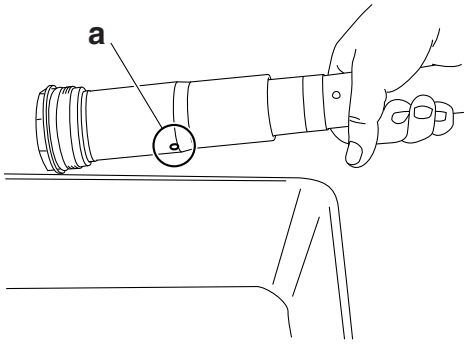
Take care not to damage the damper assembly.



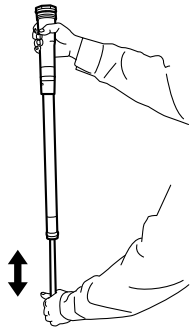
12. Allow the overflowing oil to escape at the hole "a" in the damper assembly.

TIP

The overflow measures about 10 cm³ (0.34 US oz, 0.35 Imp.oz).



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



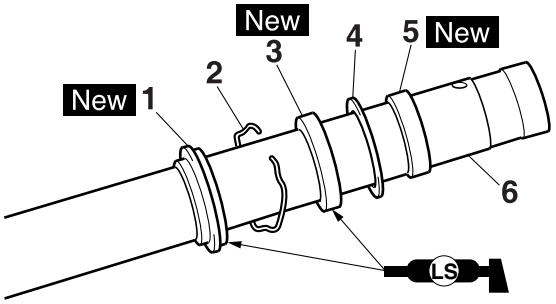
14. Install:
- Dust seal "1" New
- Oil seal clip "2"
- Oil seal "3" New
- Washer "4"
- Outer tube bushing "5" New
  (to the inner tube "6")

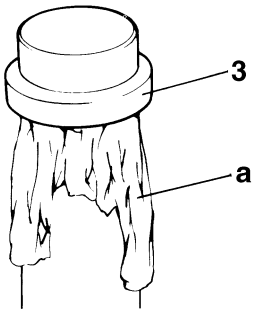
ECA24550

NOTICE

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

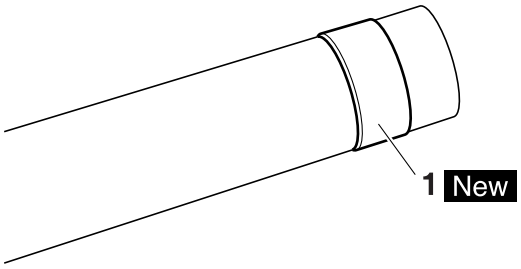
TIP
- Apply the lithium-soap-based grease on the dust seal lip and oil seal lip.
- Apply the fork oil on the inner tube.
- When installing the oil seal, use vinyl seat "a" with fork oil applied to protect the oil seal lip.



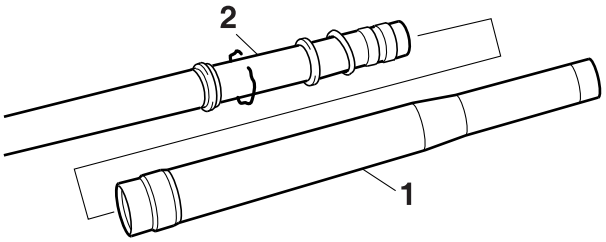


15.Install:
- Piston metal "1" New

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



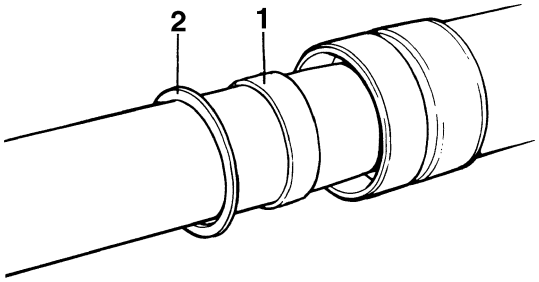
16.Install:
- Outer tube "1" (to the inner tube "2")

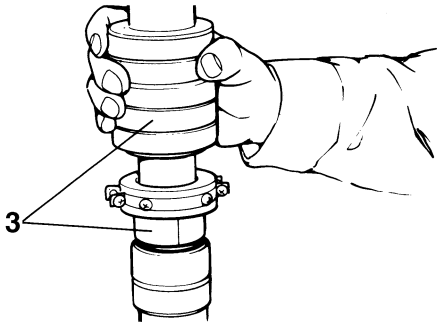


17.Install:
- Slide metal "1"
- Washer "2" (to the outer tube)

TIP
Press the slide metal into the outer tube with fork seal driver "3".

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

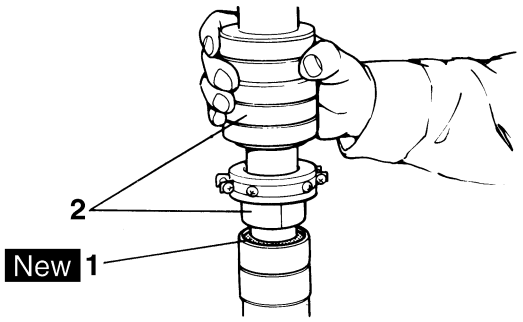




18.Install:
- Oil seal "1" New

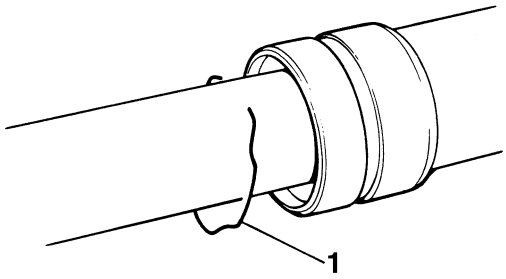
TIP
Using a fork seal driver "2", press the oil seal in until the stopper ring groove fully appears.

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



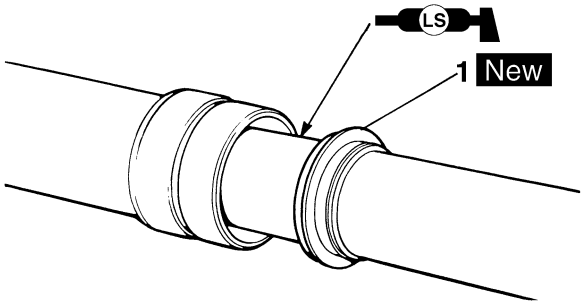
19.Install:
- Stopper ring "1"

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

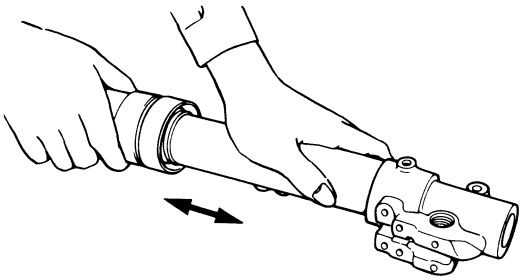


20.Install:
- Dust seal "1" New

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

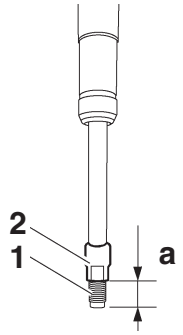


21.Check:
- Inner tube smooth movement
  Tightness/binding/rough spots → Repeat the steps (14) to (20).



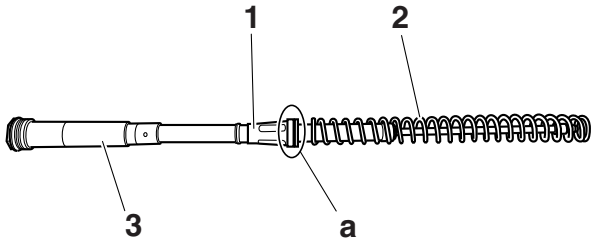
22.Measure:
- Distance "a"
  Out of specification → Turn into the locknut.

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



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

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

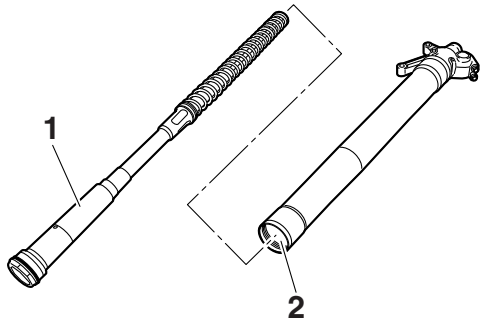


24.Install:
- Damper assembly "1"
  (to the inner tube "2")

ECA24560

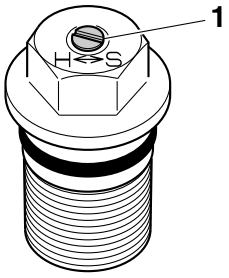
NOTICE

Allow the damper assembly to slide slowly down the inner tube until it contacts the bottom of the inner tube. Be careful not to damage the inner tube.



25.Loosen:
- Rebound damping force adjuster "1"

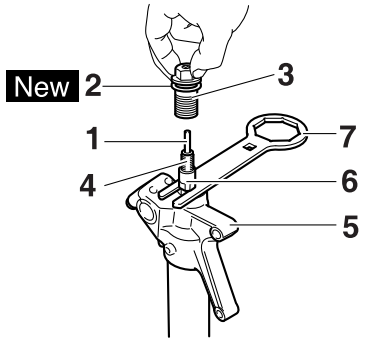
TIP
- Before loosening the damping force adjuster, record the setting position.
- Unless the damping force adjuster is fully loosened, correct damping characteristic cannot be obtained after installation.



26.Install:
- Damper adjusting rod "1"
- Copper washer "2" New
- Adjuster "3"
  (to the damper assembly "4")

TIP
- While compressing the inner tube "5", set the cap bolt ring wrench "7" between the inner tube and locknut "6".
- Fully finger tighten the adjuster onto the damper assembly.

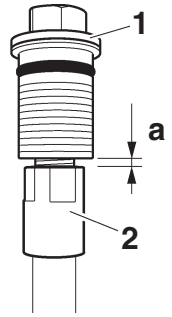
	Cap bolt ring wrench **90890-01501** **Cap bolt ring wrench** **YM-01501**



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

	Gap "a" between the adjuster and the locknut **0.5–1.0 mm (0.02–0.04 in)**

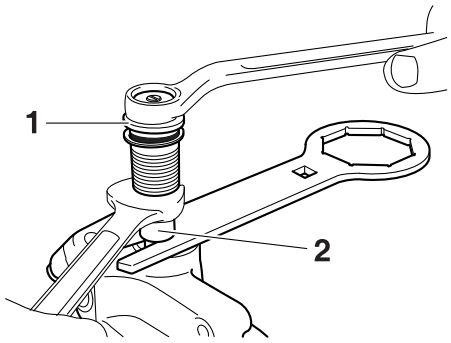
TIP
If it is installed with a gap out of specification, correct damping force cannot be obtained.



28.Tighten:
- Adjuster (locknut) "1"

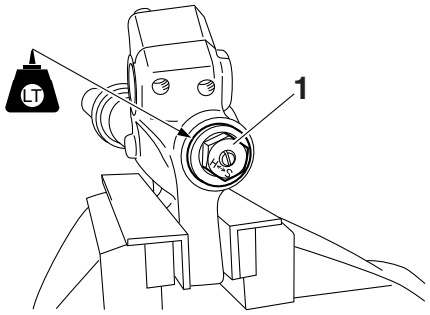
	Adjuster (locknut) **29 N·m (2.9 kgf·m, 21 lb·ft)**

TIP
Hold the locknut "2" and tighten the adjuster.



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

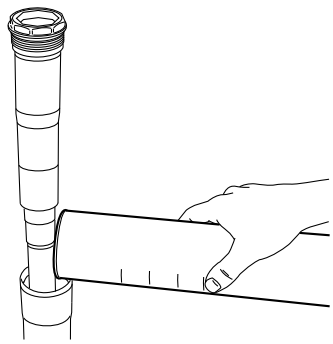
	Adjuster **55 N·m (5.5 kgf·m, 41 lb·ft)** **LOCTITE®**



30.Fill:
• Front fork leg

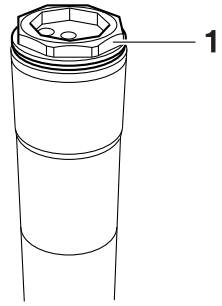
	Recommended oil **Yamaha Suspension Oil S1** **Standard oil amount** **290 cm³ (9.80 US oz, 10.23 Imp.oz)** **Extent of adjustment** **260–365 cm³ (8.79–12.34 US oz, 9.17–12.87 Imp.oz)**

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.**

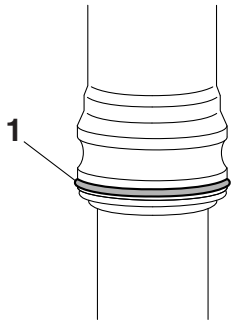


31.Install:
• Damper assembly “1”
(to the outer tube)

TIP
Temporarily tighten the damper assembly.

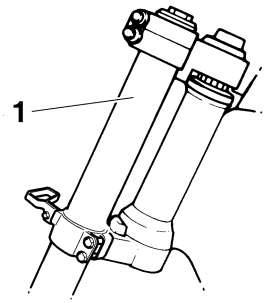


32.Install:
• Protector guide “1”



EAM30059
INSTALLING THE FRONT FORK LEGS
1. Install:
• Front fork “1”

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

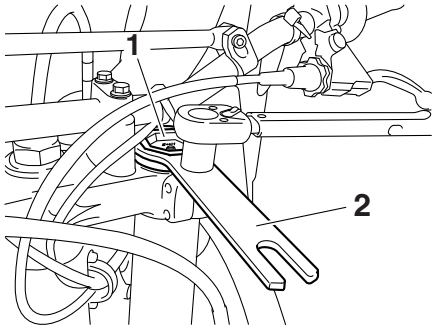


2. Tighten:
• Damper assembly “1”

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

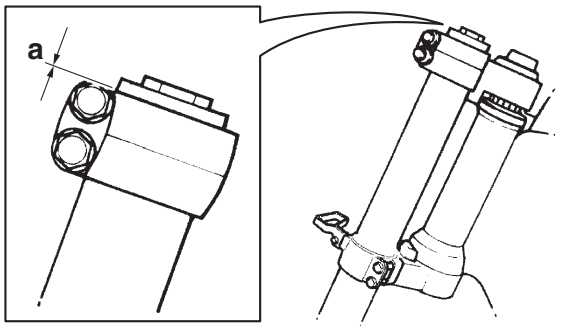
TIP
Use the cap bolt ring wrench “2” to tighten the damper assembly.

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



3. Adjust:
   • Front fork top end “a”

	Front fork top end (standard) “a” **7 mm (0.28 in)**



4. Tighten:
   • Pinch bolt (upper bracket) “1”

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

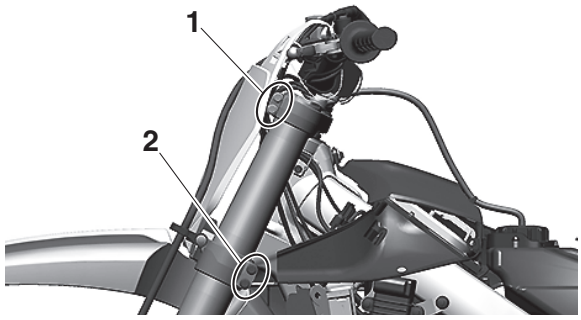
   • Pinch bolt (lower bracket) “2”

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

EWA19320

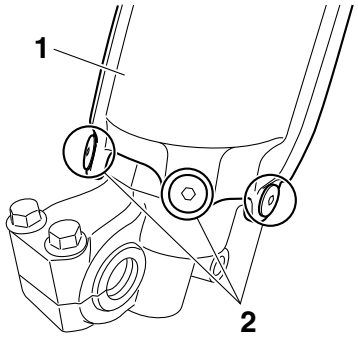
⚠ WARNING

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



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

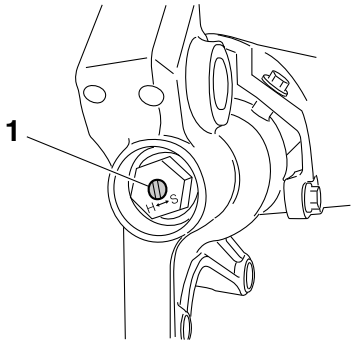
	Bolt (protector) **5 N·m (0.5 kgf·m, 3.7 lb·ft)**



6. Adjust:
   • Rebound damping force

TIP

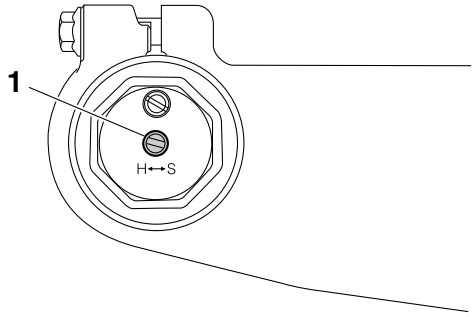
Turn in the damping adjuster “1” finger-tight and then turn out to the originally set position.



7. Adjust:
   • Compression damping force

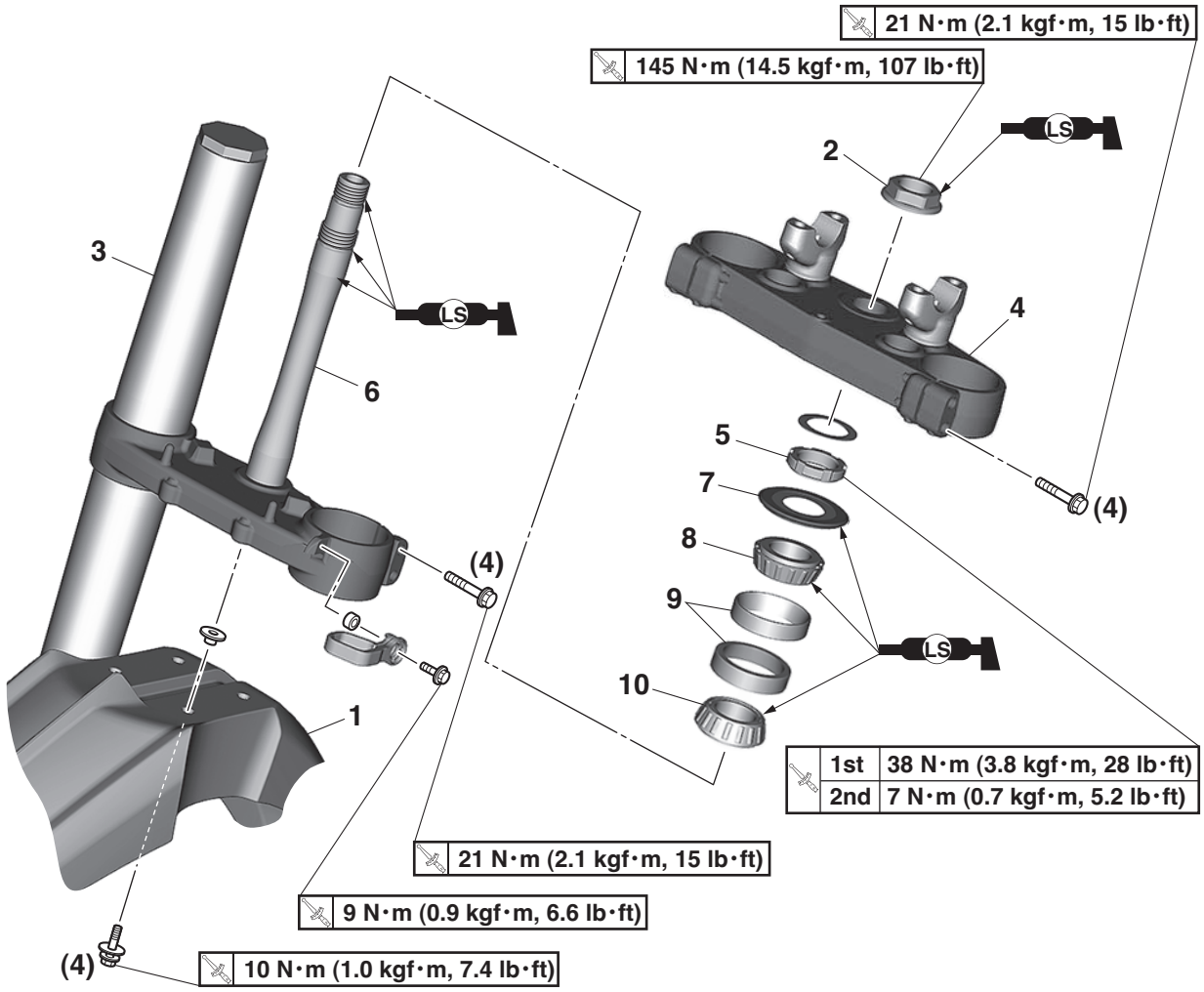
TIP

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


1
H↔S

EAM20101
STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Number plate		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-33.
1	Front fender	1	
2	Steering stem nut	1	
3	Front fork leg	2	Refer to "FRONT FORK" on page 4-38.
4	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	Bearing (lower side)	1	

EAM30060
REMOVING THE LOWER BRACKET
1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120
⚠ WARNING

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

2. Remove:
   • Ring nut “1”

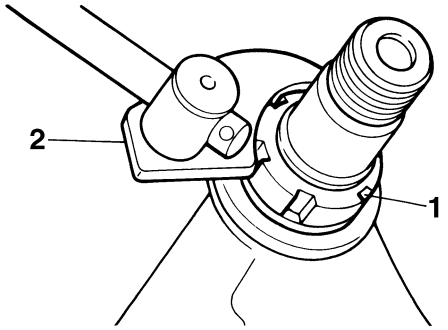
TIP
Remove the ring nut with the steering nut wrench “2”.



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

EWA13730
⚠ WARNING

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



EAM30061
CHECKING THE STEERING HEAD
1. Wash with kerosene:
   • Bearing
   • Bearing race
2. Check:
   • Bearing
   • Bearing race
   Damage/pitting → Replace.
3. Replace:
   • Bearing
   • Bearing race

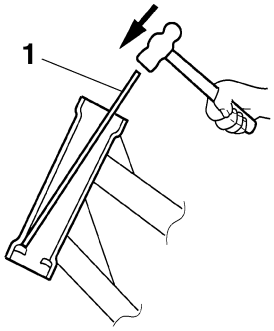
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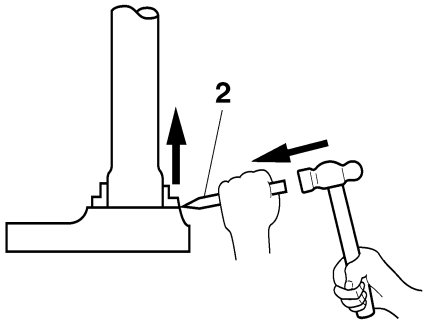
a. Remove the bearing race from the steering head pipe with a long rod “1” and a hammer.
b. Remove the bearing race from the lower bracket with a chisel “2” and a hammer.
c. Install a new bearing race.

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.



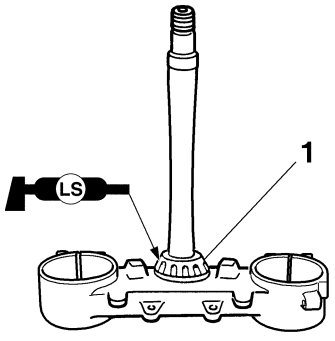


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4. Check:
   • Upper bracket
   • Lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

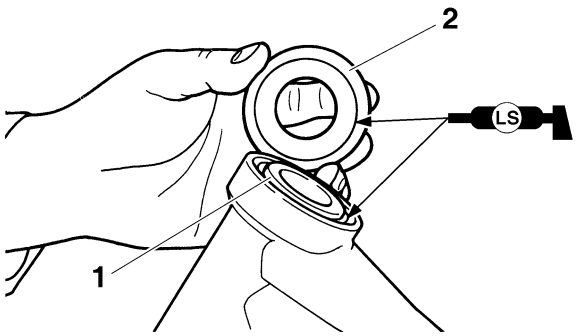
EAM30062
INSTALLING THE STEERING HEAD
1. Install:
   • Lower bearing “1”

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



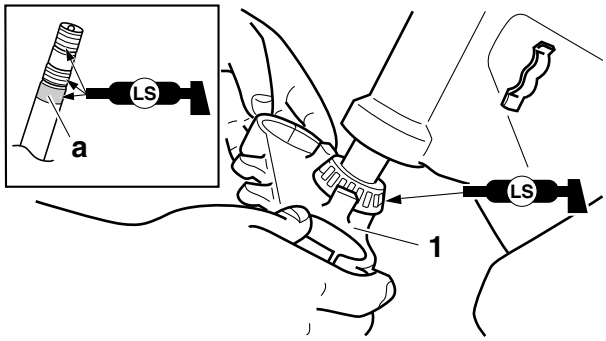
2. Install:
   • Bearing race
   • Upper bearing “1”
   • Bearing race cover “2”

TIP
Apply the lithium-soap-based grease on the bearing and bearing race cover lip.



3. Install:
   • Lower bracket “1”

TIP
Apply the lithium-soap-based grease on the bearing, the portion “a” and thread of the steering stem.

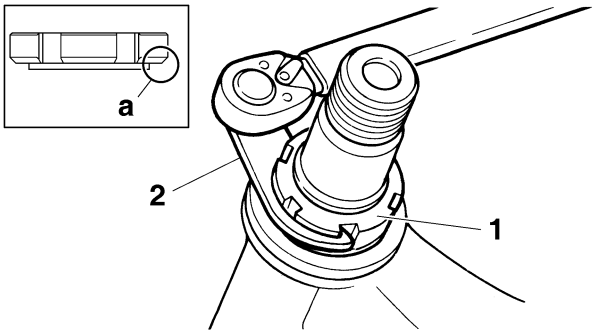


4. Install:
   • Steering ring nut “1”

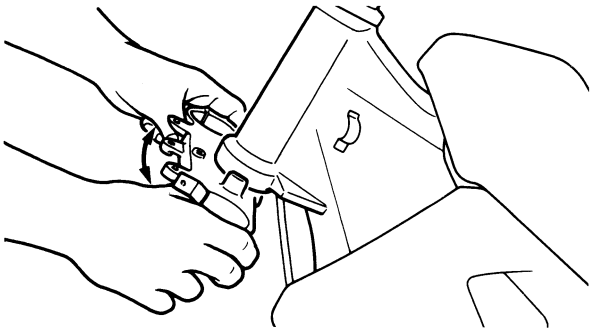
	Steering ring nut **7 N·m (0.7 kgf·m, 5.2 lb·ft)**

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

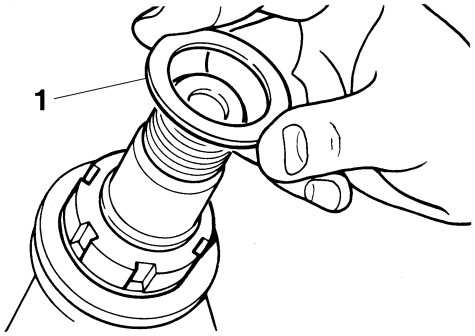
Tighten the steering ring nut with a steering nut wrench “2”.
Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-33.



5. Check the steering stem by turning this lock to lock. If there is any binding, remove the steering stem and check the steering bearing.

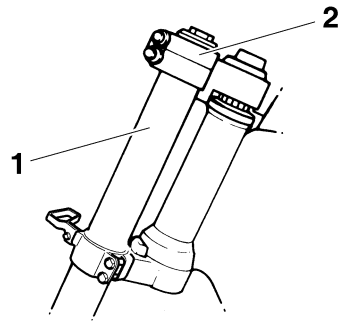


6. Install:
   • Washer “1”



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

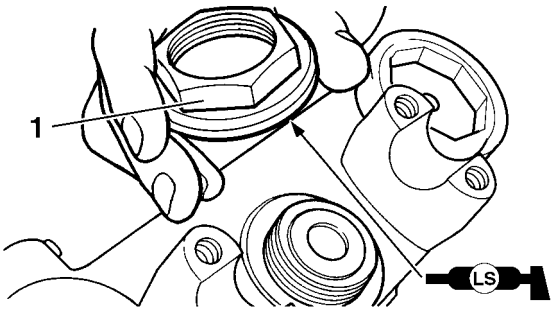
TIP
- Temporarily tighten the pinch bolts (lower bracket).
- Do not tighten the pinch bolts (upper bracket) yet.



8. Install:
   • Steering stem nut “1”

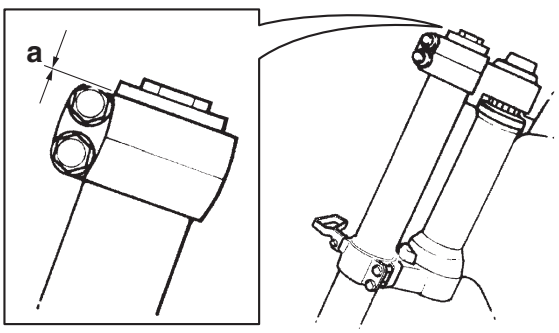
	Steering stem nut **145 N·m (14.5 kgf·m, 107 lb·ft)**

TIP
Apply the lithium-soap-based grease to the contact surface of the steering stem nut when installing.



9. After tightening the nut, check the steering for smooth movement. If not, adjust the steering by loosening the steering ring nut little by little.
10. Adjust:
   • Front fork top end “a”

	Front fork top end (standard) “a” **7 mm (0.28 in)**



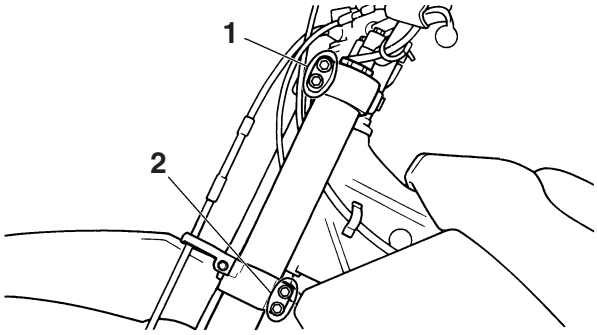
11. Tighten:
   • Pinch bolt (upper bracket) “1”

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

   • Pinch bolt (lower bracket) “2”

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

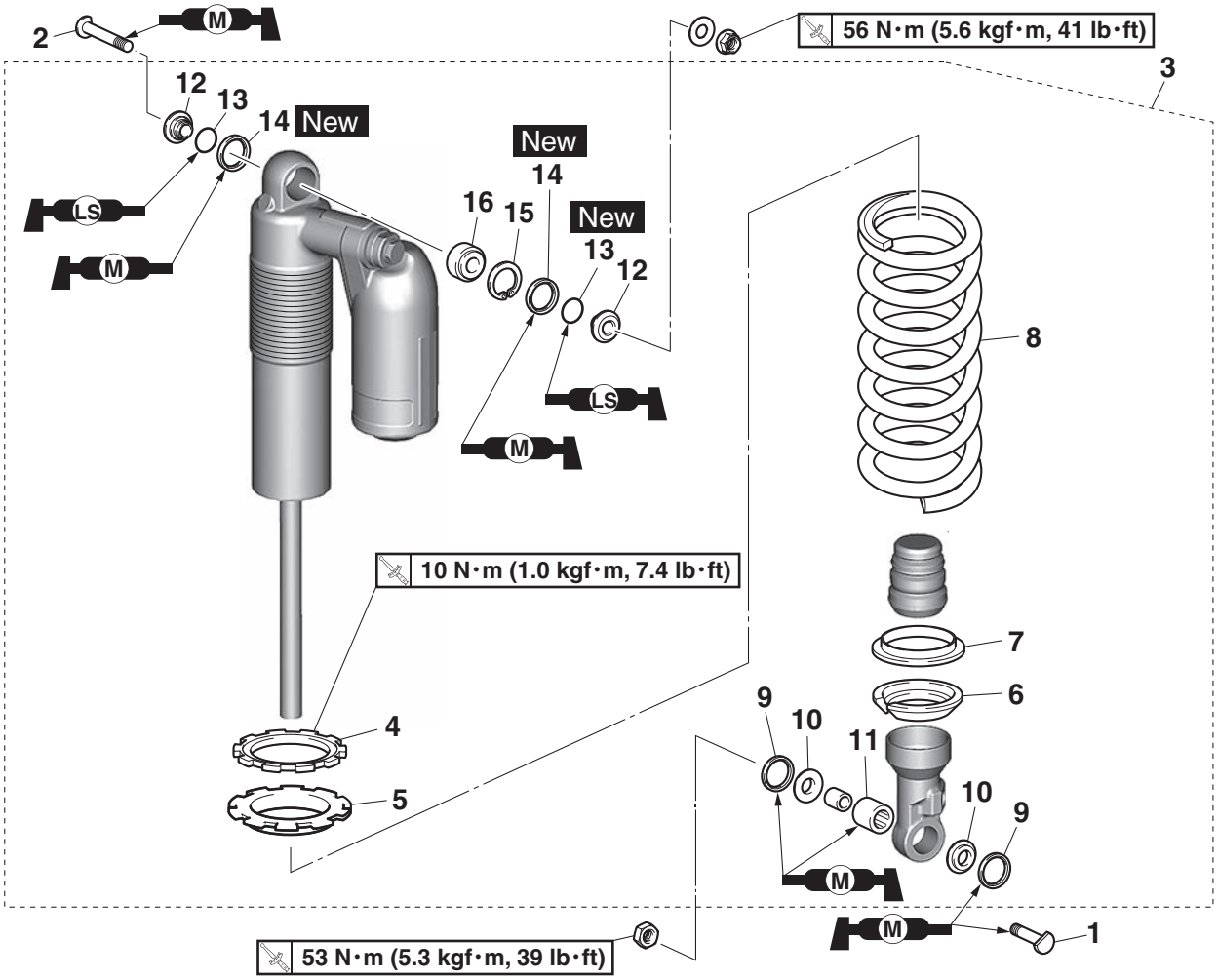
EWA19330
⚠ WARNING
Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.



EAM20102

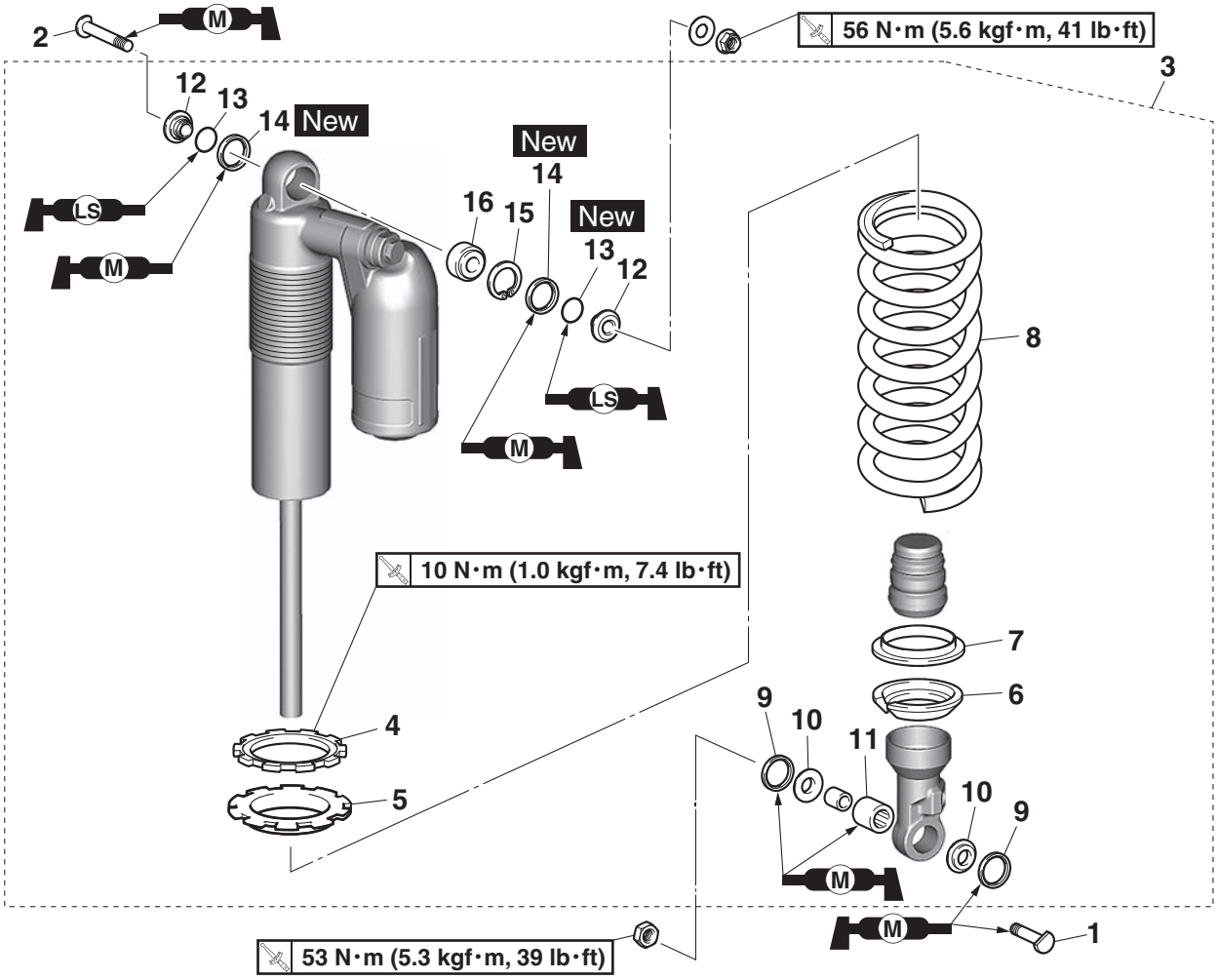
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



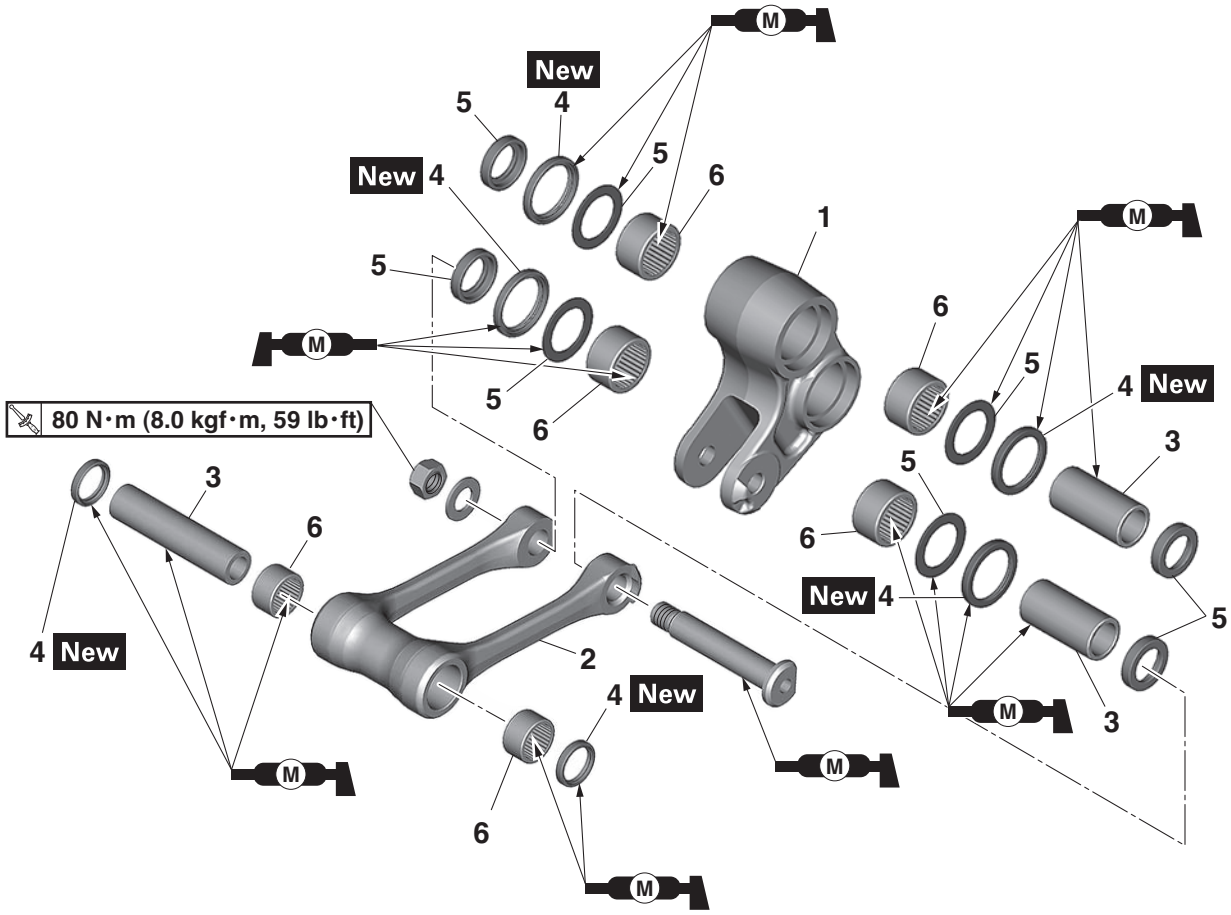
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Rear shock absorber assembly lower bolt	1	
2	Rear shock absorber assembly upper bolt	1	
3	Rear shock absorber assembly	1	
4	Locknut	1	
5	Adjusting nut	1	
6	Lower spring guide	1	
7	Upper spring guide	1	
8	Spring	1	
9	Dust seal	2	
10	Collar	2	
11	Bushing	1	
12	Collar	2	

Removing the rear shock absorber assembly



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

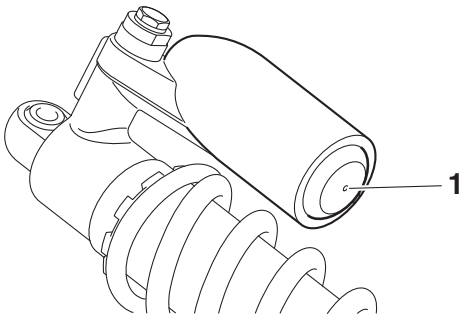
A break-in is required up to about 50 km of running.

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.

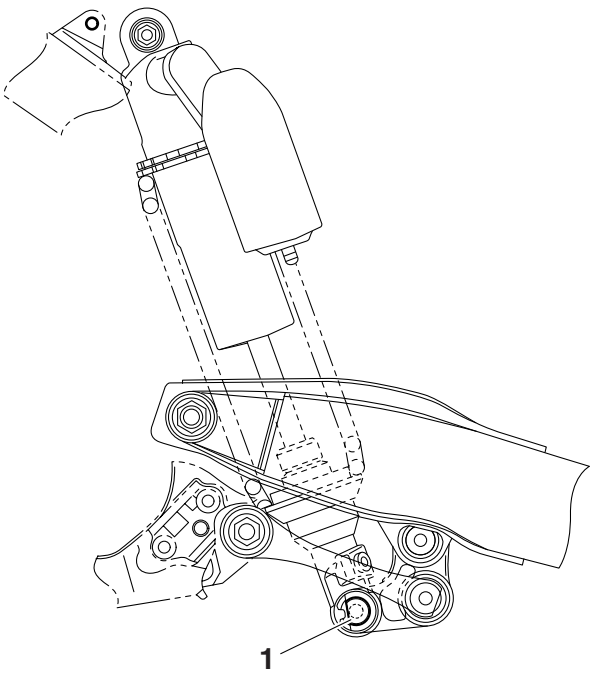
EWA13120
⚠ WARNING

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.



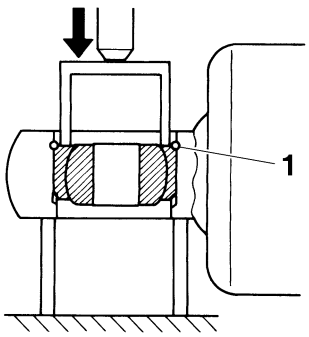
3. Remove:
   - Rear shock absorber assembly upper bolt
   - Rear shock absorber assembly

EAM30066
REMOVING THE BEARING

1. Remove:
   - Stopper ring (upper bearing) "1"

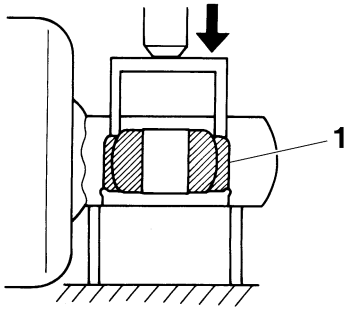
TIP

Press in the bearing while pressing its outer race and remove the stopper ring.



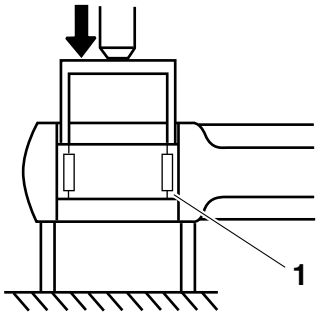
2. Remove:
   • Upper bearing “1”

TIP
Remove the bearing by pressing its outer race.



3. Remove:
   • Lower bearing “1”

TIP
Remove the bearing by pressing its outer race.



EAM30067
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY
1. Check:
   • Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   • Rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   • Spring
     Damage/wear → Replace.
   • Spring guide
     Damage/wear → Replace.
   • Bearing
     Damage/wear → Replace.
   • Bolt
     Bends/damage/wear → Replace.

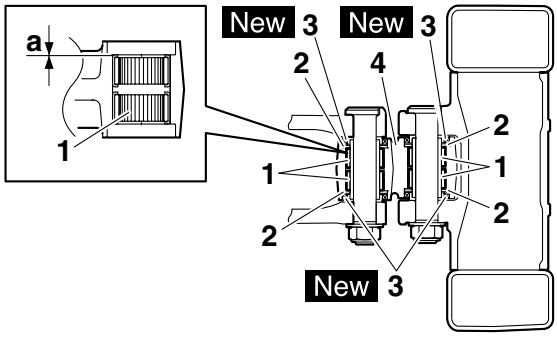
EAM30068
CHECKING THE CONNECTING ARM AND RELAY ARM
1. Check:
   • Connecting arm
   • Relay arm
     Damage/wear → Replace.
2. Check:
   • Bearing
   • Spacer
     Damage/pitting/scratches → Replace the bearings and spacers as a set.
3. Check:
   • Oil seal
     Damage/pitting → Replace.

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

	Recommended lubricant **Molybdenum disulfide grease**

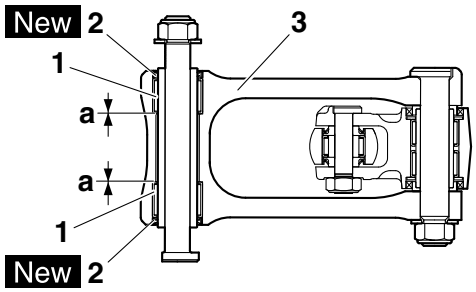
2. Install:
   • Bearing “1”
   • Washer “2”
   • Oil seal “3” New
     (to relay arm “4”)

	Installed depth “a” **0 mm (0 in)**



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

	Installed depth “a” **0 mm (0 in)**



EAM30070

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - Bearing (lower side)
   - Dust seal
   - Collar
   - Bushing

Recommended lubricant
Molybdenum disulfide grease

ECA24580

NOTICE

Do not apply the grease to the bearing outer race because it will wear the rear shock absorber surface on which the bearing is press fitted.

2. Lubricate:
   - O-ring

Recommended lubricant
Molybdenum disulfide grease

3. Install:
   - Bearing
   - Stopper ring New
     (to rear shock absorber assembly (upper side))

TIP

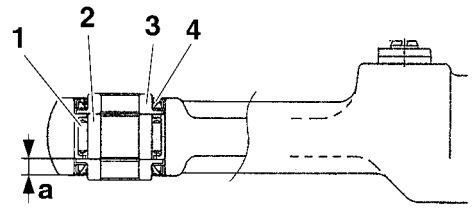
- Install the bearing parallel until the stopper ring groove appears by pressing its outer race.
- After installing the stopper ring, push back the bearing unit it contacts the stopper ring.

4. Install:
   - Bearing "1"
   - Bushing "2"
   - Collar "3"
   - Dust seal "4"
     (to rear shock absorber assembly (lower side))

TIP

Install the dust seals with their lips facing inward.

Installed depth "a"
4.25 mm (0.17 in)



5. Lubricate:
   - Connecting arm and frame bolt
   - Relay arm and connecting arm bolt
   - Relay arm and swingarm bolt (circumference and threaded portion)
   - Rear shock absorber assembly upper bolt
   - Rear shock absorber assembly lower bolt

Recommended lubricant
Molybdenum disulfide grease

6. Install:
   - Rear shock absorber assembly

TIP

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

7. Tighten:
   - Rear shock absorber assembly upper bolt

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

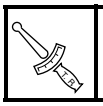
- Connecting arm bolt (frame side)

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

- Connecting arm bolt (relay arm side)

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

• Relay arm bolt (swingarm side)

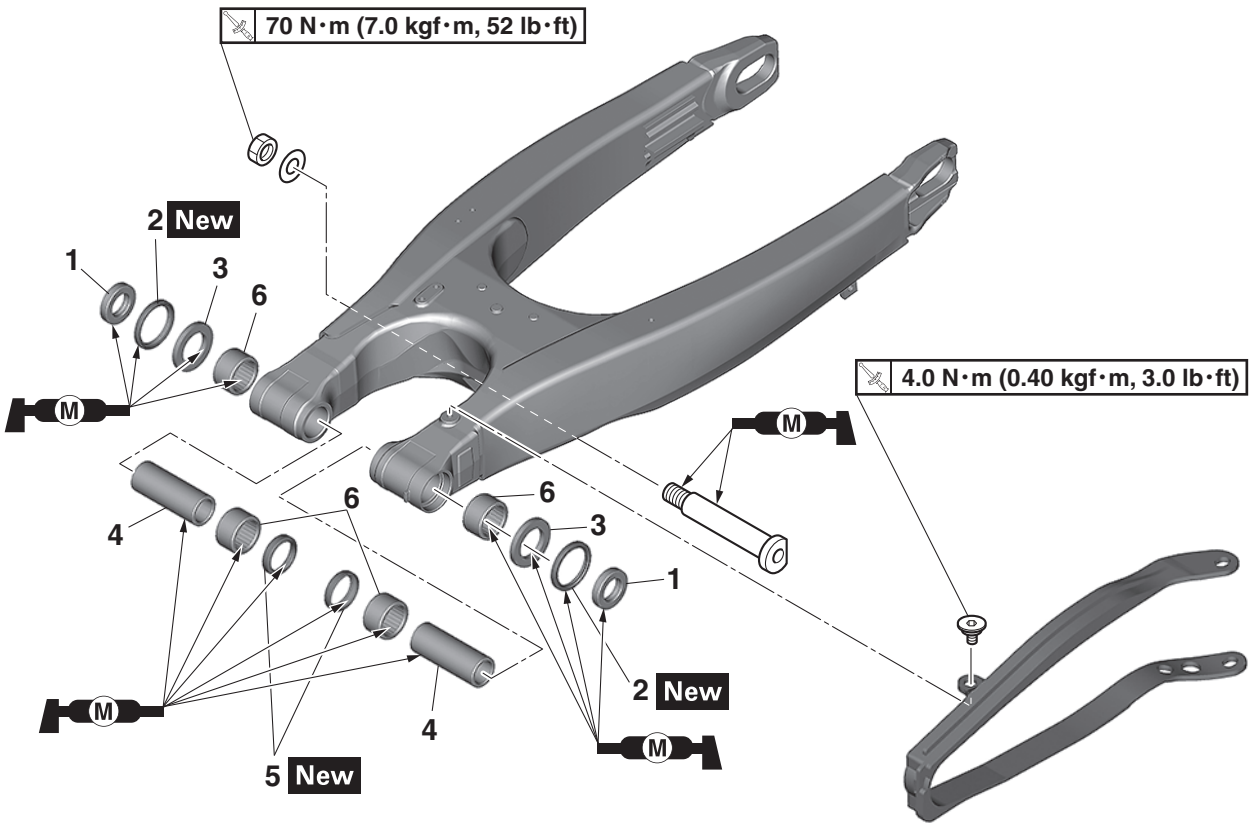
	**Relay arm bolt (swingarm side)** **70 N·m (7.0 kgf·m, 52 lb·ft)**

• Rear shock absorber assembly lower bolt

	**Rear shock absorber assembly lower bolt** **53 N·m (5.3 kgf·m, 39 lb·ft)**

EAM20103
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Brake hose holder		Refer to "REAR BRAKE" on page 4-23.
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-23.
	Bolt (brake pedal)		
	Drive chain		
1	Collar	2	
2	Oil seal	2	
3	Thrust bearing	2	
4	Bushing	2	
5	Oil seal	2	
6	Bearing	4	

EAM30071
REMOVING THE SWINGARM

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

EWA13120
⚠ WARNING

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

2. Measure:
   - Swingarm side play
   - Swingarm vertical movement

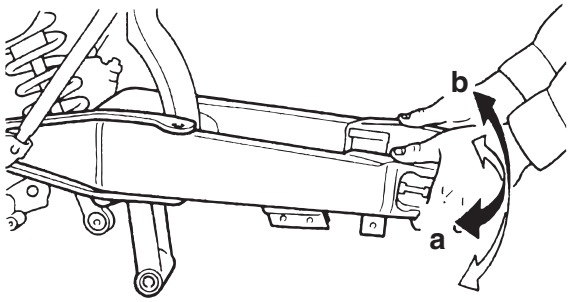
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a. Measure the tightening torque of the pivot shaft nut.

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

b. Measure the swingarm side play "a" by moving the swingarm from side to side.
c. If the swingarm side play is out of specification, check the spacers, the bearings, and the collars.
d. Check the swingarm vertical movement "b" by moving the swingarm up and down.
   If swingarm vertical movement is not smooth or if there is binding, check the spacers, the bearings, and the collars.

	**Swingarm end free play limit (radial)** **1.0 mm (0.04 in)**



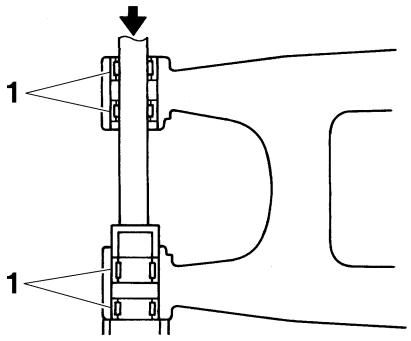
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EAM30072
REMOVING THE BEARING

1. Remove:
   - Bearing "1"

TIP

Remove the bearing by pressing its outer race.

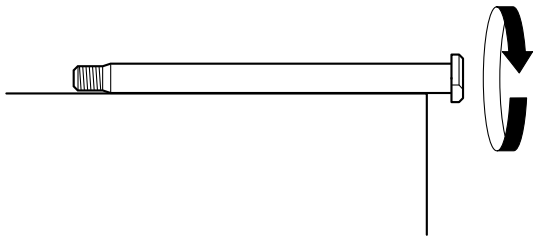


EAM30073
CHECKING THE SWINGARM

1. Check:
   - Swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - Pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

EWA13770
⚠ WARNING

Do not attempt to straighten a bent pivot shaft.



3. Wash with kerosene:
   - Pivot shaft
   - Spacer
   - Collar
   - Bearing
4. Check:
   - Oil seal
     Damage → Replace.
   - Bearing
   - Spacer
     Free play exists/unsmooth revolution/rust → Replace bearing and bushing as a set.

EAM30074
INSTALLING THE SWINGARM

1. Lubricate:
   - Bearing
   - Collar
   - Spacer
   - Oil seal **New**

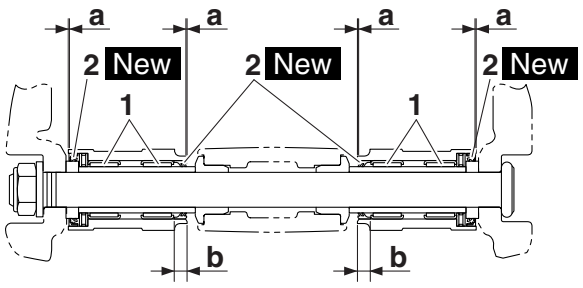
• Pivot shaft

	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)**

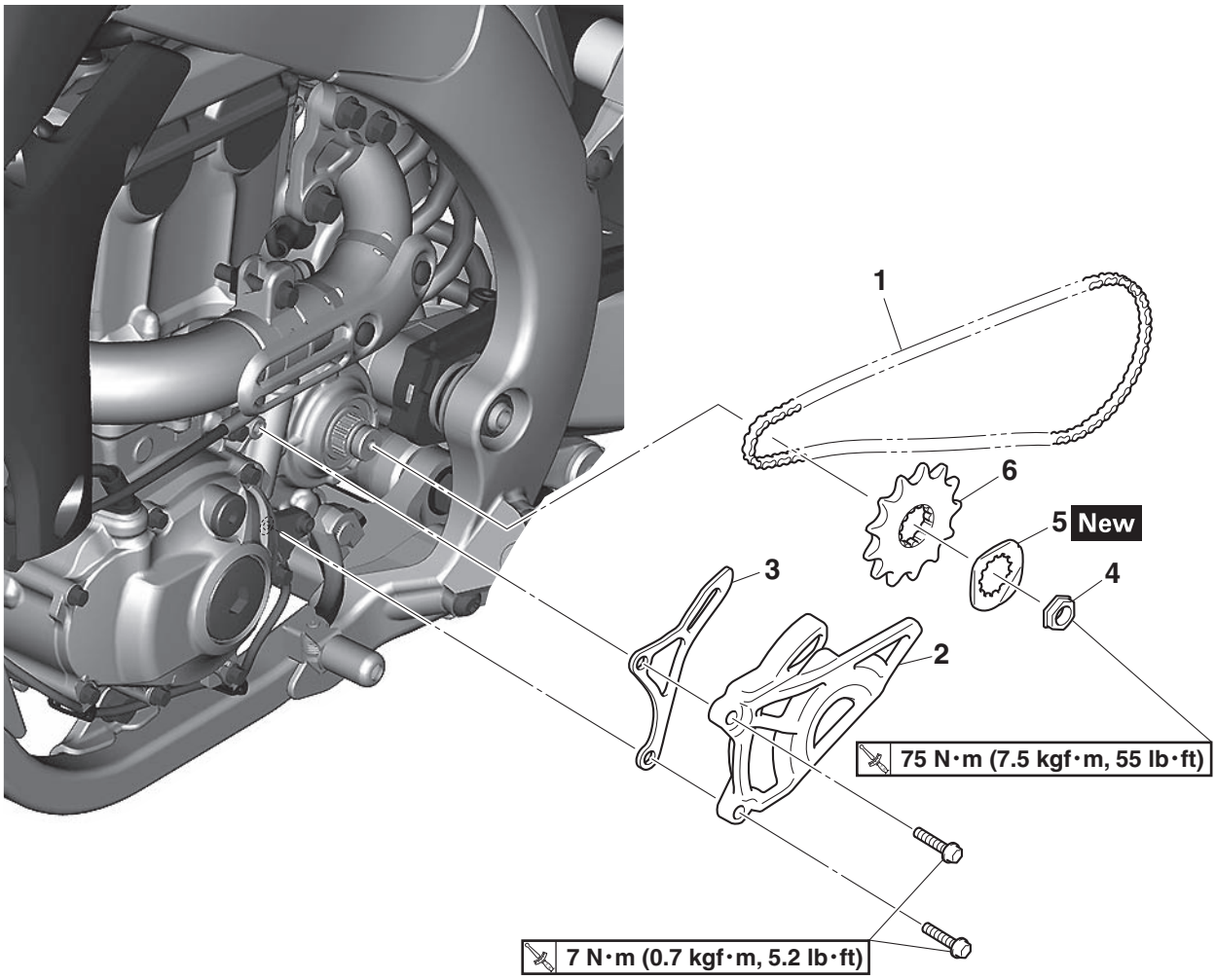
TIP
Install the pivot shaft from the right.

4. Install:
   • Rear wheel
   Refer to “REAR WHEEL” on page 4-9.
5. Adjust:
   • Drive chain slack
   Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-27.

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

EAM20104
CHAIN DRIVE

Removing the drive chain



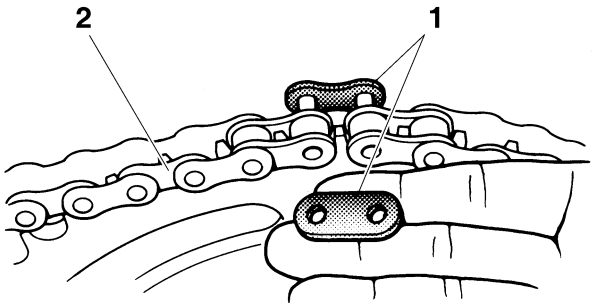
Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Drive chain	1	
2	Drive sprocket cover	1	
3	Bracket	1	
4	Drive sprocket nut	1	
5	Lock washer	1	
6	Drive sprocket	1	

EAM30075
REMOVING THE DRIVE CHAIN
1. 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:
   - Chain joint clip
   - Chain joint "1"
   - Drive chain "2"

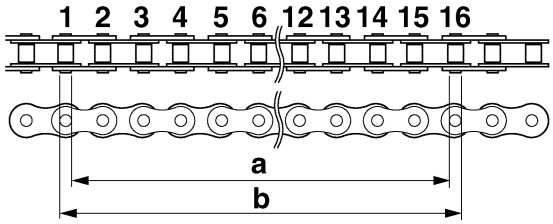


EAM30076
CHECKING THE DRIVE CHAIN
1. Measure:
   - 15-link section of the drive chain
     Out of specification → Replace the drive chain.

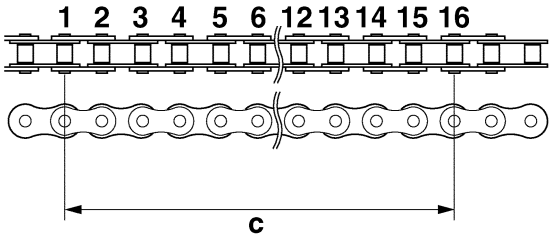
	15-link length limit **242.8 mm (9.56 in)**

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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.



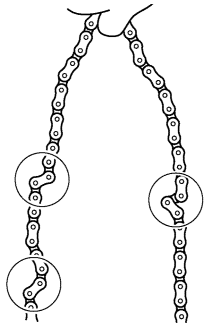
b. Calculate the length "c" of the 15-link section of the drive chain using the following formula.
   Drive chain 15-link section length "c" = (length "a" between pin inner sides + length "b" between pin outer sides)/2



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.

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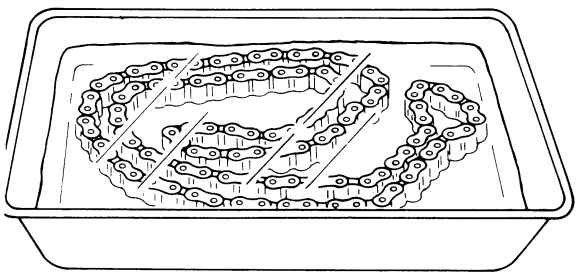
2. Check:
   - Drive chain
     Stiffness → Clean, lubricate, or replace.



3. Clean:
   - Drive chain

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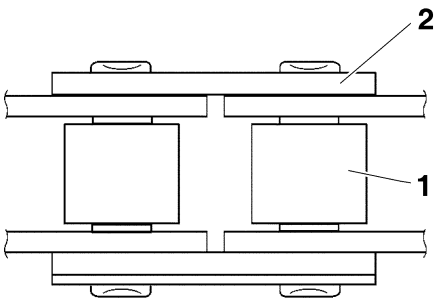
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.



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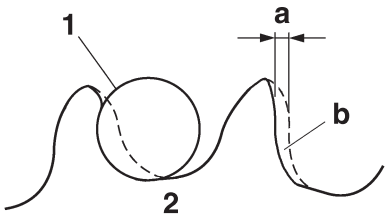
4. Check:
   - Drive chain roller "1"

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

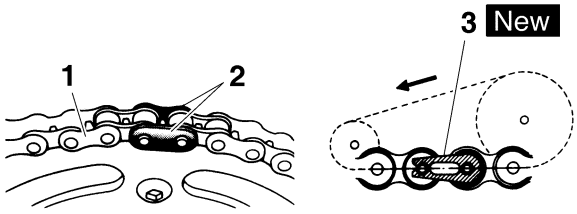
1. Drive chain roller
2. Drive sprocket

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:
   - Drive chain "1"
   - Chain joint "2"
   - Chain joint 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 5-1.

	Drive sprocket nut **75 N·m (7.5 kgf·m, 55 lb·ft)**

ECA14300
NOTICE

Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain's life.

4. Adjust:
   - Drive chain slack
     Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-27.

	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.

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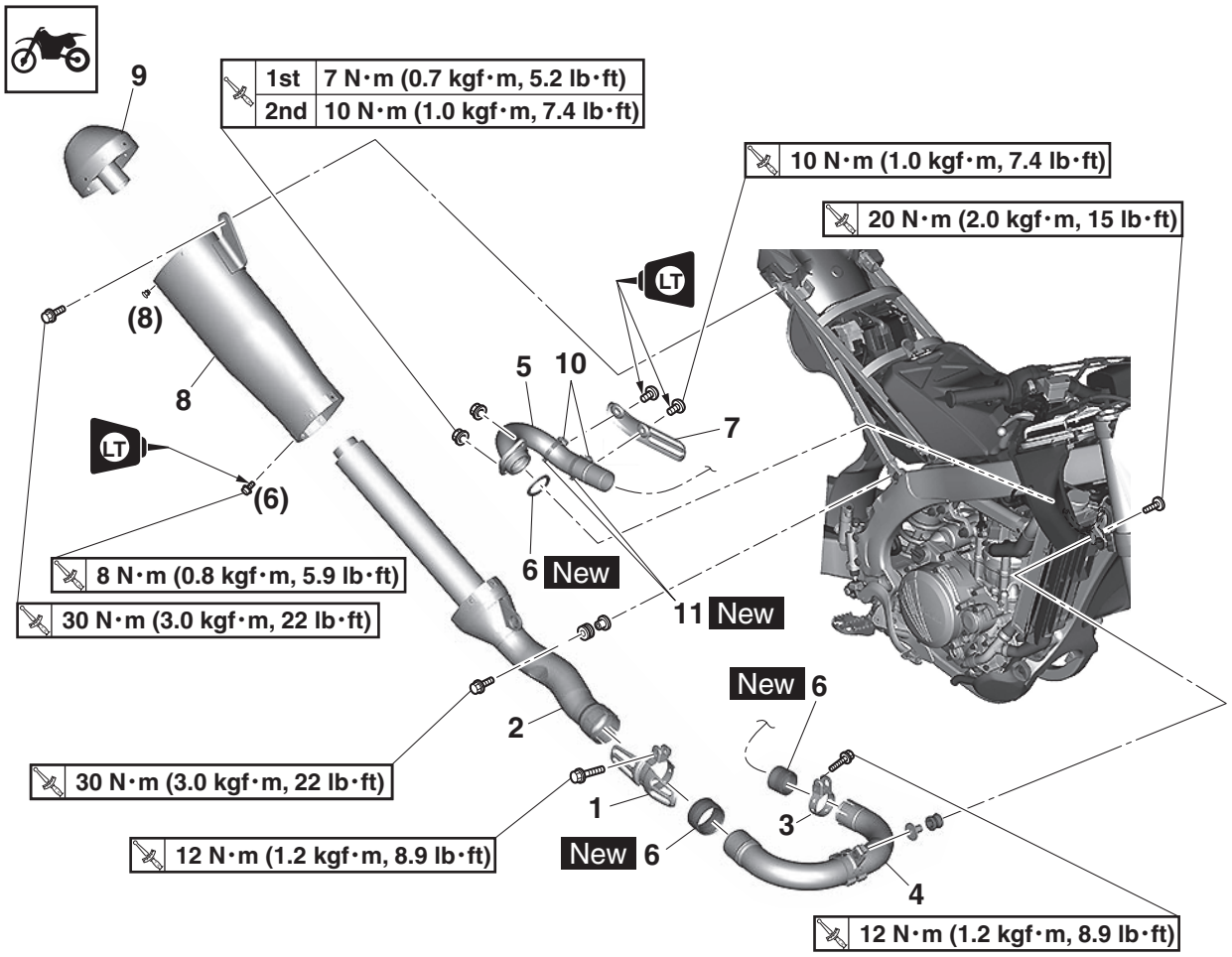
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EAM20105

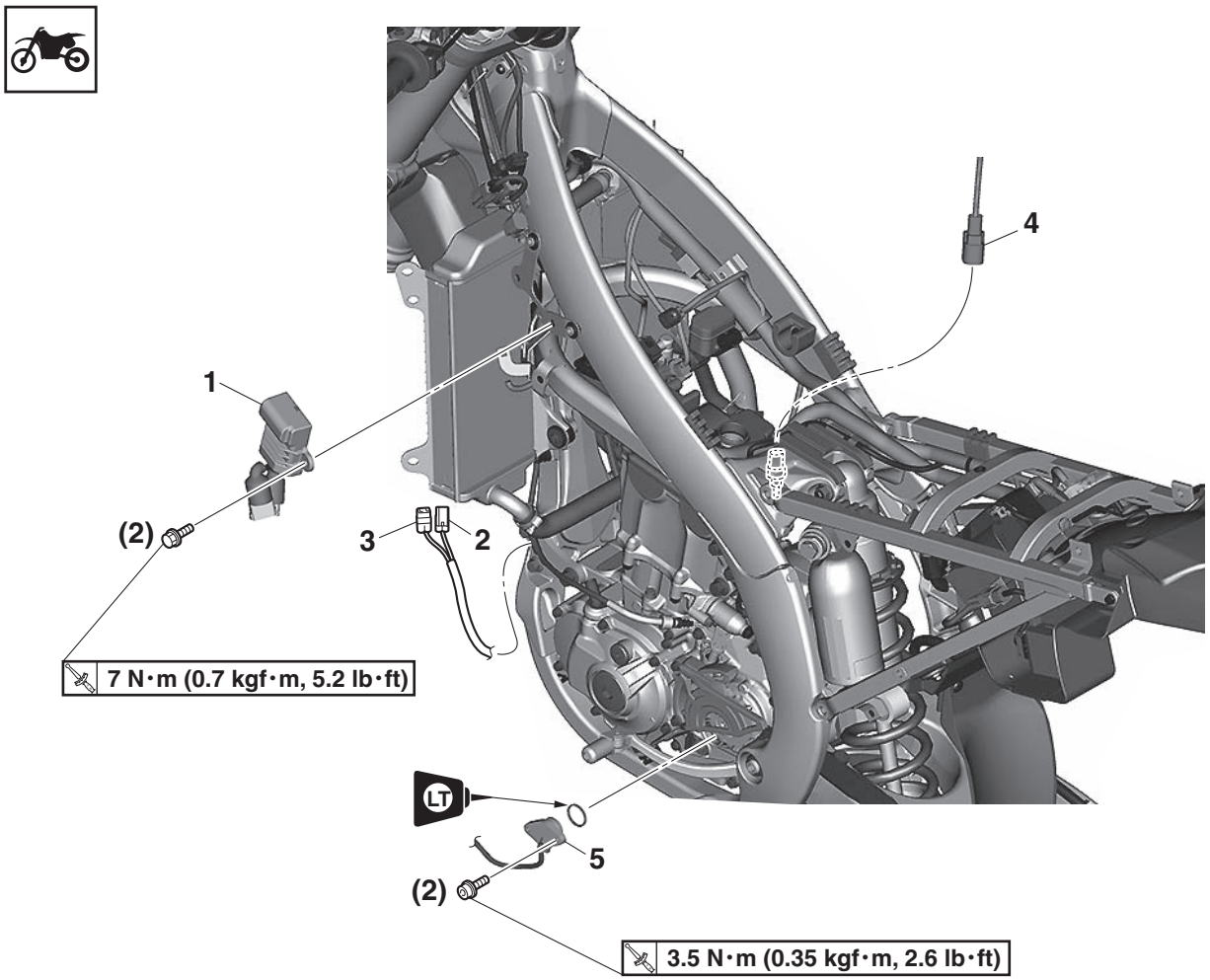
ENGINE REMOVAL

Removing the exhaust pipe



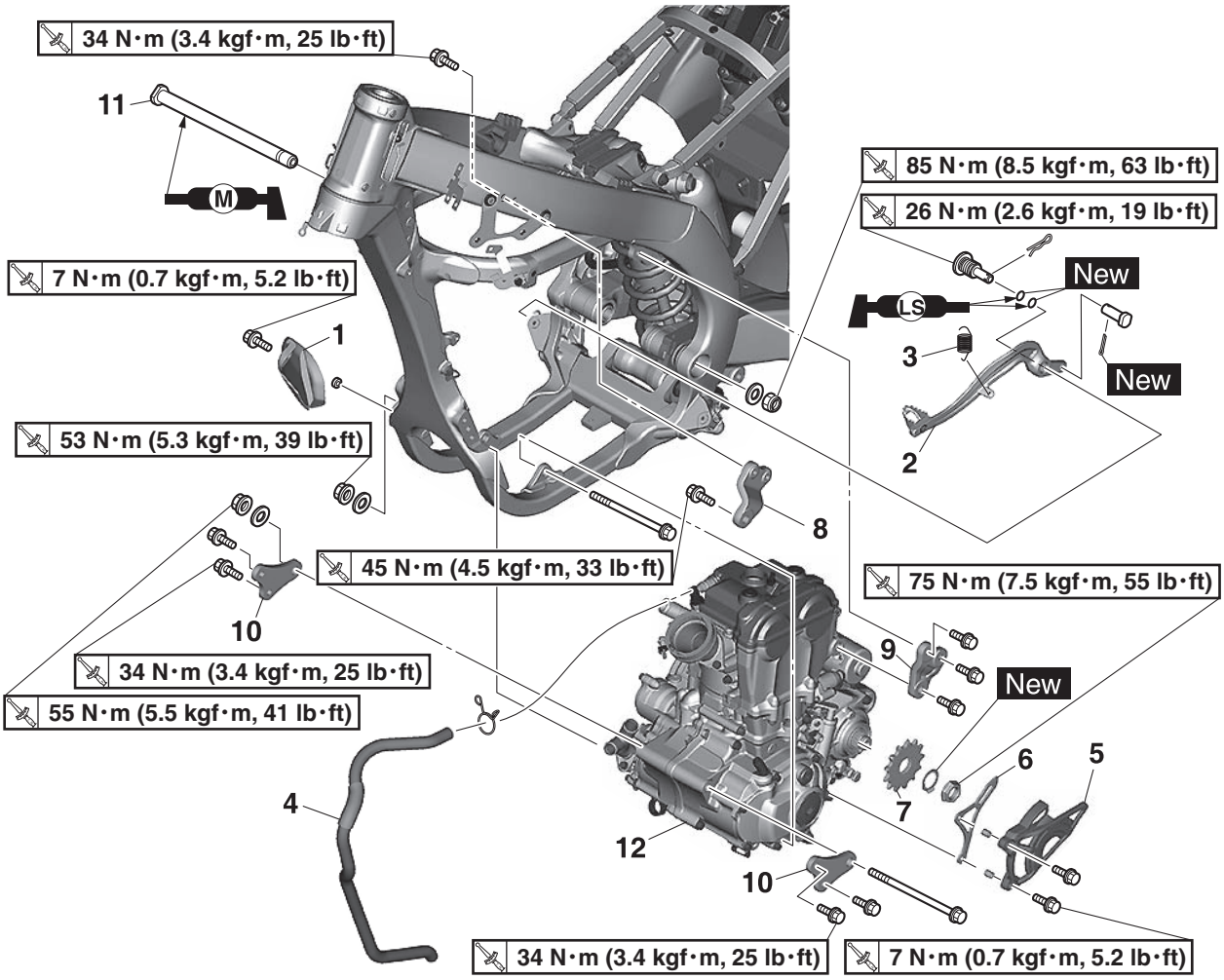
Order	Job/Parts to remove	Q'ty	Remarks
			Refer to "INSTALLING THE EXHAUST PIPE AND MUFFLER" on page 5-9.
	Side cover (right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear shock absorber assembly lower bolt		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.
	Connecting arm bolt (frame side)		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-55.
1	Silencer clamp	1	Loosen.
2	Silencer	1	
3	Exhaust pipe 2 clamp	1	Loosen.
4	Exhaust pipe 2	1	
5	Exhaust pipe 1	1	
6	Gasket	3	
7	Exhaust pipe 1 protector	1	
8	Silencer body	1	
9	Silencer cap	1	
10	Protector bracket	2	
11	Bracket band	2	Crimp the exhaust pipe protector bracket band using the boots band installation tool. 90890-01526, YM-01526

Removing the electronic parts



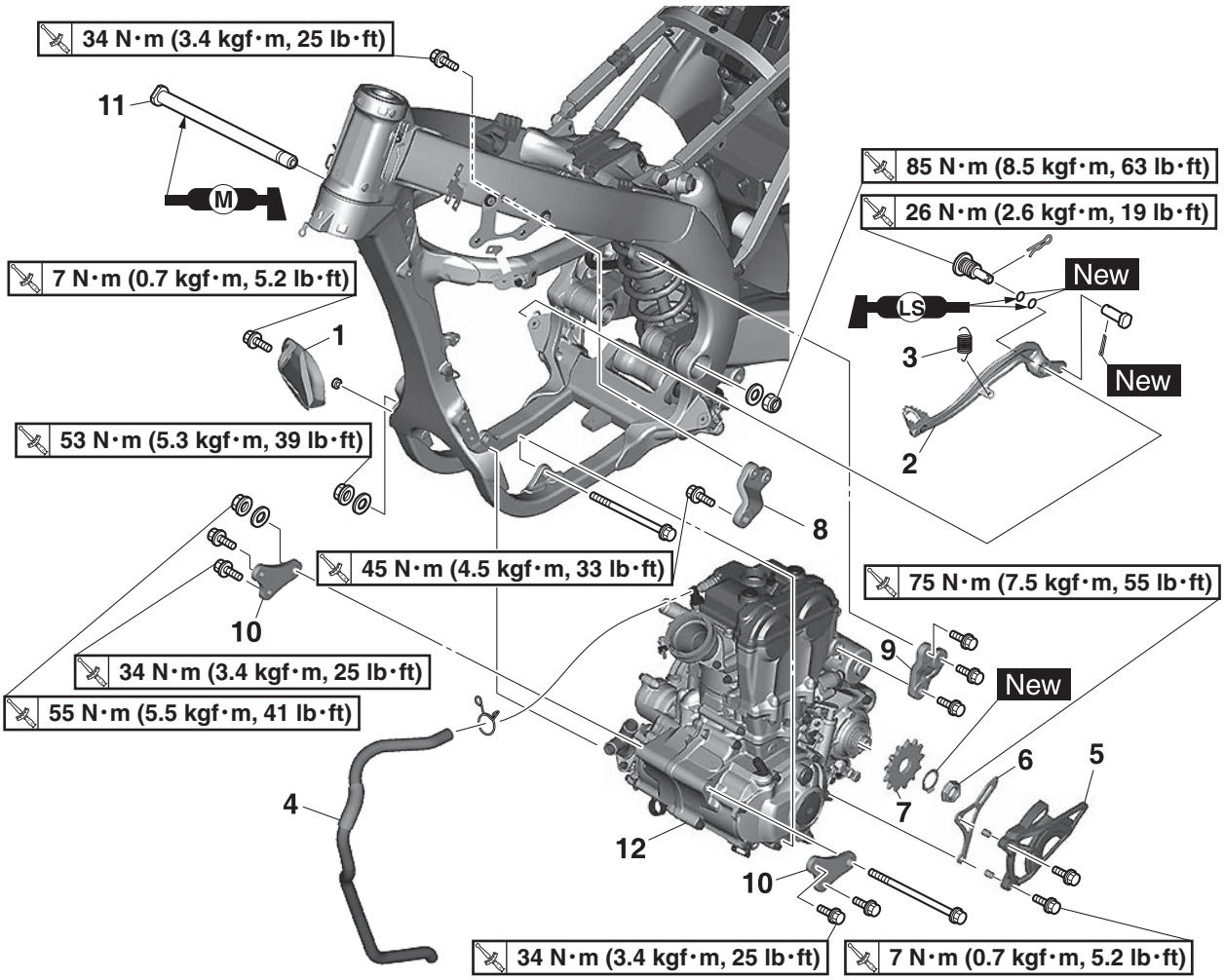
Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case cover		Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-10.
	Intake air temperature sensor coupler		Refer to "THROTTLE BODY" on page 7-5.
	ECU		Refer to "THROTTLE BODY" on page 7-5.
	Ignition coil		Refer to "THROTTLE BODY" on page 7-5.
1	Rectifier/regulator	1	
2	AC magneto coupler	1	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Coolant temperature sensor coupler	1	
5	Gear position switch	1	

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
			Use a maintenance stand to raise the front wheel off the ground.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Exhaust pipe and silencer		Refer to "ENGINE REMOVAL" on page 5-1.
	Air filter case		Refer to "THROTTLE BODY" on page 7-5.
	Throttle body		Refer to "THROTTLE BODY" on page 7-5.
	Clutch cable		Refer to "CLUTCH" on page 5-41.
	Shift pedal/Drive chain		Refer to "SHIFT SHAFT" on page 5-50. Refer to "CHAIN DRIVE" on page 4-65.
1	Engine guard	1	
2	Brake pedal	1	
3	Spring	1	
4	Cylinder head breather hose	1	
5	Drive sprocket cover	1	
6	Drive chain guide	1	
7	Drive sprocket	1	

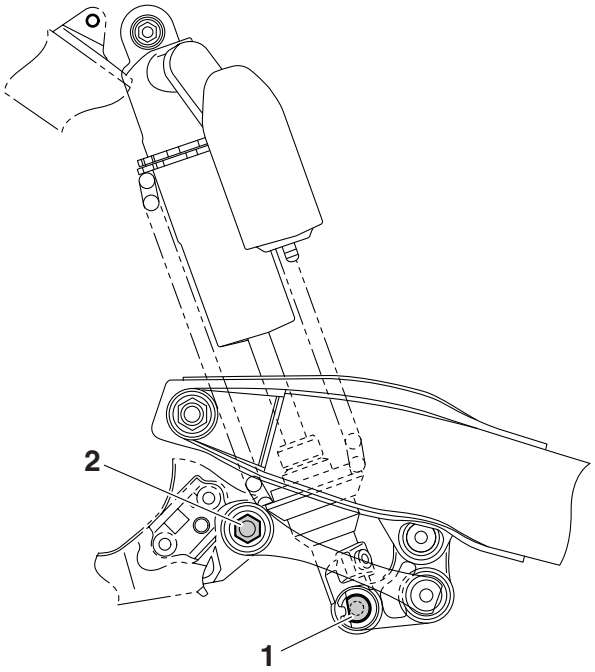
Removing the engine

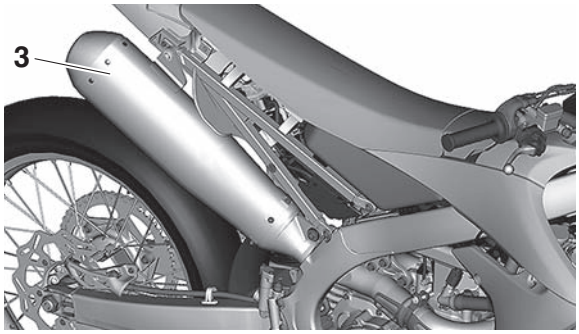


Order	Job/Parts to remove	Q'ty	Remarks
8	Upper engine bracket (right)	1	
9	Upper engine bracket (left)	1	
10	Lower engine bracket	2	
11	Pivot shaft	1	
12	Engine	1	

EAM30158
REMOVING THE SILENCER
1. Remove:
   - Rear shock absorber assembly lower bolt “1”
   - Connecting arm bolt (frame side) “2”
   - Silencer “3”

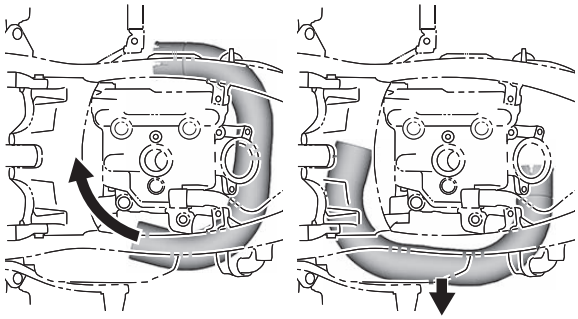
TIP
Move the rear shock absorber to the left side of the chassis, and remove the silencer.





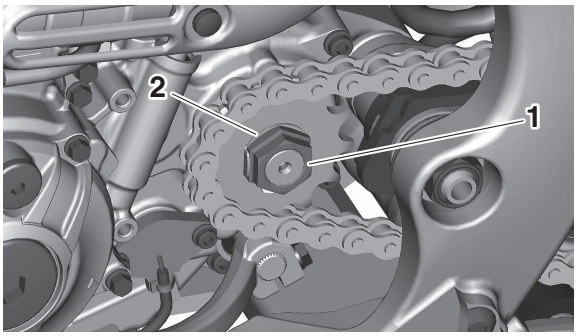
EAM30159
REMOVING THE EXHAUST PIPE 2
1. Remove:
   - Exhaust pipe 2

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



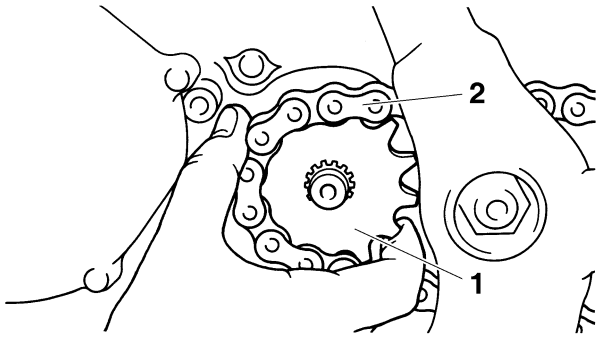
EAM30160
REMOVING THE DRIVE SPROCKET
1. Straighten the lock washer tab.
2. Remove:
   - Nut (drive sprocket) “1”
   - Lock washer “2”

TIP
Loosen the nut while applying the rear brake.



3. Remove:
   - Drive sprocket “1”
   - Drive chain “2”

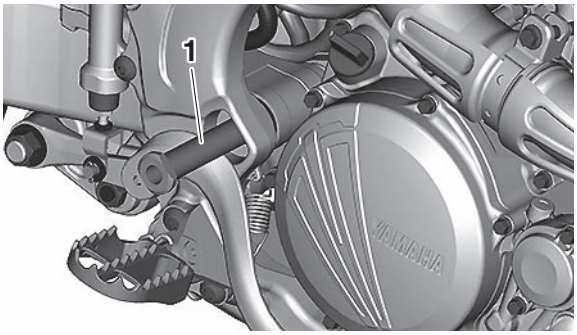
TIP
Remove the drive sprocket together with the drive chain.



EAM30161
REMOVING THE ENGINE
1. Remove:
   - Pivot shaft “1”

TIP
If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a

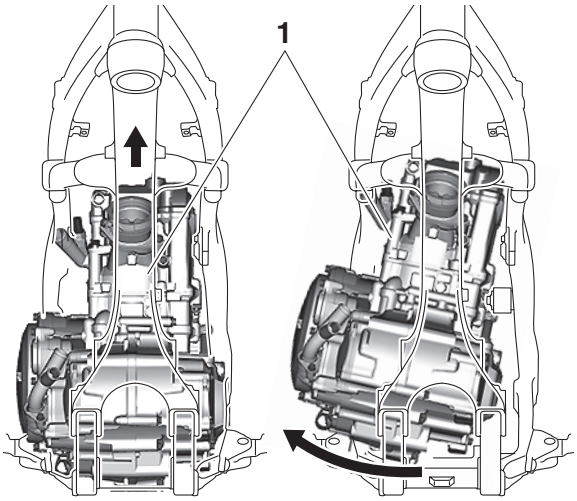
shaft of similar diameter into the other side of the swingarm to support it.



2. Remove:
   • Engine “1”
   From the right side.

TIP

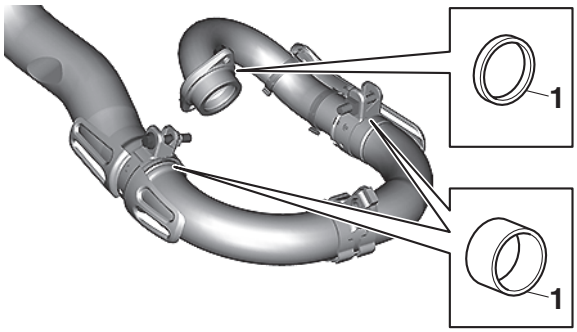
- Make sure that the couplers, the hoses, and the cables are disconnected.
- Lift up the engine, and remove this from its lower part toward the right of the chassis.



EAM30163

CHECKING THE SILENCER AND EXHAUST PIPE

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



EAM30373

CHANGING THE SILENCER FIBER

1. Remove:
   • Bolt “1”
   • Silencer body “2”

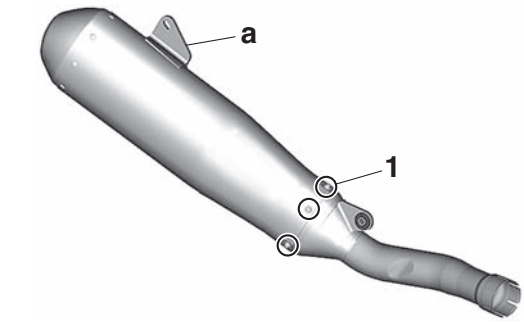
ECA25800

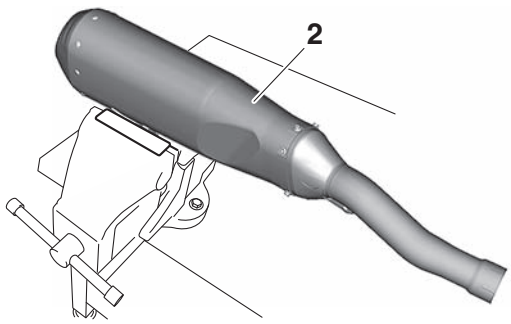
NOTICE

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

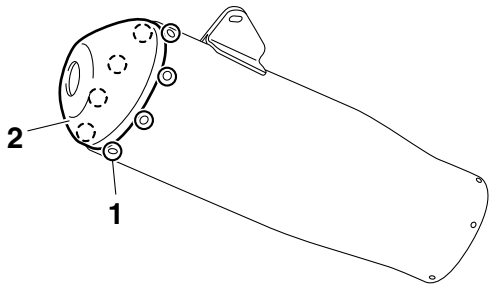
TIP

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

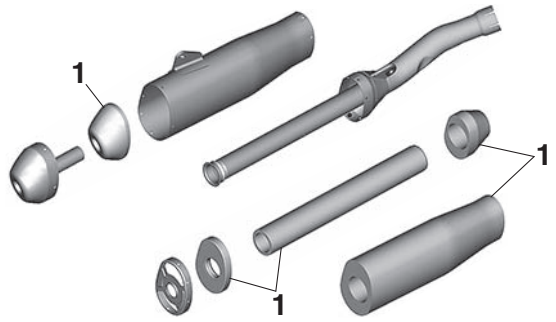




2. Remove:
   • Rivet “1”
   • Silencer cap “2”



3. Replace:
   • Fiber “1”

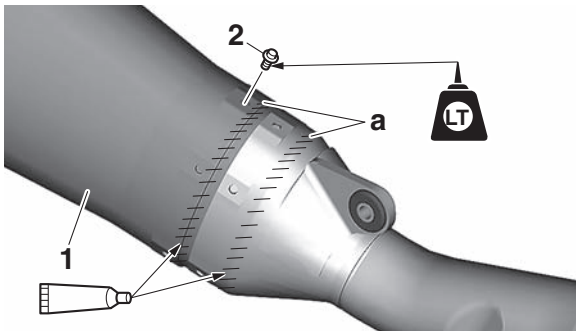


4. Install:
   • Silencer body “1”
   • Bolt “2”

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

TIP

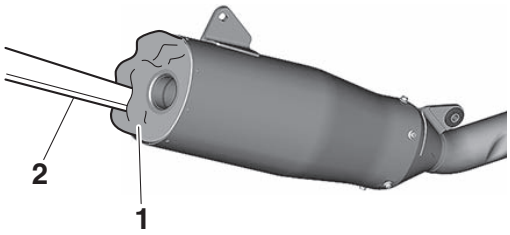
Apply heat-resistant sealant to the areas “a” shown, making sure that there are no gaps in the beads of sealant.



5. Replace:
   • Fiber “1”

TIP

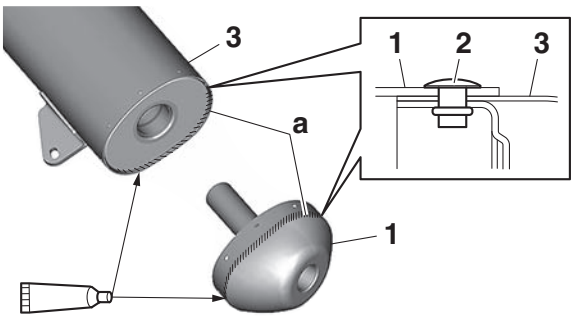
Stuff the fiber into the silencer body by using a flat board “2”.



6. Install:
   • Silencer cap “1”
   • Rivet “2”

TIP

- Apply heat-resistant sealant to the areas “a” shown, making sure that there are no gaps in the beads of sealant.
- Take care not to allow the fiber out of place when installing the silencer body “3”.



EAM30164

INSTALLING THE ENGINE

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

	Pivot shaft **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”
   • Engine bracket bolt (front side) “5”

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

   • Engine mounting bolt (front side) “6”

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

- Upper engine bracket “7”
- Engine bracket bolt (upper side) “8”

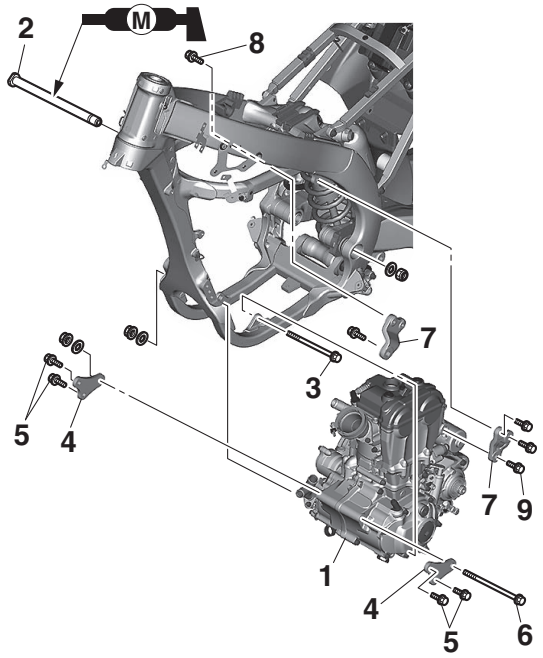
	Engine bracket bolt (upper side) **34 N·m (3.4 kgf·m, 25 lb·ft)**

- Engine mounting bolt (upper side) “9”

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

TIP

Apply molybdenum disulfide grease to the pivot shaft.



EAM30165

INSTALLING THE BRAKE PEDAL

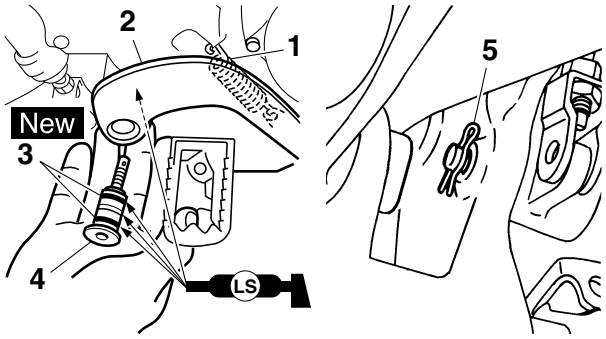
1. Install:
   - Spring “1”
   - Brake pedal “2”
   - O-ring “3” New
   - Bolt (brake pedal) “4”

	Bolt (brake pedal) **26 N·m (2.6 kgf·m, 19 lb·ft)**

   - Clip “5”

TIP

Apply the lithium-soap-based grease on the bolt, O-rings and brake pedal bracket.



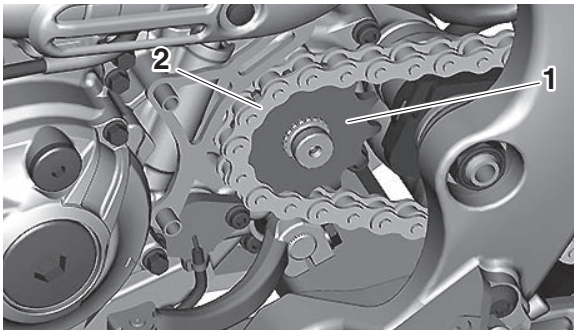
EAM30166

INSTALLING THE DRIVE SPROCKET

1. Install:
   - Drive sprocket “1”
   - Drive chain “2”

TIP

Install the drive sprocket together with the drive chain.



2. Install:
   - Lock washer “1” New
   - Nut (drive sprocket) “2”

	Nut (drive sprocket) **75 N·m (7.5 kgf·m, 55 lb·ft)**

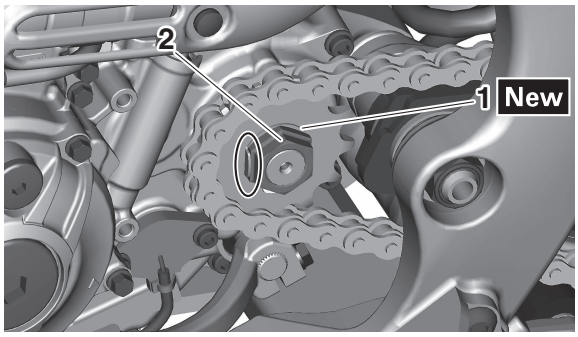
TIP

Tighten the nut while applying the rear brake.

ECA24600

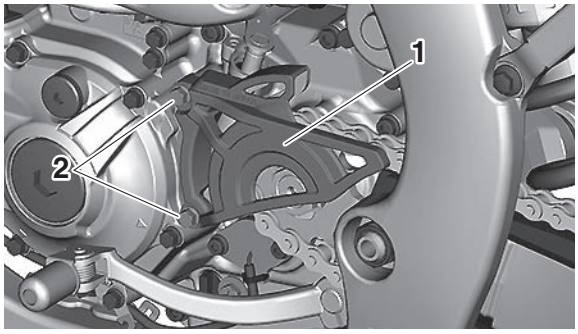
NOTICE

Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.



3. Bend the lock washer tab to lock the nut.
4. Install:
   - Drive sprocket guide
   - Drive sprocket cover “1”
   - Bolt (drive sprocket cover) “2”

	Bolt (drive sprocket cover) **7 N·m (0.7 kgf·m, 5.2 lb·ft)**



EAM30167

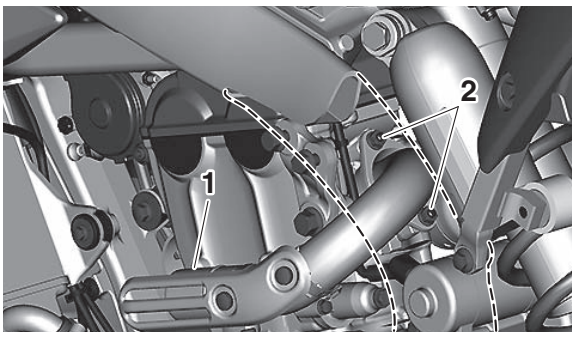
INSTALLING THE EXHAUST PIPE AND MUFFLER

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

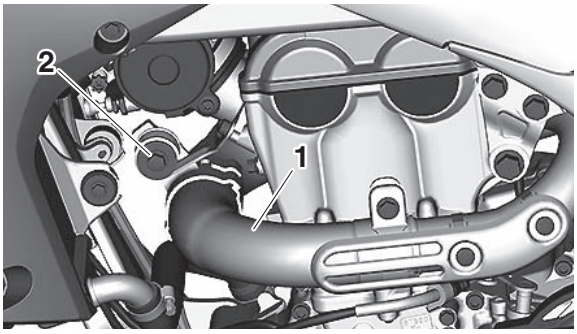
	Nut (exhaust pipe) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

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

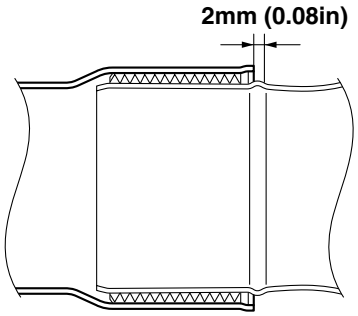


2. Install:
   - Clamp
   - Exhaust pipe 2 “1”
   - Bolt (exhaust pipe 2) “2”



TIP

Install and temporarily tighten the exhaust pipe 2 and silencer with its end positioned as shown with respect to the exhaust pipe 1 and 2.

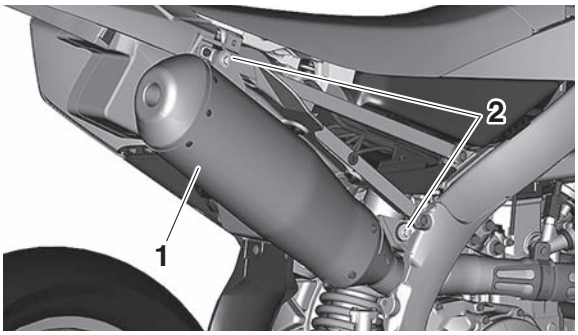


3. Install:
   - Clamp
   - Silencer “1”
   - Bolt (silencer) “2”

	Bolt (silencer) **30 N·m (3.0 kgf·m, 22 lb·ft)**

TIP

Install and temporarily tighten the silencer so that its joint is positioned as shown with respect to the exhaust pipe 2.



4. Tighten:
   • Bolt (exhaust pipe 2)

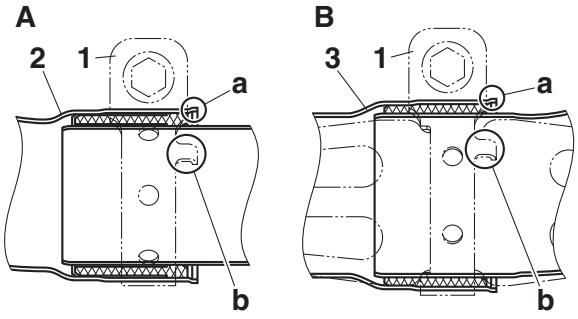
	Bolt (exhaust pipe 2) **20 N·m (2.0 kgf·m, 15 lb·ft)**

   • Clamp “1”

	Clamp **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

TIP

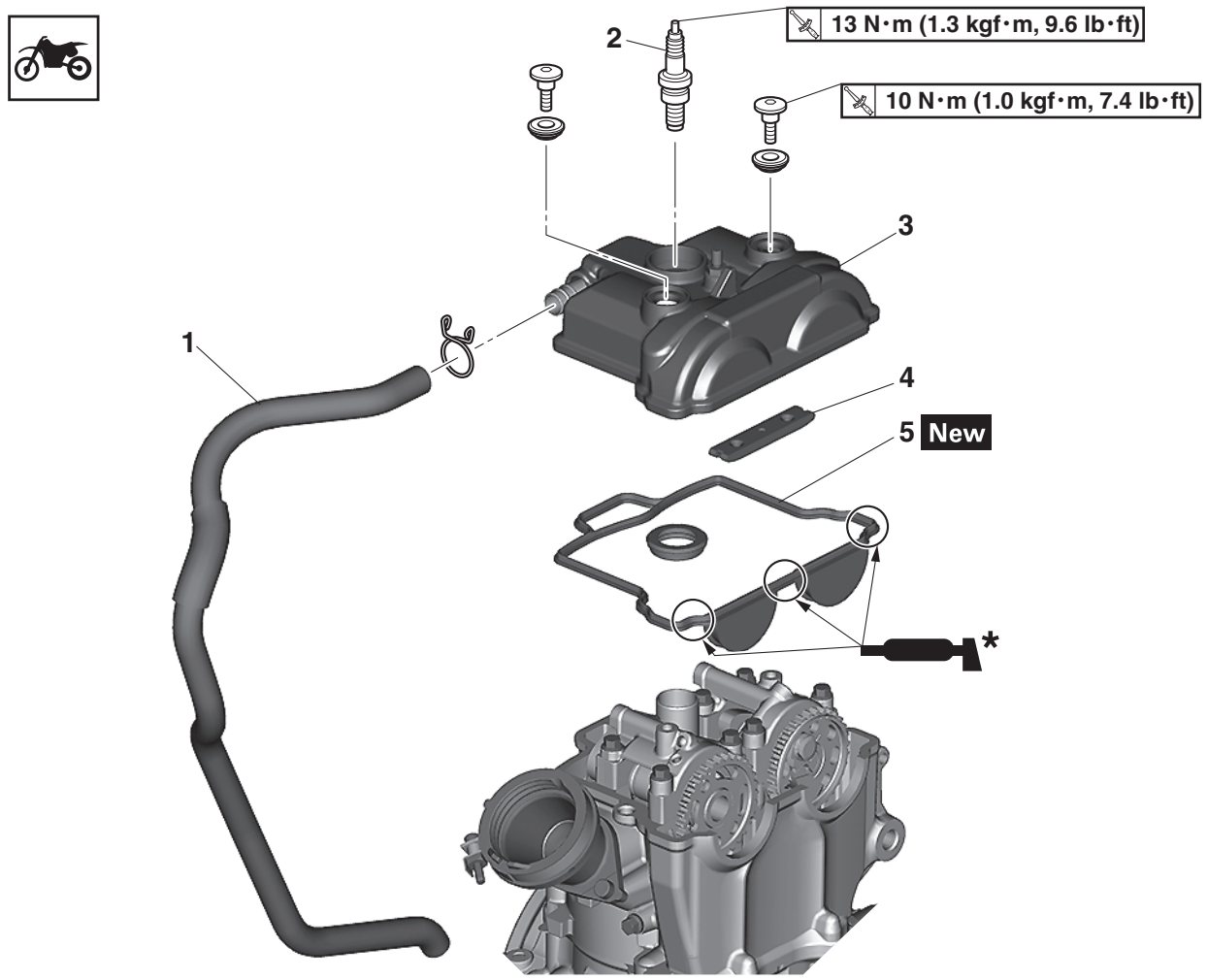
- Tighten while checking that their front and rear joints are inserted in position.
- Make sure that the exhaust pipe clamp “1” does not ride on the projection “a” on the exhaust pipe “2” or silencer “3”. Be sure to insert the projection “b” into the slot in the exhaust pipe (or silencer).



A. Exhaust pipe 1 and exhaust pipe 2
B. Exhaust pipe 2 and silencer

EAM20106
CAMSHAFT

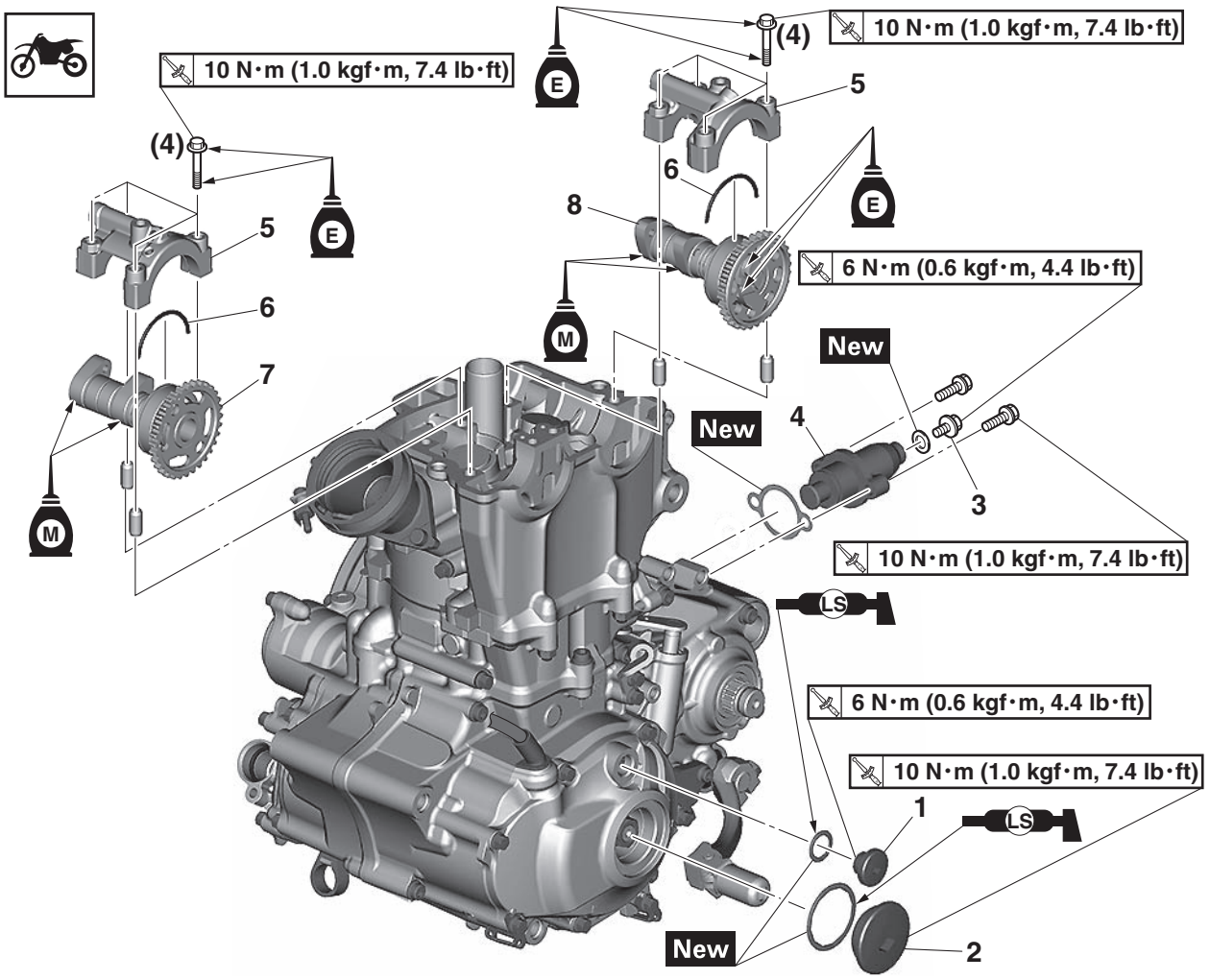
Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Ignition coil		Refer to "ENGINE REMOVAL" on page 5-1.
1	Cylinder head breather hose	1	
2	Spark plug	1	
3	Cylinder head cover	1	
4	Timing chain guide (top side)	1	
5	Cylinder head cover gasket	1	

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

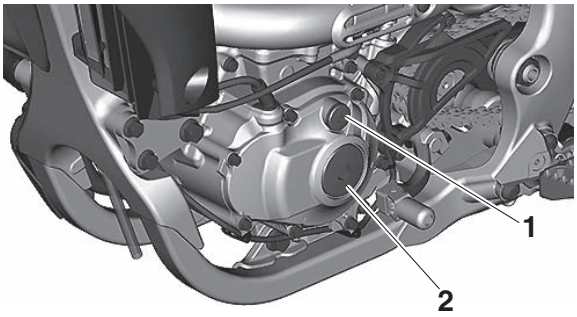
Removing the camshaft



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

EAM30080
REMOVING THE CAMSHAFT

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

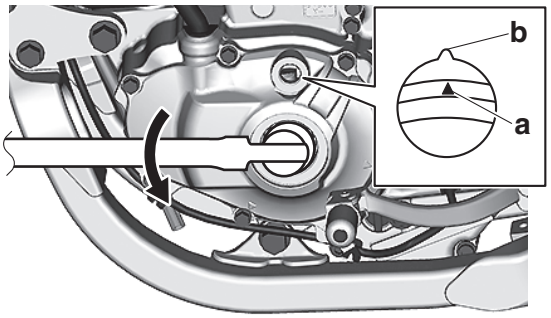


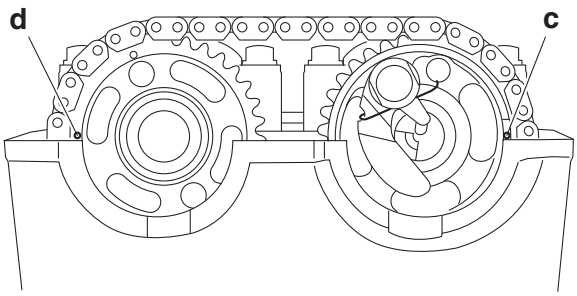
2. Align:
   • Alignment mark

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

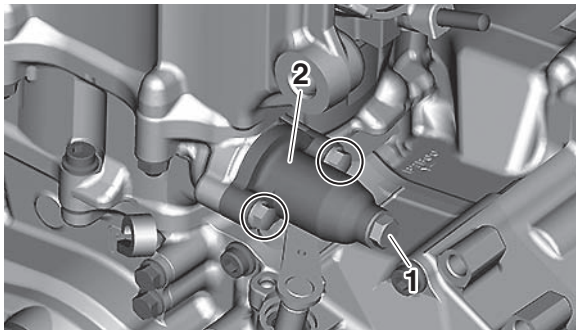
TIP
Align the alignment mark “c” on the exhaust camshaft sprocket and the alignment mark “d” on the intake camshaft sprocket with the edge of the cylinder head.





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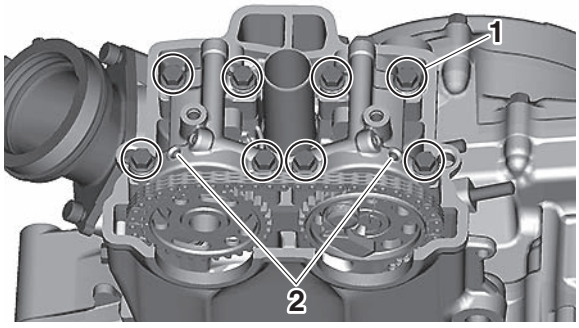
3. Remove:
   • Timing chain tensioner cap bolt “1”
   • Timing chain tensioner “2”
   • Gasket

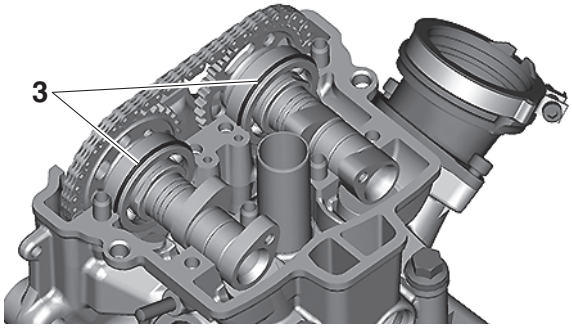


4. Remove:
   • Bolt (camshaft cap) “1”
   • Camshaft cap “2”
   • Clip “3”

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.

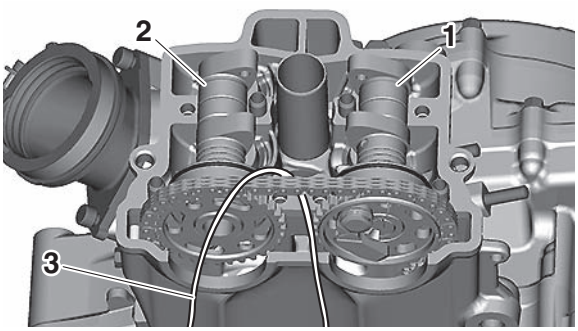




5. Remove:
   • Exhaust camshaft “1”
   • Intake camshaft “2”

TIP
Attach a wire “3” to the timing chain to prevent it

from falling into the crankcase.

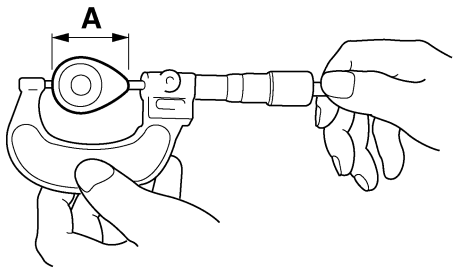


EAM30081

CHECKING THE CAMSHAFT

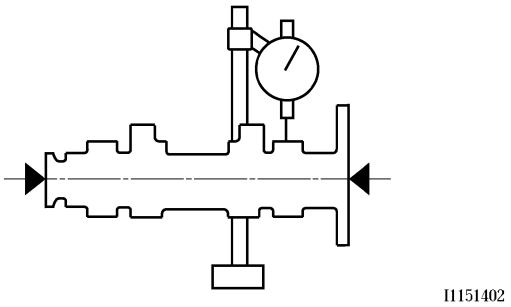
1. Check:
   • Camshaft lobe
   Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   • Camshaft lobe dimensions “A”
   Out of specification → Replace the camshaft.

Camshaft lobe dimensions
Lobe height (Intake)
32.230–32.330 mm (1.2689–1.2728 in)
Limit
32.130 mm (1.2650 in)
Lobe height (Exhaust)
33.850–33.950 mm (1.3327–1.3366 in)
Limit
33.750 mm (1.3287 in)



3. Measure:
   • Camshaft runout
   Out of specification → Replace.

Camshaft runout limit
0.030 mm (0.0012 in)

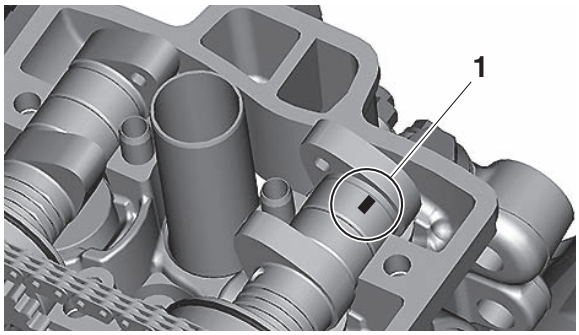


4. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

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

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



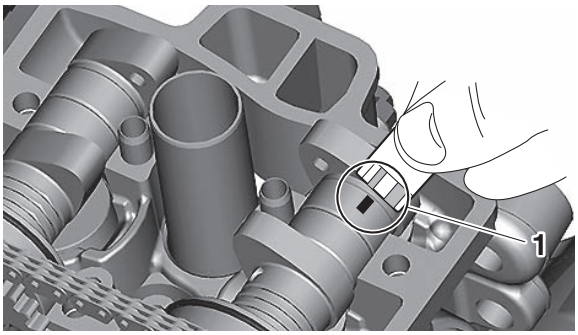
c. Install the dowel pins and the camshaft caps.

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)

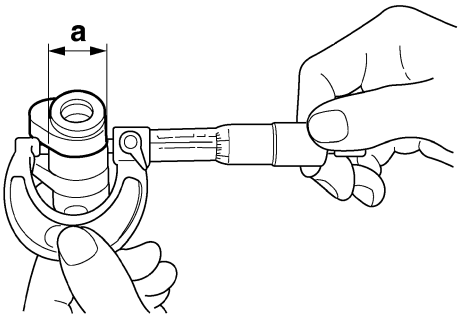
d. Remove the camshaft caps and then measure the width of the Plastigauge® “1”.



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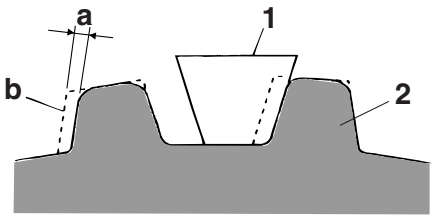
5. Measure:
   • Camshaft journal diameter “a”
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

Camshaft journal diameter
21.959–21.972 mm (0.8645–0.8650 in)



EAM30082
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
   • Timing chain “1”
   Damage/stiffness → Replace the timing chain and camshaft as a set.
2. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear “a” → Replace the camshaft and the timing chain as a set.



a. 1/4 tooth
b. Correct

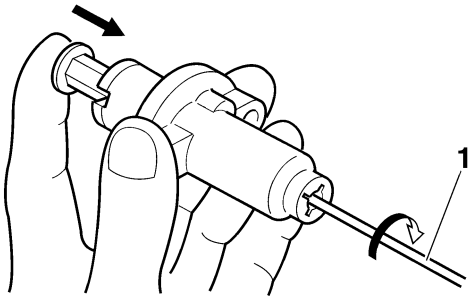
1. Timing chain roller
2. Camshaft sprocket

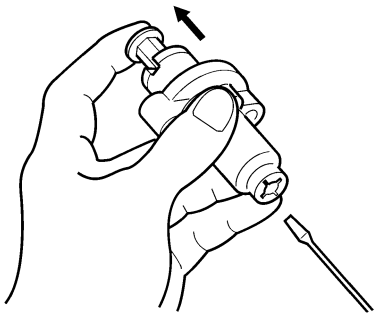
EAM30083
CHECKING THE TIMING CHAIN TENSIONERS

1. Check:
   • Timing chain tensioner
   Crack/damage → Replace.

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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.





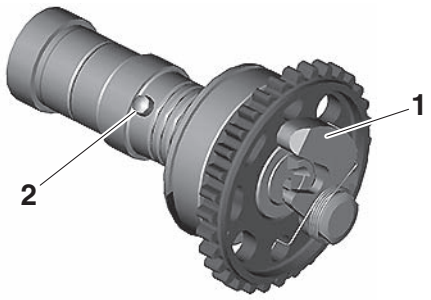
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EAM30084
CHECKING THE DECOMPRESSION SYSTEM

1. Check:
   • Decompression system

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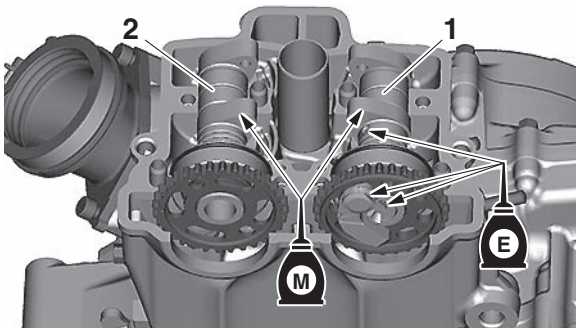
a. Check that the decompressor cam "1" moves smoothly.
b. Check that the decompressor lever pin "2" projects from the camshaft.



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EAM30085
INSTALLING THE CAMSHAFTS

1. Install:
   • Exhaust camshaft "1"
   • Intake camshaft "2"

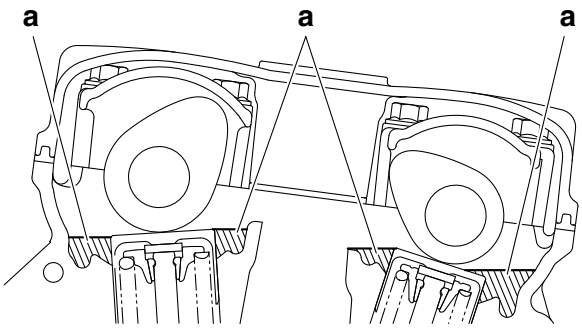


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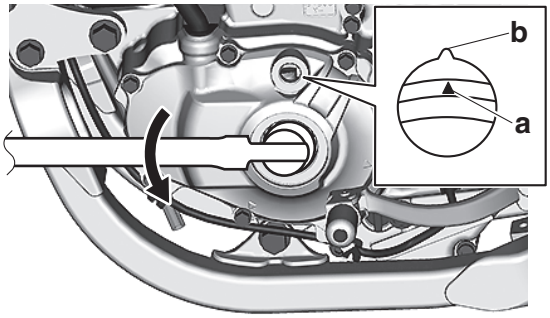
a. Turn the crankshaft counterclockwise with a wrench.

TIP

- Apply molybdenum disulfide oil to the camshafts.
- Apply the engine oil on the decompression system.
- Fill the cylinder head with engine oil up to the tops "a" of the valve lifters.



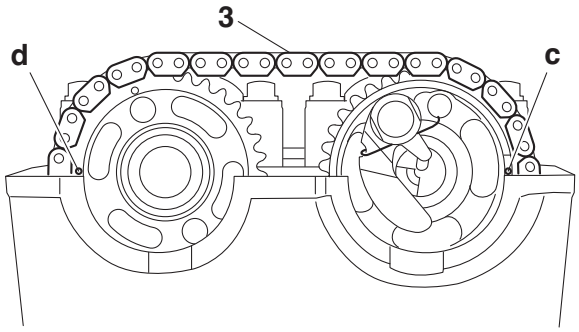
b. Align the top dead center (TDC) mark "a" on the rotor with the alignment mark "b" on the crankcase cover.



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

TIP

Make sure that the alignment mark "c" on the exhaust camshaft sprocket and the alignment mark "d" on the intake camshaft sprocket are aligned with the edge of the cylinder head.



ECA24620

NOTICE

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

d. Install the clips, the camshaft caps and the bolts (camshaft cap).

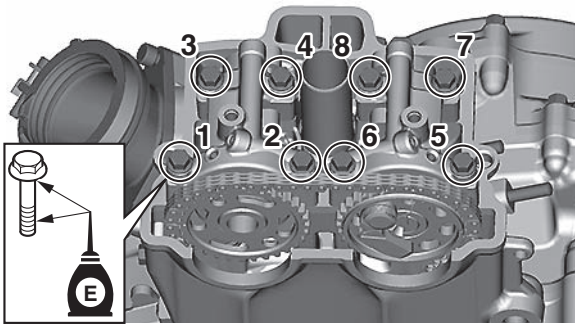
	Bolt (camshaft cap) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

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.

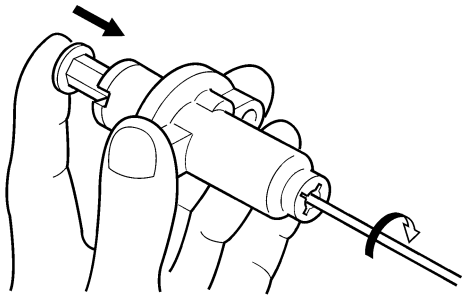


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2. Install:
   - Timing chain tensioner

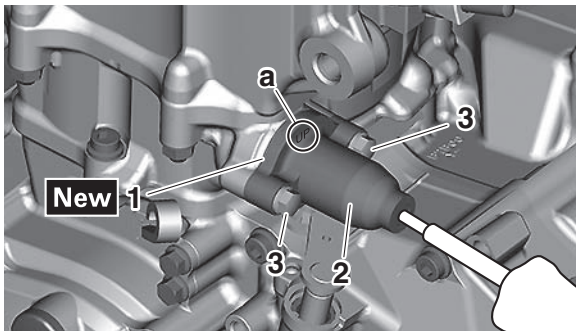
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a. While pressing the tensioner rod lightly with your fingers, use a thin screwdriver to wind the tensioner rod up fully clockwise.



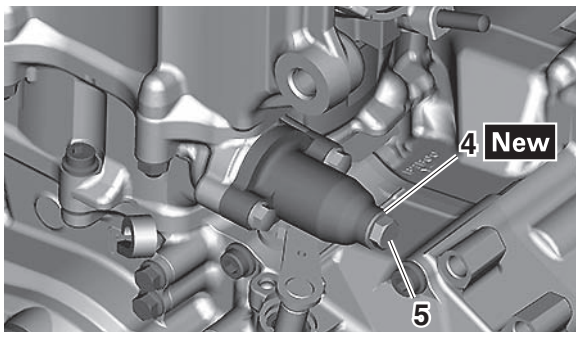
b. With the tensioner rod fully wound and the chain tensioner "UP" mark "a" facing upward, install the gasket "1", the timing chain tensioner "2" and tighten the bolt "3".

	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 "4" and the cap bolt "5".

	Tensioner cap bolt **6 N·m (0.6 kgf·m, 4.4 lb·ft)**



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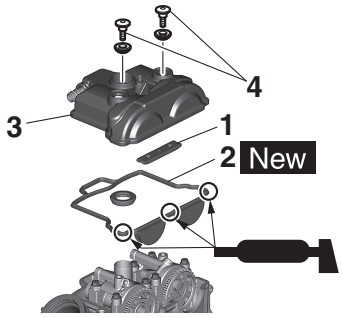
3. Turn:
   - Crankshaft
     Counterclockwise several turns.
4. Check:
   - Top dead center (TDC) mark on the rotor
     Align with the crankcase alignment mark.
   - Camshaft match marks
     Align with the cylinder head surface.
     Out of alignment → Adjust.
5. Install:
   - Timing chain guide (top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

	Bolt (cylinder head cover) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

Before installation, apply the sealant to the cylinder head cover gasket.

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**

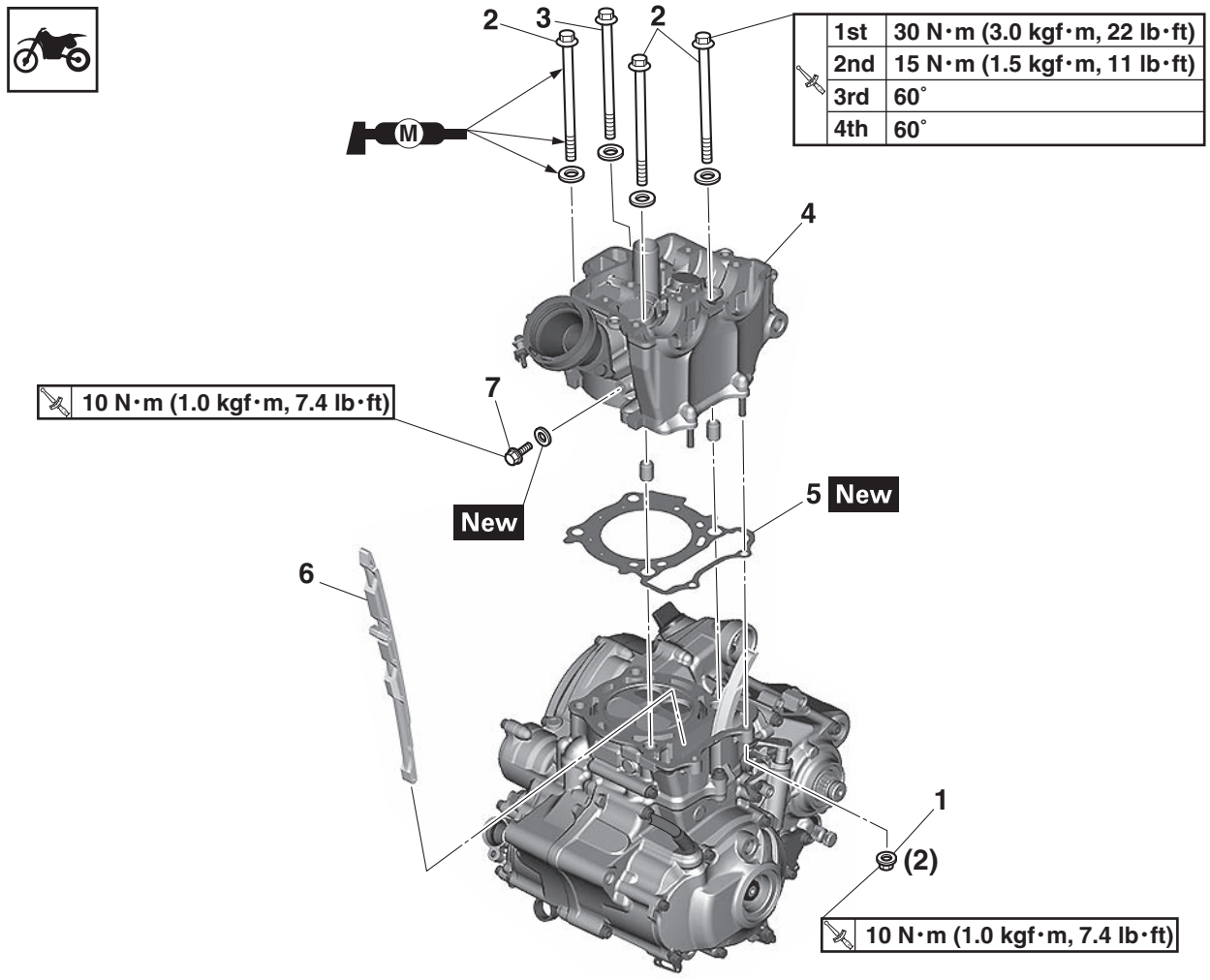


6. Install:
   - Cylinder head breather hose
   - Spark plug

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

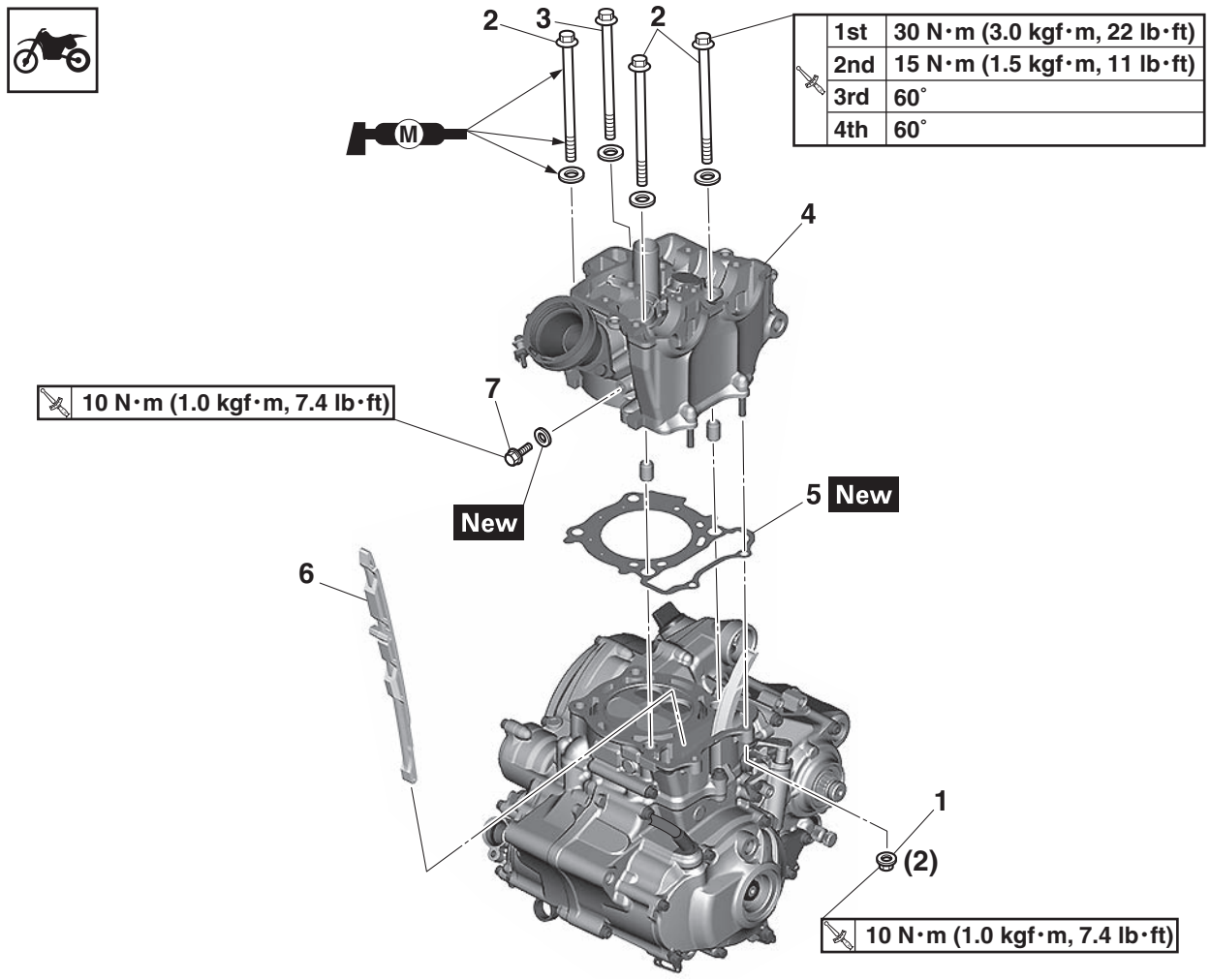
EAM20107
CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
			Refer to "INSTALLING THE CYLINDER HEAD" on page 5-22.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Exhaust pipe and silencer		Refer to "ENGINE REMOVAL" on page 5-1.
	Radiator hose		Disconnect.
	Coolant temperature sensor coupler		Disconnect.
	Throttle body		Refer to "THROTTLE BODY" on page 7-5.
	Camshaft		Refer to "CAMSHAFT" on page 5-11.
	Upper engine bracket		Refer to "ENGINE REMOVAL" on page 5-1.
1	Nut (cylinder head)	2	
2	Bolt (cylinder head)	3	
3	Bolt (cylinder head)	1	
4	Cylinder head	1	
5	Cylinder head gasket	1	

Removing the cylinder head

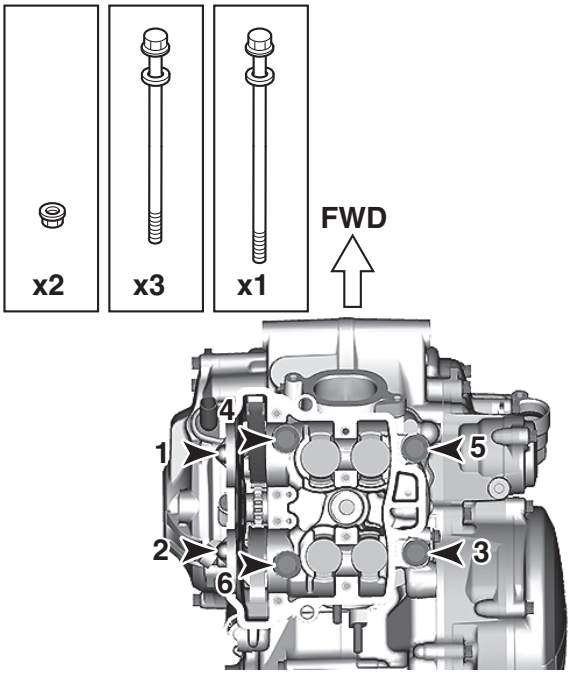


Order	Job/Parts to remove	Q'ty	Remarks
6	Timing chain guide (intake side)	1	
7	Oil passage plug	1	

EAM30086
REMOVING THE CYLINDER HEAD
1. Remove:
   • Cylinder head bolt and nut

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.

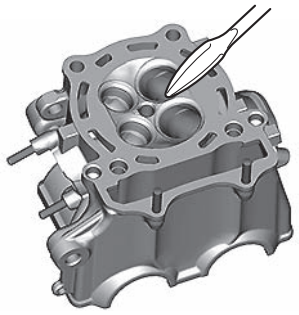
• M9 × 135 mm (5.31 in): “4”, “5”, “6”
• M9 × 145 mm (5.71 in): “3”



EAM30087
CHECKING THE TIMING CHAIN GUIDE (INTAKE SIDE)
1. Check:
   • Timing chain guide (intake side)
     Damage/wear → Replace.

EAM30088
CHECKING THE CYLINDER HEAD
1. Eliminate:
   • Combustion chamber carbon deposits

TIP
Use a rounded scraper, not a sharp instrument, in order not to damage or scratch the spark plug bore threads.



2. Check:
   • Cylinder head
     Damage/scratches → Replace.

TIP
When replacing the cylinder head, replace also the valve.
Refer to “CHECKING THE VALVE SEATS” on page 5-27.

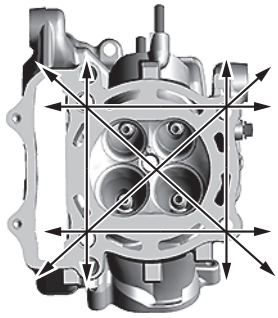
• Cylinder head coolant passages
  Mineral deposits/rust → Eliminate.
3. Measure:
   • Cylinder head warpage
     Out of specification → Resurface the cylinder head.

	Warpage limit **0.05 mm (0.0020 in)**

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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.

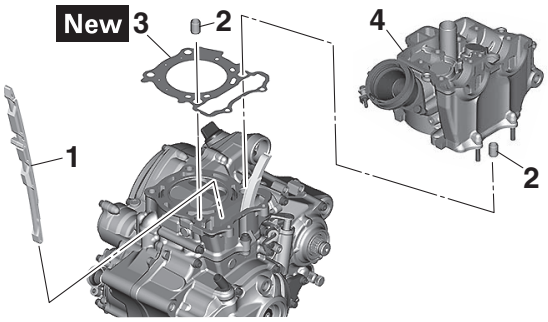


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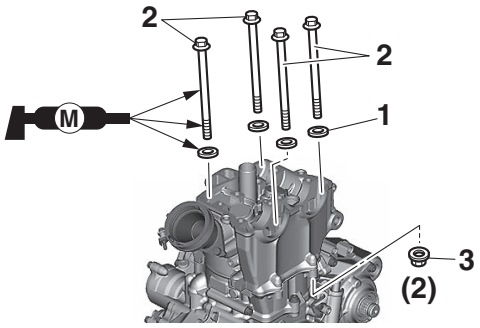
EAM30089
INSTALLING THE CYLINDER HEAD

1. Install:
   - Timing chain guide (intake side) “1”
   - Dowel pin “2”
   - Cylinder head gasket “3” New
   - Cylinder head “4”

TIP
While pulling up the timing chain, install the timing chain guide (intake side) and the cylinder head.



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

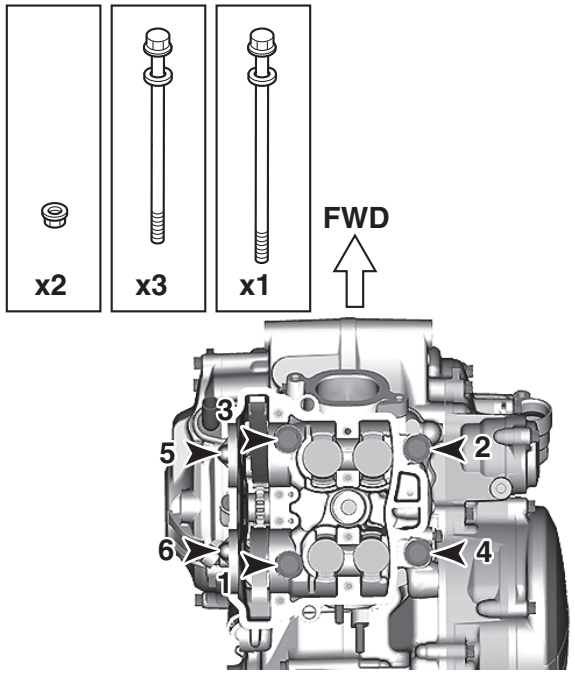


TIP
- Tighten the bolts using the following procedure.
- Repeat steps (e) to (j) for each bolt one at a time according to the tightening order of the bolts.

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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 “1”.
c. Install the washers and the bolts.
d. Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

Bolt “1”–“4”
1st
30 N·m (3.0 kgf·m, 22 lb·ft)

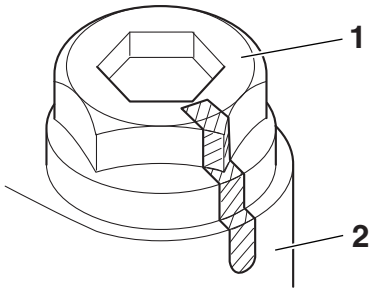


e. Remove the one bolt according to the tightening order of the bolts.
f. Again apply molybdenum disulfide grease to the threads and contact surfaces of the bolts and to both contact surfaces of the washers.
g. Retighten the bolts.

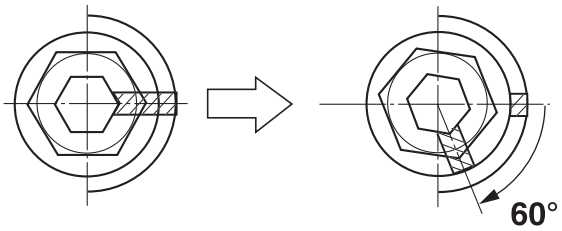
TIP
Do not remove the other bolts. Only remove the bolts one at a time according to the tightening order as shown and retighten them to the specified tightening torque.

Bolt “1”, “2”, “3”, “4”
2nd
15 N·m (1.5 kgf·m, 11 lb·ft)

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

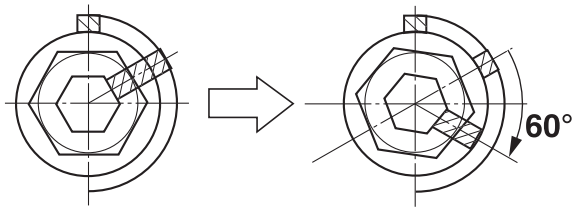


i. Tighten the cylinder head tightening bolts further.



	Bolt “1”, “2”, “3”, “4” **3rd** **Specified angle** **60°**

j. Put a mark on the corner of the bolt (cylinder head) and the cylinder head.
k. Finally, tighten all cylinder head tightening bolts further according to the tightening order.



TIP
Tighten the bolts in two steps 60° to reach the specified angle in the proper tightening sequence. Total tightening angle: 60° + 60° = 120°

	Bolt “1”, “2”, “3”, “4” **Final** **Specified angle** **60°**

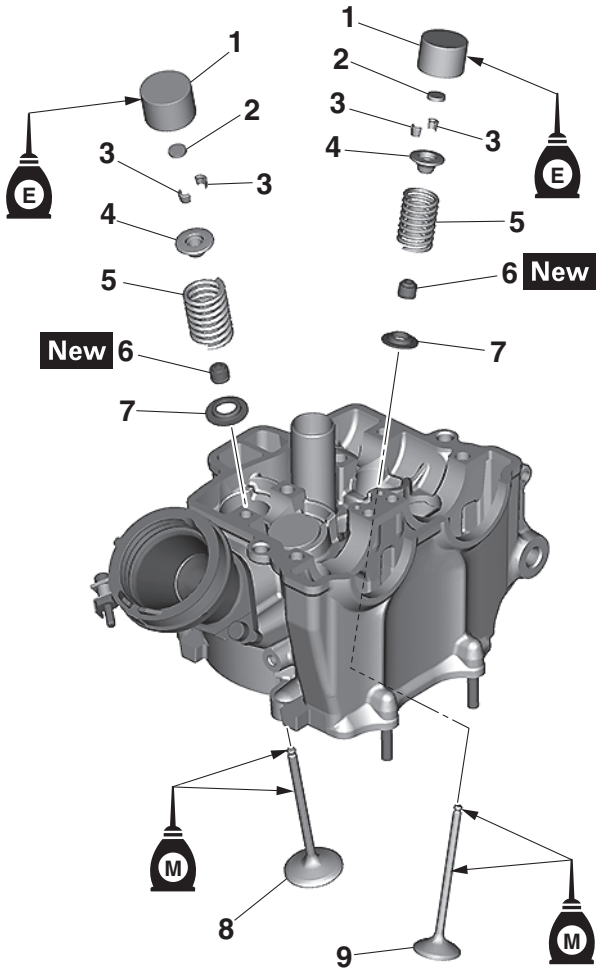
l. Tighten the nuts to the specified torque.

	Nut “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 5-19.
1	Valve lifter	4	
2	Adjusting pad	4	
3	Valve cotter	8	
4	Valve spring retainer	4	
5	Valve spring	4	
6	Valve stem seal	4	
7	Valve spring seat	4	
8	Intake valve	2	
9	Exhaust valve	2	

EAM30090
REMOVING THE VALVES

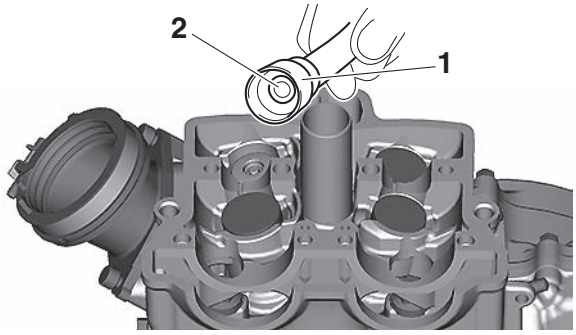
TIP
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves are properly sealed.

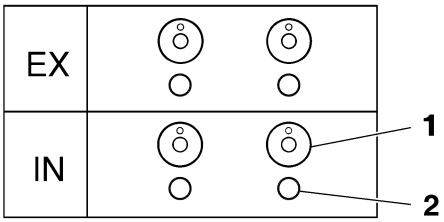
1. Remove:
   • Valve lifter “1”
   • Adjusting pad “2”

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 lapping tool (14mm)
YM-A8998



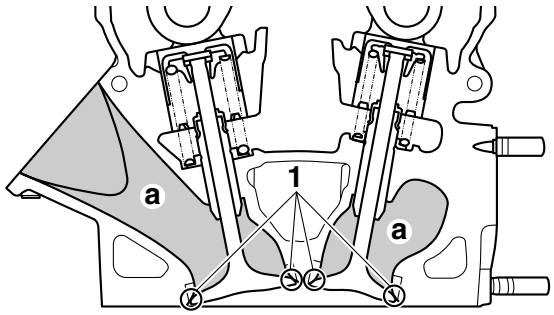


2. Check:
   • Valve sealing
   Leakage at the valve seat → Check the valve face, the valve seat, and the valve seat contact width.
   Refer to “CHECKING THE VALVE SEATS” on page 5-27.

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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”.



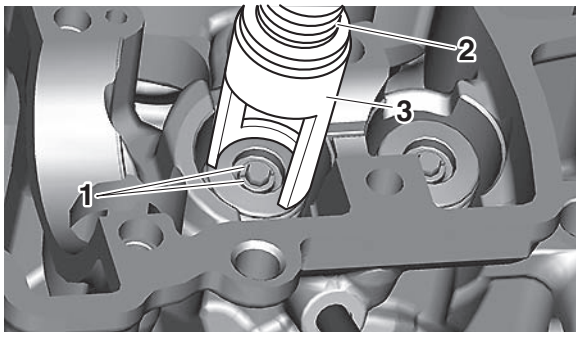
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3. Remove:
   • Valve cotter “1”

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



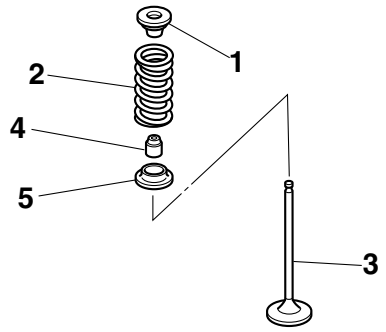
Valve spring compressor
90890-04019
Valve spring compressor
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



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.



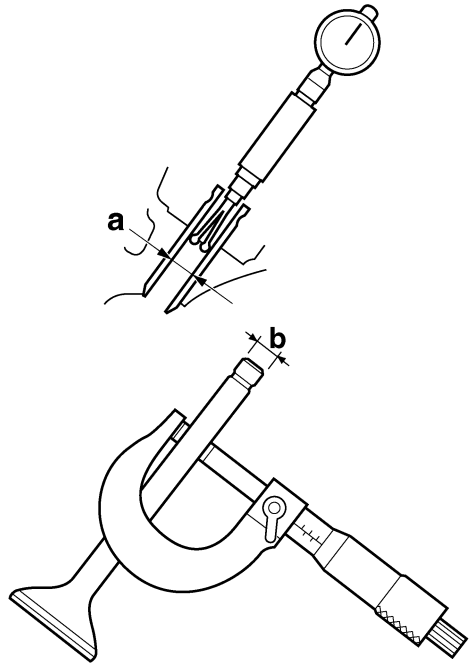
EAM30091

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 (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.025–0.052 mm (0.0010–0.0020 in)
Limit
0.100 mm (0.0039 in)

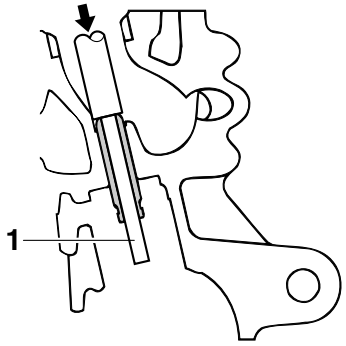


2. Replace:
   - Valve guide

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

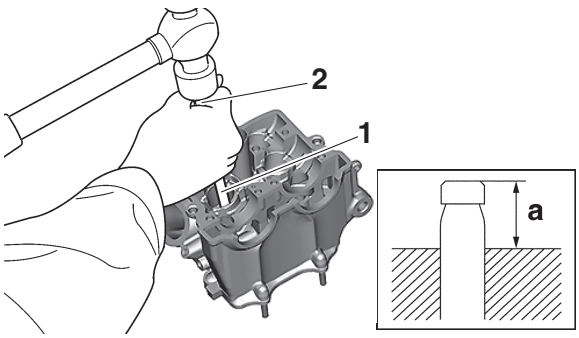
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a. Remove the valve guide with the valve guide remover “1”.

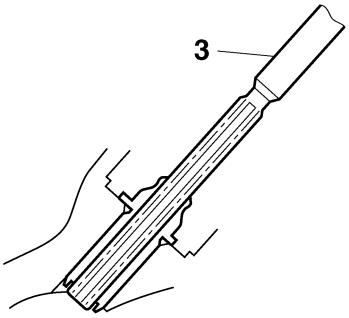


b. Install the new valve guide with the valve guide installer “1” and the valve guide remover “2”.

Valve guide installation height “a”
Intake
10.8–11.2 mm (0.43–0.44 in)
Exhaust
11.2–11.6 mm (0.44–0.46 in)



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



TIP

After replacing the valve guide, reface the valve seat.

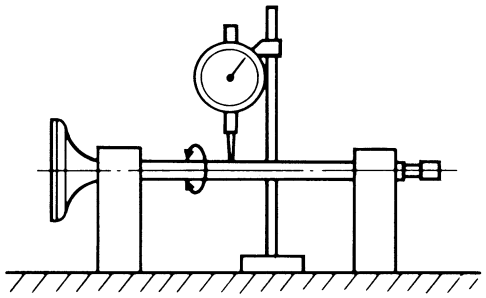
Intake
Valve guide remover (ø5)
90890-04097
Valve guide remover (5.0 mm)
YM-04097
Valve guide installer (ø5)
90890-04098
Valve guide installer (5.0 mm)
YM-04098
Valve guide reamer (ø5)
90890-04099
Valve guide reamer (5.0 mm)
YM-04099
Exhaust
Valve guide remover (ø4.5)
90890-04116
Valve guide remover (4.5 mm)
YM-04116
Valve guide installer (ø4.5)
90890-04117
Valve guide installer (4.5 mm)
YM-04117
Valve guide reamer (ø4.5)
90890-04118
Valve guide reamer (4.5 mm)
YM-04118

3. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
4. Check:
   - Valve face
     Pitting/wear → Grind the valve face.
   - Valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   - Valve stem runout
     Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout
0.010 mm (0.0004 in)

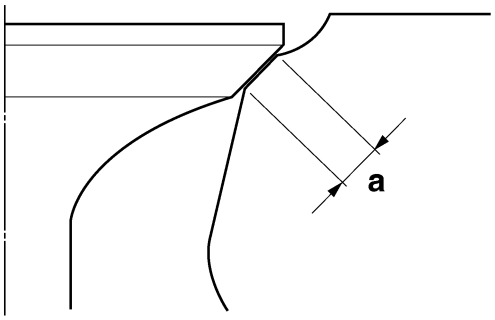


EAM30092

CHECKING THE VALVE SEATS

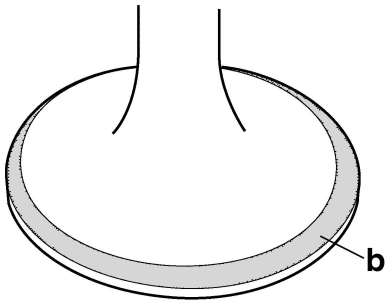
1. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
2. Check:
   - Valve seat
     Pitting/wear → Replace the cylinder head.
3. Measure:
   - Valve seat contact width "a"
     Out of specification → Replace the cylinder head.

Valve seat contact width (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)
Valve seat contact width (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)



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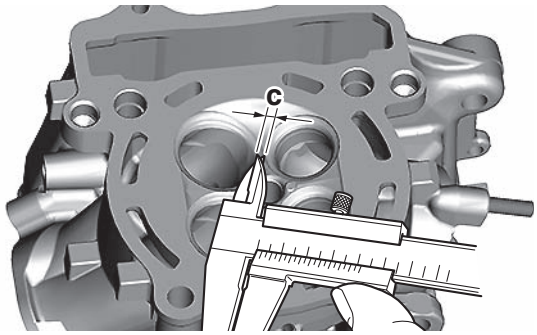
a. Apply blue layout fluid “b” onto the valve face.



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.



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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.

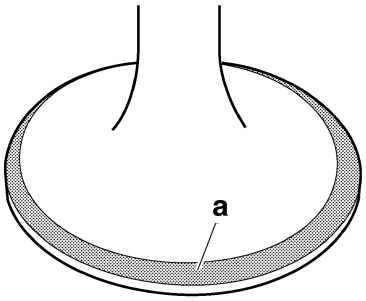
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a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

NOTICE

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

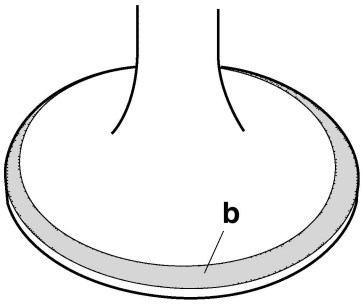


b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and the valve seat are evenly polished, then clean off all of the lapping compound.

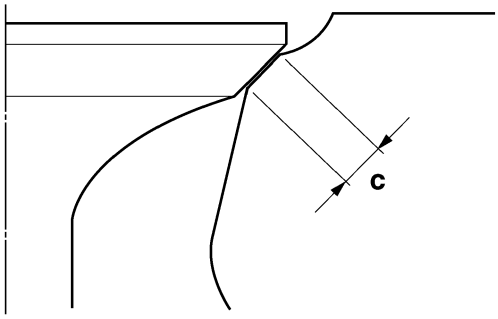
TIP

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.

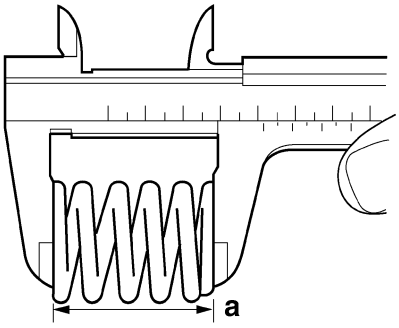


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EAM30093
CHECKING THE VALVE SPRINGS

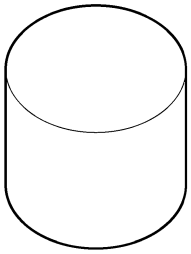
1. Measure:
   • Valve spring free length “a”
   Out of specification → Replace the valve spring.

Free length (intake)
36.78 mm (1.45 in)
Limit
34.94 mm (1.38 in)
Free length (exhaust)
35.60 mm (1.40 in)
Limit
33.82 mm (1.33 in)



EAM30094
CHECKING THE VALVE LIFTERS

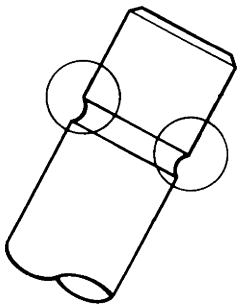
1. Check:
   • Valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.



I1170701

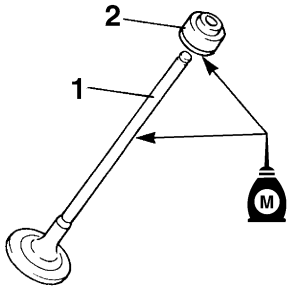
EAM30095
INSTALLING THE VALVES

1. Clean:
   • Valve stem end



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

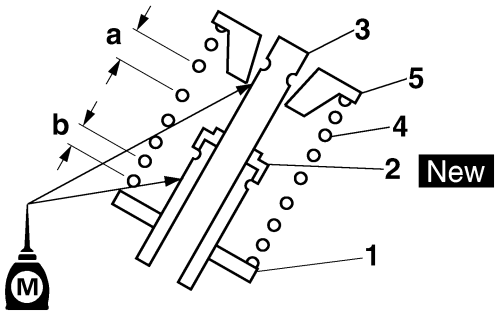
Recommended lubricant
Molybdenum disulfide oil



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.



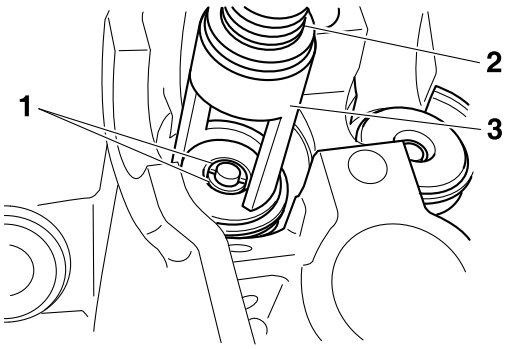
b. Smaller pitch

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

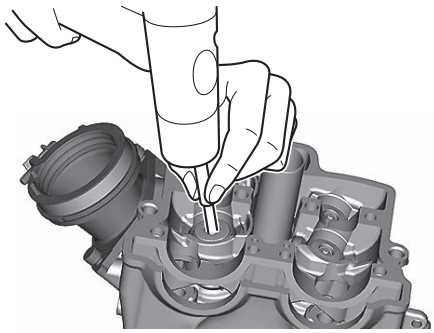


5. To fasten the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

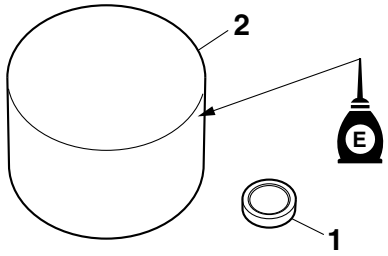
ECA13800

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

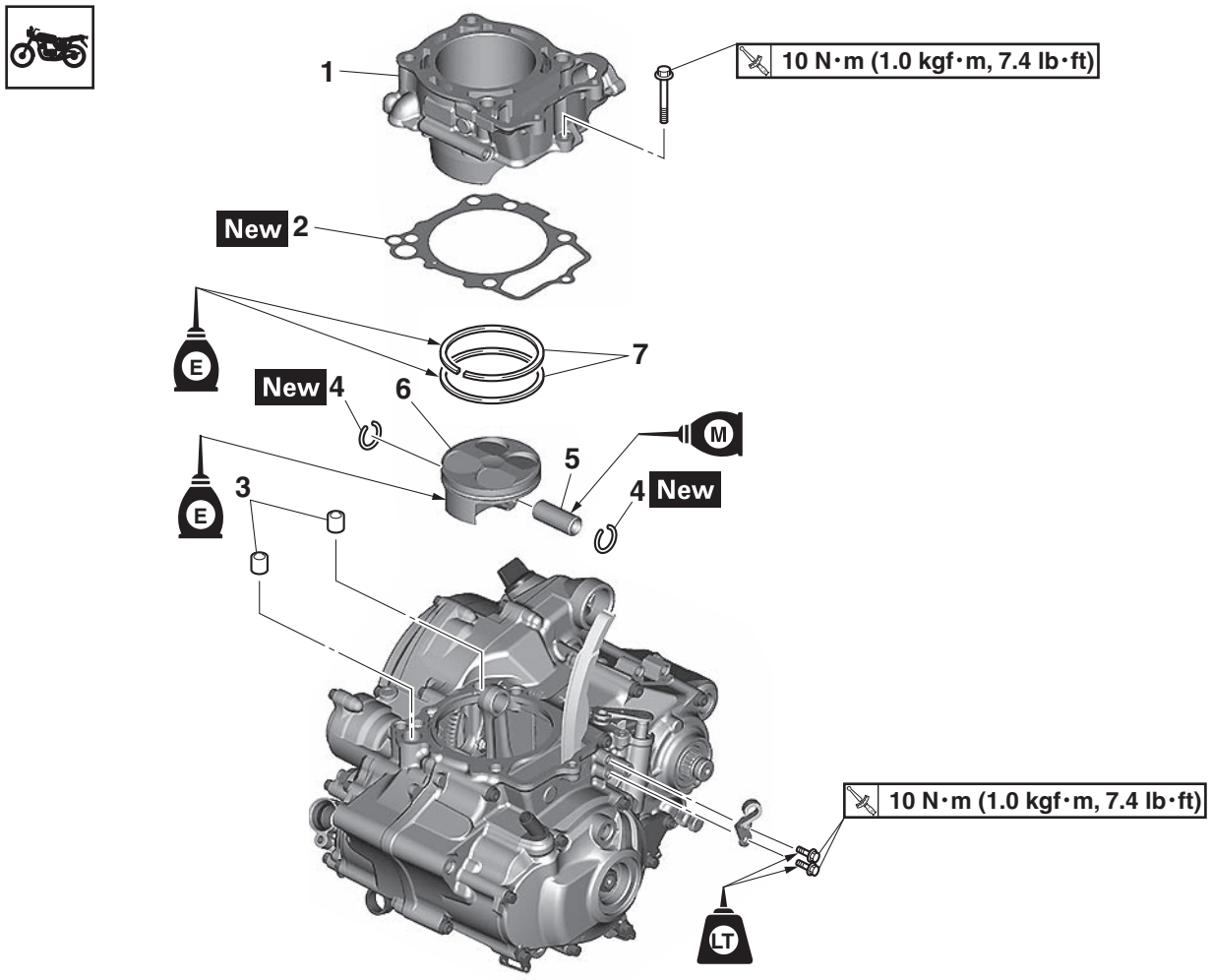
TIP

- 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 5-19.
1	Cylinder body	1	
2	Gasket	1	
3	Dowel pin	2	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Piston ring set	1	

EAM30096
REMOVING THE PISTON

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

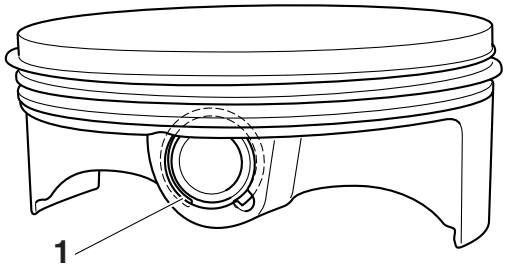
ECA13810
NOTICE

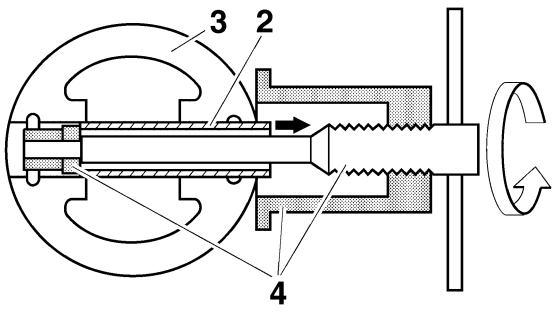
Do not use a hammer to drive the piston pin out.

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”.



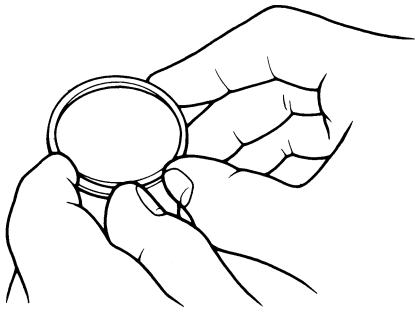
Piston pin puller set
90890-01304
Piston pin puller
YU-01304





2. Remove:
   - Top ring
   - 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

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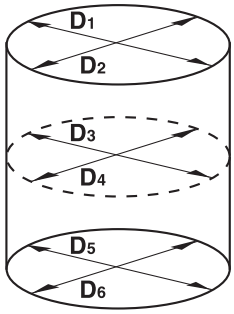
a. Measure the cylinder bore “C” with the cylinder bore gauge.

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



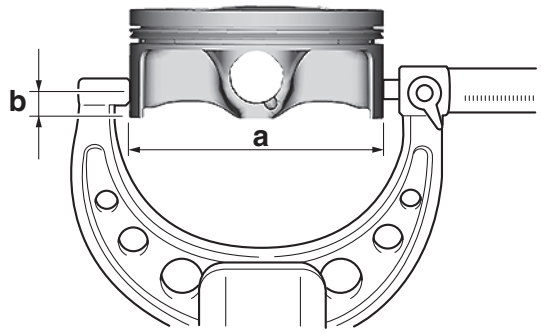
Bore
77.000–77.010 mm (3.0315–3.0319 in)
Wear limit
77.060 mm (3.0339 in)

“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
76.955–76.970 mm (3.0297–3.0303 in)
Measuring point (from piston skirt bottom)
4.0 mm (0.16 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
0.030–0.055 mm (0.0012–0.0022 in)

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

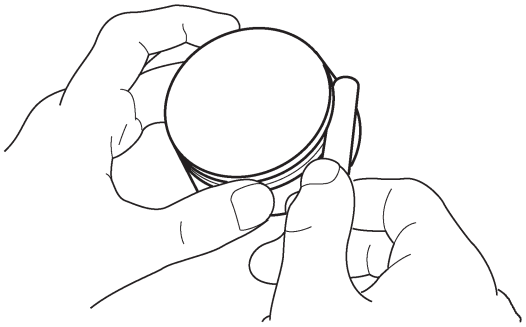
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EAM30098
CHECKING THE PISTON RINGS

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.

Ring side clearance
0.030–0.065 mm (0.0012–0.0026 in)
Side clearance limit
0.115 mm (0.0045 in)



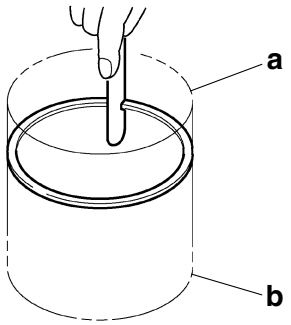
2. Install:
   • Piston ring
   (into the cylinder)

TIP
Use the piston crown to level the piston ring near bottom of cylinder "a", where cylinder wear is lowest.

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

TIP
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring
Top ring
End gap (installed)
0.15–0.25 mm (0.0059–0.0098 in)
End gap limit
0.50 mm (0.0197 in)



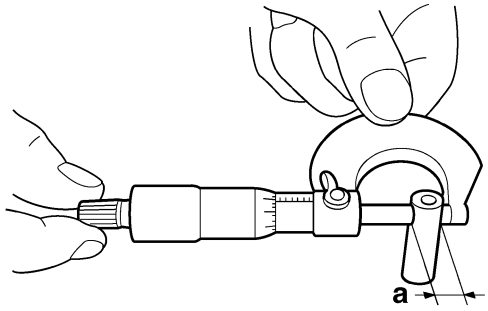
b. Upper of cylinder

EAM30099
CHECKING THE PISTON PIN

1. Check:
   • Piston pin
   Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

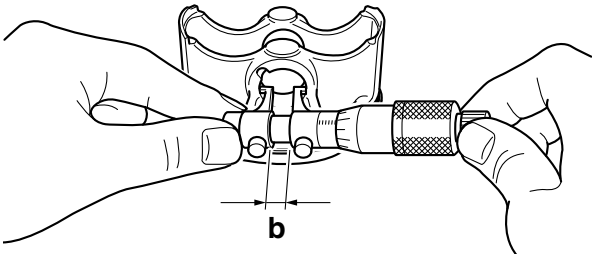
2. Measure:
   • Piston pin outside diameter “a”
   Out of specification → Replace the piston pin.

Piston pin outside diameter
15.991–16.000 mm (0.6296–0.6299 in)
Limit
15.971 mm (0.6288 in)



3. Measure:
   • Piston pin bore inside diameter “b”
   Out of specification → Replace the piston.

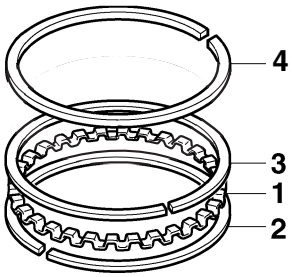
Piston pin bore inside diameter
16.002–16.013 mm (0.6300–0.6304 in)
Limit
16.043 mm (0.6316 in)

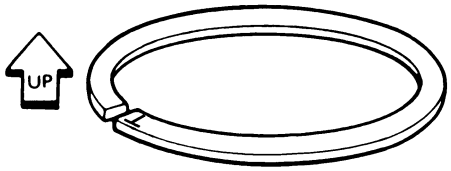


EAM30100
INSTALLING THE PISTON AND CYLINDER

1. Install:
   • Oil ring expander “1”
   • Lower oil ring rail “2”
   • Upper oil ring rail “3”
   • Top ring “4”

TIP
Be sure to install the piston ring so that the manufacturer’s marks or numbers face up.

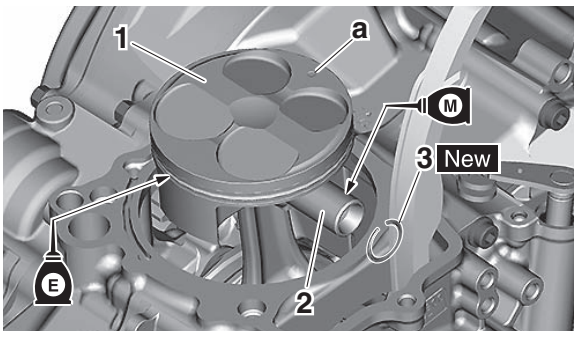


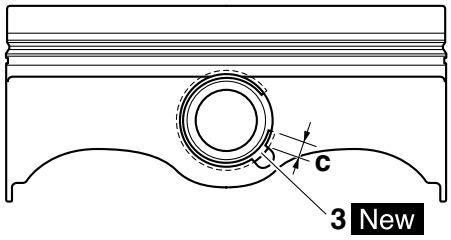


2. Install:
   • Piston “1”
   • Piston pin “2”
   • Piston pin clip “3” New

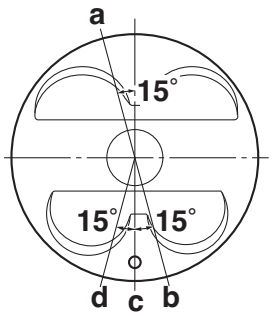
TIP
• Apply the engine oil to the piston pin.
• Install the piston with the mark “a” on it pointing to its exhaust (rear) side.
• Before installing the piston pin clip, cover the crankcase opening with a cloth to prevent the clip from falling into the crankcase.
• Make sure that the end of the piston pin clip “c” is not positioned at the cutout in the piston.

(exhaust side) through the timing chain cavity.





3. Lubricate:
   • Piston
   • Piston ring
   • Cylinder
4. Offset:
   • Piston ring end gap



a. Top ring
b. Upper oil ring rail
c. Oil ring expander
d. Lower oil ring rail

5. Install:
   • Cylinder gasket New
   • Dowel pin
   • Cylinder

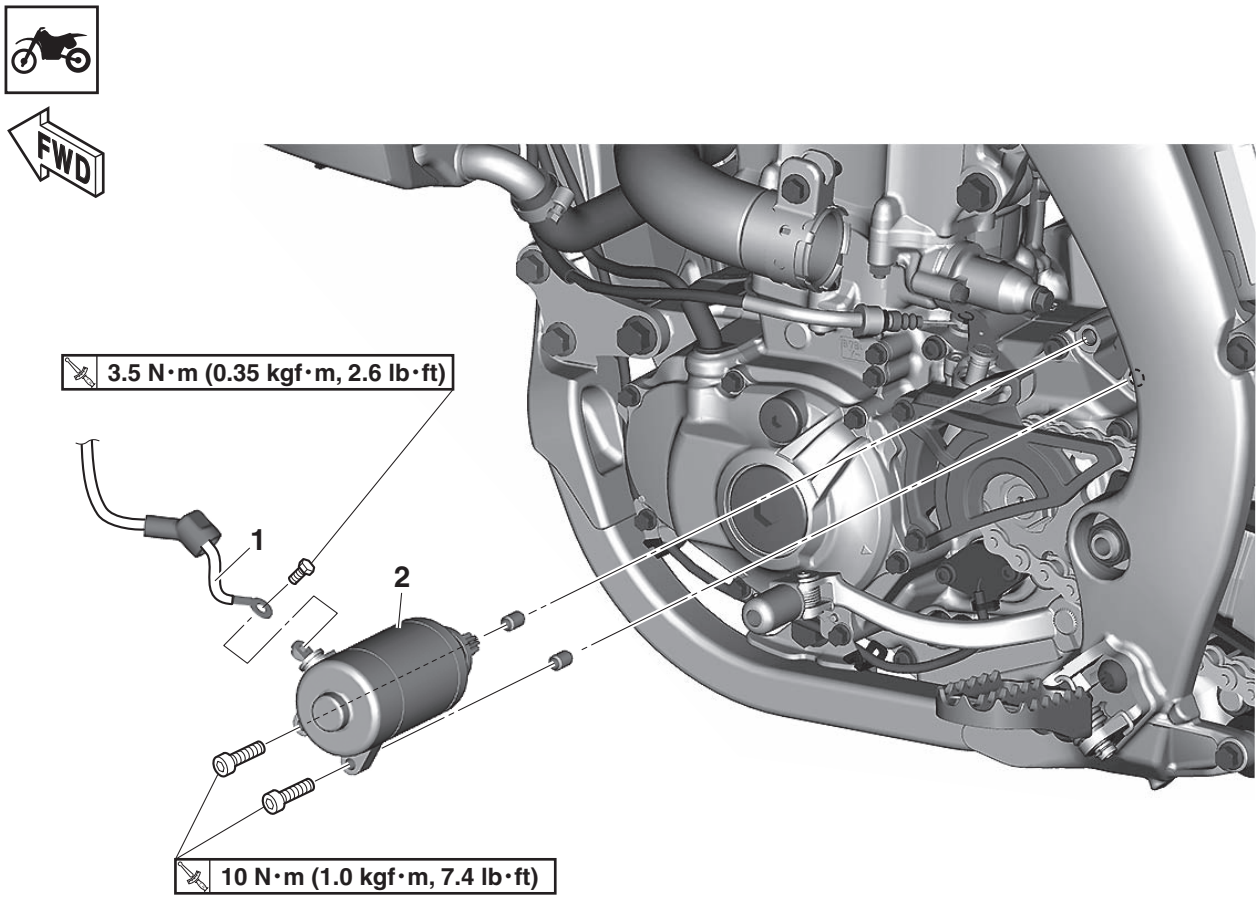
	Cylinder bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide

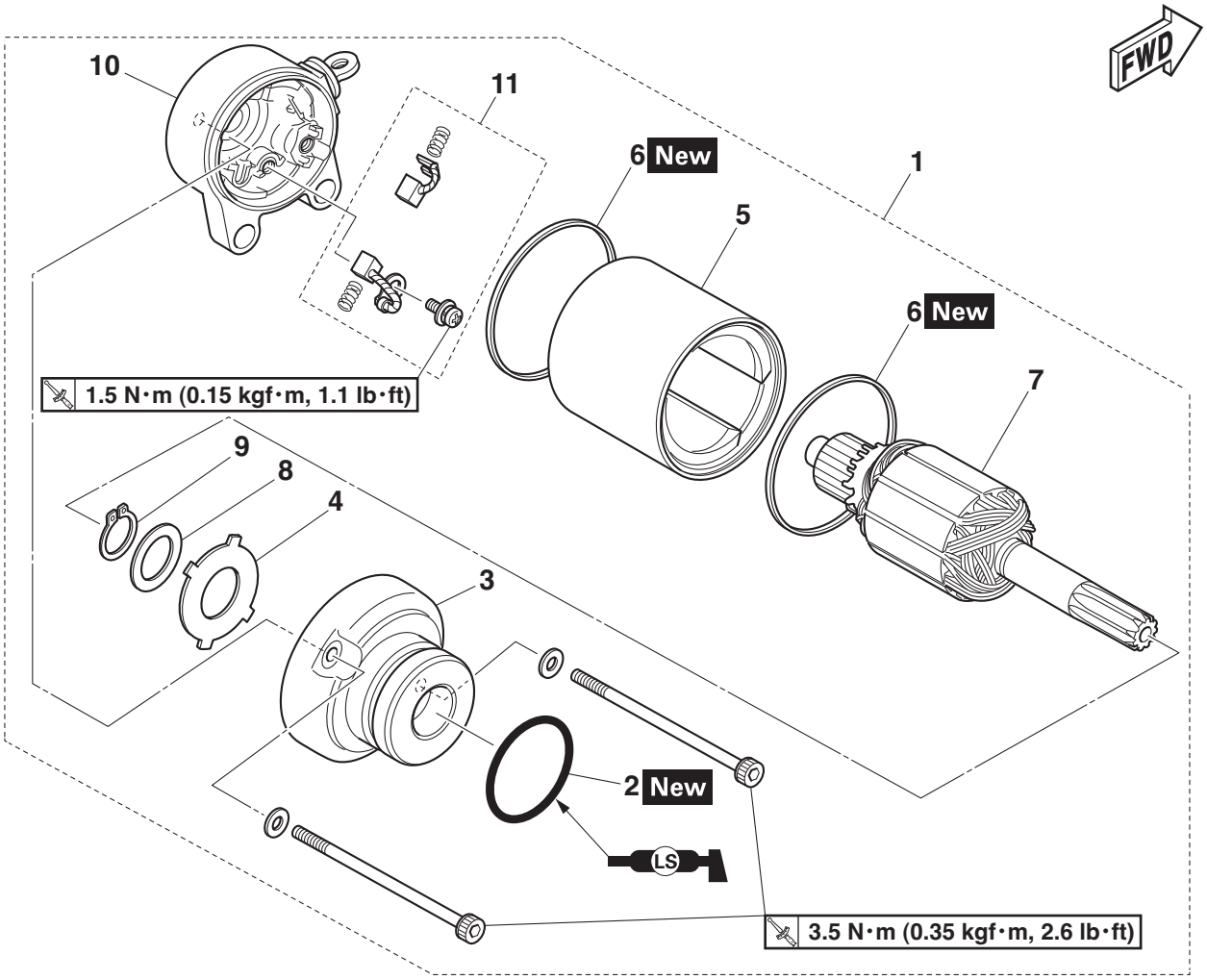
EAM20110
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-1.
1	Starter motor lead	1	
2	Starter motor	1	

Disassembling the starter motor

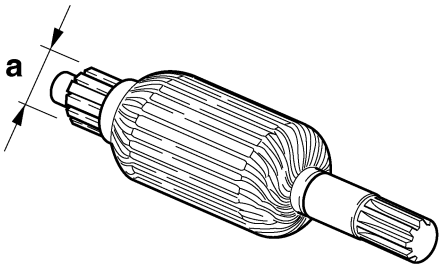


Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor assembly	1	
2	O-ring	1	
3	Starter motor front cover	1	
4	Washer	1	Starter motor front cover
5	Starter motor yoke	1	
6	Gasket	2	
7	Armature assembly	1	
8	Washer	1	
9	Circlip	1	
10	Starter motor rear cover	1	
11	Brush set	1	

EAM30106
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600 grit sandpaper.
2. Measure:
   • Commutator diameter “a”
   Out of specification → Replace the starter motor.

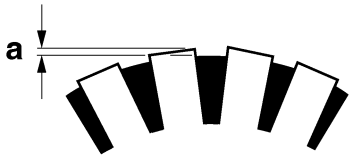
Commutator diameter
17.6 mm (0.69 in)



3. 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)
1.50 mm (0.06 in)

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



4. Measure:
   • Armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

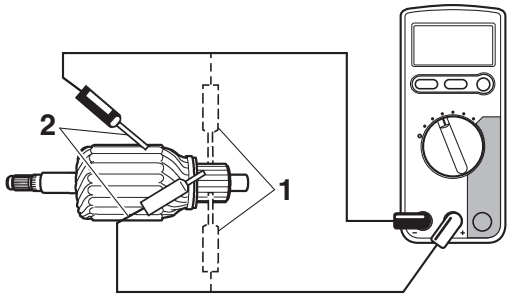
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a. Measure the armature assembly resistances “1” with the digital circuit tester.

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

Armature coil resistance “1”
0.0189–0.0231 Ω
Insulation resistance “2”
Above 1 MΩ

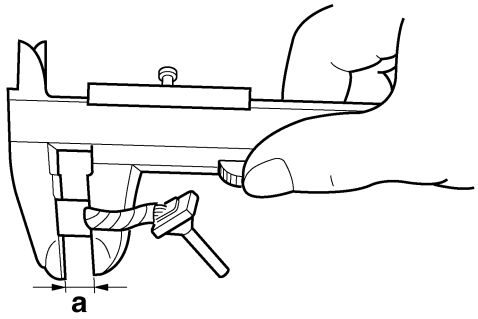
b. If any resistance is out of specification, replace the starter motor.



▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

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

Brush overall length limit
3.5 mm (0.14 in)



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

Brush spring force
3.92–5.88 N (400–600 gf, 14.11–21.17 oz)

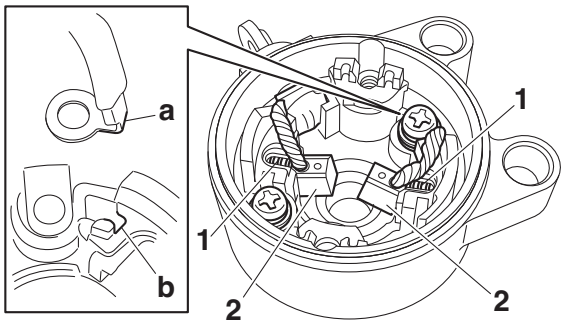
7. Check:
   • Gear teeth
   Damage/wear → Replace the starter motor.

8. Check:
   • Oil seal
   Damage/wear → Replace the defective part(s).

EAM30107
ASSEMBLING THE STARTER MOTOR

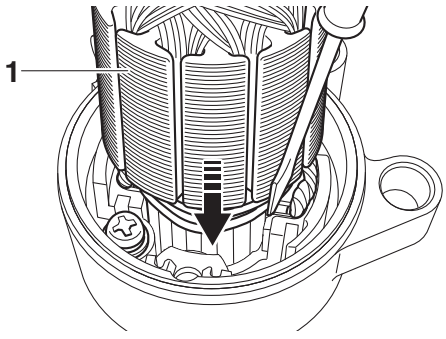
1. Install:
   • Brush spring “1”
   • Brush “2”

TIP
Align the corner of brush terminal “a” with groove “b” and fit them together.



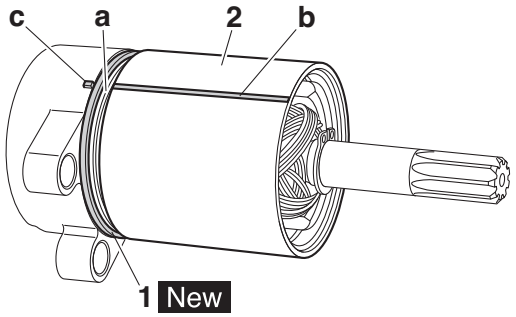
2. Install:
   • Armature assembly “1”
   Install while holding down the brush using a thin screw driver.

ECA24650
NOTICE
Be careful not to damage the brush during installation.



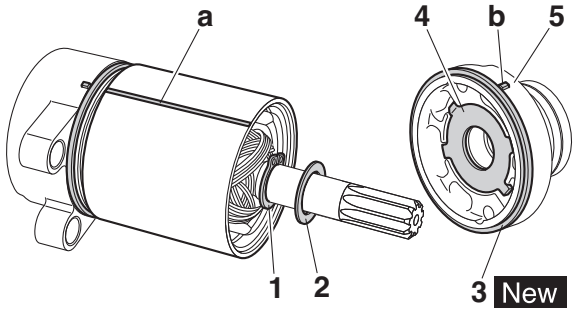
3. Install:
   • Gasket “1” New
   • Starter motor yoke “2”

TIP
- Install the starter motor yoke with its groove “a” facing starter motor rear cover.
- Align the match mark “b” on the starter motor yoke with the match mark “c” on the starter motor rear cover.



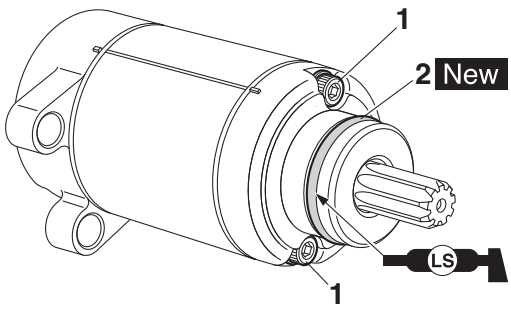
4. Install:
   • Circlip “1”
   • Plain washer “2”
   • Gasket “3” New
   • Washer (starter motor front cover) “4”
   • Starter motor front cover “5”

TIP
- For installation, align the projections on the washer with the slots in the front cover.
- Align the match mark “a” on the starter motor yoke with the match mark “b” on the starter motor front cover.

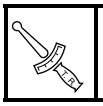


5. Install:
   • Bolt “1”
   • O-ring “2” New

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

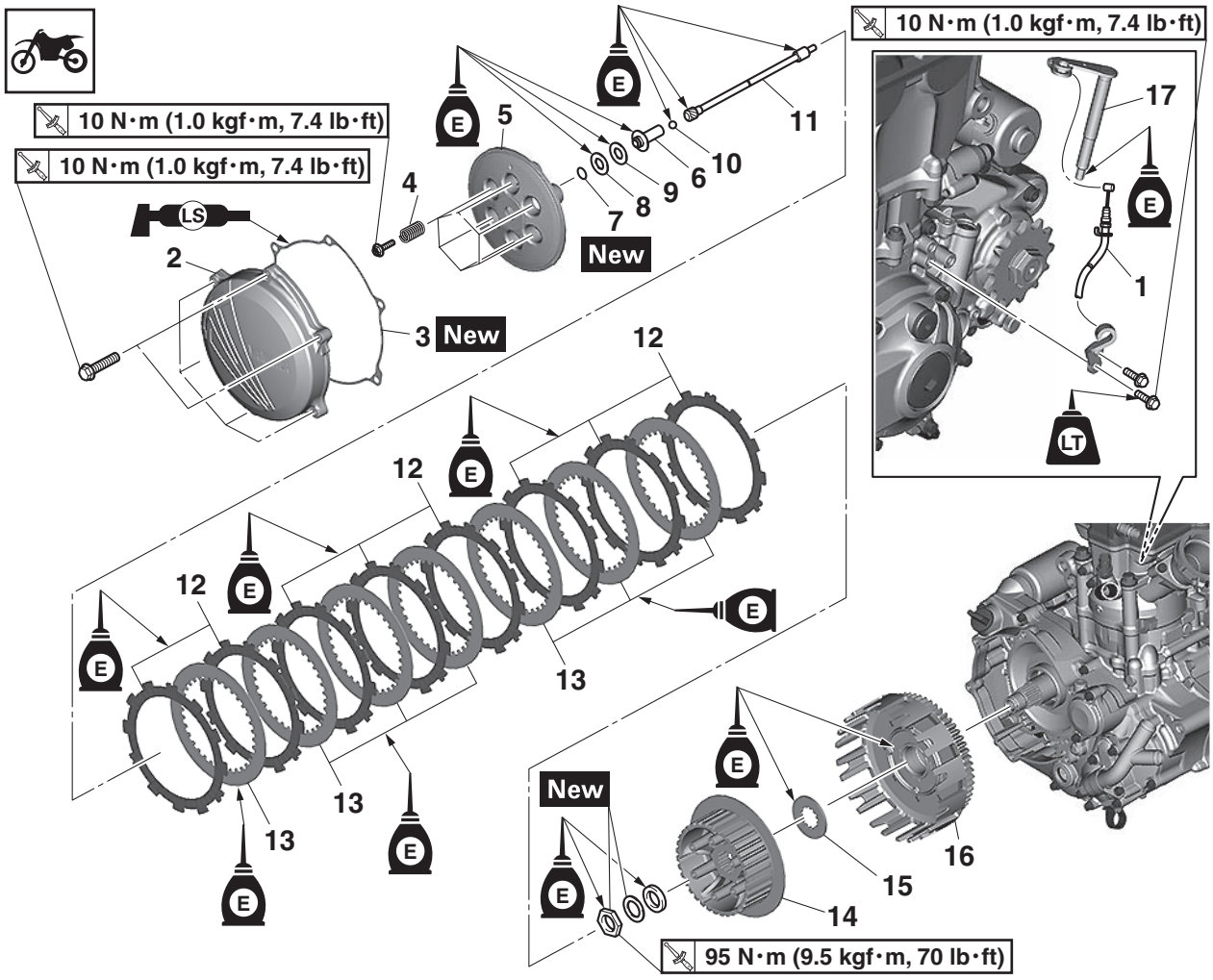


6. Install:
   • Starter motor
   • Starter motor bolt

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

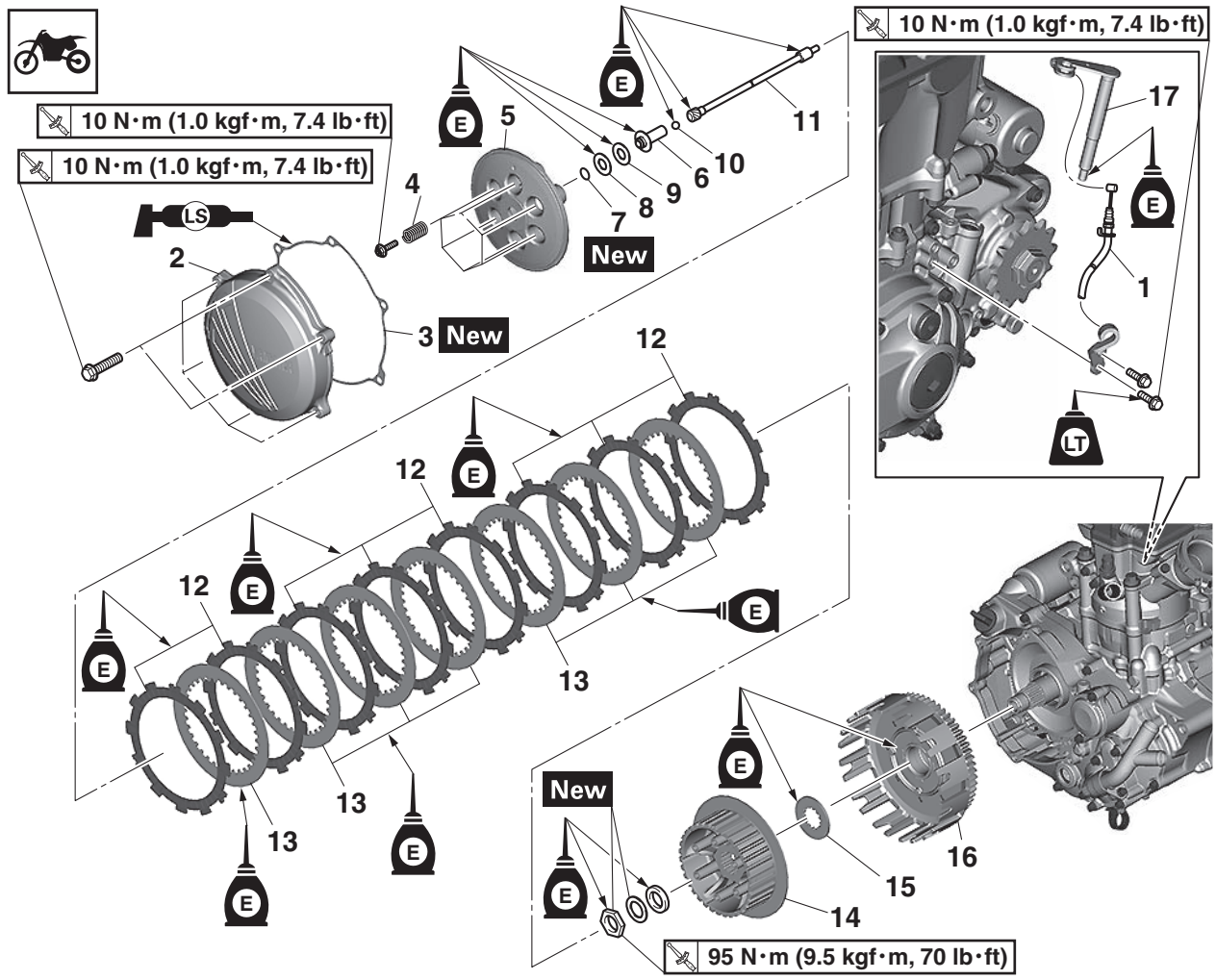
EAM20111
CLUTCH

Removing the clutch



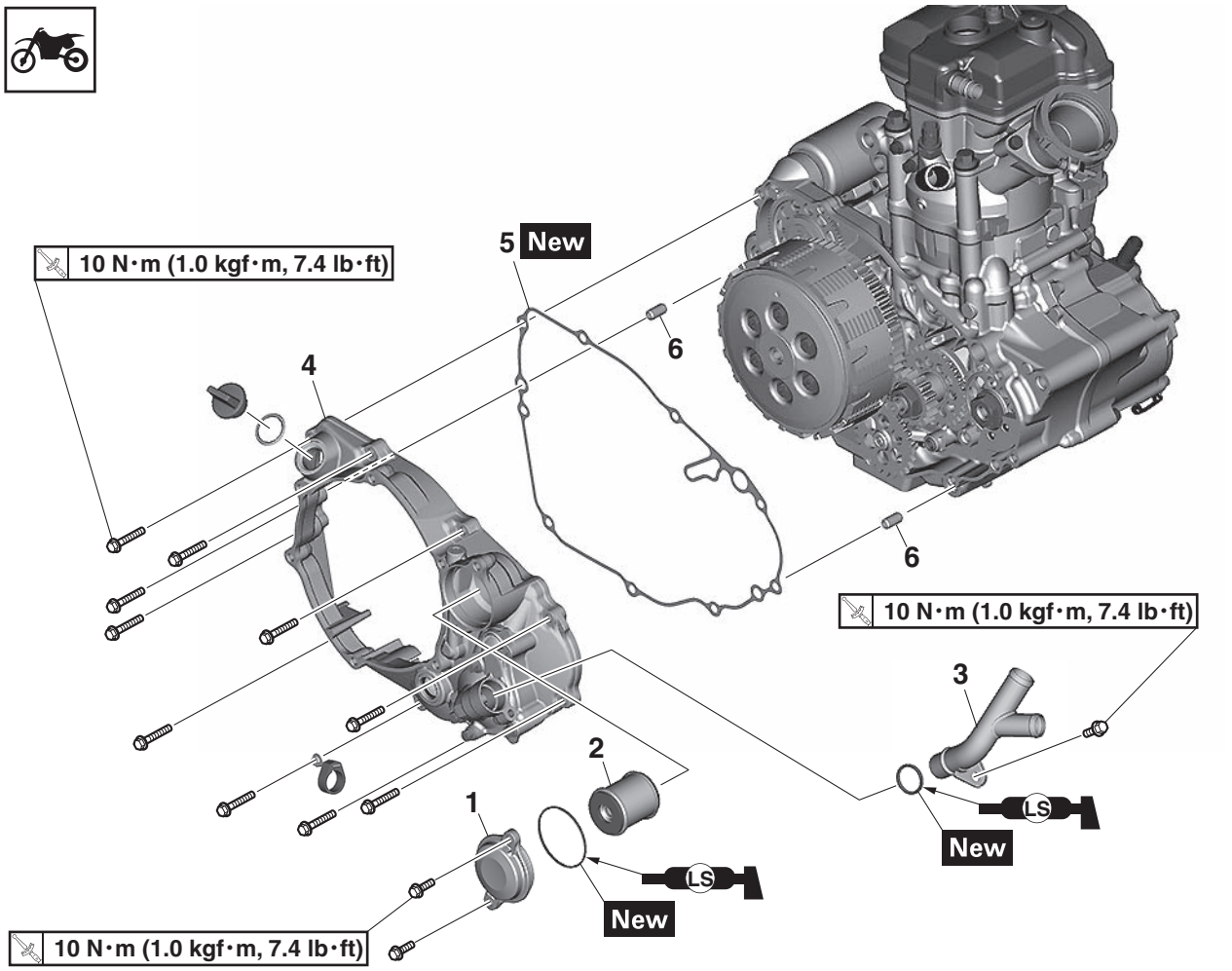
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-1.
1	Clutch cable	1	Disconnect.
2	Clutch cover	1	
3	Gasket	1	
4	Clutch spring	6	
5	Pressure plate	1	
6	Push rod 1	1	
7	Circlip	1	
8	Washers	1	
9	Bearing	1	
10	Ball	1	
11	Push rod 2	1	
12	Friction plate	8	
13	Clutch plate	7	
14	Clutch boss	1	
15	Thrust washer	1	

Removing the clutch



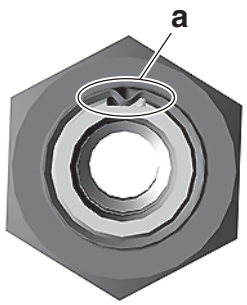
Order	Job/Parts to remove	Q'ty	Remarks
16	Primary driven gear	1	
17	Push lever shaft	1	

Removing the right crankcase cover



Order	Job/Parts to remove	Q'ty	Remarks
	Right engine guard		Refer to "ENGINE REMOVAL" on page 5-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Brake pedal		Refer to "ENGINE REMOVAL" on page 5-1.
	Clutch cover		Refer to "CLUTCH" on page 5-41.
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	

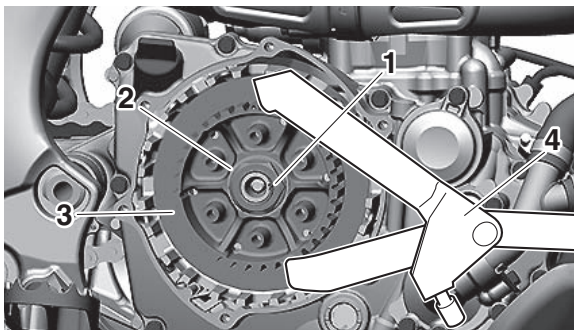
EAM30108
REMOVING THE CLUTCH
1. Straighten the clutch boss nut rib “a”.



2. Remove:
   - Clutch boss nut “1”
   - Conical washer “2”
   - Clutch boss “3”

TIP
- While holding the clutch boss with the universal clutch holder “4”, loosen the clutch boss nut.
- Do not use an impact wrench for removing the clutch boss nut.

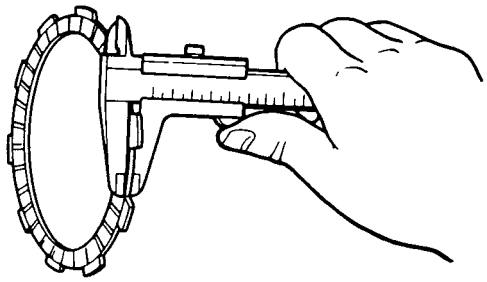
Universal clutch holder
90890-04086
Universal clutch holder
YM-91042



EAM30109
CHECKING THE FRICTION PLATES
1. Check:
   - Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace the friction plates as a set.

TIP
Measure it at four points on the friction plate.

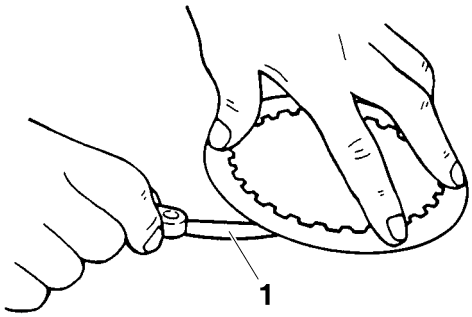
Friction plate thickness
2.70–2.80 mm (0.106–0.181 in)
Wear limit
2.60 mm (0.102 in)



EAM30110
CHECKING THE CLUTCH PLATES
1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate warpage
     (with a surface plate and thickness gauge “1”)
     Out of specification → Replace the clutch plates as a set.

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

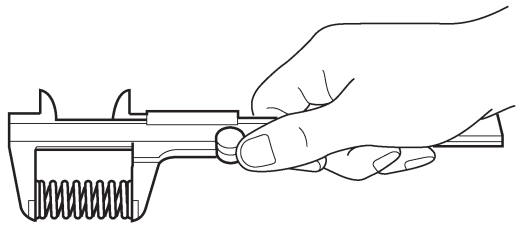
Clutch plate thickness
1.50–1.70 mm (0.059–0.067 in)
Warpage limit
0.10 mm (0.004 in)



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
46.20 mm (1.82 in)
Limit
43.89 mm (1.73 in)

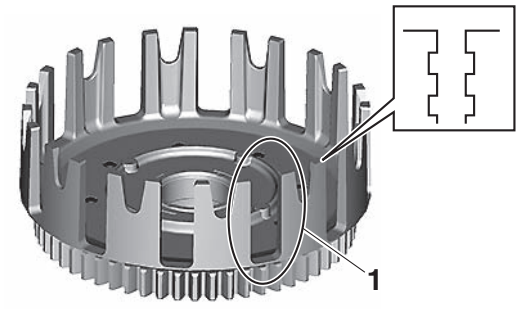


I1412901

EAM30112
CHECKING THE CLUTCH HOUSING

1. Check:
   • Clutch housing dogs "1"
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

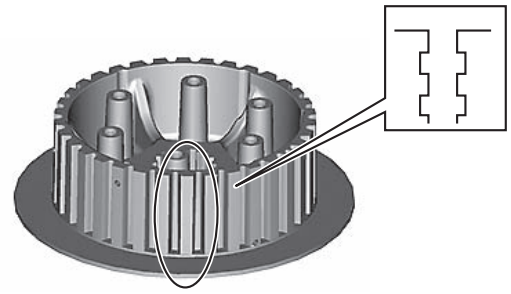
TIP
Pitting on the clutch housing dogs will cause erratic clutch operation.



EAM30113
CHECKING THE CLUTCH BOSS

1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

TIP
Pitting on the clutch boss splines will cause erratic clutch operation.

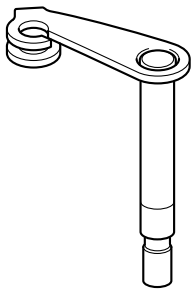


EAM30114
CHECKING THE PRESSURE PLATE

1. Check:
   • Pressure plate
   Crack/damage → Replace.

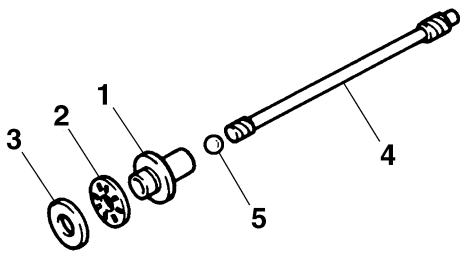
EAM30115
CHECKING THE PUSH LEVER SHAFT

1. Check:
   • Push lever shaft
   Wear/damage → Replace.



EAM30116
CHECKING THE CLUTCH PUSH RODS

1. Check:
   • Push rod 1 "1"
   • Bearing "2"
   • Washer "3"
   • Push rod 2 "4"
   • Ball "5"
   Cracks/damage/wear → Replace.



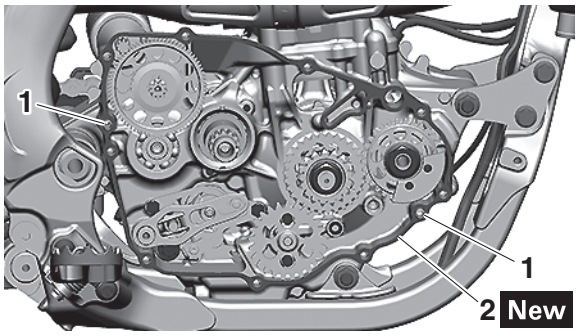
2. Measure:
   • Push rod 2 bending limit
   Out of specification → Replace.

	Push rod bending limit **0.30 mm (0.012 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.

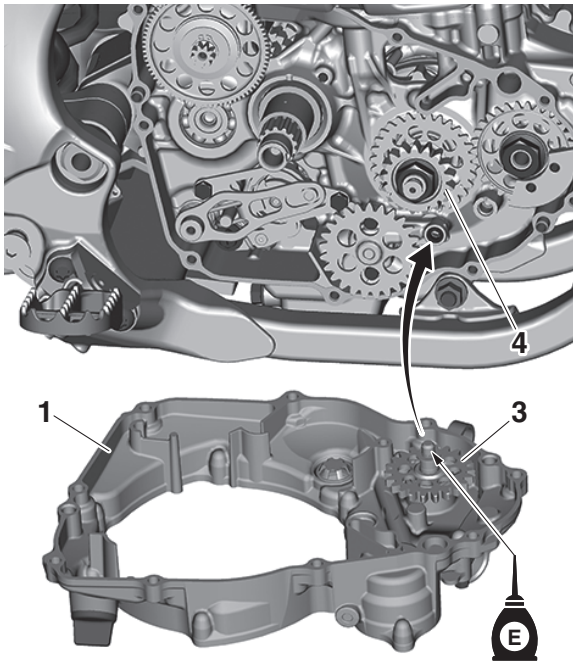
EAM30120
INSTALLING THE RIGHT CRANKCASE COVER
1. Install:
   - Dowel pin “1”
   - Gasket “2” New

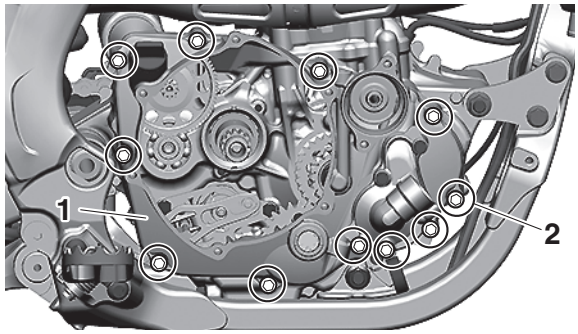


2. Install:
   - Right crankcase cover “1”
   - Right crankcase cover bolt “2”

	Right crankcase cover bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

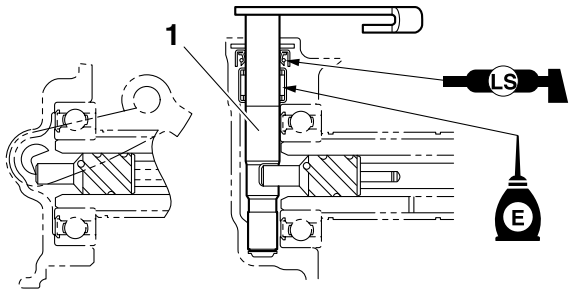
TIP
- Apply the engine oil on the impeller shaft end.
- Mesh the impeller shaft gear “3” with primary drive gear “4”.
- Tighten the right crankcase cover bolts in stages and in a crisscross pattern.





EAM30121
INSTALLING THE CLUTCH
1. Install:
   - Push lever shaft “1”

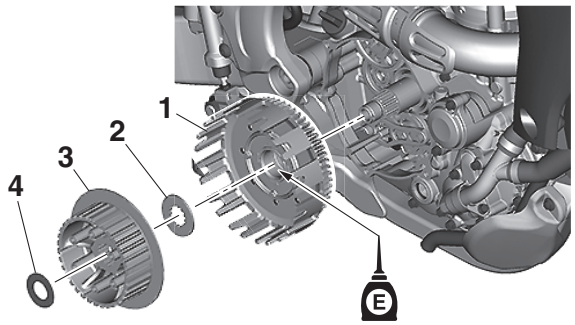
TIP
- Apply the lithium-soap-based grease on the oil seal lip.
- Before installation, apply the engine oil to the push lever shaft sliding surface.



2. Install:
   - Primary driven gear “1”
   - Thrust washer “2”
   - Clutch boss “3”
   - Washer “4”

TIP

Apply the engine oil on the primary driven gear inner circumference.



3. Install:
   - Conical washer “1” New
   - Clutch boss nut “2” New

	Clutch boss nut **95 N·m (9.5 kgf·m, 70 lb·ft)**

ECA24660

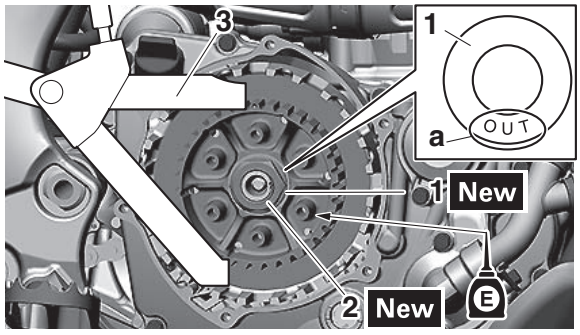
NOTICE

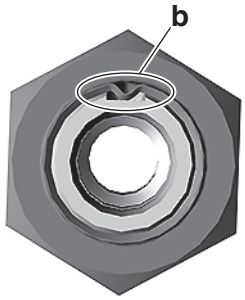
Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.

TIP

- Install the conical washer on the main axle with the “OUT” mark “a” facing away from the vehicle.
- Apply engine oil to the threads and contact surface of the clutch boss nut.
- Apply engine oil to the contact surfaces of the conical washer.
- Use the universal clutch holder “3” to hold the clutch boss.
- Do not use an impact wrench for installing the clutch boss nut.
- Stake the clutch boss nut at cutouts “b” in the main axle.

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

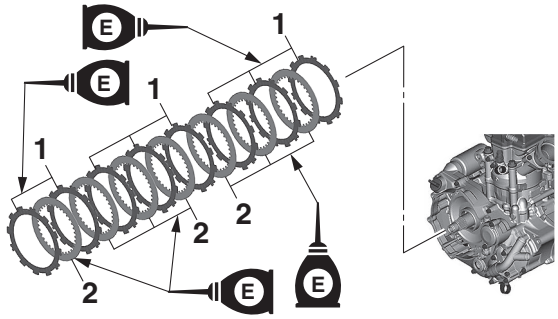


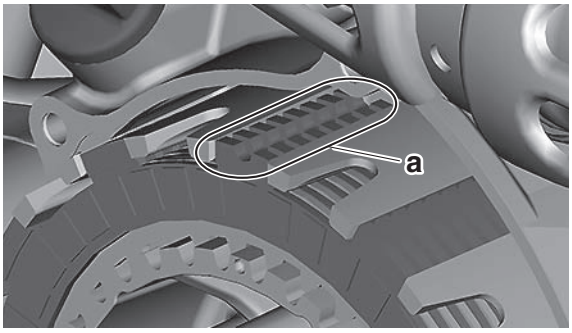


4. Install:
   - Friction plate “1”
   - Clutch plate “2”

TIP

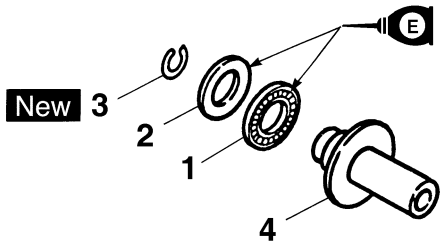
- Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.
- Align the friction plate with the groove “a” in the friction plate and install it to the primary driven gear.
- Apply the engine oil on the friction plates and clutch plates.





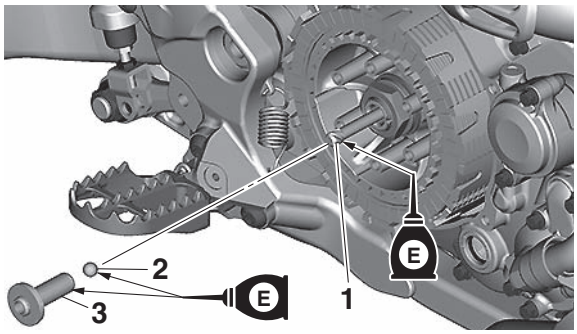
5. Install:
   • Bearing “1”
   • Washer “2”
   • Circlip “3” New
     To push rod 1 “4”.

TIP
Apply the engine oil on the bearing and washer.



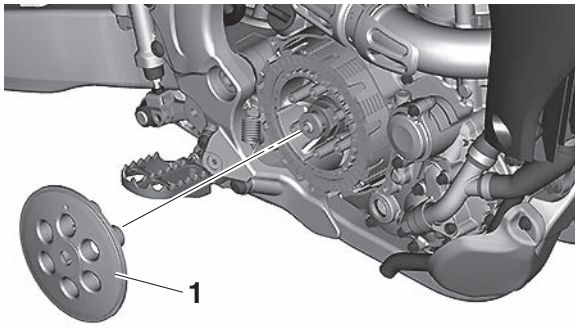
6. Install:
   • Push rod 2 “1”
   • Ball “2”
   • Push rod 1 “3”

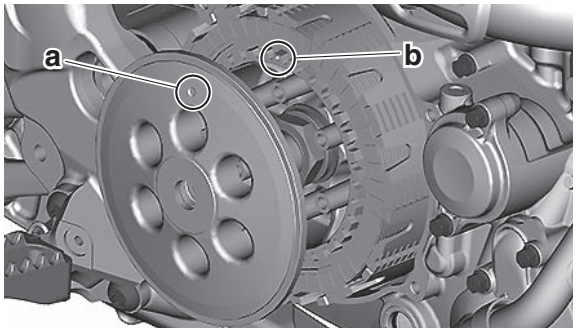
TIP
Apply the engine oil on the push rod 1, 2 and ball.



7. Install:
   • Pressure plate “1”

TIP
Making sure to align a “a” on the pressure plate with the punch mark “b” on the clutch housing.





8. Install:
   • Clutch spring
   • Clutch spring bolt

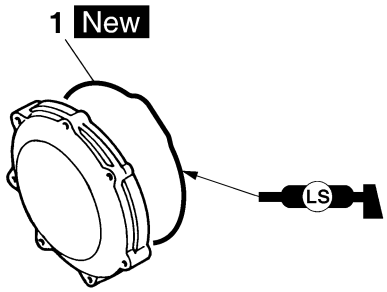
	Clutch spring bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP
Tighten the bolts in stages and in a crisscross pattern.



9. Install:
   • O-ring “1” New

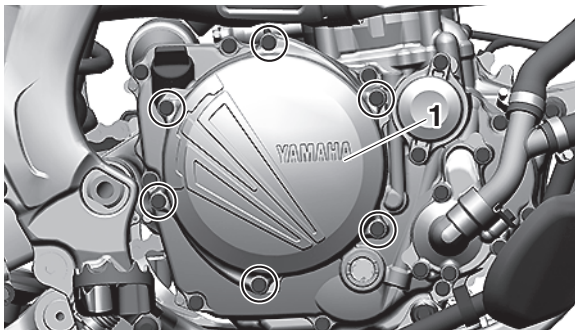
TIP
Apply the lithium-soap-based grease to the O-ring.



10.Install:
- Clutch cover “1”
- Clutch cover bolt

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

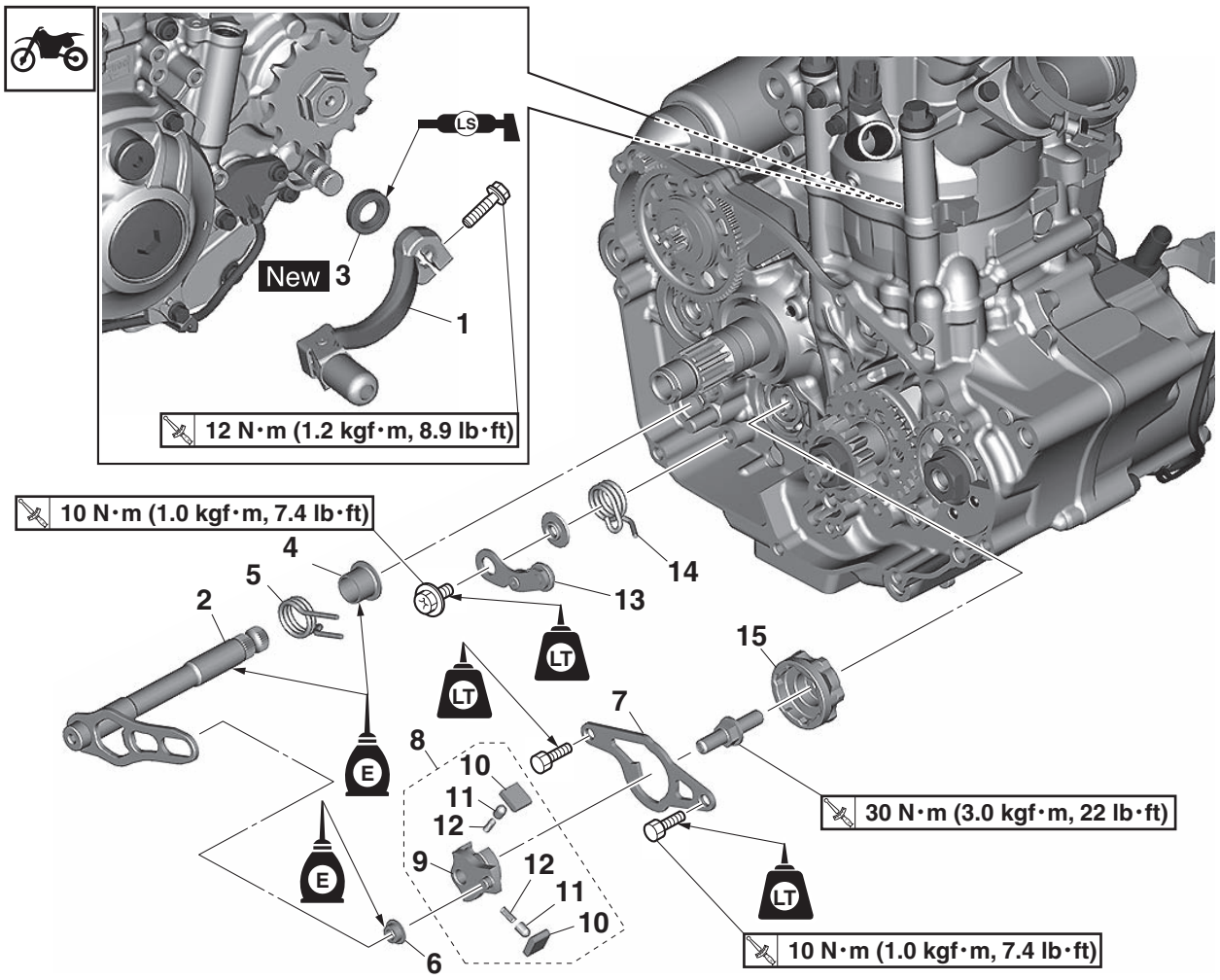
TIP
Tighten the bolts in stages and in a crisscross pattern.



EAM20113

SHIFT SHAFT

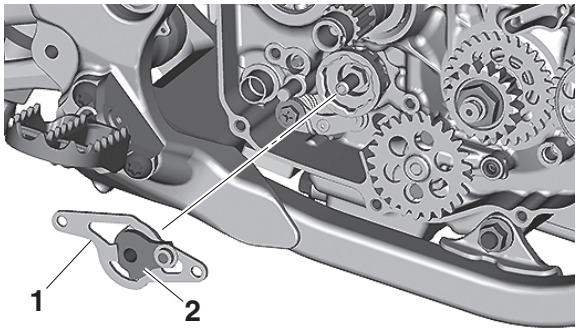
Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-41.
1	Shift pedal	1	
2	Shift shaft	1	
3	Oil seal	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Roller	1	
7	Shift guide	1	
8	Shift lever assembly	1	
9	Shift lever	1	
10	Pawl	2	
11	Pawl pin	2	
12	Spring	2	
13	Stopper lever	1	
14	Stopper lever spring	1	
15	Segment	1	

EAM30123
REMOVING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY
1. Remove:
   • Bolt (shift guide)
   • Shift guide “1”
   • Shift lever assembly “2”

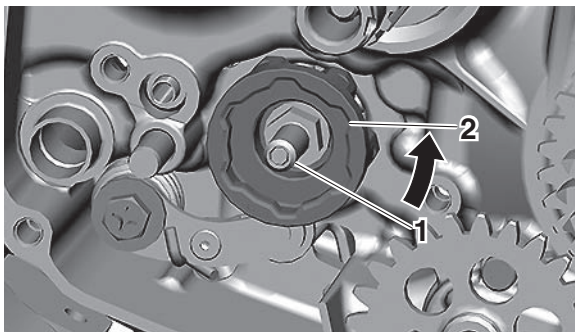
TIP
Make sure that the shift lever assembly is removed together with the shift guide.



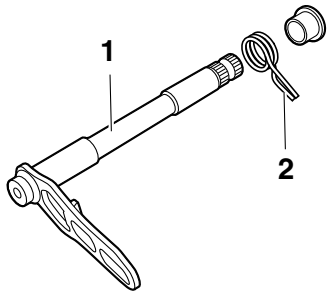
EAM30124
REMOVING THE SEGMENT
1. Remove:
   • Bolt (segment) “1”
   • Segment “2”

TIP
Turn the segment counterclockwise until it stops and loosen the bolt.

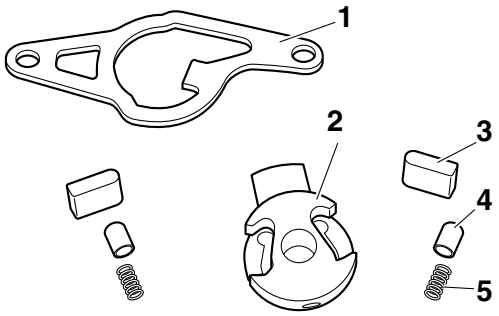
ECA24670
NOTICE
If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when removing the bolt.



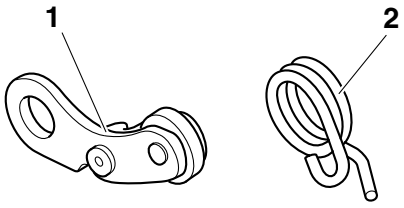
EAM30125
CHECKING THE SHIFT SHAFT
1. Check:
   • Shift shaft “1”
     Bends/damage/wear → Replace.
   • Shift shaft spring “2”
     Damage/wear → Replace.



EAM30126
CHECKING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY
1. Check:
   • Shift guide “1”
   • Shift lever “2”
   • Pawl “3”
   • Pawl pin “4”
   • Spring “5”
     Wear/damage → Replace.



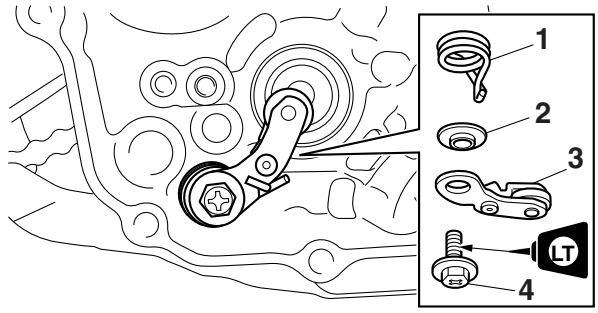
EAM30127
CHECKING THE STOPPER LEVER
1. Check:
   • Stopper lever “1”
     Wear/damage → Replace.
   • Torsion spring “2”
     Broken → Replace.



EAM30128
INSTALLING THE STOPPER LEVER
1. Install:
   • Torsion spring “1”
   • Collar “2”

• Stopper lever “3”
• Bolt (stopper lever) “4”

Bolt (stopper lever)
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®



EAM30129
INSTALLING THE SEGMENT

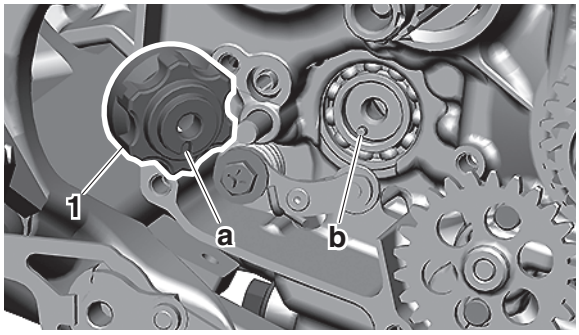
1. Install:
   • Segment “1”
   • Segment bolt

Segment bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP
• Align the notch “a” on the segment with the pin “b” on the shift cam.
• With the stopper lever pushed down, install the segment.

ECA24680
NOTICE

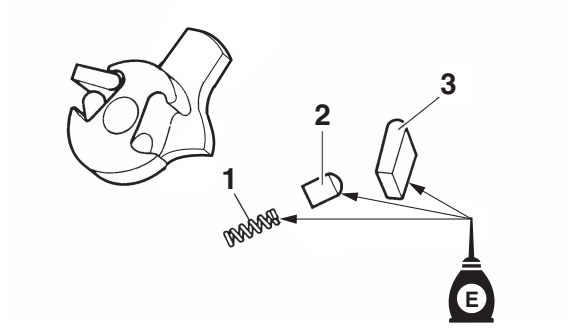
If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when tightening the bolt.



EAM30130
INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

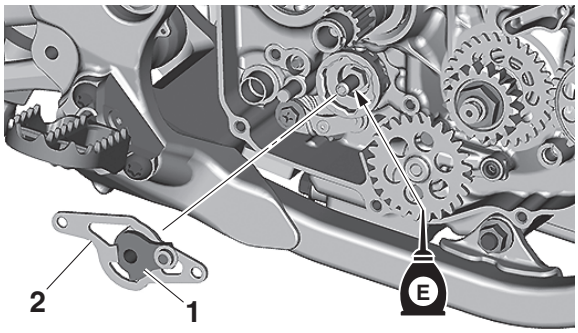
1. Install:
   • Spring “1”
   • Pawl pin “2”
   • Pawl “3”
     (to the shift lever)

TIP
Apply the engine oil on the spring, pawl pin and pawl.



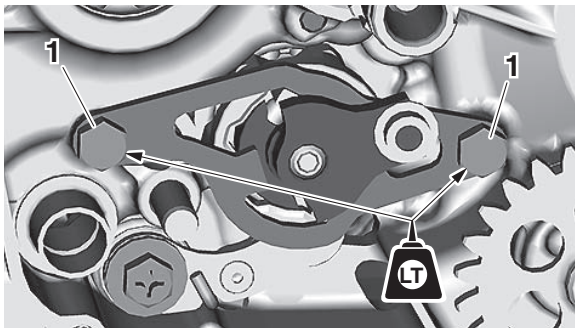
2. Install:
   • Shift lever assembly
     (to the shift guide)
3. Install:
   • Shift lever assembly “1”
   • Shift guide “2”

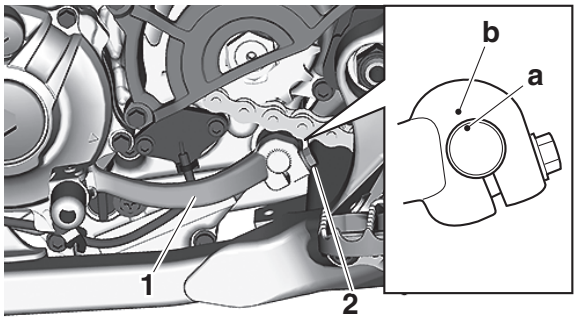
TIP
• The shift lever assembly is installed at the same time as the shift guide.
• Apply the engine oil on the segment bolt shaft.



4. Tighten:
   • Shift guide bolt “1”

Shift guide bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

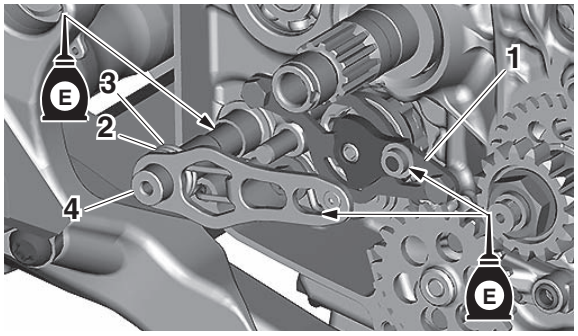




EAM30131
INSTALLING THE SHIFT SHAFT

1. Install:
   - Roller “1”
   - Shift haft spring “2” (to shift shaft)
   - Collar “3” (to shift shaft)
   - Shift shaft “4”

TIP
Apply the engine oil on the roller and shift shaft.



2. Install:
   - Oil seal New

EAM30132
INSTALLING THE SHIFT PEDAL

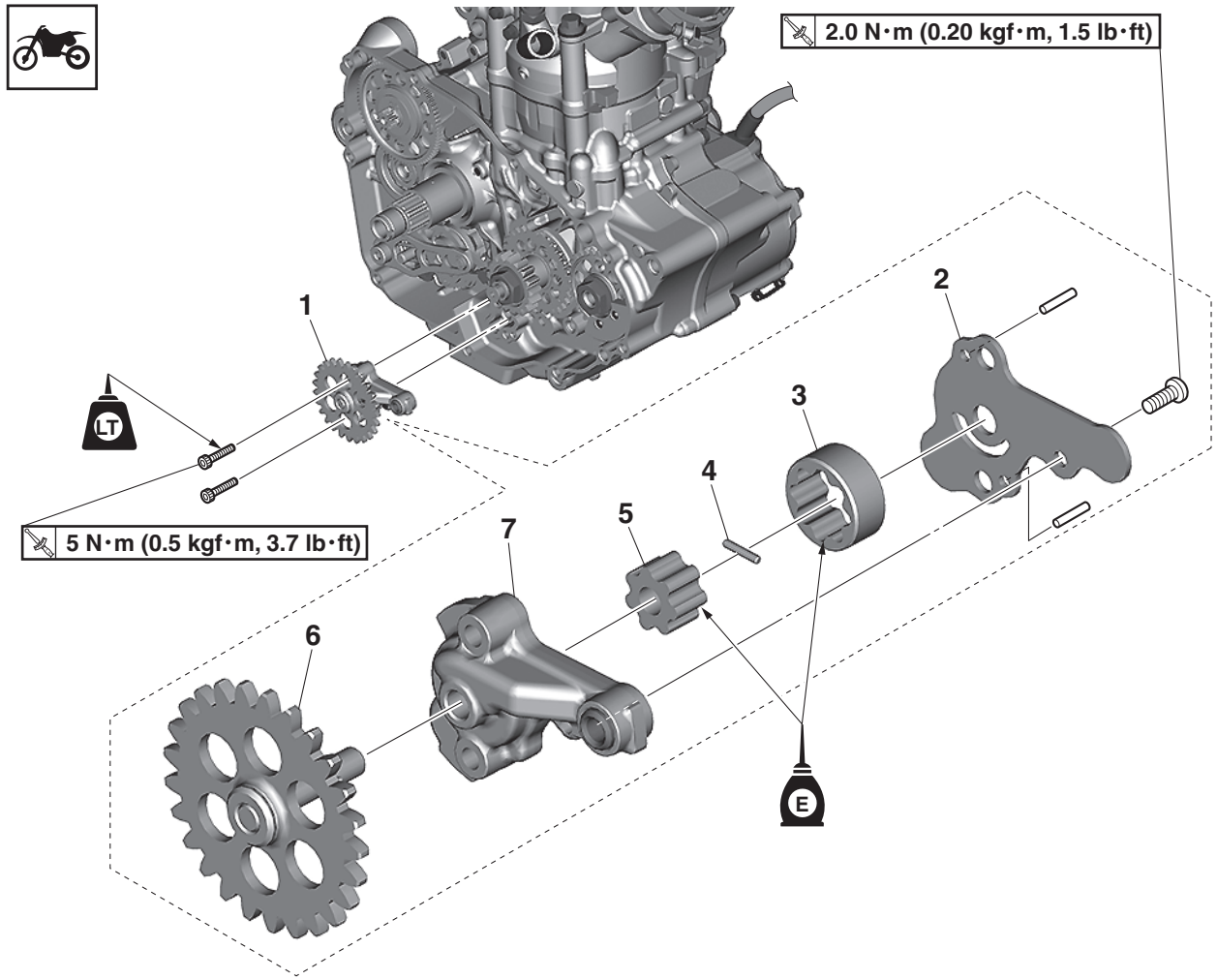
1. Install:
   - Shift pedal “1”
   - Shift pedal bolt “2”

	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.

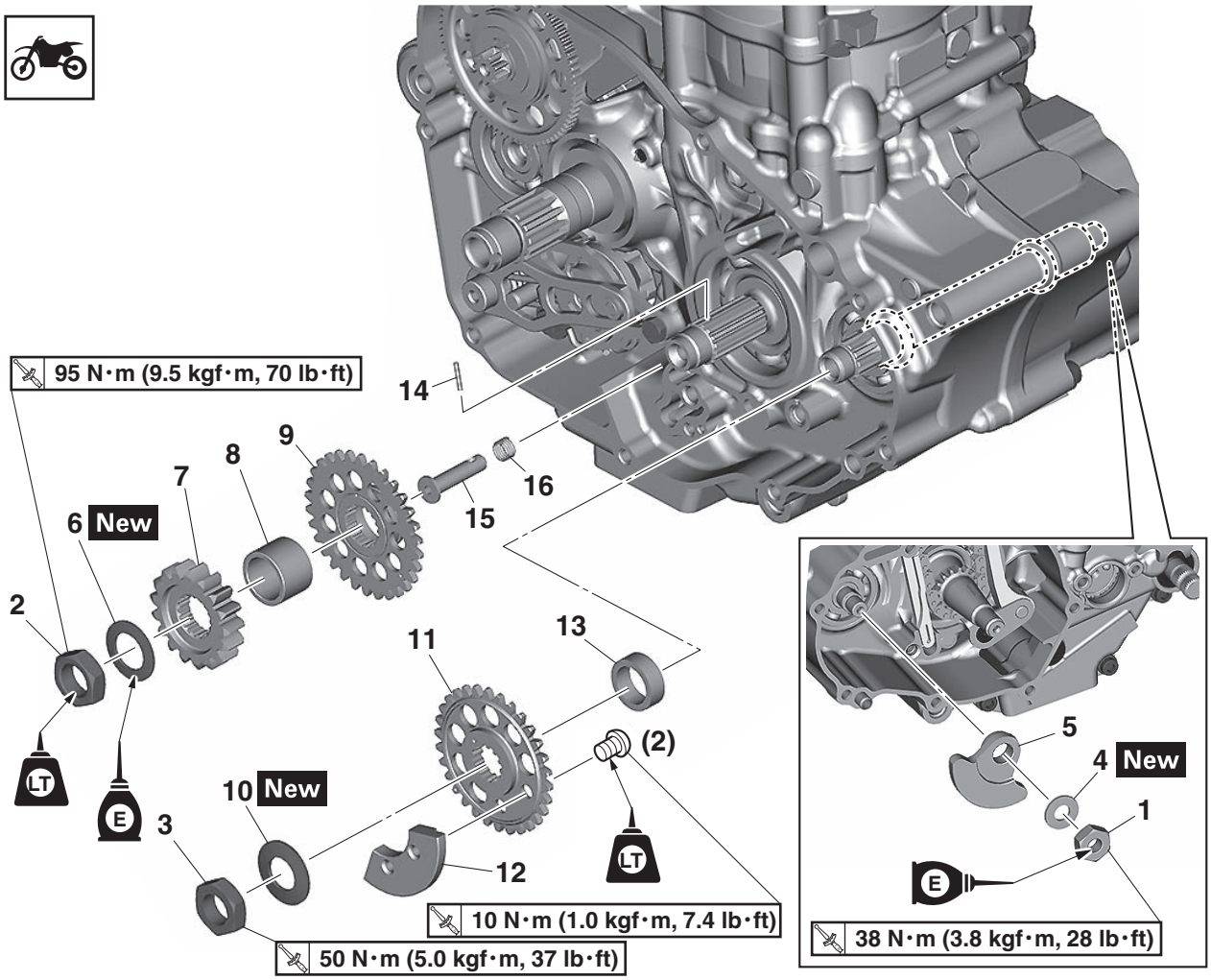
EAM20114
OIL PUMP AND BALANCER GEAR

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-41.
	Right crankcase cover		Refer to "CLUTCH" on page 5-41.
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	

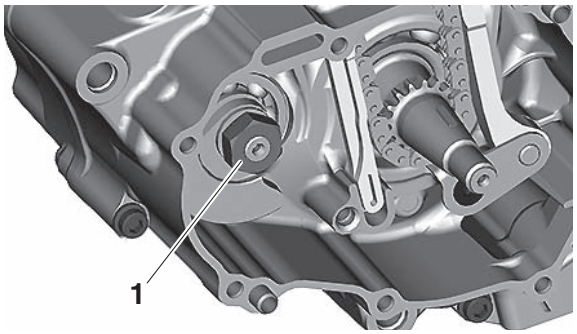
Removing the balancer

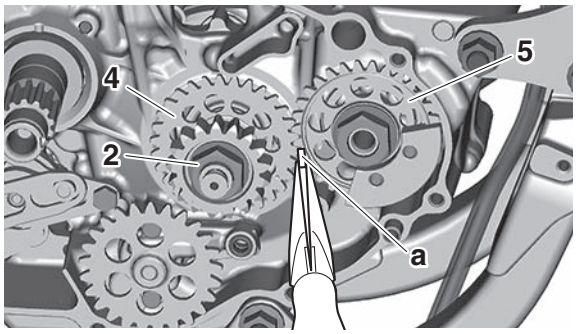


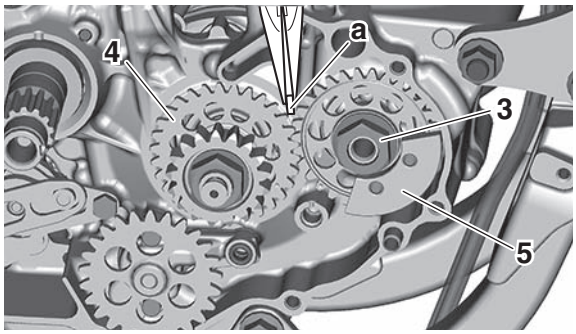
Order	Job/Parts to remove	Q'ty	Remarks
	Primary driven gear		Refer to "CLUTCH" on page 5-41.
	Right crankcase cover		Refer to "CLUTCH" on page 5-41.
	Stator		Refer to "AC MAGNETO" on page 5-60.
1	Nut (balancer)	1	
2	Nut (primary drive gear)	1	
3	Nut (balancer weight gear)	1	
4	Conical washer	1	
5	Balancer weight	1	
6	Conical washer	1	
7	Primary drive gear	1	
8	Collar	1	
9	Balancer drive gear	1	
10	Conical washer	1	
11	Balancer weight gear	1	
12	Balancer weight	1	
13	Collar	1	
14	Pin	1	
15	Relief valve	1	
16	Spring	1	

EAM30133
REMOVING THE BALANCER
1. Straighten the lock washer tab.
2. Loosen:
   - Balancer nut “1”
   - Primary drive gear nut “2”
   - Balancer weight gear nut “3”

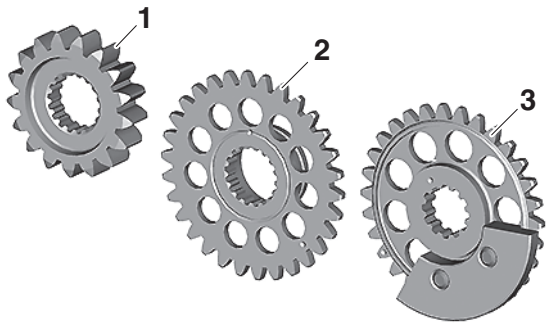
TIP
Place an aluminum plate “a” between the teeth of the balancer drive gear “4” and balancer weight gear “5”.







EAM30134
CHECKING THE PRIMARY DRIVE GEAR, BALANCER DRIVE GEAR, AND BALANCER WEIGHT GEAR
1. Check:
   - Primary drive gear “1”
   - Balancer drive gear “2”
   - Balancer weight gear “3”
     Wear/damage → Replace.

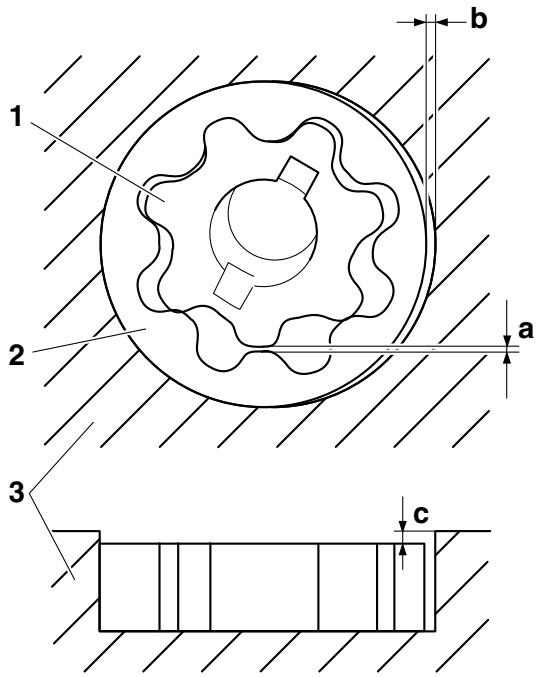


EAM30135
CHECKING THE BALANCER
1. Check:
   - Balancer
     Crack/damage → Replace.



EAM30136
CHECKING THE OIL PUMP
1. Check:
   - Oil pump cover
   - Oil pump drive shaft
   - Oil pump housing
     Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance “a”
   - Outer-rotor-to-oil-pump-housing clearance “b”
   - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance “c”
     Out of specification → Replace the oil pump.

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



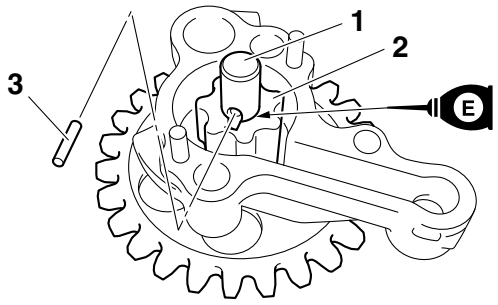
1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:
• Oil pump operation
Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAM30137
ASSEMBLING THE OIL PUMP

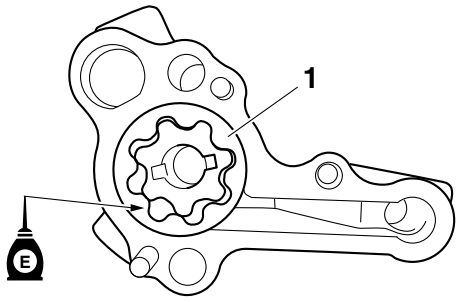
1. Install:
• Oil pump drive shaft “1”
• Inner rotor “2”
• Dowel pin “3”

TIP
• Apply the engine oil on the oil pump drive shaft and inner rotor.
• Fit the dowel pin into the groove in the inner rotor.



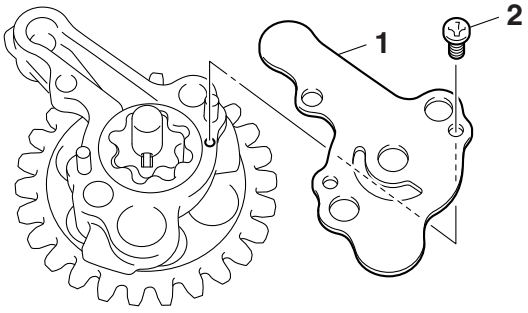
2. Install:
• Outer rotor “1”

TIP
Apply the engine oil on the outer rotor.



3. Install:
• Oil pump cover “1”
• Oil pump cover screw “2”

Oil pump cover screw
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)



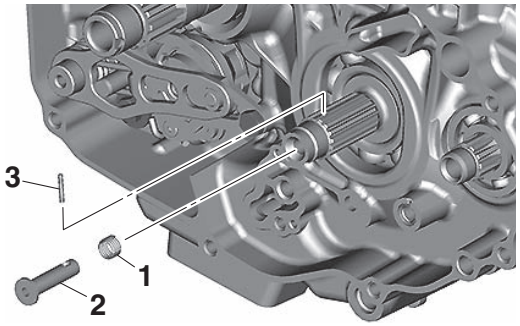
EAM30472
INSTALLING THE RELIEF VALVE

1. Install:
• Spring “1”
• Relief valve “2”

• Pin “3”

TIP

- Install the spring “1” and relief valve “2”, and pin “3”. After installing, make sure that the relief valve “2” does not come loose.
- Install the relief valve before installing the primary drive gear and collar.

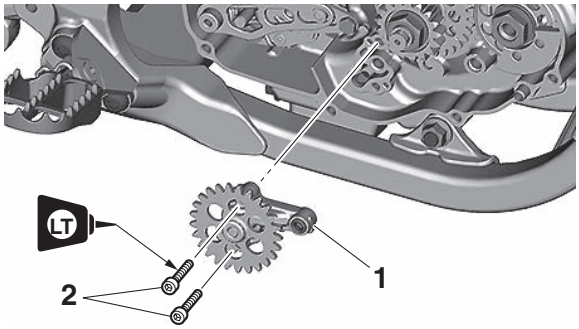


EAM30138

INSTALLING THE OIL PUMP AND BALANCER GEAR

1. Install:
   - Oil pump assembly “1”
   - Oil pump assembly bolt “2”

	**Oil pump assembly bolt** **5 N·m (0.5 kgf·m, 3.7 lb·ft)** **LOCTITE®**



ECA13890

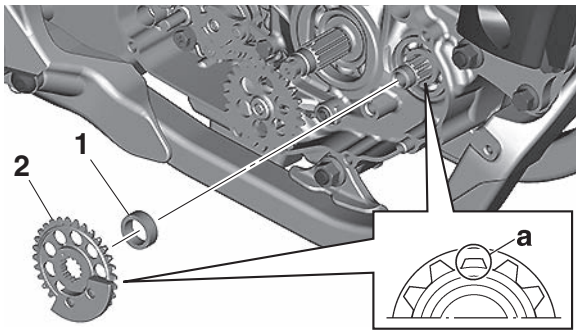
NOTICE

After tightening the bolts, make sure the oil pump turns smoothly.

2. Install:
   - Collar “1”
   - Balancer weight gear “2”

TIP

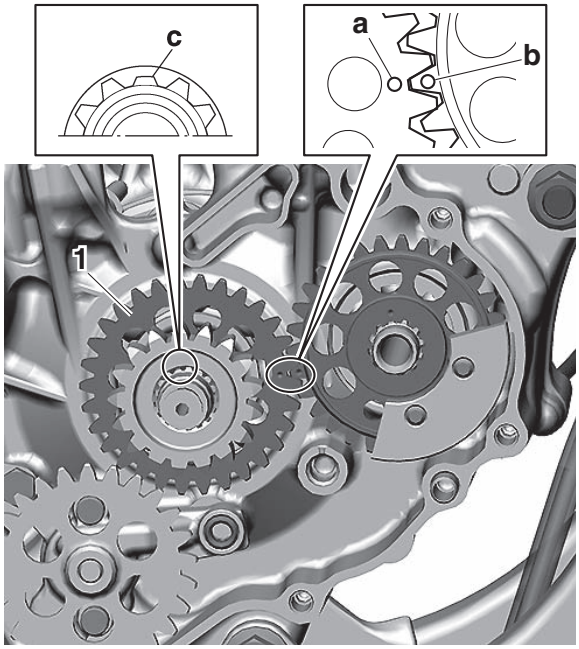
Install the balancer weight gear and balancer shaft with their lower splines “a” aligning with each other.

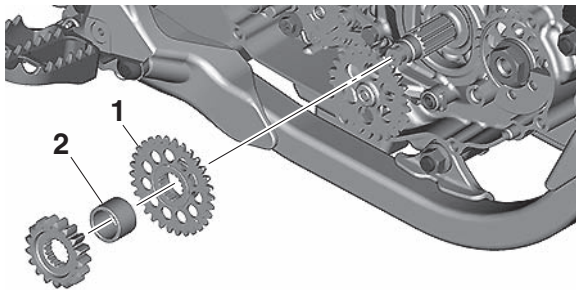


3. Install:
   - Balancer drive gear “1”
   - Collar “2”

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:
   - Conical 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”

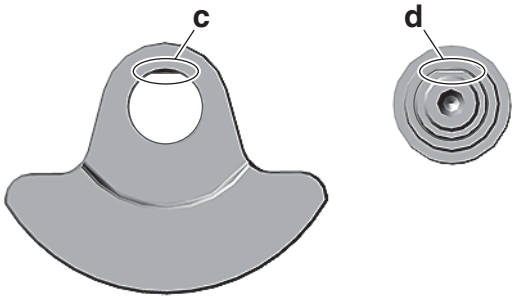
	Primary drive gear nut **95 N·m (9.5 kgf·m, 70 lb·ft)** **LOCTITE®**

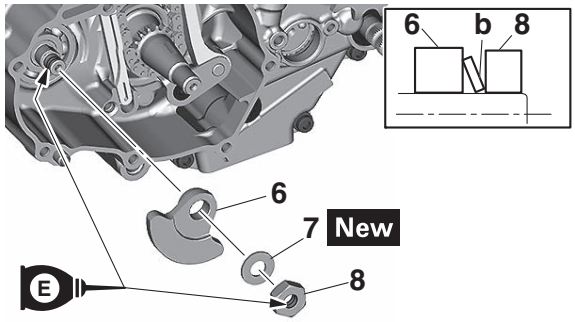
   - Balancer “6”
   - Conical washer “7” New
   - Balancer nut “8”

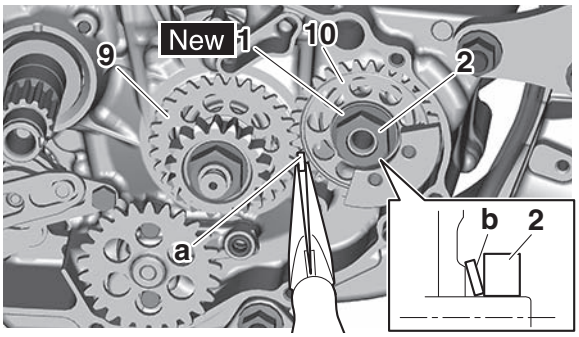
	Balancer nut **38 N·m (3.8 kgf·m, 28 lb·ft)**

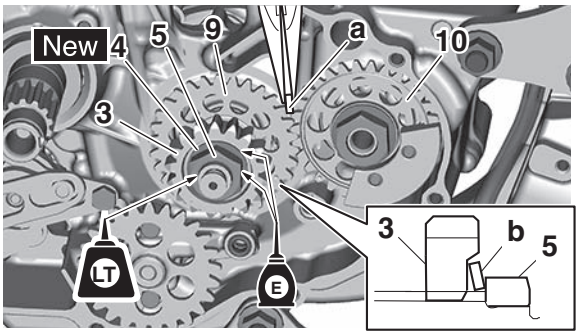
TIP

- Apply engine oil to the contact surfaces of the conical washer.
- Place an aluminum plate “a” between the teeth of the balancer drive gear “9” and balancer weight gear “10”.
- Install the conical washer with its convex surface “b” outward.
- Align the balancer flat portion “c” with the flat portion “d”.





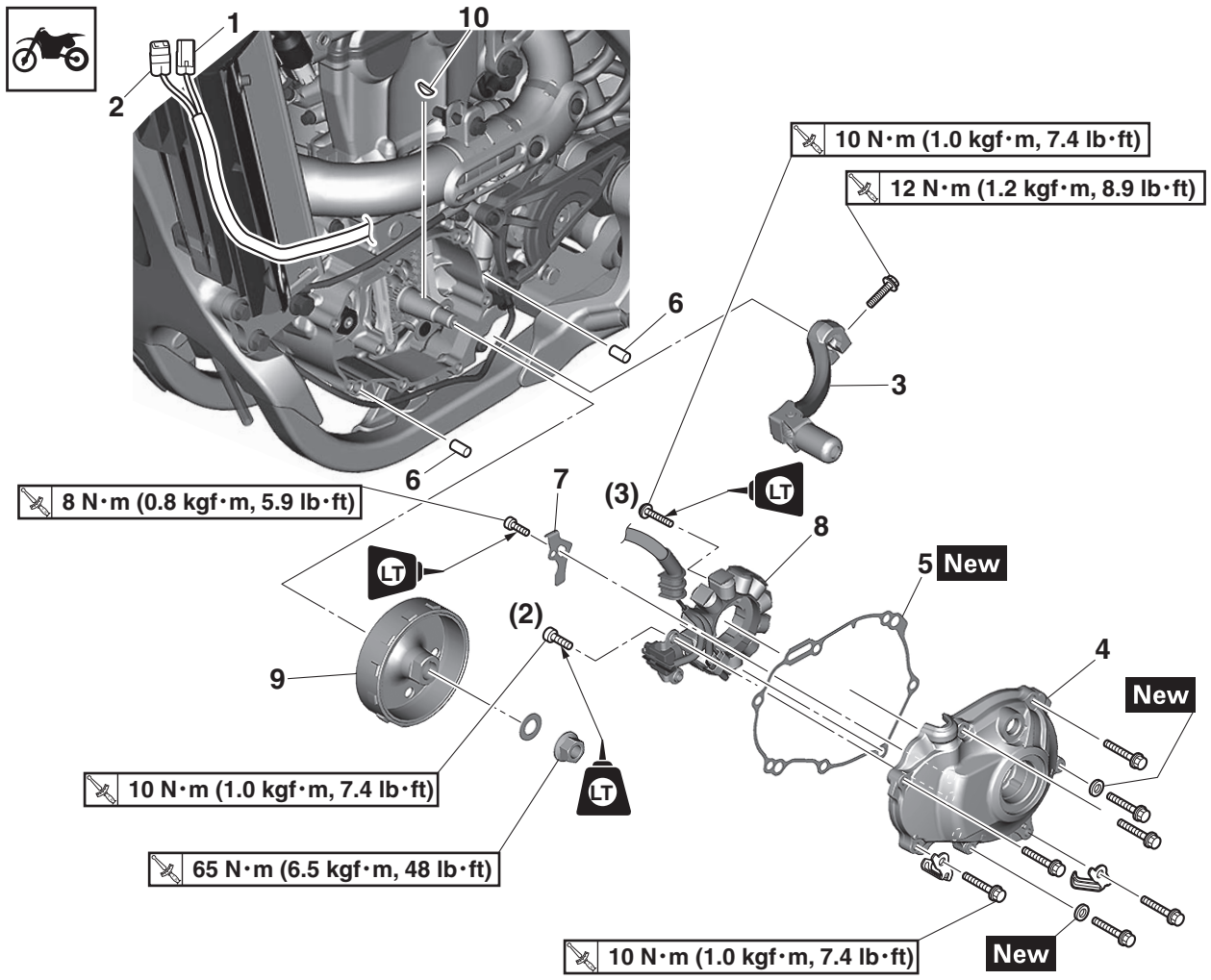




EAM20158

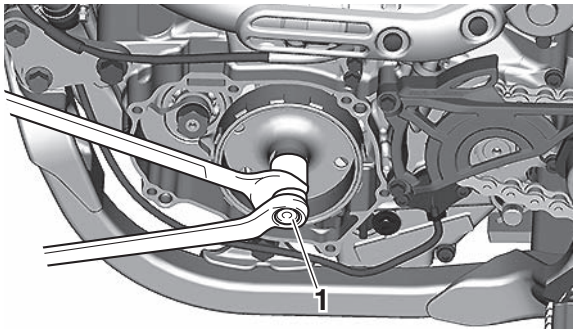
AC MAGNETO

Removing the AC magneto



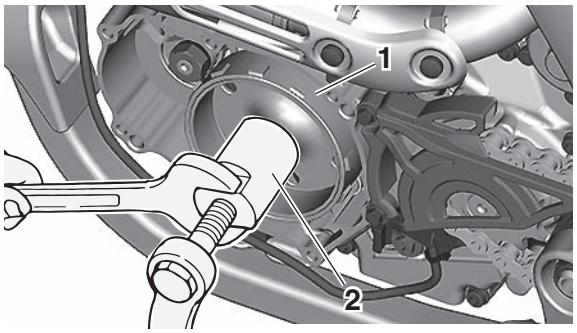
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left)		Refer to "GENERAL CHASSIS" on page 4-1.
1	AC magneto coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3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

EAM30375
REMOVING THE AC MAGNETO
1. Remove:
   • Nut (rotor) “1”
   • Washer

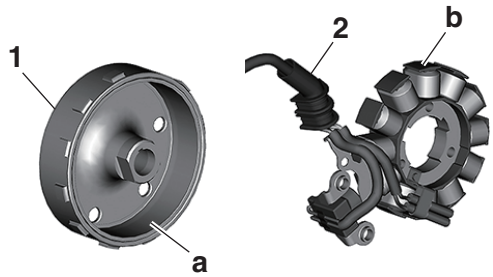


2. Remove:
   • Rotor “1”
     Use the rotor puller “2” to remove the rotor.
   • Woodruff key

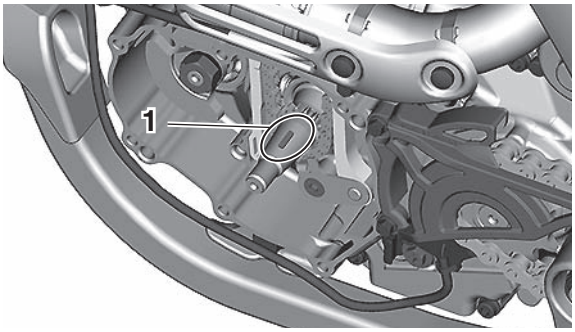
	**Rotor puller** **90890-04151** **Rotor puller** **YM-04151**



EAM30376
CHECKING THE AC MAGNETO
1. Check:
   • Rotor “1” inner surface “a”
   • Stator “2” outer surface “b”
     Damage → Inspect the crankshaft runout and crankshaft bearing.



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



EAM30378
INSTALLING THE AC MAGNETO
1. Install:
   • Stator “1”
   • Screw (stator) “2”

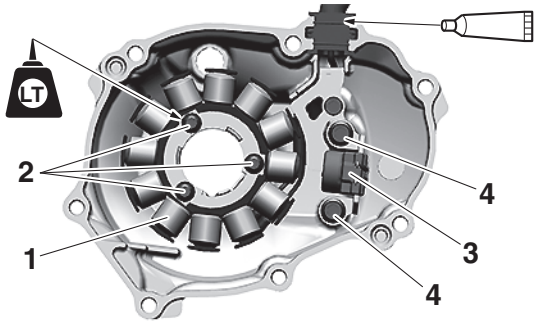
	**Screw (stator)** **10 N·m (1.0 kgf·m, 7.4 lb·ft)** **LOCTITE®**

   • Crankshaft position sensor “3”
   • Bolt (crankshaft position sensor) “4”
   • Holder
   • Bolt (holder)

	**Bolt (crankshaft position sensor)** **10 N·m (1.0 kgf·m, 7.4 lb·ft)** **LOCTITE®** **Bolt (holder)** **8 N·m (0.8 kgf·m, 5.9 lb·ft)** **LOCTITE®**

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

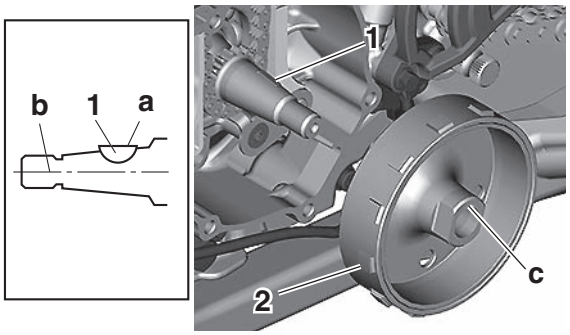
	**Yamaha bond No. 1215** **90890-85505** **(Three bond No.1215®)**



2. Install:
   - Woodruff key “1”
   - Rotor “2”

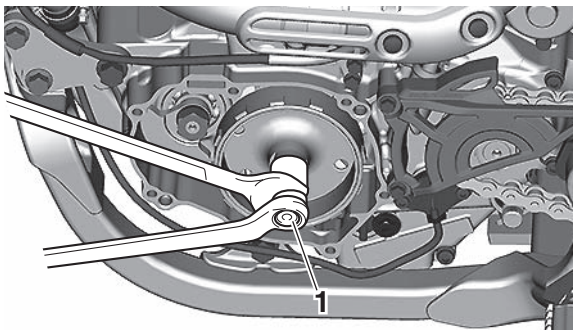
TIP

- Clean the contact surfaces of the tapered portions of the crankshaft and rotor.
- When installing the woodruff key, make sure that its flat surface “a” is in parallel with the crankshaft center line “b”.
- When installing the rotor, align the keyway “c” of the rotor with the woodruff key.



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

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

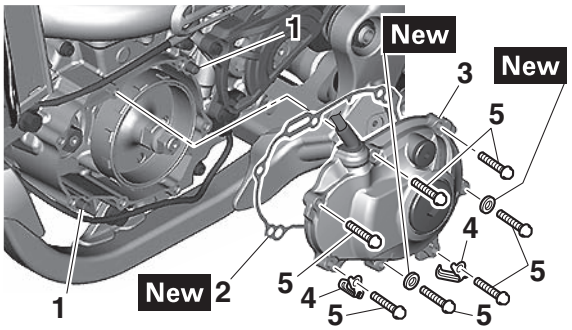


4. Install:
   - Dowel pin “1”
   - Gasket (left crankcase cover) “2” New
   - Crankcase cover (left) “3”
   - Lead holder “4”
   - Bolt (left crankcase cover) “5”

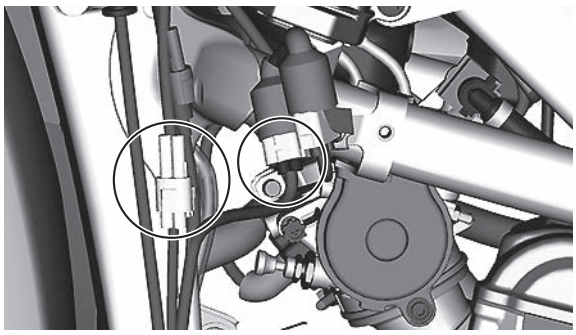
	Bolt (left crankcase cover) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

Tighten the bolts in stages and in a crisscross pattern.



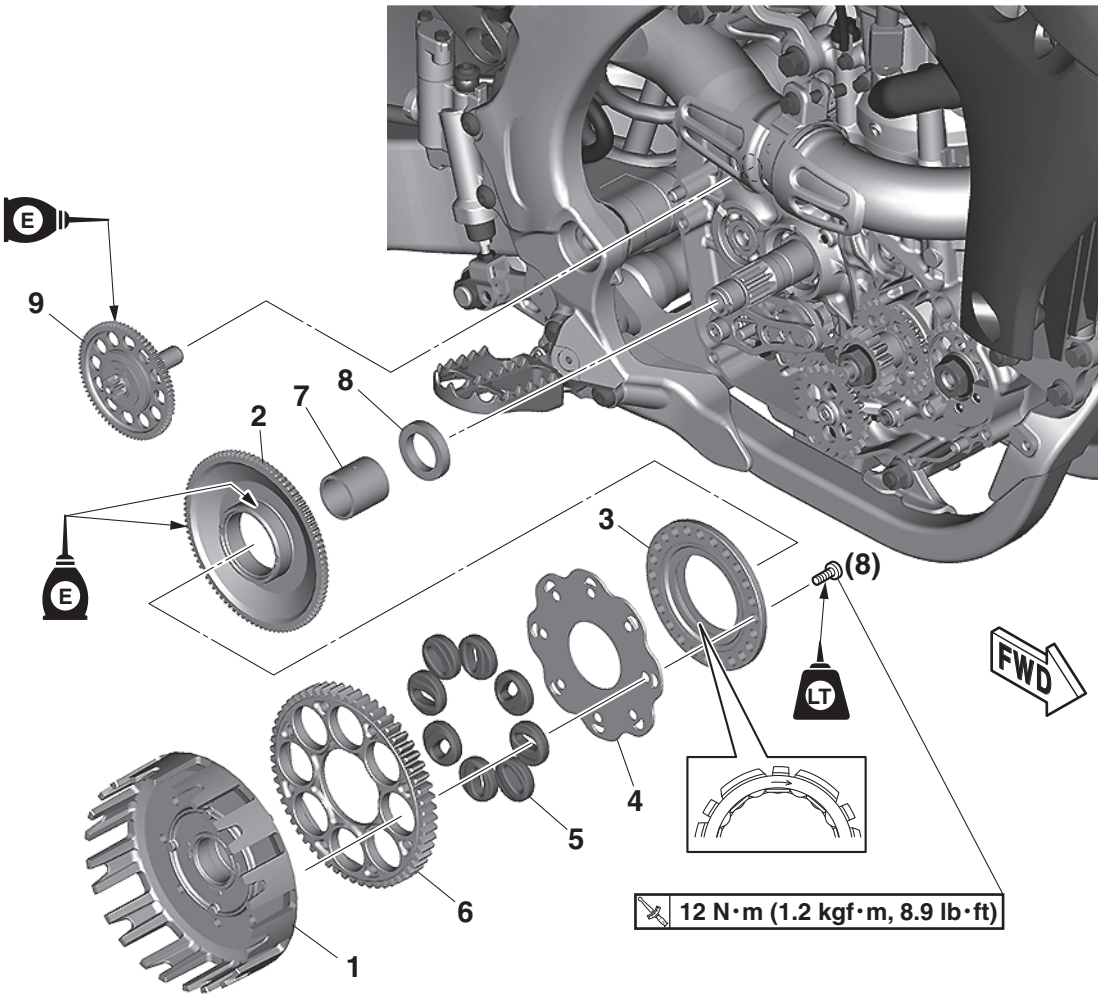
5. Connect:
   - AC magneto lead
     Refer to “CABLE ROUTING DIAGRAM” on page 2-29.



EAM20175

STARTER CLUTCH

Removing the starter clutch



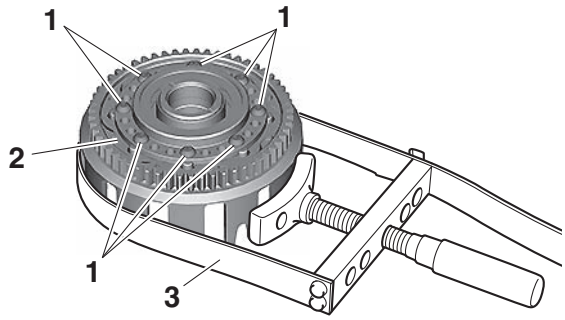
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Clutch		Refer to "CLUTCH" on page 5-41.
1	Clutch housing	1	
2	Starter clutch gear	1	
3	Starter clutch assembly	1	
4	Side plate	1	
5	Absorber	8	
6	Primary driven gear	1	
7	Spacer	1	
8	Collar	1	
9	Damper assembly	1	

EAM30469
REMOVING THE STARTER CLUTCH
1. Remove:
   • Starter clutch screw “1”

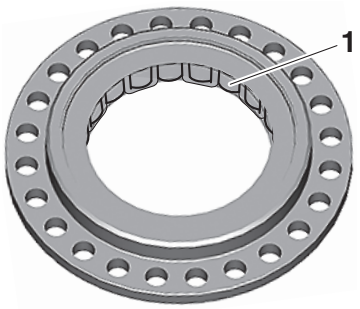
TIP
- While holding the primary driven gear “2” with the sheave holder “3”, remove the starter clutch screw.
- Fix the flat surface of the primary driven gear with the sheave holder.



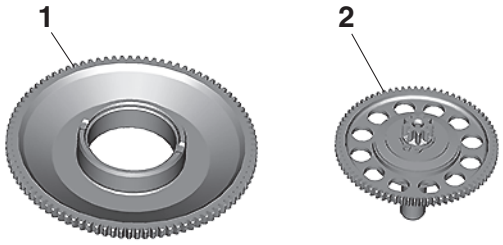
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAM30140
CHECKING THE STARTER CLUTCH
1. Check:
   • Starter clutch rollers “1”
   Damage/wear → Replace.



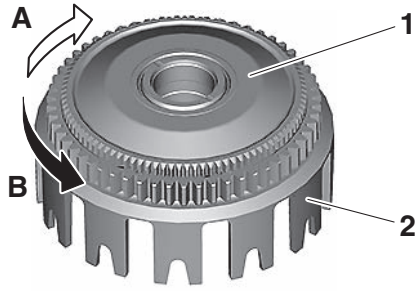
2. Check:
   • Starter clutch gear “1”
   • Damper assembly “2”
   Burrs/chips/roughness/wear → Replace the defective part(s).



3. Check:
   • Starter clutch gear’s contacting surfaces
   Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   • Starter clutch operation

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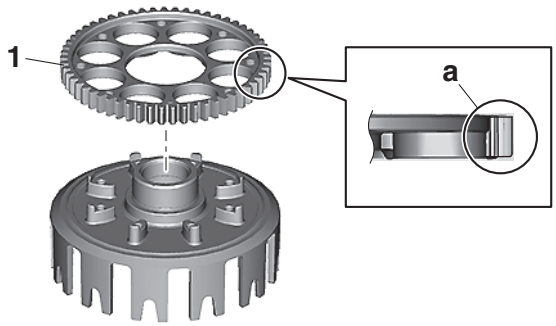
a. Install the starter clutch gear “1” onto the primary driven gear “2” and hold the primary driven gear.
b. When turning the starter clutch gear clockwise “A”, the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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EAM30470
INSTALLING THE STARTER CLUTCH
1. Install:
   • Primary driven gear “1”

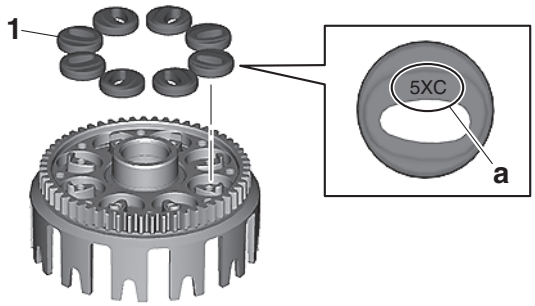
TIP
Install the primary driven gear “1” so that the portion “a” as shown faces to the starter clutch side.



2. Install:
   • Absorber “1”

TIP

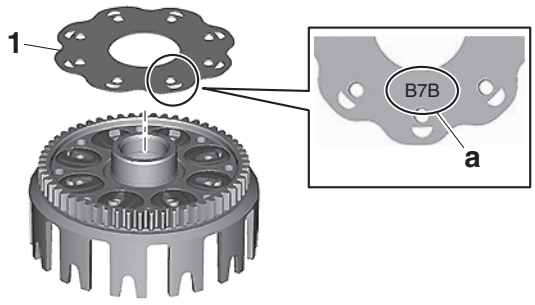
Install the absorber “1” so that the portion with the mark “5XC” “a” faces to the side plate side.



3. Install:
   • Side plate “1”

TIP

Install the side plate “1” so that the portion with the mark “B7B” “a” faces to the starter clutch side.



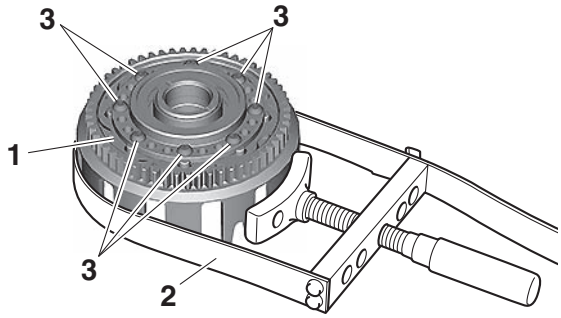
4. Install:
   • Starter clutch

	Starter clutch screw **12 N·m (1.2 kgf·m, 8.9 lb·ft)** **LOCTITE®**

TIP

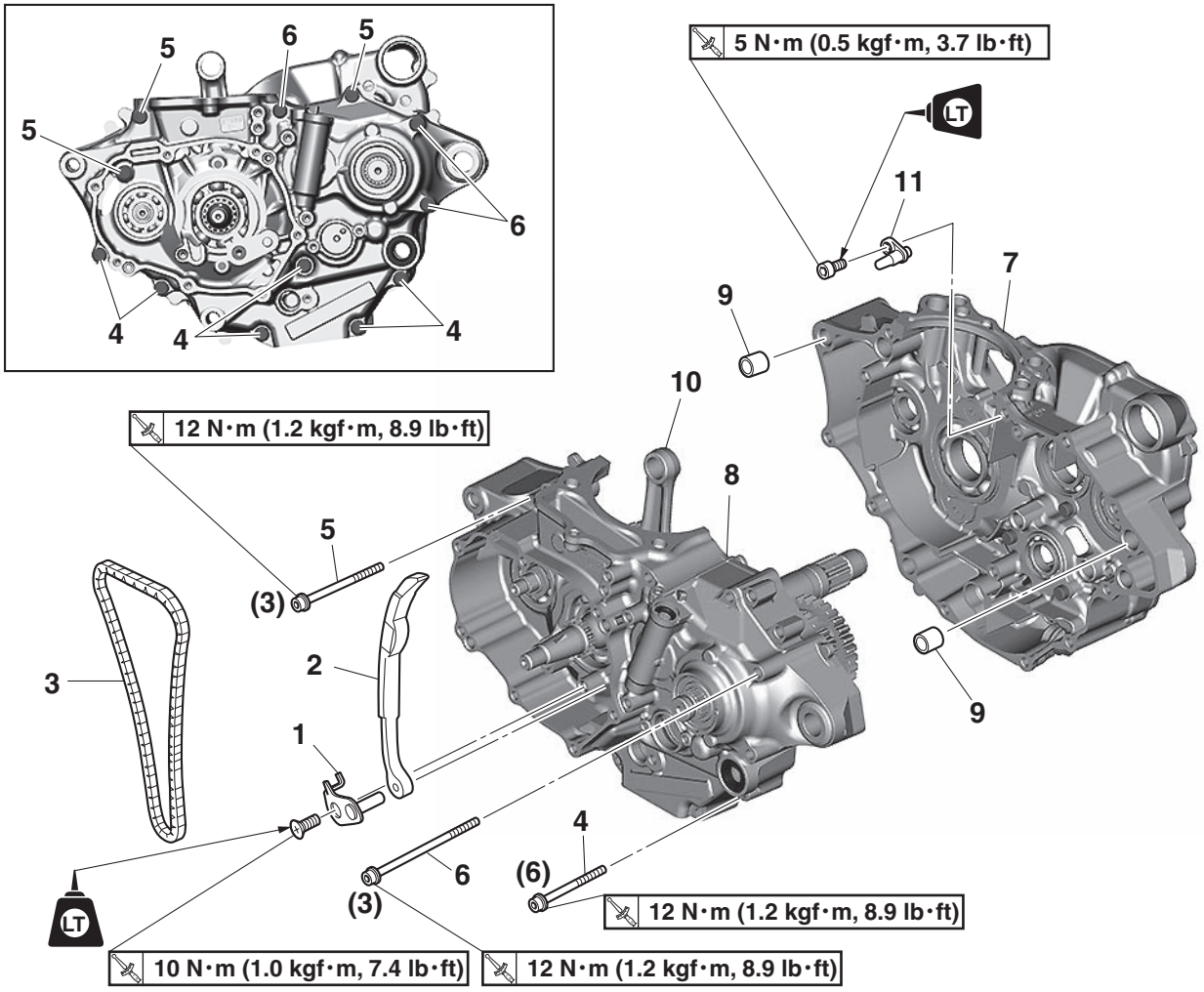
• Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark is toward the primary driven gear.
• While holding the primary driven gear “1” with the sheave holder “2”, tighten the starter clutch screw “3”.
• Fix the flat surface of the primary driven gear with the sheave holder.

	Sheave holder **90890-01701** **Primary clutch holder** **YS-01880-A**



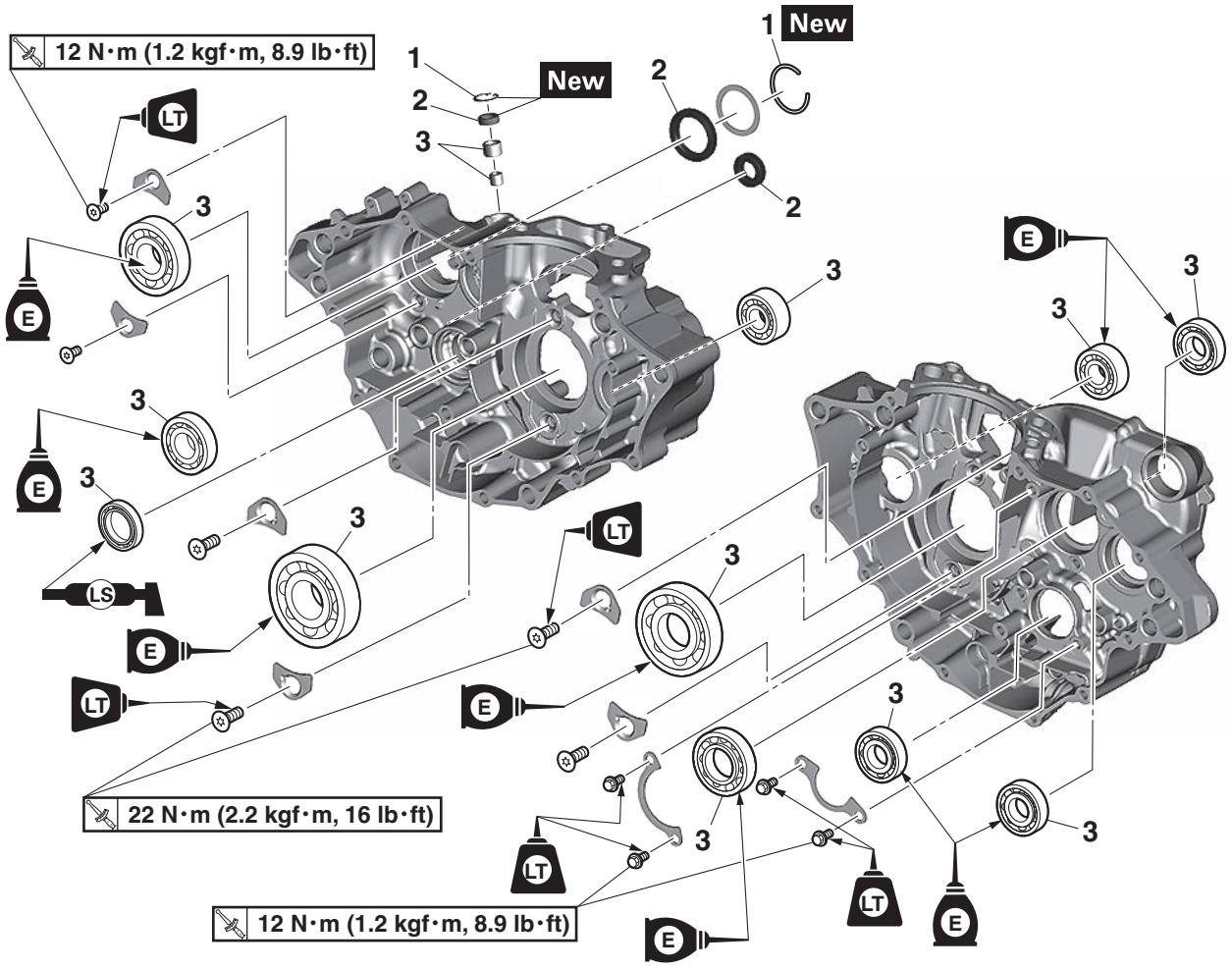
EAM20116
CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Piston		Refer to "CYLINDER AND PISTON" on page 5-31.
	Balancer		Refer to "OIL PUMP AND BALANCER GEAR" on page 5-54.
	Segment		Refer to "SHIFT SHAFT" on page 5-50.
	Stator		Refer to "AC MAGNETO" on page 5-60.
1	Timing chain guide stopper plate	1	
2	Timing chain guide (exhaust side)	1	
3	Timing chain	1	
4	Bolt [L = 45 mm (1.77 in)]	6	
5	Bolt [L = 60 mm (2.36 in)]	3	
6	Bolt [L = 75 mm (2.95 in)]	3	
7	Right crankcase	1	
8	Left crankcase	1	
9	Dowel pin	2	
10	Crankshaft	1	
11	Oil nozzle	1	

Removing the bearing and oil seal



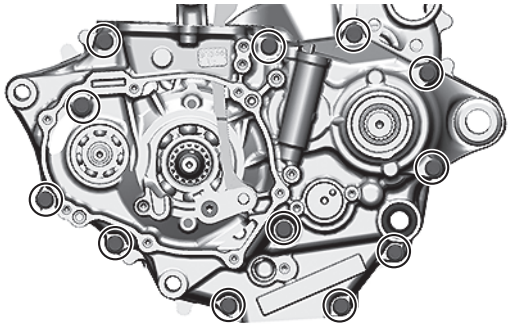
Order	Job/Parts to remove	Q'ty	Remarks
	Transmission		Refer to "TRANSMISSION" on page 5-74.
	Shift cam and shift fork		Refer to "TRANSMISSION" on page 5-74.
1	Circlip	2	
2	Oil seal	3	
3	Bearing	13	

EAM30147
DISASSEMBLING THE CRANKCASE

1. Separate:
   • Right crankcase
   • Left crankcase

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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".

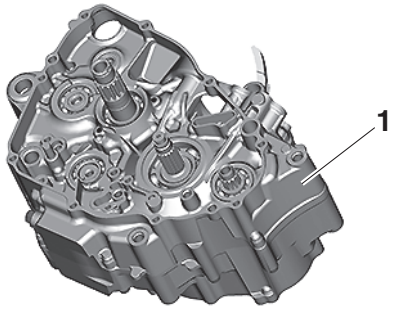
TIP

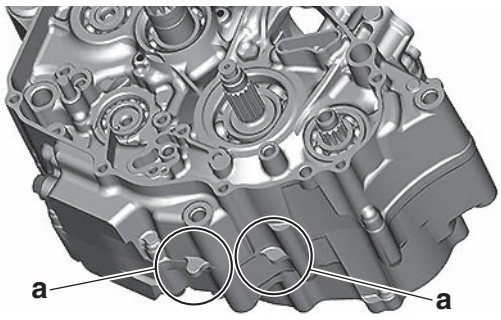
- Place the crankcase with its left side downward, split the crankcase splitting rib "a" while tap with a soft hammer.
- Lift the right crankcase horizontally while lightly patting the crankcase splitting rib and the engine mounting boss using a soft hammer, and leave the crankshaft and the transmission 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.

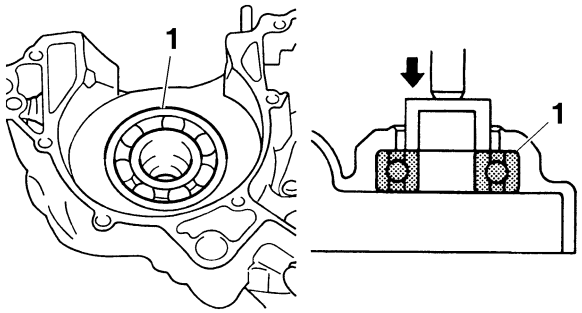
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EAM30148
REMOVING THE CRANKCASE BEARING

1. Remove:
   • Bearing "1"

TIP

- Remove the bearing from the crankcase by pressing its inner race.
- Do not use the removed bearing.



EAM30149
CHECKING THE TIMING CHAIN, TIMING CHAIN GUIDE, OIL STRAINER

1. Check:
   • Timing chain
   Stiffness → Replace the camshaft sprocket, timing chain and crankshaft sprocket as a set.
2. Check:
   • Timing chain guide
   Damage/wear → Replace.

EAM30150
CHECKING THE CRANKCASE

1. Wash:
   • Crankcase

TIP

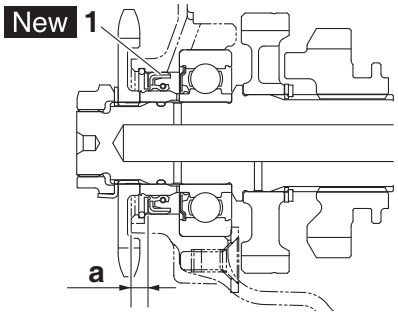
- Wash the crankcase in a mild solvent.
- Remove any remaining gasket from the crankcase mating surface.

2. Check:
   • Crankcase
     Crack/damage → Replace.
   • Oil delivery passages
     Obstruction → Blow out with compressed air.

EAM30151
INSTALLING THE OIL SEAL

1. Install:
   • Oil seal “1” New
     (to left crankcase)

	Installed depth “a” **4.5–5.0 mm (0.18–0.20 in)**



EAM30152
ASSEMBLING THE CRANKCASE

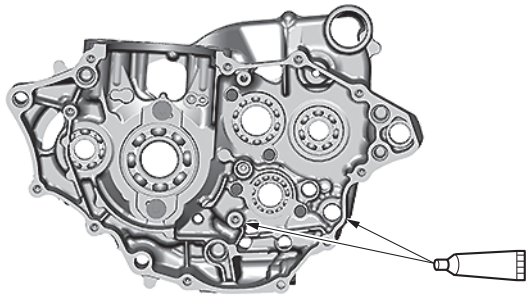
1. Install:
   • Bearing cover plate

	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.

2. Apply:
   • Sealant
     (to the crankcase mating surface)

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**



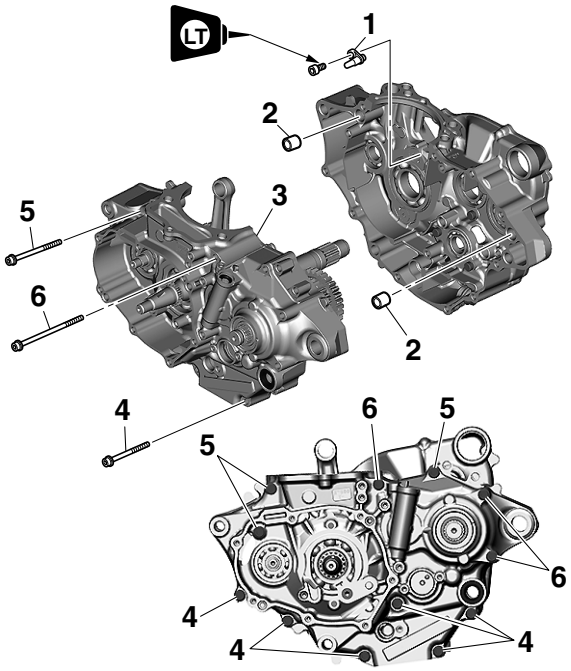
3. Install:
   • Oil nozzle “1”

	Oil nozzle **5 N·m (0.5 kgf·m, 3.7 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.

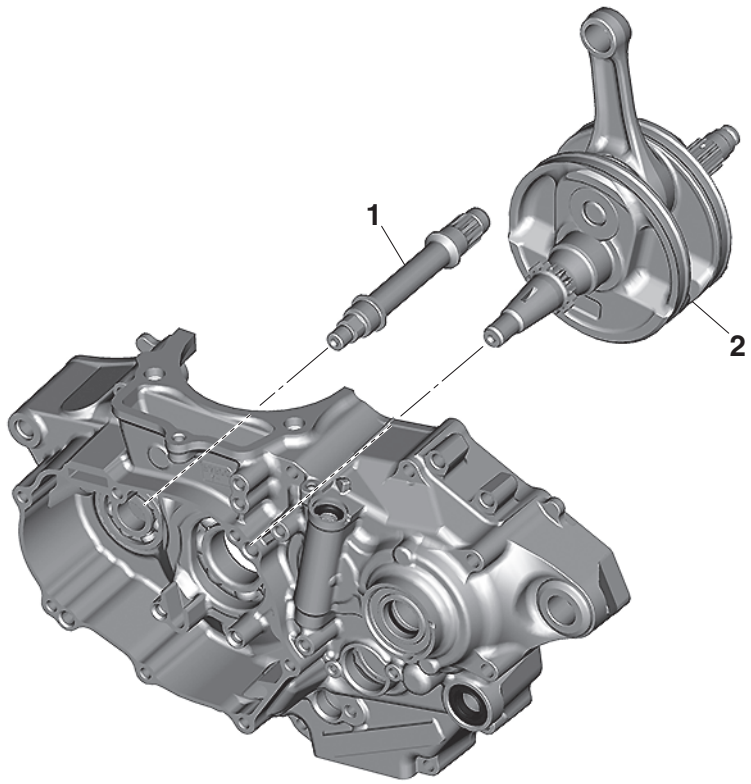


4. 45 mm (1.77 in)
5. 60 mm (2.36 in)
6. 75 mm (2.95 in)

EAM20117

CRANKSHAFT ASSEMBLY AND BALANCER SHAFT

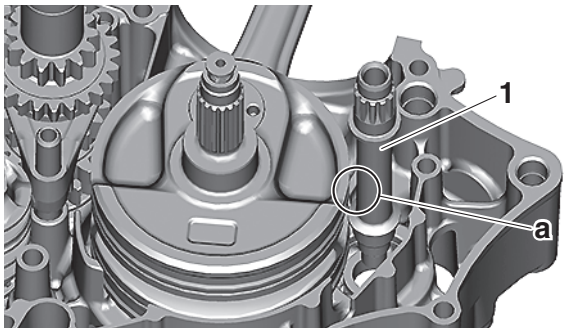
Removing the crankshaft assembly and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-66.
	Transmission		Refer to "TRANSMISSION" on page 5-74.
1	Balancer shaft	1	
2	Crankshaft assembly	1	

EAM30143
REMOVING THE BALANCER SHAFT
1. Remove:
   • Balancer shaft “1”

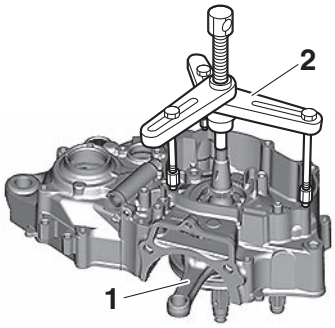
TIP
Remove the balancer shaft with its flat side “a” facing the crankshaft.

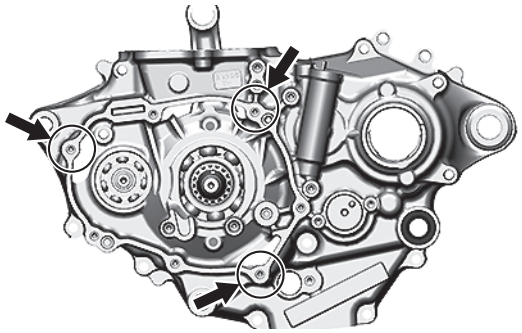


EAM30144
REMOVING THE CRANKSHAFT ASSEMBLY
1. Remove:
   • Crankshaft assembly “1”

TIP
Remove the crankshaft assembly by using the crankcase separating tool “2”.

Crankcase separating tool
90890-04152
Crankcase separating tool
YU-A9642

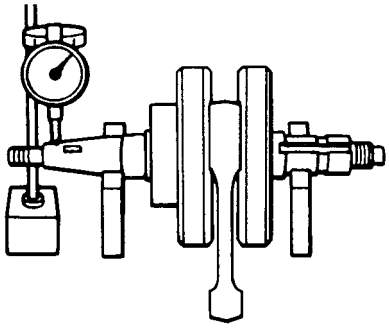




EAM30145
CHECKING THE CRANKSHAFT ASSEMBLY
1. Measure:
   • Crankshaft runout
   Out of specification → Replace the crankshaft, bearing or both.

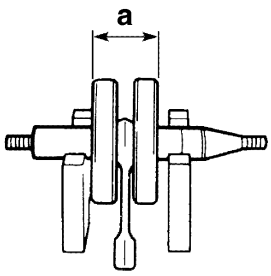
TIP
Turn the crankshaft slowly.

Runout limit
0.030 mm (0.0012 in)

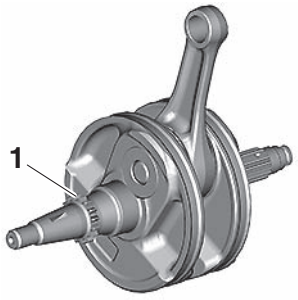


2. Measure:
   • Crank assembly width “a”
   Out of specification → Replace the crankshaft.

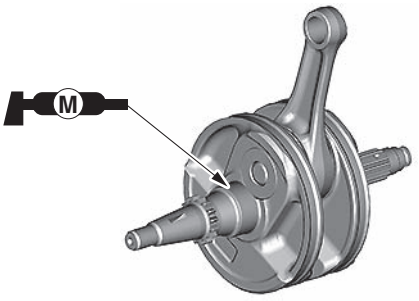
Crank assembly width
55.93–56.00 mm (2.202–2.205 in)



3. Check:
   • Crankshaft sprocket “1”
   Damage → Replace the crankshaft.



4. Check:
   • Crankshaft journal oil passage
   Obstruction → Blow out with compressed air.



EAM30146
INSTALLING THE CRANKSHAFT ASSEMBLY

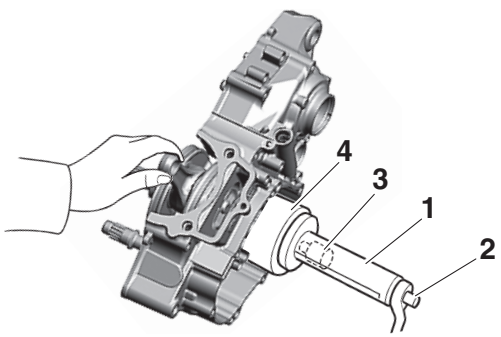
1. Install:
   • Crankshaft assembly

TIP
Install the crankshaft assembly with the crankshaft installer pot "1", crankshaft installer bolt "2", adapter (M12) "3" and spacer "4".

Crankshaft installer pot
90890-01274
Installing pot
YU-90058
Crankshaft installer bolt
90890-01275
Bolt
YU-90060
Adapter (M12)
90890-01278
Adapter #3
YU-90063
Spacer (crankshaft installer)
90890-04081
Pot spacer
YM-91044

ECA26470
NOTICE
In order to prevent the crankshaft seizure, apply molybdenum disulfide grease.

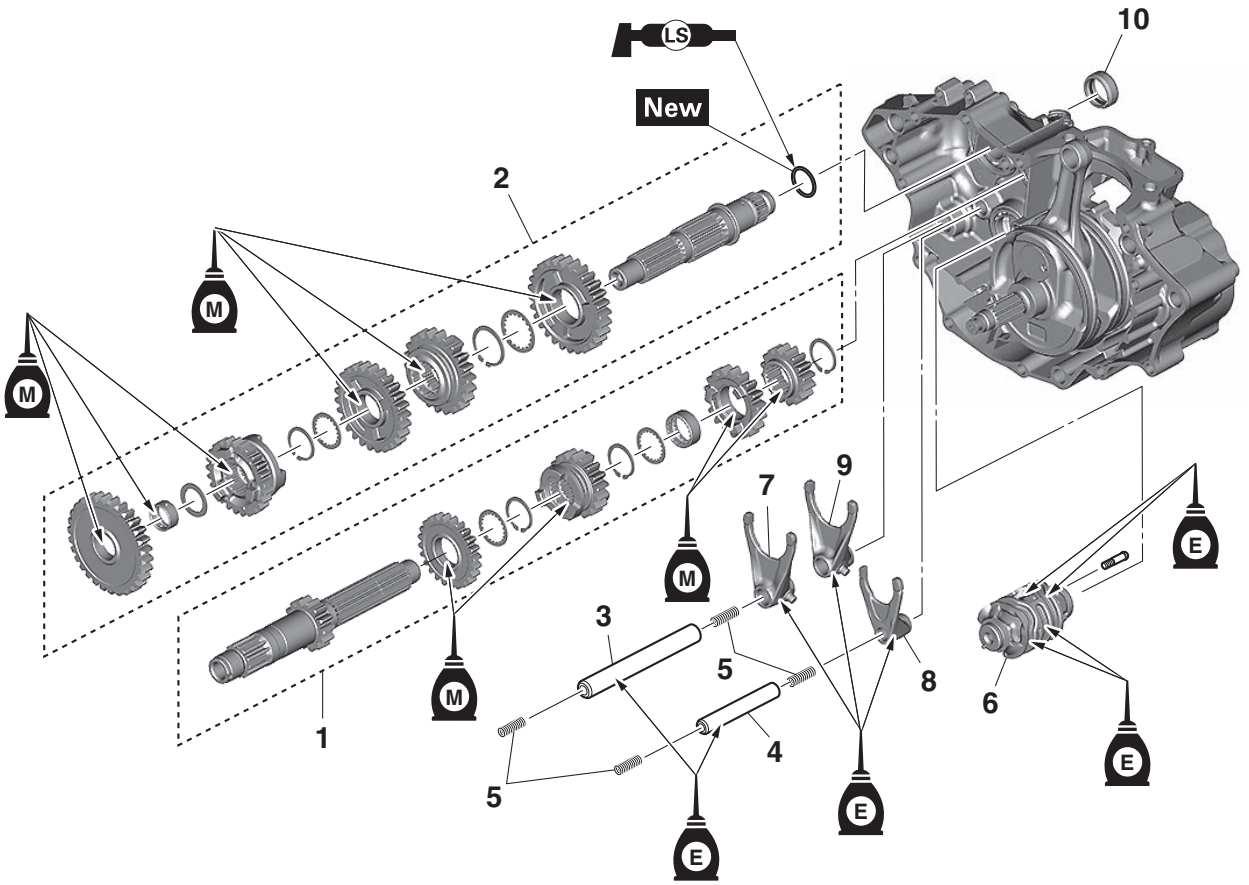
TIP
Hold the connecting rod at top dead center (TDC) with one hand while turning the nut of the crankshaft installer bolt with the other. Turn the crankshaft installer bolt until the crankshaft assembly bottoms against the bearing.



EAM20118

TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



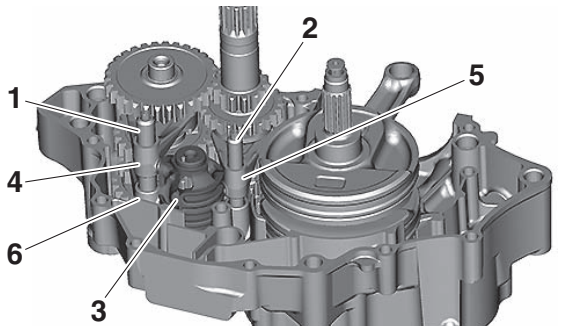
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-66.
1	Main axle	1	
2	Drive axle	1	
3	Long shift fork guide bar	1	
4	Short shift fork guide bar	1	
5	Spring	4	
6	Shift cam	1	
7	Shift fork 3 (R)	1	
8	Shift fork 2 (C)	1	
9	Shift fork 1 (L)	1	
10	Collar	1	

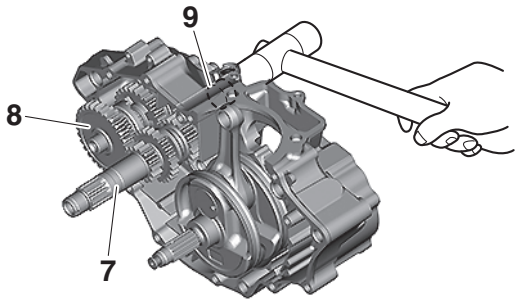
EAM30153
REMOVING THE TRANSMISSION

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

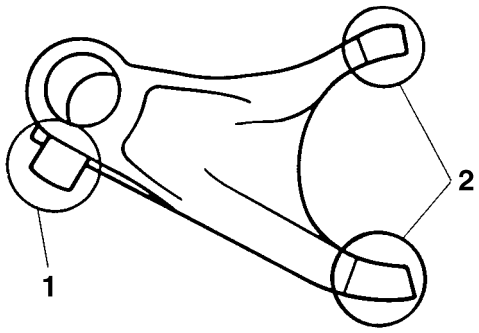
- Remove assembly with the collar “9” installed to the crankcase.
- Make a note of the position of each part. Pay particular attention to the location and direction of shift forks.
- Remove the main axle and the drive axle all together by tapping the drive axle lightly with a soft hammer.





EAM30154
CHECKING THE SHIFT FORKS

1. Check:
   - Shift fork cam follower “1”
   - Shift fork pawl “2”
     Bends/damage/scoring/wear → Replace the shift fork.

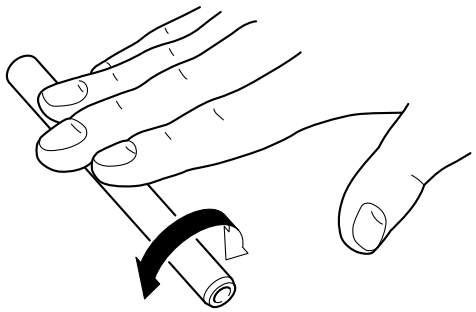


2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

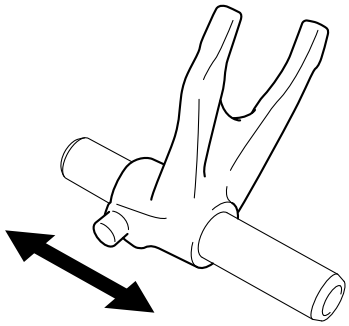
EWA12840

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.



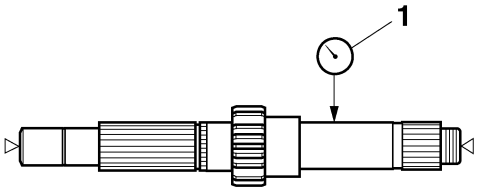
EAM30155
CHECKING THE SHIFT DRUM ASSEMBLY

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

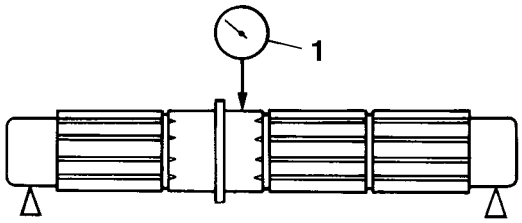
1. Measure:
   • Main axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the main axle.

	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)**

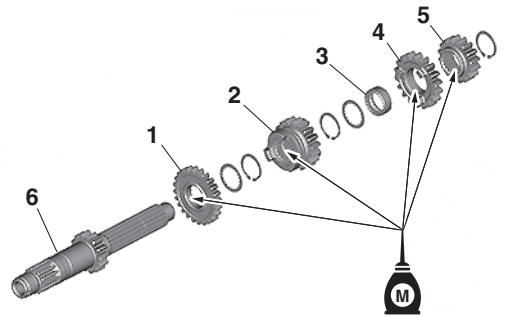


3. Check:
   • Transmission gears
   Blue discoloration/pitting/wear → Replace the defective gear(s).
   • Transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(s).
4. Check:
   • Transmission gear movement
   Rough movement → Replace the defective gear(s).

EAM30157
INSTALLING THE TRANSMISSION

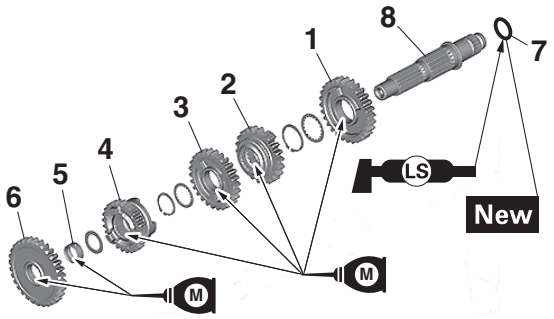
1. Install:
   • 5th pinion gear (24T) “1”
   • 3rd pinion gear (18T) “2”
   • Collar “3”
   • 4th pinion gear (18T) “4”
   • 2nd pinion gear (16T) “5”
   (to the main axle “6”)

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:
   • 2nd wheel gear (28T) “1”
   • 4th wheel gear (22T) “2”
   • 3rd wheel gear (26T) “3”
   • 5th wheel gear (25T) “4”
   • Collar “5”
   • 1st wheel gear (30T) “6”
   • O-ring “7” New
   (to the drive axle “8”)

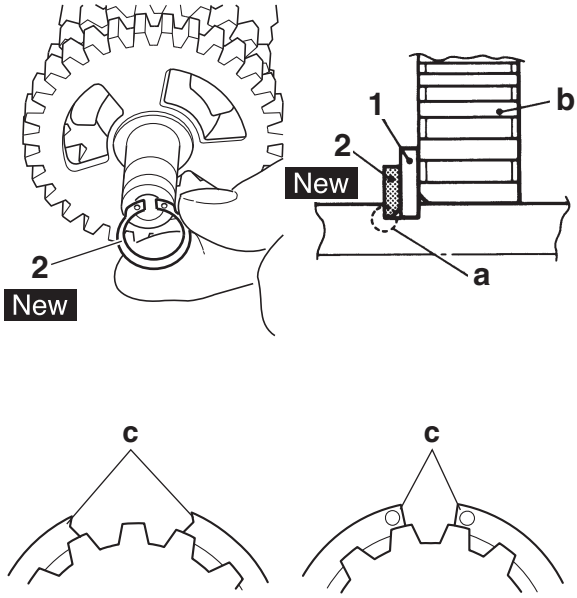
TIP
- Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and the collar and to the inner surface of the sliding gear, then install.
- Apply the lithium-soap-based grease on the O-ring.



3. Install:
   • Washer “1”
   • Circlip “2” New

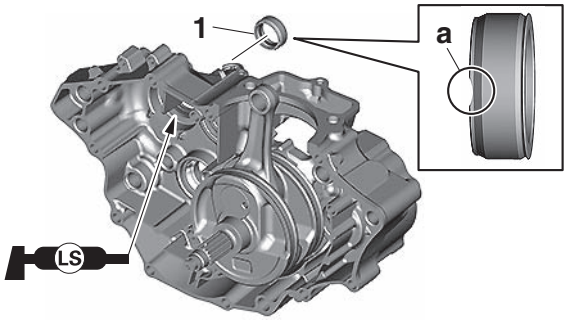
TIP
- Be sure the circlip sharp-edged corner “a” is

positioned opposite side to the washer and gear “b”.
• Install the circlip with its ends “c” settled evenly on the spline crests.



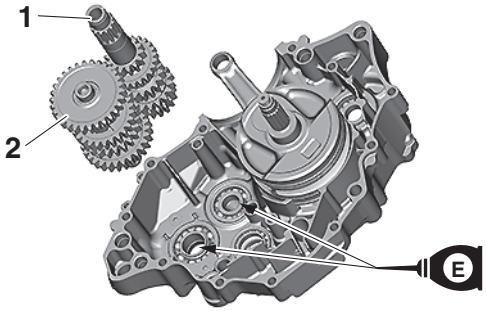
4. Install:
• Collar “1”

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.



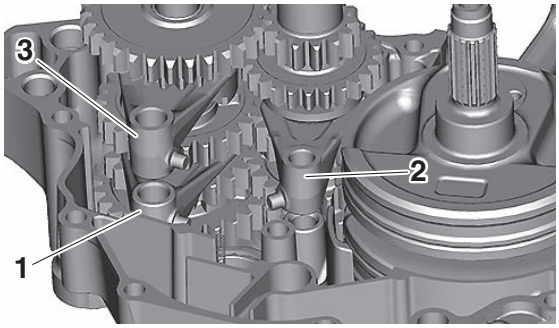
5. Install:
• Main axle “1”
• Drive axle “2”

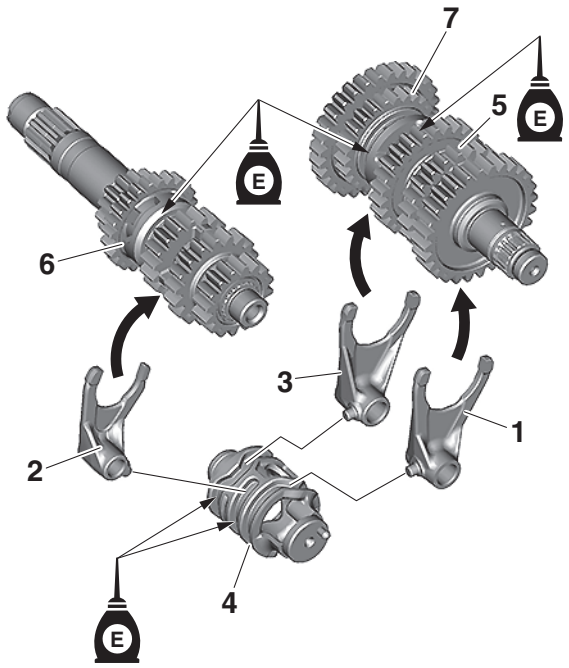
TIP
• Install to the left crankcase simultaneously.
• Apply engine oil to the main axle and the drive axle bearing.



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 “7” on the drive axle.
• Mesh the shift fork 2 (C) with the 3rd pinion gear “6” on the main axle.

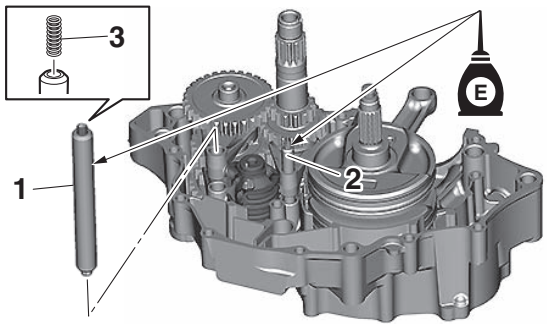




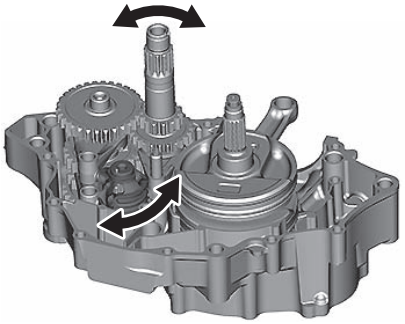
7. Install:
   - Long shift fork guide bar “1”
   - Short shift fork guide bar “2”
   - Spring “3”

TIP

- Screw the spring into the shift fork guide bar lightly beforehand.
- Apply the engine oil on the shift fork guide bars.



8. Check:
   - Operation of shift cam and shift fork
   - Transmission operation
     Unsmooth operation → Repair.



COOLING SYSTEM

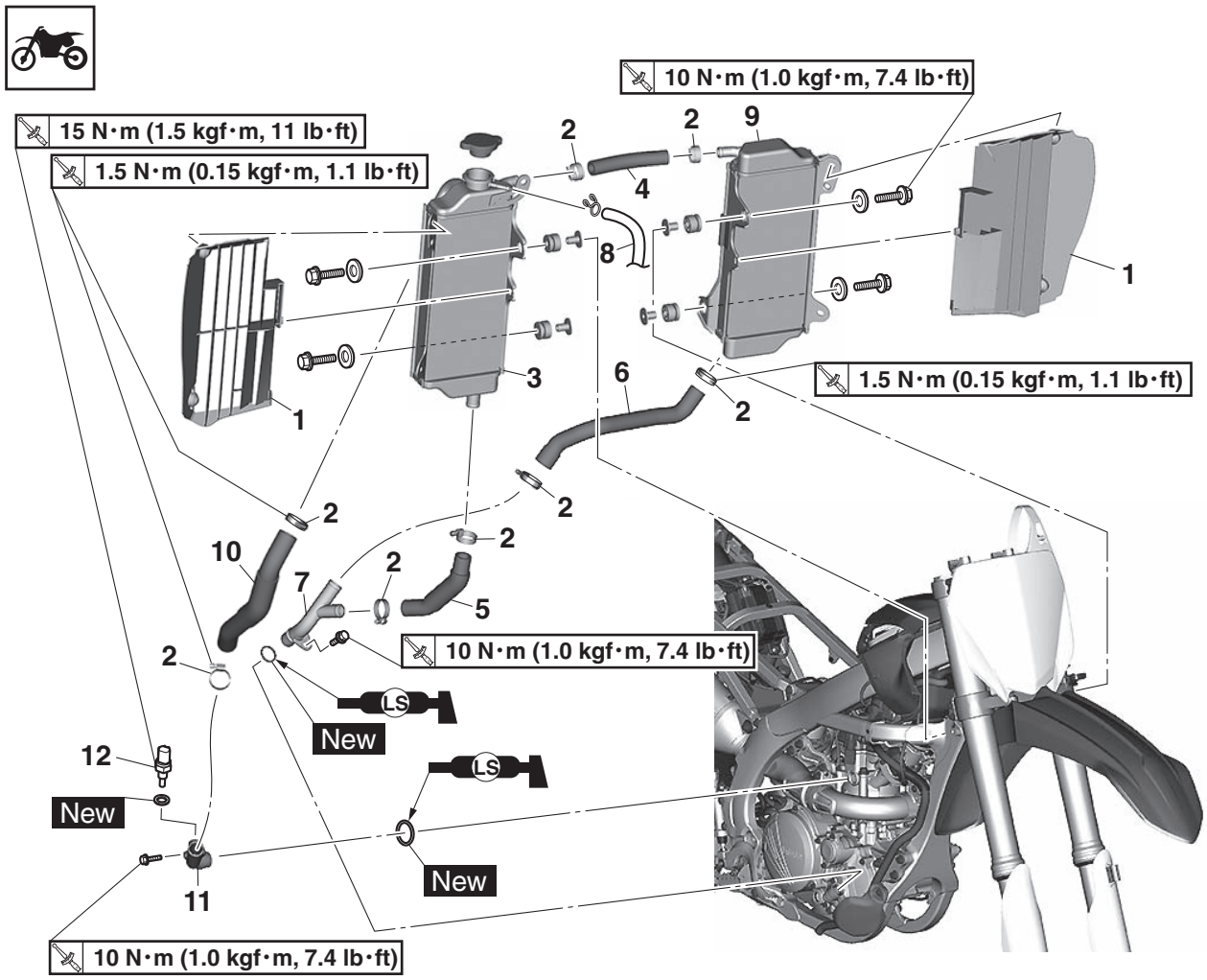
RADIATOR 6-1
HANDLING NOTE 6-3
CHECKING THE RADIATOR 6-3

WATER PUMP 6-4
REMOVING THE OIL SEAL 6-5
CHECKING THE WATER PUMP 6-5
CHECKING THE BEARING 6-5
INSTALLING THE OIL SEAL 6-5
ASSEMBLING THE WATER PUMP 6-5

EAM20138

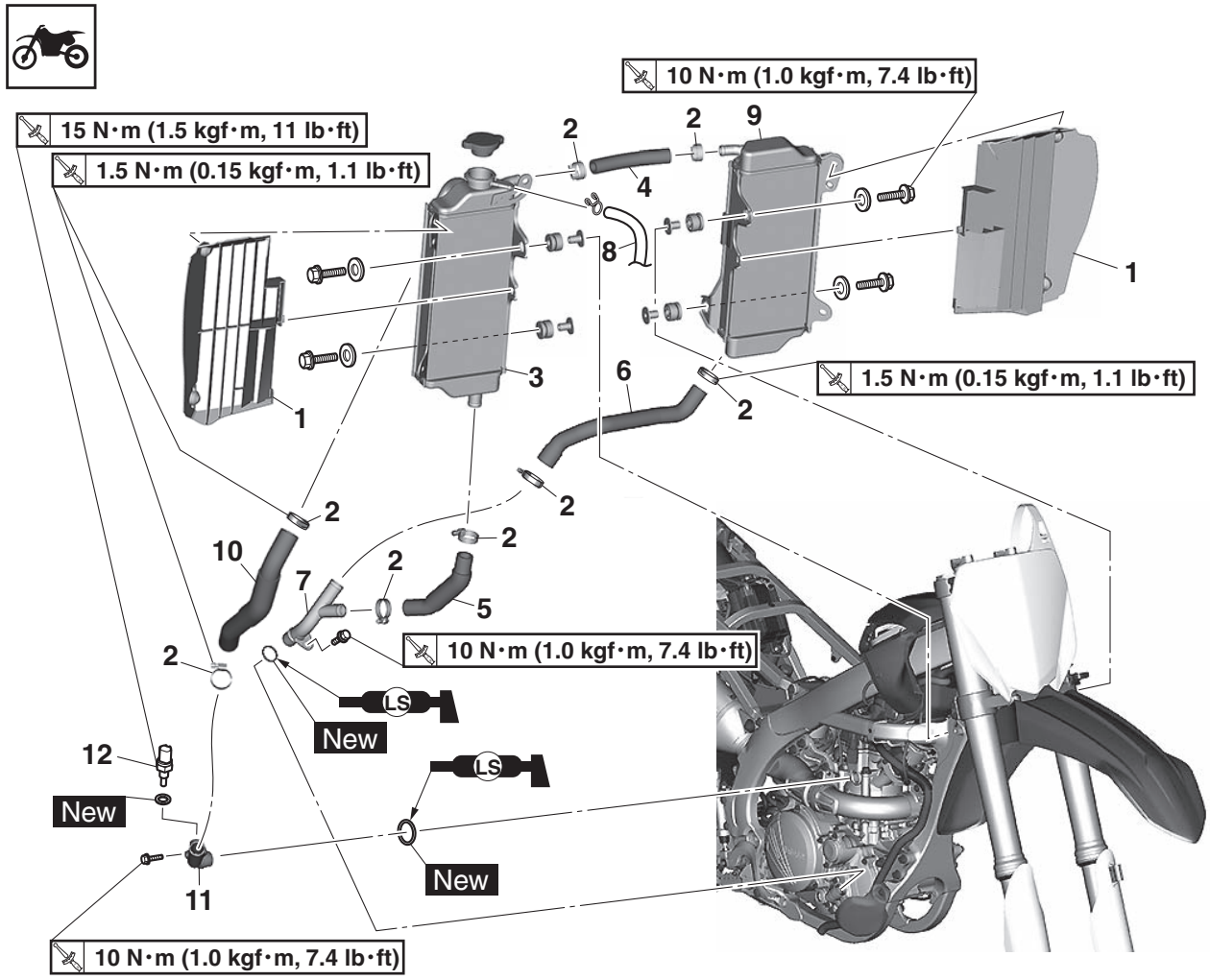
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "THROTTLE BODY" on page 7-5.
1	Radiator guard	2	
2	Radiator hose clamp	8	Loosen.
3	Radiator (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	
9	Radiator (left)	1	

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
10	Radiator hose 1	1	
11	Radiator pipe 1	1	
12	Coolant temperature sensor	1	

EAM30257
HANDLING NOTE

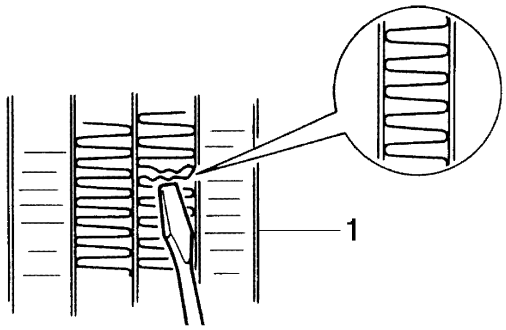
EWA19360
⚠ WARNING

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

EAM30341
CHECKING THE RADIATOR

1. Check:
   - Radiator fins "1"
     Obstructions → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

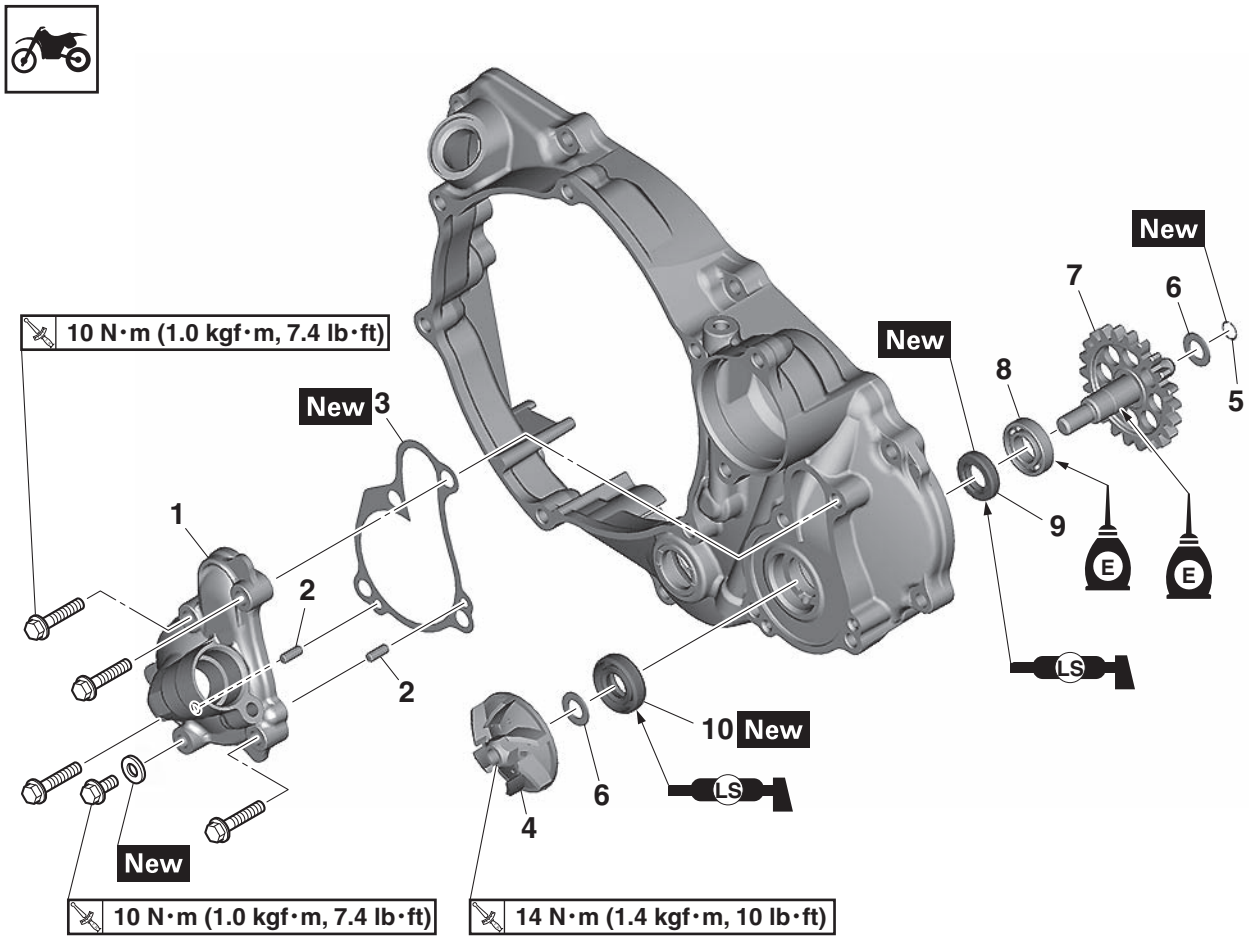
TIP
Correct any flattened fins with a thin, flat-head screwdriver.



2. Check:
   - Radiator hoses
   - Radiator pipes
     Crack/damage → Replace.

EAM20139
WATER PUMP

Removing the water pump

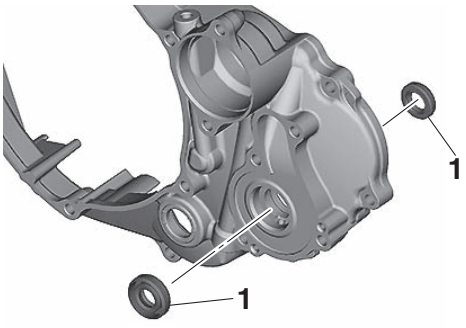


Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-6.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Right crankcase cover		Refer to "CLUTCH" on page 5-41.
1	Water pump housing	1	
2	Dowel pin	2	
3	Gasket	1	
4	Impeller	1	
5	Circlip	1	
6	Washer	2	
7	Impeller shaft assembly	1	
8	Bearing	1	
9	Oil seal	1	
10	Oil seal	1	

EAM30258
REMOVING THE OIL SEAL

TIP
- Remove the oil seal when the coolant level changes frequently more than usual, coolant has discolored, or engine oil has become milky.
- Do not use the removed oil seal.

1. Remove:
   - Oil seal "1"

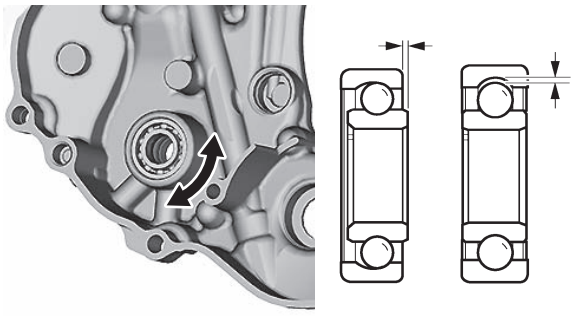


EAM30259
CHECKING THE WATER PUMP

1. Check:
   - Water pump housing cover
   - Impeller shaft
   - Impeller
     Cracks/damage/wear → Replace.

EAM30260
CHECKING THE BEARING

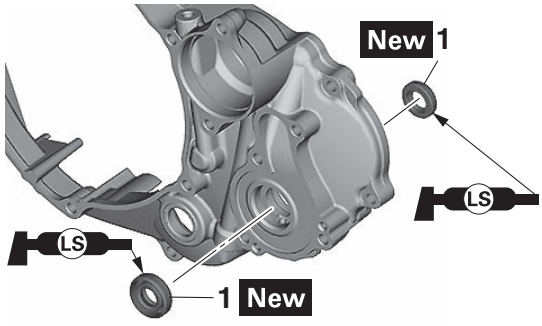
1. Check:
   - Bearing
     Rotate the inner race with your finger.
     Rough spot/seizure → Replace.



EAM30261
INSTALLING THE OIL SEAL

1. Install:
   - Oil seal "1" New

TIP
- Apply the lithium-soap-based grease on the oil seal lip.
- Install the oil seal with its manufacture's marks or numbers facing the right crankcase cover.



2. Install:
   - Bearing "1"

TIP
Install the bearing by pressing its outer race parallel.

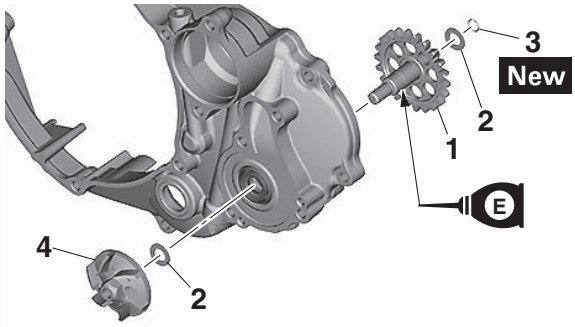


EAM30262
ASSEMBLING THE WATER PUMP

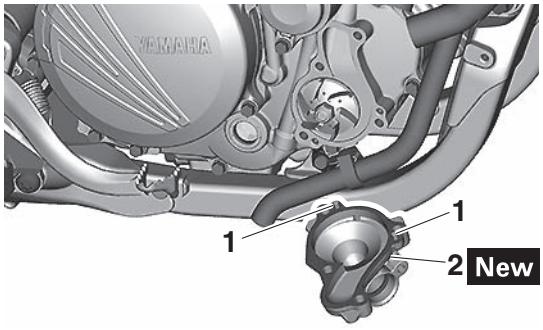
1. Install:
   - Impeller shaft assembly "1"
   - Washer "2"
   - Circlip "3" New
   - Impeller "4"

	Impeller **14 N·m (1.4 kgf·m, 10 lb·ft)**

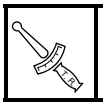
TIP
- Take care so that the oil seal lip is not damaged or the spring does not slip off its position.
- When installing the impeller shaft, apply the engine oil to the oil seal lip, the bearing, and the impeller shaft.



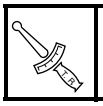
2. Install:
   • Dowel pin “1”
   • Gasket “2” New

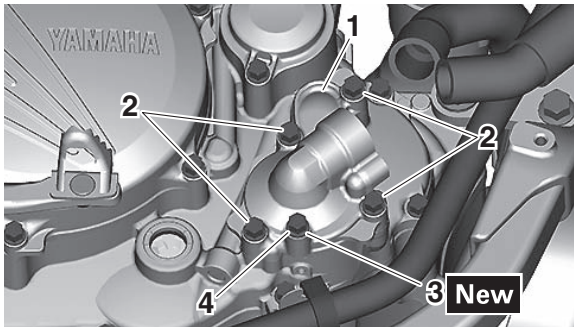


3. Install:
   • Water pump housing “1”
   • Water pump housing bolt “2”

	**Water pump housing bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

   • Washer “3” New
   • Coolant drain bolt “4”

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



FUEL SYSTEM

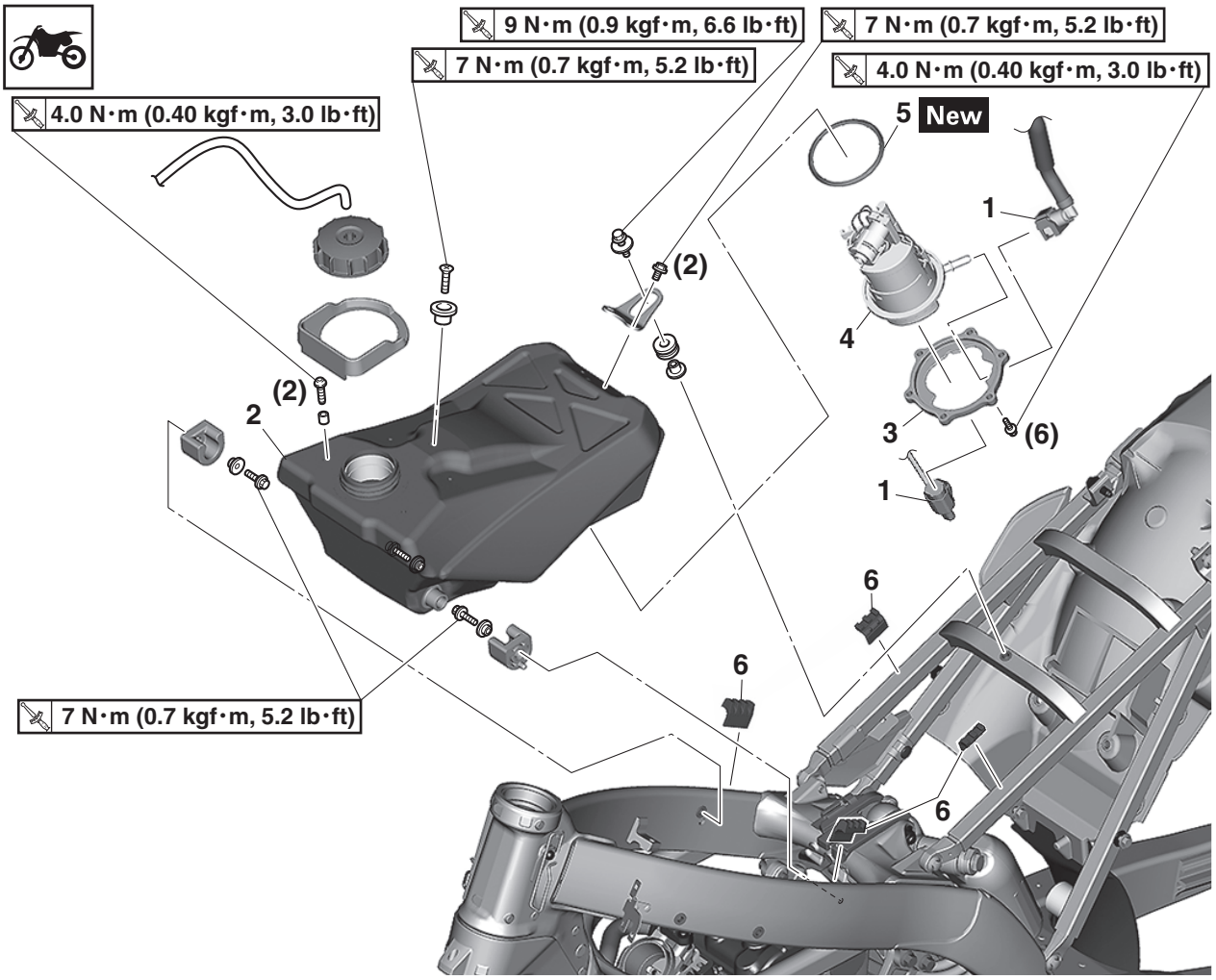
FUEL TANK 7-1
REMOVING THE FUEL TANK 7-2
REMOVING THE FUEL PUMP 7-2
CHECKING THE FUEL PUMP BODY 7-2
INSTALLING THE FUEL PUMP 7-2
INSTALLING THE FUEL TANK 7-3
CHECKING THE FUEL PRESSURE 7-3
CHECKING THE DAMPER 7-4

THROTTLE BODY 7-5
CHECKING THE INJECTOR 7-8
CHECKING THE THROTTLE BODY 7-8
CHECKING THE THROTTLE BODY JOINT 7-8
ADJUSTING THE THROTTLE POSITION SENSOR 7-9

EAM20140

FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		
	Air scoop (left/right)		
1	Fuel pump coupler/Fuel hose	1/1	Disconnect.
2	Fuel tank	1	
3	Fuel pump bracket	1	
4	Fuel pump	1	
5	Fuel 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

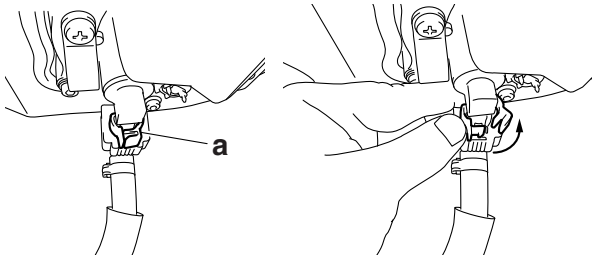
Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.

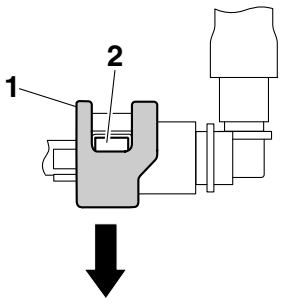
ECA24710
NOTICE

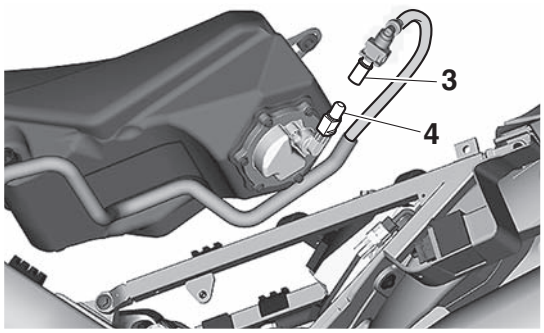
Make sure that the fuel hose is disconnected by hand. Do not forcefully disconnect the hose with tools.

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.

EAM30266
INSTALLING THE FUEL PUMP

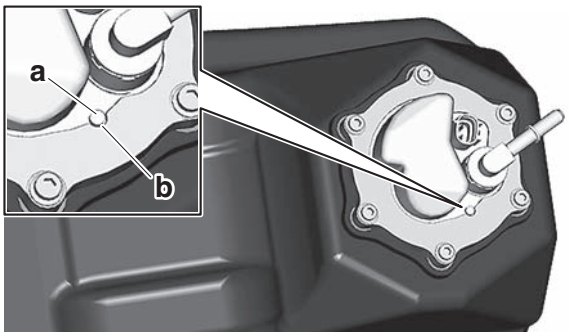
1. Install:
   • Fuel pump gasket New
   • Fuel pump
   • Fuel pump bracket

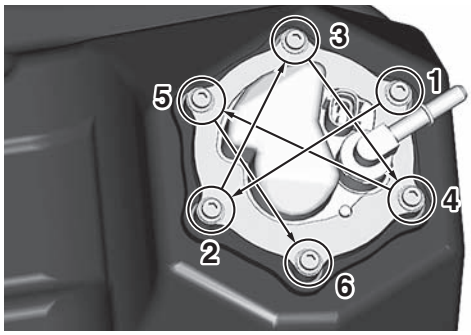
	Fuel pump bolt **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

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

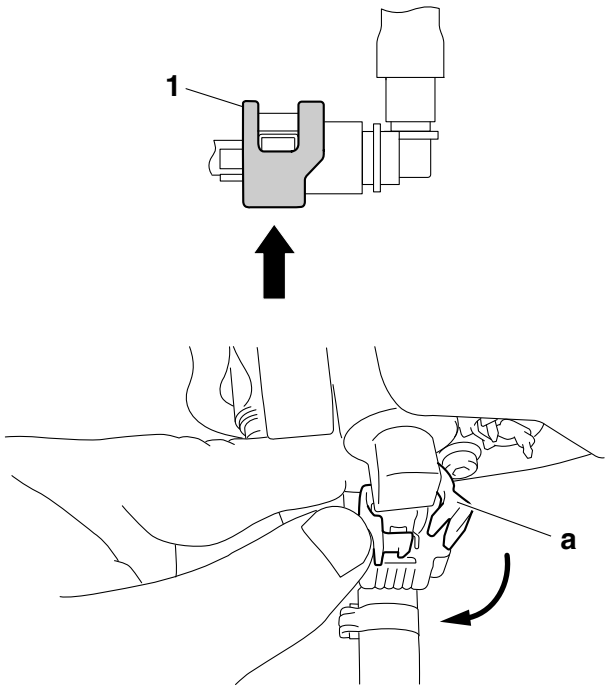
1. Install:
   • Fuel tank
2. Connect:
   • Fuel hose

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.

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

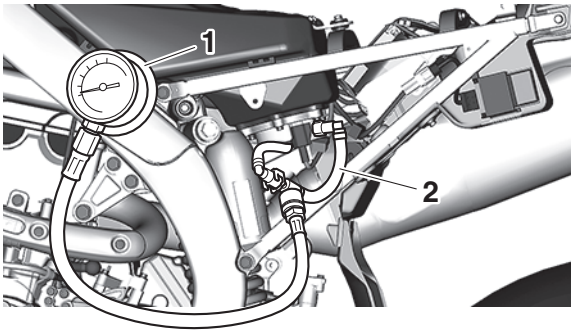
Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.

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.

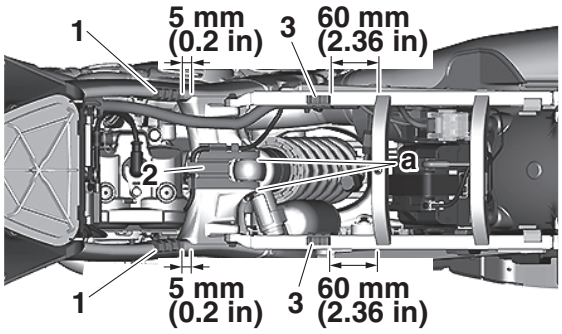
Fuel line pressure (at idle)
300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)

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EAM30269
CHECKING THE DAMPER

1. Check:
- Damper 1 “1”
- Damper 2 “2”
- Damper 3 “3”
Wear/damage → Replace.

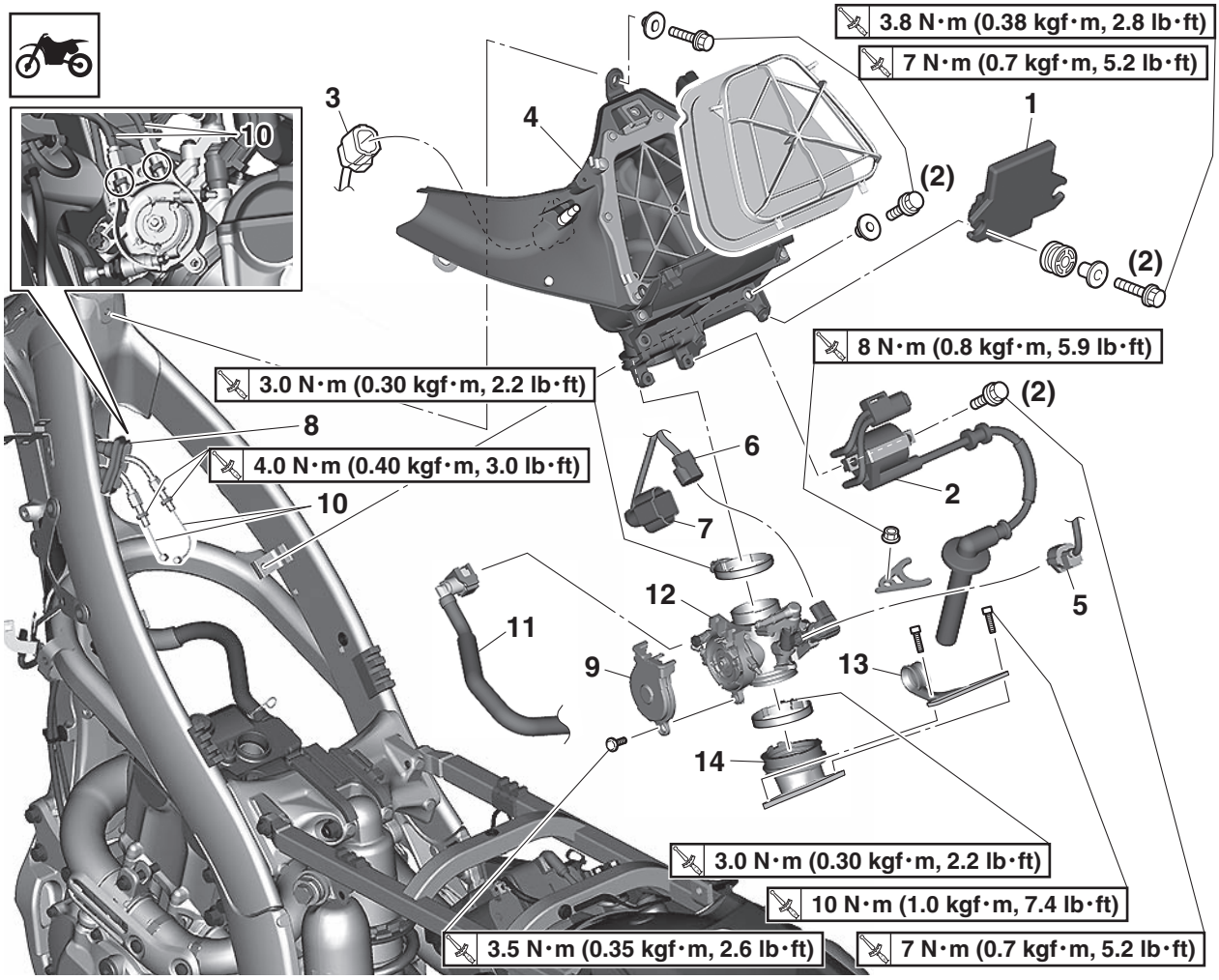
TIP
Affix the damper 2 with its projection “a” facing the rear of the vehicle.



EAM20141

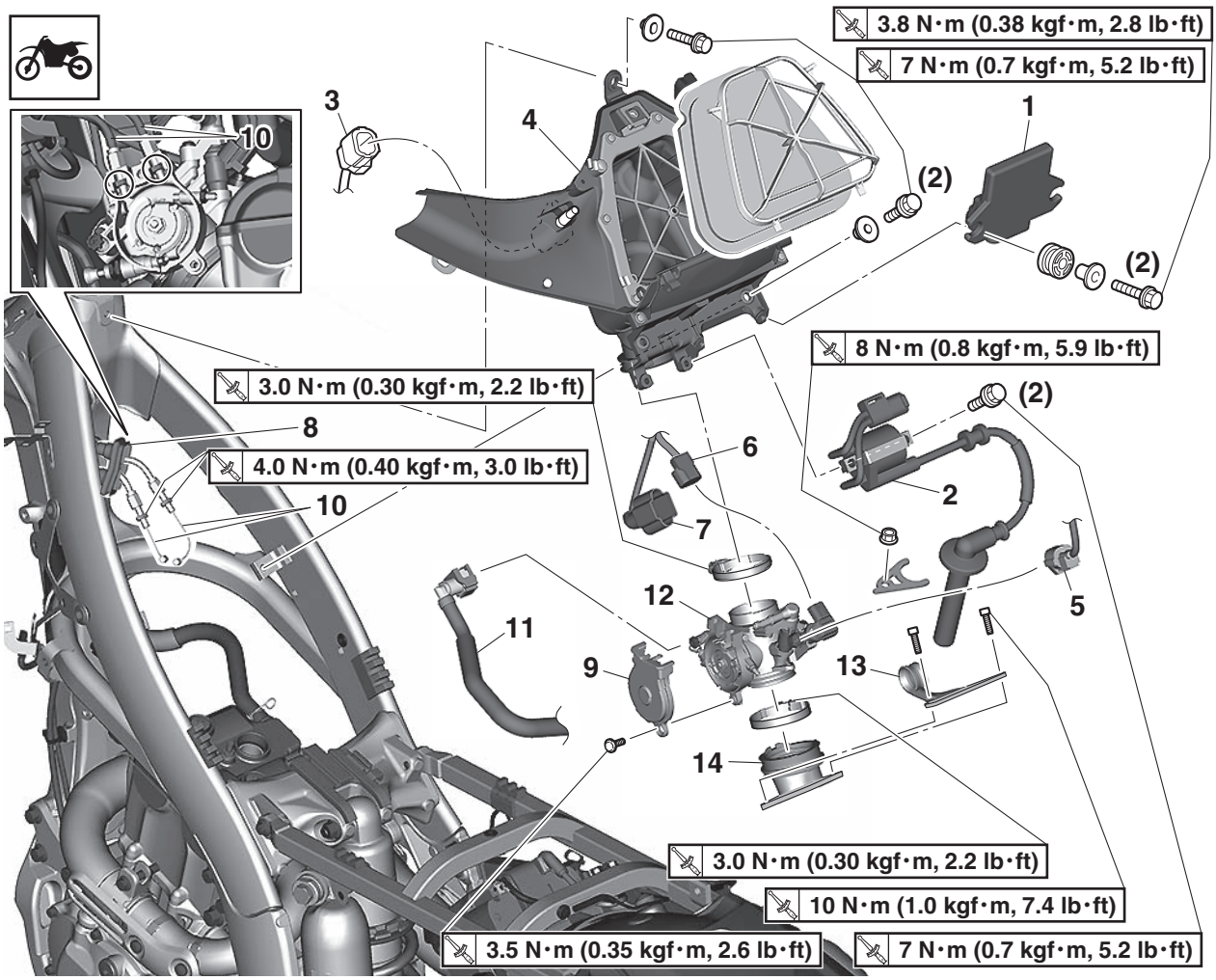
THROTTLE BODY

Removing the throttle body



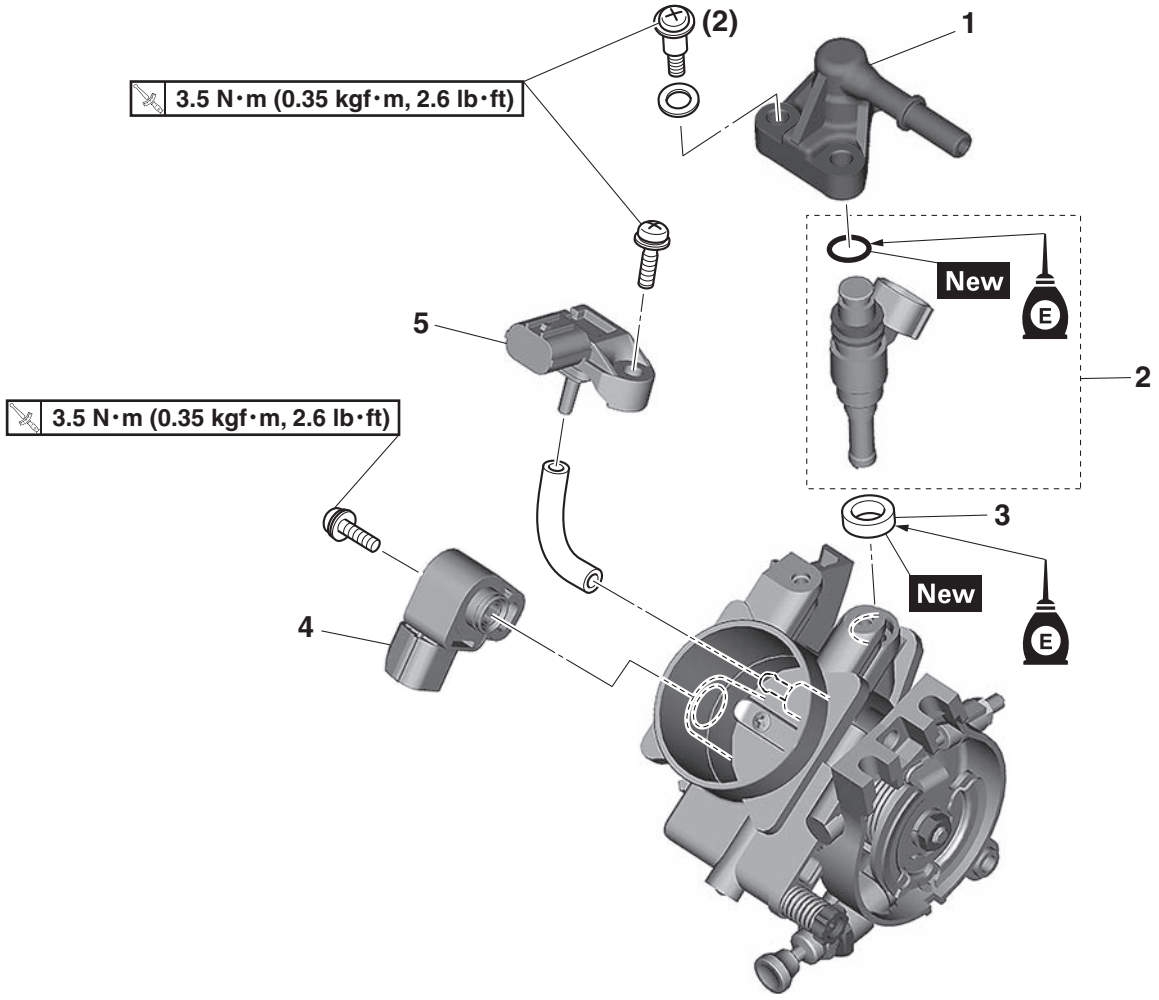
Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Air filter case cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cover (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	ECU	1	
2	Ignition coil	1	
3	Intake air temperature sensor coupler	1	Disconnect.
4	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	
10	Throttle cable	2	
11	Fuel hose	1	
12	Throttle body	1	

Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
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

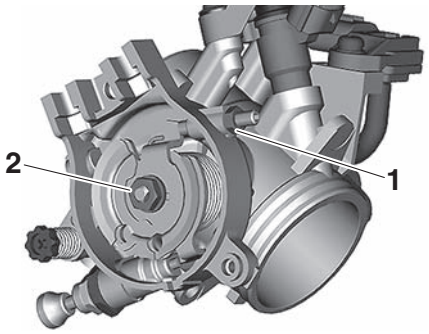
1. Check:
   • Injectors
   Obstruction → Replace, and check the fuel pump and the fuel injection system.
   Refer to "FUEL INJECTION SYSTEM" on page 8-13.
   Deposits → Replace.
   Damage → Replace.
2. Check:
   • Injector resistance
   Refer to "CHECKING THE FUEL INJECTOR" on page 8-54.

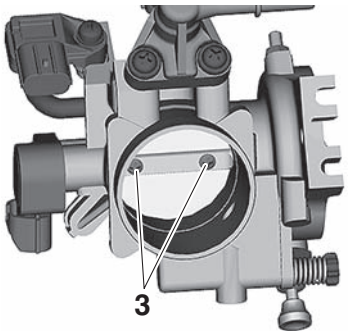
EAM30272
CHECKING THE THROTTLE BODY

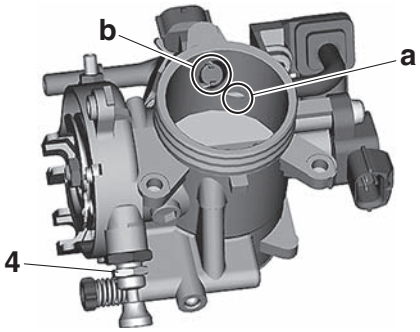
1. Check:
   • Throttle body
   Cracks/damage → Replace.
2. Check:
   • Fuel passages
   Obstructions → Clean.

ECA26070
NOTICE

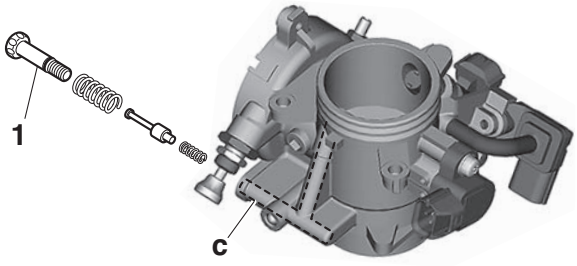
- **Before removing the throttle body, clean the area around the throttle body to prevent dirt and other foreign material from falling into the engine.**
- **If the throttle body is subject to strong shocks or dropped during cleaning, replace it.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not directly push the throttle valves to open them.**
- **Do not loosen the throttle valve stopper screw "1", throttle valve pulley nut "2", throttle valve screw "3" or starter knob nut "4". A loss of performance may occur.**
- **Do not use compressed air to clean the throttle body. Foreign materials may adhere to the intake air pressure sensor passage "a" and fuel injector "b" in the throttle body.**





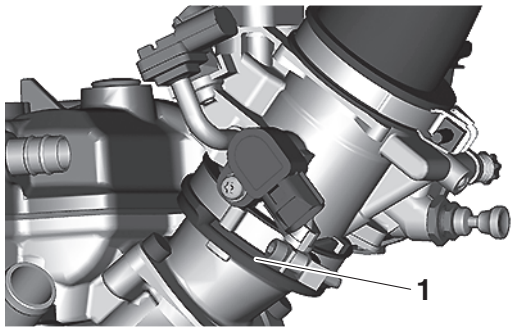


3. Check:
   • Idle screw "1" passage "c"
   Obstruction → Blow out with compressed air.



EAM30345
CHECKING THE THROTTLE BODY JOINT

1. Check:
   • Throttle body joint "1"
   Crack/damage → Replace.



EAM30273
ADJUSTING THE THROTTLE POSITION SENSOR

EWA15950
WARNING

- **Handle the throttle position sensor with special care.**
- **Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.**

1. Check:
   - Throttle position sensor
     Refer to "CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE" on page 8-53.
2. Adjust:
   - Throttle position sensor angle

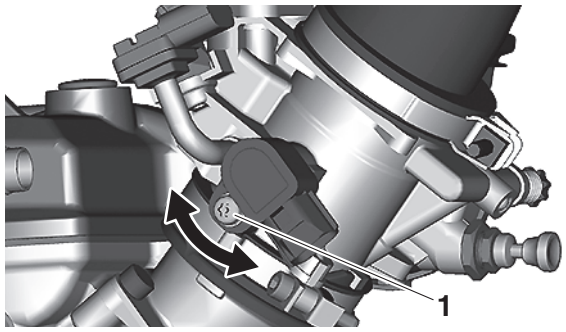
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a. Connect the Yamaha diagnostic tool.
   Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-15.

Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03262
FI diagnostic tool sub–lead
90890-03212
FI diagnostic tool sub–lead
YU-03212
OBD/ GST Leadwire kit
90890-03249

b. Temporary tighten the throttle position sensor.
c. Check that the throttle grip is fully closed.
d. Connect the throttle position sensor to the wire harness.
e. Set the Yamaha diagnostic tool to "diagnostic mode".
f. Choose the diagnostic code No. "01".
g. Adjust the throttle position sensor mounted angle until "11"–"14" appears on the Yamaha diagnostic tool.
h. After adjusting the throttle position sensor mounted angle, tighten the throttle position sensor screws "1".

Throttle position sensor screw
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)



▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

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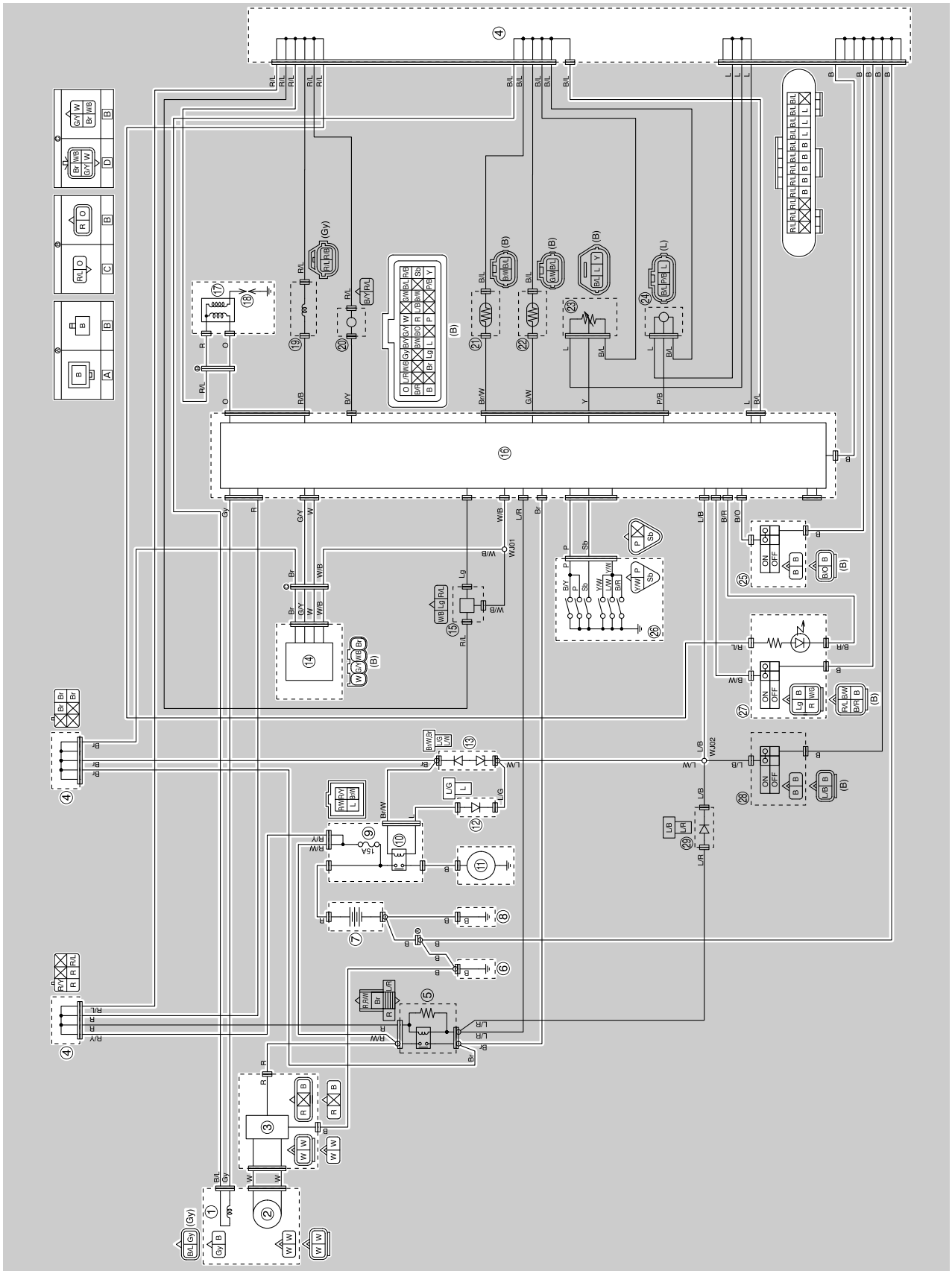
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EAM20142
IGNITION SYSTEM

EAM30277
CIRCUIT DIAGRAM



1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Engine ground
7. Battery
8. Frame ground
9. 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. Gear position switch
27. Mode switch

A. Battery sub-lead
B. Wire harness
C. Ignition coil sub-lead
D. CCU sub-lead

EAM30278
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

Before troubleshooting, remove the following part(s):
1. Side cover (left/right)
2. Seat
3. Fuel tank
4. Air scoop (left/right)
5. Air filter case cover

1. Check the ignition system wire harness connections.	NG→	Reconnect.
OK↓		
2. Check the fuse(s). Refer to "CHECKING THE FUSES" on page 8-46.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 3-37.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-36.	NG→	Correct or replace the spark plug.
OK↓		
5. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-49.	OK→	The ignition system circuit is OK.
NG↓		
6. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 8-50.	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 8-51.	NG→	Replace the crankshaft position sensor.
OK↓		

9. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-51.	NG→	Replace the stator coil.
OK↓		
10. Check the ignition system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

The mode switch to blink.

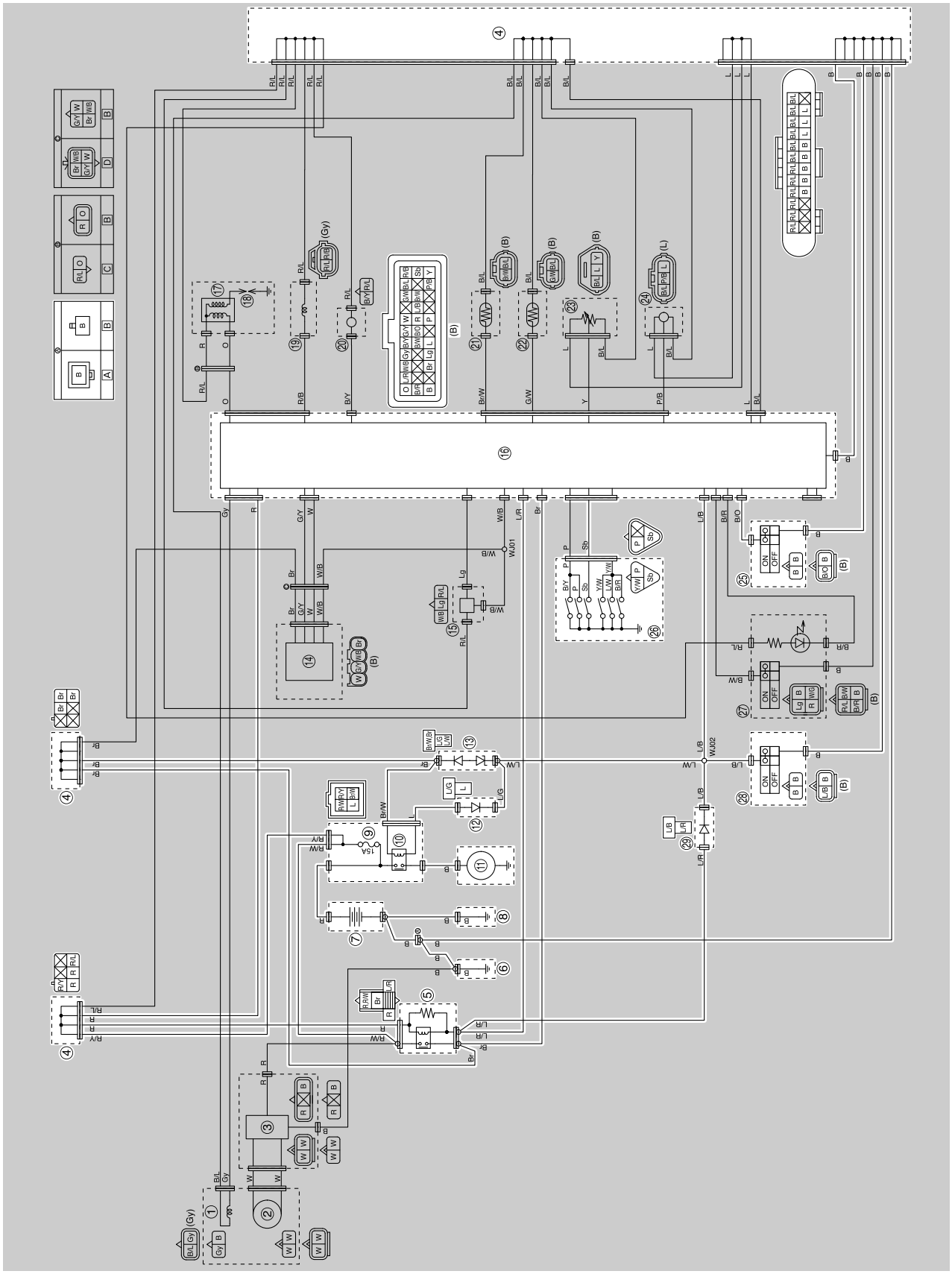
TIP

Before troubleshooting, remove the following part(s):
1. Seat
2. Air scoop (left)

1. Check the mode switch coupler connections.	NG→	Reconnect.
OK↓		
2. Check the mode switch. Refer to "CHECKING THE SWITCHES" on page 8-43.	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. Engine ground
7. Battery
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
26. Gear position switch
28. Start switch
29. 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 8-46.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-46.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main relay. Refer to "CHECKING THE RELAYS" on page 8-48.	NG→	Replace the main relay.
OK↓		
4. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-51.	OK→	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step (6).
NG↓		
5. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-38.	NG→	Repair or replace the starter motor.
OK↓		
6. Check the diodes. (Diode 1, diode 2, diode 3) Refer to "CHECKING THE DIODE" on page 8-49.	NG→	Replace the diodes.
OK↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-48.	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 8-5.

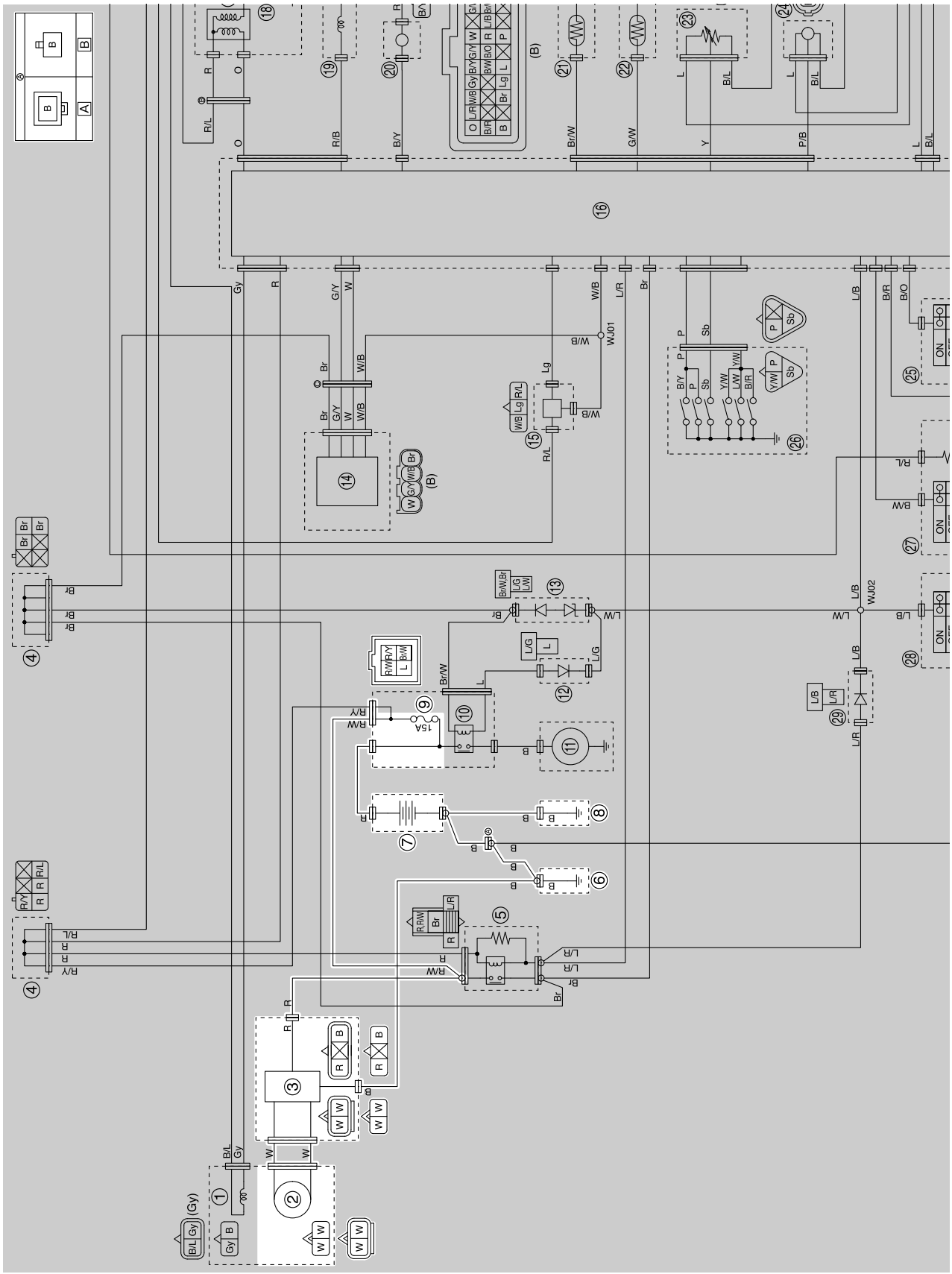
NG→ Properly connect or repair the starting system's wiring.

OK↓

Replace the ECU.

EAM20144
CHARGING SYSTEM

EAM30282
CIRCUIT DIAGRAM



2. AC magneto
3. Rectifier/regulator
6. Engine ground
7. Battery
8. Frame ground
9. 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)

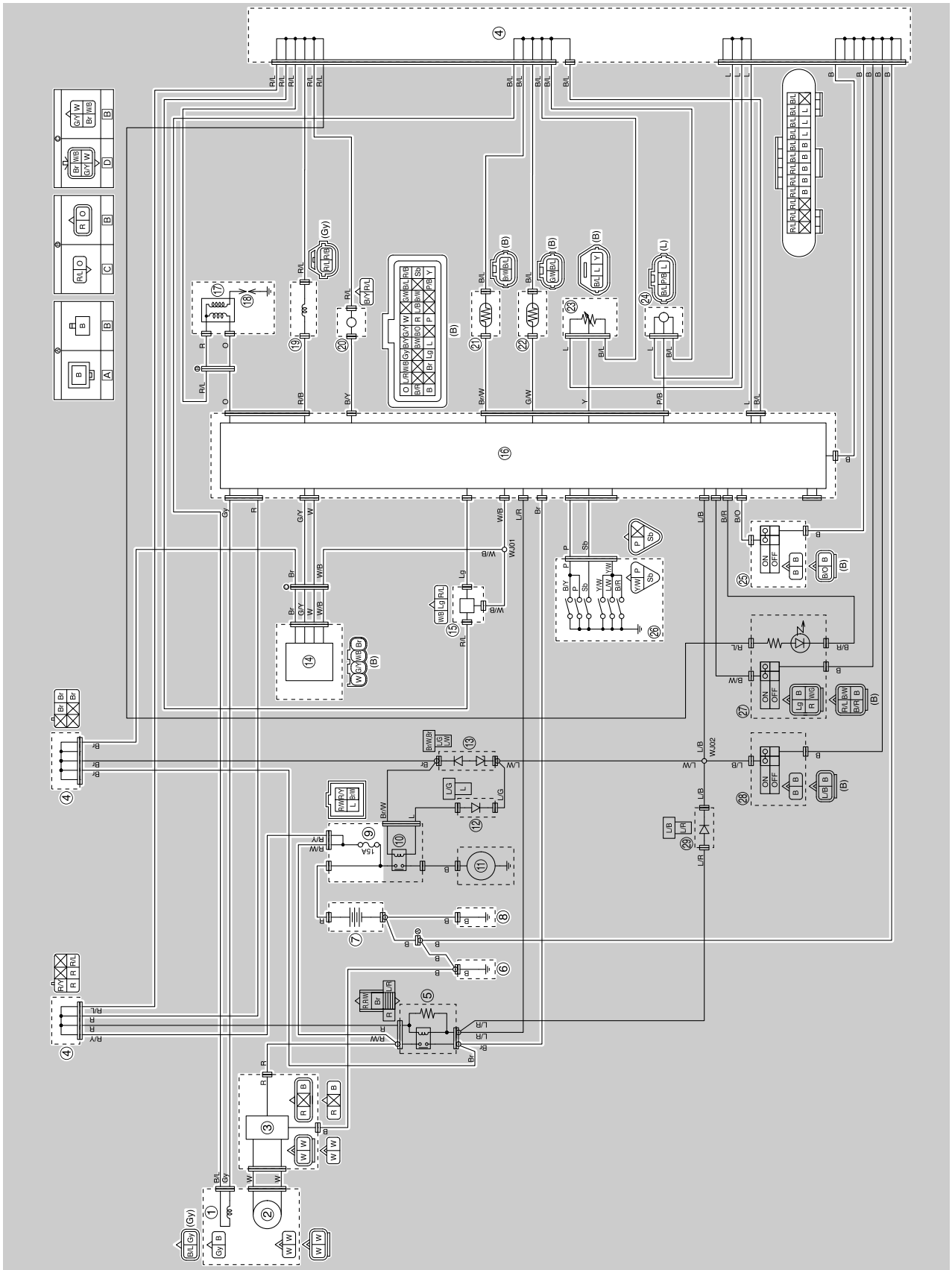
1. Check the entire charging system's wiring.	NG→	Reconnect.
OK↓		
2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-46.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-46.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-52.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-51.	NG→	Replace the stator coil.
OK↓		
6. Check the charging system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-9.	NG→	Repair or replace the wire harness.
OK↓		
This circuit is OK.		

EAM20145

FUEL INJECTION SYSTEM

EAM30284

CIRCUIT DIAGRAM



1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Engine ground
7. Battery
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
26. Gear position switch

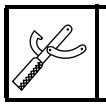
A. Battery sub-lead
B. Wire harness
C. Ignition coil sub-lead
D. CCU sub-lead

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)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03262

TIP
A generic scan tool can also be used to identify malfunctions.



OBD/ GST Leadwire kit
90890-03249

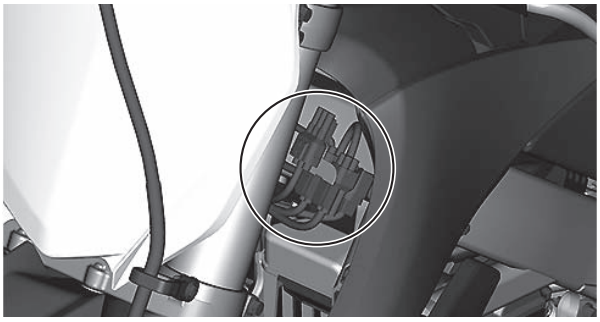
Features of the Yamaha diagnostic tool
You can use the Yamaha diagnostic tool to identify malfunctions quicker than with conventional methods.
By connecting the adapter interface, which is connected to the USB port of a computer, to a vehicle's ECU using the communication cable, you can display information that is necessary for identifying malfunctions and for maintenance to display on the computer. The displayed information includes the sensor output data and information recorded in the ECU.
Functions of the Yamaha diagnostic tool

Diagnosis of malfunction:	Fault codes recorded on the ECU are read, and the contents are displayed. The freeze frame data (FFD) is the operation data when a malfunction was detected. This data can be used to identify when the malfunction occurred and check the engine conditions and running conditions when it occurred.
Diagnosis of function:	Check the operation of the output value of each sensor and actuator.
Dynamic inspection:	Check the electric component condition automatically.
Active test:	Manually adjust injection duration and/or switch some actuators for troubleshooting.
Maintenance record:	Store the inspection history into the Yamaha diagnostic tool application.
Recall search:	Search the recall campaign information.
Monitoring:	Displays a graph of sensor output values for actual operating conditions.
Logging:	Records and saves the sensor output value in actual driving conditions.
CO adjustment:	Adjust the concentration of CO admissions during idling.
Reprogram ECU:	If necessary, the ECU is rewritten using ECU rewrite data provided by Yamaha. Ignition timing adjustment, etc. cannot be changed from the vehicle's original state.
Writing VIN/frame number:	Write the VIN/frame number in the ECU.
View logs:	Displays the logging data.

However, the Yamaha diagnostic tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

EAM30356
CONNECTING THE YAMAHA DIAGNOSTIC TOOL

1. Remove the coupler for connecting setting tool.



2. Connect the FI diagnostic tool sub-lead.



FI diagnostic tool sub–lead
90890-03212
FI diagnostic tool sub–lead
YU-03212

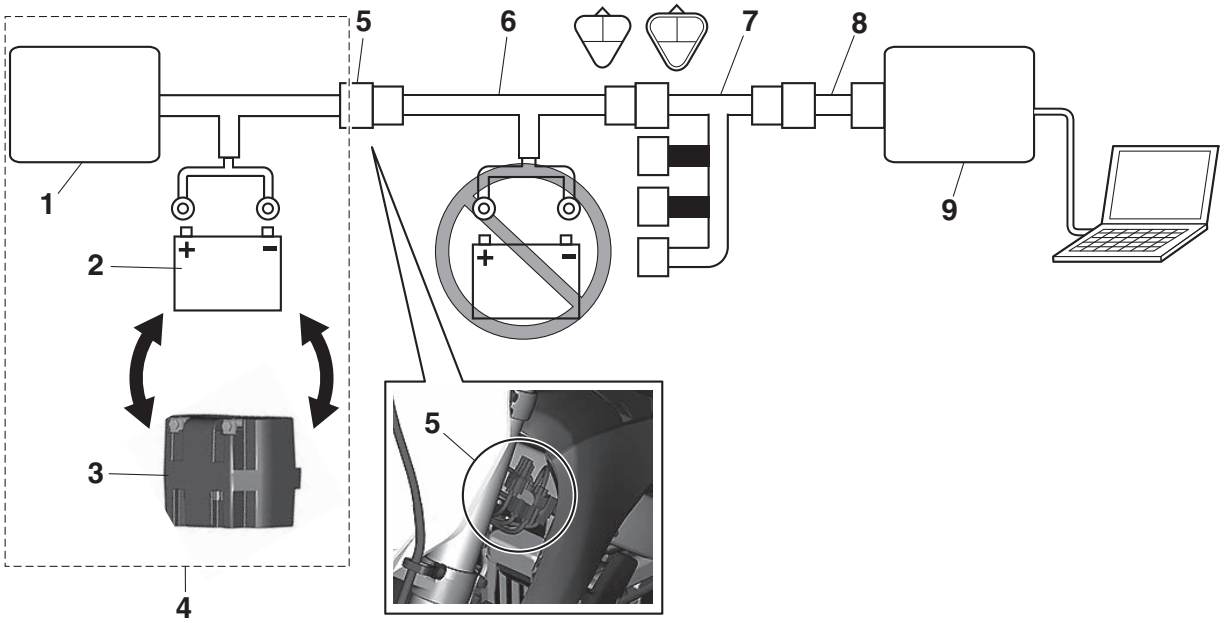
3. Connect the FI diagnostic tool sub-lead to the Yamaha diagnostic tool.

EWA20450
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 DIGNOSTIC TOOL OPERATION MANUAL”.



1. ECU (Engine Control Unit)
2. Lead battery (12 V)
3. Vehicle battery
4. Vehicle
5. Coupler for connecting optional part
6. FI diagnostic tool sub-lead
7. Sub-harness (included with the Yamaha diagnostic tool)
8. Vehicle communication cable (included with the Yamaha diagnostic tool)
9. Yamaha diagnostic tool

EAM30286
TROUBLESHOOTING DETAILS (FAULT CODE)

This section describes the measures per fault code number displayed on the Yamaha diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.
After the check and service of the malfunctioning part have been completed, delete the fault codes displayed on the Yamaha diagnostic tool according to the reinstatement method.
Fault code No.:
Fault code number displayed on the Yamaha diagnostic tool when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SENSOR OPERATION TABLE" on page 9-5.

Parts connected to the ECU

The following parts are connected to the ECU.
When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Fuel injector
- Ignition coil
- Throttle position sensor
- Intake air pressure sensor
- Coolant temperature sensor
- Intake air temperature sensor

Fault code No. 12

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 between the crankshaft position sensor and the pickup rotor.	Improperly mounted sensor → Remount or replace the sensor. Refer to “AC MAGNETO” on page 5-60.	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 8-51.	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.

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)	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)	Service is finished.
3	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. 15

TIP

If fault code numbers 15 and 16 are both displayed, perform checkup and repair jobs for fault code number 15 first.

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 7-9.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 5.

<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>Disconnect the starter relay lead (to the starter motor), and then push the starter switch.
Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.
Condition is “Recovered” → Go to item 8 and finish the service.
Condition is “Detected” → Go to item 7.</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.

<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 7-9.	Start switch to ON (main relay ON) and open and close the throttle several times. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 4 and finish the service. Condition is “Detected” → Go to item 2.
2	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. 01) When the throttle is fully closed, 11–14 displays. When the throttle is fully opened, 86–92 displays. Incorrect display range → Replace the throttle position sensor.	Start switch to ON (main relay ON) and open and close the throttle several times. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 4 and finish the service. Condition is “Detected” → Go to item 3.
3	Faulty ECU.	Replace the ECU.	Service is finished.
4	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. 21

TIP

Make sure that the machine is completely cold before checking the coolant temperature sensor.

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.	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.

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

Fault code No.		30	
Item		**The vehicle has overturned.**	
Fail-safe system		Able 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/blue	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 5.
5	Mounted condition of ignition coil. Check for looseness or pinching. Check the mounted condition for correctness.	Improperly mounted sensor → Remount or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 8 and finish the service. Condition is “Detected” → Go to item 6.
6	Defective ignition coil. (test the primary coils for continuity)	Check the primary resistance of the ignition coil. Refer to “CHECKING THE IGNITION COIL” on page 8-50.	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 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 FUEL INJECTOR" on page 8-54.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 3.
3	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler, and check the pins (for bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely, or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between injector coupler and ECU coupler. red/black–red/black Between injector coupler and joint coupler red/blue–red/blue red/yellow–red/yellow red/white–red/white red–red	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 5.

Fault code No.		**39**	
Item		**Injector: open or short circuit detected.**	
5	Faulty ECU.	Replace the ECU.	Service is finished.
6	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. 41

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 ECU coupler. red–red red–red/white Between main relay coupler and ECU coupler. brown–brown blue/red–blue/red	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 4.
4	Defective main relay.	No operating sound → Replace the main relay. Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the main relay.	Press the start switch and the engine stop switch alternately to switch the power supply (= main relay) from "ON → OFF → ON". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recovered" → Go to item 6 and finish the service. Condition is "Detected" → Go to item 5.
5	Malfunction in ECU.	Replace the ECU.	Service is finished.
6	Delete the fault code.	Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. 44

Fault code No.	**44**
Item	**EEPROM fault code number: an error is detected while reading or writing on EEPROM.**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	60
Diagnostic tool display	Displays the location of the abnormal portion of the EEPROM data. • 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.	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 5 and finish the service. Condition is “Detected” → Repeat item 1. If the same number is indicated, go to item 3.
3	“07” is indicated in diagnostic mode. (Code No. 60) EEPROM data error for setting tool adjustment values for fuel injection amount or ignition timing.	Erase the setting map in the diagnostic mode. (Code No. 65)	Start switch to ON (main relay ON), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 5 and finish the service. Condition is “Detected” → Repeat item 1. If the same number is indicated, go to item 4.
4	Faulty ECU.	Replace the ECU.	Service is finished.
5	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

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 AC MAGNETO” on page 5-61.	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

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.

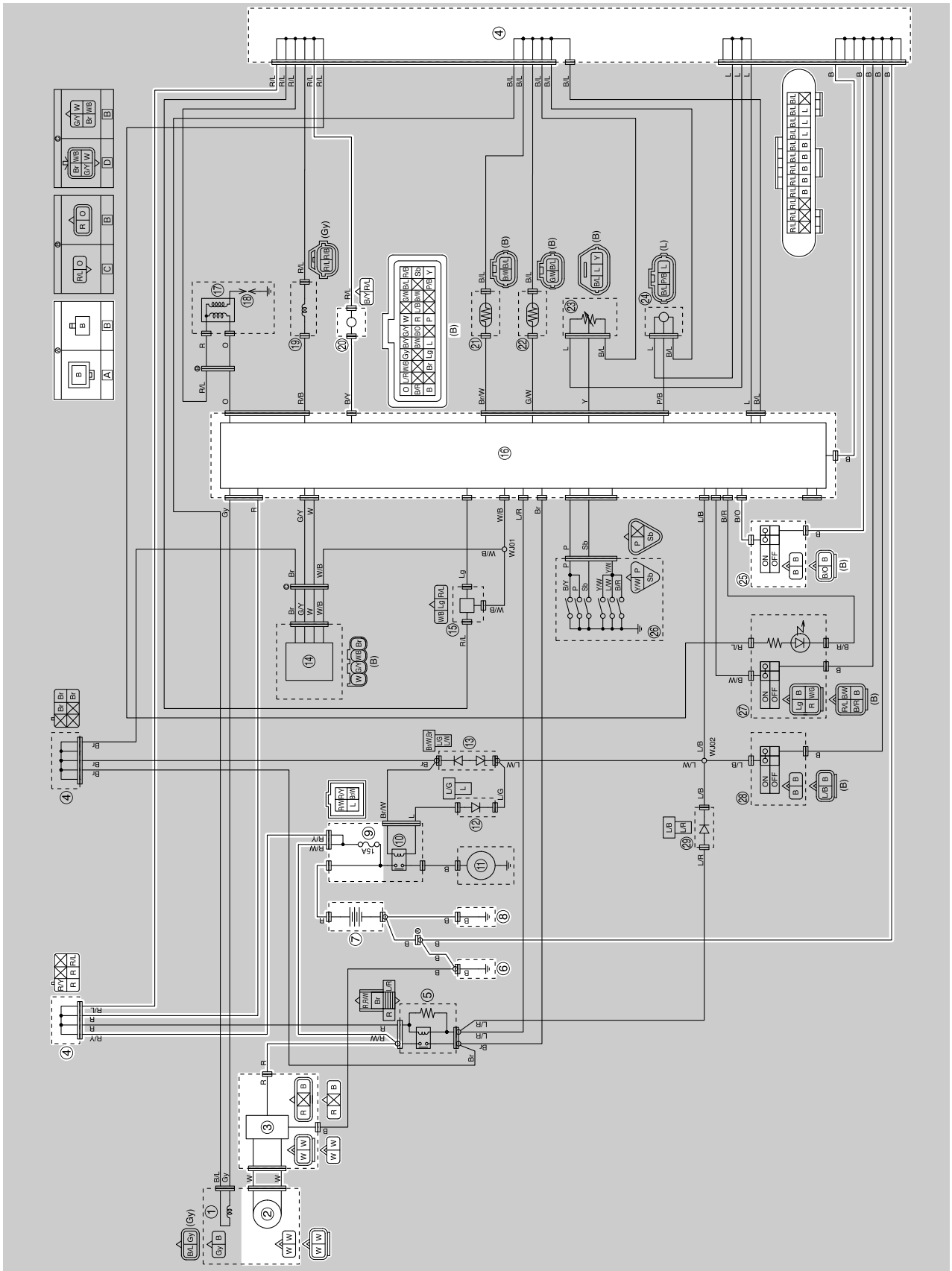
Fault code No.		70	
Item		Engine forcibly stops when the vehicle is left idling for a long period of time.	
Fail-safe system		—	
		Unable to drive vehicle	
Diagnostic code No.		—	
Diagnostic tool display		—	
Procedure		—	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Delete the fault code.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

EAM20146

FUEL PUMP SYSTEM

EAM30287

CIRCUIT DIAGRAM



2. AC magneto
3. Rectifier/regulator
4. Joint connector
6. Engine ground
7. Battery
8. Frame ground
9. Fuse
16. ECU (Engine Control Unit)
20. Fuel pump
25. Engine stop switch

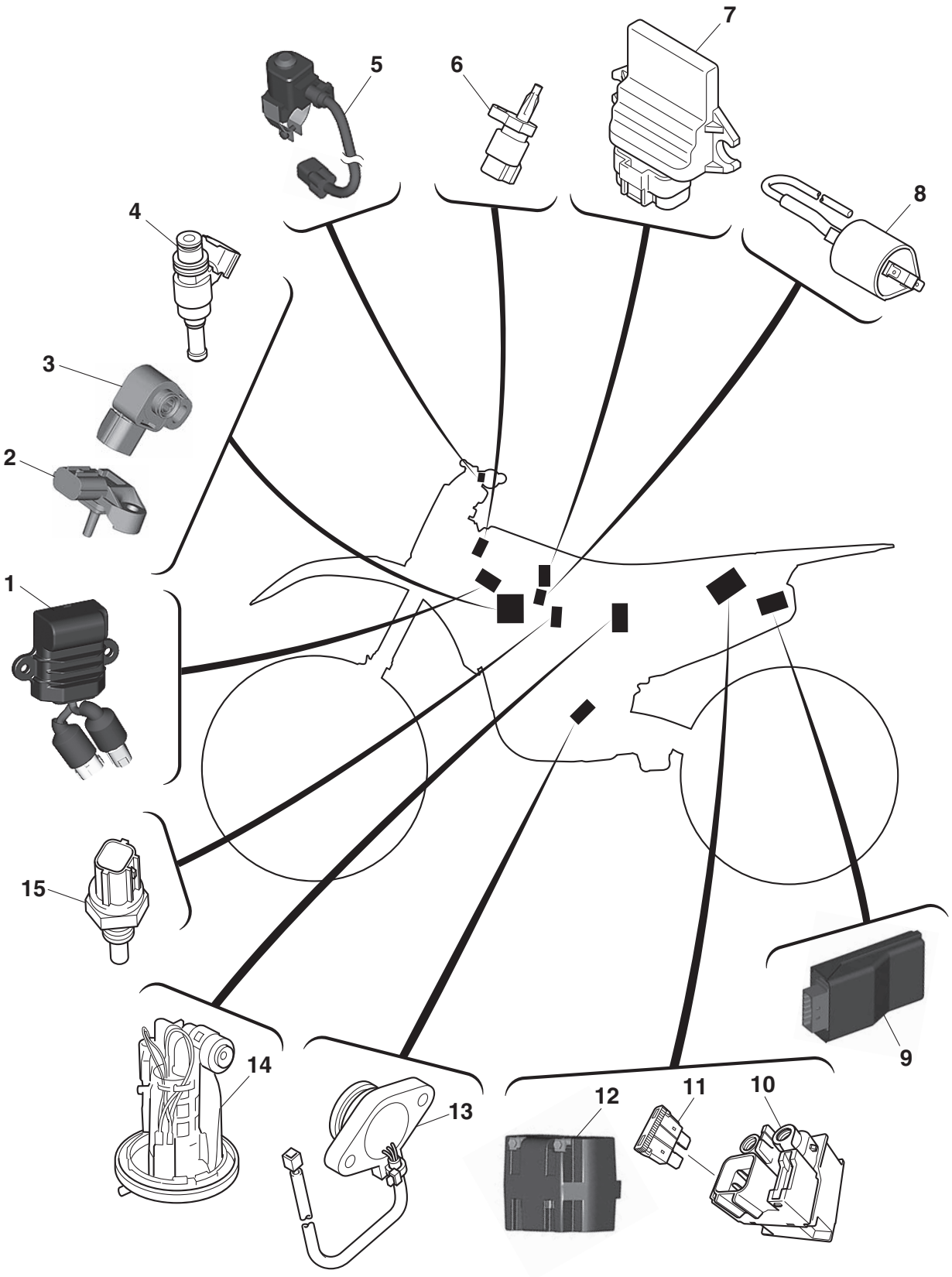
A. Battery sub-lead
B. Wire harness

EAM30288
TROUBLESHOOTING
The fuel pump fails to operate.
TIP
Before troubleshooting, remove the following part(s):
1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank
5. Air filter case cover

1. Check the fuel pump system wire harness connections.	NG→	Reconnect.
OK↓		
2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-46.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-46.	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 7-3.	NG→	Replace the fuel pump.
OK↓		
6. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 8-37.	NG→	Repair or replace the wire harness.
OK↓		
Replace the ECU.		

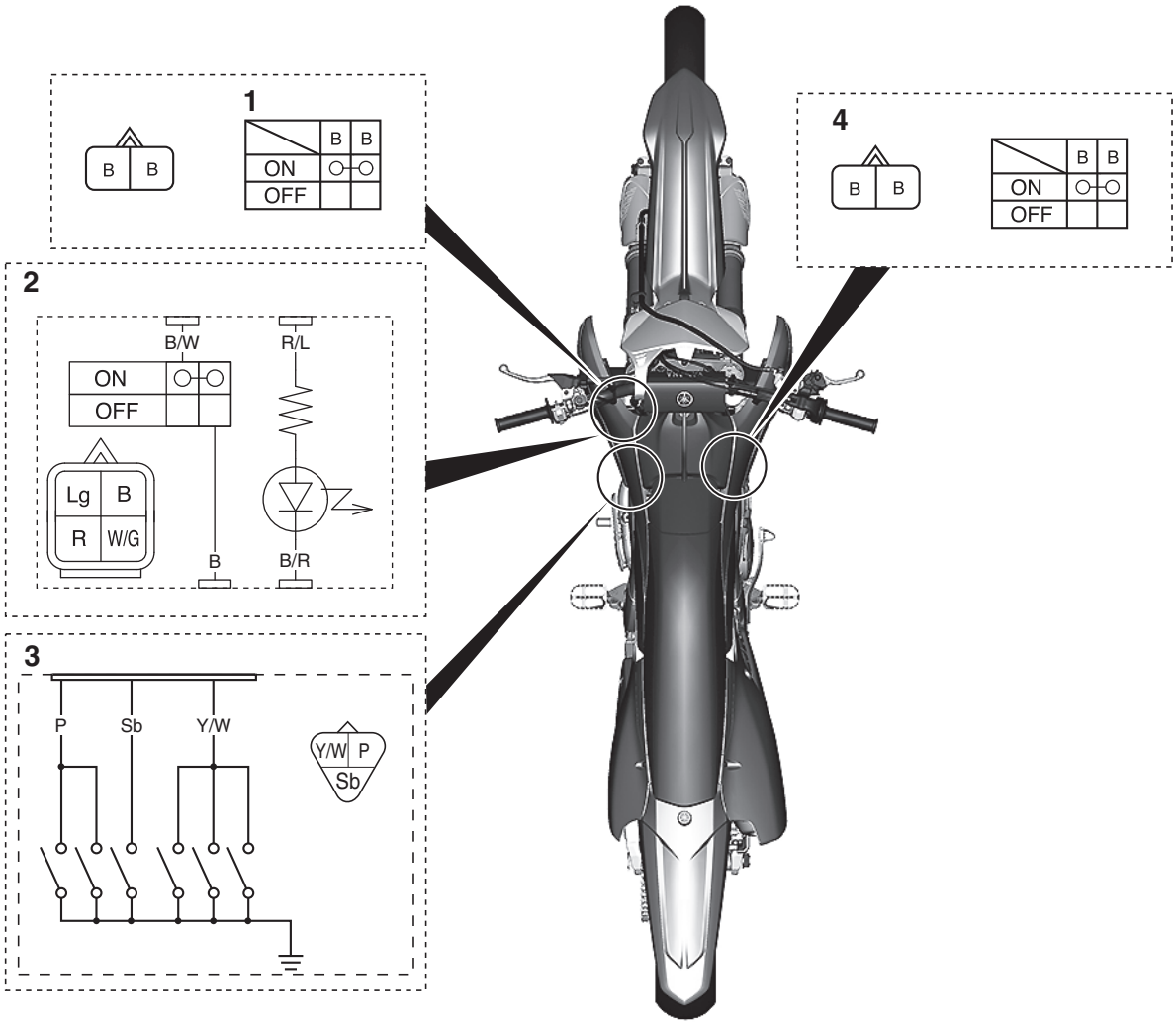
EAM20147

ELECTRICAL COMPONENTS



1. Rectifier/regulator
2. Intake air pressure sensor
3. Throttle position sensor
4. Injector
5. Mode switch
6. Intake air temperature sensor
7. ECU (Engine Control Unit)
8. Ignition coil
9. CCU (Communication Control Unit)
10. Starter relay
11. Fuse
12. Battery
13. Gear position switch
14. Fuel pump
15. Coolant temperature sensor

EAM30289
CHECKING THE SWITCHES



1. Engine stop switch
2. Mode switch
3. Gear position switch
4. 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

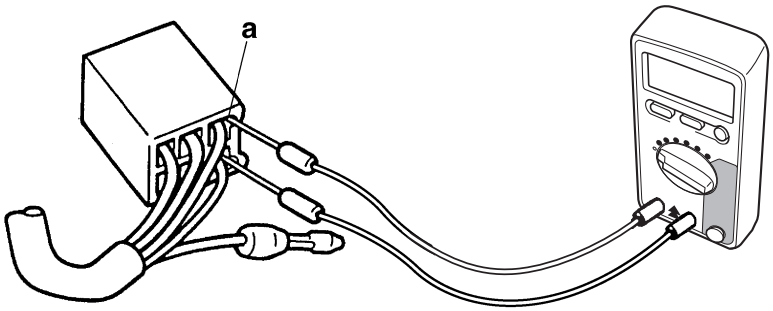
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



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.

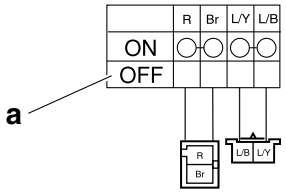


Terminal connections of the switch are shown in the terminal connection diagram below.
The switch positions "a" are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

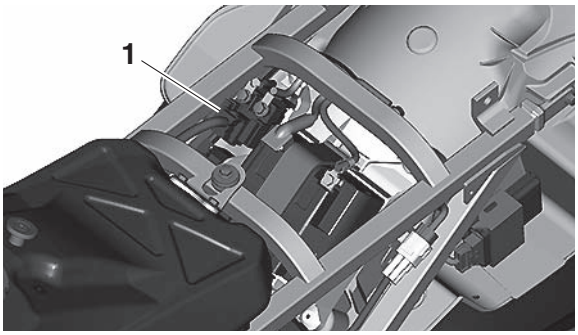
TIP

" ○——○ " 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"



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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.

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3. Replace:
   • Fuse

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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.

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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.**

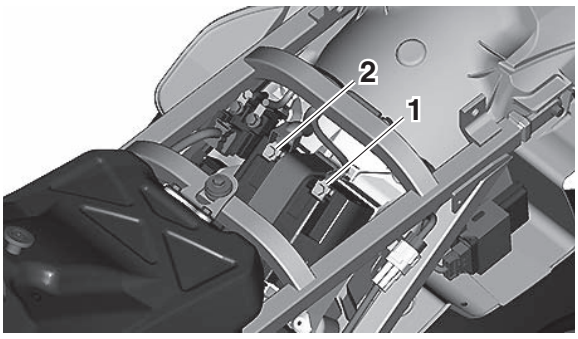
ECA26040
NOTICE
To prevent damage to the battery and battery malfunction:
- **Be sure to charge the battery using only the specified battery charger. Do not use a charger designed for lead-acid batteries. Otherwise, the battery could be damaged, such as from a long period of excessive current or current 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)

ECA13640
NOTICE
First, disconnect the negative battery lead "1", and then positive battery lead "2".



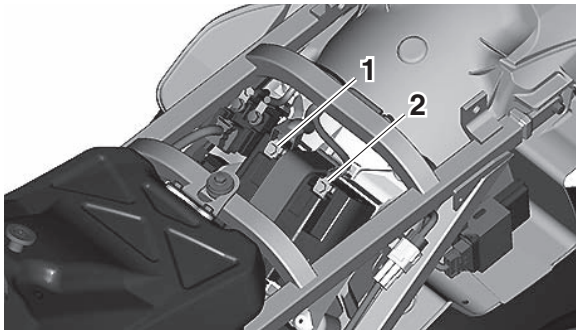
3. Remove:
   - Battery
4. Connect the battery charger (special tool) to the battery.

	Lithium battery charger 90890-05376 **Lithium battery charger DBY-ACC51-70-02**

TIP
- For instructions on charging and handling the battery charger, refer to the battery charger's instruction manual.
- Once battery charging starts, the sleep mode is canceled.

5. Charge the battery until it is fully charged.
6. Install:
   - Battery terminals
7. Connect:
   - Battery leads
   (to the battery terminals)

ECA13630
NOTICE
First, connect the positive battery lead "1", and then the negative battery lead "2".



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

	Recommended lubricant Dielectric grease

10. Install:
    - Seat
    - Side cover (left/right)
    Refer to "GENERAL CHASSIS" on page 4-1.

Checking the battery

ECA26080
NOTICE
The battery has a limited service life. If the battery cannot be charged or it is determined that the battery cannot be used after checking the battery, it should be replaced. When replacing the battery, be sure to use a Yamaha genuine lithium-ion battery.

TIP
Do not check the battery at high temperature of 65 °C (149 °F) or more or low temperatures be-

low 10 °C (50 °F). Otherwise, the control feature preventing battery charging and discharging will temporarily intervene.

1. Check:
   • Battery

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a. If the battery is hot, wait until the battery has cooled down to the ambient temperature.
b. Measure the voltage between the battery terminals.
   13.25 V or more → The battery is normal. Checking is finished.
   Less than 13.25 V → Go to step (c).
c. Connect the battery charger (special tool) to the battery and charge it.

Lithium battery charger
90890-05376
Lithium battery charger
DBY-ACC51-70-02

TIP
For instructions on charging and handling the battery charger, refer to the battery charger's instruction manual.

d. If the battery is hot, wait until the battery has cooled down to the ambient temperature.
e. Measure the voltage between the terminals of the battery.
   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.

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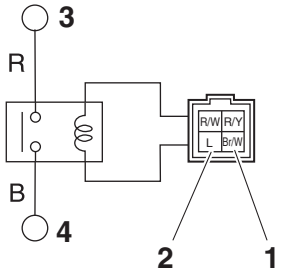
EAM30292
CHECKING THE RELAYS

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.

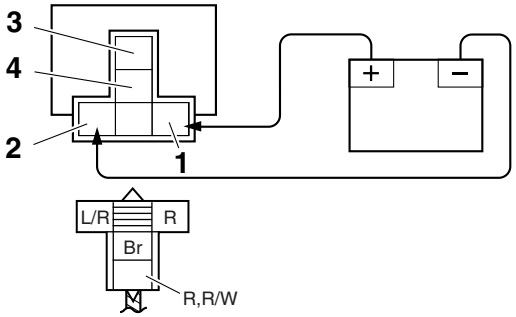
Starter relay



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")

EAM30293
CHECKING THE DIODE

1. Check:
   • Diode
   Out of specification → Replace.

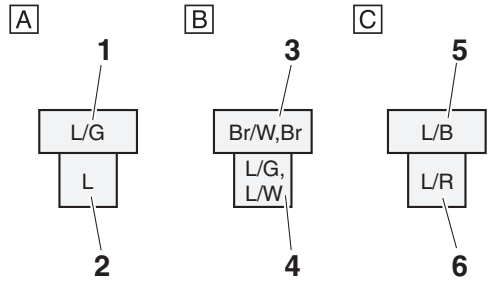
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP
The digital circuit tester and the multimeter with tachometer readings are shown in the following table.

No continuity
Tester positive lead → Blue/Green "1"
Tester negative lead → Blue "2"
Continuity
Tester positive lead → Blue "2"
Tester negative lead → Blue/Green "1"
No continuity
Tester positive lead → Brown/White, Brown "3"
Tester negative lead → Blue/Green, Blue/White "4"
Continuity
Tester positive lead → Blue/Green, Blue/White "4"
Tester negative lead → Brown/White, Brown "3"
No continuity
Tester positive prove → Blue/Black "5"
Tester negative prove → Blue/Red "6"
Continuity
Tester positive prove → Blue/Red "6"
Tester negative prove → Blue/Black "5"

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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

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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)

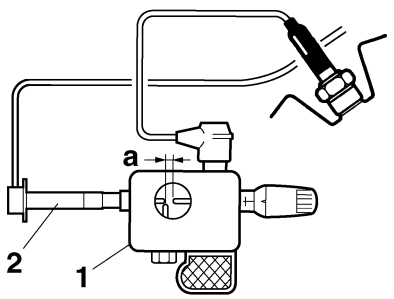
TIP
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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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.

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EAM30295

CHECKING THE SPARK PLUG CAP

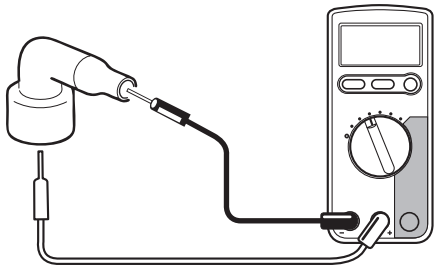
1. Remove:
   - Spark plug cap (from the spark plug lead)
2. Check:
   - Spark plug cap resistance
     Out of specification → Replace.

Resistance
7.50–12.50 kΩ

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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.

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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.

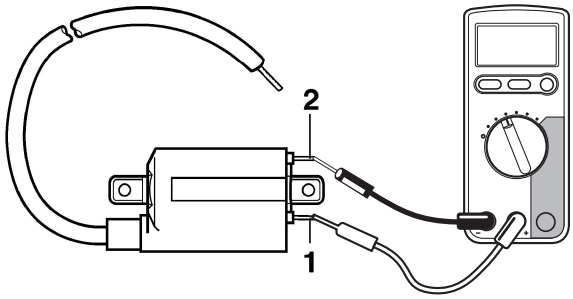
Primary coil resistance
2.16–2.64 Ω

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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.

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3. Check:
   - Secondary coil resistance
     Out of specification → Replace.

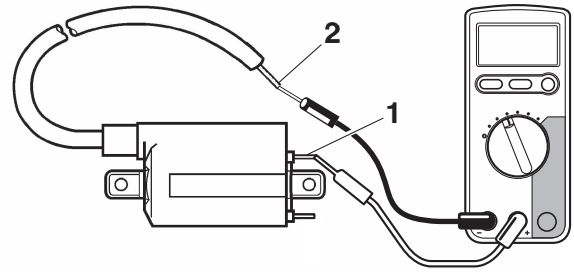
Secondary coil resistance
8.64–12.96 kΩ

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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.

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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.

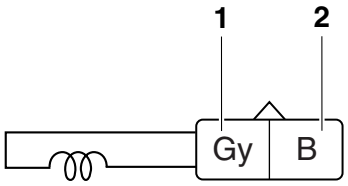
Crankshaft position sensor resistance
228–342 Ω

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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.

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EAM30379

CHECKING THE ECU

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 8-7.

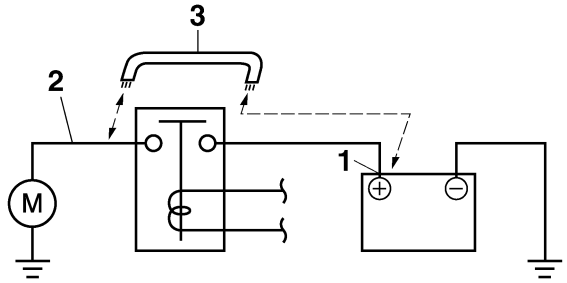
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a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

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.

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EAM30300

CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace.

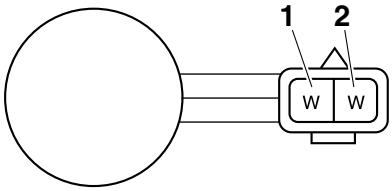
Stator coil resistance
0.512–0.768 Ω

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a. Connect the digital circuit tester (Ω) to the stator coil 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 resistance.

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EAM30301

CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Rectifier/regulator output voltage
     Out of specification → Replace.

Regulated voltage (DC)
14.0–14.8 V

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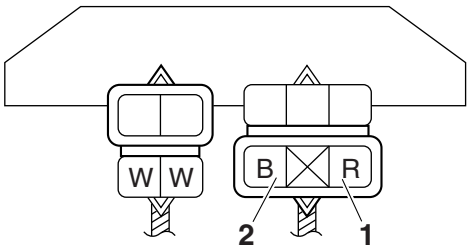
a. Set the digital tachometer to the ignition coil.

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.

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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.

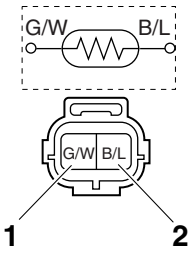
Coolant temperature sensor resistance
2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)
Coolant temperature sensor resistance
210–220 Ω at 100 °C (210–220 Ω at 212 °F)

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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"

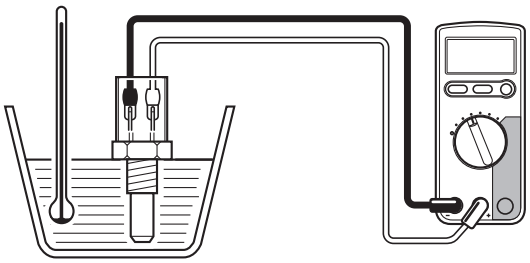


b. Immerse the coolant temperature sensor in a container filled with coolant.

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.

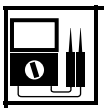


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EAM30305

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

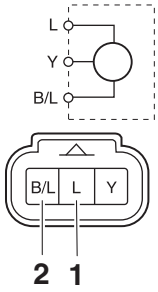
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a. Connect the test harness S-pressure sensor (3P) to the throttle position sensor coupler and the wire harness.
b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor (3P).



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.

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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.

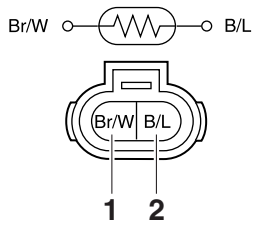
Intake air temperature sensor resistance
5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance
290–390 Ω at 80 °C (290–390 Ω at 176 °F)

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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"



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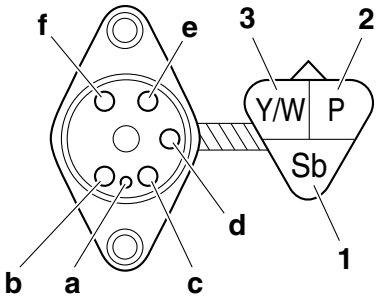
EAM30467

CHECKING THE GEAR POSITION SWITCH

1. Remove:
   - Gear position switch
2. Check:
   - Gear position switch
     Out of specification → Replace.

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

Continuity
Positive tester probe → Sky blue "1"
Negative tester probe → Sensor terminal "a"
Continuity
Positive tester probe → Pink "2"
Negative tester probe → Sensor terminal "b"
Continuity
Positive tester probe → Pink "2"
Negative tester probe → Sensor terminal "c"
Continuity
Positive tester probe → Yellow/White "3"
Negative tester probe → Sensor terminal "d"
Continuity
Positive tester probe → Yellow/White "3"
Negative tester probe → Sensor terminal "e"
Continuity
Positive tester probe → Yellow/White "3"
Negative tester probe → Sensor terminal "f"



EAM30308

CHECKING THE FUEL INJECTOR

1. Remove:
   - Fuel injector
     Refer to "THROTTLE BODY" on page 7-5.
2. Check:
   - Fuel injector resistance
     Out of specification → Replace.

Resistance
12.0 Ω

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a. Disconnect the fuel injector coupler from the

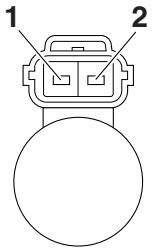
fuel injector.

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.

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TROUBLESHOOTING

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EAM20148

TROUBLESHOOTING

EAM30309

GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAM30310

STARTING FAILURE

Engine

1. Cylinder and cylinder head
   - Loose spark plug
   - Loose cylinder head or cylinder
   - Damaged cylinder head gasket
   - Damaged cylinder gasket
   - Worn or damaged cylinder
   - Incorrect valve clearance
   - Improperly sealed valve
   - Incorrect valve-to-valve-seat contact
   - Incorrect valve timing
   - Faulty valve spring
   - Seized valve
2. Piston and piston ring(s)
   - Improperly installed piston ring
   - Damaged, worn or fatigued piston ring
   - Seized piston ring
   - Seized or damaged piston
3. Air filter
   - Improperly installed air filter
   - Clogged air filter element
4. Crankcase and crankshaft
   - Improperly assembled crankcase
   - Seized crankshaft

Fuel system

1. Fuel tank
   - Empty fuel tank
   - Clogged fuel tank breather hose
   - Deteriorated or contaminated fuel
   - Clogged or damaged fuel hose
2. Fuel pump
   - Faulty fuel pump
3. Throttle body
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
   - Short main relay
2. Fuse
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
4. Ignition coil
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
5. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Broken generator rotor woodruff key
6. Switches and wiring
   - Faulty ECU
   - Faulty engine stop switch
   - Broken or shorted wiring
   - Faulty neutral switch
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty main relay
   - Faulty starter clutch

EAM30311

INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder and cylinder head
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system

1. Throttle body
   - Damaged or loose throttle body joint
   - Improperly synchronized throttle bodies
   - Improper throttle cable free play
   - Flooded throttle body

Electrical system

1. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
2. Ignition coil
   - Broken or shorted primary or secondary coil
   - Cracked or broken ignition coil

3. Ignition system
   • Faulty ECU (Engine Control Unit)
   • Faulty crankshaft position sensor
   • Broken generator rotor woodruff key

EAM30312
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE
Refer to “STARTING FAILURE” on page 9-1.
Engine
1. Air filter
   • Clogged air filter element

Fuel system
1. Fuel pump
   • Faulty fuel pump
2. Throttle body
   • Defective throttle body
3. ECU (Engine Control Unit)
   • Faulty ECU (Engine Control Unit)

EAM30313
SHIFTING IS DIFFICULT
Refer to “CLUTCH” on page 5-41.

EAM30314
SHIFT PEDAL DOES NOT MOVE
Engine
1. Shift shaft
   • Bent shift shaft
2. Shift drum and shift forks
   • Foreign object in a shift drum groove
   • Seized shift fork
   • Bent shift fork guide bar
3. Transmission
   • Seized transmission gear
   • Foreign object between transmission gears
   • Improperly assembled transmission

EAM30315
JUMPS OUT OF GEAR
Engine
1. Shift shaft
   • Incorrect shift pedal position
   • Improperly returned stopper lever
2. Shift forks
   • Worn shift fork
3. Shift drum
   • Incorrect axial play
   • Worn shift drum groove
4. Transmission
   • Worn gear dog

EAM30316
CLUTCH SLIPS
Engine
1. Clutch
   • Improperly assembled clutch
   • Loose or fatigued clutch spring
   • Worn friction plate
   • Worn clutch plate
2. Engine oil
   • Incorrect oil level
   • Incorrect oil viscosity (low)
   • Deteriorated oil

EAM30317
CLUTCH DRAGS
Engine
1. Clutch
   • Unevenly tensioned clutch springs
   • Warped pressure plate
   • Bent clutch plate
   • Swollen friction plate
   • Bent clutch push rod
   • Damaged clutch boss
   • Burnt primary driven gear bushing
2. Engine oil
   • Incorrect oil level
   • Incorrect oil viscosity (high)
   • Deteriorated oil

EAM30318
OVERHEATING
Engine
1. Cylinder head and piston
   • Heavy carbon buildup
   • Clogged coolant passages
2. Engine oil
   • Incorrect oil level
   • Incorrect oil viscosity
   • Inferior oil quality

Cooling system
1. Coolant
   • Low coolant level
2. Radiator
   • Damaged or leaking radiator
   • Faulty radiator cap
   • Bent or damaged radiator fin
3. Water pump
   • Damaged or faulty water pump
   • Damaged hose
   • Improperly connected hose
   • Damaged pipe
   • Improperly connected pipe

Fuel system
1. Throttle body
   • Damaged or loose throttle body joint
2. Air filter
   • Clogged air filter element

Chassis
1. Brake(s)
   • Dragging brake

Electrical system
1. Spark plug
   • Incorrect spark plug gap
   • Incorrect spark plug heat range
2. Ignition system
   • Faulty ECU (Engine Control Unit)
   • Faulty coolant temperature sensor

EAM30319
OVERCOOLING
Cooling system
1. Coolant temperature sensor
   • Faulty coolant temperature sensor

EAM30320
POOR BRAKING PERFORMANCE
Chassis
1. Brake(s)
   • Worn brake pad
   • Worn brake disc
   • Air in hydraulic brake system
   • Leaking brake fluid
   • Defective master cylinder kit
   • Faulty brake caliper kit
   • Faulty brake caliper seal
   • Loose union bolt
   • Damaged brake hose
   • Oil or grease on the brake disc
   • Oil or grease on the brake pad
   • Incorrect brake fluid level

EAM30361
FRONT FORK OIL LEAKING
Chassis
1. Front fork
   • Bent, damaged, or rusty inner tube
   • Cracked or damaged outer tube
   • Improperly installed oil seal
   • Damaged oil seal lip
   • Incorrect oil level (high)
   • Loose damper rod assembly bolt
   • Damaged damper rod assembly bolt copper washer
   • Cracked or damaged cap bolt O-ring

EAM30321
FAULTY FRONT FORK LEGS
Chassis
1. Front fork
   • Bent or damaged inner tube
   • Bent or damaged outer tube
   • Broken fork spring
   • Bent or damaged damper rod
   • Incorrect oil viscosity
   • Incorrect oil level

EAM30322
UNSTABLE HANDLING
Chassis
1. Handlebar
   • Bent or improperly installed handlebar
2. Steering head components
   • Improperly installed upper bracket
   • Improperly installed lower bracket (improperly tightened ring nut)
   • Bent steering stem
   • Damaged ball bearing or bearing race
3. Front fork leg(s)
   • Uneven oil levels (both front fork legs)
   • Unevenly tensioned fork spring (both front fork legs)
   • Broken fork spring
   • Bent or damaged inner tube
   • Bent or damaged outer tube
4. Swingarm
   • Worn bearing or bushing
   • Bent or damaged swingarm
5. Rear shock absorber assembly (-ies)
   • Faulty rear shock absorber spring
   • Leaking oil or gas
6. Tire(s)
   • Uneven tire pressures (front and rear)
   • Incorrect tire pressure
   • Uneven tire wear
7. Wheel(s)
   • Incorrect wheel balance
   • Broken or loose spoke
   • Damaged wheel bearing
   • Bent or loose wheel axle
   • Excessive wheel runout
8. Frame
   • Bent frame
   • Damaged steering head pipe
   • Improperly installed bearing race

EAM20156

LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

EAM30365

LIST OF DIAGNOSTIC CODES

Fault code	Item	Page
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	8-18
13	Intake air pressure sensor: open or short circuit detected.	8-19
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	8-21
15	Throttle position sensor: open or short circuit detected.	8-22
16	Throttle position sensor: stuck throttle position sensor is detected.	8-23
21	Coolant temperature sensor: open or short circuit detected.	8-24
22	Intake air temperature sensor: open or short circuit detected.	8-26
30	The vehicle has overturned.	8-27
33	Ignition coil: open or short circuit detected in the primary lead of the ignition coil.	8-28
39	Injector: open or short circuit detected.	8-30
41	ECU: built-in lean angle sensor malfunction.	8-31
43	Fuel system voltage: incorrect voltage supplied to the main relay.	8-31
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.	8-33
46	Vehicle system power supply: normal voltage is not supplied to the ECU.	8-34
50	ECU: faulty ECU memory.	8-35
70	Engine forcibly stops when the vehicle is left idling for a long period of time.	8-35

EAM30367

SENSOR OPERATION TABLE

Diagnostic code No.	Item	Display	Procedure
01	Throttle angle • Fully closed position • Fully opened position	Displays the throttle angle. • 11–14 • 86–92	 • Check with throttle fully closed. • 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.
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.

Diagnostic code No.	Item	Display	Procedure
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	—
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.	—

*1: Symbols used in the explanations of the malfunction history
○: Normal
×: There is currently a malfunction or abnormal condition.
△: A malfunction or abnormal condition occurred previously, but the affected system or component is currently operating normally.

EAM30368
ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Ignition coil	Actuates the ignition coil five times at one-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the ignition coil is actuated.	Check that a spark is generated five times. • 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
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REAR SHOCK ABSORBER SETTING PARTS 10-4
SUSPENSION SETTING (FRONT FORK).....10-6
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EAM20119
CHASSIS

EAM30168
SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET)

Secondary reduction ratio = Number of rear wheel sprocket teeth/Number of drive sprocket teeth

Secondary reduction ratio
3.846 (50/13)

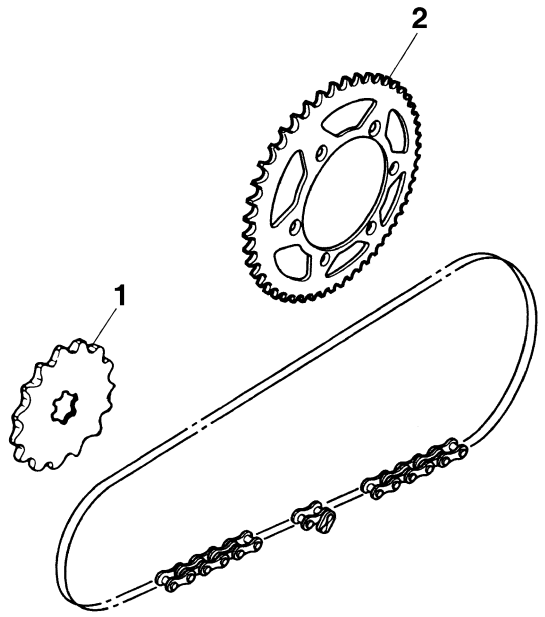
<Requirement for selection of secondary gear reduction ratio>
- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition of the day of the race, be sure to run through the circuit to set the machine suitable for the entire course.
- In actuality, it is very difficult to achieve settings suitable for the entire course and some settings may be sacrificed. Thus, the settings should be matched to the portion of the course that has the greatest effect on the race result. In such a case, run through the entire course while making notes of lap times to find the best balance; then, determine the secondary reduction ratio.
- If a course has a long straight portion where a machine can run at maximum speed, the machine is generally set such that it can develop its maximum revolutions toward the end of the straight line, with care taken to avoid the engine over-revving.

TIP

Riding technique varies from rider to rider and the performance of a machine also vary from machine to machine. Therefore, do not imitate other rider's settings from the beginning but choose your own setting according to the level of your riding technique.

EAM30169
DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS

Part name	Type	Part number
Drive sprocket "1"		
(STD)	13T	9383B-13218
Rear wheel sprocket "2"		
	47T	17D-25447-50
	48T	17D-25448-50
	49T	17D-25449-50
(STD)	50T	17D-25450-50
	51T	17D-25451-50
	52T	17D-25452-50



EAM30170
TIRE PRESSURE

Tire pressure should be adjusted to suit the road surface condition of the circuit.

Standard tire pressure
100 kPa (1.00 kgf/cm^2, 15 psi)

- Under a rainy, a muddy, a sandy, or a slippery condition, the tire pressure should be lower for a larger area of contact with the road surface.

Extent of adjustment
60–80 kPa (0.60–0.80 kgf/cm^2, 9–12 psi)

• Under a stony or a hard road condition, the tire pressure should be higher to prevent a flat tire.

Extent of adjustment
100–120 kPa (1.00–1.20 kgf/cm^2, 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.

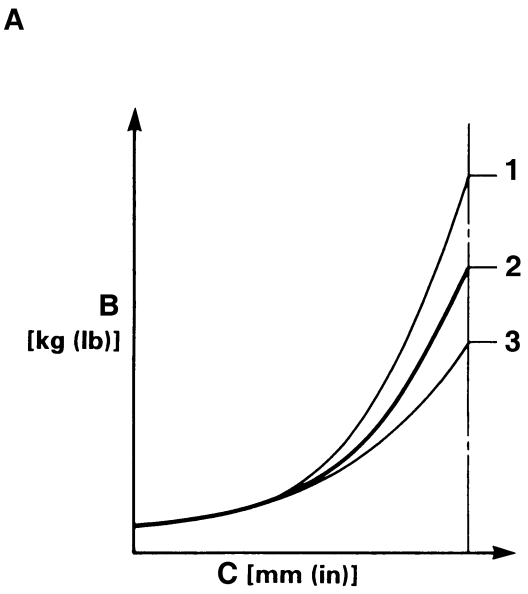
EAM30172
CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

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
290 cm³ (9.80 US oz, 10.23 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

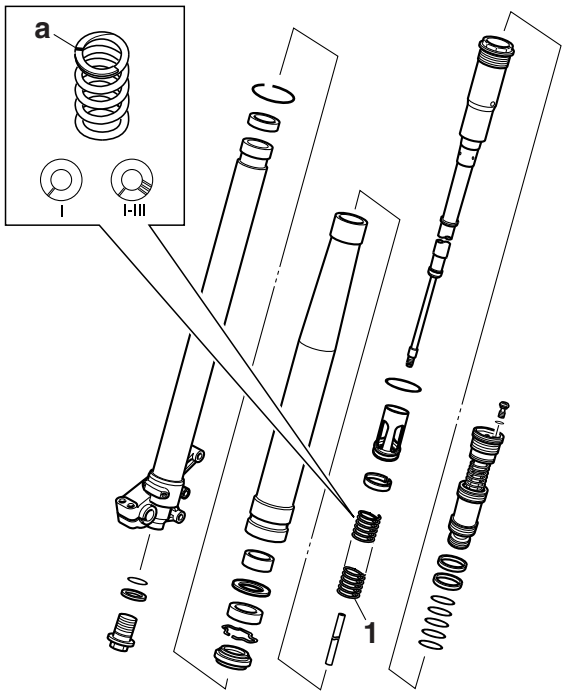
FRONT FORK SETTING PARTS

• Front fork spring "1"

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
STD	4.7	BR9-23141-40	I-IIII
STIFF	4.8	BR9-23141-50	I-IIIII
	4.9	BR9-23141-60	II-II
	5.0	BR9-23141-70	II-III
	5.1	BR9-23141-80	II-IIII

TIP

The I.D. mark (slits) "a" is proved on the end of the spring.



EAM30175

REAR SUSPENSION SETTING

The rear shock absorber setting should be made depending on the rider's feeling of an actual run and the circuit conditions.

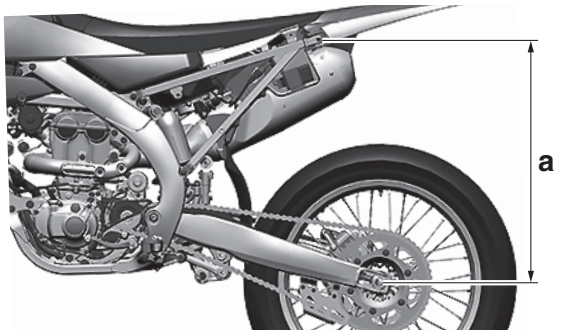
The rear suspension setting includes the following two factors:

1. Setting of spring preload
   • Change the set length of the spring.
   • Change the spring.
2. Setting of damping force
   • Change the rebound damping force.
   • Change the compression damping force.

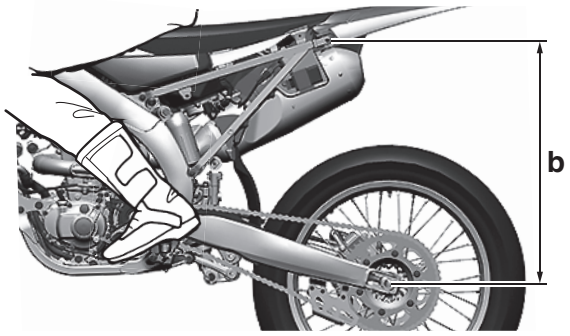
EAM30176

CHOOSING SET LENGTH

1. Place a stand or a block under the engine to put the rear wheel above the floor, and measure the length "a" between the rear wheel axle center and the rear fender holding bolt.



2. Remove the stand or block from the engine and, with a rider astride the seat, measure the sunken length "b" between the rear wheel axle center and the rear fender holding bolt.



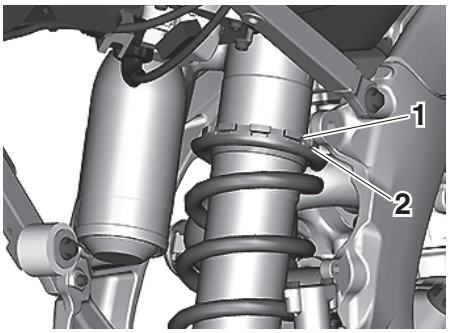
3. Loosen the locknut "1" and make adjustment by turning the adjuster "2" to achieve the standard figure from the subtraction of the length "b" from the length "a".

Standard figure
90–100 mm (3.5–3.9 in)

TIP

• If the machine is new and after it is broken in, the same set length of the spring may change because of the initial fatigue, etc. of the spring. Therefore, be sure to make reevaluation.
• If the standard figure cannot be achieved by adjusting the adjuster and changing the set

length, replace the spring with an optional one and make readjustment.



EAM30177

SETTING OF SPRING AFTER REPLACEMENT

After replacement, be sure to adjust the spring to the set length [sunken length 90–100 mm (3.5–3.9 in)] and set it.

1. Use of soft spring
   - Adjust to decrease rebound damping force to compensate for less spring load. Run with the rebound damping force adjuster one or two clicks turned out, and readjust it to suit your preference.
2. Use of stiff spring
   - Adjust to increase rebound damping force to compensate for greater spring load. Run with the rebound damping force adjuster one or two clicks turned in, and readjust it to suit your preference.

TIP

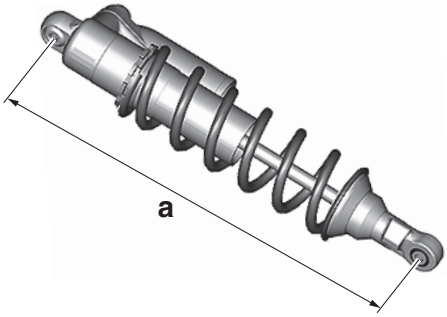
Adjusting the rebound damping force will be followed more or less by a change in the compression damping force. For correction, adjust to decrease compression damping force.

EWA19200

⚠ WARNING

When using a rear shock absorber other than currently installed, use the one whose overall length "a" does not exceed the standard as it may result in faulty performance. Never use one whose overall length is greater than standard.

	Length "a" of standard shock 460.5 mm (18.1 in)



EAM30178

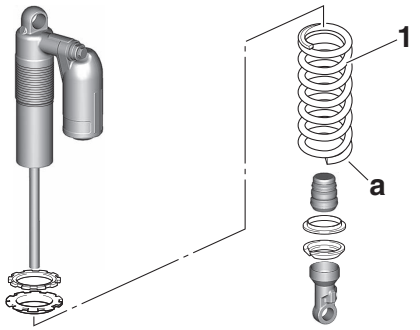
REAR SHOCK ABSORBER SETTING PARTS

- Rear shock spring "1"

Type	Spring rate N/mm	Part number	I.D. Mark
SOFT	52	BR9-22212-00 (Blue)	Yellow
		BR9-22212-50 (Black)	
	54	BR9-22212-10 (Blue)	Pink
		BR9-22212-60 (Black)	
STD	56	BR9-22212-20 (Blue)	White
		BR9-22212-70 (Black)	
STIFF	58	BR9-22212-30 (Blue)	Silver
		BR9-22212-80 (Black)	
	60	BR9-22212-40 (Blue)	Brown
		BR9-22212-90 (Black)	

TIP

- The I.D. mark "a" is marked at the end of the spring.
- Spring specification varies according to the color of I.D. marks.



• Spring preload adjusting positions

Spring preload adjusting positions
Minimum
Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.
Standard
Position in which the spring is turned in 4.0 mm (0.16 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

YZ250FK 2019

1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Joint connector
5. Main relay
6. Engine ground
7. Battery
8. Frame ground
9. 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. Gear position switch
27. Mode switch
28. Start switch
29. 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
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/W	Yellow/White

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Genuine Yamaha products are available only from your Yamaha dealer.

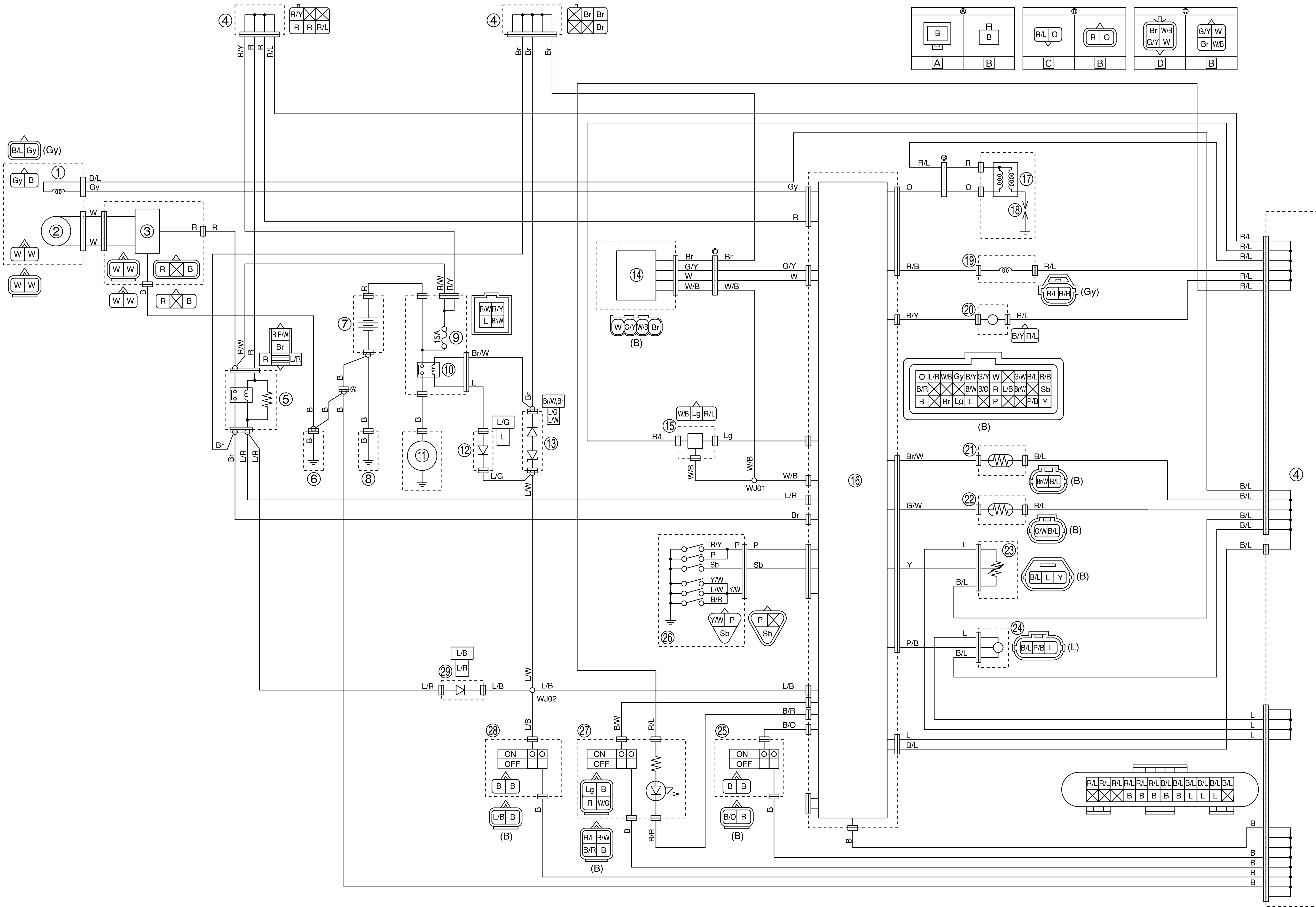
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YZ250FK 2019
WIRING DIAGRAM



YZ250FK 2019
WIRING DIAGRAM

