YAMAHA

2012

Read this manual carefully before operating this vehicle.

OWNER'S SERVICE MANUAL

WR450FB

LIT-11626-25-58

1DX-28199-10

EAS1DX3003
INTRODUCTION

Congratulations on your purchase of a Yamaha WR 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.
The design and manufacture of this Yamaha machine fully comply with the emissions standards for clean air applicable at the date of manufacture. Yamaha has met these standards without reducing the performance or economy of operation of the machine. To maintain these high standards, it is important that you and your Yamaha dealer pay close attention to the recommended maintenance schedules and operating instructions contained within this manual.

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.

EWA1DX0001

⚠ 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.

EAS1DX3004
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.

EAS1DX3006

YAMAHA MOTOR CORPORATION, U.S.A.
WR MOTORCYCLE LIMITED WARRANTY

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

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

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

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

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

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

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

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

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

EMISSION CONTROL SYSTEM WARRANTY
Yamaha Motor Corporation, U.S.A. also warrants to the ultimate purchaser and each subsequent purchaser of each 2006 and later model Yamaha motorcycle covered by this warranty that the vehicle is designed, built, and equipped so as to conform at the time of sale with all U.S. emissions standards applicable at the time of manufacture and that it is free from defects in materials and workmanship which would cause it not to meet these standards within the period listed immediately below. Failures other than those resulting from defects in material or workmanship which arise solely as a result of owner abuse and/or lack of proper maintenance are not covered by this warranty.

All Off-Road Models
Thirty (30) months from the original purchase date

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

SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. ALSO EXCLUDED FROM THIS WARRANTY ARE ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING LOSS OF USE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

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

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

WARRANTY QUESTIONS AND ANSWERS

Q. What costs are my responsibility during the warranty period?

A. The customer's responsibility includes all costs of normal maintenance services, non-warranty repairs, accident and collision damage, and oil, oil filters, air filters, spark plugs, and brake shoes or pads.

Q. What are some examples of "abnormal" strain, neglect, or abuse?

A. These terms are general and overlap each other in areas. Specific examples include: Running the machine without oil; operating the machine with a broken or damaged part which causes another part to fail, damage or failure due to improper or careless transportation and or tie down; and so on. If you heve any specific questions on operation or maintenance, please contact your dealer for advice.

Q. Does the warranty cover incidental costs such as towing or transportation due to a failure?

A. No. The warranty is limited to repair of the machine itself.

Q. May I perform any or all of the recommended maintenance shown in the Owner's Service Manual instead of having the dealer do them?

A. Yes, if you are a qualified mechanic and follow the procedures specified in the Owner's Service Manual. We do recommend, however, that items requiring special tools or equipment be done by a Yamaha motorcycle dealer.

Q. Will the warranty be void or canceled if I do not operate or maintain my new WR exactly as specified in the Owner's Service Manual?

A. No. The warranty on a new motorcycle cannot be "voided" or "cancelled." However, if a particular failure is caused by operation or maintenance other than as shown in the Owner's Service Manual, that failure may not be covered under warranty.

Q. What responsibility does my dealer have under this warranty?

A. Each Yamaha motorcycle dealer is expected to:

1. Completely set up every new machine before sale.
2. Explain the operation, maintenance, and warranty requirements to your satisfaction at the time of sale, and upon your request at any later date.
   In addition, each Yamaha motorcycle dealer is held responsible for his setup, service and warranty repair work.

Q. Does the warranty on the engine include the carburetor, air filter, air box, and exhaust pipe?

A. No. The warranty covers only the engine components.

CUSTOMER SERVICE

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

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

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

CHANGE OF ADDRESS

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

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

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

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

EAS1DX3005
SAFETY INFORMATION

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

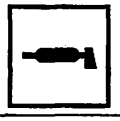
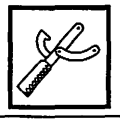
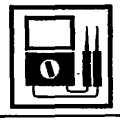
- THIS MACHINE IS TO BE OPERATED BY AN EXPERIENCED RIDER ONLY.
  Do not attempt to operate this machine at maximum power until you are totally familiar with its characteristics.
- THIS MACHINE IS DESIGNED TO BE RIDDEN BY THE OPERATOR ONLY.
  Do not carry passengers on this machine.
- ALWAYS WEAR PROTECTIVE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

EAS1DX3008
SYMBOLS

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

TIP

The following symbols are not relevant to every vehicle.

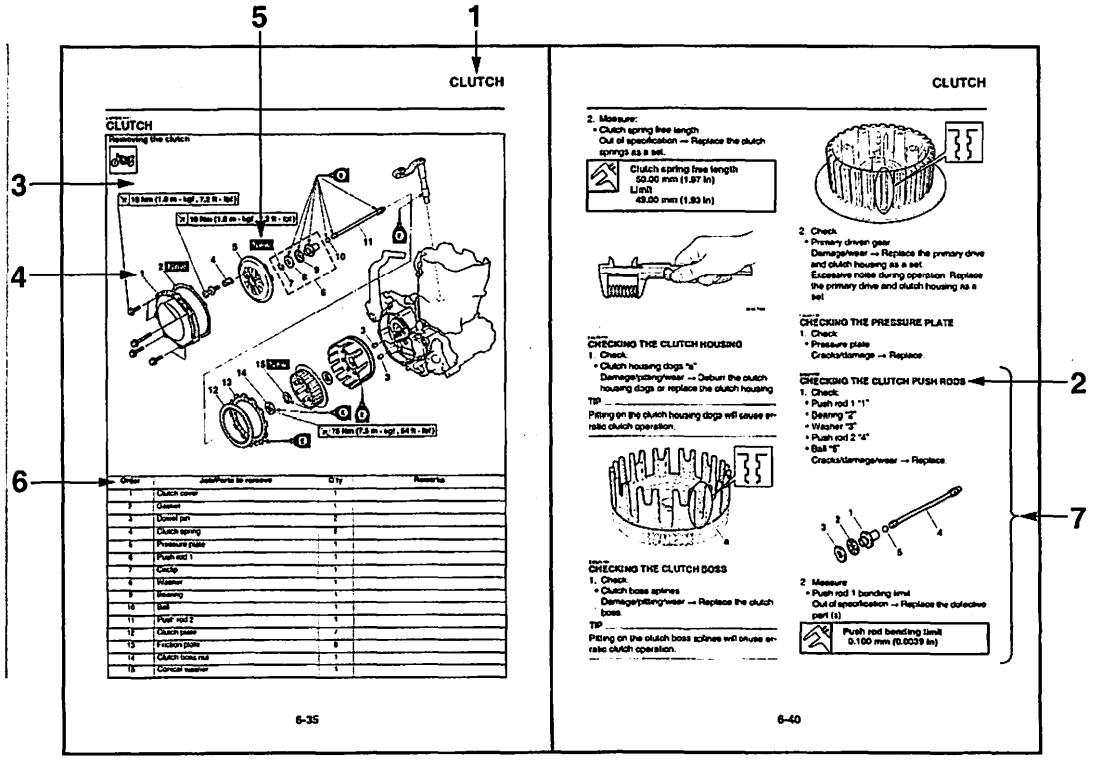
SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone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

EAS1DX3007

HOW TO USE THIS MANUAL

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

- The manual is divided into chapters and each chapter is divided into sections. The current section title "1" is shown at the top of each page.
- Sub-section titles "2" appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams "3" at the start of each removal and disassembly section.
- Numbers "4" are given in the order of the jobs in the exploded diagram. A number indicates a 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, names of parts, notes in jobs, etc.
- Jobs "7" requiring more information (such as special tools and technical data) are described sequentially.



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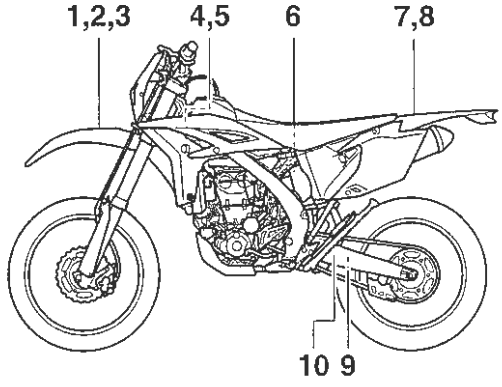
EAS1DX3009

LOCATION OF IMPORTANT LABELS

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



USA

1

Premium unleaded gasoline only.

3FB-2415E-02

6

⚠WARNING

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

4AA-2225S-80

7

⚠ WARNING

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

5PA-2118K-00

10

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-A0

CANADA

1

Premium unleaded gasoline only.

3FB-2415E-02

2

Essence super sans plomb seulement.

3FB-2415E-12

3

THIS VEHICLE IS A RESTRICTED USE MOTORCYCLE AND IS NOT INTENDED FOR USE ON PUBLIC HIGHWAYS.
CE VÉHICULE EST UNE MOTOCYCLETTE À USAGE RESTREINT DONT L'USAGE N'EST PAS DESTINE AUX VOIES PUBLIQUES.

3PT-2416E-10

4

MFD. BY YAMAHA MOTOR CO., LTD. MM / YY MADE IN JAPAN
RESTRICTED-USE MOTORCYCLE
FABRIQUÉ PAR YAMAHA MOTOR CO., LTD. MM / YY FABRIQUÉ AU JAPON
MOTOCYCLETTE À USAGE RESTREINT
****

3PT-21186-11

5

CANADA 506 TROPSNART CMVSS

This spark ignition system meets all requirements of the Canadian Interference Causing Equipment Regulations.
Ce système d'allumage par étincelle de véhicule respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

6

⚠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'explosion.
- Voir le manuel d'utilisateur pour les instructions.
- Ne pas brûler ni perforer ni ouvrir.

4AA-22259-70

7

⚠ WARNING

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

5PA-2118K-00

8

⚠ AVERTISSEMENT

- LIRE LE MANUEL DU PROPRIETAIRE AINSI QUE TQUTES 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-10

9

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-B0

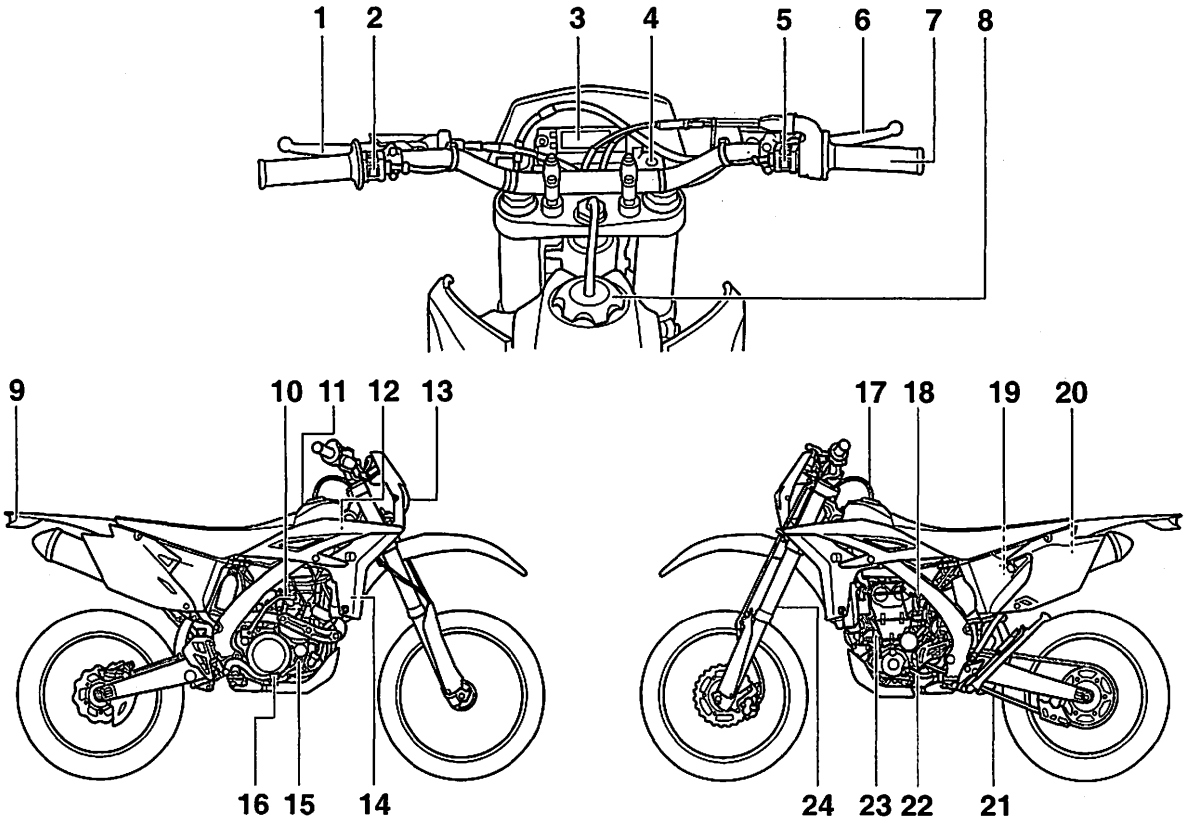
10

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-A0

EAS1DX3010
DESCRIPTION



1. Clutch lever
2. Engine stop switch
3. Multi-function display
4. Main switch
5. Start switch
6. Front brake lever
7. Throttle grip
8. Fuel tank cap
9. Taillight
10. Kickstarter crank
11. Fuel tank
12. Radiator cap
13. Headlight
14. Radiator
15. Coolant drain bolt
16. Rear brake pedal
17. Valve joint
18. Starter knob/idle adjusting screw
19. Air cleaner
20. Catch tank
21. Drive chain
22. Shift pedal
23. Oil dipstick
24. Front fork

TIP

- The machine you have purchased may differ slightly from those shown in the following.
- Designs and specifications are subject to change without notice.

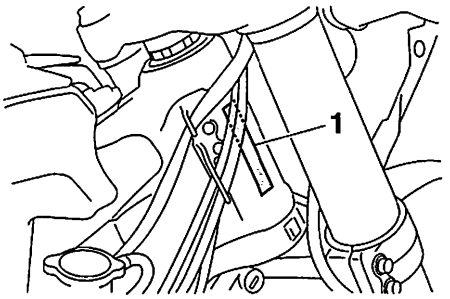
EAS1DX3011
CONSUMER INFORMATION

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

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

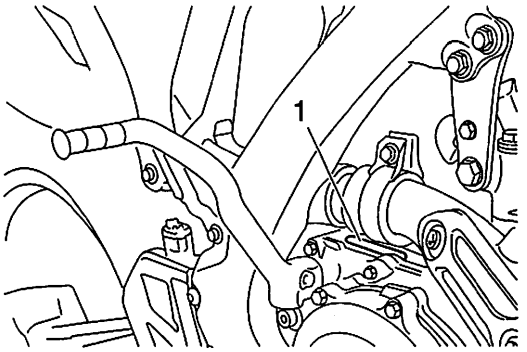
EAS1DX3012
VEHICLE IDENTIFICATION NUMBER

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



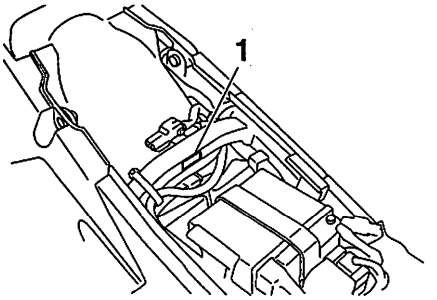
EAS1DX3013
ENGINE SERIAL NUMBER

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



EAS1DX3014
MODEL LABEL

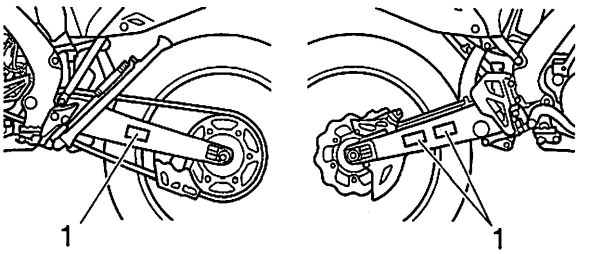
The model label "1" is affixed to the frame under the seat. This information will be needed to order spare parts.



EAS1DX3015
VEHICLE EMISSION CONTROL INFORMATION LABEL

The Vehicle Emission Control Information label "1" is affixed at the location in the illustration. This label shows specifications related to exhaust emissions as required by federal law, state law and Environment Canada.

A B



A: For Canada
B: For USA and Canada

EAS20170
FEATURES

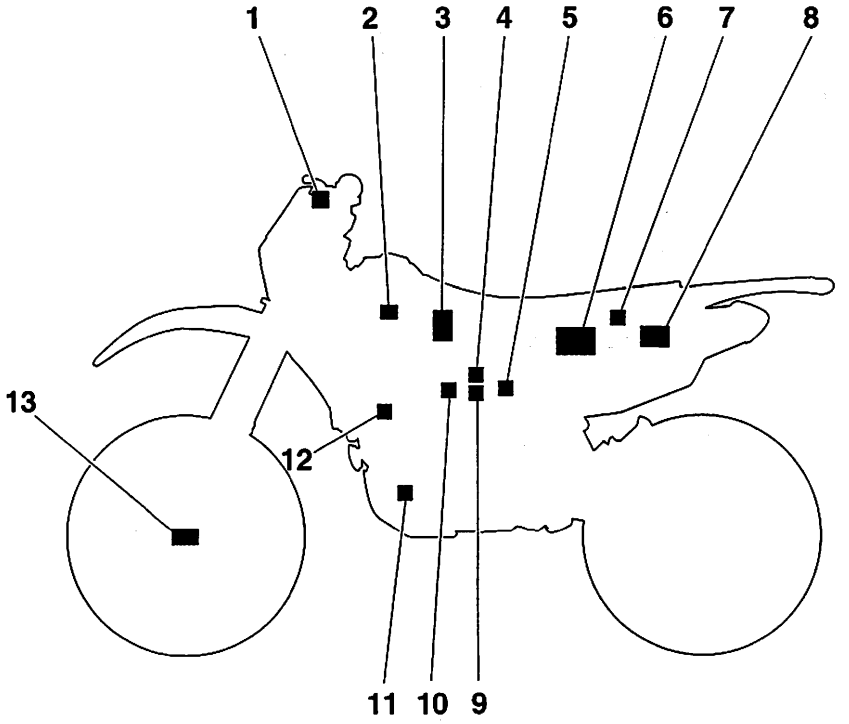
EAS1DX3016
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operating under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.

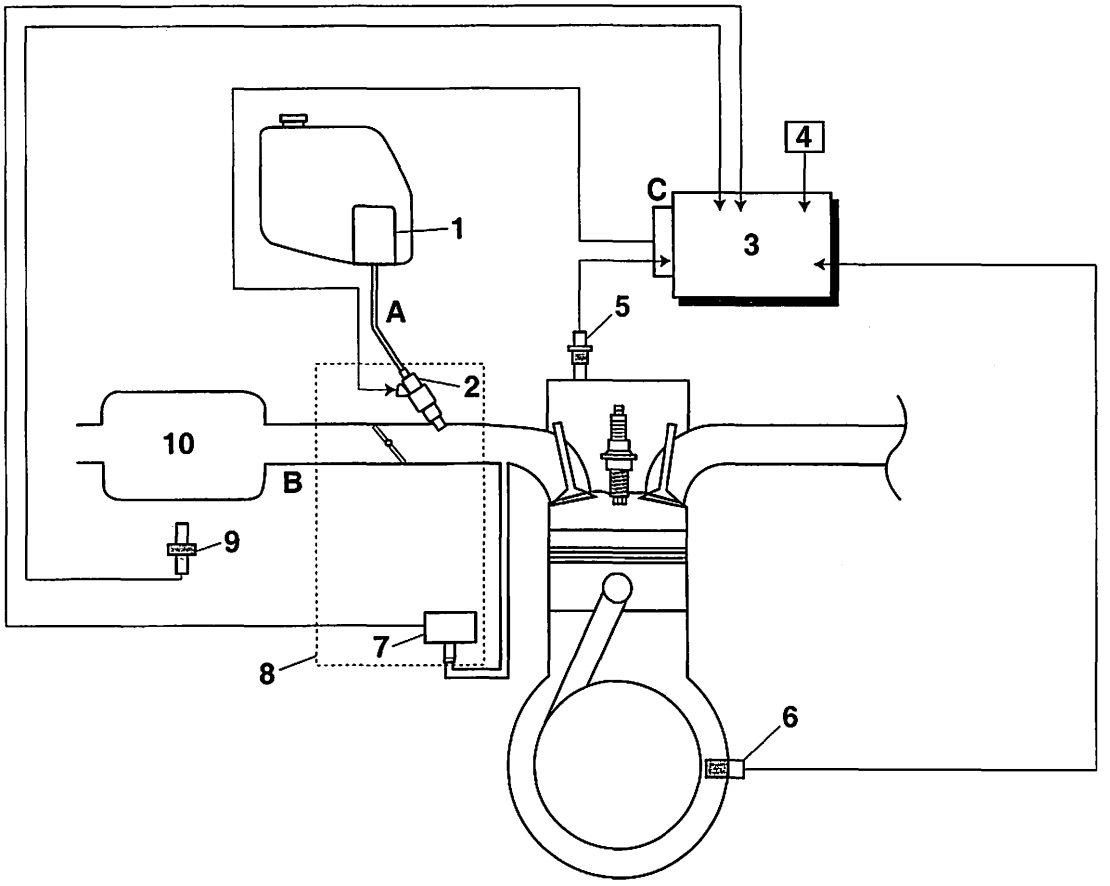


1. Engine trouble warning light
2. Lean angle sensor
3. Fuel pump
4. Intake air pressure sensor
5. Fuel injector
6. Battery
7. Intake air temperature sensor
8. ECU (engine control unit)
9. Throttle position sensor
10. Coolant temperature sensor
11. Crankshaft position sensor
12. Ignition coil
13. Speed sensor

EAS1DX3017
FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at a certain level. Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, coolant temperature sensor, atmospheric pressure sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor and intake air temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.



1. Fuel pump
2. Fuel injector
3. ECU (engine control unit)
4. Throttle position sensor
5. Coolant temperature sensor
6. Crankshaft position sensor
7. Intake air pressure sensor
8. Throttle body
9. Intake air temperature sensor
10. Air filter case

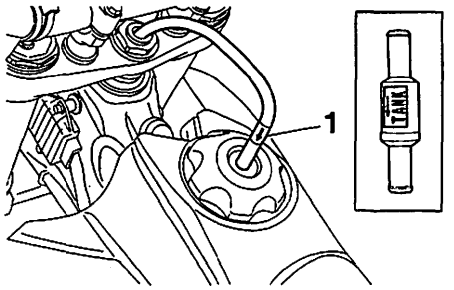
A. Fuel system
B. Intake system
C. Control system

EAS1DX3018
INCLUDED PARTS

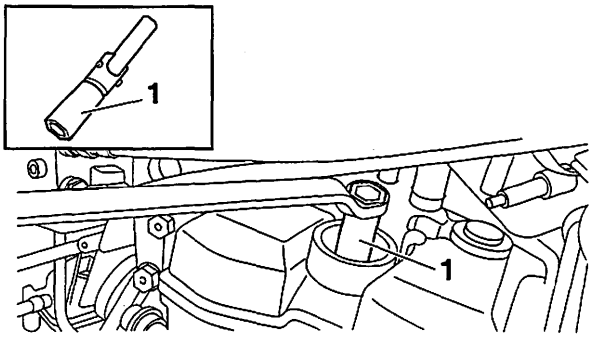
EAS1DX3019
VALVE JOINT
This valve joint "1" prevents fuel from flowing out and is installed to the fuel tank breather hose.

ECA1DX1001
NOTICE

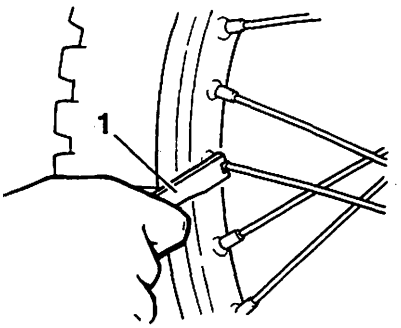
In this installation, make sure the arrow faces the fuel tank and also downward.



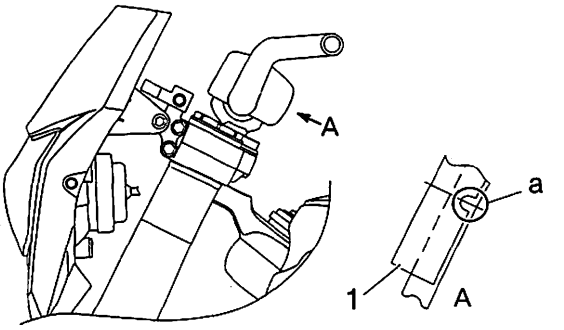
EAS1DX3020
SPARK PLUG WRENCH
This spark plug wrench "1" is used to remove and install the spark plug.



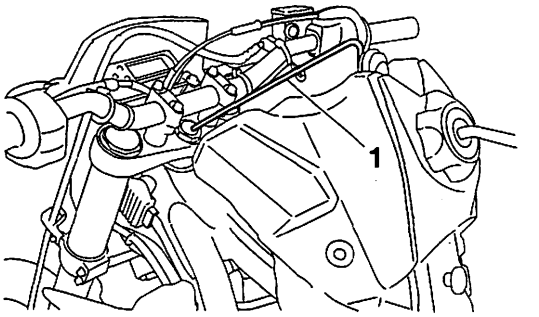
EAS1DX3021
NIPPLE WRENCH
This nipple wrench "1" is used to tighten the spoke.



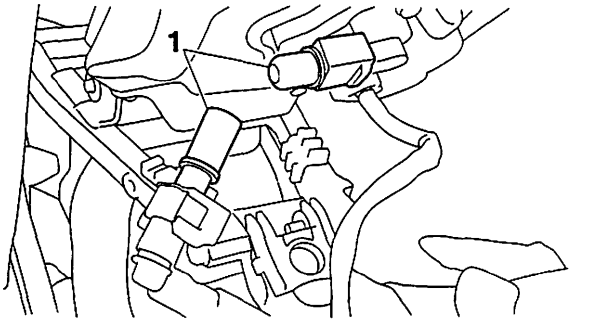
EAS1DX3022
HANDLEBAR PROTECTOR
Install the handlebar protector "1" so that the notch "a" face backward.



EAS1DX3023
HOOK (FUEL TANK)
The hook tank "1" is used to support the fuel tank during maintenance.



EAS1DX3024
FUEL HOSE JOINT COVER
The fuel hose joint covers "1" are used to prevent mud, dust, and other foreign material from entering the fuel pump when the fuel hose is disconnected.



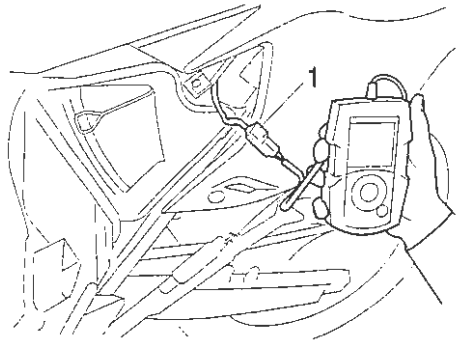
EAS1DX3025
COUPLER FOR CONNECTING OPTIONAL PART

This coupler "1" is used for connection to an optional Power Tuner and so on.

ECA1DX1002

NOTICE

When no optional parts, etc. are connected, connect the connection terminal to the original coupler.
Before removing the coupler, thoroughly wipe off any mud or water stuck to it.



Part name	Part number
GYTR Power Tuner	33D-H59C0-V0-00

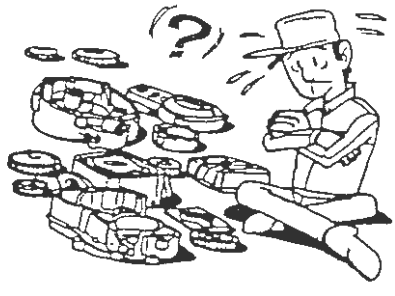
The GYTR Power Tuner is optional.

EAS20180
IMPORTANT INFORMATION

EAS1DX3025
PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.

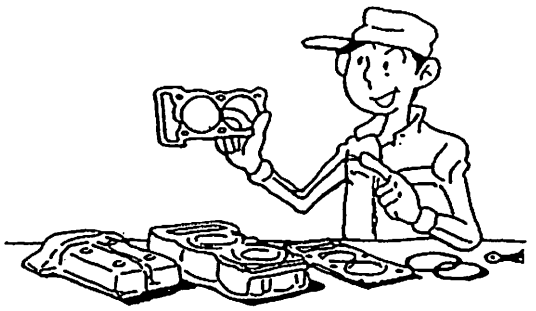
2. Use only the proper tools and cleaning equipment.
   Refer to "SPECIAL TOOLS" on page 1-15.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.



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

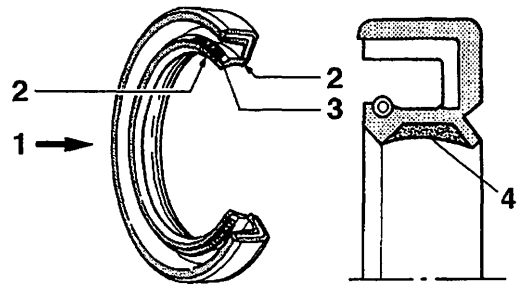
EAS1DX3027
REPLACEMENT PARTS

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



EAS1DX3028
GASKETS, OIL SEALS AND O-RINGS

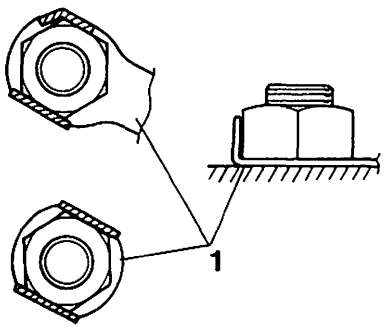
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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

EAS1DX3029
LOCK WASHERS/PLATES AND COTTER PINS

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



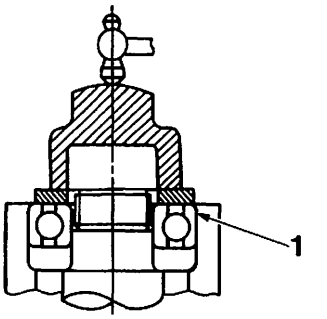
EAS1DX3030
BEARINGS AND OIL SEALS

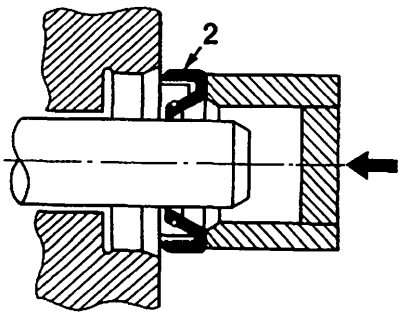
Install bearings "1" and oil seals "2" so that the manufacturer marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300

NOTICE

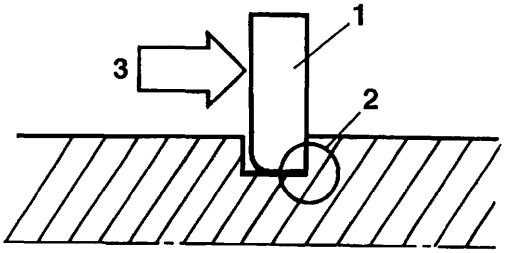
Do not spin the bearing with compressed air because this will damage the bearing surfaces.





EAS1DX3031
CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip "1", make sure the sharp-edged corner "2" is positioned opposite the thrust "3" that the circlip receives.



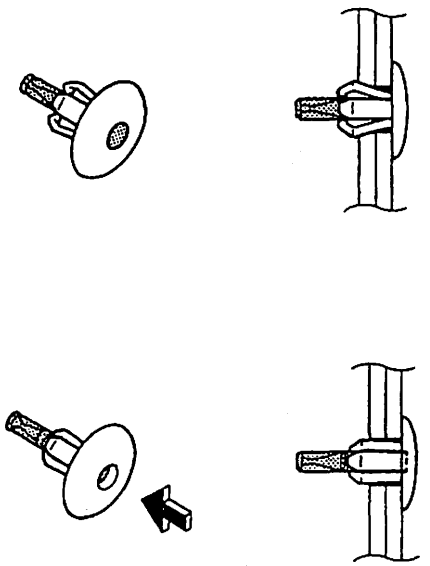
EAS1DX3032
BASIC SERVICE INFORMATION

EAS1DX3033
QUICK FASTENERS

Rivet type
1. Remove:
   • Quick fastener

TIP

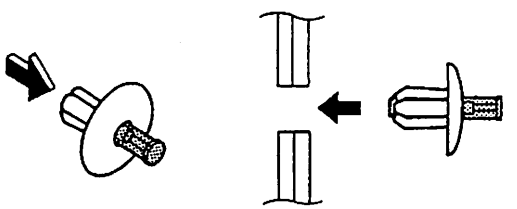
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.

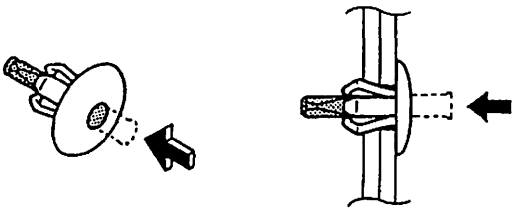


2. Install:
   • Quick fastener

TIP

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

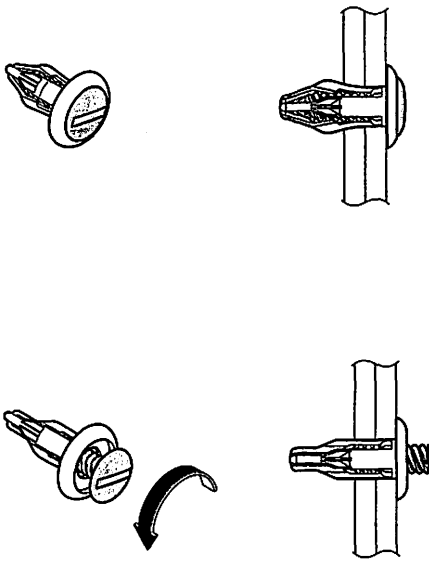




Screw type
1. Remove:
   • Quick fastener

TIP

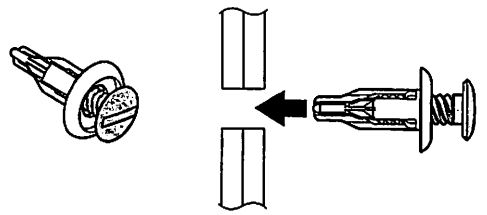
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

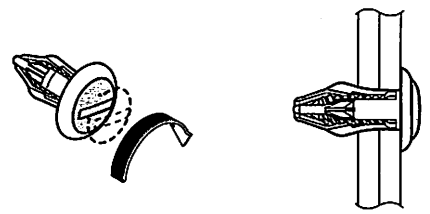


2. Install:
   • Quick fastener

TIP

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





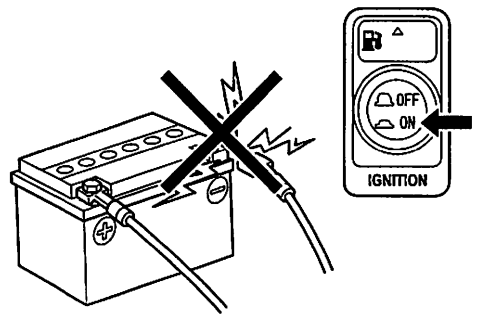
EAS1DX3034
ELECTRICAL SYSTEM

Electrical parts handling

ECA16600

NOTICE

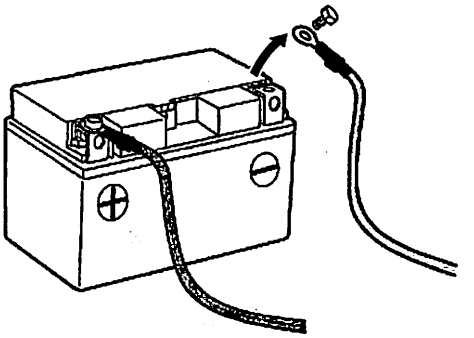
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

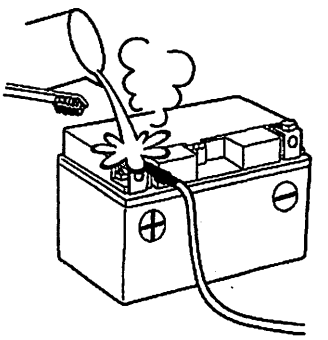
NOTICE

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

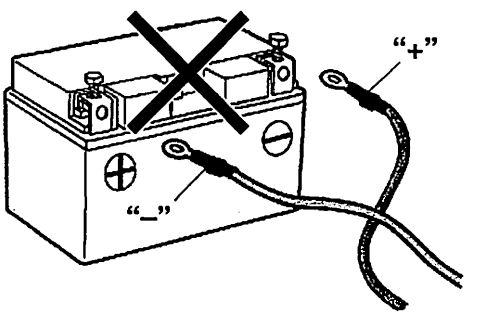
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

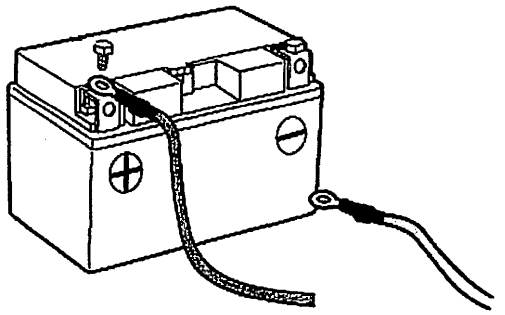
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16771

NOTICE

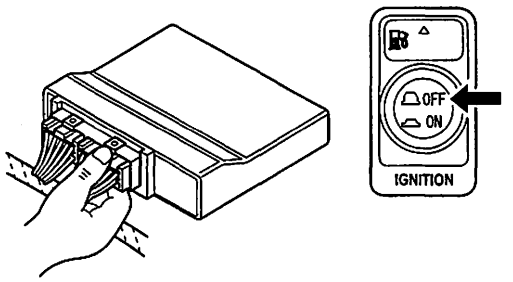
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated,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



ECA16610

NOTICE

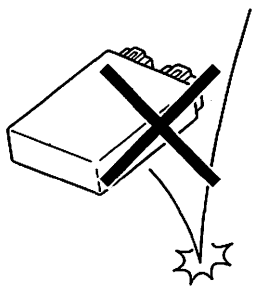
Turn the main switch to "OFF" before disconnecting or connecting an electrical component.



ECA16620

NOTICE

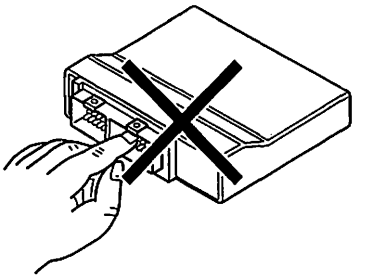
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

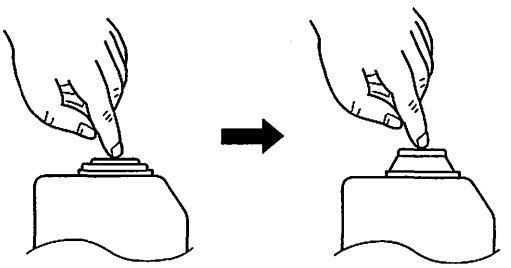
NOTICE

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



TIP

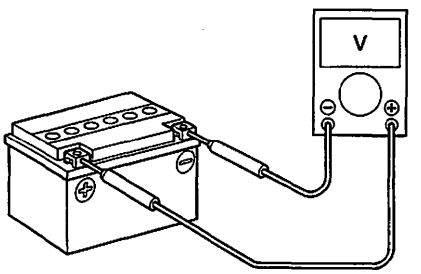
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



Checking the electrical system

TIP

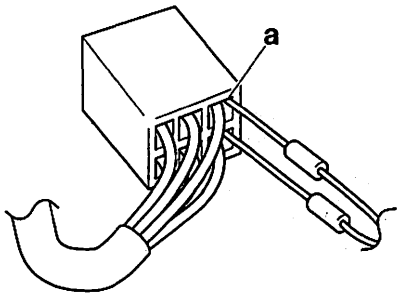
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

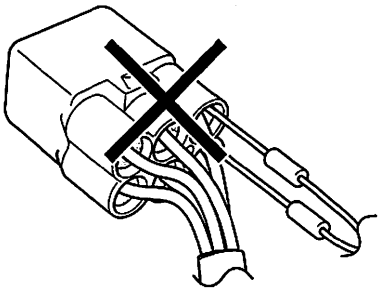
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

NOTICE

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



Checking the connections

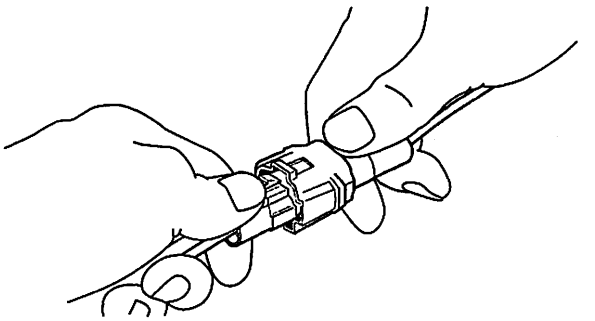
Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - Lead
   - Coupler
   - Connector

ECA16780

NOTICE

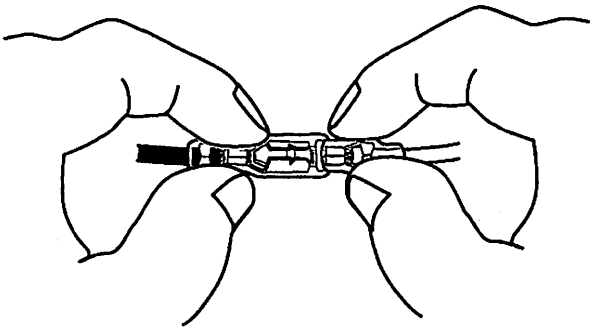
- **When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.**
- **There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.**



ECA16790

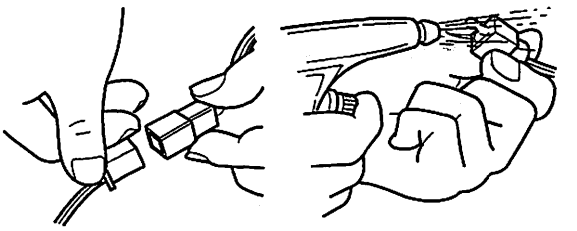
NOTICE

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



2. Check:
   - Lead
   - Coupler
   - Connector

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

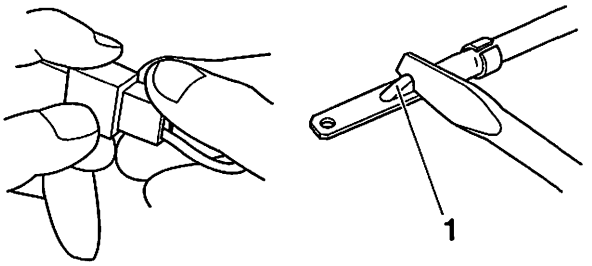


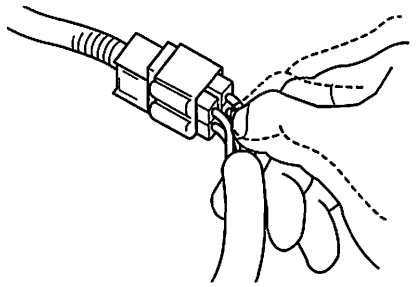
3. Check:
   - All connections

   Loose connection → Connect properly.

TIP

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

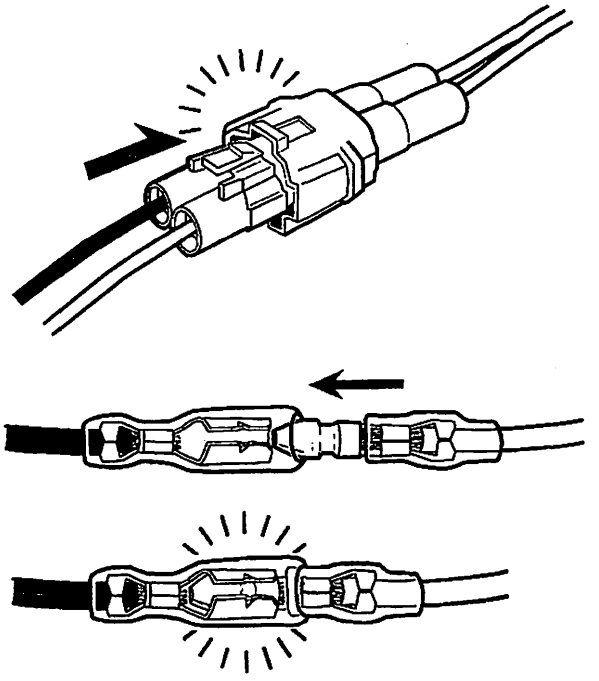




4. Connect:
   - Lead
   - Coupler
   - Connector

TIP

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

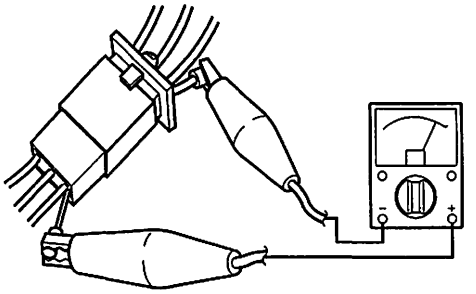


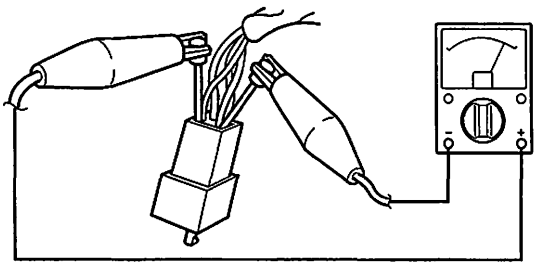
5. Check:
   - Continuity
   (with the pocket tester)

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

TIP

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



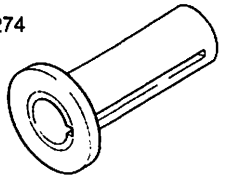
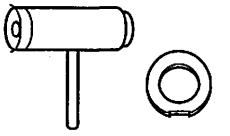
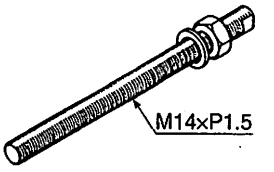
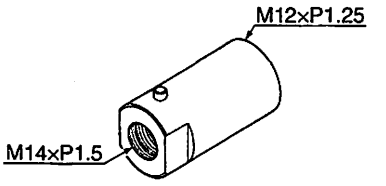
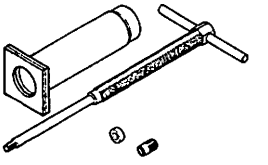
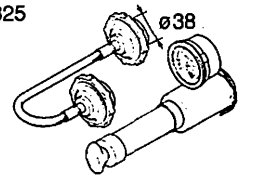
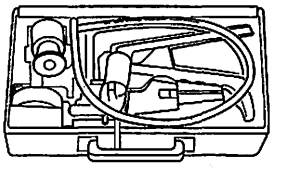


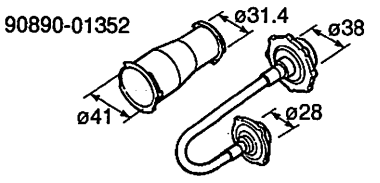
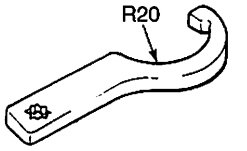
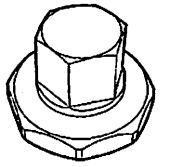
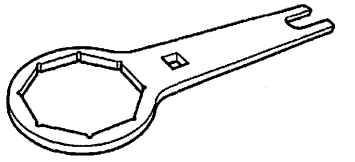
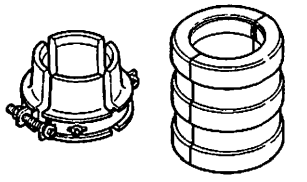
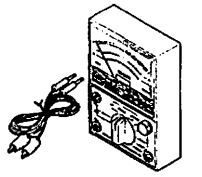
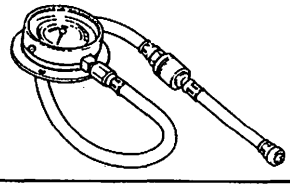
EAS1DX3035
SPECIAL TOOLS

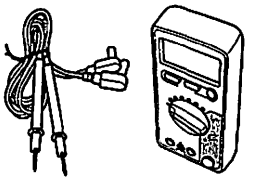
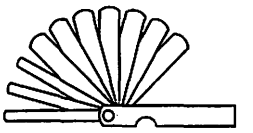
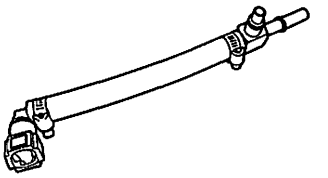
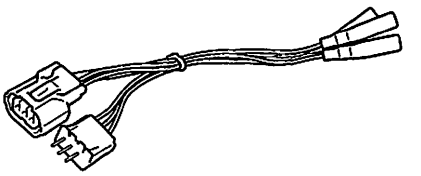
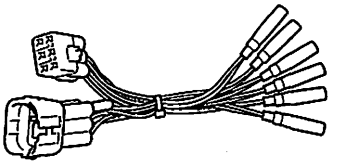
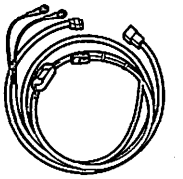
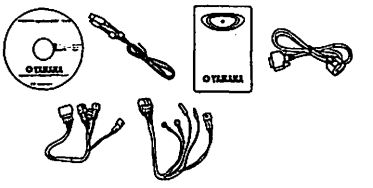
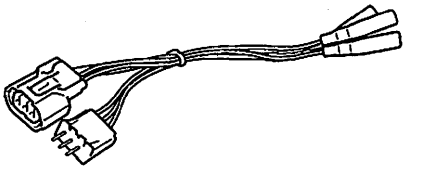
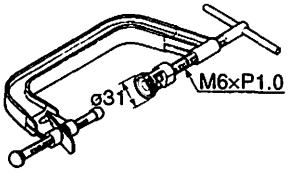
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques. The shape and part number used for the special tool differ by country, so two types are provided.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

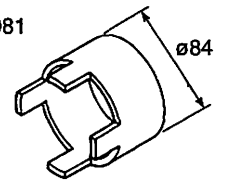
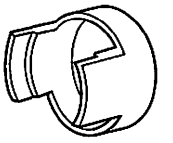
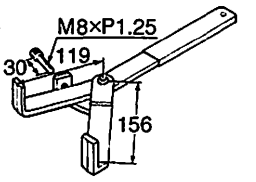
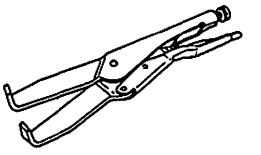
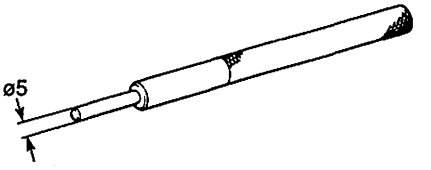
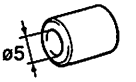
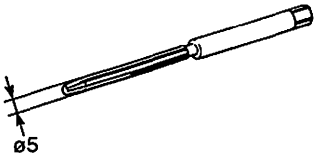
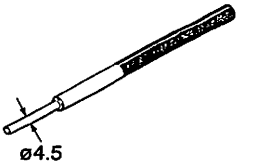
TIP

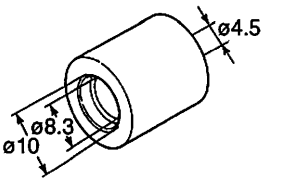
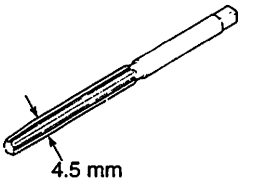
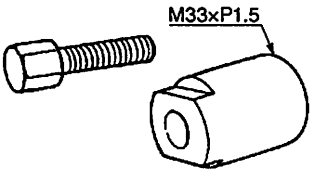
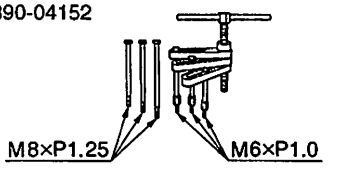
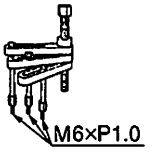
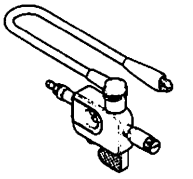
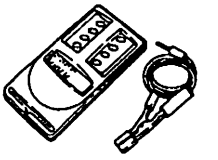
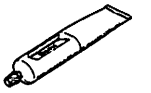
- For U.S.A. and Canada, use part number starting with "YM-", "YU-", or "ACC-".
- For others, use part number starting with "90890-".

Tool name/Part number	Illustration	Reference pages
Crankshaft installer pot 90890-01274 Installing pot YU-90058	90890-01274  YU-90058/YU-90059 	6-69
Crankshaft installer bolt 90890-01275 Bolt YU-90060		6-69
Adapter (M12) 90890-01278 Adapter #3 YU-90063		6-69
Piston pin puller set 90890-01304 YU-01304		6-27
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-01 	7-3

Tool name/Part number	Illustration	Reference pages
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984		7-3
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-24, 5-59
Cap bolt wrench 90890-01500 YM-01500		5-48, 5-51
Cap bolt ring wrench 90890-01501 YM-01501		5-47, 5-48 5-51, 5-54 5-56
Fork seal driver 90890-01502 Fork seal driver (48) YM-A0948		5-52, 5-53
Spoke nipple wrench (6–7) 90890-01521 YM-01521		3-22
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-14, 6-33 9-62, 9-64 9-65, 9-66 9-69, 9-70 9-71, 9-72 9-73, 9-74 9-75, 9-76 9-78
Pressure gauge 90890-03153 YU-03153		8-5

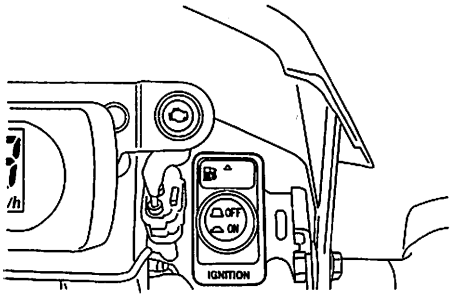
Tool name/Part number	Illustration	Reference pages
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		9-77
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-7
Fuel pressure adapter 90890-03186 YM-03186		8-5
Test harness S-pressure sensor (3P) 90890-03207 YU-03207		9-76
Test harness-lean angle sensor (6P) 90890-03209 YU-03209		9-73
FI diagnostic tool sub-lead 90890-03212		9-26
Yamaha diagnostic tool 90890-03215		9-26
Test harness-speed sensor 5TJ (3P) 90890-03228 YU-03228		9-74
Valve spring compressor 90890-04019 YM-04019		6-19, 6-24

Tool name/Part number	Illustration	Reference pages
Spacer (crankshaft installer) 90890-04081 Pot spacer YM-91044	90890-04081  YM-91044 	6-69
Universal clutch holder 90890-04086 YM-91042	90890-04086  YM-91042 	6-39, 6-41
Valve guide remover (Ø5) 90890-04097 YM-04097		6-21
Valve guide installer (Ø5) 90890-04098 YM-04098		6-21
Valve guide reamer (Ø5) 90890-04099 YM-04099		6-21
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-8
Valve guide remover (Ø4.5) 90890-04116 YM-04116		6-21

Tool name/Part number	Illustration	Reference pages
Valve guide installer (Ø4.5) 90890-04117 YM-04117		6-21
Valve guide reamer (Ø4.5) 90890-04118 YM-04118		6-21
Rotor puller 90890-04142 YM-04142		6-59
Crankcase separating tool 90890-04152 Crankcase separator YU-A9642	90890-04152  YU-A9642 	6-68
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		9-71
Digital tachometer 90890-06760 YU-39951-B		3-11
Yamaha bond No. 1215 (Three bond No.1215®) 90890-85505		6-60, 6-66

EAS1DX3036
CONTROL FUNCTIONS

EAS1DX3037
MAIN SWITCH



The main switch controls the ignition and lighting systems. The various main switch positions are described below.

ON
All electrical circuits are supplied with power; the meter lighting, taillight and auxiliary light come on, and the engine can be started.

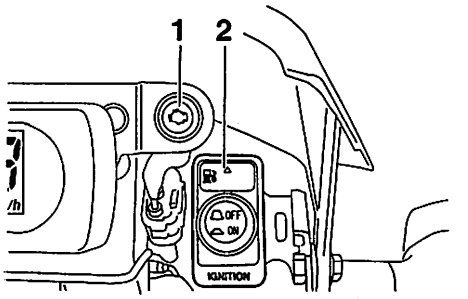
TIP
The headlight comes on automatically when the engine is started and stays on until the main switch is pushed to "OFF", even if the engine stalls.

OFF
All electrical systems are off.

EWA1DX1001
⚠ WARNING
Never push the main switch to "OFF" while the vehicle is moving, otherwise the electrical systems will be switched off, which may result in loss of control or an accident.

ECA1DX1003
NOTICE
Make sure that the main switch is in "OFF" with the engine turned off, otherwise the battery may discharge to the point that the starter motor will not operate properly.

EAS1DX3038
INDICATOR LIGHTS AND WARNING LIGHTS

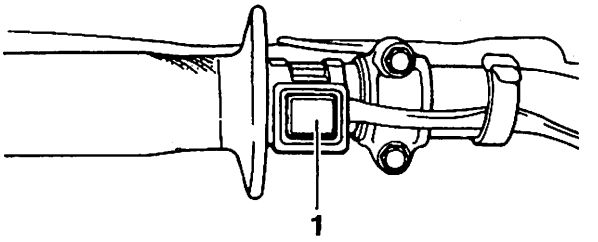


1. Engine trouble warning light "🔧"
2. Fuel level warning light "⛽"

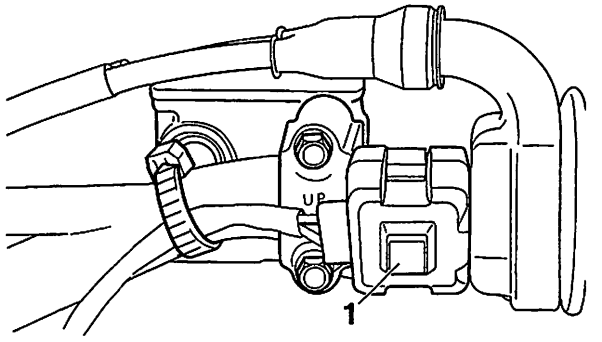
Fuel level warning light "⛽"
This warning light comes on when the fuel level drops below approximately 3.0 L (0.79 US gal, 0.66 Imp.gal). When this occurs, refuel as soon as possible.
The electrical circuit of the warning light can be checked by pushing the main switch to "ON". The warning light should come on for a few seconds, and then go off.
If the warning light does not come on initially when the main switch is pushed to "ON", or if the warning light remains on, have a Yamaha dealer check the electrical circuit.

Engine trouble warning light "🔧"
This warning light comes on or flashes if a problem is detected in the electrical circuit monitoring the engine. If this occurs, have a Yamaha dealer check the vehicle.
The electrical circuit of the warning light can be checked by pushing the main switch to "ON". The warning light should come on for a few seconds, and then go off.
If the warning light does not come on initially when the main switch is pushed to "ON", or if the warning light remains on, have a Yamaha dealer check the electrical circuit.

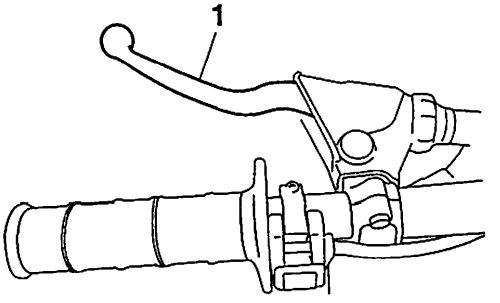
EAS1DX3039
ENGINE STOP SWITCH
The engine stop switch "1" is located on the left handlebar. Continue pushing the engine stop switch till the engine comes to a stop.



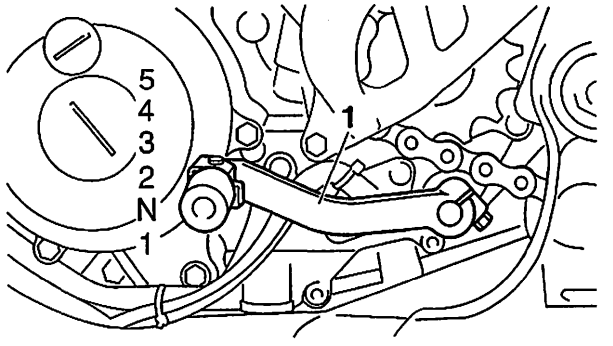
EAS1DX3040
START SWITCH
The start switch "1" is located on the right handlebar. Push this switch to crank the engine with the starter.



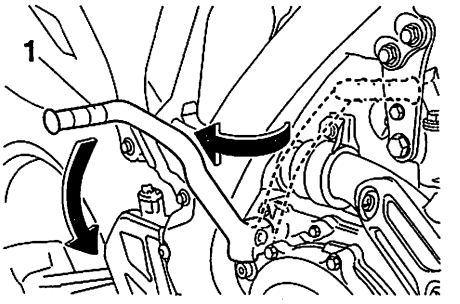
EAS1DX3041
CLUTCH LEVER
The clutch lever "1" is located on the left handlebar; it disengages or engages the clutch. Pull the clutch lever to the handlebar to disengage the clutch, and release the lever to engage the clutch. The lever should be pulled rapidly and released slowly for smooth starts.



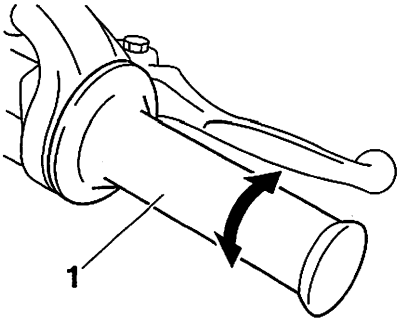
EAS1DX3042
SHIFT PEDAL
The gear ratios of the constant-mesh 5 speed transmission are ideally spaced. The gears can be shifted by using the shift pedal "1" on the left side of the engine.



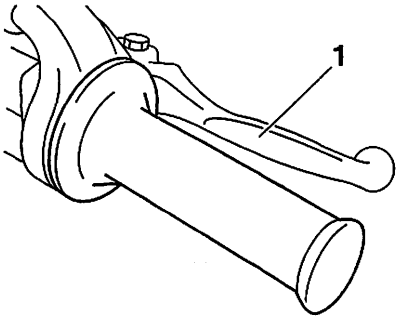
EAS1DX3043
KICKSTARTER CRANK
Rotate the kickstarter crank "1" away from the engine. Push the starter down lightly with your foot until the gears engage, then kick smoothly and forcefully to start the engine. This model has a primary kickstarter crank so the engine can be started in any gear if the clutch is disengaged. I normal practices, however, shift to neutral before starting.



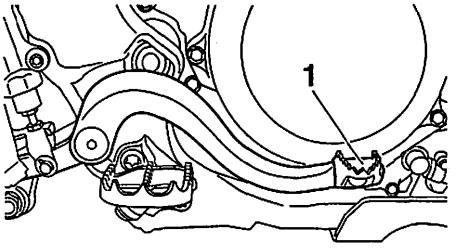
EAS1DX3044
THROTTLE GRIP
The throttle grip "1" is located on the right handlebar; it accelerates or decelerates the engine. For acceleration, turn the grip toward you; for deceleration, turn it away from you.



EAS1DX3045
FRONT BRAKE LEVER
The front brake lever "1" is located on the right handlebar. Pull it toward the handlebar to activate the front brake.

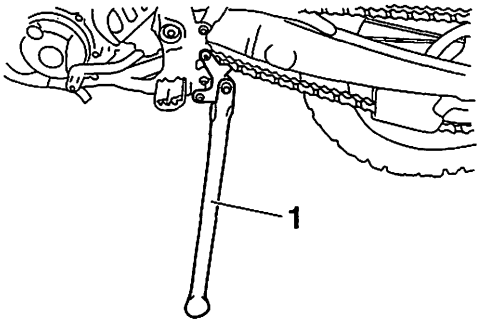


EAS1DX3046
REAR BRAKE PEDAL
The rear brake pedal "1" is located on the right side of the machine. Press down on the brake pedal to activate the rear brake.

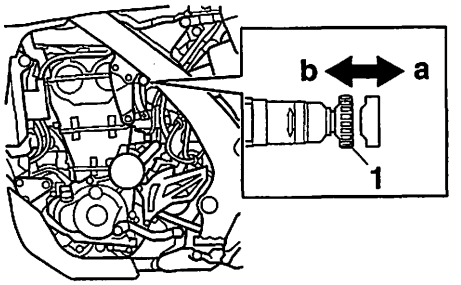


EAS1DX3047
SIDESTAND
This sidestand "1" is used to support only the machine when standing or transporting it.

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



EAS1DX3048
STARTER KNOB/IDLE ADJUSTING SCREW



1. Starter knob/idle adjusting screw

Starting a cold engine requires a richer air-fuel mixture, which is supplied by the starter.
Move the knob in direction "a" to turn on the starter.
Move the knob in direction "b" to turn off the starter.

EAS1DX3049
MULTI-FUNCTION DISPLAY

EWA32D1008
WARNING
Be sure to stop the machine before making any setting changes to the multi-function display.

The multi-function display is equipped with the following:
BASIC MODE:
- Speedometer (which shows current speed)
- Clock
- Two tripmeters (which shows the distance that has been traveled since it was last set to zero)
- Tire diameter (which shows the difference from initial setting in percentage)

RACE MODE:
- Timer (which shows the time that has been accumulated since the start of timer measurement)
- Tripmeter (which shows the accumulated travel distance in timer measurement)
- Average speed (which shows the average of the speeds that have been made since the start of timer measurement)
- Change tripmeter digits (capable of change to any given ones)
- Tire diameter correction (which shows the tire diametrical difference in percentage as the tripmeter travel distance is corrected)

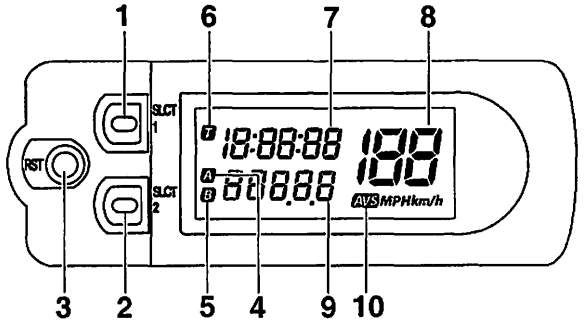
EAS1DX3050
DESCRIPTION

Operation buttons:
1. Select button "SLCT 1"
2. Select button "SLCT 2"
3. Reset button "RST"

Screen display:
4. Tripmeter indicator A
5. Tripmeter indicator B
6. Timer indicator T
7. Clock/Timer
8. Speedometer (Current speed/Average speed)
9. Tripmeter
10. Average speed indicator AVS

TIP

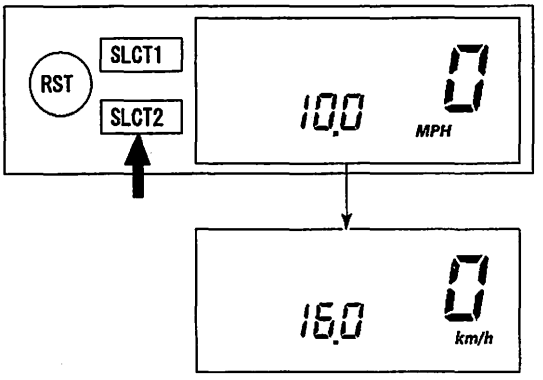
The operation buttons can be pushed in the following two manners:
Short push: Push the button. (⇨)
Long push: Push the button for 2 seconds or more. (➡)



EAS1DX3051
BASIC MODE

Changing speedometer display

1. Push the "SLCT2" button for 2 seconds or more to change the speedometer units. The speedometer display will change in the following order:
   MPH→km/h→MPH.)

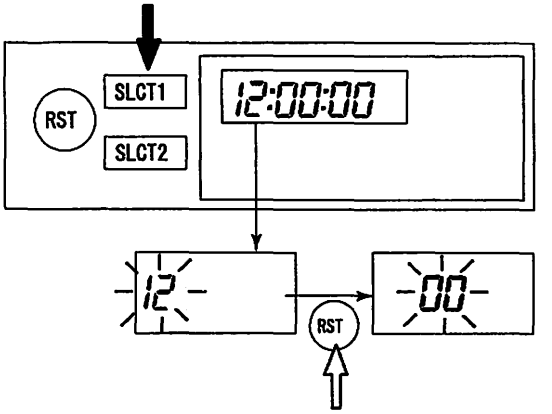


Setting the time

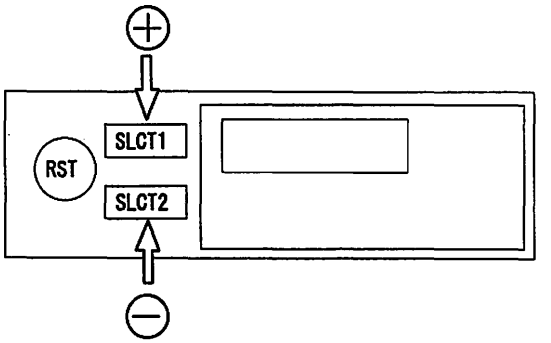
1. Push the "SLCT1" button for 2 seconds or more to enter the time setting mode.
2. Push the "RST" button to change the display for time indication. The display will change in the following order:
   Hour→Minute→Second→Hour.

TIP

The digits capable of setting go on flashing.



3. Push the "SLCT1" button (plus) or "SLCT2" button (minus) and change the time. A long push on the button will fast-forward the time.



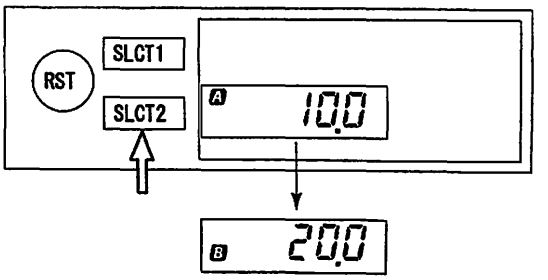
4. To end the setting, push the "RST" button for 2 seconds or more.

TIP

- In a 30-second absence of button operation, the setting will come to an end with the indicated time.
- To reset the seconds, push the "SLCT1" button or "SLCT2" button.

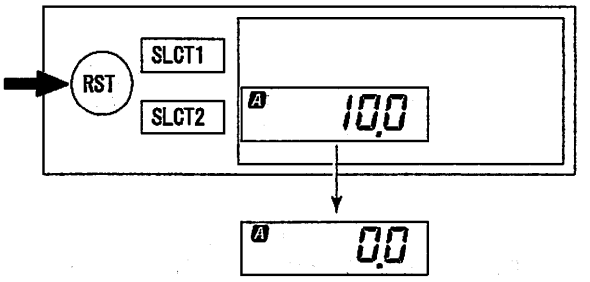
Changing tripmeter A/B (TRIP A/B)

1. Push the "SLCT2" button to change the tripmeter display. The display will change in the following order:
   TRIP A→TRIP B→TRIP A.



TIP

To reset the digits, select the tripmeter involved and push the "RST" button for 2 seconds or more.



Setting the tire diameter

TIP

The outer diameter of a tire varies with tire wear, tire pressure, and course condition.

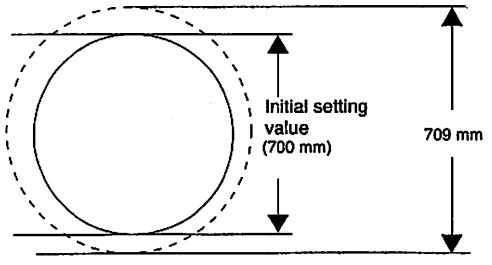
If the outer diameter of a tire varies with tire wear or tire pressure, it can be corrected in the following manner.

TIP

The initial value is preset with approximately 700 mm as 100%.

- If the outer diameter of a tire is larger than the initial value→Provide a larger set value.
- If the outer diameter of a tire is smaller than the initial value→Provide a smaller set value.

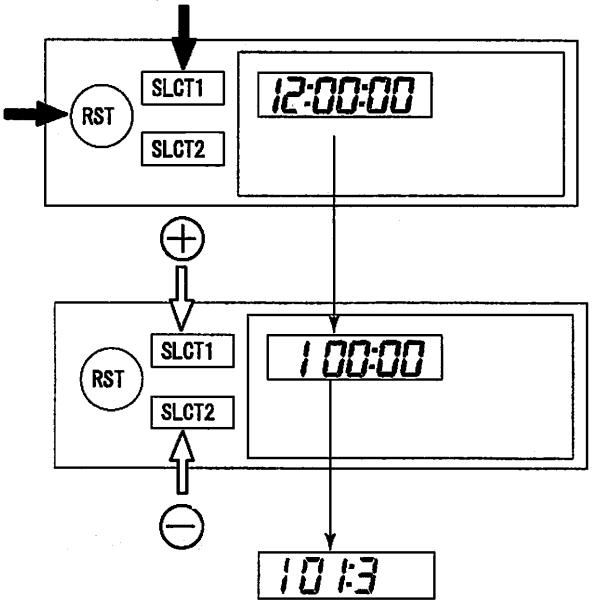
1. Compute the difference in outer diameter from the initial value for the front tire.
   Example) If the outer diameter of the tire is 709 mm, which is larger than initial value;
   709 mm/700 mm × 100(%) = 101.3(%)
   Range capable of setting: 65.0–115.0%



2. Push the "SLCT1" button and "RST" button for 2 seconds or more at the same time to enter tire diameter setting mode.
3. Push the "SLCT1" button (plus) or "SLCT2" button (minus) and change the setting. A long push on the button will fast-forward the digits.

TIP

Colon (:) for the displayed tire diameter represents the decimal marker.



4. Push the "SLCT1" button and "RST" button for 2 seconds or more at the same time will finish the setting.

EAS1DX3052

CHANGEOVER TO BASIC MODE/RACE MODE

TIP

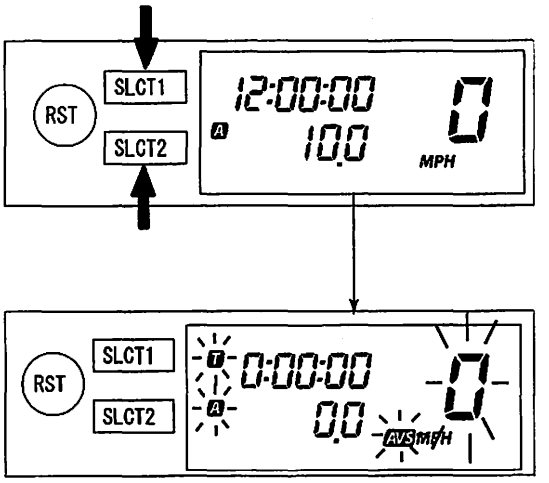
- RACE MODE displays the average speed, so it does not display the current speed. Average speed displayed in RACE MODE will be represented by a quotient of the distance accumulated by tripmeter A (TRIP A) divided by the period of time accumulated by the timer.
- Indicators T and AVS will light up as an identifier that shows RACE MODE has been selected.
- RACE MODE cannot display the functions as in BASIC MODE.
- Changeover to RACE MODE forces the digits for tripmeter A (TRIP A) in BASIC MODE to be reset.

Changeover from BASIC MODE to RACE MODE

1. Push the "SLCT1" button and "SLCT2" button for 2 seconds or more at the same time to change over to RACE MODE.

TIP

Changeover to RACE MODE will put manual start measurement on standby causing T , A , AVS, and the average speed display to flash. (For manual start, refer to "Putting measurement on standby" in "RACE MODE".)

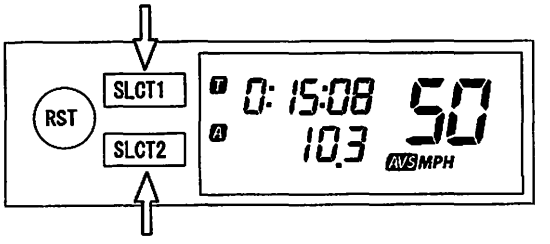


Returning to BASIC MODE from RACE MODE

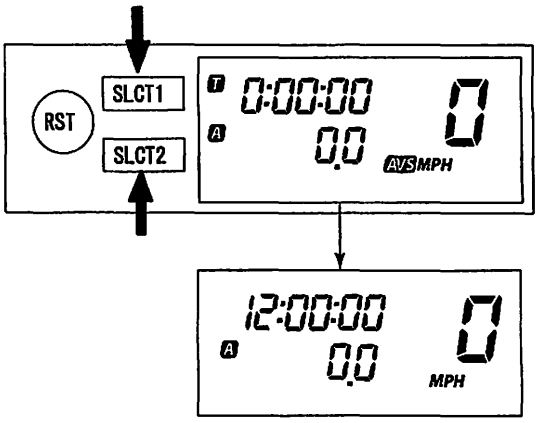
TIP

It is possible to return to BASIC MODE with timer measurement at a stop.

1. Check that the timer is not in operation. If the timer is in operation, stop the timer by pushing the "SLCT1" button and "SLCT2" button at the same time.



2. Push the "SLCT1" button and "SLCT2" button for 2 seconds or more at the same time to change over to BASIC MODE.



EAS1DX3053
RACE MODE

Putting measurement on standby

TIP

Starting measurement consists of the following two starts, either of which can be selected.
- Manual start

Starting measurement by the rider himself operating the button. (A long push on the "SLCT2" button will put measurement on standby.)
- Auto start

Starting timer measurement automatically on detection of the movement of the machine. (A long push on the "SLCT1" button will put measurement on standby.)

Manual start

TIP

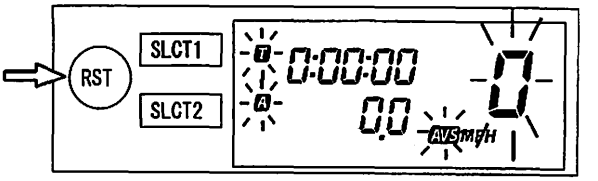
Initial setting at changeover to RACE MODE will remain for manual start.

1. Check that changeover to RACE MODE has been made. (Refer to "Changeover from BASIC MODE to RACE MODE".)

TIP

When the machine is made ready for a run by manual start, T , A , AVS , and the average speed display will start flashing.

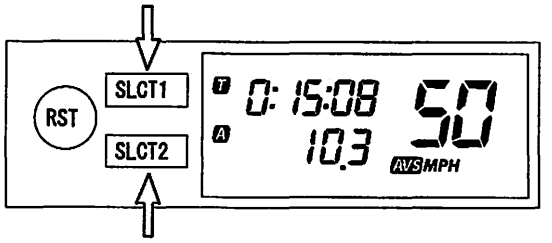
2. Start timer measurement by pushing the "RST" button.



3. When stopping timer measurement, pushing the "SLCT1" button and "SLCT2" button at the same time.

TIP

If the machine is run while timer measurement is not made, no change will occur to the digit in tripmeter A (TRIP A).



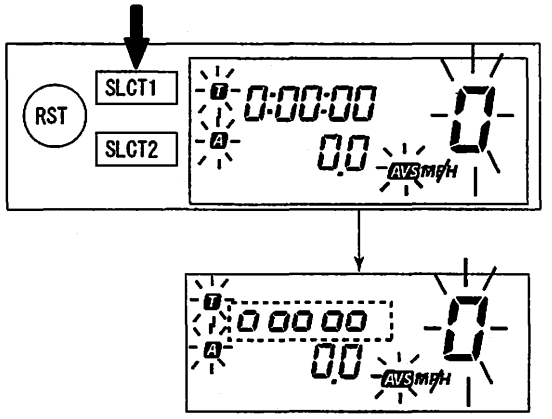
4. To resume the measurement, again push the "SLCT1" button and "SLCT2" button at the same time.

Auto start

1. Check that changeover has been made to RACE MODE. (Refer to "Changeover from BASIC MODE to RACE MODE".)
2. Make the machine ready for a run by pushing the "SLCT1" button for 2 seconds or more.

TIP

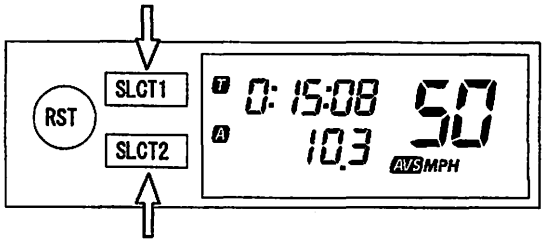
When the measurement is made ready for a run by auto start, T , A ,.AVS , and the average speed display will start flashing. Timer display will turn on scrolling from left to right.



3. Run the machine and start timer measurement.
4. To stop timer measurement, pushing the "SLCT1" button and "SLCT2" button at the same time.

TIP

If the machine is run while timer measurement is not made, no change will occur to the digit in tripmeter A (TRIP A).



5. To resume the measurement, again pushing the "SLCT1" button and "SLCT2" button at the same time.

Resetting measurement data

TIP

Resetting can be made in the following three manners.
Resetting is possible while timer measurement is made:

- Reset average speed (AVS).
- Reset average speed (AVS)/tripmeter A.

Resetting is possible while timer measurement is not made:

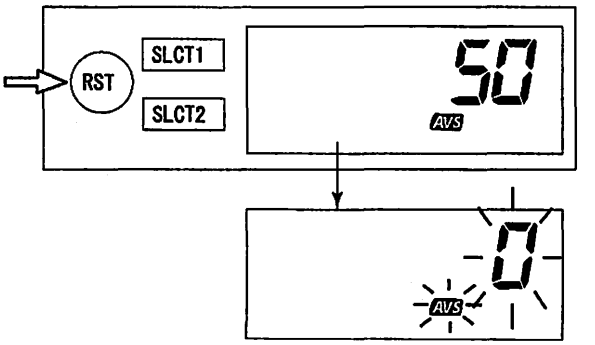
- Reset average speed (AVS)/tripmeter A/timer.

Resetting average speed (AVS)

1. Check that the timer is in operation. If the timer is not in operation, start the timer by pushing the "SLCT1" button and "SLCT2" button at the same time.
2. Reset the average speed display by pushing the "RST" button.

TIP

If reset, AVS and the average speed display will go on flashing for four seconds.

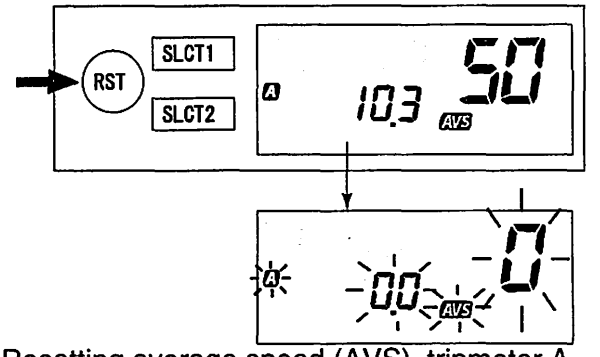


Resetting average speed (AVS) and tripmeter A (TRIP A)

1. Check that the timer is in operation. If the timer is not in operation, start the timer by pushing the "SLCT1" button and "SLCT2" button at the same time.
2. Reset tripmeter A (TRIP A) display and the average speed display by pushing the "RST" button for 2 seconds or more.

TIP

If reset, AVS , A , the travel distance display, and average speed display will go on flashing for four seconds.

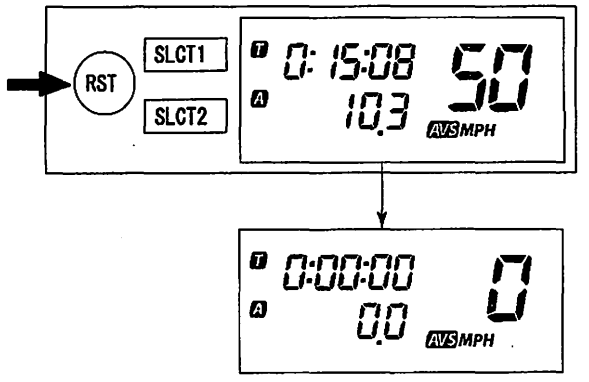


Resetting average speed (AVS), tripmeter A (TRIP A) and timer

1. Check that the timer is not in operation. If the timer is in operation, stop it by pushing the "SLCT1" button and "SLCT2" button at the same time.
2. Reset all measured data by pushing the "RST" button for 2 seconds or more.

TIP

- Resetting will reset the timer display, travel distance display, and average speed display and put measurement on standby.
- Auto start attempt will put measurement on standby as such. Likewise, manual start attempt will put measurement on standby as such.

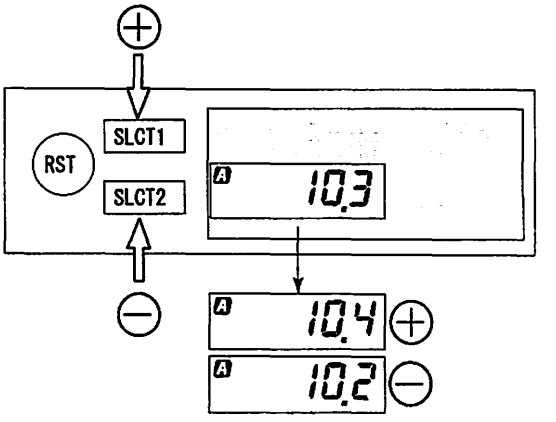


Correcting tripmeter A (TRIP A)

1. Change the travel distance display by pushing the "SLCT1" button (plus) or "SLCT2" button (minus). A long push on the button will fast-forward the change.

TIP

- Change can be made any time while timer measurement is or is not being made.
- Change in the travel distance display will be accompanied by the change in the average speed display.



Correcting tire diameter

TIP

- Correction can be made any time while timer measurement is or is not being made.
- Change in the travel distance display will be accompanied by the change in the tire's diametric percentage.
- Even back in BASIC MODE, the tire diameter set in RACE MODE will be retained.
- Correction to the tire diameter is impossible if the tripmeter indicates "0".
- If the machine is run while the tire diameter is being corrected, the tire's diametric correction will be cancelled forcedly.

1. Push the "SLCT1" button and "RST" button for 2 seconds or more at the same time and enter tire diameter correction mode.

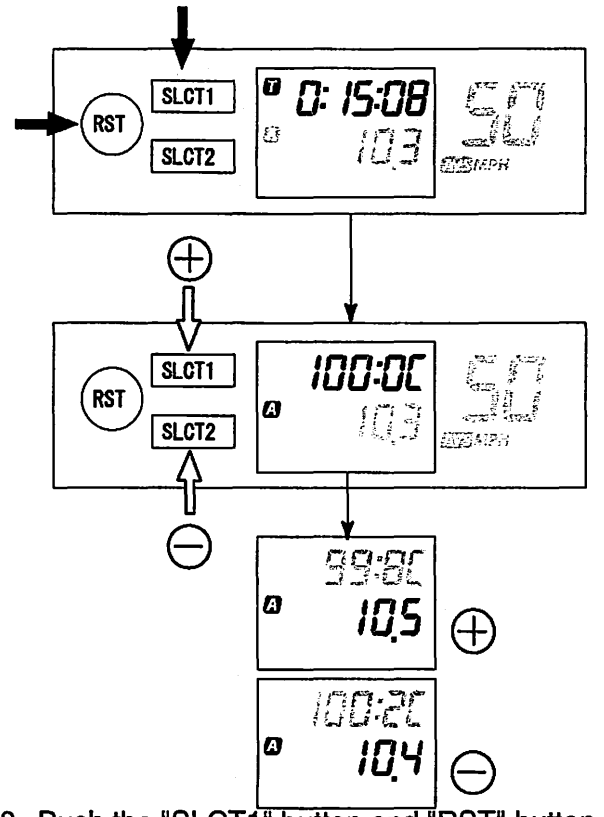
TIP

Changeover to tire correction mode will cause the timer display to change and show the diametric digit of the tire.

2. Change the digits of the travel distance by pushing the "SLCT1" button (plus) or "SLCT2" button (minus). A long push on the button will fast-forward the change in digits.

TIP

- Change in the digits of the travel distance will be accompanied by the change in the tire's diametric percentage.
- Colon (:) in the tire diameter display represents the decimal marker.
- If the tire diameter extends beyond the set range (65.0 to 115.0%), the error indicator "E" lights up for two seconds. After "E" goes off, the minimum (65%) or maximum (115%) will be automatically set.

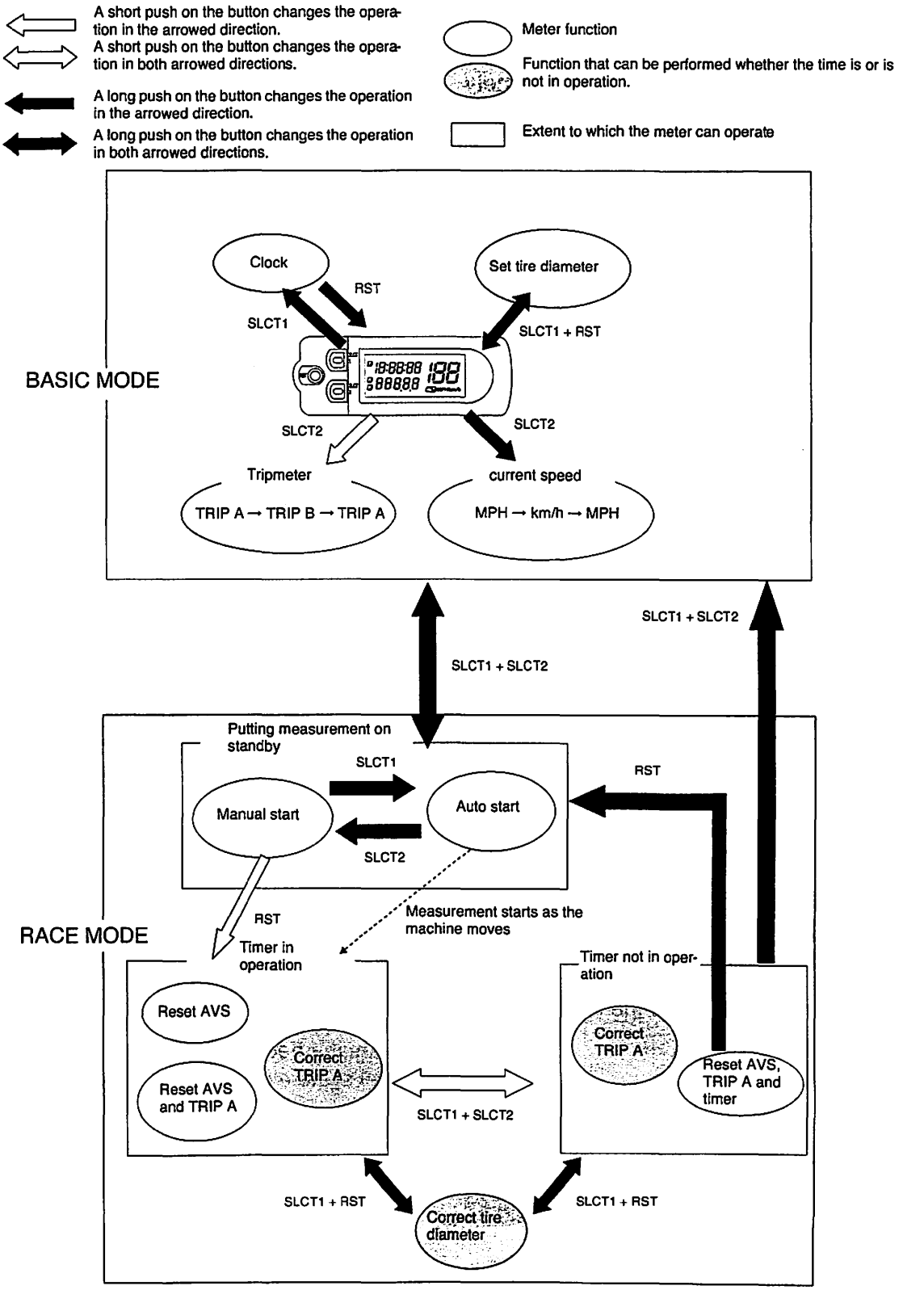


3. Push the "SLCT1" button and "RST" button for 2 seconds or more at the same time will finish the setting.

EAS1DX3054
FUNCTION DIAFRAM

TIP

The following diagram illustrates the multi-function display regarding the direction and operation condition involved in each of its functions.



EAS1DX3055
STARTING AND BREAK-IN

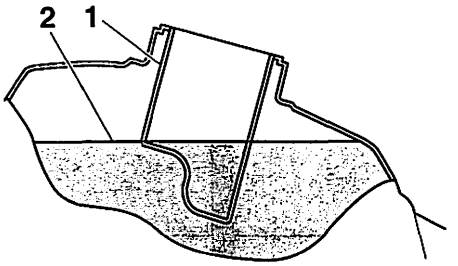
EAS1DX3056
FUEL

Make sure there is sufficient gasoline in the tank.

EWA1DX1003
⚠ WARNING

Gasoline and gasoline vapors are extremely flammable. To avoid fires and explosions and to reduce the risk of injury when refueling, follow these instructions.

1. Before refueling, turn off the engine and be sure that no one is sitting on the vehicle. Never refuel while smoking, or while in the vicinity of sparks, open flames, or other sources of ignition such as the pilot lights of water heaters and clothes dryers.
2. Do not overfill the fuel tank. Stop filling when the fuel reaches the bottom of the filler tube. Because fuel expands when it heats up, heat from the engine or the sun can cause fuel to spill out of the fuel tank.



1. Fuel tank filler tube
2. Maximum fuel level

3. Wipe up any spilled fuel immediately. ***NOTICE:*** **Immediately wipe off spilled fuel with a clean, dry, soft cloth, since fuel may deteriorate painted surfaces or plastic parts.**
4. Be sure to securely close the fuel tank cap.

EWA1DX1004
⚠ WARNING

Gasoline is poisonous and can cause injury or death. Handle gasoline with care. Never siphon gasoline by mouth. If you should swallow some gasoline or inhale a lot of gasoline vapor, or get some gasoline in your eyes, see your doctor immediately. If gasoline spills on your skin, wash with soap and water. If gasoline spills on your clothing, change your clothes.

Recommended fuel:
Premium unleaded gasoline only
Fuel tank capacity:
7.5 L (1.98 US gal, 1.65 Imp.gal)
Fuel reserve amount (when the fuel level warning light comes on):
3.0 L (0.79 US gal, 0.66 Imp.gal)

ECA1DX1004
NOTICE

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

Your Yamaha engine has been designed to use premium unleaded gasoline with a pump octane number [(R+M)/2] of 91 or higher, or a research octane number of 95 or higher. If knocking (or pinging) occurs, use a gasoline of a different brand. Use of unleaded fuel will extend spark plug life and reduce maintenance costs.

Gasohol

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

EAS1DX3057
HANDLING NOTE

EWA1DX1005
⚠ WARNING

Never start or run the engine in a closed area. The exhaust fumes are poisonous; they can cause loss of consciousness and death in a very short time. Always operate the machine in a well-ventilated area.

ECA
NOTICE

- **Unlike a two-stroke engine, this engine cannot be kick started when the throttle is open because the kickstarter may kick back. Also, if the throttle is open the air/fuel mixture may be too lean for the engine to start.**
- **Before starting the machine, perform the checks in the pre-operation check list.**

EAS1DX3058
AIR FILTER MAINTENANCE

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

EAS1DX3059
STARTING A COLD ENGINE

In order for the ignition circuit cut-off system to enable starting, one of the following conditions must be met:

- The transmission is in the neutral position.
- The transmission is in gear with the clutch lever pulled.

1. Push the main swtch to "ON".
   The following warning light should come on for a few seconds, then go off.
   - Fuel level warning light
   - Engine trouble warning light

ECA1DX1006
NOTICE

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

2. Shift the transmission into the neutral position. The neutral indicator light should come on. If not, ask a Yamaha dealer to check the electrical circuit.
3. Turn the starter on and completely close the throttle.
4. Start the engine by pushing the start switch or by pushing the kickstarter lever down.

ECA1DX1007
NOTICE

If the starter motor will not turn when pushing the start switch, stop pushing it immediately and start the engine by pushing the kickstarter lever down in order to avoid the load on the motor.

TIP

Use the kickstarter in a condition with ambient temperature below –5 °C (40 °F) or high altitude.

If the engine fails to start when using the start switch, release it, wait a few seconds, and then try again.
Each starting attempt should be as short as possible to preserve the battery. Do not crank the engine more than 10 seconds on any one attempt. If the engine does not start with the starter motor, try using the kickstarter.

5. When the engine is warm, turn the starter off.

TIP

The engine is warm when it responds quickly to the throttle with the starter turned off.

ECA1DX1008
NOTICE

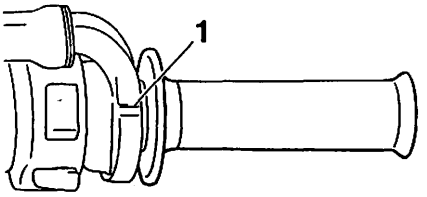
For maximum engine life, never accelerate hard when the engine is cold!

EAS1DX3060
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 does not start at high altitude, start the engine with the throttle grip opened by one degree or two degrees.
- The mark on the throttle housing indicates five degrees. Use the mark for your reference when opening the throttle grip.



1. Mark

TIP

If the engine fails to start, give the kickstarter 10 to 20 slow kicks at full throttle in order to clear the engine of the rich air-fuel mixture retained in it.

EAS1DX3061

BREAK-IN PROCEDURES

1. Before starting the engine, fill the fuel tank with the fuel.
2. Perform the pre-operation checks on the machine.
3. Start and warm up the engine. Check the idle speed, and check the operation of the controls and the engine stop switch. Then, restart the engine and check its operation within no more than 5 minutes after it is restarted.
4. Operate the machine in the lower gears at moderate throttle openings for five to eight minutes.
5. Check how the engine runs when the machine is ridden with the throttle 1/4 to 1/2 open (low to medium speed) for about one hour.
6. Restart the engine and check the operation of the machine throughout its entire operating range. Restart the machine and operate it for about 10 to 15 more minutes. The machine will now be ready to race.

ECA1DX1009

NOTICE

- **After the break-in or before each race, you must check the entire machine for loose fittings and fasteners as per "TORQUE-CHECK POINTS". Tighten all such fasteners as required.**
- **When any of the following parts have been replaced, they must be broken in.**
  CYLINDER AND CRANKSHAFT:
  About one hour of break-in operation is necessary.
  PISTON, RING, VALVES, CAMSHAFTS AND GEARS:
  These parts require about 30 minutes of break-in operation at half-throttle or less. Observe the condition of the engine carefully during operation.

EAS1DX3062
TORQUE-CHECK POINTS

Frame construction				Frame to rear frame
		Combined seat and fuel tank		Fuel tank to frame
Exhaust system				Silencer to rear frame
Engine mounting				Frame to engine
				Engine bracket to engine
				Engine bracket to frame
Steering		Steering stem to handlebar		Steering stem to frame
				Steering stem to upper bracket
				Upper bracket to handlebar
Suspension	Front	Steering stem to front fork		Front fork to upper bracket
				Front fork to lower bracket
	Rear	For link type		Assembly of links
				Link to frame
				Link to rear shock absorber
				Link to swingarm
		Installation of rear shock absorber		Rear shock absorber to frame
		Installation of swingarm		Tightening of pivot shaft
Wheel		Installation of wheel	Front	Tightening of wheel axle
				Tightening of axle holder
			Rear	Tightening of wheel axle
				Wheel to rear wheel sprocket
Brake			Front	Brake caliper to front fork
				Brake disc to wheel
				Tightening of union bolt
				Brake master cylinder to handle-bar
				Tightening of bleed screw
				Tightening of brake hose holder
			Rear	Brake pedal to frame
				Brake disc to wheel
				Tightening of union bolt
				Brake master cylinder to frame
				Tightening of bleed screw
				Tightening of brake hose holder
Fuel system				Fuel pump to fuel tank
Lubrication system				Tightening of oil hose clamp

TIP

Concerning the tightening torque, refer to "TIGHTENING TORQUES" on page 2-13 .

EAS1DX3063
MOTORCYCLE CARE AND STORAGE

EAS1DX3064
CARE

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

Before cleaning

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

Cleaning

ECA1DX1010

NOTICE

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

After normal use

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

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

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

TIP

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

1. Clean the motorcycle with cold water and a mild detergent, after the engine has cooled down.
   NOTICE: **Do not use warm water since it increases the corrosive action of the salt.**

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

After cleaning

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

EWA1DX1006

⚠ 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.**

ECA1DX1011

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.

EAS1DX3065

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.

ECA1DX1012

NOTICE

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

Long-term

Before storing your motorcycle for several months:

1. Follow all the instructions in the "Care" section of this chapter.
2. Fill up the fuel tank and add fuel stabilizer (if available) to prevent the fuel tank from rusting and the fuel from deteriorating.
3. Perform the following steps to protect the cylinder, piston rings, etc. from corrosion.
   a. Remove the spark plug cap and spark plug.
   b. Pour a teaspoonful of engine oil into the spark plug bore.
   c. Install the spark plug cap onto the spark plug, and then place the spark plug on the cylinder head so that the electrodes are grounded. (This will limit sparking during the next step.)
   d. Turn the engine over several times with the starter. (This will coat the cylinder wall with oil.)

e. Remove the spark plug cap from the spark plug, and then install the spark plug and the spark plug cap. **WARNING! To prevent damage or injury from sparking, make sure to ground the spark plug electrodes while turning the engine over.**

4. Lubricate all control cables and the pivoting points of all levers and pedals as well as of the sidestand/ centerstand.
5. Check and, if necessary, correct the tire air pressure, and then lift the motorcycle so that both of its wheels are off the ground. Alternatively, turn the wheels a little every month in order to prevent the tires from becoming degraded in one spot.
6. Cover the muffler outlet with a plastic bag to prevent moisture from entering it.
7. Remove the battery and fully charge it. Store it in a cool, dry place and charge it once a month. Do not store the battery in an excessively cold or warm place [less than 0 °C (30 °F) or more than 30 °C (90 °F)]. For more information on storing the battery, See page 9-66

TIP

Make any necessary repairs before storing the motorcycle.

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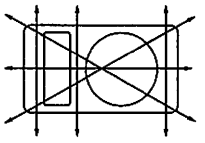
EAS1DX3066
GENERAL SPECIFICATIONS

Model	
Model	1DX3 (USA) 1DX4 (CANADA)
Dimensions	
Overall length	2160 mm (85.0 in)
Overall width	825 mm (32.5 in)
Overall height	1275 mm (50.2 in)
Seat height	960 mm (37.8 in)
Wheelbase	1465 mm (57.7 in)
Ground clearance	335 mm (13.19 in)
Weight	
Curb weight	124 kg (273 lb)

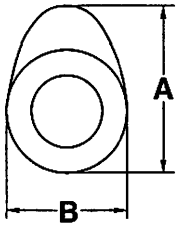
EAS1DX3067
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	449 cm³
Cylinder arrangement	Forward-inclined single cylinder
Bore × stroke	95.0 × 63.4 mm (3.74 × 2.50 in)
Compression ratio	12.30 :1
Starting system	Electric starter and kickstarter
Fuel	
Recommended fuel	Premium unleaded gasoline only
Fuel tank capacity	7.5 L (1.98 US gal, 1.65 Imp.gal)
Fuel reserve amount (when the fuel level warning light comes on)	3.0 L (0.79 US gal, 0.66 Imp.gal)
Engine oil	
Lubrication system	Dry sump
Recommended brand	YAMALUBE
Type	SAE 10W-40, SAE 10W-50, SAE 15W-40, SAE 20W-40 or SAE 20W-50
Recommended oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Quantity (disassembled)	1.20 L (1.27 US qt, 1.06 Imp qt)
Without oil filter element replacement	0.95 L (1.00 US qt, 0.84 Imp qt)
With oil filter element replacement	1.00 L (1.06 US qt, 0.88 Imp qt)
Oil filter	
Oil filter type	Paper
Bypass valve opening pressure	40.0–80.0 kPa (0.40–0.80 kgf/cm², 5.8–11.6 psi)
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.120 mm (0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.170 mm (0.0035–0.0067 in)
Limit	0.24 mm (0.0094 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.05–0.10 mm (0.0020-0.0039 in)
Limit	0.17 mm (0.0067 in)
Cooling system	
Radiator capacity (including all routes)	1.04 L (1.10 US qt, 0.92 Imp.qt)
Radiator capacity	0.63 L (0.67 US qt, 0.55 mp.qt)
Radiator cap opening pressure	107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)
Radiator core	
Width	121.4 mm (4.78 in)
Height	280.0 mm (11.02 in)
Depth	28.0 mm (1.10 in)
Water pump	
Water pump type	Single suction centrifugal pump

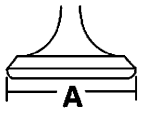
Spark plug	
Manufacturer/model	NGK/CR8E
Spark plug gap	0.7–0.8 mm (0.028–0.031 in)
Cylinder head	
Volume	22.75–23.55 cm³ (1.39–1.44 cu.in)
Warpage limit	0.10 mm (0.0039 in)



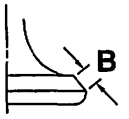
Camshaft	
Drive system	Chain drive (left)
Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
Camshaft journal diameter	21.959–21.972 mm (0.8645–0.8650 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Camshaft lobe dimensions	
Intake A	30.100–30.200 mm (1.1850–1.1890 in)
Limit	30.000 mm (1.1811 in)
Intake B	22.450–22.550 mm (0.8839–0.8878 in)
Limit	22.350 mm (0.8799 in)
Exhaust A	30.200–30.300 mm (1.1890–1.1929 in)
Limit	30.100 mm (1.1850 in)
Exhaust B	22.450–22.550 mm (0.8839–0.8878 in)
Limit	22.350 mm (0.8799 in)



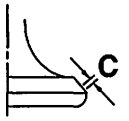
Camshaft runout limit	0.015 mm (0.0006 in)
Timing chain	
Tensioning system	Automatic
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.10–0.15 mm (0.0039–0.0059 in)
Exhaust	0.20–0.25 mm (0.0079–0.0098 in)
Valve dimensions	
Valve head diameter A (intake)	26.90–27.10 mm (1.0591–1.0669 in)
Valve head diameter A (exhaust)	27.90–28.10 mm (1.0984–1.1063 in)



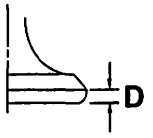
Valve face width B (intake)	2.260 mm (0.0890 in)
Valve face width B (exhaust)	2.260 mm (0.0890 in)



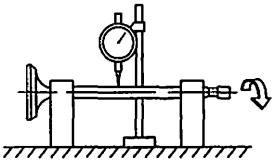
Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)



Valve margin thickness D (intake)	1.00 mm (0.0394 in)
Valve margin thickness D (exhaust)	1.00 mm (0.0394 in)



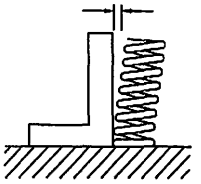
Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.445 mm (0.1750 in)
Valve stem diameter (exhaust)	4.965–4.980 mm (0.1955–0.1961 in)
Limit	4.935 mm (0.1943 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.550 mm (0.1791 in)
Valve guide inside diameter (exhaust)	5.000–5.012 mm (0.1969–0.1973 in)
Limit	5.050 mm (0.1988 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.020–0.047 mm (0.0008–0.0019 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)



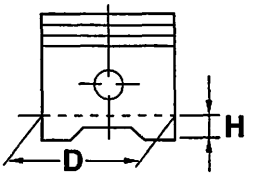
Valve spring

Free length (intake)	39.46 mm (1.55 in)
Limit	38.46 mm (1.51 in)
Free length (exhaust)	37.61 mm (1.48 in)
Limit	36.61mm (1.44 in)
Installed length (intake)	27.87 mm (1.10 in)
Installed length (exhaust)	28.38 mm (1.12 in)
Spring rate K1 (intake)	12.08 N/mm (1.23 kgf/mm, 68.98 lb/in)
Spring rate K2 (intake)	16.01 N/mm (1.63 kgf/mm, 91.42 lb/in)
Spring rate K1 (exhaust)	14.34 N/mm (1.46 kgf/mm, 81.88 lb/in)
Spring rate K2 (exhaust)	18.59 N/mm (1.90 kgf/mm, 106.15 lb/in)
Installed compression spring force (intake)	130.20–149.80 N (13.28–15.28 kgf, 29.27–33.68 lbf)
Installed compression spring force (exhaust)	123.10–141.70 N (12.55–14.45 kgf, 27.67–31.85 lbf)

Spring tilt (intake)	2.5 °/1.7 mm (2.5 °/0.07 in)
Spring tilt (exhaust)	2.5 °/1.6 mm (2.5 °/0.06 in)

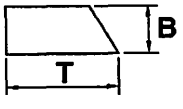


Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise
Cylinder	
Bore	95.000–95.010 mm (3.7402–3.7405 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)
Piston	
Piston-to-cylinder clearance	0.020–0.045 mm (0.0008–0.0018 in)
Limit	0.15 mm (0.006 in)
Diameter D	94.965–94.980 mm (3.7388–3.7394 in)
Height H	8.0 mm (0.31 in)

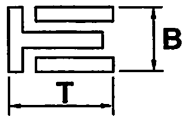


Offset	1.00 mm (0.0394 in)
Offset direction	Intake side
Piston pin bore inside diameter	18.004–18.015 mm (0.7088–0.7093 in)
Limit	18.045 mm (0.7104 in)
Piston pin outside diameter	17.991–18.000 mm (0.7083–0.7087 in)
Limit	17.971 mm (0.7075 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.00016–0.00094 in)
Piston ring	
Top ring	
Ring type	Barrel
Dimensions (B × T)	1.20 × 3.50 mm (0.05 × 0.14 in)

End gap (installed)	0.20–0.30 mm (0.0079–0.0118 in)
Limit	0.55 mm (0.0217 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Limit	0.115 mm (0.0045 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	1.00 × 3.35 mm (0.04 × 0.13 in)



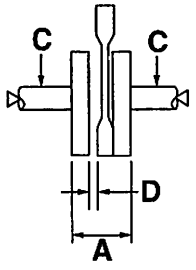
End gap (installed)	0.35–0.50 mm (0.0138–0.0197 in)
Limit	0.85 mm (0.0335 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Limit	0.115 mm (0.0045 in)
Oil ring	
Dimensions (B × T)	2.00 × 2.90 mm (0.08 × 0.11 in)



End gap (installed)	0.20–0.50 mm (0.0079–0.0197 in)

Crankshaft

Width A	61.95–62.00 mm (2.439–2.441 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.150–0.450 mm (0.0059–0.0177 in)



Balancer

Balancer drive method	Gear

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Inner push, cam push
Clutch lever free play	8.0–13.0 mm (0.31–0.51 in)
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.1110 in)
Plate quantity	8 pcs
Clutch plate 1 thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	4 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch plate 2 thickness	1.50–1.17 mm (0.059–0.067 in)
Plate quantity	3 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring free length	50.00 mm (1.97 in)
Minimum length	49.00 mm (1.93 in)
Spring quantity	6 pcs
Push rod bending limit	0.100 mm (0.0039 in)

Transmission

Transmission type	Constant mesh 5-speed
Primary reduction system	Spur gear
Primary reduction ratio	2.652 (61/23)
Final drive	Chain
Secondary reduction ratio	3.846 (50/13)
Operation	Left foot operation

Gear ratio	
1st	2.417 (29/12)
2nd	1.733 (26/15)
3rd	1.313 (21/16)
4th	1.050 (21/20)
5th	0.840 (21/25)
Shifting mechanism	
Shift mechanism type	Shift drum and guide bar
Shift fork guide bar bending limit	0.050 mm (0.0020 in)
Shift fork thickness	4.85 mm (0.1909 in)
Decompression device	
Device type	Auto decomp
Air filter	
Air filter element	Wet element
Air filter oil grade	Foam air-filter oil
Fuel pump	
Pump type	Electrical
Fuel injector	
Model/quantity	1010/1
Resistance	12.0 Ω
Throttle body	
Type/quantity	30RA/1
ID mark	1DX3 10
Fuel line pressure (at idle)	300.0–390.0 kPa (3.00–3.90 kgf/cm², 43.5–56.6 psi)
Throttle position sensor	
Throttle position sensor resistance	5.0 kΩ
Throttle position sensor output voltage	0.48–0.52 V
Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω
Intake air pressure sensor output voltage	3.75–4.25 V
Intake air temperature sensor resistance	5.40–6.60 kΩ at 0 °C (32 °F) 290–390 Ω at 80 °C (176 °F)
Coolant temperature sensor resistance	2.51–2.78 kΩ at 20°C (68°F) 210–221 Ω at 100°C (212°F)
Idling condition	
Engine idling speed	1900–2100 r/min
CO%	0.5–1.5 %
Intake vacuum	32.1–36.1 kPa (241–271 mmHg, 9.5–10.7 inHg)
Water temperature	70–90 °C (158–194 °F)
Oil temperature	70–80°C (158–176 °F)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

EAS1DX3068
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Semi double cradle
Caster angle	27.00 °
Trail	117.0 mm (4.61 in)
Front wheel	
Wheel type	Spoke wheel
Rim size	21 x 1.60
Rim material	Aluminum
Wheel travel	300.0 mm (11.81 in)
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.50 mm (0.02 in)
Rear wheel	
Wheel type	Spoke wheel
Rim size	18 x 2.15
Rim material	Aluminum
Wheel travel	294.0 mm (11.57 in)
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/GEOMAX MX51FG
Rear tire	
Type	With tube
Size	120/90-18 65M
Manufacturer/model	DUNLOP/GEOMAX MX51
Standard tire air pressure	
Front and Rear	100 kPa (1.00 kgf/cm², 15 psi)
Front brake	
Type	Single disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	250.0 × 3.0 mm (9.84 × 0.12 in)
Brake disc thickness limit	2.5 mm (0.10 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	4.4 mm (0.17 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	4.4 mm (0.17 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	11.0 mm (0.43 in)
Caliper cylinder inside diameter	27.00 mm × 2 (1.06 in × 2)
Recommended fluid	DOT 4

Rear brake	
Type	Single disc brake
Operation	Right foot operation
Rear disc brake	
Disc outside diameter × thickness	245.0 × 4.0 mm (9.65 × 0.16 in)
Brake disc thickness limit	3.5 mm (0.14 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.4 mm (0.25 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.4 mm (0.25 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	11.0 mm (0.43 in)
Caliper cylinder inside diameter	25.40 mm × 1 (1.00 in × 1)
Recommended fluid	DOT 4
Steering	
Steering bearing type	Taper roller bearing
Center to lock angle (left)	43.0 °
Center to lock angle (right)	43.0 °
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	300.0 mm (11.81 in)
Fork spring free length	454.0 mm (17.87 in)
Limit	449.0 mm (17.68 in)
Installed length	454.0 mm (17.87 in)
Spring rate K1	4.50 N/mm (0.46 kgf/mm, 25.70 lb/in)
Spring stroke K1	0.0–300.0 mm (0.00–11.81 in)
Inner tube outer diameter	48.0 mm (1.89 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	Yes
Recommended oil	Suspension oil S1
Standard oil amount	528 cm^3 (17.85 Imp.oz, 18.62 US oz)
Rebound damping	
*With the adjusting screw fully turned in	
Minimum	20 click (s) out*
Standard	12 click (s) out*
Maximum (hard)	Fully turned in
Compression damping	
*With the adjusting screw fully turned in	
Minimum	20 click (s) out*
Standard	14 click (s) out*
Maximum (hard)	Fully turned in
Rear suspension	
Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	122.0 mm (4.80 in)
Spring free length	240.0 mm (9.45 in)
Installed length	222.0 mm (8.47 in)
Spring rate K1	54.00 N/mm (5.51 kgf/mm, 308.34 lb/in)
Spring stroke K1	0.0–140.0 mm (0.00–5.51 in)
Optional spring available	Yes
Enclosed gas/air pressure (STD)	1000 kPa (10.0 kgf/cm^2, 142.2 psi)

Spring preload adjusting positions	
Minimum	238.5 mm
Standard	222.0 mm
Maximum	222.0 mm
Rebound damping adjusting positions	
*With the adjusting screw fully turned in	
Minimum	30 click (s) out*
Standard	18 click (s) out*
Maximum	Fully turned in
Compression damping adjusting positions (for fast compression damping)	
*With the adjusting screw fully turned in	
Minimum	2 turn (s) out*
Standard	7/8 turn (s) out*
Maximum	Fully turned in
Compression damping adjusting positions (for slow compression damping)	
*With the adjusting screw fully turned in	
Minimum	20 click (s) out*
Standard	10 click (s) out*
Maximum	Fully turned in
Swingarm	
Swingarm end free play limit (radial)	1.0 mm (0.04 in)
Swingarm end free play limit (axial)	0.2–0.9 mm (0.01–0.04 in)
Drive chain	
Type/manufacturer	520VM2/DAIDO
Number of links	114
Drive chain slack	48.0–58.0 mm (1.89– 2.28 in)
15-link length limit	239.3 mm (9.42 in)

EAS1DX3069
ELECTRICAL SPECIFICATIONS

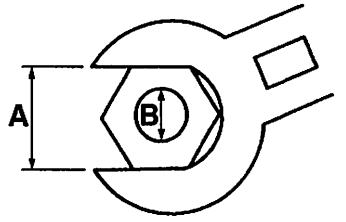
Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI
Advancer type	Digital
Ignition timing (B.T.D.C.)	10.0 °/2000 r/min
Engine control unit	
Model/manufacturer	1DX2/YAMAHA
Ignition coil	
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	3.57-4.83 Ω
Secondary coil resistance	10.71–14.49 kΩ
AC magneto	
Standard output	14.0 V, 160 W@5000 r/min
Stator coil resistance	0.528–0.792 Ω
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
No load regulated voltage	14.1–14.9 V
Rectifier capacity (DC)	35.0 A
Battery	
Model	YTZ7S (F)
Voltage, capacity	12 V, 6.0 Ah
Specific gravity	1.310
Manufacturer	GS YUASA
Ten hour rate amperage	0.60 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 35 W/35 W × 1
Auxiliary light	12 V, 3.0 W × 1
Tail/brake light	LED
Meter lighting	EL (Electroluminescent)
Indicator light	
Fuel level warning light	LED
Engine trouble warning light	12 V 1.7 W × 1
Electric starting system	
System type	Constant mesh
Starter motor	
Power output	0.48 kW
Armature coil resistance	0.0117–0.0143 Ω
Brush overall length	7.0 mm (0.28 in)
Limit	3.50 mm (0.14 in)
Brush spring force	3.92–5.88 N (400–600 gf, 14.11-21.17 oz)
Commutator diameter	17.6 mm (0.69 in)
Limit	16.6 mm (0.65 in)
Mica undercut (depth)	1.50 mm (0.06 in)

Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Starting circuit cut-off relay	
Coil resistance	86.4–105.6 Ω
Headlight relay	
Coil resistance	86.4–105.6 Ω
Fuses	
Main fuse	15.0 A
Spare fuse	15.0 A

EAS20320
TIGHTENING TORQUES

EAS20330
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 criss-cross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A. Distance between flats
B. Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		Nm	m·kgf	ft·lbf
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

EAS1DX3070
ENGINE TIGHTENING TORQUES

TIP

△ - marked portion shall be checked for torque tightening after break-in.

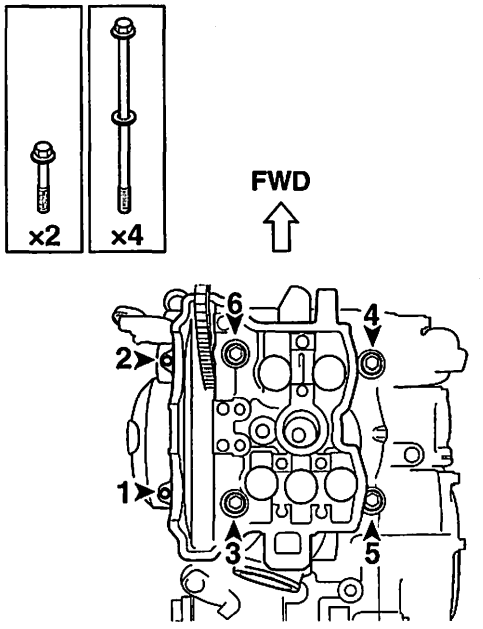
Item	Thread size	Q'ty	Tightening torque	Remarks
Camshaft cap bolt	M6	10	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Cylinder head blind plug	M12	1	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Cylinder head stud bolt	M8	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Spark plug	M10	1	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Cylinder head bolt	M10	4	See TIP.	
Cylinder head cover bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Cylinder head bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant temperature sensor	M10	1	16 Nm (1.6 m·kgf, 11 ft·lbf)	
Cylinder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Balancer bolt	M10	1	45 Nm (4.5 m·kgf, 32 ft·lbf)	Lock washer use
Balancer weight plate screw	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Balancer driven gear nut	M14	1	50 Nm (5.0 m·kgf, 36 ft·lbf)	Lock washer use
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain tensioner cap bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain guide bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil filter cover bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil pump bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil pump cover bolt	M4	1	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Oil pump drive gear shaft screw	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Engine oil drain bolt (oil filter)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil check bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil hose clamp	-	2	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Oil strainer bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle body joint bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle body joint clamp screw	M4	1	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	
Air filter case bolt	M6	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Air filter joint clamp bolt	M6	1	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	
Air filter joint and air filter case bolt	M5	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Exhaust pipe nut	M8	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Exhaust pipe bolt	M8	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
△ Muffler bolt	M8	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Muffler clamp bolt	M8	1	16 Nm (1.6 m·kgf, 11 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe protector screw	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Spark arrester bolt	M5	4	9 Nm (0.9 m·kgf, 6.4 ft·lbf)	
Muffler cap bolt	M5	6	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Throttle cable (pull) nut	M6	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Throttle cable (return) nut	M6	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Throttle cable cover bolt	M5	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Throttle body joint	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase bolt	M6	12	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Timing mark accessing screw	M14	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Crankshaft end accessing screw	M27	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cover bolt	M6	7	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase cover bolt (left)	M6	8	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase cover bolt (right)	M6	8	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase cover (right)	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Idle gear cover bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil drain bolt (crankcase right)	M6	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Oil drain bolt (crankcase left)	M6	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Oil drain bolt (crankcase)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase bearing stopper screw	M6	4	14 Nm (1.4 m·kgf, 10 ft·lbf)	
Crankcase bearing stopper screw	M6	8	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Drive axle oil seal stopper bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Ratchet wheel guide bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Kick starter crank bolt	M8	1	33 Nm (3.3 m·kgf, 24 ft·lbf)	
Kick starter crank boss screw	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Starter clutch nut	M6	6	16 Nm (1.6 m·kgf, 11 ft·lbf)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor lead screw	M5	1	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Primary drive gear nut	M20	1	110 Nm (11.0 m·kgf, 80 ft·lbf)	
Clutch spring bolts	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cable adjust bolt and lock nut	M8	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Clutch boss nut	M20	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	Lock washer use
Drive sprocket nut	M20	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	Lock washer use
Drive chain sprocket cover nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Shift pedal bolt	M6	1	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Shift guide bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Stopper lever bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Segment	M8	1	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Impeller	M8	1	14 Nm (1.4 m·kgf, 10 ft·lbf)	
Water pump housing cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant drain bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cable holder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Radiator hose clamp screw	M6	8	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Radiator bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Radiator pipe 1, 2	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

TIP

*1:First, tighten the cylinder head bolts to 30 Nm (3.0 m·kgf, 22 ft·lbf) in the proper tightening sequence and remove them. Then, after retightening them to 20 Nm (2.0 m·kgf, 14 ft·lbf) in the same sequence, tighten them further two times each by 90°to attain the specified angle of 180°.



EAS1DX3071
CHASSIS TIGHTENING TORQUES

TIP

△ - marked portion shall be checked for torque tightening after break-in.

	Item	Thread size	Q'ty	Tightening torque	Remarks
△	Engine mounting bolt (upper side)	M10	2	45 Nm (4.5 m·kgf, 33 ft·lbf)	
△	Engine mounting nut (front lower side)	M10	1	53 Nm (5.3 m·kgf, 38 ft·lbf)	
△	Engine mounting nut (rear lower side)	M10	1	53 Nm (5.3 m·kgf, 38 ft·lbf)	
△	Engine bracket bolt	M8	10	34 Nm (3.4 m·kgf, 25 ft·lbf)	
△	Main frame and rear frame	M8	4	32 Nm (3.2 m·kgf, 23 ft·lbf)	
	Cable guide and frame bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Wire harness bracket bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
	Rectifier/regulator stay bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Rectifier/regulator bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Ignition coil bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Lean angle sensor bolt	M4	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Radiator mounting nut and frame	M10	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	LT
△	Cable holder and right upper engine bracket bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
	Throttle cable housing screw	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Throttle cable and throttle body nut	M6	2	4.3 Nm (0.43 m·kgf, 3.1 ft·lbf)	
	Air temperature sensor screw	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Starter relay and positive battery lead bolt	M6	1	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
	Starter relay and starter motor lead bolt	M6	1	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
	Footrest bolt	M10	4	55 Nm (5.5 m·kgf, 40 ft·lbf)	LT
	Front refrector nut (For Canada)	M6	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
△	Engine guard bolt	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Drive chain tensioner bolt	M8	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
	Drive chain tensioner nut	M8	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
△	Front fender bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
△	Side cover and rear frame bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Rear fender bolt (front side)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Rear fender bolt (rear side)	M6	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
	Taillight assembly screw	—	3	1.1 Nm (0.11 m·kgf, 0.80 ft·lbf)	
	Taillight lead clamp and rear fender	—	3	0.50 Nm (0.05 m·kgf, 3.62 ft·lbf)	
	Reflector nut (For Canada)	M5	2	1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)	
△	Air scoop and frame bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Air scoop and air panel bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

	Item	Thread size	Q'ty	Tightening torque	Remarks
△	Air scoop and fuel tank	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Catch tank bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Pivot shaft nut	M16	1	85 Nm (8.5 m·kgf, 61 ft·lbf)	
	Rear shock absorber assembly locknut	—	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
△	Rear shock absorber assembly upper nut	M10	1	56 Nm (5.6 m·kgf, 41 ft·lbf)	
△	Rear shock absorber assembly lower nut	M10	1	53 Nm (5.3 m·kgf, 38 ft·lbf)	
△	Frame and connecting arm nut	M14	1	80 Nm (8.0 m·kgf, 58 ft·lbf)	
△	Connecting arm and relay arm nut	M14	1	80 Nm (8.0 m·kgf, 58 ft·lbf)	
△	Relay arm and swingarm nut	M14	1	70 Nm (7.0 m·kgf, 51 ft·lbf)	M
	Patch and swingarm screw	M4	4	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	LT
	Drive chain support bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Drive chain support nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Sidestand nut	M10	1	25 Nm (2.5 m·kgf, 18 ft·lbf)	
△	Steering stem nut	M24	1	145 Nm (14.5 m·kgf, 105 ft·lbf)	LS
△	Lower ring nut	M28	1	See TIP.	LS
△	Upper bracket pinch bolt	M8	4	21 Nm (2.1 m·kgf, 15 ft·lbf)	
△	Lower bracket pinch bolt	M8	4	21 Nm (2.1 m·kgf, 15 ft·lbf)	
	Fuel tank bracket and fuel tank bolt (front side)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Fuel tank bracket and fuel tank bolt (rear side)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Fuel tank bolt	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
	Seat set bracket and fuel tank screw	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Fuel pump bolt	M5	6	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
	Fuel tank bracket and rear frame bolt	M6	2	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
△	Fuel sender screw	M6	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
	Headlight body and headlight stay bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Multi-function meter nut	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Multi-function meter bracket bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
△	Main switch screw	M4	2	3.3 Nm (0.33 m·kgf, 2.4 ft·lbf)	
△	Engine trouble warning light bracket and multi-function meter bracket screw	M5	2	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
△	Front brake hose guide and headlight stay bolt	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
△	Handlebar upper holder bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
△	Handlebar lower holder nut	M10	2	34 Nm (3.4 m·kgf, 25 ft·lbf)	LS

	Item	Thread size	Q'ty	Tightening torque	Remarks
	Start switch screw	M3	1	0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)	
	Engine stop switch screw	M3	1	0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)	
	Clutch cable lock	M6	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
	Clutch lever nut	M6	1	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
	Front brake lever pivot bolt	M6	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
	Front brake lever pivot nut	M6	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
	Speed sensor lead holder and speed sensor lead bracket bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Speed sensor lead bracket and lower bracket bolt	M6	1	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
△	Front brake hose guide and lower bracket bolt	M6	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Plate 1 and front fork protector bolt	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
	Plate 2 and front fork protector screw	—	1	0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)	
	Damper assembly and outer tube	M51	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
	Adjuster and inner tube	M22	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	LT
	Base valve and damper assembly	M42	2	28 Nm (2.8 m·kgf, 20 ft·lbf)	
	Adjuster and damper assembly	M12	2	29 Nm (2.9 m·kgf, 21 ft·lbf)	
	Air bleed screw and base valve	M5	2	1.3 Nm (0.13 m·kgf, 0.94 ft·lbf)	
	Front fork and reflector bracket bolt (For Canada)	M8	4	21 Nm (2.1 m·kgf, 15 ft·lbf)	
	Front fork cap bolt	M51	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
	Front fork base valve	M22	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	LT
△	Front fork axle nut	M16	1	90 Nm (9.0 m·kgf, 65 ft·lbf)	
△	Front wheel axle pinch bolt	M8	4	21 Nm (2.1 m·kgf, 15 ft·lbf)	
△	Front brake disc bolt	M6	6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT
	Spoke (front, rear)	BC4	72	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	
△	Rear wheel axle nut	M20	1	125 Nm (12.5 m·kgf, 90 ft·lbf)	
△	Rear brake disc bolt	M6	6	14 Nm (1.4 m·kgf, 10 ft·lbf)	LT
△	Rear wheel sprocket nut	M8	6	50 Nm (5.0 m·kgf, 36 ft·lbf)	
△	Front brake caliper bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
△	Front brake hose union bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
△	Front brake caliper bleed screw	M8	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
	Front caliper support bolt	M8	2	17 Nm (1.7 m·kgf, 12 ft·lbf)	
	Front caliper pin plug	M8	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
△	Front brake master cylinder holder bolt	M6	2	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
△	Rear master cylinder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
△	Rear caliper protector bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

	Item	Thread size	Q'ty	Tightening torque	Remarks
	Rear brake caliper support bolt	M8	2	17 Nm (1.7 m·kgf, 12 ft·lbf)	
	Drive chain tensioner bolt (upper, lower)	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
	Drive chain adjuster locknut	M8	1	19 Nm (1.9 m·kgf, 14 ft·lbf)	
△	Front fork protector bolt	M6	6	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Seat bolt	M8	2	22 Nm (2.2 m·kgf, 16 ft·lbf)	
	Front brake lever position locknut	M5	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
	Front brake master cylinder cap screw	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
	Rear brake caliper pin plug	M10	1	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
	Rear brake master cylinder bolt	M6	10	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
△	Brake pedal bolt	M8	1	26 Nm (2.6 m·kgf, 19 ft·lbf)	
	Rear brake master cylinder cap bolt	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
△	Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
△	Rear brake caliper bleed screw	M8	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
△	Rear brake disc cover bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
	Clutch lever holder bolt	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
△	Front brake hose holder and front fork protector nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
	Headlight unit and headlight body bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
△	Rear brake hose holder screw	M5	4	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
	Drive chain guide screw	M5	4	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	

TIP

1. Tighten the lower ring nut with the 38 Nm (3.8 m·kgf, 27 ft·lbf) torque.
2. Turn the front fork to the left and right. The rotation motion must be smooth.
3. Fully loosen the lower ring nut, and retighten it with the 7 Nm (0.7 m·kgf, 5.1 ft·lbf) torque.

EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant types
Oil seal lips	LS
O-rings	LS
Bearings	E
Camshaft cap bolt threads	M
Cylinder head bolt threads, seats	M
Camshaft profile, journal	M
Decompression system moving parts	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Valve lifter surface	E
Crank assembly (crankshaft pin surface)	E
Crankshaft big end	E
Piston pin surface	M
Piston surface	E
Nozzle 3	E
Cylinder body inner surface	E
Water pump impeller shaft	E
Oil pump rotors (inner and outer)	E
Oil pump assembly shaft	E
Idle gear inner surface, idle gear shaft	E
Kick gear and ratchet wheel	M
Kick shaft	E
Sprocket idle gear	E
Idle gear-2 inner surface, thrust surfaces	E
Damper assembly shaft, thrust surfaces	E
Gear 3 thrust surfaces	E
Long clutch push rod	E
Short clutch push rod	E
Primary drive gear nut threads	E
Primary driven gear assembly, inner surface	E
Push lever assembly end	E
Push lever washer	E
Transmission gears (wheel and pinion)	M
Shift fork and shift fork guide bars	E
Shift shaft	E
Shift ratchet	E

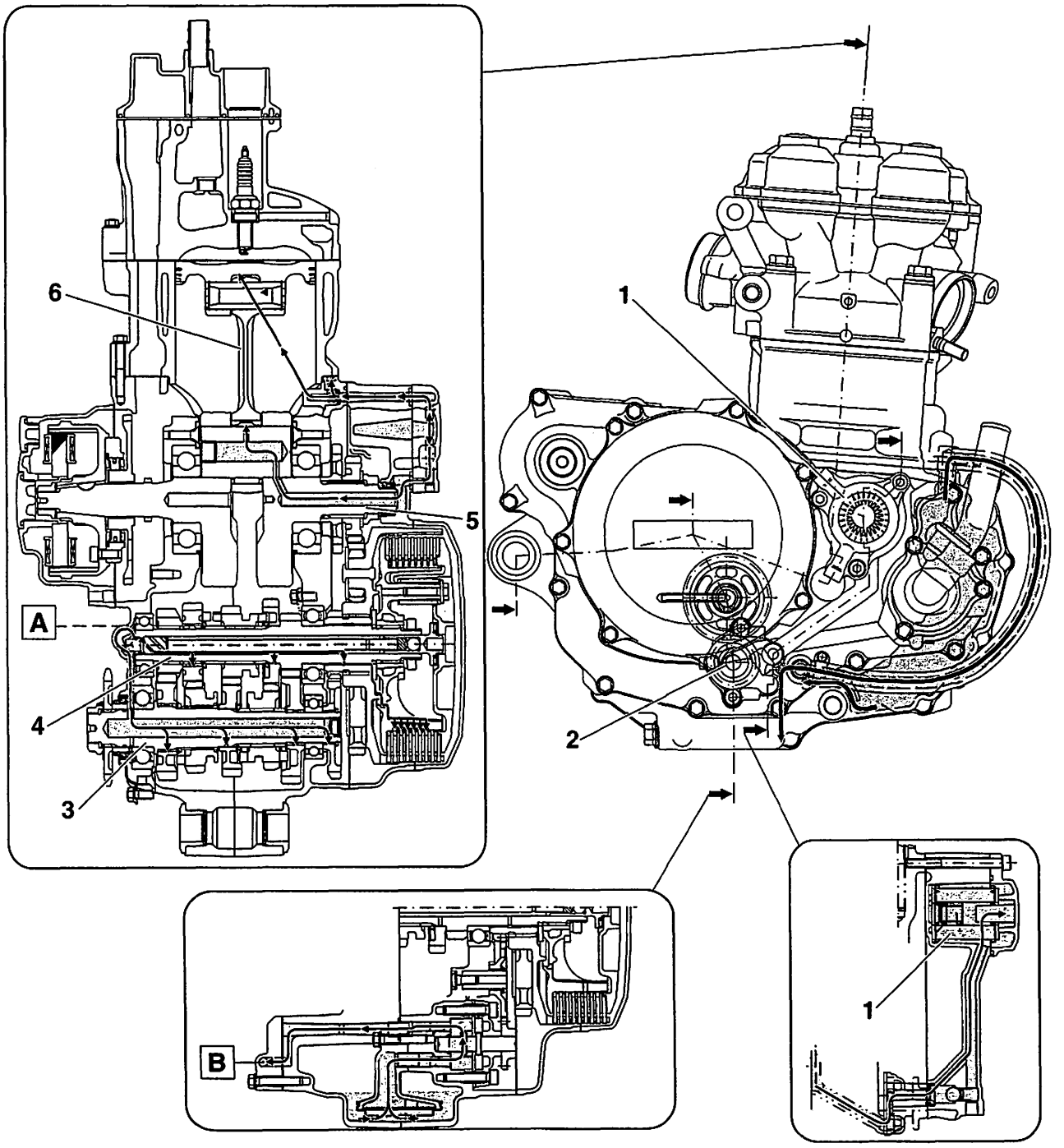
Lubrication point	Lubricant types
Shift cam	E
Clutch boss nut threads	E
Cylinder head cover gasket	Three Bond No.TB1541C®
Cylinder head semicircular surface	Yamaha bond No.1215 (Three Bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three Bond No.1215®)
Stator assembly lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)

EAS1DX3072
CHASSIS

Lubrication point	Lubricant types
Upper bearings and oil seal lip (steering head)	LS
Lower bearings and oil seal lip (steering head)	LS
Steering shaft and nut thread	LS
Handle lower holder threads	LS
Front wheel oil seal (left/right)	LS
Rear wheel oil seal (left/right)	LS
Brake pedal pivoting point and bolt	LS
Throttle cable end and throttle grip	LS
Throttle cable	LS
Brake lever bolt	S
Brake lever and front brake master cylinder	S
Rear brake master cylinder push rod (boot mount groove)	S
Brake caliper piston seal	S
Brake caliper dust seal	S
Brake caliper support bolt	S
Brake pad support bolt	S
Clutch cable end	LS
Clutch lever bolt	LS
Clutch lever	LS
Pivot shaft	LS
Swing arm bearing, collar, spacer, and oil seal	LS
Relay arm bearing, collar, washer, and oil seal	LS
Relay arm bolt thread (swing arm side)	LS
Rear shock absorber assembly bearing, collar, and oil seal	LS
Connecting rod bearing, collar and oil seal	LS
Connecting rod bolt	LS
Front wheel axle	LS
Rear wheel axle	LS
Tube guide (throttle grip) inner surface and throttle cables	LS
Sidestand bracket and sidestand	LS
Sidestand spring and link	LS
Sidestand bolt collar	LS
Speed sensor oil seal	LS

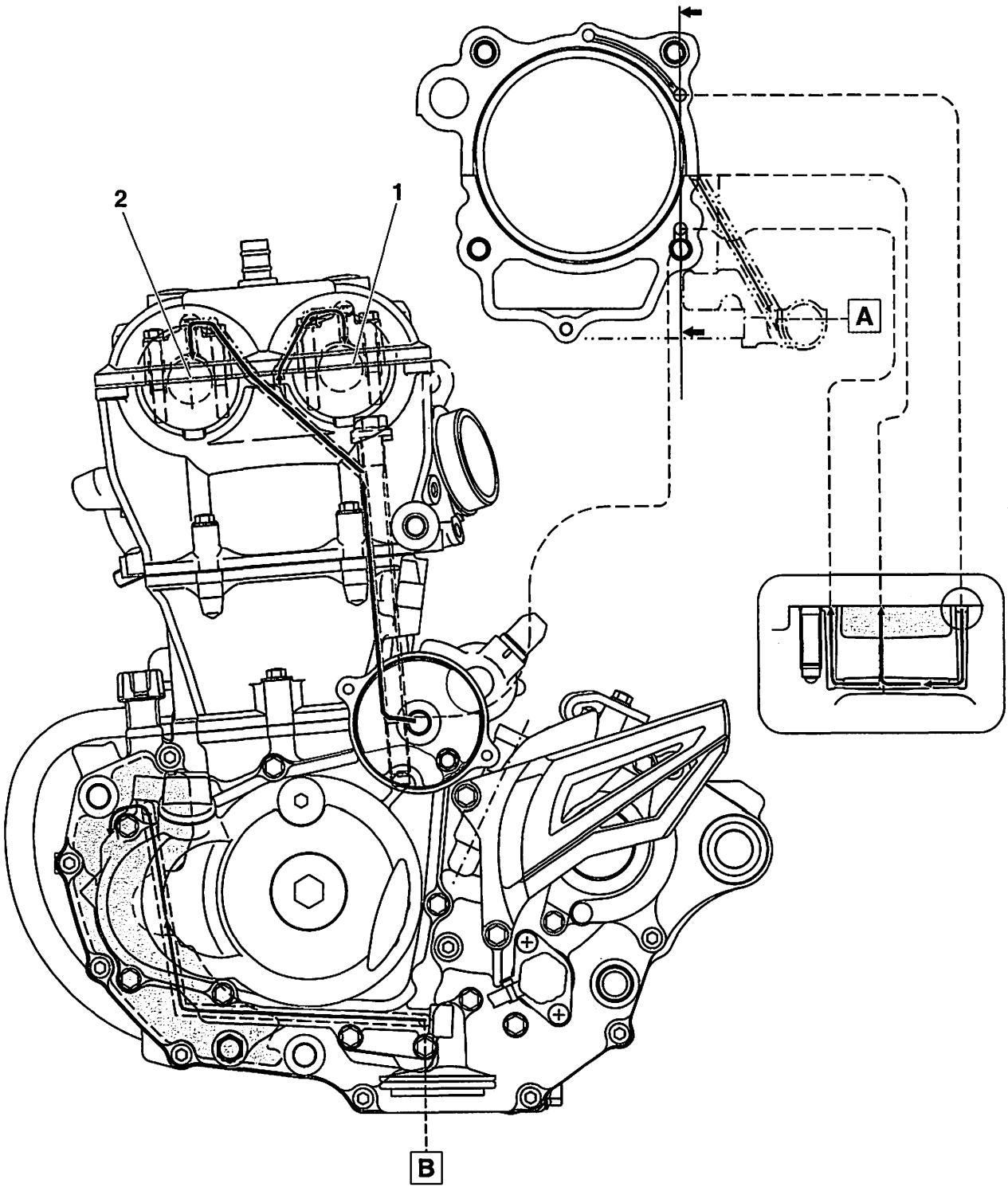
EAS20390
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20410
LUBRICATION DIAGRAMS



1. Oil filter element
2. Oil pump
3. Drive axle
4. Main axle
5. Crankshaft
6. Connecting rod

A. From cylinder
B. To oil tank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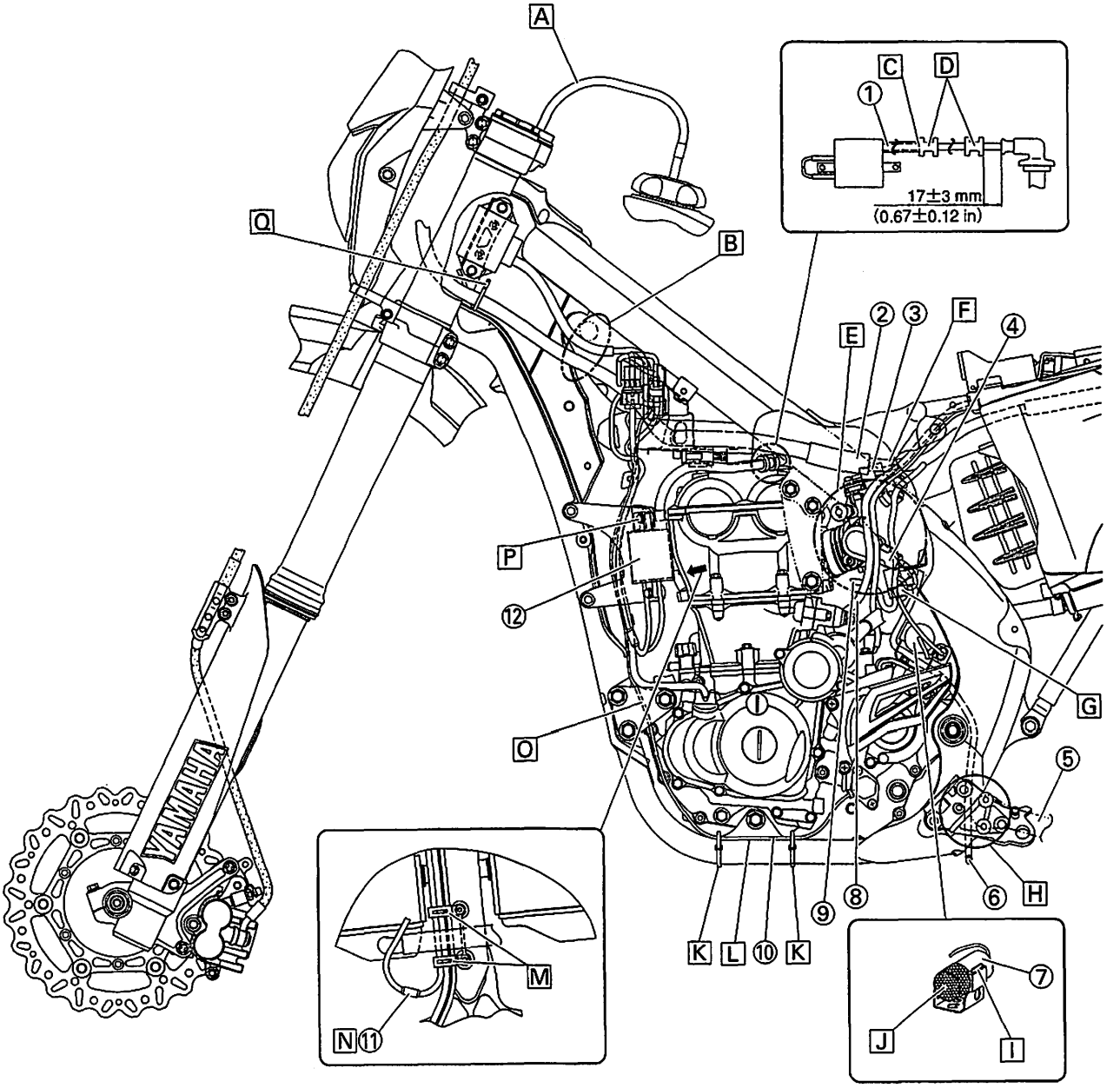
1. Intake camshaft
2. Exhaust camshaft

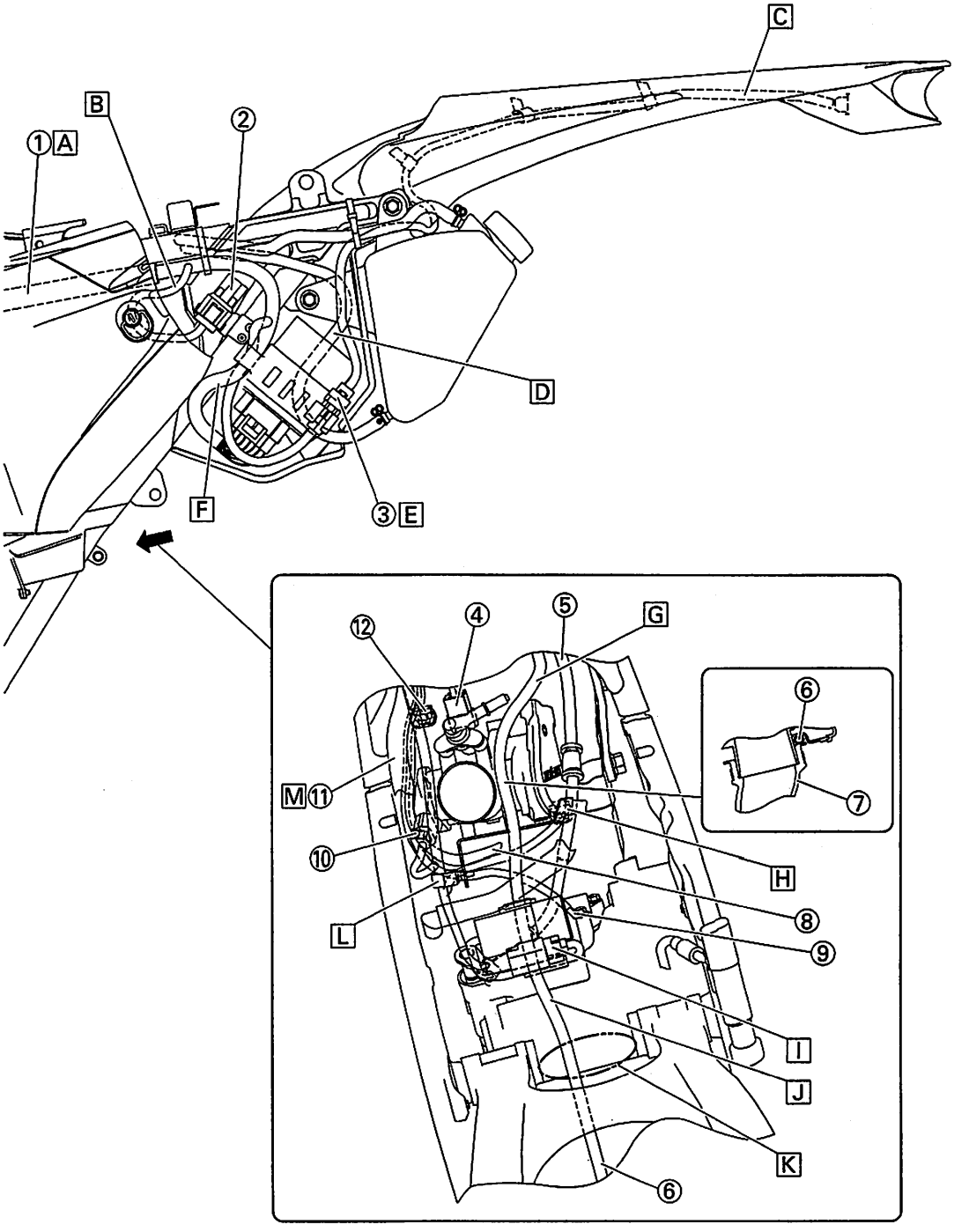
A. To main axle
B. From oil pump

EAS1DX3073
CABLE ROUTING



1. Protector
2. Main harness
3. Intake air pressure sensor coupler
4. Throttle position sensor coupler
5. Connecting arm
6. Catch tank breather hose
7. Condenser
8. Starter motor lead
9. Coolant temperature sensor lead
10. Neutral switch lead
11. Ignition coil coupler
12. Ignition coil

A. Put the end of the fuel tank breather hose in the hole in the steering stem.
B. Pass the leads under the hose connecting both (right and left) radiators.
C. Attach the grommet by pressing it against the end face of the protector.
D. Apply an adhesive to the grommet before fixing it.
E. Pass the leads so the engine breather hose is located on the outside of the vehicle.
F. Pass the main harness over the intake air pressure sensor coupler.
G. Clamp the condenser lead and coolant temperature sensor lead. Lay the leads and the locking in any direction.
H. Pass the catch tank breather hose between the cross tube (on the frame) and the connecting arm.
I. Insert the condenser in the bracket before fixing it.
J. Degrease the condenser on its surface having no lead coming out before affixing the insulation to it. When affixing the insulation, align its notch with the projection on the condenser. When the insulation materials overlap, affix them so that the longer one is directed toward the rear of the vehicle.
K. Fix the neutral switch lead to the down tube (on the frame). Lock it on the outside of the vehicle with its allowed portion directed upward. Do not cut off the lead end.
L. Pass the neutral switch lead on the outside of the vehicle away from the bracket.
M. Clamp the AC magneto lead, neutral switch lead, and ignition coil lead. The leads may be laid out in any way.
N. Pass the ignition coil lead (from coupler to ignition coil) in the rear of the radiator hose.
O. Pass the neutral switch lead on the inside of the vehicle away from the engine bracket.
P. After installing the ignition coil onto the bracket, put a cover over them.
Q. Pass the main harness through the cable guide.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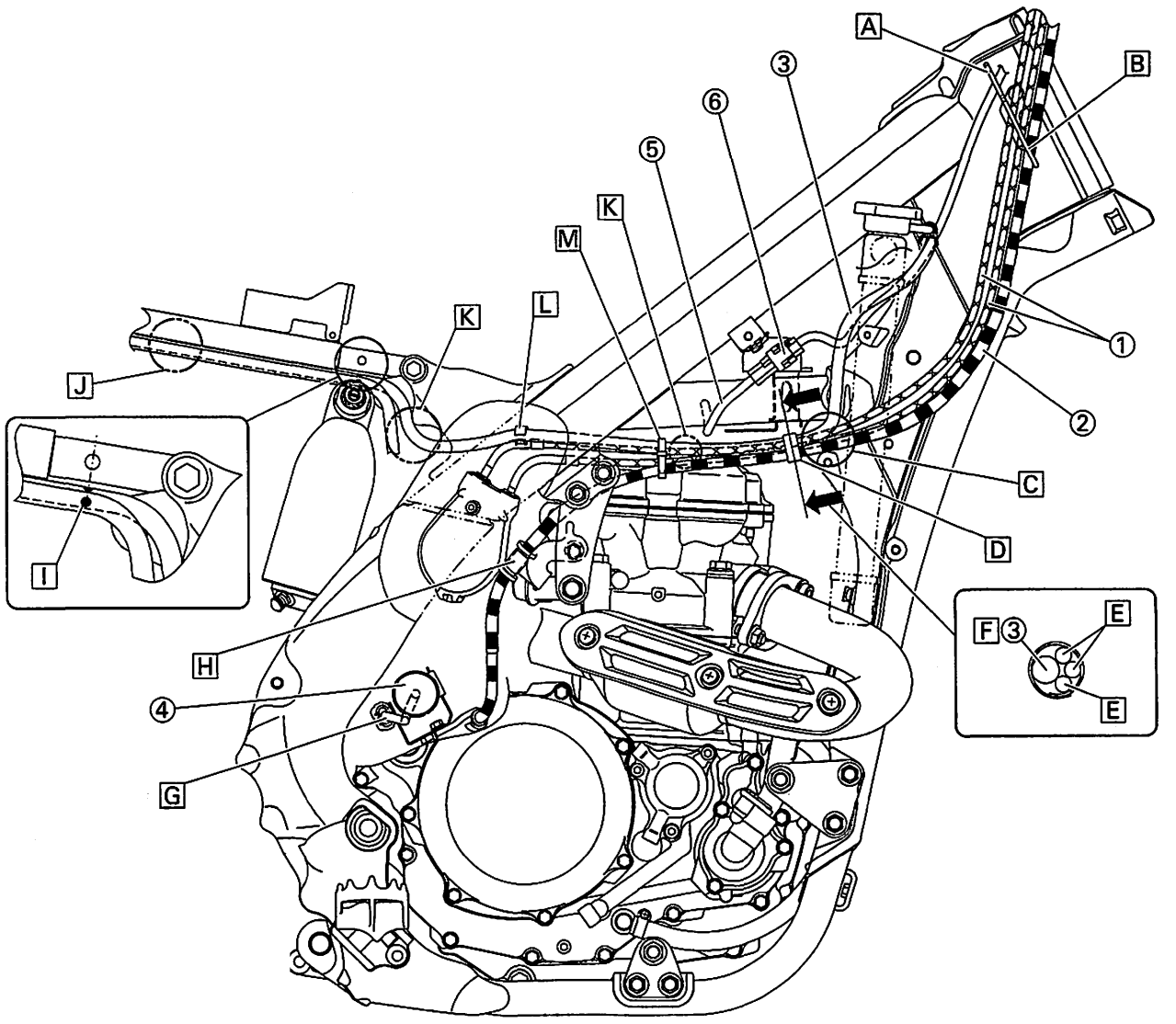
1. Main harness
2. Coupler for connecting optional part
3. Taillight coupler
4. Injector coupler
5. Clutch cable
6. Catch tank breather hose
7. Air cleaner joint
8. Starter motor lead
9. Negative lead
10. Throttle position sensor coupler
11. Engine breather hose
12. Intake air pressure sensor coupler

A. Pass the main harness between the rear frame and the air filter case.
B. Pass the lead (coupler for connecting optional part) between the air filter case and air filter duct.
C. Do not allow the taillight lead to slacken.
D. Pass the radiator breather hose on the inside of the location where the catch tank is installed.
E. Insert the taillight coupler (3P) to fit the triangle of the ECU band. Locate the clamp pawl in any direction.
F. Pass the ECU lead and taillight lead through the rubber band hook while laying out the ECU lead outside of the vehicle beyond the taillight lead.
G. Pass the catch tank breather hose behind the throttle body.
H. After connecting the coolant temperature sensor coupler (2P), put a cover over it.
I. After connecting the condenser coupler (2P), insert and fix the coupler in the bracket and put a cover over it.
J. Pass the catch tank breather hose through the front hole and rear notch in the condenser and lay it in the rear of the vehicle.
K. Pass the catch tank breather hose in front of the rear shock absorber without intervening anything.
L. Clamp the condenser lead and coolant temperature sensor lead. Lay the leads and the locking in any direction.
M. Pass the leads so the engine breather hose is located on the outside of the vehicle.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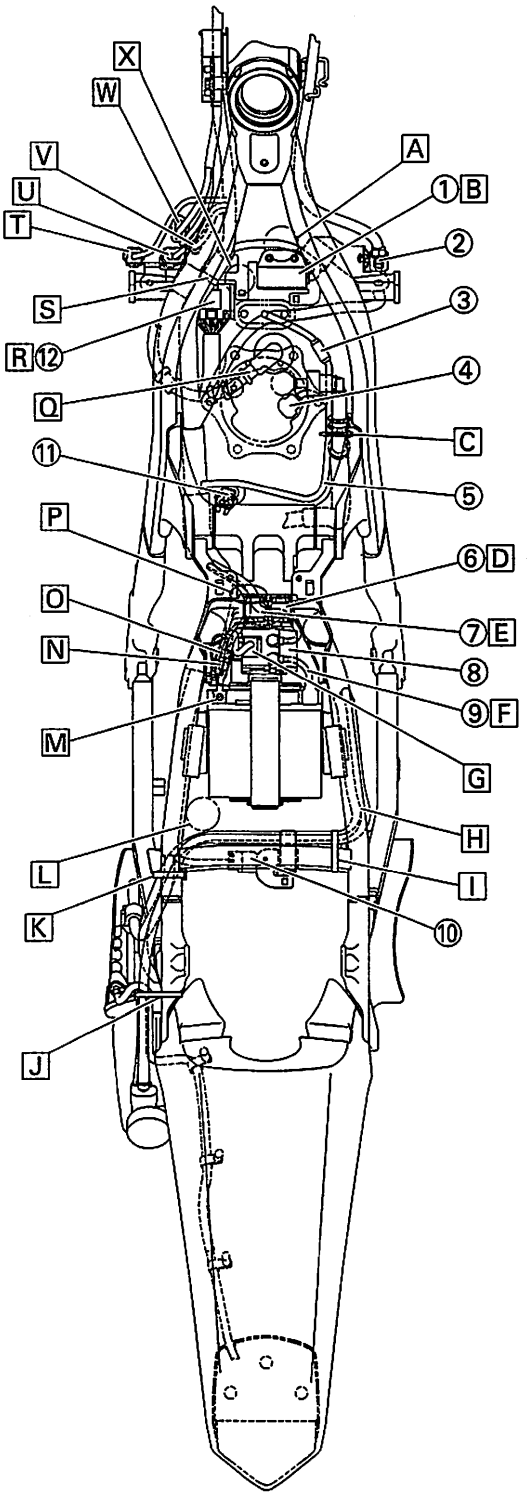
1. Throttle cable
2. Clutch cable
3. Radiator breather hose
4. Condenser
5. Main harness
6. Right handlebar switch coupler

A. Pass the right handlebar switch lead through the upper cable guide.
B. Pass the throttle cable and clutch cable through the lower cable guide. The leads. may be laid out in any way.
C. Pass the throttle cable and clutch cable between the radiator and the frame. Pass the throttle cable and clutch cable over the radiator mounting boss on the frame.
D. Determine the clamping position to fit where the throttle cable has no protector on it. Take care so that the throttle cable and clutch cable are not twisted.
E. Lay out the two throttle wires and the clutch cable in any way. Locate the locking in any direction.
F. Lay the radiator breather hose so it is located to the right of the vehicle.
G. Pass the condenser lead between the condenser and the catch tank breather hose, and connect it to the main harness at the back of the condenser.
H. Pass the clutch cable grommet through the cable guide.
I. Align the painted positions on the two breather hoses with the hole in the rear frame.
J. Pass the two breather hoses between the rear frame and the air filter case.
K. Pass the radiator breather hose under the fuel hose.
L. Clamp together the metal portion of the throttle cable and the radiator breather hose. Lay the radiator breather hose to be located to the right of the vehicle. Direct the open end of the clamp in any direction.
M. Clamp the two throttle cables, clutch cable, engine breather hose, and radiator breather hose. Direct the clamp end downward to provide clearance for the engine. Position the clamp where there is no protector on the throttle cable.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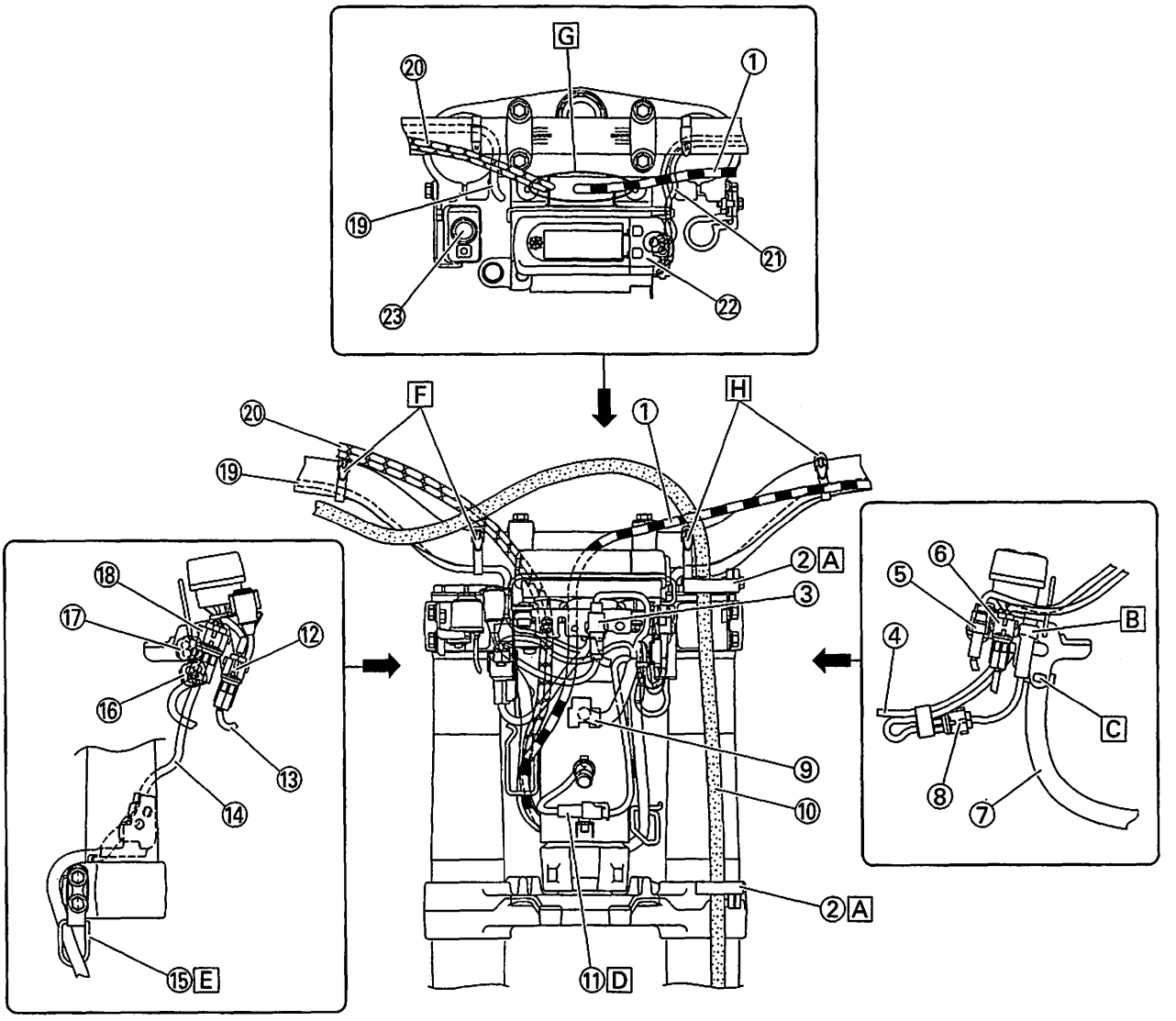
1. Lean angle sensor
2. Right handlebar switch coupler
3. Fuel sender coupler
4. Fuel pump coupler
5. Fuel pump lead
6. Headlight relay (right side of the vehicle)
7. Starting circuit cut-off relay (left side of the vehicle)
8. Starter relay
9. Positive lead
10. Intake air temperature sensor coupler
11. Injector coupler
12. Joint connector

A. The diode, which is tape-bound with the lean angle sensor lead, should be laid in front of the lean angle sensor and below the lean angle sensor lead.
B. Connect the lean angle sensor to the main harness (6P).
C. Clamp the fuel pump lead and the fuel hose together. Direct the clamp allowance and the locking in any way.
D. Connect the headlight relay (on the right side of the vehicle) to the main harness (tape-bound).
E. Connect the starting circuit cut-off relay (in the left side of the vehicle) to the main harness (not tape-bound).
F. Connect the positive lead to the battery positive terminal and starter relay terminal.
G. Connect the main harness (4P) to the starter relay.
H. Take care so that the radiator breather hose and catch tank breather hose are not twisted.
I. Fasten the radiator breather hose and catch tank breather hose to the rear frame. Clamp the hose while locating it toward the seat rail. Tighten it to the extend that the hose is not crushed. Lock it in the rear of the chassis and direct the remainder downward.
J. Clamp the catch tank breather hose and taillight lead to the rear frame. Tighten them to the extent that the breather hose is not crushed. Direct the allowed portion from the locking downward.
K. Fasten to the rear frame the radiator breather hose, catch tank breather hose, and main harness. Clamp the main harness with its branch brought up to the portion where the back stay is connected. Tighten the breather hose to the extent that it is crushed. Lock inward of the vehicle with the allowed portion directed downward.
L. Lay out the diode in the rear left of the battery.
M. Connect the negative lead to the battery negative terminal.
N. Pass the two branches from the main harness through the hole in the relay holder.
O. Connect the negative lead coupler (1P) to the main harness. Lay out the negative lead coupler between the starter relay and rear frame.
P. Pass the starter motor lead and negative lead through the hole in the relay holder.
Q. Put in the spark plug so as to allow the high tension cord to pass above the cylinder head cover bolts.
R. Insert the joint connector down in the bracket and fix it.
S. Insert the main harness clip firmly in the round hole in the bracket and fix it.
T. Connect the AC magneto coupler (2P) to the main harness.
U. Connect the regulator coupler (2P) to the main harness.
V. Connect the neutral switch coupler (1P) to the main harness.
W. Connect the regulator coupler (3P) to the AC magneto lead.
X. Lay out the joint connector 1 to the left of the lean angle sensor.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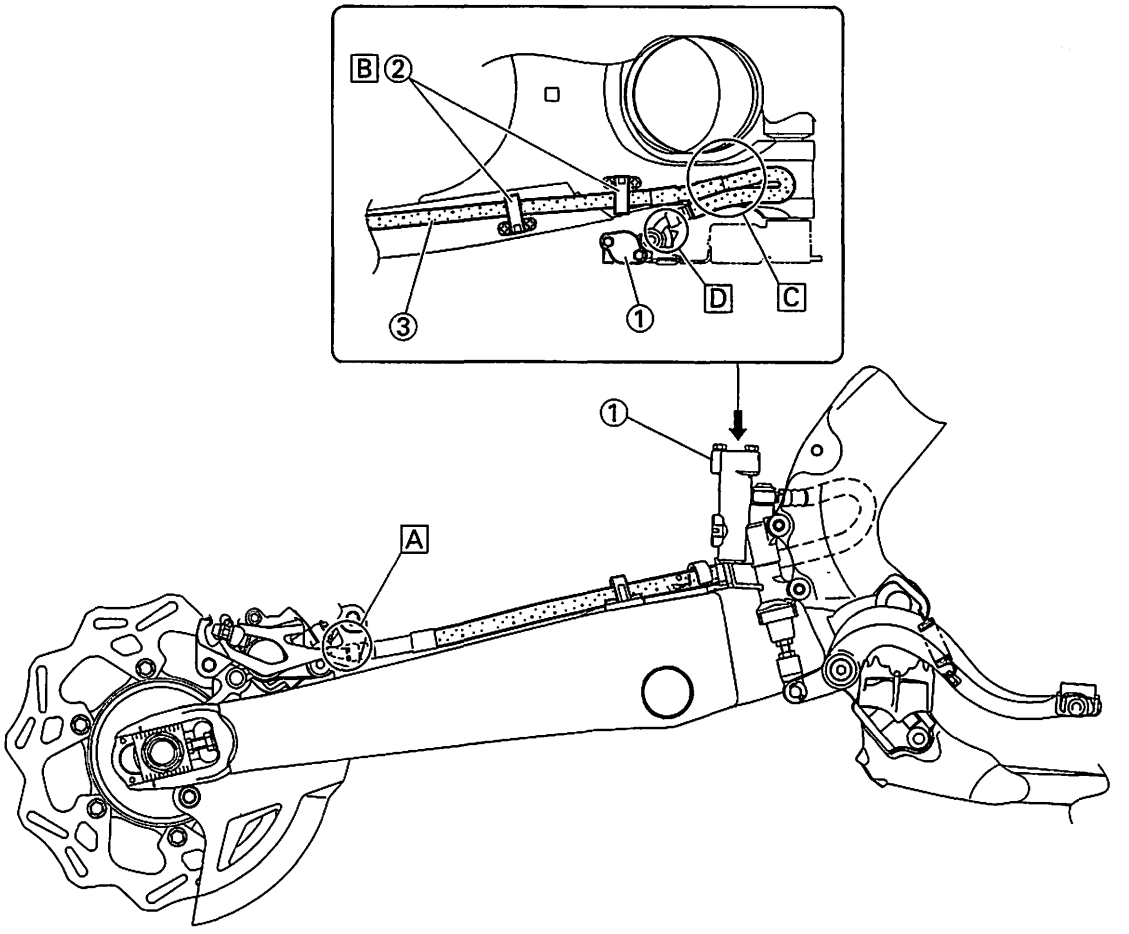
1. Clutch cable
2. Hose guide
3. Engine trouble warning light coupler
4. Auxiliary light lead
5. Clutch switch coupler
6. Engine stop switch coupler
7. Main harness
8. Resistor coupler
9. Headlight coupler
10. Brake hose
11. Auxiliary light coupler
12. Meter assembly coupler
13. Meter assembly lead
14. Speed sensor lead
15. Guide
16. Main switch coupler
17. Meter assembly optional switch coupler
18. Speed sensor coupler
19. Right handlebar switch lead
20. Throttle cable
21. Engine stop switch lead
22. Meter assembly
23. Main switch

A. Pass the brake hose through the guide.
B. After putting the resistor rubber band projection in the meter bracket, firmly secure the resistor by sliding it downward.
C. Make sure to securely fix the main harness clip while pushing it in the round hole in the meter bracket on the inside of the vehicle.
D. Fix the auxiliary light coupler while inserting it in the hole in the head light unit.
E. Pass the speed sensor lead through the guide.
F. Clamp the right handlebar switch lead to the handlebar.
G. Pass the throttle cable and clutch cable between the upper bracket and the meter bracket.
H. Clamp the engine stop switch lead and clutch switch lead to the handlebar.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1. Brake master cylinder
2. Brake hose holder
3. Brake hose

A. Install the brake hose so that its pipe portion directs as shown and lightly touches the projection on the brake caliper.
B. Pass the brake hose into the brake hose holders.
C. If the brake hose contacts the spring (rear shock absorber), correct its twist.
D. Install the brake hose so that its pipe portion directs as shown and lightly touches the projection on the brake master cylinder.

PERIODIC CHECKS AND ADJUSTMENTS

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EAS1DX3074
PERIODIC MAINTENANCE

EAS1DX3075
INTRODUCTION
This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS1DX3076
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM
TIP
- From 4200 mi (7000 km) or 9 months, repeat the maintenance intervals starting from 1800 mi (3000 km) or 3 months.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

NO.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL	ODOMETER READINGS	
				600 mi (1000 km) or 1 month	1800 mi (3000 km) or 3 months	3000 mi (5000 km) or 6 months
1	*	Fuel line	• Check fuel hoses for cracks or damage. • Replace if necessary.	√	√	√
2		Spark plug	• Check condition. • Adjust gap and clean.	√	√	√
3	*	Valve clearance	• Check and adjust valve clearance when engine is cold.	√		√
4	*	Air filter element	• Clean with solvent and apply foam air-filter oil or equivalent oil. • Replace if necessary.	√	√	√
5	*	Breather system	• Check ventilation hose for cracks or damage and drain any deposits. • Replace if necessary.	√	√	√
6	*	Fuel injection	• Adjust engine idling speed.	√	√	√
7		Exhaust system	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.	√	√	√
8		Engine oil	• Change (warm engine before draining).	√	√	√
9		Engine oil filter element	• Replace.	√	√	√

EAS1DX3077
GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL	ODOMETER READINGS	
				600 mi (1000 km) or 1 month	1800 mi (3000 km) or 3 months	3000 mi (5000 km) or 6 months
1		Clutch	• Check operation. • Adjust or replace cable.	√	√	√
2	*	Cooling system	• Check hoses for cracks of damage. • Replace if necessary.	√	√	√
			• Replace with ethylene glycol anti-freeze coolant every 1 year.	Every 1 year		
3	*	Spark arrester	• Clean.			√
4	*	Front brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√
			• Replace brake fluid every 1 year.	Every 1 year		

NO.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL	ODOMETER READINGS	
				600 mi (1000 km) or 1 month	1800 mi (3000 km) or 3 months	3000 mi (5000 km) or 6 months
5	*	Rear brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√
			• Replace brake fluid every 1 year.	Every 1 year		
6	*	Brake hoses	• Check for cracks or damage.		√	√
			• Replace.	Every 4 year		
7	*	Wheels	• Check runout, spoke tightness and for damage. • Tighten spokes if necessary.	√	√	√
8	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.	√	√	√
9	*	Wheel bearings	• Check bearings for smooth operation. • Replace if necessary.	√	√	√
10	*	Swingarm pivot bearings	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease.	√	√	√
11		Drive chain	• Check chain slack/alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every ride		
12	*	Steering bearings	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease every 1200 mi (2000 km) or 12 months (whichever comes first).	√	√	√
13		Brake and clutch lever pivot shafts	• Apply lithium-soap-based grease (all-purpose grease) lightly.	√	√	√
14		Brake pedal pivot shafts	• Apply lithium-soap-based grease (all-purpose grease) lightly.	√	√	√
15		Sidestand pivot	• Check operation. • Apply lithium-soap-based grease (all-purpose grease) lightly.	√	√	√
16	*	Front fork	• Check operation and for oil leakage. • Replace if necessary.		√	√
17	*	Shock absorber assembly	• Check operation and for oil leakage. • Replace if necessary.		√	√
18	*	Rear suspension link pivots	• Apply molybdenum disulfide grease lightly.		√	√
19	*	Control cables	• Apply Yamaha chain and cable lube or engine oil 10W-30 thoroughly.	√	√	√
20	*	Throttle grip housing and cable	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.	√	√	√
21	*	Chassis fasteners	• Check all chassis fitting and fasteners. • Correct if necessary.	√	√	√
22		Battery	• Check terminal for looseness and corrosion.		√	√

TIP

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake service
  - After disassembling the brake master cylinders and calipers, always change the fluid. Regularly check the brake fluid levels and fill the reservoirs as required.
  - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
  - Replace the brake hoses every four years and if cracked or damaged.

EAS1DX3078
MAINTENANCE INTERVALS FOR COMPETITION USE

TIP

The following schedule is intended as a general guide to maintenance and lubrication. Bear in mind that such factors as weather, terrain, geographical location, and individual usage will alter the required maintenance and lubrication intervals. If you are a doubt as to what intervals to follow in maintaining and lubricating your machine, consult your Yamaha dealer.

ITEM	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
ENGINE OIL						
Replace	●			●		
VALVES						The engine must be cold.
Check the valve clearances	●		●			Check the valve seats and valve stems for wear.
Inspect				●		
Replace					●	
VALVE SPRINGS						Check the free length and the tilt.
Inspect				●		
Replace					●	
VALVE LIFTERS						Check for scratches and wear.
Inspect				●		
Replace					●	
CAMSHAFTS						Inspect the camshaft surface.
Inspect				●		Inspect the decompression system.
Replace					●	
CAMSHAFT SPROCKETS						Check for wear on the teeth and for damage.
Inspect				●		
Replace					●	
PISTON						Inspect crack.
Inspect				●	●	Inspect carbon deposits and eliminate them.
Clean					●	
Replace					●	
PISTON RING						Check ring end gap.
Inspect				●		
Replace				●	●	
PISTON PIN						
Inspect				●		
Replace					●	
CYLINDER HEAD						
Inspect and clean				●		Inspect carbon deposits and eliminate them. Change gasket.
CYLINDER						Inspect score marks.
Inspect and clean				●		Inspect wear.
Replace					●	
CLUTCH						Inspect housing, friction plate, clutch plate and spring.
Inspect and adjust	●	●				
Replace					●	
TRANSMISSION						
Inspect					●	

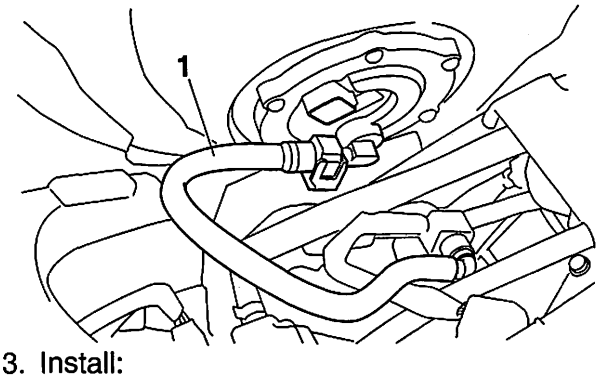
ITEM	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
Replace bearing					●	
SHIFT FORK, SHIFT CAM, GUIDE BAR						Inspect wear.
Inspect					●	
ROTOR NUT						
Retighten	●			●		
MUFFLER						
Inspect and retighten	●	●				
Clean				●		
Replace					●	
CRANK						
Inspect and clean				●	●	
THROTTLE BODY						
Inspect					●	
SPARK PLUG						
Inspect and clean	●		●			
Replace					●	
DRIVE CHAIN						Use chain lube.
Lubricate, slack, alignment	●	●				Chain slack: 48–58 mm
Replace					●	(1.89~2.28 in)
COOLING SYSTEM						
Check coolant level and leakage	●	●				
Check radiator cap operation					●	
Replace coolant					●	Every two years
Inspect hoses		●				
OUTSIDE NUTS AND BOLTS						Refer to "STARTING AND BREAK-IN" on page 1-30.
Retighten	●	●				
AIR FILTER						Use foam air-filter oil or equivalent oil.
Clean and lubricate	●	●				
Replace					●	
OIL FILTER						
Replace	●			●		
FRAME						
Clean and inspect	●	●				
FUEL TANK, FUEL PUMP						
Clean and inspect	●		●			
FUEL HOSE						
Inspect					●	
Replace					●	Every four years
BRAKES						
Adjust lever position and pedal height	●	●				
Lubricate pivot point	●	●				
Check brake disc surface	●	●				

ITEM	After break-in	Every race	Every third (or 500 km)	Every fifth (or 1,000 km)	As required	Remarks
Check fluid level and leakage	●	●				
Retighten brake disc bolts, caliper bolts, master cylinder bolts and union bolts	●	●				
Replace pads					●	
Replace brake fluid					●	Every one year
FRONT FORKS						
Inspect and adjust	●	●				Suspension oil "S1"
Replace oil	●			●		
Replace oil seal					●	
FRONT FORK OIL SEAL AND DUST SEAL						
Clean and lube	●	●				Lithium base grease
REAR SHOCK ABSORBER					(After rain ride)	
Inspect and adjust	●	●				
Lube			●		●	Molybdenum disulfide grease
Retighten	●	●				
DRIVE CHAIN GUARD AND ROLLERS						
Inspect	●	●				
DRIVE CHAIN STOPPER						
Inspect					●	
SWINGARM						
Inspect, lube and retighten	●	●				Molybdenum disulfide grease
RELAY ARM, CONNECTING ROD						
Inspect, lube and retighten	●	●				Molybdenum disulfide grease
SIDESTAND						
Lubricate					●	Lithium base grease
STEERING HEAD						
Inspect free play and retighten	●	●				
Clean and lube				●		Lithium base grease
Replace bearing					●	
TIRE, WHEELS						
Inspect air pressure, wheel run-out, tire wear and spoke looseness	●	●				
Retighten sprocket bolt	●	●				
Inspect bearings			●			
Replace bearings					●	
Lubricate			●			Lithium base grease
THROTTLE, CONTROL CABLE						
Check routing and connection	●	●				Yamaha cable lube or
Lubricate	●	●				SAE 10W-30 motor oil

EAS1DX3079
CHECKING THE FUEL LINE

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

1. Remove:
   - Seat
   - Side cover (left/right)
   - Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 5-1.
   - Fuel tank
   Refer to "FUEL TANK" on page 8-1.
2. Check:
   - Fuel hose "1"
   Cracks/damage → Replace.
   Loose connection → Connect properly.



3. Install:
   - Fuel tank
   Refer to "FUEL TANK" on page 8-1.
   - Air scoop (left/right)
   - Side cover (left/right)
   - Seat
   Refer to "GENERAL CHASSIS" on page 5-1.

EAS1DX3080
CHECKING THE SPARK PLUG

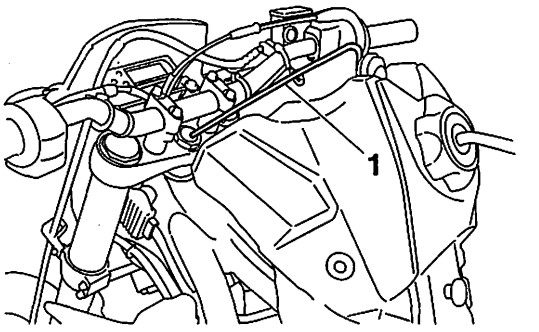
1. Remove:
   - Seat
   - Side cover (left/right)
   - Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 5-1.
   - Fuel tank

TIP

Remove the shaft installing the fuel tank in its rear. Then support the fuel tank using the supplied hook "1" as illustrated. After that, reinstall the removed shaft.

ECA1DX1001
NOTICE

Do not use too much force to pull the hose when holding up the fuel tank.



2. Remove:
   - Spark plug cap
   - Spark plug
   Refer to "CAMSHAFT" on page 6-7.

ECA13330
NOTICE

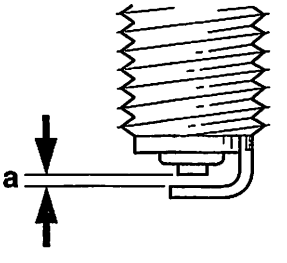
Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

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

	Manufacturer/model **NGK/CR8E**

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 wire brush)
6. Measure:
   - Spark plug gap "a"
   Out of specification → Regap.

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



7. Install:
   • Spark plug

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

TIP

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

8. Install:
   • Spark plug cap
   • Fuel tank
     Refer to "FUEL TANK" on page 8-1.
   • Air scoop (left/right)
   • Side cover (left/right)
   • Seat
     Refer to "GENERAL CHASSIS" on page 5-1.

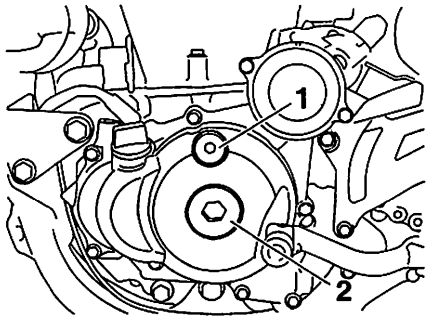
EAS1DX3081
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
   • Seat
   • Fuel tank
     Refer to "FUEL TANK" on page 8-1.
2. Remove:
   • Spark plug
   • Cylinder head cover
     Refer to "CAMSHAFT" on page 6-7.
3. Remove:
   • Timing mark accessing screw "1"
   • Crankshaft end cover "2"
   • O-ring



4. Measure:
   • Valve clearance
     Out of specification → Adjust.

	Valve clearance (cold) **Intake** **0.10–0.15 mm (0.0039–0.0059 in)** **Exhaust** **0.20–0.25 mm (0.0079–0.0098 in)**

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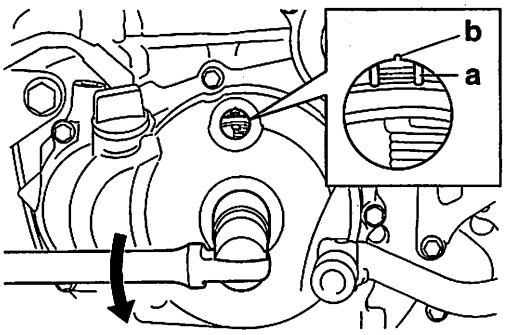
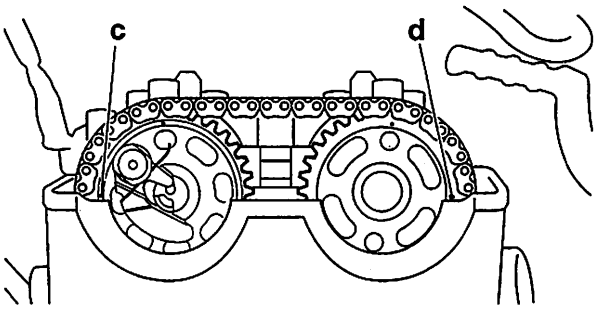
a. Turn the crankshaft counterclockwise.
b. Align TDC mark "a" of the generator rotor with mark "b" of the generator rotor cover.



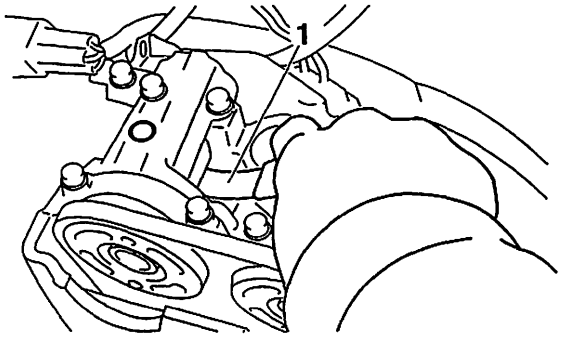
TIP

In order to be sure that the piston is at Top Dead Center, the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.



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

	Thickness gauge **90890-03180** **Feeler gauge set** **YU-26900-9**



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5. Adjust:
   • Valve clearance

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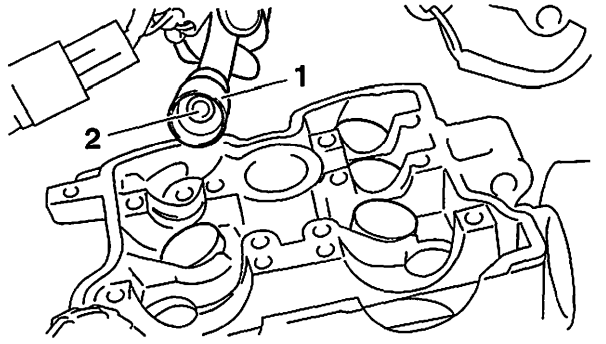
a. Remove:
   • Cam chain tensioner
   • Camshaft cap
   • Intake camshaft
   • Exhaust camshaft
   Refer to "CAMSHAFT" on page 6-7

TIP

Before removing the cam chain and camshaft, connect the cam chain using a wire so that it does not drop in the crankcase.

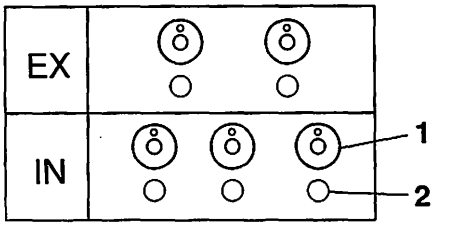
b. Remove the valve lifter "1" and the valve pad "2" with a valve lapper.



Valve lapper
90890-04101
Valve lapping tool
YM-A8998

TIP

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



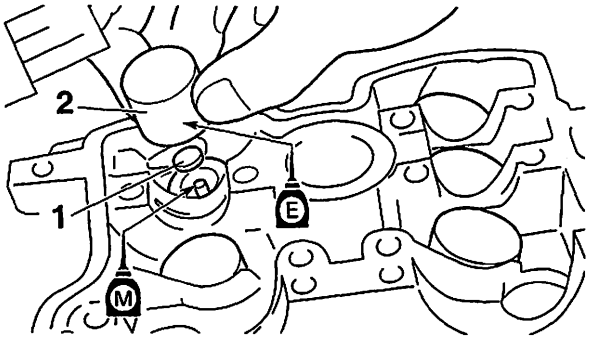
c. Select the proper valve pad from the following table.

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

TIP

- The thickness of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.
- Remember that the replacement valve pad number is a rough value. Repeat the above procedure until you have the standard valve clearance.

d. Install the new valve pad "1" and the valve lifter "2".

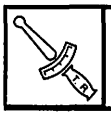


TIP

- When installing the valve pad, direct the pad having a number on it toward the lifter.
- Lubricate the valve pad with molybdenum disulfide grease.
- Lubricate the valve lifter with engine oil.
- The valve lifter must turn smoothly when rotated by hand.

• Install the valve lifter and the valve pad in the correct place.

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

	**Camshaft cap bolt** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

- Refer to "CAMSHAFT" on page 6-7
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft sprocket marks with the edge of the cylinder head.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

f. Measure the valve clearance again.

g. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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6. Install:
   • All removed parts

TIP

For installation, reverse the removal procedure. Note the following points.

EAS1DX3082

CLEANING THE AIR FILTER ELEMENT

1. Remove:
   • Air filter check hose

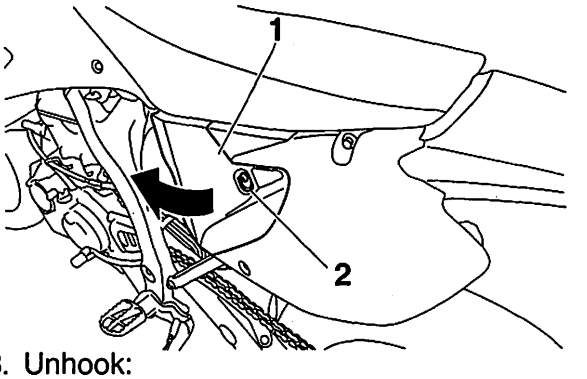
TIP

On the bottom of the air filter case is a check hose. If dust or water or both collects in this hose, replace the air filter element, clean the air filter case and air filter check hose.

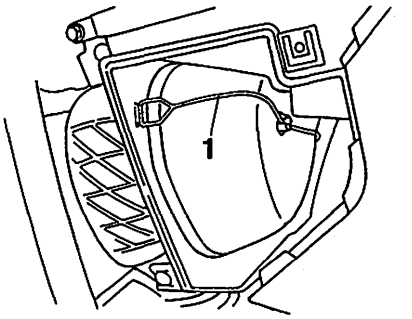
2. Open the air filter case cover "1".

TIP

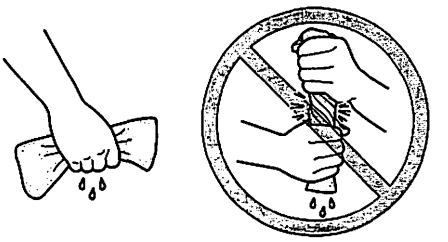
Loosen the quick fastener screw "2" and pull on it to open the air filter case cover.



3. Unhook:
   • Binder "1"



4. Remove:
   • Air filter element
   Remove the air filter element from the air filter element frame.
5. Clean:
   • Air filter element
   (with solvent)



EWA13020

⚠ WARNING

Never use low flash point solvents, such as gasoline, to clean the air filter element. Such solvents may cause a fire or an explosion.

TIP

After cleaning, gently squeeze the air filter element to remove the excess solvent.

ECA13430

NOTICE

Do not twist the air filter element when squeezing it.

6. Check:
   • Air filter element
   Damage → Replace.
7. Apply the recommended oil to the entire surface of the air filter element and squeeze out the excess oil. The air filter element should be wet but not dripping.

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

8. Install:
   • Air filter element frame "1"

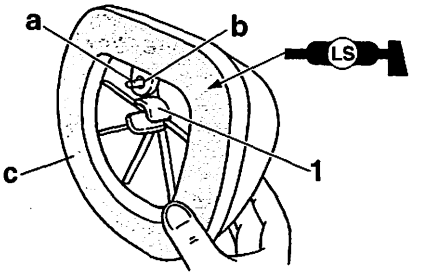
TIP

- Align the projection "a" on air filter element frame with the hole "b" in air filter element.
- Apply the lithium-soap-based grease on the matching surface "c" on air filter element.

ECA1DX1002

NOTICE

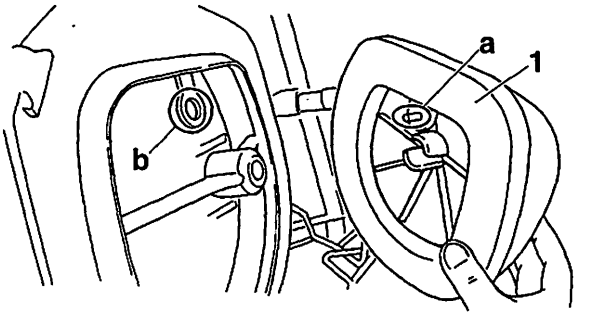
Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also leading to poor engine performance and possible overheating.



9. Install:
   • Air filter element "1"

TIP

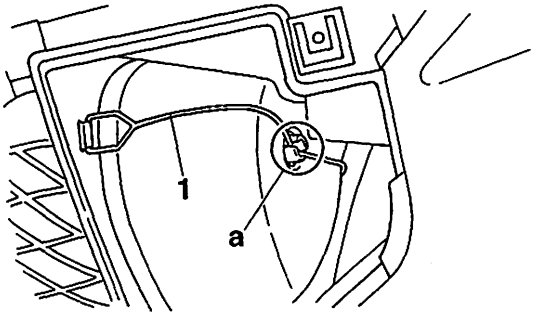
Align the projection "a" on filter guide with the hole "b" in air filter case.



10. Hook:
   • Binder "1"

TIP

Hook the binder "1" so that it contacts the filter guide projections "a".



11. Install:
   • Air filter case cover
   • Air filter check hose

EAS1DX3083

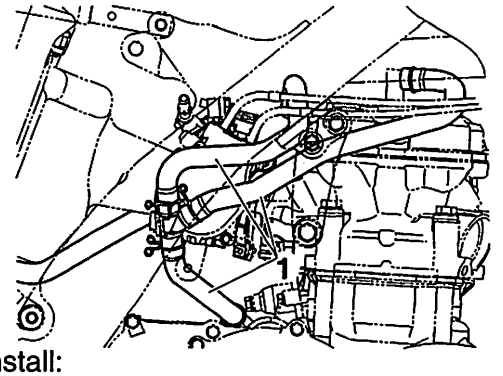
CHECKING THE BREATHER HOSES

1. Remove:
   • Seat
   • Side cover (left/right)
   • Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 5-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 8-1.
2. Check:
   • Breather hose "1"
   Cracks/damage → Replace.
   Loose connection → Connect properly.

ECA14920

NOTICE

Make sure the breather hoses are routed correctly.



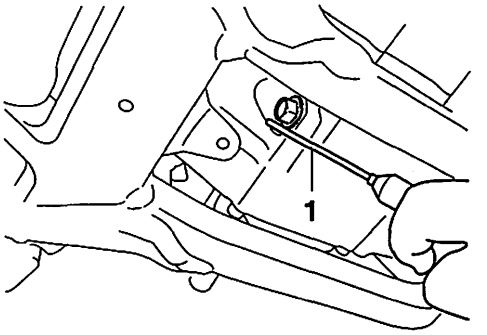
3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 8-1.
   - Air scoop (left/right)
   - Side cover (left/right)
   - Seat
     Refer to "GENERAL CHASSIS" on page 5-1.

EAS1DX3084
ADJUSTING THE ENGINE IDLING SPEED

TIP

- Prior to adjusting the idling speed, the air filter element should be clean, and the engine should have adequate compression.
- Because the air pressure is lower at high altitudes, the air-fuel mixture will become richer. If the engine idling speed is low, turn the starter knob/idling adjusting screw a few clicks counterclockwise to increase the idling speed.
- Before adjusting the engine idling speed, make sure that the compression pressure is within specification and that the air filter element is not clogged.
- Adjust the engine idling speed with the starter knob/idling adjusting screw pushed in completely.

1. Start the engine and let it warm up until it reaches the specified temperature.
2. Use a temperature probe tester "1" and contact it to the drain bolt thread.



Oil temperature
70–80 °C (158–176 °F)

3. Install:
   - Digital tachometer
     (Ignition coil lead)

Digital tachometer
90890-06760
YU-39951-B

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

Engine idling speed
1900–2100 r/min

5. Adjust:
   - Engine idling speed

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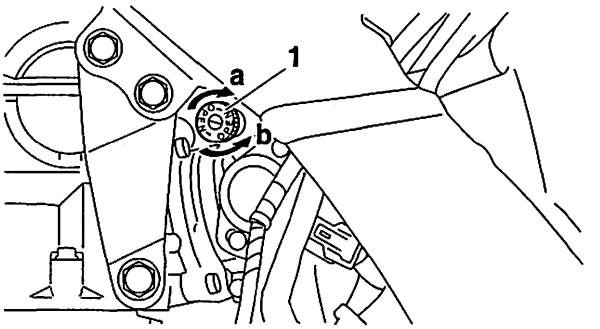
a. Adjust the engine idling speed by turning the adjust screw "1" in direction "a" or "b".



Direction "a"	Engine idling speed → Decrease
Direction "b"	Engine idling speed → Increase

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6. Adjust:
   • Throttle grip free play
   Refer to "ADJUSTING THE THROTTLE GRIP FREE PLAY" on page 3-29.

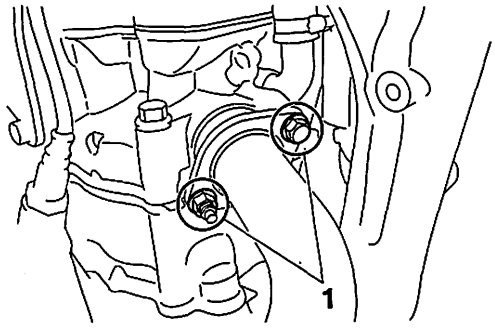
	Throttle grip free play **3.0–5.0 mm (0.12–0.20 in)**

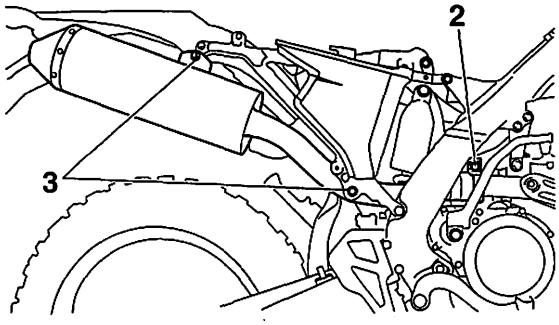
EAS1DX3085
CHECKING THE EXHAUST SYSTEM

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

1. Remove:
   • Exhaust pipe protector
2. Check:
   • Exhaust pipe
   • Muffler
   Cracks/damage → Replace.
   Refer to "ENGINE REMOVAL" on page 6-1.
   • Gasket
   Exhaust gas leaks → Replace.
   Refer to "ENGINE REMOVAL" on page 6-1.
3. Check:
   • Tightening torque

	Exhaust pipe bolt and nut "1" **20 Nm (2.0 m·kgf, 14 ft·lbf)** **Exhaust pipe and muffler bolt "2"** **16 Nm (1.6 m·kgf, 12 ft·lbf)** **Muffler and muffler bracket bolt "3"** **30 Nm (3.0 m·kgf, 22 ft·lbf)**





4. Install:
   • Exhaust pipe protector

	Exhaust pipe protector screw **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

EAS1DX3086
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

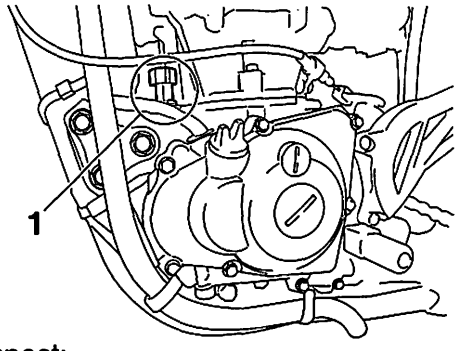
• Place the vehicle on a suitable stand.
• Make sure the vehicle is upright.

EWA1DX1002

⚠ WARNING

Never remove the oil tank cap just after high speed operation. The heated oil could spurt out causing danger. Wait until the oil cools down to approximately 70°C (158°F).

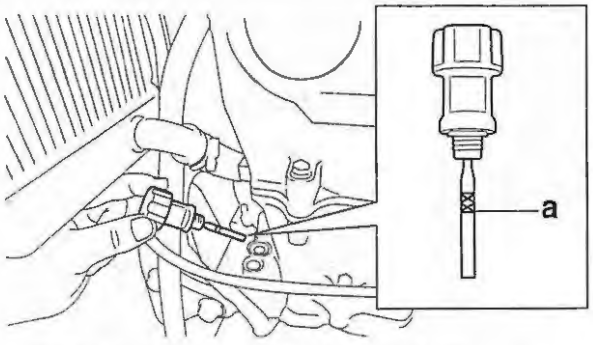
2. Idle the engine more than 3 minutes while keeping the machine upright. Then stop the engine and inspect the oil level.
3. Remove:
   • Oil tank cap "1"

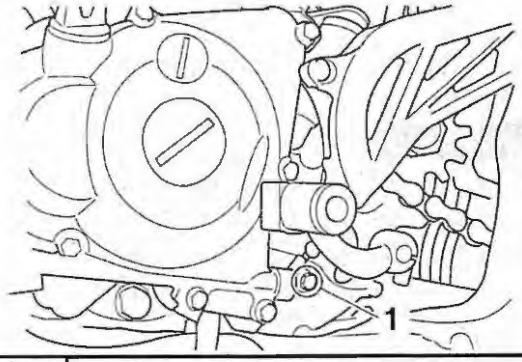


4. Inspect:
   • Oil level
   Check that the engine oil is above the level mark "a" and that the oil does not come out when the check bolt "1" is removed.
   Below the level mark "a" → Add oil through the filler cap hole until it is above the level mark "a".
   Oil comes out at the check bolt → Drain the oil until it stops coming out.

TIP

When inspecting the oil level, do not screw the oil level gauge into the oil tank. Insert the gauge lightly.



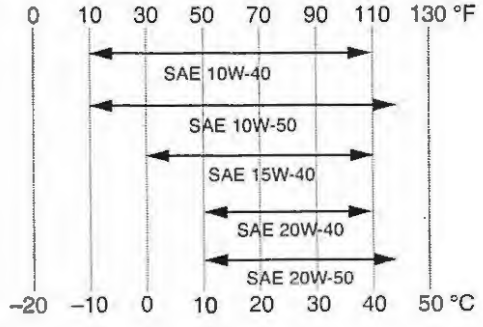


Type
SAE 10W-40, SAE 10W-50, SAE 15W-40, SAE 20W-40 or SAE 20W-50
Recommended oil grade
API service SG type or higher, JASO standard MA

ECA13360

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.**



TIP

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

5. Start the engine and let it warm up for several minutes.

ECA1DX1003

NOTICE

When the oil tank is empty, never start the engine.

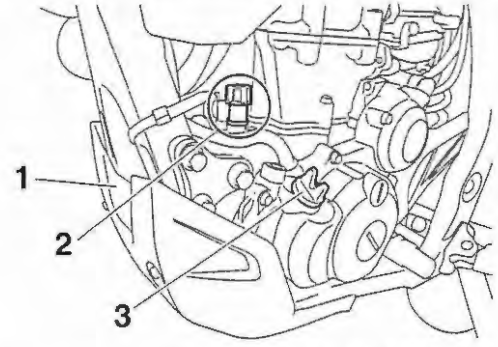
6. Idle the engine more than 10 seconds while keeping the machine upright. Then stop the engine and add the oil to the maximum level.
7. Install:
   - Oil tank cap

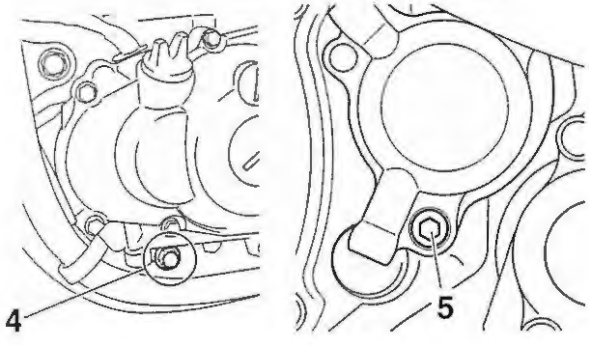
EAS1DX3087

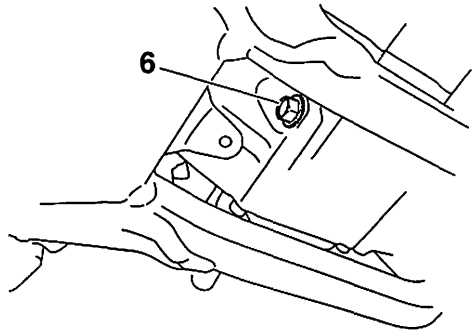
CHANGING THE ENGINE OIL

1. Start the engine and let it warm up for several minutes.
2. Stop the engine and place an oil pan under the drain bolt.
3. Remove:
   - Engine guard "1"
   - Oil tank cap "2"
   - Oil filler cap "3"
   - Drain bolt (with gasket) "4"
   - Oil filter drain bolt (O-ring) "5"
   - Drain bolt (with gasket) "6"

   Drain the crankcase and oil tank of its oil.







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

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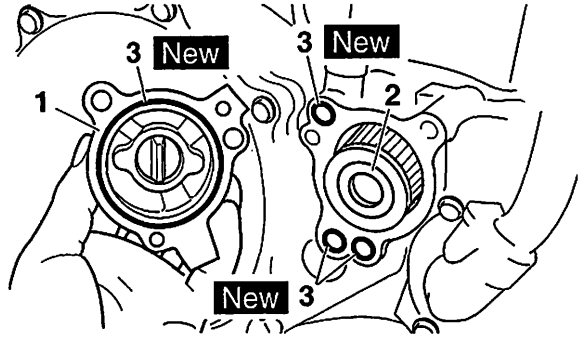
a. Remove the oil filter element cover "1" and oil filter element "2".
b. Replace the O-rings "3".



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

	Oil filter element cover bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

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5. Install:
   • Gaskets New
   • Oil filter drain bolt

	Oil filter drain bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

   • Right crankcase drain bolt

	Right crankcase drain bolt **20 Nm (2.0 m·kgf, 14 ft·lbf)**

   • Left crankcase drain bolt

	Left crankcase drain bolt **20 Nm (2.0 m·kgf, 14 ft·lbf)**

6. Fill:
   • Engine oil

	Engine oil quantity **Without oil filter element replacement** **0.95 L (1.00 US qt, 0.84 Imp qt)** **With oil filter element replacement** **1.00 L (1.06 US qt, 0.88 Imp qt)** **Quantity (disassembled)** **1.20 L (1.27 US qt, 1.06 Imp qt)**

7. Install:
   • Oil filler cap
   • Oil tank cap
8. Check:
   • Engine (for oil leaks)
   • Oil level
   Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-12.
9. Check:
   • Engine oil pressure

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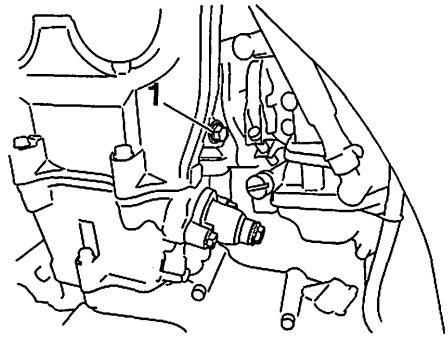
a. Slightly loosen the oil pressure check bolt "1".
b. Start the engine and keep it idling until oil starts to seep from the oil pressure check bolt. If no oil comes out after one minute, turn the engine off so it will not seize.
c. Check oil passages and oil pump for damage or leakage.
d. Start the engine after solving the problem(s) and recheck the oil pressure.
e. Tighten the oil pressure check bolt.

	Oil pressure check bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**



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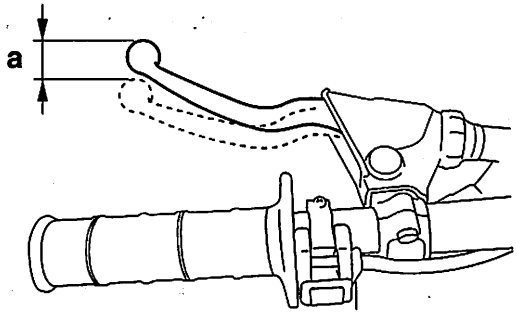
10. Install:
   • Engine guard

EAS1DX3088
ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Check:
   • Clutch lever free play "a"
   Out of specification → Adjust.

	Clutch lever free play **8.0–13.0 mm (0.31–0.51 in)**



2. Adjust:
   • Clutch lever free play

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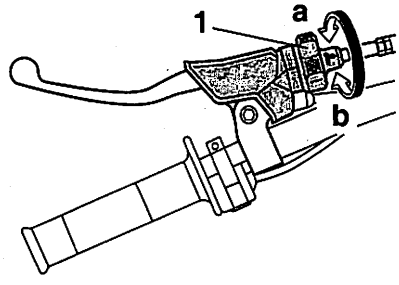
Handlebar side

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

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



TIP

If the specified clutch lever free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the clutch cable side.

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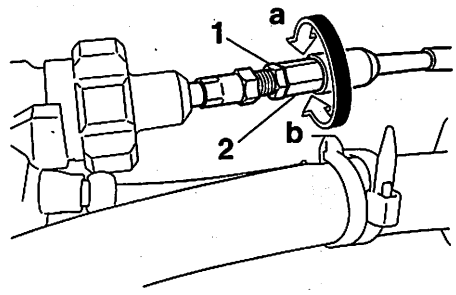
Clutch cable side

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

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

d. Tighten the locknut "1".
e. Return the clutch cable cover to its original position.



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EAS1DX3089
CHECKING THE COOLANT LEVEL

EWA1DX1003

⚠ WARNING

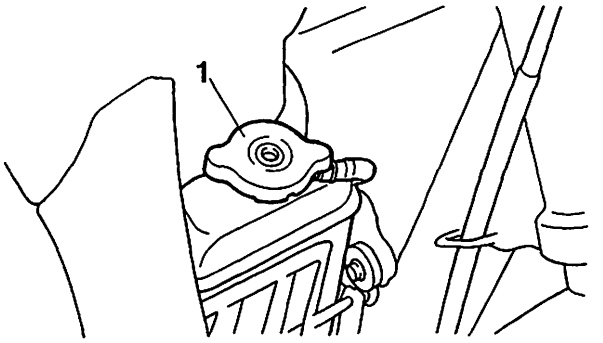
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly 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 on a level surface.

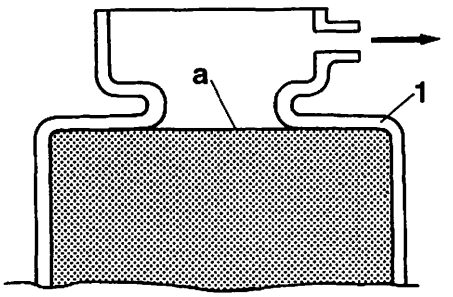
TIP

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

2. Remove:
   • Radiator cap "1"



3. Check:
   • Coolant level "a"
   Coolant level low ® Add coolant.



1. Radiator

ECA1DX1004

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.**

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

TIP

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

EAS1DX3090

CHECKING THE COOLING SYSTEM

1. Remove:
   • Seat
   • Air scoop (left/right)
   Refer to "GENERAL CHASSIS" on page 5-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 8-1.
2. Check:
   • Radiator
   • Radiator hose
   Cracks/damage → Replace.
   Refer to "RADIATOR" on page 7-1.
3. Install:
   • Fuel tank
   Refer to "FUEL TANK" on page 8-1.
   • Air scoop (left/right)
   • Seat
   Refer to "GENERAL CHASSIS" on page 5-1.

EAS1DX3091

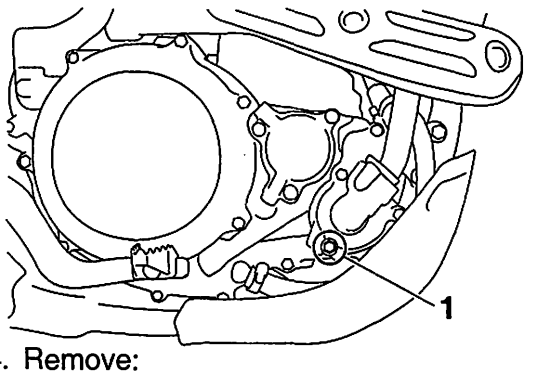
CHANGING THE COOLANT

EWA1DX1004

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. Remove:
   • Seat
   • Left side cover
2. Remove the catch tank hose from the catch tank and drain the tank of its coolant.
3. Remove:
   • Coolant drain bolt "1"



4. Remove:
   • Radiator cap
   Drain the coolant completely.

5. Clean:
   • Cooling system
   Thoroughly flush the cooling system with clean tap water.
6. Install:
   • Copper washer New
   • Coolant drain bolt

Coolant drain bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

7. Install:
   • Catch tank hose
8. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)

Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
1:1 (antifreeze:water)
Radiator capacity (including all routes)
1.04 L (1.10 US qt, 0.92 Imp.qt)

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

EWA13040

⚠ WARNING

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

ECA13480

NOTICE

- **Adding water instead of coolant lowers the antifreeze 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.**

9. Install:
   • Radiator cap
10. Start the engine, warm it up for several minutes, and then stop it.
11. Check:
   • Coolant level
   Refer to "CHECKING THE COOLANT LEVEL" on page 3-15.

TIP

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

12. Install:
   • Left side cover
   • Seat
   Refer to "GENERAL CHASSIS" on page 5-1.

EAS1DX3092

CLEANING THE SPARK ARRESTER

Refer to "CLEANING THE SPARK ARRESTER" on page 6-4.

EAS1DX3093

CHECKING THE BRAKE FLUID LEVEL

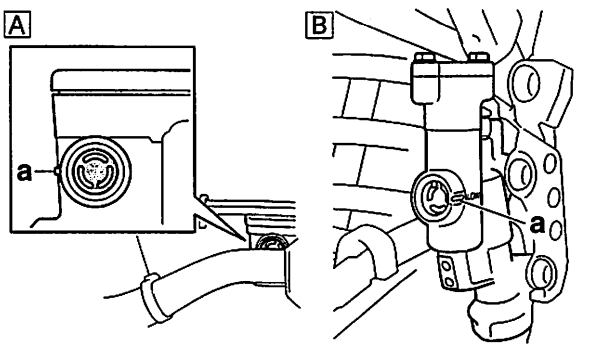
1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.
- In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

2. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.

Recommended fluid
DOT 4



A. 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

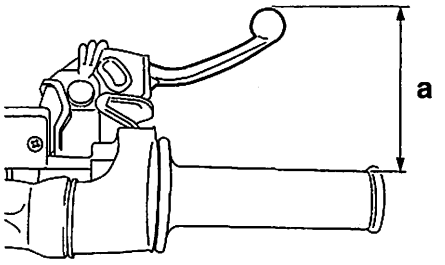
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

EAS1DX3094

ADJUSTING THE FRONT DISC BRAKE

1. Check:
   - Brake lever position "a"

Brake lever position
Standard position
95 mm (3.74 in)
Extent of adjustment
76–97 mm (2.99–3.82 in)



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

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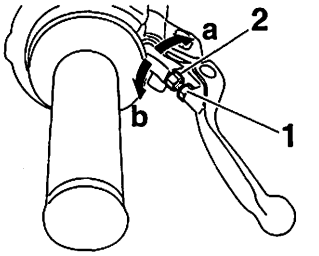
a. Loosen the locknut "1".
b. Turn the adjusting bolt "2" in direction "a" or "b" until the specified brake lever position is obtained.

Direction "a"
Brake lever position is increased.
Direction "b"
Brake lever position is decreased.

c. Tighten the locknut "1".

Locknut
5 Nm (0.5 m·kgf, 3.6 ft·lbf)



EWA13050

⚠ WARNING

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

ECA13490

NOTICE

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

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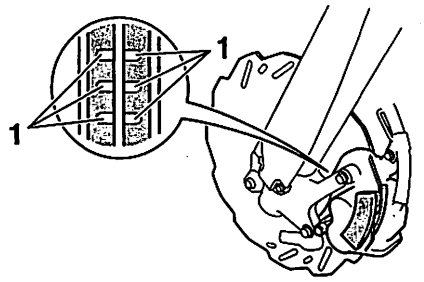
EAS1DX3095

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

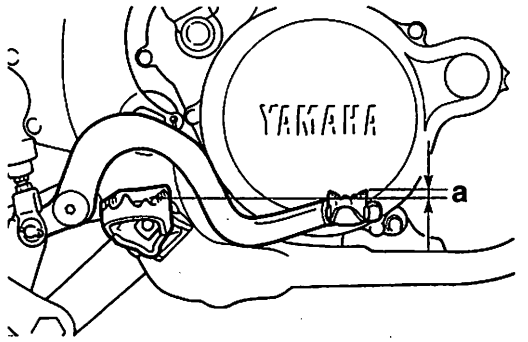
1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicator groove "1" almost disappeared → Replace the brake pads as a set.
     Refer to "FRONT BRAKE" on page 5-15.



EAS1DX3096
ADJUSTING THE REAR DISC BRAKE

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

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



2. Adjust:
   • Brake pedal position

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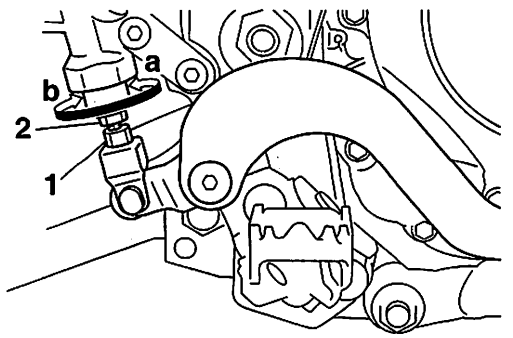
a. Loosen the locknut "1".
b. Turn the adjusting bolt "2" in direction "a" or "b" until the specified brake pedal position is obtained.

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



c. Tighten the locknut.

EWA1DX1001
⚠ WARNING

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

ECA13510
NOTICE

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

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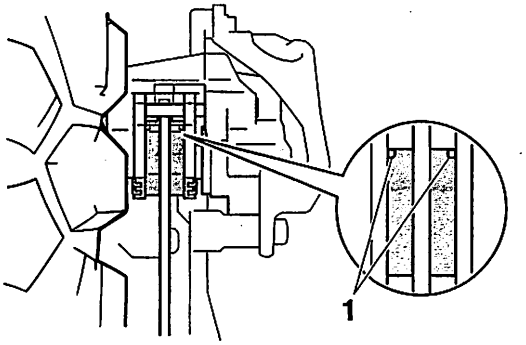
EAS1DX3097
CHECKING THE REAR BRAKE PADS

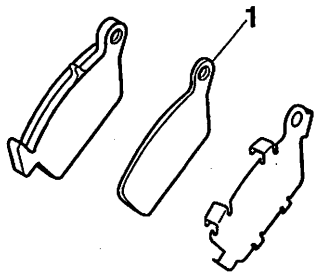
The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   • Rear brake pad
   Wear indicators "1" almost touch the brake disc → Replace the brake pads as a set.
   Refer to "REAR BRAKE" on page 5-27.



EAS1DX3098
CHECKING THE REAR BRAKE PAD INSULATOR

1. Remove:
   • Brake pad
   Refer to "REAR BRAKE" on page 5-27.
2. Inspect:
   • Rear brake pad insulator "1"
   Damage → Replace.



EAS1DX3099
BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA13100

⚠ WARNING

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

1. Remove:
   - Brake master cylinder reservoir cap

TIP

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

2. Bleed:
   - Hydraulic brake system

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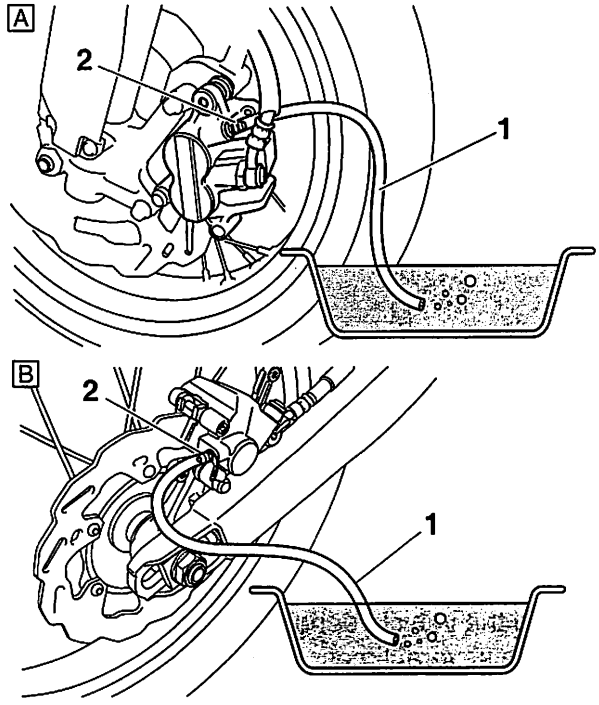
a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
c. Connect a clear plastic hose "1" tightly to the bleed screw "2", and place an oil pan under the vinyl hose end on one side.



A. Front
B. Rear

d. Place the other end of the hose into a container.
e. Slowly apply the brake several times.
f. Fully pull the brake lever or fully press down the brake pedal and hold it in position.
g. Loosen the bleed screw.

TIP

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

h. Tighten the bleed screw and then release the brake lever or brake pedal.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Tighten the bleed screw to specification.

	Bleed screw **6 Nm (0.6 m·kgf, 4.3 ft·lbf)**

k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.

EWA13110

⚠ WARNING

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

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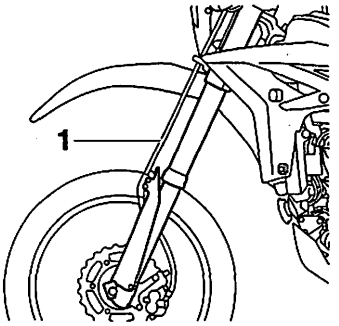
EAS1DX3100
CHECKING THE FRONT BRAKE HOSE

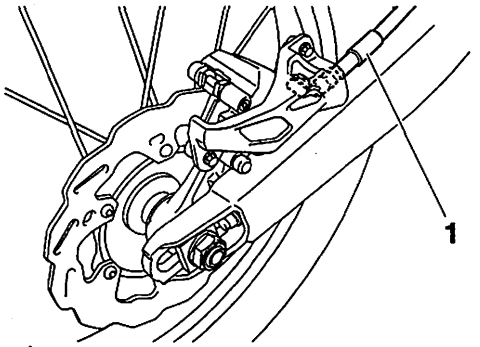
1. Check:
   • Brake hose "1"
   Cracks/damage/wear → Replace.



2. Check:
   • Brake hose clamp
   Loose Connection → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the front brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to "FRONT BRAKE" on page 5-15.

EAS1DX3101
CHECKING THE REAR BRAKE HOSE

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



2. Check:
   • Brake hose clamp
   Loose Connection → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to "REAR BRAKE" on page 5-27.

EAS1DX3102
CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260

⚠ WARNING

Never attempt to make any repairs to the wheel.

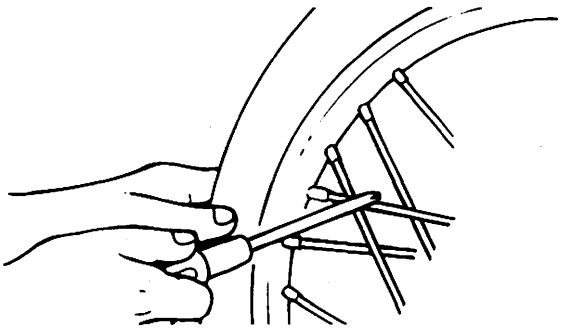
TIP

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

EAS1DX3103
CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

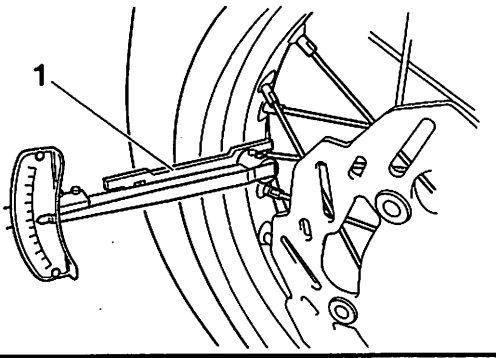
1. Check:
   • Spoke
   Bends/damage → Replace.
   Loose → Tighten.
   Tap the spokes with a screwdriver.



TIP

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

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



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

Spoke (front/rear)
3 Nm (0.3 m·kgf, 2.2 ft·lbf)

TIP

Be sure to tighten the spokes before and after break-in.

EAS1DX3104
CHECKING THE TIRES

To maximize the performance, durability, and safe operation of your motorcycle, note the following points regarding the specified tires.

Tire air pressure

The tire air pressure should be checked and, if necessary, adjusted before each ride.

EWA1DX3001

⚠ WARNING

Operation of this vehicle with improper tire pressure may cause severe injury or death from loss of control.

- **The tire air pressure must be checked and adjusted on cold tires (i.e., when the temperature of the tires equals the ambient temperature).**
- **The tire air pressure must be adjusted in accordance with the weight of the rider, the riding speed, and the riding conditions.**

Standard tire air pressure
Front and Rear
100 kPa (1.00 kgf/cm², 15 psi)

Tire inspection

The tires must be checked before each ride.

ECA1DX3001

NOTICE

- **Be sure the bead stoppers are tightened. Loose bead stoppers will cause the tire to slip off the rim if tire pressure is too low.**
- **Be sure the valve stem is positioned straight. A tilted valve stem indicates that the tire has slipped from its original position on the rim. Rotate the tire so that the valve stem is positioned straight.**

Tire information

This motorcycle is equipped with spoke wheels and tube tires.

After extensive tests, only the tires listed below have been approved for this model by Yamaha Motor Co., Ltd.

Front tire
Size
80/100-21 51M
Manufacturer/model
DUNLOP/GEOMAX MX51FG

Rear tire
Size
120/90-18 65M
Manufacturer/model
DUNLOP/GEOMAX MX51

EWA1DX3002

⚠ WARNING

- **Have a Yamaha dealer replace excessively worn tires. Operating the motorcycle with excessively worn tires decreases riding stability and can lead to loss of control.**
- **The replacement of all wheel and brake-related parts, including the tires, should be left to a Yamaha dealer, who has the necessary professional knowledge and experience.**
- **It is not recommended to patch a punctured tube. If unavoidable, however, patch the tube very carefully and replace it as soon as possible with a high-quality product.**

EAS1DX3105
CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
   - Wheel bearings
     Refer to "CHECKING THE FRONT WHEEL" on page 5-6 and "CHECKING THE REAR WHEEL" on page 5-11.

EAS1DX3106
CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm operation
     Swingarm not working properly → Check the swingarm.
     Refer to "SWINGARM" on page 5-67.
2. Check:
   - Swingarm excessive play
     Refer to "SWINGARM" on page 5-67.

EAS1DX3107
ADJUSTING THE DRIVE CHAIN SLACK

ECA13550
NOTICE

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

1. Elevate the rear wheel by placing the suitable stand under the engine.

EWA13120
⚠ WARNING

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

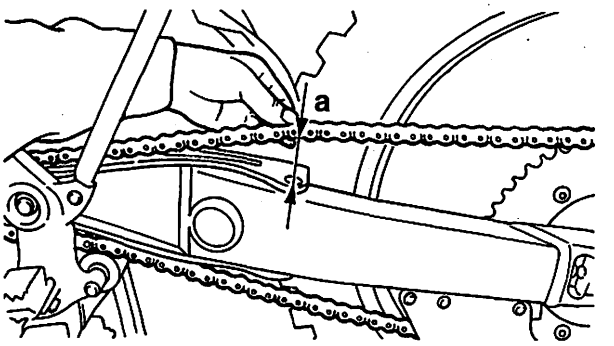
TIP

When checking and adjusting the drive chain slack, there should be no weight on the motorcycle.

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

TIP

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



1. Drive chain slack
2. Chain support mounting bolt
3. Chain tensioner

Drive chain slack
48.0–58.0 mm (1.89– 2.28 in)

5. Adjust:
   - Drive chain slack

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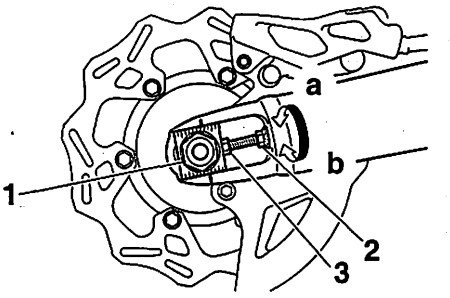
a. Loosen the wheel axle nut "1".
b. Loosen both locknuts "2".
c. Turn the drive chain puller "3" in direction "a" or "b" until the specified drive chain slack is obtained.

Direction "a"
Drive chain is tightened.
Direction "b"
Drive chain is loosened.



TIP

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

d. Tighten the locknut.

Locknut
19 Nm (1.9 m·kgf, 14 ft·lbf)

e. Tighten the wheel axle nut.

	Wheel axle nut **125 Nm (12.5 m·kgf, 90 ft·lbf)**

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EAS1DX3108

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.
This vehicle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.

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

EAS1DX3109

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

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

TIP

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

2. 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 5-38.
   - Upper bracket
     Refer to "STEERING HEAD" on page 5-58.
4. Adjust:
   - Steering head

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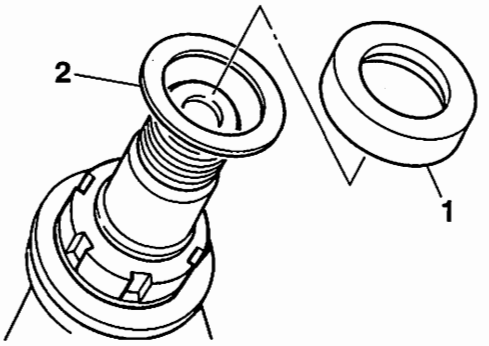
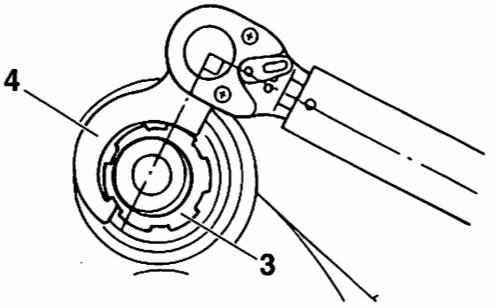
a. Remove the collar "1" and the washer "2".



b. Tighten the ring nut "3" with a steering nut wrench "4".

TIP

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



	Steering nut wrench **90890-01403** **YU-A9472**
	Ring nut (initial tightening torque) **38 Nm (3.8 m·kgf, 27 ft·lbf)**

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 inspect the upper and lower bearings.
   Refer to "STEERING HEAD" on page 5-58.
d. Loosen the ring nut "3" fully turn and then tighten it to specification with a steering nut wrench.

EWA13140

⚠ WARNING

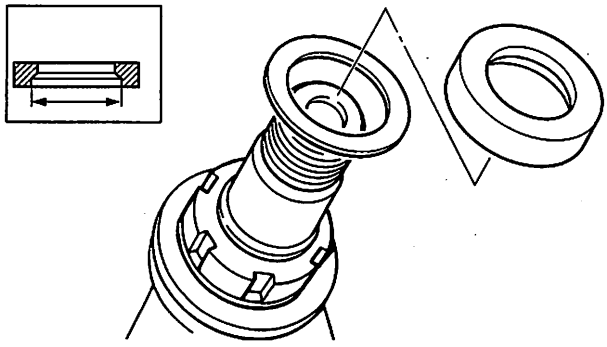
Do not overtighten the ring nut.

	Ring nut (final tightening torque) **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

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 5-58.
f. Install the washer.
g. Install the collar.

TIP

Install the collar with the larger inside diameter facing downward.



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5. Install:
   • Upper bracket
     Refer to "STEERING HEAD" on page 5-58.
   • Handlebar
     Refer to "HANDLEBAR" on page 5-38.

EAS1DX3110
LUBRICATING THE LEVERS

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

	Brake lever **Silicone grease** **Clutch lever** **Lithium-soap-based grease**

EAS1DX3111
LUBRICATING THE PEDAL

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

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

EAS1DX3112
LUBRICATING THE SIDESTAND

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

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

EAS1DX3113
CHECKING THE FRONT FORK

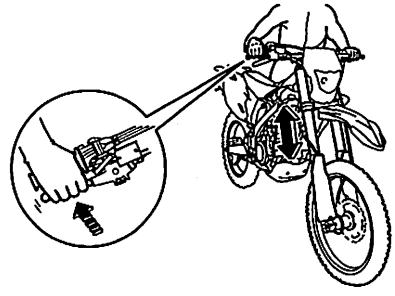
1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Check:
   • Inner tube
     Damage/scratches → Replace.
   • Front fork leg
     Oil leaks between inner tube and outer tube → Replace the oil seal.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   • Front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to "FRONT FORK" on page 5-44.



EAS1DX3114
ADJUSTING THE FRONT FORK LEGS

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

EWA32D1006

WARNING

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

Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Rebound damping

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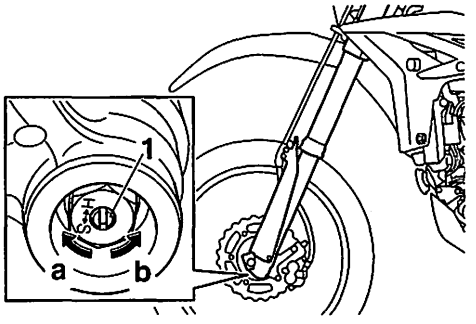
a. Turn the adjusting screw "1" in direction "a" or "b".

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

Rebound damping
Maximum (hard)
Fully turned in
Standard
12 click (s) out*
Minimum
20 click (s) out*

***With the adjusting screw fully turned in**



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Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Compression damping

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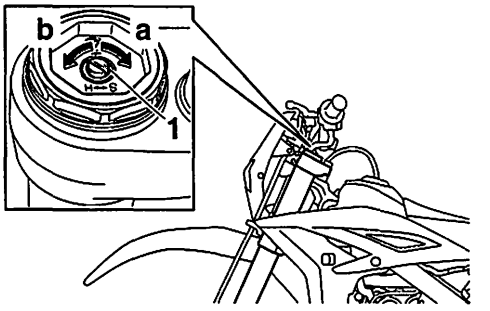
a. Turn the adjusting screw "1" in direction "a" or "b".

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

Compression damping
Maximum (hard)
Fully turned in
Standard
14 click (s) out*
Minimum
20 click (s) out*

***With the adjusting screw fully turned in**



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EAS1DX3115

AIR BLEEDING FROM FRONT FORK

When the temperature increases in the front fork during touring, the air pressure increases in the fork and the suspension will become less flexible.
Bleed following procedure.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

TIP

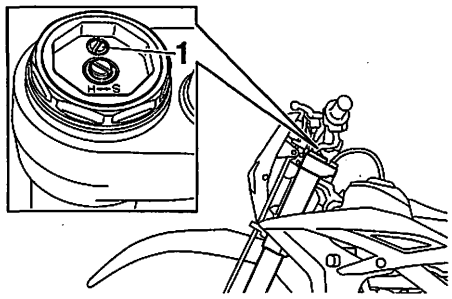
Stand the vehicle vertically using an appropriate stand, and bleed the air from the front fork.

2. Bleed the air from the front fork.
   Bleed the air from the front fork by removing bleed screw "1".

ECA32D1001

NOTICE

- **Always bleed the left and right front fork evenly.**
- **If this is not done, the vehicle will have poor stability.**



3. Install:
   • Bleed screw

	Bleed screw **1.3 Nm (0.13 m·kgf, 0.94 ft·lbf)**

EAS1DX3116
CHECKING THE REAR SUSPENSION

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Check:
   • Rear shock absorber assembly
   Gas leaks/oil leaks → Replace the rear shock absorber assembly.
   Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 5-64.
3. Check:
   • Rear shock absorber assembly operation
   • Rear suspension link pivots
   Push down seat on the vehicle several times and check if the rear shock absorber assembly rebounds smoothly.
   Rough movement → Repair.
   Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 5-61.

EAS1DX3117
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120
⚠ WARNING

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

Spring preload

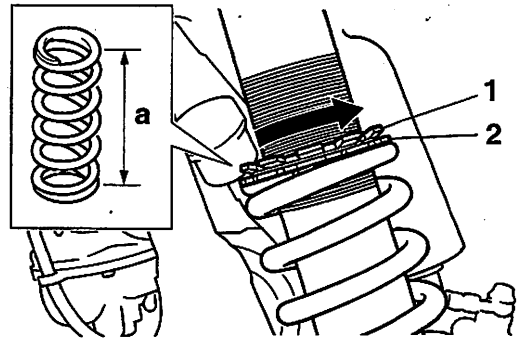
ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Remove:
   • Rear frame
   Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 5-61.
2. Adjust:
   • Spring preload

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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



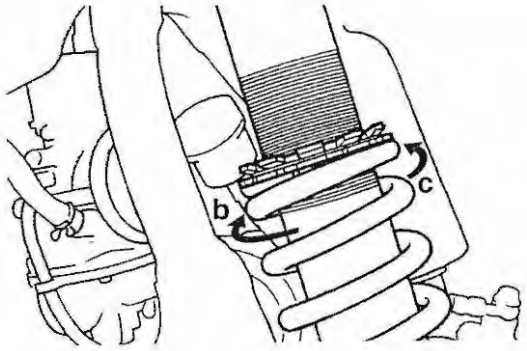
d. Turn the adjusting ring in direction "b" or "c".

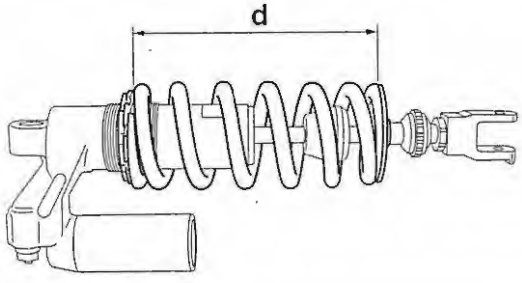
Direction "b"
Spring preload is increased (suspension is harder).
Direction "c"
Spring preload is decreased (suspension is softer).

Spring installed length "d"
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 18 mm (0.71 in) from its free length.
Maximum
Position in which the spring is turned in 18 mm (0.71 in) from its free length.

TIP

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





e. Tighten the locknut.

	Locknut **30 Nm (3.0 m·kgf, 22 ft·lbf)**

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3. Install:
   - Rear frame
     Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 5-61.

Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Rebound damping

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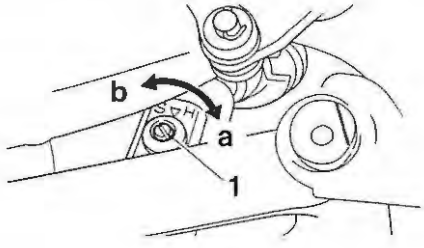
a. Turn the adjusting screw "1" in direction "a" or "b".

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

Rebound damping adjusting positions
Maximum
Fully turned in
Standard
18 click (s) out*
Minimum
30 click (s) out*

*** With the adjusting screw fully turned in**



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Compression damping (for fast compression damping)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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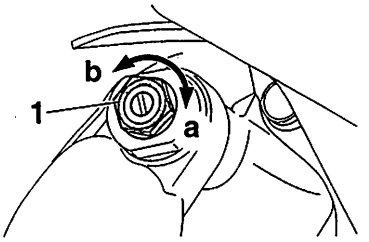
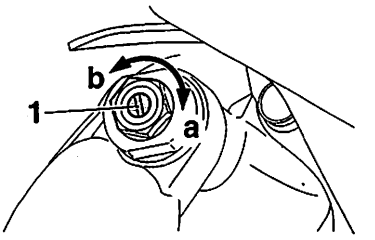
a. Turn the adjusting screw "1" in direction "a" or "b".

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

Compression damping adjusting positions (for fast compression damping)
Maximum
Fully turned in
Standard
7/8 turn (s) out*
Minimum
2 turn (s) out*

*** With the adjusting bolt fully turned in**





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Compression damping (for slow compression damping)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

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

Compression damping adjusting positions (for slow compression damping)
Maximum
Fully turned in
Standard
10 click (s) out*
Minimum
20 click (s) out*

*** With the adjusting screw fully turned in**

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EAS1DX3118

CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 5-65.

EAS1DX3119

CHECKING AND LUBRICATING THE CABLES

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

EWA13270

WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

TIP

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

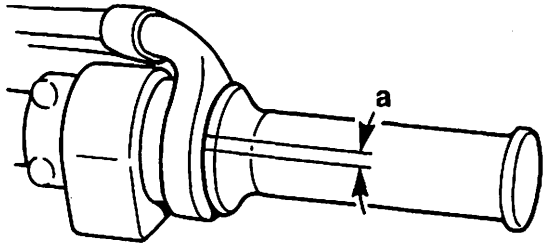
EAS1DX3120

ADJUSTING THE THROTTLE GRIP FREE PLAY

TIP

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

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



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

2. Adjust:
   • Throttle grip free play

TIP

When the throttle is opened, the accelerator cable is pulled.

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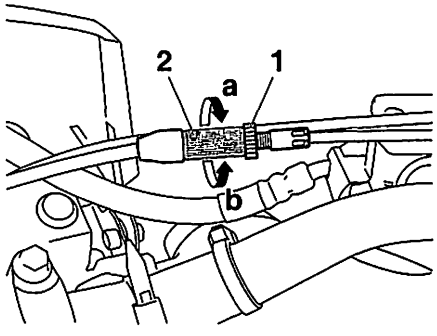
a. Slide the adjuster cover.
b. Loosen the locknut "1".
c. Turn the adjusting nut "2" in direction "a" or "b" until the specified throttle grip free play is obtained.

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

d. Tighten the locknut.



EWA12920

⚠ WARNING

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

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EAS1DX3121

CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.
Refer to "CHASSIS TIGHTENING TORQUES" on page 2-17.

EAS1DX3122

CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.

TUNING

CHASSIS **4-1**
SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET) 4-1
DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS 4-1
TIRE PRESSURE 4-1
FRONT FORK SETTING 4-2
CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL 4-2
SETTING OF SPRING AFTER REPLACEMENT 4-2
FRONT FORK SETTING PARTS 4-3
REAR SUSPENSION SETTING 4-3
CHOOSING SET LENGTH 4-3
SETTING OF SPRING AFTER REPLACEMENT 4-4
REAR SHOCK ABSORBER SETTING PARTS 4-5
SUSPENSION SETTING (FRONT FORK) 4-6
SUSPENSION SETTING (REAR SHOCK ABSORBER) 4-8

EAS1DX3124
CHASSIS

EAS1DX3125
SELECTION OF THE SECONDARY REDUCTION RATIO (SPROCKET)

Secondary reduction ratio = Number of rear wheel sprocket teeth/Number of drive sprocket teeth	
Standard secondary reduction ratio	**3.846 (50/13)**

<Requirement for selection of secondary gear reduction ratio>

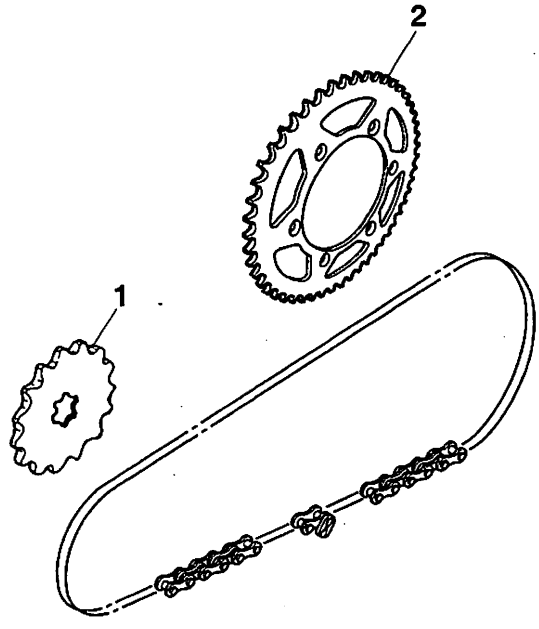
- It is generally said that the secondary gear ratio should be reduced for a longer straight portion of a speed course and should be increased for a course with many corners. Actually, however, as the speed depends on the ground condition of the day of the race, be sure to run through the circuit to set the machine suitable for the entire course.
- In actuality, it is very difficult to achieve settings suitable for the entire course and some settings may be sacrificed. Thus, the settings should be matched to the portion of the course that has the greatest effect on the race result. In such a case, run through the entire course while making notes of lap times to find the best balance; then, determine the secondary reduction ratio.
- If a course has a long straight portion where a machine can run at maximum speed, the machine is generally set such that it can develop its maximum revolutions toward the end of the straight line, with care taken to avoid the engine over-revving.

TIP

Riding technique varies from rider to rider and the performance of a machine also vary from machine to machine. Therefore, do not imitate other rider's settings from the beginning but choose your own setting according to the level of your riding technique.

EAS1DX3126
DRIVE AND REAR WHEEL SPROCKETS SETTING PARTS

Part name	Size	Part number
Drive sprocket "1" (STD)	**13T**	**9383E-13233**
Rear wheel sprocket "2"		
	48T	**5GS-25448-50**
(STD)	**50T**	**5TJ-25450-80**
	52T	**5TJ-25452-80**



EAS1DX3127
TIRE PRESSURE

Tire pressure should be adjust to suit the road surface condition of the circuit.

Standard tire pressure:
100 kPa (1.0 kgf/cm^2,15 psi)

- Under a rainy, muddy, sandy, or slippery condition, the tire pressure should be lower for a larger area of contact with the road surface.

Extent of adjustment:
60–80 kPa (0.6–0.8 kgf/cm^2,9.0–12 psi)

• Under a stony or hard road condition, the tire pressure should be higher to prevent a flat tire.

Extent of adjustment:
100–120 kPa (1.0–1.2 kgf/cm^2,15–18 psi)

EAS1DX3128
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.
   • Change the rebound damping.
   The spring acts on the load and the damping force acts on the cushion travel speed.

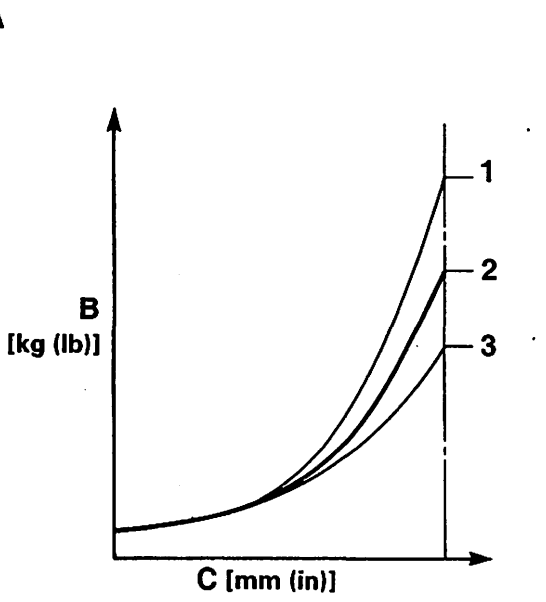
EAS1DX3129
CHANGE IN AMOUNT AND CHARACTERISTICS OF FORK OIL

Damping characteristic near the final stroke can be changed by changing the fork oil amount.

EWA1DX4001
⚠ WARNING

Adjust the oil amount in 5 cm^3 (0.2 Imp oz, 0.2 US 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.

Standard oil amount:
328 cm^3 (11.55 Imp.oz, 11.09 US oz)
Extent of adjustment
295–370 cm^3 (10.38–13.02 Imp. oz, 9.97–12.51 US 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

EAS1DX3130
SETTING OF SPRING AFTER REPLACEMENT

As the front fork setting can be easily affected by rear suspension, take care so that the machine front and rear are balanced (in position, etc.) when setting the front fork.
1. Use of soft spring
   • Change the rebound damping.
   Turn out one or two clicks.
   • Change the compression damping.
   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.
   Turn in one or two clicks.
   • Change the compression damping.
   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.

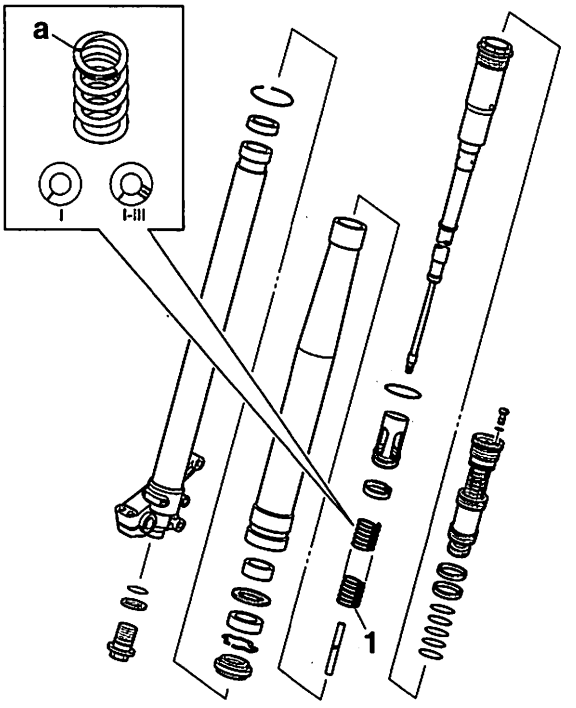
EAS1DX3131
FRONT FORK SETTING PARTS

• Front fork spring "1"

TYPE	SPRING RATE N/mm (kg/mm)	SPRING PART NUMBER	I.D. MARK (slits)
SOFT	3.9 (0.398)	1C3-23141-A1	I
	4.0 (0.408)	1C3-23141-B1	II
	4.1 (0.418)	1C3-23141-C1	III
	4.2 (0.428)	1C3-23141-D1	IIII
	4.3 (0.438)	1C3-23141-E1	IIIII
	4.4 (0.449)	1C3-23141-F1	I-I
STD	4.5 (0.459)	1DX-23141-50 1C3-23141-G1	— I-II
STIFF	4.6 (0.469)	1C3-23141-H1	I-III
	4.7 (0.479)	1C3-23141-J1	I-IIII

TIP

The I.D. mark (slits) "a" is proved on the end of the spring.



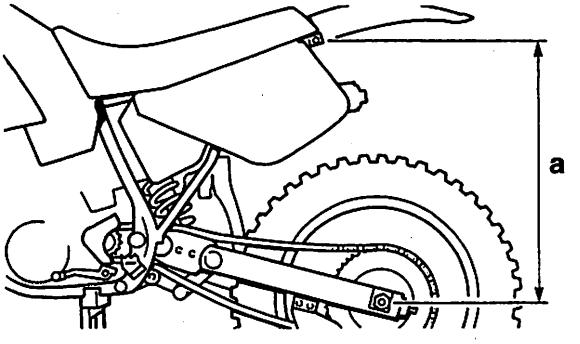
EAS1DX3132
REAR SUSPENSION SETTING

The rear suspension 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:

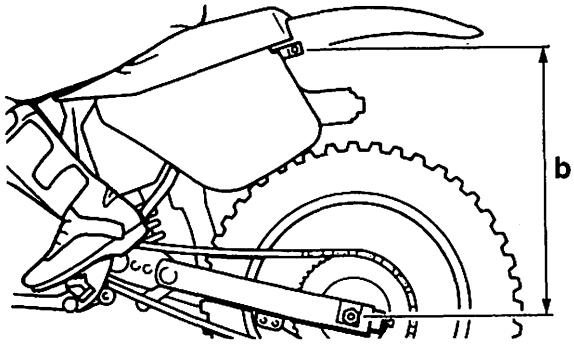
1. Setting of spring preload
   • Change the set length of the spring.
   • Change the spring.
2. Setting of damping force
   • Change the rebound damping.
   • Change the compression damping.

EAS1DX3133
CHOOSING SET LENGTH

1. Place a stand or block under the engine to put the rear wheel above the floor, and measure the length "a" between the rear wheel axle center and the rear fender holding bolt.



2. Remove the stand or block from the engine and with a rider astride the seat, measure the sunken length "b" between the rear wheel axle center and the rear fender holding bolt.

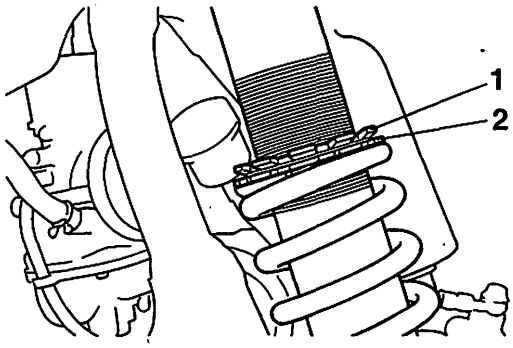


3. Loosen the locknut "1" and make adjustment by turning the spring adjuster "2" to achieve the standard figure from the subtraction of the length "b" from the length "a".

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 spring adjuster and changing the spring set length, replace the spring with an optional one and make readjustment.



EAS1DX3134

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
   - Set the soft spring for less rebound damping to compensate for its less spring load. Run with the rebound damping adjuster one or two clicks on the softer side and readjust it to suit your preference.
2. Use of stiff spring
   - Set the soft spring for more rebound damping to compensate for its greater spring load. Run with the rebound damping adjuster one or two clicks on the stiffer side and readjust it to suit your preference.

TIP

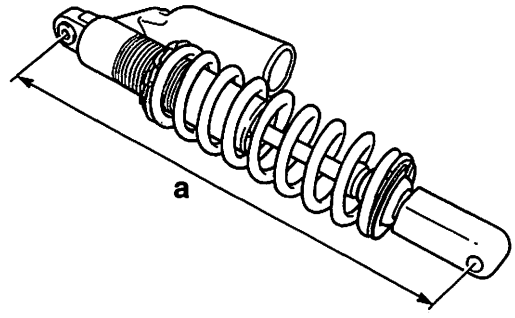
Adjusting the rebound damping will be followed more or less by a change in the compression damping. For correction, turn the low compression damping adjuster on the softer side.

EWA1DX4002

⚠ 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:
488.5 mm (19.23 in)



EAS1DX3135
REAR SHOCK ABSORBER SETTING

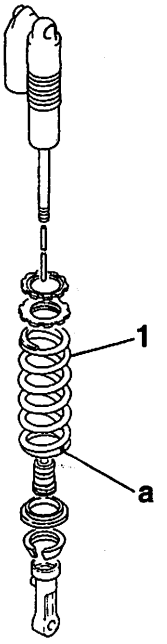
PARTS

• Rear shock spring "1"

TYPE	SPRING RATE [N/mm]	SPRING PART NUMBER (-22212-)	I.D. MARK Q'TY
SOFT	52	1DX-10(Blue)	Yellow
STD	54	1DX-20(Blue)	Pink
STIFF	56	1DX-30(Blue)	White

TIP

• The I.D. mark "a" is marked at the end of the spring.
• Spring specification varies according to the color and quantity of I.D. marks.



• Extent of adjustment (spring preload)

Maximum	Minimum
Position in which the spring is turned in 18 mm (0.71 in) from its free length.	Position in which the spring is turned in 1.5 mm (0.06 in) from its free length.

TIP

For the spring preload adjustment, refer to "ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY" on page 3-27.

EAS1DX3136
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	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Oil amount	Decrease oil amount by about 5–10 cm^3 (0.2–0.4 Imp.oz, 0.2–0.3 US oz).
					Spring	Replace with soft spring.
Unsmooth movement over entire range	○	○	○	○	Outer tube Inner tube	Check for any bends, dents, and 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.
					Under bracket tightening torque	Retighten to specified torque.
Poor initial movement				○	Rebound damping	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Oil seal	Apply grease in oil seal wall.
Soft over entire range, bottoming out	○	○			Compression damping	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Oil amount	Increase oil amount by about 5–10 cm^3 (0.2–0.4 Imp.oz, 0.2–0.3 US oz).
					Spring	Replace with stiff spring.
Stiff toward stroke end	○				Oil amount	Decrease oil amount by about 5 cm^3 (0.2 Imp.oz,0.2 US oz).
Soft toward stroke end, bottoming out	○				Oil amount	Increase oil amount by about 5 cm^3 (0.2 Imp.oz,0.2 US oz).
Stiff initial movement	○	○	○	○	Compression damping	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	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Rebound damping	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 Imp.oz, 0.2 US oz).
"Obtrusive" front, tending to upper front posture			○	○	Compression damping	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 (0.2–0.4 Imp.oz, 0.2–0.3 US oz).

EAS1DX3137
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	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	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.
Heavy and dragging			○	○	Rebound damping	Turn adjuster counterclockwise (about 2 clicks) to decrease damping.
					Spring	Replace with soft spring.
Poor road gripping				○	Rebound damping	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Low compression damping	Turn adjuster clockwise (about 1 clicks) 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	Turn adjuster clockwise (about 2 clicks) to increase damping.
					Spring	Replace with soft spring.

Symptom	Section				Check	Adjust
	Jump	Large gap	Medium gap	Small gap		
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.

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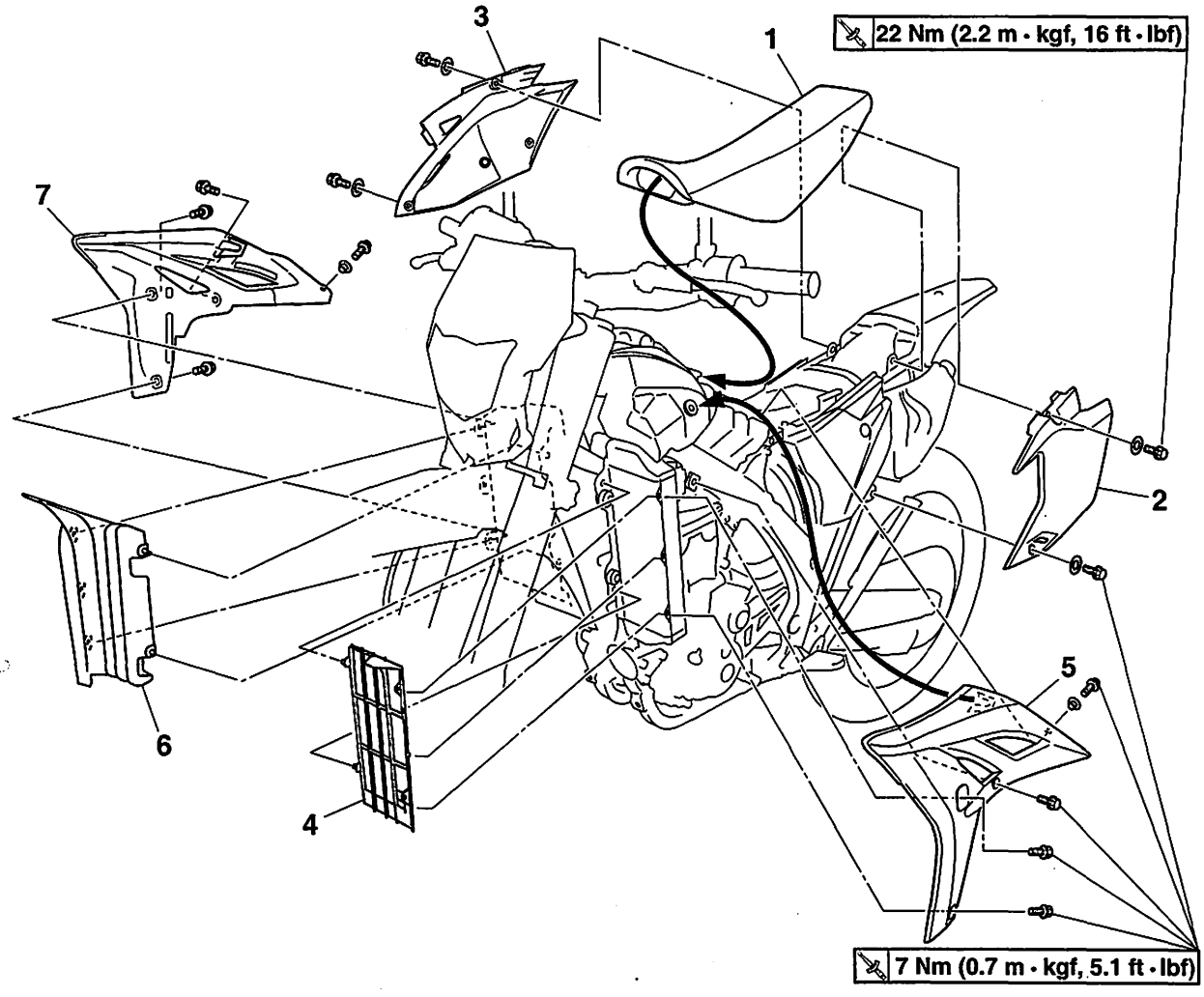
TIP

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.

EAS1DX3138

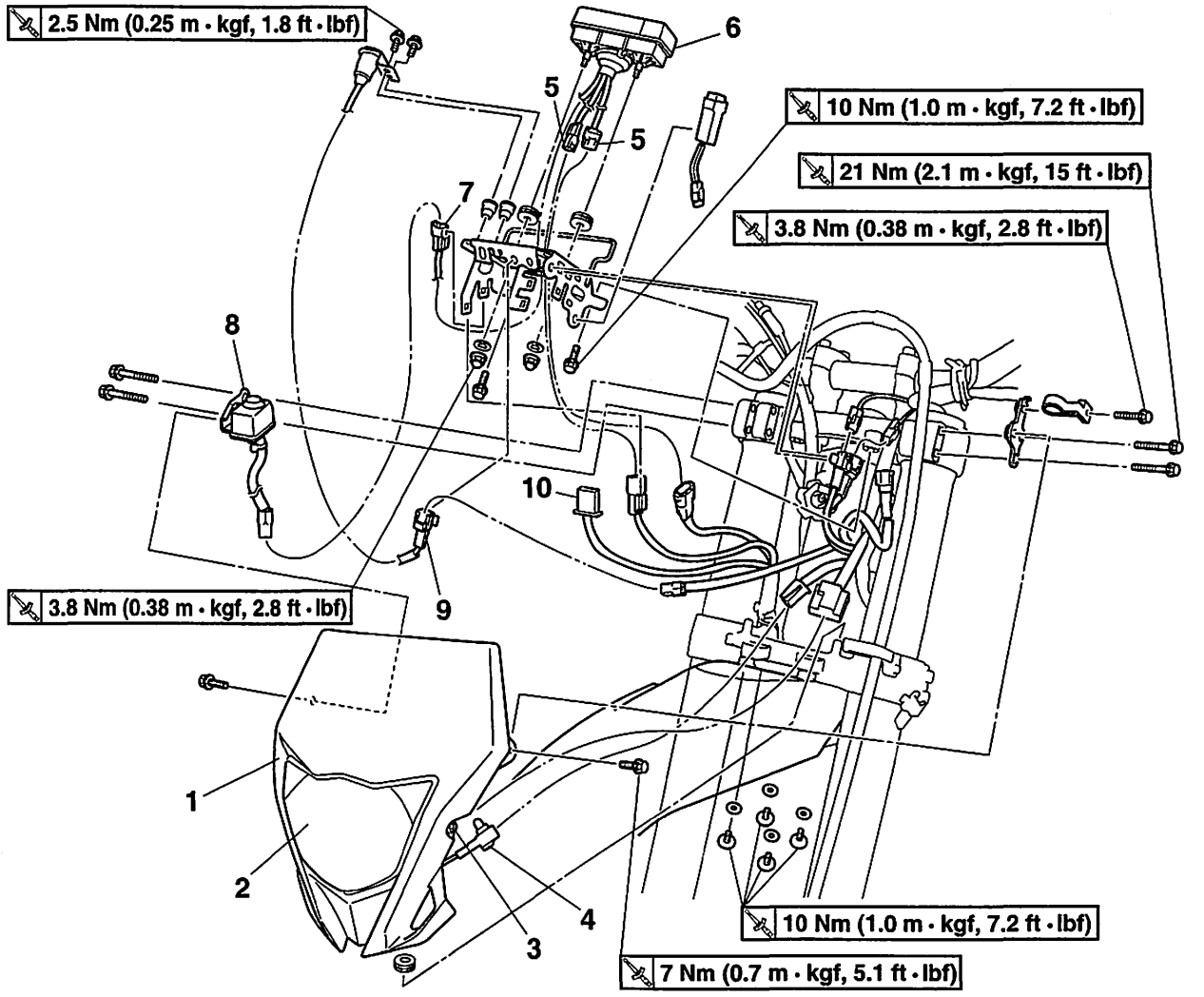
GENERAL CHASSIS

Removing the cowling



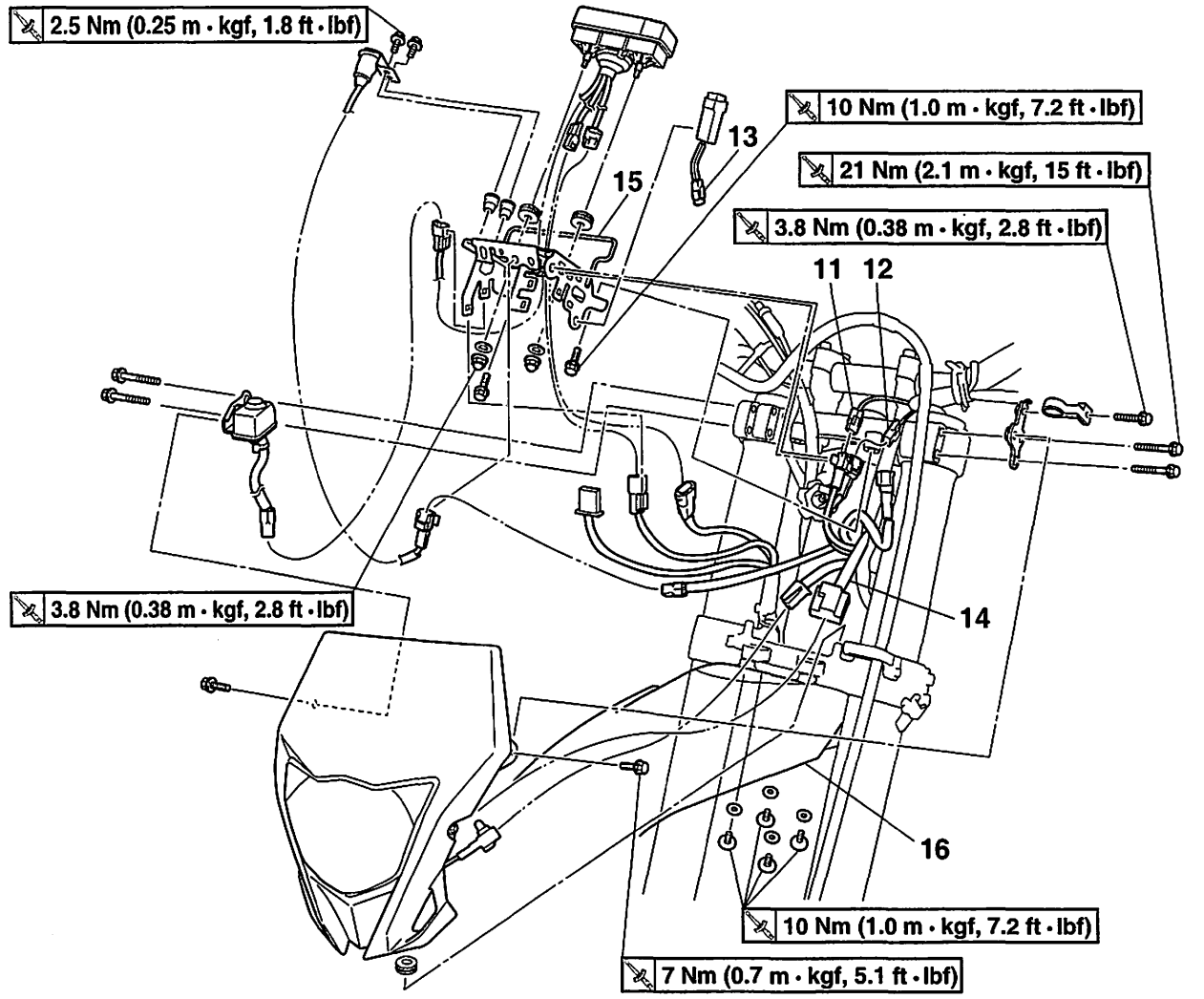
Order	Job/Parts to remove	Q'ty	Remarks
1	Seat	1	
2	Left side cover	1	
3	Right side cover	1	
4	Left air panel	1	
5	Left air scoop	1	
6	Right air panel	1	
7	Right air scoop	1	
			For installation, reverse the removal procedure.

Removing the headlight assembly, multi-function meter and front fender



Order	Job/Parts to remove	Q'ty	Remarks
	Handlebar		Refer to"HANDLEBAR" on page 5-38.
	Front fork legs		Refer to"FRONT FORK" on page 5-44.
1	Headlight body	1	
2	Headlight unit	1	
3	Headlight coupler	1	Disconnect.
4	Auxiliary light coupler	1	Disconnect.
5	Multi-function meter coupler	2	Disconnect.
6	Multi-function meter	1	
7	Main switch coupler	1	Disconnect.
8	Main switch	1	
9	Engine trouble warning light coupler	1	Disconnect.
10	Speed sensor coupler	1	Disconnect.

Removing the headlight assembly, multi-function meter and front fender



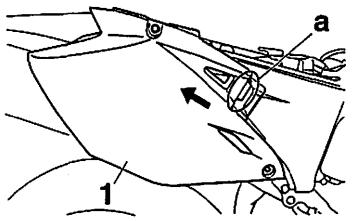
Order	Job/Parts to remove	Q'ty	Remarks
11	Clutch switch coupler	1	Disconnect.
12	Engine stop switch coupler	1	Disconnect.
13	Resistor coupler	1	Disconnect.
14	Main harness	1	
15	Multi-function meter bracket	1	
16	Front fender	1	
			For installation, reverse the removal procedure.

EAS1DX3139
REMOVING THE SIDE COVER

1. Remove:
   - Bolt (side cover)
   - Right side cover "1"

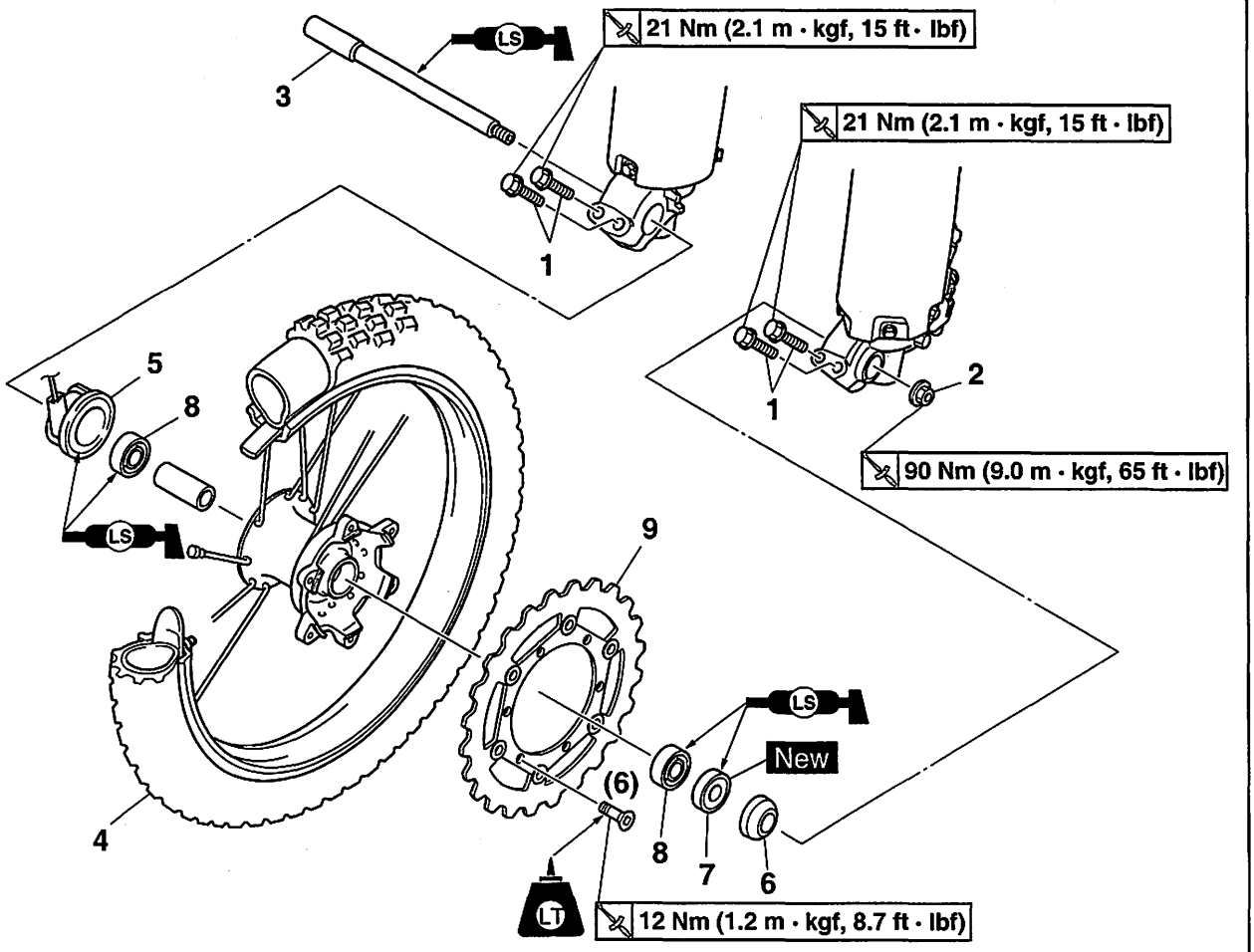
TIP

Draw the side cover backward to remove it because its projection "a" is inserted in the air filter case.



EAS1DX3140
FRONT WHEEL

Removing the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
			Use a suitable 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	Speed sensor	1	
6	Collar	1	
7	Oil seal	1	
8	Bearing	2	
9	Brake disc	1	
			For installation, reverse the removal procedure.

EAS21890
REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

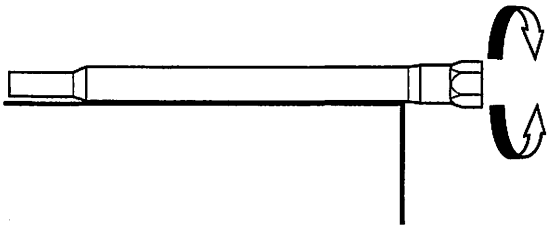
2. Remove:
   - Front wheel

TIP

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

EAS1DX3141
CHECKING THE FRONT WHEEL

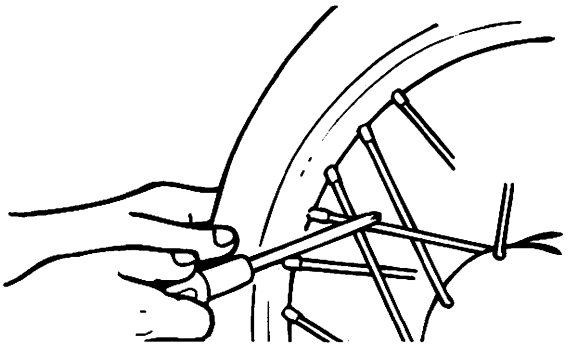
1. Check:
   - Wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.



EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

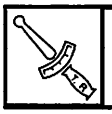
2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to "CHECKING THE TIRES" on page 3-22 and "CHECKING THE WHEELS" on page 3-21.
3. Check:
   - Spokes
     Bends/damage → Replace.
     Loose → Tighten.
     Tap the spokes with a screwdriver.



TIP

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

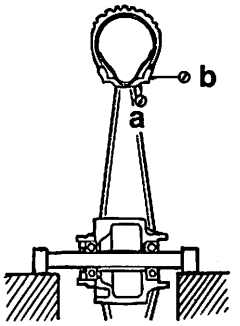
4. Tighten:
   - Spokes
     Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-21.

	**Spoke** **3 Nm (0.3 m·kgf, 2.2 ft·lbf)**

TIP

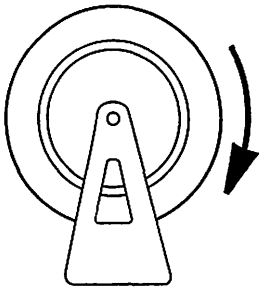
After tightening the spokes, measure the front wheel runout.

5. Measure:
   - Front wheel radial runout "a"
   - Front wheel lateral runout "b"
     Over the specified limits → Repair/replace.



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

6. Check:
   - Collars
     Damage/wear → Replace.
7. Check:
   - Wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - Oil seals
     Damage/wear → Replace.



EAS21910
DISASSEMBLING THE FRONT WHEEL

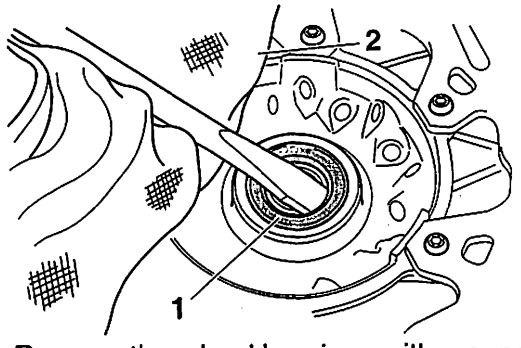
1. Remove:
   - Oil seals
   - Wheel bearings

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

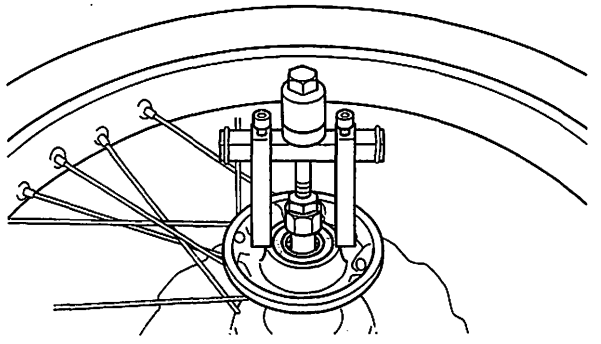
a. Clean the outside of the front wheel hub.
b. Remove the oil seals "1" with a flat-head screwdriver.

TIP

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



c. Remove the wheel bearings with a general bearing puller.



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EAS21960
ASSEMBLING THE FRONT WHEEL

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

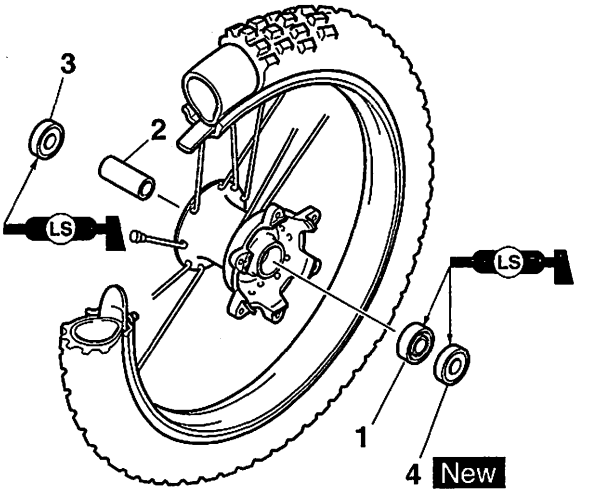
TIP

- Apply the lithium soap base grease on the bearing and oil seal lip when installing.
- Use a socket that matches the outside diameter of the race of the bearing.
- Left side of bearing shall be installed first.
- Install the oil seal with its manufacture's marks or numbers facing outward.

ECA1DX1005

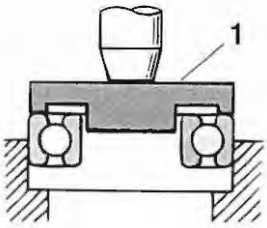
NOTICE

Do not strike the inner race of the bearing. Contact should be made only with the outer race.



TIP

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

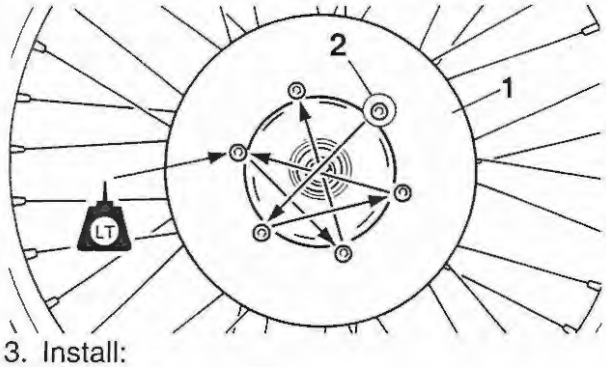


2. Install:
   • Brake disc "1"
   • Brake disc bolt "2"

	Brake disc bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)** **LOCTITE®**

TIP

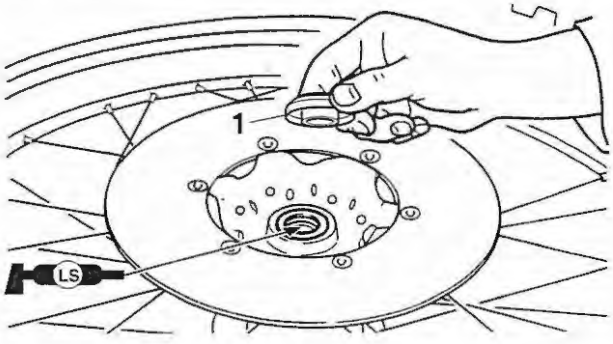
Tighten the bolts in stage, using a crisscross pattern.



3. Install:
   • Collar "1"

TIP

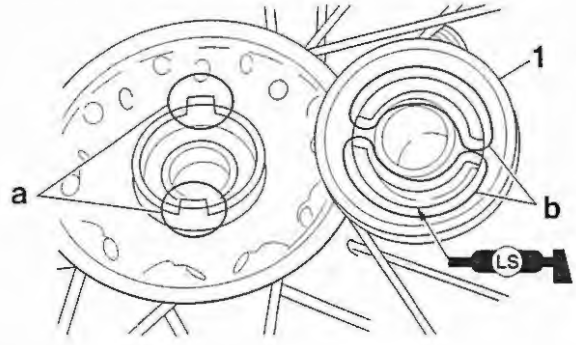
Apply the lithium soap base grease on the oil seal lip.



4. Install
   • Speed sensor "1"

TIP

Apply the lithium soap base grease on the oil seal lip of speed sensor.
Make sure the two projections "a" in the wheel hub are meshed with the two slots "b" in the speed sensor.

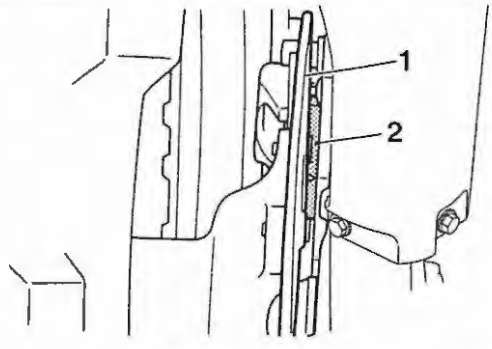


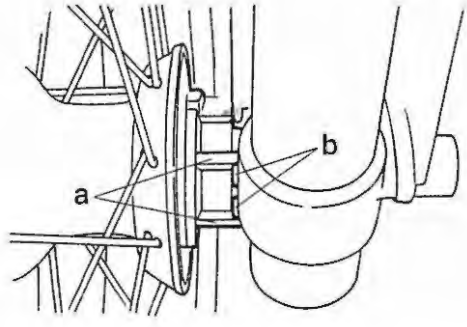
EAS1DX3142
INSTALLING THE FRONT WHEEL (DISC)

1. Install:
   • Wheel

TIP

- Install the brake disc "1" between the brake pads "2" correctly.
- Make sure that the projections "a" in the speed sensor fits over the stopper "b" on the front fork inner tube.

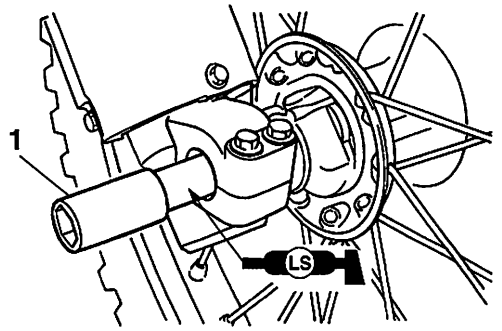




2. Install:
   • Wheel axle "1"

TIP

Apply the lithium soap base grease on the wheel axle.



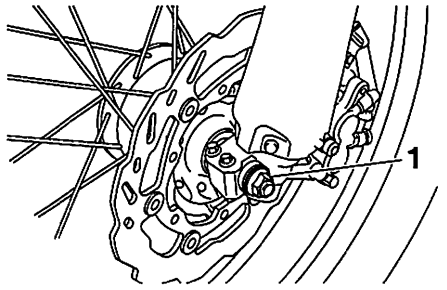
3. Install:
   • Wheel axle nut "1"

	Front wheel axle nut **90 Nm (9.0 m·kgf, 65 ft·lbf)**

ECA14140

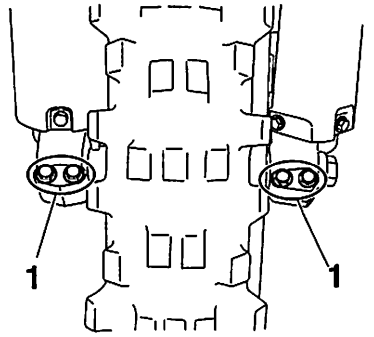
NOTICE

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



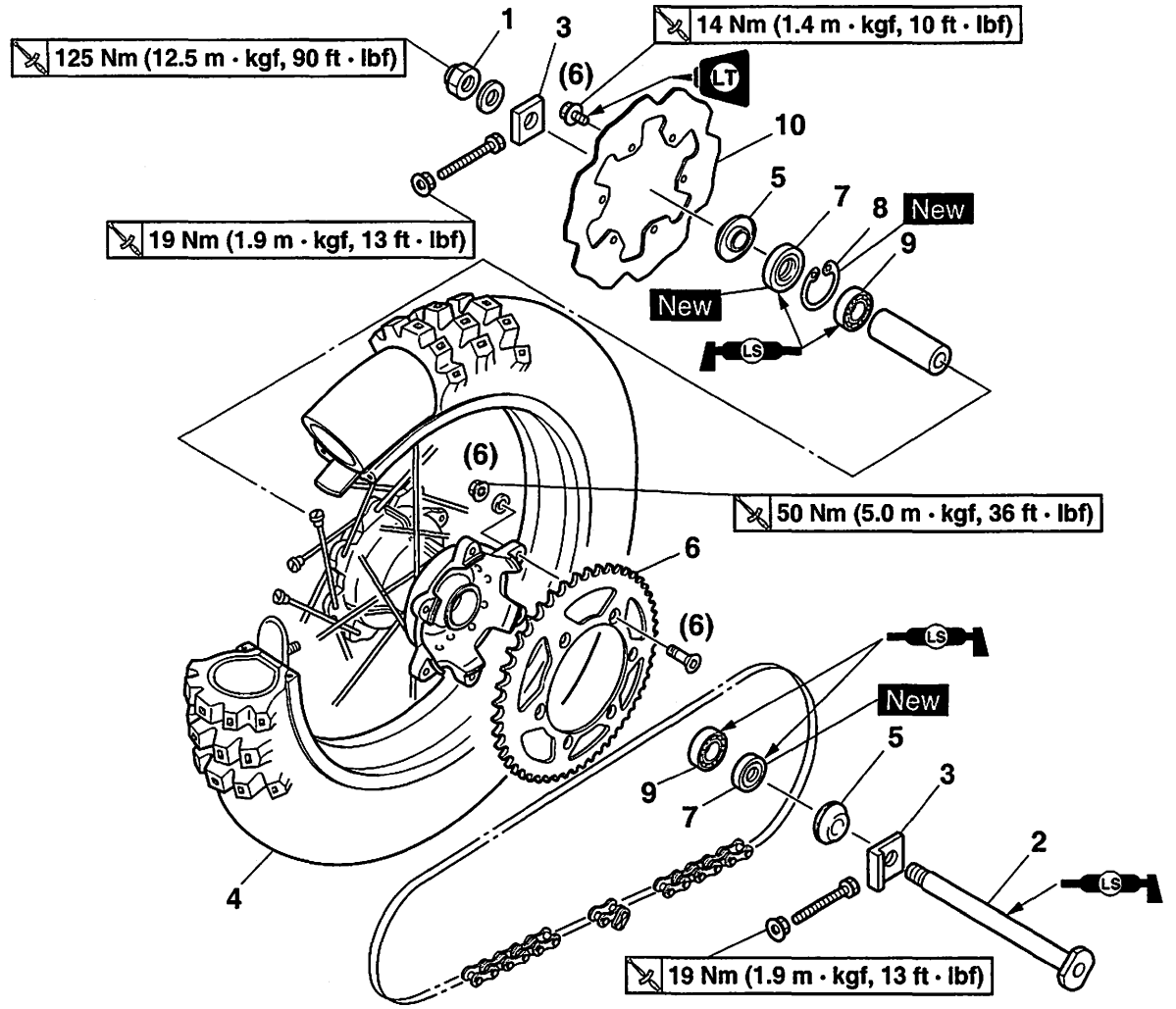
4. Tighten:
   • Front wheel axle pinch bolt "1"

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



EAS22020
REAR WHEEL

Removing the rear wheel



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

EAS22040
REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

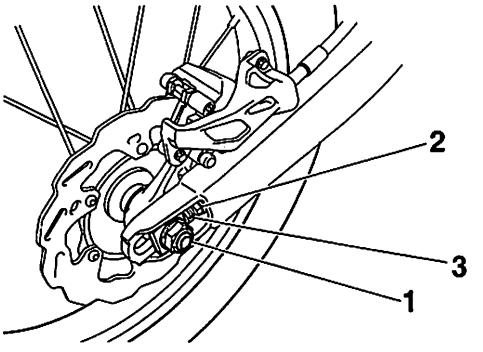
EWA13120
⚠ WARNING

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

TIP

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

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



6. Remove:
   - Wheel axle
   - Rear wheel

TIP

- Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.
- Do not de pres st the brake pedal when removing the rear wheel.

EAS1DX3143
CHECKING THE REAR WHEEL

1. Check:
   - Wheel axle
   - Rear wheel
   - Wheel bearings
   - Oil seals

   Refer to "CHECKING THE FRONT WHEEL" on page 5-6.
2. Check:
   - Tire
   - Rear wheel

   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-22 and "CHECKING THE WHEELS" on page 3-21.
3. Check:
   - Spokes

   Refer to "CHECKING THE FRONT WHEEL" on page 5-6.
4. Measure:
   - Radial wheel runout
   - Lateral wheel runout

   Refer to "CHECKING THE FRONT WHEEL" on page 5-6.

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

EAS22080
DISASSEMBLING THE REAR WHEEL

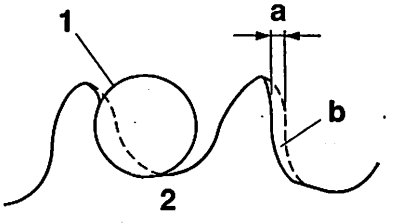
1. Remove:
   - Oil seals
   - Wheel bearings

   Refer to "DISASSEMBLING THE FRONT WHEEL" on page 5-7.

EAS22120
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
   - Rear wheel sprocket

   More than 1/4 tooth "a" wear → Replace the drive chain sprocket as a set.
   Bent teeth → Replace the drive chain sprocket as a set.



b. Correct

1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
   • Rear wheel sprocket

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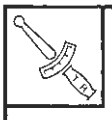
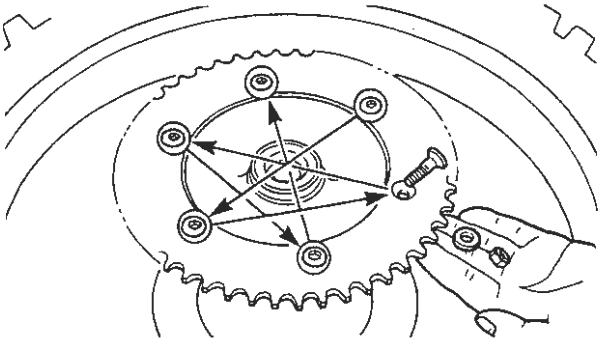
a. Remove the self-locking nuts and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install the new rear wheel sprocket.

	**Rear wheel sprocket self-locking nut** **50 Nm (5.0 m·kgf, 36 ft·lbf)**

TIP

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



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EAS22140
ASSEMBLING THE REAR WHEEL

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

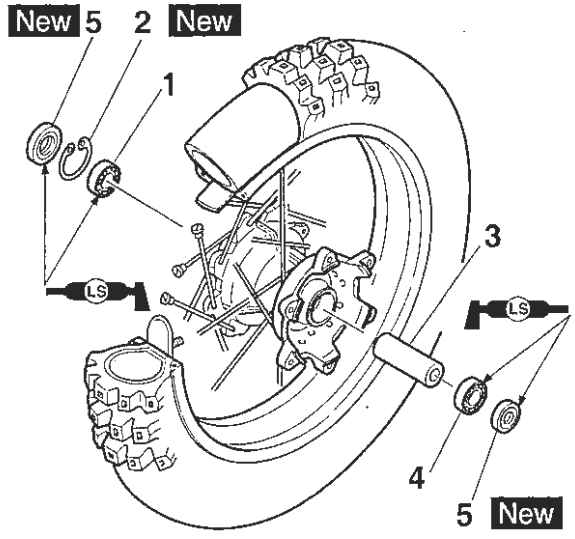
TIP

• Apply the lithium soap base grease on the bearing and oil seal lip when installing.
• Install the bearing with seal facing outward.
• Use a socket that matches the outside diameter of the race of the bearing.
• Right side of bearing shall be installed first.
• Install the oil seal with its manufacture's marks or numbers facing outward.

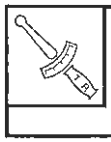
ECA1DX1006

NOTICE

Do not strike the inner race of the bearing. Contact should be made only with the outer race.

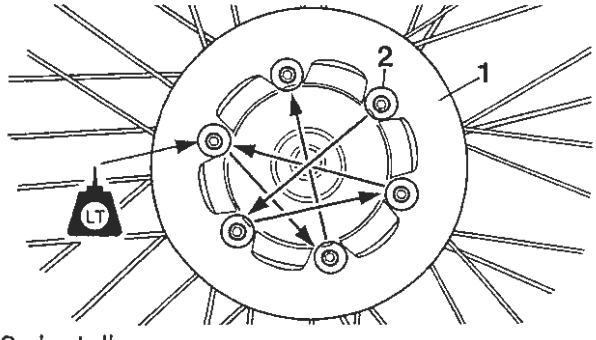


2. Install:
   • Brake disc "1"
   • Brake disc bolt "2"

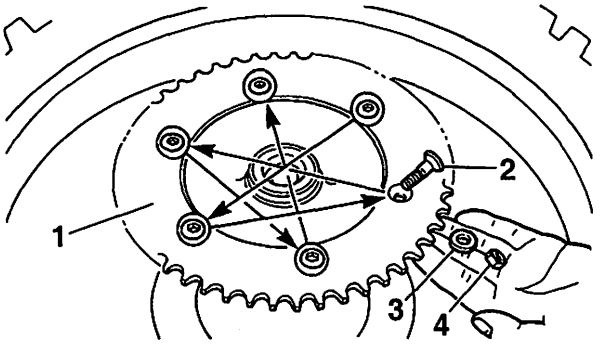
	**Brake disc bolt** **14 Nm (1.4 m·kgf, 10 ft·lbf)** **LOCTITE®**

TIP

Tighten the bolts in stage, using a crisscross pattern.



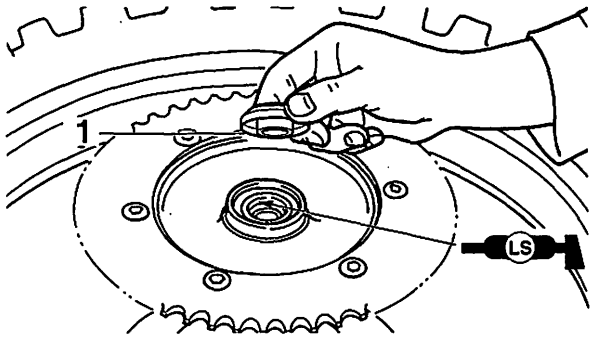
3. Install:
   • Rear wheel sprocket "1"
   • Rear wheel sprocket bolt "2"
   • Rear wheel sprocket washer "3"
   • Rear wheel sprocket nut "4"



4. Install
   • Collar "1"

TIP

Apply the lithium soap base grease on the oil seal lip.

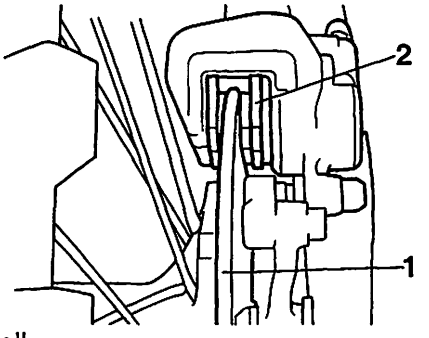


EAS22160
INSTALLING THE REAR WHEEL (DISC)

1. Install:
   • Wheel

TIP

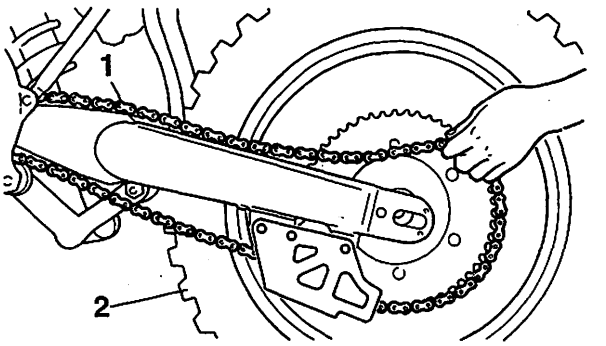
Install the brake disc "1" between the brake pads "2" correctly.



2. Install:
   • Drive chain "1"

TIP

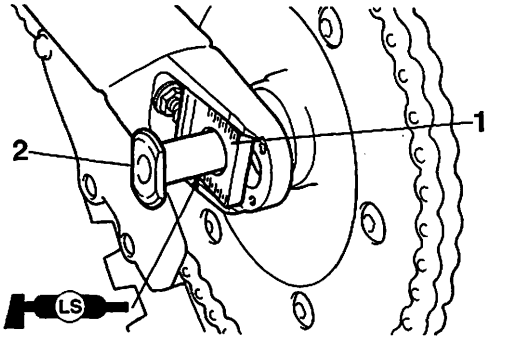
Push the wheel "2" forward and install the drive chain.



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

TIP

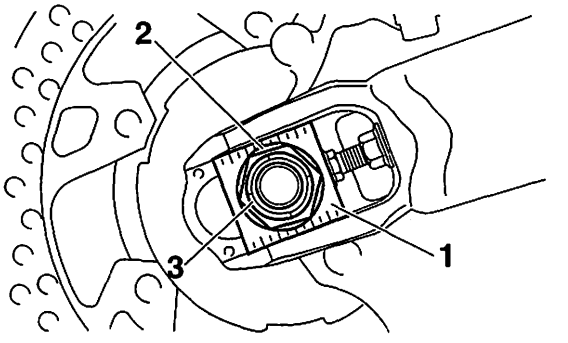
• Install the left drive chain puller, and insert the wheel axle from left side.
• Apply the lithium soap base grease on the wheel axle.



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

TIP

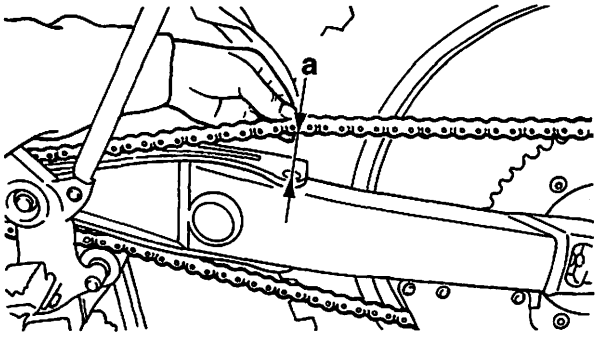
Temporarily tighten the nut (wheel axle) at this point.



5. Adjust:
   • Drive chain slack "a"

	Drive chain slack **48.0–58.0 mm (1.89– 2.28 in)**

Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-23.

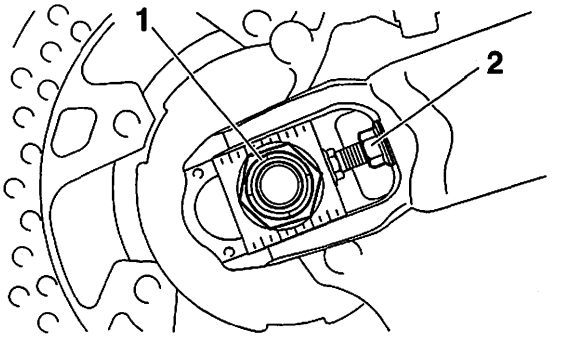


6. Tighten:
   • Wheel axle nut "1"

	Wheel axle nut **125 Nm (12.5 m·kgf, 90 ft·lbf)**

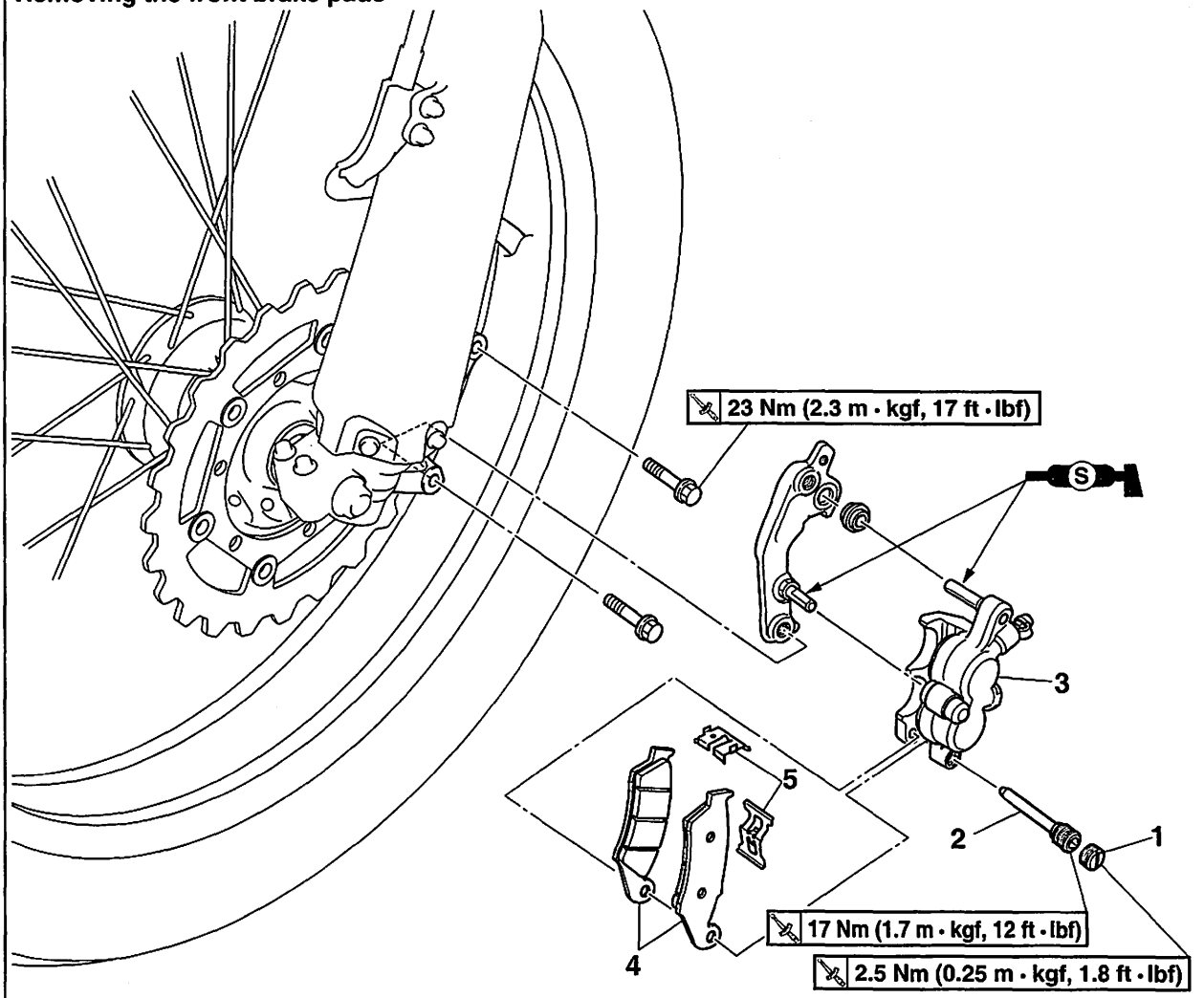
   • Locknut "2"

	Locknut **19 Nm (1.9 m·kgf, 14 ft·lbf)**



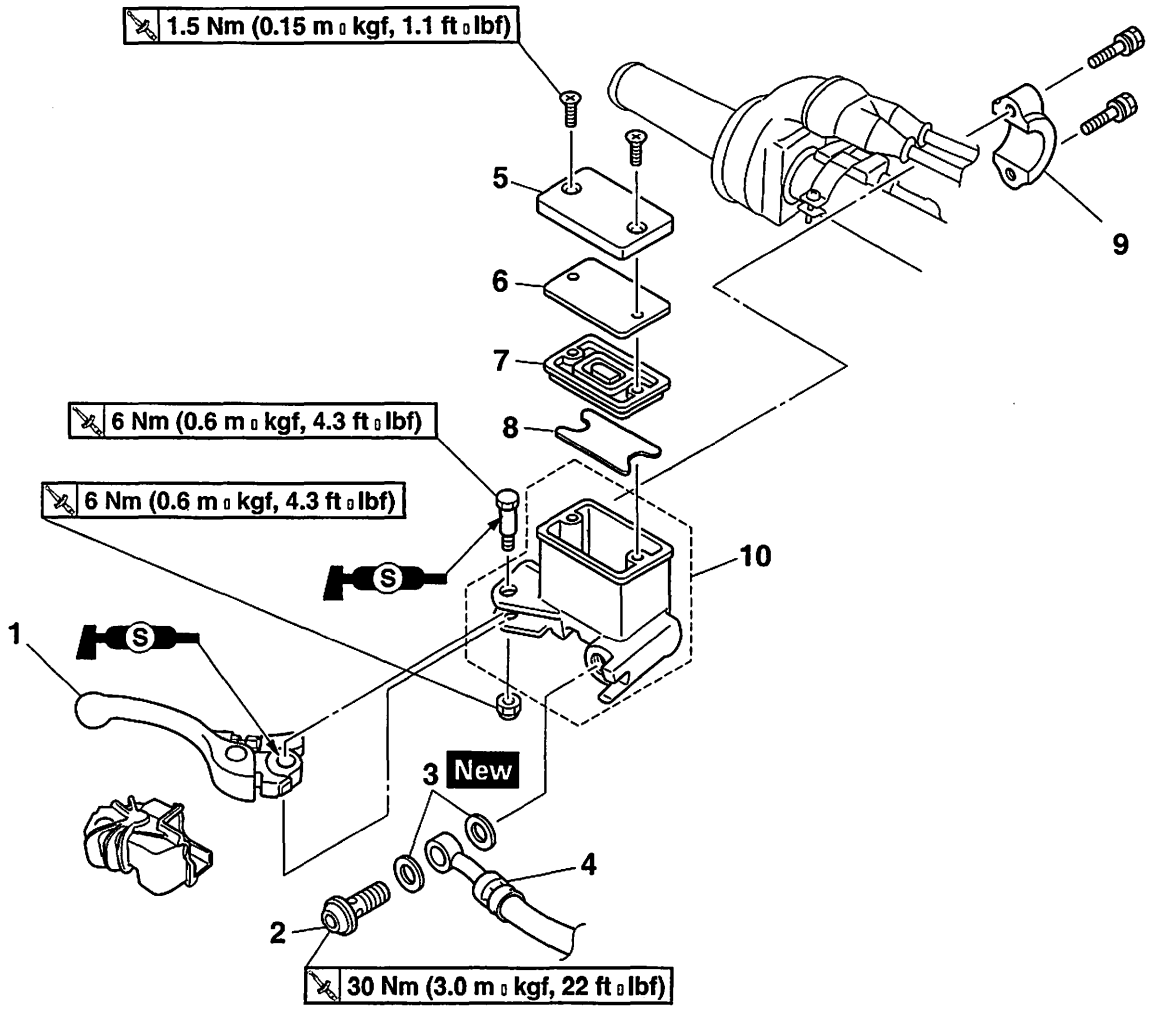
EAS1DX3144
FRONT BRAKE

Removing the front brake pads



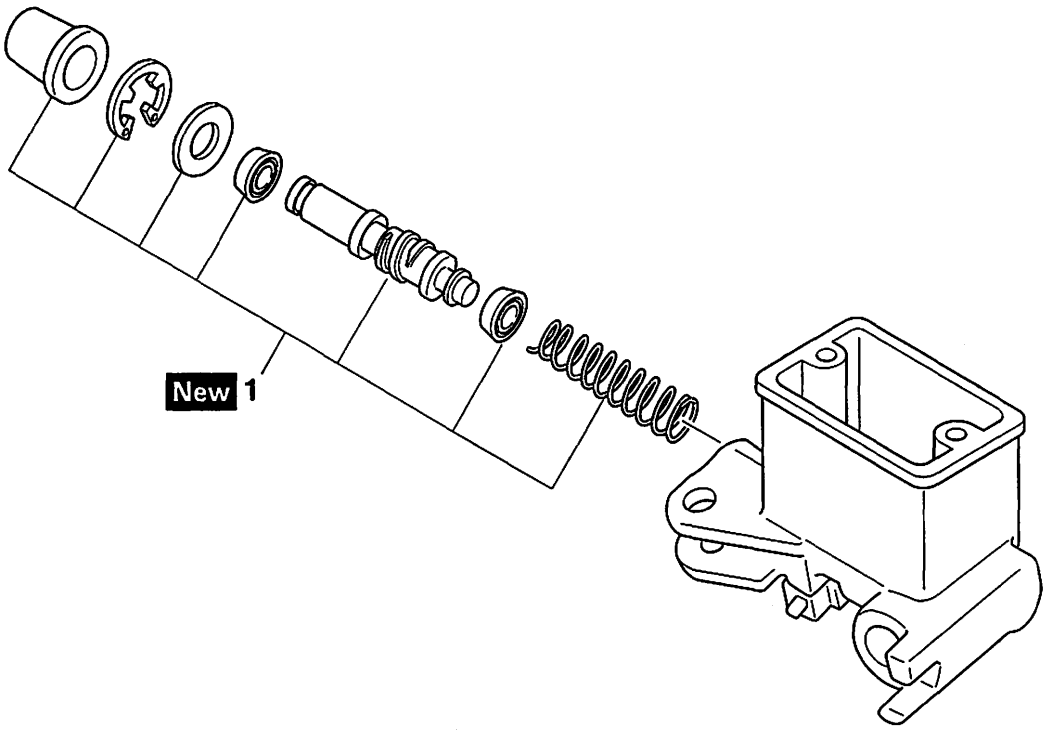
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad pin plug	1	
2	Brake pad pin	1	
3	Front brake caliper assembly	1	
4	Brake pad	2	
5	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the front brake master cylinder



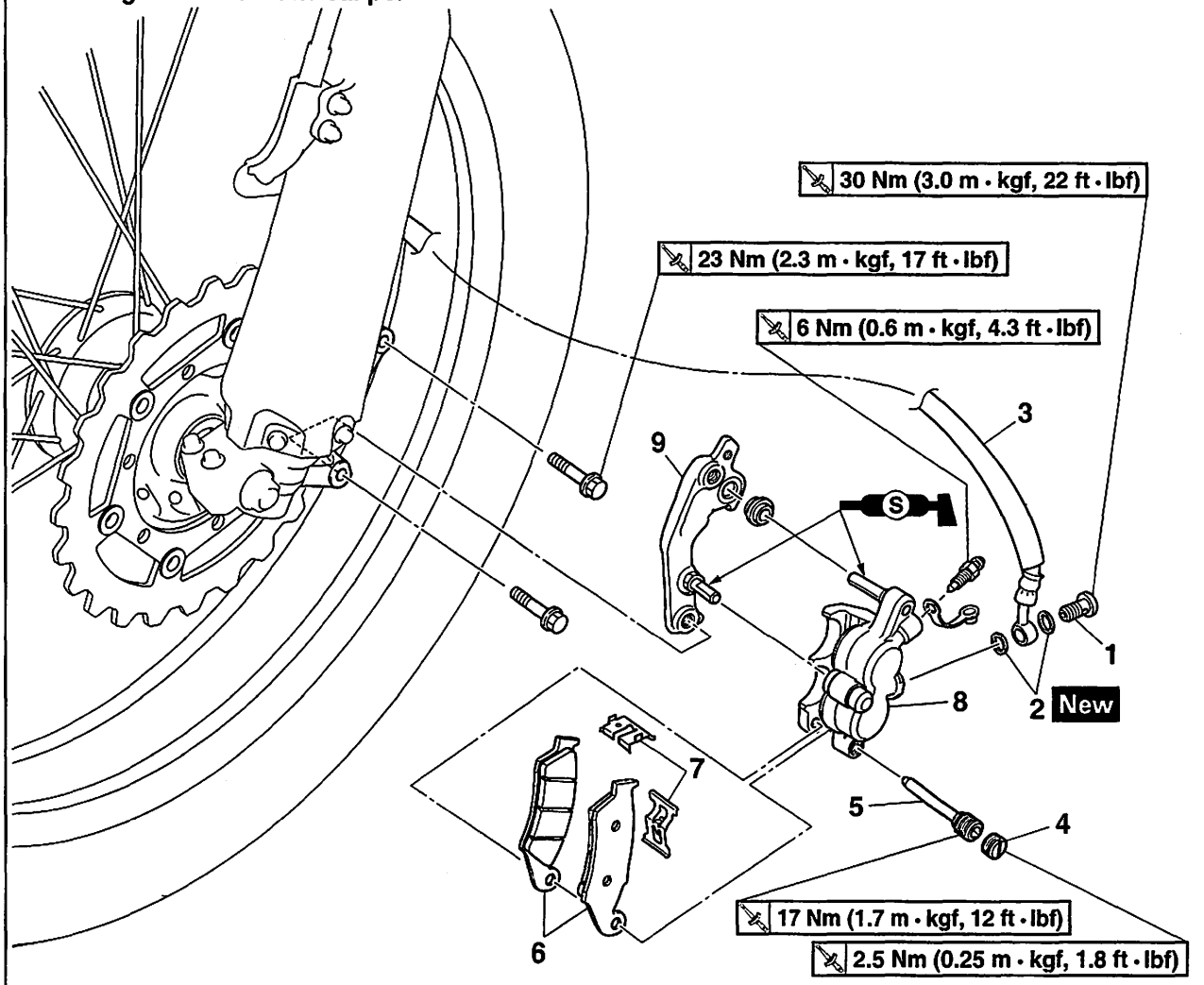
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
	Rear view mirror (right)		
1	Brake lever	1	
2	Union bolt	1	
3	Copper washer	2	
4	Front brake hose	1	
5	Brake master cylinder reservoir cap	1	
6	Brake master cylinder reservoir diaphragm holder	1	
7	Brake master cylinder reservoir diaphragm	1	
8	Front brake master cylinder float	1	
9	Front brake master cylinder holder	1	
10	Front brake master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the front brake master cylinder



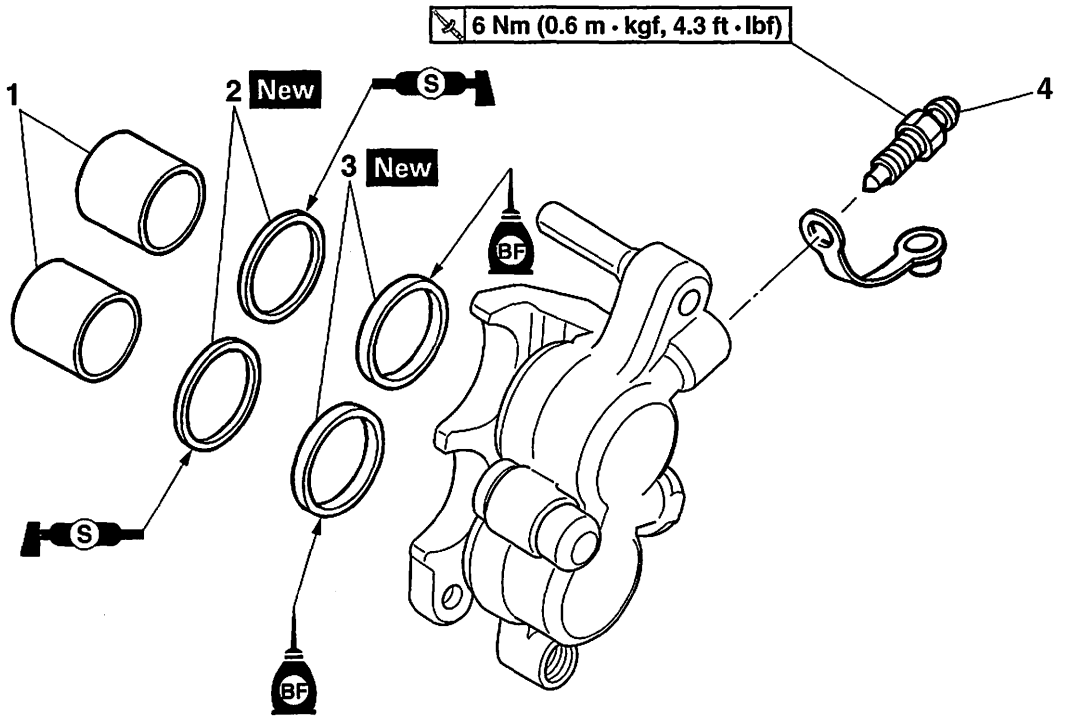
Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder kit	1	
			For assembly, reverse the disassembly procedure.

Removing the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
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	2	
8	Front brake caliper assembly	1	
9	Front brake caliper bracket	1	
			For installation, reverse the removal procedure.

Disassembling the front brake caliper

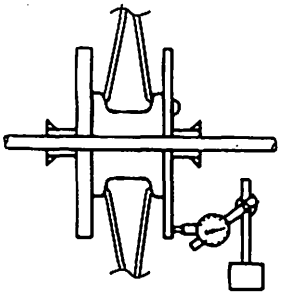


Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	2	
2	Brake caliper dust seal	2	
3	Brake caliper piston seal	2	
4	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22220
INTRODUCTION
EWA14100
⚠ WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22230
CHECKING THE FRONT BRAKE DISC
1. Remove:
   - Front wheel
   Refer to "FRONT WHEEL" on page 5-5.
2. Check:
   - Front brake disc
   Damage/galling → Replace.
3. Measure:
   - Brake disc deflection
   Out of specification → Correct the brake disc deflection or replace the brake disc.



Brake disc deflection limit
0.15 mm (0.0059 in)

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a. Place the vehicle on a suitable stand so that the front wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection front 10 mm (0.39 in), rear 7 mm (0.28 in) below the edge of the brake disc.

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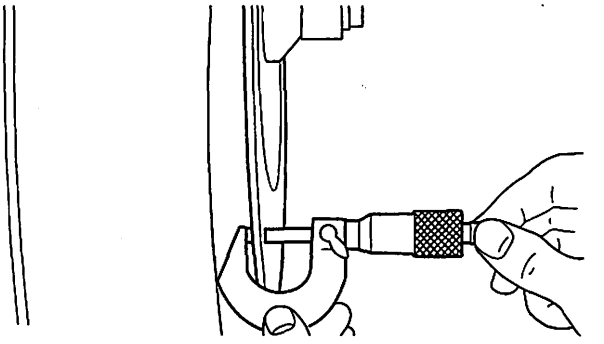
4. Measure:
   - Brake disc thickness
   Measure the brake disc thickness at a few different locations.
   Out of specification → Replace.



Brake disc thickness limit
2.5 mm (0.10 in)

5. Adjust:
   - Brake disc deflection

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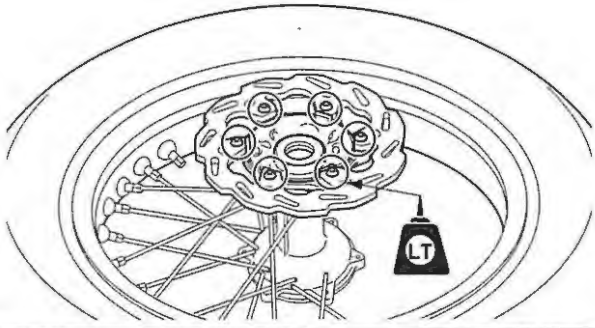
a. Remove the brake disc.
b. Turn the brake disc by one bolt hole.
c. Install the brake disc.

TIP

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



Brake disc bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®

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

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

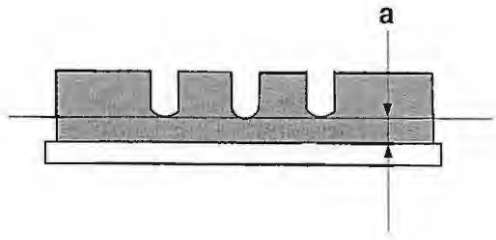
EAS1DX3145
REPLACING THE FRONT BRAKE PADS

TIP

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

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

Brake pad lining thickness (inner)
4.4 mm (0.17 in)
Limit
1.0 mm (0.04 in)
Brake pad lining thickness (outer)
4.4 mm (0.17 in)
Limit
1.0 mm (0.04 in)



2. Install:
   • Brake pads
   • Pad support

TIP

Always install new brake pads, and a pad support as a set.

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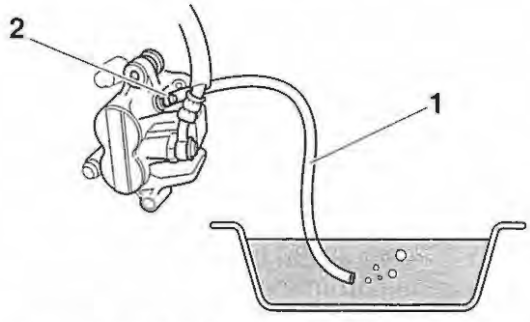
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.



b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

Bleed screw
6 Nm (0.6 m·kgf, 4.3 ft·lbf)

d. Install new brake pads and a new brake pad spring.

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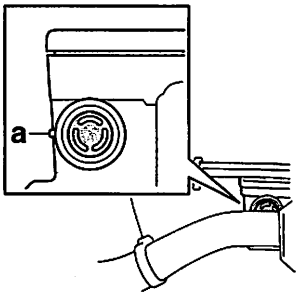
3. Install:
   • Brake pad pins
   • Brake pad clips
   • Brake pad cover
   • Brake caliper

Brake caliper bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)

4. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.



5. Check:
   • Brake lever free play
   Refer to "ADJUSTING THE FRONT DISC BRAKE" on page 3-18.
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

EAS22290
REMOVING THE FRONT BRAKE CALIPER

TIP

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

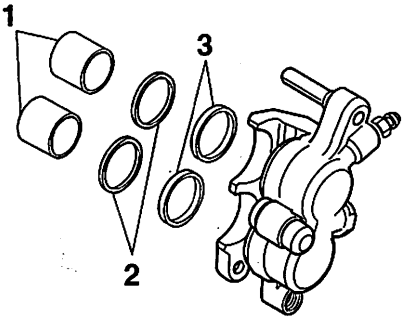
1. Remove:
   • Union bolt
   • Copper washers
   • Brake hose

TIP

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

EAS22320
DISASSEMBLING THE FRONT BRAKE CALIPER

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



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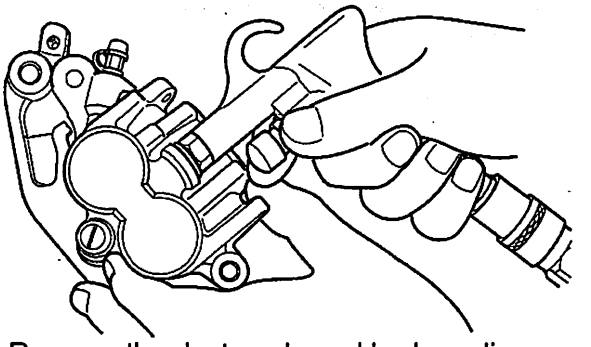
a. Blow compressed air into the brake hose joint opening to force out the pistons from the brake caliper.

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 dust seals and brake caliper piston seals.

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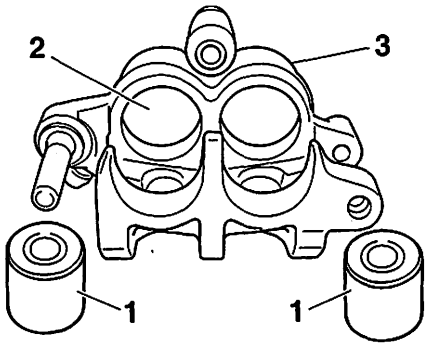
EAS1DX3146
CHECKING THE FRONT BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Brake hose	Every four years
Brake fluid	Every one year and whenever the brake is disassembled

1. Check:
   • Brake caliper pistons "1"
   Rust/scratches/wear → Replace the brake caliper pistons.

- Brake caliper cylinders "2"
  Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body "3"
  Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)
  Obstruction → Blow out with compressed air.



EWA13600

⚠ WARNING

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

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

EAS22400

ASSEMBLING THE FRONT BRAKE CALIPER

EWA13620

⚠ WARNING

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

Recommended fluid
DOT 4

EAS1DX3147

INSTALLING THE FRONT BRAKE CALIPER

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

Front brake caliper bracket
23 Nm (2.3 m·kgf, 17 ft·lbf)
Brake hose union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530

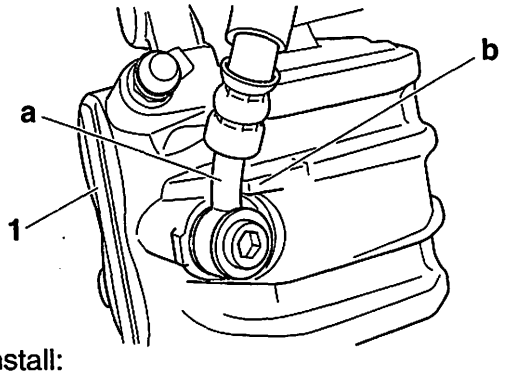
⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-29.

ECA14170

NOTICE

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



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

Brake pad pin
17 Nm (1.7 m·kgf, 12 ft·lbf)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 5-21.

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

Recommended fluid
DOT 4

EWA13090

⚠ WARNING

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

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

ECA13540

NOTICE

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

4. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
5. Check:
   - Brake fluid level
     Below the minimum level mark → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.
6. Check:
   - Brake lever free play
     Refer to "ADJUSTING THE FRONT DISC BRAKE" on page 3-18.
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

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

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

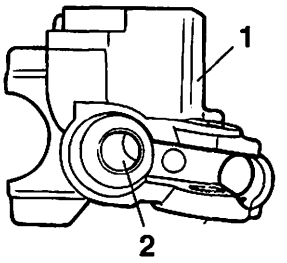
TIP

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

EAS22500

CHECKING THE FRONT BRAKE MASTER CYLINDER

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



2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake master cylinder reservoir cap
4. Check:
   - Brake master cylinder reservoir diaphragm holder
   - Brake master cylinder reservoir diaphragm holder
     Cracks/damage/wear → Replace.
5. Check:
   - Brake hoses
     Cracks/damage/wear → Replace.

EAS22520

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

WARNING

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

	Recommended fluid **DOT 4**

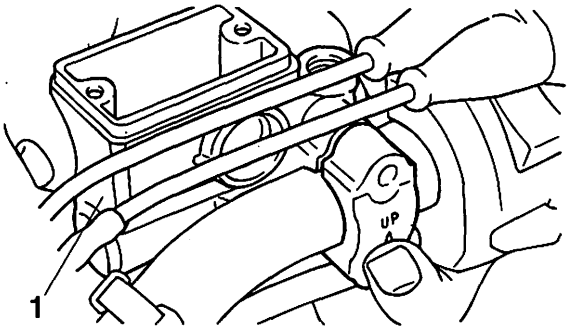
EAS1DX3148
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   • Brake master cylinder "1"

	Brake master cylinder holder bolt **9 Nm (0.9 m·kgf, 6.5 ft·lbf)**

TIP

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



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

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

EWA13530

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-29.

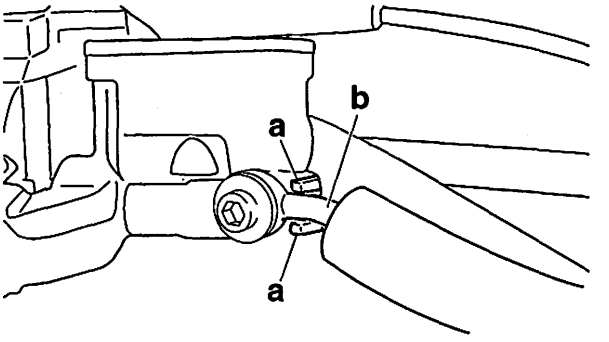
ECA1DX1007

NOTICE

Install the brake hose so that it contacts the brake master cylinder projection "a" and that its bent portion "b" faces downward.

TIP

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



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

	Recommended fluid **DOT 4**

EWA13540

⚠ WARNING

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

ECA13540

NOTICE

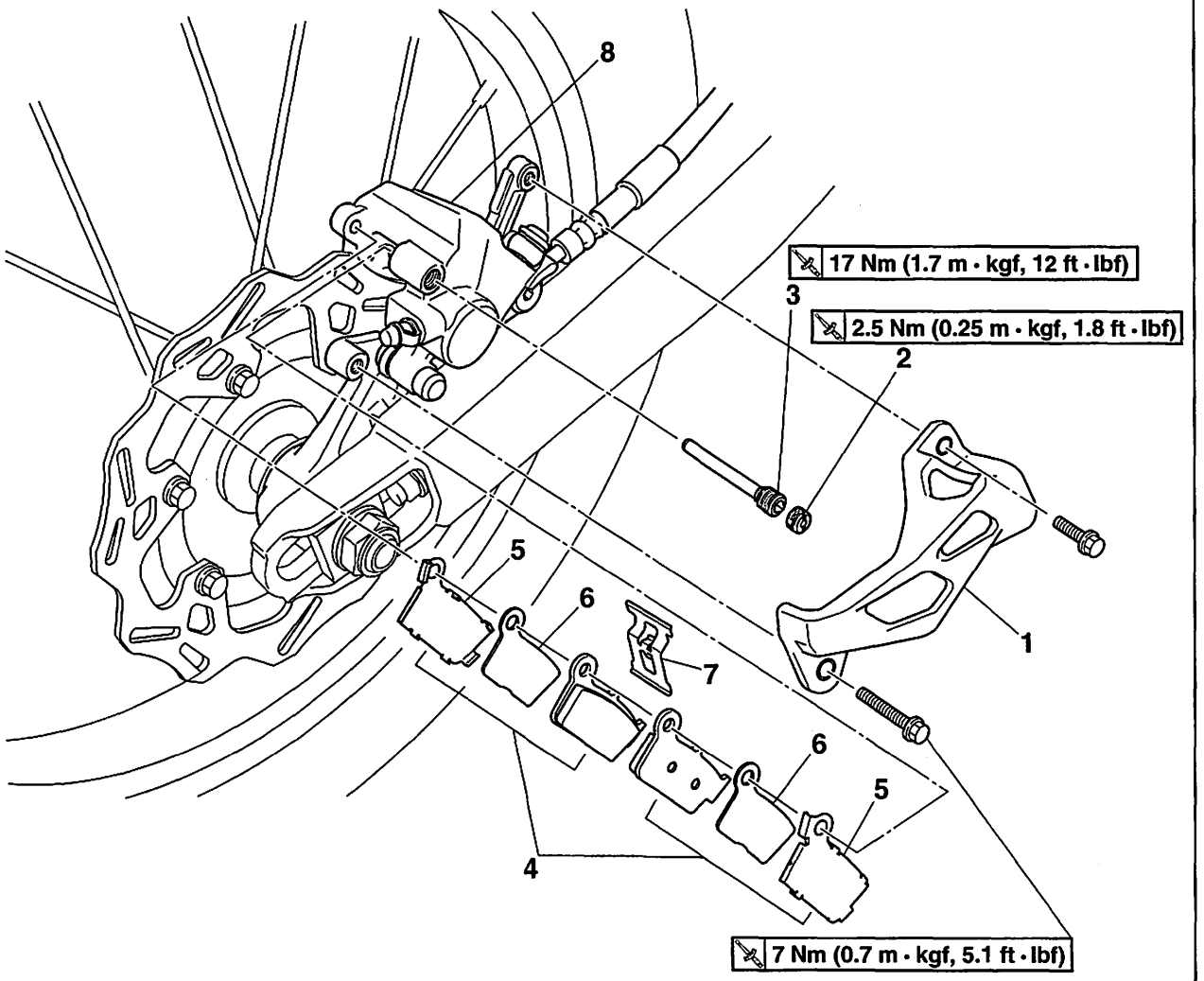
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
5. Check:
   • Brake fluid level
   Below the minimum level mark → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.
6. Check:
   • Brake lever free play
   Refer to "ADJUSTING THE FRONT DISC BRAKE" on page 3-18.

- Brake lever operation
  Soft or spongy feeling → Bleed the brake system.
  Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

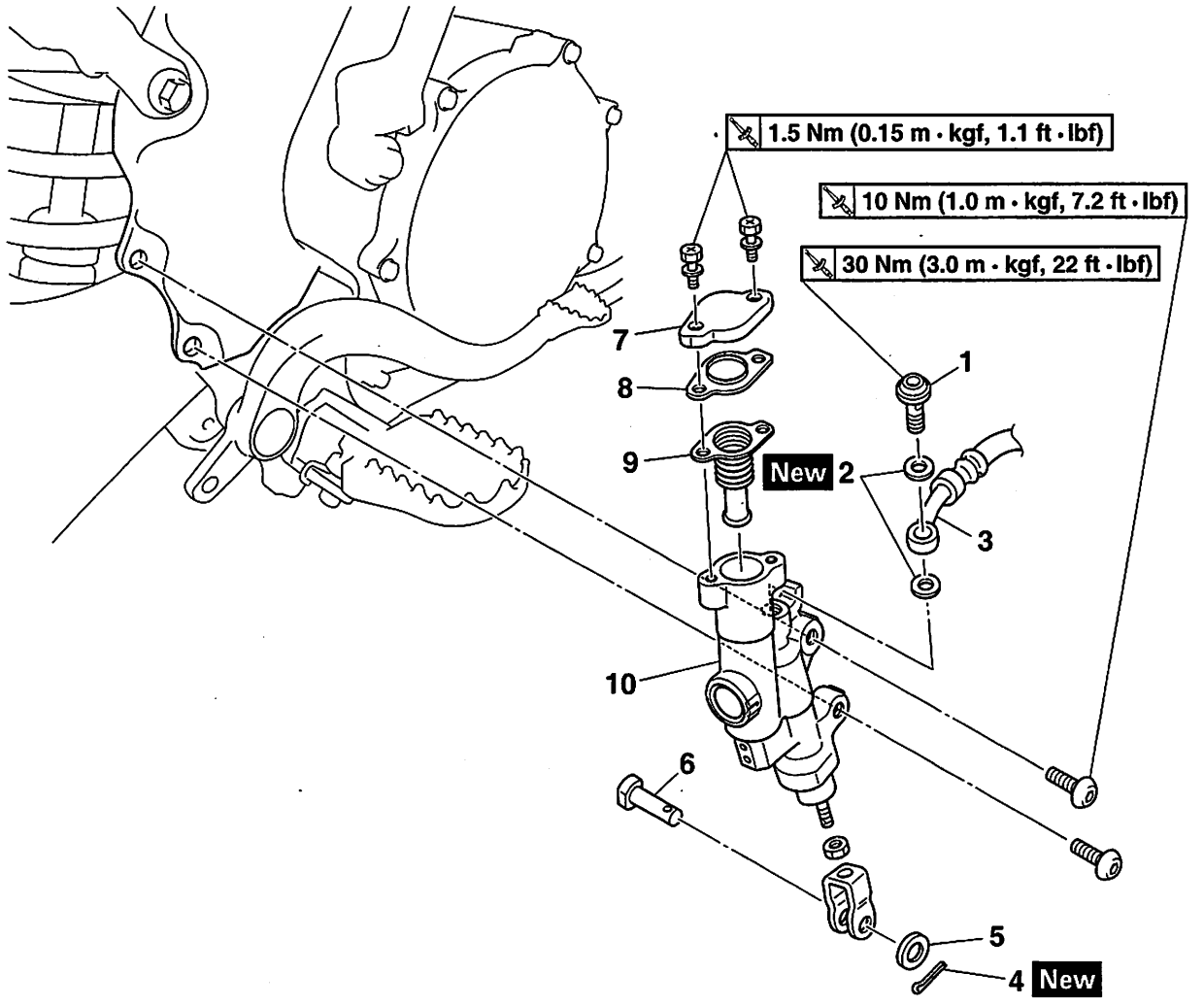
EAS1DX3149
REAR BRAKE

Removing the rear brake pads



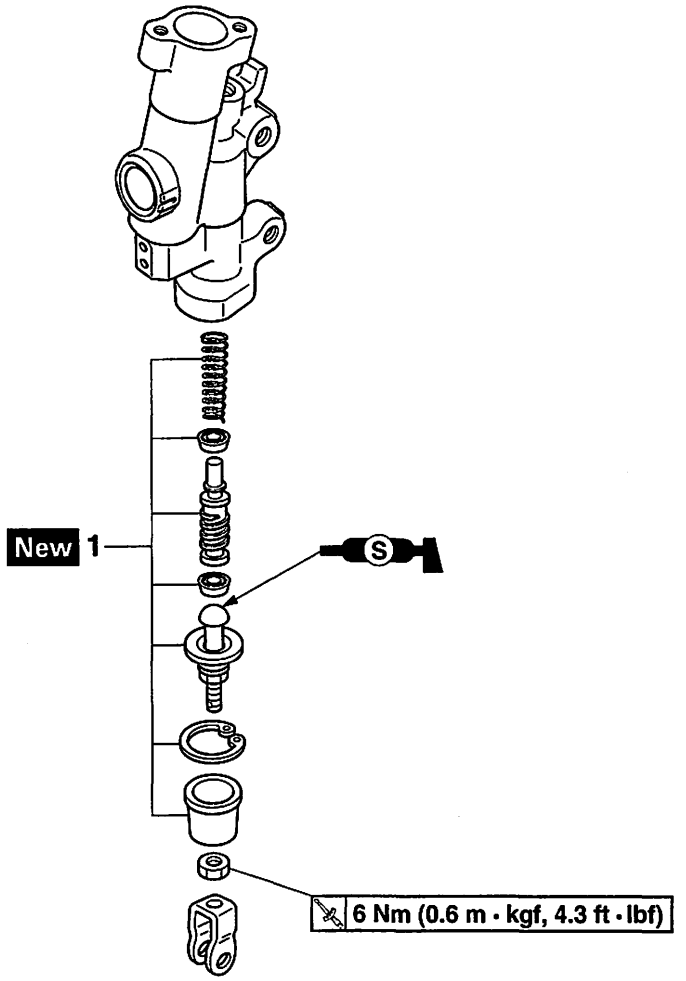
Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to"REAR WHEEL" on page 5-10.
1	Protector	1	
2	Brake pad pin plug	1	
3	Brake pad pin	1	
4	Rear brake pad	2	
5	Pad shim	2	
6	Insulator	2	
7	Rear brake pad spring	1	
8	Rear brake caliper assembly	1	
			For installation, reverse the removal procedure.

Removing the rear brake master cylinder



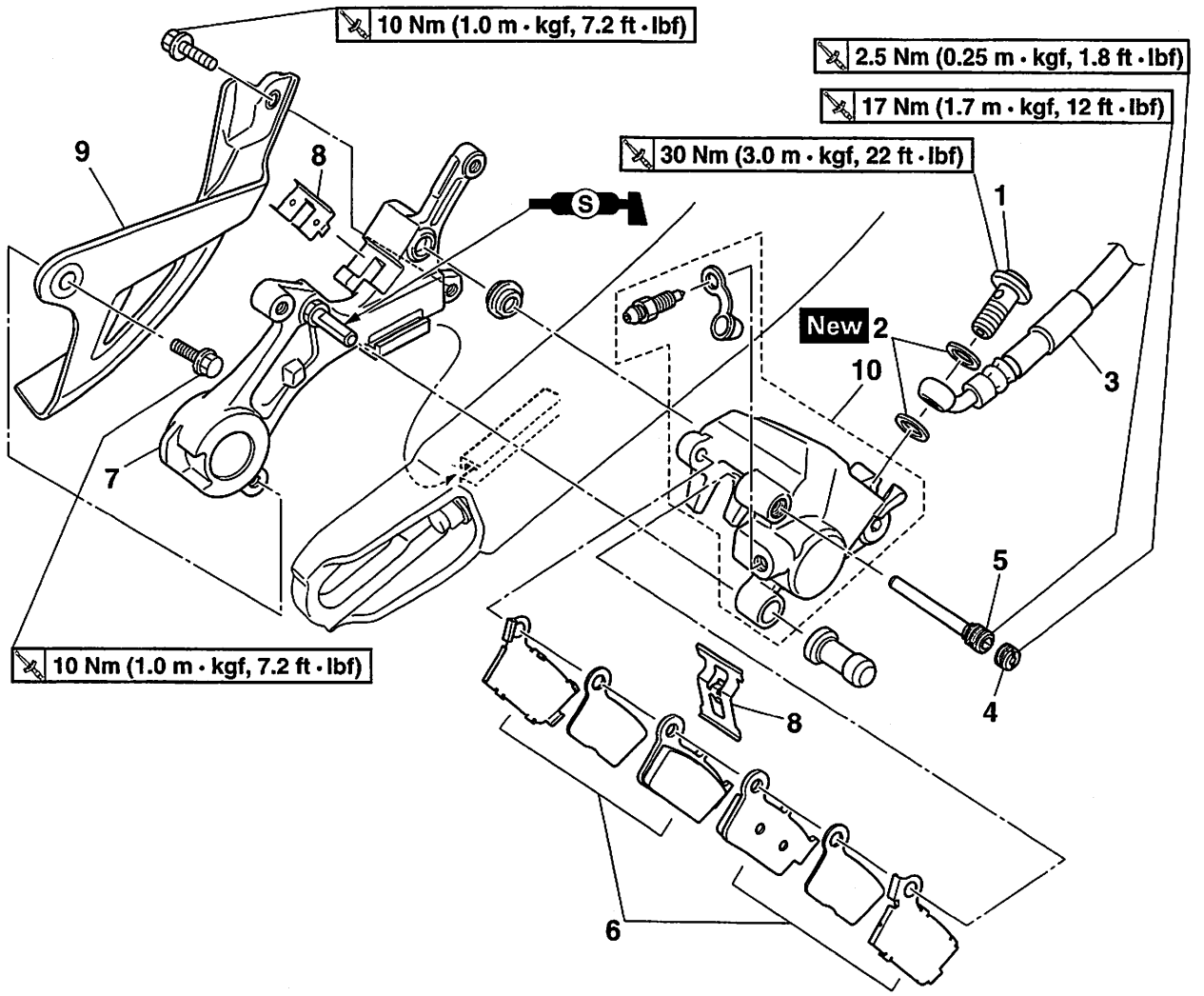
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Split pin	1	
5	Plain washer	1	
6	Pin	1	
7	Brake master cylinder reservoir cap	1	
8	Brake master cylinder reservoir diaphragm plate	1	
9	Brake master cylinder reservoir diaphragm	1	
10	Rear brake master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake master cylinder



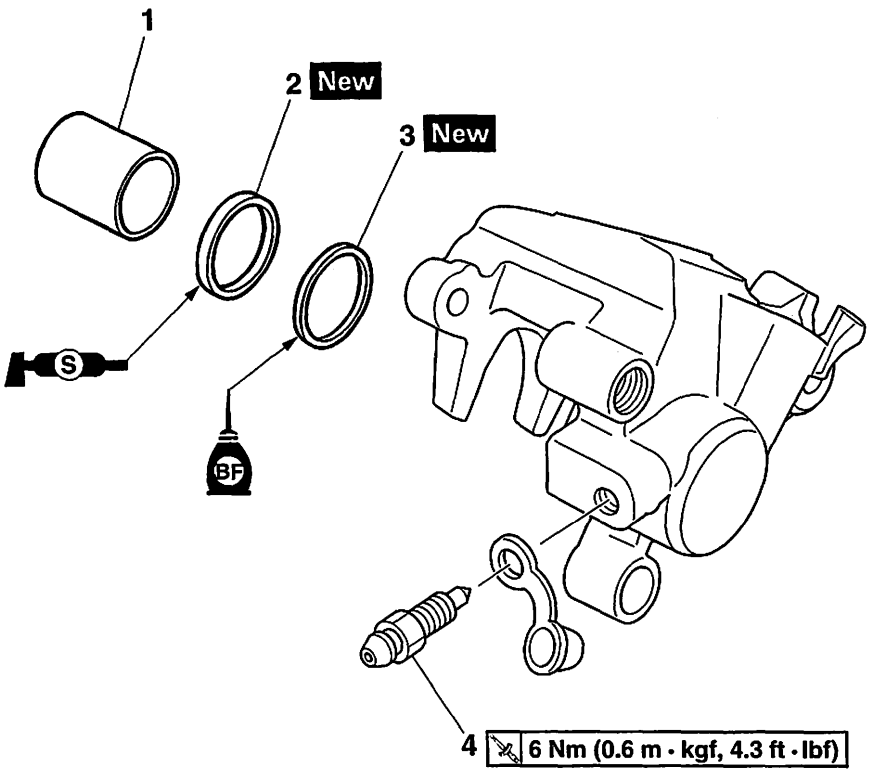
Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder kit	1	
			For assembly, reverse the disassembly procedure.

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
	Protector		
1	Union bolt	1	
2	Copper washer	2	
3	Rear brake hose	1	
4	Brake pad pin plug	1	
5	Brake pad pin	1	
6	Rear brake pad assembly	2	
7	Rear brake caliper bracket	1	
8	Brake pad spring	2	
9	Rear brake disc cover	1	
10	Rear brake caliper assembly	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	1	
2	Brake caliper dust seal	1	
3	Brake caliper piston seal	1	
4	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22560
INTRODUCTION

EWA14100
⚠ WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22570
CHECKING THE REAR BRAKE DISC

1. Remove:
   - Rear wheel
     Refer to "REAR WHEEL" on page 5-10.
2. Check:
   - Brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 5-20.

Brake disc deflection limit
0.15 mm (0.0059 in)

4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 5-20.

Brake disc thickness limit
3.5 mm (0.14 in)

5. Adjust:
   - Brake disc deflection
     Refer to "CHECKING THE FRONT BRAKE DISC" on page 5-20.

Brake disc bolt
14 Nm (1.4 m·kgf, 10 ft·lbf)
LOCTITE®

6. Install:
   - Rear wheel
     Refer to "REAR WHEEL" on page 5-10.

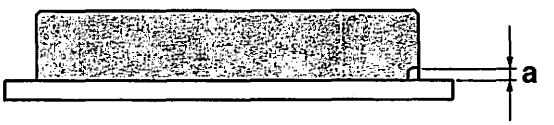
EAS1DX3150
REPLACING THE REAR BRAKE PADS

TIP

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

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

Brake pad lining thickness (inner)
6.4 mm (0.25 in)
Limit
1.0 mm (0.04 in)
Brake pad lining thickness (outer)
6.4 mm (0.25 in)
Limit
1.0 mm (0.04 in)



2. Install:
   - Brake pad shims
     (onto the brake pads)
   - Brake pads
   - Brake pad spring

TIP

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

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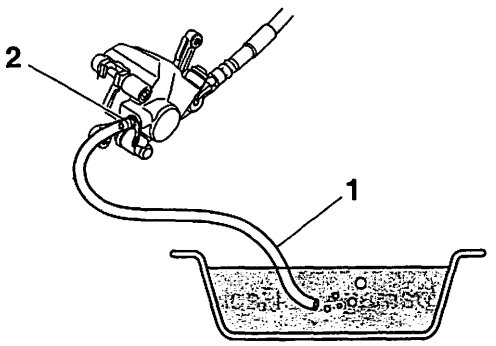
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.



b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

	**Bleed screw** **6 Nm (0.6 m·kgf, 4.3 ft·lbf)**

d. Install a new brake pad shim onto each new brake pad.
e. Install new brake pads and a new brake pad spring.

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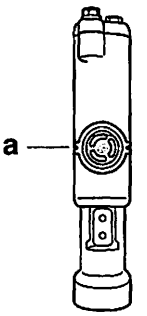
3. Install:
   - Brake pad pin
   - Brake pad pin plug
   - Rear brake caliper protector

	**Brake pad pin** **17 Nm (1.7 m·kgf, 12 ft·lbf)** **Brake pad pin plug** **2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)** **Rear brake caliper protector** **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

4. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.



5. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

EAS22590
REMOVING THE REAR BRAKE CALIPER

TIP

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

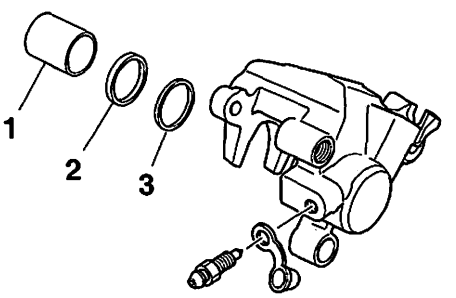
1. Remove:
   - Union bolt
   - Copper washers
   - Brake hose

TIP

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

EAS22600
DISASSEMBLING THE REAR BRAKE CALIPER

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



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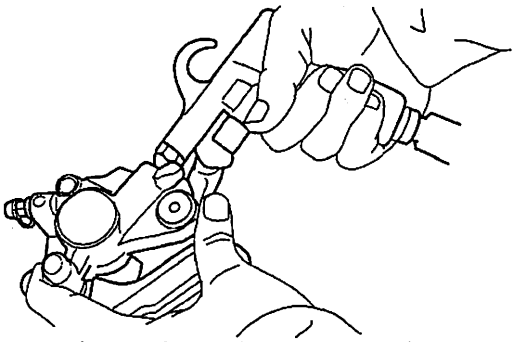
a. Blow compressed air into the brake hose joint opening to force out the piston from the brake caliper.

EWA13550

⚠ WARNING

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



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

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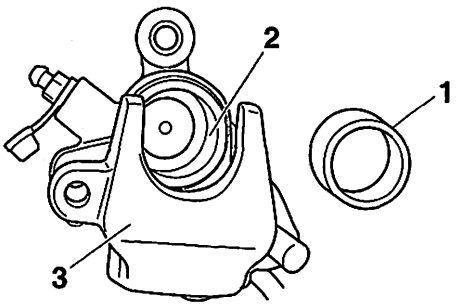
EAS1DX3151

CHECKING THE REAR BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Brake hose	Every four years
Brake fluid	Every one year and whenever the brake is disassembled

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.



EWA13610

⚠ WARNING

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

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

EAS22650

ASSEMBLING THE REAR BRAKE CALIPER

EWA13620

⚠ WARNING

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

Recommended fluid
DOT 4

EAS1DX3152

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   • Rear brake caliper
   • Rear brake caliper bracket
2. Install:
   • Rear wheel
   Refer to "REAR WHEEL" on page 5-10.
   • Brake hose
   • Union bolt

Union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530

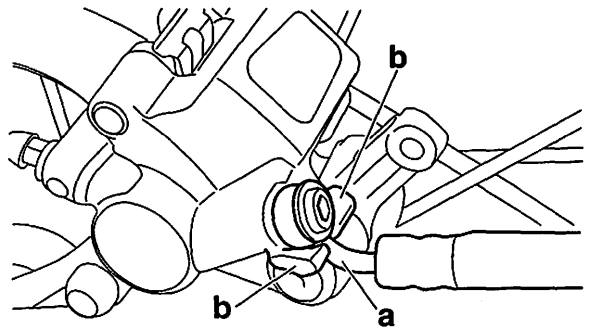
⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-29.

ECA14170

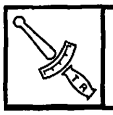
NOTICE

Install the brake hose so that its pipe portion "a" directs as shown and lightly touches the projection "b" on the brake caliper.



3. Install:
   - Brake pad springs
   - Brake pads
   - Brake pad pin
   - Brake pad pin plug

   Refer to "REPLACING THE REAR BRAKE PADS" on page 5-32.

	**Brake pad pin** **17 Nm (1.7 m·kgf, 12 ft·lbf)**

4. Fill:
   - Brake fluid reservoir

   (with the specified amount of the recommended brake fluid)

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

EWA13090

⚠ WARNING

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

ECA13540

NOTICE

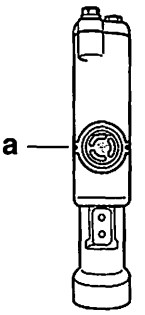
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   - Brake system

   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
6. Check:
   - Brake fluid level

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

   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.



7. Check:
   - Brake pedal operation

   Soft or spongy feeling → Bleed the brake system.

   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

TIP

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

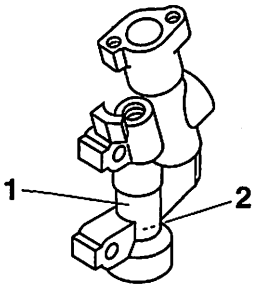
1. Remove:
   - Union bolt
   - Copper washers
   - Brake hose

TIP

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

EAS22710
CHECKING THE REAR BRAKE MASTER CYLINDER

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



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

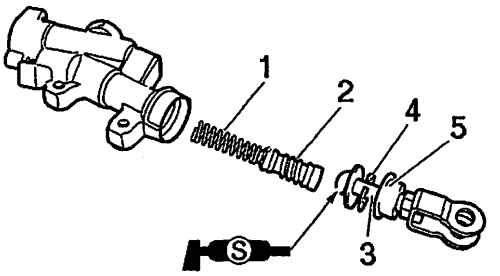
EAS22730
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520
⚠ WARNING

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

	Recommended fluid **DOT 4**

1. Install:
   - Cylinder cup New
   - Master cylinder piston
2. Install:
   - Spring "1" New
   - Master cylinder piston "2" New
   - Adjusting rod "3" New
   - Circlip "4" New
   - Dust boot "5" New



EAS1DX3153
INSTALLING THE REAR BRAKE MASTER CYLINDER

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

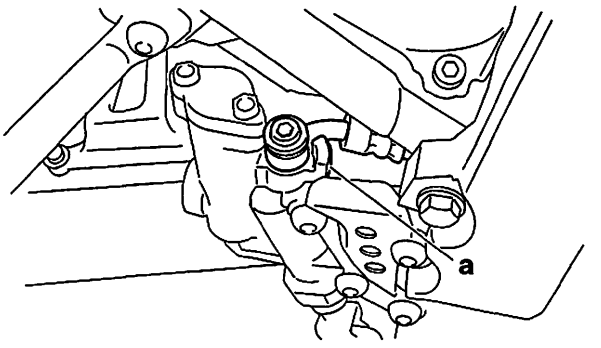
	Brake hose union bolt **30 Nm (3.0 m·kgf, 22 ft·lbf)**

EWA13530
⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-29.

ECA1DX1008
NOTICE

When installing the brake hose onto the brake master cylinder, make sure the brake pipe touch the projection "a" as shown.



2. Fill:
   • Brake fluid reservoir

	Recommended fluid **DOT 4**

EWA13090

⚠ WARNING

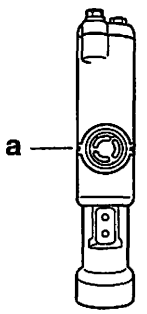
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

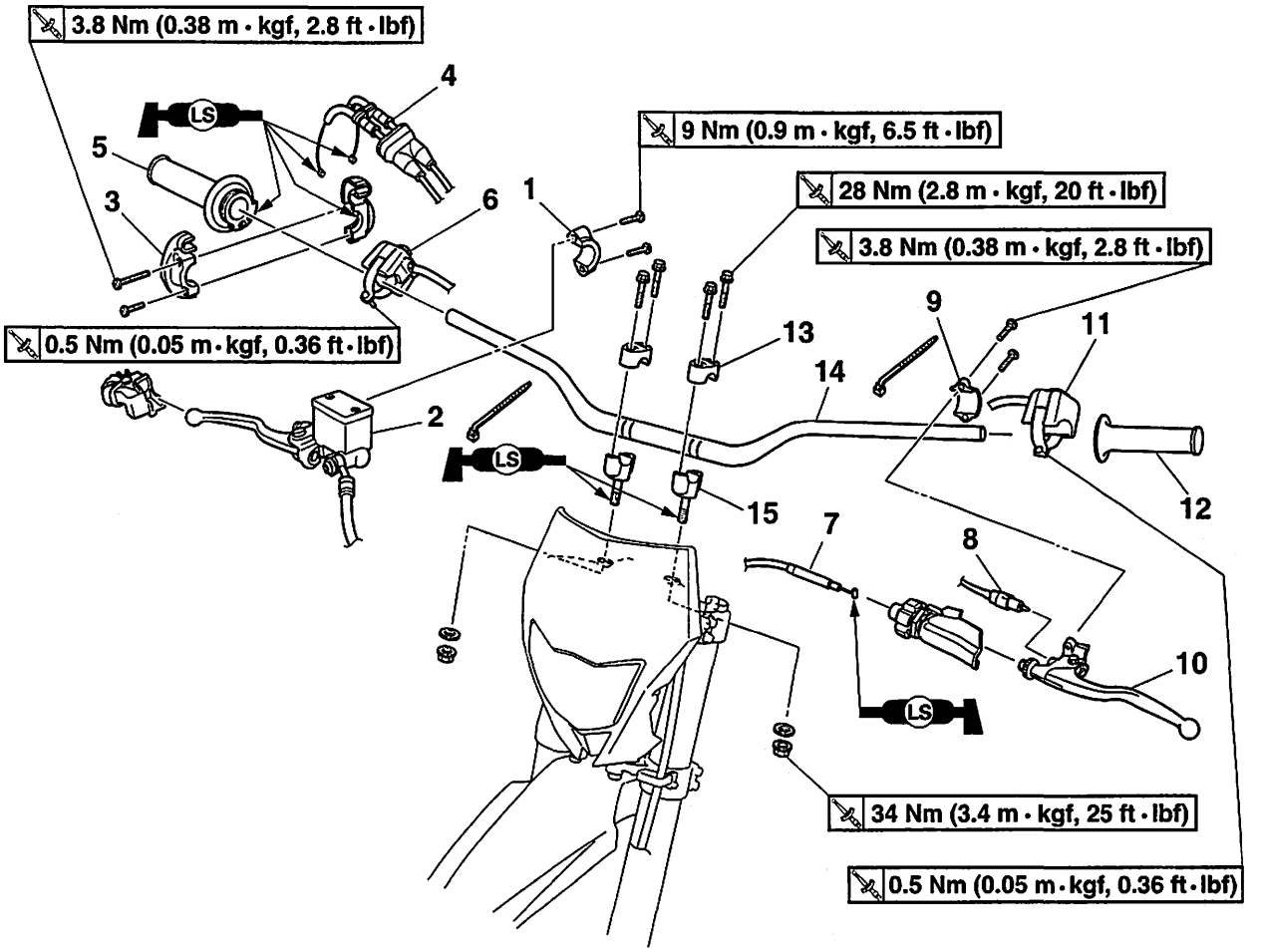
3. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.
4. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-17.



5. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-20.

EAS1DX3154
HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake master cylinder holder	1	
2	Front brake master cylinder assembly	1	
3	Throttle cable housing	1	
4	Throttle cable	1	Disconnect.
5	Throttle grip	1	
6	Start switch	1	
7	Clutch cable	1	Disconnect.
8	Clutch switch	1	Disconnect.
9	Clutch lever holder	1	
10	Clutch lever	1	
11	Engine stop switch	1	
12	Handlebar grip	1	
13	Upper handlebar holder	2	
14	Handlebar	1	
15	Lower handlebar holder	2	
			For installation, reverse the removal procedure.

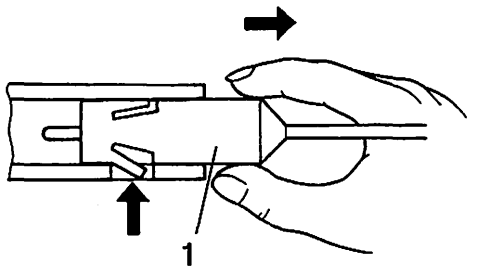
EAS1DX3155
REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Remove:
   - Clutch switch "1"



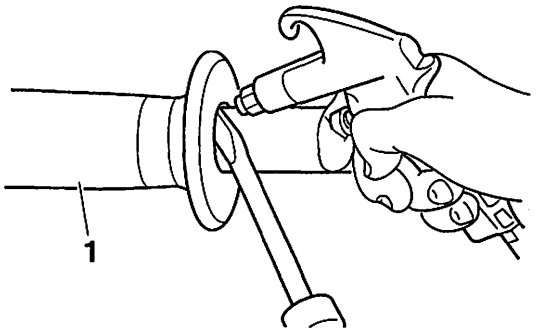
TIP

Press the projection, and remove it from the clutch lever assembly.

3. Remove:
   - Handlebar grip "1"

TIP

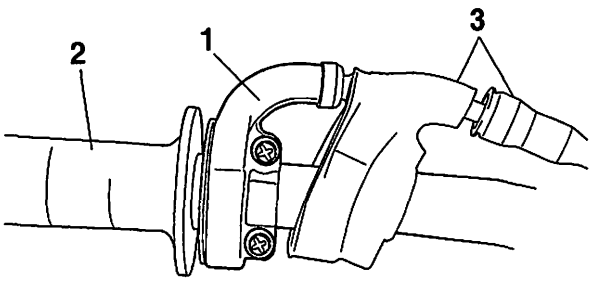
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



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

TIP

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



EAS22880
CHECKING THE HANDLEBAR

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

EWA13690
⚠ WARNING

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

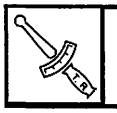
EAS1DX3156
INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Install:
   - Lower handlebar holders "1" (temporarily)
   - Handlebar "2"
   - Upper handlebar holders "3"

	**Upper handlebar holder bolt 28 Nm (2.8 m·kgf, 20 ft·lbf)**

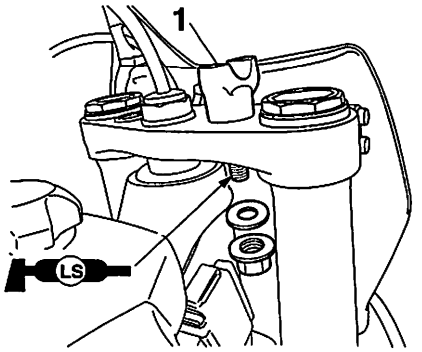
TIP

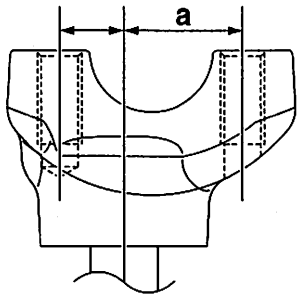
- Install the lower handlebar holders with them side having the greater distance "a" from the mounting bolt center facing forward.
- Apply lithium-soap-based grease on the thread of the lower handlebar holders.
- Installing the lower handlebar holders in the reverse direction allow the front-to-rear offset amount of the handlebar position to be changed.
- The upper handlebar holders should be installed with the punch marks "b" facing forward.
- Install the handlebar so that marks "c" are in place 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.

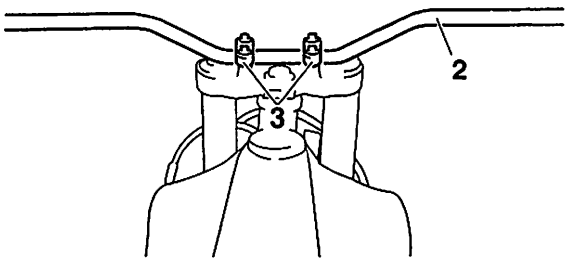
ECA14250

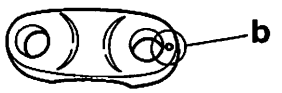
NOTICE

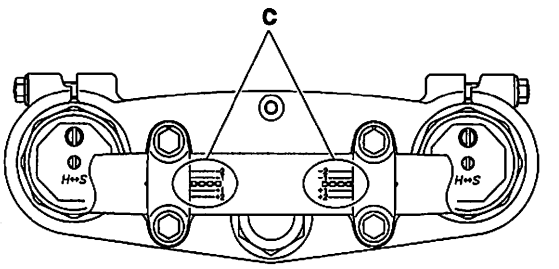
- **First, tighten the bolts on the front side of the upper handlebar holder, and then on the rear side.**
- **Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.**

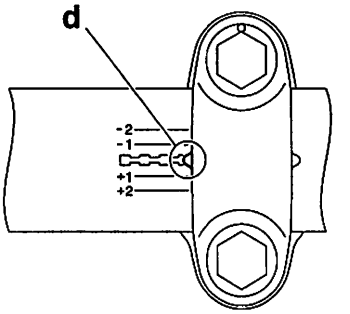












3. Tighten:
   - Lower handlebar holder nuts

	Lower handlebar holder nut 34 Nm (3.4 m·kgf, 25 ft·lbf)

4. Install:
   - Handlebar grip "1"

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

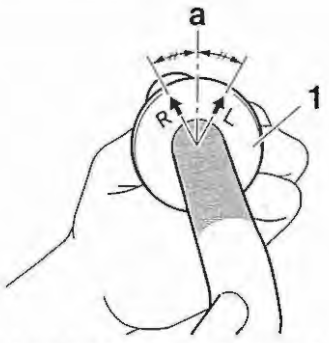
EWA13120

⚠ WARNING

Do not touch and move the handlebar grip until its adhesive dries completely.

TIP

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



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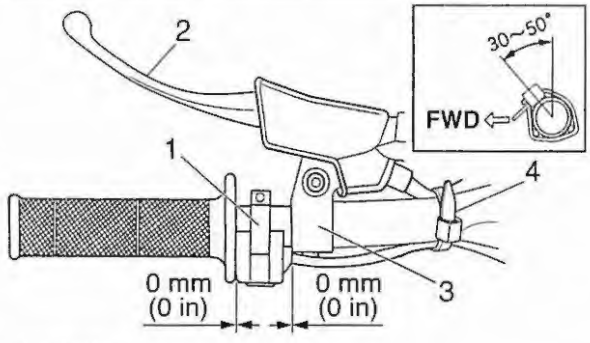
5. Install:
   - Engine stop switch "1"
   - Clutch lever "2"
   - Clutch lever holder "3"
   - Clamp "4"

	Engine stop switch screw **0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)** **Clutch lever holder bolt** **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

TIP

- The engine stop switch, clutch lever, clutch lever holder should be installed according to the dimensions shown.
- Pass the engine stop switch lead in the middle of the clutch lever holder.

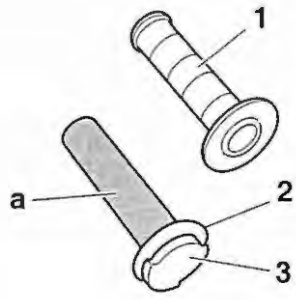


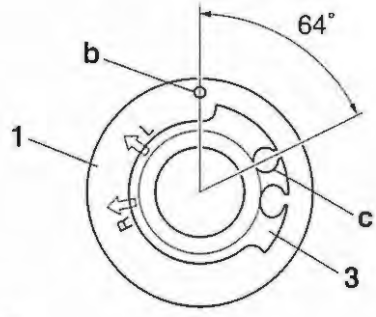
6. Install:
   - Right grip "1"
   - Collar "2"

   Apply the adhesive on the tube guide "3".

TIP

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

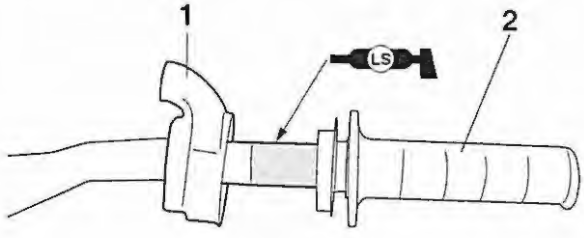




7. Install:
   - Rubber cover "1"
   - Throttle grip "2"

TIP

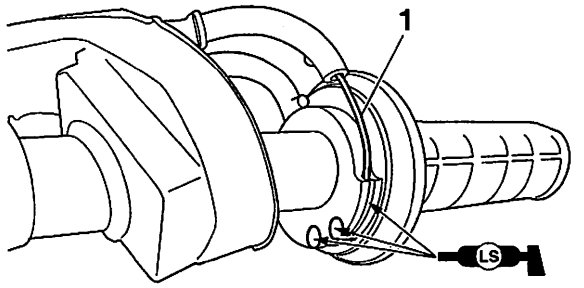
Apply the lithium soap base grease on the throttle grip sliding surface.



8. Install:
   - Throttle cables "1"

TIP

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



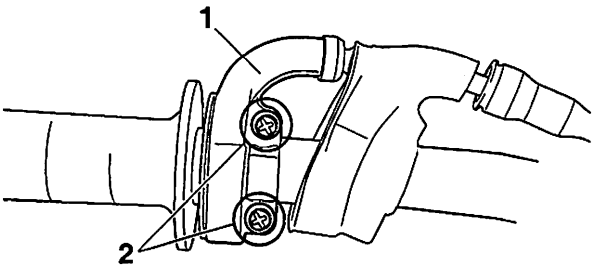
9. Install:
   - Throttle cable housings "1"
   - Screw (throttle cable housings) "2"

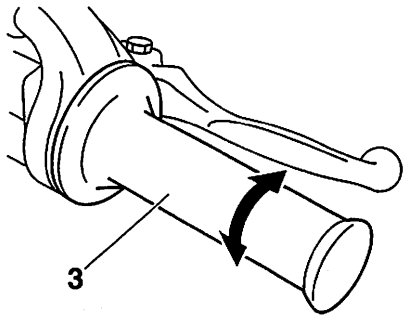
	Screw (throttle cable housings) **3.8 Nm (0.38 m·kg, 2.8 ft·lb)**

EWA1DX5001

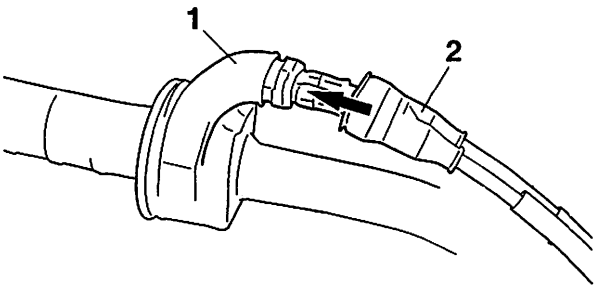
⚠ WARNING

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





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



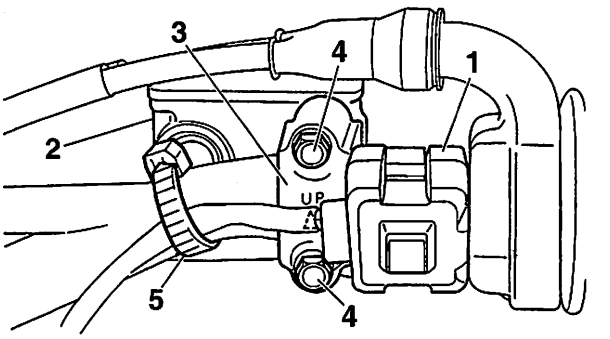
11. Install:
   - Start switch "1"
   - Front brake master cylinder assembly "2"
   - Front brake master cylinder holder "3"
   - Bolt (brake master cylinder holder) "4"

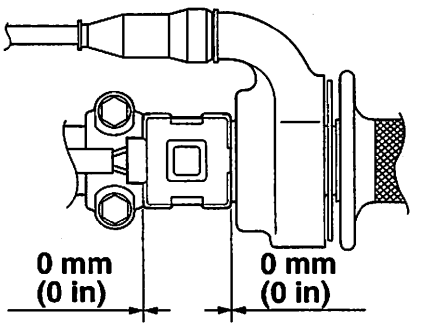
	Front brake master cylinder holder bolt **9 Nm (0.9 m·kg, 6.5 ft·lb)**

   - Clamp "5"

TIP

- Install the brake master cylinder holder with the "UP" mark facing up.
- Install in order for the top of the front brake master cylinder assembly to be level.
- First, tighten the upper bolt, then the lower bolt.
- The start switch and front brake master cylinder assembly should be installed according to the dimensions shown.





12.Adjust:
- Clutch cable free play
  Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-15.

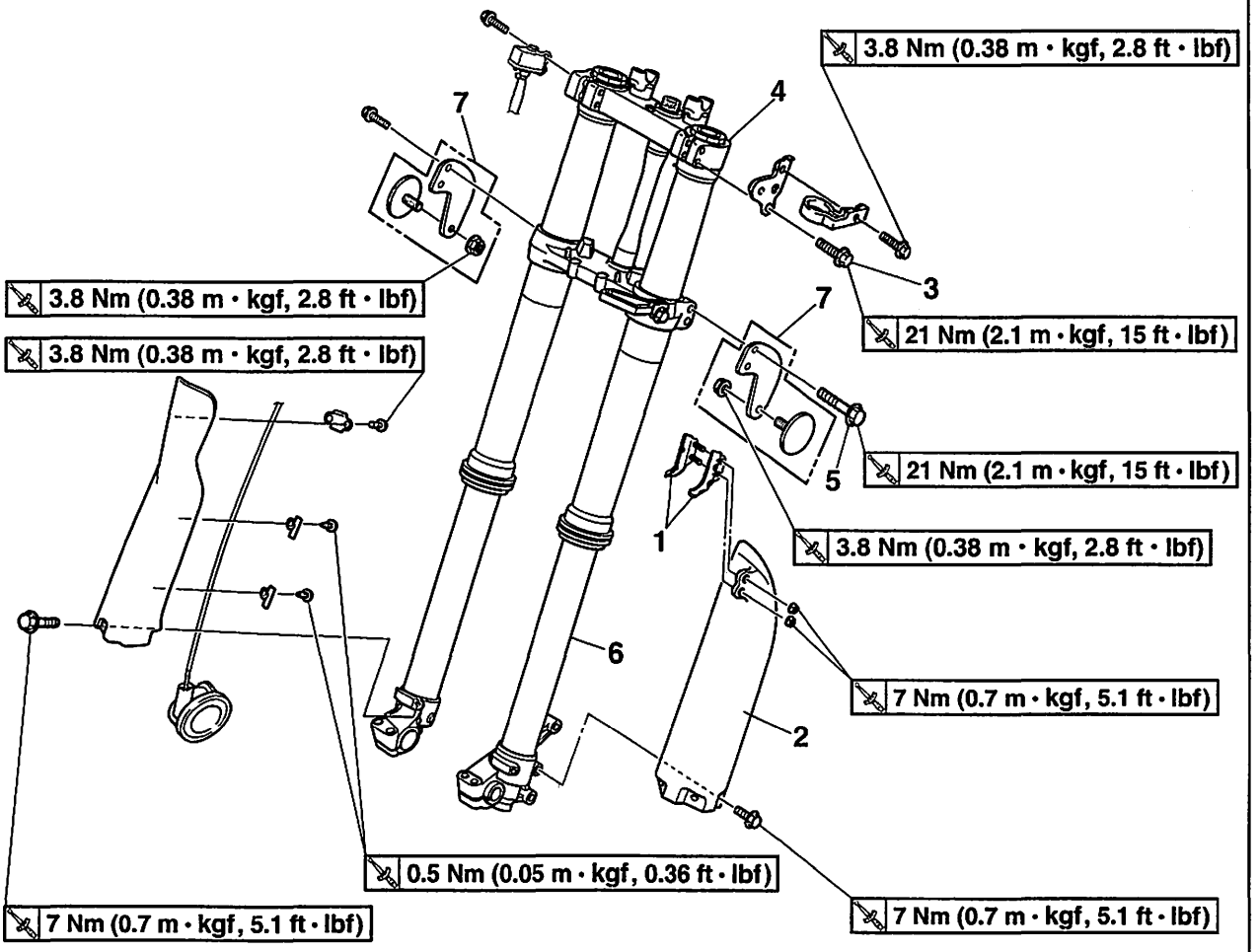
Clutch lever free play
8.0–13.0 mm (0.31–0.51 in)

13.Adjust:
- Throttle grip free play
  Refer to "ADJUSTING THE THROTTLE GRIP FREE PLAY" on page 3-29.

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

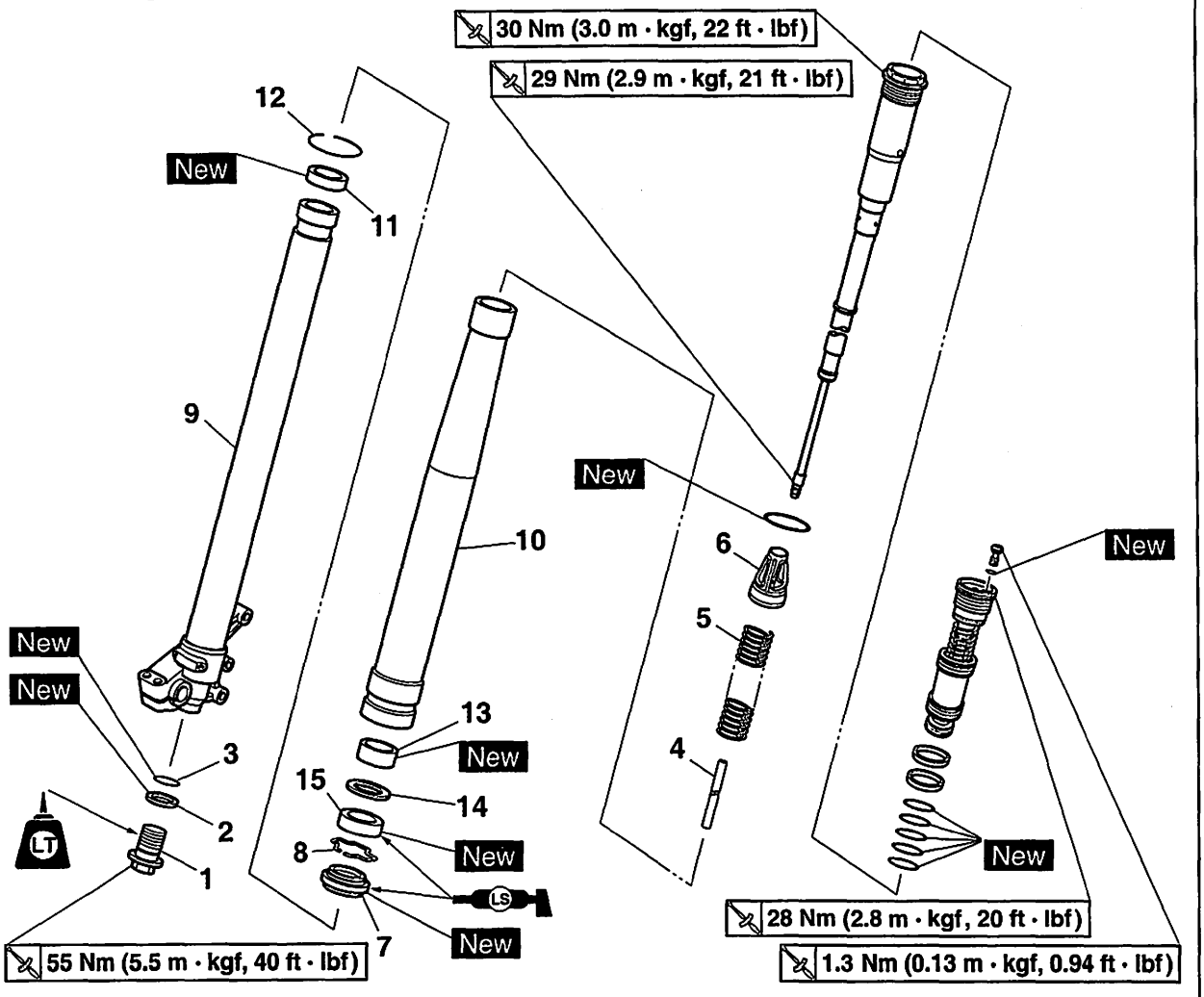
EAS1DX3157
FRONT FORK

Removing the front fork legs



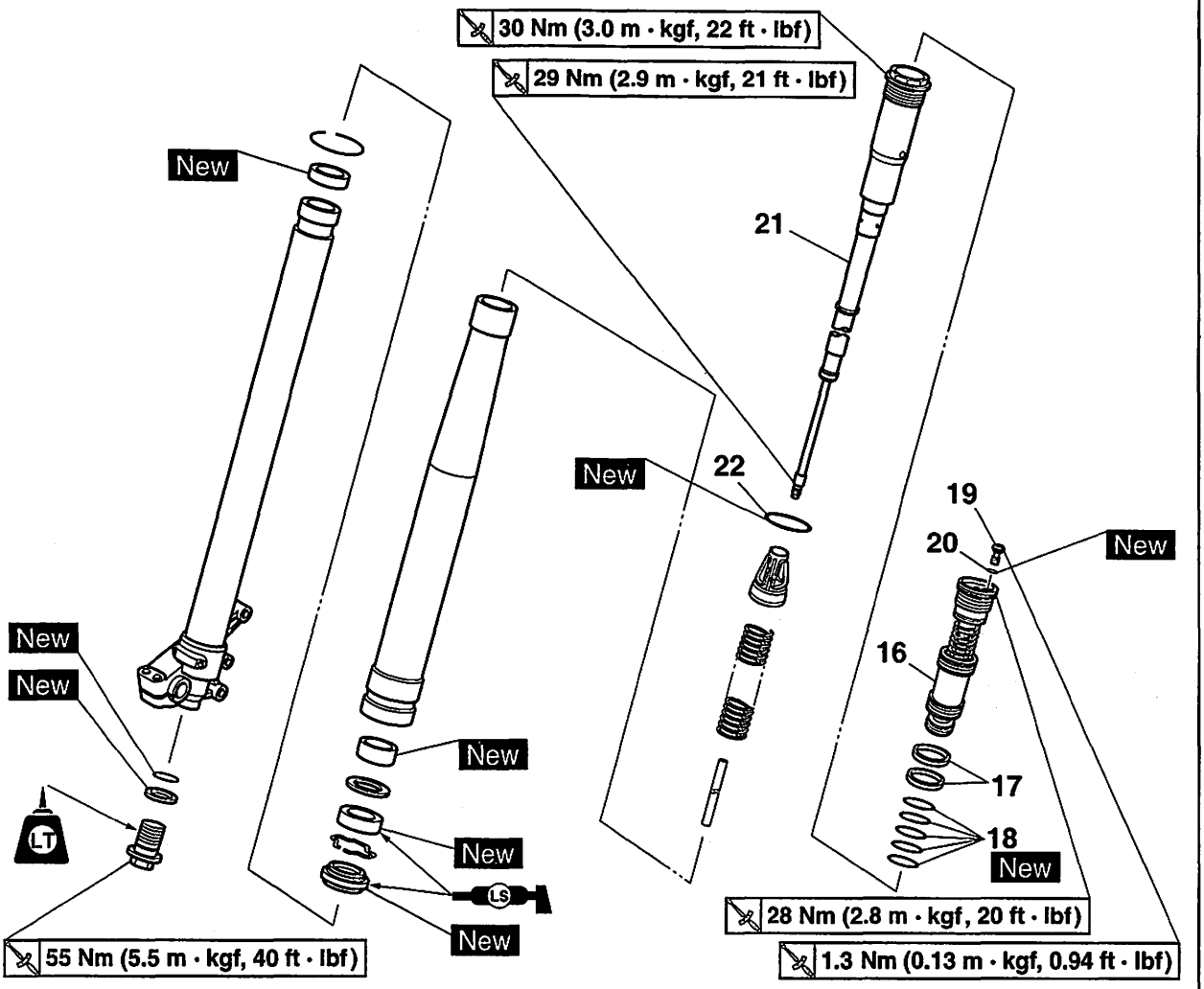
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to"FRONT WHEEL" on page 5-5.
	Front brake caliper		Refer to"FRONT BRAKE" on page 5-15.
1	Brake hose holder	2	
2	Front fork protector	1	
3	Upper bracket pinch bolt	2	Loosen.
4	Damper assembly	1	Loosen.
5	Lower bracket pinch bolt	2	Loosen.
6	Front fork leg	1	
7	Reflector/Stay/Nut	1	For Canada
			For installation, reverse the removal procedure.

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Adjuster	1	
2	Copper washer	1	
3	O-ring	1	
4	Damper adjusting rod	1	
5	Fork spring	1	
6	Collar	1	
7	Dust seal	1	
8	Oil seal clip	1	
9	Inner tube	1	
10	Outer tube	1	
11	Inner tube bushing	1	
12	Front fork protector guide	1	
13	Outer tube bushing	1	
14	Washer	1	
15	Oil seal	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
16	Base valve	1	
17	Base valve bushing	2	
18	O-ring	5	
19	Air bleed screw	1	
20	O-ring	1	
21	Damper assembly	1	
22	O-ring	1	
			For assembly, reverse the disassembly procedure.

EAS22970
REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

ECA1DX1009
NOTICE

To prevent an accidental explosion of air, the following instructions should be observed:

- **Before removing the base valves or front forks, be sure to extract the air from the air chamber completely.**

TIP

- Place the vehicle on a suitable stand so that the front wheel is elevated.
- Record the adjusting screw setting position before loosening the adjuster and the base valve.

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

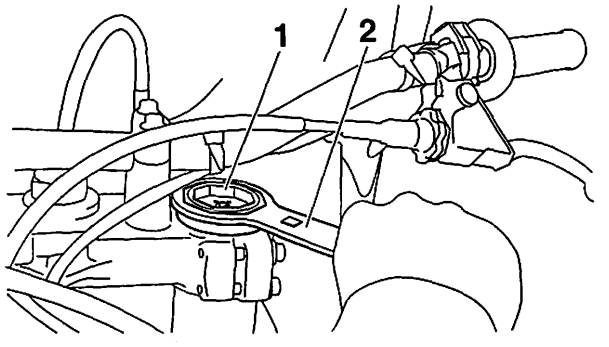
EWA13120
⚠ WARNING

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
YM-01501



3. Remove:
   - Front fork leg

EAS22980
DISASSEMBLING THE FRONT FORK LEGS

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

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

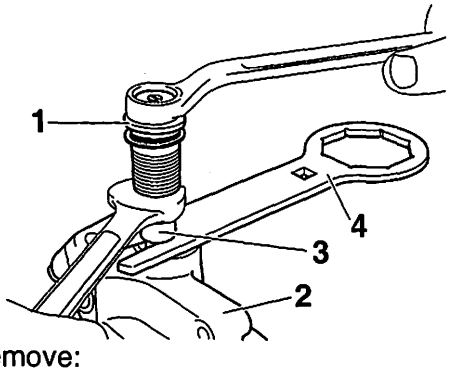
TIP

- 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.

ECA14180
NOTICE

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

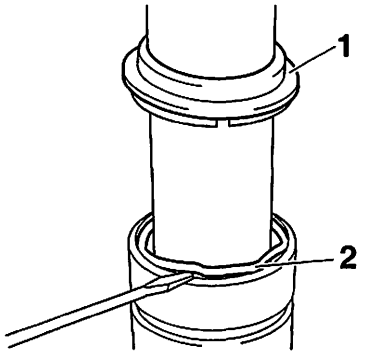
Cap bolt ring wrench
90890-01501
YM-01501



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

ECA14180
NOTICE

Do not scratch the inner tube.



4. Remove:
   • Inner tube "1"

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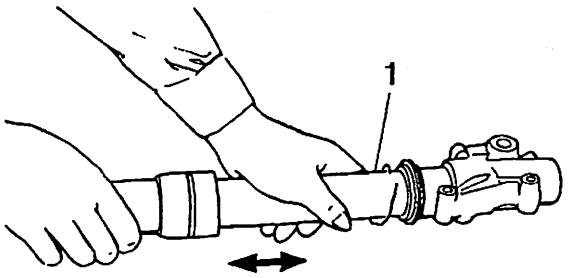
a. Hold the front fork leg horizontally.
b. Securely clamp the brake caliper bracket in a vise with soft jaws.
c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.



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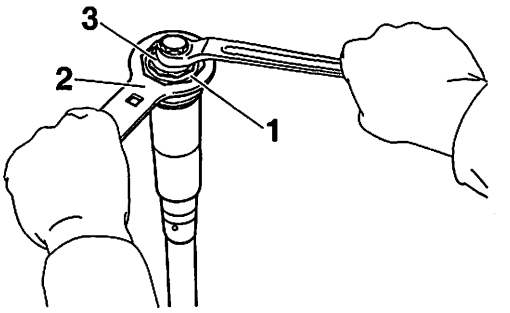
5. Remove:
   • Base valve "1"
   (from the damper assembly)

TIP

Hold the damper assembly with the cap bolt ring wrench "2" and use the cap bolt wrench "3" to remove the base valve.

	Cap bolt wrench **90890-01500** **YM-01500** **Cap bolt ring wrench** **90890-01501** **YM-01501**



EAS23010

CHECKING THE FRONT FORK LEGS

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

1. Check:
   • Inner tube surface "a"
   Scratches → Repair or replace.
   Use #1,000 grit wet sandpaper.
   Damaged oil lock piece → Replace.
   • Inner tube bends
   Out of specification → Replace.
   Use the dial gauge "1".

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

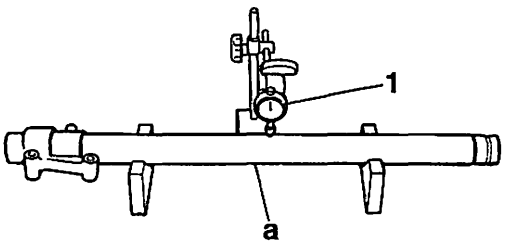
TIP

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

EWA13650

⚠ WARNING

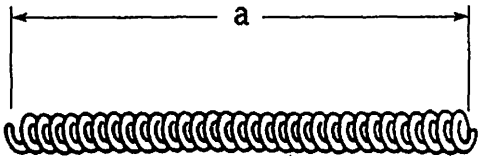
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.



2. Check:
   • Outer tube
   Scratches/wear/damage → Replace.

3. Measure:
   • Fork spring free length "a"
   Out of specification → Replace.

	Fork spring free length **454.0 mm (17.87 in)** **Limit** **449.0 mm (17.68 in)**

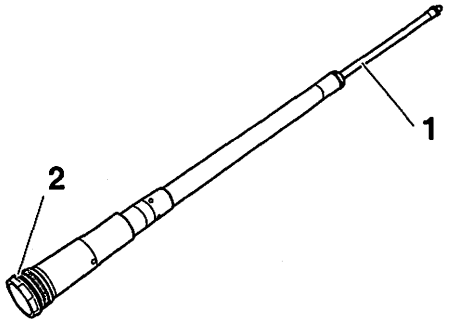


4. Check:
   • Damper assembly "1"
   Bend/damage → Replace.
   • O-ring "2"
   Wear/damage → Replace.

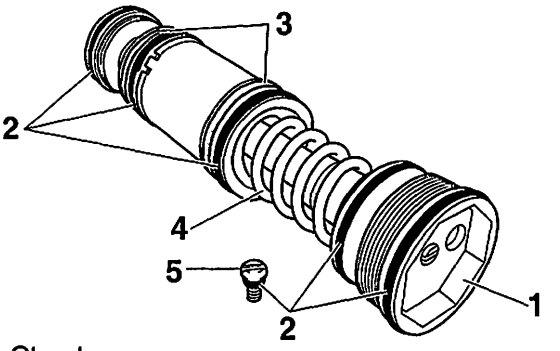
ECA1DX1010

NOTICE

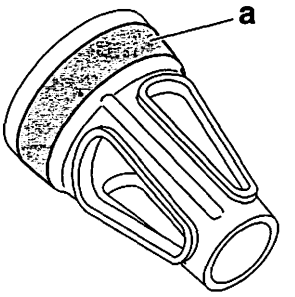
- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**



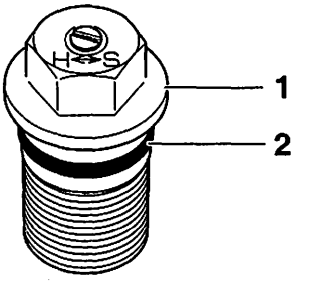
5. Check:
   • Base valve "1"
   Wear/damage → Replace.
   Contamination → Clean.
   • O-ring "2" New
   Wear/damage → Replace.
   • Base valve bushing "3"
   Wear/damage → Replace.
   • Spring "4"
   Damage/fatigue → Replace base valve.
   • Air bleed screw "5"
   Wear/damage → Replace.



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



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



EAS23020

ASSEMBLING THE FRONT FORK LEGS

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

EWA13660

WARNING

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

TIP

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

1. Stretch the damper assembly fully.
2. Fill:
   - Damper assembly
     (with the specified amount of the recommended fork oil)

Recommended oil
Suspension oil S1
Standard oil amount
208 cm³ (7.32 Imp.oz, 7.03 US oz)

ECA14210

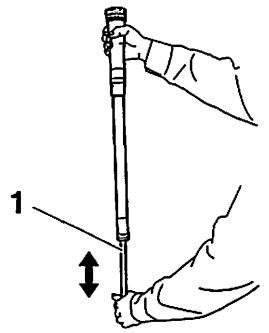
NOTICE

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

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.

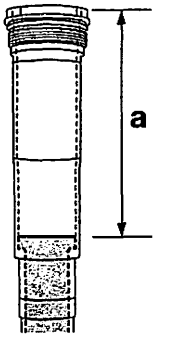
TIP

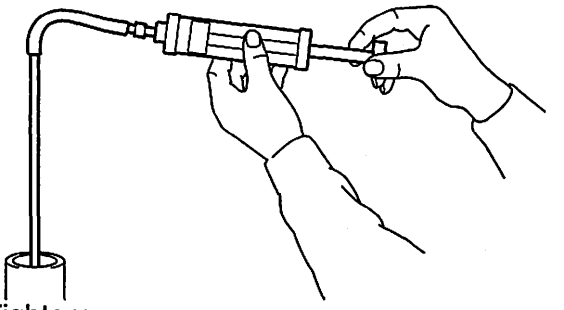
Be careful not to excessive full stroke. A stroke of 200 mm (7.9 in) or more will cause air to enter. In this case, repeat the steps 1 to 3.



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

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

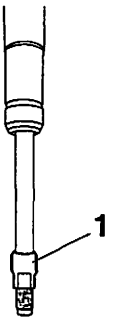




5. Tighten:
   - Locknut "1"

TIP

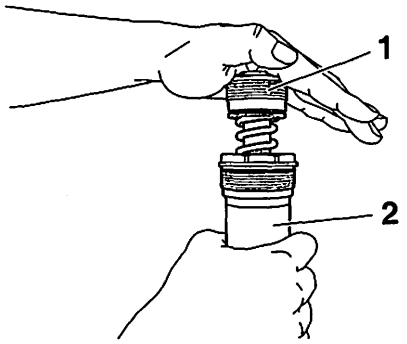
Fully finger tighten the locknut onto the damper assembly.



6. Install:
   - Base valve "1"
     (to damper assembly "2")

TIP

First bring the damper rod pressure to a maximum. Then install the base valve while releasing the damper rod pressure.



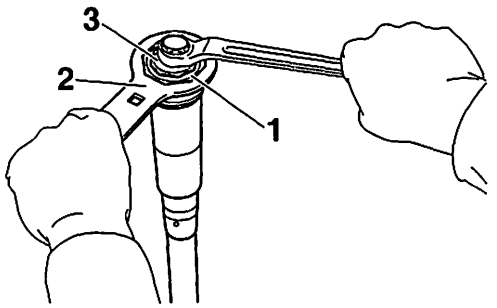
7. Check:
   • Damper assembly
   Not fully stretched → Repeat the steps 1 to 6.
8. Tighten:
   • Base valve "1"

	Base valve **29 Nm (2.9 m·kgf, 21 ft·lbf)**

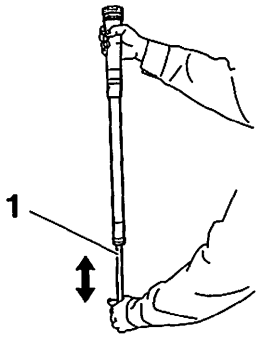
TIP

Hold the damper assembly with the cap bolt ring wrench "2" and use the cap bolt wrench "3" to tighten the base valve with specified torque.

	Cap bolt wrench **90890-01500** **YM-01500** **Cap bolt ring wrench** **90890-01501** **YM-01501**



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

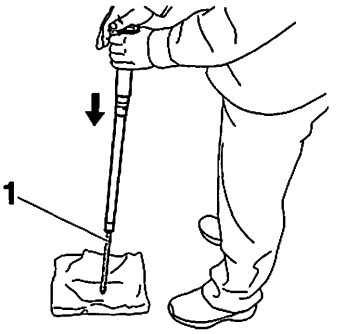


10. While protecting the damper assembly "1" with a rag and compressing fully, allow excessive oil to overflow on the base valve side.

ECA32D1010

NOTICE

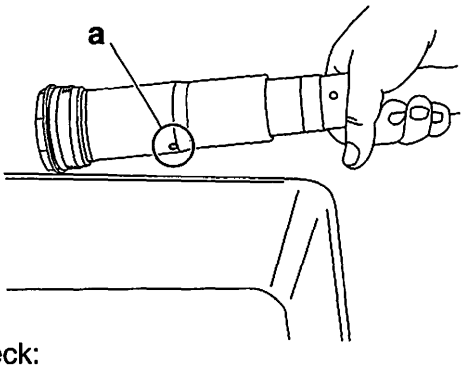
Take care not to damage the damper assembly.



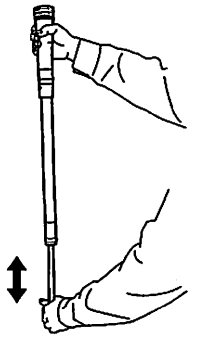
11. Allow the overflowing oil to escape at the hole "a" in the damper assembly.

TIP

The overflow measures about 8 cm^3 (0.28 Imp oz, 0.27 US oz).



12. Check:
   • Damper assembly smooth movement
   Tightness/binding/rough spots → Repeat the steps 1 to 11



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

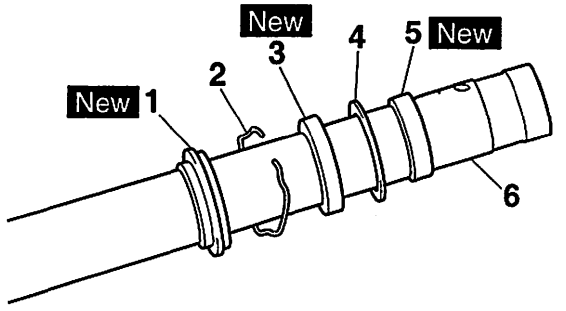
ECA32D1010

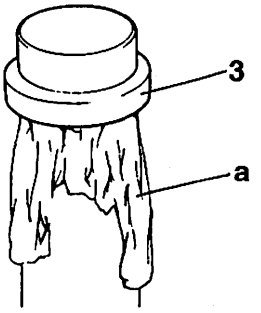
NOTICE

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

TIP

- Apply the fork oil on the inner tube.
- When installing the oil seal, use vinyl seat "a" with fork oil applied to protect the oil seal lip.

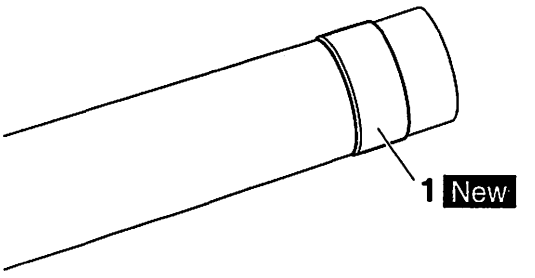




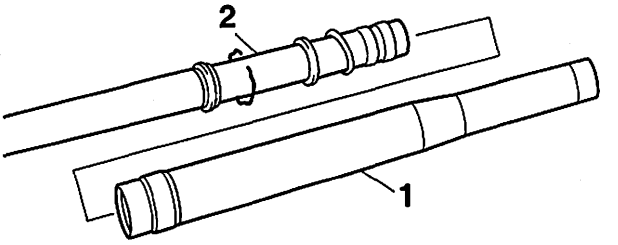
14.Install:
- Inner tube bushing "1" New

TIP

Install the inner tube bushing onto the slot on inner tube.



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

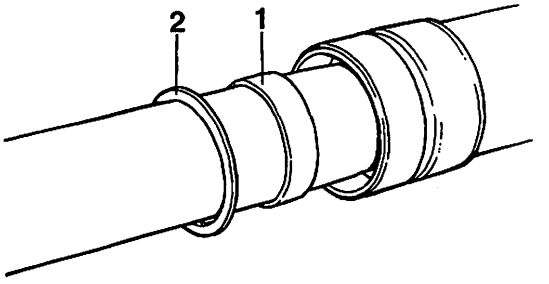


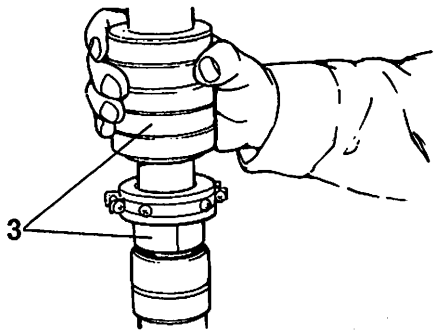
16.Install:
- Inner tube bushing "1"
- Washer "2"
  (to the outer tube)

TIP

Press the inner tube bushing into the outer tube with fork seal driver "3".

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



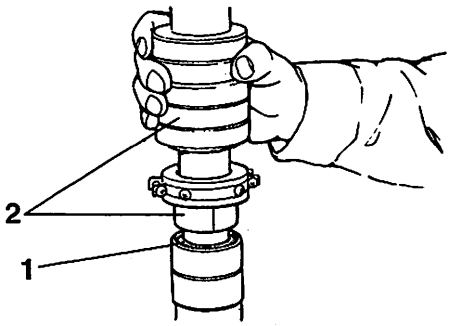


17.Install:
- Oil seal "1"

TIP

Press the oil seal into the outer tube with fork seal driver "2".

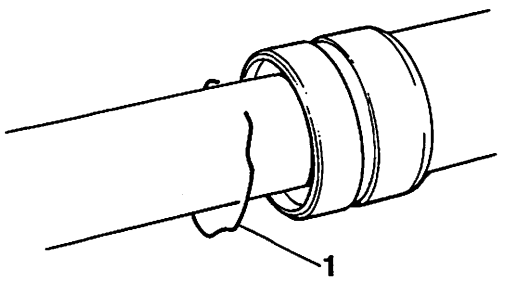
Fork seal driver
90890-01502
Fork seal driver(48)
YM-A0948



18.Install:
- Oil seal clip "1"

TIP

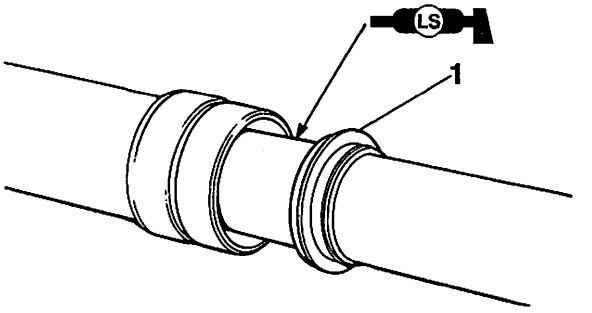
Fit the oil seal clip correctly in the groove in the outer tube.



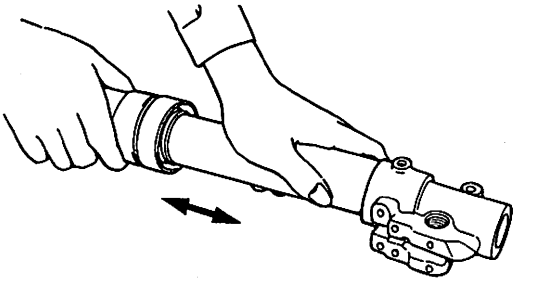
19.Install:
- Dust seal "1"

TIP

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

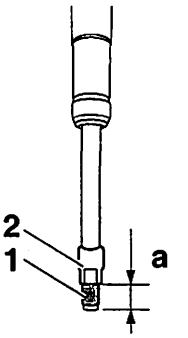


20.Check:
- Inner tube smooth movement
  Tightness/binding/rough spots → Repeat the steps 13 to 19.



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

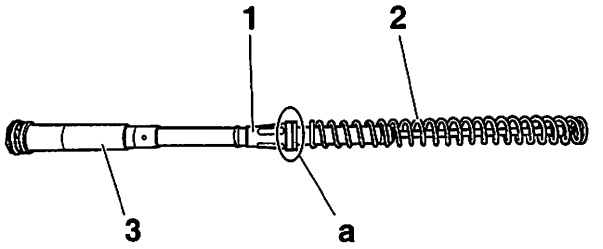
Distance "a"
16 mm (0.63 in) or more
Between the damper assembly "1" bottom and locknut "2" bottom.



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

TIP

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

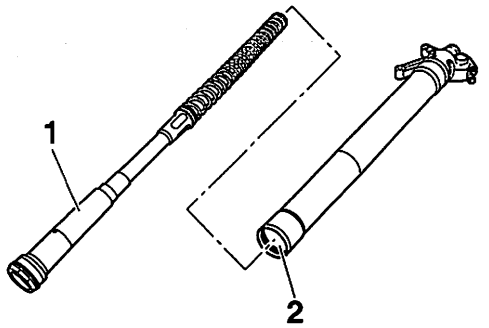


23.Install:
- Damper assembly "1"
  (to the inner tube "2")

ECA32D1010

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.

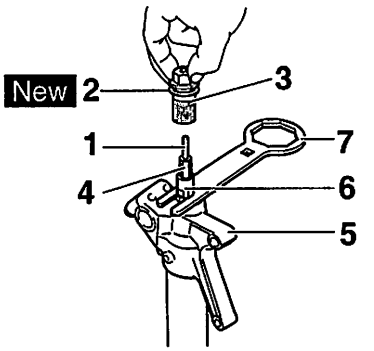


24.Install:
- Damper adjusting rod "1"
- Copper washer "2" New
- Adjuster "3"
  (to the damper assembly "4")

TIP

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

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

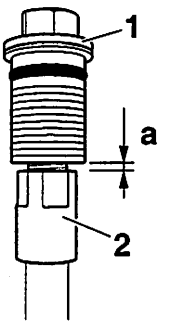


25.Inspect:
- Gap "a" between the adjuster "1" and locknut "2".
  Out of specification → Retighten and readjust the locknut.

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

TIP

If the adjuster is installed out of specification, proper damping force cannot be obtained.

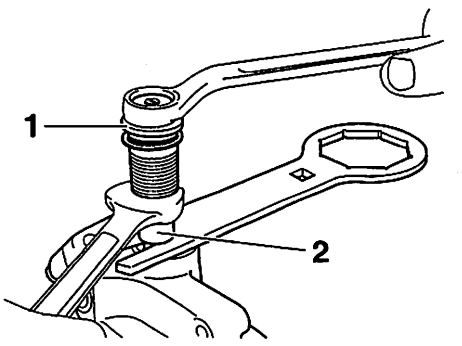


26.Tighten:
- Adjuster (locknut) "1"

	Adjuster (locknut) **29 Nm (2.9 m·kgf, 21 ft·lbf)**

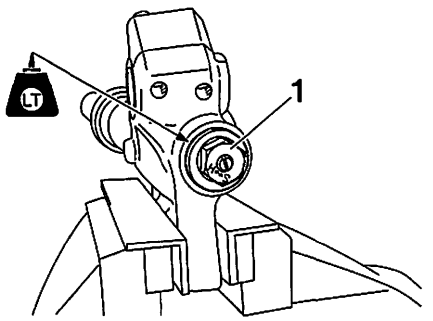
TIP

Hold the locknut "2" and tighten the adjuster with specified torque.



27.Install:
- Adjuster "1"
  (to the inner tube)

Adjuster
55 Nm (5.5 m·kgf, 40 ft·lbf)
LOCTITE®

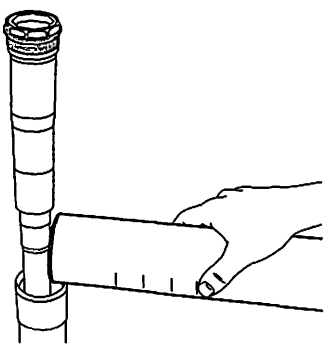


28.Fill:
- Front fork leg
  (with the specified amount of the recommended fork oil)

Recommended oil
Suspension oil S1
Standard oil amount
328 cm³ (11.55 Imp oz, 11.09 US oz)
Extent of adjustment
295–370 cm³ (10.38–13.02 Imp oz, 9.97–12.51 US oz)

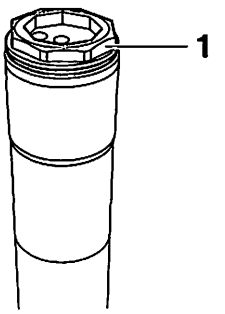
ECA14210
NOTICE

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

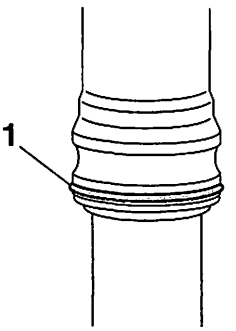


29.Install:
- Damper assembly "1"
  (to the outer tube)

TIP
Temporarily tighten the damper assembly.



30.Install:
- Fork protector guide "1"

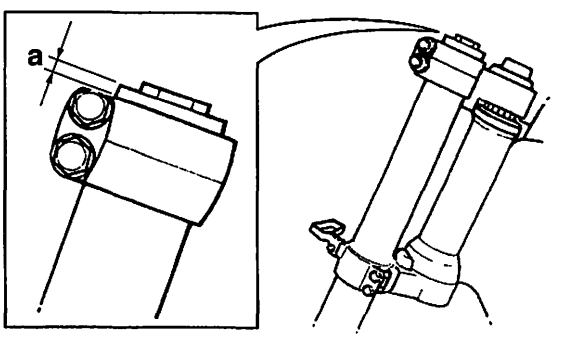


EAS1DX3158
INSTALLING THE FRONT FORK LEGS

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

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

TIP
Install the front fork leg so that difference "a" between the outer tube top face and upper bracket top face becomes 5 mm (0.2 in), and tighten it temporarily.



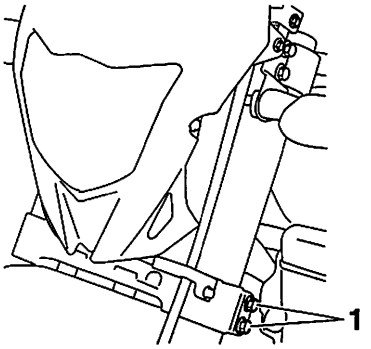
2. Tighten:
   • Lower bracket pinch bolt "1"

	Lower bracket pinch bolt **21 Nm (2.1 m·kgf, 15 ft·lbf)**

EWA1DX1005

⚠ WARNING

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



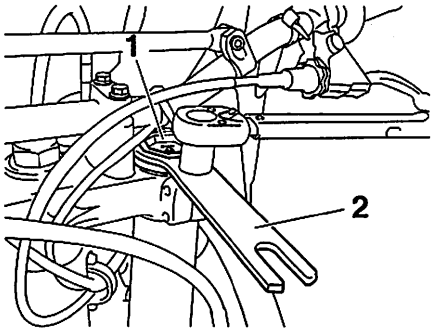
3. Tighten:
   • Damper assembly "1"

	Damper assembly **30 Nm (3.0 m·kgf, 22 ft·lbf)**

TIP

Use the cap bolt ring wrench "2" to tighten the damper assembly with specified torque.

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



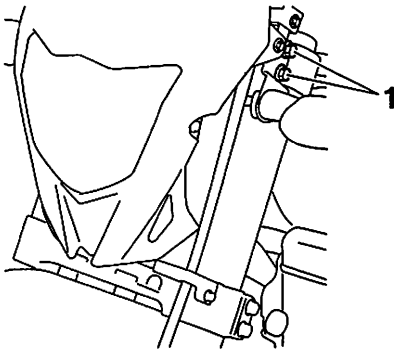
4. Tighten:
   • Upper bracket pinch bolt "1"

	Upper bracket pinch bolt **21 Nm (2.1 m·kgf, 15 ft·lbf)**

EWA13680

⚠ WARNING

Make sure the brake hoses are routed properly.

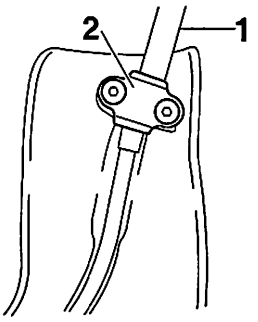


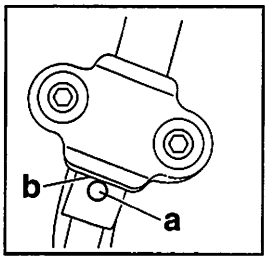
5. Install:
   • Speed sensor lead "1"
   • Plate 1 "2"
   (to the right front fork protector)

	Plate 1 bolt **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

TIP

Install the speed sensor lead so that its paint "a" directs as shown and align the bottom "b" of the plate 1 with the same paint.



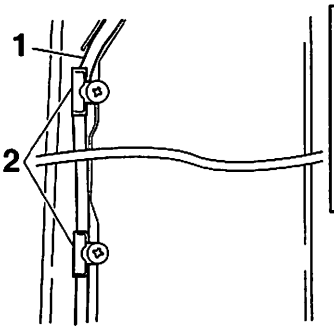


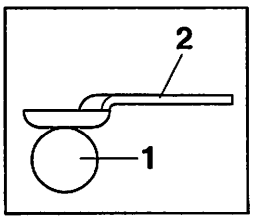
6. Install:
   • Speed sensor lead "1"
   • Plate 2 "2"
   (to the right front fork protector)

	Plate 2 screw **0.5 Nm (0.05 m·kgf, 0.36 ft·lbf)**

TIP

Install the plate 2 in the direction as shown.



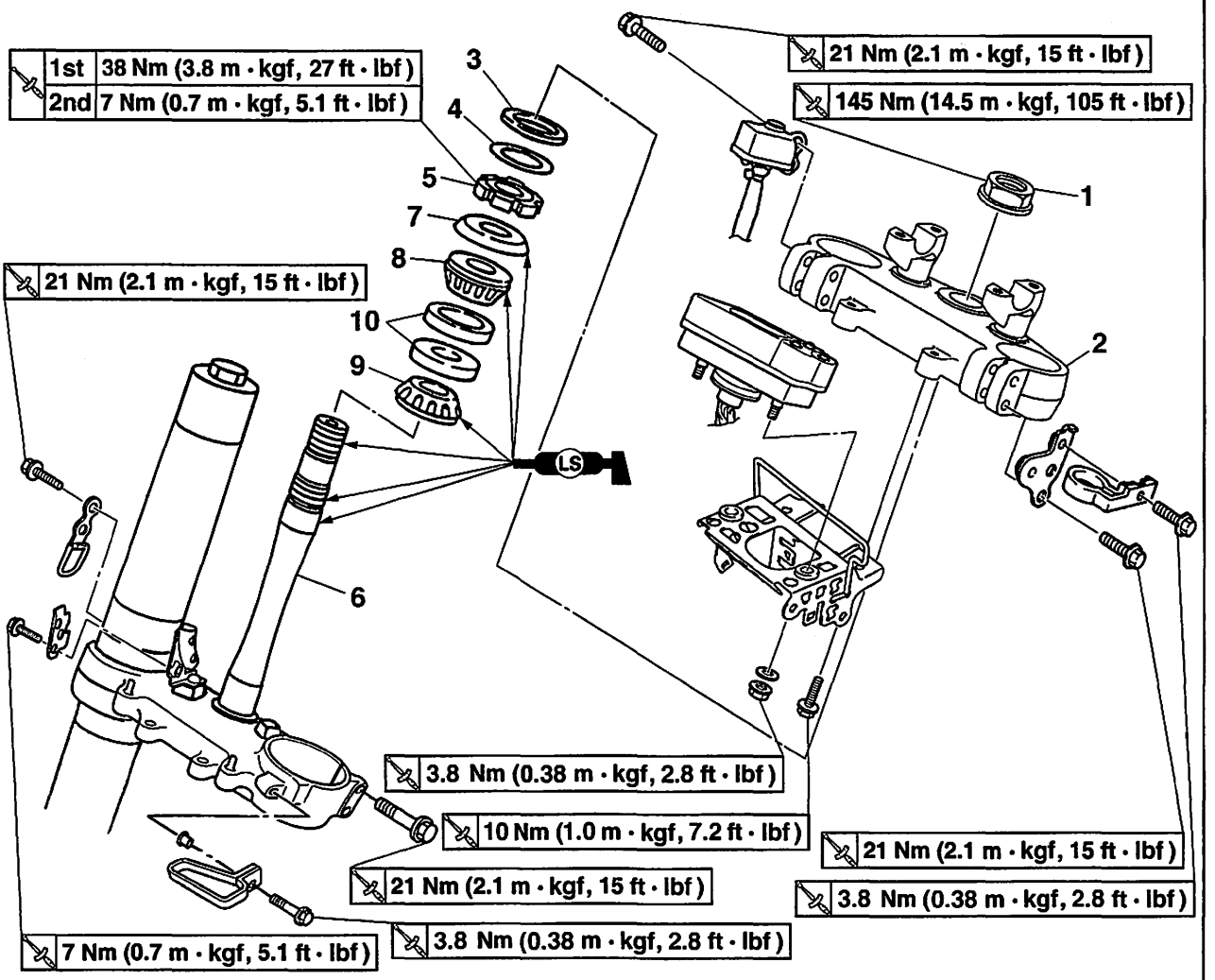


7. Adjust:
   - Rebound damping
   - Compression damping

   Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-25.

EAS1DX3159
STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Headlight assembly / multi-function meter / front fender		Refer to"GENERAL CHASSIS" on page 5-1.
	Reflector	2	For Canada
1	Steering stem nut	1	
2	Upper bracket	1	
3	Collar	1	
4	Washer	1	
5	Ring nut	1	
6	Lower bracket	1	
7	Bearing cover	1	
8	Upper bearing	1	
9	Lower bearing	1	
10	Bearing races	2	
			For installation, reverse the removal procedure.

EAS23110
REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Remove:
   - Ring nut "1"

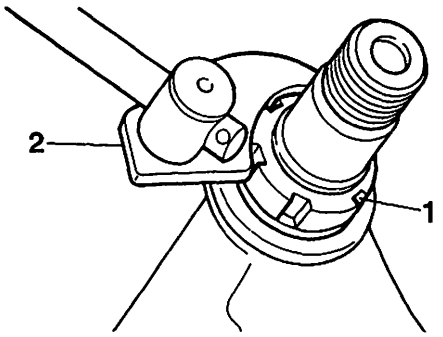
TIP

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.



EAS23120
CHECKING THE STEERING HEAD

1. Wash:
   - Bearings
   - Bearing races

	Recommended cleaning solvent Kerosene

2. Check:
   - Bearings
   - Bearing races
     Damage/pitting → Replace.
3. Replace:
   - Bearings
   - Bearing races

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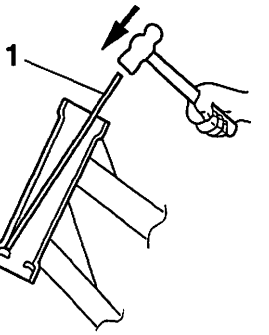
a. Remove the bearing races from the steering head pipe with a long rod "1" and hammer.
b. Remove the bearing race from the lower bracket with a floor chisel "2" and hammer.
c. Install a new bearing races.

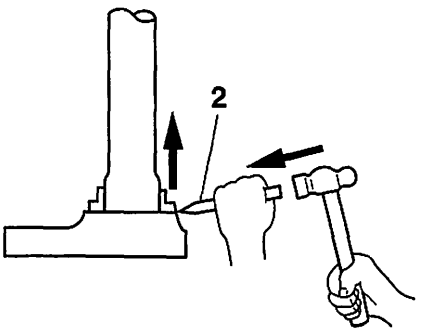
ECA14270
NOTICE

- **Take care not to damage the steering shaft thread.**
- **If the bearing race is not installed properly, the steering head pipe could be damaged.**

TIP

Always replace the bearings and bearing races as a set.





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

EAS1DX3160
INSTALLING THE STEERING HEAD

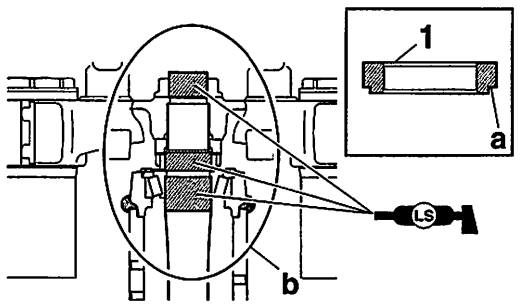
1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing races
   - Bearing cover

	Recommended lubricant Lithium-soap-based grease

2. Install:
   - Lower bracket
   - Ring nut "1"
     Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-24.

TIP

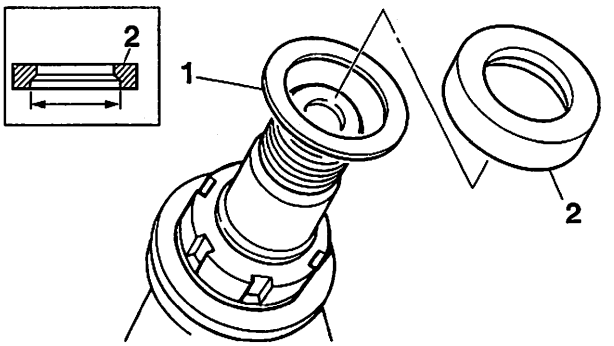
- Install the ring nut with its stepped side "a" facing downward.
- Apply lithium-soap-based grease on the portion "b" and thread of the steering stem.



3. Install:
   - Washer "1"
   - Collar "2"
   - Upper bracket
   - Steering stem nut

TIP

- Install the collar "2" with the larger inside diameter facing downward.
- Temporarily tighten the steering stem nut.



4. Install:
   - Front fork legs
     Refer to "FRONT FORK" on page 5-44.

TIP

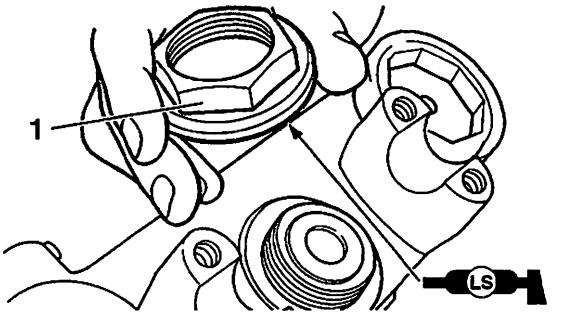
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
   - Steering stem nut "1"

	Steering stem nut **145 Nm (14.5 m·kgf, 105 ft·lbf)**

TIP

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

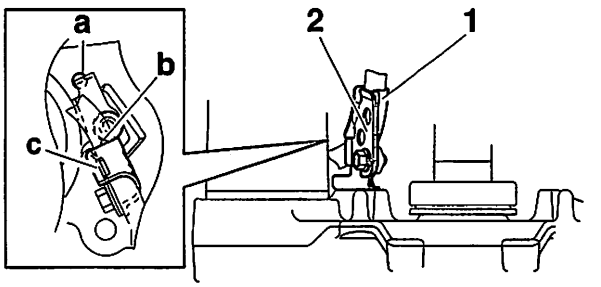


6. Install:
   - Speed sensor lead holder "1"
   - Speed sensor lead clamp "2"

	Speed sensor lead holder bolt **13 Nm (1.3 m·kgf, 9.4 ft·lbf)** **Speed sensor lead clamp bolt** **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

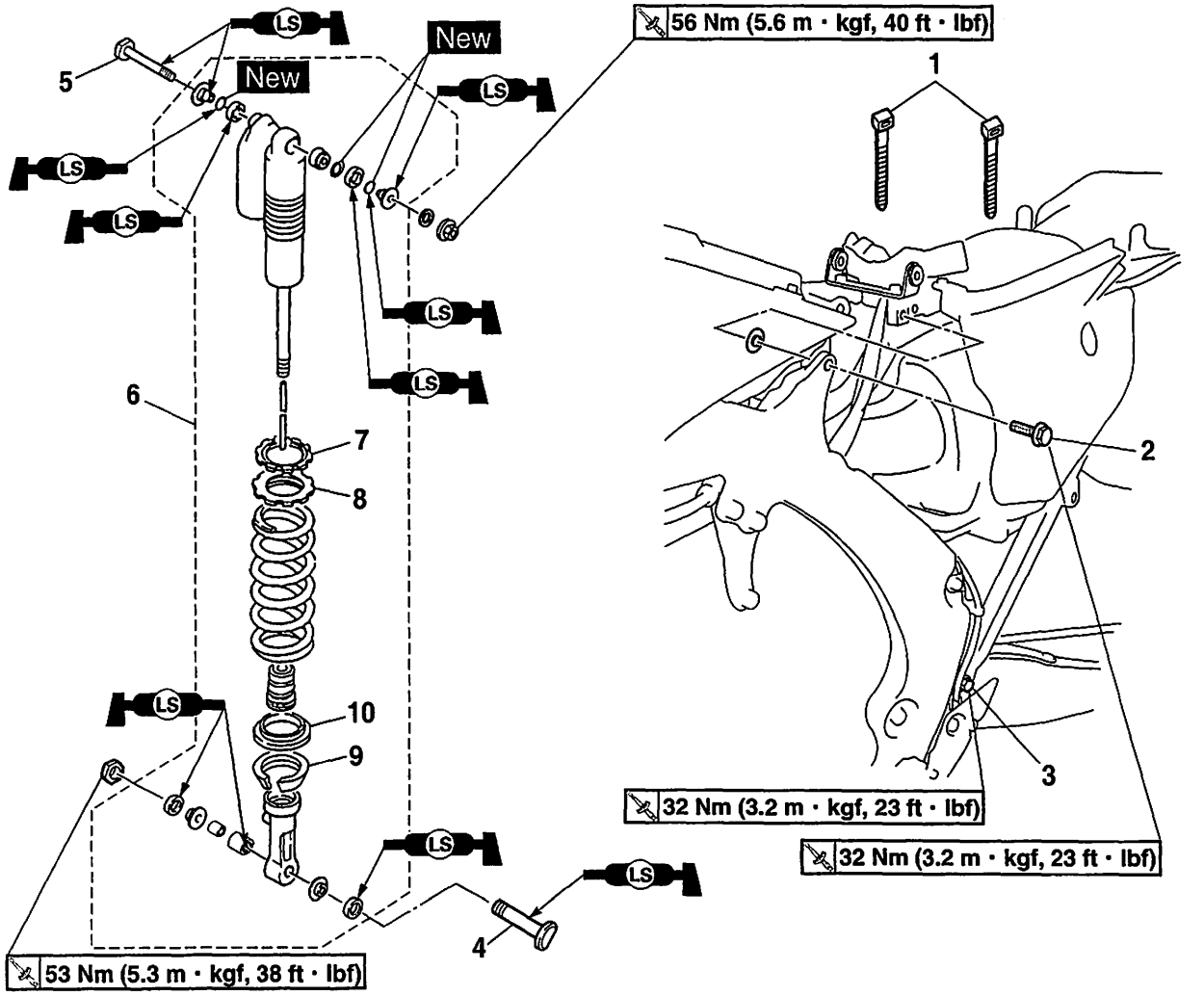
TIP

- Insert the end of the speed sensor lead holder in the hole in the lower bracket "b"
- Install so that the marking "a" on the speed sensor lead aligns with the speed sensor lead holder edge.
- Install the speed sensor lead clamp while inserting it in the hole "c" in the speed sensor lead holder.



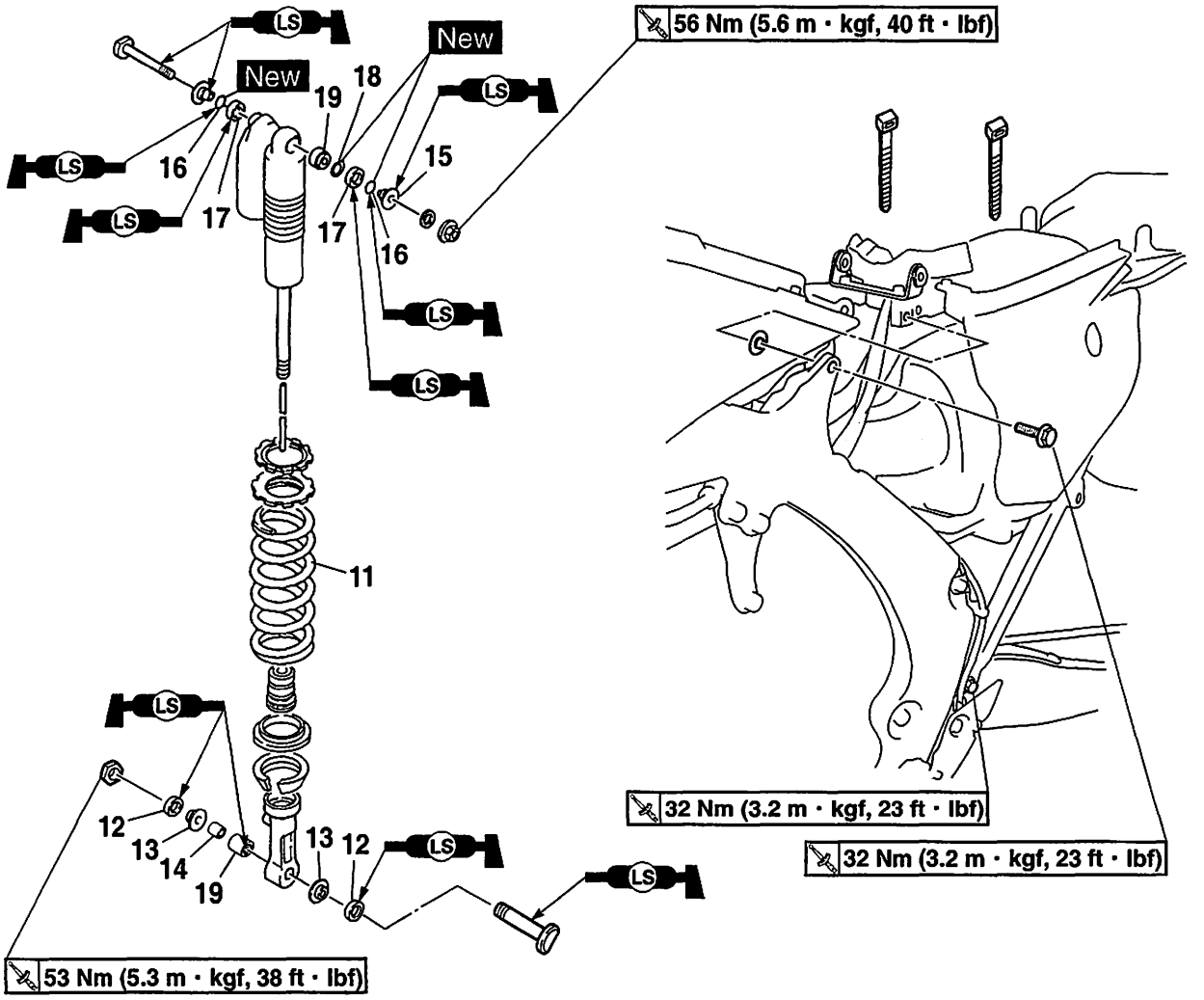
EAS1DX3161
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



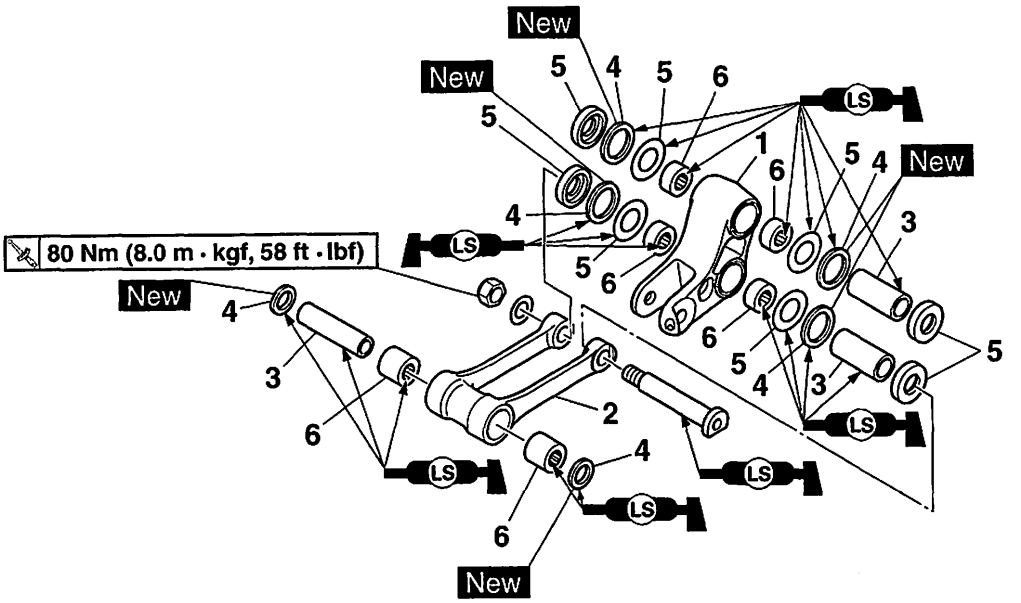
Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Side cover		Refer to"GENERAL CHASSIS" on page 5-1.
	Silencer		Refer to"ENGINE REMOVAL" on page 6-1.
	Fuel tank bracket pin		Refer to"FUEL TANK" on page 8-1.
	Battery		Refer to"CHECKING AND CHARGING THE BATTERY" on page 3-30.
	Throttle body joint		Refer to"THROTTLE BODY" on page 8-6.
1	Plastic band	2	
2	Rear frame upper bolt	2	
3	Rear frame lower bolt	2	Loosen.
4	Rear shock absorber assembly lower bolt	1	
5	Rear shock absorber assembly upper bolt	1	
6	Rear shock absorber assembly	1	
7	Locknut	1	
8	Adjusting nut	1	
9	Lower spring guide	1	
10	Upper spring guide	1	

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
11	Spring	1	
12	Dust seal	2	
13	Collar	2	
14	Bushing	1	
15	Collar	2	
16	O-ring	2	
17	Dust seal	2	
18	Stopper ring	1	
19	Bearing	2	
			For installation, reverse the removal procedure.

Disassembling the relay arm



Order	Job/Parts to remove	Q'ty	Remarks
1	Relay arm	1	
2	Connecting arm	1	
3	Collar	3	
4	Oil seal	6	
5	Washer	8	
6	Bearing	6	
			For assembly, reverse the disassembly procedure.

EAS23180
HANDLING THE REAR SHOCK ABSORBER

EWA13740
⚠ WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

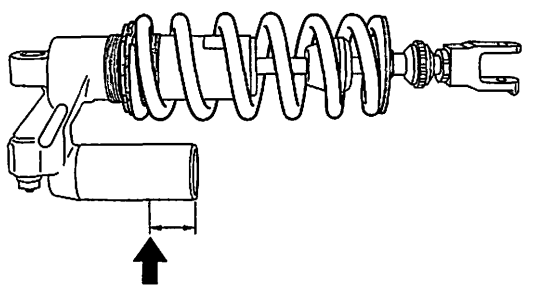
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

EAS23190
DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08-0.12 in) hole through the rear shock absorber at a point 30–35 mm from its end as shown.

EWA13760
⚠ WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS23230
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

2. Remove:
   - Rear frame upper bolt
3. Loosen:
   - Rear frame lower bolt
4. Slide:
   - Rear frame

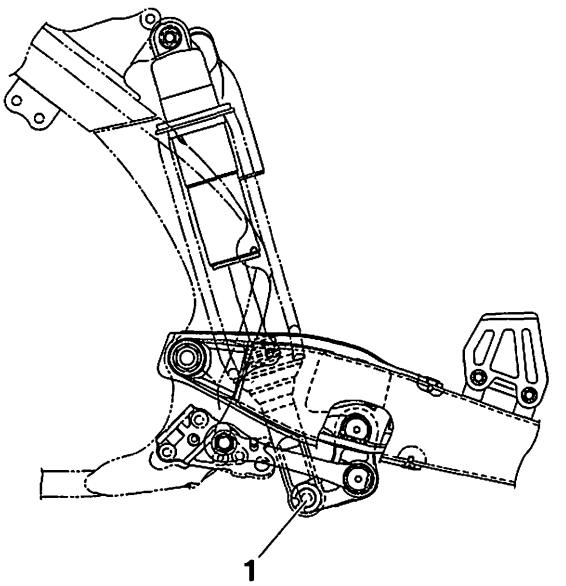
ECA1DX1011
NOTICE

Do not strain the wire harness when the rear frame is removed.

5. 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.



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

EAS23240
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.

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

EAS23260
CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
   - Connecting arm
   - Relay arm
     Damage/wear → Replace.
2. Check:
   - Bearings
   - Spacers
     Damage/pitting/scratches → Replace the bearings and spacers as a set.
3. Check:
   - Oil seals
     Damage/pitting → Replace.

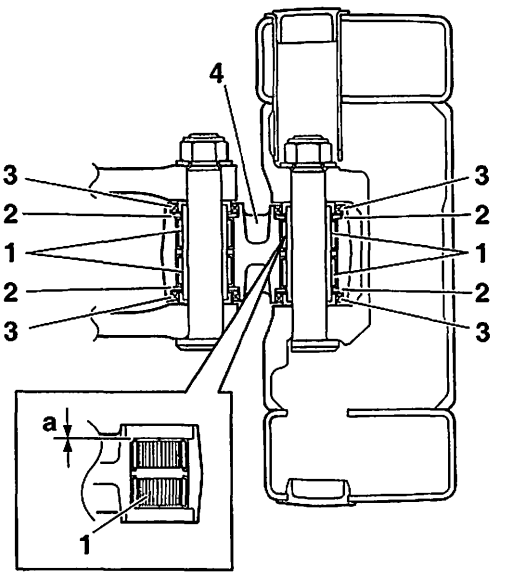
EAS23270
INSTALLING THE RELAY ARM

1. Lubricate:
   - Oil seals
   - Bearings
   - Spacers
   - Washers
   - Collars

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

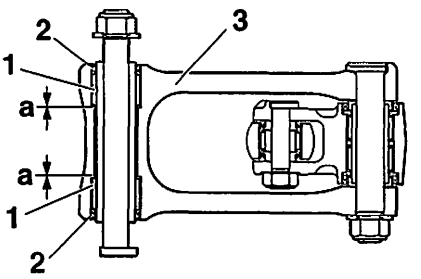
2. Install:
   - Bearings "1"
   - Washers "2"
   - Oil seals "3"
     (to relay arm "4")

	Installed depth "a" **0 mm (0 in)**



3. Install:
   - Bearings "1"
   - Oil seals "2"
     (to connecting arm "3")

	Installed depth "a" **0 mm (0 in)**



EAS23310
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

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

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

ECA1DX1012

NOTICE

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

2. Lubricate:
   • O-rings

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

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

TIP

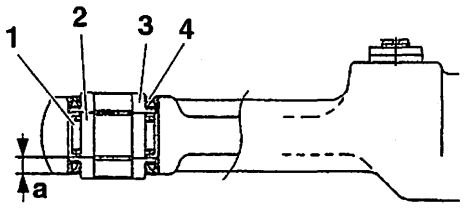
- Install the bearing parallel until the stopper ring groove appears by pressing its outer race.
- After installing the stopper ring, push back the bearing unit it contacts the stopper ring.

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

TIP

Install the dust seals with their lips facing inward.

	Installed depth "a" **4.25 mm (0.17 in)**



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

	Recommended lubricant **Lithium-soap-based 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 and frame bolt from the right.
- Install the rear shock absorber assembly lower bolts, relay arm and connecting arm bolt, and relay arm and swingarm bolt from the left.

7. Tighten:
   • Rear shock absorber assembly upper nut

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

   • Connecting arm and frame nut

	Connecting arm and frame nut **80 Nm (8.0 m·kgf, 58 ft·lbf)**

   • Relay arm and connecting arm nut

	Relay arm and connecting arm nut **80 Nm (8.0 m·kgf, 58 ft·lbf)**

   • Relay arm and swingarm nut

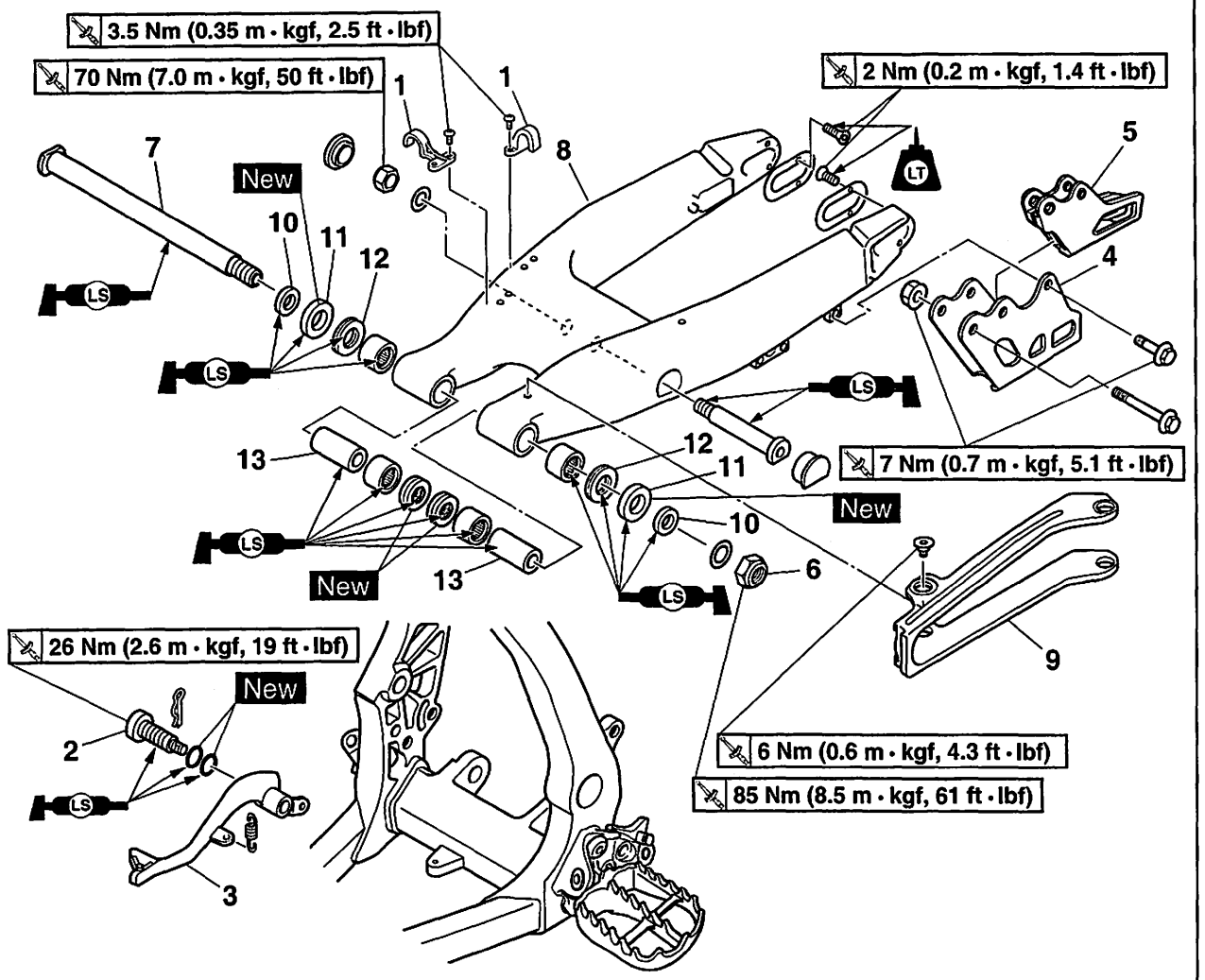
	Relay arm and swingarm nut **70 Nm (7.0 m·kgf, 51 ft·lbf)**

   • Rear shock absorber assembly lower nut

	Relay shock absorber assembly lower nut **53 Nm (5.3 m·kgf, 38 ft·lbf)**

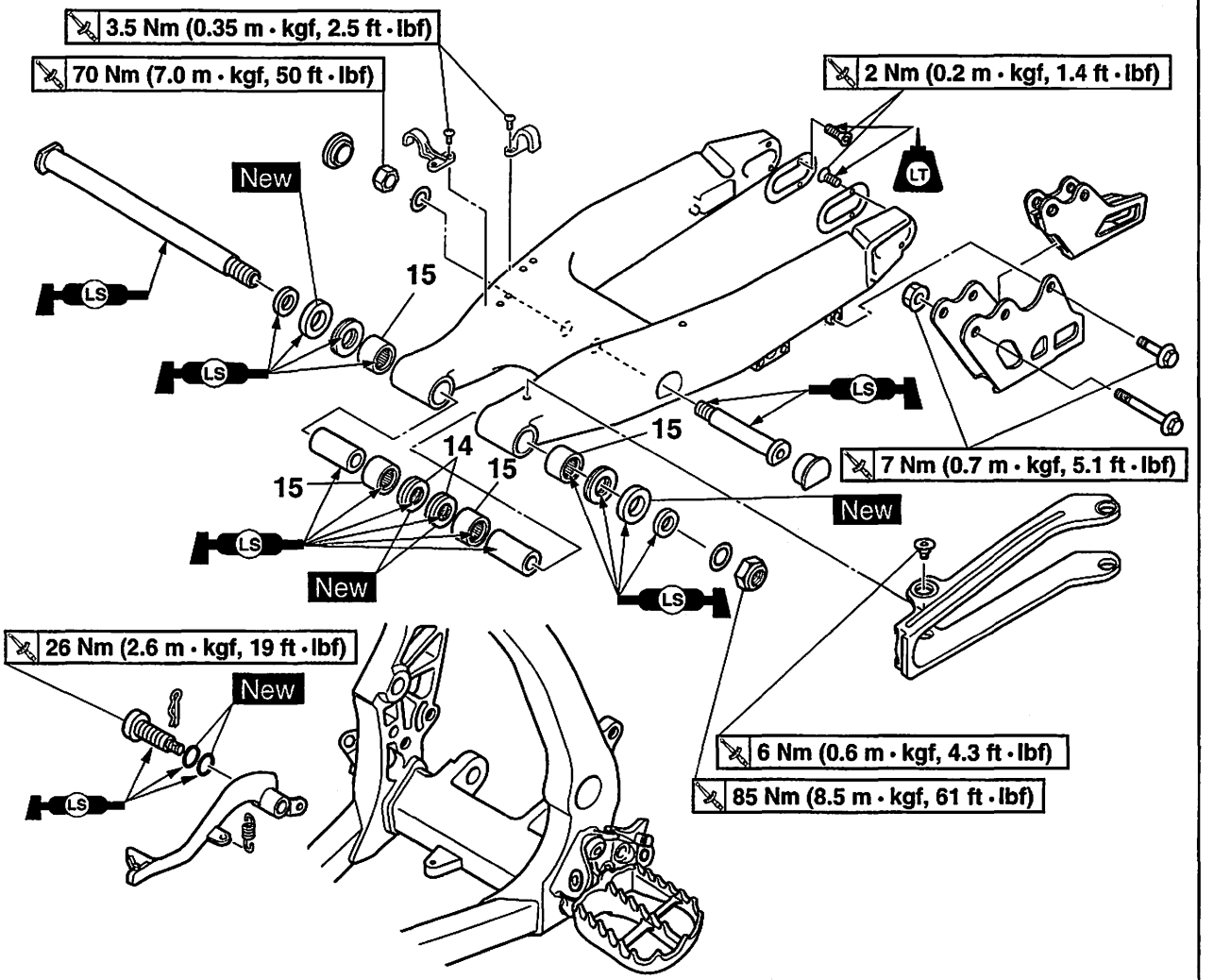
EAS1DX3162
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to"REAR WHEEL" on page 5-10.
1	Brake hose holder	2	
2	Brake pedal bolt	1	
3	Brake pedal	1	
4	Drive chain support cover	1	
5	Drive chain support	1	
6	Pivot shaft nut	1	
7	Pivot shaft	1	
8	Swingarm	1	
9	Drive chain guide	1	
10	Collar	2	
11	Oil seal	2	
12	Thrust bearing	2	
13	Spacer	2	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
14	Oil seal	2	
15	Bearing	4	
			For installation, reverse the removal procedure.

EAS23350
REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

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

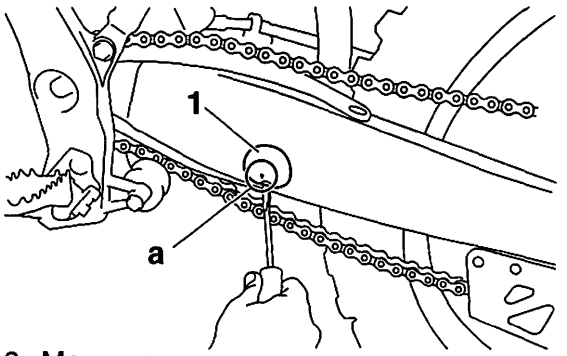
TIP

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

2. Remove:
   - Left cap "1"

TIP

Remove with a slotted-head screw-driver inserted under the mark "a" on the left cap.



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

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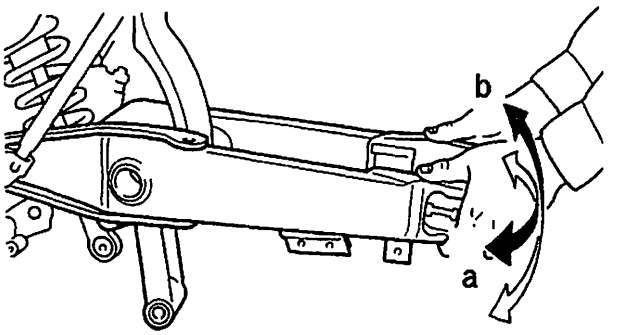
a. Measure the tightening torque of the pivot shaft nut.

	Pivot shaft nut **85 Nm (8.5 m·kgf, 61 ft·lbf)**

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

	Swingarm side play (at the end of the swingarm) **0 mm (0 in)**



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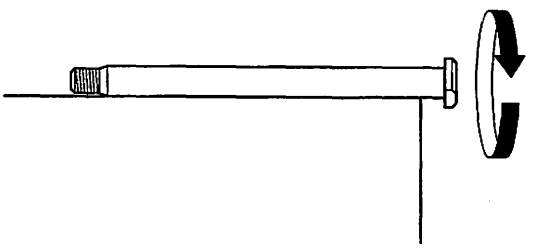
EAS23360
CHECKING THE SWINGARM

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

EWA13770

⚠ WARNING

Do not attempt to straighten a bent pivot shaft.



3. Wash:
   - Pivot shaft
   - Spacers
   - Collars
   - Bearings

	Recommended cleaning solvent **Kerosene**

4. Check:
   - Oil seals
     Damage → Replace.
   - Bearings
   - Spacers
     Free play exists/unsmooth revolution/rust → Replace bearing and bushing as a set.

EAS1DX3163
INSTALLING THE SWINGARM

1. Lubricate:
   - Bearings
   - Collars
   - Spacers
   - Oil seals
   - Pivot shaft

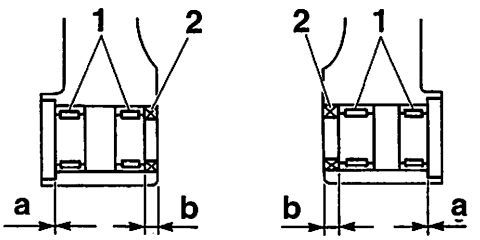
	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Bearings "1"
   - Oil seals "2"
   (to the swingarm)

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

TIP

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



3. Install:
   - Swingarm

	Pivot shaft nut **85 Nm (8.5 m·kgf, 61 ft·lbf)**

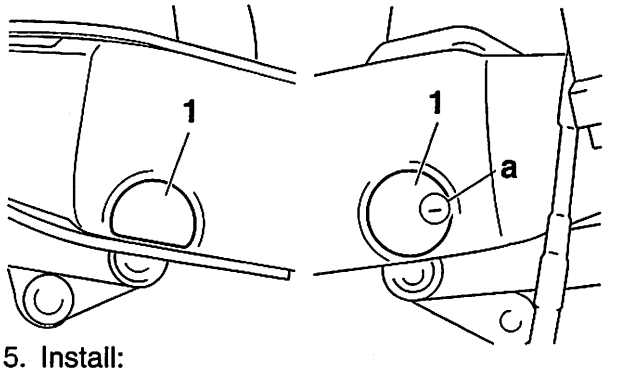
TIP

Install the pivot shaft from the right.

4. Install:
   - Cap "1"

TIP

Install the right cap with its mark "a" facing forward.

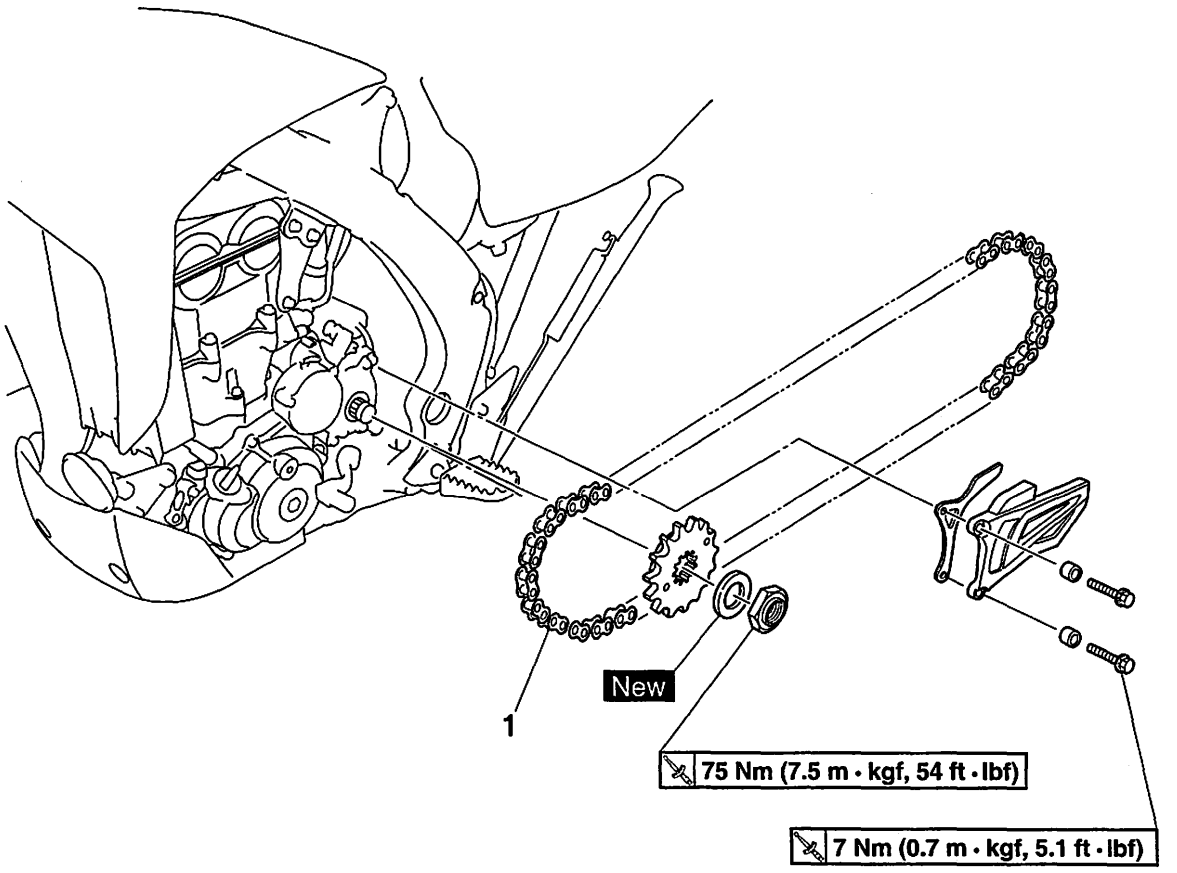


5. Install:
   - Rear wheel
   Refer to "REAR WHEEL" on page 5-10
6. Adjust:
   - Drive chain slack
   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-23.

	Drive chain slack **48.0–58.0 mm (1.89– 2.28 in)**

EAS1DX3164
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to"ENGINE REMOVAL" on page 6-1.
1	Drive chain	1	
			For installation, reverse the removal procedure.

EAS23420
REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

2. Remove:
   - Drive chain

TIP

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

EAS23441
CHECKING THE DRIVE CHAIN

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

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

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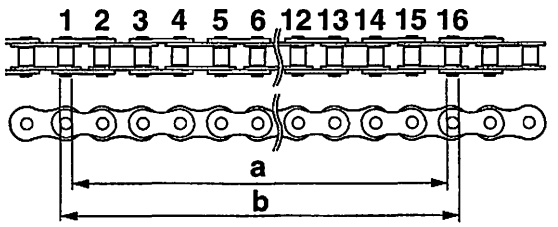
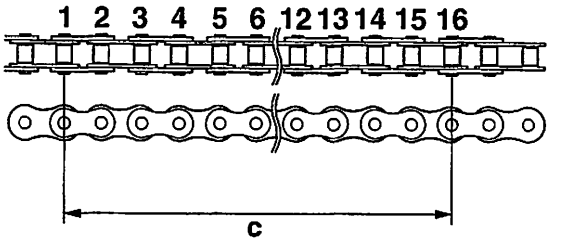
a. Measure the length "a" between the inner sides of the pins and the length "b" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.



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



TIP

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

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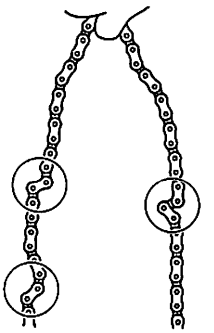
2. Check:
   - Drive chain
     Stiffness → Clean, lubricate, or replace.



3. Clean:
   - Drive chain

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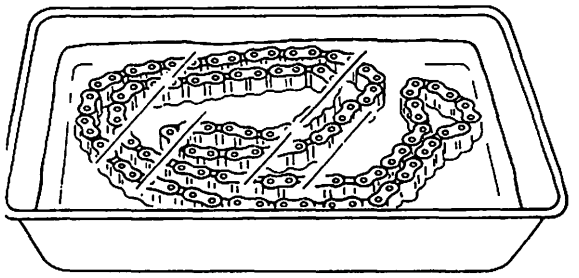
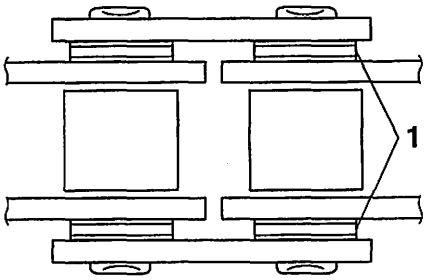
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene . and completely dry it.

ECA14290
NOTICE

- **This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.**

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





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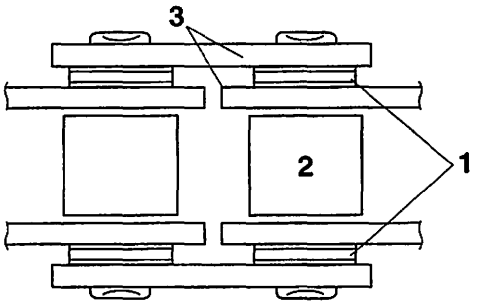
4. Check:
   • O-rings "1"
   Damage → Replace the drive chain.
   • Drive chain rollers "2"
   Damage/wear → Replace the drive chain.
   • Drive chain side plates "3"
   Damage/wear → Replace the drive chain.

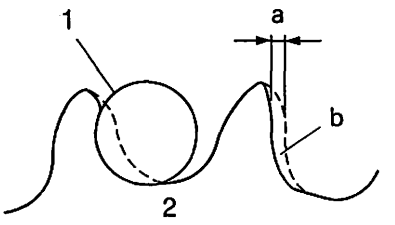


5. Lubricate:
   • Drive chain

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

EAS23460
CHECKING THE DRIVE SPROCKET

1. Check:
   • Drive sprocket
   More than 1/4 tooth "a" wear → Replace the drive chain sprockets as a set.
   Bent teeth → Replace the drive chain sprockets as a set.



b. Correct

1. Drive chain roller
2. Drive chain sprocket

EAS23470
CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 5-11.

EAS1DX3165
INSTALLING THE DRIVE CHAIN

1. Install:
   • Drive chain

ECA1DX1013

NOTICE

Be sure to put on safety goggles when working.

TIP

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

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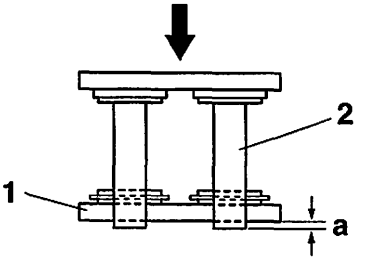
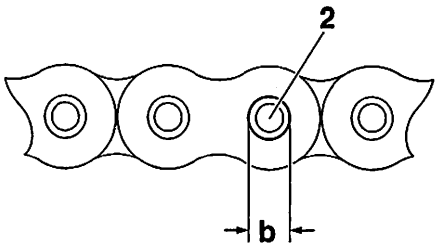
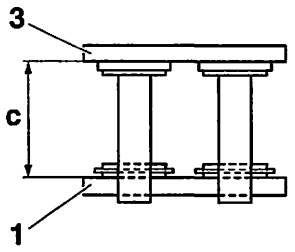
a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).



b. After riveting, make sure the diameter between the edges "b" of the connecting pin "2" is 5.5–5.8 mm (0.22–0.23 in).



c. After riveting, make sure the space "c", which is inside of the connecting link "3" and inside of the connecting plate "1", is 14.1–14.3 mm (0.56–0.65 in).



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2. Lubricate:
   • Drive chain

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

3. Install:
   • Drive sprocket
   • Lock washer New
   • Drive sprocket nut
   Refer to "ENGINE REMOVAL" on page 6-1.

	Drive sprocket nut **75 Nm (7.5 m·kgf, 54 ft·lbf)**

ECA1DX1014

NOTICE

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

4. Adjust:
   • Drive chain slack
   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-23.

	Drive chain slack **48.0–58.0 mm (1.89– 2.28 in)**

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.

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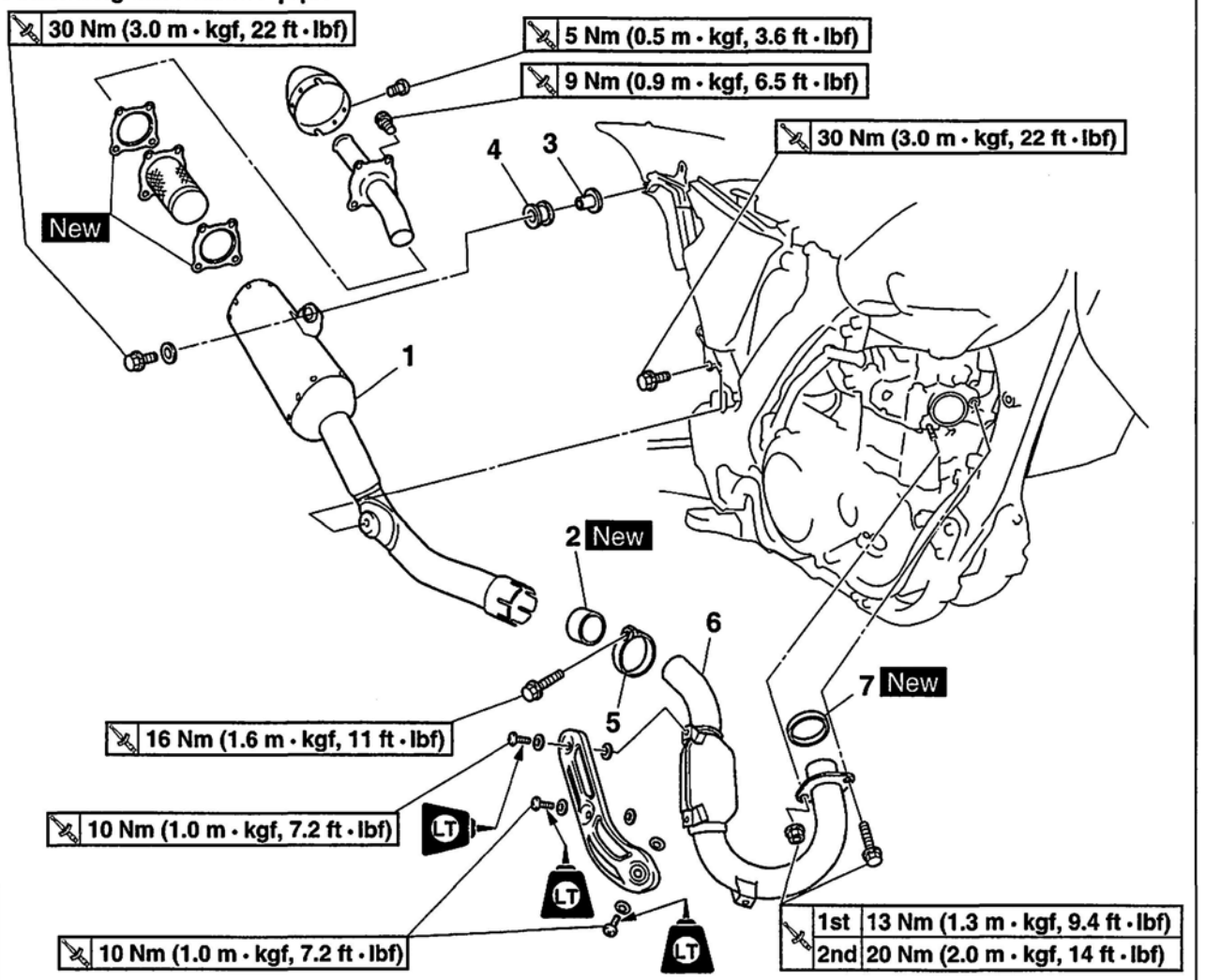
TIP

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.

EAS1DX3166

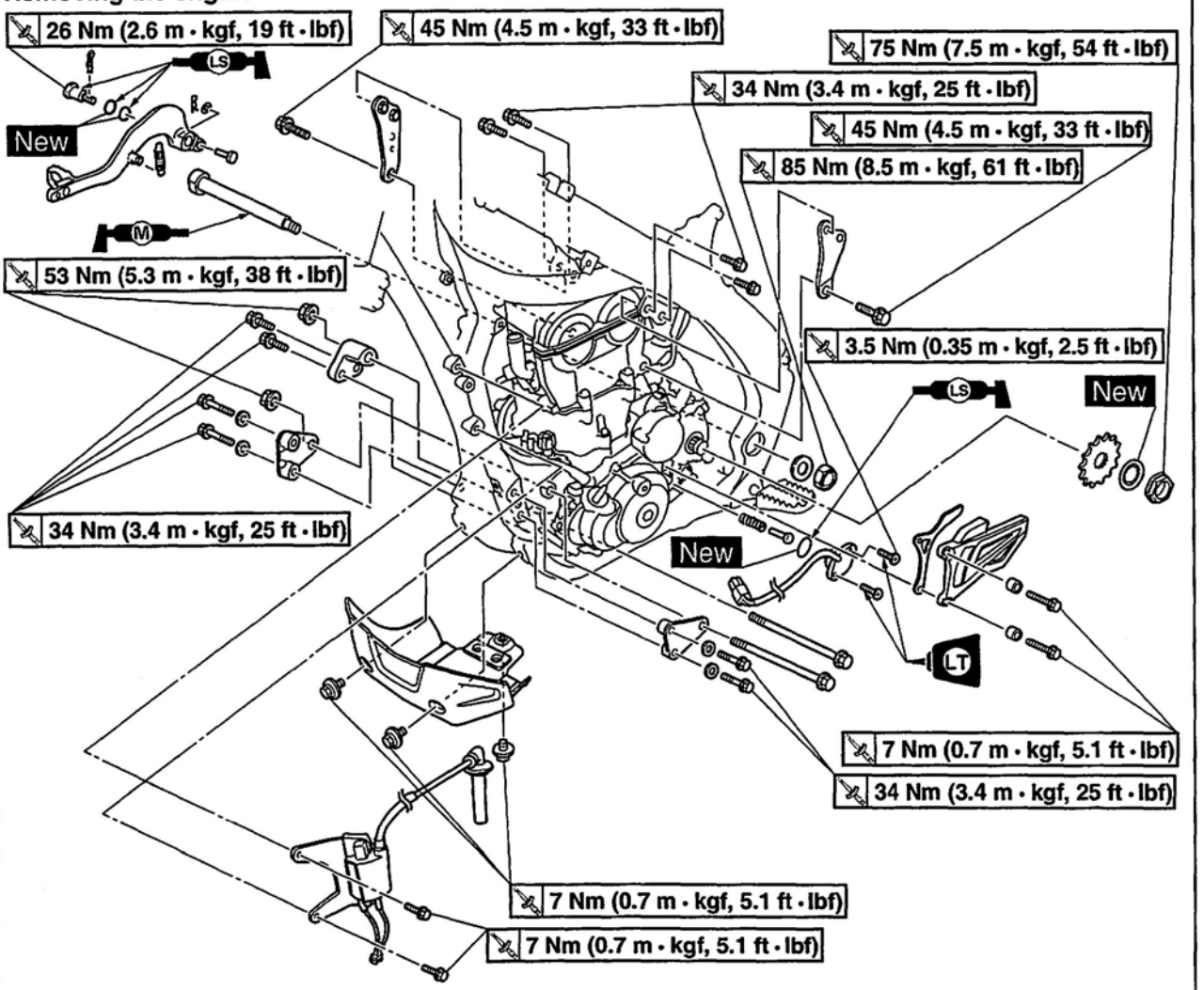
ENGINE REMOVAL

Removing the exhaust pipe



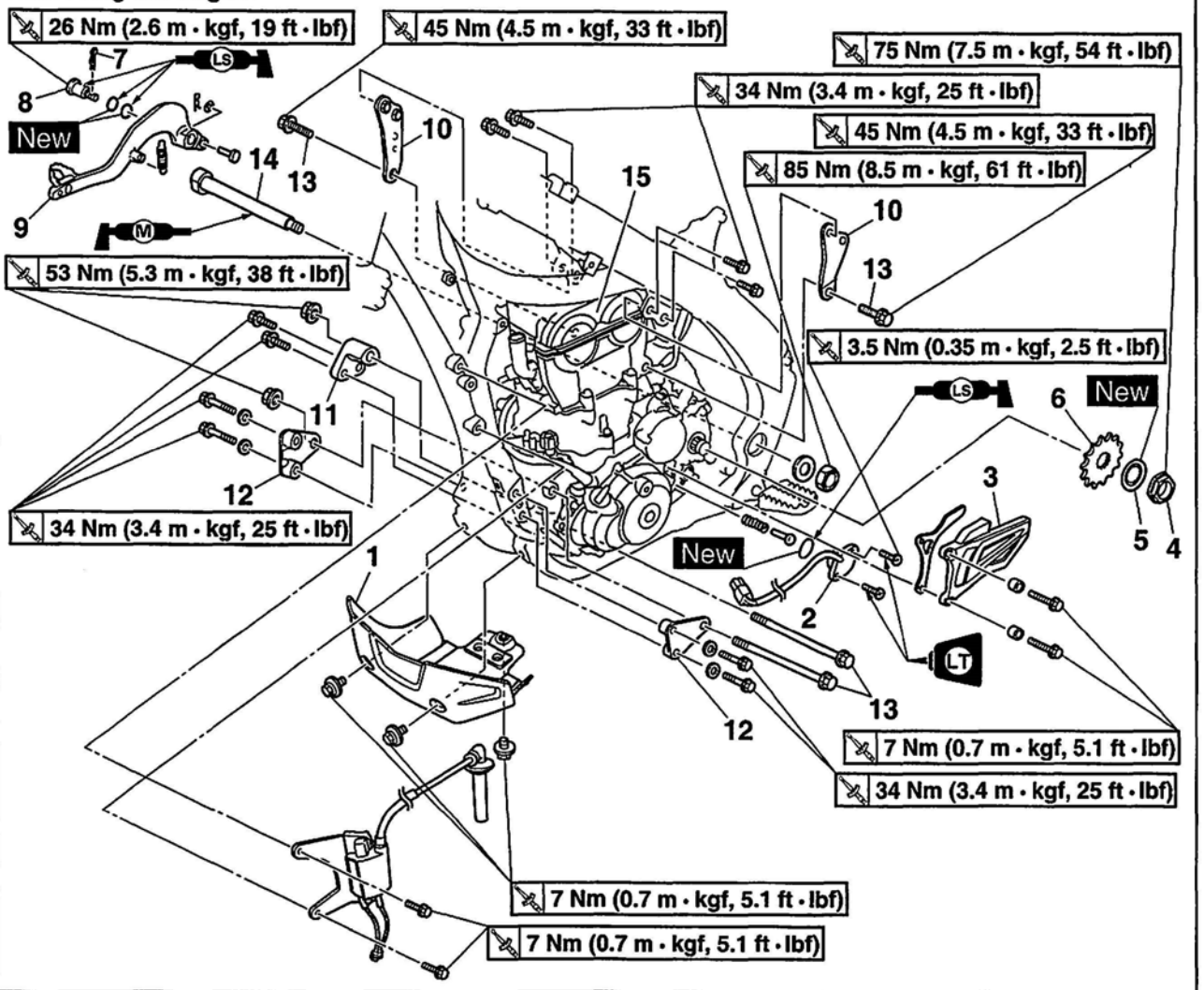
Order	Job/Parts to remove	Q'ty	Remarks
	Side cover (right)		Refer to"GENERAL CHASSIS" on page 5-1.
1	Muffler	1	
2	Muffler gasket	1	
3	Collar	1	
4	Damper	1	
5	Muffler clamp	1	
6	Exhaust pipe	1	
7	Exhaust pipe gasket	1	
			For installation, reverse the removal procedure.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
	Hold the machine by placing the suitable stand under the frame.		
	Drain the engine oil.		Refer to"CHANGING THE ENGINE OIL" on page 3-13.
	Seat		Refer to"GENERAL CHASSIS" on page 5-1.
	Fuel tank		Refer to"FUEL TANK" on page 8-1.
	Radiator		Refer to"RADIATOR" on page 7-1.
	Clutch cable and guide		Disconnect at the engine side.
	Condenser		
	Shift pedal		Refer to"SHIFT SHAFT" on page 6-47.
	Throttle body		Refer to"THROTTLE BODY" on page 8-6.
	Cylinder head breather hose		Refer to"CAMSHAFT" on page 6-7.
	Ignition coil		
	Disconnect the AC magneto lead.		
	Coolant temperature sensor		
	Disconnect the starter motor lead.		Refer to"ELECTRIC STARTER" on page 6-31.
	Negative battery lead		Disconnect at the engine side.

Removing the engine



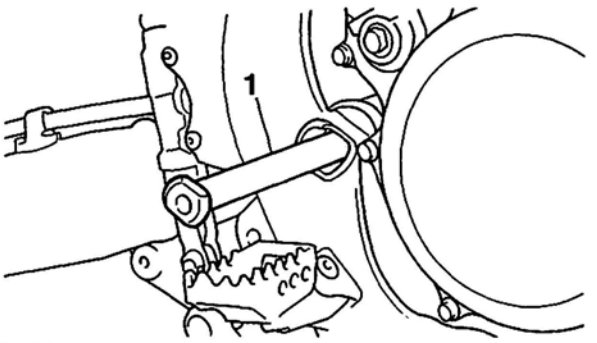
Order	Job/Parts to remove	Q'ty	Remarks
1	Engine guard	1	
2	Neutral switch	1	
3	Drive chain sprocket cover	1	
4	Nut (drive sprocket)	1	
5	Lock washer	1	
6	Drive sprocket	1	
7	Clip	1	
8	Bolt (brake pedal)	1	
9	Brake pedal	1	
10	Upper engine bracket	2	
11	Lower engine bracket	1	
12	Front engine bracket	2	
13	Engine mounting bolt	4	
14	Pivot shaft	1	
15	Engine	1	
			For installation, reverse the removal procedure.

EAS1DX3167
REMOVING THE ENGINE

1. Remove:
   • Pivot shaft "1"

TIP

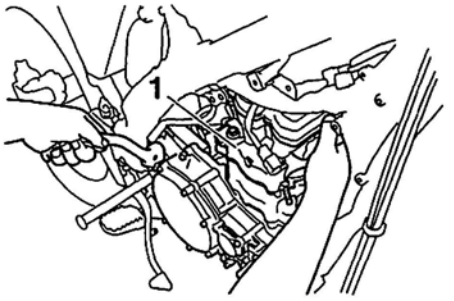
If the pivot shaft is pulled all the way out, the swingarm will come loose. If possible, insert a shaft of similar diameter into the other side of the swingarm to support it.



2. Remove:
   • Engine "1"
   From right side.

TIP

Make sure that the couplers, hoses and cables are disconnected.



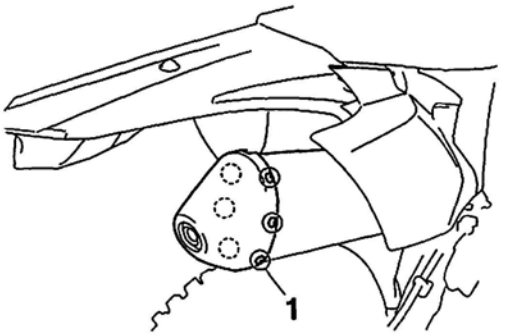
EAS1DX3168
CLEANING THE SPARK ARRESTER

EWA1DX1006

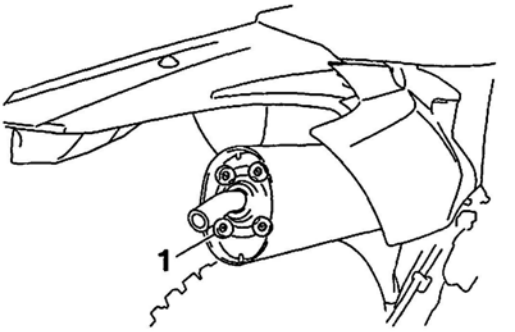
⚠ WARNING

- **Be sure the exhaust pipe and muffler are cool before cleaning the spark arrester.**
- **Do not start the engine when cleaning the exhaust system.**

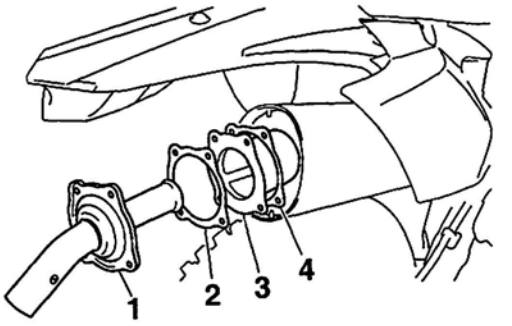
1. Remove:
   • Muffler cap screws "1"



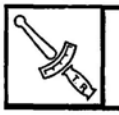
2. Remove:
   • Spark arrester bolts "1"



3. Remove:
   • Tail pipe "1"
   • Tail pipe gasket "2"
   • Spark arrester "3"
   Pull the spark arrester out of the muffler.
   • Spark arrester gasket "4"



4. Clean:
   • Spark arrester
   Tap the spark arrester lightly, then use a wire brush to remove any carbon deposits.
5. Install:
   • Spark arrester gasket New
   • Spark arrester
   Insert the spark arrester into the muffler and align the bolt holes.
   • Tail pipe gasket New
   • Spark arrester bolts

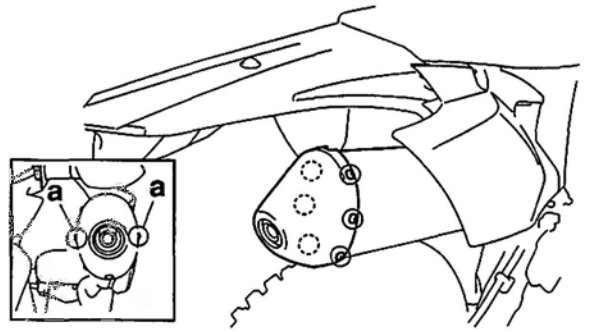
	**Spark arrester bolt** **9 Nm (0.9 m·kgf, 6.4 ft·lbf)**

6. Install:
   • muffler cap

	Muffler cap screw **5 Nm (0.5 m·kgf, 3.6 ft·lbf)**

TIP

First tighten the two screws "a" located horizontally apart, and then tighten the others.



EAS23720
INSTALLING THE ENGINE

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

	Pivot shaft **85 Nm (8.5 m·kgf, 61 ft·lbf)**

   • Lower engine bracket "3"
   • Lower engine bracket bolt "4"

	Lower engine bracket bolt **34 Nm (3.4 m·kgf, 25 ft·lbf)**

   • Front engine mounting bolt "5"

	Front engine mounting bolt **53 Nm (5.3 m·kgf, 38 ft·lbf)**

   • Front engine bracket "6"
   • Front engine bracket bolt "7"

	Front engine bracket bolt **34 Nm (3.4 m·kgf, 25 ft·lbf)**

   • Upper engine bracket "8"
   • Upper engine bracket bolt "9"

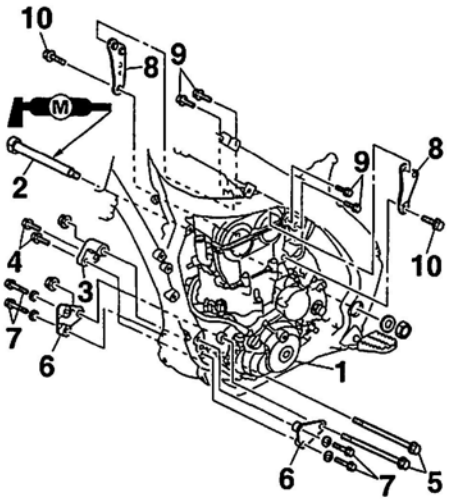
	Upper engine bracket bolt **34 Nm (3.4 m·kgf, 25 ft·lbf)**

   • Upper engine mounting bolt "10"

	Upper engine mounting bolt **45 Nm (4.5 m·kgf, 33 ft·lbf)**

TIP

Apply the lithium-soap based grease on the pivot shaft.



EAS1DX3169
INSTALLING THE EXHAUST PIPE AND MUFFLER

1. Install:
   • Gasket New
   • Exhaust pipe "1"
   • Exhaust pipe nut "2"

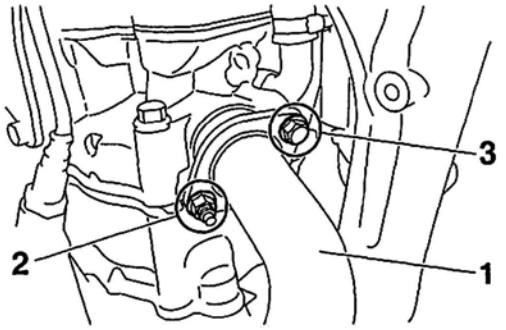
	Exhaust pipe nut **20 Nm (2.0 m·kgf, 14 ft·lbf)**

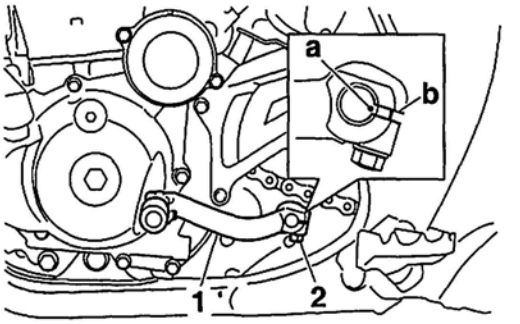
   • Exhaust pipe bolt "3"

	Exhaust pipe bolt **20 Nm (2.0 m·kgf, 14 ft·lbf)**

TIP

First, temporarily tighten the exhaust pipe nut, then tighten the exhaust pipe bolt 13 Nm (1.3 m·kgf, 9.4 ft·lbf). After that, retighten the exhaust pipe nut 20 Nm (2.0 m·kgf, 14 ft·lbf) and then the exhaust pipe bolt 20 Nm (2.0 m·kgf, 14 ft·lbf).



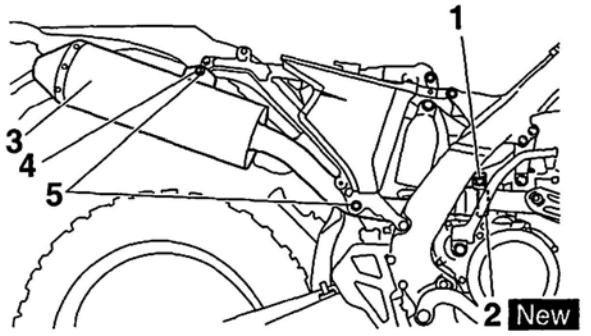


2. Install:
   • Muffler clamp "1"

	Muffler clamp **16 Nm (1.6 m·kgf, 12 ft·lbf)**

   • Gasket "2" New
   • Muffler "3"
   • Washer "4"
   • Muffler bolt "5"

	Muffler bolt **30 Nm (3.0 m·kgf, 22 ft·lbf)**



EAS32D1009
INSTALLING THE SHIFT PEDAL

1. Install:
   • Shift pedal "1"
   • Shift pedal bolt "2"

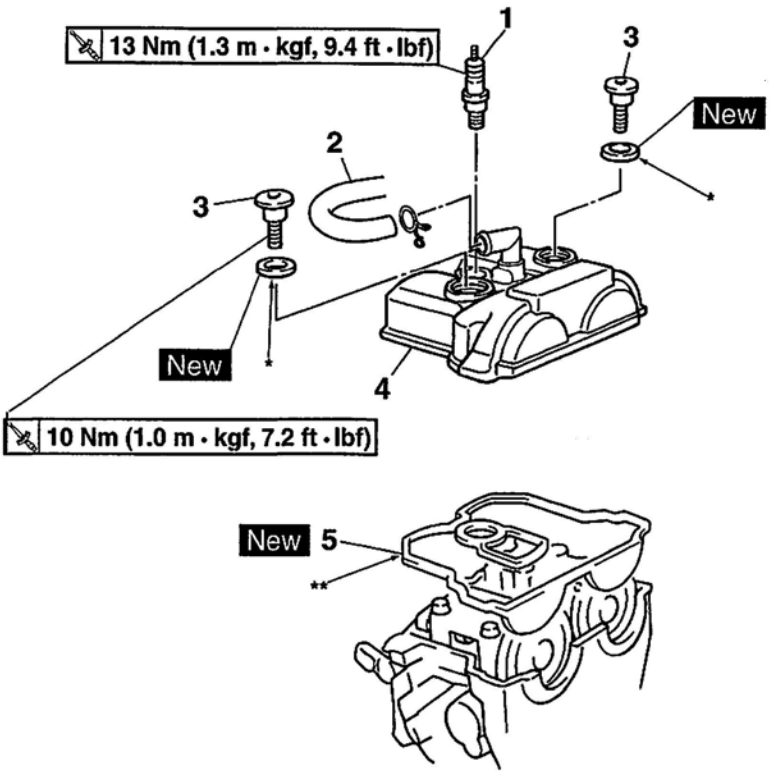
	Shift pedal bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

TIP

Align the punch mark "a" on the shift shaft with the notch "b" in the shift pedal.

EAS23730
CAMSHAFT

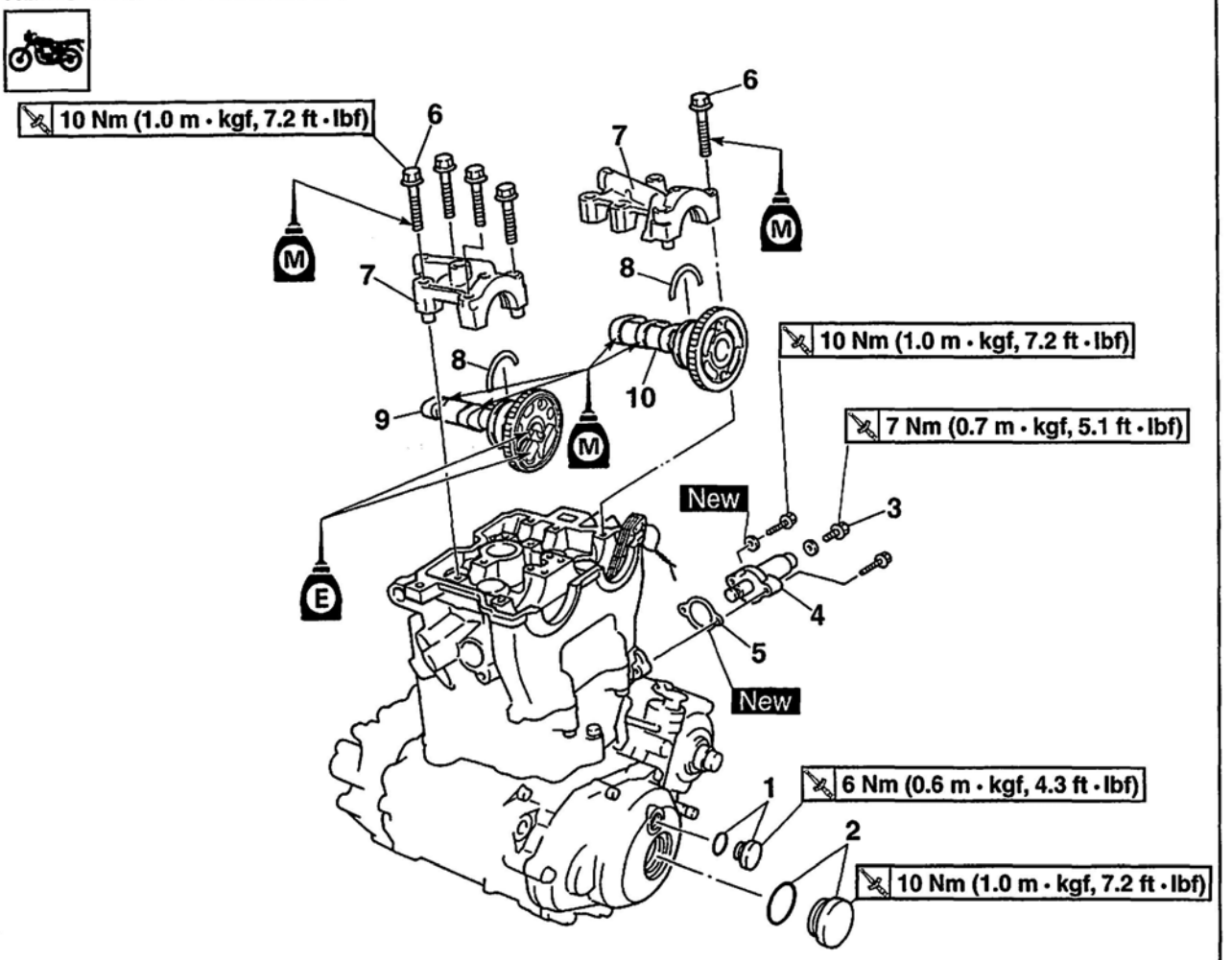
REMOVING THE CYLINDER HEAD COVER



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to"GENERAL CHASSIS" on page 5-1
	Fuel tank		Refer to"FUEL TANK" on page 8-1
	Engine upper bracket (right)		Refer to"ENGINE REMOVAL" on page 6-1
	Engine upper bracket (left)		
1	Spark plug	1	
2	Cylinder head breather hose	1	
3	Bolt (cylinder head cover)	2	
4	Cylinder head cover	1	
5	Cylinder head cover gasket	1	
			For installation, reverse the removal procedure.

*Silicone fluid
**Three bond No.1541C®

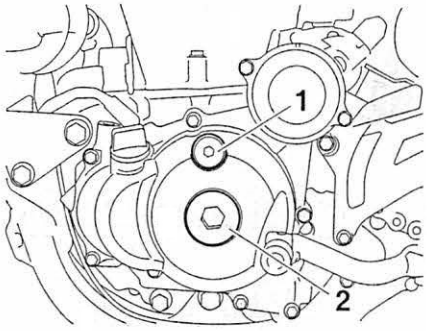
REMOVING THE CAMSHAFT



Order	Job/Parts to remove	Q'ty	Remarks
1	Timing mark accessing screw	1	
2	Crankshaft end cover	1	
3	Timing chain tensioner cap bolt	1	
4	Timing chain tensioner	1	
5	Gasket	1	
6	Bolt (camshaft cap)	10	
7	Camshaft cap	2	
8	Clip	2	
9	Exhaust camshaft	1	
10	Intake camshaft	1	
			For installation, reverse the removal procedure.

EAS23800
REMOVING THE CAMSHAFT

1. Remove:
   - Timing mark accessing screw "1"
   - Crankshaft end cover "2"



2. Align:
   - TDC on the generator rotor (mark on the crankcase cover)

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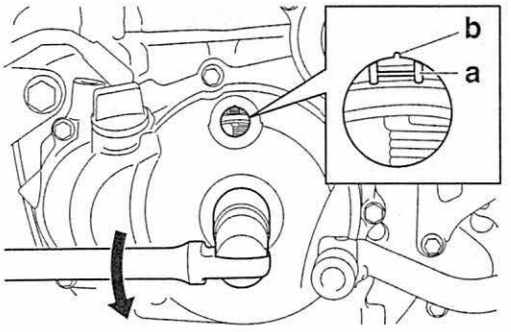
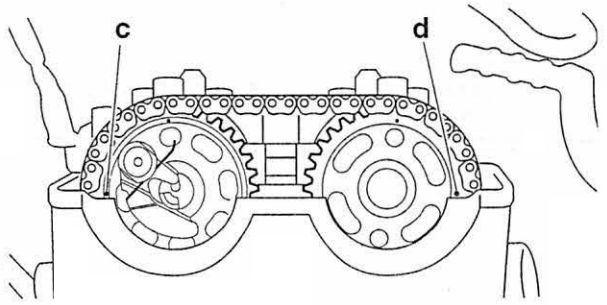
a. Turn the crankshaft counterclockwise.
b. When piston is at TDC on the compression stroke, align the mark "a" on the generator rotor with the mark "b" on the crankcase cover.

TIP

In order to be sure that the piston is at Top Dead Center, the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.





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3. Loosen:
   - Camshaft sprocket bolt

4. Remove:
   - Timing chain tensioner assembly
   - Gasket
5. Remove:
   - Camshaft cap bolts "1"
   - Camshaft cap "2"
   - Clip

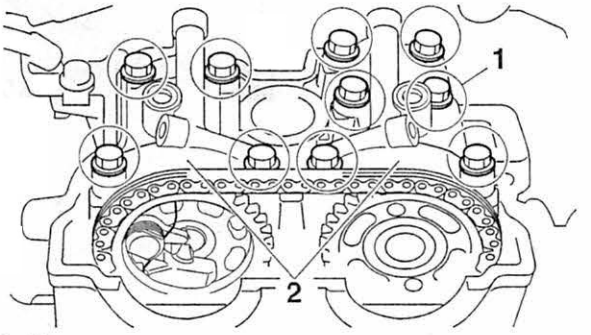
TIP

Remove the bolts (camshaft cap) in a criss-cross pattern, working from the outside in.

ECA1DX1015

NOTICE

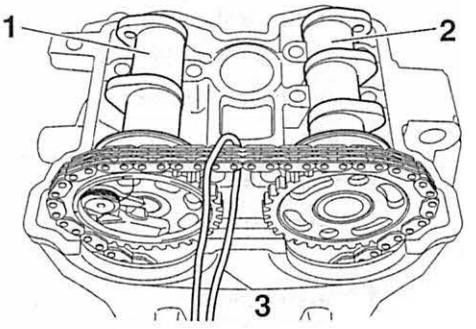
The bolts (camshaft cap) must be removed evenly to prevent damage to the cylinder head, camshafts or camshaft caps.



6. Remove:
   - Intake camshaft "1"
   - Exhaust camshaft "2"

TIP

Attach a wire "3" to the timing chain to prevent it from falling into the crankcase.

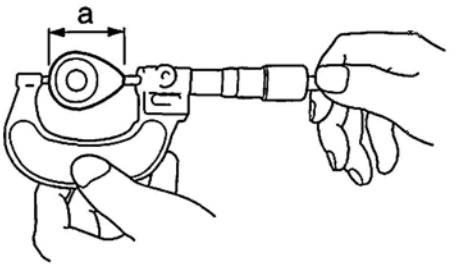


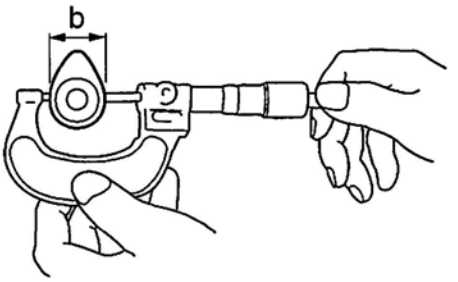
EAS23840
CHECKING THE CAMSHAFT

1. Check:
   - Camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.

2. Measure:
   • Camshaft lobe dimensions "a" and "b"
   Out of specification → Replace the camshaft.

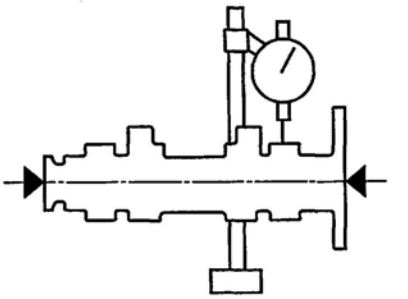
Camshaft lobe dimensions
Intake A
30.100–30.200 mm (1.1850–1.1890 in)
Limit
30.000 mm (1.1811 in)
Intake B
22.450–22.550 mm (0.8839–0.8878 in)
Limit
22.350 mm (0.8799 in)
Exhaust A
30.200–30.300 mm (1.1890–1.1929 in)
Limit
30.100 mm (1.1850 in)
Exhaust B
22.450–22.550 mm (0.8839–0.8878 in)
Limit
22.350 mm (0.8799 in)





3. Measure:
   • Camshaft runout
   Out of specification → Replace.

Camshaft runout limit
0.015 mm (0.0006 in)



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

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

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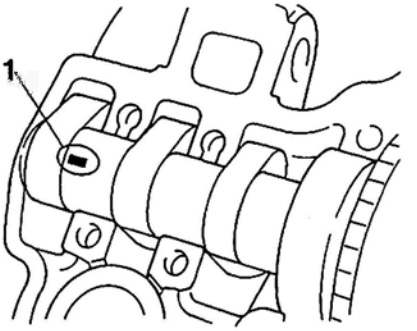
a. Install the camshaft into the cylinder head.
b. Position a strip of Plastigauge® "1" onto the camshaft journal as shown.



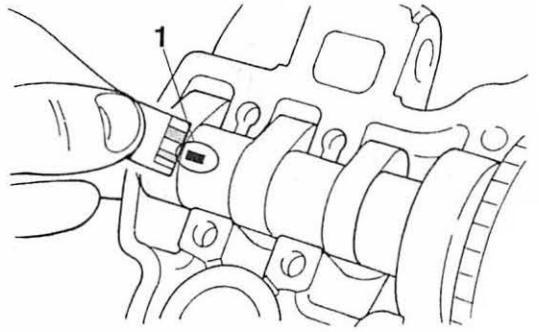
c. Install the dowel pins and camshaft caps.

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 Nm (1.0 m·kgf, 7.2 ft·lbf)

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



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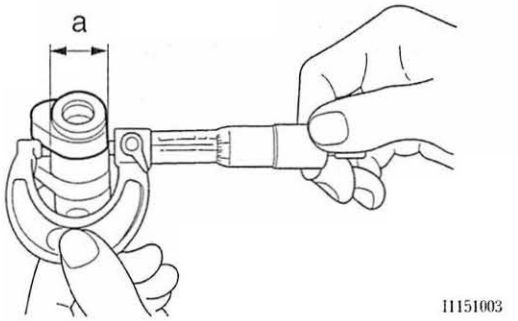
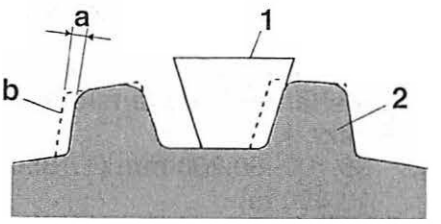
5. Measure:
   • Camshaft journal diameter "a"
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

	Camshaft journal diameter 21.959–21.972 mm (0.8645–0.8650 in)



EAS23870
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
   • Timing chain "1"
   Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.
2. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear "a" → Replace the camshaft sprocket and the timing chain as a set.



a. 1/4 tooth
b. Correct

1. Timing chain roller
2. Camshaft sprocket

EAS23960
CHECKING THE TIMING CHAIN TENSIONERS

The following procedure applies to both of the timing chain tensioners.

1. Check:
   • Timing chain tensioner
   Cracks/damage → Replace.

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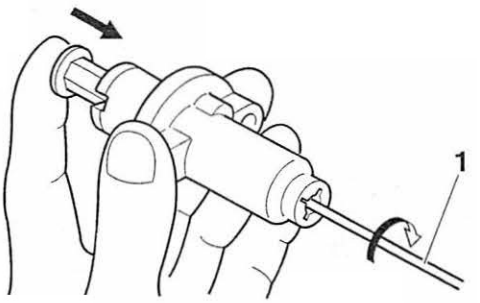
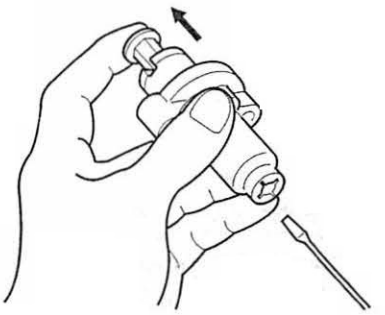
a. While pressing the tensioner rod lightly with fingers, use a thin screwdriver "1" and wind the tensioner rod up fully clockwise.
b. When releasing the screwdriver by pressing lightly with fingers, make sure that the tensioner rod will come out smoothly.
c. If not, replace the tensioner assembly.





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EAS32D1001
CHECKING THE DECOMPRESSION SYSTEM

1. Check:
   • Decompression system

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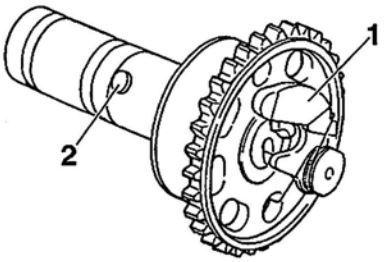
a. Check that the decompressor lever pin "1" projects from the camshaft.
b. Check that the decompressor cam "2" moves smoothly.



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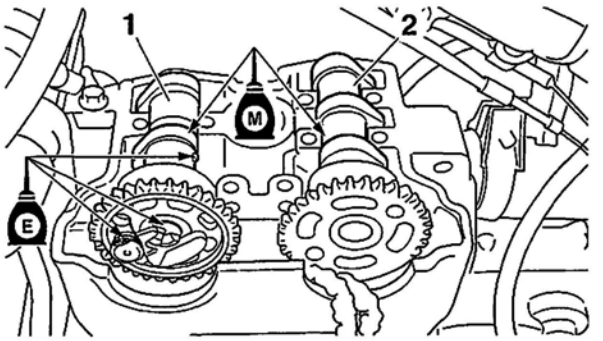
EAS1DX3170
INSTALLING THE CAMSHAFTS

1. Install:
   • Exhaust camshaft "1"
   • Intake camshaft "2"



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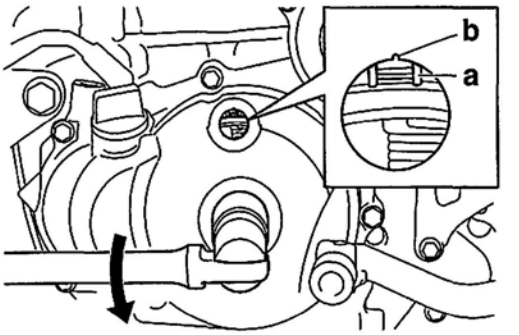
a. Turn the crankshaft counterclockwise with a wrench.

TIP

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

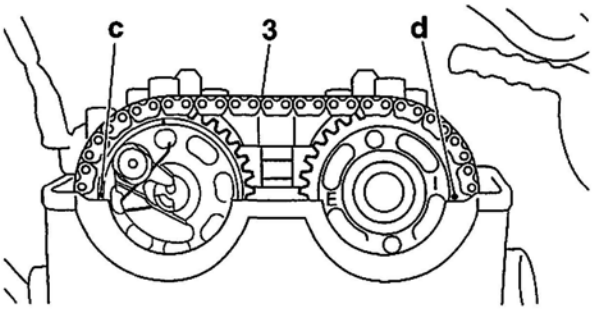
b. Align the TDC mark "a" on the rotor with the align mark "b" on the crankcase cover when piston is at TDC on compression stroke.



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

TIP

The camshafts should be installed onto the cylinder head so that the punch mark "c" on the exhaust camshaft and the punch mark "d" on the intake camshaft must align with the cylinder head surface, as shown in the illustration.



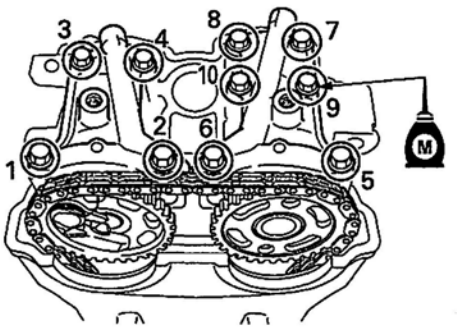
ECA1DX1016

NOTICE

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

d. Install the clips, camshaft caps and bolts (camshaft cap).

	Camshaft cap bolt **10Nm (1.0 m·kgf, 7.2 ft·lbf)**



TIP

- Before installing the clips, cover the cylinder head with a clean rag to prevent the clips from into the cylinder head cavity.
- Apply the molybdenum disulfide oil on the thread of the bolts (camshaft cap).
- Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

ECA1DX1017

NOTICE

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

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2. Install:
   - Timing chain tensioner

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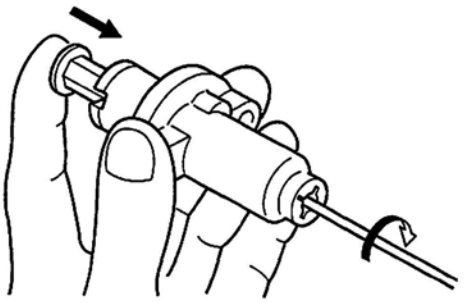
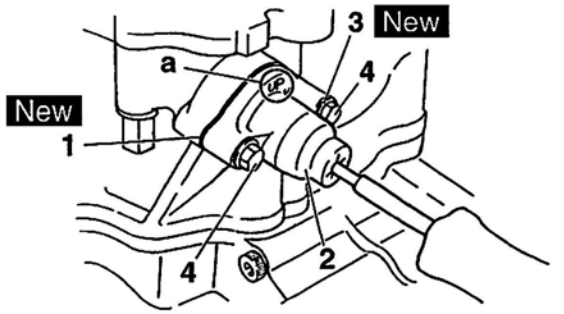
a. While pressing the tensioner rod lightly with fingers, use a thin screwdriver and wind the tensioner rod up fully clockwise.



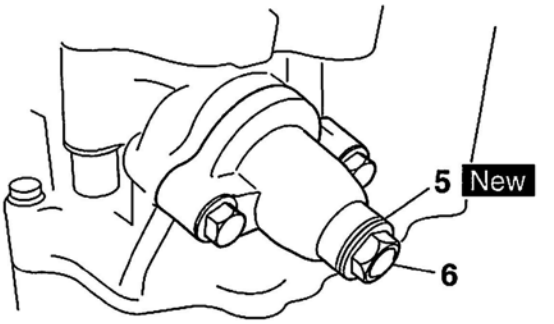
b. With the rod fully wound and the chain tensioner UP mark "a" facing upward, install the gasket "1", the timing chain tensioner "2", and the gasket "3", and tighten the bolt "4" to the specified torque.

	Timing chain tensioner bolt 10Nm (1.0 m·kgf, 7.2 ft·lbf)



c. Release the screwdriver, check the tensioner rod to come out and tighten the gasket "5" and the cap bolt "6" to the specified torque.

	Tensioner cap bolt 7Nm (0.7 m·kgf, 5.1 ft·lbf)



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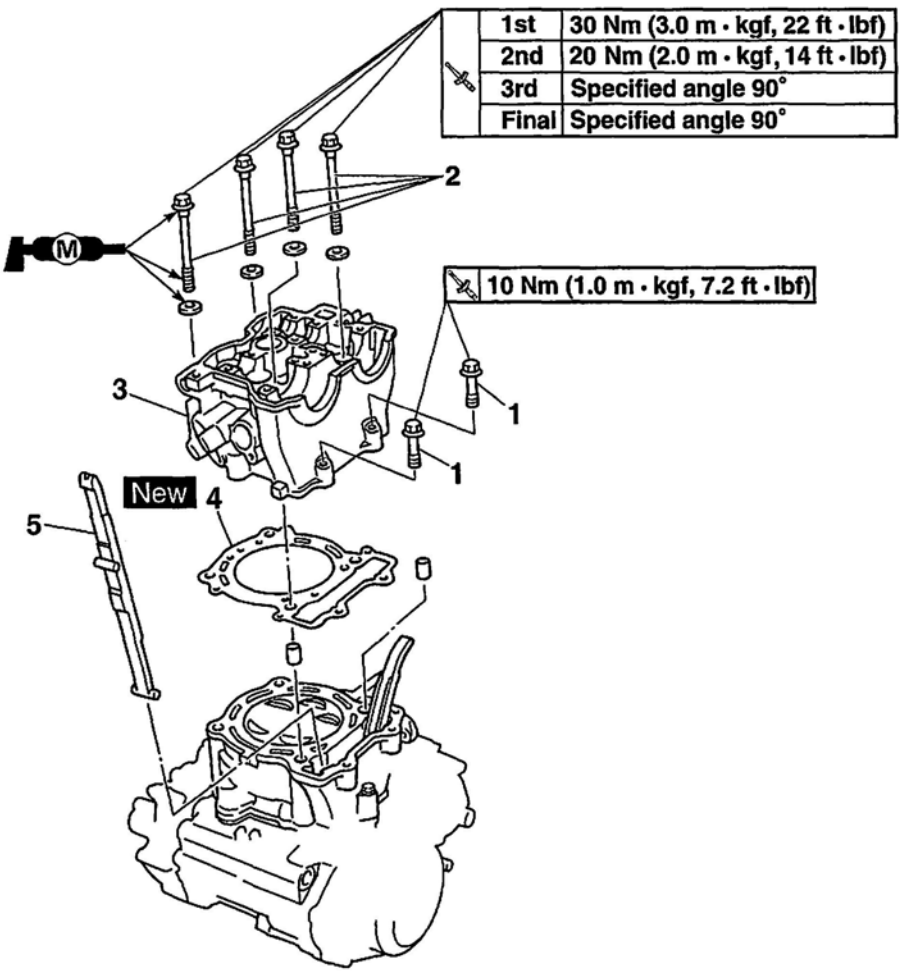
3. Turn:
   - Crankshaft
     Counterclockwise several turns.
4. Check:
   - Rotor TDC mark
     Align with the crankcase align mark.
   - Camshaft match marks
     Align with the cylinder head surface.
     Out of alignment → Adjust.
5. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to"ADJUSTING THE VALVE CLEARANCE" on page 3-7.

EAS24100
CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to"GENERAL CHASSIS" on page 5-1.
	Fuel tank		Refer to"FUEL TANK" on page 8-1.
	Exhaust pipe and silencer		Refer to"ENGINE REMOVAL" on page 6-1.
	Radiator		Refer to"RADIATOR" on page 7-1.
	Throttle body		Refer to"THROTTLE BODY" on page 8-6.
	Camshaft		Refer to"CAMSHAFT" on page 6-7.
1	Bolt	2	
2	Bolt	4	
3	Cylinder head	1	
4	Gasket	1	
5	Timing chain guide (exhaust side)	1	
			For installation, reverse the removal procedure.

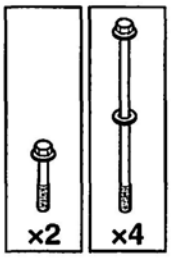
EAS1DX3171
REMOVING THE CYLINDER HEAD

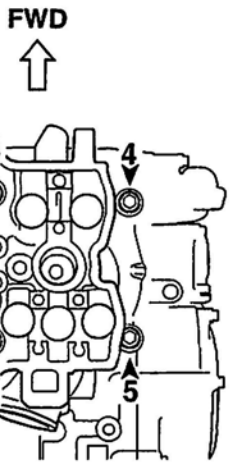
1. Remove:
   • Cylinder head bolts

TIP

• Loosen the bolts in the proper sequence as shown.
• Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.

• M6 × 35mm: "1" – "2"
• M10 × 165 mm: "3" – "6"





EAS1DX3172
CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

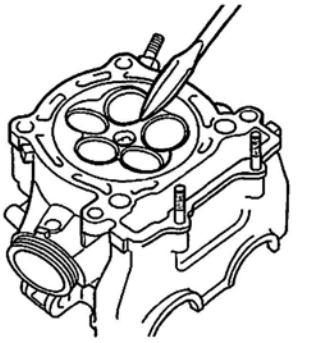
1. Check:
   • Timing chain guide (exhaust side)
   Damage/wear → Replace.

EAS24160
CHECKING THE CYLINDER HEAD

1. Eliminate:
   • Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:
• Spark plug bore threads
• Valve seats



2. Check:
   • Cylinder head
   Damage/scratches → Replace.

TIP

Replace the titanium valves with the cylinder head.

Refer to "CHECKING THE VALVE SEATS" on page 6-21
   • Cylinder head water jacket
   Mineral deposits/rust → Eliminate.
3. Measure:
   • Cylinder head warpage
   Out of specification → Resurface the cylinder head.

	Warpage limit **0.10 mm (0.0039 in)**

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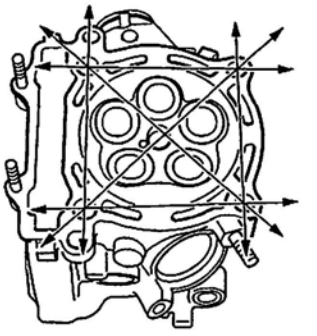
a. Place a straightedge and a thickness gauge across the cylinder head.
b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

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



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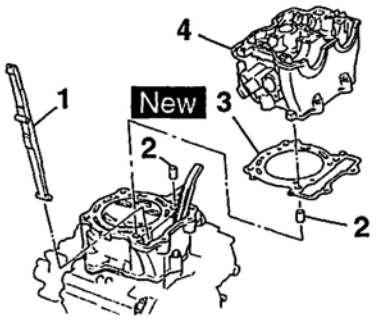
EAS24230
INSTALLING THE CYLINDER HEAD

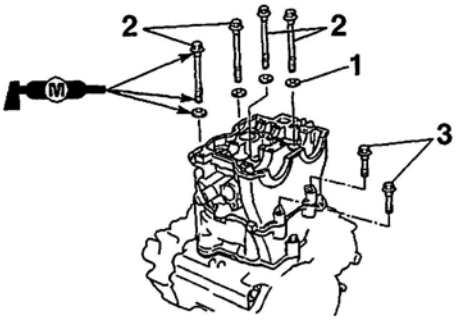
1. Install:
   - Timing chain guide (exhaust side) "1"
   - Dowel pin "2"
   - Cylinder head gasket "3" New
   - Cylinder head "4"

TIP

While pulling up the timing chain, install the timing chain guide (exhaust side) and cylinder head.



2. Install:
   - Washer "1"
   - Bolt "2"
   - Bolt "3"



TIP

Tighten the bolts using the following procedure.

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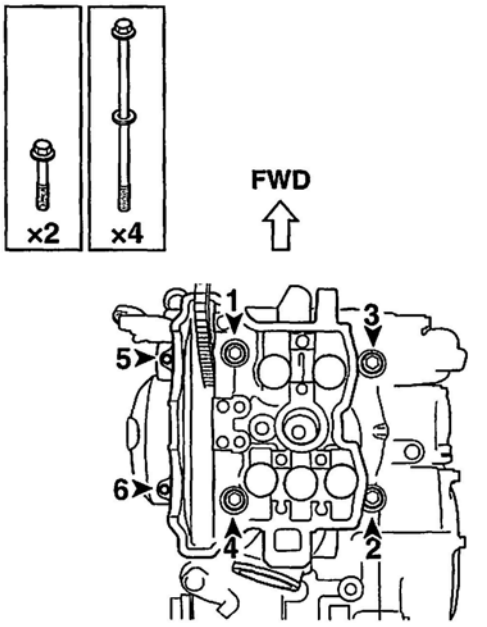
a. Wash the threads and contact surfaces of the bolts, the contact surfaces of the plain washers, the contact surface of the cylinder head, and the threads of the crankcase.
b. Apply the molybdenum disulfide grease on the threads and contact surfaces of the bolts and on both contact surfaces of the plain "1" – "4" washers.
c. Install the plain washers and bolts.
d. Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

Bolts "1" – "4"
1st
30 Nm (3.0 m·kgf, 22 ft·lbf)



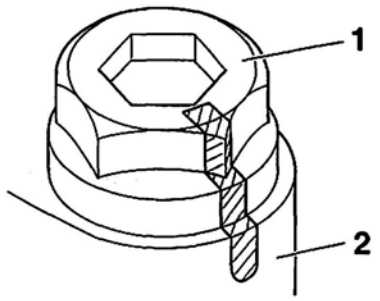
e. Remove the bolts.
f. Again apply the molybdenum disulfide grease on the threads and contact surfaces of the bolts and on both contact surfaces of the plain washers.
g. Retighten the bolts.

TIP

Tighten the bolts to the specified torque in two or three steps in the proper tightening sequence as shown.

Bolts "1" – "4"
2nd
20 Nm (2.0 m·kgf, 14 ft·lbf)

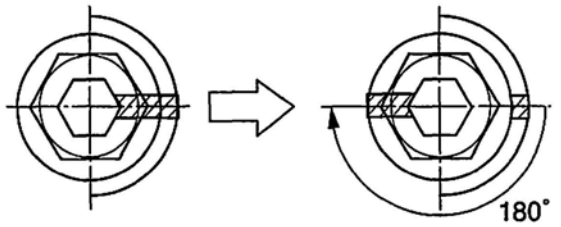
h. Put a mark on the corner "1" of the bolt (cylinder head) and the cylinder head "2" as shown.



TIP

Tighten the bolts 90° in each of the two steps to reach the specified angle of 180° in the proper tightening sequence as shown.

	Bolts "1" – "4" **Final** **Specified angle 180°**



g. Tighten the bolts to the specified torque.

	Bolt "5", "6" **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

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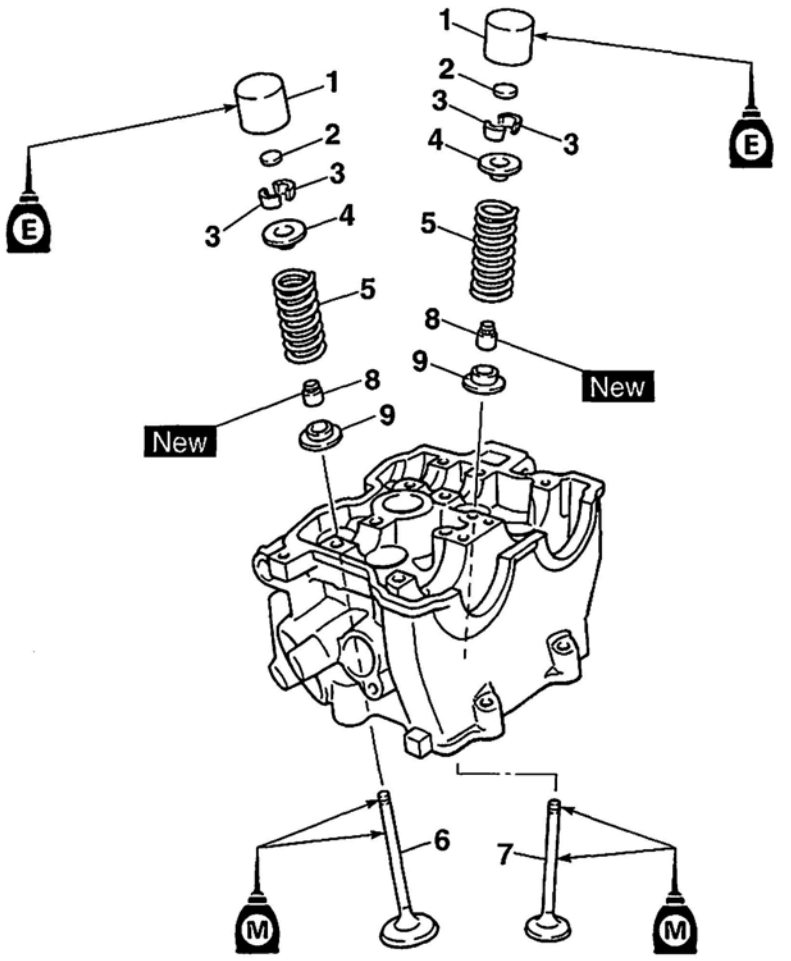
EAS24270
VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to"CYLINDER HEAD" on page 6-14.
1	Valve lifter	5	
2	Valve pad	5	
3	Valve cotter	10	
4	Valve spring retainer	5	
5	Valve spring	5	
6	Exhaust valve	2	
7	Intake valve	3	
8	Valve stem seal	5	
9	Valve spring seat	5	
			For installation, reverse the removal procedure.

EAS24280
REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

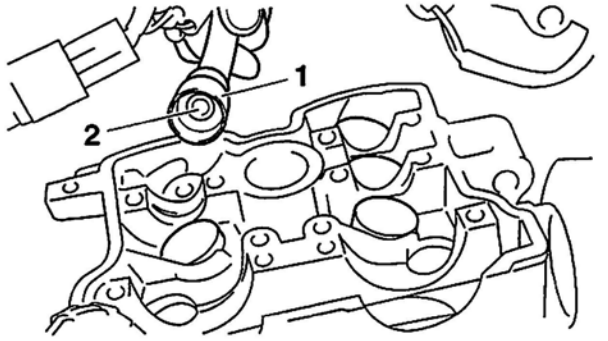
TIP

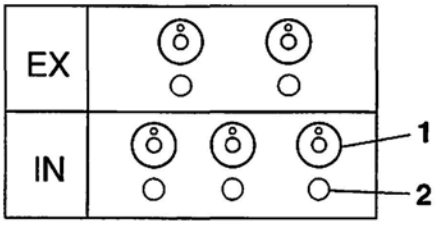
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
   - Valve lifter "1"
   - Valve pad "2"

TIP

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.





2. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to "CHECKING THE VALVE SEATS" on page 6-21.

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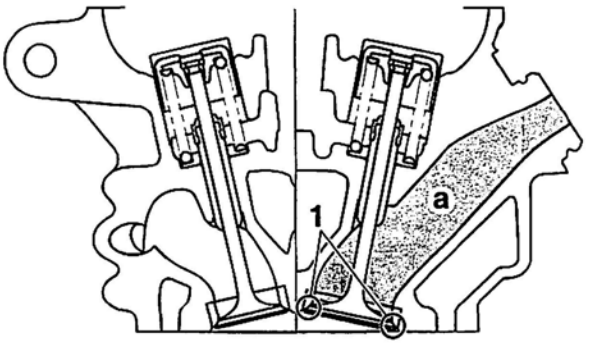
a. Pour a clean solvent "a" into the intake and exhaust ports.
b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



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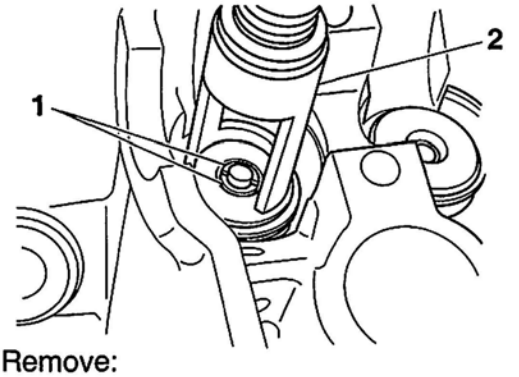
3. Remove:
   - Valve cotters "1"

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "2".

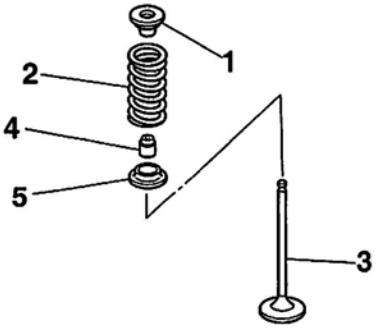
Valve spring compressor
90890-04019
YM-04019



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

TIP

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



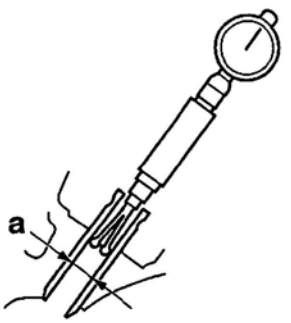
EAS24290
CHECKING THE VALVES AND VALVE GUIDES

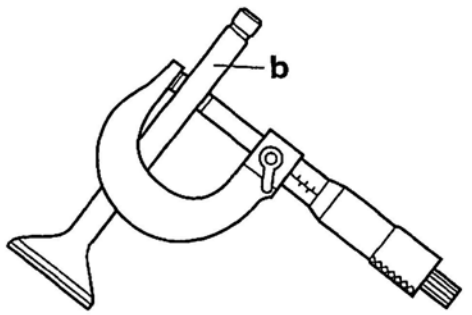
The following procedure applies to all of the valves and valve guides.

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

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

Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.020–0.047 mm (0.0008–0.0019 in)
Limit
0.100 mm (0.0039 in)





2. Replace:
   - Valve guide

TIP

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

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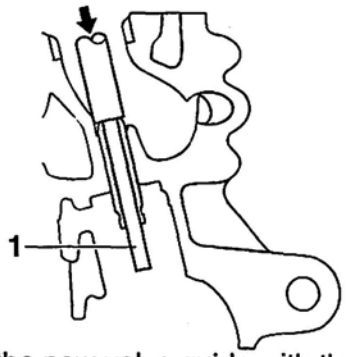
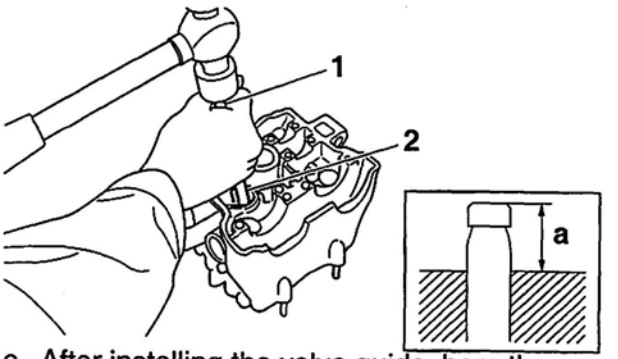
a. Remove the valve guide with the valve guide remover "1".

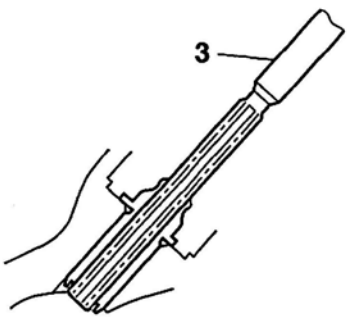


b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".

Valve guide installation height "a"
Intake
10.3-10.7 mm (0.41-0.42 in)
Exhaust
10.3-10.7 mm (0.41-0.42 in)



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



TIP

After replacing the valve guide, reface the valve seat.

Intake
Valve guide remover (ø4.5)
90890-04116
YM-04116
Valve guide installer (ø4.5)
90890-04117
YM-04117
Valve guide reamer (ø4.5)
90890-04118
YM-04118
Exhaust
Valve guide remover(ø5.0)
90890-04097
YM-04097
Valve guide installer (ø5.0)
90890-04098
YM-04098
Valve guide reamer (ø5.0)
90890-04099
YM-04099

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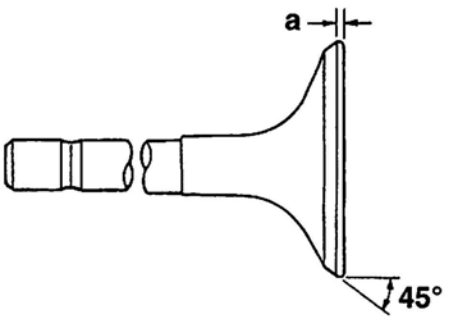
3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   • Valve margin thickness "a"
   Out of specification → Replace the valve.

Valve margin thickness D (intake)
1.00 mm (0.0394 in)
Valve margin thickness D (exhaust)
1.00 mm (0.0394 in)

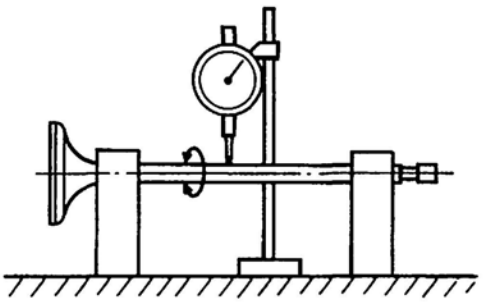


6. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
0.010 mm (0.0004 in)

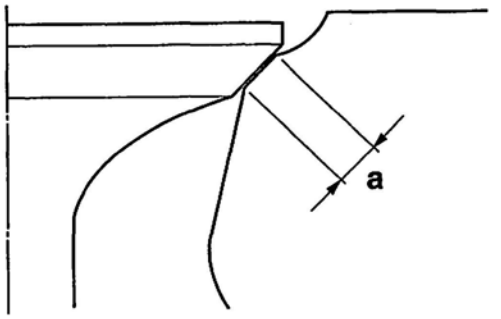


EAS24300
CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat width "a"
   Out of specification → Replace the cylinder head.

Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)



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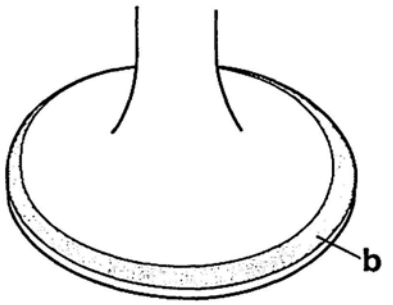
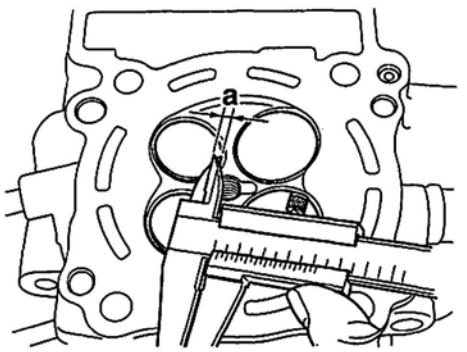
a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



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

TIP

Where the valve seat and valve face contacted one another, the blueing will have been removed.



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4. Lap:
   - Valve face
   - Valve seat

TIP

After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

ECA1DX1018

NOTICE

This model uses titanium intake valves. Titanium valves that have been used to lap the valve seats must not be used.Always replace lapped valves with new valves.

TIP

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

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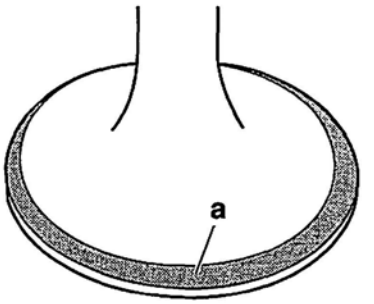
a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

NOTICE

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

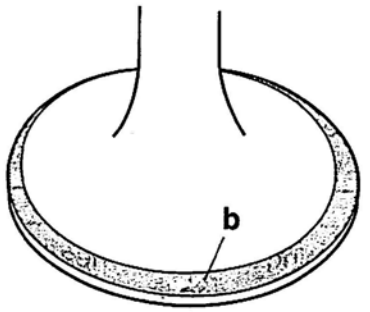


b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

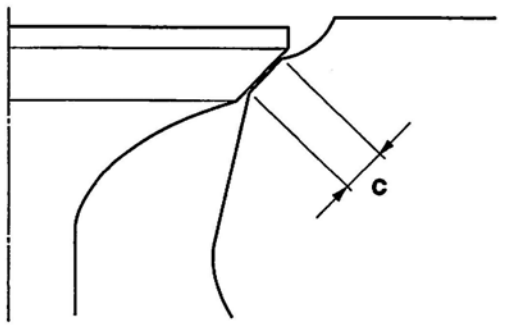
TIP

For the best lapping results, lightly tap the valve seat while turning the valve back and forth between your hands.

e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



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



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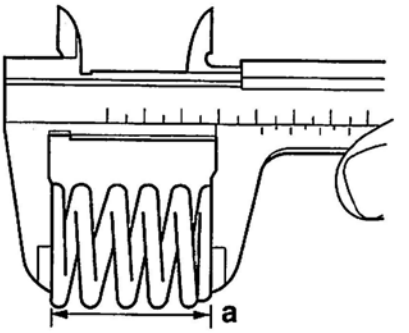
EAS24310
CHECKING THE VALVE SPRINGS

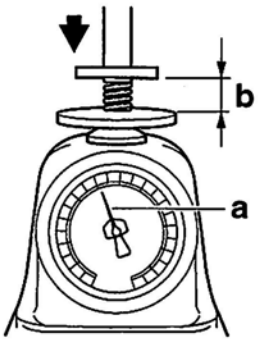
The following procedure applies to all of the valve springs.

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

Valve spring free length
Free length (intake)
39.46 mm (1.55 in)
Limit
38.46 mm (1.51 in)
Free length (exhaust)
37.61 mm (1.48 in)
Limit
36.61 mm (1.44 in)



2. Measure:
   • Compressed valve spring force "a"
   Out of specification → Replace the valve spring.

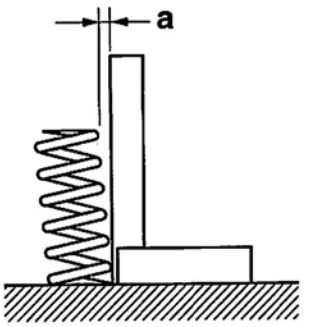


b. Installed length

Installed compression spring force (intake)
130.20–149.80 N (13.28–15.28 kgf, 29.27–33.68 lbf)
Installed compression spring force (exhaust)
123.10–141.70 N (12.55–14.45 kgf, 27.67–31.85 lbf)
Installed length (intake)
27.87 mm (1.10 in)
Installed length (exhaust)
28.38 mm (1.12 in)

3. Measure:
   • Valve spring tilt "a"
   Out of specification → Replace the valve spring.

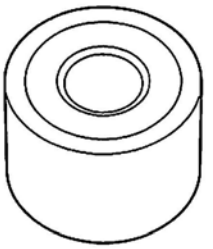
Spring tilt limit
Spring tilt (intake)
2.5 °/1.7 mm (2.5 °/0.07 in)
Spring tilt (exhaust)
2.5 °/1.6 mm (2.5 °/0.06 in)



EAS24320
CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

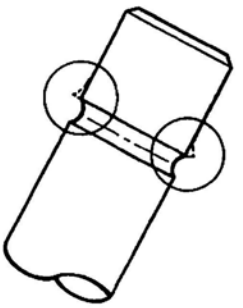
1. Check:
   - Valve lifter
     Damage/scratches → Replace the valve lifters and cylinder head.



EAS24340
INSTALLING THE VALVES

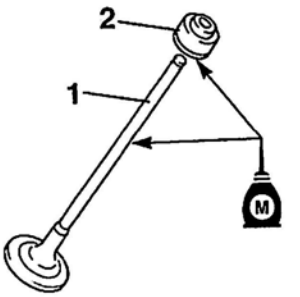
The following procedure applies to all of the valves and related components.

1. Deburr:
   - Valve stem end
     (with an oil stone)



2. Lubricate:
   - Valve stem "1"
   - Valve stem seal "2"
     (with the recommended lubricant)

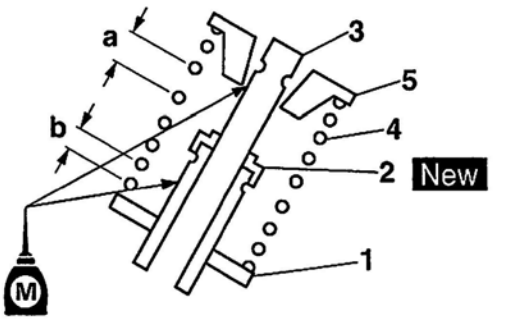
	Recommended lubricant **Molybdenum disulfide oil**



3. Install:
   - Spring seat "1"
   - Valve stem seal "2"
   - Valve "3"
   - Valve spring "4"
   - Valve spring retainer "5"
     (onto 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.



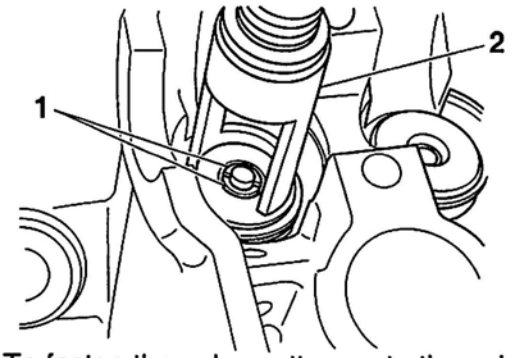
b. Smaller pitch

4. Install:
   - Valve cotters "1"

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor "2" and the valve spring compressor attachment.

	Valve spring compressor **90890-04019** **YM-04019**

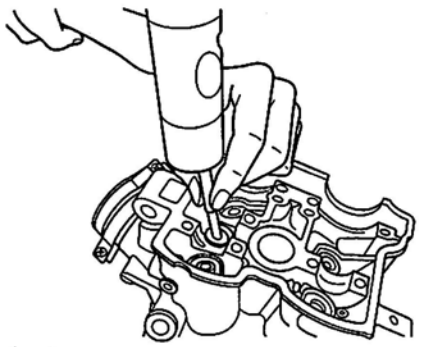


5. To fasten the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

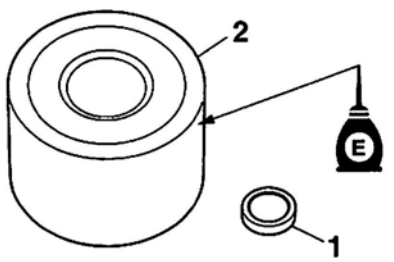
NOTICE

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



6. Lubricate:
   - Valve pad "1"
   - Valve lifter "2"

	Recommended lubricant **Engine oil**



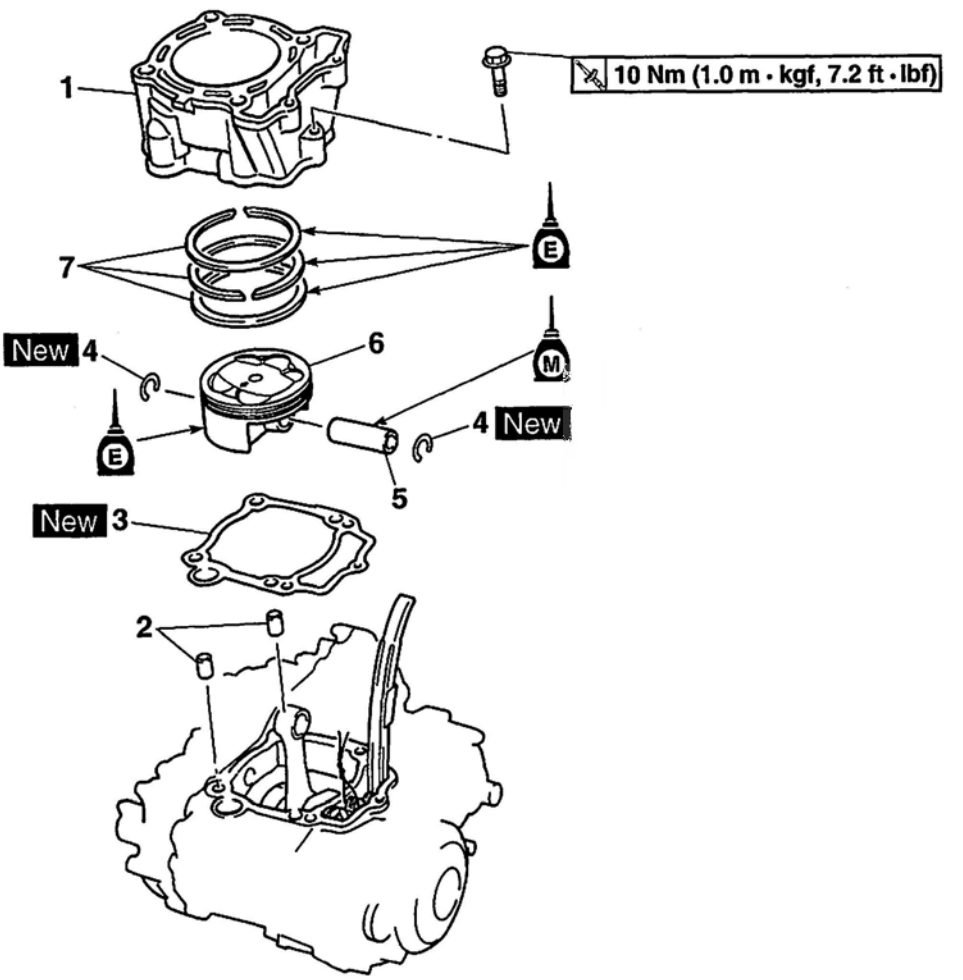
7. Install:
   - Valve pad
   - Valve lifter

TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

EAS24350
CYLINDER AND PISTON

Removing the cylinder and piston



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to"CYLINDER HEAD" on page 6-14.
1	Cylinder	1	
2	Dowel pin	2	
3	Cylinder gasket	1	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Piston ring set	1	
			For installation, reverse the removal procedure.

EAS24380
REMOVING THE PISTON

1. Remove:
   - Piston pin clips "1"
   - Piston pin "2"
   - Piston "3"

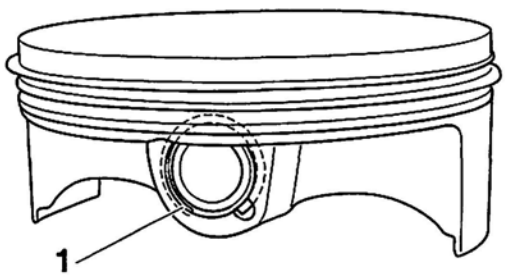
ECA13810
NOTICE

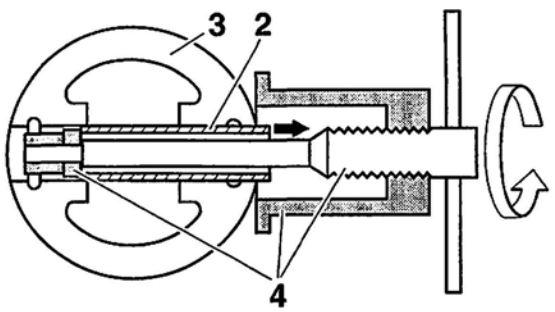
Do not use a hammer to drive the piston pin out.

TIP

- Before removing the piston pin clip, cover the crankcase opening with a clean rag 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's pin 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
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 other side of the ring over the piston crown.

EAS24390
CHECKING THE CYLINDER AND PISTON

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

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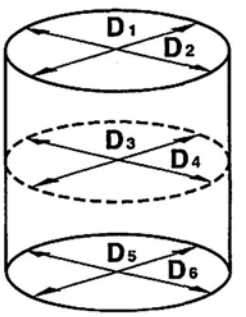
a. Measure cylinder bore "C" with the cylinder bore gauge.

TIP

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

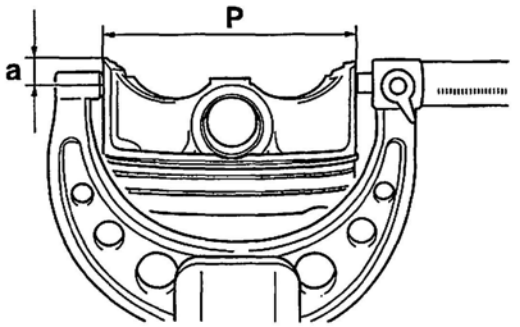
Bore
95.000–95.010 mm (3.7402–3.7405 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

"C" = maximum of D_1–D_6
"T" = (maximum of D_1 or D_2) - (maximum of D_5 or D_6)
Out of round limit = maximum of D_1, D_3 or D_5 - maximum of D_2, D_4 or D_6



b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "P" with the micrometer.

Diameter D
94.965–94.980 mm (3.7388–3.7394 in)



a. 9 mm (0.35 in) from the bottom edge of the piston

d. If out of specification, replace the cylinder, piston and piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore "D" -
Piston skirt diameter "P"

Piston-to-cylinder clearance
0.020–0.045 mm (0.0008–0.0018 in)
Limit
0.15 mm (0.006 in)

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

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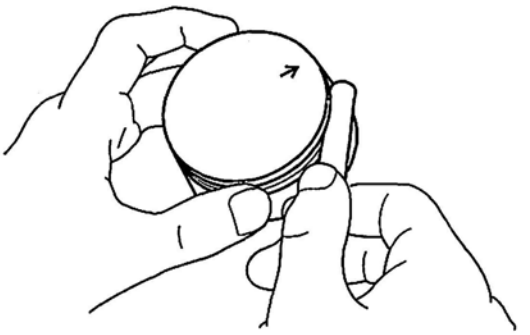
EAS24430
CHECKING THE PISTON RINGS

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.

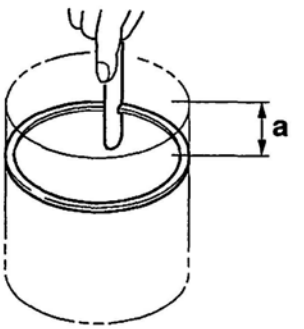
Piston ring side clearance
Ring side clearance
0.030–0.065 mm (0.0012–0.0026 in)
Limit
0.115 mm (0.0045 in)
Ring side clearance
0.020–0.055 mm (0.0008–0.0022 in)
Limit
0.115 mm (0.0045 in)



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

TIP

Level the piston ring into the cylinder with the piston crown.



a. 10 mm (0.39 in)

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

TIP

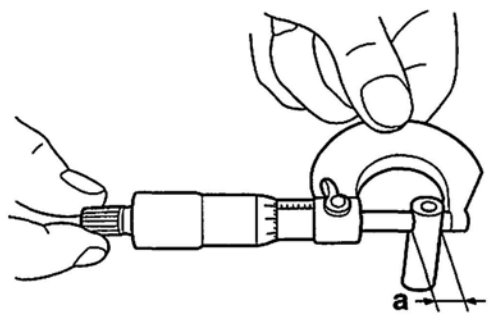
The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring
Top ring
End gap (installed)
0.20–0.30 mm (0.0079–0.0118 in)
Limit
0.55 mm (0.0217 in)
2nd ring
End gap (installed)
0.35–0.50 mm (0.0138–0.0197 in)
Limit
0.85 mm (0.0335 in)
Oil ring
End gap (installed)
0.20–0.50 mm (0.0079–0.0197 in)

EAS24440
CHECKING THE PISTON PIN

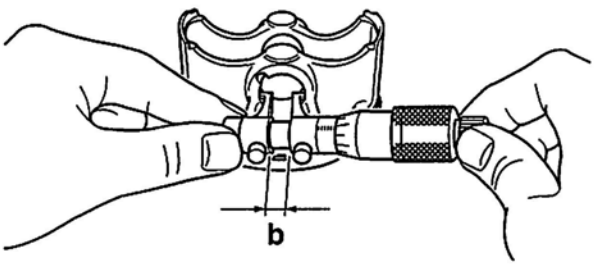
1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

Piston pin outside diameter
17.991–18.000 mm (0.7083–0.7087 in)
Limit
17.971 mm (0.7075 in)



3. Measure:
   - Piston pin bore diameter "b"
     Out of specification → Replace the piston.

Piston pin bore inside diameter
18.004–18.015 mm (0.7088–0.7093 in)
Limit
18.045 mm (0.7104 in)



4. Calculate:
   - Piston-pin-to-piston-pin-bore clearance
     Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter "b" -
Piston pin outside diameter "a"

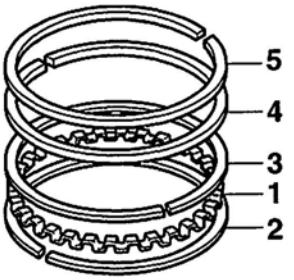
Piston-pin-to-piston-pin-bore clearance
0.004–0.024 mm (0.00016–0.00094 in)

EAS24450
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

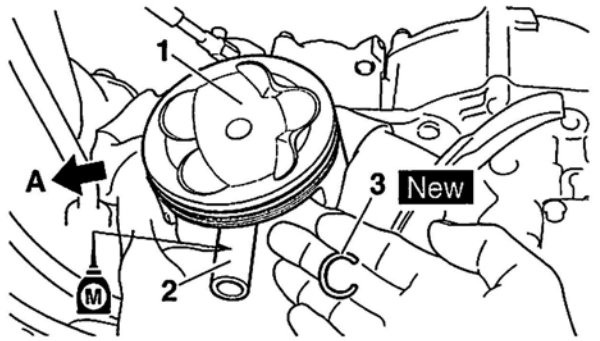
Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



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

TIP

- Apply molybdenum disulfide oil the piston pin.
- Install the piston as shown.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



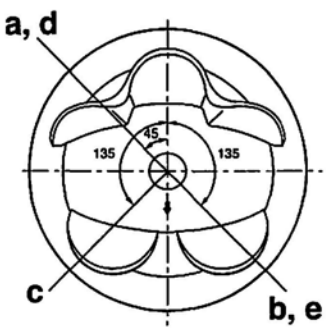
A. Exhaust side

3. Lubricate:
   - Piston
   - Piston rings
   - Cylinder

   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

4. Offset:
   - Piston ring end gaps



a. Top ring end
b. 2nd ring end
c. Upper oil ring end
d. Oil ring
e. Lower oil ring end

5. Install:
   - Cylinder gasket New
   - Dowel pin
   - Cylinder

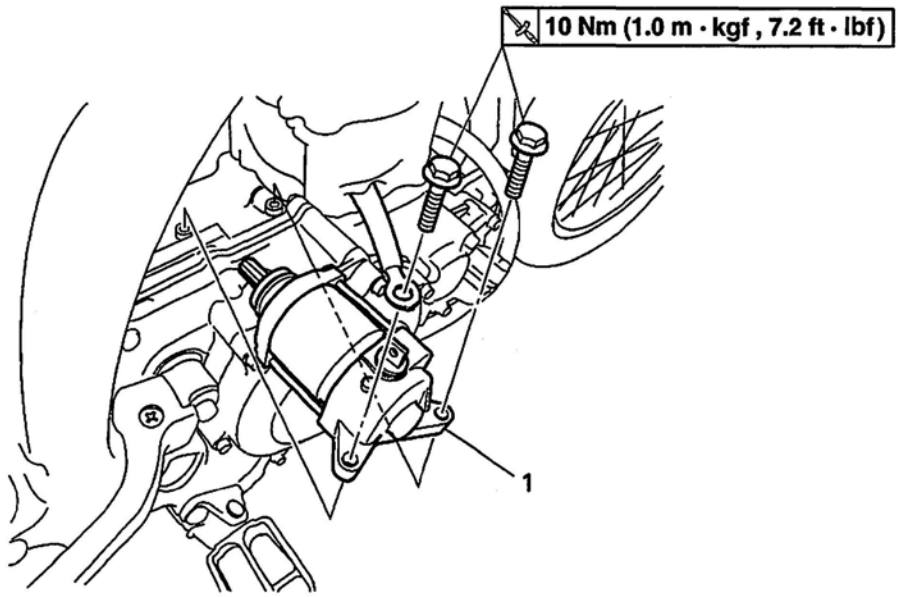
	Cylinder bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

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.

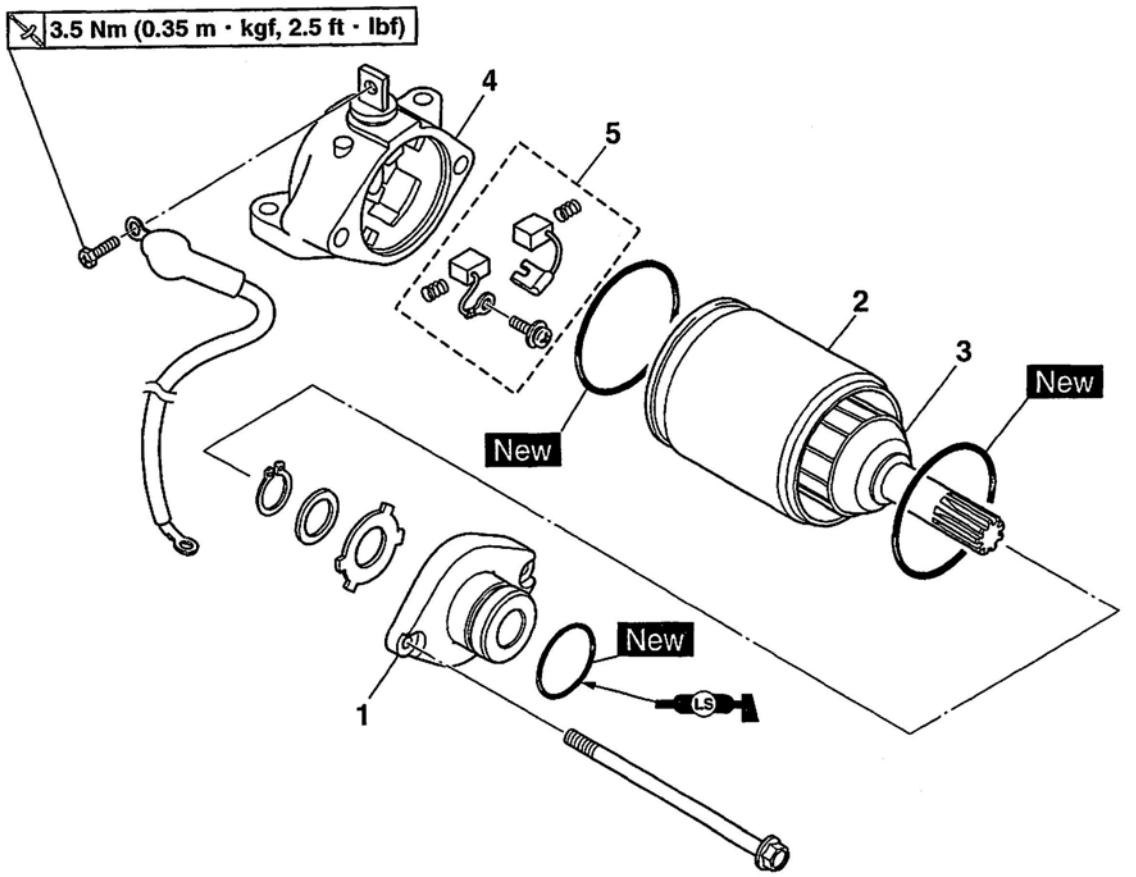
EAS24760
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe		Refer to"ENGINE REMOVAL" on page 6-1.
1	Starter motor	1	
			For assembly, reverse the disassemble procedure.

Disassembling the starter motor

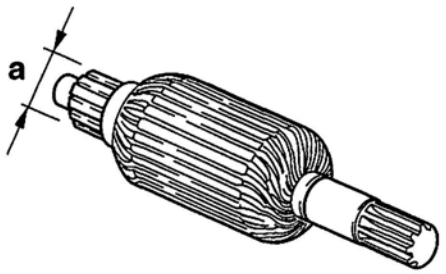


Order	Job/Parts to remove	Q'ty	Remarks
1	Starter motor front cover	1	
2	Starter motor yoke	1	
3	Armature assembly	1	
4	Starter motor rear cover	1	
5	Brush set	2	
			For assembly, reverse the disassembly procedure.

EAS24790
CHECKING THE STARTER MOTOR

1. Check:
   - Commutator
     Dirt → Clean with 600 grit sandpaper.
2. Measure:
   - Commutator diameter "a"
     Out of specification → Replace the starter motor.

Limit
16.6 mm (0.65 in)



3. Measure:
   - Mica undercut "a"
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
1.50 mm (0.06 in)

TIP

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

4. Measure:
   - Armature assembly resistances (commutator and insulation)
     Out of specification → Replace the starter motor.

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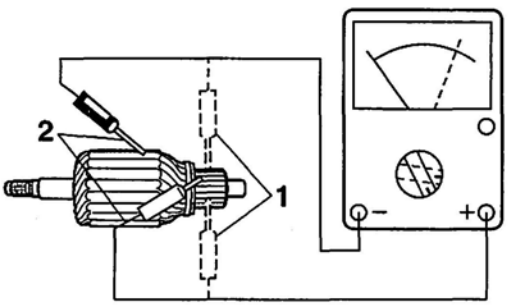
a. Measure the armature assembly resistances with the pocket tester.

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

Armature coil
Commutator resistance "1"
0.0117–0.0143 Ω
Insulation resistance "2"
Above 1 MΩ

b. If any resistance is out of specification, replace the starter motor.



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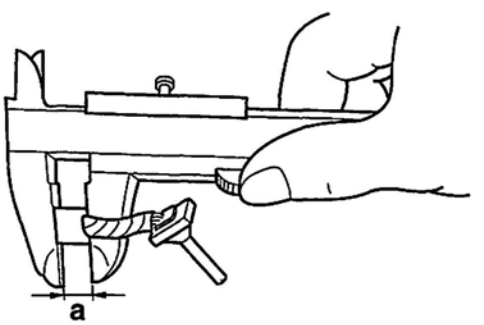
5. Measure:
   - Brush length "a"
     Out of specification → Replace the brush set.

Limit
3.50 mm (0.14 in)



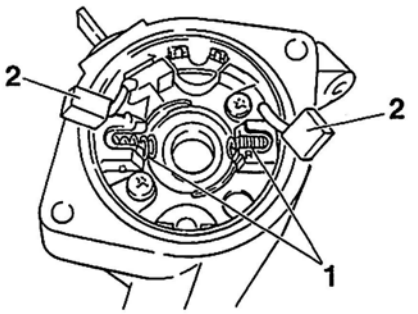
6. Measure:
   - Brush spring force
     Out of specification → Replace the brush set.

Brush spring force
3.92–5.88 N (400–600 gf, 14.11–21.17 oz)

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

EAS24600
ASSEMBLING THE STARTER MOTOR

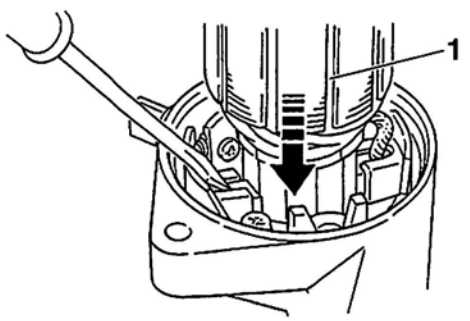
1. Install:
   • Brush spring "1"
   • Brush "2"



2. Install:
   • Armature assembly "1"
   Install while holding down the brush using a thin screw driver.

ECA1DX1019
NOTICE

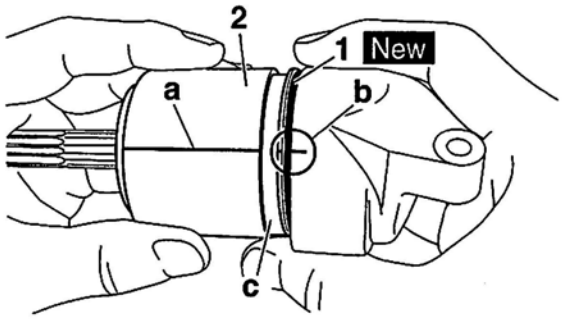
Be careful not to damage the brush during installation.



3. Install:
   • O-ring "1" New
   • Starter motor yoke "2"

TIP

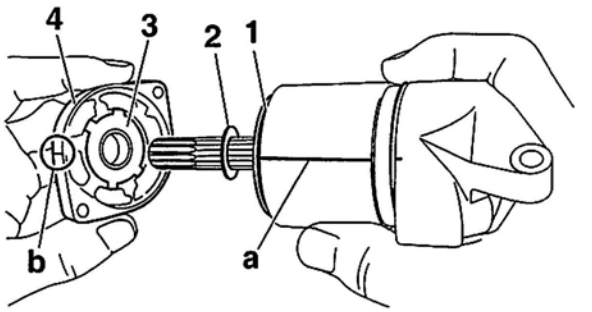
- Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor rear cover.
- Install the starter motor yoke with its groove "c" facing rear cover.



4. Install:
   • O-ring "1" New
   • Circlip
   • Plain washer "2"
   • Washer (starter motor front cover) "3"
   • Starter motor front cover "4"

TIP

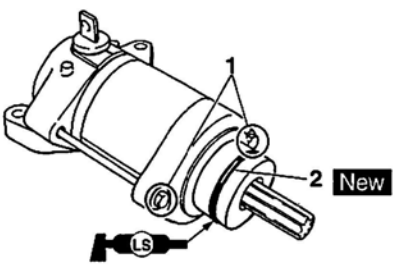
- For installation, align the projections on the washer with the slots in the front cover.
- Align the match mark "a" on the starter motor yoke with the match mark "b" on the starter motor front cover.



5. Install:
   • Bolt "1"
   • O-ring "2" New

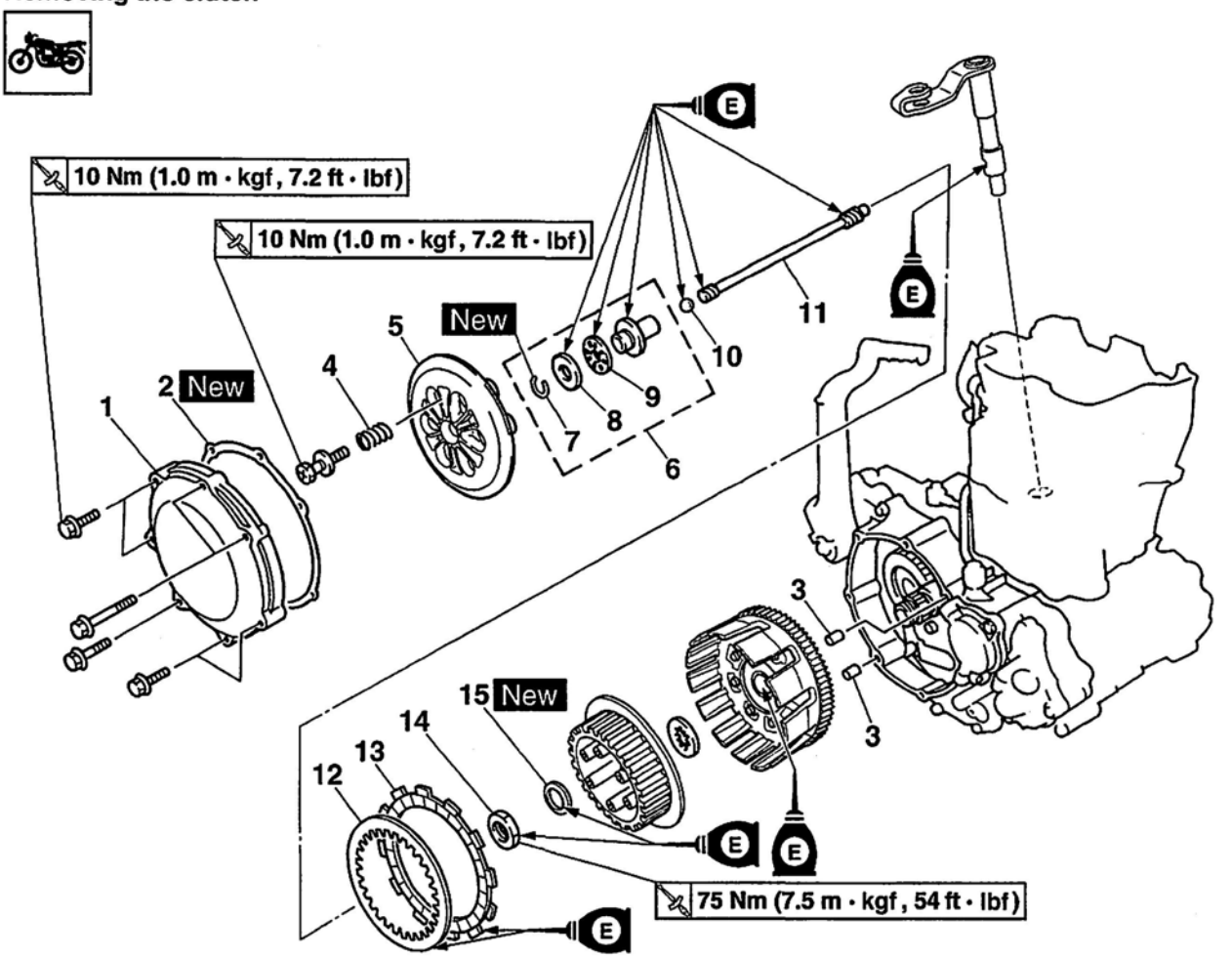
TIP

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



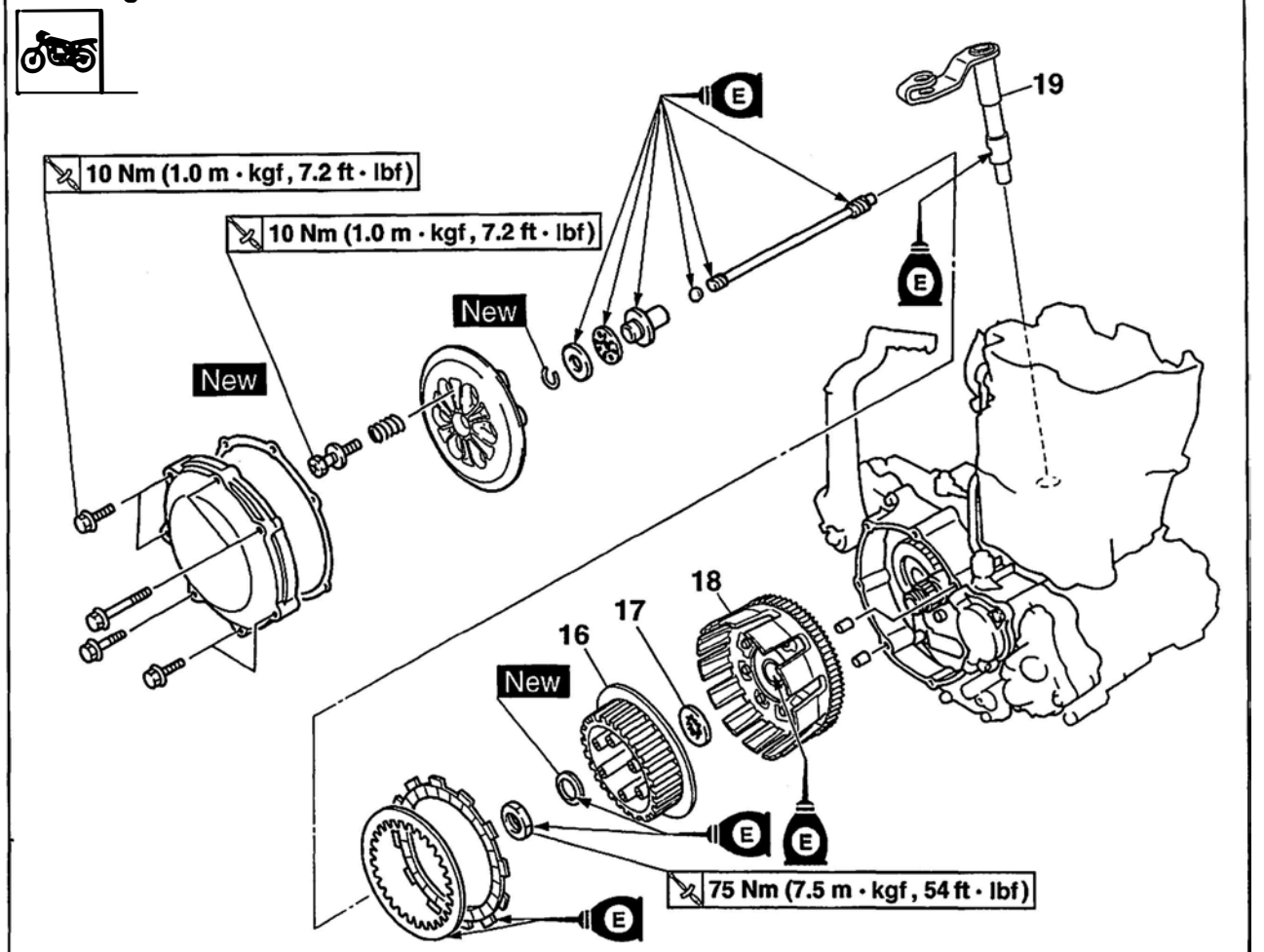
EAS1DX3173
CLUTCH

Removing the clutch



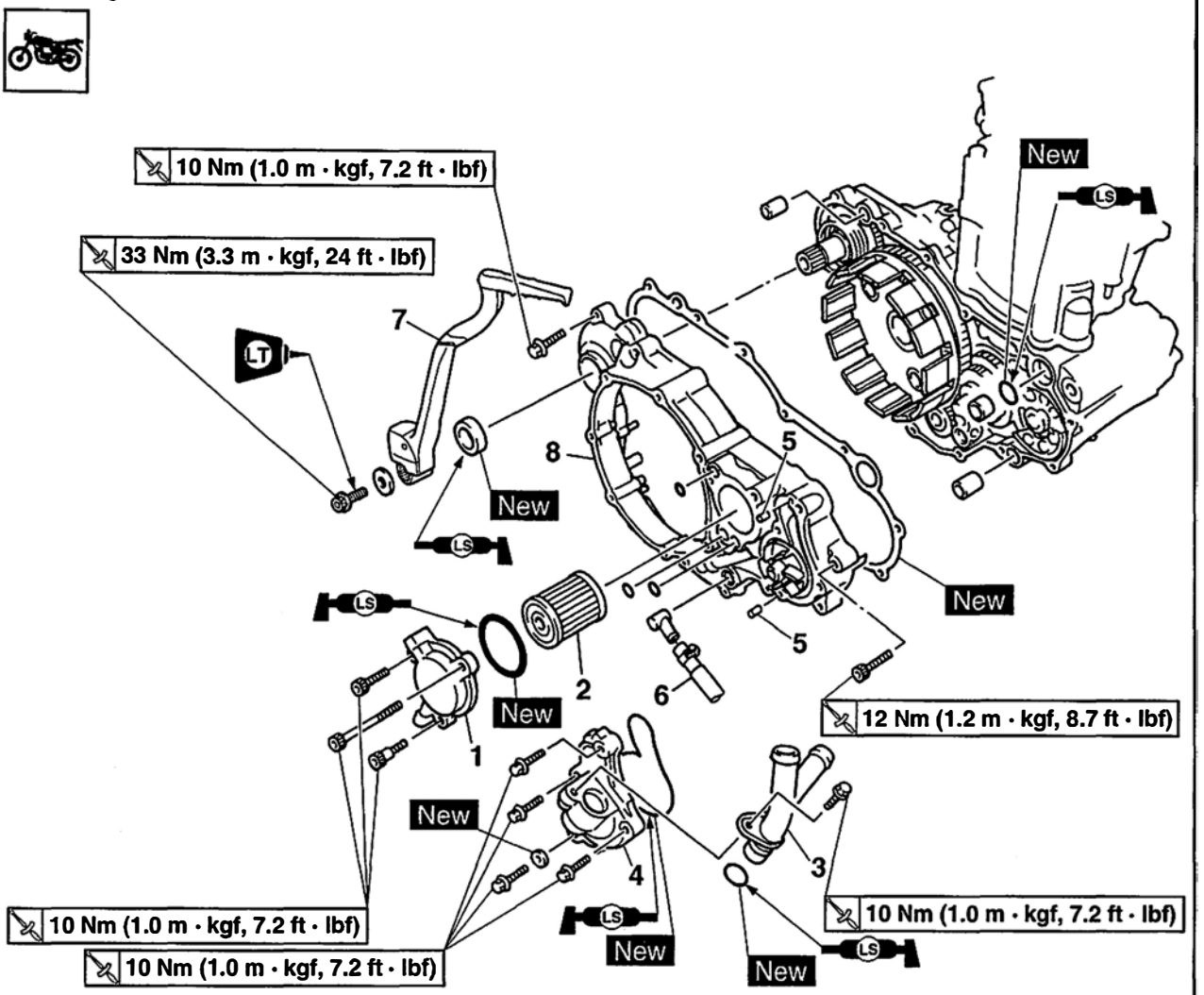
Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch cover	1	
2	Gasket	1	
3	Dowel pin	2	
4	Clutch spring	6	
5	Pressure plate	1	
6	Push rod 1	1	
7	Circlip	1	
8	Washer	1	
9	Bearing	1	
10	Ball	1	
11	Push rod 2	1	
12	Clutch plate	7	
13	Friction plate	8	
14	Clutch boss nut	1	
15	Conical washer	1	

Removing the clutch



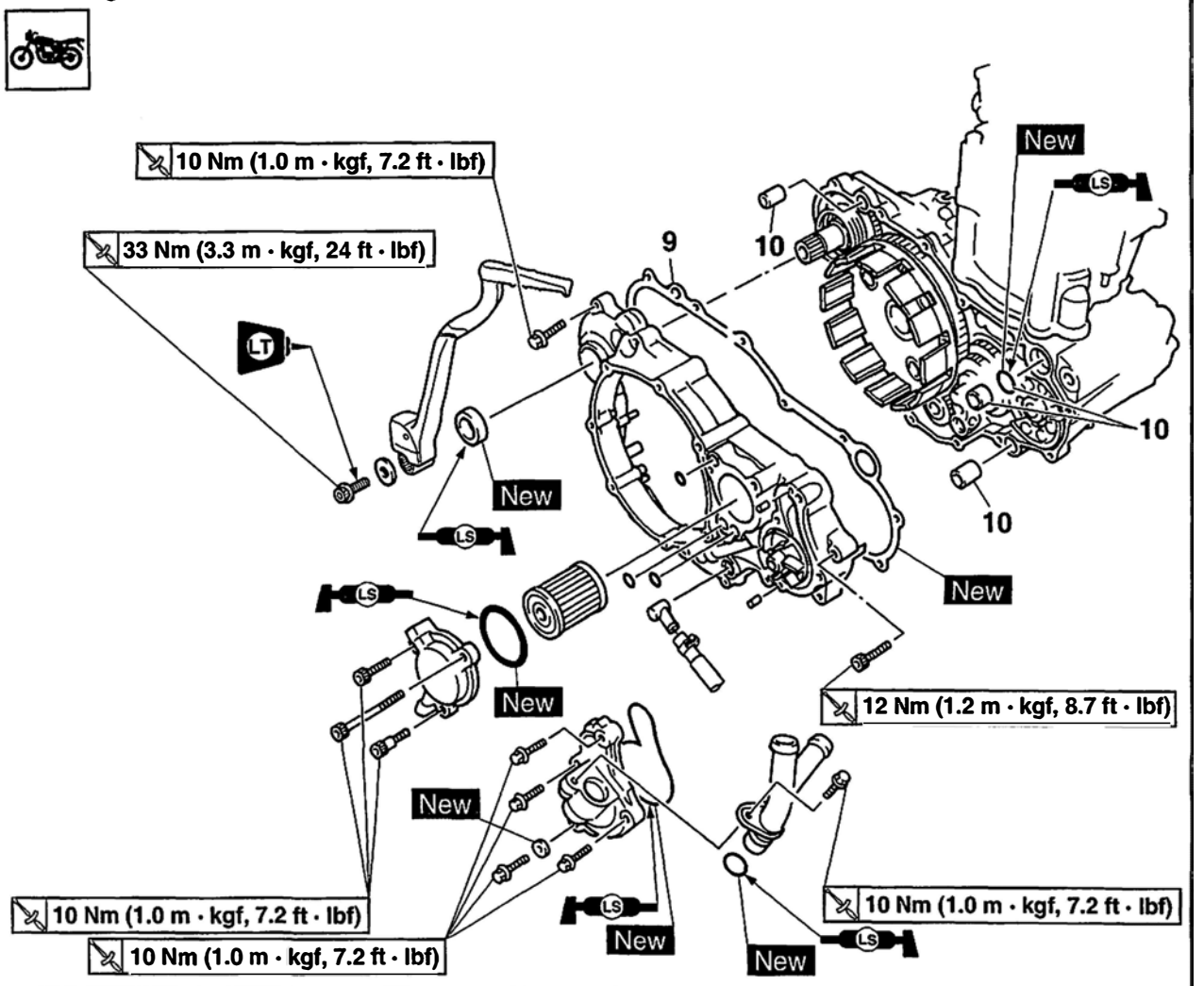
Order	Job/Parts to remove	Q'ty	Remarks
16	Clutch boss	1	
17	Thrust washer	1	
18	Primary driven gear	1	
19	Push lever shaft	1	
			For installation, reverse the removal procedure.

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Engine guard		Refer to"ENGINE REMOVAL" on page 6-1.
	Drain the engine oil.		Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Drain the coolant.		Refer to "CHANGING THE COOLANT" on page 3-16.
	Exhaust pipe		Refer to"ENGINE REMOVAL" on page 6-1.
	Brake pedal		Refer to"ENGINE REMOVAL" on page 6-1.
1	Oil filter element cover	1	
2	Oil filter element	1	
3	Coolant pipe 2	1	
4	Water pump housing	1	
5	Pin	2	
6	Oil tank breather hose	1	
7	Kickstarter crank	1	
8	Right crankcase cover	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
9	Gasket	1	
10	Dowel pin/O-ring	3/1	
			For installation, reverse the removal procedure.

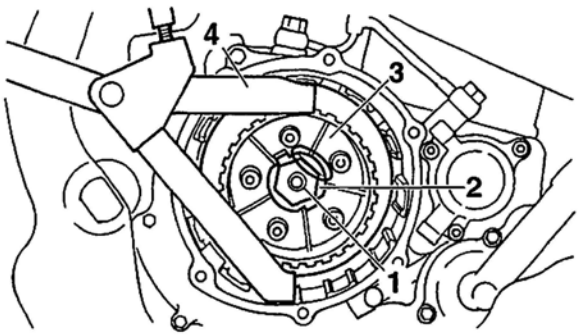
EAS25070
REMOVING THE CLUTCH

1. Straighten the lock washer tab.
2. Remove:
   - Clutch boss nut "1"
   - Conical washer "2"
   - Clutch boss "3"

TIP

While holding the clutch boss with the universal clutch holder "4", loosen the clutch boss nut.

Universal clutch holder
90890-04086
YM-91042



EAS25100
CHECKING THE FRICTION PLATES

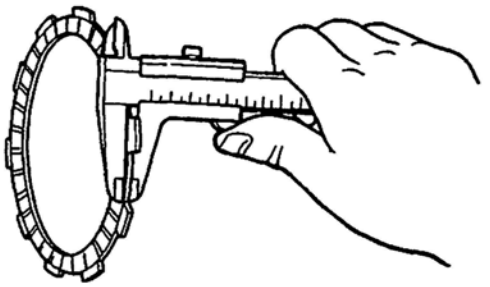
The following procedure applies to all of the friction plates.

1. Check:
   - Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace the friction plates as a set.

TIP

Measure the friction plate at four places.

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

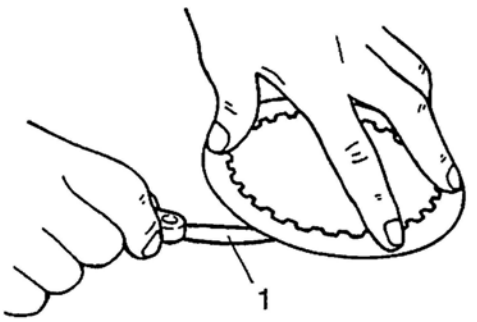


EAS25110
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate warpage
     (with a surface plate and thickness gauge "1")
     Out of specification → Replace the clutch plates as a set.

Warpage limit
0.10 mm (0.0039 in)



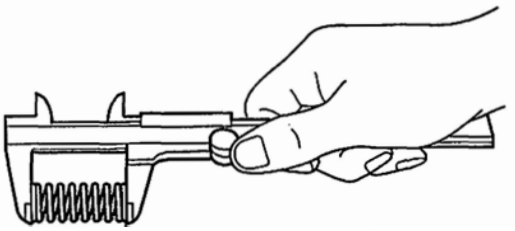
EAS25140
CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

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

2. Measure:
   • Clutch spring free length
   Out of specification → Replace the clutch springs as a set.

Clutch spring free length
50.00 mm (1.97 in)
Limit
49.00 mm (1.93 in)



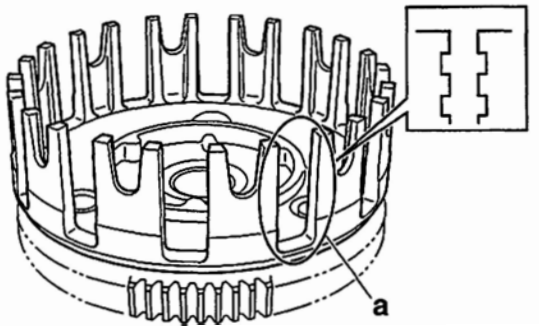
I1412901

EAS25150
CHECKING THE CLUTCH HOUSING

1. Check:
   • Clutch housing dogs "a"
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.

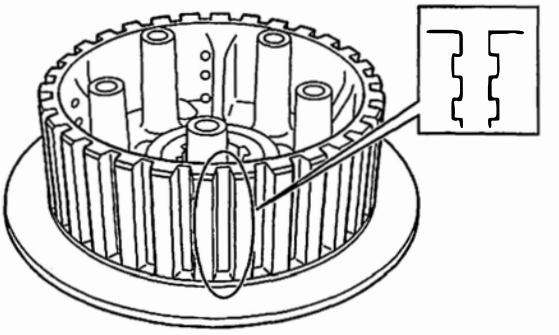


EAS25160
CHECKING THE CLUTCH BOSS

1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



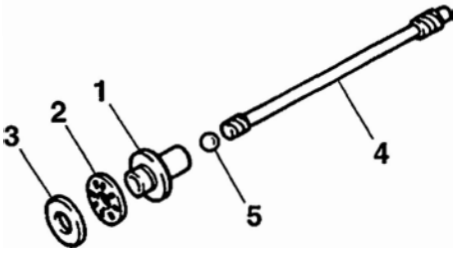
2. Check:
   • Primary driven gear
   Damage/wear → Replace the primary drive and clutch housing as a set.
   Excessive noise during operation → Replace the primary drive and clutch housing as a set.

EAS25170
CHECKING THE PRESSURE PLATE

1. Check:
   • Pressure plate
   Cracks/damage → Replace.

EAS25190
CHECKING THE CLUTCH PUSH RODS

1. Check:
   • Push rod 1 "1"
   • Bearing "2"
   • Washer "3"
   • Push rod 2 "4"
   • Ball "5"
   Cracks/damage/wear → Replace.



2. Measure:
   • Push rod 1 bending limit
   Out of specification → Replace the defective part (s).

Push rod bending limit
0.100 mm (0.0039 in)

EAS25200
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.

EAS25210
CHECKING THE PRIMARY DRIVEN GEAR

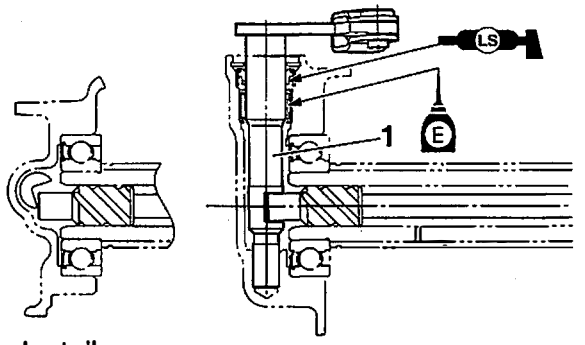
1. Check:
   - Primary driven gear
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS25260
INSTALLING THE CLUTCH

1. Install:
   - Push lever shaft "1"

TIP

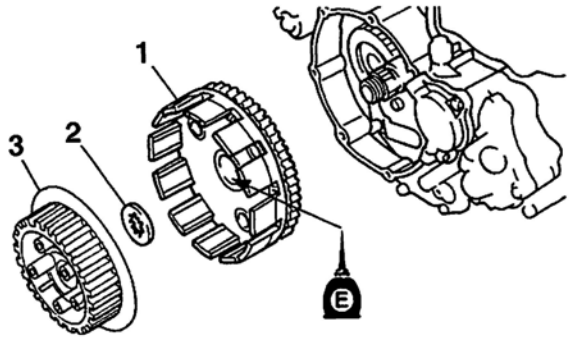
Apply the lithium soap base grease on the oil seal lip.



2. Install
   - Primary driven gear "1"
   - Thrust washer "2"
   - Clutch boss "3"

TIP

Apply the engine oil on the primary driven gear inner circumference.



3. Install:
   - Conical washer "1" New
   - Clutch boss nut "2"

	Clutch boss nut **75 Nm (7.5 m·kgf, 54 ft·lbf)**

ECA1DX1020

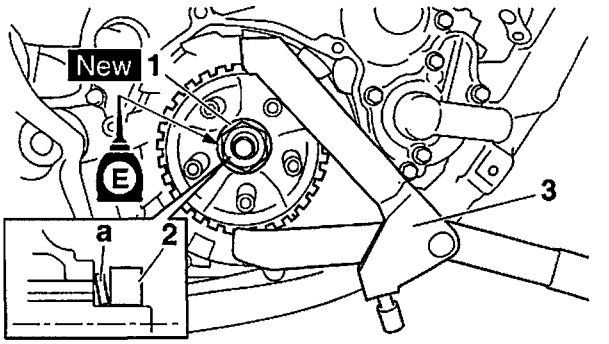
NOTICE

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

TIP

- Install the conical washer with its convex surface "a" outward.
- Apply engine oil to the threads and contact surface of the clutch boss nut.
- Apply engine oil to the contact surfaces of the conical washer.
- Use the clutch holding tool "3" to hold the clutch boss.

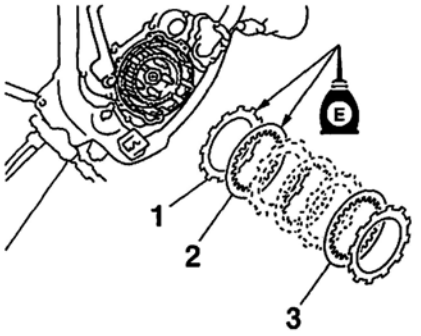
	Universal clutch holder **90890-04086** **YM-91042**

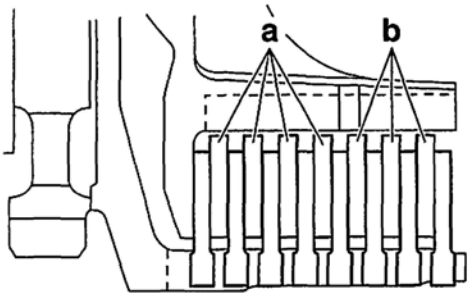


4. Install:
   - Friction plate "1"
   - Clutch plate 1 [t=2.0 mm (0.079 in)] "2"
   - Clutch plate 2 [t=1.6 mm (0.063 in)] "3"

TIP

- Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.
- Apply the engine oil on the friction plates and clutch plates.
- Check the clutch plate for thickness and install 4 thicker ones "a" on the engine side and 3 thinner ones "b" on the outside.

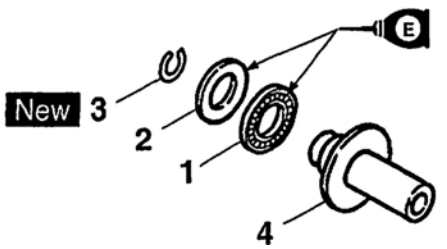




5. Install:
   - Bearing "1"
   - Washer "2"
   - Circlip "3" New
     To push rod 1 "4".

TIP

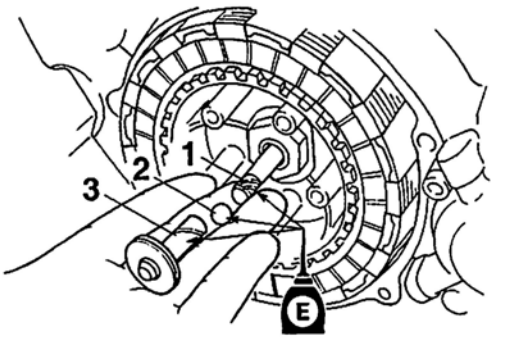
Apply the engine oil on the bearing and washer.



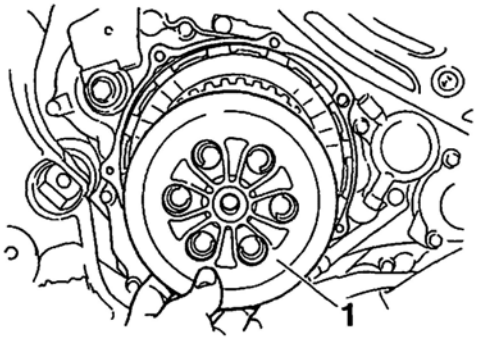
6. Install:
   - Push rod 2 "1"
   - Ball "2"
   - Push rod 1 "3"

TIP

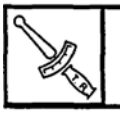
Apply the engine oil on the push rod 1, 2 and ball.



7. Install:
   - Pressure plate "1"

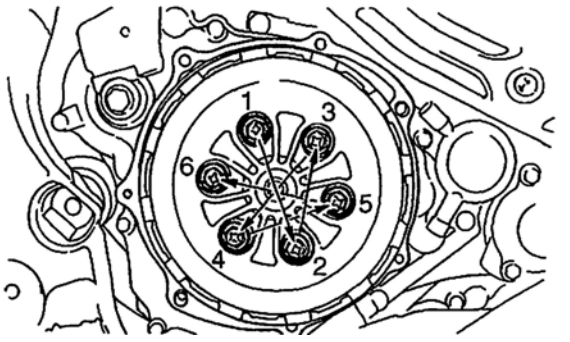


8. Install:
   - Clutch spring
   - Clutch spring bolt

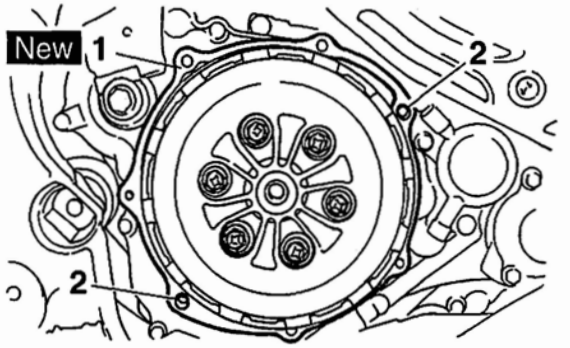
	**Clutch spring bolt** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

Tighten the bolts in stage, using a crisscross pattern.



9. Install:
   - Clutch cover gasket "1" New
   - Dowel pin "2"

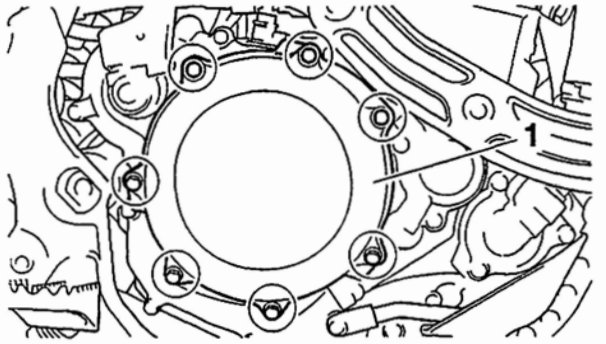


10. Install:
   - Clutch cover "1"
   - Clutch cover bolt

	Clutch cover bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

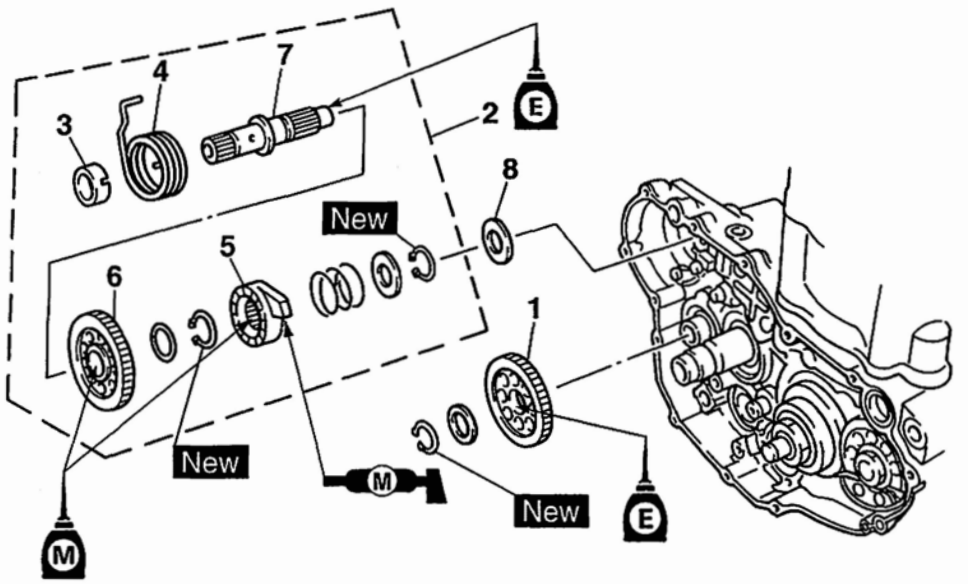
TIP

Tighten the bolts in stage, using a crisscross pattern.



EAS1DX3174
KICKSTATER

Removing the kick shaft



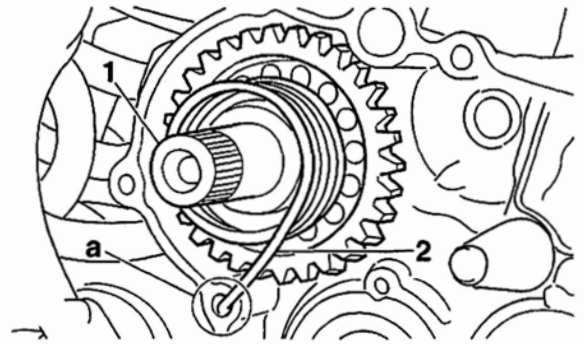
Order	Job/Parts to remove	Q'ty	Remarks
1	Kick idle gear	1	
2	Kick shaft assembly	1	
3	Spring guide	1	
4	Torsion spring	1	
5	Ratchet wheel	1	
6	Kick gear	1	
7	Kick shaft	1	
8	Washer	1	
			For assembly, reverse the disassembly procedure.

EAS1DX3175
REMOVING THE KICK SHAFT ASSEMBLY

1. Remove:
   • Kick shaft assembly "1"

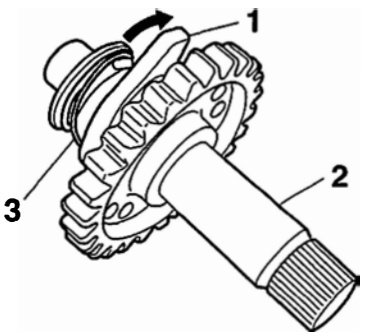
TIP

Unhook the torsion spring "2" from the hole "a" in the crankcase.



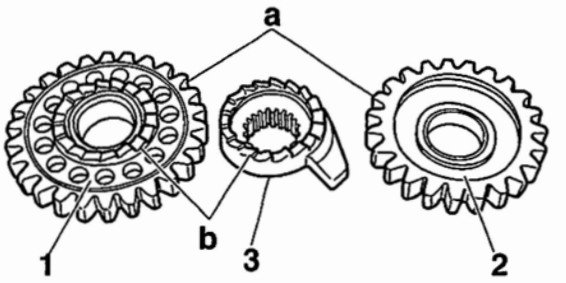
EAS1DX3176
CHECKING THE KICK SHAFT AND RATCHET WHEEL

1. Check:
   • Ratchet wheel "1" smooth movement
   Unsmooth movement → Replace.
   • Kick shaft "2"
   Wear/damage → Replace the kick shaft assembly.
   • Spring "3"
   Broken → Replace.



EAS1DX3177
CHECKING THE KICK GEAR, KICK IDLE GEAR AND RATCHET WHEEL

1. Inspect:
   • Kick gear "1"
   Wear/damage → Replace the kick shaft assembly.
   • Kick idle gear "2"
   • Ratchet wheel "3"
   • Gear teeth "a"
   • Ratchet teeth "b"
   Wear/damage → Replace.

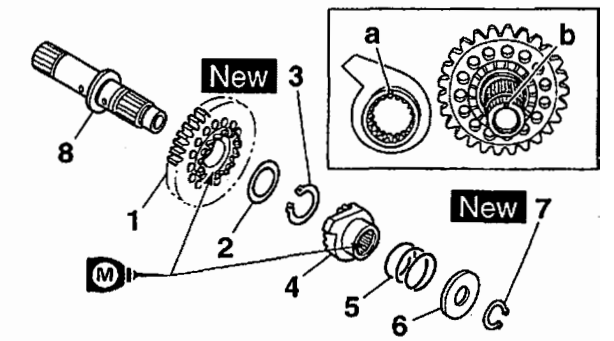


EAS1DX3178
INSTALLING THE KICK SHAFT ASSEMBLY

1. Install:
   • Kick gear "1"
   • Washer "2"
   • Circlip "3" New
   • Ratchet wheel "4"
   • Spring "5"
   • Washer "6"
   • Circlip "7" New
   To kick shaft "8".

TIP

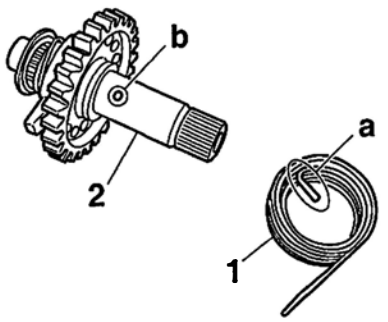
- Apply the molybdenum disulfide oil on the inner circumferences of the kick gear and ratchet wheel.
- Align the punch mark "a" on the ratchet wheel with the punch mark "b" on the kick shaft.



2. Install:
   • Torsion spring "1"
   To kick shaft "2".

TIP

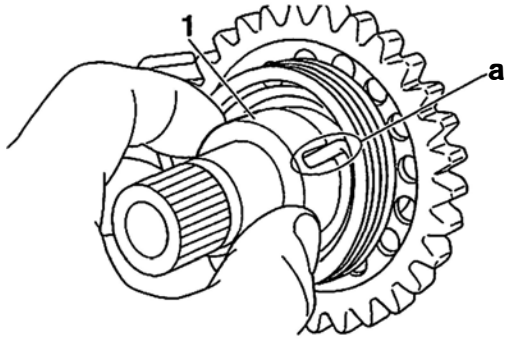
Make sure the stopper "a" of the torsion spring fits into the hole "b" on the kick shaft.



3. Install:
   • Spring guide "1"

TIP

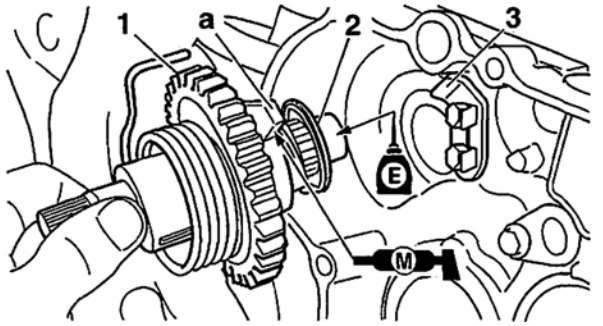
Slide the spring guide into the kick shaft, make sure the groove "a" in the spring guide fits on the stopper of the torsion spring.



4. Install:
   • Kick shaft assembly "1"
   • Washer "2"

TIP

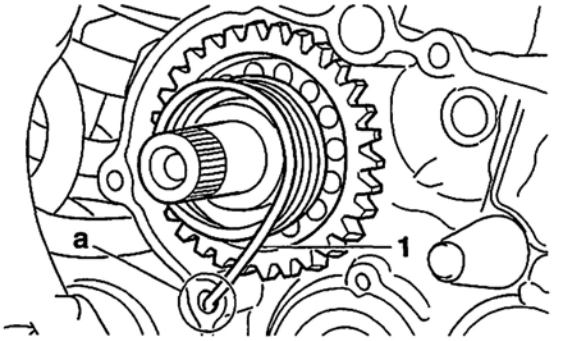
- Apply the molybdenum disulfide grease on the contacting surfaces of the kick shaft stopper "a" and kick shaft ratchet wheel guide "3".
- Apply the engine oil on the kick shaft.
- Slide the kick shaft assembly into the crankcase and make sure the kick shaft stopper "a" fits into the kick shaft ratchet wheel guide.



5. Hook:
   • Torsion spring "1"

TIP

Turn the torsion spring clockwise and hook into the proper hole "a" in the crankcase.



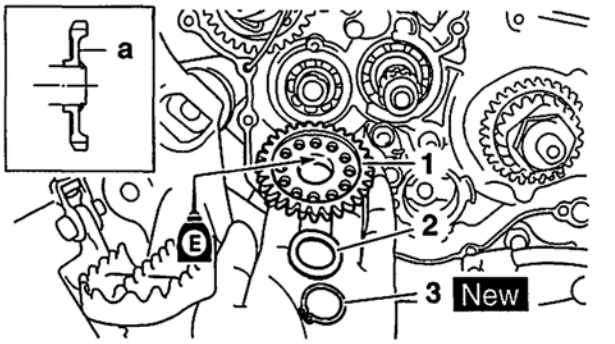
EAS1DX3179

INSTALLING THE KICK IDLE GEAR

1. Install:
   • Kick idle gear "1"
   • Washer "2"
   • Circlip "3" New

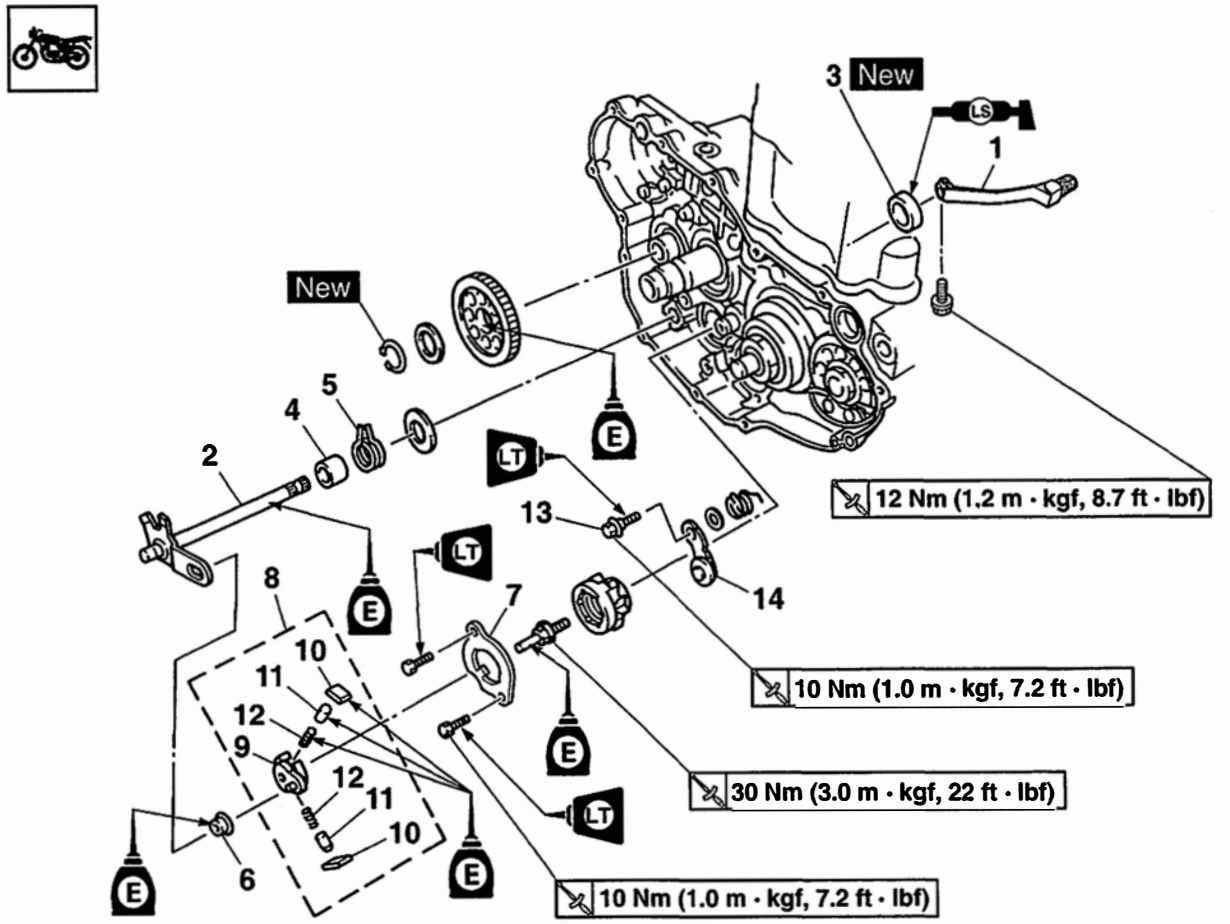
TIP

- Apply the engine oil on the kick idle gear inner circumference.
- Install the kick idle gear with its depressed side "a" toward you.



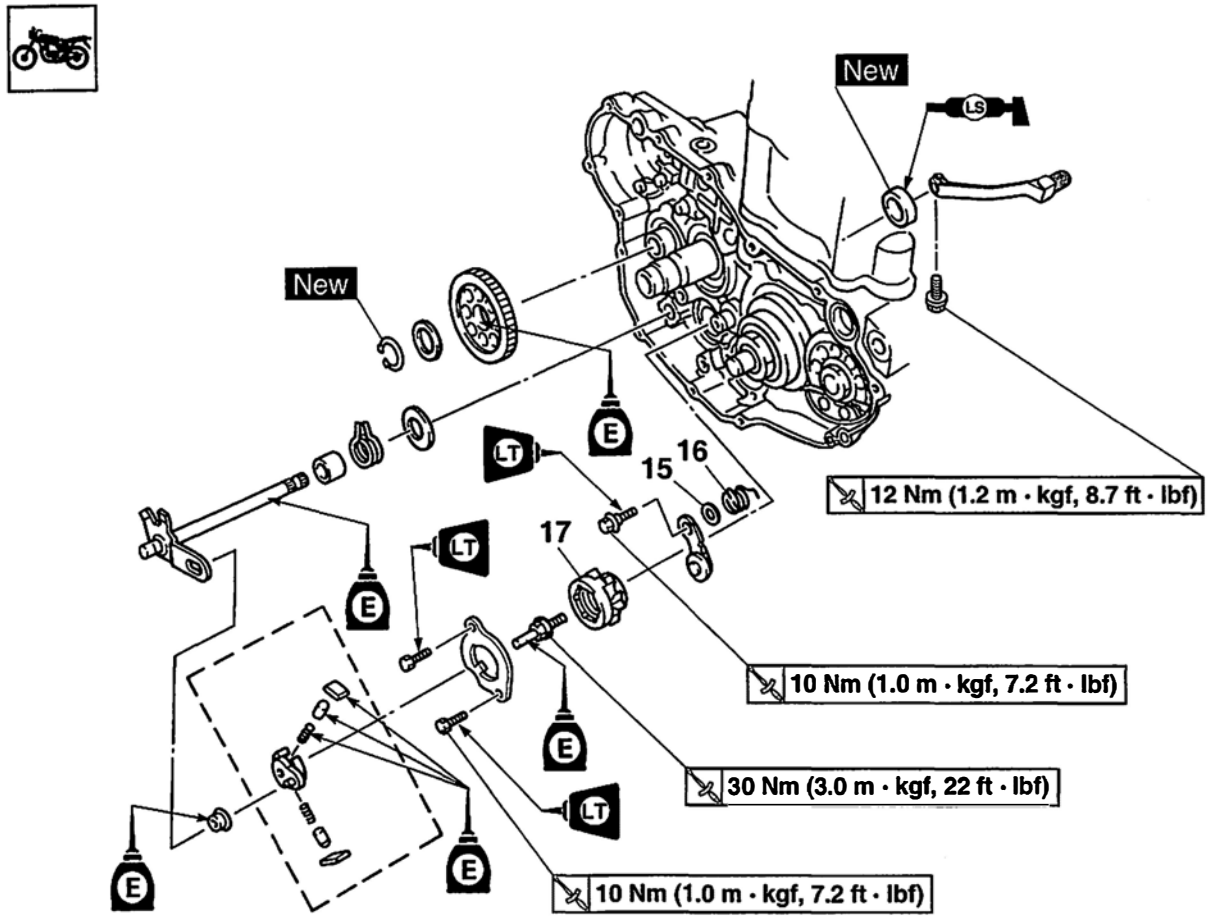
EAS25410
SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump		Refer to "OIL PUMP AND BALANCER GEAR" on page 6-51.
1	Shift pedal	1	
2	Shift shaft	1	
3	Oil seal	1	
4	Collar	1	
5	Shift shaft spring	1	
6	Roller	1	
7	Shift guide	1	
8	Shift lever assembly	1	
9	Shift lever	1	
10	Pawl	2	
11	Pawl pin	2	
12	Spring	2	
13	Bolt (stopper lever)	1	
14	Stopper lever	1	

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
15	Washer	1	
16	Stopper lever spring	1	
17	Segment	1	
			For installation, reverse the removal procedure.

EAS1DX3180
REMOVING THE SEGMENT

1. Remove:
   - Bolt (segment) "1"
   - Segment "2"

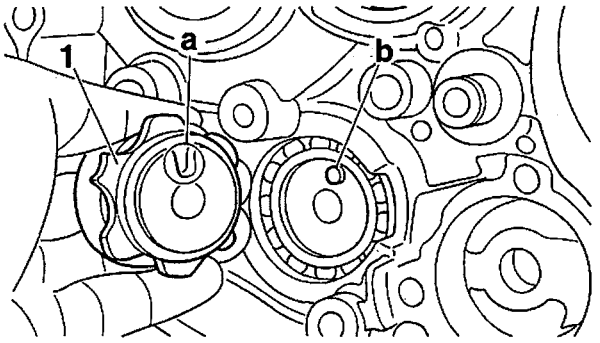
TIP

Turn the segment counterclockwise until it stops and loosen the bolt.

ECA1DX1021

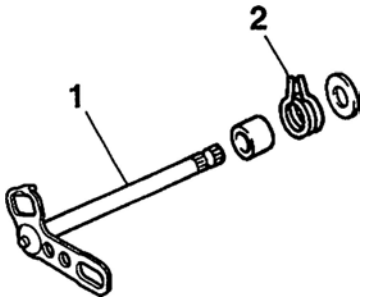
NOTICE

If the segment gets an impact, it may be damaged. Take care not to give an impact to the segment when removing the bolt.



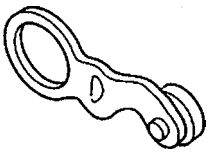
EAS25420
CHECKING THE SHIFT SHAFT

1. Check:
   - Shift shaft "1"
     Bends/damage/wear → Replace.
   - Shift shaft spring "2"
     Damage/wear → Replace.



EAS25430
CHECKING THE STOPPER LEVER

1. Check:
   - Stopper lever
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.
   - Stopper lever spring
   - Damage/wear → Replace.



EAS1DX3181
INSTALLING THE SEGMENT

1. Install:
   - Segment "1"
   - Segment bolt

	Segment bolt **30 Nm (3.0 m·kgf, 22 ft·lbf)**

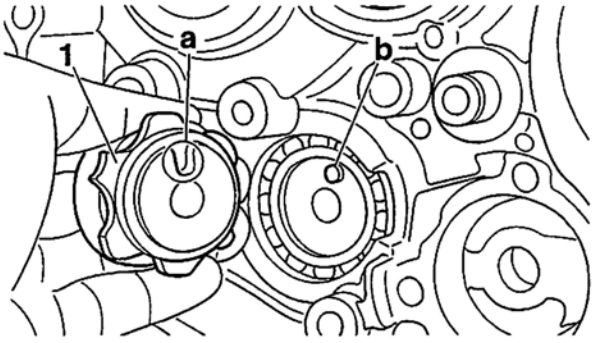
TIP

Align the notch "a" on the segment with the pin "b" on the shift cam.

ECA1DX1022

NOTICE

If the segment gets an impact, it may be damaged. Take care not to give an impact to the segment when tightening the bolt.



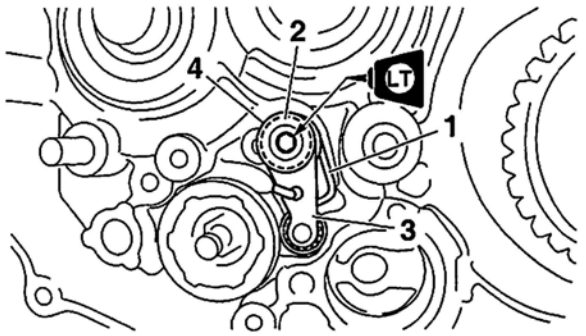
EAS1DX3182
INSTALLING THE STOPPER LEVER

1. Install:
   - Torsion spring "1"
   - Washer "2"
   - Stopper lever "3"
   - Stopper lever bolt "4"

	Stopper lever bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

Align the stopper lever roller with the slot on segment.



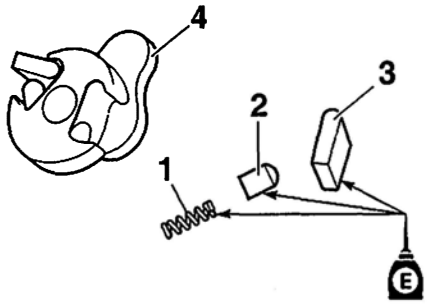
EAS1DX3183
INSTALLING THE SHIFT GUIDE AND SHIFT LEVER ASSEMBLY

1. Install:
   - Spring "1"
   - Pawl pin "2"
   - Pawl "3"

   To shift lever "4".

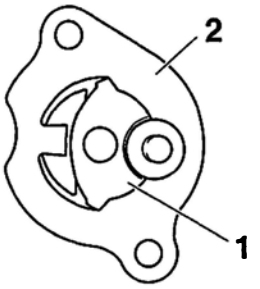
TIP

Apply the engine oil on the spring, pawl pin and pawl.



2. Install:
   - Shift lever assembly "1"

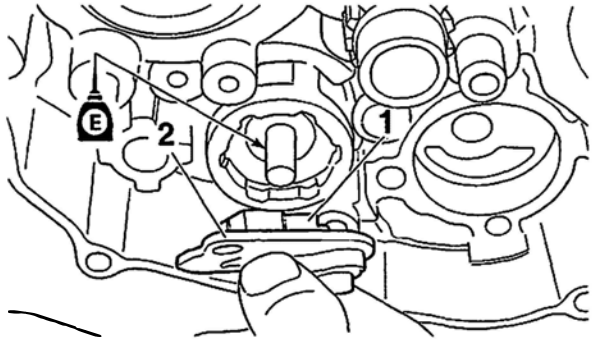
   To shift guide "2".



3. Install:
   - Shift lever assembly "1"
   - Shift guide "2"

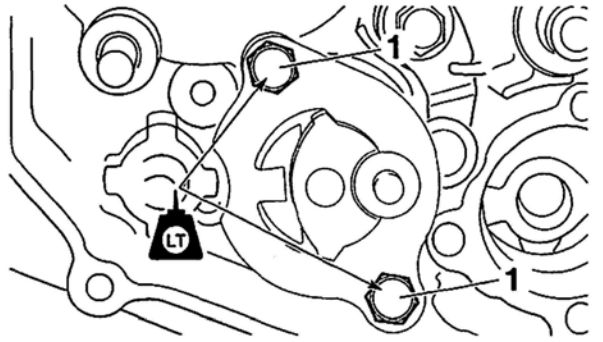
TIP

- The shift lever assembly is installed at the same time as the shift guide.
- Apply the engine oil on the segment bolt shaft.



4. Install:
   - Shift guide bolt "1"

	Shift guide bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

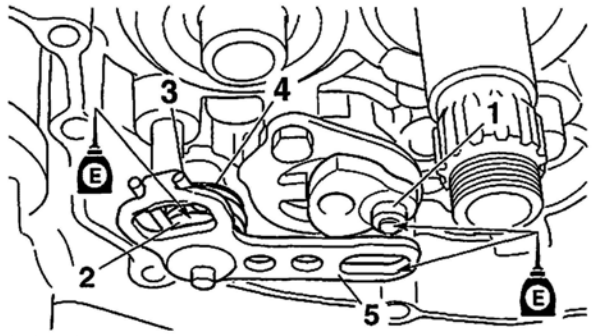


EAS25450
INSTALLING THE SHIFT SHAFT

1. Install:
   - Roller "1"
   - Collar "2"
   - Shift shaft spring "3"
   - Washer "4"
   - Shift shaft "5"

TIP

Apply the engine oil on the roller and shift shaft.

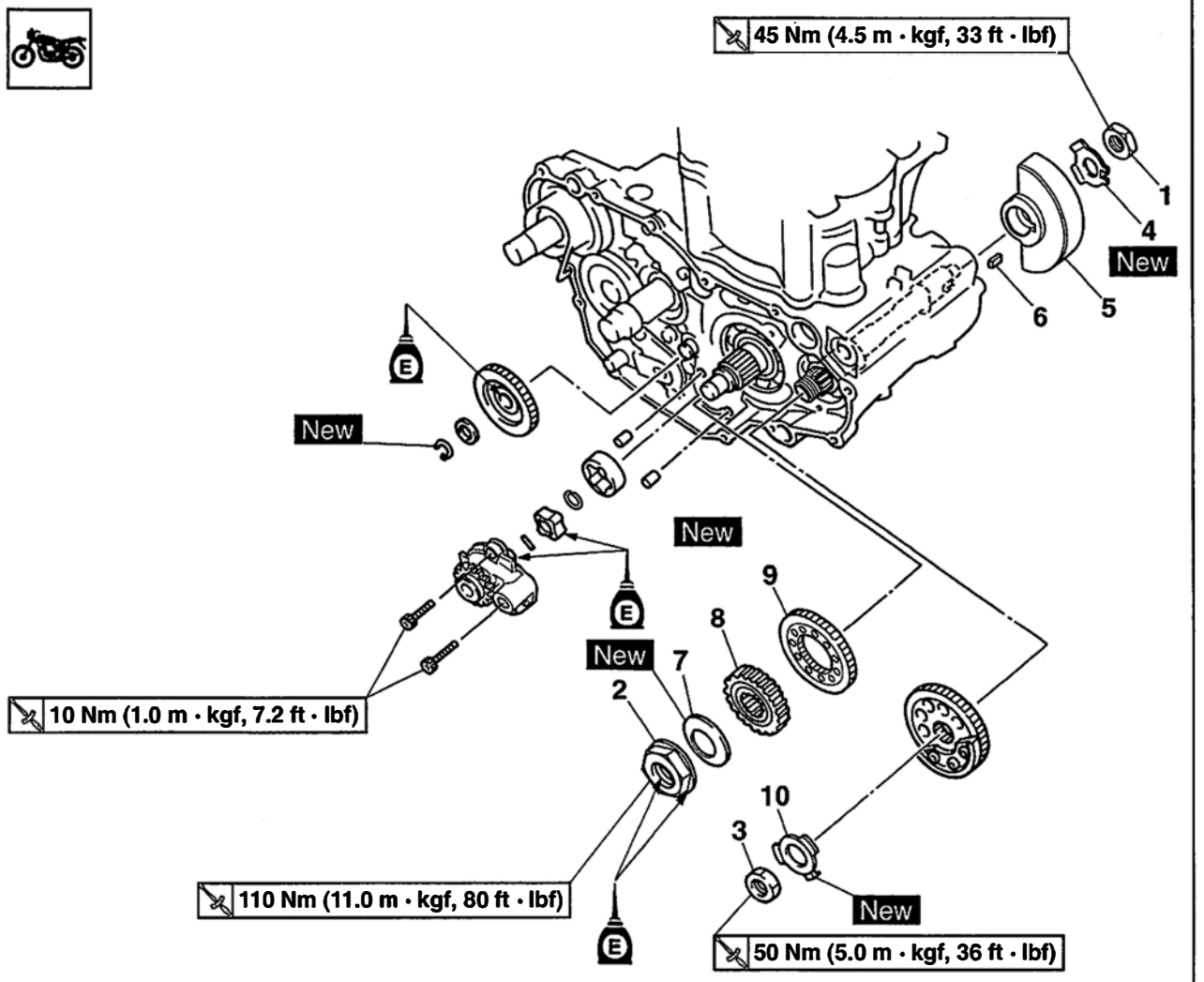


2. Install:
   - Oil seal New
   - Shift pedal

EAS1DX3184

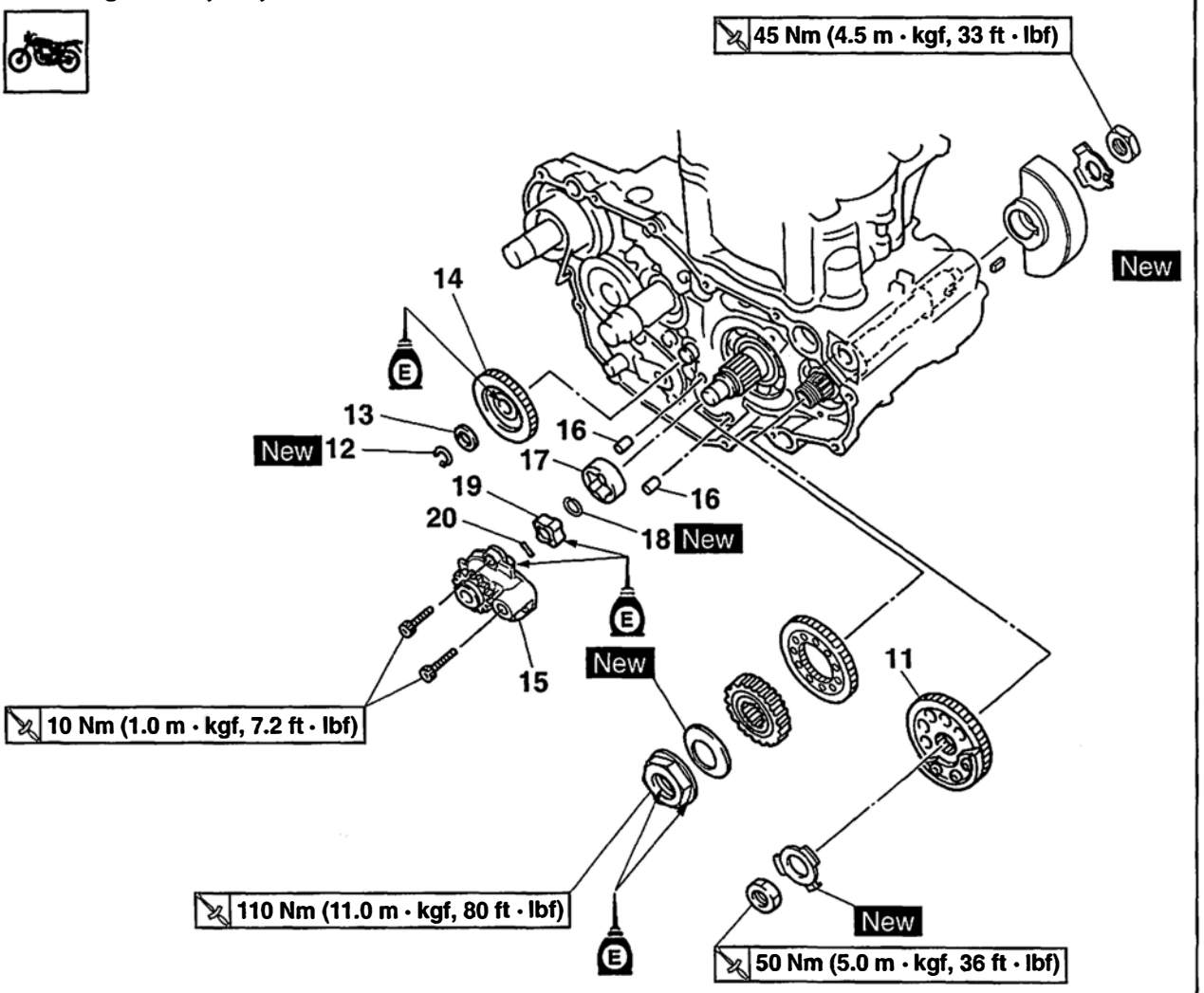
OIL PUMP AND BALANCER GEAR

Removing the oil pump and balancer



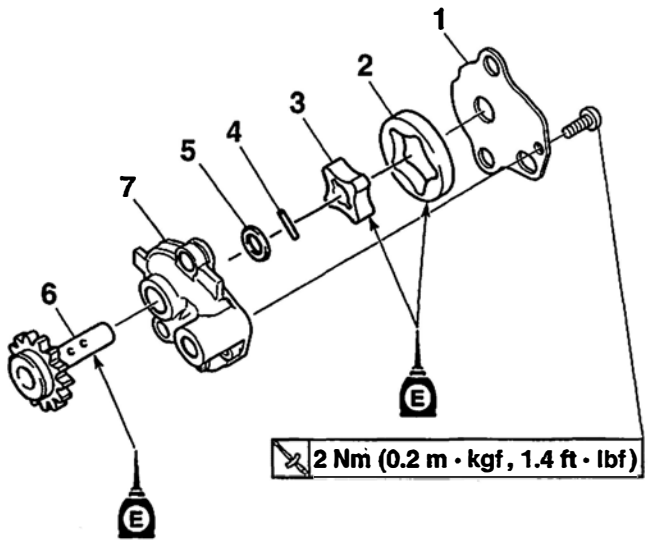
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch/Primary drive gear		Refer to "CLUTCH" on page 6-35.
	Shift shaft		Refer to "SHIFT SHAFT" on page 6-47.
	Primary driven gear		Refer to "CLUTCH" on page 6-35.
	Left crankcase cover		Refer to "CLUTCH" on page 6-35.
	Generator rotor		Refer to "GENERATOR AND STARTER CLUTCH" on page 6-57.
1	Balancer nut	1	
2	Primary drive gear nut	1	
3	Balancer weight gear nut	1	
4	Lock washer	1	
5	Balancer	1	
6	Straight key	1	
7	Conical washer	1	
8	Primary drive gear	1	
9	Balancer drive gear	1	
10	Lock washer	1	

Removing the oil pump and balancer



Order	Job/Parts to remove	Q'ty	Remarks
11	Balancer weight gear	1	
12	Circlip	1	
13	Washer	1	
14	Oil pump drive gear	1	
15	Oil pump assembly	1	
16	Dowel pin	2	
17	Outer rotor 2	1	
18	Circlip	1	
19	Inner rotor 2	1	
20	Dowel pin	1	
			For installation, reverse the removal procedure.

Disassembling the oil pump



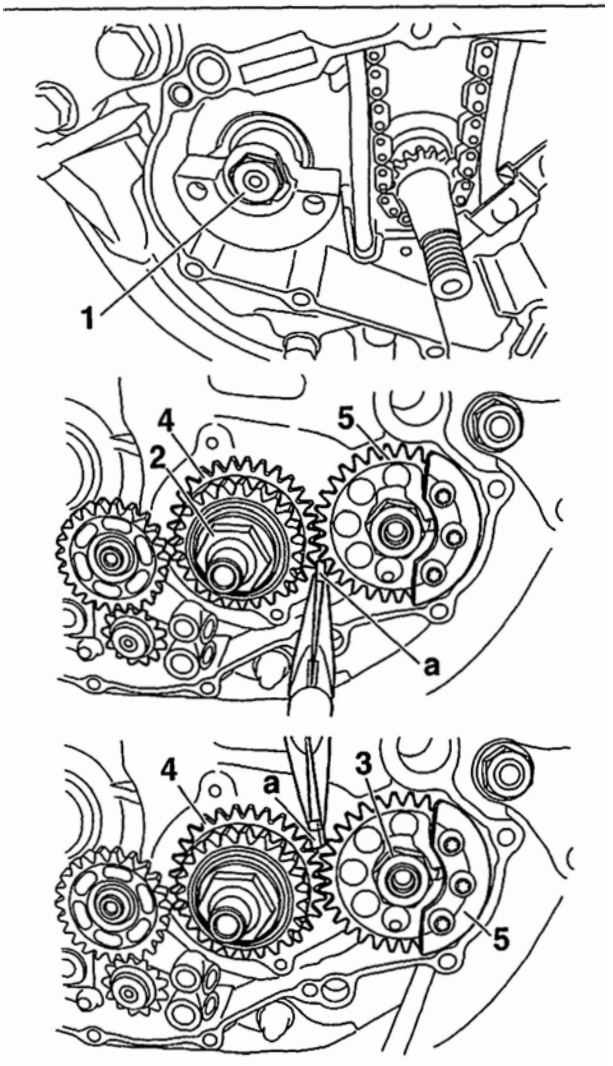
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Outer rotor 1	1	
3	Inner rotor 1	1	
4	Dowel pin	1	
5	Washer	1	
6	Oil pump drive shaft	1	
7	Rotor housing	1	
			For assembly, reverse the disassembly procedure.

EAS1DX3185
REMOVING THE BALANCER

1. Straighten the lock washer tab.
2. Loosen:
   - Balancer nut "1"
   - Primary drive gear nut "2"
   - Balancer weight gear nut "3"

TIP

Place an aluminum plate "a" between the teeth of the balancer drive gear "4" and balancer weight gear "5".



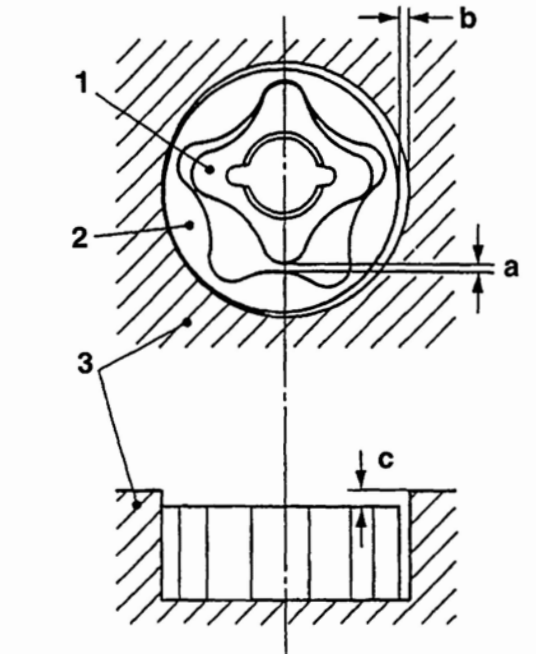
EAS1DX3186
CHECKING THE OIL PUMP

1. Check:
   - Oil pump drive gear
   - Oil pump driven gear
   - Oil pump housing
   - Oil pump housing cover

   Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance "a"
   - Outer-rotor-to-oil-pump-housing clearance "b"
   - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance "c"

   Out of specification → Replace the oil pump.

Inner-rotor-to-outer-rotor-tip clearance
Less than
0.120 mm (0.0047 in)
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.090–0.170 mm (0.0035–0.0067 in)
Limit
0.24 mm (0.0094 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.05–0.10 mm (0.0020-0.0039 in)
Limit
0.17 mm (0.0067 in)



1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:
   - Oil pump operation

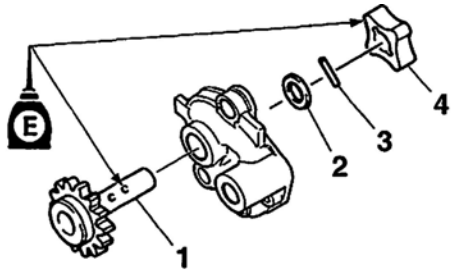
   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).

EAS1DX3187
ASSEMBLING THE OIL PUMP

1. Install:
   - Oil pump drive shaft "1"
   - Washer "2"
   - Dowel pin "3"
   - Inner rotor 1 "4"

TIP

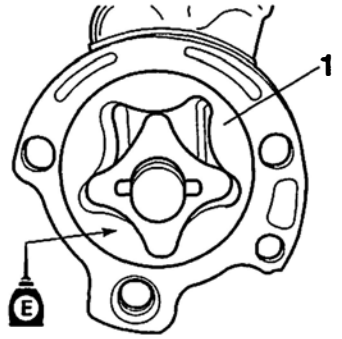
- Apply the engine oil on the oil pump drive shaft and inner rotor 1.
- Fit the dowel pin into the groove in the inner rotor 1.



2. Install:
   - Outer rotor 1 "1"

TIP

Apply the engine oil on the outer rotor 1.



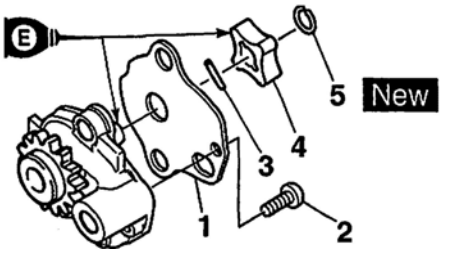
3. Install:
   - Oil pump cover "1"
   - Oil pump cover screw "2"

	Oil pump cover screw **2 Nm (0.2 m·kgf, 1.4ft·lbf)**

   - Dowel pin "3"
   - Inner rotor 2 "4"
   - Circlip "5" New

TIP

- Apply the engine oil on the oil pump drive shaft end and inner rotor 2.
- Fit the dowel pin into the groove in the inner rotor 2.



4. Check:
   - Oil pump operation
     Refer to "CHECKING THE OIL PUMP" on page 6-54.

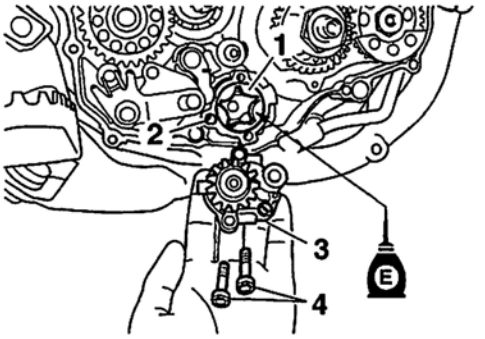
EAS1DX3188
INSTALLING THE OIL PUMP AND BALANCER GEAR

1. Install:
   - Outer rotor 2 "1"
   - Dowel pin "2"
   - Oil pump assembly "3"
   - Oil pump assembly bolt "4"

	Oil pump assembly bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

Apply the engine oil on the outer rotor 2.



ECA1DX1023

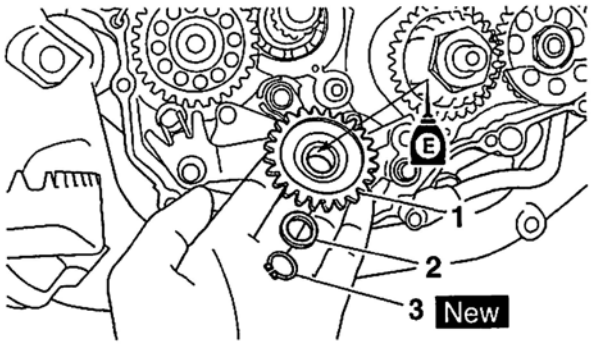
NOTICE

~~After tightening the bolts, make sure the oil~~ pump turns smoothly.

2. Install:
   - Oil pump drive gear "1"
   - Washer "2"
   - Circlip "3" New

TIP

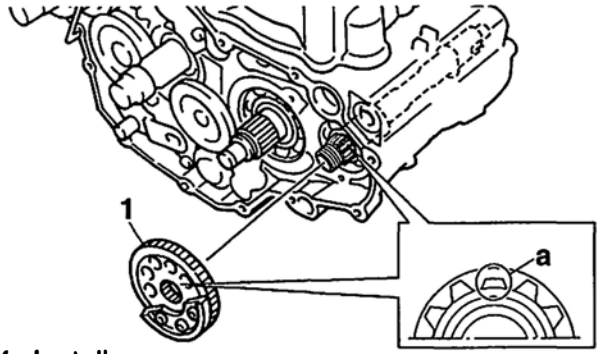
Apply the engine oil on the oil pump drive gear inner circumference.



3. Install:
   - Balancer weight gear "1"

TIP

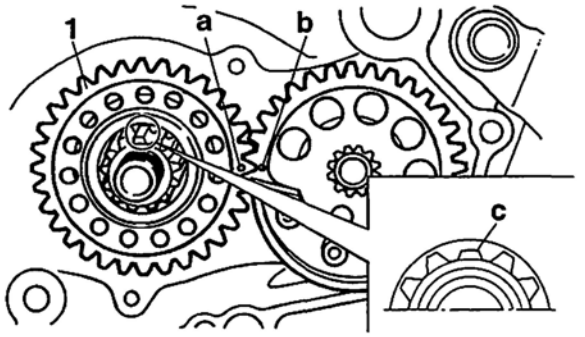
Install the balancer weight gear and balancer shaft with their lower splines "a" aligning with each other.



4. Install:
   - Balancer drive gear "1"

TIP

- Align the punched mark "a" on the balancer drive gear with the punched mark "b" on the balancer weight gear.
- Install the balancer drive gear and crankshaft with the lower splines "c" aligning with each other.



5. Install:
   - Lock washer "1" New
   - Balancer weight gear nut "2"

	Balancer weight gear nut **50 Nm (5.0 m·kgf, 36 ft·lbf)**

   - Primary drive gear "3"
   - Conical washer "4" New
   - Primary drive gear nut "5"

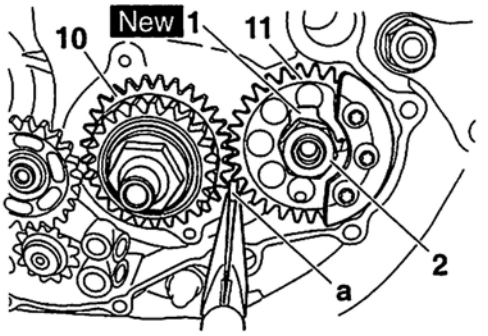
	Primary drive gear nut **110 Nm (11.0 m·kgf, 80 ft·lbf)**

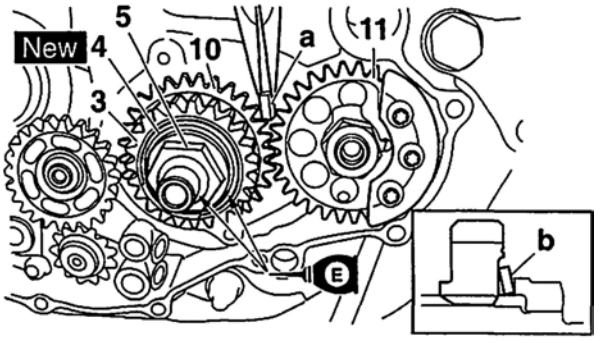
   - Straight key "6"
   - Balancer "7"
   - Lock washer "8" New
   - Balancer nut "9"

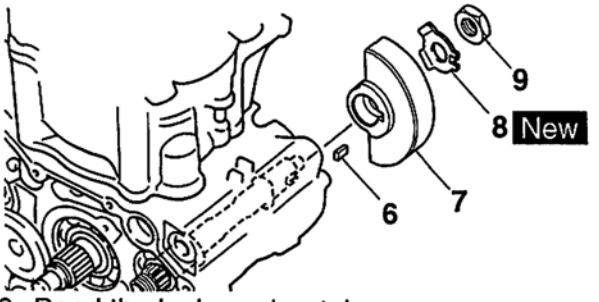
	Balancer nut **45 Nm (4.5 m·kgf, 33 ft·lbf)**

TIP

- Apply engine oil to the contact surface and threaded portion of the primary drive gear nut.
- Place an aluminum plate "a" between the teeth of the balancer drive gear "10" and balancer weight gear "11".
- Install the conical washer with its convex surface "b" outward.



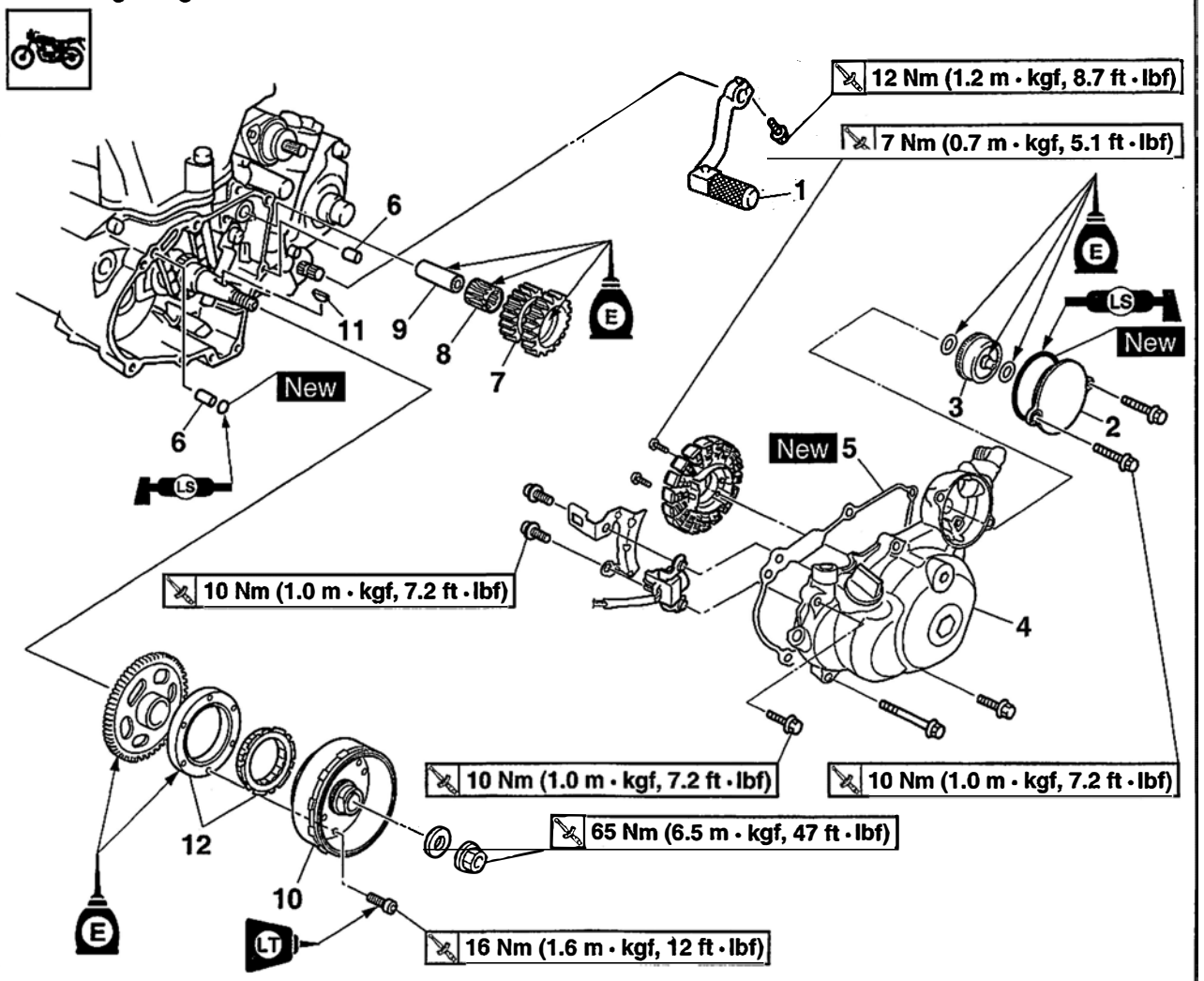




6. Bend the lock washer tab.

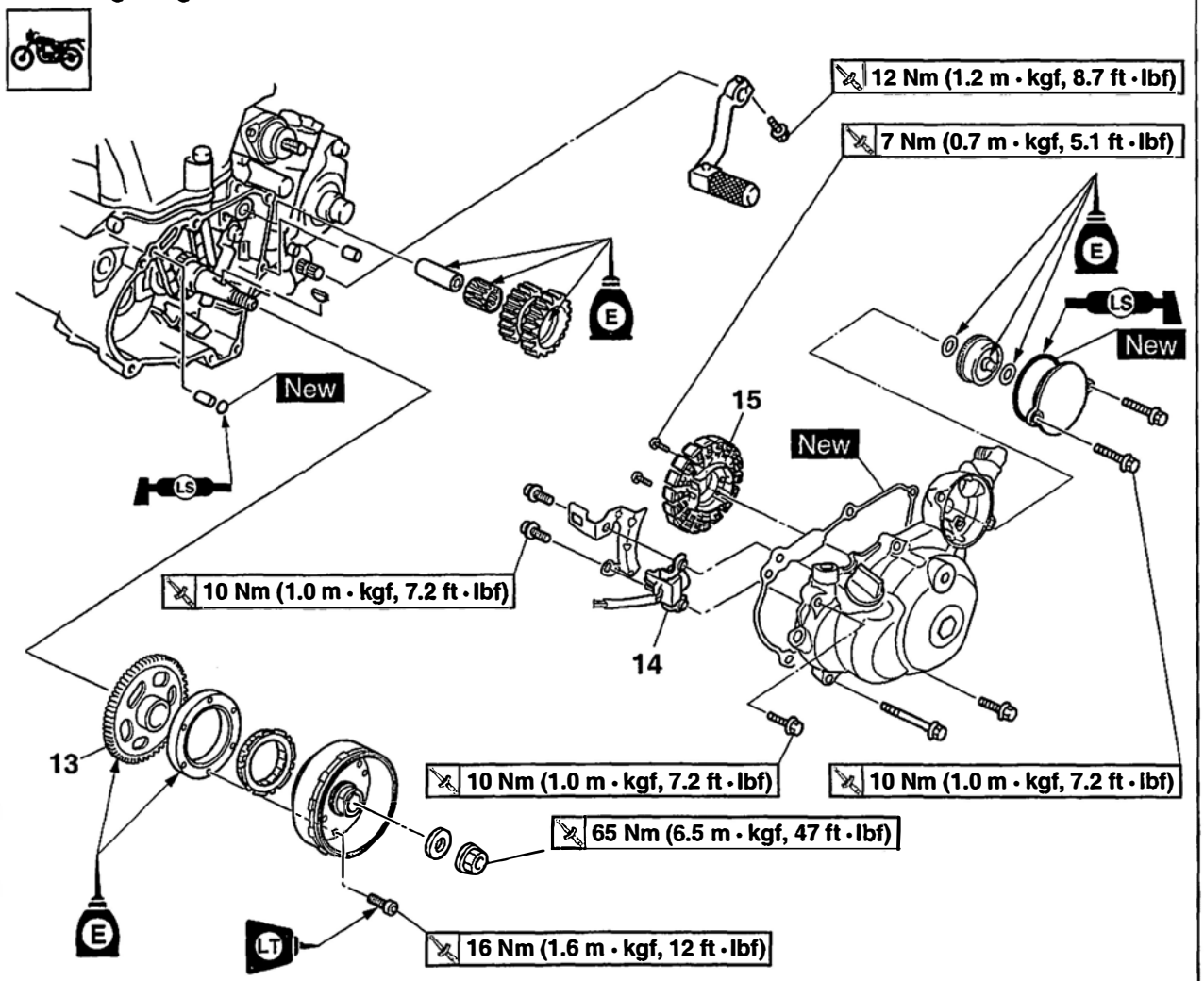
EAS1DX3189
GENERATOR AND STARTER CLUTCH

Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
	Drain the engine oil.		Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Seat and fuel tank		Refer to "GENERAL CHASSIS" on page 5-1 and "FUEL TANK" on page 8-1.
	Disconnect the AC magneto lead.		
1	Shift pedal	1	
2	Cover (Damper assembly)	1	
3	Damper assembly	1	
4	Left crankcase cover	1	
5	Gasket	1	
6	Dowel pin	2	
7	Starter idle gear	1	
8	Bearing	1	
9	Starter idle gear shaft	1	
10	Generator rotor	1	
11	Woodruff key	1	
12	Starter clutch	1	

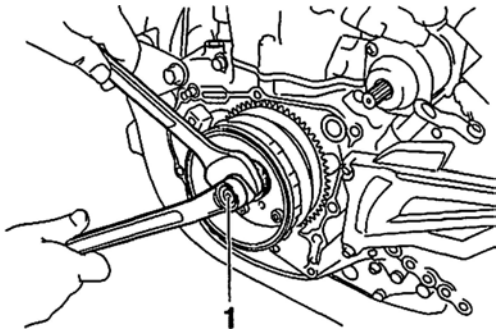
Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
13	Starter clutch drive gear	1	
14	Crankshaft position sensor	1	
15	Stator	1	
			For installation, reverse the removal procedure.

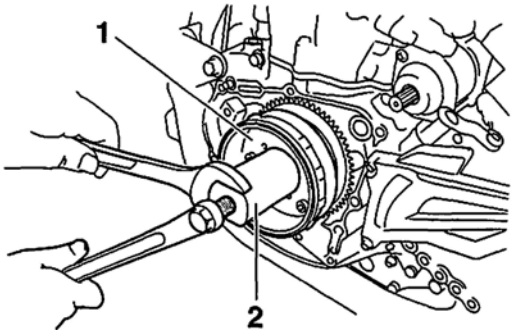
EAS1DX3190
REMOVING THE GENERATOR

1. Remove:
   - Generator rotor nut "1"
   - Washer



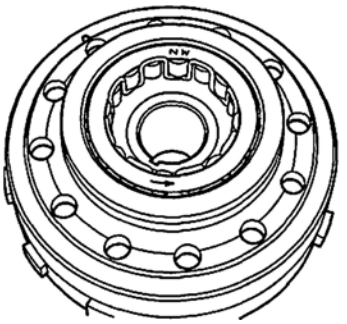
2. Remove:
   - Generator rotor "1" (with the rotor puller "2")
   - Woodruff key

	**Rotor puller** **90890-04142** **YM-04142**

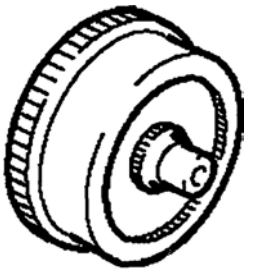


EAS1DX3191
CHECKING THE STARTER CLUTCH

1. Check:
   - Starter clutch rollers
     Damage/wear → Replace



2. Check:
   - Starter clutch idle gear
   - Starter clutch gear
     Burrs/chips/roughness/wear → Replace the defective part (s).
3. Check:
   - Starter clutch gear
     Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   - Damper assembly
     Damage/pitting/wear → Replace the damper assembly.
   - Check the gear of the starter motor arma-ture.



5. Check:
   - Starter clutch operation

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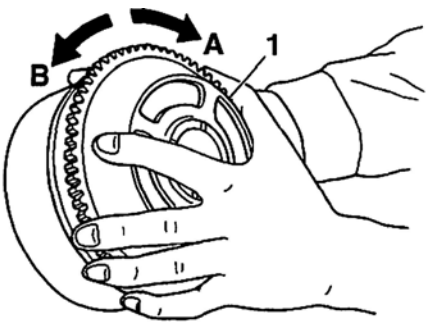
a. Install the starter clutch drive gear "1" onto the starter clutch and hold the starter clutch.
b. When turning the starter clutch drive gear clockwise "A", the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch drive gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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EAS1DX3192
INSTALLING THE STARTER CLUTCH

1. Install:
   - Stator "1"
   - Stator bolt "2"

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

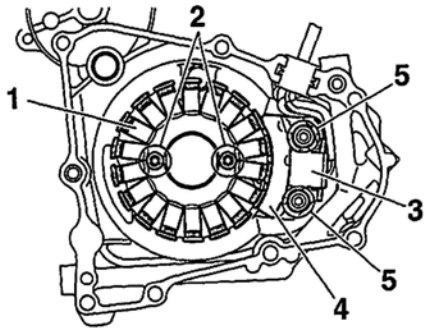
   - Crankshaft position sensor "3"
   - Holder "4"
   - Crankshaft position sensor bolt "5"

	Crankshaft position sensor bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

- Pass the AC magneto lead under the crankshaft position sensor.
- Pass the AC magneto lead under the holder as shown.
- Take care not to catch the AC magneto lead between crankcase cover ribs.
- Tighten the stator bolt using the T25 bit.
- Apply the sealant to the grommet of the AC magneto lead.

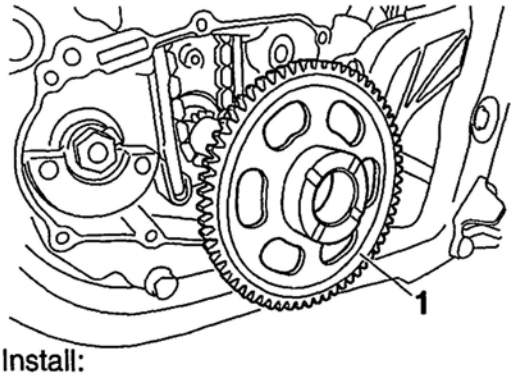
	YAMAHA Bond No. 1215 (Three-Bond No. 1215®) **90890-85505**



2. Install
   - Starter clutch drive gear "1"

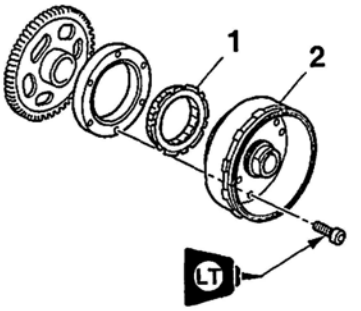
TIP

Apply the engine oil on the starter clutch drive gear inner circumference.



3. Install:
   - Starter clutch "1"

   To generator rotor "2".



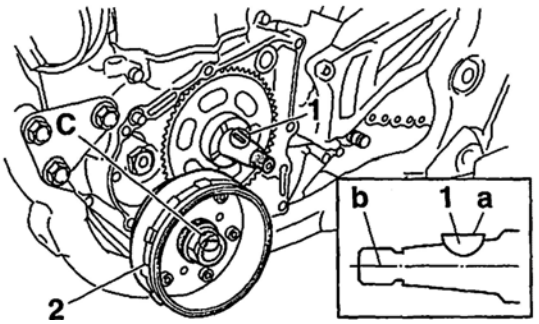
	Starter clutch bolt **16 Nm (1.6 m·kgf, 12 ft·lbf)** **LOCTITE®**

EAS1DX3193
INSTALLING THE GENERATOR

1. Install:
   - Woodruff key "1"
   - Generator rotor "2"

TIP

- Degrease 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.

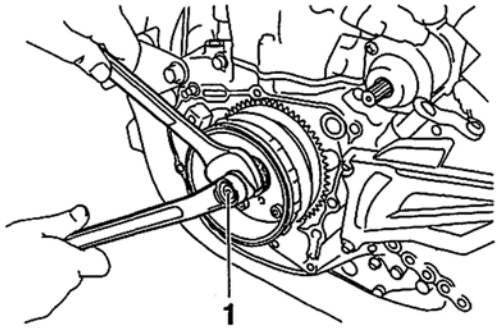


2. Install:
   - Washer
   - Generator rotor nut "1"

	Generator rotor nut **65 Nm (6.5 m·kgf, 47 ft·lbf)**

TIP

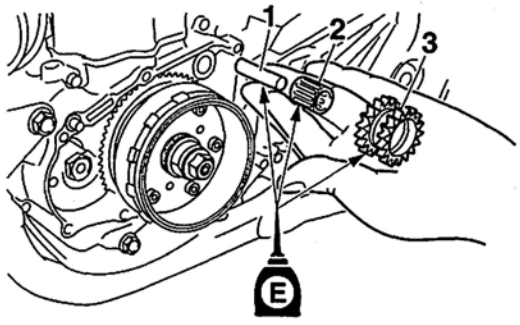
Tighten the generator rotor nut to 65 Nm (6.5 m·kgf, 47 ft·lbf), loosen and retighten the generator rotor nut to 65 Nm (6.5 m·kgf, 47 ft·lbf).



3. Install:
   - Starter idle gear shaft "1"
   - Bearing "2"
   - Starter idle gear 2 "3"

TIP

Apply the engine oil on the starter idle gear shaft, bearing and idle gear inner circumference.

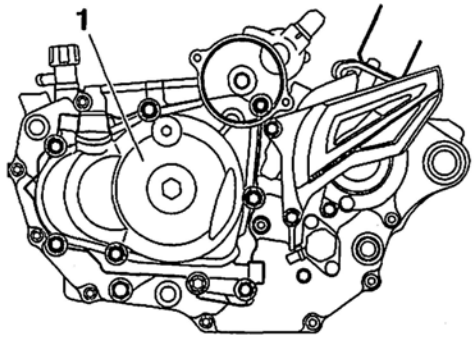


4. Install:
   - Dowel pin
   - Crankcase cover gasket New
   - Left crankcase cover "1"
   - Crankcase cover bolt

	Crankcase cover bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

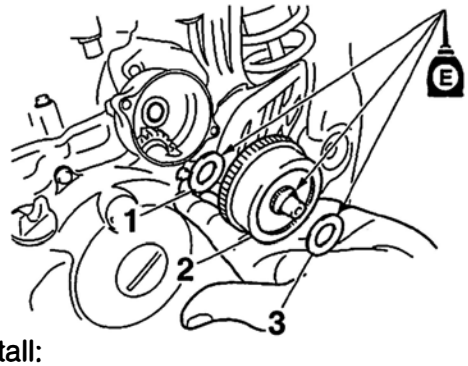
Tighten the bolts in stage, using a crisscross pattern.



5. Install:
   - Washer "1"
   - Damper assembly "2"
   - Washer "3"

TIP

Apply the engine oil to the shaft and washers.

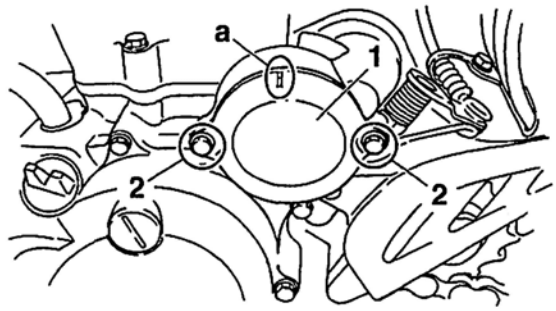


6. Install:
   - Cover (damper assembly) "1"
   - Bolt "2"

	Bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

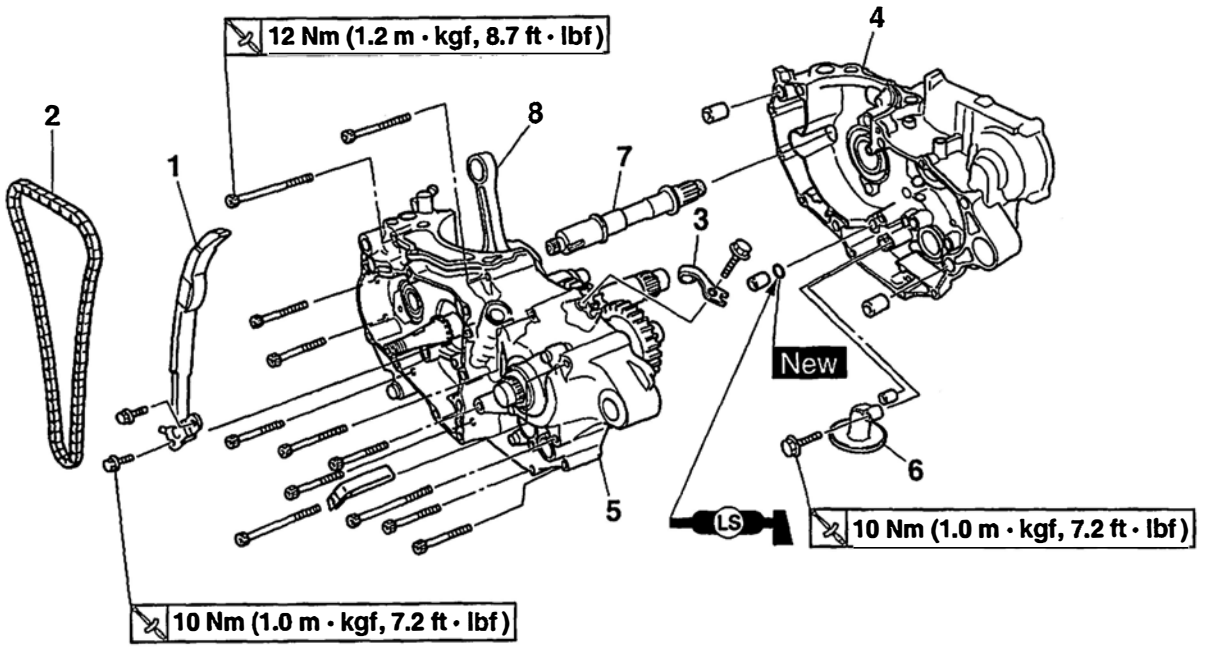
TIP

Install the cover (damper assembly) with its mark "a" facing upward.



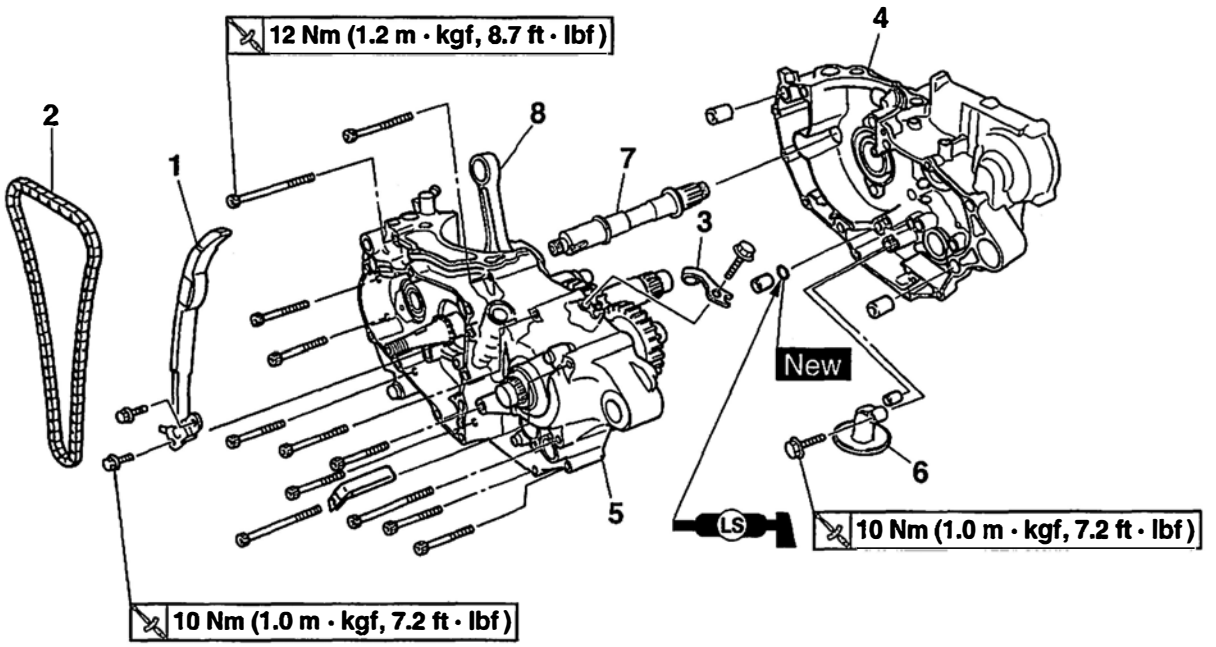
EAS25540
CRANKCASE

Separating the crankcase



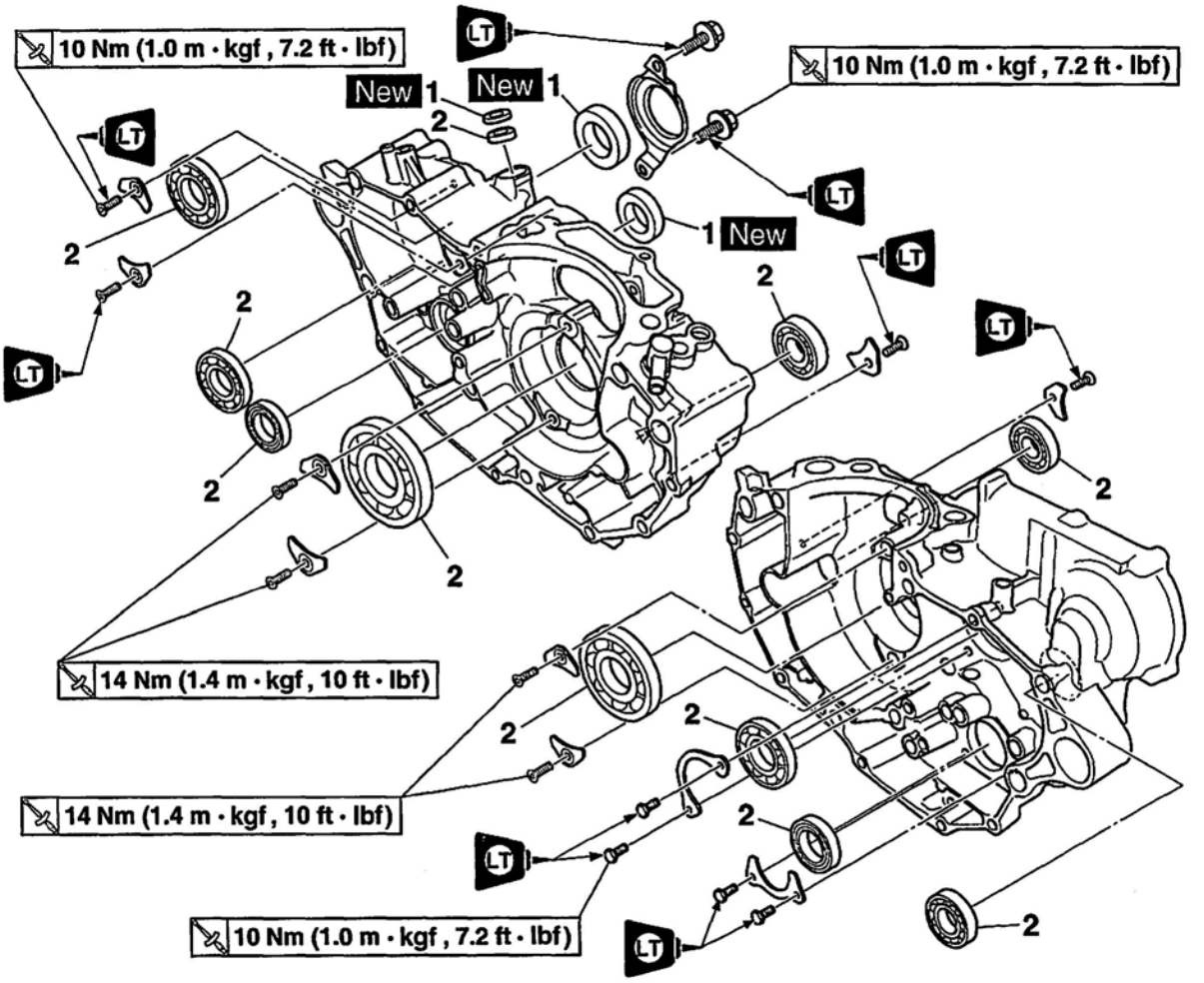
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 6-1.
	Piston		Refer to "CYLINDER AND PISTON" on page 6-26.
	Balancer		Refer to "OIL PUMP AND BALANCER GEAR" on page 6-51.
	Kick shaft assembly		Refer to "KICKSTATER" on page 6-44.
	Segment		Refer to "SHIFT SHAFT" on page 6-47.
	Stator		Refer to "GENERATOR AND STARTER CLUTCH" on page 6-57.
1	Timing chain guide (intake side)	1	
2	Timing chain	1	
3	Clutch cable holder	1	
4	Right crankcase	1	
5	Left crankcase	1	
6	Oil strainer	1	
7	Balancer shaft	1	
8	Crankshaft	1	

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

Removing the bearing and oil seal



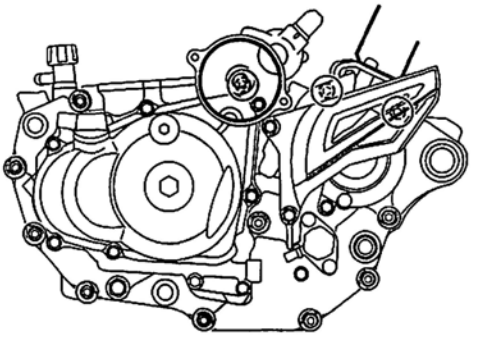
Order	Job/Parts to remove	Q'ty	Remarks
	Crankshaft assembly		Refer to"CRANKSHAFT ASSEMBLY AND BALANCER SHAFT" on page 6-67.
	Transmission assembly		Refer to"TRANSMISSION" on page 6-70.
1	Oil seal	3	
2	Bearing	11	
			For installation, reverse the removal procedure.

EAS25570
DISASSEMBLING THE CRANKCASE

1. Separate:
   - Right crankcase
   - Left crankcase

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Remove the crankcase bolts, hose guide and clutch cable holder.



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

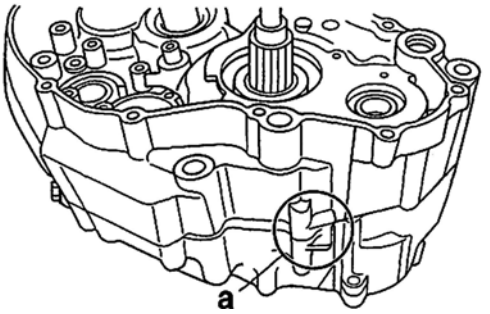
TIP

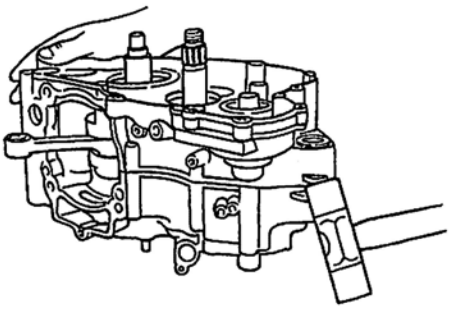
- Place the crankcase with its left side downward and split it by inserting a screwdriver tip into the splitting slit "a" in the crankcase.
- Lift the right crankcase horizontally while lightly patting the case splitting slit and engine mounting boss using a soft hammer, and leave the crankshaft and transmission with the left crankcase.

ECA13910

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.





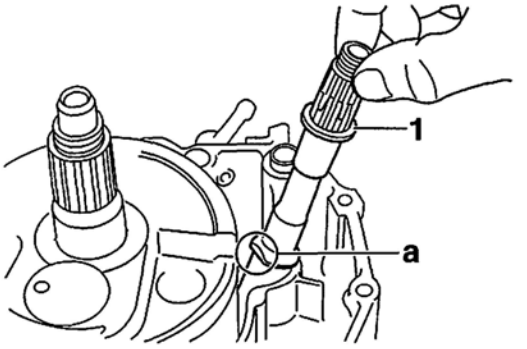
c. Remove the dowel pins and O-ring.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Remove:
   - Balancer shaft "1"

TIP

Remove the balancer shaft with its flat side "a" facing the crankshaft.



EAS1DX3194
CHECKING THE TIMING CHAIN, TIMING CHAIN GUIDE, OIL STRAINER

1. Check:
   - Timing chain
     Stiffness → Replace the camshaft sprocket, timing chain and crankshaft sprocket as a set.
2. Check:.
   - Timing chain guide
     Damage/wear → Replace.
3. Check:
   - Oil strainer
     Obstruction → Blow out with compressed air.
     Cracks/damage → Replace.

EAS25580
CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.

3. Check:
   - Crankcase
     Cracks/damage → Replace.
   - Oil delivery passages
     Obstruction → Blow out with compressed air.

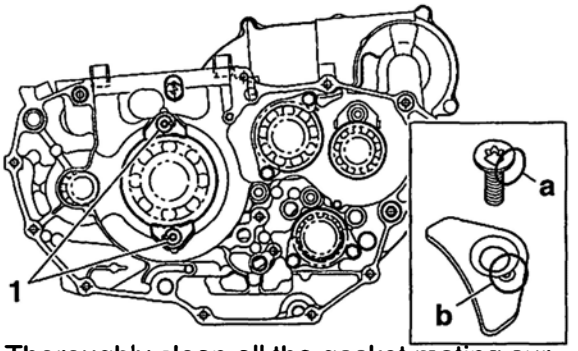
EAS25700
ASSEMBLING THE CRANKCASE

1. Install:
   - Oil strainer
   - Bearing cover plate

	Oil strainer bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **Bearing cover plate** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®** **Bearing cover plate (crankshaft)** **14 Nm (1.4 m·kgf, 10 ft·lbf)**

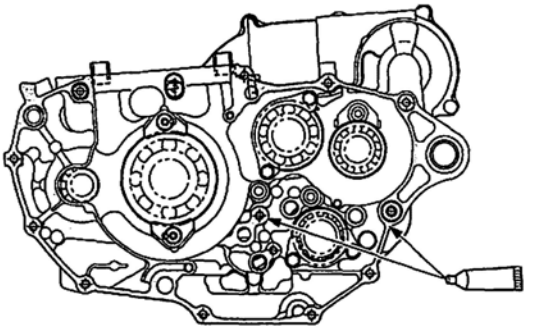
TIP

- Install the bearing by pressing its outer race parallel.
- To prevent the bearing cover plate crankshaft screw "1" from becoming loose, crush the screw head periphery "a" into the concave "b" using a punch etc. In so doing, take care not to damage the screwdriver receiving hole in the screw head.



2. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
3. Apply:
   - Sealant
     (onto the crankcase mating surfaces)

	Yamaha bond No. 1215 (Three Bond No.1215®) **90890-85505**

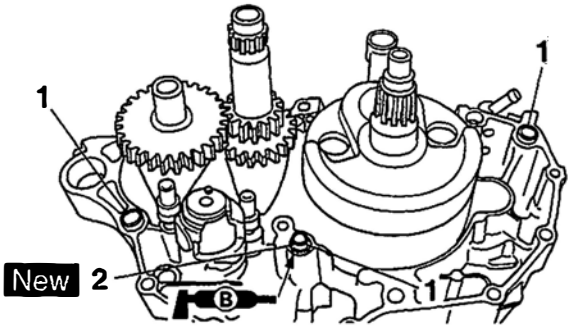


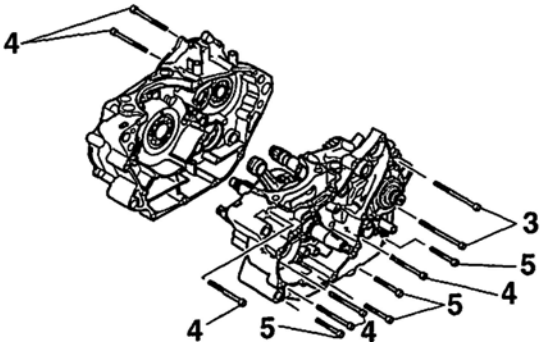
4. Install:
   - Dowel pins "1"
   - O-ring "2" New
   - Crankcase (to the left crankcase)

	Crankcase bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

TIP

- Apply the lithium soap base grease on the O-ring.
- Fit the right crankcase onto the left crankcase. Tap lightly on the case with soft hammer.
- When installing the crankcase, the connecting rod should be positioned at TDC (top dead center).
- Tighten the bolts in a crisscross pattern in two (2) stages, with 1/4 turn each.

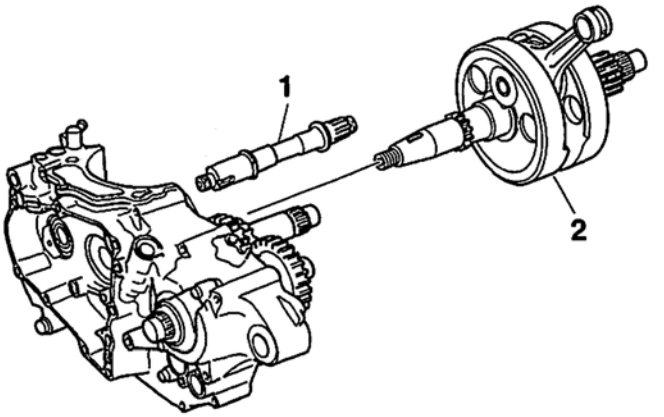




3. M6 × 80 mm
4. M6 × 60 mm
5. M6 × 50 mm

EAS25970
CRANKSHAFT ASSEMBLY AND BALANCER SHAFT

Removing the crankshaft assembly and balancer shaft



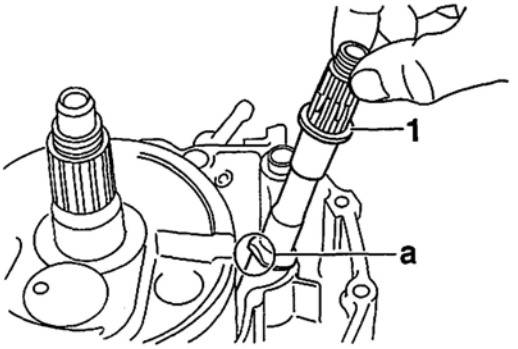
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to"CRANKCASE" on page 6-62.
1	Balancer shaft	1	
2	Crankshaft assembly	1	
			For installation, reverse the removal procedure.

EAS1DX3195
REMOVING THE BALANCER SHAFT

1. Remove:
   • Balancer shaft "1"

TIP

Remove the balancer shaft with its flat side "a" facing the crankshaft.



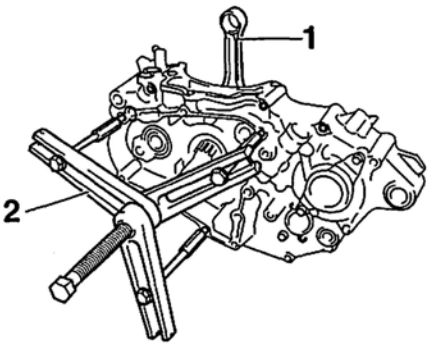
EAS26000
REMOVING THE CRANKSHAFT ASSEMBLY

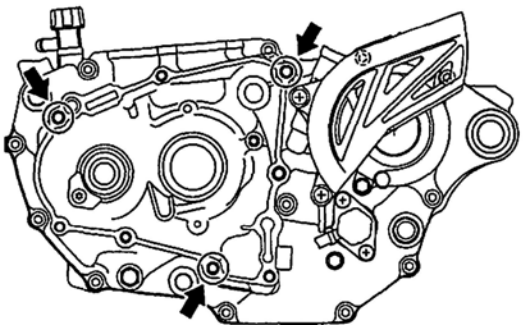
1. Remove:
   • Crankshaft assembly "1"

TIP

Remove the crankshaft assembly by using the crankcase separating tool "2".

Crankcase separating tool
90890-04152
Crankcase separator
YU-A9642





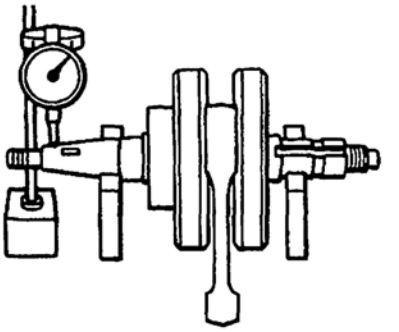
EAS26060
CHECKING THE CRANKSHAFT ASSEMBLY

1. Measure:
   • Crankshaft runout
   Out of specification → Replace the crankshaft, bearing or both.

TIP

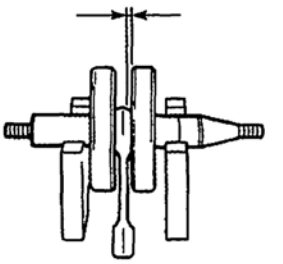
Turn the crankshaft slowly.

Runout limit C
0.030 mm (0.0012 in)



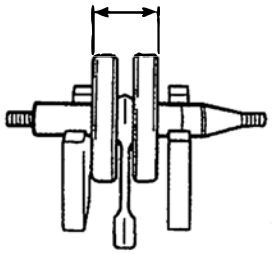
2. Measure:
   • Big end side clearance
   Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

Big end side clearance D
0.150–0.450 mm (0.0059–0.0177 in)

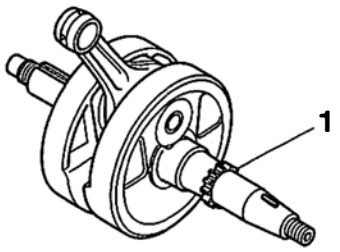


3. Measure:
   • Crankshaft width
   Out of specification → Replace the crankshaft.

Width A
61.95–62.00 mm (2.439–2.441 in)



4. Check:
   • Crankshaft sprocket "1"
   Damage → Replace the crankshaft.



5. Check:
   • Crankshaft journal oil passage
   Obstruction → Blow out with compressed air.

EAS26210
INSTALLING THE CRANKSHAFT ASSEMBLY

1. Install:
   • Crankshaft assembly

TIP

Install the crankshaft assembly with the crankshaft installer pot "1", crankshaft installer bolt "2", adapter (M12) "3" and spacer "4".

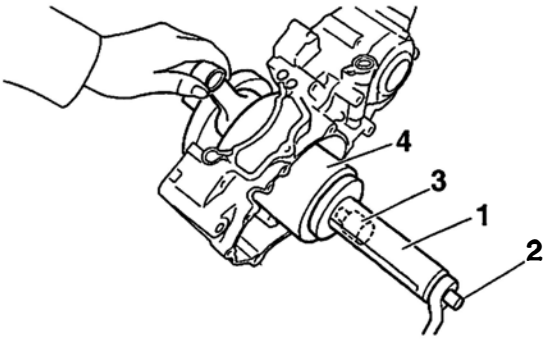
Crankshaft installer pot "1"
90890-01274
Installing pot
YU-90058
Crankshaft installer bolt "2"
90890-01275
Bolt
YU-90060
Adapter (M12) "3"
90890-01278
Adapter #3
YU-90063
Spacer (crankshaft installer) "4"
90890-04081
Pot spacer
YM-91044

ECA13970
NOTICE

To avoid scratching the crankshaft and to ease the installation procedure, lubricate the oil seal lips with lithium-soap-based grease and each bearing with engine oil.

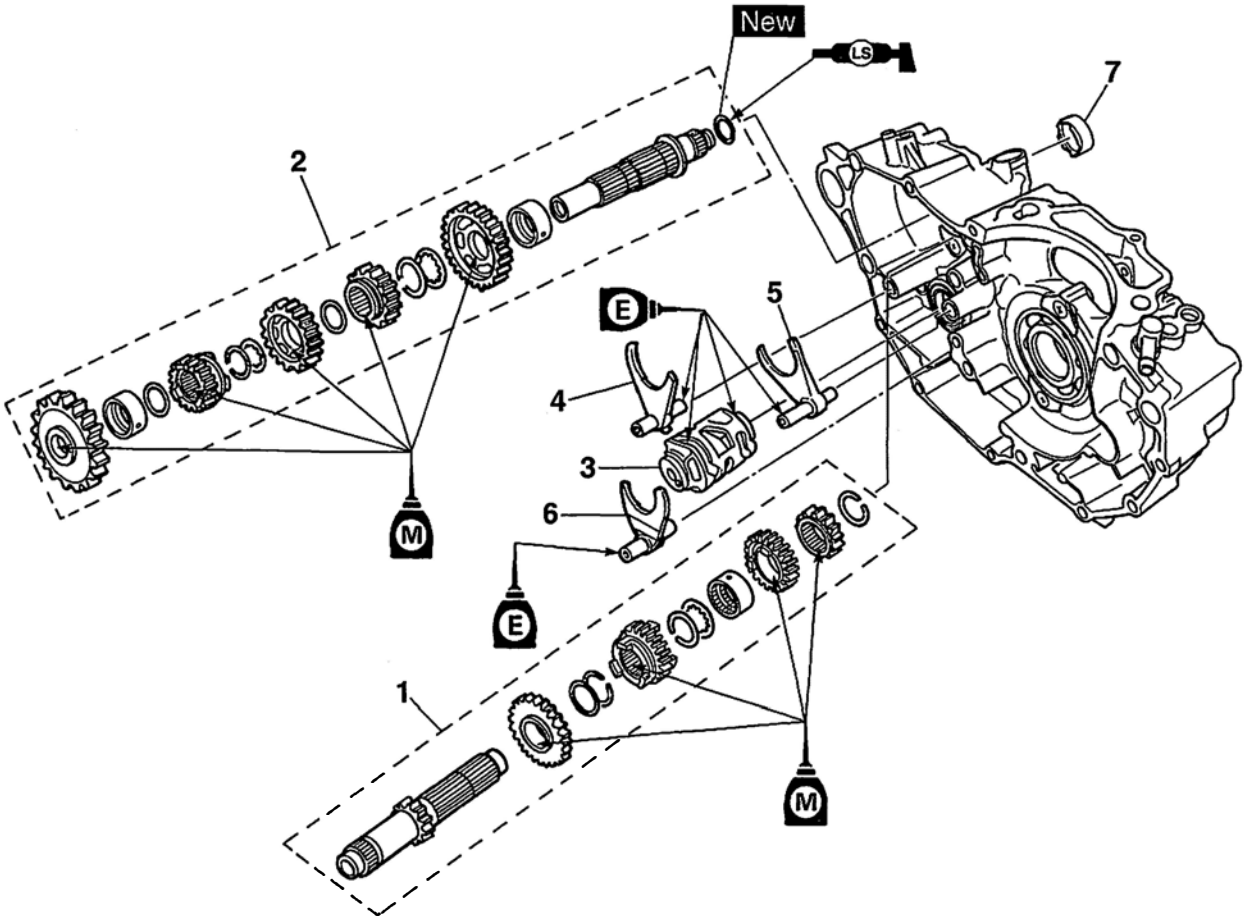
TIP

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.



EAS26241
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks

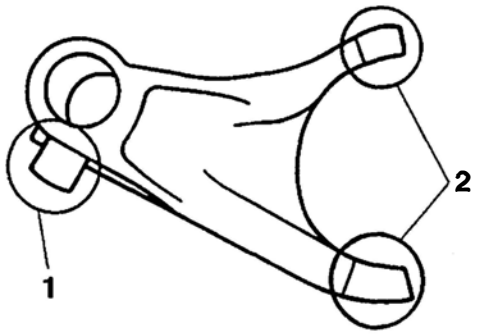


Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to"CRANKCASE" on page 6-62.
1	Main axle assembly	1	
2	Drive axle assembly	1	
3	Shift drum	1	
4	Shift fork-R	1	
5	Shift fork-C	1	
6	Shift fork-L	1	
7	Collar	1	
			For installation, reverse the removal procedure.

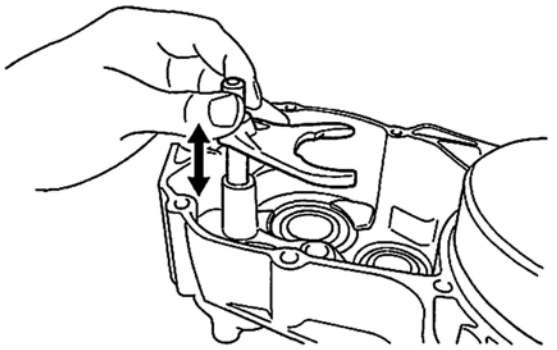
EAS26260
CHECKING THE SHIFT FORKS

The following procedure applies to all of 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 movement
     Unsmooth operation → Replace shift fork.

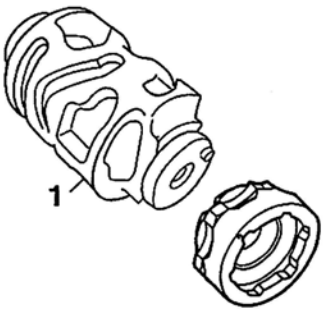


TIP

For a malfunctioning shift fork, replace not only the shift fork itself but the two gears each adjacent to the shift fork.

EAS26270
CHECKING THE SHIFT DRUM ASSEMBLY

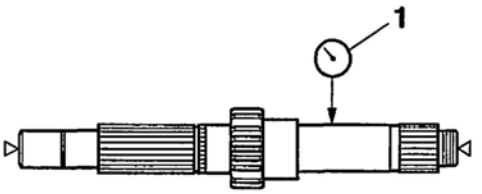
1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment "1"
     Damage/wear → Replace the shift drum as-sembly.



EAS1DX3196
CHECKING THE TRANSMISSION

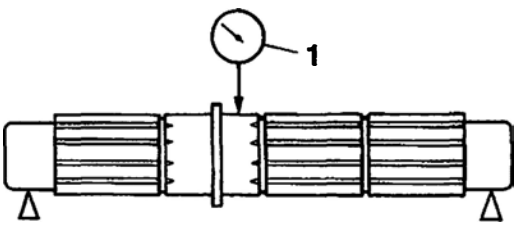
1. Measure:
   - Main axle runout
     (with a centering device and dial gauge "1")
     Out of specification → Replace the main axle.

	Main axle runout limit **0.08 mm (0.0032 in)**



2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge "1")
     Out of specification → Replace the drive axle.

	Drive axle runout limit **0.08 mm (0.0032 in)**



3. Check:
   - Transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear (s).

- Transmission gear dogs
  Cracks/damage/rounded edges → Replace the defective gear (s).

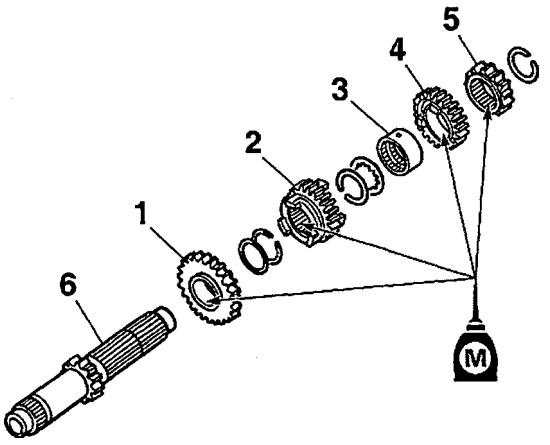
4. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part (s).

EAS26340
INSTALLING THE TRANSMISSION

1. Install:
   - 5th pinion gear (25T) "1"
   - 3rd pinion gear (16T) "2"
   - Collar "3"
   - 4th pinion gear (20T) "4"
   - 2nd pinion gear (15T) "5"
     To main axle "6".

TIP

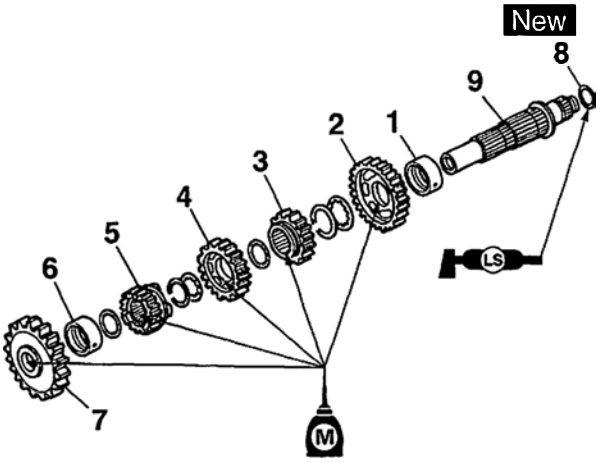
Apply the molybdenum disulfide oil on the inner and end surface of the idler gear and on the inner surface of the sliding gear, then install.



2. Install:
   - Collar "1"
   - 2nd wheel gear (26T) "2"
   - 4th wheel gear (21T) "3"
   - 3rd wheel gear (21T) "4"
   - 5th wheel gear (21T) "5"
   - Collar "6"
   - 1st wheel gear (29T) "7"
   - O-ring "8" New
     To drive axle "9".

TIP

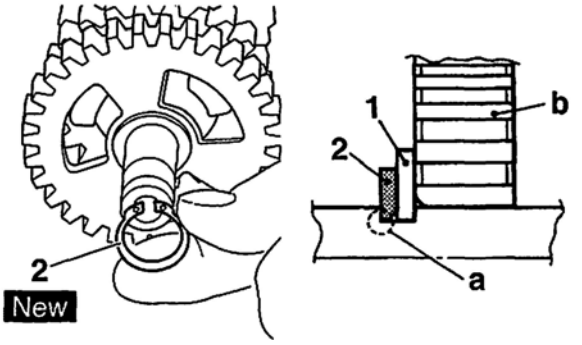
- Apply the molybdenum disulfide oil on the inner and end surface of the idler gear and on the inner surface of the sliding gear, then install.
- Apply the lithium soap base grease on the O-ring.



3. Install:
   - Washer "1"
   - Circlip "2" New

TIP

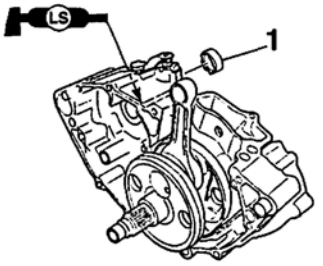
- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the washer and gear "b".
- Install the circlip with its ends "c" settled evenly on the spline crests.



4. Install:
   • Collar "1"

TIP

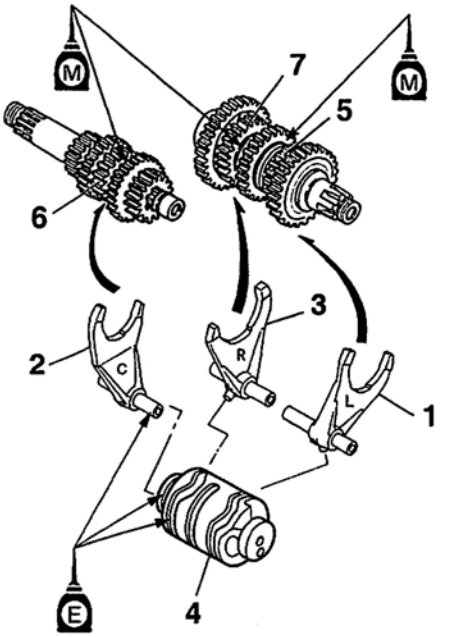
- Apply the lithium soap base grease on the oil seal lip.
- When installing the collar into the crankcase, pay careful attention to the crankcase oil seal lip.



5. Install:
   • Shift fork 1 (L) "1"
   • Shift fork 2 (C) "2"
   • Shift fork 3 (R) "3"
   • Shift cam "4"
   To main axle and drive axle.

TIP

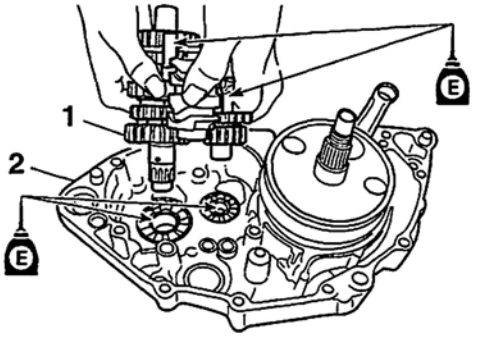
- Apply the molybdenum disulfide oil on the shift fork grooves.
- Apply engine oil to the shift cam groove, bearing contact surface and shift fork shaft.
- Mesh the shift fork #1 (L) with the 4th wheel gear "5" and #3 (R) with the 5th wheel gear "7" on the drive axle.
- Mesh the shift fork #2 (C) with the 3rd pinion gear "6" on the main axle.



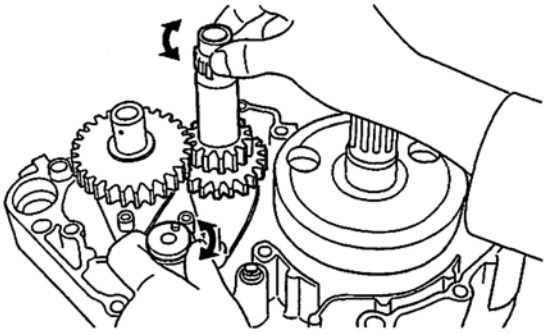
6. Install:
   • Transmission assembly "1"
   To left crankcase "2".

TIP

Apply the engine oil on the bearings and guide bars.



7. Check:
   • Shifter operation
   • Transmission operation
   Unsmooth operation → Repair.



COOLING SYSTEM

RADIATOR **7-1**
HANDLING NOTE 7-3
CHECKING THE RADIATOR 7-3
INSTALLING THE RADIATOR 7-3

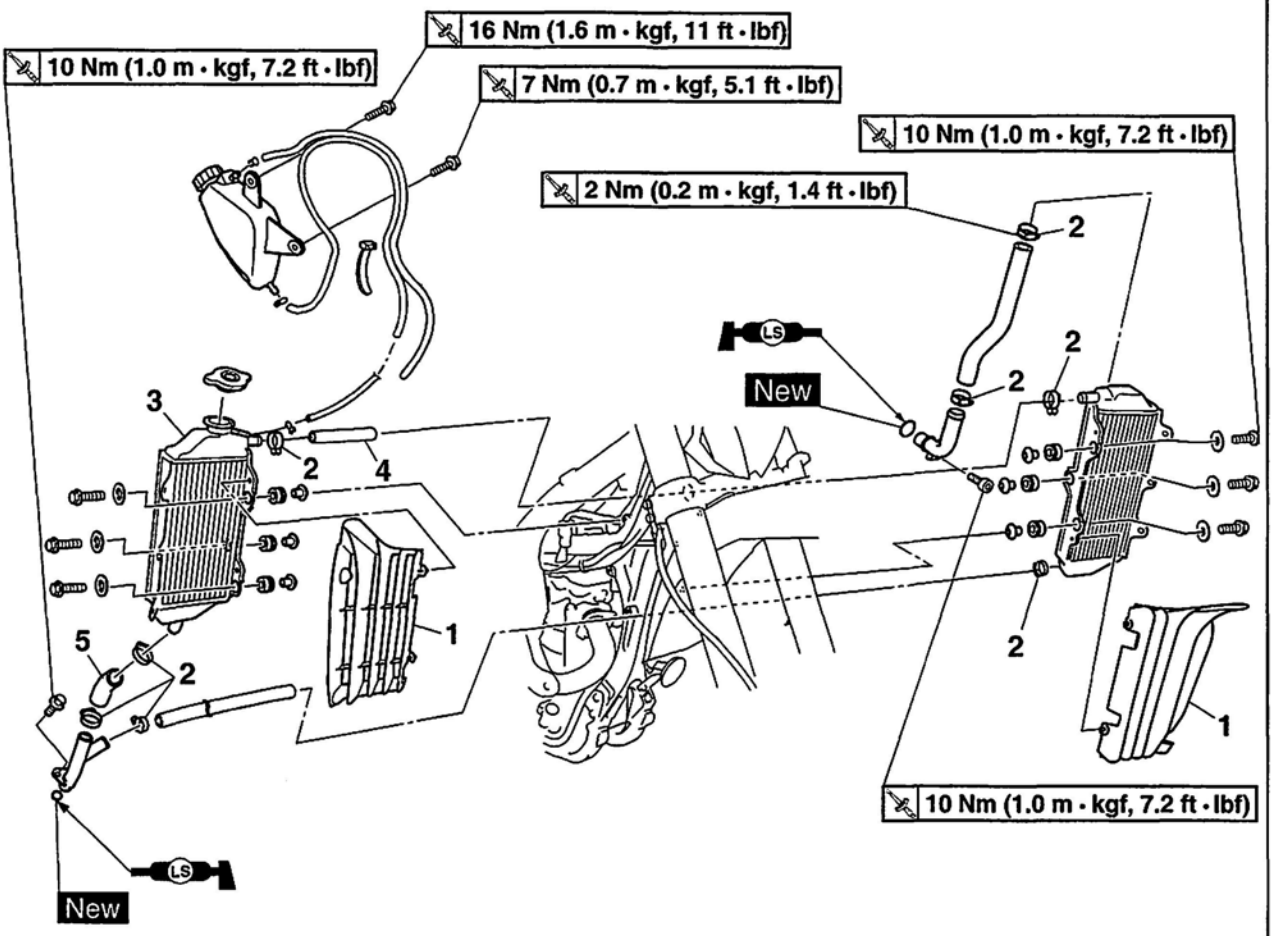
WATER PUMP **7-5**
CHECKING THE WATER PUMP 7-6
ASSEMBLING THE WATER PUMP 7-6

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.

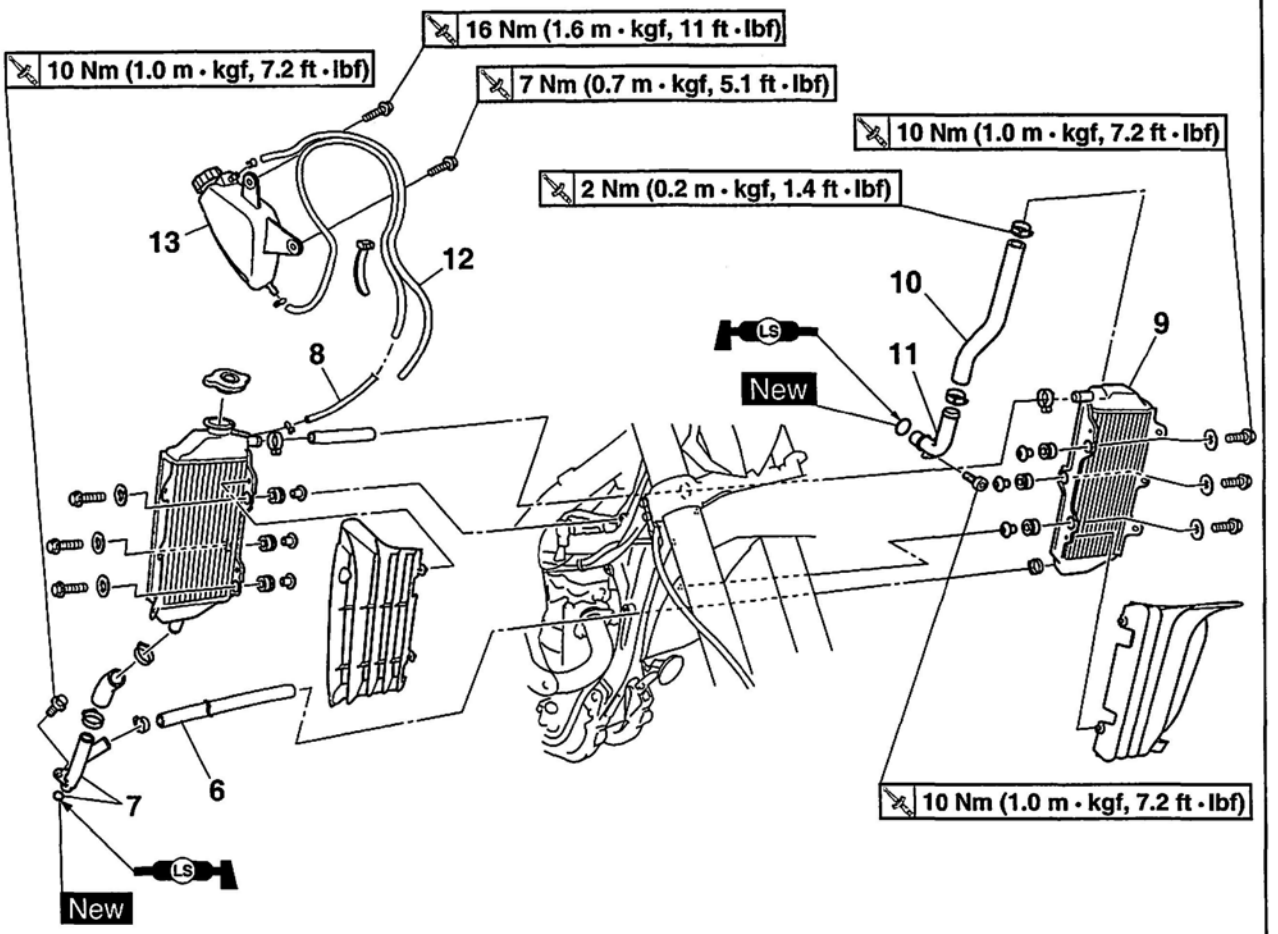
EAS1DX3197
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Air scoop (left/right)		Refer to "GENERAL CHASSIS" on page 5-1.
	Fuel tank		Refer to "FUEL TANK" on page 8-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-16.
1	Air panel	2	
2	Radiator hose clamp	8	
3	Right radiator	1	
4	Radiator hose 2	1	
5	Radiator hose 3	1	

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
6	Radiator hose 4	1	
7	Pipe 2/O-ring	1/1	
8	Catch tank hose	1	
9	Left radiator	1	
10	Radiator hose 1	1	
11	Pipe 1/O-ring	1/1	
12	Catch tank breather hose	1	
13	Catch tank	1	
			For installation, reverse the removal procedure.

EAS1DX3198
HANDLING NOTE

EWA1DX1007
⚠ WARNING

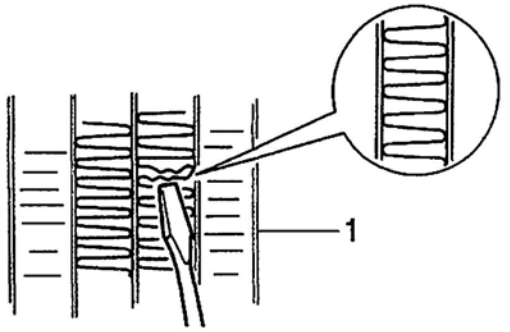
Do not remove the radiator cap when the engine and radiator are hot. Scalding hot fluid and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, open the radiator cap by the following procedure: Place a thick rag, like a towel, over the radiator cap, slowly rotate the cap counterclockwise to the detent. This procedure allows any residual pressure to escape. When the hissing sound has stopped, press down on the cap while turning counterclockwise and remove it.

EAS26390
CHECKING THE RADIATOR

1. Check:
   - Radiator fins "1"
     Obstruction → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flathead screwdriver.



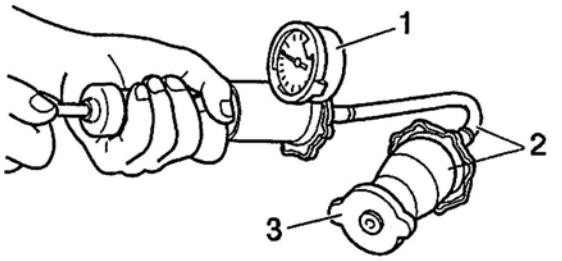
2. Check:
   - Radiator hoses
   - Radiator pipes
     Cracks/damage → Replace.
3. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure
107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

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



I4110202

b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

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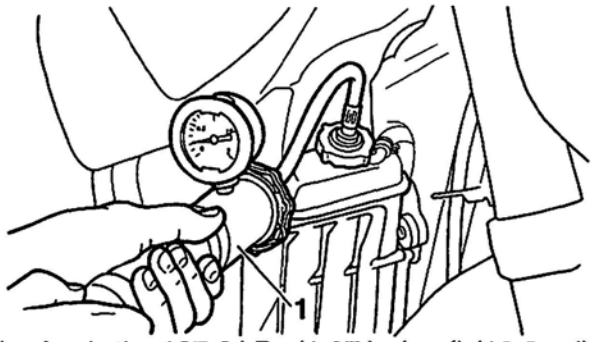
EAS1DX3199
INSTALLING THE RADIATOR

1. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-16.
2. Check:
   - Cooling system
     Leakage → Collect or replace.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Attach the radiator cap tester "1" to the radiator.

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



b. Apply the 137.3 kPa (1.37 kg/cm²) (19.9 psi) pressure.
c. Measure the indicated pressure with the gauge.

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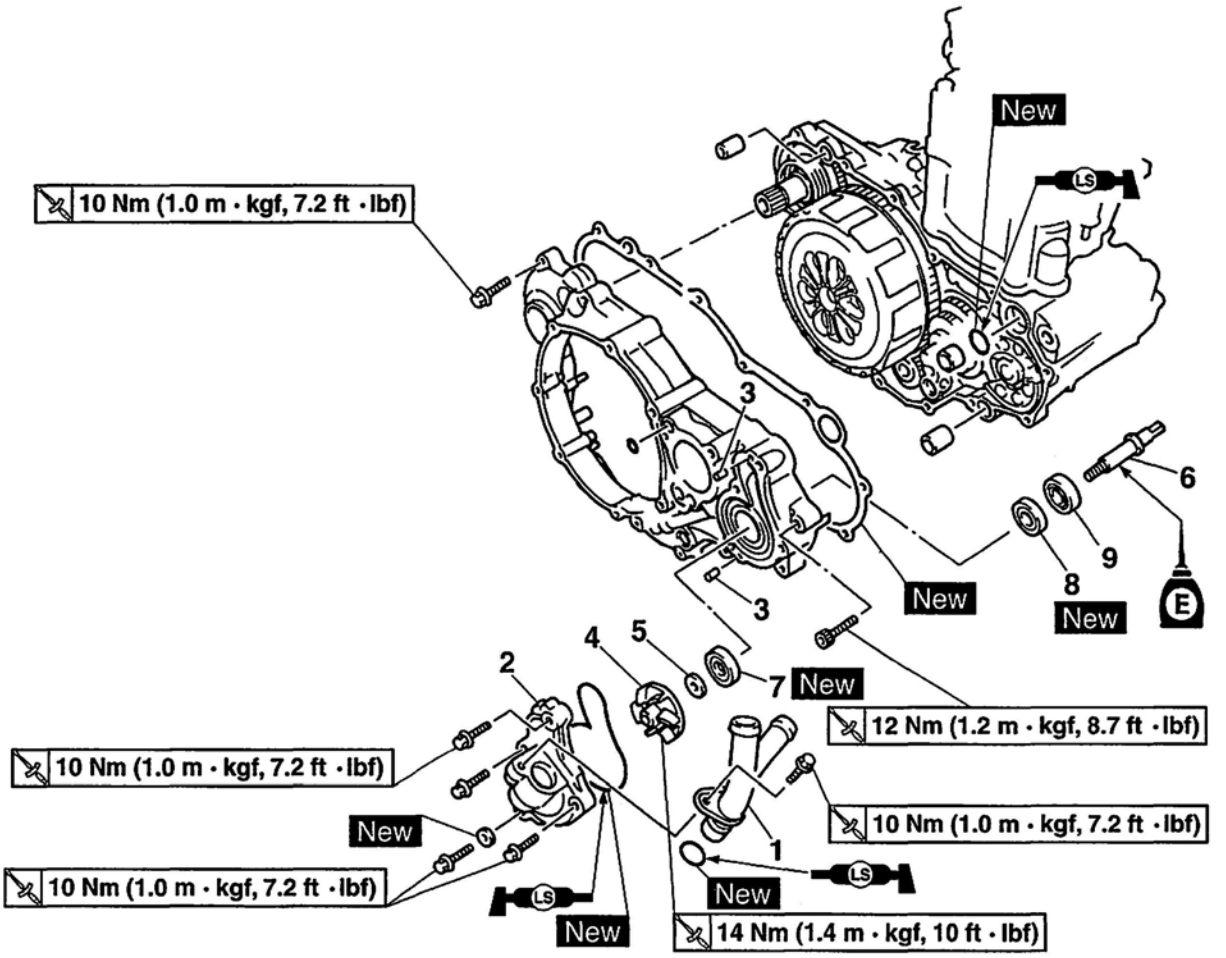
3. Measure:
   • Radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to "CHECKING THE RADIATOR" on page 7-3.

EAS1DX3200
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Drains the coolant.		Refer to "CHANGING THE COOLANT" on page 3-16.
	Drains the engine oil.		Refer to "CHANGING THE ENGINE OIL" on page 3-13.
	Crankcase cover right		Refer to "CLUTCH" on page 6-35.
1	Coolant pipe 2	1	
2	Water pump housing	1	
3	Pin	2	
4	Impeller	1	
5	Washer	1	
6	Impeller shaft	1	
7	Oil seal 1	1	
8	Oil seal 2	1	
9	Bearing	1	
			For installation, reverse the removal procedure.

EAS26530
CHECKING THE WATER PUMP

1. Check:
   - Water pump housing cover
   - Impeller shaft
     Cracks/damage/wear → Replace.

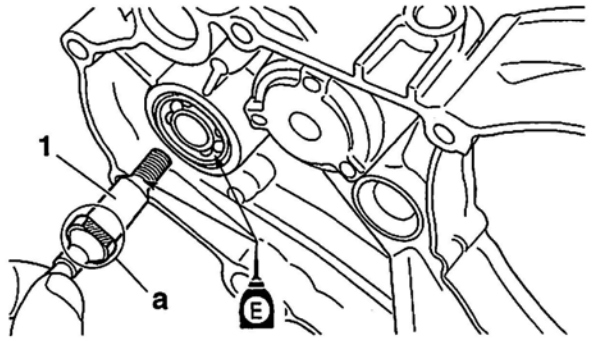
EAS26560
ASSEMBLING THE WATER PUMP

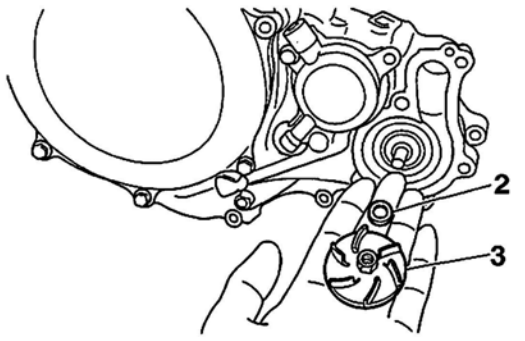
1. Install:
   - Impeller shaft "1"
   - Washer "2"
   - Impeller "3"

	Impeller **14 Nm (1.4 m·kgf, 10 ft·lbf)**

TIP

- Take care so that the oil seal lip is not damaged or the spring does not slip off its position.
- When installing the impeller shaft, apply the engine oil on the oil seal lip, bearing and impeller shaft. And install the shaft while turning it.
- Hold the impeller shaft on its width across the flats "a" with spanners, etc. and install the impeller.

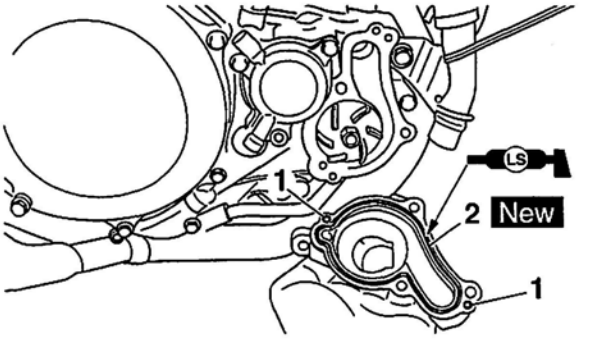




2. Install:
   - Dowel pin "1"
   - O-ring "2" New

TIP

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

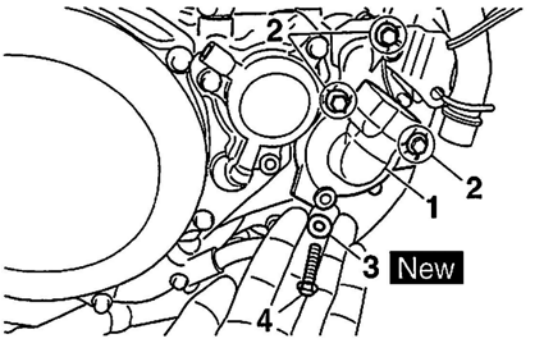


3. Install:
   - Water pump housing "1"
   - Water pump housing bolt "2"

	Water pump housing bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

   - Washer "3" New
   - Coolant drain bolt "4"

	Coolant drain bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

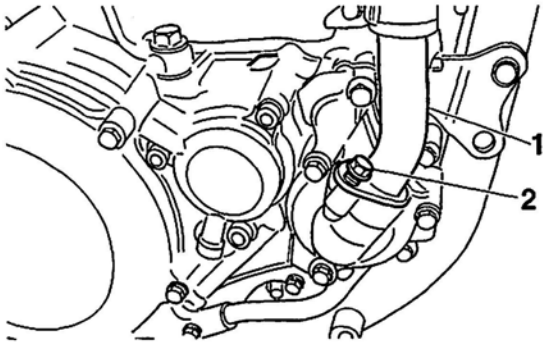


4. Install:
   - O-ring New
   - Coolant pipe "1"
   - Coolant pipe bolt "2"

	Coolant pipe bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

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


1
2

FUEL SYSTEM

FUEL TANK **8-1**
REMOVING THE FUEL TANK 8-3
REMOVING THE FUEL PUMP 8-3
CHECKING THE FUEL PUMP BODY 8-3
INSTALLING THE FUEL PUMP 8-3
REMOVING THE FUEL SENDER 8-4
CHECKING THE FUEL SENDER 8-4
INSTALLING THE FUEL SENDER 8-4
INSTALLING THE FUEL TANK 8-5
CHECKING THE FUEL PRESSURE 8-5

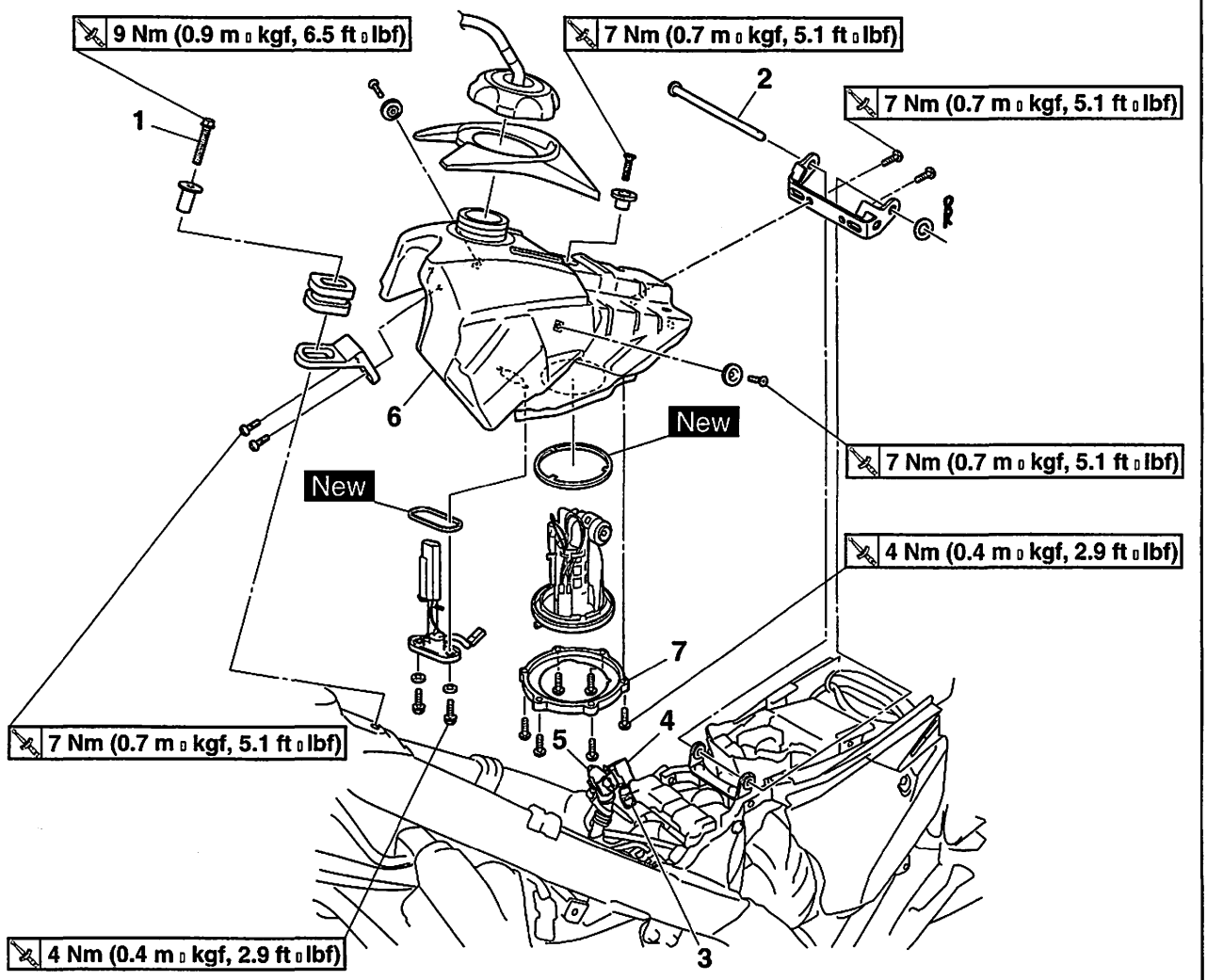
THROTTLE BODY **8-6**
REMOVING THE THROTTLE BODY 8-8
CHECKING THE INJECTOR 8-8
CHECKING THE THROTTLE BODY 8-8
CHECKING THE THROTTLE BODY JOINT 8-9
ADJUSTING THE THROTTLE POSITION SENSOR 8-9

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.

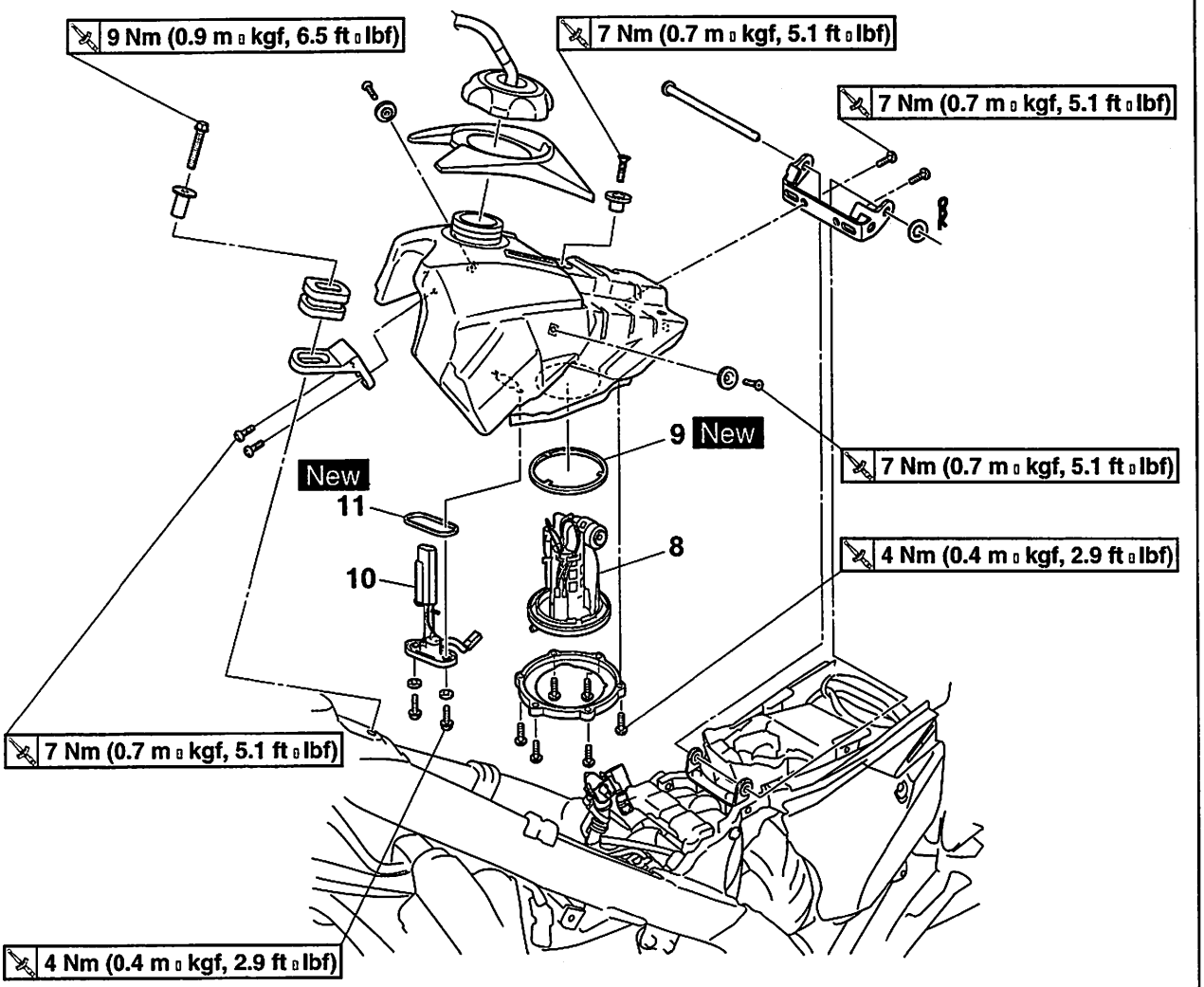
EAS26620
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 5-1.
	Side cover (left/right)		
	Air scoop (left/right)		
1	Fuel tank bolt	1	
2	Fuel tank bracket pin	1	
3	Fuel sender coupler	1	Disconnect.
4	Fuel pump coupler	1	Disconnect.
5	Fuel hose	1	
6	Fuel tank	1	
7	Fuel pump bracket	1	

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
8	Fuel pump	1	
9	Fuel pump gasket	1	
10	Fuel sender	1	
11	Fuel sender gasket	1	
			For installation, reverse the removal procedure.

EAS26630
REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel hose coupler

EWA23P1001
⚠ WARNING

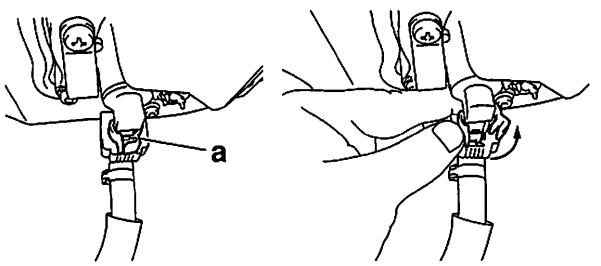
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

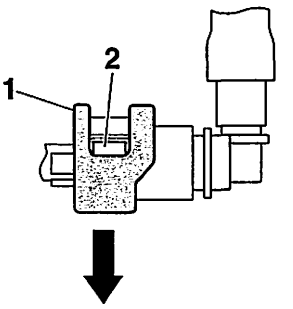
ECA23P1090
NOTICE

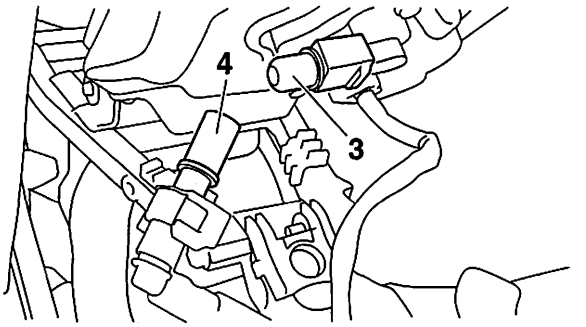
Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

- To disconnect the fuel hose from the fuel tank, remove the fuel hose connector holder "a", and then slide the fuel hose connector cover.
- To remove the fuel hose from the fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.
- To prevent sand, dust, and other foreign material from entering the fuel pump, install the included fuel hose joint cover 1 "3" and fuel hose joint cover 2 "4" onto the fuel pump and disconnected fuel hose.







3. 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.

EAS26640
REMOVING THE FUEL PUMP

1. Remove:
   - Fuel pump

ECA14720
NOTICE

Do not drop the fuel pump or give it a strong shock.

EAS1DX3201
CHECKING THE FUEL PUMP BODY

1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.

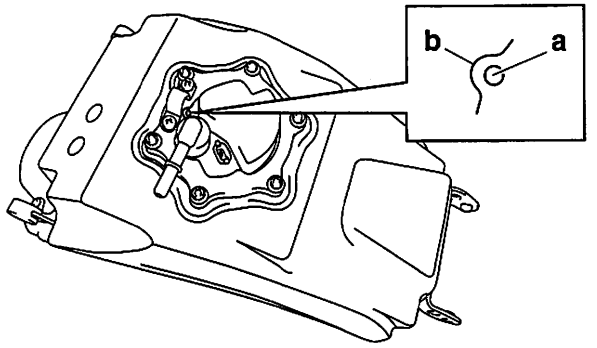
EAS26700
INSTALLING THE FUEL PUMP

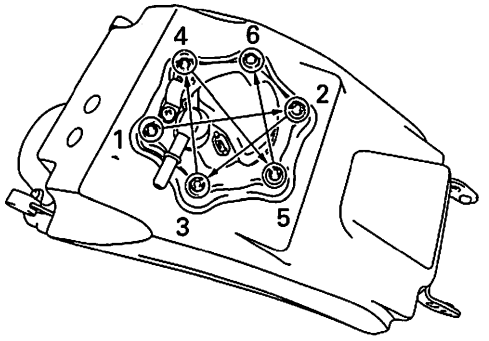
1. Install:
   - Fuel pump gasket New
   - Fuel pump
   - Fuel pump bracket

	Fuel pump bolts **4 Nm (0.4 m·kgf, 2.9 ft·lbf)**

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the lip on the fuel pump gasket upward.
- Install the fuel pump as shown in the illustration.
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Align the slot "b" on the fuel tank damper with the projection "a" on the fuel pump.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.





EAS1DX3202
REMOVING THE FUEL SENDER

1. Remove:
   - Fuel sender

ECA14720

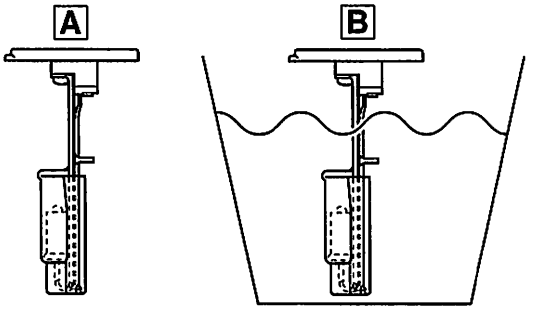
NOTICE

Do not drop the fuel sender or give it a strong shock.

EAS1DX3203
CHECKING THE FUEL SENDER

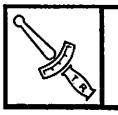
1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler (from the wire harness)
2. Remove:
   - Fuel tank
3. Remove:
   - Fuel sender (from the fuel tank)
4. Connect:
   - Fuel sender coupler
5. Push the main switch to "ON".
6. Check:
   - Fuel level warning light
     Out of specification → Replace the fuel sender.

Fuel pump is atmosphere "A"
→ Fuel level warning light is come on
Fuel pump is soaked in fuel "B"
→Fuel level warning light is goes off



EAS1DX3204
INSTALLING THE FUEL SENDER

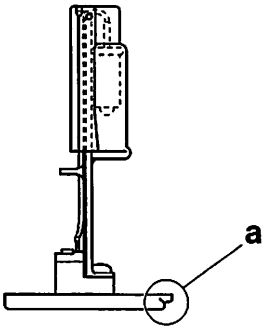
1. Install:
   - Fuel sender gasket New
   - Fuel sender



Fuel sender bolts
4 Nm (0.4 m·kgf, 2.9 ft·lbf)

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel sender.
- Always use a new fuel sender gasket.
- Install the fuel sender as shown in the illustration.
- When install the fuel sender, make sure that the projection "a" faces the right side of the vehicle.



EAS1DX3205
INSTALLING THE FUEL TANK

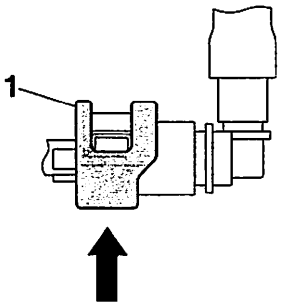
1. Install:
   • Fuel hose

ECA1DX1024
NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holders are in the correct position, otherwise the fuel hose will not be properly installed.

TIP

- Insert the fuel hose on the fuel pipe until you hear a definite "click".
- Slide the fuel hose connector cover "1" at the fuel hose end in the direction of the arrow.



EAS1DX3206
CHECKING THE FUEL PRESSURE

1. Check:
   • Fuel pressure

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a. Remove the seat.
   Refer to"GENERAL CHASSIS" on page 5-1.
b. Remove the fuel tank bolt and hold up the fuel tank.
c. Disconnect the fuel hose from the fuel pump.
   Refer to "REMOVING THE FUEL TANK" on page 8-3.

EWA1DX1008
⚠ WARNING

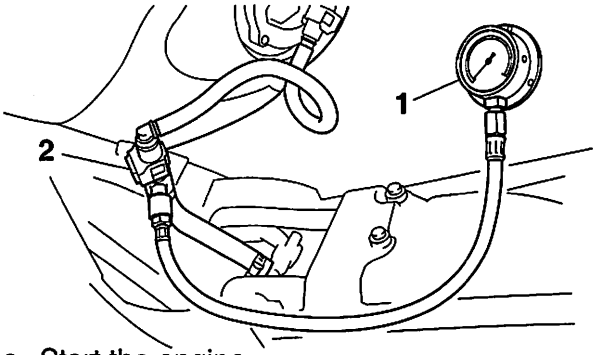
Cover fuel hose connection with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA1DX1025
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

d. Connect the pressure gauge "1" and fuel pressure adapter "2" to the fuel hose.

Pressure gauge
90890-03153
YU-03153
Fuel pressure adapter
90890-03186
YM-03186



e. Start the engine.
f. Measure the fuel pressure.
   Faulty → Replace the fuel pump.

Fuel line pressure (at idle)
300.0–390.0 kPa (3.00–3.90 kgf/cm², 43.5–56.6 psi)

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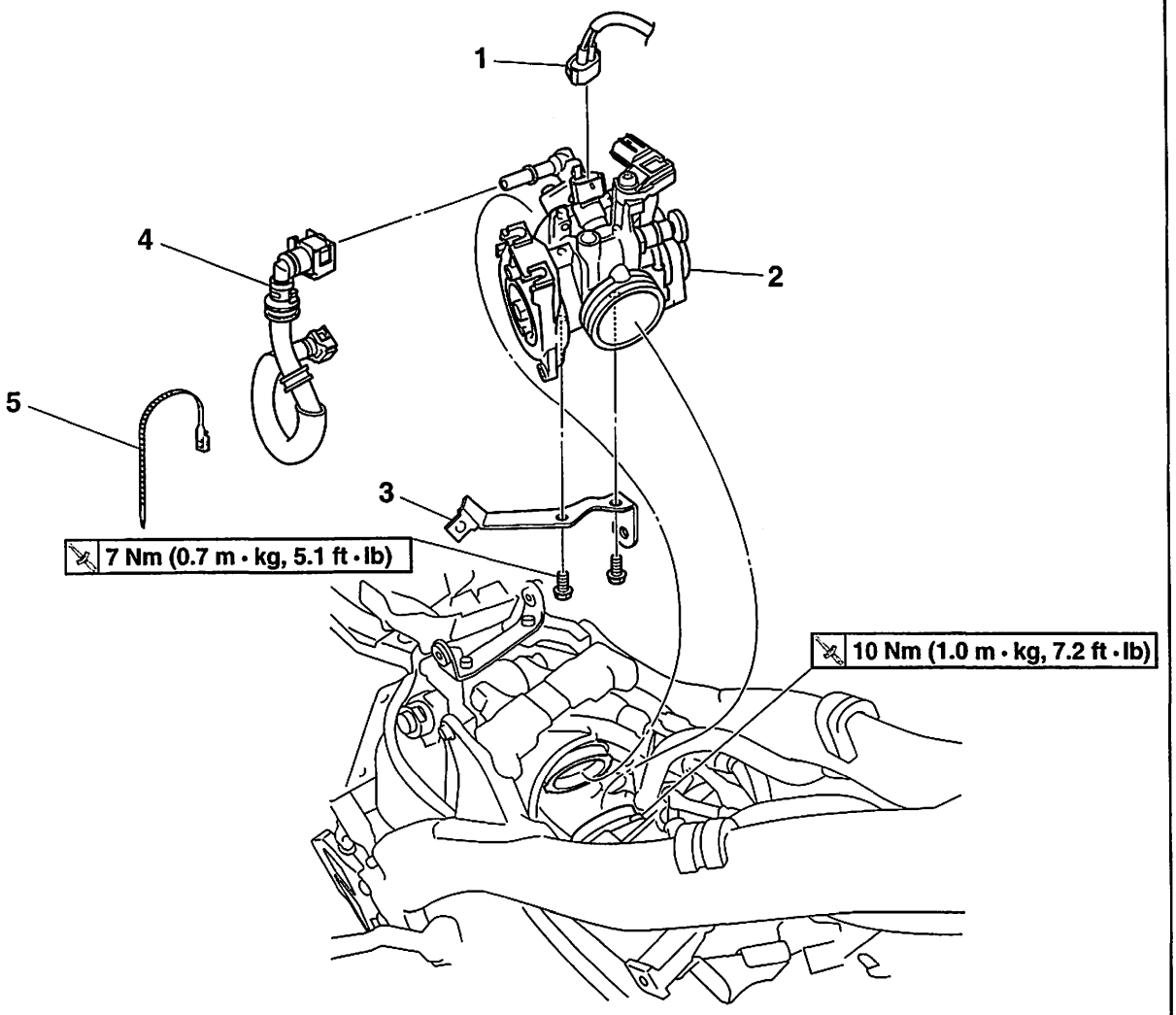
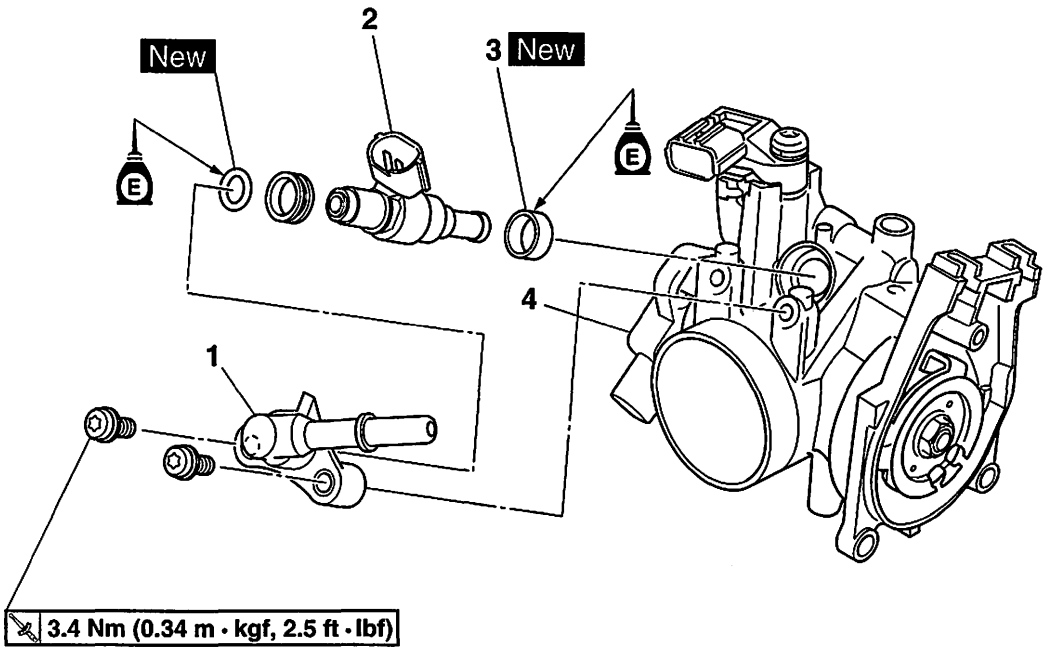
EAS26970
THROTTLE BODY

Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 5-1.
	Side cover (left/right)		
	Air scoop (left/right)		
	Fuel tank		Refer to "FUEL TANK" on page 8-1.
	Throttle cable cover		
	Throttle cable		
	Ignition coil lead		
	Rear frame		Loosen.
	Ignition coil lead		Loosen.
1	Injector coupler	1	Disconnect.
2	Throttle body assembly	1	
3	Bracket	1	
4	Fuel hose	1	
5	Clamp	1	
			For installation, reverse the removal procedure.

Disassembling the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
1	Delivery pipe	1	
2	Injector	1	
3	Gasket	1	
4	Throttle position sensor	1	
			For assembly, reverse the disassembly procedure.

EAS1DX3207
REMOVING THE THROTTLE BODY

The following procedure applies to both of the throttle body.

1. Remove:
   - Rear frame upper bolt
   - Rear shock absorber assembly upper bolt
   Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 5-61.
2. Loosen:
   - Rear frame lower bolt
   - Rear shock absorber assembly lower bolt
3. Slide:
   - Rear frame
   - Rear shock absorber assembly

ECA1DX1026
NOTICE

Do not strain the wire harness when the rear frame and rear shock absorber assembly are removed.

4. Loosen:
   - Throttle body joint clamp screw
5. Remove:
   - Throttle body

TIP

Remove the throttle body from the right side of the vehicle.

EAS26980
CHECKING THE INJECTOR

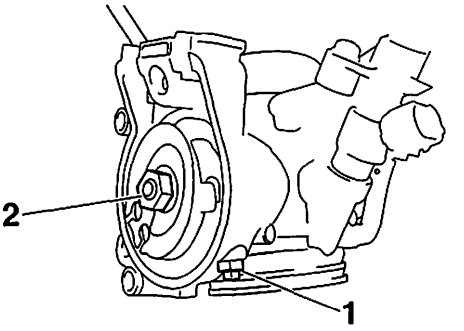
1. Check:
   - Injector
   Obstruction→ Replace and check the fuel pump/fuel supply system.
   Deposit → Replace.
   Damage → Replace.
2. Check:
   - Injector resistance
   Refer to "CHECKING THE FUEL INJECTOR" on page 9-78.

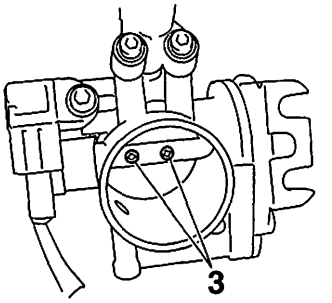
EAS26990
CHECKING THE THROTTLE BODY

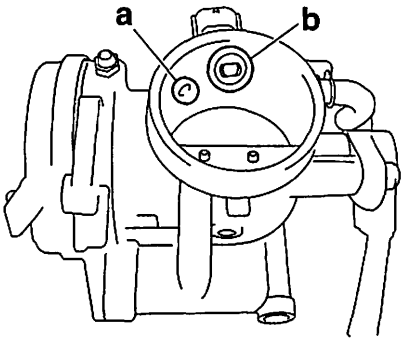
1. Check:
   - Throttle body
   Cracks/damage → Replace the throttle body as a set.
2. Check:
   - Fuel passages
   Obstructions → Clean.

ECA1DX1027
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", or throttle valve screw "3". Otherwise, a loss of performance may occur.**
- **Do not use compressed air to clean the throttle body. Otherwise, foreign material may adhere to the intake air pressure sensor passage "a" and fuel injector "b" in the throttle body.**

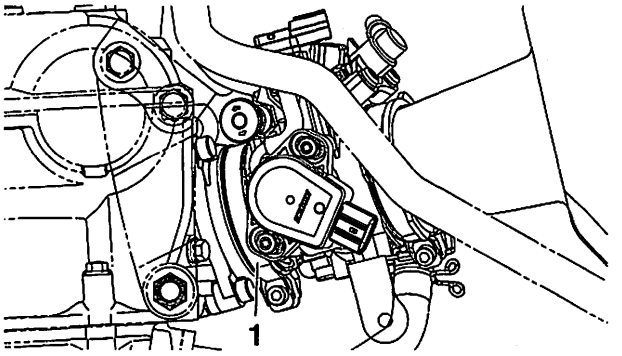






EAS1DX3208
CHECKING THE THROTTLE BODY JOINT

1. Check:
   • Throttle body joint "1"
   Cracks/damage → Replace.



EAS27030
ADJUSTING THE THROTTLE POSITION SENSOR

EWA32D1011

⚠ 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" on page 9-76.
2. Adjust:
   • Throttle position sensor angle

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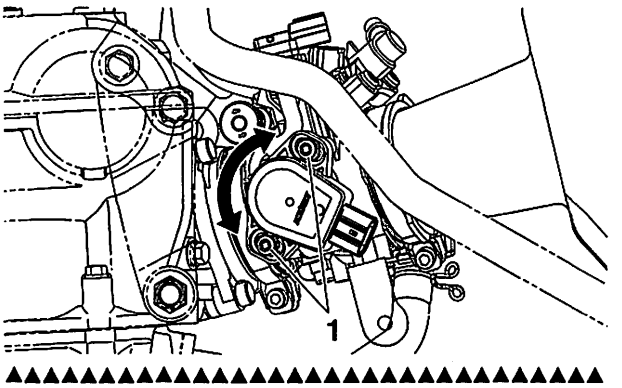
a. Connect the diagnostic tool.
   Refer to "YAMAHA DIAGNOSTIC TOOL" on page 9-26.
b. Temporary tighten the throttle position sensor.
c. Check that the throttle grip is fully closed.
d. Connect the throttle position sensor to the wire harness.
e. Set the main switch to "OFF" .
f. Set the diagnostic tool to "diagnostic mode"
g. Diagnostic code number "d:01" is selected.
h. Adjust the position of the throttle position sensor angle so that 9-16 can appear in the diagnostic tool.
i. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "1" .

	Throttle position sensor screw 3.4 Nm (0.34 m·kgf, 2.5 ft·lbf)



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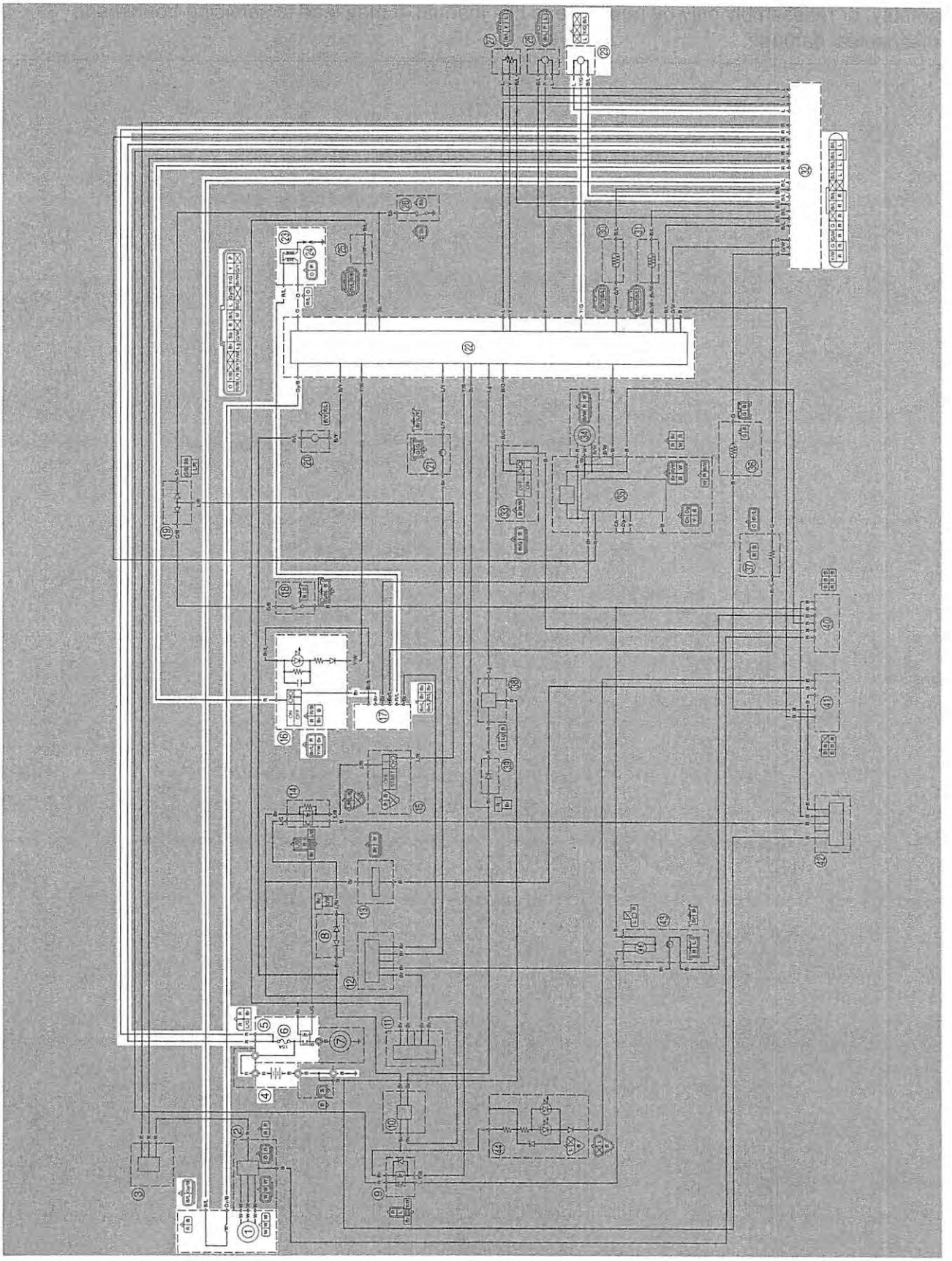
TIP

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.

EAS27090
IGNITION SYSTEM

EAS1DX3209
CIRCUIT DIAGRAM



1. AC magneto
4. Battery
5. Main fuse
6. Starter relay
16. Main switch
17. Joint connector
22. ECU (electronic control unit)
23. Ignition coil
24. Spark plug
29. Lean angle sensor
32. Joint connector

EAS1DX3210
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. Air scoop (left/right)
4. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSE" on page 9-65.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-6.	NG →	Re-gap or replace the spark plug.
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 9-71.	OK →	The ignition system is normal.
NG ↓		
5. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 9-71.	NG →	Replace the ignition coil.
OK ↓		
6. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 9-72.	NG →	Replace the stater assembly.
OK ↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 9-60.	NG →	Replace the main switch.
OK ↓		

8. Check the engine stop switch.
   Refer to "CHECKING THE SWITCHES" on page 9-60.
   NG → Replace the engine stop switch.
   OK ↓

9. Check the neutral switch.
   Refer to "CHECKING THE SWITCHES" on page 9-60.
   NG → Replace the neutral switch.
   OK ↓

10. Check the relay unit (Starting circuit cut-off relay).
    Refer to "CHECKING THE RELAYS" on page 9-69.
    NG → Replace the relay unit.
    OK ↓

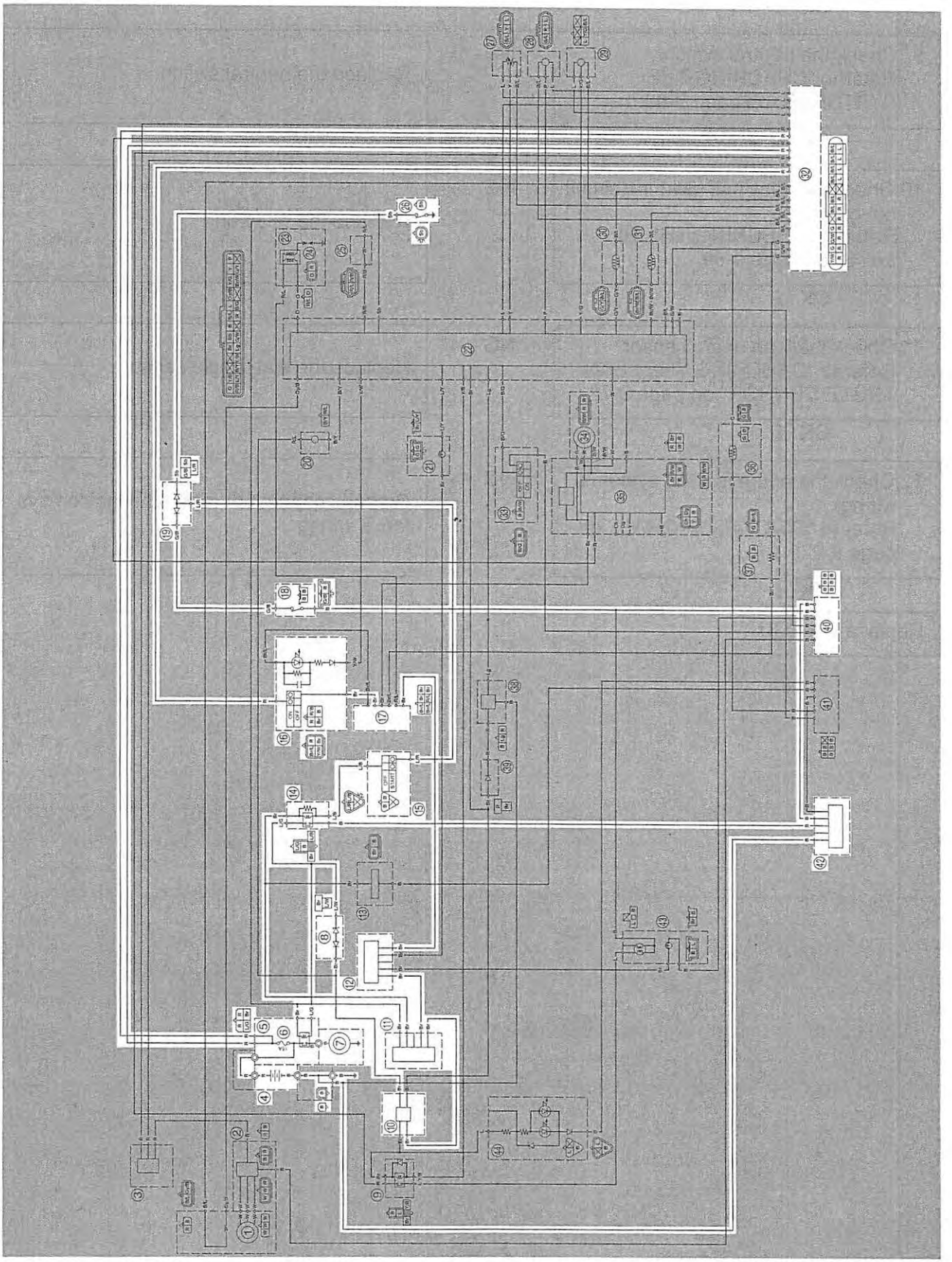
11. Check the lean angle sensor.
    Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 9-72.
    NG → Replace the lean angle sensor.
    OK ↓

12. Check the entire ignition system's wiring.
    Refer to "CIRCUIT DIAGRAM" on page 9-2.
    NG → Properly connect or repair the ignition system's wiring.
    OK ↓

Replace the ECU.

EAS27160
ELECTRIC STARTING SYSTEM

EAS1DX3211
CIRCUIT DIAGRAM



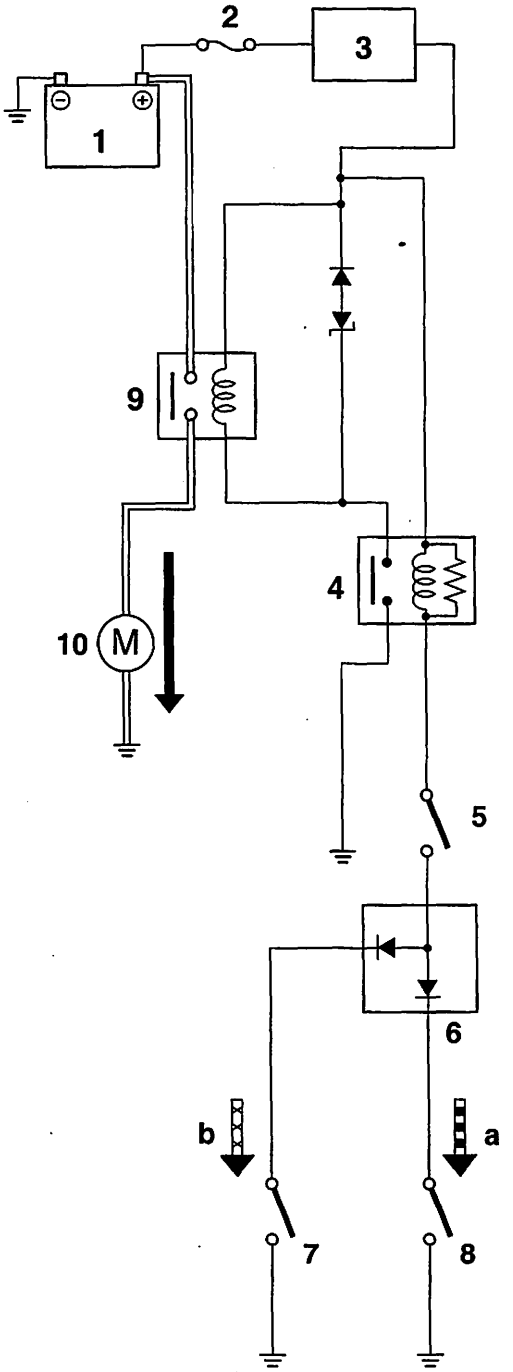
4. Battery
5. Main fuse
6. Starter relay
7. Starter motor
8. Starter relay diode
10. Connector
11. Connector
12. Connector
14. Starting circuit cut-off relay
15. Start switch
16. Main switch
17. Joint connector
18. Clutch switch
19. Diode
26. Neutral switch
32. Joint connector
40. Joint connector
42. Connector

EAS1DX3212
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is set to "ON", the starter motor can only operate if at least one of the following conditions is met:" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cut-off relay is closed and the engine can be started by pressing the start switch.



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

1. Battery
2. Main fuse
3. Main switch
4. Starting circuit cut-off relay
5. Start switch
6. Diode
7. Clutch switch
8. Neutral switch
9. Starter relay
10. Starter motor

EAS1DX3213
TROUBLESHOOTING

The starter motor fails to turn.

TIP

Before troubleshooting, remove the following part (s):
1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank

1. Check the fuse.
   Refer to "CHECKING THE FUSE" on page 9-65.
   NG → Replace the fuse.
   OK ↓
2. Check the battery.
   Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.
   NG → • Clean the battery terminals.
   • Recharge or replace the battery.
   OK ↓
3. Check the starter motor operation.
   Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 9-73.
   OK → Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
   NG ↓
4. Check the starter motor.
   Refer to "CHECKING THE STARTER MOTOR" on page 6-33.
   NG → Repair or replace the starter motor.
   OK ↓
5. Check the relay unit (Starting circuit cut-off relay).
   Refer to "CHECKING THE RELAYS" on page 9-69.
   NG → Replace the relay unit.
   OK ↓
6. Check the diode.
   Refer to "CHECKING THE DIODE" on page 9-70.
   NG → Replace the diode.
   OK ↓
7. Check the starter relay.
   Refer to "CHECKING THE RELAYS" on page 9-69.
   NG → Replace the starter relay.
   OK ↓

8. Check the main switch.
   Refer to "CHECKING THE SWITCHES" on page 9-60.
   NG → Replace the main switch.
   OK ↓

9. Check the engine stop switch.
   Refer to "CHECKING THE SWITCHES" on page 9-60.
   NG → Replace the start switch.
   OK ↓

10. Check the neutral switch.
    Refer to "CHECKING THE SWITCHES" on page 9-60.
    NG → Replace the neutral switch.
    OK ↓

11. Check the clutch switch.
    Refer to "CHECKING THE SWITCHES" on page 9-60.
    NG → Replace the clutch switch.
    OK ↓

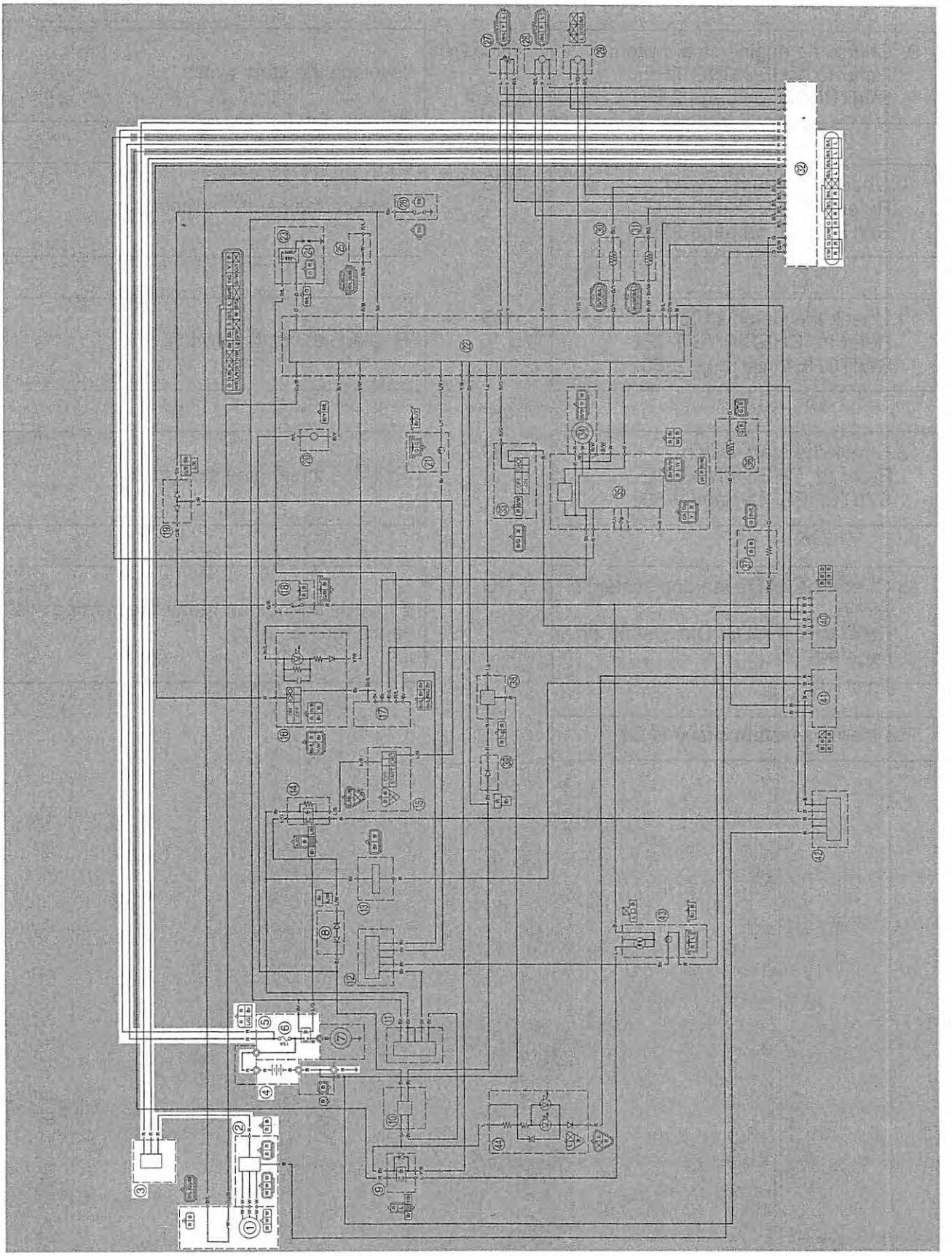
12. Check the start switch.
    Refer to "CHECKING THE SWITCHES" on page 9-60.
    NG → Replace the engine stop switch.
    OK ↓

13. Check the entire starting system's wiring.
    Refer to "CIRCUIT DIAGRAM" on page 9-6.
    NG → Properly connect or repair the starting system's wiring.
    OK ↓

The starting system circuit is OK.

EAS27200
CHARGING SYSTEM

EAS1DX3214
CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
3. Connector
4. Battery
5. Main fuse
6. Starter relay
32. Joint connector

EAS27220
TROUBLESHOOTING

The battery is not being charged.

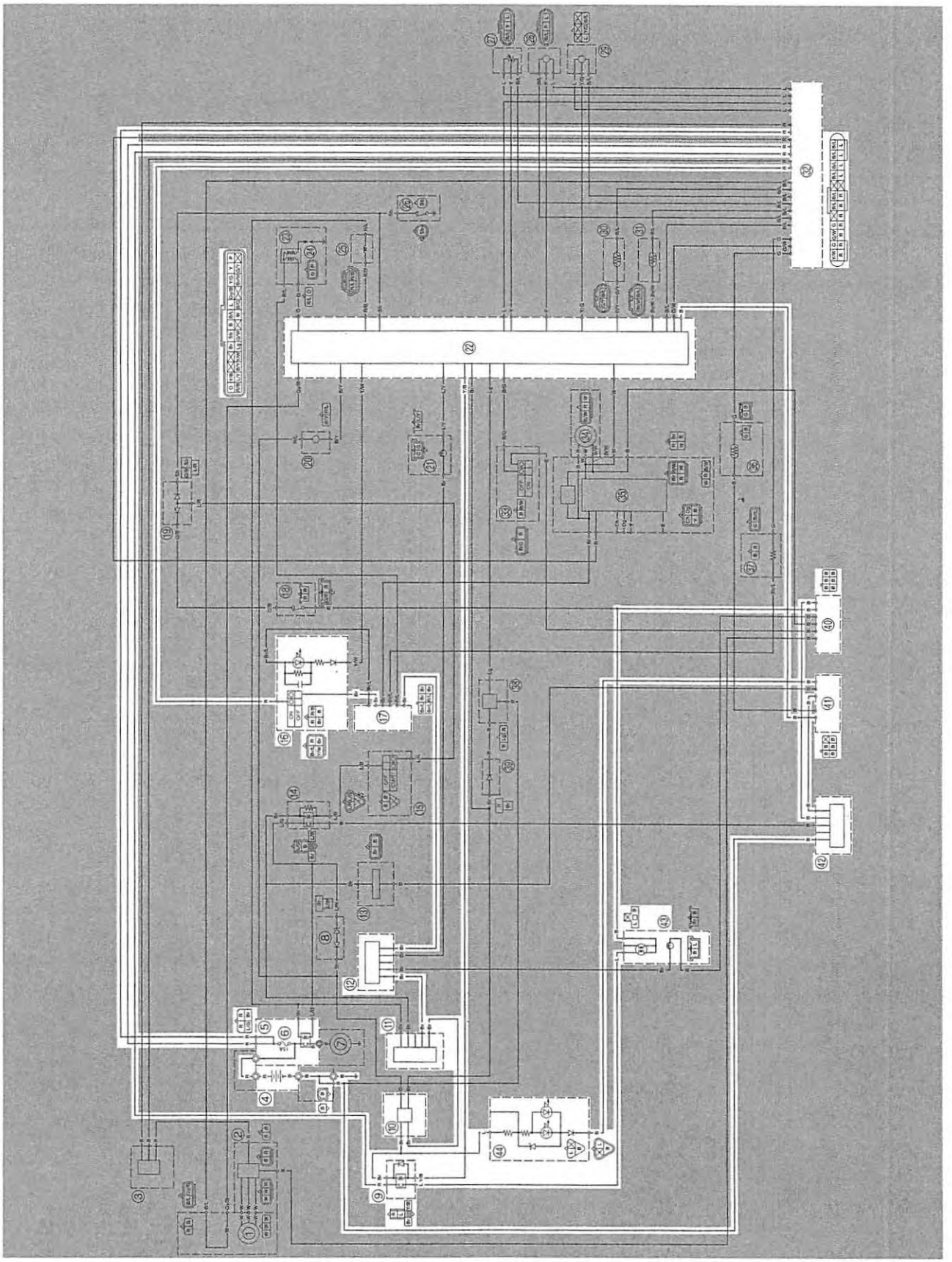
TIP

Before troubleshooting, remove the following part (s):
1. Seat
2. Side cover (left/right)

1. Check the fuse. Refer to "CHECKING THE FUSE" on page 9-65.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 9-73.	NG →	Replace the stator assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 9-74.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 9-12.	NG →	Properly connect or repair the charging system's wiring.
OK ↓		
This circuit is OK.		

EAS27240
LIGHTING SYSTEM

EAS1DX3215
CIRCUIT DIAGRAM



4. Battery
5. Main fuse
6. Starter relay
9. Headlight relay
10. Connector
11. Connector
12. Connector
16. Main switch
17. Joint connector
22. ECU (electronic control unit)
32. Joint connector
40. Joint connector
41. Joint connector
42. Connector
43. Headlight
44. Taillight

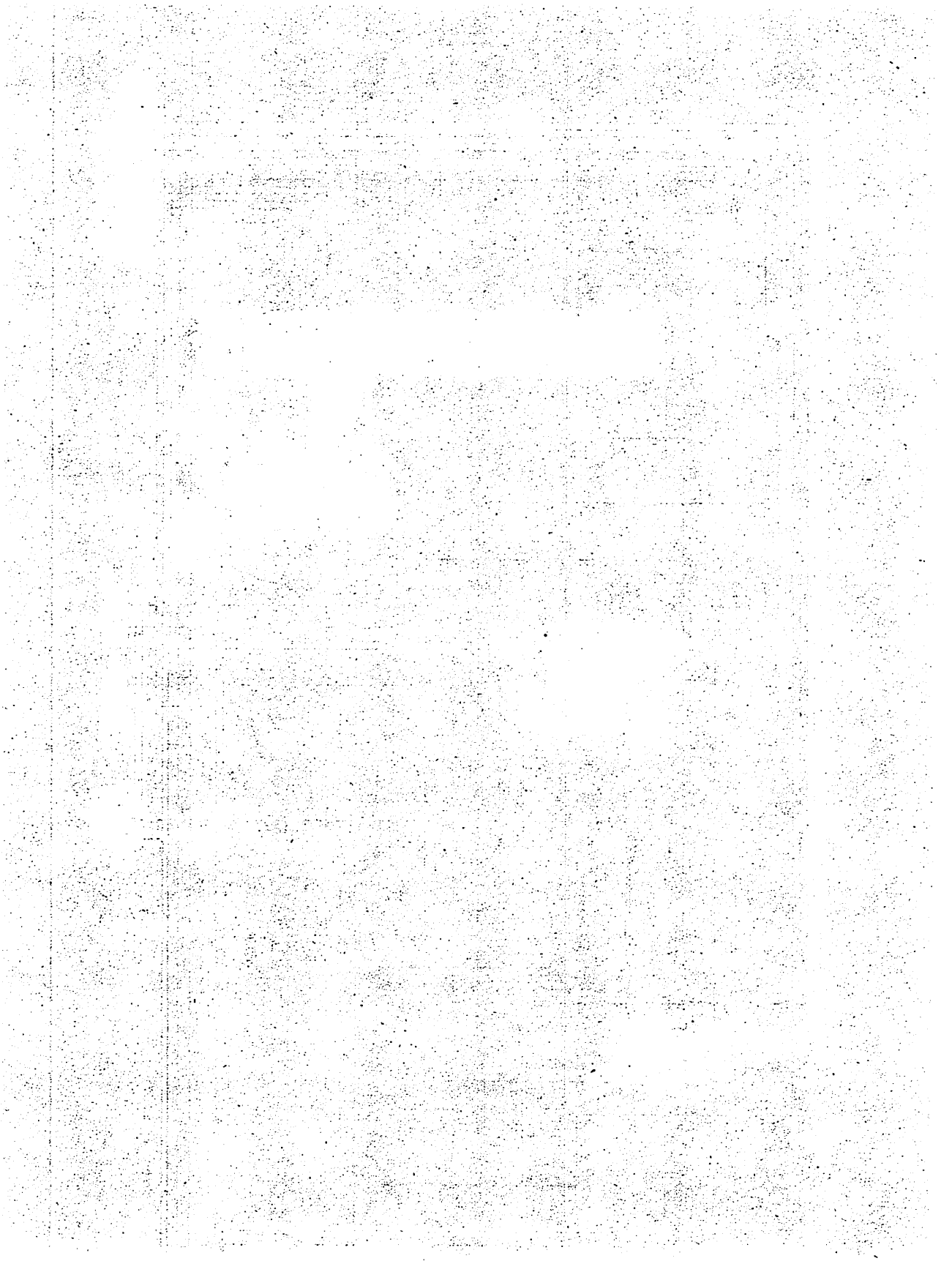
EAS1DX3216
TROUBLESHOOTING

Any of the following fail to light: headlight or meter light.

TIP

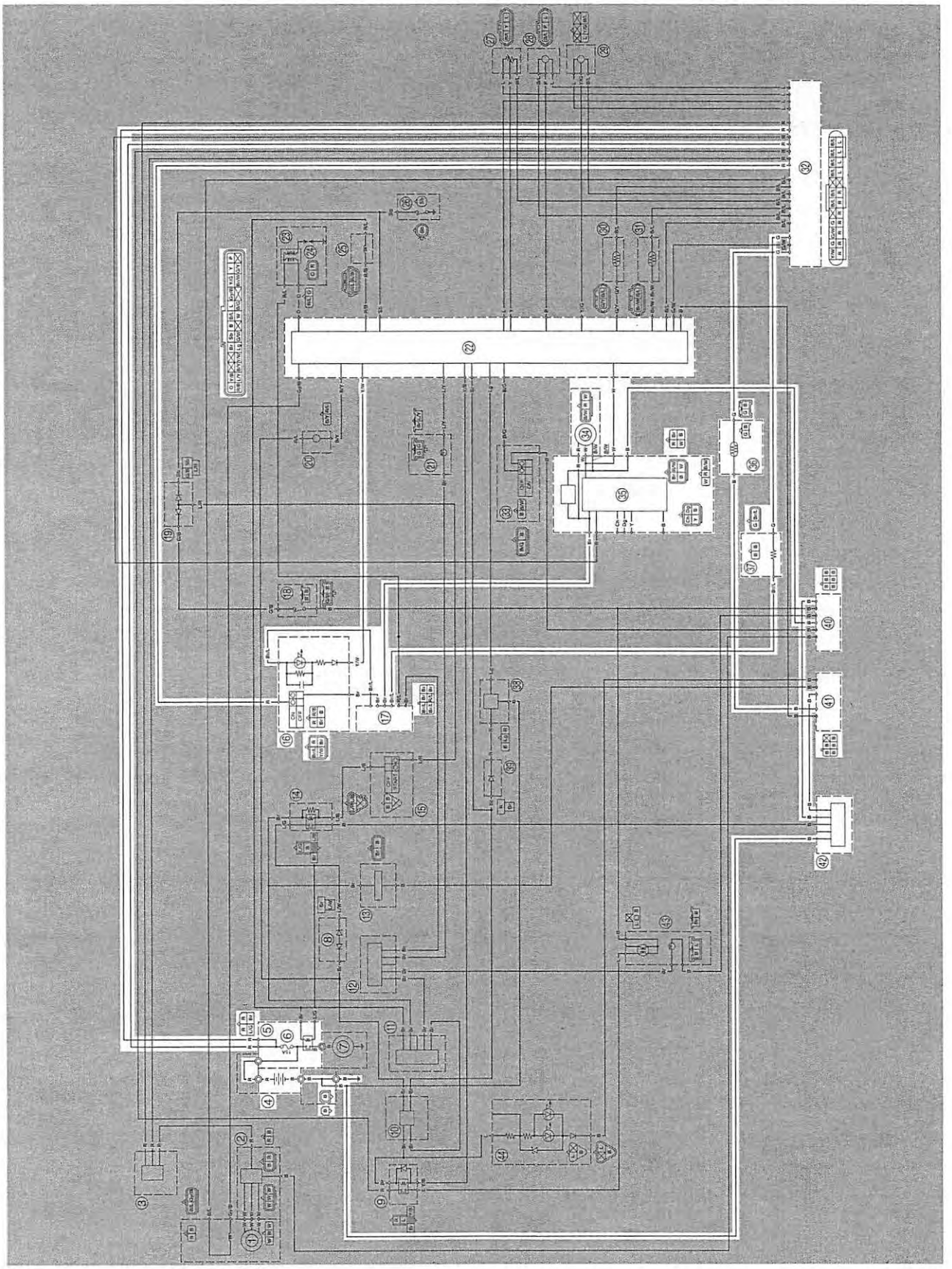
Before troubleshooting, remove the following part (s):
1. Seat
2. Side cover (left)
3. Air scoop (left/right)
4. Fuel tank

1. Check the each bulbs and bulb sockets condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 9-64.	NG →	Replace the bulb (s) and bulb socket (s).
OK ↓		
2. Check the fuse. Refer to "CHECKING THE FUSE" on page 9-65.	NG →	Replace the fuse.
OK ↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 9-60.	NG →	Replace the main switch.
OK ↓		
5. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 9-69.	NG →	Replace the headlight relay.
OK ↓		
6. Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 9-16.	NG →	Properly connect or repair the lighting system's wiring.
OK ↓		
Replace the ECU.		



EAS27270
SIGNALING SYSTEM

EAS1DX3217
CIRCUIT DIAGRAM



4. Battery
5. Main fuse
6. Starter relay
16. Main switch
17. Joint connector
22. ECU (electronic control unit)
32. Joint connector
34. Speed sensor
35. Multi-function display
36. Fuel sender
37. Resistor
40. Joint connector
41. Joint connector
42. Connector

EAS1DX3218
TROUBLESHOOTING

- The speedometer does not operate normally.
- The fuel indicator light does not come on.

TIP

Before troubleshooting, remove the following part (s):
1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSE" on page 9-65.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 9-60.	NG →	Replace the main switch.
OK ↓		
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 9-20.	NG →	Properly connect or repair the signaling system's wiring.
OK ↓		
This circuit is OK.		

Check the signaling system

The speedometer fails to operate.

1. Check the speed sensor. Refer to "CHECKING THE SPEED SENSOR" on page 9-74.	NG →	Replace the speed sensor.
OK ↓		
2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 9-20.	NG →	Properly connect or repair the signaling system's wiring.
OK ↓		
Replace the meter assembly.		

The fuel level warning light fails to come on.

1. Check the fuel sender.
   Refer to "CHECKING THE FUEL SENDER" on page 9-74.

NG → Replace the fuel sender assembly.

OK ↓

2. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 9-20.

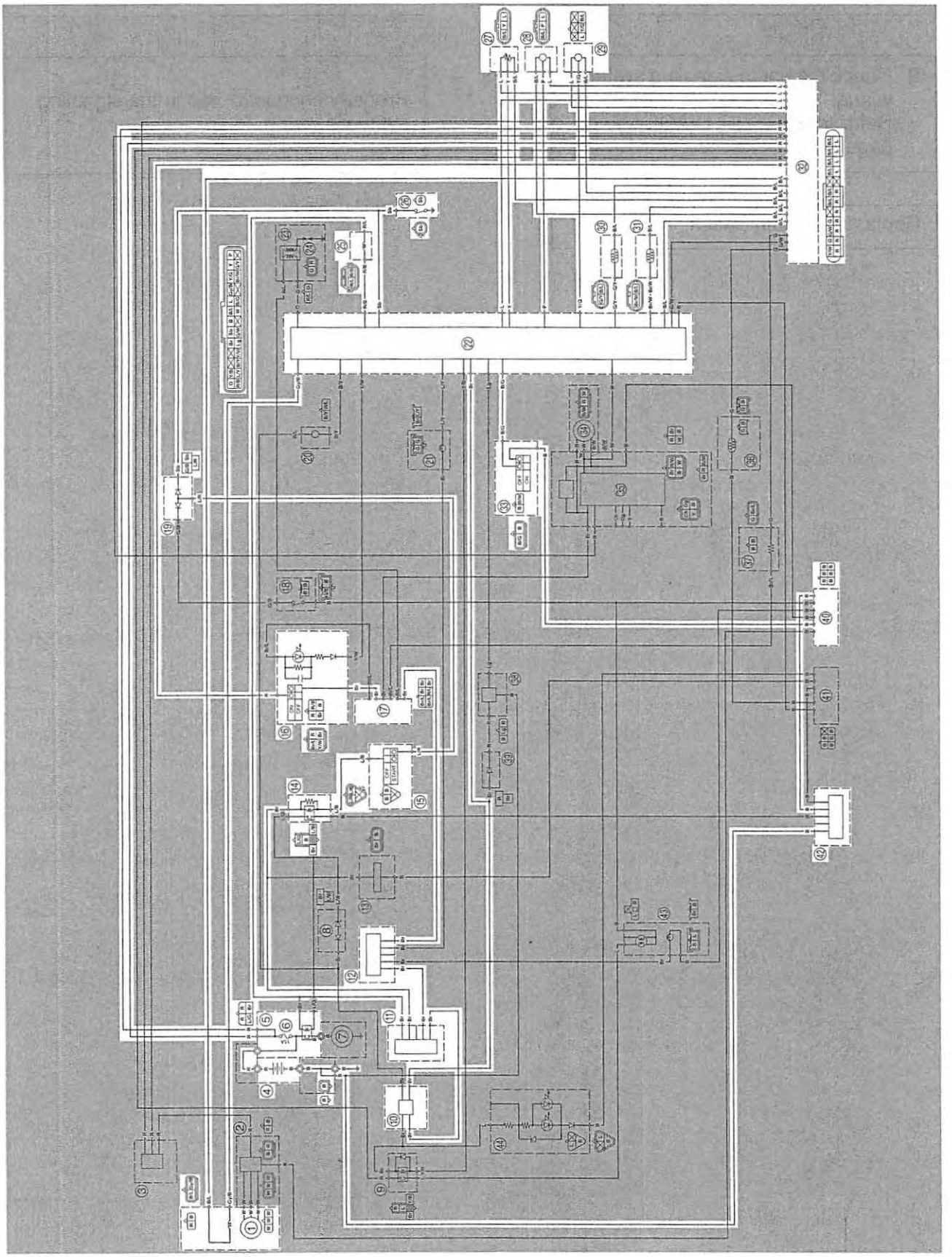
NG → Properly connect or repair the signaling system's wiring.

OK ↓

Replace the main switch.

EAS27330
FUEL INJECTION SYSTEM

EAS1DX3219
CIRCUIT DIAGRAM



1. AC magneto
4. Battery
5. Main fuse
6. Starter relay
10. Connector
11. Connector
12. Connector
14. Starting circuit cut-off relay
15. Start switch
16. Main switch
17. Joint connector
19. Diode
22. ECU (electronic control unit)
25. Injector
26. Neutral switch
27. Throttle position sensor
28. Intake air pressure sensor
29. Lean angle sensor
30. Coolant temperature sensor
31. Intake air temperature sensor
32. Joint connector
33. Engine stop switch
40. Joint connector
42. Connector

EAS1DX3220
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** **90890-03215**

Features of the Yamaha diagnostic tool

A diagnosis can be made more quickly than traditional methods with the Yamaha Diagnostic Tool. Using this software, ECU and sensor data, as well as fault diagnosis, vehicle maintenance, and any necessary information can be recorded and displayed on your computer screen through a USB adapter connected to the computer interface with a communication cable connected to the vehicle's ECU.
Data obtained in various functions can be saved as vehicle history, and can be accumulated.

Functions of the Yamaha diagnostic tool

Fault diagnosis mode	Error codes recorded on the ECU are read, and the contents are displayed.
Function diagnostic mode	Check the operation of the output value of each sensor and actuator.
Inspection mode	Determine whether each sensor or actuator is functioning properly.
CO adjustment mode	Adjust the concentration of CO admissions during idling.
Monitoring mode	Displays a graph of sensor output values for actual operating conditions.
Logging mode	Records and saves the sensor output value in actual driving conditions.
View log	Displays the logging data.
ECU rewrite	If necessary, the ECU is rewritten using ECU rewrite data provided by Yamaha. Ignition timing adjustment, etc. cannot be changed from the vehicle's original state.

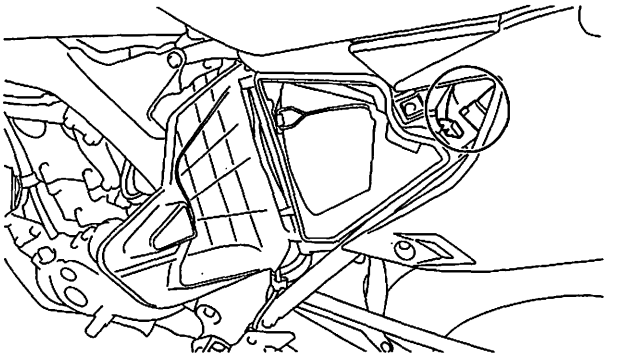
However, the diagnostic tool cannot be used to freely change the basic vehicle functions, such as adjusting the ignition timing.

Connecting the Yamaha diagnostic tool

1. Remove the side cover (left/right) and seat.
2. Open the air filter case cover.
3. Disconnect the coupler for connecting optional part.
4. Connect the sub-lead for diagnostic tool to the coupler for connecting optional part and the diagnostic tool.

	**FI diagnostic tool sub-lead** **90890-03212**

5. Connect the sub-lead for diagnostic tool to the battery.



TIP

When the Yamaha diagnostic tool is connected to the vehicle, the operation of the meter and indicators will be different from the normal operation.

EAS1DX3221

ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code number is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes while the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the clock LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and fuel injection system operation

Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the following conditions is present and the start switch is pushed:

12: Crankshaft position sensor

30: Lean angle sensor (latch up detected)

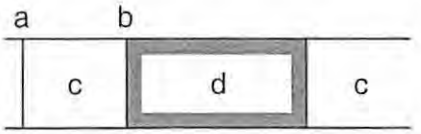
33: Ignition coil (Malfunction detected in the primary wire of the ignition coil)

41: Lean angle sensor (open or short circuit)

50: ECU internal malfunction (faulty ECU memory)

Checking the engine trouble warning light

The engine trouble warning light comes on for around 2 seconds after the main switch has been set to "ON" and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.



a. Main switch OFF
b. Main switch ON
c. Light OFF
d. Light ON for 2 seconds

ECU detects an abnormal signal from a sensor

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue operating or stop operating, depending on the conditions.

EAS27400
TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   • Fault code number

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a. Check the fault code number displayed on the meter.
b. Identify the faulty system with the fault code number.
c. Identify the probable cause of the malfunction.

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2. Check and repair the probable cause of the malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to "TROUBLESHOOTING DETAILS" on page 9-33. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to"TROUBLESHOOTING DETAILS" on page 9-33 and "LIST OF DIAGNOSTIC CODES" on page 9-31.	Check and repair.

3. Perform the reinstatement action for the fuel injection system.
   Refer to "Reinstatement method" in the appropriate table in "TROUBLESHOOTING DETAILS" on page 8-36.
4. Set the main switch to "OFF", then to "ON" again, and then check that no fault code number is displayed.

TIP

If another fault code number is displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to"LIST OF DIAGNOSTIC CODES"(Diagnostic code No.d:62).

TIP

Setting the main switch to "OFF" will not erase the malfunction history.

The engine operation is not normal, but the engine trouble warning light does not come on.

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS" on page 8-36.

d:01: Throttle position sensor signal (throttle angle) d:30: Ignition coil d:36: Injector

   If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts. If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS1DX3222
LIST OF SELF-DIAGNOSTIC AND FAIL-SAFE ACTIONS

Able/unable to start: Indicates whether the engine can be started when the malfunction for the applicable item has occurred.
Able/unable to drive: Indicates whether the vehicle can continue to be driven (the engine can continue to operate) when the malfunction for the applicable item has occurred while the vehicle is being driven (the engine is operating).

Fault code	Item	Page
12	Crankshaft position sensor	9-34
13	Intake air pressure sensor (open or short circuit)	9-35
14	Intake air pressure sensor (clogged or detached hose)	9-36
15	Throttle position sensor (open or short circuit)	9-37
16	Throttle position sensor (stuck)	9-39
21	Coolant temperature sensor (open or short circuit)	9-40
22	Intake air temperature sensor (open or short circuit)	9-41
30	Overturn detected	9-42
33	Ignition system	9-43
39	Fuel injector (open circuit)	9-44
41	Lean angle sensor (open or short circuit)	9-45
42	Wheel sensor	9-46
44	EEPROM writing error	9-47
46	Vehicle system power supply	9-48
50	ECU internal malfunction (abnormal ROM data)	9-48

When using the special service tool

Waiting for connection.	ECU internal malfunction (output signal error)	9-49
Er-4	ECU internal malfunction (input signal error)	9-50

EAS1DX3223
LIST OF DIAGNOSTIC CODES

Diagnostic code No.	Item	Details	Standard values of the meter display or description of operation
d:01	Throttle angle	Displays the throttle angle. • Check with throttle fully closed.	Display when the throttle is fully closed: 9–16
d:03	Intake air pressure	Displays the intake air pressure. • Check the pressure in the intake manifold. • Push the start switch and check that the intake air pressure changes.	0–126 (kPa) When the engine is stopped: Check that the atmospheric pressure is displayed. • At sea level (0 m): Approx. 101 (kPa) • 3,000 m above sea level: Approx. 70 (kPa) When the engine is cranking: The displayed value changes because the intake air pressure changes.
d:05	Intake air temperature	Displays the intake air temperature. • Check the temperature in the intake manifold and air filter case.	–30 to 120 (°C)/–22 to 248 (°F) When the engine is cold: Displayed temperature is close to the ambient temperature. When the engine is warm: Displayed temperature is the ambient temperature + approx. 20 °C (offset for the radiant heat).
d:06	Coolant temperature	Displays the coolant temperature. • Check the coolant temperature.	–30 to 120 (°C)/–22 to 248 (°F) When the engine is cold: Displayed temperature is close to the ambient temperature. When the engine is warm: Displayed temperature is the current coolant temperature.
d:07	Vehicle speed pulse	Displays the cumulative number for the vehicle speed pulse.	0–999 (pulses) When the front wheel is stopped: Check that the displayed number does not change. When the front wheel is rotated several turns by hand to input the vehicle speed pulse: Check that the displayed number increases.
d:08	Lean angle sensor	Displays the lean angle sensor output voltage.	0–5.0 (V) When the vehicle is upright: 0.4–1.4 (V) When the vehicle is overturned: 3.7–4.4 (V)
d:09	Monitor voltage	Displays the fuel system voltage.	0–18.7 (V) Standard value: Approx. 12 (V)
d:21	Neutral switch and clutch switch	Check the neutral switch and clutch switch operation.	Display when the gear is in neutral: ON Display when the gear is other than neutral and not operating clutch: OFF

Diagnostic code No.	Item	Details	Standard values of the meter display or description of operation
d:30	Ignition coil	Check that power is supplied to the ignition coil. • Check that a spark is generated.	Actuates the ignition coil five times at 1-second intervals. The "WARNING" LED on the FI diagnostic tool comes on each time the ignition coil is actuated.
d:36	Fuel injector (#1)	Check that power is supplied to the fuel injector. Check the fuel injector operation by listening for the operating sound or by confirming the operation visually.	**TIP: Before performing this operation, be sure to disconnect the fuel pump coupler.** Actuates the fuel injector five times at 1-second intervals. The "WARNING" LED on the FI diagnostic tool comes on each time the fuel injector is actuated.
d:52	Headlight relay Headlight	Check the headlight relay operation by listening for the operating sound.	Actuates the headlight relay five times at 5-second intervals. The "WARNING" LED on the FI diagnostic tool comes on each time the headlight relay is actuated.
d:60	EEPROM fault code number display	Displays the location of the abnormal portion of the EEPROM data that has been detected as fault code number 44. If there is more than one location, the display alternates every 2 seconds.	00: No fault (If fault code number 44 is displayed, the ECU is malfunctioning.) 01: CO adjustment value
d:61	Malfunction history (△) code number display*1	Displays the fault code numbers that were previously recorded in the malfunction history (△). If more than one code number is detected, the display alternates every 2 seconds to show all the detected code numbers.	00: No malfunction history (△) Other number displayed: Displays the code numbers recorded in the malfunction history △. Refer to the fault codes.
d:62	Malfunction history (△) code number erasure*1	Displays the total number of malfunctions that have been recorded in the malfunction history (× and △). In addition, erases the malfunction history (△).	00: No malfunction history (× and △) Other number displayed: Displays the total number of malfunctions that have been recorded in the malfunction history (× and △). When this operation starts, all of the malfunctions (△) are overwritten to the normal condition (○). (TIP: The malfunctions [×] are not overwritten to the normal condition [○].)

Diagnostic code No.	Item	Details	Standard values of the meter display or description of operation
d:64	Setting history	Display setting history	00:There is no setting history. 01:There is setting history. 02:Whether or not setting history data exists cannot be determined (damage to history data)
d:65	Setting map erasure	Display setting history	• Display 00:There are settings that were made using the setting tool. 01:There are settings that were made using the setting tool. • Operation To erase the setting map, push the "MODE".
d:70	Program version number	Check the version number of the program.	0–254 (–)

*1 Symbols used in the explanations of the malfunction history
○: Normal
×: There is currently a malfunction or abnormal condition.
△: A malfunction or abnormal condition occurred previously, but the affected system or component is currently operating normally.

EAS1DX3224
TROUBLESHOOTING DETAILS
This section describes the measures per fault code number displayed on the 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, reset the diagnostic tool display according to the reinstatement method.
Fault code No.:
Fault code number displayed on the diagnostic tool when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated.

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	—

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of crankshaft position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (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. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between the crankshaft position sensor coupler and ECU coupler. black/blue–black/blue gray/black–gray/black	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Installed condition of crankshaft position sensor. Check for looseness or pinching. Check the gap between the crankshaft position sensor and the pickup rotor.	Improperly installed sensor → Reinstall or replace the sensor.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 9-72.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
6	Malfunction in ECU.	Replace the ECU.	

TIP

If fault code Nos. 13 and 14 are both displayed, perform the checks and maintenance jobs for fault code No. 13 first.

Fault code No.	**13**
Item	**Intake air pressure sensor: open or short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	d:03
Diagnostic tool display	Displays the intake air pressure.
Procedure	Operate the throttle while pushing the start switch.(If the display value changes, the performance is OK.)

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of intake air pressure sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Connection of sub wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the sub wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air pressure sensor coupler and ECU coupler. black/blue–black/blue pink–pink blue–blue	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Installed condition of intake air pressure sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
6	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. d:03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa 1000 m above sea level: Approx. 90 kPa 2000 m above sea level: Approx. 80 kPa 3000 m above sea level: Approx. 70 kPa When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Replace the intake air pressure sensor.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
7	Malfunction in ECU.	Replace the ECU.	

TIP

If fault code Nos. 13 and 14 are both displayed, perform the checks and maintenance jobs for fault code No. 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.		d:03	
Diagnostic tool display		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch.(If the display value changes, the performance is OK.)	
Order	**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. Fault code number is not displayed → Service is finished. Fault code number is displayed → Proceed to the next order.

Fault code No.		14	
Item		Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
2	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. d:03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa 1000 m above sea level: Approx. 90 kPa 2000 m above sea level: Approx. 80 kPa 3000 m above sea level: Approx. 70 kPa When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Replace the intake air pressure sensor.	

TIP

If fault code Nos. 15 and 16 are both displayed, perform the checks and maintenance jobs for fault code No. 15 first.

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		d:01	
Diagnostic tool display		Throttle position sensor signal • 9–16 (fully closed position)	
Procedure		Check with throttle valves fully closed.	
Order	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of throttle position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.

Fault code No.	15		
Item	Throttle position sensor: open or short circuit detected.		
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Connection of sub wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the sub wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle position sensor coupler and ECU coupler. black/blue–black/blue yellow–yellow blue–blue	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Installed condition of throttle position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 8-9.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
6	Applied voltage of throttle position sensor lead.	Check the applied voltage. (black/blue–blue) Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 9-76.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
7	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. d:01) Replace if defective.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
8	Malfunction in ECU.	Replace the ECU.	

Location of disconnected lead	Output voltage
Disconnected ground lead	5V
Disconnected output lead	0V
Disconnected power supply lead	0V

TIP

If fault code Nos. 15 and 16 are both displayed, perform the checks and maintenance jobs for fault code No. 15 first.

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.	d:01
Diagnostic tool display	Throttle position sensor signal • 9–16 (fully closed position)
Procedure	Check with throttle valves fully closed.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of throttle position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 8-9.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. d:01) Replace if defective.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Malfunction in ECU.	Replace the ECU.	

TIP

Make sure that the engine is completely cool before checking the coolant temperature sensor.

Fault code No.	21
Item	**Coolant temperature sensor: open or short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	d:06
Diagnostic tool display	Displays the coolant temperature.
Procedure	Compare the actually measured coolant temperature with the diagnostic tool display value.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of coolant temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between coolant temperature sensor coupler and ECU coupler. green/yellow–green/yellow black/blue–black/blue	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Installed condition of coolant temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. d:06) Replace if defective.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
6	Malfunction in ECU.	Replace the ECU.	

TIP

Make sure that the engine is completely cool before checking the intake air temperature sensor.

Fault code No.	22
Item	**Intake air temperature sensor: open or short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	d:05
Diagnostic tool display	Displays the intake air temperature.
Procedure	Compare the actually measured intake air temperature with the diagnostic tool display value.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air temperature sensor coupler and ECU coupler. black/blue–black/blue brown/white–brown/white	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Installed condition of intake air temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. d:05) Replace if defective.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
6	Malfunction in ECU.	Replace the ECU.	

Fault code No.	**30**
Item	**Turnover of vehicle.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	d:08
Diagnostic tool display	Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)
Procedure	Remove the lean angle sensor and incline it more than 45 degrees.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	The vehicle has overturned.	Raise the vehicle upright.	Set the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Installed condition of lean angle sensor.	Check for a loose mounting, pinched mounting, or sensor mounting direction (up or down). Make sure that the mounting position is correct.	Set the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. d:08) Replace if defective.	Set the main switch to "ON", then to "OFF", and then back to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Malfunction in ECU.	Replace the ECU.	

Fault code No.	33
Item	**Ignition coil: open or short circuit detected in the primary lead of the ignition coil.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	d:30
Actuation	Actuates the ignition coil five times at one-second intervals. The engine trouble warning light and the "WARNING" LED on the diagnostic tool come on each time the ignition coil is actuated.
Procedure	Check that a spark is generated five times. • Connect an ignition checker.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (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. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ignition coil coupler and ECU coupler. orange–orange	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Installed condition of ignition coil. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Defective ignition coil. (test the primary coils for continuity)	Defective → Replace. Refer to "CHECKING THE IGNITION COIL" on page 9-71.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
6	Malfunction in ECU.	Execute the diagnostic mode (diagnostic code No. D30). No spark → Replace the ECU.	

TIP

Disconnect the fuel pump coupler when this diagnostic tool is used.

Fault code No.	39
Item	**Injector: open or short circuit detected.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	d:36
Actuation	Actuates injector five times at one-second intervals. The engine trouble warning light and the "WARNING" LED on the diagnostic tool come on each time the fuel injector is actuated.
Procedure	Check that injector is actuated five times by listening for the operating sound.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of injector coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Check for the operating sound of the injector in the diagnostic mode (Code No. d:36). Operating sound heard → Go to the order 7. Operating sound unheard → Go to the order 2.
2	Defective injector.	Measure the injector resistance. If the resistance is not 12 Ω, replace the injector.	Check for the operating sound of the injector in the diagnostic mode (Code No. d:36). Operating sound heard → Go to the order 7. Operating sound unheard → Go to the order 3.
3	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Check for the operating sound of the injector in the diagnostic mode (Code No. d:36). Operating sound heard → Go to the order 7. Operating sound unheard → Go to the order 4.
4	Connection of sub wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the sub wire harness.	Check for the operating sound of the injector in the diagnostic mode (Code No. d:36). Operating sound heard → Go to the order 7 Operating sound unheard → Go to the order 5.

Fault code No.		39	
Item		Injector: open or short circuit detected.	
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between injector coupler and ECU coupler. red/black–red/black red/blue–red/blue	Check for the operating sound of the injector in the diagnostic mode (Code No. d:36). Operating sound heard → Go to the order 7. Operating sound unheard → Go to the order 6.
6	Malfunction in ECU.	Replace the ECU.	–
7	Stop displaying the error code Start the engine and leave it idling for approximately 5 seconds. After that, check whether or not the error code is displayed.	–	–

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		d:08	
Diagnostic tool display		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
Procedure		Remove the lean angle sensor and incline it more than 45 degrees.	
Order	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of lean angle sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON." Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between lean angle sensor coupler and ECU coupler. blue–blue yellow/green–yellow/green black/blue–black/blue	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. d:08) Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 9-72.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.	42
Item	Speed sensor: no normal signals are received from the speed sensor.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	d:07
Diagnostic tool display	Vehicle speed pulse 0–999
Procedure	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of speed sensor (meter) coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Execute the diagnostic mode. (Code No. d:07) Rotate the front wheel by hand and check that the indicated value increases. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Execute the diagnostic mode. (Code No. d:07) Rotate the front wheel by hand and check that the indicated value increases. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.

Fault code No.	42		
Item	**Speed sensor: no normal signals are received from the speed sensor.**		
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between rear wheel sensor coupler and ECU coupler. white–white	Execute the diagnostic mode. (Code No. d:07) Rotate the front wheel by hand and check that the indicated value increases. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Defective speed sensor.	Execute the diagnostic mode. (Code No. d:07) Replace if defective. Refer to "CHECKING THE SPEED SENSOR" on page 9-74	Execute the diagnostic mode. (Code No. d:07) Rotate the front wheel by hand and check that the indicated value increases. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.	44		
Item	**EEPROM fault code number: an error is detected while reading or writing on EEPROM.**		
Fail-safe system	Able/Unable to start engine		
	Able/Unable to drive vehicle		
Diagnostic code No.	d:60		
Diagnostic tool display	EEPROM fault code display • 00: No fault • 01: CO adjustment valve • 07: Setting tool adjustment values 0–8 for fuel injection amount or ignition timing		
Procedure	—		
Order	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Locate the malfunction	Execute the diagnostic mode (Code No. d:60). 00: Perform the procedure in order 4. 01: Perform the procedure in order 4.	—

Fault code No.		44	
Item		**EEPROM fault code number: an error is detected while reading or writing on EEPROM.**	
2	"01" is indicated in Diagnostic mode (Code No. d:60) EEPROM data error for adjustment of CO concentration	Change the CO concentration, and rewrite in EEPROM. After this adjustment is made, the memory is not recovered when the main switch is turned OFF and ON again. → Replace the ECU.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat the procedure in order 1. If the same number is indicated, perform the procedure in order 4.
3	"07" is indicated in Diagnostic mode (Code No. d:60) EEPROM data error for setting tool adjustment values for fuel injection amount or ignition timing.	Erase the setting map in the diagnostic mode (diagnostic code No. d:65).	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat the procedure in order 1. If the same number is indicated, perform the procedure in order 4.
4	Malfunction in ECU.	Replace the ECU.	

Fault code No.		46	
Item		**Charging voltage is abnormal.**	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Diagnostic tool display		—	
Procedure		—	
Order	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Malfunction in charging system.	Check the charging system. Refer to "CHARGING SYSTEM" on page 9-12. Defective rectifier/regulator or AC magneto → Replace. Defective connection in the charging system circuit → Properly connect or repair the charging system wiring.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat the procedure in order 1.

Fault code No.	50
Item	**Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	—
Diagnostic tool display	—

Fault code No.	50		
Item	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)		
Procedure	—		
Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU.	Set the main switch to "ON". Check that the fault code number is not displayed.

Fault code No.	waiting for connection		
Item	No communication signal is received from the ECU.		
Fail-safe system	Able/Unable to start engine (Unable when ECU is malfunctioning)		
	Able/Unable to drive vehicle (Unable when ECU is malfunctioning)		
Diagnostic code No.	—		
Diagnostic tool display	—		
Procedure	—		
Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of diagnostic tool coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. light green–light green	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Diagnostic tool malfunction	Replace the diagnostic tool.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.

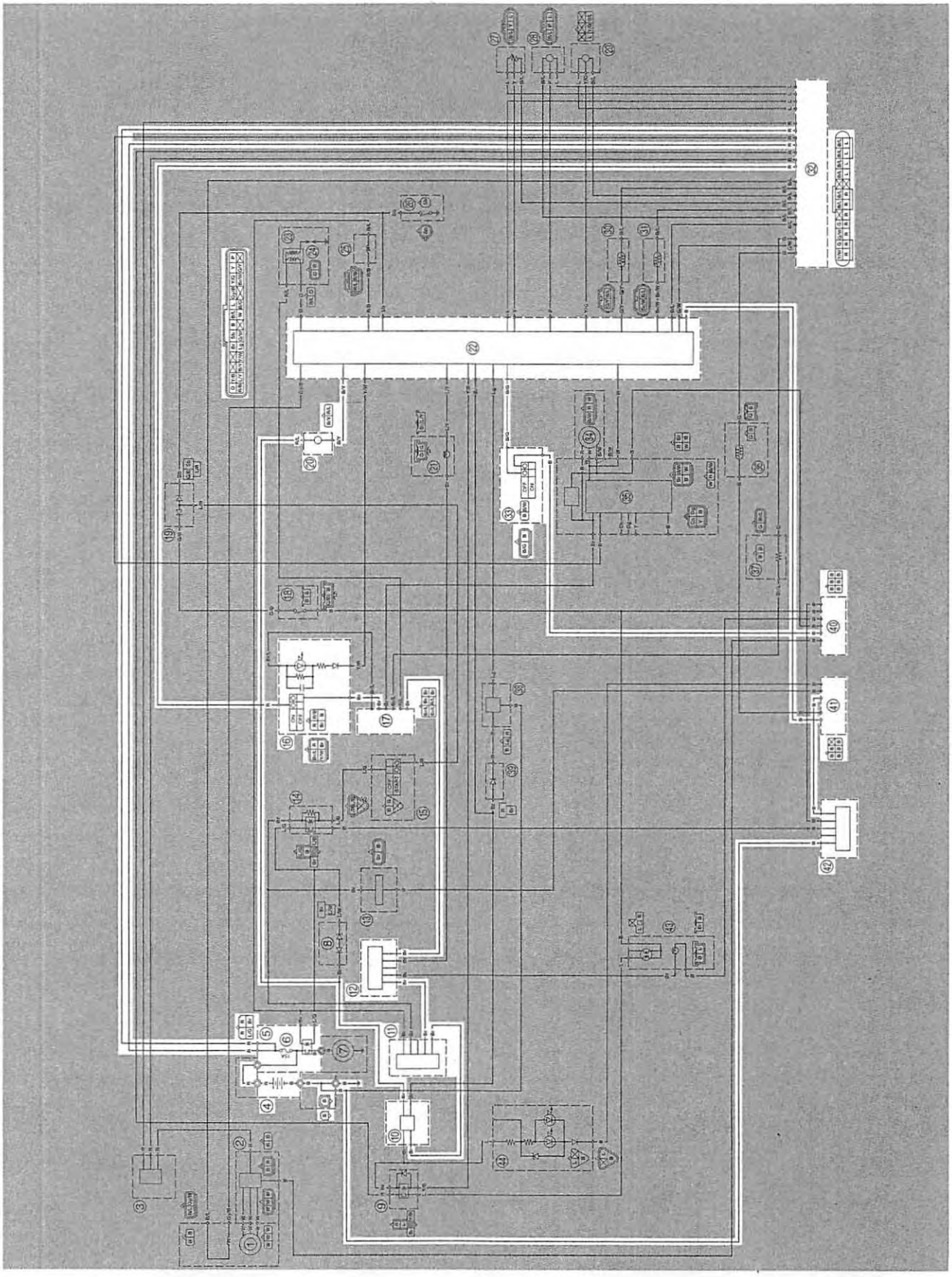
Fault code No.		waiting for connection	
Item		No communication signal is received from the ECU.	
5	Malfunction in ECU.	Replace the ECU.	

Fault code No.	Er-4
Item	Registered data cannot be received from the diagnostic tool.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Diagnostic tool display	—
Procedure	—

Order	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of diagnostic tool coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
2	Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or repair/replace the wire harness.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. light green–light green	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
4	Diagnostic tool malfunction	Replace the diagnostic tool.	Set the switch on the diagnostic tool sub wire harness to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to next order.
5	Malfunction in ECU.	Replace the ECU.	

EAS27550
FUEL PUMP SYSTEM

EAS1DX3225
CIRCUIT DIAGRAM



4. Battery
5. Main fuse
6. Starter relay
10. Connector
11. Connector
12. Connector
16. Main switch
17. Joint connector
20. Fuel pump
22. ECU (electronic control unit)
32. Joint connector
33. Engine stop switch
40. Joint connector
41. Joint connector
42. Connector

EAS1DX3226
TROUBLE SHOOTING

The fuel pump fails to operate.

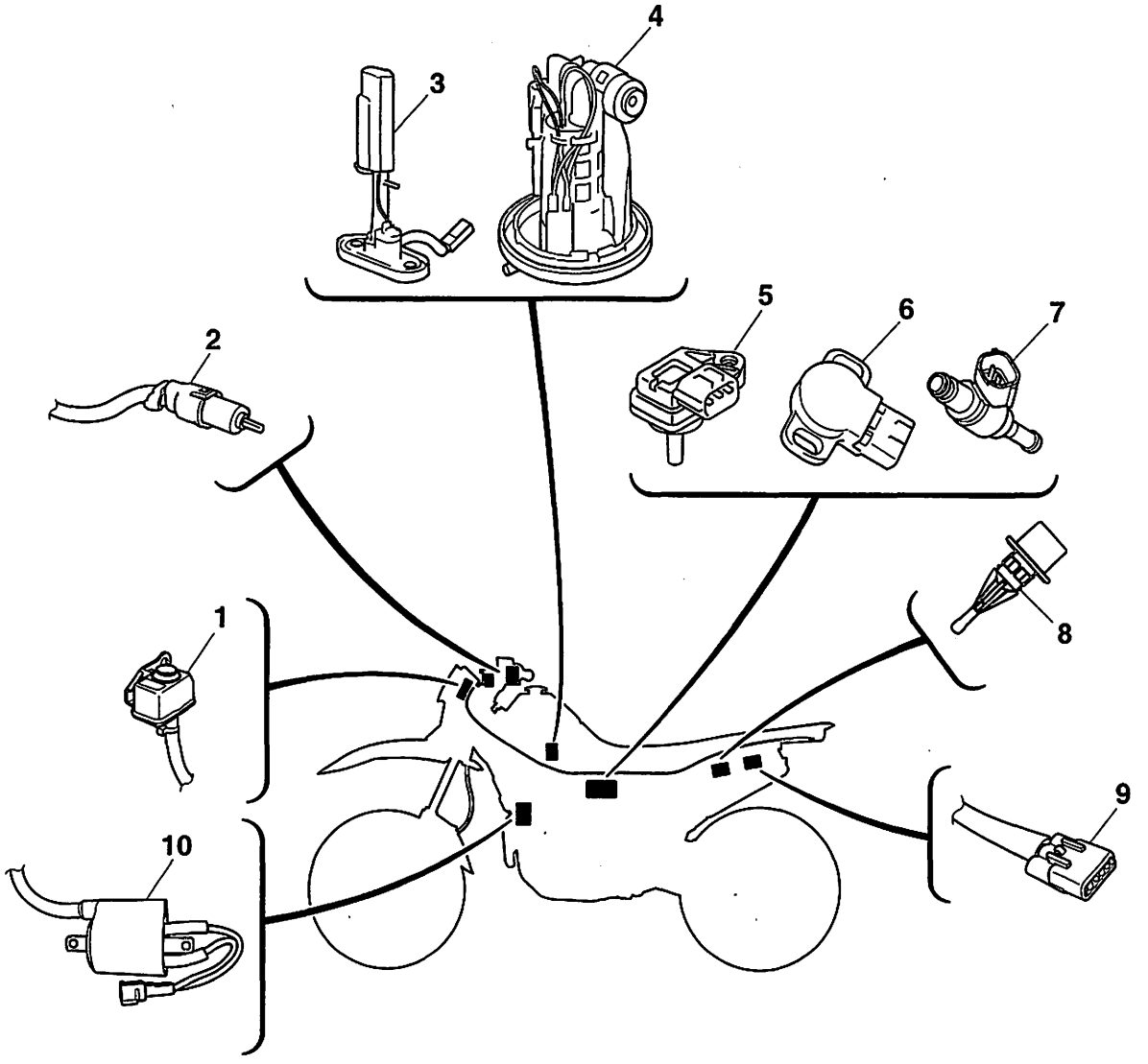
TIP

Before troubleshooting, remove the following part(s):
1. Seat
2. Side cover (left/right)
3. Air scoop (left/right)
4. Fuel tank

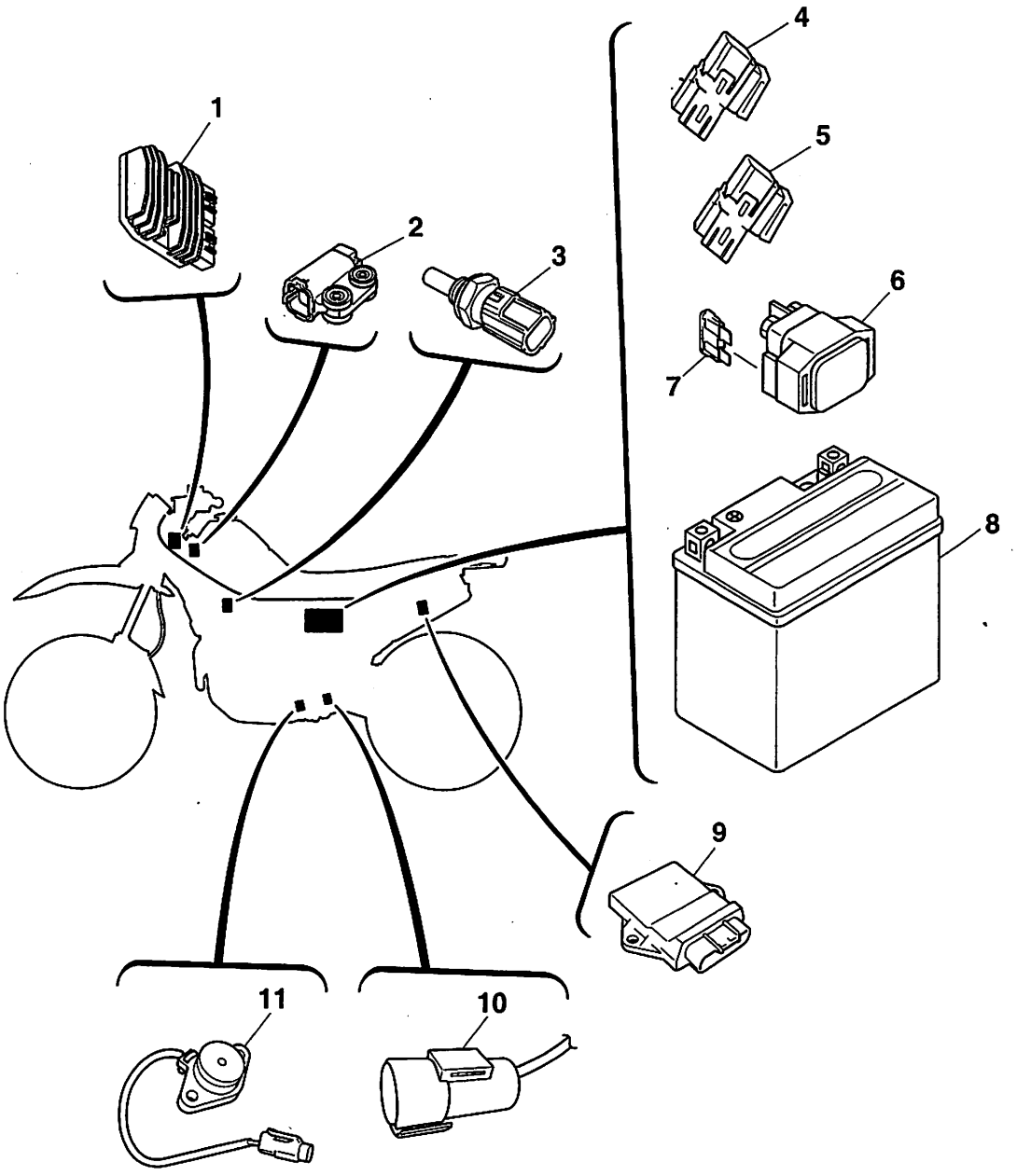
1. Check the fuse. Refer to "CHECKING THE FUSE" on page 9-65.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 9-66.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 9-60.	NG →	Replace the main switch.
OK ↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 9-60.	NG →	Replace the engine stop switch.
OK ↓		
5. Check fuel pressure. Refer to "CHECKING THE FUEL PRESSURE" on page 8-5.	NG →	Replace the fuel pump.
OK ↓		
6. Check the fuel pump system wire harness connections. Refer to "CIRCUIT DIAGRAM" on page 9-52.	NG →	Properly connect or repair the fuel pump system's wiring.
OK ↓		
Replace the ECU.		

EAS27971
ELECTRICAL COMPONENTS

EAS1DX3227



1. Main switch
2. Clutch switch
3. Fuel sender
4. Fuel pump
5. Intake air pressure sensor
6. Throttle position sensor
7. Injector
8. Intake air temperature sensor
9. Coupler for connecting optional part
10. Ignition coil


1
2
3
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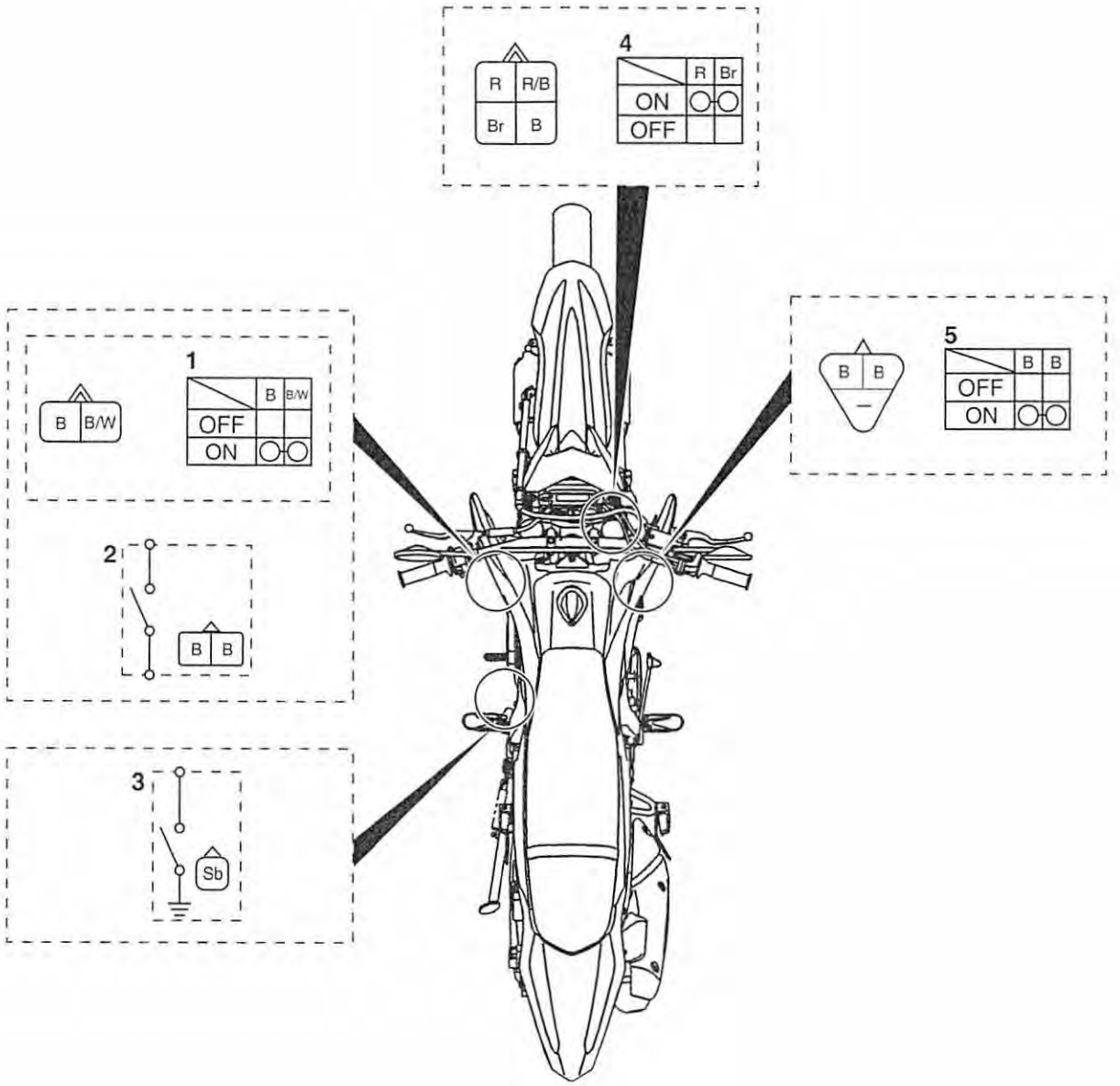
11

1. Rectifier/regulator
2. Lean angle sensor
3. Coolant temperature sensor
4. Head light relay
5. Starting circuit cut-off relay
6. Starter relay
7. Main fuse
8. Battery
9. ECU(engine control unit)
10. Condenser
11. Neutral switch

EAS1DX3228
CHECKING THE SWITCHES



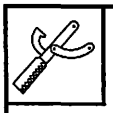
1. Engine stop switch
2. Clutch switch
3. Neutral switch
4. Main switch
5. Start switch

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14370

NOTICE

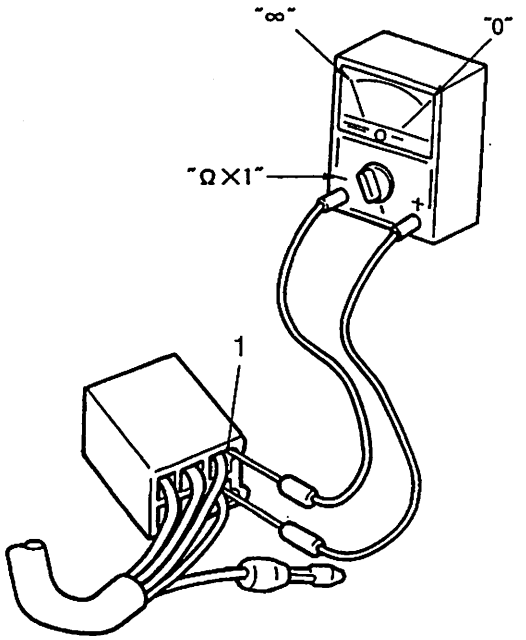
Never insert the tester probes into the coupler terminal slots "1". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



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

TIP

- Before checking for continuity, set the pocket tester to "0" and to the "Ω× 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.

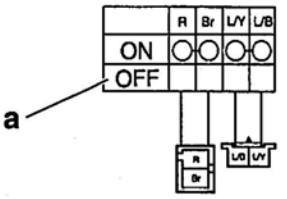


The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on below.
The switch positions "a" are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

TIP

"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

The example illustration below shows that:
There is continuity between red and brown when the switch is set to "ON".



EAS27990
CHECKING THE BULBS AND BULB SOCKETS

TIP

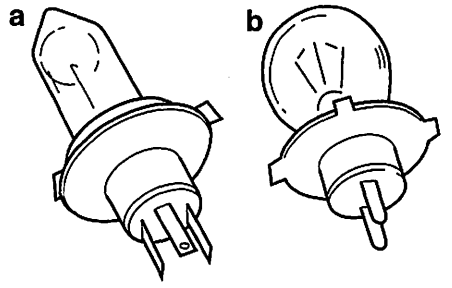
Do not check any of the lights that use LEDs.

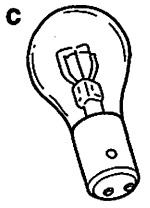
Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the illustration on the left.

- Bulbs "a" and "b" are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulbs "c" is used for turn signal and can be removed from the socket by pushing and turning the bulb counterclockwise.





Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
   - Bulb

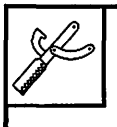
EWA13320
⚠ WARNING

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

ECA14380
NOTICE

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - Bulb (for continuity)
   (with the pocket tester)
   No continuity → Replace.



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

TIP

Before checking for continuity, set the pocket tester to "0" and to the "Ω× 1" range.

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a. Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "2", and check the continuity.
b. Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "3", and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

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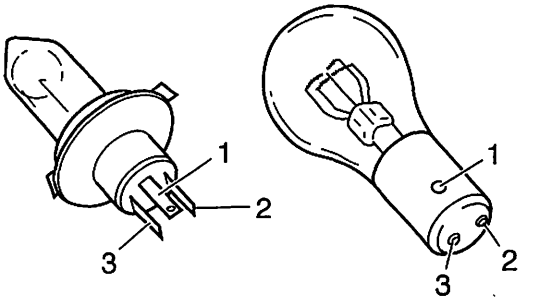

Checking the condition of the bulb sockets
The following procedure applies to all of the bulb sockets.
1. Check:
   • Bulb socket (for continuity)
   (with the pocket tester)
   No continuity → Replace.

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

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

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a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

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EAS1DX3229
REPLACING THE HEADLIGHT BULB

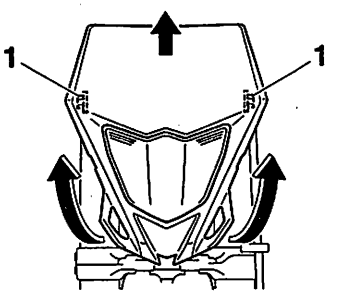
EWA13320
⚠ WARNING

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

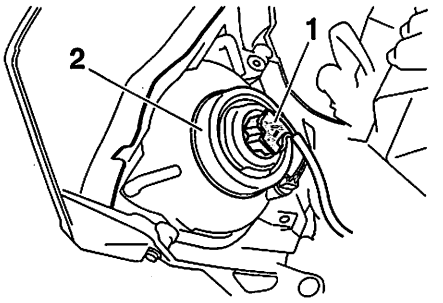
1. Remove:
   • Headlight unit bolt "1"

TIP

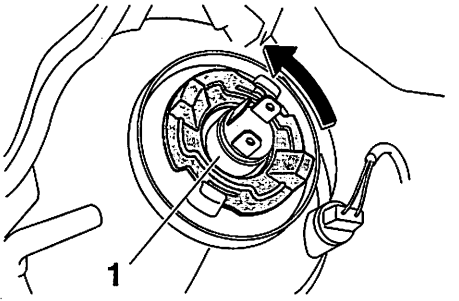
After you have removed the headlight unit bolts, lift and remove the headlight unit from front fender grommet.



2. Remove:
   • Headlight coupler "1"
   • Bulb cover "2"



3. Remove:
   • Headlight bulb "1"



4. Install:
   • Headlight bulb New
   Fasten the new headlight bulb with the headlight bulb holder.

ECA13690
NOTICE

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

5. Install:
   • Bulb cover
   • Headlight coupler
6. Install:
   • Headlight unit

	Headlight unit bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

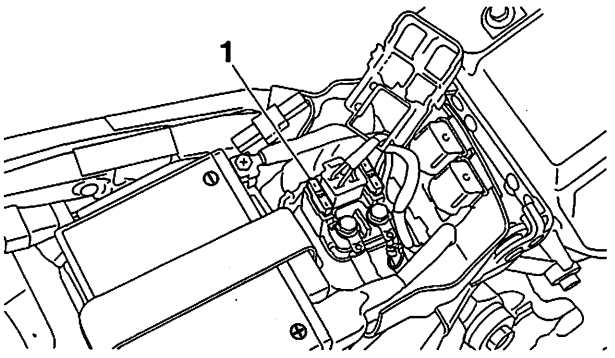
EAS1DX3230
CHECKING THE FUSE

The following procedure applies to all of the fuses.

ECA13680
NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
   • Side cover (left/right)
   • Seat
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   • Fuse "1"



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a. Connect the pocket tester to the fuse and check the continuity.

TIP

Set the pocket tester selector to "W × 1".

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

b. If the pocket tester indicates "∞", replace the fuse.

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3. Replace:
   • Fuse

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Set the main switch to "OFF".
b. Install a new fuse of the correct amperage rating.
c. Set on the switches to verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	15 A	1
Spare	15 A	1

EWA13310

⚠ WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   • Seat
   • Side cover (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS28030

CHECKING AND CHARGING THE BATTERY

EWA13290

⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL

- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL

- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

ECA13660

NOTICE

- **This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

TIP

Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

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

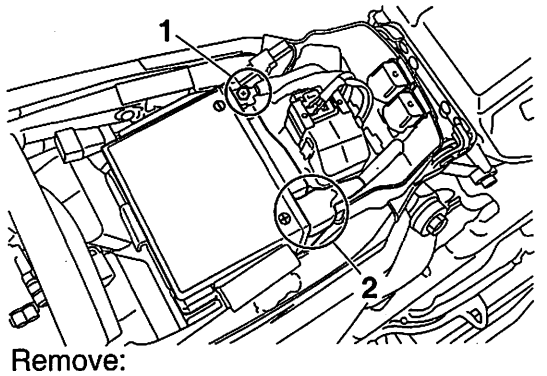
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery leads

   (from the battery terminals)

ECA13640

NOTICE

First, disconnect the negative battery lead "1", and then positive battery lead "2".



3. Remove:
   - Battery
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

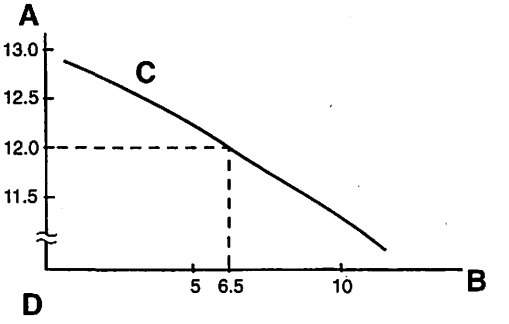
- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

TIP

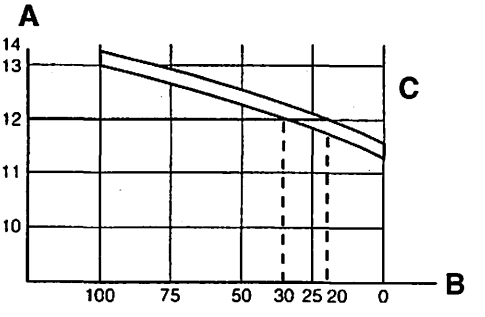
- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example
Open-circuit voltage = 12.0 V
Charging time = 6.5 hours
Charge of the battery = 20–30%



A. Open-circuit voltage (V)
B. Charging time (hours)
C. Relationship between the open-circuit voltage and the charging time at 20°C (68°F)
D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



A. Open-circuit voltage (V)
B. Charging condition of the battery (%)
C. Ambient temperature 20°C (68°F)

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5. Charge:
   • Battery
   (refer to the appropriate charging method)

EWA13300

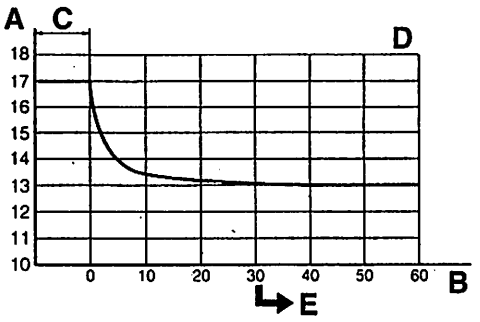
⚠ WARNING

Do not quick charge a battery.

ECA13670

NOTICE

- **Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)**
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**
- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**
- **As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Regulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**



A. Open-circuit voltage (V)
B. Time (minutes)
C. Charging
D. Ambient temperature 20°C (68°F)
E. Check the open-circuit voltage.

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Charging method using a variable-current (voltage) charger

a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

TIP

Set the charging voltage to 16–17 V.If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

• Standard charging current is reached Battery is good. • Standard charging current is not reached Replace the battery.

d. Adjust the voltage so that the current is at the standard charging level.
e. Set the time according to the charging time suitable for the open-circuit voltage.

f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

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Charging method using a constant voltage charger

a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.
c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regulated Lead Acid) battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

TIP

Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

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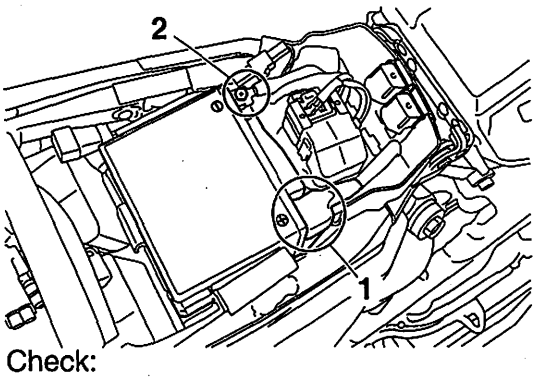
6. Install:
   • Battery
7. Connect:
   • Battery leads
   (to the battery terminals)

ECA1DX1028

NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



8. Check:
   • Battery terminals
   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
9. Lubricate:
   • Battery terminals

	Recommended lubricant **Dielectric grease**

10. Install:
   • Seat
   • Side cover (left/right)
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS1DX3231

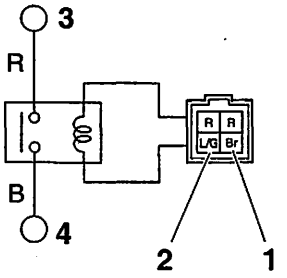
CHECKING THE RELAYS

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.

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

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

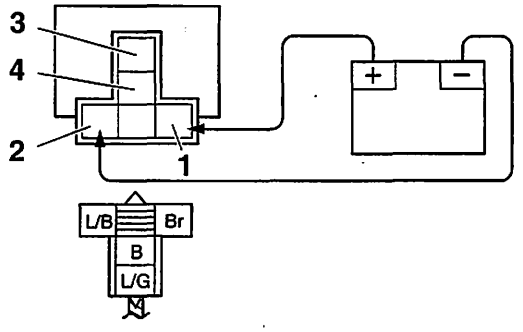
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" to "4")

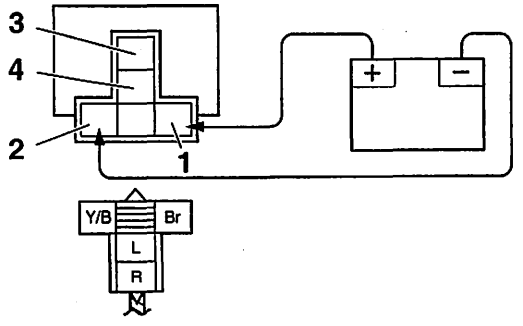
Starting circuit cut-off relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" to "4")

Head light relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" to "4")

EAS1DX3232
CHECKING THE DIODE

1. Check:
   • Diode
   Out of specification → Replace.

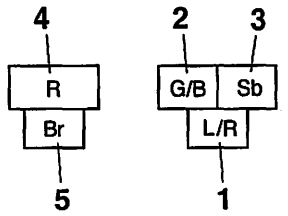
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

The pocket tester and the analog pocket tester readings are shown in the following table.

Continuity
Tester positive lead → Blue/Red "1"
Tester negative lead → Green/Black "2"
Continuity
Tester positive lead → Green/Black "2"
Tester negative lead → Blue/Red "1"
No continuity
Tester positive lead → Blue/Red "1"
Tester negative lead → Sky blue "3"
Continuity
Tester positive lead → Sky blue "3"
Tester negative lead → Blue/Red "1"
No continuity
Tester positive lead → Red "4"
Tester negative lead → Brown "5"
No continuity
Tester positive lead → Brown "5"
Tester negative lead → Red "4"
Continuity

a. Disconnect the diode from the wire harness.
b. Connect the pocket tester (Ω × 1) to the diode coupler as shown.
c. Check the diode for continuity.
d. Check the diode for no continuity.



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EAS28930
CHECKING THE IGNITION SPARK GAP

1. Check:
   - Ignition spark gap
     Out of specification → Perform the ignition system troubleshooting, starting with step 4. Refer to "TROUBLESHOOTING" on page 9-4.

	Minimum ignition spark gap **6.0 mm (0.24 in)**

TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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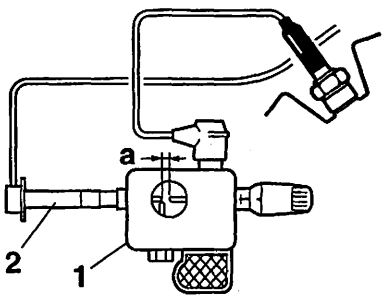
a. Remove the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

	Ignition checker **90890-06754** **Oppama pet-4000 spark checker** **YM-34487**



2. Spark plug cap

c. Turn the engine stop switch to "○".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the start switch "Ⓢ" and gradually increase the spark gap until a misfire occurs.

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EAS1DX3233
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.

	Spark plug cap resistance **10 kW**

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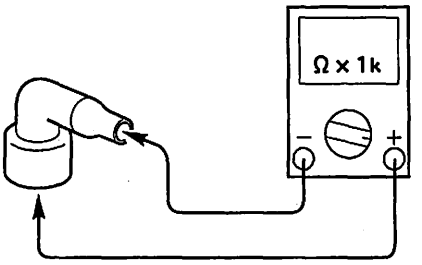
a. Connect the pocket tester (Ω× 1k) to the spark plug cap as shown.

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



b. Measure the spark plug cap resistance.

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EAS1DX3234
CHECKING THE IGNITION COIL

1. Disconnect
   - Ignition coil coupler
     (from the wire harness)
   - Spark plug cap
     (from the ignition coil)
2. Check:
   - Primary coil resistance
     Out of specification → Replace.

	Primary coil resistance **3.57-4.83 Ω**

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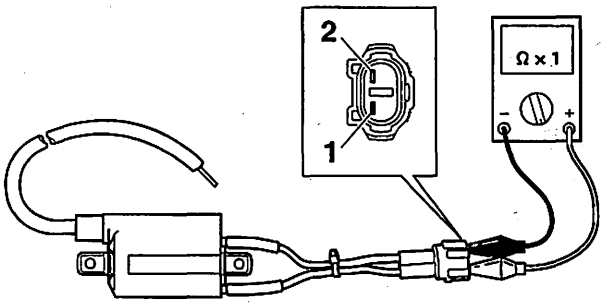
a. Connect the pocket tester (Ω× 1) to the ignition coil as shown.

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

- Positive tester probe
  Orange "1"
- Negative tester probe
  Red/Blue "2"



b. Measure the primary coil resistance.

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3. Check:
   - Secondary coil resistance
     Out of specification → Replace.

Secondary coil resistance
10.71–14.49 kΩ

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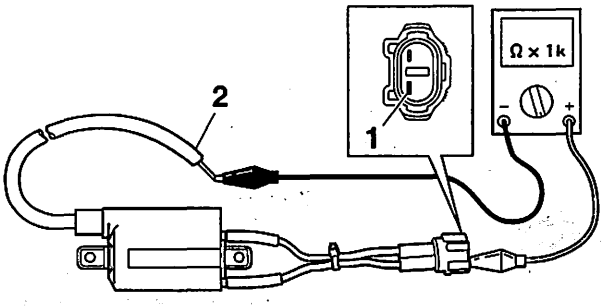
a. Connect the pocket tester (Ω× 1k) to the ignition coil as shown.

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

- Positive tester probe
  Orange "1"
- Negative tester probe
  Spark plug lead "2"



b. Measure the secondary coil resistance.

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EAS1DX3235
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 the crankshaft position sensor.

Crankshaft position sensor resistance
248–372 Ω

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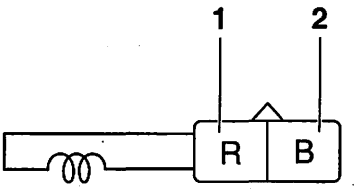
a. Connect the pocket tester (Ω× 100) to the crankshaft position sensor coupler as shown.

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

- Positive tester probe
  Red "1"
- Negative tester probe
  Black "2"



b. Measure the crankshaft position sensor resistance.

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EAS28130
CHECKING THE LEAN ANGLE SENSOR

1. Remove:
   - Lean angle sensor
     (from the bracket.)
2. Check:
   - Lean angle sensor out put voltage
     Out of specification→ Replace.

Lean angle sensor out put voltage
Less than 65° "a"
0.4–1.4V
More than 65° "b"
3.7–4.4V

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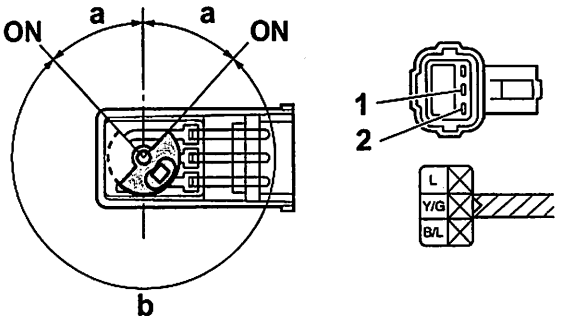
a. Connect the lean angle sensor coupler to the wire harness.

b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness-lean angle sensor (6P)
90890-03209
YU-03209

- Positive tester probe
  Yellow/Green "1"
- Negative tester probe
  Black/Blue "2"



c. Incline the lean angle sensor.
d. Measure the lean angle sensor out put voltage.

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EAS1DX3236
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   - Starter motor operation
     Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
     Refer to "ELECTRIC STARTING SYSTEM" on page 9-6.

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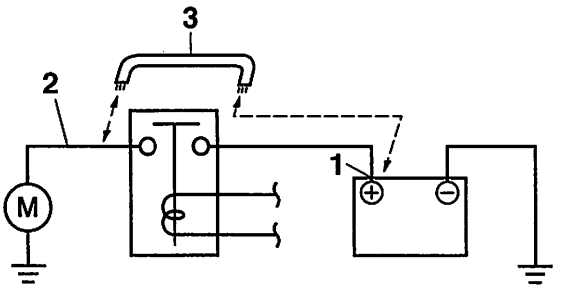
a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA14130

⚠ WARNING

- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**



b. Check the starter motor operation.

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EAS28150
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler
     (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the stator coil.

Stator coil resistance
0.528–0.792 Ω

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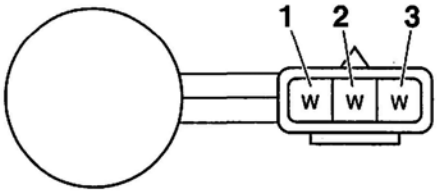
a. Connect the pocket tester (Ω× 1) to the stator coil coupler as shown.

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

- Positive tester probe
  White "1"
- Negative tester probe
  White "2"

- Positive tester probe
  White "1"
- Negative tester probe
  White "3"

- Positive tester probe
  White "2"
- Negative tester probe
  White "3"



b. Measure the stator coil resistance.

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EAS1DX3237
CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Charging voltage
     Out of specification → Replace the rectifier/regulator.

	Charging voltage **14 V at 5000 r/min**

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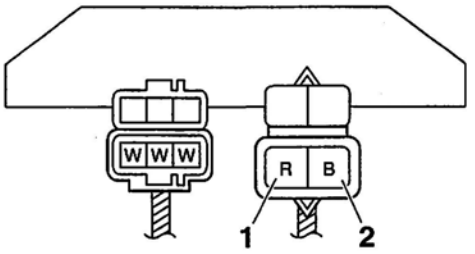
a. Set the digital tachometer to the ignition coil.
b. Connect the pocket tester (DC 20 V) to the rectifier/regulator coupler as shown.

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

- Positive tester probe
  Red "1"
- Negative tester probe
  Black "2"



c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the charging voltage.

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EAS28240
CHECKING THE SPEED SENSOR

1. Check:
   - Speed sensor output voltage
     Out of specification → Replace.

	Output voltage reading cycle **0.6V to 4.8V to 0.6V to 4.8V**

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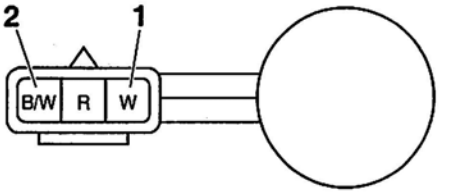
a. Connect the test harness-speed sensor (3P) to the speed sensor coupler and wire harness as shown.
b. Connect the pocket tester (DC20V) to the test harness-speed sensor (3P).

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C** **Test harness-speed sensor 5TJ (3P)** **90890-03228** **YU-03228**

- Positive tester probe
  White "1"
- Negative tester probe
  Black/white "2"



c. Set the main switch to "ON".
d. Elevate the front wheel and slowly turn it.
e. Measure the voltage (DC 5 V) of white and black/white. With the front wheel slowly rotating, voltage alternates between 0 V and 5 V.

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EAS1DX3238
CHECKING THE FUEL SENDER

Drain the gasoline.

1. Disconnect:
   - Fuel sender coupler
     (from the fuel sender)

2. Remove:
   • Fuel sender
   (from the fuel tank)
3. Check:
   • Fuel sender resistance
   Out of specification → Replace the fuel pump.

Fuel sender resistance
1.35-1.90 kΩ at 25°C (77°F)

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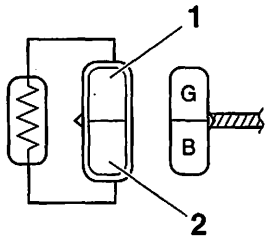
a. Connect the pocket tester (Ω× 1k) to the fuel sender as shown.

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

• Positive tester probe
Green "1"
• Negative tester probe
Black "2"



b. Measure the resistance of the fuel sender.

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EAS1DX3239
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
2.51–2.78 kΩ at 20°C (68°F)
210-221 Ω at 100°C (212°F)

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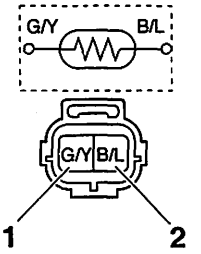
a. Connect the pocket tester (Ω × 1k/100) to the coolant temperature sensor as shown.

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

• Positive tester probe
Green/Yellow "1"
• Negative tester probe
Black/Blue "2"

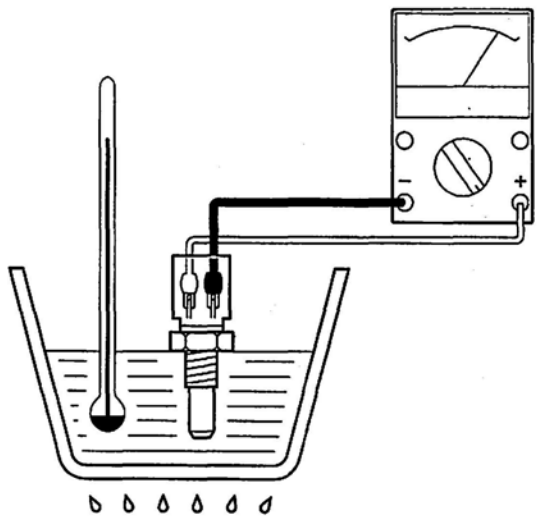


b. Immerse the coolant temperature sensor in a container filled with coolant.

TIP

Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer in the coolant.
d. Slowly heat the coolant, and then let it cool to the specified temperature indicated in the table.
e. Check the coolant temperature sensor for continuity at the temperatures indicated in the table.



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EAS28300
CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   - Throttle position sensor (from the throttle body)

EWA1DX1009

⚠ 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.**

2. Check:
   - Throttle position sensor maximum resistance
     Out of specification → Replace the throttle position sensor.

Throttle position sensor resistance
5.0 kW

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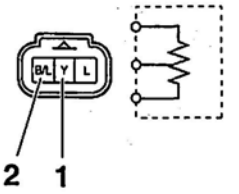
a. Connect the pocket tester (Ω× 1k) to the throttle position sensor as shown.

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

- Positive tester probe → Yellow "1"
- Negative tester probe → Black/Blue "2"



b. Check the throttle position sensor maximum resistance.

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3. Install:
   - Throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 8-9.

EAS1DX3240
CHECKING THE THROTTLE POSITION SENSOR INPUT VOLTAGE

1. Check
   - Throttle position sensor input voltage
     Out of specification → Replace the ECU.

Throttle position sensor input voltage
4-6 V

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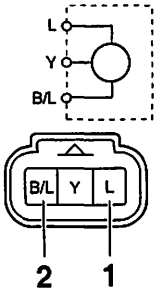
a. Connect the test harness S-pressure sensor (3P) to the throttle position sensor coupler and wire harness as shown
b. Connect the pocket tester (DC20V) to the test harness S-pressure sensor (3P).

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness S-pressure sensor (3P)
90890-03207
YU-03207

• Positive tester probe→ Blue "1" • Negative tester probe→ Black/Blue "2"



c. Start the engine.
d. Measure the throttle position sensor input voltage.

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EAS28410
CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
   • Intake air pressure sensor output voltage
   Out of specification → Replace.

	Intake air pressure sensor output voltage **3.75–4.25 V**

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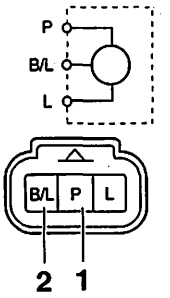
a. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler (wire harness side) as shown.

	Digital circuit tester **90890-03174** **Model 88 Multimeter with tachometer** **YU-A1927**

• Positive tester probe Pink "1" • Negative tester probe Black/Blue "2"



b. Set the main switch to "ON".
c. Measure the intake air pressure sensor output voltage.

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EAS1DX3241
CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   • Intake air temperature sensor
   (from the air filter case.)

EWA1DX1010

⚠ WARNING

- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

2. Check:
   • Intake air temperature sensor resistance
   Out of specification → Replace.

	Intake air temperature sensor resistance **5.40–6.60 kΩ at 0 °C (32 °F)** **290–390 Ω at 80 °C (176 °F)**

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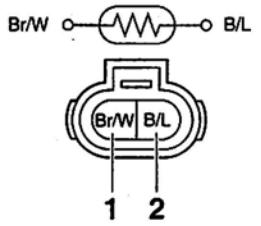
a. Connect the pocket tester (Ω × 1k/ × 100) to the intake air temperature sensor terminal as shown.

	Digital circuit tester **90890-03174** **Model 88 Multimeter with tachometer** **YU-A1927**

• Positive tester probe Brown/White "1" • Negative tester probe Black/Blue "2"



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EAS1DX3242
CHECKING THE FUEL INJECTOR

The following procedure applies to all of the fuel injector.

1. Remove:
   - Fuel injector
     Refer to "THROTTLE BODY" on page 8-6
2. Check:
   - Fuel injector resistance
     Out of specification → Replace the fuel injector.

	Resistance **12.0 Ω**

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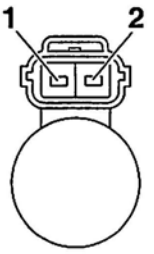
a. Disconnect the fuel injector coupler from the fuel injector.
b. Connect the pocket tester (Ω × 10) to the fuel injector coupler as shown.

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

- Positive tester probe →
  Injector terminal "1"
- Negative tester probe →
  Injector terminal "2"



c. Measure the fuel injector resistance.

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TROUBLESHOOTING

TROUBLESHOOTING **10-1**
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EAS28450
TROUBLESHOOTING

EAS28460
GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS1DX3243
STARTING FAILURES

Engine

1. Cylinder and cylinder head
   - Loose spark plug
   - Loose cylinder head or cylinder
   - Damaged cylinder head gasket
   - Damaged cylinder gasket
   - Worn or damaged cylinder
   - Incorrect valve clearance
   - Improperly sealed valve
   - Incorrect valve-to-valve-seat contact
   - Incorrect valve timing
   - Faulty valve spring
   - Seized valve
2. Piston and piston ring(s)
   - Improperly installed piston ring
   - Damaged, worn or fatigued piston ring
   - Seized piston ring
   - Seized or damaged piston
3. Air filter
   - Improperly installed air filter
   - Clogged air filter element
4. Crankcase and crankshaft
   - Improperly assembled crankcase
   - Seized crankshaft

Fuel system

1. Fuel tank
   - Empty fuel tank
   - Clogged fuel tank overflow hose
   - Deteriorated or contaminated fuel
   - Clogged or damaged fuel hose
2. Fuel pump
   - Faulty fuel pump
3. Throttle body
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
4. Ignition coil
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
5. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Broken generator rotor woodruff key
6. Switches and wiring
   - Defective lean angle sensor
   - Faulty main switch
   - Faulty engine stop switch
   - Broken or shorted wiring
   - Faulty neutral switch
   - Faulty start switch
   - Faulty clutch switch
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty starting circuit cut-off relay
   - Faulty starter clutch

EAS1DX3244
INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder and cylinder head
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system

1. Throttle body
   - Damaged or loose throttle body joint
   - Improperly synchronized throttle bodies
   - Improper throttle cable free play
   - Flooded throttle body

Electrical system
1. Battery
   - Discharged battery
   - Faulty battery
2. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
3. Ignition coil
   - Broken or shorted primary or secondary coil
   - Cracked or broken ignition coil
4. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Broken generator rotor woodruff key

EAS28520
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES" on page 10-1.

Engine
1. Air filter
   - Clogged air filter element

Fuel system
1. Fuel pump
   - Faulty fuel pump
2. Throttle body
   - Defective throttle body
3. ECU
   - Faulty ECU

EAS28530
FAULTY GEAR SHIFTING

Shifting is difficult

Refer to"CLUTCH" on page 6-35

EAS28540
SHIFT PEDAL DOES NOT MOVE

Shift shaft
- Bent shift shaft

Shift drum and shift forks
- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission
- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550
JUMPS OUT OF GEAR

Shift shaft
- Incorrect shift pedal position
- Improperly returned stopper lever.

Shift forks
- Worn shift fork

Shift drum
- Incorrect axial play
- Worn shift drum groove

Transmission
- Worn gear dog

EAS28560
FAULTY CLUTCH

Clutch slips
1. Clutch
   - Improperly assembled clutch
   - Loose or fatigued clutch spring
   - Worn friction plate
   - Worn clutch plate
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (low)
   - Deteriorated oil

Clutch drags
1. Clutch
   - Unevenly tensioned clutch springs
   - Warped pressure plate
   - Bent clutch plate
   - Swollen friction plate
   - Bent clutch push rod
   - Damaged clutch boss
   - Burnt primary driven gear bushihg
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (high)
   - Deteriorated oil

EAS28590
OVERHEATING

Engine
1. Cylinder head and piston
   - Heavy carbon buildup
   - Clogged coolant passages
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity
   - Inferior oil quality

Cooling system
1. Coolant
   - Low coolant level
2. Radiator
   - Damaged or leaking radiator
   - Faulty radiator cap
   - Bent or damaged radiator fin
3. Water pump
   - Damaged or faulty water pump
   - Thermostat stays closed
   - Damaged hose
   - Improperly connected hose
   - Damaged pipe
   - Improperly connected pipe

Fuel system
1. Throttle body
   - Damaged or loose throttle body joint
2. Air filter
   - Clogged air filter element

Chassis
1. Brake(s)
   - Dragging brake

Electrical system
1. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
2. Ignition system
   - Faulty ECU
   - Faulty coolant temperature sensor

EAS28610
OVERCOOLING

Cooling system
- Faulty coolant temperature sensor

EAS28620
POOR BRAKING PERFORMANCE
- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Defective master cylinder kit
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660
FAULTY FRONT FORK LEGS

Leaking oil
- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper. washer
- Cracked or damaged cap bolt O-ring

Malfunction
- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28690
UNSTABLE HANDLING
1. Handlebar
   - Bent or improperly installed handlebar
2. Steering head components
   - Improperly installed upper bracket
   - Improperly installed lower bracket (improperly tightened ring nut)
   - Bent steering stem
   - Damaged ball bearing or bearing race
3. Front fork leg (s)
   - Uneven oil levels (both front fork legs)
   - Unevenly tensioned fork spring (both front fork legs)
   - Broken fork spring
   - Bent or damaged inner tube
   - Bent or damaged outer tube

4. Swingarm
   • Worn bearing or bushing
   • Bent or damaged swingarm
5. Rear shock absorber assembly (-ies)
   • Faulty rear shock absorber spring
   • Leaking oil or gas
6. Tire (s)
   • Uneven tire pressures (front and rear)
   • Incorrect tire pressure
   • Uneven tire wear
7. Wheel (s)
   • Incorrect wheel balance
   • Broken or loose spoke
   • Damaged wheel bearing
   • Bent or loose wheel axle
   • Excessive wheel runout
8. Frame
   • Bent frame
   • Damaged steering head pipe
   • Improperly installed bearing race

EAS1DX3245
FAULTY LIGHTING SYSTEM

Headlight does not come on
• Fuse open circuit
• Wrong headlight bulb
• Too many electrical accessories
• Hard charging
• Incorrect connection
• Improperly grounded circuit
• Poor contacts (main switch)
• Burnt-out headlight bulb

Headlight bulb burnt out
• Wrong headlight bulb
• Faulty battery
• Faulty rectifier/regulator
• Improperly grounded circuit
• Faulty main switch
• Headlight bulb life expired

Taillight does not come on
• Wrong taillight LED
• Too many electrical accessories
• Incorrect connection
• Faulty battery

EAS1DX3247

WIRING DIAGRAM

WR450FB 2012

1. AC magneto
2. Rectifier/regulator
3. Connector
4. Battery
5. Main fuse
6. Starter relay
7. Starter motor
8. Starter relay diode
9. Headlight relay
10. Connector
11. Connector
12. Connector
13. Condenser
14. Starting circuit cut-off relay
15. Start switch
16. Main switch
17. Joint connector
18. Clutch switch
19. Diode
20. Fuel pump
21. Engine trouble warning light
22. ECU (electronic control unit)
23. Ignition coil
24. Spark plug
25. Injector
26. Neutral switch
27. Throttle position sensor
28. Intake air pressure sensor
29. Lean angle sensor
30. Coolant temperature sensor
31. Intake air temperature sensor
32. Joint connector
33. Engine stop switch
34. Speed sensor
35. Multi-function display
36. Fuel sender
37. Resistor
38. Coupler for connecting optional part
39. Diode
40. Joint connector
41. Joint connector
42. Connector
43. Headlight
44. Taillight

EAS1DX3248

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/W	Black/White
B/Y	Black/Yellow
Br/L	Brown/Blue
Br/W	Brown/White
G/B	Green/Black
G/W	Green/White
G/Y	Green/Yellow
Gy/B	Gray/Black
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
R/B	Red/Black
R/L	Red/Blue
R/W	Red/White
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/W	Yellow/White

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EAS1DX3002

WR450FB
OWNER'S SERVICE MANUAL

1st Edition, January 2012

Printed in Japan
P/N. LIT-11626-25-58