YAMAHA

2027

# OWNER'S SERVICE MANUAL

# YZ450F

⚠ Read this manual carefully before operating this vehicle.

*YZ450F*
*YZ450FV*

D03-2819U-51-E0●

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

**For Canada**

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure of low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects.
Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. COMMUN.CONT.UNIT ASSY. (T722-A01) has been tested and found to comply with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules.

**Reporting safety defects (For Canada)**

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform Transport Canada in addition to notifying Yamaha Motor Canada Ltd., Canada. If Transport Canada receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, Transport Canada cannot become involved in individual problems between you, your dealer, or Yamaha Motor Canada Ltd., Canada.
To contact Transport Canada, you may call Defect Investigations and Recall Division at 819-420-4300 or toll free 1-800-333-0510, go to "tc.canada.ca" or email: mvs-sa@tc.gc.ca or write to Transport Canada, 330 Sparks Street Ottawa, ON, K1A 0N5.
You can also obtain other information about motor vehicle safety from "tc.canada.ca".

**Consumer Protection Act (Quebec)**

While Yamaha Motor Canada Ltd. and its related affiliates, as applicable (collectively, "Yamaha") will honour the terms of its warranty, pursuant to applicable Quebec law, Yamaha does not guarantee the availability of replacement parts, repair services, or information required for the maintenance or repair of this product or any of its components.

**For Europe**
Declaration of Conformity:

Hereby, YAMAHA MOTOR CO., LTD. declares that the radio equipment type, Communication Control Unit, T722-A01 is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:
https://global.yamaha-motor.com/eu_doc/

Frequency band: 2.4GHz
The maximum radio frequency power: 25.2mW

Manufacturer:
YAMAHA MOTOR CO., LTD.
2500 Shingai, Iwata, Shizuoka, 438-8501 Japan

Importer:
YAMAHA MOTOR EUROPE N.V.
Koolhovenlaan 101, 1119 NC Schiphol-Rijk, 1117 ZN, Schiphol, the Netherlands

**Information of the Lithium-ion battery (BR98)**

Manufacturer:
Trend Power Technology (Changshu) INC.
No.868 Dongnan Avenue, Changshu High_tech Industrial
Development Zone, Jiangsu PRC,CN

Importer: (EU)
YAMAHA MOTOR EUROPE N.V.
Koolhovenlaan 101, 1119 NC Schiphol-Rijk, 1117 ZN, Schiphol, the Netherlands

Importer: (UK)
YAMAHA MOTOR EUROPE N.V., BRANCH UK
Units A2-A3, Kingswey Business Park, Forsyth Road, Woking, Surrey. GU21 5SA. United Kingdom.

**For UK**
PSTI Statement of compliance The Statement of compliance is available at the following Internet address;
https://www.yamaha-motor.eu/gb/en/service-support/yamaha-factory-warranty/motorcycle-cybersecurity-support-period-based-on-the-uk-psti/

**For Ukraine**
Інформація з техніки безпеки:
Слід використовувати в тому ж середовищі, що й транспортний засіб.
Слід зберігати та транспортувати за тих же умов, що й транспортний засіб.
Установлення: див. посібник з налаштування.

Частотний діапазон: 2.4 ГГц
Максимальна потужність радіочастотного сигналу: 25.2 мВт

Виробник:
YAMAHA MOTOR CO., LTD.
2500 Shingai, Iwata, Shizuoka, 438-8501, Japan/Японія.

Імпортер:
VIDI Motor
вул. Велика Кільцева, 60-а (ViDi Auto City), Київська обл., Софіївська Борщагівка 08131, Київ, Україна

**For Moldova**

Declarație de conformitate:

Prin prezenta, YAMAHA MOTOR CO., LTD. declară că tipul de echipamente radio unitate de control al comunicațiilor T722-A01 este în conformitate cu Directiva 2014/53/UE.
Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet:
https://global.yamaha-motor.com/eu_doc/

Informații privind siguranța:
A se utiliza în mediul în care se utilizează vehiculul.
A se depozita și transporta în aceleași condiții ca și vehiculul.
Instalare: Consultați ghidul de instalare.

Bandă de frecvență: 2.4 GHz
Puterea maximă de radiofrecvență: 25.2 mW

Producător:
YAMAHA MOTOR CO., LTD.
2500 Shingai, Iwata, Shizuoka, 438-8501, Japan

Importator:
Motodynamics S.A.
Germanikis Scholis Athinon 10, 15123, Marousi, Grecia

**For Serbia**

Упутства:
Користите у околини где се користи возило.
Чувајте и преносите под истим условима као и возило.
Инсталација: погледајте водич за подешавање.

Техничке спецификације:
Бежичне спецификације: бежични LAN 11b, 11g, 11n
Довод напајања: 12 V батерија

Произвођач:
YAMAHA MOTOR CO., LTD.
2500 Shingai, Iwata, Shizuoka 438-8501, Japan

Увозник:
Delta Team Krško d.o.o.
Cesta Krških Žrtev 135A, Krško 8270, Slovenija

Безбедносне информације:
Користите у околини где се користи возило.
Чувајте и преносите под истим условима као и возило.
Инсталација: погледајте водич за подешавање.

Фреквенцијски опсег: 2.4 GHz
Максимална снага радио-фреквенције: 25.2 mW

Комплетан текст ЕУ декларације о усаглашености доступан је на следећој интернет адреси:
https://global.yamaha-motor.com/eu_doc/

EAM20080

**YZ450F**
**YZ450FV**
**OWNER'S SERVICE MANUAL**
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**First edition, April 2026**
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EAM20180
# IMPORTANT

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

**TIP**

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

EWA20270

**⚠ WARNING**

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

EAM30001
## IMPORTANT MANUAL INFORMATION

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

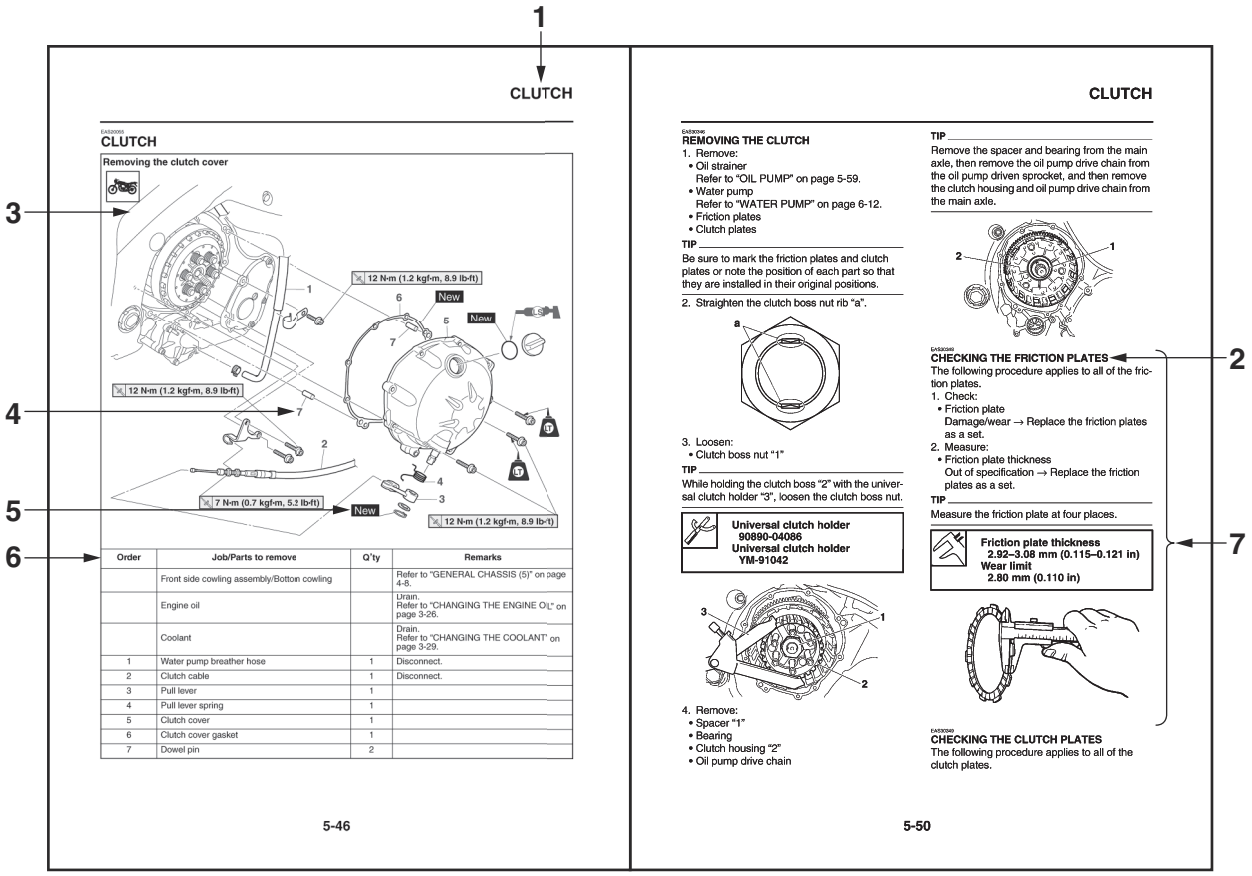
| | |
|---|---|
| ⚠ | **This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.** |
| **⚠ WARNING** | **A WARNING indicates a hazardous situation which, if not avoided, could result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

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.




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# 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 |  | Lithium-soap-based grease |
|  | Tightening torque |  | Molybdenum disulfide grease |
|  | Wear limit, clearance |  | Silicone grease |
|  | Engine speed |  | Apply locking agent (LOCTITE®). |
|  | Electrical data |  | Replace the part with a new one. |
|  | Engine oil | | |

EAM10003

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EAM20168

# SAFETY INFORMATION

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

EAM30401

**FOR SAFETY, BE SURE TO OBEY THE FOLLOWING:**

**Be a Responsible Owner**

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

Motorcycles are single-track vehicles.

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

He or she should:

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

**Safe Riding**

Perform the pre-operation checks each time you use the vehicle to make sure it is in safe operating condition. Failure to inspect or maintain the vehicle properly increases the possibility of an accident or equipment damage. Refer to "PRE-OPERATION INSPECTION AND MAINTENANCE" on page 3-6 for a list of pre-operation checks.

1. This motorcycle is designed for off-road use only, therefore, it is illegal to operate it on public streets, roads, or highways, even a dirt or gravel one. Off-road use on public lands may be illegal. Please check local regulations before riding.
2. This motorcycle is designed to carry the operator only. No passengers.
3. The failure of motorists to detect and recognize motorcycles in traffic is the predominating cause of automobile/motorcycle accidents. Many accidents have been caused by an automobile driver who did not see the motorcycle. Making yourself conspicuous appears to be very effective in reducing the chance of this type of accident.
   **Therefore:**
   - Wear a brightly colored jacket.
   - Use extra caution when you are approaching and passing through intersections, since intersections are the most likely places for motorcycle accidents to occur.
   - Ride where other motorists can see you. Avoid riding in another motorist's blind spot.
   - Never maintain a motorcycle without proper knowledge. Contact an authorized motorcycle dealer to inform you on basic motorcycle maintenance. Certain maintenance can only be carried out by certified staff.
4. Many accidents involve inexperienced operators.
   - Make sure that you are qualified and that you only lend your motorcycle to other qualified operators.
   - Know your skills and limits. Staying within your limits may help you to avoid an accident.
   - We recommend that you practice riding your motorcycle until you have become thoroughly familiar with the motorcycle and all of its controls.
5. Many accidents have been caused by error of the motorcycle operator. A typical error made by the operator is veering wide on a turn due to excessive speed or under cornering (insufficient lean angle for the speed). Never travel faster than warranted by conditions.
6. Ride cautiously in unfamiliar areas. You may encounter hidden obstacles that could cause an accident.
7. The posture of the operator is important for proper control. The operator should keep both hands on the handlebar and both feet on the operator footrests during operation to maintain control of the motorcycle.
8. Never ride under the influence of alcohol or other drugs.
9. Be sure the transmission is in neutral before starting the engine.

**Protective Apparel**

The majority of fatalities from motorcycle

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

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

**Avoid Carbon Monoxide Poisoning**

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

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

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

**Genuine Yamaha Accessories**

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

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

**Aftermarket Parts, Accessories, and Modifications**

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

Keep the following guidelines in mind when mounting accessories.

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

**Aftermarket Tires and Rims**

The tires and rims that came with your motorcycle were designed to match the performance capabilities and to provide the best combination of handling, braking, and comfort. Other tires, rims, sizes, and combinations may not be appropriate. Refer to “CHECKING THE TIRES” on page 3-34 for tire specifications and more information on replacing your tires.

**Transporting the Motorcycle**

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

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

EAM20203
# ABOUT THE BATTERY

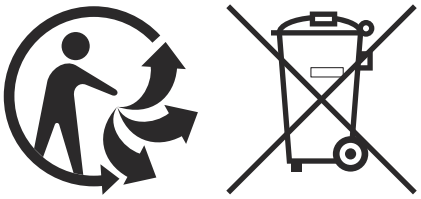
EAM30642
## LITHIUM-ION BATTERY
The lithium-ion battery used in the vehicle features high energy density and has a high voltage (approximately three times that of nickel-cadmium (Ni-Cd) or nickel-hydrogen (Ni-MH) batteries), meaning it can be made both compact and lightweight.
Nickel-cadmium and nickel-hydrogen batteries have a memory effect that causes their capacity to degrade quickly as a result of repeated partial discharging and charging, so that they need to be completely discharged periodically. Lithium-ion batteries can be repeatedly partially charged without needing to be fully discharged.

EAM30644
## LITHIUM-ION BATTERY DEGRADATION
The charge capacity of the lithium-ion battery gradually decreases over time and usage. The rate of capacity degradation varies based on the usage conditions.

**TIP**
- It is not necessary to use up the battery before charging.
- Storing the vehicle in an extremely hot or cold place could degrade the lithium-ion battery capacity more quickly.
- Even if the lithium-ion battery is not used, it discharges and degrades gradually over time.

EAM30643
## RECYCLING THE BATTERY
Lithium-ion batteries can be recycled. If the capacity decreases excessively due to degradation, have a Yamaha dealer replace the battery. Always follow local regulations regarding the disposal of batteries.

For EU countries:
According to the European Guideline 2012/19/EU, electrical devices/tools that are no longer usable must be collected separately and disposed of in an environmentally correct manner.



For FRANCE:

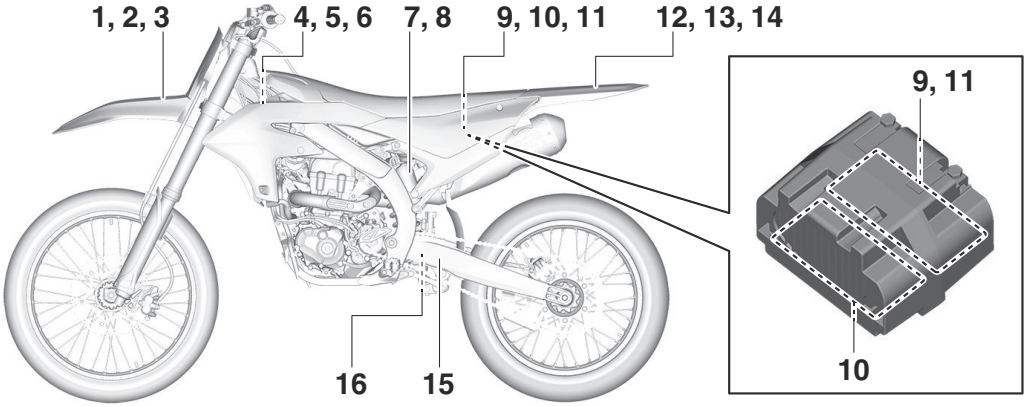



EAM30662
## YAMAHA LITHIUM-ION BATTERY
For handling the YAMAHA lithium-ion battery, refer to the “YAMAHA LITHIUM-ION BATTERY USER’S MANUAL”.

EAM20085

# LOCATION OF IMPORTANT LABELS

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




**CAN**

**1**

Premium unleaded gasoline only.

3FB-2415E-03

**2**

Essence super sans plomb seulernent.

3FB-2415E-13

**3**

THIS VEHICLE IS A COMPETITION MOTORCYCLE AND IS FOR USE EXCLUSIVELY IN CLOSED COURSE COMPETITION AND IS NOT INTENDED FOR USE ON PUBLIC ROADS.

CE VÉHICULE EST UNE MOTOCYCLETTE DE COMPÉTITION DONT L'USAGE EST RÉSERVÉ AUX COMPÉTITIONS EN CIRCUITS FERMÉS ET NON DESTINÉ AUX VOIES PUBLIQUES.

4SR-2416E-02

**4**

MFD. BY YAMAHA MOTOR CO., LTD. MM / YY MADE IN JAPAN
COMPETITION MOTORCYCLE
FABRIQUÉ PAR YAMAHA MOTOR CO., LTD. MM / YY FABRIQUÉ AU JAPON
MOTOCYCLETTE DE COMPETITION
**********

4SR-21186-01

**5**

CANADA · ISSUED · CSA/SAC · TRANSPORT · 506

CAN ICES-002 / NMB-002

8KM-82377-03

**7**

**⚠WARNING**

This unit contains high pressure nitrogen gas.
Mishandling can cause explosion.
- Read owner's manual for instructions.
- Do not incinerate, puncture or open.

**⚠AVERTISSEMENT**

Cette unité contient de l'azote à haute pression.
Une mauvaise manipulation peut entrainer d'expiosion.
- Voir le manuel d'utilisateur pour les instructions.
- Ne pas brûler ni perforer ni ouvrir.

4AA-22259-70

**9**

**⚠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

**10**

**⚠AVERTISSEMENT**

Pour éviter les étincelles, les brûlures, les incendies et les explosions :
- Lire le manuel du propriétaire avant utilisation.
- Charger la batterie uniquement avec le chargeur spécifié.
- Utiliser la batterie uniquement avec le produit spécifié ; aucune autre utilisation.
- Ne pas placer près du feu ou immerger dans l'eau.
- Ne pas utiliser la batterie si elle est tombée, a reçu un choc ou si elle est visiblement endommagée.
- Ne pas démonter ou modifier la batterie ou court-circuiter ses bornes.

12

**⚠ 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-01

13

**⚠ AVERTISSEMENT**

- LIRE LE MANUEL DU PROPRIETAIRE AINSI QUE TOUTES LES ETIQUETTES AVANT D'UTILISER CE VEHICULE.
- NE JAMAIS TRANSPORTER DE PASSAGER. La conduite avec passager augmente les risques de perte de contrôle.
- NE JAMAIS ROULER SUR DES CHEMINS PUBLICS. Vous pourriez entrer en collision avec un autre véhicule.
- TOUJOURS PORTER UN CASQUE DE MOTOCYCLISTE APPROUVE, des lunettes et des vêtements de protection.
- EXCLUSIVEMENT POUR L'USAGE D'UN CONDUCTEUR EXPERIMENTE.

5PA-2118K-11

15

**TIRE INFORMATION**

Cold tire normal pressure should be set as follows.
FRONT : 100kPa, {1.00kgf/cm²}, 15psi
REAR : 100kPa, {1.00kgf/cm²}, 15psi

3RV-21668-A1

16

**INFORMATION SUR LES PNEUS**

La pression des pneus à froid doit normalement être réglée comme suit.
AVANT : 100kPa, {1.00kgf/cm²}, 15psi
ARRIERE : 100kPa, {1.00kgf/cm²}, 15psi

3RV-21668-B1

**EUR**

6

UK CA CE
YAMAHA MOTOR CO, LTD,
2500 SHINGAI,
IWATA, SHIZUOKA, JAPAN

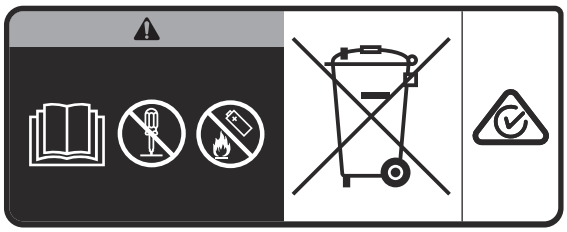
BN6-211AA-10

8

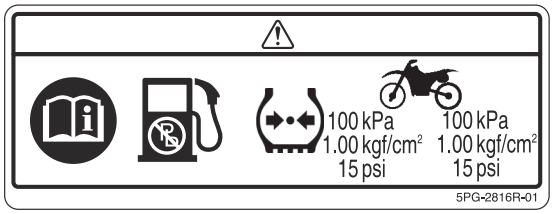


4AA-22259-40

11



14



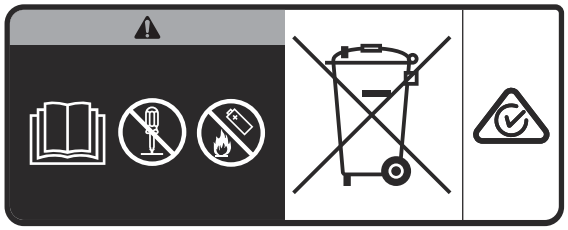

5PG-2816R-01

**AUS, NZL, ZAF**

**8**



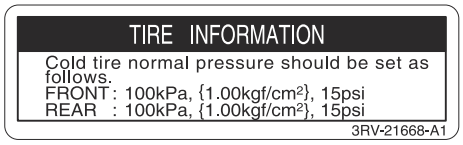

**11**



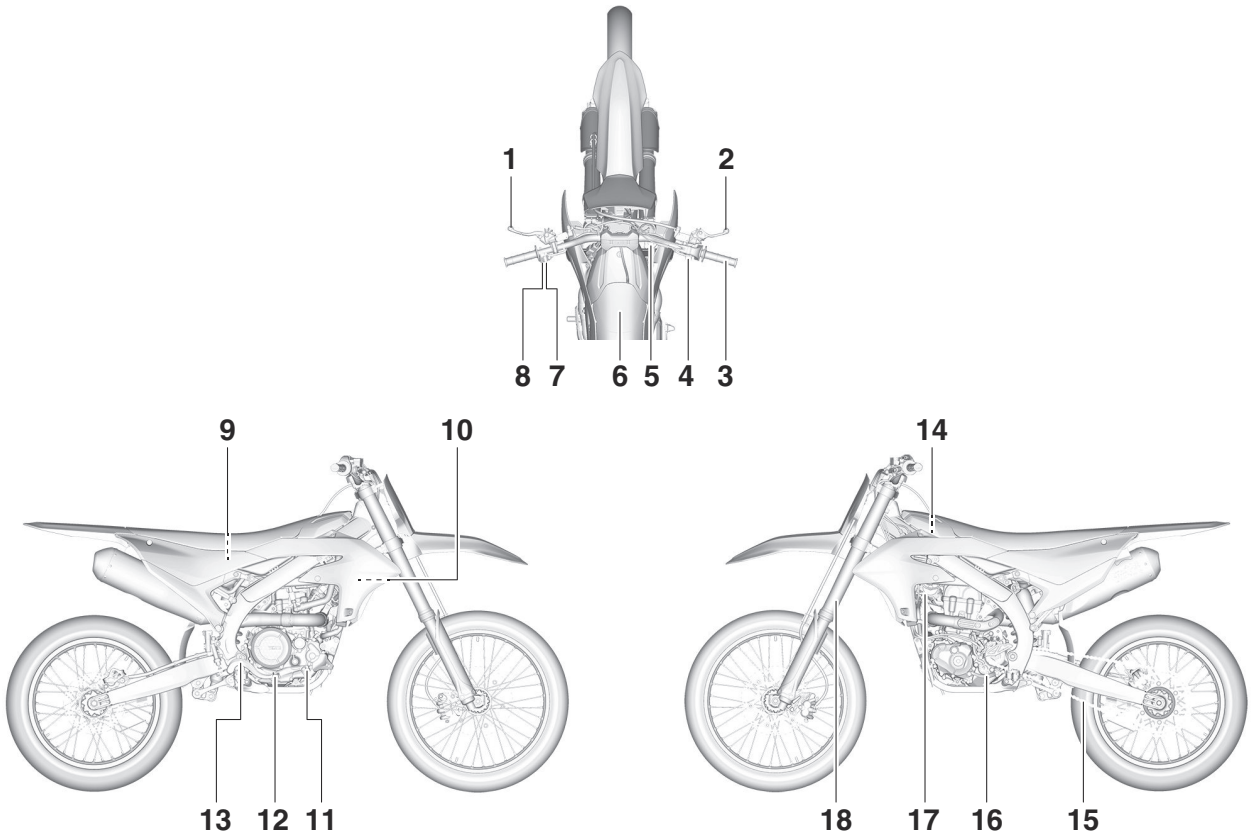
**12**




**15**



EAM20086
# DESCRIPTION



1. Clutch lever
2. Front brake lever
3. Throttle grip
4. Starter switch
5. Radiator cap
6. Fuel tank cap
7. Engine stop switch
8. Multi-function button
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.

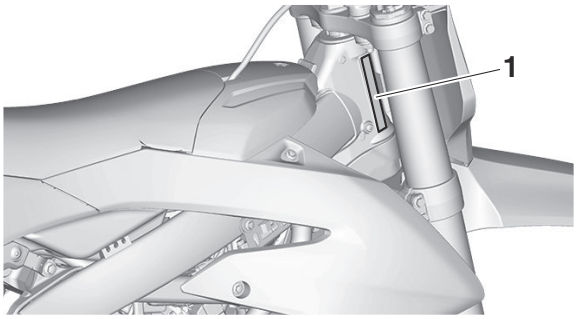
EAM20087
# IDENTIFICATION

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.

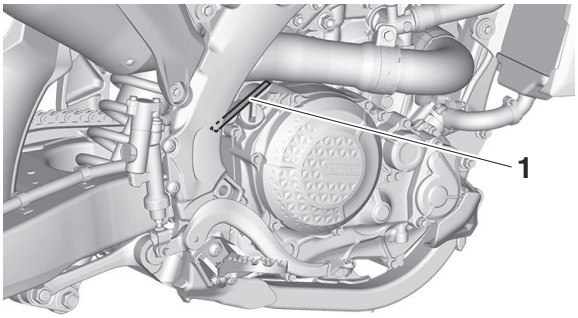
EAM30002
## VEHICLE IDENTIFICATION NUMBER

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




EAM30003
## ENGINE SERIAL NUMBER

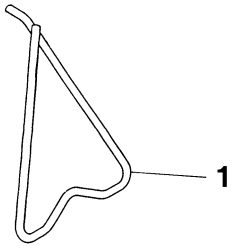
The engine serial number "1" is stamped into the elevated part of the right-side of the engine.



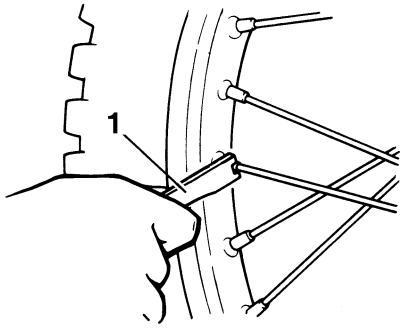
EAM20088
# INCLUDED PARTS

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

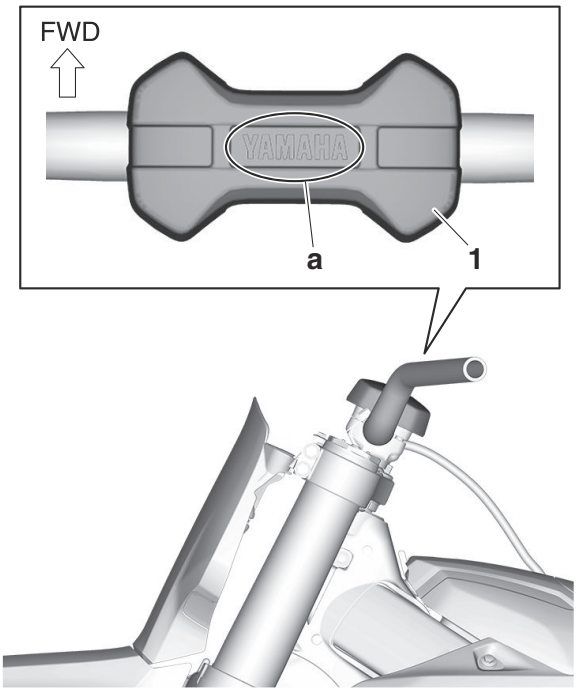
EWA20260
**WARNING**
- **Never apply additional force to the sidestand.**
- **Remove this sidestand before starting out.**



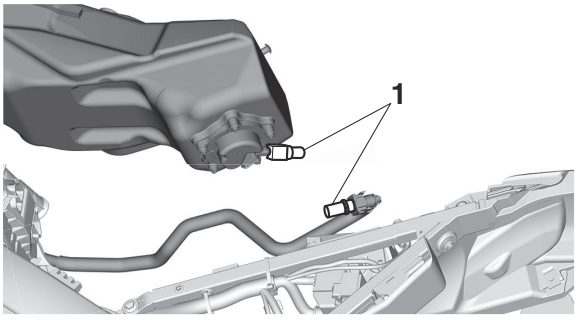

EAM30005
## NIPPLE WRENCH
The nipple wrench "1" is used to tighten the spoke.



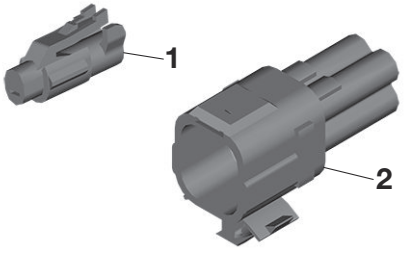

EAM30006
## HANDLEBAR PROTECTOR
Install the handlebar protector "1" so that the mark "a" is facing the direction shown in the illustration.




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.




EAM30653
## COUPLER (1P) AND COUPLER (4P)
The coupler (1P) "1" and coupler (4P) "2" should be connected so that after removing the CCU, neither mud nor dust enters the couplers (on the side of the wire harness) that have been connected to the CCU sub-lead.



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.**

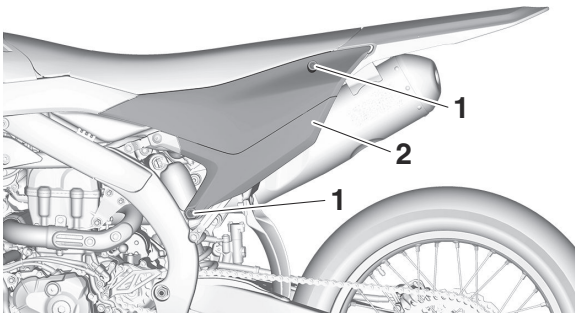
ECA26050
***NOTICE***

**• 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.

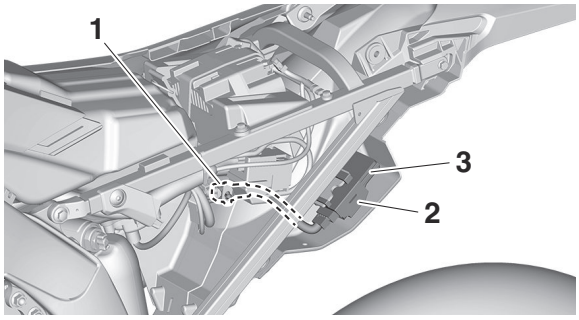
**Before connecting to the CCU wireless network (in case of initial use of the Power Tuner app)**

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

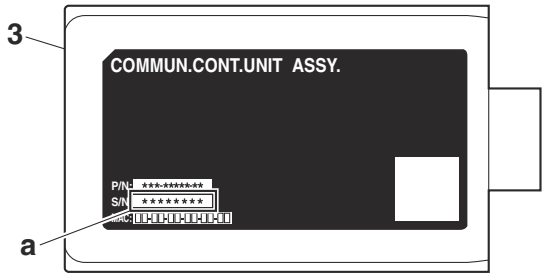



1. Bolt
2. Side cover (left)

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 starter 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.

**TIP**

If the ECU has been activated while the engine is stopped:
In case of map 1, the indicator light on the handlebar switch (left) will blink light in blue once every 4 seconds.
In case of map 2, the indicator light on the handlebar switch (left) will light in blue.

3. Activate the Power Tuner app.

**TIP**

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

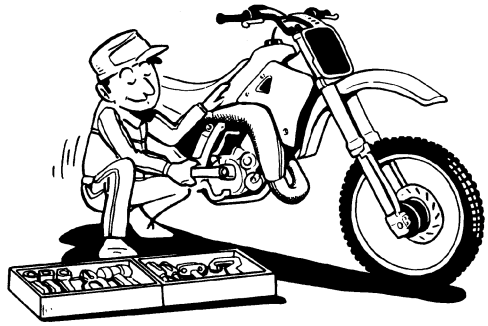
EAM20089
# IMPORTANT INFORMATION

EAM30009
## PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before the jobs, completely remove mud, dust, and the like in order to prevent the entry of them into the inside during the jobs.
   Refer to "CARE" on page 1-34.



2. Use proper special tools and equipment. Refer to "SPECIAL TOOLS" on page 1-20.



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.

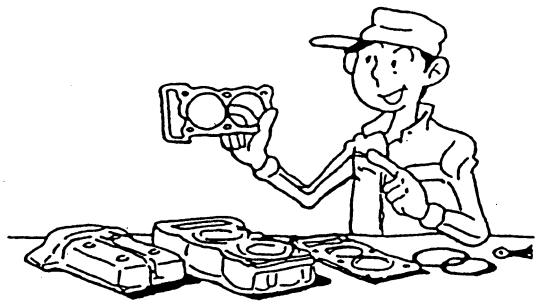
EWA18970

**⚠ 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.**

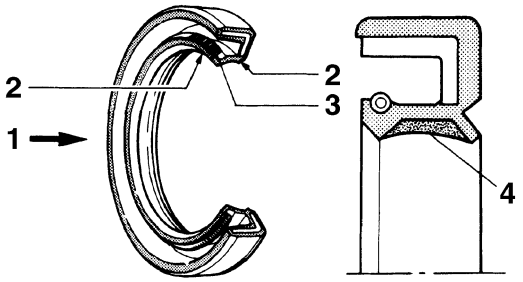
EAM30010
## REPLACEMENT PARTS

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.

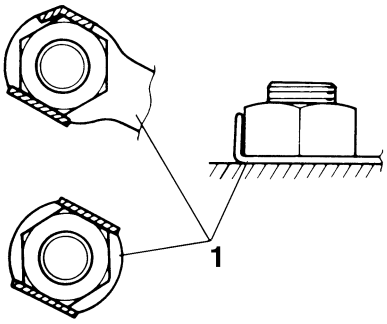



1. Oil
2. Lip
3. Spring
4. Grease

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

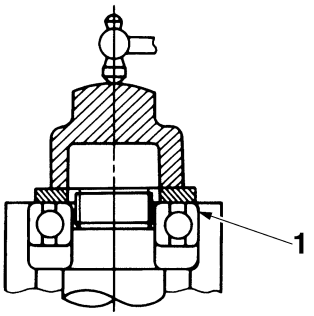
## BEARINGS AND OIL SEALS

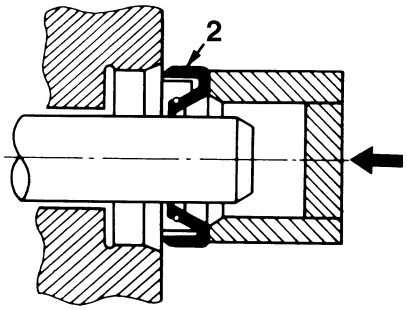
Install bearings “1” and oil seals “2” with their manufacturer’s marks or size symbols facing outward. During installation of an oil seal, make sure that its main lip faces the oil chamber (the target to be sealed). Before installation, always apply a light coat of grease to the oil seal lip.

ECA13300

***NOTICE***

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

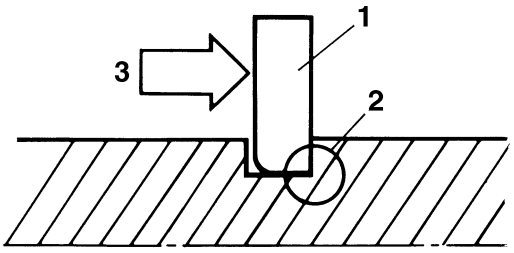



EAM30014

## 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.

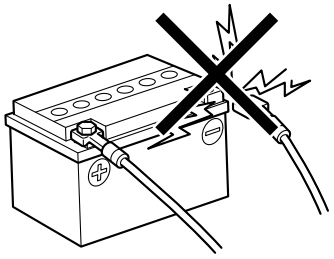


EAM20120
# BASIC SERVICE INFORMATION

EAM30181
## ELECTRICAL SYSTEM
### Electrical parts handling

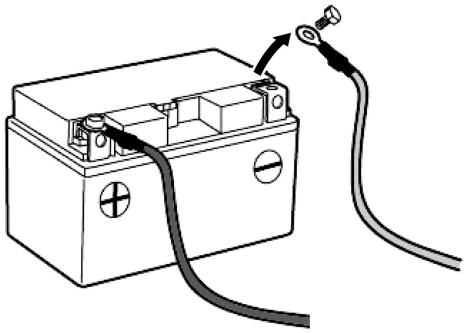
ECA16600
**NOTICE**

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



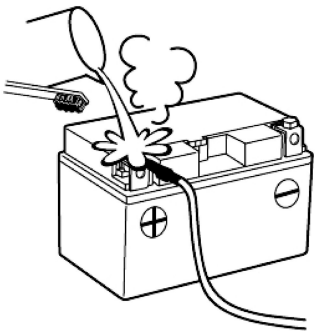
ECA16751
**NOTICE**

**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.**



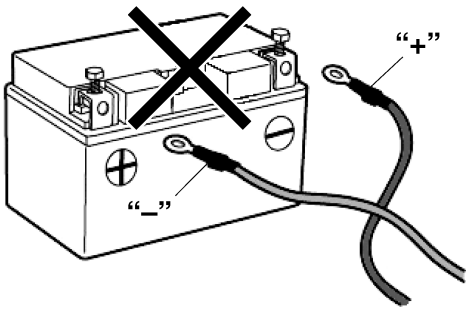
**TIP**

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



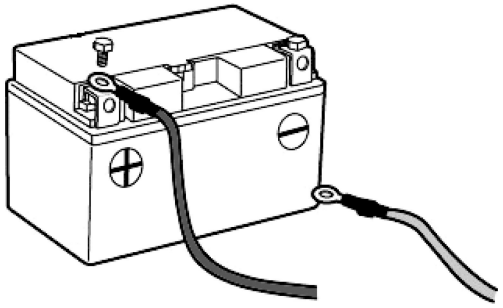
ECA16760
**NOTICE**

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



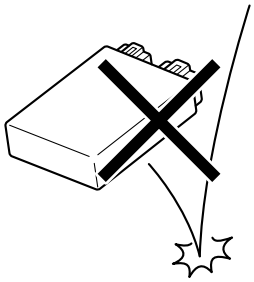

ECA16771
**NOTICE**

**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**

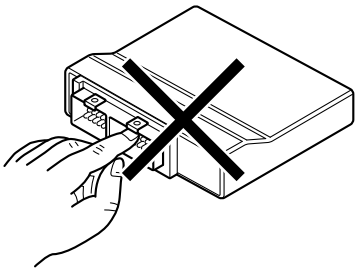
**Handle electrical components with special care, and do not subject them to strong shocks.**



ECA16630

***NOTICE***

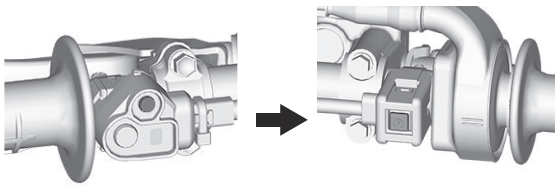
**Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.**



**TIP**

To restart the ECU (Engine Control Unit):

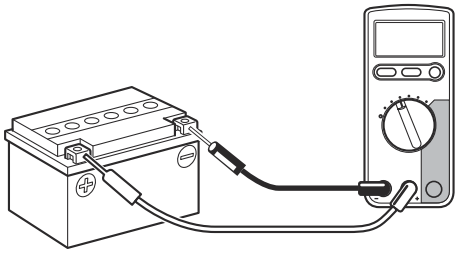
- Hold the engine stop switch pressed for 1 second or longer.
- The ECU will shut down 3 seconds after holding the engine stop switch pressed.
- Press the starter switch to restart the ECU.



### Checking the electrical system

**TIP**

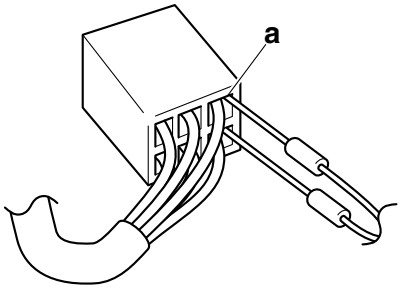
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

***NOTICE***

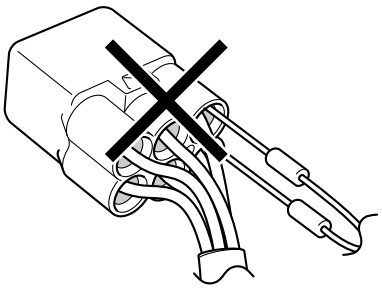
**Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.**




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.

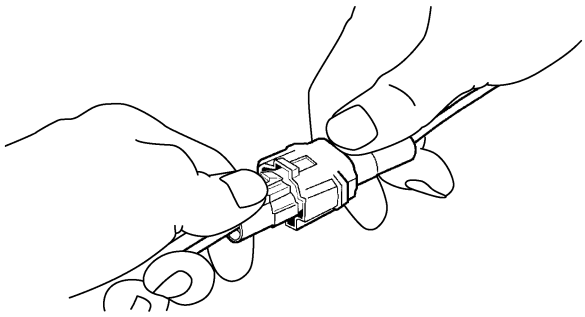
1. Disconnect:
   - Lead
   - Coupler
   - Connector

ECA16780

***NOTICE***

- **When disconnecting a coupler, release the**

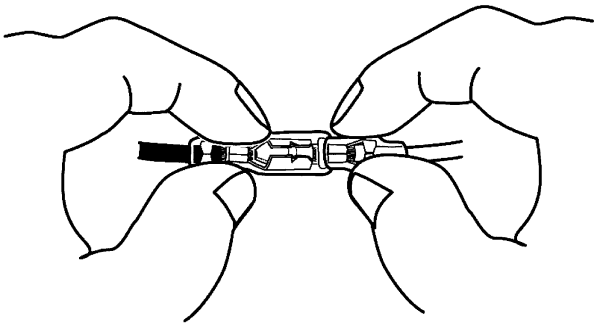
**coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.**
- **There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.**



ECA16790

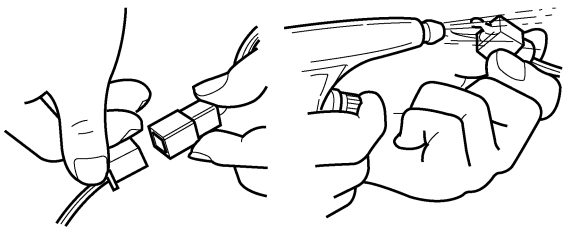
***NOTICE***

**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

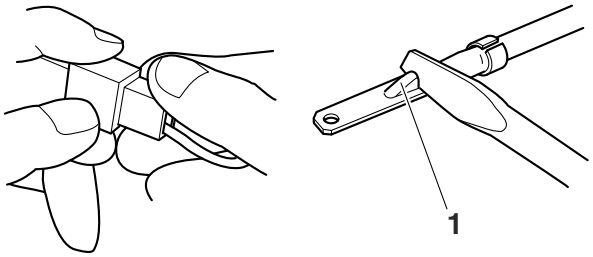
   Moisture → Dry with compressed air.
   Rust/stains → Connect and disconnect several times.

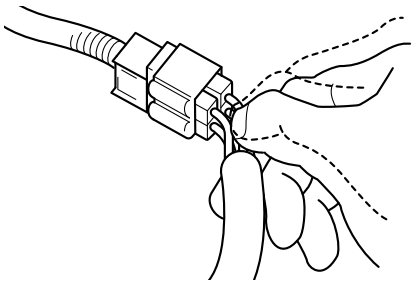


3. Check:
   - All connections

   Loose connection → Connect properly.

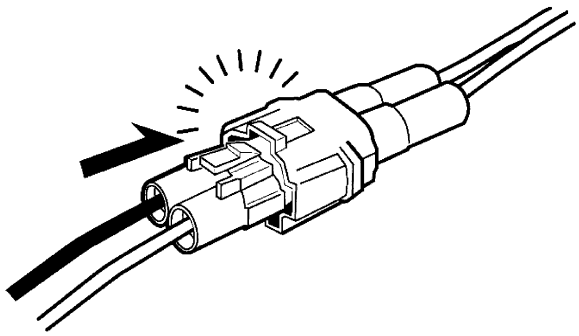
**TIP**
- If the pin "1" on the terminal is flattened, bend it up.
- After disassembling or assembling a coupler, pull on the leads to make sure that they are installed securely.

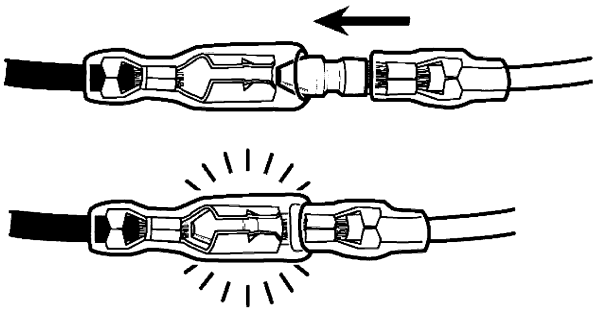


4. Connect:
   - Lead
   - Coupler
   - Connector

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

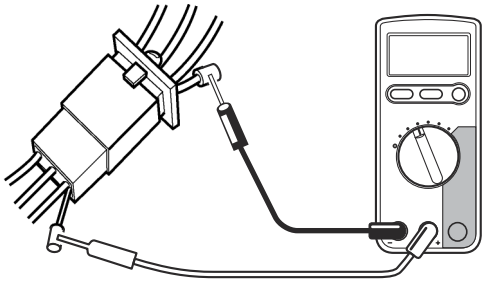


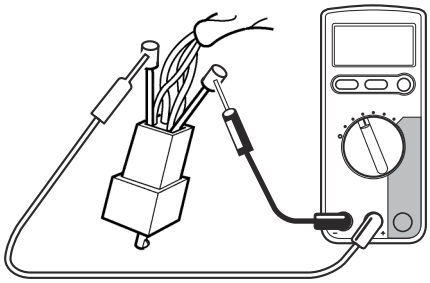


5. Check:
   • No continuity

| | |
|---|---|
| | **Digital circuit tester (CD732)**<br>**90890-03243**<br>**Model 88 Multimeter with tachometer**<br>**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.



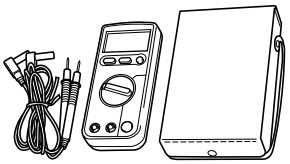
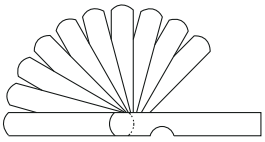
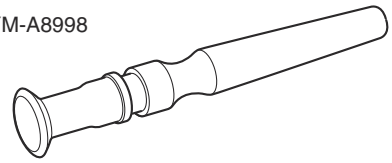
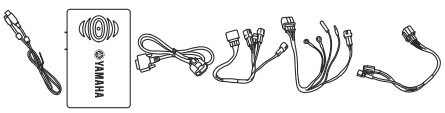
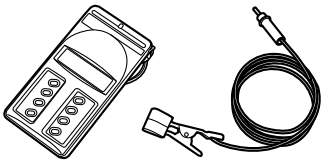


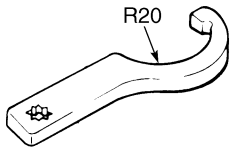
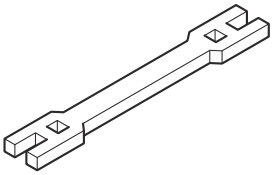
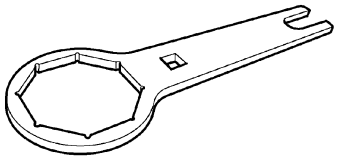
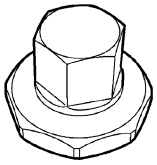
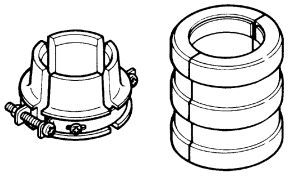
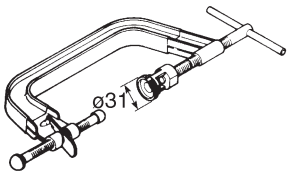
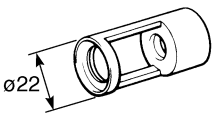
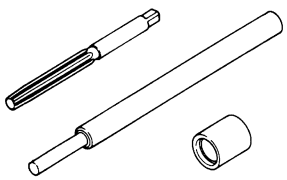
EAM20121
## SPECIAL TOOLS

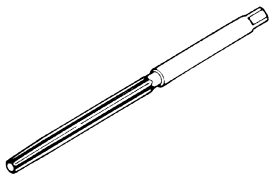
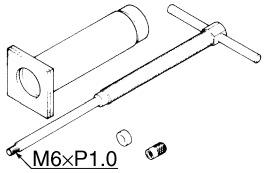
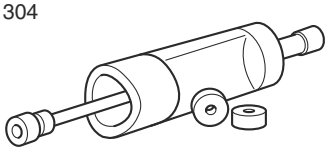
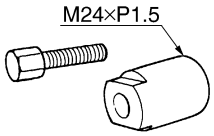
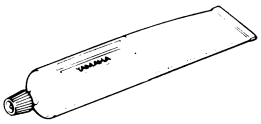
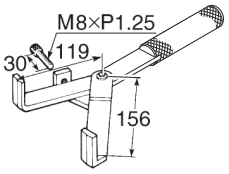
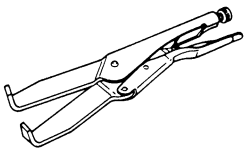
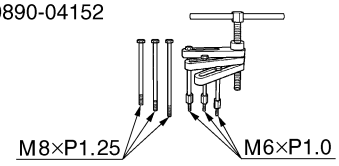
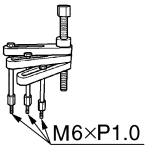
The following special tools are required for accurate and complete adjustment and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and tool number used for the special tool differ by country, so two types are provided.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

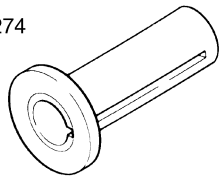
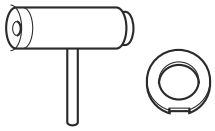
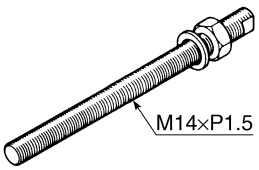
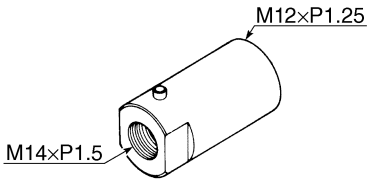
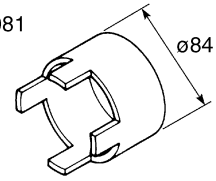
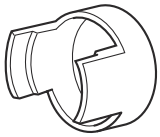
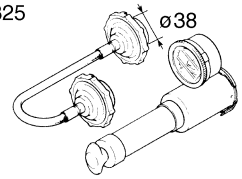
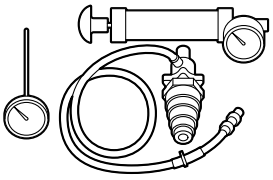
**TIP**

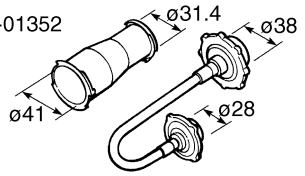
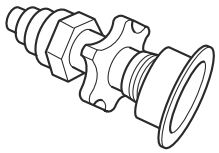
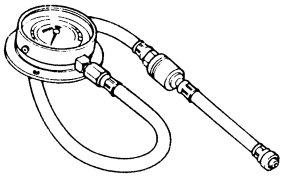
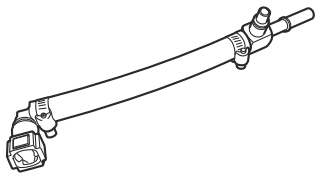
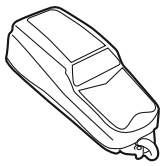
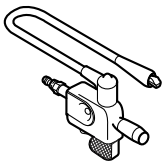
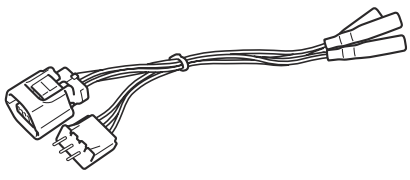
- For U.S.A. and Canada, use tool number starting with "YM-", "YU-", or "ACC-".
- For others, use tool number starting with "90890-".

| Tool name/Tool No. | Illustration | Reference pages |
|---|---|---|
| Digital circuit tester (CD732)<br>90890-03243<br>Model 88 Multimeter with tachometer<br>YU-A1927 |  | 1-19, 5-44, 8-50, 8-52, 8-54, 8-55, 8-55, 8-55, 8-56, 8-57, 8-57, 8-57, 8-58, 8-59, 8-59, 8-60 |
| Thickness gauge<br>90890-03268<br>Feeler gauge set<br>YU-26900-9 |  | 3-7, 5-52 |
| Valve lapper (ø14)<br>90890-04101<br>Valve lapper (ø14)<br>YM-A8998 | 90890-04101<br>  <br>YM-A8998<br>  | 3-8, 5-26 |
| Yamaha diagnostic tool USB<br>90890-03274 |  | 3-12, 7-8, 8-22 |
| Yamaha diagnostic tool (A/I)<br>90890-03273 |  | 3-12, 7-8, 8-22 |
| Digital tachometer<br>90890-06760<br>Digital tachometer<br>YU-39951-B |  | 3-12, 8-57 |

| Tool name/Tool No. | Illustration | Reference pages |
|---|---|---|
| Steering nut wrench<br>90890-01403<br>Exhaust flange nut wrench<br>YU-A9472 |  | 3-28, 4-60 |
| Spoke nipple wrench (6–7)<br>90890-01521<br>Spoke nipple wrench (6–7)<br>YM-01521 |  | 3-34 |
| Cap bolt ring wrench<br>90890-01501<br>Cap bolt ring wrench<br>YM-01501 |  | 4-47, 4-47,<br>4-48, 4-51,<br>4-54, 4-56 |
| Cap bolt wrench<br>90890-01911 |  | 4-48, 4-51 |
| Fork seal driver<br>90890-01917<br>Fork seal driver (48)<br>YM-A0948 |  | 4-52, 4-53 |
| Valve spring compressor<br>90890-04200<br>Valve spring compressor<br>YM-04019 |  | 5-26, 5-30 |
| Valve spring compressor attachment<br>90890-04108<br>Valve spring compressor adapter 22 mm<br>YM-04108 |  | 5-26, 5-30 |
| Valve guide remover & installer set (ø5.5)<br>90890-04016<br>Valve guide remover (5.5 mm)<br>YM-01122 |  | 5-28 |

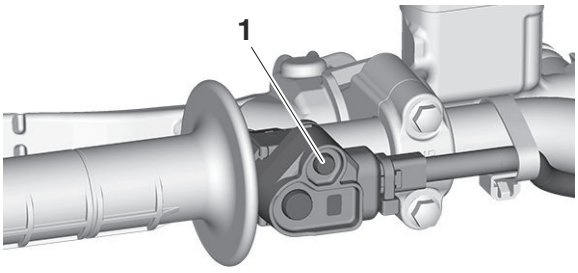
| Tool name/Tool No. | Illustration | Reference pages |
|---|---|---|
| Valve guide reamer (5.5 mm)<br>90890-01196<br>Valve guide reamer (5.5 mm)<br>YM-01196 |  | 5-28 |
| Piston pin puller set<br>90890-01304<br>Piston pin puller<br>YU-01304 | 90890-01304<br>  <br>YU-01304<br>  | 5-33 |
| Rotor puller<br>90890-04151<br>Rotor puller<br>YM-04151 |  | 5-40 |
| Yamaha bond No. 1215<br>90890-85505<br>Three bond No. 1215® |  | 5-40, 5-78 |
| Clutch holder<br>90890-04199<br>Universal clutch holder<br>YM-91042 |  <br>YM-91042<br>  | 5-52, 5-56 |
| Crankcase separating tool<br>90890-04152<br>Crankcase separating tool<br>YU-A9642 | 90890-04152<br>  <br>YU-A9642<br>  | 5-81 |

| Tool name/Tool No. | Illustration | Reference pages |
|---|---|---|
| Crankshaft installer pot<br>90890-01274<br>Installing pot<br>YU-90058 | 90890-01274<br>  <br>YU-90058/YU-90059<br>  | 5-82 |
| Crankshaft installer bolt<br>90890-01275<br>Bolt<br>YU-90060 |  | 5-82 |
| Adapter (M12)<br>90890-01278<br>Adapter #3<br>YU-90063 |  | 5-82 |
| Spacer (crankshaft installer)<br>90890-04081<br>Pot spacer<br>YM-91044 | 90890-04081<br>  <br>YM-91044<br>  | 5-82 |
| Radiator cap tester<br>90890-01325<br>Mityvac cooling system tester kit<br>YU-24460-A | 90890-01325<br>  <br>YU-24460-A<br>  | 6-5, 6-5 |

| Tool name/Tool No. | Illustration | Reference pages |
|---|---|---|
| Radiator cap tester adapter<br>90890-01352<br>Pressure tester adapter<br>YU-33984 | 90890-01352<br>  <br>YU-33984<br>  | 6-5, 6-5 |
| Pressure gauge<br>90890-03153<br>Pressure gauge<br>YU-03153 |  | 7-8 |
| Fuel pressure adapter<br>90890-03186<br>Fuel pressure adapter<br>YM-03186 |  | 7-8 |
| Lithium battery charger<br>90890-05376<br>Lithium battery charger<br>DBY-ACC51-70-02 |  | 8-53, 8-53 |
| Ignition checker<br>90890-06754<br>Oppama pet–4000 spark checker<br>YM-34487 |  | 8-54 |
| Test harness (3P) – sub throttle position sensor<br>90890-03214 |  | 8-58 |

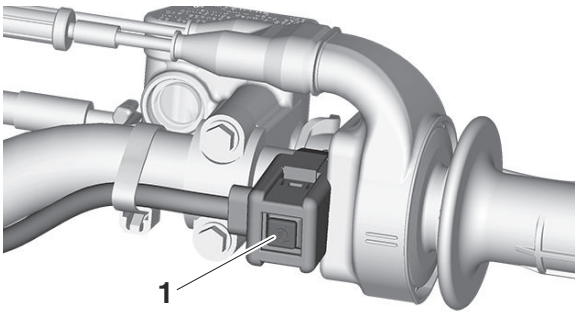
EAM20181
# INSTRUMENT AND CONTROL FUNCTIONS

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




EAM30663
## STARTER SWITCH
The starter switch "1" is located on the right handlebar. Push this switch to crank the engine with the starter.

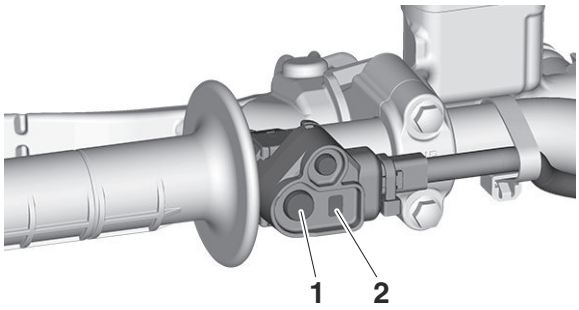
**TIP**
- When the starter switch is pushed, the indicator light on the handlebar switch (left) may illuminate orange for approx. 2 seconds as a self-check, but this is not a malfunction.
- Indicator light on the handlebar switch (left) flashes orange → Check or replace any faulty electrical part(s).
  Refer to "CHECKING THE INDICATOR LIGHT" on page 8-21.
- Indicator light on the handlebar switch (left) blinks in blue twice → The engine has been cranked while the ECU was locked.
  Refer to "ECU LOCK FUNCTION" on page 1-28.

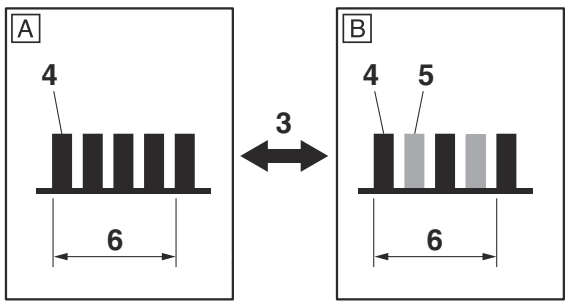



EAM30626
## LAUNCH CONTROL SYSTEM
When the launch control system is operated, the ignition timing is delayed to reduce slipping at the rear wheel which occurs when the vehicle accelerates from a stationary position.
This can be used to starting off in a stable manner on a slippery road surface.
However, the effect may not be adequate depending on the rider's operations and road surface conditions.

**How to operate**
1. Put the gear into the neutral position.
2. Start the engine.
3. Push the multi-function button "1" for more than one second to turn on the launch control system.

**TIP**
- When the launch control system is turned on, it automatically enters Rev. clip mode, and then the indicator light "2" will flash.
- The map change can be changed even when the launch control system is operating.
- When the indicator light flashes alternately purple and blue, map 2 is selected.
- If the engine speed reaches the set rev limit speed, the indicator light will blink about 4 times per second.



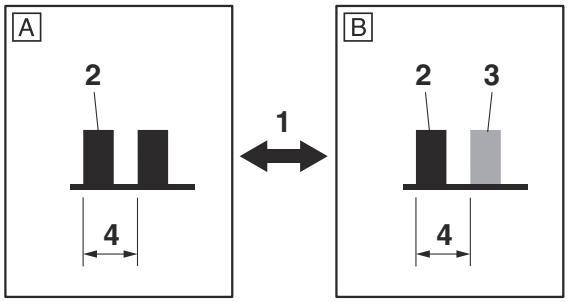




A. Map 1
B. Map 2

3. Push the multi-function button
4. Purple
5. Blue
6. Approx. 1 second (4 flashes/second)

4. Put the gear into the 1st or 2nd gear for starting off.

**TIP**
- When starting off, the system automatically controls the launch.
- The map change can be changed even when the launch control system is operating.
- When the indicator light flashes alternately purple and blue, map 2 is selected.

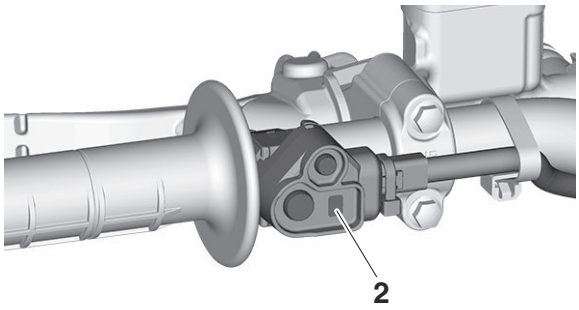



A. Map 1
B. Map 2

1. Push the multi-function button
2. Purple
3. Blue
4. 1 second (1 flash/second)

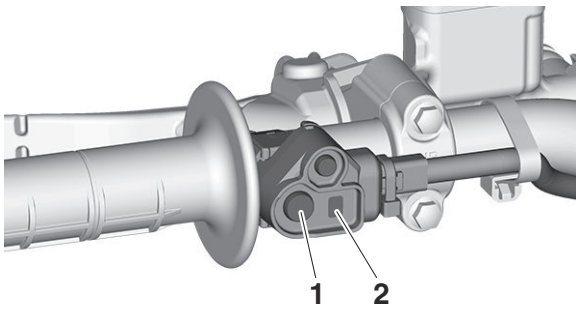
5. After starting off, the launch control system will turn off automatically when the gear is shifted into the 3rd gear.
   The launch control system will also turn off when the engine is stopped or the gear is shifted into the 3rd gear or higher.

**TIP**
- When the launch control system is turned off, the indicator light "2" will stop flashing.
- In case the map 1 is set, the indicator light blinks in blue once every 4 seconds if the ECU has been activated while the engine is stopped even if the launch control system is off.
- Indicator light on the handlebar switch (left) flashes orange → Check or replace any faulty electrical part(s).
  Refer to "CHECKING THE INDICATOR LIGHT" on page 8-21.
- Indicator light on the handlebar switch (left) blinks in blue twice → The engine has been cranked while the ECU was locked.
  Refer to "ECU LOCK FUNCTION" on page 1-28.



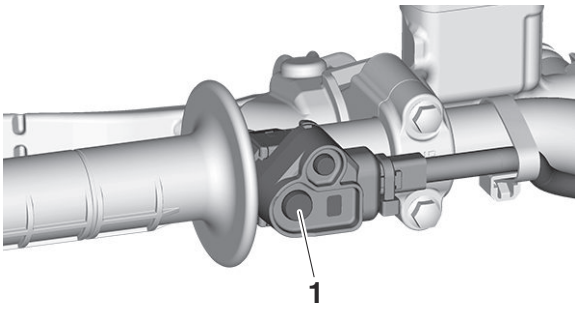

EAM30664
### LAP TIME MEASUREMENT
Lap time records can be measured by activating from the Power Tuner app.
When the multi-function button "1" is pressed, the indicator light "2" will blink in blue and the measurement will start.

**TIP**
- When pressing the multi-function button "1" again, the indicator light "2" will blink in blue and shift to the next lap time.
- Map change cannot be changed while in lap time measurement.
- Measurement results can be received and saved on the app.
- After the ECU has shut down, the lap time measurement will finish.




EAM30665
### MAP CHANGE
Push the multi-function button "1" to change between map 1 and map 2.

**TIP**
Indicator light on the handlebar switch (left) flashes orange → Check or replace any faulty electrical part(s).
Refer to "CHECKING THE INDICATOR LIGHT" on page 8-21.

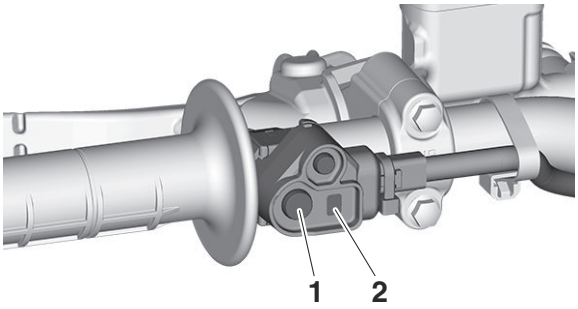



**To change the map**

1. Shift to neutral.
2. Start the engine.
3. Push the multi-function button “1”.

**TIP**

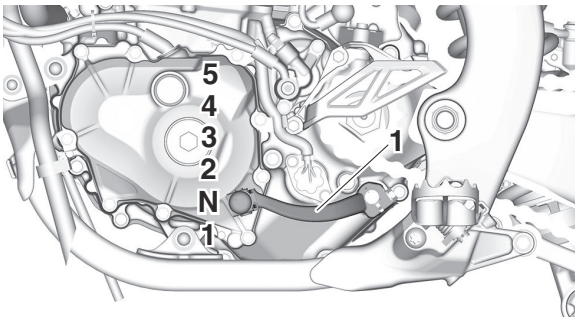
- As shipped from the factory, map 1 and 2 are the same.
- You must use the Power Tuner app to adjust the map settings.
- When the indicator light “2” illuminates blue, map 2 is selected.




EAM30185

## SHIFT PEDAL

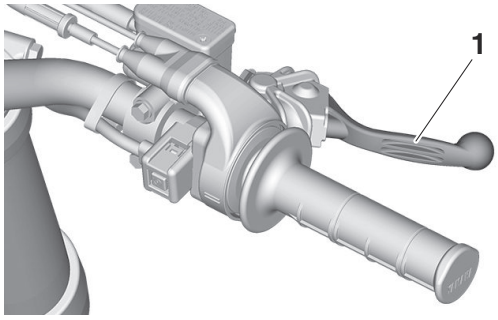
The shift pedal “1” has adopted a method of 1 down & 4 ups (press-down & kick-ups).
Press it down for N (neutral) to 1st, and kick it up for 2nd to 5th.




EAM30188

## FRONT BRAKE LEVER

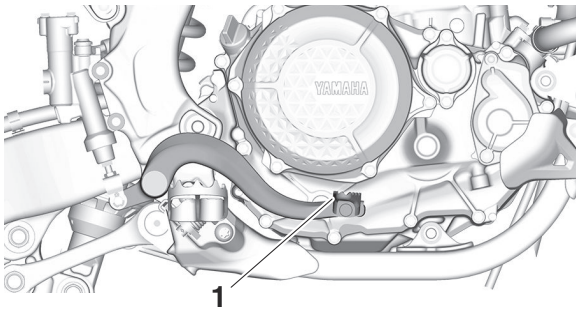
The front brake lever “1” is located on the right handlebar. Pull it toward the handlebar to activate the front brake.




EAM30189

## REAR BRAKE PEDAL

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




EAM30444

## STARTER KNOB

Starting a cold engine requires a larger amount of intake air, which is supplied by the starter knob “1”.
Pushing the knob toward “a” turns ON the starter, resulting in a larger angle of throttle valve.

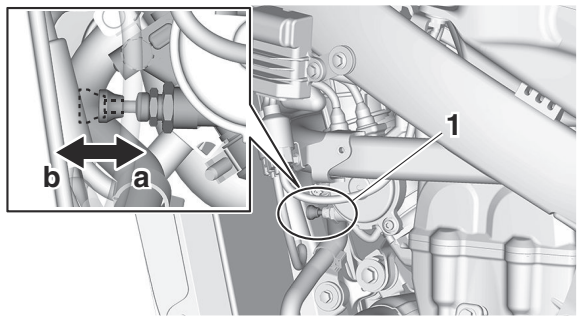
**TIP**

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

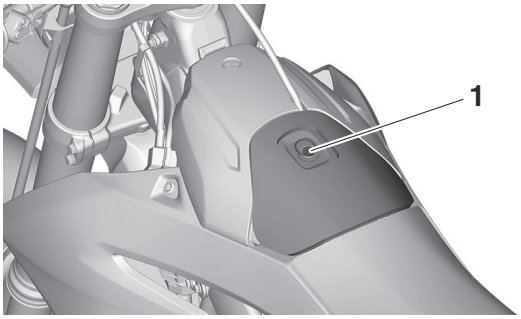
EWA20470

**WARNING**

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

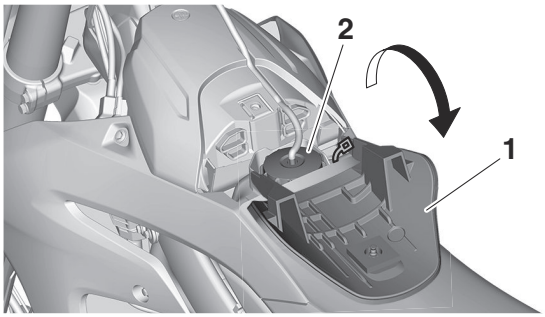


EAM30192
## FUEL TANK CAP
Fuel tank cap is located under the sub-seat.
1. Loosen:
   • Quick fastener "1"




2. Remove the sub-seat "1" to open the fuel tank cap "2".

**TIP**
- When installing the sub-seat, make sure that the plastic band is not twisted.
- When installing the sub-seat, push down the quick fastener, rotate it, and then secure the sub-seat with the quick fastener.




EAM30666
## ECU LOCK FUNCTION
The vehicle is not equipped with a physical key.
The ECU lock function locking the ECU from the Power Tuner app can immobilize the vehicle.
The lock condition can be checked from the Power Tuner app.

**TIP**
- The lock status cannot be checked from the vehicle without attempting to start the engine.
- If an attempt is made to start the engine while the ECU is locked, the indicator light on the handlebar switch (left) blinks in blue twice.
- When starting the engine, if only the starter motor is turning but the engine does not crank, this might be due to the ECU being locked. Continuing to starting the engine in this state could cause the battery to run flat.

### Setting of the ECU management password
From the Power Tuner app, the password can be set for the ECU using 8 to 20 letters including (upper and lower case), numbers, and symbols.

**TIP**
- For security reasons, it is recommended to set a password consisting of 10 digits or more, including 3 kinds of letters or more.
- If the password is not set from the Power Tuner app, for example if a smartphone is not used, there is a risk that someone could set a password without your permission.
- If you forget the password, the ECU needs to be replaced for a fee. Please do not forget the password.

### ECU lock and unlock, password removal
When the password meets the password input requirements from the Power Tuner app, locking or unlocking the ECU and removal of the password is possible.
Anyone who does not know the password cannot start the engine if the ECU is locked.

**TIP**
- Anyone who does not know the password, including the YAMAHA dealer, cannot remove or change the password.
- When the vehicle is transferred to another person, the password should be removed before the transfer.

EAM20123
# STARTING AND BREAK-IN

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

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

ECA24180
***NOTICE***

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

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

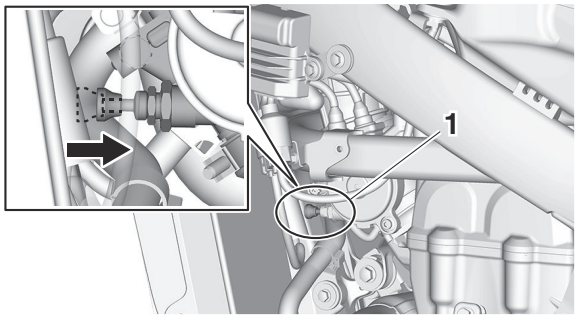
EWA19010
**⚠ WARNING**

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

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

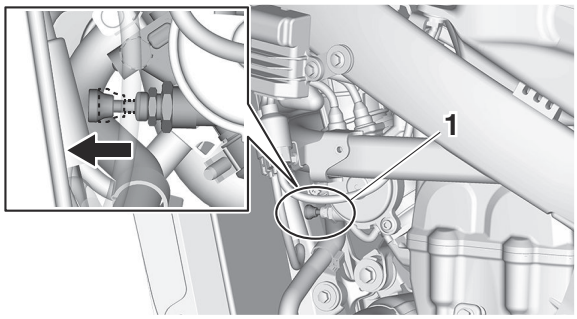
EAM30196
## STARTING A COLD ENGINE
1. Press the shift pedal to neutral.
2. Push the starter knob “1” completely.

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




3. Start the engine by pushing the starter switch.
   If the engine fails to start when using the starter 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.

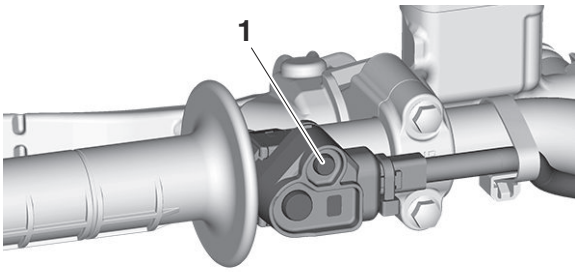



EWA19030
**⚠ WARNING**

**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 starter 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 autostop system. The engine stops automatically if left idling for 7 minutes. If the engine stops, push the starter 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 starter switch.

EWA23110

**⚠ WARNING**

**If the clutch lever is not pulled and the starter 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 3-6.

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.
   - Clutch
     Check for clutch fluid leaks.
   - Generator
     Check for looseness in mounted areas of the generator rotor and the stator coil assembly.
     Check that the connector is not being disconnected.
   - Silencer
     Check the main body and stay for cracks. Check for leaks.
   - Mounting bolts and nuts
     Check for looseness in mounted areas of parts, as well as engine mounting bolts and engine brackets.
2. For the chassis
   - Check welds and mounted areas of the frame, the swingarm, the link, the bracket, and so on, for looseness and cracks.
   - Wheel(s)
     Check the wheel for runout. Check the spoke for looseness.
   - Brake(s)
     Check the brake disc mounting bolt for looseness.
     Check that the reservoir contains the specified amount of brake fluid. Check for leaks.
   - Cable
     Grease and adjust cables.
   - Drive chain
     Lubricate the drive chain and adjust its tension.
   - Fuel tank
     Clean the inside of the fuel tank. Check for leaks.
   - Suspension
     Check for oil leaks in the front fork or the rear shock absorber. Check that the mounted conditions are good.
   - Sprocket
     Check for looseness in the sprocket mounted on the rear wheel.
   - Mounting bolts and nuts
     Check mounted areas for looseness.

ECA25831
***NOTICE***

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

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

EAM30195
## AIR FILTER MAINTENANCE

Apply the Yamaha foam air filter oil or other quality foam air filter oil to the element. (Excess oil in the element may adversely affect engine starting.) Refer to “CLEANING THE AIR FILTER ELEMENT” on page 3-17.

EAM20125
# TORQUE-CHECK POINTS

| | | | | |
|---|---|---|---|---|
| Frame construction | | | | Fuel tank to frame |
| | | | | Frame to rear frame |
| | | | | Frame to engine protector |
| Engine mounting | | | | Frame to engine |
| | | | | Engine bracket to engine |
| | | | | Engine bracket to frame |
| Seat | | | | Seat to rear fender |
| 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 |

| | |
|---|---|
| Clutch | Tightening of union bolt |
| | Clutch master cylinder to handlebar |
| | Tightening of bleed screw |
| 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 shroud |
| | Tightening of side cover |
| | Tightening of rear fender |
| | Tightening of mud flap |
| | Tightening of rear brake caliper cover |

**TIP**

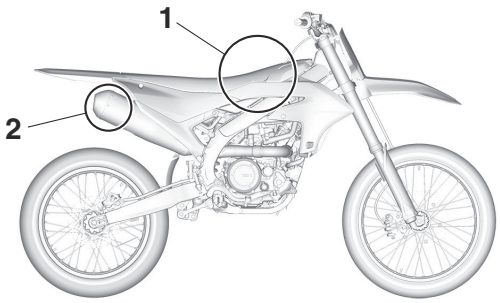
Concerning the tightening torque, refer to “TIGHTENING TORQUES” on page 2-10.

EAM20126
# MOTORCYCLE CARE AND STORAGE

EAM30200
## CARE
While the open design of a motorcycle reveals the attractiveness of the technology, it also makes it more vulnerable. Rust and corrosion can develop even if high-quality components are used. A rusty exhaust pipe may go unnoticed on a car, however, it detracts from the overall appearance of a motorcycle. Frequent and proper care does not only comply with the terms of the warranty, but it will also keep your motorcycle looking good, extend its life and optimize its performance.

### Before cleaning
**TIP**
Be sure to confirm that the vehicle is completely cooled.

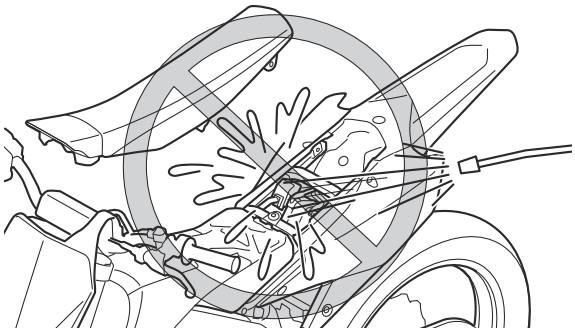
1. Block or cover the following parts with suitable measures.
   - Air duct "1"
     (other gaps around shrouds and seats)
   - Muffler outlet "2"




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

### Cleaning
ECA26730
***NOTICE***

- **Avoid using strong acidic wheel cleaners, especially on spoked wheels. If such products are used on hard-to-remove dirt, do not leave the cleaner on the affected area any longer than instructed. Also, thoroughly rinse the area off with water, immediately dry it, and then apply a corrosion protection spray.**
- **Improper cleaning can damage plastic parts (such as cowlings, panels, windshields, headlight lenses, meter lenses, etc.) and the mufflers. Use only a soft, clean cloth or sponge with water to clean plastic. However, if the plastic parts cannot be thoroughly cleaned with water, diluted mild detergent with water may be used. Be sure to rinse off any detergent residue using plenty of water, as it is harmful to plastic parts.**
- **Do not use any harsh chemical products on plastic parts. Be sure to avoid using cloths or sponges which have been in contact with strong or abrasive cleaning products, solvent or thinner, fuel (gasoline), rust removers or inhibitors, brake fluid, antifreeze or electrolyte.**
- **For motorcycles equipped with a windshield: Do not use strong cleaners or hard sponges as they will cause dulling or scratching. Some cleaning compounds for plastic may leave scratches on the windshield. Test the product on a small hidden part of the windshield to make sure that it does not leave any marks. If the windshield is scratched, use a quality plastic polishing compound after washing.**
- **When cleaning using either a high-pressure cleaning machine or a water hose, do not direct the water jet toward the following areas:(Otherwise, it could cause either damage due to the water pressure or malfunction due to water entry.)**
  **Wheels or swing arm bearings**
  **Fork seals or brake seals**
  **Electrical parts, such as couplers, switches, battery, etc.**
  **Muffler or hoses**
  **Air cleaner intake port**
- **Do not clean using a water jet with the seat or cover removed.**



After normal use

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

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

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

**TIP**

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

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

**After cleaning**

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

EWA19050

**WARNING**

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

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

ECA24240

***NOTICE***

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

**TIP**

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

EAM30201

## STORAGE

### Short-term

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

ECA24250

***NOTICE***

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

**stored.**

**Long-term**

Before storing your motorcycle for several months:

1. Follow all the instructions in the “CARE” on page 1-34.
2. Fill up the fuel tank and add fuel stabilizer (if available) to prevent the fuel tank from rusting and the fuel from deteriorating.
3. Perform the following steps to protect the cylinder, piston rings, etc. from corrosion.
   a. Remove the spark plug cap and spark plug.
   b. Pour a teaspoonful of engine oil into the spark plug bore.
   c. Install the spark plug cap onto the spark plug, and then place the spark plug on the cylinder head so that the electrodes are grounded. (This will limit sparking during the next step.)
   d. Turn the engine over several times with the starter. (This will coat the cylinder wall with oil.)
   e. Remove the spark plug cap from the spark plug, and then install the spark plug and the spark plug cap. **WARNING! To prevent damage or injury from sparking, make sure to ground the spark plug electrodes while turning the engine over.**
4. Lubricate all control cables and the pivoting points of all levers and pedals as well as of the sidestand/centerstand.
5. Check and, if necessary, correct the tire air pressure, and then lift the motorcycle so that both of its wheels are off the ground. Alternatively, turn the wheels a little every month in order to prevent the tires from becoming degraded in one spot.
6. Cover the muffler outlet with a plastic bag to prevent moisture from entering it.
7. Remove the battery and fully charge it. Store it in a cool, dry place and charge it once a month. Do not store the battery in an excessively cold or warm place [less than 0 °C (32 °F) or more than 65 °C (149 °F)]. For more information on storing the battery, “CHECKING AND CHARGING THE BATTERY” on page 8-52.

**TIP**

Make any necessary repairs before storing the motorcycle.

EAM30679

## VEHICLE RECYCLING INFORMATION (FOR FRANCE)

This product is subject to recycling obligations in France and is marked with the Triman logo, in accordance with Article 17 of the AGEC Law (Anti-Waste and Circular Economy Law) dated February 10, 2020.




quefairedemesdechets.fr
Avant de recycler, privilégiez la réparation

# SPECIFICATIONS

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EAM20127
# GENERAL SPECIFICATIONS

| | |
|---|---|
| **Model** | |
| Model | D03B (CAN)<br>D03C (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>D03E (AUS, NZL, ZAF)<br>D03G (CAN)<br>D03H (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>D03J (AUS, NZL, ZAF) |
| **Dimensions** | |
| Overall length | 2175 mm (85.6 in) |
| Overall width | 825 mm (32.5 in) |
| Overall height | 1275 mm (50.2 in) |
| Seat height | 965 mm (38.0 in) |
| Wheelbase | 1475 mm (58.1 in) |
| Ground clearance | 345 mm (13.58 in) |
| **Weight** | |
| Curb weight | 109 kg (242 lb) |
| Riding capacity | 1 person |

EAM20128
# ENGINE SPECIFICATIONS

| | |
|---|---|
| **Engine** | |
| Combustion cycle | 4-stroke |
| Cooling system | Liquid cooled |
| Valve train | DOHC |
| Displacement | 450 $cm^3$ |
| Number of cylinders | Single cylinder |
| Bore × stroke | 97.0 × 60.8 mm (3.82 × 2.39 in) |
| Compression ratio | 13.0 : 1 |
| Starting system | Electric starter |
| **Fuel** | |
| Recommended fuel | Unleaded gasoline (E10 acceptable) |
| Octane number (RON) | 95 |
| Fuel tank capacity | 6.2 L (1.6 US gal, 1.4 Imp.gal) |
| **Engine oil** | |
| Recommended brand | YAMALUBE |
| SAE viscosity grades | 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50 |
| Recommended engine oil grade | API service SG type or higher, JASO standard MA |
| Lubrication system | Dry sump |
| Engine oil quantity | |
| Oil change | 0.94 L (0.99 US qt, 0.83 Imp.qt) |
| With oil filter removal | 0.96 L (1.01 US qt, 0.84 Imp.qt) |
| Quantity (disassembled) | 1.20 L (1.27 US qt, 1.06 Imp.qt) |
| **Oil filter** | |
| Oil filter type | Cartridge |
| **Cooling system** | |
| Coolant quantity | |
| Radiator (including all routes) | 1.03 L (1.09 US qt, 0.91 Imp.qt) |
| Radiator cap valve opening pressure | 107.9–137.3 kPa (1.08–1.37 $kgf/cm^2$, 15.6–19.9 psi) |
| Cooling system leak test pressure | 137.3 kPa (1.37 $kgf/cm^2$, 19.9 psi) |
| **Spark plug(s)** | |
| Manufacturer/model | NGK/LMAR8G |
| Spark plug gap | 0.7–0.8 mm (0.028–0.031 in) |
| **Cylinder head** | |
| Warpage limit | 0.05 mm (0.0020 in) |
| **Camshaft** | |
| Camshaft cap inside diameter | 22.043–22.064 mm (0.8678–0.8687 in) |
| Camshaft journal diameter | 22.002–22.015 mm (0.8662–0.8667 in) |
| Camshaft-journal-to-camshaft-cap clearance | 0.028–0.062 mm (0.0011–0.0024 in) |
| Camshaft-journal-to-camshaft-cap clearance limit | 0.080 mm (0.0032 in) |
| Camshaft lobe dimensions | |
| Lobe height limit (Intake) | 38.030 mm (1.4972 in) |
| Lobe height limit (Exhaust) | 34.170 mm (1.3453 in) |
| **Valve, valve seat, valve guide** | |
| Valve clearance (cold) | |

| | |
|---|---|
| Intake | 0.10–0.17 mm (0.0039–0.0067 in) |
| Exhaust | 0.15–0.22 mm (0.0059–0.0087 in) |
| Valve dimensions | |
| Valve seat contact width limit (intake) | 1.5 mm (0.06 in) |
| Valve seat contact width limit (exhaust) | 1.5 mm (0.06 in) |
| Valve stem diameter limit (intake) | 5.445 mm (0.2144 in) |
| Valve stem diameter limit (exhaust) | 5.435 mm (0.2140 in) |
| Valve guide inside diameter (intake) | 5.500–5.512 mm (0.2165–0.2170 in) |
| Valve guide inside diameter (exhaust) | 5.500–5.512 mm (0.2165–0.2170 in) |
| Valve-stem-to-valve-guide clearance limit (intake) | 0.080 mm (0.0032 in) |
| Valve-stem-to-valve-guide clearance limit (exhaust) | 0.100 mm (0.0039 in) |
| Valve stem runout | 0.020 mm (0.0008 in) |
| **Valve spring** | |
| Free length limit (intake) | 36.65 mm (1.44 in) |
| Free length limit (exhaust) | 37.34 mm (1.47 in) |
| **Cylinder** | |
| Bore | 97.000–97.010 mm (3.8189–3.8193 in) |
| Wear limit | 97.060 mm (3.8213 in) |
| **Piston** | |
| Piston-to-cylinder clearance | 0.010–0.045 mm (0.0004–0.0018 in) |
| Diameter | 96.955–96.970 mm (3.8171–3.8177 in) |
| Measuring point (from piston skirt bottom) | 9.0 mm (0.35 in) |
| Piston pin bore inside diameter limit | 18.045 mm (0.7104 in) |
| Piston pin outside diameter limit | 17.981 mm (0.7079 in) |
| Piston-pin-to-piston-pin-bore clearance | 0.004–0.024 mm (0.0002–0.0009 in) |
| **Piston ring** | |
| Top ring | |
| End gap limit | 0.55 mm (0.0217 in) |
| Ring side clearance | 0.015–0.065 mm (0.0006–0.0026 in) |
| Side clearance limit | 0.120 mm (0.0047 in) |
| 2nd ring | |
| End gap limit | 0.85 mm (0.0335 in) |
| Ring side clearance | 0.020–0.060 mm (0.0008–0.0024 in) |
| Side clearance limit | 0.100 mm (0.0039 in) |
| **Connecting rod** | |
| Oil clearance | 0.021–0.038 mm (0.0008–0.0015 in) |
| **Bearing color code** | |
| Code 0 | Pink |
| Code 8 | White |
| **Crankshaft** | |
| Crank assembly width | 61.93–62.00 mm (2.438–2.441 in) |
| Runout limit | 0.030 mm (0.0012 in) |
| **Clutch** | |
| Clutch type | Wet, multiple-disc |
| Friction plate 1 thickness | 2.12–2.28 mm (0.083–0.090 in) |
| Wear limit | 2.02 mm (0.080 in) |
| Plate quantity | 4 pcs |

| | |
|---|---|
| Friction plate 2 thickness | 2.12–2.28 mm (0.083–0.090 in) |
| Wear limit | 2.02 mm (0.080 in) |
| Plate quantity | 4 pcs |
| Clutch plate 1 thickness | 1.35–1.45 mm (0.053–0.057 in) |
| Plate quantity | 7 pcs |
| Warpage limit | 0.10 mm (0.004 in) |
| Clutch plate 2 thickness | 0.93–1.07 mm (0.037–0.042 in) |
| Plate quantity | 2 pcs |
| Warpage limit | 0.10 mm (0.004 in) |
| Clutch spring free height | 4.59 mm (0.18 in) |
| Clutch spring free height limit | 4.36 mm (0.17 in) |
| Push rod bending limit | 0.10 mm (0.004 in) |
| **Drivetrain** | |
| Primary reduction ratio | 2.481 (67/27) |
| Transmission type | Constant mesh 5-speed |
| Gear ratio | |
| 1st | 2.000 (28/14) |
| 2nd | 1.625 (26/16) |
| 3rd | 1.350 (27/20) |
| 4th | 1.136 (25/22) |
| 5th | 1.000 (21/21) |
| Main axle runout limit | 0.08 mm (0.0032 in) |
| Drive axle runout limit | 0.08 mm (0.0032 in) |
| Secondary reduction ratio | 3.846 (50/13) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>3.923 (51/13) (AUS, CAN, NZL, ZAF) |
| Final drive | Chain |
| **Air filter** | |
| Air filter element | Wet element |
| Air filter oil grade | Yamaha foam air filter oil or other quality foam air filter oil |
| **Fuel pump** | |
| Maximum consumption amperage | 2.4 A |
| **Fuel injector** | |
| Resistance | 12.0 Ω |
| **Throttle body** | |
| ID mark | D021 |
| **Idling condition** | |
| Engine idling speed | 1900–2100 r/min |
| Coolant temperature | 70–80 °C (158–176 °F) |
| Fuel line pressure (at idle) | 300–390 kPa (3.0–3.9 kgf/cm$^2$, 43.5–56.6 psi) |
| Throttle grip free play | 3.0–6.0 mm (0.12–0.24 in) |

EAM20129
# CHASSIS SPECIFICATIONS

| | |
|---|---|
| **Chassis** | |
| Caster angle | 27.5 ° |
| Trail | 123 mm (4.8 in) |
| **Front wheel** | |
| Wheel type | Spoke wheel |
| Rim size | 21x1.6 |
| Radial wheel runout limit | 2.0 mm (0.08 in) |
| Lateral wheel runout limit | 2.0 mm (0.08 in) |
| Wheel axle bending limit | 0.50 mm (0.02 in) |
| **Rear wheel** | |
| Wheel type | Spoke wheel |
| Rim size | 19x2.15 |
| Radial wheel runout limit | 2.0 mm (0.08 in) |
| Lateral wheel runout limit | 2.0 mm (0.08 in) |
| Wheel axle bending limit | 0.50 mm (0.02 in) |
| **Front tire** | |
| Type | With tube |
| Size | 80/100-21 51M |
| Manufacturer/model | DUNLOP/MX33 |
| **Rear tire** | |
| Type | With tube |
| Size | 120/80-19 63M |
| Manufacturer/model | DUNLOP/MX33 |
| **Tire air pressure (measured on cold tires)** | |
| Front | 100 kPa (1.00 kgf/cm$^2$, 15 psi) |
| Rear | 100 kPa (1.00 kgf/cm$^2$, 15 psi) |
| **Front brake** | |
| Type | Hydraulic single disc brake |
| Brake disc thickness limit | 2.5 mm (0.10 in) |
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in) |
| Brake pad lining thickness limit | 1.0 mm (0.04 in) |
| Master cylinder inside diameter | 9.52 mm (0.37 in) |
| Caliper cylinder inside diameter (Left) | 25.40 mm, 25.40 mm (1.00 in, 1.00 in) |
| Specified brake fluid | DOT 4 |
| **Rear brake** | |
| Type | Hydraulic single disc brake |
| Brake disc thickness limit | 3.5 mm (0.14 in) |
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in) |
| Brake pad lining thickness limit | 1.0 mm (0.04 in) |
| Master cylinder inside diameter | 9.5 mm (0.37 in) |
| Caliper cylinder inside diameter | 22.65 mm (0.89 in) |
| Specified brake fluid | DOT 4 |
| **Clutch** | |
| Specified brake and clutch fluid | DOT 4 |

| | |
|---|---|
| **Front suspension** | |
| Type | Telescopic fork |
| Spring | Coil spring |
| Shock absorber | Hydraulic damper |
| Wheel travel | 310 mm (12.2 in) |
| Fork spring free length limit | 492.0 mm (19.37 in) |
| Inner tube bending limit | 0.2 mm (0.01 in) |
| Recommended oil | Yamaha Suspension Oil S1 |
| Quantity (left) | 501.0 $cm^3$ (16.94 US oz, 17.67 Imp.oz) (AUS, CAN, NZL, ZAF)<br>516.0 $cm^3$ (17.45 US oz, 18.20 Imp.oz) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR) |
| Quantity (right) | 501.0 $cm^3$ (16.94 US oz, 17.67 Imp.oz) (AUS, CAN, NZL, ZAF)<br>516.0 $cm^3$ (17.45 US oz, 18.20 Imp.oz) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR) |
| 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) | 13 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>9 (AUS, CAN, NZL, ZAF) |
| Adjustment value from the start position (Hard) | 0 |
| Compression damping | |
| Adjusting system | Mechanical adjustable type |
| Unit for compression damping adjustment | Click |
| Adjustment value from the start position (Soft) | 20 |
| Adjustment value from the start position (STD) | 12 (AUS, CAN, NZL, ZAF)<br>14 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR) |

| | |
|---|---|
| Adjustment value from the start position (Hard) | 0 |
| **Rear suspension** | |
| Type | Swingarm (link suspension) |
| Spring | Coil spring |
| Shock absorber | Gas-hydraulic damper |
| Wheel travel | 295 mm (11.6 in) |
| Spring preload | |
| Adjusting system | Mechanical adjustable type |
| Adjustment value (Soft) | 1.5 mm (0.06 in) |
| Adjustment value (STD) | 7.0 mm (0.28 in) |
| Adjustment value (Hard) | 18.0 mm (0.71 in) |
| Rebound damping | |
| Adjusting system | Mechanical adjustable type |
| Unit for adjustment | Click |
| Adjustment value from the start position (Soft) | 30 |
| Adjustment value from the start position (STD) | 13 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>8 (AUS, CAN, NZL, ZAF) |
| 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+1/2 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>1+3/8 (AUS, CAN, NZL, ZAF) |
| Adjustment value from the start position (Hard) | 0 |
| Slow compression damping | |
| Unit for adjustment | Click |
| Adjustment value from the start position (Soft) | 20 |
| Adjustment value from the start position (STD) | 12 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)<br>7 (AUS, CAN, NZL, ZAF) |

| | |
|---|---|
| Adjustment value from the start position (Hard) | 0 |
| **Drive chain** | |
| Size | 520 |
| Chain type | Non-sealed type |
| Number of links | 114 |
| Drive chain slack (Maintenance Stand) | 50.0–60.0 mm (1.97–2.36 in) |
| 15-link length limit | 242.9 mm (9.56 in) |

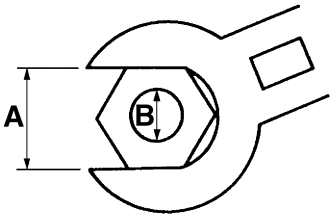
EAM20130
# ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Voltage** | |
| System voltage | 12 V |
| **Ignition system** | |
| Ignition system | TCI |
| Ignition timing (B.T.D.C.) | 8.0–12.0 °/2000 r/min |
| **Engine control unit** | |
| Model | D032 (AUS, CAN, NZL, ZAF)<br>D033 (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR) |
| **Ignition coil** | |
| Primary coil resistance | 1.98–2.42 Ω |
| Secondary coil resistance | 14.64–21.96 kΩ |
| **Spark plug cap** | |
| Resistance | 10.00 kΩ |
| **Charging system** | |
| Charging system | AC magneto |
| Standard output | 14.0 V, 7.1 A at 5000 r/min |
| **Rectifier/regulator** | |
| Regulator type | Single-phase |
| Regulated voltage (DC) | 14.0–14.8 V |
| **Battery** | |
| Model | BR98 |
| Voltage, capacity | 12 V, 2.4 Ah (5 HR) |
| **Starter motor** | |
| Brush overall length | 11.0 mm (0.43 in) |
| Brush overall length limit | 5.5 mm (0.22 in) |
| Brush spring force | 4.80–7.20 N (489–734 gf, 17.28–25.92 oz) |
| Mica undercut (depth) | 2.40 mm (0.09 in) |
| **Fuel injection sensor** | |
| Crankshaft position sensor resistance | 228–342 Ω |
| Intake air temperature sensor resistance | 5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F) |
| Intake air temperature sensor resistance | 290–390 Ω at 80 °C (290–390 Ω at 176 °F) |
| Intake air pressure sensor output voltage | 3.59–3.67 V at 101.3 kPa (3.59–3.67 V at 1.01 kgf/cm$^2$, 3.59–3.67 V at 14.7 psi) |
| Coolant temperature sensor resistance | 2310–2590 Ω at 20 °C (2310–2590 Ω at 68 °F) |
| Coolant temperature sensor resistance | 310–326 Ω at 80 °C (310–326 Ω at 176 °F) |
| **Fuse(s)** | |
| Main fuse | 15.0 A |
| Spare fuse | 15.0 A |

EAM20131
# TIGHTENING TORQUES

EAM30205
## GENERAL TIGHTENING TORQUE SPECIFICATIONS

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




A. Distance between flats
B. Outside thread diameter

| A (nut) | B (bolt) | General tightening torques | | |
|---|---|---|---|---|
| | | N·m | kgf·m | lb·ft |
| 10 mm | 6 mm | 6 | 0.6 | 4.4 |
| 12 mm | 8 mm | 15 | 1.5 | 11 |
| 14 mm | 10 mm | 30 | 3.0 | 22 |
| 17 mm | 12 mm | 55 | 5.5 | 41 |
| 19 mm | 14 mm | 85 | 8.5 | 63 |
| 22 mm | 16 mm | 130 | 13.0 | 96 |

EAM30203
## ENGINE TIGHTENING TORQUES

**TIP**

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

| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| Camshaft cap bolt | M6 | 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) | |
| Oil passage plug (cylinder head) | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Cylinder head bolt | M10 | 4 | See TIP. | M |
| Cylinder head bolt | M6 | 2 | 12 N·m (1.2 kgf·m, 8.9 lb·ft) | |
| Cylinder head cover bolt | M6 | 3 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Cylinder head stud bolt (exhaust pipe) | M6 | 3 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Stud bolt (cylinder head cover) | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Cylinder head cover breather plate bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Oil nozzle (cylinder head) | M6 | 1 | 3.0 N·m (0.30 kgf·m, 2.2 lb·ft) | |
| Cylinder bolt | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Balancer driven gear nut | M14 | 1 | 50 N·m (5.0 kgf·m, 37 lb·ft) | Use a lock washer. |
| Timing chain guide stopper plate (exhaust side) | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Timing chain tensioner cap bolt | M6 | 1 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | |
| Timing chain tensioner bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Coolant drain bolt | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Radiator hose clamp screw | M6 | 8 | 1.5 N·m (0.15 kgf·m, 1.1 lb·ft) | |
| Radiator bolt | M6 | 4 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Radiator pipe joint bolt | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Water pump housing cover bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Oil pump assembly bolt | M5 | 2 | 5 N·m (0.5 kgf·m, 3.7 lb·ft) | |
| Oil pump cover bolt | M4 | 1 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | |
| Oil strainer bolt | M6 | 2 | 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) | |
| Air filter case bracket bolt | M6 | 4 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |

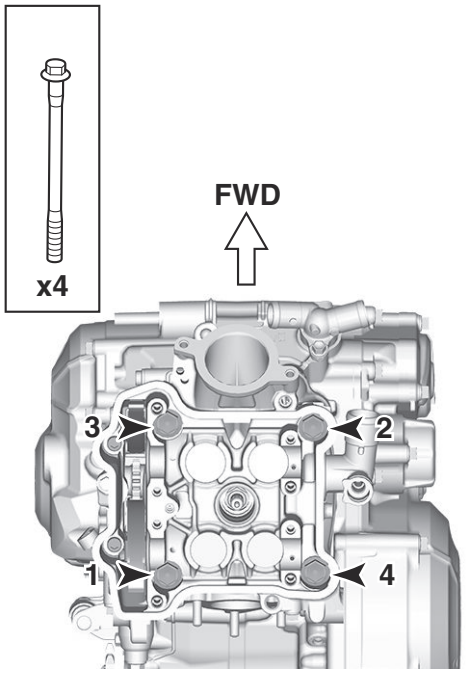
| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| Intake air temperature sensor screw | M5 | 1 | 1.5 N·m (0.15 kgf·m, 1.1 lb·ft) | |
| Clutch hose union bolt | M10 | 2 | 30 N·m (3.0 kgf·m, 22 lb·ft) | △ |
| Clutch master cylinder holder bolt | M6 | 2 | 9 N·m (0.9 kgf·m, 6.6 lb·ft) | |
| Clutch master cylinder reservoir cap screw | M4 | 2 | 1.5 N·m (0.15 kgf·m, 1.1 lb·ft) | |
| Clutch lever pivot bolt | M6 | 1 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | |
| Clutch lever pivot nut | M6 | 1 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | |
| Locknut (clutch lever position) | M6 | 1 | 5 N·m (0.5 kgf·m, 3.7 lb·ft) | |
| Exhaust pipe nut | M6 | 3 | 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 | 16 N·m (1.6 kgf·m, 12 lb·ft) | |
| Oil nozzle (crankcase) | M5 | 1 | 0.5 N·m (0.05 kgf·m, 0.37 lb·ft) | |
| Oil nozzle bolt | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | LT |
| Engine oil drain bolt (crankcase) | M10 | 1 | 20 N·m (2.0 kgf·m, 15 lb·ft) | |
| Engine oil drain bolt (oil tank) | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Crankcase bolt | M6 | 9 | 12 N·m (1.2 kgf·m, 8.9 lb·ft) | |
| Crankshaft end accessing screw | M36 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | E |
| Timing mark accessing screw | M14 | 1 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | E |
| Drive sprocket cover bolt | M6 | 2 | 6 N·m (0.6 kgf·m, 4.4 lb·ft) | |
| Crankcase bearing cover plate screw | M8 | 4 | 30 N·m (3.0 kgf·m, 22 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 | 8 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Crankcase cover bolt (right) | M6 | 10 | 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) | |
| Bolt (holder) | M6 | 2 | 12 N·m (1.2 kgf·m, 8.9 lb·ft) | LT |
| Primary drive gear nut | M20 | 1 | See TIP. | M |
| Bolt (pressure plate 1) | M6 | 6 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | E |
| Clutch boss nut | M20 | 1 | 75 N·m (7.5 kgf·m, 55 lb·ft) | Stake. E |

| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| Clutch release cylinder bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Clutch release cylinder bleed screw | M6 | 1 | 5 N·m (0.5 kgf·m, 3.7 lb·ft) | |
| Drive sprocket nut | M20 | 1 | 90 N·m (9.0 kgf·m, 66 lb·ft) | Use a lock washer. |
| Segment bolt | M8 | 1 | 30 N·m (3.0 kgf·m, 22 lb·ft) | |
| Shift guide bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Stopper lever bolt | M6 | 1 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Shift pedal bolt | M6 | 1 | 12 N·m (1.2 kgf·m, 8.9 lb·ft) | △ |
| Generator rotor nut | M12 | 1 | 65 N·m (6.5 kgf·m, 48 lb·ft) | |
| Stator coil screw | M5 | 3 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Crankshaft position sensor bolt | M6 | 2 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| 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) | |
| Ignition coil bolt | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Starter motor bolt | M6 | 1 | 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 bolts evenly in the tightening order to 36 N·m (3.6 kgf·m, 27 lb·ft). Remove the one bolt according to the tightening order. When doing so, do not loosen the other bolts. Retighten the bolt to 18 N·m (1.8 kgf·m, 13 lb·ft), and then tighten it further to reach the specified angle (90°). 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: 90° + 60° = 150° (The first and second time, be sure to apply molybdenum disulfide grease to the bolt threads and seats as well as to both sides of the plain washers.)




**TIP**

**Primary drive gear nut**

1. Thoroughly clean the threaded portion of the crankshaft, contact surface of the washer, and threaded portion and contact surface of the primary drive gear nut to remove the oil.
2. Apply molybdenum disulfide grease to the threaded portion of the crankshaft, the contact surface of the washer, and contact surface and threaded portion of the primary drive gear nut.
3. Tighten the primary drive gear nut 170 N·m (17 kgf·m, 125 lb·ft).

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) | △ |
| Handlebar switch screw (left) | M4 | 1 | 1.3 N·m (0.13 kgf·m, 0.95 lb·ft) | |
| Starter switch | M3 | 1 | 0.5 N·m (0.05 kgf·m, 0.37 lb·ft) | |
| Lower ring nut | M28 | 1 | See TIP. | △ |
| Damper assembly (front fork) | M51 | 2 | 30 N·m (3.0 kgf·m, 22 lb·ft) | |
| Inner tube and adjuster | M22 | 2 | 55 N·m (5.5 kgf·m, 41 lb·ft) | |
| Base valve (front fork) | M42 | 2 | 28 N·m (2.8 kgf·m, 21 lb·ft) | |

| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| 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) | |
| Screw (adjuster knob) | M4 | 2 | 0.6 N·m (0.06 kgf·m, 0.44 lb·ft) | |
| Front fork protector bolt | M6 | 6 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Brake hose holder bolt | M6 | 2 | 9 N·m (0.9 kgf·m, 6.6 lb·ft) | △ |
| Screw (throttle cable housing) | M5 | 2 | 3.8 N·m (0.38 kgf·m, 2.8 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 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 | 5 N·m (0.5 kgf·m, 3.7 lb·ft) | △ |
| Front wheel axle nut | M18 | 1 | 115 N·m (11.5 kgf·m, 85 lb·ft) | △ |
| Front wheel axle pinch bolt | M8 | 4 | 21 N·m (2.1 kgf·m, 15 lb·ft) | △ |
| Front brake disc bolt | M6 | 6 | 13 N·m (1.3 kgf·m, 9.6 lb·ft) | △/ |
| Rear brake disc bolt | M6 | 6 | 13 N·m (1.3 kgf·m, 9.6 lb·ft) | △/ |
| Footrest bracket bolt | M10 | 4 | 55 N·m (5.5 kgf·m, 41 lb·ft) | |
| Rear brake pedal bolt | M8 | 1 | 26 N·m (2.6 kgf·m, 19 lb·ft) | △ |
| Screw (rear brake pedal) | M5 | 2 | 6 N·m (0.6 kgf·m, 4.4 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 | 5 N·m (0.5 kgf·m, 3.7 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 | 40 N·m (4.0 kgf·m, 30 lb·ft) | △ |

| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| Nipple (spoke) | — | 72 | 2.5 N·m (0.25 kgf·m, 1.8 lb·ft) | △ |
| Rear brake caliper protector bolt | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Engine mounting bolt (upper side) | M10 | 2 | 45 N·m (4.5 kgf·m, 33 lb·ft) | △ |
| Engine mounting bolt (front side) | M10 | 1 | 55 N·m (5.5 kgf·m, 41 lb·ft) | △ |
| Engine mounting bolt (lower side) | M10 | 1 | 53 N·m (5.3 kgf·m, 39 lb·ft) | △ |
| Engine bracket bolt (upper side) | M8 | 4 | 34 N·m (3.4 kgf·m, 25 lb·ft) | △ |
| Engine bracket bolt (front side) | M8 | 2 | 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 | 75 N·m (7.5 kgf·m, 55 lb·ft) | △/  |
| Rear shock absorber assembly upper nut | M10 | 1 | 56 N·m (5.6 kgf·m, 41 lb·ft) | △ |
| Rear shock absorber assembly lower nut | M10 | 1 | 53 N·m (5.3 kgf·m, 39 lb·ft) | △ |
| Relay arm nut (swingarm side) | M14 | 1 | 70 N·m (7.0 kgf·m, 52 lb·ft) | △ |
| Connecting arm nut (relay arm side) | M14 | 1 | 80 N·m (8.0 kgf·m, 59 lb·ft) | △ |
| Connecting arm nut (frame side) | M14 | 1 | 80 N·m (8.0 kgf·m, 59 lb·ft) | △ |
| 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) | |
| Fuel tank bolt (front side) | M6 | 2 | 8 N·m (0.8 kgf·m, 5.9 lb·ft) | △ |
| Screw (fuel tank) | M6 | 1 | 4.0 N·m (0.40 kgf·m, 3.0 lb·ft) | |
| Fuel pump bolt | M5 | 5 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Screw (fuel inlet pipe) | M5 | 2 | 3.5 N·m (0.35 kgf·m, 2.6 lb·ft) | |
| Seat set bracket screw | M6 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Seat bolt | M6 | 2 | 13 N·m (1.3 kgf·m, 9.6 lb·ft) | △ |
| Side cover bolt (left) | M6 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Center side cover bolt (left) | M6 | 1 | 9.5 N·m (0.95 kgf·m, 7.0 lb·ft) | |
| Side cover bolt (right) | M6 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Center side cover bolt (right) | M6 | 1 | 9.5 N·m (0.95 kgf·m, 7.0 lb·ft) | |
| Shroud bolt (frame) | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Shroud bolt (air filter case) | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Shroud bolt (fuel tank) | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Shroud bolt (radiator guard) | M6 | 2 | 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) | △ |

| Item | Thread size | Q'ty | Tightening torques | Remarks |
|---|---|---|---|---|
| Rear fender bolt (front side) | M6 | 4 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Rear fender bolt (rear side) | M6 | 2 | 16 N·m (1.6 kgf·m, 12 lb·ft) | △ |
| Screw (mud flap) | — | 2 | 1.3 N·m (0.13 kgf·m, 0.95 lb·ft) | △ |
| Number plate bolt | M6 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | △ |
| Frame ground bolt (negative battery lead) | M6 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Ignition coil bracket bolt | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Starter relay bolt | M6 | 2 | 3.5 N·m (0.35 kgf·m, 2.6 lb·ft) | |
| Battery box bolt | M6 | 2 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |

**TIP**

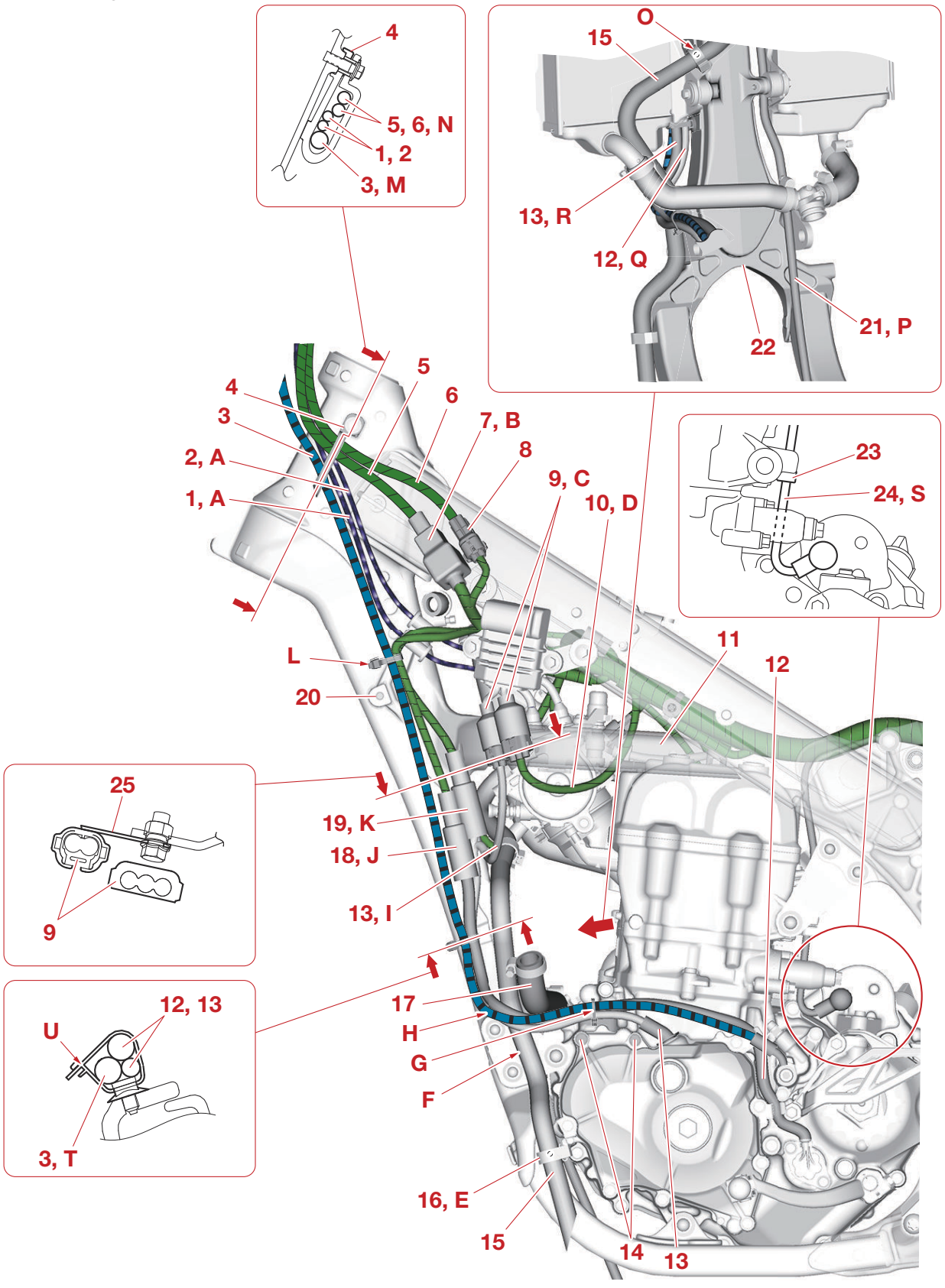
**Lower ring nut**

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

EAM20152

# CABLE ROUTING DIAGRAM

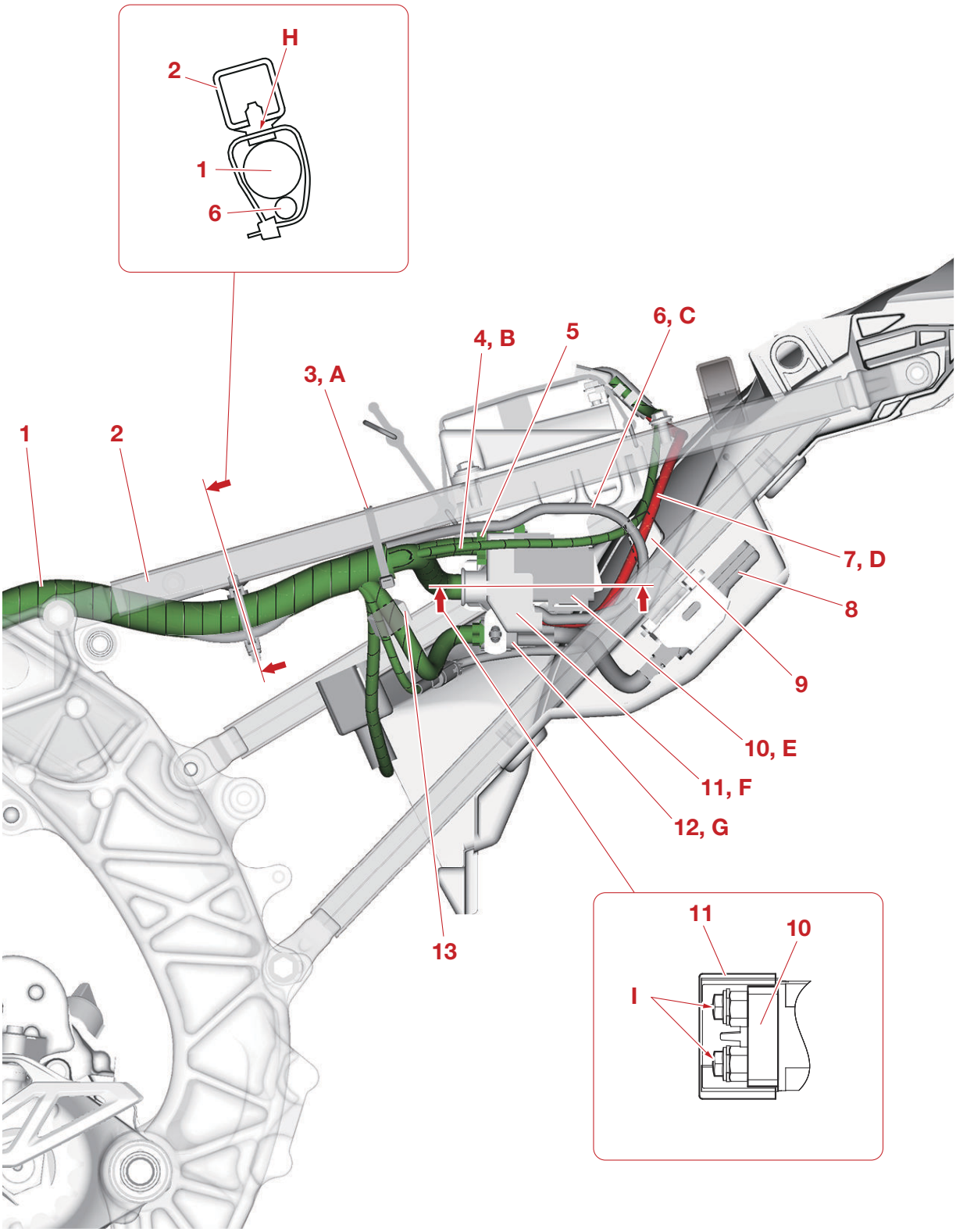
**Frame and engine (front left side view)**



1. Throttle cable (return)
2. Throttle cable (pull)
3. Clutch hose
4. Cable holder
5. Handlebar switch lead (left)
6. Starter switch lead
7. Handlebar switch coupler (left) (black, 6-pin)
8. Starter switch coupler (black, 2-pin)
9. Rectifier/regulator coupler
10. Rectifier/regulator lead
11. Tension arm
12. Gear position switch lead
13. Stator coil assembly lead
14. Crankcase cover bolt (left)
15. Cylinder head breather hose
16. Holder
17. Radiator hose
18. Gear position switch coupler (white, 3-pin)
19. Stator coil assembly coupler (gray, 2-pin)
20. Upper radiator boss
21. Radiator breather hose
22. Down tube
23. Clamp
24. Starter motor lead
25. Bracket

A. Route the throttle cable behind the handlebar switch lead (left) and starter switch lead with respect to the vehicle.
B. Insert the handlebar switch 6-pin coupler (left) (black) into the bracket and secure it. After securing the coupler, install the cover over it up to the wire harness as shown.
C. Insert the rectifier/regulator 2-pin coupler (not colored) and rectifier/regulator 3-pin coupler (not colored) into the bracket and secure them. After securing, install the cover over them.
D. Pass the rectifier/regulator lead (wire harness side) to the inside of the tension arm (the side of the vehicle).
E. Install the cylinder head breather hose by aligning the paint mark on the cylinder head breather hose with the holder. When doing so, the paint mark should be within the holder area.
F. Route the cylinder head breather hose between the two engine bracket bolts (front) and the one engine bracket bolt (rear).
G. Fasten the clutch hose, gear position switch lead and stator coil assembly lead with a plastic locking tie. The fastening position should be between the crankcase cover bolt (left) and the crankcase cover bolt (left), as shown. Place the lock portion of the plastic locking tie to the outside of the vehicle, and then cut off the end of the remaining portion. (The direction of the end does not matter.)
H. Route the clutch hose outside the vehicle past the gear position switch lead and stator coil assembly lead.
I. Pass the stator coil assembly lead behind the radiator. Be sure the lead will not be pinched between the radiator and the tension arm.
Also make sure that the lead is not pinched between the radiator and the gear position switch 3-pin coupler (white).
J. After connecting the gear position switch 3-pin coupler (white), attach the coupler cover.
K. After connecting the stator coil assembly 2-pin coupler (gray), attach the coupler cover.
L. Fasten the clutch hose, gear position switch lead, and stator coil assembly lead over the upper radiator boss with the plastic locking tie. Place the lock portion of the plastic locking tie to the front of the vehicle, and then cut off the end of the remaining portion. (The direction of the end does not matter.)
M. Route the clutch hose under the handlebar switch lead (left), starter switch lead, and throttle cable.
N. The routing order of the handlebar switch lead (left) and starter switch lead does not matter.
O. Install the clamp by aligning the paint mark on the cylinder head breather hose. When doing so, the paint mark should be within the clamp area.
P. Pass the radiator breather hose through the down tube.
Q. Route the gear position switch lead outside the vehicle past the cylinder head breather hose.
R. Route the stator coil assembly lead outside the vehicle past the cylinder head breather hose.
S. When fastening the starter motor lead with the clamp, close the clamp while applying tension to the starter motor lead so that the starter motor lead has no slack.
It does not matter if the starter motor lead contacts the crankcase cover bolt and timing chain tensioner.
T. Route the clutch hose while facing the front, and then fasten it using the clamp at the paint mark.
U. Insert the clip portion of the clamp into the frame. The lock part should face toward the front of the vehicle.
Cut off the end of the remaining portion. (The direction of the end does not matter.)

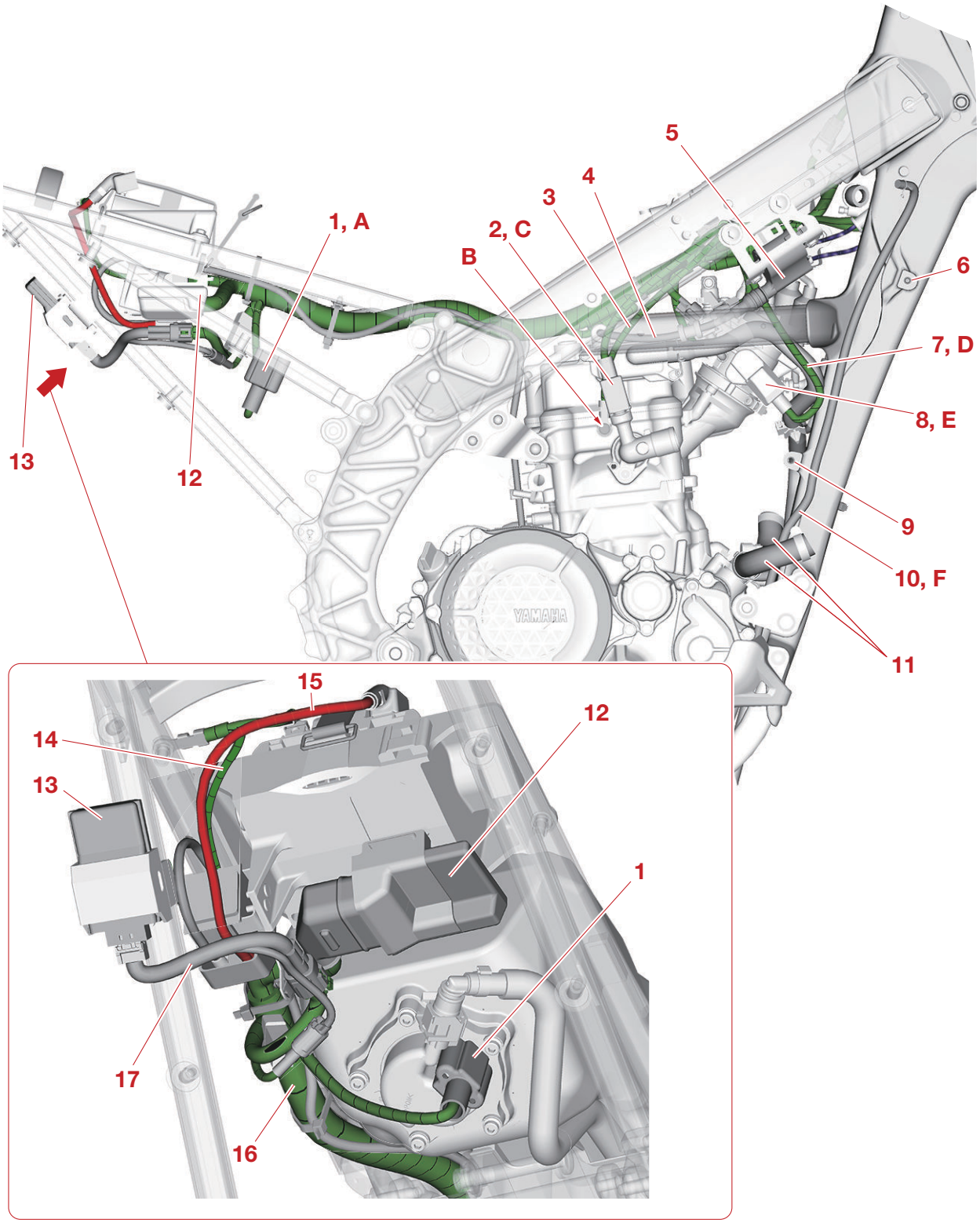
Frame (rear left side view)



1. Wire harness
2. Rear frame
3. Plastic locking tie
4. Negative battery lead
5. Starter relay coupler (black, 4-pin)
6. Starter motor lead
7. Positive battery lead
8. CCU (Communication Control Unit)
9. Rear fender (projection)
10. Starter relay
11. Starter relay cover
12. CCU coupler
13. Diode

A. Fasten the starter motor lead and wire harness to the rear frame at the white tape position of the wire harness using the plastic locking tie. Point the lock portion of the wire harness to the lower side of the vehicle while pointing the end of the lock portion to the outside of the vehicle, and then cut off the end.
B. Route the negative battery lead through the inside of the vehicle along the starter motor lead.
C. Route the starter motor lead between the starter relay and the rear frame. Adjust any slack between the starter relay and the plastic locking tie of the rear frame.
D. Route the positive battery lead on the outside of the projection on the rear fender (outside the vehicle).
E. Insert the starter relay into the battery bracket, and secure it.
F. Install the starter relay cover over the starter relay.
G. Insert the CCU coupler into the battery bracket so that the coupler is located on the inside (of the vehicle), and then secure it.
H. Insert the clip of the clamp into the frame. Fasten the starter motor lead and wire harness at the green tape position of the wire harness. Place the starter motor lead under the vehicle's wire harness. Place the lock portion of the plastic locking tie to the lower part of the vehicle, and then cut off the end by pointing it to the outside of the vehicle.
I. Point the starter motor lead to the outside, and then install it.

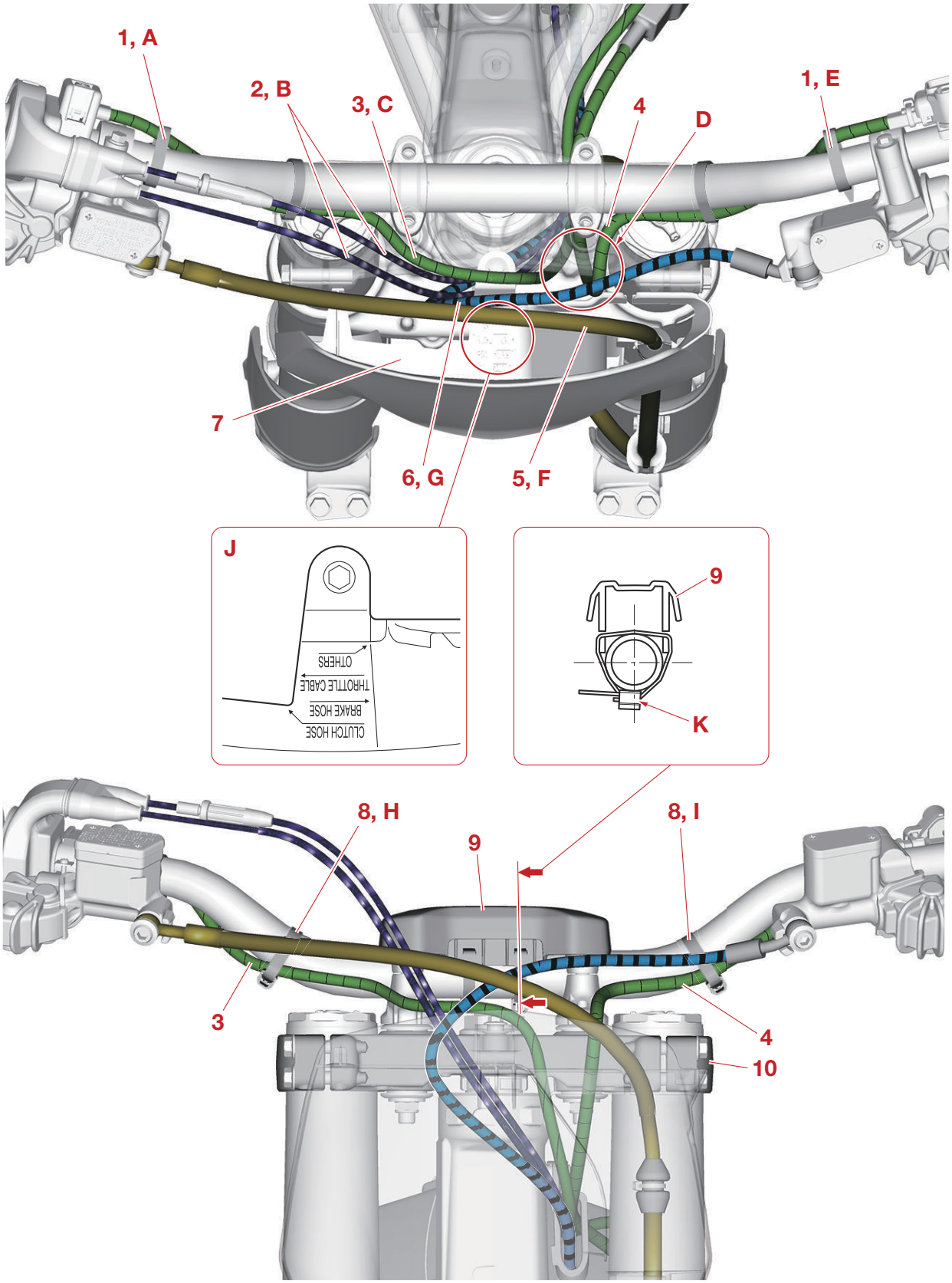
Frame and engine (right side view)



1. Fuel pump coupler (black, 5-pin)
2. Coolant temperature sensor coupler (black, 2-pin)
3. Engine ground lead
4. High tension cord
5. Ignition coil
6. Upper radiator boss
7. Throttle position sensor lead
8. Throttle position sensor coupler (black, 3-pin)
9. Lower radiator boss
10. Radiator breather hose
11. Radiator hose
12. ECU (Engine Control Unit)
13. CCU (Communication Control Unit)
14. Wire harness (to the negative battery lead)
15. Positive battery lead
16. Wire harness
17. CCU sub-lead

A. After connecting, install the cover over the fuel pump 5-pin coupler (black).
B. Route the engine ground lead outside the vehicle past the high tension cord.
When installing the engine ground lead terminal, it can face either way. Point the engine ground lead to the upper side of the vehicle, and then install it.
C. Route the coolant temperature sensor lead outside the vehicle past the high tension cord. After connecting the water temperature sensor 2-pin coupler (black), install the cover over it.
D. Route the throttle position sensor lead inside the vehicle along the ignition coil.
E. After connecting the throttle position sensor 3-pin coupler (black), install the cover over it. Pay attention so that the folded part of the cover does not get caught.
F. The radiator breather hose should be routed in the following order and via each mentioned point.
The upper radiator boss at the rear of the vehicle.
The lower radiator boss at the front of the vehicle.
The radiator hose at the front of the vehicle.
For routing the remaining leads, refer to the diagram “Frame and engine (front left side view)”.

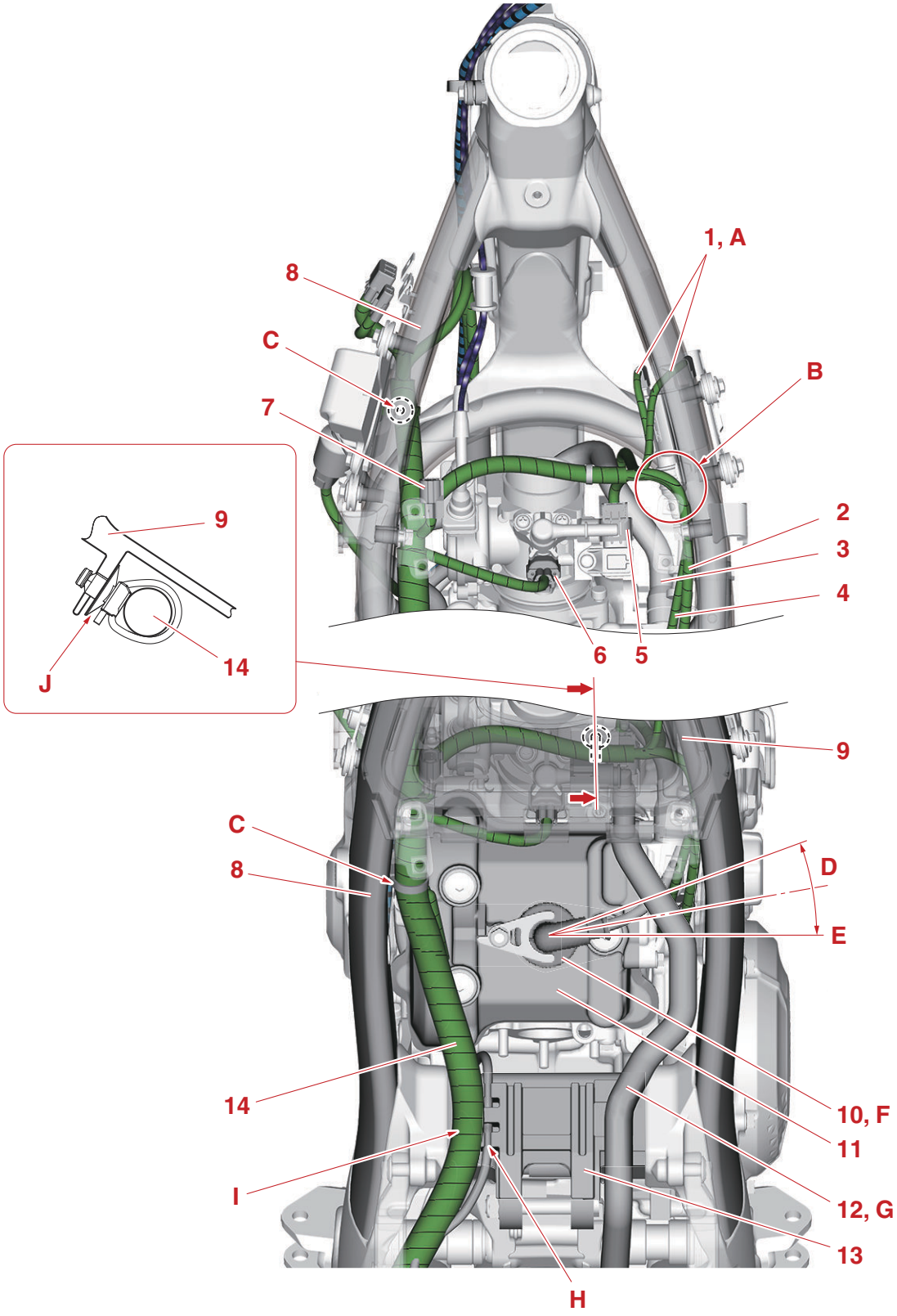
**Handlebar (front view)**



1. Plastic locking tie
2. Throttle cable
3. Starter switch lead
4. Handlebar switch lead (left)
5. Front brake hose
6. Clutch hose
7. Number plate
8. Plastic locking tie
9. Handlebar protector
10. Upper bracket

A. Fasten the starter switch lead to the handlebar using the plastic locking tie.
Point the lock portion of the plastic locking tie toward the lower part of the vehicle, and the tip of the plastic locking tie to the front side of the vehicle.
Pay attention so that the tip of the plastic locking tie does not contact the brake master cylinder.
B. Route the throttle cable on the right side of the number plate mounting bracket.
C. Route the starter switch lead on the left side of the number plate mounting bracket.
D. Route the starter switch lead and handlebar switch lead (left) between the routing portion of the number plate and the upper bracket.
E. Fasten the handlebar switch lead (left) to the handlebar using the plastic locking tie.
Point the lock portion of the plastic locking tie toward the lower part of the vehicle, and the tip of the plastic locking tie to the front side of the vehicle.
Pay attention so that the tip of the plastic locking tie does not contact the clutch master cylinder.
F. Route the front brake hose through the number plate upper guide.
G. Route the clutch hose on the right side of the vehicle, where the license plate is installed, in front of the vehicle, where the throttle cable is routed, and to the rear side of vehicle where the brake hose is routed.
H. Secure the starter switch lead to the handlebar using the plastic locking tie. Point the lock portion of the plastic locking tie to the lower part of the vehicle while pointing the end to the front side of the vehicle.
Make sure that the tip of the plastic locking tie does not contact the front fork.
I. Secure the handlebar switch lead (left) to the handlebar using the plastic locking tie. Point the lock portion of the plastic locking tie to the lower part of the vehicle while pointing the end to the front side of the vehicle.
Make sure that the tip of the plastic locking tie does not contact the front fork.
J. Route the cables according to the instructions on the number plate.
K. Secure the handlebar and handlebar protector with the plastic locking tie. Point the lock portion of the plastic locking tie to the lower side of the vehicle. The direction of the end does not matter.

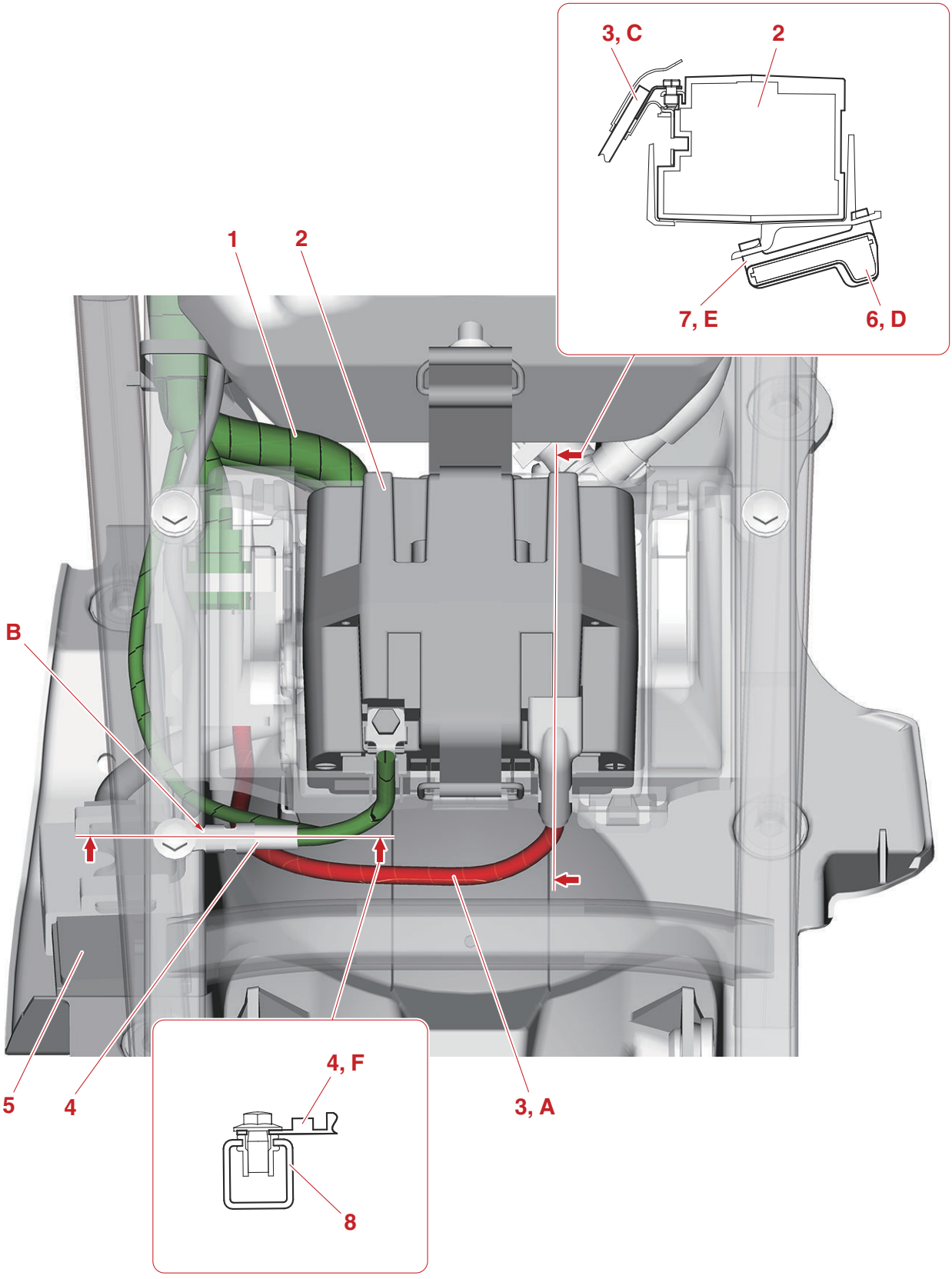
Frame and engine (top view)



1. Ignition coil lead
2. Coolant temperature sensor lead
3. Cylinder head breather hose
4. Engine ground lead
5. Intake air pressure sensor coupler (dark blue, 3-pin)
6. Fuel injector coupler (gray, 2-pin)
7. Intake air temperature sensor coupler (black, 2-pin)
8. Tank rail
9. Air filter case
10. Spark plug cap
11. Cylinder head cover
12. Fuel hose
13. Damper
14. Wire harness

A. Install the terminal so that the lead is positioned above the vehicle. Connect the black cover of the ignition coil lead to the black terminal of the ignition coil, and the white cover to the green terminal.
When doing so, at the branch portion of the wire harness, route the ignition coil lead (with the black cover) over and on the right side of the ignition coil lead (with the white cover).
B. Route the coolant temperature sensor lead, engine ground lead, and high tension cord outside the vehicle past the cylinder head breather hose.
C. Insert the projection of the main harness into the hole in the frame.
D. 0–20°
E. Right side of the vehicle.
F. Insert the spark plug cap all the way into the cylinder head cover so that there is no clearance between the cap and the cover.
G. Place the fuel hose on the flat surface on the upper side of the damper.
H. Route the starter motor lead along the damper and clamp it.
I. Place the wire harness on the flat surface on the upper side of the damper. When doing so, be careful so that the wire harness does not contact the engine.
J. Insert the clip portion of the clamp into the air filter assembly.

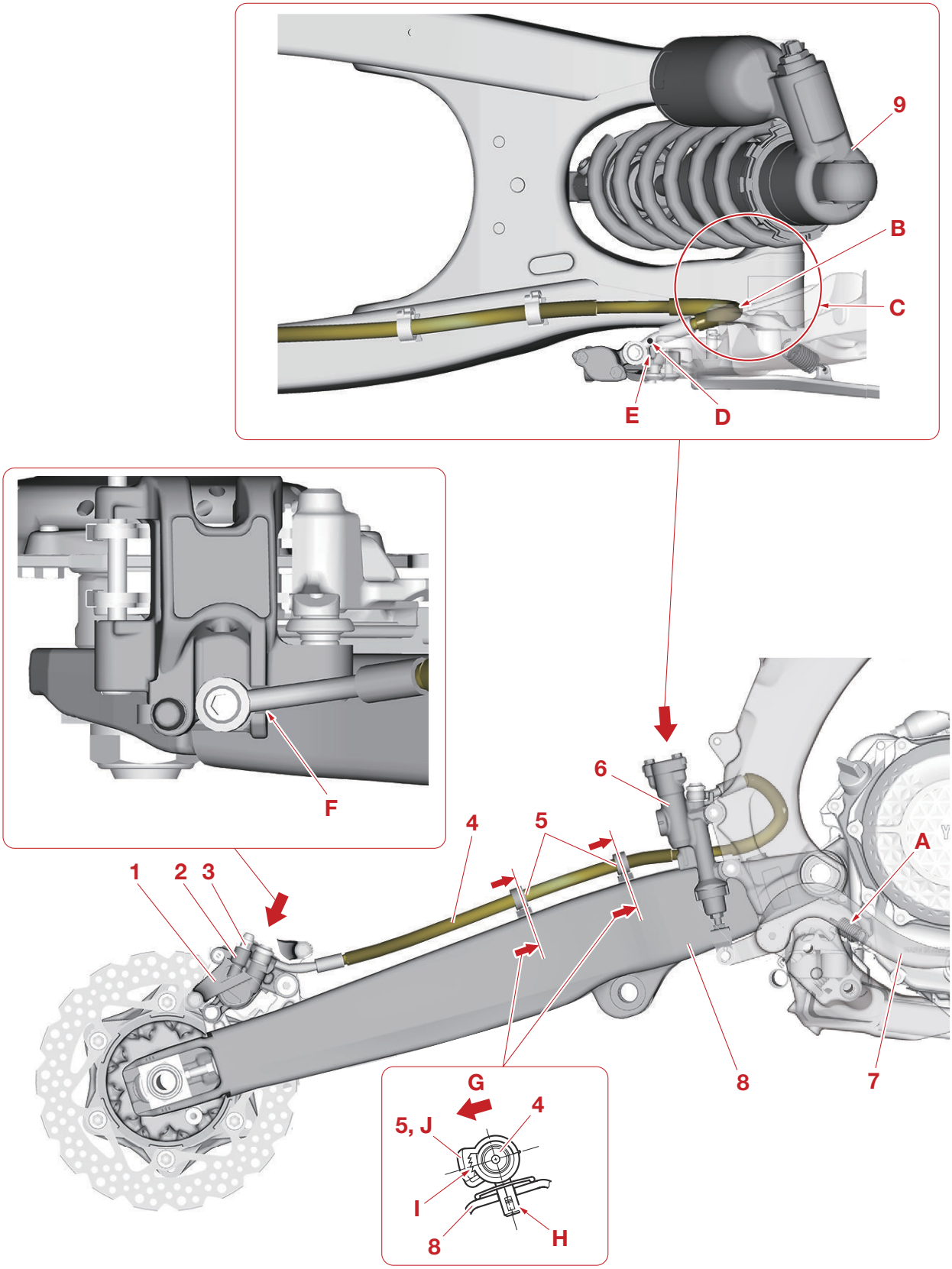
Frame and battery (top view)



1. ECU lead
2. Battery
3. Positive battery lead
4. Negative battery lead
5. CCU (Communication Control Unit)
6. ECU (Engine Control Unit)
7. Holder
8. Rear frame

A. Route the positive battery lead under the vehicle's negative battery lead.
B. Point the terminal of the negative battery lead to the inside of the vehicle, and install it.
C. After connecting the positive battery lead in the direction shown in the illustration, put the cover over it.
D. After connecting the ECU coupler, put the coupler cover over it.
E. Insert the holder with the ECU installed into the battery box bracket. When doing so, secure the ECU so that the connector of the ECU points to the left side of the vehicle.
F. Install the terminal in the direction shown.

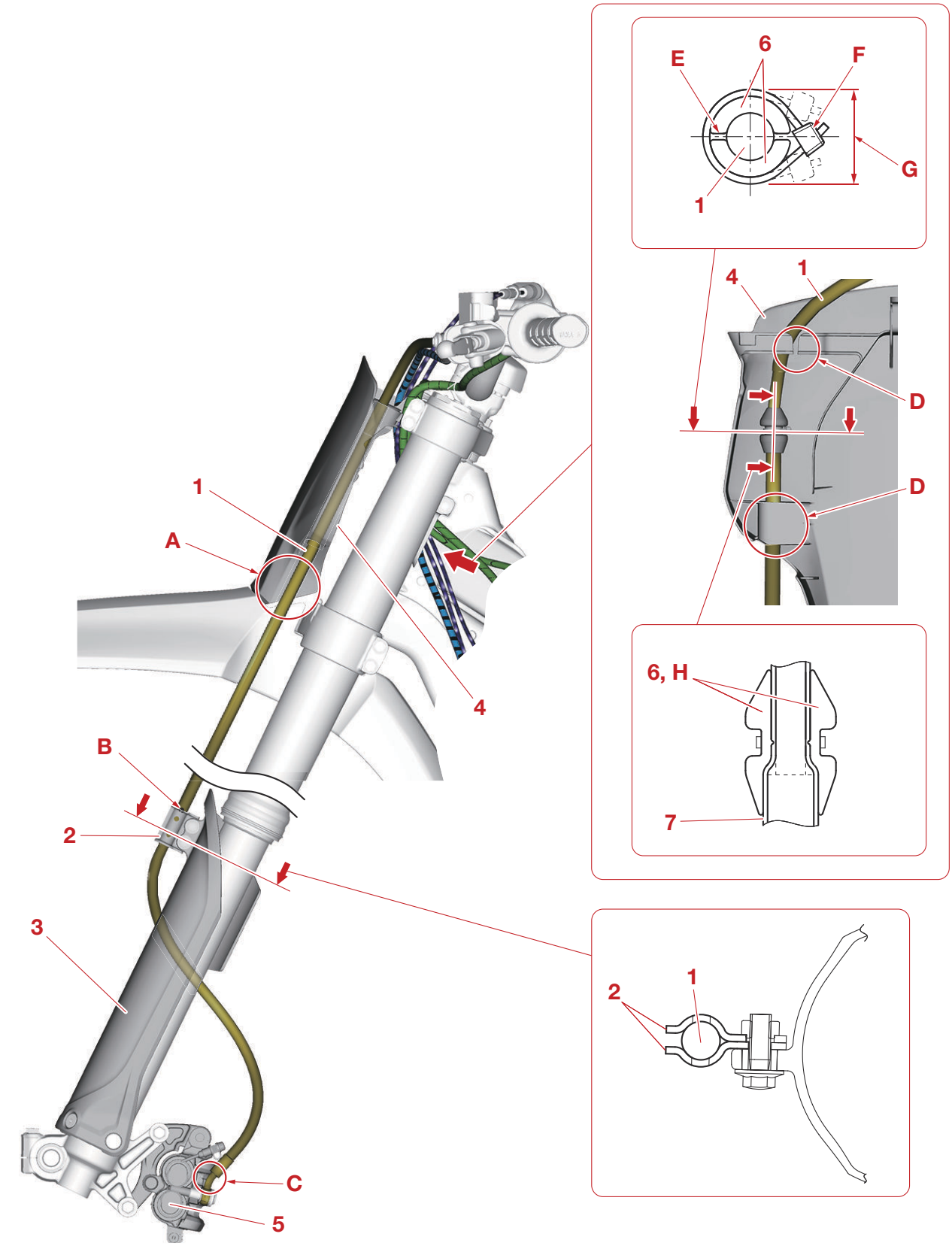
Rear brake (right side view)



1. Protector
2. Rear brake caliper
3. Bleed screw
4. Rear brake hose
5. Clamp
6. Rear brake master cylinder assembly
7. Brake pedal
8. Swingarm
9. Rear shock absorber assembly

A. It does not matter whether the spring is installed upward or downward.
B. Route the rear brake hose and spring so that they do not interfere with each other.
C. Make sure that the rear brake hose is not excessively twisted.
D. Install the rear brake hose so that the paint mark of the rear brake faces to the upper part of the vehicle.
E. Make sure that the metal part of the rear brake hose contacts the stopper of the rear brake master cylinder.
F. Make sure that the metal part of the rear brake hose contacts the stopper of the rear brake caliper.
G. Inside of the vehicle
H. Insert the clamp all the way into the base.
I. Make sure that the lock portion of the clamp is engaged by 3 or more notches.
J. Face the opening of the clamp to the inside of the vehicle.

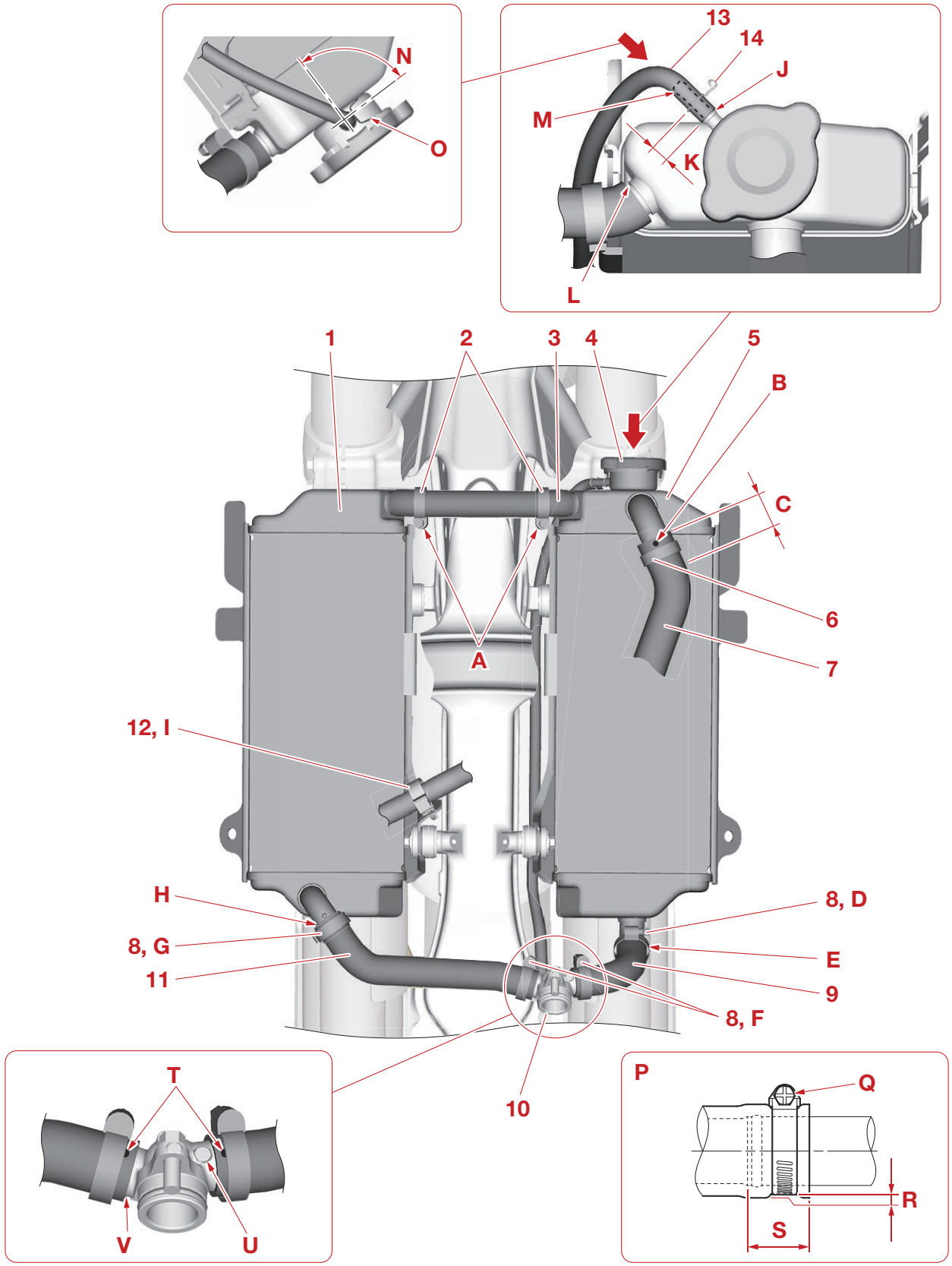
**Front brake (left side view)**



1. Front brake hose
2. Brake hose holder
3. Protector
4. Number plate
5. Front brake caliper
6. Protector
7. Front brake hose (shrinkable tube side)

A. Route the front brake hose on the outside of the number plate from the position shown.
B. Install the brake hose holder by aligning it with the paint mark of the front brake hose.
C. Make sure that the metal part of the front brake hose contacts the stopper of the front brake caliper.
D. Route the front brake hose through the guide of the number plate.
E. Whether there is a clearance when assembling the protector does not matter. Point the mating surface line to the left and right directions of the vehicle, and then install.
F. Fasten the front brake hose and protector with the plastic locking tie. Point the lock portion to the inside of the vehicle, and then cut off the end of the plastic locking tie. After tightening the plastic locking tie, make sure that the protector does not wobble at the top and bottom.
G. Place the lock portion within the area shown by the arrow.
H. Install the protector to the shrinkable tube of the front brake hose. Align the stepped part of the front brake hose with the stepped part of the protector.

Radiator (rear side view)



1. Radiator (left)
2. Radiator hose clamp
3. Radiator hose 2
4. Radiator cap
5. Radiator (right)
6. Radiator hose clamp
7. Radiator hose 1
8. Radiator hose clamp
9. Radiator hose 4
10. Radiator pipe 2
11. Radiator hose 3
12. Clamp
13. Breather pipe
14. Clip

A. Tighten the band from the rear side of the vehicle, and then point the lock portion to the lower side.
Install so that the metal part of the radiator and lock portion of the band contact the tip of the bolt, and that the clearance is within 5.9 mm (0.23 in).
B. Point the mark to the rear side of the vehicle.
C. Inserted depth 20 mm (0.8 in)
D. Tighten the band from the right side of the vehicle, and then point the lock portion to the rear side of the vehicle.
E. Insert the radiator hose 4 all the way into the bent portion of the pipe of the radiator (right).
F. Point the lock portion of the band to the front side of the vehicle.
G. Tighten the band from the left side of the vehicle, and then point the lock portion to the front side of the vehicle.
H. Insert the radiator hose 3 as a reference of the projection on the pipe of the radiator (left).
I. Insert the clamp into the radiator, and then make sure that the it contacts the side plate. Point the lock portion of the clamp to the rear side of the vehicle.
J. Insert the breather pipe into the bulge portion.
K. 3 mm (0.12 in) or more
L. Make sure that the front side of the vehicle, where the radiator hose 2 is located, contacts the bulge.
M. Make sure that the clip does not ride on top of the spool.
N. The direction of the knob of the clip should be in the range from the right side direction of the vehicle to the downward direction. Pay attention so that the grip of the clip does not contact the radiator.
O. Clip that is installed to the right direction of the vehicle
P. Details of the insert portion of the radiator hose
Q. Install the band between the spool portion and the tip of the radiator hose.
R. 0–1 mm (0–0.04 in)
S. Inserted length
T. Align the mark of the radiator hose 3, 4 with the protrusion on the radiator pipe 2.
U. Insert the radiator hose 4 until it contacts the protrusion on the radiator pipe 2.
V. Insert the radiator hose 3 until it contacts the protrusion on the radiator pipe 2.

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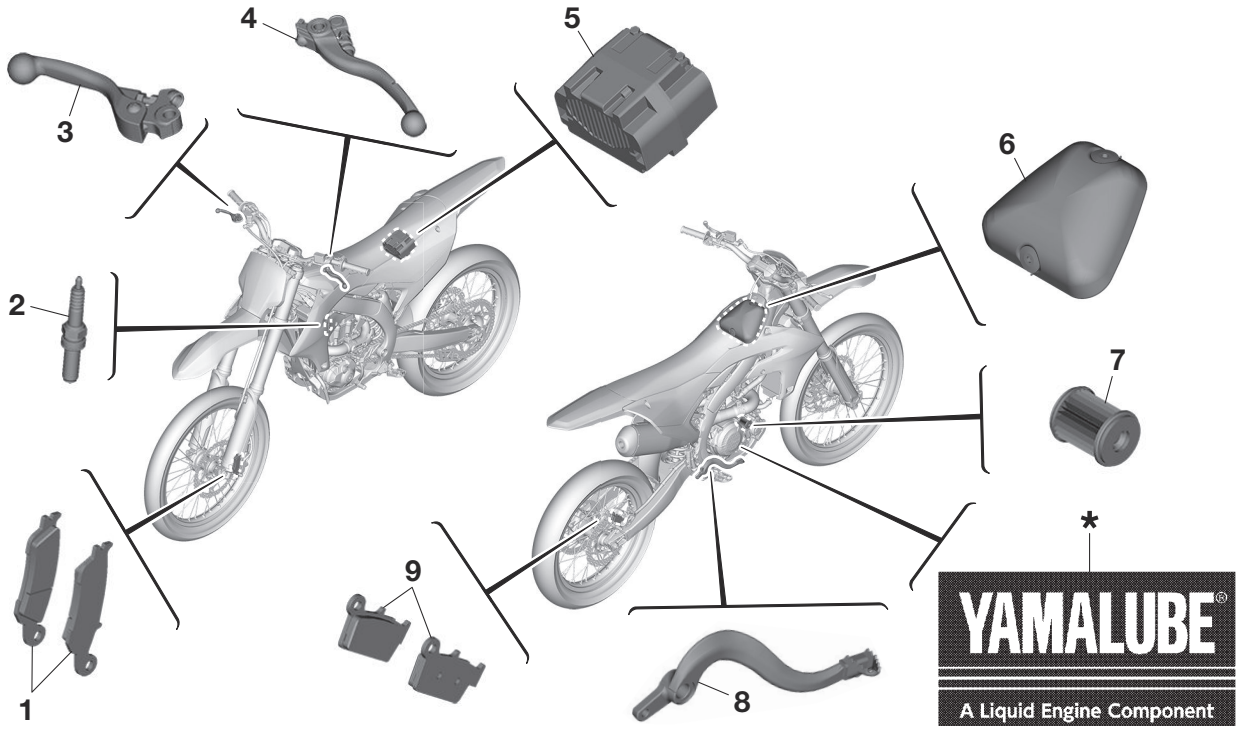
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EAM20202
## SERVICING PARTS

Regularly check or replace the servicing parts shown in the illustration.




* Engine oil, lubricants & greases, care products.

| Ref. No. | Part No. | Part name in parts catalog | Q'ty |
|---|---|---|---|
| 1 | B2W-25805-00 | BRAKE PAD KIT | 1 |
| 2 | 94701-00434 | PLUG, SPARK (NGK LMAR8G) | 1 |
| 3 | B2W-83922-00 | LEVER 2 | 1 |
| 4 | D03-83912-00 | LEVER 1 | 1 |
| 5 | BR9-82100-B9 * | BATTERY ASSY (4S1P) | 1 |
| | BR9-82100-D9 ** | BATTERY ASSY | |
| 6 | BHR-14451-01 | ELEMENT, AIR CLEANER | 1 |
| 7 | 5D3-13440-02 | ELEMENT ASSY, OIL CLEANER | 1 |
| 8 | D05-27200-00 | PEDAL, BRAKE | 1 |
| 9 | D05-W0046-00 | BRAKE PAD KIT 2 | 1 |

* For ALB, AND, AUS, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, NZL, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR, ZAF
** For CAN

**TIP**

The part number is subject to change. In that case, order the part from a Yamaha dealer by stating the identification number of your vehicle.

EAM20157
# MAINTENANCE INTERVALS

EAM30369
## MAINTENANCE INTERVALS
ECA25871
***NOTICE***

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

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

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

| No. | | Item | Routine | After break-in | Every race (about 2.5 hours) | Every third race (about 7.5 hours) | Every fifth race (about 12.5 hours) | As required |
|---|---|---|---|---|---|---|---|---|
| 11 | * | Cylinder head | • Check the coolant passages for corrosion.<br>• Inspect carbon deposits and eliminate them.<br>• Check for warpage, and replace the gasket. | | | | √ | |
| 12 | * | Cylinder | • Inspect score marks. | | | | √ | |
| | | | • Inspect wear. | | | | | √ |
| 13 | | Engine oil | • Check the engine oil amount. | | √ | | | √ |
| | | | • Replace. | √ | | √ | | |
| 14 | | Oil filter element | • Replace. | √ | | | √ | |
| 15 | * | Clutch | • Adjust lever position. | √ | √ | | | |
| | | | • Lubricate pivot point. | √ | √ | | | |
| | | | • Check fluid leakage. | √ | √ | | | |
| | | | • Check fluid level. | Every 45 hours | | | | √ |
| | | | • Retighten release cylinder bolts, master cylinder bolts and union bolts. (Check for tightening torques.) | √ | √ | | | |
| | | | • Inspect housing, friction plate, clutch plate and spring. | √ | √ | | | |
| | | | • Replace. | | | | | √ |
| | | | • Replace clutch fluid. | Every four years | | | | √ |
| 16 | * | Transmission | • Inspect. | | | | | √ |
| | | | • Replace bearings. | | | | | √ |
| 17 | * | Shift fork, shift drum, guide bar | • Inspect wear. | | | | | √ |
| 18 | * | Nut (generator rotor) | • Check for tightening torques. | √ | | | √ | |
| 19 | * | Exhaust pipe, silencer, protector | • Check for exhaust leaks, and tightening torques. | √ | √ | | | |
| | | | • Clean. | | | | √ | |
| | | | • Replace fiver. (When the exhaust sound becomes louder or when a performance drop is felt.) | | | √ | | √ |
| 20 | * | Crankshaft | • Inspect and clean. | | | | √ | √ |
| 21 | * | Throttle body | • Inspect. | | | | | √ |
| 22 | | Air filter | • Clean and lubricate. | √ | √ | | | |
| | | | • Replace. | | | | | √ |
| 23 | | Spark plug | • Check the electrodes and the terminals for wear. | √ | | √ | | |
| | | | • Replace. | | | | | √ |
| 24 | * | Cooling system | • Check coolant level and leakage. | √ | √ | | | |
| | | | • Check radiator cap operation. | | | | | √ |
| | | | • Check radiator cap attached. | √ | √ | | | |
| | | | • Change the coolant. | Every two years | | | | √ |
| | | | • Inspect hoses. | | √ | | | |

| No. | | Item | Routine | After break-in | Every race (about 2.5 hours) | Every third race (about 7.5 hours) | Every fifth race (about 12.5 hours) | As required |
|---|---|---|---|---|---|---|---|---|
| 25 | * | Engine guard | • Replace. | | | | | √ |
| 26 | * | Frame | • Clean and inspect. | √ | √ | | | |
| 27 | * | Fuel tank, fuel pump | • Inspect. | √ | | √ | | |
| 28 | * | Fuel hose | • Inspect. | | | | | √ |
| | | | • Replace. | Every four years | | | | √ |
| 29 | * | Front fork leg(s) | • Clean. | √ | √ | | | |
| | | | • Inspect and adjust. | √ | √ | | | |
| | | | • Replace oil. | √ | | | √ | |
| | | | • Replace oil seal. | | | | | √ |
| | | | • Clean and grease oil seals and dust seals. | √ | √ | | | √ |
| 30 | | Protector guide | • Replace. | | | | | √ |
| 31 | * | Rear shock absorber | • Inspect and adjust. | √ | √ | | | |
| | | | • Grease pillow balls and bearings. (After rain ride) | | | √ | | √ |
| | | | • Check for tightening torques. | √ | √ | | | |
| 32 | * | Brake(s) | • Adjust lever position and pedal position. | √ | √ | | | |
| | | | • Lubricate pivot point. | √ | √ | | | |
| | | | • Check brake disc surface. | √ | √ | | | |
| | | | • Check fluid level and leakage. | √ | √ | | | |
| | | | • Retighten brake disc bolts, caliper bolts, master cylinder bolts and union bolts. (Check for tightening torques.) | √ | √ | | | |
| | | | • Replace pads. | | | | | √ |
| | | | • Replace brake fluid. | Every one year | | | | √ |
| 33 | * | Swingarm | • Inspect, lube and retighten. | √ | √ | | | |
| 34 | * | Relay arm, connecting rod | • Inspect, lube and retighten. | √ | √ | | | |
| 35 | * | Steering head | • Inspect free play and retighten. (Check for tightening torques.) | √ | √ | | | |
| | | | • Clean and lube. (After rain ride) | | | | √ | |
| | | | • Replace bearings. | | | | | √ |
| 36 | * | Tire, wheels | • Inspect air pressure, wheel run-out, tire wear and spoke looseness. | √ | √ | | | |
| | | | • Retighten sprocket bolt. | √ | √ | | | |
| | | | • Check the bearing. | | | √ | | |
| | | | • Replace bearings. | | | | | √ |
| | | | • Lubricate. | | | √ | | |
| 37 | * | Drive chain | • Clean, lubricate, slack, alignment. | √ | √ | | | |
| | | | • Replace. | | | | | √ |
| 38 | * | Drive chain guide | • Inspect wear. | | √ | | | |

| No. | | Item | Routine | After break-in | Every race (about 2.5 hours) | Every third race (about 7.5 hours) | Every fifth race (about 12.5 hours) | As required |
|---|---|---|---|---|---|---|---|---|
| 39 | * | Drive chain guide and drive chain support | • Replace. | | | | | √ |
| 40 | | Cables | • Routing (Connection) | √ | √ | | | |
| | | | • Check and grease. | √ | √ | | | |
| | | | • Check throttle cables on the throttle body for dirt and wear. | √ | √ | | | |
| 41 | | Brake pedal, footrest | • Lubricate. | √ | √ | | | |
| 42 | * | Outside nuts and bolts | • Retighten. | √ | √ | | | |
| 43 | * | Battery | • Check terminal for looseness and corrosion. | | | | | √ |

EAM20134

# PRE-OPERATION INSPECTION AND MAINTENANCE

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

EAM30209

## GENERAL INSPECTION AND MAINTENANCE

| Item | Inspect | Page |
|---|---|---|
| Coolant | Check that coolant is filled up to the radiator cap.<br>Check the cooling system for leakage. | 3-22, 3-22, 3-23, 6-5, 6-5 |
| Fuel | Check that a fresh gasoline is filled in the fuel tank.<br>Check the fuel line for leakage. | 1-29 |
| Engine oil | Check that the oil level is correct. Check the crankcase and oil line for leakage. | 3-13, 3-14 |
| Gear shifter and clutch | Check that gears can be shifted correctly in order and that the clutch operates smoothly. | 3-15 |
| Throttle grip/Housing | Check that the throttle grip operation and free play are correctly adjusted. Lubricate the throttle grip and housing, if necessary. | 3-12, 3-35 |
| Brakes | Check the play of front brake and effect of front and rear brake. | 3-24, 3-24, 3-24, 3-25, 3-25, 3-25, 3-26, 3-26 |
| Drive chain | Check drive chain slack and alignment. Check that the drive chain is lubricated properly. | 3-27, 4-75, 4-75, 4-76, 4-76, 4-76 |
| Wheels | Check for excessive wear and tire pressure. Check for loose spokes and have no excessive play. | 3-34, 3-34, 3-35, 3-35 |
| Steering | Check that the handlebar can be turned smoothly and have no excessive play. | 3-28 |
| Front forks and rear shock absorber | Check that they operate smoothly and there is no oil leakage. | 3-29, 3-30, 3-31, 3-31, 3-34 |
| Cables (wires) | Check that the 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. | 3-20 |
| Rear wheel sprocket | Check that the rear wheel sprocket tightening bolt is not loose. | 4-14, 4-14, 4-14, 4-14, 4-15, 4-15 |
| Lubrication | Check for smooth operation. Lubricate if necessary. | 3-35, 3-35, 3-35, 3-35 |
| Bolts and nuts | Check the chassis and engine for loose bolts and nuts. | 1-32 |
| Lead connectors | Check that the stator coil assembly, ECU and ignition coil are connected tightly. | 1-16 |
| Settings | Is the machine set suitably for the condition of the racing course and weather or by taking into account the results of test runs before racing? Are inspection and maintenance completely done? | 10-1, 10-1, 10-1, 10-2, 10-2, 10-3, 10-3, 10-4, 10-4, 10-6, 10-7 |

**TIP**

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

EAM20135
# ENGINE

EAM30226
## ADJUSTING THE VALVE CLEARANCE

**TIP**

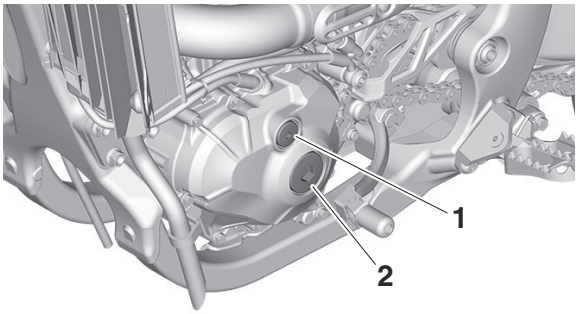
- This section is intended for those who have basic knowledge and skill concerning the servicing of Yamaha motorcycles (e.g., Yamaha dealers, service engineers, etc.). Those who have little knowledge and skill concerning servicing are requested not to undertake inspection, adjustment, disassembly, or reassembly only by reference to this manual. It may lead to servicing trouble and mechanical damage.
- Make sure that the valve clearance is checked or adjusted while the engine is cold (at room temperature).
- While the valve clearance is checked or adjusted, make sure that the piston is positioned in the top dead center (TDC).

1. Remove:
   - Seat
   - Side cover (left/right)
   - Shroud (left/right)

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

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

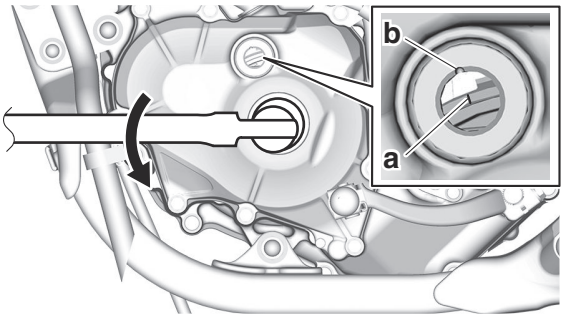



4. Check:
   - Valve clearance

   Out of specification → Regulate.

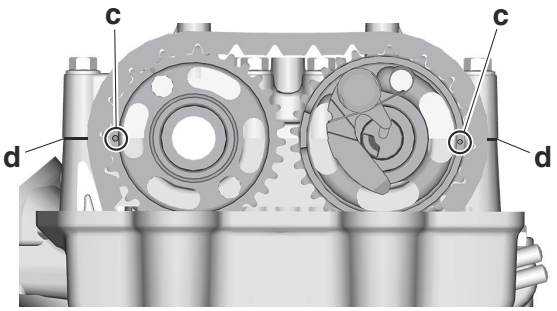
**Valve clearance (cold)**
**Intake**
**0.10–0.17 mm (0.0039–0.0067 in)**
**Exhaust**
**0.15–0.22 mm (0.0059–0.0087 in)**

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




**TIP**

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

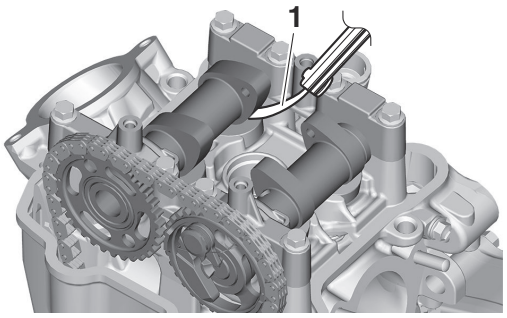



c. Measure the valve clearance using a thickness gauge "1".

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

**TIP**

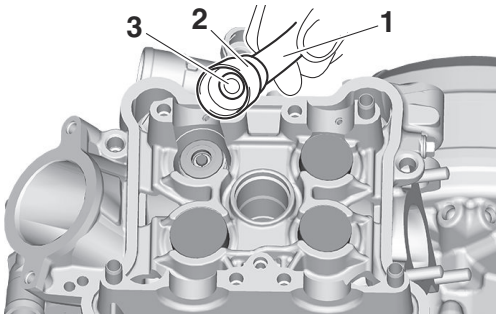
Record the measured reading if the clearance is incorrect.

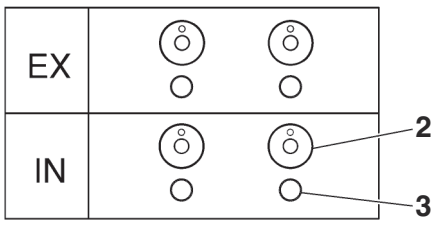



5. Adjust:
   • Valve clearance
   a. Remove the camshaft (intake and exhaust).
      Refer to "CAMSHAFT" on page 5-11.
   b. Remove the valve lifter "2" and the adjusting pad "3" with a valve lapper "1".

**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.

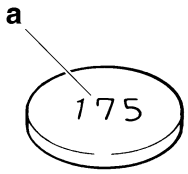
**Valve lapper (ø14)**
**90890-04101**
**Valve lapper (ø14)**
**YM-A8998**




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

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




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

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

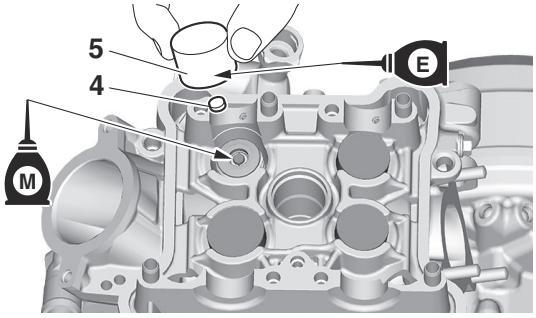
| Last digit of pad number | Rounded value |
|---|---|
| 0, 1 or 2 | 0 |
| 4, 5 or 6 | 5 |
| 8 or 9 | 10 |

   Example:
   Pad number = 148
   Rounded value = 150
   e. Install the new adjusting pads "4" and the valve lifters "5".

ECA24310
***NOTICE***
**Do not twist adjusting pads and valve lifters forcibly during installation.**

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

with their numbers facing upward.




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

EAM30383

## VALVE CLEARANCE SHIM CHART

### INTAKE

| A | B | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 |
| 0.00 – 0.01 | | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 |
| 0.02 – 0.06 | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 |
| 0.07 – 0.09 | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 |
| 0.10 – 0.17 | C | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.18 – 0.24 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | |
| 0.25 – 0.29 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | |
| 0.30 – 0.34 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | |
| 0.35 – 0.39 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | |
| 0.40 – 0.44 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | |
| 0.45 – 0.49 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | |
| 0.50 – 0.54 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | |
| 0.55 – 0.59 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | |
| 0.60 – 0.64 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | |
| 0.65 – 0.69 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | |
| 0.70 – 0.74 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | |
| 0.75 – 0.79 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | |
| 0.80 – 0.84 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | |
| 0.85 – 0.89 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | |
| 0.90 – 0.94 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | |
| 0.95 – 0.99 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | |
| 1.00 – 1.04 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | |
| 1.05 – 1.09 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | |
| 1.10 – 1.14 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | |
| 1.15 – 1.19 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | |
| 1.20 – 1.24 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | |
| 1.25 – 1.29 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | |
| 1.30 – 1.34 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | | |
| 1.35 – 1.39 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |

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

Example:
Valve clearance (cold) 0.10–0.17 mm (0.0039–0.0067 in)
Installed is 175.
Measured clearance 0.25 mm (0.0098 in)
Replace 175 pad with 185 pad.
Pad No. 175 = 1.75 mm (0.0689 in)
Pad No. 185 = 1.85 mm (0.0728 in)

**EXHAUST**

| A | B | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 |
| 0.00 – 0.01 | | | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 |
| 0.02 – 0.06 | | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 |
| 0.07 – 0.11 | | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 |
| 0.12 – 0.14 | | 120 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 |
| 0.15 – 0.22 | C | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.23 – 0.29 | 125 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | |
| 0.30 – 0.34 | 130 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | |
| 0.35 – 0.39 | 135 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | |
| 0.40 – 0.44 | 140 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | |
| 0.45 – 0.49 | 145 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | |
| 0.50 – 0.54 | 150 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | |
| 0.55 – 0.59 | 155 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | |
| 0.60 – 0.64 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | |
| 0.65 – 0.69 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | |
| 0.70 – 0.74 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | |
| 0.75 – 0.79 | 175 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | |
| 0.80 – 0.84 | 180 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | |
| 0.85 – 0.89 | 185 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | |
| 0.90 – 0.94 | 190 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | |
| 0.95 – 0.99 | 195 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | |
| 1.00 – 1.04 | 200 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | |
| 1.05 – 1.09 | 205 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | |
| 1.10 – 1.14 | 210 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | |
| 1.15 – 1.19 | 215 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | |
| 1.20 – 1.24 | 220 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | |
| 1.25 – 1.29 | 225 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | |
| 1.30 – 1.34 | 230 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | |
| 1.35 – 1.39 | 235 | 240 | | | | | | | | | | | | | | | | | | | | | | | |
| 1.40 – 1.44 | 240 | | | | | | | | | | | | | | | | | | | | | | | | |

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

Example:
Valve clearance (cold) 0.15–0.22 mm (0.0059–0.0087 in)
Installed is 175.
Measured clearance 0.30 mm (0.0118 in)
Replace 175 pad with 185 pad.
Pad No. 175 = 1.75 mm (0.0689 in)
Pad No. 185 = 1.85 mm (0.0728 in)

EAM30412
## CHECKING THE ENGINE IDLING SPEED

**TIP**

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

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

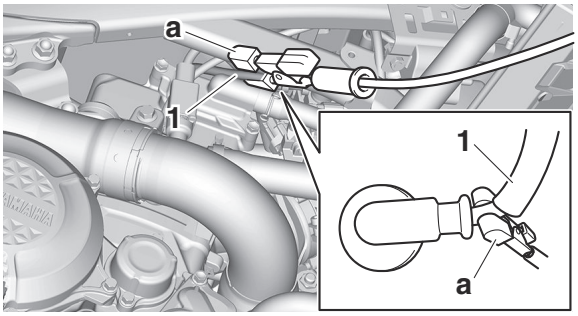
| | |
|---|---|
|  | **Yamaha diagnostic tool USB 90890-03274**<br>**Yamaha diagnostic tool (A/I) 90890-03273** |
|  | **Coolant temperature 70–80 °C (158–176 °F)** |

3. Install:
   - Digital tachometer

| | |
|---|---|
|  | **Digital tachometer 90890-06760**<br>**Digital tachometer YU-39951-B** |

**TIP**

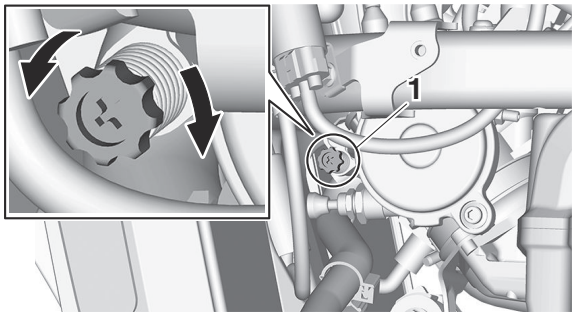
Get the high tension cord "1" of the ignition coil pinched in the detector "a" of the digital tachometer.




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

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

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



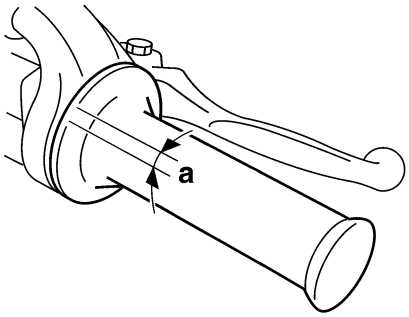

EAM30475
## CHECKING THE THROTTLE GRIP

**TIP**

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

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

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

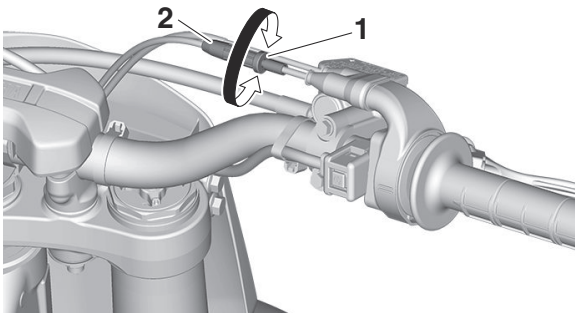



2. Adjust:
   - Throttle grip free play
     a. Loosen the locknut "1".
     b. Turn the adjuster "2" until the specified throttle grip free play is obtained.
     c. Tighten the locknut.

EWA18470

**⚠ WARNING**

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




EAM30254
## CHECKING THE SPARK PLUG

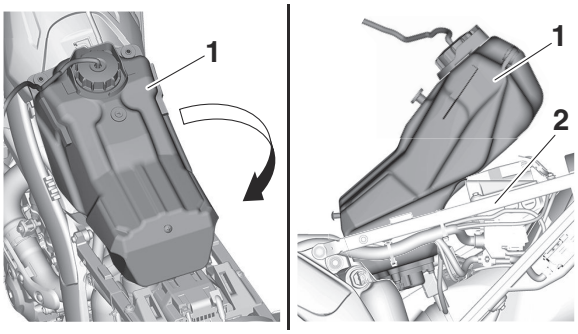
1. Remove:
   - Seat
   - Side cover (left/right)
   - Shroud (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank "1"
   Refer to "FUEL TANK" on page 7-1.

ECA24400
***NOTICE***

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

**TIP**

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




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

ECA24410
***NOTICE***

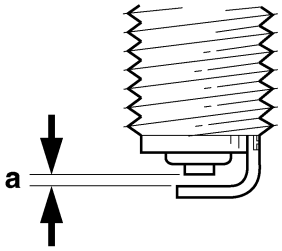
**In order not to allow the dirt accumulated around the spark plug to drop from the spark plug hole into the cylinder, clean it before removing the spark plug.**

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

| | |
|---|---|
| | **Manufacturer/model**<br>**NGK/LMAR8G** |

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

| | |
|---|---|
| | **Spark plug gap**<br>**0.7–0.8 mm (0.028–0.031 in)** |




7. Install:
   - Spark plug

| | |
|---|---|
| | **Spark plug**<br>**13 N·m (1.3 kgf·m, 9.6 lb·ft)** |

**TIP**

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

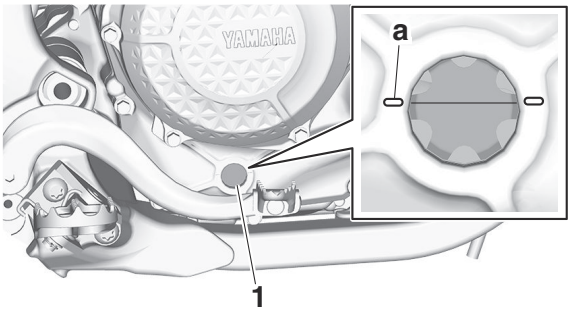
8. Install:
   - Spark plug cap
   - Fuel tank
   - Shroud (left/right)
   - Side cover (left/right)
   - Seat
   Refer to "GENERAL CHASSIS" on page 4-1.

EAM30224
## CHECKING THE ENGINE OIL LEVEL

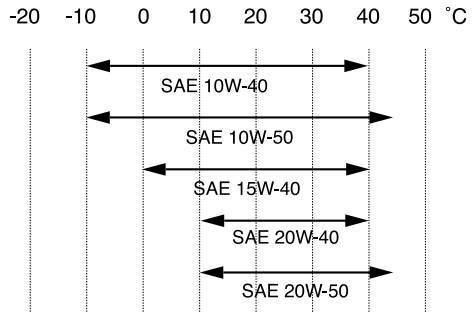
1. Start the engine and warm it up for ten minutes until the engine oil has reached a normal temperature of 60 °C (140 °F), and then turn the engine off.
2. Stand the vehicle upright on a level surface.
3. Start the engine, wait for ten seconds, turn the engine off, and then wait a few minutes.

4. Check:
   • Engine oil level
   The engine oil level should be between the minimum level (lower edge of the oil check window "1") and the maximum level mark "a".
   Below the minimum level → Add the recommended engine oil to the proper level.

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




**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**



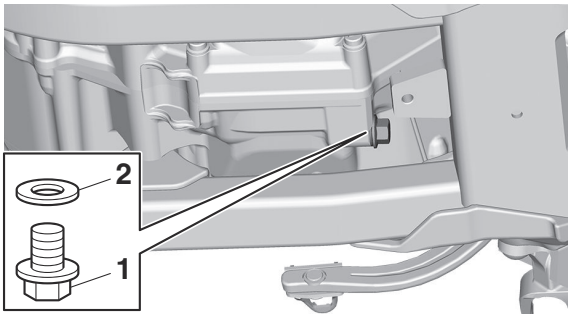

ECA13361
***NOTICE***
- **Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of "CD" or higher and do not use oils labeled "ENERGY CONSERVING II".**
- **Do not allow foreign materials to enter the crankcase.**

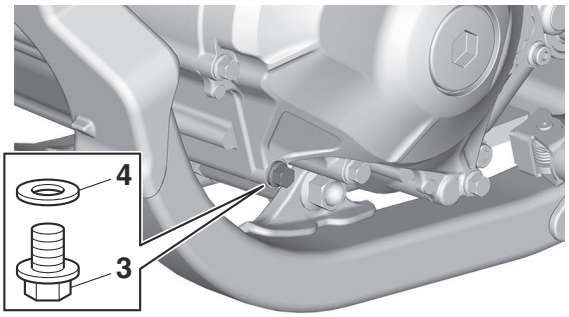
5. Start the engine, warm it up for several minutes, and then turn it off.
6. Check the engine oil level again.

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

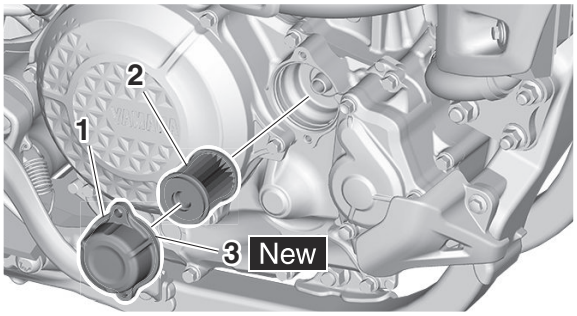
EAM30225
## CHANGING THE ENGINE OIL

1. Stand the vehicle upright on a level surface.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the engine oil drain bolts.
4. Remove:
   • Oil filler cap
   (along with the O-ring)
5. Remove:
   • Engine oil drain bolt (crankcase) "1"
   (along with the gasket "2")
   • Engine oil drain bolt (oil tank) "3"
   (along with the gasket "4")




6. Drain:
   • Engine oil
   (completely from the oil tank and crankcase)
7. If the oil filter element is also to be replaced, perform the following procedure.
   a. Remove the oil filter element cover "1", 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**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

8. Install:
   - Engine oil drain bolt (oil tank) (along with the gasket New)
   - Engine oil drain bolt (crankcase) (along with the gasket New)

| | |
|---|---|
| | **Engine oil drain bolt (oil tank)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)**<br>**Engine oil drain bolt (crankcase)**<br>**20 N·m (2.0 kgf·m, 15 lb·ft)** |

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

| | |
|---|---|
| | **Engine oil quantity**<br>**Oil change**<br>**0.94 L (0.99 US qt, 0.83 Imp.qt)**<br>**With oil filter removal**<br>**0.96 L (1.01 US qt, 0.84 Imp.qt)**<br>**Quantity (disassembled)**<br>**1.20 L (1.27 US qt, 1.06 Imp.qt)** |

10. Install:
    - Engine oil filler cap (along with the O-ring New)
11. Check:
    - Oil level
      Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-13.
12. Check:
    - Engine oil pressure
      a. Start the engine.

EWA19130

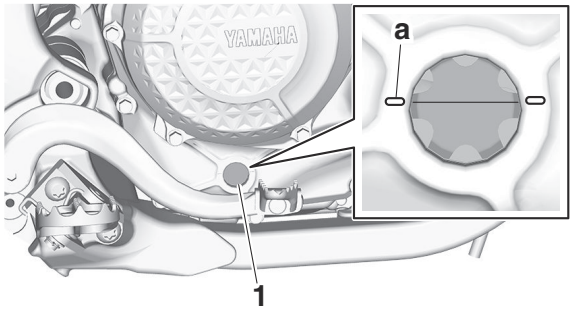
**⚠ WARNING**

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

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

**TIP**

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




a. Maximum level mark

ECA26740

***NOTICE***

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

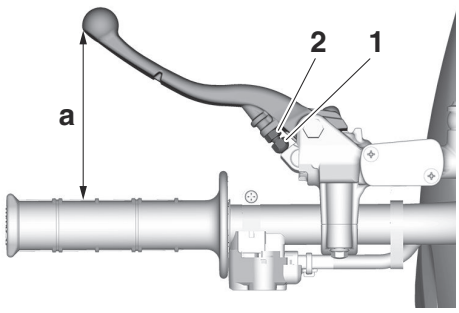
c. If the engine oil level does not decrease at the specified level mark, check the engine oil system for leaks, and the engine oil passages and oil pump for damage.
d. Check the oil pressure again.

EAM30370

## ADJUSTING THE CLUTCH LEVER POSITION

1. Adjust:
   - Clutch lever position (distance "a" from the handlebar grip to the clutch lever)
     a. While pushing the clutch lever forward, turn the clutch lever adjusting bolt "1" until the clutch lever is in the desired position.
     b. Tighten the locknut (clutch lever position) "2" to specification.

| | |
|---|---|
| | **Locknut (clutch lever position)**<br>**5 N·m (0.5 kgf·m, 3.7 lb·ft)** |




EAM30667
## CHECKING THE CLUTCH FLUID

**TIP**
- When changing the clutch fluid, it is recommended to also replace the friction plate and clutch plate.
- The clutch fluid level rises as the wear on the friction plate increases.

1. Stand the vehicle on a level surface.

**TIP**
Place the vehicle on a suitable stand.

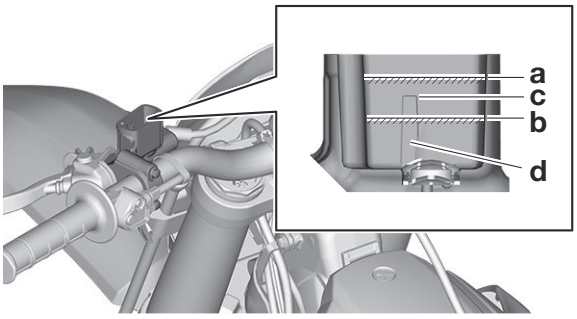
2. Check:
   - Clutch fluid level
     The clutch fluid level is above the baseline → Check the friction plate for wear.
     Refer to "CLUTCH" on page 5-46.
     The clutch fluid level is under the baseline → Check the hydraulic clutch system for leakage.

EWA13370
**WARNING**
- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420
***NOTICE***
**Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.**

**TIP**
- In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.
- Adjust the clutch fluid level with the baseline.
- Make sure that clutch fluid does not overflow when the diaphragm is set and the cap is attached.
- Wipe off any adhered clutch fluid.

**Specified brake and clutch fluid**
**DOT 4**




a. The clutch fluid level is above the baseline.
b. The clutch fluid level is under the baseline.
c. Baseline
d. Raised portion

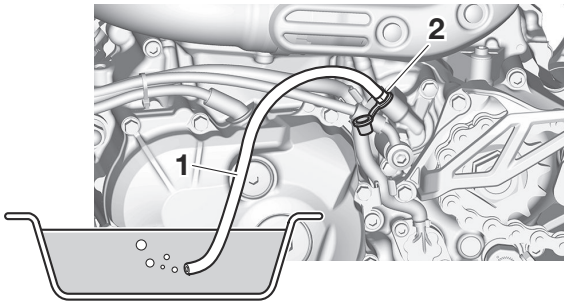
EAM30668
## BLEEDING THE HYDRAULIC CLUTCH SYSTEM

EWA13000
**WARNING**
**Bleed the hydraulic clutch system whenever:**
- **the system was disassembled,**
- **a clutch hose was loosened or removed,**
- **the clutch fluid level is very low,**
- **clutch operation is faulty.**

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

1. Bleed:
   - Hydraulic clutch system
     a. Add the specified clutch fluid to the proper level.

b. Install the clutch master cylinder reservoir diaphragm.
c. Connect a clear plastic hose "1" tightly to the bleed screw "2", and place a container under the vinyl hose end on one side.




d. Slowly squeeze the clutch lever several times.
e. Fully squeeze the clutch lever without releasing it.
f. Loosen the bleed screw.
g. Tighten the bleed screw and then release the clutch lever.
h. Repeat steps (d) to (g) until all of the air bubbles have disappeared from the clutch fluid in the clear plastic hose.
i. Tighten the bleed screw to specification.

**Clutch release cylinder bleed screw**
**5 N·m (0.5 kgf·m, 3.7 lb·ft)**

j. Add the specified clutch fluid to the proper level.
Refer to "CHECKING THE CLUTCH FLUID" on page 3-16.

EWA13010

**⚠ WARNING**

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

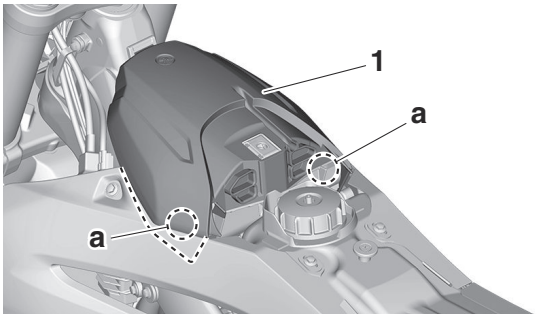
EAM30219

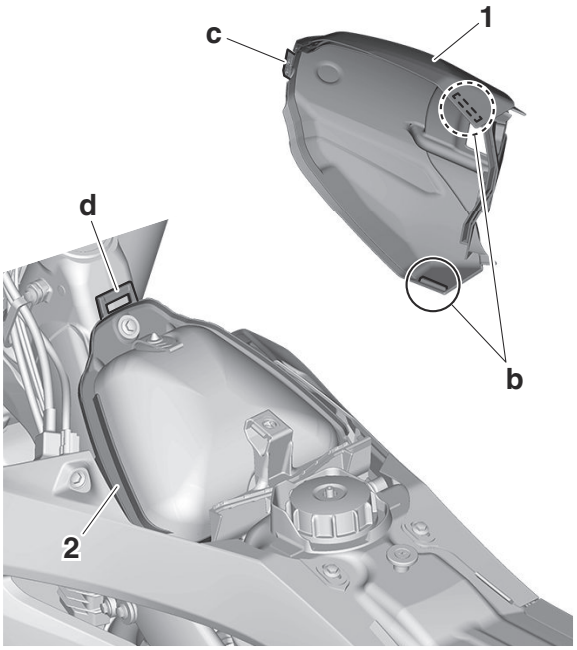
## CLEANING THE AIR FILTER ELEMENT

1. Remove:
   - Sub-seat
     Refer to "FUEL TANK CAP" on page 1-28.
   - Air filter case cover "1"

**TIP**

To remove the air filter case cover:
- Raise the air filter case cover rear side while pushing the side "a" of the air intake duct from inside to unhook the ribs "b" on both sides of the air filter case cover from the air filter case "2".
- Slide the air filter case cover to the rear of the vehicle to remove the projection "c" from the hole "d" in the air filter case.

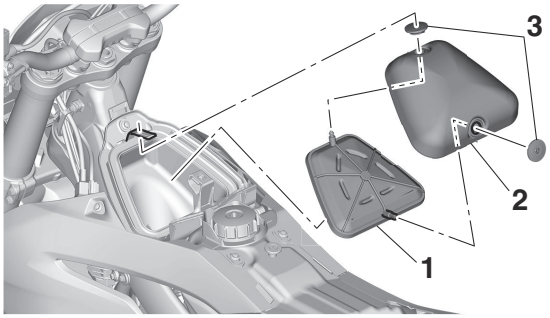


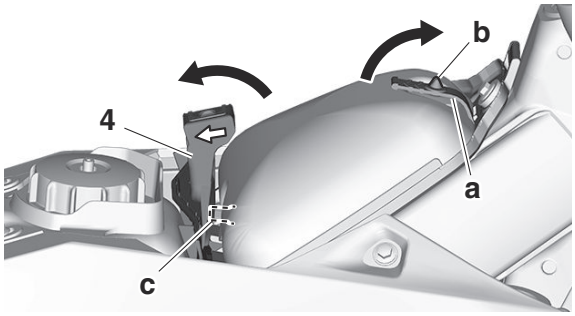




2. Remove:
   - Air filter element guide "1"
   - Air filter element "2"
     (from the air filter element guide)
   - Seal "3"
     (from the air filter element)

**TIP**

To remove the air filter element:
- Release the band "a" from the projection "b", and then move the air filter case assembly bracket "4" in the direction of the arrow to release the projection "c".
- Remove the air filter element and the air filter element guide as a set.




3. Wash:
   - Air filter element
     a. After washing the element with air filter cleaner or kerosene, squeeze and dry it completely.

EWA19110

**⚠ WARNING**

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

ECA24280

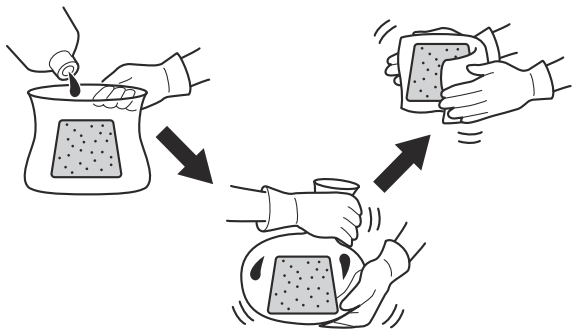
***NOTICE***

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

4. Check:
   - Air filter element
     Damage → Replace.
5. Apply:
   - Yamaha foam air filter oil or other quality foam air filter oil
     a. Put the air filter element into a plastic bag and drip the filter oil into the bag.
     b. With the element inside the bag, rub it thoroughly so that the element is evenly permeated with the oil.
     c. Wrap the element in a clean cloth, rub the element gently, and wipe off any excess oil.

**TIP**

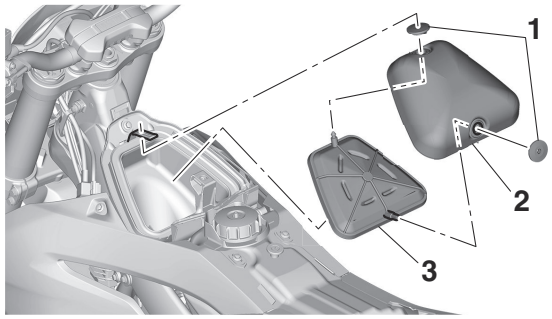
- The element should be permeated with oil so that it is wet but not dripping.
- When replacing the element, permeate the element in oil by using the same procedure as when cleaning.

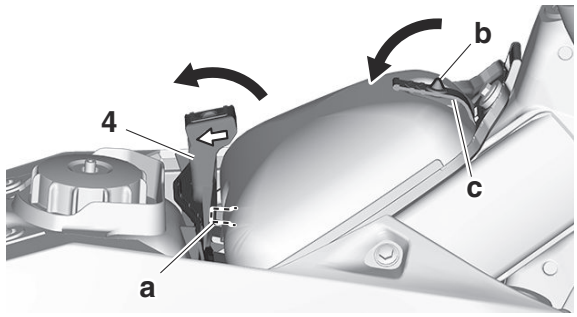


6. Install:
   - Air filter case assembly bracket (if removed)
     Refer to "THROTTLE BODY" on page 7-4.
   - Seal "1"
     (to the air filter element)
   - Air filter element "2"
     (to the air filter element guide)
   - Air filter element guide "3"

**TIP**

- Apply lithium-soap-based grease on the entire seal lips when installing the air filter element guide.
- To install the air filter element:
  - Move the air filter case assembly bracket "4" to the rear of the vehicle.
  - Set the projection "a" on the air filter element guide to the air filter case assembly bracket and insert the projection "b" on the air filter element guide to the band "c".

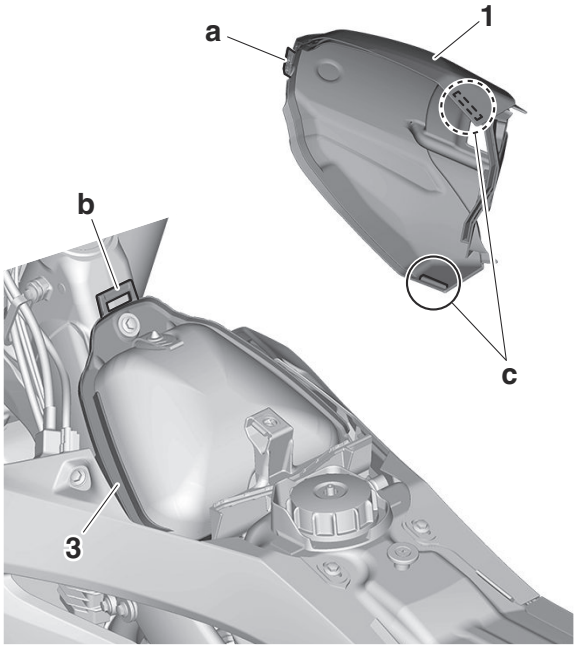


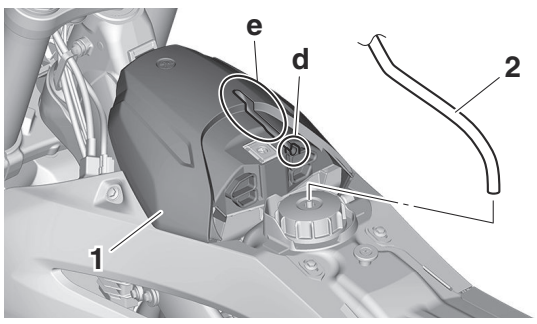



7. Install:
   • Air filter case cover “1”
   • Fuel tank breather hose “2” (to the air filter case cover)

**TIP**

- To install the air filter case cover:
  - Insert the projection “a” on air filter case cover to the hole “b” in the air filter case “3”.
  - Push the rear side of the air filter case cover to hook the ribs “c” to the air filter case.
- Insert the fuel tank breather hose end with the protector into the steering shaft hole.
- Fit the other end of the fuel tank breather hose into the projection on the fuel tank cap.
- Route the fuel tank breather hose through the guide “d”, and then fit it into the groove “e” in the air filter case cover.



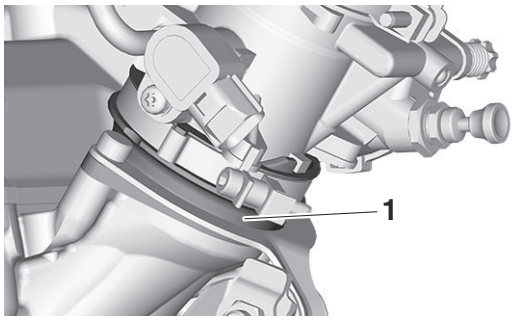




8. Install:
   • Sub-seat

EAM30335

## CHECKING THE THROTTLE BODY JOINT

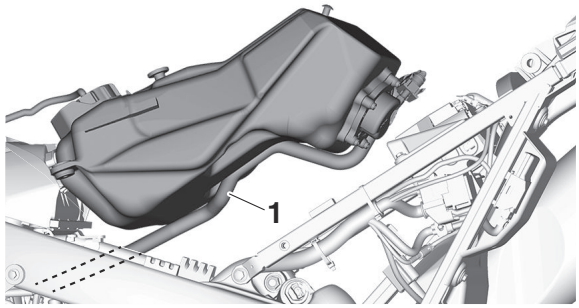
1. Check:
   • Throttle body joint “1”
   Crack/damage → Replace.




EAM30222

## CHECKING THE FUEL LINE

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

EAM30476

## CHECKING THE CYLINDER HEAD BREATHER HOSE

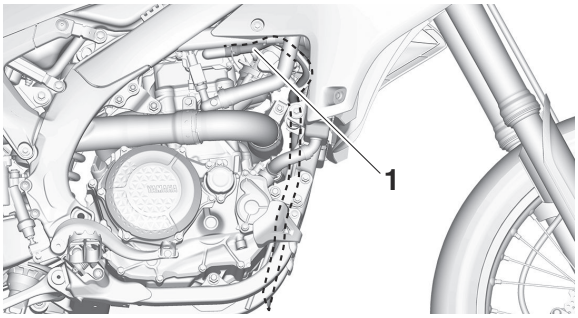
1. Check:
   • Breather hose “1”
   Crack/damage → Replace.

Loose connection → Connect properly.

ECA14920

***NOTICE***

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




EAM30221

## CHECKING THE EXHAUST SYSTEM

1. Remove:
   - Exhaust pipe 1
   - Exhaust pipe 2

   Refer to "ENGINE REMOVAL" on page 5-3.
2. Remove:
   - Exhaust pipe protector
3. Check:
   - Exhaust pipe 1
   - Exhaust pipe 2
   - Silencer

   Crack/damage → Replace.
4. Check:
   - Silencer fiber

   Damage → Replace.
5. Replace:
   - Silencer fiber
     a. Remove the rivets "1" and silencer body "2".

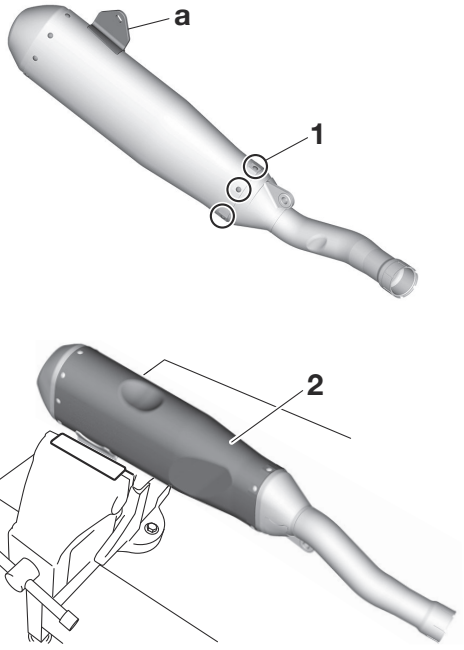
ECA25800

***NOTICE***

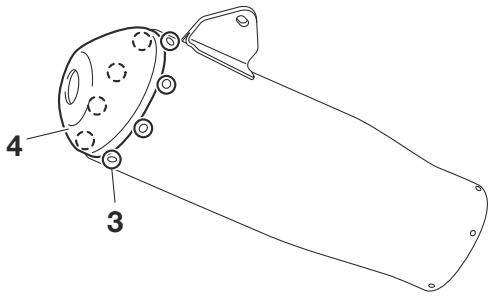
**Do not hit the silencer stay "a" as it may do damage to the silencer.**

**TIP**

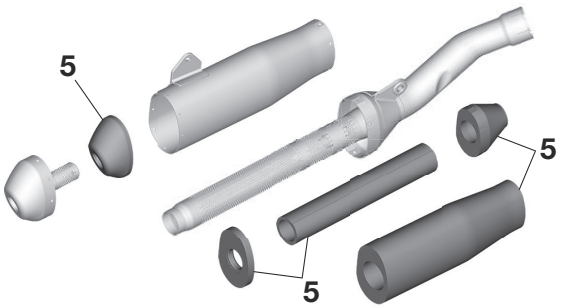
Remove the inner pipe while holding the silencer in place with a vise etc.



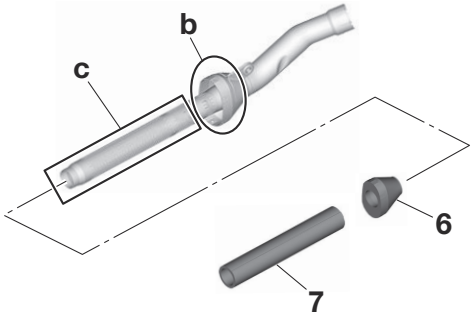

b. Remove the rivets "3" and silencer cap "4".




c. Replace the fiber inserts "5".



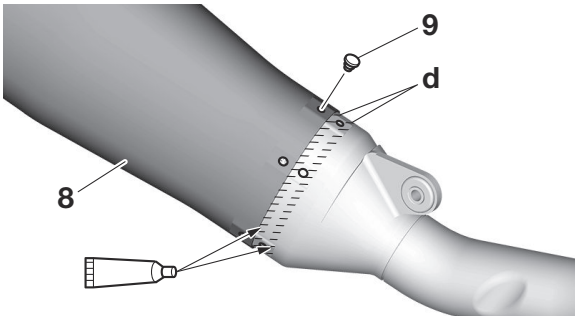

d. Install the fiber insert "6" to the part "b".
e. Twist the fiber insert "7" onto the inner pipe "c".




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

**TIP**

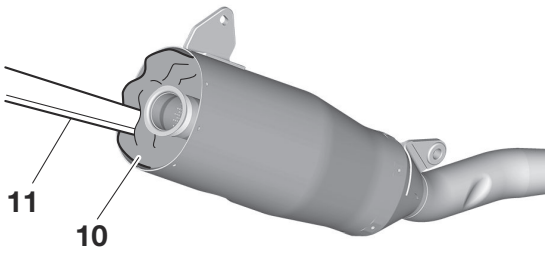
Apply heat-resistant sealant to the areas “d” shown, making sure that there are no gaps in the beads of sealant.




g. Install the fiber “10”.

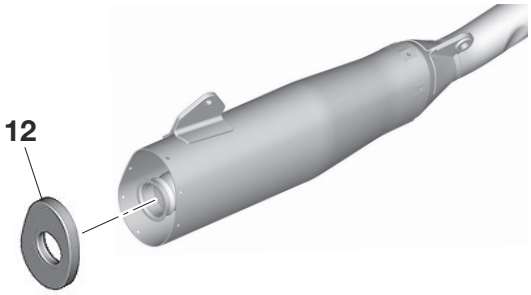
**TIP**

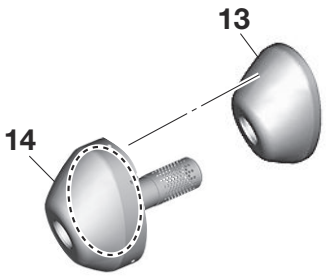
Stuff the fiber into the silencer body by using a flat board “11”.




h. Install the fiber insert “12” to the inner pipe.

i. Install the fiber insert “13” to the inside of the silencer cap “14”.

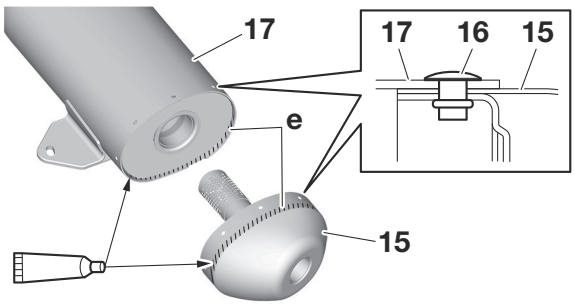



j. Install the silencer cap “15” and rivet “16”.

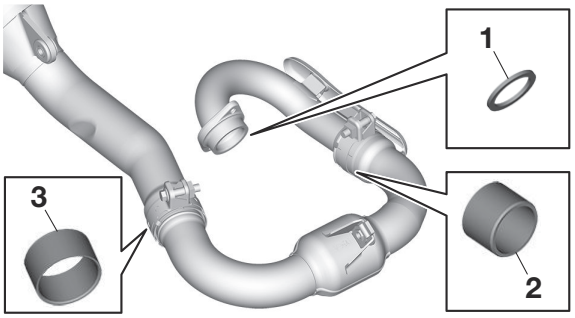
**TIP**

- Apply heat-resistant sealant to the areas “e” shown, making sure that there are no gaps in the beads of sealant.
- Take care not to allow the fiber out of place when installing the silencer body “17”.



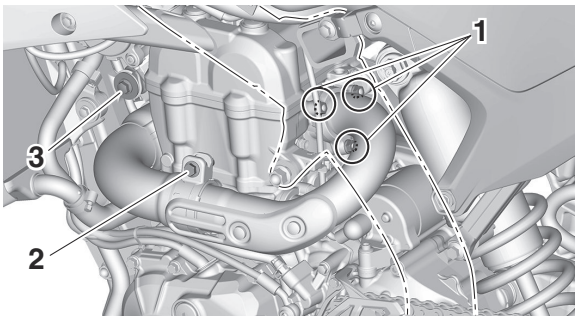

6. Check:
   - Gasket “1”
   - Gasket “2”
   - Gasket “3”

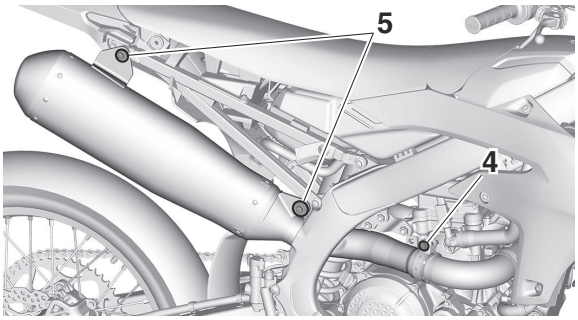
   Damage → Replace.



7. Check:
   • Tightening torques

**Exhaust pipe nut "1"**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**
**Exhaust pipe clamp bolt "2"**
**16 N·m (1.6 kgf·m, 12 lb·ft)**
**Exhaust pipe bracket bolt "3"**
**20 N·m (2.0 kgf·m, 15 lb·ft)**
**Exhaust pipe clamp bolt "4"**
**16 N·m (1.6 kgf·m, 12 lb·ft)**
**Silencer bolt "5"**
**30 N·m (3.0 kgf·m, 22 lb·ft)**




8. Install:
   • Exhaust pipe protector

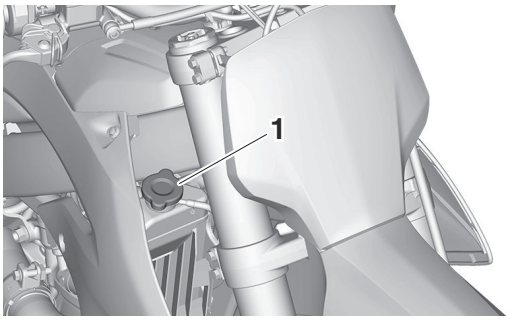
**Exhaust pipe protector screw**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**
**LOCTITE®**

EAM30210
## CHECKING THE COOLANT LEVEL

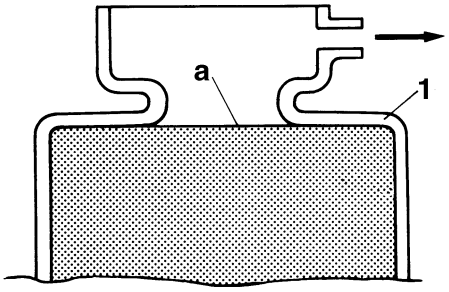
EWA13030
**⚠ WARNING**

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

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




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




1. Radiator

ECA24260
***NOTICE***

- **Adding water instead of coolant lowers the antifreeze content. If, therefore, water is used instead of coolant, check, and if necessary, adjust the antifreeze concentration.**
- **Use only distilled water. However, if 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)
- Shroud (left/right)
  Refer to "GENERAL CHASSIS" on page 4-1.

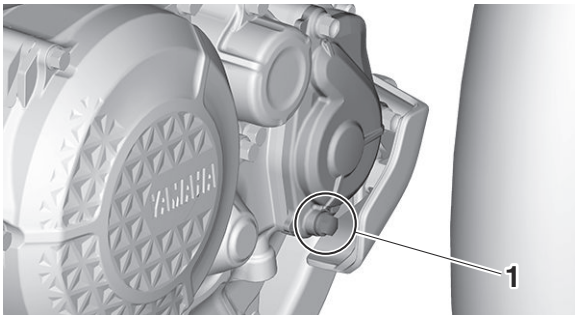
2. Check:
   - Radiator
   - Radiator hose
     Crack/damage → Replace.
     Refer to "RADIATOR" on page 6-3.
3. Install:
   - Shroud (left/right)
   - Side cover (left/right)
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.

EAM30212
## CHANGING THE COOLANT

EWA13030
**WARNING**

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

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




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**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

6. Pour coolant.

| | |
|---|---|
|  | **Recommended coolant**<br>**High quality ethylene glycol antifreeze containing anti-corrosion for aluminum engine**<br>**Radiator (including all routes)**<br>**1.03 L (1.09 US qt, 0.91 Imp.qt)**<br>**Coolant mixing ratio**<br>**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 3-22.

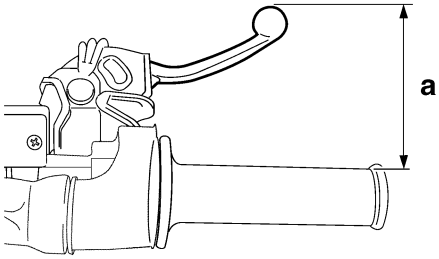
EAM20136
# CHASSIS

EAM30479
## ADJUSTING THE FRONT DISC BRAKE

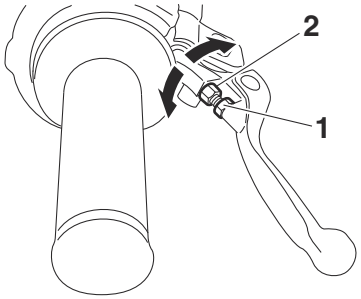
**TIP**
There should be no free play at the brake lever end.

1. Check:
   • Brake lever position "a"

| | |
|---|---|
| | **Brake lever position**<br>**100 mm (3.94 in)**<br>**Extent of adjustment**<br>**86–105 mm (3.39–4.13 in)** |




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




   c. Tighten the locknut.

| | |
|---|---|
| | **Locknut**<br>**5 N·m (0.5 kgf·m, 3.7 lb·ft)** |

EWA13050
**⚠ WARNING**

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

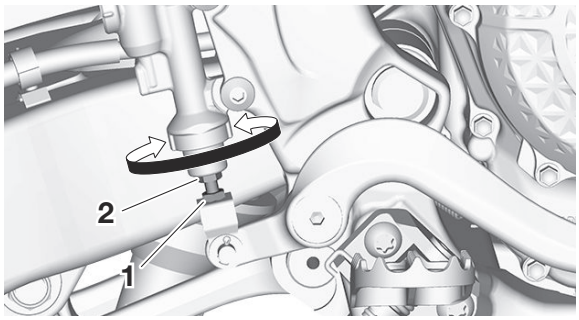
ECA13490
***NOTICE***

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

4. Install:
   • Brake lever cover

EAM30480
## ADJUSTING THE REAR DISC BRAKE

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




   c. Tighten the locknut.

| | |
|---|---|
| | **Locknut**<br>**6 N·m (0.6 kgf·m, 4.4 lb·ft)** |

EWA19150
**⚠ WARNING**

**A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before running, bleed the brake system. Air in the brake system will cause braking performance to be reduced.**

ECA13510
***NOTICE***

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

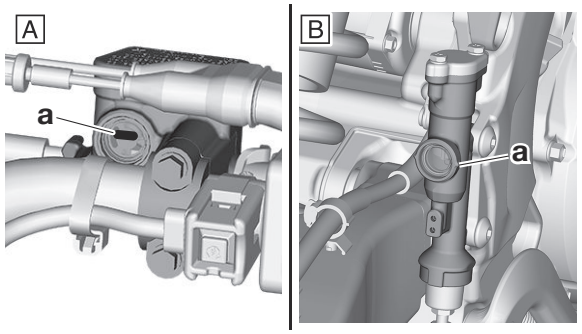
EAM30234
## CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle upright on a level surface.

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

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

**Specified brake fluid**
**DOT 4**




A. Front brake
B. Rear brake

EWA13090

**⚠ WARNING**

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

ECA13540

***NOTICE***

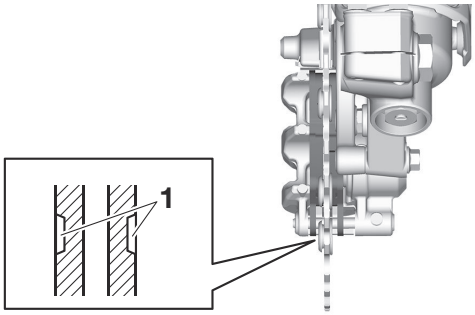
**Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**

EAM30231

## CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicator grooves "1" almost touch the brake disc → Replace the brake pads as a set.
     Refer to "FRONT BRAKE" on page 4-17.

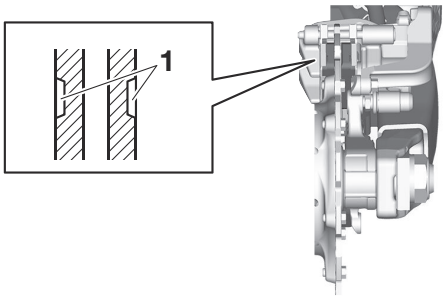



EAM30232

## CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Rear brake pad
     Wear indicator grooves "1" almost touch the brake disc → Replace the brake pads as a set.
     Refer to "REAR BRAKE" on page 4-28.




EAM30478

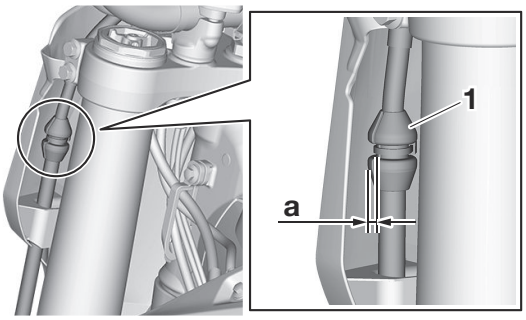
## CHECKING THE FRONT BRAKE HOSE

1. Check:
   - Brake hose
     Cracks/damage/wear → Replace.
2. Check:
   - Brake hose clamp
     Loose connection → Tighten the clamp bolt.
3. Stand the vehicle upright and apply the front brake several times.
4. Check:
   - Brake hose
     Brake fluid leaks → Replace the damaged brake hose.
     Refer to "FRONT BRAKE" on page 4-17.
5. Check:
   - Protector "1"
     Out of specification → Replace.

**TIP**

The protector reaches the limit of its use when it is worn down to the same height "a" as of the

plastic locking tie circumference.




EAM30498

## CHECKING THE REAR BRAKE HOSE

1. Check:
   - Brake hose
     Cracks/damage/wear → Replace.
2. Hold the vehicle upright and apply the rear brake several times.
3. Check:
   - Brake hose
     Brake fluid leakage → Replace the damaged hose.
     Refer to "REAR BRAKE" on page 4-28.

EAM30499

## CHECKING THE BRAKE OPERATION

1. Check:
   - Brake operation
     Brake not working properly → Check the brake system.
     Refer to "FRONT BRAKE" on page 4-17 and "REAR BRAKE" on page 4-28.

**TIP**

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

EAM30477

## BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA19140

**⚠ WARNING**

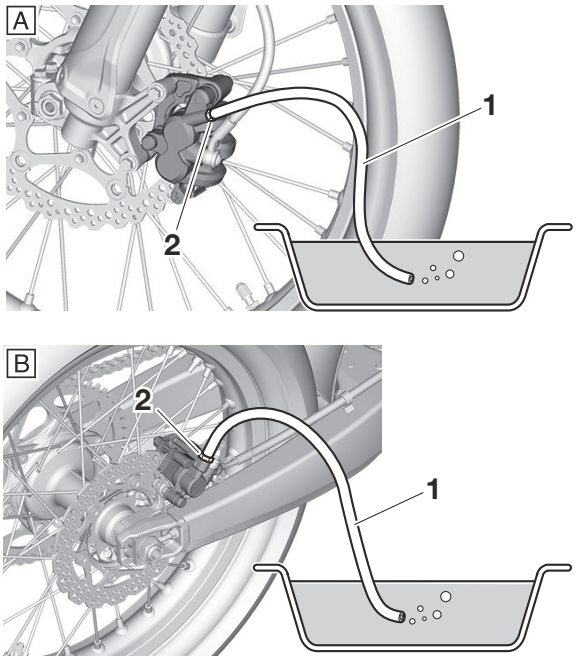
**Bleed the brake system whenever:**
- **The system is disassembled.**
- **A brake hose is loosened, disconnected, or replaced.**
- **The brake fluid level is very low.**
- **Brake operation is faulty.**

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

**TIP**

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

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




A. Front
B. Rear

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

**TIP**

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

   g. Tighten the bleed screw and then release

the brake lever or brake pedal.

h. Repeat steps (d) to (g) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.

**TIP**

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

ECA24320

***NOTICE***

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

i. Tighten the bleed screw.

| | |
|---|---|
| | **Bleed screw**<br>**5 N·m (0.5 kgf·m, 3.7 lb·ft)** |

j. Pour brake fluid to the reservoir up to the specified level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.

EWA13110

**⚠ WARNING**

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

EAM30481

## DRIVE CHAIN SLACK

ECA13550

***NOTICE***

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

### Checking the drive chain slack

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

EWA13120

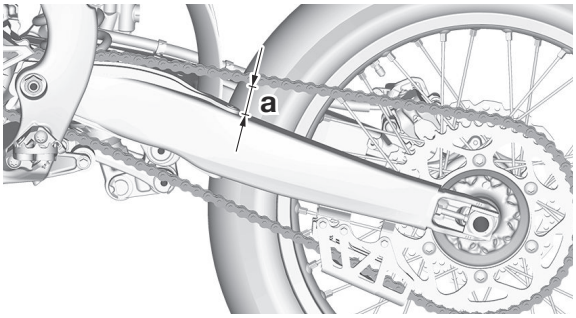
**⚠ WARNING**

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

2. Shift the transmission into the neutral position.
3. Pull the drive chain up above the drive chain guide installation bolt with a force of about 50 N (5.0 kgf, 37 lbf).
4. Check:
   - Drive chain slack "a"
     Out of specification → Regulate.

**TIP**

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




| | |
|---|---|
| | **Drive chain slack (Maintenance Stand)**<br>**50.0–60.0 mm (1.97–2.36 in)** |

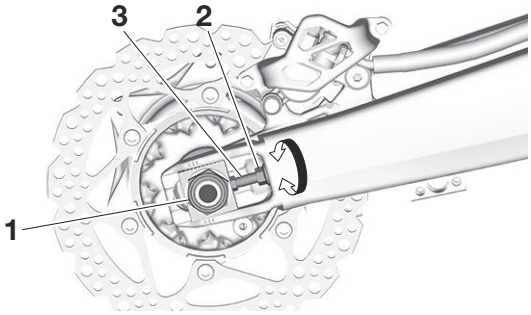
### Adjusting the drive chain slack

EWA13120

**⚠ WARNING**

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

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




**TIP**

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

d. Tighten the wheel axle nut.

| | |
|---|---|
| | **Wheel axle nut**<br>**135 N·m (13.5 kgf·m, 100 lb·ft)** |

e. Tighten the drive chain puller locknut.

| | |
|---|---|
| | **Drive chain puller locknut**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |

EAM30247

## CHECKING AND ADJUSTING THE STEERING HEAD

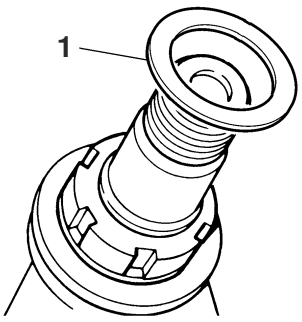
1. Use a maintenance stand to raise the front wheel off the ground.

EWA13120

**⚠ WARNING**

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

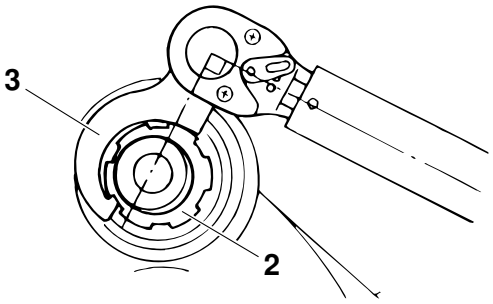
2. Check:
   - Steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Blinding/looseness → Adjust the steering head.
3. Remove:
   - Handlebar
     Refer to "HANDLEBAR" on page 4-39.
   - Upper bracket
     Refer to "STEERING HEAD" on page 4-58.
4. Adjust:
   - Steering head
     a. Remove the washer "1".




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

**TIP**

- Set the torque wrench at a right angle to the steering nut wrench.
- Move the steering to the left and right a couple of times to check that it moves smoothly.




| | |
|---|---|
| | **Steering nut wrench**<br>**90890-01403**<br>**Exhaust flange nut wrench**<br>**YU-A9472** |
| | **Ring nut (initial tightening torque)**<br>**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 4-58.
     d. Loosen the ring nut fully turn and then tighten it to specification with a steering nut wrench.

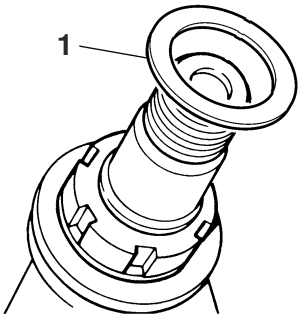
EWA13140

**⚠ WARNING**

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

| | |
|---|---|
| | **Ring nut (final tightening torque)**<br>**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 4-58.
     f. Install the washer "1".




5. Install:
   • Upper bracket
     Refer to "STEERING HEAD" on page 4-58.
   • Handlebar
     Refer to "HANDLEBAR" on page 4-39.

EAM30502
## LUBRICATING THE STEERING HEAD

1. Lubricate:
   • Upper bearing
   • Lower bearing
   • Bearing race

| | |
|---|---|
| | **Recommended lubricant**<br>**Lithium-soap-based grease** |

EAM30338
## CHECKING THE FRONT FORK LEGS

1. Stand the vehicle upright on a level surface.

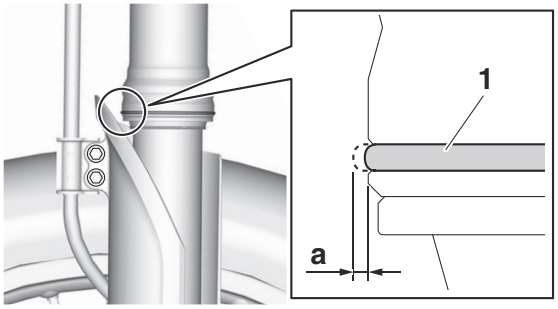
EWA13120
**WARNING**

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

2. Check:
   • Inner tube
     Damage/scratches → Replace.
   • Front fork leg
     Oil leaks between inner tube and outer tube → Replace the oil seal.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   • Front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Unsmooth operation → Correct or replace.
     Refer to "FRONT FORK" on page 4-45.
5. Check:
   • Protector guide "1"
     Out of specification → Replace.

**TIP**

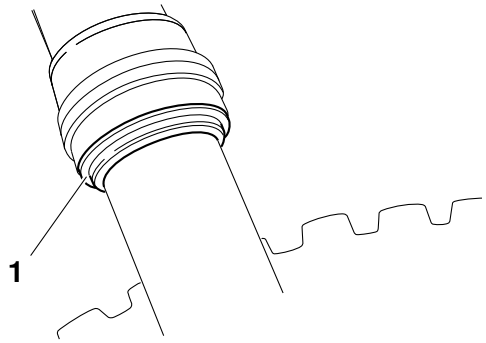
The protector guide reaches the limit of its use when it is worn down to the same height "a" as of the outer tube circumference.




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

ECA24330
**NOTICE**

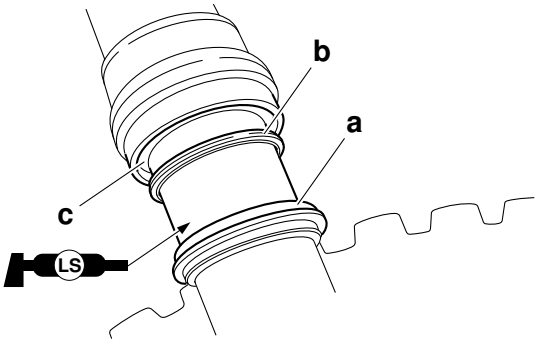
**Be careful not to damage the dust seal and the inner tube by a driver.**




7. Clean:
   • Dust seal "a"
   • Scraper "b"
   • Oil seal "c"

**TIP**

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



EAM30239
## ADJUSTING THE FRONT FORK LEGS
EWA19180
**WARNING**

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

### Rebound damping
ECA24340
***NOTICE***

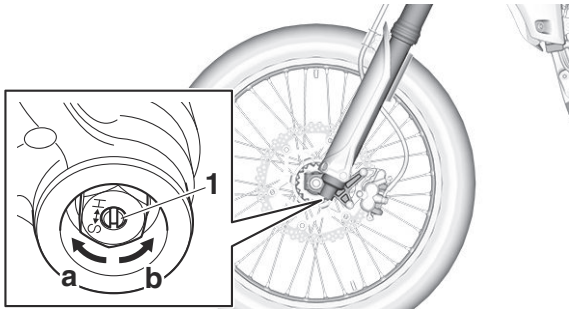
**Do not turn the adjuster forcibly beyond its adjusting range.**

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

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

**Rebound damping**
**Minimum (soft)**
**20 click(s) in direction "b"***
**Standard**
**13 click(s) in direction "b"* (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**9 click(s) in direction "b"* (AUS, CAN, NZL, ZAF)**
**Maximum (hard)**
**0 click(s) in direction "b"***
***With the adjusting screw fully turned in direction "a"**

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




### Compression damping
ECA24350
***NOTICE***

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

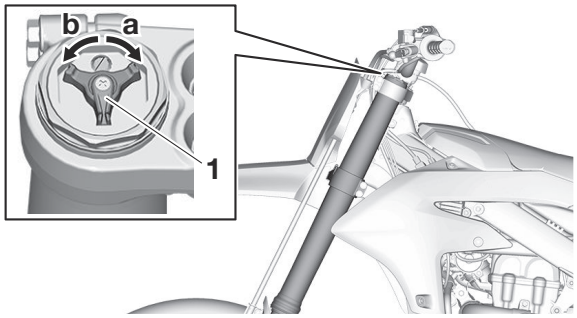
1. Adjust:
   - Compression damping
     a. Turn the adjuster "1" in the direction of "a" or "b" to make an adjustment.

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

**Compression damping**
**Minimum (soft)**
**20 click(s) in direction "b"***
**Standard**
**12 click(s) in direction "b"* (AUS, CAN, NZL, ZAF)**
**14 click(s) in direction "b"* (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**Maximum (hard)**
**0 click(s) in direction "b"***
***With the adjusting screw fully turned in direction "a"**

**TIP**
Although the total number of clicks of a damping force adjusting mechanism may not exactly match the above specifications due to small differences in production, the actual number of clicks always represents the entire adjusting

range. To obtain a precise adjustment, it would be advisable to check the number of clicks of each damping force adjusting mechanism and to modify the specifications as necessary.




**Air bleeding from front fork**

**TIP**

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

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

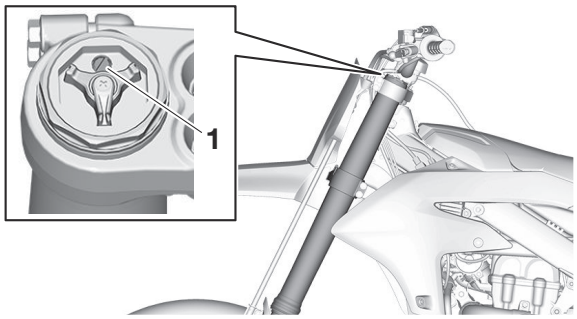
EWA13120

**⚠ WARNING**

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

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

| | |
|---|---|
| | **Bleed screw**<br>**1.3 N·m (0.13 kgf·m, 0.95 lb·ft)** |




EAM30482

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle upright on a level surface.

EWA13120

**⚠ WARNING**

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

2. Check:
   - Rear shock absorber assembly
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.
     Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-63.
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 4-63.

EAM30242

## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

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

EWA13120

**⚠ WARNING**

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

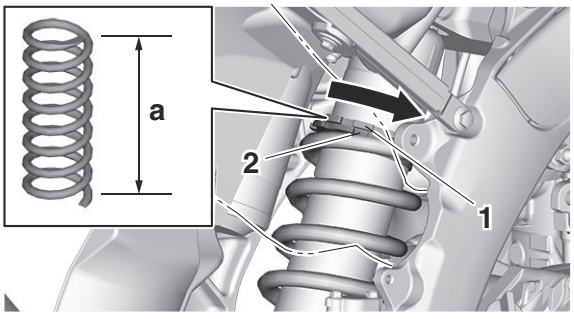
**Spring preload**

ECA24360

***NOTICE***

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

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

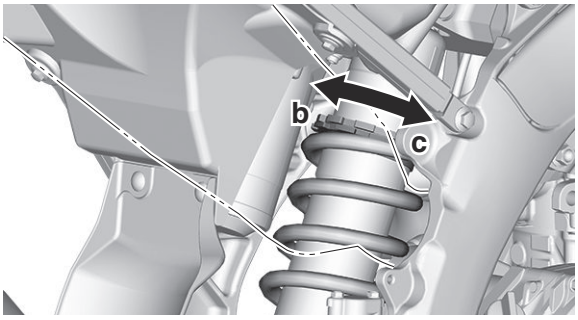



     d. Turn the adjuster in the direction of "b" or "c" to make an adjustment.

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

**Spring preload adjusting positions**
**Minimum**
**Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.**
**Standard**
**Position in which the spring is turned in 7.0 mm (0.28 in) from its free length.**
**Maximum**
**Position in which the spring is turned in 18.0 mm (0.71 in) from its free length.**

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




e. Tighten the locknut.

**Rebound damping**

ECA24370

***NOTICE***

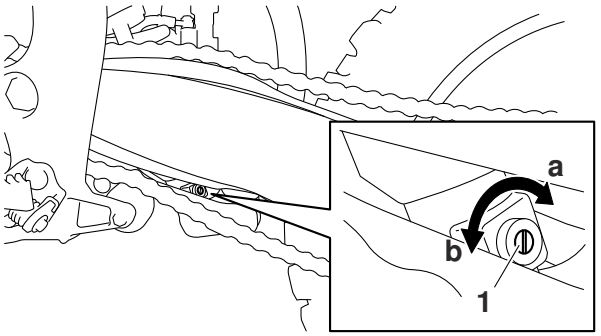
**Do not turn the adjuster forcibly beyond its adjusting range.**

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

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

**Rebound damping**
**Minimum (soft)**
**30 click(s) in direction "b"***
**Standard**
**8 click(s) in direction "b"* (AUS, CAN, NZL, ZAF)**
**13 click(s) in direction "b"* (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**Maximum (hard)**
**0 click(s) in direction "a"**
***With the adjusting screw fully turned in direction "a"**

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




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

ECA24370

***NOTICE***

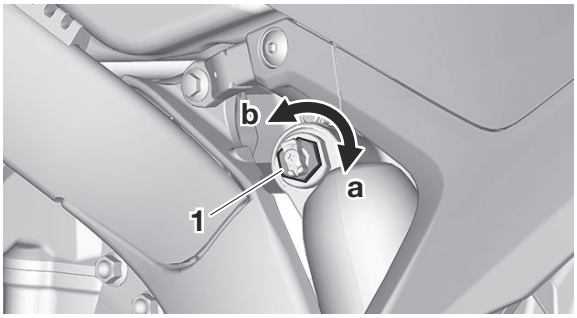
**Do not turn the adjuster forcibly beyond its adjusting range.**

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

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

**Fast compression damping**
**Minimum (soft)**
**2 turn(s) in direction "b"***
**Standard**
**1+1/2 turn(s) in direction "b"* (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**1+3/8 turn(s) in direction "b"* (AUS, CAN, NZL, ZAF)**
**Maximum (hard)**
**0 turn(s) in direction "b"***
***With the adjusting screw fully turned in direction "a"**

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




**Compression damping (for slow compression damping)**

ECA24390

***NOTICE***

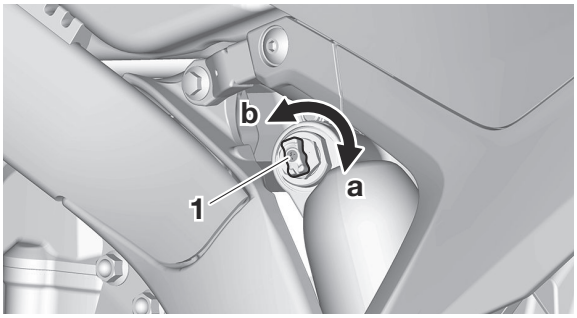
**Do not turn the adjuster forcibly beyond its adjusting range.**

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

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

**Slow compression damping**
**Minimum (soft)**
**20 click(s) in direction "b"***
**Standard**
**12 click(s) in direction "b"* (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**7 click(s) in direction "b"* (AUS, CAN, NZL, ZAF)**
**Maximum (hard)**
**0 click(s) in direction "b"***
***With the adjusting screw fully turned in direction "a"**

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



EAM30240
## CHECKING THE SWINGARM OPERATION
1. Check:
   • Swingarm smooth action
   • Swingarm free play
   Refer to "SWINGARM" on page 4-70.

EAM30500
## LUBRICATING THE SWINGARM PIVOT
1. Lubricate:
   • Oil seal
   • Collar

| | |
|---|---|
| | **Recommended lubricant**<br>**Lithium-soap-based grease** |

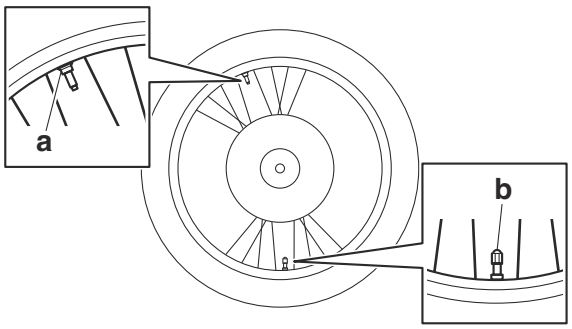
Refer to "INSTALLING THE SWINGARM" on page 4-72.

EAM30501
## CHECKING THE CONNECTING ARM AND RELAY ARM
Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 4-67.

EAM30243
## CHECKING THE TIRES
1. Measure:
   • Tire pressure
   Out of specification → Regulate.

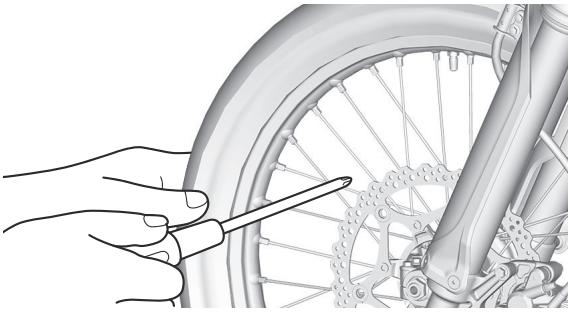
| | |
|---|---|
| | **Tire air pressure (measured on cold tires)**<br>**Front**<br>**100 kPa (1.00 kgf/cm², 15 psi)**<br>**Rear**<br>**100 kPa (1.00 kgf/cm², 15 psi)** |

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



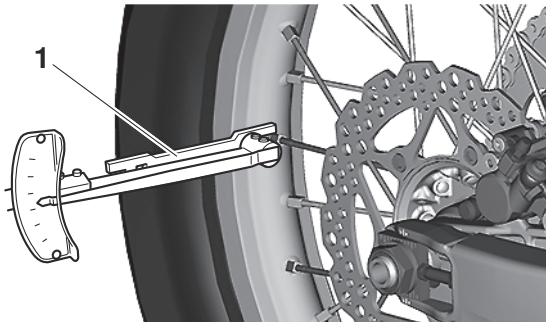

a. Bead stopper tightening nut
b. Tire valve stem

EAM30244
## CHECKING AND TIGHTENING THE SPOKES
1. Check:
   • Spoke
   Bend/damage → Replace.
   Loose → Tighten.
   Tap the spoke with a screwdriver.



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

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




| | |
|---|---|
| | **Spoke nipple wrench (6–7)**<br>**90890-01521**<br>**Spoke nipple wrench (6–7)**<br>**YM-01521** |

| | |
|---|---|
|  | **Spoke**<br>**2.5 N·m (0.25 kgf·m, 1.8 lb·ft)** |

**TIP**

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

EAM30245

## CHECKING THE WHEELS

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

EWA13260

**⚠ WARNING**

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

EAM30246

## CHECKING THE WHEEL BEARINGS

1. Check:
   - Wheel bearing
     Refer to "CHECKING THE FRONT WHEEL" on page 4-9 and "CHECKING THE REAR WHEEL" on page 4-14.

EAM30253

## CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.
Refer to "CHASSIS TIGHTENING TORQUES" on page 2-14.

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**<br>**Engine oil or a suitable cable lubricant** |

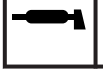
**TIP**

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

EAM30483

## LUBRICATING THE BRAKE LEVER

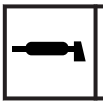
1. Lubricate the pivoting points and metal-to-metal moving parts of the following parts.
   - Brake lever

| | |
|---|---|
|  | **Recommended lubricant**<br>**Silicone grease** |

EAM30503

## LUBRICATING THE CLUTCH LEVER

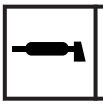
1. Lubricate the pivoting points and metal-to-metal moving parts of the following parts.
   - Clutch lever

| | |
|---|---|
|  | **Recommended lubricant**<br>**Lithium-soap-based grease** |

EAM30250

## LUBRICATING THE PEDAL

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

| | |
|---|---|
|  | **Recommended lubricant**<br>**Lithium-soap-based grease** |

EAM20137
# ELECTRICAL SYSTEM

EAM30256
## CHECKING AND CHARGING THE BATTERY
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-52.

EAM30505
## CHECKING THE FUSES
Refer to “CHECKING THE FUSES” on page 8-52.

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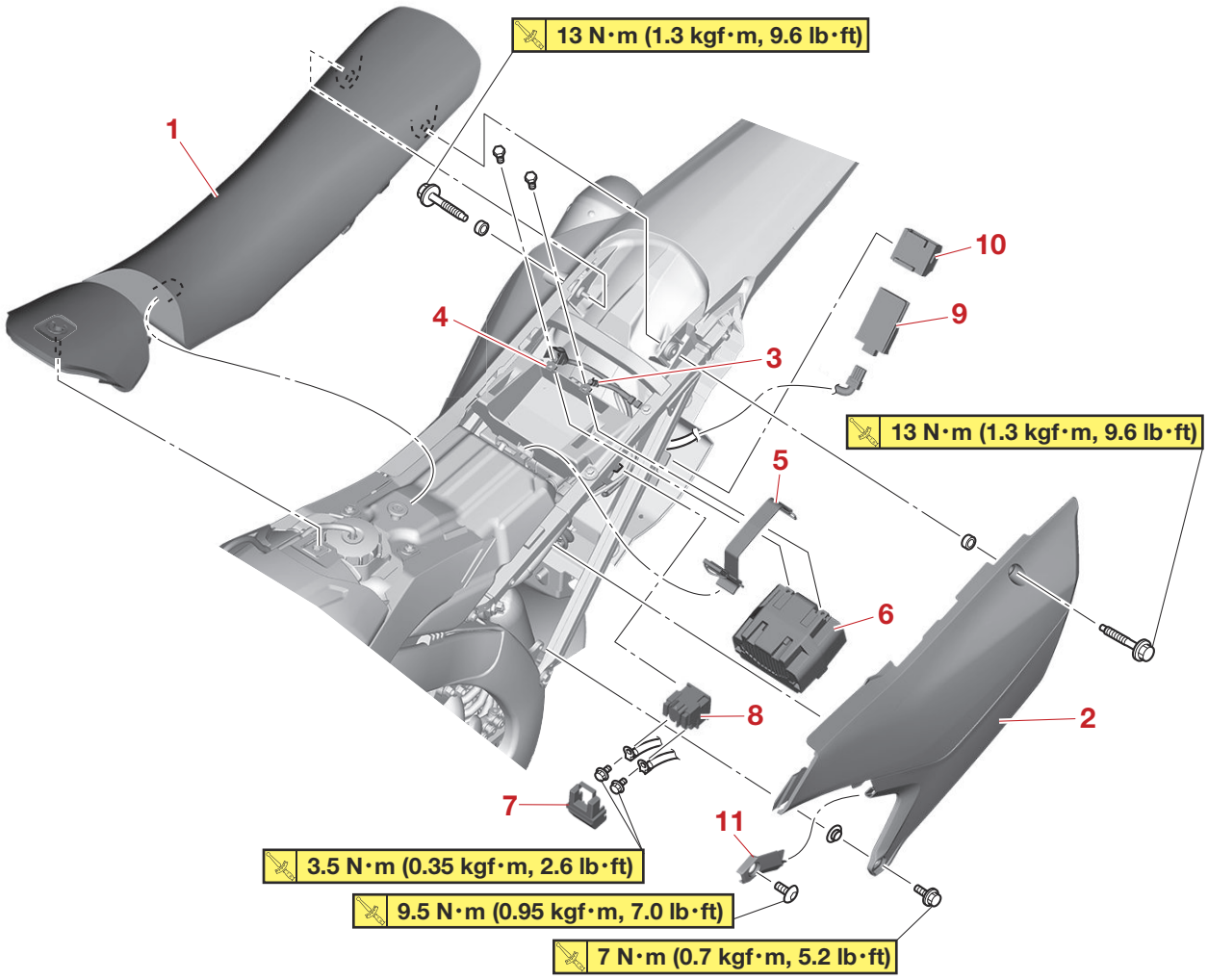
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INSTALLING THE DRIVE CHAIN..... 4-76

EAM20094

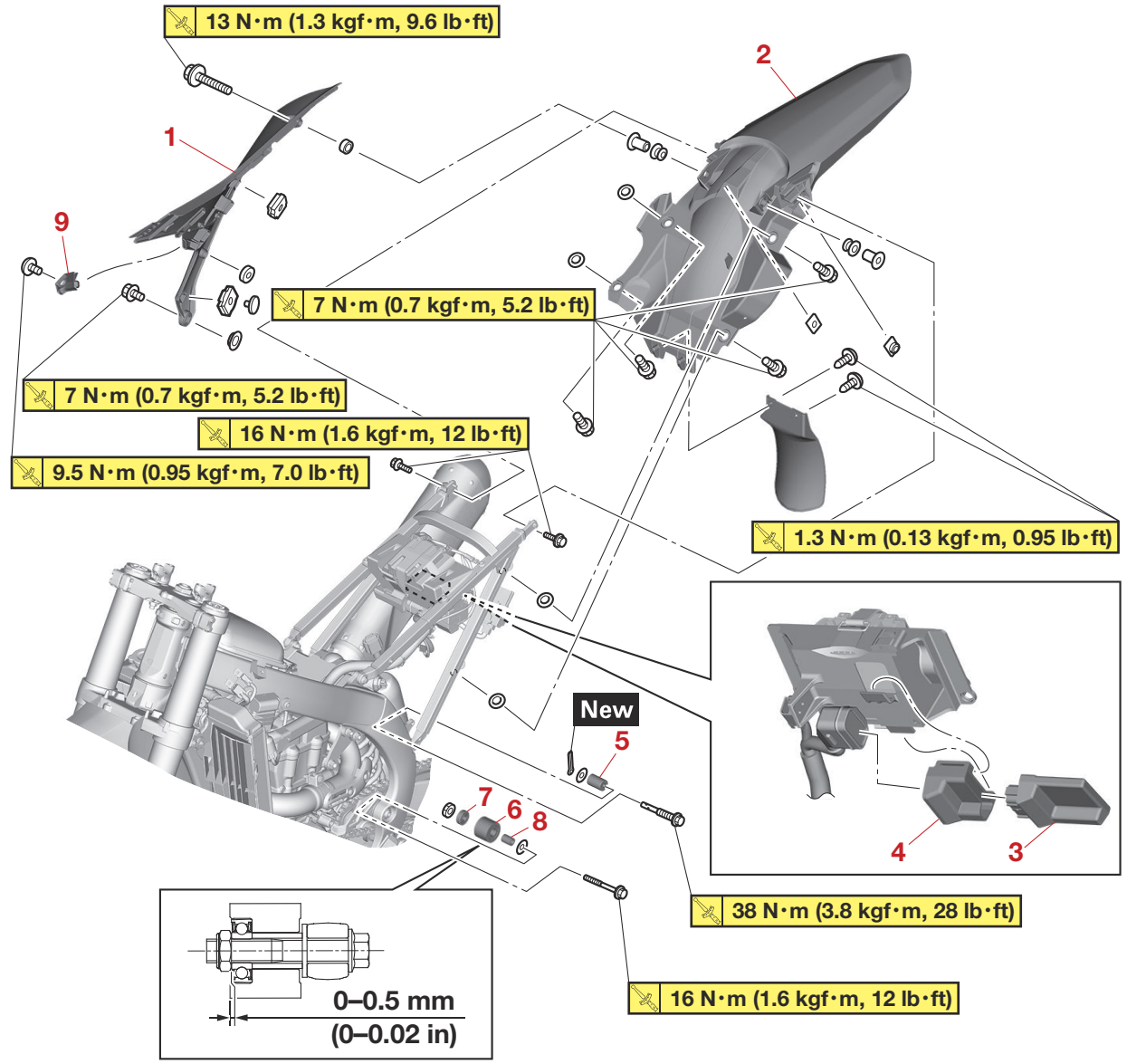
# GENERAL CHASSIS

**Removing the seat and battery**



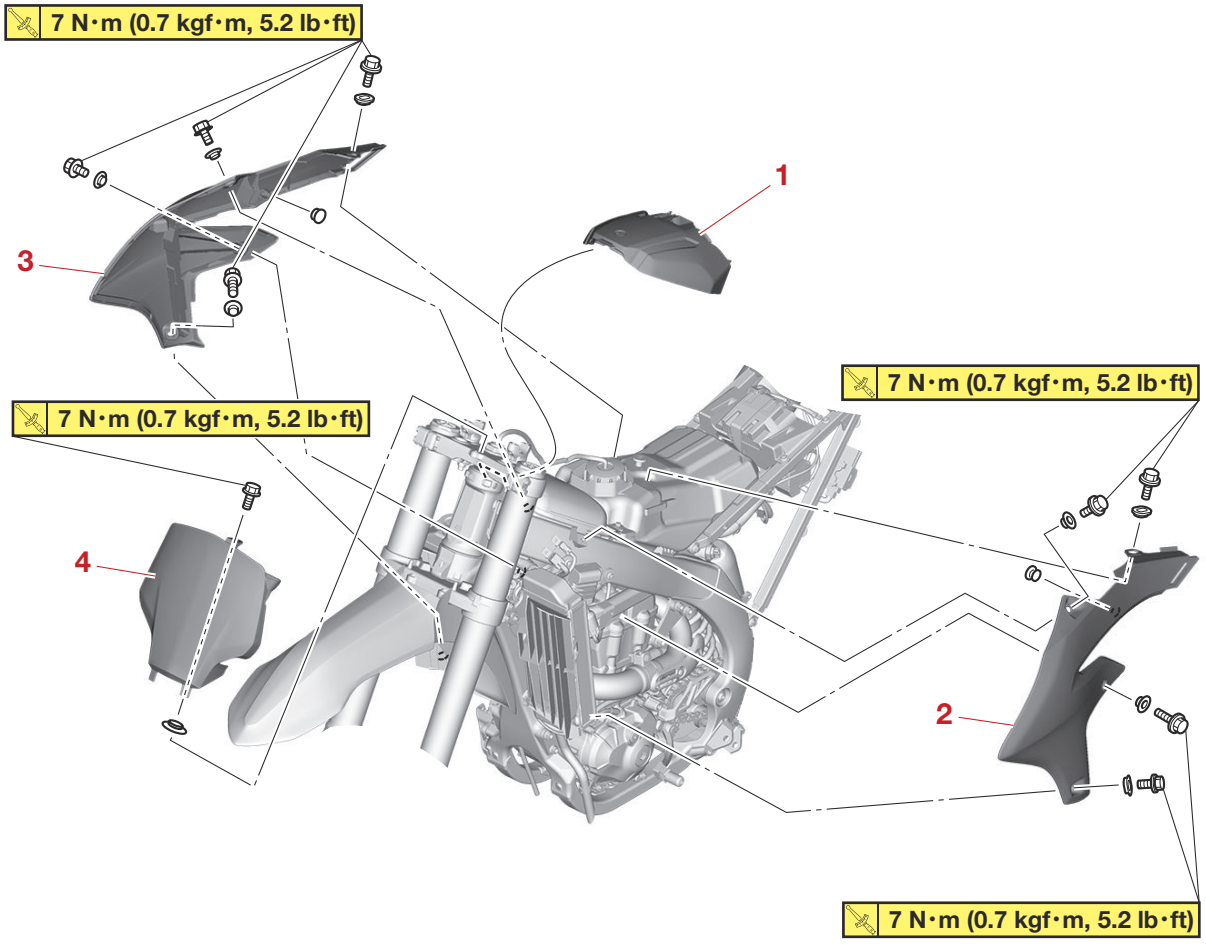

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Seat | 1 | |
| 2 | Side cover (left) | 1 | |
| 3 | Negative battery lead | 1 | Disconnect. |
| 4 | Positive battery lead | 1 | Disconnect. |
| 5 | Battery band | 1 | |
| 6 | Battery | 1 | |
| 7 | Cover | 1 | |
| 8 | Starter relay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

## Removing the side cover




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Side cover (right) | 1 | |
| 2 | Rear fender | 1 | |
| 3 | ECU (Engine Control Unit) | 1 | |
| 4 | Holder | 1 | |
| 5 | Drive chain tensioner (upper) | 1 | |
| 6 | Drive chain tensioner (lower) | 1 | |
| 7 | Bearing | 1 | |
| 8 | Collar | 1 | |
| 9 | Center side cover (right) | 1 | |

## Removing the shroud

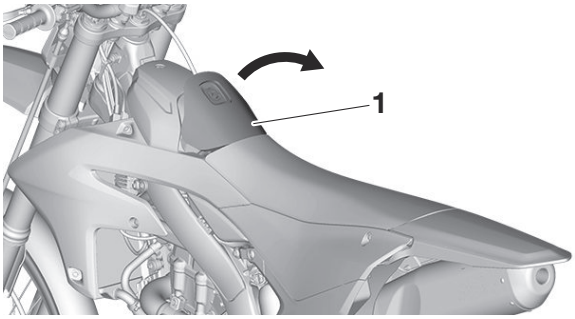



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Air filter case cover | 1 | Refer to "CLEANING THE AIR FILTER ELEMENT" on page 3-17. |
| 2 | Shroud (left) | 1 | |
| 3 | Shroud (right) | 1 | |
| 4 | Number plate | 1 | |

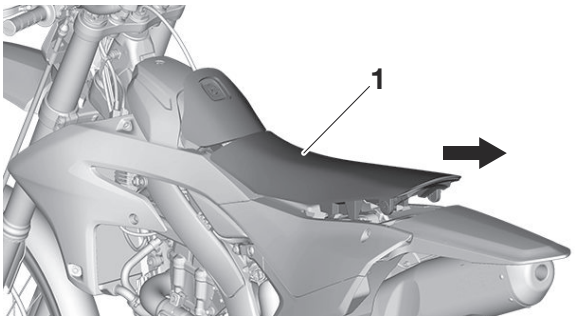
EAM30016
## REMOVING THE SEAT

**TIP**
The sub-seat and the seat are coupled with each other with a plastic band.
When removing the seat, always remove the sub-seat beforehand.

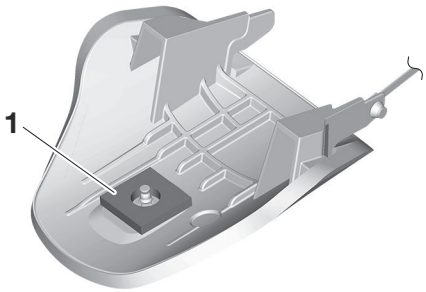
1. Remove:
   • Sub-seat "1"
   Refer to "FUEL TANK CAP" on page 1-28.




2. Remove:
   • Seat "1"

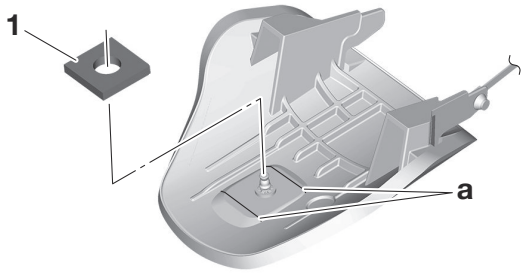



3. Check:
   • Damper "1"
   Damage/wear/detachment → Replace.




4. Replace:
   • Damper "1"

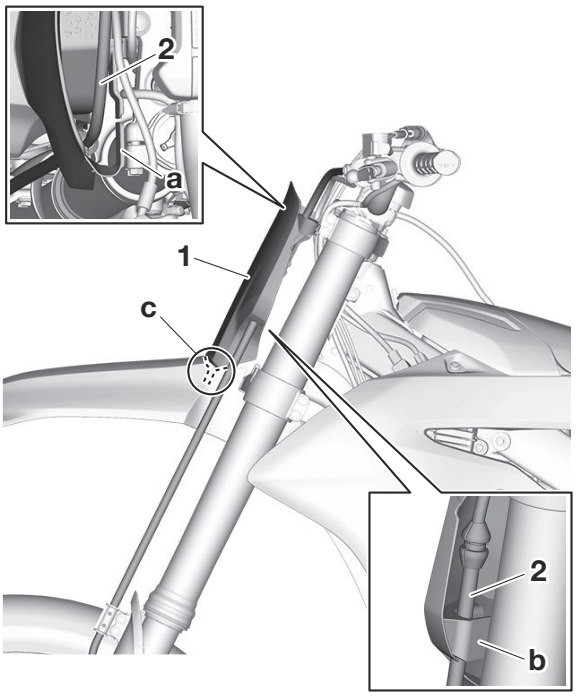
**TIP**
Install a new damper to the original position by aligning it with the scribe line "a".




EAM30371
## REMOVING THE NUMBER PLATE

1. Remove:
   • Bolt (number plate)
   • Number plate "1"

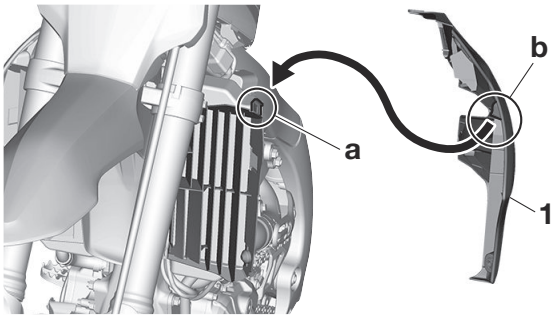
**TIP**
- Remove the brake hose "2" from the upper guide "a" and the lower guide "b" on the number plate.
- The projection "c" on the number plate is inserted into the front fender. Remove the number plate by pulling it off the front fender.




EAM30640
## INSTALLING THE SHROUD

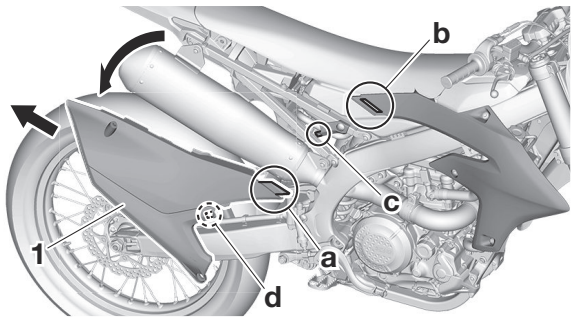
1. Install:
   • Shroud (left "1"/right)

**TIP**
Insert the projection "a" on the radiator guard (left/right) into the hole "b" in the shroud (left/right), install the shroud, and then secure it with the bolts.




EAM30459
## REMOVING THE SIDE COVER
1. Remove:
   • Side cover (right) “1”

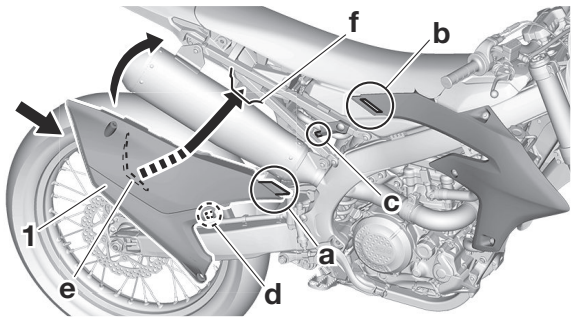
**TIP**
Remove the side cover (right) from the vehicle by removing the bolts and sliding it as shown.




a. Projection (upper)
b. Slot (upper)
c. Projection (lower)
d. Slot (lower)

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.

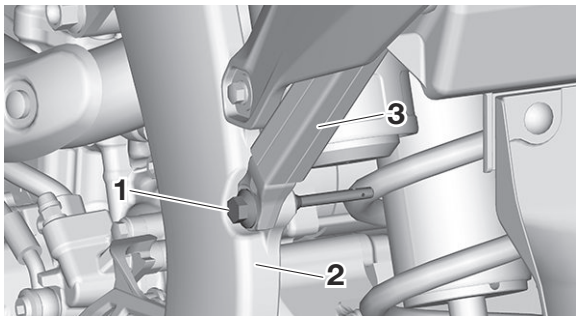



a. Projection (upper)
b. Slot (upper)
c. Projection (lower)
d. Slot (lower)
e. Rib (side cover)
f. Rib (rear fender)

EAM30669
## INSTALLING THE DRIVE CHAIN TENSIONER (UPPER)
1. Install:
   • Rear frame bolt “1”

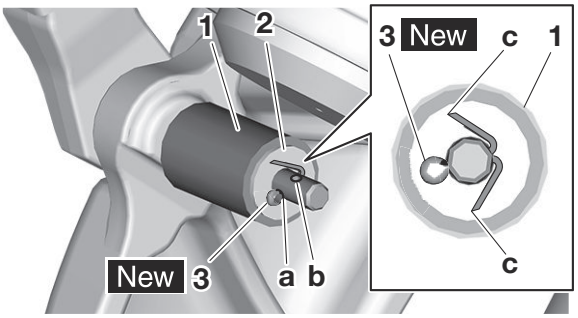
| | |
|---|---|
| | **Rear frame bolt**<br>**38 N·m (3.8 kgf·m, 28 lb·ft)** |

**TIP**
Install the front frame “2” to the rear frame “3” using the rear frame bolt.




2. Install:
   • Drive chain tensioner (upper) “1”
   • Washer “2”
   • Pin “3” New

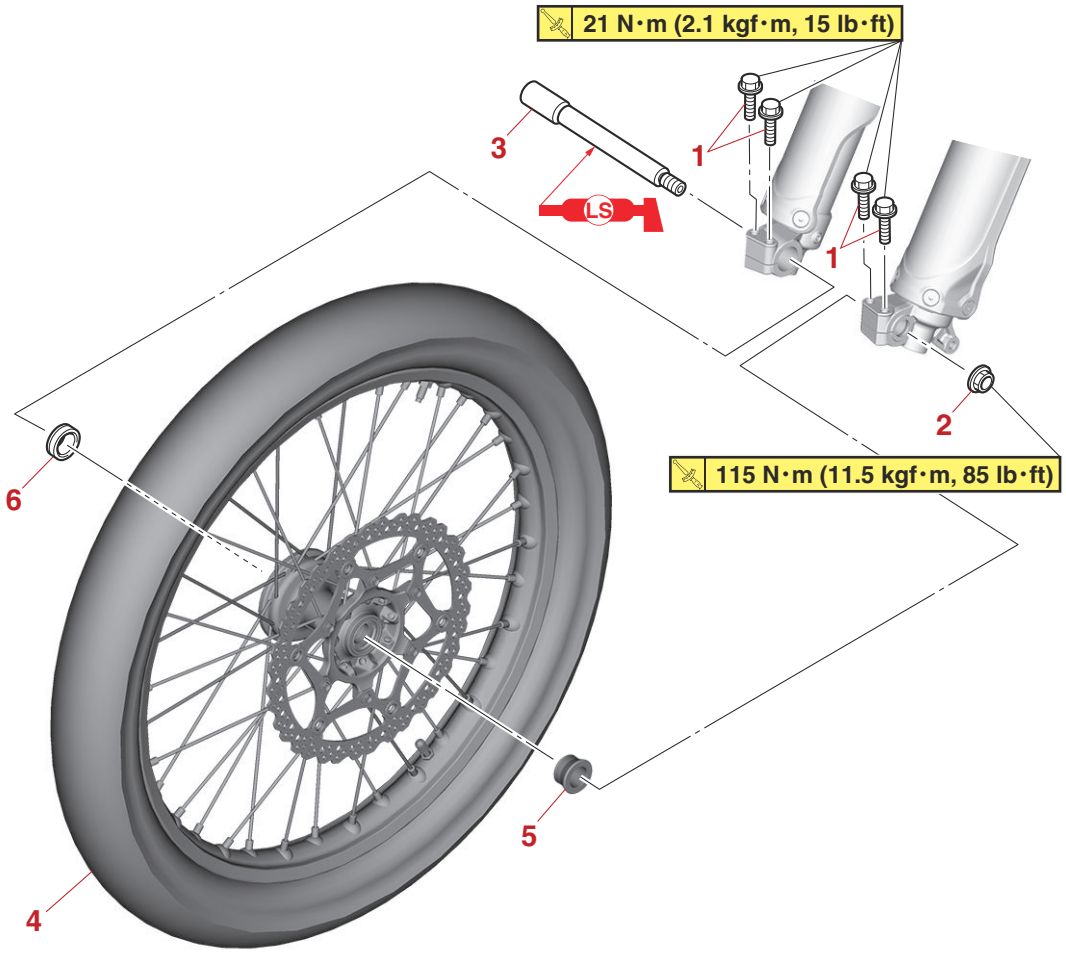
**TIP**
- When inserting the pin into the pin hole of the rear frame bolt, insert it into the pin hole “a” on the outside of the vehicle. However, if assembly is difficult, it is possible to insert it into the pin hole “b” on the inside of the vehicle.
- The tip of the bent pin should not protrude from the outside diameter of the drive chain tensioner (upper).
- It does not matter if the tip of the pin “c” is away from the rear frame bolt.


1
2
3 New
c
1
New 3
a b
c

EAM20095

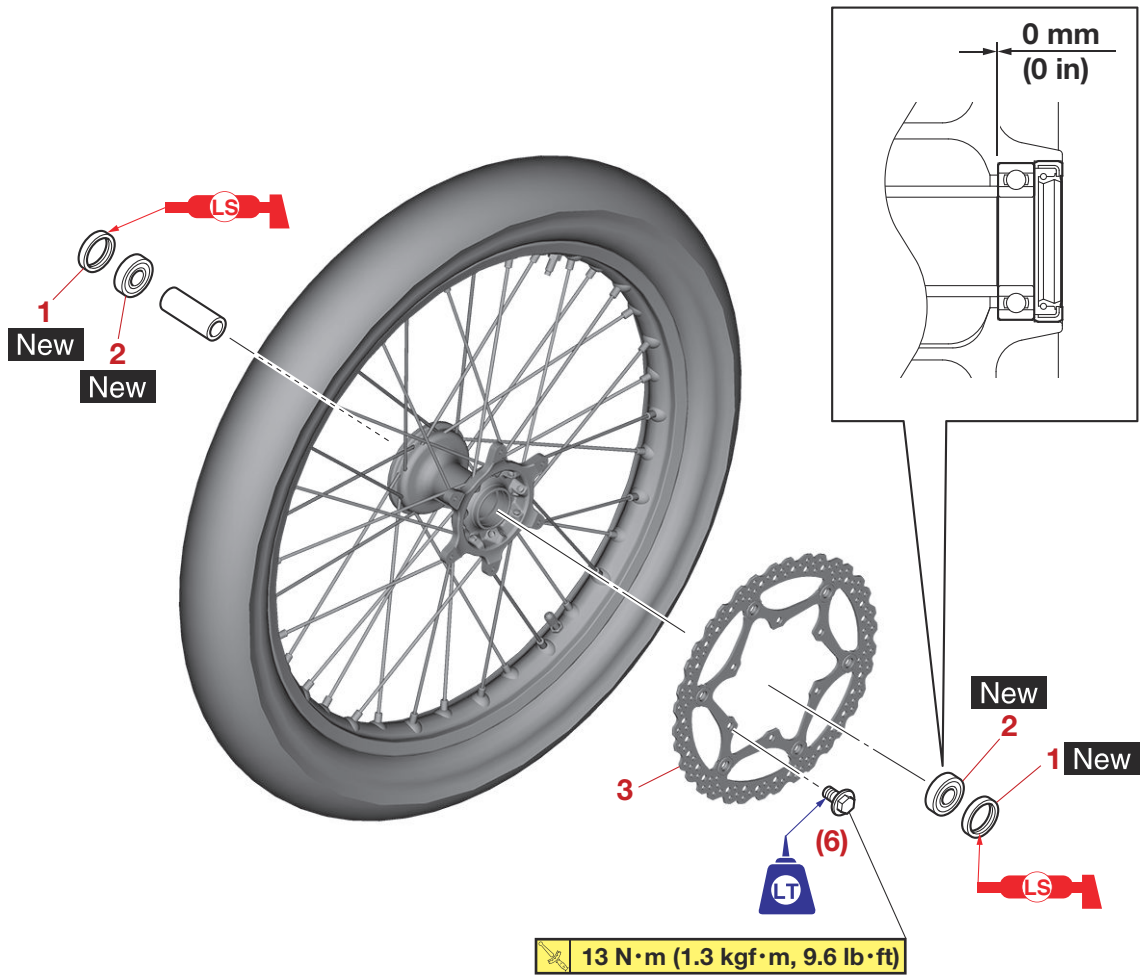
# FRONT WHEEL

## 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 (left) | 1 | |
| 6 | Collar (right) | 1 | |

## Disassembling the front wheel




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Oil seal | 2 | |
| 2 | Bearing | 2 | |
| 3 | Brake disc | 1 | |

EAM30017
## REMOVING THE FRONT WHEEL
1. Use a maintenance stand to raise the front wheel off the ground.

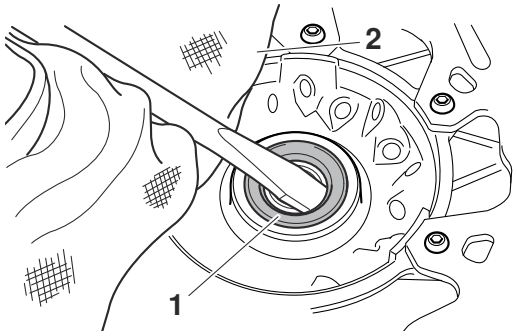
EWA13120
**⚠ WARNING**

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

2. Remove:
   • Front wheel

EAM30019
## DISASSEMBLING THE FRONT WHEEL
1. Remove:
   • Oil seal
   • Bearing
   a. Clean the outside of the front wheel hub.
   b. Remove the oil seals "1" with a flat-head screwdriver.

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




   c. Remove the bearings with a bearing puller.

EAM30018
## CHECKING THE FRONT WHEEL
1. Check:
   • Front wheel axle
   Roll the front wheel axle on a flat surface.
   Bends → Replace.

EWA13460
**⚠ WARNING**

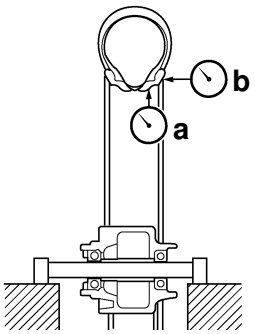
**Do not attempt to straighten a bent wheel axle.**

2. Check:
   • Tire
   • Front wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-34 and "CHECKING THE WHEELS" on page 3-35.
3. Check:
   • Spoke
   Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-34.
4. Tighten:
   • Spoke
   Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-34.

| | |
|---|---|
| | **Spoke**<br>**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**<br>**2.0 mm (0.08 in)**<br>**Lateral wheel runout limit**<br>**2.0 mm (0.08 in)** |

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

EAM30020
## ASSEMBLING THE FRONT WHEEL
1. Install:
   • Bearing (left side) "1" New
   • Spacer "2"
   • Bearing (right side) "3" New
   • Oil seal "4" New

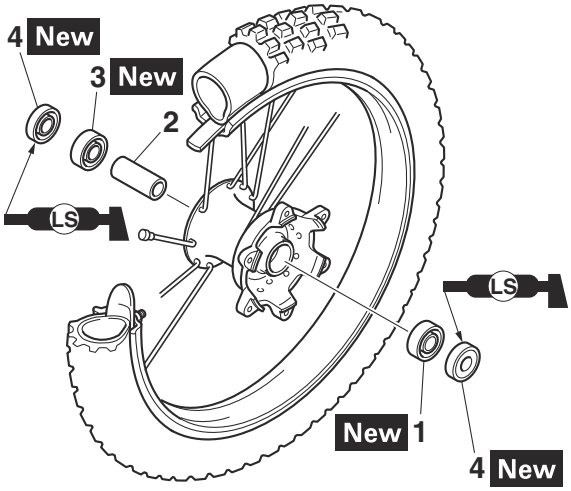
**TIP**
• Apply the lithium-soap-based grease to the oil seal lip when installing.

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

ECA24420

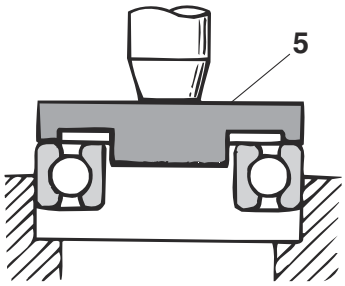
***NOTICE***

**Install the bearing by pressing its outer race parallel.**




**TIP**

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




2. Install:
   • Brake disc
   • Brake disc bolt

| | |
|---|---|
| | **Brake disc bolt**<br>**13 N·m (1.3 kgf·m, 9.6 lb·ft)**<br>**LOCTITE®** |

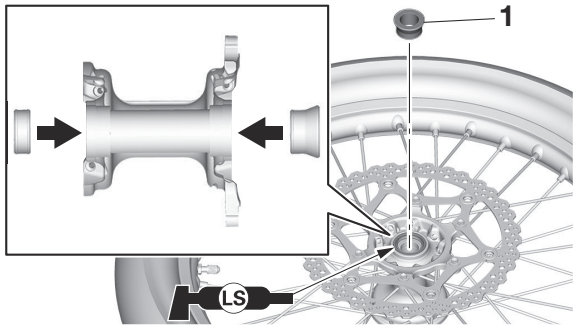
**TIP**

Tighten the bolts in stages and in a crisscross pattern.

3. Install:
   • Collar "1"

**TIP**

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



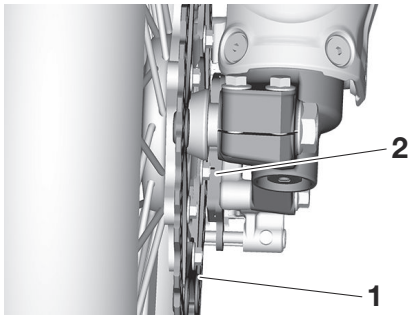

EAM30617

## INSTALLING THE FRONT WHEEL

1. Install:
   • Front wheel

**TIP**

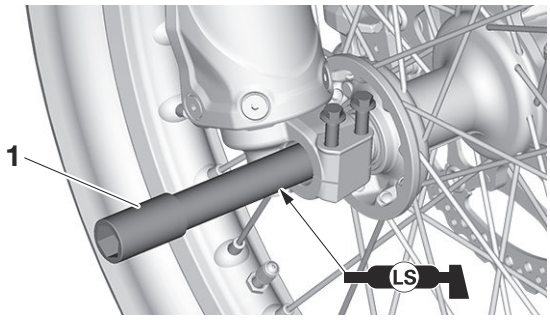
Install the brake disc "1" between the brake pads "2" correctly.




2. Install:
   • Front wheel axle "1"

**TIP**

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



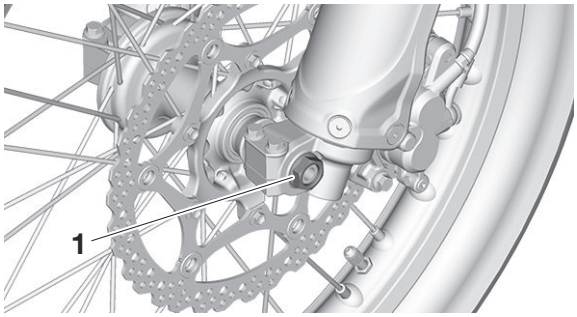

3. Tighten:
   • Front wheel axle nut "1"

| | |
|---|---|
| | **Front wheel axle nut**<br>**115 N·m (11.5 kgf·m, 85 lb·ft)** |

ECA24430

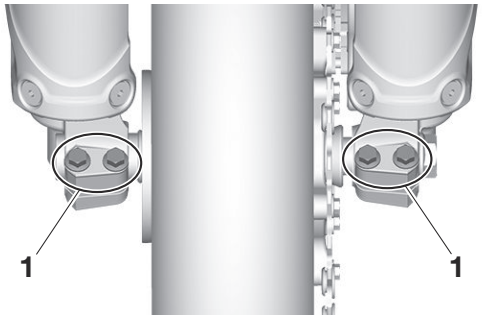
***NOTICE***

**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”

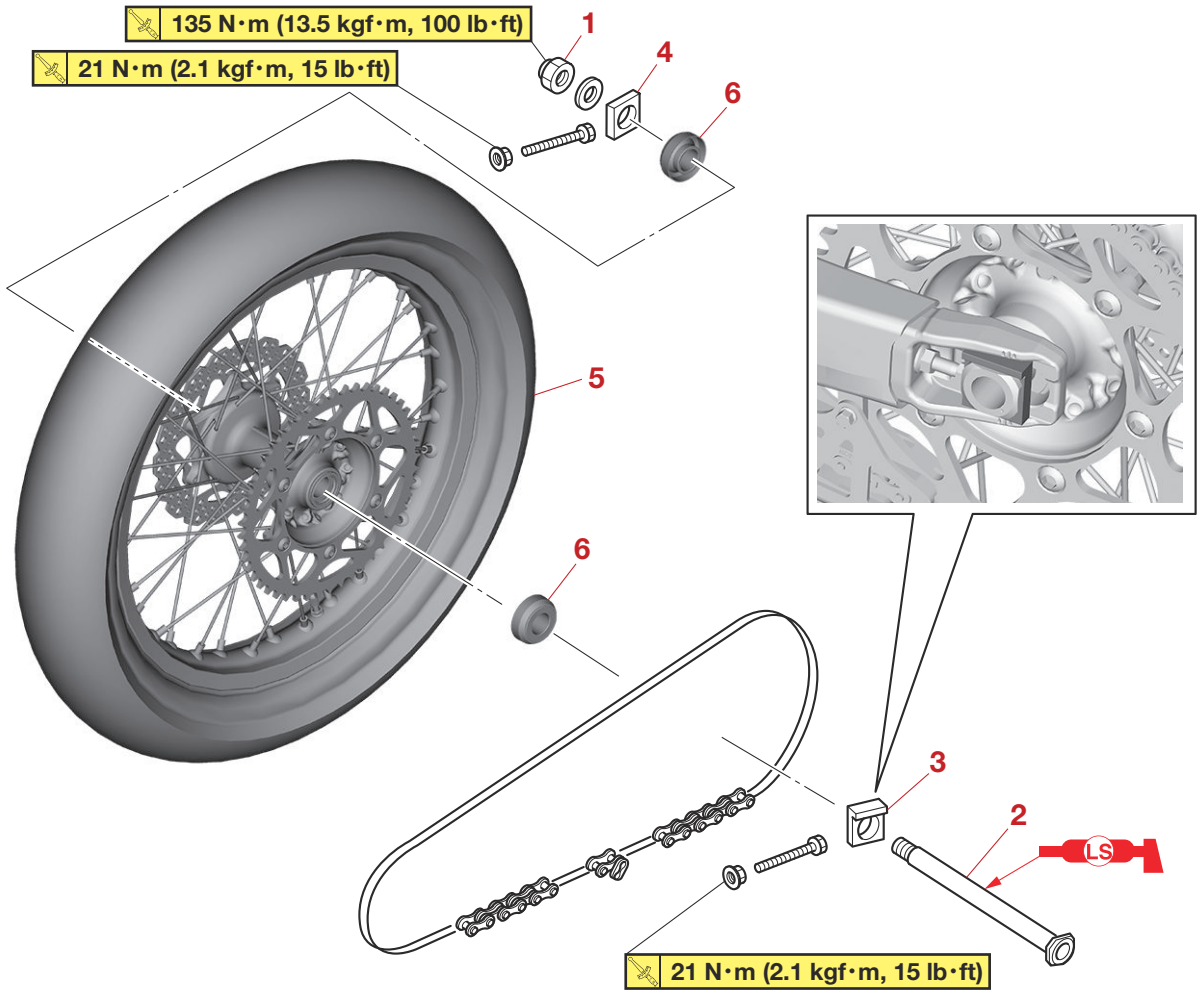
| | |
|---|---|
| | **Front wheel axle pinch bolt**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |



EAM20096

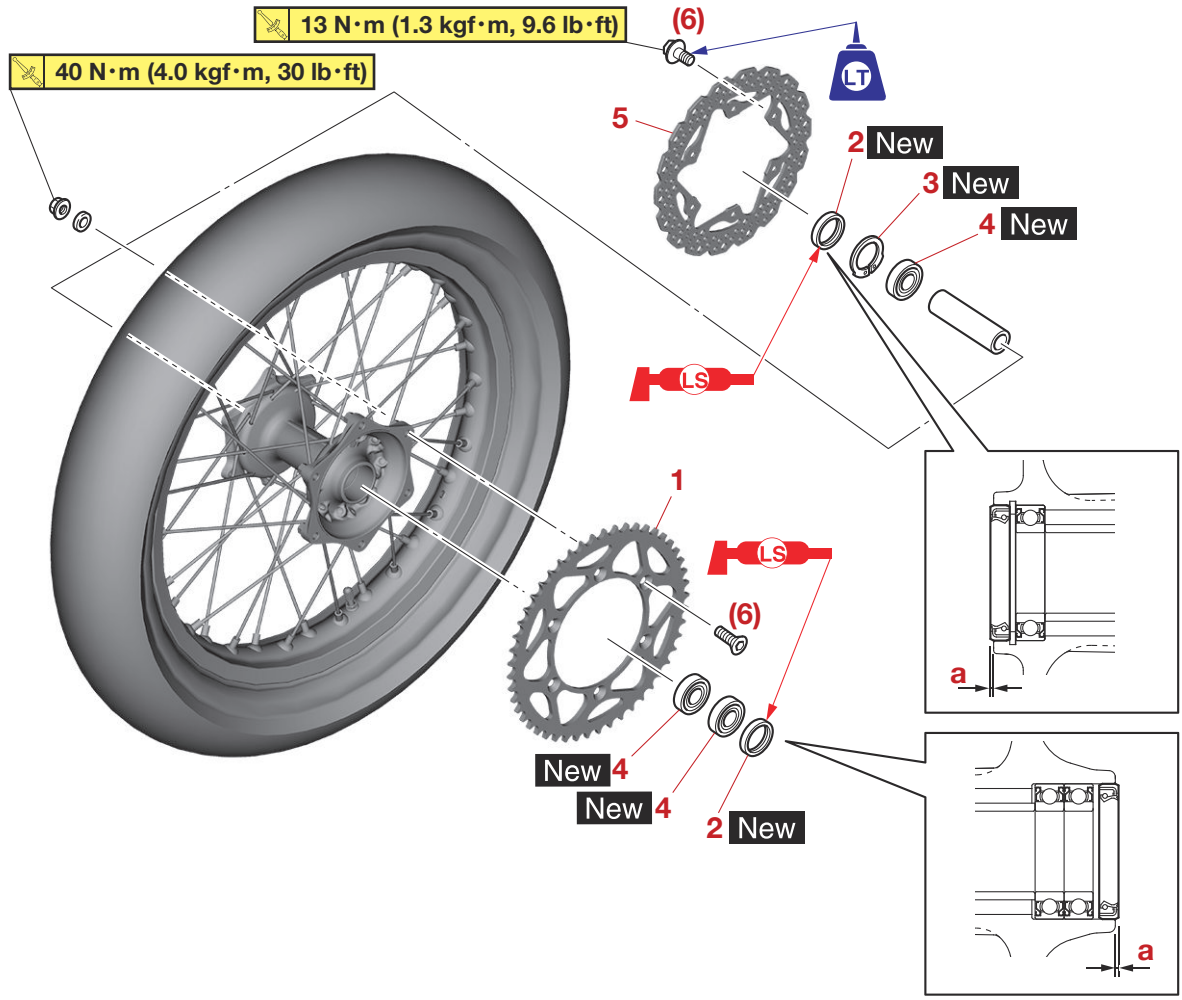
# REAR WHEEL

## Removing the rear wheel




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | | | Use a maintenance stand to raise the rear wheel off the ground. |
| 1 | Rear wheel axle nut | 1 | |
| 2 | Rear wheel axle | 1 | |
| 3 | Drive chain puller (left) | 1 | |
| 4 | Drive chain puller (right) | 1 | |
| 5 | Rear wheel | 1 | |
| 6 | Collar | 2 | |

## Disassembling the rear wheel



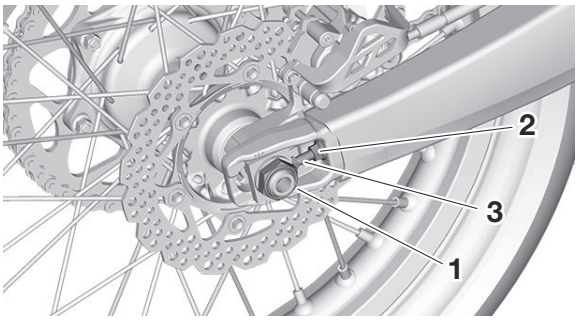

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Rear wheel sprocket | 1 | |
| 2 | Oil seal | 2 | ["a" = Approx. 1.0 mm (0.04 in)] |
| 3 | Circlip | 1 | |
| 4 | Bearing | 3 | |
| 5 | Brake disc | 1 | |

EAM30022
## REMOVING THE REAR WHEEL
1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120
**⚠ WARNING**

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

2. Remove:
   • Rear wheel axle nut "1"
3. Loosen:
   • Locknut "2"
4. Tighten:
   • Adjusting bolt "3"




5. Remove:
   • Rear wheel axle
   • Rear wheel

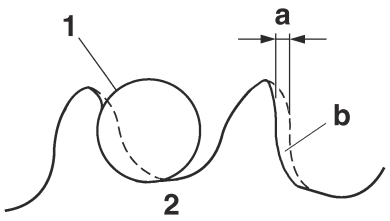
**TIP**
- Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.
- Do not depress the brake pedal with the rear wheel removed.

EAM30024
## DISASSEMBLING THE REAR WHEEL
1. Remove:
   • Oil seal
   • Bearing
   Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-9.

EAM30023
## CHECKING THE REAR WHEEL
1. Check:
   • Rear wheel axle
   • Rear wheel
   • Bearing
   • Oil seal
   Refer to "CHECKING THE FRONT WHEEL" on page 4-9.
2. Check:
   • Tire
   • Rear wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-34 and "CHECKING THE WHEELS" on page 3-35.
3. Check:
   • Spoke
   Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-34.
4. Measure:
   • Radial wheel runout
   • Lateral wheel runout
   Refer to "CHECKING THE FRONT WHEEL" on page 4-9.

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

EAM30025
## CHECKING AND REPLACING THE REAR WHEEL SPROCKET
1. Check:
   • Rear wheel sprocket
   More than 1/4 tooth wear "a" → Replace the rear wheel sprocket and the drive sprocket as a set.
   Bent tooth → Replace the rear wheel sprocket and the drive sprocket as a set.




b. Correct

1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
   • Rear wheel sprocket
   a. Remove the 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 nut**
**40 N·m (4.0 kgf·m, 30 lb·ft)**

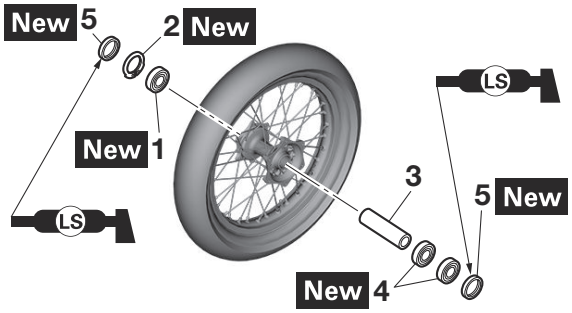
**TIP**
Tighten the nuts in stages and in a crisscross pattern.

EAM30026
## ASSEMBLING THE REAR WHEEL

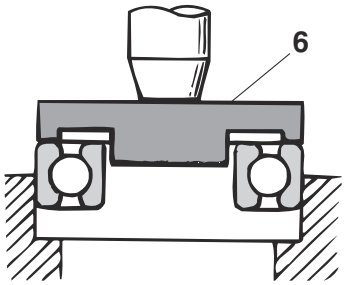
1. Install:
   - Bearing (right side) "1" New
   - Circlip "2" New
   - Spacer "3"
   - Bearing (left side) "4" New
   - Oil seal "5" New

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

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




**TIP**
Use a socket "6" that matches the diameter of the bearing outer race and that of the oil seal.



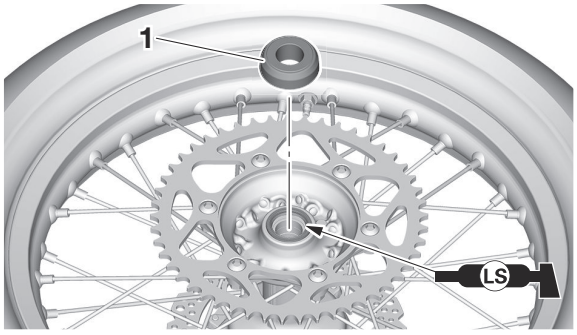

2. Install:
   - Brake disc
   - Brake disc bolt

| | |
|---|---|
| | **Brake disc bolt**<br>**13 N·m (1.3 kgf·m, 9.6 lb·ft)**<br>**LOCTITE®** |

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

3. Install:
   - Collar "1"

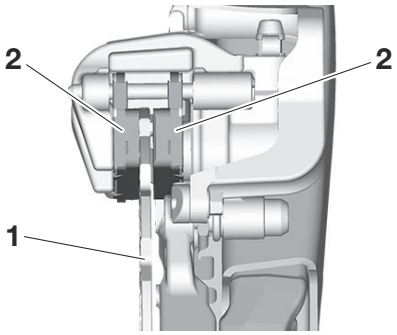
**TIP**
Apply the lithium-soap-based grease on the oil seal lip.




EAM30027
## INSTALLING THE REAR WHEEL

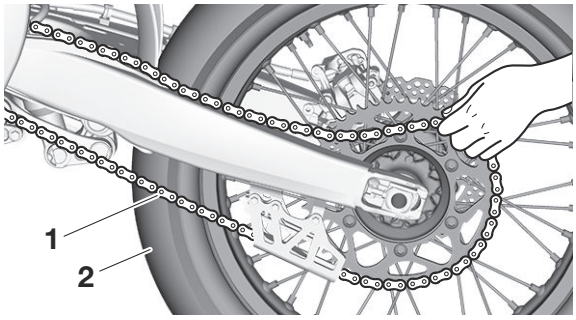
1. Install:
   - Rear wheel

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




2. Install:
   - Drive chain "1"

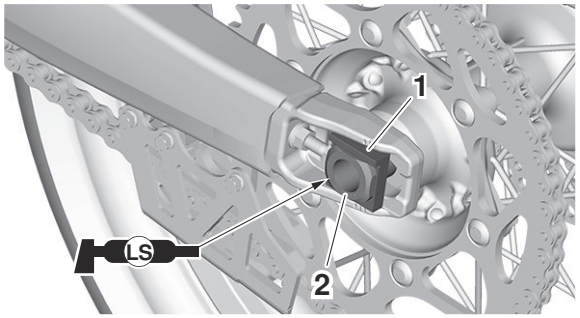
**TIP**
Push the rear wheel "2" forward and install the drive chain.



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

**TIP**

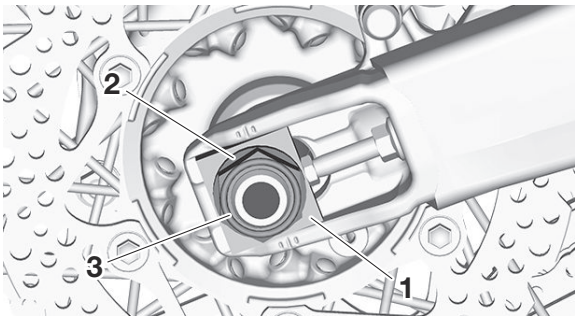
• Install the drive chain puller (left), and insert the rear wheel axle from the left side.
• Apply the lithium-soap-based grease to the rear wheel axle.




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

**TIP**

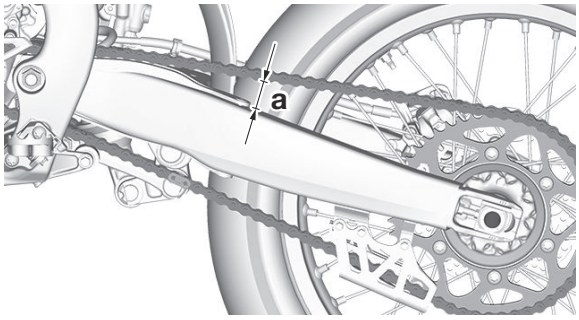
Temporarily tighten the rear wheel axle nut at this point.




5. Adjust:
   • Drive chain slack “a”

| | |
|---|---|
| | **Drive chain slack (Maintenance Stand)**<br>**50.0–60.0 mm (1.97–2.36 in)** |

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

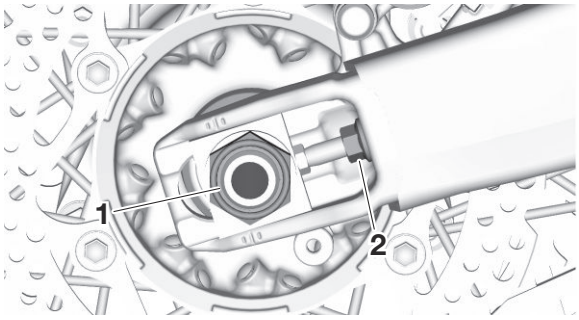



6. Tighten:
   • Rear wheel axle nut “1”

| | |
|---|---|
| | **Rear wheel axle nut**<br>**135 N·m (13.5 kgf·m, 100 lb·ft)** |

   • Locknut “2”

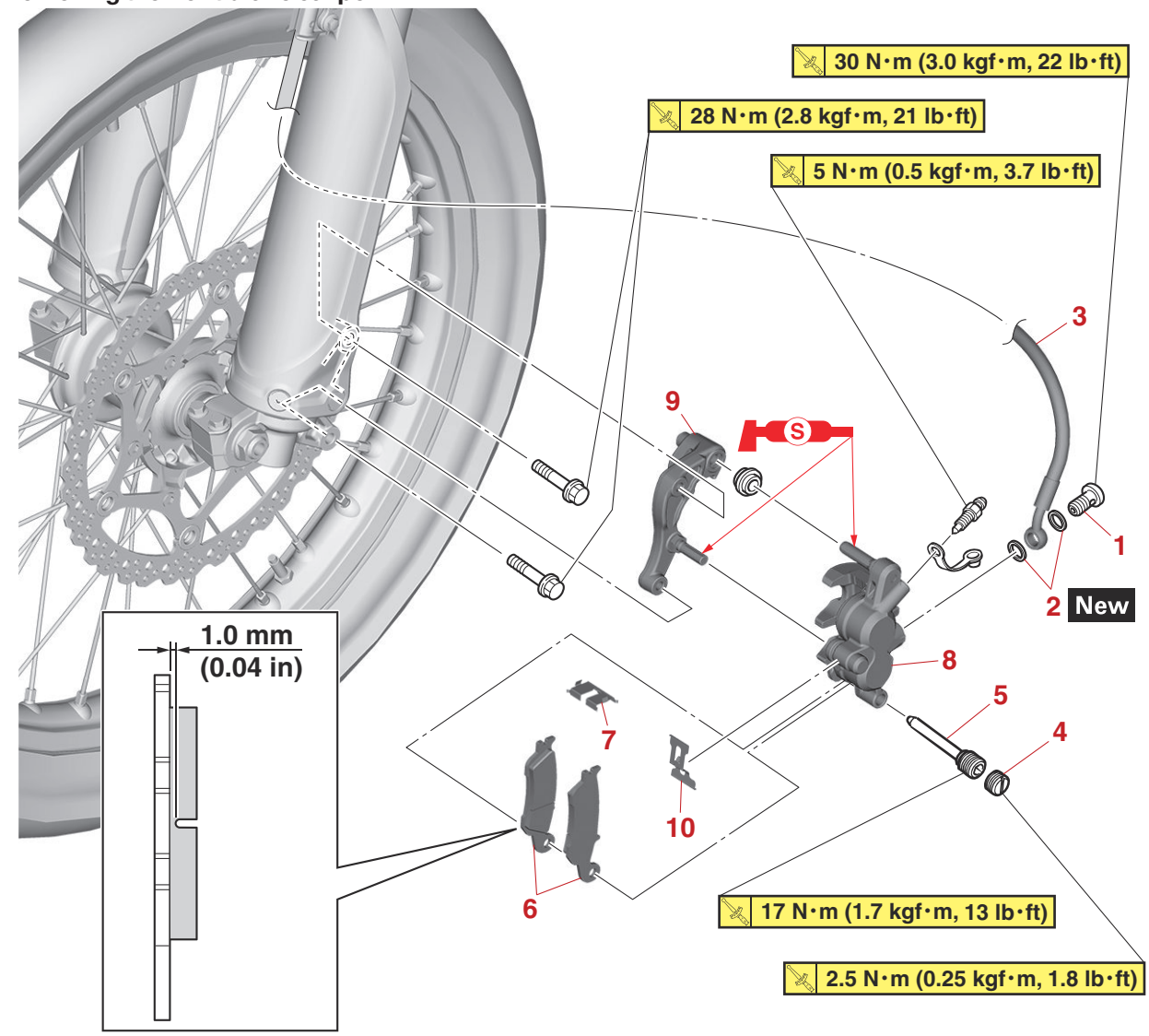
| | |
|---|---|
| | **Locknut**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |



EAM20097

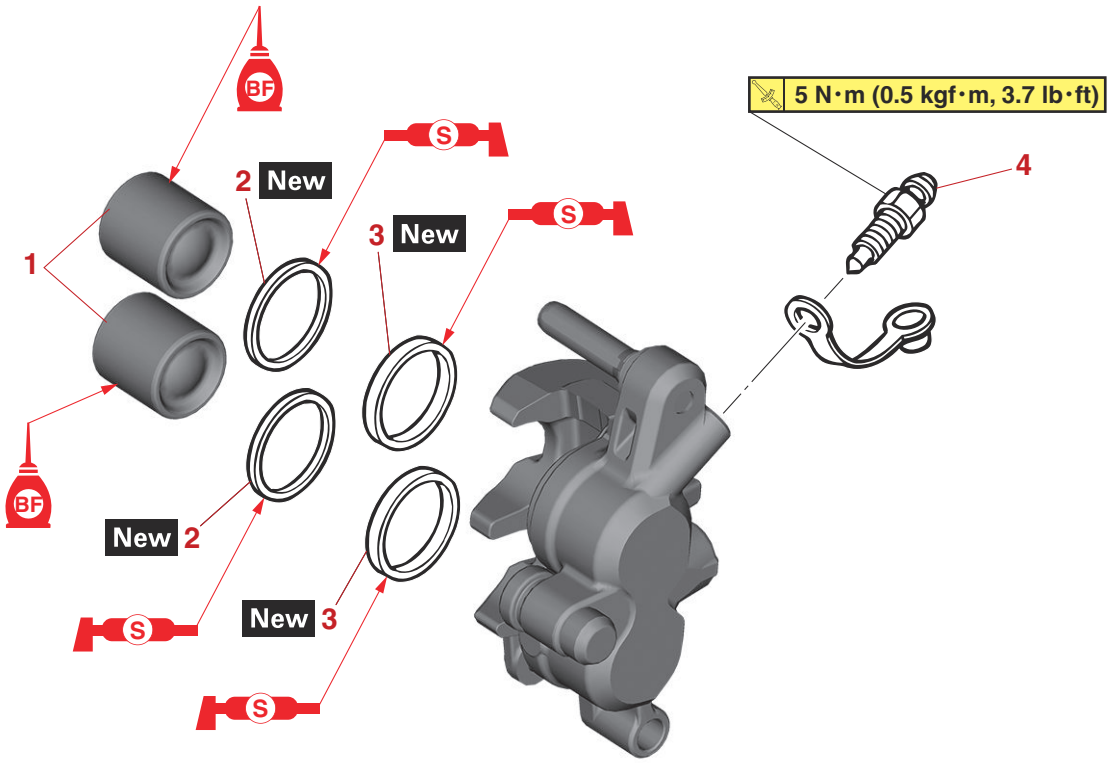
# FRONT BRAKE

## Removing the front brake caliper



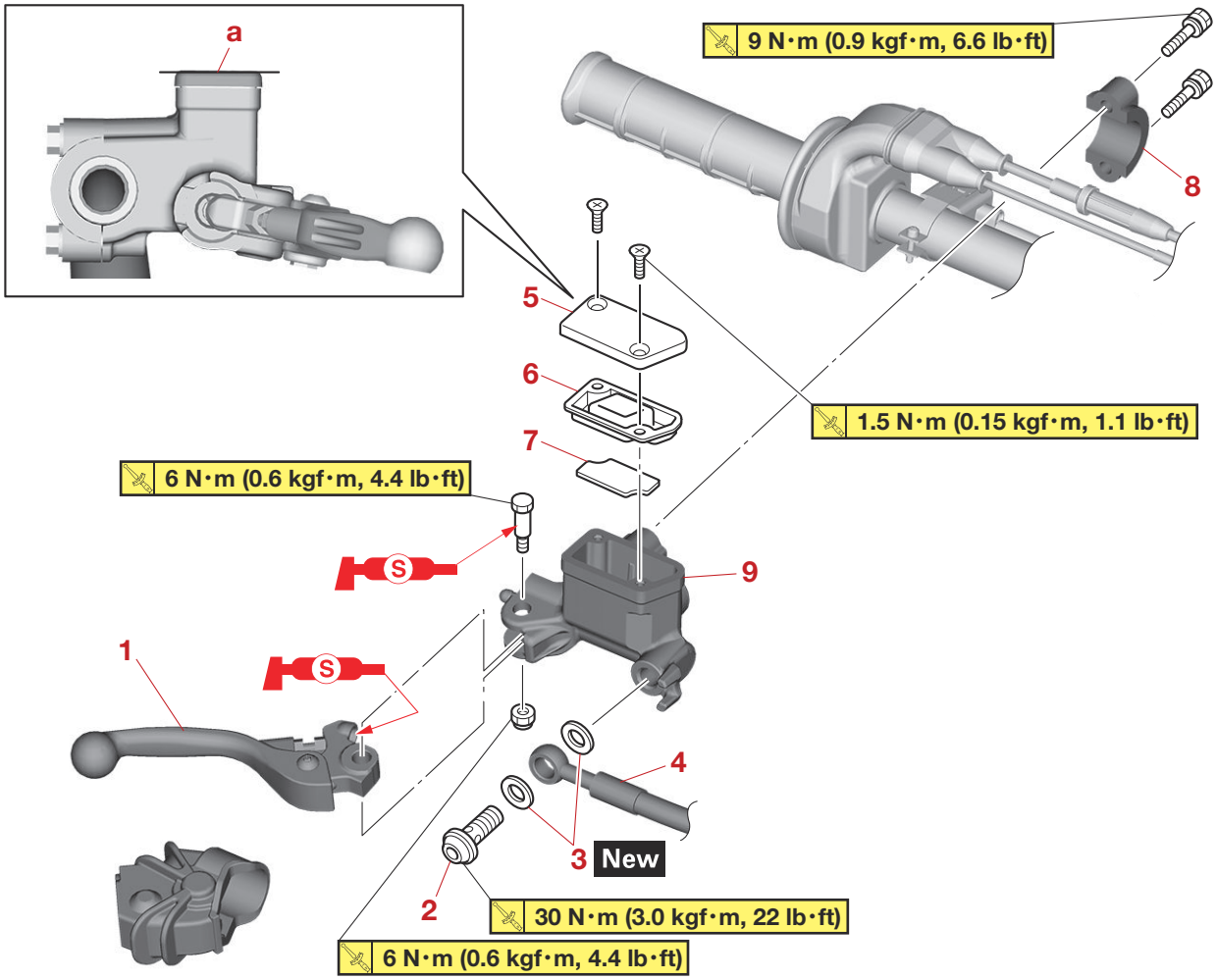

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Brake fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26. |
| 1 | Union bolt | 1 | |
| 2 | Copper washer | 2 | |
| 3 | Front brake hose | 1 | |
| 4 | Brake pad pin plug | 1 | |
| 5 | Brake pad pin | 1 | |
| 6 | Brake pad | 2 | |
| 7 | Brake pad spring | 1 | |
| 8 | Front brake caliper assembly | 1 | |
| 9 | Front brake caliper bracket | 1 | |
| 10 | Brake pad spring | 1 | |

**Disassembling the front brake caliper**



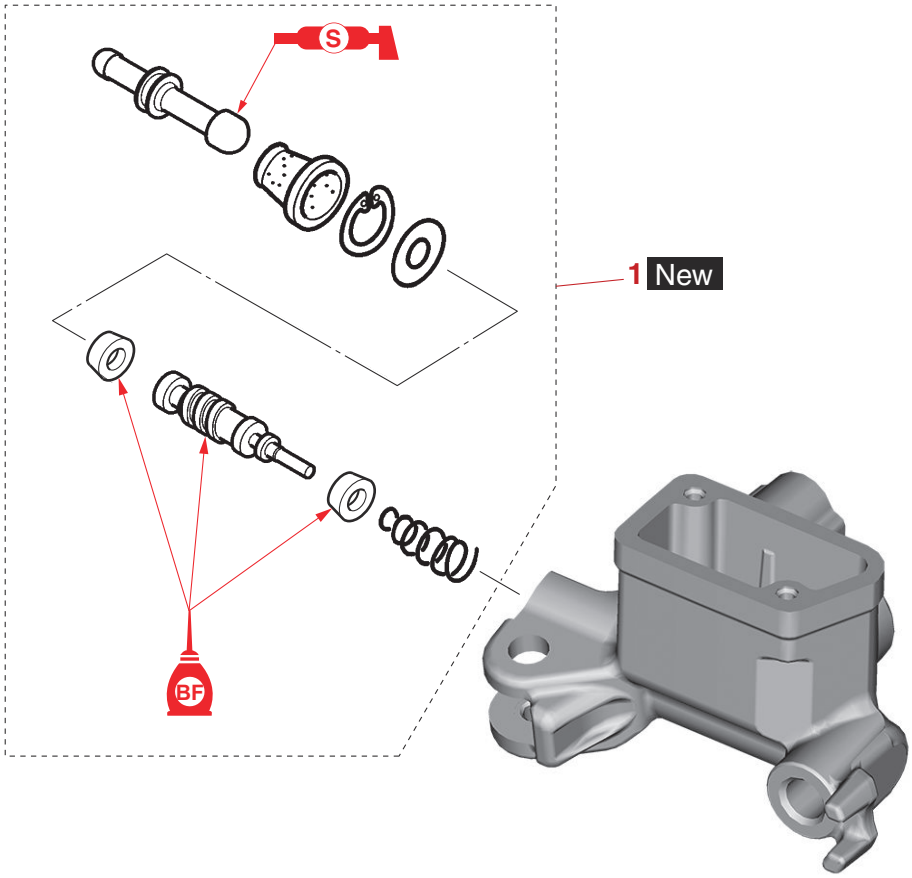

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Brake caliper piston | 2 | |
| 2 | Brake caliper piston dust seal | 2 | |
| 3 | Brake caliper piston seal | 2 | |
| 4 | Bleed screw | 1 | |

## Removing the front brake master cylinder




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Brake fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26. |
| 1 | Brake lever | 1 | |
| 2 | Union bolt | 1 | |
| 3 | Copper washer | 2 | |
| 4 | Front brake hose | 1 | |
| 5 | Brake master cylinder reservoir cap | 1 | Adjust the front brake master cylinder so that the top "a" of the brake master cylinder reservoir cap is horizontal. |
| 6 | Brake master cylinder reservoir diaphragm | 1 | |
| 7 | Front brake master cylinder float | 1 | |
| 8 | Front brake master cylinder holder | 1 | |
| 9 | Front brake master cylinder | 1 | |

**Disassembling the front brake master cylinder**




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

EAM30028
## INTRODUCTION
EWA19210
**WARNING**

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

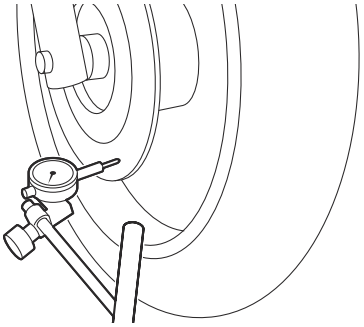
EAM30029
## CHECKING THE FRONT BRAKE DISC
1. Check:
   - Front brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

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

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

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

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

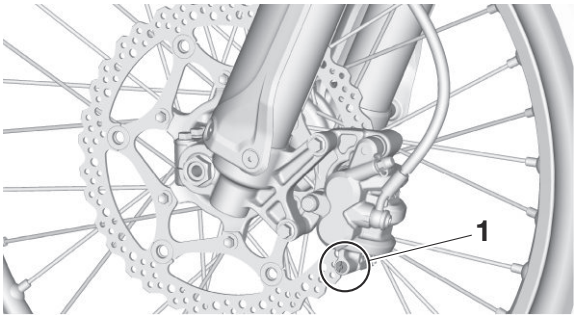


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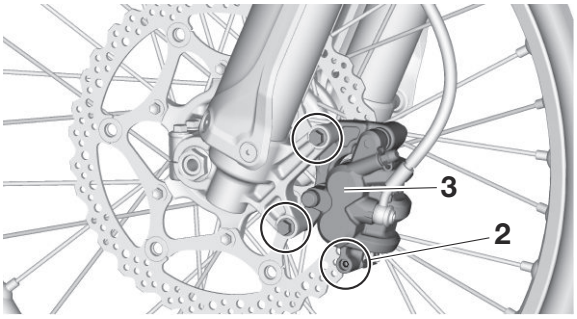
4. Replace:
   - Brake disc
     Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-9.

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

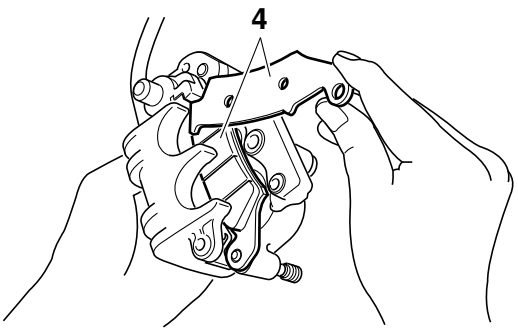
1. Remove:
   - Brake pad
     a. Remove the pad pin plug "1".




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

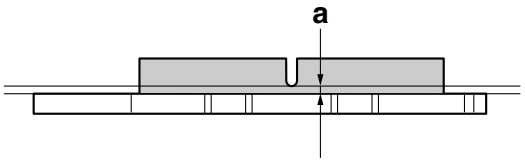



     d. Remove the pad pin and brake pads "4".




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

| | |
|---|---|
| | **Brake pad lining thickness limit**<br>**1.0 mm (0.04 in)** |

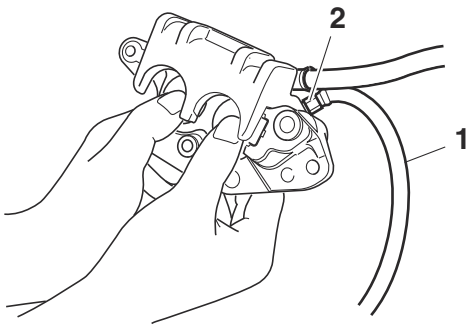



3. Install:
   • Brake pad
   a. Connect the plastic hose "1" to the bleed screw "2" and place a container under the end of the plastic hose.
   b. Loosen the bleed screw and push the brake caliper piston in.

EWA19160

**⚠ WARNING**

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



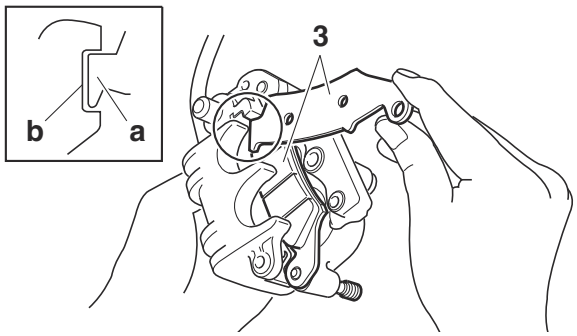

   c. Tighten the bleed screw.

| | |
|---|---|
| | **Bleed screw**<br>**5 N·m (0.5 kgf·m, 3.7 lb·ft)** |

   d. Install the brake pads "3" and the pad pin.

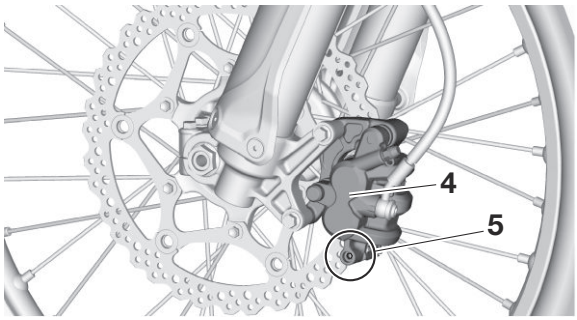
**TIP**

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



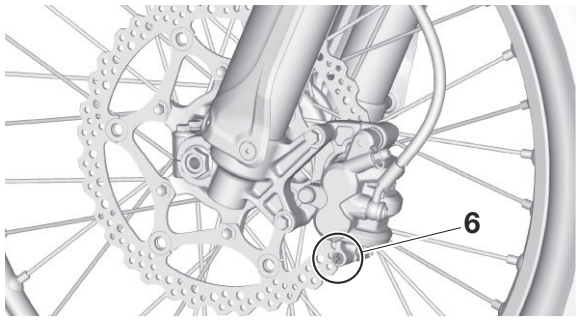

   e. Install the brake caliper "4" and tighten the pad pin "5".

| | |
|---|---|
| | **Front brake caliper bolt**<br>**28 N·m (2.8 kgf·m, 21 lb·ft)**<br>**Pad pin**<br>**17 N·m (1.7 kgf·m, 13 lb·ft)** |




   f. Install the pad pin plug "6".

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




4. Check:
   • Brake fluid level
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.
5. Check:
   • Brake lever operation
   A softy or spongy feeling → Bleed the brake

system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.

EAM30030
## REMOVING THE FRONT BRAKE CALIPER

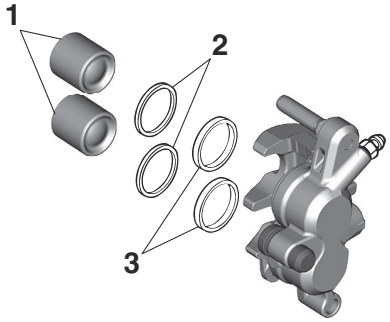
**TIP**
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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

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

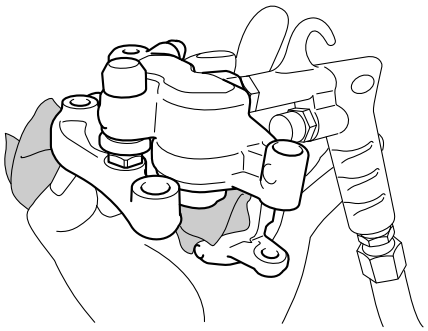
EAM30031
## DISASSEMBLING THE FRONT BRAKE CALIPER

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




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

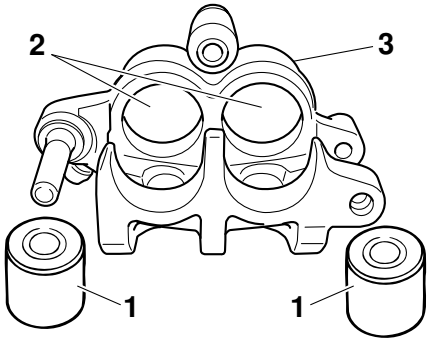
EWA13550
**WARNING**
- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



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

EAM30032
## CHECKING THE FRONT BRAKE CALIPER

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




EWA19220
**WARNING**
**When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.**

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

EAM30033
## ASSEMBLING THE FRONT BRAKE CALIPER

EWA19230
**WARNING**
- **Before installation, clean and lubricate the**

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

**Specified brake fluid**
**DOT 4**

EAM30035
### INSTALLING THE FRONT BRAKE CALIPER

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

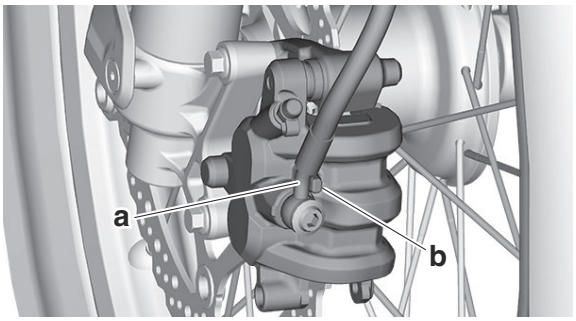
**Front brake caliper bracket**
**28 N·m (2.8 kgf·m, 21 lb·ft)**
**Brake hose union bolt**
**30 N·m (3.0 kgf·m, 22 lb·ft)**

EWA13531
**WARNING**

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

ECA24460
***NOTICE***

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




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

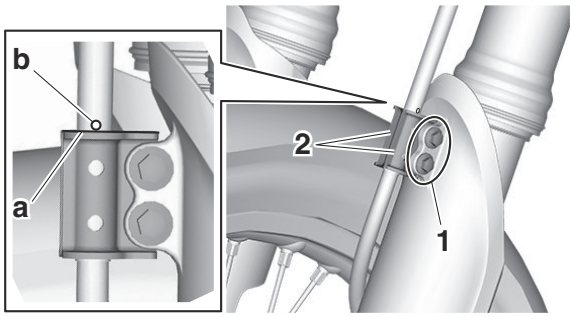
**Brake pad pin**
**17 N·m (1.7 kgf·m, 13 lb·ft)**
**Brake pad pin plug**
**2.5 N·m (0.25 kgf·m, 1.8 lb·ft)**

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

3. Tighten:
   - Brake hose holder bolt "1"

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

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




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

**Specified brake fluid**
**DOT 4**

EWA13090
**WARNING**

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

ECA13540
***NOTICE***

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

5. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.
6. Check:
   • Brake fluid level
   The minimum level mark or below → Add.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.
7. Check:
   • Brake lever operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.

EAM30036
## REMOVING THE FRONT BRAKE MASTER CYLINDER

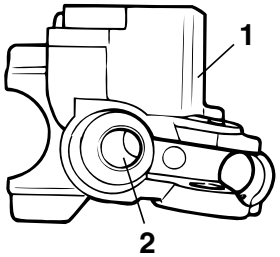
**TIP**
Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

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

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

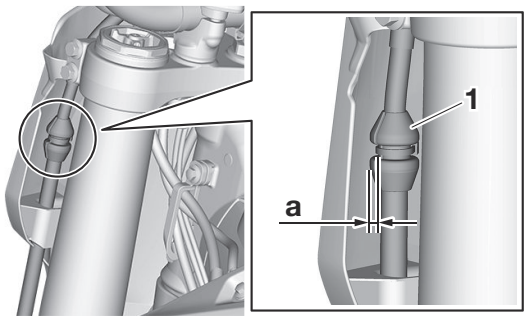
EAM30037
## CHECKING THE FRONT BRAKE MASTER CYLINDER

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




2. Check:
   • Brake master cylinder reservoir cap
   Damage/scratches/wear → Replace.
3. Check:
   • Brake hose
   Cracks/damage/wear → Replace.
   • Protector "1"
   Out of specification → Replace.

**TIP**
The protector reaches the limit of its use when it is worn down to the same height "a" as of the plastic locking tie circumference.



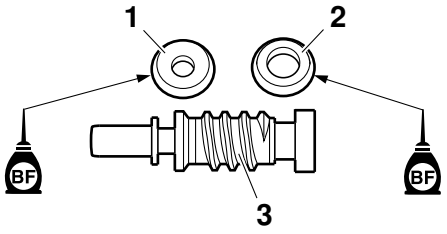

EAM30038
## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

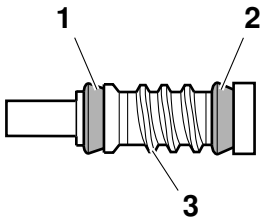
EWA13520
**WARNING**
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

| | |
|---|---|
| | **Specified brake fluid**<br>**DOT 4** |

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

EWA20240
**WARNING**
**Apply brake fluid to the cylinder cups and install them as shown. Wrong orientation in installation causes poor braking performance.**

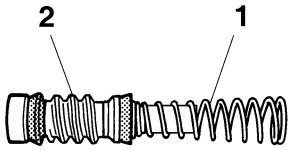



3. Install:
   • Spring "1"
   (to the brake master cylinder piston "2")

**TIP**

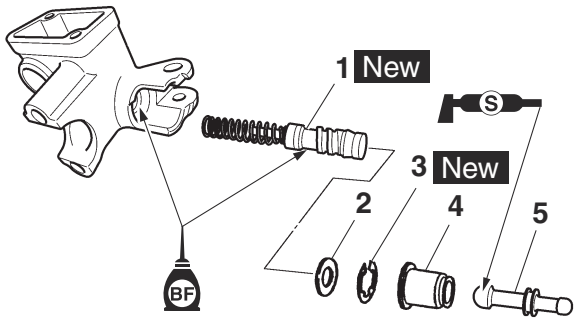
Install the spring with a smaller inside diameter to the brake master cylinder piston.




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

**TIP**

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




EAM30039

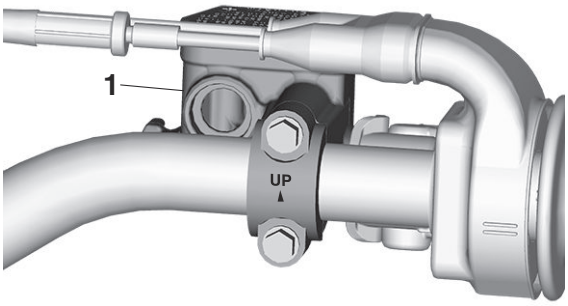
## INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   • Brake master cylinder "1"

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

**TIP**

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




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

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

EWA13531

**WARNING**

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

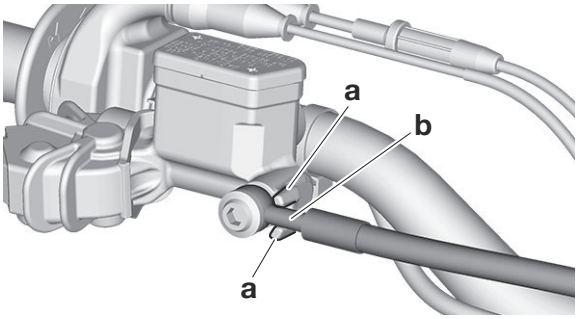
ECA24470

***NOTICE***

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

**TIP**

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




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

| | |
|---|---|
| | **Specified brake fluid**<br>**DOT 4** |

EWA13090

**⚠ WARNING**

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

ECA13540

***NOTICE***

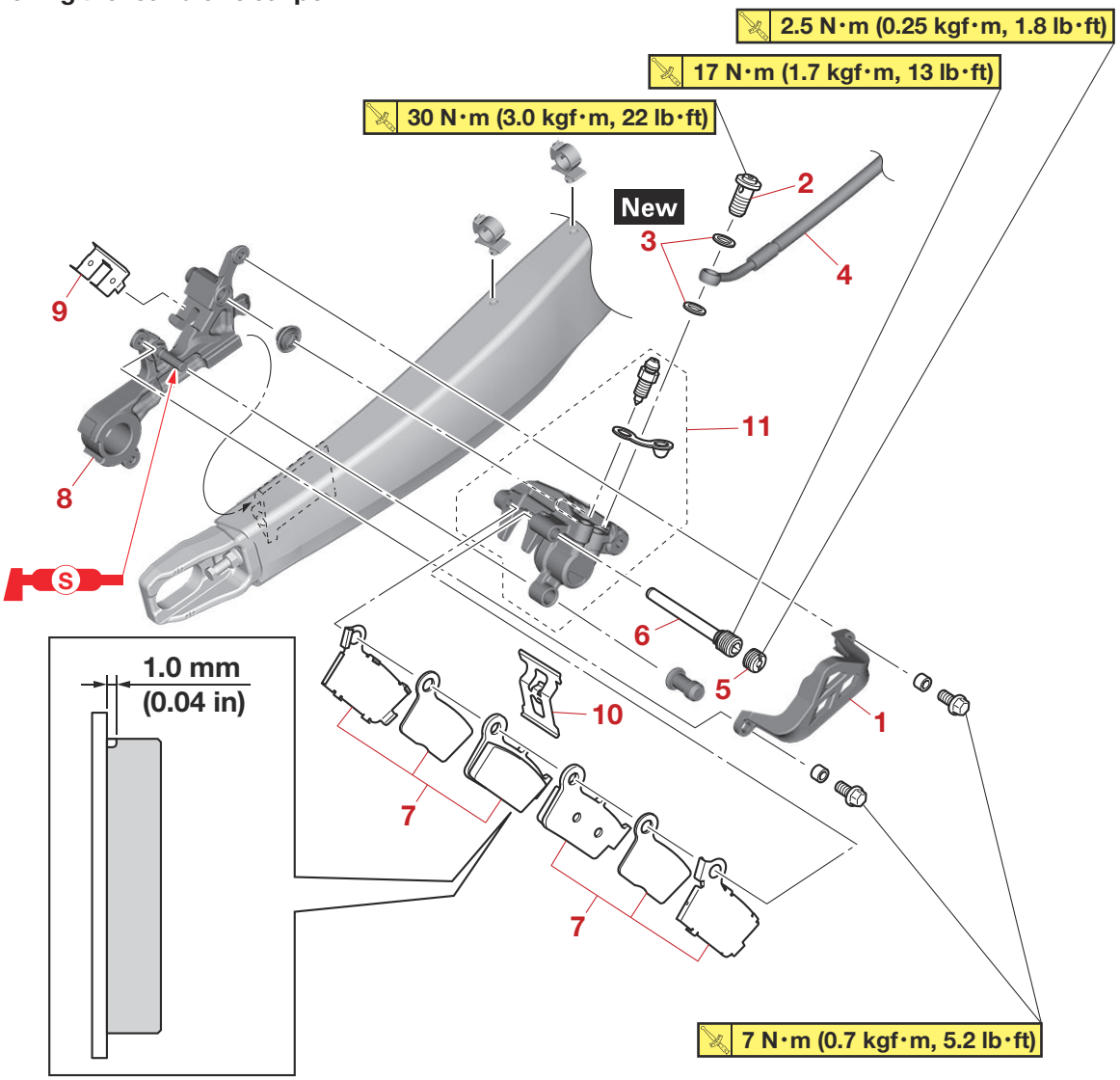
**Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**

4. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.
5. Check:
   - Brake fluid level
     The minimum level mark or below → Add.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.
6. Check:
   - Brake lever operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.

EAM20098

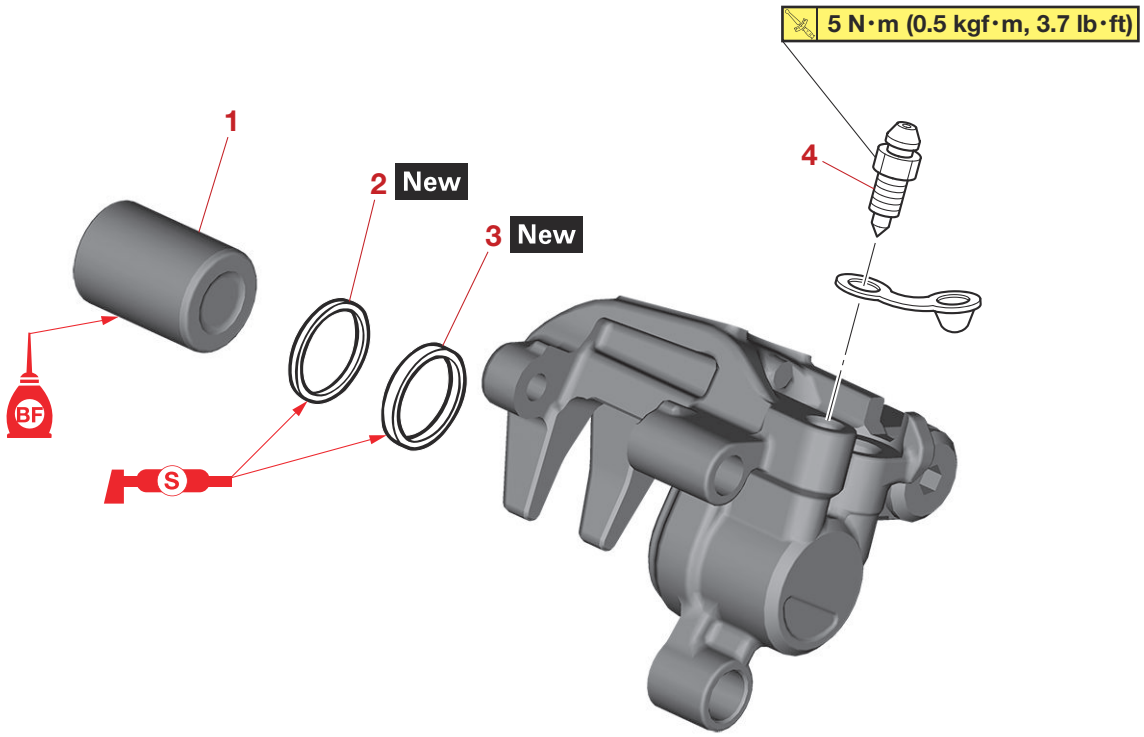
# REAR BRAKE

## Removing the rear brake caliper



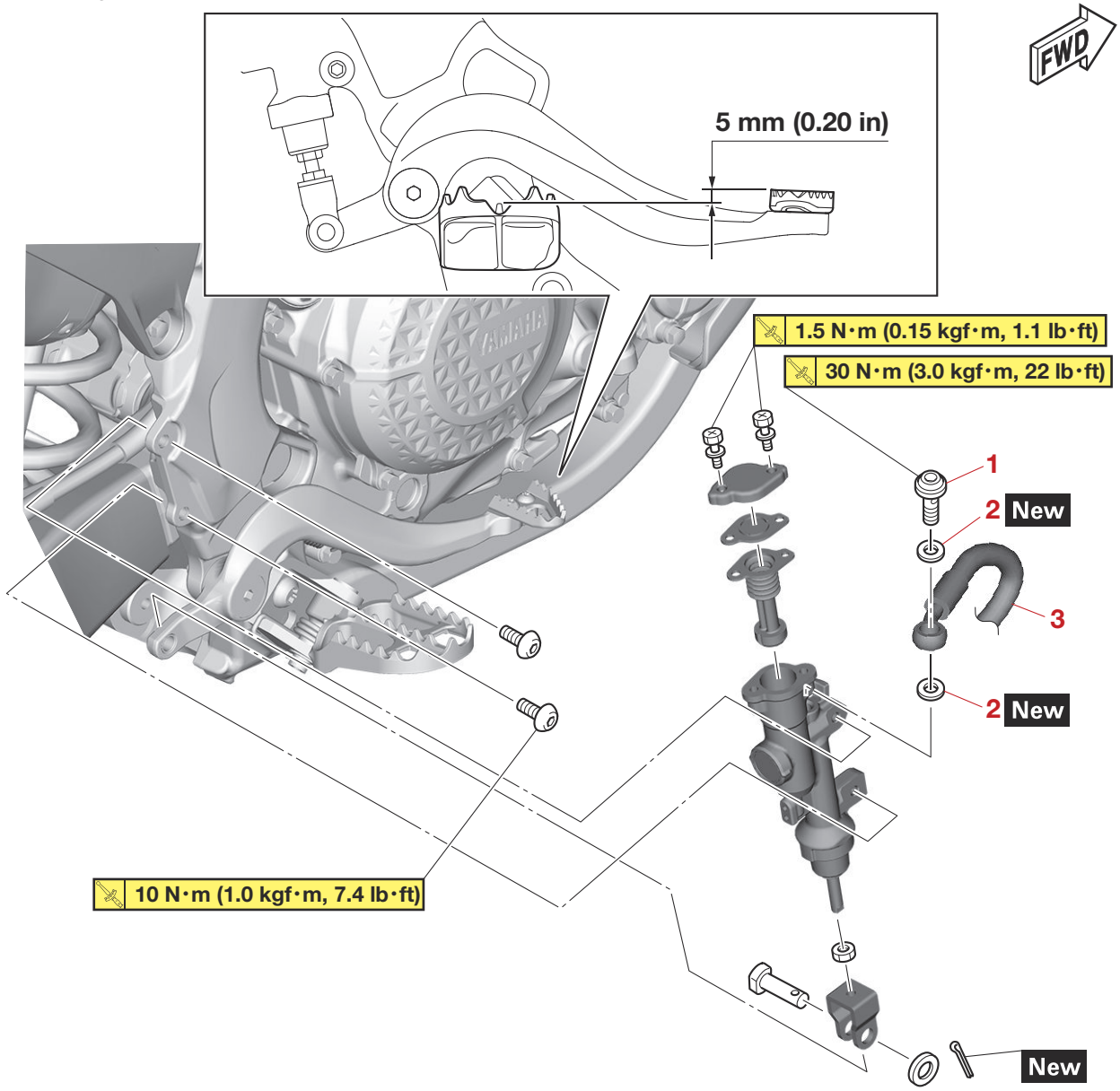

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Brake fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26. |
| | Rear wheel | | Refer to "REAR WHEEL" on page 4-12. |
| 1 | Protector | 1 | |
| 2 | Union bolt | 1 | |
| 3 | Copper washer | 2 | |
| 4 | Rear 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 | 1 | |
| 10 | Brake pad spring | 1 | |
| 11 | Rear brake caliper assembly | 1 | |

## Disassembling the rear brake caliper



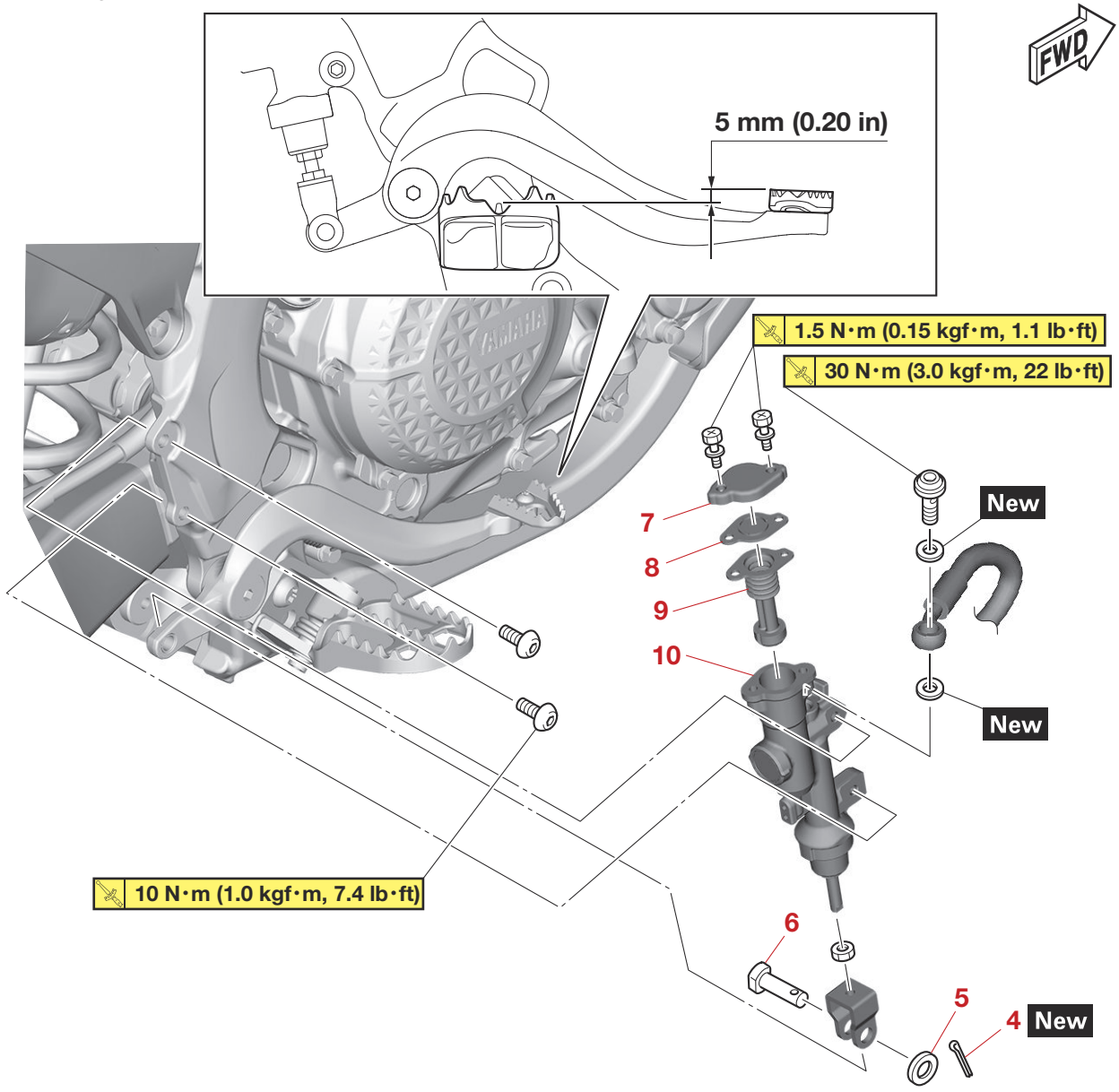

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Brake caliper piston | 1 | |
| 2 | Brake caliper piston dust seal | 1 | |
| 3 | Brake caliper piston seal | 1 | |
| 4 | Bleed screw | 1 | |

## Removing the rear brake master cylinder



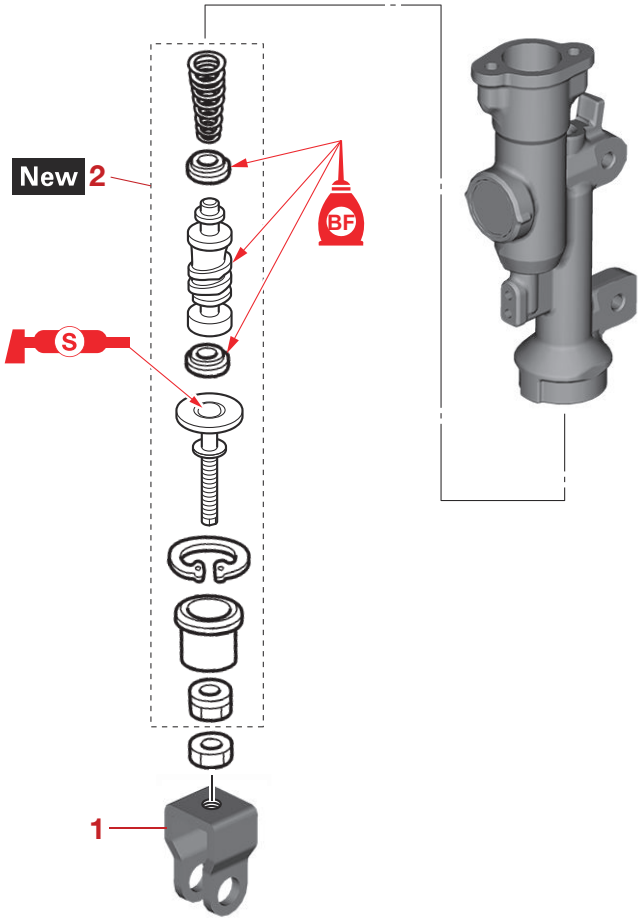

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Brake fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26. |
| 1 | Union bolt | 1 | |
| 2 | Copper washer | 2 | |
| 3 | Brake hose | 1 | |

## Removing the rear brake master cylinder




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 4 | Split pin | 1 | |
| 5 | Washer | 1 | |
| 6 | Pin | 1 | |
| 7 | Brake master cylinder reservoir cap | 1 | |
| 8 | Brake master cylinder reservoir diaphragm plate | 1 | |
| 9 | Brake master cylinder reservoir diaphragm | 1 | |
| 10 | Rear brake master cylinder | 1 | |

## Disassembling the rear brake master cylinder




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Brake master cylinder joint | 1 | |
| 2 | Brake master cylinder kit | 1 | |

EAM30040
## INTRODUCTION
EWA19260
**WARNING**

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

EAM30041
## CHECKING THE REAR BRAKE DISC
1. Check:
   - Brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-21.

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

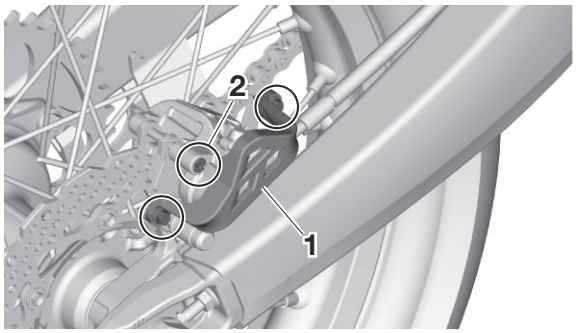
3. Measure:
   - Brake disc runout
     Out of specification → Replace the brake disc.
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-21.

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

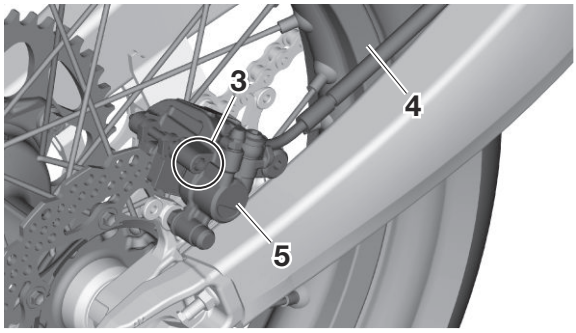
4. Replace:
   - Brake disc
     Refer to "ASSEMBLING THE REAR WHEEL" on page 4-15.

EAM30523
## REPLACING THE REAR BRAKE PADS
**TIP**
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

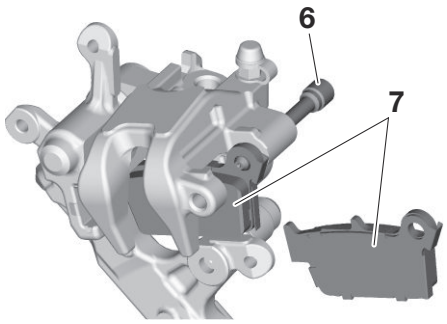
1. Remove:
   - Brake pad
     a. Remove the protector "1" and the pad pin plug "2".




     b. Loosen the pad pin "3".
     c. Remove the rear wheel "4" and the brake caliper "5".
     Refer to "REAR WHEEL" on page 4-12.

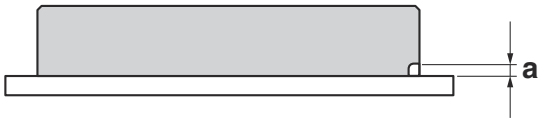



     d. Remove the pad pin "6" and the brake pads "7".




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

| | |
|---|---|
| | **Brake pad lining thickness limit**<br>**1.0 mm (0.04 in)** |

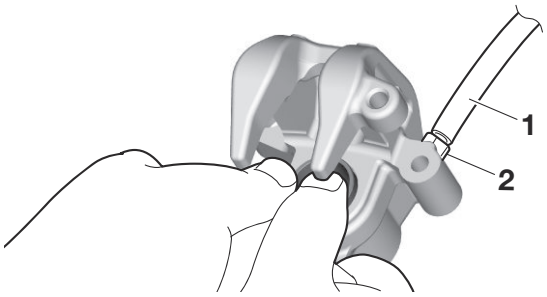



3. Install:
   • Brake pad
   a. Connect the plastic hose “1” to the bleed screw “2” and place a container under the end of the plastic hose.
   b. Loosen the bleed screw and push the brake caliper piston in.

EWA19170

**⚠ WARNING**

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



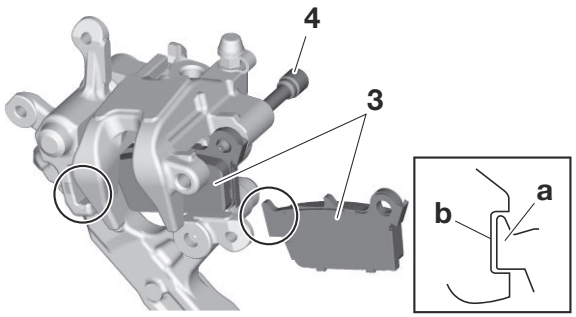

   c. Tighten the bleed screw.

| | |
|---|---|
| | **Bleed screw**<br>**5 N·m (0.5 kgf·m, 3.7 lb·ft)** |

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

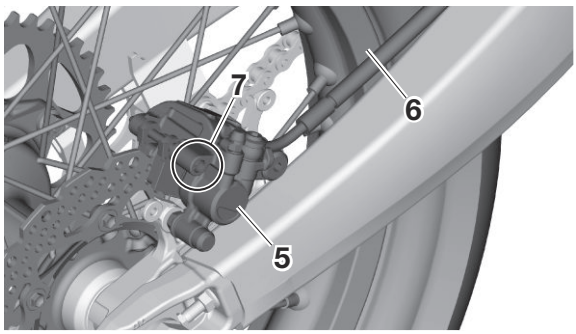
**TIP**

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



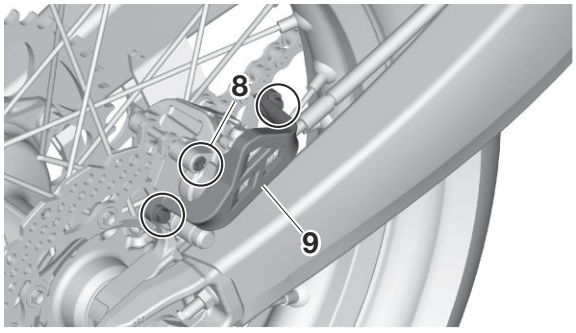

   e. Install the brake caliper “5” and the rear wheel “6”.
   Refer to “REAR WHEEL” on page 4-12.
   f. Tighten the pad pin “7”.

| | |
|---|---|
| | **Pad pin**<br>**17 N·m (1.7 kgf·m, 13 lb·ft)** |




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

| | |
|---|---|
| | **Pad pin plug**<br>**2.5 N·m (0.25 kgf·m, 1.8 lb·ft)**<br>**Rear brake caliper protector bolt**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)** |



4. Check:
   • Brake fluid level
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.
5. Check:
   • Brake pedal operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.

EAM30042
## REMOVING THE REAR BRAKE CALIPER

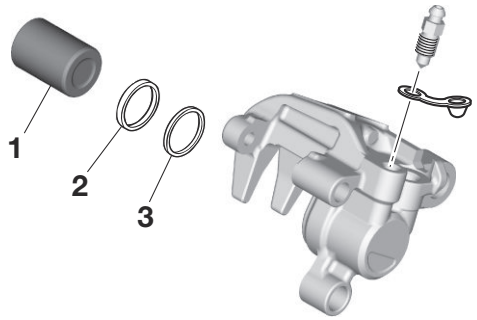
**TIP**
Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

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

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

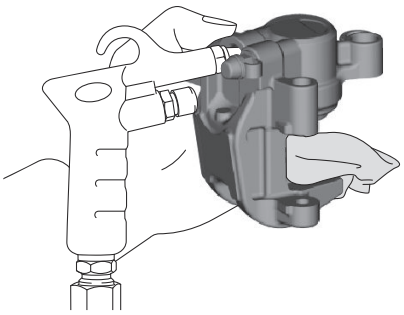
EAM30043
## DISASSEMBLING THE REAR BRAKE CALIPER

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




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

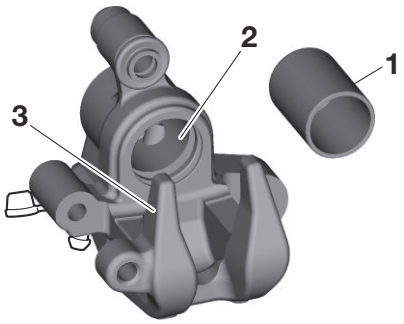
EWA13550
**⚠ WARNING**
- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



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

EAM30044
## CHECKING THE REAR BRAKE CALIPER

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




EWA19270
**⚠ WARNING**
**When the brake caliper is disassembled, replace the brake caliper piston seal and the brake caliper piston dust seal with new ones.**

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

EAM30045
## ASSEMBLING THE REAR BRAKE CALIPER

EWA19280
**⚠ WARNING**
- **Before installation, clean and lubricate the internal parts. Use new brake fluid for**

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

| | |
|---|---|
| | **Specified brake fluid**<br>**DOT 4** |

EAM30047
### INSTALLING THE REAR BRAKE CALIPER
1. Install:
   - Rear brake caliper
   - Rear brake caliper bracket
2. Install:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-12.
   - Copper washer New
   - Brake hose
   - Union bolt

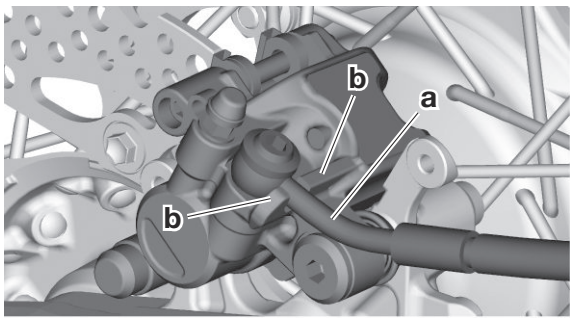
| | |
|---|---|
| | **Brake hose union bolt**<br>**30 N·m (3.0 kgf·m, 22 lb·ft)** |

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**<br>**17 N·m (1.7 kgf·m, 13 lb·ft)**<br>**Brake pad pin plug**<br>**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**<br>**DOT 4** |

EWA13090
**WARNING**

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

ECA13540
***NOTICE***

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

5. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.
6. Check:
   - Brake fluid level
     The minimum level mark or below → Add.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-24.
7. Check:
   - Brake pedal operation
     A softy or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-26.

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

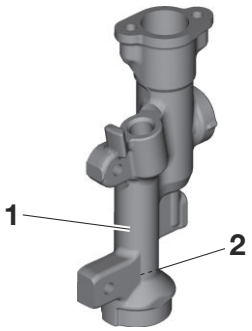
**TIP**

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

EAM30050

## ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

**⚠ WARNING**

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

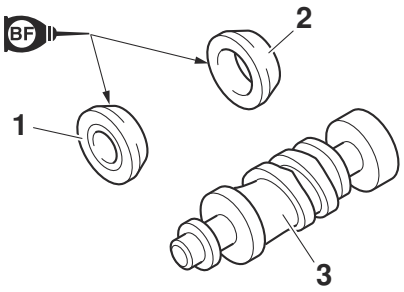
| | |
|---|---|
| | **Specified brake fluid**<br>**DOT 4** |

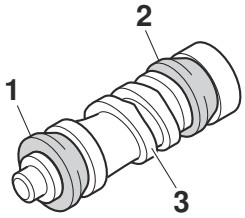
1. Wash the brake master cylinder with brake fluid.
2. Install:
   • Primary cylinder cup "1"
   • Secondary cylinder cup "2"
   (to the brake master cylinder piston "3")

EWA19300

**⚠ WARNING**

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

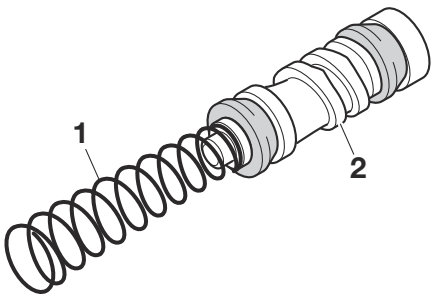



3. Install:
   • Spring "1"
   (to the brake master cylinder piston "2")

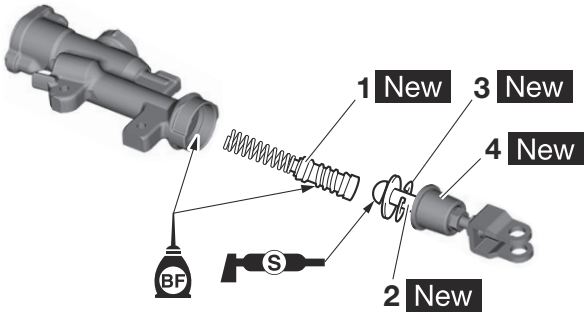
**TIP**

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



4. Install:
   • Brake master cylinder piston assembly “1” New
   • Push rod “2” New
   • Circlip “3” New
   • Dust boot “4” New

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




EAM30051
## INSTALLING THE REAR BRAKE MASTER CYLINDER

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

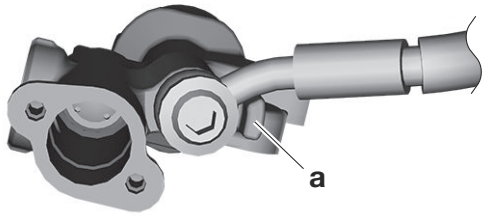
| | |
|---|---|
| | **Brake hose union bolt 30 N·m (3.0 kgf·m, 22 lb·ft)** |

EWA13531
**WARNING**

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

ECA24500
***NOTICE***

**Make sure that the pipe portion of the brake hose touches the projection “a” on the brake caliper.**




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

| | |
|---|---|
| | **Specified brake fluid DOT 4** |

EWA13090
**WARNING**

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

ECA24510
***NOTICE***

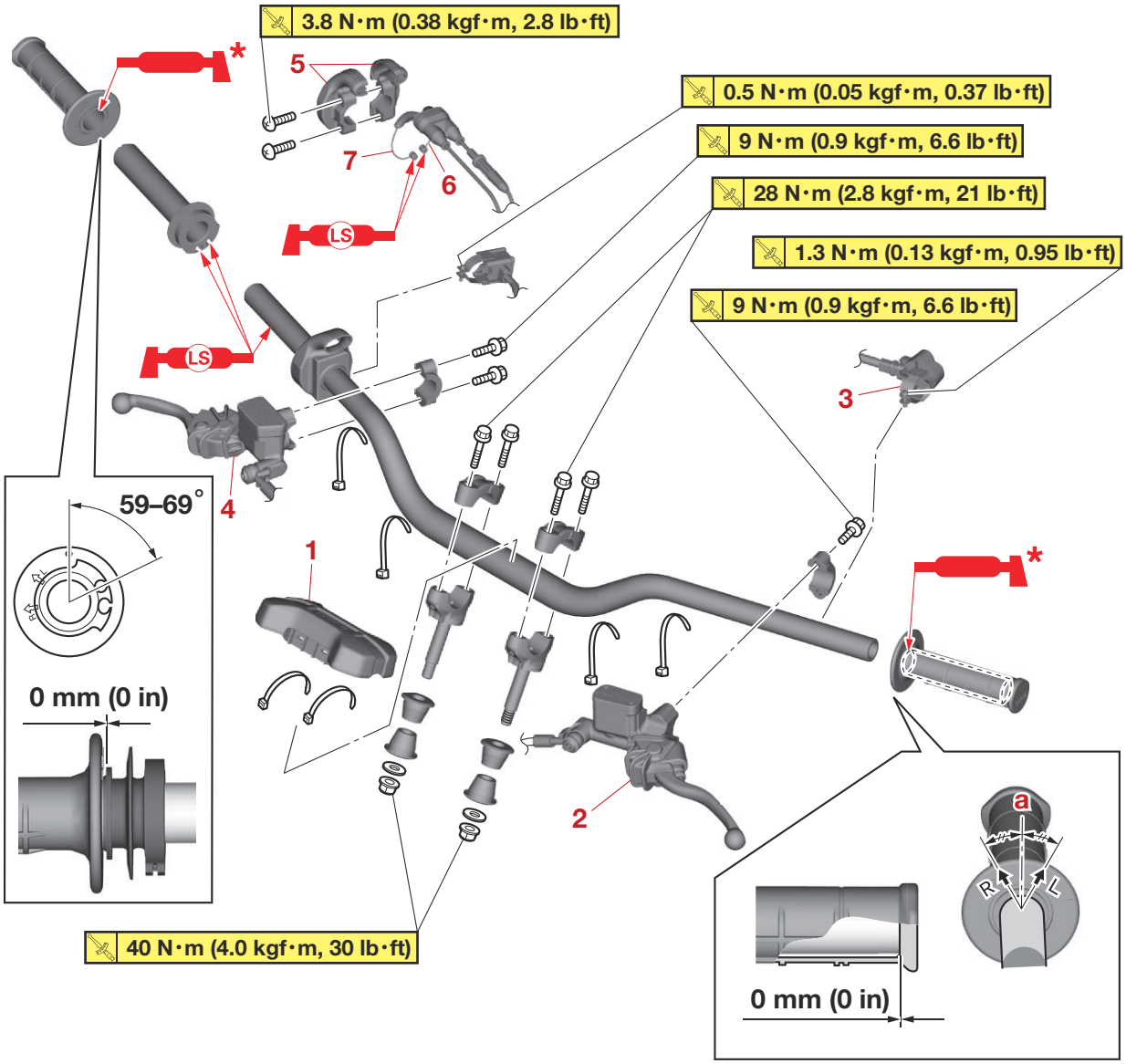
**Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**

3. Bleed:
   • Brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-26.
4. Check:
   • Brake fluid level
   The minimum level mark or below → Add.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-24.
5. Check:
   • Brake pedal operation
   A softy or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-26.

EAM20099

# HANDLEBAR

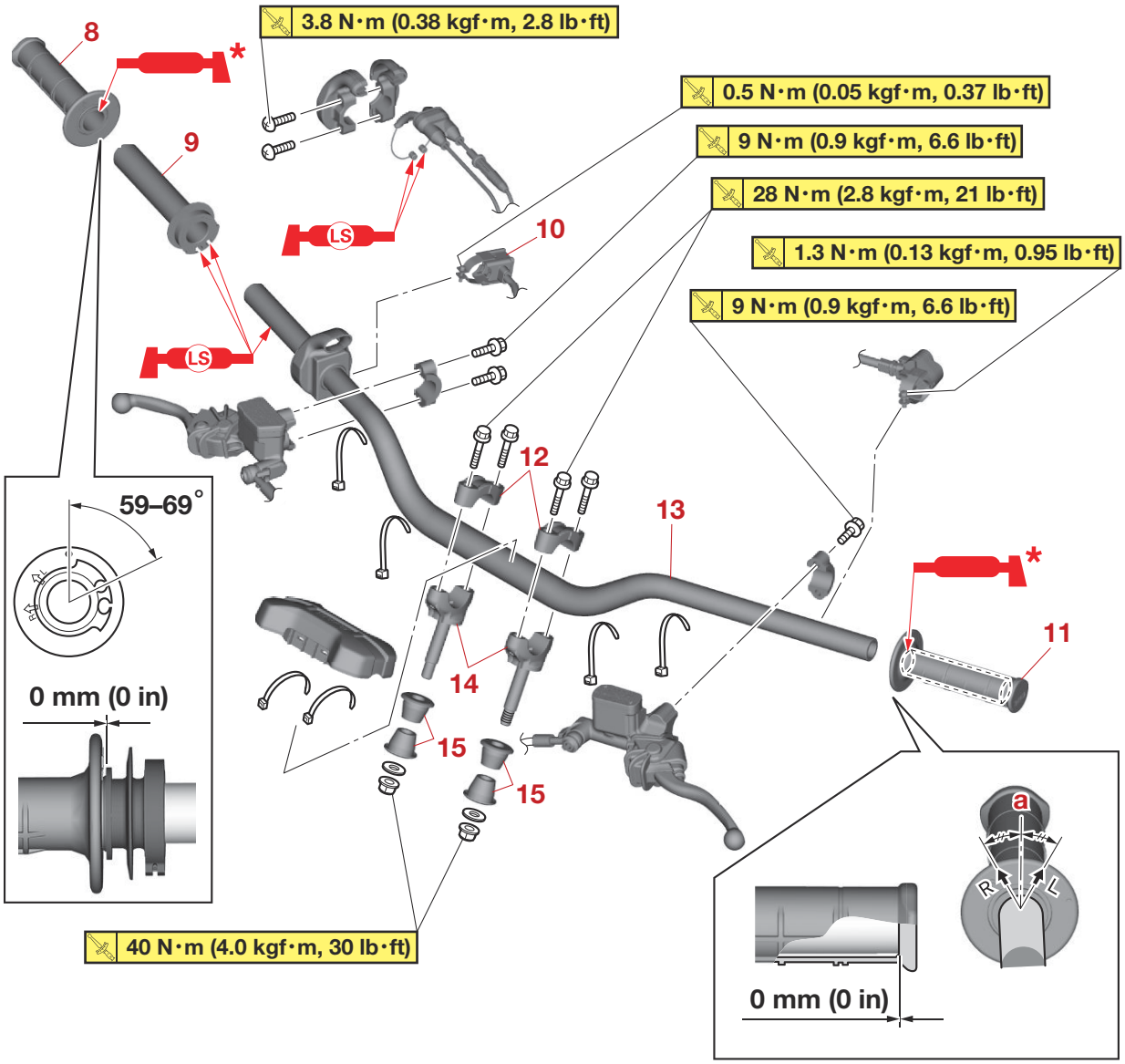
## Removing the handlebar




* Rubber adhesive

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Number plate | | Refer to "GENERAL CHASSIS" on page 4-1. |
| 1 | Handlebar protector | 1 | |
| 2 | Clutch master cylinder | 1 | |
| 3 | Handlebar switch (left) | 1 | |
| 4 | Brake master cylinder | 1 | |
| 5 | Throttle cable housing | 1 | |
| 6 | Throttle cable (pull) | 1 | Disconnect. |
| 7 | Throttle cable (return) | 1 | Disconnect. |

## Removing the handlebar




* Rubber adhesive

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 8 | Handlebar grip (right) | 1 | |
| 9 | Tube guide | 1 | |
| 10 | Starter switch | 1 | |
| 11 | Handlebar grip (left) | 1 | Install the handlebar grip (left) to the handlebar so that the line "a" between the two arrow marks faces straight upward. |
| 12 | Upper handlebar holder | 2 | |
| 13 | Handlebar | 1 | |
| 14 | Lower handlebar holder | 2 | |
| 15 | Damper | 4 | |

EAM30052
## REMOVING THE HANDLEBAR
1. Stand the vehicle upright on a level surface.

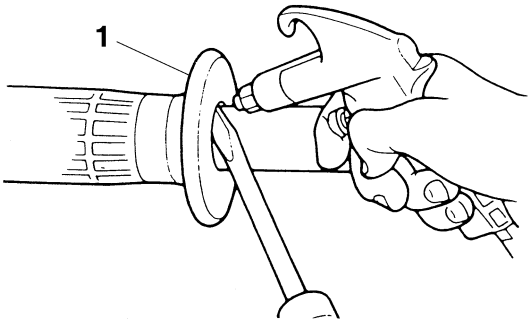
EWA13120
**⚠ WARNING**

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

2. Remove:
   • Grip "1"

**TIP**

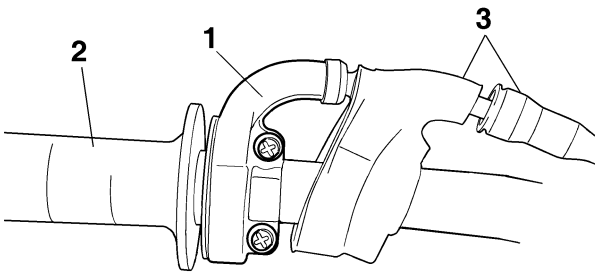
Blow in compressed air between the handlebar or tube guide and the grip. Then remove the grip which has become loose.




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

**TIP**

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




EAM30053
## CHECKING THE HANDLEBAR
1. Check:
   • Handlebar
   Bends/cracks/damage → Replace.

EWA13690
**⚠ WARNING**

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

EAM30054
## INSTALLING THE HANDLEBAR
1. Stand the vehicle upright on a level surface.

EWA13120
**⚠ WARNING**

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

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

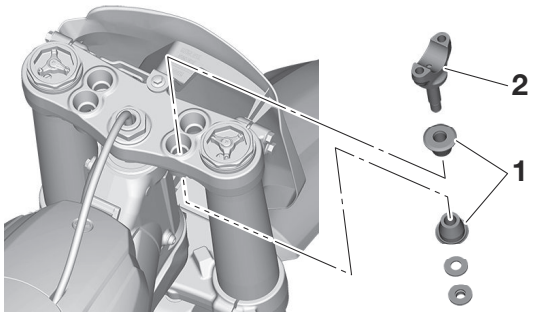
| | |
|---|---|
| | **Upper handlebar holder bolt 28 N·m (2.8 kgf·m, 21 lb·ft)** |

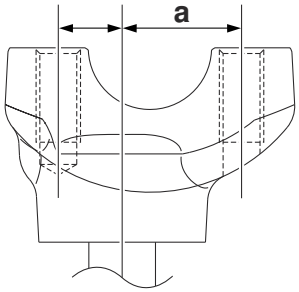
**TIP**

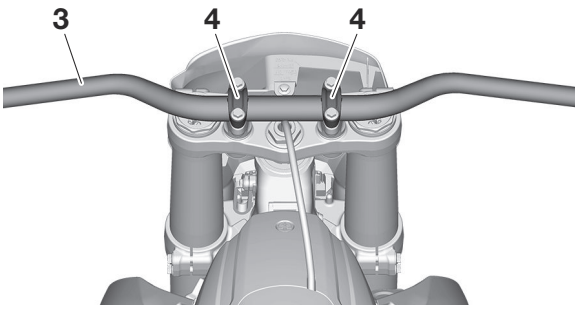
- Install the lower handlebar holders with the side having the longer distance "a" from the mounting bolt center facing towards the front side of the vehicle.
- Installing the lower handlebar holders in the reverse direction allow the front-to-rear offset amount of the handlebar position to be changed.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

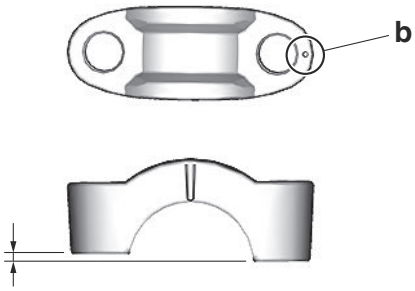
ECA14250
***NOTICE***

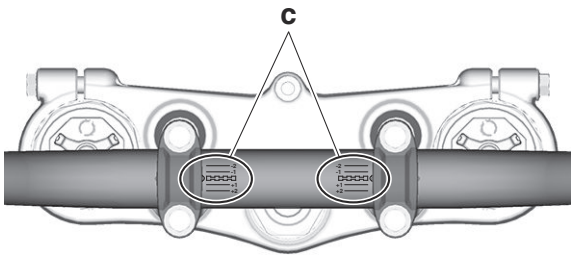
- **First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.**
- **Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

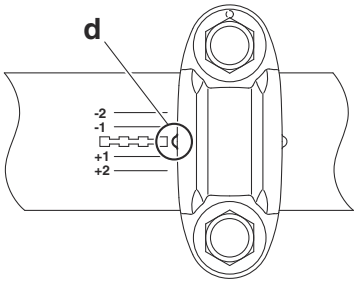




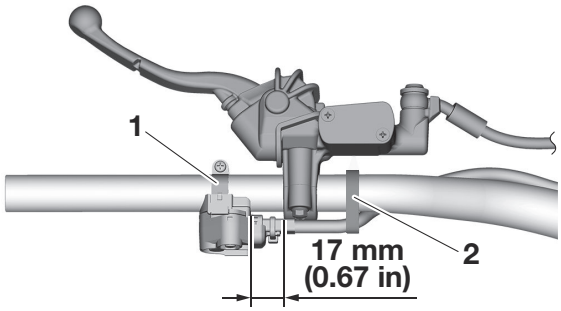

3. Tighten:
   • Lower handlebar holder nut

| | |
|---|---|
| | **Lower handlebar holder nut**<br>**40 N·m (4.0 kgf·m, 30 lb·ft)** |

4. Install:
   • Clutch master cylinder
   Refer to "INSTALLING THE CLUTCH MASTER CYLINDER" on page 5-58.
5. Install:
   • Handlebar switch (left) "1"
   • Clamp "2"

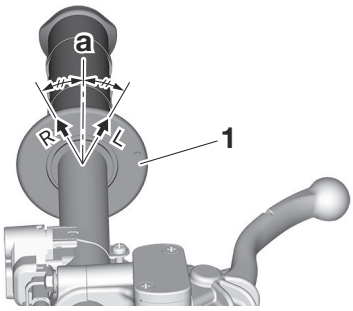
| | |
|---|---|
| | **Handlebar switch (left)**<br>**1.3 N·m (0.13 kgf·m, 0.95 lb·ft)** |

**TIP**
- The handlebar switch (left) "1" should be installed according to the dimensions shown.
- Pass the handlebar switch lead (left) through the middle of the clutch master cylinder holder.




6. Install:
   • Handlebar grip (left) "1"
   a. Apply a thin coat of rubber adhesive onto the inside of the handlebar grip (left).
   b. Install the handlebar grip (left) on the handlebar by pressing the grip from the left side.
   c. Wipe off any excess adhesive with a clean cloth.

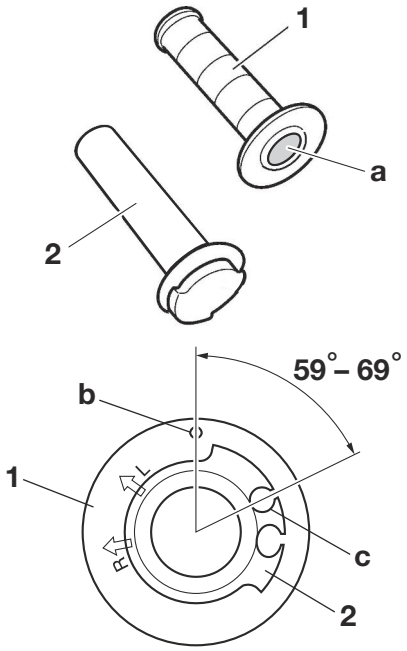
**TIP**
- Before applying the adhesive, wipe off grease or oil on the handlebar surface with a lacquer thinner.
- Install the handlebar grip (left) to the handlebar so that the line "a" between the two arrow marks faces straight upward.




7. Adjust:
   • Clutch lever position
   Refer to "ADJUSTING THE CLUTCH LEVER POSITION" on page 3-15.
8. Install:
   • Handlebar grip (right) "1"
   • Tube guide "2"
   a. Apply a thin coat of rubber adhesive to the inside "a" of the handlebar grip (right) "1", and then install the handlebar grip (right) "1" to the tube guide "2".
   b. Wipe off any excess adhesive with a clean cloth.

**TIP**

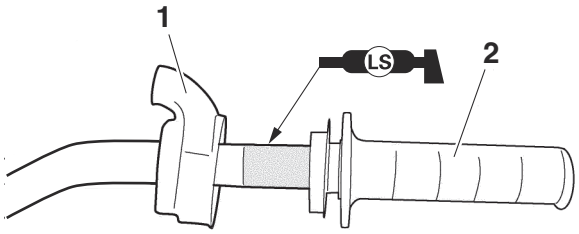
- Before applying the adhesive, wipe off grease or oil on the tube guide surface with a lacquer thinner.
- Install the grip to the tube guide so that the grip match mark "b" and tube guide slot "c" form the angle as shown.




9. Install:
   • Rubber cover "1"
   • Throttle grip "2"

**TIP**

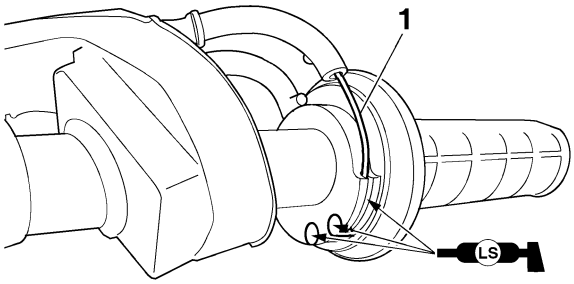
Apply the lithium-soap-based grease on the throttle grip sliding surface.




10. 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.



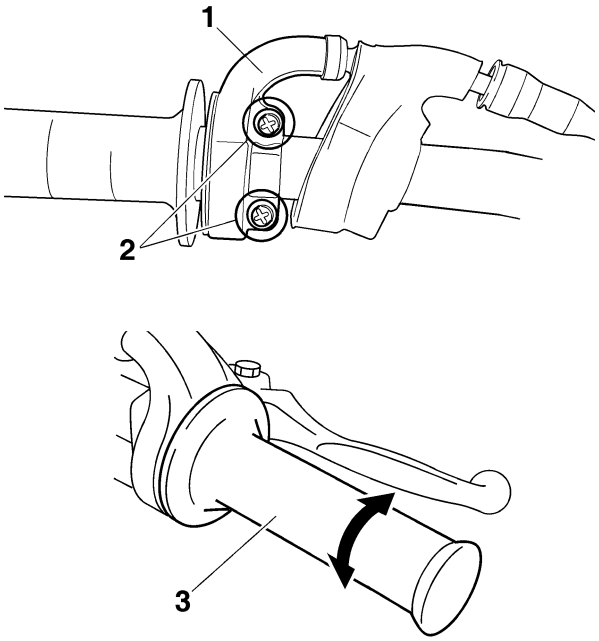

11. Install:
    • Throttle cable housing "1"
    • Screw (throttle cable housing) "2"

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

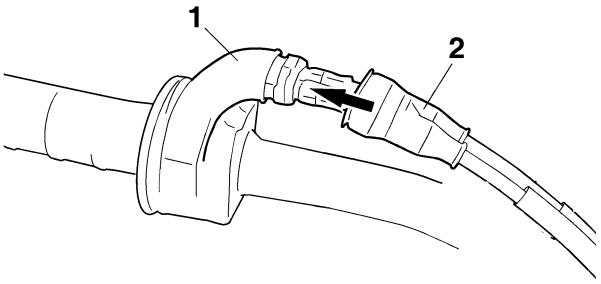
EWA19310

**WARNING**

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



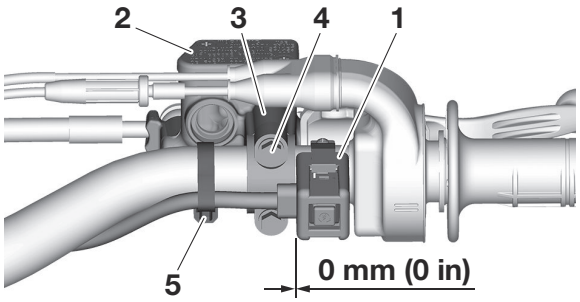

12. Install:
- Rubber cover "1"
- Cover (throttle cable housing) "2"

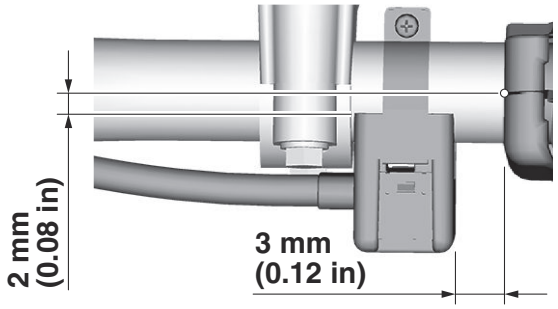



13. Install:
- Starter switch "1"
- Front brake master cylinder assembly "2"
- Front brake master cylinder holder "3"
- Front brake master cylinder holder bolt "4"
- Clamp "5"

**Front 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.
- 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.
- Pass the starter switch lead through the middle of the front brake master cylinder holder.



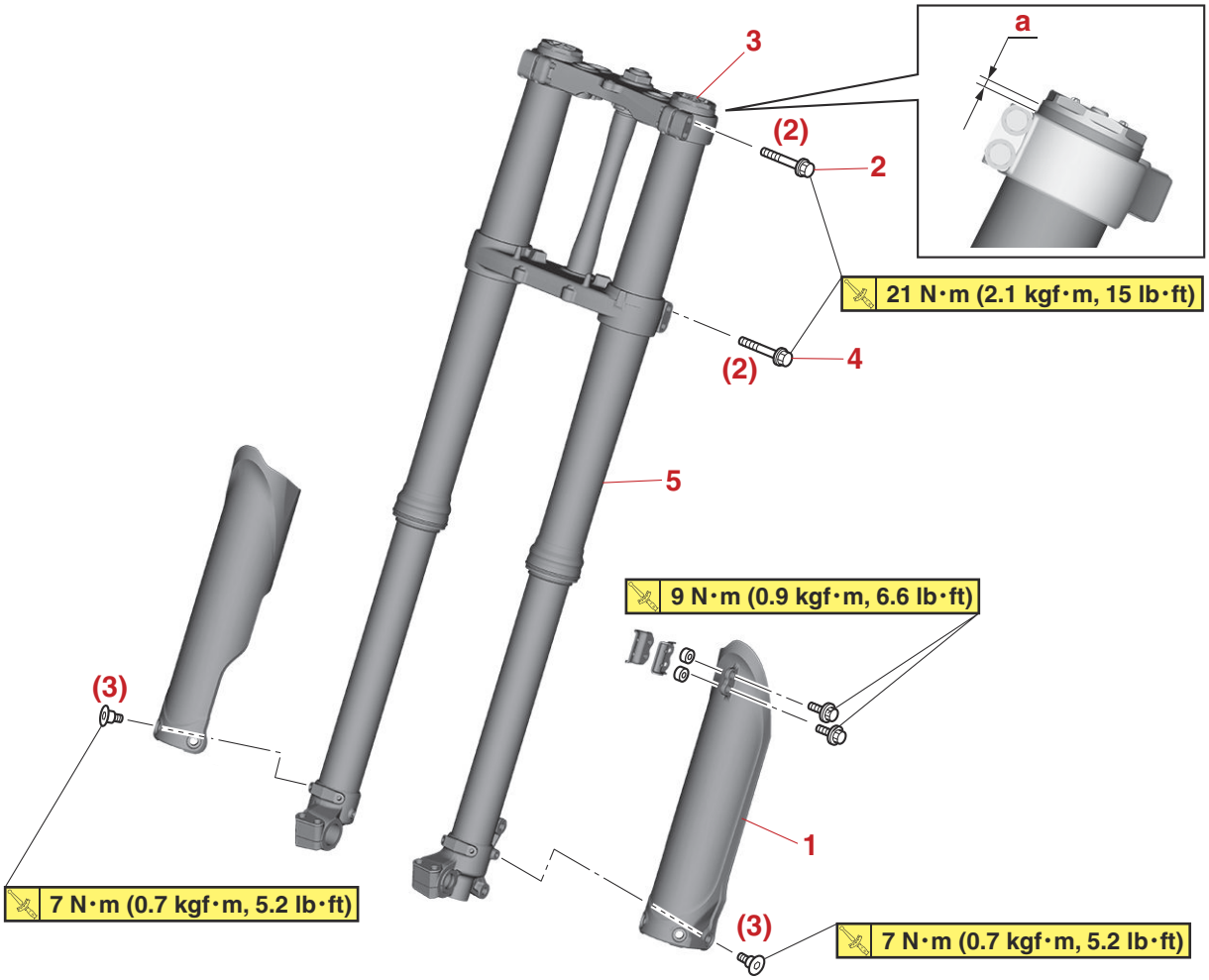




14. Adjust:
- Throttle grip free play
  Refer to "CHECKING THE THROTTLE GRIP" on page 3-12.

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

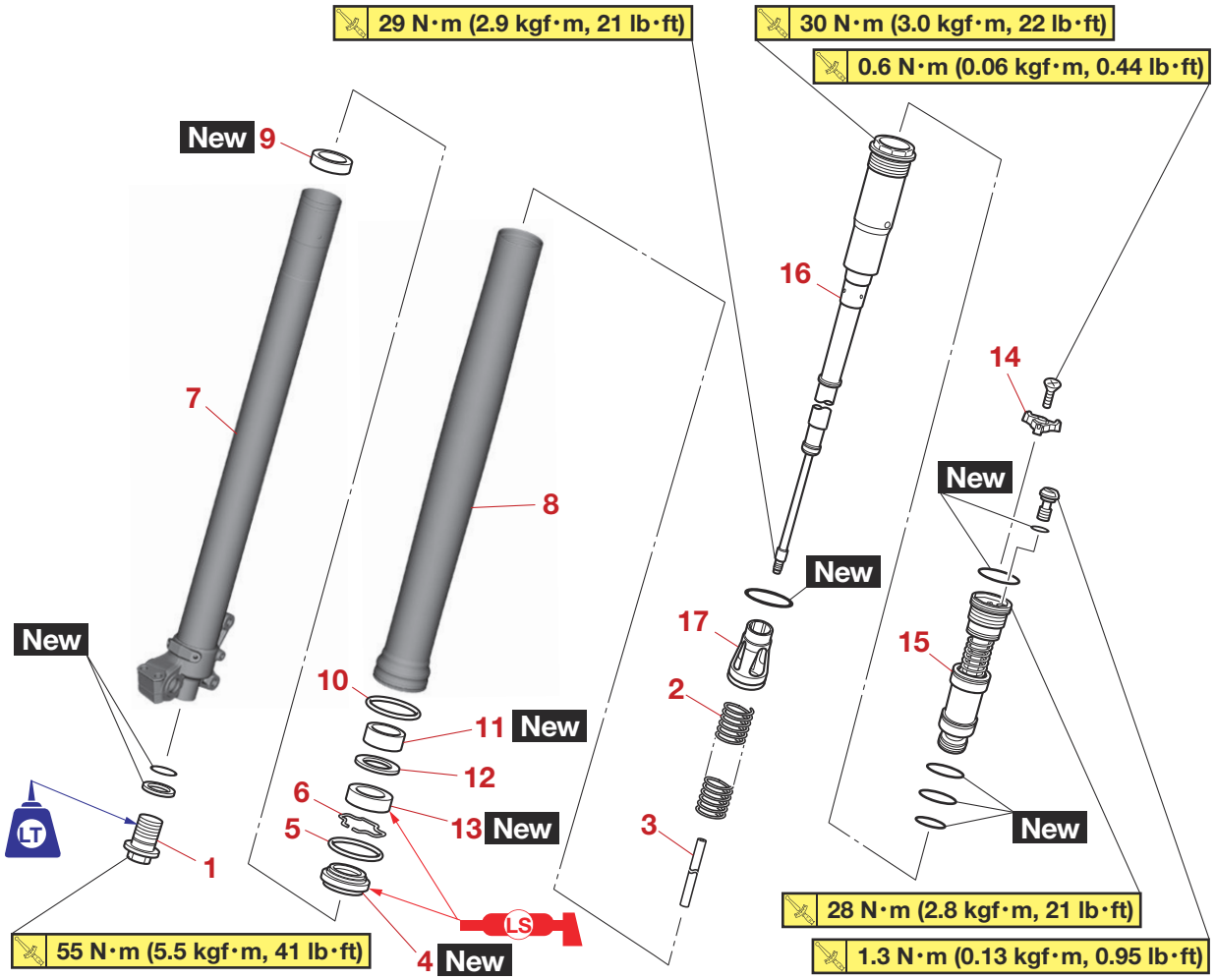
EAM20100
# FRONT FORK

## 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 4-7. |
| | Front brake caliper | | Refer to "FRONT BRAKE" on page 4-17. |
| | 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 | ["a" = 2 mm (0.1 in) (AUS, CAN, NZL, ZAF) 5 mm (0.2 in) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)] |

## Disassembling the front fork leg




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Adjuster | 1 | |
| 2 | Fork spring | 1 | |
| 3 | Damper adjusting rod | 1 | |
| 4 | Dust seal | 1 | |
| 5 | Scraper | 1 | |
| 6 | Stopper ring | 1 | |
| 7 | Inner tube | 1 | |
| 8 | Outer tube | 1 | |
| 9 | Piston metal | 1 | |
| 10 | Protector guide | 1 | |
| 11 | Slide metal | 1 | |
| 12 | Washer | 1 | |
| 13 | Oil seal | 1 | |
| 14 | Adjuster knob | 1 | |
| 15 | Base valve | 1 | |
| 16 | Damper assembly | 1 | |
| 17 | Upper spring seat | 1 | |

EAM30055
## REMOVING THE FRONT FORK LEGS

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

EWA13120
**⚠ WARNING**

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

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

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

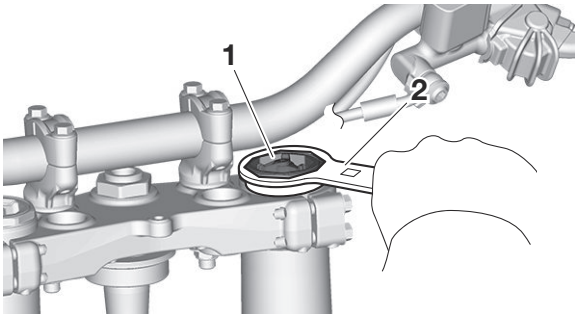
EWA20350
**⚠ WARNING**

**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)

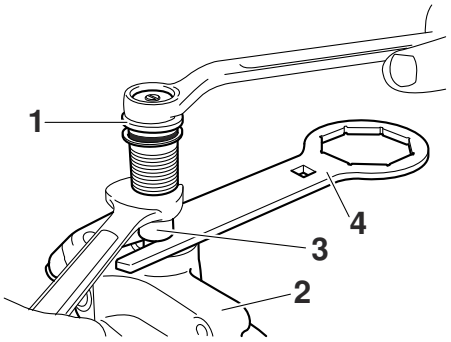
**TIP**
- While compressing the inner tube "2", set the cap bolt ring wrench "4" between the inner tube and locknut "3".
- Hold the locknut and remove the adjuster.

ECA24520
***NOTICE***

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



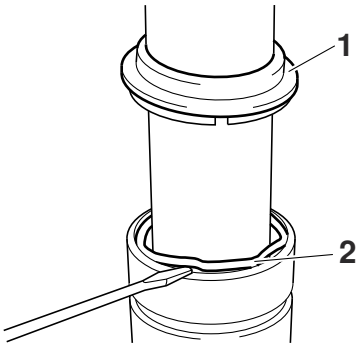
**Cap bolt ring wrench**
**90890-01501**
**Cap bolt ring wrench**
**YM-01501**



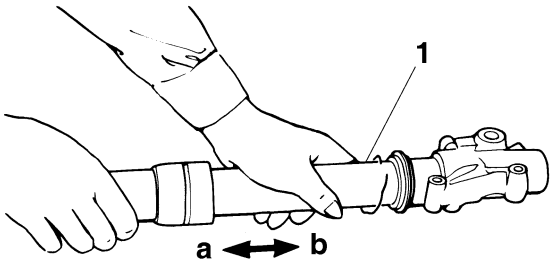

3. Remove:
   - Dust seal "1"
   - Stopper ring "2"
     (with a flat-head screwdriver)

ECA14180
***NOTICE***

**Do not scratch the inner tube.**




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

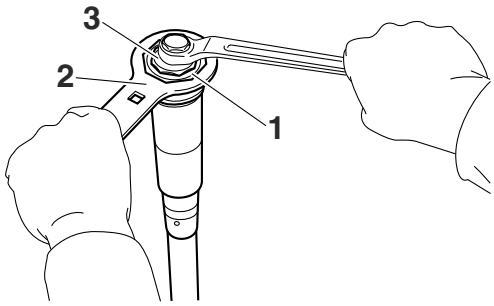



5. Remove:
   • Adjuster knob
   • Base valve "1"
   (from the damper assembly)

**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.
- 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**
**90890-01911**
**Cap bolt ring wrench**
**90890-01501**
**Cap bolt ring wrench**
**YM-01501**




EAM30057

## CHECKING THE FRONT FORK LEGS

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

**Inner tube bending limit**
**0.2 mm (0.01 in)**

**TIP**

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

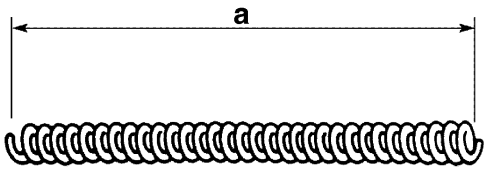
EWA13650

**WARNING**

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

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

**Fork spring free length limit**
**492.0 mm (19.37 in)**

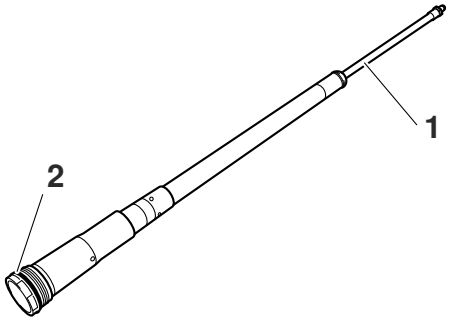



4. Check:
   • Damper assembly "1"
   Bend/damage → Replace.
   • O-ring "2"
   Wear/damage → Replace.

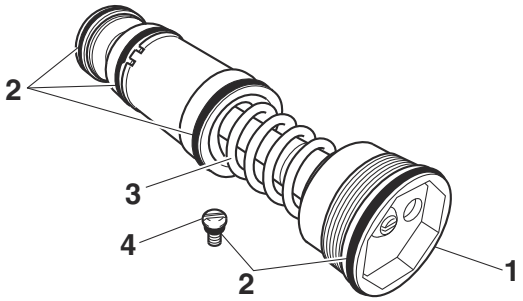
ECA14200

***NOTICE***

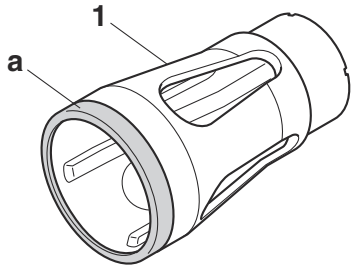
- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**



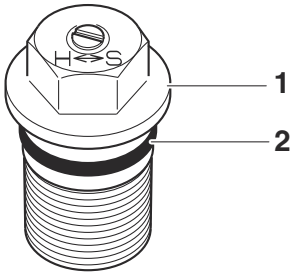

5. Check:
   - Base valve "1"
     Wear/damage → Replace.
     Contamination → Clean.
   - O-ring "2"
     Wear/damage → Replace.
   - Base valve bushing
     Wear/damage → Replace.
   - Fork spring "3"
     Damage/fatigue → Replace the base valve.
   - Bleed screw "4"
     Wear/damage → Replace.



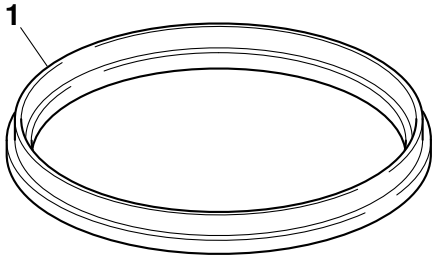

6. Check:
   - Upper spring seat "1"
     (contacting surface "a")
     Wear/damage → Replace.




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




8. Check:
   - Scraper "1"
     Damage → Replace.




EAM30058

## ASSEMBLING THE FRONT FORK LEGS

EWA13660

**WARNING**

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

**TIP**

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

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

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

ECA24530

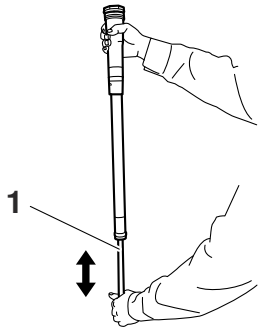
***NOTICE***

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

3. After filling, pump the damper assembly "1" slowly up and down (about 200 mm (7.9 in) stroke) several times to bleed the damper assembly of air.

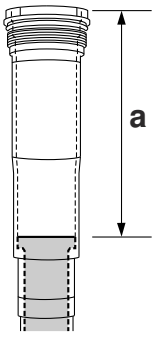
**TIP**

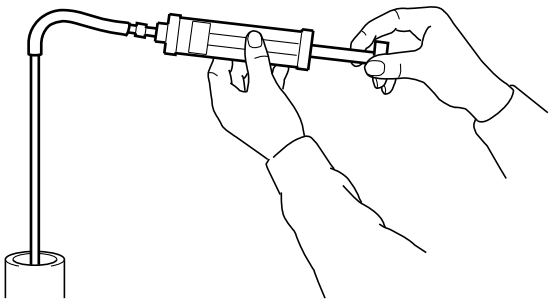
Avoid excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps (1) to (3).




4. Measure:
   - Oil level (left and right) "a"
     Out of specification → Regulate.

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

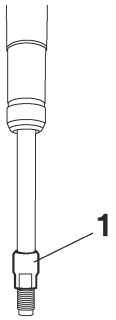


5. Tighten:
   - Locknut "1"

**TIP**

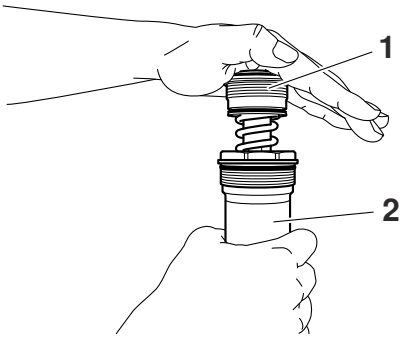
Fully finger tighten the locknut onto the damper assembly.




6. 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.

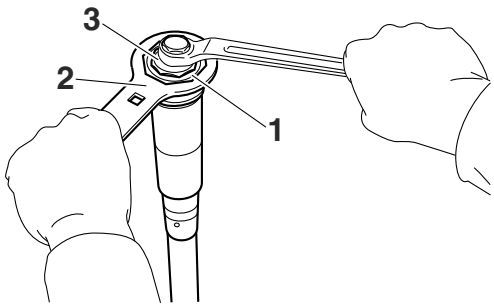



7. Check:
   - Damper assembly
     Not fully stretched → Repeat the steps (1) to (7).
8. Tighten:
   - Base valve "1"
   - Screw (adjuster knob)

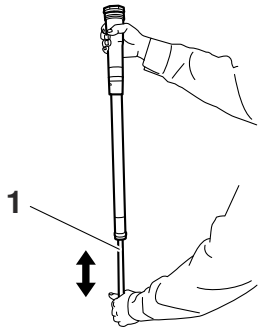
**Base valve**
**28 N·m (2.8 kgf·m, 21 lb·ft)**
**Screw (adjuster knob)**
**0.6 N·m (0.06 kgf·m, 0.44 lb·ft)**

**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**
**90890-01911**
**Cap bolt ring wrench**
**90890-01501**
**Cap bolt ring wrench**
**YM-01501**

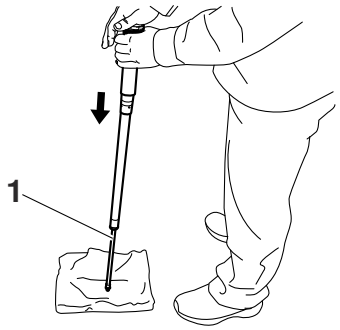



9. After filling, pump the damper assembly "1" slowly up and down more than 10 times to distribute the fork oil.



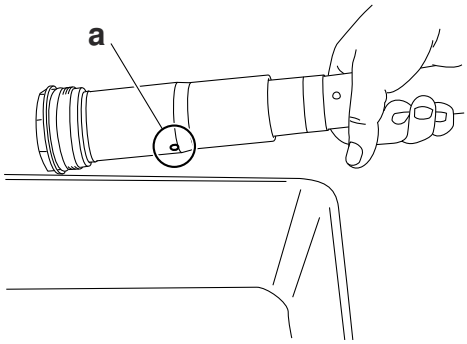

10. While protecting the damper assembly "1" with a cloth and compressing fully, allow excessive oil to overflow on the base valve side.

ECA24540
***NOTICE***
**Take care not to damage the damper assembly.**

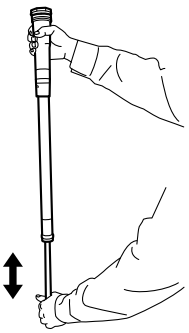



11. Allow the overflowing oil to escape at the hole "a" in the damper assembly.

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



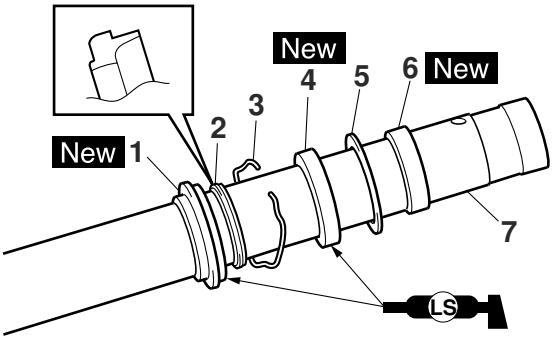

12. Check:
- Damper assembly smooth movement
  Tightness/binding/rough spots → Repeat the steps (1) to (12).

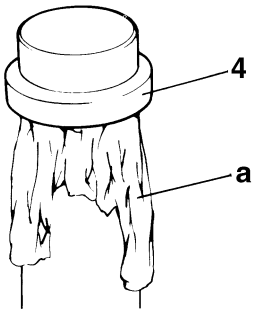


13. Install:
- Dust seal "1" New
- Scraper "2"
- Stopper ring "3"
- Oil seal "4" New
- Washer "5"
- Slide metal "6" New
  (to the inner tube "7")

ECA24550
***NOTICE***
**Make sure that the numbered side of the oil seal faces bottom side.**

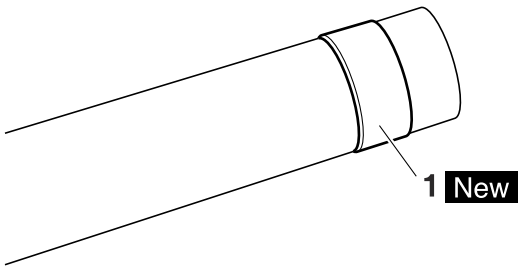
**TIP**
- Apply the lithium-soap-based grease on the dust seal lip and oil seal lip.
- Apply the fork oil on the inner tube.
- Install the scraper to the inner tube as shown in the illustration.
- When installing the oil seal, use vinyl seat "a" with fork oil applied to protect the oil seal lip.



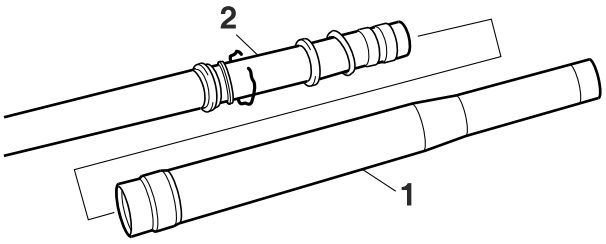




14. Install:
- Piston metal "1" New

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



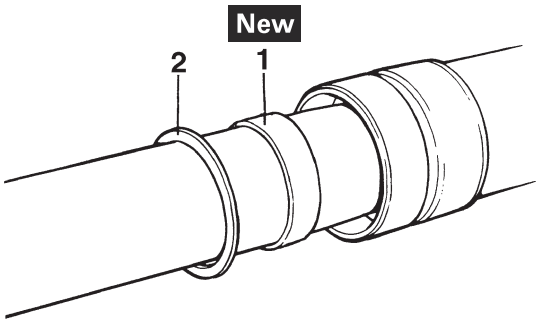

15. Install:
- Outer tube "1"
  (to the inner tube "2")

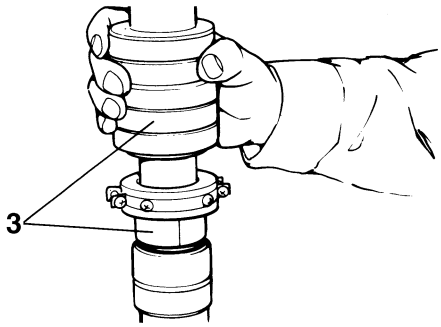



16. Install:
- Slide metal "1" New
- Washer "2"
  (to the outer tube)

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

| | |
|---|---|
| | **Fork seal driver**<br>**90890-01917**<br>**Fork seal driver (48)**<br>**YM-A0948** |

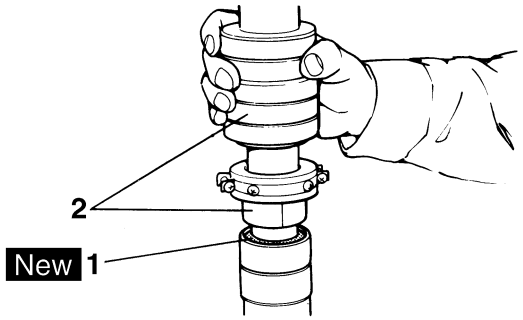



17. Install:
- Oil seal "1" New

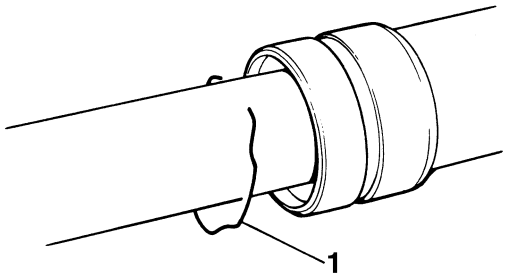
**TIP**
Using a fork seal driver "2", press the oil seal in until the stopper ring groove fully appears.

**Fork seal driver**
**90890-01917**
**Fork seal driver (48)**
**YM-A0948**



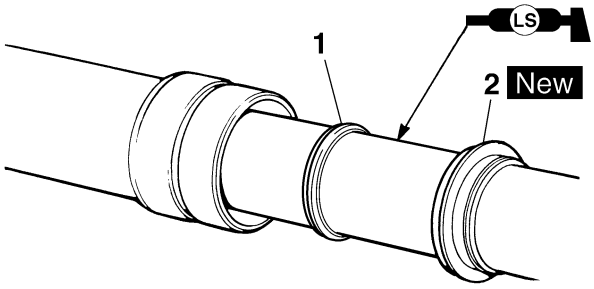

18. Install:
- Stopper ring "1"

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

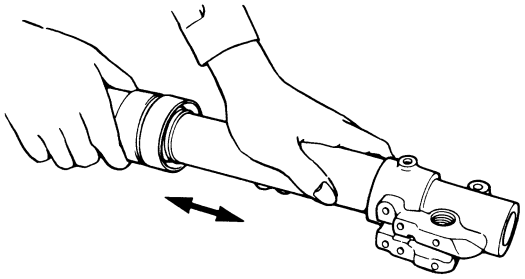



19. Install:
- Scraper "1"
- Dust seal "2" New

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

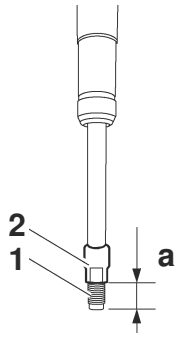



20. Check:
- Inner tube smooth movement
  Tightness/binding/rough spots → Repeat the steps (13) to (20).



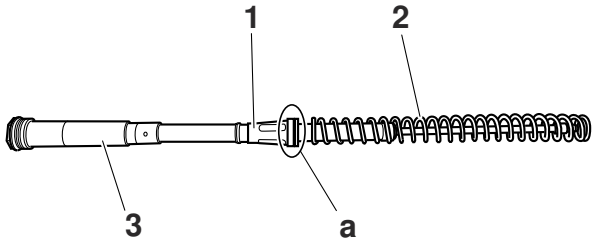
21. Measure:
- Distance "a"
  Out of specification → Turn the locknut to specification.

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




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

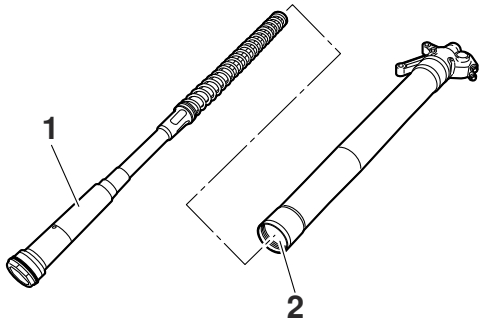
**TIP**
Install the upper spring seat with its larger dia. end "a" facing the fork spring.




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

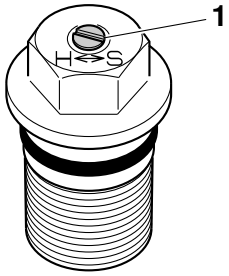
ECA24560
**NOTICE**

**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.**




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

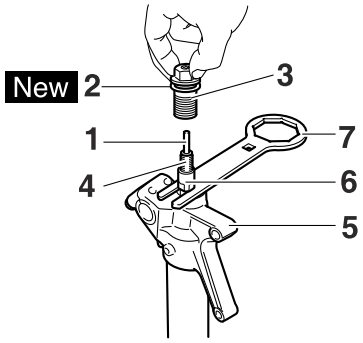
**TIP**
- Before loosening the damping force adjuster, record the setting position.
- Unless the damping force adjuster is fully loosened, correct damping characteristic cannot be obtained after installation.




25. 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.

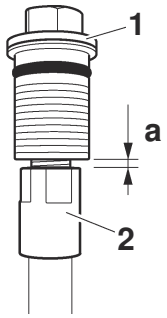
| | |
|---|---|
| | **Cap bolt ring wrench**<br>**90890-01501**<br>**Cap bolt ring wrench**<br>**YM-01501** |




26. 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**<br>**0.5–1.0 mm (0.02–0.04 in)** |

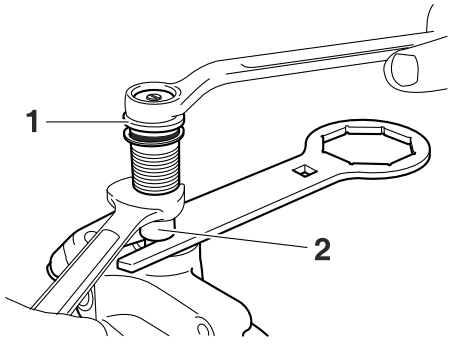
**TIP**
If it is installed with a gap out of specification, correct damping force cannot be obtained.




27. Tighten:
- Adjuster (damper assembly) "1"

| | |
|---|---|
| | **Adjuster (damper assembly)**<br>**29 N·m (2.9 kgf·m, 21 lb·ft)** |

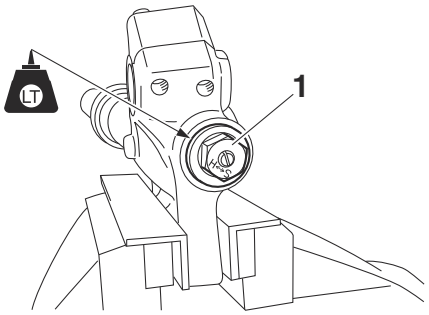
**TIP**
Hold the locknut "2" and tighten the adjuster.




28. Install:
- Adjuster "1"

(to the inner tube)

| | |
|---|---|
| | **Adjuster**<br>**55 N·m (5.5 kgf·m, 41 lb·ft)**<br>**LOCTITE®** |



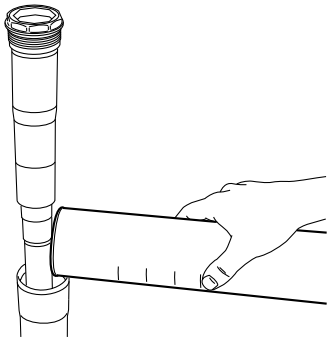

29. Fill:
- Front fork leg

| | |
|---|---|
| | **Recommended oil**<br>**Yamaha Suspension Oil S1**<br>**Standard oil amount**<br>**295.0 cm³ (9.97 US oz, 10.40 Imp.oz) (AUS, CAN, NZL, ZAF)**<br>**310.0 cm³ (10.48 US oz, 10.93 Imp.oz) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**<br>**Extent of adjustment**<br>**260–365 cm³ (8.79–12.34 US oz, 9.17–12.87 Imp.oz)** |

ECA24570

***NOTICE***

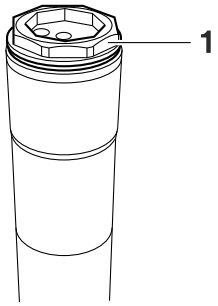
- **Be sure to use the recommended oil. Other oils may have an adverse effect on front fork performance.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**



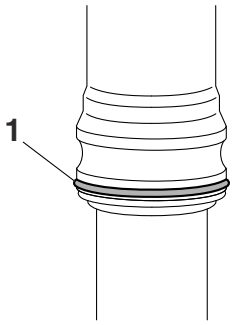
30. Install:
- Damper assembly "1"
(to the outer tube)

**TIP**

Temporarily tighten the damper assembly.




31. Install:
- Protector guide "1"



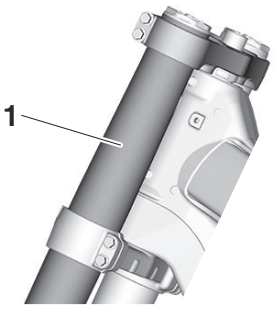

EAM30059

## INSTALLING THE FRONT FORK LEGS

1. Install:
- Front fork "1"

**TIP**

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

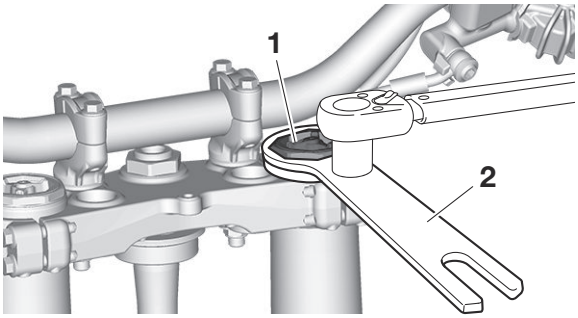



2. Tighten:
- Damper assembly "1"

| | |
|---|---|
| | **Damper assembly**<br>**30 N·m (3.0 kgf·m, 22 lb·ft)** |

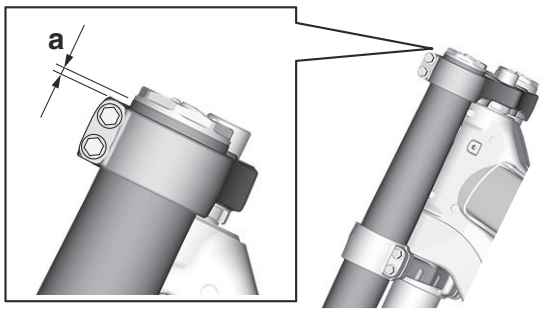
**TIP**
Use the cap bolt ring wrench "2" to tighten the damper assembly.

| | |
|---|---|
| | **Cap bolt ring wrench**<br>**90890-01501**<br>**Cap bolt ring wrench**<br>**YM-01501** |




3. Adjust:
   • Front fork top end "a"

| | |
|---|---|
| | **Front fork top end (standard) "a"**<br>**2 mm (0.1 in) (AUS, CAN, NZL, ZAF)**<br>**5 mm (0.2 in) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)** |



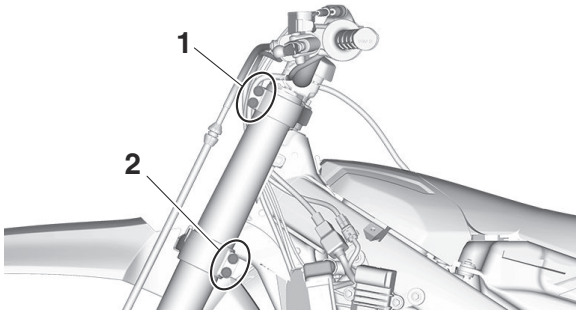

4. Tighten:
   • Upper bracket pinch bolt "1"

| | |
|---|---|
| | **Upper bracket pinch bolt**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |

   • Lower bracket pinch bolt "2"

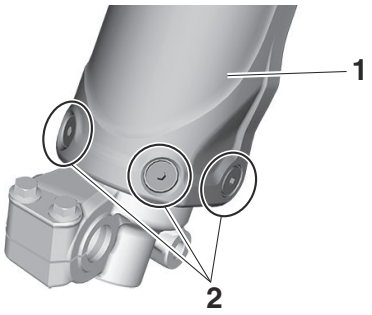
| | |
|---|---|
| | **Lower bracket pinch bolt**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |

EWA19320
**WARNING**
**Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.**



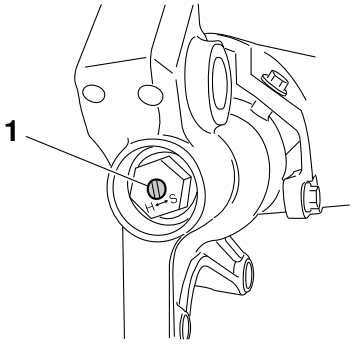

5. Install:
   • Protector "1"
   • Front fork protector bolt "2"

| | |
|---|---|
| | **Front fork protector bolt**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)** |



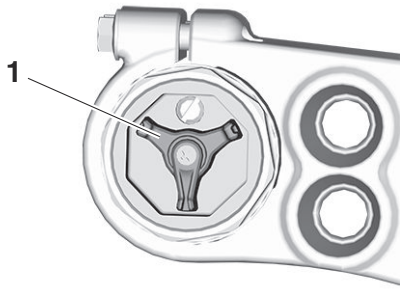

6. Adjust:
   • Rebound damping force

**TIP**
Turn in the damping adjuster "1" finger-tight and then turn out to the originally set position.



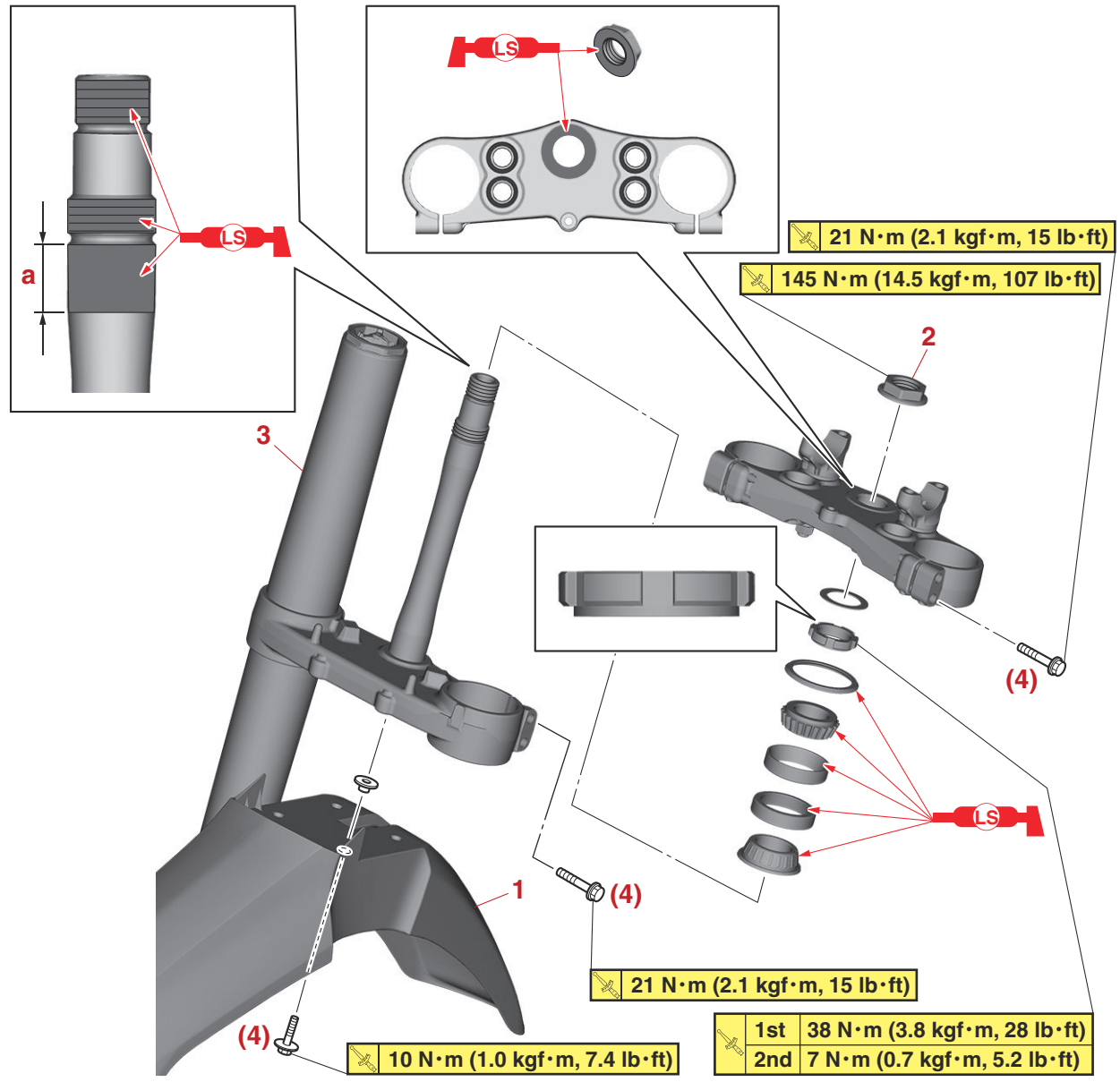

7. Adjust:
   • Compression damping force

**TIP**
Turn in the damping adjuster "1" finger-tight and then turn out to the originally set position.


1

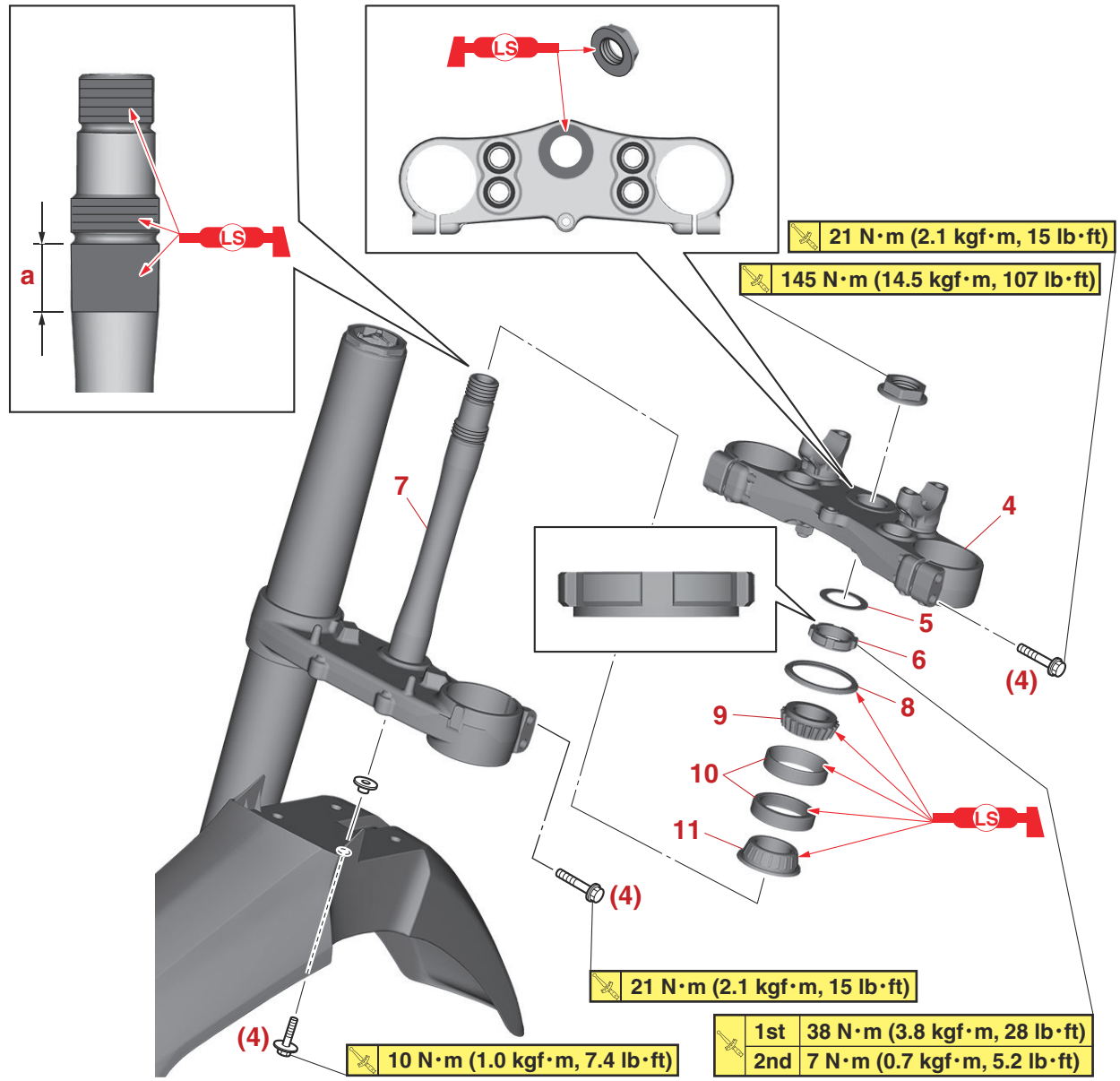
EAM20101
# STEERING HEAD

**Removing the lower bracket**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | | | Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-28. |
| | | | 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 4-39. |
| 1 | Front fender | 1 | |
| 2 | Steering stem nut | 1 | |
| 3 | Front fork leg | 2 | Refer to "FRONT FORK" on page 4-45. |

## Removing the lower bracket




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 4 | Upper bracket | 1 | |
| 5 | Washer | 1 | |
| 6 | Steering ring nut | 1 | |
| 7 | Lower bracket | 1 | ["a" = Approx. 20.0 mm (0.79 in)] |
| 8 | Bearing race cover | 1 | |
| 9 | Upper bearing | 1 | |
| 10 | Bearing race | 2 | |
| 11 | Lower bearing | 1 | |

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

EWA13120
**⚠ WARNING**

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

2. Remove:
   • Ring nut "1"

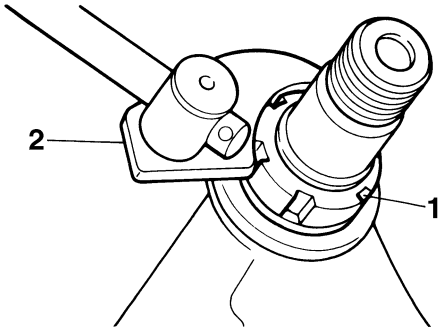
**TIP**
Remove the ring nut with the steering nut wrench "2".



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

EWA13730
**⚠ WARNING**

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

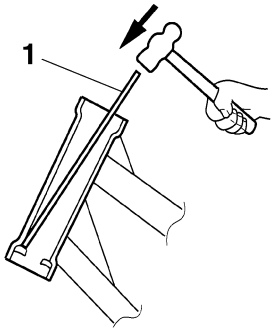


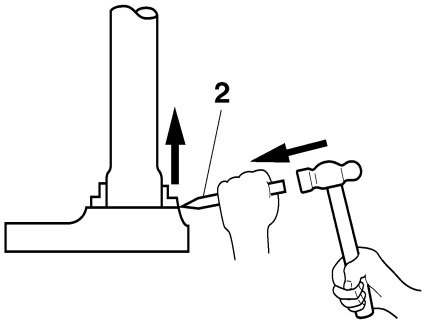

EAM30061
### CHECKING THE STEERING HEAD
1. Wash with kerosene:
   • Bearing
   • Bearing race
2. Check:
   • Bearing
   • Bearing race
   Damage/pitting → Replace.
3. Replace:
   • Bearing
   • Bearing race
   a. Remove the bearing race from the steering head pipe with a long rod "1" and a hammer.
   b. Remove the bearing race from the lower bracket with a chisel "2" and a hammer.
   c. Install a new bearing race.

ECA14270
**NOTICE**

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

**TIP**
Always replace the bearing and the bearing race as a set.

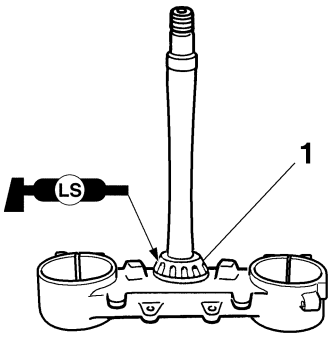



4. Check:
   • Upper bracket
   • Lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

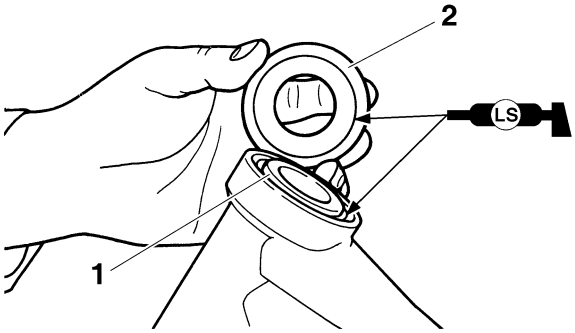
EAM30062
### INSTALLING THE STEERING HEAD
1. Install:
   • Lower bearing "1"

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



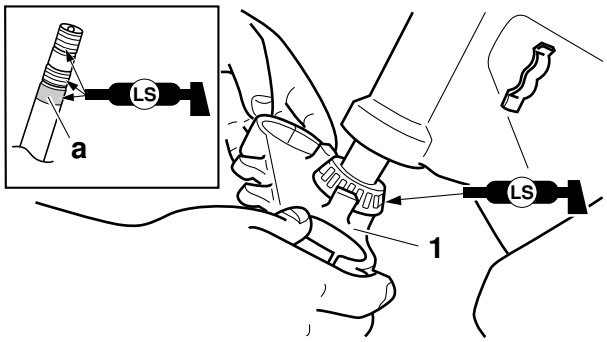
2. Install:
   • Bearing race
   • Upper bearing "1"
   • Bearing race cover "2"

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




3. Install:
   • Lower bracket "1"

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

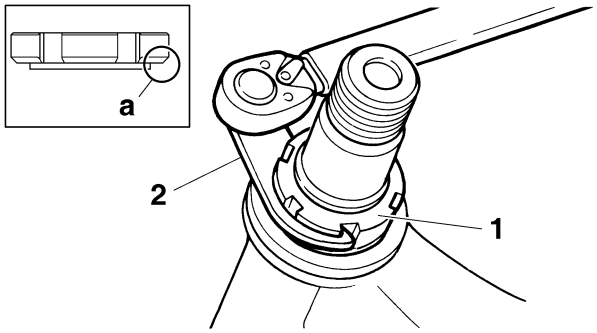



4. Install:
   • Steering ring nut "1"

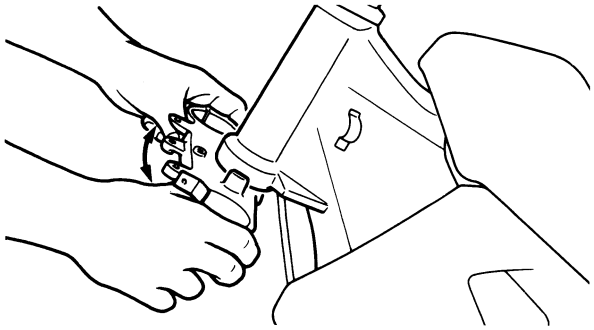
| | |
|---|---|
| | **Steering ring nut**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)** |

**TIP**
Install the steering ring nut with its stepped side "a" facing downward.

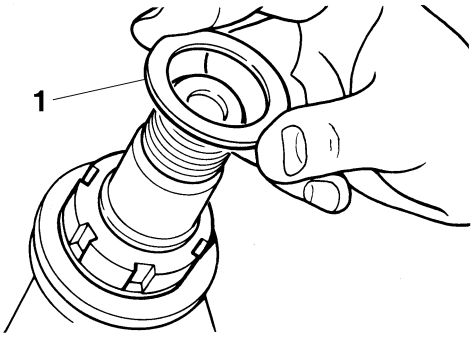
Tighten the steering ring nut with a steering nut wrench "2".
Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-28.




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

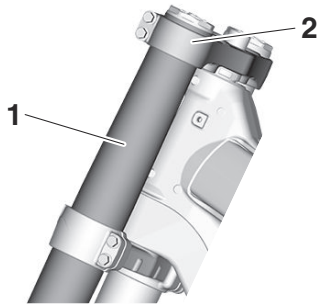


6. Install:
   • Washer "1"




7. Install:
   • Front fork "1"
   • Upper bracket "2"

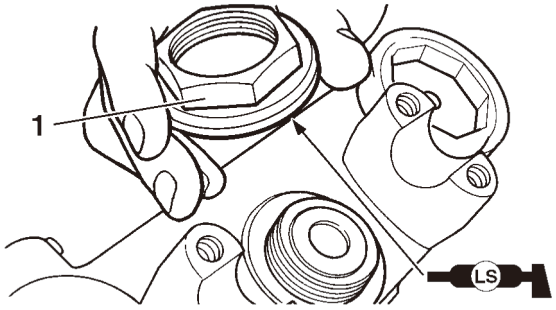
**TIP**
- Temporarily tighten the lower bracket pinch bolts.
- Do not tighten the upper bracket pinch bolts yet.




8. Install:
   • Steering stem nut “1”

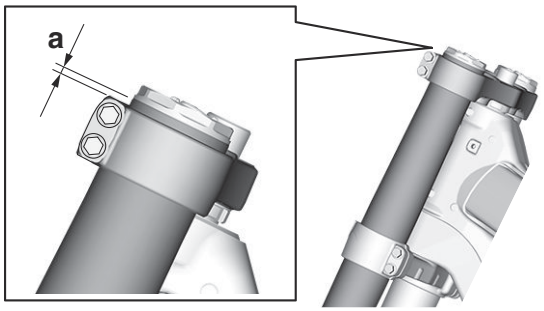
| | |
|---|---|
| | **Steering stem nut**<br>**145 N·m (14.5 kgf·m, 107 lb·ft)** |

**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”**<br>**2 mm (0.1 in) (AUS, CAN, NZL, ZAF)**<br>**5 mm (0.2 in) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)** |



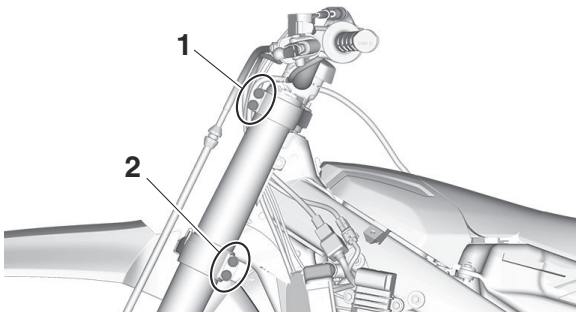

11. Tighten:
   • Upper bracket pinch bolt “1”

| | |
|---|---|
| | **Upper bracket pinch bolt**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |

   • Lower bracket pinch bolt “2”

| | |
|---|---|
| | **Lower bracket pinch bolt**<br>**21 N·m (2.1 kgf·m, 15 lb·ft)** |

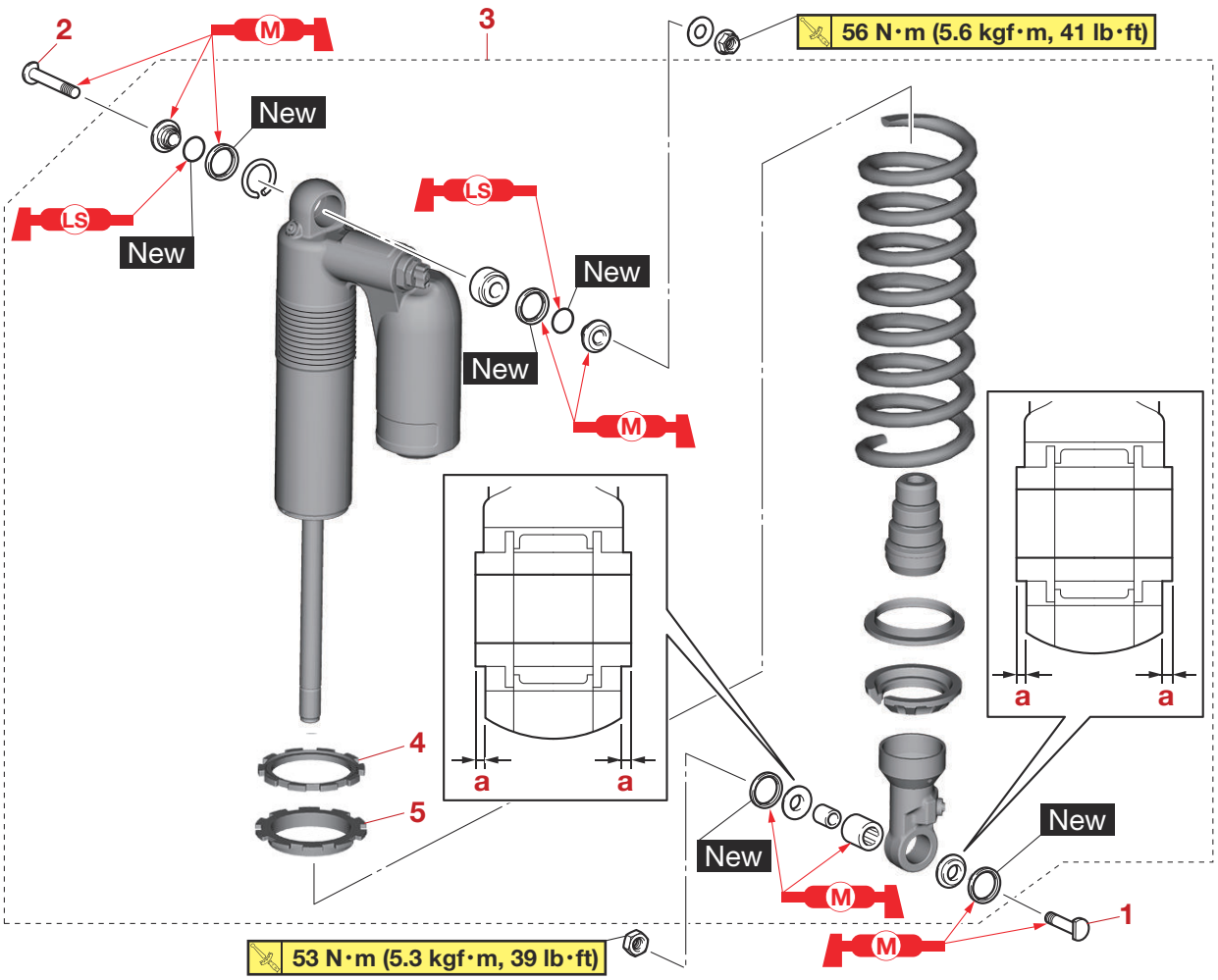
EWA19330
**WARNING**
**Tighten the lower bracket to specified torque. If torqued too much, it may cause the front fork to malfunction.**



EAM20102

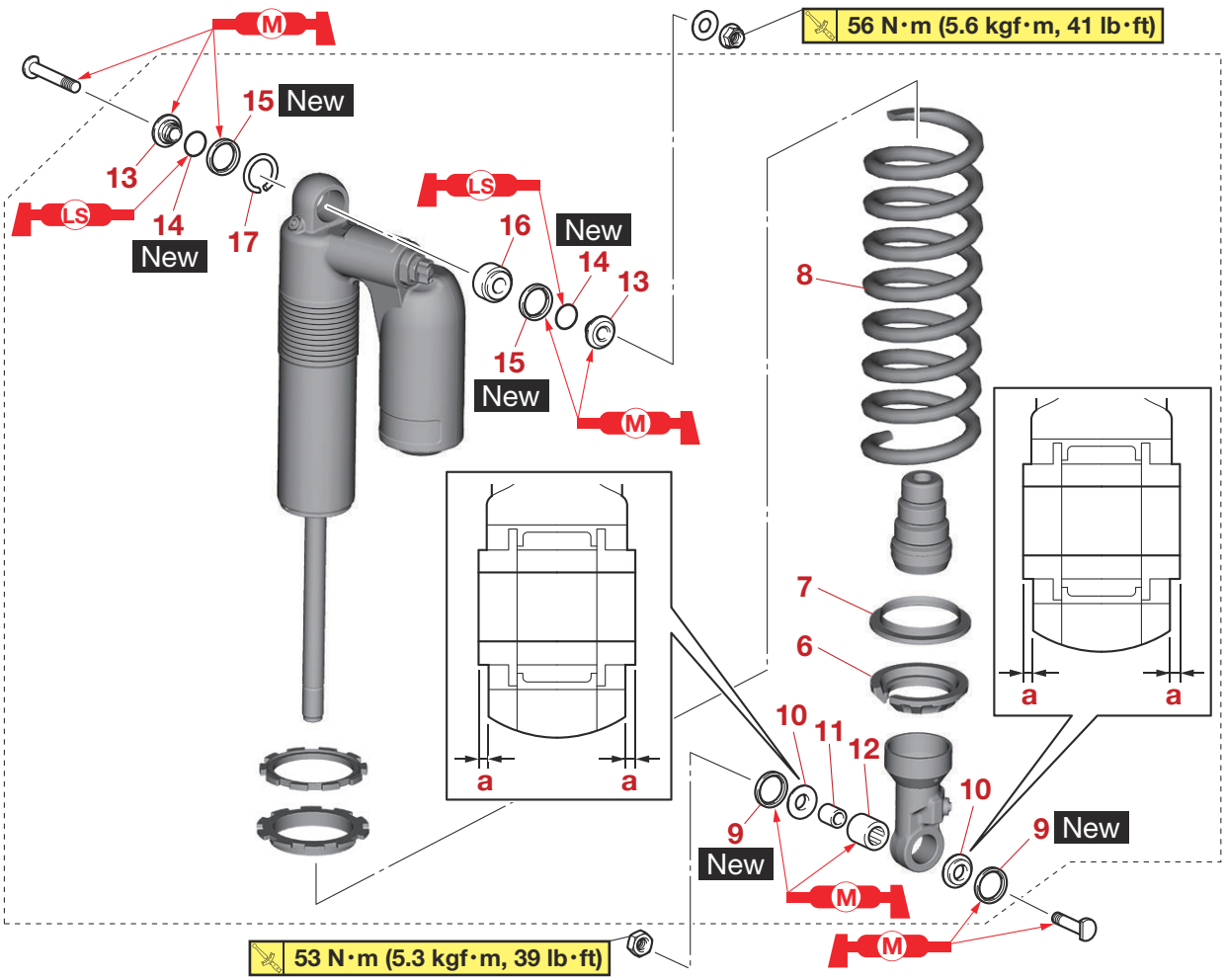
# REAR SHOCK ABSORBER ASSEMBLY

**Removing the rear shock absorber assembly**



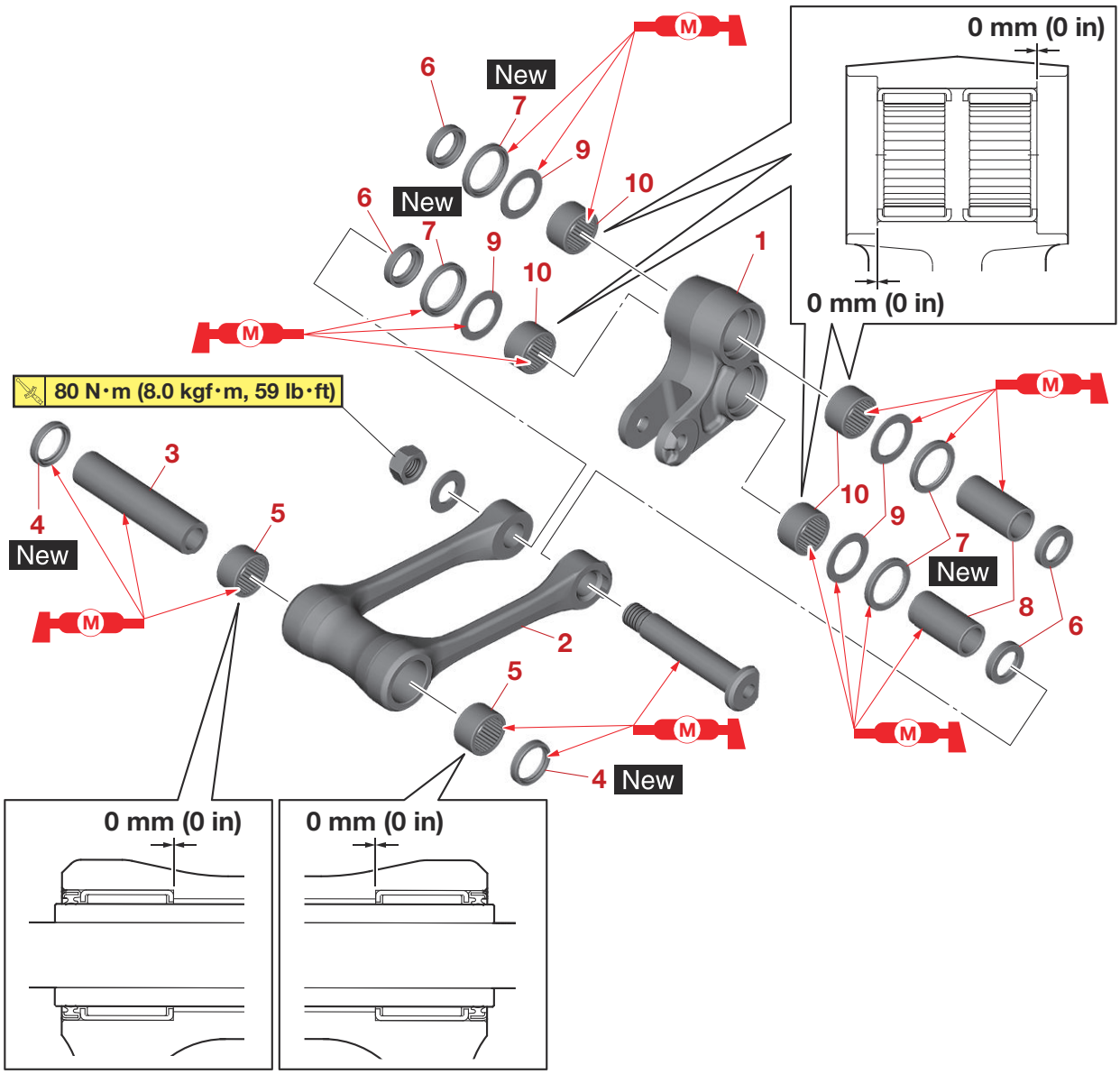

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Seat | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Side cover (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" 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 | |

## Removing the rear shock absorber assembly




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 6 | Spring guide (lower) | 1 | |
| 7 | Spring guide (upper) | 1 | |
| 8 | Spring | 1 | |
| 9 | Dust seal | 2 | |
| 10 | Collar | 2 | ["a" = 0.3 mm (0.01 in) or more] |
| 11 | Bushing | 1 | |
| 12 | Bearing | 1 | |
| 13 | Collar | 2 | |
| 14 | O-ring | 2 | |
| 15 | Dust seal | 2 | |
| 16 | Bushing | 1 | |
| 17 | Stopper ring | 1 | |

**Disassembling the relay arm**



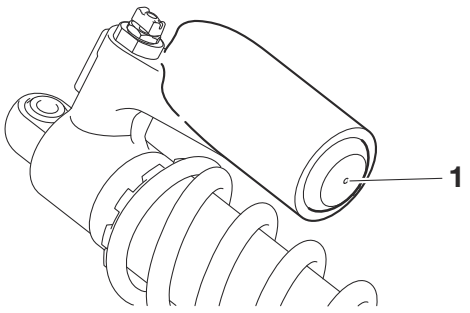

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Relay arm | 1 | |
| 2 | Connecting arm | 1 | |
| 3 | Collar | 1 | |
| 4 | Oil seal | 2 | |
| 5 | Bearing | 2 | |
| 6 | Washer | 4 | |
| 7 | Oil seal | 4 | |
| 8 | Collar | 2 | |
| 9 | Washer | 4 | |
| 10 | Bearing | 4 | |

EAM30063
## HANDLING THE REAR SHOCK ABSORBER
EWA13740
**⚠ WARNING**

**This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.**
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

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

EAM30064
## DISPOSING OF A REAR SHOCK ABSORBER
Before disposing the rear shock absorber, be sure to extract the nitrogen gas from valve "1".
EWA19340
**⚠ WARNING**
- **Wear protective glasses to prevent your eyes from damage due to possible gas or metal chips scattered.**
- **To dispose of a damaged or a worn-out rear shock absorber, take the unit to your Yamaha dealer for this disposal procedure.**



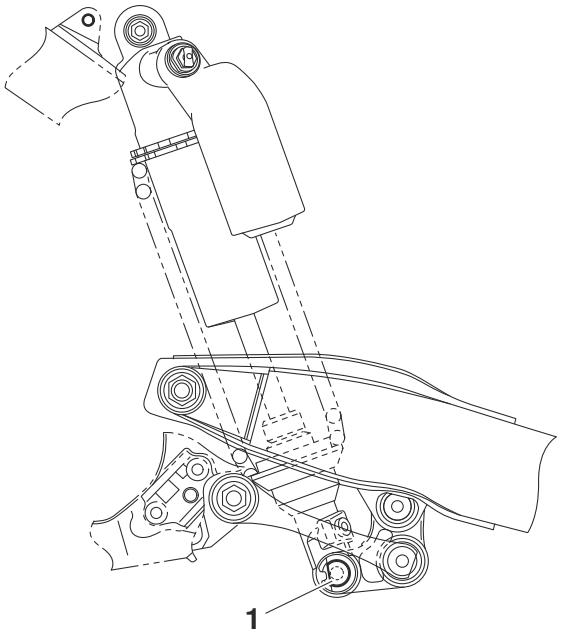

EAM30065
## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY
1. Use a maintenance stand to raise the rear wheel off the ground.

EWA13120
**⚠ WARNING**

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

2. Remove:
   - Rear shock absorber assembly lower bolt "1"

**TIP**
While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.




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

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

Bends/damage/wear → Replace.

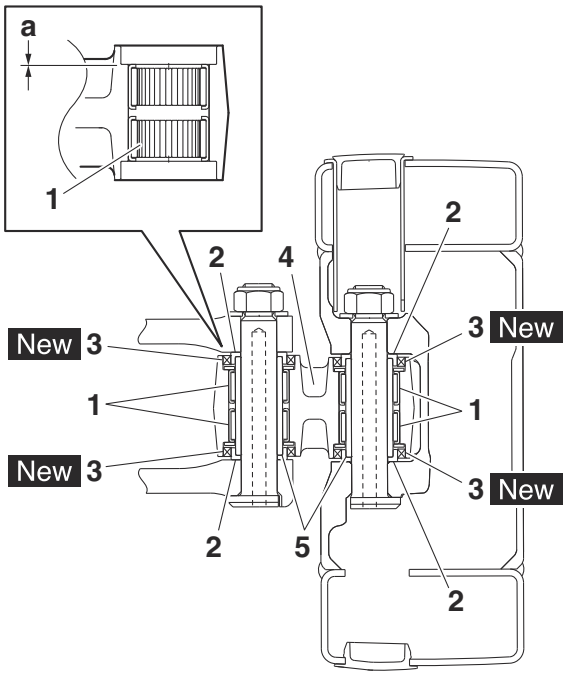
EAM30068
### CHECKING THE CONNECTING ARM AND RELAY ARM
1. Check:
   • Connecting arm
   • Relay arm
   Damage/wear → Replace.
2. Check:
   • Bearing
   • Collar
   Damage/pitting/scratches → Replace the bearings and collars as a set.
3. Check:
   • Oil seal
   Damage/pitting → Replace.

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

| | |
|---|---|
| | **Recommended lubricant**<br>**Molybdenum disulfide grease** |

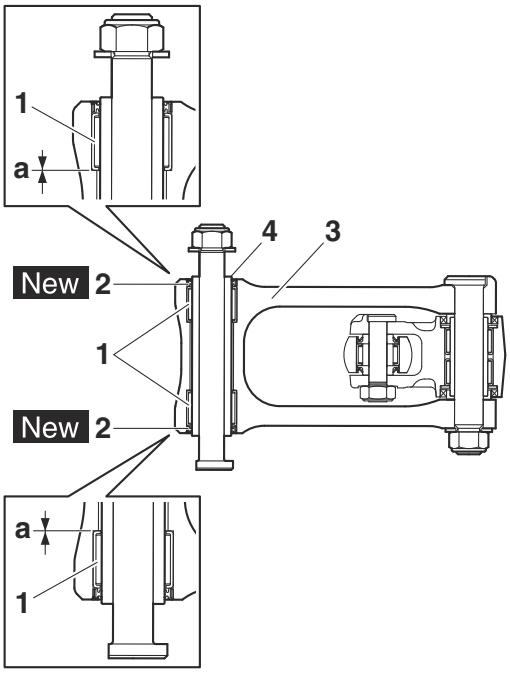
2. Install:
   • Bearing "1"
   • Washer "2"
   • Oil seal "3" New
   (into the relay arm "4")
   • Collar "5"

| | |
|---|---|
| | **Installed depth "a"**<br>**0 mm (0 in)** |




EAM30625
### INSTALLING THE CONNECTING ARM
1. Install:
   • Bearing "1"
   • Oil seal "2" New
   (into the connecting arm "3")
   • Collar "4"

| | |
|---|---|
| | **Installed depth "a"**<br>**0 mm (0 in)** |



EAM30070

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

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

| | |
|---|---|
| | **Recommended lubricant**<br>**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**<br>**Lithium-soap-based grease** |

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

**TIP**

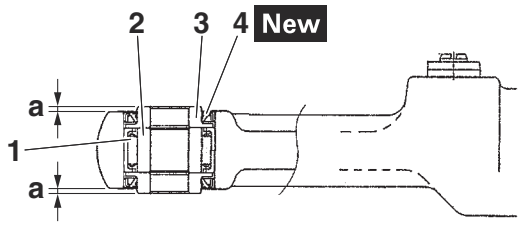
- Install the bushing parallel until the stopper ring groove appears by pressing its outer race.
- After installing the stopper ring, push back the bushing until it contacts the stopper ring.

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

**TIP**

Install the dust seals with their lips facing inward.

| | |
|---|---|
| | **Installed depth "a"**<br>**0.3 mm (0.01 in) or more** |




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**<br>**Molybdenum disulfide grease** |

6. Install:
   - Rear shock absorber assembly

**TIP**

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

7. Tighten:
   - Rear shock absorber assembly upper nut

| | |
|---|---|
| | **Rear shock absorber assembly upper nut**<br>**56 N·m (5.6 kgf·m, 41 lb·ft)** |

   - Connecting arm nut (frame side)

| | |
|---|---|
| | **Connecting arm nut (frame side)**<br>**80 N·m (8.0 kgf·m, 59 lb·ft)** |

   - Connecting arm nut (relay arm side)

| | |
|---|---|
| | **Connecting arm nut (relay arm side)**<br>**80 N·m (8.0 kgf·m, 59 lb·ft)** |

   - Relay arm nut (swingarm side)

| | |
|---|---|
| | **Relay arm nut (swingarm side)**<br>**70 N·m (7.0 kgf·m, 52 lb·ft)** |

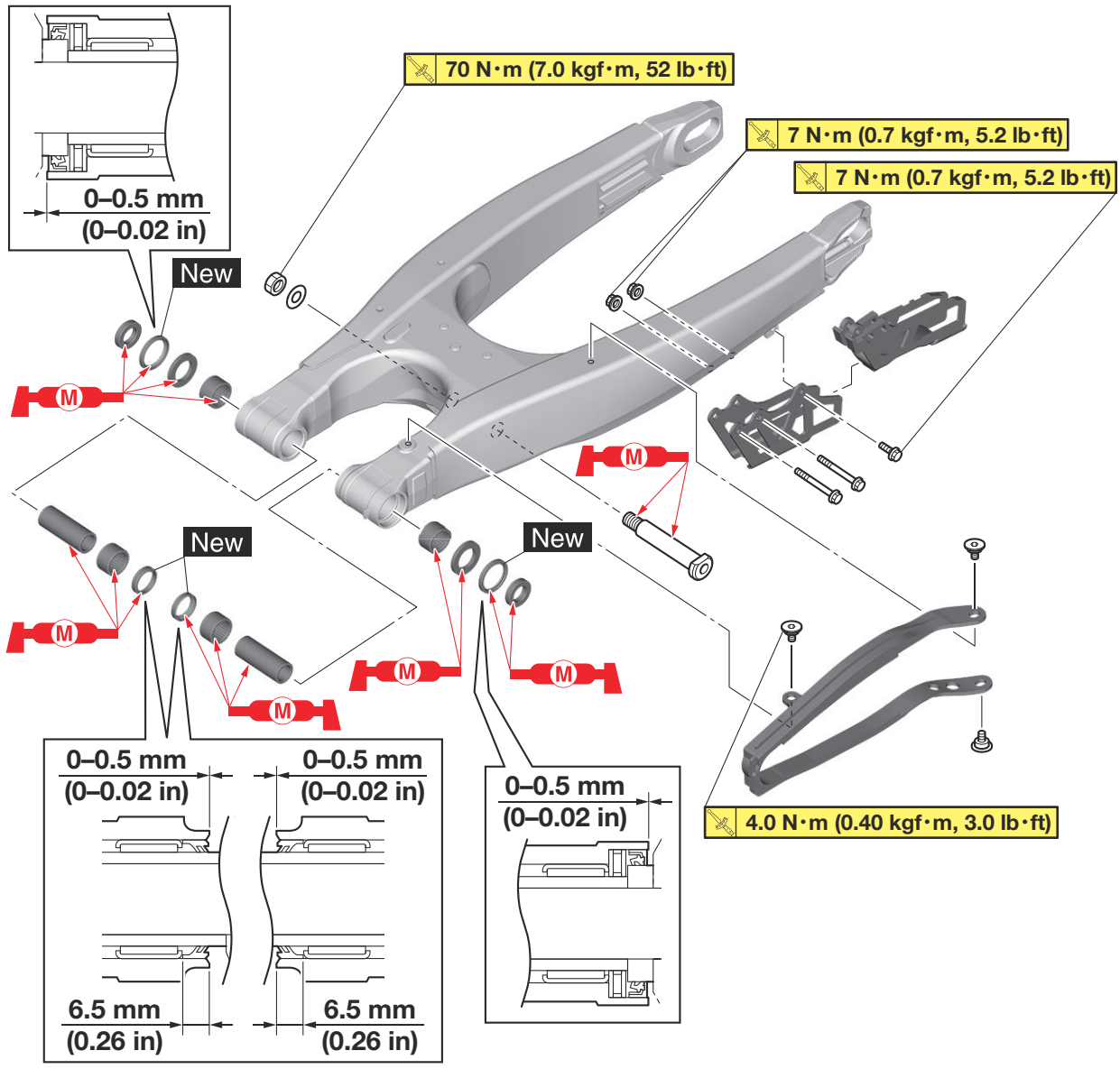
• Rear shock absorber assembly lower nut



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

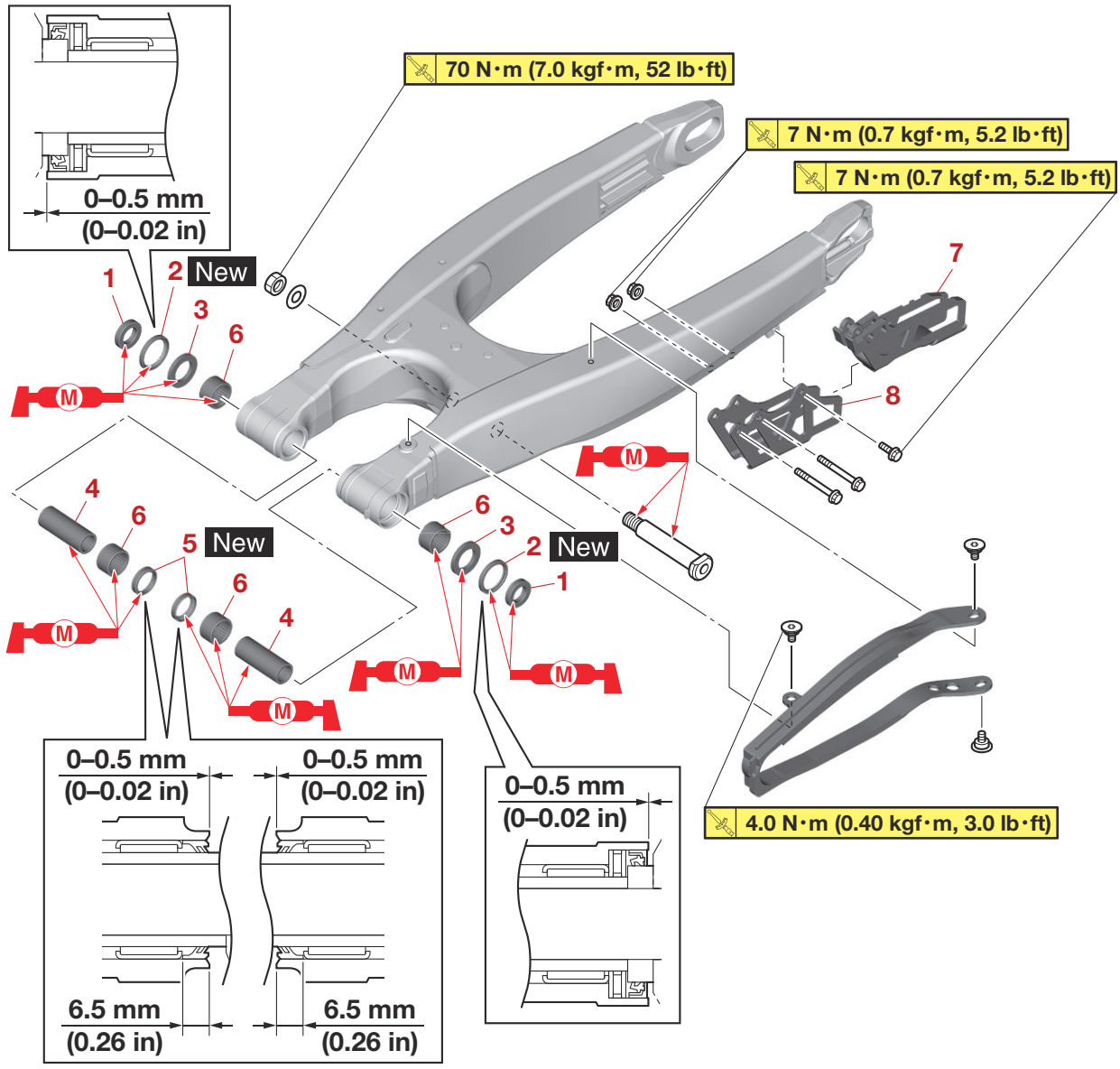
EAM20103
# SWINGARM

**Removing the swingarm**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | | | Use a maintenance stand to raise the rear wheel off the ground. |
| | Rear brake caliper | | Refer to "REAR BRAKE" on page 4-28. |
| | Bolt (brake pedal) | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Drive chain | | Refer to "CHAIN DRIVE" on page 4-74. |

## Removing the swingarm




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Collar | 2 | |
| 2 | Oil seal | 2 | |
| 3 | Thrust bearing | 2 | |
| 4 | Bushing | 2 | |
| 5 | Oil seal | 2 | |
| 6 | Bearing | 4 | |
| 7 | Drive chain support | 1 | |
| 8 | Drive chain support cover | 1 | |

EAM30071
## REMOVING THE SWINGARM

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

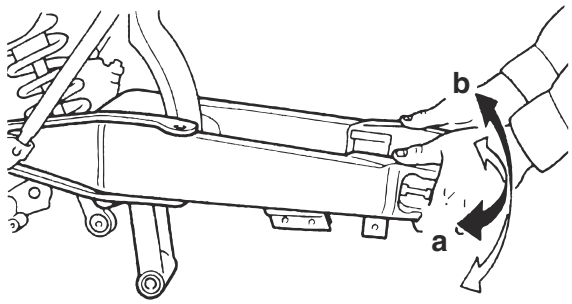
EWA13120
**⚠ WARNING**

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

2. Measure:
   - Swingarm side play
   - Swingarm vertical movement
   a. Measure the tightening torque of the pivot shaft nut.

| | |
|---|---|
| | **Pivot shaft nut**<br>**75 N·m (7.5 kgf·m, 55 lb·ft)** |

   b. Check the swingarm side play "a" by moving the swingarm from side to side. If the swingarm has side-to-side play, check the bushings, the bearings, and the collars.
   c. Check the swingarm vertical movement "b" by moving the swingarm up and down.
   If swingarm vertical movement is not smooth or if there is binding, check the bushings, the bearings, and the collars.




EAM30073
## CHECKING THE SWINGARM

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

EWA13770
**⚠ WARNING**

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

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

EAM30074
## INSTALLING THE SWINGARM

1. Lubricate:
   - Bearing
   - Thrust bearing
   - Collar
   - Bushing
   - Oil seal
   - Pivot shaft

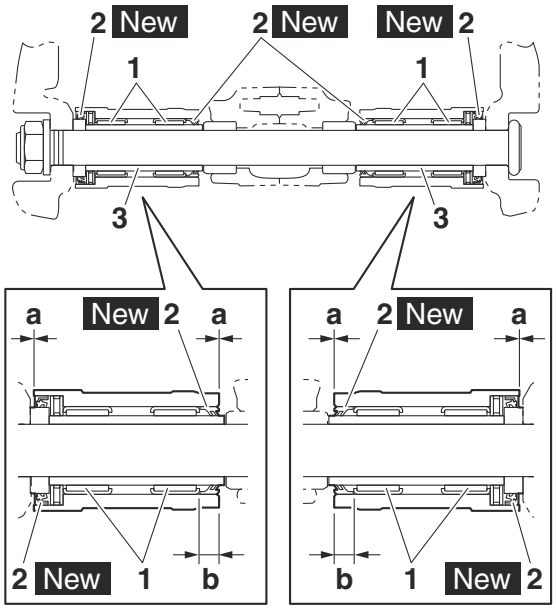
| | |
|---|---|
| | **Recommended lubricant**<br>**Molybdenum disulfide grease** |

2. Install:
   - Bearing "1"
   - Oil seal "2" New
   (to the swingarm)
   - Collar "3"

| | |
|---|---|
| | **Installed depth "a"**<br>**0–0.5 mm (0–0.02 in)**<br>**Installed depth "b"**<br>**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

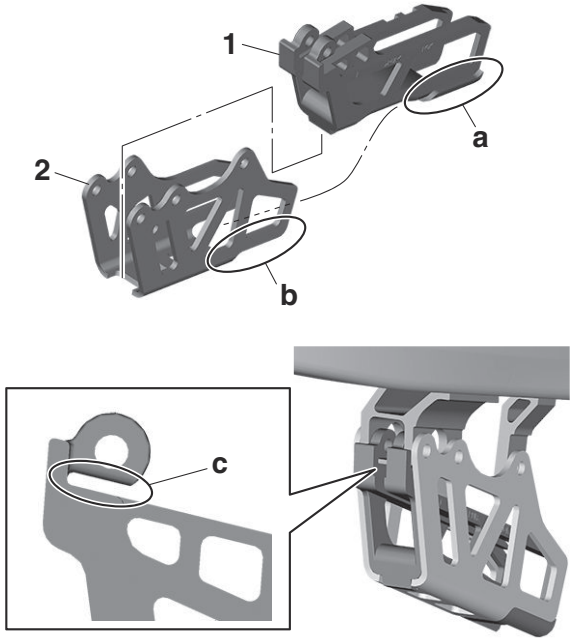
| | |
|---|---|
| | **Pivot shaft nut**<br>**75 N·m (7.5 kgf·m, 55 lb·ft)** |

**TIP**
- Install the pivot shaft from the right.
- Apply lithium-soap-based grease onto the threads and contact surface of the pivot shaft nut.

4. Install:
   • Drive chain support "1"
   • Drive chain support cover "2"

| | |
|---|---|
| | **Drive chain support nut**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)**<br>**Bolt (drive chain support)**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)** |

**TIP**
- Align the projection "a" on the drive chain support with the part "b" of the drive chain support cover, and then install.
- Align the slit "c" in the drive chain support with swingarm stay as shown, and then install the drive chain support.

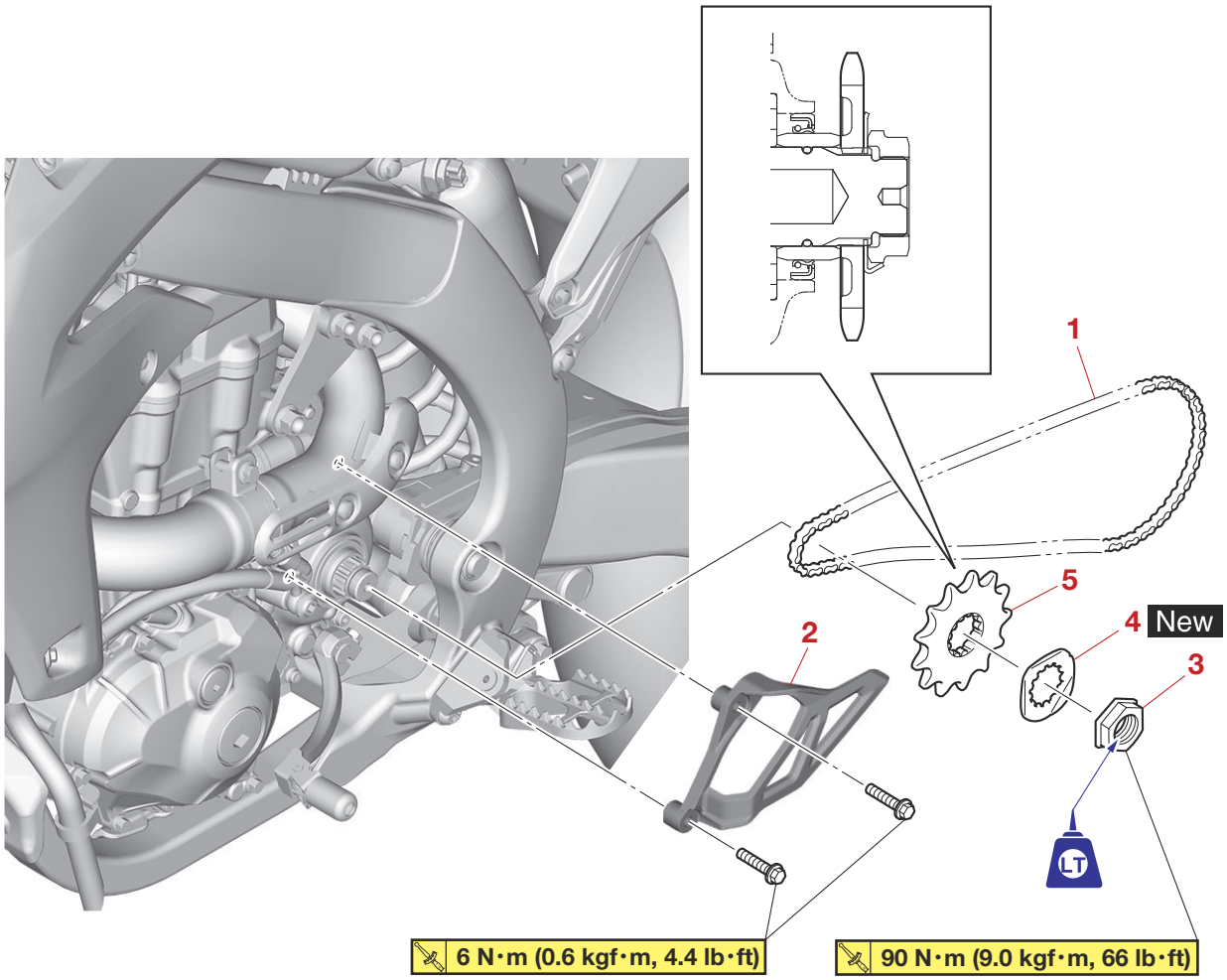



5. Install:
   • Rear wheel
   Refer to "REAR WHEEL" on page 4-12.
6. Adjust:
   • Drive chain slack
   Refer to "DRIVE CHAIN SLACK" on page 3-27.

| | |
|---|---|
| | **Drive chain slack (Maintenance Stand)**<br>**50.0–60.0 mm (1.97–2.36 in)** |

EAM20104
# CHAIN DRIVE

**Removing the drive chain**



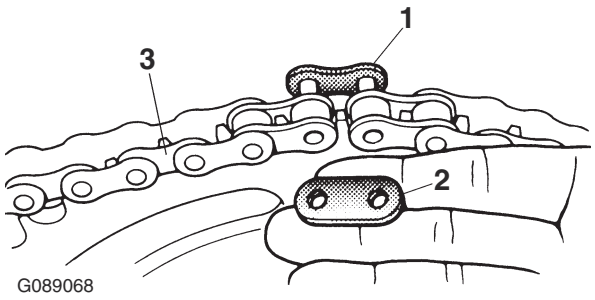

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Drive chain | 1 | |
| 2 | Drive sprocket cover | 1 | |
| 3 | Drive sprocket nut | 1 | |
| 4 | Lock washer | 1 | |
| 5 | Drive sprocket | 1 | |

EAM30075
## REMOVING THE DRIVE CHAIN
1. Stand the vehicle on a level surface.

EWA13120
**⚠ WARNING**

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

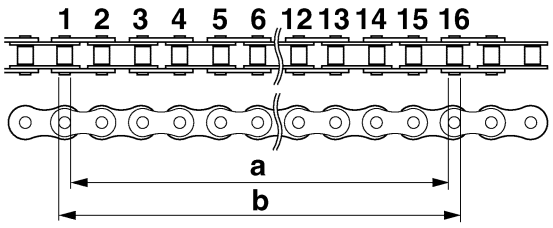
2. Remove:
   - Master link clip
   - Master link "1"
   - Master link plate "2"
   - Drive chain "3"



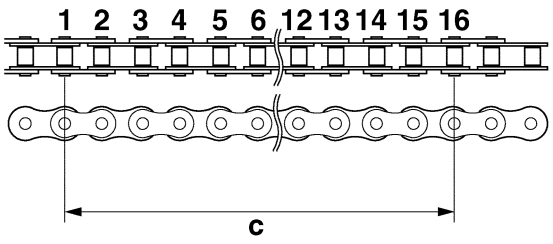

EAM30076
## CHECKING THE DRIVE CHAIN
1. Measure:
   - 15-link section of the drive chain
     Out of specification → Replace the drive chain.

| | |
|---|---|
| | **15-link length limit**<br>**242.9 mm (9.56 in)** |

   a. Measure the length "a" between the inner sides of the pins and the length "b" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.

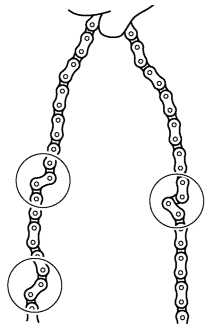



   b. Calculate the length "c" of the 15-link section of the drive chain using the following formula.
      Drive chain 15-link section length "c" = (length "a" between pin inner sides + length "b" between pin outer sides)/2

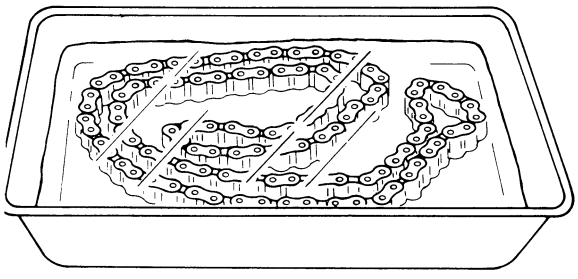



**TIP**
- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.

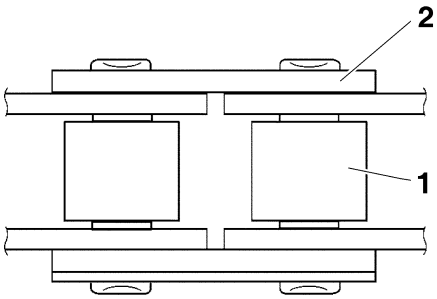
2. Check:
   - Drive chain
     Stiffness → Clean, lubricate, or replace.



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



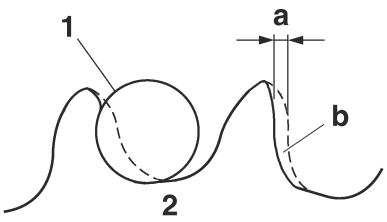
4. Check:
   - Drive chain roller "1"
     Damage/wear → Replace the drive chain.
   - Drive chain side plate "2"
     Damage/wear → Replace the drive chain.




5. Lubricate:
   • Drive chain

EAM30077
## CHECKING THE DRIVE SPROCKET

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




b. Correct

1. Drive chain roller
2. Drive sprocket

EAM30078
## CHECKING THE REAR WHEEL SPROCKET

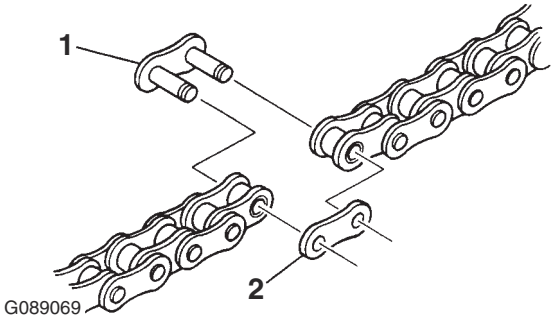
Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-14.

EAM30079
## INSTALLING THE DRIVE CHAIN

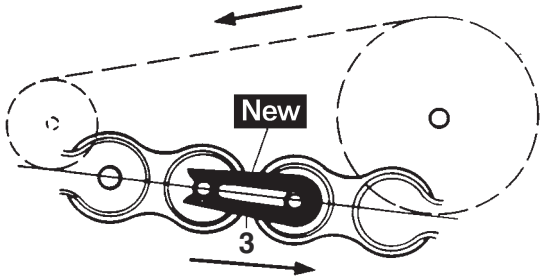
1. Install:
   • Master link "1"
   • Master link plate "2"
   • Master link clip "3" New

EWA20250
**⚠ WARNING**

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




G089069




G089070

2. Lubricate:
   • Drive chain
3. Install:
   • Drive sprocket
   • Lock washer New
   • Drive sprocket nut

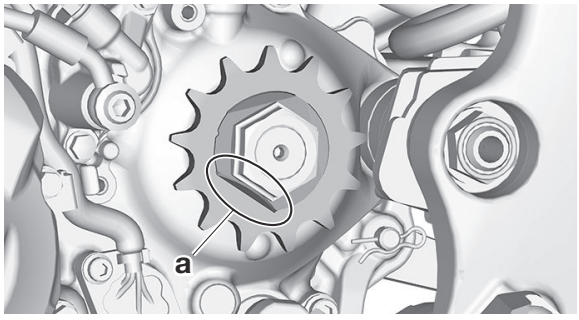
| | |
|---|---|
| | **Drive sprocket nut**<br>**90 N·m (9.0 kgf·m, 66 lb·ft)**<br>**LOCTITE®** |

ECA14300
***NOTICE***

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

**TIP**

After the drive sprocket nut has been tightened to specification, firmly bend the lock washer tabs "a" along the flat of the drive sprocket nut.




4. Adjust:
   • Drive chain slack
   Refer to "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.**

# ENGINE

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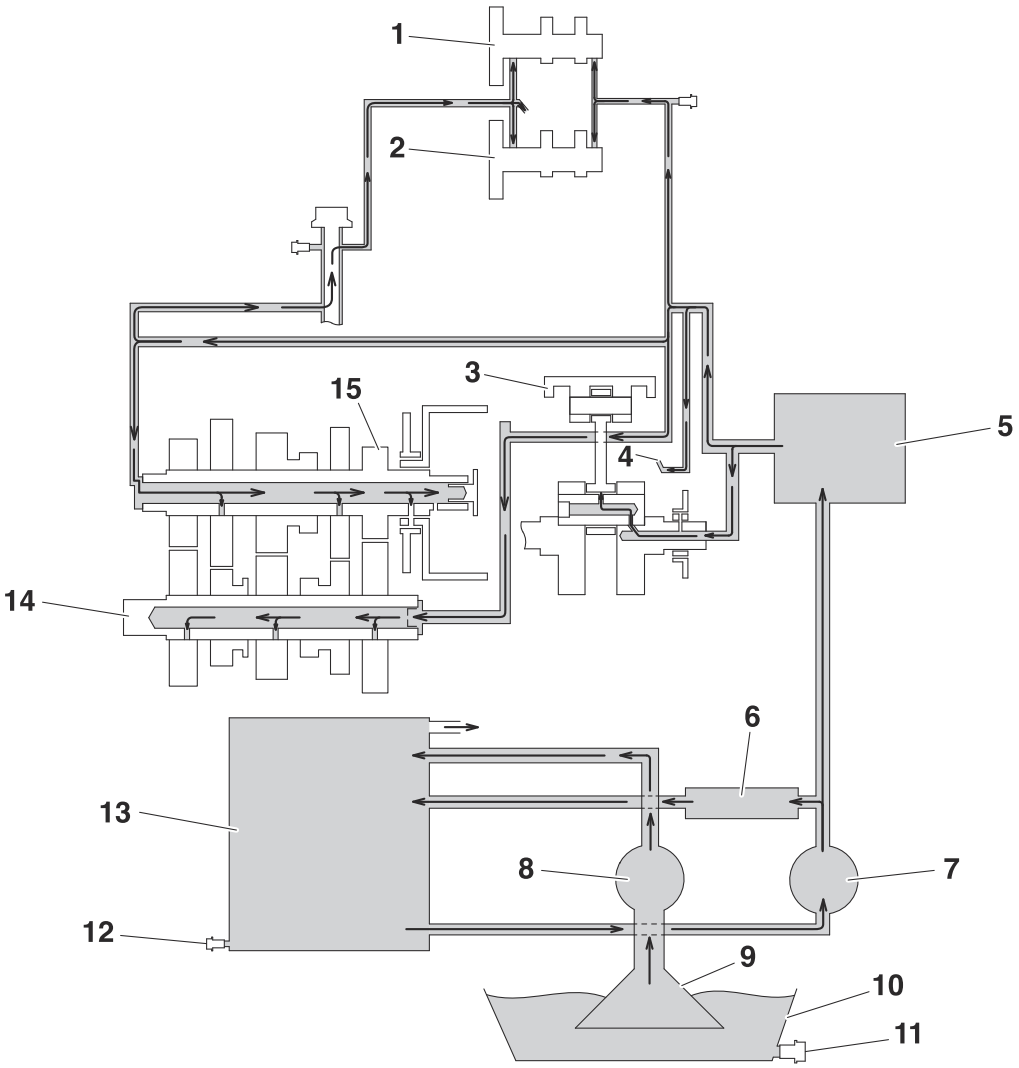
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EAM20185
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAM30526
## ENGINE OIL LUBRICATION CHART

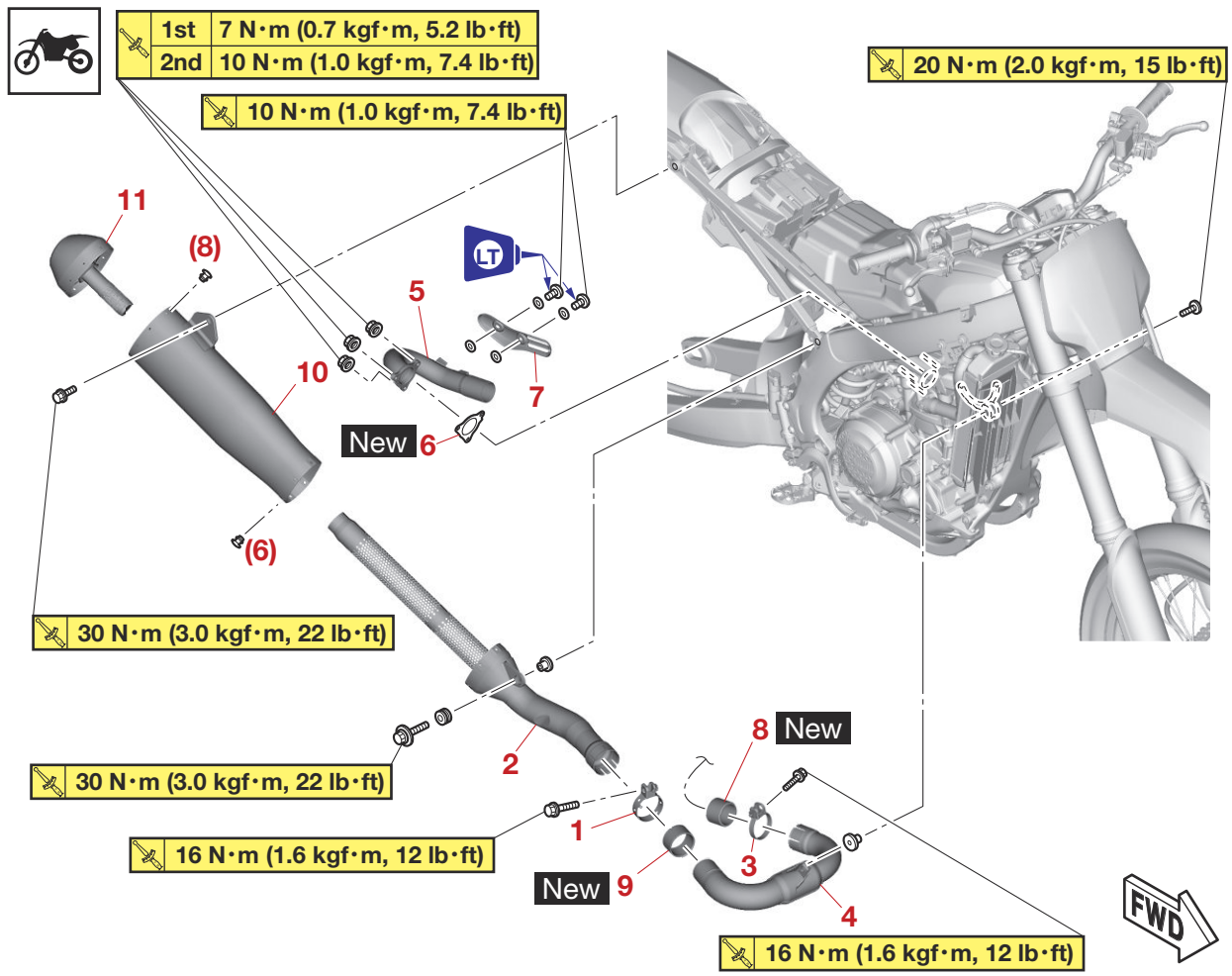


1. Intake camshaft
2. Exhaust camshaft
3. Piston
4. Oil nozzle
5. Oil filter element
6. Relief valve
7. Oil feed pump
8. Scavenging pump
9. Oil strainer
10. Oil pan
11. Oil pan bolt
12. Oil tank bolt
13. Oil tank
14. Drive axle
15. Main axle

EAM20105

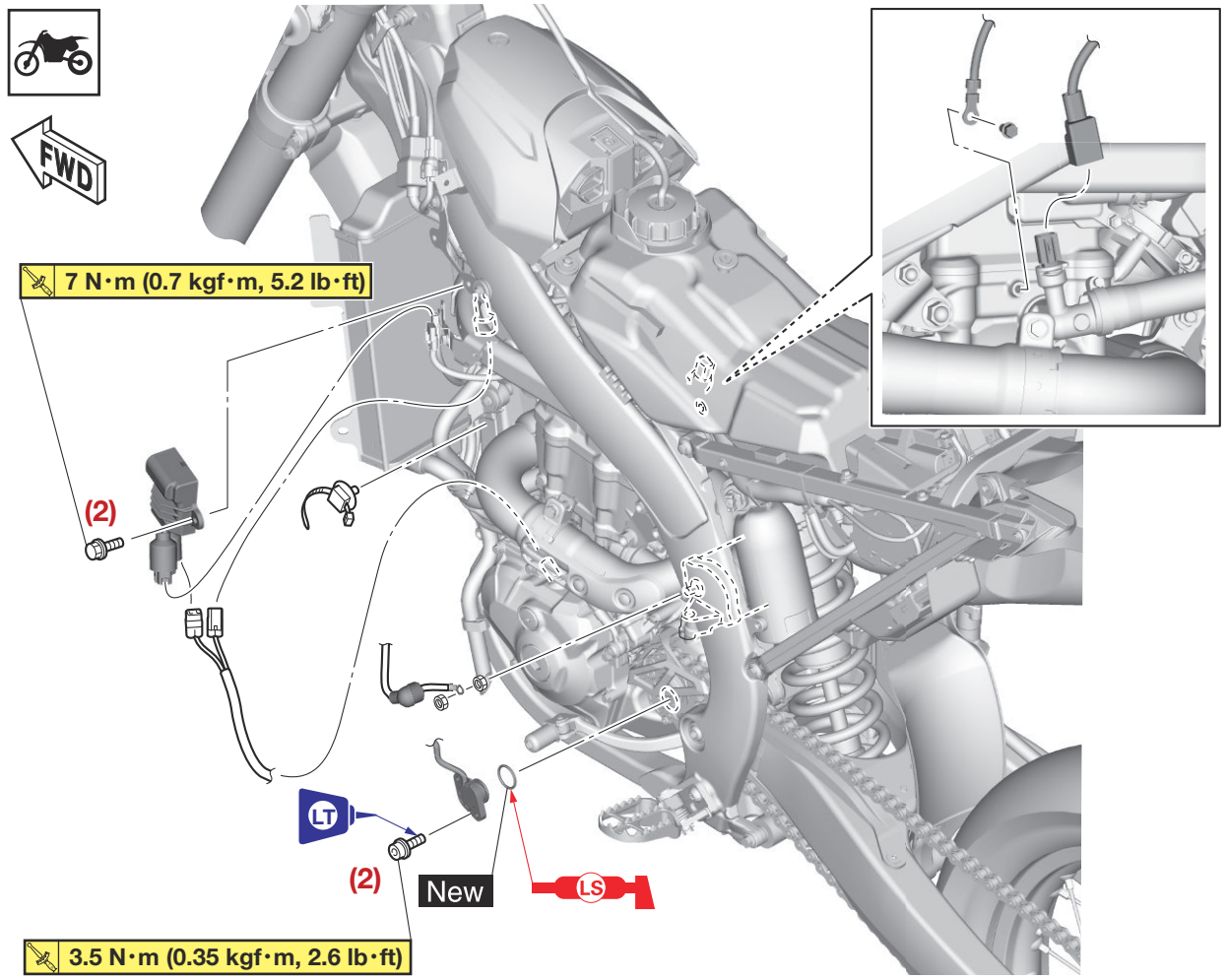
# ENGINE REMOVAL

## Removing the exhaust pipe



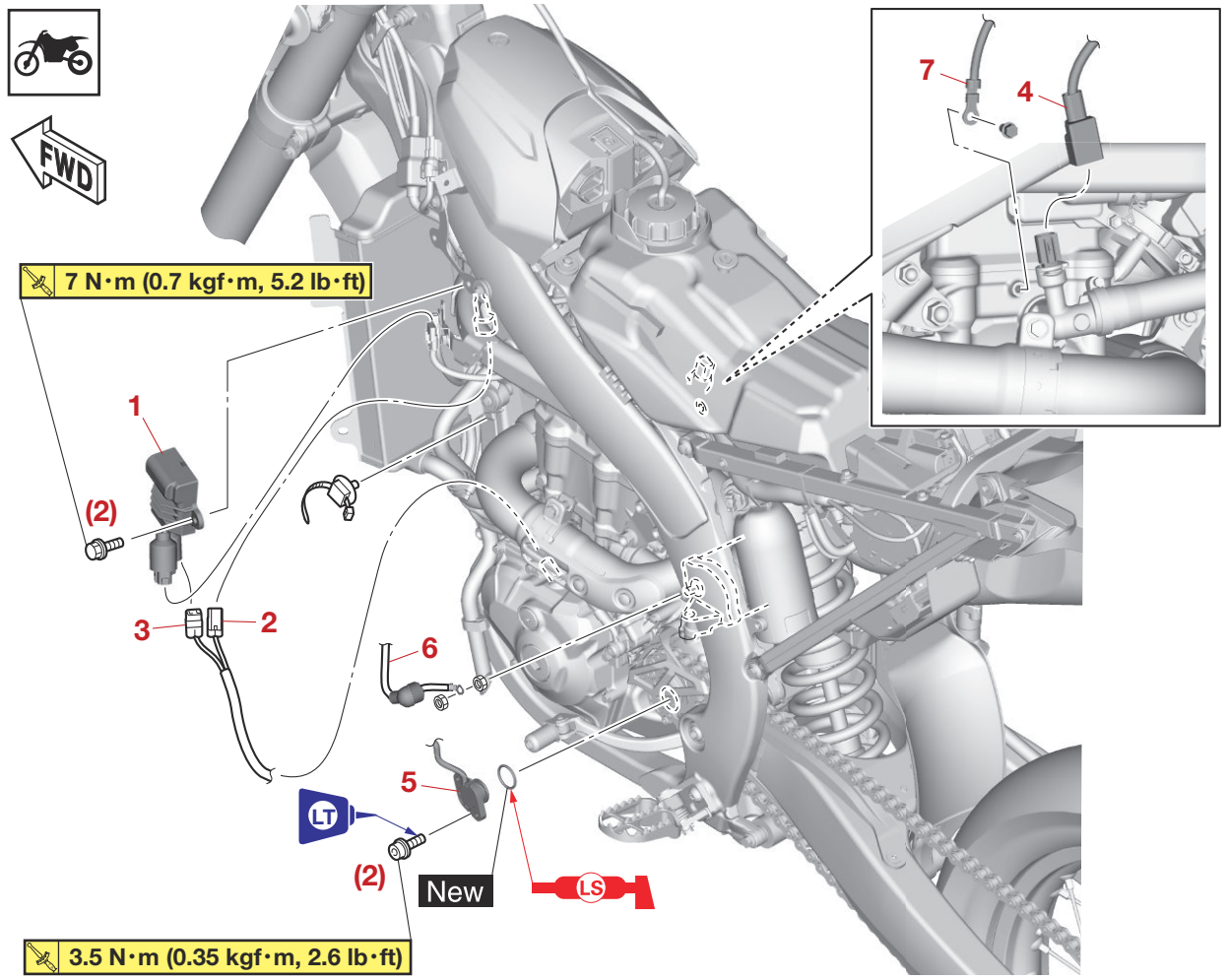

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Side cover (right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| 1 | Silencer clamp | 1 | Loosen. |
| 2 | Silencer | 1 | |
| 3 | Exhaust pipe 2 clamp | 1 | Loosen. |
| 4 | Exhaust pipe 2 | 1 | |
| 5 | Exhaust pipe 1 | 1 | |
| 6 | Gasket | 1 | |
| 7 | Exhaust pipe 1 protector | 1 | |
| 8 | Gasket | 1 | |
| 9 | Gasket | 1 | |
| 10 | Silencer body | 1 | |
| 11 | Silencer cap | 1 | |

## Removing the electronic parts



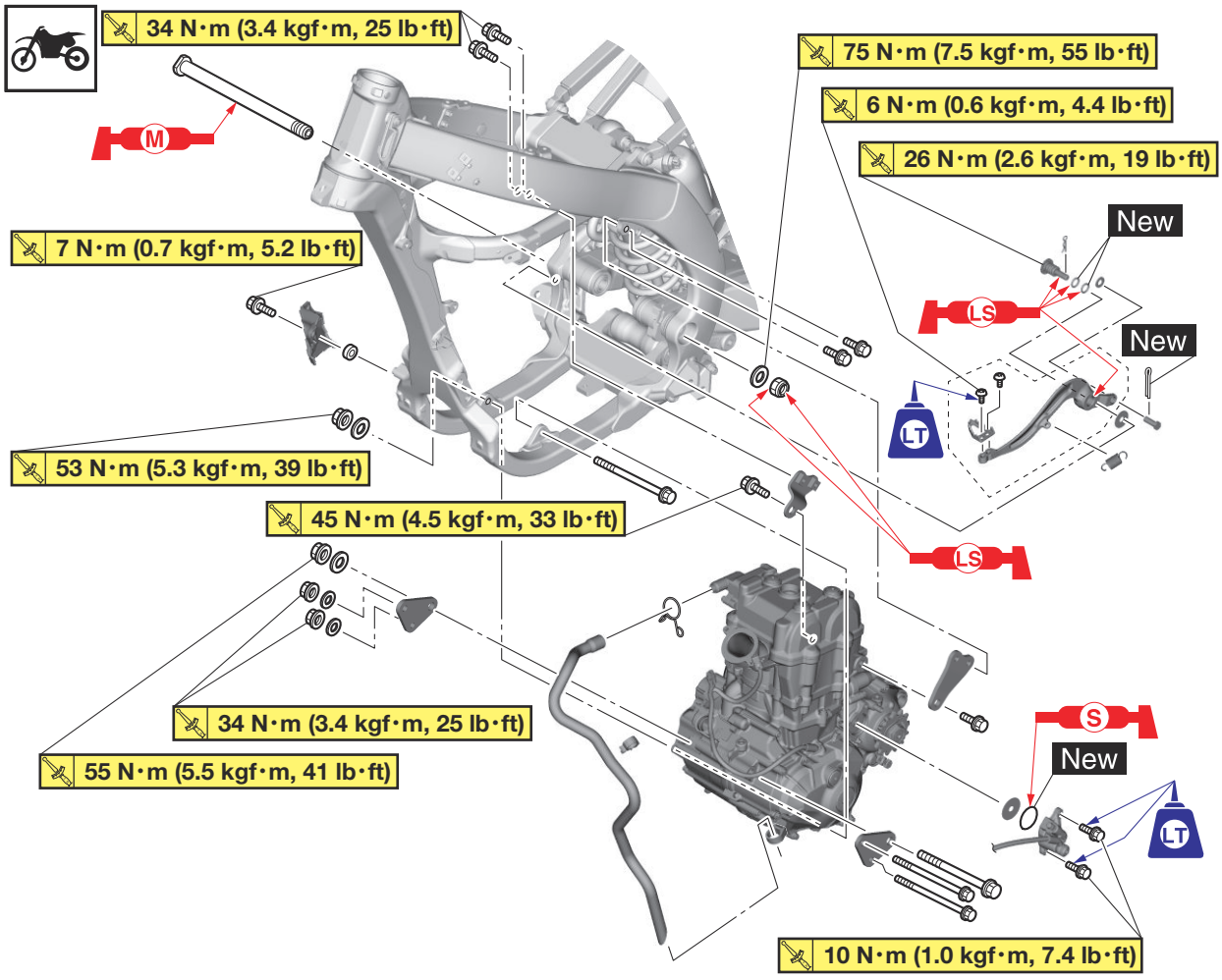

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | | | Use a maintenance stand to raise the front wheel off the ground. |
| | Seat | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Side cover (left) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left) | | Refer to "GENERAL CHASSIS" on page 4-1. |

## Removing the electronic parts



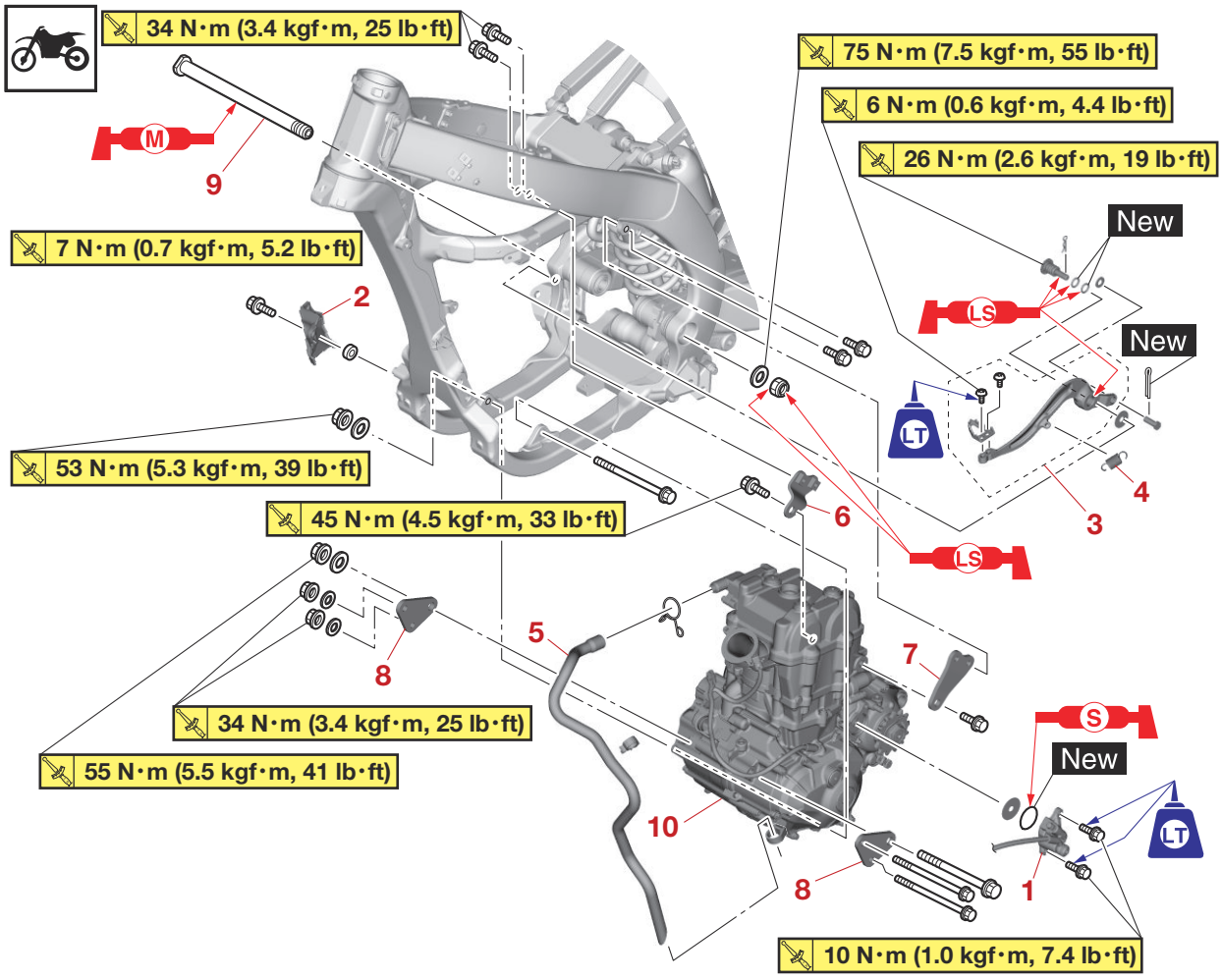

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Rectifier/regulator | 1 | |
| 2 | Stator coil assembly coupler | 1 | Disconnect. |
| 3 | Crankshaft position sensor coupler | 1 | Disconnect. |
| 4 | Coolant temperature sensor coupler | 1 | |
| 5 | Gear position switch | 1 | |
| 6 | Starter motor lead | 1 | Disconnect. |
| 7 | Engine ground lead terminal | 1 | Disconnect. |

## 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. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" on page 7-1. |
| | Exhaust pipe/Silencer | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Air filter case | | Refer to "THROTTLE BODY" on page 7-4. |
| | Throttle body | | Refer to "THROTTLE BODY" on page 7-4. |
| | Shift pedal/Drive sprocket | | Refer to "SHIFT SHAFT" on page 5-61.<br>Refer to "CHAIN DRIVE" on page 4-74. |

## Removing the engine

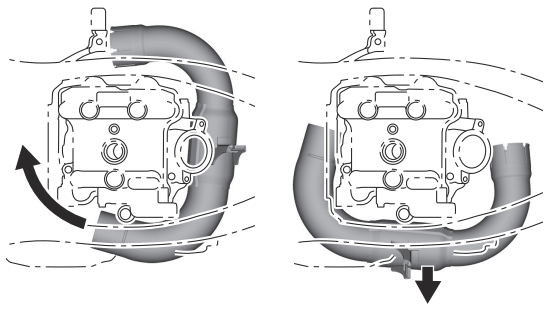



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Starter motor | | Disconnect.<br>Refer to "ELECTRIC STARTER" on page 5-42. |
| | Spark plug cap | | Disconnect.<br>Refer to "THROTTLE BODY" on page 7-4. |
| | Radiator hose 1/3/4 | | Disconnect.<br>Refer to "RADIATOR" on page 6-3. |
| 1 | Clutch release cylinder assembly | 1 | |
| 2 | Engine guard | 1 | |
| 3 | Brake pedal | 1 | |
| 4 | Spring | 1 | |
| 5 | Cylinder head breather hose | 1 | |
| 6 | Upper engine bracket (right) | 1 | |
| 7 | Upper engine bracket (left) | 1 | |
| 8 | Lower engine bracket | 2 | |
| 9 | Pivot shaft | 1 | |
| 10 | Engine | 1 | |

EAM30161
## REMOVING THE ENGINE

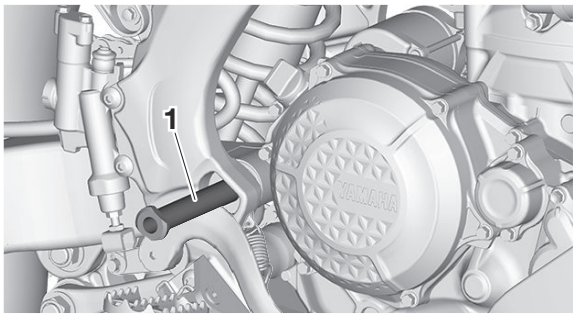
1. Remove:
   • Exhaust pipe 2

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



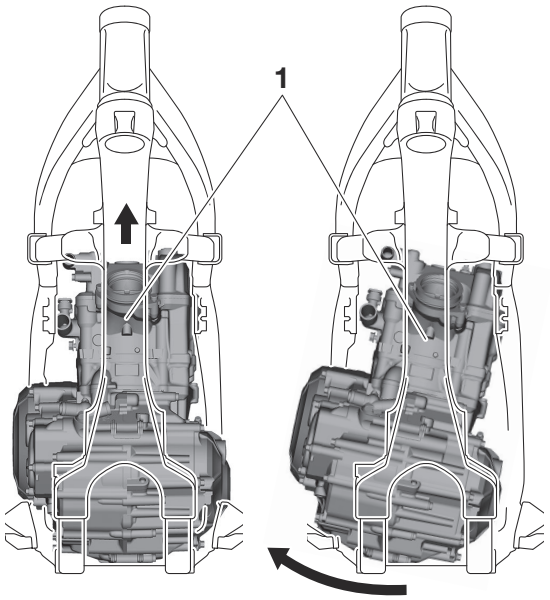
2. Remove:
   • Pivot shaft “1”

**TIP**
If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a shaft of similar diameter into the other side of the swingarm to support it.




3. Remove:
   • Engine “1”
   (from the right side)

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




EAM30164
## INSTALLING THE ENGINE

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

| | |
|---|---|
| | **Pivot shaft nut**<br>**75 N·m (7.5 kgf·m, 55 lb·ft)** |

   • Engine mounting bolt (lower side) “3”

| | |
|---|---|
| | **Engine mounting bolt (lower side)**<br>**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)**<br>**34 N·m (3.4 kgf·m, 25 lb·ft)** |

   • Engine mounting bolt (front side) “6”

| | |
|---|---|
| | **Engine mounting bolt (front side)**<br>**55 N·m (5.5 kgf·m, 41 lb·ft)** |

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

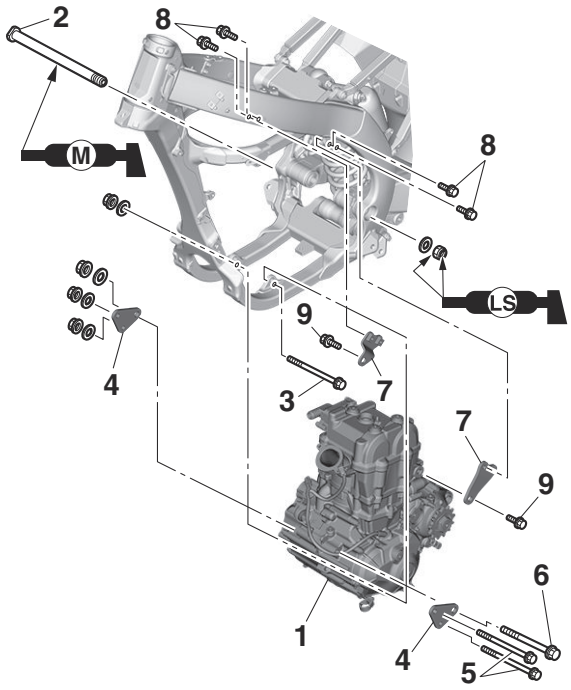
| | |
|---|---|
| | **Engine bracket bolt (upper side)**<br>**34 N·m (3.4 kgf·m, 25 lb·ft)** |

   • Engine mounting bolt (upper side) “9”

| | |
|---|---|
| | **Engine mounting bolt (upper side)**<br>**45 N·m (4.5 kgf·m, 33 lb·ft)** |

**TIP**

- Apply molybdenum disulfide grease to the pivot shaft.
- Apply lithium-soap-based grease onto the threads and contact surface of the pivot shaft nut.




EAM30167

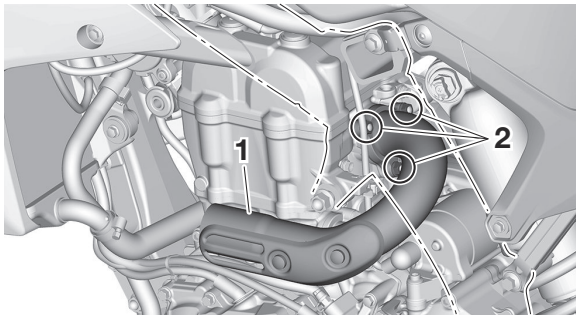
## INSTALLING THE EXHAUST PIPE AND MUFFLER

1. Install:
   - Gasket New
   - Exhaust pipe 1 “1”
   - Exhaust pipe nut “2”

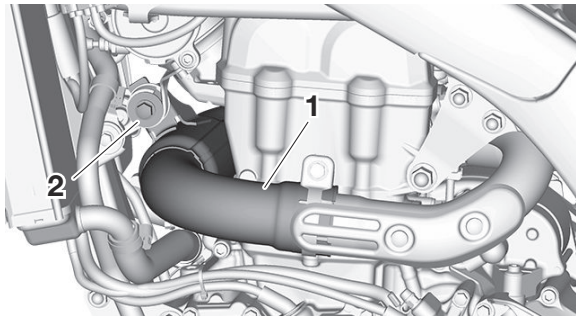
| | |
|---|---|
| | **Exhaust pipe nut**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**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).

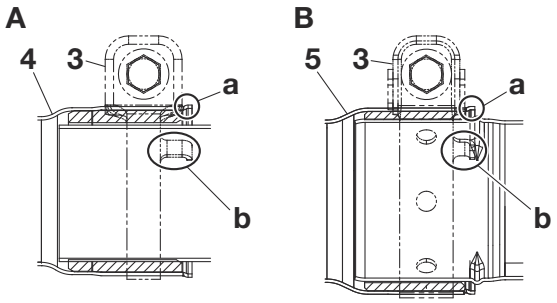



2. Install:
   - Exhaust pipe 2 clamp
   - Exhaust pipe 2 “1”
   - Exhaust pipe bracket bolt “2”




**TIP**

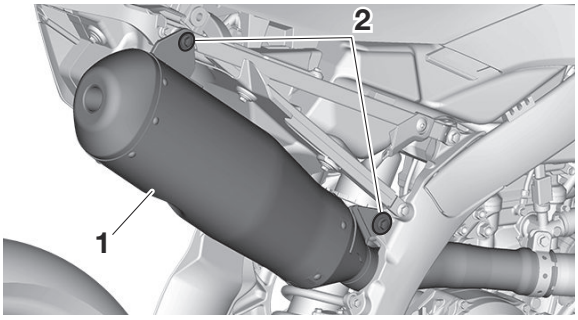
Make sure that the clamp “3” does not ride on the projection “a” on the exhaust pipe “4” or silencer “5”. Be sure to insert the projection “b” into the slot in the exhaust pipe (or silencer).




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

3. Install:
   - Silencer clamp
   - Silencer “1”
   - Silencer bolt “2”

| | |
|---|---|
| | **Silencer bolt**<br>**30 N·m (3.0 kgf·m, 22 lb·ft)** |




4. Tighten:
   • Exhaust pipe bracket bolt

| | |
|---|---|
| | **Exhaust pipe bracket bolt**<br>**20 N·m (2.0 kgf·m, 15 lb·ft)** |

   • Exhaust pipe 2 clamp

| | |
|---|---|
| | **Exhaust pipe clamp bolt (exhaust pipe 2 clamp)**<br>**16 N·m (1.6 kgf·m, 12 lb·ft)** |

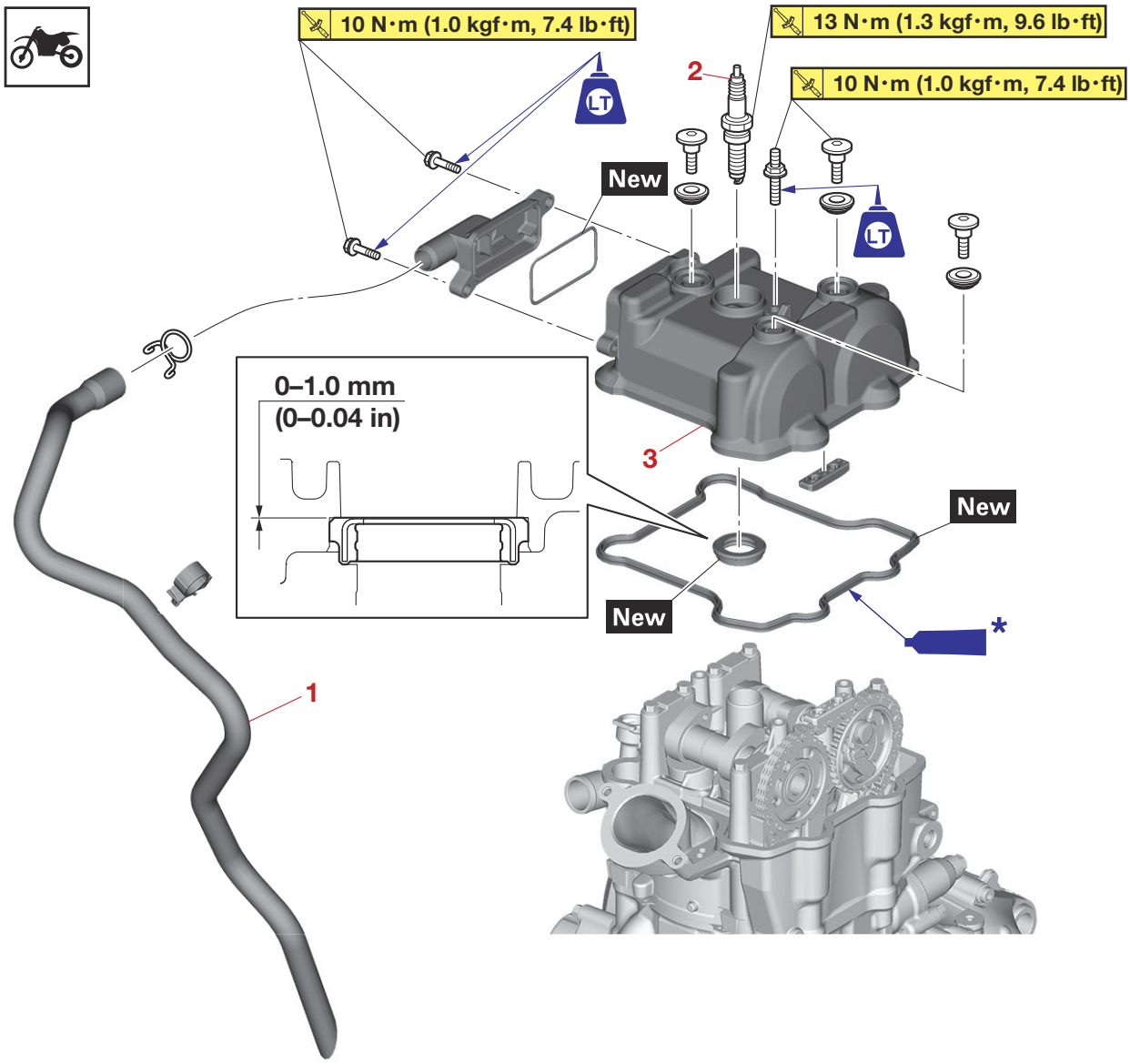
   • Silencer clamp

| | |
|---|---|
| | **Exhaust pipe clamp bolt (silencer clamp)**<br>**16 N·m (1.6 kgf·m, 12 lb·ft)** |

**TIP**
Tighten while checking that their front and rear joints are inserted in position.

EAM20106
# CAMSHAFT

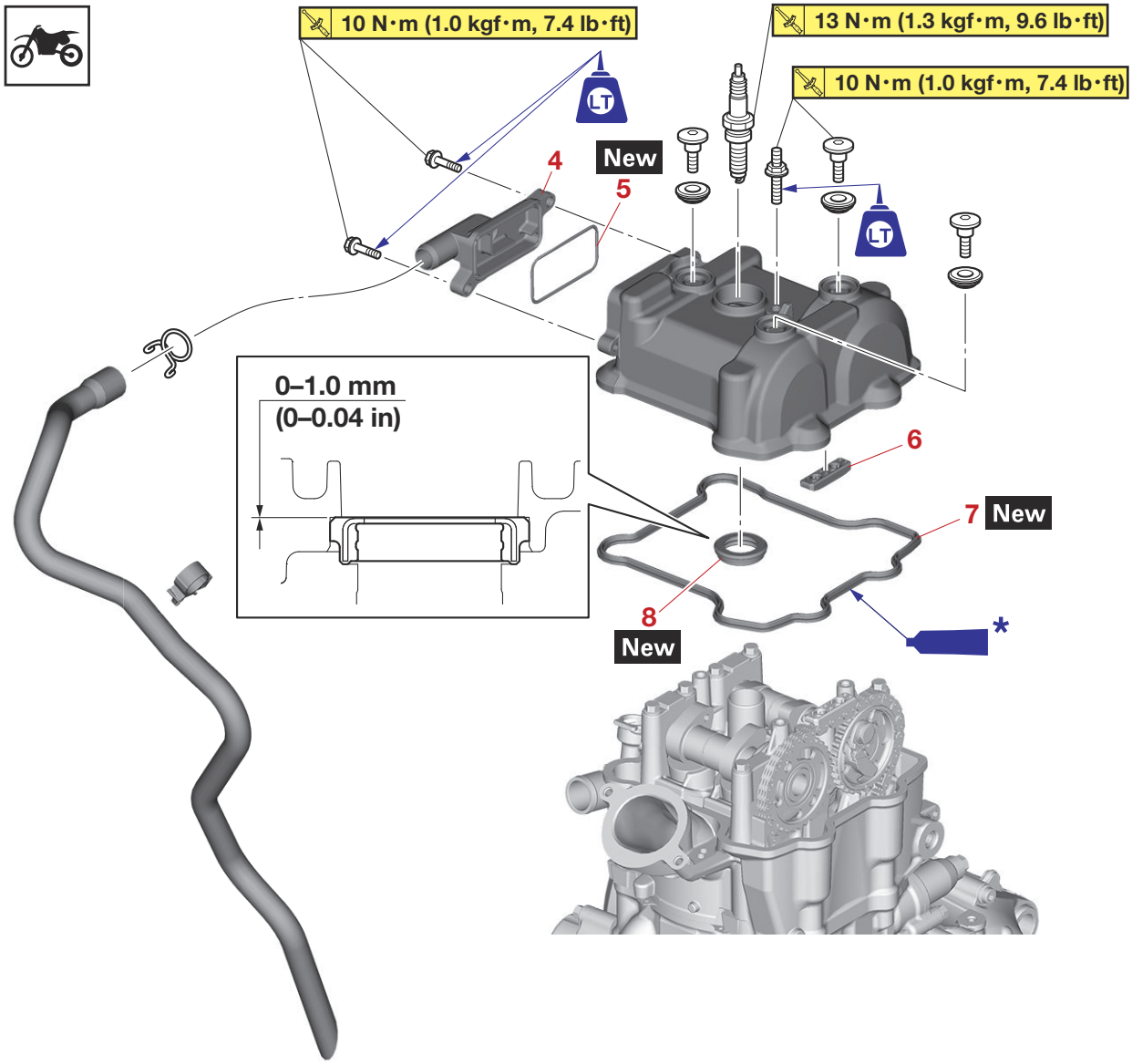
## Removing the cylinder head cover




*** Three bond No. 1541C®**

| 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. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" on page 7-1. |
| 1 | Cylinder head breather hose | 1 | |
| 2 | Spark plug | 1 | |
| 3 | Cylinder head cover | 1 | |

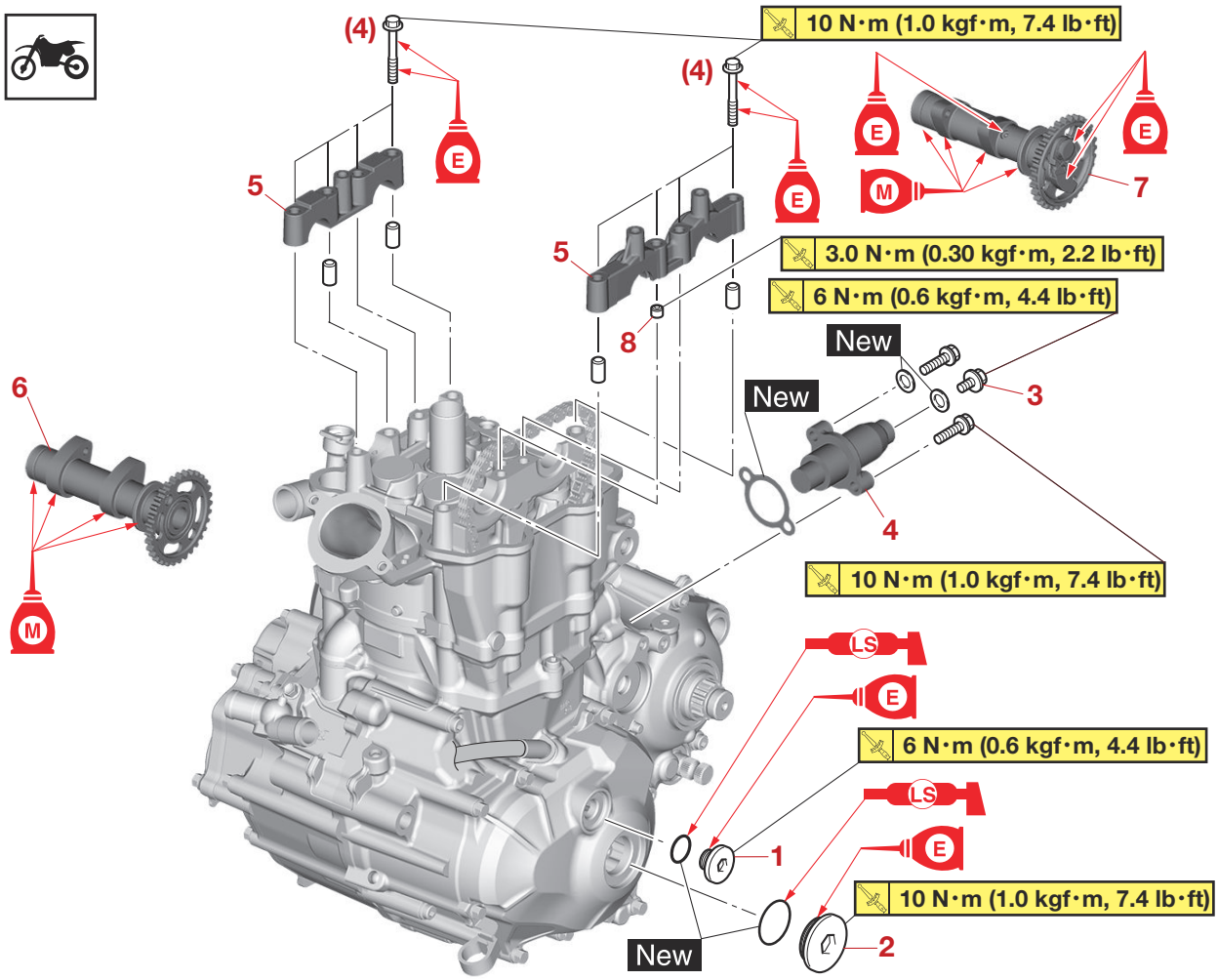
## Removing the cylinder head cover




*** Three bond No. 1541C®**

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 4 | Cylinder head cover breather plate | 1 | |
| 5 | Gasket | 1 | |
| 6 | Timing chain guide (top side) | 1 | |
| 7 | Cylinder head cover gasket | 1 | |
| 8 | Gasket | 1 | |

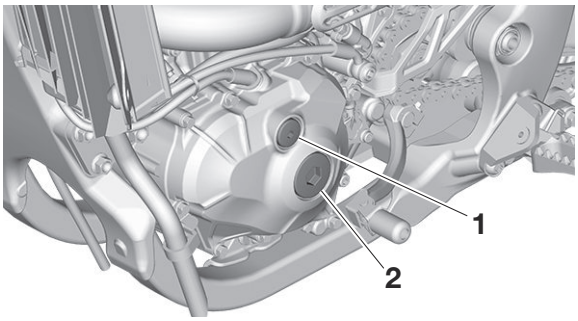
## Removing the camshaft



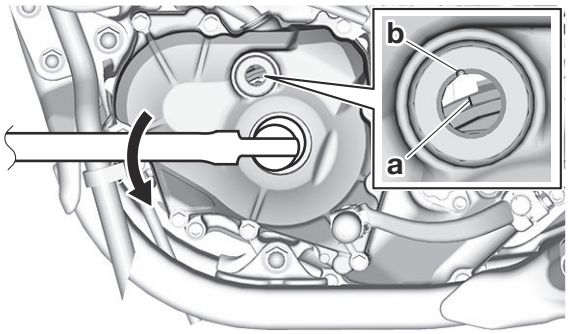

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Timing mark accessing screw | 1 | |
| 2 | Crankshaft end accessing screw | 1 | |
| 3 | Timing chain tensioner cap bolt | 1 | |
| 4 | Timing chain tensioner | 1 | |
| 5 | Camshaft cap | 2 | |
| 6 | Intake camshaft | 1 | |
| 7 | Exhaust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

EAM30080
## REMOVING THE CAMSHAFT

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

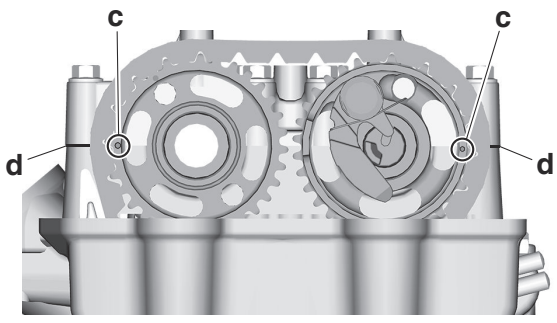



2. Align:
   - Alignment mark
     a. Turn the crankshaft counterclockwise with a wrench.
     b. Align the top dead center (TDC) mark “a” on the generator rotor with the alignment mark “b” on the crankcase cover.

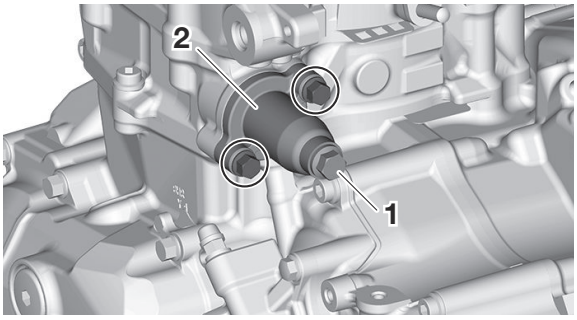



**TIP**

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




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




4. Remove:
   - Camshaft cap bolt “1”
   - Camshaft cap “2”

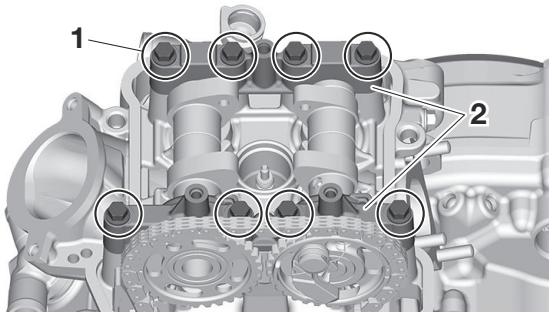
**TIP**

Remove the camshaft cap bolts in a crisscross pattern, working from the outside in.

ECA24610

***NOTICE***

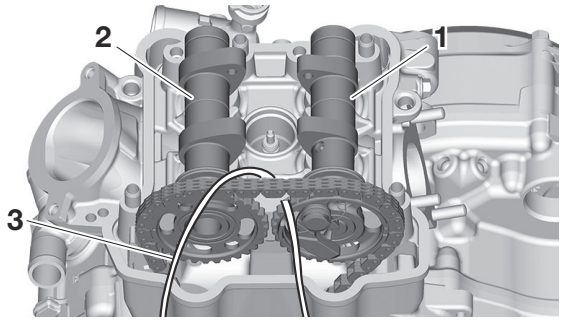
**The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.**




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

**TIP**

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

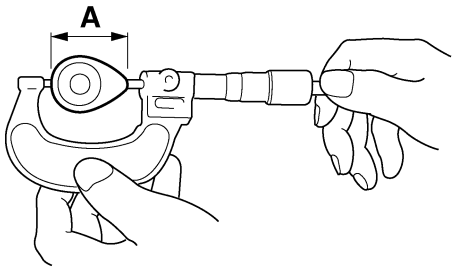



EAM30081
## CHECKING THE CAMSHAFT

1. Check:
   - Camshaft lobe
     Blue discoloration/pitting/scratches →

Replace the camshaft.
2. Measure:
   • Camshaft lobe dimensions "A"
   Out of specification → Replace the camshaft.

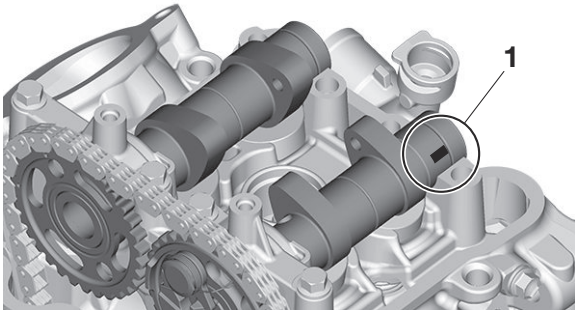
**Camshaft lobe dimensions**
**Lobe height limit (Intake)**
**38.030 mm (1.4972 in)**
**Lobe height limit (Exhaust)**
**34.170 mm (1.3453 in)**




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

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

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

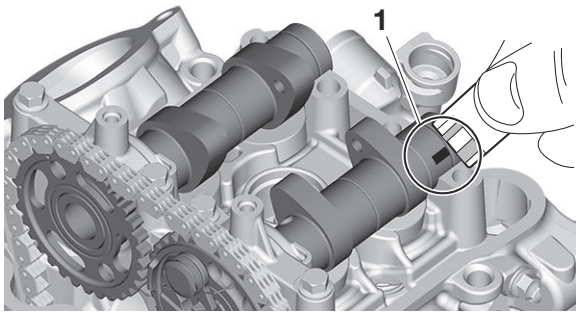



   c. Install the dowel pins and the camshaft caps.

**TIP**
- Tighten the camshaft cap bolts in a crisscross pattern from innermost to outer caps.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance.

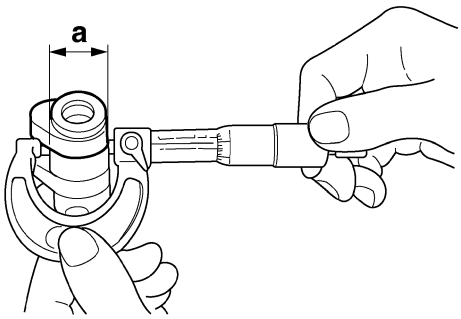
**Camshaft cap bolt**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

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



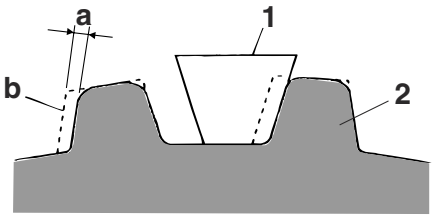

4. Measure:
   • Camshaft journal diameter "a"
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

**Camshaft journal diameter**
**22.002–22.015 mm (0.8662–0.8667 in)**




EAM30082
## CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
   • Timing chain "1"
   Damage/stiffness → Replace the timing chain and camshaft as a set.
2. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear "a" → Replace the camshaft and the timing chain as a set.



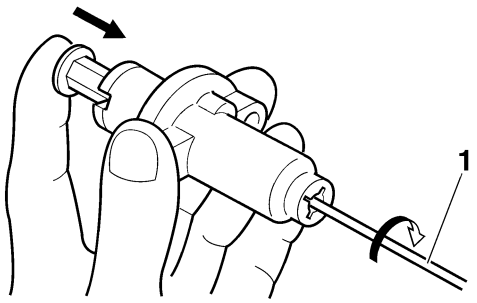

a. 1/4 tooth
b. Correct

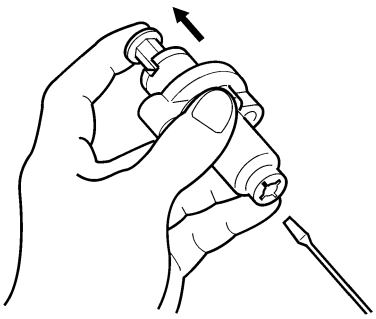
1. Timing chain roller
2. Camshaft sprocket

EAM30083

## CHECKING THE TIMING CHAIN TENSIONERS

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

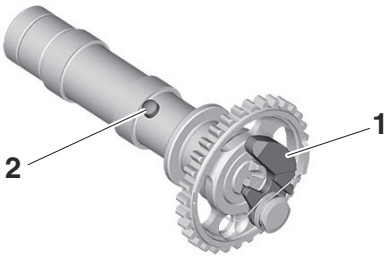


EAM30084

## CHECKING THE DECOMPRESSION SYSTEM

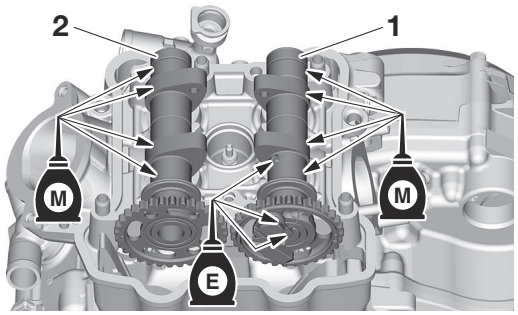
1. Check:
   - Decompression system
     a. Check that the decompressor cam "1" moves smoothly.
     b. Check that the decompressor lever pin "2" projects from the camshaft.




EAM30085

## INSTALLING THE CAMSHAFTS

1. Install:
   - Exhaust camshaft "1"
   - Intake camshaft "2"

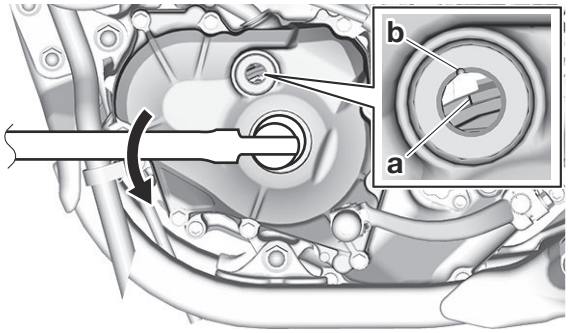



a. Turn the crankshaft counterclockwise with a wrench.

**TIP**

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

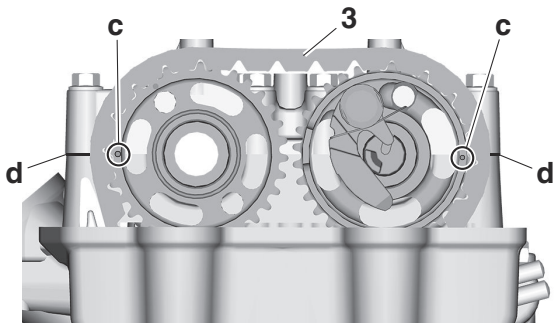
b. Align the top dead center (TDC) mark "a" on the generator rotor with the alignment mark "b" on the crankcase cover.




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

**TIP**

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




ECA24620

***NOTICE***

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

d. Install the camshaft caps and the camshaft cap bolts.

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

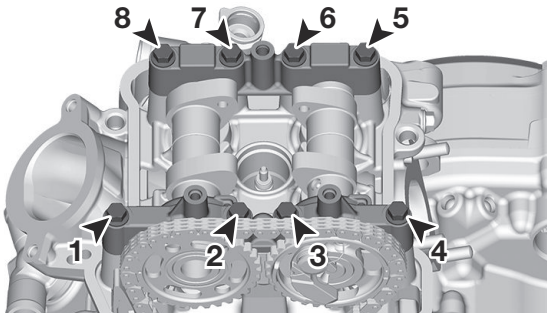
**TIP**

- Apply the engine oil to the threads and contact surfaces.
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

ECA24630

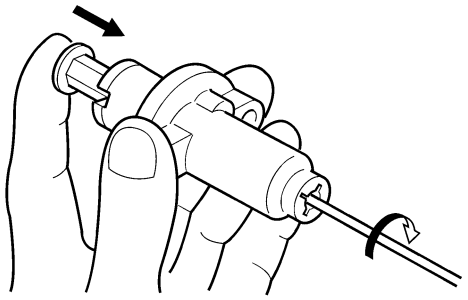
***NOTICE***

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



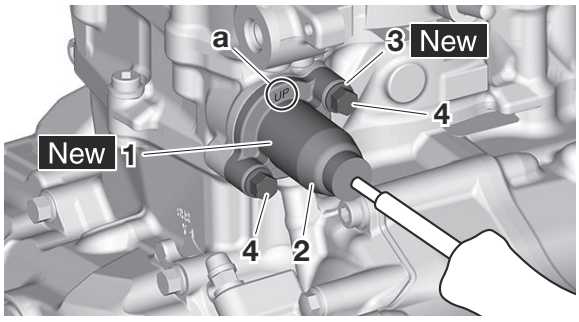

2. Install:
   - Timing chain tensioner

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



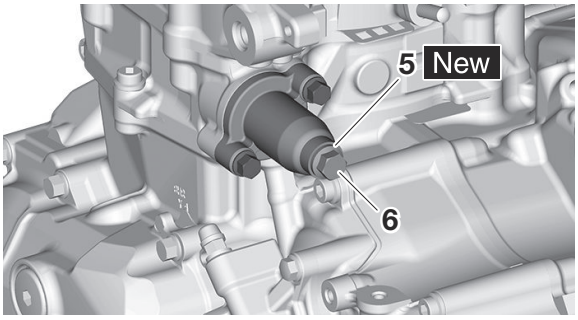
   b. With the tensioner rod fully wound and the chain tensioner "UP" mark "a" facing upward, install the gasket "1", the timing chain tensioner "2", and the gasket "3", and tighten the bolts "4".

| | |
|---|---|
| | **Timing chain tensioner bolt 10 N·m (1.0 kgf·m, 7.4 lb·ft)** |




   c. Release the screwdriver, check that the tensioner rod comes out smoothly, and tighten the gasket "5" and the cap bolt "6".

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

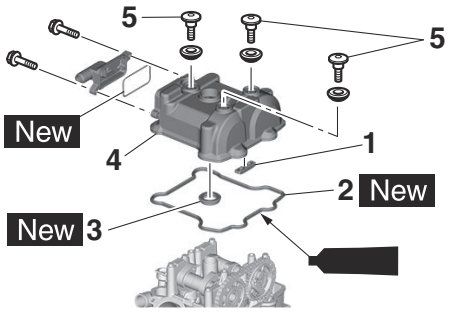



3. Turn:
   • Crankshaft
   Counterclockwise several turns.
4. Check:
   • Top dead center (TDC) mark on the generator rotor
   Align with the crankcase alignment mark.
   • Camshaft match marks
   Align with the cylinder head surface.
   Out of alignment → Adjust.
5. Install:
   • Timing chain guide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

| | |
|---|---|
| | **Bolt (cylinder head cover)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**TIP**

Before installation, apply the Three bond No. 1541C® to the cylinder head cover gasket.



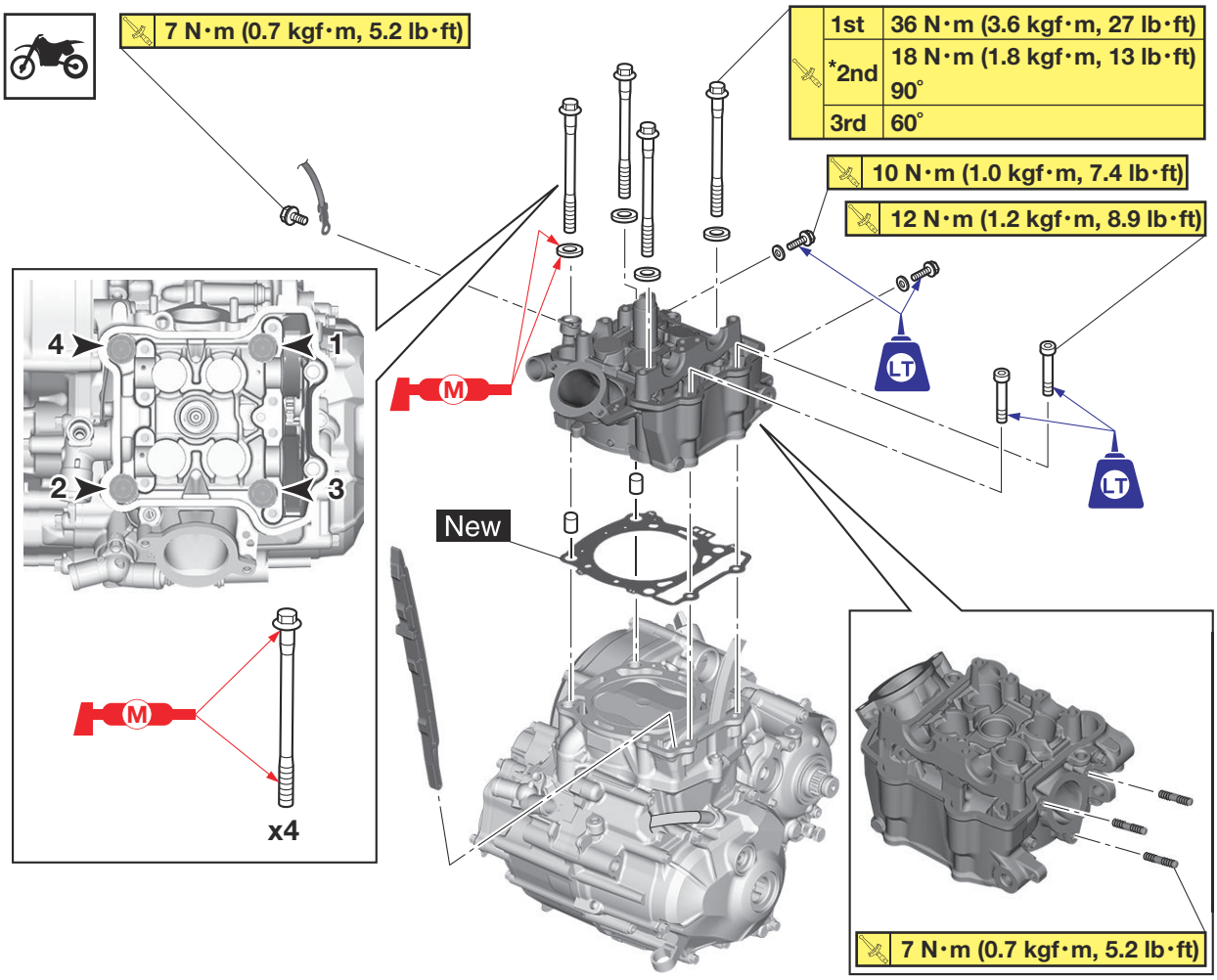

6. Install:
   • Cylinder head breather hose
   • Spark plug

| | |
|---|---|
| | **Spark plug**<br>**13 N·m (1.3 kgf·m, 9.6 lb·ft)** |

EAM20107

# CYLINDER HEAD

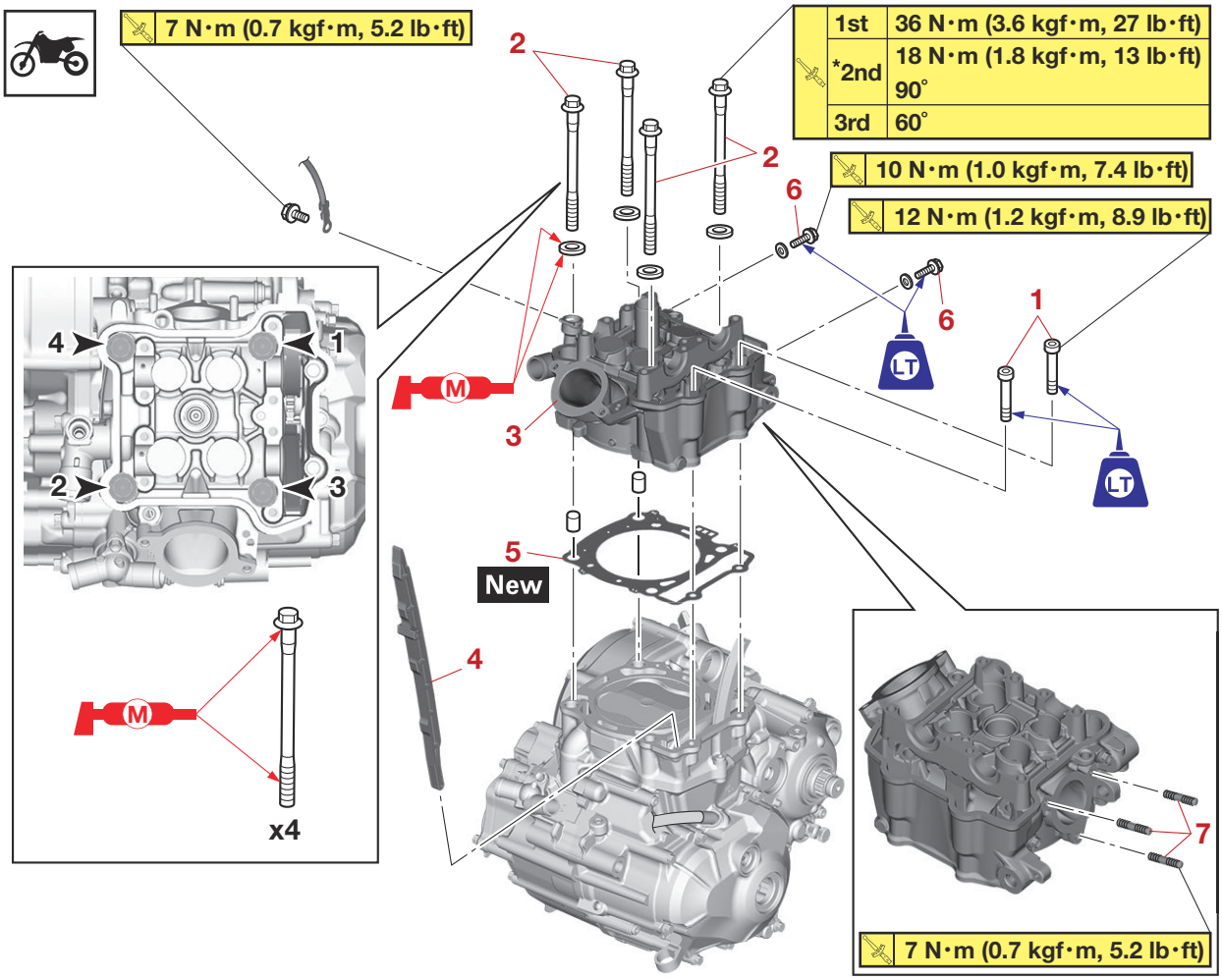
## Removing the cylinder head




*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and the specified angle (after loosening a bolt, retighten it before loosening the next bolt).**

| 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. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" on page 7-1. |
| | Exhaust pipe/Silencer | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Radiator hose | | Disconnect. |
| | Coolant temperature sensor coupler | | Disconnect. |
| | Throttle body | | Refer to "THROTTLE BODY" on page 7-4. |
| | Camshaft | | Refer to "CAMSHAFT" on page 5-11. |
| | Upper engine bracket | | Refer to "ENGINE REMOVAL" on page 5-3. |

## Removing the cylinder head



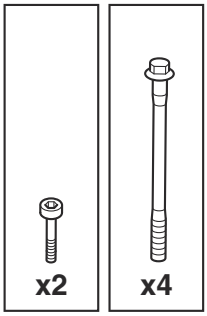

*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and the specified angle (after loosening a bolt, retighten it before loosening the next bolt).**

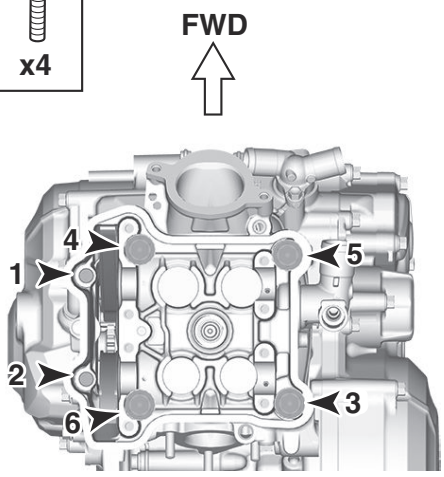
| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Bolt (cylinder head) | 2 | |
| 2 | Bolt (cylinder head) | 4 | |
| 3 | Cylinder head | 1 | |
| 4 | Timing chain guide (intake side) | 1 | |
| 5 | Cylinder head gasket | 1 | |
| 6 | Oil passage plug | 2 | |
| 7 | Cylinder head stud bolt | 3 | Tighten until they contact the bottom. |

EAM30086
## REMOVING THE CYLINDER HEAD
1. Remove:
   • Cylinder head bolt

**TIP**
- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After fully loosening all the bolts, remove them.

   • M6 × 45 mm (1.77 in): [1]–[2]
   • M10 × 129 mm (5.08 in): [3], [4], [5], [6]




EAM30087
## CHECKING THE TIMING CHAIN GUIDE (INTAKE SIDE)
1. Check:
   • Timing chain guide (intake side)
   Damage/wear → Replace.

EAM30088
## CHECKING THE CYLINDER HEAD
1. Eliminate:
   • Combustion chamber carbon deposits

**TIP**
Use a rounded scraper, not a sharp instrument, in order not to damage or scratch the spark plug bore threads.

2. Check:
   • Cylinder head
   Damage/scratches → Replace.

**TIP**
When replacing the cylinder head, replace also the valve.

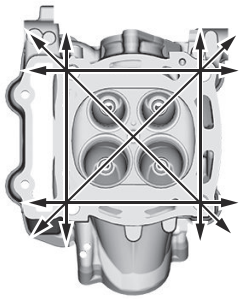
Refer to "CHECKING THE VALVE SEATS" on page 5-28.

   • Cylinder head coolant passages
   Mineral deposits/rust → Eliminate.
3. Measure:
   • Cylinder head warpage
   Out of specification → Resurface the cylinder head.

| | |
|---|---|
| | **Warpage limit**<br>**0.05 mm (0.0020 in)** |

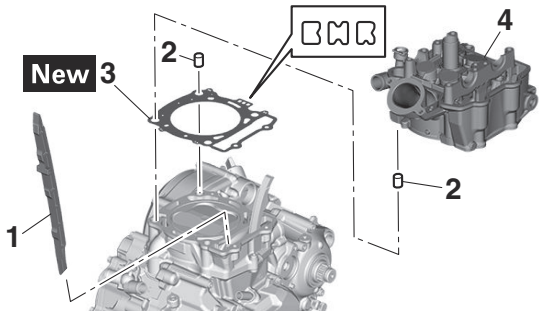
   a. Place a straightedge and a thickness gauge across the cylinder head.
   b. Measure the warpage.
   c. If the limit is exceeded, resurface the cylinder head as follows.
   d. Place a 400–600 grit wet sandpaper on a surface plate, and resurface the cylinder head using a figure-eight sanding pattern.

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

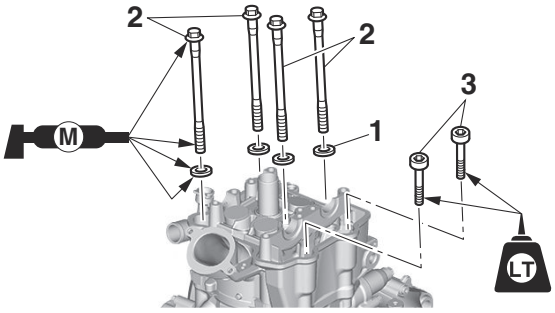


EAM30089
## INSTALLING THE CYLINDER HEAD
1. Install:
   • Timing chain guide (intake side) "1"
   • Dowel pin "2"
   • Cylinder head gasket "3" New
   • Cylinder head "4"

**TIP**
- While pulling up the timing chain, install the timing chain guide (intake side) and the cylinder head.
- Install the cylinder head gasket as shown in the illustration.




2. Install:
   - Washer "1"
   - Bolt "2"
   - Bolt "3"

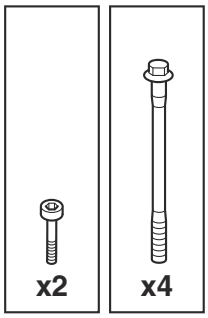



**TIP**

Tighten the bolts using the following procedure.

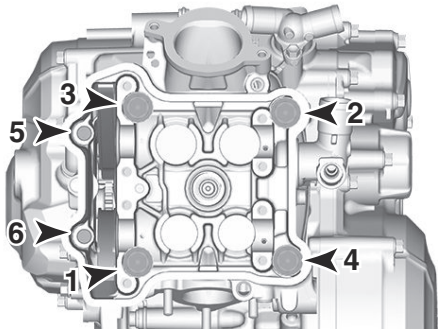
a. Wash the threads and contact surfaces of the bolts, the contact surfaces of the washers, the contact surface of the cylinder head, and the threads of the crankcase.
b. Apply molybdenum disulfide grease to the threads and contact surfaces of the bolts and to both contact surfaces of the washers.
c. Install the washers and the bolts.
d. Install the bolts in the tightening sequence shown until the bolt and washer are lightly seated against the cylinder head.
e. Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

| | |
|---|---|
| | **Bolt [1]–[4]**<br>**1st**<br>**36 N·m (3.6 kgf·m, 27 lb·ft)** |










f. Remove the bolt [1].

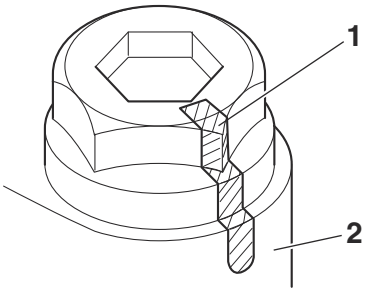
**TIP**

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

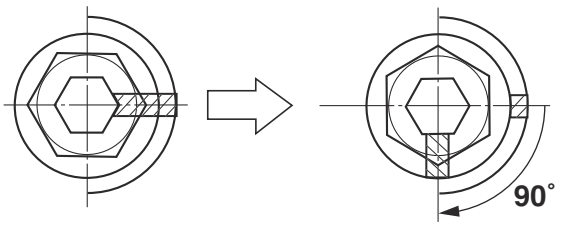
g. Again apply molybdenum disulfide grease to the thread and contact surface of the bolts and to both contact surface of the washer.
h. Retighten the bolt.

| | |
|---|---|
| | **Bolt [1]**<br>**2nd**<br>**18 N·m (1.8 kgf·m, 13 lb·ft)** |

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




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



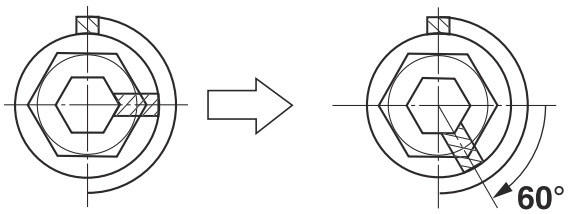

**Bolt [1]**
**Specified angle**
**90°**

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

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

**Bolt [2]–[4]**
**2nd**
**18 N·m (1.8 kgf·m, 13 lb·ft)**
**Specified angle**
**90°**

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




**Final**
**Specified angle**
**60°**

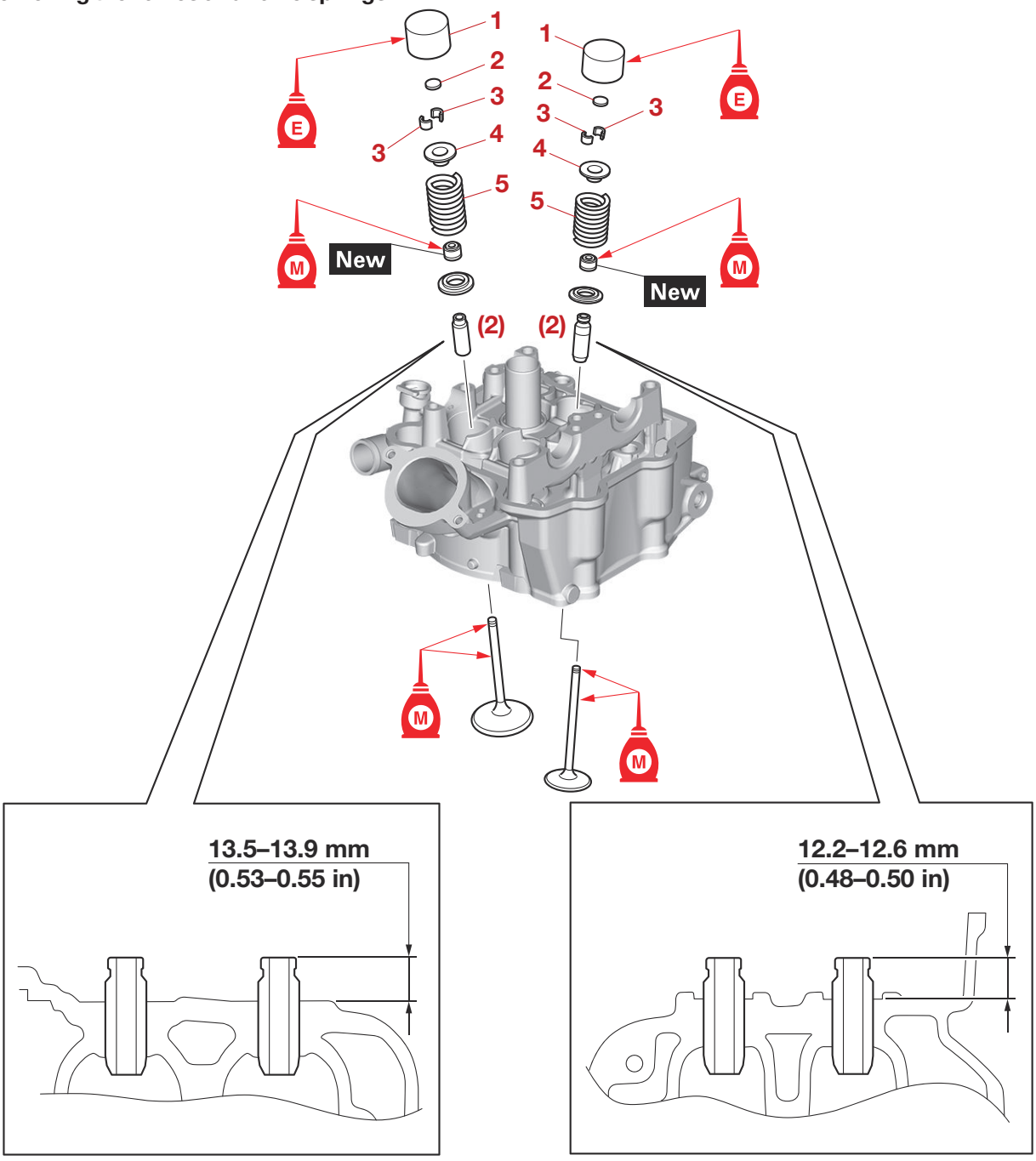
m. Tighten the bolts to the specified torque.

**Bolt [5], [6]**
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**
**LOCTITE®**

EAM20108

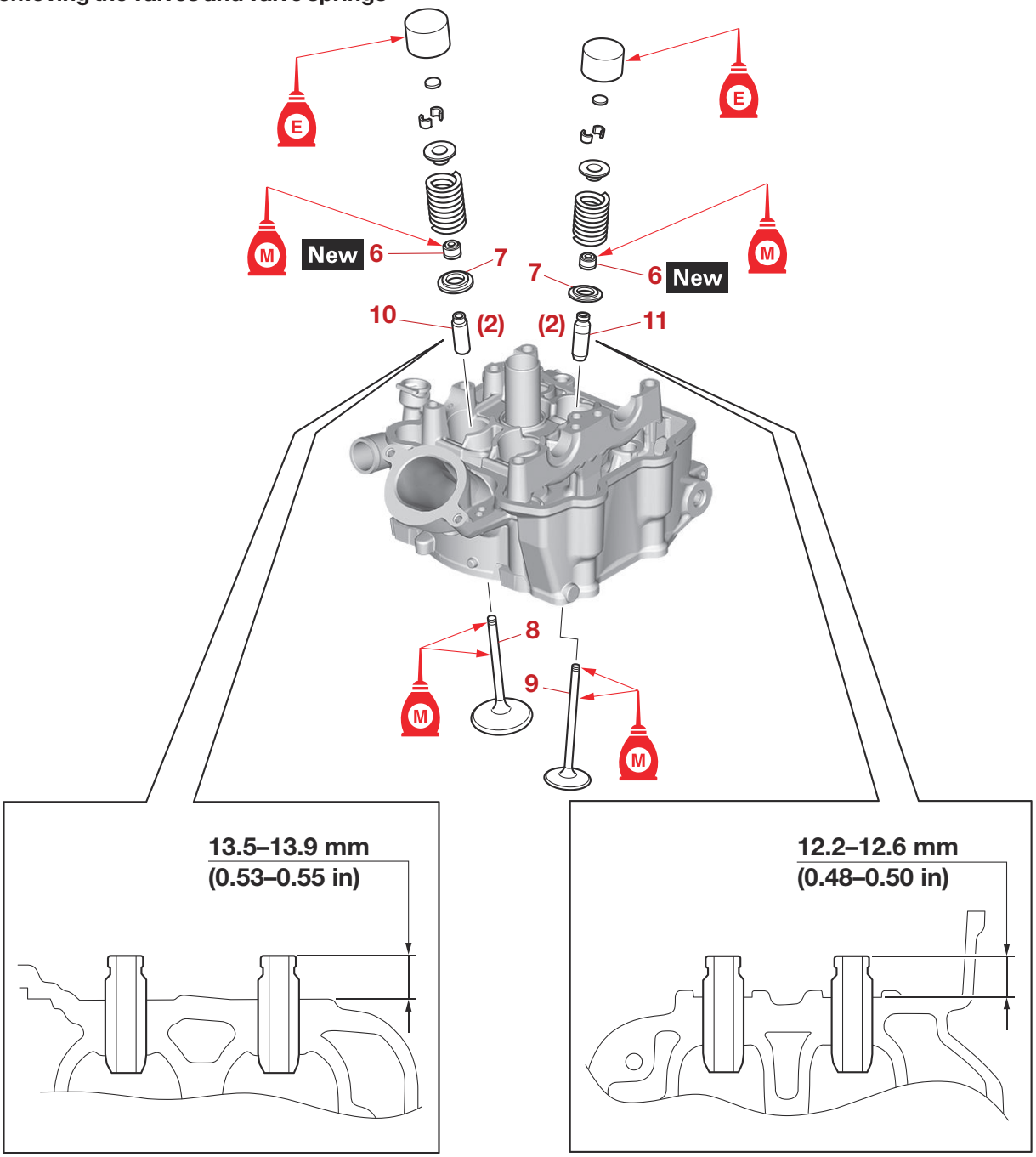
# VALVES AND VALVE SPRINGS

**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 | |

**Removing the valves and valve springs**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 6 | Valve stem seal | 4 | |
| 7 | Valve spring seat | 4 | |
| 8 | Intake valve | 2 | |
| 9 | Exhaust valve | 2 | |
| 10 | Intake valve guide | 2 | |
| 11 | Exhaust valve guide | 2 | |

EAM30090
## REMOVING THE VALVES

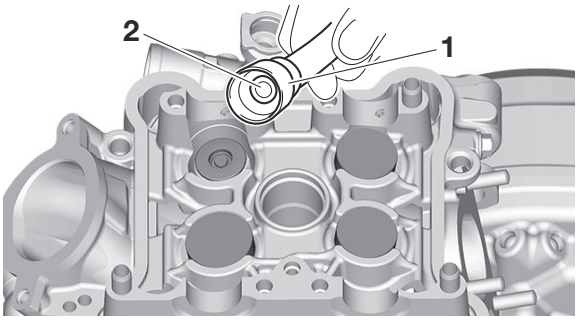
**TIP**
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves are properly sealed.

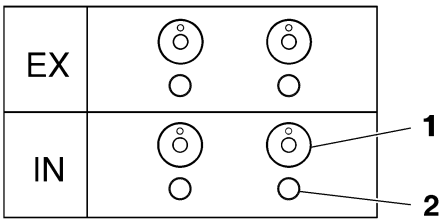
1. Remove:
   • Valve lifter "1"
   • Adjusting pad "2"

**TIP**
- Place a cloth in the timing chain space to prevent adjusting pads from falling into the crankcase.
- Make a note of the positions of valve lifters and adjusting pads so that they can be reinstalled in their original places.



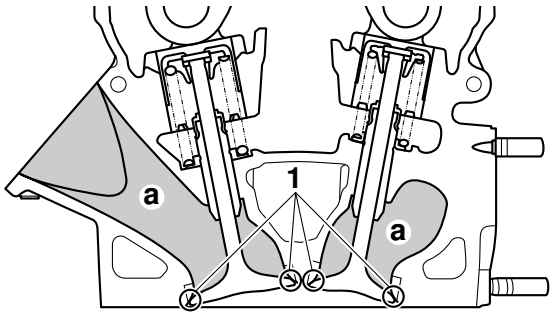
**Valve lapper (ø14)**
**90890-04101**
**Valve lapper (ø14)**
**YM-A8998**




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

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

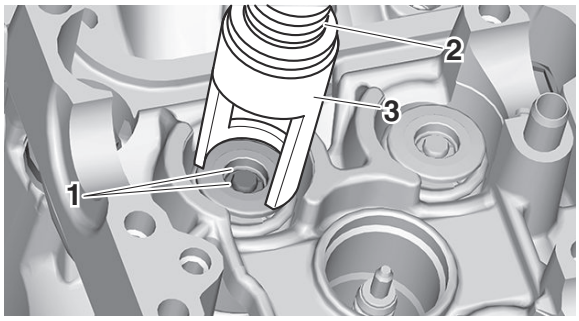



3. Remove:
   • Valve cotter "1"

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

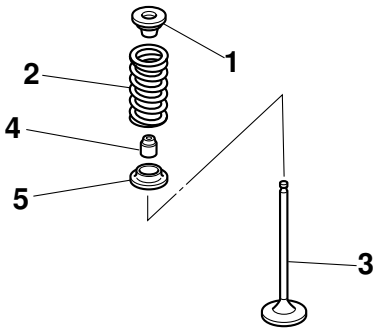


**Valve spring compressor**
**90890-04200**
**Valve spring compressor**
**YM-04019**
**Valve spring compressor attachment**
**90890-04108**
**Valve spring compressor adapter 22 mm**
**YM-04108**




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

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



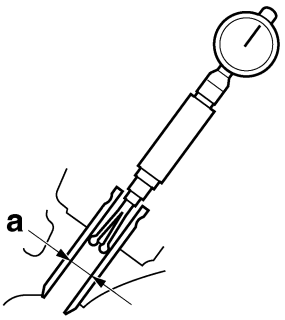

EAM30091

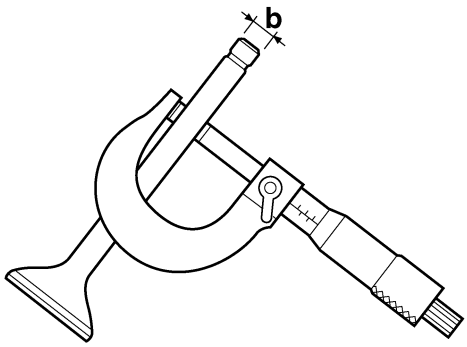
## CHECKING THE VALVES AND VALVE GUIDES

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

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

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

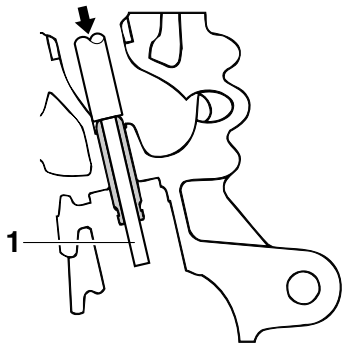



2. Replace:
   - Valve guide

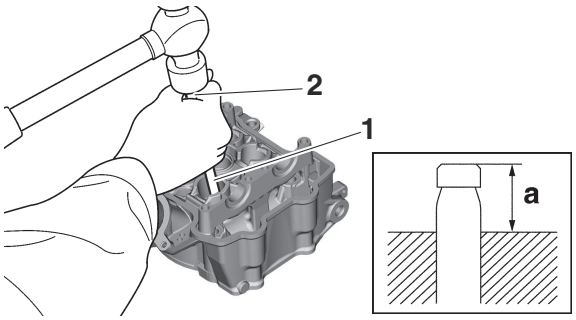
**TIP**
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

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

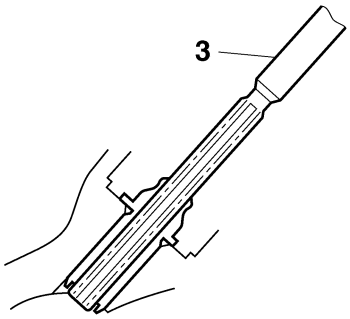



b. Install the new valve guide with the valve guide installer "1" and the valve guide remover "2".

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




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



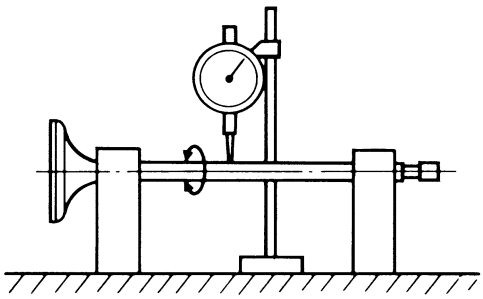

**TIP**
After replacing the valve guide, reface the valve seat.

**Valve guide remover & installer set (ø5.5)**
**90890-04016**
**Valve guide remover (5.5 mm)**
**YM-01122**
**Valve guide reamer (5.5 mm)**
**90890-01196**
**Valve guide reamer (5.5 mm)**
**YM-01196**

3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

**TIP**
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

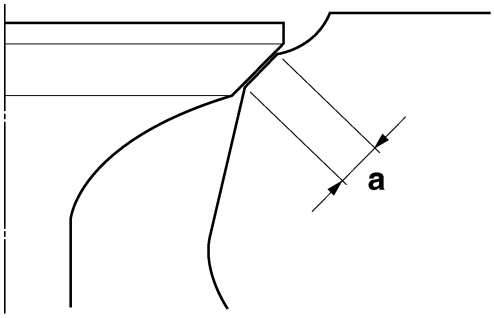
**Valve stem runout**
**0.020 mm (0.0008 in)**



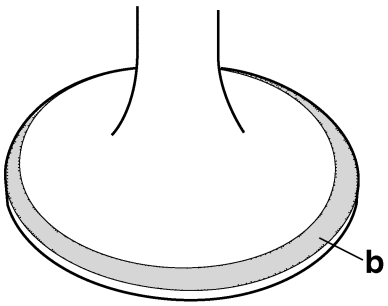
EAM30092
## CHECKING THE VALVE SEATS

1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat contact width "a"
   Out of specification → Replace the cylinder head.

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

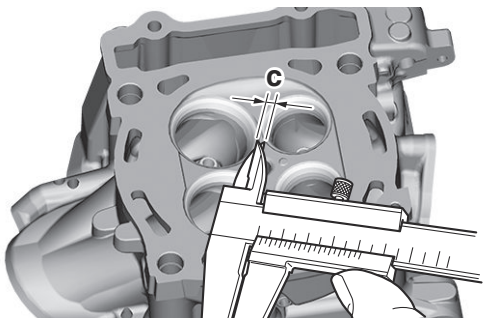



a. Apply blue layout fluid "b" onto the valve face.




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

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




4. Lap:
   • Valve face
   • Valve seat

ECA24640

***NOTICE***

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

**TIP**

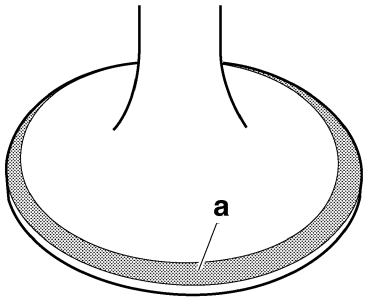
- When replacing the cylinder head, replace also the valves with new ones without them.
- When replacing the valves or the valve guides, use new valves to lap the valve seats, and then replace them with new valves.

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

ECA13790

***NOTICE***

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

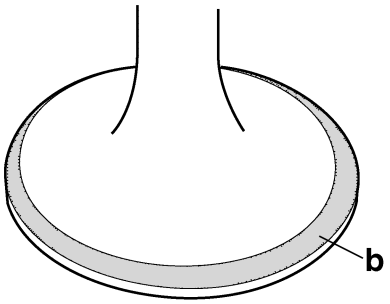



b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and the valve seat are evenly polished, then clean off all of the lapping compound.

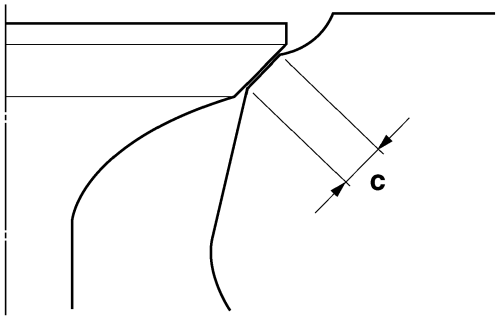
**TIP**

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

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




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

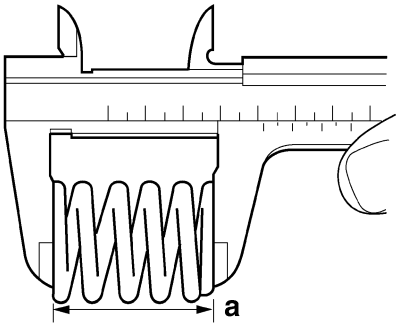



EAM30093

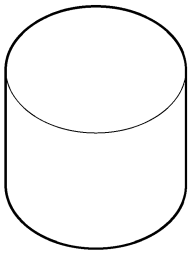
## CHECKING THE VALVE SPRINGS

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

**Free length limit (intake)**
**36.65 mm (1.44 in)**
**Free length limit (exhaust)**
**37.34 mm (1.47 in)**

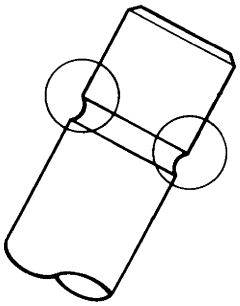


EAM30094
## CHECKING THE VALVE LIFTERS
1. Check:
   • Valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.



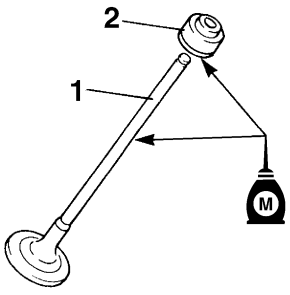
I1170701

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



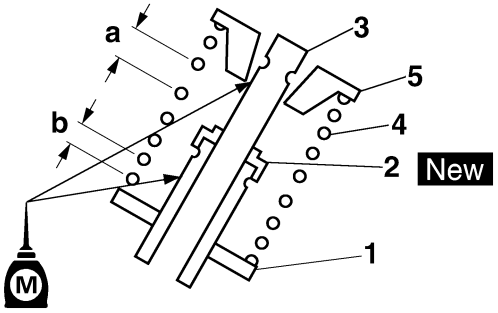
2. Lubricate:
   • Valve stem "1"
   • Valve stem seal "2"

| | |
|---|---|
| | **Recommended lubricant**<br>**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.

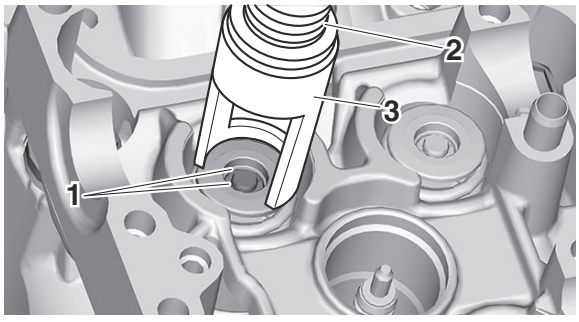



b. Smaller pitch

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".

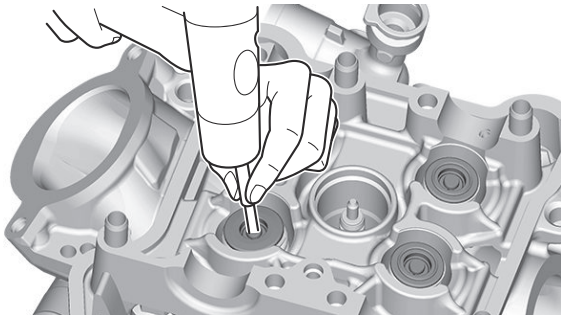
| | |
|---|---|
| | **Valve spring compressor**<br>**90890-04200**<br>**Valve spring compressor**<br>**YM-04019**<br>**Valve spring compressor attachment**<br>**90890-04108**<br>**Valve spring compressor adapter 22 mm**<br>**YM-04108** |



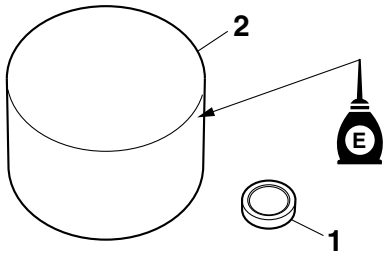

5. To fasten the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800
***NOTICE***
**Hitting the valve tip with excessive force**

**could damage the valve.**



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



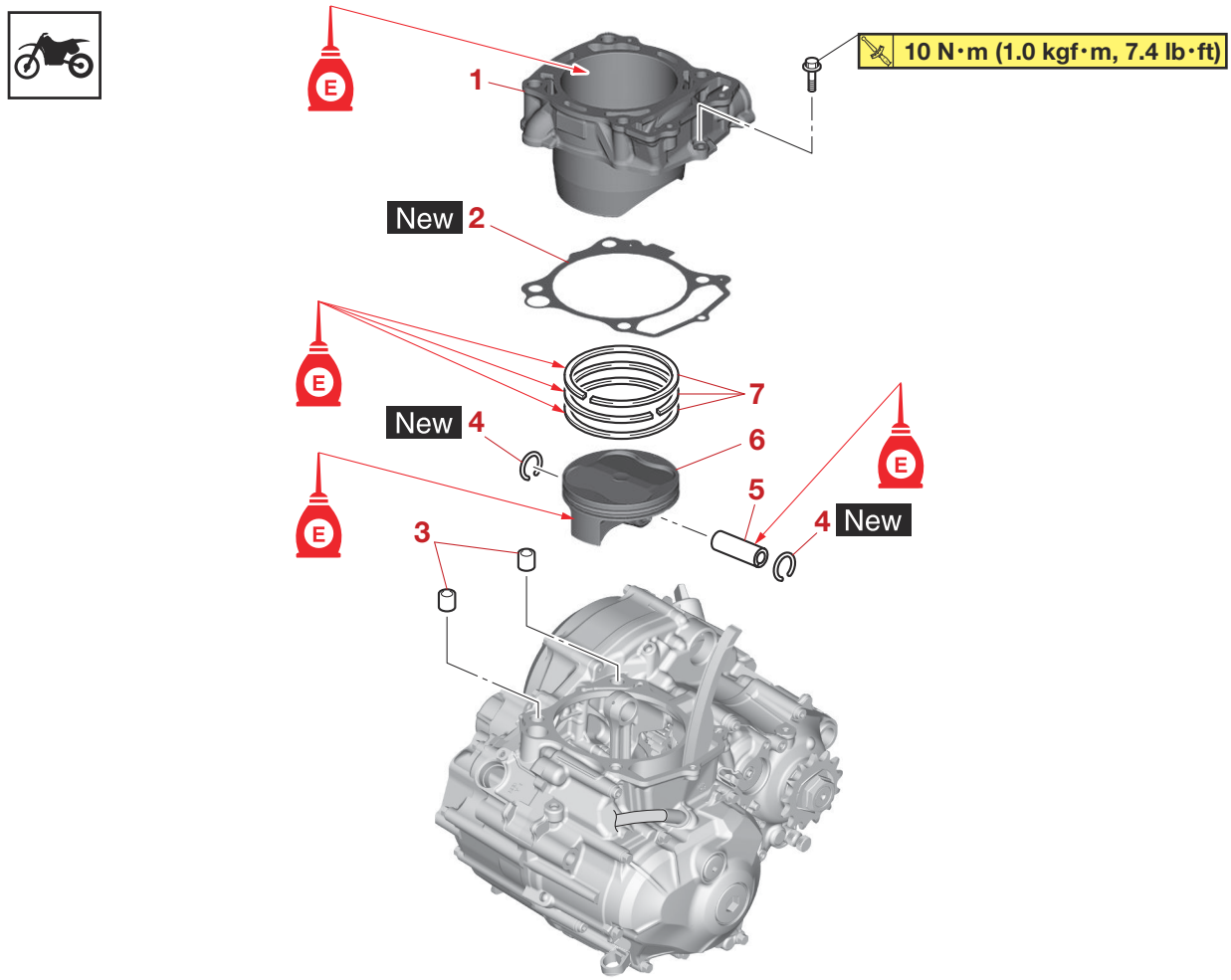

7. Install:
   • Adjusting pad
   • Valve lifter

**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"

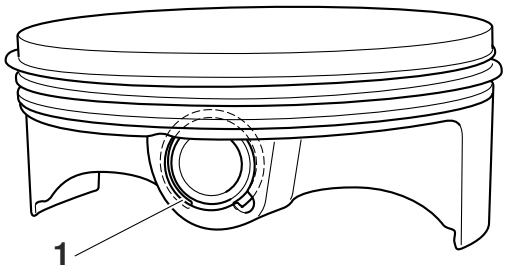
ECA13810
***NOTICE***

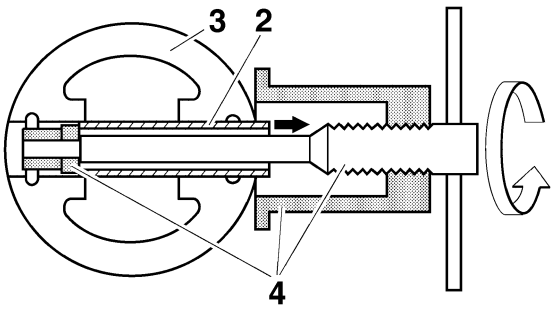
**Do not use a hammer to drive the piston pin out.**

**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".



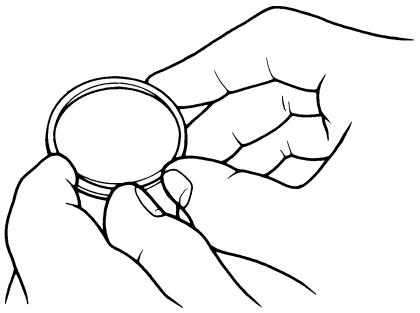
**Piston pin puller set**
**90890-01304**
**Piston pin puller**
**YU-01304**




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

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



EAM30097
## CHECKING THE CYLINDER AND PISTON

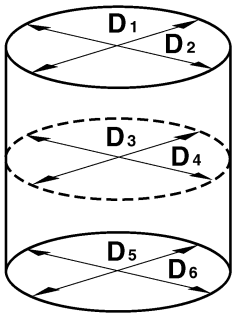
1. Check:
   - Piston wall (Sidewall)
   - Cylinder wall
     Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance
     a. Measure the cylinder bore "C" with the cylinder bore gauge.

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



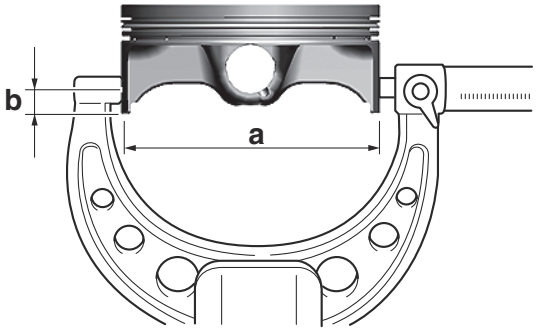
**Bore**
**97.000–97.010 mm (3.8189–3.8193 in)**
**Wear limit**
**97.060 mm (3.8213 in)**

"C" = maximum of $D_1$, $D_2$, $D_3$, $D_4$, $D_5$, $D_6$




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

**Diameter**
**96.955–96.970 mm (3.8171–3.8177 in)**
**Measuring point (from piston skirt bottom)**
**9.0 mm (0.35 in)**




d. If out of specification, replace the cylinder, the piston, and the piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "C" - Piston diameter

**Piston-to-cylinder clearance**
**0.010–0.045 mm (0.0004–0.0018 in)**
**Limit**
**0.15 mm (0.006 in)**

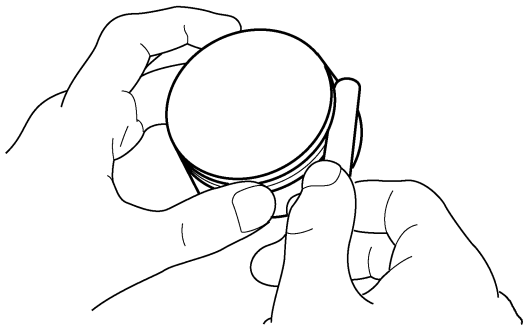
f. If out of specification, replace the cylinder, the piston, and the piston rings as a set.

EAM30098
## CHECKING THE PISTON RINGS

1. Measure:
   • Piston ring side clearance
   Out of specification → Replace the piston and piston rings as a set.

**TIP**
Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

**Top ring**
**Ring side clearance**
**0.015–0.065 mm (0.0006–0.0026 in)**
**Side clearance limit**
**0.120 mm (0.0047 in)**
**2nd ring**
**Ring side clearance**
**0.020–0.060 mm (0.0008–0.0024 in)**
**Side clearance limit**
**0.100 mm (0.0039 in)**



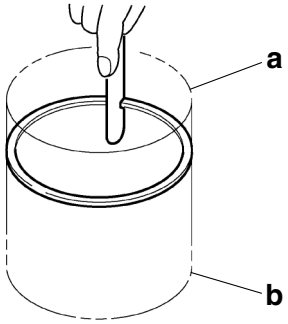
2. Install:
   • Piston ring
   (into the cylinder)

**TIP**
Use the piston crown to level the piston ring near bottom of cylinder "a", where cylinder wear is lowest.

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

**TIP**
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace the oil ring as a set.

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



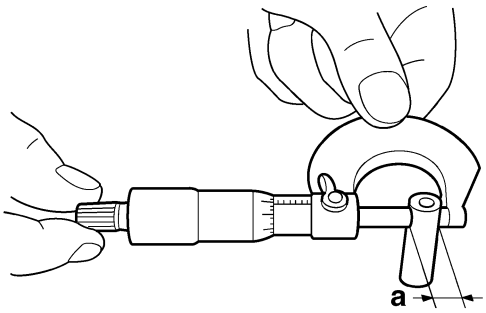

b. Upper of cylinder

EAM30099

## CHECKING THE PISTON PIN

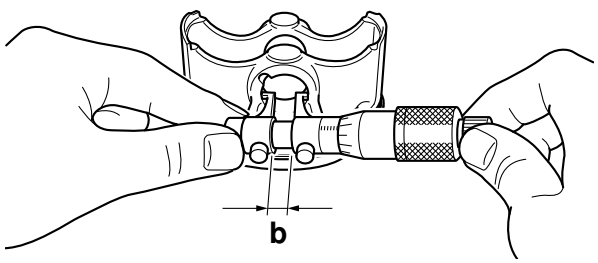
1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

| | |
|---|---|
| | **Piston pin outside diameter limit**<br>**17.981 mm (0.7079 in)** |




3. Measure:
   - Piston pin bore inside diameter "b"
     Out of specification → Replace the piston.

| | |
|---|---|
| | **Piston pin bore inside diameter limit**<br>**18.045 mm (0.7104 in)** |



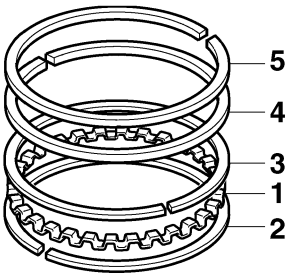

EAM30100

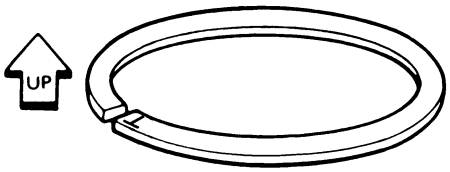
## INSTALLING THE PISTON AND CYLINDER

1. Install:
   - Oil ring expander "1"
   - Lower oil ring rail "2"
   - Upper oil ring rail "3"
   - 2nd ring "4"
   - Top ring "5"

**TIP**

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.

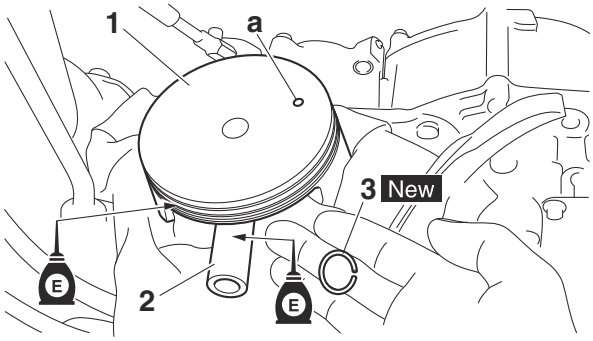


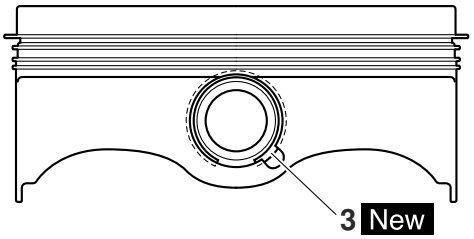




2. Install:
   - Piston "1"
   - Piston pin "2"
   - Piston pin clip "3" New

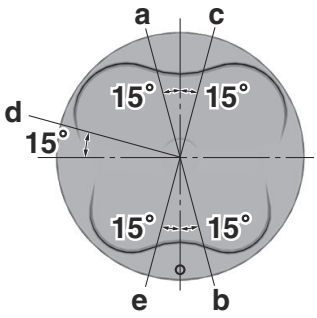
**TIP**

- Apply the engine oil to the piston and piston pin.
- Install the piston with the mark "a" on it pointing to its exhaust (rear) side.
- Before installing the piston pin clip, cover the crankcase opening with a cloth to prevent the clip from falling into the crankcase.
- Make sure that the end of the piston pin clip is not positioned at the cutout in the piston.




3. Lubricate:
   • Piston
   • Piston ring
   • Cylinder
4. Offset:
   • Piston ring end gap




a. Top ring
b. 2nd ring
c. Upper oil ring rail
d. Oil ring expander
e. Lower oil ring rail

5. Install:
   • Gasket New
   • Dowel pin
   • Cylinder

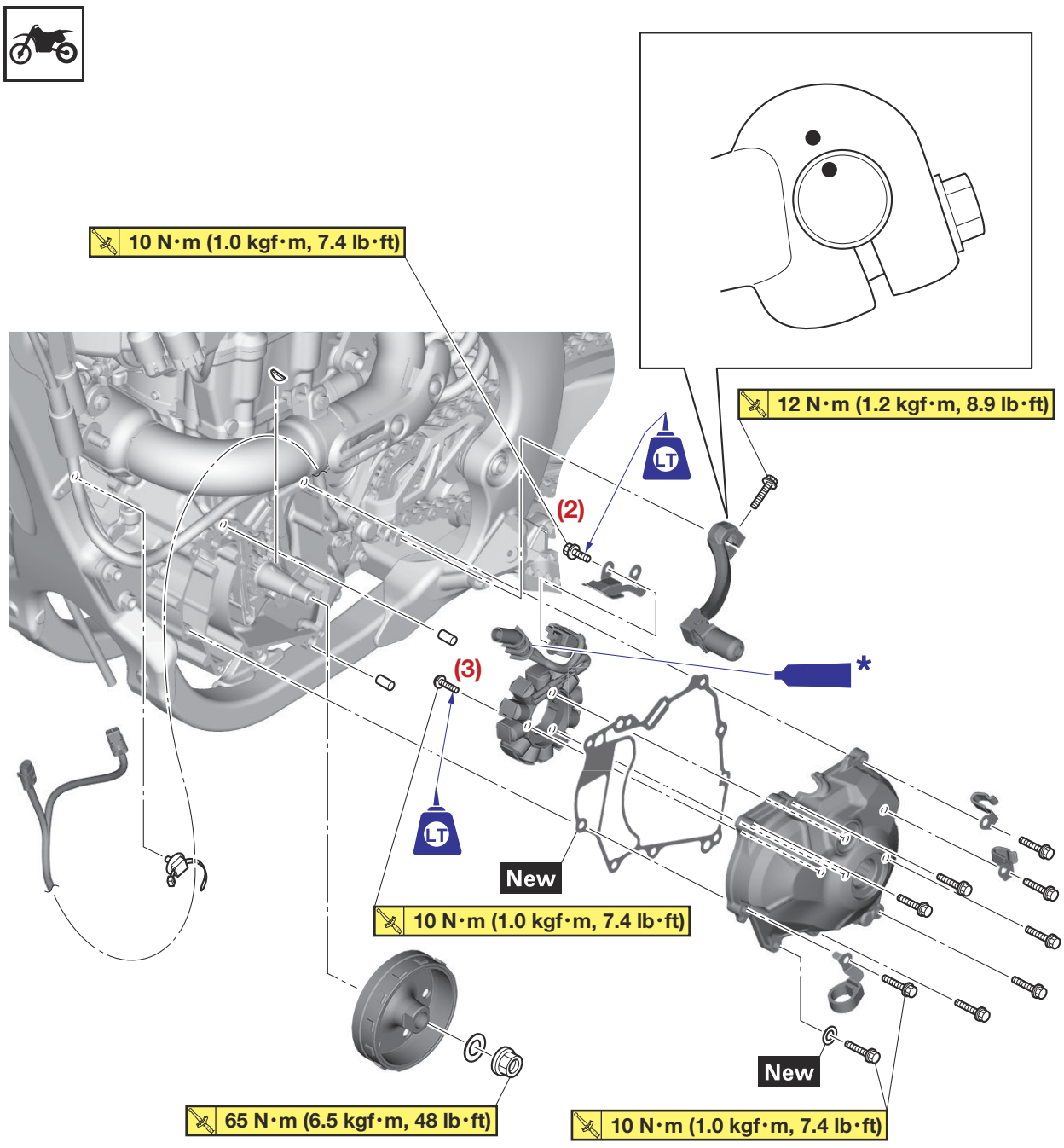
| | |
|---|---|
| | **Cylinder bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**TIP**

- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.

EAM20183
# GENERATOR

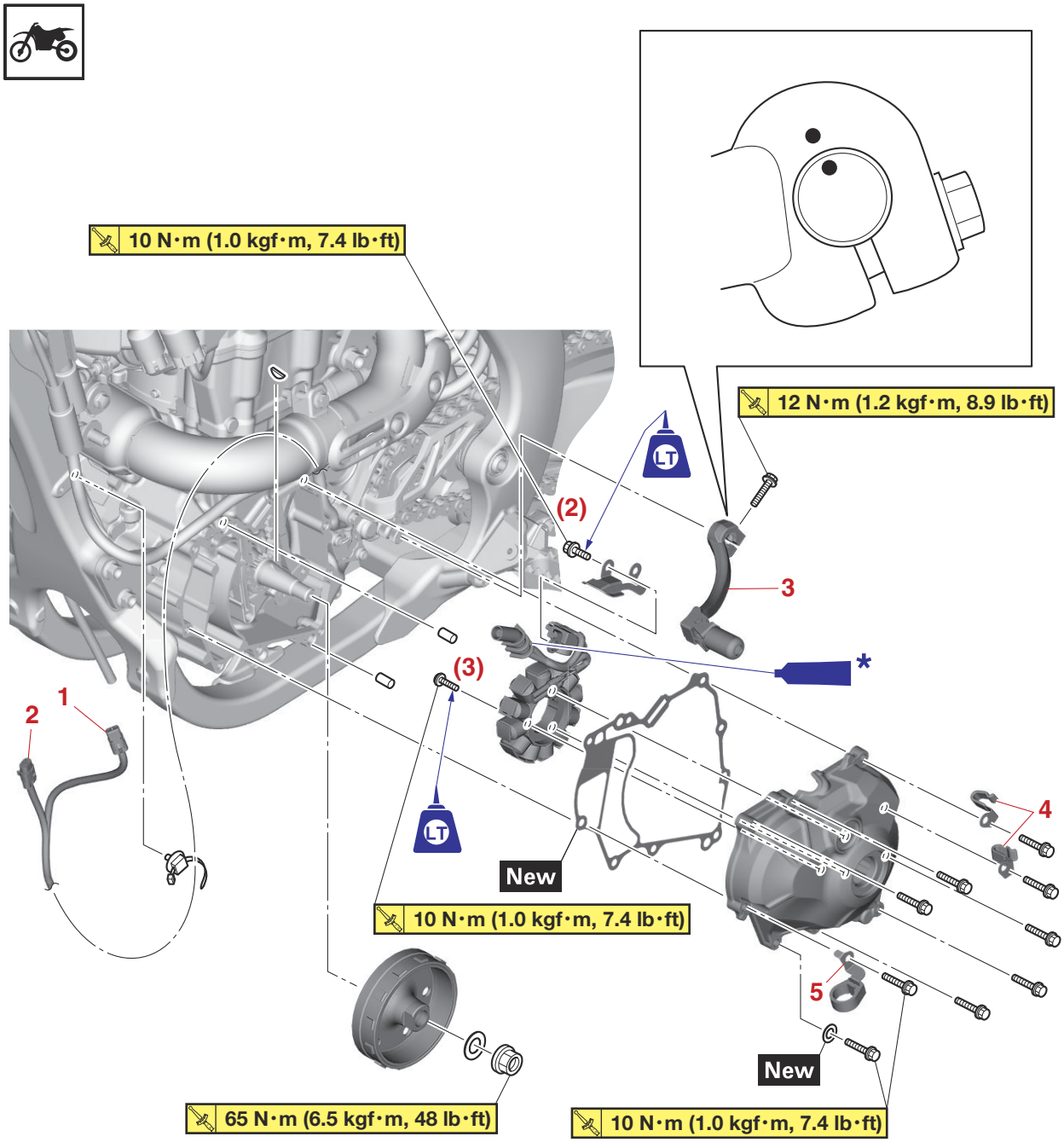
**Removing the stator coil assembly**




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

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Engine oil | | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-14. |
| | Seat | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left) | | Refer to "GENERAL CHASSIS" on page 4-1. |

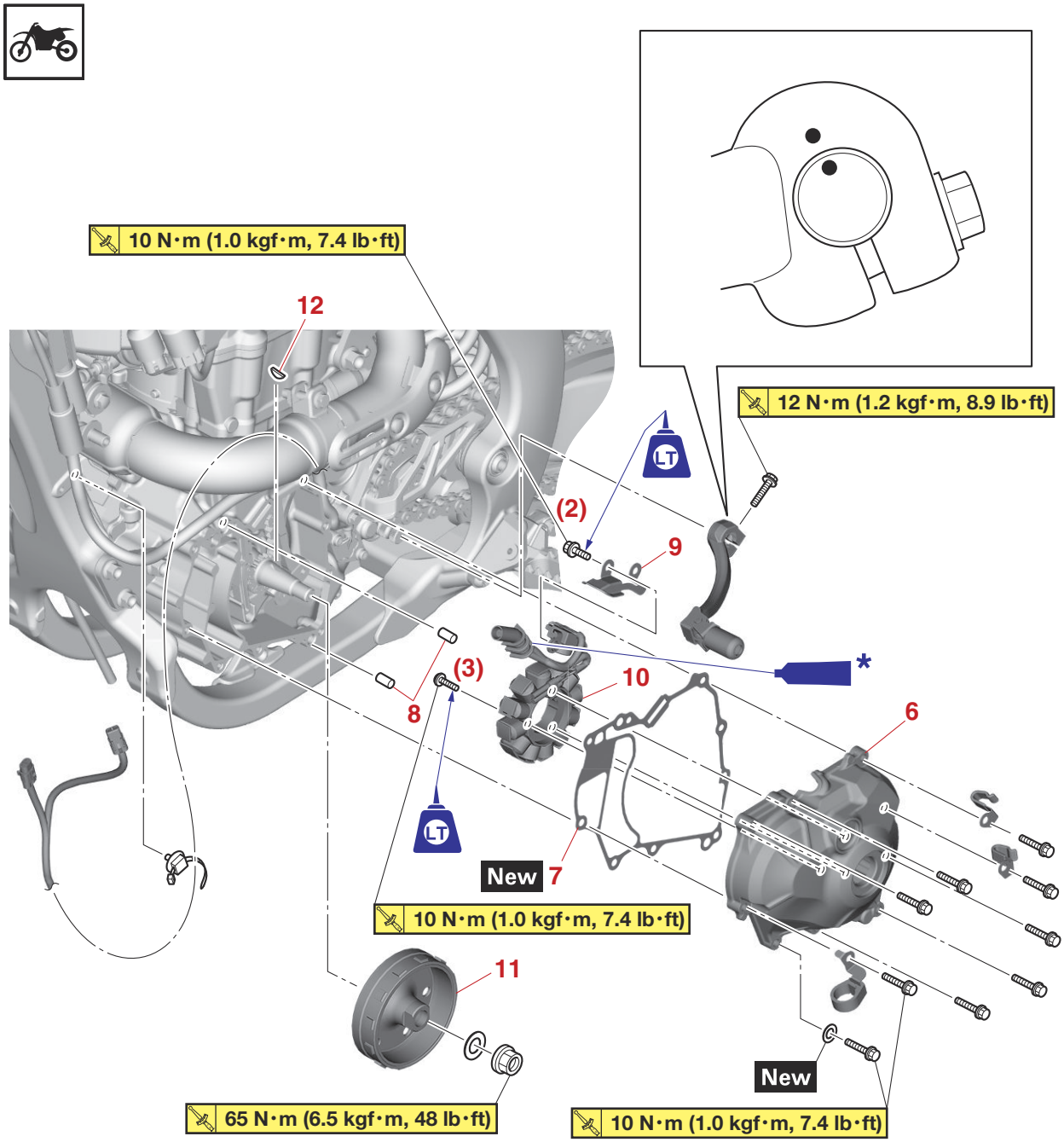
## Removing the stator coil assembly




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

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Stator coil assembly coupler | 1 | Disconnect. |
| 2 | Crankshaft position sensor coupler | 1 | Disconnect. |
| 3 | Shift pedal | 1 | When installing, align the punch marks on the shift pedal and the shift shaft. |
| 4 | Clamp | 2 | |
| 5 | Holder | 1 | |

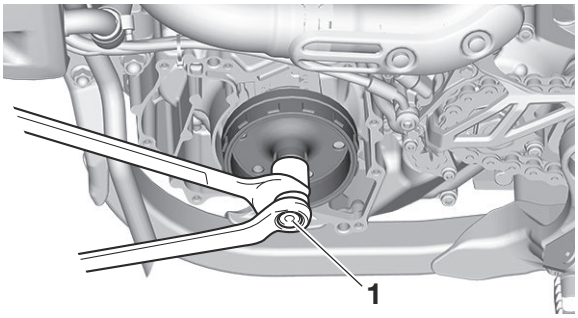
## Removing the stator coil assembly




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

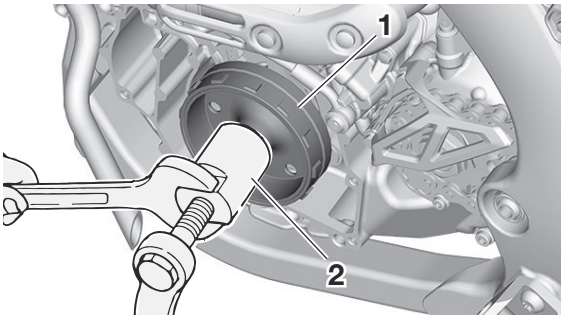
| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 6 | Crankcase cover (left) | 1 | |
| 7 | Gasket | 1 | |
| 8 | Dowel pin | 2 | |
| 9 | Clamp | 1 | |
| 10 | Stator coil assembly | 1 | |
| 11 | Generator rotor | 1 | |
| 12 | Woodruff key | 1 | |

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

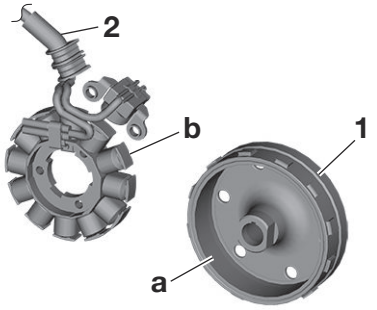



2. Remove:
   • Generator rotor “1”
   (with the rotor puller “2”)
   • Woodruff key

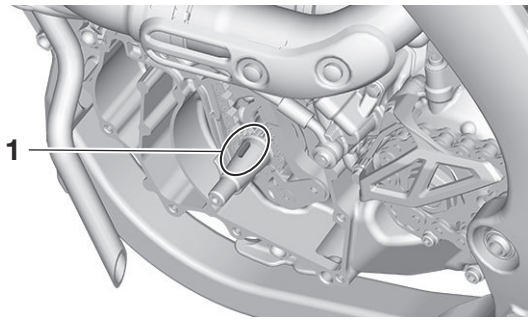
**Rotor puller**
**90890-04151**
**Rotor puller**
**YM-04151**




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




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




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

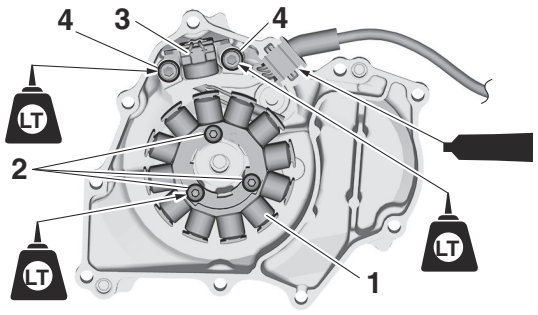
**Screw (stator coil assembly)**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**
**LOCTITE®**

   • Crankshaft position sensor “3”
   • Bolt (crankshaft position sensor) “4”

**Bolt (crankshaft position sensor)**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**
**LOCTITE®**

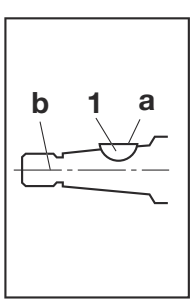
**TIP**
- Apply the sealant to the grommet of the stator coil assembly lead.
- Tighten the stator coil assembly screws using the T25 bit.
- Pass the stator coil assembly lead through the crankcase cover side.

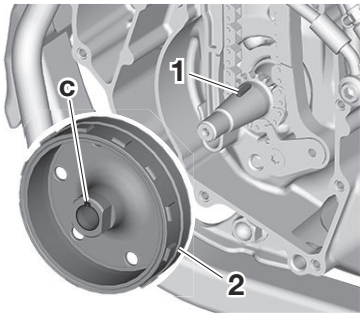
**Yamaha bond No. 1215**
**90890-85505**
**Three bond No. 1215®**



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

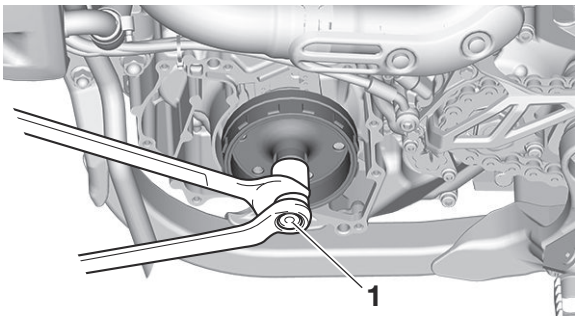
**TIP**
- Clean the contact surfaces of the tapered portions of the crankshaft and generator rotor.
- When installing the woodruff key, make sure that its flat surface “a” is in parallel with the crankshaft center line “b”.
- When installing the generator rotor, align the keyway “c” of the generator rotor with the woodruff key.




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

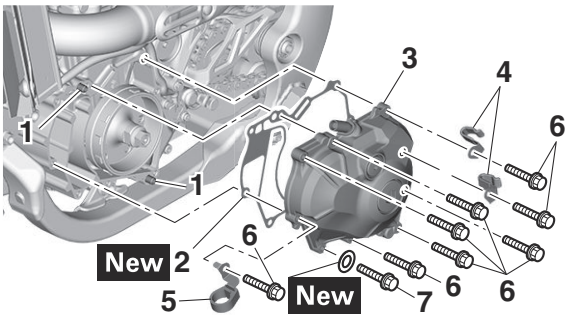
| | |
|---|---|
| | **Nut (generator rotor)**<br>**65 N·m (6.5 kgf·m, 48 lb·ft)** |



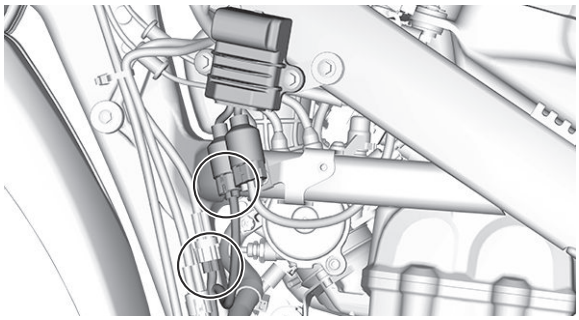

4. Install:
   • Dowel pin “1”
   • Gasket (crankcase cover (left)) “2” New
   • Crankcase cover (left) “3”
   • Lead holder “4”
   • Holder “5”
   • Crankcase cover bolt (left) “6”
   • Washer New
   • Engine oil drain bolt (oil tank) “7”

| | |
|---|---|
| | **Crankcase cover bolt (left)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)**<br>**Engine oil drain bolt (oil tank)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

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

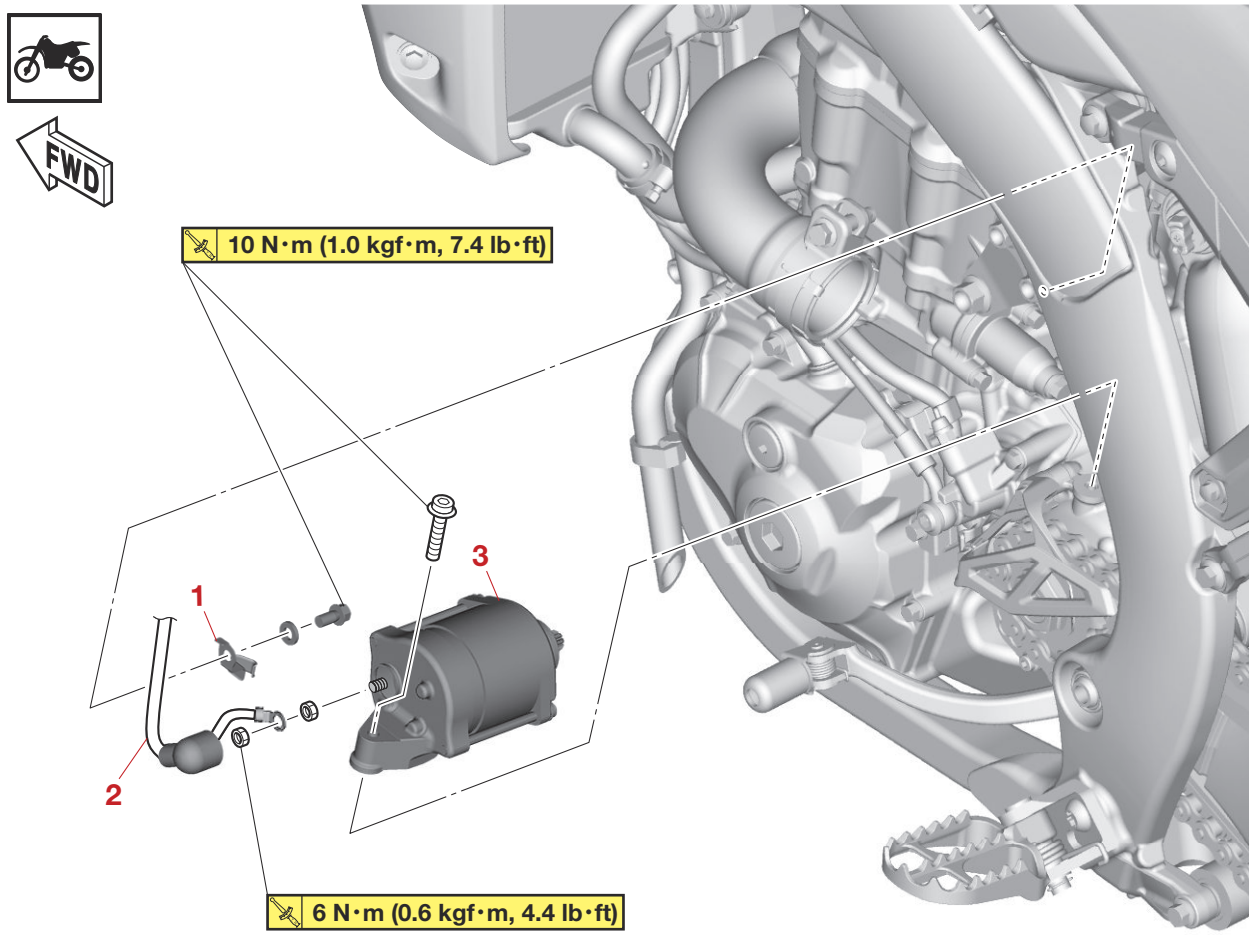



5. Connect:
   • Stator coil assembly lead
   Refer to “CABLE ROUTING DIAGRAM” on page 2-19.



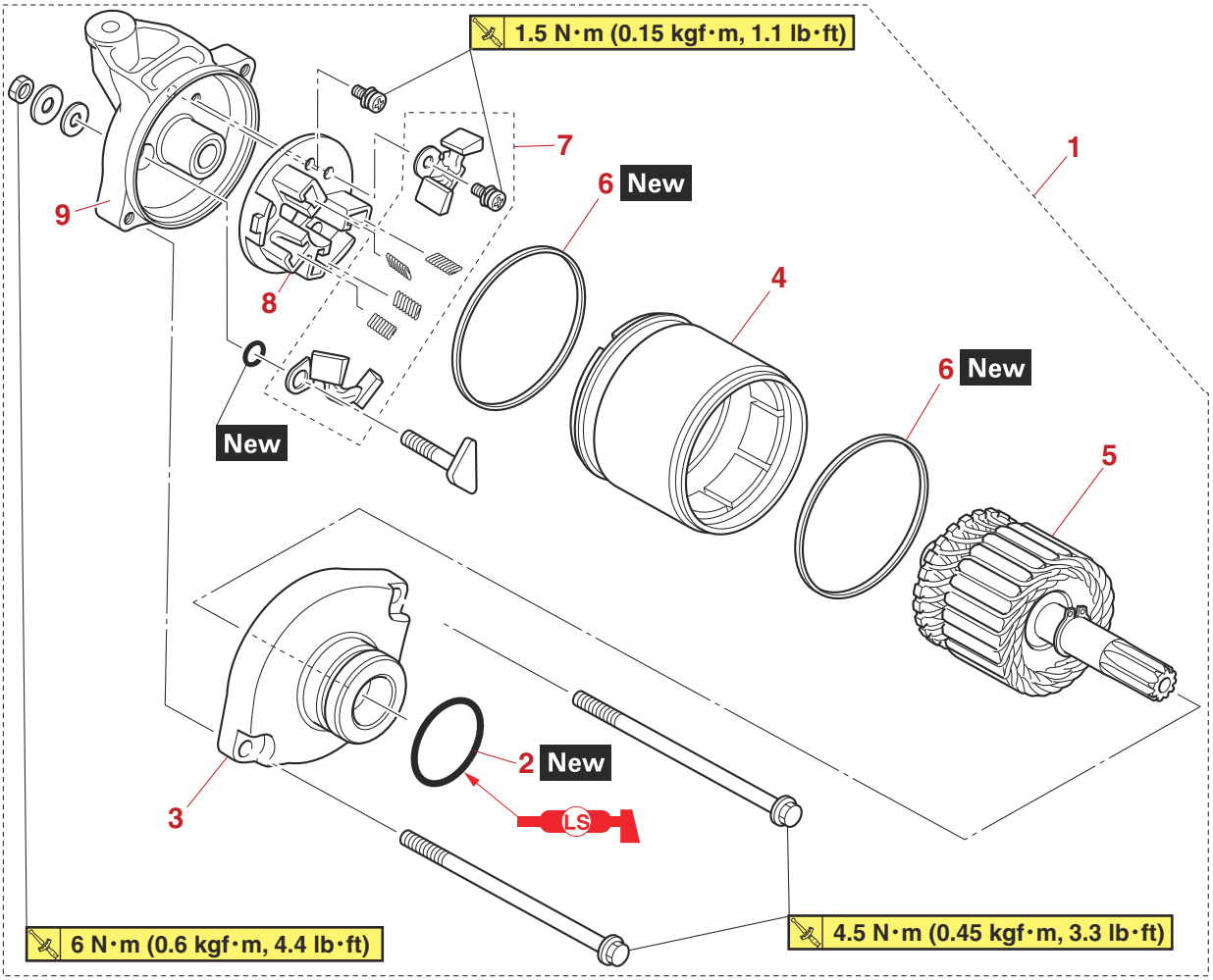
EAM20110
# ELECTRIC STARTER

**Removing the starter motor**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Exhaust pipe | | Refer to "ENGINE REMOVAL" on page 5-3. |
| 1 | Clamp | 1 | |
| 2 | Starter motor lead | 1 | When removing or installing the installation nut of the starter motor lead, be sure to hold the nut on the starter motor side firmly in place using a spanner. |
| 3 | Starter motor | 1 | |

## Disassembling the starter motor



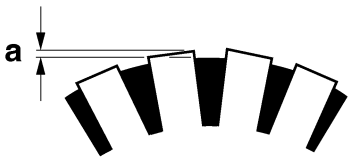

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Starter motor assembly | 1 | |
| 2 | O-ring | 1 | |
| 3 | Starter motor front cover | 1 | |
| 4 | Starter motor yoke | 1 | |
| 5 | Armature assembly | 1 | |
| 6 | Gasket | 2 | |
| 7 | Brush set | 1 | |
| 8 | Brush holder | 1 | |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

EAM30106
## CHECKING THE STARTER MOTOR

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

**Mica undercut (depth)**
**2.40 mm (0.09 in)**

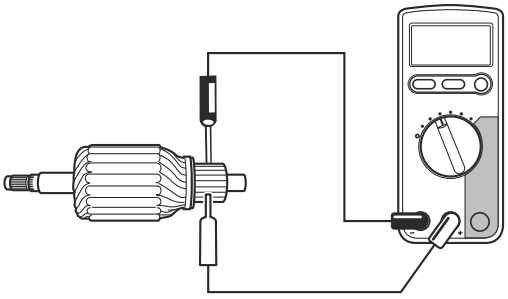
**TIP**
The mica of the commutator must be undercut to ensure proper operation of the commutator.




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

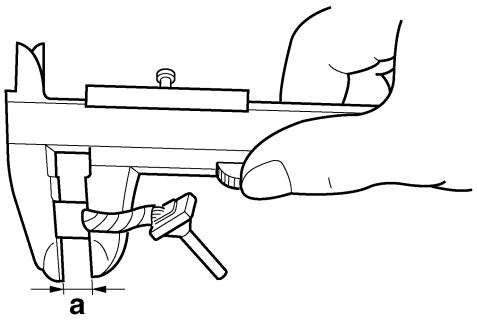
**Digital circuit tester (CD732)**
**90890-03243**
**Model 88 Multimeter with tachometer**
**YU-A1927**

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



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

**Brush overall length limit**
**5.5 mm (0.22 in)**




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

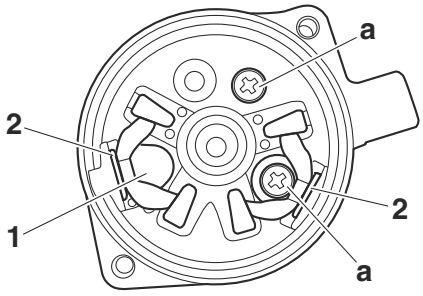
**Brush spring force**
**4.80–7.20 N (489–734 gf, 17.28–25.92 oz)**

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

EAM30107
## ASSEMBLING THE STARTER MOTOR

1. Install:
   • Brush spring "1"
   • Brush "2"

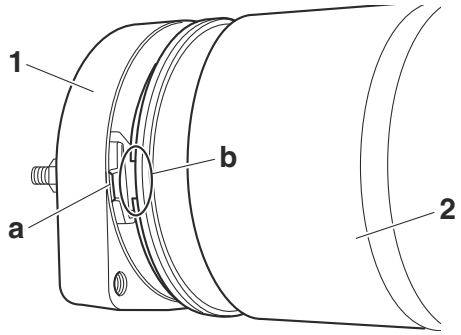
**TIP**
Install the brush holder using the screws "a".




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

**TIP**
Install the starter motor rear cover with its projection "a" facing the groove "b" of the starter

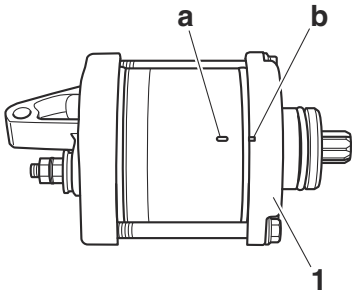
motor yoke.




3. Install:
   - Circlip
   - Plain washer
   - O-ring New
   - Washer (starter motor front cover)
   - Starter motor front cover "1"

**TIP**

Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor front cover.




4. Install:
   - Bolt
   - O-ring New

**TIP**

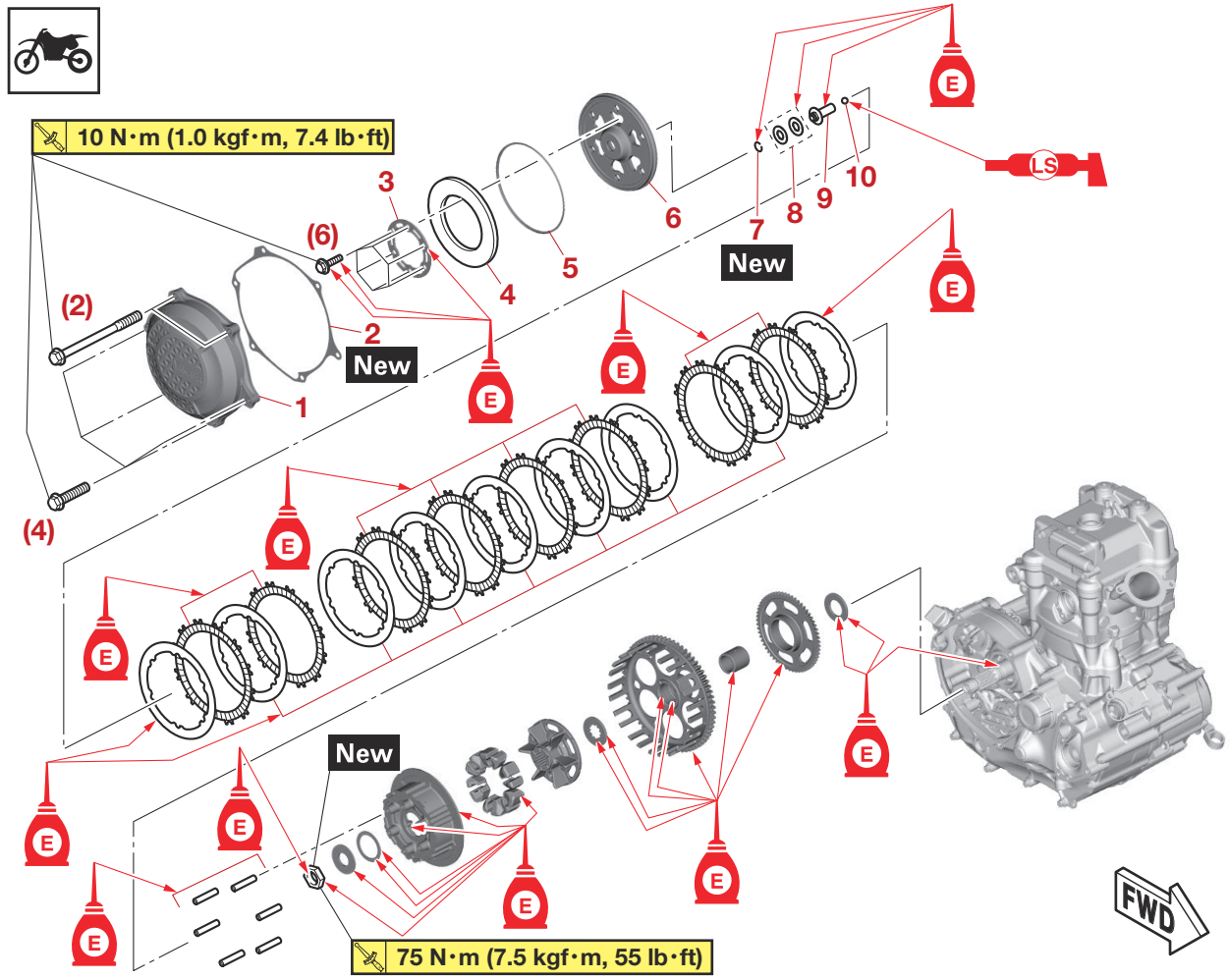
Apply the lithium-soap-based grease on the O-ring.

5. Install:
   - Starter motor
   - Starter motor bolt

| | |
|---|---|
|  | **Starter motor bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

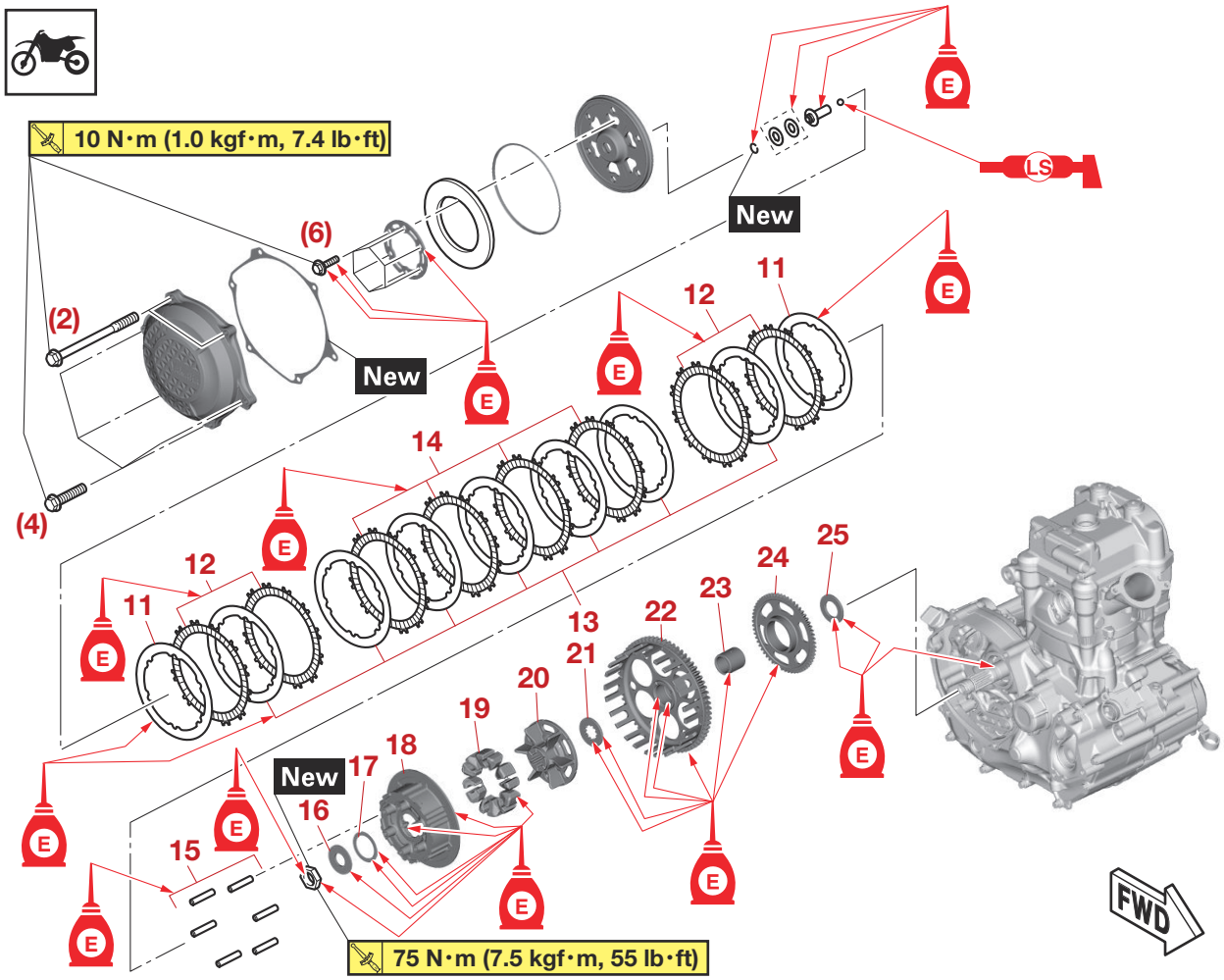
EAM20111
# CLUTCH

## Removing the clutch



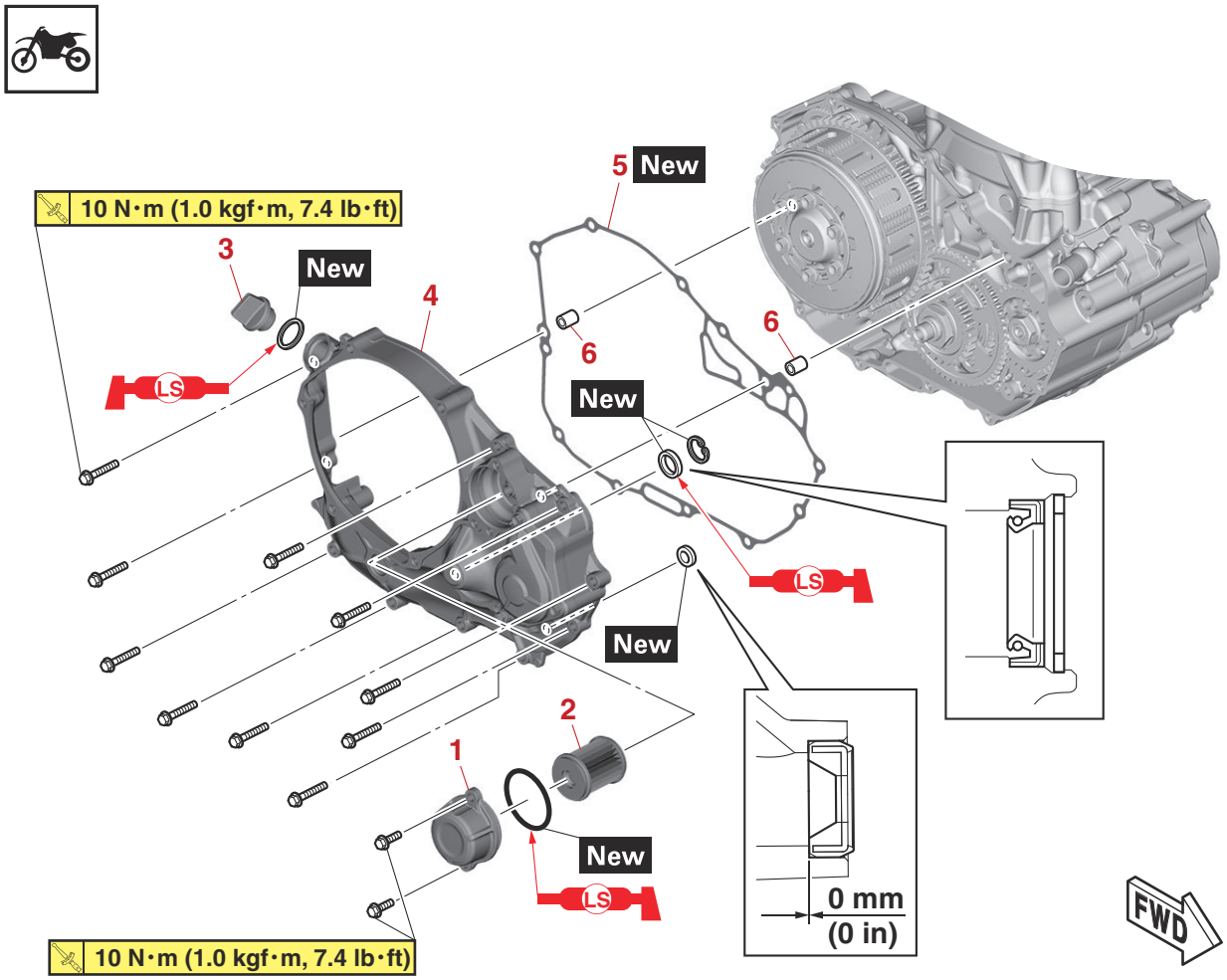

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Engine oil | | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-14. |
| 1 | Clutch cover | 1 | |
| 2 | Gasket | 1 | |
| 3 | Pressure plate 1 | 1 | |
| 4 | Clutch spring | 1 | |
| 5 | Spring retainer | 1 | |
| 6 | Pressure plate 2 | 1 | |
| 7 | Circlip | 1 | |
| 8 | Bearing | 1 | |
| 9 | Push rod 1 | 1 | |
| 10 | Ball | 1 | |

## Removing the clutch



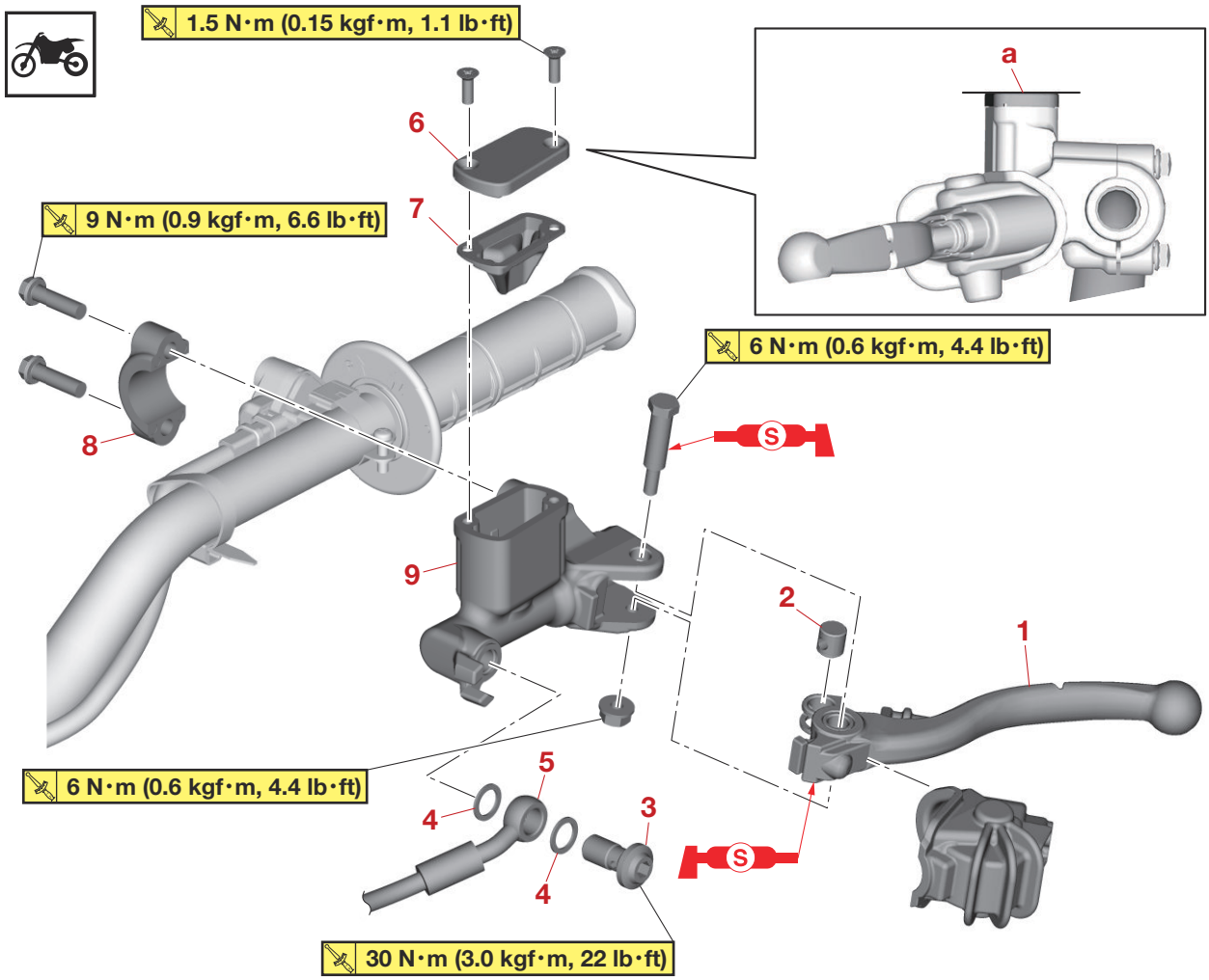

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 11 | Clutch plate 2 | 2 | [Thickness: 1.0 mm (0.04 in)] |
| 12 | Friction plate 2 | 4 | Blue paint on the outer circumference, including 1 pawl head only. |
| 13 | Clutch plate 1 | 7 | [Thickness: 1.4 mm (0.06 in)] |
| 14 | Friction plate 1 | 4 | |
| 15 | Collar | 6 | |
| 16 | Spacer | 1 | |
| 17 | Washer | 1 | |
| 18 | Sleeve | 1 | |
| 19 | Absorber | 6 | |
| 20 | Clutch boss | 1 | |
| 21 | Washer | 1 | |
| 22 | Primary driven gear | 1 | |
| 23 | Collar | 1 | |
| 24 | Idle gear | 1 | |
| 25 | Washer | 1 | |

## Removing the crankcase cover (right)



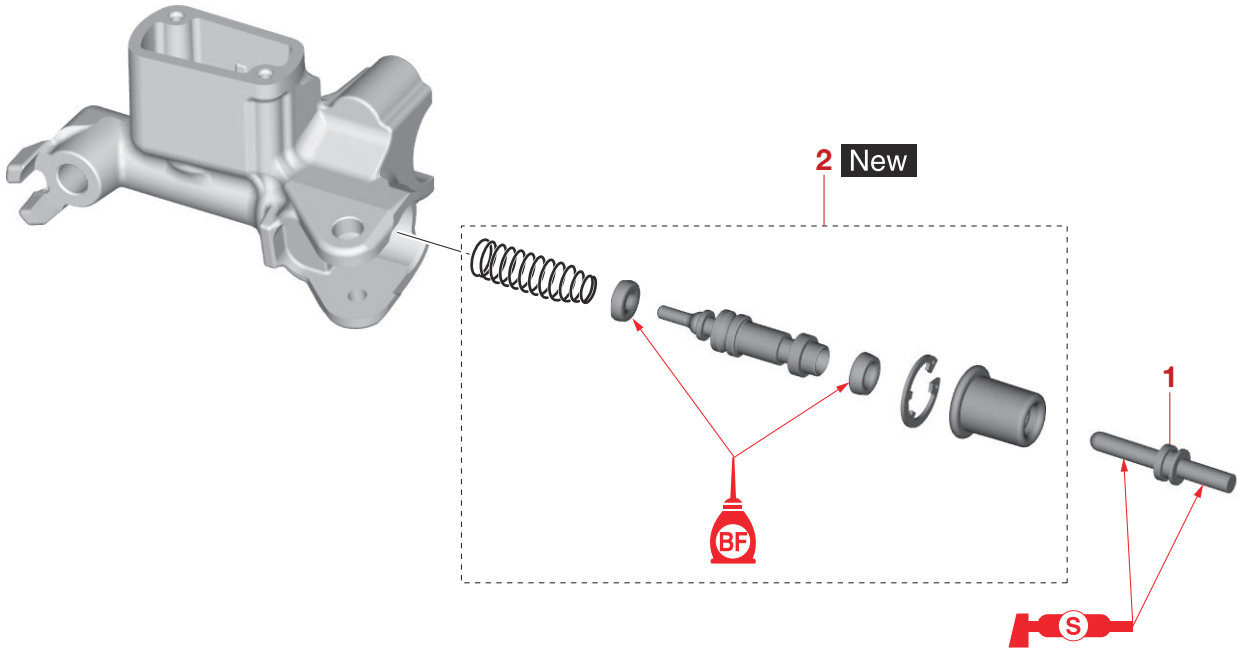

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Right engine guard | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Engine oil | | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-14. |
| | Coolant | | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-23. |
| | Brake pedal | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Clutch cover | | Refer to "CLUTCH" on page 5-46. |
| 1 | Oil filter element cover | 1 | |
| 2 | Oil filter element | 1 | |
| 3 | Oil filler cap | 1 | |
| 4 | Crankcase cover (right) | 1 | |
| 5 | Gasket | 1 | |
| 6 | Dowel pin | 2 | |

## Removing the clutch master cylinder



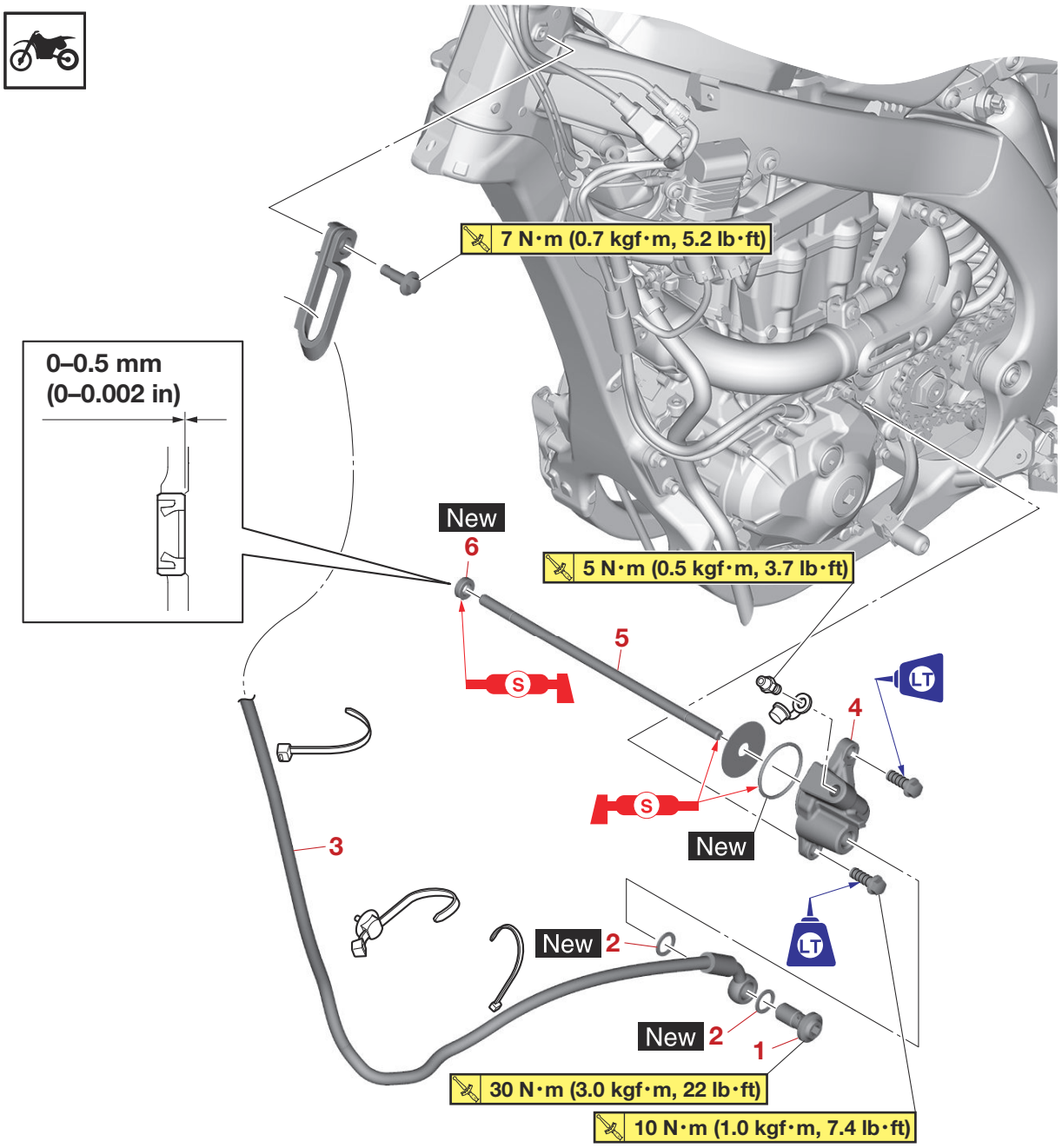

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Clutch fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16. |
| 1 | Clutch lever | 1 | |
| 2 | Bushing | 1 | |
| 3 | Clutch hose union bolt | 1 | |
| 4 | Copper washer | 2 | |
| 5 | Clutch hose | 1 | |
| 6 | Clutch master cylinder reservoir cap | 1 | Adjust the clutch master cylinder so that the top "a" of the clutch master cylinder reservoir cap is horizontal. |
| 7 | Clutch master cylinder reservoir diaphragm | 1 | |
| 8 | Clutch master cylinder holder | 1 | |
| 9 | Clutch master cylinder | 1 | |

## Disassembling the clutch master cylinder




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Push rod | 1 | |
| 2 | Master cylinder kit | 1 | |

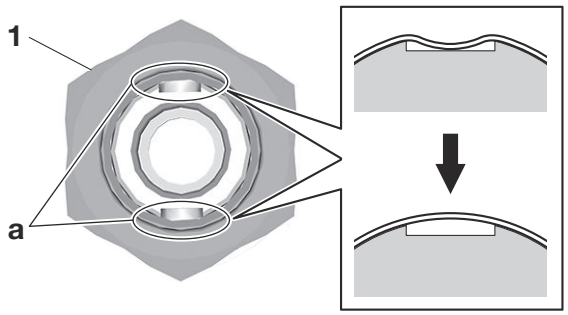
## Removing the clutch release




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Drive sprocket cover | | Refer to "CHAIN DRIVE" on page 4-74. |
| | Clutch fluid | | Drain.<br>Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16. |
| 1 | Clutch hose union bolt | 1 | |
| 2 | Copper washer | 2 | |
| 3 | Clutch hose | 1 | |
| 4 | Clutch release cylinder | 1 | |
| 5 | Push rod 2 | 1 | |
| 6 | Oil seal | 1 | |

EAM30108
## REMOVING THE CLUTCH
1. Loosen:
   • Clutch boss nut "1"
     a. Raise the staked part "a" of the clutch boss nut as shown in the illustration.

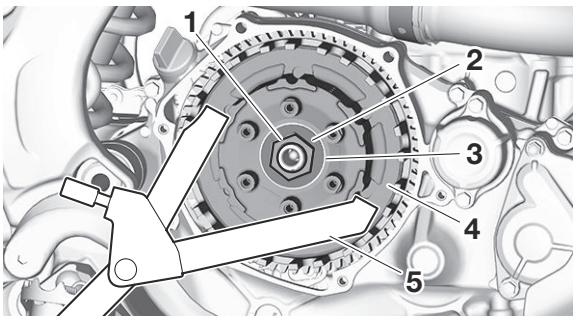
**TIP**
- When raising the staked part, take care not to affect the threaded part where the nut will be attached.
- Make sure that the staked part is fully raised to the same curvature as before staking.




   b. Loosen the clutch boss nut.
2. Remove:
   • Clutch boss nut "1"
   • Spacer "2"
   • Washer "3"
   • Sleeve "4"
   • Absorber
   • Clutch boss

**TIP**
While holding the sleeve with the clutch holder "5", loosen the clutch boss nut.

**Clutch holder**
**90890-04199**
**Universal clutch holder**
**YM-91042**




EAM30109
## CHECKING THE FRICTION PLATES
1. Check:
   • Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   • Friction plate thickness
     Out of specification → Replace the friction plates as a set.

**TIP**
Measure it at four points on the friction plate.

**Friction plate 1 thickness**
**2.12–2.28 mm (0.083–0.090 in)**
**Wear limit**
**2.02 mm (0.080 in)**
**Friction plate 2 thickness**
**2.12–2.28 mm (0.083–0.090 in)**
**Wear limit**
**2.02 mm (0.080 in)**

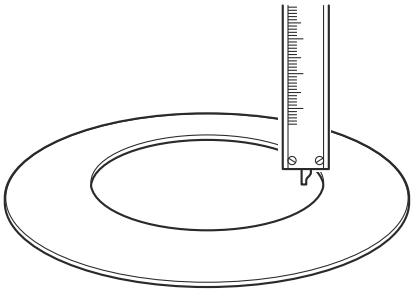
EAM30110
## CHECKING THE CLUTCH PLATES
1. Check:
   • Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   • Clutch plate warpage
     (with a surface plate and thickness gauge)
     Out of specification → Replace the clutch plates as a set.

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

**Warpage limit**
**0.10 mm (0.004 in)**

EAM30111
## CHECKING THE CLUTCH SPRING
1. Check:
   • Spring retainer
     Damage → Replace.
2. Check:
   • Clutch spring
     Damage → Replace the clutch spring.
3. Measure:
   • Clutch spring free height
     Out of specification → Replace the clutch spring.

**Clutch spring free height**
**4.59 mm (0.18 in)**
**Clutch spring free height limit**
**4.36 mm (0.17 in)**



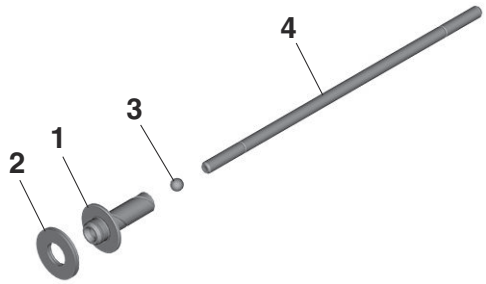
EAM30629
## CHECKING THE COLLAR
1. Check:
   - Collar "1"
     Damage/pitting/wear → Replace the collars as a set.

**TIP**
Pitting on the collar will cause erratic clutch operation.




EAM30114
## CHECKING THE PRESSURE PLATE
1. Check:
   - Pressure plate
     Crack/damage → Replace.

EAM30484
## CHECKING THE PUSH ROD
1. Check:
   - Push rod 1 "1"
   - Bearing "2"
   - Ball "3"
   - Push rod 2 "4"
     Cracks/damage/wear → Replace.



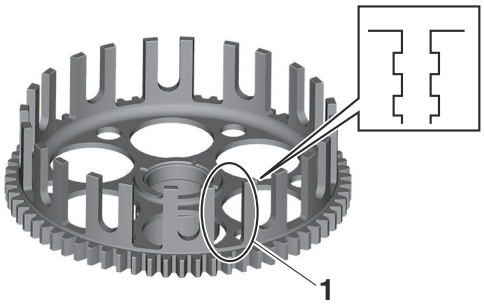

2. Measure:
   - Push rod 2 bending limit
     Out of specification → Replace.

**Push rod bending limit**
**0.10 mm (0.004 in)**

EAM30117
## CHECKING THE PRIMARY DRIVE GEAR
1. Check:
   - Primary drive gear
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the primary drive and primary driven gears as a set.
2. Check:
   - Primary-drive-gear-to-primary-driven-gear free play
     Free play exists → Replace the primary drive and primary driven gears as a set.

EAM30118
## CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
   - Primary driven gear
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the primary drive and primary driven gears as a set.
2. Check:
   - Primary driven gear dogs "1"
     Damage/pitting/wear → Deburr the primary driven gear dogs or replace the primary driven gear.

**TIP**
Pitting on the primary driven gear dogs will cause erratic clutch operation.

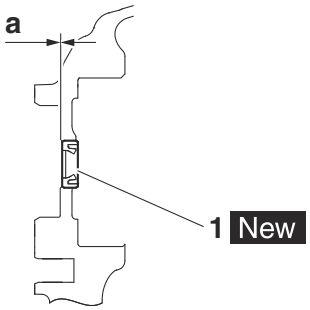



EAM30639

## INSTALLING THE CLUTCH RELEASE

1. Install:
   - Oil seal "1" New

| | |
|---|---|
| | **Installed depth "a"**<br>**0.0–0.5 mm (0.00–0.02 in)** |

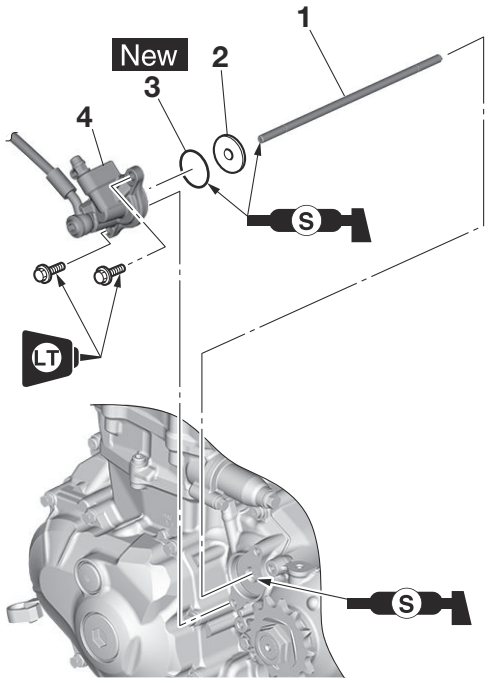



2. Install:
   - Push rod 2 "1"
   - Washer "2"
   - O-ring "3" New
   - Clutch release cylinder assembly "4"

| | |
|---|---|
| | **Clutch release cylinder bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)**<br>**LOCTITE®** |

**TIP**

Apply silicone grease on the O-ring, the seal lip and the push rod end.




EAM30121

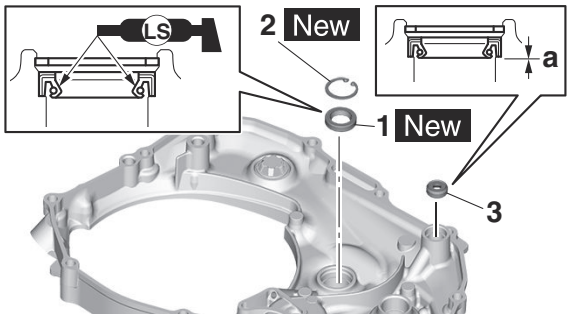
## INSTALLING THE CLUTCH

1. Install:
   - Oil seal "1" New
   - Circlip "2" New
   - Check ball seat "3"

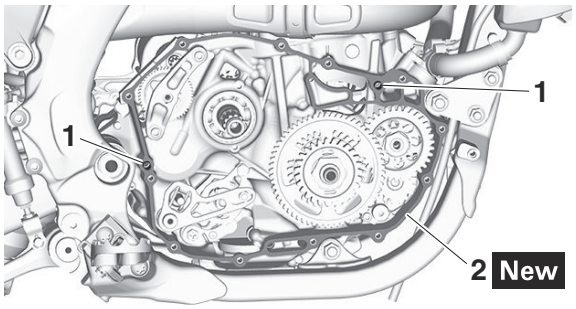
**TIP**

- Apply the lithium-soap-based grease on the oil seal lip.
- Install the oil seal in parallel with its manufacture's marks or numbers facing inward.

| | |
|---|---|
| | **Installed depth "a"**<br>**0 mm (0 in)** |




2. Install:
   - Dowel pin "1"
   - Gasket "2" New

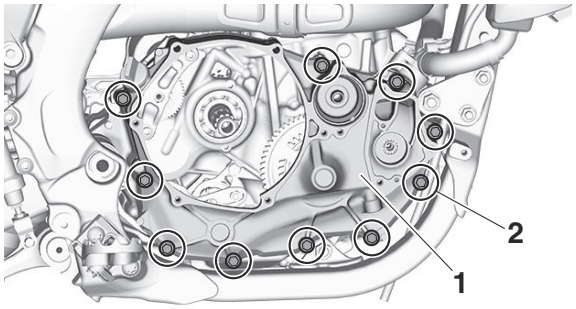



3. Install:
   • Crankcase cover (right) “1”
   • Crankcase cover bolt (right) “2”

| | |
|---|---|
| | **Crankcase cover bolt (right)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**TIP**

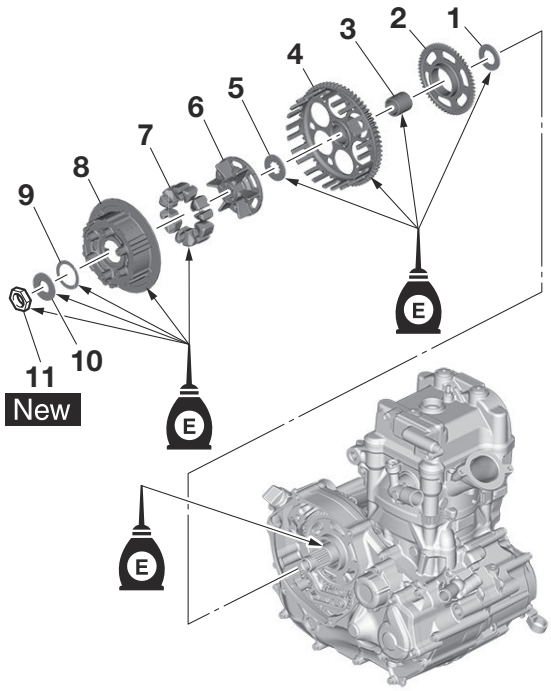
Tighten the crankcase cover bolts (right) in stages and in a crisscross pattern.




4. Install:
   • Washer “1”
   • Idle gear “2”
   • Collar “3”
   • Primary driven gear “4”
   • Washer “5”
   • Clutch boss “6”
   • Absorber “7”
   • Sleeve “8”
   • Washer “9”
   • Spacer “10”
   • Clutch boss nut “11” New

**TIP**

- Apply engine oil to the main axle.
- Apply engine oil to the contact surfaces of the washer “1”.
- Apply engine oil to the inner surface of the collar “3”.
- Apply engine oil to the inner surface and the contact surfaces of the primary driven gear “4”.
- Apply engine oil to the contact surfaces of the washer “5”.
- Apply engine oil to the absorber “7”.
- Apply engine oil to the inner surface and the contact surfaces of the sleeve “8”.
- Apply engine oil to the contact surfaces of the washer “9”.
- Apply engine oil to the contact surfaces of the spacer “10”.
- Apply the engine oil on the threads and contact surface of the clutch boss nut “11”.
- Do not tighten the clutch boss nut “11” with the washer “9” caught in the stepped portion of the spacer “10”.




5. Tighten:
   • Clutch boss nut “1” New

| | |
|---|---|
| | **Clutch boss nut**<br>**75 N·m (7.5 kgf·m, 55 lb·ft)** |

ECA24660

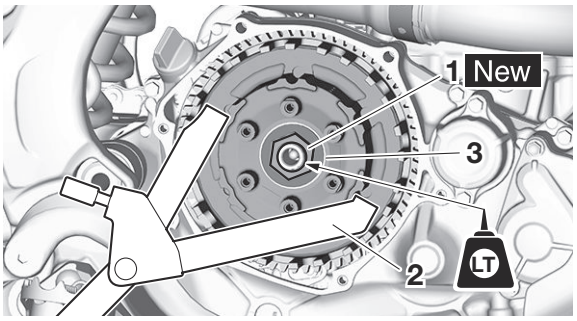
***NOTICE***

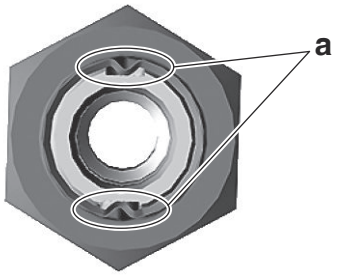
**Make sure to tighten to specification; otherwise, it may damage the other part that is fastened together.**

**TIP**

- Use the clutch holder “2” to hold the sleeve.
- After tightening the clutch boss nut, make sure that the washer “3” can rotate freely.
- Stake the clutch boss nut at cutouts “a” in the main axle. Take care not to affect the threaded part where the nut will be attached.

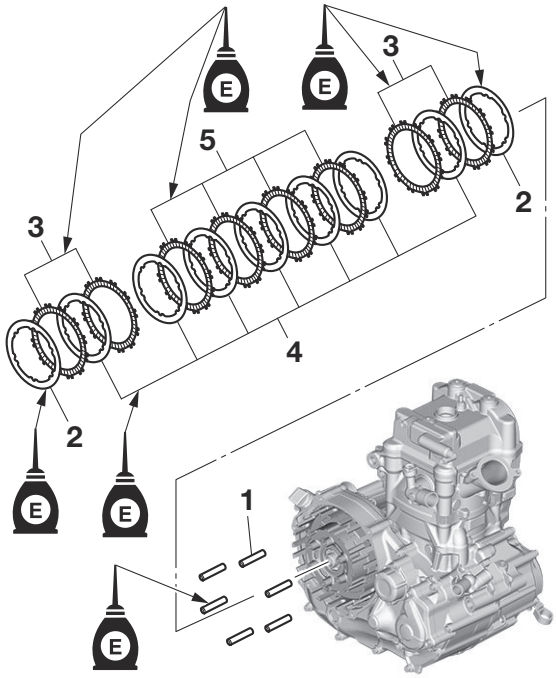
**Clutch holder**
**90890-04199**
**Universal clutch holder**
**YM-91042**



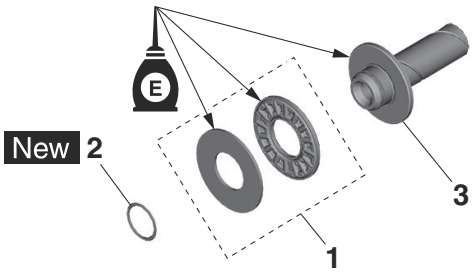

6. Install:
   - Collar "1"
   - Clutch plate 2 (thickness: 1.0 mm (0.04 in)) "2"
   - Friction plate 2 (painted) "3"
   - Clutch plate 1 (thickness: 1.4 mm (0.06 in)) "4"
   - Friction plate 1 (unpainted) "5"

**TIP**
- The friction plate 2 has blue paint on one pawl head on the outer circumference with the pawls.
- Install the clutch plates and friction plates alternately on the sleeve, starting with a clutch plate and ending with a clutch plate.
- From the clutch boss side, install the friction plates and clutch plates in the order of the illustrations.
- Apply the engine oil on the collars, friction plates, and clutch plates.



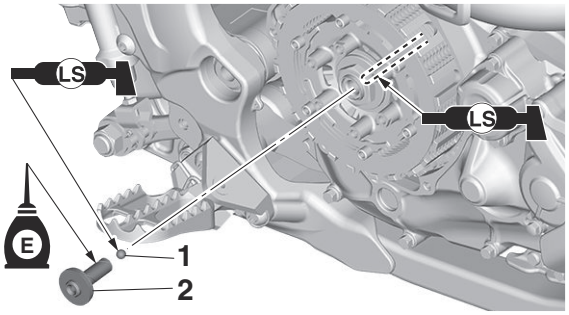

7. Install:
   - Bearing "1"
   - Circlip "2" New
     (to the push rod 1 "3")

**TIP**
Apply the engine oil on the bearing and push rod 1.

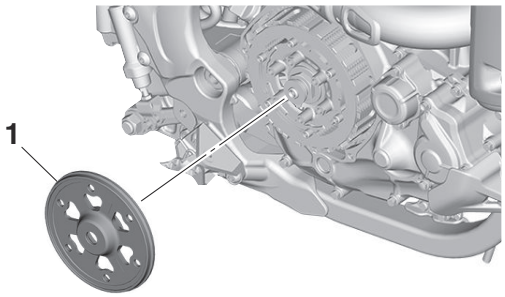



8. Install:
   - Ball "1"
   - Push rod 1 "2"

**TIP**
- Apply the engine oil on the push rod 1 .
- Apply the lithium-soap-based grease on the ball.




9. Install:
   • Pressure plate 2 “1”

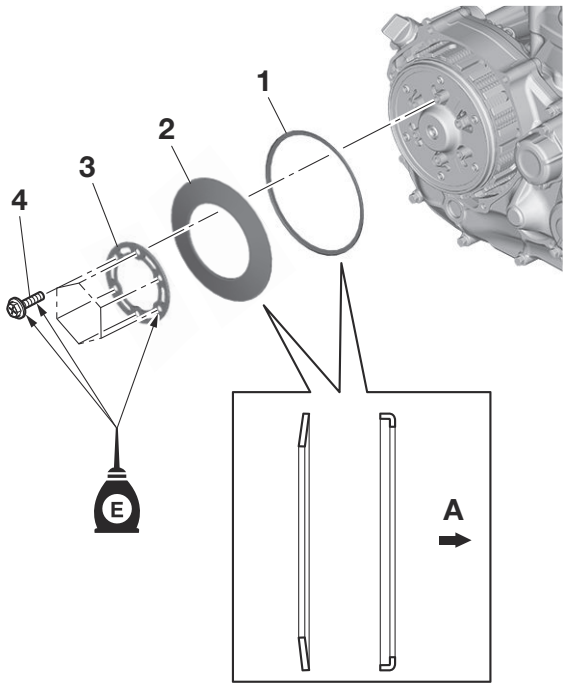



10. Install:
   • Spring retainer “1”
   • Clutch spring “2”
   • Pressure plate 1 “3”
   • Bolt (pressure plate 1) “4”

| | |
|---|---|
| | **Bolt (pressure plate 1)**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**TIP**

- Apply the engine oil on the threads and contact surface of the bolts, and contact surface of the pressure plate 1.
- First temporarily tighten all bolts to 4.0 N·m (0.40 kgf·m, 3.0 lb·ft) in a crisscross pattern. Then retighten them to 10 N·m (1.0 kgf·m, 7.4 lb·ft) in a crisscross pattern.



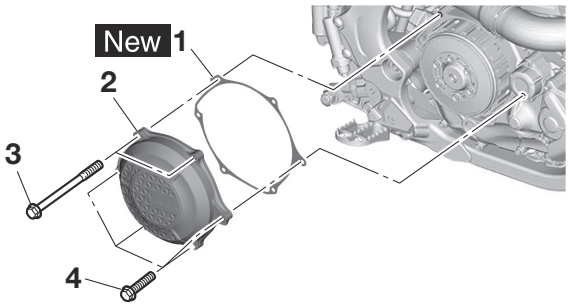

A. Engine side

11. Install:
   • Gasket “1” New
   • Clutch cover “2”
   • Clutch cover bolt (long) “3”
   • Clutch cover bolt (short) “4”

| | |
|---|---|
| | **Clutch cover bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

**TIP**

Tighten the bolts in stages and in a crisscross pattern.




EAM30670

## DISASSEMBLING THE CLUTCH MASTER CYLINDER

ECA13840

***NOTICE***

- **Clutch components rarely require disassembly.**
- **Therefore, always follow these preventive measures:**

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

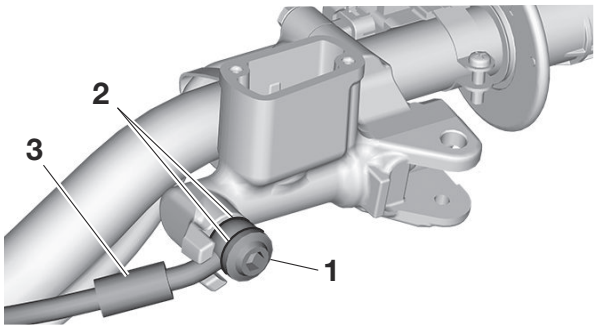
**TIP**

Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

1. Remove:
   - Clutch hose union bolt "1"
   - Copper washer "2"
   - Clutch hose "3"

**TIP**

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




EAM30671

## CHECKING THE CLUTCH MASTER CYLINDER

1. Check:
   - Clutch master cylinder body
     Cracks/damage → Replace the clutch master cylinder.
   - Clutch fluid delivery passage
     (clutch master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Clutch master cylinder
   - Clutch master cylinder kit
     Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
3. Check:
   - Clutch master cylinder reservoir
     Cracks/damage → Replace.
   - Clutch master cylinder reservoir diaphragm
     Damage/wear → Replace.
4. Check:
   - Clutch hose
     Cracks/damage/wear → Replace.

EAM30672

## ASSEMBLING THE CLUTCH MASTER CYLINDER

EWA13340

**WARNING**

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

| | |
|---|---|
| | **Specified brake and clutch fluid**<br>**DOT 4** |

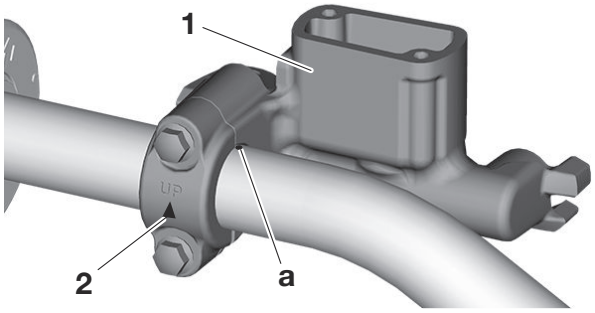
EAM30673

## INSTALLING THE CLUTCH MASTER CYLINDER

1. Install:
   - Clutch master cylinder "1"
   - Clutch master cylinder holder "2"

**TIP**

- Install the clutch lever holder with the "UP" mark facing up.
- Align the end of the clutch lever holder with the paint mark "a" on the left handlebar.
- First, tighten the upper bolt, then the lower bolt.




2. Install:
   • Copper washer "1" New
   • Clutch hose "2"
   • Clutch hose union bolt "3"

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

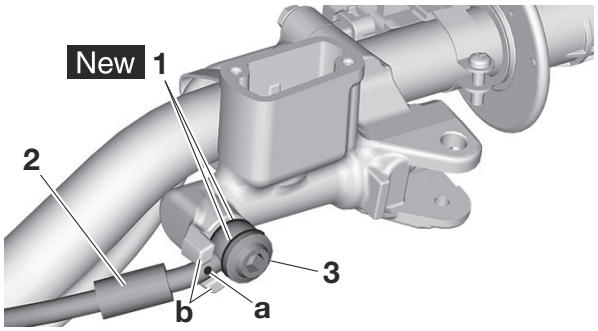
EWA18510

**⚠ WARNING**

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

**TIP**

- When installing the clutch hose to the clutch master cylinder, the white paint dot "a" on the clutch pipe should point to the front side of the vehicle as shown, and then align it with the protrusion "b" on the clutch master cylinder.
- Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.




3. Fill:
   • Clutch master cylinder reservoir
   (with the specified amount of the specified brake and clutch fluid)

| | |
|---|---|
| | **Specified brake and clutch fluid DOT 4** |

EWA17270

**⚠ WARNING**

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

ECA13420

***NOTICE***

**Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.**

**TIP**

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

4. Bleed:
   • Clutch system
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16.
5. Check:
   • Clutch fluid level
   Refer to "CHECKING THE CLUTCH FLUID" on page 3-16.
6. Check:
   • Clutch lever operation
   Soft or spongy feeling → Bleed the clutch system.
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16.

EAM30674

## REMOVING THE CLUTCH RELEASE CYLINDER

1. Remove:
   • Clutch hose union bolt
   • Copper washer
   • Clutch hose

**TIP**

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

EAM30675

## CHECKING THE CLUTCH RELEASE CYLINDER

1. Check:
   • Clutch release cylinder body

Cracks/damage → Replace the clutch release cylinder.

EAM30676
### INSTALLING THE CLUTCH RELEASE CYLINDER

1. Install:
   - Copper washer "1" New
   - Clutch hose "2"
   - Clutch hose union bolt "3"

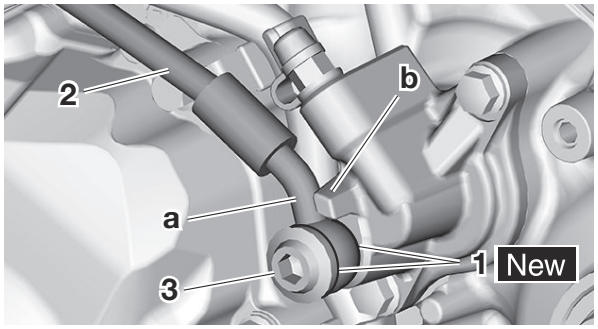
| | |
|---|---|
| | **Clutch hose union bolt 30 N·m (3.0 kgf·m, 22 lb·ft)** |

EWA18510
**⚠ WARNING**

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

ECA18370
***NOTICE***

**When installing the clutch hose onto the clutch release cylinder, make sure the pipe "a" touches the projection "b" on the clutch release cylinder body.**




2. Fill:
   - Clutch master cylinder reservoir
     (with the specified amount of the specified brake and clutch fluid)

| | |
|---|---|
| | **Specified brake and clutch fluid DOT 4** |

EWA17270
**⚠ WARNING**

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

ECA13420
***NOTICE***

**Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.**

**TIP**

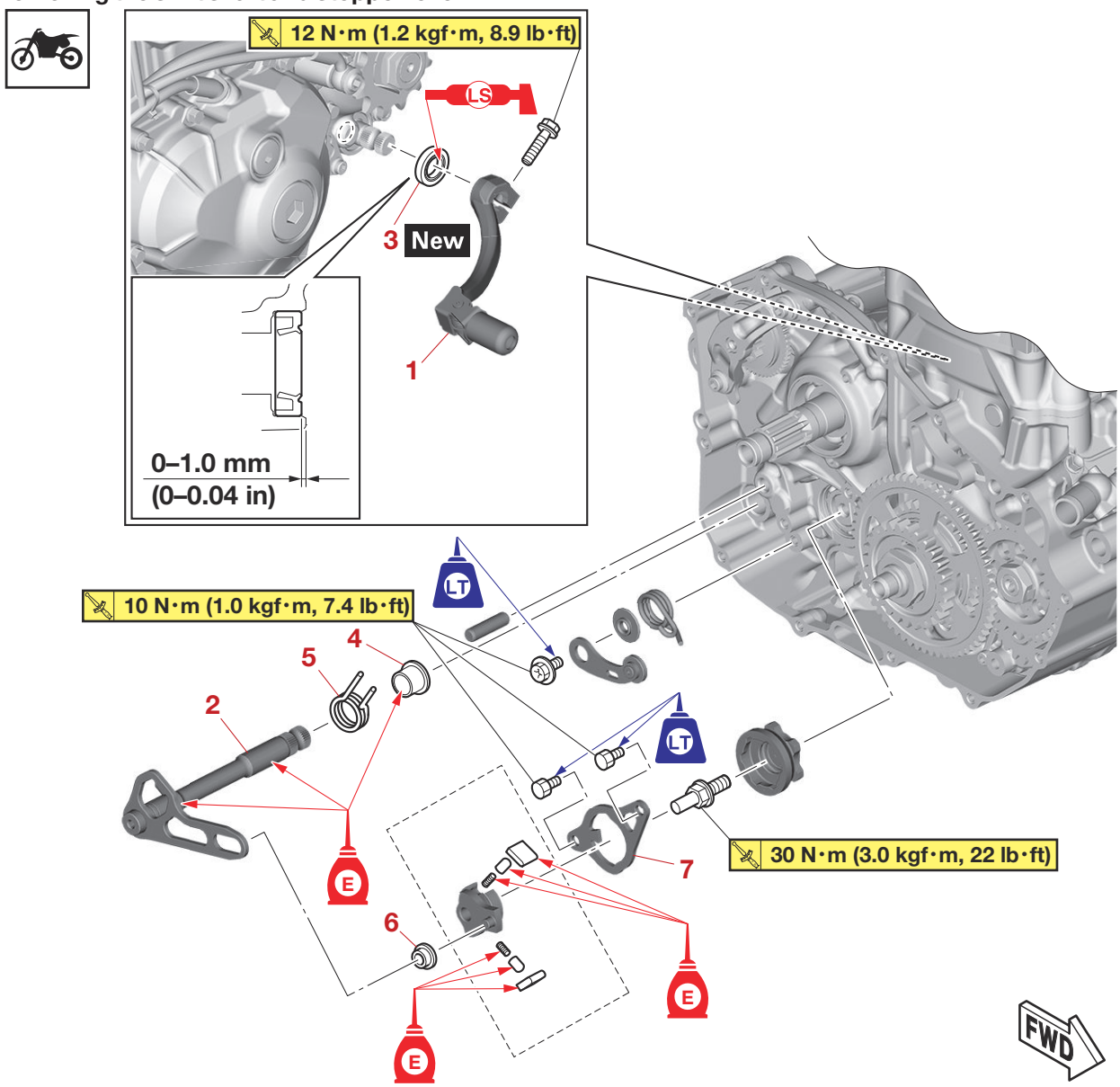
In order to ensure a correct reading of the clutch fluid level, make sure that the top of the clutch master cylinder reservoir is horizontal.

3. Bleed:
   - Clutch system
     Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16.
4. Check:
   - Clutch fluid level
     Refer to "CHECKING THE CLUTCH FLUID" on page 3-16.
5. Check:
   - Clutch lever operation
     Soft or spongy feeling → Bleed the clutch system.
     Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM" on page 3-16.

EAM20113

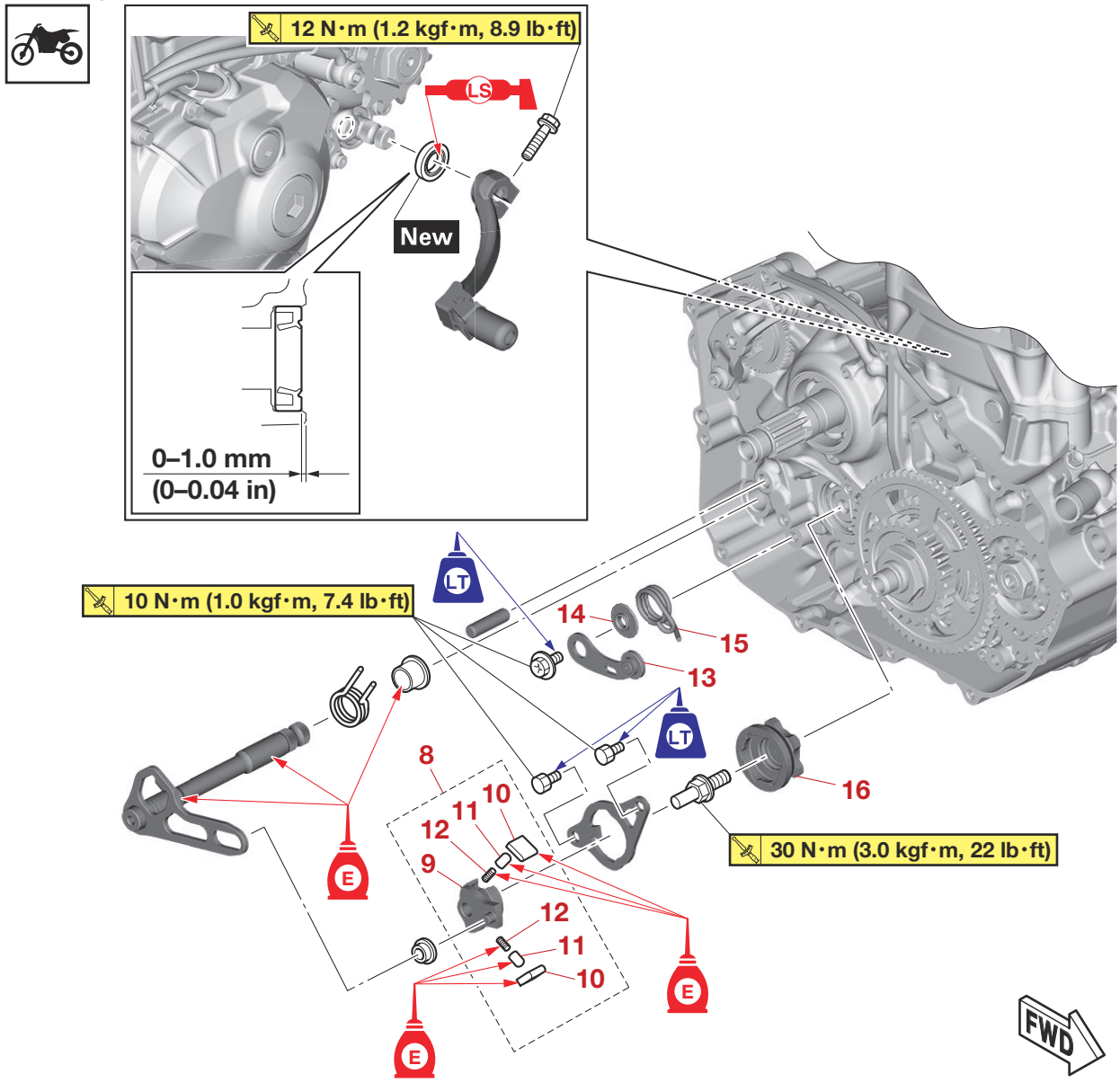
# SHIFT SHAFT

## Removing the shift shaft and stopper lever




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Idle gear | | Refer to "CLUTCH" on page 5-46. |
| 1 | Shift pedal | 1 | |
| 2 | Shift shaft | 1 | |
| 3 | Oil seal | 1 | |
| 4 | Collar | 1 | |
| 5 | Shift shaft spring | 1 | |
| 6 | Roller | 1 | |
| 7 | Shift guide | 1 | |

## Removing the shift shaft and stopper lever

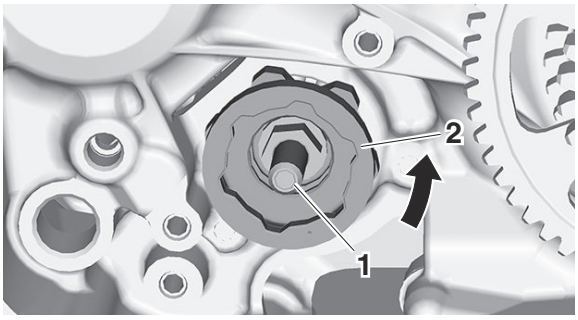



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 8 | Shift lever assembly | 1 | |
| 9 | Shift lever | 1 | |
| 10 | Pawl | 2 | |
| 11 | Pawl pin | 2 | |
| 12 | Spring | 2 | |
| 13 | Stopper lever | 1 | |
| 14 | Collar | 1 | |
| 15 | Stopper lever spring | 1 | |
| 16 | Segment | 1 | |

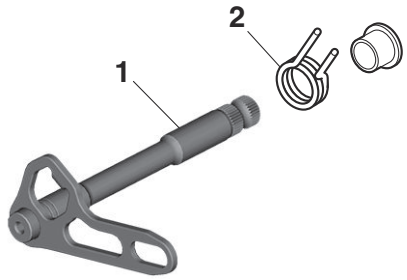
EAM30124
### REMOVING THE SEGMENT
1. Remove:
   • Bolt (segment) “1”
   • Segment “2”

**TIP**
Turn the segment counterclockwise until it stops and loosen the bolt.

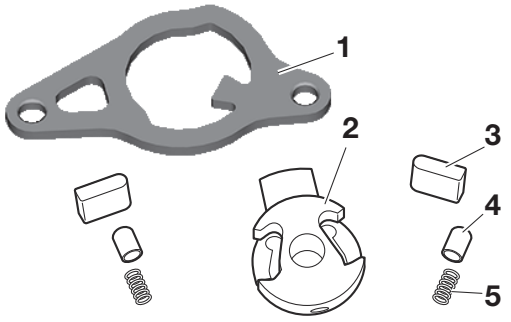
ECA24670
***NOTICE***
**If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when removing the bolt.**



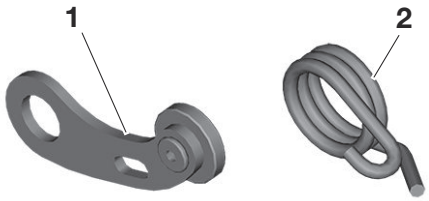

EAM30125
### CHECKING THE SHIFT SHAFT
1. Check:
   • Shift shaft “1”
   Bends/damage/wear → Replace.
   • Shift shaft spring “2”
   Damage/wear → Replace.




2. Check:
   • Shift guide “1”
   • Shift lever “2”
   • Pawl “3”
   • Pawl pin “4”
   • Spring “5”
   Wear/damage → Replace.



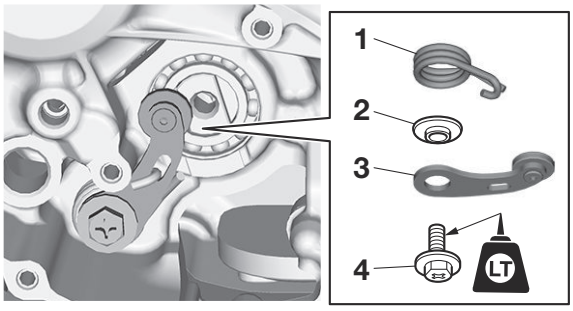

EAM30127
### CHECKING THE STOPPER LEVER
1. Check:
   • Stopper lever “1”
   Wear/damage → Replace.
   • Stopper lever spring “2”
   Broken → Replace.




EAM30131
### INSTALLING THE SHIFT SHAFT
1. Install:
   • Stopper lever spring “1”
   • Collar “2”
   • Stopper lever “3”
   • Bolt (stopper lever) “4”



**Bolt (stopper lever)**
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**
**LOCTITE®**




2. Install:
   • Segment “1”
   • Segment bolt

| | |
|---|---|
| | **Segment bolt**<br>**30 N·m (3.0 kgf·m, 22 lb·ft)** |

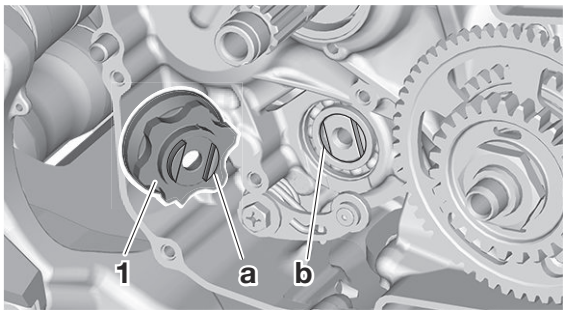
**TIP**

- Align the projections "a" on the segment with the slits "b" on the shift drum.
- With the stopper lever pushed down, install the segment.

ECA24680

***NOTICE***

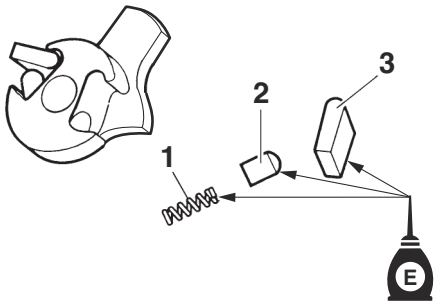
**If the segment gets an impact, the stopper lever may be damaged. Take care not to give an impact to it when tightening the bolt.**




3. Install:
   - Spring "1"
   - Pawl pin "2"
   - Pawl "3"
     (to the shift lever)

**TIP**

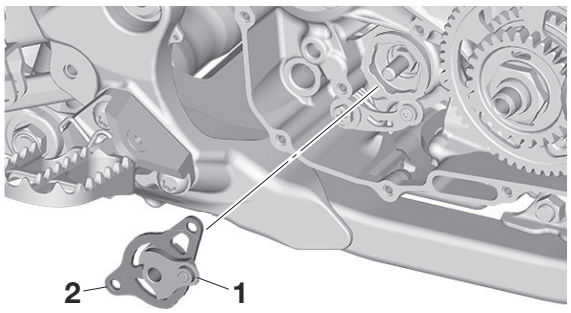
Apply the engine oil on the spring, pawl pin and pawl.




4. Install:
   - Shift lever assembly
     (to the shift guide)
5. Install:
   - Shift lever assembly "1"
   - Shift guide "2"

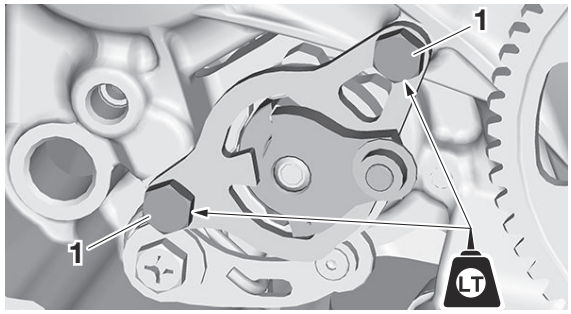
**TIP**

The shift lever assembly is installed at the same time as the shift guide.




6. Tighten:
   - Shift guide bolt "1"

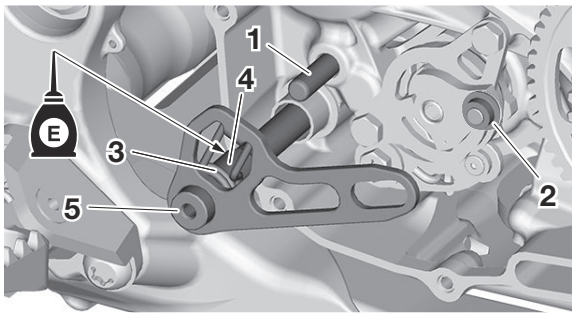
| | |
|---|---|
| | **Shift guide bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)**<br>**LOCTITE®** |




7. Install:
   - Dowel pin "1"
   - Roller "2"
   - Shift shaft spring "3" (to the shift shaft)
   - Collar "4" (to the shift shaft)
   - Shift shaft "5"

**TIP**

Apply the engine oil on the shift shaft.

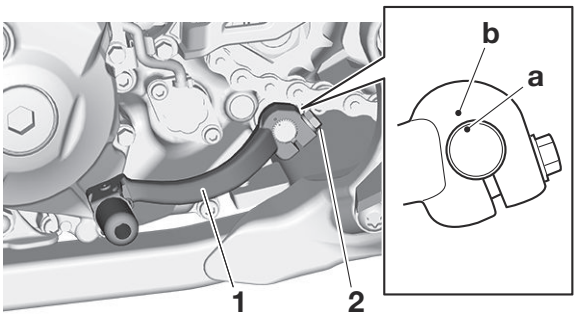



8. Install:
   - Oil seal New
9. Install:
   - Shift pedal "1"
   - Shift pedal bolt "2"

| | |
|---|---|
| | **Shift pedal bolt**<br>**12 N·m (1.2 kgf·m, 8.9 lb·ft)** |

**TIP**

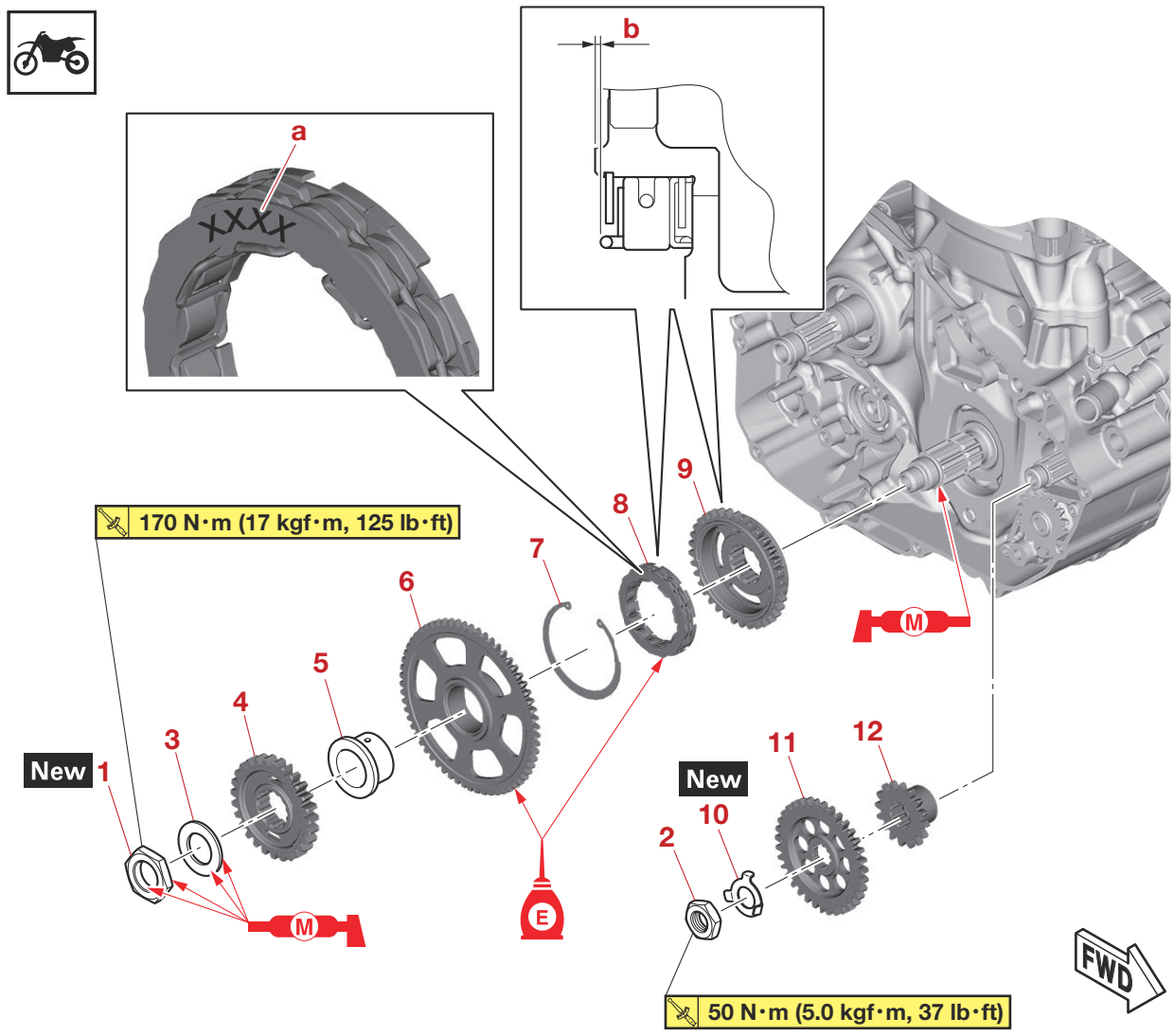
Align the punch mark “a” on the shift shaft with the punch mark “b” in the shift pedal.



EAM20175

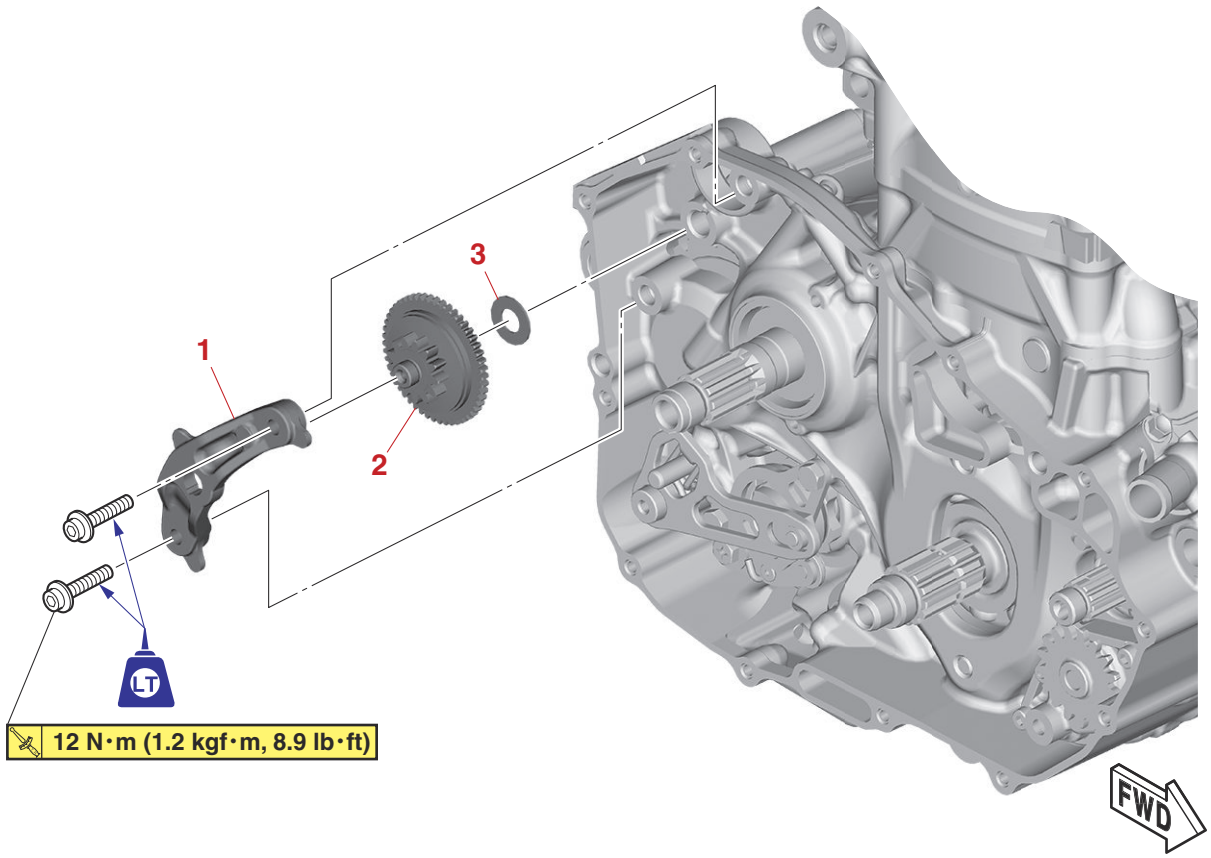
# STARTER CLUTCH

**Removing the balancer gear**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Idle gear | | Refer to "CLUTCH" on page 5-46. |
| | Crankcase cover (right) | | Refer to "CLUTCH" on page 5-46. |
| 1 | Primary drive gear nut | 1 | |
| 2 | Balancer driven gear nut | 1 | |
| 3 | Washer | 1 | |
| 4 | Primary drive gear | 1 | |
| 5 | Collar | 1 | |
| 6 | Starter reduction gear | 1 | |
| 7 | Circlip | 1 | |
| 8 | Starter clutch assembly | 1 | ["a": Manufacturer's mark] |
| 9 | Balancer drive gear | 1 | ["b": 0.7 mm (0.03 in) or more] |
| 10 | Lock washer | 1 | |
| 11 | Balancer driven gear | 1 | |
| 12 | Oil pump drive gear | 1 | |

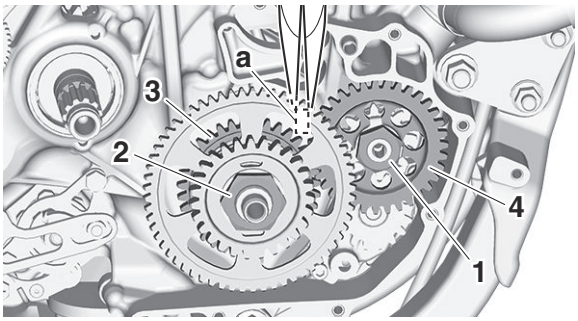
### Removing the damper assembly

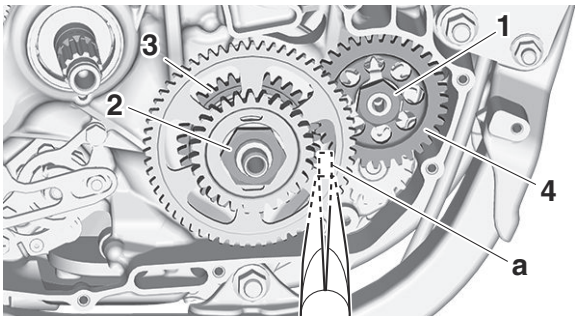



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Engine oil | | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-14. |
| | Clutch | | Refer to "CLUTCH" on page 5-46. |
| 1 | Holder | 1 | |
| 2 | Damper assembly | 1 | |
| 3 | Washer | 1 | |

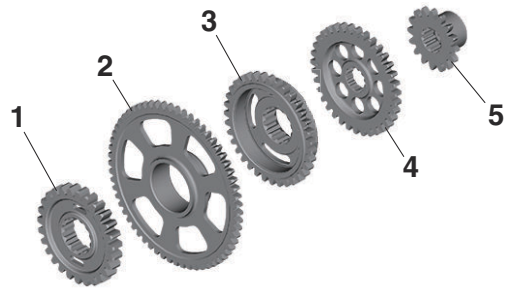
EAM30624
## REMOVING THE BALANCER GEAR
1. Straighten the lock washer tab.
2. Loosen:
   • Balancer driven gear nut “1”
   • Primary drive gear nut “2”

**TIP**
Place an aluminum plate “a” between the teeth of the balancer drive gear “3” and balancer driven gear “4”.

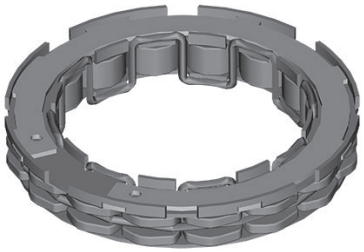


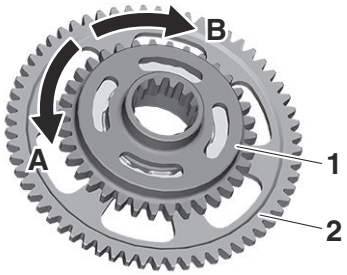

3. Check:
   • Primary drive gear “1”
   • Starter reduction gear “2”
   • Balancer drive gear “3”
   • Balancer driven gear “4”
   • Oil pump drive gear “5”
   Wear/damage → Replace.




EAM30140
## CHECKING THE STARTER CLUTCH
1. Remove:
   • Starter clutch assembly
   Refer to “OIL PUMP” on page 5-71.
2. Check:
   • Starter clutch assembly
   Burrs/chips/roughness/wear → Replace the starter clutch assembly.

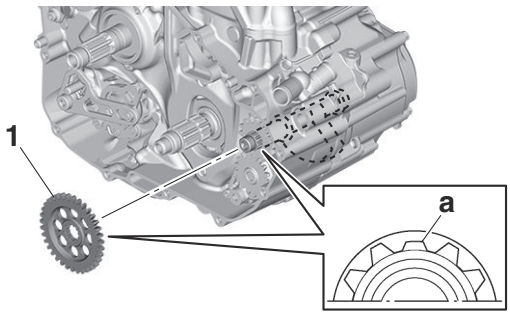


3. Check:
   • Starter clutch operation
   a. Install the starter clutch onto the balancer drive gear “1”, and then install onto the starter reduction gear “2”.
   b. When turning the balancer drive gear counterclockwise “A”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.
   c. When turning the balancer drive gear clockwise “B”, the starter clutch and the balancer drive gear should engage, otherwise the starter clutch is faulty and must be replaced.




EAM30630
## INSTALLING THE BALANCER GEAR
1. Install:
   • Oil pump drive gear
   • Balancer driven gear “1”

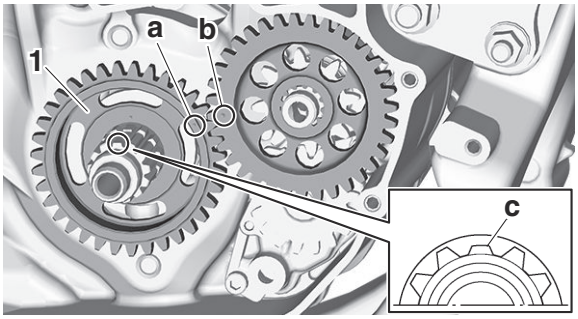
**TIP**
Install the balancer driven gear and balancer shaft with their lower splines “a” aligning with each other.




2. Install:
   • Balancer drive gear “1”

**TIP**

- Align the punched mark “a” on the balancer drive gear with the punched mark “b” on the balancer driven gear.
- Install the balancer drive gear and crankshaft with the lower splines “c” aligning with each other.




3. Wash:
   • Threaded portion of the crankshaft
   • Contact surface of the washer
   • Threaded portion and contact surface of the primary drive gear nut

**TIP**

Thoroughly clean the threaded portion of the crankshaft, contact surface of the washer, and threaded portion and contact surface of the primary drive gear nut to remove the oil.

4. Install:
   • Lock washer “1” New
   • Balancer driven gear nut “2”

| | |
|---|---|
| | **Balancer driven gear nut**<br>**50 N·m (5.0 kgf·m, 37 lb·ft)** |

   • Starter clutch assembly “3”

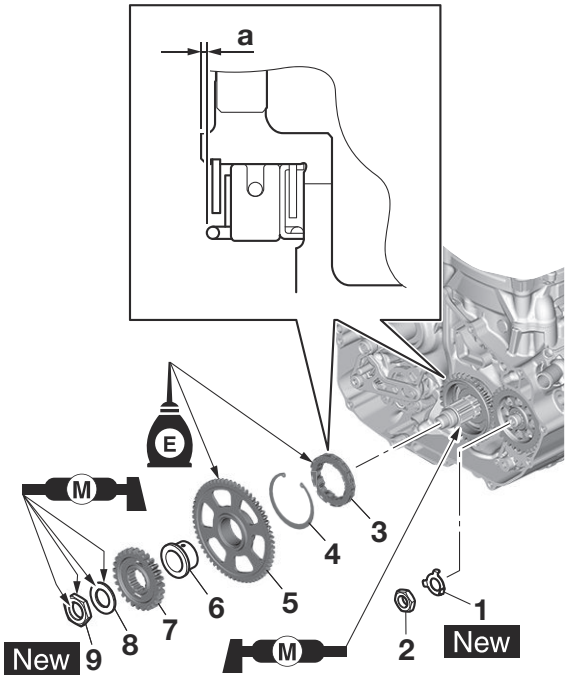
| | |
|---|---|
| | **Installed depth “a”**<br>**0.7 mm (0.03 in) or more** |

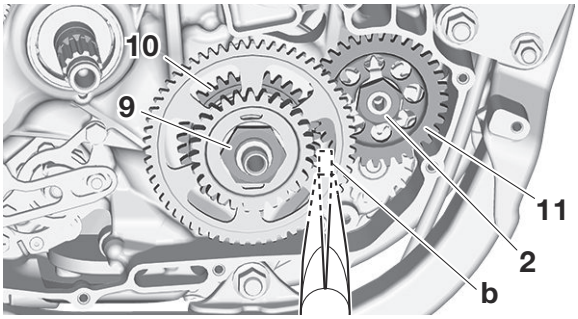
   • Circlip “4”
   • Starter reduction gear “5”
   • Collar “6”
   • Primary drive gear “7”
   • Washer “8”
   • Primary drive gear nut “9” New

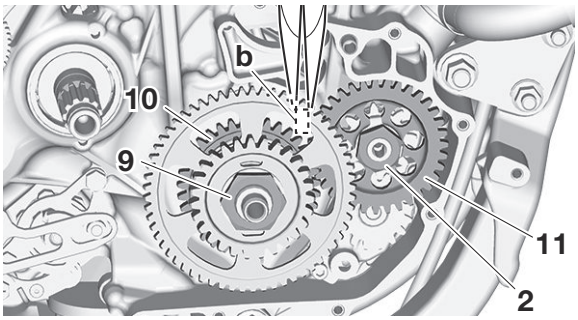
| | |
|---|---|
| | **Primary drive gear nut**<br>**170 N·m (17 kgf·m, 125 lb·ft)** |

**TIP**

- Apply molybdenum disulfide grease to the threaded portion of the crankshaft.
- Apply engine oil to the starter clutch assembly.
- Install the starter clutch assembly with its manufacturer’s mark facing outward.
- Install the starter clutch assembly so that the clearance “a” between the starter clutch assembly and the balancer drive gear is 0.7 mm (0.03 in) or more.
- Apply engine oil to the inner surface and the contact surfaces of the starter reduction gear.
- Apply molybdenum disulfide grease to the contact surface of the washer.
- Apply molybdenum disulfide grease to the contact surface and threaded portion of the primary drive gear nut.
- Place an aluminum plate “b” between the teeth of the balancer drive gear “10” and balancer driven gear “11”.



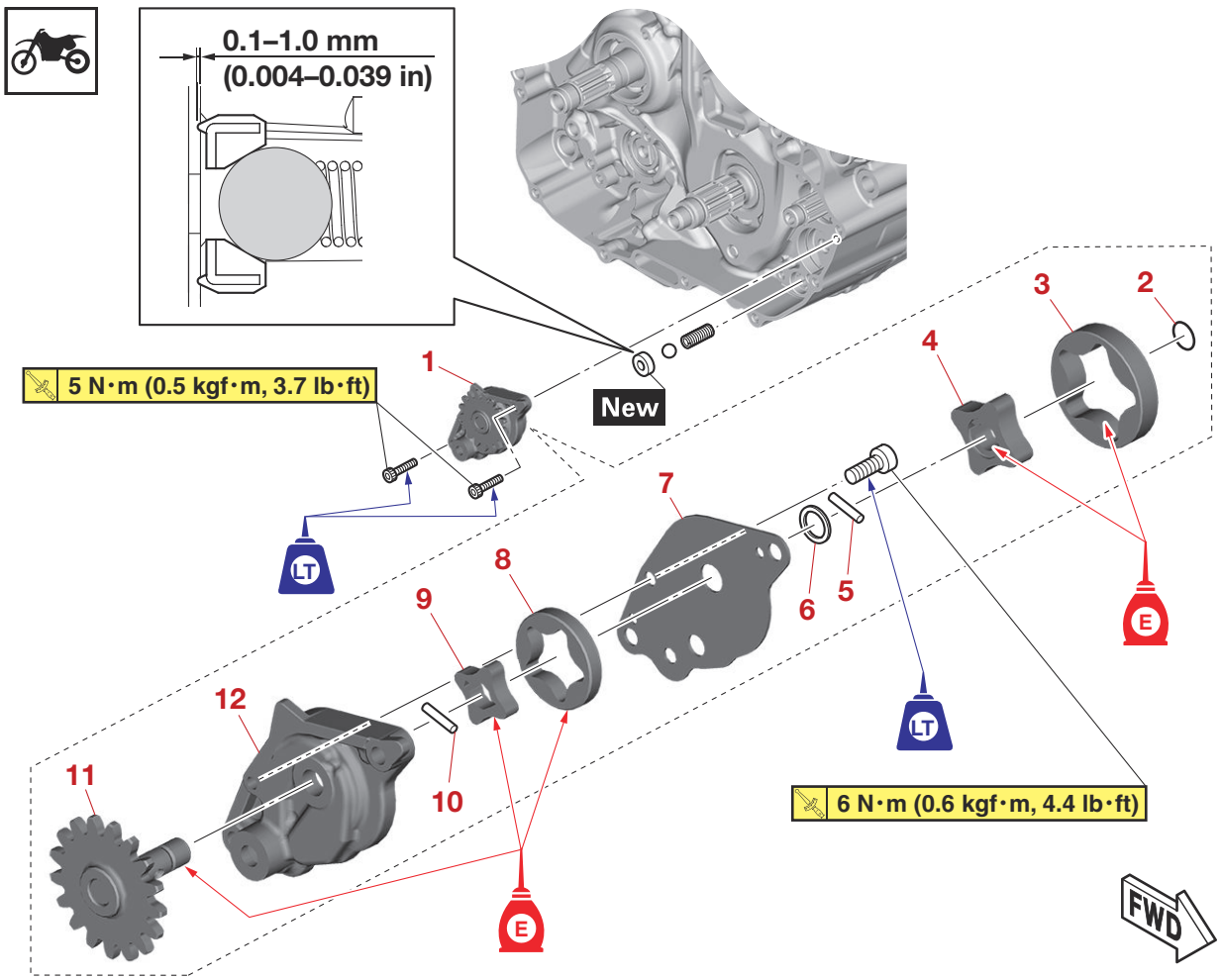



5. Bend the lock washer tab.

EAM20182
# OIL PUMP

**Removing the oil pump**

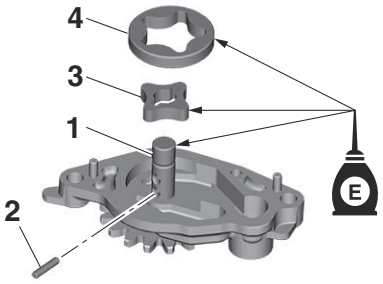



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Oil pump drive gear | | Refer to "STARTER CLUTCH" on page 5-66. |
| 1 | Oil pump assembly | 1 | |
| 2 | Circlip | 1 | |
| 3 | Outer rotor 1 | 1 | |
| 4 | Inner rotor 1 | 1 | |
| 5 | Dowel pin | 1 | |
| 6 | Washer | 1 | |
| 7 | Oil pump cover | 1 | |
| 8 | Outer rotor 2 | 1 | |
| 9 | Inner rotor 2 | 1 | |
| 10 | Dowel pin | 1 | |
| 11 | Oil pump drive shaft | 1 | |
| 12 | Oil pump housing | 1 | |

EAM30136
## CHECKING THE OIL PUMP
1. Check:
   • Oil pump cover
   • Oil pump drive shaft
   • Oil pump housing
   Cracks/damage/wear → Replace the oil pump assembly.
2. Check:
   • Oil pump operation
   Rough movement → Repeat step (1) or replace the oil pump assembly.

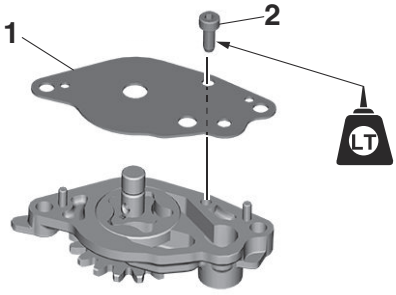
EAM30137
## ASSEMBLING THE OIL PUMP
1. Install:
   • Oil pump drive shaft "1"
   • Dowel pin "2"
   • Inner rotor 2 "3"
   • Outer rotor 2 "4"

**TIP**
- Apply the engine oil on the oil pump drive shaft, inner rotor 2, and outer rotor 2.
- Fit the dowel pin into the slit in the inner rotor 2.



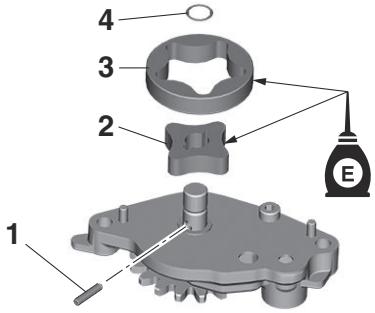

2. Install:
   • Oil pump cover "1"
   • Oil pump cover bolt "2"

**Oil pump cover bolt**
**6 N·m (0.6 kgf·m, 4.4 lb·ft)**
**LOCTITE®**



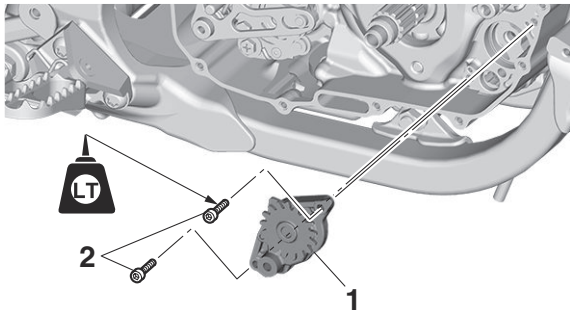

3. Install:
   • Washer
   • Dowel pin "1"
   • Inner rotor 1 "2"
   • Outer rotor 1 "3"
   • Circlip "4"

**TIP**
- Apply the engine oil on the inner rotor 1 and outer rotor 1.
- Fit the dowel pin into the groove in the inner rotor 1.




EAM30486
## INSTALLING THE OIL PUMP
1. Install:
   • Oil pump assembly "1"
   • Oil pump assembly bolt "2"

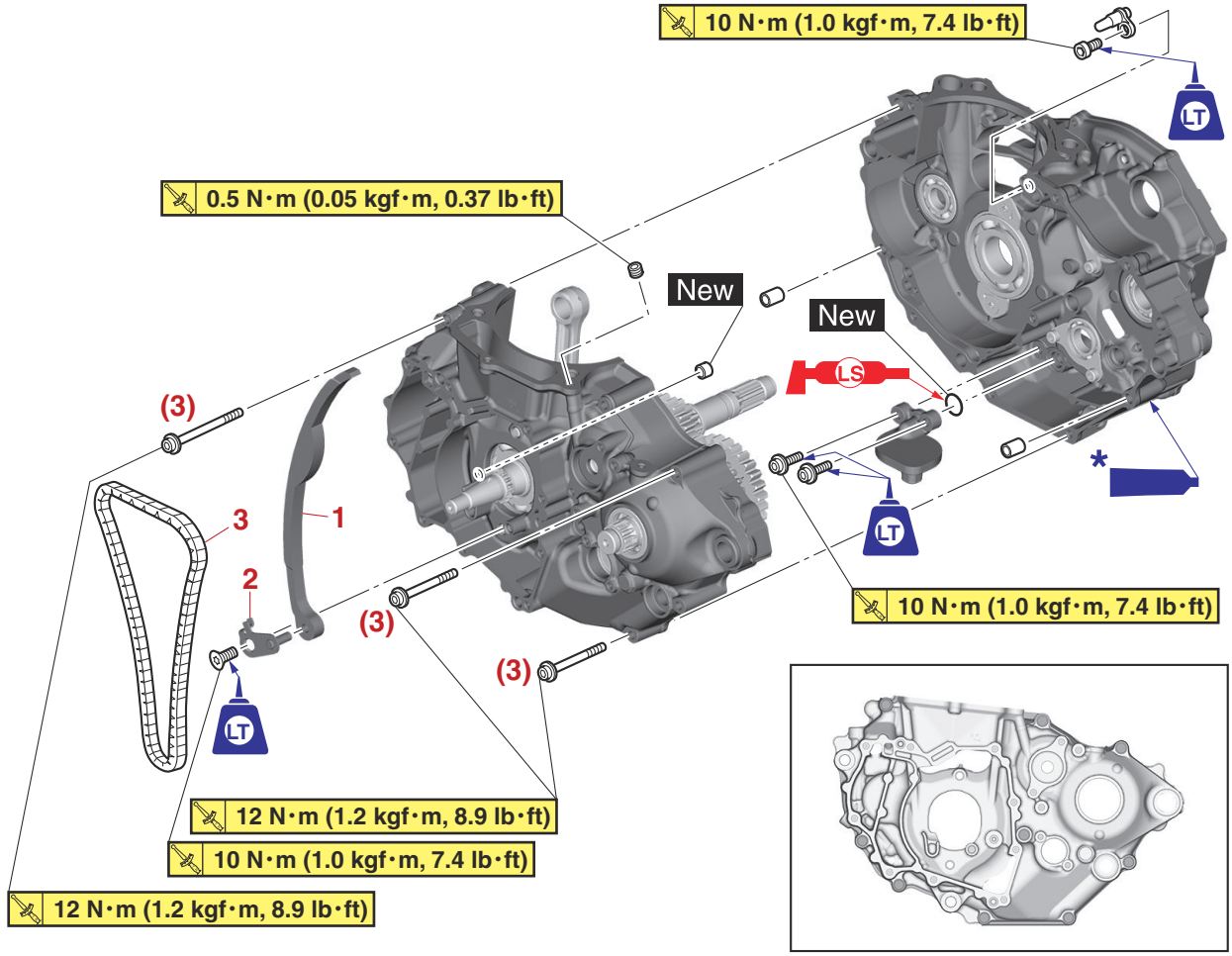
**Oil pump assembly bolt**
**5 N·m (0.5 kgf·m, 3.7 lb·ft)**
**LOCTITE®**




ECA13890
***NOTICE***
**After tightening the bolts, make sure the oil pump turns smoothly.**

EAM20116
# CRANKCASE

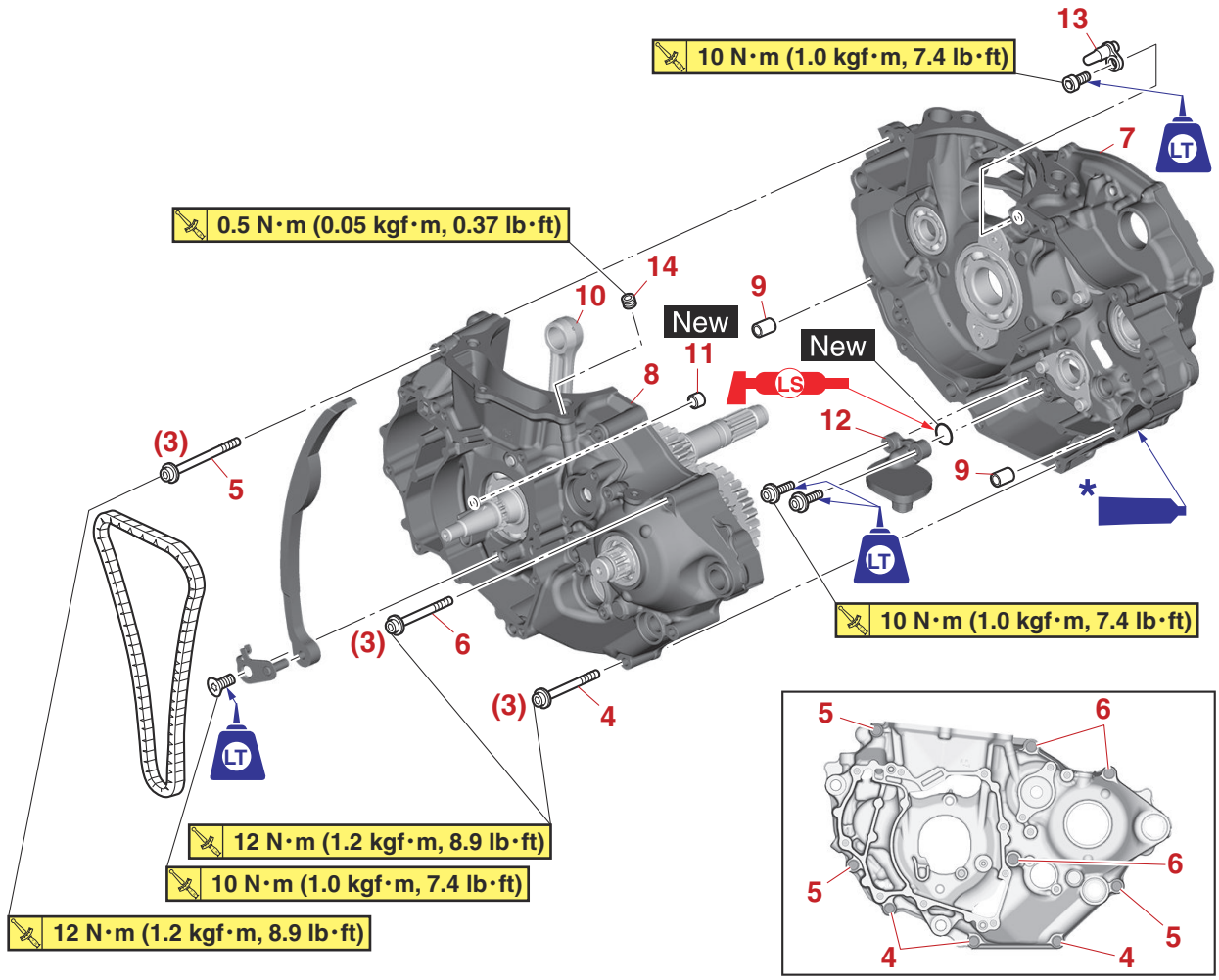
## Separating the crankcase




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

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Engine | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Piston | | Refer to "CYLINDER AND PISTON" on page 5-32. |
| | Oil pump | | Refer to "OIL PUMP" on page 5-71. |
| | Segment | | Refer to "SHIFT SHAFT" on page 5-61. |
| | Stator coil assembly | | Refer to "GENERATOR" on page 5-37. |
| | Clutch release/Push rod 2 | | Refer to "CLUTCH" on page 5-46. |
| 1 | Timing chain guide (exhaust side) | 1 | |
| 2 | Timing chain guide stopper plate | 1 | |
| 3 | Timing chain | 1 | |

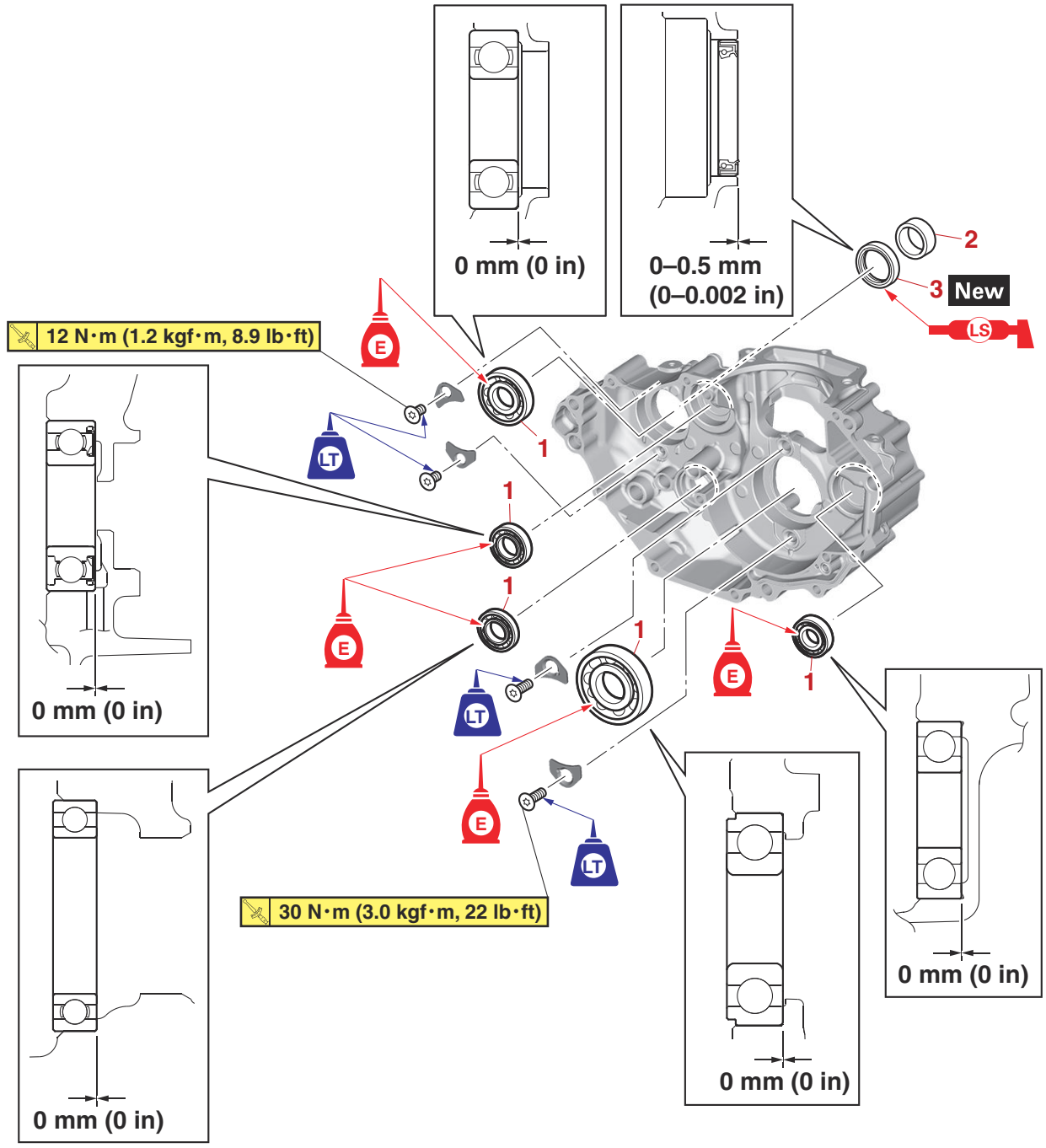
## Separating the crankcase




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

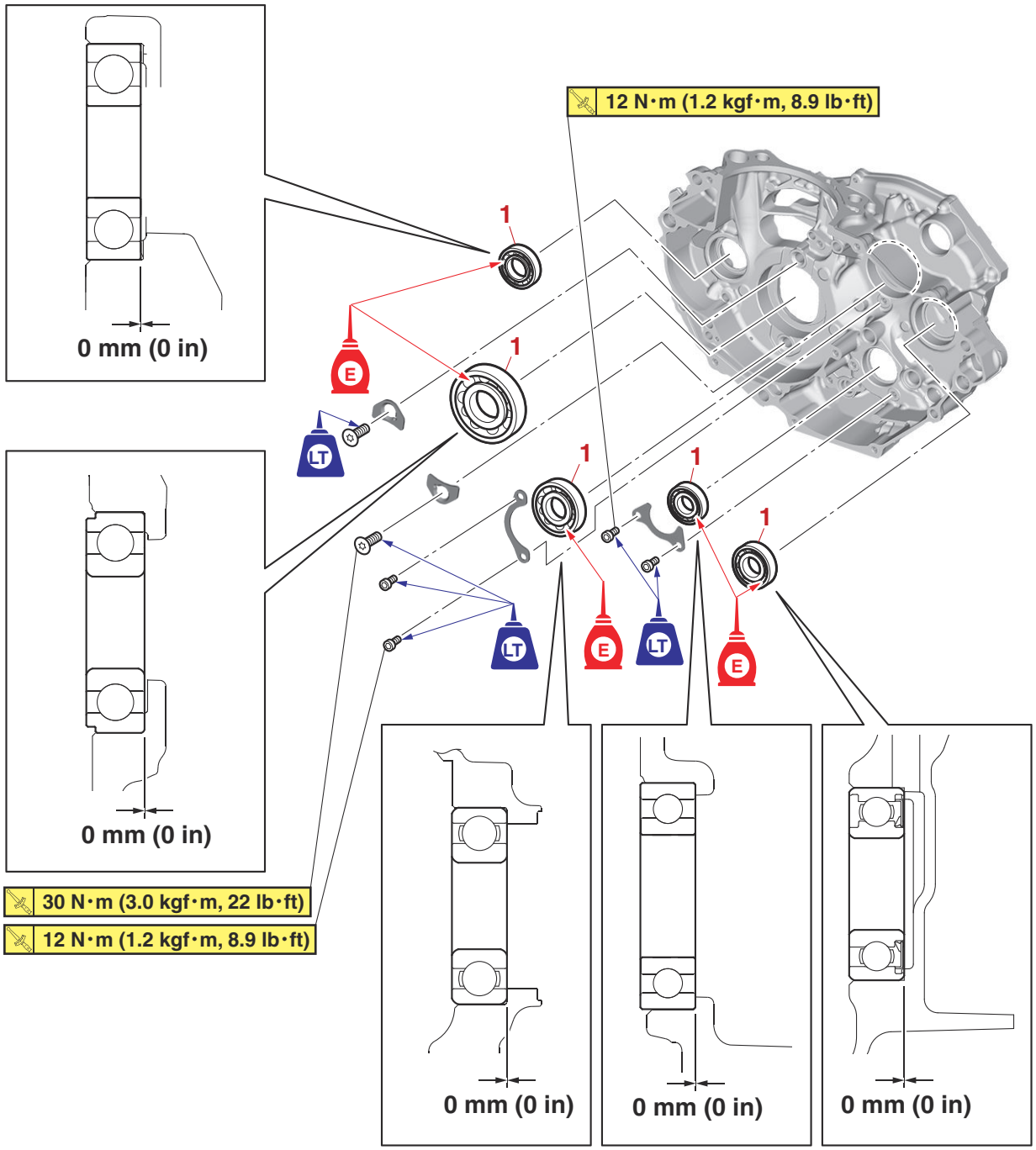
| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 4 | Bolt | 3 | [L = 45 mm (1.77 in)] |
| 5 | Bolt | 3 | [L = 75 mm (2.95 in)] |
| 6 | Bolt | 3 | [L = 60 mm (2.36 in)] |
| 7 | Crankcase (right) | 1 | |
| 8 | Crankcase (left) | 1 | |
| 9 | Dowel pin | 2 | |
| 10 | Crankshaft | 1 | |
| 11 | Gasket | 1 | |
| 12 | Oil strainer | 1 | |
| 13 | Oil nozzle 1 | 1 | |
| 14 | Oil nozzle 2 | 1 | |

## Removing the bearing and oil seal (left)




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Transmission | | Refer to "TRANSMISSION" on page 5-83. |
| | Shift drum/Shift fork | | Refer to "TRANSMISSION" on page 5-83. |
| 1 | Bearing | 5 | |
| 2 | Collar | 1 | |
| 3 | Oil seal | 1 | |

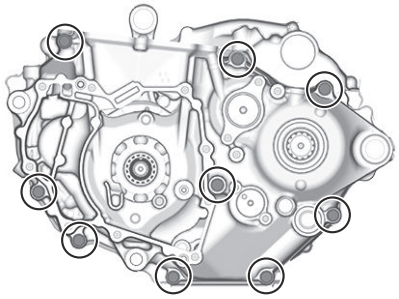
## Removing the bearing and oil seal (right)




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Bearing | 5 | |

EAM30147
## DISASSEMBLING THE CRANKCASE

1. Separate:
   - Right crankcase
   - Left crankcase
   a. Remove the crankcase bolts.



**TIP**

Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.

   b. Remove the right crankcase "1".

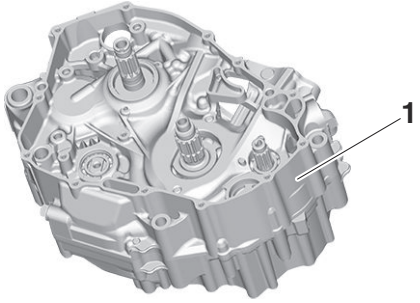
**TIP**

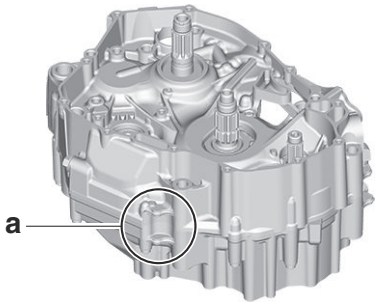
- Place the crankcase with its left side downward and split it by inserting a screwdriver tip into the splitting slit "a" in the crankcase.
- Lift the right crankcase horizontally while lightly patting the crankcase splitting slit and the engine mounting boss using a soft hammer, and leave the crankshaft and the transmission with the left crankcase.

ECA24690

***NOTICE***

**Use soft hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface. Work slowly and carefully. Make sure the case halves separate evenly. If the cases do not separate, check for a remaining case bolt or fitting. Do not force.**

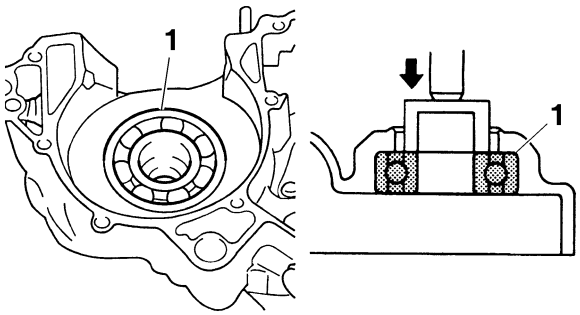



   c. Remove the dowel pins and O-ring.
2. Remove:
   - Bearing "1"

**TIP**

- Remove the bearing from the crankcase by pressing its inner race.
- Do not use the removed bearing.




EAM30490
## CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

1. Check:
   - Timing chain
     Stiffness → Replace the camshaft sprocket, timing chain and crankshaft sprocket as a set.
2. Check:
   - Timing chain guide
     Damage/wear → Replace.

EAM30150
## CHECKING THE CRANKCASE

1. Wash:
   - Crankcase

**TIP**

- Wash the crankcase in a mild solvent.
- Remove any remaining gasket from the crankcase mating surface.

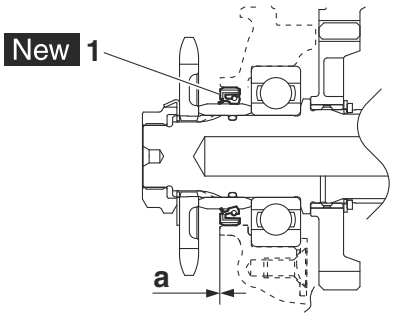
2. Check:
   - Crankcase
     Crack/damage → Replace.
   - Oil delivery passages
     Obstruction → Blow out with compressed

air.

EAM30641
### CHECKING THE OIL STRAINER
1. Check:
   • Oil strainer
   Damage → Replace.
   Contaminants → Clean with solvent.

EAM30152
### ASSEMBLING THE CRANKCASE
1. Install:
   • Oil seal "1" New
   (to the left crankcase)

| | |
|---|---|
| | **Installed depth "a"**<br>**0.0–0.5 mm (0.00–0.02 in)** |



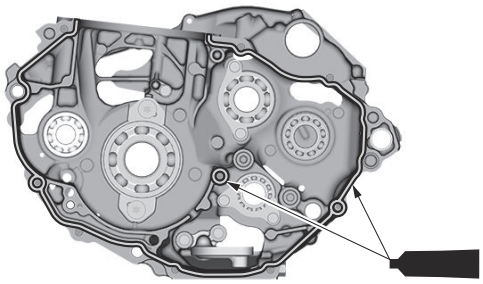

2. Install:
   • Bearing cover plate

| | |
|---|---|
| | **Bearing cover plate bolt**<br>**12 N·m (1.2 kgf·m, 8.9 lb·ft)**<br>**LOCTITE®**<br>**Bearing cover plate screw (crankshaft)**<br>**30 N·m (3.0 kgf·m, 22 lb·ft)**<br>**LOCTITE®** |

**TIP**
Install the bearing by pressing its outer race parallel.

3. Apply:
   • Sealant
   (to the crankcase mating surface)

| | |
|---|---|
| | **Yamaha bond No. 1215**<br>**90890-85505**<br>**Three bond No. 1215®** |



4. Install:
   • Oil nozzle 1 "1"
   (to the right crankcase)

| | |
|---|---|
| | **Oil nozzle bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)**<br>**LOCTITE®** |

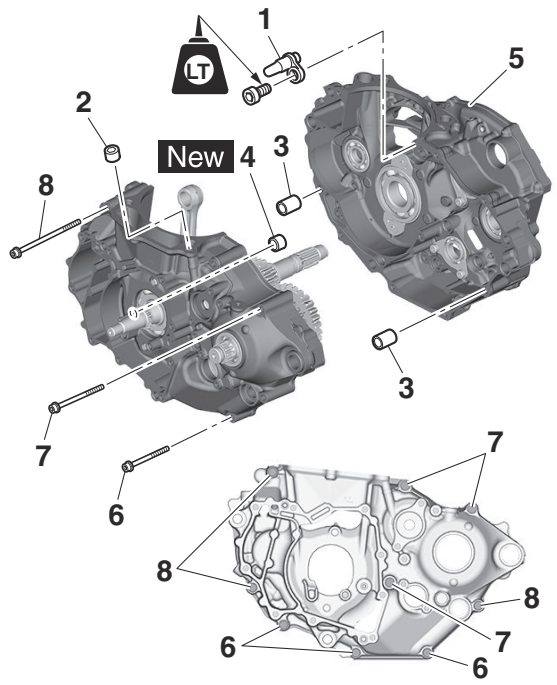
   • Oil nozzle 2 "2"
   (to the left crankcase)

| | |
|---|---|
| | **Oil nozzle**<br>**0.5 N·m (0.05 kgf·m, 0.37 lb·ft)** |

   • Dowel pin "3"
   • Gasket "4" New
   (to the left crankcase)
   • Crankcase "5"
   (to the left crankcase)

| | |
|---|---|
| | **Crankcase bolt**<br>**12 N·m (1.2 kgf·m, 8.9 lb·ft)** |

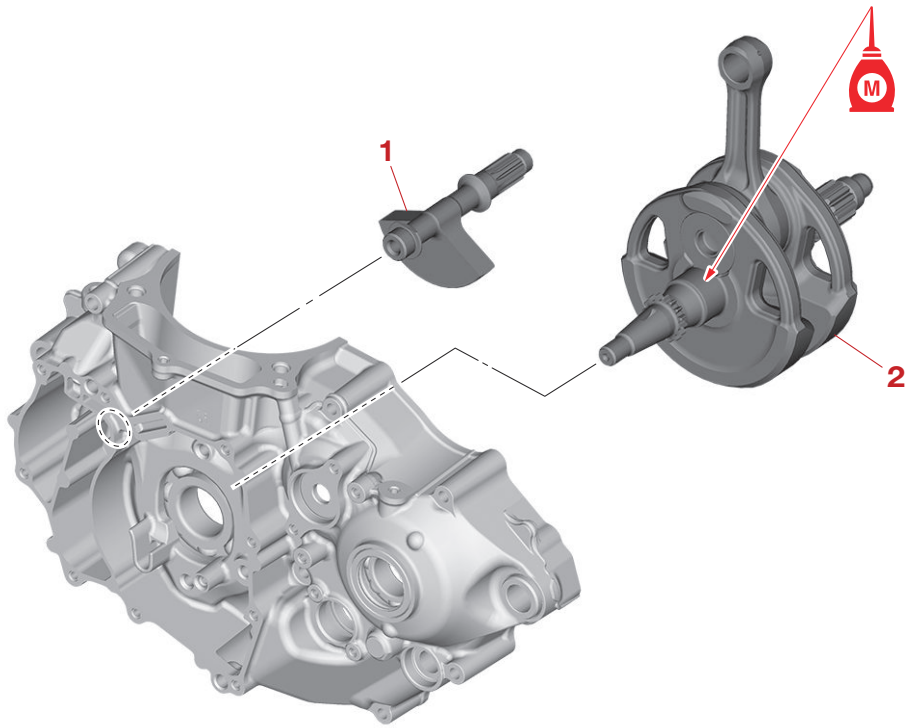
**TIP**
- Fit the right crankcase onto the left crankcase. Tap lightly on the case with soft hammer.
- When installing the crankcase, the connecting rod should be positioned at top dead center (TDC).
- Tighten the bolts in a crisscross pattern in two stages, with 1/4 turn each.




6. 45 mm (1.77 in)
7. 60 mm (2.36 in)
8. 75 mm (2.95 in)

EAM20184
# CRANKSHAFT AND BALANCER SHAFT

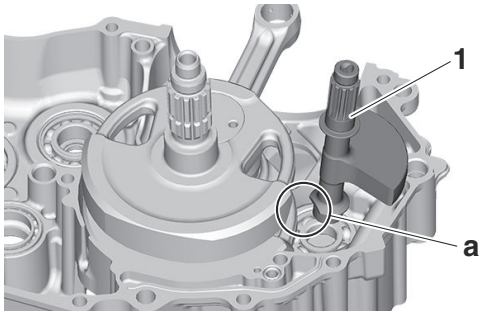
**Removing the crankshaft assembly and balancer shaft**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Crankcase | | Separate.<br>Refer to "CRANKCASE" on page 5-73. |
| | Transmission | | Refer to "TRANSMISSION" on page 5-83. |
| 1 | Balancer shaft | 1 | |
| 2 | Crankshaft assembly | 1 | |

EAM30491
## REMOVING THE CRANKSHAFT
1. Remove:
   • Balancer shaft “1”

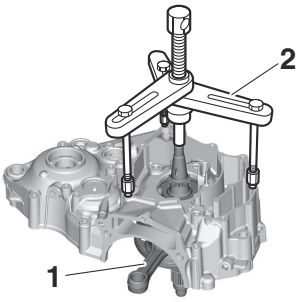
**TIP**
Remove the balancer shaft with its flat side “a” facing the crankshaft.

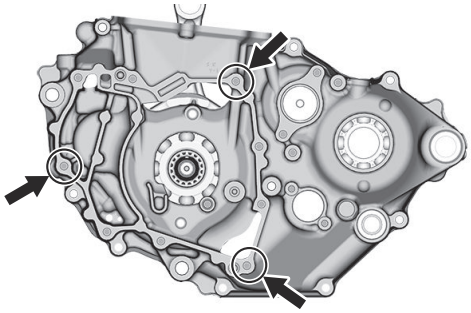



2. Remove:
   • Crankshaft assembly “1”

**TIP**
Remove the crankshaft assembly by using the crankcase separating tool “2”.

| | |
|---|---|
| | **Crankcase separating tool 90890-04152**<br>**Crankcase separating tool YU-A9642** |

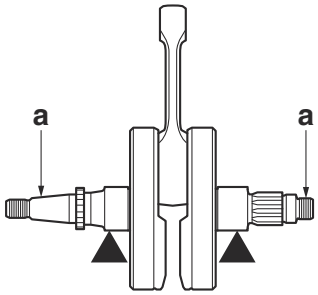


EAM30492
## CHECKING THE CRANKSHAFT
1. Measure:
   • Crankshaft runout “a”
   Out of specification → Replace the crankshaft.

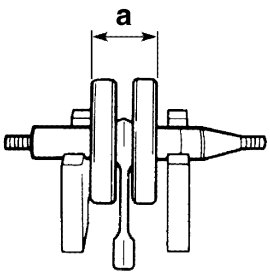
**TIP**
Turn the crankshaft slowly.

| | |
|---|---|
| | **Runout limit 0.030 mm (0.0012 in)** |

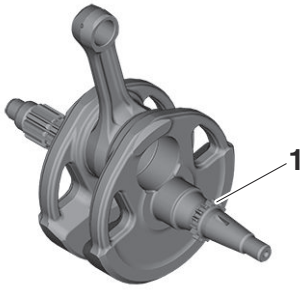



2. Measure:
   • Crank assembly width “a”
   Out of specification → Replace the crankshaft.

| | |
|---|---|
| | **Crank assembly width 61.93–62.00 mm (2.438–2.441 in)** |




3. Check:
   • Crankshaft sprocket “1”
   Damage → Replace the crankshaft.

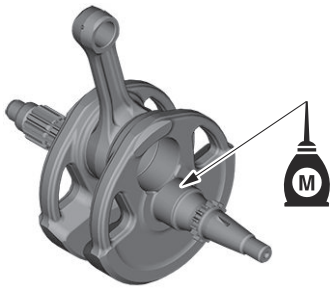



4. Check:
   • Crankshaft journal oil passage
   Obstruction → Blow out with compressed air.

EAM30493

### INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft assembly




**TIP**

Install the crankshaft assembly with the crankshaft installer pot "1", crankshaft installer bolt "2", adapter (M12) "3" and spacer "4".



**Crankshaft installer pot**
**90890-01274**
**Installing pot**
**YU-90058**
**Crankshaft installer bolt**
**90890-01275**
**Bolt**
**YU-90060**
**Adapter (M12)**
**90890-01278**
**Adapter #3**
**YU-90063**
**Spacer (crankshaft installer)**
**90890-04081**
**Pot spacer**
**YM-91044**

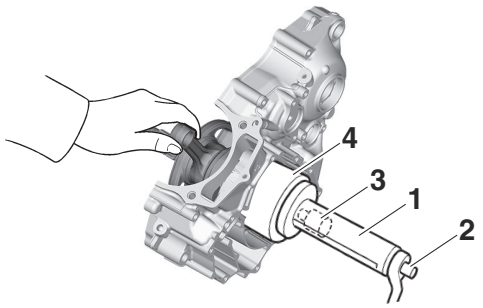
ECA29190

***NOTICE***

- **To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease.**
- **In order to prevent the crankshaft seizure, apply molybdenum disulfide oil.**

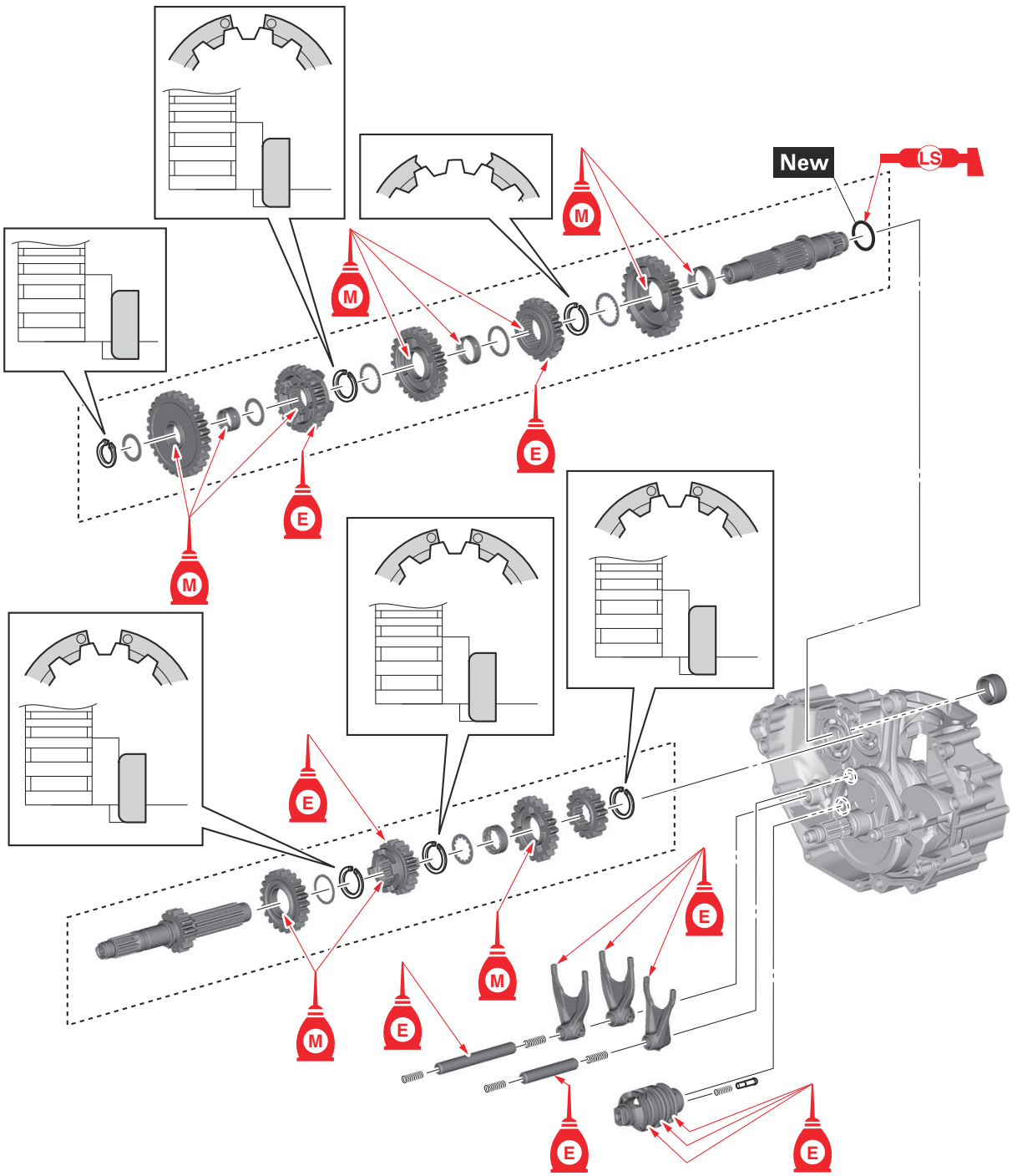
**TIP**

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.



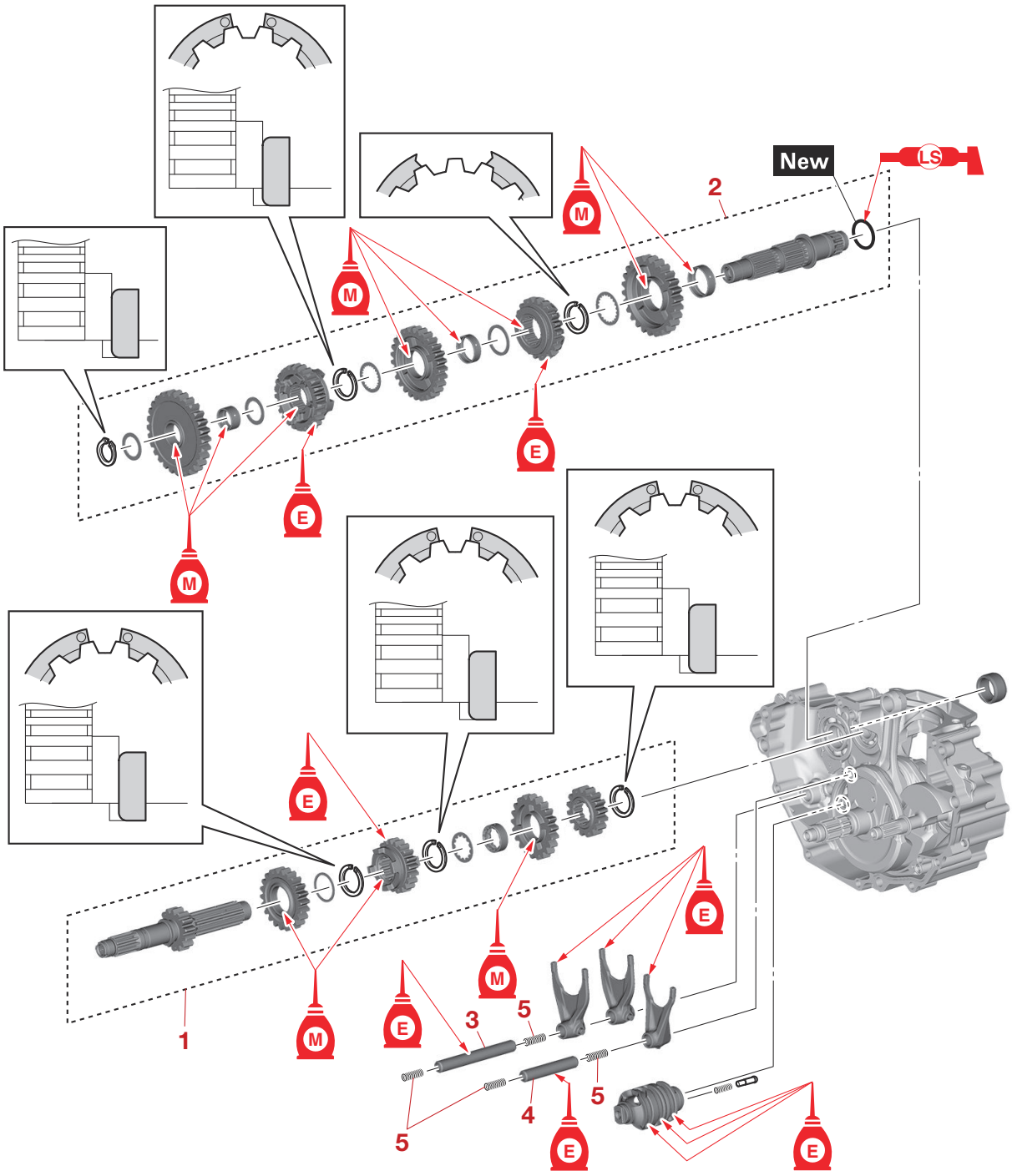
EAM20118
# TRANSMISSION

**Removing the transmission, shift drum assembly, and shift forks**



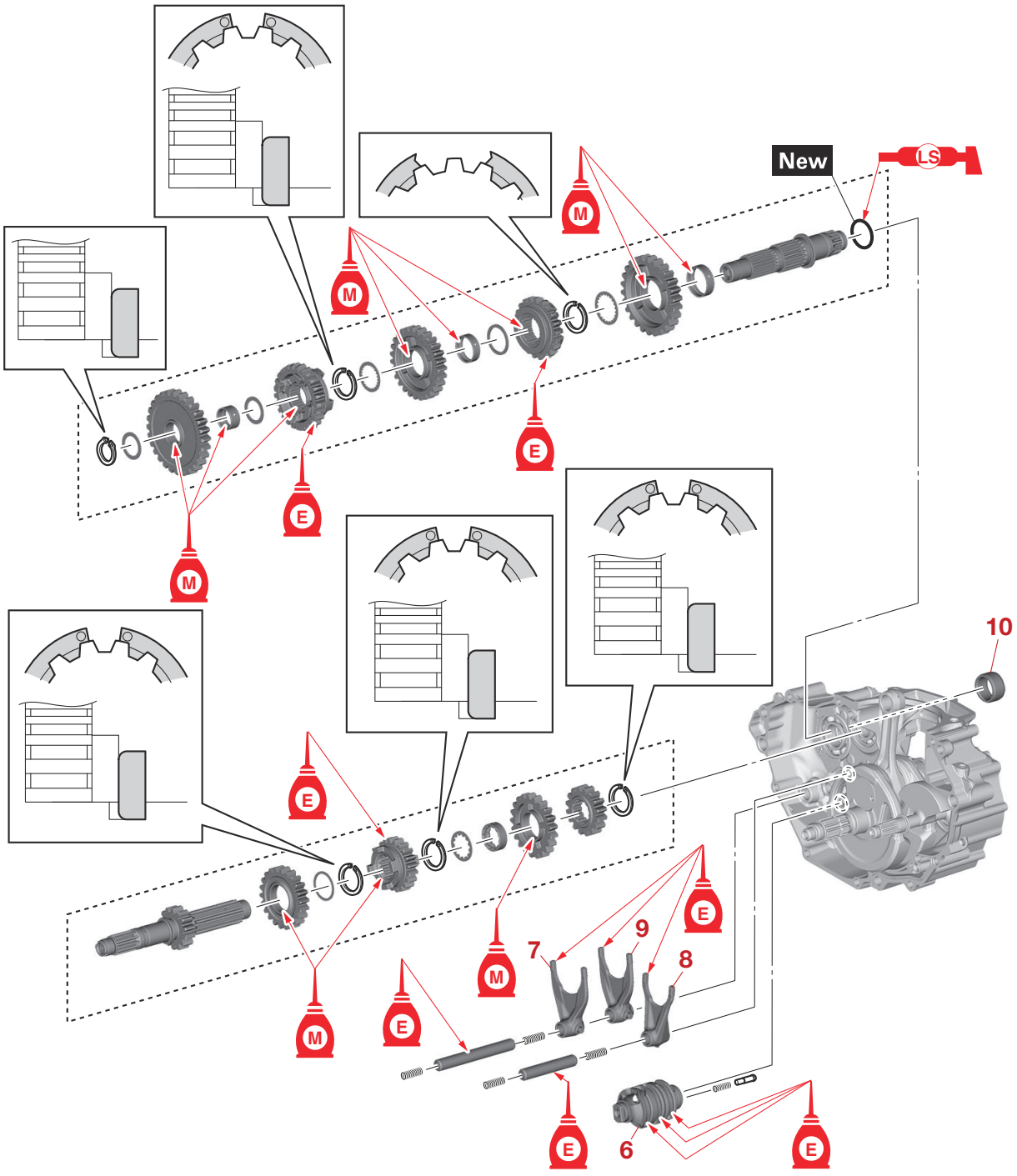

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Engine | | Refer to "ENGINE REMOVAL" on page 5-3. |
| | Crankcase | | Separate.<br>Refer to "CRANKCASE" on page 5-73. |

**Removing the transmission, shift drum assembly, and shift forks**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 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 | |

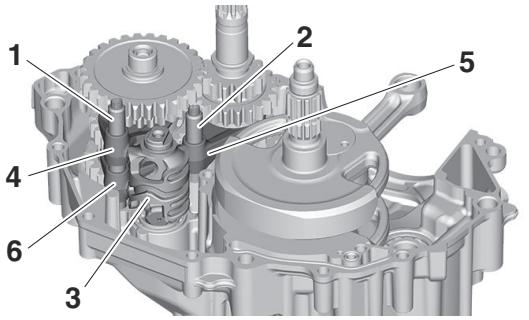
**Removing the transmission, shift drum assembly, and shift forks**

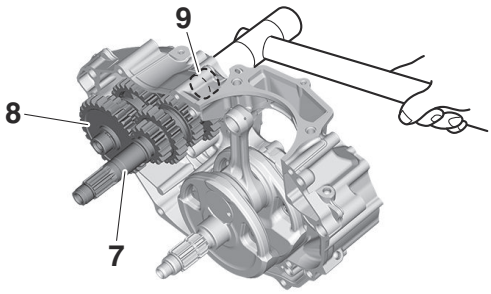



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 6 | Shift drum | 1 | |
| 7 | Shift fork 3 (R) | 1 | |
| 8 | Shift fork 2 (C) | 1 | |
| 9 | Shift fork 1 (L) | 1 | |
| 10 | Collar | 1 | |

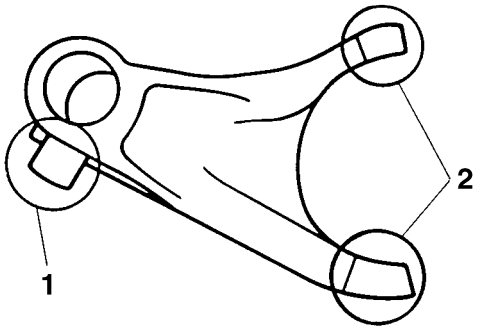
EAM30153
## REMOVING THE TRANSMISSION
1. Remove:
   - Long shift fork guide bar “1”
   - Short shift fork guide bar “2”
   - Shift drum “3”
   - Shift fork 3 (R) “4”
   - Shift fork 2 (C) “5”
   - Shift fork 1 (L) “6”
   - Main axle “7”
   - Drive axle “8”
   - Collar “9”

**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.

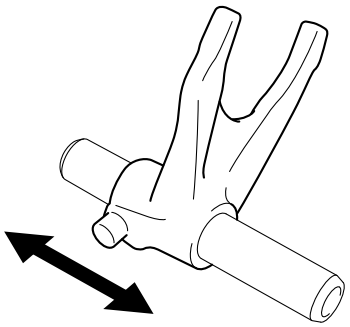



2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA12840
**WARNING**

**Do not attempt to straighten a bent shift fork guide bar.**

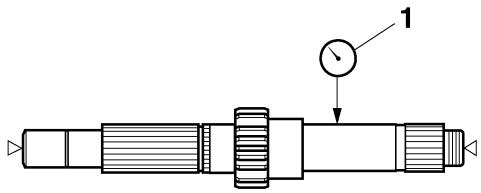
3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



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.

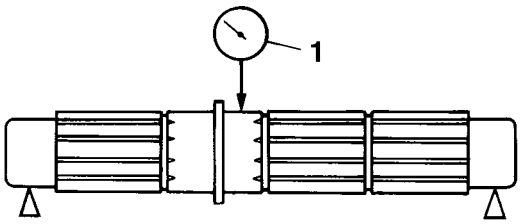
EAM30156
## CHECKING THE TRANSMISSION
1. Measure:
   - Main axle runout
     (with a centering device and dial gauge “1”)
     Out of specification → Replace the main axle.

| | |
|---|---|
| | **Main axle runout limit**<br>**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**<br>**0.08 mm (0.0032 in)** |




3. Check:
   • Transmission gear
   Blue discoloration/pitting/wear → Replace the defective gear(s).
   • Transmission gear dog
   Cracks/damage/rounded edges → Replace the defective gear(s).
4. Check:
   • Transmission gear movement
   Rough movement → Replace the defective gear(s).

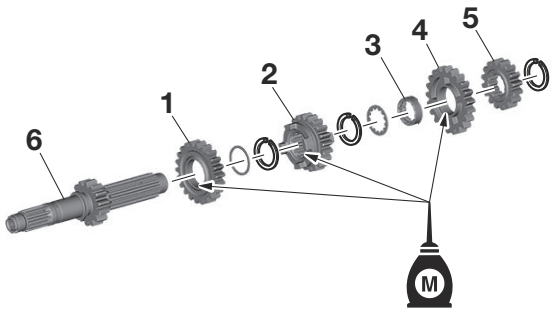
EAM30157

## INSTALLING THE TRANSMISSION

1. Install:
   • 4th pinion gear (22T) "1"
   • 3rd pinion gear (20T) "2"
   • Collar "3"
   • 5th pinion gear (21T) "4"
   • 2nd pinion gear (16T) "5"
   (to the main axle "6")

**TIP**

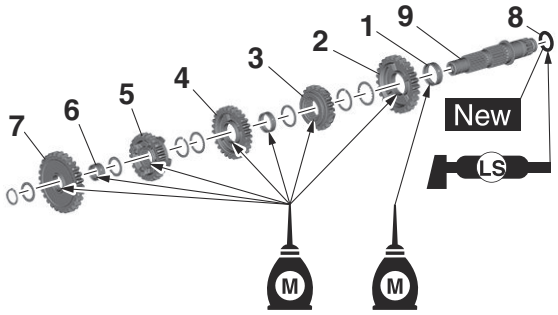
Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and to the inner surface of the sliding gear, then install.




2. Install:
   • Collar "1"
   • 2nd wheel gear (26T) "2"
   • 5th wheel gear (21T) "3"
   • 3rd wheel gear (27T) "4"
   • 4th wheel gear (25T) "5"
   • Collar "6"
   • 1st wheel gear (28T) "7"
   • O-ring "8" New
   (to the drive axle "9")

**TIP**

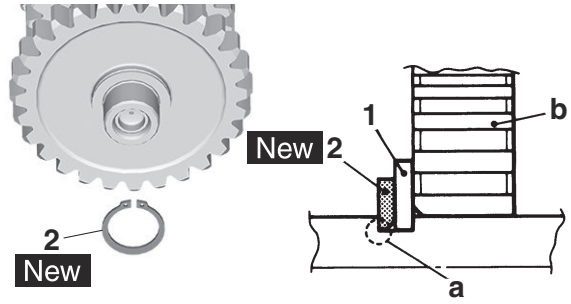
- Before installation, apply molybdenum disulfide oil to the inner and end surface of the idler gear and the collar and to the inner surface of the sliding gear, then install.
- Apply the lithium-soap-based grease on the O-ring.

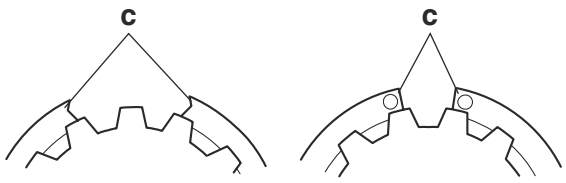



3. Install:
   • Washer "1"
   • Circlip "2" New

**TIP**

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the washer and gear "b".
- Install the circlip with its ends "c" settled evenly on the spline crests.

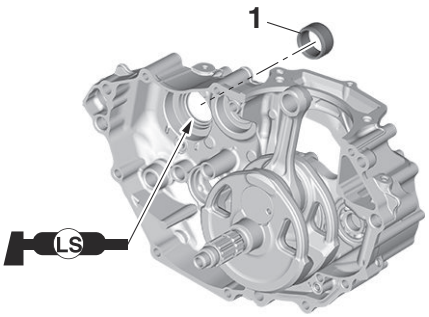



4. Install:
   • Collar "1"

**TIP**

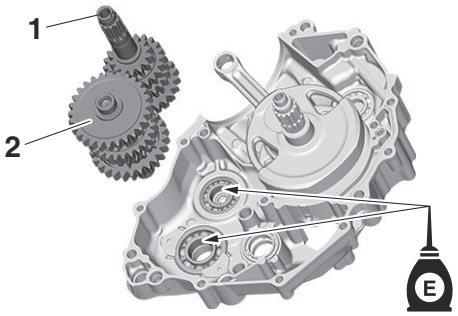
- Apply the lithium-soap-based grease on the oil seal lip.
- When installing the collar into the crankcase, pay careful attention to the crankcase oil seal lip.




5. Install:
   • Main axle "1"
   • Drive axle "2"

**TIP**

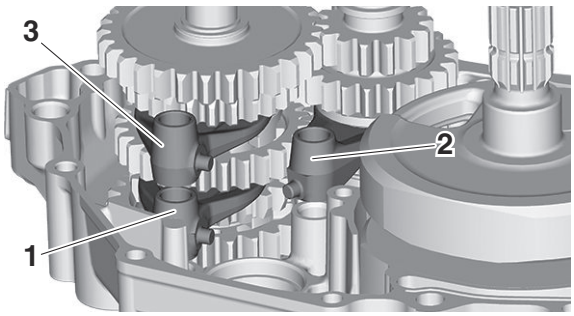
- Install to the left crankcase simultaneously.
- Apply engine oil to the main axle and the drive axle bearing.

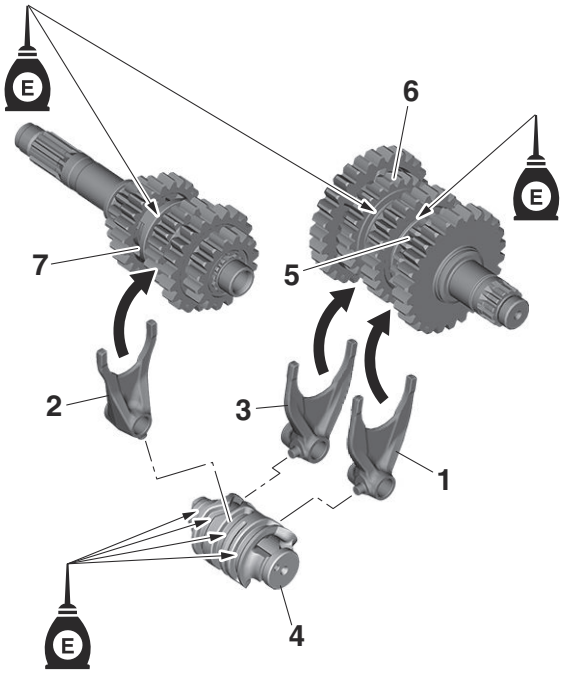


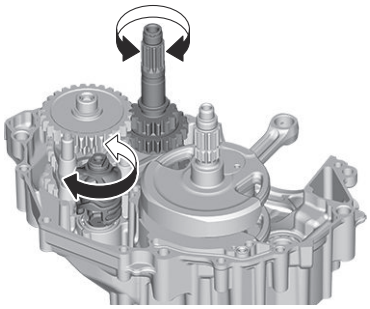

6. Install:
   • Shift fork 1 (L) "1"
   • Shift fork 2 (C) "2"
   • Shift fork 3 (R) "3"
   • Shift drum "4"
   (to the main axle and the drive axle)

**TIP**

- Apply engine oil to the shift fork grooves.
- Apply engine oil to the shift drum groove and the bearing contact surface.
- Mesh the shift fork 1 (L) with the 5th wheel gear "5" and shift fork 3 (R) with the 4th wheel gear "6" on the drive axle.
- Mesh the shift fork 2 (C) with the 3rd pinion gear "7" on the main axle.



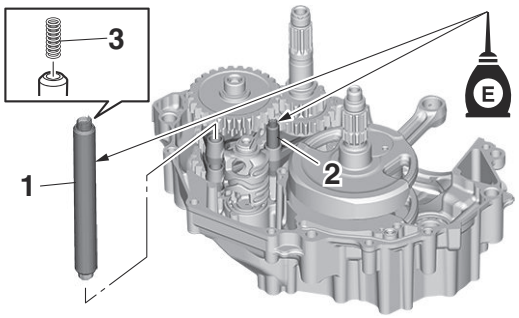


7. Install:
   - Long shift fork guide bar "1"
   - Short shift fork guide bar "2"
   - Spring "3"

**TIP**

- Screw the spring into the shift fork guide bar lightly beforehand.
- Apply the engine oil on the shift fork guide bars.




8. Check:
   - Operation of shift drum and shift fork
   - Transmission operation
     Unsmooth operation → Repair.

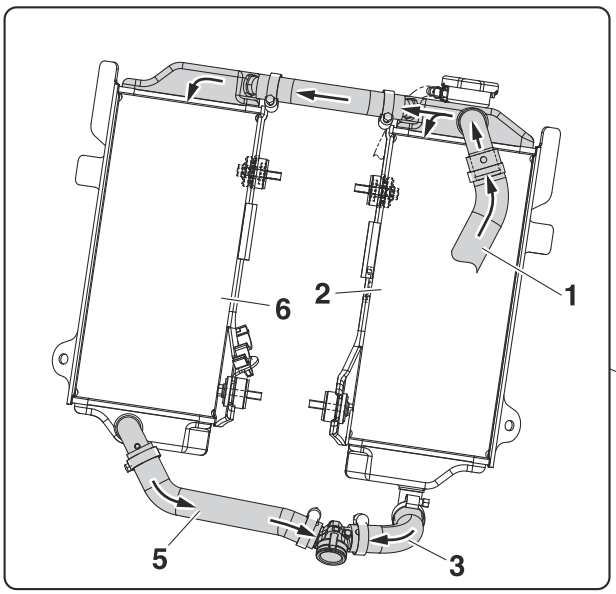
# COOLING SYSTEM

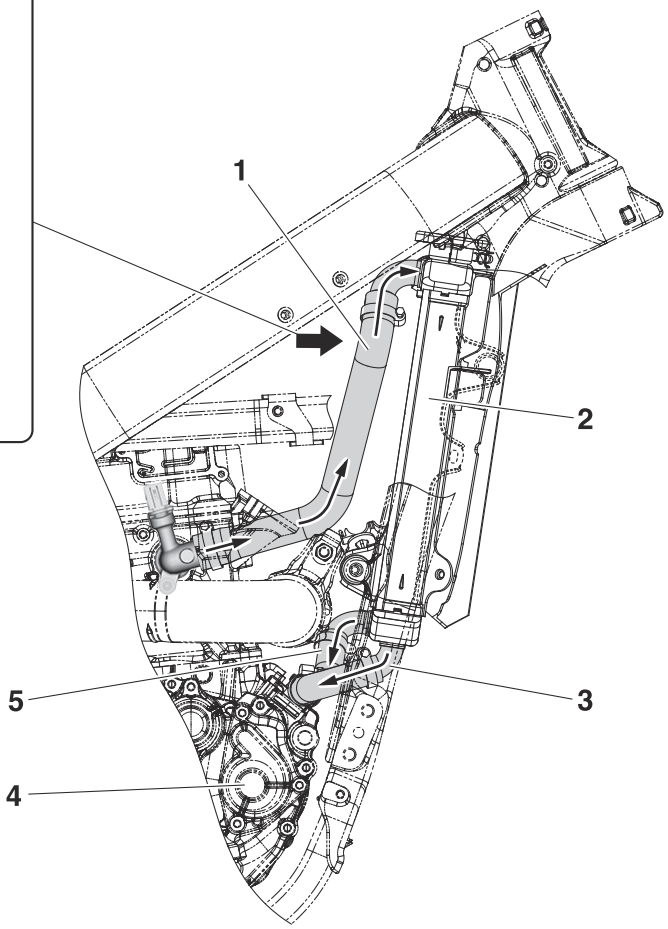
**COOLING SYSTEM DIAGRAMS**.....6-1

**RADIATOR**..... 6-3
CHECKING THE RADIATOR.....6-5
INSTALLING THE RADIATOR..... 6-5

**WATER PUMP**.....6-7
DISASSEMBLING THE WATER PUMP..... 6-9
CHECKING THE WATER PUMP.....6-9
ASSEMBLING THE WATER PUMP..... 6-9

EAM20186
# COOLING SYSTEM DIAGRAMS

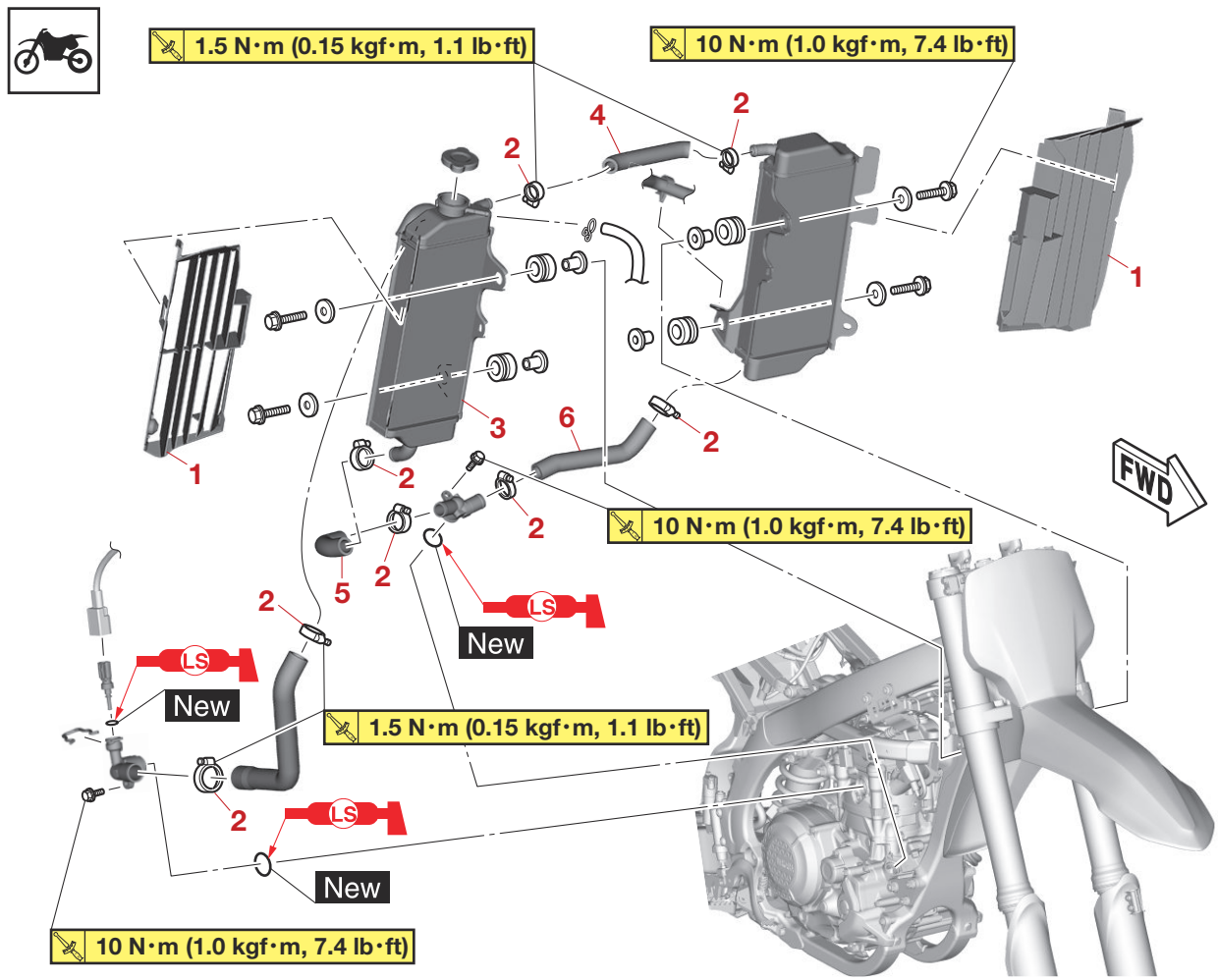


1. Radiator hose 1
2. Radiator (right)
3. Radiator hose 4
4. Water pump
5. Radiator hose 3
6. Radiator (left)

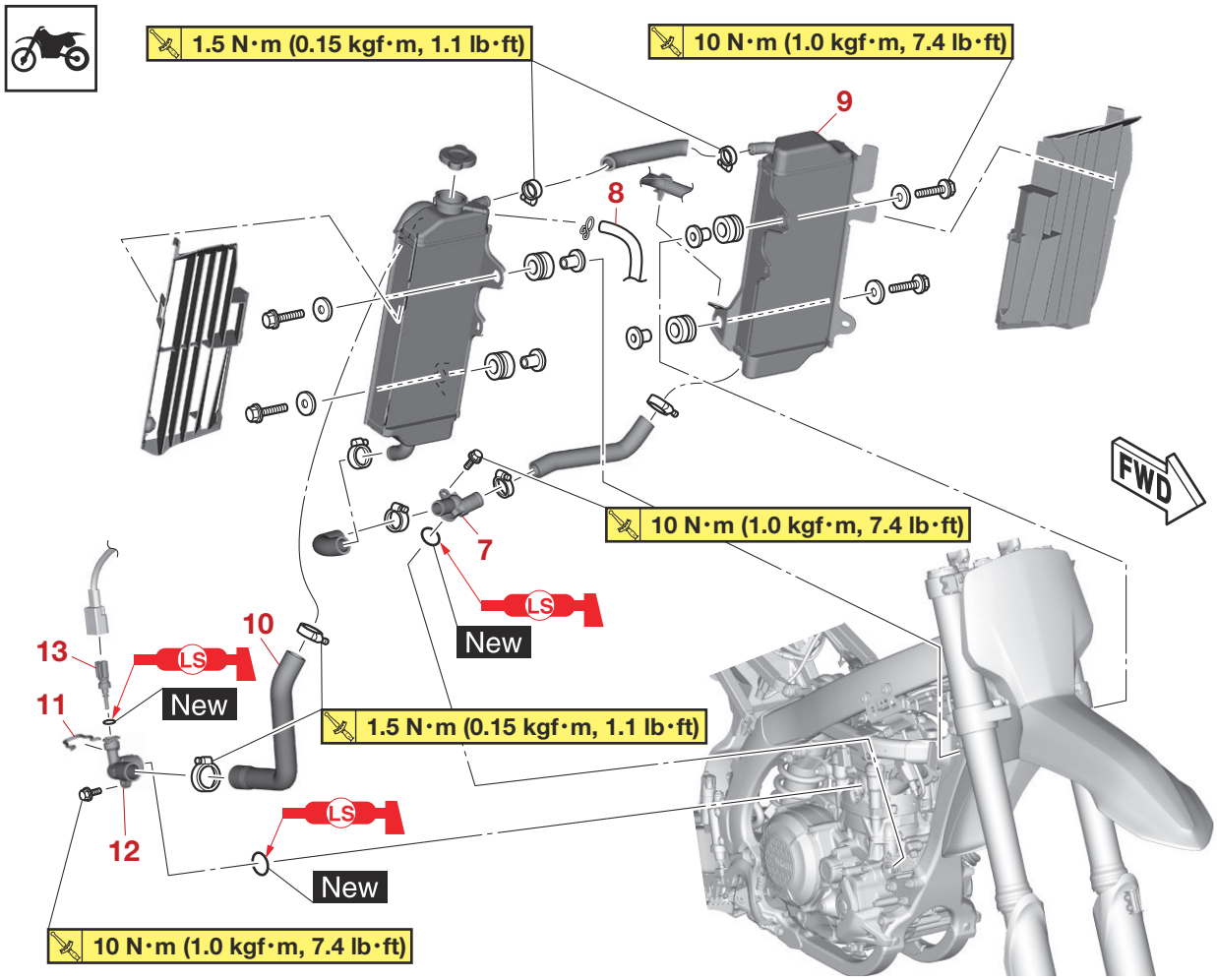
EAM20138
# RADIATOR

## Removing the radiator




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Coolant | | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-23. |
| | Seat | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Side cover (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" on page 7-1. |
| | Air filter case | | Refer to "THROTTLE BODY" on page 7-4. |
| 1 | Radiator guard | 2 | |
| 2 | Radiator hose clamp | 8 | Loosen. |
| 3 | Radiator (right) | 1 | |
| 4 | Radiator hose 2 | 1 | |
| 5 | Radiator hose 4 | 1 | |
| 6 | Radiator hose 3 | 1 | |

## Removing the radiator



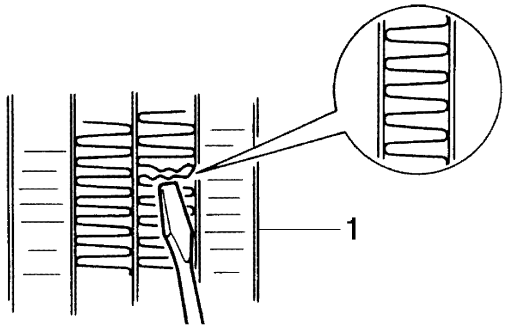

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 7 | Radiator pipe 2 | 1 | |
| 8 | Radiator breather hose | 1 | |
| 9 | Radiator (left) | 1 | |
| 10 | Radiator hose 1 | 1 | |
| 11 | Clip | 1 | |
| 12 | Radiator pipe 1 | 1 | |
| 13 | Coolant temperature sensor | 1 | |

EAM30341
## CHECKING THE RADIATOR
EWA13030
**⚠ WARNING**

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

1. Check:
   - Radiator fin "1"
     Obstructions → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

**TIP**
Correct any flattened fins with a thin, flat-head screwdriver.



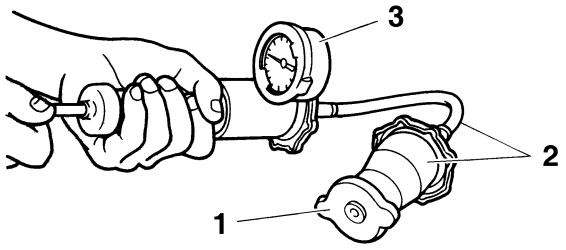

2. Check:
   - Radiator hose
   - Radiator pipe
     Crack/damage → Replace.
3. Check:
   - Radiator cap valve opening pressure
     a. Install the radiator cap tester adapter "2" and the radiator cap tester "3" to the radiator cap "1", and activate the tester to check whether it can stay for 5 to 10 seconds within standard pressure values.

**TIP**
Before attaching the cap to the tester, apply water to its sealing surface.

**Radiator cap valve opening pressure**
**107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)**

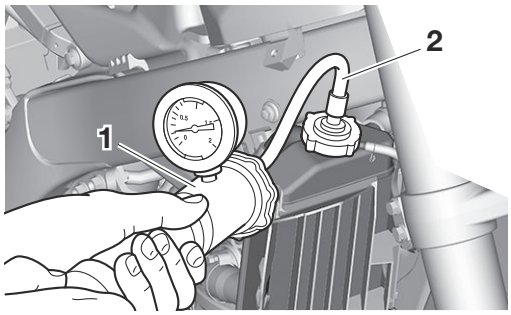
No stay → Replace.

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




EAM30506
## INSTALLING THE RADIATOR
1. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-23.
2. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
3. Install:
   - Radiator cap tester "1"
   - Radiator cap tester adapter "2"

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




4. Activate the tester to apply the test pressure.

| | |
|---|---|
| | **Cooling system leak test pressure 137.3 kPa (1.37 kgf/cm$^2$, 19.9 psi)** |

ECA24270

***NOTICE***

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

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

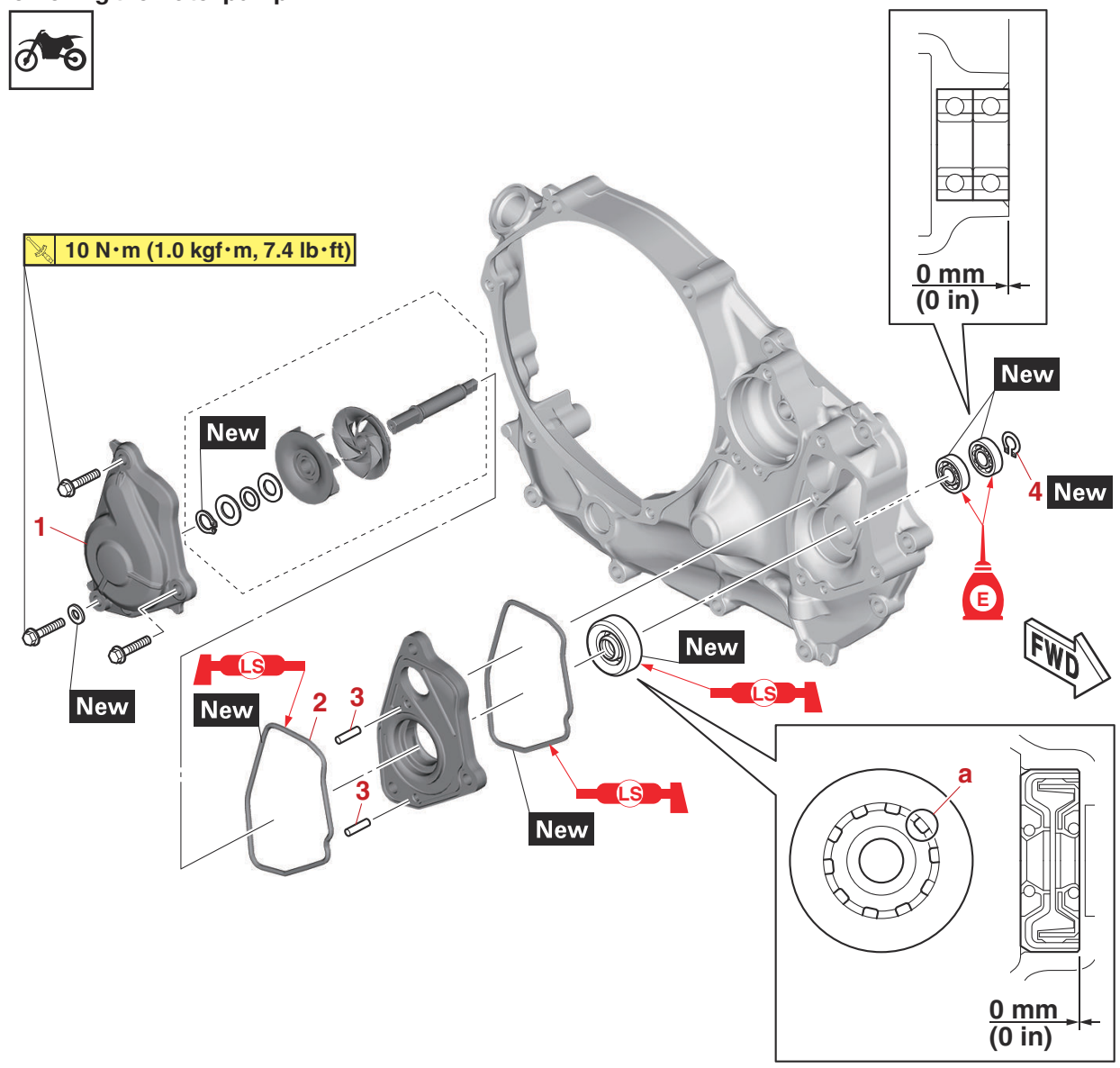
EWA19090

**⚠ WARNING**

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

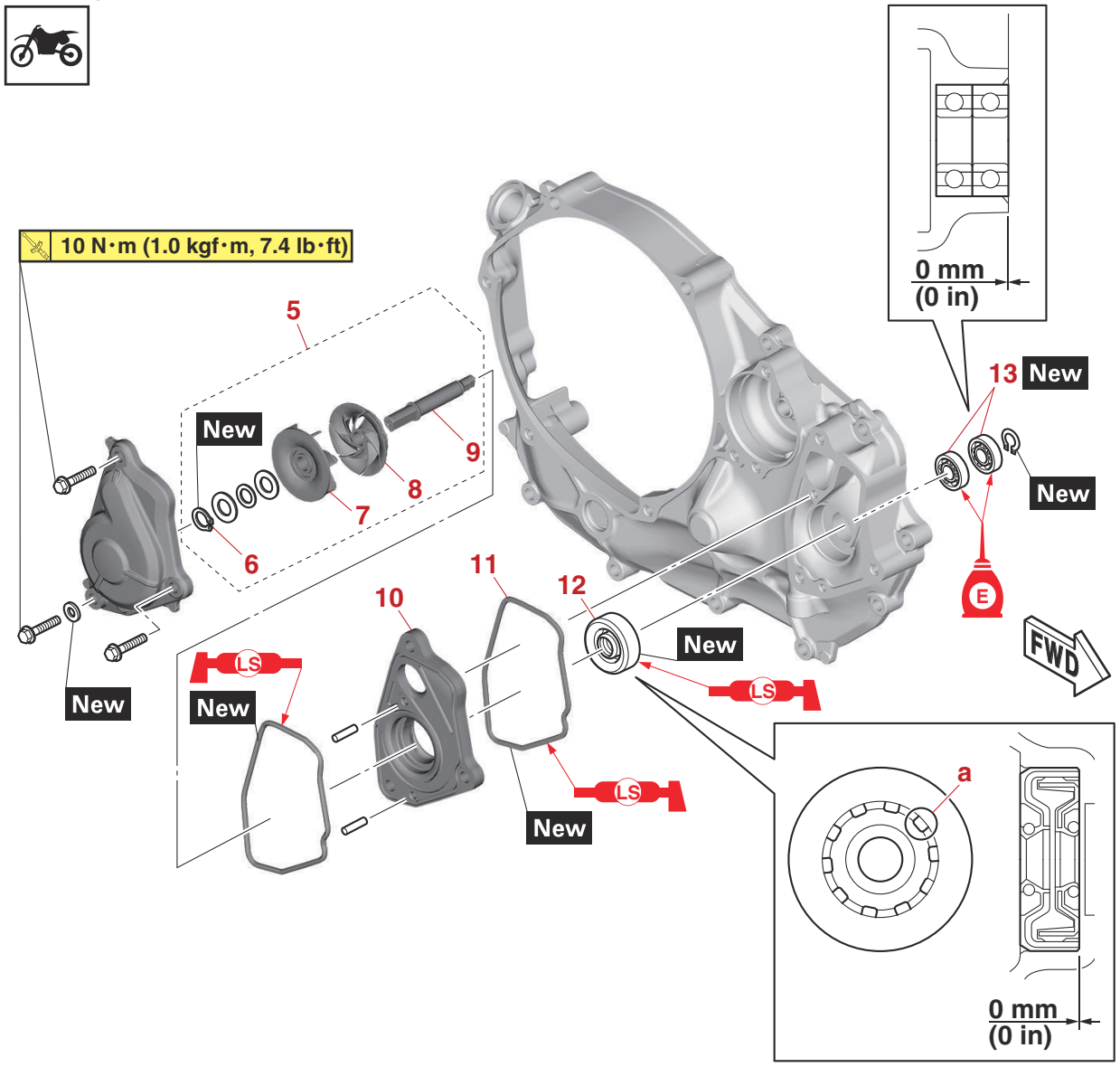
EAM20139
# WATER PUMP

**Removing the water pump**




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Coolant | | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-23. |
| | Engine oil | | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-14. |
| | Crankcase cover (right) | | Refer to "CLUTCH" on page 5-46. |
| 1 | Water pump housing cover | 1 | |
| 2 | O-ring | 1 | |
| 3 | Dowel pin | 2 | |
| 4 | Circlip | 1 | |

## Removing the water pump

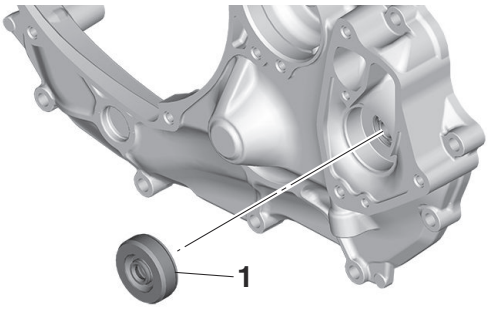



| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 5 | Impeller shaft assembly | 1 | |
| 6 | Circlip | 1 | |
| 7 | Impeller 1 | 1 | |
| 8 | Impeller 2 | 1 | |
| 9 | Impeller shaft | 1 | |
| 10 | Water pump housing | 1 | |
| 11 | O-ring | 1 | |
| 12 | Oil seal | 1 | Make sure the projections "a" on the oil seal point to the outside, and then install the oil seal. |
| 13 | Bearing | 2 | |

EAM30494
## DISASSEMBLING THE WATER PUMP

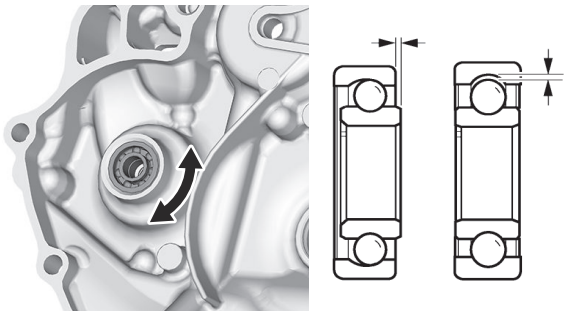
**TIP**
- Remove the oil seal when the coolant level changes frequently more than usual, coolant has discolored, or engine oil has become milky.
- Do not use the removed oil seal.

1. Remove:
   - Oil seal "1"




EAM30259
## CHECKING THE WATER PUMP

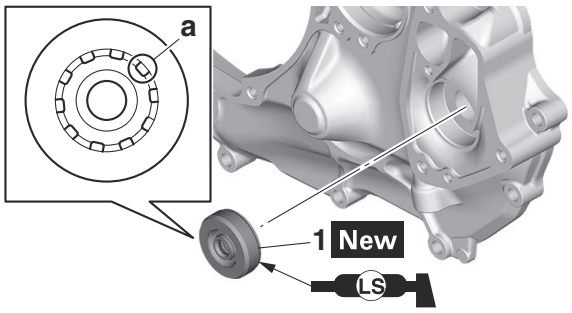
1. Check:
   - Water pump housing cover
   - Impeller shaft
   - Impeller
     Cracks/damage/wear → Replace.
2. Check:
   - Bearing
     Rotate the inner race with your finger.
     Rough spot/seizure → Replace.



EAM30262
## ASSEMBLING THE WATER PUMP

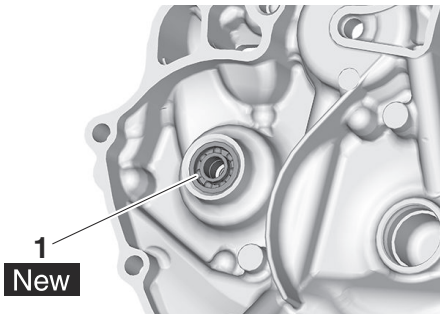
1. Install:
   - Oil seal "1" New

**TIP**
- Apply the lithium-soap-based grease on the oil seal lip.
- Make sure the projections "a" on the oil seal point to the outside, and then install the oil seal.



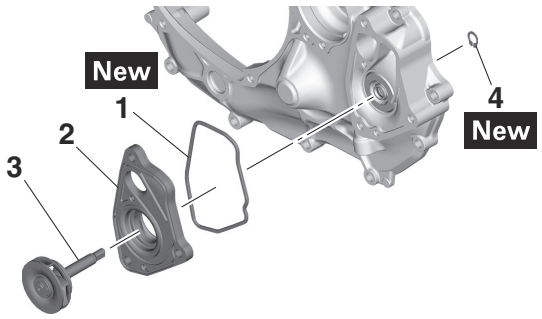

2. Install:
   - Bearing "1" New

**TIP**
Install the bearings by pressing its outer race parallel.

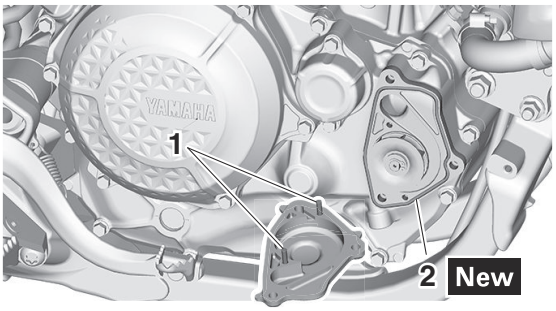



3. Install:
   - O-ring "1" New
   - Water pump housing "2"
   - Impeller shaft assembly "3"
   - Circlip "4" New

**TIP**
Take care so that the oil seal lip is not damaged or the spring does not slip off its position.




4. Install:
   - Dowel pin "1"
   - O-ring "2" New

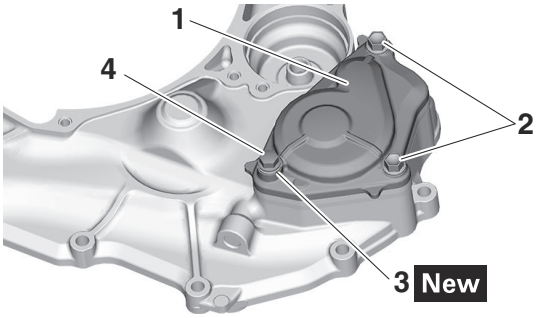



5. Install:
   • Water pump housing cover “1”
   • Water pump housing bolt “2”

| | |
|---|---|
| | **Water pump housing bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |

   • Washer “3” New
   • Coolant drain bolt “4”

| | |
|---|---|
| | **Coolant drain bolt**<br>**10 N·m (1.0 kgf·m, 7.4 lb·ft)** |



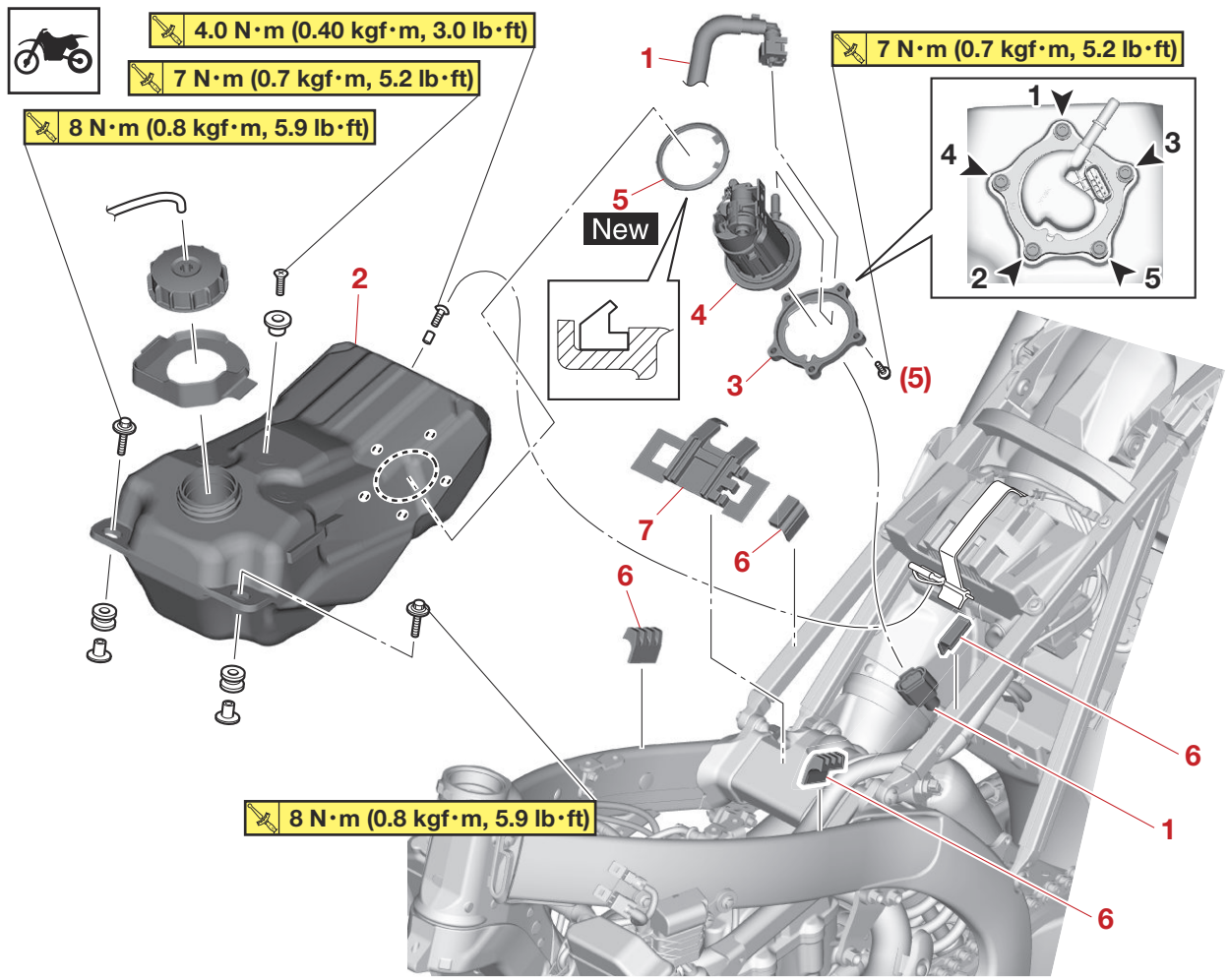
# FUEL SYSTEM

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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) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| 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 | |
| 7 | Damper | 1 | |

EAM30263
## REMOVING THE FUEL TANK
1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Seat
   - Side cover (left/right)
   - Shroud (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.
3. Disconnect:
   - Fuel pump coupler
   - Fuel hose

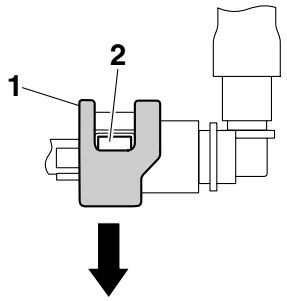
EWA19370
**WARNING**

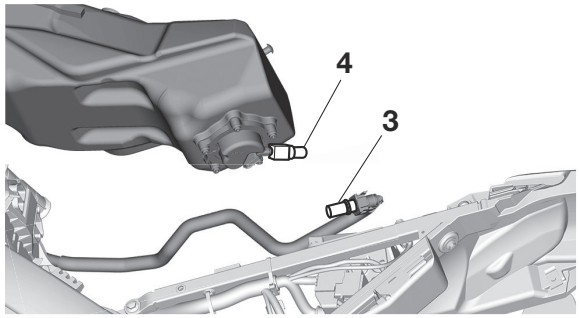
**Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel to spurt out when the hose is removed.**

ECA24710
***NOTICE***

**Make sure that the fuel hose is disconnected by hand. Do not forcefully disconnect the hose with tools.**

**TIP**
- To remove the fuel hose, 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.




4. Remove:
   - Fuel tank

**TIP**
Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAM30264
## REMOVING THE FUEL PUMP
1. Remove:
   - Fuel pump

ECA24720
***NOTICE***

**Do not drop the fuel pump or give it a strong shock.**

EAM30265
## CHECKING THE FUEL PUMP BODY
1. Check:
   - Fuel pump body
   Obstructions → Clean.
   Cracks/damage → Replace the fuel pump assembly.

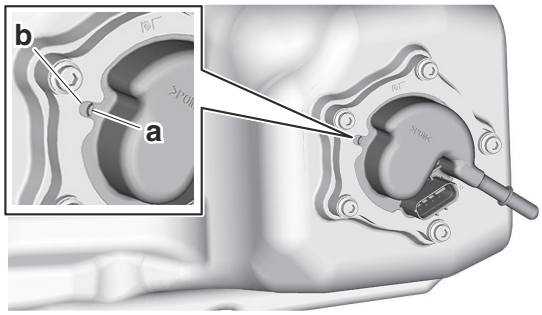
EAM30508
## CHECKING THE FUEL PUMP OPERATION
1. Check:
   - Fuel pump operation
   Refer to "CHECKING THE FUEL PRESSURE" on page 7-7.

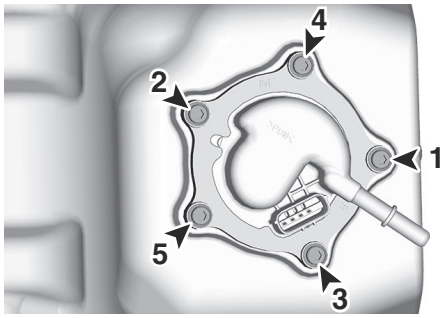
EAM30266
## INSTALLING THE FUEL PUMP
1. Install:
   - Fuel pump gasket New
   - Fuel pump
   - Fuel pump bracket

| | |
|---|---|
| | **Fuel pump bolt**<br>**7 N·m (0.7 kgf·m, 5.2 lb·ft)** |

**TIP**
- Take care not to damage the installation surfaces of the fuel tank.
- Always use a new fuel pump gasket.
- Install the lip on the fuel pump gasket upward.

- Install the fuel pump as shown in the figure.
- Align the projection “a” on the fuel pump with the slot “b” in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.




EAM30267

## INSTALLING THE FUEL TANK

1. Install:
   - Fuel tank
2. Connect:
   - Fuel hose

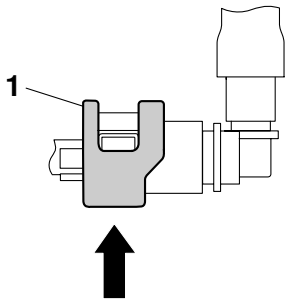
ECA24740

***NOTICE***

- **Connect the fuel hose securely, and check that the orientation of the installed fuel hose holder is correct.**
- **Take care not to kink or pinch the fuel hose.**

**TIP**

- Insert the fuel hose into the fuel pipe securely until you hear a “click”.
- Slide the fuel hose connector cover “1” at the hose end in the direction of the arrow.



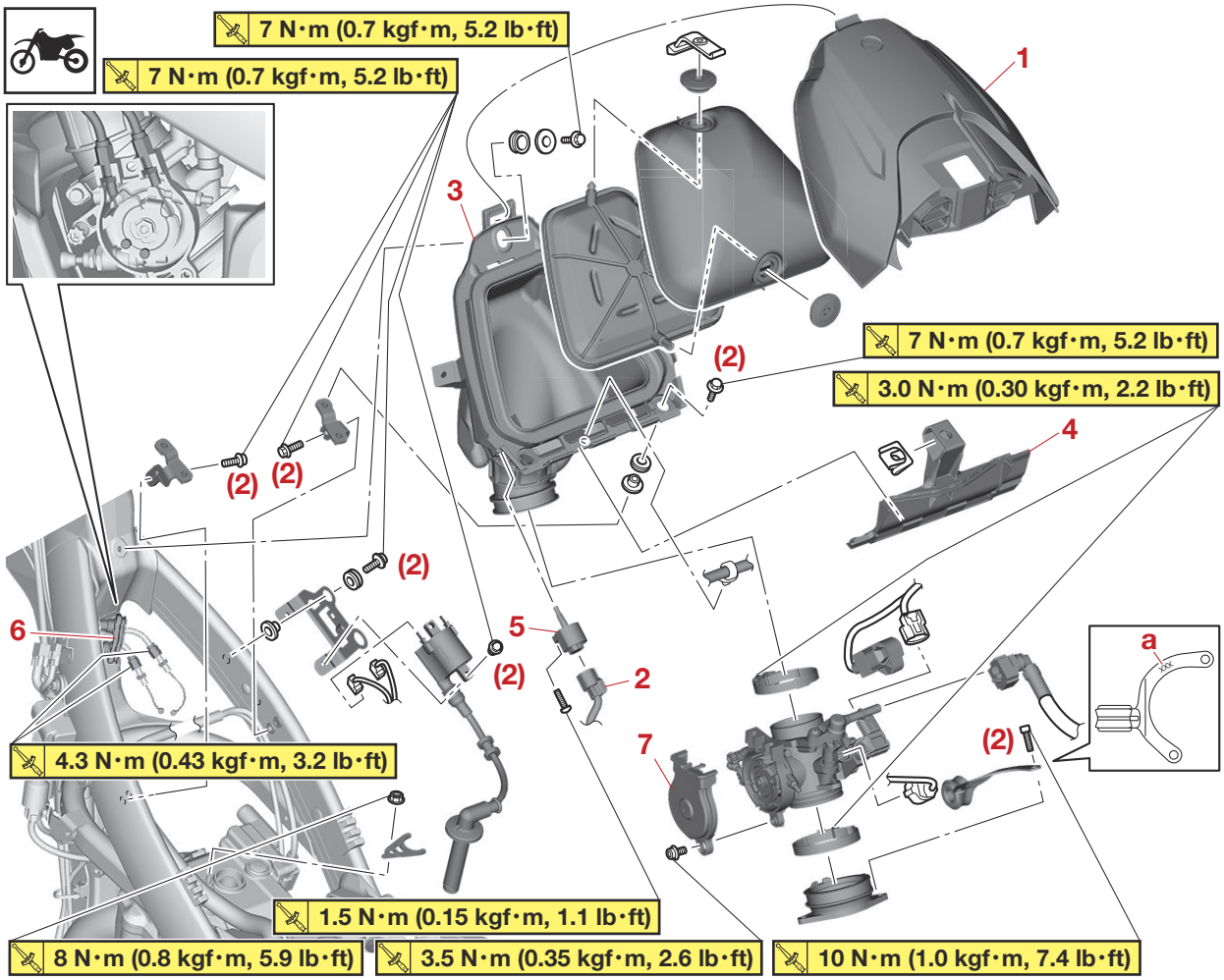

3. Connect:
   - Fuel pump coupler
4. Install:
   - Shroud (left/right)
   - Side cover (left/right)
   - Seat

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

EAM20141

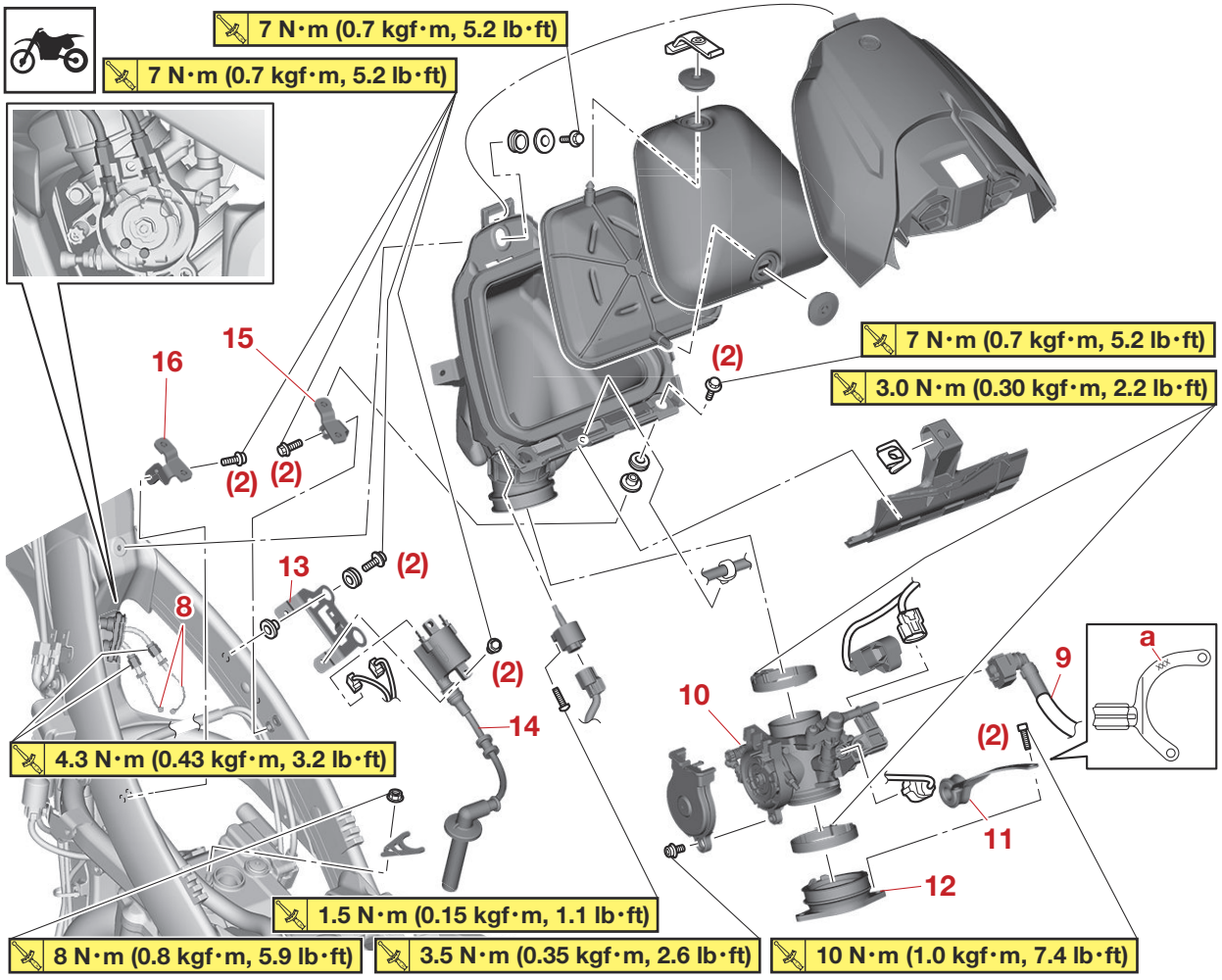
# THROTTLE BODY

## Removing the throttle body



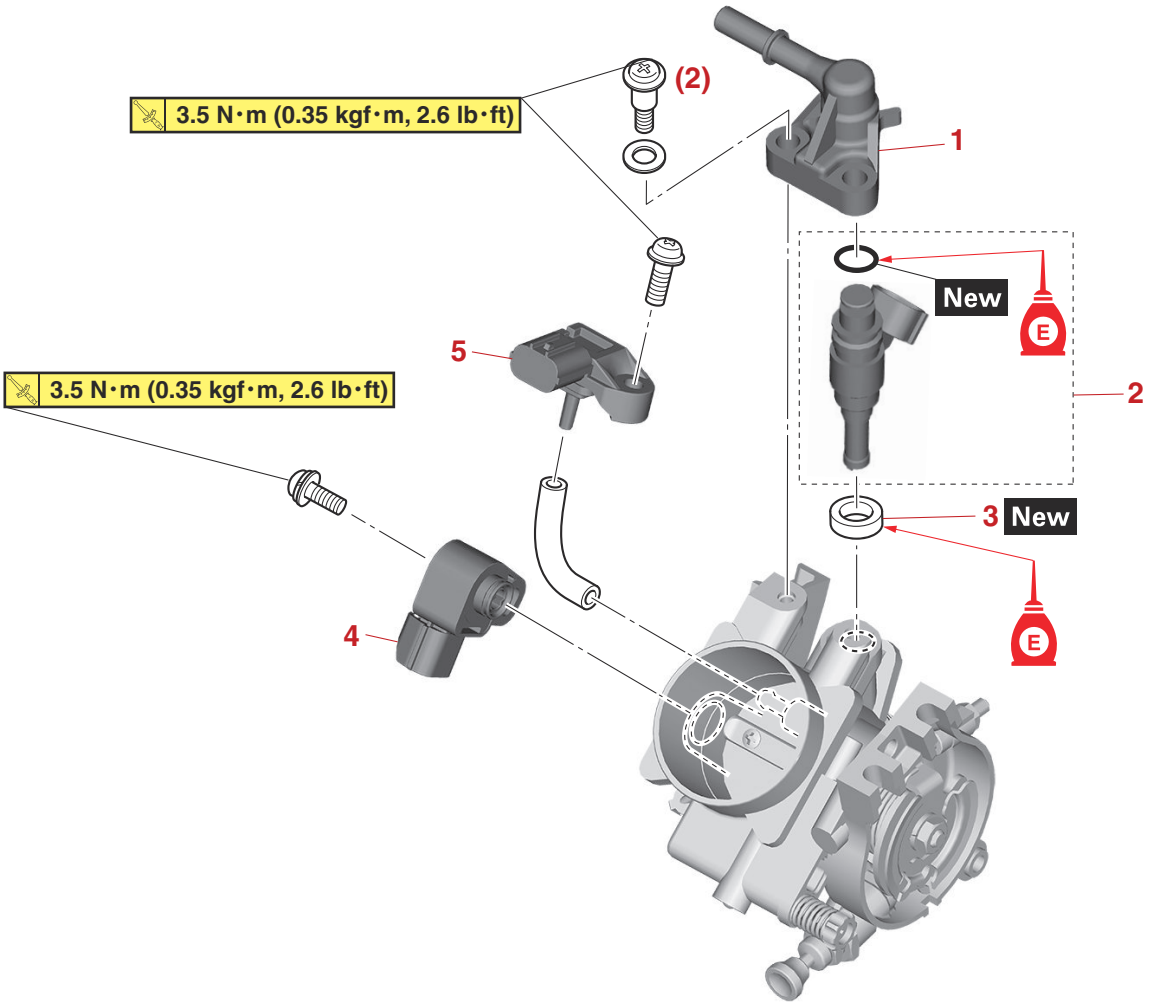

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| | Seat | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Side cover (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Shroud (left/right) | | Refer to "GENERAL CHASSIS" on page 4-1. |
| | Fuel tank | | Refer to "FUEL TANK" on page 7-1. |
| 1 | Air filter case cover | 1 | |
| 2 | Intake air temperature sensor coupler | 1 | Disconnect. |
| 3 | Air filter case | 1 | |
| 4 | Air filter case assembly bracket | 1 | |
| 5 | Intake air temperature sensor | 1 | |
| 6 | Cover | 1 | |
| 7 | Throttle cable cover | 1 | |

## Removing the throttle body




| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 8 | Throttle cable | 2 | |
| 9 | Fuel hose | 1 | |
| 10 | Throttle body | 1 | |
| 11 | Exhaust pipe bracket | 1 | Install so that the stamped "a" is on the right side of the vehicle. |
| 12 | Throttle body joint | 1 | |
| 13 | Ignition coil bracket | 1 | |
| 14 | Spark plug cap/Ignition coil | 1/1 | |
| 15 | Air filter case bracket (right) | 1 | |
| 16 | Air filter case bracket (left) | 1 | |

**Removing the injector**

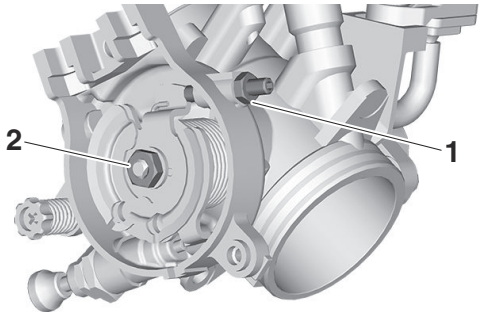


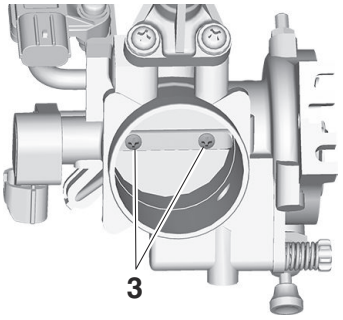

| Order | Job/Parts to remove | Q'ty | Remarks |
|---|---|---|---|
| 1 | Fuel inlet pipe | 1 | |
| 2 | Injector | 1 | |
| 3 | Gasket | 1 | |
| 4 | Throttle position sensor | 1 | |
| 5 | Intake air pressure sensor | 1 | |

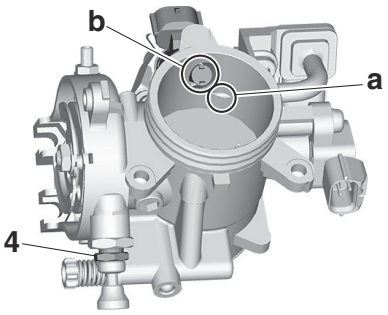
EAM30271
## CHECKING THE INJECTOR
1. Check:
   • Injector
   Obstruction → Replace, and check the fuel pump and the fuel injection system.
   Refer to "FUEL INJECTION SYSTEM" on page 8-15.
   Deposits → Replace.
   Damage → Replace.
2. Check:
   • Injector resistance
   Refer to "CHECKING THE INJECTOR" on page 8-59.

EAM30272
## CHECKING THE THROTTLE BODY
1. Check:
   • Throttle body
   Cracks/damage → Replace.
2. Check:
   • Fuel passages
   Obstructions → Clean.

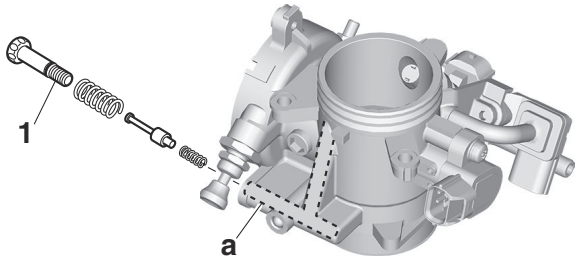
ECA26070
***NOTICE***
- **Before removing the throttle body, clean the area around the throttle body to prevent dirt and other foreign material from falling into the engine.**
- **If the throttle body is subject to strong shocks or dropped during cleaning, replace it.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not directly push the throttle valves to open them.**
- **Do not loosen the throttle valve stopper screw "1", throttle valve pulley nut "2", throttle valve screw "3" or starter knob nut "4". A loss of performance may occur.**
- **Do not use compressed air to clean the throttle body. Foreign materials may adhere to the intake air pressure sensor passage "a" and fuel injector "b" in the throttle body.**




3. Check:
   • Idle screw "1" passage "a"
   Obstruction → Blow out with compressed air.




EAM30268
## CHECKING THE FUEL PRESSURE
1. Check:
   • Fuel pressure
   a. Remove the side cover (left/right), the seat and the shroud (left/right).
   Refer to "GENERAL CHASSIS" on page 4-1.
   b. Remove the fuel tank bolt and lift the fuel tank.
   c. Disconnect the fuel hose from the fuel pump.
   Refer to "REMOVING THE FUEL TANK" on page 7-2.

EWA19380
**⚠ WARNING**
**Cover the fuel hose connection with a cloth when disconnecting it. This is because residual pressure in the fuel hose could cause fuel**

**to spurt out when the hose is removed.**

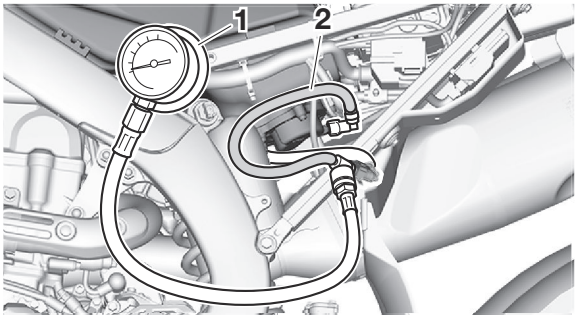
ECA24750

***NOTICE***

**Make sure that the fuel hose is disconnected by hand. Do not forcibly disconnect the hose with tools.**

d. Connect the pressure gauge "1" and the fuel pressure adapter "2" to the fuel hose.

**Pressure gauge**
**90890-03153**
**Pressure gauge**
**YU-03153**
**Fuel pressure adapter**
**90890-03186**
**Fuel pressure adapter**
**YM-03186**




e. Start the engine.
f. Measure the fuel line pressure.
Out of specification → Replace the fuel pump.

**Fuel line pressure (at idle)**
**300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)**

EAM30273

## ADJUSTING THE THROTTLE POSITION SENSOR

EWA15950

**⚠ WARNING**

- **Handle the throttle position sensor with special care.**
- **Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.**

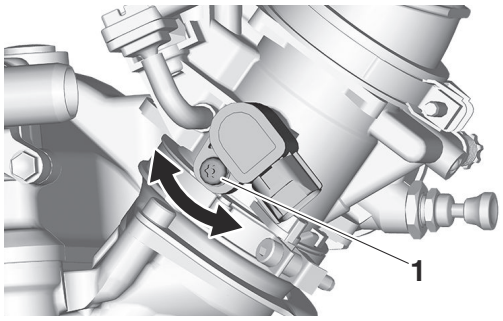
1. Check:
   - Throttle position sensor
   Refer to "CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE" on page 8-58.
2. Adjust:
   - Throttle position sensor angle

a. Connect the Yamaha diagnostic tool.
Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-21.

**Yamaha diagnostic tool USB**
**90890-03274**
**Yamaha diagnostic tool (A/I)**
**90890-03273**

b. Temporary tighten the throttle position sensor.
c. Check that the throttle grip is fully closed.
d. Connect the throttle position sensor to the wire harness.
e. Set the Yamaha diagnostic tool to "diagnostic mode".
f. Choose the diagnostic code No. "01".
g. Adjust the throttle position sensor mounted angle until "11"–"14" appears on the Yamaha diagnostic tool.
h. After adjusting the throttle position sensor mounted angle, tighten the throttle position sensor screw "1".

**Throttle position sensor screw**
**3.5 N·m (0.35 kgf·m, 2.6 lb·ft)**



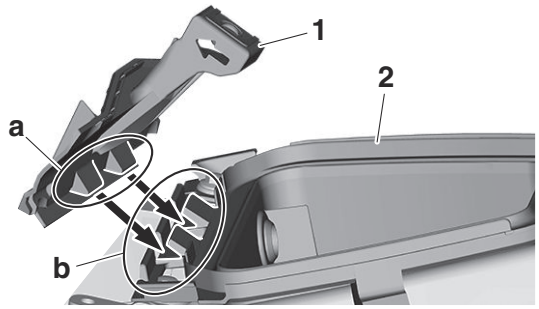

EAM30631

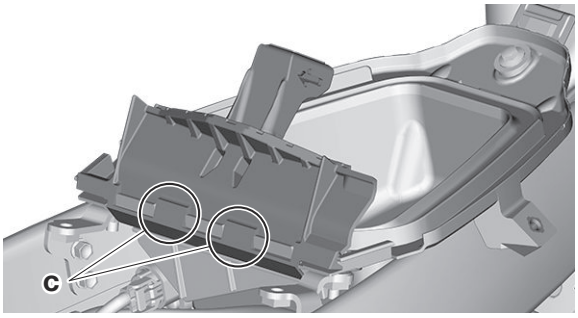
## INSTALLING THE AIR FILTER CASE ASSEMBLY BRACKET

1. Install:
   - Air filter case assembly bracket "1"

**TIP**

Align the projections "a" on the air filter case assembly bracket with the grooves "b" in the air filter case "2", and then push down the portion "c".


1
2
a
b


c

# ELECTRICAL SYSTEM


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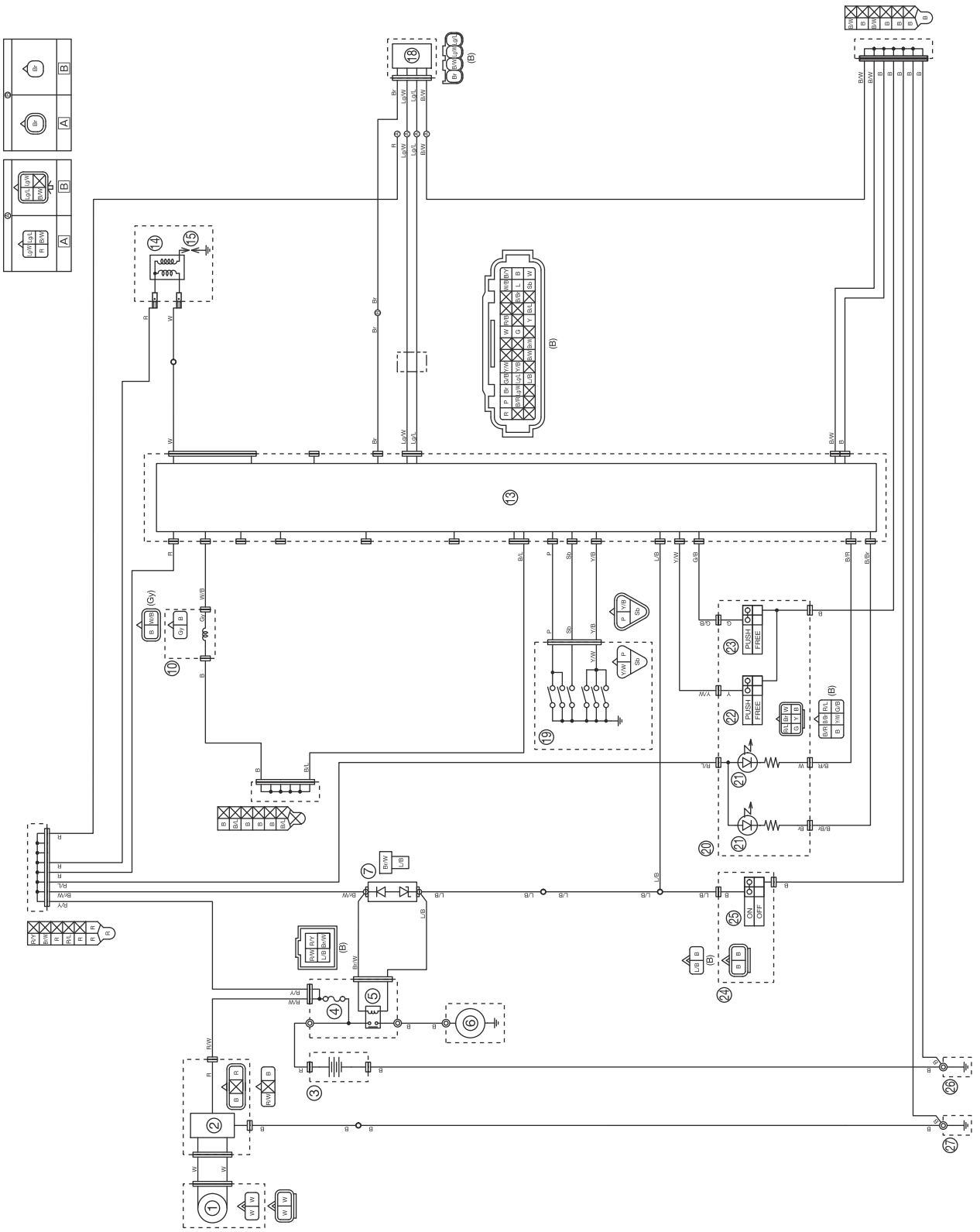
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EAM20142
# IGNITION SYSTEM

EAM30277
## CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
3. Battery
4. Fuse
5. Starter relay
6. Starter motor
7. Diode 1
10. Crankshaft position sensor
13. ECU (Engine Control Unit)
14. Ignition coil
15. Spark plug
18. CCU (Communication Control Unit)
19. Gear position switch
20. Handlebar switch (left)
21. Indicator light
22. Multi-function button
23. Engine stop switch
24. Handlebar switch (right)
25. Starter switch
26. Frame ground
27. Engine ground

A. Wire harness
B. 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. Seat
2. Side cover (left/right)
3. Shroud (left/right)
4. Fuel tank
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 8-52. | NG→ | Replace the fuse(s). |
| OK↓ | | |
| 3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-52. | NG→ | • Clean the battery terminals.<br>• Recharge or replace the battery. |
| OK↓ | | |
| 4. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-13. | NG→ | Correct or replace the spark plug. |
| OK↓ | | |
| 5. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-54. | OK→ | The ignition system circuit is OK. |
| NG↓ | | |
| 6. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 8-55. | NG→ | Replace the ignition coil. |
| OK↓ | | |
| 7. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-50. | NG→ | Replace the handlebar switch (left). |
| OK↓ | | |
| 8. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-56. | NG→ | Replace the crankshaft position sensor. |
| OK↓ | | |

| | | |
|---|---|---|
| 9. Check the stator coil assembly. Refer to "CHECKING THE STATOR COIL" on page 8-56. | NG→ | Replace the stator coil assembly. |
| OK↓ | | |
| 10. Check the ignition system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-1. | NG→ | Repair or replace the wire harness. |
| OK↓ | | |
| Replace the ECU. | | |

The launch control system does not operate.

**TIP**

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left)
3. Shroud (left)

| | | |
|---|---|---|
| 1. Check the handlebar switch coupler (left) connections. | NG→ | Reconnect. |
| OK↓ | | |
| 2. Check the gear position switch coupler connections. | NG→ | Reconnect. |
| OK↓ | | |
| 3. Check the multi-function button. Refer to "CHECKING THE SWITCHES" on page 8-50. | NG→ | Replace the handlebar switch (left). |
| OK↓ | | |
| 4. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-59. | NG→ | Replace the gear position switch. |
| OK↓ | | |
| 5. 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 map change does not operate.

**TIP**

Before troubleshooting, remove the following part(s):

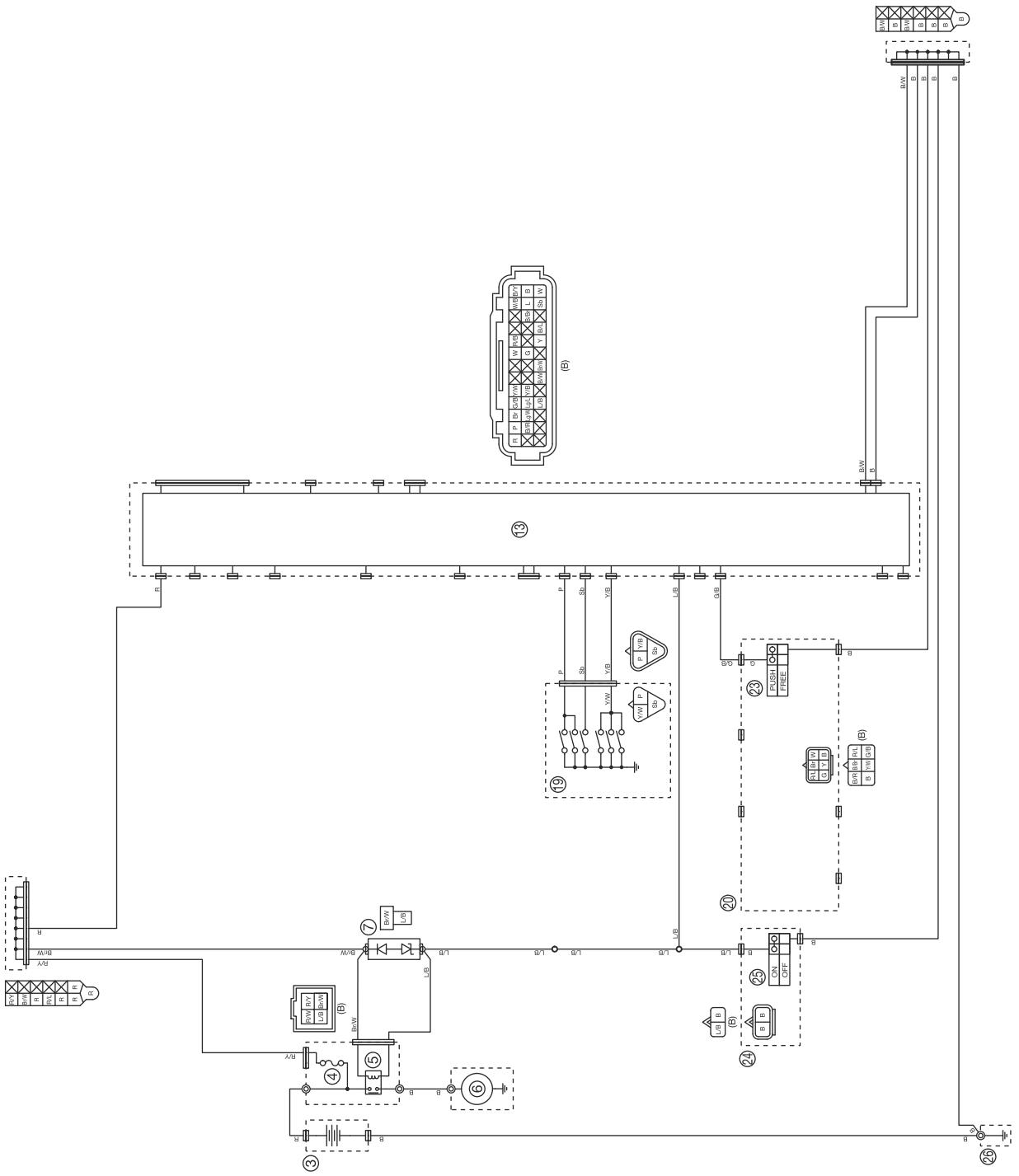
1. Seat
2. Side cover (left)
3. Shroud (left)

1. Check the handlebar switch coupler (left) connections.
   NG→ Reconnect.
   OK↓
2. Check the handlebar switch (left). Refer to “CHECKING THE SWITCHES” on page 8-50.
   NG→ Replace the handlebar switch (left).
   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



3. Battery
4. Fuse
5. Starter relay
6. Starter motor
7. Diode 1
13. ECU (Engine Control Unit)
19. Gear position switch
20. Handlebar switch (left)
23. Engine stop switch
24. Handlebar switch (right)
25. Starter switch
26. Frame ground

EAM30281

## TROUBLESHOOTING

The starter motor fails to turn.

**TIP**

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left/right)
3. Shroud (left/right)
4. Fuel tank
5. Air filter case cover

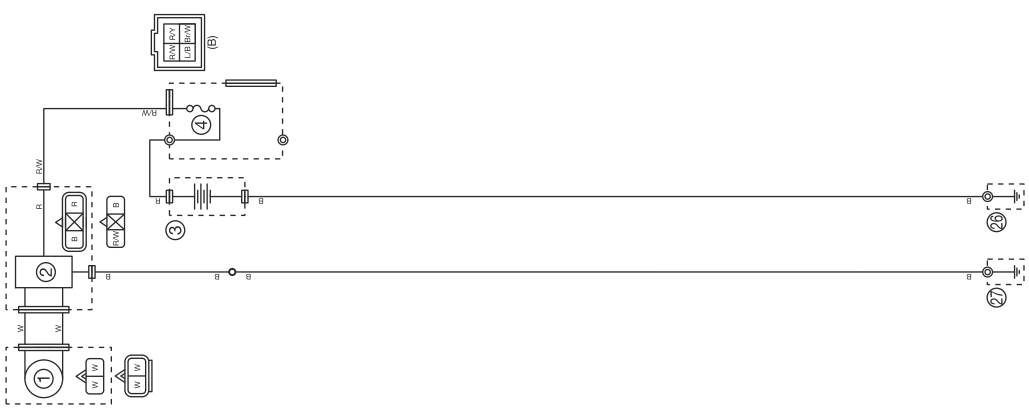
| | | |
|---|---|---|
| 1. Check the fuse.<br>Refer to "CHECKING THE FUSES" on page 8-52. | NG→ | Replace the fuse(s). |
| OK↓ | | |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-52. | NG→ | • Clean the battery terminals.<br>• Recharge or replace the battery. |
| OK↓ | | |
| 3. Check the starter motor operation.<br>Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-56. | OK→ | Starter motor is OK. Perform the electric starting system troubleshooting, starting with step (5). |
| NG↓ | | |
| 4. Check the starter motor.<br>Refer to "CHECKING THE STARTER MOTOR" on page 5-44. | NG→ | Repair or replace the starter motor. |
| OK↓ | | |
| 5. Check the starter relay.<br>Refer to "CHECKING THE RELAYS" on page 8-54. | NG→ | Replace the starter relay. |
| OK↓ | | |
| 6. Check the engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-50. | NG→ | Replace the handlebar switch (left). |
| OK↓ | | |
| 7. Check the starter switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-50. | NG→ | Replace the starter switch. |
| OK↓ | | |
| 8. Check the entire starting system's wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-7. | NG→ | Properly connect or repair the starting system's wiring. |
| OK↓ | | |
| Replace the ECU. | | |

EAM20144

# CHARGING SYSTEM

EAM30282

## CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
3. Battery
4. Fuse
26. Frame ground
27. Engine ground

EAM30283

## TROUBLESHOOTING

The battery is not being charged.

**TIP**

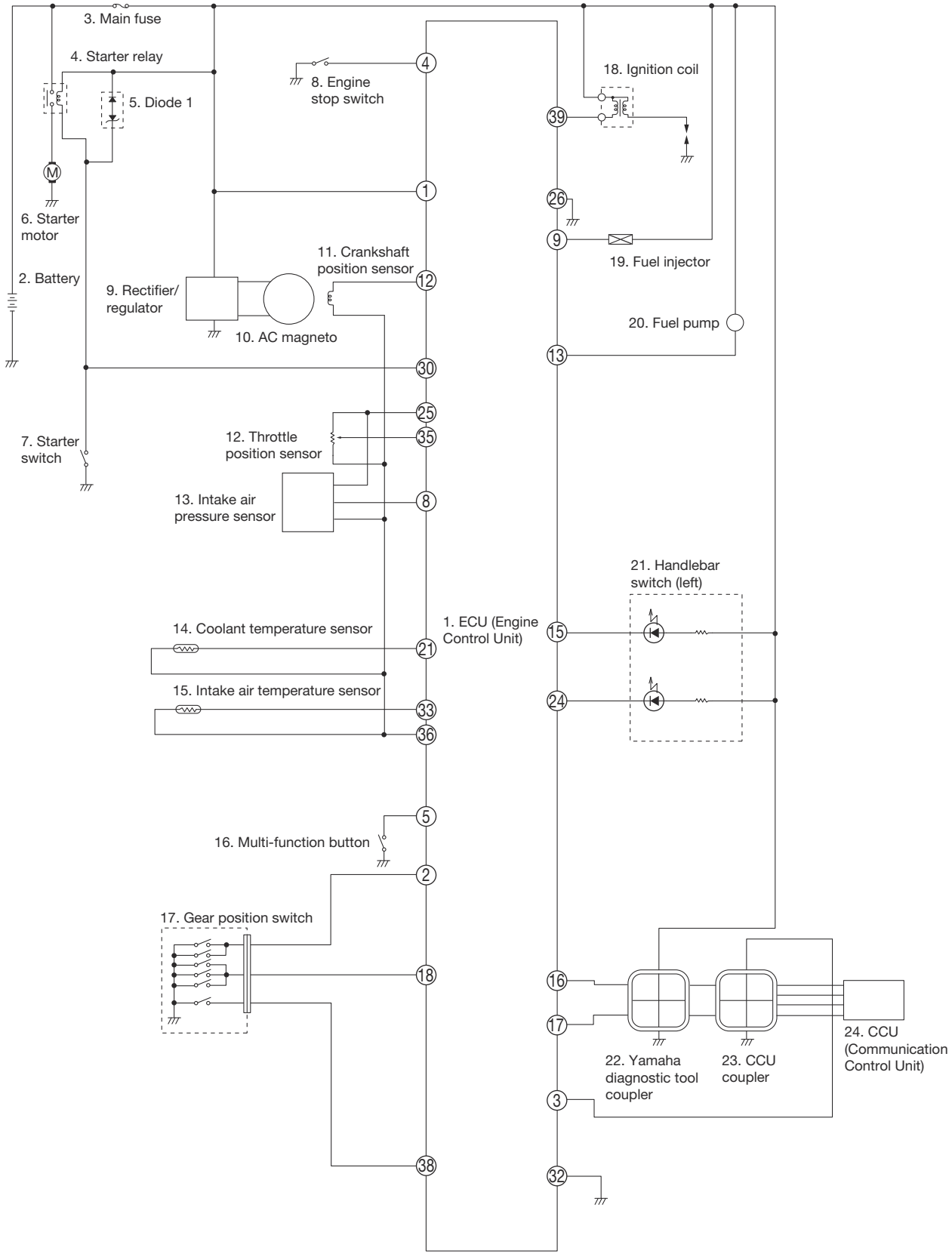
Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left)
3. Shroud (left)

| | | |
|---|---|---|
| 1. Check the entire charging system's wiring. | NG → | Reconnect. |
| OK ↓ | | |
| 2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-52. | NG→ | Replace the fuse(s). |
| OK↓ | | |
| 3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-52. | NG→ | • Clean the battery terminals.<br>• Recharge or replace the battery. |
| OK↓ | | |
| 4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-57. | NG → | Replace the rectifier/regulator. |
| OK ↓ | | |
| 5. Check the stator coil assembly. Refer to "CHECKING THE STATOR COIL" on page 8-56. | NG → | Replace the stator coil assembly. |
| OK ↓ | | |
| 6. Check the charging system wire harness. Refer to "CIRCUIT DIAGRAM" on page 8-11. | NG → | Repair or replace the wire harness. |
| OK ↓ | | |
| This circuit is OK. | | |

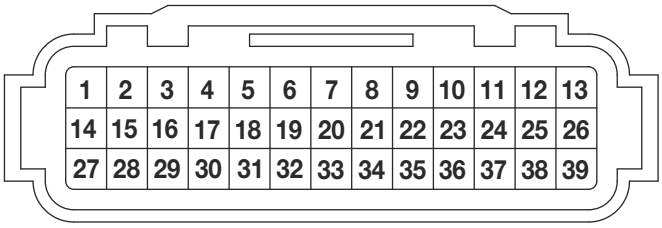
EAM20145
# FUEL INJECTION SYSTEM

EAM30646
## ECU CIRCUIT DIAGRAM



1. ECU (Engine Control Unit)
2. Battery
3. Main fuse
4. Starter relay
5. Diode 1
6. Starter motor
7. Starter switch
8. Engine stop switch
9. Rectifier/regulator
10. AC magneto
11. Crankshaft position sensor
12. Throttle position sensor
13. Intake air pressure sensor
14. Coolant temperature sensor
15. Intake air temperature sensor
16. Multi-function button
17. Gear position switch
18. Ignition coil
19. Fuel injector
20. Fuel pump
21. Handlebar switch (left)
22. Yamaha diagnostic tool coupler
23. CCU coupler
24. CCU (Communication Control Unit)

EAM30647
## ECU COUPLER LAYOUT

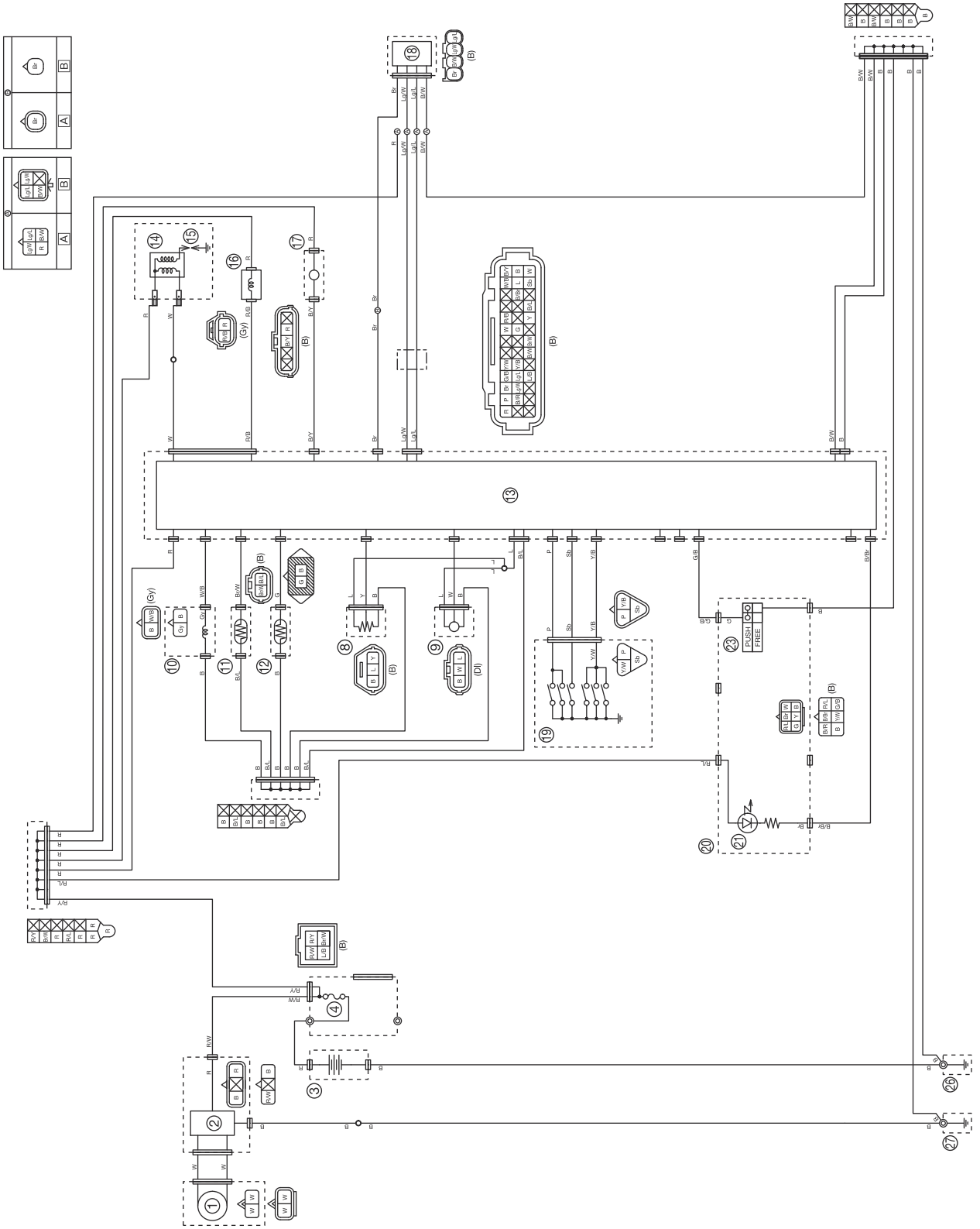



| No. | Connected parts | Wire harness color |
|---|---|---|
| 1 | Starter relay, Main fuse | R |
| 2 | Gear position switch | P |
| 3 | CCU (Communication Control Unit) | Br |
| 4 | Engine stop switch | G/B |
| 5 | Multi-function button | Y/W |
| 6 | — | — |
| 7 | — | — |
| 8 | Intake air pressure sensor | W |
| 9 | Fuel injector | R/B |
| 10 | — | — |
| 11 | — | — |
| 12 | Crankshaft position sensor | W/B |
| 13 | Fuel pump | B/Y |
| 14 | — | — |
| 15 | Handlebar switch (left) | B/R |
| 16 | CCU (Communication Control Unit) | Lg/W |
| 17 | CCU (Communication Control Unit) | Lg/L |
| 18 | Gear position switch | Y/B |
| 19 | — | — |
| 20 | — | — |
| 21 | Coolant temperature sensor | G |
| 22 | — | — |
| 23 | — | — |
| 24 | Handlebar switch (left) | B/Br |

| No. | Connected parts | Wire harness color |
|---|---|---|
| 25 | Intake air pressure sensor, Throttle position sensor | L |
| 26 | Ground | B |
| 27 | — | — |
| 28 | — | — |
| 29 | — | — |
| 30 | Starter relay | L/B |
| 31 | — | — |
| 32 | Ground | B/W |
| 33 | Intake air temperature sensor | Br/W |
| 34 | — | — |
| 35 | Throttle position sensor | Y |
| 36 | Coolant temperature sensor, Crankshaft position sensor, Intake air pressure sensor, Intake air temperature sensor, Throttle position sensor | B/L |
| 37 | — | — |
| 38 | Gear position switch | Sb |
| 39 | Ignition coil | W |

EAM30284

## CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
3. Battery
4. Fuse
8. Throttle position sensor
9. Intake air pressure sensor
10. Crankshaft position sensor
11. Intake air temperature sensor
12. Coolant temperature sensor
13. ECU (Engine Control Unit)
14. Ignition coil
15. Spark plug
16. Fuel injector
17. Fuel pump
18. CCU (Communication Control Unit)
19. Gear position switch
20. Handlebar switch (left)
21. Indicator light
23. Engine stop switch
26. Frame ground
27. Engine ground

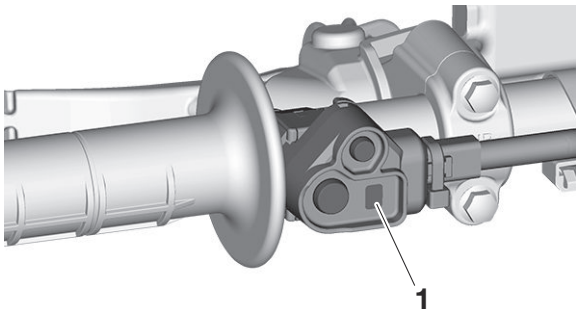
A. Wire harness
B. CCU sub-lead

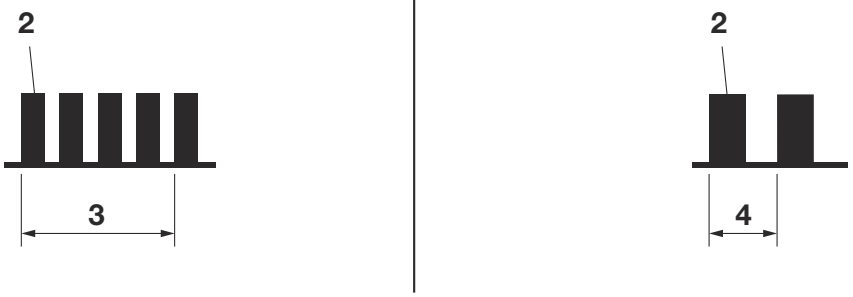
EAM30645
## CHECKING THE INDICATOR LIGHT

If the indicator light "1" blinks in orange, determine the fault code by using the Yamaha diagnostic tool. Check and repair the detected fault by referring to "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-23.

**TIP**

- For connecting to the Yamaha diagnostic tool, refer to "Connecting the Yamaha diagnostic tool" on page 8-22.
- If the indicator light "1" on the handlebar switch (left) does not come on in orange when keeping the starter switch pressed after the ECU has shut down, the warning function to detect abnormalities of the handlebar switch (left) may be defective.
  Refer to "BASIC SERVICE INFORMATION" on page 1-16 about how to shut down the ECU.
- The action of the fail-safe system varies depending on the orange blinking pattern of the indicator light.




2. Orange
3. Approx. 1 second
4. 1 second

| Blinking condition of the indicator light | Fail-safe system |
|---|---|
| Indicator light flashes orange fast | Unable to start engine<br>Unable to cranking engine |
| Indicator light flashes orange slow | Able to drive vehicle |

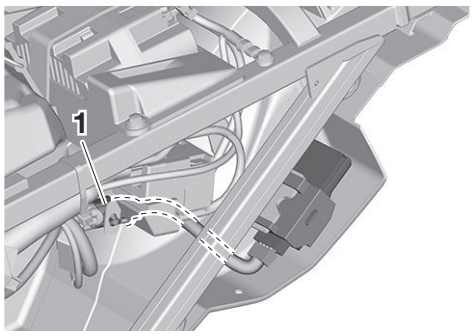
EAM30285
## YAMAHA DIAGNOSTIC TOOL

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**
**90890-03274**
**Yamaha diagnostic tool (A/I)**
**90890-03273**

**Connecting the Yamaha diagnostic tool**

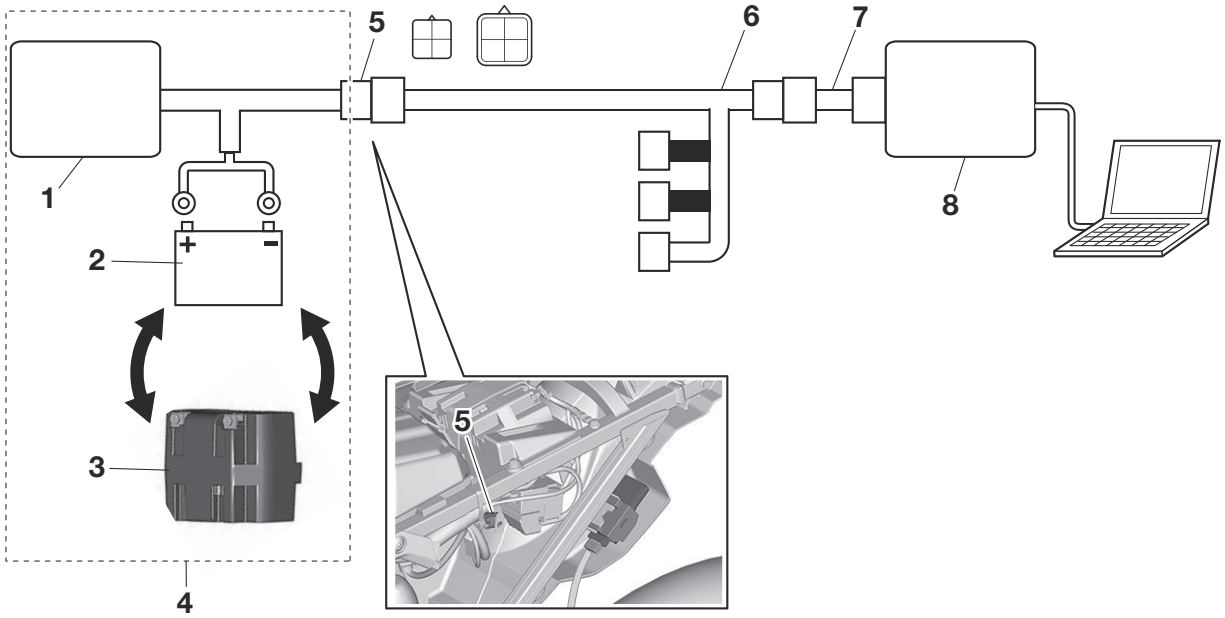
1. Disconnect the CCU sub-lead coupler "1".




2. Connect the Yamaha diagnostic tool.

**TIP**

- Prepare the fully charged 12 V lead battery for yourself.
- Replace the vehicle battery with a lead battery (12 V).
- For information on how to connect and use the Yamaha diagnostic tool, refer to "YAMAHA DIAGNOSTIC TOOL OPERATION MANUAL".




1. ECU (Engine Control Unit)
2. Lead battery (12 V)
3. Vehicle battery
4. Vehicle
5. Yamaha diagnostic tool coupler
6. Sub-harness (included with the Yamaha diagnostic tool)
7. Vehicle communication cable (included with the Yamaha diagnostic tool)
8. Yamaha diagnostic tool

EAM30286
## TROUBLESHOOTING DETAILS (FAULT CODE)
This section describes the measures per fault code number displayed on the Yamaha diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.
After the check and service of the malfunctioning part have been completed, delete the fault codes displayed on the Yamaha diagnostic tool according to the reinstatement method.
Fault code No.:
Fault code number displayed on the Yamaha diagnostic tool when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-13.

### 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. 8

| | |
|---|---|
| **Fault code No.** | **8** |
| **Item** | **Gear position switch: open or short circuit detected.** |
| **Fail-safe system** | Able to start engine |
| | Able to drive vehicle |
| **Diagnostic code No.** | 25 |
| **Diagnostic tool display** | Displays the gear position.<br>• N (gear in neutral)<br>• 1 (gear in 1st or 2nd)<br>• 3 (gear in other than 1st or 2nd) |
| **Procedure** | — |

| Item | Probable cause of malfunction and check | Maintenance job | Confirmation of service completion |
|---|---|---|---|
| 1 | Connection of gear position switch coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), change the gear position from neutral position to 1st → 2nd → … → 5th position. (When doing so, be sure to hold each position for 10 seconds or more.)<br>And then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |

| Fault code No. | | 8 | |
|---|---|---|---|
| **Item** | | **Gear position switch: open or short circuit detected.** | |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), change the gear position from neutral position to 1st → 2nd → … → 5th position. (When doing so, be sure to hold each position for 10 seconds or more.)<br>And then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between gear position switch coupler and ECU coupler.<br>pink–pink<br>sky blue–sky blue<br>yellow/black–yellow/black | Starter switch to ON (no need to start the engine), change the gear position from neutral position to 1st → 2nd → … → 5th position. (When doing so, be sure to hold each position for 10 seconds or more.)<br>And then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of gear position switch.<br>Check for looseness or pinching. | Improperly mounted switch → Remount or replace the switch.<br>Refer to "ENGINE REMOVAL" on page 5-3. | Starter switch to ON (no need to start the engine), change the gear position from neutral position to 1st → 2nd → … → 5th position. (When doing so, be sure to hold each position for 10 seconds or more.)<br>And then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 5 | Defective gear position switch. | Execute the diagnostic mode. (Code No. 25)<br>The values are indicated according to the gear position.<br>Gear in neutral: N<br>Gear in 1st or 2nd: 1<br>Gear in other than 1st or 2nd: 3<br>Abnormal display → Gear position switch is defective → Replace the gear position switch. | Starter switch to ON (no need to start the engine), change the gear position from neutral position to 1st → 2nd → … → 5th position. (When doing so, be sure to hold each position for 10 seconds or more.)<br>And then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 6. |
| 6 | Faulty ECU. | Replace the ECU. | Service is finished. |

| | | | |
|---|---|---|---|
| **Fault code No.** | | **8** | |
| **Item** | | **Gear position switch: open or short circuit detected.** | |
| 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. 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.<br>Check the locking condition of the coupler.<br>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 2 seconds or more, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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 2 seconds or more, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between crankshaft position sensor coupler and ECU coupler.<br>white/black–white/black<br>Between crankshaft position sensor coupler and ECU coupler.<br>black–black/blue | Crank the engine 2 seconds or more, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of crankshaft position sensor.<br>Check for looseness or pinching.<br>Check the gap (0.85 mm (0.0335 in)) between the crankshaft position sensor and the pickup rotor. | Improperly mounted sensor → Remount or replace the sensor.<br>Refer to "GENERATOR" on page 5-37. | Crank the engine 2 seconds or more, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |

| Fault code No. | | 12 | |
|---|---|---|---|
| Item | | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor. | |
| 5 | Defective crankshaft position sensor. | Check the crankshaft position sensor.<br>Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-56. | Crank the engine 2 seconds or more, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 6. |
| 6 | Faulty ECU. | Replace the ECU. | Service is finished. |
| 7 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

**Fault code No. 13**

**TIP**

- If fault code numbers 13 and 14 are both displayed, perform checkup and repair jobs for fault code number 13 first.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

| Fault code No. | | 13 | |
|---|---|---|---|
| Item | | Intake air pressure sensor: open or short circuit detected. | |
| Fail-safe system | | Able to start engine | |
| | | Able to drive vehicle | |
| Diagnostic code No. | | 03 | |
| Diagnostic tool display | | Displays the intake air pressure. | |
| Procedure | | The atmospheric pressure is displayed on the Yamaha diagnostic tool. | |
| **Item** | **Probable cause of malfunction and check** | **Maintenance job** | **Confirmation of service completion** |
| 1 | Connection of intake air pressure sensor coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |

| Fault code No. | | 13 | |
|---|---|---|---|
| **Item** | | **Intake air pressure sensor: open or short circuit detected.** | |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between intake air pressure sensor coupler and ECU coupler.<br>white–white<br>blue–blue<br>Between intake air pressure sensor coupler and ECU coupler.<br>black–black/blue | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of intake air pressure sensor.<br>Check for looseness or pinching.<br>Check the mounted position for correctness. | Improperly mounted sensor → Remount or replace the sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 5 | Defective intake air pressure sensor. | Execute the diagnostic mode. (Code No. 03)<br>Proper display:<br>Atmospheric pressure at the current altitude and weather conditions is indicated while engine stopping.<br>0 m above sea level: About 101 kPa (about 3.63 V)<br>1000 m above sea level: About 90 kPa (about 3.30 V)<br>2000 m above sea level: About 80 kPa (about 3.00 V)<br>3000 m above sea level: About 70 kPa (about 2.70 V)<br>Abnormal display → Intake air pressure sensor is defective → Replace the intake air pressure sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>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 |

| | |
|---|---|
| **Fault code No.** | **14** |
| **Item** | **Intake air pressure sensor: hose system malfunction (clogged or detached hose).** |
| **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).<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 3 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Defective intake air pressure sensor. | Execute the diagnostic mode. (Code No. 03)<br>Proper display:<br>Atmospheric pressure at the current altitude and weather conditions is indicated while engine stopping.<br>0 m above sea level: About 101 kPa (about 3.63 V)<br>1000 m above sea level: About 90 kPa (about 3.30 V)<br>2000 m above sea level: About 80 kPa (about 3.00 V)<br>3000 m above sea level: About 70 kPa (about 2.70 V)<br>Value does not change during cranking → Intake air pressure sensor replacement. | Start the engine and let it idle for approximately 5 seconds (fully close the throttle valve).<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 3 and finish the service. |
| 3 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

### Fault code No. 15

**TIP**

Before troubleshooting, disconnect the starter motor lead from the starter relay.

| | |
|---|---|
| **Fault code No.** | **15** |
| **Item** | **Throttle position sensor: open or short circuit detected.** |
| **Fail-safe system** | Able to start engine |
| | Able to drive vehicle |
| **Diagnostic code No.** | 01 |
| **Diagnostic tool display** | Displays the throttle angle.<br>• 11–14 (throttle in fully closed position)<br>• 86–92 (throttle in fully opened position) |
| **Procedure** | • Check with throttle fully closed.<br>• Check with throttle fully opened. |

| Fault code No. | 15 |
|---|---|
| Item | Throttle position sensor: open or short circuit detected. |

| Item | Probable cause of malfunction and check | Maintenance job | Confirmation of service completion |
|---|---|---|---|
| 1 | Connection of throttle position sensor coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between throttle position sensor coupler and ECU coupler.<br>yellow–yellow<br>blue–blue<br>Between throttle position sensor coupler and ECU coupler.<br>black–black/blue | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of throttle position sensor.<br>Check for looseness or pinching.<br>Check the mounted position for correctness. | Improperly mounted sensor → Remount or replace the sensor.<br>Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-8. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 5 | Applied voltage of throttle position sensor lead. | Check the applied voltage. (black–blue)<br>Location of disconnected lead / Output voltage<br>Disconnected ground lead: 5 V<br>Disconnected output lead: 0 V<br>Disconnected power supply lead: 0 V | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 6. |

| Fault code No. | | 15 | |
|---|---|---|---|
| **Item** | | **Throttle position sensor: open or short circuit detected.** | |
| 6 | Defective throttle position sensor. | Execute the diagnostic mode. (Code No. 01)<br>Correct display range:<br>When the throttle is fully closed, 11–14 displays.<br>When the throttle is fully opened, 86–92 displays.<br>Incorrect display range → Replace the throttle position sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 8 and finish the service.<br>Condition is "Detected" → Go to item 7. |
| 7 | Faulty ECU. | Replace the ECU. | Service is finished. |
| 8 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

### Fault code No. 16

**TIP**

- If fault code numbers 15 and 16 are both displayed, perform checkup and repair jobs for fault code number 15 first.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

| Fault code No. | | 16 | |
|---|---|---|---|
| **Item** | | **Throttle position sensor: stuck throttle position sensor is detected.** | |
| **Fail-safe system** | | Able to start engine | |
| | | Able to drive vehicle | |
| **Diagnostic code No.** | | 01 | |
| **Diagnostic tool display** | | Displays the throttle angle.<br>• 11–14 (throttle in fully closed position)<br>• 86–92 (throttle in fully opened position) | |
| **Procedure** | | • Check with throttle fully closed.<br>• Check with throttle fully opened. | |
| **Item** | **Probable cause of malfunction and check** | **Maintenance job** | **Confirmation of service completion** |
| 1 | Mounted condition of throttle position sensor.<br>Check for looseness or pinching.<br>Check the mounted condition for correctness. | Improperly mounted sensor → Remount or replace the sensor.<br>Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-8. | Starter switch to ON (no need to start the engine), and open and close the throttle several times.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 2. |

| Fault code No. | | 16 | |
|---|---|---|---|
| **Item** | | **Throttle position sensor: stuck throttle position sensor is detected.** | |
| 2 | Defective throttle position sensor. | Execute the diagnostic mode. (Code No. 01)<br>Correct display range:<br>When the throttle is fully closed, 11–14 displays.<br>When the throttle is fully opened, 86–92 displays.<br>Incorrect display range → Replace the throttle position sensor. | Starter switch to ON (no need to start the engine), and open and close the throttle several times.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Faulty ECU. | Replace the ECU. | Service is finished. |
| 4 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

### Fault code No. 21

**TIP**

- Make sure that the machine is completely cold before checking the coolant temperature sensor.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

| Fault code No. | | 21 | |
|---|---|---|---|
| **Item** | | **Coolant temperature sensor: open or short circuit detected.** | |
| **Fail-safe system** | | Able to start engine | |
| | | Able to drive vehicle | |
| **Diagnostic code No.** | | 06 | |
| **Diagnostic tool display** | | Displays the coolant temperature. | |
| **Procedure** | | Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value. | |
| **Item** | **Probable cause of malfunction and check** | **Maintenance job** | **Confirmation of service completion** |
| 1 | Connection of coolant temperature sensor coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |

| Fault code No. | | 21 | |
|---|---|---|---|
| **Item** | | **Coolant temperature sensor: open or short circuit detected.** | |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between coolant temperature sensor coupler and ECU coupler.<br>green–green<br>Between coolant temperature sensor coupler and ECU coupler.<br>black–black/blue | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of coolant temperature sensor.<br>Check for looseness or pinching.<br>Check the mounted position for correctness. | Improperly mounted sensor → Remount or replace the sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 5 | Defective coolant temperature sensor. | Execute the diagnostic mode. (Code No. 06)<br>Proper display:<br>When the machine is cold, displayed temperature is close to the ambient temperature.<br>Improper display → Replace the coolant temperature sensor.<br>Refer to "RADIATOR" on page 6-3. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 6. |
| 6 | Faulty ECU. | Replace the ECU. | Service is finished. |
| 7 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

### Fault code No. 22

**TIP**

- Make sure that the machine is completely cold before checking the intake air temperature sensor.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

| Fault code No. | | 22 | |
|---|---|---|---|
| **Item** | | **Intake air temperature sensor: open or short circuit detected.** | |
| **Fail-safe system** | | Able to start engine | |
| | | Able to drive vehicle | |
| **Diagnostic code No.** | | 05 | |
| **Diagnostic tool display** | | Displays the intake air temperature. | |
| **Procedure** | | Compare the actually measured intake air temperature with the Yamaha diagnostic tool display value. | |
| **Item** | **Probable cause of malfunction and check** | **Maintenance job** | **Confirmation of service completion** |

| Fault code No. | | 22 | |
|---|---|---|---|
| Item | | Intake air temperature sensor: open or short circuit detected. | |
| 1 | Connection of intake air temperature sensor coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between intake air temperature sensor coupler and ECU coupler.<br>brown/white–brown/white<br>Between intake air temperature sensor coupler and ECU coupler.<br>black/blue–black/blue | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of intake air temperature sensor.<br>Check for looseness or pinching.<br>Check the mounted position for correctness. | Improperly mounted sensor → Remount or replace the sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 5 | Defective intake air temperature sensor. | Execute the diagnostic mode. (Code No. 05)<br>Proper display:<br>When the machine is cold, displayed temperature is close to the ambient temperature.<br>Improper display → Replace the intake air temperature sensor. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 6. |
| 6 | Faulty ECU. | Replace the ECU. | Service is finished. |
| 7 | Delete the fault code. | Confirm that the fault code has a condition of "Recovered" using the Yamaha diagnostic tool, and then delete the fault code. | |

**Fault code No. 30**

**TIP**

- If fault code numbers 8, 15, 16, and 30 are displayed, perform checkup and repair jobs for fault code number 8, 15, or 16 first.
- Before troubleshooting, disconnect the starter motor lead from the starter relay.

| | |
|---|---|
| **Fault code No.** | **30** |
| **Item** | **The vehicle has overturned.** |
| **Fail-safe system** | Unable to start engine |
| | Unable to drive vehicle |
| **Diagnostic code No.** | 08 |
| **Diagnostic tool display** | Displays the lean angle sensor output voltage.<br>• 0.4–1.4 (V) (upright)<br>• 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. | Stand the vehicle upright, starter switch to ON (no need to start the engine), wait 10 seconds, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Mounted condition of ECU.<br>Check for mounted position and angle.<br>Check the mounted condition for correctness. | Improperly mounted ECU → Remount the ECU. | Stand the vehicle upright, starter switch to ON (no need to start the engine), wait 10 seconds, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Faulty ECU. | Execute the diagnostic mode. (Code No. 08)<br>Proper display:<br>When the vehicle is upright: 0.4–1.4 (V)<br>When the vehicle is overturned: 3.7–4.4 (V)<br>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 |

| | |
|---|---|
| **Fault code No.** | **33** |
| **Item** | **Ignition coil: open or short circuit detected in the primary lead of the ignition coil.** |
| **Diagnostic code No.** | 30 |
| **Actuation** | Actuates the ignition coil five times at one-second intervals.<br>"WARNING" on the Yamaha diagnostic tool blinks five times when the ignition coil is actuated. |
| **Procedure** | Check that a spark is generated five times.<br>• Connect an ignition checker. |

| Item | Probable cause of malfunction and check | Maintenance job | Confirmation of service completion |
|---|---|---|---|
| 1 | Connection of ignition coil coupler.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between ignition coil coupler and ECU coupler.<br>white–white<br>Between ignition coil coupler and ECU coupler.<br>red–red<br>Between ignition coil coupler and starter relay coupler.<br>red–red/yellow<br>Between starter relay terminal and battery terminal.<br>red–red | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Mounted condition of ignition coil.<br>Check for looseness or pinching.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 5. |

| Fault code No. | | 33 | |
|---|---|---|---|
| Item | | Ignition coil: open or short circuit detected in the primary lead of the ignition coil. | |
| 5 | Defective ignition coil. (test the primary coils for continuity) | Check the primary resistance of the ignition coil.<br>Refer to "CHECKING THE IGNITION COIL" on page 8-55. | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 7 and finish the service.<br>Condition is "Detected" → Go to item 6. |
| 6 | Faulty ECU. | Execute the diagnostic mode. (Code No. 30)<br>No spark → 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. 39**

| 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.<br>"WARNING" on the Yamaha diagnostic tool blinks five times when the injector is actuated. | |
| Procedure | | Before performing this operation, be sure to disconnect the fuel pump coupler.<br>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.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 2. |

| Fault code No. | | 39 | |
|---|---|---|---|
| **Item** | | **Injector: open or short circuit detected.** | |
| 2 | Defective injector. | Check the injector.<br>Refer to "CHECKING THE INJECTOR" on page 8-59. | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Connection of wire harness ECU coupler.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 4. |
| 4 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between injector coupler and ECU coupler.<br>red/black–red/black<br>Between injector coupler and starter relay coupler.<br>red–red/yellow<br>Between starter relay terminal and battery terminal.<br>red–red | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 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** | | Able to start engine | |
| | | Able to drive vehicle | |
| **Diagnostic code No.** | | 08 | |
| **Diagnostic tool display** | | Displays the lean angle sensor output voltage.<br>• 0.4–1.4 (V) (upright)<br>• 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 CCU, and incorrect recognition voltage of the motorcycle.** |
| **Fail-safe system** | Able to start engine |
| | Able to drive vehicle |
| **Diagnostic code No.** | 09 |
| **Diagnostic tool display** | Fuel system voltage<br>Approximately 12.0 (V) |
| **Procedure** | Disconnect the starter relay, and push the starter switch. |

| Item | Probable cause of malfunction and check | Maintenance job | Confirmation of service completion |
|---|---|---|---|
| 1 | Wire harness and CCU sub-lead continuity. | Open or short circuit → Replace the wire harness or CCU sub-lead.<br>Between starter relay terminal and battery terminal.<br>red–red<br>Between starter relay coupler and ECU coupler.<br>red/yellow–red<br>Between ECU coupler and CCU sub-lead coupler (wire harness).<br>brown–brown<br>Between CCU sub-lead coupler (sub-lead side) and CCU coupler.<br>brown–brown | Press the engine stop switch for 1 second or more, and then press the starter switch (no need to start the engine).<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Malfunction in CCU. | Replace the CCU. | Press the engine stop switch for 1 second or more, and then press the starter switch (no need to start the engine).<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 4 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Malfunction in 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. 44

**TIP**

Before troubleshooting, disconnect the starter motor lead from the starter relay.

| | |
|---|---|
| **Fault code No.** | **44** |
| **Item** | **EEPROM read error: an error is detected while reading or writing on EEPROM.** |
| **Fail-safe system** | Able to start engine |
| | Able to drive vehicle |
| **Diagnostic code No.** | 60 |
| **Diagnostic tool display** | Displays the location of the abnormal portion of the EEPROM data.<br>• 00: No fault<br>• 01: CO adjustment value<br>• 07: Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8<br>• 12: Throttle position when fully closed |
| **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)<br>00: Go to item 5.<br>01: Go to item 2.<br>07: Go to item 3.<br>12: Go to item 4. | |
| 2 | "01" is indicated in diagnostic mode. (Code No. 60)<br>EEPROM read error for adjustment of CO concentration. | Change the CO concentration, and rewrite in EEPROM.<br>After this adjustment, push the engine stop switch, and then push the starter switch. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Repeat item 1.<br>If the same number is indicated, go to item 5. |
| 3 | "07" is indicated in diagnostic mode. (Code No. 60)<br>EEPROM read error for setting tool adjustment values for fuel injection amount or ignition timing. | Erase the setting map in the diagnostic mode. (Code No. 65) | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Repeat item 1.<br>If the same number is indicated, go to item 5. |
| 4 | "12" is indicated in diagnostic mode. (Code No. 60)<br>EEPROM read error for throttle position when fully closed. | Press the engine stop switch for 1 second or more, and then press the starter switch (no need to start the engine). | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Repeat item 1.<br>If the same number is indicated, go to item 5. |
| 5 | Faulty ECU. | Replace the ECU. | Service is finished. |

| | | | |
|---|---|---|---|
| **Fault code No.** | | **44** | |
| **Item** | | **EEPROM read error: an error is detected while reading or writing on EEPROM.** | |
| 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. 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.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 2. |
| 2 | Connection of AC magneto coupler.<br>Check the locking condition of the coupler.<br>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.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 3. |
| 3 | Wire harness continuity. | Open or short circuit → Replace the wire harness.<br>Between rectifier/regulator coupler and starter relay coupler.<br>red/white–red/white<br>Between starter relay terminal and battery terminal.<br>red–red<br>Between rectifier/regulator coupler and engine ground.<br>black–black<br>Between rectifier/regulator coupler and AC magneto coupler.<br>white–white | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 4. |

| Fault code No. | | 46 | |
|---|---|---|---|
| Item | | Vehicle system power supply: normal voltage is not supplied to the ECU. | |
| 4 | Defective AC magneto. | Check the AC magneto.<br>Refer to "CHECKING THE STATOR COIL" on page 8-56. | Start the engine and let it idle for approximately 5 seconds.<br>Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>Condition is "Recovered" → Go to item 6 and finish the service.<br>Condition is "Detected" → Go to item 5. |
| 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. 50

**TIP**

Before troubleshooting, disconnect the starter motor lead from the starter relay.

| Fault code No. | | 50 | |
|---|---|---|---|
| Item | | ECU: faulty ECU memory. | |
| Fail-safe system | | Unable to start engine | |
| | | Unable to drive vehicle | |
| Diagnostic code No. | | — | |
| Diagnostic tool display | | — | |
| Procedure | | — | |
| **Item** | **Probable cause of malfunction and check** | **Maintenance job** | **Confirmation of service completion** |
| 1 | Faulty ECU. | Replace the ECU. | Starter switch to ON (no need to start the engine), and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool.<br>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.

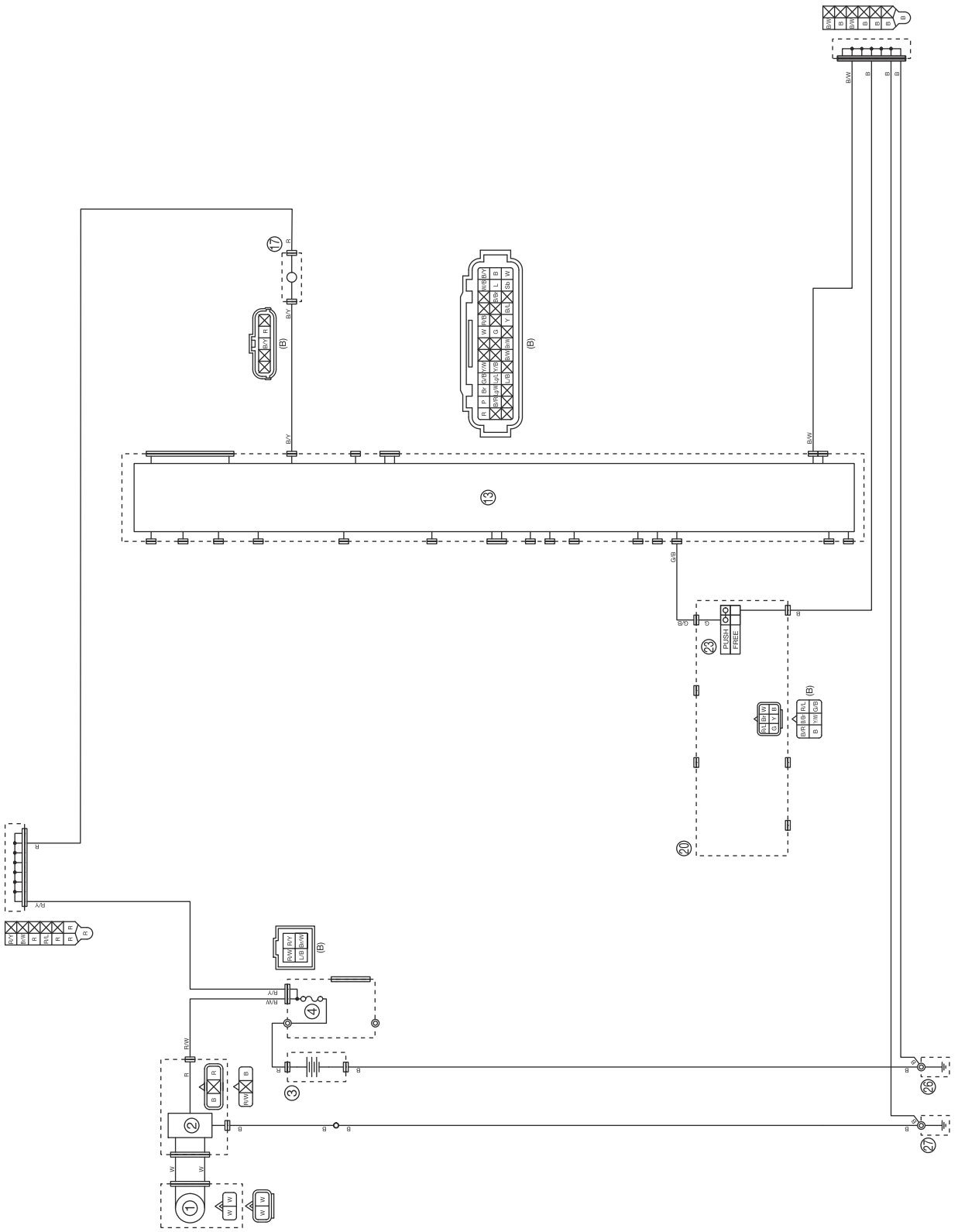
| Fault code No. | 70 |
|---|---|
| Item | Engine forcibly stops when the vehicle is left idling for a long period of time. |
| Fail-safe system | — |
| | Unable to drive vehicle |

| | |
|---|---|
| **Fault code No.** | **70** |
| **Item** | **Engine forcibly stops when the vehicle is left idling for a long period of time.** |
| **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



1. AC magneto
2. Rectifier/regulator
3. Battery
4. Fuse
13. ECU (Engine Control Unit)
17. Fuel pump
20. Handlebar switch (left)
23. Engine stop switch
26. Frame ground
27. Engine ground

EAM30288

## TROUBLESHOOTING

The fuel pump fails to operate.

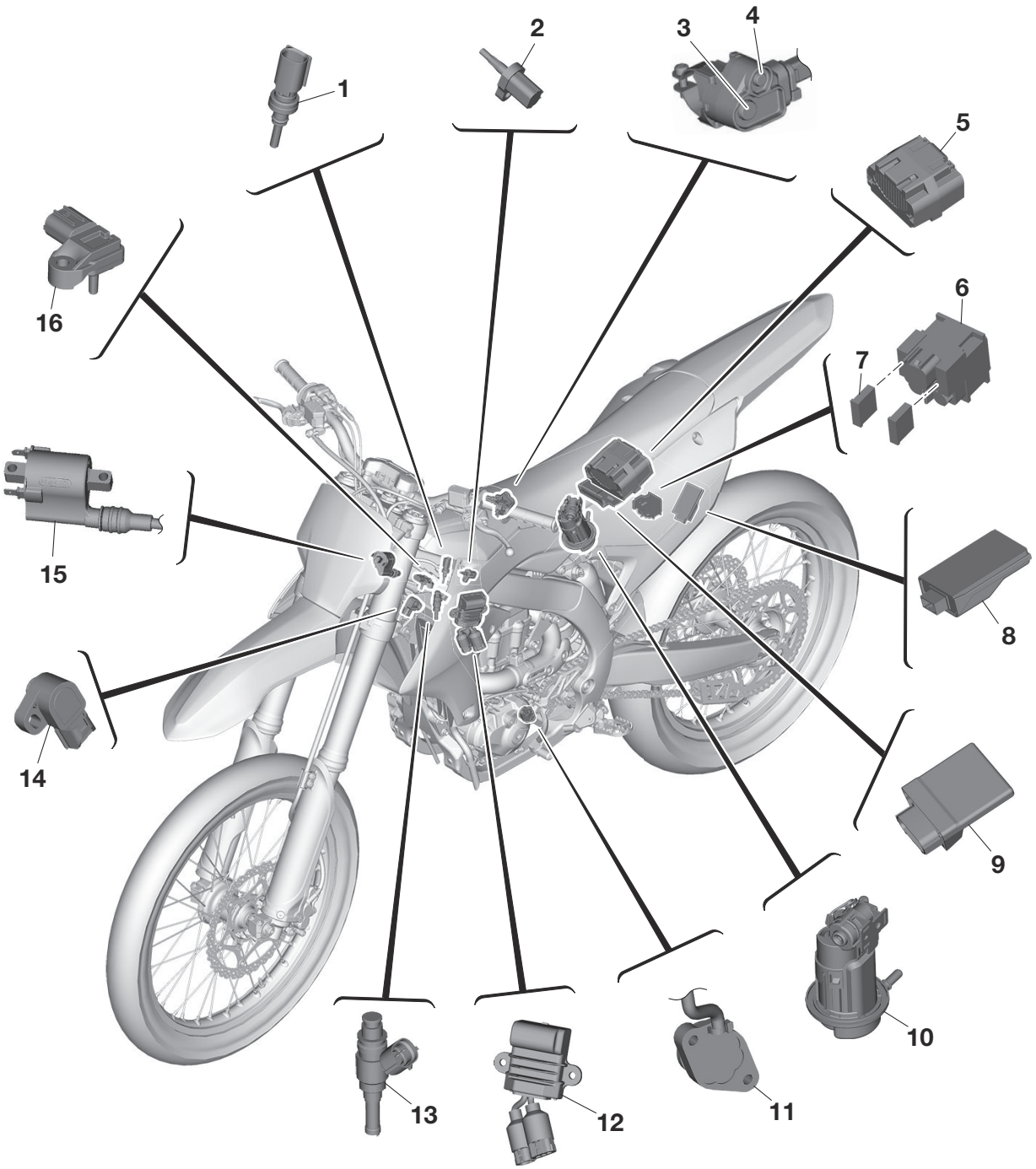
**TIP**

Before troubleshooting, remove the following part(s):

1. Seat
2. Side cover (left/right)
3. Shroud (left/right)
4. Fuel tank
5. Air filter case cover

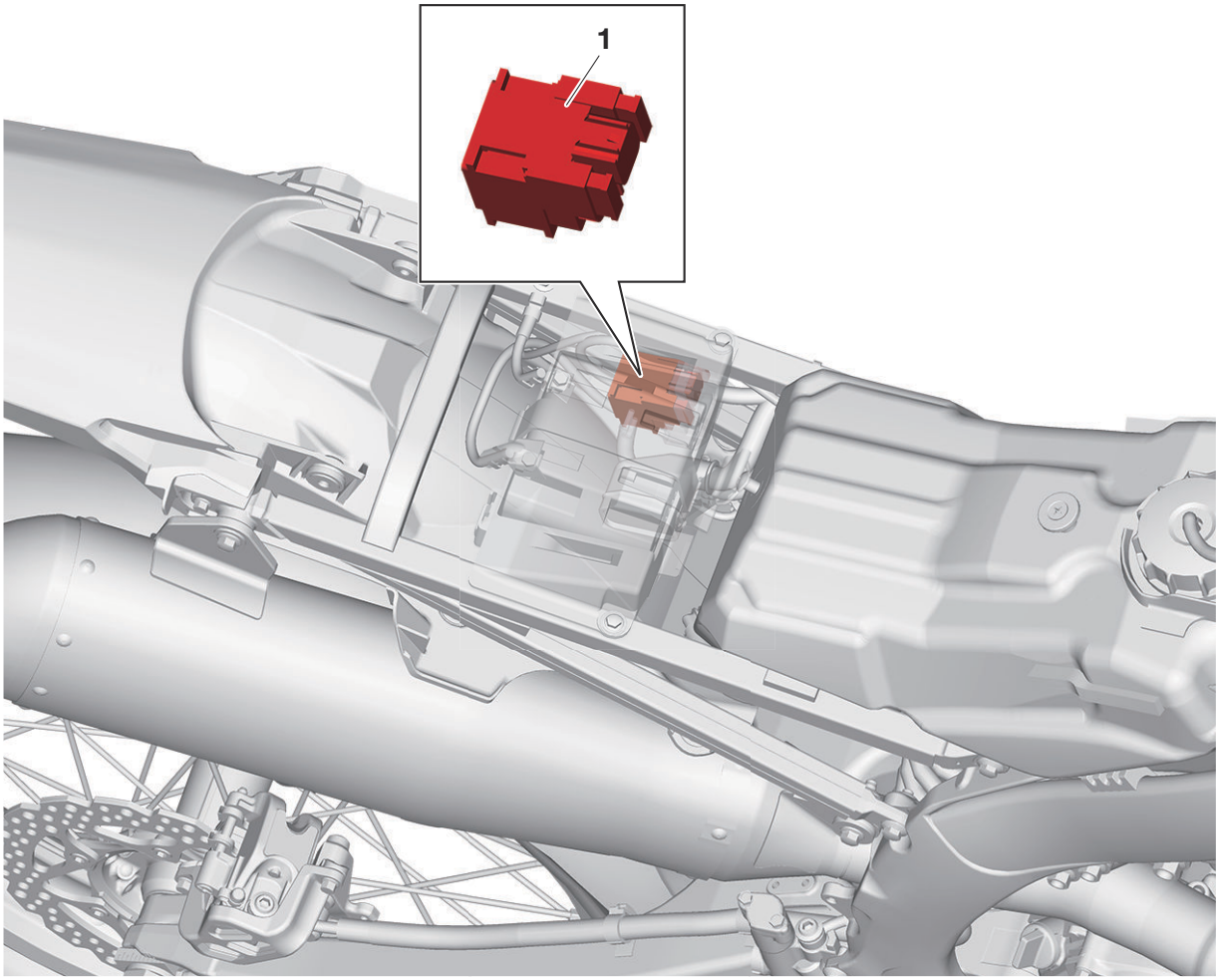
| | | |
|---|---|---|
| 1. Check the fuel pump system wire harness connections. | NG→ | Reconnect. |
| OK↓ | | |
| 2. Check the fuse. Refer to "CHECKING THE FUSES" on page 8-52. | NG→ | Replace the fuse(s). |
| OK↓ | | |
| 3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-52. | NG→ | • Clean the battery terminals.<br>• Recharge or replace the battery. |
| OK↓ | | |
| 4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-50. | NG→ | Replace the handlebar switch (left). |
| OK↓ | | |
| 5. Check fuel pressure. Refer to "CHECKING THE FUEL PRESSURE" on page 7-7. | NG→ | Replace the fuel pump. |
| OK↓ | | |
| 6. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 8-43. | NG→ | Repair or replace the wire harness. |
| OK↓ | | |
| Replace the ECU. | | |

EAM20147
# ELECTRICAL COMPONENTS



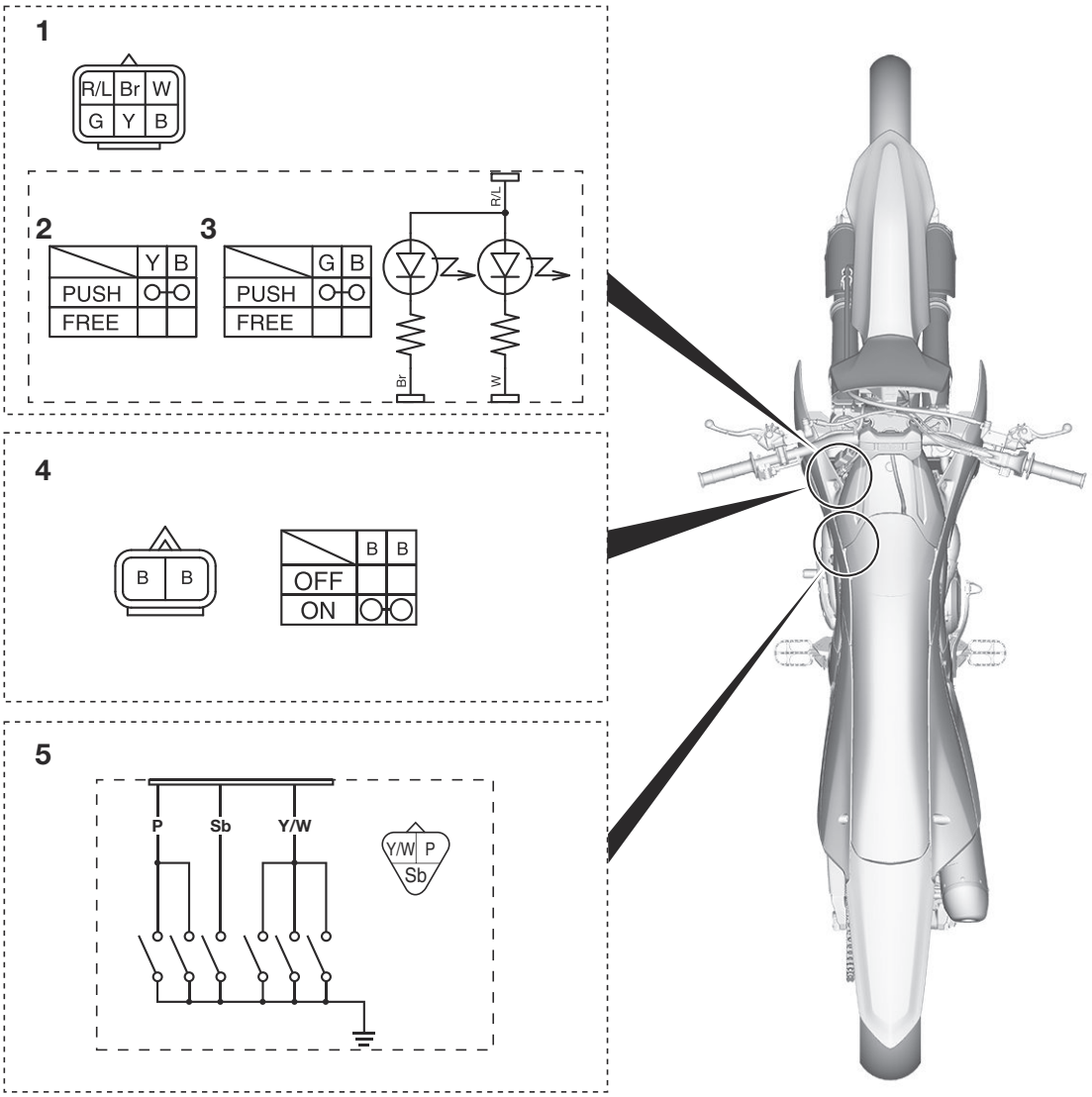
1. Coolant temperature sensor
2. Intake air temperature sensor
3. Multi-function button
4. Engine stop switch
5. Battery
6. Starter relay
7. Fuse
8. CCU (Communication Control Unit)
9. ECU (Engine Control Unit)
10. Fuel pump
11. Gear position switch
12. Rectifier/regulator
13. Injector
14. Throttle position sensor
15. Ignition coil
16. Intake air pressure sensor

EAM30648
## RELAY LOCATION CHART




1. Starter relay

EAM30289
## CHECKING THE SWITCHES




1. Handlebar switch (left)
2. Multi-function button
3. Engine stop switch
4. Starter switch
5. Gear position switch

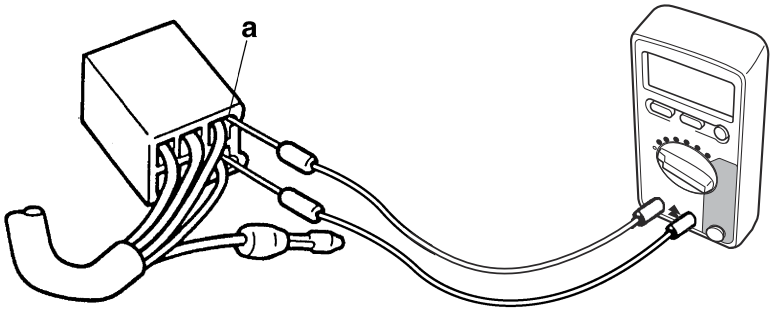
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

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**

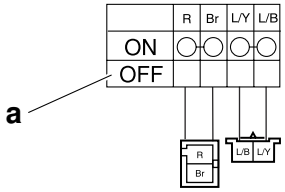
**TIP**
When checking for continuity, switch back and forth between the switch positions a few times.



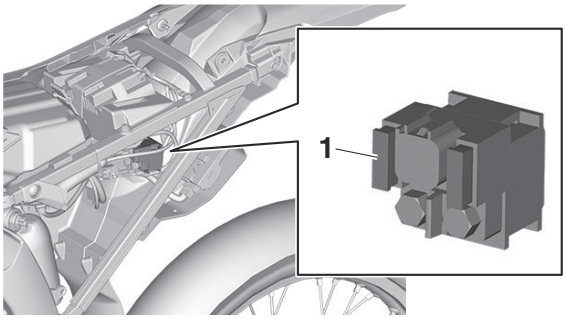

Terminal connections of the switch are shown in the terminal connection diagram below.
The switch positions "a" are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

**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
   • Side cover (left)
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   • Fuse "1"




   a. Connect the digital circuit tester to the fuse and check the continuity.

**TIP**
Set the digital circuit tester selector to "Ω".

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

   b. If the digital circuit tester indicates "O.L", replace the fuse.
3. Replace:
   • Fuse
   a. Install a new fuse of the correct amperage rating.
   b. Push the starter switch to verify if the electrical circuit is operational.
   c. If the fuse immediately blows again, check the electrical circuit.

| Fuses | Amperage rating | Q'ty |
|---|---|---|
| Main | 15 A | 1 |
| Spare | 15 A | 1 |

EWA13310
**WARNING**
**Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

4. Install:
   • Side cover (left)
   • Seat
   Refer to "GENERAL CHASSIS" on page 4-1.

EAM30291
## CHECKING AND CHARGING THE BATTERY
EWA20430
**WARNING**
**To avoid sparking, burns, fire, and explosion:**
- **Charge battery only with specified charger.**
- **Use battery only for specified product – no other use.**
- **Do not place near fire or immerse in water.**
- **Do not use battery if it has been dropped, subject to impact, or visibly damaged.**
- **Do not disassemble or modify the battery, or short across its terminals.**

ECA26041
***NOTICE***
**To prevent damage to the battery and battery malfunction:**
- **Be sure to charge the battery using only the specified battery charger. Do not use a charger designed for lead-acid batteries. Otherwise, the battery could be damaged, such as from a long period of excessive current or voltage exceeding 16 V.**
- **Avoid excessive current discharge, such as pressing the starter switch for a long time. Wait for more than 10 seconds before attempting to start again. Charge the battery again as soon as possible. A long state of discharge below 10 V will damage the battery.**
- **Do not use the specified battery charger to charge a battery other than the lithium-ion battery. Otherwise, the battery or charger could be damaged.**
- **Be careful not to drop the battery or subject it to strong impacts.**
- **Avoid charging the battery at high temperatures of 65 °C (149 °F) or more or low temperatures under 0 °C (32 °F). A control feature preventing battery charging and discharging will temporarily intervene. The battery will discharge at 65 °C (149 °F) or more or low temperatures under -10 °C (14 °F).**
- **If the battery is charged between 0 °C (32 °F)and 10 °C (50 °F), battery charging may**

**stop halfway without the battery becoming fully charged even when the specified battery charger is used. If this occurs, disconnect the battery charger, and then resume charging again.**

**TIP**

This model uses a lithium-ion battery. When new, the battery is supplied in sleep mode to minimize current discharging until first-time use. In the sleep mode, a voltage as low as approximately 0.1 V can be measured if voltage measurement is performed. As such the battery cannot be used, but this is not a malfunction. By activating the battery as follows, the sleep mode will be canceled and the battery can be used normally.

**Charging (activation) steps**

1. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery lead
     (from the battery terminals)

ECA13700

***NOTICE***

**First, disconnect the negative battery lead, and then the positive battery lead.**

3. Remove:
   - Battery
4. Connect the battery charger (special tool) to the battery.



**Lithium battery charger**
**90890-05376**
**Lithium battery charger**
**DBY-ACC51-70-02**

**TIP**

- For instructions on charging and handling the battery charger, refer to the battery charger's instruction manual.
- Once battery charging starts, the sleep mode is canceled.

5. Charge the battery until it is fully charged.
6. Install:
   - Battery
7. Connect:
   - Battery lead
     (to the battery terminals)

ECA26980

***NOTICE***

**First, connect the positive battery lead, and then the negative battery lead.**

8. Check:
   - Battery terminal
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
9. Lubricate:
   - Battery terminal



**Recommended lubricant**
**Dielectric grease**

10. Install:
    - Seat
      Refer to "GENERAL CHASSIS" on page 4-1.

**Checking the battery**

ECA26080

***NOTICE***

**The battery has a limited service life. If the battery cannot be charged or it is determined that the battery cannot be used after checking the battery, it should be replaced. When replacing the battery, be sure to use a Yamaha genuine lithium-ion battery.**

**TIP**

Do not check the battery at high temperature of 65 °C (149 °F) or more or low temperatures below 10 °C (50 °F). Otherwise, the control feature preventing battery charging and discharging will temporarily intervene.

1. Check:
   - Battery
     a. If the battery is hot, wait until the battery has cooled down to the ambient temperature.
     b. Measure the voltage between the battery terminals.
        13.25 V or more → The battery is normal. Checking is finished.
        Less than 13.25 V → Go to step (c).
     c. Connect the battery charger (special tool) to the battery and charge it.



**Lithium battery charger**
**90890-05376**
**Lithium battery charger**
**DBY-ACC51-70-02**

**TIP**

For instructions on charging and handling the battery charger, refer to the battery charger's instruction manual.

     d. If the battery is hot, wait until the battery has cooled down to the ambient

temperature.
e. Measure the voltage between the battery terminals.
13.25 V or more → The battery is normal. Checking is finished.
10 V or more and less than 13.25 V → Perform from step (c) again.
Less than 10 V → Replace the battery.

**TIP**
Before replacing the battery, make sure that the battery temperature is proper (temperature not more than 65 °C (149 °F) or less than 0 °C (32 °F)). Otherwise, wait until the battery temperature is proper and perform the procedure from step (c) again.

EAM30636
### REPLACING THE ECU (Engine Control Unit)
1. Turn off the main switch.
2. Replace the ECU (Engine Control Unit).
Refer to "GENERAL CHASSIS" on page 4-1.
3. Check:
• Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.

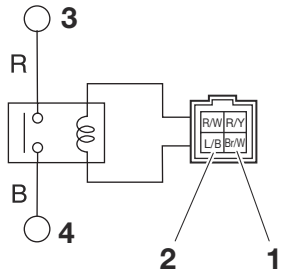
**Engine idling speed**
**1900–2100 r/min**

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")**

EAM30294
### CHECKING THE IGNITION SPARK GAP
1. Check:
• Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step (5).
Refer to "TROUBLESHOOTING" on page 8-3.

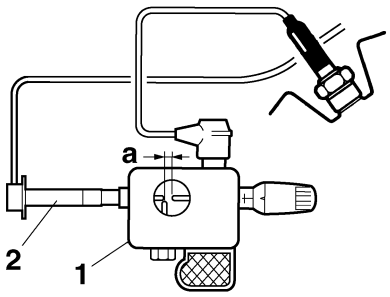
**Minimum ignition spark gap**
**6.0 mm (0.24 in)**

**TIP**
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

a. Remove the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

**Ignition checker**
**90890-06754**
**Oppama pet–4000 spark checker**
**YM-34487**

c. Crank the engine, and measure the ignition spark gap "a".




2. Spark plug cap

d. Crank the engine, and gradually increase the spark gap until a misfire occurs.

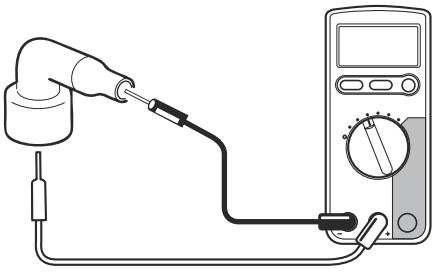
EAM30295
### CHECKING THE SPARK PLUG CAP

1. Remove:
   - Spark plug cap (from the spark plug lead)
2. Check:
   - Spark plug cap resistance
     Out of specification → Replace.

**Resistance**
**10.00 kΩ**

a. Connect the digital circuit tester (Ω) to the spark plug cap.

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



b. Measure the spark plug cap resistance.

EAM30296
### CHECKING THE IGNITION COIL

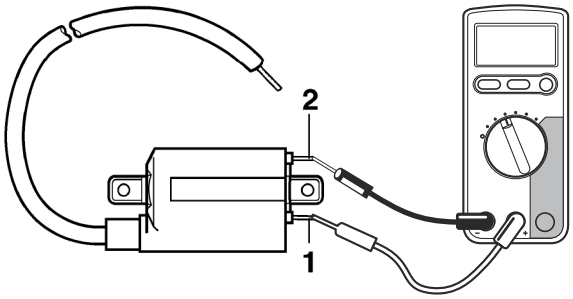
1. Disconnect:
   - Ignition coil terminal (from the wire harness)
   - Spark plug cap (from the ignition coil)
2. Check:
   - Primary coil resistance
     Out of specification → Replace.

**Primary coil resistance**
**1.98–2.42 Ω**

a. Connect the digital circuit tester (Ω) to the ignition coil.

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

- Positive tester probe → Ignition coil terminal 1 “1”
- Negative tester probe → Ignition coil terminal 2 “2”




b. Measure the primary coil resistance.

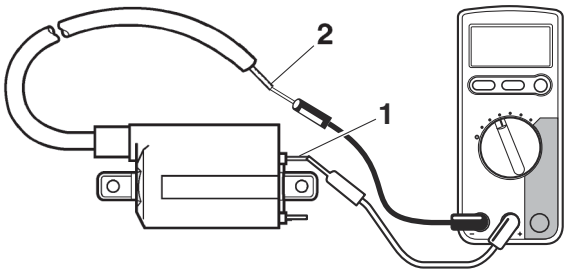
3. Check:
   - Secondary coil resistance
     Out of specification → Replace.

**Secondary coil resistance**
**14.64–21.96 kΩ**

a. Connect the digital circuit tester (Ω) to the ignition coil.

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

- Positive tester probe → Ignition coil terminal 1 “1”
- Negative tester probe → Spark plug lead “2”




b. Measure the secondary coil resistance.

EAM30297
### CHECKING THE CRANKSHAFT POSITION SENSOR

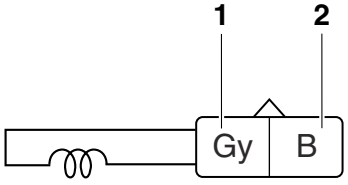
1. Disconnect:
   - Crankshaft position sensor coupler (from the wire harness)
2. Check:
   - Crankshaft position sensor resistance
     Out of specification → Replace.

**Crankshaft position sensor resistance**
**228–342 Ω**

a. Connect the digital circuit tester (Ω) to the crankshaft position sensor coupler.

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

- Positive tester probe → Gray "1"
- Negative tester probe → Black "2"




b. Measure the crankshaft position sensor resistance.

EAM30298
### CHECKING THE LEAN ANGLE SENSOR

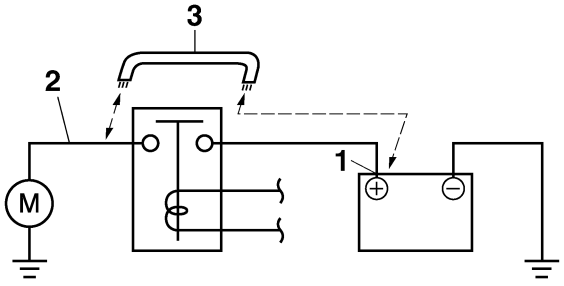
1. Check:
   - Mounted condition of ECU
     Improperly mounted → Remount.

**TIP**
- The lean angle sensor is built into the ECU.
- The lean angle sensor stops the engine in case of a turnover.
- To ensure that the lean angle sensor operates correctly, do not change the installed condition of the ECU.

EAM30299
### CHECKING THE STARTER MOTOR OPERATION

1. Check:
   - Starter motor operation
     Does not operate → Perform the electric starting system troubleshooting, starting with step (3).
     Refer to "TROUBLESHOOTING" on page 8-9.
     a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810
**WARNING**
- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**



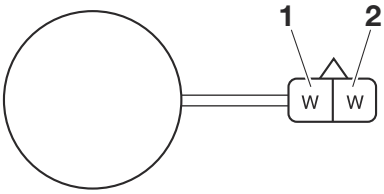

b. Check the starter motor operation.

EAM30300
### CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil assembly coupler (from the wire harness)
2. Check:
   - Stator coil assembly
     a. Connect the digital circuit tester (Ω) to the stator coil assembly coupler.

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

- Positive tester probe → White "1"
- Negative tester probe → White "2"




b. Check the stator coil for continuity.
c. If there is no continuity, replace the stator coil assembly.

EAM30301
## CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Rectifier/regulator output voltage
     Out of specification → Replace.

**Regulated voltage (DC)**
**14.0–14.8 V**

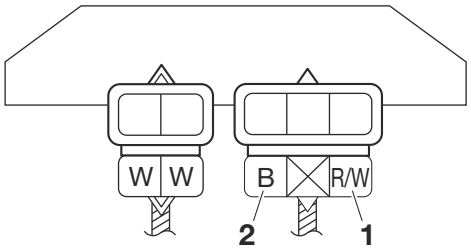
a. Set the digital tachometer to the ignition coil.

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

b. Connect the digital circuit tester (DCV) to the rectifier/regulator coupler.

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

- Positive tester probe → Red/White "1"
- Negative tester probe → Black "2"




c. Start the engine and let it run at about 5000 r/min.
d. Measure the output voltage.

EAM30303
## CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   - Coolant temperature sensor

EWA14130
**WARNING**

- **Handle the coolant temperature sensor with special care.**
- **Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.**

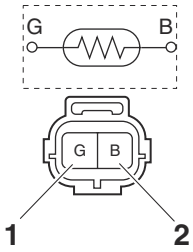
2. Check:
   - Coolant temperature sensor resistance
     Out of specification → Replace.

**Coolant temperature sensor resistance**
**2310–2590 Ω at 20 °C (2310–2590 Ω at 68 °F)**
**Coolant temperature sensor resistance**
**310–326 Ω at 80 °C (310–326 Ω at 176 °F)**

a. Connect the digital circuit tester (Ω) to the coolant temperature sensor.

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

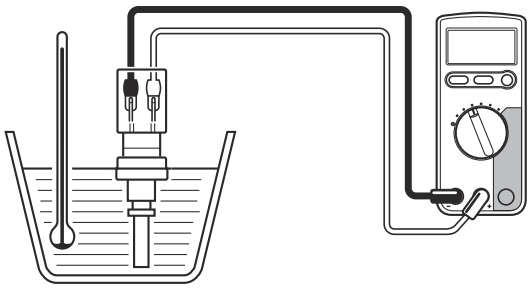
- Positive tester probe → Green "1"
- Negative tester probe → Black "2"




b. Immerse the coolant temperature sensor in a container filled with coolant.

**TIP**
Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer in the coolant.
d. Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
e. Check the coolant temperature sensor for continuity at the temperatures indicated in the table.



EAM30305
## CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE

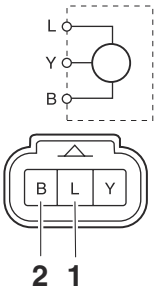
1. Check:
   • Throttle position sensor input voltage
   Out of specification → Replace the throttle position sensor.

**Digital circuit tester (CD732)**
**90890-03243**
**Model 88 Multimeter with tachometer**
**YU-A1927**
**Test harness (3P) – sub throttle position sensor**
**90890-03214**

**Throttle position sensor input voltage**
**4–6 V**

a. Connect the test harness to the throttle position sensor coupler and the wire harness.
b. Connect the digital circuit tester (DCV) to the test harness.

• Positive tester probe → Blue "1"
• Negative tester probe → Black "2"




c. Start the engine.
d. Measure the throttle position sensor input voltage.

EAM30307
## CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   • Intake air temperature sensor (from the air filter case)

EWA14110
**⚠ WARNING**
- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

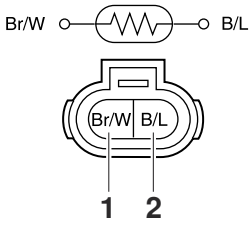
2. Check:
   • Intake air temperature sensor resistance
   Out of specification → Replace.

**Intake air temperature sensor resistance**
**5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)**
**Intake air temperature sensor resistance**
**290–390 Ω at 80 °C (290–390 Ω at 176 °F)**

a. Connect the digital circuit tester (Ω) to the intake air temperature sensor terminal.

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

- Positive tester probe →
  Brown/White "1"
- Negative tester probe →
  Black/Blue "2"

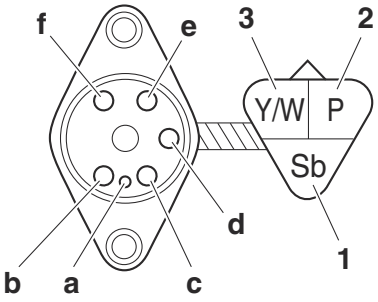



EAM30467
## CHECKING THE GEAR POSITION SWITCH

1. Remove:
   - Gear position switch
2. Check:
   - Gear position switch
     Out of specification → Replace.

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

**Continuity**
**Positive tester probe →**
**Sky blue "1"**
**Negative tester probe →**
**Sensor terminal "a"**
**Continuity**
**Positive tester probe →**
**Pink "2"**
**Negative tester probe →**
**Sensor terminal "b"**
**Continuity**
**Positive tester probe →**
**Pink "2"**
**Negative tester probe →**
**Sensor terminal "c"**
**Continuity**
**Positive tester probe →**
**Yellow/White "3"**
**Negative tester probe →**
**Sensor terminal "d"**
**Continuity**
**Positive tester probe →**
**Yellow/White "3"**
**Negative tester probe →**
**Sensor terminal "e"**
**Continuity**
**Positive tester probe →**
**Yellow/White "3"**
**Negative tester probe →**
**Sensor terminal "f"**




EAM30496
## CHECKING THE INJECTOR

1. Remove:
   - Fuel injector
     Refer to "THROTTLE BODY" on page 7-4.
2. Check:
   - Fuel injector resistance
     Out of specification → Replace.

**Resistance**
**12.0 Ω**

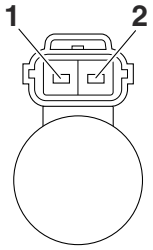
a. Disconnect the fuel injector coupler from the fuel injector.

b. Connect the digital circuit tester (Ω) to the fuel injector coupler.



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

- Positive tester probe → Injector terminal "1"
- Negative tester probe → Injector terminal "2"




c. Measure the fuel injector resistance.

# TROUBLESHOOTING

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EAM20148
# TROUBLESHOOTING

EAM30309
## GENERAL INFORMATION

**TIP**

Troubleshooting information provided here does not cover all the trouble symptoms, possible causes, and remedial actions. Some items may not apply depending on the model. Use this information as a guide and quick reference matrix when performing basic troubleshooting. Refer to the each chapter for detailed information on checking, adjustment, and replacement.

EAM30509
## TROUBLESHOOTING OF ENGINE (fault code not detected)

**TIP**

If a fault code is detected, refer to the “FUEL INJECTION SYSTEM” on page 8-15.

### Engine does not crank.

| Symptom | Possible cause | Actions |
|---|---|---|
| Starter motor does not operate | Refer to “TROUBLESHOOTING” under “ELECTRIC STARTING SYSTEM” on page 8-7. | |
| Starter motor operates, but the engine does not crank. | Starter clutch malfunction | Replace the starter clutch. |
| | Improper oil grade (starter clutch slipping) | Change to recommended engine oil. |
| | Stuck piston or seized crankshaft | Disassemble and check the engine. Replace defective parts. |

### Engine will not start or is difficult to start, but it cranks.

| Symptom | Possible cause | Actions |
|---|---|---|
| Spark plug does not produce a spark | Refer to “TROUBLESHOOTING” under “IGNITION SYSTEM” on page 8-1. | |
| Fuel not supplied | — | Measure the fuel pressure. |
| | Empty fuel tank | Fill the fuel tank with fuel. |
| | Clogged fuel tank cap breather hole | Clean the fuel tank cap. |
| | Clogged or damaged fuel hose | Clean, repair, or replace the fuel hose. |
| | Fuel leakage | Check the fuel passage. Repair or replace as necessary. |
| | Clogged fuel pump | Clean or replace the fuel pump. |
| | Cracks or damage in fuel pump | Replace the fuel pump. |
| | Fuel pump malfunction | Refer to “TROUBLESHOOTING” under “FUEL PUMP SYSTEM” on page 8-43. |
| | Failed or clogged fuel injector | Replace the fuel injector. |
| | ECU failure | Replace the ECU. |

| Symptom | Possible cause | Actions |
|---|---|---|
| — | Water or foreign material in fuel, degraded fuel | Change fuel. |
| | Loose spark plug | Tighten the spark plug to the specified torque. |
| | Loose cylinder head or cylinder | Tighten bolts or nuts on cylinder head and cylinder to the specified torque. |
| | Damaged cylinder head gasket | Replace the cylinder head gasket. |
| | Incorrect valve timing | Adjust the valve timing. |
| | Incorrect valve clearance | Adjust the valve clearance. |
| | Worn valve guide | Replace the valve guide. |
| | Bent, damaged, or stuck valve | Replace the valve. |
| | Poor contact between valve and valve seat | Reface the valve-to-valve-seat contact. |
| | Fatigued or broken valve spring | Replace the valve spring. |
| | Worn, damaged, or stuck piston ring | Replace the piston and piston rings as a set. |
| | Seized or damaged piston | Replace the piston and piston rings as a set. |
| | Worn or damaged cylinder bore | Replace the cylinder, piston, and piston rings as a set. |

**Incorrect idling speed or mid-to-high speed**

| Symptom | Possible cause | Actions |
|---|---|---|
| Spark plug does not produce a spark | Incorrect spark plug gap | Adjust the spark plug gap. |
| | Worn or damaged spark plug | Replace the spark plug. |
| | Defective spark plug cap | Replace the spark plug cap. |
| | Defective ignition coil | Replace the ignition coil. |
| | ECU failure | Replace the ECU. |
| Low fuel pressure | — | Measure the fuel pressure. |
| | Fuel leakage | Check the fuel passage. Repair or replace as necessary. |
| | Clogged fuel pump | Clean or replace the fuel pump. |
| | Cracks or damage in fuel pump | Replace the fuel pump. |
| | Fuel pump malfunction | Refer to “TROUBLESHOOTING” under “FUEL PUMP SYSTEM” on page 8-43. |
| Fuel not supplied | Failed or clogged fuel injector | Replace the fuel injector. |
| | ECU failure | Replace the ECU. |

| Symptom | Possible cause | Actions |
|---|---|---|
| — | Worn camshaft lobe | Replace the camshaft. |
| | Water or foreign material in fuel, degraded fuel | Change fuel. |
| | Contaminated throttle body or clogged internal passage | Clean the throttle body. |
| | Incorrectly adjusted throttle cable | Adjust the throttle grip free play. |
| | Incorrectly adjusted idling speed (idle screw) | Adjust the idle screw. |
| | Incorrect throttle position sensor angle | Adjust the throttle position sensor angle. |
| | Incorrect acceleration position sensor angle | Adjust the acceleration position sensor angle. |
| | Faulty ECU | Replace the ECU. |
| | Clogged vacuum hose | Clean the vacuum hose. |
| | Cracks and damage in vacuum hose | Replace the vacuum hose. |
| | Damaged throttle body joint | Replace the throttle body joint. |
| | Loose throttle body joint | Tighten the throttle body joint bolts to the specified torque. |
| | Clogged air filter element | Clean or replace the air filter element. |
| | Incorrect oil level (high) | Adjust the oil level to the specified level. |

**Excessive noise from engine**

| Symptom | Possible cause | Actions |
|---|---|---|
| Noise heard from around cylinder head | Incorrect valve clearance (too wide) | Adjust the valve clearance. |
| | Fatigued or broken valve spring | Replace the valve spring. |
| | Worn or damaged camshaft lobe | Replace the camshaft. |
| | Worn or damaged valve lifter | Replace the valve lifter and cylinder head as a set. |
| | Worn or damaged camshaft journal | Replace the camshaft. |
| | Worn or damaged cylinder head (camshaft journal) | Replace the cylinder head. |
| Noise heard from around timing chain | Worn or damaged timing chain | Replace the timing chain and camshaft sprocket as a set. |
| | Worn or damaged camshaft sprocket | Replace the timing chain and camshaft sprocket as a set. |
| | Worn or damaged timing chain guide | Replace the timing chain guide. |
| | Cracked, damaged, or faulty timing chain tensioner | Replace the timing chain tensioner. |

| Symptom | Possible cause | Actions |
|---|---|---|
| Noise heard from around piston | Worn or damaged piston ring | Replace the piston and piston rings as a set. |
| | Worn or damaged piston | Replace the piston and piston rings as a set. |
| | Worn piston (piston pin hole) | Replace the piston and piston pin as a set. |
| | Worn or damaged piston pin | Replace the piston pin. |
| | Worn or damaged cylinder bore | Replace the cylinder, piston, and piston rings as a set. |
| | Carbon buildup in piston head and combustion chamber | Clean the piston head and combustion chamber. |
| Noise heard from around crankshaft | Worn or damaged crankshaft journal or crank pin | Replace the crankshaft. |
| | Cracked, worn, or damaged balancer shaft | Replace the balancer drive gear and balancer shaft as a set. |
| | Worn or damaged balancer drive gear | Replace the balancer drive gear and balancer shaft as a set. |
| | Worn or damaged big end bearing | Replace the big end bearing. |
| | Worn or damaged crankshaft journal bearing | Replace the crankshaft journal bearing. |
| | Worn or damaged balancer shaft journal bearing | Replace the balancer shaft journal bearing. |

EAM30510

## TROUBLESHOOTING OF CLUTCH

### Manual clutch

| Symptom | Possible cause | Actions |
|---|---|---|
| Clutch slippage | Improperly assembled clutch | Reassemble the clutch. |
| | Improperly assembled clutch master cylinder | Reassemble the clutch master cylinder. |
| | Improperly assembled clutch release cylinder | Reassemble the clutch release cylinder. |
| | Incorrect clutch fluid level | Adjust the clutch fluid level to the specified level. |
| | Damaged clutch hose | Replace the clutch hose. |
| | Loose union bolt | Tighten the union bolt to the specified torque. |
| | Loose clutch spring | Tighten the pressure plate bolts to the specified torque. |
| | Fatigued clutch spring | Replace the clutch spring. |
| | Warped pressure plate | Replace the pressure plate. |
| | Worn friction plate | Replace the friction plates as a set. |
| | Warped or worn clutch plate | Replace the clutch plates as a set. |
| | Damaged clutch release cylinder | Replace the clutch release cylinder. |
| | Incorrect oil level | Adjust the engine oil level to the specified level. |
| | Incorrect oil viscosity (low) | Change to recommended engine oil. |
| | Deteriorated oil | Change to recommended engine oil. |

| Symptom | Possible cause | Actions |
|---|---|---|
| Clutch drags | Air in hydraulic clutch system | Bleed the hydraulic clutch system. |
| | Fluid leakage from hydraulic clutch system | Check the hydraulic clutch system and repair or replace faulty parts as necessary. |
| | Faulty clutch spring | Replace the clutch spring. |
| | Warped pressure plate | Replace the pressure plate. |
| | Swollen friction plate | Replace the friction plates as a set. |
| | Warped clutch plate | Replace the clutch plates as a set. |
| | Bent pull rod (outer pull type) | Replace the pull rod. |
| | Worn pull rod tooth (outer pull type) | Replace the pull rod and pull lever shaft as a set. |
| | Bent push rod (inner push type) | Replace the push rod. |
| | Damaged or worn collars | Replace the collars. |
| | Seized primary driven gear bushing | Replace the primary driven gear. |
| | Damaged clutch release cylinder | Replace the clutch release cylinder. |
| | Incorrect oil level | Adjust the engine oil level to the specified level. |
| | Incorrect oil viscosity (high) | Change to recommended engine oil. |
| | Deteriorated oil | Change to recommended engine oil. |
| Clutch noise | Damaged or worn primary driven gear | Replace the primary drive gear or crankshaft, and the primary driven gear as a set. |
| | Loose clutch boss nut | Tighten the clutch boss nut to the specified torque. |
| | Fatigued absorber | Replace the absorber. |
| | Worn clutch housing bearing | Replace the clutch housing bearing. |
| | Worn pressure plate bearing | Replace the pressure plate bearing. |

EAM30511

## TROUBLESHOOTING OF TRANSMISSION

| Symptom | Possible cause | Actions |
|---|---|---|
| Difficult or impossible to shift transmission gear | Clutch drags | Refer to “Clutch drags”. |
| | Improperly adjusted shift rod | Adjust the shift rod installation length. |
| | Bent shift shaft | Replace the shift shaft. |
| | Foreign object in a shift drum groove | Remove foreign object from shift drum groove. |
| | Damaged shift drum | Replace the shift drum. |
| | Seized shift fork | Replace the shift fork and shift fork guide bar as a set. |
| | Bent shift fork guide bar | Replace the shift fork guide bar. |
| | Foreign object between transmission gears | Remove foreign object from transmission gears. |
| | Seized transmission gear | Replace the seized gear and the axle as a set. |
| | Improperly assembled transmission | Reassemble the transmission axle assembly. |
| Jumps out of gear | Incorrect shift pedal position | Adjust the shift pedal position. |
| | Improperly returned stopper lever | Replace the stopper lever spring. |
| | Bent or worn shift fork | Replace the shift fork. |
| | Shift drum incorrect axial play | Replace the shift drum. |
| | Worn shift drum groove | Replace the shift drum. |
| | Worn transmission gear dog | Replace the transmission gear. |
| Transmission noise | Damaged or worn transmission gear | Replace the transmission gear. |
| | Worn main axle spline | Replace the main axle. |
| | Worn drive axle spline | Replace the drive axle. |
| | Worn bearing | Replace the bearing. |

EAM30512

## TROUBLESHOOTING OF COOLING SYSTEM

| Symptom | Possible cause | Actions |
|---|---|---|
| Overheating | Carbon buildup in piston head and combustion chamber | Clean the piston head and combustion chamber. |
| | Clogged engine cooling water passages | Check and clean the engine cooling water passages. |
| | Incorrect oil level | Adjust the oil level to the specified level. |
| | Incorrect oil viscosity | Change to recommended engine oil. |
| | Inferior oil quality | Change to recommended engine oil. |
| | Low coolant level | Add recommended coolant to the specified level. |
| | Damaged or leaking radiator | Replace the radiator. |
| | Faulty radiator cap | Replace the radiator cap. |
| | Clogged radiator fin | Clean the radiator fin. |
| | Bent or damaged radiator fin | Repair the radiator fin or replace the radiator. |
| | Damaged or faulty water pump | Replace the water pump. |
| | Damaged hoses or pipes | Replace the hose or pipe. |
| | Improperly connected hoses or pipes | Connect the hoses and pipes properly. |
| | Damaged throttle body joint | Replace the throttle body joint. |
| | Loose throttle body joint | Tighten the throttle body joint bolts to the specified torque. |
| | Clogged air filter element | Clean or replace the air filter element. |
| | Brake drags | Check the brake system and repair or replace faulty parts as necessary. |
| | Incorrect spark plug gap | Adjust to the specified spark plug gap. |
| | Incorrect spark plug heat range | Replace the spark plug with the one of the specified type. |
| | Faulty ECU | Replace the ECU. |
| Noise from water pump | Contact between the water pump housing cover and impeller | Disassemble the water pump and replace faulty parts. |
| | Worn water pump housing bearing | Replace the water pump housing bearing. |

EAM30513
## TROUBLESHOOTING OF BRAKE

| Symptom | Possible cause | Actions |
|---|---|---|
| Poor performance of disc brake | Worn brake pad | Replace the brake pads as a set. |
| | Worn or deflected brake disc | Replace the brake disc. |
| | Air in hydraulic brake system | Bleed the hydraulic brake system. |
| | Brake fluid leakage | Check the hydraulic brake system and repair or replace faulty parts as necessary. |
| | Incorrect brake fluid level (low) | Add brake fluid to the specified level. |
| | Stuck brake caliper piston | Replace the caliper piston seal. |
| | Stuck brake caliper and slide pin | Lubricate the caliper slide pin. |
| | Loose union bolt | Tighten the union bolt to the specified torque. |
| | Damaged brake hose and brake pipe | Replace the brake hose and brake pipe. |
| | Oil or grease on the brake disc or brake pad | Clean the brake disc or brake pad. |
| | Insufficient lubrication of brake lever or brake pedal pivot | Lubricate the brake lever or brake pedal pivot. |

EAM30514
## TROUBLESHOOTING OF SUSPENSION

| Symptom | Possible cause | Actions |
|---|---|---|
| Front fork is hard | Bent or damaged inner tube | Replace the inner tube. |
| | Bent or damaged outer tube | Replace the outer tube. |
| | Damaged or worn slide metal | Replace the slide metal. |
| | Bent or damaged damper rod | Replace the damper rod. |
| | Bent wheel axle | Replace the wheel axle. |
| | Incorrect oil viscosity (high) | Change to recommended fork oil. |
| | Incorrect oil level (high) | Adjust to the specified oil level. |
| | Improperly adjusted spring preload (hard) | Adjust the spring preload. |
| | Improperly adjusted rebound damping (hard) | Adjust the rebound damping. |
| | Improperly adjusted compression damping (hard) | Adjust the compression damping. |

| Symptom | Possible cause | Actions |
|---|---|---|
| Front fork is soft | Fatigued or broken fork spring | Replace the fork spring. |
| | Incorrect oil viscosity (low) | Change to recommended fork oil. |
| | Incorrect oil level (low) | Adjust to the specified oil level. |
| | Improperly adjusted spring preload (soft) | Adjust the spring preload. |
| | Improperly adjusted rebound damping (soft) | Adjust the rebound damping. |
| | Improperly adjusted compression damping (soft) | Adjust the compression damping. |
| Leaking oil from front fork | Bent, damaged, or corroded inner tube | Replace the inner tube. |
| | Cracked or damaged outer tube | Replace the outer tube. |
| | Improperly installed oil seal | Replace the oil seal. |
| | Damaged oil seal lip | Replace the oil seal. |
| | Incorrect oil level (high) | Adjust to the specified oil level. |
| | Loose damper rod assembly bolt | Tighten the damper rod assembly bolt to the specified torque. |
| | Damaged damper rod assembly bolt copper washer | Replace the damper rod assembly bolt copper washer. |
| | Cracked or damaged cap bolt O-ring | Replace the cap bolt O-ring. |
| Rear suspension is hard | Bent or damaged rear shock absorber rod | Replace the rear shock absorber. |
| | Bent swingarm pivot shaft | Replace the swingarm pivot shaft. |
| | Damaged or worn swingarm bearing or bushing | Replace the swingarm bearing or bushing. |
| | Damaged or worn relay arm bearing | Replace the relay arm bearing. |
| | Damaged or worn connecting arm bearing | Replace the connecting arm bearing. |
| | Improperly adjusted rear shock absorber spring preload (hard) | Adjust the spring preload. |
| | Improperly adjusted rear shock absorber rebound damping (hard) | Adjust the rebound damping. |
| | Improperly adjusted rear shock absorber compression damping (hard) | Adjust the compression damping. |

| Symptom | Possible cause | Actions |
|---|---|---|
| Rear suspension is soft | Oil leaking from rear shock absorber | Replace the rear shock absorber. |
| | Gas leaking from rear shock absorber | Replace the rear shock absorber. |
| | Fatigued or damaged rear shock absorber spring | Replace the rear shock absorber. |
| | Improperly adjusted rear shock absorber spring preload (soft) | Adjust the spring preload. |
| | Improperly adjusted rear shock absorber rebound damping (soft) | Adjust the rebound damping. |
| | Improperly adjusted rear shock absorber compression damping (soft) | Adjust the compression damping. |
| Oil leaking from rear shock absorber | Bent, damaged, or corroded rear shock absorber rod | Replace the rear shock absorber. |
| | Damaged oil seal lip | Replace the rear shock absorber. |

EAM30515
## TROUBLESHOOTING OF STEERING/HANDLING

| Symptom | Possible cause | Actions |
|---|---|---|
| Handlebar wobble | Loose lower ring nut | Tighten the lower ring nut to the specified torque. |
| | Worn bearing or bearing race | Replace the bearing and bearing race as a set. |
| | Warped front fork | Repair or replace the front fork. |
| | Bent front wheel axle | Replace the front wheel axle. |
| | Incorrect tire pressure | Adjust to the specified tire pressure. |
| | Worn, deformed, or incorrect tire | Replace the tire. |
| Heavy steering | Lower ring nut is tightened too tight | Tighten the lower ring nut to the specified torque. |
| | Bent lower bracket | Replace the lower bracket. |
| | Broken bearing or bearing race | Replace the bearing and bearing race as a set. |
| | Incorrect tire pressure | Adjust to the specified tire pressure. |
| Front wheel vibration | Loose spoke | Tighten the spoke and adjust the runout. |
| | Damaged or worn wheel bearing | Replace the wheel bearing. |
| | Worn, deformed, or incorrect tire | Replace the tire. |
| | Loose wheel axle or wheel axle nut | Tighten the wheel axle or wheel axle nut to the specified torque. |
| | Loose wheel axle pinch bolt | Tighten the wheel axle pinch bolt to the specified torque. |
| | Incorrect front fork oil level | Adjust to the specified front fork oil level. |

| Symptom | Possible cause | Actions |
|---|---|---|
| Rear wheel vibration | Loose spoke | Tighten the spoke and adjust the runout. |
| | Damaged or worn wheel bearing | Replace the wheel bearing. |
| | Worn, deformed, or incorrect tire | Replace the tire. |
| | Loose wheel axle nut | Tighten the wheel axle nut to the specified torque. |
| | Loose swingarm pivot shaft | Tighten the swingarm pivot shaft to the specified torque. |
| | Bent or damaged swingarm | Replace the swingarm bearing. |
| | Damaged or worn swingarm bearing or bushing | Replace the swingarm bearing or bushing. |

EAM30516

## TROUBLESHOOTING OF CHARGING SYSTEM

| Symptom | Possible cause | Actions |
|---|---|---|
| Battery is not charged | Refer to “TROUBLESHOOTING” under “CHARGING SYSTEM” on page 8-11. | |

EAM20174
# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAM30497
## SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

| Fault code | Item | Page |
|---|---|---|
| 8 | Gear position switch: open or short circuit detected. | 8-23 |
| 12 | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor. | 8-25 |
| 13 | Intake air pressure sensor: open or short circuit detected. | 8-26 |
| 14 | Intake air pressure sensor: hose system malfunction (clogged or detached hose). | 8-27 |
| 15 | Throttle position sensor: open or short circuit detected. | 8-28 |
| 16 | Throttle position sensor: stuck throttle position sensor is detected. | 8-30 |
| 21 | Coolant temperature sensor: open or short circuit detected. | 8-31 |
| 22 | Intake air temperature sensor: open or short circuit detected. | 8-32 |
| 30 | The vehicle has overturned. | 8-33 |
| 33 | Ignition coil: open or short circuit detected in the primary lead of the ignition coil. | 8-34 |
| 39 | Injector: open or short circuit detected. | 8-36 |
| 41 | ECU: built-in lean angle sensor malfunction. | 8-37 |
| 43 | Fuel system voltage: incorrect voltage supplied to the CCU, and incorrect recognition voltage of the motorcycle. | 8-38 |
| 44 | EEPROM read error: an error is detected while reading or writing on EEPROM. | 8-38 |
| 46 | Vehicle system power supply: normal voltage is not supplied to the ECU. | 8-40 |
| 50 | ECU: faulty ECU memory. | 8-41 |
| 70 | Engine forcibly stops when the vehicle is left idling for a long period of time. | 8-41 |

EAM30425
## DIAGNOSTIC CODE: SENSOR OPERATION TABLE

| Diagnostic code No. | Item | Display | Procedure |
|---|---|---|---|
| 01 | Throttle angle<br>• Fully closed position<br>• Fully opened position | Displays the throttle angle.<br>• 11–14<br>• 86–92 | <br>• Check with throttle fully closed.<br>• Check with throttle fully opened. |
| 03 | Pressure of suction pipe | Displays the intake air pressure.<br>• Check the change of the intake pressure valve when the starter switch is pushed. | The atmospheric pressure is displayed on the Yamaha diagnostic tool. |
| 05 | Intake air temperature | Displays the intake air temperature. | Compare the actually measured intake air temperature with the Yamaha diagnostic tool display value. |

| Diagnostic code No. | Item | Display | Procedure |
|---|---|---|---|
| 06 | Coolant temperature | Displays the coolant temperature. | Compare the actually measured coolant temperature with the Yamaha diagnostic tool display value. |
| 08 | Lean angle sensor<br>• Upright<br>• Overturn | Displays the output voltage.<br>• 0.4–1.4 (V)<br>• 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.<br>• Approximately 12.0 (V) | — |
| 25 | Gear position switch<br>• Gear in neutral<br>• Gear in 1st or 2nd<br>• Gear in other than 1st or 2nd | <br>• N<br>• 1<br>• 3 | Operate the shift pedal. |
| 60 | EEPROM fault code display<br>• No fault<br>• CO adjustment value<br>• Power Tuner injection correction setting 0–8, or Power Tuner ignition timing correction setting 0–8<br>• Fully-closed throttle angle | <br>• 00<br>• 01<br>• 07<br>• 12 | — |
| 64 | Setting history display<br>• There is no history.<br>• There is some history.<br>• History is unknown (History data is damaged). | Displays the presence or absence of the setting history by Power Tuner.<br>• 00<br>• 01<br>• 02 | — |
| 65 | Setting map erasure<br>• There is no setting.<br>• There is some setting. | Displays the presence or absence of the setting history by Power Tuner.<br>• 00<br>• 01 | Erase all setting maps by the operation start processing. |
| 70 | Program version number | Displays a program version No. | — |

EAM30426

## DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

| Diagnostic code No. | Item | Actuation | Procedure |
|---|---|---|---|
| 30 | Ignition coil | Actuates the ignition coil five times at one-second intervals. "WARNING" on the Yamaha diagnostic tool blinks five times when the ignition coil is actuated. | Check that a spark is generated five times.<br>• 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
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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) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**3.923 (51/13) (AUS, CAN, NZL, ZAF)**

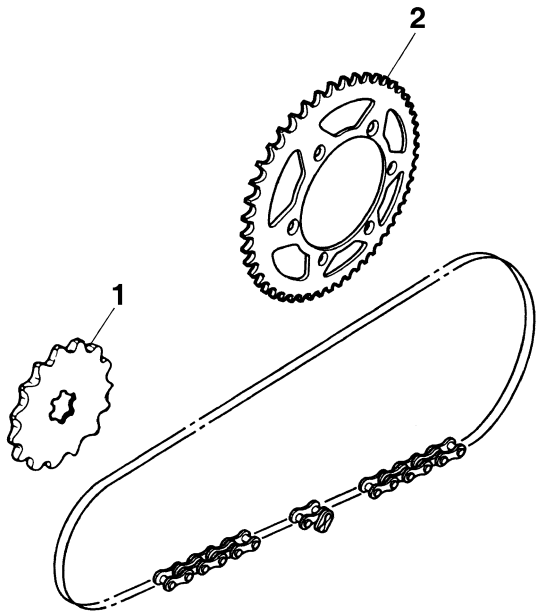
<Requirement for selection of secondary gear reduction ratio>
- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition of the day of the race, be sure to run through the circuit to set the machine suitable for the entire course.
- In actuality, it is very difficult to achieve settings suitable for the entire course and some settings may be sacrificed. Thus, the settings should be matched to the portion of the course that has the greatest effect on the race result. In such a case, run through the entire course while making notes of lap times to find the best balance; then, determine the secondary reduction ratio.
- If a course has a long straight portion where a machine can run at maximum speed, the machine is generally set such that it can develop its maximum revolutions toward the end of the straight line, with care taken to avoid the engine over-revving.

**TIP**
Riding technique varies from rider to rider and the performance of a machine also vary from machine to machine. Therefore, do not imitate other rider's settings from the beginning but choose your own setting according to the level of your riding technique.

EAM30169
## DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS

| Part name | | Type | Part number |
|---|---|---|---|
| Drive sprocket "1" | (STD) | 13T | 9383E-13233 |
| Rear wheel sprocket "2" | | 47T | 17D-25447-50 |
| | | 48T | 17D-25448-50 |
| | | 49T | B2W-25449-00 |
| | (STD)*1 | 50T | B2W-25450-00 |
| | (STD)*2 | 51T | B2W-25451-00 |
| | | 52T | 17D-25452-50 |

*1: For D03C, D03H
*2: For D03B, D03E, D03G, D03J




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/cm², 9–12 psi)**

- Under a stony or a hard road condition, the tire pressure should be higher to prevent a flat tire.

**Extent of adjustment**
**100–120 kPa (1.00–1.20 kgf/cm², 15–18 psi)**

EAM30171

## FRONT FORK SETTING

The front fork setting should be made depending on the rider's feeling of an actual run and the circuit conditions.
The front fork setting includes the following three factors:

1. Setting of air spring characteristics
   - Change the fork oil amount.
2. Setting of spring preload
   - Change the spring.
3. Setting of damping force
   - Change the compression damping force.
   - Change the rebound damping force.
     The spring acts on the load and the damping force acts on the cushion travel speed.

EAM30172

## CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

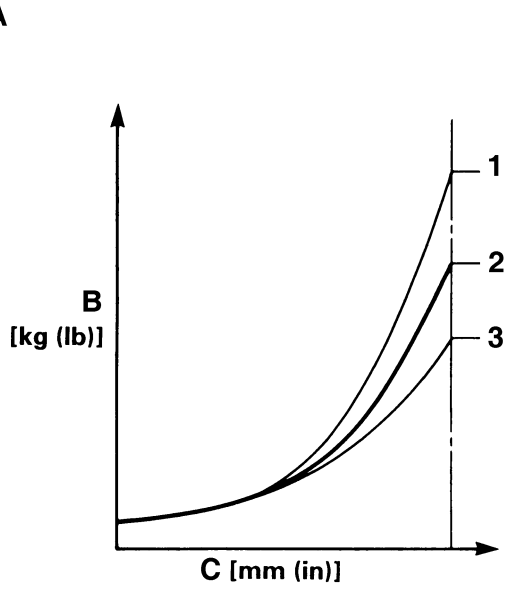
Damping characteristic near the final stroke can be changed by changing the fork oil amount.

EWA19190

**⚠ WARNING**

**Adjust the oil amount in 5 cm³ (0.2 US oz, 0.2 Imp.oz) increments or decrements. Too small oil amount causes the front fork to produce a noise at full rebound or the rider to feel some pressure on his hands or body. Alternatively, too large oil amount will cause the air spring characteristics to have a tendency to be stiffer with the consequent deteriorated performance and characteristics. Therefore, adjust the front fork within the specified range.**

**Recommended oil**
**Yamaha Suspension Oil S1**
**Standard oil amount**
**295.0 cm³ (9.97 US oz, 10.40 Imp.oz) (AUS, CAN, NZL, ZAF)**
**310.0 cm³ (10.48 US oz, 10.93 Imp.oz) (ALB, AND, AUT, BEL, BGR, BIH, CHE, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HRV, HUN, IRL, ISL, ISR, ITA, KVX, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MNE, NLD, NOR, POL, PRT, ROM, SRB, SVK, SVN, SWE, TUR, UKR)**
**Extent of adjustment**
**260–365 cm³ (8.79–12.34 US oz, 9.17–12.87 Imp.oz)**




A. Air spring characteristics in relation to oil amount change
B. Load
C. Stroke

1. Max. oil amount
2. Standard oil amount
3. Min. oil amount

EAM30173

## SETTING OF SPRING AFTER REPLACEMENT

As the front fork setting can be easily affected by the rear suspension, take care so that the front and the rear are balanced (in position etc.) when setting the front fork.

1. Use of soft spring
   • Change the rebound damping force.
   Turn out one or two clicks.
   • Change the compression damping force.
   Turn in one or two clicks.

**TIP**

Generally a soft spring gives a soft riding feeling. Rebound damping tends to become stronger and the front fork may sink deeply over a series of gaps.

2. Use of stiff spring
   • Change the rebound damping force.
   Turn in one or two clicks.
   • Change the compression damping force.
   Turn out one or two clicks.

**TIP**

Generally a stiff spring gives a stiff riding feeling. Rebound damping tends to become weaker, resulting in lack of a sense of contact with the road surface or in a vibrating handlebar.

EAM30174

## FRONT FORK SETTING PARTS

• Front fork spring

| STD Spring rate N/mm | 5.0 *1<br>5.1 *2 |
|---|---|

| Type | Spring rate N/mm | Part number | I.D. mark (slits) |
|---|---|---|---|
| SOFT | 4.5 | BR9-23141-20 | I-II |
| ↑ | 4.6 | BR9-23141-30 | I-III |
| | 4.7 | BR9-23141-40 | I-IIII |
| | 4.8 | BR9-23141-50 | I-IIIII |
| | 4.9 | BR9-23141-60 | II-II |
| ↓ | 5.0 | BR9-23141-70 | II-III |
| STIFF | 5.1 | BR9-23141-80 | II-IIII |

*1: For D03B, D03E, D03G, D03J
*2: For D03C, D03H

**TIP**

The I.D. mark (slits) is proved on the end of the spring.

EAM30175

## REAR SUSPENSION SETTING

The rear shock absorber setting should be made depending on the rider's feeling of an actual run and the circuit conditions.

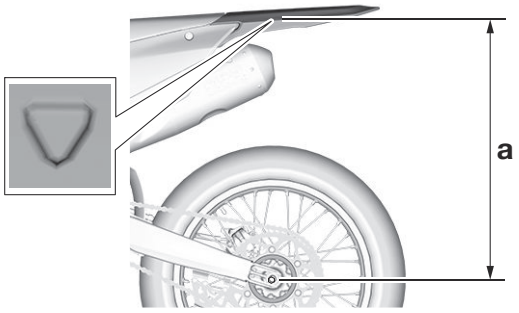
The rear suspension setting includes the following two factors:

1. Setting of spring preload
   • Change the set length of the spring.
   • Change the spring.
2. Setting of damping force
   • Change the rebound damping force.
   • Change the compression damping force.

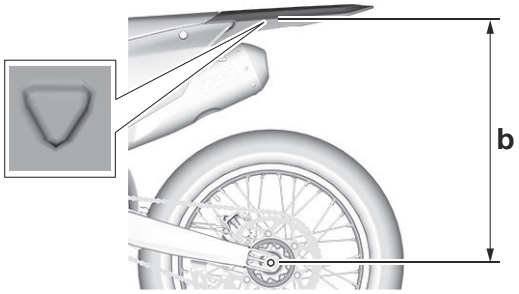
EAM30176

## CHOOSING SET LENGTH

1. Place a stand or a block under the engine to put the rear wheel above the floor, and measure the length "a" between the rear wheel axle center and "△" mark of rear fender.




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 "△" mark of rear fender.



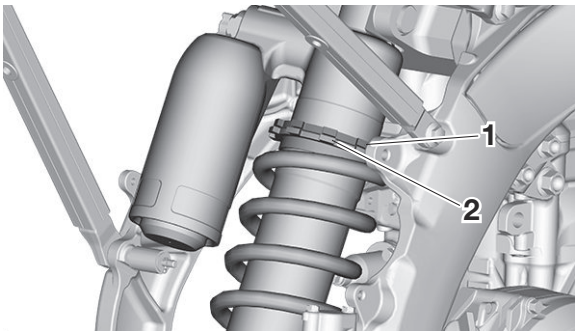

3. Loosen the locknut "1" and make adjustment by turning the adjuster "2" to achieve the standard figure from the subtraction of the length "b" from the length "a".

**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**

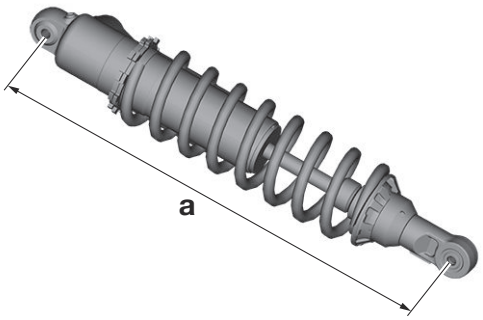
Adjusting the rebound damping force will be followed more or less by a change in the compression damping force. For correction, adjust to decrease compression damping force.

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"

| STD Spring rate N/mm | 56 *1<br>58 *2 |
|---|---|

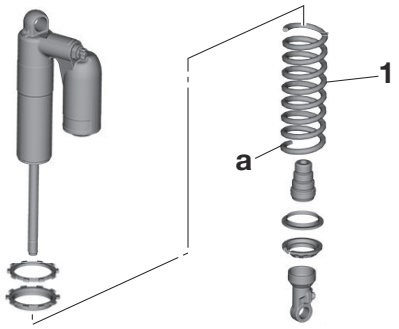
| Type | Spring rate N/mm | Part number | I.D. mark |
|---|---|---|---|
| SOFT<br>↑ | 52 | BR9-22212-00 (Blue) | Yellow |
| | | BR9-22212-50 *3 (Black) | |
| | 54 | BR9-22212-10 (Blue) | Pink |
| | | BR9-22212-60 *3 (Black) | |
| | 56 | BR9-22212-A0 *4 (Silver) | White |
| | | BR9-22212-20 *3 (Blue) | |
| | | BR9-22212-70 *3 (Black) | |
| | 58 | BR9-22212-B0 *4 (Silver) | Gold |
| | | BR9-22212-30 *3 (Blue) | Silver |
| | | BR9-22212-80 *3 (Black) | |
| ↓<br>STIFF | 60 | BR9-22212-40 (Blue) | Brown |
| | | BR9-22212-90 *3 (Black) | |

*1: For D03B, D03E, D03G, D03J
*2: For D03C, D03H
*3: For D03G, D03H, D03J
*4: For D03B, D03C, D03E

**TIP**

- The I.D. mark "a" is marked at the end of the

spring.
- Spring specification varies according to the color of I.D. marks.




- Spring preload adjusting positions

**Spring preload adjusting positions**
**Minimum**
**Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.**
**Standard**
**Position in which the spring is turned in 7.0 mm (0.28 in) from its free length.**
**Maximum**
**Position in which the spring is turned in 18.0 mm (0.71 in) from its free length.**

**TIP**
For the spring preload adjustment, refer to "ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY" on page 3-31.

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 $cm^3$ (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 $cm^3$ (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 $cm^3$ (0.2 US oz, 0.2 Imp.oz). |
| Soft toward stroke end, bottoming out | √ | | | | Oil amount | Increase oil amount by about 5 $cm^3$ (0.2 US oz, 0.2 Imp.oz). |
| Stiff initial movement | √ | √ | √ | √ | Compression damping force | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |

| Symptom | Section | | | | Check | Adjust |
|---|---|---|---|---|---|---|
| | Jump | Large gap | Medium gap | Small gap | | |
| Low front, tending to lower front posture | | | √ | √ | Compression damping force | Turn adjuster clockwise (about 2 clicks) to increase damping. |
| | | | | | Rebound damping force | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| | | | | | Balance with rear end | Set sunken length for 95–100 mm (3.7–3.9 in) when one passenger is astride seat (lower rear posture). |
| | | | | | Oil amount | Increase oil amount by about 5 $cm^3$ (0.2 US oz, 0.2 Imp.oz). |
| "Obtrusive" front, tending to upper front posture | | | √ | √ | Compression damping force | Turn adjuster counterclockwise (about 2 clicks) to decrease damping. |
| | | | | | Balance with rear end | Set sunken length for 90–95 mm (3.5–3.7 in) when one passenger is astride seat (upper rear posture). |
| | | | | | Spring | Replace with soft spring. |
| | | | | | Oil amount | Decrease oil amount by about 5–10 $cm^3$ (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. |

EAM20212

YAMAHA LITHIUM-ION BATTERY USER'S MANUAL

YAMAHA

English

# User's manual

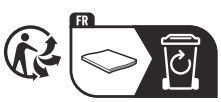
## - YAMAHA Lithium Ion Battery -

- **Please read all user's manual before use the YAMAHA batteries and chargers for safety.**
- **Be sure to observe the following in order to avoid burns or other injury from fluid leakage, overheating, fire or explosion.**
- **Please contact the place of purchase for information on installation and adjustment of the products which are not found in the user's manual.**
- **The following instructions must be observed at all times in order to prevent personal injury and physical damage to equipment and surroundings.**
- **WARNING: Risk of Fire. Never Disassemble. No User Serviceable Parts.**

**Manufacturer:**
Trend Power Technology (Changshu) INC.
No.868 Dongnan Avenue, Changshu High_tech Industrial
Development Zone, Jiangsu PRC,CN

**Importer: (EU)**
YAMAHA MOTOR EUROPE N.V.
Koolhovenlaan 101, 1119 NC Schiphol-Rijk, 1117 ZN, Schiphol, the Netherlands

**Importer: (UK)**
YAMAHA MOTOR EUROPE N.V., BRANCH UK
Units A2-A3, Kingswey Business Park, Forsyth Road, Woking, Surrey. GU21 5SA. United Kingdom.




**BNK-2819W-00**

**⚠ Battery safety instructions and warnings.**

- Only use the designated charger and follow the specified charging conditions when charging the battery. Otherwise it may cause overheating, bursting, or ignition of the battery.
- Do not leave the battery near sources of heat such as heaters, vehicle or any dangerous place.
- Do not heat the battery or throw it into fire.
- Do not deform, modify, disassemble or apply solder directly to the battery.
- Do not connect the (+) and (-) terminals and other terminals with metallic objects. Do not carry or store the battery together with metallic objects such as necklaces or hairpins. Because it could cause short-circuits, overheating, burns or other injury.
- Do not place the battery into the water, and do not allow the battery terminals to get wet. Otherwise it may cause overheating, bursting, or ignition of the battery.
- Do not puncture, crush or will damage the battery.
- If any liquid leaking from the battery gets into your eyes, skin or clothes, immediately wash the affected area thoroughly with clean water, and seek medical advice immediately. The battery liquid would damage your eyes and body.
- If the battery does not charge by the charger in 1 minute, please unplug the charger cable and plug again, if still not working please contact the place of purchase immediately.
- Do not use the battery if it has any external damage.
- Do not use the battery if leakages, discoloration, deformation or any other abnormalities occur.
- Do not recharge the battery in wet or very humid places, or outdoors.
- Do not insert or remove the plug while it is wet. Otherwise it may cause electric shocks. If there is water leaking out of the plug, dry it thoroughly before inserting it.
- Do not store in direct sunlight or in places (such as inside cars) where the heat can become excessive. Keep away from heat and open flames. This may result in battery leakage.
- Use both hands when handling the product to avoid the dangerous and injury.
- If an error occurs during discharge or charging, stop using the battery immediately and refer to the user's manual. If you are not sure, consult the place of purchase.
- Do not clean the battery with high pressure water spray.
- Do not use alcohol, solvents or abrasive cleaner to clean the battery or charger. Please use a dry or slightly damp cloth.
- This battery is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the battery system by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the battery & charger.
- If the battery exploded, please contact firefighters immediately, and please cautiously remove other batteries if possible, evacuate all persons from immediate area of fire, and use plenty of cold water (min. 10 times pack weight) to put out the fire before the rescue.
- Do not expose battery systems to strong mechanical impacts.
- Products with broken seals shall not be used and shall be immediately forwarded for appropriate recycling.

### ⚠ Charging condition and safety instructions.

- The battery is not fully charged at the time you purchase. Before riding, be sure to charge the battery until it is fully charged.
- Please only use YAMAHA charger to charge the battery pack.
- Be sure the charge port and plugs are always clean and dry before connecting the charger.
- Never use the charger which you suspect is damaged or know to be broken.
- Do not disassemble or modify the battery charger.
- Do not use any non-approval male connector insert the battery connector and charger, especially with metal or conductive materials.
- Do not allow the battery charger to get wet, and using it while it is wet, don't tough or hold it with wet hand to avoid an electric shock.
- Do not use the charger when it is covered with a cloth or other material.
- Do not touch the metallic parts of the device or the power plug on the AC adapter or other parts if there is a lightning storm.
- Do not use the charger to charge the battery outdoor or in the environments with high humidity, and please avoid exposure to rain or wind.
- In order to prevent the cable from being damaged, please do not hold the charger cable only when carrying it and avoid wrapping cable around the main body during storage.
- Please always remove the battery from vehicle before washing the vehicle with water or any kinds of liquid material.
- Please wait for an hour if you would like to charge the battery after riding, due to the battery temperature might be too high.
- Recommend to charge the battery in an area with a smoke detector.
- It is not recommended to have the battery pack connected permanently to the charger.

### ⚠ Recycle

- Battery packs, accessories and packaging should be sorted for environmental friendly recycling.
- Lithium ion batteries are recyclable, valuable resources. For information on used batteries, follow the rules in your area. If you are not sure, consult the place of purchase.
- Electronic devices that are no longer usable and defective/drained batteries must be collected separately and recycled in an environmentally friendly manner.
- Do not touch severely damaged batteries with your bare hands – electrolyte may escape and cause skin irritation. Store the defective battery in a safe location outdoors. Cover the terminals if necessary and inform your dealer. They will help you to dispose of it properly.



### ⚠ Pack storage condition.

- Store the battery in a safe place away from reach of infants and pets.
- If the battery is stored in temperatures which are outside these ranges, then it may cause fire, injury.
- Do not store battery at below temperatures below -10 °C or above 60 °C.
- Store the battery in cool indoor places where they do not become exposed to direct sunlight or rain. If the storage temperature is low or high, the performance of the battery is reduced, and its available time will be shorter. When you use the battery after a long storage period, be sure to charge it before use.
- Temperature above 70 °C may result in battery leakage and rupture.

**⚠ Assembly battery condition.**

- Please do not use the battery immediately after shipment. The battery can be used after charging it with the designated charger. Be sure to charge it before use.
- Please always switch off the battery and the system when you insert or remove the battery from system.

**⚠ Pack operation condition.**

- The operating temperature ranges for the battery are given below. Do not use the battery in temperatures outside these ranges. If the battery is used in temperatures which are outside these ranges, then it may cause fire, injury.
- Only use the battery during discharge temperature range: -10 °C–65 °C
- Only charge the battery it during charging temperature range: -10 °C–60 °C
- The battery must be charged in an ambient temperature, on a non-flammable and dry surface, away from any sources of heat, humidity or flammable materials.
- If the battery has been charged in a low temperature environment (0 °C or below), the maximum riding distance per full charge becomes shorter. This is due to a characteristic of the battery. If the battery is charged at room temperature, the battery becomes normal again.

**⚠ Warranty void condition.**

- Charge the battery at least every 3 months to approximately 70 % capacity, even when the battery is not in use.
- For replacement information, please contact the place of purchase.
- Products are not guaranteed against natural wear and deterioration from normal use and aging.
- The life of the battery will vary depending on factors such as the storage method, the usage conditions, the surrounding environment and the characteristics of the individual battery pack.
- If the battery has become completely empty, charge it as soon as possible. If the battery is left uncharged, it may cause the battery to deteriorate and become unusable.
- Please do not disassemble the battery or other relates parts, including label, or improper human operation, it may cause the battery lost warranty.

EAM20149

# WIRING DIAGRAM

**YZ450F/YZ450FV 2027**

1. AC magneto
2. Rectifier/regulator
3. Battery
4. Fuse
5. Starter relay
6. Starter motor
7. Diode 1
8. Throttle position sensor
9. Intake air pressure sensor
10. Crankshaft position sensor
11. Intake air temperature sensor
12. Coolant temperature sensor
13. ECU (Engine Control Unit)
14. Ignition coil
15. Spark plug
16. Fuel injector
17. Fuel pump
18. CCU (Communication Control Unit)
19. Gear position switch
20. Handlebar switch (left)
21. Indicator light
22. Multi-function button
23. Engine stop switch
24. Handlebar switch (right)
25. Starter switch
26. Frame ground
27. Engine ground

A. Wire harness
B. CCU sub-lead

EAM30323

## COLOR CODE

| | |
|---|---|
| B | Black |
| Br | Brown |
| Dl | Dark blue |
| G | Green |
| Gy | Gray |
| L | Blue |
| P | Pink |
| R | Red |
| Sb | Sky blue |
| W | White |
| Y | Yellow |
| B/Br | Black/Brown |
| B/L | Black/Blue |
| B/R | Black/Red |
| B/W | Black/White |
| B/Y | Black/Yellow |
| Br/W | Brown/White |
| G/B | Green/Black |
| L/B | Blue/Black |
| Lg/L | Light green/Blue |
| Lg/W | Light green/White |
| R/B | Red/Black |
| R/L | Red/Blue |
| R/W | Red/White |
| R/Y | Red/Yellow |
| W/B | White/Black |
| Y/B | Yellow/Black |
| Y/W | Yellow/White |



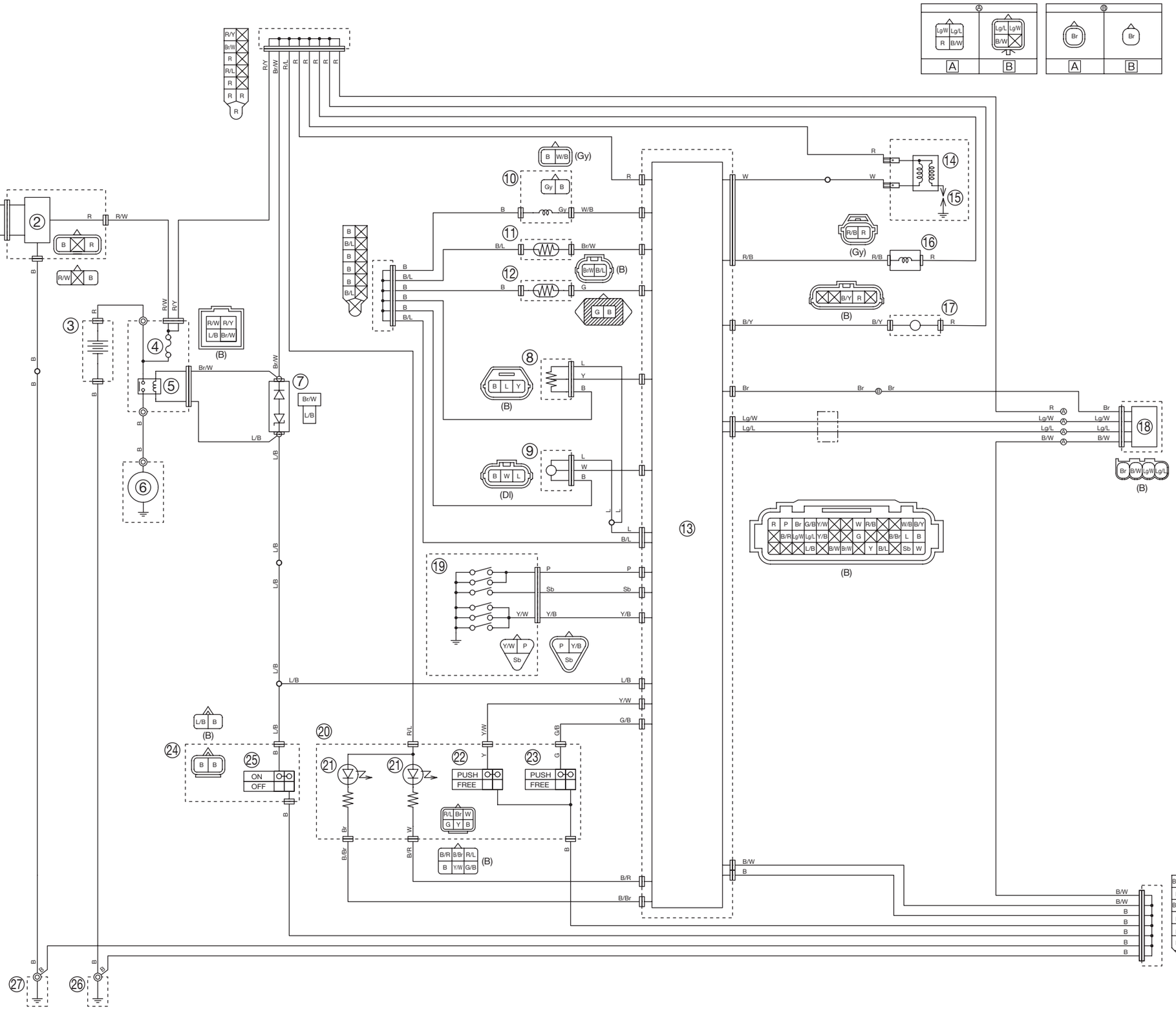
**YZ450F/YZ450FV 2027**
**WIRING DIAGRAM**

**YZ450F/YZ450FV 2027**
**SCHÉMA DE CÂBLAGE**

**YZ450F/YZ450FV 2027**
**SCHALTPLAN**

**YZ450F/YZ450FV 2027**
**SCHEMA ELETTRICO**

**YZ450F/YZ450FV 2027**
**DIAGRAMA ELÉCTRICO**



**YZ450F/YZ450FV 2027**
**WIRING DIAGRAM**

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