YAMAHA 2015

SERVICE MANUAL

FZ07F
FZ07FC

FZ-07

LIT-11616-28-07 2RC-28197-10

EAS20002

FZ07F/FZ07FC
SERVICE MANUAL
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EAS20003

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

EAS30001

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.**

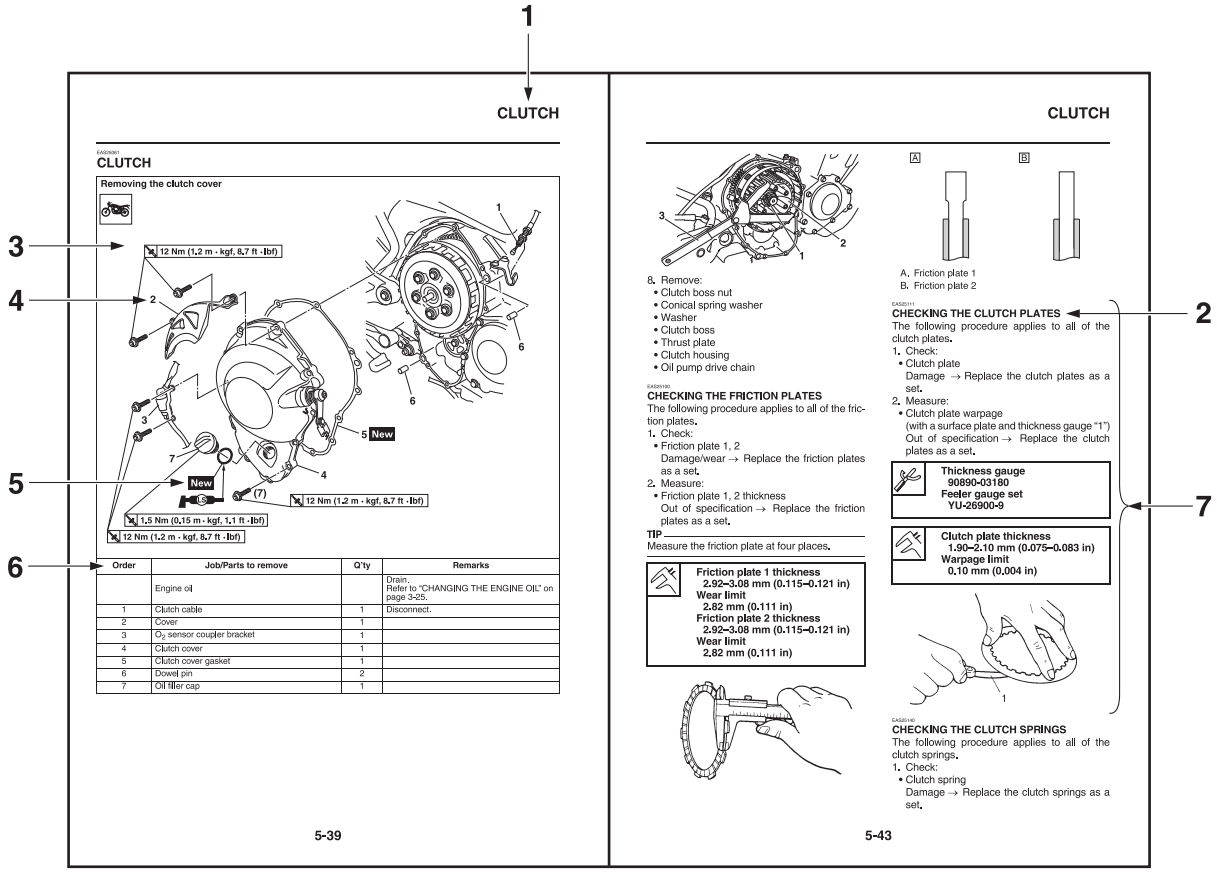
TIP	A TIP provides key information to make procedures easier or clearer.

EAS20004

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. This step explains removal and disassembly procedure only. For installation and assembly procedure, reverse the steps.
- Jobs "7" requiring more information (such as special tools and technical data) are described sequentially.



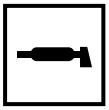
EAS20005

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.
	Silicone fluid		

EAS10003

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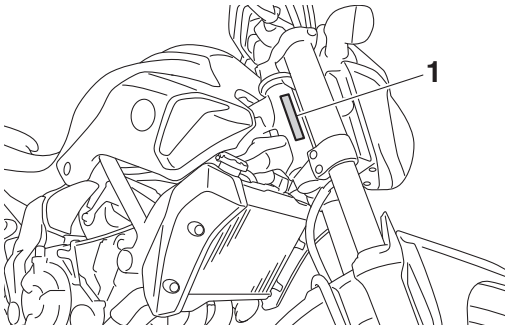
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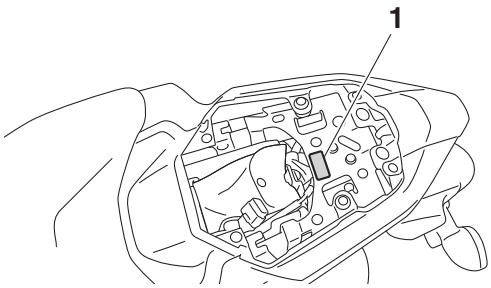
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EAS20007
IDENTIFICATION

EAS30002
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS30003
MODEL LABEL
The model label “1” is affixed to the frame under the passenger seat. This information will be needed to order spare parts.



EAS20008
FEATURES

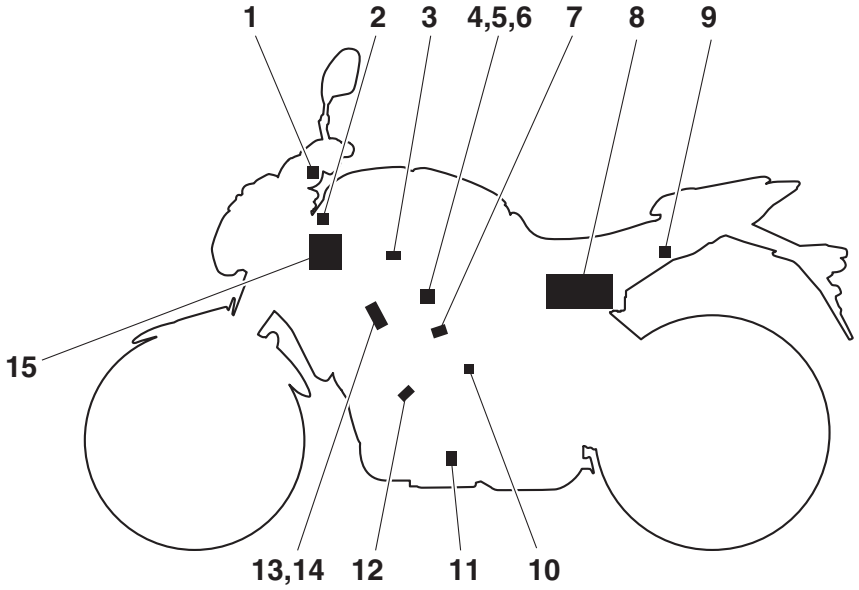
EAS30005
OUTLINE OF THE FI SYSTEM

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.

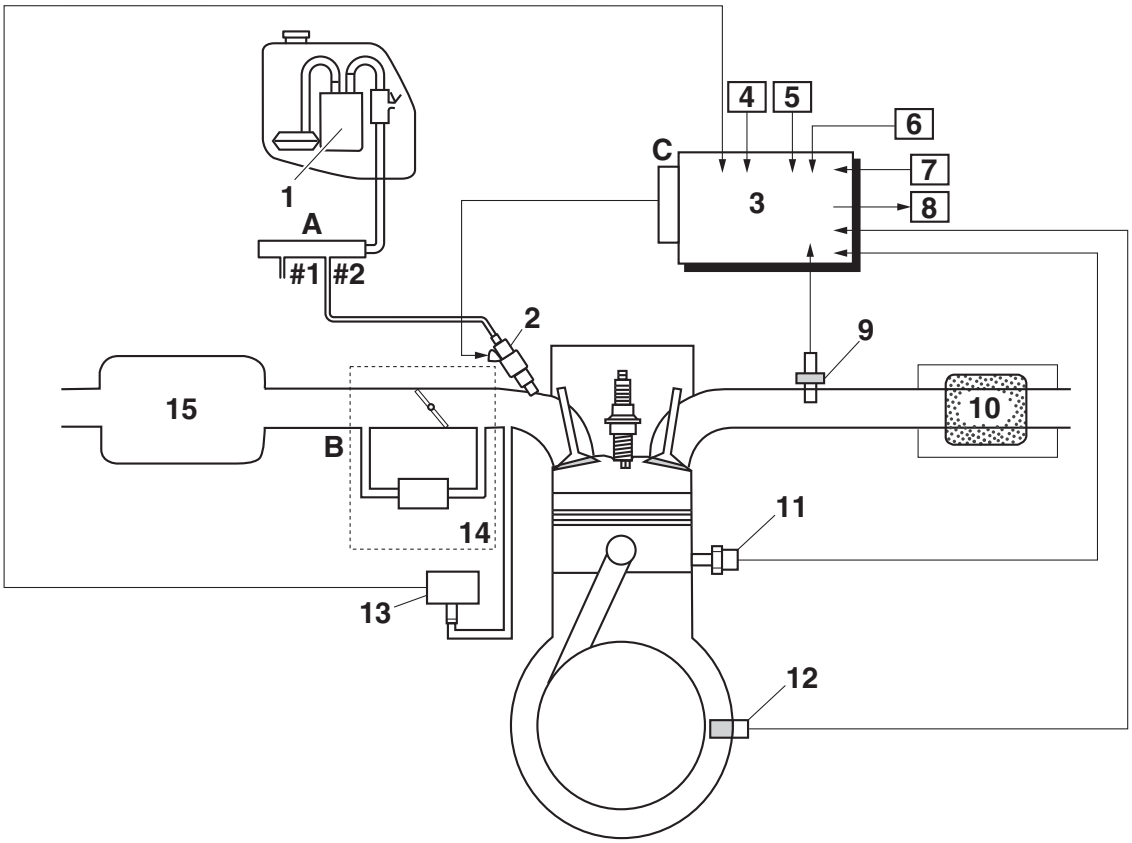


1. Engine trouble warning light
2. Intake air temperature sensor
3. Intake air pressure sensor
4. Fuel injectors
5. Throttle position sensor
6. ISC (idle speed control) valve
7. Coolant temperature sensor
8. Battery
9. Lean angle sensor
10. Speed sensor
11. O_2 sensor
12. Crankshaft position sensor
13. Ignition coils
14. Spark plugs
15. ECU (engine control unit)

EAS30617
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.

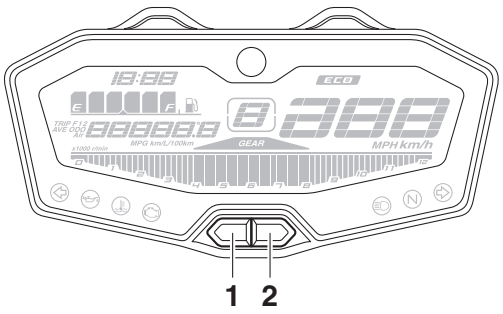
The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, coolant temperature sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, speed sensor and O_2 sensor enable 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.



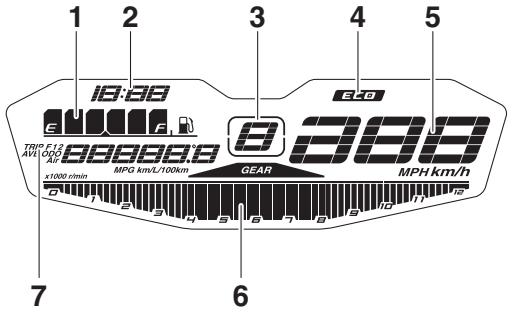
1. Fuel pump
2. Fuel injector
3. ECU (engine control unit)
4. Throttle position sensor
5. Intake air temperature sensor
6. Speed sensor
7. Lean angle sensor
8. ISC (idle speed control) unit
9. O_2 sensor
10. Catalytic converter
11. Coolant temperature sensor
12. Crankshaft position sensor
13. Intake air pressure sensor
14. Throttle body
15. Air filter case

A. Fuel system
B. Air system
C. Control system

EAS30982
MULTI-FUNCTION METER UNIT



1. Set button (left)
2. Set button (right)



1. Fuel meter
2. Clock
3. Transmission gear display
4. Eco indicator “ECO”
5. Speedometer
6. Tachometer
7. Multi-function display

EWA12423
WARNING

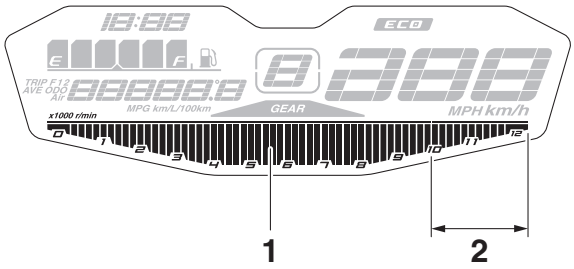
Be sure to stop the vehicle before making any setting changes to the multi-function meter unit. Changing settings while riding can distract the operator and increase the risk of an accident.

The multi-function meter unit is equipped with the following:
- a speedometer
- a tachometer
- a clock
- a fuel meter
- an eco indicator
- a transmission gear display
- a multi-function display
- a self-diagnosis device
- a brightness control mode

TIP
- Be sure to turn the key to “ON” before using the left and right set buttons except for setting the brightness control mode.
- To switch the speedometer and multi-function display between kilometers and miles, set the multi-function display to the odometer mode or a tripmeter mode, and then press the left set button for at least three seconds.

Speedometer
The speedometer shows the vehicle’s traveling speed.

Tachometer



1. Tachometer
2. Tachometer red zone

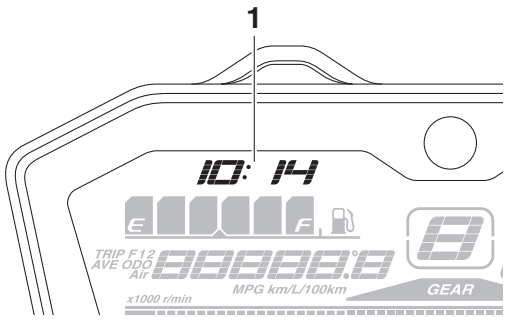
The tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.

ECA19660
NOTICE

Do not operate the engine in the tachometer red zone.

	Red zone **10000 r/min and above**

Clock



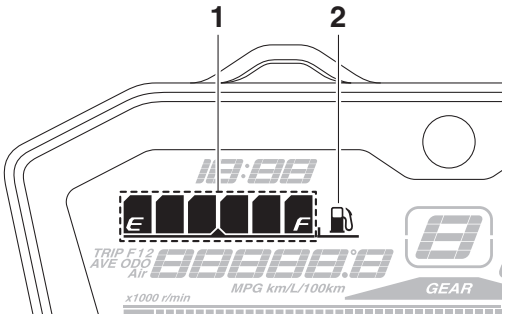
1. Clock

The clock displays when the key is turned to "ON". In addition, the clock can be displayed for 10 seconds by pushing the left set button when the main switch is in the "OFF", "LOCK" or "P≦" position.

[To set the clock]

1. Turn the key to "ON".
2. Push the left set button and right set button together for at least two seconds.
3. When the hour digits start flashing, push the right set button to set the hours.
4. Push the left set button, and the minute digits will start flashing.
5. Push the right set button to set the minutes.
6. Push the left set button and then release it to start the clock.

Fuel meter



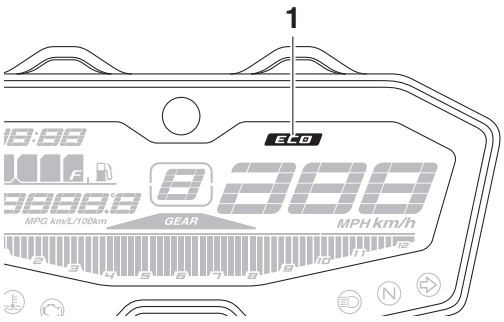
1. Fuel meter
2. Fuel level warning indicator "⛽"

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards "E" (Empty) as the fuel level decreases. When the last segment and fuel level warning indicator "⛽" start flashing, refuel as soon as possible.

TIP

This fuel meter is equipped with a self-diagnosis system. If a problem is detected in the electrical circuit, the following cycle is repeated until the malfunction is corrected: fuel level segments and fuel level warning indicator "⛽" flash eight times, then go off for approximately 3 seconds. If this occurs, check the electrical circuit. Refer to "SIGNALING SYSTEM" on page 8-21.

Eco indicator



1. Eco indicator "ECO"

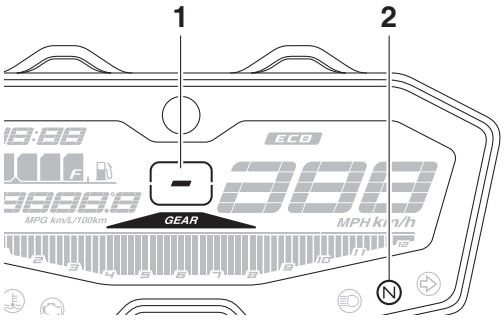
This indicator comes on when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator goes off when the vehicle is stopped.

TIP

Consider the following tips to reduce fuel consumption:

- Avoid high engine speeds during acceleration.
- Travel at a constant speed.
- Select the transmission gear that is appropriate for the vehicle speed.

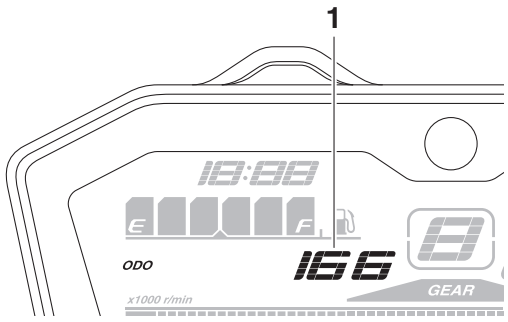
Transmission gear display



1. Transmission gear display
2. Neutral indicator light "**N**"

This display shows the selected gear. The neutral position is indicated by "–" and by the neutral indicator light.

Multi-function display



1. Multi-function display

The multi-function display is equipped with the following:
- an odometer
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the left segment of the fuel meter and fuel level warning indicator started flashing)
- a coolant temperature display
- an ambient temperature display
- an instantaneous fuel consumption display
- an average fuel consumption display

Push the left set button to switch the display between the odometer mode “ODO”, tripmeter mode “TRIP 1” and “TRIP 2”, instantaneous fuel consumption mode “km/L”, “L/100 km” or “MPG”, average fuel consumption mode “AVE_ _._ km/L”, “AVE_ _._ L/100 km” or “AVE_ _._ MPG”, coolant temperature mode “_ _ °F”, and ambient temperature mode “Air_ _ °F” in the following order:
ODO → TRIP 1 → TRIP 2 → km/L, L/100 km or MPG → AVE_ _._ km/L, AVE_ _._ L/100 km or AVE_ _._ MPG → _ _ °F → Air_ _ °F → ODO

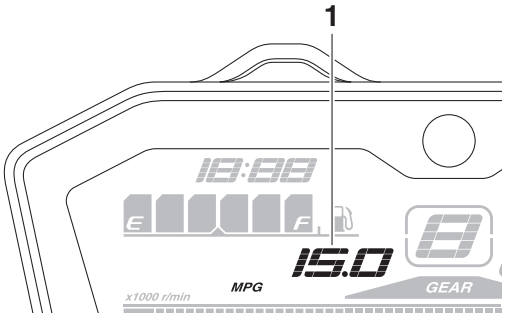
TIP

Push the right set button to switch the display in the reverse order.

If the fuel level warning indicator “⛽” and left segment of the fuel meter start flashing, the display automatically changes to the fuel reserve tripmeter mode “TRIP F” and starts counting the distance traveled from that point. In that case, push the left set button to switch the display between the various tripmeter, odometer, instantaneous fuel consumption and average fuel consumption modes in the following order:
TRIP F → km/L, L/100 km or MPG → AVE_ _._ km/L, AVE_ _._ L/100 km or AVE_ _._ MPG → _ _ °F → Air_ _ °F → ODO → TRIP 1 → TRIP 2 → TRIP F

To reset a tripmeter, select it by pushing the left set button, and then push the right set button for at least one second.
If you do not reset the fuel reserve tripmeter manually, it resets itself automatically and the display returns to the prior mode after refueling and traveling 5 km (3 mi).

Instantaneous fuel consumption display



1. Instantaneous fuel consumption display

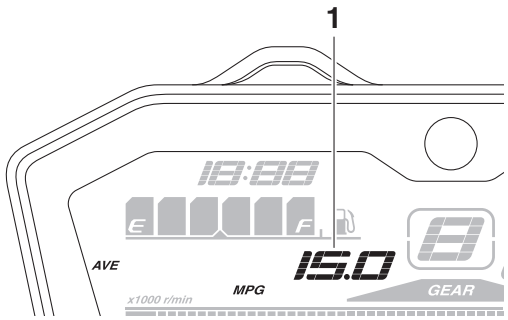
The instantaneous fuel consumption display can be set to either “km/L”, “L/100 km” or “MPG”.
- “km/L”: The distance that can be traveled on 1.0 L of fuel under the current riding conditions is shown.
- “L/100 km”: The amount of fuel necessary to travel 100 km under the current riding conditions is shown.
- “MPG”: The distance that can be traveled on 1.0 US gal of fuel under the current riding conditions is shown.

To switch between the instantaneous fuel consumption displays, push the left set button for one second when one of the displays is shown.

TIP

If traveling at speeds under 20 km/h (12 mi/h), “_ _._” is displayed.

Average fuel consumption mode



1. Average fuel consumption display

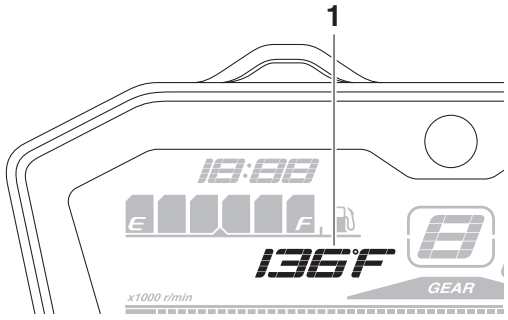
The average fuel consumption display can be set to either “AVE_ _._ km/L”, “AVE_ _._ L/100 km” or “AVE_ _._ MPG”.
This display shows the average fuel consumption since it was last reset.
- “AVE_ _._ km/L”: The average distance that can be traveled on 1.0 L of fuel is shown.
- “AVE_ _._ L/100 km”: The average amount of fuel necessary to travel 100 km is shown.
- “AVE_ _._ MPG”: The average distance that can be traveled on 1.0 US gal of fuel is shown.

To switch between the average fuel consumption displays, push the left set button for one second when one of the displays is shown.
To reset the average fuel consumption display, select it by pushing the left set button, and then push the right set button for at least one second.

TIP

After resetting an average fuel consumption display, “_ _._” is shown for that display until the vehicle has traveled 1 km (0.6 mi).

Coolant temperature display



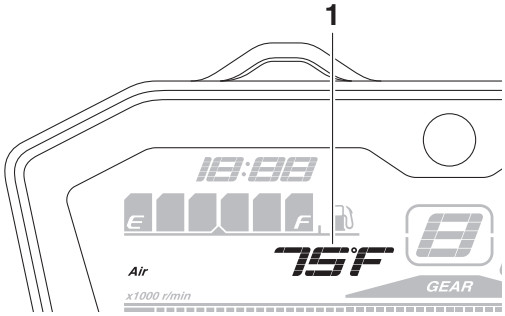
1. Coolant temperature display

This display shows the coolant temperature from 104 °F to 242 °F in 1 °F increments.
If the message “HI” flashes, stop the vehicle, then stop the engine, and let the engine cool.

TIP

- When the coolant temperature is below 104 °F, “LO” will be displayed.
- The coolant temperature varies with changes in the weather and engine load.

Ambient temperature display



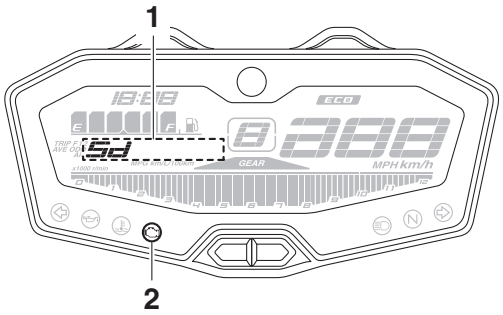
1. Ambient temperature display

This display shows the ambient temperature from 14 °F to 210 °F in 1 °F increments. The temperature displayed may vary from the ambient temperature.

TIP

- When the ambient temperature is below 14 °F, “LO” will be displayed.
- The accuracy of the temperature reading may be affected when riding slowly [approximately under 20 km/h (12.5 mi/h)] or when stopped at traffic signals, railroad crossings, etc.

Self-diagnosis device



1. Error code display
2. Engine trouble warning light “ ”

This model is equipped with a self-diagnosis device for various electrical circuits.
If a problem is detected in any of those circuits, the engine trouble warning light will come on and the display will indicate a fault code.

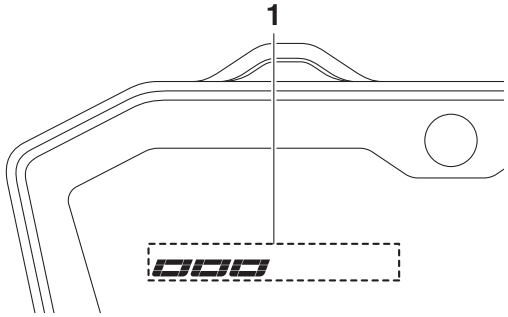
If the display indicates any fault codes, note the code number, and then check the fuel injection system. (Refer to “FUEL INJECTION SYSTEM” on page 8-33.)

ECA20360

NOTICE

If the display indicates a fault code, the vehicle should be checked as soon as possible in order to avoid engine damage.

Brightness control mode



1. Brightness level display

This function allows you to adjust the brightness of the multi-function meter unit panel to suit the outside lighting conditions.

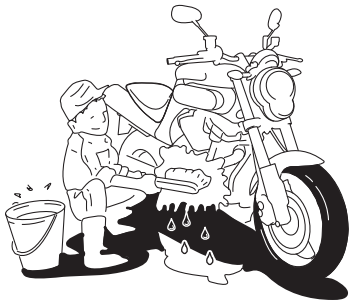
[To adjust the brightness]

1. Turn the key to “OFF”.
2. Push and hold the left set button.
3. Turn the key to “ON” and continue pushing the left set button until the display switches to the brightness control mode.
4. Push the right set button to set the brightness level.
5. Push the left set button to confirm the selected brightness level and exit the brightness control mode.

EAS20009
IMPORTANT INFORMATION

EAS30006
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 1-16.
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.

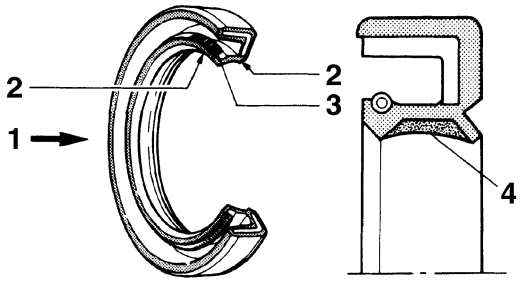
EAS30007
REPLACEMENT PARTS

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.



EAS30008
GASKETS, OIL SEALS AND O-RINGS

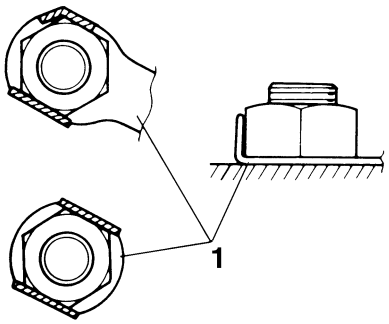
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



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

EAS30009
LOCK WASHERS/PLATES AND COTTER PINS

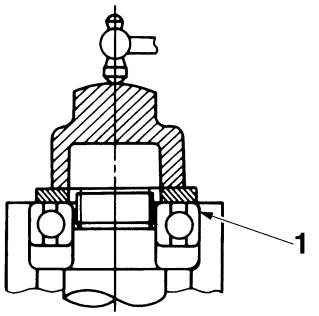
After removal, replace all lock washers/plates “1” and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.

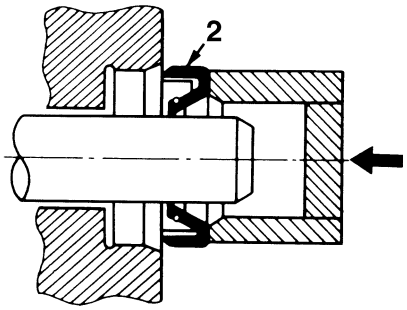


EAS30010
BEARINGS AND OIL SEALS
Install bearings “1” and oil seals “2” so that the manufacturer marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

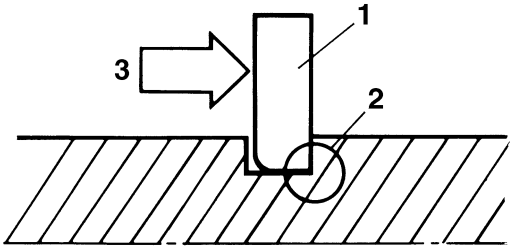
ECA13300
NOTICE

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





EAS30011
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.



EAS30012
RUBBER PARTS
Check rubber parts for deterioration during inspection. Some of the rubber parts are sensitive to gasoline, flammable oil, grease, etc. Do not allow any items other than the specified one to contact the parts.

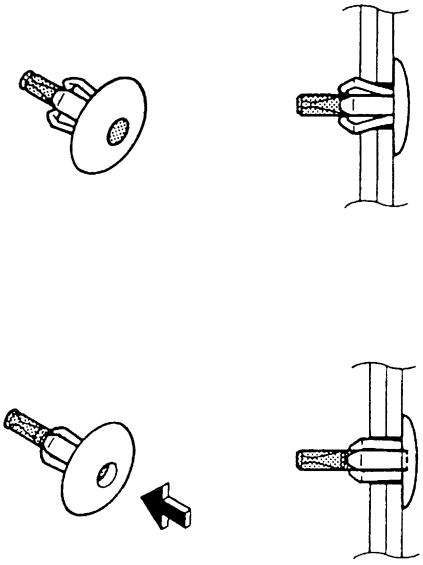
EAS20010
BASIC SERVICE INFORMATION

EAS30013
QUICK FASTENERS

Rivet type
1. Remove:
   • Quick fastener

TIP

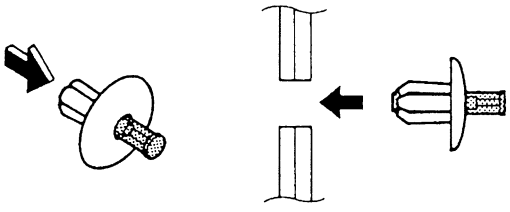
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.

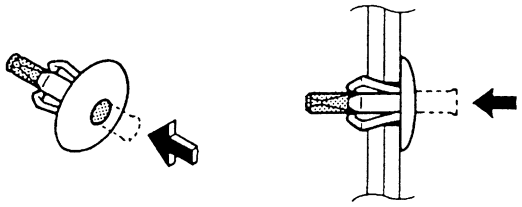


2. Install:
   • Quick fastener

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.

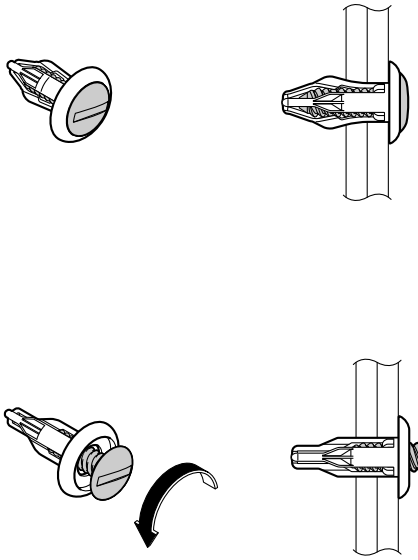




Screw type
1. Remove:
   • Quick fastener

TIP

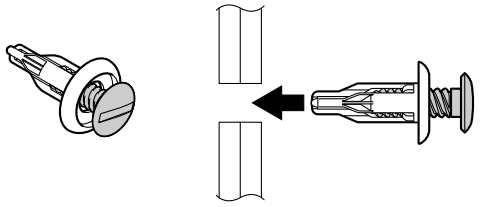
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

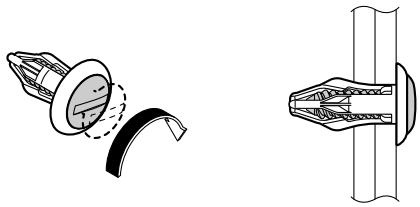


2. Install:
   • Quick fastener

TIP

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



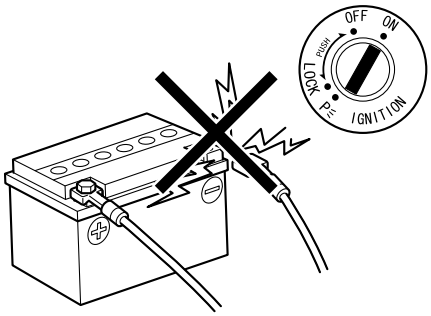


EAS30014
ELECTRICAL SYSTEM

Electrical parts handling

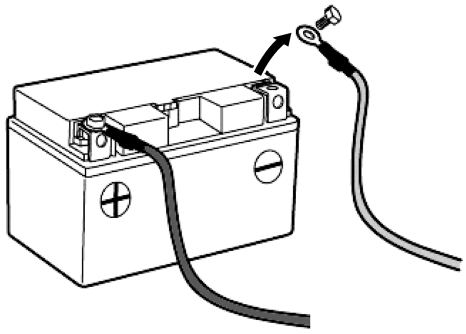
ECA16600
NOTICE

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



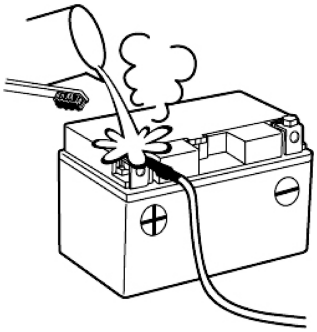
ECA16751
NOTICE

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.



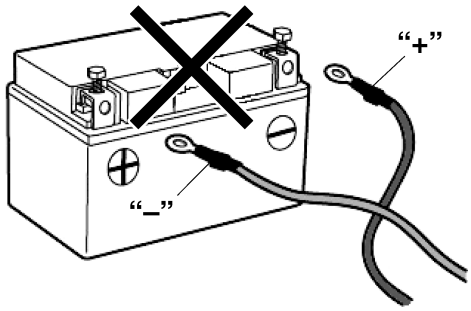
TIP

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



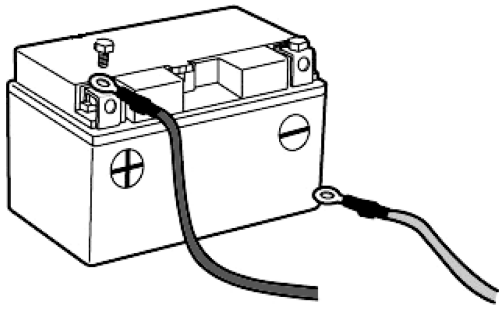
ECA16760
NOTICE

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



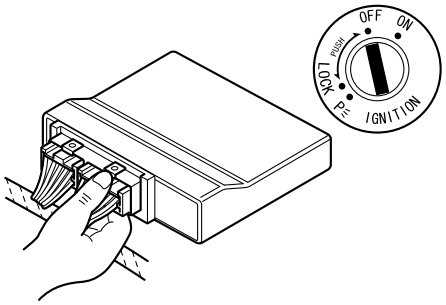
ECA16771
NOTICE

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

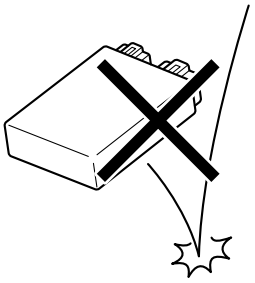
Turn the main switch to “OFF” before disconnecting or connecting an electrical component.



ECA16620

NOTICE

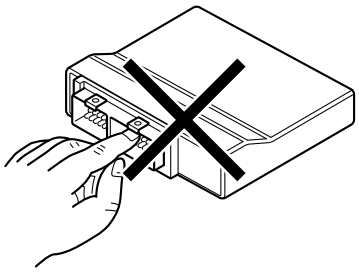
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

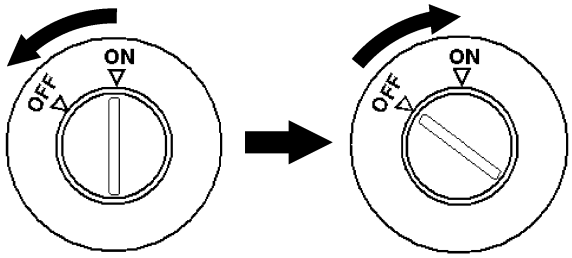
NOTICE

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

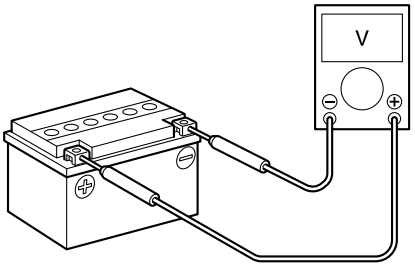
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



Checking the electrical system

TIP

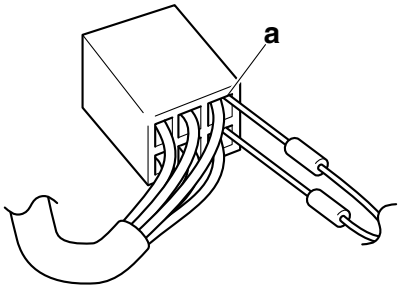
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

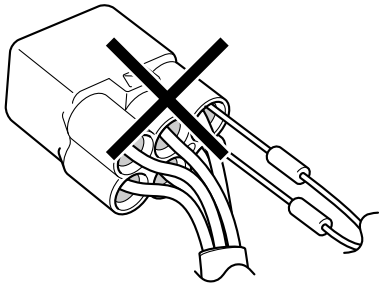
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

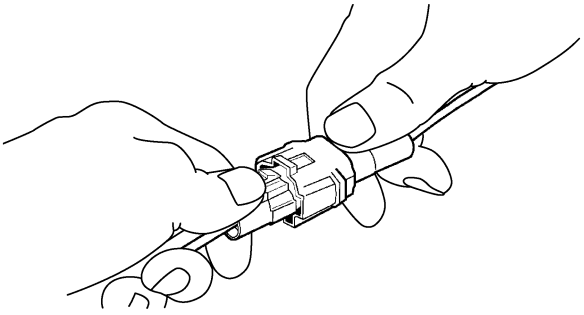
NOTICE

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.

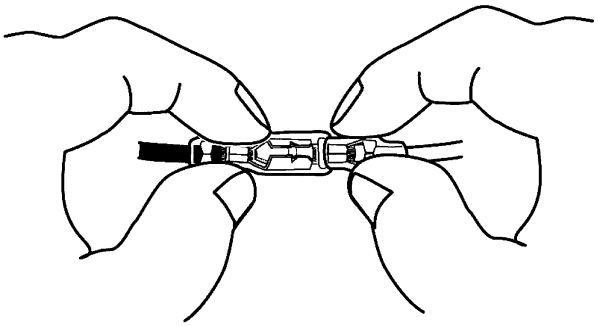


Checking the connections
Check the leads, couplers, and connectors for stains, rust, moisture, etc.
1. Disconnect:
   • Lead
   • Coupler
   • Connector

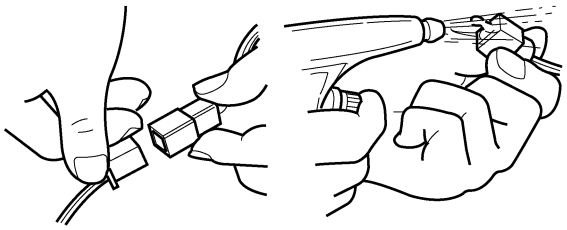
ECA16780
NOTICE
• When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
• There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790
NOTICE
When disconnecting a connector, do not pull the leads. Hold both sections of the connector securely, and then disconnect the connector.

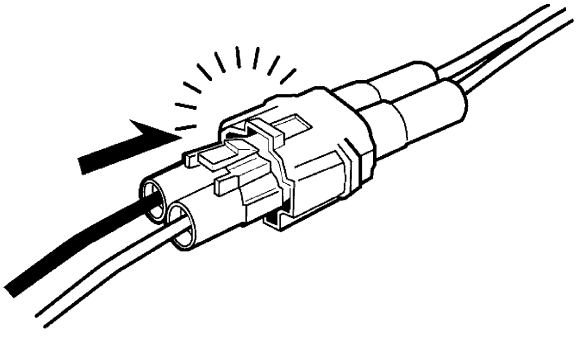


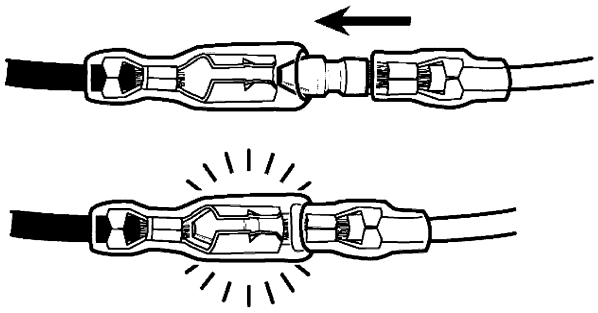
2. Check:
   • Lead
   • Coupler
   • Connector
   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.



3. 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.



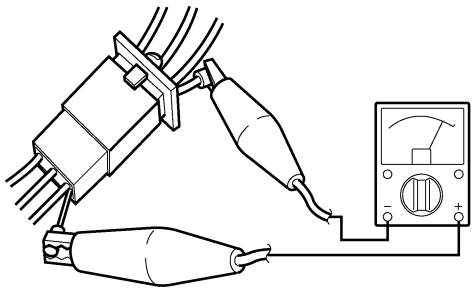


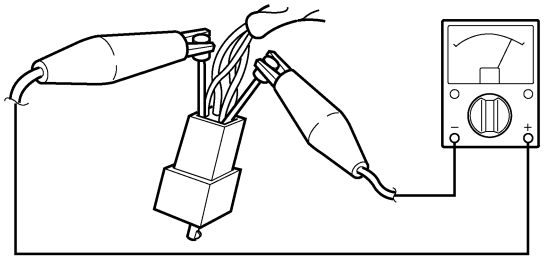
4. Check:
   • Continuity
   (with the pocket tester)

	Pocket tester **90890-03132**

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.





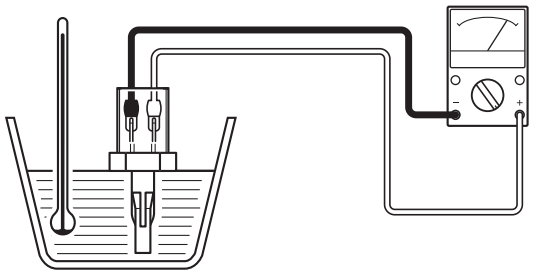
5. Check:
   • Resistance

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

TIP

The resistance values shown were obtained at the standard measuring temperature of 20 °C (68 °F). If the measuring temperature is not 20 °C (68 °F), the specified measuring conditions will be shown.

	Intake air temperature sensor resistance **5.40–6.60 kΩ at 0 °C (32 °F)** **290–390 Ω at 80 °C (176 °F)**

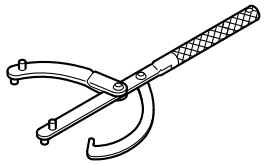
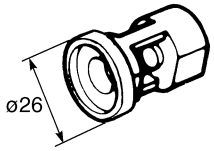
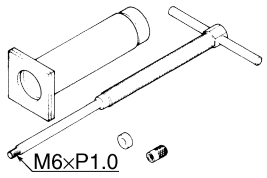
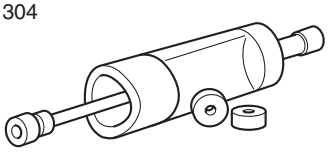
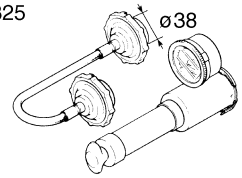
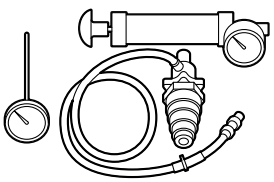
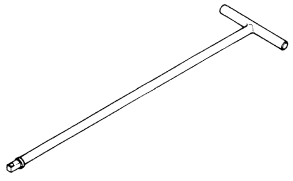


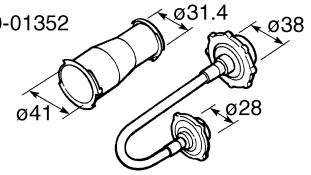
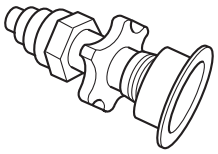
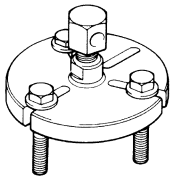
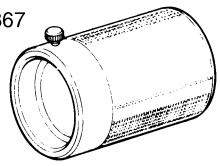
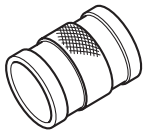
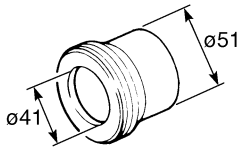
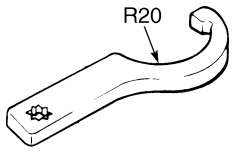
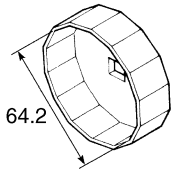
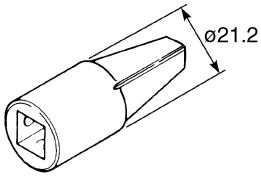
EAS20012
SPECIAL TOOLS

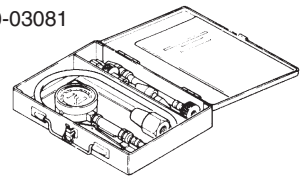
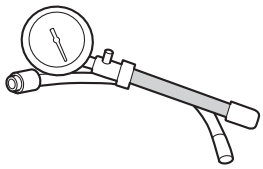
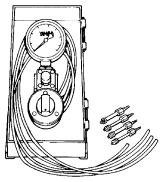
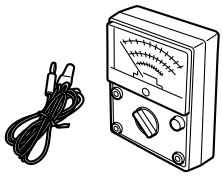
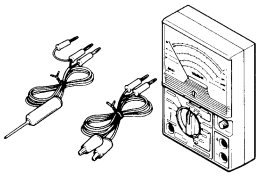
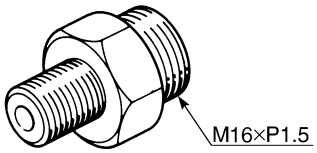
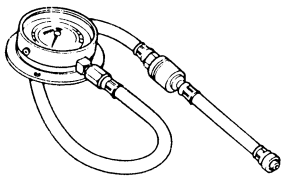
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

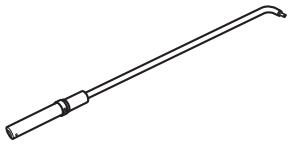
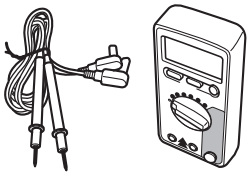
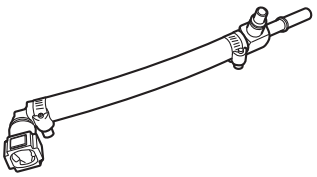
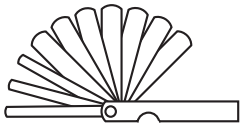
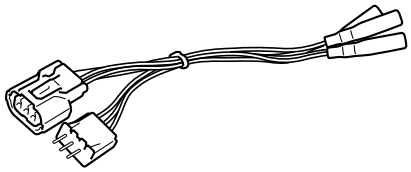
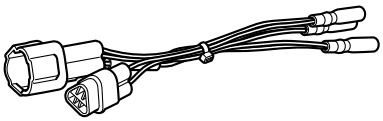
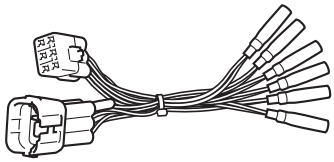
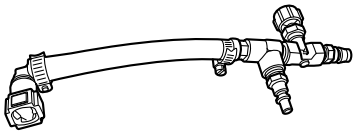
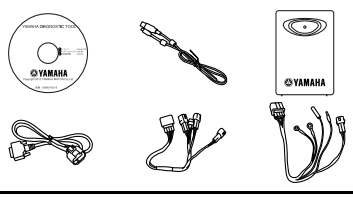
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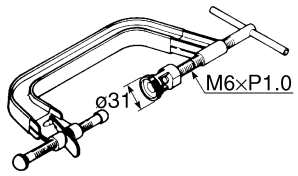
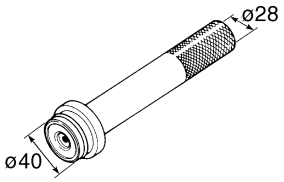
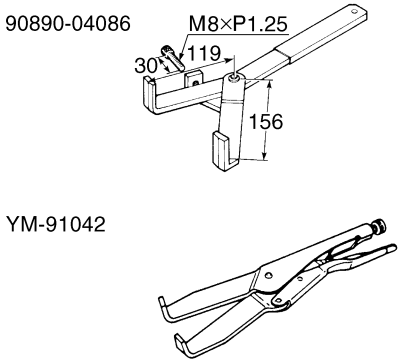
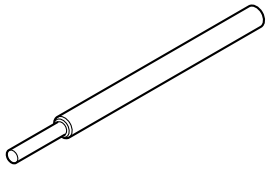
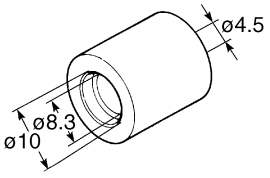
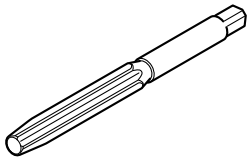
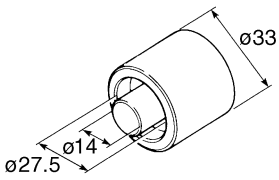
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

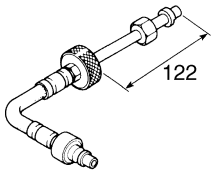
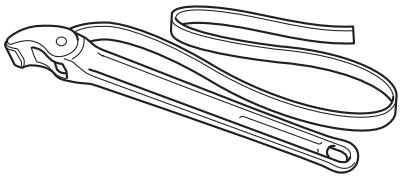
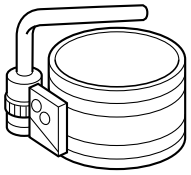
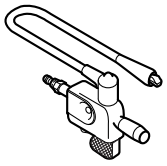
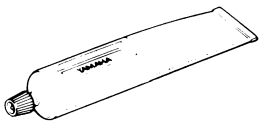
Tool name/Tool No.	Illustration	Reference pages
Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235		5-15, 5-19
Valve spring compressor attachment 90890-01243 Valve spring compressor adapter (26 mm) YM-01253-1		5-30, 5-35
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-75
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	6-3
T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326		4-70, 4-72

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984 	6-3
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-40
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	90890-01367  YM-A9409-7/YM-A5142-4 	4-72, 4-72, 4-73
Fork seal driver attachment (ø41) 90890-01381 Replacement 41 mm YM-A5142-2		4-72, 4-72
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-19, 4-78
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-22
Damper rod holder 90890-01460		4-70, 4-72

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081  YU-33223 	5-1
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-9
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-15, 8-81, 8-82, 8-83, 8-83, 8-87, 8-88, 8-89, 8-89, 8-90, 8-90, 8-91, 8-91, 8-93, 8-93, 8-94, 8-95, 8-95, 8-96, 8-97, 8-98
Pocket tester 90890-03132		1-15
Oil pressure adapter H 90890-03139		3-23
Pressure gauge 90890-03153 Pressure gauge YU-03153		3-23, 7-15, 7-16

Tool name/Tool No.	Illustration	Reference pages
Carburetor angle driver 2 90890-03173		3-9
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-46, 8-92, 8-96
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-16
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 5-53
Test harness S– pressure sensor (3P) 90890-03207 Test harness S– pressure sensor (3P) YU-03207		8-96
Test harness– speed sensor (3P) 90890-03208 Test harness– speed sensor (3P) YU-03208		8-94
Test harness– lean angle sensor (6P) 90890-03209 Test harness– lean angle sensor (6P) YU-03209		8-91
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-15
Yamaha diagnostic tool (US) 90890-03234		3-8, 8-36

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-30, 5-35
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058		6-12
Universal clutch holder 90890-04086 Universal clutch holder YM-91042		5-52, 5-55
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-7
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-32
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-32
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-32
Mechanical seal installer 90890-04132 Water pump seal installer YM-33221-A		6-12

Tool name/Tool No.	Illustration	Reference pages
Extension 90890-04136		5-1
Rotor holding tool 90890-04166 YM-04166		5-40, 5-40, 5-41, 5-41
Piston ring compressor 90890-05158 Piston ring compressor YM-08037		5-82
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-90
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-22, 5-42, 5-69, 5-71

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EAS20013
GENERAL SPECIFICATIONS

Model	
Model	FZ07F 2RC1 (USA) FZ07FC 2RC2 (California)
Dimensions	
Overall length	2085 mm (82.1 in)
Overall width	745 mm (29.3 in)
Overall height	1090 mm (42.9 in)
Seat height	805 mm (31.7 in)
Wheelbase	1400 mm (55.1 in)
Ground clearance	140 mm (5.51 in)
Minimum turning radius	2700 mm (106.3 in)
Weight	
Curb weight	180 kg (397 lb)
Maximum load	175 kg (386 lb)

EAS20014
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	689 cm³
Cylinder arrangement	Inline 2-cylinder
Bore × stroke	80.0 × 68.6 mm (3.15 × 2.70 in)
Compression ratio	11.5 : 1
Standard compression pressure (at sea level)	#1 880 kPa/355 r/min (8.8 kgf/cm²/355 r/min, 125.2 psi/355 r/min) #2 790 kPa/355 r/min (7.9 kgf/cm²/355 r/min, 112 psi/355 r/min)
Minimum-maximum	#1 770–990 kPa/355 r/min (7.7–9.9 kgf/cm²/355 r/min, 109.5–140.8 psi/355 r/min) #2 690–880 kPa/355 r/min (6.9–8.8 kgf/cm²/355 r/min, 98.1–125.1 psi/355 r/min)
Starting system	Electric starter
Fuel	
Recommended fuel	Regular unleaded gasoline (Gasohol (E10) acceptable)
Fuel tank capacity	14 L (3.70 US gal, 3.08 Imp.gal)
Fuel reserve amount	2.7 L (0.71 US gal, 0.59 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Recommended brand	YAMALUBE
Type	SAE 10W-30, 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Quantity (disassembled)	3.00 L (3.17 US qt, 2.64 Imp.qt)
Without oil filter cartridge replacement	2.30 L (2.43 US qt, 2.02 Imp.qt)
With oil filter cartridge replacement	2.60 L (2.75 US qt, 2.29 Imp.qt)
Oil pressure	280.0 kPa/5000 r/min at 100 °C (40.6 psi/5000 r/min at 212 °F)
Oil filter	
Oil filter type	Cartridge
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	0.09–0.15 mm (0.0035–0.0059 in)
Limit	0.22 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.03–0.08 mm (0.0012–0.0032 in)
Bypass valve opening pressure	80.0–120.0 kPa (0.80–1.20 kgf/cm², 11.6–17.4 psi)

Relief valve operating pressure	630.0–810.0 kPa (6.30–8.10 kgf/cm², 91.4–117.5 psi)
Cooling system	
Radiator capacity (including all routes)	1.60 L (1.69 US qt, 1.41 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap opening pressure	108.0–137.4 kPa (1.08–1.37 kgf/cm², 15.7–19.9 psi)
Thermostat	
Valve opening temperature	80.0–84.0 °C (176.00–183.20 °F)
Valve full open temperature	95.0 °C (203.00 °F)
Valve lift (full open)	8.0 mm (0.31 in)
Radiator core	
Width	322.6 mm (12.70 in)
Height	180.0 mm (7.09 in)
Depth	24.0 mm (0.94 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	77/40 × 17/25 (1.309)
Spark plug(s)	
Manufacturer/model	NGK/LMAR8A-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
Cylinder head	
Combustion chamber volume	18.48–20.08 cm³ (1.13–1.23 cu.in)
Warpage limit	0.05 mm (0.0020 in)
Camshaft	
Drive system	Chain drive (right)
Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
Camshaft journal diameter	21.959–21.972 mm (0.8645–0.8650 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Camshaft lobe dimensions	
Lobe height (Intake)	35.610–35.710 mm (1.4020–1.4059 in)
Limit	35.510 mm (1.3980 in)
Base circle diameter (Intake)	27.950–28.050 mm (1.1004–1.1043 in)
Limit	27.850 mm (1.0965 in)
Lobe height (Exhaust)	35.710–35.810 mm (1.4059–1.4098 in)
Limit	35.610 mm (1.4020 in)
Base circle diameter (Exhaust)	27.950–28.050 mm (1.1004–1.1043 in)
Limit	27.850 mm (1.0965 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Timing chain	
Tensioning system	Automatic
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.11–0.20 mm (0.0043–0.0079 in)
Exhaust	0.24–0.30 mm (0.0094–0.0118 in)

Valve dimensions	
Valve head diameter (intake)	31.40–31.60 mm (1.2362–1.2441 in)
Valve head diameter (exhaust)	26.40–26.60 mm (1.0394–1.0472 in)
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Valve seat contact width (exhaust)	0.90–1.10 mm (0.0354–0.0433 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)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 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)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)

Valve spring

Free length (intake)	40.30 mm (1.59 in)
Limit	38.29 mm (1.51 in)
Free length (exhaust)	41.39 mm (1.63 in)
Limit	39.32 mm (1.55 in)
Installed length (intake)	34.34 mm (1.35 in)
Installed length (exhaust)	35.84 mm (1.41 in)
Spring rate K1 (intake)	26.03 N/mm (2.65 kgf/mm, 148.63 lbf/in)
Spring rate K2 (intake)	42.21 N/mm (4.30 kgf/mm, 241.02 lbf/in)
Spring rate K1 (exhaust)	28.90 N/mm (2.95 kgf/mm, 165.02 lbf/in)
Spring rate K2 (exhaust)	44.19 N/mm (4.51 kgf/mm, 252.32 lbf/in)
Installed compression spring force (intake)	144.00–166.00 N (14.68–16.93 kgf, 32.37–37.32 lbf)
Installed compression spring force (exhaust)	149.00–171.00 N (15.19–17.44 kgf, 33.50–38.44 lbf)
Spring tilt (intake)	1.8 mm (0.07 in)
Spring tilt (exhaust)	1.8 mm (0.07 in)
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	80.000–80.010 mm (3.1496–3.1500 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

Piston-to-cylinder clearance	0.015–0.040 mm (0.0006–0.0016 in)
Diameter	79.970–79.985 mm (3.1484–3.1490 in)
Measuring point (from piston skirt bottom)	8.0 mm (0.31 in)
Offset	0.00 mm (0.0000 in)
Piston pin bore inside diameter	18.004–18.015 mm (0.7088–0.7093 in)
Limit	18.045 mm (0.7104 in)
Piston pin outside diameter	17.990–17.995 mm (0.7083–0.7085 in)
Limit	17.970 mm (0.7075 in)

Piston-pin-to-piston-pin-bore clearance	0.009–0.025 mm (0.0004–0.0010 in)
Limit	0.075 mm (0.0030 in)
Piston ring	
Top ring	
Ring type	Barrel
End gap (installed)	0.15–0.25 mm (0.0059–0.0098 in)
Limit	0.50 mm (0.0197 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
End gap (installed)	0.30–0.45 mm (0.0118–0.0177 in)
Limit	0.80 mm (0.0315 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Limit	0.115 mm (0.0045 in)
Oil ring	
End gap (installed)	0.10–0.35 mm (0.0039–0.0138 in)
Connecting rod	
Oil clearance	0.027–0.051 mm (0.0011–0.0020 in)
Bearing color code	1. Blue 2. Black 3. Brown 4. Green
Crankshaft	
Runout limit	0.030 mm (0.0012 in)
Big end side clearance	0.160–0.262 mm (0.0063–0.0103 in)
Journal oil clearance	0.018–0.042 mm (0.0007–0.0017 in)
Bearing color code	-1.Violet-Pink 0.White-Pink 1.Blue-Pink 2.Black-Pink 3.Brown-Pink
Balancer	
Balancer drive method	Gear
Balancer shaft runout limit	0.030 mm (0.0012 in)
Balancer shaft journal to balancer shaft bearing clearance	0.020–0.054 mm (0.0008–0.0021 in)
Clutch	
Clutch type	Wet, multiple-disc
Clutch release method	Outer pull, rack and pinion pull
Clutch lever free play	5.0–10.0 mm (0.20–0.39 in)
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.111 in)
Plate quantity	5 pcs
Friction plate 1 thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.110 in)
Plate quantity	2 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	6 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch spring free length	50.00 mm (1.97 in)
Limit	47.50 mm (1.87 in)
Spring quantity	6 pcs

Transmission	
Transmission type	Constant mesh 6-speed
Primary reduction ratio	1.925 (77/40)
Final drive	Chain
Secondary reduction ratio	2.688 (43/16)
Operation	Left foot operation
Gear ratio	
1st	2.846 (37/13)
2nd	2.125 (34/16)
3rd	1.632 (31/19)
4th	1.300 (26/20)
5th	1.091 (24/22)
6th	0.964 (27/28)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
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	5.76–5.89 mm (0.2268–0.2319 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Maximum consumption amperage	3.3 A
Fuel injector	
Model/quantity	297500–2310/2
Throttle body	
Type/quantity	EHDW38–1
ID mark	1WS1 00 (USA) 1WS1 10 (California)
Throttle position sensor	
Resistance	2.64–6.16 kΩ
Output voltage (at idle)	0.63–0.73 V
Fuel injection sensor	
Crankshaft position sensor resistance	228–342 Ω
Intake air pressure sensor output voltage	3.57–3.71 V at 101.3 kPa (3.57–3.71 V at 1.01 kgf/cm², 3.57–3.71 V at 14.7 psi)
Intake air temperature sensor resistance	290–390 Ω at 80 °C (290–390 Ω at 176 °F)
Coolant temperature sensor resistance	2510–2780 Ω at 20 °C (2510–2780 Ω at 68 °F)
Idling condition	
Fuel line pressure at idling	300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi) / Regulated pressure 324 kPa (3.2 kgf/cm², 47.0 psi)
Engine idling speed	1100–1300 r/min

CO%	0.0–2.0 %
Intake vacuum	29.8–32.4 kPa (224–243 mmHg, 8.8–9.6 inHg)
Water temperature	85.0–105.0 °C (185.00–221.00 °F)
Oil temperature	60.0–80.0 °C (140.00–176.00 °F)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

EAS20015
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	24.80°
Trail	90 mm (3.5 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	130 mm (5.1 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT5.50
Rim material	Aluminum
Wheel travel	130 mm (5.1 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	MICHELIN/PILOT ROAD 3
Manufacturer/model	BRIDGESTONE/BT023F F
Wear limit (front)	1.0 mm (0.04 in)
Rear tire	
Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	MICHELIN/PILOT ROAD 3A
Manufacturer/model	BRIDGESTONE/BT023R M
Wear limit (rear)	1.0 mm (0.04 in)
Tire air pressure (measured on cold tires)	
Loading condition	0–175 kg (0–386 lb)
Front	225 kPa (2.25 kgf/cm², 33 psi)
Rear	250 kPa (2.50 kgf/cm², 36 psi)
High-speed riding	
Front	225 kPa (2.25 kgf/cm², 33 psi)
Rear	250 kPa (2.50 kgf/cm², 36 psi)
Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	282.0 × 4.5 mm (11.10 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc runout limit (as measured on wheel)	0.10 mm (0.0039 in)

Brake pad lining thickness (inner)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.00 mm (0.59 in)
Caliper cylinder inside diameter	30.23 mm (1.19 in)
Caliper cylinder inside diameter	27.00 mm (1.06 in)
Specified brake fluid	DOT 4

Rear brake

Type	Single disc brake
Operation	Right foot operation
Rear disc brake	
Disc outside diameter × thickness	245.0 × 5.0 mm (9.65 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.18 mm (1.50 in)
Specified brake fluid	DOT 4

Steering

Steering bearing type	Angular bearing
Center to lock angle (left)	35.0°
Center to lock angle (right)	35.0°

Front suspension

Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	130.0 mm (5.12 in)
Fork spring free length	345.4 mm (13.60 in)
Limit	331.6 mm (13.06 in)
Collar length	150.0 mm (5.91 in)
Fork spring installed length	338.4 mm (13.32 in)
Spring rate K1	8.50 N/mm (0.87 kgf/mm, 48.54 lbf/in)
Spring stroke K1	0.0–130.0 mm (0.00–5.12 in)
Inner tube outer diameter	41.0 mm (1.61 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha fork oil 10WT
Quantity	403.0 cm^3 (13.63 US oz, 14.21 Imp.oz)
Level	162.0 mm (6.38 in)

Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	55.0 mm (2.17 in)
Spring free length	171.5 mm (6.75 in)
Spring installed length	158.5 mm (6.24 in)
Spring rate K1	107.80 N/mm (10.99 kgf/mm, 615.54 lbf/in)
Spring stroke K1	0.0–55.0 mm (0.00–2.17 in)

Enclosed gas/air pressure (STD)	980 kPa (9.8 kgf/cm², 139.4 psi)
Spring preload adjusting positions	
Minimum	1
Standard	3
Maximum	9

Drive chain

Size/manufacturer	525VAZ/DAIDO
Number of links	108
15-link length limit	239.3 mm (9.42 in)
Drive chain slack	51.0–56.0 mm (2.01–2.20 in)
Limit	58.0 mm (2.28 in)

EAS20016
ELECTRICAL SPECIFICATIONS

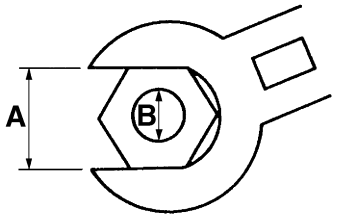
Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI
Ignition timing (B.T.D.C.)	10.0°/1200 r/min
Engine control unit	
Model/manufacturer	TBDFN8/DENSO
Ignition coil	
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.19–1.61 Ω
Secondary coil resistance	8.50–11.50 kΩ
Lean angle sensor output voltage	
Less than 65°	0.4–1.4 V
More than 65°	3.7–4.4 V
AC magneto	
Standard output	14.0 V, 29.3 A at 5000 r/min
Stator coil resistance	0.128–0.192 Ω (W-W)
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Regulated voltage (DC)	14.1–14.9 V
Rectifier capacity	50.0 A
Battery	
Model	YTZ10S
Voltage, capacity	12 V, 8.6 Ah
Specific gravity	1.310
Manufacturer	GS YUASA
Ten hour rate charging current	0.86 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 60.0 W/55.0 W × 1
Auxiliary light	12 V, 5.0 W × 1
Tail/brake light	LED
Front turn signal/position light	12 V, 21.0 W/5.0 W × 2
Rear turn signal light	12 V, 21.0 W × 2
License plate light	12 V, 5.0 W × 1
Meter lighting	LED
Indicator light	
Neutral indicator light	LED
Turn signal indicator light	LED

Oil pressure warning light	LED
High beam indicator light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
Electric starting system	
System type	Constant mesh
Starter motor	
Power output	0.50 kW
Armature coil resistance	0.0150–0.0250 Ω
Brush overall length	12.0 mm (0.47 in)
Limit	6.50 mm (0.26 in)
Brush spring force	6.03–6.52 N (615–665 gf, 21.71–23.47 oz)
Mica undercut (depth)	0.70 mm (0.03 in)
Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Horn	
Horn type	Plane
Quantity	1
Maximum amperage	3.0 A
Turn signal/hazard relay	
Relay type	Full transistor
Built-in, self-canceling device	No
Fuel sender unit	
Sender unit resistance (full)	9.0–11.0 Ω
Sender unit resistance (empty)	213.0–219.0 Ω
Fuses	
Main fuse	30.0 A
Headlight fuse	15.0 A
Signaling system fuse	10.0 A
Ignition fuse	10.0 A
Radiator fan motor fuse	10.0 A
Parking lighting fuse	10.0 A
Fuel injection system fuse	10.0 A
Auxiliary fuse	2.0 A
Backup fuse	7.5 A
Spare fuse	15.0 A
Spare fuse	10.0 A
Spare fuse	7.5 A
Spare fuse	2.0 A
Spare fuse	30.0 A

EAS20017
TIGHTENING TORQUES

EAS30015
GENERAL TIGHTENING TORQUE SPECIFICATIONS

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



A. Distance between flats
B. Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		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

EAS30016
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe nut	M8	4	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Cylinder head stud bolt (exhaust pipe)	M8	4	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Muffler bracket bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Muffler bracket bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Muffler cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
O_2 sensor	M12	1	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Starter motor terminal nut	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Engine ground lead bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
O_2 sensor coupler bracket bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Spark plug	M10	2	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Exhaust camshaft sprocket bolt	M7	2	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Intake camshaft sprocket bolt	M7	2	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Exhaust camshaft cap bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	E
Intake camshaft cap bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	E
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing chain tensioner cap bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Timing mark accessing bolt	M8	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Crankshaft end cover	M36	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Cylinder head cover bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Breather plate bolt	M5	6	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	LT
Cylinder head bolt	M10	6	See TIP.	E
Cylinder head bolt	M6	2	See TIP.	
Timing chain guide bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Timing chain bolt (right side of cylinder head)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter clutch bolt	M8	3	32 Nm (3.2 m·kgf, 23 ft·lbf)	LT
Generator rotor bolt	M12	1	70 Nm (7.0 m·kgf, 51 ft·lbf)	E
Generator cover bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT
Generator cover bolt	M6	8	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Stator coil bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Crankshaft position sensor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Coupler and hose bracket bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor front cover bolt	M5	2	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Starter motor terminal and rear cover nut	M6	1	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Clutch boss nut	M20	1	95 Nm (9.5 m·kgf, 69 ft·lbf)	Stake. E
Clutch spring bolt	M6	6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Clutch cover bolt	M6	10	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Clutch cable holder bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT
Oil pump drive chain guide bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Shift shaft spring stopper	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	LT
Oil pump cover screw	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Oil pump bolt	M6	4	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Holder bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil pan bolt	M6	11	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil strainer bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Crankcase bolt	M9	6	See TIP.	l=80 mm (3.15 in) E
Crankcase bolt	M8	6	See TIP.	l=70 mm (2.76 in) E
Crankcase bolt	M8	2	See TIP.	l=65 mm (2.56 in) E
Crankcase bolt	M6	2	See TIP.	l=65 mm (2.56 in) E
Crankcase bolt	M6	3	See TIP.	l=60 mm (2.36 in) E
Crankcase bolt	M6	8	See TIP.	l=40 mm (1.57 in) E
Oil pressure switch	PT1/8	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	Three bond No.1215®
Oil pressure switch lead bolt	M4	1	1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)	
Oil pressure switch lead holder bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Blind plate bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Gear position switch bolt	M5	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	LT
Speed sensor bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Main gallery bolt	M16	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Connecting rod bolt	M8	4	See TIP.	M
Balancer driven gear bolt	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	E
Balancer shaft cover bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT
Bearing retainer bolt	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT

Item	Thread size	Q'ty	Tightening torque	Remarks
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Radiator cap bolt	M3	1	1.0 Nm (0.10 m·kgf, 0.72 ft·lbf)	
Coolant reservoir bolt	M6	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Radiator side cover bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Radiator fan motor bolt	M6	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Radiator bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Horn nut	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Radiator inlet hose clamp screw	M5	1	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Water jacket joint inlet hose clamp screw	M5	1	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Oil filter cartridge union bolt	M20	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	E
Coolant temperature sensor	M10	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Thermostat cover bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Water pump housing bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Water pump inlet/outlet pipe bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant drain bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Intake air pressure sensor bolt	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Intake air temperature sensor bolt	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Air duct bracket screw	M5	4	1.6 Nm (0.16 m·kgf, 1.2 ft·lbf)	
Air filter element screw	M5	1	1.6 Nm (0.16 m·kgf, 1.2 ft·lbf)	
Throttle cable locknut (throttle body side)	M6	2	4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)	
Throttle cable locknut (handlebar side)	M6	1	4.3 Nm (0.43 m·kgf, 3.1 ft·lbf)	
Throttle body joint clamp screw	M5	4	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	
Air filter case joint clamp screw	M5	2	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	
Air filter case bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Fuel rail bolt	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
ISC (idle speed control) valve plate screw	M6	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kgf, 31 ft·lbf)	

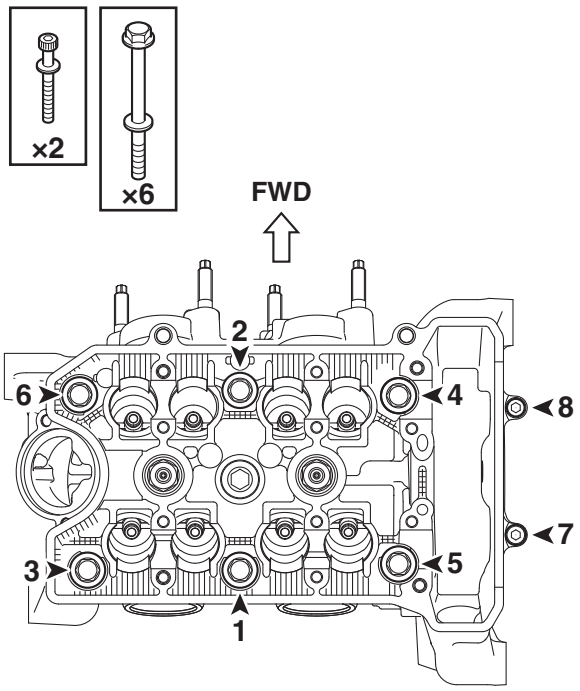
TIP

Cylinder head bolt

Tighten the cylinder head bolts "1"–"8" in the proper tightening sequence as follows:

1. Lubricate the cylinder head bolts "1"–"6" threads and mating surface with engine oil.
2. Tighten the cylinder head bolts "1"–"6" to 10 Nm (1.0 m·kgf, 7.2 ft·lbf).
3. Tighten the cylinder head bolts "1"–"6" to 40 Nm (4.0 m·kgf, 29 ft·lbf).
4. Loosen and retighten the cylinder head bolts "1"–"6" to 20 Nm (2.0 m·kgf, 14 ft·lbf) in the proper tightening sequence, and then tighten them further to reach the specified angle 90° in the proper tightening sequence.

5. Tighten the cylinder head bolts “7” and “8” to 10 Nm (1.0 m·kgf, 7.2 ft·lbf).

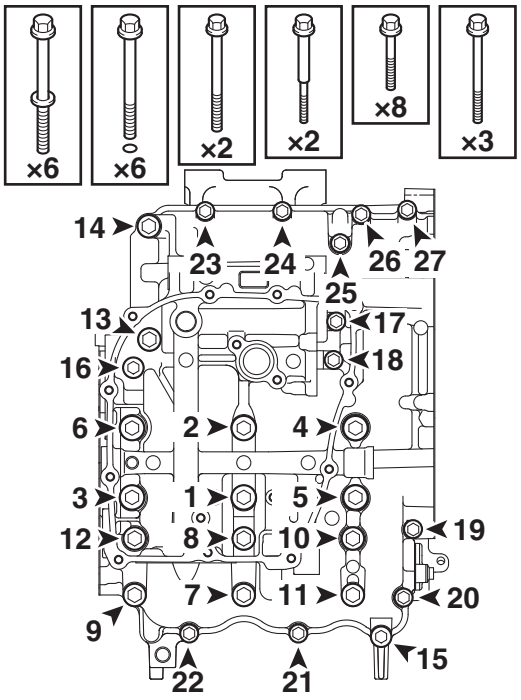


TIP

Crankcase bolt

Tighten the crankcase bolts “1”–“27” in the proper tightening sequence as follows: Tighten the bolts “1”–“16” in the order of the embossed numbers on the crankcase.

1. Lubricate the crankcase bolts “1”–“27” threads, mating surfaces, washers, and O-rings with the engine oil.
2. Tighten the crankcase bolts “1”–“6” to 24 Nm (2.4 m·kgf, 17 ft·lbf).
3. Loosen and retighten the crankcase bolts “1”–“6” to 17 Nm (1.7 m·kgf, 12 ft·lbf) in the proper tightening sequence, and then tighten them further to reach the specified angle 60° in the proper tightening sequence.
4. Tighten the crankcase bolts “7”–“27”.
   “7”–“14”: 24 Nm (2.4 m·kgf, 17 ft·lbf)
   “15”–“16”: 10 Nm (1.0 m·kgf, 7.2 ft·lbf)
   “17”–“27”: 10 Nm (1.0 m·kgf, 7.2 ft·lbf)
   Tighten the bolts “17”–“27” in any tightening sequence using a crisscross pattern.



TIP

Connecting rod bolt

Tighten the connecting rod bolts to 20 Nm (2.0 m·kgf, 14 ft·lbf), and then tighten them further to reach the specified angle 175–185°.

EAS30017
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting nut (rear upper side)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Engine mounting nut (rear lower side)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Engine mounting bolt (left front side)	M12	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	
Engine mounting bolt (left upper side)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Engine mounting bolt (right front side)	M12	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	
Engine mounting bolt (right upper side)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Engine bracket bolt (right)	M8	2	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Engine bracket bolt (left)	M8	2	25 Nm (2.5 m·kgf, 18 ft·lbf)	
Clutch cable guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rider seat bracket bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Battery terminal bolt	M6	2	2.2 Nm (0.22 m·kgf, 1.6 ft·lbf)	
Rider seat bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lean angle sensor bolt	M4	2	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Starter relay bolt	M6	2	3.6 Nm (0.36 m·kgf, 2.6 ft·lbf)	
Battery box bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear side cover bolt (M8 × 25 mm)	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rear side cover bolt (M6 × 12 mm)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Tail/brake light bolt	M6	2	3.3 Nm (0.33 m·kgf, 2.4 ft·lbf)	
Mudguard assembly bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rear reflector nut	M5	2	1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)	
License plate bracket nut	M6	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
License plate/turn signal light bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Center cover screw	M5	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Upper tail cover screw	M5	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Headlight assembly bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Headlight side cover bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Headlight center cover bolt	M6	4	0.8 Nm (0.08 m·kgf, 0.58 ft·lbf)	
Meter assembly screw	M4	3	1.3 Nm (0.13 m·kgf, 0.94 ft·lbf)	
Meter assembly bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank top cover bolt	M5	1	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Fuel tank cover bolt (M5 × 12 mm)	M5	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Fuel tank cover bolt (M5 × 16 mm)	M5	8	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Fuel tank center cover bolt	M5	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Air scoop bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank front cover lower bolt	M6	2	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Fuel tank front cover upper bolt	M5	2	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Rollover valve and overflow hose clamp screw (for California only)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Air scoop inner panel bolt	M5	6	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Electrical components tray 1 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)	
Electrical components tray 2 nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Electrical components tray 2 bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake disc bolt	M6	10	18 Nm (1.8 m·kgf, 13 ft·lbf)	LT
Front wheel axle	M16	1	65 Nm (6.5 m·kgf, 47 ft·lbf)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front brake hose holder bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Drive chain puller locknut	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rear wheel sprocket nut	M10	6	80 Nm (8.0 m·kgf, 58 ft·lbf)	
Rear brake disc bolt	M8	5	30 Nm (3.0 m·kgf, 22 ft·lbf)	LT
Wheel axle nut	M18	1	105 Nm (10.5 m·kgf, 76 ft·lbf)	
Rear brake caliper retaining bolt	M12	1	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Rear brake caliper bolt	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	LT
Brake caliper bleed screw	M8	3	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Brake master cylinder reservoir cap bolt	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Brake lever pivot bolt	M6	1	1.0 Nm (0.10 m·kgf, 0.72 ft·lbf)	
Brake lever pivot nut	M6	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Front brake light switch screw	M4	1	1.2 Nm (0.12 m·kgf, 0.87 ft·lbf)	
Front brake caliper bolt	M10	2	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Front reflector nut	M5	2	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
Front brake hose union bolt (brake caliper side)	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Front brake hose union bolt (master cylinder side)	M10	3	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Brake pad retaining bolt	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Screw plug	M10	1	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
Rear brake hose union bolt (brake caliper side)	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Rear brake hose union bolt (master cylinder side)	M10	1	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Brake fluid reservoir holder nut	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Footrest assembly bolt (right foot-rest)	M8	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Rear brake master cylinder bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Brake pedal bolt	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	LT
Rear brake hose guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear brake hose holder bolt	M6	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Rear brake pedal adjusting locknut	M8	1	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Rearview mirror	M10	2	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Handlebar switch screw (right)	M4	2	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Throttle cable housing bolt	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Handlebar switch screw (left)	M4	2	2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)	
Grip end	M16	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Upper handlebar holder bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Lower handlebar holder nut	M10	2	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Clutch lever pivot nut	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Clutch lever holder pinch bolt	M6	1	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Clutch cable locknut	M8	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front fork damper rod bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	LT
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Upper bracket pinch bolt (left and right)	M8	2	26 Nm (2.6 m·kgf, 19 ft·lbf)	
Upper bracket pinch bolt (center)	M10	1	21 Nm (2.1 m·kgf, 15 ft·lbf)	
Front fork cap bolt	M38	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front fender bracket bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front fender bolt (upper side)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	LT
Front fender bolt (lower side)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front fender side cover bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose holder bracket bolt	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Front brake hose lower holder bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Cap nut	M25	1	See TIP.	
Drive chain guard bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Relay arm nut	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Connecting arm nut (relay arm side)	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Rear shock absorber assembly bolt (front side)	M10	1	44 Nm (4.4 m·kgf, 32 ft·lbf)	
Rear shock absorber assembly nut (rear side)	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Pivot shaft protector bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Pivot shaft protector bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Sidestand bolt	M10	2	63 Nm (6.3 m·kgf, 46 ft·lbf)	LT
Footrest assembly bolt (left footrest)	M8	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Footrest plate bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Passenger footrest bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Pivot shaft nut	M16	1	110 Nm (11 m·kgf, 80 ft·lbf)	
Footrest bracket bolt	M10	4	45 Nm (4.5 m·kgf, 33 ft·lbf)	LT
Sidestand pivot nut	M10	1	46 Nm (4.6 m·kgf, 33 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Sidestand switch nut	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Connecting arm nut (frame side)	M12	1	52 Nm (5.2 m·kgf, 38 ft·lbf)	
Drive sprocket cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Drive sprocket nut	M22	1	95 Nm (9.5 m·kgf, 69 ft·lbf)	Stake E
Shift arm pinch bolt	M6	1	14 Nm (1.4 m·kgf, 10 ft·lbf)	
Shift rod locknut (shift arm side)	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
Shift rod locknut (shift pedal side)	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	Left-hand threads
Shift rod upper joint bolt	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	LT
Fuel pump bolt	M5	4	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Fuel tank bolt (front side)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank bolt (rear side)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear fuel tank bracket bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front fuel tank bracket bolt	M8	1	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Fuel tank overflow/breather hose clamp screw (for USA only)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

TIP

Cap nut

1. First, tighten the cap nut to approximately 52 Nm (5.2 m·kgf, 38 ft·lbf) with a torque wrench, then loosen the cap nut completely.
2. Retighten the cap nut to 18 Nm (1.8 m·kgf, 13 ft·lbf) with a torque wrench.

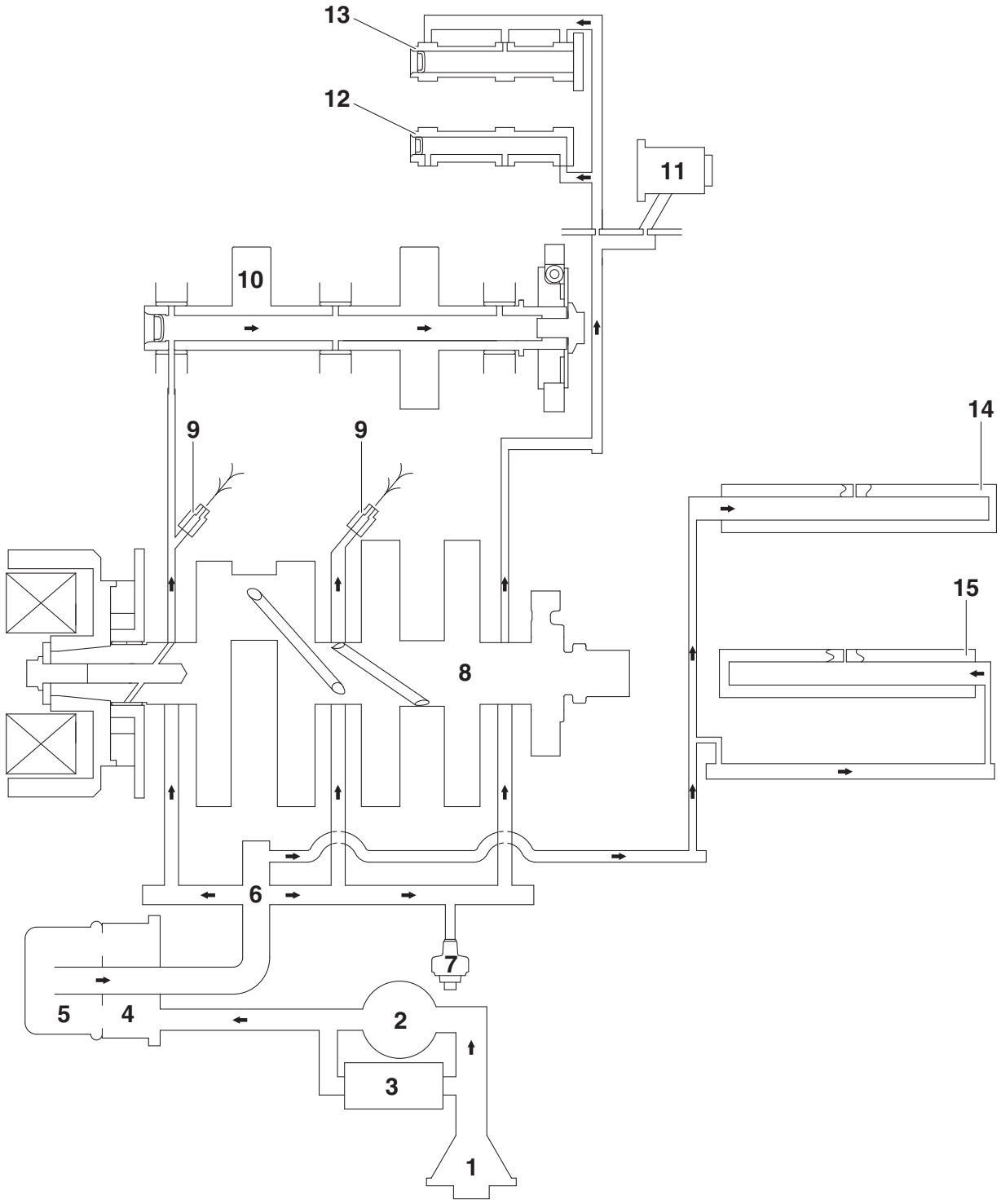
EAS20018
LUBRICATION POINTS AND LUBRICANT TYPES

EAS30018
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Coolant hose insertion part	Water or S
Bearings	E
Camshaft lobes and journals (intake and exhaust)	M
Valve stem seal (installed on valve guide)	S
Valve lifter outer surface (intake and exhaust)	E
Valve stems and stem ends (intake and exhaust)	M
Decompression camshaft moving point	E
Crankshaft big ends	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts	M
Crankshaft journals	E
Balancer shaft journals	E
Generator rotor bolt thread and washer	E
Balancer shaft buffer plate bolt	E
Oil pump rotors (inner and outer)	E
Oil pump shaft	E
Oil cooler union bolt	E
Starter clutch idle gear inner surface and end	E
Starter clutch outer assembly	E
Starter clutch gear	E
Primary driven gear end	E
Crankcase cover and clutch pull rod	LS
Clutch housing thrust washer	E
Clutch boss nut and conical washer	E
Transmission gears (wheel and pinion) and collar	M
Transmission gears inner surface (shift fork contact parts)	M
Drive sprocket nut	E
Shift drum assembly	E
Shift forks and shift fork guide bars	E
Shift shaft washer	E
Shift shaft moving surface	E

EAS20019
LUBRICATION SYSTEM CHART AND DIAGRAMS

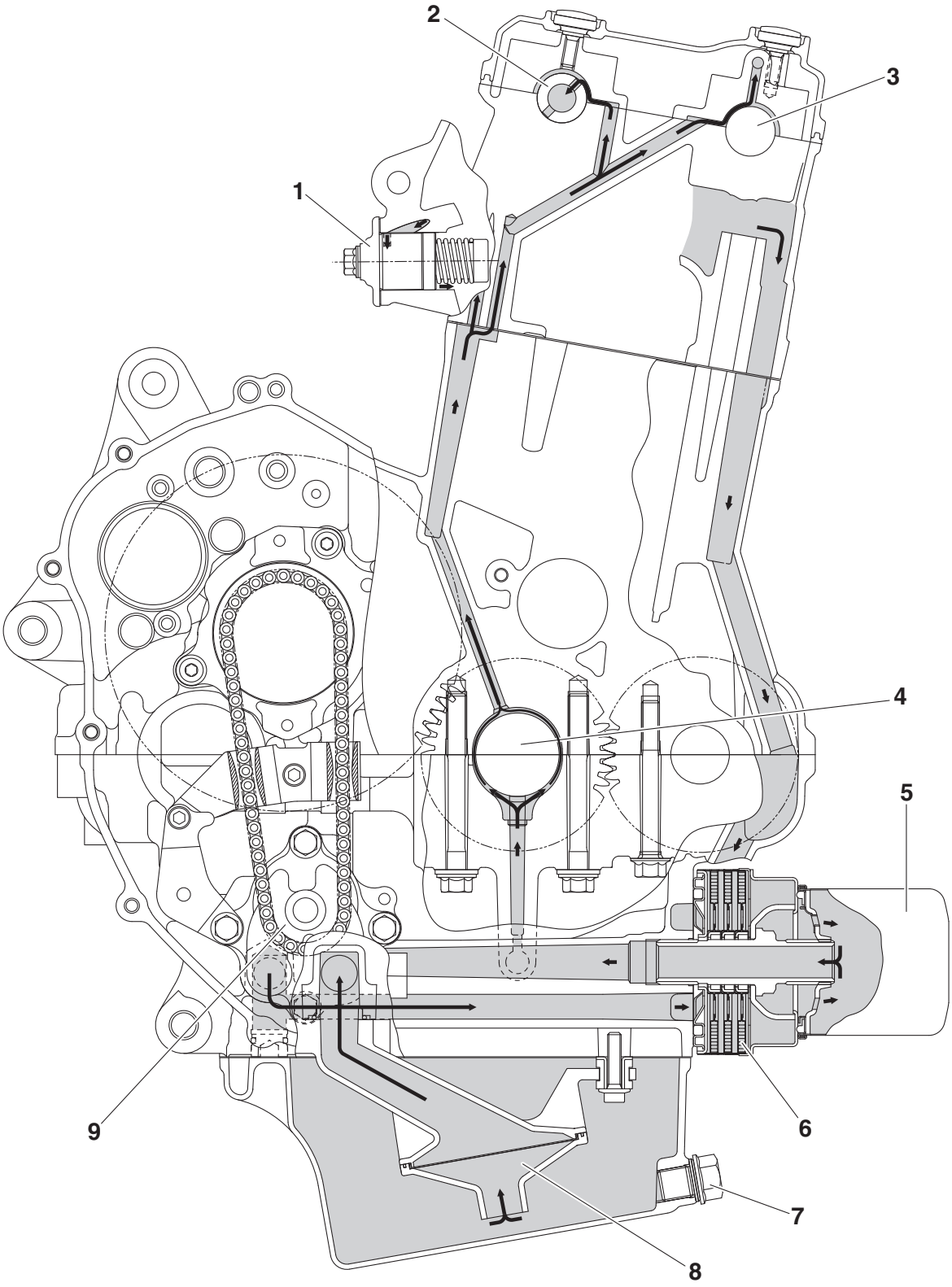
EAS30020
ENGINE OIL LUBRICATION CHART



1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter cartridge
6. Main gallery
7. Oil pressure switch
8. Crankshaft
9. Oil nozzle
10. Balancer shaft assembly
11. Timing chain tensioner
12. Intake camshaft
13. Exhaust camshaft
14. Main axle
15. Drive axle

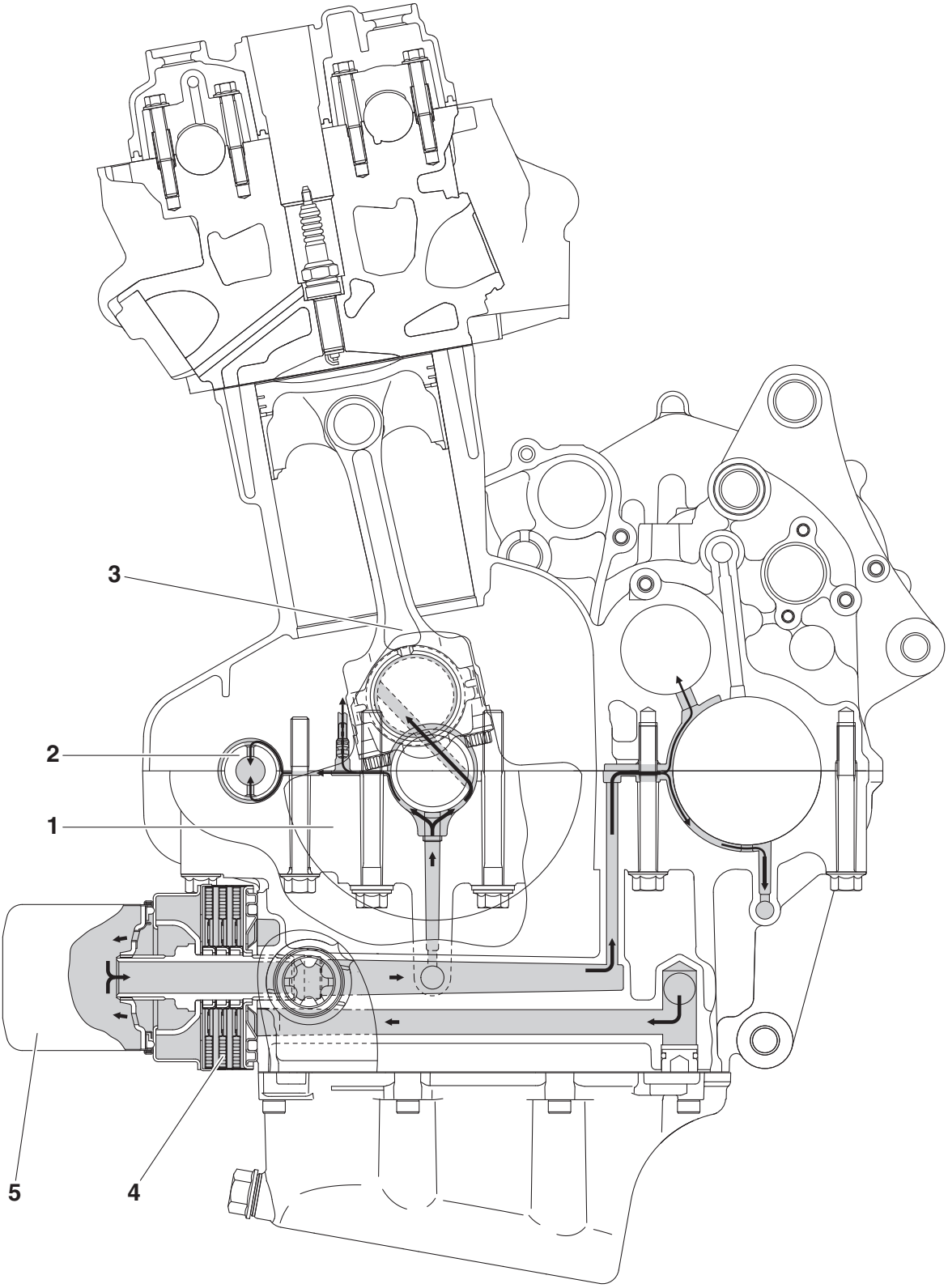
EAS30021
LUBRICATION DIAGRAMS

Crankcase, cylinder, and cylinder head (right side view)



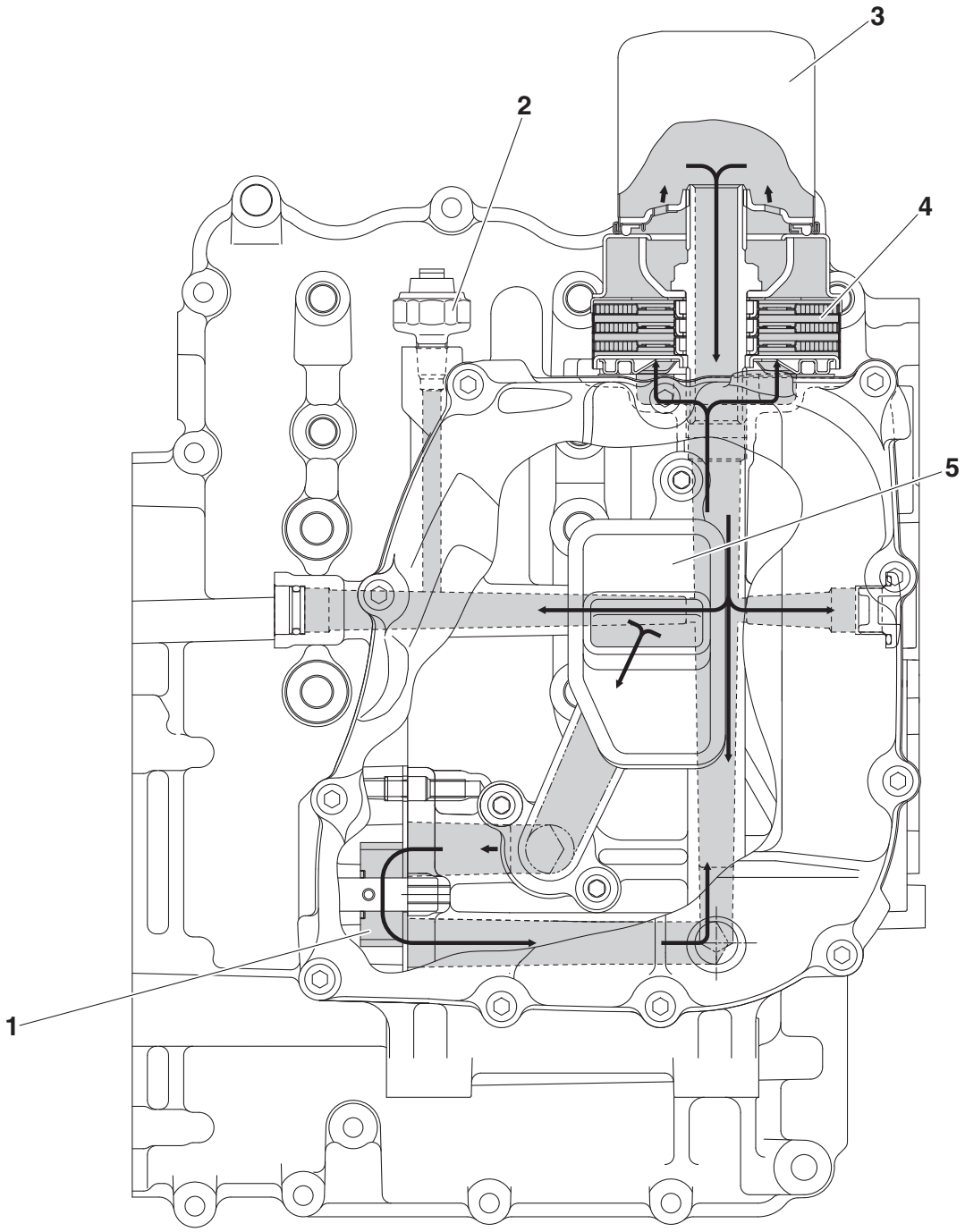
1. Timing chain tensioner
2. Intake camshaft
3. Exhaust camshaft
4. Crankshaft
5. Oil filter cartridge
6. Oil cooler
7. Oil drain bolt
8. Oil strainer
9. Oil pump

Crankcase and cylinder (left side view)



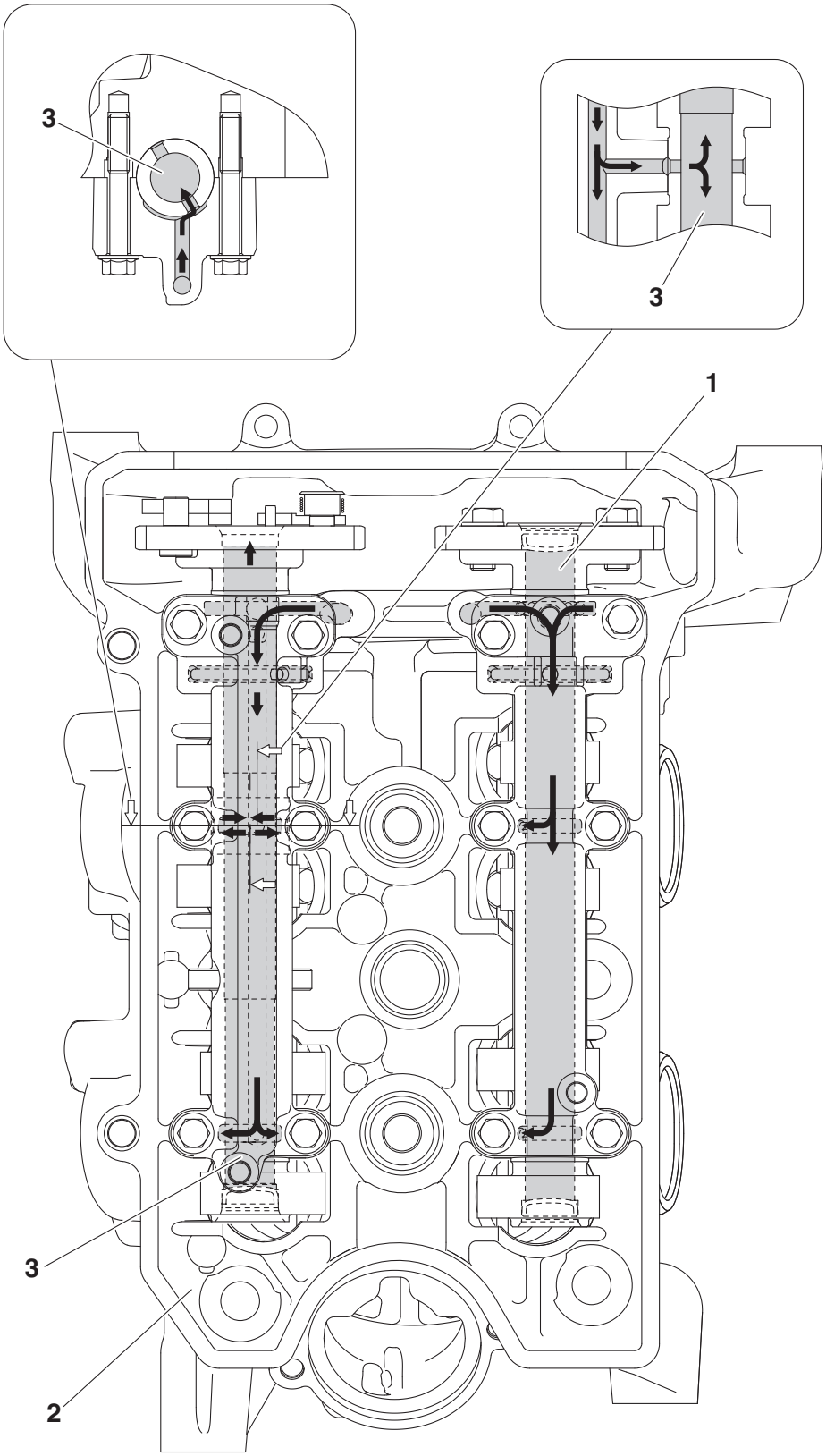
1. Crankshaft
2. Balancer shaft assembly
3. Connecting rod
4. Oil cooler
5. Oil filter cartridge

Oil pump (bottom view)



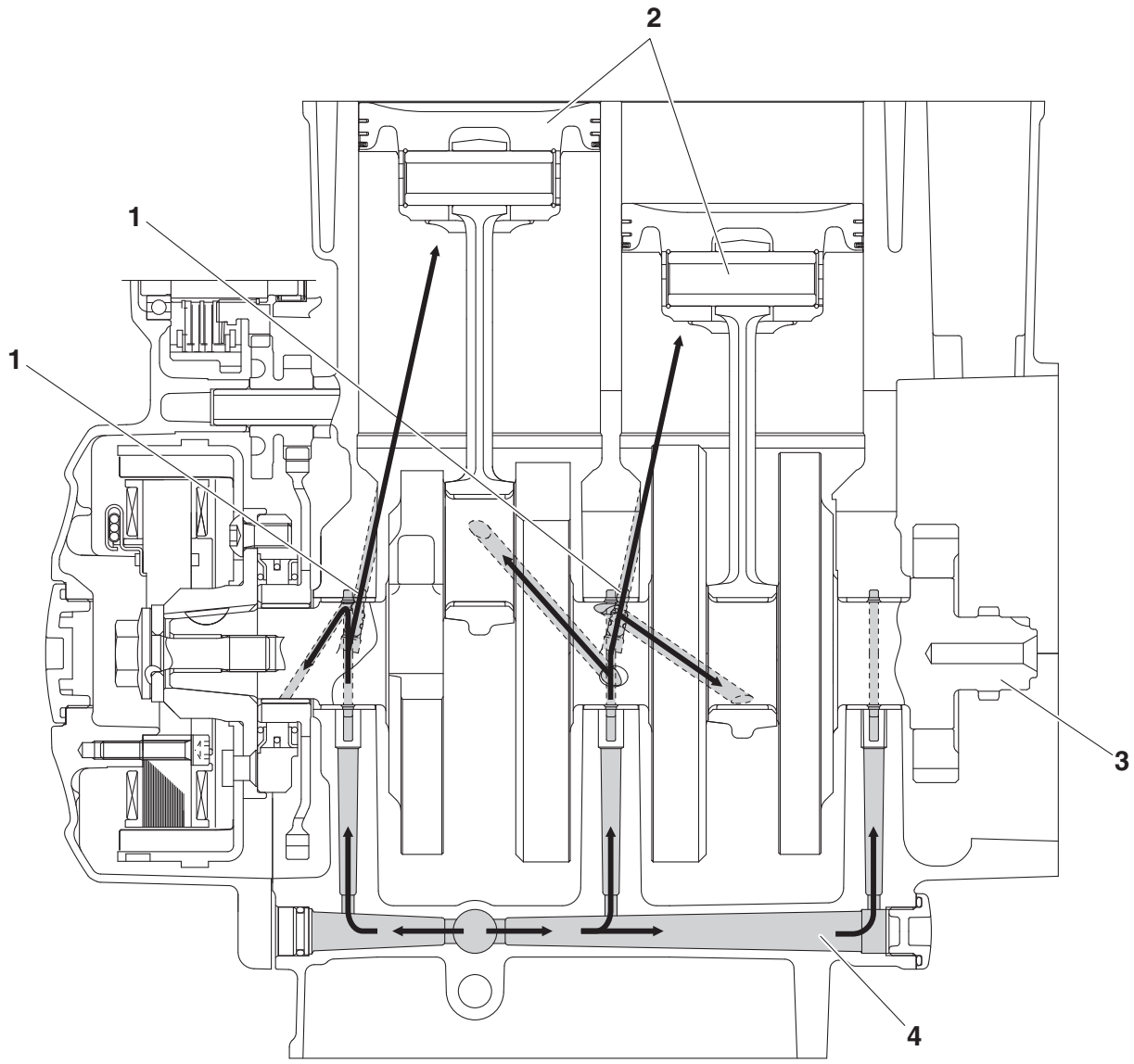
1. Oil pump
2. Oil pressure switch
3. Oil filter cartridge
4. Oil cooler
5. Oil strainer

Camshaft (top view)



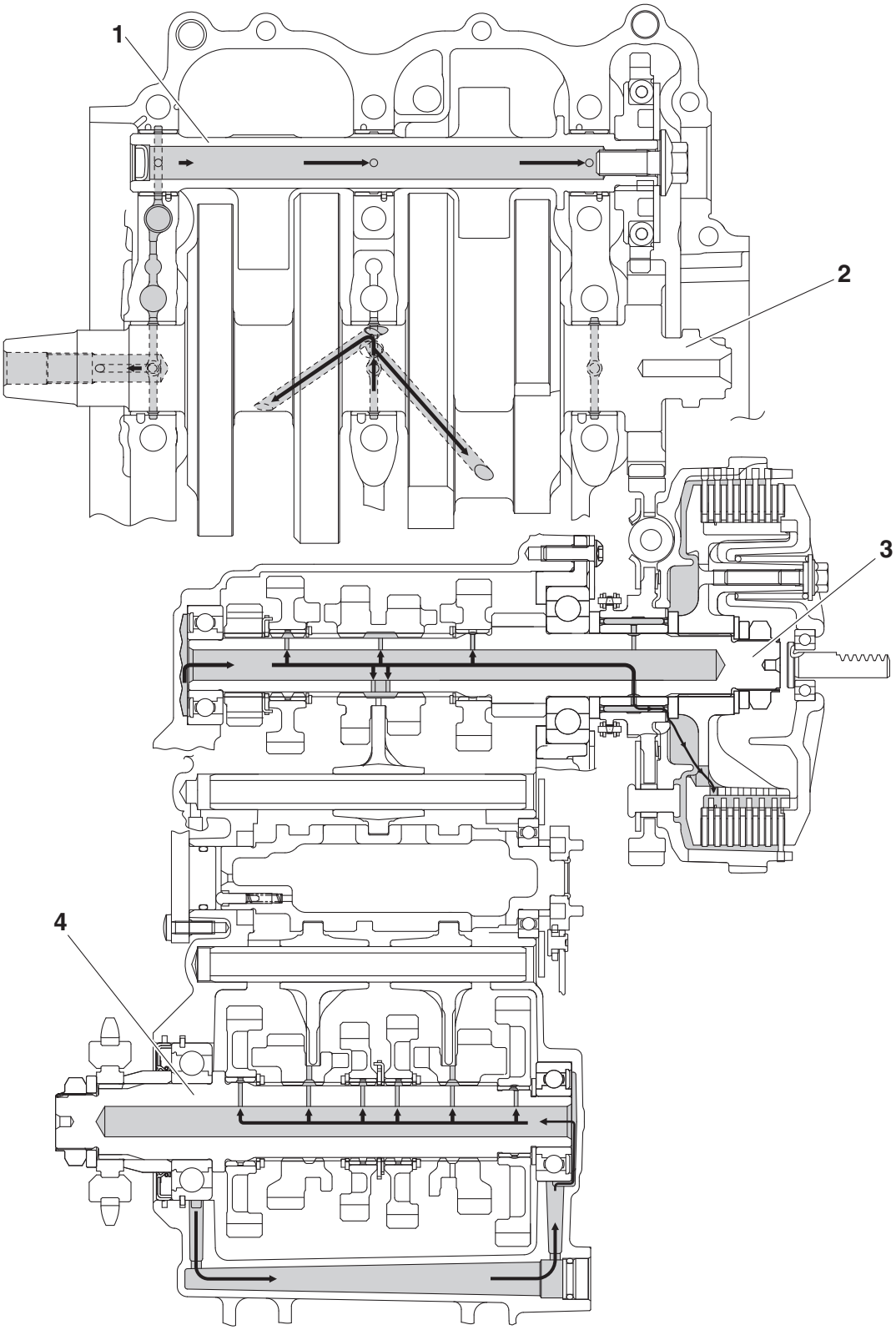
1. Intake camshaft
2. Cylinder head
3. Exhaust camshaft

Crankshaft (front view)



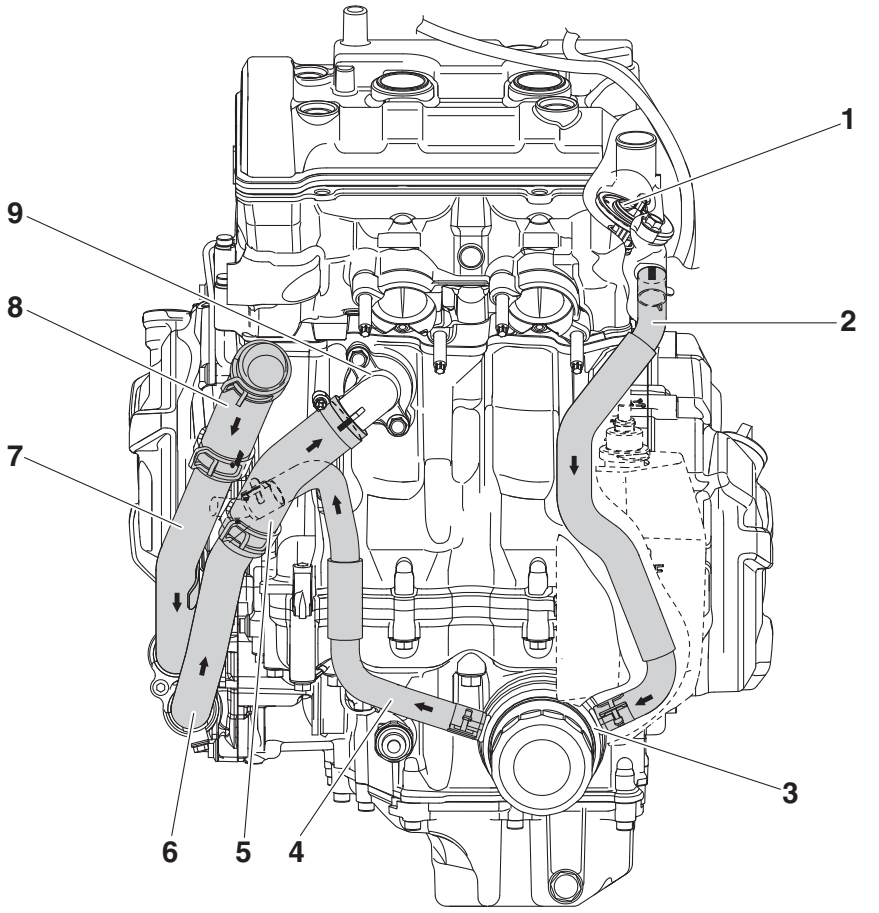
1. Oil nozzle
2. Piston
3. Crankshaft
4. Main gallery

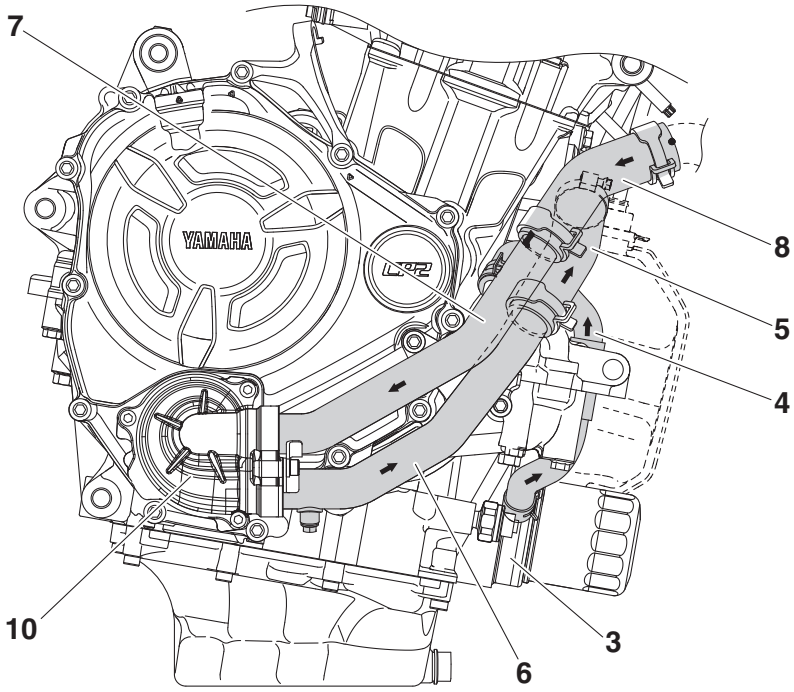
Crankshaft and transmission (top view)



1. Balancer shaft assembly
2. Crankshaft
3. Main axle
4. Drive axle

EAS20020
COOLING SYSTEM DIAGRAMS

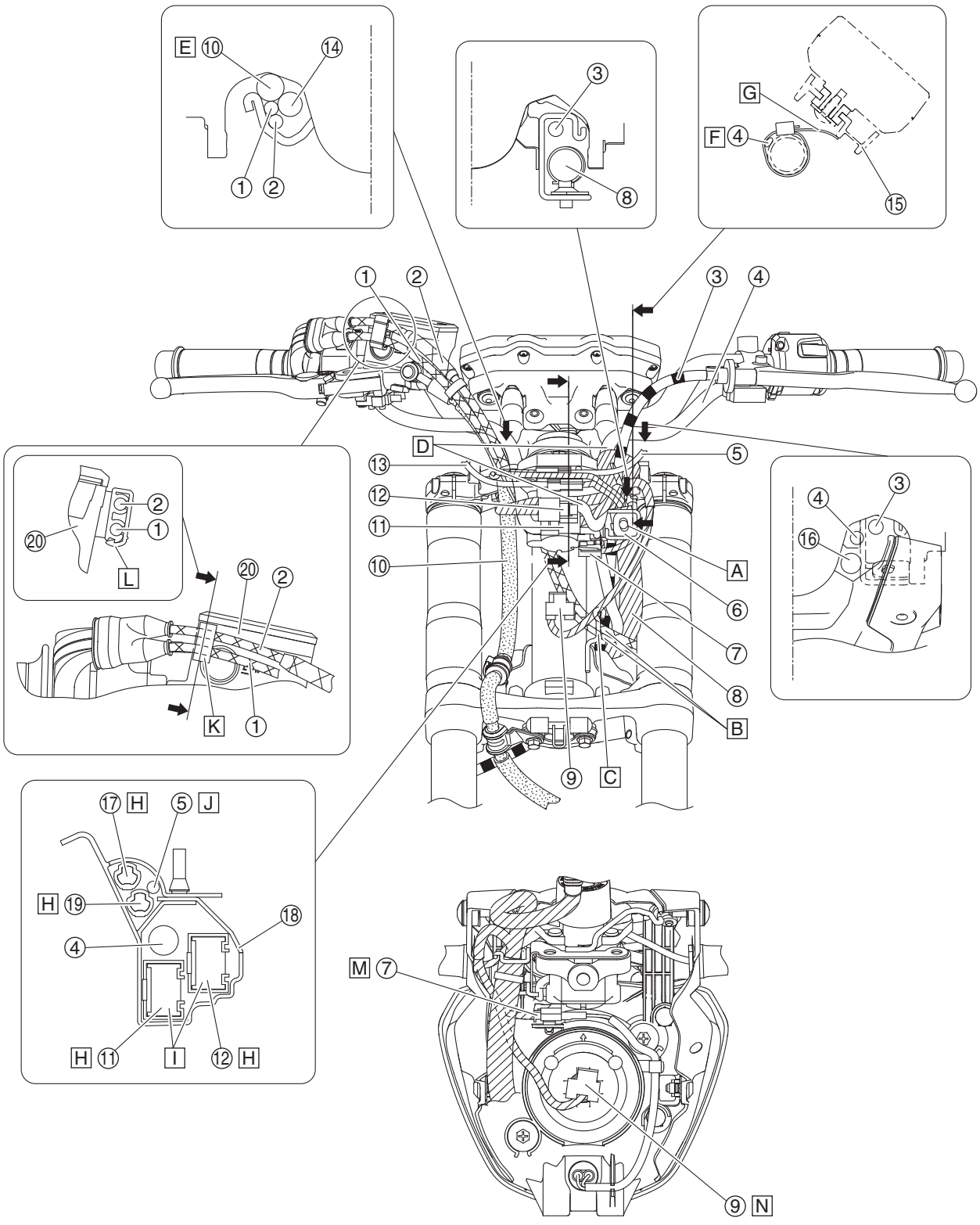




1. Thermostat
2. Oil cooler inlet hose
3. Oil cooler
4. Oil cooler outlet hose
5. Water jacket joint inlet hose
6. Water pump outlet pipe
7. Water pump inlet pipe
8. Radiator outlet hose
9. Water jacket joint
10. Water pump

EAS20021
CABLE ROUTING

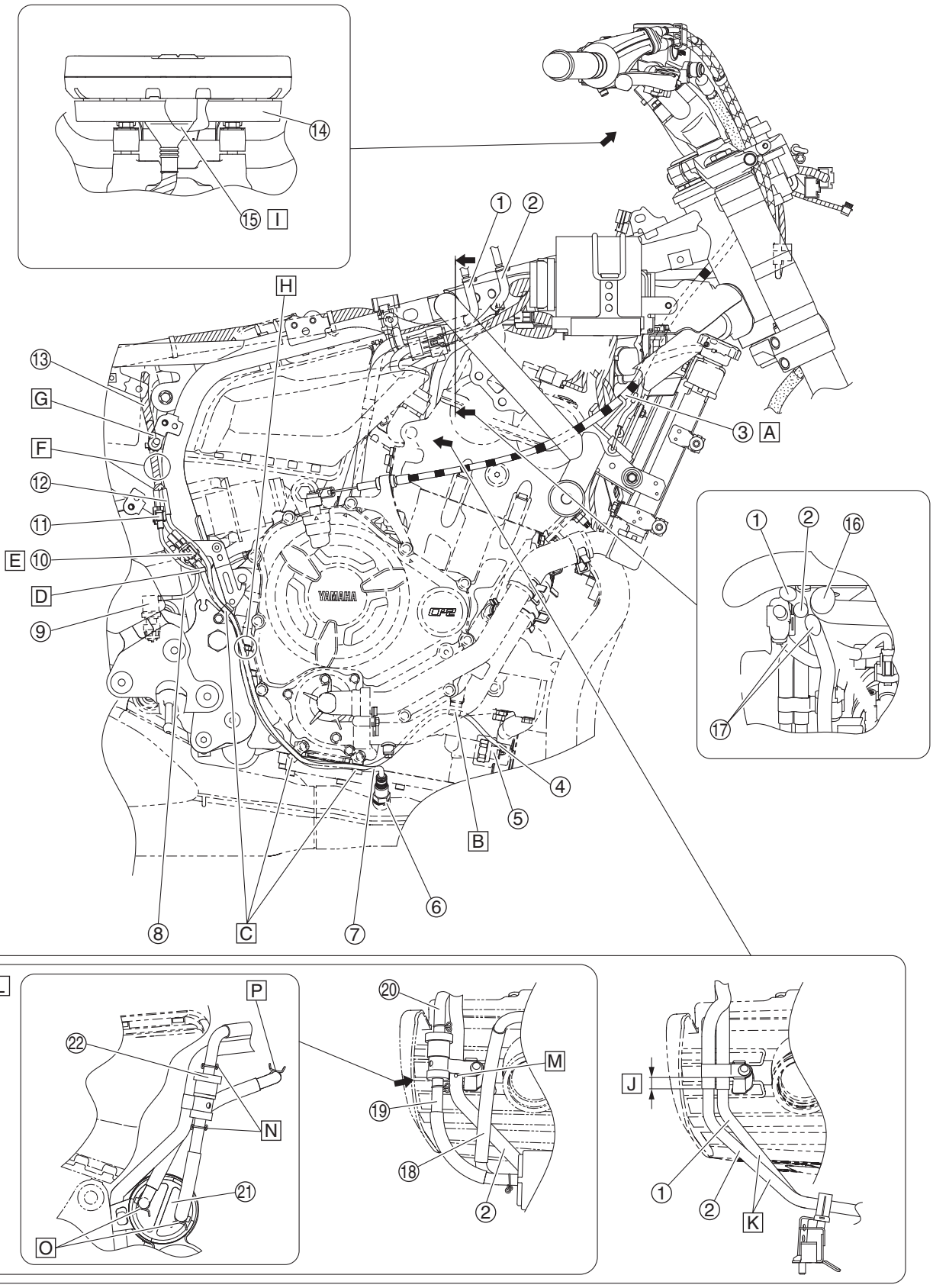
Handlebar (front view)



1. Throttle cable (decelerator cable)
2. Throttle cable (accelerator cable)
3. Clutch cable
4. Handlebar switch lead (left handlebar switch)
5. Front turn signal/position light lead (left turn signal/position light)
6. Guide
7. Auxiliary light coupler
8. Wire harness
9. Headlight coupler
10. Front brake hose (front brake master cylinder to front brake caliper)
11. Handlebar switch coupler (right handlebar switch)
12. Handlebar switch coupler (left handlebar switch)
13. Front turn signal/position light lead (right turn signal/position light)
14. Handlebar switch lead (right handlebar switch)
15. Meter assembly bracket
16. Meter assembly lead
17. Front turn signal/position light coupler (left turn signal/position light)
18. Coupler cover
19. Front turn signal/position light coupler (right turn signal/position light)
20. Front brake master cylinder

A. Insert the projection on the wire harness holder completely into the hole in the guide.
B. Route the throttle cables through the guide.
C. Route the throttle cable (decelerator cable) over the throttle cable (accelerator cable)
D. Route the handlebar switch lead (left handlebar switch) to the rear of the wire harness.
E. Route the front brake hose (front brake master cylinder to front brake caliper) to the rear of the right handlebar switch lead and throttle cables.
F. Route the handlebar switch lead to the front of the handlebar.
G. Make sure that the end of the plastic band contacts the meter assembly bracket as shown in the illustration.
H. Connect the coupler, and then place the coupler in the coupler cover.
I. The couplers may be positioned in any order.
J. Route the front left turn signal/position light lead through the coupler cover, and then fold the lead back to the right of the cover.
K. Fasten the throttle cables with the holder at the location shown in the illustration.
L. Face the damper on the holder toward the front brake master cylinder and face the catch of the holder downward.
M. Connect the auxiliary light coupler.
N. Connect the headlight coupler.

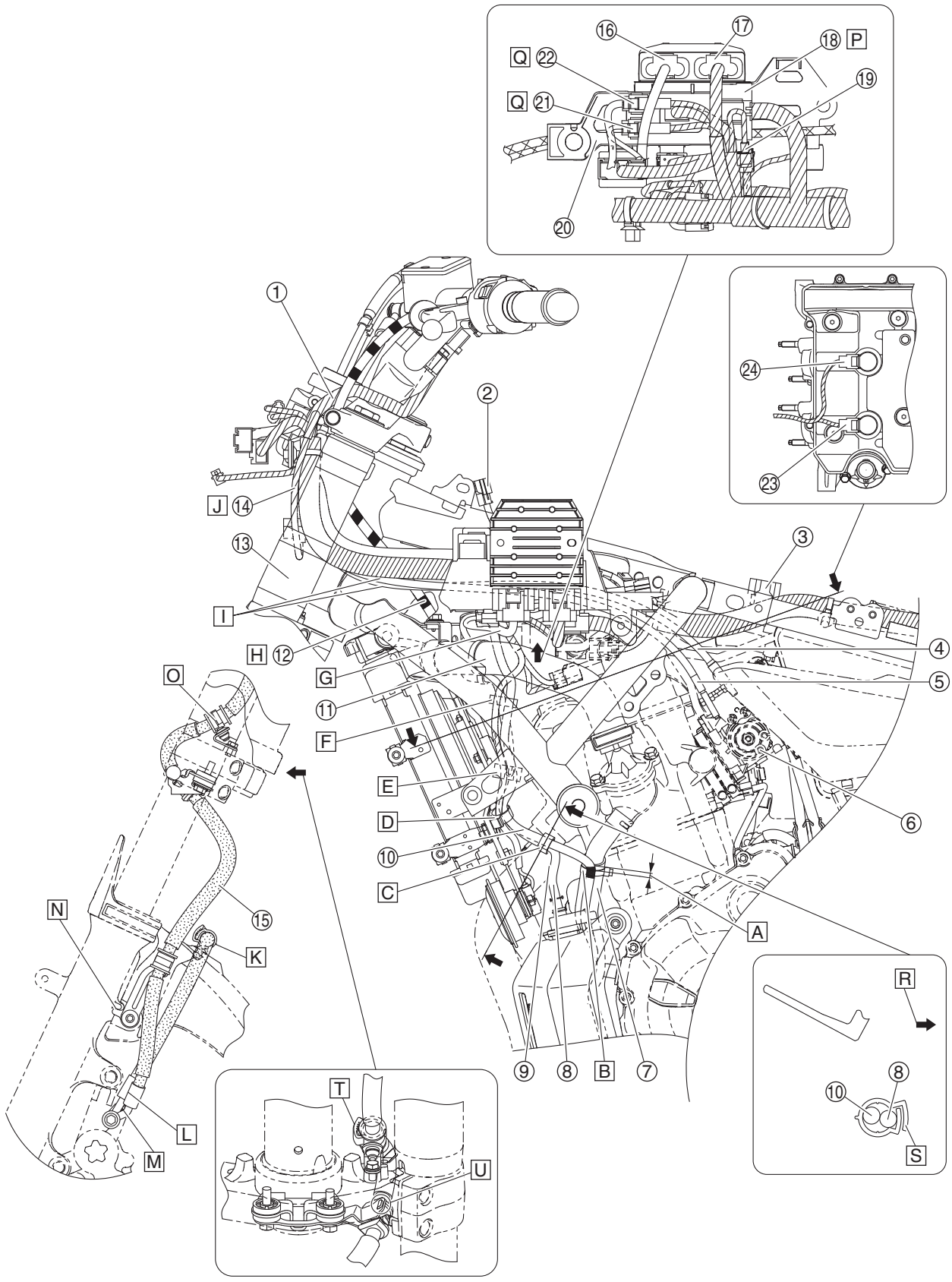
Clutch cable (right side view)



1. Fuel tank breather hose
2. Fuel tank overflow hose
3. Clutch cable
4. Oil pressure switch lead
5. Oil pressure switch
6. O_2 sensor
7. O_2 sensor lead
8. Rear brake light switch lead
9. Rear brake light switch
10. O_2 sensor coupler
11. Rear brake light switch coupler
12. Oil pressure switch connector
13. Wire harness
14. Meter assembly cover
15. Rubber cover
16. Cylinder head breather hose
17. Sub-wire harness
18. Canister purge hose (hose joint to canister)
19. Fuel tank breather hose (rollover valve to canister)
20. Fuel tank breather hose (fuel tank to rollover valve)
21. Canister
22. Rollover valve

A. Route the clutch cable through the guide as shown in the illustration.
B. Route the oil pressure switch lead through the guide, and then secure the lead by bending the guide around the lead.
C. Route the oil pressure switch lead to the inside of the O_2 sensor lead, and then secure the leads by bending the guides around the leads.
D. Fasten the rear brake light switch lead and O_2 sensor lead with the holder.
E. Connect the O_2 sensor coupler, and then insert the projection on the coupler into the hole in the bracket.
F. Make sure that the wire harness is not pinched between the pivot shaft protector (right) and the frame.
G. Insert the projection on the wire harness holder into the hole in the frame from the inside of the frame.
H. Do not pinch the O_2 sensor lead between the pivot shaft protector and the engine.
I. After connecting the meter assembly coupler, install the rubber cover completely until it contacts the meter assembly.
J. Less than 10 mm (0.39 in). Fasten the hose protector of each hose with the holder.
K. Make sure that there is no slack in the fuel tank breather hose or fuel tank overflow hose.
L. For California only
M. When fastening the fuel tank overflow hose with the rollover valve holder, make sure that the paint mark on the hose is positioned 0–10 mm from the holder.
N. Point the ends of the hose clamp inward.
O. Point the ends of the hose clamp downward.
P. Point the ends of the hose clamp upward.

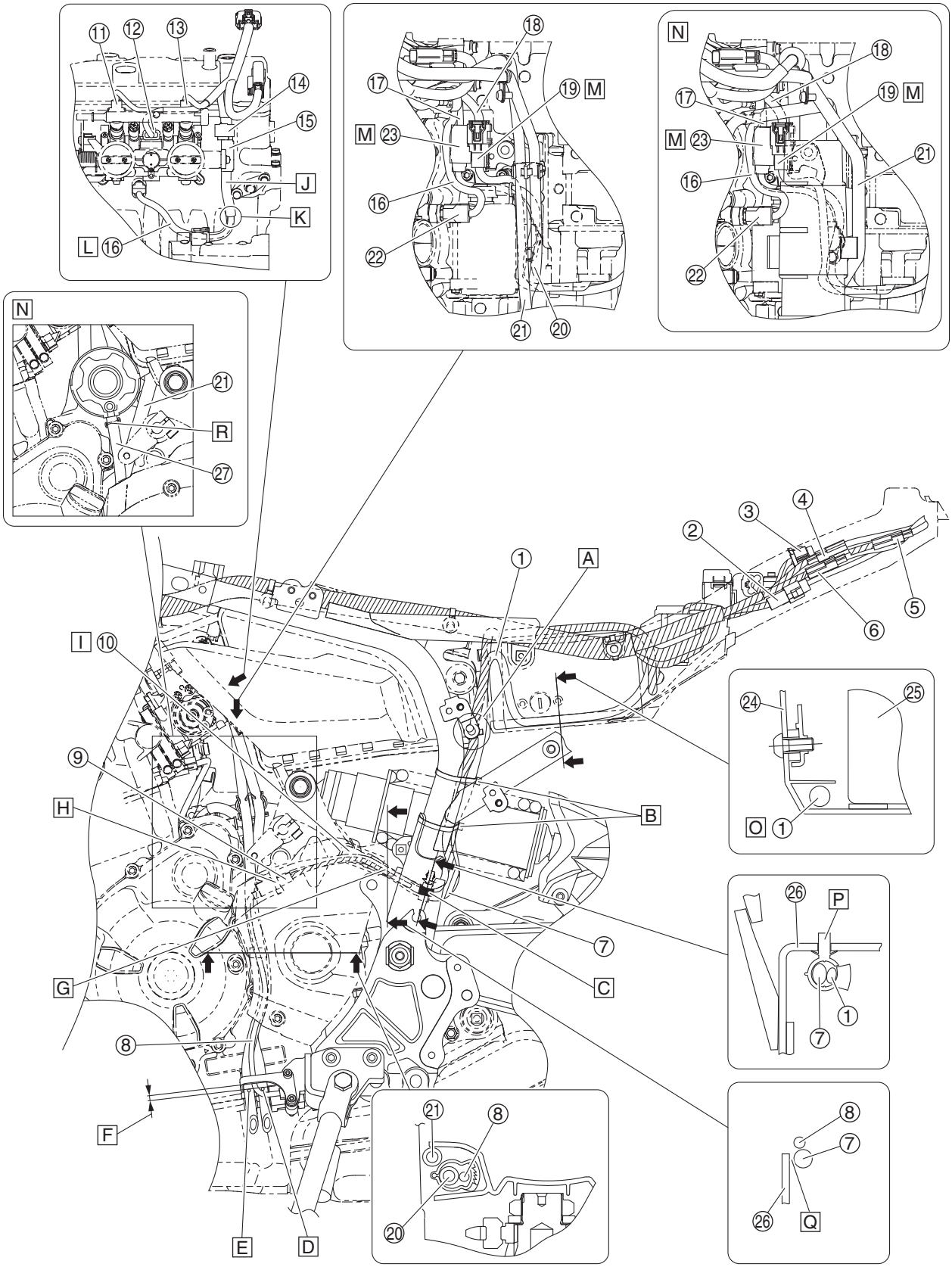
Rectifier/regulator (left side view)



1. Wire harness
2. Intake air temperature sensor coupler
3. Fuel pump coupler
4. Throttle cable (decelerator cable)
5. Throttle cable (accelerator cable)
6. Throttle body assembly
7. Oil cooler inlet hose
8. Coolant reservoir hose
9. Horn lead
10. AC magneto lead
11. Radiator inlet hose
12. Clutch cable
13. Steering head pipe
14. Headlight lead
15. Front brake hose (front brake master cylinder to front brake caliper)
16. AC magneto lead coupler
17. Rectifier/regulator coupler
18. Joint coupler
19. Auxiliary DC outlet coupler
20. Rectifier/regulator bracket
21. Crankshaft position sensor coupler
22. Radiator fan motor coupler
23. Ignition coil #1 coupler
24. Ignition coil #2 coupler

A. 5–10 mm (0.20–0.39 in)
B. Fasten the AC magneto lead to the oil cooler inlet hose with a plastic locking tie. Make sure to route the AC magneto lead to the outside of the oil cooler inlet hose. Align the plastic locking tie with the blue tape on the AC magneto lead. Face the buckle of the plastic locking tie rearward, and then cut off the excess end of the tie to 2 mm (0.08 in) or less.
C. Fasten the AC magneto lead, horn lead, and coolant reservoir hose with the holder at the location shown in the illustration. Make sure that there is no slack in the AC magneto lead.
D. Secure the holder by inserting the projection on the holder into the hole in the radiator fan motor bracket, and then fasten the AC magneto lead, horn lead, and coolant reservoir hose with the holder. Make sure that the coolant reservoir hose and leads do not cross between the oil cooler inlet hose and this holder.
E. Fasten the AC magneto lead, horn lead, and coolant reservoir hose with the holder.
F. Fasten the AC magneto lead, horn lead, and coolant reservoir hose with the holder at the location shown in the illustration. Make sure that there is no slack in the AC magneto lead, horn lead, and coolant reservoir hose.
G. Route the AC magneto lead to the inside of the radiator inlet hose, and then connect the AC magneto coupler to the rectifier/regulator.
H. Route the clutch cable through the hole in the cover.
I. Make sure that the throttle cables do not twist between the throttle body assembly and the steering head pipe.
J. Route the headlight lead to the rear of the guide.
K. Face the catch of the holder forward, and then close the holder until three clicks or more are heard. Make sure that the brake hose does not contact the front fender.
L. Make sure that there is 0.5–1.5 mm of clearance between the pipe sections of the brake hoses.
M. When installing the brake hoses onto the left and right brake calipers, make sure that the pipe section of each hose contacts the projection on each brake caliper.
N. Make sure that the projection on the brake hose holder contacts the stopper on the front fork.
O. Make sure that the lower flange on the brake hose grommet contacts the holder.
P. Install the joint coupler completely onto the tab on the rectifier/regulator bracket.
Q. Connect the coupler, and then insert the projection on the coupler into the hole in the rectifier/regulator bracket.
R. Inward
S. Face the catch of the holder inward.
T. Fasten the grommet on the brake hose with the holder. Face the catch of the holder inward, and then close the holder until three clicks or more are heard.
U. Be sure to fit the projection on the lower section of the brake hose holder into the hole in the upper section.

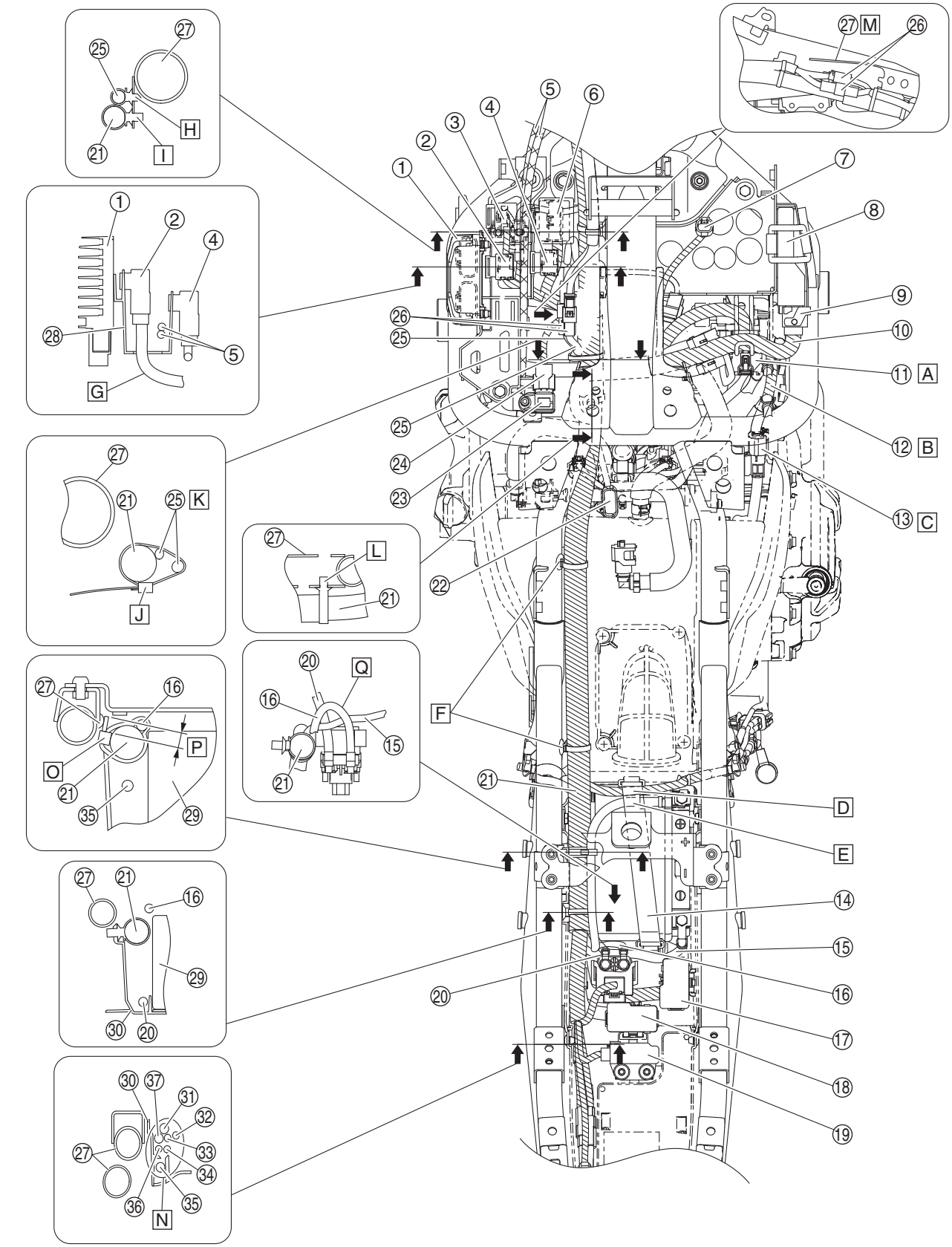
Engine (left side view)



1. Starter motor lead
2. Tail/brake light assembly coupler
3. Yamaha diagnostic tool coupler
4. License plate light coupler
5. Rear turn signal light coupler (left turn signal light)
6. Rear turn signal light coupler (right turn signal light)
7. Engine ground lead
8. Sidestand switch lead
9. Sidestand switch coupler
10. Terminal cover
11. Injector #1 coupler
12. ISC (idle speed control) unit coupler
13. Injector #2 coupler
14. Throttle position sensor coupler
15. Throttle position sensor
16. Coolant temperature sensor lead
17. Speed sensor lead
18. Gear position switch lead
19. Gear position switch coupler
20. Fuel tank breather hose (blue paint mark)
21. Fuel tank overflow hose (white paint mark)
22. Coolant temperature sensor coupler
23. Speed sensor coupler
24. Battery box
25. Battery
26. Frame
27. Canister breather hose

A. Insert the projection on the engine ground lead holder into the hole in the frame from the inside of the frame.
B. Fasten the engine ground lead and starter motor lead to the frame with plastic locking ties. Point the end of each plastic locking tie rearward, and then cut off the excess end of the tie to 2 mm (0.08 in) or less.
C. Fasten the starter motor lead and engine ground lead with the holder. Align the white tape on the starter motor lead with the holder.
D. Blue paint mark
E. White paint mark
F. 0–10 mm (0–0.39 in)
G. Make sure that there is no twist in the starter motor lead and sidestand switch lead.
H. Fasten the starter motor lead, gear position switch lead, and sidestand switch coupler with the plastic band. Face the buckle of the plastic band downward with the end pointing inward.
I. Cover the engine ground terminal with the terminal cover.
J. Route the coolant temperature sensor lead, speed sensor lead, and gear position switch lead between the throttle position sensor and the cylinder head.
K. The gear position switch lead and coolant temperature sensor lead may be positioned and routed in any order.
L. Route the coolant temperature sensor lead to the front of the speed sensor lead.
M. Insert the projection on the coupler into the hole in the bracket.
N. For California only
O. Fit the starter motor lead between the bottom of the battery box and the rib on the battery box.
P. Insert the projection on the holder into the hole in the frame from the bottom of the frame. The catch of the holder may be facing in any direction.
Q. Do not pinch the sidestand switch lead between the engine ground lead and the frame.
R. Point the ends of the hose clamp inward.

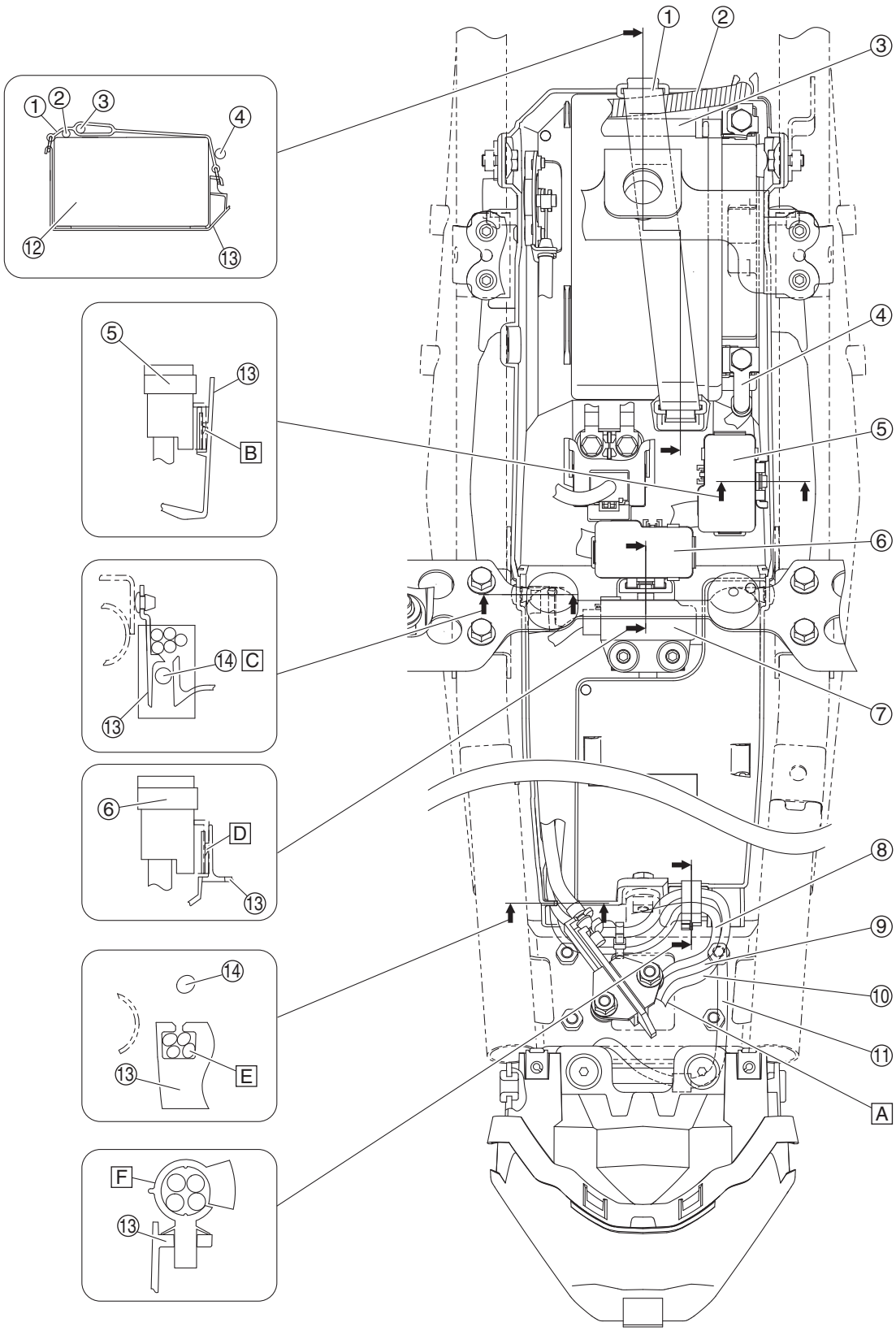
Frame (top view)



1. Rectifier/regulator
2. Headlight relay
3. Turn signal/hazard relay
4. Radiator fan motor relay
5. Throttle cable
6. Relay unit
7. Intake air temperature sensor coupler
8. ECU (engine control unit)
9. ECU coupler
10. ECU lead
11. Sub-wire harness coupler (13 pins)
12. Sub-wire harness
13. Sub-wire harness coupler (10 pins)
14. Battery band
15. Negative battery lead
16. Positive battery lead
17. Fuse box 1
18. Fuse box 2
19. Lean angle sensor
20. Starter motor lead
21. Wire harness
22. Fuel pump coupler
23. Intake air pressure sensor
24. Intake air pressure sensor coupler
25. Main switch lead
26. Main switch coupler
27. Frame
28. Rectifier/regulator bracket
29. Battery
30. Battery box
31. Lean angle sensor lead
32. Yamaha diagnostic tool coupler lead
33. Rear left turn signal light lead
34. Rear right turn signal light lead
35. Seat lock cable
36. License plate light lead
37. Tail/brake light assembly lead

A. Insert the projection on the sub-wire harness coupler (13 pins) into the hole in the bracket.
B. Route the ECU lead and sub-wire harness through the guide.
C. Connect the sub-wire harness coupler (10 pins), and then insert the projection on the coupler into the hole in the bracket.
D. Fasten the wire harness with the battery band. Do not route the wire harness through the hole in the battery band.
E. Route the positive battery lead through the hole in the battery band.
F. Insert the projection on each wire harness holder into the hole in the frame.
G. Route the headlight relay lead and turn signal/hazard relay lead through the rear hole in the rectifier/regulator bracket.
H. Insert the projection on the main switch lead holder into the upper hole in the frame.
I. Insert the projection on the wire harness holder into the lower hole in the frame.
J. Face the buckle of the plastic band downward with the end pointing inward.
K. Route the main switch lead to the outside of the wire harness.
L. Insert the projection on the wire harness holder into the hole in the frame from the bottom of the frame.
M. Position the main switch couplers under the frame.
N. The leads may be routed in any order.
O. Position the buckle of the plastic locking tie below the frame weld.
P. Cut off the excess end of the plastic locking tie to 10 mm (0.39 in) or less.
Q. Push the slack in the positive battery lead downward.

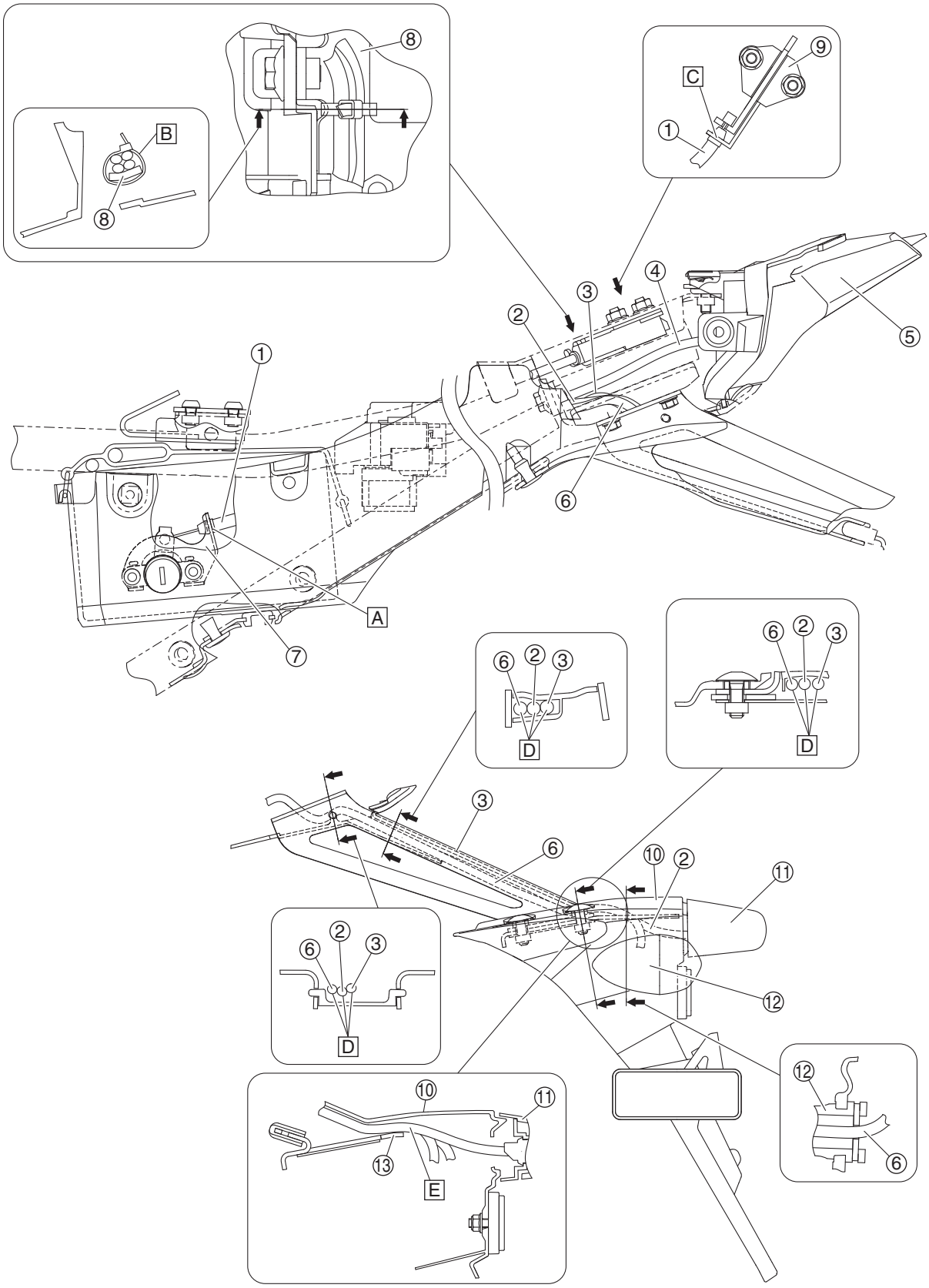
Rear fender (top view)



1. Battery band
2. Wire harness
3. Positive battery lead
4. Negative battery lead
5. Fuse box 1
6. Fuse box 2
7. Lean angle sensor
8. Rear turn signal light lead (left turn signal light)
9. Rear turn signal light lead (right turn signal light)
10. License plate light lead
11. Tail/brake light assembly lead
12. Battery
13. Battery box
14. Seat lock cable

A. Route the rear left turn signal light lead, rear right turn signal light lead, and license plate light lead through the hole in the frame.
B. Install fuse box 1 completely onto the tab on the battery box.
C. Route the seat lock cable through the guide on the battery box.
D. Install fuse box 2 completely onto the tab on the battery box.
E. Route the tail/brake light assembly lead, rear turn signal light leads, and license plate light lead through the hole in the battery box. The leads may be routed in any order.
F. Fasten the tail/brake light assembly lead, rear turn signal light leads, and license plate light lead with the holder. The leads may be fastened in any order.

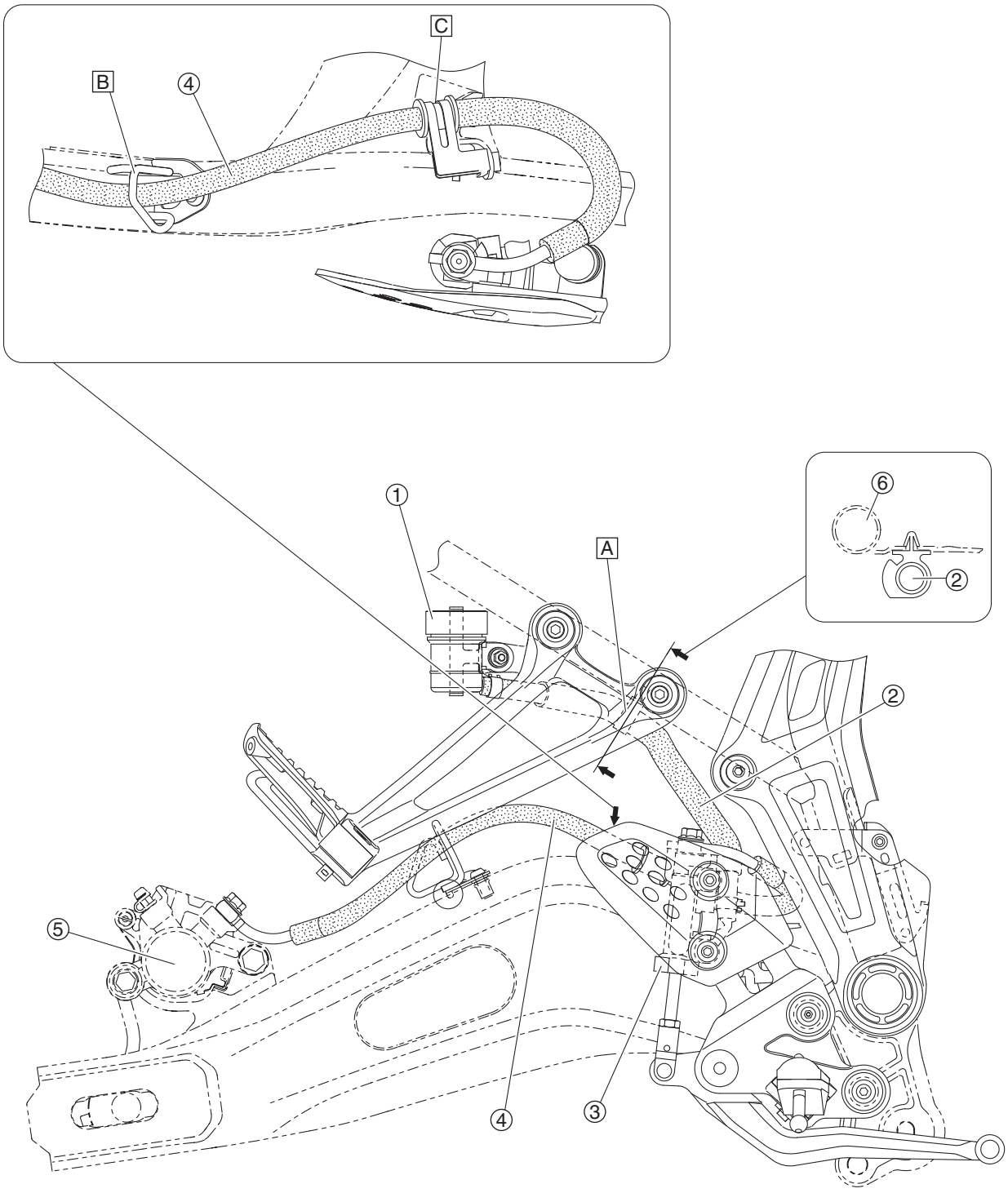
Rear fender (left side view)



1. Seat lock cable
2. License plate light lead
3. Rear turn signal light lead (right turn signal light)
4. Tail/brake light assembly lead
5. Tail/brake light assembly
6. Rear turn signal light lead (left turn signal light)
7. Seat lock key cylinder bracket
8. Frame
9. Seat lock assembly
10. Mudguard
11. License plate light
12. Rear turn signal light (left)
13. Plate

A. Insert the seat lock cable completely into the hole in the seat lock key cylinder bracket.
B. Fasten the tail/brake light assembly lead, rear turn signal light leads, and license plate light lead with a plastic locking tie. The leads may be fastened in any order. Cut off the excess end of the plastic locking tie so that it does not contact the seat lock assembly.
C. Insert the seat lock cable completely into the hole in the seat lock assembly.
D. The leads may be routed in any order.
E. Route the rear turn signal light leads and license plate light lead between the mudguard and the plate.

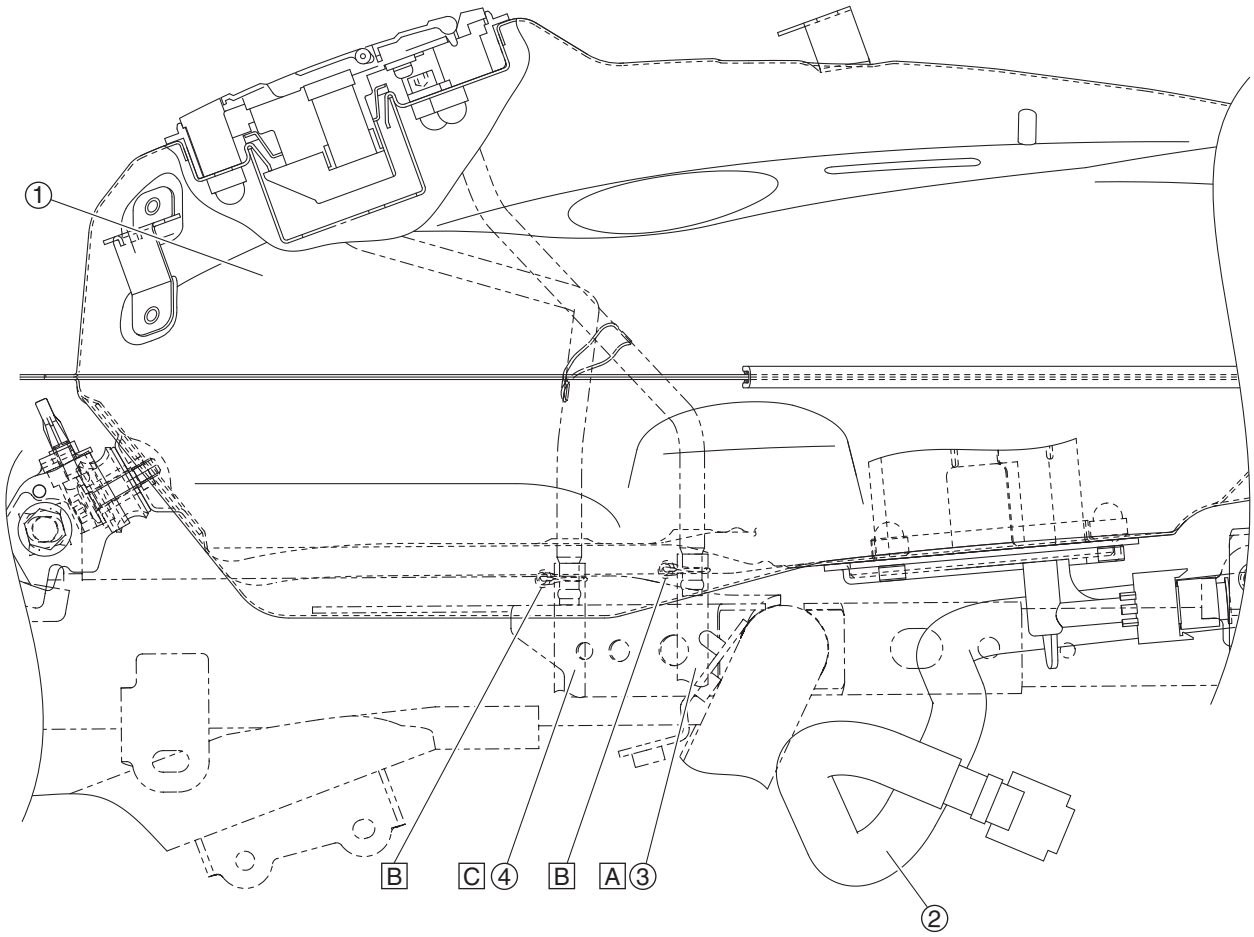
Rear brake (right side view)



1. Brake fluid reservoir
2. Brake fluid reservoir hose
3. Rear brake master cylinder
4. Brake hose (rear brake master cylinder to rear brake caliper)
5. Rear brake caliper
6. Frame

A. Fasten the straight portion of the brake fluid reservoir hose with the holder as shown in the illustration.
B. Route the rear brake hose (rear brake master cylinder to rear brake caliper) through the guide.
C. Fasten the grommet on the brake hose (rear brake master cylinder to rear brake caliper) with the holder.

Fuel tank (left side view)



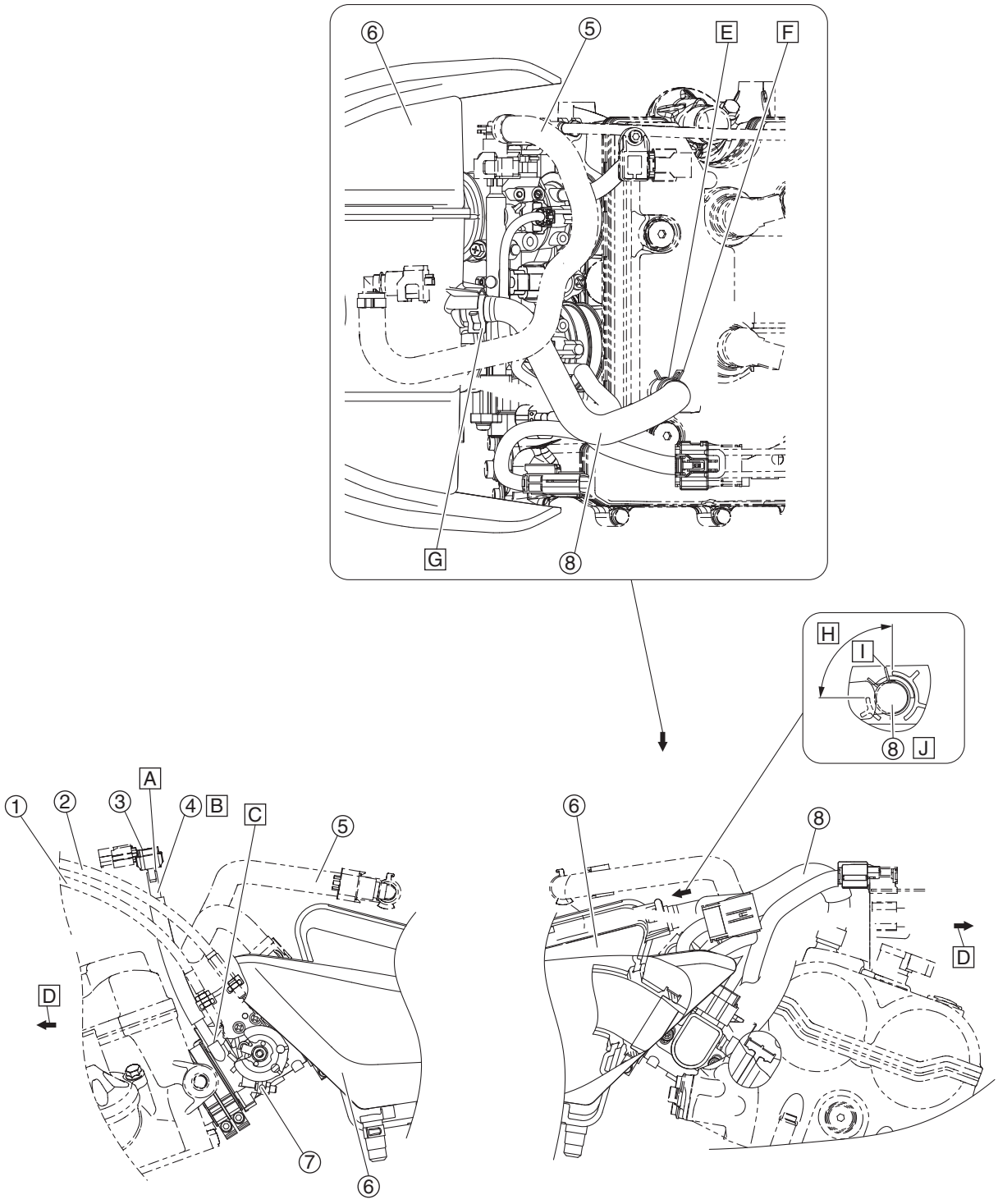
1. Fuel tank
2. Fuel hose
3. Fuel tank breather hose
4. Fuel tank overflow hose

A. Face the blue paint mark on the fuel tank breather hose to the right. Install the hose up to the wide portion of the pipe.

B. Align the ends of the hose clamp with the paint mark on the hose. Make sure not to install the hose clamp on the raised portion of the hose fitting. Make sure that the hose clamp does not contact the bottom of the fuel tank.

C. Face the white paint mark on the fuel tank overflow hose to the right. Install the hose up to the wide portion of the pipe.

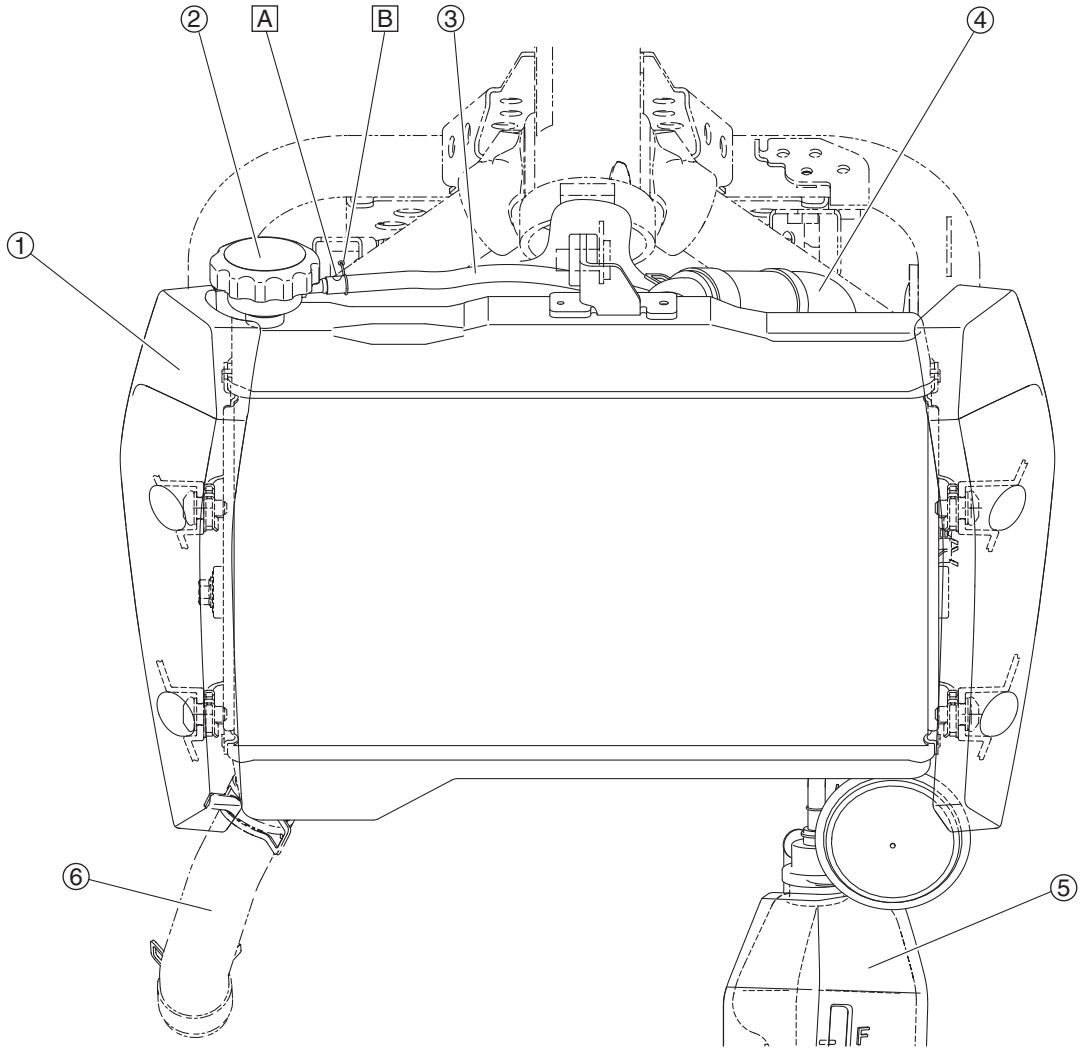
Throttle body (top, right, and left side view)



1. Throttle cable (accelerator cable)
2. Throttle cable (decelerator cable)
3. Intake air pressure sensor
4. Intake air pressure sensor hose
5. Fuel hose
6. Air filter case
7. Throttle body assembly
8. Cylinder head breather hose

A. Install the intake air pressure sensor hose up to the bend in the hose fitting of the intake air pressure sensor.
B. Make sure that the hose is not twisted.
C. Install the intake air pressure sensor hose onto the throttle body assembly, making sure that the hose contacts the throttle body assembly.
D. Forward
E. Face the yellow paint mark on the cylinder head breather hose to the left. Install the crankcase breather hose completely onto the hose fitting.
F. Position the hose clamp 1–4 mm (0.04–0.16 in) from the end of the hose. Point the ends of the hose clamp to the left.
G. Position the hose clamp 1–4 mm (0.04–0.16 in) from the end of the hose.
H. 90°
I. Position the ends of the hose clamp within the range shown in the illustration.
J. Face the blue paint mark on the cylinder head breather hose upward. Install the cylinder head breather hose onto the air filter case, making sure that the hose contacts the case.

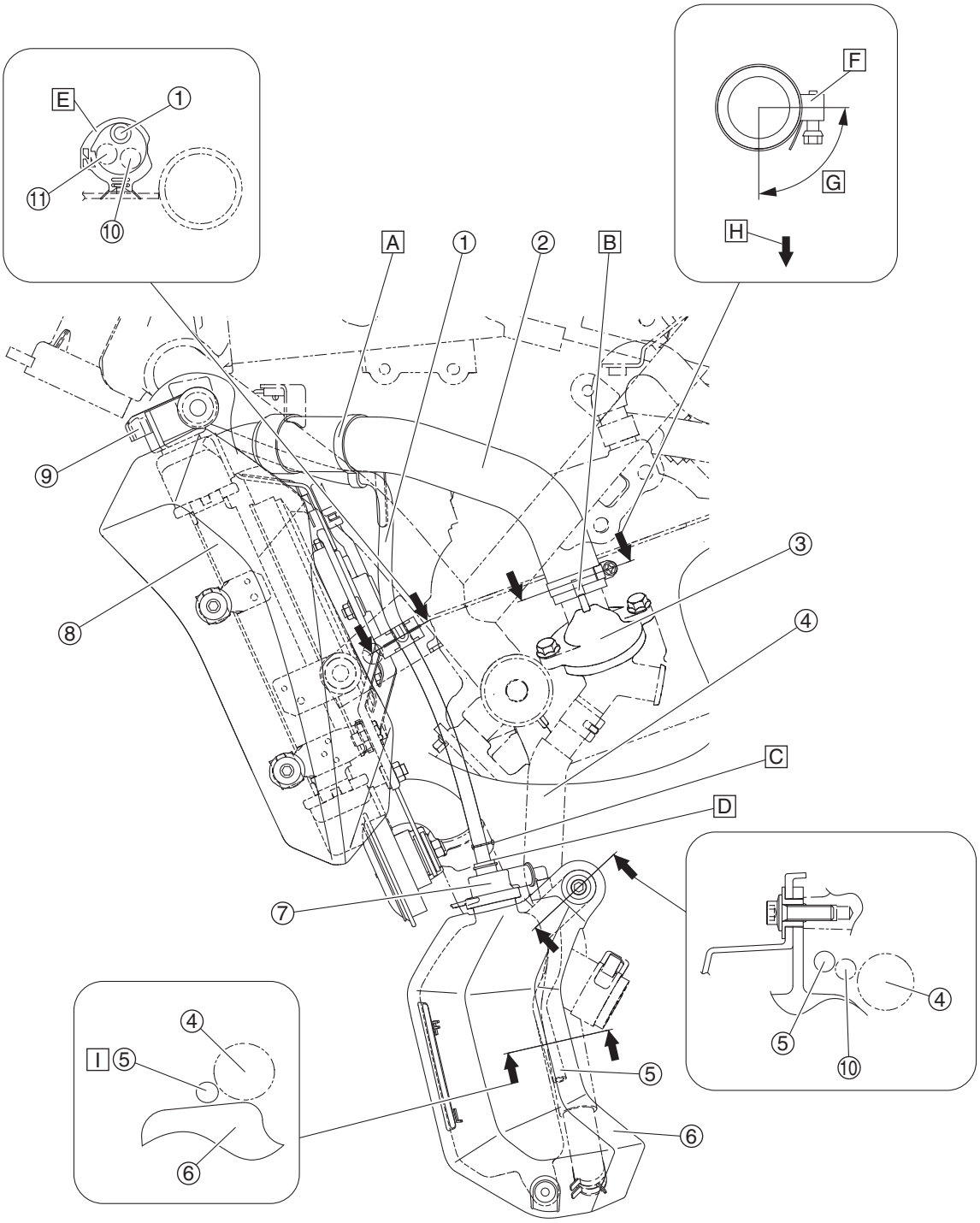
Radiator (front view)



1. Radiator
2. Radiator cap
3. Coolant reservoir hose
4. Radiator inlet hose
5. Coolant reservoir
6. Radiator outlet hose

A. Connect the end of the coolant reservoir hose that is identified by the white paint mark to the radiator.
B. Point the ends of the hose clamp toward the frame.

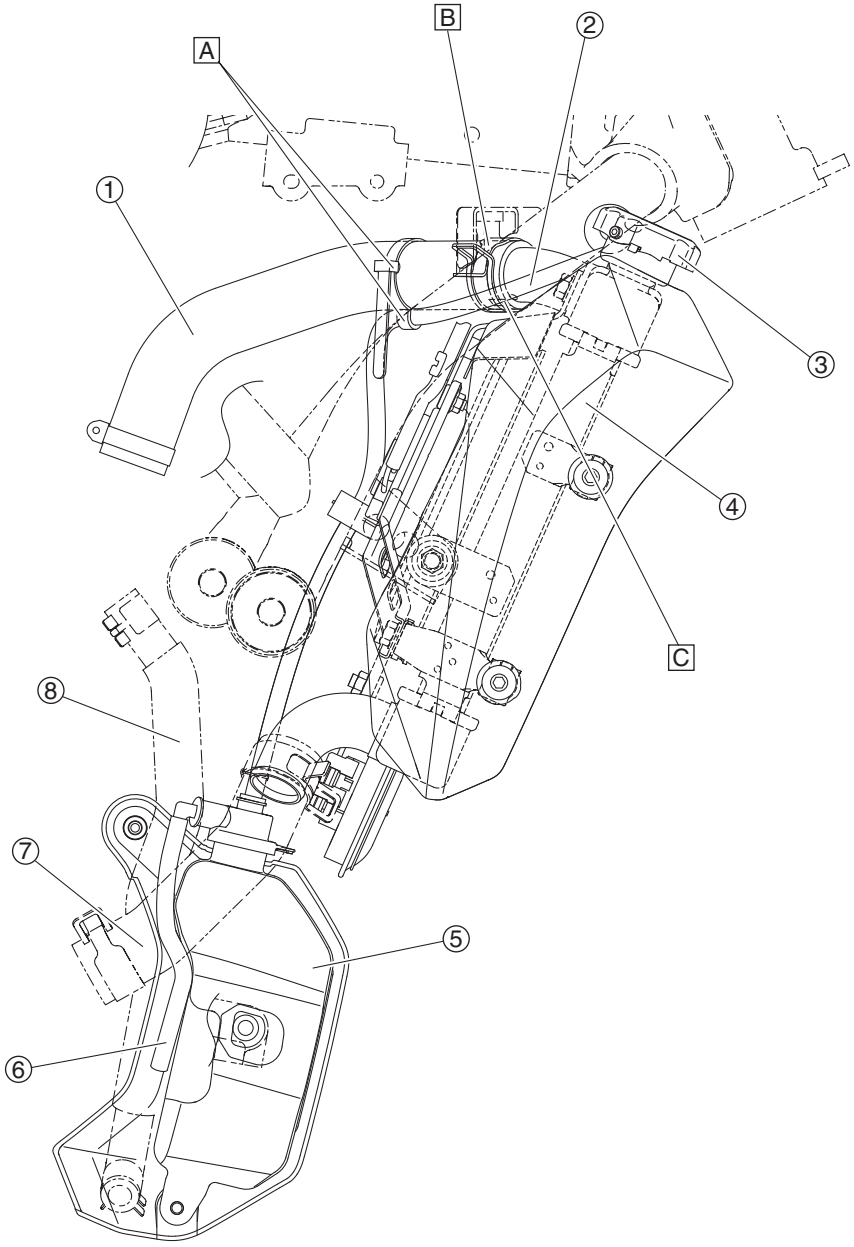
Radiator (left side view)



1. Coolant reservoir hose
2. Radiator inlet hose
3. Thermostat housing
4. Oil cooler inlet hose
5. Coolant reservoir breather hose
6. Coolant reservoir
7. Coolant reservoir cap
8. Radiator
9. Radiator cap
10. AC magneto lead
11. Horn lead

A. Fasten the coolant reservoir hose to the radiator inlet hose with the plastic locking tie. Position the coolant reservoir hose directly under the radiator inlet hose. Face the buckle of the plastic locking tie inward with the end pointing downward.
B. Align the white paint mark on the radiator inlet hose with the projection on the thermostat housing. Install the radiator inlet hose onto the thermostat housing, making sure that the hose contacts the projection on the housing.
C. Point the ends of the hose clamp outward.
D. Install the coolant reservoir hose onto the coolant reservoir cap, making sure that the hose contacts the cap.
E. Face the catch of the holder forward.
F. Position the clamp screw within the range shown in the illustration.
G. 90°
H. Outward
I. Route the coolant reservoir breather hose to the outside of the oil cooler inlet hose.

Radiator (right side view)



1. Radiator inlet hose
2. Coolant reservoir hose
3. Radiator cap
4. Radiator
5. Coolant reservoir
6. Coolant reservoir breather hose
7. Radiator outlet hose
8. Oil cooler inlet hose

A. Align the plastic locking tie with the white paint marks on the radiator inlet hose and coolant reservoir hose.

B. Point the ends of the hose clamp in the direction shown in the illustration. Make sure that the ends of the hose clamp do not contact the coolant reservoir hose.

C. Align the yellow paint mark on the radiator inlet hose with the projection on the radiator pipe. Install the radiator inlet hose onto the radiator pipe, making sure that the hose contacts the projection on the pipe.

PERIODIC CHECKS AND ADJUSTMENTS

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EAS20022
PERIODIC MAINTENANCE

EAS30022
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.

EAS30614
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

TIP

- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Fuel line	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	Spark plugs	• Check condition. • Adjust gap and clean. • Replace every 8000 mi (13000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	Valve clearance	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	Crankcase breather system	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	Fuel injection	• Adjust synchronization.	√	√	√	√	√	√
6	*	Evaporative emission control system (for California only)	• Check control system for damage. • Replace if necessary.				√		√

EAS30615
GENERAL MAINTENANCE AND LUBRICATION CHART

TIP

- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Air filter element	• Replace.	Every 24000 mi (37000 km)					
2		Air filter check hose	• Clean.	√	√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
3	*	**Clutch**	• Check operation. • Adjust or replace cable.	√	√	√	√	√	√
4	*	**Front brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
5	*	**Rear brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
6	*	**Brake hoses**	• Check for cracks or damage. • Check for correct routing and clamping.		√	√	√	√	√
			• Replace.	Every 4 years					
7	*	**Brake fluid**	• Replace.	Every 2 years					
8	*	**Wheels**	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
9	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
10	*	**Wheel bearings**	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
11	*	**Swingarm pivot bearings**	• Check operation and for excessive play.		√	√	√	√	√
			• Moderately repack with lithium-soap-based grease.	Every 32000 mi (50000 km)					
12		**Drive chain**	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 500 mi (800 km) and after washing the motorcycle, riding in the rain or riding in wet areas					
13	*	**Steering bearings**	• Check bearing assemblies for looseness.	√	√	√	√	√	√
			• Moderately repack with lithium-soap-based grease.	Every 12000 mi (19000 km)					
14	*	**Chassis fasteners**	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
15		**Brake lever pivot shaft**	• Apply silicone grease lightly.		√	√	√	√	√
16		**Brake pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
17		**Clutch lever pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
18		**Shift pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
19		**Sidestand pivot**	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
20	*	**Sidestand switch**	• Check operation and replace if necessary.	√	√	√	√	√	√
21	*	**Front fork**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
22	*	**Shock absorber assembly**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
23	*	Rear suspension link pivots	• Apply lithium-soap-based grease lightly.	Every 12000 mi (19000 km)					
24		Engine oil	• Change (warm engine before draining).	√	√	√	√	√	√
25		Engine oil filter cartridge	• Replace.	√		√		√	
26	*	Cooling system	• Check hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
			• Change coolant.					√	
27	*	Front and rear brake switches	• Check operation.	√	√	√	√	√	√
28	*	Control cables	• Apply Yamaha cable lubricant or other suitable cable lubricant thoroughly.	√	√	√	√	√	√
29	*	Throttle grip	• Check operation. • Check throttle grip free play, and adjust if necessary. • Lubricate cable and grip housing.		√	√	√	√	√
30	*	Lights, signals and switches	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

TIP

- Air filter
  - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
  - The air filter element needs to be replaced more frequently when 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.

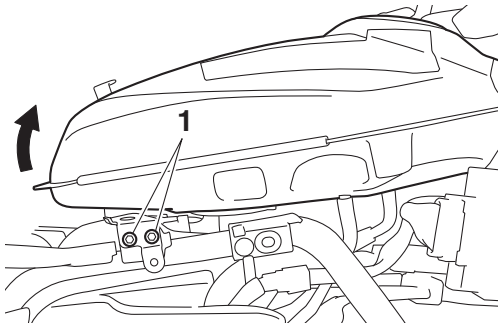
EAS30619
CHECKING THE FUEL LINE
The following procedure applies to all of the fuel, vacuum and breather hoses.
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover
   - Fuel tank front cover
     Refer to "GENERAL CHASSIS (4)" on page 4-11.
   - Rear fuel tank bracket bolts "1"

TIP

After removing the rear fuel tank bracket bolts, lift up the rear of the fuel tank.

ECA20070
NOTICE

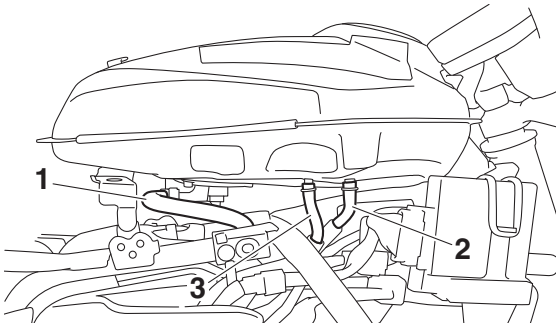
When lifting up the fuel tank, be careful not to pull the fuel tank overflow hose and fuel tank breather hose.



2. Check:
   - Fuel hose "1"
   - Fuel tank overflow hose "2"
   - Fuel tank breather hose "3"
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA16950
NOTICE

Make sure the fuel tank breather/overflow hose is routed correctly.



3. Install:
   - Rear fuel tank bracket bolt

	Rear fuel tank bracket bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

4. Install:
   - Fuel tank front cover
   - Fuel tank center cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank top cover
     Refer to "GENERAL CHASSIS (4)" on page 4-11.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30620
CHECKING THE SPARK PLUGS
The following procedure applies to all of the spark plugs.
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover
   - Fuel tank front cover
     Refer to "GENERAL CHASSIS (4)" on page 4-11.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Remove:
   - Ignition coils
   - Spark plugs

ECA13320
NOTICE

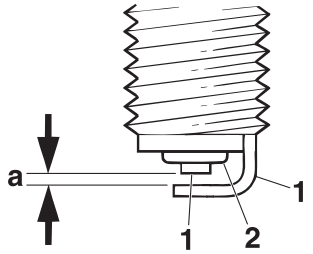
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

	Manufacturer/model **NGK/LMAR8A-9**

4. Check:
   • Electrode “1”
   Damage/wear → Replace the spark plug.
   • Insulator “2”
   Abnormal color → Replace the spark plug.
   Normal color is medium-to-light tan.
5. Clean:
   • Spark plug
   (with a spark plug cleaner or wire brush)
6. Measure:
   • Spark plug gap “a”
   (with a wire thickness gauge)
   Out of specification → Regap.

	Spark plug gap **0.8–0.9 mm (0.031–0.035 in)**



7. Install:
   • Spark plugs
   • Ignition coils

	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:
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Fuel tank front cover
   • Fuel tank center cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank top cover
   Refer to “GENERAL CHASSIS (4)” on page 4-11.
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

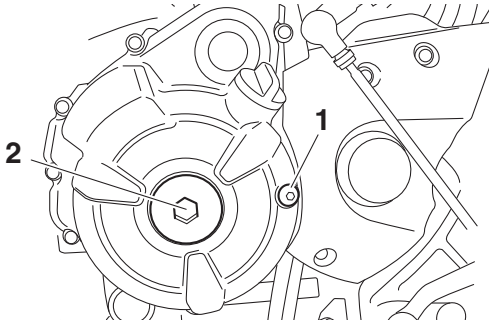
EAS30622
ADJUSTING THE VALVE CLEARANCE

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. Drain:
   • Coolant
   Refer to “CHANGING THE COOLANT” on page 3-24.
2. Remove:
   • Fuel tank top cover
   • Fuel tank cover (left)
   Refer to “GENERAL CHASSIS (4)” on page 4-11.
   • Radiator
   • Radiator inlet hose
   Refer to “RADIATOR” on page 6-1.
   • Clutch cable guide
   Refer to “ENGINE REMOVAL” on page 5-3.
3. Remove:
   • Ignition coils
   • Spark plugs
   • Cylinder head cover
   • Cylinder head cover gasket
   Refer to “CAMSHAFTS” on page 5-11.
4. Remove:
   • Timing mark accessing bolt “1”
   • Crankshaft end cover “2”

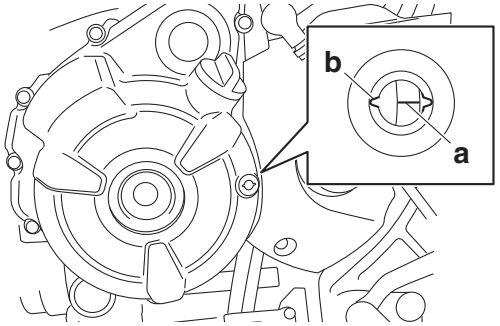


5. Measure:
   • Valve clearance
   Out of specification → Adjust.

Valve clearance (cold)
Intake
0.11–0.20 mm (0.0043–0.0079 in)
Exhaust
0.24–0.30 mm (0.0094–0.0118 in)

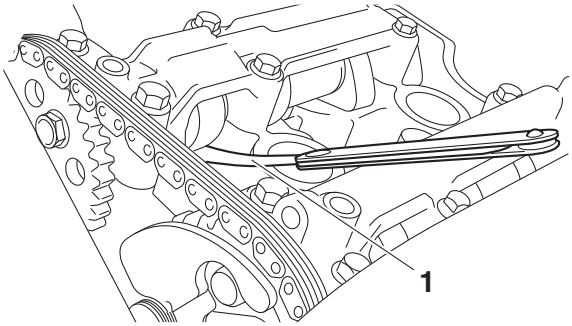
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a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



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

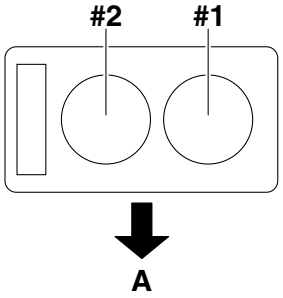
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



TIP

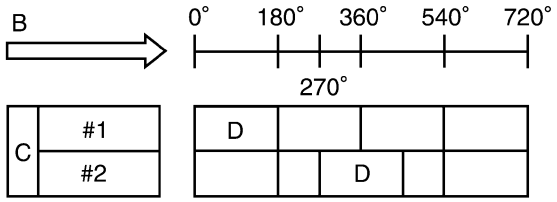
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence
Cylinder #1 → #2



A. Front

d. To measure the valve clearances of cylinder #2 turn the crankshaft 270° counterclockwise.



B. Degrees that the crankshaft is turned counterclockwise
C. Cylinder
D. Combustion cycle

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6. Remove:
   • Camshaft

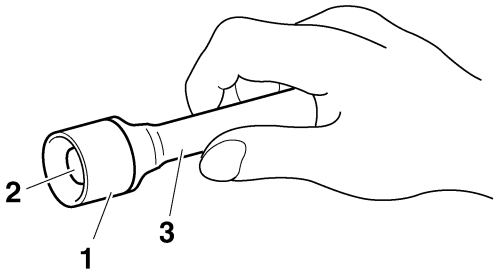
TIP

- Refer to "CHANGING THE COOLANT" on page 3-24.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

7. Adjust:
   • Valve clearance

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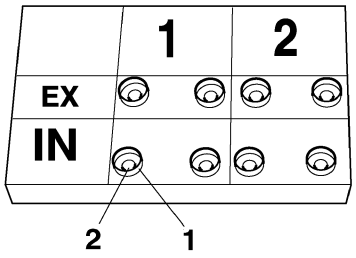
a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".



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.

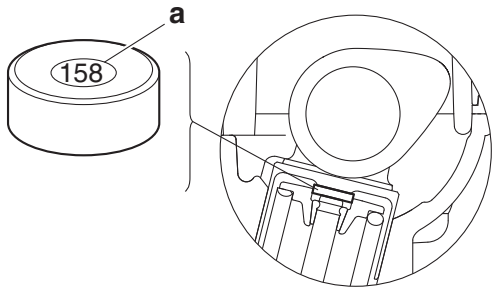


b. Calculate the difference between the specified valve clearance and the measured valve clearance.
   Example:
   Specified valve clearance = 0.11–0.20 mm (0.0043–0.0079 in)
   Measured valve clearance = 0.25 mm (0.0098 in)
   0.25 mm (0.0098 in)–0.20 mm (0.0079 in) = 0.05 mm (0.0020 in)
c. Check the thickness of the current valve pad.

TIP

The thickness "a" of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.

Example:
If the valve pad is marked "158", the pad thickness is 1.58 mm (0.0622 in).



d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
   Example:
   1.58 mm (0.0622 in) + 0.05 mm (0.0020 in) = 1.63 mm (0.0641 in)
   The valve pad number is 163.
e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

Last digit	Rounded value
0, 1, 2	0
3, 4, 5, 6	5
7, 8, 9	10

TIP

Refer to the following table for the available valve pads.

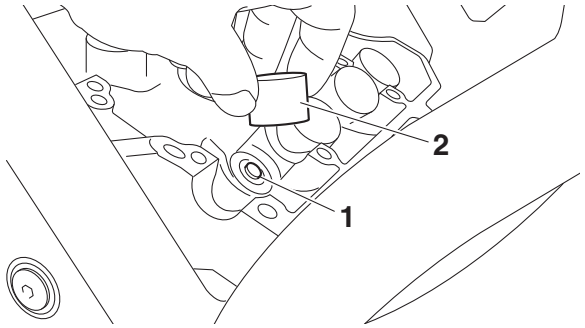
Valve pad range	No. 150–240
Valve pad thickness	1.50–2.40 mm (0.0590–0.0944 in)
Available valve pads	25 thicknesses in 0.05 mm (0.0020 in) increments

Example:
Valve pad number = 163
Rounded value = 165
New valve pad number = 165

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

TIP

- Lubricate the valve pad with molybdenum disulfide oil.
- Lubricate the valve lifter with engine oil.
- Install the valve lifter and the valve pad in the correct place.
- The valve lifter must turn smoothly when rotated by hand.



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

Exhaust camshaft cap bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
Intake camshaft cap bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Refer to "CAMSHAFTS" on page 5-11.
- Lubricate the camshaft lobes and camshaft journals with molybdenum disulfide oil.
- First, install the exhaust camshaft.
- Align the camshafts sprocket marks with the cylinder head edge.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

h. Measure the valve clearance again.
i. 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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8. Install:
   - All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017
CHECKING THE ENGINE IDLING SPEED

TIP

Prior to checking the engine idling speed, the throttle body synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Check:
   - Engine idling speed
     Out of specification → Go to next step.

Engine idling speed
1100–1300 r/min

3. Check:
   - ISC (idle speed control) learning value
     "00" or "01" → Check the intake system.
     "02" → Clean the ISC (idle speed control) valve.
     Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) VALVE" on page 7-11.

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a. Connect the Yamaha diagnostic tool.
   Use the diagnostic code number "67".
   Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5.

Yamaha diagnostic tool (US)
90890-03234

b. Check the ISC (idle speed control) leaning value.

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EAS30797
SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:
- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Canister purge hoses (for California only)
- Vacuum hoses

Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

TIP

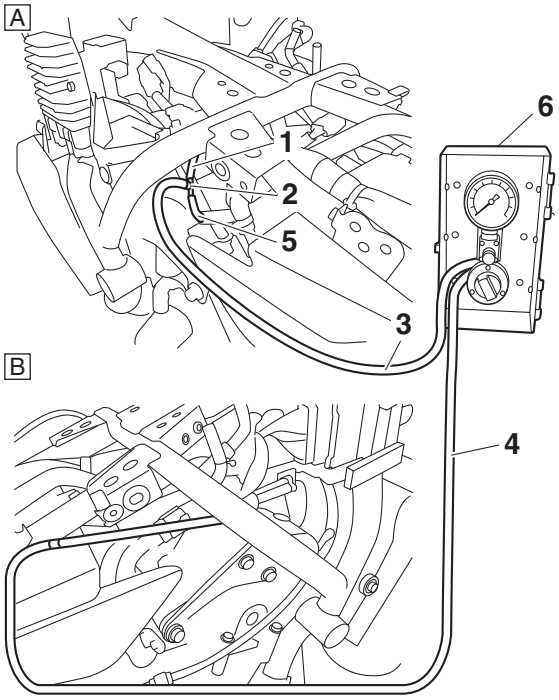
Place the vehicle on a suitable stand.

2. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover

- Fuel tank front cover
  Refer to "GENERAL CHASSIS (4)" on page 4-11.
- Fuel tank
  Refer to "FUEL TANK" on page 7-1.

3. Disconnect:
   - Intake air pressure sensor hose
     Refer to "THROTTLE BODIES" on page 7-8.
   - Cap
     Refer to "THROTTLE BODIES" on page 7-8.
4. Install:
   - Hoses "1" (Parts No.: 5JW-24311-00)
   - 3-way joints "2" (Parts No.: 90413-05014)
   - Vacuum gauge hose #1 "3"
   - Vacuum gauge hose #2 "4"
   - Intake air pressure sensor hose "5"
   - Vacuum gauge "6"

Vacuum gauge
90890-03094
Vacuummate
YU-44456



A. Throttle body #1
B. Throttle body #2

5. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
6. Check:
   - Throttle body synchronization

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a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

Engine idling speed
1100–1300 r/min

b. Check the vacuum pressure.

The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).

If out of specification → Adjust the throttle body synchronization.

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Adjusting the throttle body synchronization

1. Adjust:
   - Throttle body synchronization

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a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

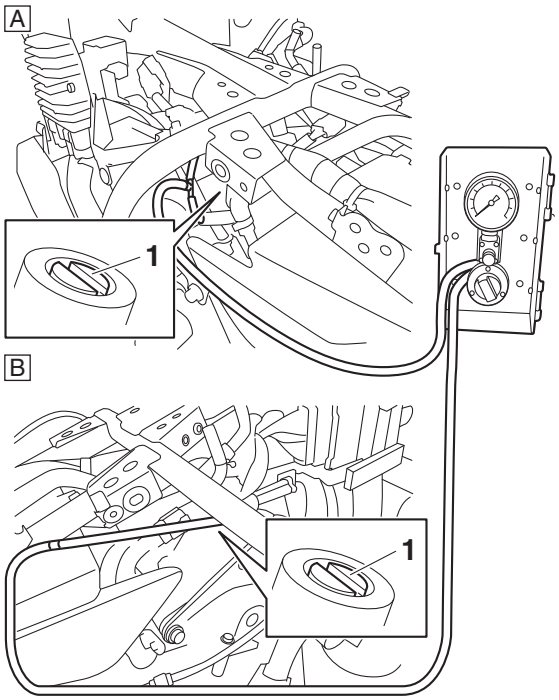
Engine idling speed
1100–1300 r/min

b. With throttle body #1 as standard, adjust throttle body #2 using the air screw "1".

TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.
- The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).

Carburetor angle driver 2
90890-03173



A. Throttle body #1
B. Throttle body #2

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2. Stop the engine and remove the measuring equipment.
3. Connect:
   • Intake air pressure sensor hose
   Refer to "THROTTLE BODIES" on page 7-8.
   • Cap
   Refer to "THROTTLE BODIES" on page 7-8.
4. Install:
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Fuel tank front cover
   • Fuel tank center cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank top cover
   Refer to "GENERAL CHASSIS (4)" on page 4-11.
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
5. Adjust:
   • Throttle grip free play
   Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-27.

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

EAS30798
CHECKING THE THROTTLE BODY JOINTS

1. Remove:
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   • Fuel tank top cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank center cover
   • Fuel tank front cover
   Refer to "GENERAL CHASSIS (4)" on page 4-11.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
2. Disconnect:
   • Intake air pressure sensor hose
   • Canister purge hoses (for California only)
   Refer to "THROTTLE BODIES" on page 7-8.
3. Remove:
   • Throttle bodies
   Refer to "THROTTLE BODIES" on page 7-8.
4. Check:
   • Throttle body joints
   Cracks/damage → Replace.
5. Install:
   • Throttle bodies
   Refer to "THROTTLE BODIES" on page 7-8.
6. Connect:
   • Intake air pressure sensor hose
   • Canister purge hoses (for California only)
   Refer to "THROTTLE BODIES" on page 7-8.
7. Install:
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Fuel tank front cover
   • Fuel tank center cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank top cover
   Refer to "GENERAL CHASSIS (4)" on page 4-11.
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30626
CHECKING THE CANISTER (for California only)

1. Remove:
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
2. Check:
   • Canister

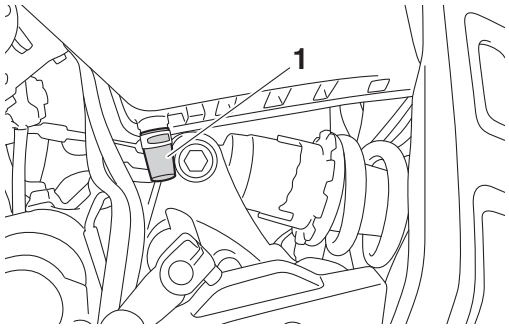
- Canister purge hoses
- Fuel tank breather hoses
- Canister breather hose
  Cracks/damage→ Replace.

3. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.

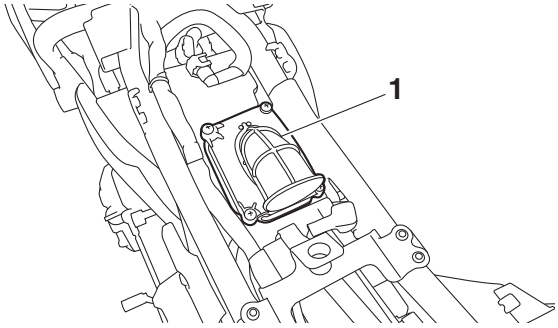
EAS31130
REPLACING THE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

TIP

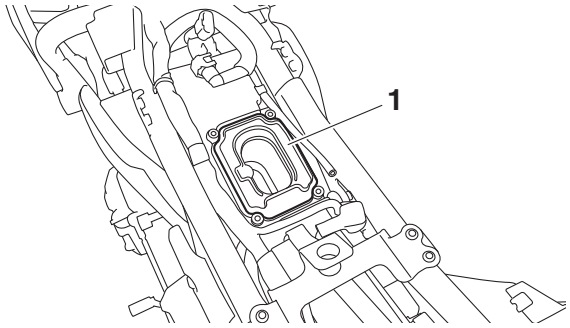
There is an air filter check hose “1” at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter check hose and replace the air filter element.



1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover
   - Fuel tank front cover
     Refer to “GENERAL CHASSIS (4)” on page 4-11.
   - Fuel tank
     Refer to“FUEL TANK” on page 7-1.
2. Remove:
   - Air duct bracket “1”
     Refer to “AIR FILTER ELEMENT” on page 7-7.



3. Remove:
   - Air filter element “1”



4. Check:
   - Air filter element
     Damage → Replace.

TIP

- Replace the air filter element every 37000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

5. Install:
   - Air filter element
   - Air duct bracket



Air filter element screw
1.6 Nm (0.16 m·kgf, 1.2 ft·lbf)
Air duct bracket screw
1.6 Nm (0.16 m·kgf, 1.2 ft·lbf)

ECA20710

NOTICE

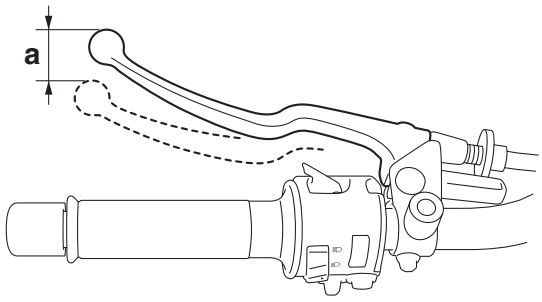
Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body synchronization, leading to poor engine performance and possible overheating.

6. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Fuel tank front cover
   - Fuel tank center cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank top cover
     Refer to “GENERAL CHASSIS (4)” on page 4-11.
   - Rider seat
     Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30629
ADJUSTING THE CLUTCH LEVER FREE PLAY

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

Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)



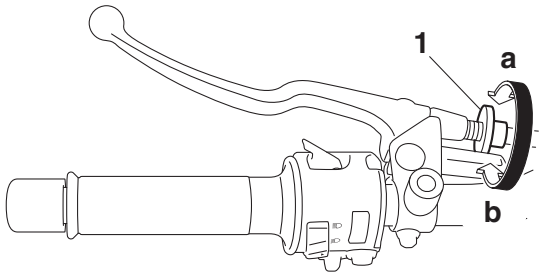
2. Adjust:
   • Clutch lever free play

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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 engine side.

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Engine side

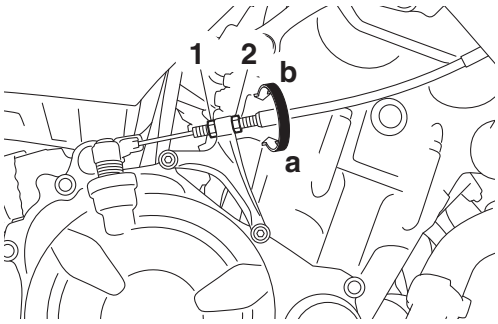
a. Loosen the locknut "1".

b. Turn the adjusting nut "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.

c. Tighten the locknut "1".

Clutch cable locknut
7 Nm (0.7 m·kgf, 5.1 ft·lbf)



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EAS30801
CHECKING THE BRAKE OPERATION

1. Check:
   • Brake operation
   Brake not working properly → Check the brake system.
   Refer to "FRONT BRAKE" on page 4-32 and "REAR BRAKE" on page 4-46.

TIP

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

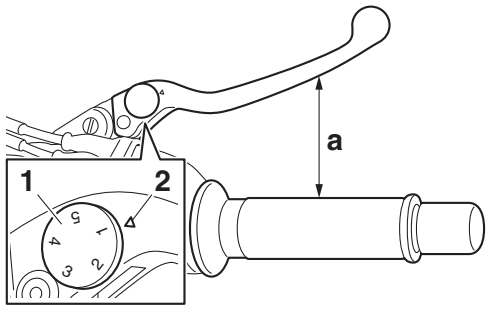
EAS30630
ADJUSTING THE FRONT DISC BRAKE

1. Adjust:
   • Brake lever position
   (distance "a" from the throttle grip to the brake lever)

TIP

- While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark "2" on the brake lever holder.

Position #1
Distance “a” is the largest.
Position #5
Distance “a” is the smallest.



EWA17050

⚠ WARNING

- **After adjusting the brake lever position, make sure the pin on the brake lever holder is firmly inserted in the hole in the adjusting dial.**
- **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 brake performance resulting in loss of control and possibly cause an accident. Therefore, check and if necessary, bleed the brake system.**

ECA13490

NOTICE

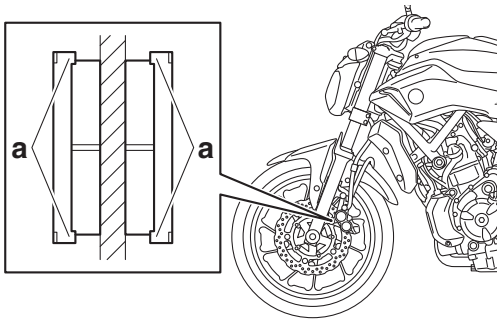
After adjusting the brake lever position, make sure there is no brake drag.

EAS30633

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 indicators “a” almost touch the brake disc → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” on page 4-32.



EAS30631

ADJUSTING THE REAR DISC BRAKE

1. 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.

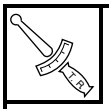
Direction “a”
Brake pedal is raised.
Direction “b”
Brake pedal is lowered.

EWA13070

⚠ WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt “c” is visible through the hole “d”.

c. Tighten the locknut “1” to specification.



Rear brake pedal adjusting locknut
18 Nm (1.8 m·kgf, 13 ft·lbf)

EWA17030

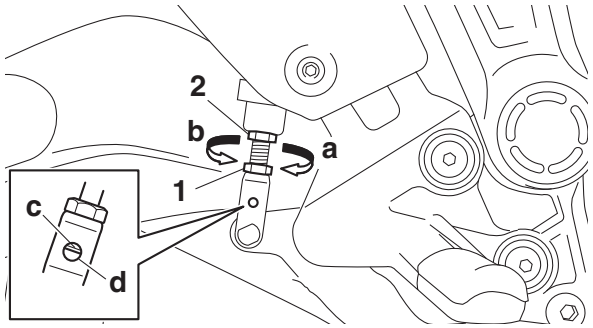
⚠ WARNING

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.



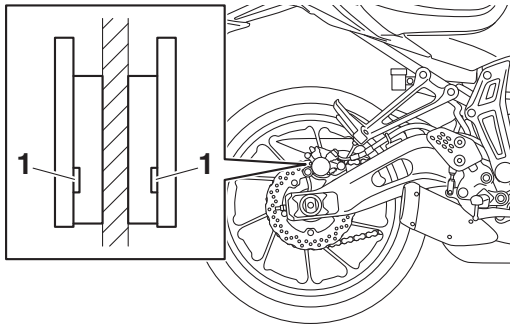
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2. Adjust:
   • Rear brake light switch
   Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-26.

EAS30634
CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

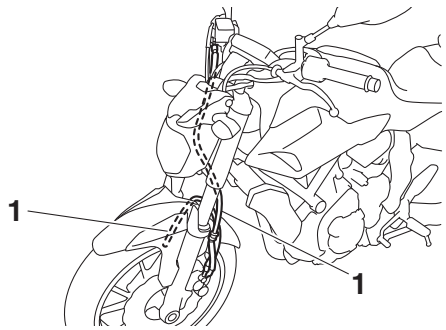
1. Operate the brake.
2. Check:
   • Rear brake pad
   Wear indicators "1" almost touch the brake disc → Replace the brake pads as a set.
   Refer to "REAR BRAKE" on page 4-46.



EAS30635
CHECKING THE FRONT BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose holders.

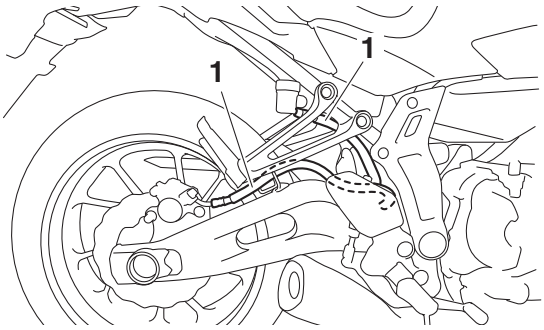
1. Check:
   • Brake hose "1"
   Cracks/damage/wear → Replace.



2. Check:
   • Brake hose holder
   Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to "FRONT BRAKE" on page 4-32.

EAS30636
CHECKING THE REAR BRAKE HOSE

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



2. Check:
   • Brake hose holder
   • Brake hose guide
   Loose → Tighten the bolt.
3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to "REAR BRAKE" on page 4-46.

EAS30637
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.**

TIP

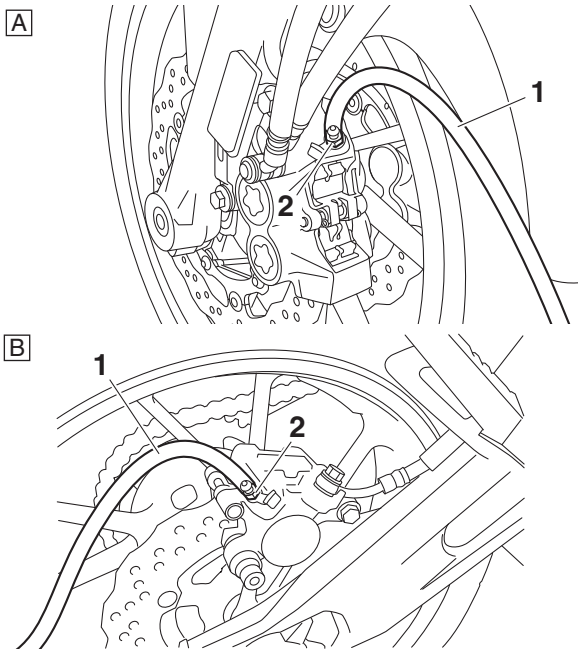
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.

- 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 until the tiny bubbles in the hose have disappeared.

1. Bleed:
   - Hydraulic brake system

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a. Fill the brake fluid reservoir to the proper level with the specified 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".



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 be fully depressed.

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.

Brake caliper bleed screw
5 Nm (0.5 m·kgf, 3.6 ft·lbf)

k. Fill the brake master cylinder or brake fluid reservoir to the proper level with the specified brake fluid.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.

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EAS30632
CHECKING THE BRAKE FLUID LEVEL

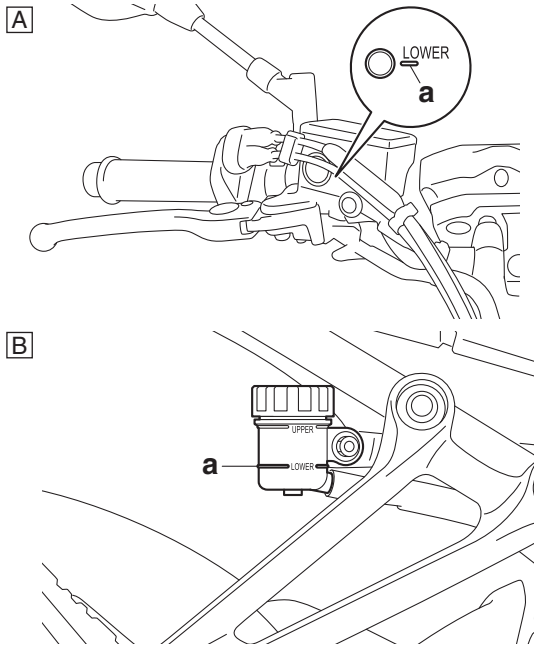
1. Stand the vehicle on a level surface.

TIP

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

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

Specified brake fluid
DOT 4



A. Front brake
B. Rear brake

EWA13090
WARNING
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540
NOTICE
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

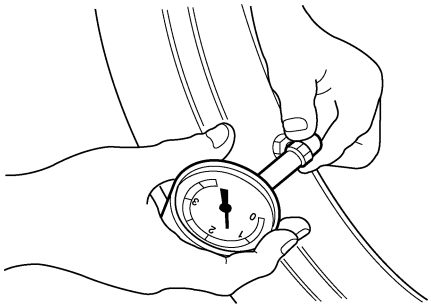
TIP
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS30638
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.

EAS30640
CHECKING THE TIRES
The following procedure applies to both of the tires.
1. Check:
   - Tire pressure
     Out of specification → Regulate.



EWA13180
WARNING
- **The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.**
- **The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.**
- **Operation of an overloaded vehicle could cause tire damage, an accident or an injury.**

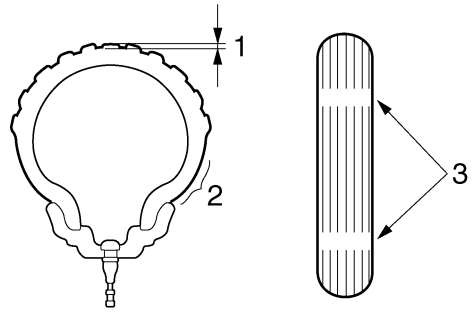
NEVER OVERLOAD THE VEHICLE.



Tire air pressure (measured on cold tires)
Loading condition
0–175 kg (0–386 lb)
Front
225 kPa (2.25 kgf/cm², 33 psi)
Rear
250 kPa (2.50 kgf/cm², 36 psi)
High-speed riding
Front
225 kPa (2.25 kgf/cm², 33 psi)
Rear
250 kPa (2.50 kgf/cm², 36 psi)
Maximum load
175 kg (386 lb)
*** Total weight of rider, passenger, cargo and accessories**

2. Check:
   - Tire surfaces
     Damage/wear → Replace the tire.

EWA13190
WARNING
It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.



1. Tire tread depth
2. Side wall
3. Wear indicator

Wear limit (front)
1.0 mm (0.04 in)
Wear limit (rear)
1.0 mm (0.04 in)

EWA14090

⚠ WARNING

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.

Front tire
Size
120/70 ZR17M/C (58W)
Manufacturer/model
MICHELIN/PILOT ROAD 3
Manufacturer/model
BRIDGESTONE/BT023F F

Rear tire
Size
180/55 ZR17M/C (73W)
Manufacturer/model
MICHELIN/PILOT ROAD 3A
Manufacturer/model
BRIDGESTONE/BT023R M

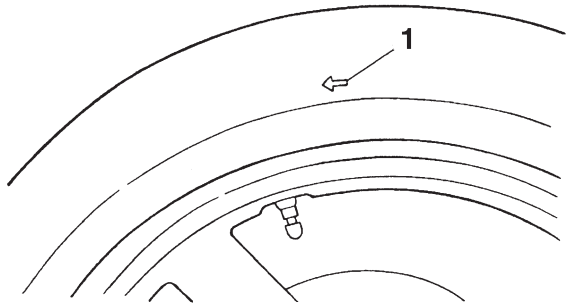
EWA13210

⚠ WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

TIP

For tires with a direction of rotation mark "1": Install the tire with the mark pointing in the direction of wheel rotation.



EAS30641

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 4-20 and "CHECKING THE REAR WHEEL" on page 4-28.

EAS30802

CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm operation
     Swingarm not working properly → Check the swingarm.
     Refer to "SWINGARM" on page 4-84.
2. Check:
   - Swingarm excessive play
     Refer to "SWINGARM" on page 4-84.

EAS30643

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
   - Bearing
   - Spacer

Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-88.

EAS30644

ADJUSTING THE DRIVE CHAIN SLACK

ECA13550

NOTICE

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swing-

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

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

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

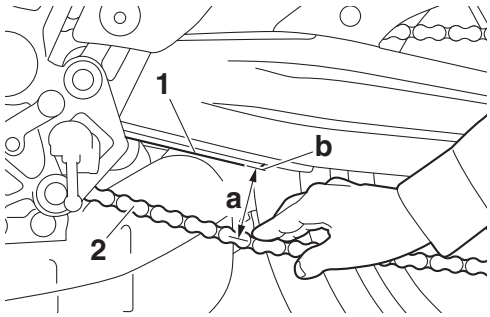
TIP

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

2. Shift the transmission into the neutral position.
3. Check:
   - Drive chain slack
     Out of specification → Adjust.

TIP

Measure the distance "a" between the rib end "b" on the drive chain guide "1" and the center of the drive chain "2".



Drive chain slack
51.0–56.0 mm (2.01–2.20 in)
Limit
58.0 mm (2.28 in)

ECA20870

NOTICE

Improper drive chain slack will overload the engine as well as other vital parts of the motorcycle and can lead to chain slippage or breakage. If the drive chain slack is more than the specified limit, the chain can damage the frame, swingarm, and other parts. To prevent this from occurring, keep the drive chain slack within the specified limits.

4. Adjust:
   - Drive chain slack

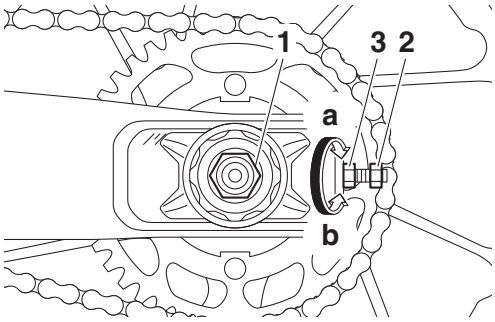
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a. Loosen the wheel axle nut "1".
b. Loosen both of the drive chain puller locknuts "2".
c. Turn both of the drive chain puller adjusting nuts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

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

TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
- There should be no clearance between the swingarm end plate and the adjusting nuts.



d. Tighten the wheel axle nut to specification.

Wheel axle nut
105 Nm (10.5 m·kgf, 76 ft·lbf)

e. Tighten the drive chain puller locknuts to specification.

Drive chain puller locknut
16 Nm (1.6 m·kgf, 12 ft·lbf)

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EAS30803

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

EAS30645
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.

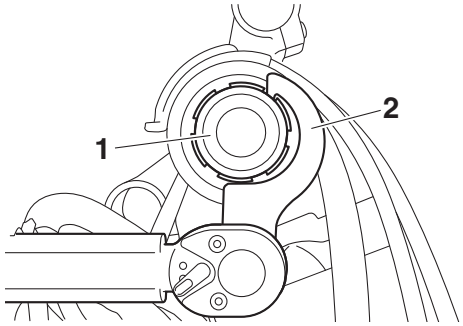
2. Check:
   - Steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Blinding/looseness → Adjust the steering head.
3. Remove:
   - Upper bracket
     Refer to "FRONT FORK" on page 4-64.
4. Adjust:
   - Steering head

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a. Loosen the cap nut "1", and then tighten it to specification with a steering nut wrench "2".

TIP

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



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

Cap nut (initial tightening torque)
52 Nm (5.2 m·kgf, 38 ft·lbf)

b. Loosen the cap nut completely, then tighten it to specification.

EWA17770
WARNING

Do not overtighten the cap nut.

Cap nut (final tightening torque)
18 Nm (1.8 m·kgf, 13 ft·lbf)

c. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-76.

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5. Install:
   - Upper bracket
     Refer to "FRONT FORK" on page 4-64.

EAS30646
LUBRICATING THE STEERING HEAD

1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing cover
   - Lower bearing dust seal

Recommended lubricant
Lithium-soap-based grease

EAS31186
CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.
Refer to "CHASSIS TIGHTENING TORQUES" on page 2-19.

EAS30804
LUBRICATING THE BRAKE LEVER

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

Recommended lubricant
Silicone grease

EAS30649
LUBRICATING THE PEDAL
Lubricate the pivoting point and metal-to-metal moving parts of the pedal.

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

EAS30805
LUBRICATING THE CLUTCH LEVER
Lubricate the pivoting point and metal-to-metal moving parts of the lever.

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

EAS30650
CHECKING THE SIDESTAND
1. Check:
   - Sidestand operation
     Check that the sidestand moves smoothly.
     Rough movement → Repair or replace.

EAS30651
LUBRICATING THE SIDESTAND
Lubricate the pivoting point, metal-to-metal moving parts and spring contact point of the sidestand.

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

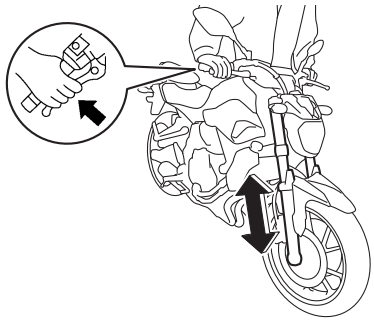
EAS30652
CHECKING THE SIDESTAND SWITCH
Refer to "CHECKING THE SWITCHES" on page 8-79.

EAS30653
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 4-64.



EAS30808
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY
Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-82.

EAS30655
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.

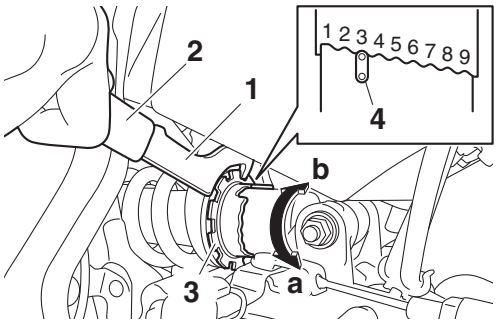
1. Adjust:
   - Spring preload

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a. Adjust the spring preload with the special wrench "1" and extension bar "2" included in the owner's tool kit.
b. Turn the adjusting ring "3" in direction "a" or "b".
c. Align the desired position on the adjusting ring with the stopper "4".

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

Spring preload adjusting positions
Minimum
1
Standard
3
Maximum
9



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EAS30809
CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to “CHECKING THE RELAY ARM” on page 4-82 and “CHECKING THE CONNECTING ARM” on page 4-87.

EAS30656
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

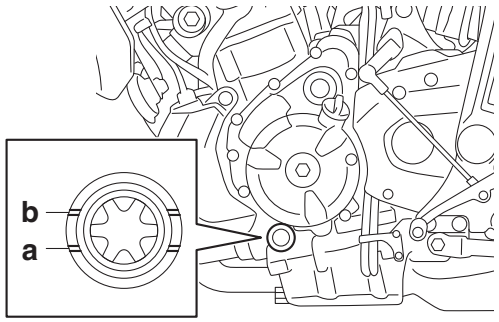
TIP

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

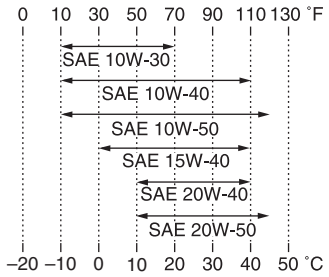
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Check:
   - Engine oil level
     The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
     Below the minimum level mark → Add the recommended engine oil to the proper level.

TIP

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



Recommended brand
YAMALUBE
Type
SAE 10W-30, 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade
API service SG type or higher, JASO standard MA



ECA13361
NOTICE

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

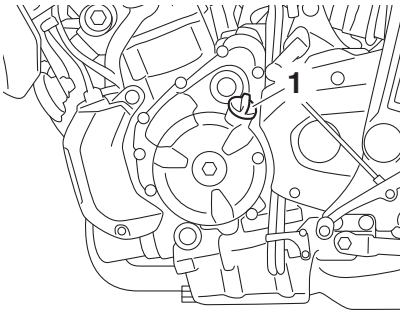
4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

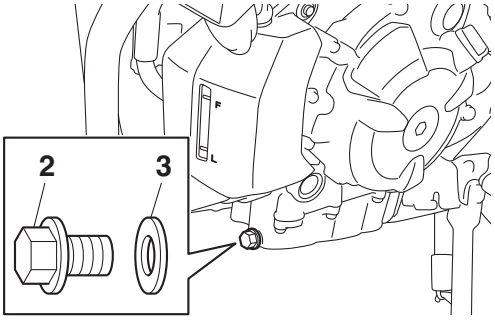
TIP

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

EAS30657
CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   - Engine oil filler cap “1”
   - Engine oil drain bolt “2” (along with the gasket “3”)



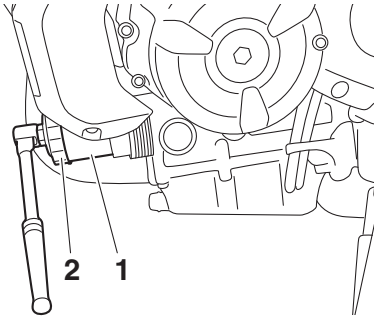


4. Drain:
   - Engine oil (completely from the oil pan)
5. If the oil filter cartridge is also to be replaced, perform the following procedure.

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a. Remove the oil filter cartridge “1” with an oil filter wrench “2”.

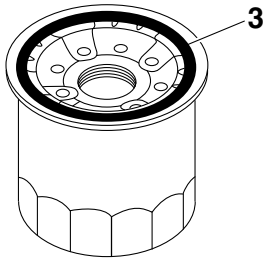
	**Oil filter wrench** **90890-01426** **Oil filter wrench** **YU-38411**



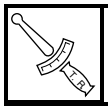
b. Lubricate the O-ring “3” of the new oil filter cartridge with a thin coat of engine oil.

ECA13390
NOTICE

Make sure the O-ring “3” is positioned correctly in the groove of the oil filter cartridge.

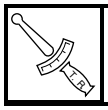


c. Tighten the new oil filter cartridge to specification with an oil filter wrench.

	**Oil filter cartridge** **17 Nm (1.7 m·kgf, 12 ft·lbf)**

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6. Install:
   - Engine oil drain bolt (along with the gasket New)

	**Engine oil drain bolt** **43 Nm (4.3 m·kgf, 31 ft·lbf)**

7. Fill:
   - Oil pan (with the specified amount of the recommended engine oil)

	**Engine oil quantity** **Quantity (disassembled)** **3.00 L (3.17 US qt, 2.64 Imp.qt)** **Without oil filter cartridge replacement** **2.30 L (2.43 US qt, 2.02 Imp.qt)** **With oil filter cartridge replacement** **2.60 L (2.75 US qt, 2.29 Imp.qt)**

8. Install:
   - Engine oil filler cap (along with the O-ring New)
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
    - Engine (for engine oil leaks)

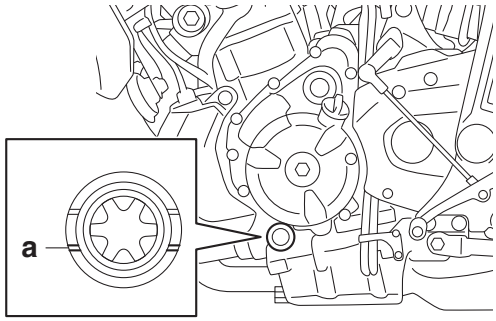
11.Check:
- Engine oil level
  Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-21.

EAS30810
MEASURING THE ENGINE OIL PRESSURE

1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on the suitable stand.
- Make sure that the vehicle is upright.

2. Check:
- Engine oil level
  Below the minimum level mark "a" → Add the recommended engine oil to the proper level.



3. Start the engine, warm it up for several minutes, and then turn it off.

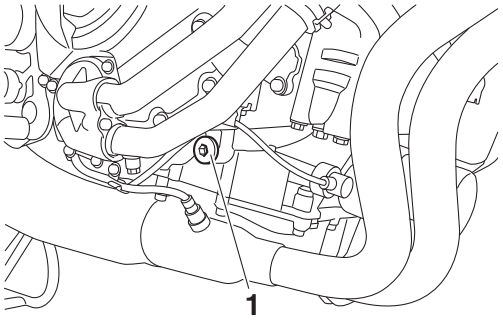
ECA13410
NOTICE

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

4. Remove:
- Main gallery bolt "1"

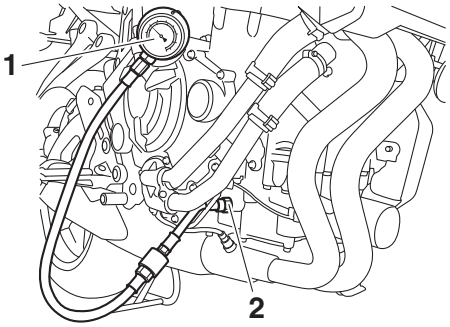
EWA12980
⚠ WARNING

The engine, muffler and engine oil are extremely hot.



5. Install:
- Oil pressure gauge "1"
- Adapter "2"

Pressure gauge
90890-03153
Pressure gauge
YU-03153
Oil pressure adapter H
90890-03139



6. Measure:
- Engine oil pressure
  (at the following conditions)

Oil pressure
280.0 kPa/5000 r/min at 100 °C
(40.6 psi/5000 r/min at 212 °F)

Out of specification → Check.

Engine oil pressure	Possible causes
Below specification	• Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal
Above specification	• Leaking oil passage • Faulty oil filter • Oil viscosity too high

7. Install:
- Main gallery bolt
- O-ring New

Main gallery bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)

TIP

Lubricate the O-ring with a thin coat of lithium-soap-based grease.

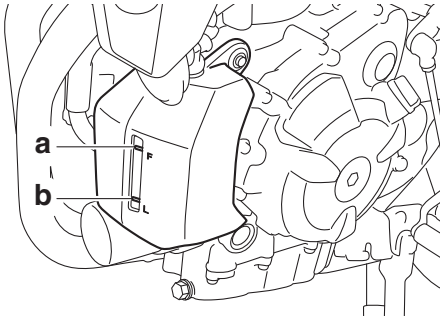
EAS30811
CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on a suitable stand.

• Make sure the vehicle is upright.

2. Check:
   • Coolant level
   The coolant level should be between the maximum level mark “a” and minimum level mark “b”.
   Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

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.

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

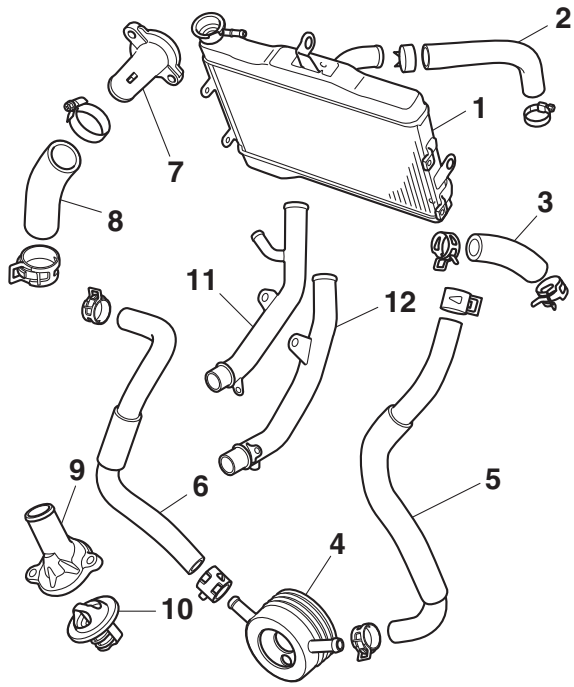
TIP

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

EAS30812

CHECKING THE COOLING SYSTEM

1. Check:
   • Radiator “1”
   • Radiator inlet hose “2”
   • Radiator outlet hose “3”
   • Oil cooler “4”
   • Oil cooler inlet hose “5”
   • Oil cooler outlet hose “6”
   • Water jacket joint “7”
   • Water jacket joint inlet hose “8”
   • Thermostat cover “9”
   • Thermostat “10”
   • Water pump inlet pipe “11”
   • Water pump outlet pipe “12”
   Cracks/damage → Replace.
   Refer to “RADIATOR” on page 6-1, “OIL COOLER” on page 6-4, “THERMOSTAT” on page 6-7 and “WATER PUMP” on page 6-9.



EAS30813

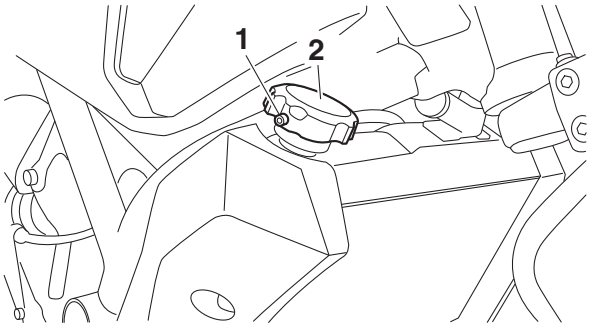
CHANGING THE COOLANT

1. Remove:
   • Radiator cap bolt “1”
   • Radiator cap “2”

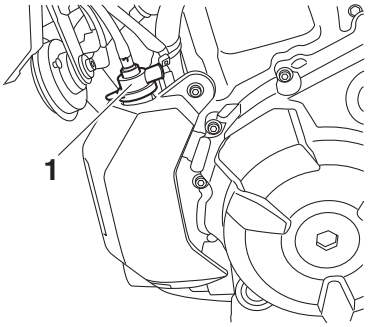
EWA13030

⚠ WARNING

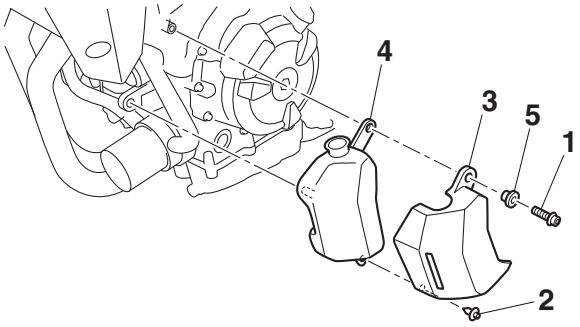
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly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



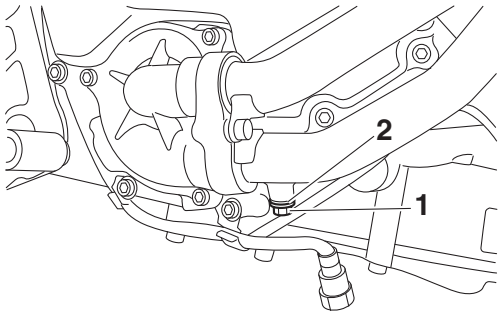
2. Remove:
   • Coolant reservoir cap “1”



3. Remove:
   • Coolant reservoir bolt “1”
   • Coolant reservoir quick fastener “2”
   • Coolant reservoir cover “3”
   • Coolant reservoir “4”
   • Collar “5”



4. Drain:
   • Coolant
   (from the coolant reservoir)
5. Remove:
   • Coolant drain bolt “1”
   • Copper washer “2”



6. Drain:
   • Coolant
   (from the engine and radiator)
7. Install:
   • Coolant drain bolt
   • Copper washer New

Coolant drain bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

8. Install:
   • Collar
   • Coolant reservoir
   • Coolant reservoir cover
   • Coolant reservoir quick fastener
   • Coolant reservoir bolt

Coolant reservoir bolt
5 Nm (0.5 m·kgf, 3.6 ft·lbf)

9. 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)
1.60 L (1.69 US qt, 1.41 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)
0.25 L (0.26 US qt, 0.22 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.**

ECA13481

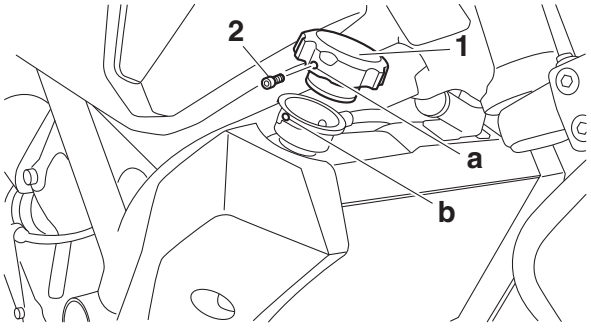
NOTICE

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

10.Install:
- Radiator cap "1"
- Radiator cap bolt "2"

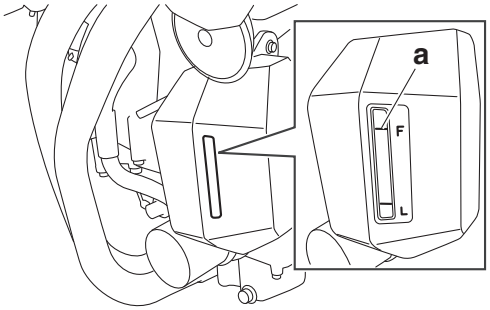
TIP

Align the hole "a" in the radiator cap with the hole "b" in the radiator.



Radiator cap bolt
1.0 Nm (0.10 m·kgf, 0.72 ft·lbf)

11.Fill:
- Coolant reservoir
  (with the recommended coolant to the maximum level mark "a")



12.Install:
- Coolant reservoir cap

13.Start the engine, warm it up for several minutes, and then turn it off.

14.Check:
- Coolant level
  Refer to "CHECKING THE COOLANT LEVEL" on page 3-23.

TIP

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

EAS30814

CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-79.

EAS30659

ADJUSTING THE REAR BRAKE LIGHT SWITCH

TIP

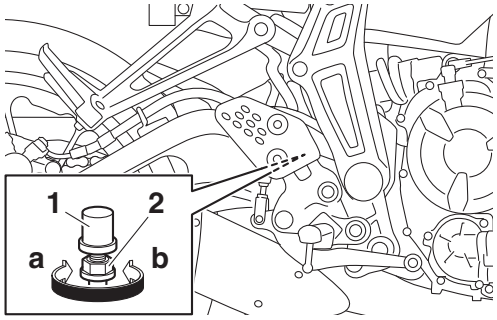
The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:
   - Rear brake light operation timing
     Incorrect → Adjust.
2. Adjust:
   - Rear brake light operation timing

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a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

Direction "a"
Brake light comes on sooner.
Direction "b"
Brake light comes on later.



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EAS30660
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.

EAS30861
CHECKING THE THROTTLE GRIP OPERATION

1. Check:
   - Throttle cables
     Damage/deterioration → Replace.
   - Throttle cable installation
     Incorrect → Reinstall the throttle cables.
     Refer to "HANDLEBAR" on page 4-59.
2. Check:
   - Throttle grip movement
     Rough movement → Lubricate or replace the defective part(s).

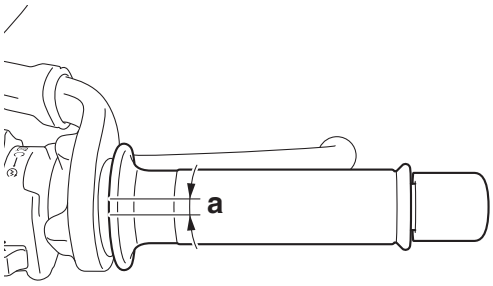
Recommended lubricant
Suitable cable lubricant

TIP

With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.
Repeat this check with the handlebar turned all the way to the left and right.

3. Check:
   - Throttle grip free play "a"
     Out of specification → Adjust.

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



4. Adjust:
   - Throttle grip free play

TIP

Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly.

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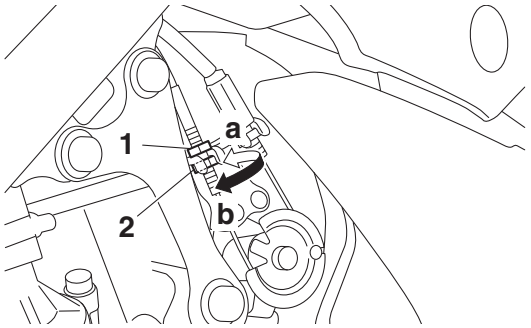
Throttle body side

a. Loosen the locknut "1" on the accelerator cable.
b. 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.

c. Tighten the locknut.

Throttle cable locknut (throttle body side)
4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)



TIP

If the specified throttle grip free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

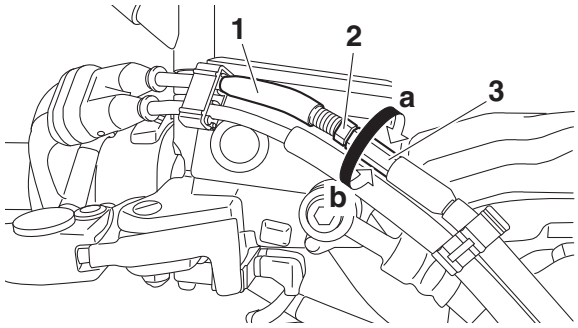
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Handlebar side

a. Slide back the rubber cover "1".
b. Loosen the locknut "2".
c. Turn the adjusting nut "3" 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.

Throttle cable locknut (handlebar side)
4.3 Nm (0.43 m·kgf, 3.1 ft·lbf)

e. Slide the rubber cover to its original position.

TIP

Make sure that the adjusting nut is covered completely by the rubber cover.

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EAS30816

CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-84.

EAS30662

CHECKING THE FUSES

Refer to "CHECKING THE FUSES" on page 8-83.

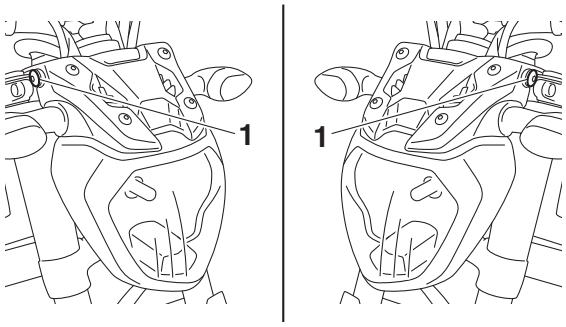
EAS30665

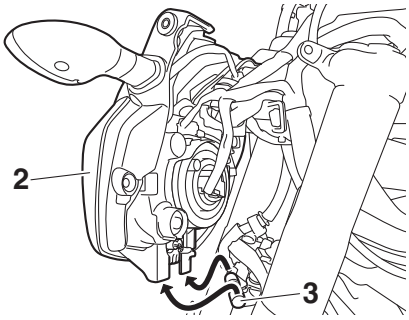
REPLACING THE HEADLIGHT BULB

1. Remove:
   • Headlight assembly bolts "1"

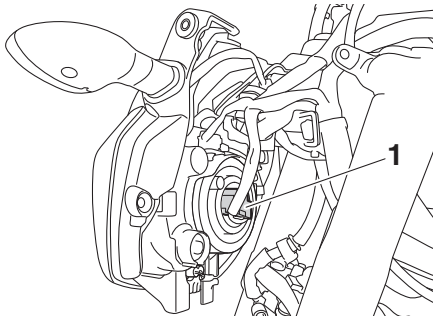
TIP

Lift up the headlight unit "2", and then remove it from the headlight bracket "3".

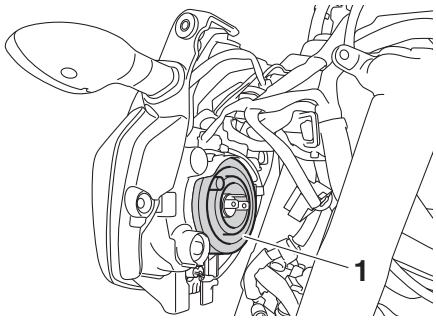




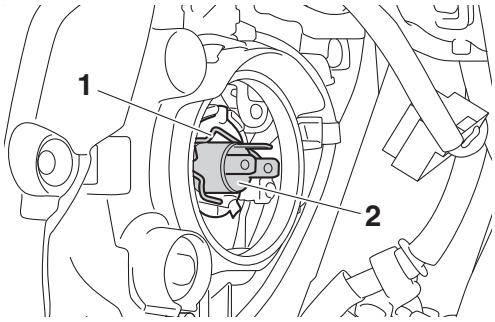
2. Disconnect:
   • Headlight coupler "1"



3. Remove:
   • Headlight bulb cover "1"



4. Unhook:
   • Headlight bulb holder “1”
5. Remove:
   • Headlight bulb “2”



EWA13320

⚠ WARNING

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

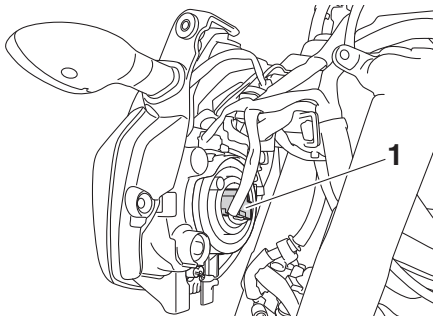
6. Install:
   • Headlight bulb New
   Secure the new headlight bulb with the headlight bulb holder.

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.

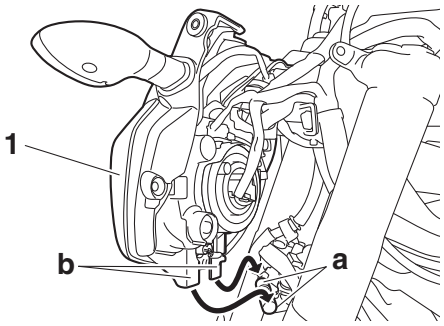
7. Hook:
   • Headlight bulb holder
8. Install:
   • Headlight bulb cover
9. Connect:
   • Headlight coupler “1”



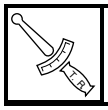
10. Install:
    • Headlight assembly “1”

TIP

Fit the projections “a” on the headlight bracket into the holes “b” in the headlight assembly.

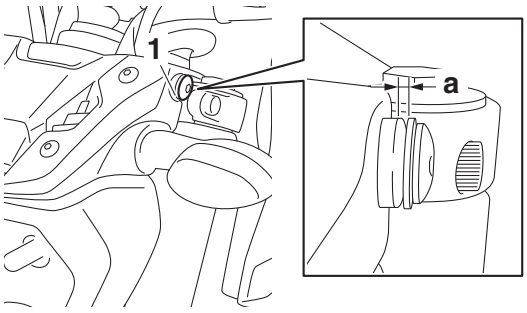


11. Install:
    • Headlight assembly bolts “1”

	**Headlight assembly bolt 7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

When the headlight assembly bolts are tightened to specification, there may be gaps “a” between the washers and the grommets as shown in the illustration.



EAS30664

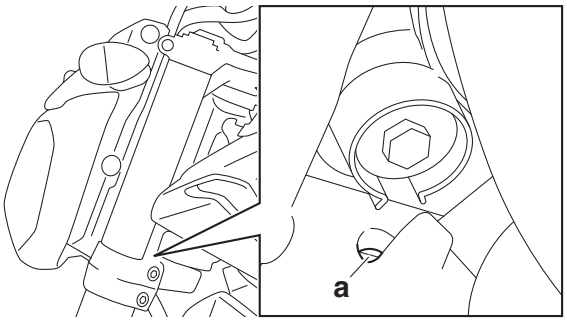
ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
   • Headlight beam (vertically)

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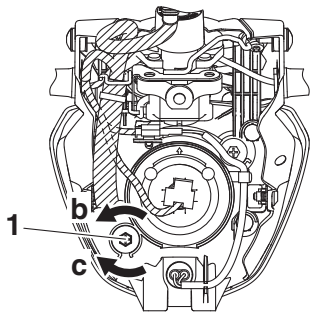
TIP

To adjust the headlight beam (vertically), insert a crosshead screwdriver into the hole "a" in the lower bracket and turn the adjusting screw.



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

Direction "b"
Headlight beam is raised.
Direction "c"
Headlight beam is lowered.



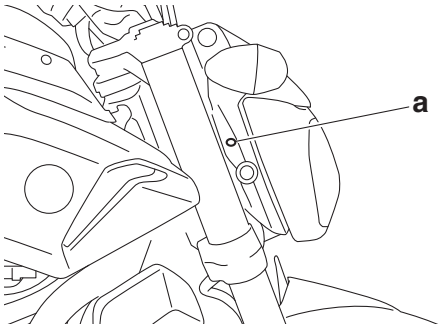
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2. Adjust:
   • Headlight beam (horizontally)

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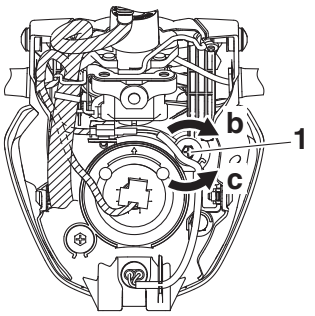
TIP

To adjust the headlight beam (horizontally), insert a crosshead screwdriver into the hole "a" in the headlight assembly and turn the adjusting screw.



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

Direction "b"
Headlight beam moves to the right.
Direction "c"
Headlight beam moves to the left.



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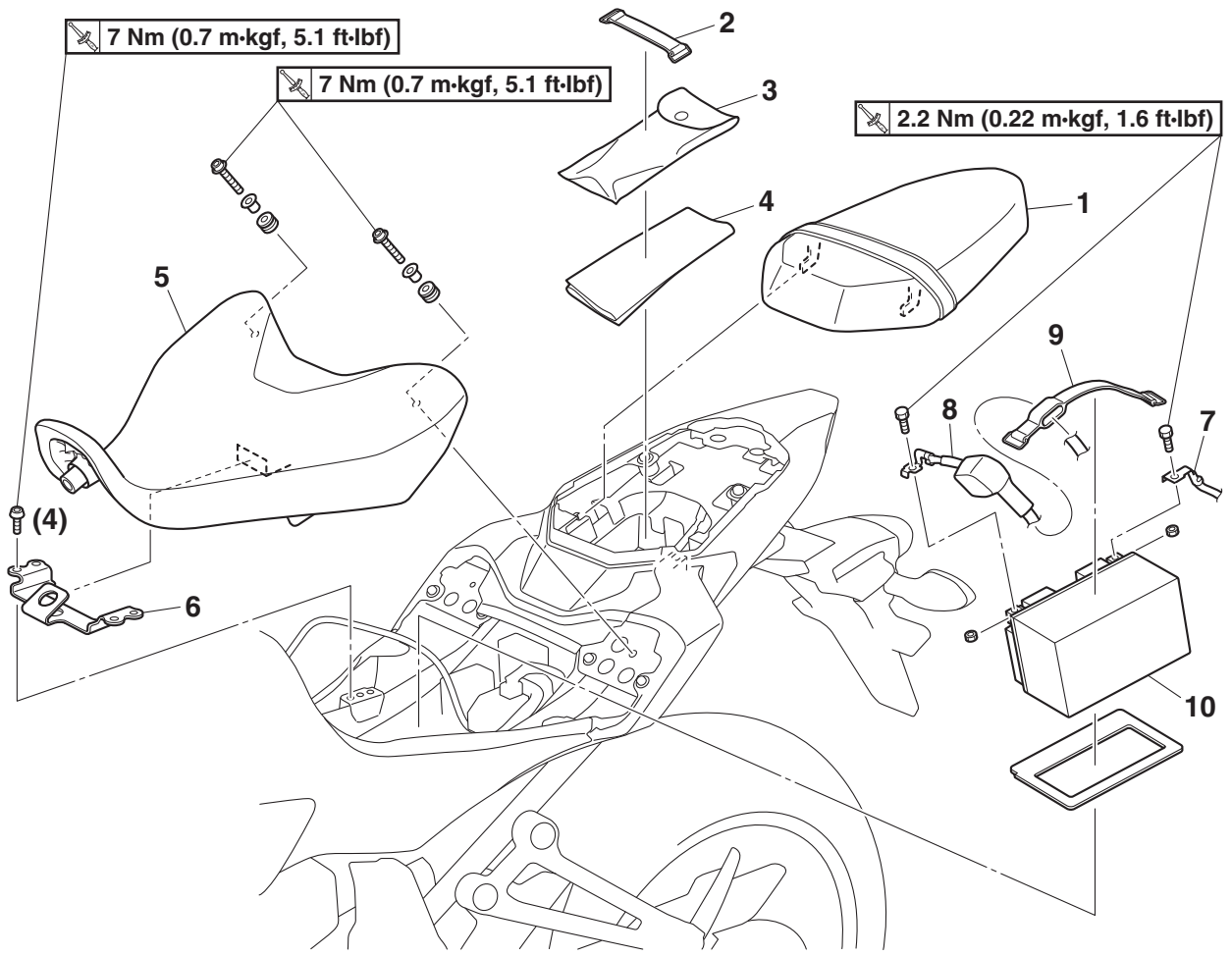
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EAS20026
GENERAL CHASSIS (1)

Removing the seats and battery



Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Owner's tool kit band	1	
3	Owner's tool kit	1	
4	Pouch	1	
5	Rider seat	1	
6	Rider seat bracket	1	
7	Negative battery lead	1	Disconnect.
8	Positive battery lead	1	Disconnect.
9	Battery band	1	
10	Battery	1	

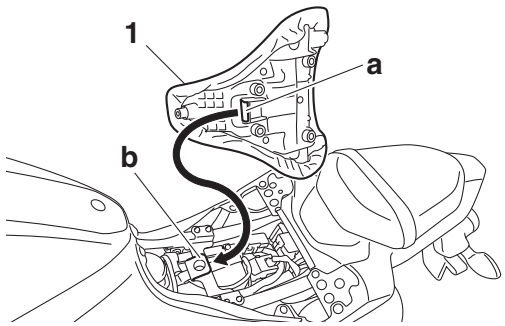
EAS31125
INSTALLING THE RIDER SEAT

1. Install:
   • Rider seat “1”

	Rider seat bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

Fit the slot “a” in the rider seat onto the projection “b” on the rider seat bracket as shown, and then place the seat in the original position.

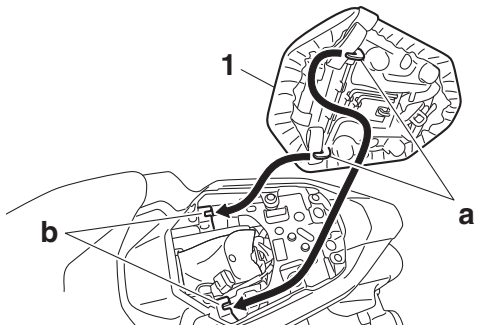


EAS31126
INSTALLING THE PASSENGER SEAT

1. Install:
   • Passenger seat “1”

TIP

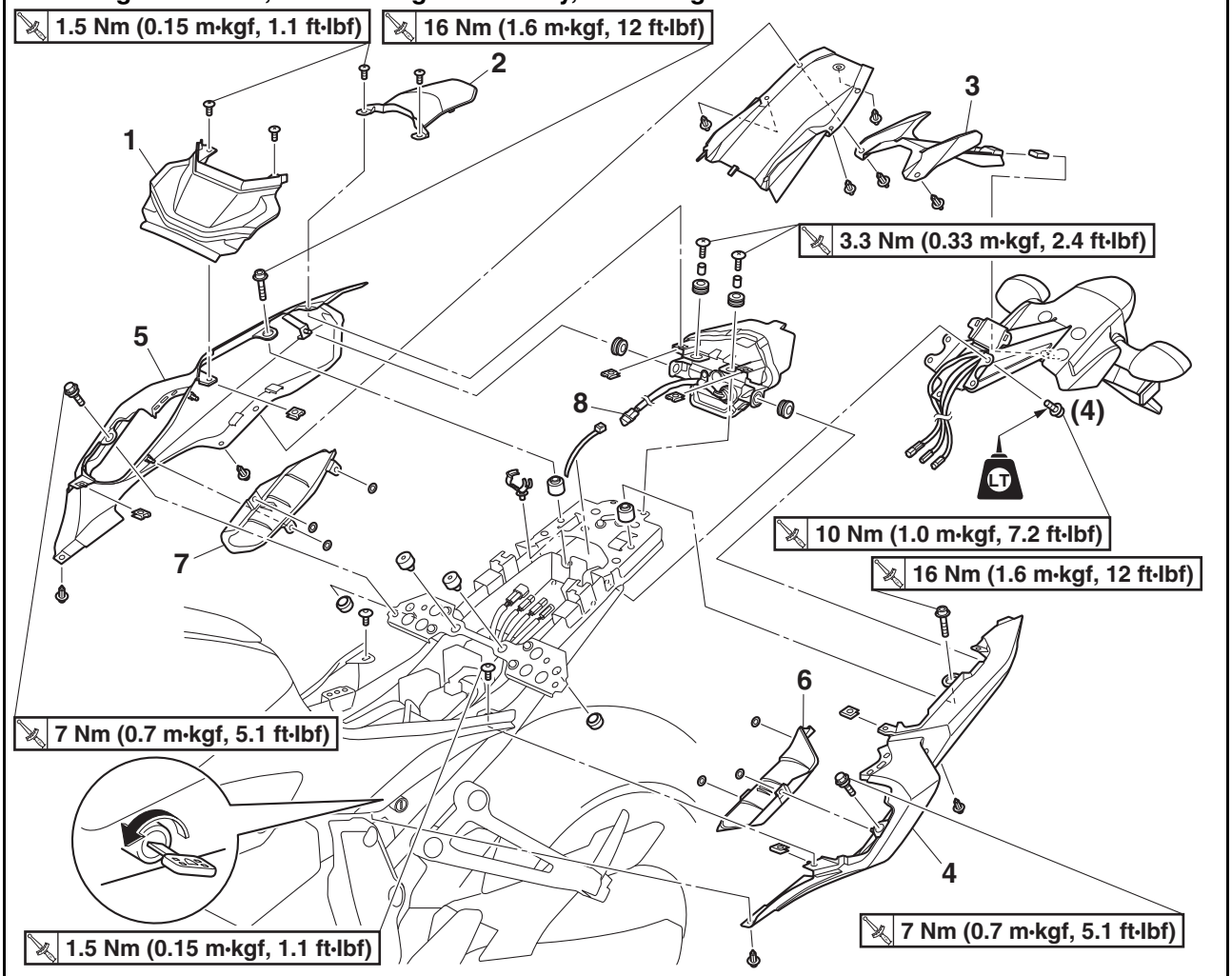
Insert the projections “a” on the front of the passenger seat into the grooves “b” as shown, and then push the rear of the seat down to lock it in place.



EAS20155

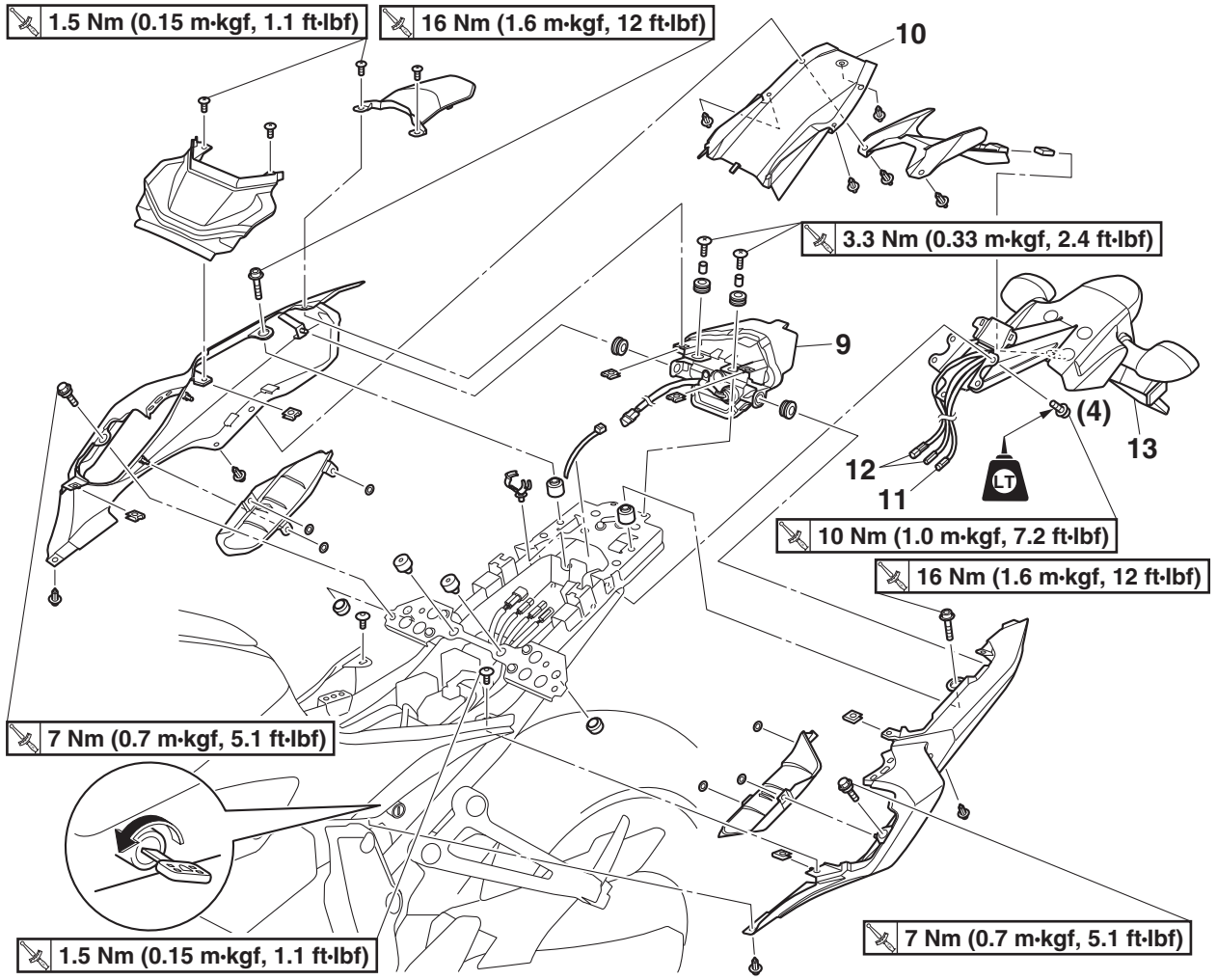
GENERAL CHASSIS (2)

Removing the covers, tail/brake light assembly, and mudguard



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/passenger seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Center cover	1	
2	Upper tail cover	1	
3	Lower tail cover	1	
4	Rear side cover (left)	1	
5	Rear side cover (right)	1	
6	Lining cover (left)	1	
7	Lining cover (right)	1	
8	Tail/brake light coupler	1	Disconnect.

Removing the covers, tail/brake light assembly, and mudguard

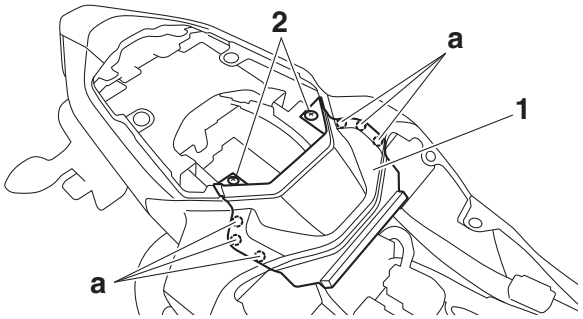


Order	Job/Parts to remove	Q'ty	Remarks
9	Tail/brake light assembly	1	
10	Lower fender cover	1	
11	License plate light coupler	1	Disconnect.
12	Rear turn signal light coupler	2	Disconnect.
13	Mudguard assembly	1	

EAS31094
REMOVING THE CENTER COVER
1. Remove:
   • Center cover “1”

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a. Remove the center cover screws “2”.
b. Unhook the projections “a” on the center cover from the rear side covers.



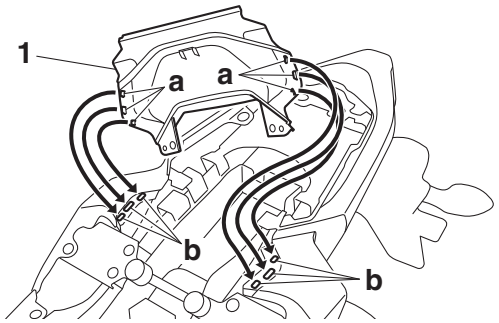
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EAS31095
INSTALLING THE CENTER COVER
1. Install:
   • Center cover “1”

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a. Fit the projections “a” on the center cover into the holes “b” in the rear side covers, and then tighten the center cover screws.

	Center cover screw **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)**

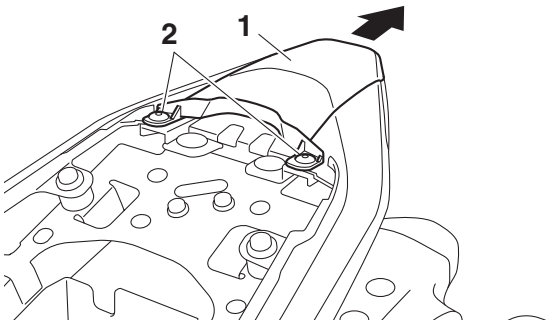


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EAS31096
REMOVING THE UPPER TAIL COVER
1. Remove:
   • Upper tail cover “1”

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a. Remove the upper tail cover screws “2”.
b. Slide the upper tail cover rearward and remove it.

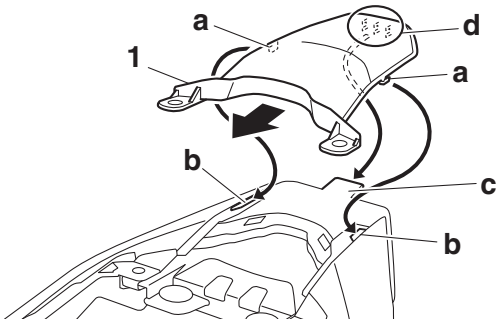


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EAS31097
INSTALLING THE UPPER TAIL COVER
1. Install:
   • Upper tail cover “1”

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a. Fit the projections “a” on the upper tail cover into the holes “b” in the rear side covers, and then slide the cover forward while fitting the projection “c” on the tail/brake light assembly into the slots “d” in the cover ribs. and then slide the cover forward.
b. Tighten the upper tail cover screws.



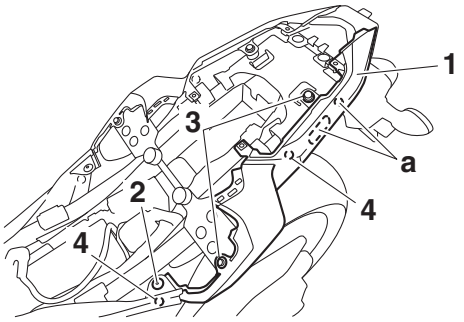
	Upper tail cover screw **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)**

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EAS31098
REMOVING THE REAR SIDE COVERS
The following procedure applies to both of the rear side covers.
1. Remove:
   • Rear side cover “1”

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a. Remove the fuel tank cover bolt “2”, rear side cover bolts “3” and quick fasteners “4”.
b. Pull the rear side cover off at the areas “a” shown.



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EAS31099

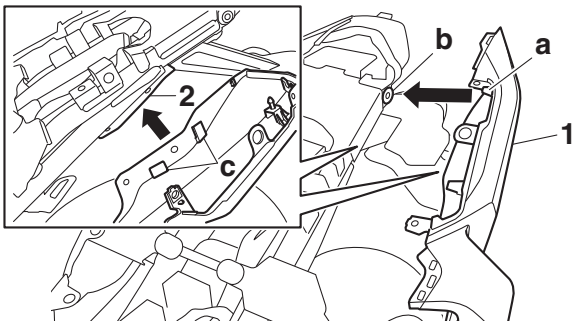
INSTALLING THE REAR SIDE COVERS

The following procedure applies to both of the rear side covers.

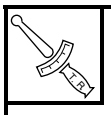
1. Install:
   - Rear side cover “1”

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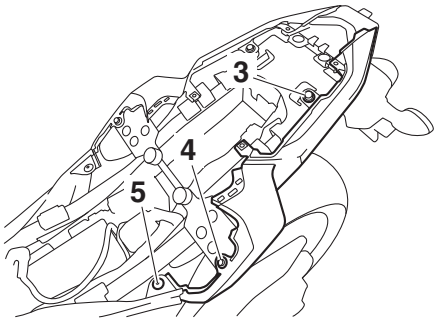
a. Fit the projection “a” on the rear side cover into the grommet “b” and fit the lower fender cover “2” between the rear side cover and the projections “c” on the rear side cover.



b. Install the rear side cover bolt (M8 × 25 mm) “3”, rear side cover bolt (M6 × 12 mm) “4”, fuel tank cover bolt (M5 × 12 mm) “5” and quick fasteners, and then tighten the bolts to specification.



Rear side cover bolt (M8 × 25 mm)
16 Nm (1.6 m·kgf, 12 ft·lbf)
Rear side cover bolt (M6 × 12 mm)
7 Nm (0.7 m·kgf, 5.1 ft·lbf)
Fuel tank cover bolt (M5 × 12 mm)
1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)



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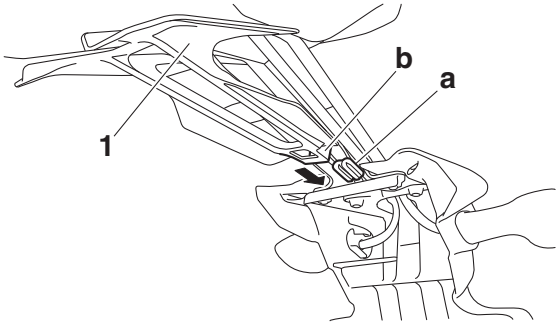
EAS31127

INSTALLING THE LOWER TAIL COVER

1. Install:
   - Lower tail cover “1”

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a. Fit the projection “a” on the tail/brake light assembly into the hole “b” in the lower tail cover.



b. Installing the quick fastener.

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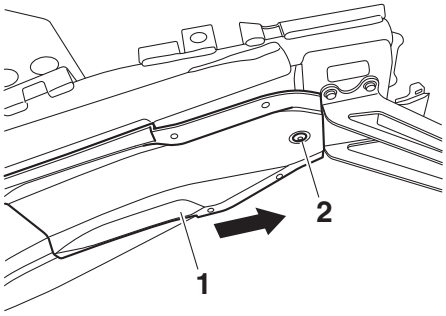
EAS31100

REMOVING THE LOWER FENDER COVER

1. Remove:
   - Lower fender cover “1”

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a. Remove the quick fastener “2”.
b. Slide the lower fender cover rearward and remove it.



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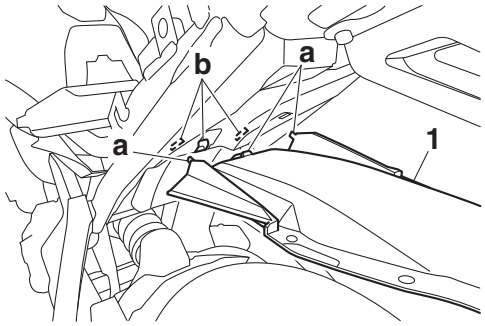
EAS31101

INSTALLING THE LOWER FENDER COVER

1. Install:
   - Lower fender cover “1”

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a. Fit the projections “a” on the lower fender cover into the holes “b” in the battery box.
b. Install the quick fastener.

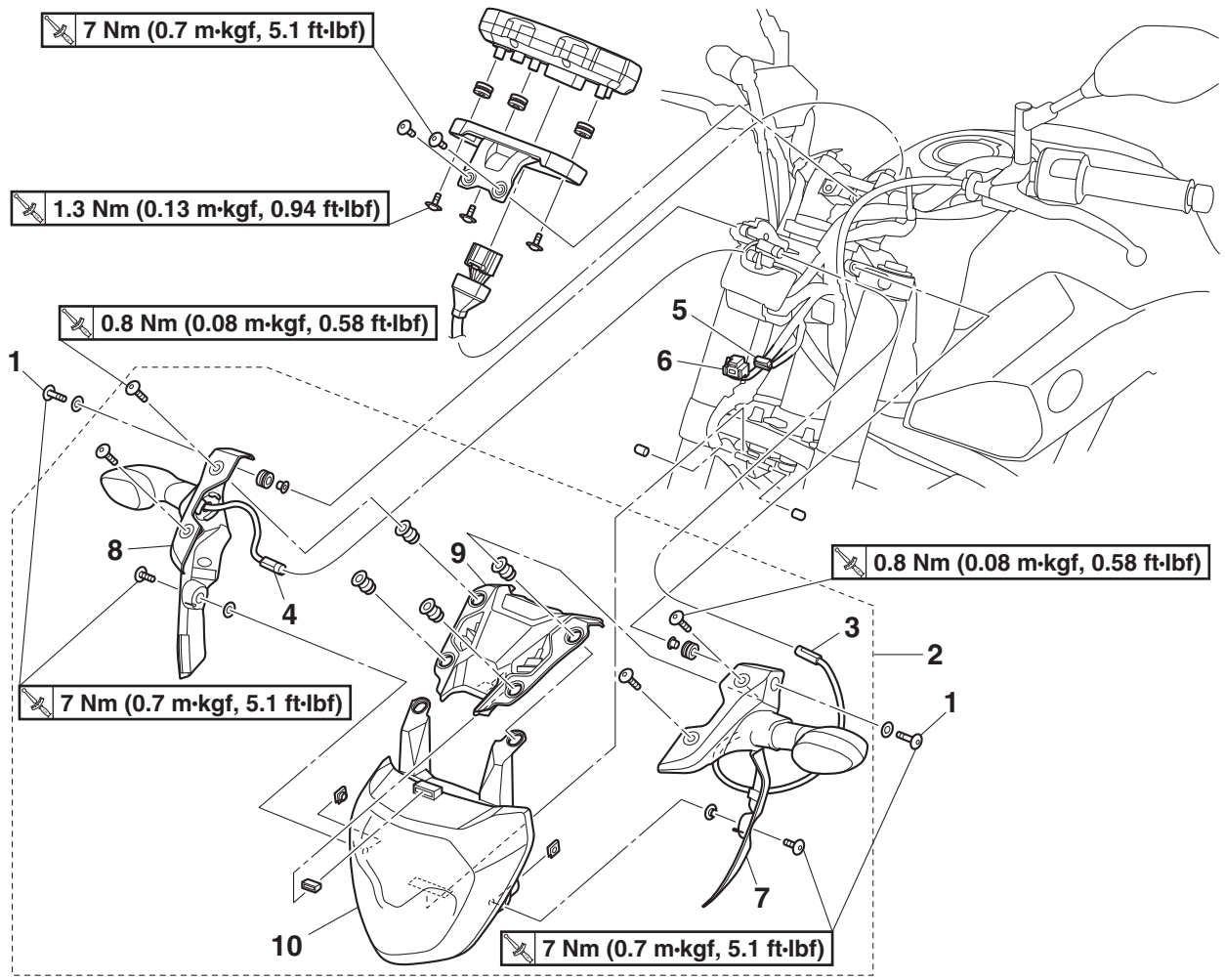


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EAS20156

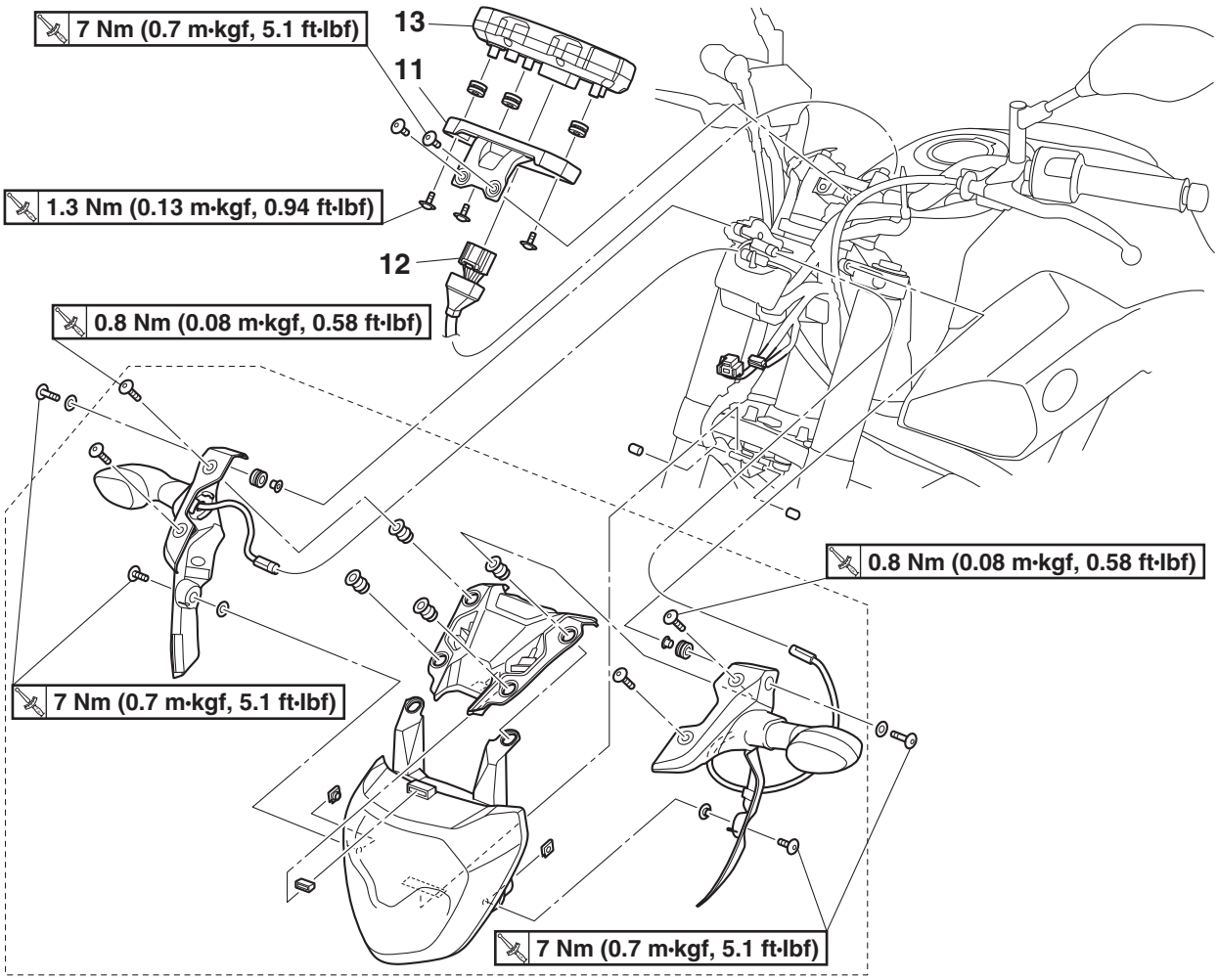
GENERAL CHASSIS (3)

Removing the headlight and meter assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Headlight assembly bolt	2	
2	Headlight assembly	1	
3	Front turn signal light coupler (left)	1	Disconnect.
4	Front turn signal light coupler (right)	1	Disconnect.
5	Auxiliary light coupler	1	Disconnect.
6	Headlight coupler	1	Disconnect.
7	Headlight side cover (left)	1	
8	Headlight side cover (right)	1	
9	Headlight center cover	1	
10	Headlight	1	

Removing the headlight and meter assembly



Order	Job/Parts to remove	Q'ty	Remarks
11	Meter assembly bracket	1	
12	Meter assembly coupler	1	Disconnect.
13	Meter assembly	1	

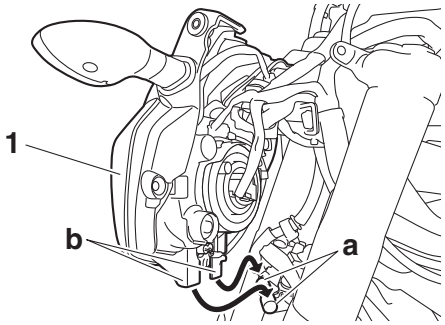
EAS31128
INSTALLING THE HEADLIGHT ASSEMBLY

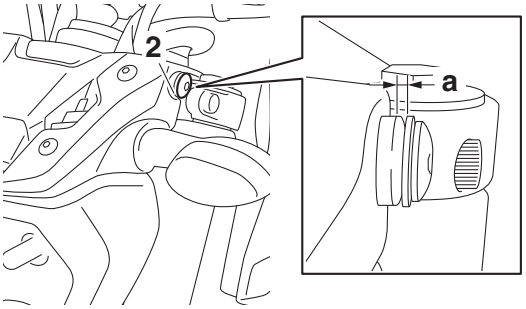
1. Install:
   - Headlight assembly “1”
   - Headlight assembly bolts “2”

	**Headlight assembly bolt 7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

- Fit the projections “a” on the headlight bracket in to the holes “b” in the headlight assembly.
- When the headlight assembly bolts are tightened to specification, there may be gaps “a” between the washers and the grommets as shown in the illustration.

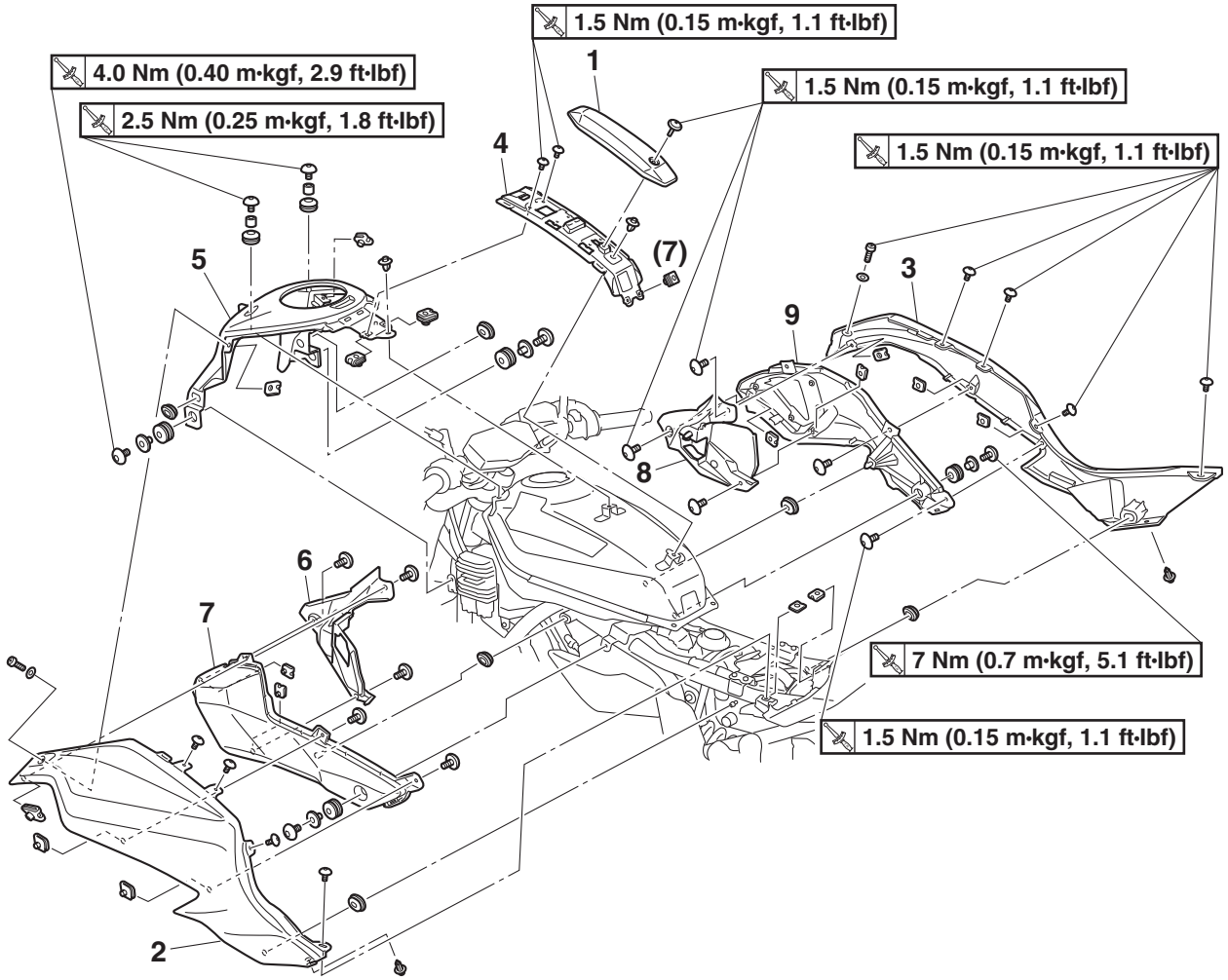




EAS20157

GENERAL CHASSIS (4)

Removing the fuel tank covers and air scoops

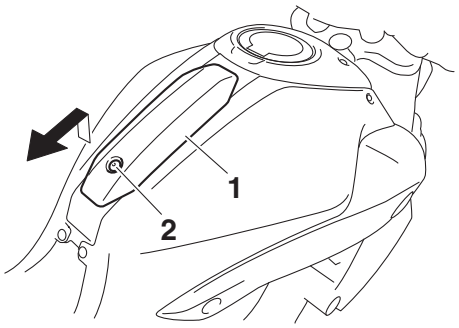


Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Fuel tank top cover	1	
2	Fuel tank cover (left)	1	
3	Fuel tank cover (right)	1	
4	Fuel tank center cover	1	
5	Fuel tank front cover	1	
6	Air scoop inner panel (left)	1	
7	Air scoop (left)	1	
8	Air scoop inner panel (right)	1	
9	Air scoop (right)	1	

EAS31102
REMOVING THE FUEL TANK TOP COVER
1. Remove:
   • Fuel tank top cover “1”

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a. Remove the fuel tank top cover bolt “2”.
b. Lift the rear of the fuel tank top cover, and then pull it rearward to remove it.

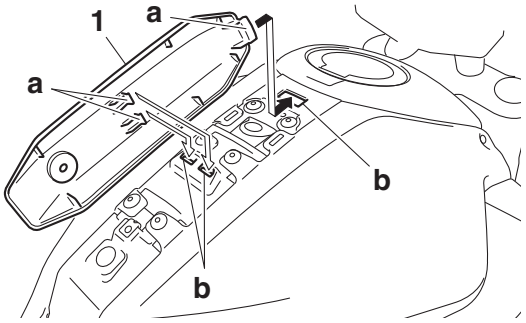


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EAS31103
INSTALLING THE FUEL TANK TOP COVER
1. Install:
   • Fuel tank top cover “1”

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a. Fit the projections “a” on the fuel tank top cover into the holes “b” in the fuel tank center cover.



b. Install the fuel tank top cover bolt, and then tighten the bolt to specification.

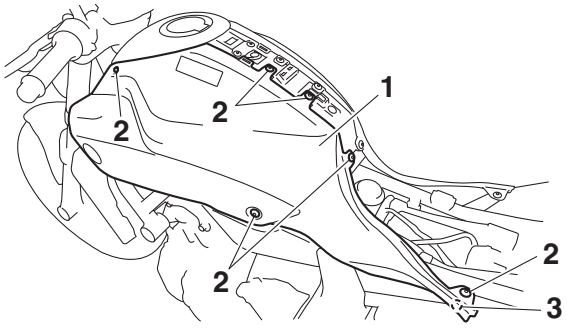
	Fuel tank top cover bolt 1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)

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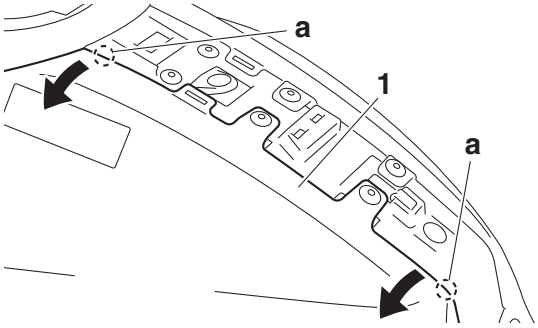
EAS31104
REMOVING THE FUEL TANK COVERS
The following procedure applies to both of the fuel tank covers.
1. Remove:
   • Fuel tank cover “1”

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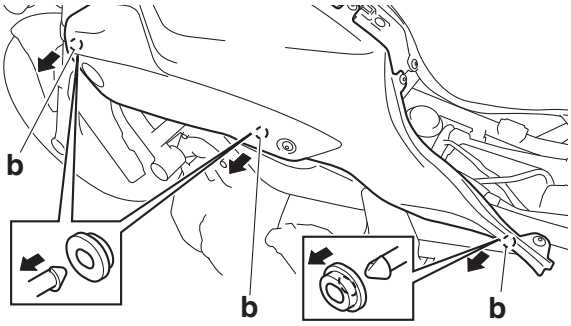
a. Remove the fuel tank cover bolts “2” and quick fastener “3”.



b. Remove the projections “a” on the fuel tank cover from the fuel tank center cover and remove the fuel tank cover.



c. Pull the fuel tank cover outward to remove the projections “b” from the grommets.



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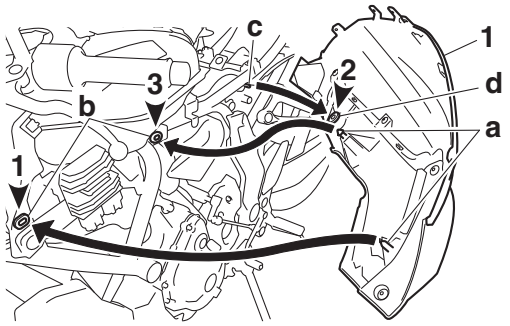
EAS31105
INSTALLING THE FUEL TANK COVERS
The following procedure applies to both of the fuel tank covers.
1. Install:
   • Fuel tank cover “1”

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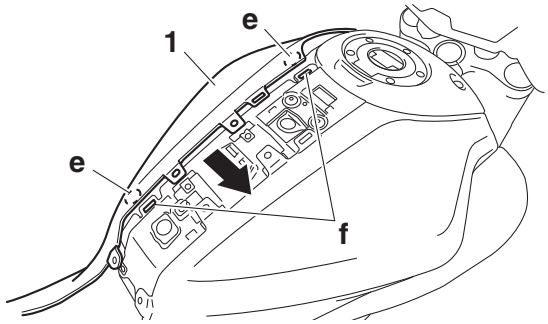
a. Fit the projections “a” on the fuel tank cover into the grommets “b” and fit the projection “c” on the battery box into the grommet “d” on the fuel tank cover.

TIP

Fit the projections into the grommets in the order shown in the illustration.

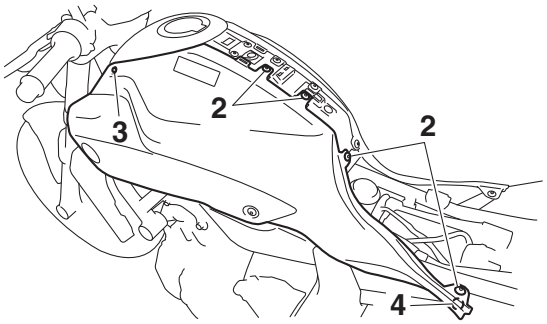


b. Fit the projections “e” on the fuel tank cover into the holes “f” in the fuel tank center cover.



c. Install the fuel tank cover bolts (M5 × 12 mm) “2”, fuel tank cover bolt (M5 × 16 mm) “3”, washer, and quick fastener “4”, and then tighten the bolts to specification.

	Fuel tank cover bolt (M5 × 12 mm) **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)** **Fuel tank cover bolt (M5 × 16 mm)** **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)**



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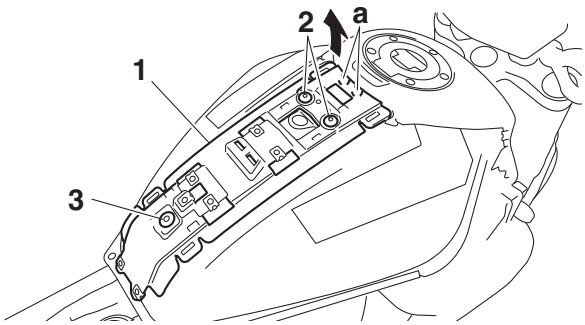
EAS31106

REMOVING THE FUEL TANK CENTER COVER

1. Remove:
   - Fuel tank center cover “1”

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a. Remove the fuel tank center cover bolts “2” and quick fastener “3”.
b. Remove the projections “a” on the fuel tank center cover from the fuel tank front cover and remove the fuel tank center cover.



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EAS31107

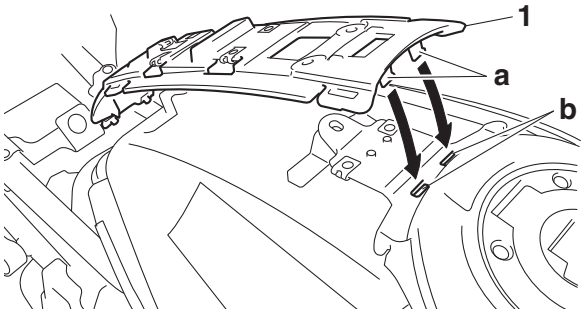
INSTALLING THE FUEL TANK CENTER COVER

1. Install:
   - Fuel tank center cover “1”

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a. Fit the projections “a” on the fuel tank center cover into the holes “b” in the fuel tank front cover.
b. Install the fuel tank center cover bolts and quick fastener, and then tighten the bolts to specification.

	Fuel tank center cover bolt **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)**

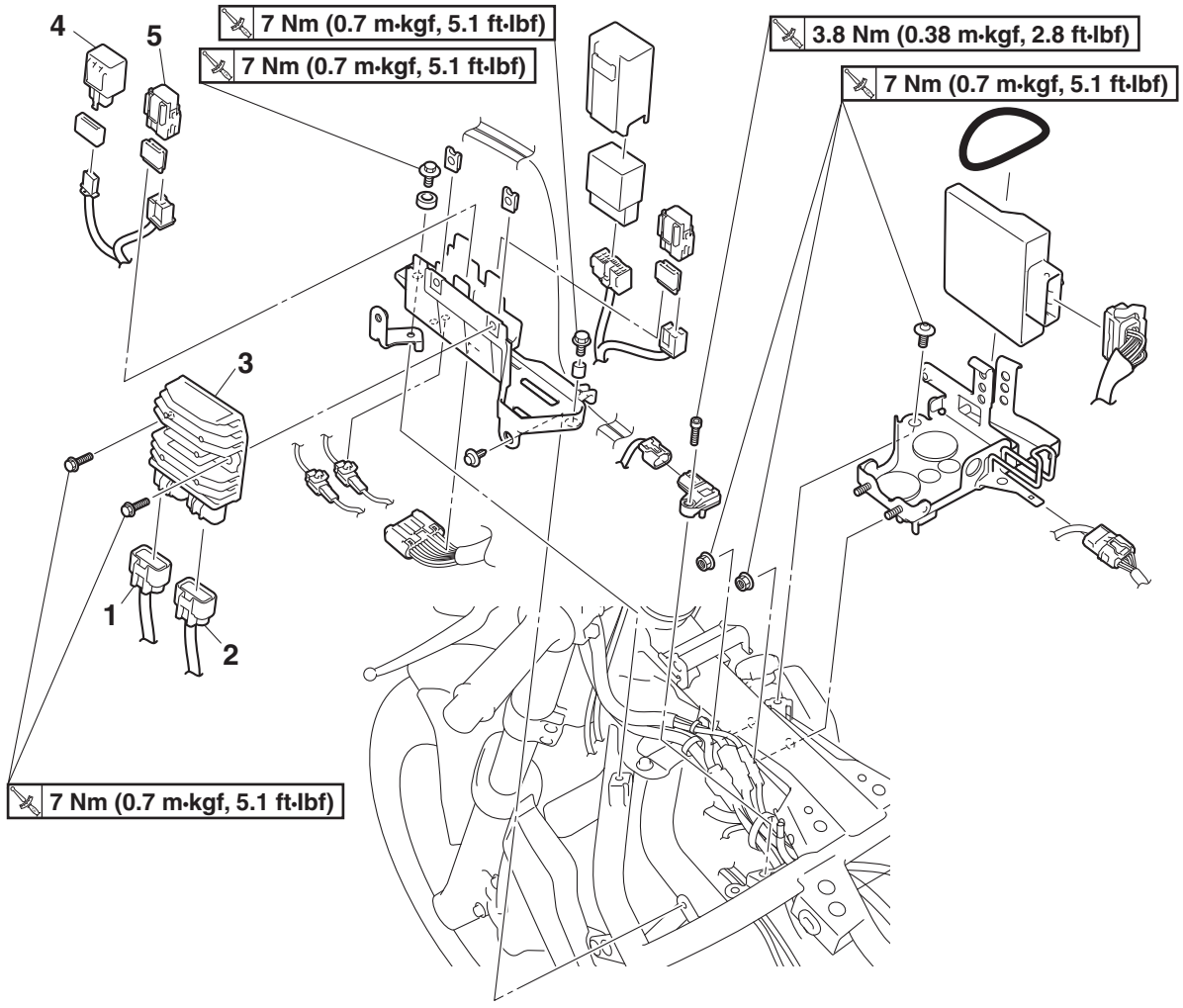


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EAS20158

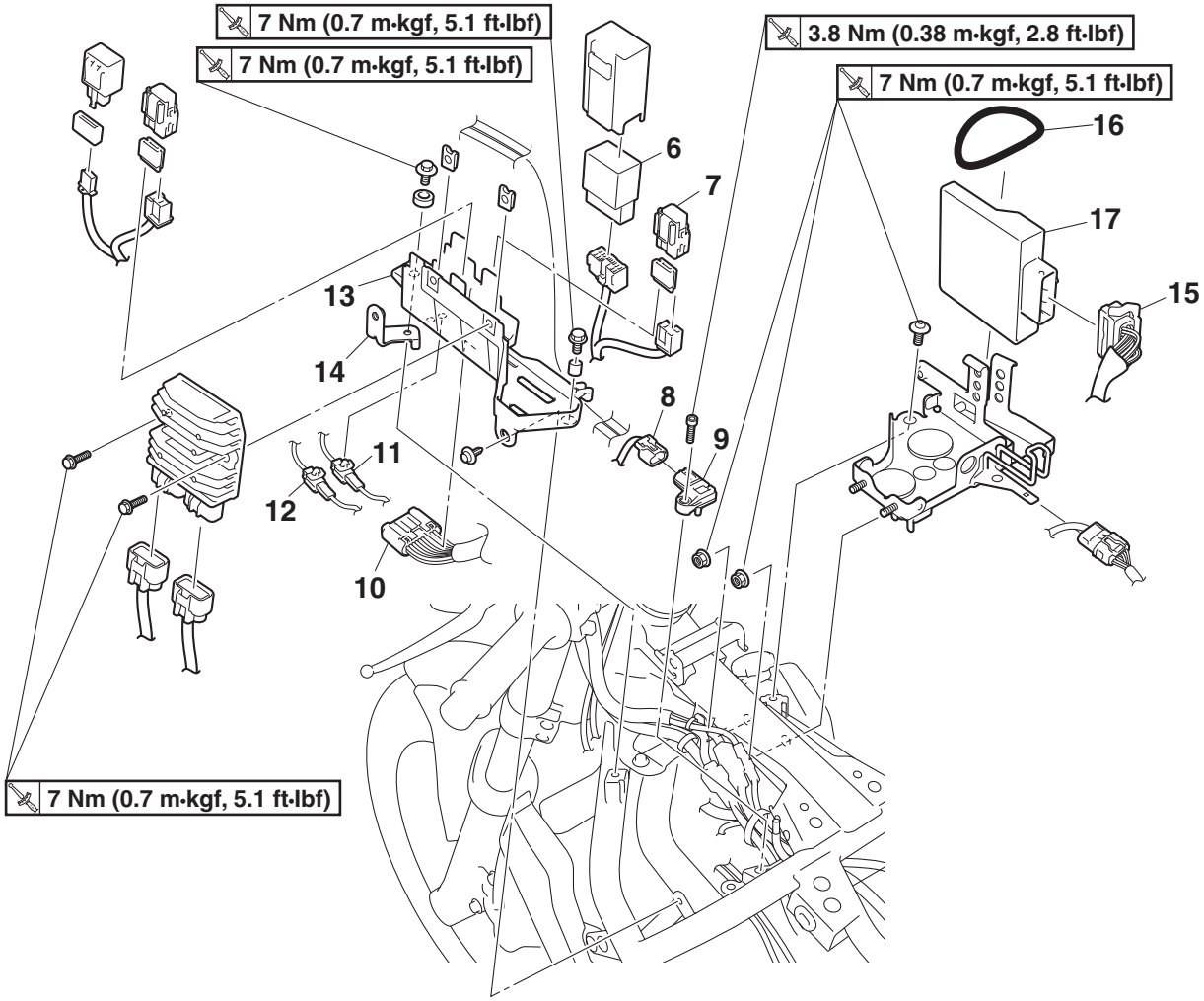
GENERAL CHASSIS (5)

Removing the electrical components tray



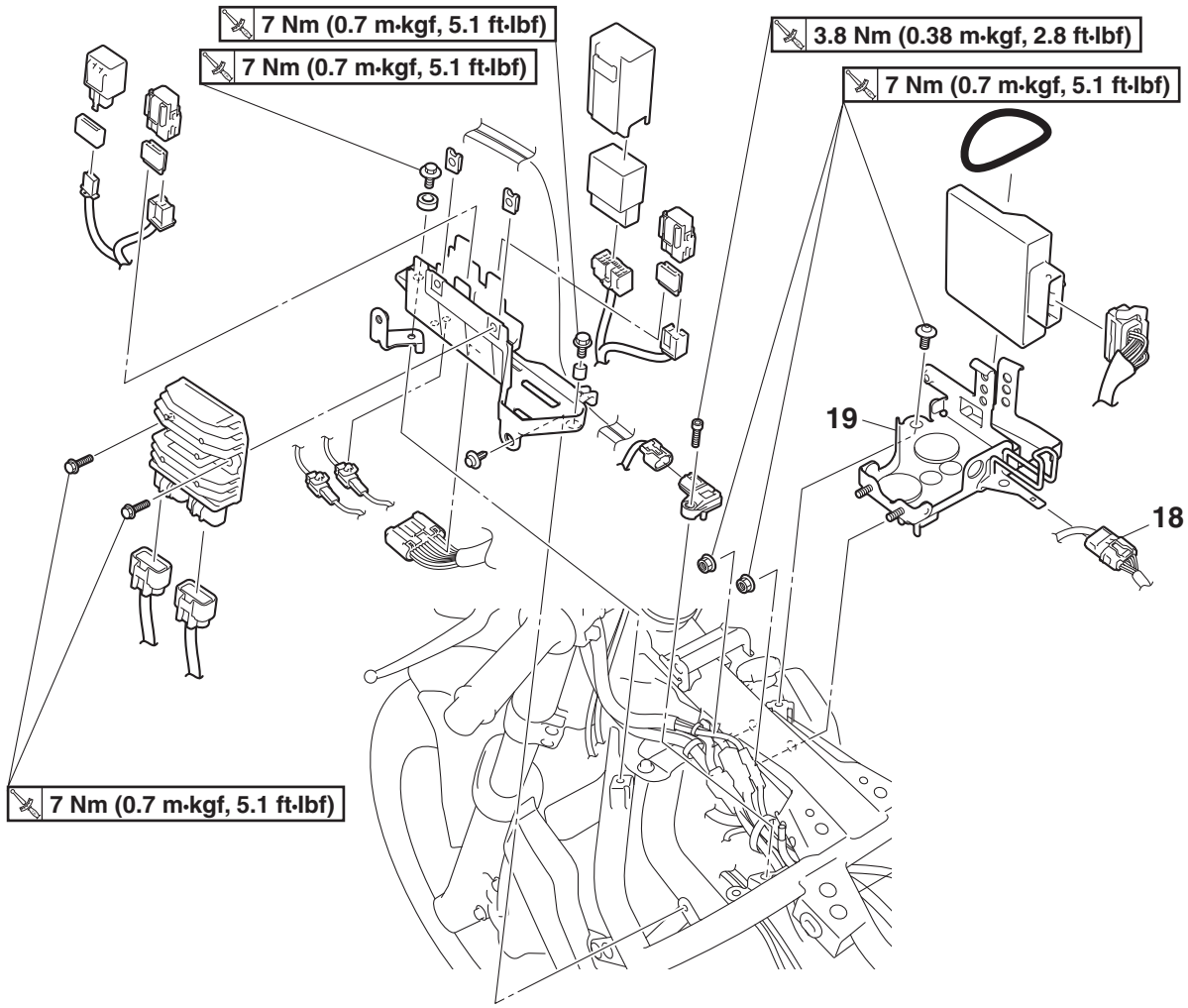
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Stator coil coupler	1	
2	Rectifier/regulator coupler	1	Disconnect.
3	Rectifier/regulator	1	
4	Turn signal/hazard relay	1	
5	Headlight relay	1	

Removing the electrical components tray



Order	Job/Parts to remove	Q'ty	Remarks
6	Relay unit	1	
7	Fan motor relay	1	
8	Intake air pressure sensor coupler	1	Disconnect.
9	Intake air pressure sensor	1	
10	Joint coupler	1	
11	Crankshaft position sensor coupler	1	
12	Fan motor coupler	1	
13	Electrical components tray 1	1	
14	Fuel tank cover bracket	1	
15	ECU coupler	1	Disconnect.
16	ECU band	1	
17	ECU (engine control unit)	1	

Removing the electrical components tray

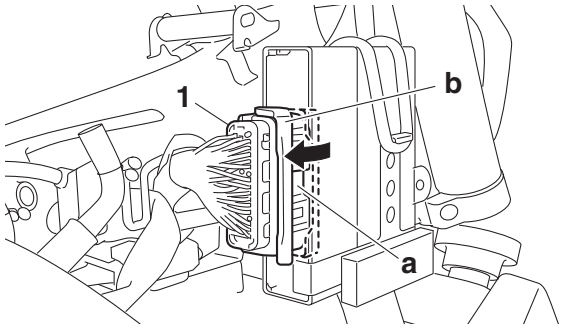


Order	Job/Parts to remove	Q'ty	Remarks
18	Sub-wire harness coupler	1	
19	Electrical components tray 2	1	

EAS31108
REMOVING THE ECU (engine control unit)
1. Disconnect:
   • ECU coupler “1”

TIP

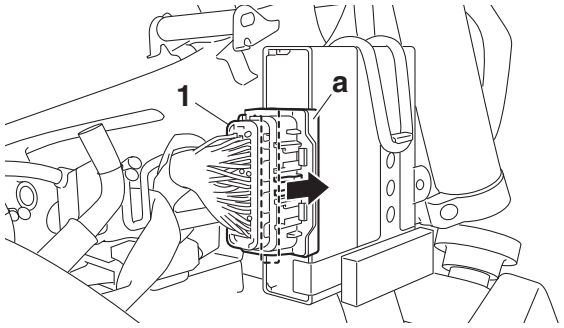
While pushing the portion “a” of the ECU coupler, move the lock lever “b” in the direction of the arrow shown to disconnect the coupler.



EAS31109
INSTALLING THE ECU (engine control unit)
1. Connect:
   • ECU coupler “1”

TIP

Connect the ECU coupler, and then push the lock lever “a” of the coupler in the direction of the arrow shown.

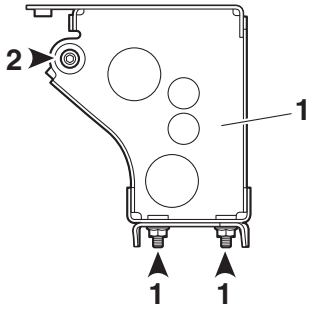


EAS31129
INSTALLING THE ELECTRICAL COMPONENTS TRAYS
1. Install:
   • Electrical components tray 2 “1”

	Electrical components tray 2 nut **7 Nm (0.7 m·kgf, 5.1 ft·lbf)** **Electrical components tray 2 bolt** **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

Tighten the electrical components tray 2 nuts and bolt in the proper tightening sequence as shown.

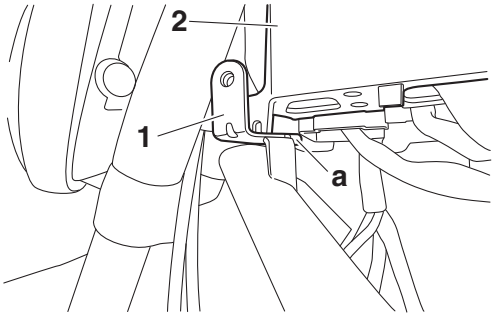


2. Install:
   • Fuel tank cover bracket “1”
   • Electrical components tray 1 “2”

	Electrical components tray 1 bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

Make sure that the projection “a” on the fuel tank cover bracket contacts the frame.

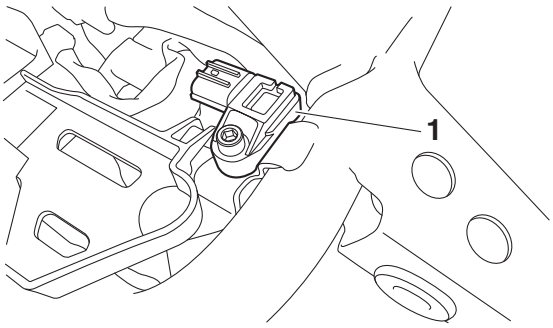


3. Install:
   • Intake air pressure sensor “1”

	Intake air pressure sensor bolt **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

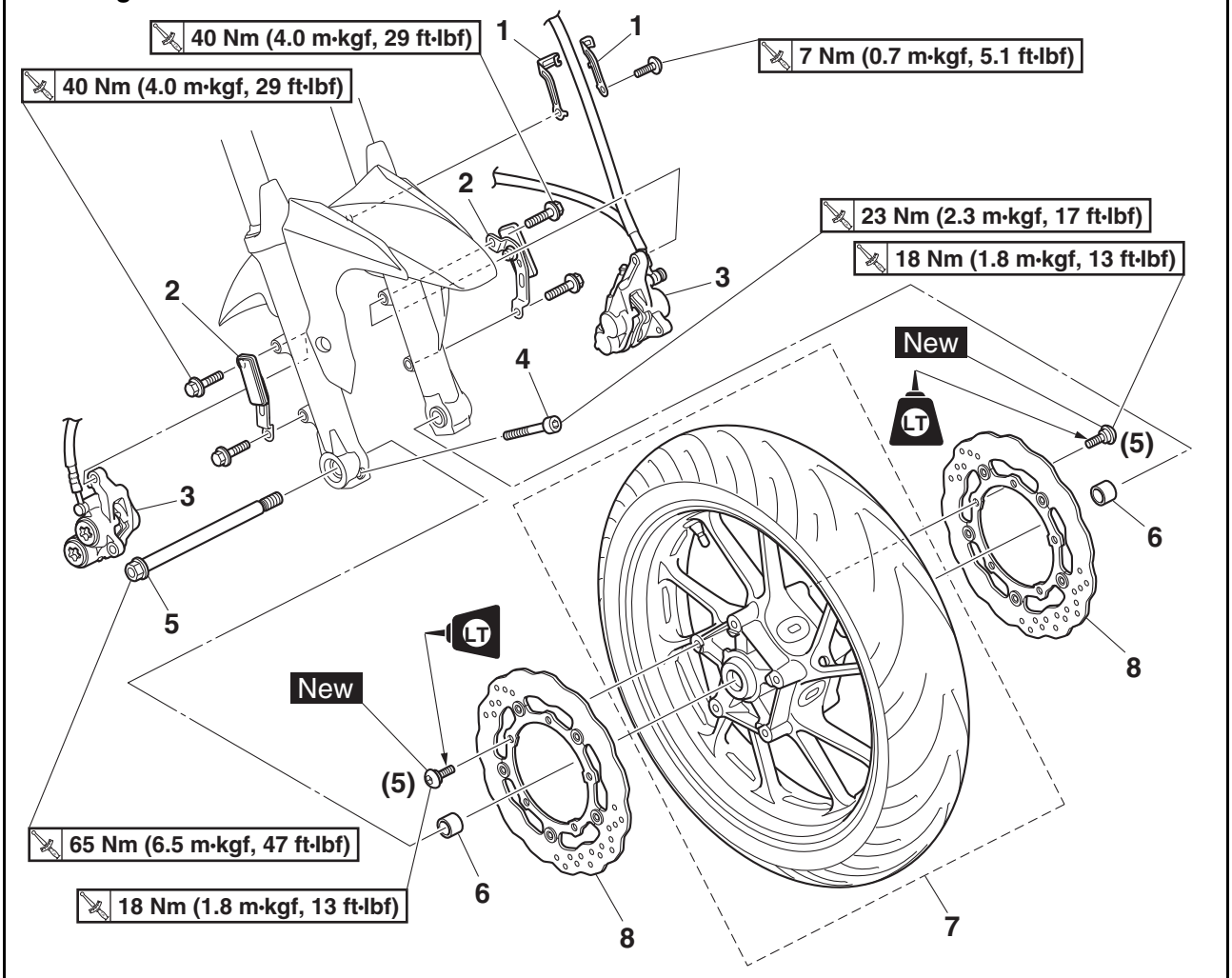
TIP

Make sure that the intake air pressure sensor contacts the frame.



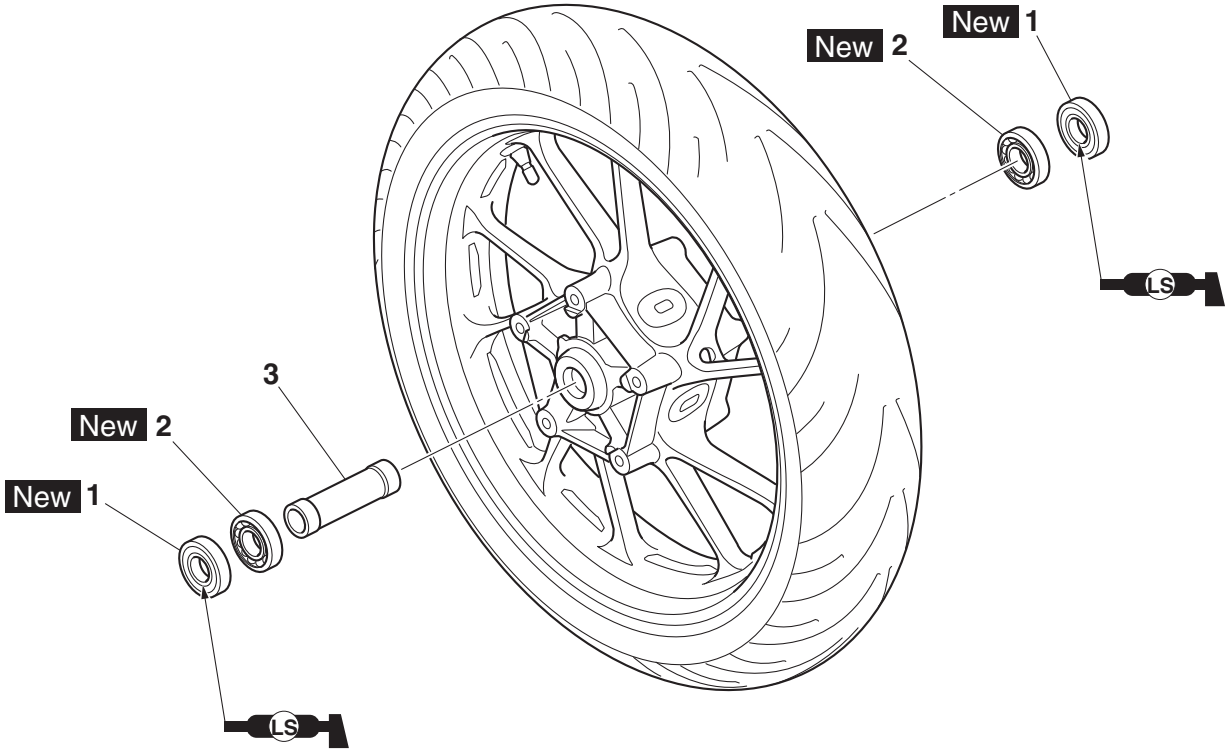
EAS20028
FRONT WHEEL

Removing the front wheel and brake discs



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake hose holder	2	
2	Front reflector	2	
3	Front brake caliper	2	
4	Wheel axle pinch bolt	1	Loosen.
5	Front wheel axle	1	
6	Collar	2	
7	Front wheel	1	
8	Front brake disc	2	

Disassembling the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Wheel bearing	2	
3	Spacer	1	

EAS30145
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.

2. Remove:
   - Front brake hose holders
   - Front reflectors
   - Front brake calipers

TIP

Do not apply the brake lever when removing the brake caliper.

3. Elevate:
   - Front wheel

TIP

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

4. Loosen:
   - Front wheel axle pinch bolt
5. Remove:
   - Front wheel axle
   - Front wheel

EAS30146
DISASSEMBLING THE FRONT WHEEL

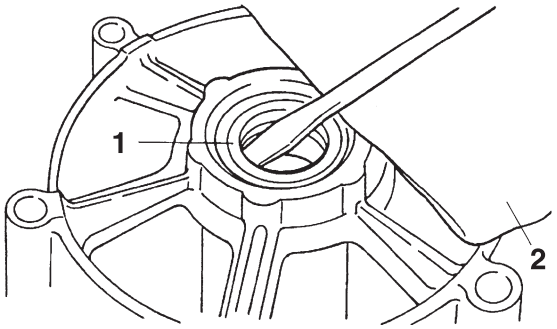
1. Remove:
   - Oil seal
   - Wheel bearings

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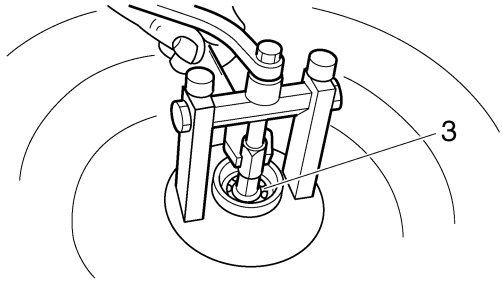
a. Clean the surface of the front wheel hub.
b. Remove the oil seals “1” with a flat-head screwdriver.

TIP

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



c. Remove the wheel bearings “3” with a general bearing puller.



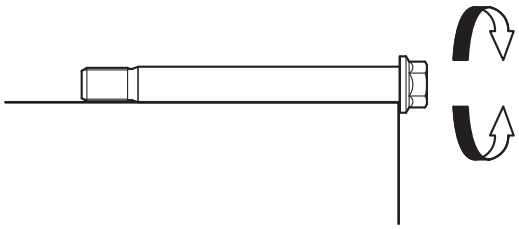
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EAS30147
CHECKING THE FRONT WHEEL

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

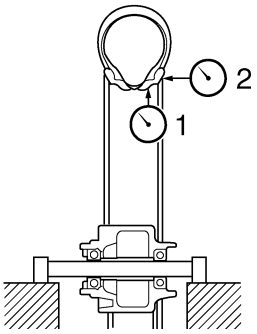
EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

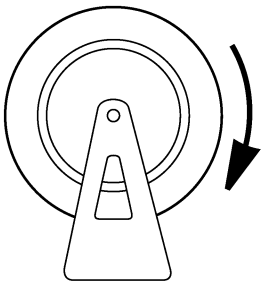


2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” on page 3-16 and “CHECKING THE WHEELS” on page 3-16.
3. Measure:
   - Radial wheel runout “1”
   - Lateral wheel runout “2”
     Over the specified limits → Replace.

Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
0.5 mm (0.02 in)



4. Check:
   - Wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - Oil seal
     Damage/wear → Replace.



EAS30151
ASSEMBLING THE FRONT WHEEL

1. Install:
   - Wheel bearings New
   - Oil seals New

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a. Install the new wheel bearing (right side).

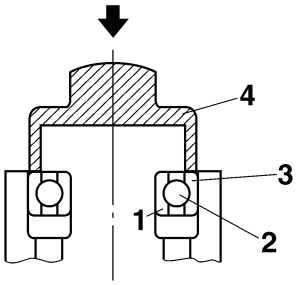
ECA18110

NOTICE

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

TIP

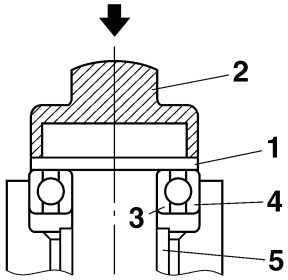
Use a socket "4" that matches the diameter of the wheel bearing outer race.



b. Install the spacer.
c. Install the new wheel bearing (left side).

TIP

Place a suitable washer "1" between the socket "2" and the bearing so that both the inner race "3" and outer race "4" are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer "5".



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EAS30152
ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

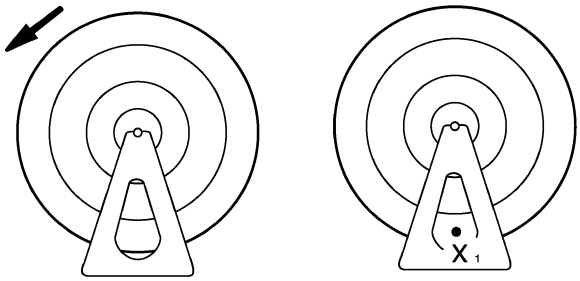
1. Remove:
   - Balancing weight(s)
2. Find:
   - Front wheel's heavy spot

TIP

Place the front wheel on a suitable balancing stand.

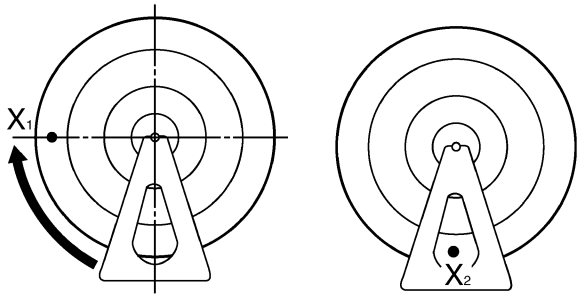
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a. Spin the front wheel.
b. When the front wheel stops, put an "X_1" mark at the bottom of the wheel.



c. Turn the front wheel 90° so that the "X_1" mark is positioned as shown.

d. Release the front wheel.
e. When the wheel stops, put an "X_2" mark at the bottom of the wheel.



f. Repeat steps (c) through (e) several times until all the marks come to rest at the same spot.
g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

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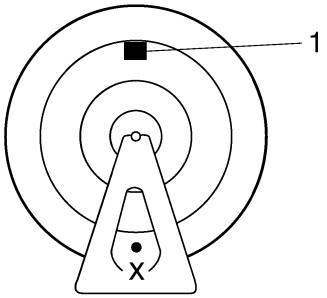
3. Adjust:
   • Front wheel static balance

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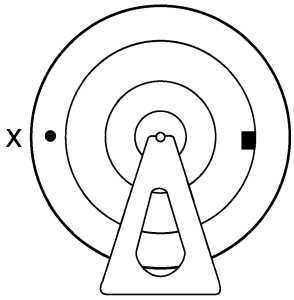
a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

TIP

Start with the lightest weight.



b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



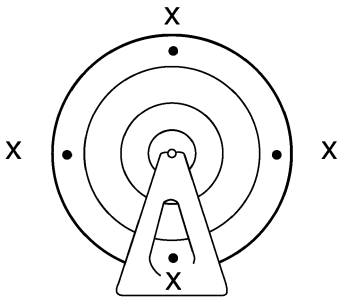
c. If the heavy spot does not stay in that position, install a heavier weight.
d. Repeat steps (b) and (c) until the front wheel is balanced.

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4. Check:
   • Front wheel static balance

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a. Turn the front wheel and make sure it stays at each position shown.



b. If the front wheel does not remain stationary at all of the positions, rebalance it.

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EAS30932
INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

1. Install:
   • Front brake discs

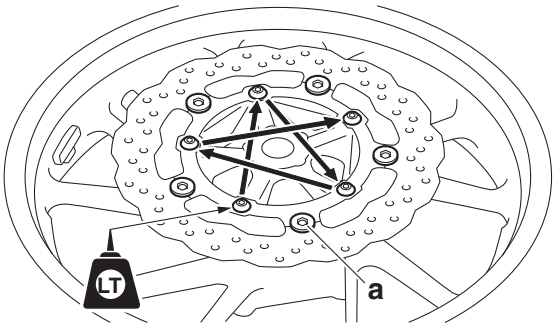
	**Front brake disc bolt** **18 Nm (1.8 m·kgf, 13 ft·lbf)** **LOCTITE®**

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

- Install each front brake disc so that the chamfered portions of the rivets "a" face outward.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



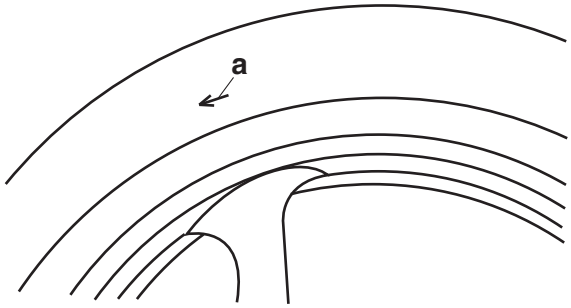
2. Check:
   • Front brake discs
   Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-38.
3. Lubricate:
   • Oil seal lips

Recommended lubricant
Lithium-soap-based grease

4. Install:
   • Collars
   • Front wheel
   • Front wheel axle

TIP

Install the front wheel with the mark "a" on the front tire pointing in the direction of wheel rotation.



5. Tighten:
   • Front wheel axle
   • Front wheel axle pinch bolt

Front wheel axle
65 Nm (6.5 m·kgf, 47 ft·lbf)
Front wheel axle pinch bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)

ECA19760

NOTICE

Before tightening the wheel axle, push down hard on the handlebars several times and check if the front fork rebounds smoothly.

TIP

First, tighten the wheel axle, then the wheel axle pinch bolt.

6. Install:
   • Front brake calipers
   • Front reflectors
   • Front brake hose holders "1"

Front brake caliper bolt
40 Nm (4.0 m·kgf, 29 ft·lbf)
Front brake hose holder bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

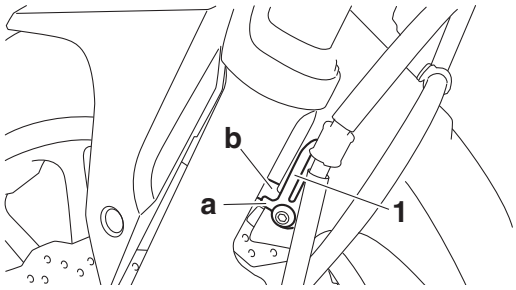
EWA13500

WARNING

Make sure the brake hose is routed properly.

TIP

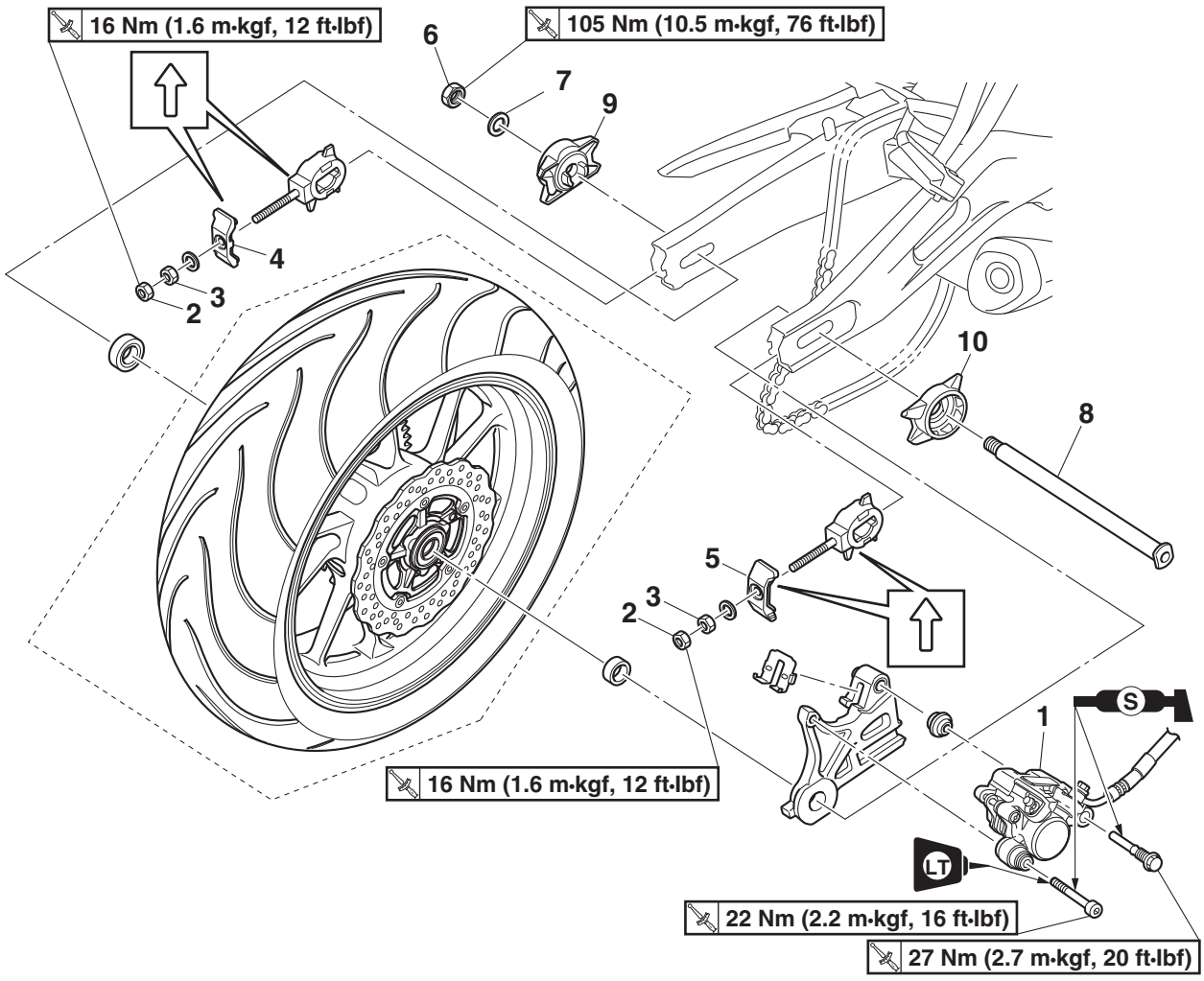
Install the front brake hose holder so that the projection "a" on the holder contacts the stopper "b" on the front fork.



EAS20029

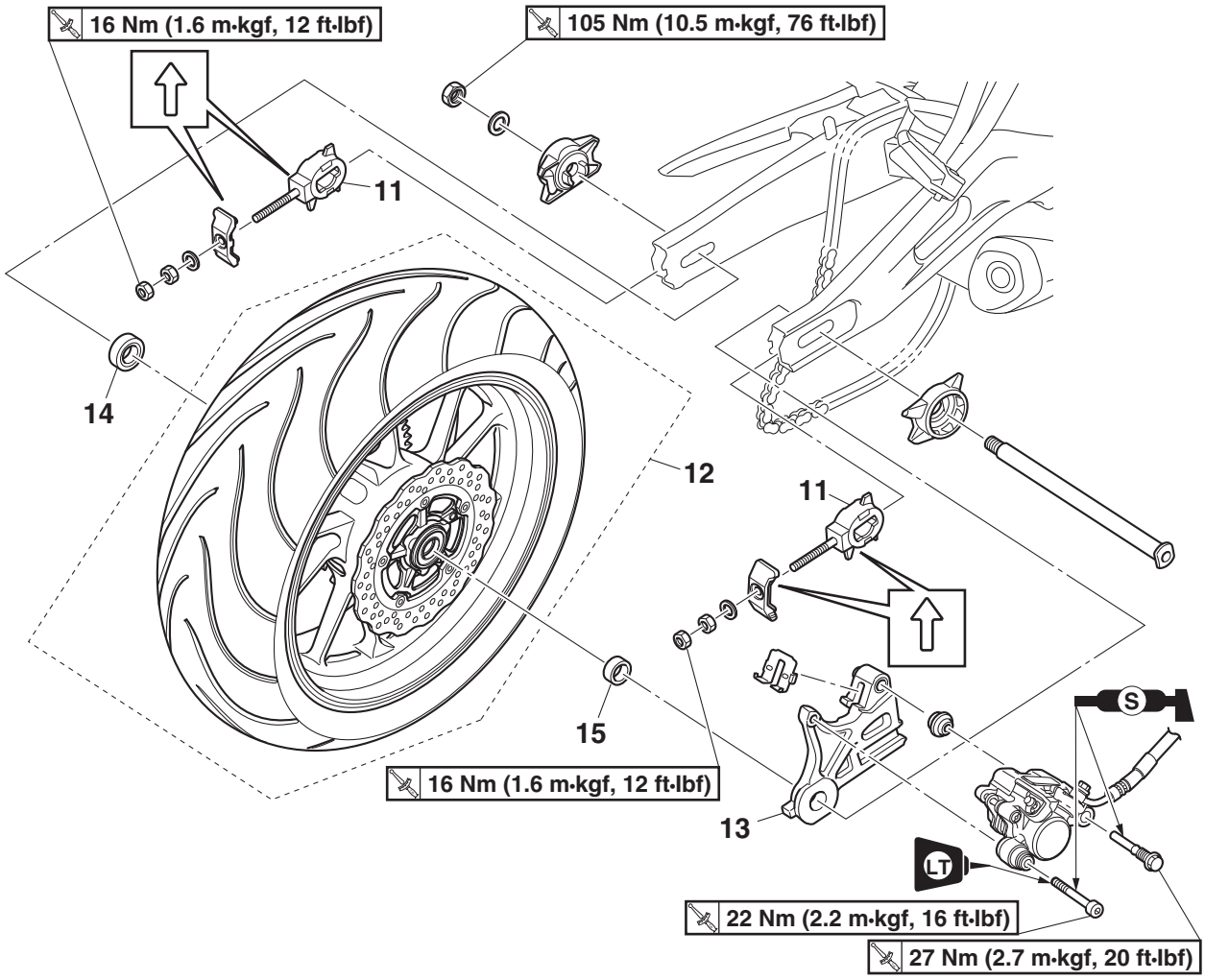
REAR WHEEL

Removing the rear wheel



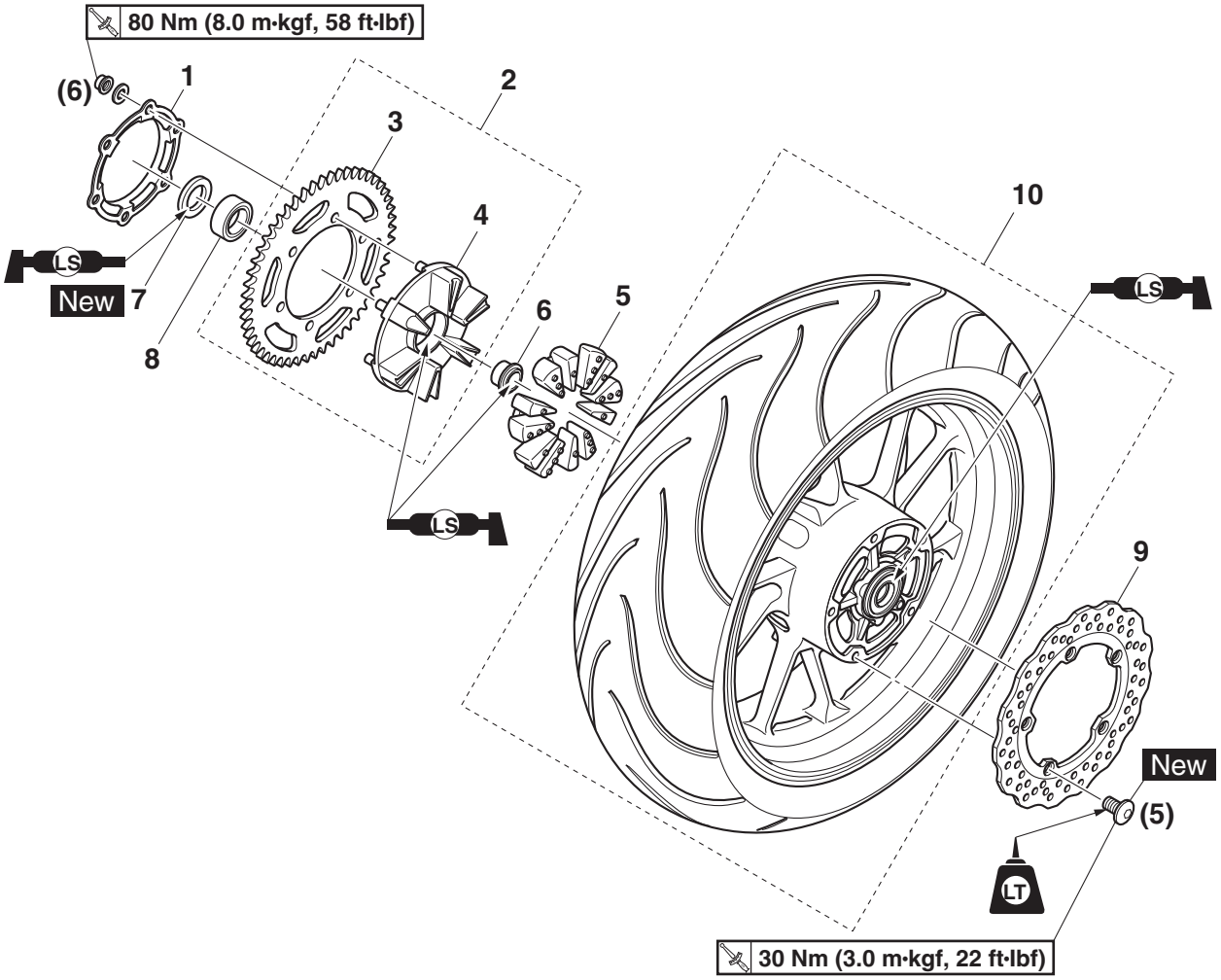
Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper	1	
2	Drive chain puller locknut	2	Loosen.
3	Drive chain adjusting nut	2	Loosen.
4	Swingarm end plate (left)	1	
5	Swingarm end plate (right)	1	
6	Wheel axle nut	1	
7	Washer	1	
8	Rear wheel axle	1	
9	Drive chain slack adjusting plate (left)	1	
10	Drive chain slack adjusting plate (right)	1	

Removing the rear wheel



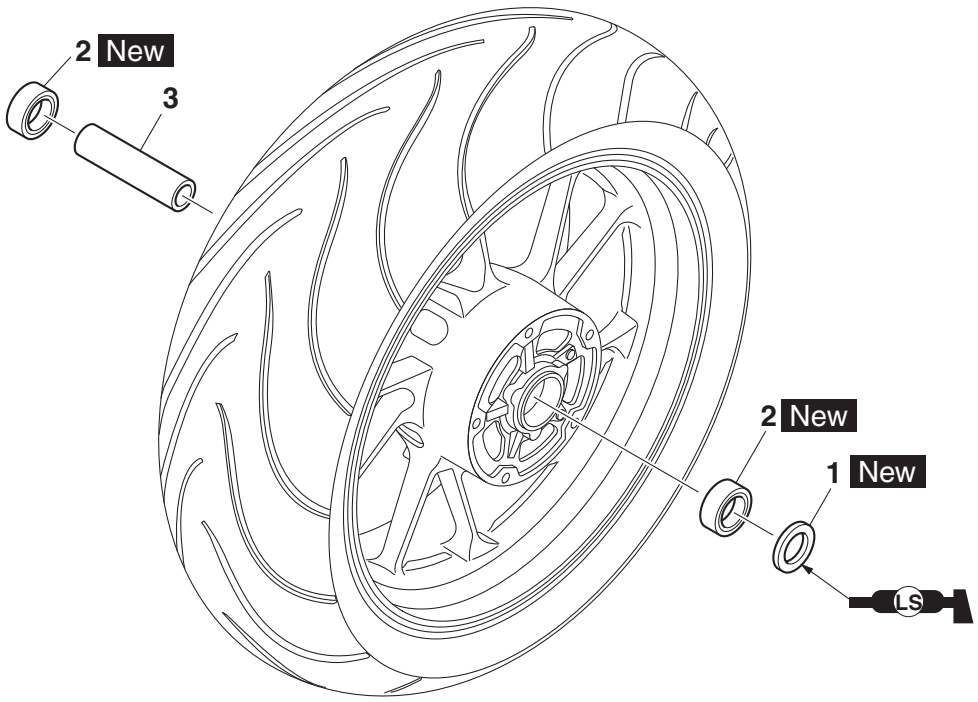
Order	Job/Parts to remove	Q'ty	Remarks
11	Chain puller	2	
12	Rear wheel	1	
13	Brake caliper bracket	1	
14	Collar (left)	1	
15	Collar (right)	1	

Removing the rear brake disc and rear wheel sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Bracket	1	
2	Rear wheel sprocket assembly	1	
3	Rear wheel sprocket	1	
4	Rear wheel drive hub	1	
5	Rear wheel drive hub damper	6	
6	Collar	1	
7	Oil seal	1	
8	Bearing	1	
9	Rear brake disc	1	
10	Rear wheel	1	

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Wheel bearing	2	
3	Spacer	1	

EAS30156
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

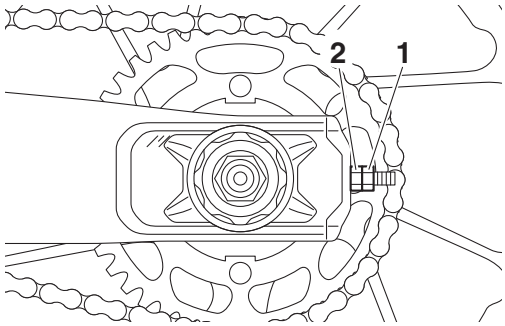
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - Rear brake caliper

TIP

Do not depress the brake pedal when removing the brake caliper.

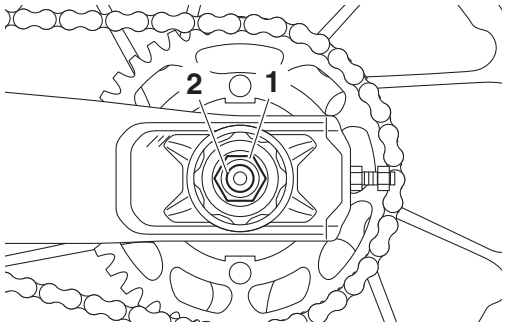
3. Loosen:
   - Chain puller locknuts "1"
   - Drive chain adjusting nuts "2"



4. Remove:
   - Wheel axle nut "1"
   - Washer
   - Rear wheel axle "2"
   - Drive chain slack adjusting plates
   - Rear wheel

TIP

Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.



EAS30158
DISASSEMBLING THE REAR WHEEL

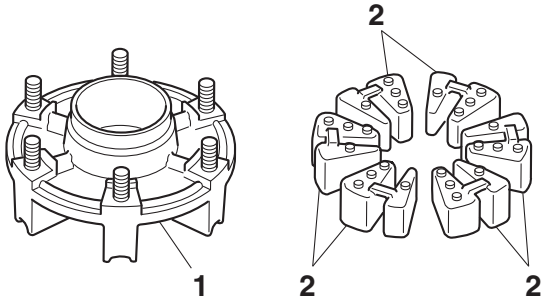
1. Remove:
   - Oil seal
   - Wheel bearings
   Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-20.

EAS30159
CHECKING THE REAR WHEEL

1. Check:
   - Rear wheel axle
   - Wheel bearings
   - Oil seal
   Refer to "CHECKING THE FRONT WHEEL" on page 4-20.
2. Check:
   - Tire
   - Rear wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-16 and "CHECKING THE WHEELS" on page 3-16.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout
   Refer to "CHECKING THE FRONT WHEEL" on page 4-20.

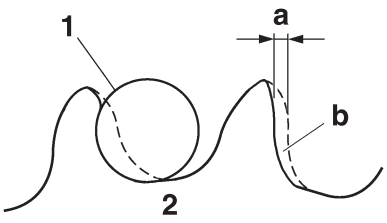
EAS30160
CHECKING THE REAR WHEEL DRIVE HUB

1. Check:
   - Rear wheel drive hub "1"
   Cracks/damage → Replace.
   - Rear wheel drive hub dampers "2"
   Damage/wear → Replace.



EAS30161
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
   - Rear wheel 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.

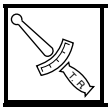


b. Correct
1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
• Rear wheel sprocket

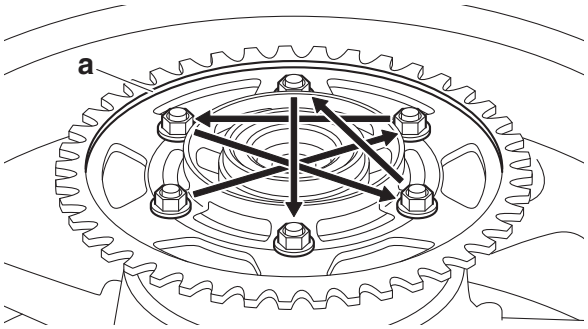
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a. Remove the rear wheel sprocket nuts, bracket, and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install a new rear wheel sprocket.

	**Rear wheel sprocket nut** **80 Nm (8.0 m·kgf, 58 ft·lbf)**

TIP

- Install the rear wheel sprocket so that the stepped side “a” of the sprocket faces away from the hub.
- Tighten the rear wheel sprocket nuts in stages and in a crisscross pattern.



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EAS30163
ASSEMBLING THE REAR WHEEL

1. Install:
   - Wheel bearings New
   - Oil seal New
     Refer to “ASSEMBLING THE FRONT WHEEL” on page 4-21.

EAS30164
ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
   - Rear wheel static balance
     Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-21.

EAS30165
INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Install:
   - Rear brake disc

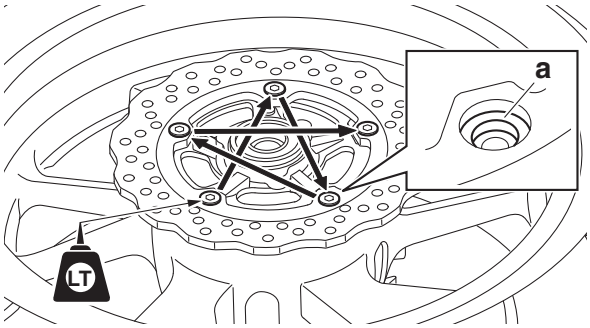
	**Rear brake disc bolt** **30 Nm (3.0 m·kgf, 22 ft·lbf)** **LOCTITE®**

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

- Install the brake disc so that the recessed portions of the bolt holes “a” face away from the hub.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



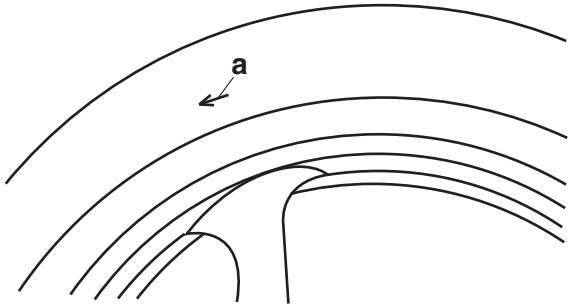
2. Install:
   - Rear wheel sprocket
     Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-28.
3. Check:
   - Rear brake disc
     Refer to “CHECKING THE REAR BRAKE DISC” on page 4-52.
4. Lubricate:
   - Oil seal lips

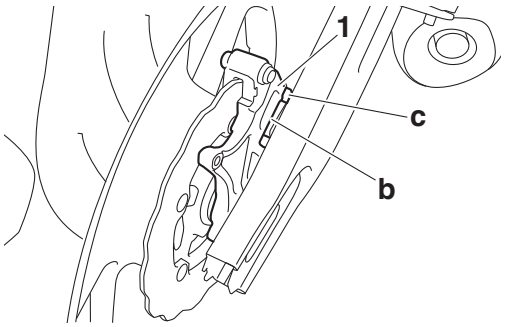
Recommended lubricant
Lithium-soap-based grease

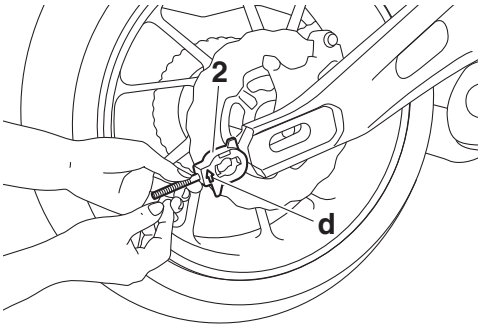
5. Install:
   - Collar (right)
   - Collar (left)
   - Brake caliper bracket “1”
   - Rear wheel
   - Chain pullers “2”
   - Drive chain slack adjusting plates
   - Rear wheel axle
   - Washer
   - Wheel axle nut
   - Swingarm end plates “3”

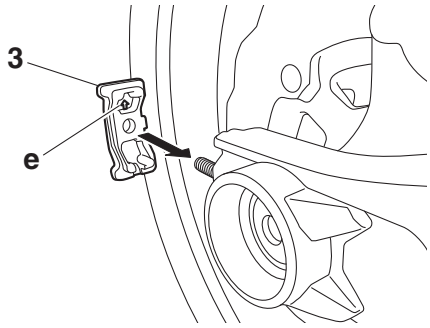
TIP

- Install the rear wheel with the mark “a” on the rear tire pointing in the direction of wheel rotation.
- Align the projection “b” in the swingarm with the slot “c” of the brake caliper bracket.
- Make sure that the arrow mark “d” on each chain puller points upward.
- Make sure that the arrow mark “e” on each swingarm end plate points upward.

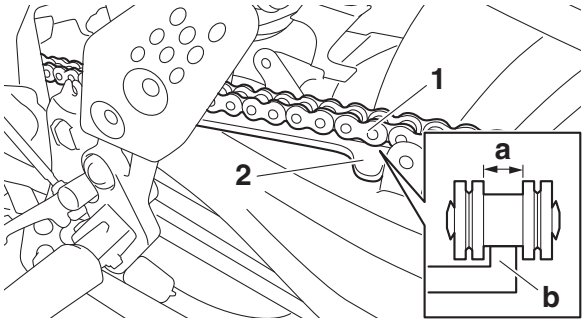








6. Install:
   - Rear brake caliper
   - Rear brake caliper retaining bolt
   - Rear brake caliper bolt
7. Fit the space “a” between the side plates of the drive chain “1” onto the rib “b” on the drive chain guide “2”.



8. Adjust:
   - Drive chain slack
     Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-17.

Drive chain slack
51.0–56.0 mm (2.01–2.20 in)

9. Tighten:
   - Wheel axle nut
   - Rear brake caliper retaining bolt
   - Rear brake caliper bolt



Wheel axle nut
105 Nm (10.5 m·kgf, 76 ft·lbf)
Rear brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)
Rear brake caliper bolt
22 Nm (2.2 m·kgf, 16 ft·lbf)
LOCTITE®

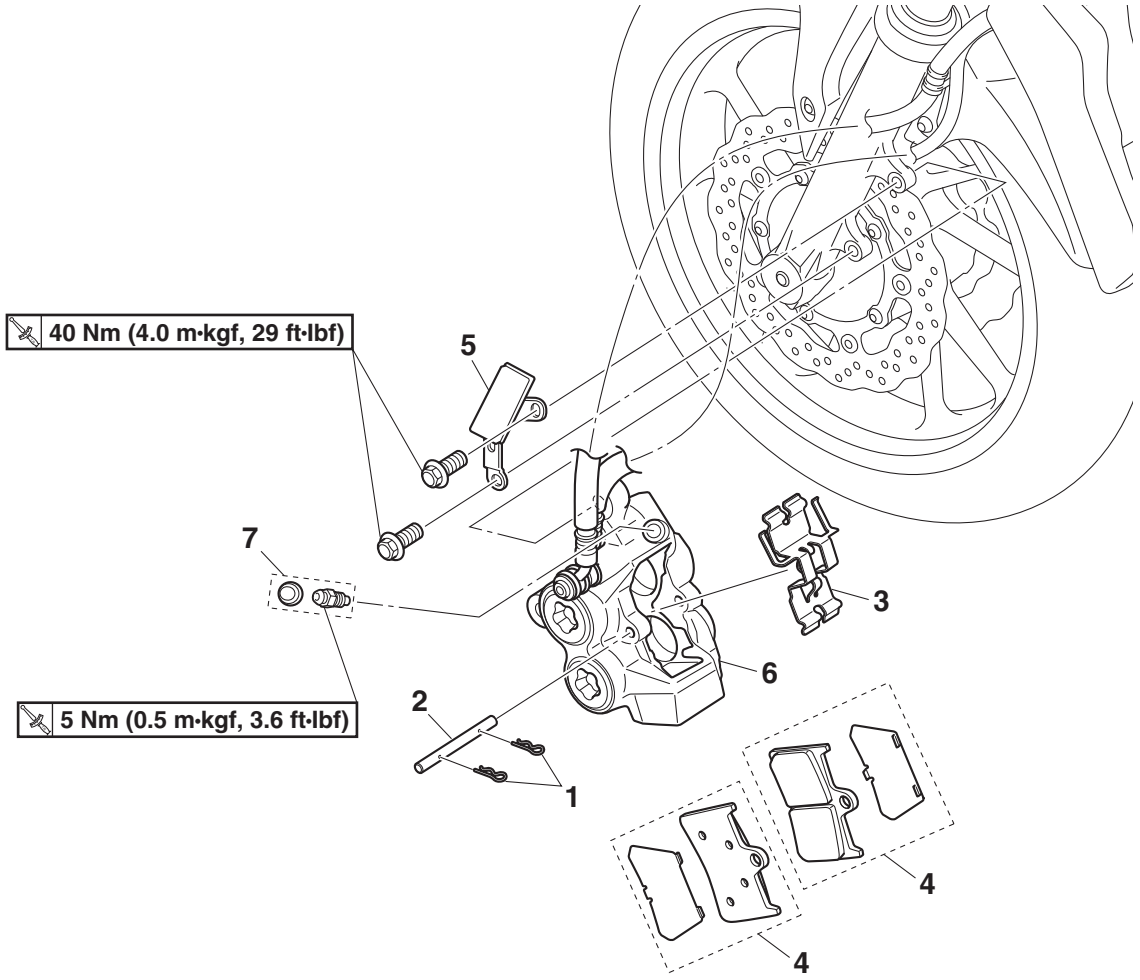
EWA13500

⚠ WARNING

Make sure the brake hose is routed properly.

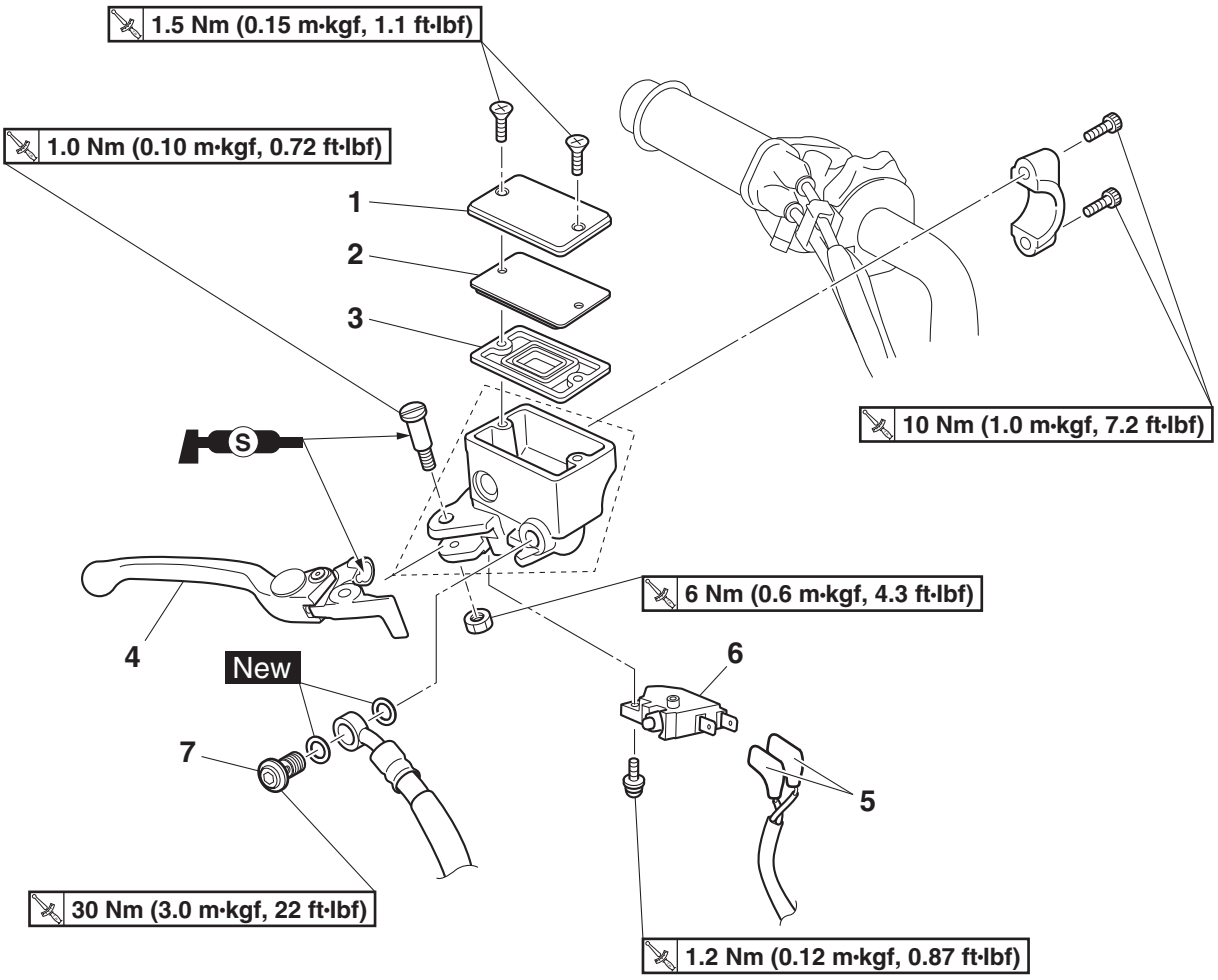
EAS20030
FRONT BRAKE

Removing the front brake pads



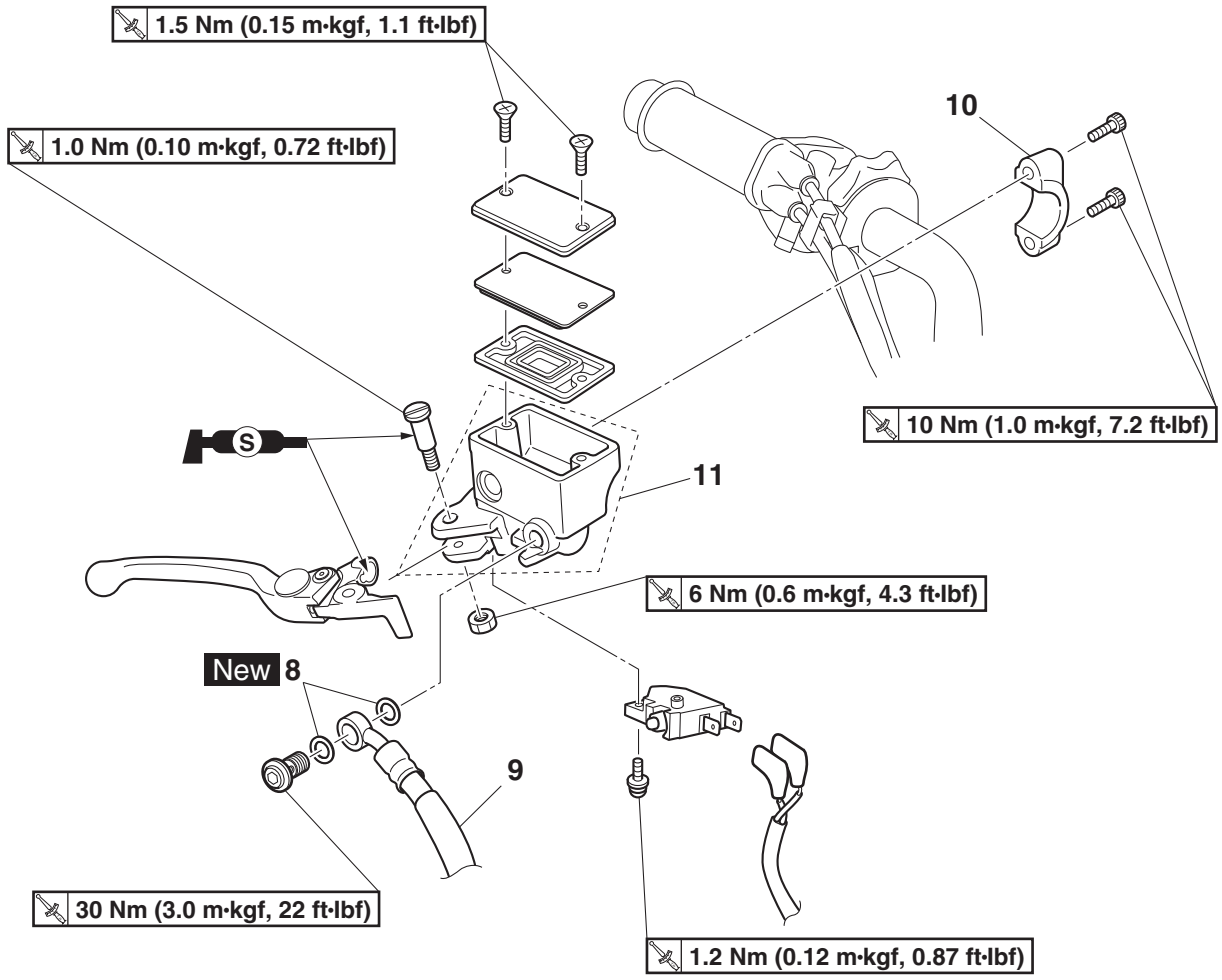
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Front reflector	1	
6	Front brake caliper	1	
7	Brake caliper bleed screw	1	

Removing the front brake master cylinder



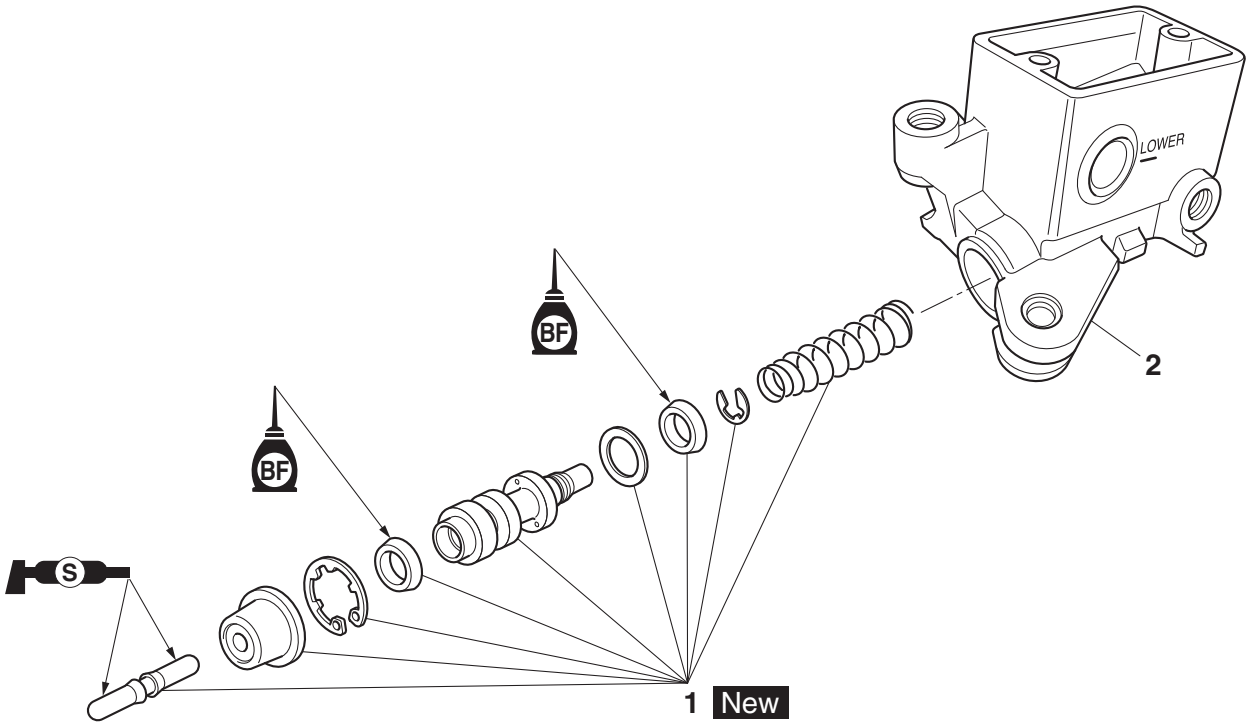
Order	Job/Parts to remove	Q'ty	Remarks
	Rearview mirror (right)		Refer to "HANDLEBAR" on page 4-59.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.
6	Front brake light switch	1	
7	Front brake hose union bolt (master cylinder side)	1	

Removing the front brake master cylinder



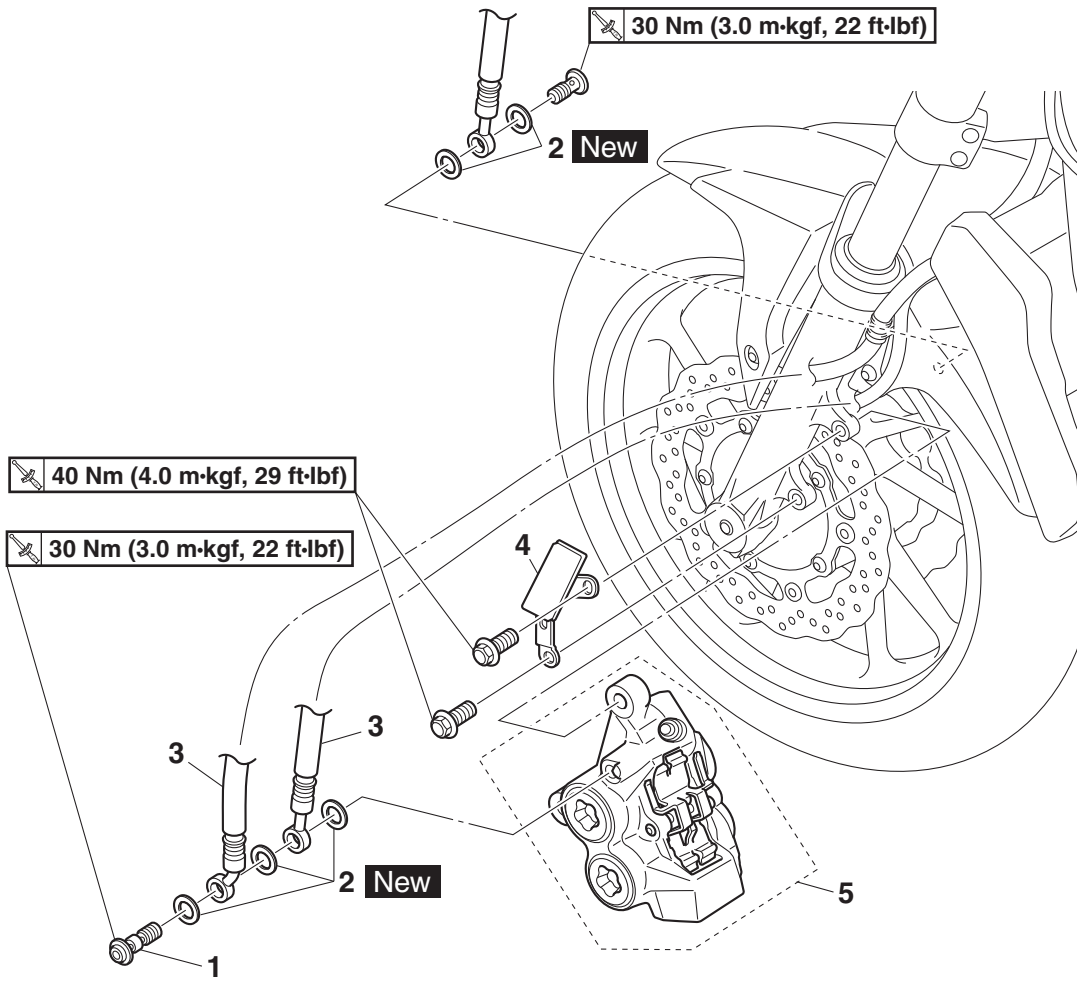
Order	Job/Parts to remove	Q'ty	Remarks
8	Brake hose gasket	2	
9	Brake hose	1	
10	Front brake master cylinder holder	1	
11	Front brake master cylinder assembly	1	

Disassembling the front brake master cylinder



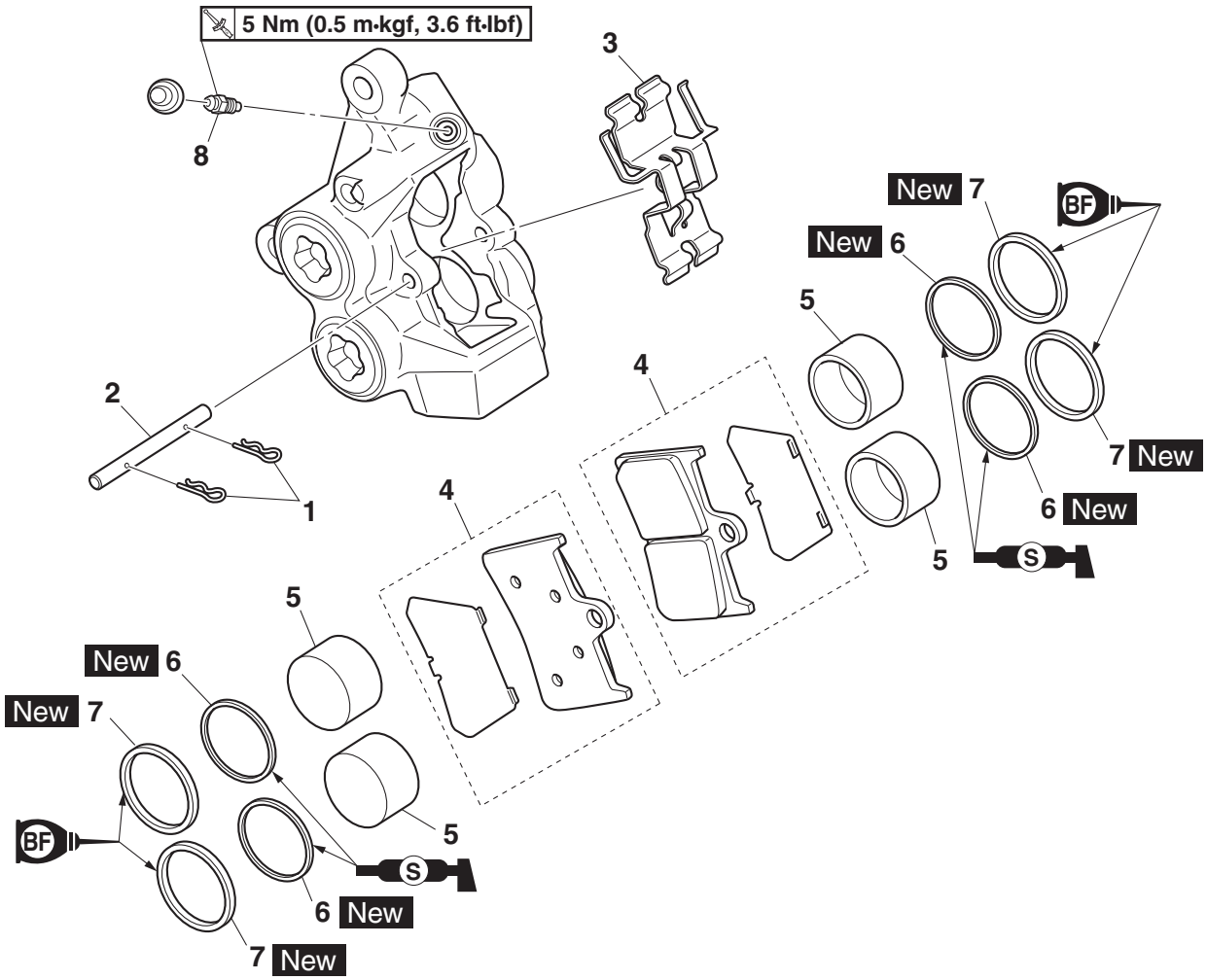
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	

Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Front brake hose union bolt (brake caliper side)	1	
2	Brake hose gasket	5	
3	Brake hose	2	
4	Front reflector	1	
5	Front brake caliper	1	

Disassembling the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Brake caliper piston	4	
6	Brake caliper piston dust seal	4	
7	Brake caliper piston seal	4	
8	Brake caliper bleed screw	1	

EAS30168
INTRODUCTION
EWA14101
WARNING

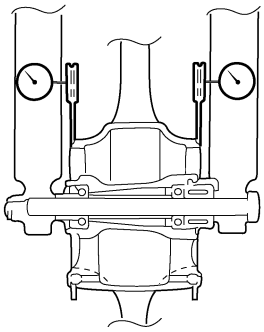
Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, 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.**

EAS30169
CHECKING THE FRONT BRAKE DISCS
The following procedure applies to both brake discs.
1. Remove:
   - Front wheel
     Refer to “FRONT WHEEL” on page 4-18.
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.

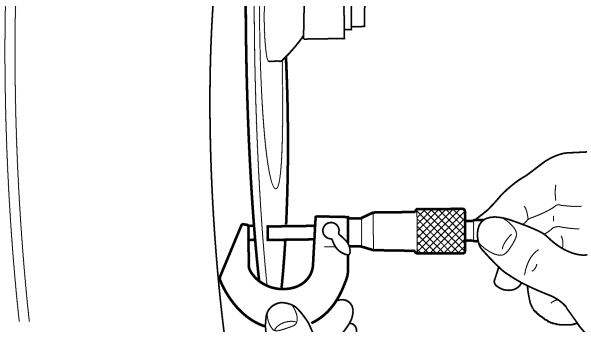
Brake disc runout limit (as measured on wheel)
0.10 mm (0.0039 in)

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a. Place the vehicle on a suitable stand so that the front wheel is elevated.
b. Before measuring the 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 1.5 mm (0.06 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
4.0 mm (0.16 in)



5. Adjust:
   - Brake disc deflection

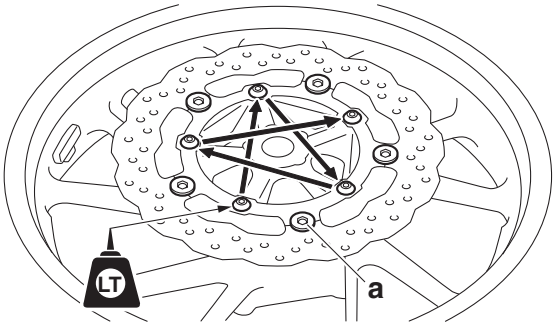
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a. Remove the brake disc.
b. Rotate the brake disc by one bolt hole.
c. Install the brake disc.

Front brake disc bolt
18 Nm (1.8 m·kgf, 13 ft·lbf)
LOCTITE®

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP
- Install each front brake disc so that the chamfered portions of the rivets “a” face outward.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



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 4-18.

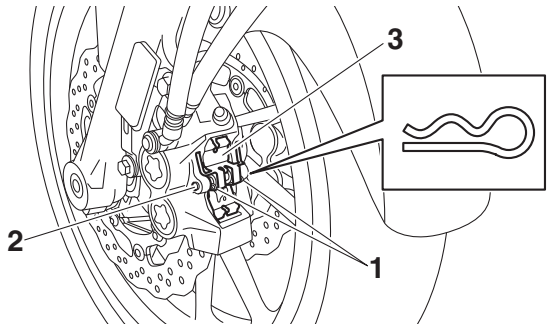
EAS30170
REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

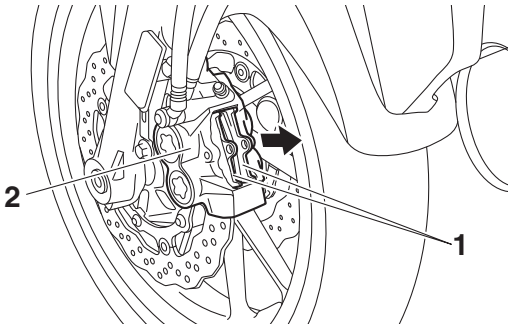
TIP

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

1. Remove:
   • Brake pad clips "1"
   • Brake pad pin "2"
   • Brake pad spring "3"

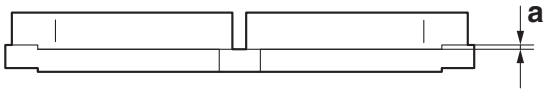


2. Remove:
   • Brake pads "1"
   • Front brake caliper "2"



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

Brake pad lining thickness (inner)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)
Brake pad lining thickness (outer)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)



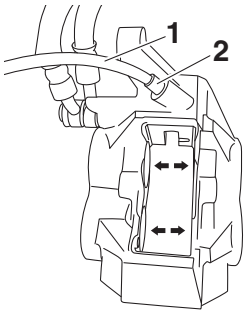
4. Install:
   • Brake pads
   • Brake pad spring

TIP

Always install new brake pads and new 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.



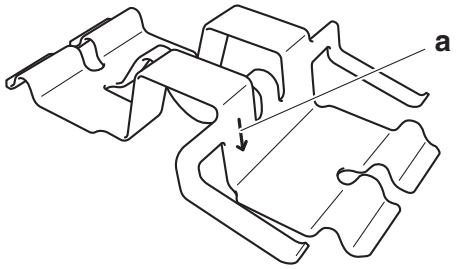
c. Tighten the bleed screw.

	Brake caliper bleed screw 5 Nm (0.5 m·kgf, 3.6 ft·lbf)

d. Install the new brake pad shims, new brake pads, and a new brake pad spring.

TIP

The arrow mark "a" on the brake pad spring must point in the direction of disc rotation.

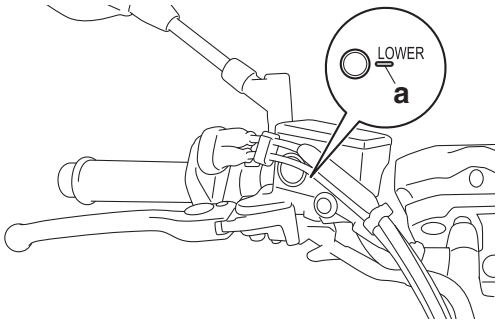


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5. Install:
   - Brake pad pin
   - Brake pad clips
   - Front brake caliper

	Front brake caliper bolt 40 Nm (4.0 m·kgf, 29 ft·lbf)

6. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



7. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS30724

REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

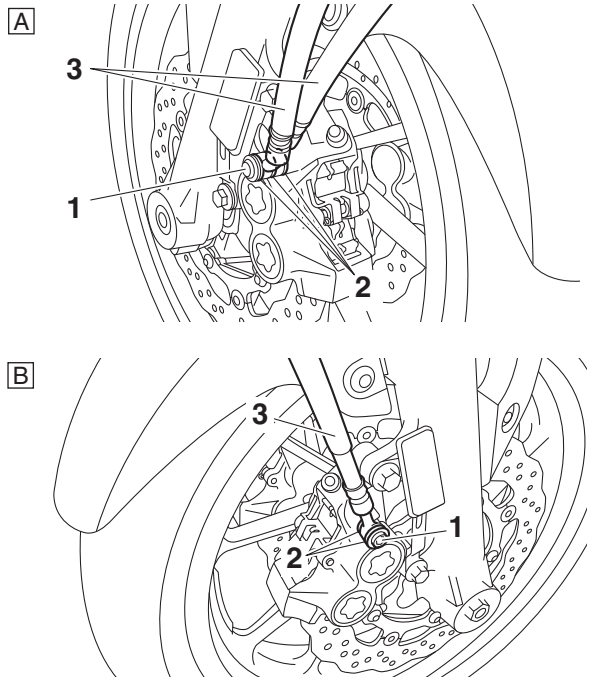
TIP

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

1. Remove:
   - Brake hose union bolt "1"
   - Brake hose gaskets "2"
   - Brake hoses "3"

TIP

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



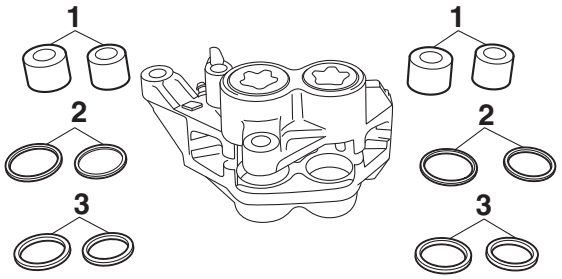
A. Left side

B. Right side

EAS30172
DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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

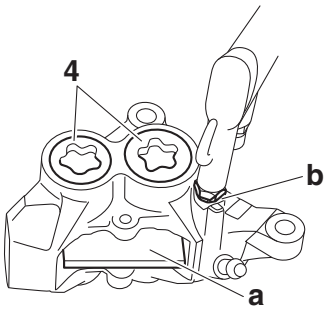


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a. Secure the right side brake caliper pistons with a piece of wood “a”.
b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWA17060
WARNING

- **Never try to pry out the brake caliper pistons.**
- **Do not loosen the bolts “4”.**



c. Remove the brake caliper piston dust seals and brake caliper piston seals.
d. Repeat the previous steps to force out the right side pistons from the brake caliper.

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EAS30173
CHECKING THE FRONT BRAKE CALIPERS

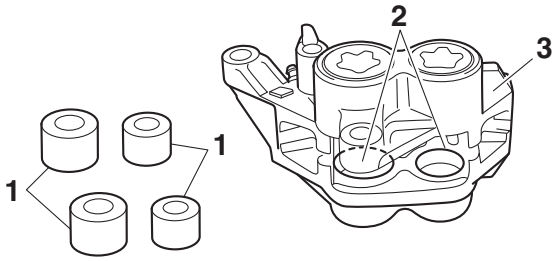
The following procedure applies to both of the brake calipers.

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Piston dust seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years 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.

EWA13611
WARNING

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



EAS30174
ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13621
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 brake caliper piston dust seals and brake caliper piston seals to swell and distort.**

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

Specified brake fluid
DOT 4

EAS30175
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Front brake caliper "1"
   - Brake hose gaskets "2" New
   - Brake hoses "3"
   - Brake hose union bolt "4"

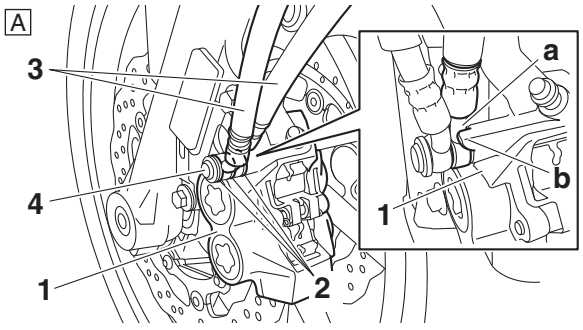
Front brake hose union bolt (brake caliper side)
30 Nm (3.0 m·kgf, 22 ft·lbf)

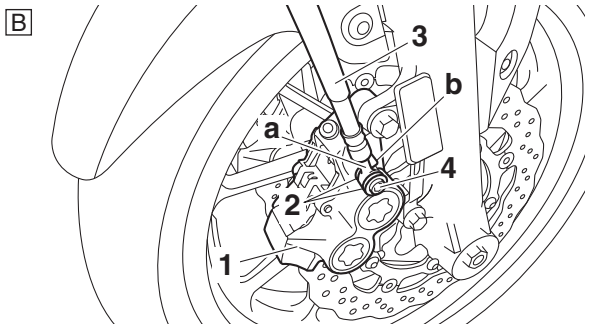
EWA13530
⚠ WARNING

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

ECA20851
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.
• There should be 0.5–1.5 mm (0.020–0.059 in) of clearance between the brake pipes. (Left side only)





A. Left side
B. Right side

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

Front brake caliper bolt
40 Nm (4.0 m·kgf, 29 ft·lbf)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-39.

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

Specified brake fluid
DOT 4

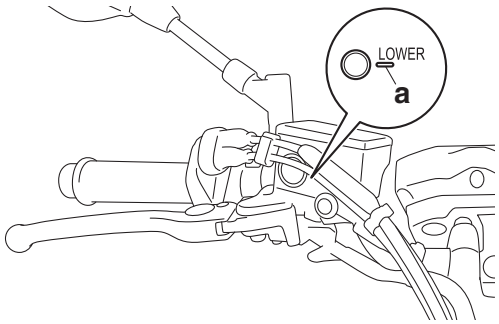
EWA13090
⚠ WARNING

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

ECA13540
NOTICE

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

4. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
5. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



6. Check:
   • Brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS30179
REMOVING THE FRONT BRAKE MASTER CYLINDER

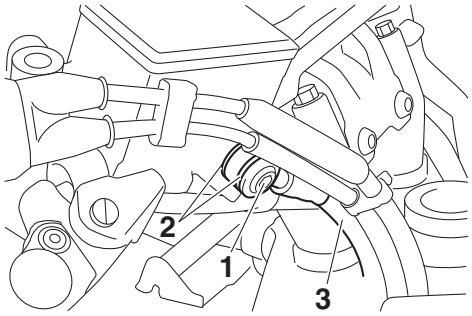
TIP

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

1. Disconnect:
   • Brake light switch connectors
   (from the front brake light switch)
2. Remove:
   • Brake hose union bolt "1"
   • Brake hose gaskets "2"
   • Brake hose "3"

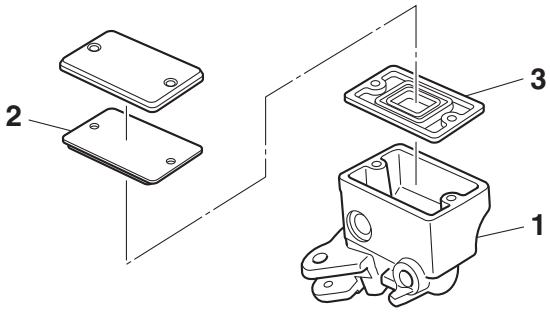
TIP

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



EAS30725
CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
   • Brake master cylinder
   Damage/scratches/wear → Replace.
   • Brake fluid delivery passages
   (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 "1"
   • Brake master cylinder reservoir diaphragm holder "2"
   Cracks/damage → Replace.
   • Brake master cylinder reservoir diaphragm "3"
   Damage/wear → Replace.



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

EAS30181
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

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

Specified brake fluid
DOT 4

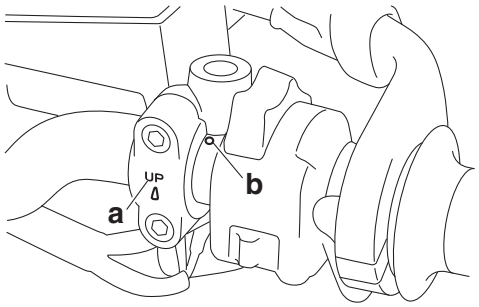
EAS30182
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   - Front brake master cylinder assembly
   - Front brake master cylinder holder

Front brake master cylinder holder bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Install the front brake master cylinder holder with the "UP" mark "a" facing up.
- Align the end of the front brake master cylinder holder with the punch mark "b" on the handlebar.
- First, tighten the upper bolt, then the lower bolt.
- There should be more than 11 mm (0.43 in) for clearance between the right handlebar switch and the front brake master cylinder holder. Also, the punch mark should be seen.



2. Install:
   - Brake hose
   - Brake hose gaskets New
   - Brake hose union bolt

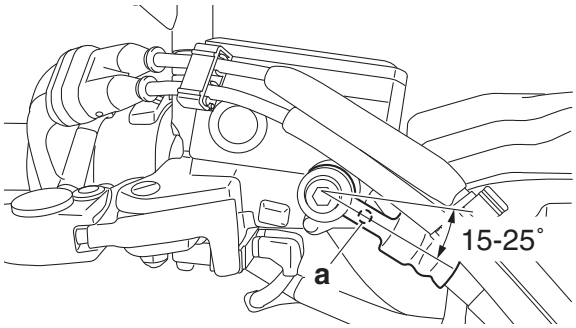
Front brake hose union bolt (master cylinder side)
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530
WARNING

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

TIP

- Install the brake pipe so that paint mark "a" on the pipe faces to the rear of the vehicle.
- Attach the brake hose so that its angle is 15° to 25° against the straight line in parallel with the ceiling plane of the master cylinder.
- While holding the brake hose, tighten the union bolt as shown.
- 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 specified brake fluid)

Specified brake fluid
DOT 4

EWA13540
WARNING

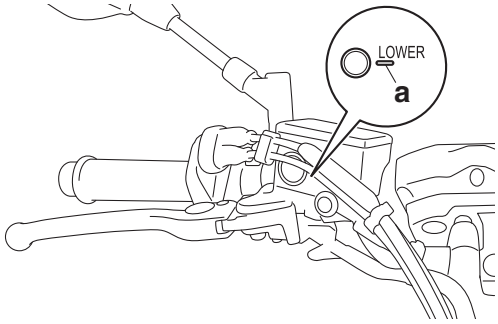
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor 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 3-14.

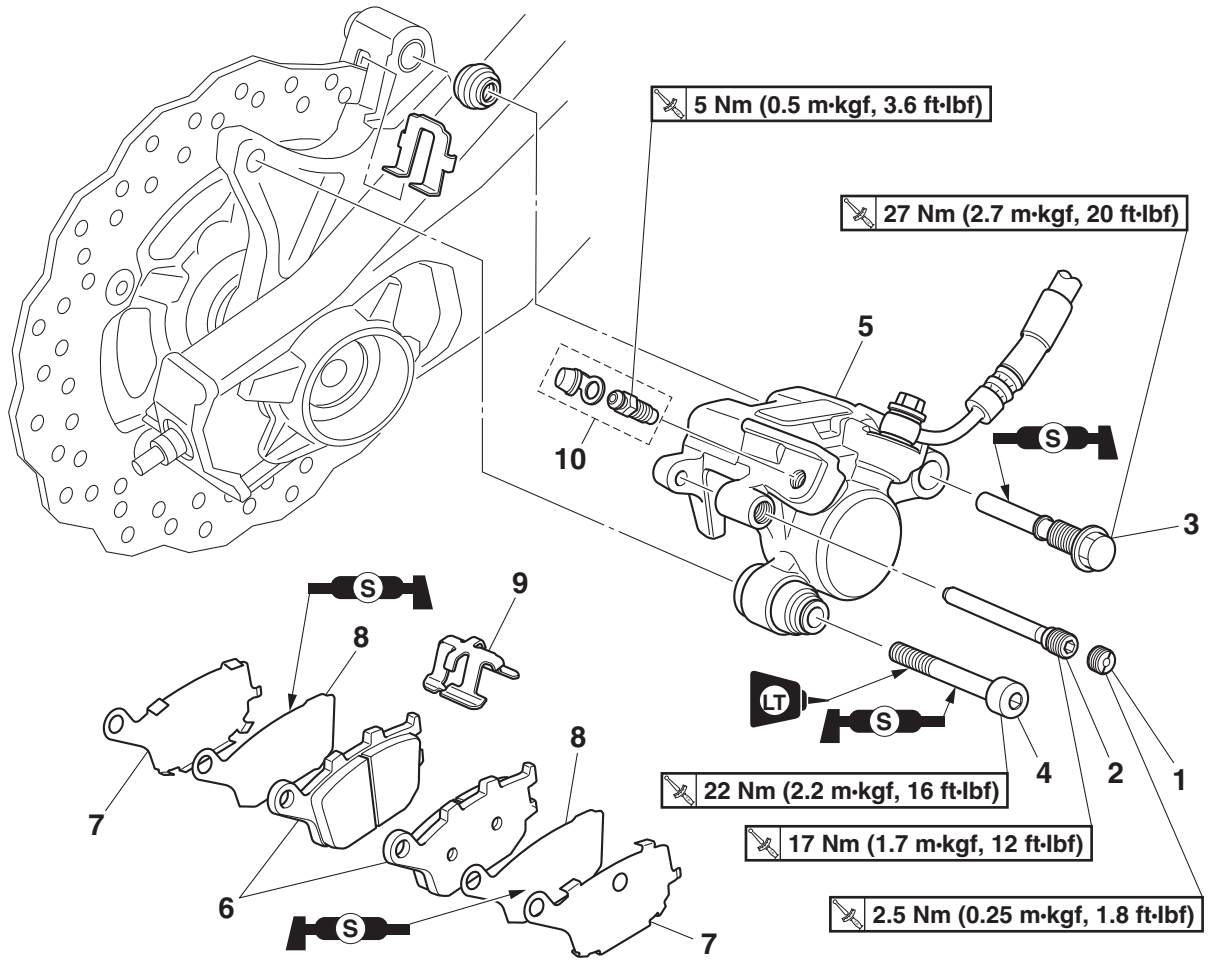
5. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



6. Check:
   • Brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

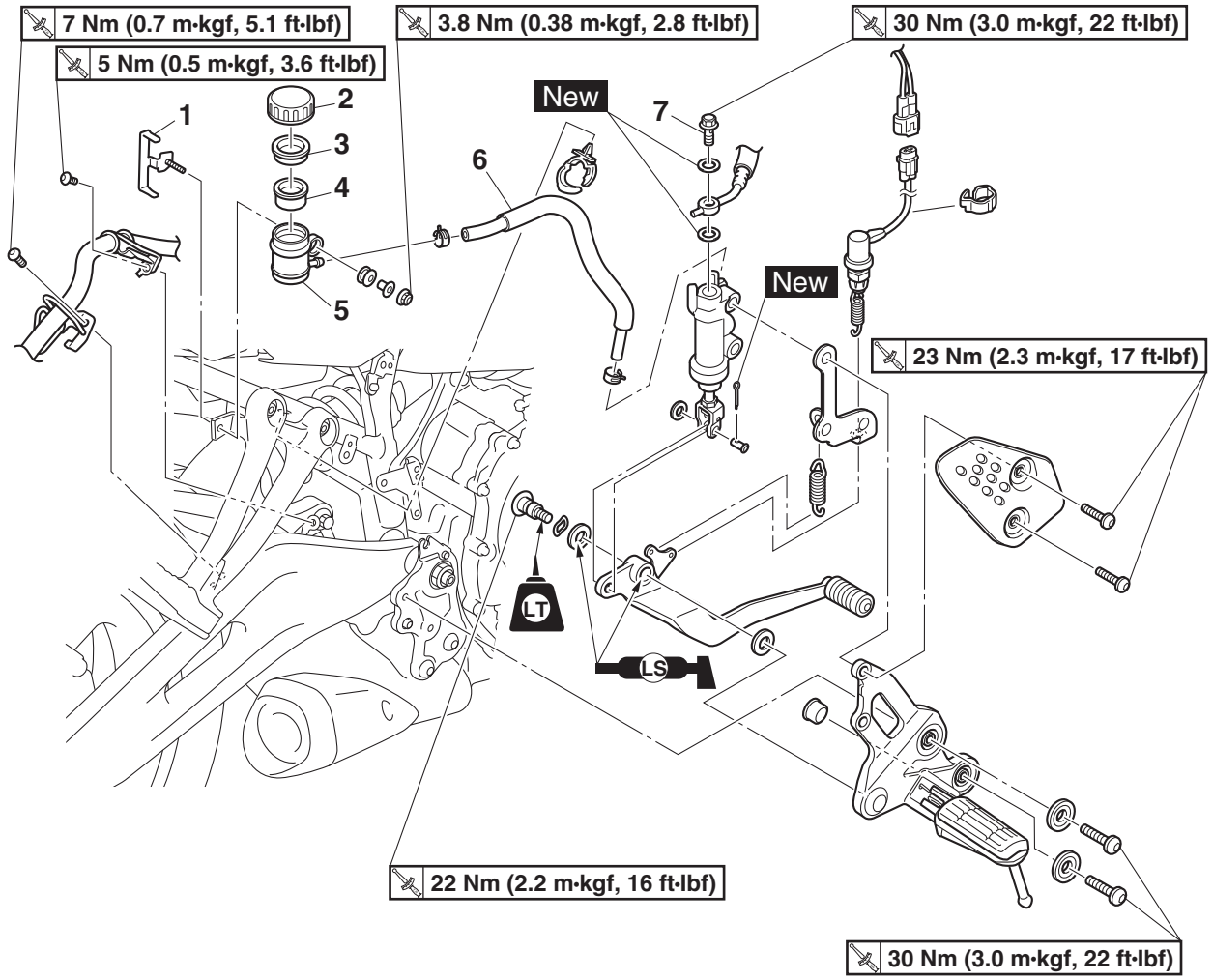
EAS20031
REAR BRAKE

Removing the rear brake pads



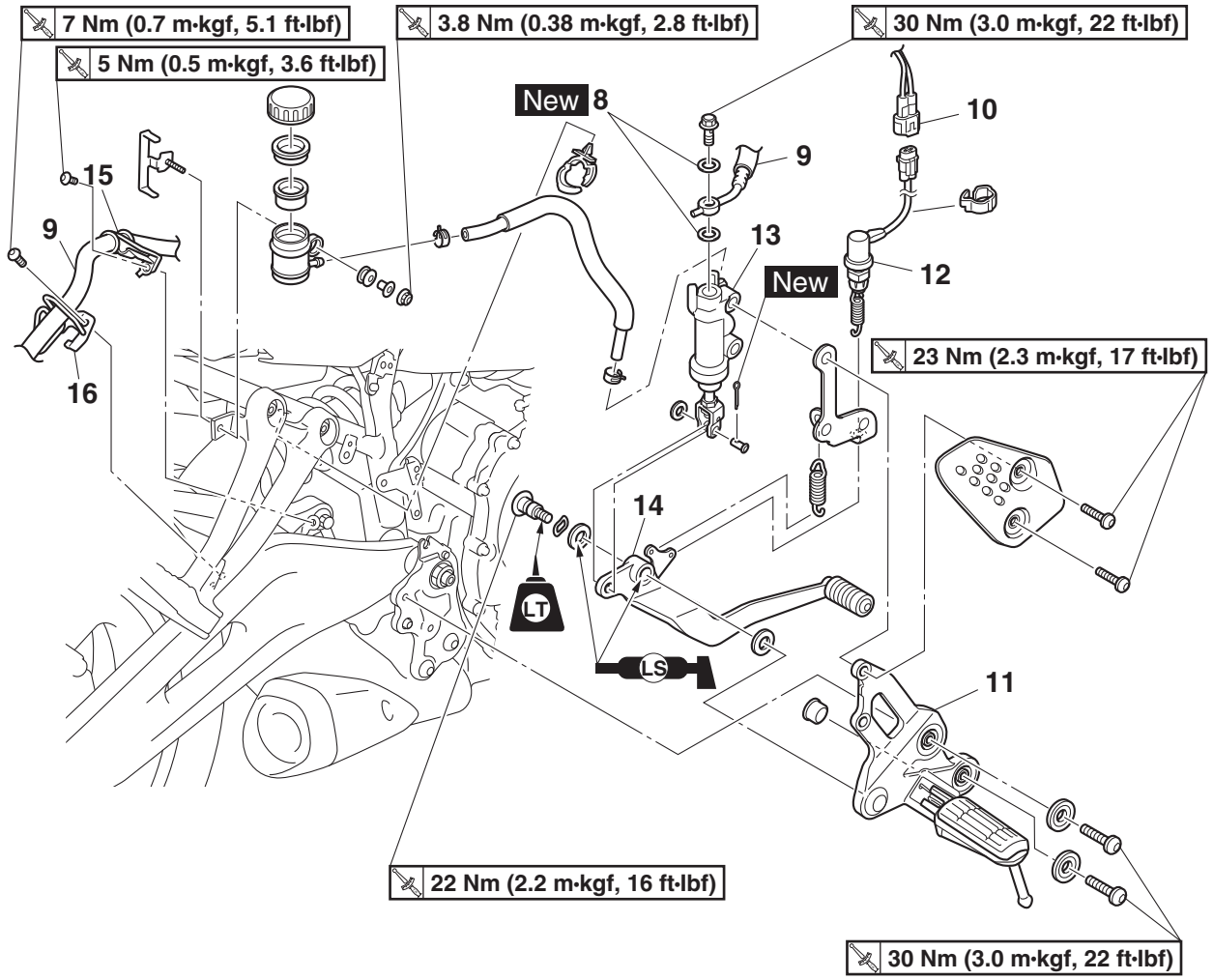
Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad retaining bolt	1	
3	Rear brake caliper retaining bolt	1	
4	Rear brake caliper bolt	1	
5	Rear brake caliper	1	
6	Brake pad	2	
7	Brake pad shim	2	
8	Brake pad insulator	2	
9	Brake pad spring	1	
10	Brake caliper bleed screw	1	

Removing the rear brake master cylinder



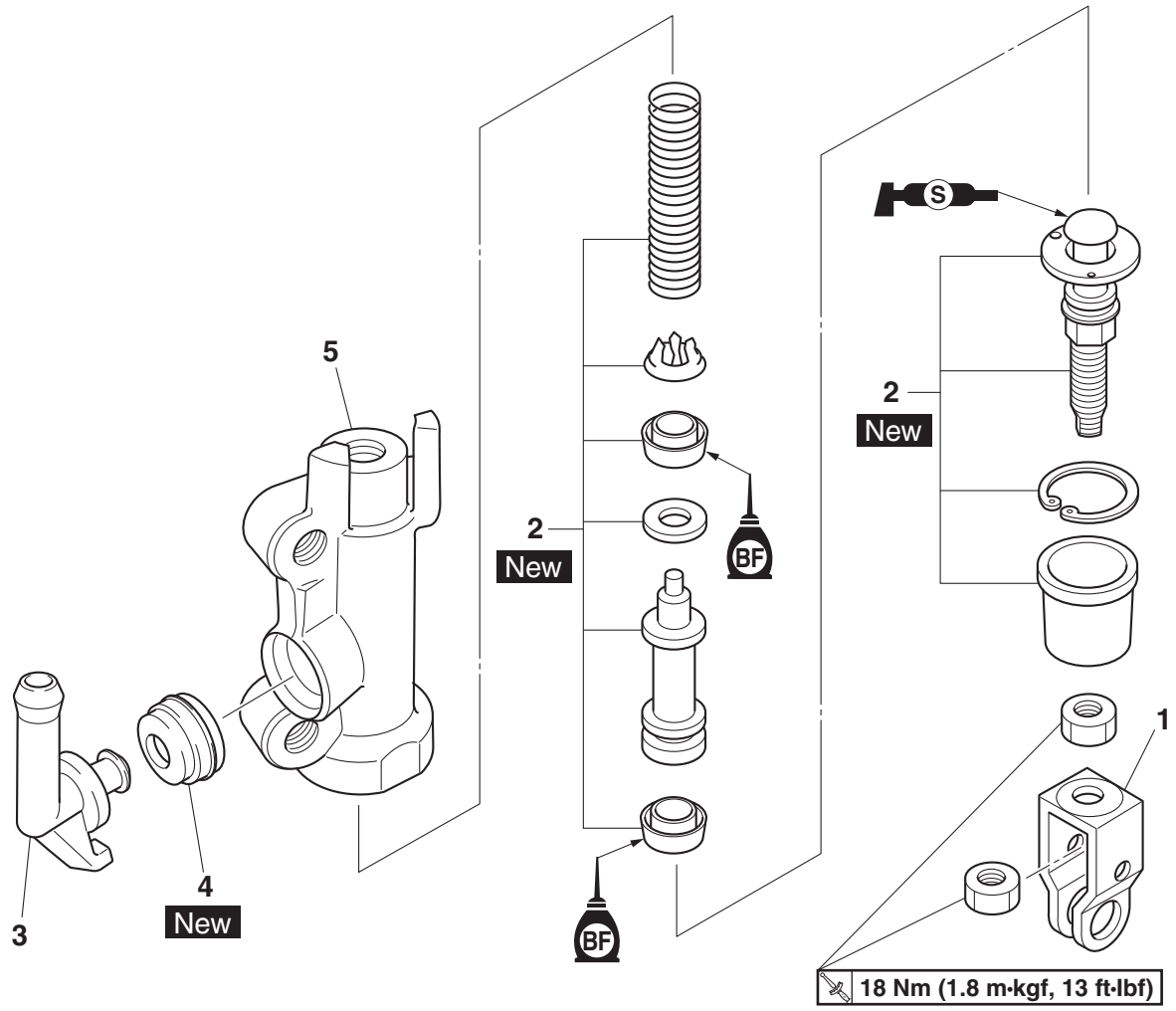
Order	Job/Parts to remove	Q'ty	Remarks
	Pivot shaft protector (right)		Refer to "SWINGARM" on page 4-84.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Brake fluid reservoir holder	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Rear brake hose union bolt (master cylinder side)	1	

Removing the rear brake master cylinder



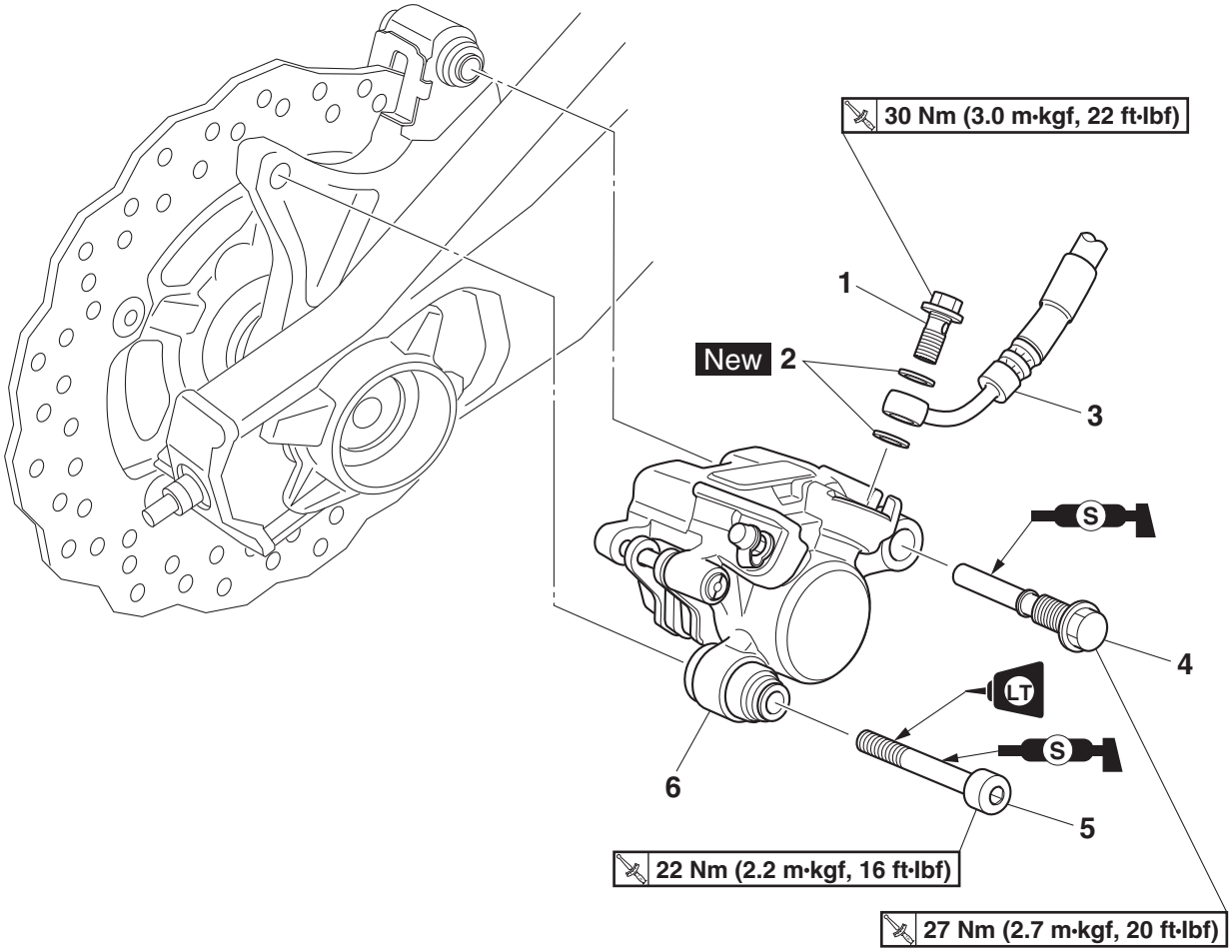
Order	Job/Parts to remove	Q'ty	Remarks
8	Brake hose gasket	2	
9	Brake hose	1	Disconnect.
10	Rear brake light switch coupler	1	Disconnect.
11	Footrest assembly (right)	1	
12	Rear brake light switch	1	
13	Rear brake master cylinder	1	
14	Brake pedal	1	
15	Rear brake hose holder	1	
16	Rear brake hose guide	1	

Disassembling the rear brake master cylinder



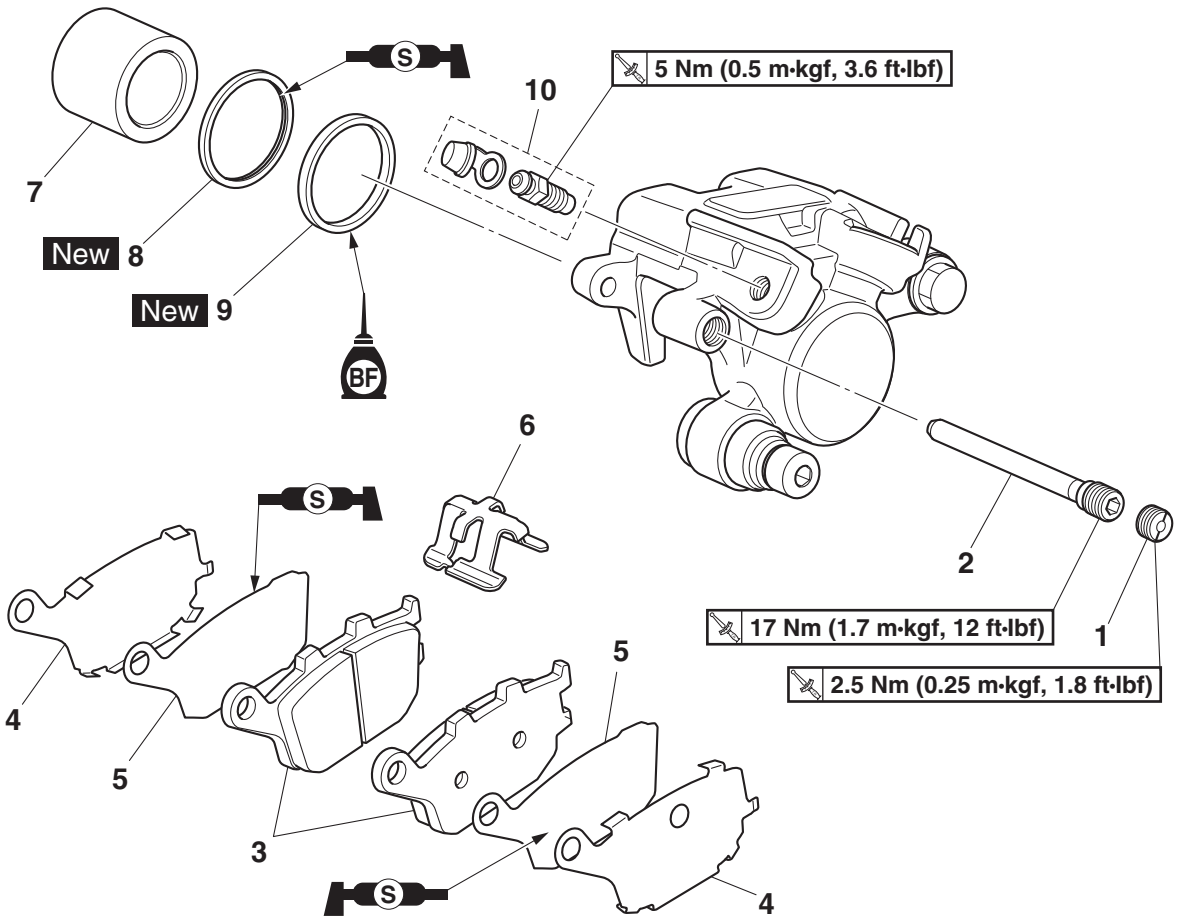
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder yoke	1	
2	Brake master cylinder kit	1	
3	Hose joint	1	
4	Bushing	1	
5	Brake master cylinder body	1	

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 3-14.
1	Rear brake hose union bolt (brake caliper side)	1	
2	Brake hose gasket	2	
3	Brake hose	1	
4	Rear brake caliper retaining bolt	1	
5	Rear brake caliper bolt	1	
6	Rear brake caliper	1	

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad retaining bolt	1	
3	Brake pad	2	
4	Brake pad shim	2	
5	Brake pad insulator	2	
6	Brake pad spring	1	
7	Brake caliper piston	1	
8	Brake caliper piston dust seal	1	
9	Brake caliper piston seal	1	
10	Brake caliper bleed screw	1	

EAS30183
INTRODUCTION

EWA14101
⚠ 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.**

EAS30184
CHECKING THE REAR BRAKE DISC

1. Remove:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-24.
2. Check:
   - Rear 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 DISCS" on page 4-38.

Brake disc runout limit (as measured on wheel)
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 DISCS" on page 4-38.

Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
   - Brake disc deflection
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-38.

Rear brake disc bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)
LOCTITE®

6. Install:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-24.

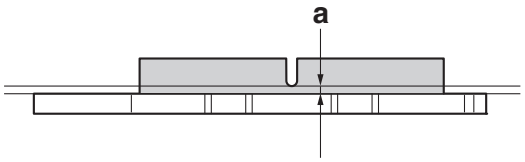
EAS30185
REPLACING THE REAR BRAKE PADS

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)
6.0 mm (0.24 in)
Limit
1.0 mm (0.04 in)
Brake pad lining thickness (outer)
6.0 mm (0.24 in)
Limit
1.0 mm (0.04 in)



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

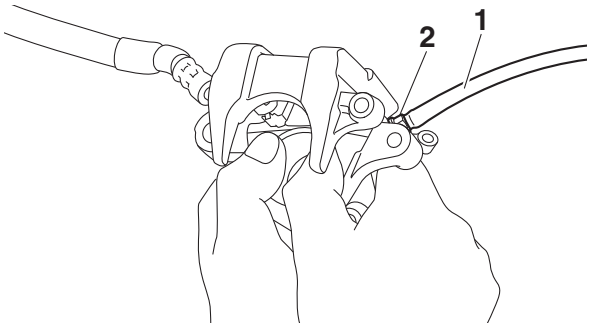
- Brake pad spring
  (into the rear brake caliper)
- Brake pads

TIP

Always install new brake pads, brake pad insulators, brake pad shims, and 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 piston into the brake caliper with your finger.



c. Tighten the bleed screw.

	Brake caliper bleed screw **5 Nm (0.5 m·kgf, 3.6 ft·lbf)**

d. Install the brake pad insulators and brake pad shims onto each brake pads.

TIP

Apply silicone grease between the brake pad insulator and the brake pad shim.

ECA18210

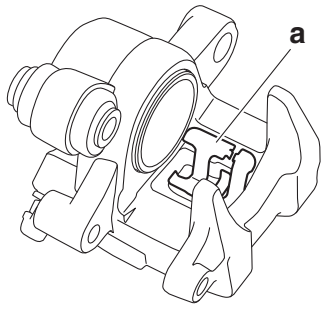
NOTICE

• Do not allow grease to contact the brake pads.
• Remove any excess grease.

e. Install the brake pads and brake pad spring.

TIP

The longer tangs "a" of the brake pad spring must point in the direction of the brake caliper piston.



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3. Lubricate:
   - Rear brake caliper bolt
   - Rear brake caliper retaining bolt

	Recommended lubricant **Silicone grease**

ECA18210

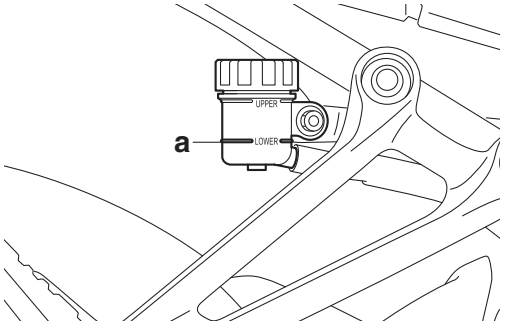
NOTICE

• Do not allow grease to contact the brake pads.
• Remove any excess grease.

4. Install:
   - Rear brake caliper
   - Rear brake caliper bolt
   - Rear brake caliper retaining bolt
   - Brake pad retaining bolt
   - Screw plug

	Rear brake caliper bolt **22 Nm (2.2 m·kgf, 16 ft·lbf)** **LOCTITE®** **Rear brake caliper retaining bolt** **27 Nm (2.7 m·kgf, 20 ft·lbf)** **Brake pad retaining bolt** **17 Nm (1.7 m·kgf, 12 ft·lbf)** **Screw plug** **2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)**

5. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



6. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS30186
REMOVING THE REAR BRAKE CALIPER

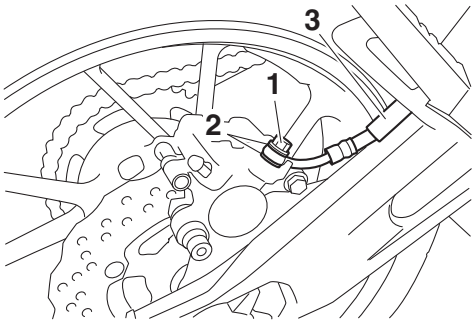
TIP

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

1. Remove:
   • Rear brake hose union bolt "1"
   • Brake hose gaskets "2"
   • Brake hose "3"

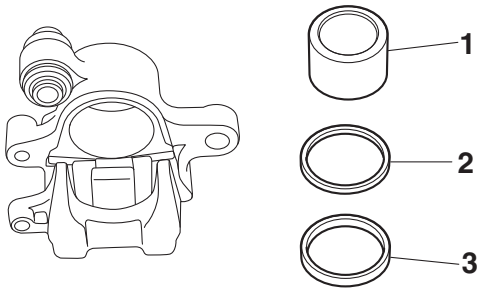
TIP

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



EAS30187
DISASSEMBLING THE REAR BRAKE CALIPER

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



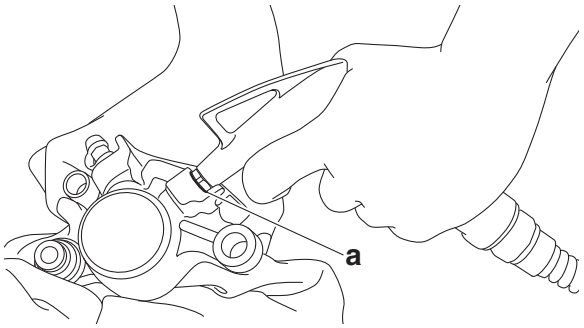
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a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

EWA13550

⚠ WARNING

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



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

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EAS30188
CHECKING THE REAR BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seal	Every two years
Piston dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

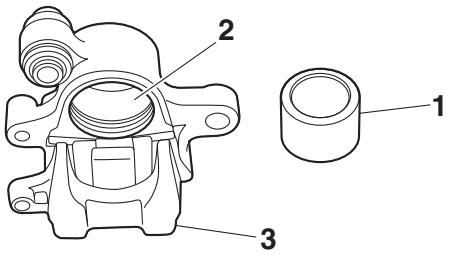
1. Check:
   • Brake caliper piston "1"
   Rust/scratches/wear → Replace the brake caliper piston.

- 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.

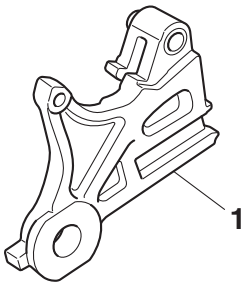
EWA17070

⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



2. Check:
   - Rear brake caliper bracket “1”
     Cracks/damage → Replace.
     Refer to “REAR WHEEL” on page 4-24.



EAS30189

ASSEMBLING THE REAR BRAKE CALIPER

EWA17080

⚠ 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 brake caliper piston dust seal and brake caliper piston seal to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.**

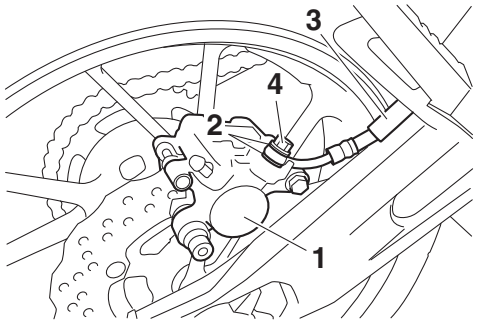
Specified brake fluid
DOT 4

EAS30190

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Rear brake caliper “1” (temporarily)
   - Brake hose gaskets “2” New
   - Brake hose “3”
   - Rear brake hose union bolt “4”

Rear brake hose union bolt (brake caliper side)
30 Nm (3.0 m·kgf, 22 ft·lbf)



EWA13530

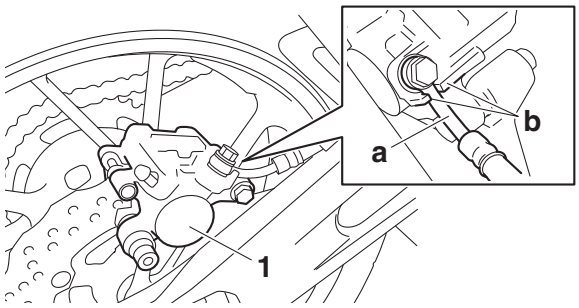
⚠ WARNING

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

ECA19080

NOTICE

When installing the brake hose onto the brake caliper “1”, make sure the brake pipe “a” passes between the projections “b” on the brake caliper.



2. Remove:
   - Rear brake caliper
3. Install:
   - Brake pad insulators (onto the brake pads)

- Brake pad shims
  (onto the brake pads)
- Brake pad spring
  (into the rear brake caliper)
- Brake pads
- Rear brake caliper
  Refer to "REPLACING THE REAR BRAKE PADS" on page 4-52.

Rear brake caliper bolt
22 Nm (2.2 m·kgf, 16 ft·lbf)
LOCTITE®
Rear brake caliper retaining bolt
27 Nm (2.7 m·kgf, 20 ft·lbf)
Brake pad retaining bolt
17 Nm (1.7 m·kgf, 12 ft·lbf)
Screw plug
2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)

4. Fill:
   - Brake fluid reservoir
     (with the specified amount of the specified brake fluid)

Specified brake fluid
DOT 4

EWA13090

WARNING

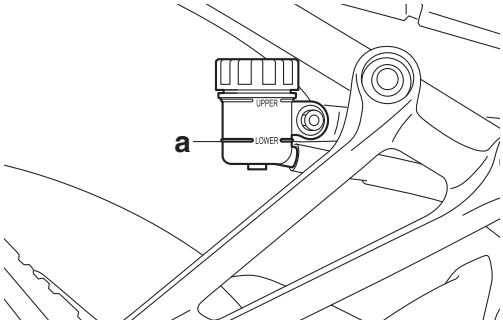
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

5. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
6. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



7. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

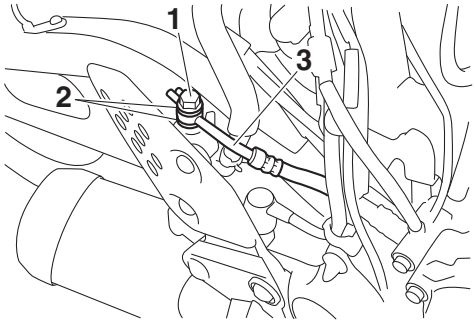
EAS30193

REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:
   - Brake hose union bolt "1"
   - Brake hose gaskets "2"
   - Brake hose "3"

TIP

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

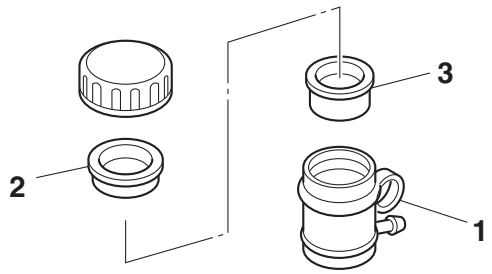


EAS30194

CHECKING THE REAR BRAKE MASTER CYLINDER

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

3. Check:
   - Brake fluid reservoir “1”
   - Brake fluid reservoir diaphragm holder “2”
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm “3”
     Damage/wear → Replace.



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

EAS30195
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520
WARNING

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

Specified brake fluid
DOT 4

1. Install:
   - Brake master cylinder kit New

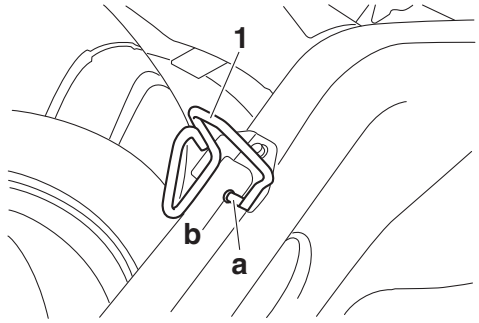
EAS30196
INSTALLING THE REAR BRAKE MASTER CYLINDER

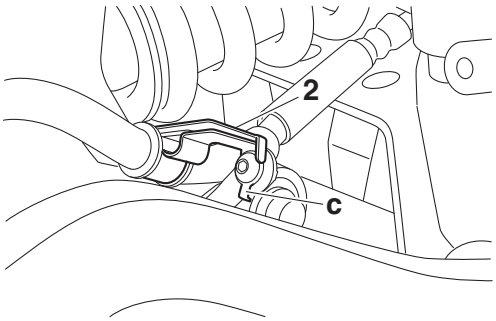
1. Install:
   - Rear brake hose guide “1”
   - Rear brake hose holder “2”

TIP

- Fit the projection “a” on the rear brake hose guide into the hole “b” in the swingarm.
- Make sure that the projection “c” on the rear brake hose holder contacts the swingarm.

Rear brake hose guide bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)
Rear brake hose holder bolt
5 Nm (0.5 m·kgf, 3.6 ft·lbf)





2. Install:
   - Brake hose gaskets New
   - Brake hose
   - Brake hose union bolt
   - Brake fluid reservoir hose

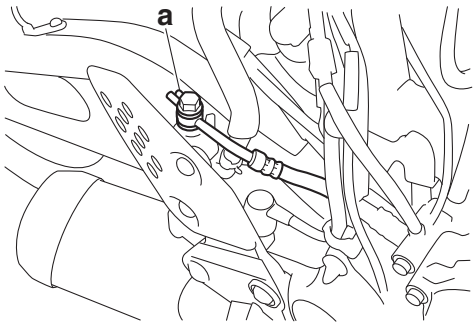
Rear brake hose union bolt (master cylinder side)
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530
WARNING

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

ECA14160
NOTICE

When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection “a” as shown.



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

	Specified brake fluid **DOT 4**

EWA13090

⚠ WARNING

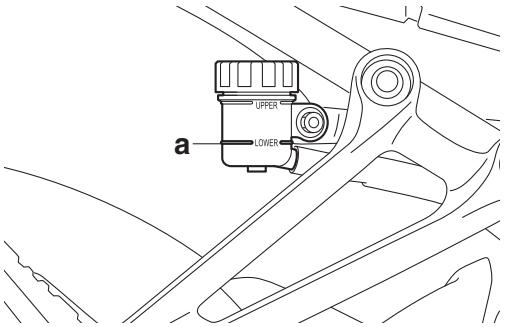
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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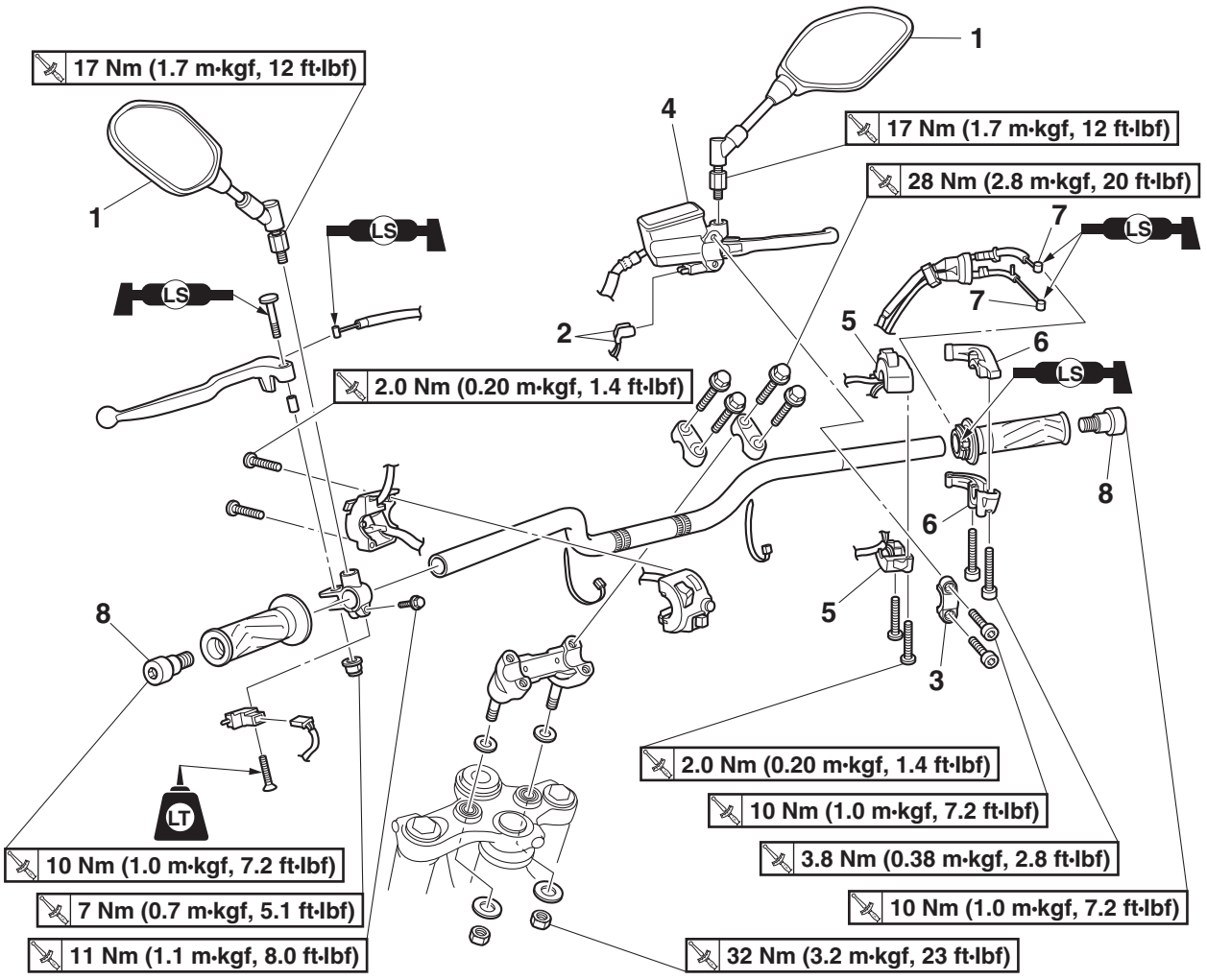
4. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
5. Check:
   • Brake fluid level
   Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-15.



6. Adjust:
   • Brake pedal position
   Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-13.
7. Adjust:
   • Rear brake light operation timing
   Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-26.

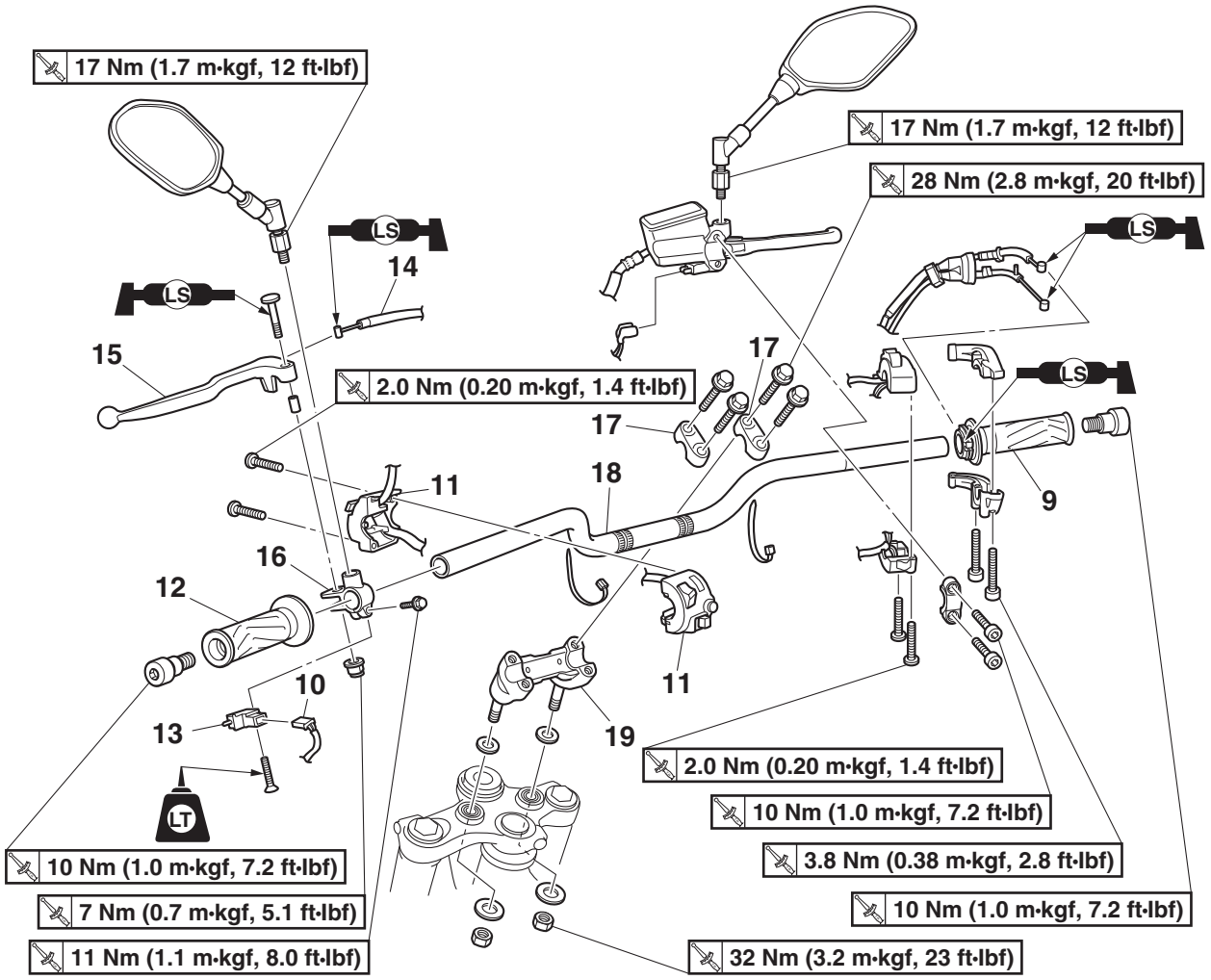
EAS20033
HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
	Meter assembly bracket		Refer to "GENERAL CHASSIS (3)" on page 4-8.
1	Rearview mirror	2	
2	Front brake light switch connector	2	Disconnect.
3	Front brake master cylinder holder	1	
4	Front brake master cylinder assembly	1	
5	Handlebar switch (right)	1	
6	Throttle cable housing	1	
7	Throttle cable	2	Disconnect.
8	Grip end	2	

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
9	Throttle grip	1	
10	Clutch switch coupler	1	Disconnect.
11	Handlebar switch (left)	1	
12	Handlebar grip	1	
13	Clutch switch	1	
14	Clutch cable	1	Disconnect.
15	Clutch lever	1	
16	Clutch lever holder	1	
17	Upper handlebar holder	2	
18	Handlebar	1	
19	Lower handlebar holder	1	

EAS30203
REMOVING THE HANDLEBAR
1. Stand the vehicle on a level surface.

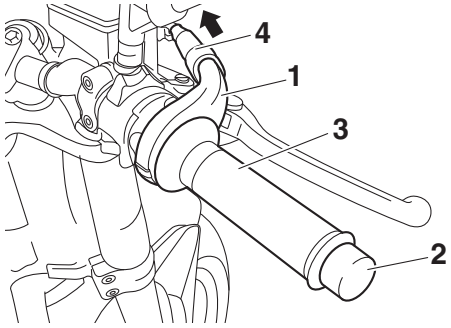
EWA13120
⚠ WARNING

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

2. Remove:
   - Throttle cable housings “1”
   - Grip end (right) “2”
   - Throttle grip “3”

TIP

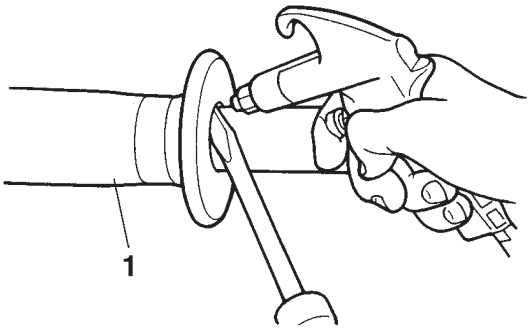
While removing the throttle cable housing, pull back the rubber cover “4”.



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.



EAS30204
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.

EAS30205
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 holder
   - Handlebar “1”
   - Upper handlebar holders “2”

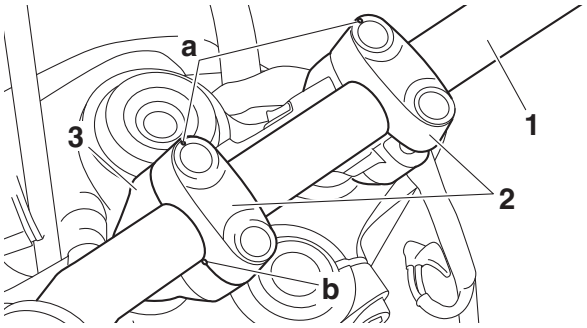
Lower handlebar holder nut
32 Nm (3.2 m·kgf, 23 ft·lbf)
Upper handlebar holder bolt
28 Nm (2.8 m·kgf, 20 ft·lbf)

ECA18300
NOTICE

First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.

TIP

- The upper handlebar holders should be installed with the punch marks “a” facing forward.
- Align the punch mark “b” on the handlebar with the left side upper surface of the lower handlebar holder “3”.



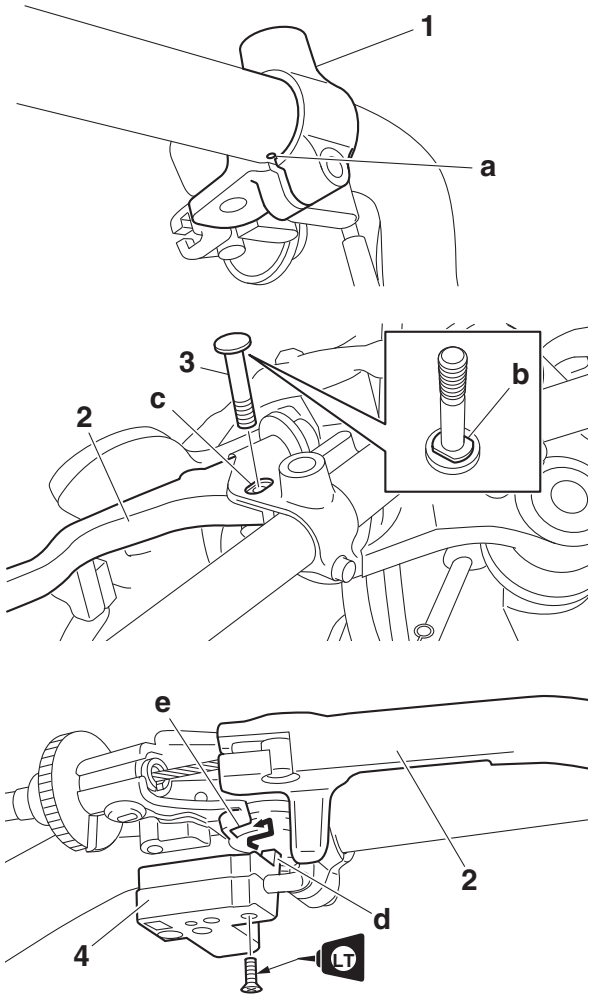
3. Install:
   - Clutch lever holder “1”
   - Clutch lever “2”
   - Clutch lever pivot bolt “3”
   - Clutch cable
   - Clutch switch “4”

Clutch lever holder pinch bolt
11 Nm (1.1 m·kgf, 8.0 ft·lbf)
Clutch lever pivot nut
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

TIP

- Align the center of slit on the clutch lever holder with the punch mark “a” on the handlebar.

- Fit the projection “b” on the bottom of the bolt head into the slot “c” in the bolt hole in the clutch lever holder.
- While squeezing the clutch lever, fit the projection “d” on the clutch switch into the slot “e” in the clutch lever holder.



4. Install:
   - Handlebar grip “1”
   - Grip end (left) “2”

	Grip end **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

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a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.
b. Side the handlebar grip over the end of the left handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

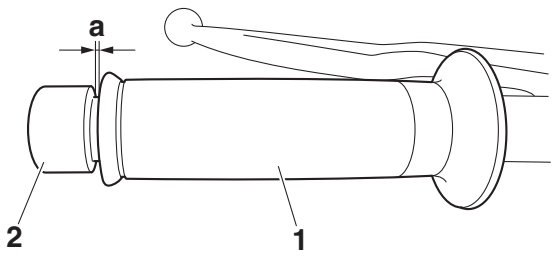
EWA13700

⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

TIP

There should be 1–3 mm (0.04–0.12 in) of clearance “a” between the handlebar grip and the grip end.



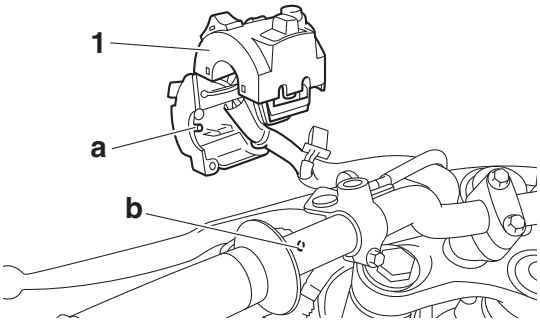
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5. Install:
   - Handlebar switch (left) “1”

	Handlebar switch screw (left) **2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)**

TIP

Align the projection “a” on the left handlebar switch with the hole “b” in the handlebar.



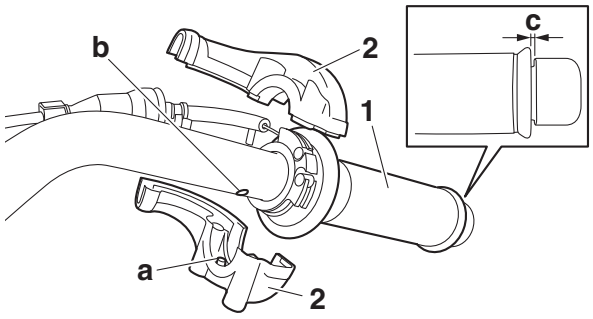
6. Install:
   - Throttle grip “1”
   - Throttle cables
   - Grip end (right)
   - Throttle cable housings “2”

	Grip end **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **Throttle cable housing bolt** **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

TIP

- Align the projection “a” on the throttle cable housing with the hole “b” in the handlebar.

• There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.

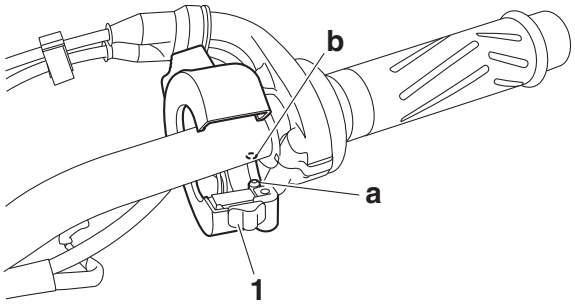


7. Install:
   • Handlebar switch (right) “1”

	Handlebar switch screw (right) **2.0 Nm (0.20 m·kgf, 1.4 ft·lbf)**

TIP

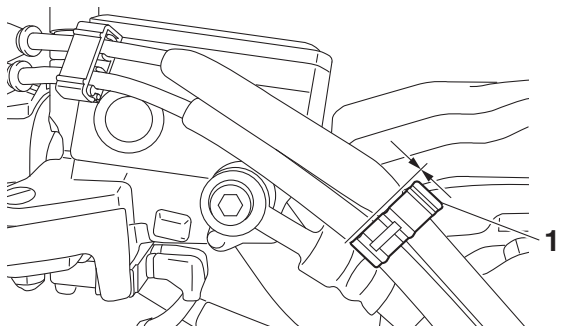
Align the projection “a” on the right handlebar switch with the hole “b” in the handlebar.

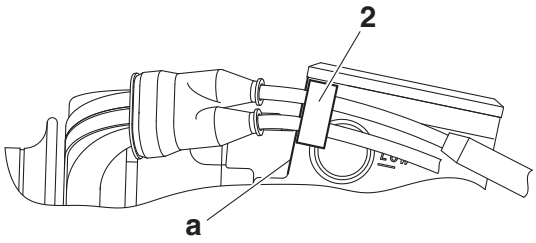


8. Install:
   • Throttle cable holder 1 “1”
   • Throttle cable holder 2 “2”

TIP

• Make sure that the throttle cable holder 1 “1” contacts the throttle cable adjusting nut and that the open ends of the holder are pointing rearward.
• Align the throttle cable holder 2 “2” with the edge “a” of the front brake master cylinder.





9. Install:
   • Front brake master cylinder assembly
   Refer to “INSTALLING THE FRONT BRAKE MASTER CYLINDER” on page 4-44.
10. Adjust:
   • Throttle grip free play
   Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-27.

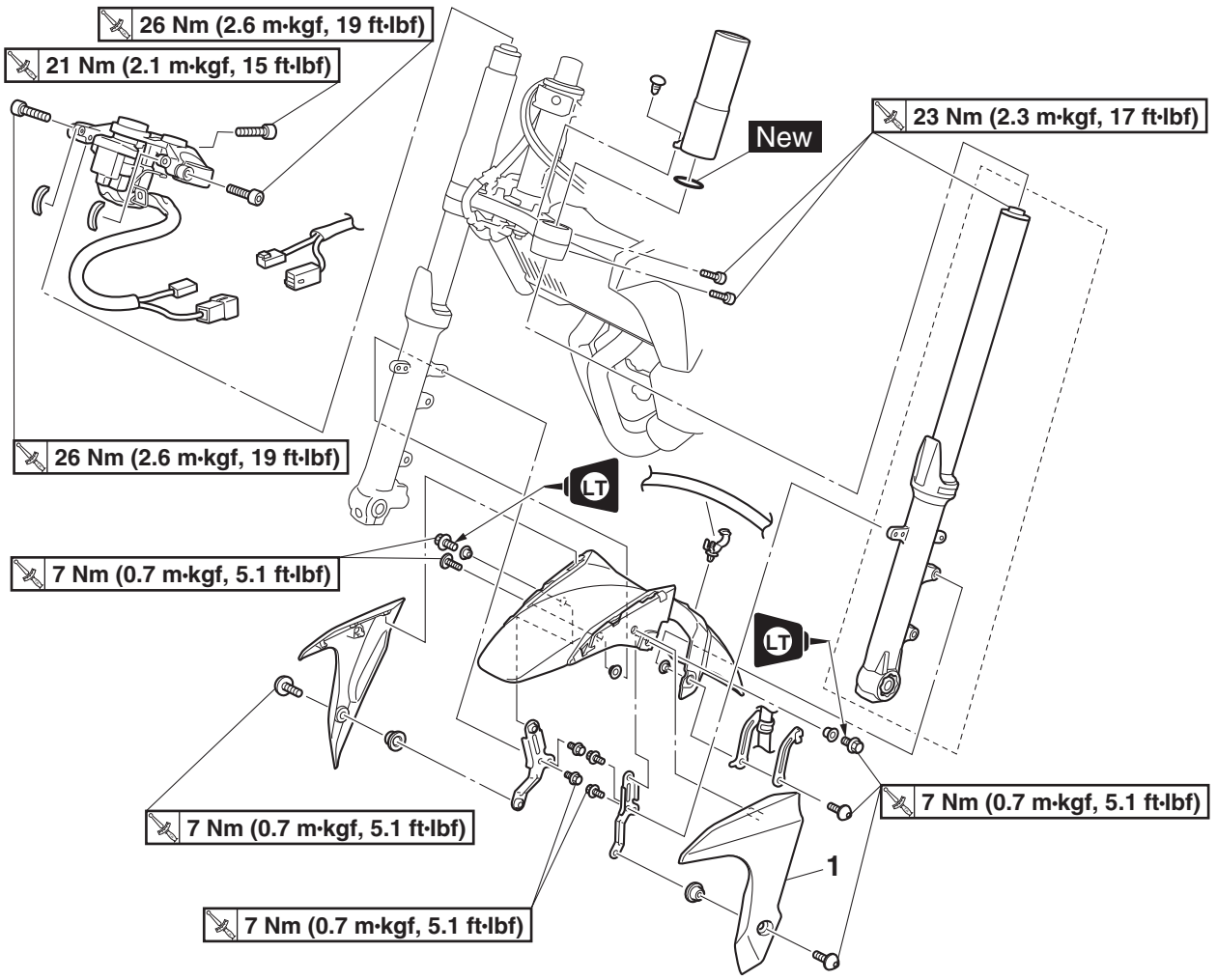
	Throttle grip free play **3.0–5.0 mm (0.12–0.20 in)**

11. Adjust:
   • Clutch lever free play
   Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-12.

	Clutch lever free play **10.0–15.0 mm (0.39–0.59 in)**

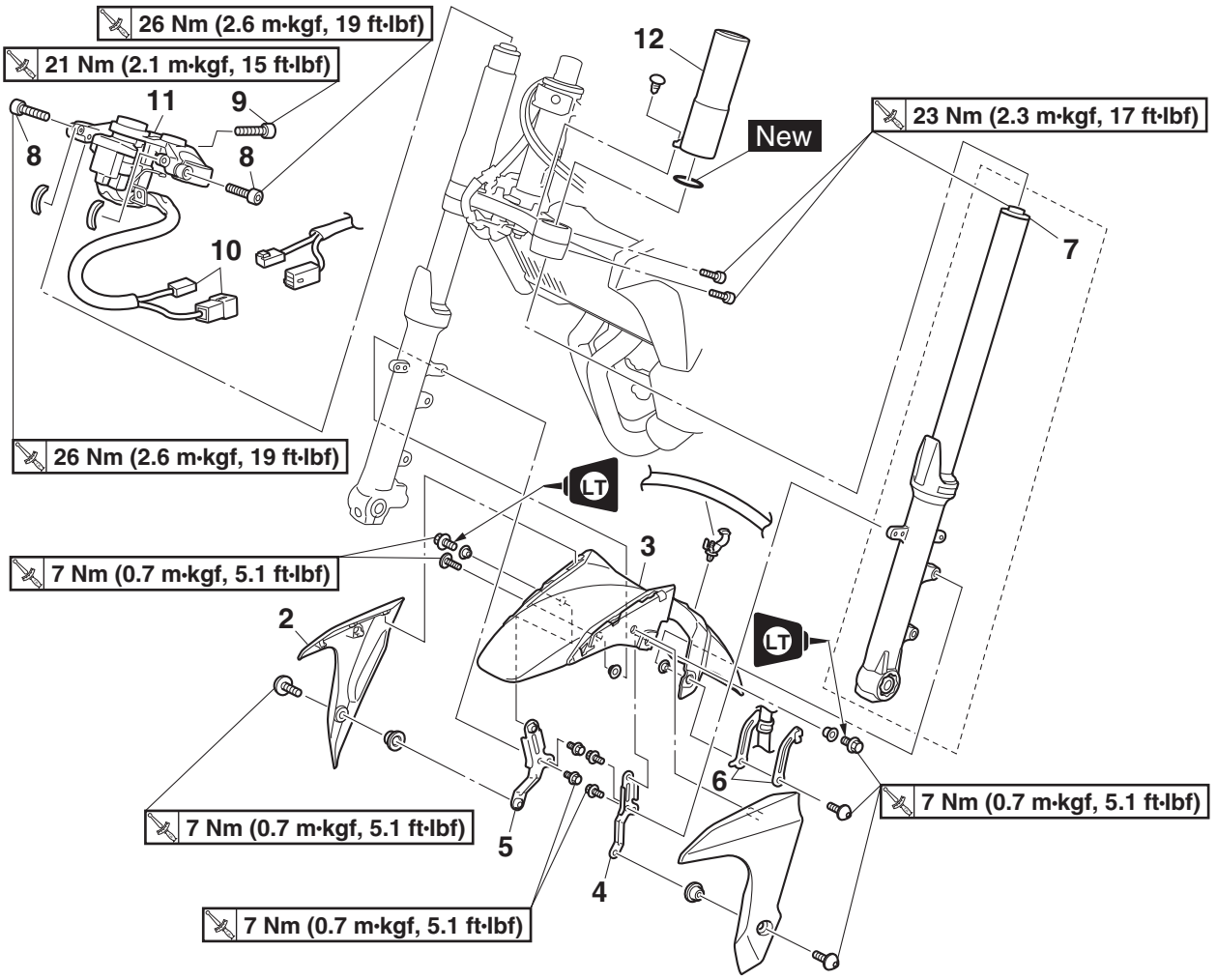
EAS20034
FRONT FORK

Removing the front fork legs



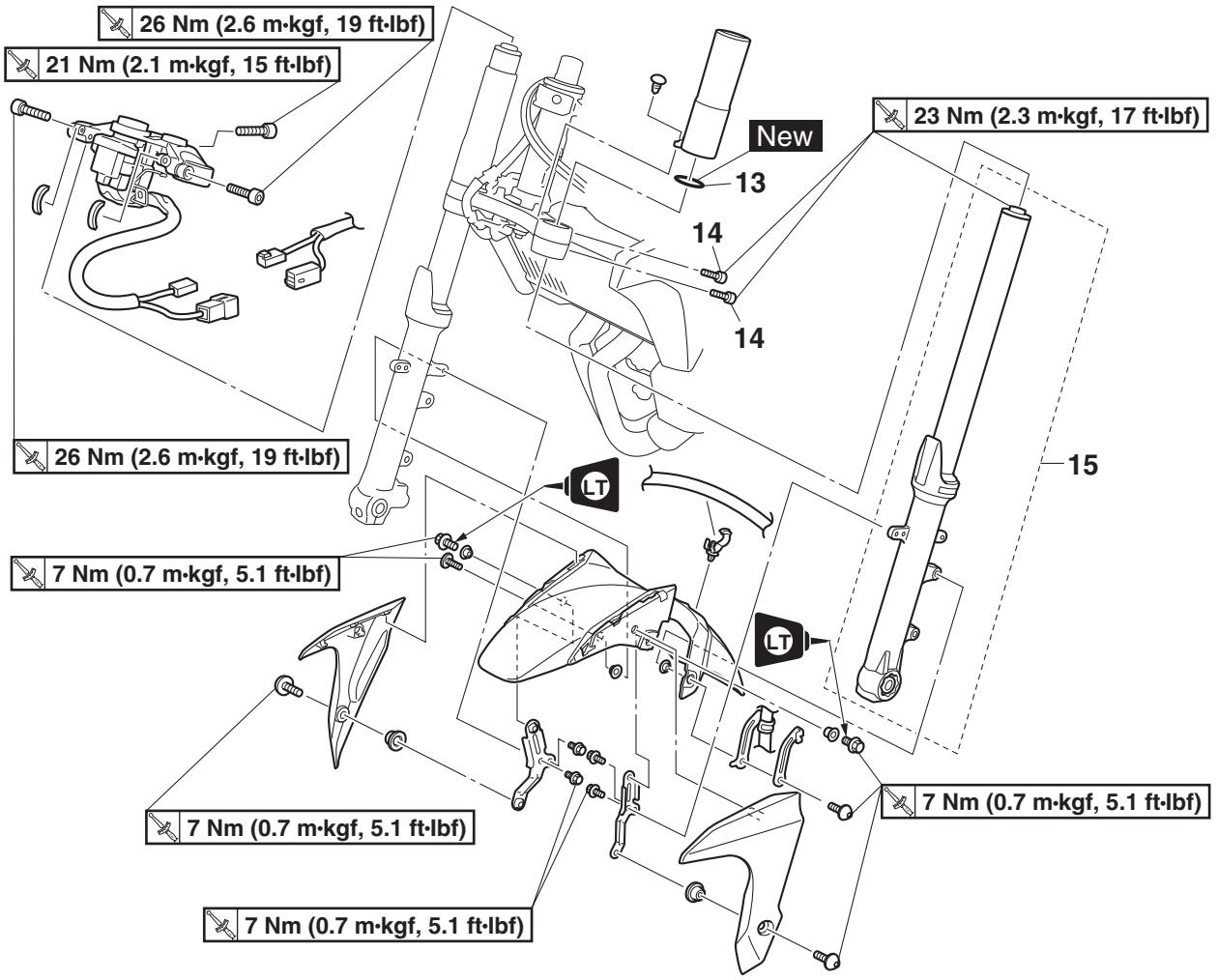
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Meter assembly bracket		Refer to "GENERAL CHASSIS (3)" on page 4-8.
	Handlebar		Refer to "HANDLEBAR" on page 4-59.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Front wheel		Refer to "FRONT WHEEL" on page 4-18.
1	Front fender side cover (left)	1	

Removing the front fork legs



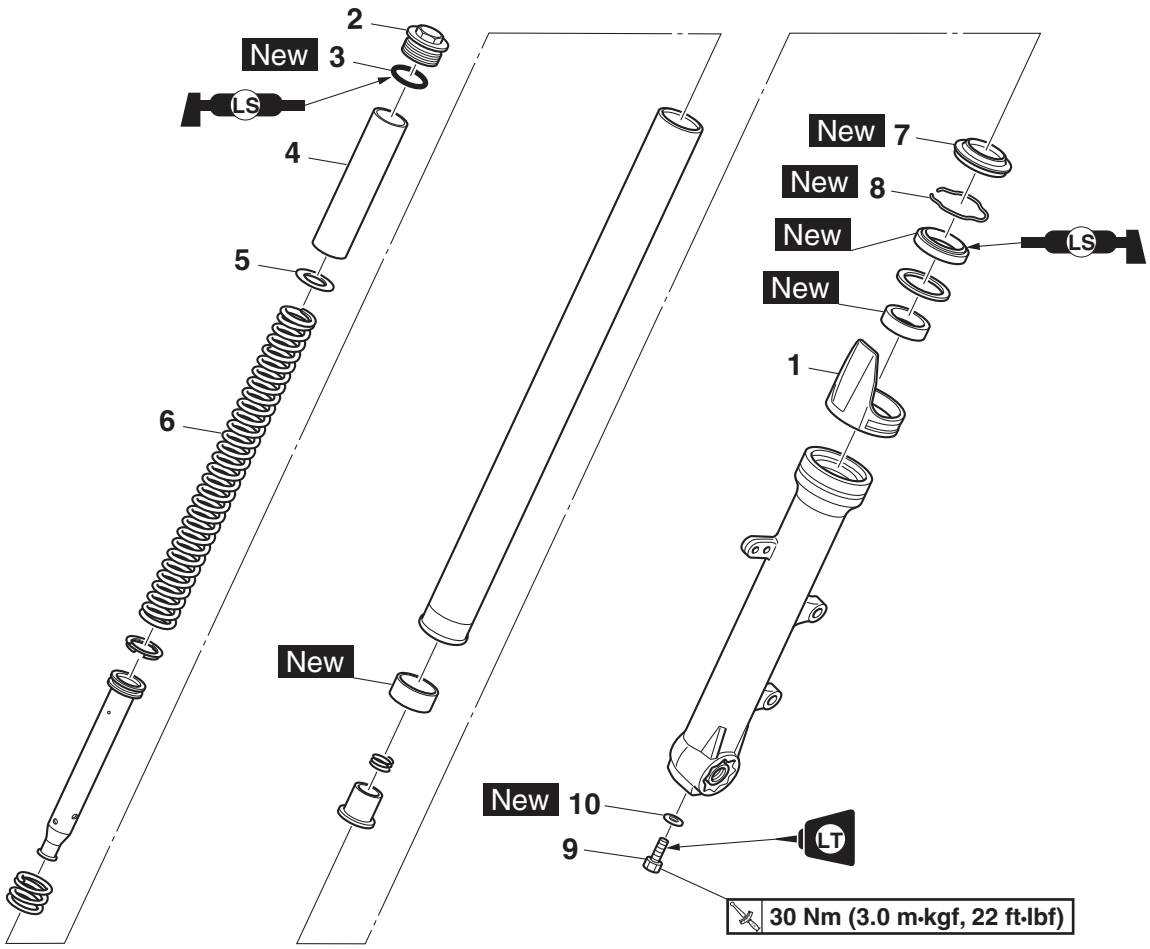
Order	Job/Parts to remove	Q'ty	Remarks
2	Front fender side cover (right)	1	
3	Front fender	1	
4	Front fender bracket (left)	1	
5	Front fender bracket (right)	1	
6	Brake hose holder	1	
7	Front fork cap bolt	1	Loosen.
8	Upper bracket pinch bolt (left and right)	2	Loosen.
9	Upper bracket pinch bolt (center)	1	Loosen.
10	Main switch coupler	2	Disconnect.
11	Upper bracket	1	
12	Front fork cover	1	

Removing the front fork legs



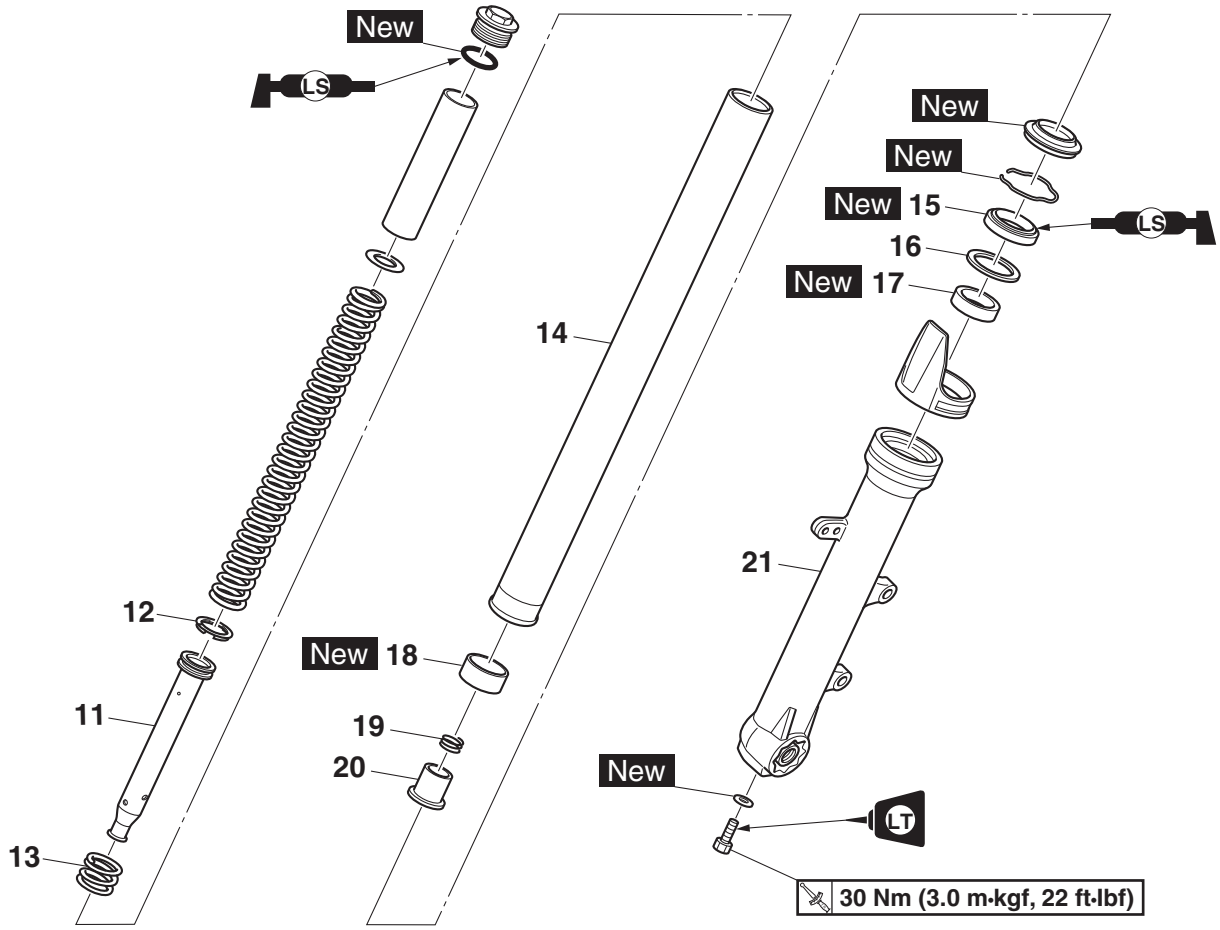
Order	Job/Parts to remove	Q'ty	Remarks
13	O-ring	1	
14	Lower bracket pinch bolt	2	Loosen.
15	Front fork leg	1	

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	Protector	1	
2	Front fork cap bolt	1	
3	O-ring	1	
4	Spacer	1	
5	Spring seat	1	
6	Fork spring	1	
7	Dust seal	1	
8	Oil seal clip	1	
9	Front fork damper rod bolt	1	
10	Copper washer	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
11	Damper rod	1	
12	Damper rod ring	1	
13	Rebound spring	1	
14	Inner tube	1	
15	Oil seal	1	
16	Washer	1	
17	Outer tube bushing	1	
18	Inner tube bushing	1	
19	Oil flow stopper spring	1	
20	Oil flow stopper	1	
21	Outer tube	1	

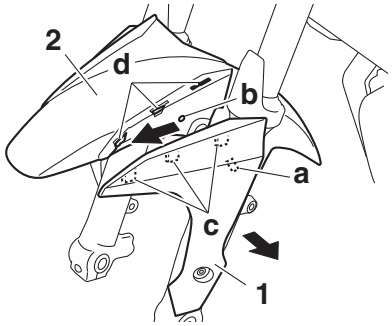
EAS31110
REMOVING THE FRONT FENDER SIDE COVERS AND FRONT FORK LEGS

The following procedure applies to both of the front fender side covers and front fork legs.

1. Remove:
   - Front fender side cover “1”
   - Front fender “2”
   - Front fender brackets

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a. Remove the projection “a” on the cover from the hole “b” in the front fender.
b. Slide the front fender side cover forward to remove the projections “c” on the cover from the holes “d” in the front fender, and then remove the cover.



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2. Stand the vehicle on a level surface.

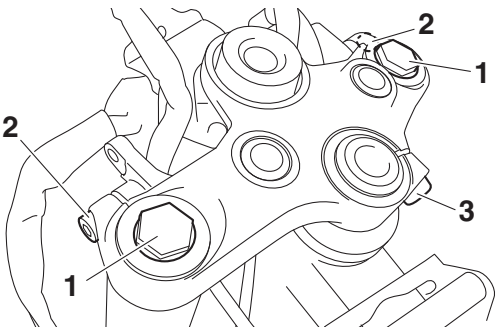
EWA13120
⚠ WARNING

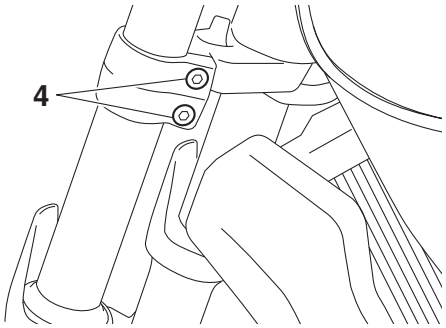
Securely support the vehicle so that there is no danger of it falling over.

TIP

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

3. Loosen:
   - Front fork cap bolt “1”
   - Upper bracket pinch bolts (left and right) “2”
   - Upper bracket pinch bolt (center) “3”
   - Lower bracket pinch bolts “4”





EWA13640
⚠ WARNING

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

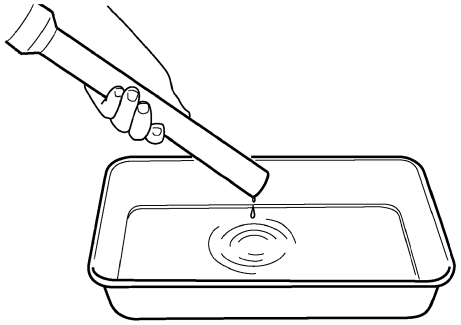
EAS30207
DISASSEMBLING THE FRONT FORK LEGS

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

1. Drain:
   - Fork oil

TIP

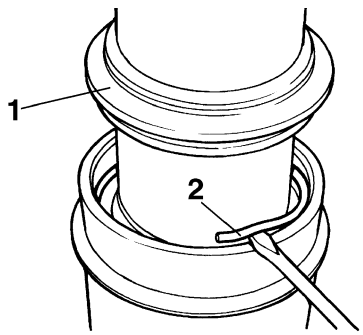
Stroke the outer tube several times while draining the fork oil.



2. Remove:
   - Dust seal “1”
   - Oil seal clip “2”
     (with a flathead screwdriver)

ECA14180
NOTICE

Do not scratch the inner tube.



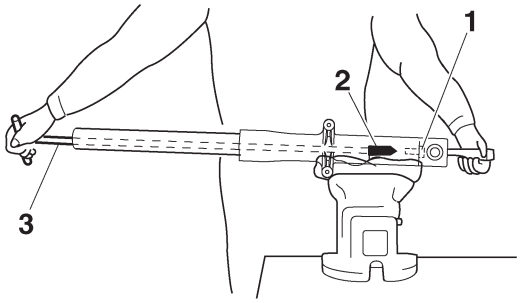
3. Remove:
   • Front fork damper rod bolt “1”
   • Copper washer

TIP

While holding the damper rod with the damper rod holder “2” and T-handle “3”, loosen the front fork damper rod bolt.



Damper rod holder
90890-01460
T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



4. Remove:
   • Inner tube

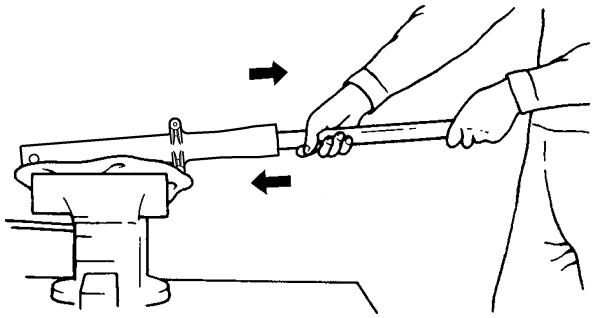
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a. Hold the front fork leg horizontally.
b. Securely clamp the brake caliper bracket in a vise with soft jaws.
c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

ECA14190

NOTICE

• Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.
• Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.



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EAS30208

CHECKING THE FRONT FORK LEGS

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

1. Check:
   • Inner tube
   • Outer tube
   Bends/damage/scratches → Replace.

EWA13650

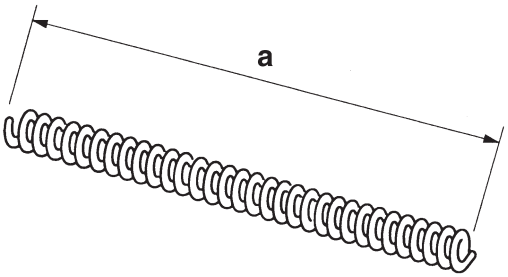
⚠ WARNING

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

2. Measure:
   • Fork spring free length “a”
   Out of specification → Replace.



Fork spring free length
345.4 mm (13.60 in)
Limit
331.6 mm (13.06 in)



3. Check:
   • Damper rod
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.
   • Oil flow stopper
   Damage → Replace.

ECA14200

NOTICE

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

EAS30209

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
  - –Oil seal clip
  - –Dust seal
  - –O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

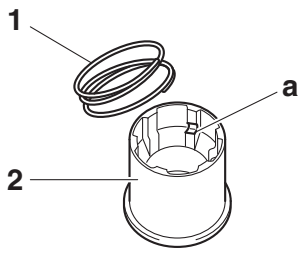
1. Install:
   - Oil flow stopper spring “1”
   - Oil flow stopper “2”
   - Damper rod ring “3”
   - Damper rod “4”
   - Rebound spring
   - Inner tube bushing “5” New

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a. Install the oil flow stopper spring into the oil flow stopper.

TIP

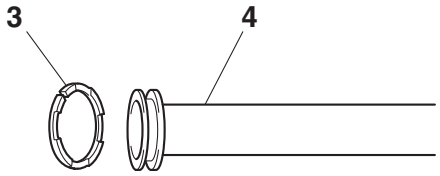
Make sure that the oil flow stopper spring is installed securely into the grooves “a” in the oil flow stopper.



b. Install the damper rod ring onto the damper rod.

TIP

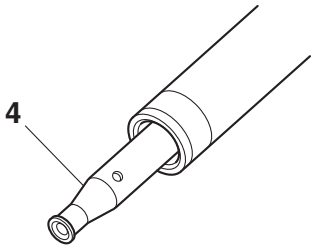
Fit the damper rod ring into the damper rod groove so that the side of the ring with the projections is facing in the direction shown in the illustration.



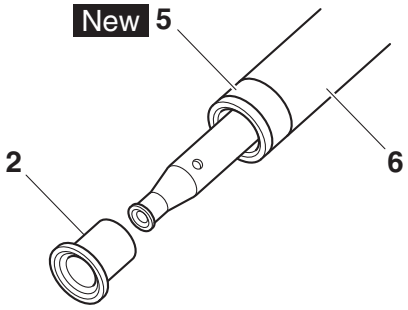
c. Install the damper rod and rebound spring to the inner tube.

TIP

Allow the damper rod to slide slowly down the inner tube until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



d. Install the oil flow stopper and inner tube bushing onto the inner tube “6”.



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2. Lubricate:
   - Inner tube’s outer surface

	Recommended oil **Yamaha fork oil 10WT**

3. Install:
   - Inner tube
     (in the outer tube)
4. Install:
   - Copper washer New
   - Front fork damper rod bolt

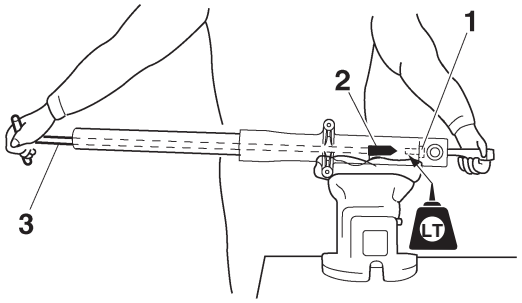
5. Tighten:
   • Front fork damper rod bolt “1”

Front fork damper rod bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)
LOCTITE®

TIP

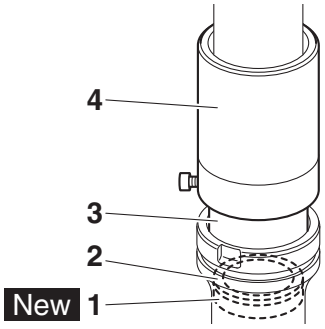
While holding the damper rod assembly with the damper rod holder “2” and T-handle “3”, tighten the front fork damper rod bolt.

Damper rod holder
90890-01460
T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



6. Install:
   • Outer tube bushing “1” New
   • Washer “2”
   (with the fork seal driver attachment “3” and fork seal driver weight “4”)

Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø41)
90890-01381
Replacement 41 mm
YM-A5142-2



7. Install:
   • Oil seal “1” New
   (with the fork seal driver attachment “2” and fork seal driver weight “3”)

ECA14220

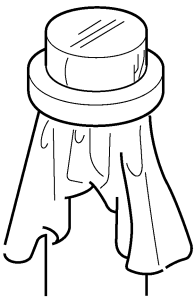
NOTICE

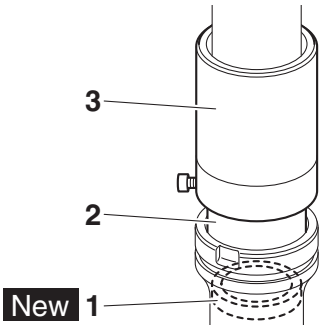
Make sure the numbered side of the oil seal faces up.

TIP

- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.

Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø41)
90890-01381
Replacement 41 mm
YM-A5142-2

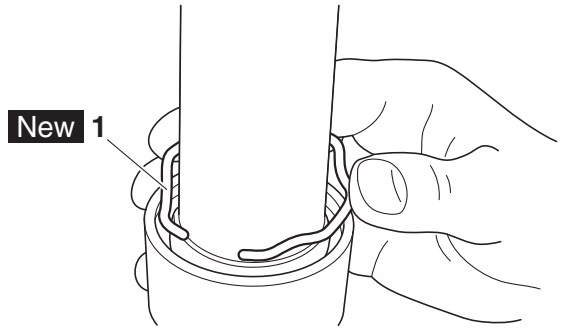




8. Install:
   • Oil seal clip “1” New

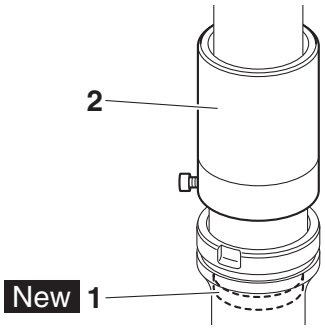
TIP

Adjust the oil seal clip so that it fits into the outer tube’s groove.



9. Install:
   • Dust seal “1” New
   (with the fork seal driver weight “2”)

	**Fork seal driver weight** **90890-01367** **Replacement hammer** **YM-A9409-7**



10. Fill:
   • Front fork leg
   (with the specified amount of the recommended fork oil)

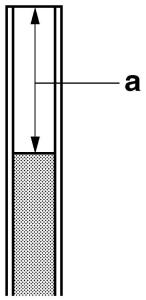
	**Quantity** **403.0 cm³ (13.63 US oz, 14.21 Imp.oz)** **Recommended oil** **Yamaha fork oil 10WT**

11. Measure:
   • Front fork leg oil level “a”
   (from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
   Out of specification → Correct.

	**Level** **162.0 mm (6.4 in)**

TIP

- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.



12. Install:
   • Fork spring
   • Spring seat
   • Spacer
   • Front fork cap bolt
   (along with the O-ring New)

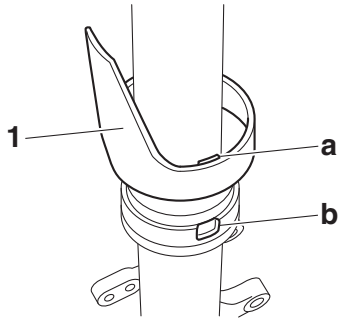
TIP

- Before installing the front fork cap bolt, lubricate its O-ring with grease.
- Temporarily tighten the front fork cap bolt.
- Tighten the front fork cap bolt specified torque, when installing the front fork with upper bracket.

13. Install:
   • Protector “1”

TIP

Align the projection “a” on the protector with the slot “b” in the outer tube.



EAS31111

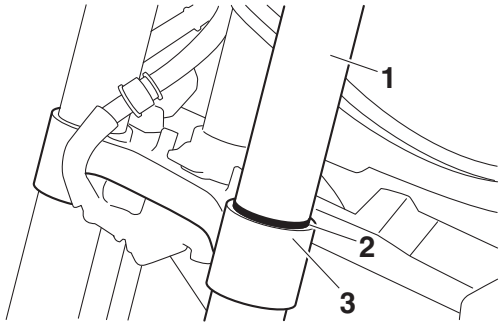
INSTALLING THE FRONT FORK LEGS AND FRONT FENDER SIDE COVERS

The following procedure applies to both of the front fork legs and front fender side covers.

1. Install:
   • Front fork leg “1”
   Temporarily tighten the lower bracket pinch bolts.
   • O-ring “2”

TIP

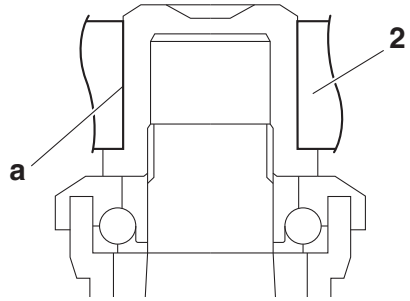
Make sure that the O-ring contacts the top of the lower bracket “3”.

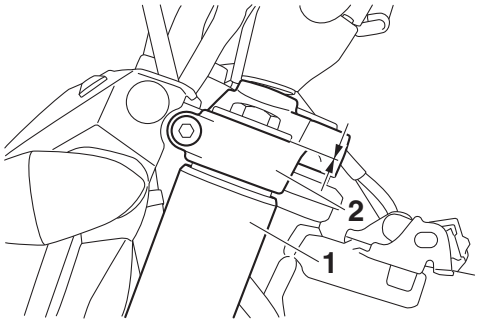


2. Install:
   - Front fork cover “1”
   - Upper bracket “2”

TIP

- Before installing the upper bracket, remove any grease from the outer surface “a” of the cap nut.
- Make sure the inner tube end is flush with the top of the upper bracket.





3. Tighten:
   - Lower bracket pinch bolts
   - Upper bracket pinch bolt (center)
   - Upper bracket pinch bolts (left and right)
   - Front fork cap bolt

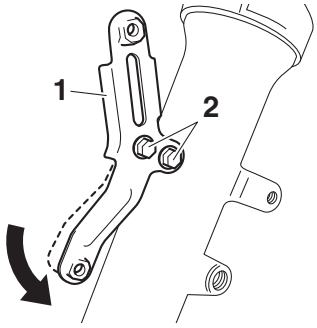
Lower bracket pinch bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
Upper bracket pinch bolt (center)
21 Nm (2.1 m·kgf, 15 ft·lbf)
Upper bracket pinch bolt (left and right)
26 Nm (2.6 m·kgf, 19 ft·lbf)
Front fork cap bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)

4. Install:
   - Front fender brackets “1”

Front fender bracket bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

TIP

Temporarily tighten the front fender bracket bolts “2”. Then, while pushing the bottom of each front fender bracket in the direction shown in the illustration, tighten the front fender bracket bolts to specification.



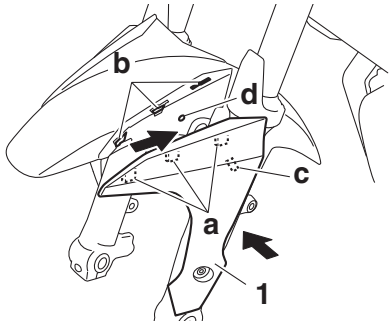
5. Install:
   - Front fender
   - Front fender side cover “1”

Front fender bolt (upper side)
7 Nm (0.7 m·kgf, 5.1 ft·lbf)
LOCTITE®
Front fender bolt (lower side)
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

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a. Fit the projections “a” on the front fender side cover into the holes “b” in the front fender, and then slide the cover rearward.
b. Fit the projection “c” on the front fender side cover into the hole “d” in the front fender.
c. Install the front fender side cover bolt, and then tighten the bolts to specification.

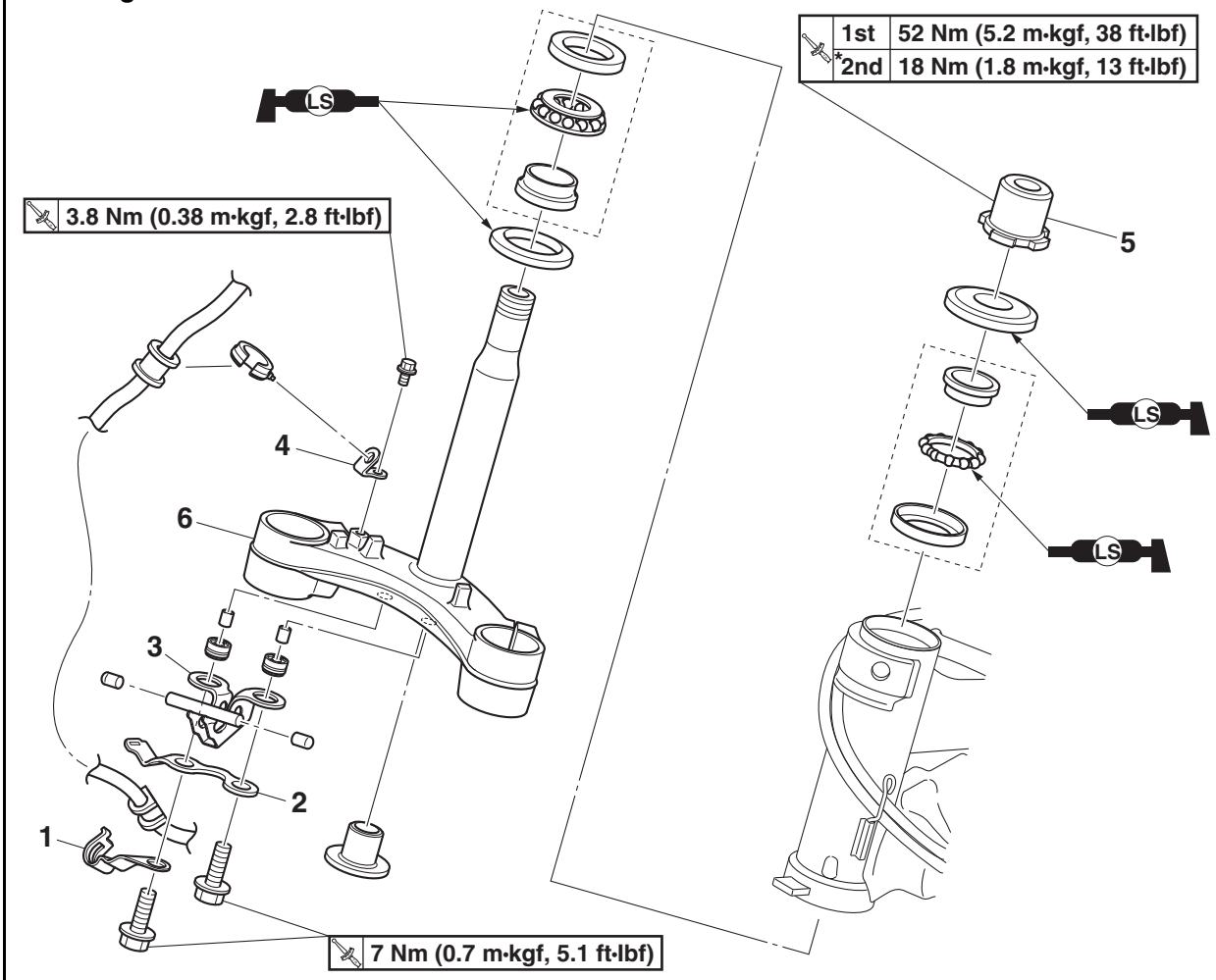
Front fender side cover bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)


b
d
c
a
1

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EAS20035
STEERING HEAD

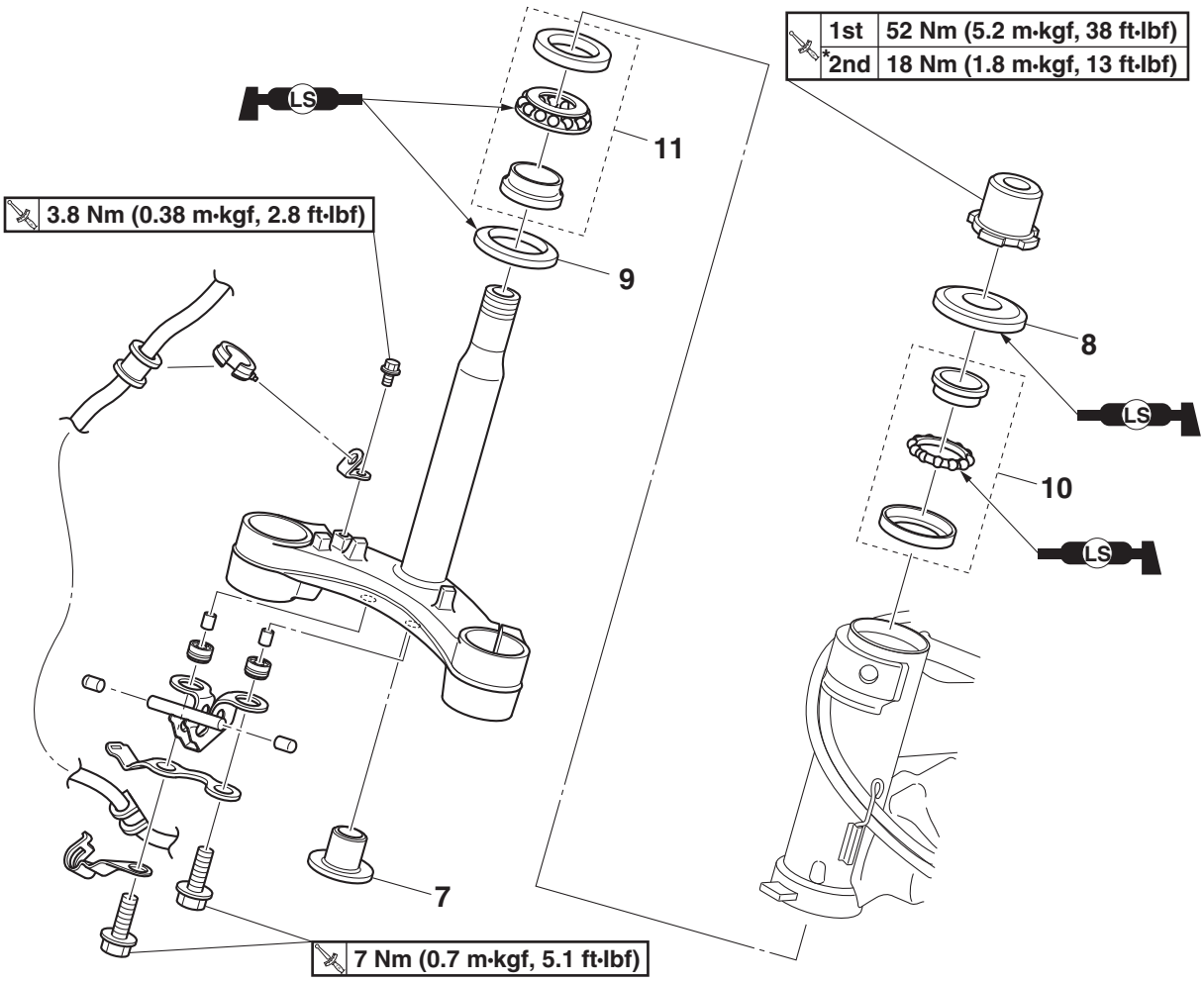
Removing the lower bracket



*** Loosen the cap nut completely, and then tighten it to specification.**

Order	Job/Parts to remove	Q'ty	Remarks
	Headlight assembly		Refer to "GENERAL CHASSIS (3)" on page 4-8.
	Handlebar		
	Front fork legs		Refer to "FRONT FORK" on page 4-64.
1	Front brake hose lower holder	1	
2	Front brake hose upper holder	1	
3	Headlight bracket	1	
4	Front brake hose holder bracket	1	
5	Cap nut	1	
6	Lower bracket	1	

Removing the lower bracket



*** Loosen the cap nut completely, and then tighten it to specification.**

Order	Job/Parts to remove	Q'ty	Remarks
7	Lower bracket cap	1	
8	Bearing cover	1	
9	Lower bearing dust seal	1	
10	Upper bearing	1	
11	Lower bearing	1	

EAS30213
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:
   - Cap nut “1”
   - Lower bracket

EWA13730
⚠ WARNING

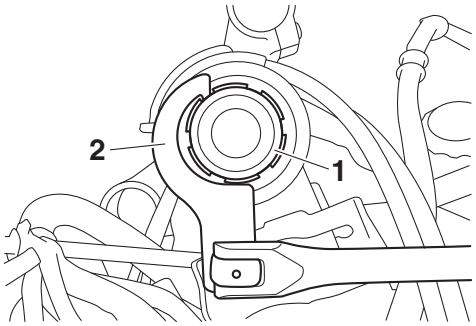
Securely support the lower bracket so that there is no danger of it falling.

TIP

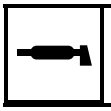
Remove the cap nut with the steering nut wrench “2”.



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



EAS30214
CHECKING THE STEERING HEAD
1. Wash:
   - Bearing
   - Bearing races



Recommended cleaning solvent
Kerosene

2. Check:
   - Bearing
   - Bearing races
     Damage/pitting → Replace the bearings and bearing races as a set.
3. Replace:
   - Bearing
   - Bearing races

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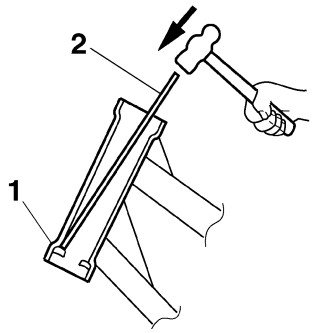
a. Remove the bearing races from the steering head pipe “1” with a long rod “2” and hammer.
b. Remove the bearing race “3” from the lower bracket with a floor chisel “4” and hammer.
c. Install a new dust seal and new bearing races.

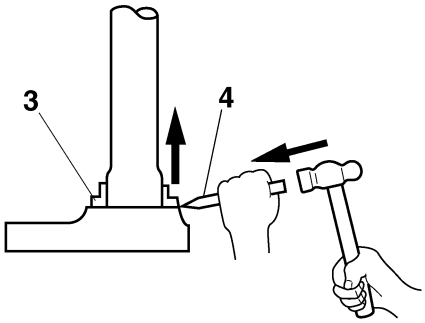
ECA14270
NOTICE

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.
- Whenever the steering head is disassembled, replace the dust seal.

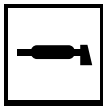




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4. Check:
   - Lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

EAS30216
INSTALLING THE STEERING HEAD
1. Lubricate:
   - Upper bearing
   - Lower bearing

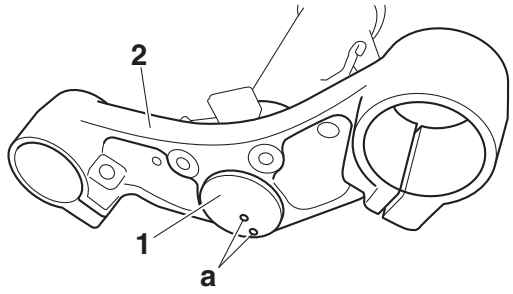


Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Lower bracket cap “1”
     (onto the lower bracket “2”)

TIP

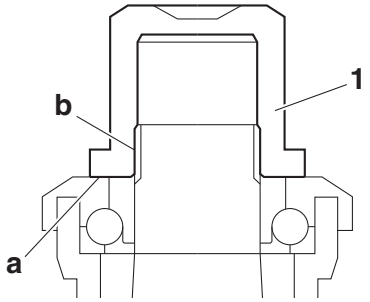
Face the holes “a” in the lower bracket cap rearward.



3. Install:
   - Lower bracket
   - Cap nut “1”
     Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-19.

TIP

Before installing the cap nut, remove any grease from the contact surfaces “a” between the cap nut and the bearing cover and from the threads “b” of the lower bracket and cap nut.

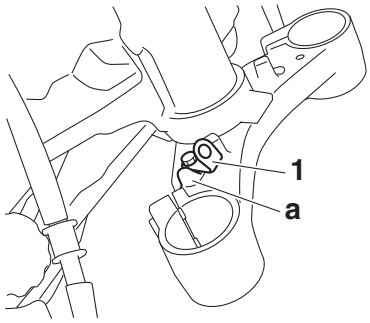


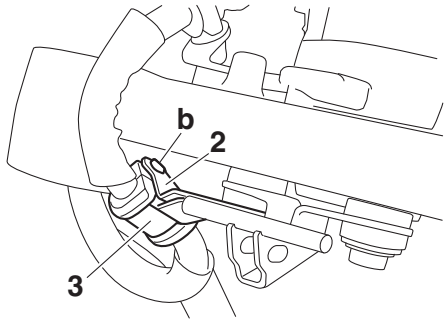
4. Install:
   - Front brake hose holder bracket “1”
   - Headlight bracket
   - Front brake hose upper holder “2”
   - Front brake hose lower holder “3”

	Front brake hose holder bracket bolt **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)** **Front brake hose lower holder bolt** **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

- Make sure that the front brake hose holder bracket contacts the projection “a” on the lower bracket.
- Make sure that the projection “b” on the front brake hose lower holder fits into the hole in the front brake hose upper holder.

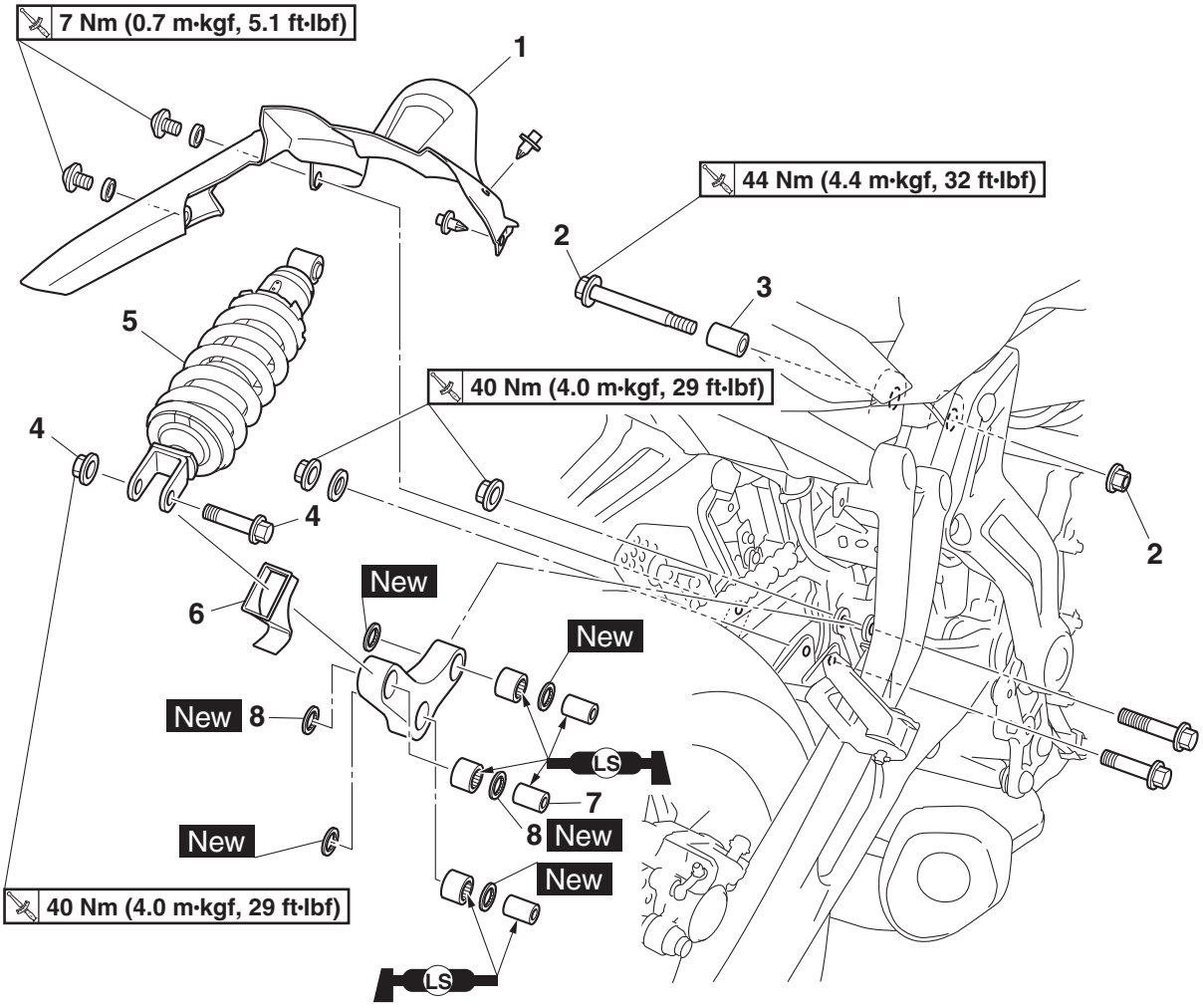




EAS20036

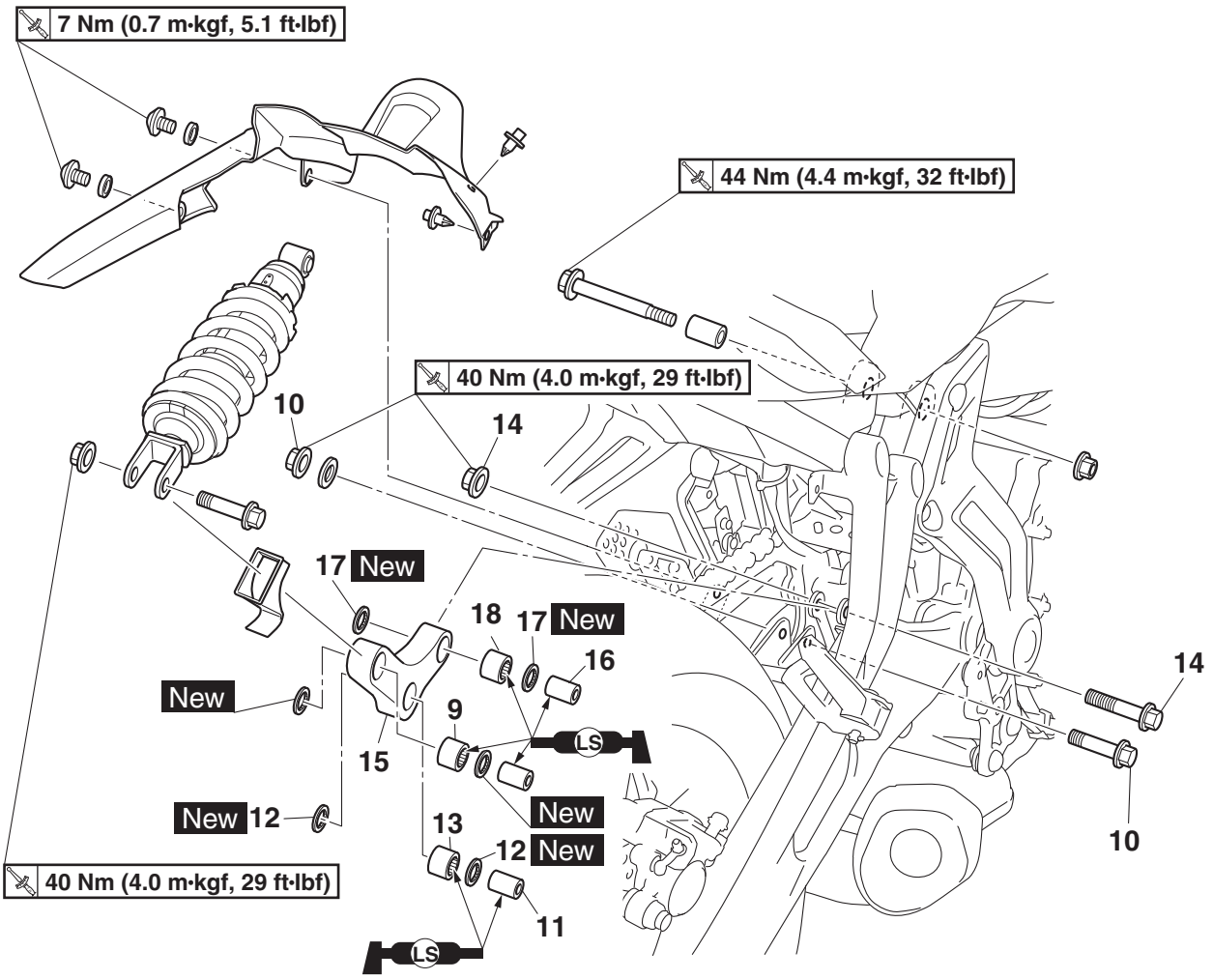
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Drive chain guard	1	
2	Rear shock absorber assembly nut/bolt (front side)	1/1	
3	Spacer	1	
4	Rear shock absorber assembly nut/bolt (rear side)	1/1	
5	Rear shock absorber assembly	1	
6	Relay arm rubber cover	1	
7	Spacer	1	
8	Oil seal	2	

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
9	Bearing	1	
10	Relay arm nut/bolt	1/1	
11	Spacer	1	
12	Oil seal	2	
13	Bearing	1	
14	Connecting arm nut/bolt (relay arm side)	1/1	
15	Relay arm	1	
16	Spacer	1	
17	Oil seal	2	
18	Bearing	1	

EAS30826
HANDLING THE REAR SHOCK ABSORBER

EWA13740
⚠ WARNING

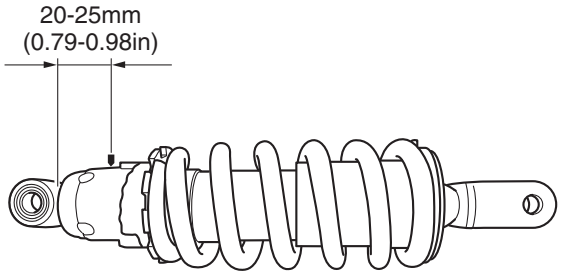
This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear 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.**

EAS30729
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 20–25 mm (0.79–0.98 in) from its end as shown.

EWA13760
⚠ WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS30219
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.

EAS30220
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - Rear shock absorber assembly
     Gas leaks → Replace the rear shock absorber assembly.
   - Spring
     Damage/wear → Replace the rear shock absorber assembly.
   - Bolts
     Bends/damage/wear → Replace.

EAS31112
CHECKING THE RELAY ARM

1. Check:
   - Relay arm
     Damage/wear → Replace.
2. Check:
   - Bearings
   - Oil seals
     Damage/pitting → Replace.
3. Check:
   - Collars
     Damage/scratches → Replace.

EAS30222
INSTALLING THE RELAY ARM

1. Lubricate:
   - Spacers
   - Bearings

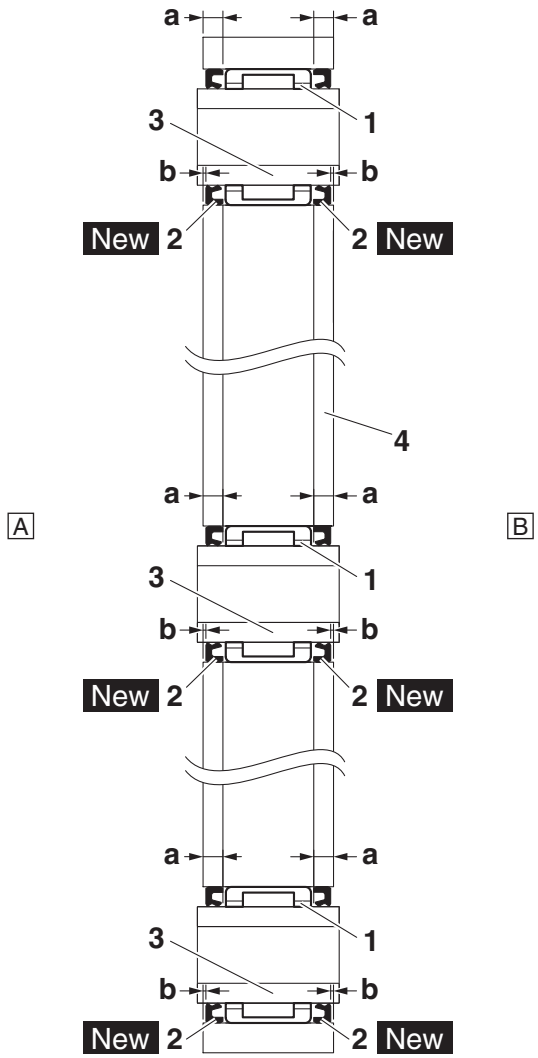
	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Bearings “1”
   - Oil seals “2” New
   - Spacers “3”
     (to the relay arm “4”)

	Installed depth “a” **4.0 mm (0.16 in)** **Install depth “b”** **More than 0.3 mm (0.01 in)**

TIP

When installing the oil seals to the relay arm, face the character stamps of the oil seals outside.

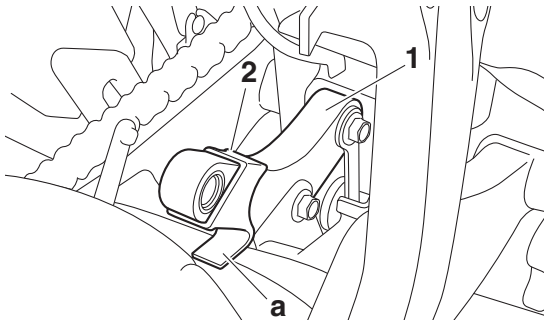


A. Left side
B. Right side

3. Install:
   • Relay arm “1”
   • Relay arm rubber cover “2” (to the relay arm)

TIP

Make sure that the portion “a” of the relay arm rubber cover is positioned on top of the swingarm.



4. Tighten:
   • Connecting arm nut
   • Relay arm nut

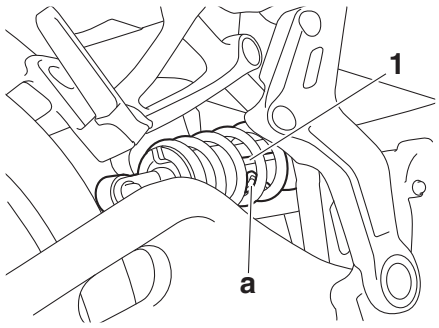
Connecting arm nut (relay arm side)
40 Nm (4.0 m·kgf, 29 ft·lbf)
Relay arm nut
40 Nm (4.0 m·kgf, 29 ft·lbf)

EAS30225
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
   • Rear shock absorber assembly “1”

TIP

Make sure that the label “a” on the rear shock absorber assembly faces down.

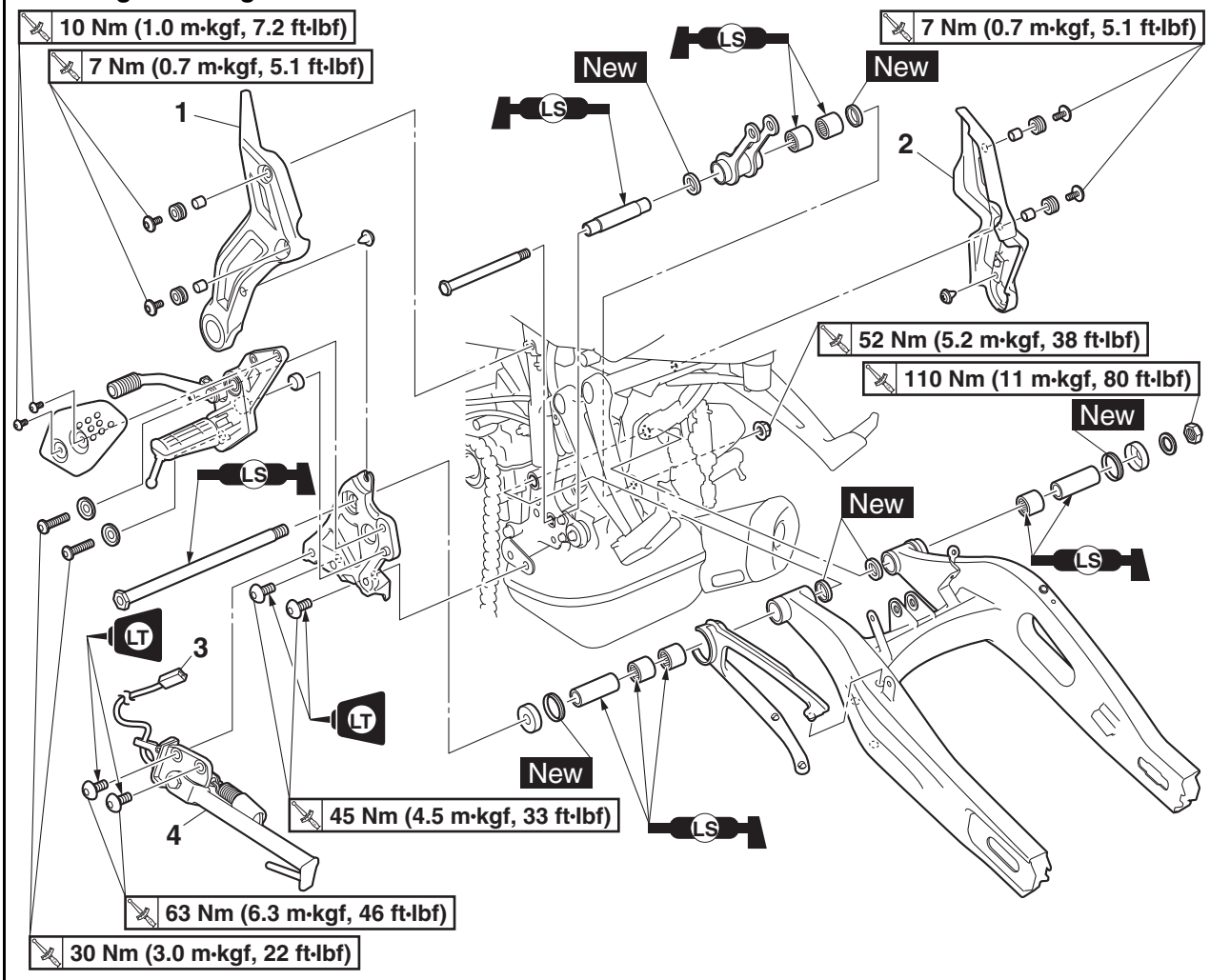


2. Tighten:
   • Rear shock absorber assembly nut (front side)
   • Rear shock absorber bolt (rear side)

Rear shock absorber assembly bolt (front side)
44 Nm (4.4 m·kgf, 32 ft·lbf)
Rear shock absorber assembly nut (rear side)
40 Nm (4.0 m·kgf, 29 ft·lbf)

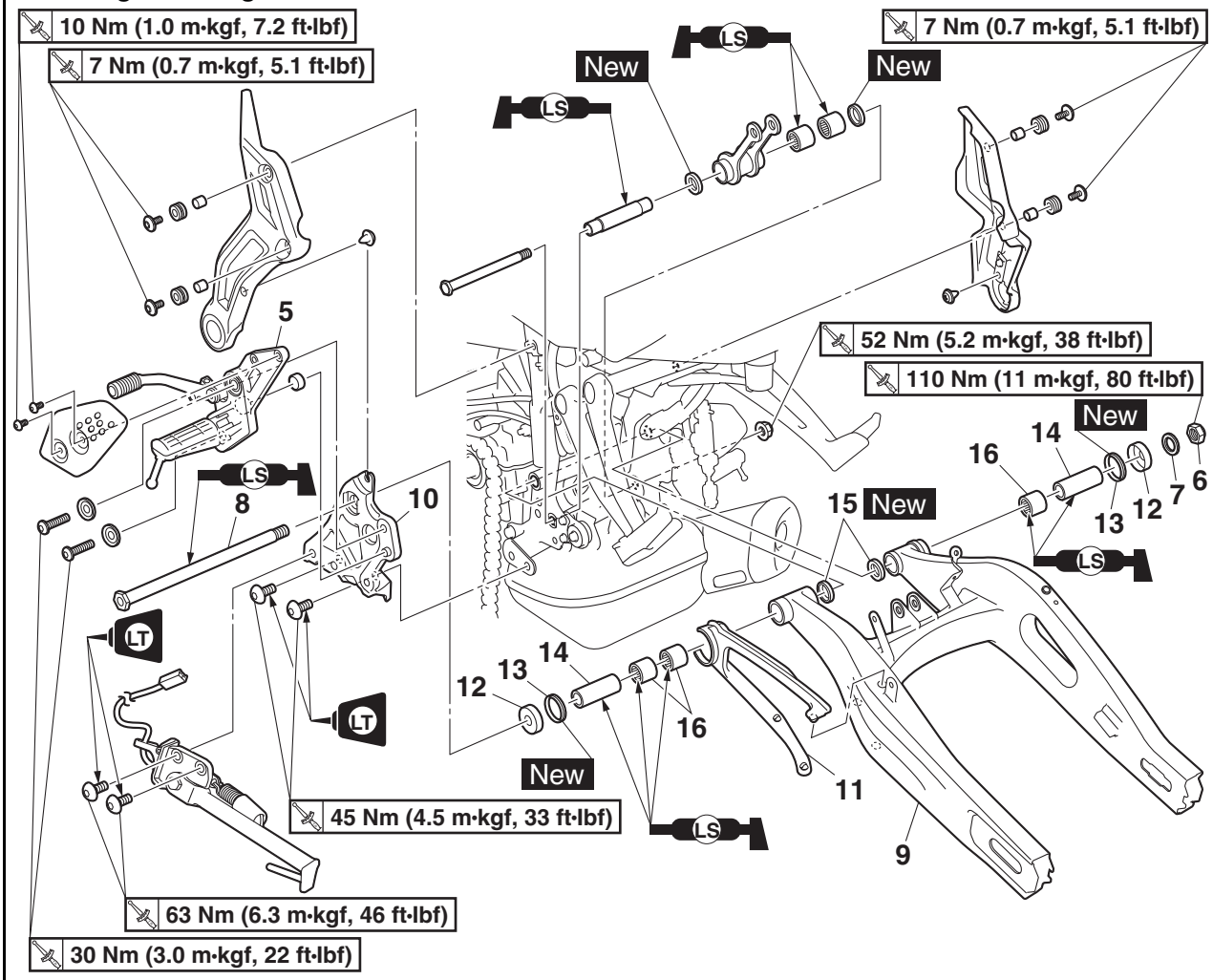
EAS20037
SWINGARM

Removing the swingarm



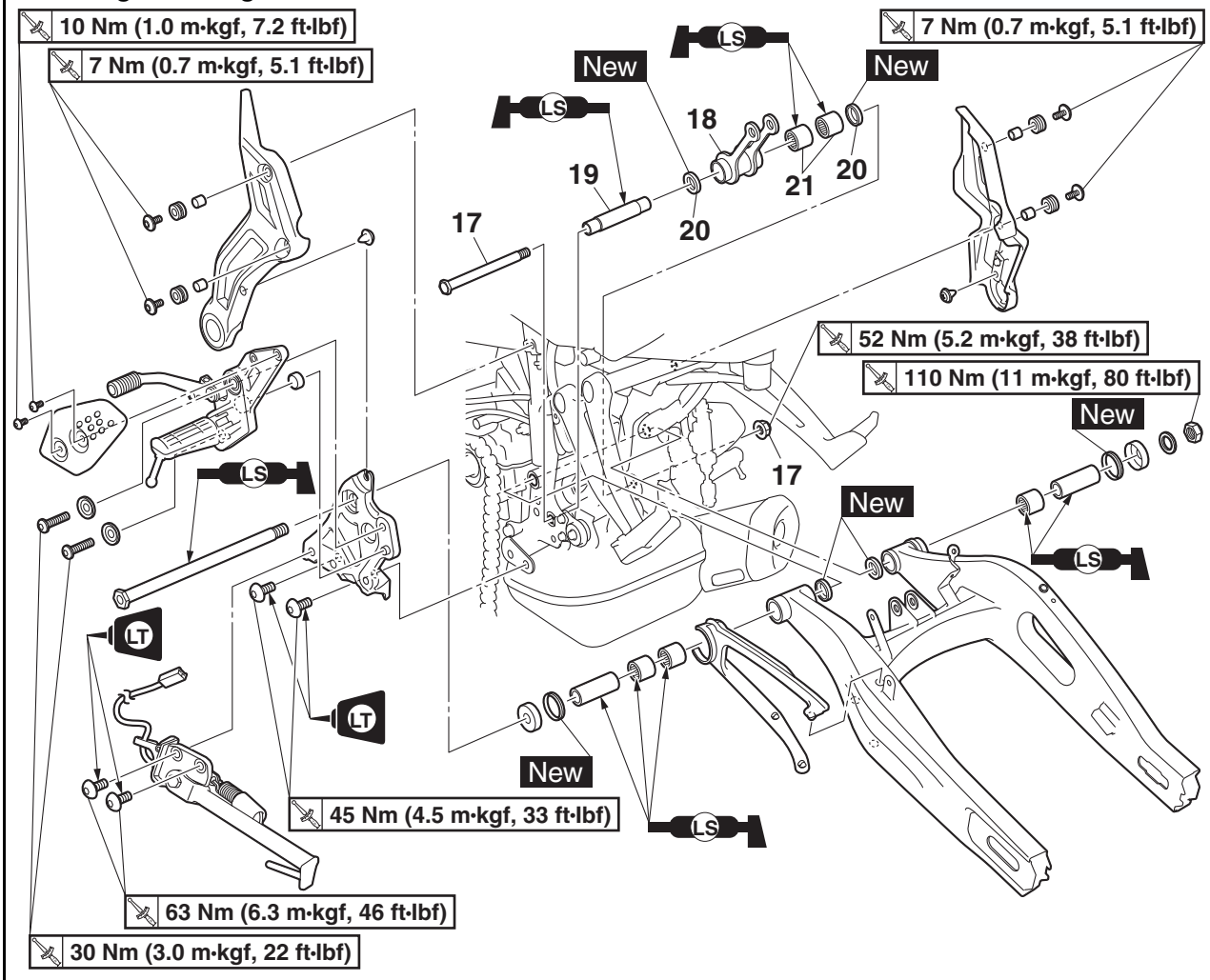
Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper/Rear brake hose guide/Rear brake hose holder		Refer to "REAR BRAKE" on page 4-46.
	Rear wheel		Refer to "REAR WHEEL" on page 4-24.
	Relay arm		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-80.
	Drive chain sprocket cover		Refer to "CHAIN DRIVE" on page 4-90.
1	Pivot shaft protector (left)	1	
2	Pivot shaft protector (right)	1	
3	Sidestand switch coupler	1	
4	Sidestand	1	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
5	Footrest assembly (left)	1	
6	Pivot shaft nut	1	
7	Washer	1	
8	Pivot shaft	1	
9	Swingarm	1	
10	Footrest bracket (left)	1	
11	Drive chain guide	1	
12	Dust cover	2	
13	Oil seal	2	
14	Spacer	2	
15	Oil seal	2	
16	Bearing	3	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
17	Connecting arm nut/bolt (frame side)	1/1	
18	Connecting arm	1	
19	Spacer	1	
20	Oil seal	2	
21	Bearing	2	

EAS30226
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.

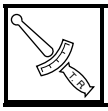
TIP

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

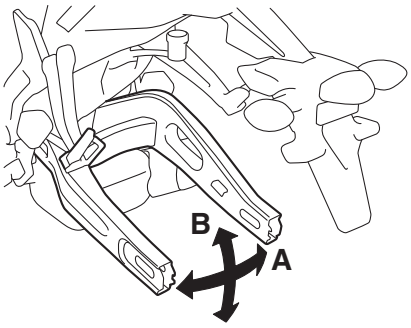
2. Measure:
   - Swingarm side play
   - Swingarm vertical movement

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

	**Pivot shaft nut** **110 Nm (11 m·kgf, 80 ft·lbf)**

b. Check the swingarm side play "A" by moving the swingarm from side to side.
   If the swingarm has side-to-side play, check the collars, bearings, and dust covers.
c. Check the swingarm vertical movement "B" by moving the swingarm up and down.
   If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, collars, bearings, and dust covers.



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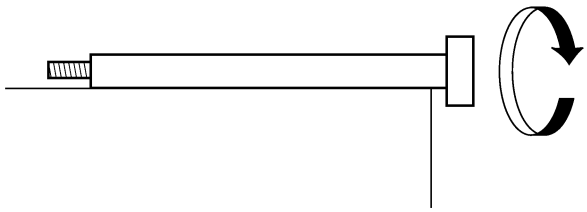
3. Remove:
   - Swingarm

EAS30227
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

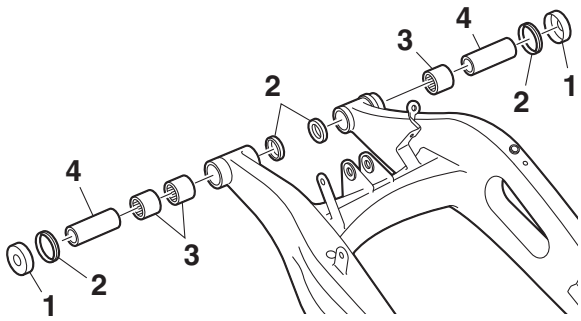
Do not attempt to straighten a bent pivot shaft.



3. Wash:
   - Pivot shaft
   - Dust covers
   - Collars
   - Bearings
   - Washer

	**Recommended cleaning solvent** **Kerosene**

4. Check:
   - Dust covers "1"
   - Oil seals "2"
     Damage/wear → Replace.
   - Bearings "3"
     Damage/pitting → Replace.
   - Collars "4"
     Damage/scratches → Replace.



EAS31113
CHECKING THE CONNECTING ARM

1. Check:
   - Connecting arm
     Damage/wear → Replace.
2. Check:
   - Bearings
   - Oil seals
     Damage/pitting → Replace.

3. Check:
   • Collar
   Damage/scratches → Replace.

EAS31114
INSTALLING THE CONNECTING ARM

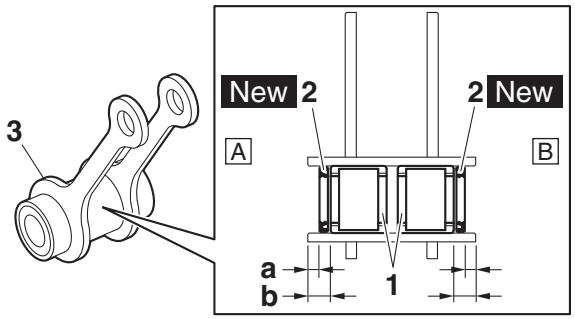
1. Lubricate:
   • Spacers
   • Bearings

Recommended lubricant
Lithium-soap-based grease

2. Install:
   • Bearings “1”
   • Oil seals “2” New
   (to the connecting arm “3”)

TIP

When installing the oil seals to the connecting arm, face the character stamp of the oil seals outside.



A. Left side
B. Right side

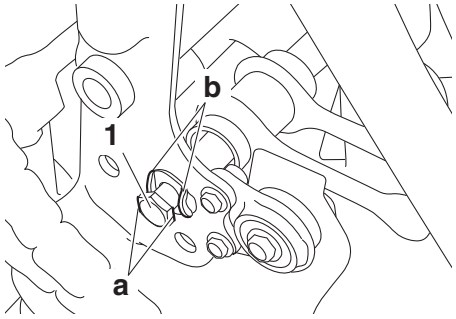
Installed depth “a”
3.5–4.5 mm (0.14–0.18 in)
Installed depth “b”
8.0–9.0 mm (0.31–0.35 in)

3. Install:
   • Spacer
   • Connecting arm
   • Connecting arm bolt “1”
   • Connecting arm nut

Connecting arm nut (frame side)
52 Nm (5.2 m·kgf, 38 ft·lbf)

TIP

Align two flat sides “a” of the connecting arm bolt with the projections “b” on the frame.



EAS30228
INSTALLING THE SWINGARM

1. Lubricate:
   • Spacers
   • Pivot shaft
   • Bearings

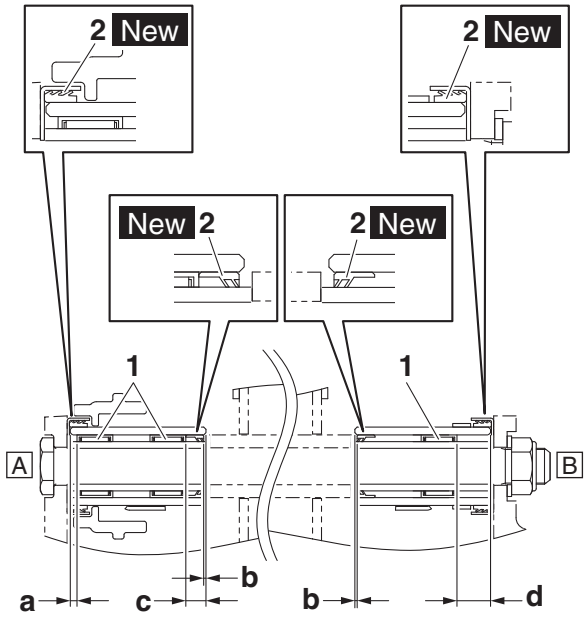
Recommended lubricant
Lithium-soap-based grease

2. Install:
   • Bearings “1”
   • Oil seals “2” New
   (to the swingarm)

Installed depth “a”
3.0 mm (0.12 in)
Installed depth “b”
1.0 mm (0.04 in)
Installed depth “c”
9.0 mm (0.35 in)
Installed depth “d”
15 mm (0.59 in)

TIP

Install the oil seals to the swingarm so that they are facing in the directions shown in the illustration.



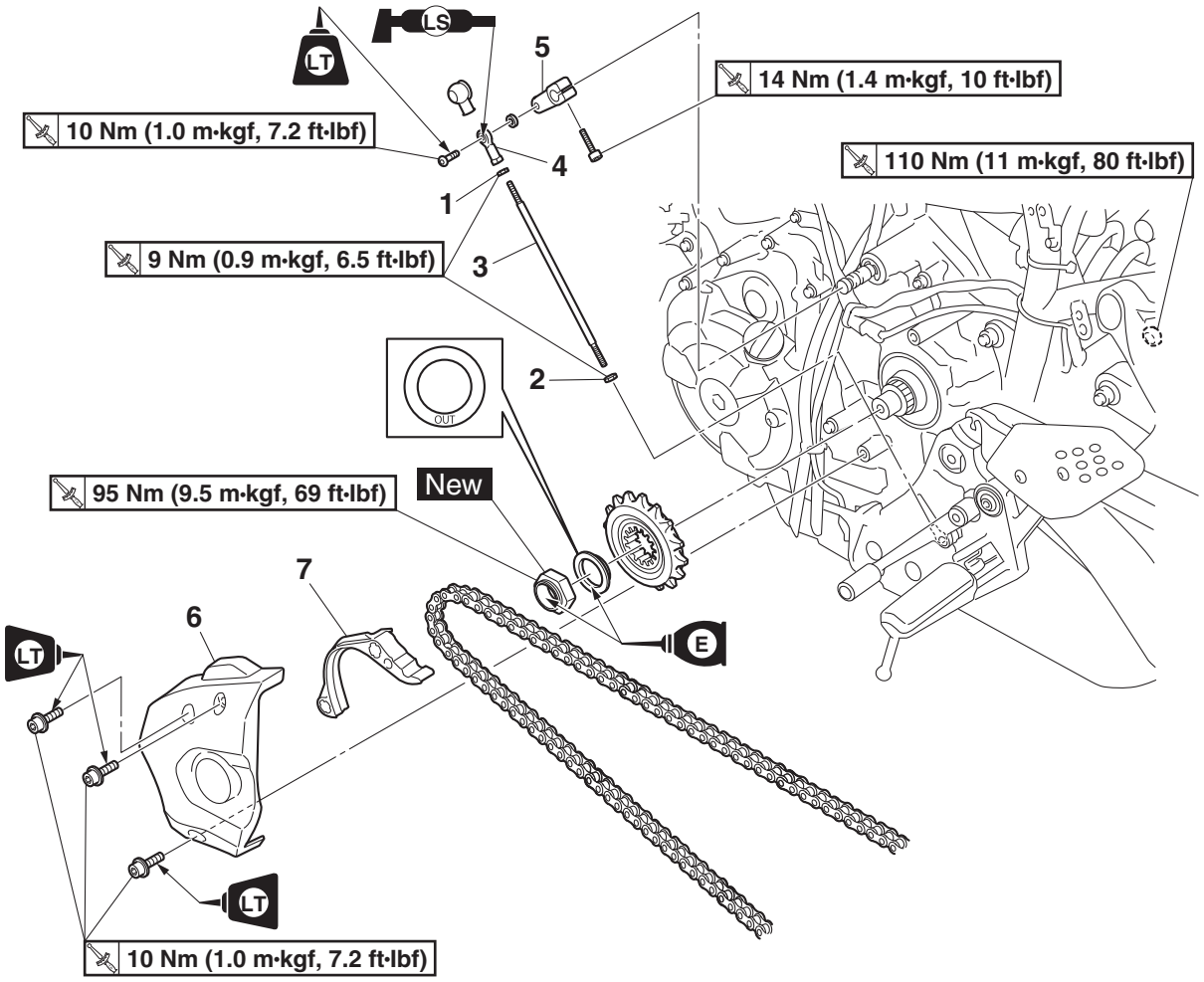
A. Left side
B. Right side

3. Adjust:
   • Drive chain slack
   Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-17.

	Drive chain slack **51.0–56.0 mm (2.01–2.20 in)**

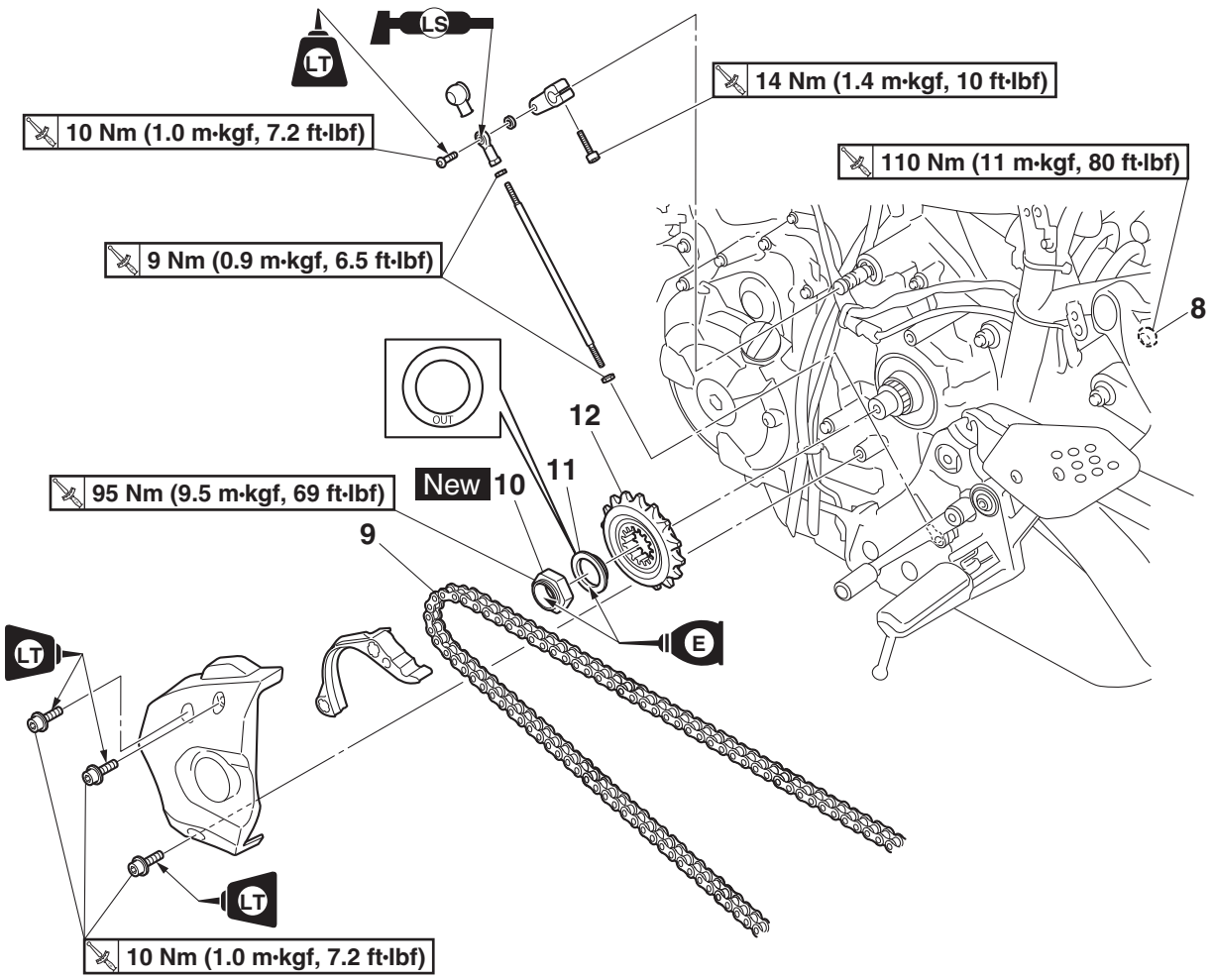
EAS20038
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive chain guard		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-80.
	Pivot shaft protectors/sidestand		Refer to "SWINGARM" on page 4-84.
1	Shift rod locknut (shift arm side)	1	
2	Shift rod locknut (shift pedal side)	1	Left-hand threads
3	Shift rod	1	
4	Shift rod joint	1	
5	Shift arm	1	
6	Drive sprocket cover	1	
7	Drive chain guide	1	

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
8	Pivot shaft nut	1	Loosen.
9	Drive chain	1	
10	Drive sprocket nut	1	
11	Washer	1	
12	Drive sprocket	1	

EAS30229
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 “1”

TIP

Push the rear wheel forward and remove the drive chain from the rear wheel sprocket. Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-17.

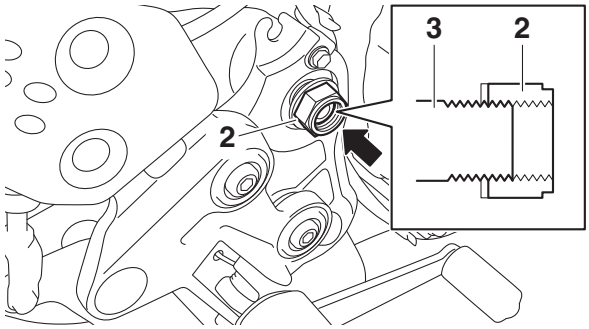
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a. Loosen the pivot shaft nut “2” so that the engaged thread length on the pivot shaft “3” is 3–4 ridges.

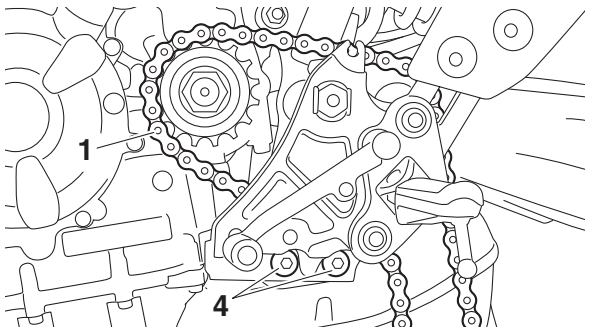
ECA21200
NOTICE

Make sure that the pivot shaft nut does not come off the pivot shaft.

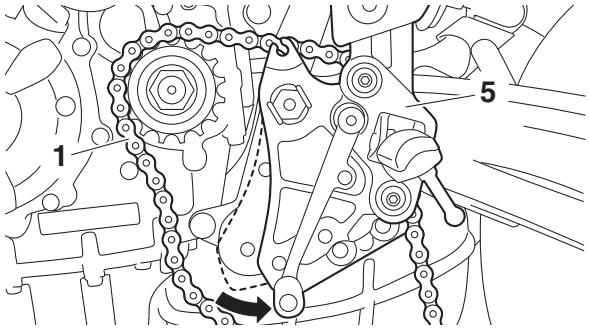
b. Tap the pivot shaft nut to push the pivot shaft to the left.



c. Remove the footrest bracket bolts “4”.

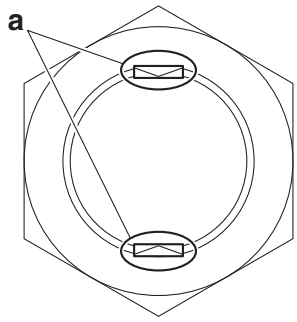


d. Move the footrest bracket “5” rearward, and then remove the drive chain.



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EAS31115
REMOVING THE DRIVE SPROCKET
1. Straighten the drive sprocket nut ribs “a”.



2. Loosen:
   • Drive chain sprocket nut

TIP

Loosen the drive sprocket nut while pressing the brake pedal.

EAS30230
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)**

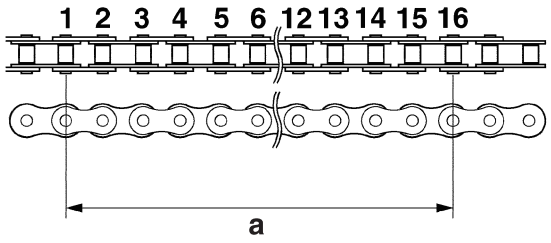
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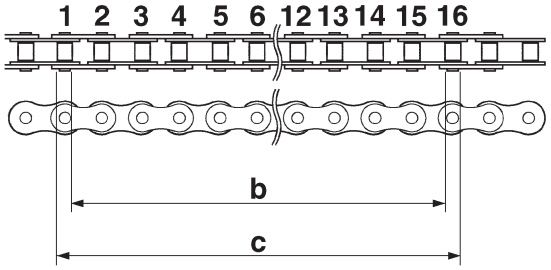
a. Measure the length “b” between the inner sides of the pins and the length “c” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
b. Calculate the length “a” of the 15-link section of the drive chain using the following formula.
   Drive chain 15-link section length “a” = (length “b” between pin inner sides + length “c” between pin outer sides)/2

TIP

• When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.

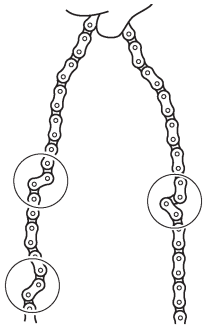
• Perform this procedure 2–3 times, at a different location each time.





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2. Check:
   • Drive chain
   Stiffness → Clean and lubricate or replace.



3. Clean:
   • Drive chain

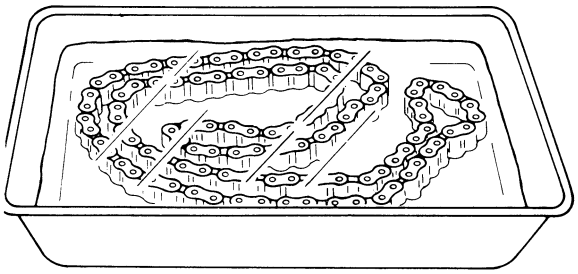
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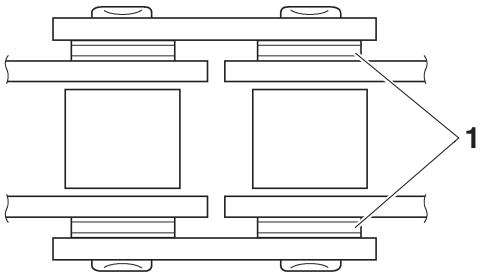
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.

ECA14290

NOTICE

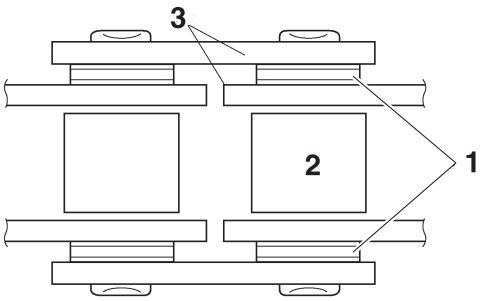
• This motorcycle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's 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/cracks → Replace the drive chain.

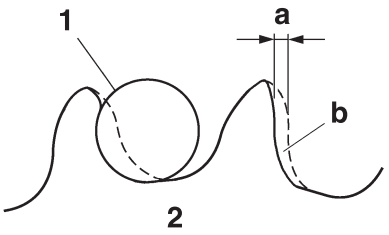


5. Lubricate:
   • Drive chain

Recommended lubricant
Chain lubricant suitable for O-ring chains

EAS30231
CHECKING THE DRIVE SPROCKET

1. Check:
   - Drive sprocket
     More than 1/4 tooth "a" wear → Replace the drive chain sprocket, drive chain, and rear wheel sprocket as a set.
     Bent teeth → Replace the drive chain sprocket, drive chain, and rear wheel sprocket as a set.



b. Correct
1. Drive chain roller
2. Drive sprocket

EAS30232
CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-28.

EAS30233
CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-28.

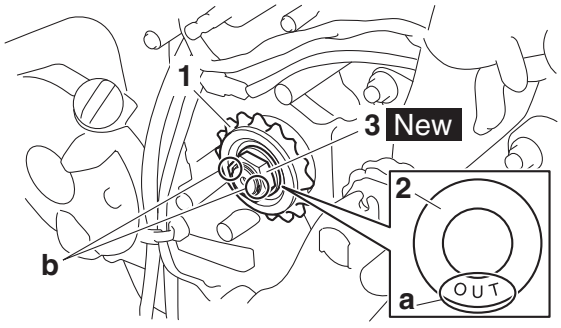
EAS31116
INSTALLING THE DRIVE SPROCKET

1. Install:
   - Drive sprocket "1"
   - Washer "2"
   - Drive sprocket nut "3" New

Drive sprocket nut
95 Nm (9.5 m·kgf, 69 ft·lbf)

TIP

- While applying the rear brake, tighten the drive sprocket nut.
- Install washer with the "OUT" mark "a" facing out.
- Stake the drive sprocket nut at cutouts "b" in the drive axle.

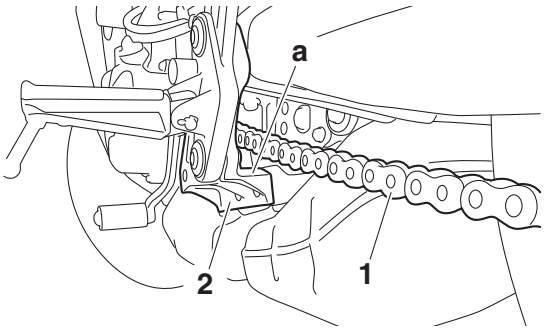


EAS30234
INSTALLING THE DRIVE CHAIN

1. Install:
   - Drive chain "1"

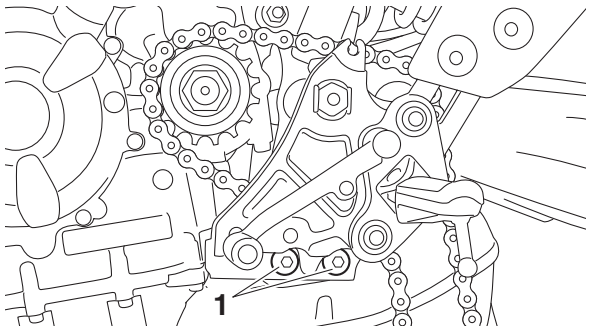
TIP

Make sure that the drive chain is positioned above the portion "a" of the footrest bracket "2".



2. Tighten:
   - Footrest bracket bolts "1"

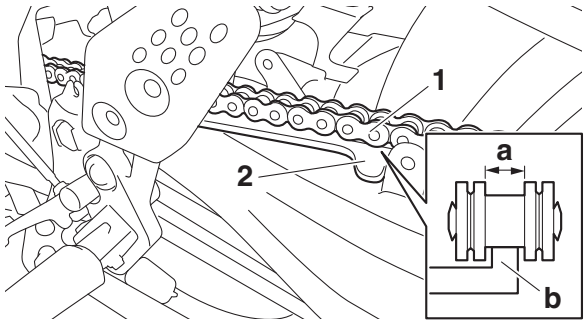
Footrest bracket bolt
45 Nm (4.5 m·kgf, 33 ft·lbf)
LOCTITE®



3. Lubricate:
   - Drive chain

Recommended lubricant
Chain lubricant suitable for O-ring chains

4. Fit the space “a” between the side plates of the drive chain “1” onto the rib “b” on the drive chain guide “2”.

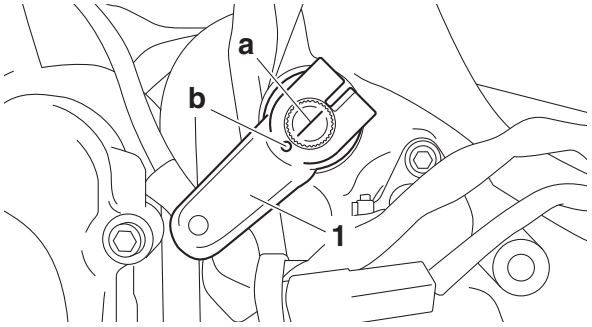


5. Install:
   - Shift arm “1”
   - Shift rod joint
   - Shift rod
   - Shift rod locknuts

TIP

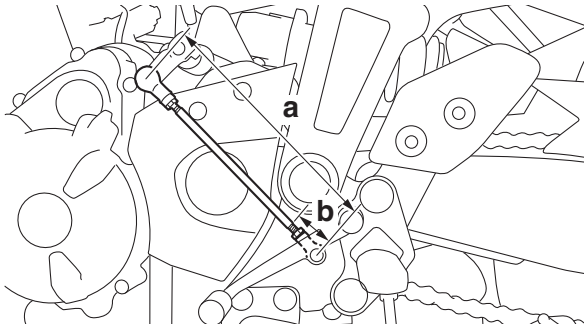
Before installing, make sure to align the mark “a” of the shift shaft with the punch mark “b” of the shift arm.

	Shift arm pinch bolt **14 Nm (1.4 m·kgf, 10 ft·lbf)**



6. Measure:
   - Installed shift rod length “a” and “b”
     Incorrect → Adjust.

	Installed length “a” **217.5–219.5 mm (8.56–8.64 in)** **Installed length “b”** **35.0–36.0 mm (1.38–1.42 in)**



7. Adjust:
   - Installed shift rod length

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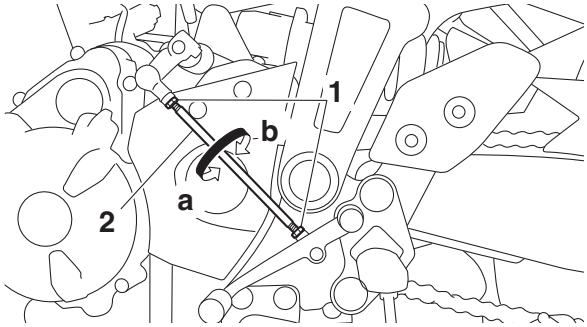
a. Loosen both locknuts “1”.

TIP

The shift rod locknut (shift pedal side) has left-hand threads.

b. Turn the shift rod “2” in direction “a” or “b” to obtain the correct shift pedal position.

Direction “a”
Installed shift rod length increases.
Direction “b”
Installed shift rod length decreases.



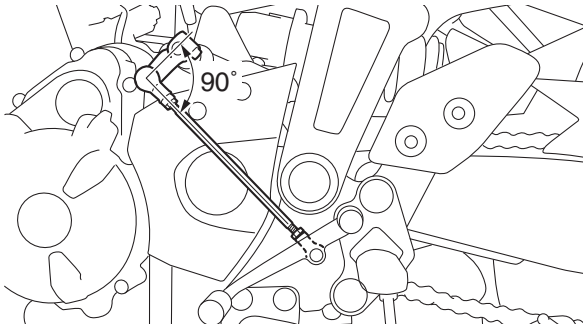
c. Tighten both locknuts.

TIP

The shift rod locknut (shift pedal side) has left-hand threads.

	Shift rod locknut (shift arm side) **9 Nm (0.9 m·kgf, 6.5 ft·lbf)** **Shift rod locknut (shift pedal side)** **9 Nm (0.9 m·kgf, 6.5 ft·lbf)** **Left-hand threads**

d. Make sure the installed shift rod length is within specification. Make sure that the installed shift rod length is within specification and that the angle between the shift arm and the shift rod is 90°.



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8. Adjust:
   • Drive chain slack
   Refer to"ADJUSTING THE DRIVE CHAIN SLACK" on page 3-17.

	Drive chain slack **51.0–56.0 mm (2.01–2.20 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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EAS20041
ENGINE INSPECTION

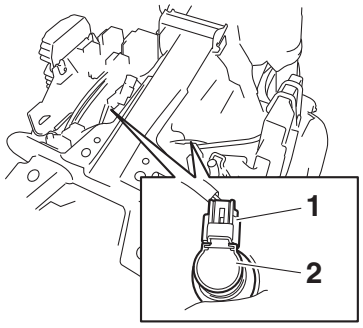
EAS30249
MEASURE THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover
   - Fuel tank front cover
     Refer to "GENERAL CHASSIS (4)" on page 4-11.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
4. Disconnect:
   - Ignition coil couplers "1"
5. Remove:
   - Ignition coils "2"



6. Remove:
   - Spark plugs

ECA13340

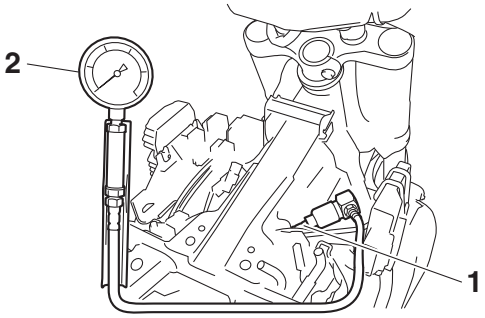
NOTICE

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

7. Install:
   - Extension "1"
   - Compression gauge "2"



Extension
90890-04136
Compression gauge
90890-03081
Engine compression tester
YU-33223



8. Measure:
   - Compression pressure
     Out of specification → Refer to steps (c) and (d).

TIP

Due to the engine characteristics, the compression pressure is different for cylinder #1 and cylinder #2.



Standard compression pressure (at sea level)
#1 880 kPa/355 r/min (8.8 kgf/cm²/355 r/min, 125.2 psi/355 r/min)
#2 790 kPa/355 r/min (7.9 kgf/cm²/355 r/min, 112 psi/355 r/min)
Minimum-maximum
#1 770–990 kPa/355 r/min (7.7–9.9 kgf/cm²/355 r/min, 109.5–140.8 psi/355 r/min)
#2 690–880 kPa/355 r/min (6.9–8.8 kgf/cm²/355 r/min, 98.1–125.1 psi/355 r/min)

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a. Turn the main switch to "ON".
b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12940

⚠ WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Pistons, valves, cylinder head gasket or piston ring(s) possibly defective → Repair.

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9. Install:
   • Spark plugs
   • Ignition coils

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

10. Connect:
    • Ignition coil couplers
11. Install:
    • Fuel tank
      Refer to “FUEL TANK” on page 7-1.
    • Fuel tank front cover
    • Fuel tank center cover
    • Fuel tank cover (left)
    • Fuel tank cover (right)
    • Fuel tank top cover
      Refer to “GENERAL CHASSIS (4)” on page 4-11.
    • Rider seat
      Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS31133

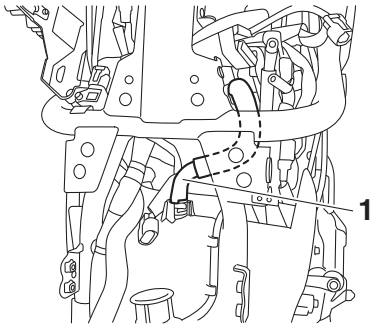
CHECKING THE CYLINDER HEAD BREATHER HOSE

1. Remove:
   • Rider seat
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Fuel tank top cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank center cover
   • Fuel tank front cover
     Refer to “GENERAL CHASSIS (4)” on page 4-11.
   • Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Check:
   • Cylinder head breather hose “1”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA14920

NOTICE

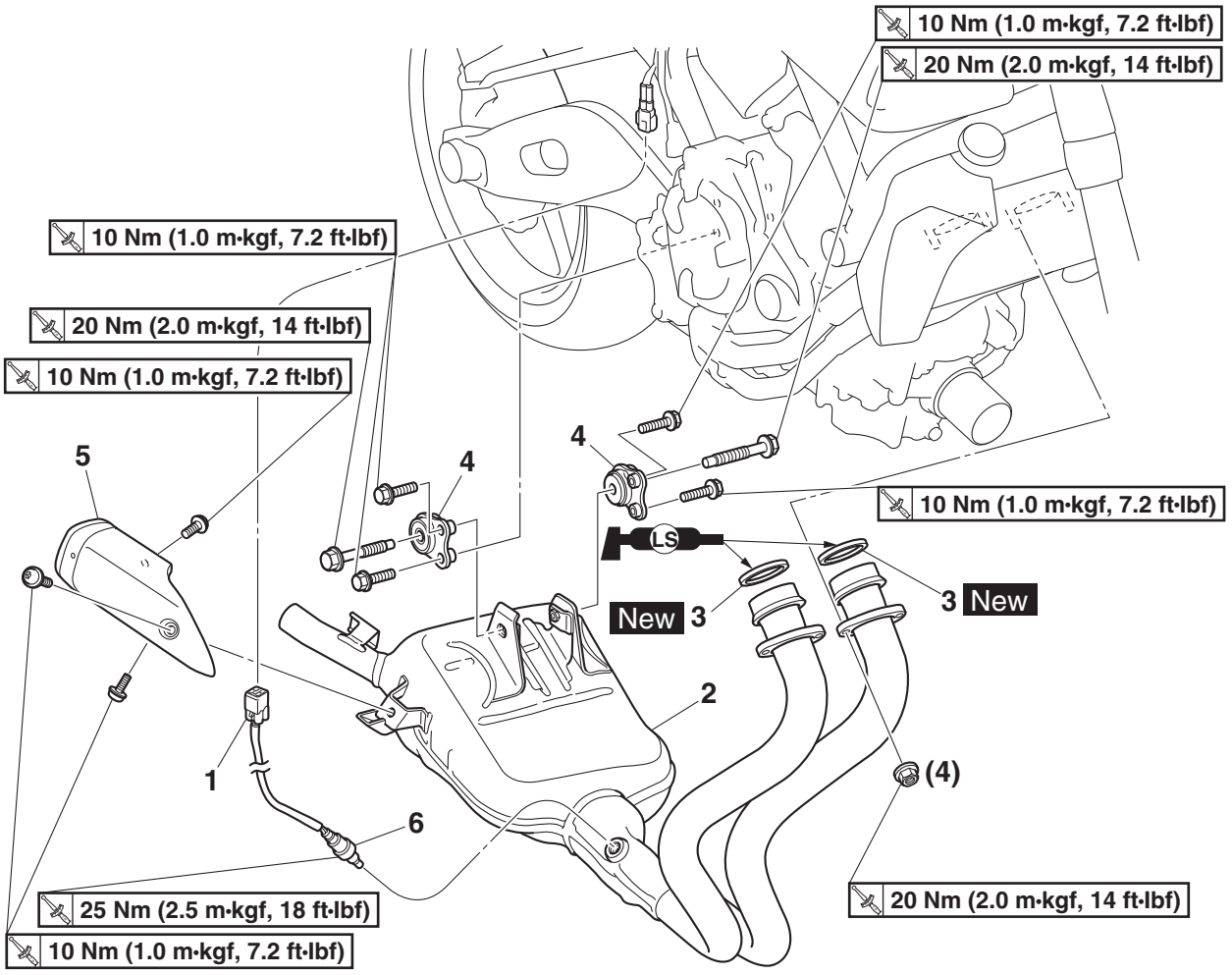
Make sure the cylinder head breather hose is routed correctly.



3. Install:
   • Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   • Fuel tank front cover
   • Fuel tank center cover
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   • Fuel tank top cover
     Refer to “GENERAL CHASSIS (4)” on page 4-11.
   • Rider seat
     Refer to “GENERAL CHASSIS (1)” on page 4-1.

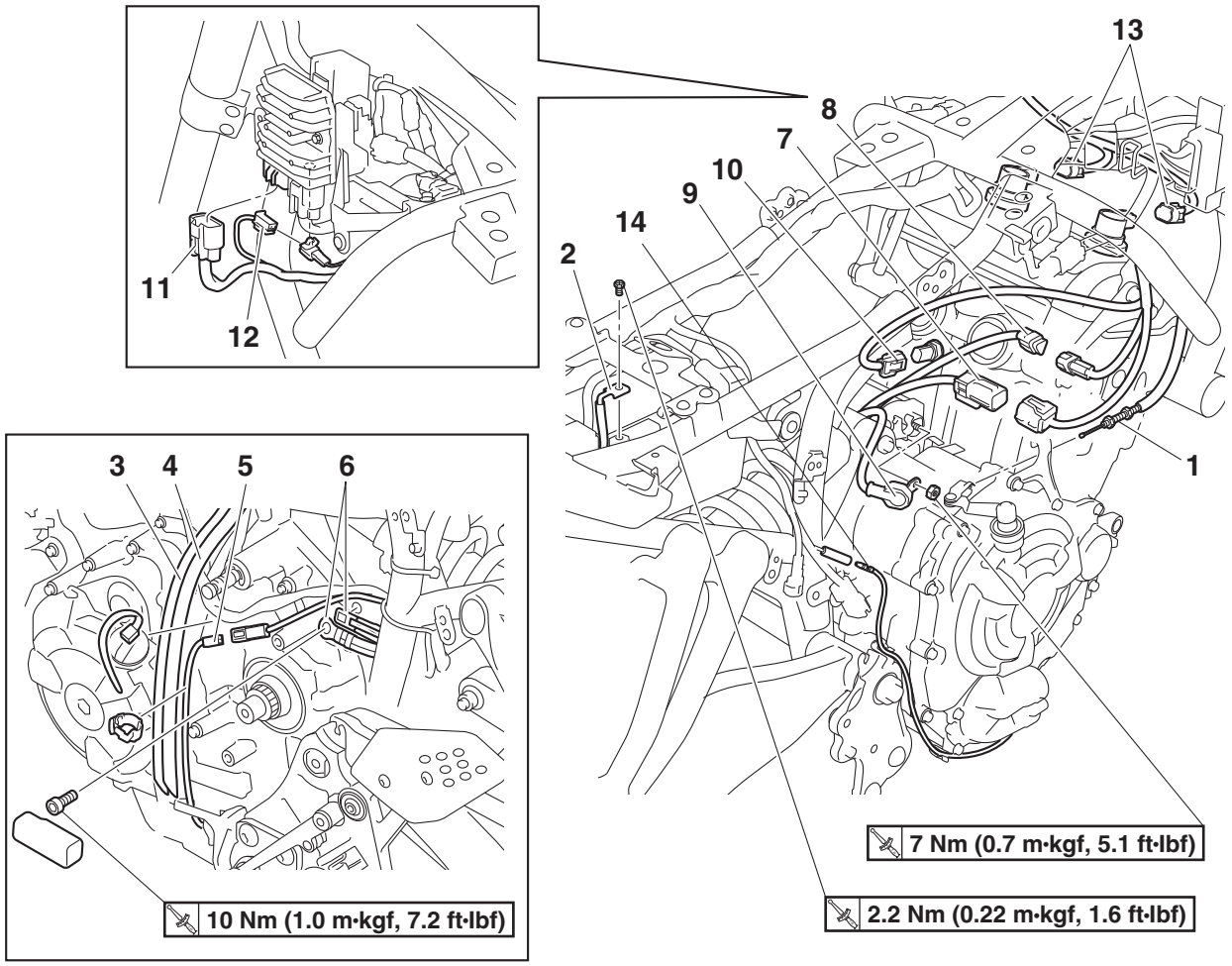
EAS20042
ENGINE REMOVAL

Removing the muffler and exhaust pipe



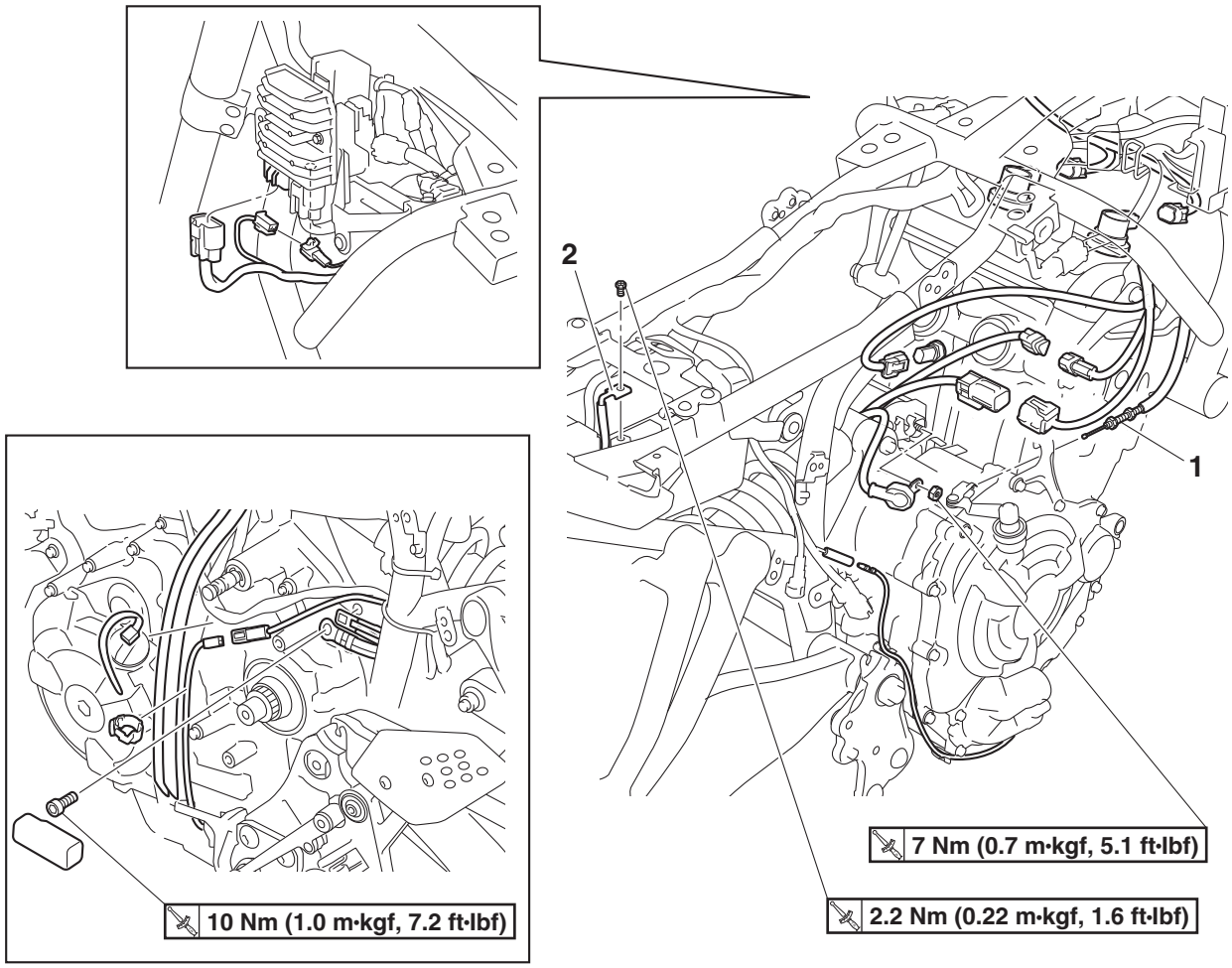
Order	Job/Parts to remove	Q'ty	Remarks
	Pivot shaft protector (right)		Refer to "SWINGARM" on page 4-84.
	Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-46.
1	O_2 sensor coupler	1	Disconnect.
2	Muffler assembly	1	
3	Exhaust gasket	2	
4	Muffler bracket	2	
5	Muffler cover	1	
6	O_2 sensor	1	Remove the O_2 sensor only when necessary.

Disconnecting the leads and hoses



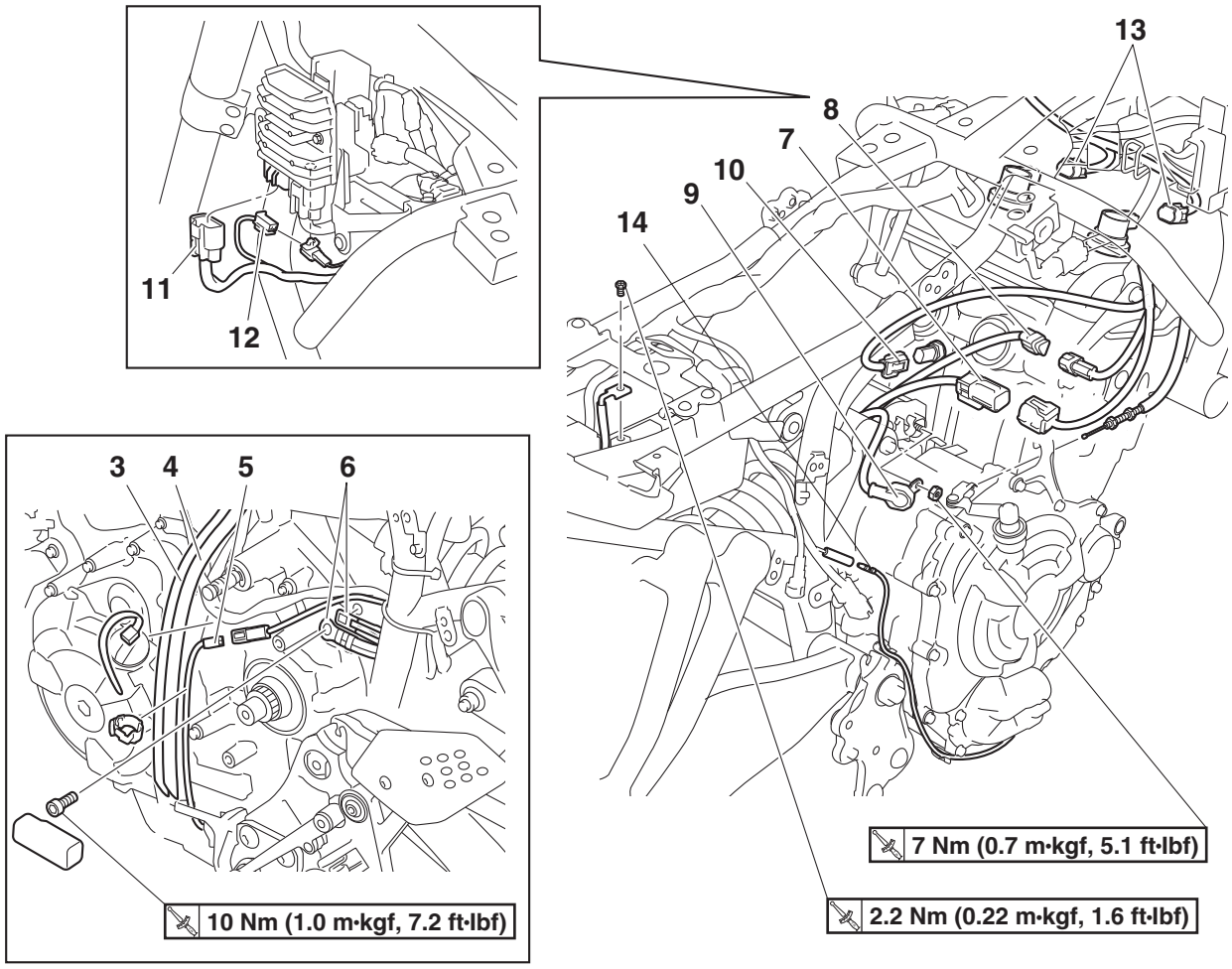
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Pivot shaft protectors/Sidestand/Footrest assembly (left)		Refer to "SWINGARM" on page 4-84.
	Brake fluid reservoir/Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-46.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air duct bracket		Refer to "AIR FILTER ELEMENT" on page 7-7.
	Throttle bodies/Air filter case/Cylinder head breather hose		Refer to "THROTTLE BODIES" on page 7-8.

Disconnecting the leads and hoses



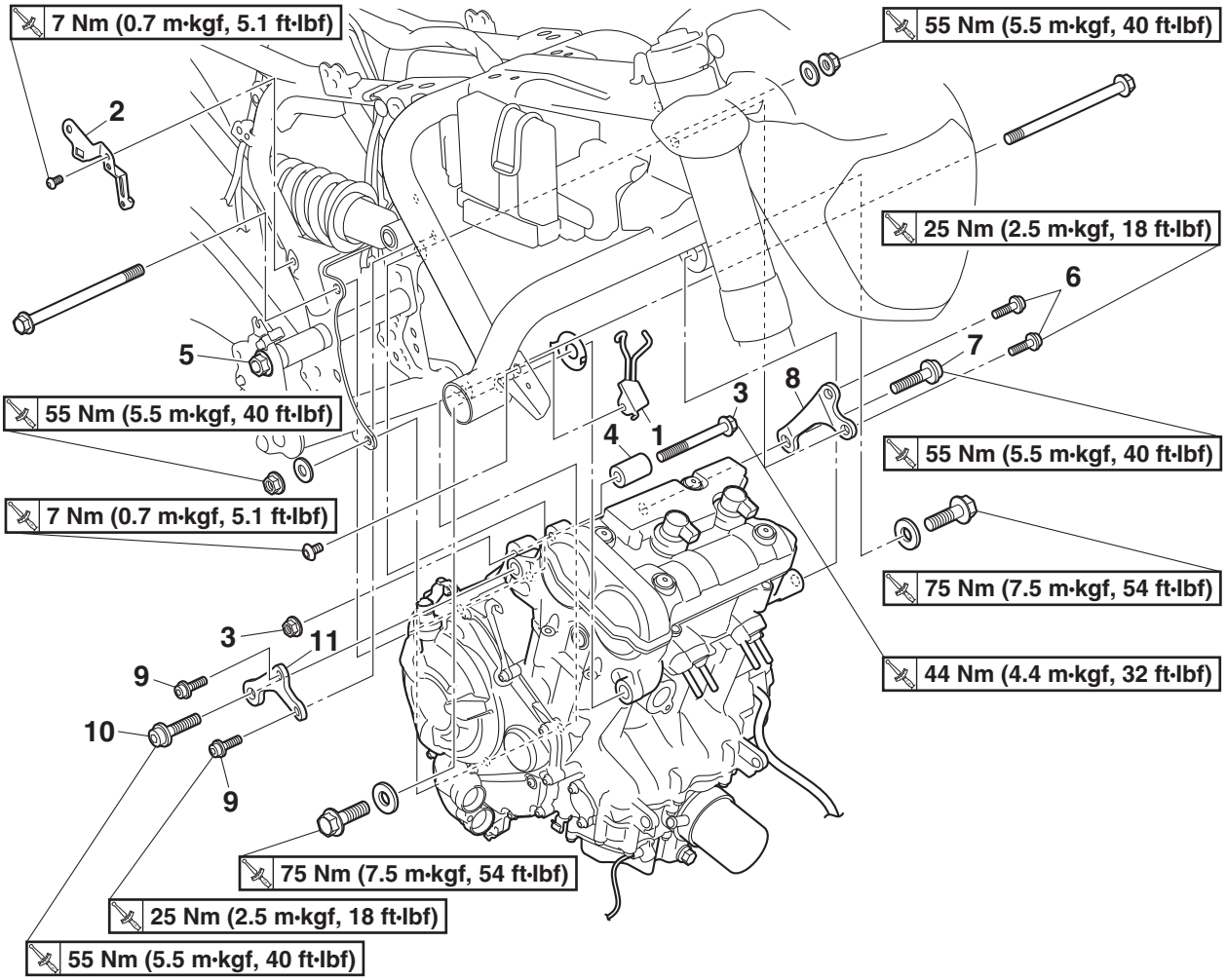
Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
	Radiator/Coolant reservoir		Refer to "RADIATOR" on page 6-1.
	Oil cooler outlet hose/Oil cooler inlet hose		Refer to "OIL COOLER" on page 6-4.
	Water pump inlet pipe/Water pump outlet pipe		Refer to "WATER PUMP" on page 6-9.
	Drive chain/Drive sprocket		Refer to "CHAIN DRIVE" on page 4-90.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
1	Clutch cable	1	Disconnect.
2	Negative battery lead	1	Disconnect.

Disconnecting the leads and hoses



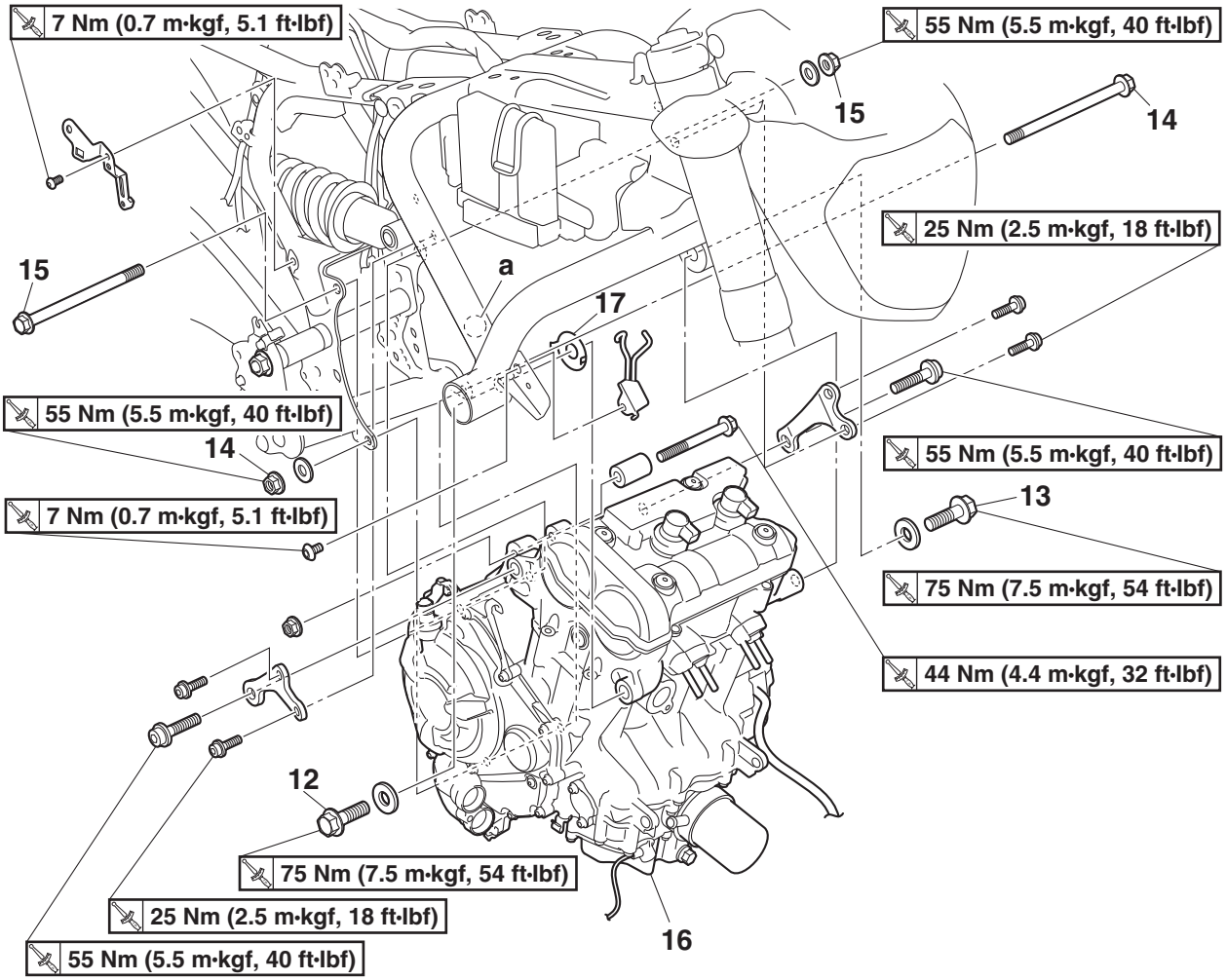
Order	Job/Parts to remove	Q'ty	Remarks
3	Fuel tank overflow hose	1	
4	Fuel tank breather hose	1	
5	Sidestand switch coupler	1	Disconnect.
6	Engine ground lead	2	Disconnect.
7	Gear position switch coupler	1	Disconnect.
8	Speed sensor coupler	1	Disconnect.
9	Starter motor lead	1	Disconnect.
10	Coolant temperature sensor coupler	1	Disconnect.
11	Stator coil coupler	1	Disconnect.
12	Crankshaft position sensor coupler	1	Disconnect.
13	Ignition coil coupler	2	Disconnect.
14	Oil pressure switch connector	1	Disconnect.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch cable guide	1	
2	O_2 sensor coupler bracket	1	
3	Rear shock absorber assembly bolt/nut (front side)	1/1	
4	Spacer	1	
5	Pivot shaft nut	1	Loosen.
6	Engine bracket bolt (left)	2	
7	Engine mounting bolt (left upper side)	1	
8	Engine bracket (left)	1	
9	Engine bracket bolt (right)	2	
10	Engine mounting bolt (right upper side)	1	
11	Engine bracket (right)	1	

Removing the engine

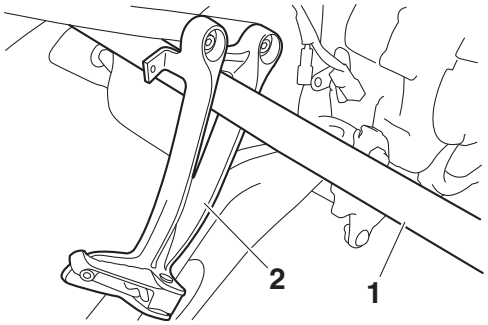


Order	Job/Parts to remove	Q'ty	Remarks
12	Engine mounting bolt (right front side)	1	
13	Engine mounting bolt (left front side)	1	
14	Engine mounting bolt/nut (rear lower side)	1/1	
15	Engine mounting bolt/nut (rear upper side)	1/1	
16	Engine	1	
17	Plate	1	Install the plate only for frames that have a stamped "1" mark at the location "a".

EAS30250
REMOVING THE ENGINE

TIP

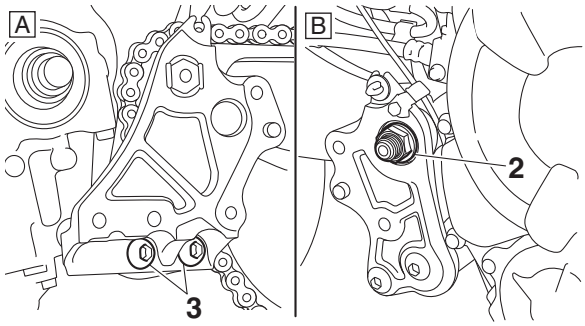
Pass a suitable rod “1” through the holes in the brackets of the passenger footrests “2” and secure the rod to support the vehicle.



1. Remove:
   • Engine mounting bolt (rear lower side) “1”

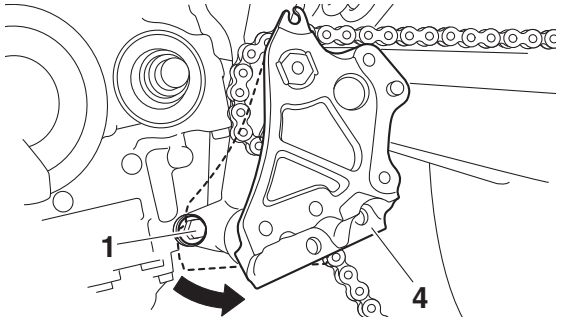
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a. Loosen the pivot shaft nut “2”, and then remove the footrest bracket bolts “3”.



A. Left side
B. Right side

b. Move the footrest bracket “4” rearward, and then loosen the engine mounting bolt (rear lower side).



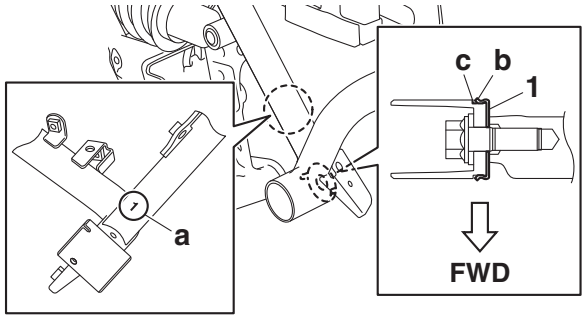
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EAS30251
INSTALLING THE ENGINE

1. Install: (for models with a stamped “1” mark on the frame)
   • Plate “1”

TIP

• Install the plate only for frames that have a stamped “1” mark at the location “a”.
• Fit the projections “b” on the plate into the slots “c” in the frame.

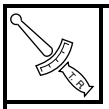


2. Install:
   • Engine “2”
3. Install:
   • Engine mounting bolt (rear upper side) “3”
   • Engine mounting nut (rear upper side) “4”
   • Engine mounting bolt (rear lower side) “5”
   • Engine mounting nut (rear lower side) “6”
   • Engine mounting bolt (left front side) “7”
   • Engine mounting bolt (right front side) “8”
   • Engine mounting bolt (right upper side) “9”
   • Engine bracket bolts (right) “10”
   • Engine bracket (right) “11”

TIP

Temporarily tighten the bolts and nuts.

4. Tighten:
   • Engine mounting nut (rear upper side) “4”
   • Engine mounting nut (rear lower side) “6”
   • Engine mounting bolt (left front side) “7”



Engine mounting nut (rear upper side)
55 Nm (5.5 m·kgf, 40 ft·lbf)
Engine mounting nut (rear lower side)
55 Nm (5.5 m·kgf, 40 ft·lbf)
Engine mounting bolt (left front side)
75 Nm (7.5 m·kgf, 54 ft·lbf)

5. Install:
   • Engine mounting bolt (left upper side) “12”
   • Engine bracket bolts (left) “13”
   • Engine bracket (left) “14”

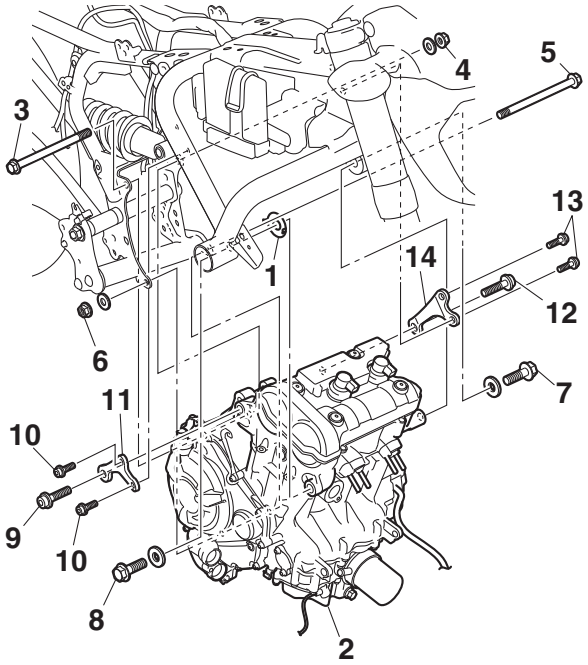
TIP

Temporarily tighten the bolts.

6. Tighten:
   • Engine mounting bolt (left upper side) “12”

- Engine mounting bolt (right front side) “8”
- Engine mounting bolt (right upper side) “9”
- Engine bracket bolts (right) “10”
- Engine bracket bolts (left) “13”

Engine mounting bolt (left upper side)
55 Nm (5.5 m·kgf, 40 ft·lbf)
Engine mounting bolt (right front side)
75 Nm (7.5 m·kgf, 54 ft·lbf)
Engine mounting bolt (right upper side)
55 Nm (5.5 m·kgf, 40 ft·lbf)
Engine bracket bolt (right)
25 Nm (2.5 m·kgf, 18 ft·lbf)
Engine bracket bolt (left)
25 Nm (2.5 m·kgf, 18 ft·lbf)

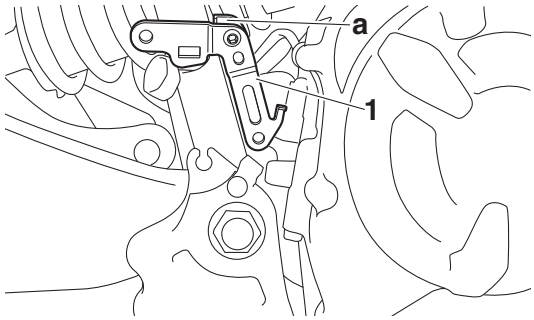


7. Install:
- O_2 sensor coupler bracket “1”

O_2 sensor coupler bracket bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

TIP

Make sure that the portion “a” of the frame contacts the O_2 sensor coupler bracket.

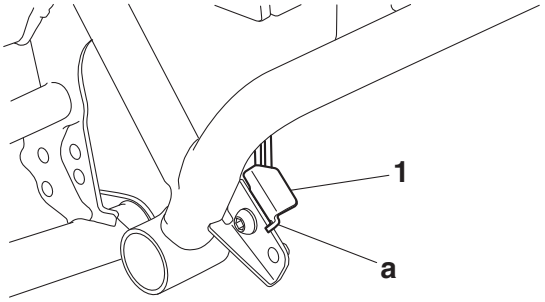


8. Install:
- Clutch cable guide “1”

Clutch cable guide bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

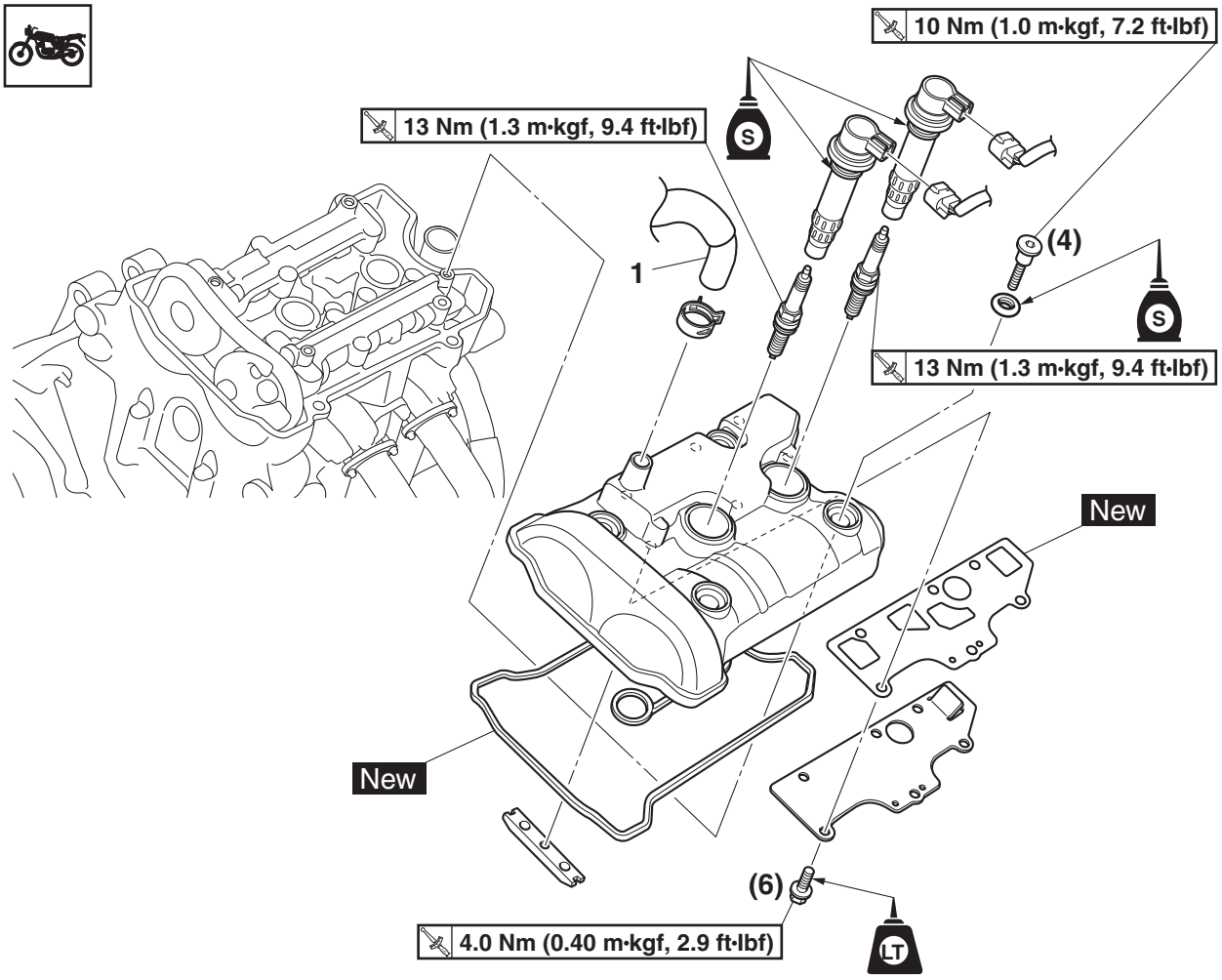
TIP

Make sure that the projection “a” on the clutch cable guide contacts the frame.



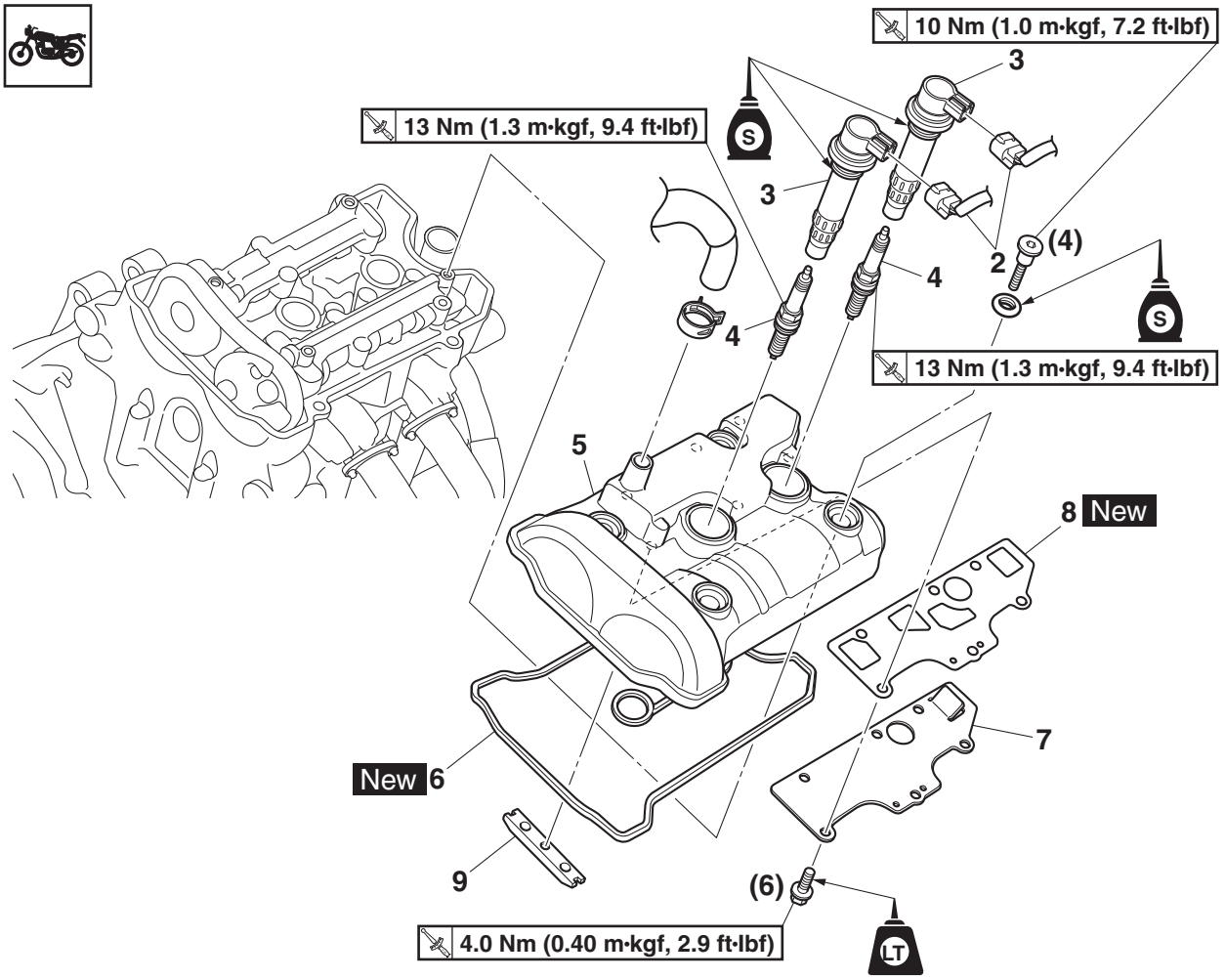
EAS20043
CAMSHAFTS

Removing the cylinder head cover



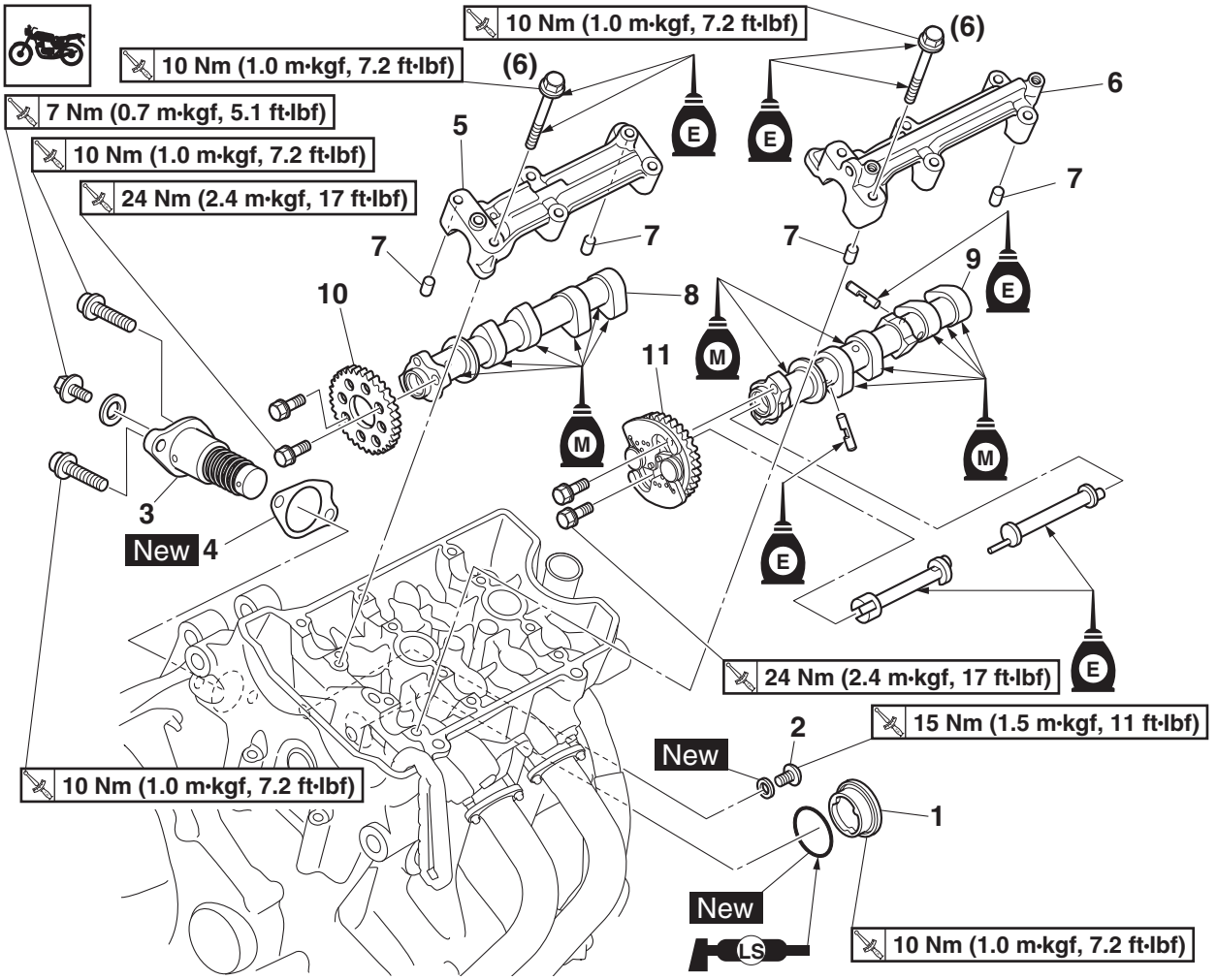
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank top cover/Fuel tank cover (left)		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
	Radiator inlet hose/Radiator		Refer to "RADIATOR" on page 6-1.
	Clutch cable guide		Refer to "ENGINE REMOVAL" on page 5-3.
1	Cylinder head breather hose	1	Disconnect.

Removing the cylinder head cover



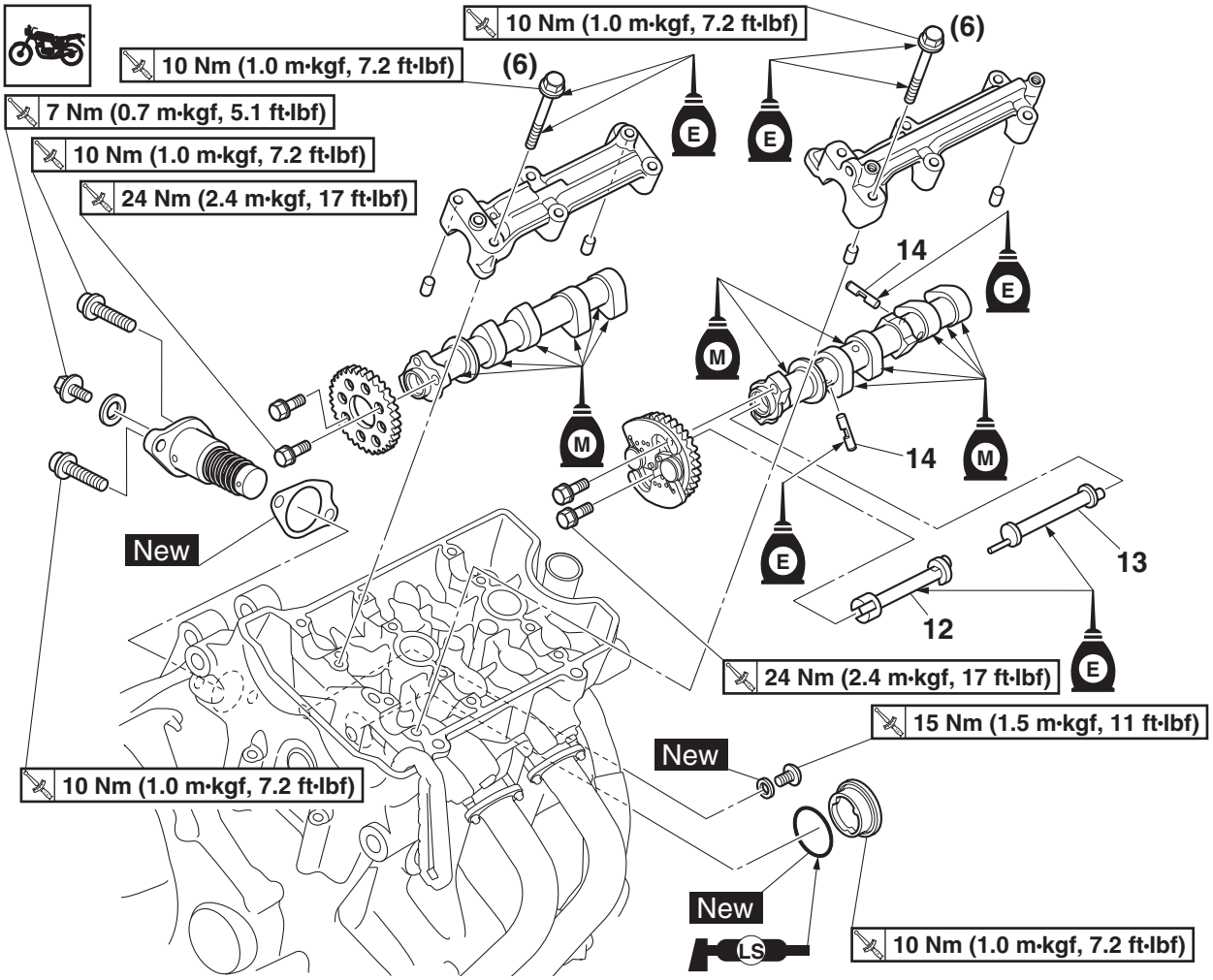
Order	Job/Parts to remove	Q'ty	Remarks
2	Ignition coil coupler	2	Disconnect.
3	Ignition coil	2	
4	Spark plug	2	
5	Cylinder head cover	1	
6	Cylinder head cover gasket	1	
7	Breather plate	1	
8	Breather plate gasket	1	
9	Timing chain guide (upper side)	1	

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
1	Crankshaft end cover	1	
2	Timing mark accessing bolt	1	
3	Timing chain tensioner	1	
4	Timing chain tensioner gasket	1	
5	Intake camshaft cap	1	
6	Exhaust camshaft cap	1	
7	Dowel pin	4	
8	Intake camshaft	1	
9	Exhaust camshaft	1	
10	Intake camshaft sprocket	1	
11	Exhaust camshaft sprocket	1	

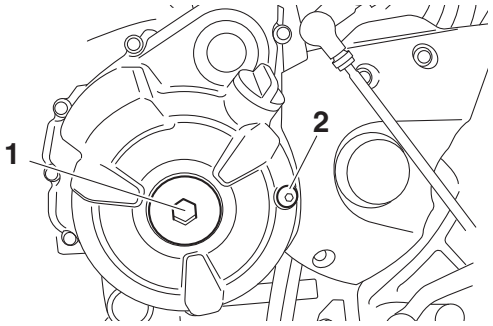
Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
12	Decompressor lever #2	1	
13	Decompressor lever #1	1	
14	Decompressor lever pin	2	

EAS30256
REMOVING THE CAMSHAFTS

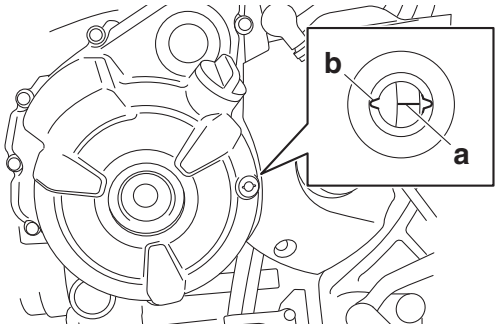
1. Remove:
   - Crankshaft end cover “1”
   - Timing mark accessing bolt “2”



2. Align:
   - Mark “a” on the generator rotor (with the slot “b” in the generator rotor cover)

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a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC on the exhaust stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator rotor cover.

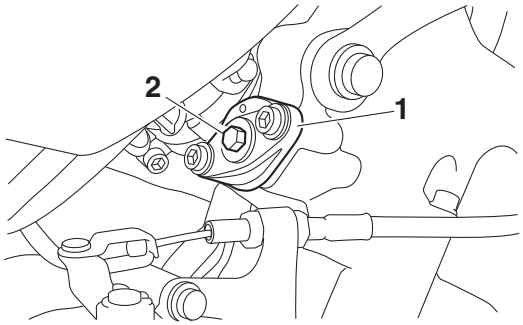


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3. Remove:
   - Timing chain tensioner “1”
   - Timing chain tensioner gasket

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a. Insert the hexagon wrench “2” (part No.: 1WS-12228-00) into the timing chain tensioner.
b. Remove the timing chain tensioner.



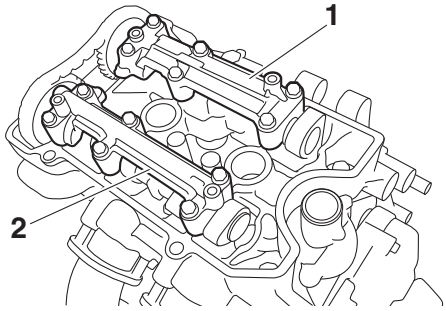
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4. Remove:
   - Intake camshaft cap “1”
   - Exhaust camshaft cap “2”

ECA13720

NOTICE

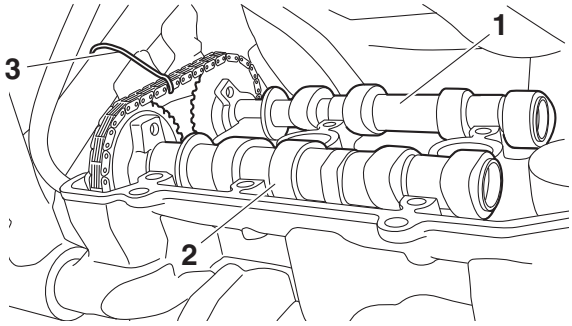
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



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

TIP

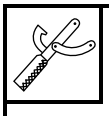
To prevent the timing chain from falling into the crankcase, fasten it with a wire “3”.



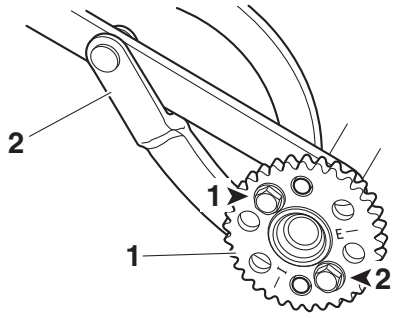
6. Remove:
   - Intake camshaft sprocket “1”

TIP

While holding the intake camshaft sprocket with the rotor holding tool “2”, loosen the intake camshaft sprocket bolts.



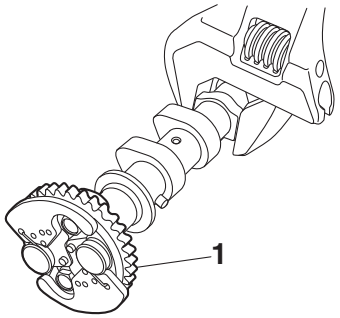
Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



7. Remove:
   • Exhaust camshaft sprocket “1”

TIP

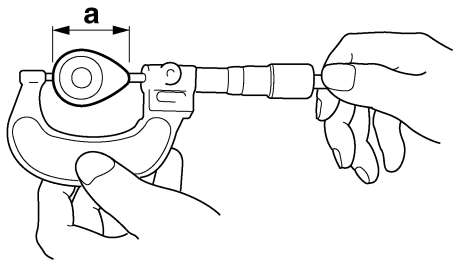
While holding the exhaust camshaft with a suitable tool, loosen the exhaust camshaft sprocket bolts.

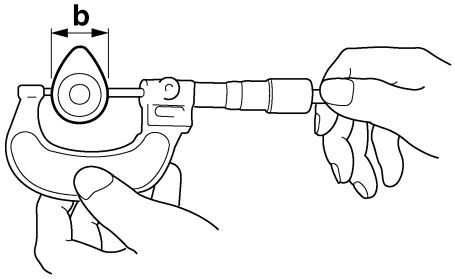


EAS30257
CHECKING THE CAMSHAFTS

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.

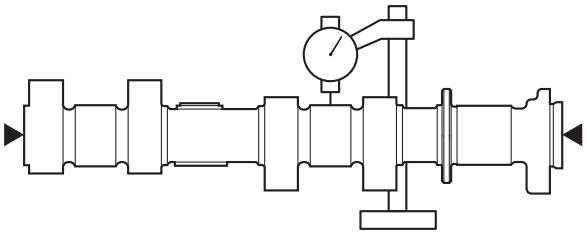
Camshaft lobe dimensions
Lobe height (Intake)
35.610–35.710 mm (1.4020–1.4059 in)
Limit
35.510 mm (1.3980 in)
Base circle diameter (Intake)
27.950–28.050 mm (1.1004–1.1043 in)
Limit
27.850 mm (1.0965 in)
Lobe height (Exhaust)
35.710–35.810 mm (1.4059–1.4098 in)
Limit
35.610 mm (1.4020 in)
Base circle diameter (Exhaust)
27.950–28.050 mm (1.1004–1.1043 in)
Limit
27.850 mm (1.0965 in)





3. Measure:
   • Camshaft runout
   Out of specification → Replace.

Camshaft runout limit
0.030 mm (0.0012 in)

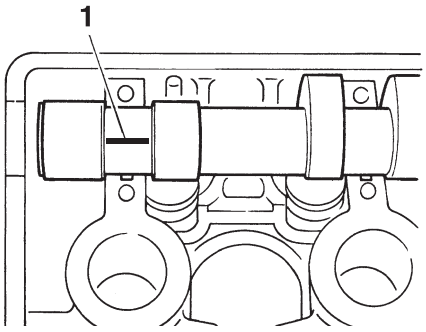


4. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

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

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a. Install the camshafts into the cylinder head (without the camshaft caps).
b. Position a strip of Plastigauge® "1" onto the camshaft journal as shown.



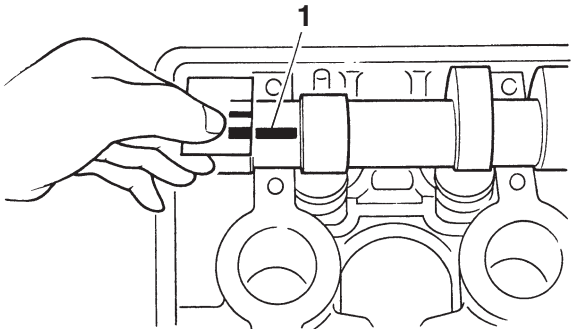
c. Install the dowel pins and camshaft caps.

TIP

• Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
• Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.

Exhaust camshaft cap bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
Intake camshaft cap bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

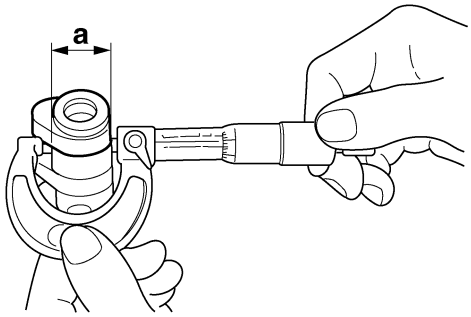
d. Remove the camshaft caps, and then measure the width of the Plastigauge® "1".



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

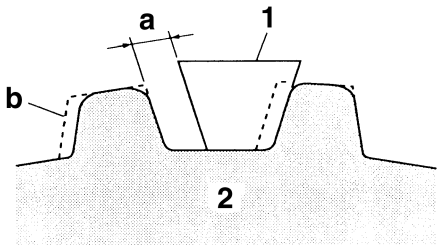
Camshaft journal diameter
21.959–21.972 mm (0.8645–0.8650 in)



EAS30936

CHECKING THE CAMSHAFT SPROCKETS

1. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear "a" → Replace the camshaft sprockets and timing chain as a set.



a. 1/4 tooth
b. Correct
1. Timing chain
2. Camshaft sprocket

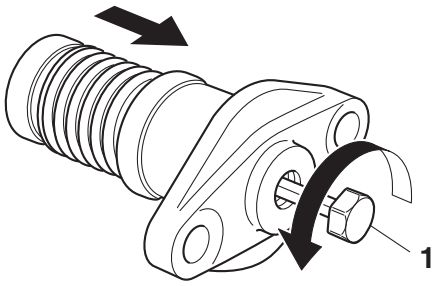
EAS30266
CHECKING THE TIMING CHAIN TENSIONER
1. Check:
   • Timing chain tensioner
   Cracks/damage/rough movement → Replace.

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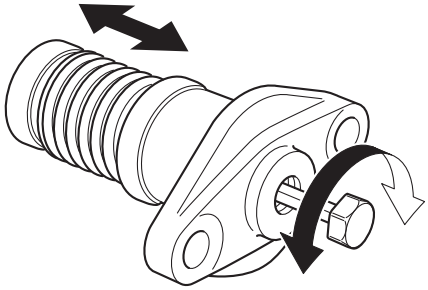
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it counterclockwise with a stopper bolt "1" (Parts No.: 1WS-12228-00) until it stops.



b. Make sure that the timing chain tensioner rod moves in and out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.

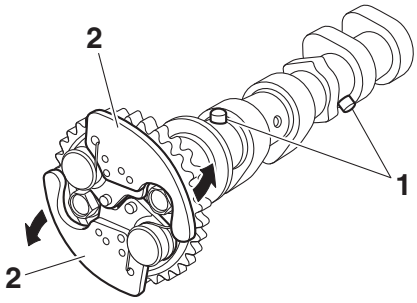


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EAS30267
CHECKING THE DECOMPRESSION SYSTEM
1. Check:
   • Decompression system

TIP

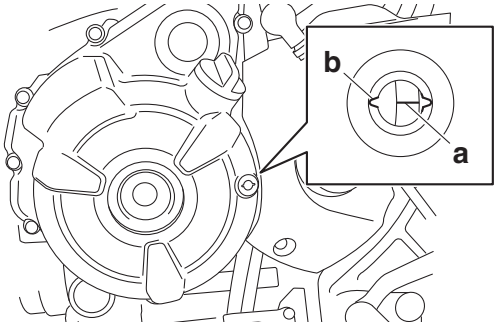
- Check that the decompressor lever pins "1" projects from the camshaft.
- Check that the decompressor cams "2" and decompressor lever pins "1" moves smoothly.



EAS30269
INSTALLING THE CAMSHAFTS
1. Align:
   • Mark "a" on the generator rotor
   (with the slot "b" in the generator rotor cover)

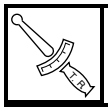
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a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



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2. Install:
   • Intake camshaft sprocket "1"

	**Intake camshaft sprocket bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)**

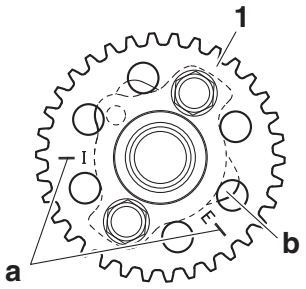
ECA19980
NOTICE

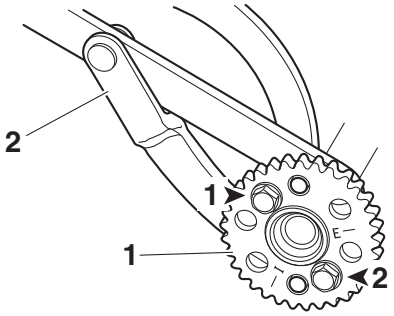
Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

TIP

- Make sure that the marks "a" on the intake camshaft sprocket are aligned with cam lobe #1 "b" as shown in the illustration.
- While holding the intake camshaft sprocket with the rotor holding tool "2", tighten the intake camshaft sprocket bolts in the proper tightening sequence as shown.

Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235

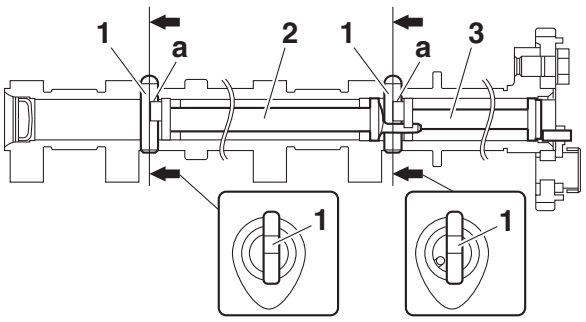




3. Install:
   - Decompressor lever pins “1”
   - Decompressor lever #1 “2”
   - Decompressor lever #2 “3”

TIP

- Face the cutout “a” in each decompressor lever pin toward the exhaust camshaft sprocket.
- Install the decompressor lever pins, decompressor lever #1, and decompressor lever #2 into the exhaust camshaft as shown in the illustration.



4. Install:
   - Exhaust camshaft sprocket “1”

Exhaust camshaft sprocket bolt
24 Nm (2.4 m·kgf, 17 ft·lbf)

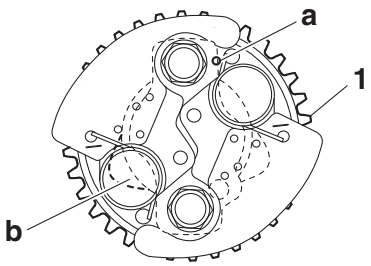
ECA19980

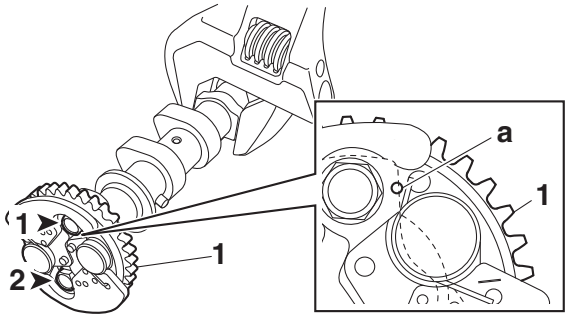
NOTICE

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

TIP

- Make sure that the mark “a” on the exhaust camshaft sprocket is aligned with cam lobe #1 “b” as shown in the illustration.
- While holding the exhaust camshaft with a suitable tool, tighten the exhaust camshaft sprocket bolts.
- Tighten the camshaft sprocket bolts in the tightening sequence as shown.





5. Install:
   - Timing chain “1”
     (onto the exhaust camshaft sprocket “2”)
   - Exhaust camshaft
   - Exhaust camshaft cap

ECA20930

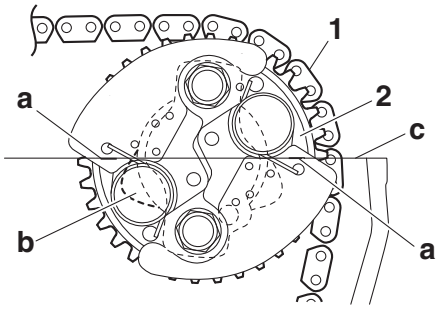
NOTICE

- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

TIP

- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- Make sure that the match marks “a” on the exhaust camshaft sprocket and cam lobe #1 “b” are aligned with the cylinder head edge “c” as shown in the illustration.
- Temporarily tighten the exhaust camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.

	Exhaust camshaft cap bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)



6. Install:
   - Timing chain “1” (onto the intake camshaft sprocket “2”)
   - Intake camshaft
   - Intake camshaft cap

ECA20930

NOTICE

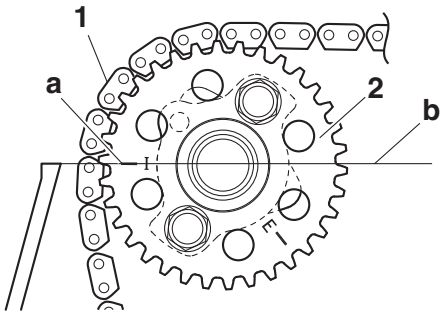
- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

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a. Install the timing chain onto intake camshaft sprocket, and then install the intake camshaft onto the cylinder head.

TIP

Make sure the match mark “a” on the intake camshaft sprocket is aligned with the cylinder head edge “b”.



b. Tighten the intake camshaft cap bolts.

TIP

Temporarily tighten the intake camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.

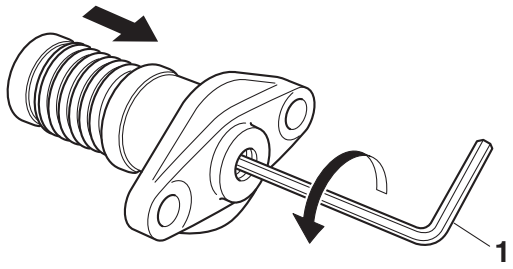
	Intake camshaft cap bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

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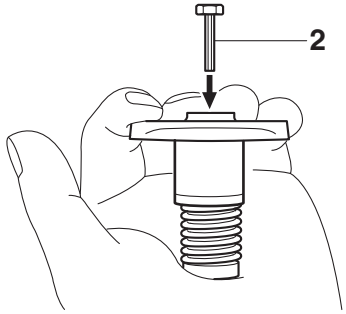
7. Install:
   - Timing chain tensioner
   - Timing chain tensioner gasket New

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a. While lightly pressing the timing chain tensioner rod by hand, turn the timing chain tensioner rod fully counterclockwise with a hexagon wrench “1”.



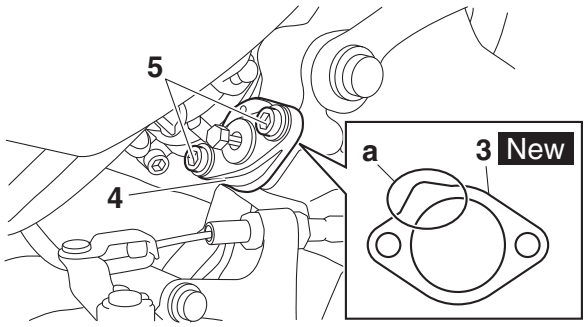
b. Keep pressing the timing chain tensioner rod by hand, remove the hexagon wrench, and then insert the stopper bolt “2” (Parts No.: 1WS-12228-00) into the timing chain tensioner rod.



c. Install a new timing chain tensioner gasket "3", the timing chain tensioner "4", and the timing chain tensioner bolts "5" on the cylinder block.

TIP

Be sure to install the timing chain tensioner gasket so that the portion "a" of the gasket is protruding from the upper inner side of the timing chain tensioner.



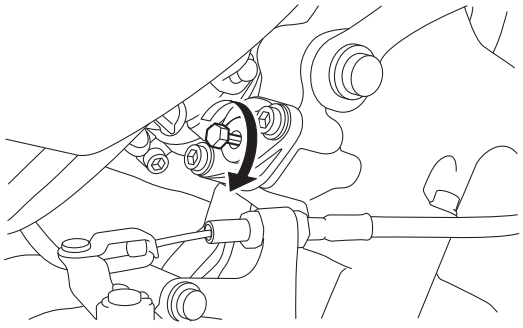
d. Tighten the timing chain tensioner bolts to specification.

	Timing chain tensioner bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

e. Screw the stopper bolt by hand until the timing chain tensioner rod touches the timing chain guide, and then tighten 1/4 turn by tool.

TIP

The timing chain tensioner rod is extended by turning the stopper bolt clockwise.

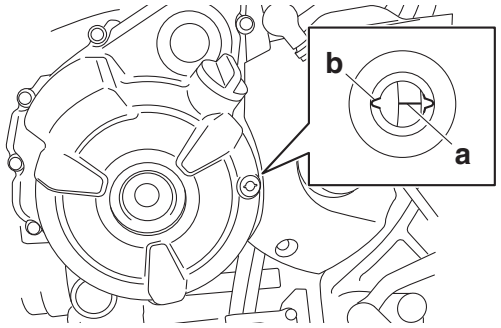


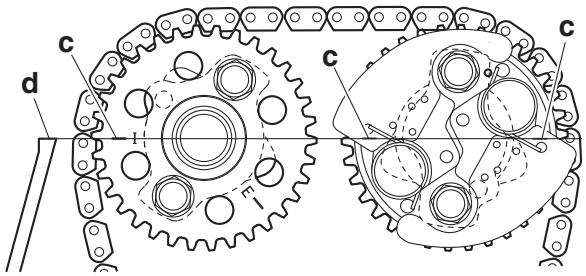
f. Remove the stopper bolt.
g. Install the timing chain tensioner cap bolt and gasket, and then tighten the timing chain tensioner cap bolt to specification.

	Timing chain tensioner cap bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

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8. Turn:
   • Crankshaft
   (several turns counterclockwise)
9. Check:
   • Mark "a"
   Make sure the mark "a" on the generator rotor is aligned with the slot "b" in the generator rotor cover.
   • Camshaft sprocket match mark
   Make sure the match marks "c" on the camshaft sprockets are aligned with the cylinder head mating surface "d".
   Out of alignment → Adjust.
   Refer to the installation steps above.



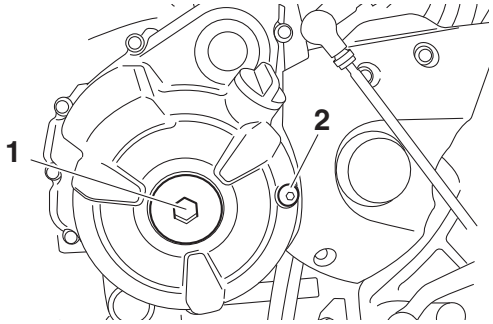


10. Measure:
    • Valve clearance
    Out of specification → Adjust.
    Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
11. Install:
    • Timing mark accessing bolt "1"

	Timing mark accessing bolt **15 Nm (1.5 m·kgf, 11 ft·lbf)**

• Crankshaft end cover "2"

	Crankshaft end cover **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**



EAS30274
INSTALLING THE CYLINDER HEAD COVER

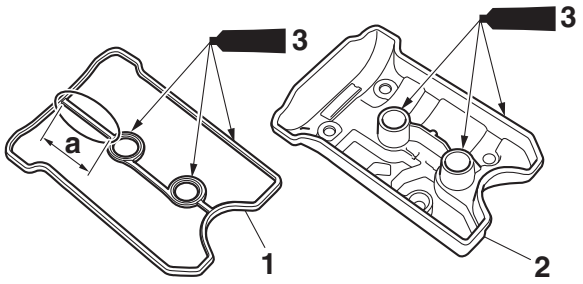
1. Install:
   - Timing chain guide (top side)
   - Cylinder head cover gasket “1” New (to the cylinder head cover)
   - Cylinder head cover “2”

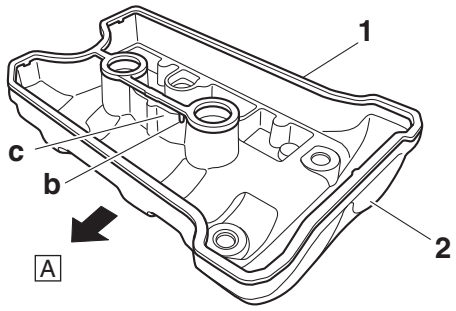
	Cylinder head cover bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

- Apply Yamaha bond No.1215 “3” onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- After installing the cylinder head cover gasket “1” to the cylinder head cover, cut off the “a” section.
- Make sure that the projection “b” on the cylinder head cover gasket is positioned on the exhaust side of the rib “c” on the cylinder head cover.

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**





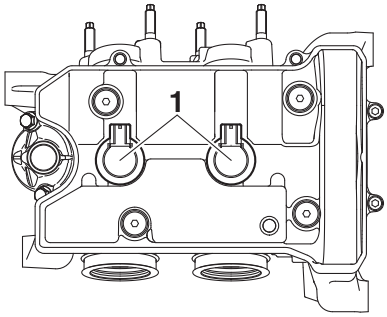
A. Exhaust side

2. Install:
   - Spark plugs
   - Ignition coils “1”

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

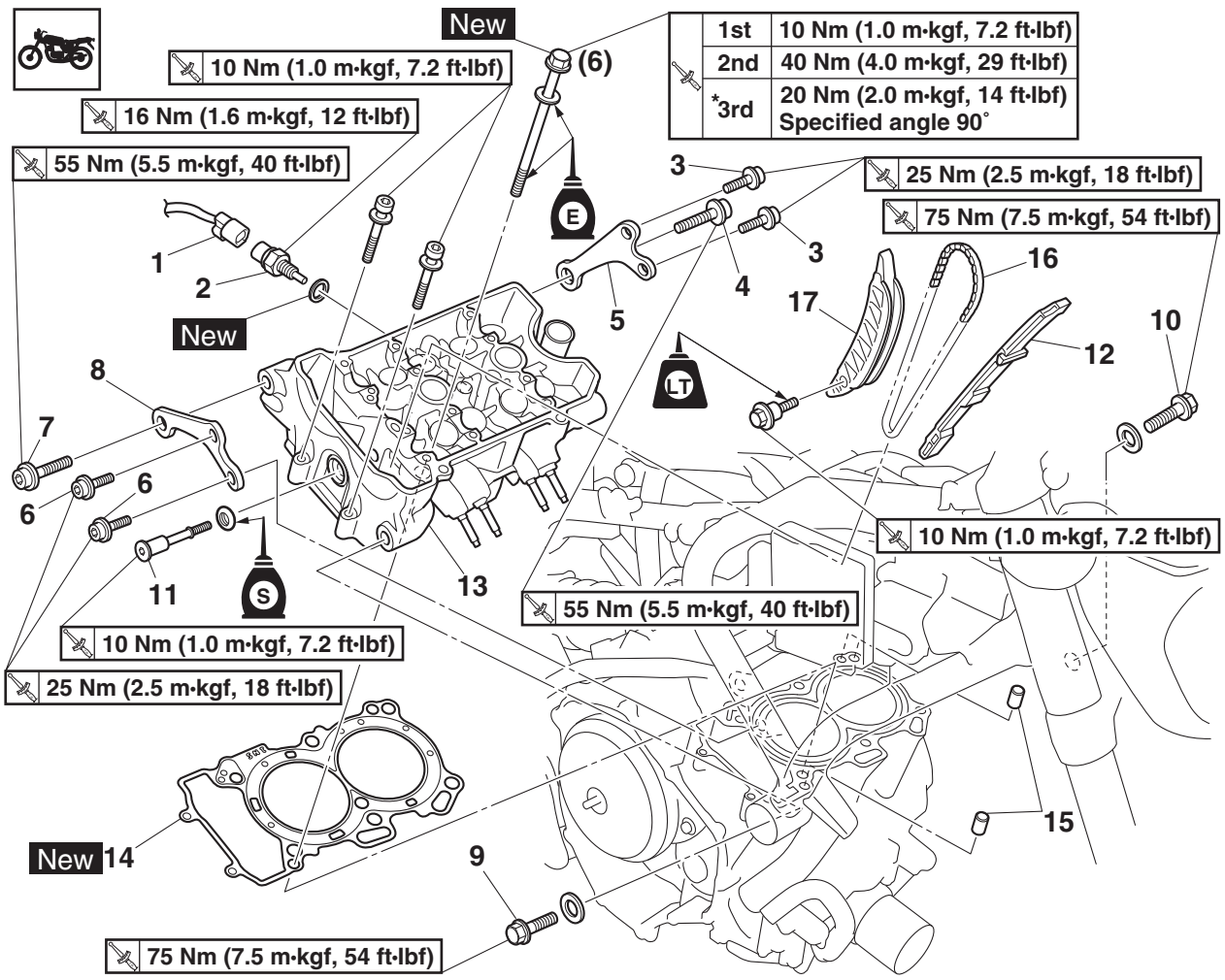
TIP

Install the ignition coils “1” in the direction shown in the illustration.



EAS20044
CYLINDER HEAD

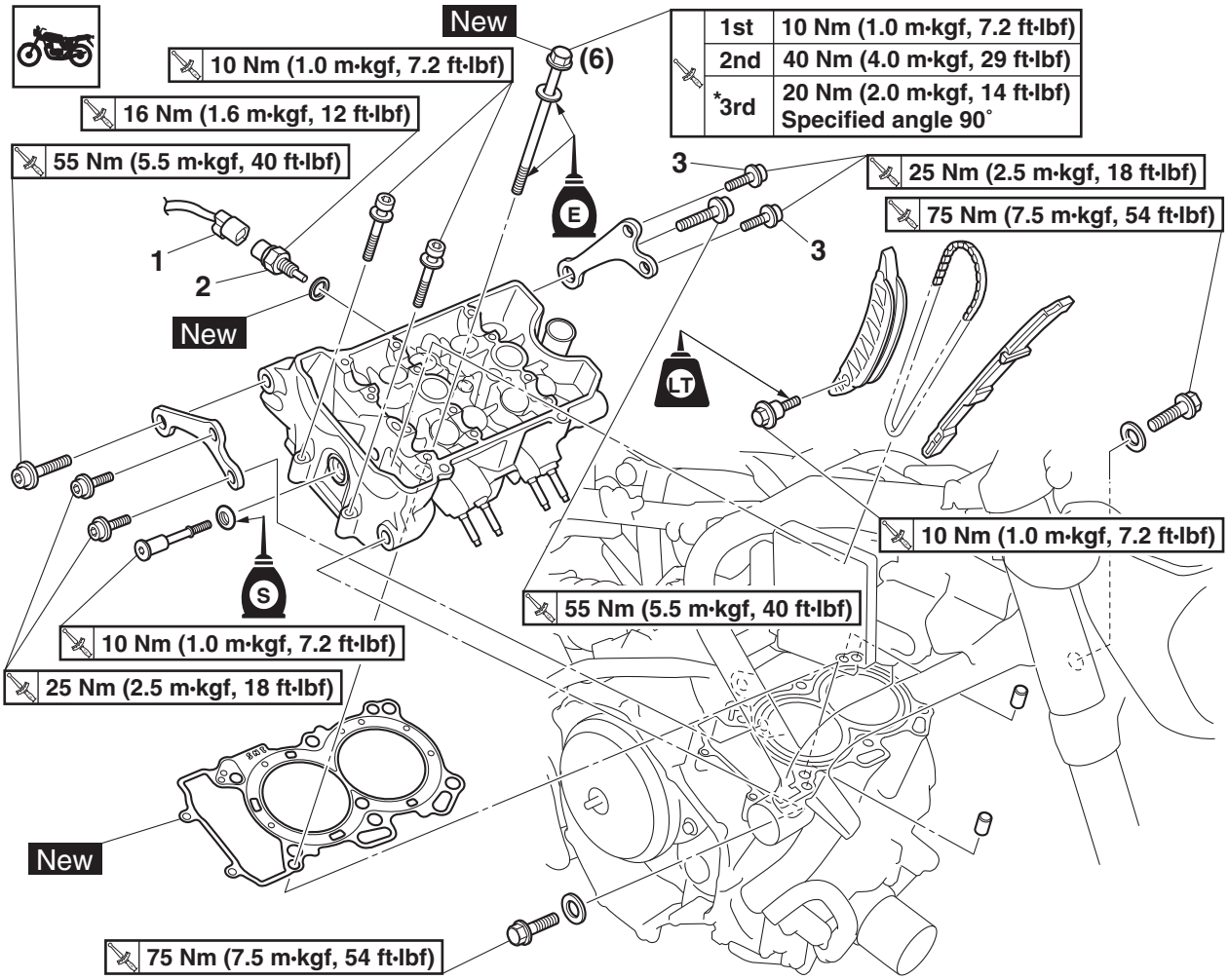
Removing the cylinder head



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank side covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air duct bracket		Refer to "AIR FILTER ELEMENT" on page 7-7.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-8.
	Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-46.

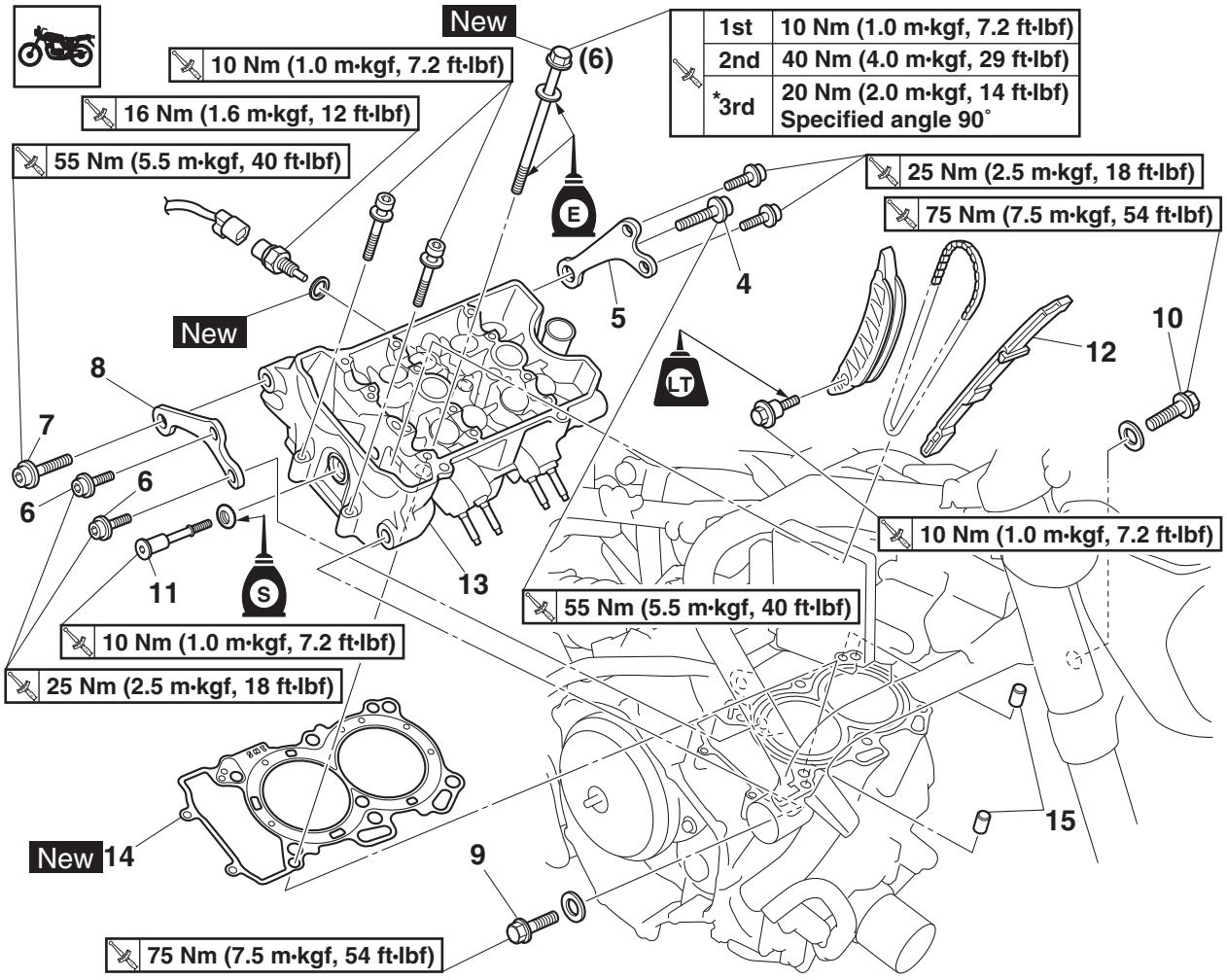
Removing the cylinder head



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

Order	Job/Parts to remove	Q'ty	Remarks
	Muffler assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Oil cooler inlet hose		Disconnect. Refer to "OIL COOLER" on page 6-4.
	Radiator		Refer to "RADIATOR" on page 6-1.
	Cylinder head cover/Intake camshaft/Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-11.
	Clutch cover		Refer to "CLUTCH" on page 5-48.
	Thermostat		Refer to "THERMOSTAT" on page 6-7.
1	Coolant temperature sensor coupler	1	Disconnect.
2	Coolant temperature sensor	1	
3	Engine bracket bolt (left)	2	

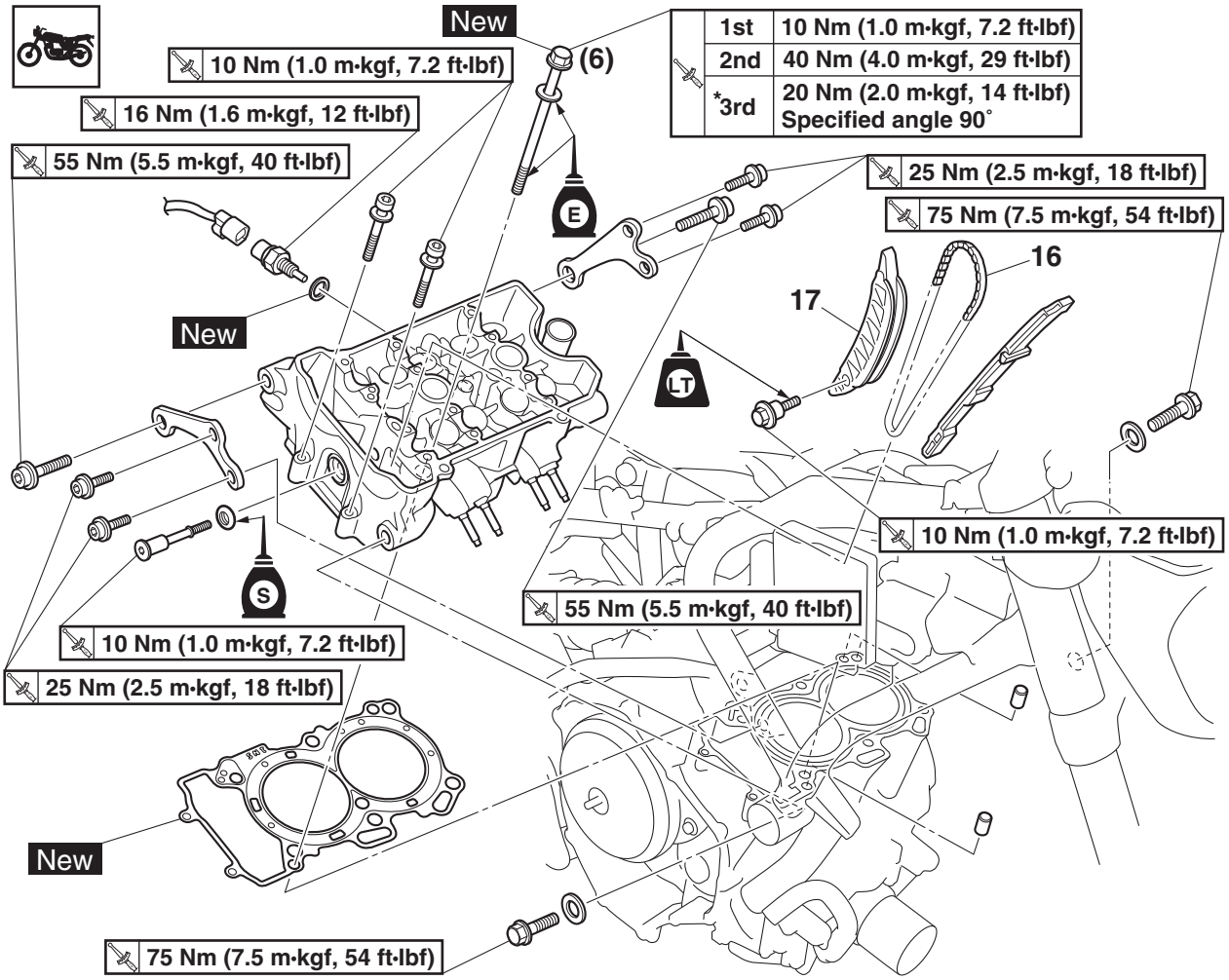
Removing the cylinder head



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

Order	Job/Parts to remove	Q'ty	Remarks
4	Engine mounting bolt (left upper side)	1	
5	Engine bracket (left)	1	
6	Engine bracket bolt (right)	2	
7	Engine mounting bolt (right upper side)	1	
8	Engine bracket (right)	1	
9	Engine mounting bolt (right front side)	1	
10	Engine mounting bolt (left front side)	1	
11	Timing chain bolt (right side of cylinder head)	1	
12	Timing chain guide (exhaust side)	1	
13	Cylinder head	1	
14	Cylinder head gasket	1	
15	Dowel pin	2	

Removing the cylinder head



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

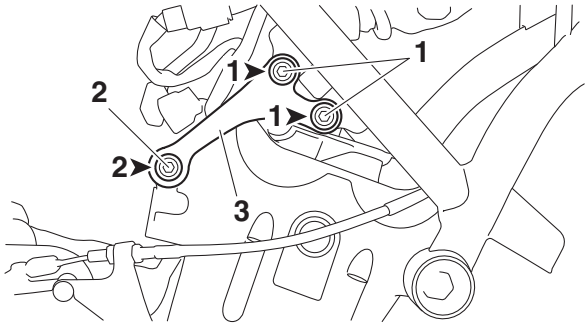
Order	Job/Parts to remove	Q'ty	Remarks
16	Timing chain	1	
17	Timing chain guide (intake side)	1	

EAS30276
REMOVING THE CYLINDER HEAD

1. Remove:
   The following procedure applies to both of the engine bracket.
   - Engine bracket bolts “1”
   - Engine mounting bolt “2”
   - Engine bracket “3”

TIP

- Place a suitable stand under the engine.
- Loosen the bolts in the proper sequence as shown.

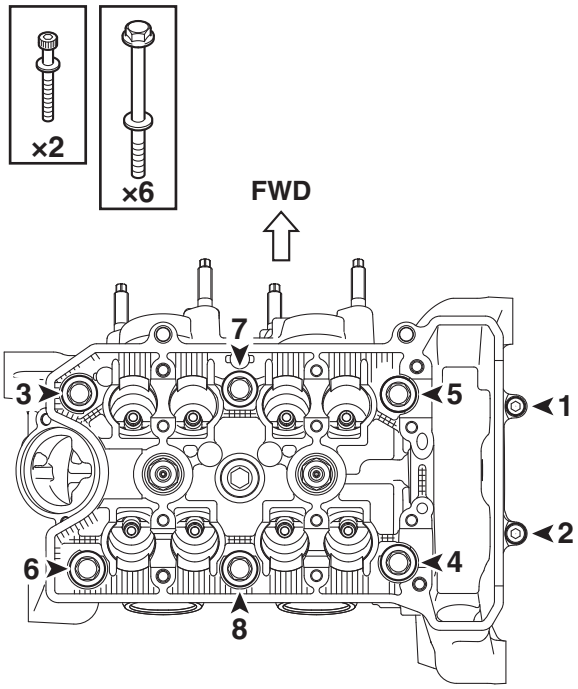


2. Remove:
   - Cylinder head bolt (M6) (×2)
   - Cylinder head bolt (M10) (×6)

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 × 45 mm: “1”, “2”
  - M10 × 100 mm: “3”–“8”



EAS30278
CHECKING THE TIMING CHAIN GUIDES

1. Check:
   - Timing chain guide (exhaust side)
   - Timing chain guide (intake side)
     Damage/wear → Replace.

EAS30277
CHECKING THE CYLINDER HEAD

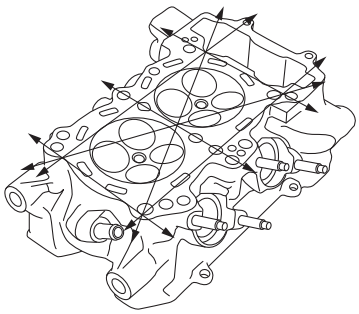
1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:
- Spark plug bore threads
- Valve seats

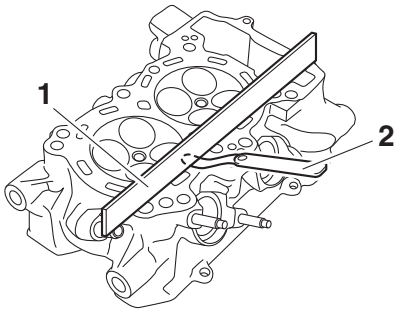
2. Check:
   - Cylinder head
     Damage/scratches → Replace.
   - Cylinder head water jacket
     Mineral deposits/rust → Eliminate.
3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

Warpage limit
0.05 mm (0.0020 in)



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a. Place a straightedge “1” and a thickness gauge “2” 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, rotate the cylinder head several times.

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EAS30282

INSTALLING THE CYLINDER HEAD

1. Install:
   - Cylinder head
   - Cylinder head bolt (M10) (×6) New
   - Cylinder head bolt (M6) (×2)

TIP

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M10) threads and mating surface with engine oil.

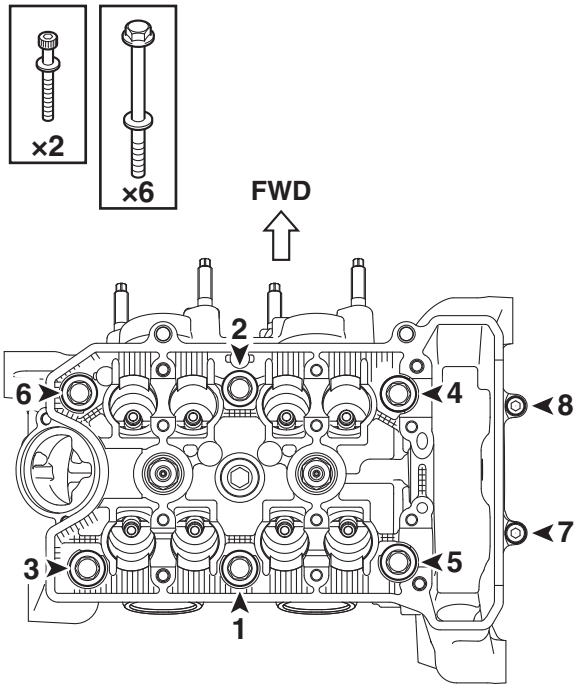
2. Tighten:
   - Cylinder head bolts “1”–“6”
   - Cylinder head bolts “7”, “8”

Cylinder head bolt (“1”–“6”)
1st: 10 Nm (1.0 m·kgf, 7.2 ft·lbf)
2nd: 40 Nm (4.0 m·kgf, 29 ft·lbf)
***3rd: 20 Nm (2.0 m·kgf, 14 ft·lbf)**
Specified angle 90°
Cylinder head bolt (“7”, “8”)
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

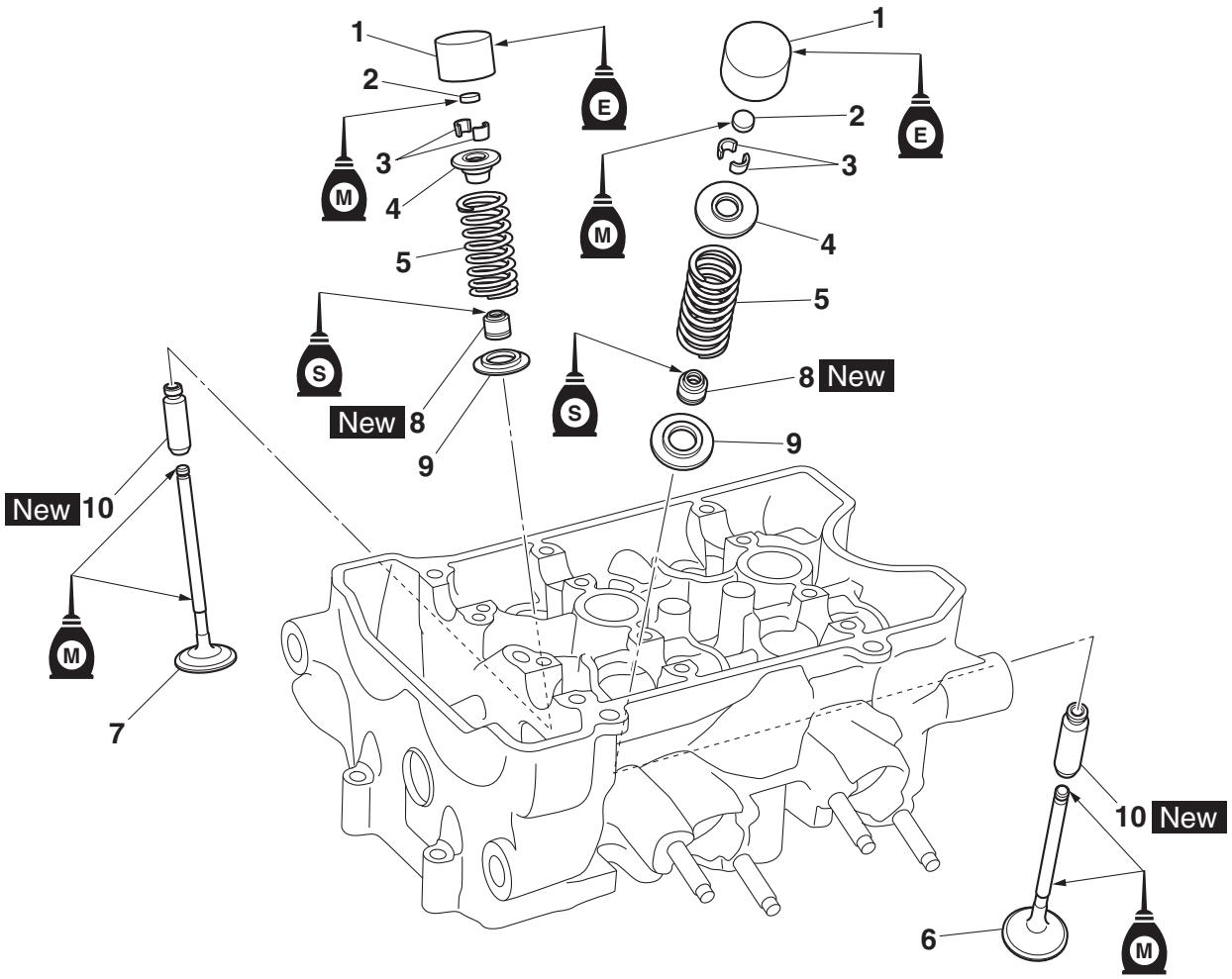
TIP

Tighten the cylinder head bolts in the tightening sequence as shown and torque them in 4 stages.



EAS20045
VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-23.
1	Valve lifter	8	
2	Valve pad	8	
3	Valve cotter	16	
4	Valve spring retainer	8	
5	Valve spring	8	
6	Exhaust valve	4	
7	Intake valve	4	
8	Valve stem seal	8	
9	Valve spring seat	8	
10	Valve guide	8	

EAS30283
REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

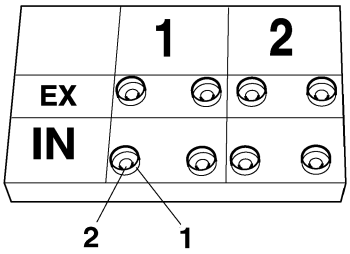
TIP

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.



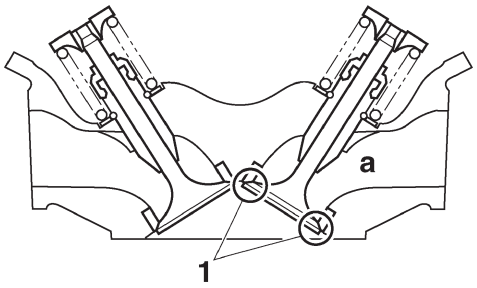
2. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to "CHECKING THE VALVE SEATS" on page 5-32.

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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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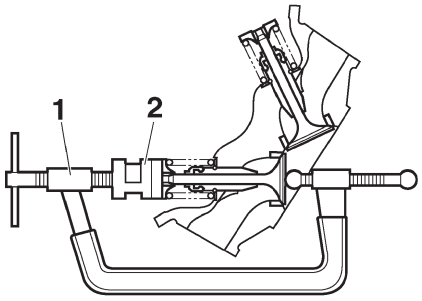
3. Remove:
   - Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".



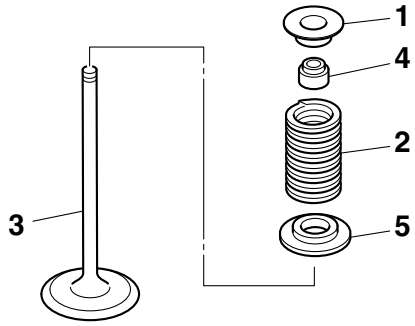
Valve spring compressor
90890-04019
Valve spring compressor
YM-04019
Valve spring compressor attachment
90890-01243
Valve spring compressor adapter (26 mm)
YM-01253-1



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.



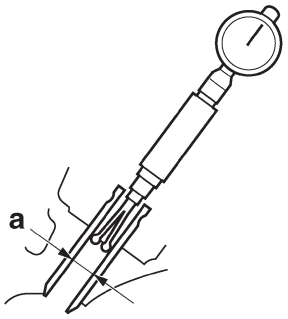
EAS30284
CHECKING THE VALVES AND VALVE GUIDES

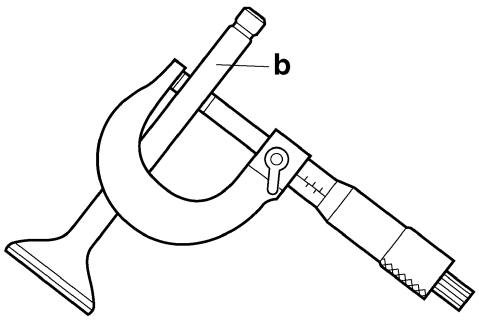
The following procedure applies to all of the valves and valve guides.

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)
0.025–0.052 mm (0.0010–0.0020 in)
Limit
0.100 mm (0.0039 in)





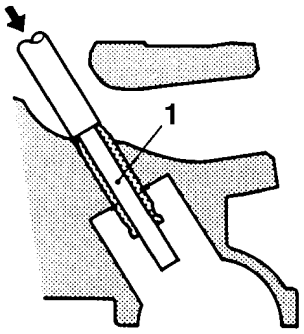
2. Replace:
   • Valve guide

TIP

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

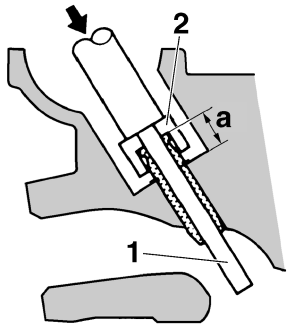
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a. Remove the valve guide with the valve guide remover “1”.



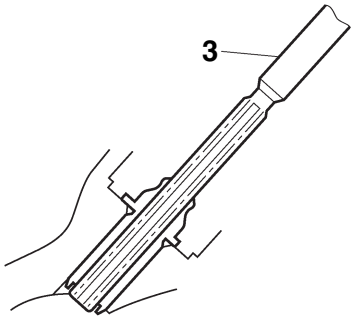
b. Install the new valve guide with the valve guide installer “2” and valve guide remover “1”.

Valve guide position
14.8–15.2 mm (0.58–0.60 in)



a. Valve guide position

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.

Valve guide remover (ø4.5)
90890-04116
Valve guide remover (4.5 mm)
YM-04116
Valve guide installer (ø4.5)
90890-04117
Valve guide installer (4.5 mm)
YM-04117
Valve guide reamer (ø4.5)
90890-04118
Valve guide reamer (4.5 mm)
YM-04118

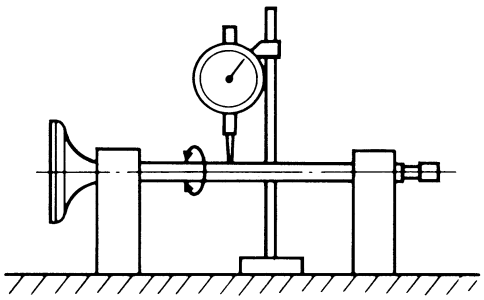
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3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout
0.010 mm (0.0004 in)



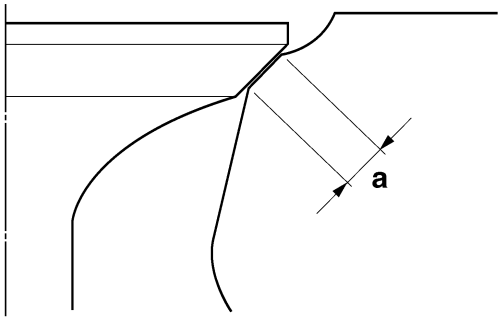
EAS30285

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

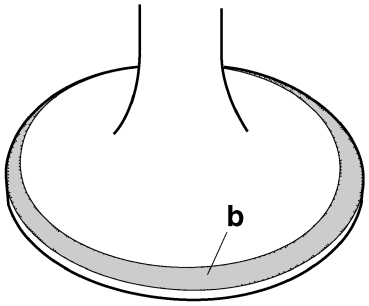
1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat width “a”
   Out of specification → Replace the cylinder head.

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



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



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

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.

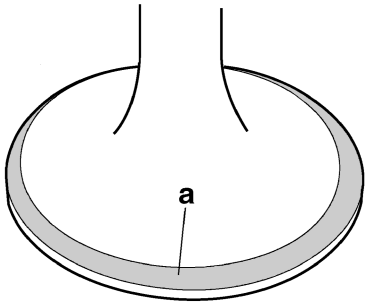
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a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

NOTICE

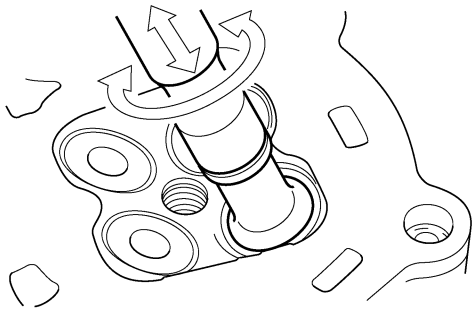
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



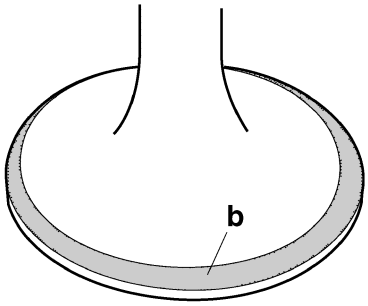
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

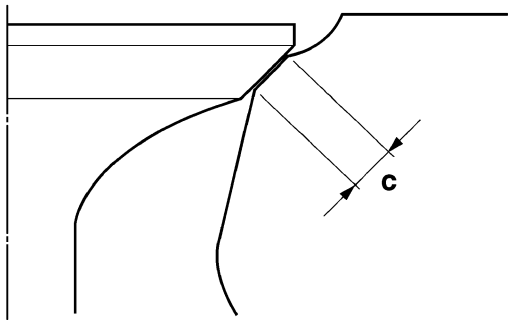
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



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 blue layout fluid “b” onto the valve face.



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



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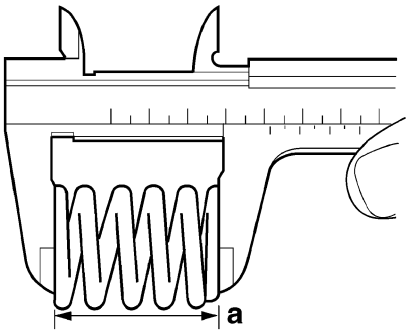
EAS30286

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

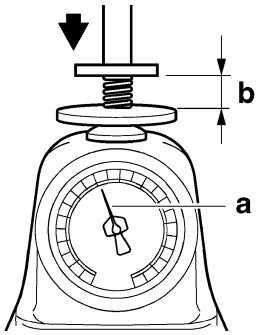
1. Measure:
   • Valve spring free length “a”
   Out of specification → Replace the valve spring.

Free length (intake)
40.30 mm (1.59 in)
Limit
38.29 mm (1.51 in)
Free length (exhaust)
41.39 mm (1.63 in)
Limit
39.32 mm (1.55 in)



2. Measure:
   • Compressed valve spring force “a”
   Out of specification → Replace the valve spring.

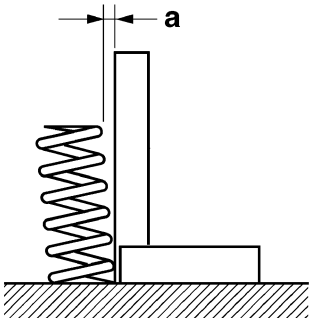
Installed compression spring force (intake)
144.00–166.00 N (14.68–16.93 kgf, 32.37–37.32 lbf)
Installed compression spring force (exhaust)
149.00–171.00 N (15.19–17.44 kgf, 33.50–38.44 lbf)
Installed length (intake)
34.34 mm (1.35 in)
Installed length (exhaust)
35.84 mm (1.41 in)



b. Installed length

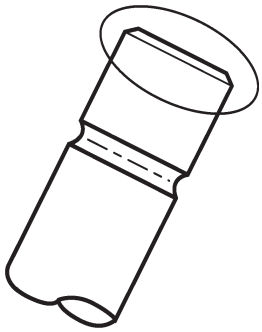
3. Measure:
   • Valve spring tilt “a”
   Out of specification → Replace the valve spring.

Spring tilt (intake)
1.8 mm (0.07 in)
Spring tilt (exhaust)
1.8 mm (0.07 in)



EAS30287
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.

EAS30288
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • Valve stem end
   (with an oil stone)

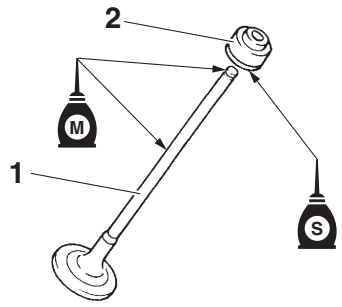


2. Lubricate:
   • Valve stem “1”
   • Valve stem end
   (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil

3. Lubricate:
   • Valve stem seal “2”
   (with the recommended lubricant)

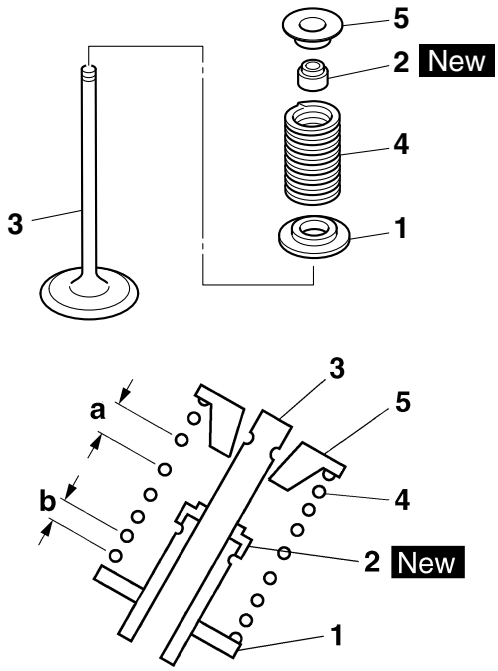
Recommended lubricant
Silicone fluid



4. Install:
   - Valve spring seat “1” (into the cylinder head)
   - Valve stem seal “2” New
   - Valve “3”
   - Valve spring “4”
   - Valve spring retainer “5”

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a” facing up.



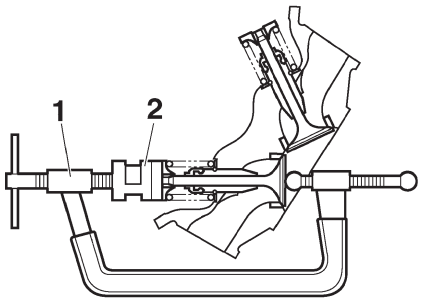
b. Smaller pitch

5. Install:
   - Valve cotters

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.

Valve spring compressor
90890-04019
Valve spring compressor
YM-04019
Valve spring compressor attachment
90890-01243
Valve spring compressor adapter (26 mm)
YM-01253-1

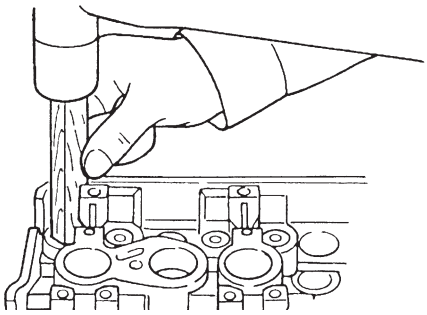


6. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

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



7. Lubricate:
   - Valve lifter (with the recommended lubricant)

Recommended lubricant
Engine oil

8. Install:
   - Valve pad
   - Valve lifter

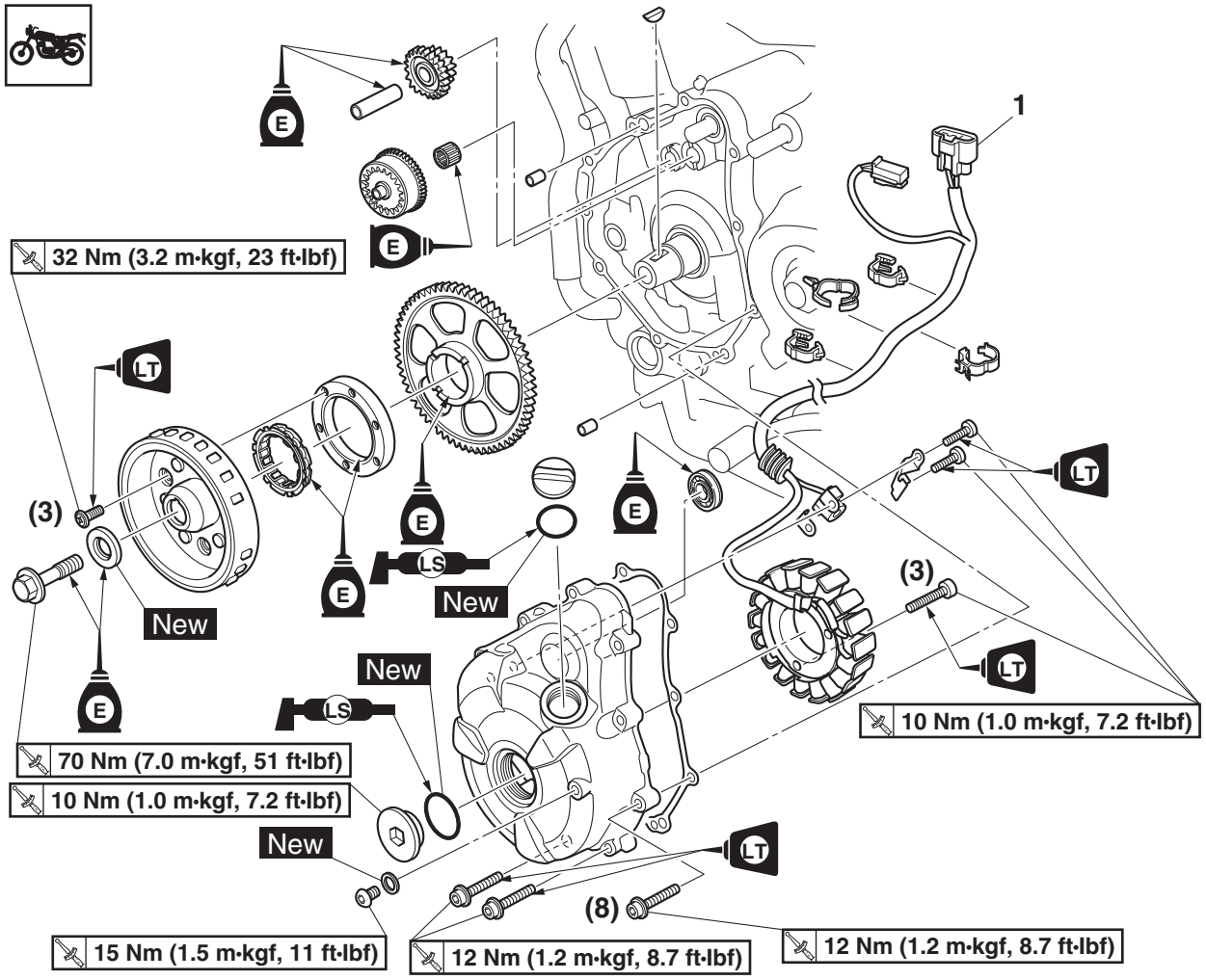
TIP

- The valve lifter must move smoothly when rotated with a finger.

- Each valve lifter and valve pad must be reinstalled in their original position.

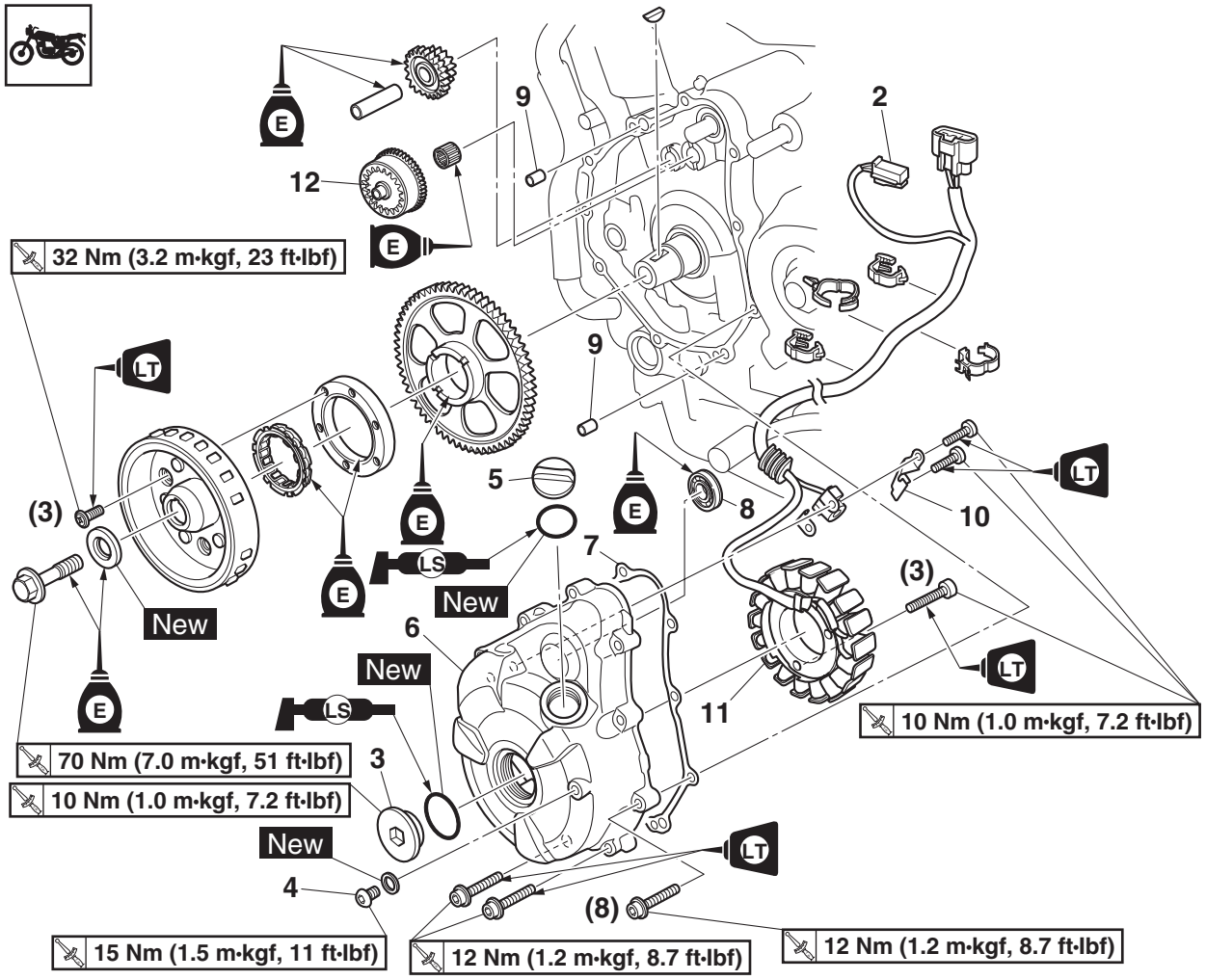
EAS20140
GENERATOR AND STARTER CLUTCH

Removing the stator coil, generator rotor and starter clutch



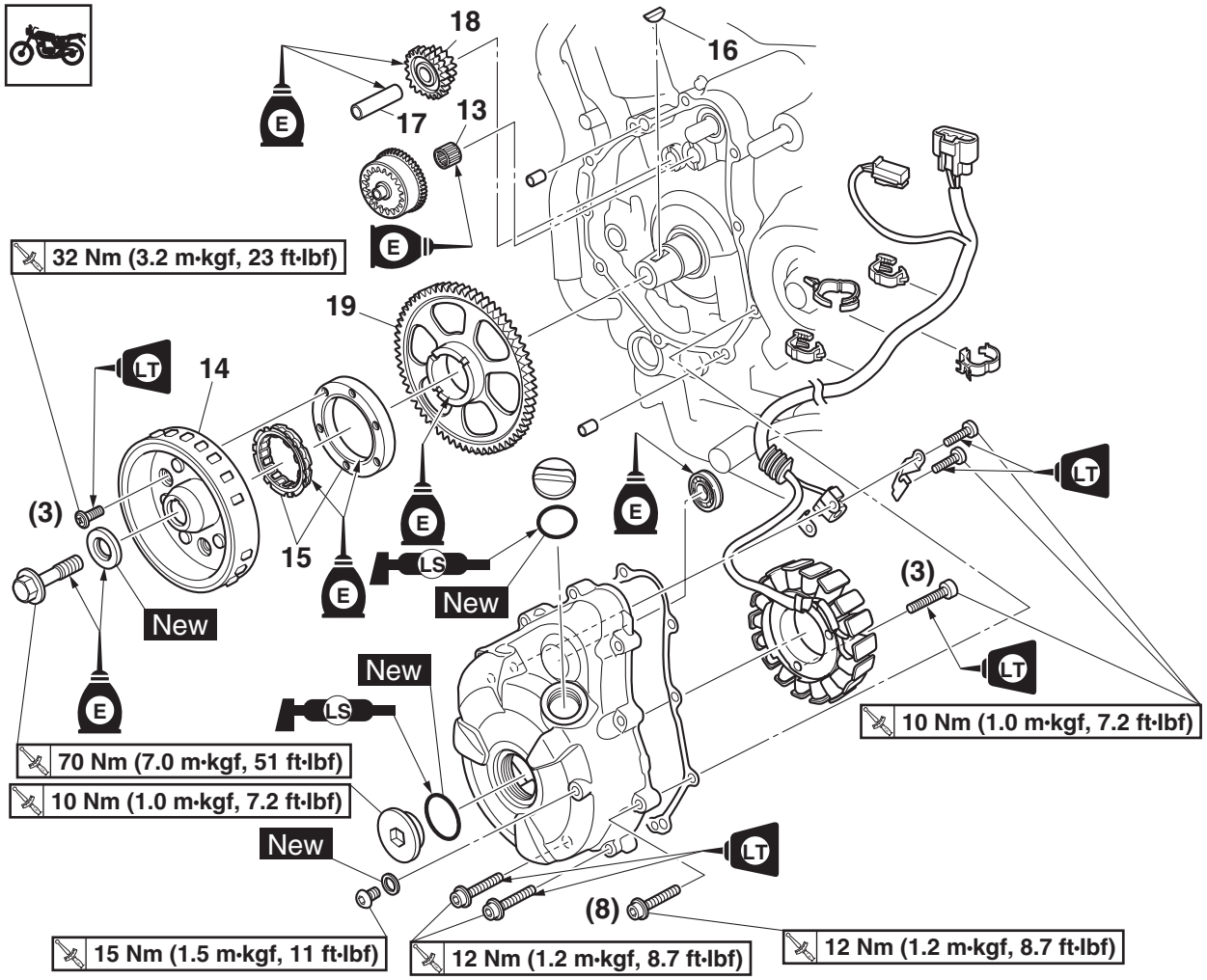
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank cover (left)		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Drive chain sprocket cover		Refer to "CHAIN DRIVE" on page 4-90.
	Coolant reservoir		Refer to "RADIATOR" on page 6-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
1	Stator coil coupler	1	Disconnect.

Removing the stator coil, generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
2	Crankshaft position sensor coupler	1	Disconnect.
3	Crankshaft end cover	1	
4	Timing mark accessing bolt	1	
5	Oil filler cap	1	
6	Generator cover	1	
7	Generator cover gasket	1	
8	Bearing	1	
9	Dowel pin	2	
10	Stator coil lead holder	1	
11	Stator coil assembly (Stator coil/Crankshaft position sensor)	1	
12	Torque limiter	1	

Removing the stator coil, generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
13	Bearing	1	
14	Generator rotor	1	
15	Starter clutch	1	
16	Woodruff key	1	
17	Starter clutch idle gear shaft	1	
18	Starter clutch idle gear	1	
19	Starter clutch gear	1	

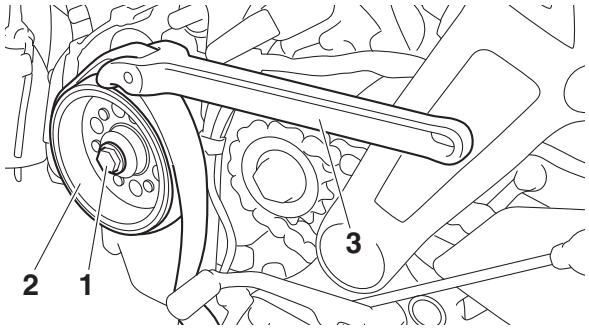
EAS30867
REMOVING THE GENERATOR
1. Remove:
   • Generator rotor bolt “1”
   • Washer

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, loosen the generator rotor bolt.



Rotor holding tool
90890-04166
YM-04166



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

ECA13880

NOTICE

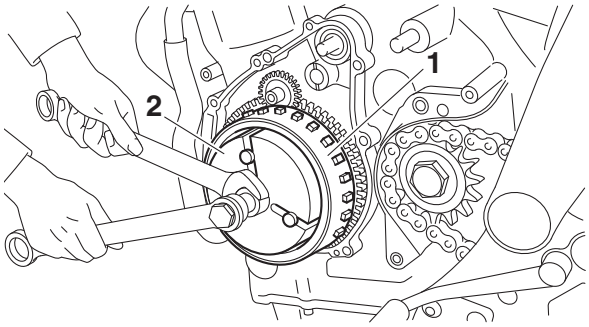
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

TIP

• Install the flywheel puller bolts to the threaded holes of the starter clutch.
• Make sure the flywheel puller is centered over the generator rotor.



Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B



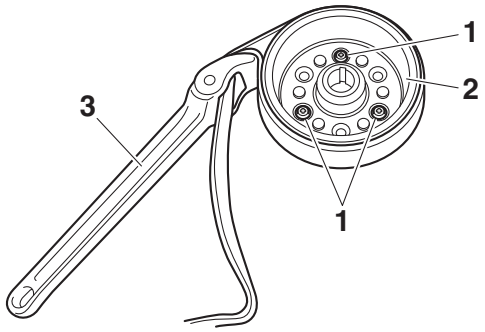
EAS30868
REMOVING THE STARTER CLUTCH
1. Remove:
   • Starter clutch bolts “1”
   • Starter clutch

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, loosen the starter clutch bolts.



Rotor holding tool
90890-04166
YM-04166

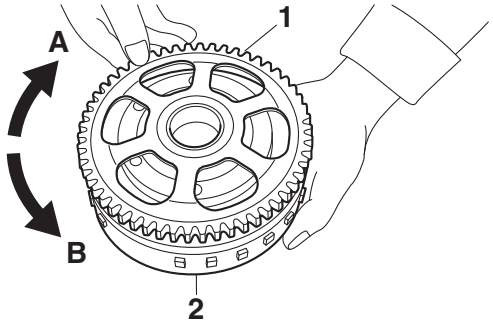


EAS30869
CHECKING THE STARTER CLUTCH
1. Check:
   • Starter clutch rollers
   Damage/wear → Replace.
2. Check:
   • Starter clutch idle gear
   • Starter clutch gear
   Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   • Starter clutch gear contact surfaces
   Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   • Starter clutch operation

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a. Install the starter clutch gear “1” onto the generator rotor “2” and hold the generator rotor.

b. When turning the starter clutch gear clockwise “A”, the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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EAS30870
CHECKING THE TORQUE LIMITER

1. Check:
   • Torque limiter
   Damage/wear → Replace.

TIP

Do not disassemble the torque limiter.

EAS30871
INSTALLING THE STARTER CLUTCH

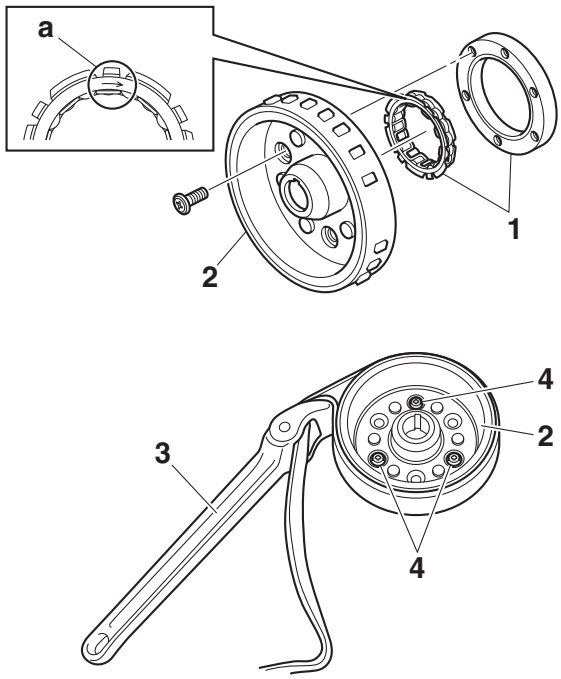
1. Install:
   • Starter clutch “1”

	Starter clutch bolt **32 Nm (3.2 m·kgf, 23 ft·lbf)** **LOCTITE®**

TIP

- Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark “a” is toward the generator rotor “2”.
- While holding the generator rotor with the rotor holding tool “3”, tighten the starter clutch bolts “4”.

	Rotor holding tool **90890-04166** **YM-04166**



EAS30872
INSTALLING THE GENERATOR

1. Install:
   • Woodruff key
   • Generator rotor
   • Washer New
   • Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

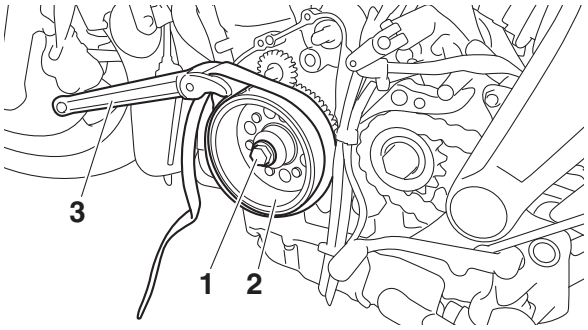
2. Tighten:
   • Generator rotor bolt “1”

	Generator rotor bolt **70 Nm (7.0 m·kgf, 51 ft·lbf)**

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, tighten the generator rotor bolt.

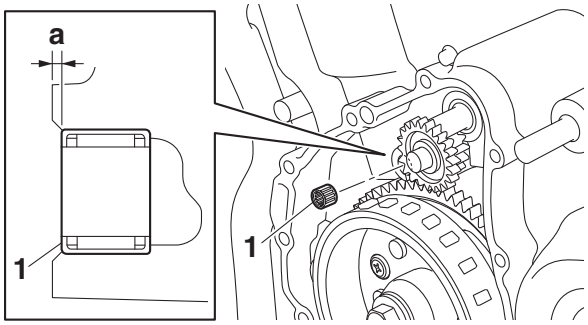
	Rotor holding tool **90890-04166** **YM-04166**



3. Install:
   • Bearing “1”

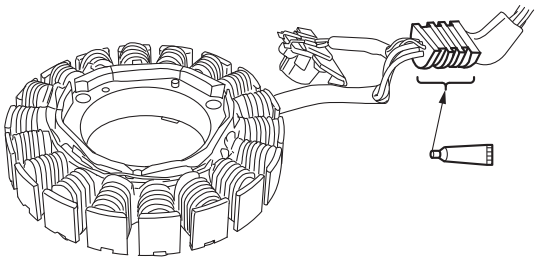
TIP

Make sure that the bearing does not protrude past the surface “a” of the cylinder.



4. Apply:
   • Sealant
   (onto the stator coil lead grommet)

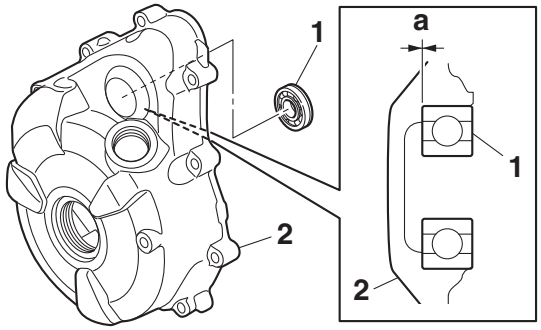
	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**



5. Install:
   • Bearing “1”

TIP

Make sure that the bearing contacts the surface “a” of the generator cover “2”.

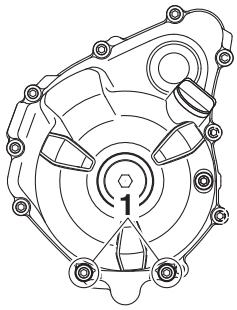


6. Install:
   • Generator cover gasket New
   • Generator cover

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

TIP

- Tighten the generator cover bolts in stages and in a crisscross pattern.
- Apply LOCTITE® to the threads of only the generator cover bolts “1” shown in the illustration.



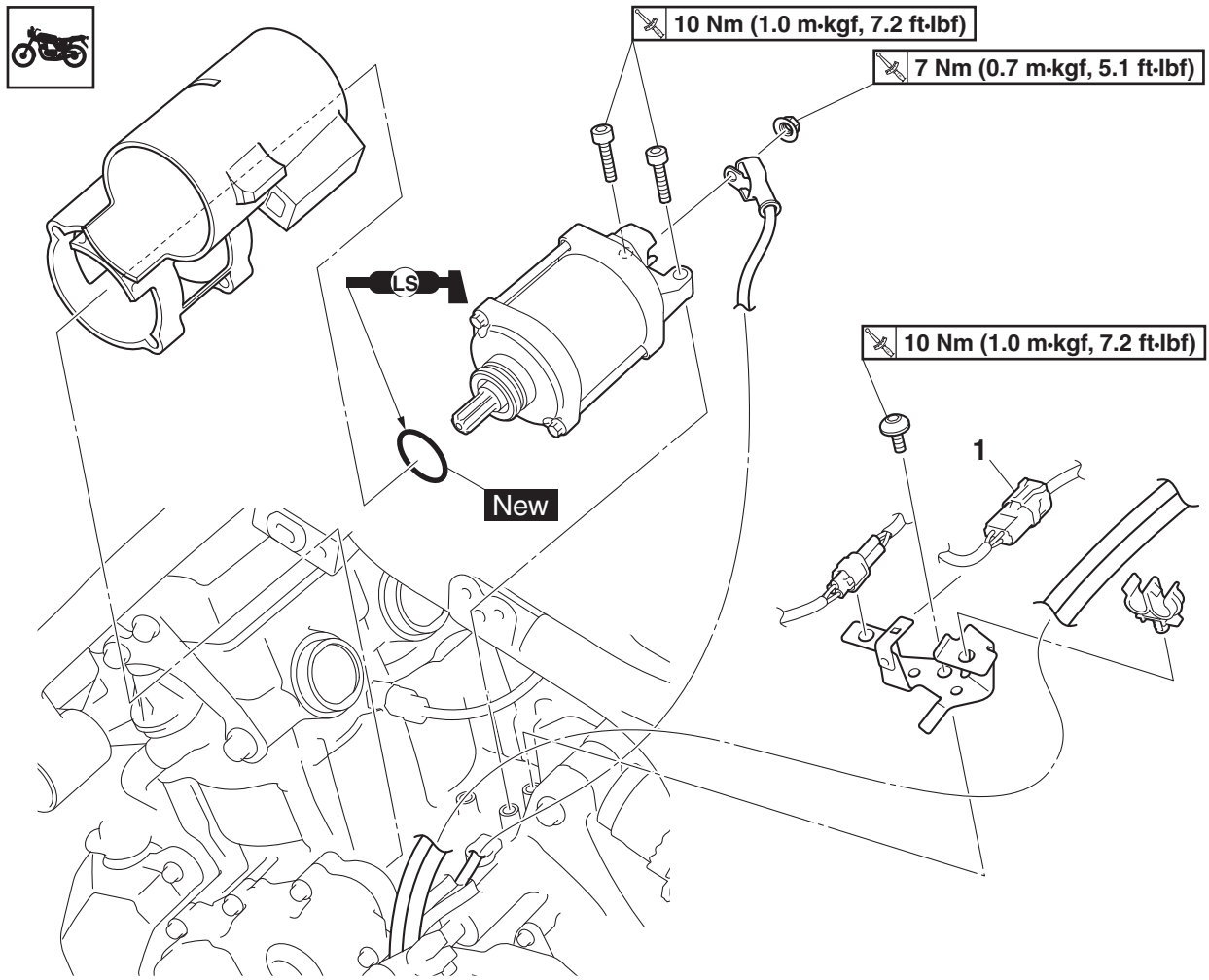
7. Connect:
   • Stator coil coupler
   • Crankshaft position sensor coupler

TIP

To route the stator coil lead, refer to “CABLE ROUTING” on page 2-41.

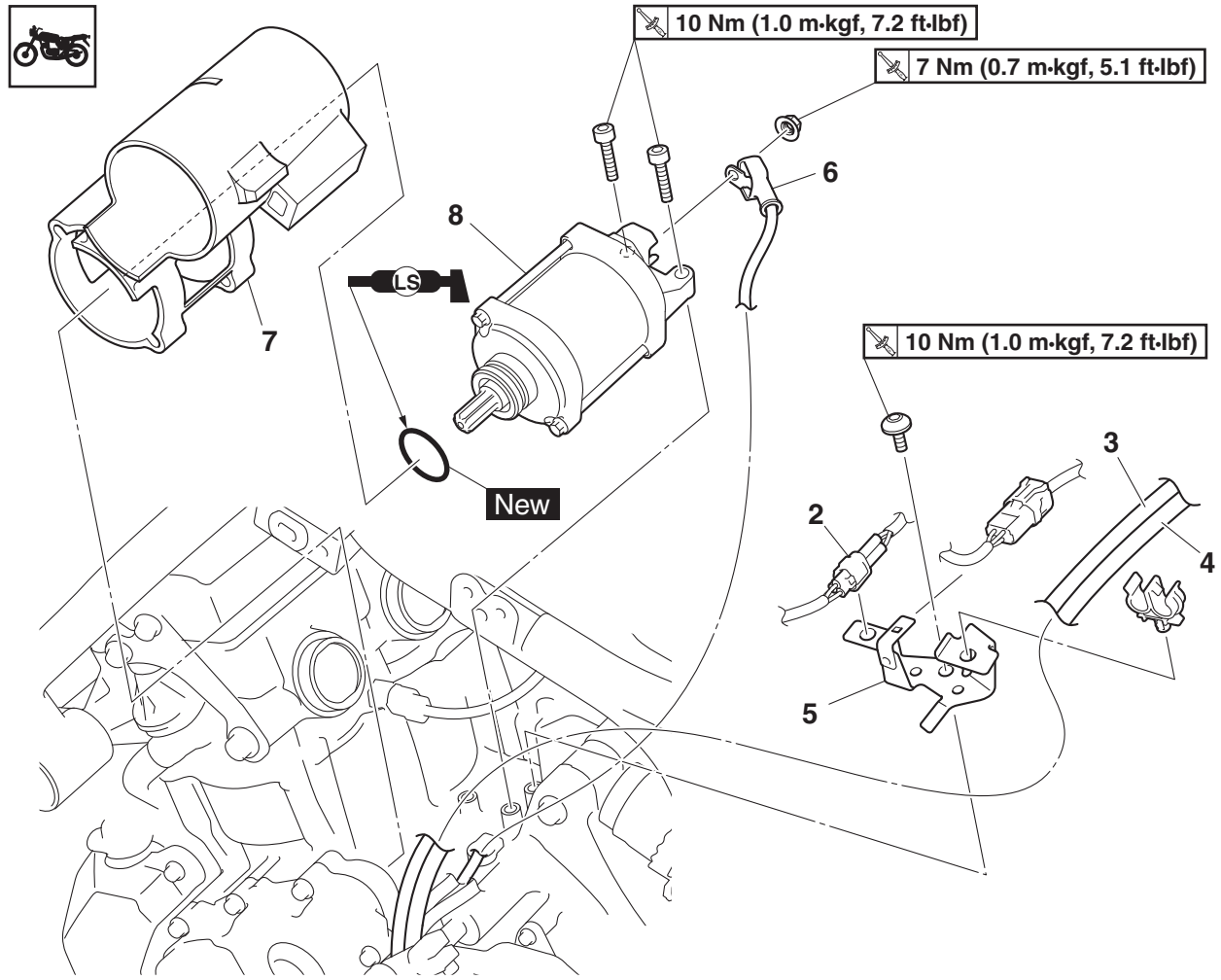
EAS20052
ELECTRIC STARTER

Removing the starter motor



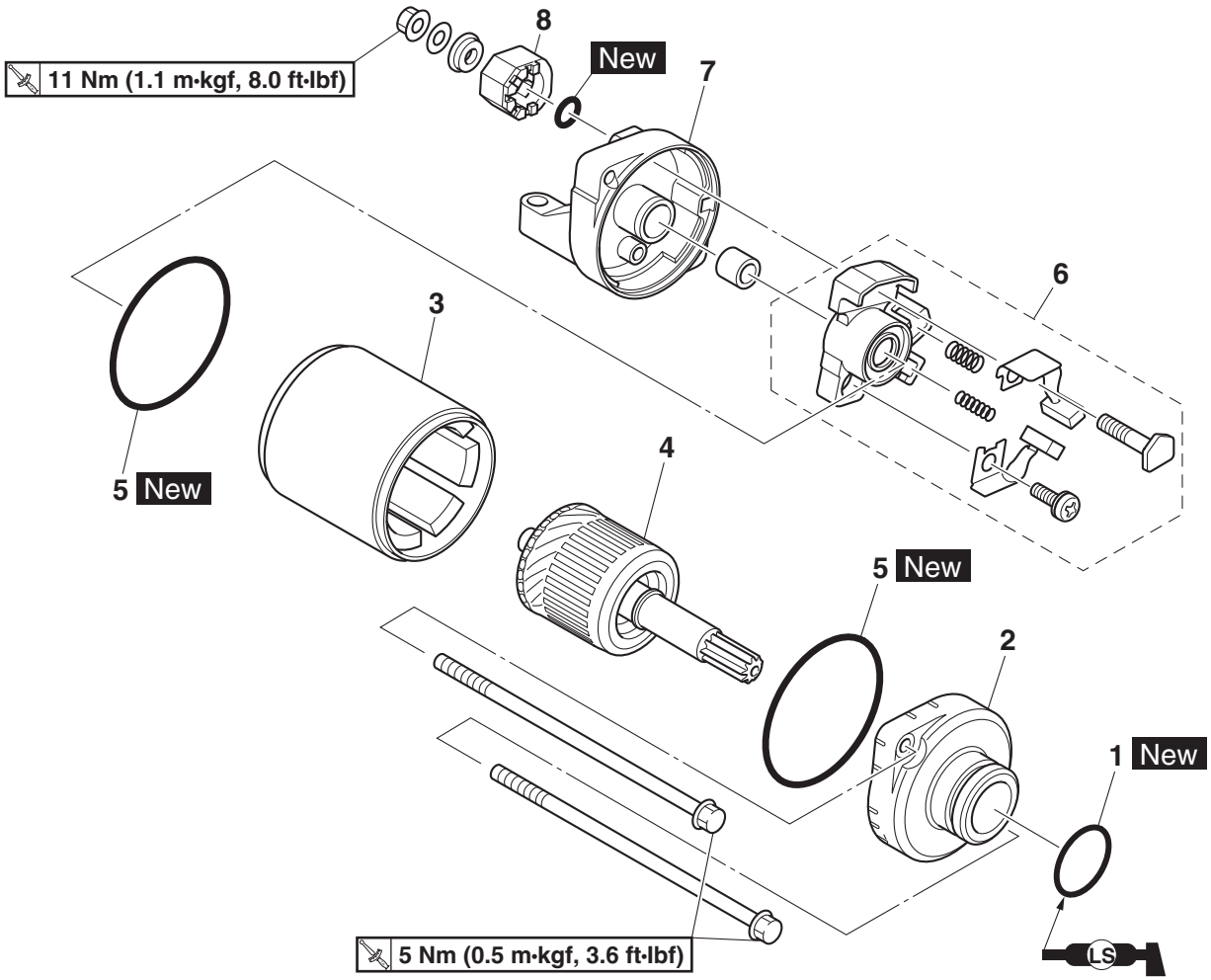
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Pivot shaft protectors		Refer to "SWINGARM" on page 4-84.
	Air duct bracket		Refer to "AIR FILTER ELEMENT" on page 7-7.
	Throttle bodies/Air filter case		Refer to "THROTTLE BODIES" on page 7-8.
1	Gear position switch coupler	1	

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
2	Speed sensor coupler	1	
3	Fuel tank overflow hose	1	
4	Fuel tank breather hose	1	
5	Coupler and hose bracket	1	
6	Starter motor lead	1	Disconnect.
7	Canister holder	1	For California only
8	Starter motor	1	

Disassembling the starter motor



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

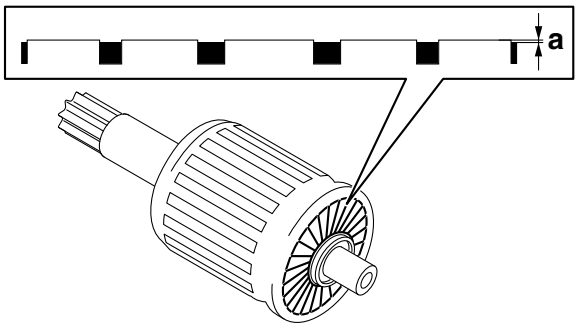
EAS30325
CHECKING THE STARTER MOTOR

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

Mica undercut (depth)
0.70 mm (0.03 in)

TIP

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



3. Measure:
   • Armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

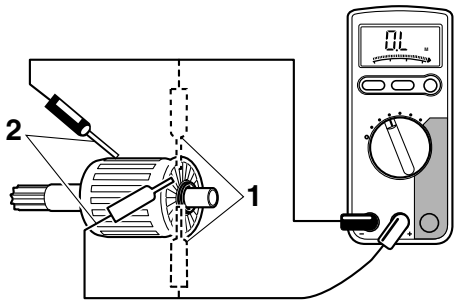
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a. Measure the armature assembly resistances with the digital circuit tester.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

Armature coil
Commutator resistance “1”
0.015–0.025 Ω
Insulation resistance “2”
Above 1 MΩ at 20 °C (68 °F)

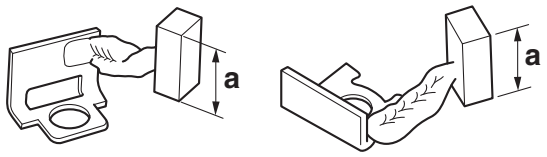
b. If any resistance is out of specification, replace the starter motor.



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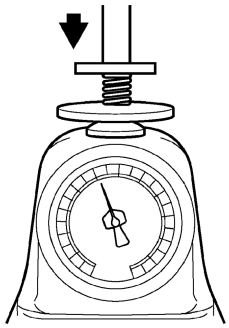
4. Measure:
   • Brush length “a”
   Out of specification → Replace the brush holder set.

Brush overall length
12.0 mm (0.47 in)
Limit
6.50 mm (0.26 in)



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

Brush spring force
6.03–6.52 N (615–665 gf, 21.71–23.47 oz)



6. Check:
   • Gear teeth
   Damage/wear → Replace the starter motor.

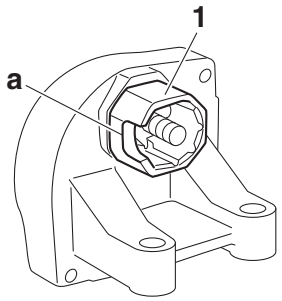
7. Check:
   • Bearing
   • Oil seal
   Damage/wear → Replace the starter motor front cover.

EAS30326
ASSEMBLING THE STARTER MOTOR

1. Install:
   • Lead guide “1”

TIP

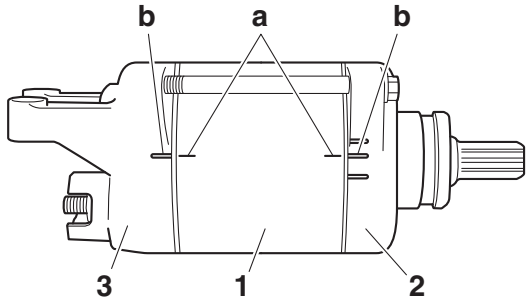
Make sure that the slot “a” in the lead guide is facing in the direction shown in the illustration.



2. Install:
   • Starter motor yoke “1”
   • Starter motor front cover “2”
   • Starter motor rear cover “3”

TIP

Align the match marks “a” on the starter motor yoke with the match marks “b” on the front cover and rear covers.

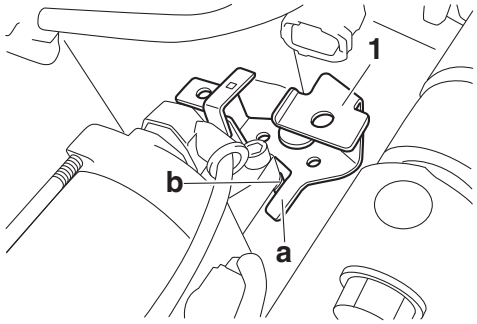


EAS30327
INSTALLING THE STARTER MOTOR

1. Install:
   • Coupler and hose holder bracket “1”

TIP

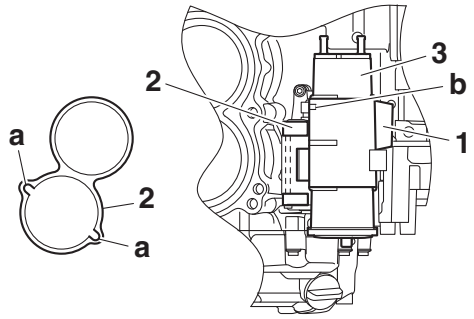
Make sure that the tab “a” on the coupler and hose holder bracket contacts the projection “b” on the cylinder block.



2. Install (for California only):
   • Canister holder “1”
   • Starter motor “2”
   • Canister “3”

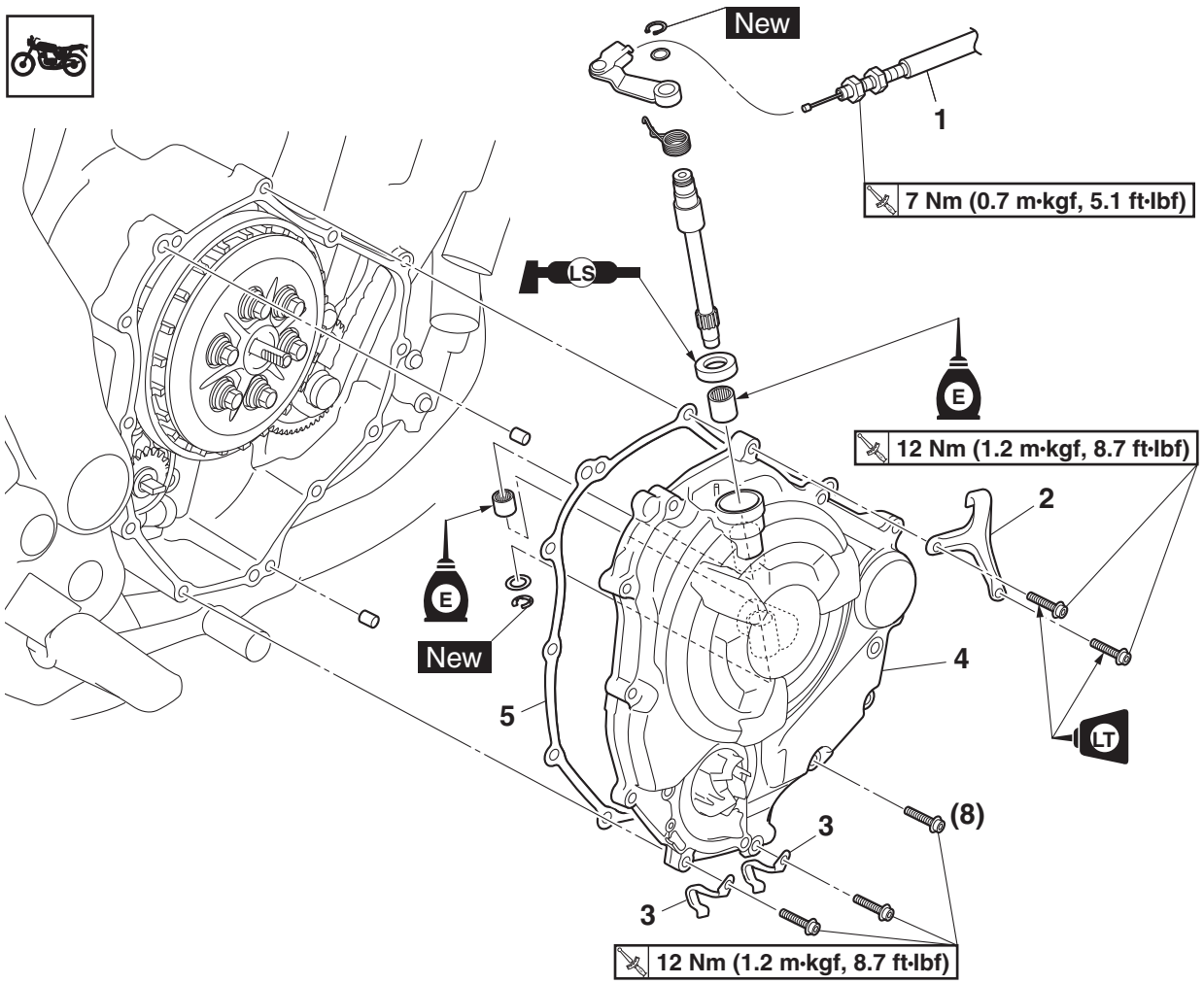
TIP

- Pass the starter motor front cover bolts through the slots “a” in the canister holder to secure it.
- Install the canister holder with the stamped mark “2RC” “b” facing forward.



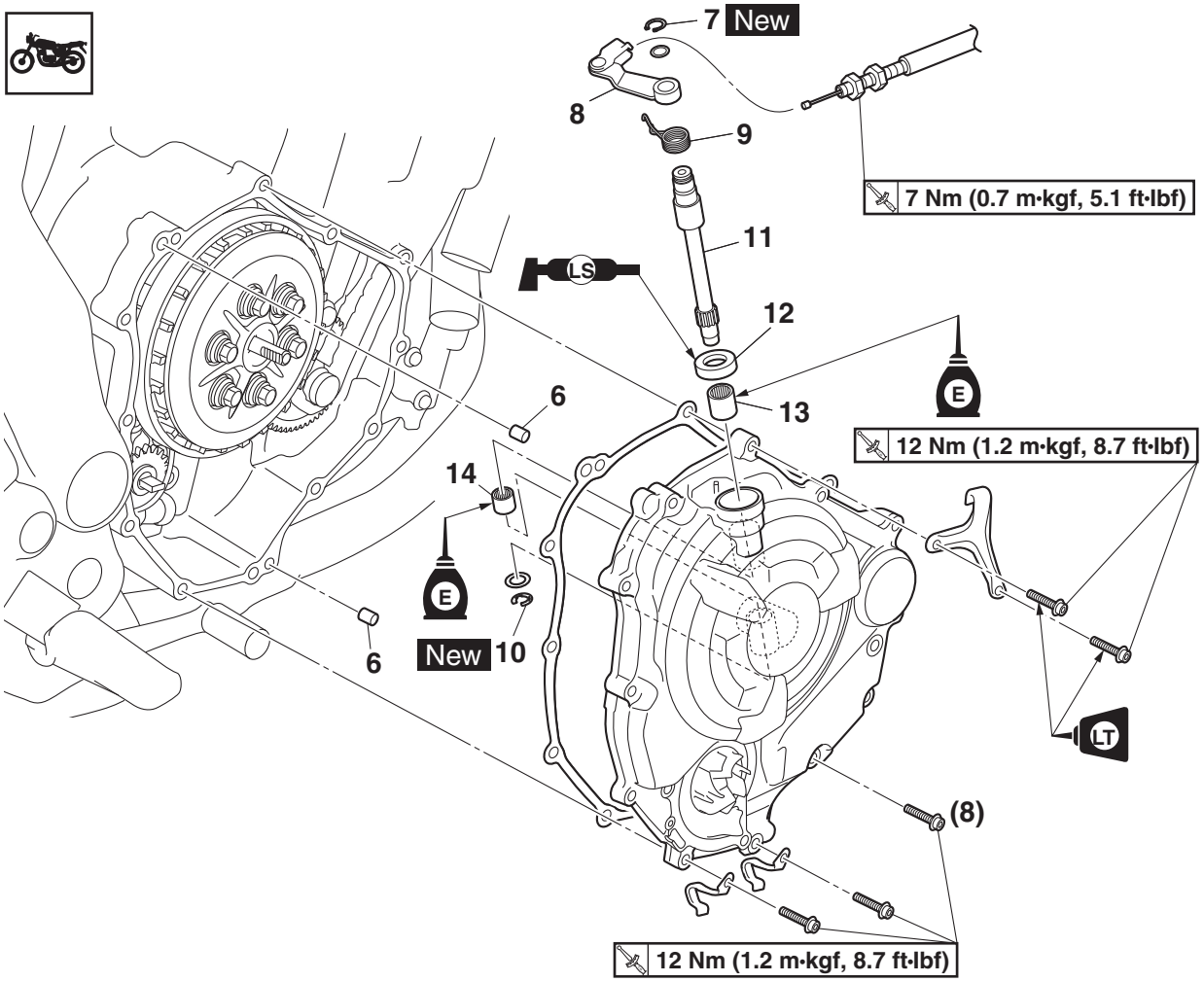
EAS20055
CLUTCH

Removing the clutch cover and pull lever shaft



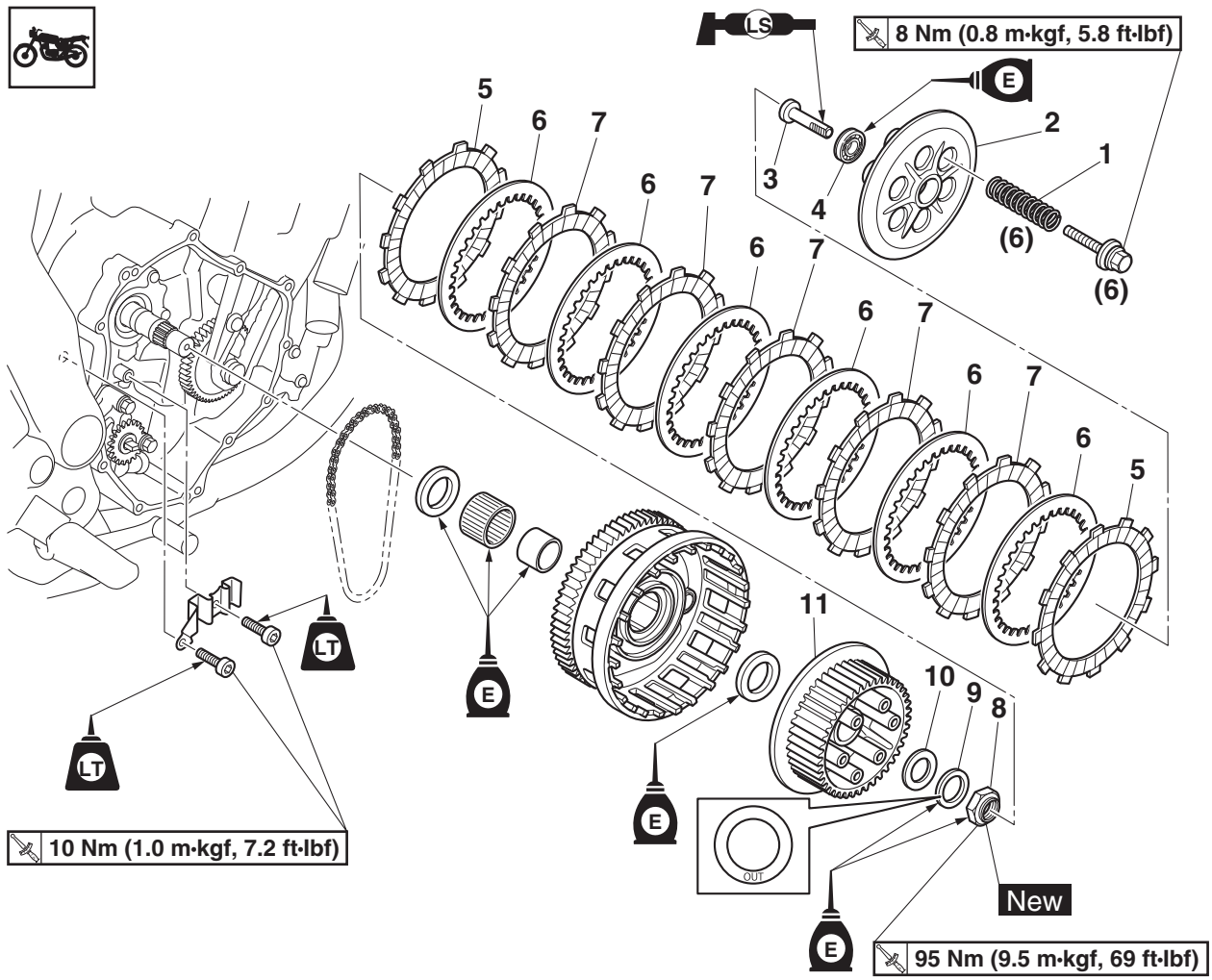
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
	Water pump housing		Refer to "WATER PUMP" on page 6-9.
1	Clutch cable	1	Disconnect.
2	Clutch cable holder	1	
3	Holder (O_2 sensor lead and oil pressure switch lead)	2	
4	Clutch cover	1	
5	Clutch cover gasket	1	

Removing the clutch cover and pull lever shaft



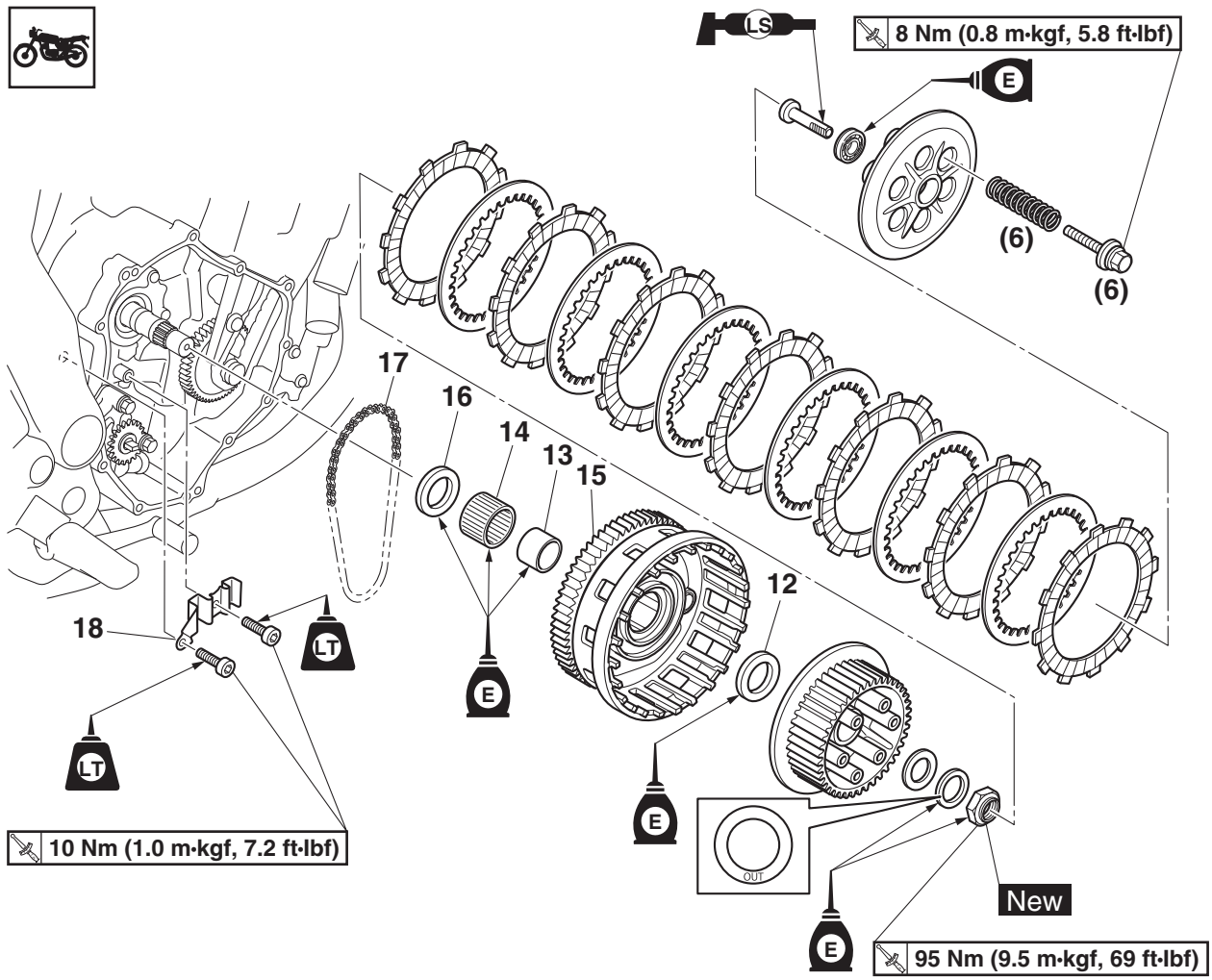
Order	Job/Parts to remove	Q'ty	Remarks
6	Dowel pin	2	
7	Circlip	1	
8	Pull lever	1	
9	Pull lever spring	1	
10	Circlip	1	
11	Pull lever shaft	1	
12	Oil seal	1	
13	Bearing	1	
14	Bearing	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	2	
6	Clutch plate	6	
7	Friction plate 2	5	
8	Clutch boss nut	1	
9	Conical spring washer	1	
10	Washer	1	
11	Clutch boss	1	

Removing the clutch



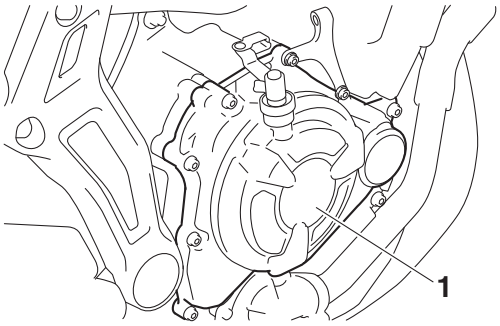
Order	Job/Parts to remove	Q'ty	Remarks
12	Thrust plate	1	
13	Spacer	1	
14	Bearing	1	
15	Clutch housing	1	
16	Thrust plate	1	
17	Oil pump drive chain	1	
18	Oil pump drive chain guide	1	

EAS30346
REMOVING THE CLUTCH

1. Remove:
   - Clutch cover “1”
   - Gasket

TIP

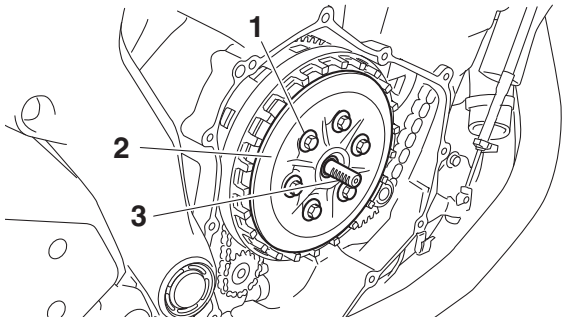
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



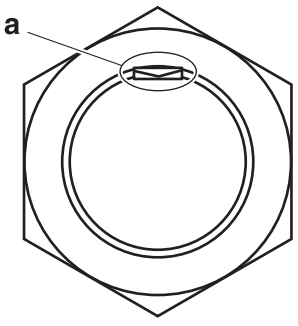
2. Remove:
   - Compression spring bolts “1”
   - Compression springs
   - Pressure plate “2”
   - Pull rod “3”

TIP

Loosen the compression spring bolts in stages and in a crisscross pattern.



3. Remove:
   - Friction plates 1
   - Clutch plates
   - Friction plates 2
4. Straighten the clutch boss nut rib “a”.

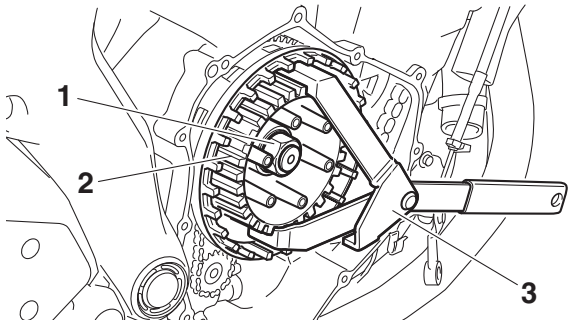


5. Loosen:
   - Clutch boss nut “1”

TIP

While holding the clutch boss “2” with the universal clutch holder “3”, loosen the clutch boss nut.

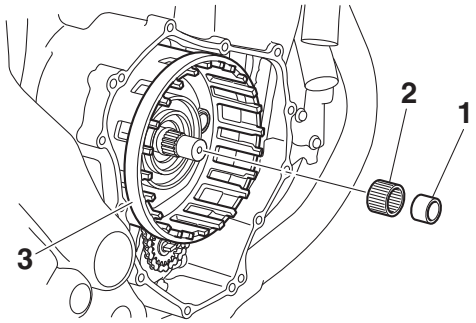
Universal clutch holder
90890-04086
Universal clutch holder
YM-91042



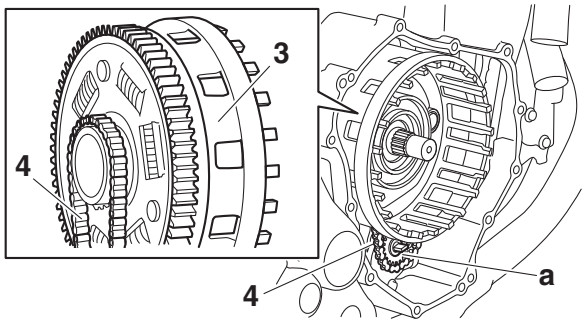
6. Remove:
   - Spacer “1”
   - Bearing “2”
   - Clutch housing “3”

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a. Remove the spacer and bearing.



b. Remove the oil pump drive chain “4” from the oil pump driven sprocket “a”, and then remove the clutch housing.

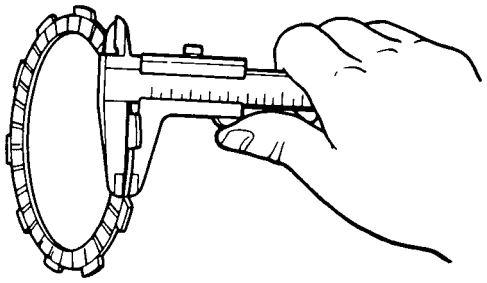


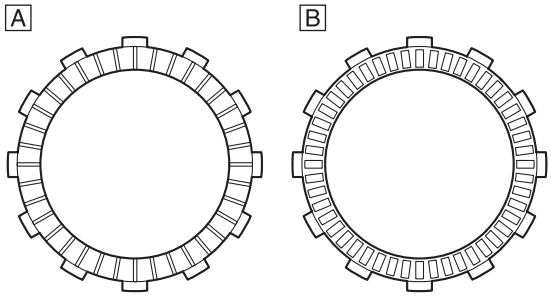
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EAS30348
CHECKING THE FRICTION PLATES
The following procedure applies to all of the friction plates.
1. Check:
   • Friction plate
   Damage/wear → Replace the friction plates as a set.
2. Measure:
   • Friction plate thickness
   Out of specification → Replace the friction plates as a set.

TIP
Measure the friction plate at four places.

Friction plate 1 thickness
2.90–3.10 mm (0.114–0.122 in)
Wear limit
2.80 mm (0.110 in)
Friction plate 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)



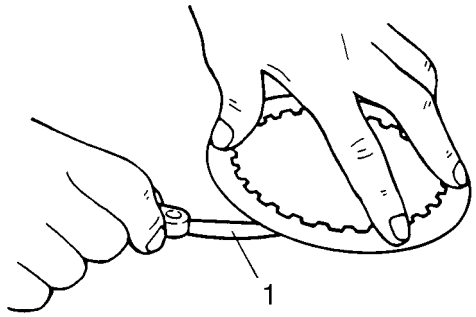


A. Friction plate 1
B. Friction plate 2

EAS30349
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.

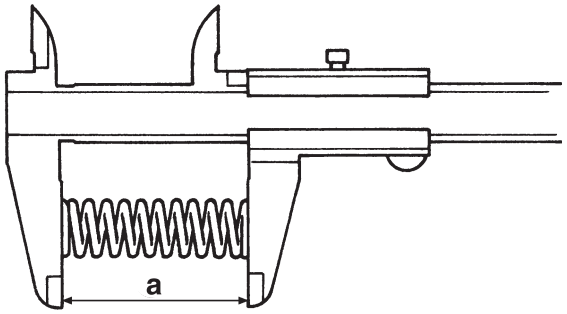
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9

Warpage limit
0.10 mm (0.004 in)



EAS30351
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 “a”
   Out of specification → Replace the clutch springs as a set.

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



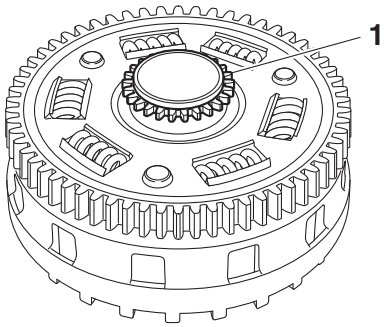
EAS30352
CHECKING THE CLUTCH HOUSING

1. Check:
   - Clutch housing dogs
     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.

2. Check:
   - Oil pump drive sprocket "1"
     Cracks/damage/wear → Replace.



3. Check:
   - Bearing
     Damage/wear → Replace the bearing and clutch housing.

EAS30353
CHECKING THE CLUTCH BOSS

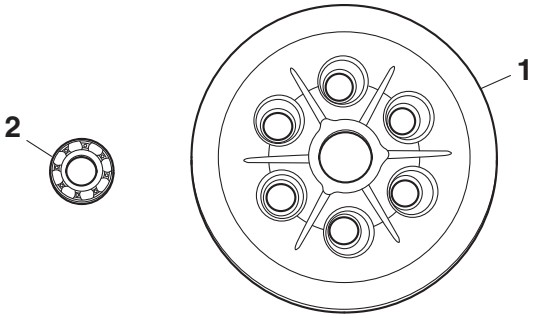
1. Check:
   - Clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.

EAS30354
CHECKING THE PRESSURE PLATE

1. Check:
   - Pressure plate "1"
     Cracks/damage → Replace.
   - Bearing "2"
     Damage/wear → Replace.

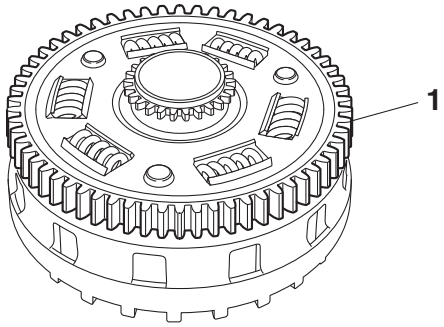


EAS30356
CHECKING THE PRIMARY DRIVE GEAR

1. Check:
   - Primary drive gear
     Damage/wear → Replace the crankshaft and clutch housing as a set.
     Excessive noise during operation → Replace the crankshaft and clutch housing as a set.

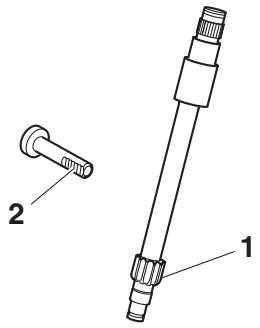
EAS30357
CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
   - Primary driven gear "1"
     Damage/wear → Replace the clutch housing and crankshaft as a set.
     Excessive noise during operation → Replace the clutch housing and crankshaft as a set.



EAS30358
CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:
   - Pull lever shaft pinion gear teeth "1"
   - Pull rod teeth "2"
     Damage/wear → Replace the pull rod and pull lever shaft as a set.



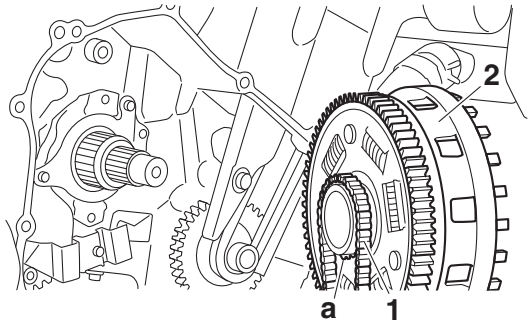
2. Check:
   • Pull rod bearing
   Damage/wear → Replace.

EAS30363
INSTALLING THE CLUTCH

1. Install:
   • Oil pump drive chain “1”
   • Thrust plate
   • Clutch housing “2”
   • Bearing
   • Spacer

TIP

Install the oil pump drive chain onto the oil pump drive sprocket “a”.



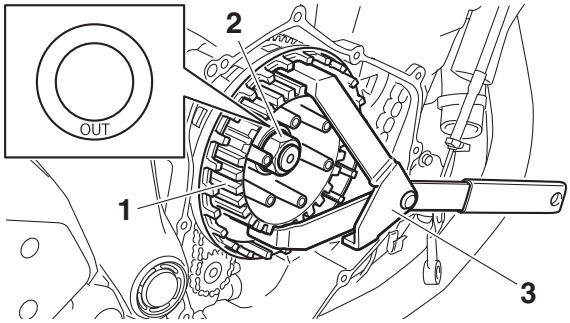
2. Install:
   • Thrust plate
   • Clutch boss “1”
   • Washer
   • Conical spring washer
   • Clutch boss nut “2” New

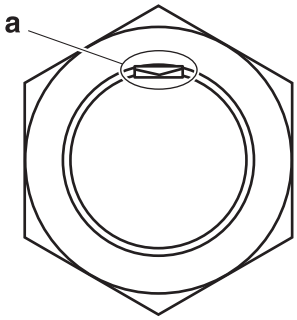
	Clutch boss nut **95 Nm (9.5 m·kgf, 69 ft·lbf)**

TIP

- Lubricate the conical spring washer and clutch boss nut threads with engine oil.
- Install the washer on the main axle with the “OUT” mark facing away from the vehicle.
- While holding the clutch boss “1” with the universal clutch holder “3”, tighten the clutch boss nut.
- Stake the clutch boss nut at a cutout “a” in the main axle.

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

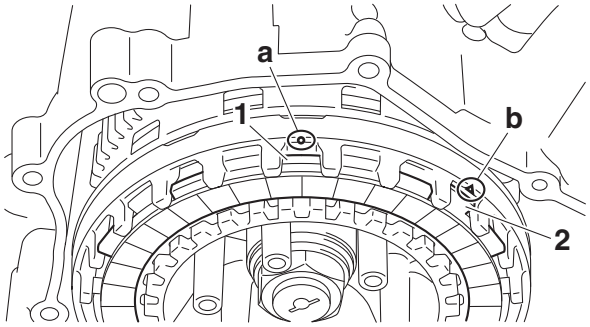




3. Install:
   • Friction plates 1 “1”
   • Friction plates 2 “2”

TIP

- First, install a friction plate, and then alternate between a clutch plate and a friction plate.
- Align a projection on friction plate 1 with the punch mark “a” on the clutch housing and align a projection on friction plate 2 with the “△” mark “b” on the housing.



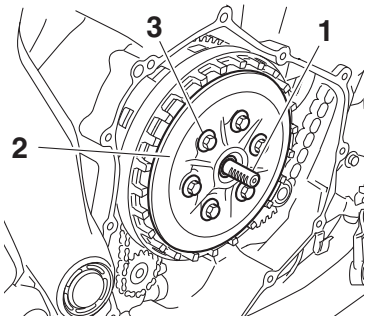
4. Install:
   • Bearing
   • Pull rod “1”
   • Pressure plate “2”

- Clutch springs
- Clutch spring bolts “3”

	Clutch spring bolt **8 Nm (0.8 m·kgf, 5.8 ft·lbf)**

TIP

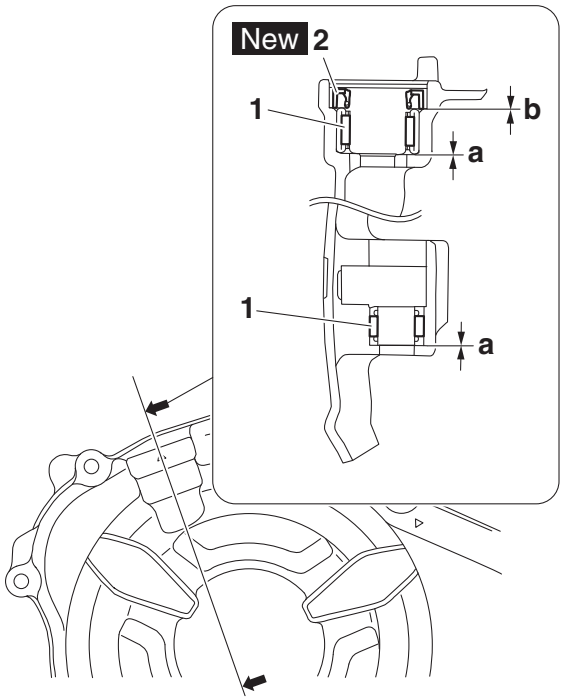
- Apply lithium-soap-based grease onto the pull rod.
- Tighten the clutch spring bolts in stages and in a crisscross pattern.



5. Install:
   - Bearings “1”
   - Oil seal “2” New
     (to the clutch cover)

TIP

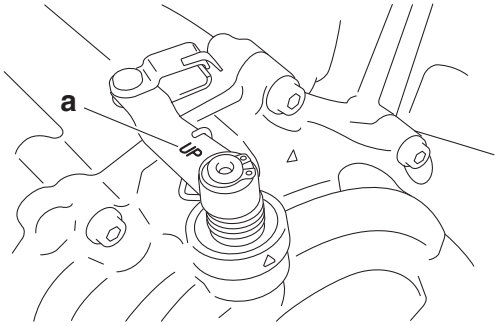
- Lubricate the bearings with engine oil and lubricate the oil seal with lithium-soap-based grease.
- Install the bearings until they contact the surfaces “a” and install the oil seal until it contacts the surface “b” as shown in the illustration.

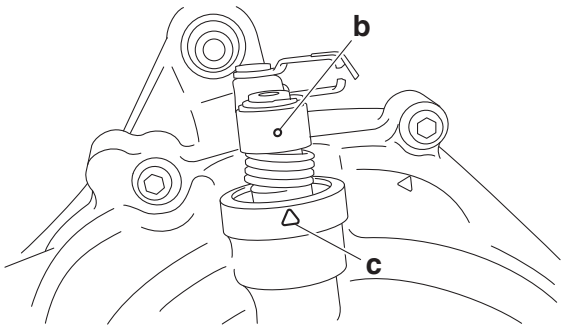


6. Install:
   - Pull lever

TIP

- Install the pull lever with the “UP” mark “a” facing toward upper side.
- When installing the pull lever, push the pull lever and check that the punch mark “b” on the pull lever aligns with the mark “c” on the clutch cover.





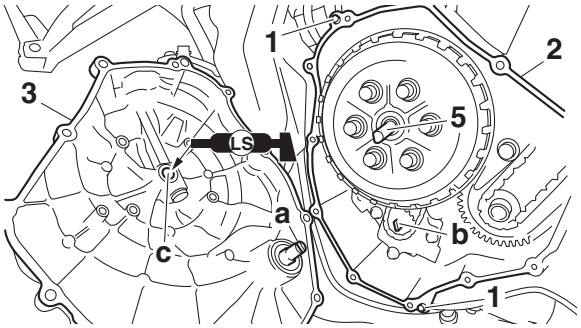
7. Install:
   - Dowel pins “1”

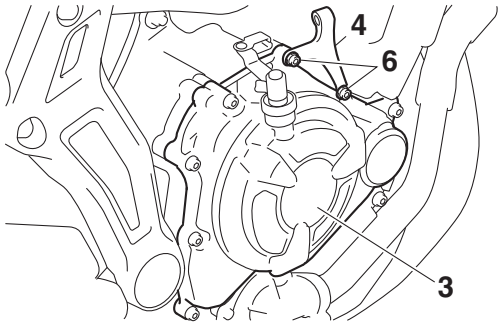
- Clutch cover gasket “2” New
- Clutch cover “3”
- Clutch cable holder “4”

Clutch cover bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
Clutch cable holder bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®

TIP

- Align the slit “a” in the impeller shaft with the projection “b” on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod “5” rearward and align the rod with the hole “c” in the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cable holder bolts “6” shown in the illustration.
- Tighten the bolts in stages and in a crisscross pattern.

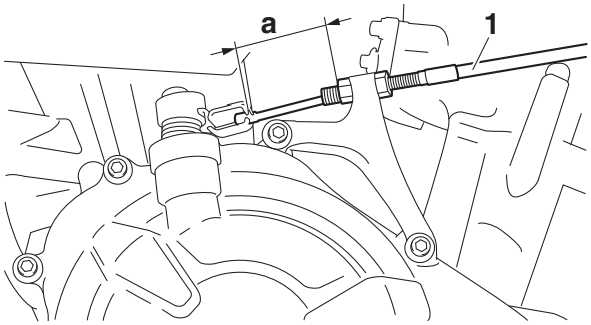


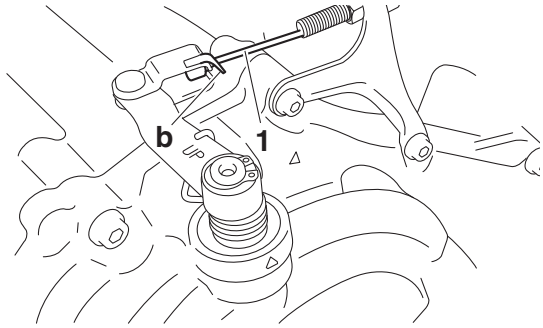


8. Connect:
   - Clutch cable “1”

TIP

- Install the clutch cable so that the clutch cable length “a” is 51.6–62.2mm (2.03–2.45 in) as shown in the illustration. In addition, make sure that the vehicle is positioned upright when measuring the clutch cable length.
- After installing the clutch cable, bend the projection “b” on the pull lever.



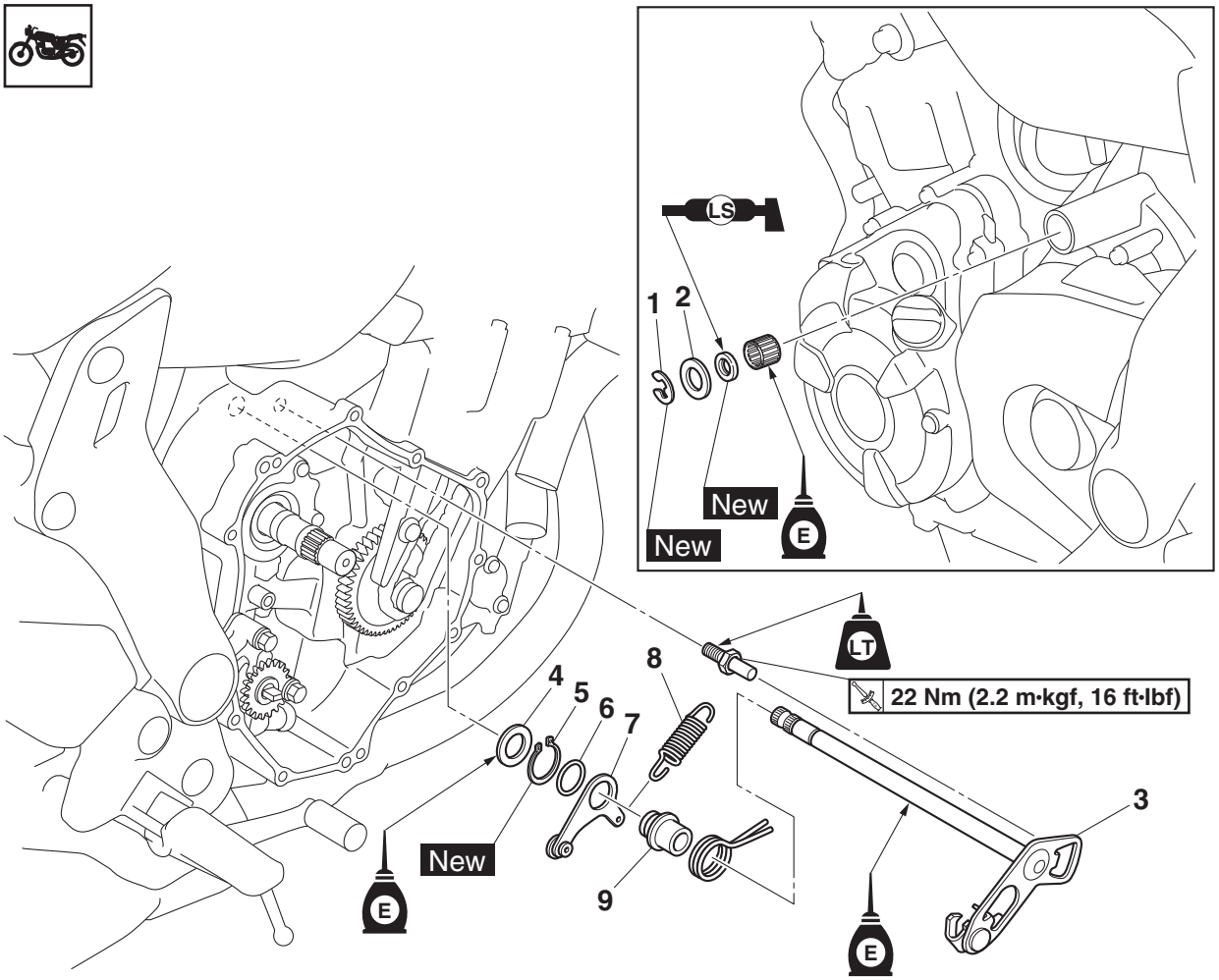


9. Adjust:
   - Clutch lever free play
     Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-12.

Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

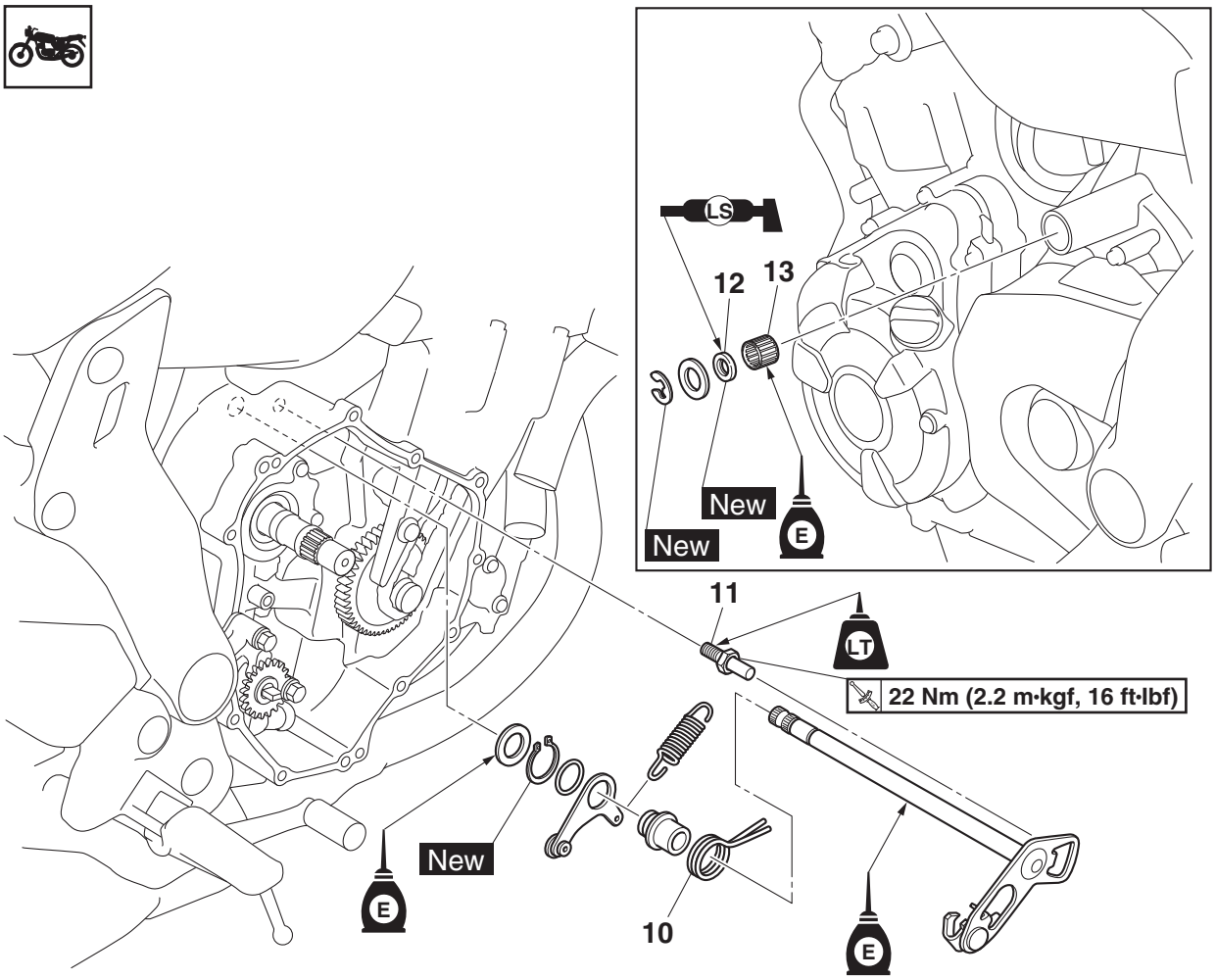
EAS20057
SHIFT SHAFT

Removing the shift shaft and stopper lever



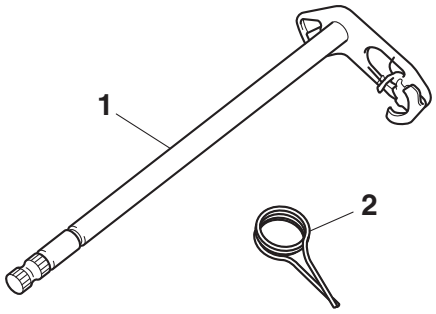
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing		Refer to "CLUTCH" on page 5-48.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	
7	Stopper lever	1	
8	Stopper lever spring	1	
9	Collar	1	

Removing the shift shaft and stopper lever

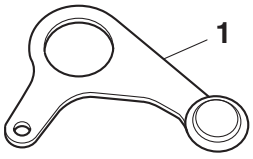


Order	Job/Parts to remove	Q'ty	Remarks
10	Shift shaft spring	1	
11	Shift shaft spring stopper	1	
12	Oil seal	1	
13	Bearing	1	

EAS30377
CHECKING THE SHIFT SHAFT
1. Check:
   - Shift shaft “1”
     Bends/damage/wear → Replace.
   - Shift shaft spring “2”
   - Collar
     Damage/wear → Replace.



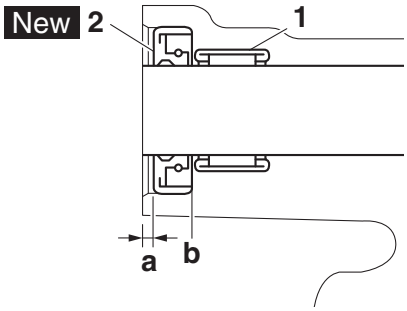
EAS30378
CHECKING THE STOPPER LEVER
1. Check:
   - Stopper lever “1”
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.



EAS30381
INSTALLING THE SHIFT SHAFT
1. Install:
   - Bearing “1”
   - Oil seal “2” New

	Install depth “a” **0.6–1.1 mm (0.02–0.04 in)**

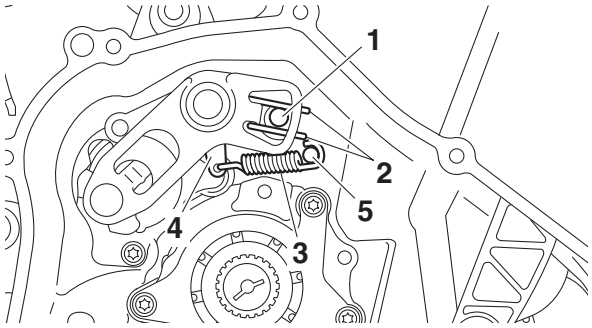
TIP
- Apply engine oil onto the bearing.
- Make sure that the bearing does not protrude past the line “b” shown in the illustration.
- Lubricate the oil seal lips with lithium-soap-based grease.



2. Install:
   - Shift shaft spring stopper
   - Washer
   - Shift shaft assembly
   - Stopper lever spring

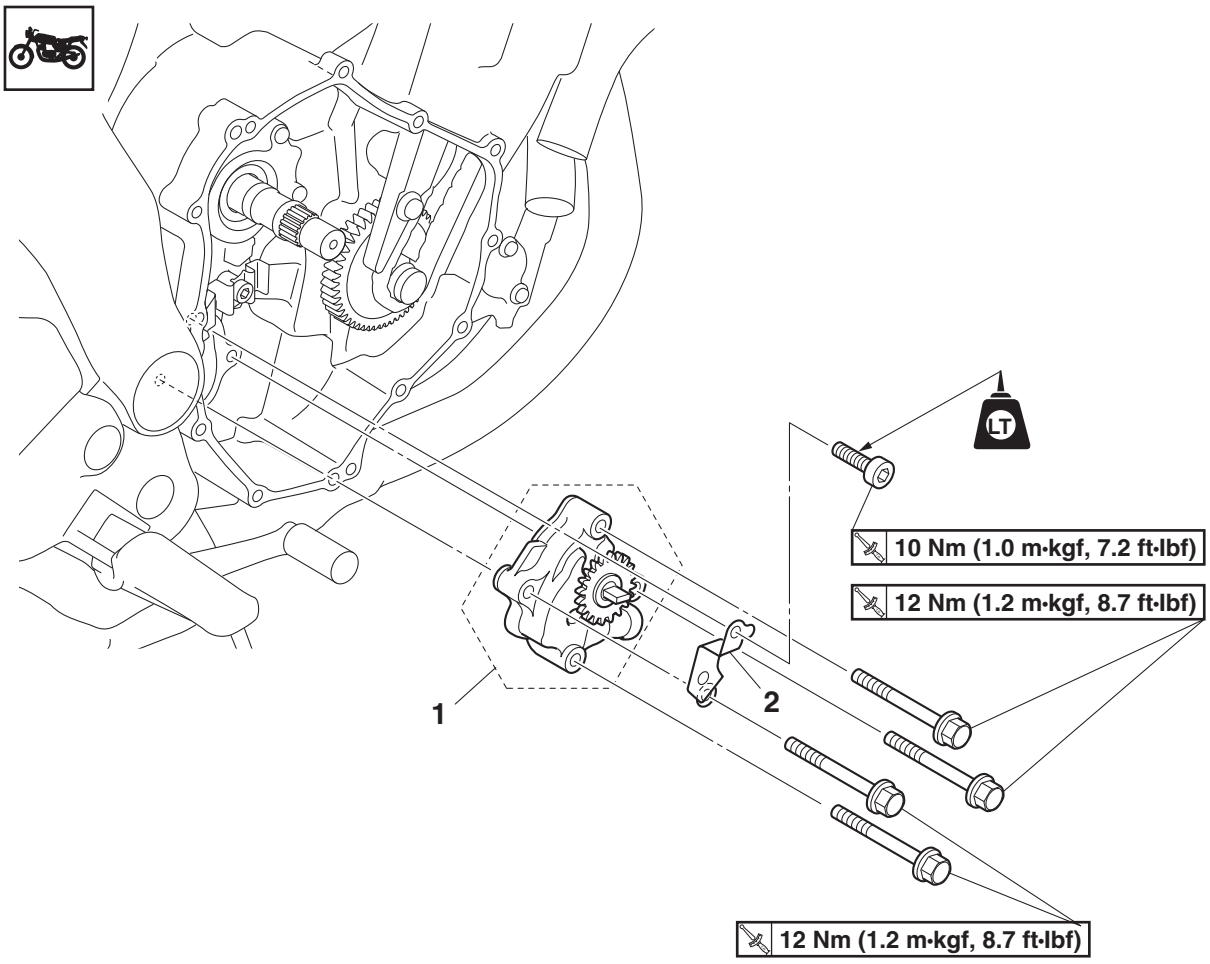
	Shift shaft spring stopper **22 Nm (2.2 m·kgf, 16 ft·lbf)** **LOCTITE®**

TIP
- Hook the end of the shift shaft spring “2” onto the shift shaft spring stopper “1”.
- Hook the ends of the stopper lever spring “3” onto the stopper lever “4” and the stopper lever spring hook “5”.
- Mesh the stopper lever with the shift drum segment assembly.



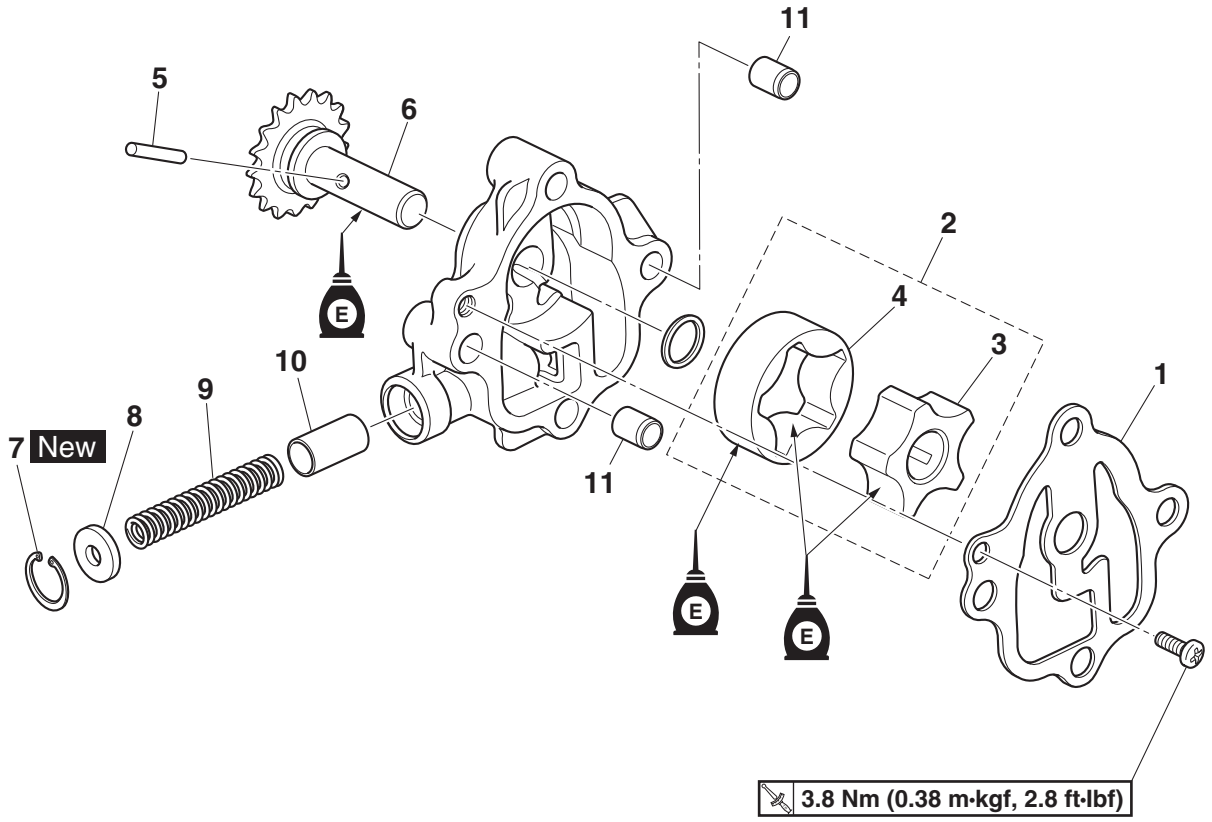
EAS20054
OIL PUMP

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing		Refer to "CLUTCH" on page 5-48.
1	Oil pump assembly	1	
2	Holder	1	

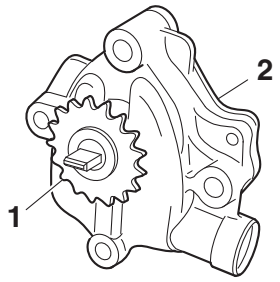
Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Oil pump rotor assembly	1	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Oil pump driven sprocket	1	
7	Circlip	1	Hold down the washer when removing the circlip.
8	Washer	1	
9	Spring	1	
10	Relief valve	1	
11	Dowel pin	2	

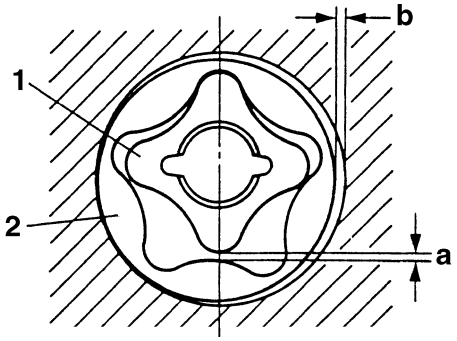
EAS30336
CHECKING THE SPROCKET AND CHAIN
1. Check:
   - Oil pump drive sprocket
     Refer to "CHECKING THE CLUTCH HOUSING" on page 5-54.
   - Oil pump driven sprocket
     Refer to "CHECKING THE OIL PUMP" on page 5-63.
2. Check:
   - Oil pump drive chain
     Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket (clutch housing), and oil pump driven sprocket as a set.

EAS30337
CHECKING THE OIL PUMP
1. Check:
   - Oil pump driven sprocket "1"
   - Oil pump housing "2"
     Cracks/damage/wear → Replace the defective part(s).



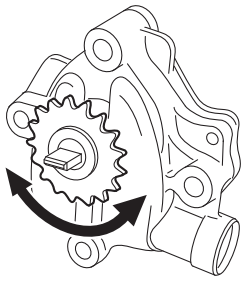
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance "a"
   - Outer-rotor-to-oil-pump-housing clearance "b"
     Out of specification → Replace the defective part(s).

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
0.09–0.15 mm (0.0035–0.0059 in)
Limit
0.22 mm (0.0087 in)

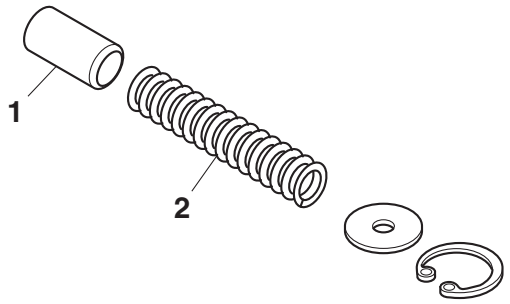


1. Inner rotor
2. Outer rotor

3. Check:
   - Oil pump operation
     Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS30338
CHECKING THE RELIEF VALVE
1. Check:
   - Relief valve "1"
   - Spring "2"
     Damage/wear → Replace the oil pump assembly.



EAS30342
ASSEMBLING THE OIL PUMP
1. Lubricate:
   - Inner rotor
   - Outer rotor
     (with the recommended lubricant)

Recommended lubricant
Engine oil

2. Lubricate:
   • Oil pump driven sprocket
   (with the recommended lubricant)

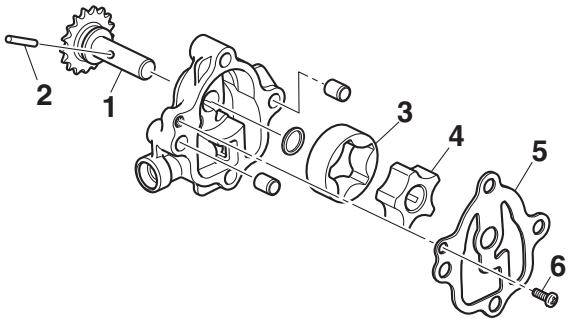
	Recommended lubricant **Engine oil**

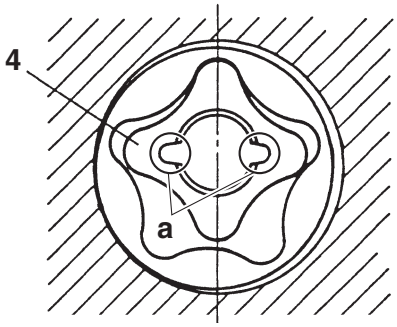
3. Install:
   • Oil pump driven sprocket “1”
   • Pin “2”
   • Outer rotor “3”
   • Inner rotor “4”
   • Oil pump cover “5”
   • Oil pump cover screw “6”

	Oil pump cover screw **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

TIP

Align the pin in the oil pump shaft with the grooves “a” in the inner rotor.





4. Check:
   • Oil pump operation
   Refer to “CHECKING THE OIL PUMP” on page 5-63.

EAS30343
INSTALLING THE OIL PUMP

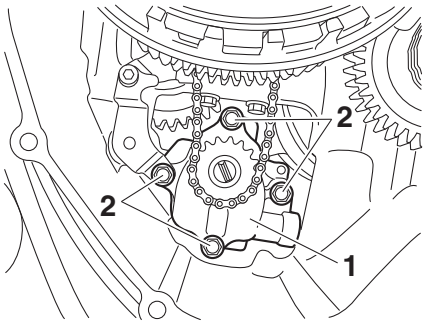
1. Install:
   • Oil pump “1”
   • Oil pump bolts “2”

	Oil pump bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

ECA20940

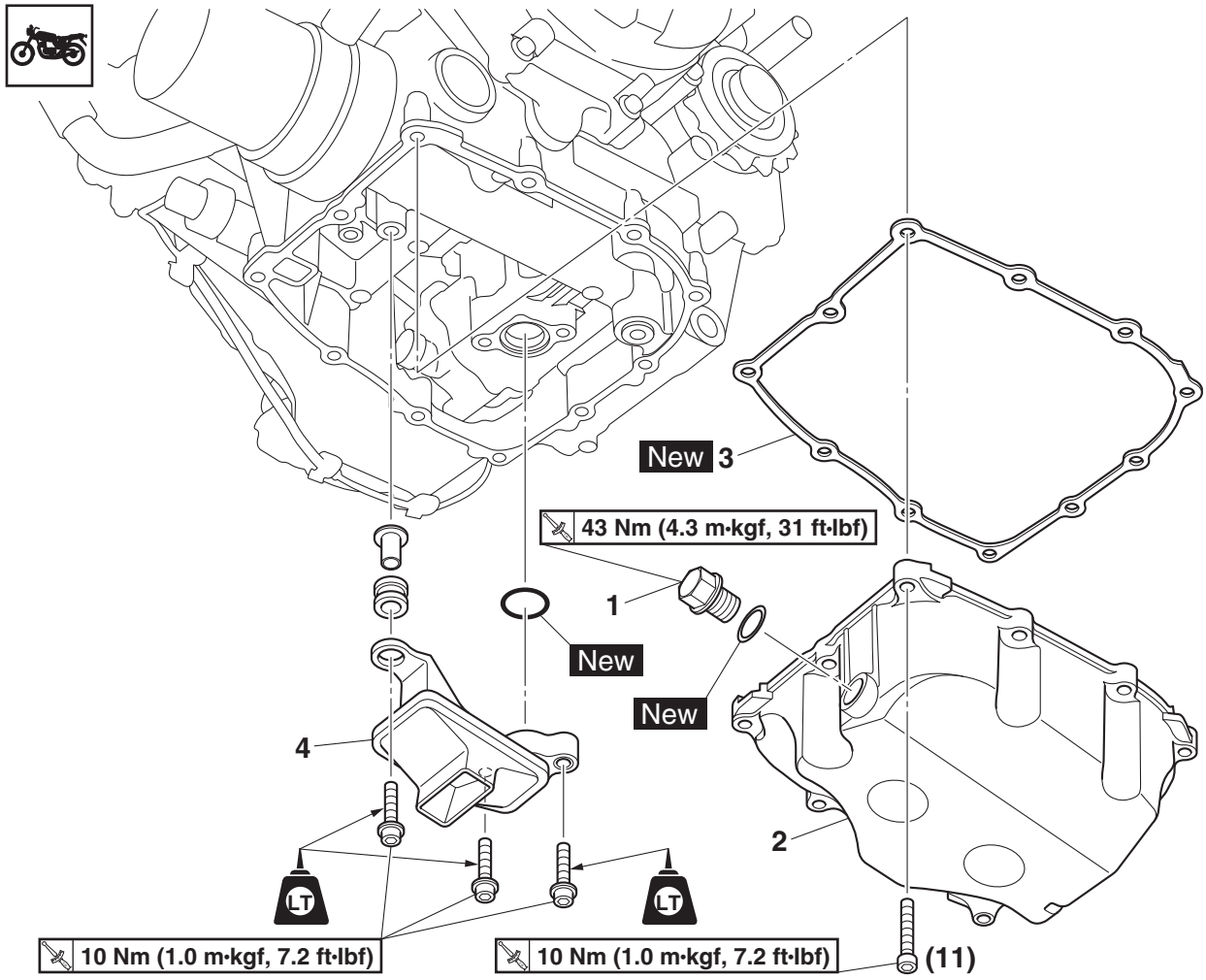
NOTICE

After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.



EAS20177
OIL PAN

Removing the oil pan



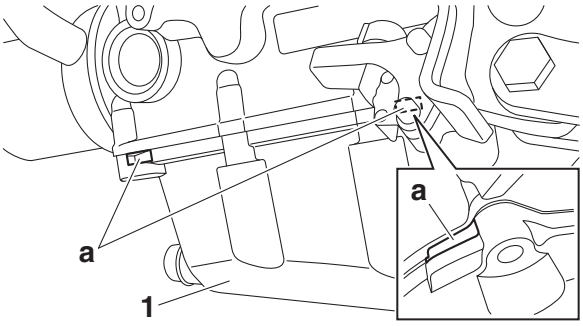
Order	Job/Parts to remove	Q'ty	Remarks
	Pivot shaft protector (right)		Refer to "SWINGARM" on page 4-84.
	Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-46.
	Muffler assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
1	Engine oil drain bolt	1	
2	Oil pan	1	
3	Oil pan gasket	1	
4	Oil strainer	1	

EAS31068
REMOVING THE OIL PAN

1. Remove:
   • Oil pan “1”
   • Oil pan gasket

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Insert a flat-head screwdriver into the slots “a” in the oil pan to remove the oil pan.

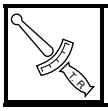


EAS31069
CHECKING THE OIL STRAINER

1. Check:
   • Oil strainer
   Damage → Replace.
   Contaminants → Clean with solvent.

EAS31070
INSTALLING THE OIL PAN

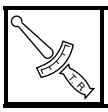
1. Install:
   • Oil pan gasket New
   • Oil pan

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

TIP

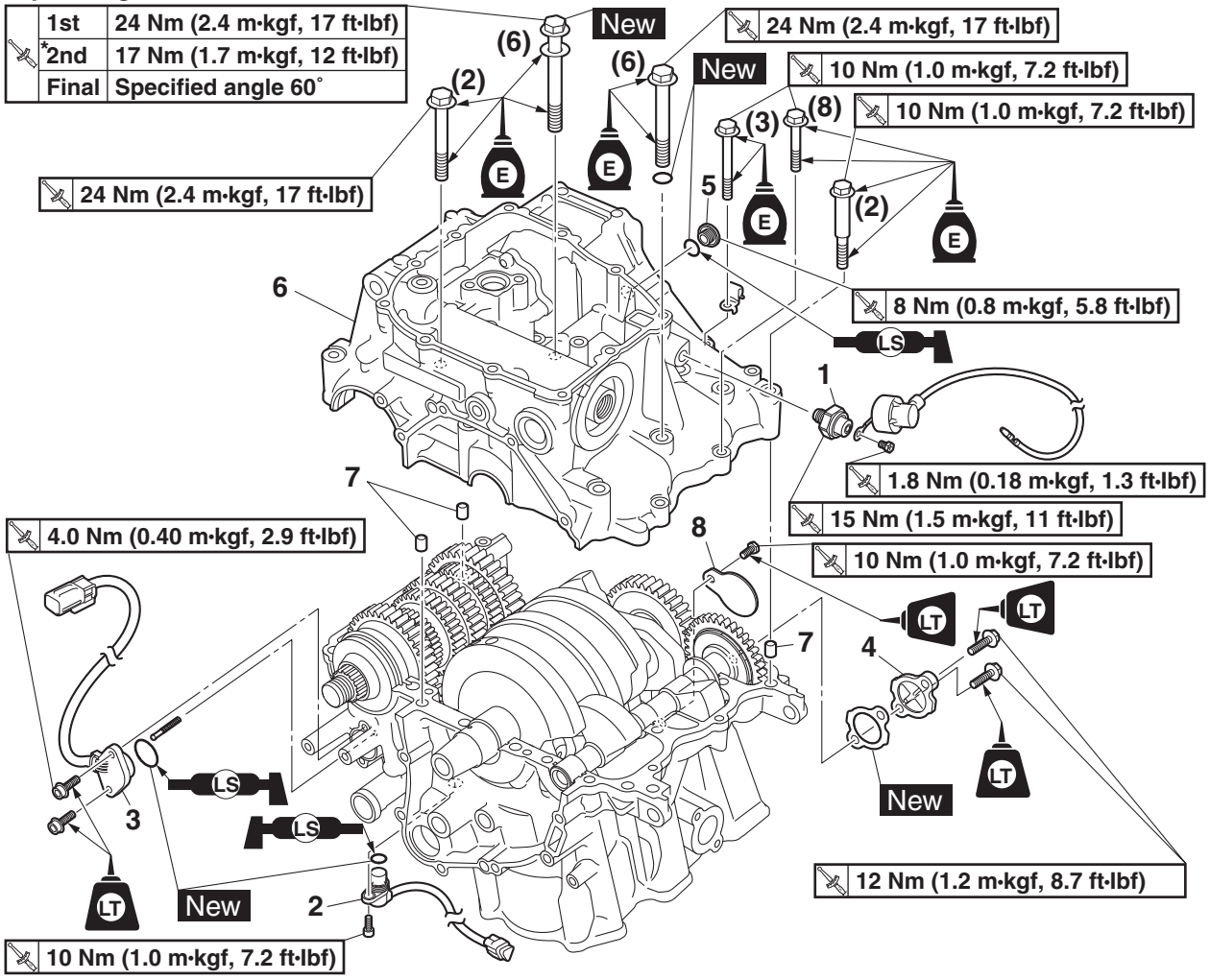
Tighten the oil pan bolts in stages and in a crisscross pattern.

2. Install:
   • Gasket New
   • Engine oil drain bolt

	**Engine oil drain bolt** **43 Nm (4.3 m·kgf, 31 ft·lbf)**

EAS20059
CRANKCASE

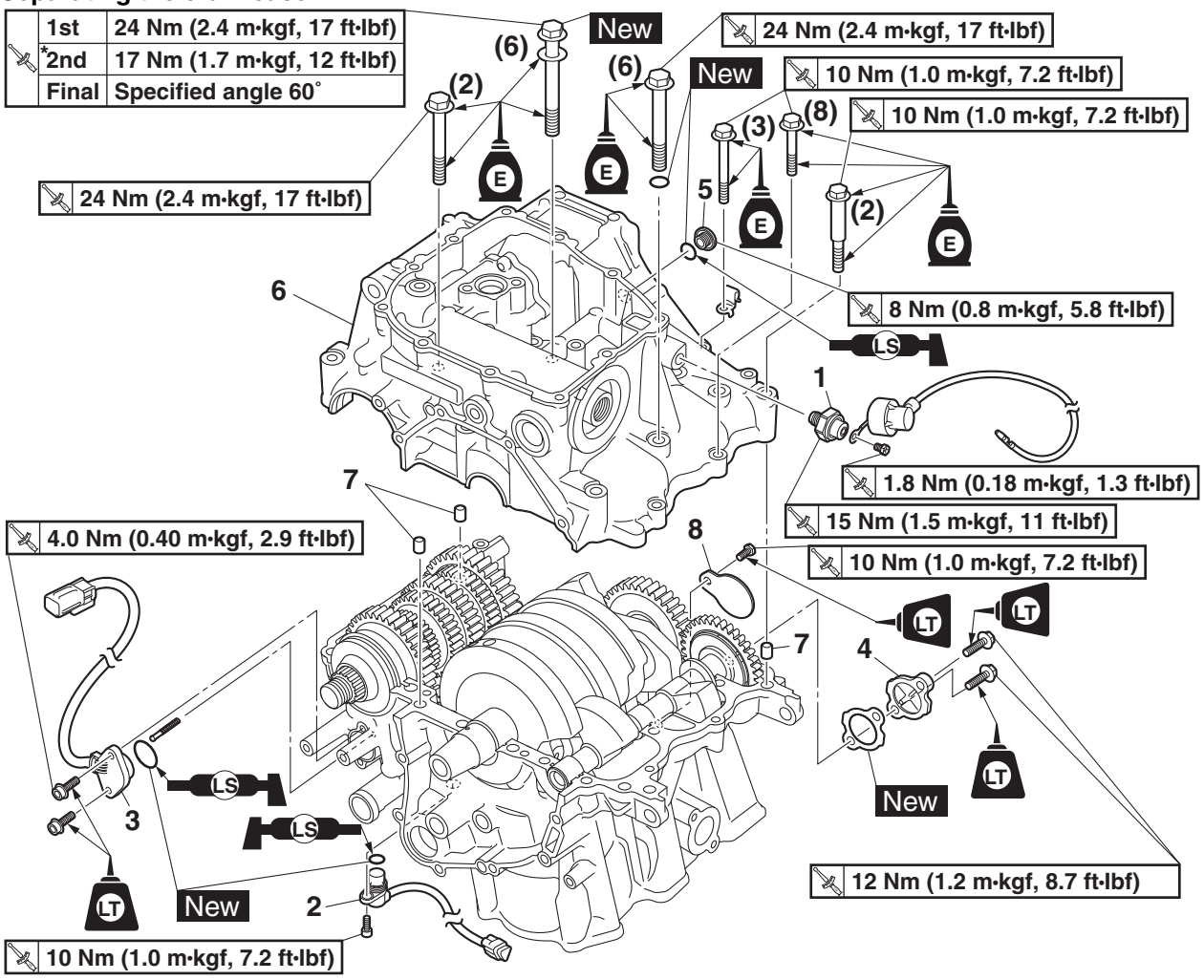
Separating the crankcase



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Cylinder head cover		Refer to "CAMSHAFTS" on page 5-11.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-23.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-37.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-43.
	Clutch housing		Refer to "CLUTCH" on page 5-48.
	Oil strainer		Refer to "OIL PAN" on page 5-65.

Separating the crankcase



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.**

Order	Job/Parts to remove	Q'ty	Remarks
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-90.
1	Oil pressure switch	1	
2	Speed sensor	1	
3	Gear position switch	1	
4	Balancer shaft access cover	1	
5	Main gallery bolt	1	
6	Crankcase	1	
7	Dowel pin	3	
8	Blind plate	1	

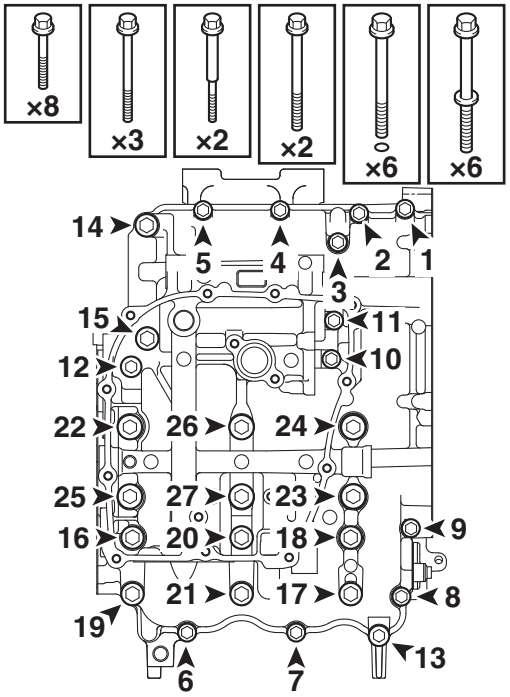
EAS30389
DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
   • Crankcase bolt (×27)

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts "1"–"11" in any loosening sequence.
- Loosen the bolts "12"–"27" in the proper sequence as shown.
- The numbers embossed "1"–"16" on the crankcase indicate the crankcase tightening sequence.

- M6 × 40 mm bolt (×8): "1", "2", "4"–"7", "10", "11"
- M6 × 60 mm bolt (×3): "3", "8", "9"
- M6 × 65 mm bolt (×2): "12", "13"
- M8 × 65 mm bolt (×2): "14", "15"
- M8 × 70 mm bolt (×6) (bolts with O-rings): "16"– "21"
- M9 × 80 mm bolt (×6) (bolts with washers): "22"–"27"



3. Remove:
   • Crankcase
   • Dowel pins

ECA13900
NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

EAS30390
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.

EAS30397
ASSEMBLING THE CRANKCASE

1. Lubricate:
   • Crankshaft journal bearing inner surface (with the recommended lubricant)

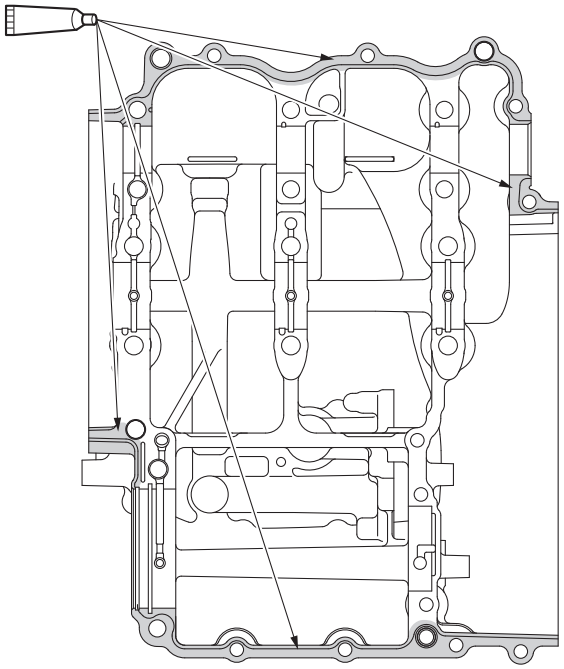
	Recommended lubricant **Engine oil**

2. Apply:
   • Sealant
   (onto the crankcase mating surfaces)

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**

ECA20880
NOTICE

Do not allow any sealant to come into contact with the oil gallery, crankshaft journal bearings, or balancer shaft journal bearings.

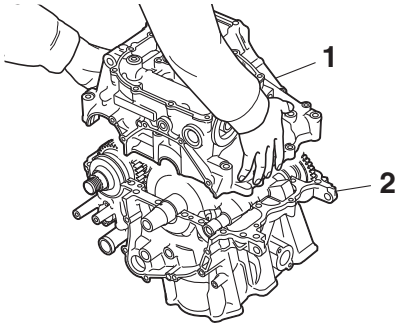


3. Install:
   • Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
   • Crankcase "1"
   (onto the cylinder "2")

ECA13980

NOTICE

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.

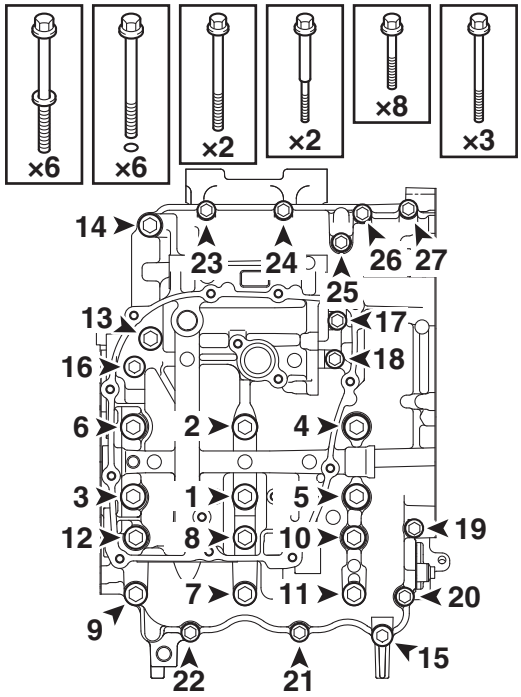


6. Install:
   • Crankcase bolt (×27)

TIP

- Tighten the bolts "1"–"16" in the order of the embossed numbers on the crankcase.
- Lubricate the bolts "1"–"6" threads, mating surfaces and washers with engine oil.
- Lubricate the bolts "7"–"12" threads, mating surfaces and O-rings with engine oil.
- Lubricate the bolts "13"–"27" threads and mating surfaces with engine oil.

  • M9 × 80 mm bolt (×6) (bolts with washers): "1"–"6" New
  • M8 × 70 mm bolt (×6) (bolts with new O-rings): "7"–"12"
  • M8 × 65 mm bolt (×2): "13", "14"
  • M6 × 65 mm bolt (×2): "15", "16"
  • M6 × 40 mm bolt (×8): "17", "18", "21"–"24", "26", "27"
  • M6 × 60 mm bolt (×3): "19", "20", "25"



7. Tighten:
   • Crankcase bolts "1"–"6"

Crankcase bolts (bolts with washers) "1"–"6"
1st: 24 Nm (2.4 m·kgf, 17 ft·lbf)
***2nd: 17 Nm (1.7 m·kgf, 12 ft·lbf)**
Final: specified angle 60°

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

EWA16610

⚠ WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

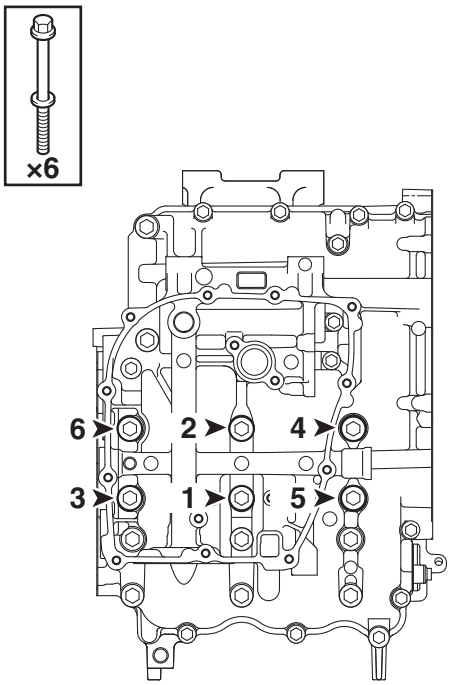
ECA20890

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.

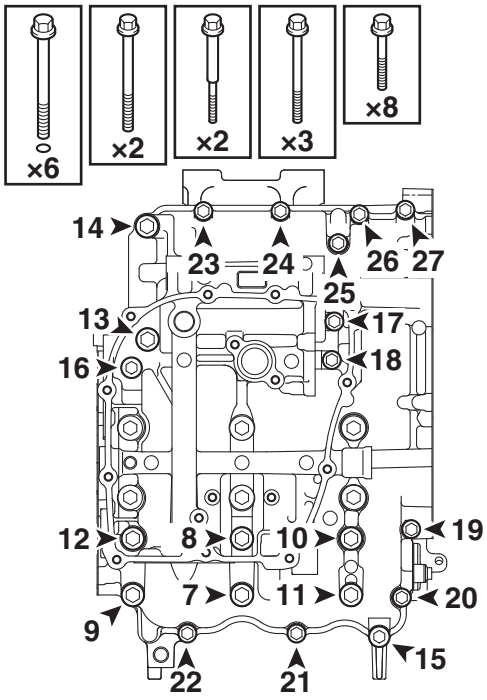


8. Tighten:
   • Crankcase bolts “7”–“27”

	Crankcase bolts “7”–“14” **24 Nm (2.4 m·kgf, 17 ft·lbf)** **Crankcase bolts “15”–“27”** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

- Tighten the bolts “7”–“16” in the tightening sequence cast on the crankcase.
- Tighten the bolts “17”–“27” in any tightening sequence using a crisscross pattern.



EAS31071

INSTALLING THE OIL PRESSURE SWITCH

1. Install:
   • Oil pressure switch “1”
   • Oil pressure switch lead “2”

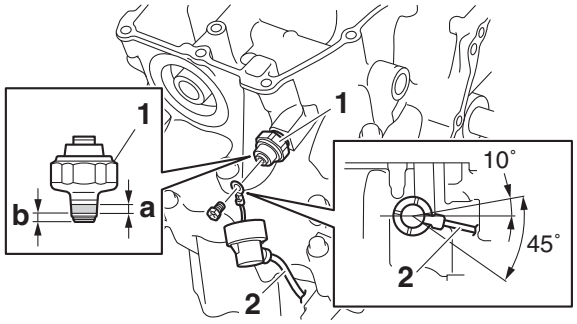
	Oil pressure switch **15 Nm (1.5 m·kgf, 11 ft·lbf)** **Oil pressure switch lead bolt** **1.8 Nm (0.18 m·kgf, 1.3 ft·lbf)**

2. Apply:
   • Sealant
   (onto the oil pressure switch threads)

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**

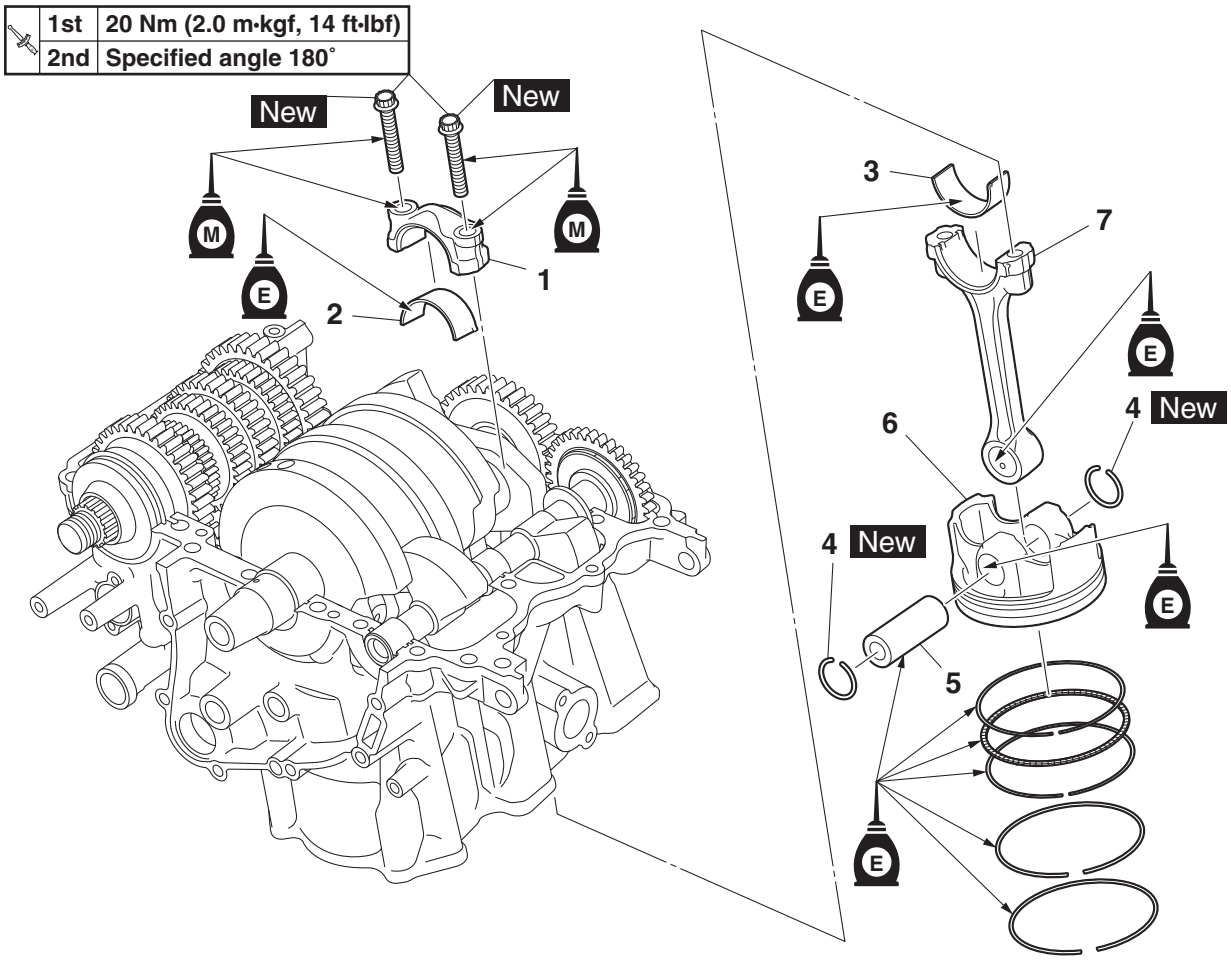
TIP

- Apply Three bond No.1215® to the threads “a” of the oil pressure switch. However, do not apply Three bond No.1215® to the portion “b” of the oil pressure switch.
- Install the oil pressure switch lead so that it is routed within the range shown in the illustration.


1
b
a
1
10˚
45˚
2
2

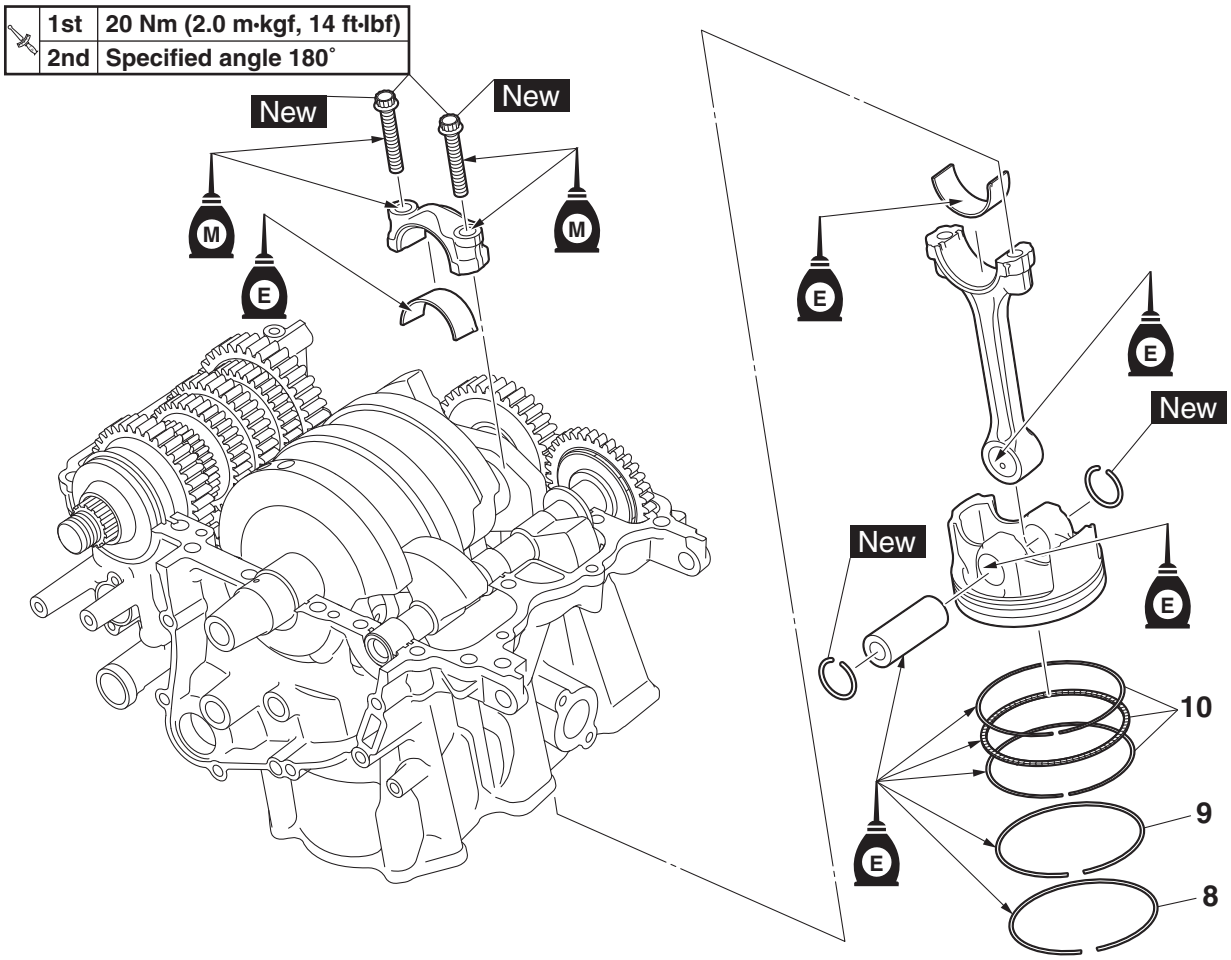
EAS20132
CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to all of the connecting rods and pistons.
			Refer to "CRANKCASE" on page 5-67.
1	Connecting rod cap	1	
2	Big end lower bearing	1	
3	Big end upper bearing	1	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Connecting rod	1	

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
8	Top ring	1	
9	2nd ring	1	
10	Oil ring	1	

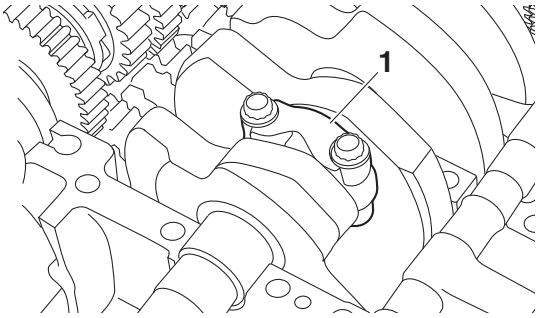
EAS30745
REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
   - Connecting rod cap “1”
   - Connecting rod
   - Big end bearings

TIP

- Identify the position of each connecting rod cap so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.



2. Remove:
   - Piston pin clips “1”
   - Piston pin “2”
   - Piston “3”
   - Connecting rod “4”

ECA13810

NOTICE

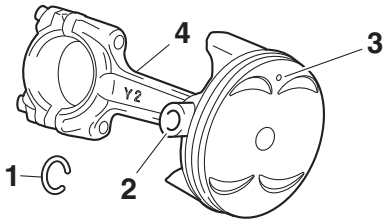
Do not use a hammer to drive the piston pin out.

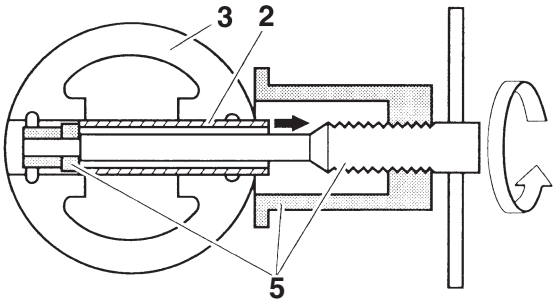
TIP

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set “5”.



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

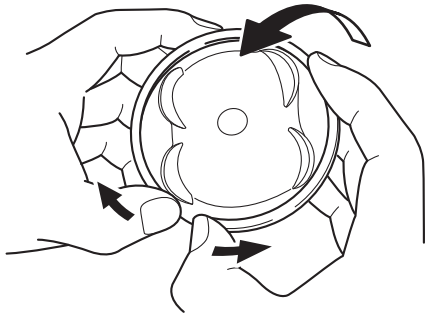




3. Remove:
   - Top ring
   - 2nd ring
   - Oil ring

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.



EAS30747
CHECKING THE CYLINDER AND PISTON

The following procedure applies to all of the cylinders and pistons.

1. Check:
   - Piston wall
   - Cylinder wall
     Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

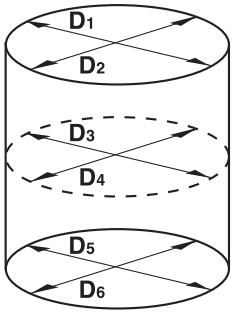
a. Measure cylinder bore with the cylinder bore gauge.

TIP

Measure cylinder bore by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

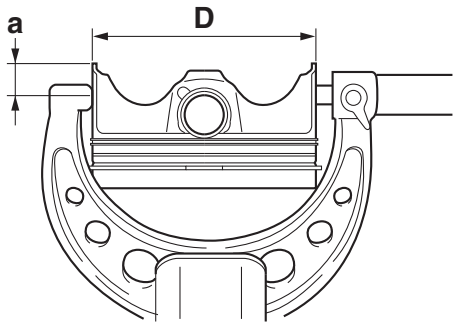
Bore
80.000–80.010 mm (3.1496–3.1500 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

Cylinder bore = maximum of D_1–D_6
Taper limit = 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 – minimum of D_2, D_4 or D_6



b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "D" with the micrometer.

Diameter
79.970–79.985 mm (3.1484–3.1490 in)



a. 8.0 mm (0.31 in) from the bottom edge of the piston

d. If out of specification, replace the piston and piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance = Cylinder bore – Piston skirt diameter

Piston-to-cylinder clearance
0.015–0.040 mm (0.0006–0.0016 in)

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

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS30748

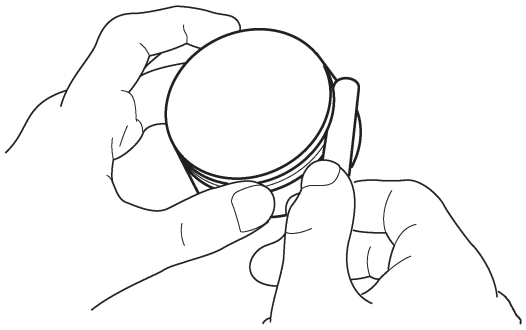
CHECKING THE PISTON RINGS

1. Measure:
   • Piston ring side clearance
   Out of specification → Replace the piston and piston rings as a set.

TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

Top ring
Ring side clearance
0.030–0.065 mm (0.0012–0.0026 in)
Limit
0.115 mm (0.0045 in)
2nd ring
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

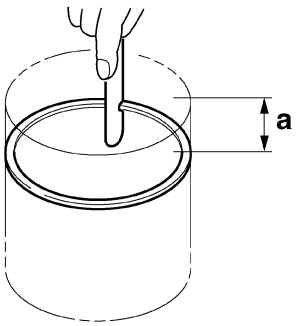
Level the piston ring into the cylinder with the piston crown.

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

TIP

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Top ring
End gap (installed)
0.15–0.25 mm (0.0059–0.0098 in)
Limit
0.50 mm (0.0197 in)
2nd ring
End gap (installed)
0.30–0.45 mm (0.0118–0.0177 in)
Limit
0.115 mm (0.0045 in)
Oil ring
End gap (installed)
0.10–0.35 mm (0.0039–0.0138 in)



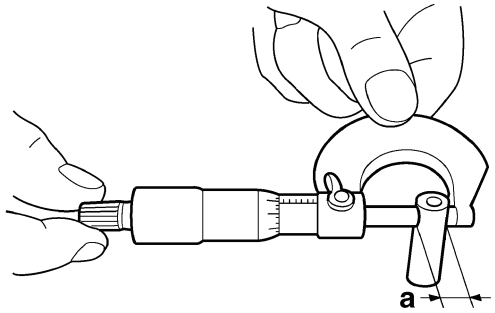
a. 5 mm (0.20 in)

EAS30749
CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

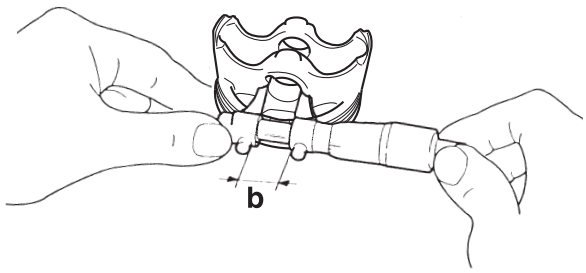
1. Check:
   • Piston pin
   Blue discoloration/grooves → Replace the piston pin, and then check the lubrication system.
2. Measure:
   • Piston pin outside diameter "a"
   Out of specification → Replace the piston pin.

Piston pin outside diameter
17.990–17.995 mm (0.7083–0.7085 in)
Limit
17.970 mm (0.7075 in)



3. Measure:
   • Piston pin bore inside diameter "b"
   Out of specification → Replace the piston.

Piston pin bore inside diameter
18.004–18.015 mm (0.7088–0.7093 in)
Limit
18.045 mm (0.7104 in)



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 inside diameter "b" –
Piston pin outside diameter "a"

Piston-pin-to-piston-pin-bore clearance
0.009–0.025 mm (0.0004–0.0010 in)
Limit
0.075 mm (0.0030 in)

EAS30750
CHECKING THE CONNECTING RODS

1. Measure:
   • Crankshaft-pin-to-big-end-bearing clearance
   Out of specification → Replace the big end bearings.

Oil clearance
0.027–0.051 mm (0.0011–0.0020 in)

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The following procedure applies to all of the connecting rods.

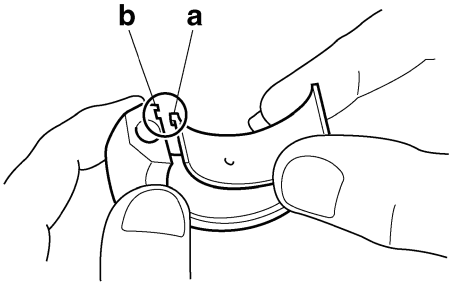
ECA13930
NOTICE

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

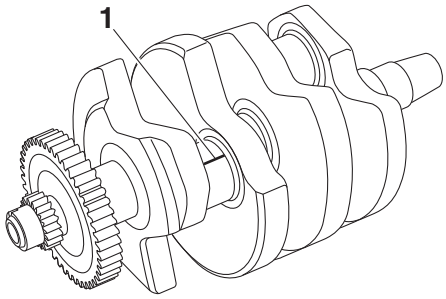
a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

TIP

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



c. Put a piece of Plastigauge® "1" on the crankshaft pin.



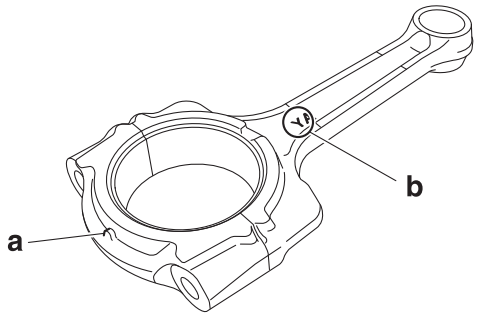
d. Assemble the connecting rod halves.

ECA18390
NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

• Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
• Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
• After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

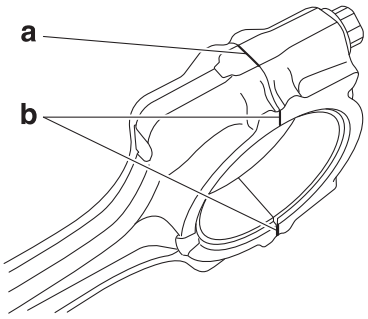
Install by carrying out the following procedures in order to assemble in the most suitable condition.

e. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.

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

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

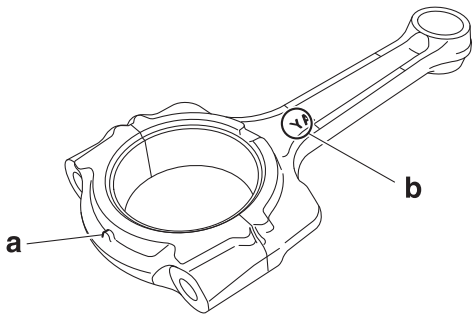


a. Side machined face
b. Thrusting faces

f. Loosen the connecting rod bolts, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

TIP

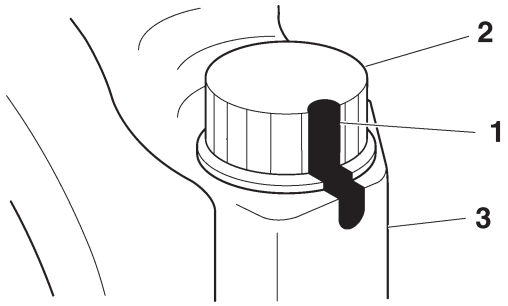
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection "a" on the connecting rod cap faces the same direction as the "Y" mark "b" on the connecting rod.
- Make sure the "Y" marks "b" on the connecting rods face towards the left side of the crankshaft.



g. Tighten the connecting rod bolts with a torque wrench.

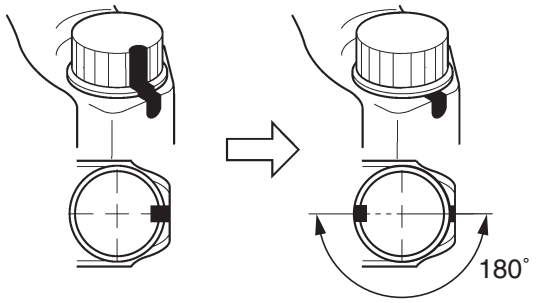
	Connecting rod bolt (1st) 20 Nm (2.0 m·kgf, 14 ft·lbf)

h. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



i. Tighten the connecting rod bolts further to reach the specified angle 175–185°.

	Connecting rod bolt (final) Specified angle 180°



EWA16610

⚠ WARNING

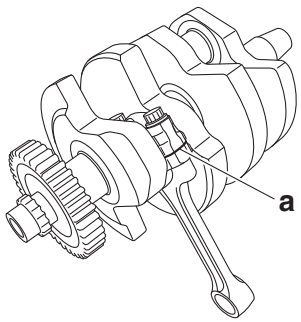
If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

ECA20890

NOTICE

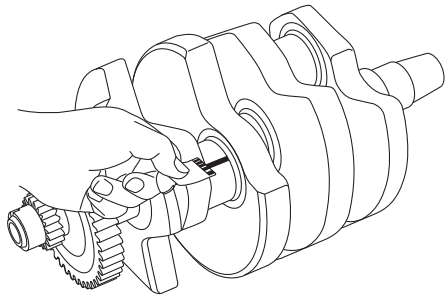
Do not use a torque wrench to tighten the bolt to the specified angle.

j. After the installation, check that the section shown "a" is flush with each other by touching the surface.



k. Remove the connecting rod and big end bearings.

l. Measure the compressed Plastigauge® width on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

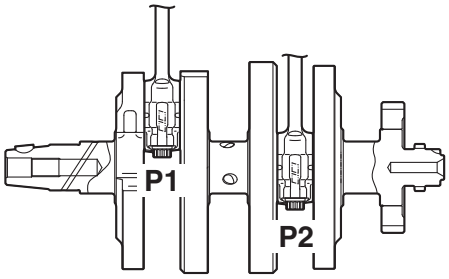


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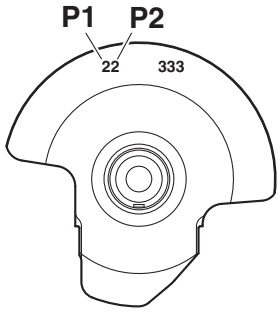
2. Select:
   • Big end bearings (P_1–P_2)

TIP

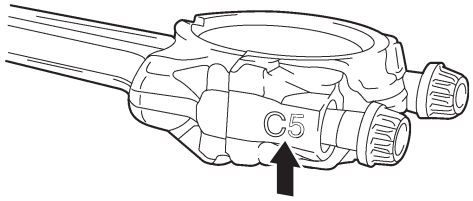
- The numbers “A” stamped into the crankshaft web and the numbers “B” on the connecting rods are used to determine the replacement big end bearings sizes.
- “P_1”–“P_2” refer to the bearings shown in the crankshaft illustration.



A



B



For example, if the connecting rod “P_1” and the crankshaft web “P_1” numbers are “5” and “2” respectively, then the bearing size for “P_1” is:

“P_1” (connecting rod)– “P_1” (crankshaft) = 5 – 2 = 3 (brown)

Bearing color code
1. Blue 2. Black 3. Brown 4. Green

EAS30751

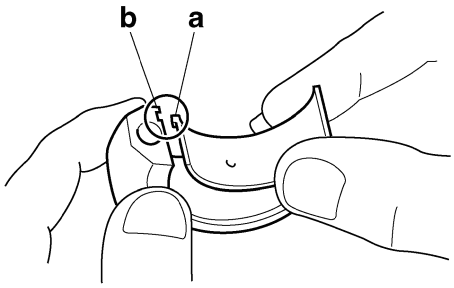
INSTALLING THE CONNECTING ROD AND PISTON

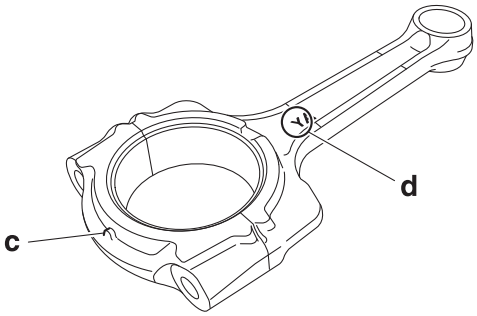
The following procedure applies to all of the connecting rods and pistons.

1. Install:
   • Big end bearings
   • Connecting rod cap
   (onto the connecting rod)

TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.





2. Tighten:
   • Connecting rod bolts New

ECA18390

NOTICE

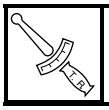
Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

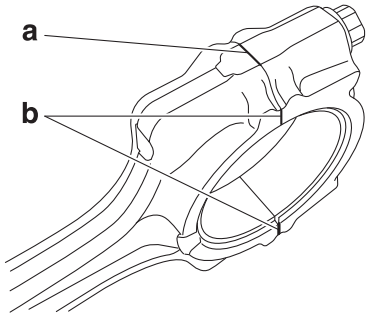
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a. Replace the connecting rod bolts with new ones.
b. Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
c. After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
d. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.

	**Connecting rod bolt** **30 Nm (3.0 m·kgf, 22 ft·lbf)**

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



a. Side machined face
b. Thrusting faces

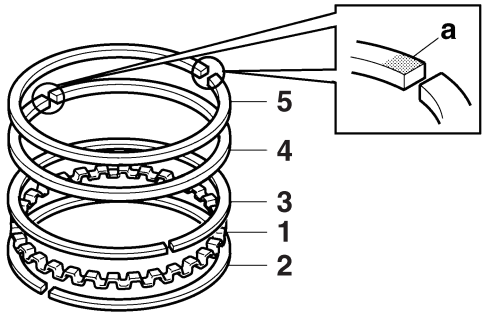
e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

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3. 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 “a” face up.

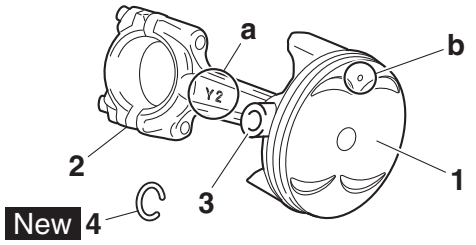


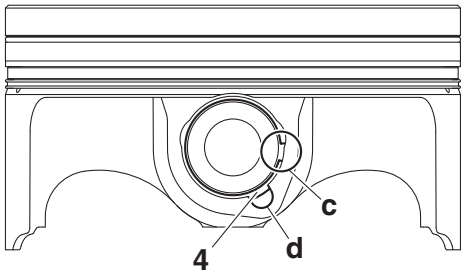
4. Install:
   • Piston “1”
     (onto the respective connecting rod “2”)
   • Piston pin “3”
   • Piston pin clips “4” New

TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod faces left when the punch mark “b” on the piston is pointing up as shown.
- When installing a piston pin clip, make sure that the clip ends “c” are positioned away from the cutout “d” in the piston as shown in the illustration.

• Reinstall each piston into its original cylinder.

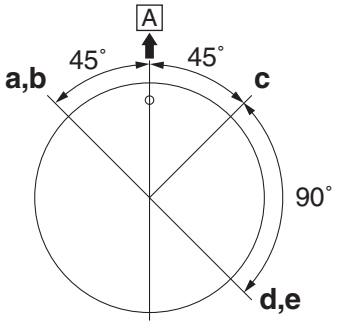




5. Lubricate:
   • Piston
   • Piston rings
   • Cylinder
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

6. Offset:
   • Piston ring end gaps



a. 2nd ring
b. Lower oil ring rail
c. Upper oil ring rail
d. Top ring
e. Oil ring expander
A. Exhaust side

7. Lubricate:
   • Crankshaft pin
   • Connecting rod big end bearing inner surface
   (with the recommended lubricant)

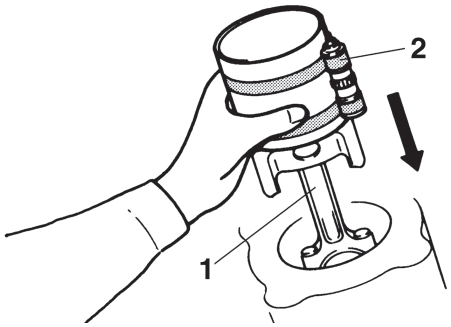
	Recommended lubricant **Engine oil**

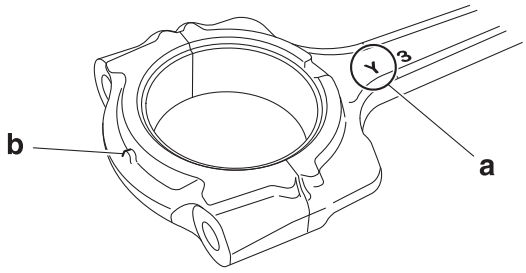
8. Install:
   • Connecting rod assemblies “1”
   (into the cylinder and onto the crankshaft pin)
   • Connecting rod caps
   (onto the connecting rod)

TIP

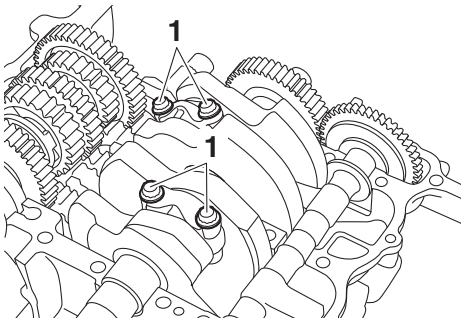
- While compressing the piston ring with piston ring compressor “2”, install the connecting rod assembly into the cylinder with the other hand.
- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection “b” on the connecting rod cap faces the same direction as the “Y” mark “a” on the connecting rod.
- Apply Molybdenum disulfide oil to the threads and seats of the connecting rod bolt.

	Piston ring compressor **90890-05158** **Piston ring compressor** **YM-08037**





9. Tighten:
   • Connecting rod bolts “1”



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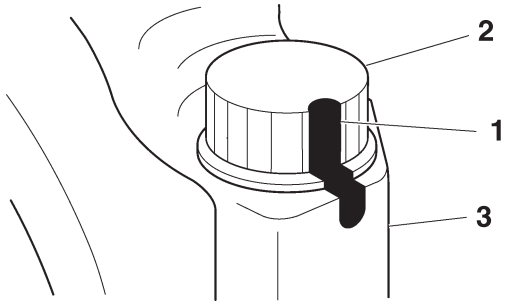
TIP

Tighten the connecting rod bolts using the following procedure.

a. Tighten the connecting rod bolts with a torque wrench.

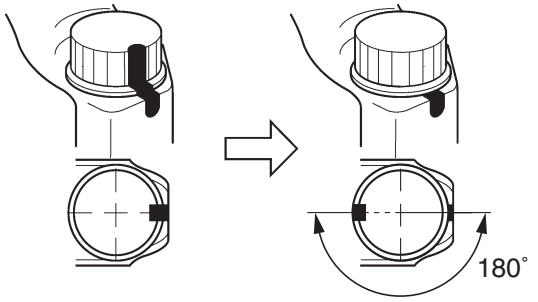
	Connecting rod bolt (1st) 20 Nm (2.0 m·kgf, 14 ft·lbf)

b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



c. Tighten the connecting rod bolts further to reach the specified angle 175–185°.

	Connecting rod bolt (final) Specified angle 180°



EWA16610

⚠ WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

ECA20890

NOTICE

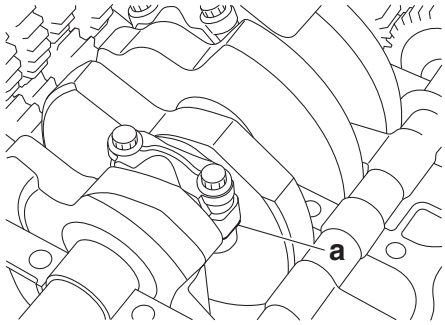
Do not use a torque wrench to tighten the bolt to the specified angle.

d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA17120

⚠ WARNING

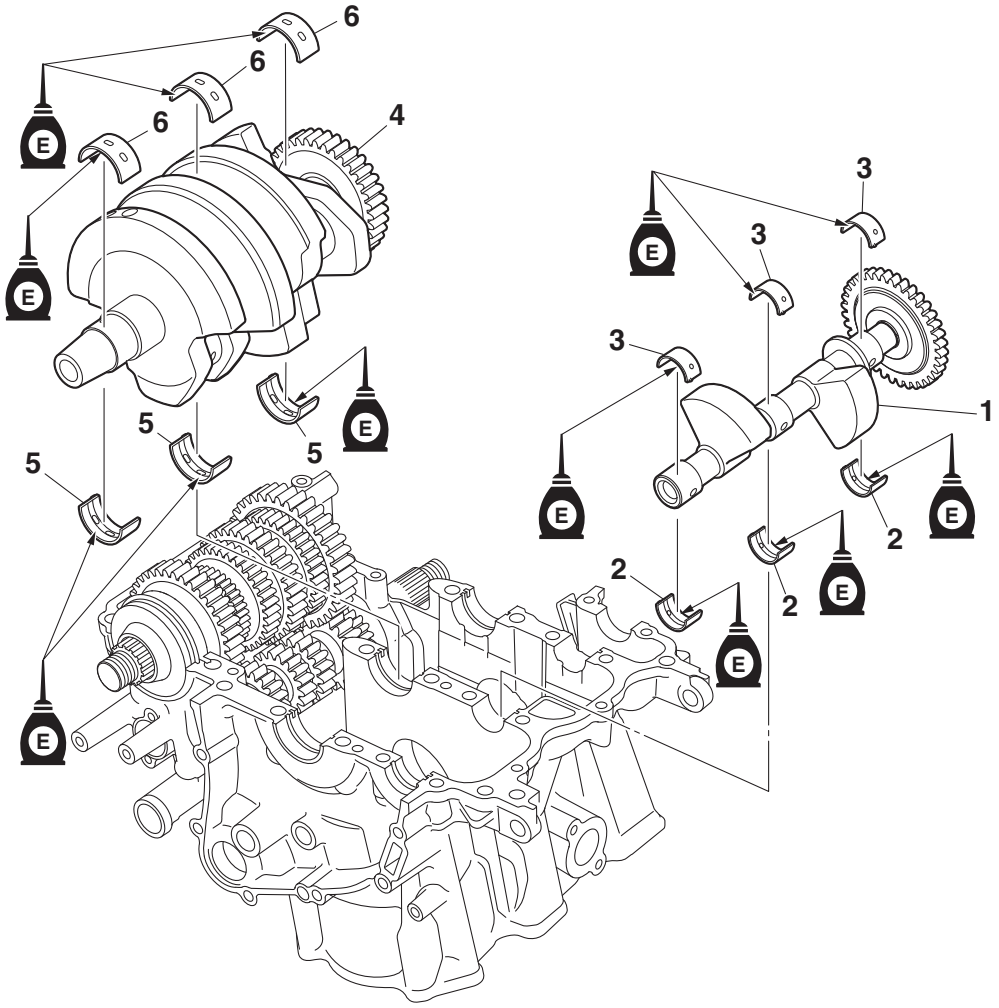
If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.



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EAS20178
CRANKSHAFT AND BALANCER SHAFT

Removing the crankshaft and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Refer to "CRANKCASE" on page 5-67.
	Connecting rod		Refer to "CONNECTING RODS AND PISTONS" on page 5-73.
1	Balancer shaft assembly	1	
2	Balancer shaft journal lower bearing	3	
3	Balancer shaft journal upper bearing	3	
4	Crankshaft assembly	1	
5	Crankshaft journal lower bearing	3	
6	Crankshaft journal upper bearing	3	

EAS31072
REMOVING THE BALANCER SHAFT JOURNAL BEARINGS
1. Remove:
   - Balancer shaft journal lower bearings (from the crankcase)
   - Balancer shaft journal upper bearings (from the cylinder)

TIP

Identify the position of each balancer shaft journal bearing so that it can be reinstalled in its original place.

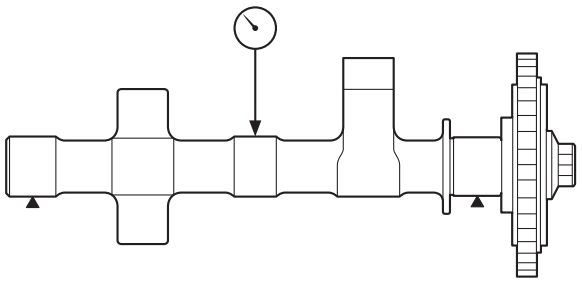
EAS31074
REMOVING THE CRANKSHAFT JOURNAL BEARINGS
1. Remove:
   - Crankshaft journal lower bearings (from the crankcase)
   - Crankshaft journal upper bearings (from the cylinder)

TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

EAS31142
CHECKING THE BALANCER SHAFT ASSEMBLY
1. Check:
   - Balancer driven gear
     Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
     Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.
2. Measure:
   - Balancer shaft runout
     Out of specification → Replace the balancer shaft assembly.

Balancer shaft runout limit
0.030 mm (0.0012 in)



3. Check:
   - Balancer shaft assembly
     Cracks/damage/wear → Replace the balancer shaft assembly and journal bearings.
     Dirt → Clean.
   - Bearings
     Damage/wear → Replace.
4. Measure:
   - Balancer shaft-journal-to-balancer shaft-journal-bearing clearance
     Out of specification → Replace the balancer shaft journal bearings.

Balancer shaft journal to balancer shaft bearing clearance
0.020–0.054 mm (0.0008–0.0021 in)

ECA18400
NOTICE

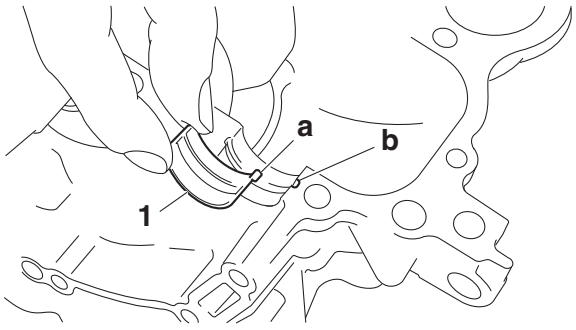
Do not interchange the balancer shaft journal bearings. To obtain the correct balancer shaft-journal-to-balancer shaft-journal-bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.

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a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcase and cylinder.
b. Install the balancer shaft journal upper bearings “1” and the balancer shaft assembly into the cylinder.

TIP

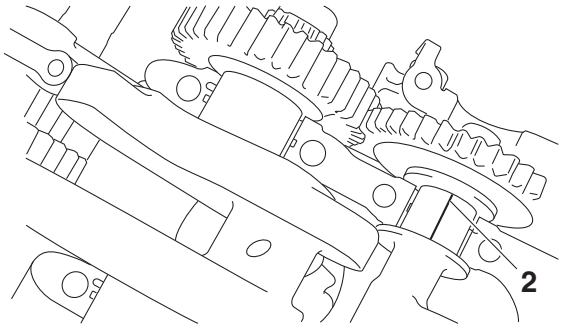
Align the projections “a” on the balancer shaft journal upper bearings with the notches “b” in the cylinder.



c. Put a piece of Plastigauge® “2” on each balancer shaft journal.

TIP

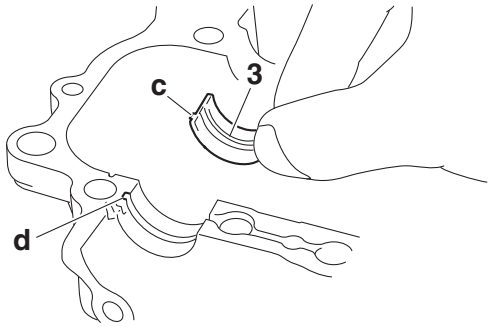
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



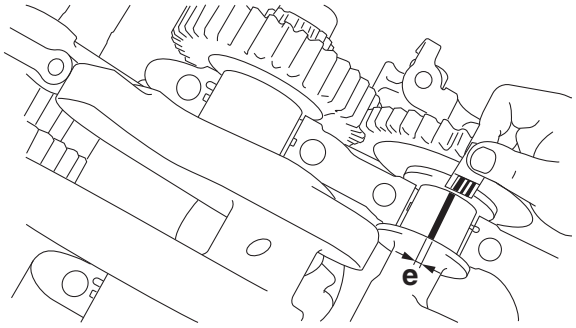
d. Install the balancer shaft journal lower bearings "3" into the crankcase and assemble the crankcase and cylinder.

TIP

- Align the projections "c" of the balancer shaft journal lower bearings with the notches "d" in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



e. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-67.
f. Remove the crankcase and the balancer shaft journal lower bearings.
g. Measure the compressed Plastigauge® width "e" on each balancer shaft journal. If the balancer shaft-journal-to-balancer shaft-journal-bearing clearance is out of specification, select replacement balancer shaft journal bearings.

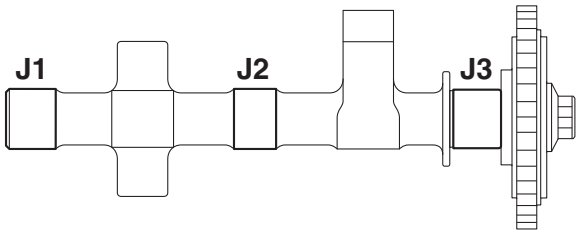


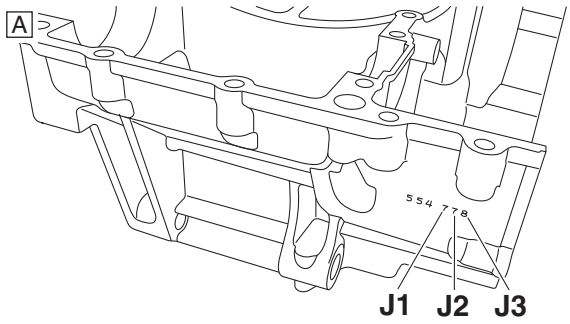
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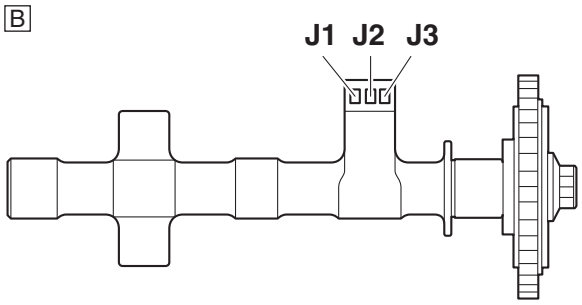
5. Select:
   - Balancer shaft journal bearings (J_1–J_3)

TIP

- The numbers "A" stamped into the crankcase and the numbers "B" stamped into the balancer shaft web are used to determine the replacement balancer shaft journal bearing sizes.
- J_1–J_3 refer to the bearings shown in the crankcase and balancer shaft web illustration.
- If J_1–J_3 are the same, use the same size for all of the bearings.







For example, if the crankcase J_1 and balancer shaft web J_1 numbers are 6 and 5 respectively, then the bearing size for J_1 is:

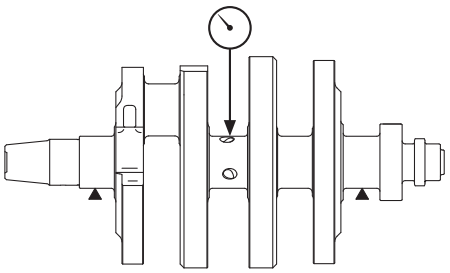
J_1 (crankcase) – J_1 (balancer shaft web) = 6 – 5 = 1 (blue)

Bearing color code
1.Blue 2.Black 3.Brown 4.Green 5. Yellow

EAS31075
CHECKING THE CRANKSHAFT

1. Check:
   • Balancer drive gear
   Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
   Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.
2. Measure:
   • Crankshaft runout
   Out of specification → Replace the crankshaft.

Runout limit
0.030 mm (0.0012 in)



3. Check:
   • Crankshaft journal surfaces
   • Crankshaft pin surfaces
   • Bearing surfaces
   Scratches/wear → Replace the crankshaft.
4. Measure:
   • Crankshaft-journal-to-crankshaft-journal-bearing clearance
   Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance
0.018–0.042 mm (0.0007–0.0017 in)

ECA13920
NOTICE

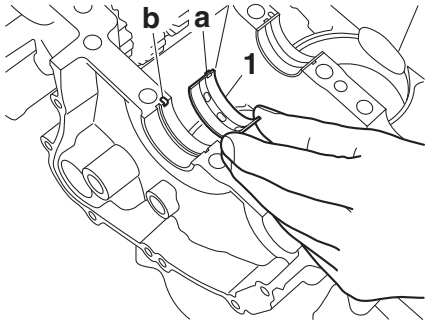
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

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a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the cylinder and crankcase.
b. Install the crankshaft journal upper bearings “1” and the crankshaft into the cylinder.

TIP

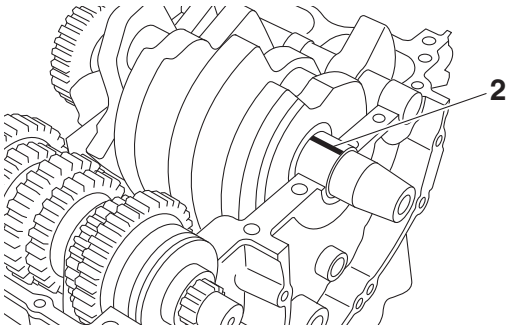
Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the cylinder.



c. Put a piece of Plastigauge® “2” on each crankshaft journal.

TIP

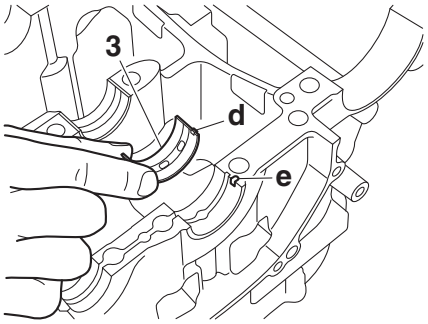
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



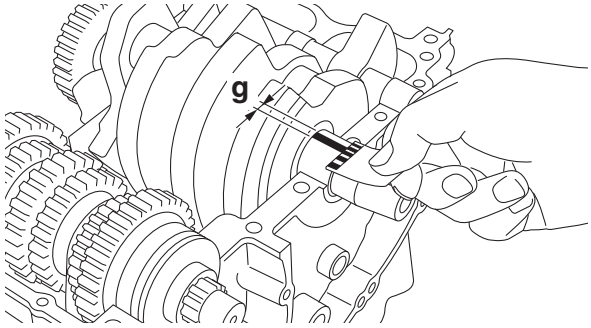
d. Install the crankshaft journal lower bearings “3” into the crankcase and assemble the crankcase and cylinder.

TIP

- Align the projections “d” of the crankshaft journal lower bearings with the notches “e” in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



e. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-67.
f. Remove the crankcase and the crankshaft journal lower bearings.
g. Measure the compressed Plastigauge® width "g" on each crankshaft journal.
If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

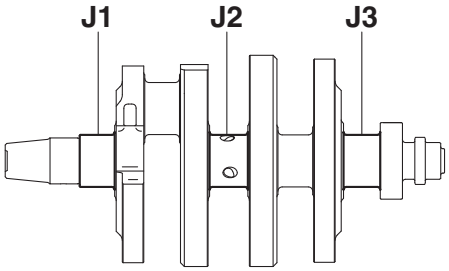


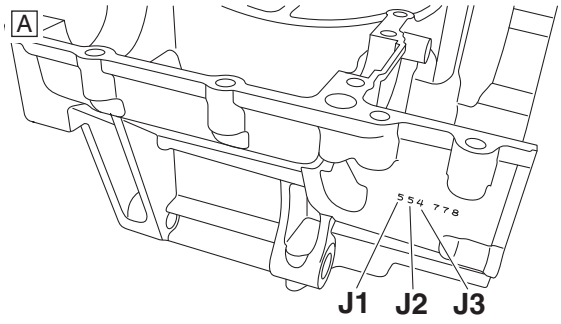
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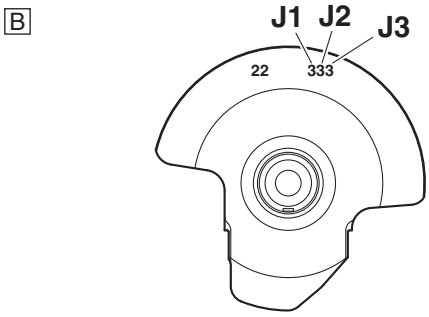
5. Select:
• Crankshaft journal bearings (J_1–J_3)

TIP

- The numbers "A" stamped into the crankcase and the numbers "B" stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J_1–J_3 refer to the bearings shown in the crankcase and crankshaft web illustration.
- If J_1–J_3 are the same, use the same size for all of the bearings.







For example, if the crankcase J_1 and crankshaft web J_1 numbers are 5 and 3 respectively, then the bearing size for J_1 is:

J_1 (crankcase) – J_1 (crankshaft web) –2
= 5 – 3 – 2
= 0 (white–pink)

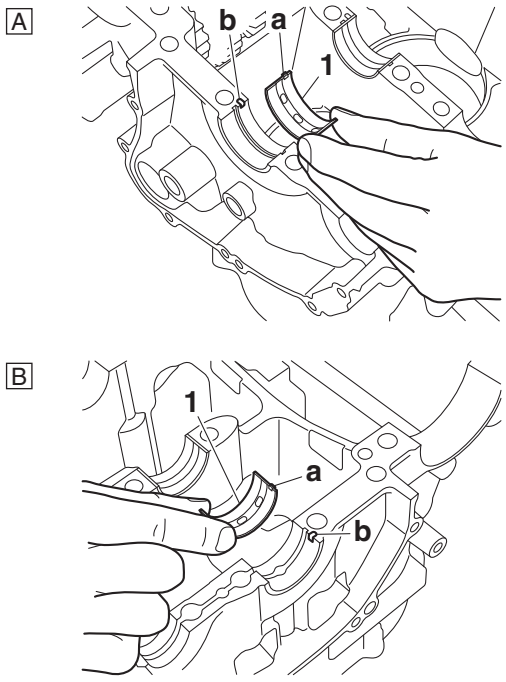
Bearing color code
-1.Violet-Pink 0.White-Pink
1.Blue-Pink 2.Black-Pink
3.Brown-Pink

EAS31077
INSTALLING THE CRANKSHAFT

1. Install:
• Crankshaft journal upper bearings (into the upper crankcase)
• Crankshaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each crankshaft journal bearing in its original place.



A. Cylinder
B. Crankcase

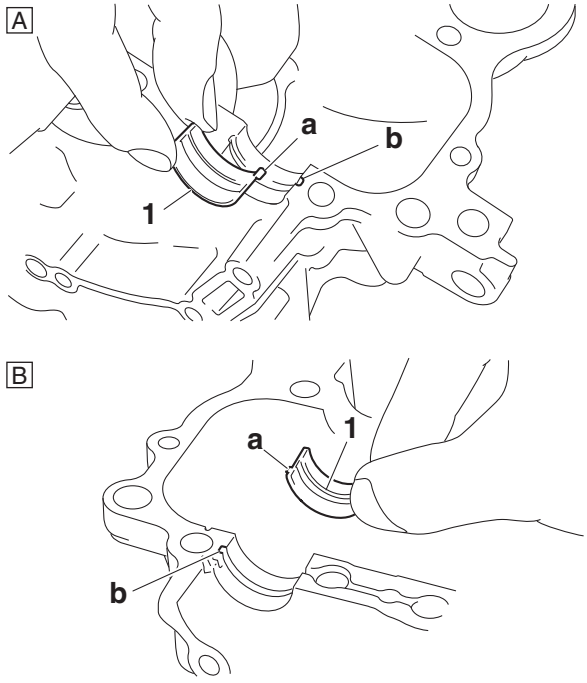
EAS31078

INSTALLING THE BALANCER SHAFT ASSEMBLY

1. Install:
   - Balancer shaft journal upper bearings (into the upper crankcase)
   - Balancer shaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections “a” on the balancer shaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each balancer shaft journal bearing in its original place.

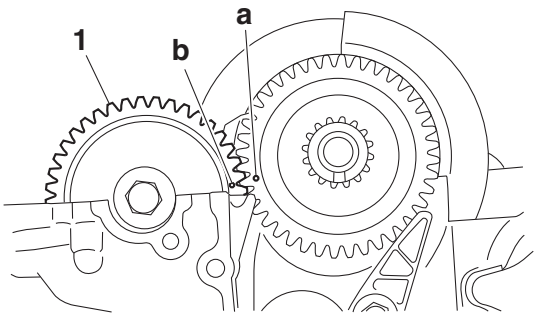


A. Upper crankcase
B. Lower crankcase

2. Install:
   - Balancer shaft “1”

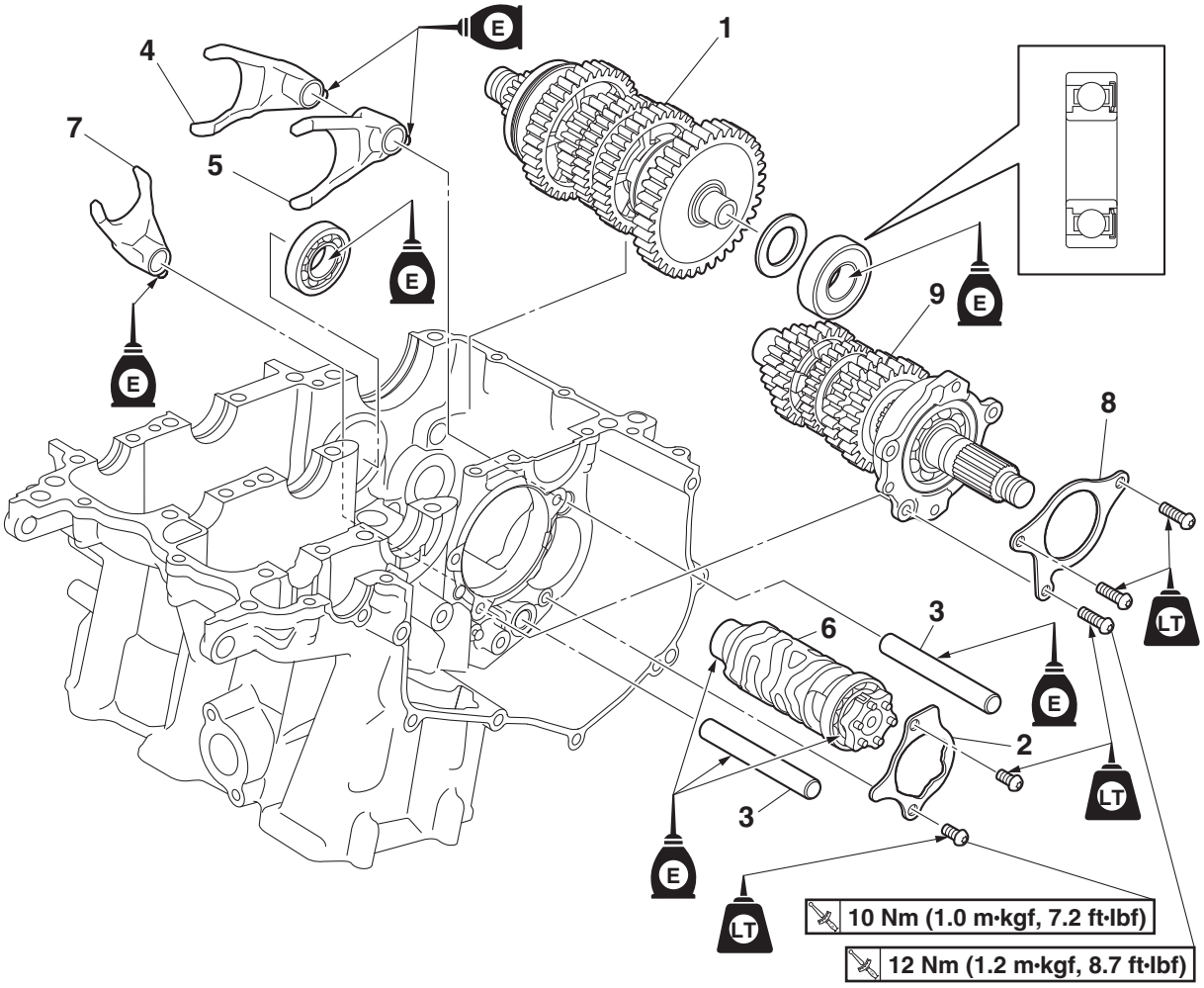
TIP

Align the punch mark “a” in the balancer drive gear with the punch mark “b” in the balancer driven gear.



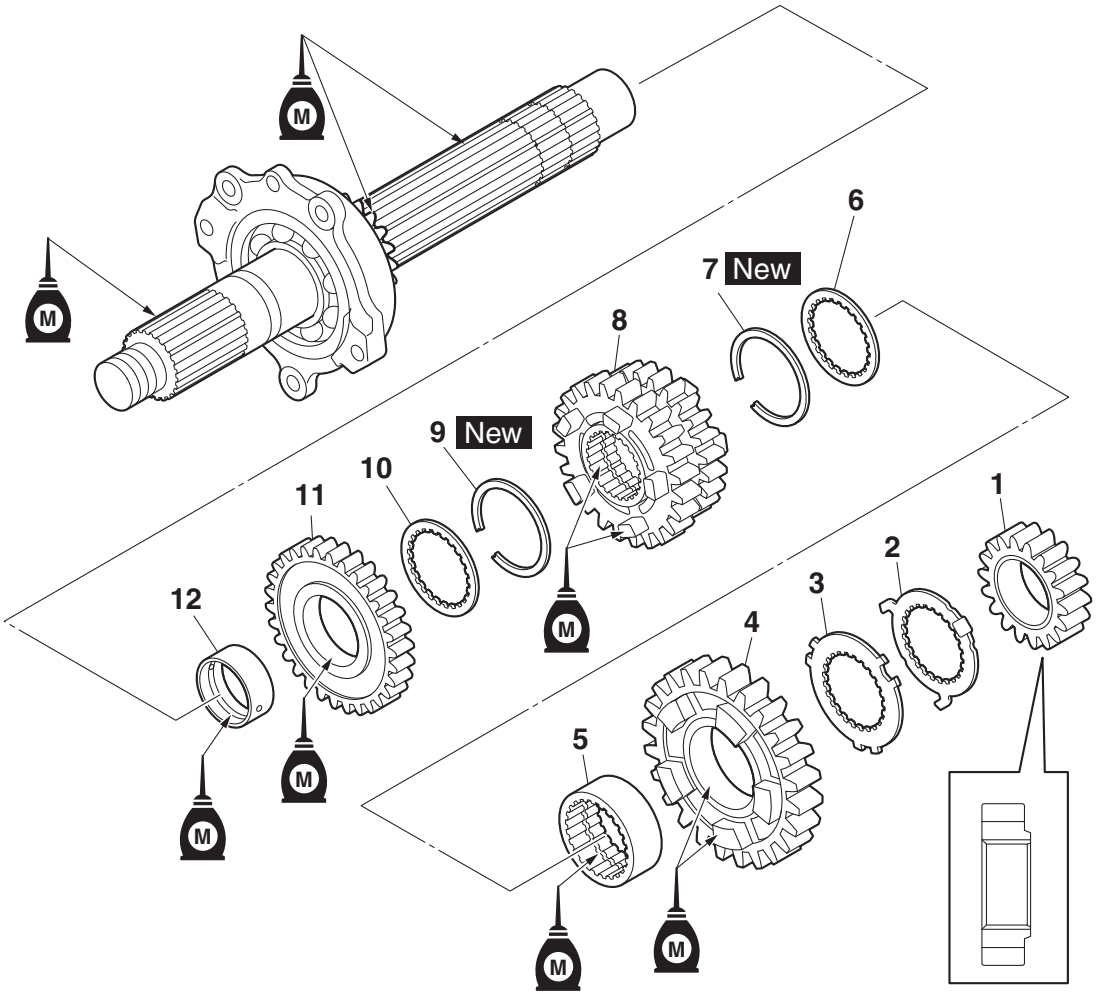
EAS20062
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



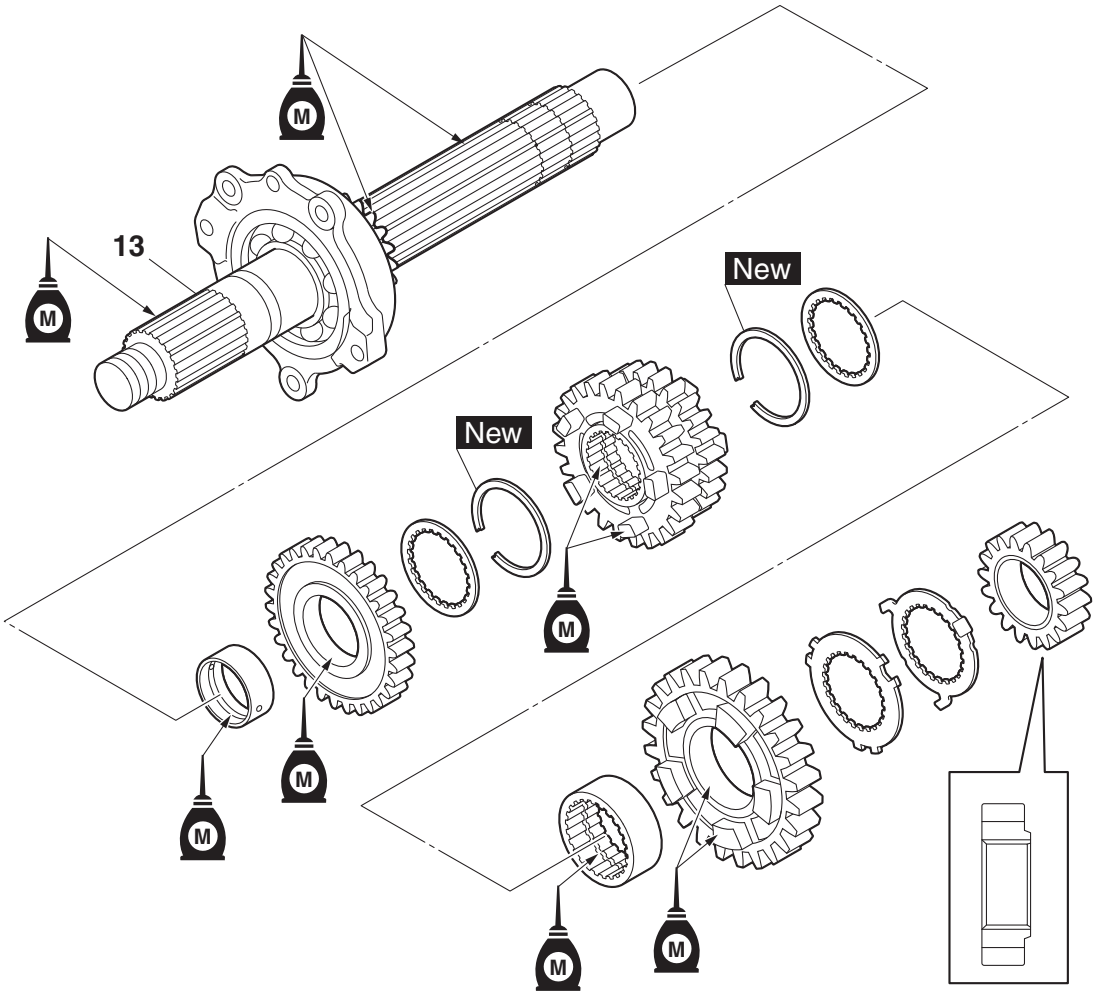
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Refer to "CRANKCASE" on page 5-67.
1	Drive axle assembly	1	
2	Shift drum retainer	1	
3	Shift fork guide bar	2	
4	Shift fork "L"	1	
5	Shift fork "R"	1	
6	Shift drum assembly	1	
7	Shift fork "C"	1	
8	Bearing retainer	1	
9	Main axle assembly	1	

Disassembling the main axle assembly



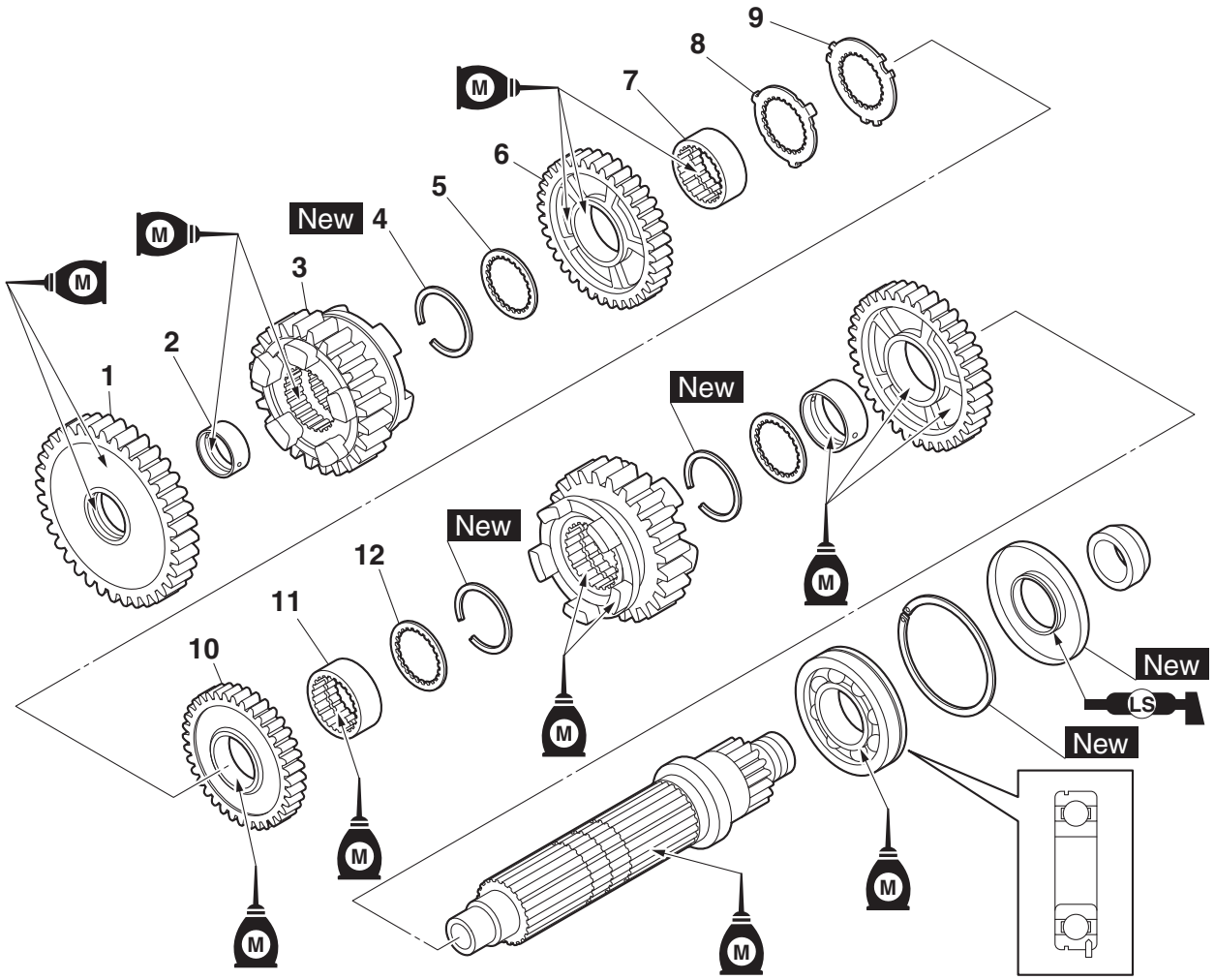
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	

Disassembling the main axle assembly



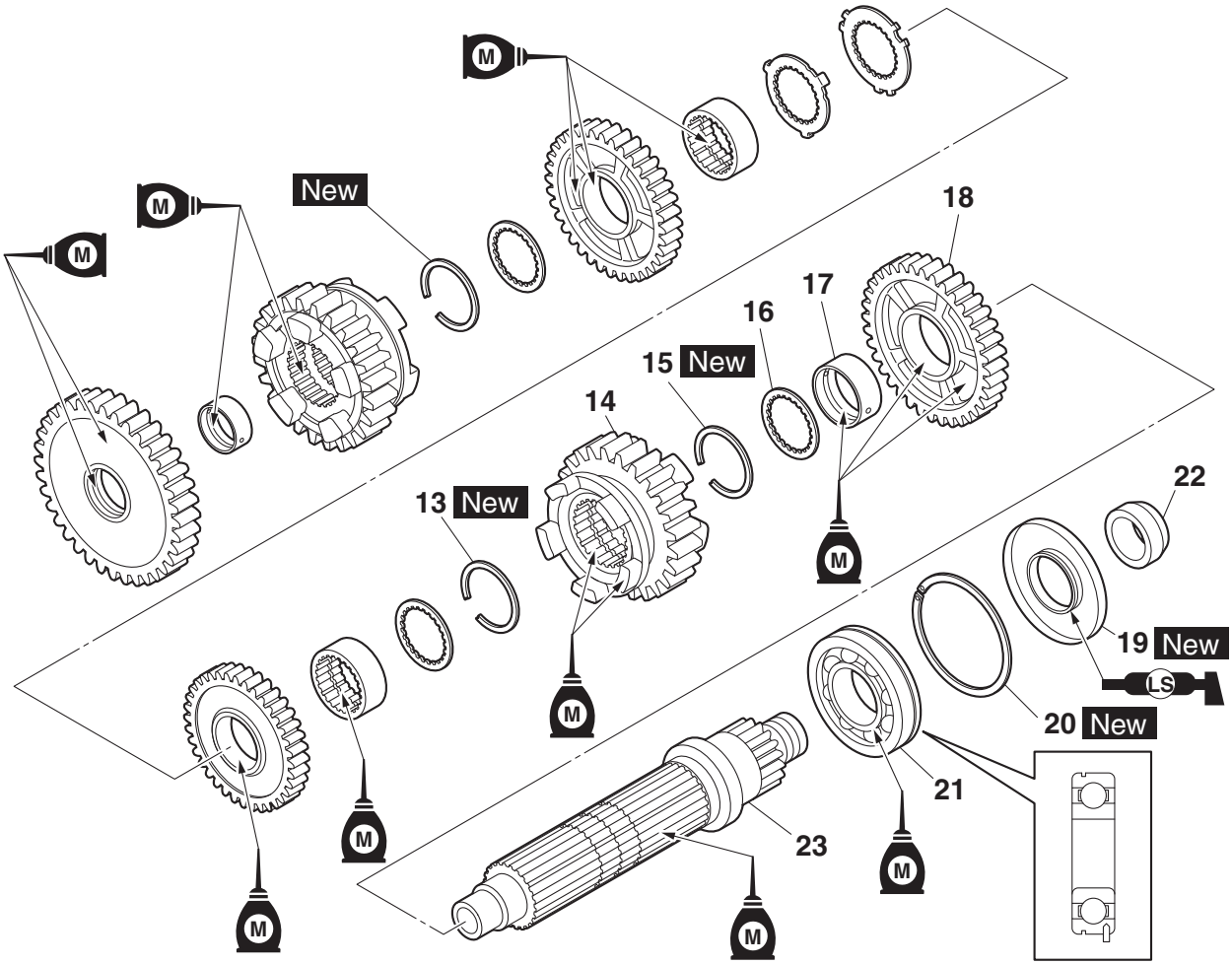
Order	Job/Parts to remove	Q'ty	Remarks
13	Main axle	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	1st wheel gear	1	
2	Collar	1	
3	5th wheel gear	1	
4	Circlip	1	
5	Washer	1	
6	3rd wheel gear	1	
7	Collar	1	
8	Toothed lock washer	1	
9	Toothed lock washer retainer	1	
10	4th wheel gear	1	
11	Collar	1	
12	Washer	1	

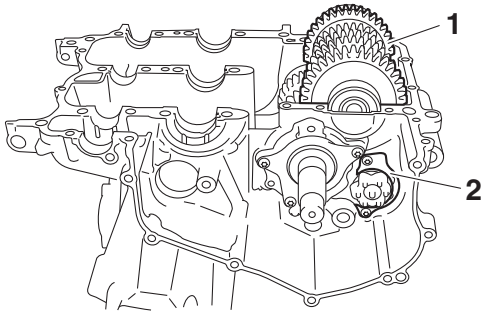
Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
13	Circlip	1	
14	6th wheel gear	1	
15	Circlip	1	
16	Washer	1	
17	Collar	1	
18	2nd wheel gear	1	
19	Oil seal	1	
20	Circlip	1	
21	Bearing	1	
22	Collar	1	
23	Drive axle	1	

EAS30430
REMOVING THE TRANSMISSION

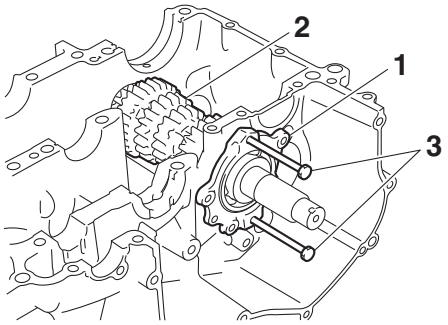
1. Remove:
   - Drive axle assembly “1”
   - Shift drum retainer “2”
   - Shift fork guide bars
   - Shift fork “L” and “R”
   - Shift drum assembly
   - Shift fork “C”



2. Remove:
   - Bearing retainer
   - Main axle assembly bearing housing “1”
   - Main axle assembly “2”

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a. Insert two bolts “3” of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



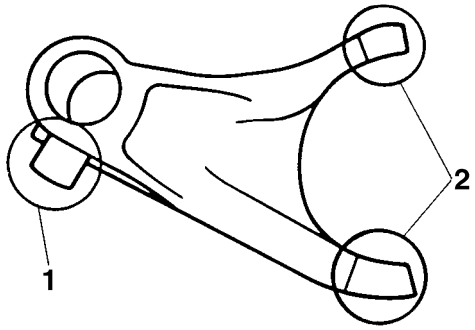
b. Tighten the bolts until they contact the crankcase surface.
c. Continue tightening the bolts until the main axle assembly comes free from the cylinder.

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EAS30431
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.

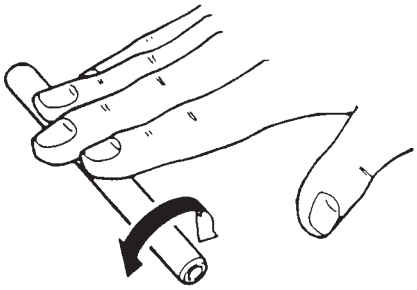


2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA12840

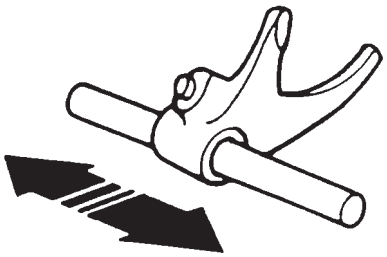
⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



319-010

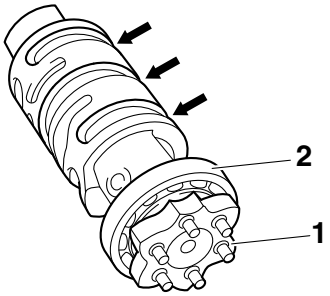
3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



319-011

EAS30432
CHECKING THE SHIFT DRUM ASSEMBLY

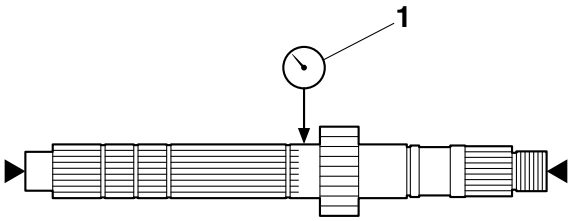
1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment “1”
     Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing “2”
     Damage/pitting → Replace the shift drum assembly.



EAS30433
CHECKING THE TRANSMISSION

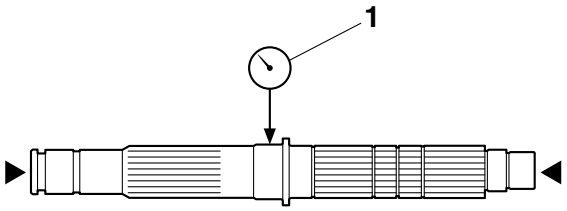
1. Measure:
   • Main axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the main axle.

	Main axle runout limit **0.08 mm (0.0032 in)**

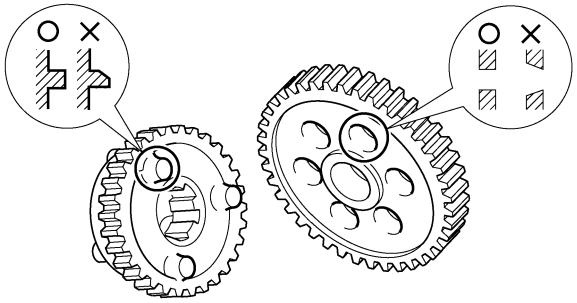


2. Measure:
   • Drive axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the drive axle.

	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).



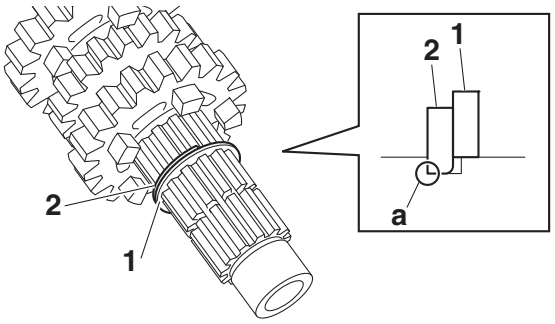
4. Check:
   • Transmission gear engagement
   (each pinion gear to its respective wheel gear)
   Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   • Transmission gear movement
   Rough movement → Replace the defective part(s).
6. Check:
   • Circlips
   Bends/damage/looseness → Replace.

EAS30435
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

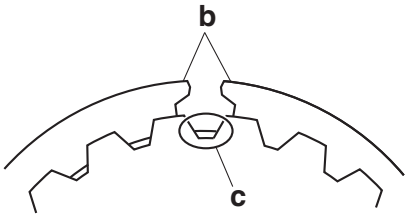
1. Install:
   • Toothed washer “1”
   • Circlip “2” New

TIP

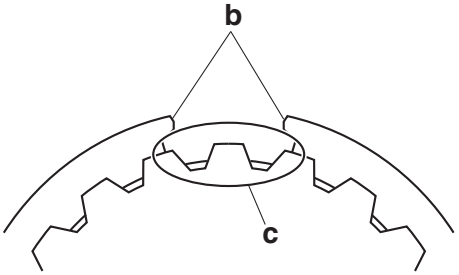
- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends “b” of the circlip with a groove “c” in the axle.



A



B

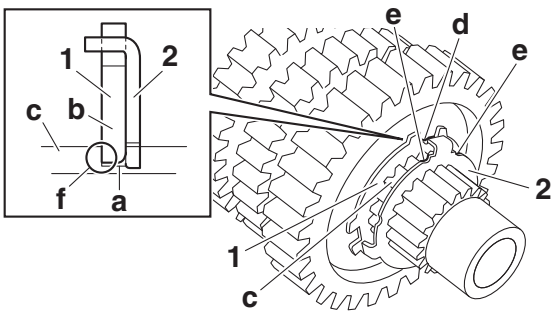


A. Main axle
B. Drive axle

2. Install:
   • Toothed lock washer retainer “1”
   • Toothed lock washer “2”

TIP

- With the toothed lock washer retainer in the groove “a” in the axle, align the projection “b” on the retainer with an axle spline “c”, and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks “e” with the alignment mark “d” on the retainer.
- Be sure the toothed lock washer retainer sharp-edged corner “f” is positioned opposite side to the toothed lock washer.



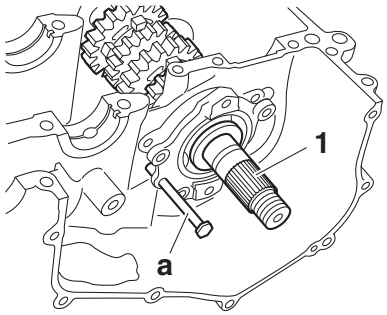
EAS30438
INSTALLING THE TRANSMISSION

1. Install:
   • Main axle assembly “1”
   • Bearing retainer

Bearing retainer bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®

TIP

Use a suitable pin “a” to position the bearing housing, and then install the housing until it contacts the cylinder.



2. Install:
   • Shift fork “C”
   • Shift drum assembly
   • Shift fork guide bar

TIP

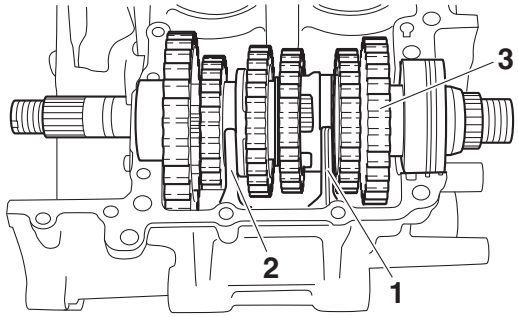
- The embossed marks on the shift forks should face towards the right side of the engine.
- Install shift fork “C” into the groove in the 3rd pinion gear on the main axle.

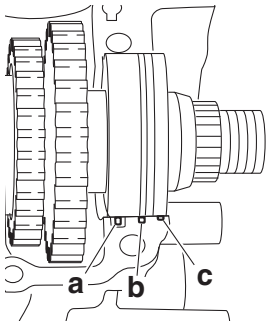
3. Install:
   • Shift fork “L” “1”
   • Shift fork “R” “2”
   • Shift fork guide bar
   • Shift drum retainer
   • Drive axle assembly “3”

Shift drum retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP

- Install shift fork “L” into the groove in the 6th wheel gear and shift fork “R” into the groove in the 5th wheel gear on the drive axle.
- Make sure that the projection “a” on the drive axle assembly is inserted into the slot in the cylinder.
- Make sure that the drive axle bearing circlip “b” and flange “c” of the oil seal are inserted into the grooves in the cylinder.





4. Check:
   • Transmission
     Rough movement → Repair.

TIP

Oil each gear, shaft, and bearing thoroughly.

COOLING SYSTEM

RADIATOR 6-1
CHECKING THE RADIATOR 6-3
INSTALLING THE RADIATOR 6-3

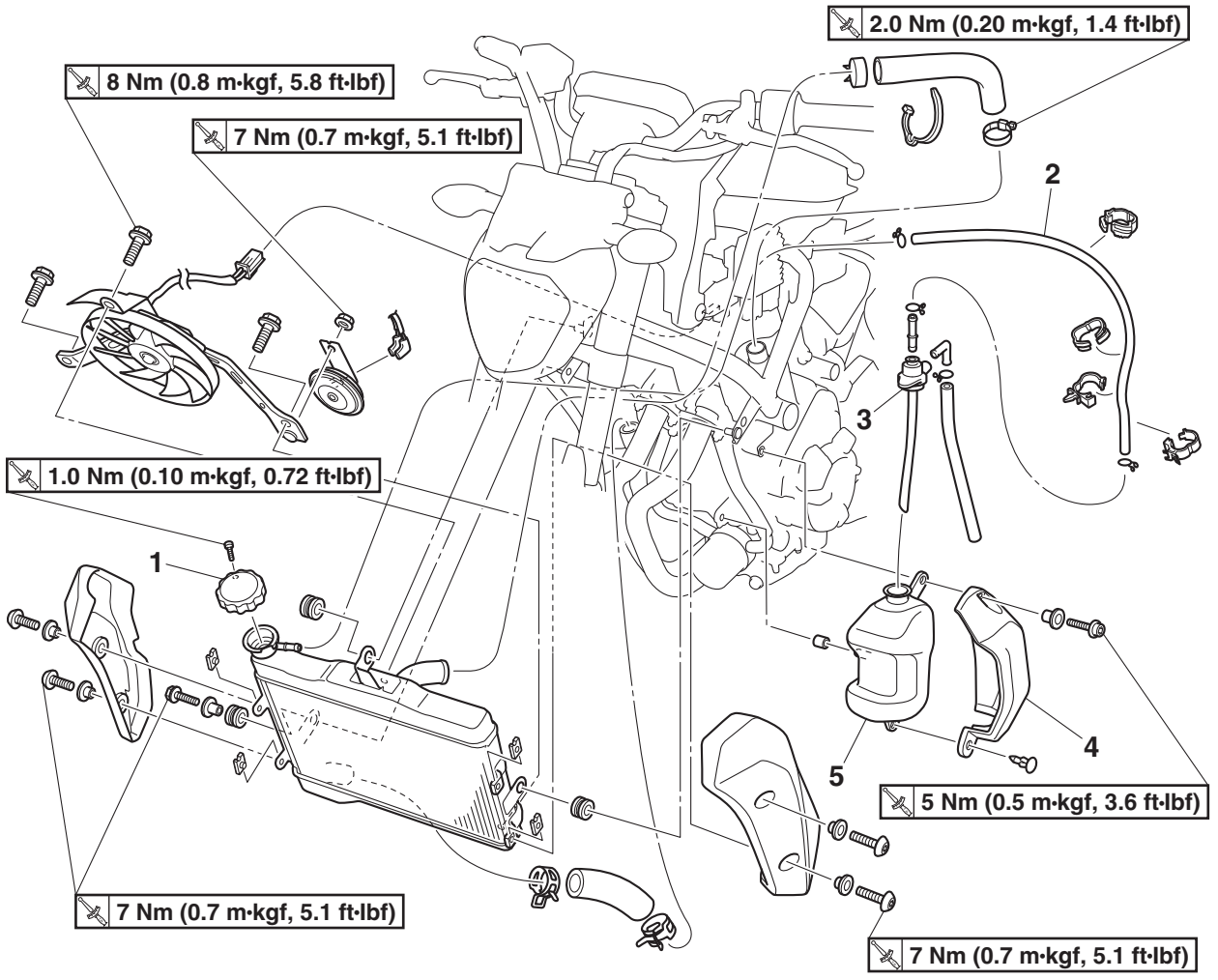
OIL COOLER 6-4
CHECKING THE OIL COOLER 6-6
CHECKING THE WATER JACKET JOINT 6-6
INSTALLING THE OIL COOLER 6-6

THERMOSTAT 6-7
CHECKING THE THERMOSTAT 6-8
INSTALLING THE THERMOSTAT 6-8

WATER PUMP 6-9
DISASSEMBLING THE WATER PUMP 6-11
CHECKING THE WATER PUMP 6-11
ASSEMBLING THE WATER PUMP 6-11
INSTALLING THE CLUTCH COVER 6-13

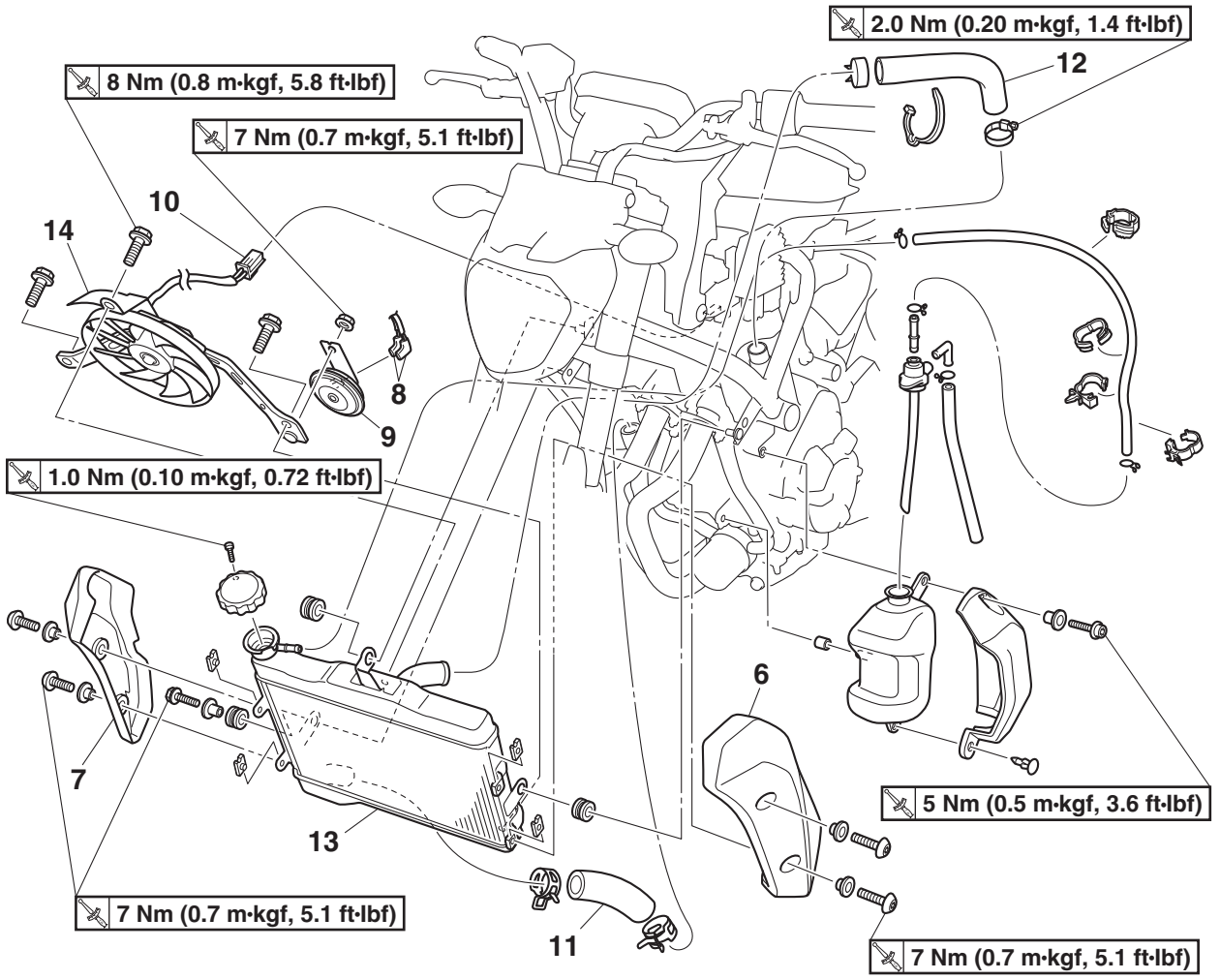
EAS20063
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
	Fuel tank top cover/Fuel tank side cover (left)		Refer to "GENERAL CHASSIS (4)" on page 4-11.
1	Radiator cap	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir cap	1	
4	Coolant reservoir cover	1	
5	Coolant reservoir	1	

Removing the radiator



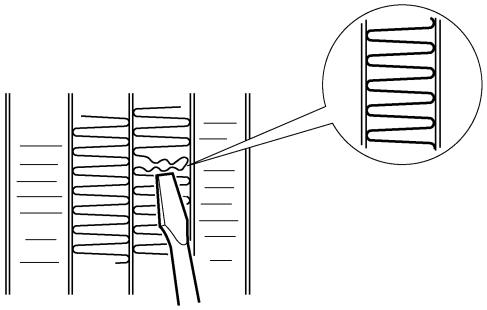
Order	Job/Parts to remove	Q'ty	Remarks
6	Radiator side cover (left)	1	
7	Radiator side cover (right)	1	
8	Horn connector	2	Disconnect.
9	Horn	1	
10	Radiator fan motor coupler	1	Disconnect.
11	Radiator outlet hose	1	
12	Radiator inlet hose	1	
13	Radiator	1	
14	Radiator fan	1	

EAS30439
CHECKING THE RADIATOR

1. Check:
   - Radiator fins
     Obstruction → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



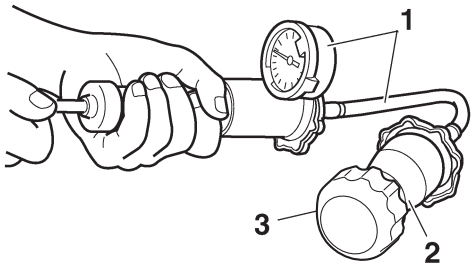
2. Check:
   - Radiator hoses
     Cracks/damage → Replace.
   - Radiator pipes
     Cracks/damage → Replace the radiator.
3. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure
108.0–137.4 kPa (1.08–1.37 kgf/cm², 15.7–19.9 psi)

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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



b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

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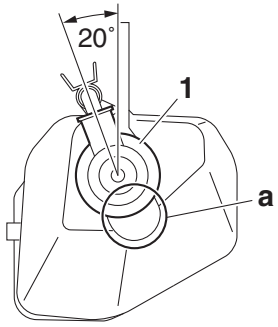
4. Check:
   - Radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to "COOLING SYSTEM" on page 8-29.

EAS30440
INSTALLING THE RADIATOR

1. Install:
   - Coolant reservoir cap "1"

TIP

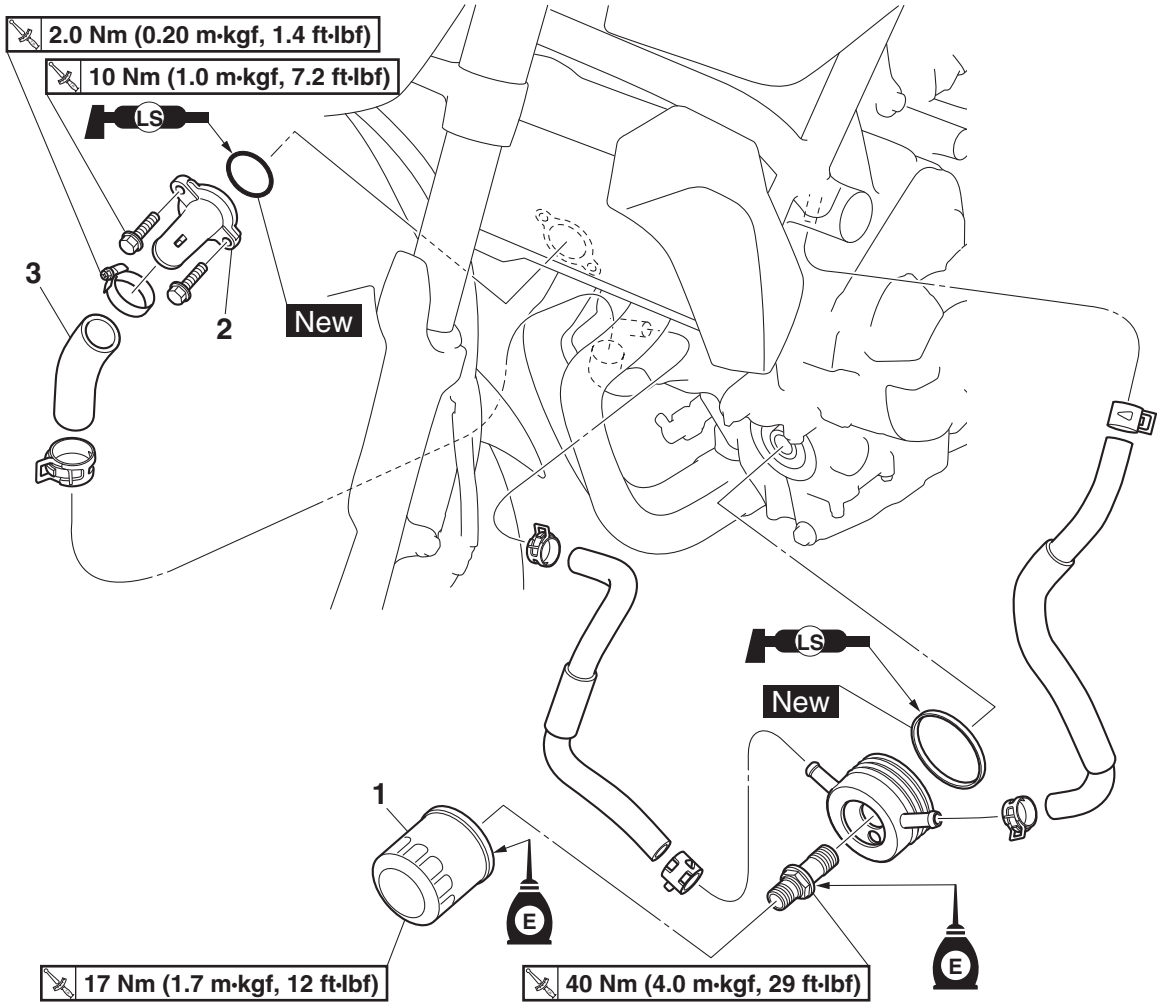
Point the tab "a" on the coolant reservoir cap in the direction shown in the illustration.



2. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-24.
3. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
4. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR" on page 6-3.

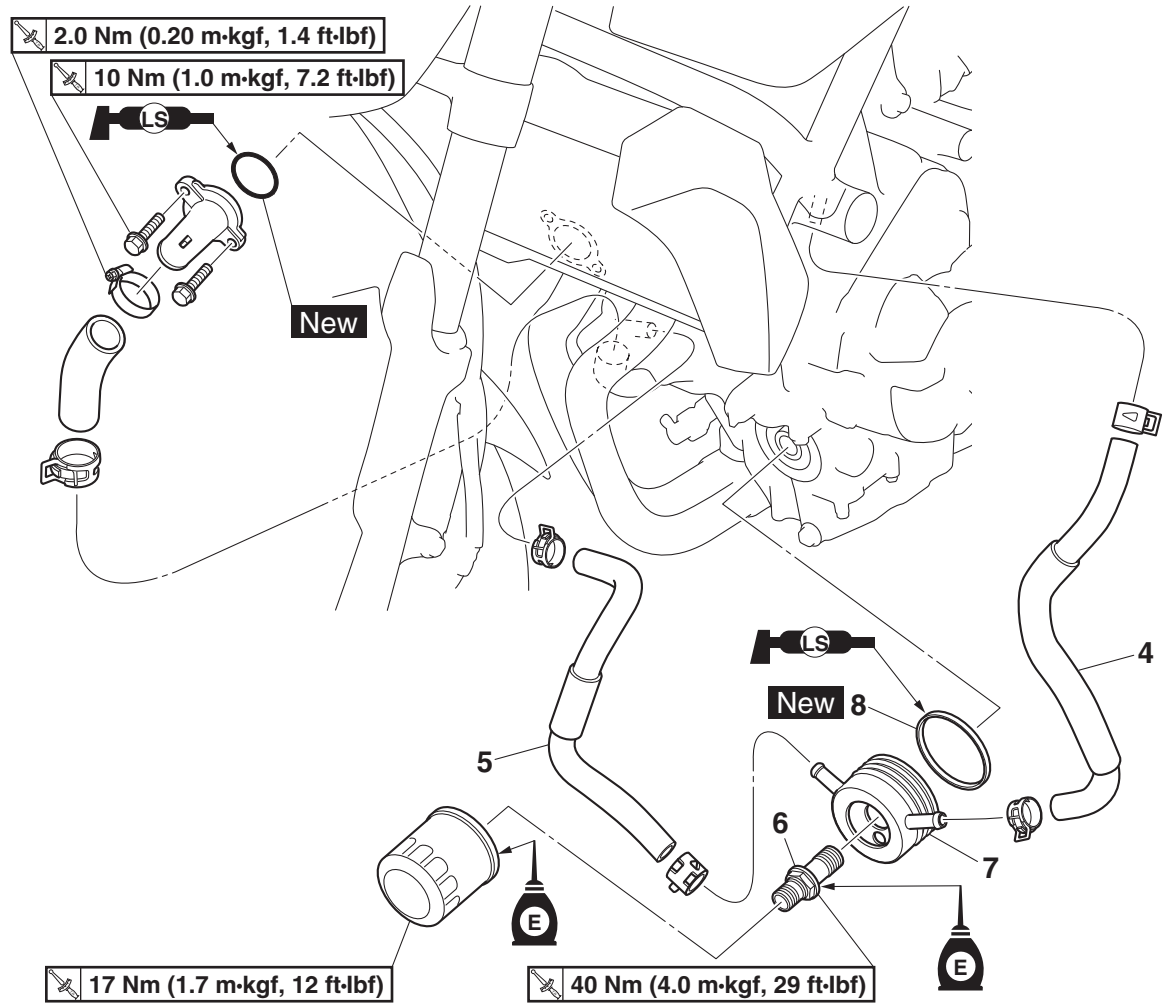
EAS20064
OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
	Coolant reservoir		Refer to "RADIATOR" on page 6-1.
1	Oil filter cartridge	1	
2	Water jacket joint	1	
3	Water jacket joint inlet hose	1	

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
4	Oil cooler inlet hose	1	
5	Oil cooler outlet hose	1	
6	Oil filter cartridge union bolt	1	
7	Oil cooler	1	
8	Gasket	1	

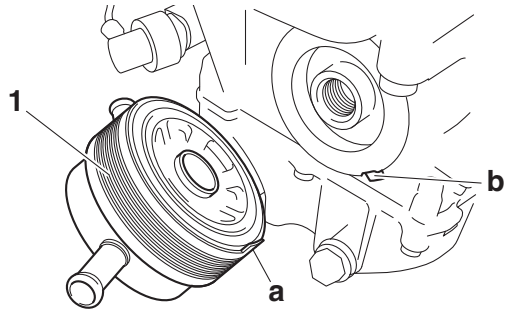
EAS30441
CHECKING THE OIL COOLER
1. Check:
   • Oil cooler
   Cracks/damage → Replace.
2. Check:
   • Oil cooler inlet hose
   • Oil cooler outlet hose
   • Water pump outlet hose
   Cracks/damage → Replace.

EAS31123
CHECKING THE WATER JACKET JOINT
1. Check:
   • Water jacket joint
   Mineral deposits/rust → Eliminate.

EAS30442
INSTALLING THE OIL COOLER
1. Clean:
   • Mating surfaces of the oil cooler and the crankcase
   (with a cloth dampened with lacquer thinner)
2. Install:
   • Gasket New
   • Oil cooler "1"
   • Oil filter cartridge union bolt

	**Oil filter cartridge union bolt** **40 Nm (4.0 m·kgf, 29 ft·lbf)**

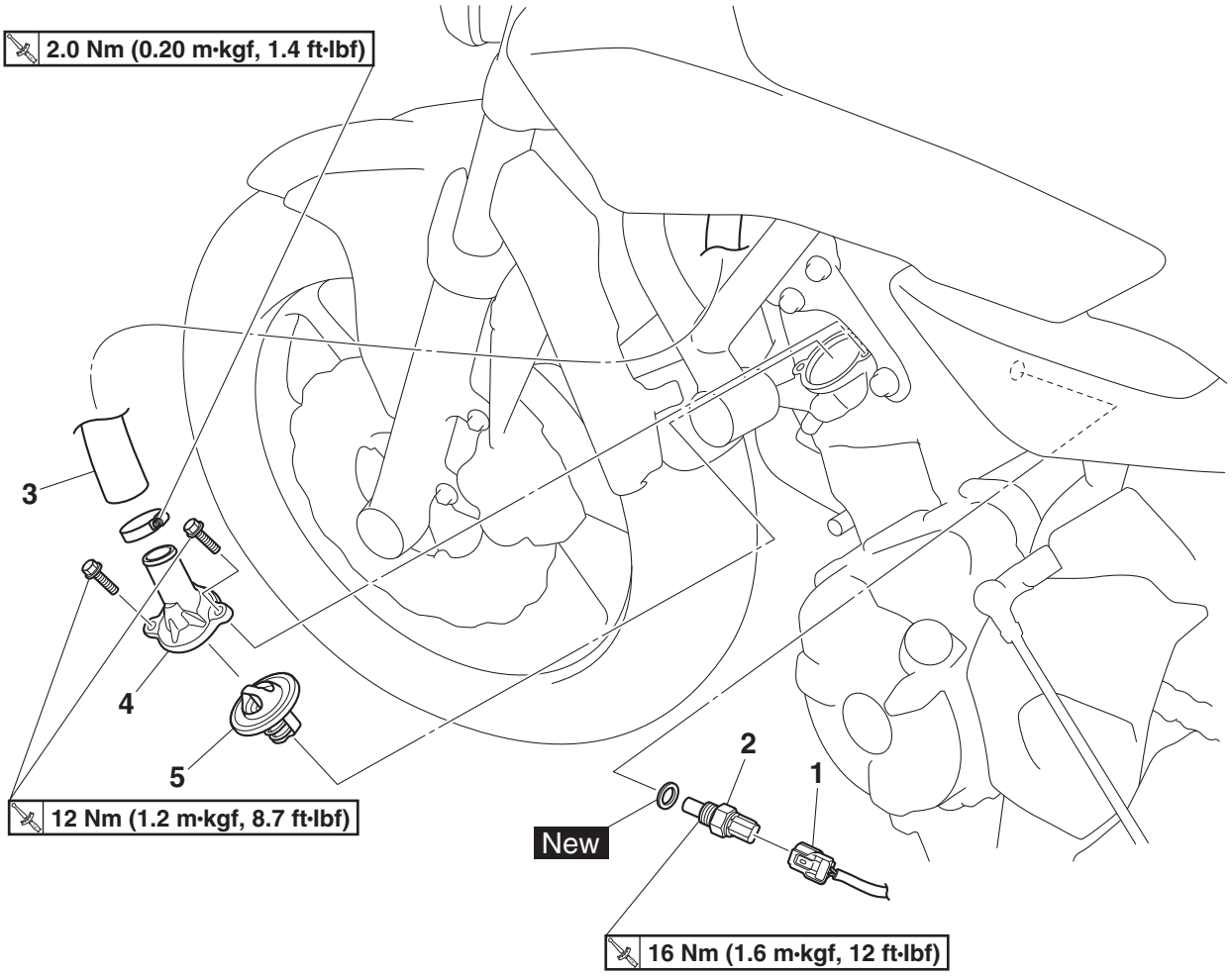
TIP
- Before installing the oil cooler, apply engine oil lightly to the oil filter cartridge union bolt.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.



3. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to "CHANGING THE COOLANT" on page 3-24.
   • Crankcase
   (with the specified amount of the recommended engine oil)
   Refer to "CHANGING THE ENGINE OIL" on page 3-22.
4. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.
   Refer to "INSTALLING THE RADIATOR" on page 6-3.
5. Measure:
   • Radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to "CHECKING THE RADIATOR" on page 6-3.

EAS20065
THERMOSTAT

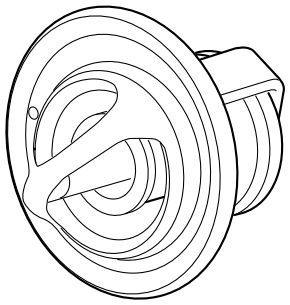
Removing the thermostat



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
1	Coolant temperature sensor coupler	1	Disconnect.
2	Coolant temperature sensor	1	
3	Radiator inlet hose	1	Disconnect.
4	Thermostat cover	1	
5	Thermostat	1	

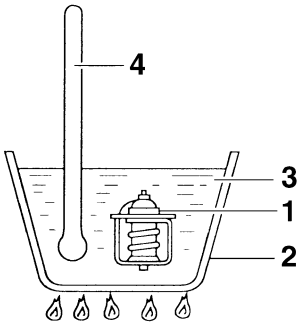
EAS30443
CHECKING THE THERMOSTAT

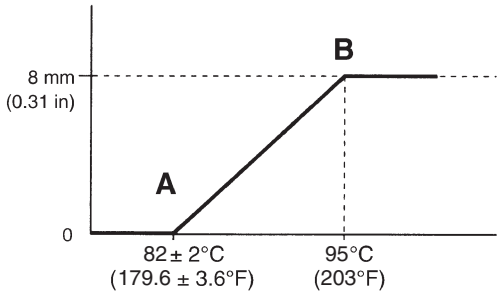
1. Check:
   • Thermostat
   Does not open at 80–84 °C (176–183.2 °F) → Replace.



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a. Suspend the thermostat “1” in a container “2” filled with water.
b. Slowly heat the water “3”.
c. Place a thermometer “4” in the water.
d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.





A. Fully closed
B. Fully open

TIP

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

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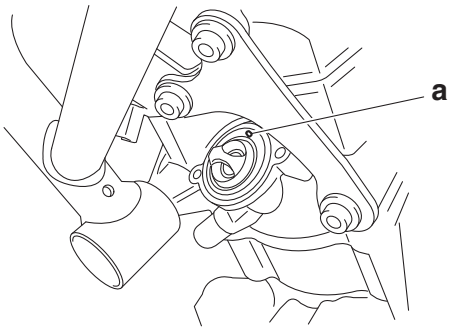
2. Check:
   • Thermostat cover
   Cracks/damage → Replace.

EAS30939
INSTALLING THE THERMOSTAT

1. Install:
   • Thermostat

TIP

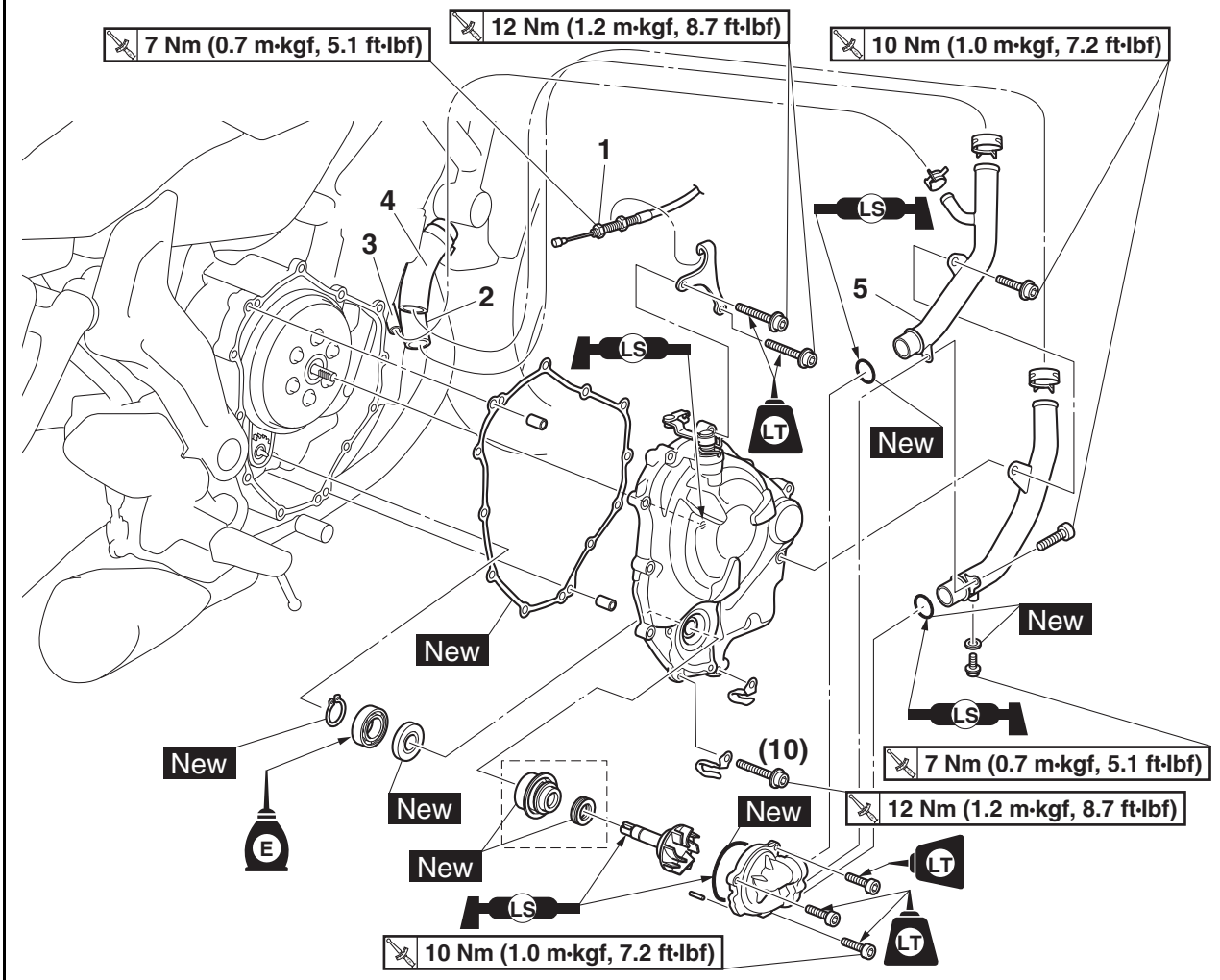
Install the thermostat with its breather valve “a” facing inward.



2. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-24.
3. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.
4. Measure:
   • Radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to “CHECKING THE RADIATOR” on page 6-3.

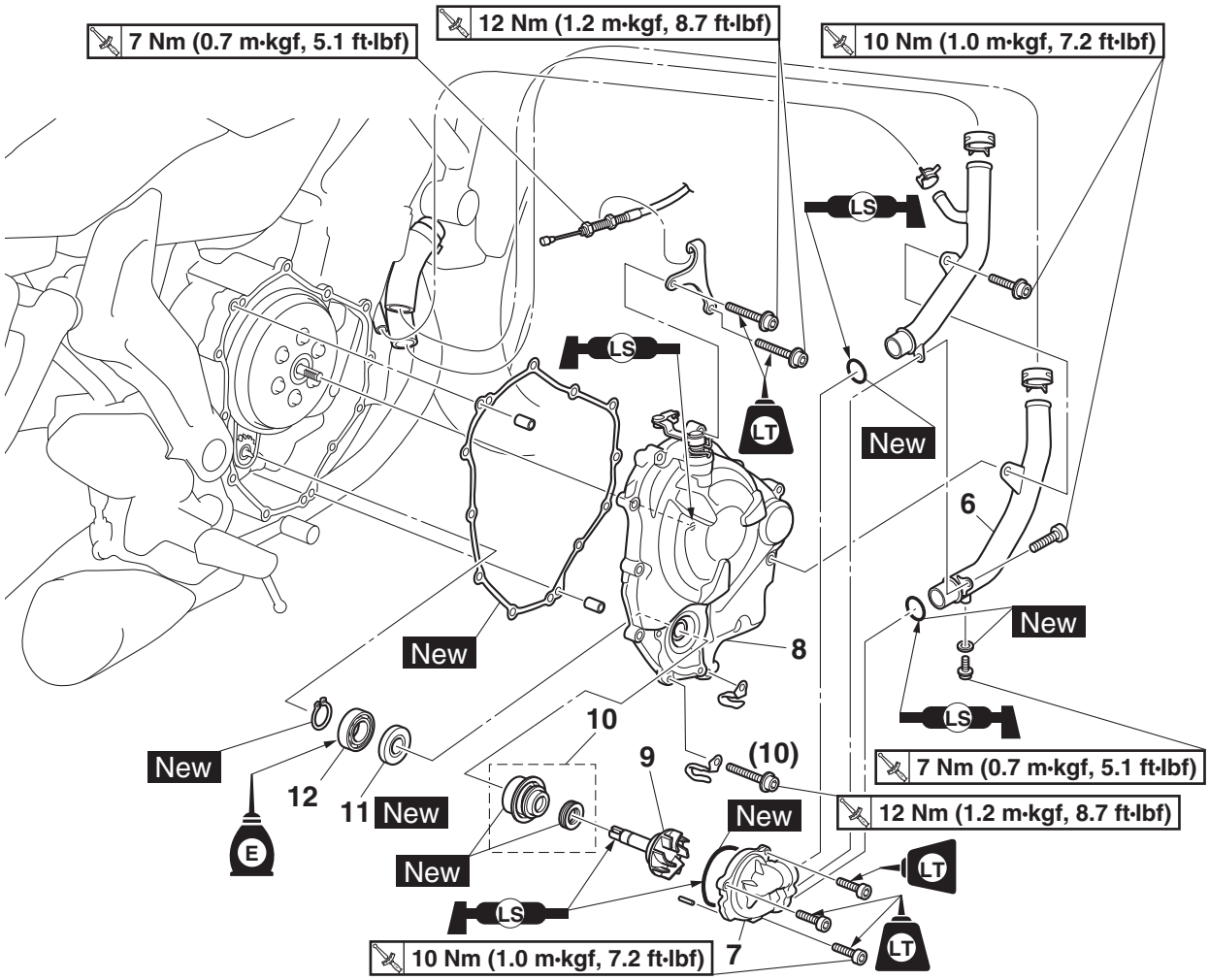
EAS20066
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-24.
	Engine oil		Refer to "CHANGING THE ENGINE OIL" on page 3-22.
1	Clutch cable	1	Disconnect.
2	Water pump outlet hose	1	Disconnect.
3	Oil cooler outlet hose	1	Disconnect.
4	Radiator outlet hose	1	Disconnect.
5	Water pump inlet pipe	1	

Removing the water pump



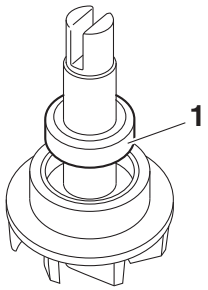
Order	Job/Parts to remove	Q'ty	Remarks
6	Water pump outlet pipe	1	
7	Water pump housing	1	
8	Clutch cover	1	
9	Impeller shaft	1	
10	Water pump seal assembly	1	
11	Oil seal	1	
12	Bearing	1	

EAS30446
DISASSEMBLING THE WATER PUMP

1. Remove:
   • Mechanical seal (impeller side) “1”
   (from the impeller, with a thin, flat-head screwdriver)

TIP

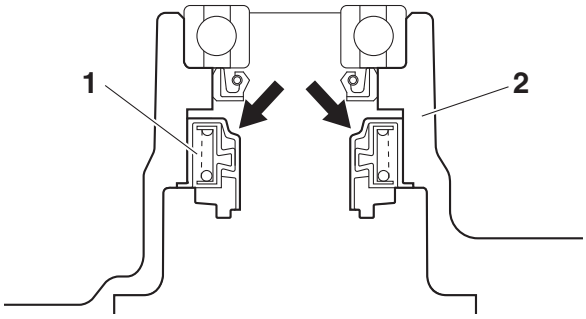
Do not scratch the impeller shaft.



2. Remove:
   • Mechanical seal (housing side) “1”

TIP

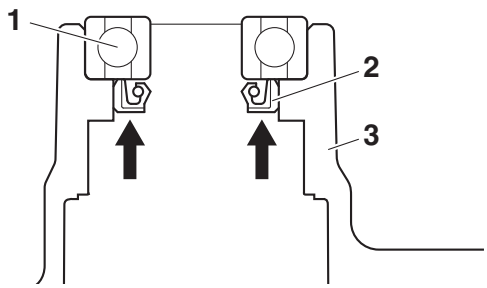
Remove the mechanical seal (housing side) from the inside of the clutch cover “2”.



3. Remove:
   • Bearing “1”
   • Oil seal “2”

TIP

Remove the bearing and oil seal from the outside of the clutch cover “3”.



EAS30447
CHECKING THE WATER PUMP

1. Check:
   • Water pump housing
   • Clutch cover
   • Impeller shaft
   Cracks/damage/wear → Replace.
2. Check:
   • Bearing
   Rough movement → Replace.
3. Check:
   • Water pump outlet pipe
   • Water pump inlet pipe
   Cracks/damage/wear → Replace.

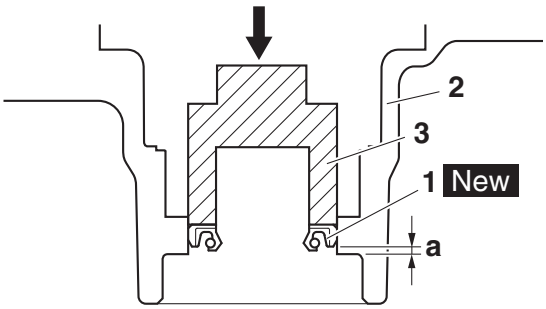
EAS30448
ASSEMBLING THE WATER PUMP

1. Install:
   • Oil seal “1” New
   • Bearing
   (into the clutch cover “2”)

TIP

Install the oil seal with a socket “3” that matches its outside diameter.

Installed depth of oil seal “a”
0.5–1.0 mm (0.02–0.04 in)



2. Install:
   • Mechanical seal (housing side) “1” New
   (into the clutch cover “2”)

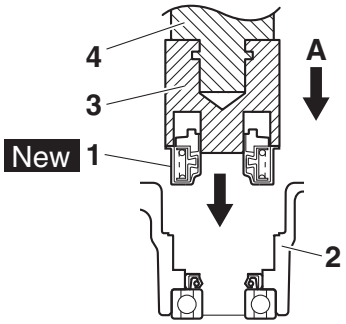
ECA20330
NOTICE

Never lubricate the mechanical seal (housing side) surface with oil or grease.

TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the clutch cover.

Mechanical seal installer
90890-04132
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058

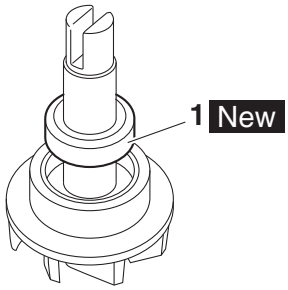


3. Mechanical seal installer
4. Middle driven shaft bearing driver
A. Push down

3. Install:
   • Mechanical seal (impeller side) "1" New

TIP

Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.



4. Measure:
   • Mechanical seal (impeller side)
   Out of specification → Repeat steps (3) and (4).

ECA20340

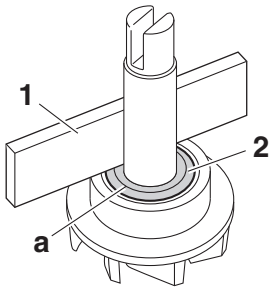
NOTICE

Make sure the mechanical seal (impeller side) is flush with the impeller.

TIP

If the surface "a" of the mechanical seal (impeller side) that contacts the mechanical seal (housing side) is dirty, clean it.

Mechanical seal (impeller side)
0.15 mm (0.006 in)

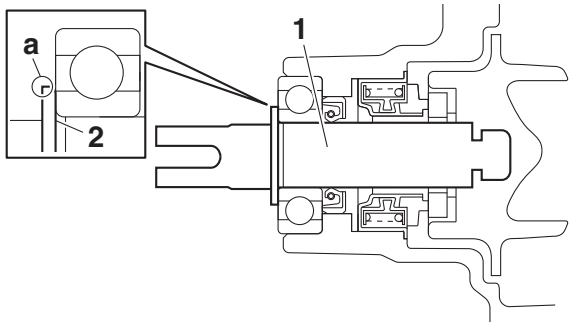


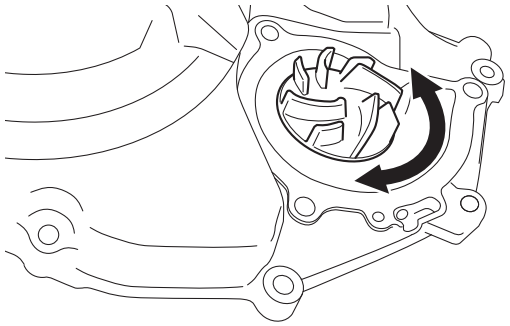
1. Straightedge
2. Impeller

5. Install:
   • Impeller shaft "1"
   • Circlip "2"

TIP

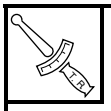
- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the bearing.
- After installation, check that the impeller shaft rotates smoothly.





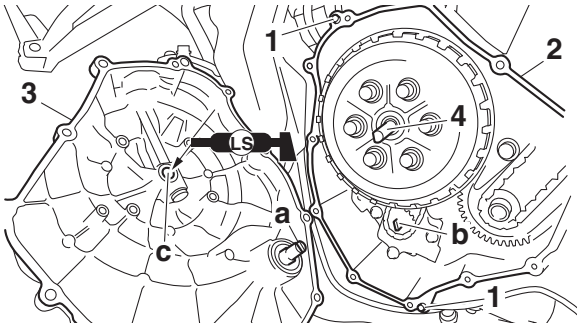
EAS31117
INSTALLING THE CLUTCH COVER

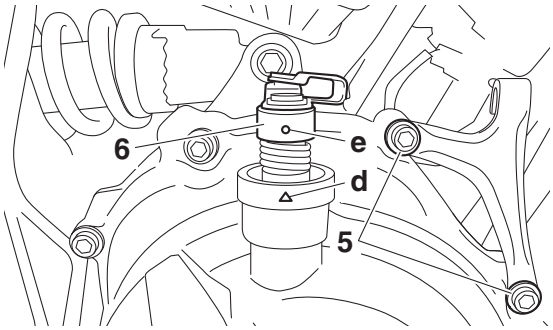
1. Install:
   - Dowel pins “1”
   - Clutch cover gasket “2” New
   - Clutch cover “3”

	**Clutch cover bolt** **12 Nm (1.2 m·kgf, 8.7 ft·lbf)** **Clutch cable holder bolt** **12 Nm (1.2 m·kgf, 8.7 ft·lbf)** **LOCTITE®**

TIP

- Align the slit “a” in the impeller shaft with the projection “b” on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod “4” rearward and align the rod with the hole “c” in the clutch cover.
- Apply looking agent (LOCTITE®) to the threads of only the clutch cable holder bolts “5”.
- Tighten the bolts in stages and in a crisscross pattern.
- After installing the clutch cover, make sure that the alignment mark “d” on the clutch cover is aligned with the punch mark “e” on the pull lever “6”.





2. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-24.
3. Check:
   - Cooling system
     Leaks → Repair or replace the faulty part.
4. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.
5. Adjust:
   - Clutch lever free play
     Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-12.

FUEL SYSTEM

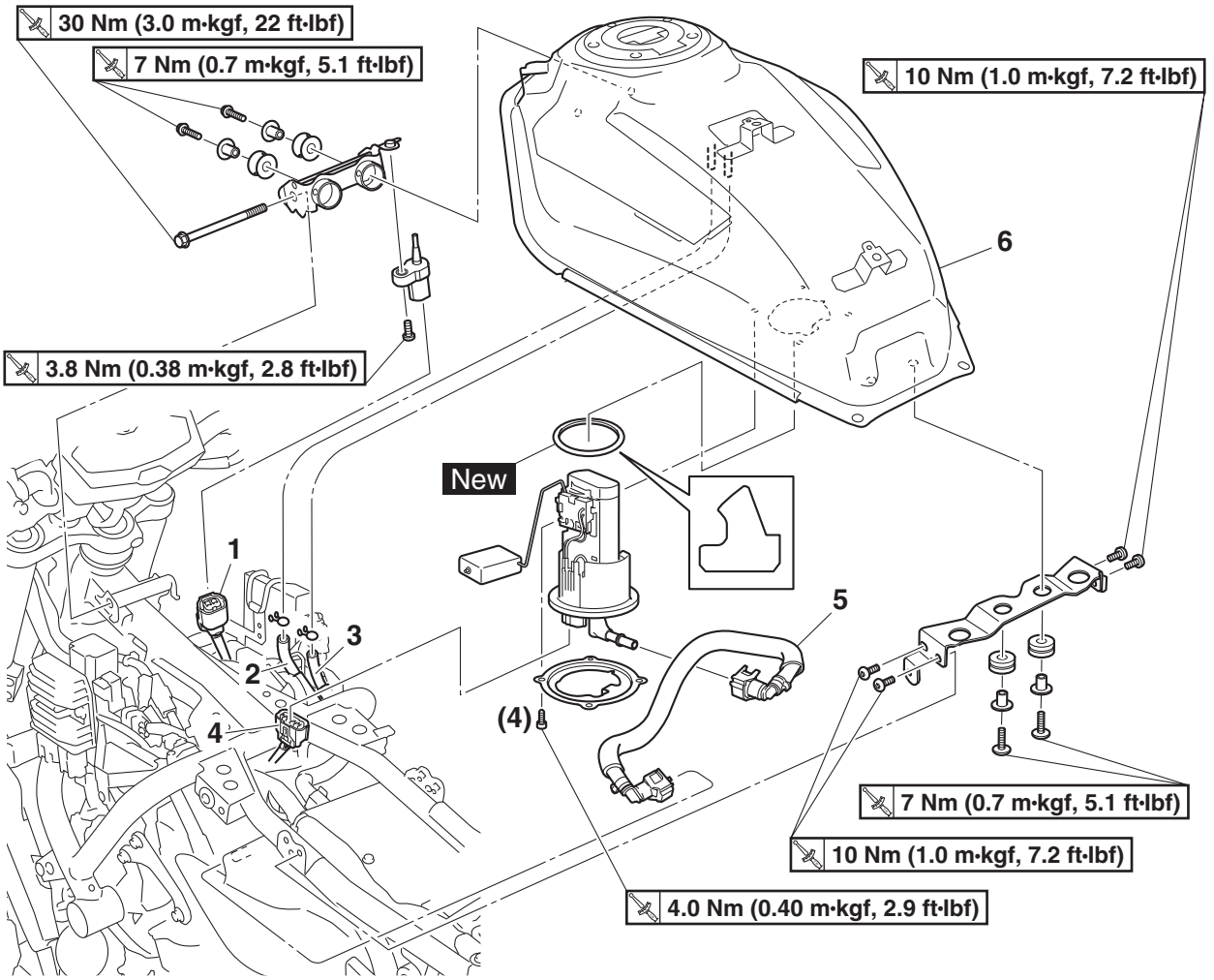
FUEL TANK 7-1
REMOVING THE FUEL TANK 7-4
REMOVING THE FUEL PUMP 7-4
CHECKING THE FUEL PUMP BODY 7-4
CHECKING THE ROLLOVER VALVE (for California only) 7-4
INSTALLING THE CANISTER (for California only) 7-4
INSTALLING THE FUEL PUMP 7-5
INSTALLING THE FUEL TANK BRACKET 7-5
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CLEANING THE ISC (IDLE SPEED CONTROL) VALVE 7-11
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INSTALLING THE THROTTLE BODY JOINTS 7-16
INSTALLING THE AIR FILTER CASE 7-16

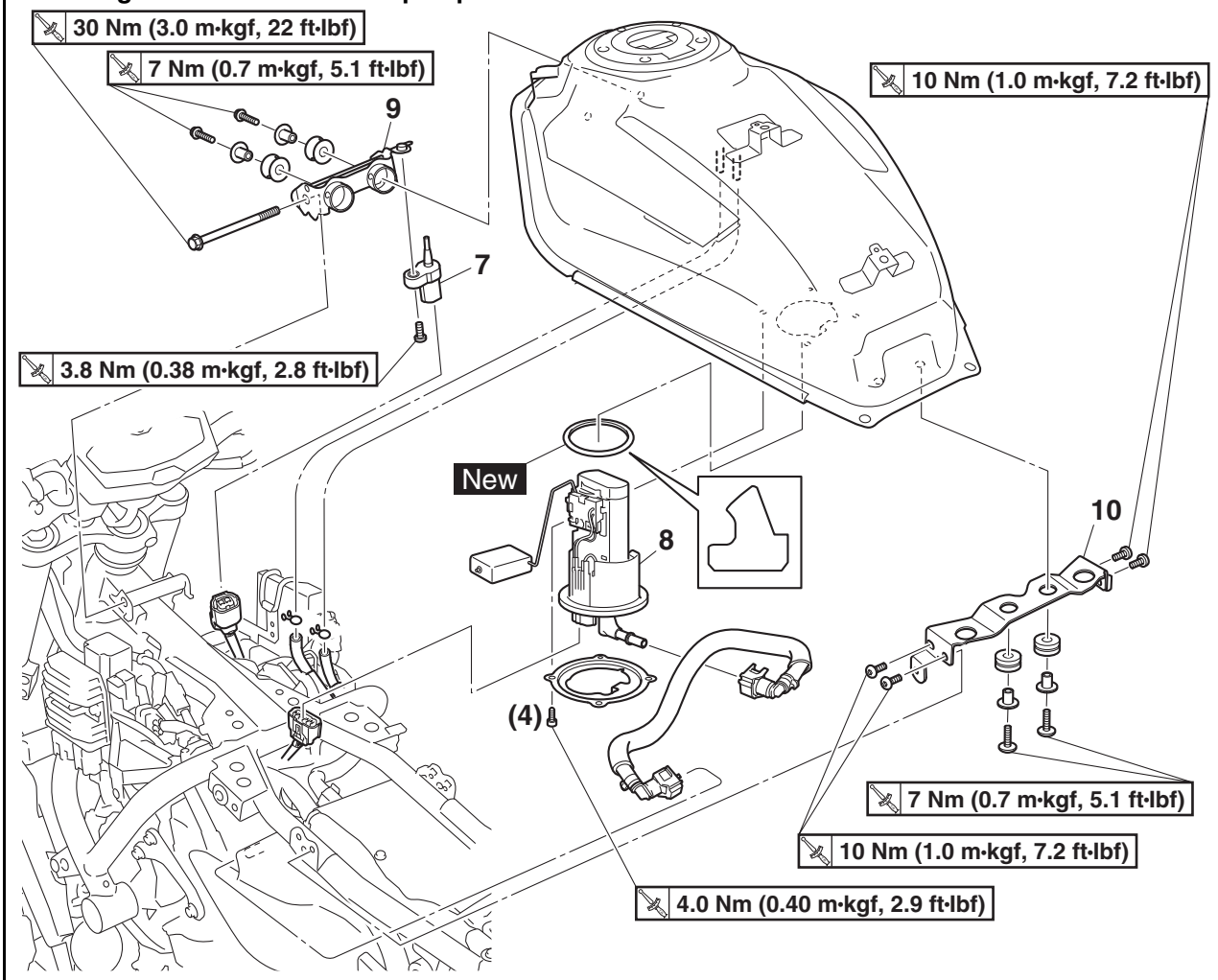
EAS20067
FUEL TANK

Removing the fuel tank and fuel pump



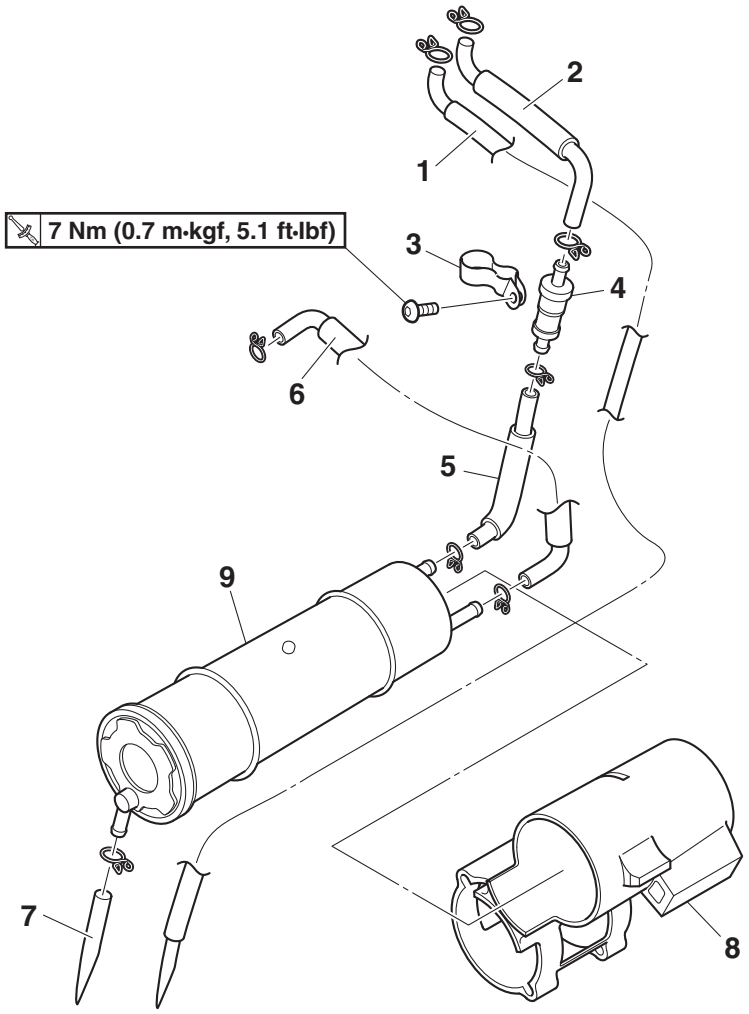
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
1	Intake air temperature sensor coupler	1	Disconnect.
2	Fuel tank overflow hose	1	Disconnect.
3	Fuel tank breather hose	1	Disconnect.
4	Fuel pump coupler	1	Disconnect.
5	Fuel hose	1	
6	Fuel tank	1	

Removing the fuel tank and fuel pump



Order	Job/Parts to remove	Q'ty	Remarks
7	Intake air temperature sensor	1	
8	Fuel pump	1	
9	Front fuel tank bracket	1	
10	Rear fuel tank bracket	1	

Removing the canister (for California only)



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies/Air filter case		Refer to "THROTTLE BODIES" on page 7-8.
1	Fuel tank overflow hose	1	
2	Fuel tank breather hose (fuel tank to rollover valve)	1	
3	Rollover valve and fuel tank overflow hose clamp	1	
4	Rollover valve	1	
5	Fuel tank breather hose (rollover valve to canister)	1	
6	Canister purge hose (hose joint to canister)	1	
7	Canister breather hose	1	
8	Canister holder	1	Refer to "ELECTRIC STARTER" on page 5-43.
9	Canister	1	

EAS30450
REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   • Fuel hose

EWA17320
⚠ WARNING

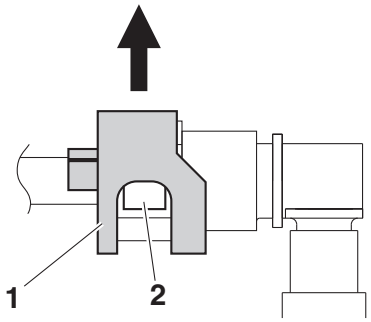
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA20020
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 remove the fuel hose from the fuel rail and fuel pump, 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.



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.

EAS30451
REMOVING THE FUEL PUMP

1. Remove:
   • Fuel pump

ECA14720
NOTICE

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

EAS30454
CHECKING THE FUEL PUMP BODY

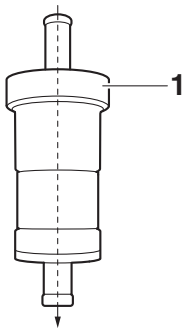
1. Check:
   • Fuel pump body
   Obstruction → Clean.
   Cracks/damage → Replace fuel pump assembly.

EAS30699
CHECKING THE ROLLOVER VALVE (for California only)

1. Check:
   • Rollover valve "1"
   • Damage/faulty → Replace.

TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.

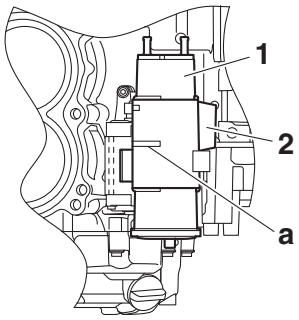


EAS31330
INSTALLING THE CANISTER (for California only)

1. Install:
   • Canister "1"
   • Canister holder "2"

TIP

Fit the projection on the canister into the slot "a" in the canister holder.



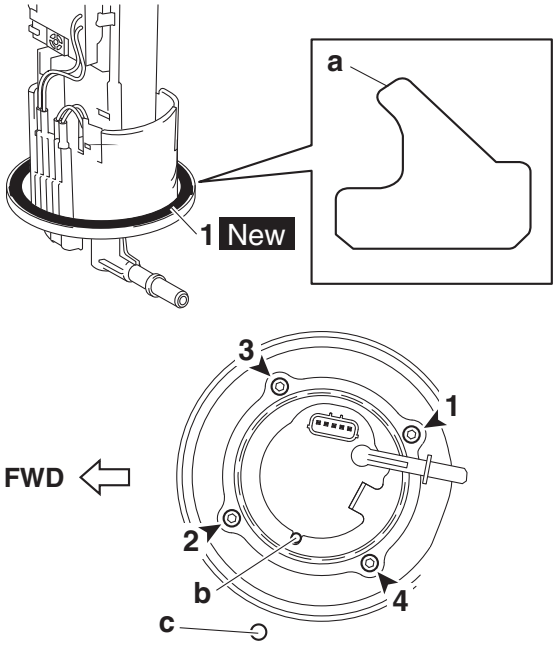
EAS30456
INSTALLING THE FUEL PUMP

1. Install:
   - Fuel pump gasket “1” New
   - Fuel pump
   - Fuel pump bracket

	Fuel pump bolt **4.0 Nm (0.40 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.
- The gasket lip “a” shall face toward the fuel tank.
- Align the projection “b” on the fuel pump with the punch mark “c” on the fuel tank.
- Align the slot in the fuel pump bracket with the projection “b” on the fuel pump.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



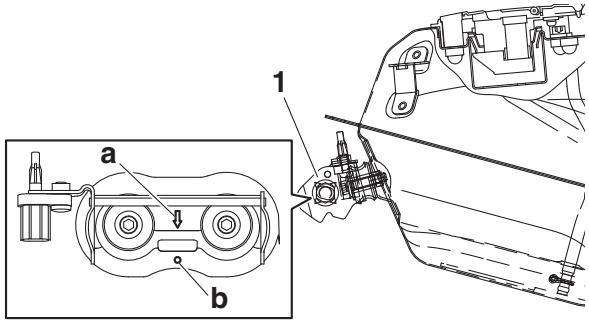
EAS31081
INSTALLING THE FUEL TANK BRACKET

1. Install:
   - Grommets
   - Collars
   - Front fuel tank bracket “1”

	Fuel tank bolt (front side) **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

Make sure that the arrow mark “a” on the front fuel tank bracket points toward the hole “b” in the fuel tank.

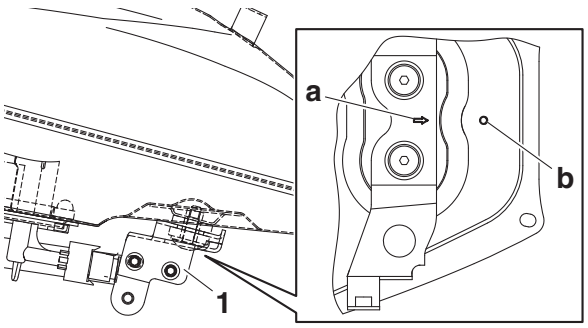


2. Install:
   - Grommets
   - Collars
   - Rear fuel tank bracket “1”

	Fuel tank bolt (rear side) **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

TIP

Make sure that the arrow mark “a” on the rear fuel tank bracket points toward the punch mark “b” on the fuel tank.



EAS30457
INSTALLING THE FUEL TANK

1. Tighten:
   - Front fuel tank bracket bolt (temporarily)

TIP

Temporarily tighten the front fuel tank bracket bolt.

2. Install:
   • Fuel hose

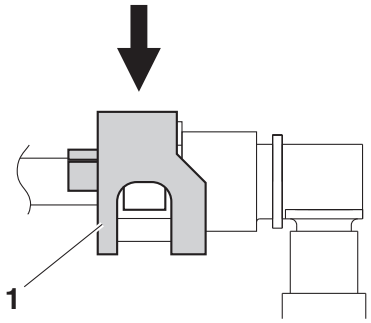
ECA18420

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position; otherwise, the fuel hose will not be properly installed.

TIP

- Install the fuel hose securely onto the fuel rail and fuel pump until a distinct “click” is heard.
- To install the fuel hose, slide the fuel hose connector cover “1” on each end of the hose in the direction of the arrow shown.



3. Connect:
   • Fuel pump coupler
   • Fuel tank breather hose
   • Fuel tank overflow hose
   • Intake air temperature sensor
4. Tighten:
   • Rear fuel tank bracket bolts

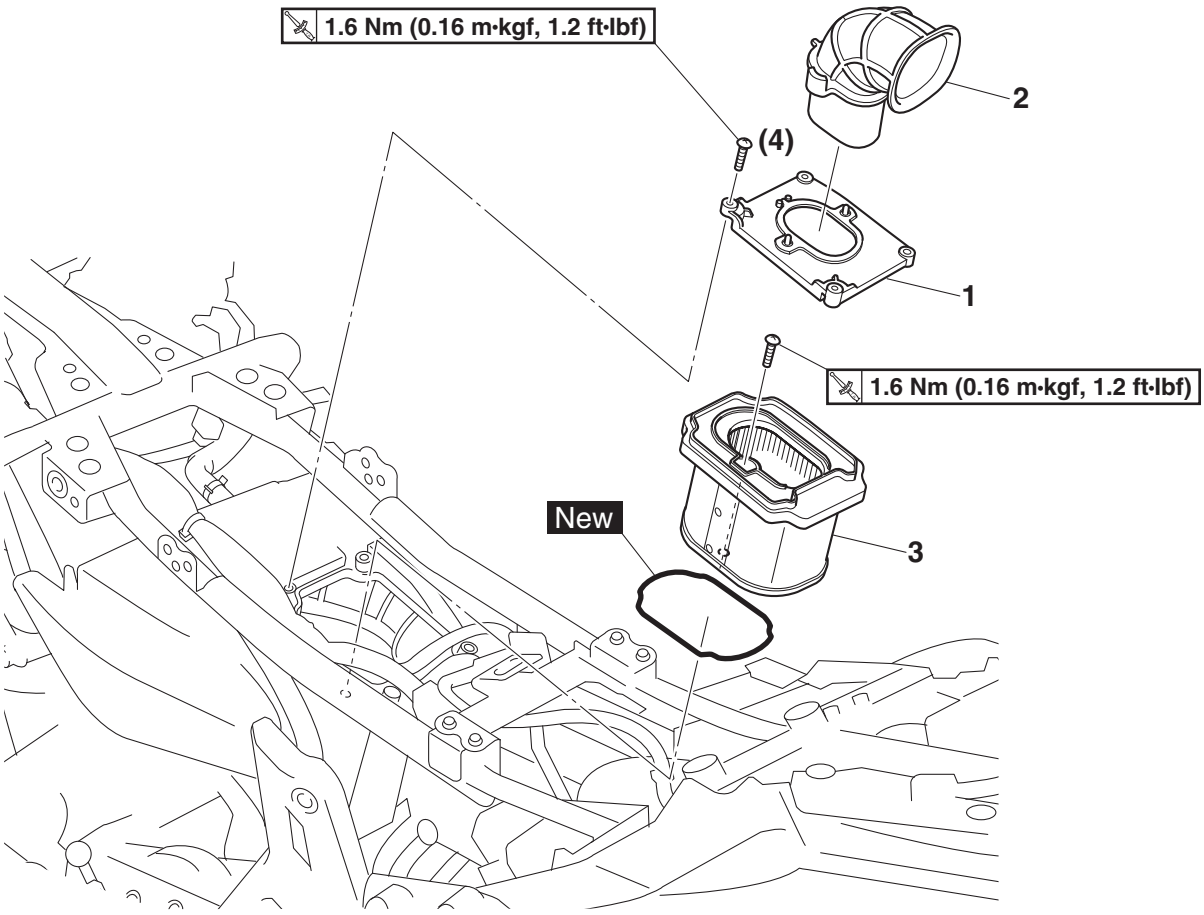
	**Rear fuel tank bracket bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

5. Tighten:
   • Front fuel tank bracket bolt

	**Front fuel tank bracket bolt 30 Nm (3.0 m·kgf, 22 ft·lbf)**

EAS20199
AIR FILTER ELEMENT

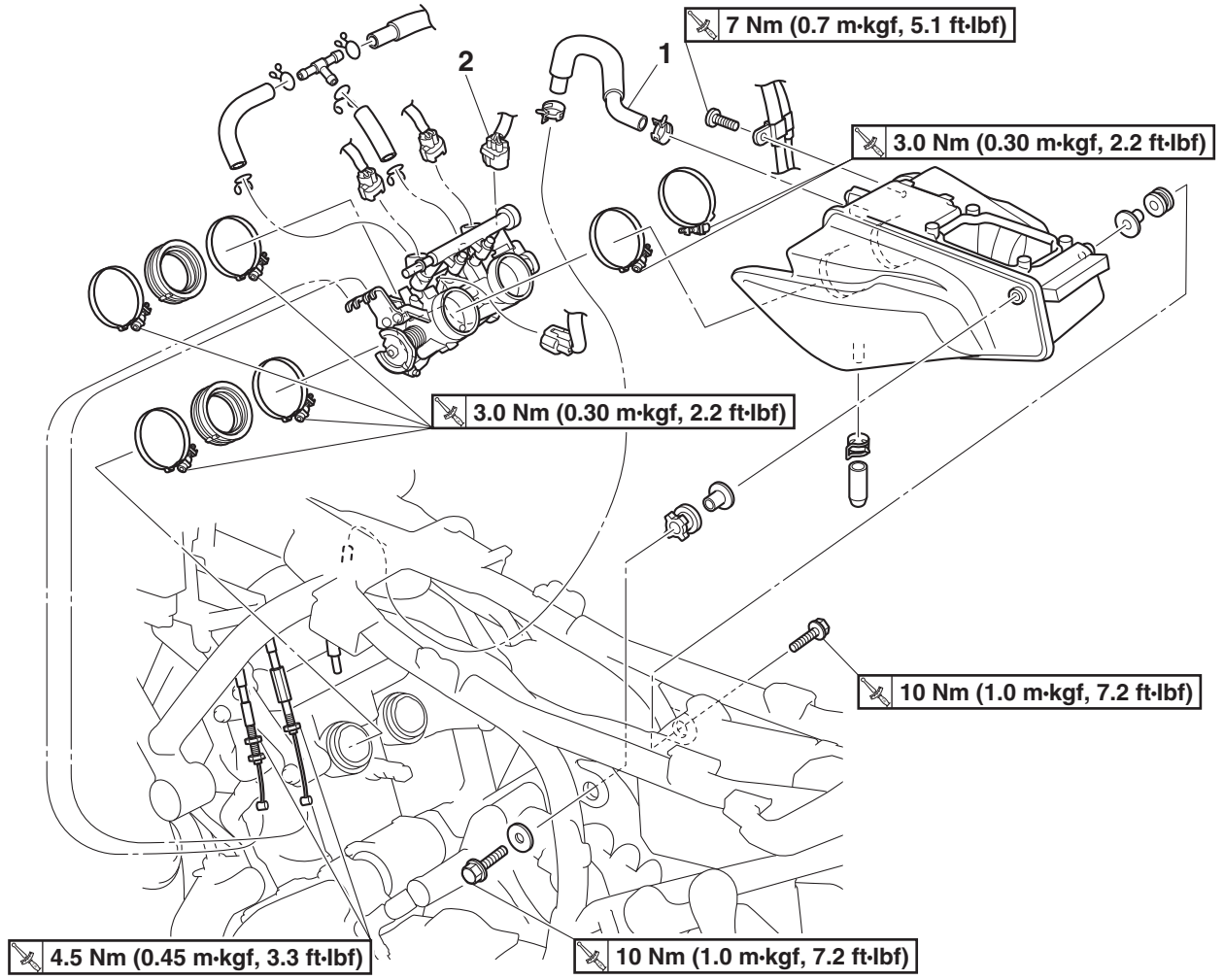
Removing the air filter element



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Air duct bracket	1	
2	Air duct	1	
3	Air filter element	1	

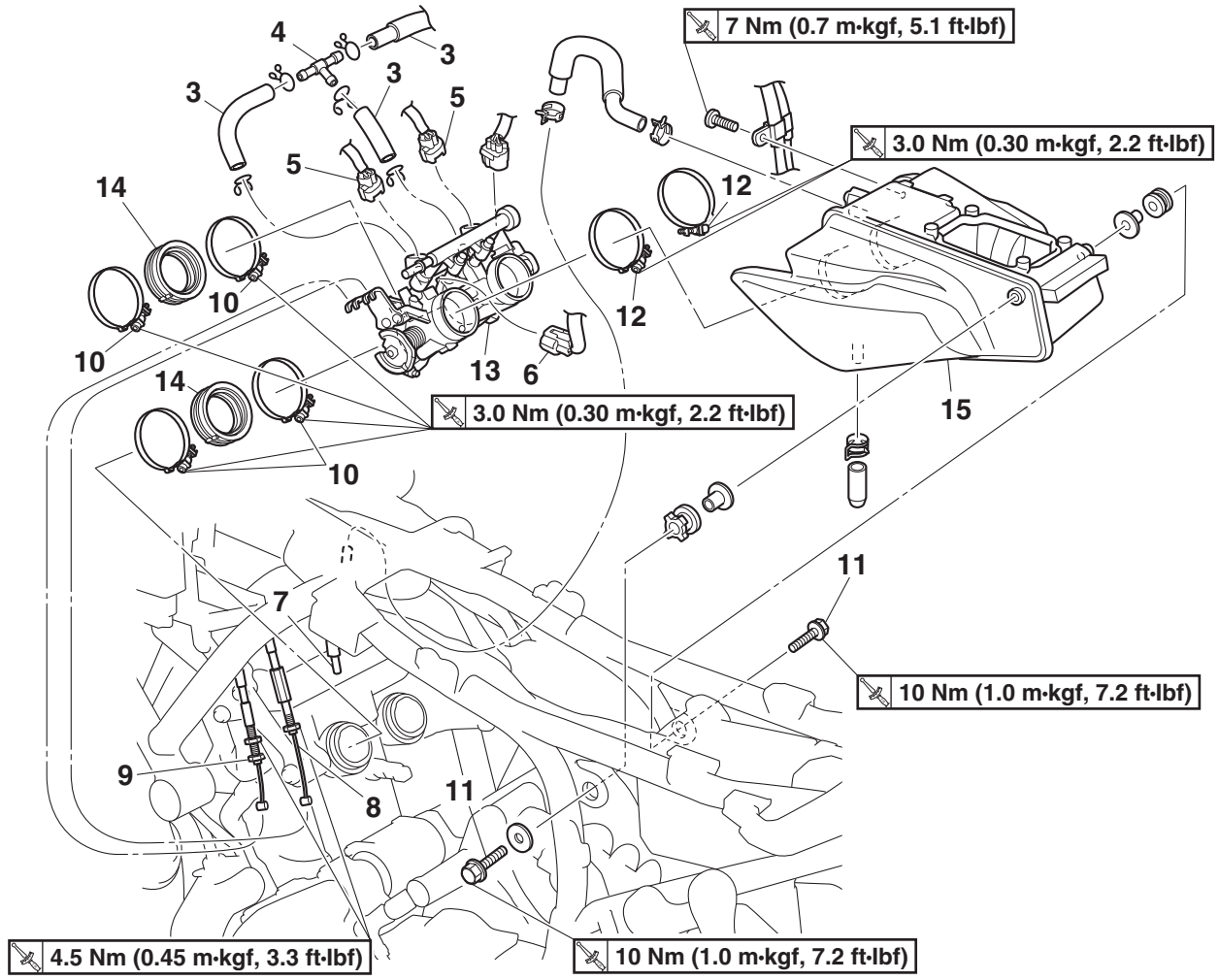
EAS20070
THROTTLE BODIES

Removing the air filter case and throttle bodies



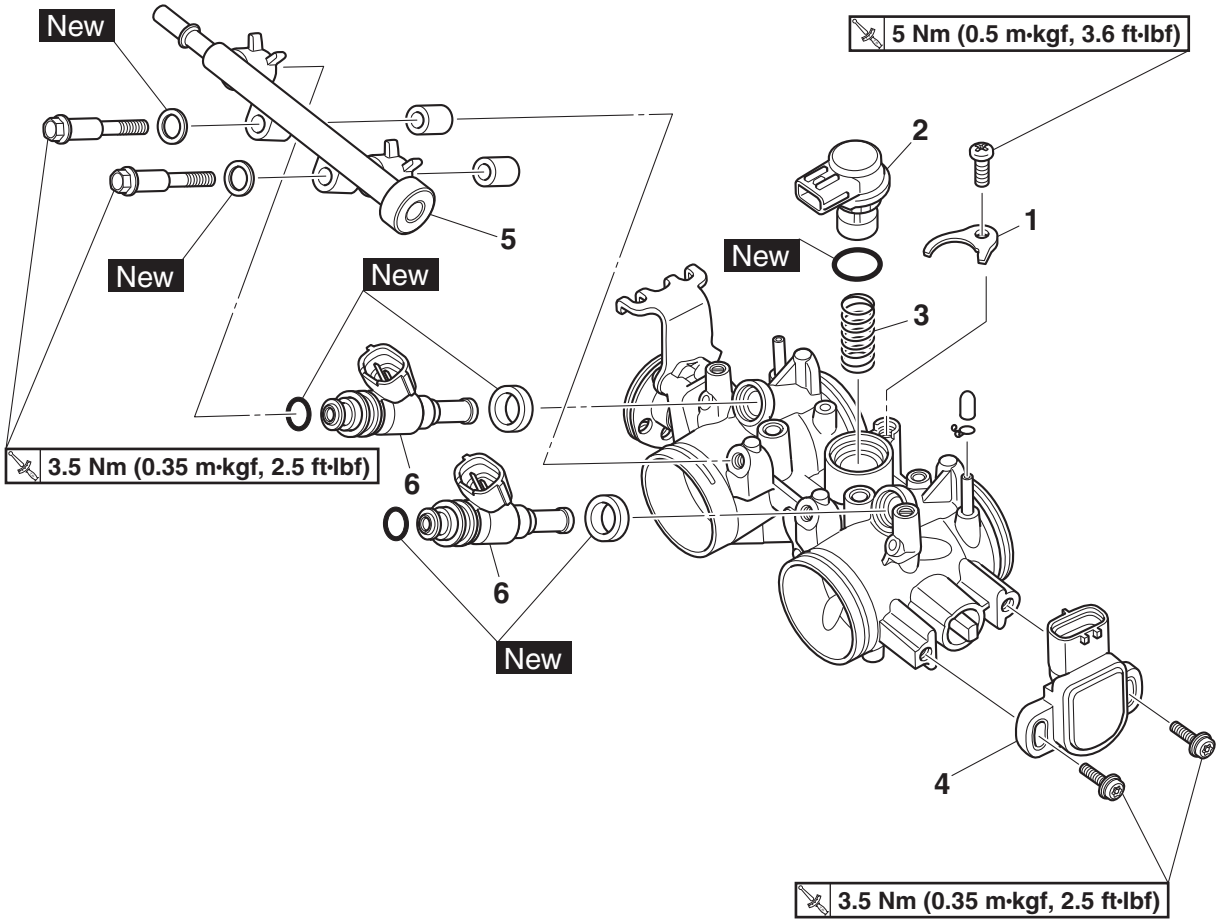
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank top cover/Fuel tank covers/Fuel tank center cover/Fuel tank front cover		Refer to "GENERAL CHASSIS (4)" on page 4-11.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air duct bracket		Refer to "AIR FILTER ELEMENT" on page 7-7.
	Pivot shaft protector (left/right)		Refer to "SWINGARM" on page 4-84.
1	Cylinder head breather hose	1	
2	Throttle position sensor coupler	1	Disconnect.

Removing the air filter case and throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
3	Canister purge hose	3	For California only.
4	Hose joint	1	For California only.
5	Injector coupler	2	Disconnect.
6	ISC (idle speed control) unit coupler	1	Disconnect.
7	Intake air pressure sensor hose	1	Disconnect.
8	Throttle cable (decelerator cable)	1	Disconnect.
9	Throttle cable (accelerator cable)	1	Disconnect.
10	Throttle body joint clamp screw	4	Loosen.
11	Air filter case bolt	2	
12	Air filter case joint clamp screw	2	Loosen.
13	Throttle bodies	1	
14	Throttle body joint	2	
15	Air filter case	1	

Removing the fuel injectors



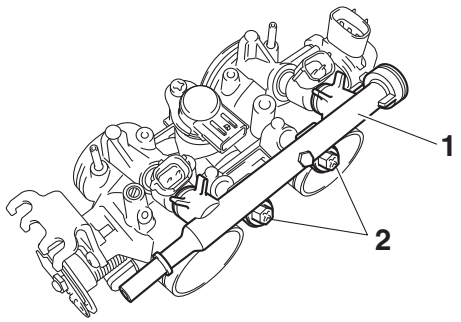
Order	Job/Parts to remove	Q'ty	Remarks
1	ISC (idle speed control) valve plate	1	
2	ISC (idle speed control) valve	1	
3	Spring	1	
4	Throttle position sensor	1	
5	Fuel rail	1	
6	Fuel injector	2	

EAS30475
CHECKING THE INJECTORS (BEFORE REMOVING)
1. Check:
   • Injectors
   Use the diagnostic code numbers “36–37”. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.

EAS30476
REMOVING THE INJECTORS
EWA17330
⚠ WARNING
- **Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.**
- **Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.**
- **Turn the main switch to “OFF” and disconnect the negative battery lead from the battery terminal before removing the injectors.**

1. Remove:
   • Fuel rail “1”

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a. Remove the fuel rail bolts “2” as shown.



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EAS30477
CHECKING THE INJECTORS
1. Check:
   • Injectors
   Obstruction → Replace and check the fuel pump/fuel supply system.
   Deposit → Replace.
   Damage → Replace.
2. Check:
   • Injector resistance
   Refer to “CHECKING THE FUEL INJECTORS” on page 8-98.

EAS30479
CHECKING THE THROTTLE BODIES
TIP
Before checking the throttle bodies, check the following items:
- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Vacuum hoses

EWA17850
⚠ WARNING
If the throttle bodies are subjected to strong shocks or dropped during checking, replace them.

1. Check:
   • Throttle bodies
   Cracks/damage → Replace the throttle bodies.

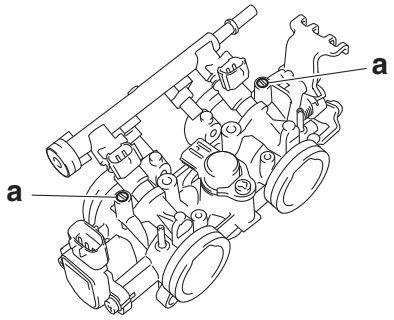
EAS31143
CLEANING THE ISC (IDLE SPEED CONTROL) VALVE
1. Remove the throttle bodies from the vehicle.

TIP
Before removing the throttle bodies, disconnect the throttle cables and couplers.

Cleaning the throttle bodies
1. Clean:
   • Throttle bodies

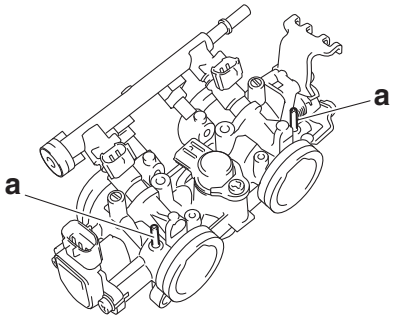
ECA20910
NOTICE
- **Observe the following precautions; otherwise, the throttle bodies may not operate properly.**
- **Do not open the throttle valves quickly.**
- **Do not subject the throttle bodies to excessive force.**
- **Wash the throttle bodies in a petroleum-based solvent.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.**
- **Do not directly push the throttle valves to open them.**

• Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.



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a. Place the throttle bodies on a flat surface with the air filter case side facing up.
b. Install the caps (895-14169-00) onto the hose fittings "a".



c. Push the lever in the direction shown in the illustration to hold the throttle valves in the open position.

EWA16680

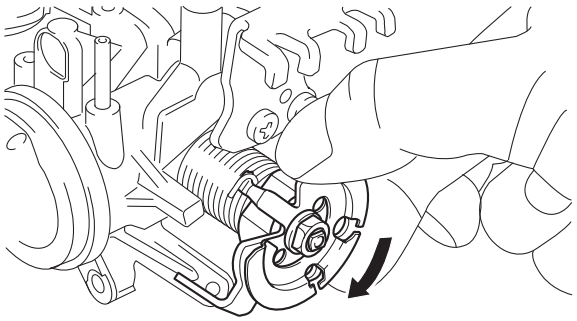
⚠ WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA21190

NOTICE

• Do not use tools to open the throttle valves or to keep them in the open position.
• Do not open the throttle valves quickly.



d. Apply a petroleum-based solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any petroleum-based solvent to enter the opening for the injectors.
- Do not apply any petroleum-based solvent to the portions of the throttle valve shafts between the throttle bodies.

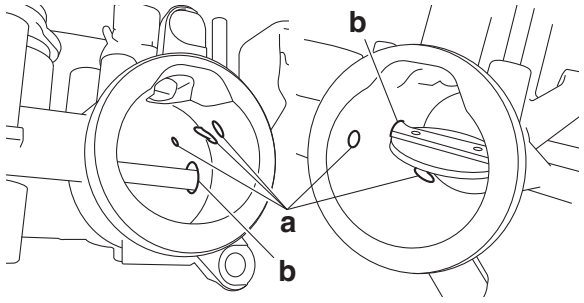
e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ECA18470

NOTICE

• Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.
• Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.

f. After removing the carbon deposits, clean the inside of the throttle bodies with a petroleum-based solvent, and then dry the throttle bodies using compressed air.
g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



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Cleaning the ISC (idle speed control) valve

1. Remove:
   - ISC (idle speed control) valve plate
   - ISC (idle speed control) valve
   - O-ring
2. Clean:
   - ISC (idle speed control) valve "1"

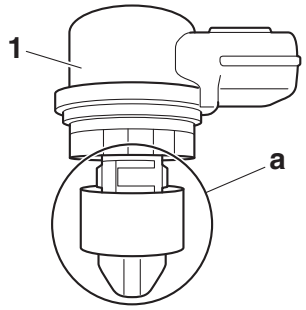
Recommended cleaning agent:
Yamaha oil & brake cleaner

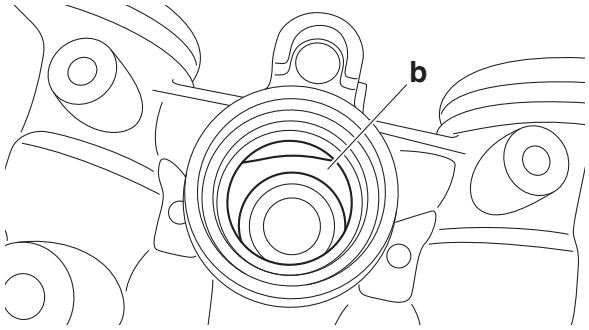
ECA21230
NOTICE

- **Be sure to use the recommended cleaning agent.**
- **Do not spray the cleaning agent directly onto the ISC valve or throttle bodies and do not immerse them in the cleaning agent.**
- **To prevent scratching the components, do not use a brush, metal file, or other abrasive tool.**
- **Do not clean with compressed air.**
- **Do not allow the removed deposits or foreign materials to adhere to the sealing surfaces of the O-ring.**
- **Do not scratch or deform the ISC valve or air passage; otherwise, poor starting performance, an unstable engine idling speed, or uncontrollable engine speed could result.**
- **Do not clean any areas other than those indicated in the illustrations. If the cleaning agent attaches to the ISC valve or enters the throttle bodies, thoroughly wipe it off.**

TIP

Clean the area “a” of the ISC valve and the ISC valve installation hole “b” in the throttle bodies.



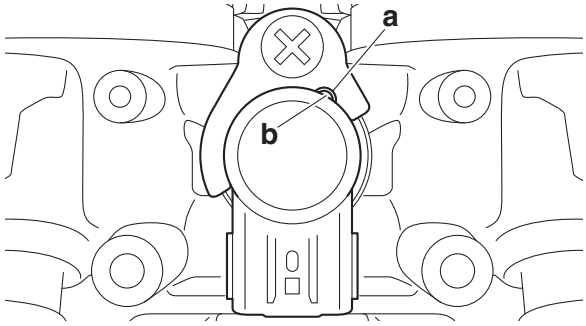


3. Install:
   - O-ring New
   - ISC (idle speed control) valve
   - ISC (idle speed control) valve plate

ISC (idle speed control) valve plate screw
5 Nm (0.5 m·kgf, 3.6 ft·lbf)

TIP

Align the slot “a” in the ISC valve plate with the projection “b” on the ISC valve.

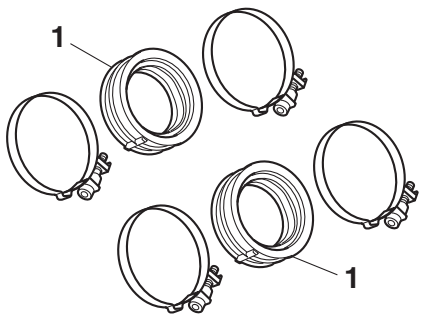


Resetting the ISC (idle speed control) learning values

1. Install:
   - Throttle bodies
2. Reset:
   - ISC (idle speed control) learning values
     Use the diagnostic code number “67”.
     Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
3. Adjust:
   - Throttle bodies synchronizing
     Out of specification → Replace the throttle bodies.
     Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-8.

EAS30792
CHECKING THE THROTTLE BODY JOINTS

1. Check:
   - Throttle body joints “1”
     Cracks/damage → Replace.



EAS30485
ADJUSTING THE THROTTLE POSITION SENSOR

EWA16690
⚠ 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.

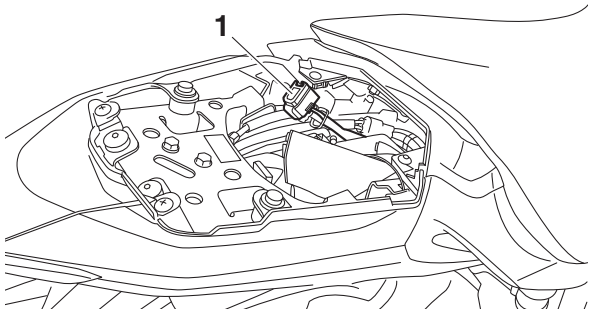
1. Check:
   • Throttle position sensor
   Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-95.
2. Adjust:
   • Throttle position sensor angle

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a. Temporary tighten the throttle position sensor screws.
b. Check that the throttle valves are fully closed.
c. Connect the throttle position sensor to the wire harness.
d. Remove the protective cap, and then connect the Yamaha diagnostic tool to coupler "1".

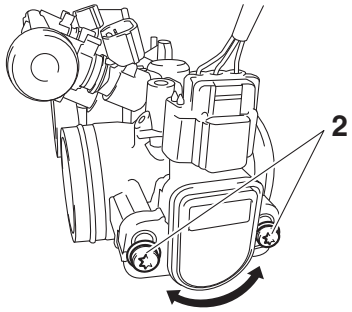
TIP

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



e. Diagnostic code number "01" is selected.
f. Adjust the position of the throttle position sensor angle so that 11–21 can appear in the Yamaha diagnostic tool screen.
g. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "2".

	Throttle position sensor screw 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)



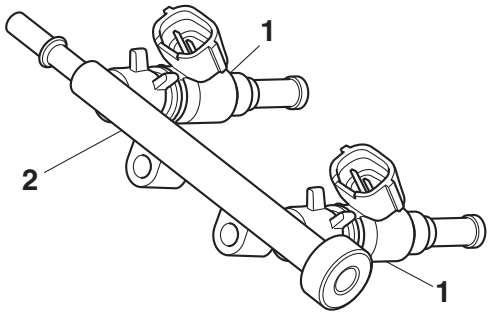
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EAS31124
INSTALLING THE FUEL INJECTORS

ECA20000
NOTICE

• Always use new O-rings.
• When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.
• Be careful not to twist or pinch the O-rings when installing the injectors.
• If an injector is subject to strong shocks or excessive force, replace it.
• If installing the original fuel rail and screws, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the screw seats could prevent the screws from being tightened to the specified torque.

1. Install new seals onto the end of each injector.
2. Install the fuel injectors "1" to the fuel rail "2".



	Fuel rail bolt 3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)

3. Install the fuel injector assemblies to the throttle bodies.
4. Check the injector pressure after the fuel injectors are installed to the throttle bodies.
   Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-15.

EAS30481
CHECKING THE INJECTOR PRESSURE

TIP

- After installing the fuel injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

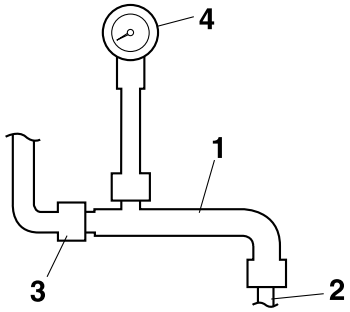
1. Check:
   - Injector pressure

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a. Connect the fuel injector pressure adapter "1" to the fuel rail "2", and then connect an air compressor "3" to the adapter.
b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel injector pressure adapter
90890-03210
Fuel injector pressure adapter
YU-03210



c. Close the valve on the fuel injector pressure adapter.
d. Apply air pressure with the air compressor.
e. Open the valve on the fuel injector pressure adapter until the specified pressure is reached.



Specific air pressure
490 kPa (4.9 kgf/cm^2, 69.7 psi)

ECA18440
NOTICE

Never exceed the specified air pressure or damage could occur.

f. Close the valve on the fuel injector pressure adapter.
g. Check that the specified air pressure is held for about one minute.
   Pressure drops → Check the pressure gauge and adapter.
   Check the seals and O-rings, and then reinstall.
   Replace the fuel injectors.

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EAS30482
CHECKING THE FUEL PRESSURE

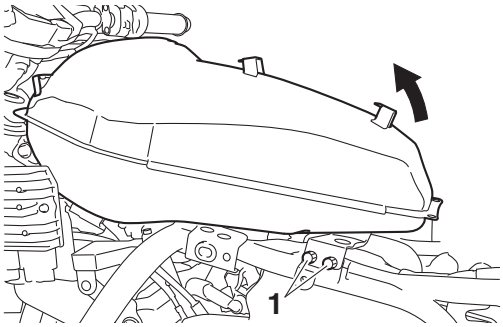
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank top cover
   - Fuel tank cover (left)
   - Fuel tank cover (right)
   - Fuel tank center cover
   - Fuel tank front cover
     Refer to "GENERAL CHASSIS (4)" on page 4-11.
2. Check:
   - Fuel pressure

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a. Remove the rear fuel tank bracket bolts "1" and holdup the fuel tank.

ECA20070
NOTICE

When lifting up the fuel tank, be careful not to pull the fuel tank overflow hose and fuel tank breather hose.



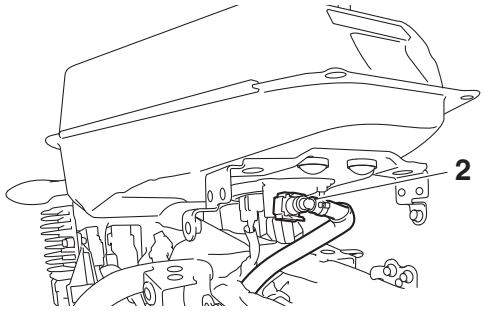
b. Disconnect the fuel hose "2" from the fuel tank.

EWA16640
⚠ 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 hoses.

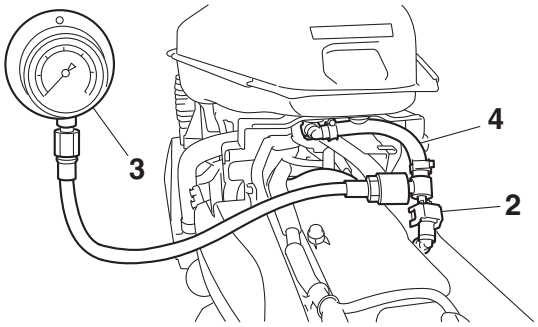
ECA20010
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



c. Connect the pressure gauge "3" and adapter "4" to the fuel hose "2".

Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel pressure adapter
90890-03176
Fuel pressure adapter
YM-03176



d. Start the engine.
e. Measure the fuel pressure.

Fuel line pressure at idling
300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi) / Regulated pressure 324 kPa (3.2 kgf/cm², 47.0 psi)

Faulty → Replace the fuel pump.

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3. Install:
   • Fuel tank

Rear fuel tank bracket bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

Refer to "FUEL TANK" on page 7-1.
- Fuel tank front cover
- Fuel tank center cover
- Fuel tank cover (left)
- Fuel tank cover (right)
- Fuel tank top cover
  Refer to "GENERAL CHASSIS (4)" on page 4-11.
- Rider seat
  Refer to "GENERAL CHASSIS (1)" on page 4-1.

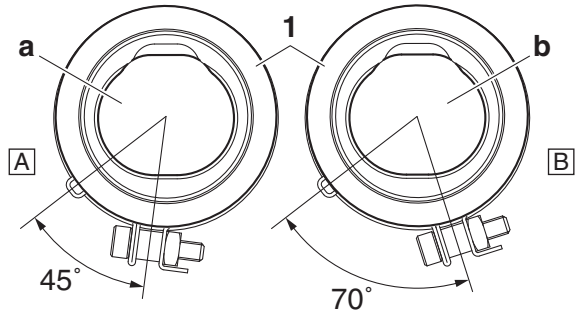
EAS30937
INSTALLING THE THROTTLE BODY JOINTS

1. Install:
   • Throttle body joints "1"

Throttle body joint clamp screw
3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)

TIP

Be sure to install the throttle body joints "1" as shown in the illustration.



a. #1 cylinder
b. #2 cylinder
A. Left
B. Right

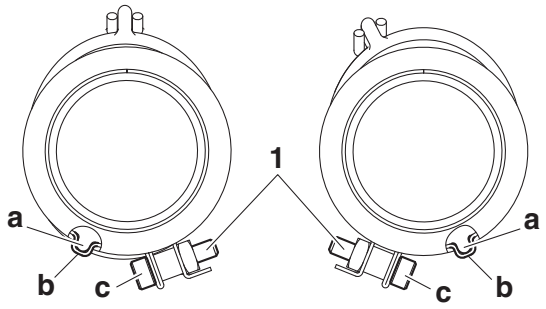
EAS31092
INSTALLING THE AIR FILTER CASE

1. Install:
   • Air filter case joint clamps "1"

Air filter case joint clamp screw
3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)

TIP

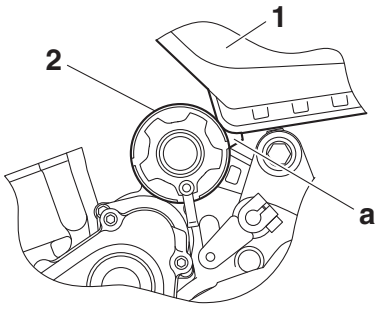
- Align the projection "a" on the air filter case joint with the slot "b" in the air filter case joint clamp.
- Face the screw head "c" of the air filter case joint clamp outward.



2. Install (for California only):
   • Air filter case “1”

TIP

Position the projection “a” on the canister holder “2” under the air filter case.



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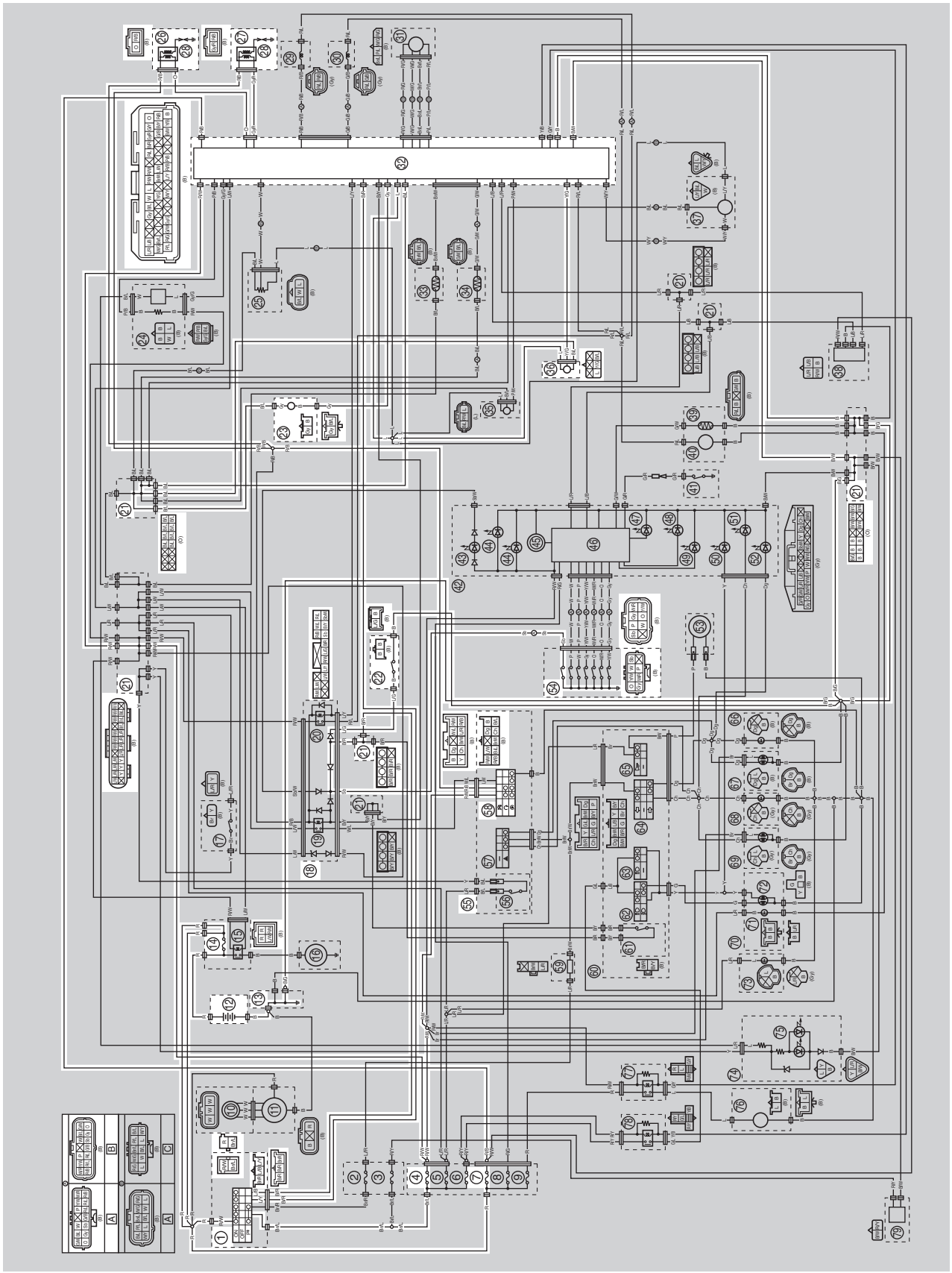
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EAS20072
IGNITION SYSTEM

EAS30490
CIRCUIT DIAGRAM

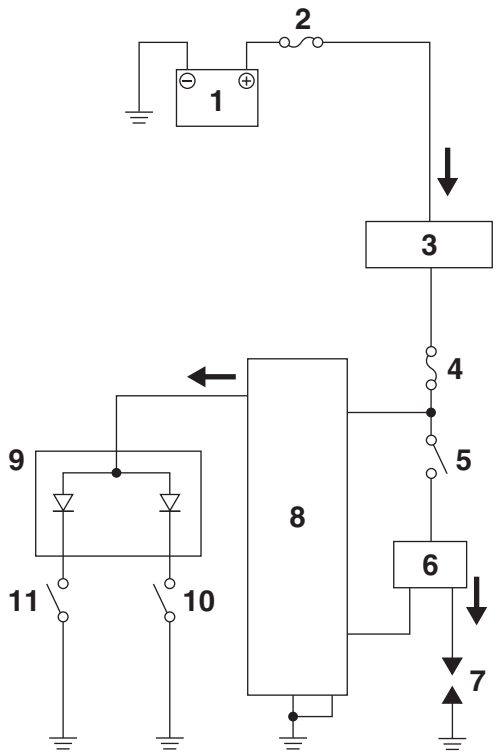


1. Main switch
4. Ignition fuse
7. Fuel injection system fuse
12. Battery
13. Engine ground
14. Main fuse
18. Relay unit
21. Joint coupler
22. Sidestand switch
23. Crankshaft position sensor
26. Ignition coil #1
27. Ignition coil #2
28. Spark plug
32. ECU (engine control unit)
36. Lean angle sensor
54. Gear position switch
55. Handlebar switch (right)
58. Start/engine stop switch
A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)

EAS30491
ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ECU does not flow to the ignition coils or fuel injectors when the gear position switch (neutral circuit) or sidestand switch is open. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Start/engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (engine control unit)
9. Relay unit (diode)
10. Sidestand switch
11. Gear position switch

EAS30492
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank
6. Drive sprocket cover
7. Headlight assembly

1. Check the fuses. (Ignition, fuel injection system, and main) Refer to “CHECKING THE FUSES” on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to “CHECKING THE SPARK PLUGS” on page 3-4.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to “CHECKING THE IGNITION SPARK GAP” on page 8-90.	OK →	Ignition system is OK.
NG ↓		
5. Check the ignition coils. Refer to “CHECKING THE IGNITION COILS” on page 8-90.	NG →	Replace the ignition coil(s).
OK ↓		
6. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-91.	NG →	Replace the crankshaft position sensor.
OK ↓		
7. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	Replace the main switch unit.
OK ↓		

8. Check the start/engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-79.
NG → • The start/engine stop switch is faulty. • Replace the right handlebar switch.

OK ↓

9. Check the gear position switch. Refer to “CHECKING THE GEAR POSITION SWITCH” on page 8-97.
NG → Replace the gear position switch.

OK ↓

10. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-79.
NG → Replace the sidestand switch.

OK ↓

11. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-89.
NG → Replace the relay unit.

OK ↓

12. Check the lean angle sensor. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-91.
NG → Replace the lean angle sensor.

OK ↓

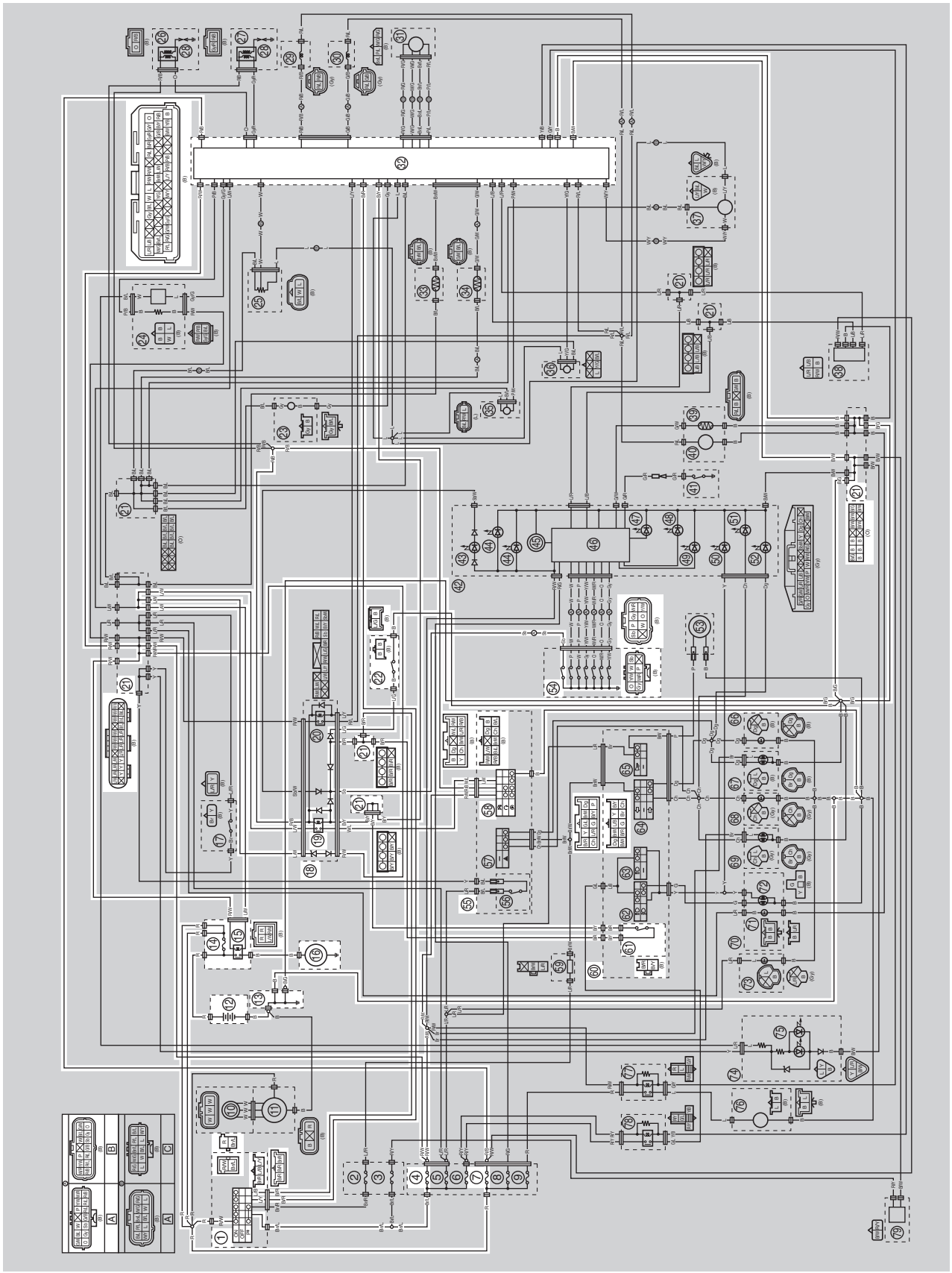
13. Check the entire ignition system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-1.
NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20073
ELECTRIC STARTING SYSTEM

EAS30493
CIRCUIT DIAGRAM



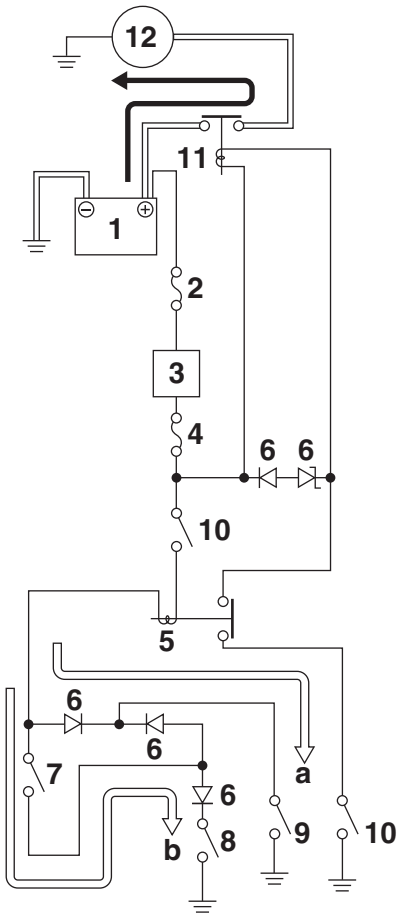
1. Main switch
4. Ignition fuse
7. Fuel injection system fuse
12. Battery
13. Engine ground
14. Main fuse
15. Starter relay
16. Starter motor
18. Relay unit
19. Starting circuit cut-off relay
21. Joint coupler
22. Sidestand switch
32. ECU (engine control unit)
54. Gear position switch
55. Handlebar switch (right)
58. Start/engine stop switch
60. Handlebar switch (left)
61. Clutch switch
A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)

EAS30494
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON" and the "" side of the start/engine stop switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand 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 "" side of the start/engine stop switch.



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Starting circuit cut-off relay
6. Relay unit (diode)
7. Clutch switch
8. Sidestand switch
9. Gear position switch
10. Start/engine stop switch
11. Starter relay
12. Starter motor

EAS30495
TROUBLESHOOTING
The starter motor fails to turn.

TIP
• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank
6. Drive sprocket cover
7. Headlight assembly

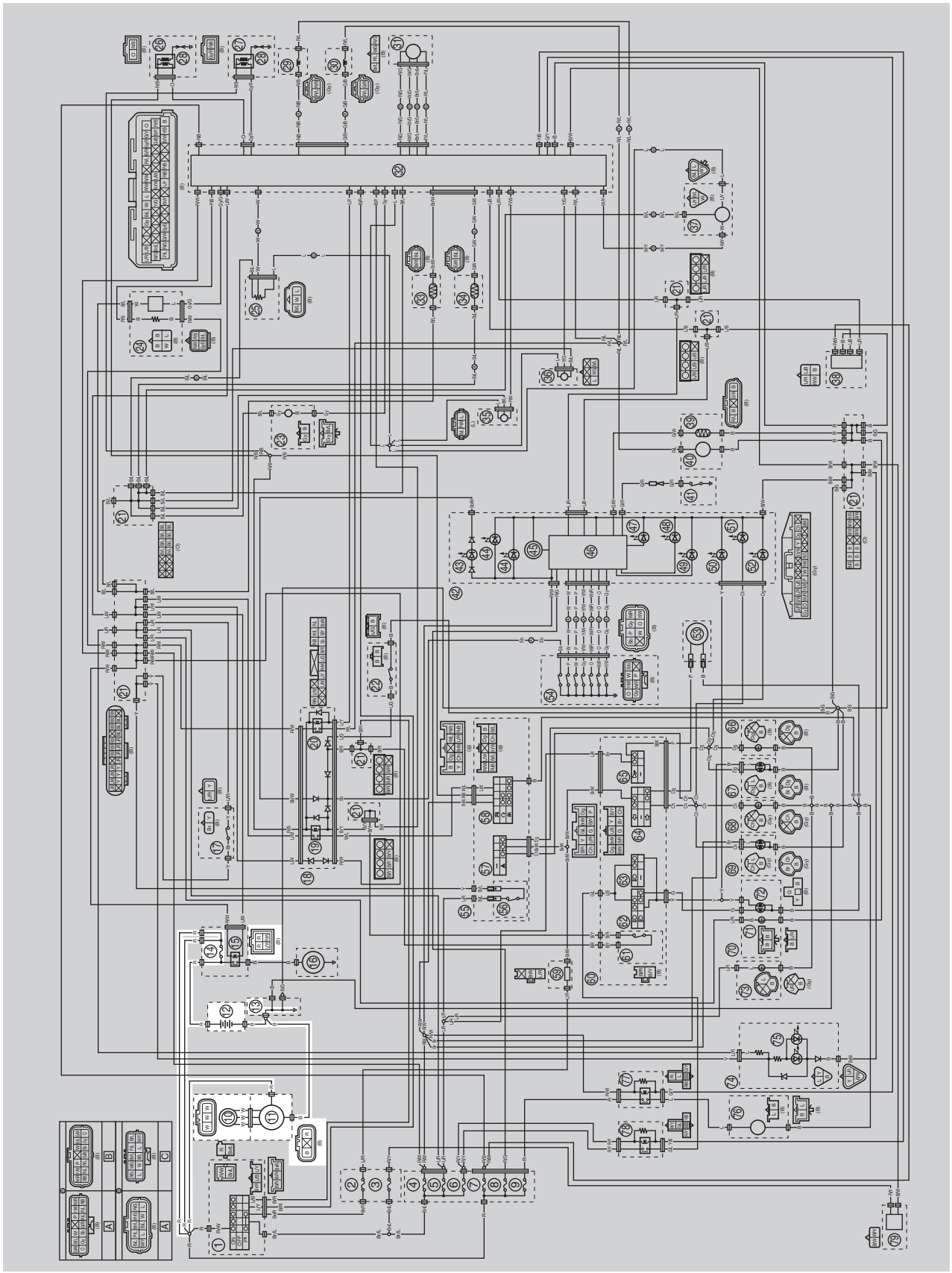
1. Check the fuses. (Ignition, fuel injection system, and main) Refer to “CHECKING THE FUSES” on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 8-92.	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 5-46.	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 8-87.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-89.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to “CHECKING THE RELAYS” on page 8-87.	NG →	Replace the starter relay.
OK ↓		

8. Check the main switch.
   Refer to “CHECKING THE SWITCHES” on page 8-79.
   NG → Replace the main switch unit.
   OK ↓
9. Check the gear position switch.
   Refer to “CHECKING THE GEAR POSITION SWITCH” on page 8-97.
   NG → Replace the gear position switch.
   OK ↓
10. Check the sidestand switch.
    Refer to “CHECKING THE SWITCHES” on page 8-79.
    NG → Replace the sidestand switch.
    OK ↓
11. Check the clutch switch.
    Refer to “CHECKING THE SWITCHES” on page 8-79.
    NG → Replace the clutch switch.
    OK ↓
12. Check the start/engine stop switch.
    Refer to “CHECKING THE SWITCHES” on page 8-79.
    NG →
    • The start/engine stop switch is faulty.
    • Replace the right handlebar switch.
    OK ↓
13. Check the entire starting system wiring.
    Refer to “CIRCUIT DIAGRAM” on page 8-7.
    NG → Properly connect or replace the wiring harness.
    OK ↓

Replace the ECU. Refer to“REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20074
CHARGING SYSTEM

EAS30496
CIRCUIT DIAGRAM



10.AC magneto
11.Rectifier/regulator
12.Battery
13.Engine ground
14.Main fuse

EAS30497
TROUBLESHOOTING

The battery is not being charged.

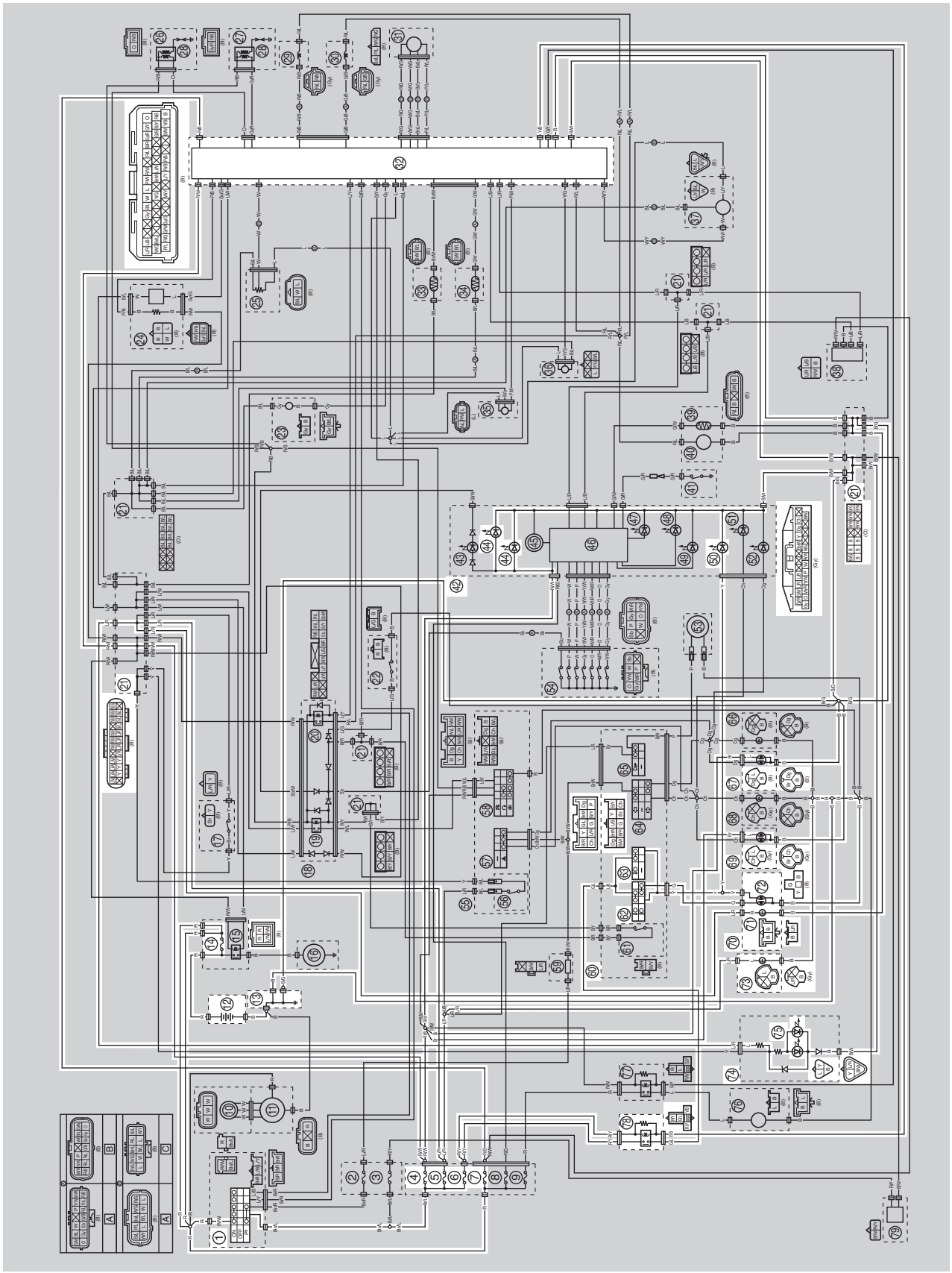
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank cover (left)

1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-83.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-92.	NG →	Replace the stator coil assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-92.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-13.	NG →	Properly connect or replace the wiring harness.
OK ↓		
The charging system circuit is OK.		

EAS20075
LIGHTING SYSTEM

EAS30498
CIRCUIT DIAGRAM



1. Main switch
4. Ignition fuse
5. Signaling system fuse
6. Headlight fuse
7. Fuel injection system fuse
12. Battery
13. Engine ground
14. Main fuse
21. Joint coupler
32. ECU (engine control unit)
42. Meter assembly
44. Meter light
50. High beam indicator light
60. Handlebar switch (left)
62. Dimmer switch
63. Pass switch
67. Front turn signal/position light (right)
69. Front turn signal/position light (left)
70. Headlight assembly
71. Auxiliary light
72. Headlight
73. License plate light
74. Tail/brake light assembly
75. Tail/brake light
78. Headlight relay

EAS30499
TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, position light, license plate light or meter light.

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank
6. Headlight assembly

1. Check the each bulbs and bulb sockets condition. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-82.	NG →	Replace the bulb(s) and bulb socket(s).
OK ↓		
2. Check the fuses. (Ignition, signaling system, headlight, fuel injection system, and main) Refer to “CHECKING THE FUSES” on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	Replace the main switch unit.
OK ↓		
5. Check the dimmer switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	• The dimmer switch is faulty. • Replace the left handlebar switch.
OK ↓		
6. Check the pass switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	• The pass switch is faulty. • Replace the left handlebar switch.
OK ↓		

7. Check the headlight relay.
   Refer to “CHECKING THE RELAYS” on page 8-87.

NG → Replace the headlight relay.

OK ↓

8. Check the entire lighting system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-17.

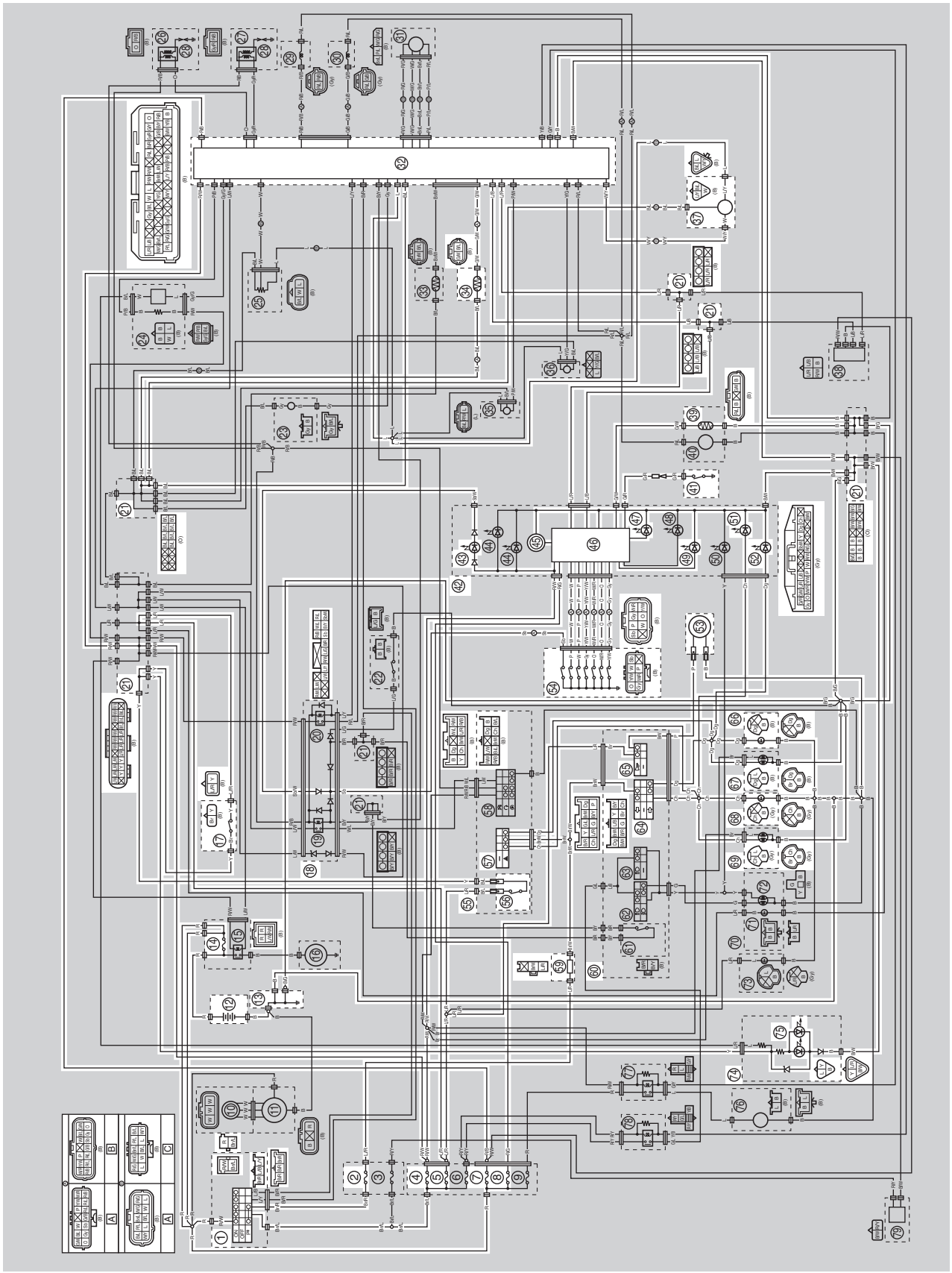
NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU, meter assembly, front turn signal/position light assembly(-ies), or tail/brake light. Refer to“REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20076
SIGNALING SYSTEM

EAS30500
CIRCUIT DIAGRAM



1. Main switch
2. Parking lighting fuse
4. Ignition fuse
5. Signaling system fuse
7. Fuel injection system fuse
8. Backup fuse
12. Battery
13. Engine ground
14. Main fuse
17. Rear brake light switch
18. Relay unit
21. Joint coupler
32. ECU (engine control unit)
34. Coolant temperature sensor
37. Speed sensor
39. Fuel sender
41. Oil pressure switch
42. Meter assembly
43. Neutral indicator light
45. Tachometer
46. Multi-function meter
47. Oil pressure warning light
49. Coolant temperature warning light
51. Turn signal indicator light (left)
52. Turn signal indicator light (right)
53. Horn
54. Gear position switch
55. Handlebar switch (right)
56. Front brake light switch
57. Hazard switch
59. Turn signal/hazard relay
60. Handlebar switch (left)
64. Turn signal switch
65. Horn switch
66. Rear turn signal light (right)
67. Front turn signal/position light (right)
68. Rear turn signal light (left)
69. Front turn signal/position light (left)
74. Tail/brake light assembly
75. Tail/brake light

A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)
C. Sub-wire harness (speed sensor, throttle position sensor, ISC)

EAS30501
TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank
6. Drive sprocket cover
7. Headlight assembly

1. Check the fuses. (Parking lighting, ignition, signaling system, fuel injection system, back-up, and main) Refer to “CHECKING THE FUSES” on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	Replace the main switch unit.
OK ↓		
4. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-21.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Check the condition of each of the signaling system circuits. Refer to “Checking the signaling system”.		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	• The horn switch is faulty. • Replace the left handlebar switch.
OK ↓		

2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-21. — NG → Properly connect or replace the wiring harness.

OK ↓

Replace the horn.

The tail/brake light fails to come on.

1. Check the front brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-79. — NG → Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-79. — NG → Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-21. — NG → Properly connect or replace the wiring harness.

OK ↓

Replace the tail/brake light.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal light bulbs and sockets. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-82. — NG → Replace the turn signal light bulb, socket or both.

OK ↓

2. Check the turn signal switch. Refer to “CHECKING THE SWITCHES” on page 8-79. — NG →
- The turn signal switch is faulty.
- Replace the left handlebar switch.

OK ↓

3. Check the hazard switch. Refer to “CHECKING THE SWITCHES” on page 8-79. — NG →
- The hazard switch is faulty.
- Replace the right handlebar switch.

OK ↓

4. Check the turn signal/hazard relay. Refer to “CHECKING THE RELAYS” on page 8-87. — NG → Replace the turn signal/hazard relay.

OK ↓

5. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.
   NG → Properly connect or replace the wiring harness.
   OK ↓
Replace the meter assembly or turn signal/position light assembly(-ies).

The neutral indicator light fails to come on.

1. Check the gear position switch.
   Refer to “CHECKING THE GEAR POSITION SWITCH” on page 8-97.
   NG → Replace the gear position switch.
   OK ↓
2. Check the relay unit (diode).
   Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-89.
   NG → Replace the relay unit.
   OK ↓
3. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.
   NG → Properly connect or replace the wiring harness.
   OK ↓

Replace the meter assembly.

The oil pressure warning light fails to come on when the main switch is set to “ON”.

1. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.
   NG → Properly connect or replace the wiring harness
   OK ↓
2. Disconnect the oil pressure switch lead from the oil pressure switch, and then check whether the oil pressure warning light comes on when the lead is connected to the engine ground.
   NG → Replace the meter assembly.
   OK ↓

Replace the oil pressure switch.

The oil pressure warning light remains on after the engine is started.

1. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.

NG → Properly connect or replace the wiring harness.

OK ↓

2. Measure the engine oil pressure.
   Refer to “MEASURING THE ENGINE OIL PRESSURE” on page 3-23.

NG → Check the engine oil leakage, oil viscosity, oil seal, oil filter, or oil pump.

OK ↓

Replace the oil pressure switch.

The fuel meter, fuel level warning light, or both fail to come on.

1. Check the fuel sender.
   Refer to “CHECKING THE FUEL SENDER” on page 8-93.

NG → Replace the fuel pump assembly.

OK ↓

2. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.

NG → Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly.

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor.
   Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-94.

NG → Replace the coolant temperature sensor.

OK ↓

2. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.

NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU or meter assembly.
Refer to“REPLACING THE ECU (engine control unit)” on page 8-84.

The speedometer fails to operate.

1. Check the speed sensor.
   Refer to “CHECKING THE SPEED SENSOR” on page 8-94.

NG → Replace the speed sensor.

OK ↓

2. Check the entire speed sensor wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-21.

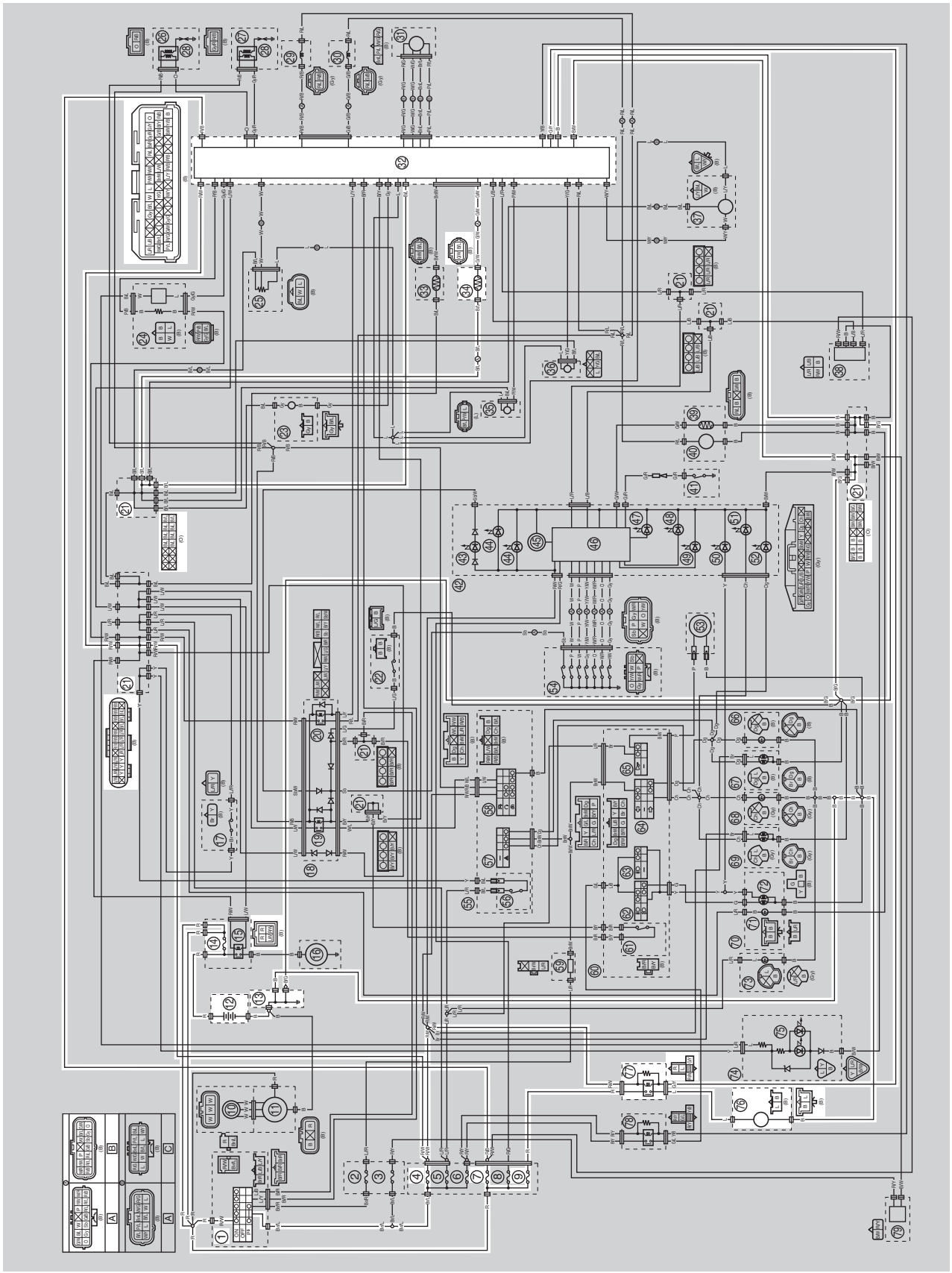
NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU or meter assembly.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20077
COOLING SYSTEM

EAS30502
CIRCUIT DIAGRAM



1. Main switch
4. Ignition fuse
7. Fuel injection system fuse
9. Radiator fan motor fuse
12. Battery
13. Engine ground
14. Main fuse
21. Joint coupler
32. ECU (engine control unit)
34. Coolant temperature sensor
76. Radiator fan motor
77. Radiator fan motor relay
A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)

EAS30503
TROUBLESHOOTING
The radiator fan motor fails to turn.

TIP
• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank

1. Check the fuses. (Ignition, fuel injection system, radiator fan, and main) Refer to "CHECKING THE FUSES" on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-79.	NG →	Replace the main switch unit.
OK ↓		
4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-94.	NG →	Replace the radiator fan motor.
OK ↓		
5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-87.	NG →	Replace the radiator fan motor relay.
OK ↓		
6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-94.	NG →	Replace the coolant temperature sensor.
OK ↓		

7. Check the entire cooling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-29.

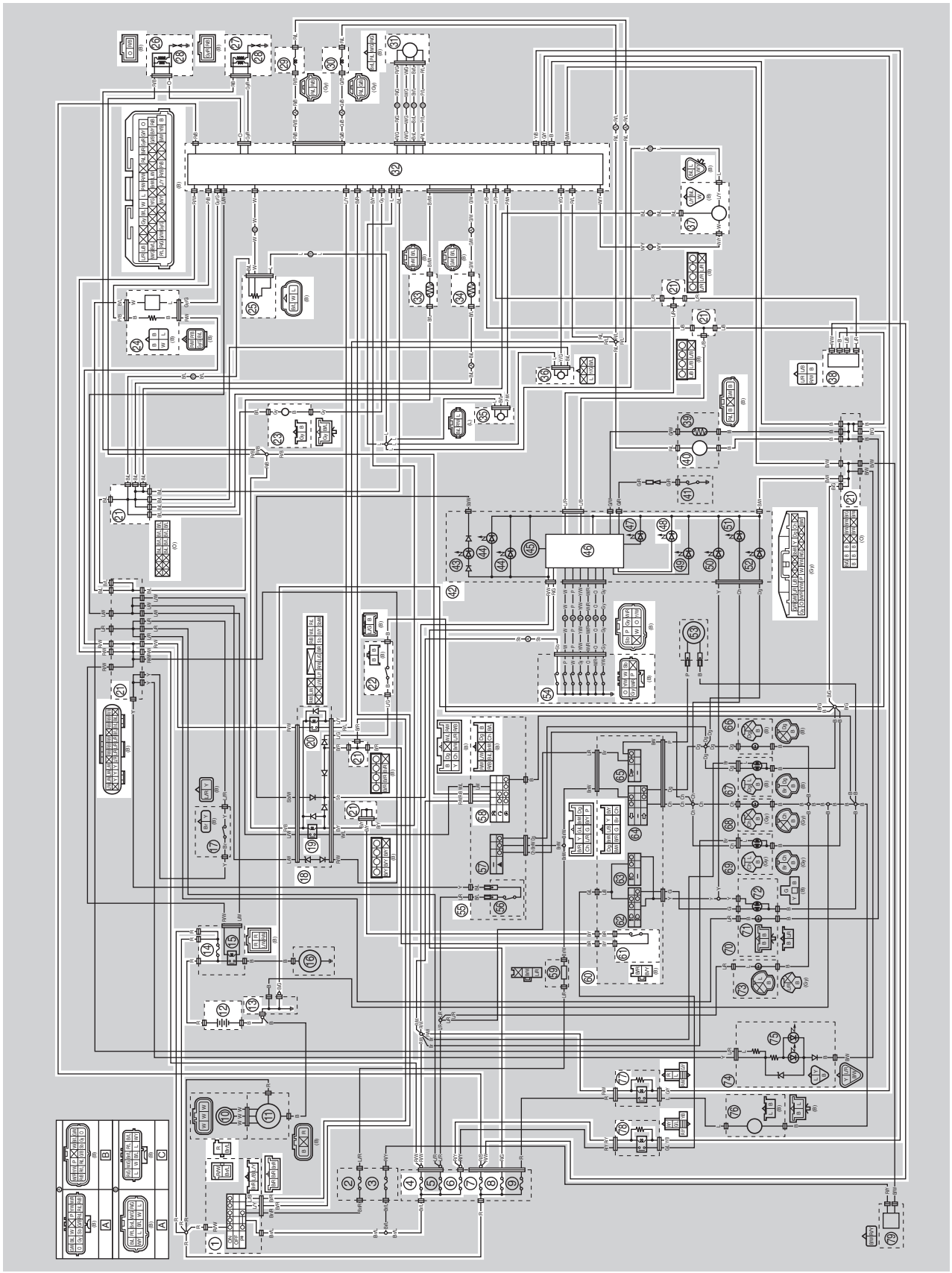
NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20078
FUEL INJECTION SYSTEM

EAS30504
CIRCUIT DIAGRAM



1. Main switch
4. Ignition fuse
6. Headlight fuse
7. Fuel injection system fuse
8. Backup fuse
12. Battery
13. Engine ground
14. Main fuse
18. Relay unit
19. Starting circuit cut-off relay
20. Fuel pump relay
21. Joint coupler
22. Sidestand switch
23. Crankshaft position sensor
24. O_2 sensor
25. Throttle position sensor
26. Ignition coil #1
27. Ignition coil #2
28. Spark plug
29. Fuel injector #1
30. Fuel injector #2
31. ISC (idle speed control) unit
32. ECU (engine control unit)
33. Intake air temperature sensor
34. Coolant temperature sensor
35. Intake air pressure sensor
36. Lean angle sensor
37. Speed sensor
38. Yamaha diagnostic tool coupler
40. Fuel pump
42. Meter assembly
46. Multi-function meter
48. Engine trouble warning light
54. Gear position switch
55. Handlebar switch (right)
58. Start/engine stop switch
60. Handlebar switch (left)
61. Clutch switch
77. Radiator fan motor relay
78. Headlight relay

A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)
C. Sub-wire harness (speed sensor, throttle position sensor, ISC)

EAS30505
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 "㊋" side of the start/engine stop 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 meter display. This number 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 "㊋" side of the start/engine stop switch is pushed:

12:	Crankshaft position sensor	41:	Lean angle sensor (open or short circuit)
19:	Black/red ECU lead (broken or disconnected)	50:	ECU internal malfunction (memory check error)
30:	Lean angle sensor (latch up detected)		

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 "㊋" side of the start/engine stop switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.

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.

EAS30506
TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   - Fault code number

▼▼

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.

▲▲▲

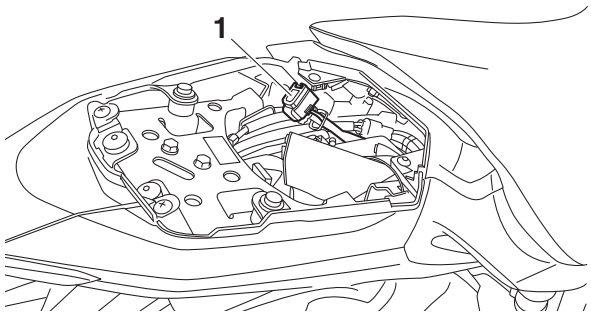
Functions of the Yamaha diagnostic tool

Fault diagnosis mode:	Fault codes recorded on the ECU are read, and the contents are displayed. The freeze frame data (FFD) is the operation data when a malfunction was detected. This data can be used to identify when the malfunction occurred and check the engine conditions and running conditions when it occurred.
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.

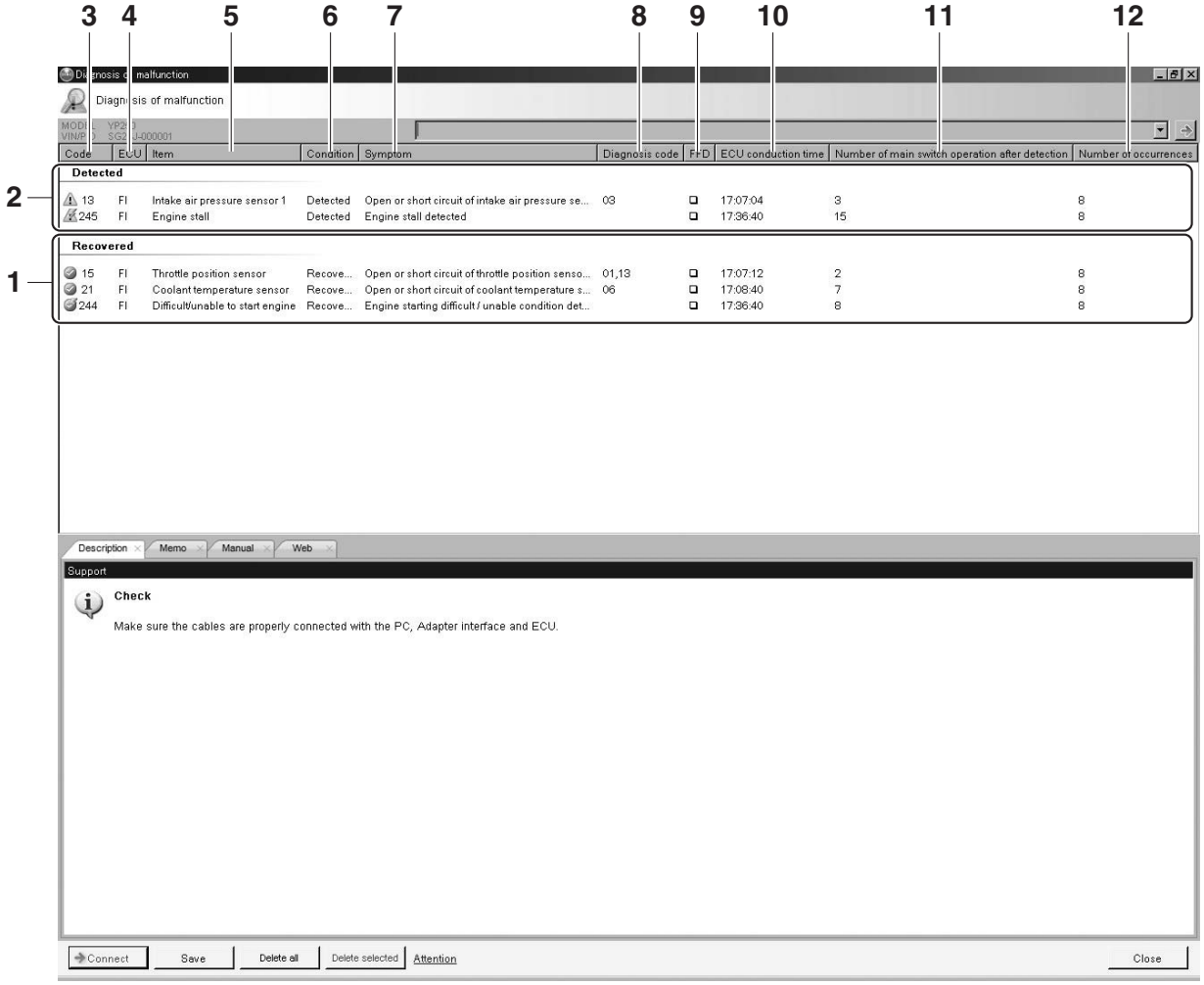
Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.

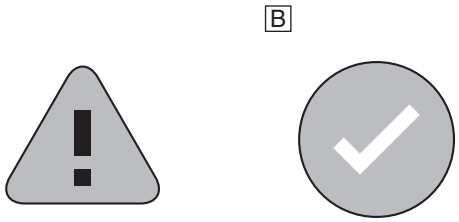


Operation of the Yamaha diagnostic tool (Malfunction mode)

Malfunction results are displayed in the top part of the window area.



1. Recovered
   The item list of the malfunction detected in the past (already recovered) are displayed.
2. Detected
   The item list of the malfunction currently occurred are displayed.
3. Code
   The following icons and the fault code numbers for the detected malfunctions are displayed.



A. Detected malfunction
B. Recovered malfunction

4. ECU
   The types of the control units are displayed.

5. Item
   The item names of the detected malfunction are displayed.
6. Condition
   The current conditions are displayed. (Detected/Recovered)
7. Symptom
   The symptoms of the detected malfunction are displayed.
8. Diagnosis code
   The diagnosis codes related to the detected malfunction are displayed.
9. FFD (only for models that can display freeze frame data)
   The mark "❑" is displayed when the freeze frame data is available.
10. ECU conduction time (hour: minute: second)
    The total ECU conduction time (total hours the vehicle's main switch was ON) when the malfunction was detected is displayed.
11. Number of main switch operation after detection
    The number of times the main switch was turned on between the malfunction detection and code reading is displayed.
12. Number of occurrences
    The number of malfunction occurrences between the malfunction detection and code reading is displayed.

EAS30508
TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. 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 meter display according to the reinstatement method.
Fault code No.:
Fault code number displayed on the meter when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5.

Fault code No. 12

Fault code No.	**12**
Item	**Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	—
Meter display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of crankshaft position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
2	Connection of 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 replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and ECU coupler. gray–gray Between crankshaft position sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
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. Refer to “GENERATOR AND STARTER CLUTCH” on page 5-37.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-91. Replace if defective.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 13

TIP

If fault code numbers “13” and “14” are both indicated, take the actions specified for fault code number “13” first.

Fault code No.	13
Item	Intake air pressure sensor: open or short circuit detected.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	03
Meter display	Displays the intake air pressure.
Procedure	Operate the throttle while pushing the “(≋)” side of the start/engine stop switch. (If the display value changes, the performance is OK.)

Fault code No.	13
Item	Intake air pressure sensor: open or short circuit detected.

Item	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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air pressure sensor coupler and ECU coupler. pink/white–pink/white blue–blue Between intake air pressure sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of intake air pressure sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
5	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the intake air pressure sensor. Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-96.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 14

TIP

If fault code numbers “13” and “14” are both indicated, take the actions specified for fault code number “13” first.

Fault code No.		14	
Item		Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Meter display		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the “≋” side of the start/engine stop switch. (If the display value changes, the performance is OK.)	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

Fault code No.		14	
Item		Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
1	Condition of intake air pressure sensor hose. Check the intake air pressure sensor hose condition.	Clogged or detached hose → 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 → Go to item 2.
2	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Check the intake air pressure sensor. Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-96.	

Fault code No. 15

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		01	
01	Meter display	Throttle position sensor signal • 11–21 (fully closed position) • 96–106 (fully open position)	
	Procedure	• Check with throttle valves fully closed. • Check with throttle valves fully open.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle position sensor coupler and sub-wire harness coupler. black/blue–black/blue white–white blue–blue Between sub-wire harness and ECU coupler. white–white blue–blue Between sub-wire harness and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of throttle position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or adjust the sensor. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-14.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Throttle position sensor resistance.	Measure the throttle position sensor resistance. black/blue–blue Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-95.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Defective throttle position sensor.	Check throttle position sensor signal. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 11–21 is indicated. When throttle valves are fully open: A value of 96–106 is indicated.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 19

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		20	
Meter display		Sidestand switch • “ON” (sidestand retracted) • “OFF” (sidestand extended)	
Procedure		Extend and retract the sidestand (with the transmission in gear).	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of sidestand switch 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 replace the wire harness.	Turn the main switch to “ON”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of relay unit 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 replace the wire harness.	Turn the main switch to “ON”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.	
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between sidestand switch coupler and relay unit coupler. blue/green–blue/green Between relay unit coupler and joint coupler. black/red–black/red Between joint coupler and main switch coupler. black/red–black/red Between main switch coupler and ECU coupler. black/red–black/red	Turn the main switch to “ON”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective sidestand switch.	Execute the diagnostic mode. (Code No. 20) Shift the transmission into gear. Sidestand retracted: “ON” Sidestand extended: “OFF” Replace if defective.	Turn the main switch to “ON”, and then extend and retract the sidestand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 21

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		06	
Meter display		Displays the coolant temperature.	
Procedure		Compare the actually measured coolant temperature with the meter display value.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of coolant temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between coolant temperature sensor coupler and sub-wire harness coupler. green/white–green/white black/blue–black/blue Between sub-wire harness coupler and ECU coupler. green/white–green/white Between sub-wire harness coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of coolant temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-94.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 22

Fault code No.	22
Item	Intake air temperature sensor: open or short circuit detected.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	05
Meter display	Displays the air temperature.

Fault code No.	22
Item	Intake air temperature sensor: open or short circuit detected.
Procedure	Compare the actually measured air temperature with the meter display value.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air temperature sensor coupler and ECU coupler. brown/white–brown/white Between intake air temperature sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of intake air temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. 05) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature. → Check the intake air temperature sensor. Replace if defective. Refer to “CHECKING THE INTAKE AIR TEMPERATURE SENSOR” on page 8-96.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 24

Fault code No.	**24**
Item	**O_2 sensor: no normal signals are received from the O_2 sensor.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Meter display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of O_2 sensor.	Improperly installed sensor → Reinstall or replace the sensor.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of O_2 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 replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of 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 replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between O_2 sensor coupler and ECU coupler. gray/green–gray/green pink/black–pink/black Between O_2 sensor coupler and joint coupler. black/blue–black/blue red/white–red/white Between joint coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue Between joint coupler and ignition fuse. red/white–red/white	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.

Fault code No.		24	
Item		O_2 sensor: no normal signals are received from the O_2 sensor.	
5	Check fuel pressure.	Refer to “CHECKING THE FUEL PRESSURE” on page 7-15.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Defective O_2 sensor.	Check the O_2 sensor. Replace if defective. Refer to “ENGINE REMOVAL” on page 5-3.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 63) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 30

Fault code No.		30	
Item		Latch up detected.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	
Meter 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 65 degrees.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	The vehicle has overturned.	Raise the vehicle upright.	Turn 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 item 2.
2	Installed condition of lean angle sensor.	Check the installed direction and condition of the sensor.	Turn 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 item 3.

Fault code No.		30	
Item		Latch up detected.	
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) Replace if defective. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-91.	Turn 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 item 4.
4	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 33

Fault code No.		33	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		30	
Actuation		Actuates the cylinder-#1 ignition coil five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of cylinder-#1 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 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 item 2.
2	Connection of 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 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 item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder-#1 ignition coil coupler and ECU coupler. orange–orange Between cylinder-#1 ignition coil coupler and right handlebar switch coupler. red/black–red/black	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 item 4.

Fault code No.		33	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
4	Installed condition of cylinder-#1 ignition coil. Check for looseness or pinching.	Improperly installed ignition coil → Reinstall or replace the ignition coil.	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 item 5.
5	Defective cylinder-#1 ignition coil.	Measure the primary coil resistance of the cylinder-#1 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-90.	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 item 6.
6	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 30) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-84.	

Fault code No. 34

Fault code No.		34	
Item		Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		31	
Actuation		Actuates the cylinder-#2 ignition coil five times at one-second intervals. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of cylinder-#2 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 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 item 2.
2	Connection of 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 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 item 3.

Fault code No.		34	
Item		Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder-#2 ignition coil coupler and ECU coupler. gray/red–gray/red Between cylinder-#2 ignition coil coupler and right handlebar switch coupler. red/black–red/black	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 item 4.
4	Installed condition of cylinder-#2 ignition coil. Check for looseness or pinching.	Improperly installed ignition coil → Reinstall or replace the ignition coil.	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 item 5.
5	Defective cylinder-#2 ignition coil.	Measure the primary coil resistance of the cylinder-#2 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-90.	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 item 6.
6	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 31) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-84.	

Fault code No. 37

TIP

- If fault code numbers "37" and "46" are both indicated, take the actions specified for fault code number "46" first.
- If fault code numbers "37" and "42" are both indicated, take the actions specified for fault code number "42" first.

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		54	
Actuation		Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The "CHECK" indicator and " " on the Yamaha diagnostic tool screen comes on during the operation.	
Procedure		The ISC unit vibrates when the ISC valve operates.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
A-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve.	ISC operating sound is heard → Go to item A-2. ISC operating sound is not heard → Go to item B-2 for the defective ISC (idle speed control) unit.
A-2	Incorrect speed sensor signal.	Check the speed sensor. Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value does not increase → Go to fault code No. 42.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-3.
A-3	Throttle valve does not fully close.	Check the throttle body assembly. Refer to “THROTTLE BODIES” on page 7-8 Check the throttle grip free play. Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-27.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-4.
A-4	ISC valve is not moving correctly.	Replace the ISC valve.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-5.
A-5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		54	
Actuation		Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen comes on during the operation.	
Procedure		The ISC unit vibrates when the ISC valve operates.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

Fault code No.		37		
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
B-1	Locate the malfunction.		Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve.	ISC operating sound is heard → Go to item A-2 for the component other than ISC (idle speed control) unit is defective. ISC operating sound is not heard → Go to item B-2.
B-2	Connection of ISC (idle speed control) unit 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-8 and delete the fault code. ISC operating sound is not heard → Go to item B-3.
B-3	Connection of 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-8 and delete the fault code. ISC operating sound is not heard → Go to item B-4.
B-4	Wire harness continuity.		Open or short circuit → Replace the wire harness. Between ISC (idle speed control) unit coupler and sub-wire harness coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue Between sub-harness and ECU coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-8 and delete the fault code. ISC operating sound is not heard → Go to item B-5.
B-5	Installed condition of ISC (idle speed control) unit. Check for looseness or pinching.		Improperly installed ISC (idle speed control) unit → Reinstall the ISC (idle speed control) unit.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-8 and delete the fault code. ISC operating sound is not heard → Go to item B-6.
B-6	ISC valve is not moving correctly.		Replace the ISC valve.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-8 and delete the fault code. ISC operating sound is not heard → Go to item B-7.

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
B-7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	
B-8	Delete the fault code.		Start the engine and let it idle for approximately 10 seconds. Check that the fault code number is not displayed.

Fault code No. 39

Fault code No.		39	
Item		Fuel injector: open or short circuit detected.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		36, 37	
36	Actuation	Actuates fuel injector #1 five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated.	
	Procedure	Check that fuel injector #1 is actuated five times by listening for the operating sound.	
37	Actuation	Actuates fuel injector #2 five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated.	
	Procedure	Check that fuel injector #2 is actuated five times by listening for the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Identify the malfunctioning fuel injector	Execute the diagnostic mode. (Code Nos. 36, 37) Identify the fuel injector that does not produce an operating sound. Perform the following procedures for the defective fuel injector.	
2	Connection of fuel injector #1 and/or fuel injector #2 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 replace the wire harness.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 3. Operating sound → Go to item 7.

Fault code No.		39	
Item		Fuel injector: open or short circuit detected.	
3	Defective fuel injector #1 and/or fuel injector #2.	Measure the fuel injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-98.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 4. Operating sound → Go to item 7.
4	Connection of 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 replace the wire harness.	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 5. Operating sound → Go to item 7.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between fuel injector coupler and sub-wire harness coupler. Fuel injector #1 red/black–red/black red/blue–red/blue Fuel injector #2 green/black–green/black red/blue–red/blue Between sub-wire harness coupler and ECU coupler. Fuel injector #1 red/black–red/black red/blue–red/blue Fuel injector #2 green/black–green/black red/blue–red/blue	Execute the diagnostic mode. (Code Nos. 36, 37) No operating sound → Go to item 6. Operating sound → Go to item 7.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	
7	Delete the fault code.		Start the engine and let it idle for approximately 5 seconds. Check that the fault code number is not displayed.

Fault code No. 41

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.		08	
Meter 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 65 degrees.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**

Fault code No.		41	
Item		Lean angle sensor: open or short circuit detected.	
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 replace the wire harness.	Turn 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 item 2.
2	Connection of 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 replace the wire harness.	Turn 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 item 3.
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 Between lean angle sensor coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Turn 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 item 4.
4	Defective lean angle sensor.	Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-91.	Turn 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 item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 42

Fault code No.	42	
Item	A	Speed sensor: no normal signals are received from the speed sensor.
	B	Gear position switch: open or short circuit is detected.
	C	Clutch switch: open or short circuit is detected.
Fail-safe system	Able to start engine	
	Able to drive vehicle	
Diagnostic code No.	07	
Meter display	Rear wheel speed pulse 0–999	

Fault code No.	42	
Item	A	**Speed sensor: no normal signals are received from the speed sensor.**
	B	**Gear position switch: open or short circuit is detected.**
	C	**Clutch switch: open or short circuit is detected.**
Procedure	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
A-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2.
		Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF”	Incorrect indication → Go to item B-2 for the gear position switch.
		When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: “ON”	Incorrect indication → Go to item C-2 for the clutch switch.
A-2	Connection of speed 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-7 and delete the fault code. Value does not increase → Go to item A-3.
A-3	Connection of 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-7 and delete the fault code. Value does not increase → Go to item A-4.

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
A-4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between speed sensor coupler and sub-wire harness coupler. blue–blue black/blue–black/blue white/yellow–white/yellow Between sub-wire harness coupler and ECU coupler. blue–blue white/yellow–white/yellow Between sub-wire harness coupler and joint coupler. black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-7 and delete the fault code. Value does not increase → Go to item A-5.
A-5	Defective speed sensor	Check the speed sensor. Replace if defective. Refer to “CHECKING THE SPEED SENSOR” on page 8-94.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-7 and delete the fault code. Value does not increase → Go to item A-6.
A-6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	Go to item A-7 and delete the fault code.
A-7	Delete the fault code.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Check that the fault code number is not displayed. The fault code can also be deleted by activating the diagnostic mode and selecting diagnostic code number “63”.

Fault code No.	**42**	
Item	**A**	**Speed sensor: no normal signals are received from the speed sensor.**
	B	**Gear position switch: open or short circuit is detected.**
	C	**Clutch switch: open or short circuit is detected.**
Fail-safe system	Able to start engine	
	Able to drive vehicle	
Diagnostic code No.	21	
Meter display	Neutral • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released)	
Procedure	Operate the transmission and clutch lever.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
B-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2 for the speed sensor.
		Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"	Incorrect indication → Go to item B-2.
		When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"	Incorrect indication → Go to item C-2 for the clutch switch.
B-2	Connection of gear position switch 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-3.
B-3	Connection of 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-4.

Fault code No.		42		
Item		A	Speed sensor: no normal signals are received from the speed sensor.	
		B	Gear position switch: open or short circuit is detected.	
		C	Clutch switch: open or short circuit is detected.	
B-4	Wire harness continuity.		Open or short circuit → Replace the wire harness. Between ECU coupler and joint coupler. black/yellow–black/yellow Between joint coupler and relay unit coupler. black/yellow–black/yellow Between relay unit coupler and sub-wire harness coupler. sky blue–sky blue Between sub-wire harness coupler and gear position switch coupler. sky blue–sky blue	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-5.
B-5	Defective relay unit.		Check the relay unit. Replace if defective. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-89.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-6.
B-6	Defective gear position switch.		Check the gear position switch. Replace if defective. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-97.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-7.
B-7	Faulty shift drum (neutral detection area).		Malfunction → Replace the shift drum. Refer to "TRANSMISSION" on page 5-90.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9 and delete the fault code. Incorrect indication → Go to item B-8.
B-8	Malfunction in ECU.		Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-84.	

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
B-9	Delete the fault code.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Check that the fault code number is not displayed. The fault code can also be deleted by activating the diagnostic mode and selecting diagnostic code number “63”.

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		21	
Meter display		Clutch switch • “ON” (when the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted) • “OFF” (when the clutch lever is squeezed with the transmission in gear and when the sidestand is extended)	
Procedure		Operate the transmission, clutch lever, and sidestand.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
C-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2 for the speed sensor.
		Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF”	Incorrect indication → Go to item B-2 for the gear position switch.
		When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: “ON”	Incorrect indication → Go to item C-2.

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
C-2	Clutch lever adjustment.	Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-12.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-3.
C-3	Connection of clutch switch 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-4.
C-4	Connection of 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 replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-5.

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
C-5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between clutch switch coupler and left handlebar switch coupler. black/red–black/red black/yellow–black/yellow Between left handlebar switch coupler and joint coupler. black/red–black/red black/yellow–black/yellow Between joint coupler and relay unit coupler. black/red–black/red black/yellow–black/yellow Between joint coupler and ECU coupler. black/red–black/red black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-6.
C-6	Defective relay unit.	Check the relay unit. Replace if defective. Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-89.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-7.
C-7	Defective clutch switch.	Check the clutch switch. Replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-79.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-9 and delete the fault code. Incorrect indication → Go to item C-8.
C-8	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Gear position switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
C-9	Delete the fault code.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Check that the fault code number is not displayed. The fault code can also be deleted by activating the diagnostic mode and selecting diagnostic code number “63”.

Fault code No. 43

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		09, 50	
09	Meter display	Fuel system voltage (battery voltage) Approximately 12.0	
	Procedure	Set the start/engine stop switch to “ ”, and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)	
50	Actuation	Actuates the relay unit five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on each time the relay is actuated. (When the relay is on, the “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen go off. When the relay is off, the “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on.)	
	Procedure	Check that the relay unit is actuated five times by listening for the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of relay unit 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 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 item 2.

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
2	Connection of 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 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 item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. red/blue–red/blue blue/yellow–blue/yellow Between relay unit coupler and joint coupler. red/white–red/white Between joint coupler and ignition fuse. red/white–red/white Between ignition fuse and main switch coupler. brown/blue–brown/blue Between main switch coupler and starter relay coupler. red–red Between starter relay coupler and battery terminal. red–red	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 item 4.
4	Defective relay unit.	Execute the diagnostic mode. (Code No. 50) No operating sound → Replace the relay unit.	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 item 5.
5	Defective relay unit.	Execute the diagnostic mode. (Code No. 09) Fuel system voltage is below 3 V → Replace the relay unit.	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 item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 44

Fault code No.	44
Item	EEPROM fault code number: an error is detected while reading or writing on EEPROM.
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	60

Fault code No.	**44**
Item	**EEPROM fault code number: an error is detected while reading or writing on EEPROM.**
Meter display	EEPROM fault code display • 00 (no history) • 01–02: Cylinder fault code number (history exists) If more than one cylinder is defective, the display switches every two seconds to show the cylinder fault code numbers of all defective cylinders in a repeating cycle. • 11: Data error for ISC (idle speed control) learning values (history exists)
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction	Execute the diagnostic mode. (Code No. 60) Replace ECU if defective.	
2	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. 46

Fault code No.	**46**
Item	**Charging voltage is abnormal.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Meter display	—
Procedure	—

Item	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 8-13. Defective rectifier/regulator or AC magneto → Replace. Defective connection in the charging system circuit → Properly connect or 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 → Repeat the maintenance job.

Fault code No. 50

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 display.)**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—
Meter 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 display.)
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	Turn the main switch to “ON”. Check that the fault code number is not displayed.

Fault code No. 89 (Yamaha diagnostic tool)

Fault code No.	89 (Yamaha diagnostic tool)
Item	Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Meter display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of meter assembly 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter assembly coupler and joint coupler. blue/black–blue/black blue/red–blue/red Between joint coupler and ECU coupler. blue/black–blue/black blue/red–blue/red	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.

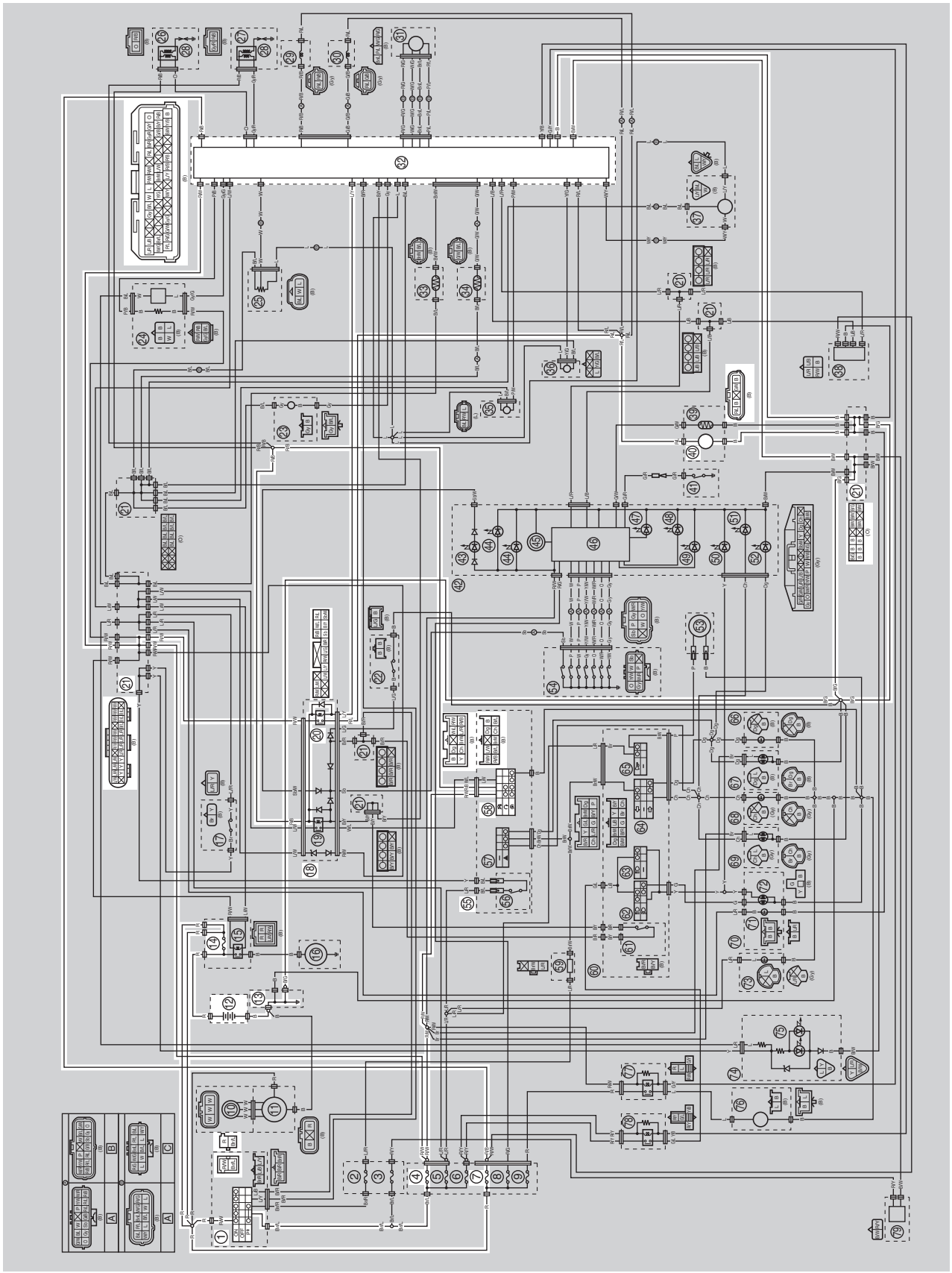
Fault code No.		89 (Yamaha diagnostic tool)	
Item		Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

Fault code No. Err (meter display)

Fault code No.		Err (meter display)	
Item		Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Meter display		—	
Procedure		—	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of meter assembly 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of 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 replace the wire harness.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter assembly coupler and joint coupler. blue/black–blue/black blue/red–blue/red Between joint coupler and ECU coupler. blue/black–blue/black blue/red–blue/red	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to “ON”. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.	

EAS20081
FUEL PUMP SYSTEM

EAS30513
CIRCUIT DIAGRAM



1. Main switch
4. Ignition fuse
7. Fuel injection system fuse
12. Battery
13. Engine ground
14. Main fuse
18. Relay unit
20. Fuel pump relay
21. Joint coupler
32. ECU (engine control unit)
40. Fuel pump
55. Handlebar switch (right)
58. Start/engine stop switch

EAS30514
TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Center cover
4. Fuel tank side covers
5. Fuel tank
6. Headlight assembly

1. Check the fuses. (Ignition, fuel injection system, and main) Refer to “CHECKING THE FUSES” on page 8-83.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-84.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	Replace the main switch unit.
OK ↓		
4. Check the start/engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-79.	NG →	• The start/engine stop switch is faulty. • Replace the right handlebar switch.
OK ↓		
5. Check the relay unit (fuel pump relay). Refer to “CHECKING THE RELAYS” on page 8-87.	NG →	Replace the relay unit.
OK ↓		
6. Check the fuel pump. Refer to “CHECKING THE FUEL PUMP BODY” on page 7-4.	NG →	Replace the fuel pump assembly.
OK ↓		

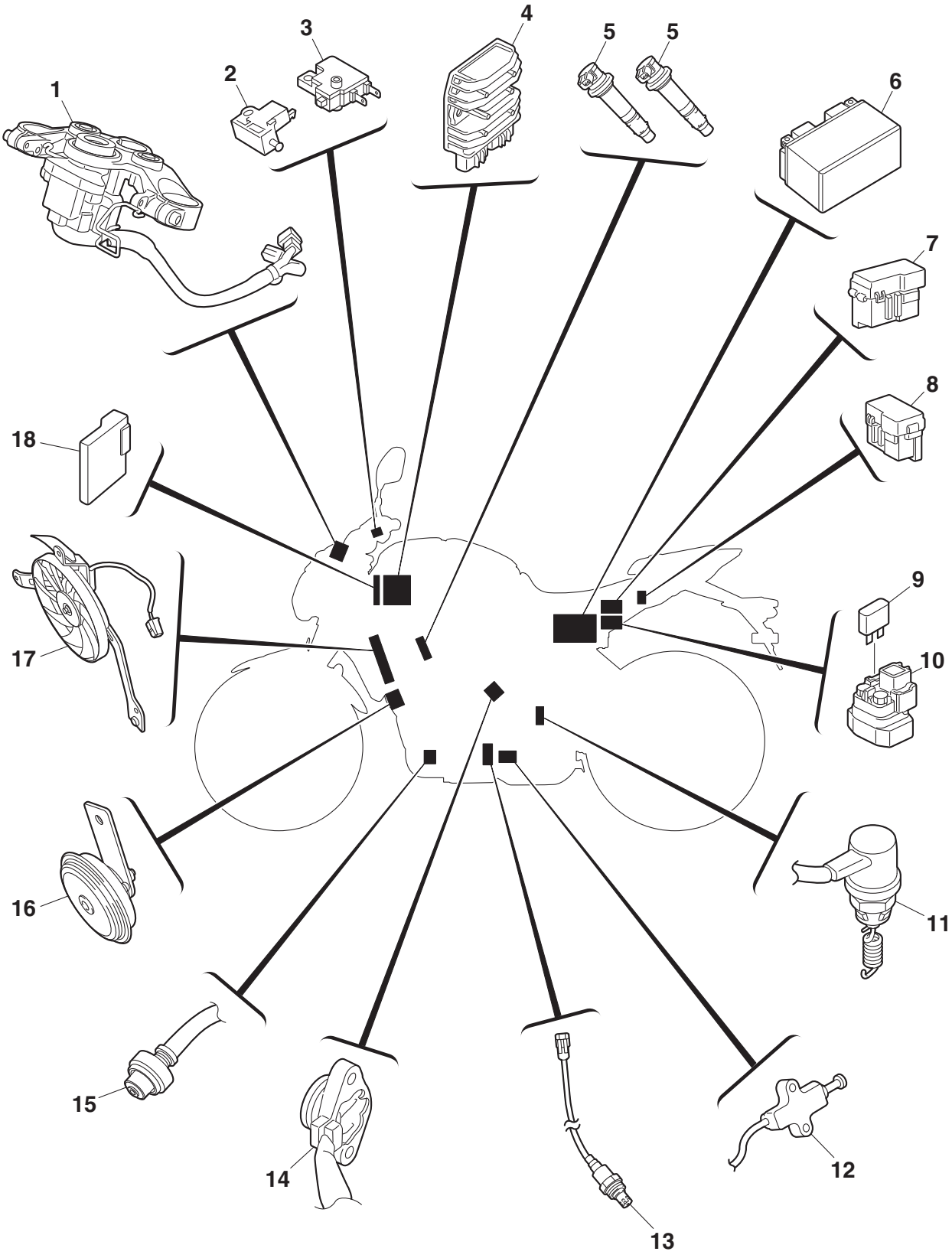
7. Check the entire fuel pump system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-71.

NG → Properly connect or replace the wiring harness.

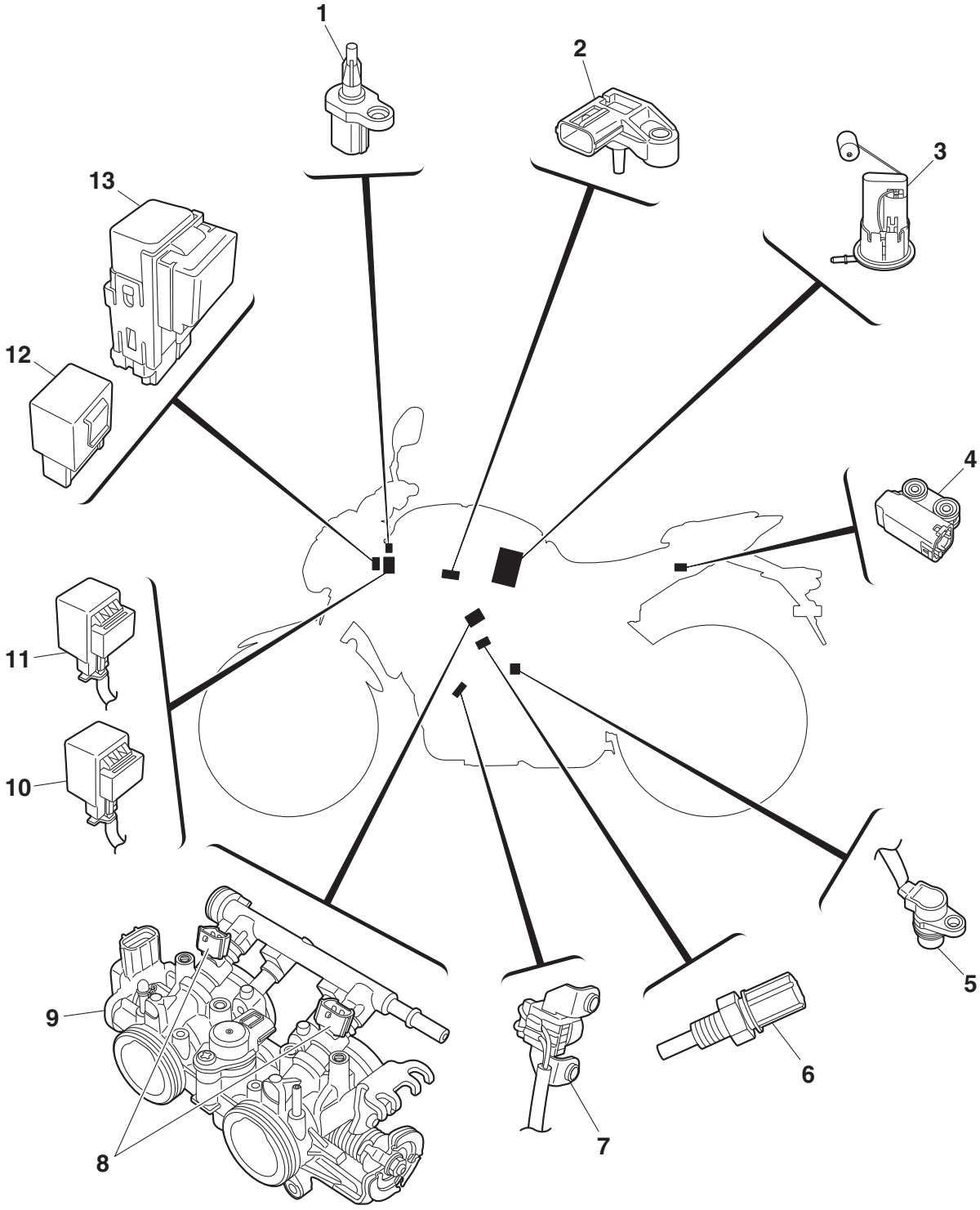
OK ↓

Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-84.

EAS20089
ELECTRICAL COMPONENTS

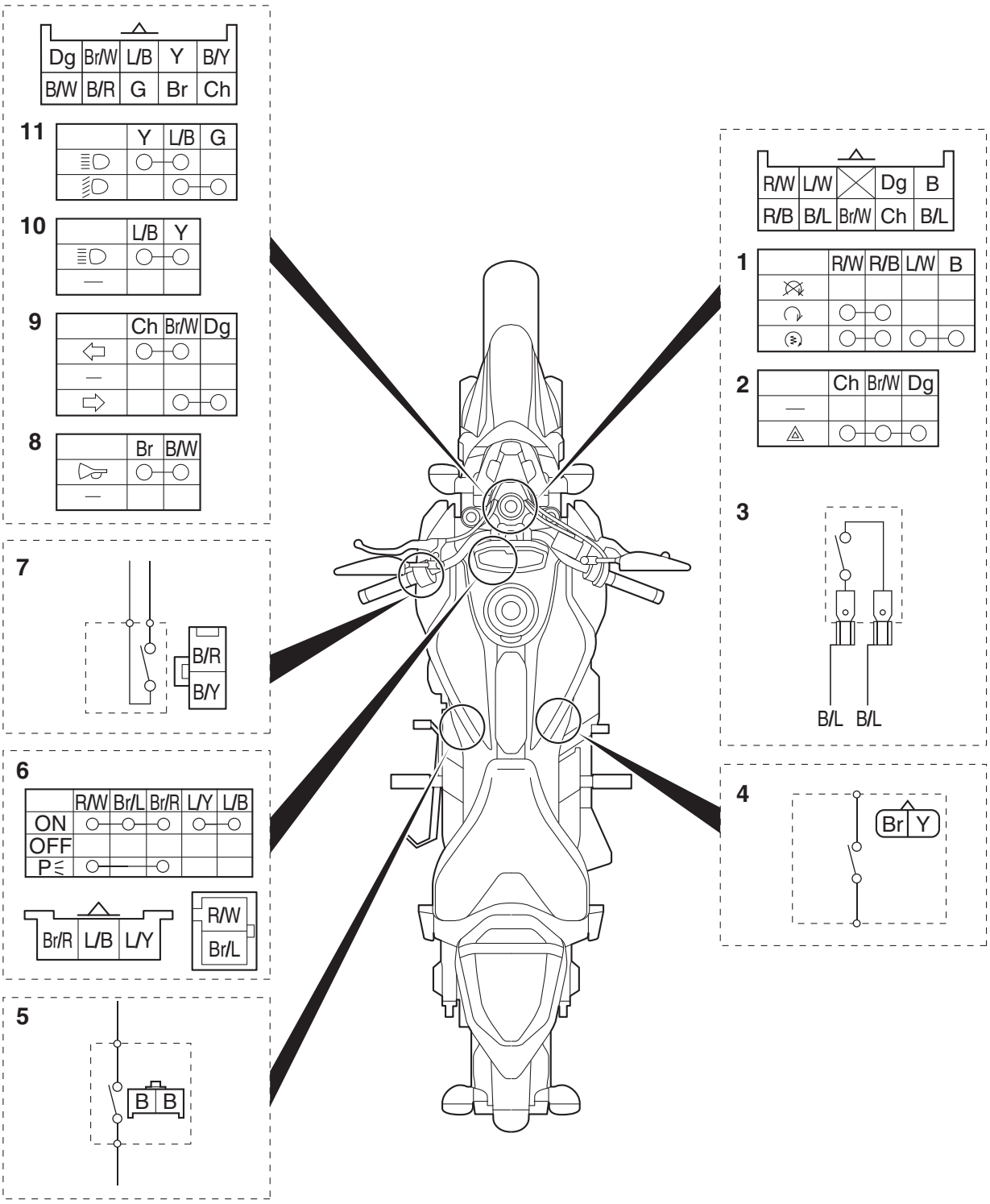


1. Main switch
2. Front brake light switch
3. Clutch switch
4. Rectifier/regulator
5. Ignition coil
6. Battery
7. Fuse box 1
8. Fuse box 2
9. Main fuse
10. Starter relay
11. Rear brake light switch
12. Sidestand switch
13. O_2 sensor
14. Gear position switch
15. Oil pressure switch
16. Horn
17. Radiator fan motor
18. ECU (engine control unit)


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1. Intake air temperature sensor
2. Intake air pressure sensor
3. Fuel pump
4. Lean angle sensor
5. Speed sensor
6. Coolant temperature sensor
7. Crankshaft position sensor
8. Fuel injector
9. Throttle position sensor
10. Radiator fan motor relay
11. Headlight relay
12. Relay unit
13. Turn signal/hazard relay

EAS30549
CHECKING THE SWITCHES



1. Start/engine stop switch
2. Hazard switch
3. Front brake light switch
4. Rear brake light switch
5. Sidestand switch
6. Main switch
7. Clutch switch
8. Horn switch
9. Turn signal switch
10. Pass switch
11. Dimmer 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.

ECA18520

NOTICE

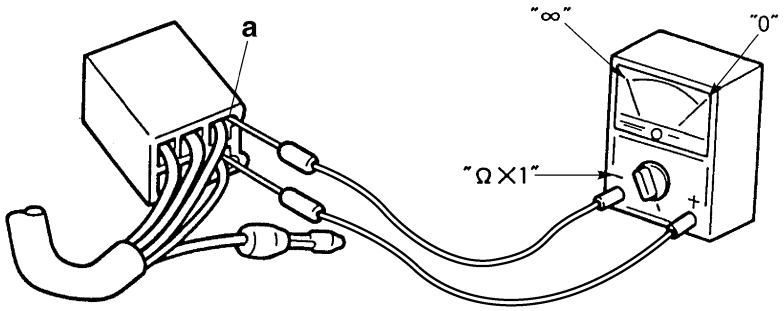
Never insert the tester probes into the coupler terminal slots "a". Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



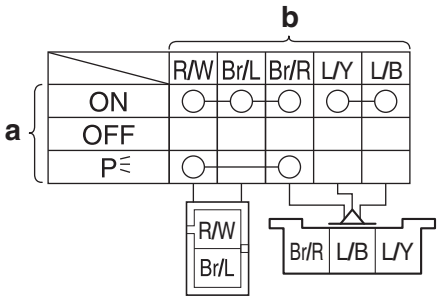
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

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 switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by " ○——○ ".
There is continuity between red/white, brown/blue and brown/red and between blue/yellow and blue/black when the switch is set to "ON".
There is continuity between red/white and brown/red when the switch is set to "P≦".

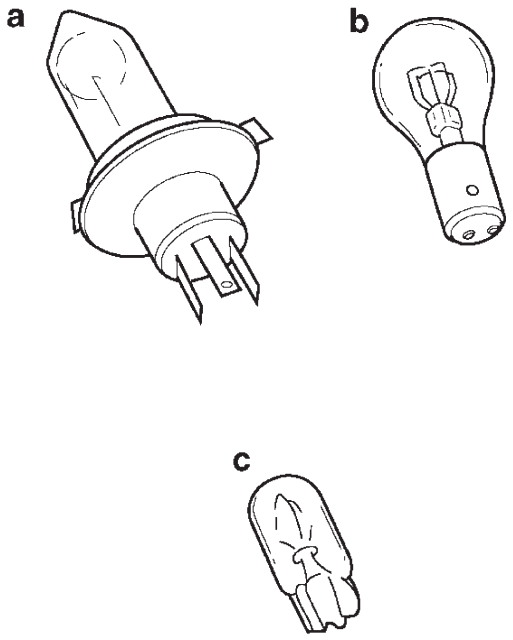


EAS30550
CHECKING THE BULBS AND BULB SOCKETS

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" 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 "b" are used for turn signal lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs "c" are used for license plate and auxiliary lights and can be removed from their respective sockets by carefully pulling them out.



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.

ECA14381
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 a 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.**

2. Check:
   - Bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

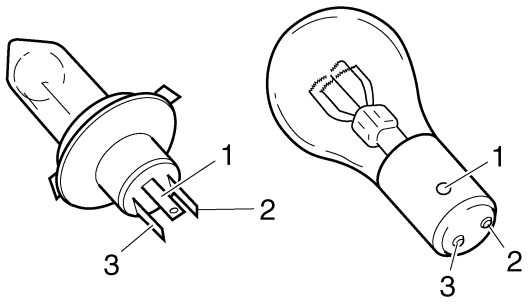


Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.

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.



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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EAS30551
CHECKING THE FUSES
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:
   • Rider seat
   • Passenger seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   • Center cover
   Refer to "GENERAL CHASSIS (2)" on page 4-3.
2. Check:
   • Fuse

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a. Connect the pocket tester to the fuse and check the continuity.

TIP

Set the pocket tester selector to "Ω × 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:
   • Blown fuse

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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	30 A	1
Headlight	15 A	1
Signaling system	10 A	1
Ignition	10 A	1
Fuel injection system	10 A	1
Radiator fan motor	10 A	1
Parking lighting	10 A	1
Backup	7.5 A	1
Auxiliary	2.0 A	1
Spare	30 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1
Spare	2.0 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:
   • Center cover
   Refer to "GENERAL CHASSIS (2)" on page 4-3.

- Rider seat
- Passenger seat
  Refer to"GENERAL CHASSIS (1)" on page 4-1.

EAS31006
REPLACING THE ECU (engine control unit)

1. Turn the main switch to "OFF".
2. Replace the ECU (engine control unit).
   Refer to "REMOVING THE ECU (engine control unit)" on page 4-17.
3. Clean the ISC (idle speed control).
   Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) VALVE" on page 7-11.
4. Check:
   - Engine idling speed
     Start the engine, warm it up, and then measure the engine idling speed.

	Engine idling speed 1100–1300 r/min

EAS30552
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.**

ECA13661
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.**

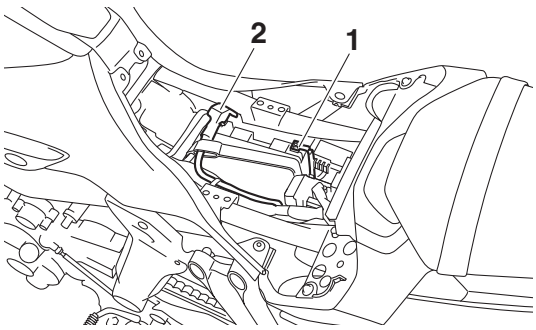
TIP

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:
   - Rider seat
   - Seat bracket
     Refer to "GENERAL CHASSIS (1)" 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
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

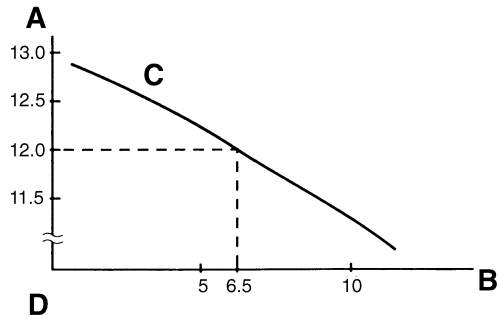
• Positive tester probe → positive battery terminal • Negative tester probe → negative battery terminal

TIP

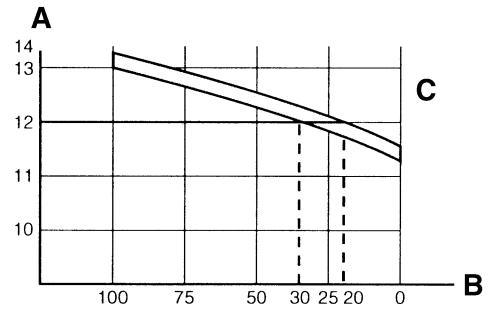
- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

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

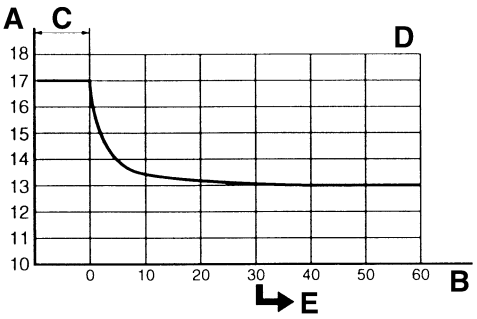
Do not quick charge a battery.

ECA13671

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.

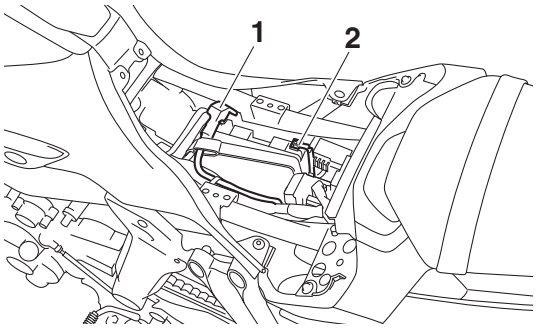
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6. Install:
   • Battery
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
7. Connect:
   • Battery leads
   (to the battery terminals)

ECA13630

NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



8. Check:
   • Battery terminals
   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
9. Lubricate:
   • Battery terminals

Recommended lubricant
Dielectric grease

10. Install:
   • Seat bracket
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

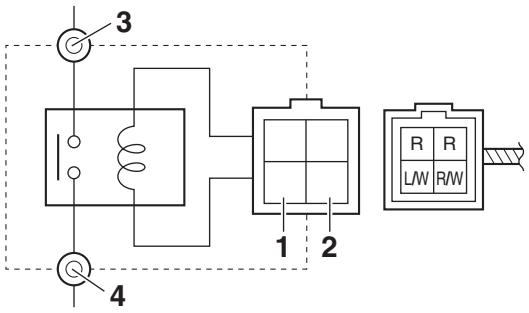
CHECKING THE RELAYS

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 ($\Omega \times 1$) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

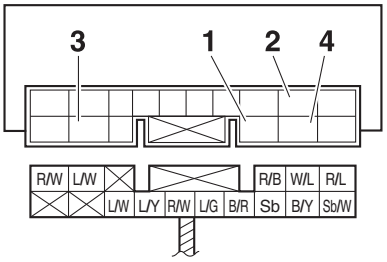
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Relay operation
Continuity
(between "3" and "4")

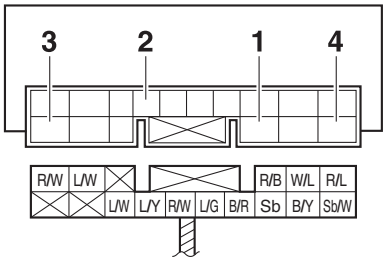
Relay unit (starting circuit cut-off relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Relay unit (fuel pump relay)

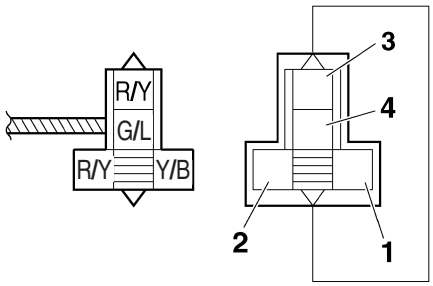


1. Positive battery terminal

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

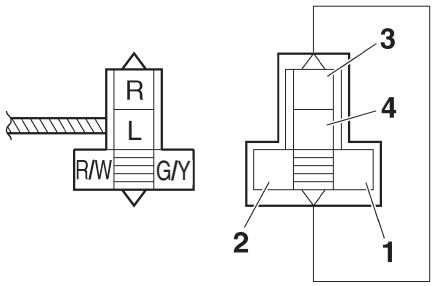
Headlight relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

EAS30794
CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:
   • Turn signal/hazard relay input voltage
   Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and replace the wire harness.

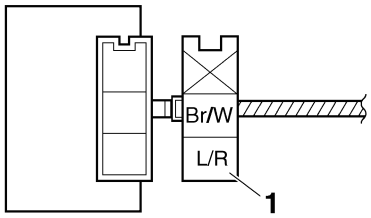
Turn signal/hazard relay input voltage
DC 12V

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

• Positive tester probe
Blue/red “1”
• Negative tester probe
Ground



b. Turn the main switch to “ON”.
c. Measure the turn signal/hazard relay input voltage.

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2. Check:
   • Turn signal/hazard relay output voltage
   Out of specification → Replace.

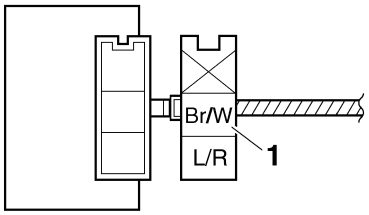
Turn signal/hazard relay output voltage
DC 12V

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

- Positive tester probe
  Brown/white “1”
- Negative tester probe
  Ground



b. Turn the main switch to “ON”.
c. Measure the turn signal/hazard relay output voltage.

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EAS30795
CHECKING THE RELAY UNIT (DIODE)

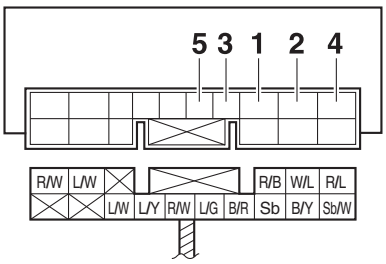
1. Check:
   - Relay unit (diode)
     Out of specification → Replace.

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

TIP

The pocket tester or the analog pocket tester readings are shown in the following table.

Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Black/yellow “2”
No continuity
Positive tester probe
Black/yellow “2”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Blue/red “3”
No continuity
Positive tester probe
Blue/red “3”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Sky blue/white “4”
No continuity
Positive tester probe
Sky blue/white “4”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Blue/green “5”
Negative tester probe
Black/red “3”
No continuity
Positive tester probe
Black/red “3”
Negative tester probe
Blue/green “5”



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a. Disconnect the relay unit coupler from the wire harness.
b. Connect the pocket tester ($\Omega \times 1$) to the relay unit terminal as shown.

c. Check the relay unit (diode) for continuity.
d. Check the relay unit (diode) for no continuity.

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EAS30558
CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

1. Check:
   • Primary coil resistance
   Out of specification → Replace.

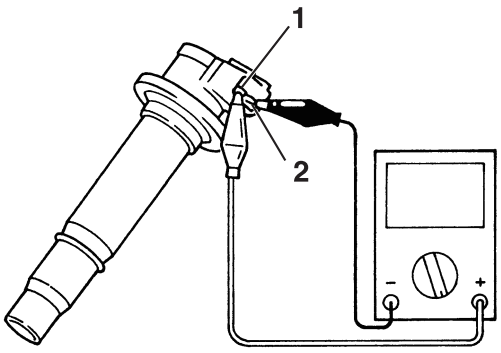
Primary coil resistance
1.19–1.61 Ω

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a. Disconnect the ignition coil coupler from the ignition coil.
b. 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
  Ignition coil terminal "1"
• Negative tester probe
  Ignition coil terminal "2"



c. Measure the primary coil resistance.

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2. Check:
   • Secondary coil resistance
   Out of specification → Replace.

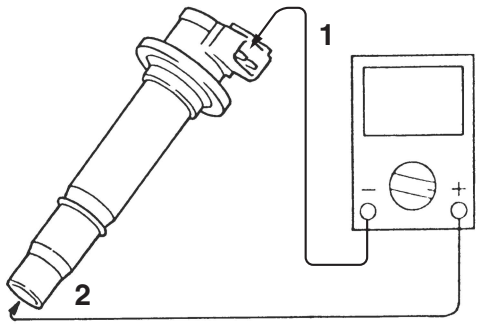
Secondary coil resistance
8.50–11.50 kΩ

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a. Connect the pocket tester (Ω × 1 k) to the ignition coil as shown.

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

• Negative tester probe
  Ignition coil terminal "1"
• Positive tester probe
  Spark plug terminal "2"



b. Measure the secondary coil resistance.

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EAS30556
CHECKING THE IGNITION SPARK GAP

1. Check:
   • Ignition spark gap
   Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to "TROUBLESHOOTING" on page 8-4.

Minimum ignition spark gap
6.0 mm (0.24 in)

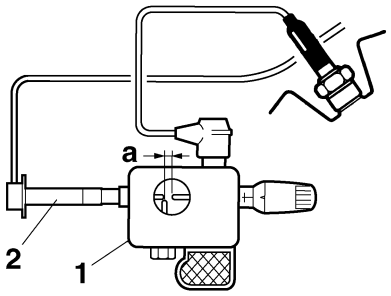
TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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a. Remove the ignition coil from the spark plug.
b. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Oppama pet–4000 spark checker
YM-34487



2. Ignition coil

c. Turn the main switch to "ON".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the "≋" side of the start/engine stop switch and gradually increase the spark gap until a misfire occurs.

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EAS30560

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.

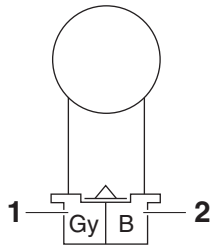
Crankshaft position sensor resistance
228–342 Ω

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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
Gray "1"
• Negative tester probe
Black "2"



b. Measure the crankshaft position sensor resistance.

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EAS30561

CHECKING THE LEAN ANGLE SENSOR

1. Remove:
   • Lean angle sensor (from the battery box.)
2. Check:
   • Lean angle sensor output voltage
   Out of specification → Replace.

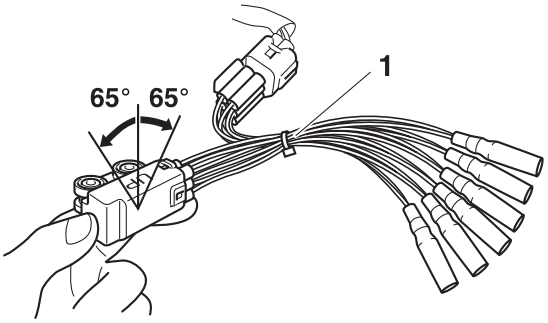
Lean angle sensor output voltage
Less than 65°: 0.4–1.4 V
More than 65°: 3.7–4.4 V

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a. Connect the test harness– lean angle sensor (6P) "1" to the lean angle sensor and wire harness as shown.
b. Connect the pocket tester (DC 20 V) to the test harness– lean angle sensor (6P).

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness– lean angle sensor (6P)
90890-03209
Test harness– lean angle sensor (6P)
YU-03209

• Positive tester probe
Yellow/green (wire harness color)
• Negative tester probe
Black/blue (wire harness color)



c. Set the main switch to "ON".
d. Turn the lean angle sensor to 65°.
e. Measure the lean angle sensor output voltage.

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EAS30562
CHECKING THE STARTER MOTOR OPERATION

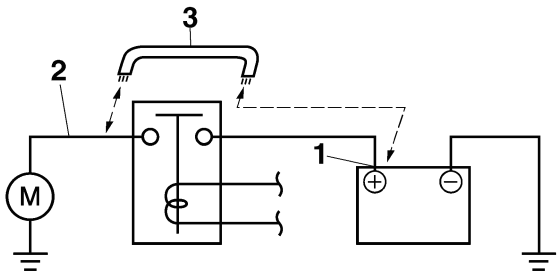
1. Check:
   • Starter motor operation
   Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
   Refer to "TROUBLESHOOTING" on page 8-10.

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a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810
⚠ WARNING

• A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
• This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



b. Check the starter motor operation.

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EAS30566
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
0.128–0.192 Ω (W-W)

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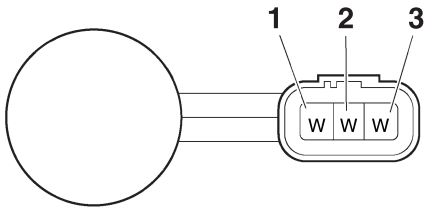
a. Connect the digital circuit tester to the stator coil coupler as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

• 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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EAS30680
CHECKING THE RECTIFIER/REGULATOR

1. Check:
   • Charging voltage
   Out of specification → Replace the rectifier/regulator.

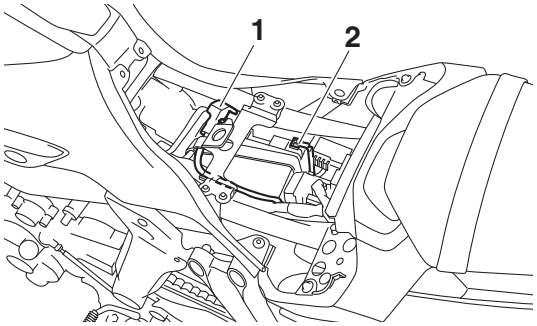
Charging voltage
14 V at 5000 r/min

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a. Connect the pocket tester (DC 20 V) to the battery terminals as shown.

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

- Positive tester probe
  Positive battery terminal “1”
- Negative tester probe
  Negative battery terminal “2”



b. Start the engine and let it run at approximately 5000 r/min.
c. Measure the charging voltage.

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EAS30573
CHECKING THE FUEL SENDER

1. Disconnect:
   - Fuel pump coupler
     (from the fuel pump)
2. Remove:
   - Fuel tank
3. Remove:
   - Fuel pump
     (from the fuel tank)
4. Check:
   - Fuel sender resistance
     Out of specification → Replace the fuel pump assembly.

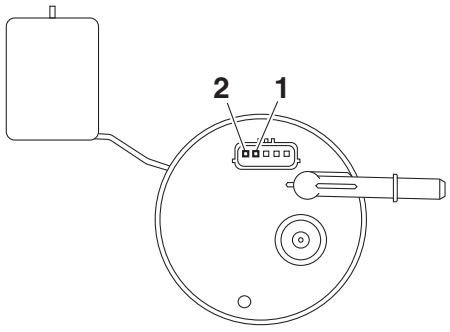
Sender unit resistance (full)
9.0–11.0 Ω
Sender unit resistance (empty)
213.0–219.0 Ω

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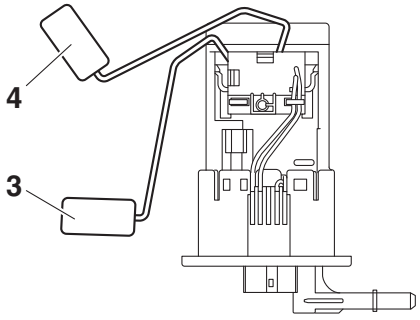
a. Connect the pocket tester (Ω × 10/ × 100) to the fuel sender terminals as shown.

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

- Positive tester probe
  Fuel pump terminal “1”
- Negative tester probe
  Fuel pump terminal “2”



b. Move the fuel sender float to minimum “3” and maximum “4” level position.



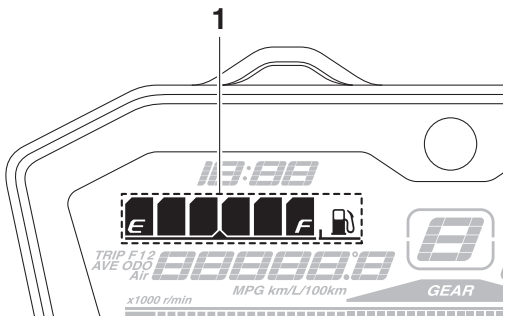
c. Measure the fuel sender resistance.

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EAS30938
CHECKING THE FUEL METER/FUEL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

1. Check:
   - Fuel meter/fuel level warning light “1”
     (Turn the main switch to “ON”.)
     Warning light comes on for a few seconds, then goes off → Warning light is OK.
     Warning light does not come on → Replace the meter assembly.
     Warning light flashes eight times, then goes off for 3 seconds in a repeated cycle (malfunction detected in fuel sender) → Replace the fuel pump assembly.



EAS30576
CHECKING THE SPEED SENSOR

1. Check:
   • Speed sensor output voltage
   Out of specification → Replace.

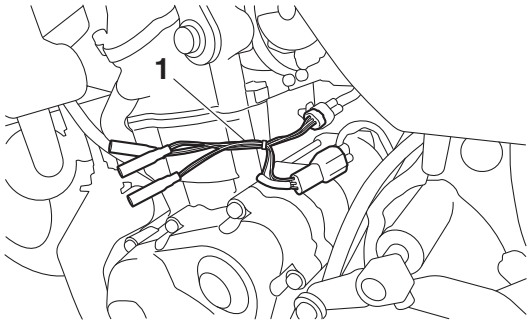
	Output voltage reading cycle **0.6 V to 4.8 V to 0.6 V to 4.8 V**

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a. Connect the test harness– speed sensor (3P) "1" to the speed sensor and wire harness as shown.
b. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C** **Test harness– speed sensor (3P)** **90890-03208** **Test harness– speed sensor (3P)** **YU-03208**

• Positive tester probe White/yellow (wire harness color) • Negative tester probe Black/blue (wire harness color)



c. Set the main switch to "ON".
d. Elevate the rear wheel and slowly rotate it.
e. Measure the voltage of white/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

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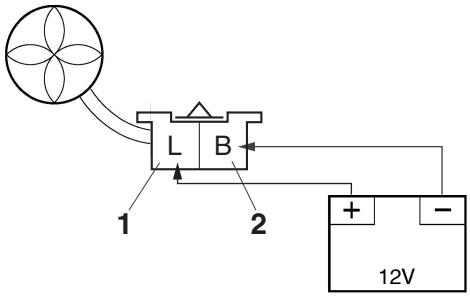
EAS30577
CHECKING THE RADIATOR FAN MOTOR

1. Check:
   • Radiator fan motor
   Faulty/rough movement → Replace.

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a. Disconnect the radiator fan motor coupler from the wire harness.
b. Connect the battery (DC 12 V) as shown.

• Positive tester probe Blue "1" • Negative tester probe Black "2"



c. Measure the radiator fan motor movement.

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EAS30578
CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   • Coolant temperature sensor
   Refer to "CYLINDER HEAD" on page 5-23.

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 **2510–2780 Ω at 20 °C (2510–2780 Ω at 68 °F)**

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a. Connect the pocket tester (Ω × 1 k) to the coolant temperature sensor as shown.

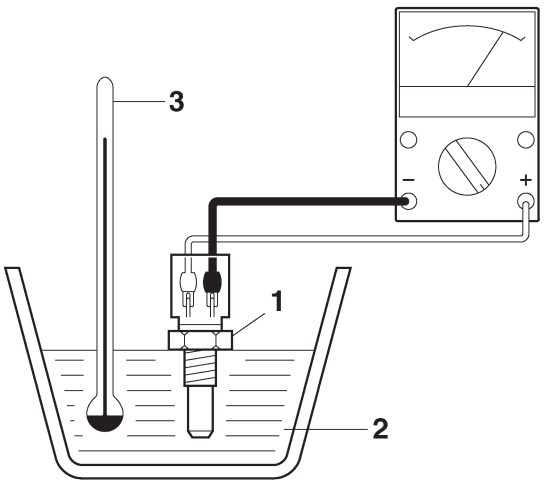
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

TIP

Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the coolant.



d. Heat the coolant or let it cool down to the specified temperatures.
e. Measure the coolant temperature sensor resistance.

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3. Install:
   • Coolant temperature sensor

Coolant temperature sensor
16 Nm (1.6 m·kgf, 12 ft·lbf)

EAS30581
CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   • Throttle position sensor (from the throttle body)

EWA16690

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.

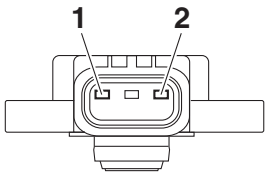
Resistance
2.64–6.16 kΩ

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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
  Sensor terminal "1"
- Negative tester probe
  Sensor terminal "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 7-14.

EAS30593
CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
   • Intake air pressure sensor output voltage
   Out of specification → Replace.

Intake air pressure sensor output voltage
4.200 V at 119.990 kPa

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a. Connect the test harness S– pressure sensor (3P) "1" to the intake air pressure sensor and wire harness as shown.

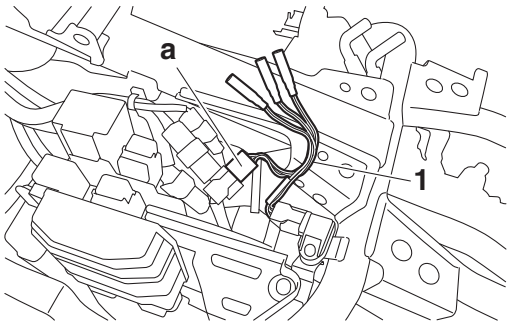
ECA20920
NOTICE

Pay attention to the installing direction of the test harness S– pressure sensor (3P) coupler.

b. Connect the digital circuit tester (DCV) to the test harness S– pressure sensor (3P) "a".

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927
Test harness S– pressure sensor (3P)
90890-03207
Test harness S– pressure sensor (3P)
YU-03207

• Positive tester probe
Pink/white (wire harness color)
• Negative tester probe
Black/blue (wire harness color)



c. Set the main switch to "ON".
d. Measure the intake air pressure sensor output voltage.

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EAS30594
CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   • Intake air temperature sensor

EWA14110
WARNING

- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

2. Check:
   • Intake air temperature sensor resistance
   Out of specification → Replace.

Intake air temperature sensor resistance
290–390 Ω at 80 °C (290–390 Ω at 176 °F)

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a. Connect the pocket tester (× 100) to the intake air temperature sensor terminal as shown.

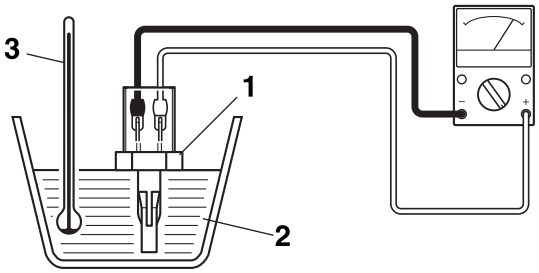
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

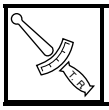
c. Place a thermometer "3" in the water.



d. Slowly heat the water, then let it cool down to the specified temperature.
e. Measure the intake air temperature sensor resistance.

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3. Install:
   • Intake air temperature sensor

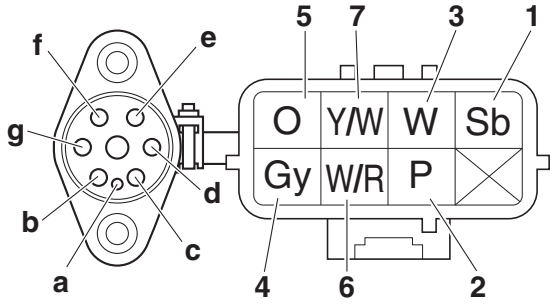
	**Intake air pressure sensor bolt** **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

EAS31088
CHECKING THE GEAR POSITION SWITCH

1. Remove:
   • Drive sprocket cover
   Refer to "CHAIN DRIVE" on page 4-90.
   • Gear position switch
   Refer to "CRANKCASE" on page 5-67.
2. Check:
   • Gear position switch
   Out of specification → Replace the gear position switch.

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

	**Result** **Neutral position** **Continuity** **Positive tester probe** **Sky blue "1"** **Negative tester probe** **Switch terminal "a"** **1st position** **Continuity** **Positive tester probe** **Pink "2"** **Negative tester probe** **Switch terminal "b"** **2nd position** **Continuity** **Positive tester probe** **White "3"** **Negative tester probe** **Switch terminal "c"** **3rd position** **Continuity** **Positive tester probe** **Gray "4"** **Negative tester probe** **Switch terminal "d"** **4th position** **Continuity** **Positive tester probe** **Orange "5"** **Negative tester probe** **Switch terminal "e"** **5th position** **Continuity** **Positive tester probe** **White/red "6"** **Negative tester probe** **Switch terminal "f"** **6th position** **Continuity** **Positive tester probe** **Yellow/white "7"** **Negative tester probe** **Switch terminal "g"**



EAS30681
CHECKING THE FUEL INJECTORS

The following procedure applies to all of the fuel injectors.

1. Remove:
   - Fuel injector
     Refer to "THROTTLE BODIES" on page 7-8.
2. Check:
   - Fuel injector resistance
     Out of specification → Replace the fuel injector.

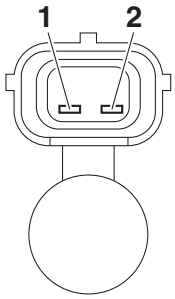
Resistance
12.0 Ω at 20 °C (12.0 Ω at 68 °F)

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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
  Fuel injector terminal "1"
- Negative tester probe
  Fuel injector terminal "2"



c. Measure the fuel injector resistance.

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TROUBLESHOOTING

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EAS20090
TROUBLESHOOTING

EAS30599
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.

EAS30600
STARTING FAILURE

Engine
1. Cylinder(s) 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(s) 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 cap breather hose
   - Deteriorated or contaminated fuel
   - Clogged or damaged fuel hose
2. Fuel pump
   - Faulty fuel pump
   - Faulty relay unit (fuel pump relay)
3. Throttle body(-ies)
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system
1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse(s)
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
4. Ignition coil(s)
   - 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 straight key
6. Switches and wiring
   - Faulty main switch
   - Faulty start/engine stop switch
   - Broken or shorted wiring
   - Faulty gear position switch (neutral circuit)
   - Faulty sidestand switch
   - Faulty clutch switch
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty relay unit (starting circuit cut-off relay)
   - Faulty starter clutch

EAS30601
INCORRECT ENGINE IDLING SPEED

Engine
1. Cylinder(s) and cylinder head
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system
1. Throttle body(-ies)
   - Damaged or loose throttle body joint
   - Improperly synchronized throttle bodies
   - Improper throttle grip free play
   - Flooded throttle body
   - Vacuum hose

Electrical system
1. Battery
   • Discharged battery
   • Faulty battery
2. Spark plug(s)
   • Incorrect spark plug gap
   • Incorrect spark plug heat range
   • Fouled spark plug
   • Worn or damaged electrode
   • Worn or damaged insulator
3. Ignition coil(s)
   • Broken or shorted primary or secondary coils
   • Cracked or broken ignition coil
4. Ignition system
   • Faulty ECU
   • Faulty crankshaft position sensor
   • Broken generator rotor straight key

EAS30602
POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURE” on page 9-1.

Engine
1. Air filter
   • Clogged air filter element

Fuel system
1. Throttle body(-ies)
   • Faulty throttle body
2. Fuel pump
   • Faulty fuel pump

EAS30603
FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS30604
SHIFT PEDAL DOES NOT MOVE

Shift shaft
• Improperly adjusted shift rod
• 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

EAS30605
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

EAS30849
FAULTY CLUTCH

Clutch slips
1. Clutch
   • Improperly assembled clutch
   • Improperly adjusted clutch cable
   • 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 pull rod
   • Broken clutch boss
   • Burnt primary driven gear bushing
   • Match marks not aligned
2. Engine oil
   • Incorrect oil level
   • Incorrect oil viscosity (high)
   • Deteriorated oil

EAS30607
OVERHEATING

Engine
1. Clogged coolant passages
   • Cylinder head and piston(s)
   • Heavy carbon buildup

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
4. Thermostat
   • Thermostat stays closed
5. Oil cooler
   • Clogged or damaged oil cooler
6. Hose(s) and pipe(s)
   • Damaged hose
   • Improperly connected hose
   • Damaged pipe
   • Improperly connected pipe

Fuel system
1. Throttle body(-ies)
   • Damaged or loose throttle body joint
2. Air filter
   • Clogged air filter element

Chassis
1. Brake(s)
   • Dragging brake

Electrical system
1. Spark plug(s)
   • Incorrect spark plug gap
   • Incorrect spark plug heat range
2. Ignition system
   • Faulty ECU

EAS30608
OVERCOOLING

Cooling system
1. Thermostat
   • Thermostat stays open

EAS30609
POOR BRAKING PERFORMANCE
• Worn brake pad
• Worn brake disc
• Air in hydraulic brake system
• Leaking brake fluid
• 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

EAS30610
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
• Worn or damaged outer tube bushing
• Bent or damaged damper rod
• Incorrect oil viscosity
• Incorrect oil level

EAS30611
UNSTABLE HANDLING

Handlebar
• Bent or improperly installed handlebar

Steering head components
• Improperly installed upper bracket
• Improperly installed lower bracket (improperly tightened cap nut)
• Bent steering stem
• Damaged ball bearing or bearing race

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

Swingarm
• Worn bearing or bushing
• Bent or damaged swingarm

Rear shock absorber assembly
- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(s)
- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)
- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame
- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS30612
FAULTY LIGHTING OR SIGNALING SYSTEM

Headlight does not come on
- 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

Tail/brake light does not come on
- Faulty brake light switch
- Too many electrical accessories
- Incorrect connection
- Faulty tail/brake light assembly

Turn signal does not come on
- Faulty turn signal switch
- Faulty turn signal/hazard relay
- Faulty turn signal/position light
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

Turn signal blinks slowly
- Faulty turn signal/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

Turn signal remains lit
- Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Turn signal blinks quickly
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Horn does not sound
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS20116
SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS31118
SELF-DIAGNOSTIC FUNCTION TABLE

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 8-35.

Fault code No.	Item
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.
13	Intake air pressure sensor: open or short circuit detected.
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).
15	Throttle position sensor: open or short circuit detected.
19	Sidestand switch: a break or disconnection of the black/red lead of the ECU is detected.
21	Coolant temperature sensor: open or short circuit detected.
22	Intake air temperature sensor: open or short circuit detected.
24	O_2 sensor: no normal signals are received from the O_2 sensor.
30	Latch up detected.
33	Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.
34	Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.
37	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
39	Injector: open or short circuit detected.
41	Lean angle sensor: open or short circuit detected.
42	Speed sensor: no normal signals are received from the speed sensor.
	Gear position switch: open or short circuit is detected.
	Clutch switch: open or short circuit is detected.
43	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.
46	Charging voltage is abnormal.
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter display.)
56	ECU: Unidentified code is received.
70	Engine idling stop

EAS31119
COMMUNICATION ERROR WITH THE METER

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 8-35.

Fault code No.	Item
89 (Yamaha diagnostic tool) Err (meter display)	Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.

EAS31120
DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Meter display	Procedure
01	Throttle position sensor signal		
	• Fully closed position	11–21	Check with throttle valves fully closed.
	• Fully open position	96–106	Check with throttle valves fully open.
03	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pushing the "(≋)" side of the start/engine stop switch. (If the display value changes, the performance is OK.)
05	Air temperature	Displays the air temperature.	Compare the actually measured air temperature with the meter display value.
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the meter display value.
07	Vehicle speed pulses	Vehicle speed pulse 0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor	Lean angle sensor output voltage	Remove the lean angle sensor and incline it more than 65 degrees.
	• Upright	0.4–1.4	
	• Overturned	3.7–4.4	
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the start/engine stop switch to "◯", and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)
20	Sidestand switch		Extend and retract the sidestand (with the transmission in gear).
	• Stand retracted	ON	
	• Stand extended	OFF	

Diagnostic code No.	Item	Meter display	Procedure
21	Neutral switch and clutch switch		Operate the transmission, clutch lever, and sidestand.
	• Transmission is in gear or the clutch lever released	OFF	
	• Clutch lever is squeezed with the transmission in gear and when the sidestand is retracted	ON	
	• Clutch lever is squeezed with the transmission in gear and when the sidestand is extended	OFF	
60	EEPROM fault code display		
	• No history	00 • No malfunctions detected (If the self-diagnosis fault code 44 is indicated, the ECU is defective.)	—
	• History exists	01–02 (Cylinder fault code) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) 11 (Data error for ISC (idle speed control) learning values)	—
61	Malfunction history code display		
	• No history	00	—
	• History exists	Fault codes 12–89 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—
62	Malfunction history code erasure		
	• No history	00	—
	• History exists	• Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, “03” is displayed.)	Save the malfunction history to the computer, and then delete the fault codes.

Diagnostic code No.	Item	Meter display	Procedure
63	Malfunction code reinstatement (for fault code No. 24, 42 only) • No malfunction code • Malfunction code exists	 00 Fault code 24, 42 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	 — Save the malfunction history to the computer, and then delete the fault codes.
67	ISC (idle speed control) learning condition display ISC (idle speed control) learning data erasure	00 ISC (idle speed control) learning data has been erased. 01 It is not necessary to erase the ISC (idle speed control) learning data. 02 It is necessary to erase the ISC (idle speed control) learning data.	To erase the ISC (idle speed control) learning data, set the start/engine stop switch from "⊠" to "○" 3 times in 5 seconds.
70	Control number	0–254 [-]	—

EAS31121
DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Cylinder-#1 ignition coil	Actuates cylinder-#1 ignition coil five times at one-second intervals. The "CHECK" indicator and "🔧" on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.
31	Cylinder-#2 ignition coil	Actuates cylinder-#2 ignition coil five times at one-second intervals. The "CHECK" indicator and "🔧" on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.
36	Fuel injector #1	Actuates fuel injector #1 five times at one-second intervals. The "CHECK" indicator and "🔧" on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that fuel injector #1 is actuated five times by listening for the operating sound.

Diagnostic code No.	Item	Actuation	Procedure
37	Fuel injector #2	Actuates fuel injector #2 five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that fuel injector #2 is actuated five times by listening for the operating sound.
50	Relay unit	Actuates the relay unit five times at one-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on each time the relay is actuated. (When the relay is on, the “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen go off. When the relay is off, the “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on.)	Check that the relay unit is actuated five times by listening for the operating sound.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at five-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on each time the relay is actuated.	Check that the radiator fan motor relay is actuated five times by listening for the operating sound.
52	Headlight relay	Actuates the headlight relay five times at five-second intervals. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on each time the relay is actuated.	Check that the headlight relay is actuated five times by listening for the operating sound.
54	ISC valve	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The “CHECK” indicator and “ ” on the Yamaha diagnostic tool screen come on during the operation.	The ISC unit vibrates when the ISC valve operates.

EAS20164
EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
192	Intake air pressure sensor	Brief abnormality detected in intake air pressure sensor	Same as for fault code number 13	Perform the checks and maintenance jobs for fault code number 13.
193	Throttle position sensor	Brief abnormality detected in throttle position sensor	Same as for fault code number 15	Perform the checks and maintenance jobs for fault code number 15.
195	Sidestand switch	Brief abnormality detected in black/red input lead of ECU	Same as for fault code number 19	Perform the checks and maintenance jobs for fault code number 19.
196	Coolant temperature sensor	Brief abnormality detected in coolant temperature sensor	Same as for fault code number 21	Perform the checks and maintenance jobs for fault code number 21.
197	Intake air temperature sensor	Brief abnormality detected in intake air temperature sensor	Same as for fault code number 22	Perform the checks and maintenance jobs for fault code number 22.
203	Lean angle sensor	Brief abnormality detected in lean angle sensor	Same as for fault code number 41	Perform the checks and maintenance jobs for fault code number 41.
240	O_2 sensor (Correction value remains at upper limit)	Correction value remains at upper limit during O_2 feedback	• Open or short circuit in the wire harness between the sensor and the ECU Gy/G–Gy/G P/B–P/B B/L–B/L • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective ECU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 240 may be indicated even if the system is normal.
241	O_2 sensor (Correction value remains at lower limit)	Correction value remains at lower limit during O_2 feedback	• Open or short circuit in the wire harness between the sensor and the ECU Gy/G–Gy/G P/B–P/B B/L–B/L • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective ECU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 241 may be indicated even if the system is normal.

No.	Item	Symptom	Possible cause	Remarks
242	ISC (idle speed control) (Correction value remains at upper limit)	Correction value remains at upper limit while the engine is idling	Low engine idling speed • Clogged throttle body • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• Execute the diagnostic mode (diagnostic code number 67) and check the ISC maintenance requirements. • If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 242 may be indicated even if the system is normal.
243	ISC (idle speed control) (Correction value remains at lower limit)	Correction value remains at lower limit while the engine is idling	High engine idling speed • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 243 may be indicated even if the system is normal.
244	Difficult/unable to start engine	Engine starting difficult/unable condition detected	• Empty fuel tank • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 244 may be indicated even if the system is normal.
245	Engine stall	Engine stall detected	• Empty fuel tank • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 245 may be indicated even if the system is normal.

EAS20091

WIRING DIAGRAM

FZ07F/FZ07FC 2015

1. Main switch
2. Parking lighting fuse
3. Auxiliary fuse
4. Ignition fuse
5. Signaling system fuse
6. Headlight fuse
7. Fuel injection system fuse
8. Backup fuse
9. Radiator fan motor fuse
10. AC magneto
11. Rectifier/regulator
12. Battery
13. Engine ground
14. Main fuse
15. Starter relay
16. Starter motor
17. Rear brake light switch
18. Relay unit
19. Starting circuit cut-off relay
20. Fuel pump relay
21. Joint coupler
22. Sidestand switch
23. Crankshaft position sensor
24. O_2 sensor
25. Throttle position sensor
26. Ignition coil #1
27. Ignition coil #2
28. Spark plug
29. Fuel injector #1
30. Fuel injector #2
31. ISC (idle speed control) unit
32. ECU (engine control unit)
33. Intake air temperature sensor
34. Coolant temperature sensor
35. Intake air pressure sensor
36. Lean angle sensor
37. Speed sensor
38. Yamaha diagnostic tool coupler
39. Fuel sender
40. Fuel pump
41. Oil pressure switch
42. Meter assembly
43. Neutral indicator light
44. Meter light
45. Tachometer
46. Multi-function meter
47. Oil pressure warning light
48. Engine trouble warning light
49. Coolant temperature warning light
50. High beam indicator light
51. Turn signal indicator light (left)
52. Turn signal indicator light (right)
53. Horn
54. Gear position switch
55. Handlebar switch (right)
56. Front brake light switch
57. Hazard switch
58. Start/engine stop switch
59. Turn signal/hazard relay
60. Handlebar switch (left)
61. Clutch switch
62. Dimmer switch
63. Pass switch
64. Turn signal switch
65. Horn switch
66. Rear turn signal light (right)
67. Front turn signal/position light (right)
68. Rear turn signal light (left)
69. Front turn signal/position light (left)
70. Headlight assembly
71. Auxiliary light
72. Headlight
73. License plate light
74. Tail/brake light assembly
75. Tail/brake light
76. Radiator fan motor
77. Radiator fan motor relay
78. Headlight relay
79. Auxiliary DC outlet

A. Wire harness
B. Sub-wire harness (gear position switch, coolant temperature sensor, fuel injector)
C. Sub-wire harness (speed sensor, throttle position sensor, ISC)

EAS30613

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
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/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/L	Green/Blue
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/B	Pink/Black
P/L	Pink/Blue
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/G	White/Green
W/L	White/Blue
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/W	Yellow/White



FZ07F/FZ07FC 2015 WIRING DIAGRAM

