



YAMAHA

2017

SERVICE MANUAL

SCR95H SCR95HC



EAS20002

**SCR95H/SCR95HC
SERVICE MANUAL**
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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.

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.

HOW TO USE THIS MANUAL

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

- The manual is divided into chapters and each chapter is divided into sections. The current section title “1” is shown at the top of each page.
- Sub-section titles “2” appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams “3” at the start of each removal and disassembly section.
- Numbers “4” are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols “5” indicate parts to be lubricated or replaced.
- Refer to “SYMBOLS”.
- A job instruction chart “6” accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- Jobs “7” requiring more information (such as special tools and technical data) are described sequentially.

1

GENERATOR AND STARTER CLUTCH

GENERATOR AND STARTER CLUTCH

Removing the stator coil

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
	Sidestand/Drive pulley cover		Refer to "BELT DRIVE" on page 4-71.
1	Rectifier/regulator coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Damper cover	1	
4	Generator cover damper	1	
5	Crankshaft end accessing screw	1	

5-40

2

GENERATOR AND STARTER CLUTCH

REMOVING THE GENERATOR

1. Remove:

- Generator rotor bolt "1"
- Washer

TIP

- While holding the generator rotor "2" with the sheave holder "3", loosen the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

3

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

2. Remove:

- Generator rotor "1"
- (with the flywheel puller "2")
- Woodruff key

NOTICE

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

4

Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B

REMOVING THE STARTER CLUTCH

1. Remove:

- Starter clutch bolts "1"
- Starter clutch

TIP

While holding the generator rotor "2" with the sheave holder "3", loosen the starter clutch bolts.

3

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

2

1

CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers
- Damage/wear → Replace.

2. Check:

- Starter clutch idle gears
- Starter clutch gear
- Burns/chips/roughness/wear → Replace the defective part(s).

3. Check:

- Starter clutch gear's contacting surfaces
- Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

- Starter clutch operation

5-43

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.

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GENERAL INFORMATION

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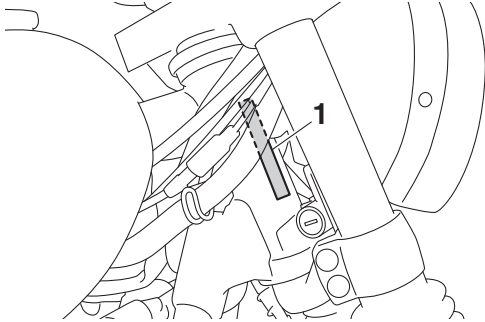
EAS20007

IDENTIFICATION

EAS30002

VEHICLE IDENTIFICATION NUMBER

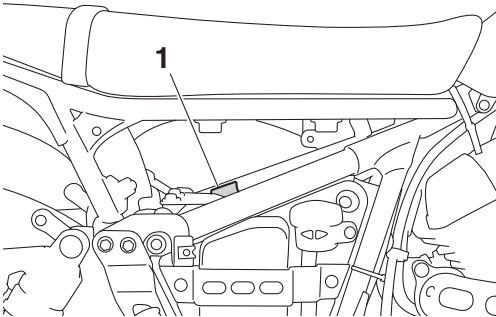
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS30003

MODEL LABEL

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



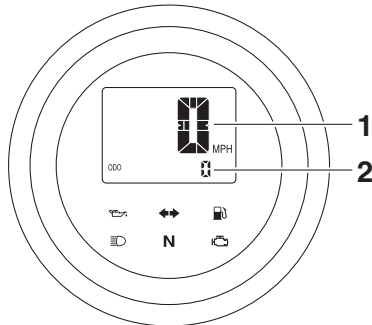
EAS20008

FEATURES

EAS30682

INSTRUMENT FUNCTIONS

Multi-function meter unit



1. Speedometer
2. Odometer/tripmeter/fuel reserve tripmeter/clock

EWA17650



WARNING

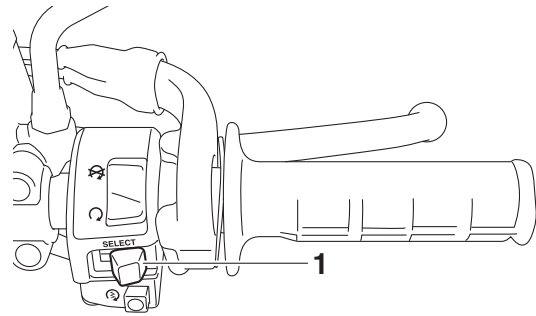
Be sure to stop the vehicle before making any setting changes to the multi-function meter unit. Changing settings while riding can distract the operator and increase the risk of an accident.

The multi-function meter unit is equipped with the following:

- a speedometer
- an odometer
- two tripmeters
- a fuel reserve tripmeter
- a clock
- a self-diagnosis device

TIP

- Be sure to turn the key to “ON” before using the “SELECT” switch.
- To switch the speedometer and odometer/tripmeter displays between kilometers and miles, select the odometer mode, and then push the “SELECT” switch for 5 seconds.

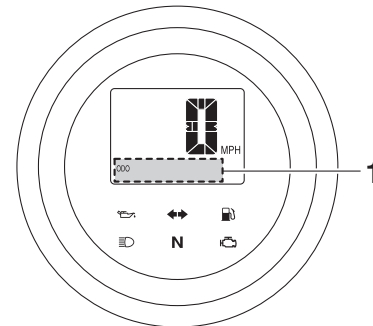


1. “SELECT” switch

Speedometer

The speedometer shows the vehicle’s traveling speed.

Odometer, tripmeters, fuel reserve tripmeter and clock



1. Odometer/tripmeter/fuel reserve tripmeter/clock

The odometer shows the total distance traveled. The tripmeters show the distance traveled since they last reset.

The fuel reserve tripmeter shows the distance traveled since the fuel level warning light came on.

The clock displays time in 12-hour format.

TIP

- The odometer will lock at 999999.
- The tripmeters will reset and continue counting after 999.9 is reached.

In normal operation, use the “SELECT” switch to change the display between the odometer “ODO”, tripmeters “TRIP 1” and “TRIP 2”, and the clock in the following order:

ODO → TRIP 1 → TRIP 2 → clock → ODO

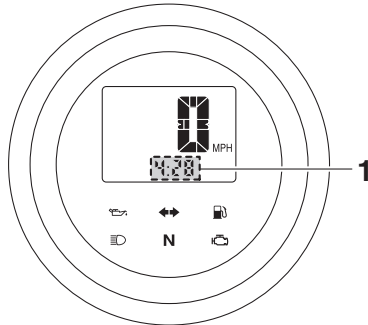
If the fuel level warning light comes on, the display automatically changes to the fuel reserve tripmeter “TRIP F” and starts counting the distance traveled from that point. In this case, use the “SELECT” switch to change the display between the various tripmeters and the odometer

in the following order:

TRIP F → TRIP 1 → TRIP 2 → clock → ODO → TRIP F

To reset a tripmeter, select it by using the “SELECT” switch, and then push the “SELECT” switch for one second. If you do not reset the fuel reserve tripmeter manually, after refueling and traveling 5 km (3 mi) it will reset automatically and disappear from the display.

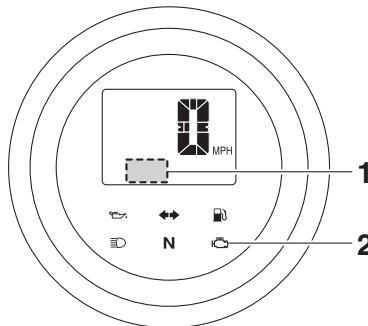
[To set the clock]




1. Clock

1. Use the “SELECT” switch to change the display to the clock mode.
2. Push the “SELECT” switch for 5 seconds.
The hour digits will start flashing.
3. Use the “SELECT” switch to set the hours.
4. Push the “SELECT” switch for one second and the minute digits will start flashing.
5. Use the “SELECT” switch to set the minutes.
6. Push the “SELECT” switch for one second to start the clock.

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 an error code.

If the display indicates any error codes, note the code number, and then check the vehicle. Refer to “FUEL INJECTION SYSTEM” on page 7-27.

ECA20220

NOTICE

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

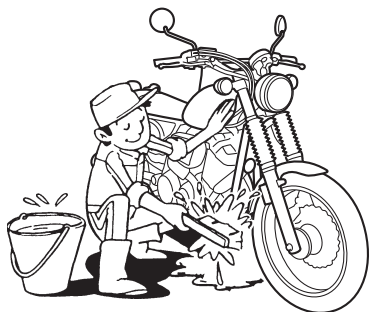
EAS20009

IMPORTANT INFORMATION

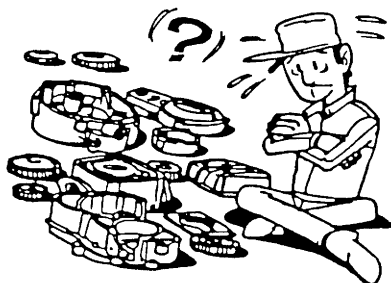
EAS30006

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 1-11.
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.

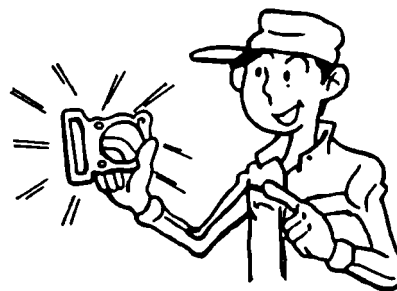


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS30007

REPLACEMENT PARTS

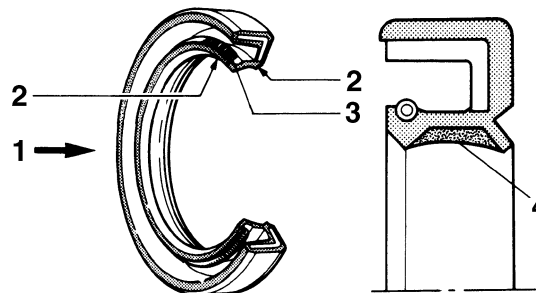
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



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.

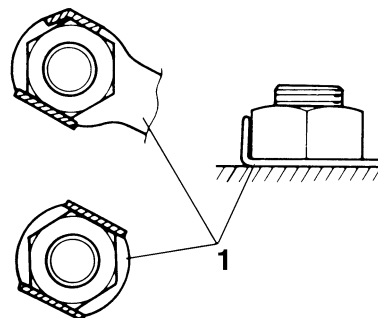


1. Oil
2. Lip
3. Spring
4. Grease

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’s 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

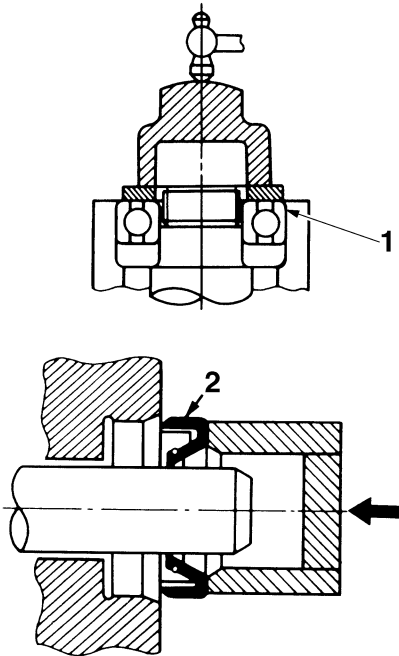
NOTICE

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

EAS30012

RUBBER PARTS

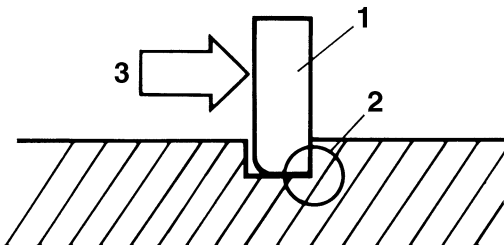
Check rubber parts for deterioration during inspection. Some of the rubber parts are sensitive to gasoline, flammable oil, grease, etc. Do not allow any items other than the specified one to contact the parts.



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.



EAS20010

BASIC SERVICE INFORMATION

EAS30013

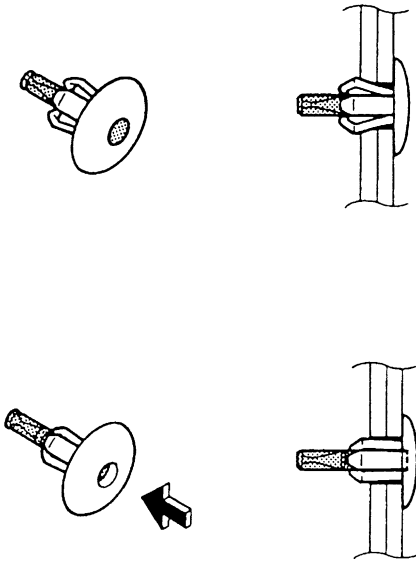
QUICK FASTENERS

Rivet type

1. Remove:
 - Quick fastener

TIP

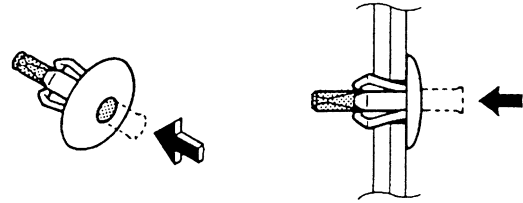
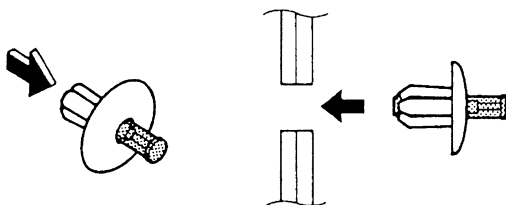
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.



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.

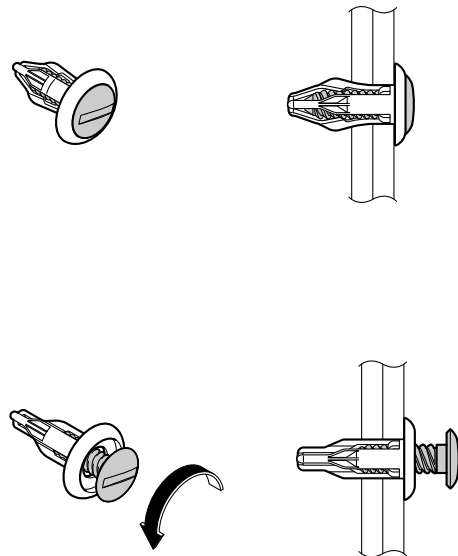


Screw type

1. Remove:
 - Quick fastener

TIP

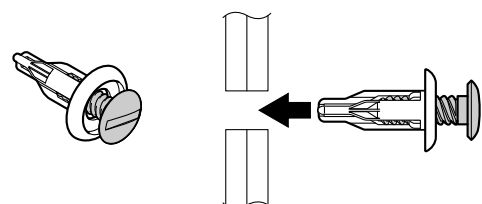
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

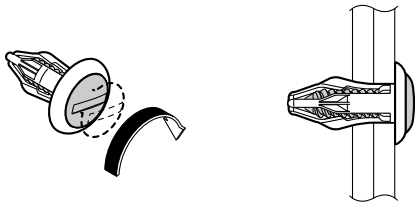


2. Install:
 - Quick fastener

TIP

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





EAS30014

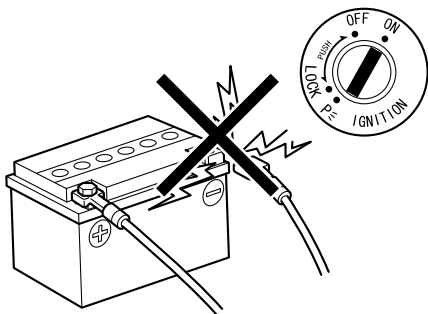
ELECTRICAL SYSTEM

Electrical parts handling

ECA16600

NOTICE

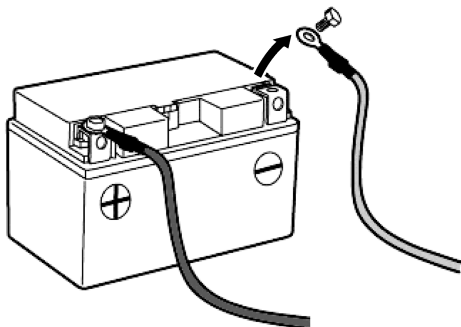
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

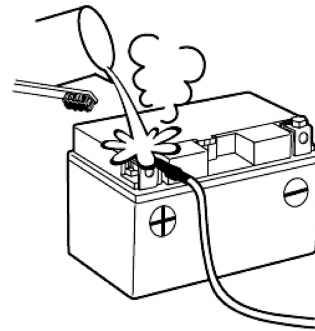
NOTICE

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

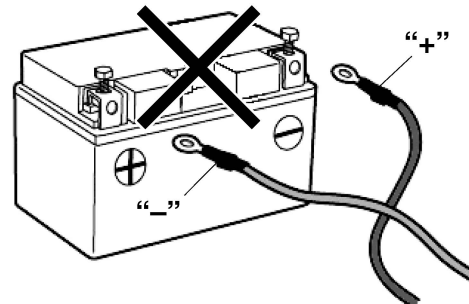
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

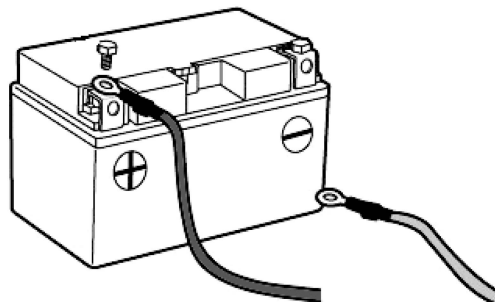
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16771

NOTICE

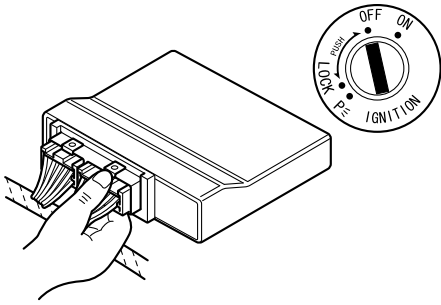
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated,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



ECA16610

NOTICE

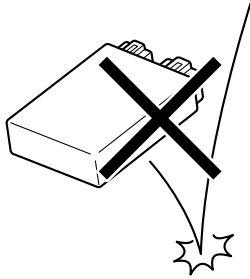
Turn the main switch to "OFF" before disconnecting or connecting an electrical component.



ECA16620

NOTICE

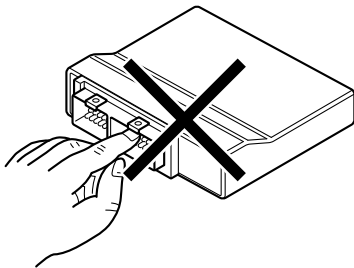
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

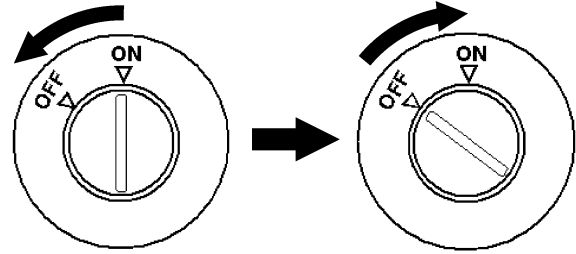
NOTICE

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

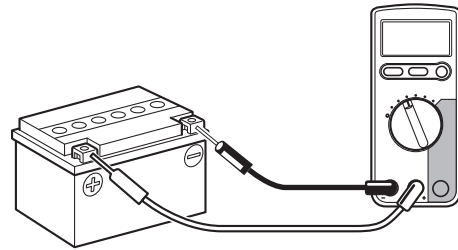
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



Checking the electrical system

TIP

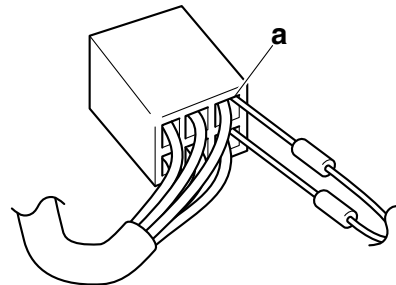
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

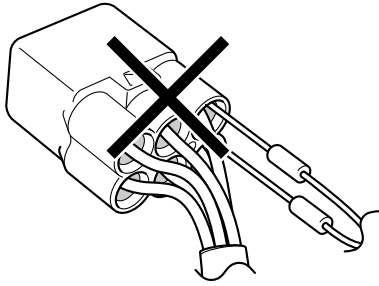
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



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.

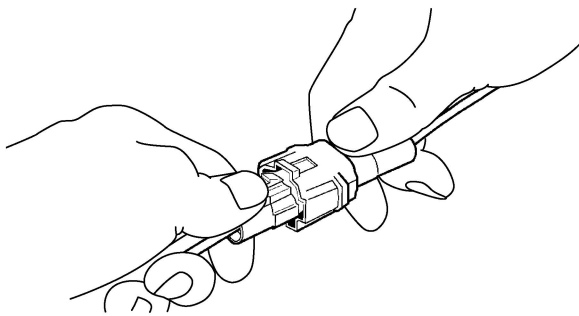
1. Disconnect:

- Lead
- Coupler
- Connector

ECA16780

NOTICE

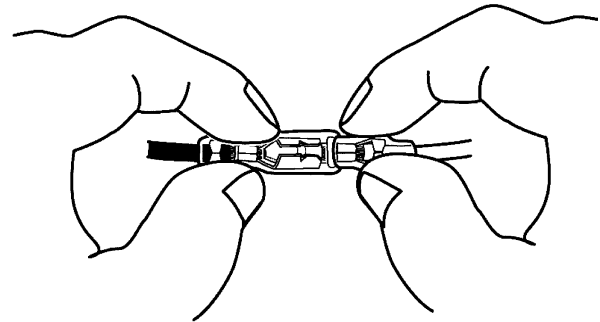
- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790

NOTICE

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

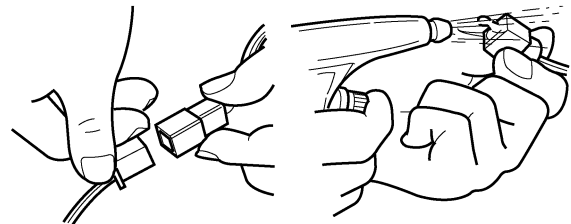


2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

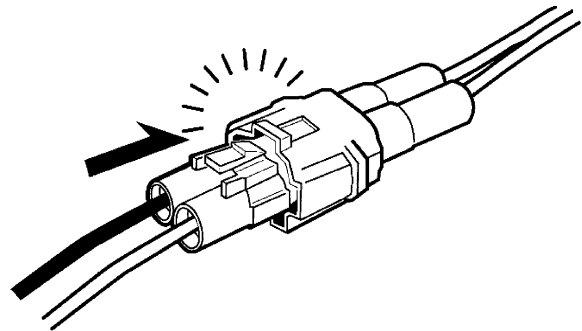


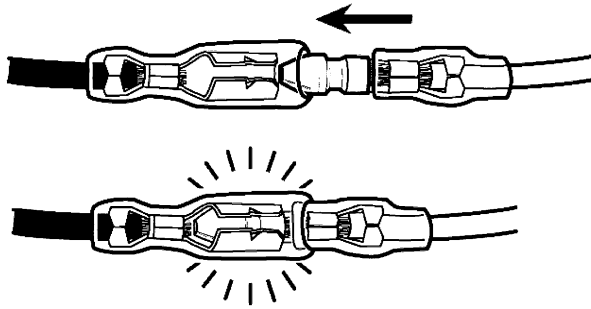
3. Connect:

- 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:

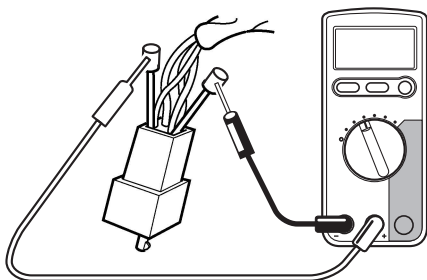
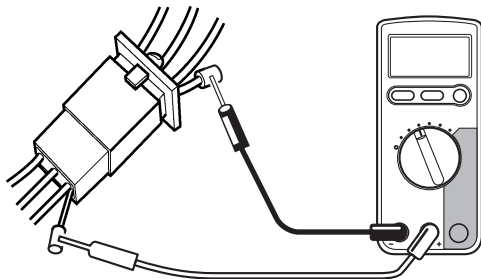
- Continuity
(with the digital circuit tester)



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

TIP

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.



5. Check:

- Resistance



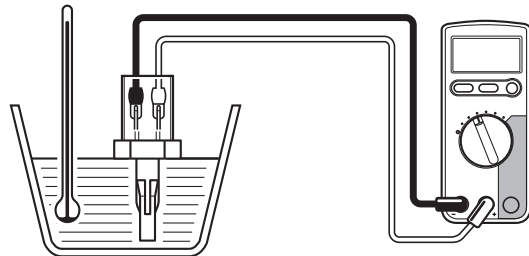
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

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 re-
sistance
5400–6600 Ω at 0 °C (5400–6600
 Ω at 32 °F)
Intake air temperature sensor re-
sistance
290–390 Ω at 80 °C (290–390 Ω
at 176 °F)



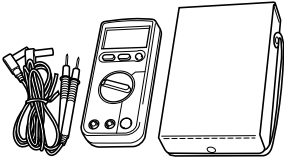

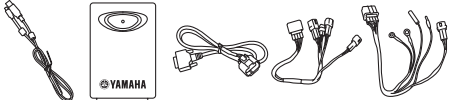
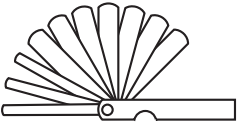
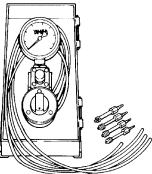

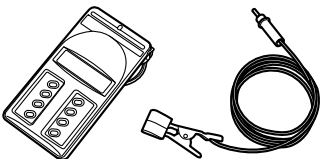
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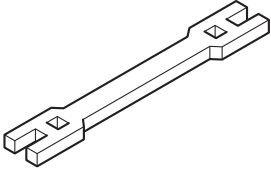

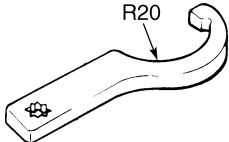
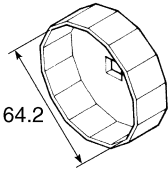
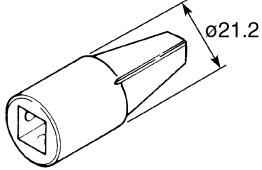
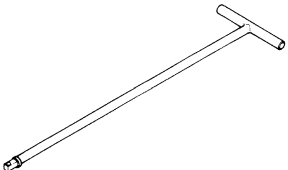
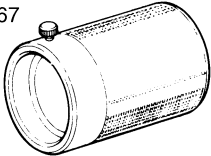
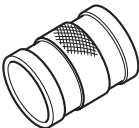
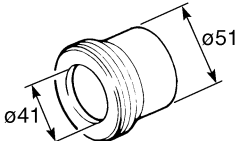
SPECIAL TOOLS

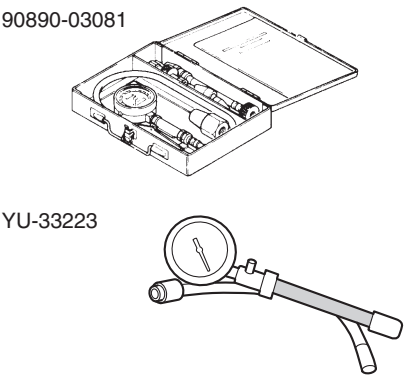
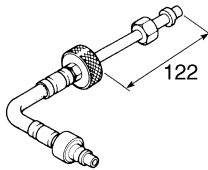
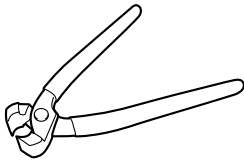
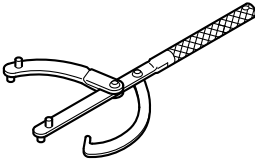
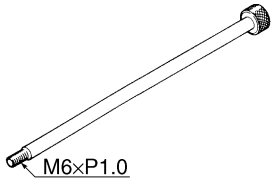
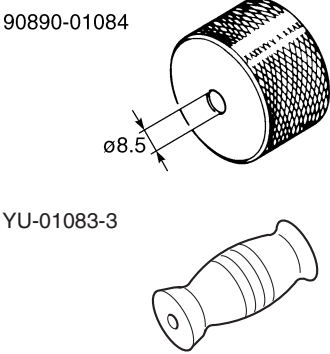
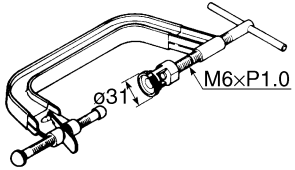
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

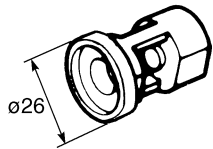
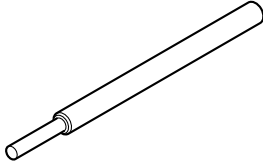
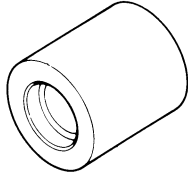
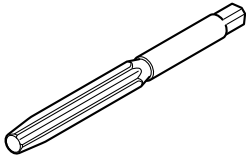
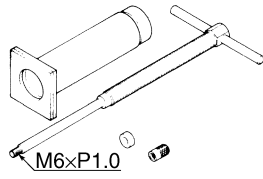
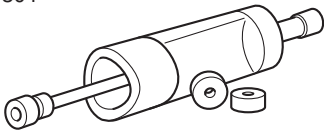
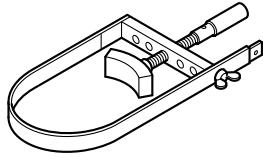
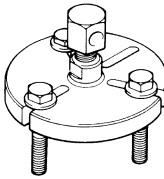
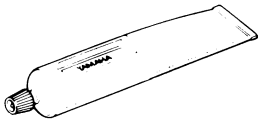
TIP

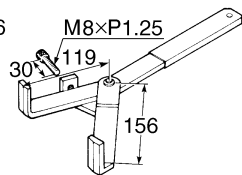
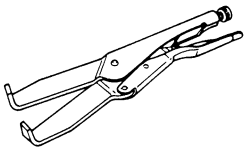
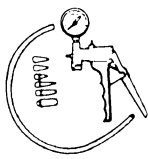
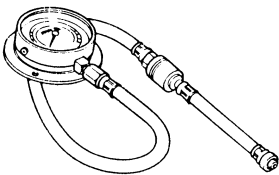
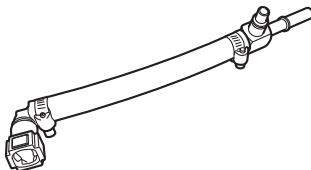
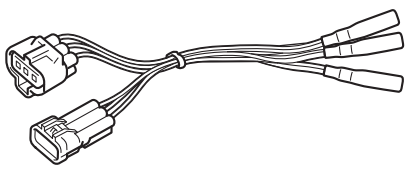
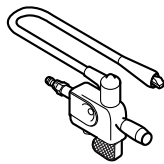
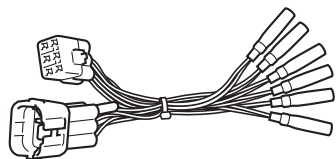
- For U.S.A. and Canada, use part numbers starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part numbers starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		1-10, 1-10, 5-62, 6-12, 7-73, 7-74, 7-75, 7-75, 7-79, 7-80, 7-80, 7-80, 7-82, 7-82, 7-82, 7-83, 7-83, 7-84, 7-84, 7-85, 7-86, 7-87, 7-87
Yamaha diagnostic tool USB (US) 90890-03251		3-4, 7-31
Yamaha diagnostic tool (A/I) 90890-03252		3-4, 7-31
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 3-6, 3-7
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-8
Digital tachometer 90890-06760 Digital tachometer YU-39951-B		3-8, 7-84

Tool name/Tool No.	Illustration	Reference pages
Spoke nipple wrench (8–9) 90890-01522 Spoke nipple wrench (8–9) YM-01522		3-15
Belt tension gauge 90890-03170 Rear drive belt tension gauge YM-03170		3-17
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-19, 4-64
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-22
Damper rod holder 90890-01460		4-55, 4-57
T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326		4-55, 4-57
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	<p>90890-01367</p>  <p>YM-A9409-7/YM-A5142-4</p> 	4-58, 4-58, 4-58
Fork seal driver attachment (ø41) 90890-01381 Replacement 41 mm YM-A5142-2		4-58, 4-58

Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223	 <p>90890-03081</p> <p>YU-33223</p>	5-1
Extension 90890-04136	 <p>122</p>	5-1
Boots band installation tool 90890-01526 Boots band installation tool YM-01526		5-11
Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235		5-17, 5-21, 5-22
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1	 <p>M6xP1.0</p>	5-18
Weight 90890-01084 Weight YU-01083-3	 <p>90890-01084</p> <p>ø8.5</p> <p>YU-01083-3</p>	5-18
Valve spring compressor 90890-04019 Valve spring compressor YM-04019	 <p>ø37</p> <p>M6xP1.0</p>	5-28, 5-33

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor attachment 90890-01243 Valve spring compressor adapter (26 mm) YM-01253-1		5-28, 5-33
Valve guide remover (ø6) 90890-04064 Valve guide remover (6.0 mm) YM-04064-A		5-29
Valve guide installer (ø6) 90890-04065 Valve guide installer (6.0 mm) YM-04065-A		5-29
Valve guide reamer (ø6) 90890-04066 Valve guide reamer (6.0 mm) YM-04066		5-29
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  M6xP1.0 YU-01304 	5-35
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-43, 5-43, 5-44, 5-44, 5-52, 5-57
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-43
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-44, 5-69

Tool name/Tool No.	Illustration	Reference pages
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	 	5-52, 5-55
Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423		6-12
Pressure gauge 90890-03153 Pressure gauge YU-03153		6-12
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		6-12
Test harness– TPS (3P) 90890-03204 Test harness– TPS (3P) YU-03204		6-12
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		7-81
Test harness– lean angle sensor (6P) 90890-03209 Test harness– lean angle sensor (6P) YU-03209		7-83

SPECIFICATIONS

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GENERAL SPECIFICATIONS

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GENERAL SPECIFICATIONS

Model

Model	BL31 (SCR95H_U49) BL32 (SCR95HC_CAL)
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Dimensions

Overall length	2250 mm (88.6 in)
Overall width	895 mm (35.2 in)
Overall height	1165 mm (45.9 in)
Seat height	830 mm (32.7 in)
Wheelbase	1575 mm (62.0 in)
Ground clearance	140 mm (5.51 in)
Minimum turning radius	3.3 m (10.83 ft)

Weight

Curb weight	248 kg (547 lb)
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Loading

Maximum load	209 kg (461 lb)
Riding capacity	2 person

EAS20014

ENGINE SPECIFICATIONS

Engine

Combustion cycle	4-stroke
Cooling system	Air cooled
Valve train	SOHC
Displacement	942 cm ³
Cylinder arrangement	V-type
Number of cylinders	2-cylinder
Bore × stroke	85.0 × 83.0 mm (3.35 × 3.27 in)
Compression ratio	9.0 : 1
Compression pressure	1218–1568 kPa/400 r/min (12.2–15.7 kgf/cm ² /400 r/min, 173.2–223.0 psi/400 r/min)
Starting system	Electric starter

Fuel

Recommended fuel	Regular unleaded gasoline (Gasohol [E10] acceptable)
Fuel tank capacity	13 L (3.4 US gal, 2.9 Imp.gal)
Fuel reserve amount	2.8 L (0.74 US gal, 0.62 Imp.gal)

Engine oil

Recommended brand	YAMALUBE
SAE viscosity grades	10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Oil change	3.70 L (3.91 US qt, 3.26 Imp.qt)
With oil filter removal	4.00 L (4.23 US qt, 3.52 Imp.qt)
Quantity (disassembled)	4.30 L (4.55 US qt, 3.78 Imp.qt)

Oil filter

Oil filter type	Cartridge
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Oil pump

Inner-rotor-to-outer-rotor-tip clearance	0.000–0.120 mm (0.0000–0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09–0.19 mm (0.0035–0.0075 in)
Limit	0.26 mm (0.0102 in)
Bypass valve opening pressure	80.0–120.0 kPa (0.80–1.20 kgf/cm ² , 11.6–17.4 psi)
Relief valve operating pressure	391.0–489.0 kPa (3.91–4.89 kgf/cm ² , 56.7–70.9 psi)

Spark plug(s)

Manufacturer/model	NGK/CPR7EA-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)

Cylinder head

Warping limit	0.03 mm (0.0012 in)
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ENGINE SPECIFICATIONS

Camshaft

Camshaft lobe dimensions	
Lobe height (Intake)	42.470–42.570 mm (1.6720–1.6760 in)
Limit	42.370 mm (1.6681 in)
Lobe height (Exhaust)	42.138–42.238 mm (1.6590–1.6629 in)
Limit	42.038 mm (1.6550 in)
Camshaft runout limit	0.030 mm (0.0012 in)

Rocker arm/rocker arm shaft

Rocker arm inside diameter	12.000–12.018 mm (0.4724–0.4731 in)
Limit	12.036 mm (0.4739 in)
Rocker arm shaft outside diameter	11.981–11.991 mm (0.4717–0.4721 in)
Limit	11.941 mm (0.4701 in)

Valve, valve seat, valve guide

Valve clearance (cold)	
Intake	0.08–0.12 mm (0.0032–0.0047 in)
Exhaust	0.22–0.26 mm (0.0087–0.0102 in)
Valve dimensions	
Valve seat contact width (intake)	1.00–1.20 mm (0.0394–0.0472 in)
Limit	1.6 mm (0.06 in)
Valve seat contact width (exhaust)	1.00–1.20 mm (0.0394–0.0472 in)
Limit	1.6 mm (0.06 in)
Valve stem diameter (intake)	5.975–5.990 mm (0.2352–0.2358 in)
Limit	5.945 mm (0.2341 in)
Valve stem diameter (exhaust)	5.960–5.975 mm (0.2346–0.2352 in)
Limit	5.930 mm (0.2335 in)
Valve guide inside diameter (intake)	6.000–6.012 mm (0.2362–0.2367 in)
Valve guide inside diameter (exhaust)	6.000–6.012 mm (0.2362–0.2367 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)	42.43 mm (1.67 in)
Limit	40.31 mm (1.59 in)
Free length (exhaust)	42.43 mm (1.67 in)
Limit	40.31 mm (1.59 in)
Spring tilt (intake)	1.9 mm (0.07 in)
Spring tilt (exhaust)	1.9 mm (0.07 in)

Cylinder

Bore	85.000–85.010 mm (3.3465–3.3468 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

Piston-to-cylinder clearance	0.030–0.055 mm (0.0012–0.0022 in)
Diameter	84.955–84.970 mm (3.3447–3.3453 in)
Measuring point (from piston skirt bottom)	8.0 mm (0.31 in)

ENGINE SPECIFICATIONS

Piston pin bore inside diameter	21.004–21.015 mm (0.8269–0.8274 in)
Limit	21.045 mm (0.8285 in)
Piston pin outside diameter	20.991–21.000 mm (0.8264–0.8268 in)
Limit	20.971 mm (0.8256 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.0002–0.0009 in)
Piston ring	
Top ring	
Ring type	Barrel
End gap limit	0.60 mm (0.0236 in)
Ring side clearance	0.040–0.080 mm (0.0016–0.0032 in)
Side clearance limit	0.100 mm (0.0039 in)
2nd ring	
Ring type	Taper
End gap limit	0.80 mm (0.0315 in)
Ring side clearance	0.030–0.070 mm (0.0012–0.0028 in)
Side clearance limit	0.100 mm (0.0039 in)
Connecting rod	
Oil clearance	0.023–0.046 mm (0.0009–0.0018 in)
Bearing color code	
4	Black
5	Brown
6	Green
Crankshaft	
Runout limit	0.020 mm (0.0008 in)
Crankshaft journal diameter	49.968–49.980 mm (1.9672–1.9677 in)
Crankshaft journal bearing inside diameter	50.010–50.028 mm (1.9689–1.9696 in)
Journal oil clearance	0.030–0.060 mm (0.0012–0.0024 in)
Clutch	
Clutch type	Wet, multiple-disc
Clutch lever free play	5.0–10.0 mm (0.20–0.39 in)
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
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.111 in)
Plate quantity	7 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warping limit	0.20 mm (0.008 in)
Clutch spring height	7.40 mm (0.29 in)
Minimum height	7.03 mm (0.28 in)
Spring quantity	1 pc
Drivetrain	
Primary reduction ratio	1.674 (72/43)
Transmission type	Constant mesh 5-speed
Gear ratio	
1st	3.067 (46/15)
2nd	2.063 (33/16)

ENGINE SPECIFICATIONS

3rd	1.579 (30/19)
4th	1.259 (34/27)
5th	1.042 (25/24)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	2.333 (70/30)
Final drive	Belt
Shifting mechanism	
Installed shift rod length	95.0–99.0 mm (3.74–3.90 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Maximum consumption amperage	2.0 A
Throttle body	
ID mark	1TP1 01 (SCR95H) 1TP2 11 (SCR95HC)
Fuel injector	
Resistance	12.0 Ω
Throttle position sensor	
Output voltage (at idle)	0.63–0.73 V
Idling condition	
Engine idling speed	950–1050 r/min
Engine oil temperature	60–70 °C (140–158 °F)
Intake vacuum	34.7–40.0 kPa (260–300 mmHg, 10.2–11.8 inHg)
Fuel line pressure (at idle)	220.0–300.0 kPa (2.20–3.00 kgf/cm ² , 31.9–43.5 psi)
Throttle grip free play	4.0–6.0 mm (0.16–0.24 in)

EAS20015

CHASSIS SPECIFICATIONS

Chassis

Frame type	Double cradle
Caster angle	28.4 °
Trail	129 mm (5.1 in)

Front wheel

Wheel type	Spoke wheel
Rim size	19 × 2.50
Rim material	Aluminum
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Rear wheel

Wheel type	Spoke wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Wheel axle bending limit	0.25 mm (0.01 in)

Front tire

Type	With tube
Size	100/90-19M/C 57H
Manufacturer/model	BRIDGESTONE/TRAIL WING 101 E

Rear tire

Type	With tube
Size	140/80R17M/C 69H
Manufacturer/model	BRIDGESTONE/TRAIL WING 152 E

Tire air pressure (measured on cold tires)

Up to 90 kg (198 lb) load	
Front	280 kPa (2.80 kgf/cm ² , 41 psi)
Rear	280 kPa (2.80 kgf/cm ² , 41 psi)
90 kg (198 lb) load - maximum load	
Front	280 kPa (2.80 kgf/cm ² , 41 psi)
Rear	280 kPa (2.80 kgf/cm ² , 41 psi)

Front brake

Type	Hydraulic single disc brake
Disc outside diameter × thickness	298.0 × 5.0 mm (11.73 × 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	6.0 mm (0.24 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	14.00 mm (0.55 in)
Caliper cylinder inside diameter (Left)	30.16 mm (1.19 in)
	33.34 mm (1.31 in)
Specified brake fluid	DOT 4

CHASSIS SPECIFICATIONS

Rear brake

Type	Hydraulic single disc brake
Disc outside diameter × thickness	298.0 × 6.0 mm (11.73 × 0.24 in)
Brake disc thickness limit	5.5 mm (0.22 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness	5.8 mm (0.23 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	41.30 mm (1.63 in)
Specified brake fluid	DOT 4

Front suspension

Type	Telescopic fork
Spring	Coil spring
Shock absorber	Hydraulic damper
Wheel travel	120 mm (4.7 in)
Fork spring free length	343.2 mm (13.51 in)
Limit	336.3 mm (13.24 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil G10
Quantity (left)	586.0 cm ³ (19.81 US oz, 20.67 Imp.oz)
Quantity (right)	586.0 cm ³ (19.81 US oz, 20.67 Imp.oz)
Level (left)	96 mm (3.8 in)
Level (right)	96 mm (3.8 in)

Rear suspension

Type	Swingarm
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Wheel travel	70 mm (2.8 in)
Spring preload	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Cam position
Adjustment value (Soft)	0 notch out (from the fully turned-in position)
Adjustment value (STD)	1 notch out (from the fully turned-in position)
Adjustment value (Hard)	4 notches out (from the fully turned-in position)

Drive belt

Drive belt slack	6.0–8.0 mm (0.24–0.31 in)
Drive belt slack (on a suitable stand)	7.0–9.0 mm (0.28–0.35 in)

ELECTRICAL SPECIFICATIONS

EAS20016

ELECTRICAL SPECIFICATIONS

Voltage

System voltage	12 V
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Engine control unit

Model/manufacturer	FUA0044/MITSUBISHI
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Ignition system

Ignition system	TCI
Advancer type	Digital
Ignition timing (B.T.D.C.)	5.0 °/1000 r/min

Ignition coil

Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	2.16–2.64 Ω
Secondary coil resistance	8.64–12.96 k Ω

Spark plug cap

Resistance	7.50–12.50 k Ω
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Charging system

Charging system	AC magneto
Standard output	14.0 V, 32.8 A at 5000 r/min
Standard output	14.0 V, 460 W at 5000 r/min
Stator coil resistance	0.128–0.192 Ω (B-B)

Rectifier/regulator

Regulator type	Three-phase
Regulated voltage (DC)	14.3–14.7 V
Rectifier capacity (DC)	50.0 A

Battery

Model	YTZ14S
Voltage, capacity	12 V, 11.2 Ah (10 HR)

Headlight

Bulb type	Halogen bulb
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Bulb wattage × quantity

Headlight	H4, 60.0 W/55.0 W × 1
Brake/tail light	LED
Front turn signal/position light	23.0 W/8.0 W × 2
Rear turn signal light	21.0 W × 2
License plate light	5.0 W × 1
Meter lighting	EL (Electroluminescent)

Indicator light

Neutral indicator light	LED
High beam indicator light	LED
Oil level warning light	LED
Turn signal indicator light	LED

ELECTRICAL SPECIFICATIONS

Fuel level warning light	LED
Engine trouble warning light	LED
Starter motor	
Power output	0.80 kW
Armature coil resistance	0.0050–0.0150 Ω
Brush overall length	12.0 mm (0.47 in)
Limit	6.50 mm (0.26 in)
Brush spring force	6.02–6.51 N (614–664 gf, 21.69–23.45 oz)
Mica undercut (depth)	0.70 mm (0.03 in)
Oil level switch	
Oil level switch resistance (maximum level position)	484.0–536.0 Ω
Oil level switch resistance (minimum level position)	114.0–126.0 Ω
Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω
Intake air temperature sensor resistance	5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance	290–390 Ω at 80 °C (290–390 Ω at 176 °F)
Engine temperature sensor resistance	2510–2780 Ω at 20 °C (2510–2780 Ω at 68 °F)
Engine temperature sensor resistance	210–221 Ω at 100 °C (210–221 Ω at 212 °F)
Lean angle sensor output voltage	
Operating angle	45 °
Output voltage up to operating angle	0.4–1.4 V
Output voltage over operating angle	3.7–4.4 V
Fuse(s)	
Main fuse	40.0 A
Headlight fuse	20.0 A
Taillight fuse	7.5 A
Signaling system fuse	7.5 A
Ignition fuse	15.0 A
Fuel injection system fuse	10.0 A
Backup fuse	7.5 A

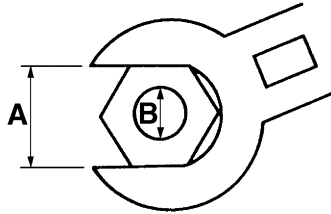
EAS20017

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		
		N·m	kgf·m	lb·ft
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	94

TIGHTENING TORQUES

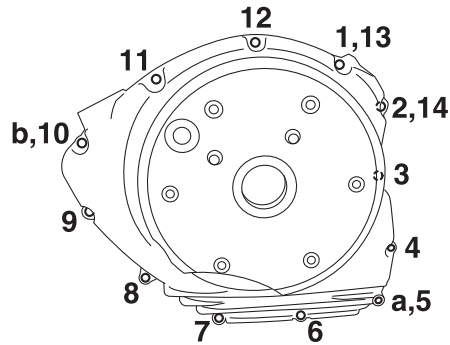
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ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	2	13 N·m (1.3 kgf·m, 9.4 lb·ft)	
Tappet cover bolt	M6	18	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Oil filter cartridge	M20	1	17 N·m (1.7 kgf·m, 12 lb·ft)	
Oil filter cartridge union bolt	M20	1	70 N·m (7.0 kgf·m, 51 lb·ft)	
Engine oil drain bolt	M14	1	43 N·m (4.3 kgf·m, 31 lb·ft)	
Muffler and exhaust pipe bolt	M8	1	12 N·m (1.2 kgf·m, 8.7 lb·ft)	
Muffler and muffler bracket bolt	M10	2	35 N·m (3.5 kgf·m, 25 lb·ft)	
Muffler protector 1	M6	2	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Muffler protector 2	M6	2	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Muffler cap	M6	5	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Exhaust pipe nut	M8	2	20 N·m (2.0 kgf·m, 14 lb·ft)	
Exhaust pipe bolt	M8	2	20 N·m (2.0 kgf·m, 14 lb·ft)	
Exhaust pipe joint cover bolt	M6	2	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Exhaust pipe joint nut	M8	2	15 N·m (1.5 kgf·m, 11 lb·ft)	
Exhaust pipe protector 1 bolt	M6	2	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Exhaust pipe protector 2 bolt	M6	3	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Exhaust pipe protector 3 bolt	M6	2	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Generator cover bolt	M6	12	12 N·m (1.2 kgf·m, 8.7 lb·ft)	 See TIP.
Generator rotor bolt	M12	1	90 N·m (9.0 kgf·m, 65 lb·ft)	
Clutch cover bolt	M6	11	12 N·m (1.2 kgf·m, 8.7 lb·ft)	l = 40 mm (1.57 in)  See TIP.
Clutch cover bolt (with washer)	M6	1	10 N·m (1.0 kgf·m, 7.2 lb·ft)	l = 40 mm (1.57 in)  See TIP.
Clutch cover bolt	M6	3	12 N·m (1.2 kgf·m, 8.7 lb·ft)	l = 65 mm (2.56 in)  See TIP.
Drive pulley nut	M22	1	140 N·m (14 kgf·m, 100 lb·ft)	 Stake.

TIP**Generator cover bolt**

Temporally tighten “a” and “b” and then tighten the generator cover bolts in the order shown in the illustration.

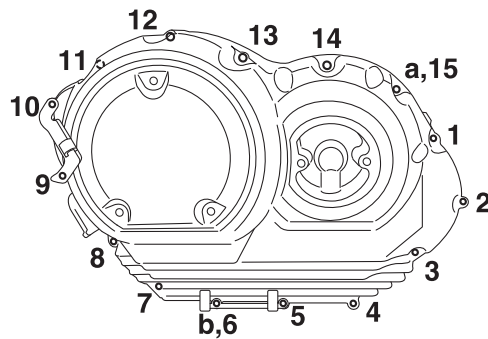


TIP**Clutch cover bolt**

Temporally tighten the bolts “a” and “b”, and then tighten the clutch cover bolts in the order shown in the illustration.

Bolt “1”–“13”, “15”: 12 N·m (1.2 kgf·m, 8.7 lb·ft)

Bolt “14”: 10 N·m (1.0 kgf·m, 7.2 lb·ft)



TIGHTENING TORQUES

EAS30017

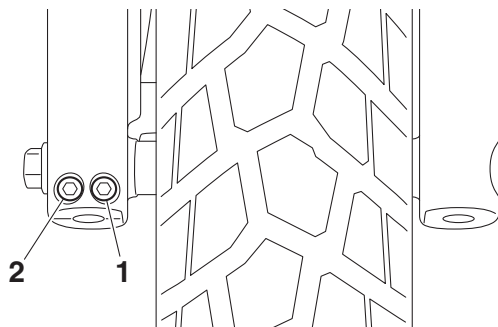
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Clutch cable locknut (crankcase side)	M8	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Front wheel axle	M16	1	59 N·m (5.9 kgf·m, 43 lb·ft)	
Front wheel axle pinch bolt	M8	2	20 N·m (2.0 kgf·m, 14 lb·ft)	See TIP.
Front brake caliper bolt	M10	2	27 N·m (2.7 kgf·m, 20 lb·ft)	
Front brake caliper bleed screw	M7	1	6 N·m (0.6 kgf·m, 4.3 lb·ft)	
Rear wheel axle nut	M18	1	150 N·m (15 kgf·m, 108 lb·ft)	
Rear brake caliper bolt	M10	2	27 N·m (2.7 kgf·m, 20 lb·ft)	
Rear brake caliper bleed screw	M7	1	6 N·m (0.6 kgf·m, 4.3 lb·ft)	
Rear wheel pulley self-locking nut	M12	5	95 N·m (9.5 kgf·m, 69 lb·ft)	
Upper bracket pinch bolt	M8	2	20 N·m (2.0 kgf·m, 14 lb·ft)	
Lower bracket pinch bolt	M10	4	23 N·m (2.3 kgf·m, 17 lb·ft)	
Upper handlebar holder bolt	M8	4	28 N·m (2.8 kgf·m, 20 lb·ft)	
Lower handlebar holder nut	M10	2	32 N·m (3.2 kgf·m, 23 lb·ft)	
Steering stem nut	M22	1	110 N·m (11 kgf·m, 80 lb·ft)	
Lower ring nut (initial tightening torque)	M25	1	52 N·m (5.2 kgf·m, 38 lb·ft)	See TIP.
Lower ring nut (final tightening torque)	M25	1	18 N·m (1.8 kgf·m, 13 lb·ft)	See TIP.

TIP

Front wheel axle pinch bolt

1. Insert the front wheel axle from the right side and tighten it to 59 N·m (5.9 kgf·m, 43 lb·ft).
2. In the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1", tighten each bolt to 20 N·m (2.0 kgf·m, 14 lb·ft) without performing temporary tightening.



TIP

Lower ring nut

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































LUBRICATION POINTS AND LUBRICANT TYPES

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LUBRICATION POINTS AND LUBRICANT TYPES

EAS30018




















ENGINE

Lubrication point	Lubricant
Oil seals (lip)	
O-rings	
Bearings	
Cylinder head bolts, nuts and washers	
Connecting rods (small end and big end)	
Crankshaft journals	
Pistons (outer surface)	
Piston pins (outer surface)	
Camshaft cam lobes and camshaft journals	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Rocker arm shafts	
Oil strainer	
Oil filter cartridge union bolt	
Crankcase stud bolts	
Starter clutch idle gear 1 shaft	
Starter clutch idle gear 1	
Starter clutch gear (inner and outer surfaces)	
Starter clutch and metal-to-metal moving parts	
Starter clutch idle gear 2 shaft	
Starter clutch idle gear 2	
Primary driven gear (inner surface) and collar	
Clutch pull rod	
Oil pump drive sprocket (inner surface)	
Clutch thrust washers	
Clutch boss nut and washer	
Transmission gears (wheel and pinion) and collar	
Shift forks and shift fork guide bars	
Shift drum	
Shift shaft and shift	
Crankcase (mating surface)	Yamaha bond No.1215 (Three Bond No.1215®)
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)
Crankcase breather pipe	Yamaha bond No.1215 (Three Bond No.1215®)

LUBRICATION POINTS AND LUBRICANT TYPES

EAS30019

CHASSIS

Lubrication point	Lubricant
Steering bearings and upper bearing race cover (lip)	
Lower bearing steering seal (lip)	
Front wheel oil seals (lip)	
Rear wheel oil seal (lip)	
Rear wheel drive hub (mating surface)	
Brake pedal shaft (pivoting point)	
Shift pedal (pivoting point)	
Sidestand (pivoting point) and metal-to-metal moving parts	
Shift rod joint (inner surface) and metal to metal moving parts	
Throttle grip tube guide (inner surface) and throttle cables	
Brake lever (pivoting point) and metal-to-metal moving parts	
Brake master cylinder push rod (contact surface)	
Clutch lever (pivoting point) and metal-to-metal moving parts	
Swingarm pivot bearings (inner surface)	
Swingarm pivot oil seals (lip)	
Pivot shaft (outer surface)	
Rear wheel axle (outer surface)	
Engine mounting bolt (front lower side) (thread part)	
Brake pedal spring hole in brake pedal	

LUBRICATION POINTS AND LUBRICANT TYPES

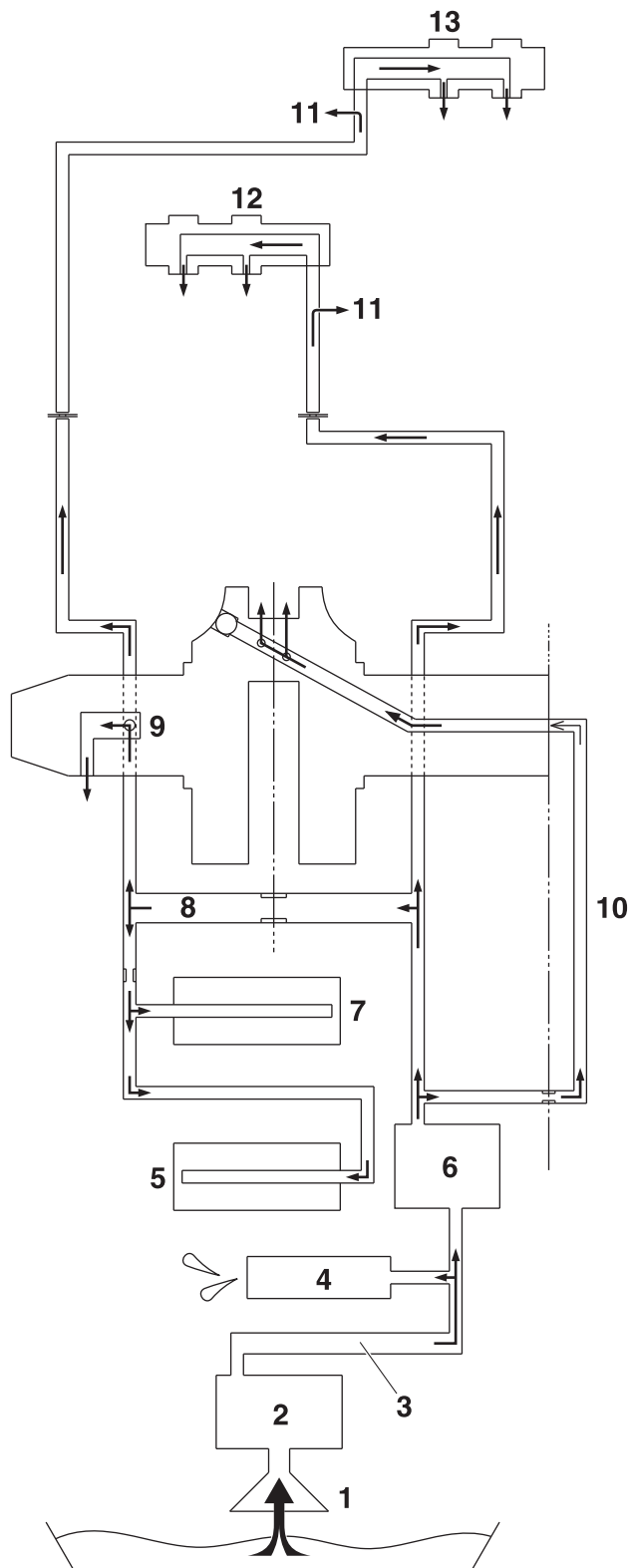
LUBRICATION SYSTEM CHART AND DIAGRAMS

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LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS30020

ENGINE OIL LUBRICATION CHART



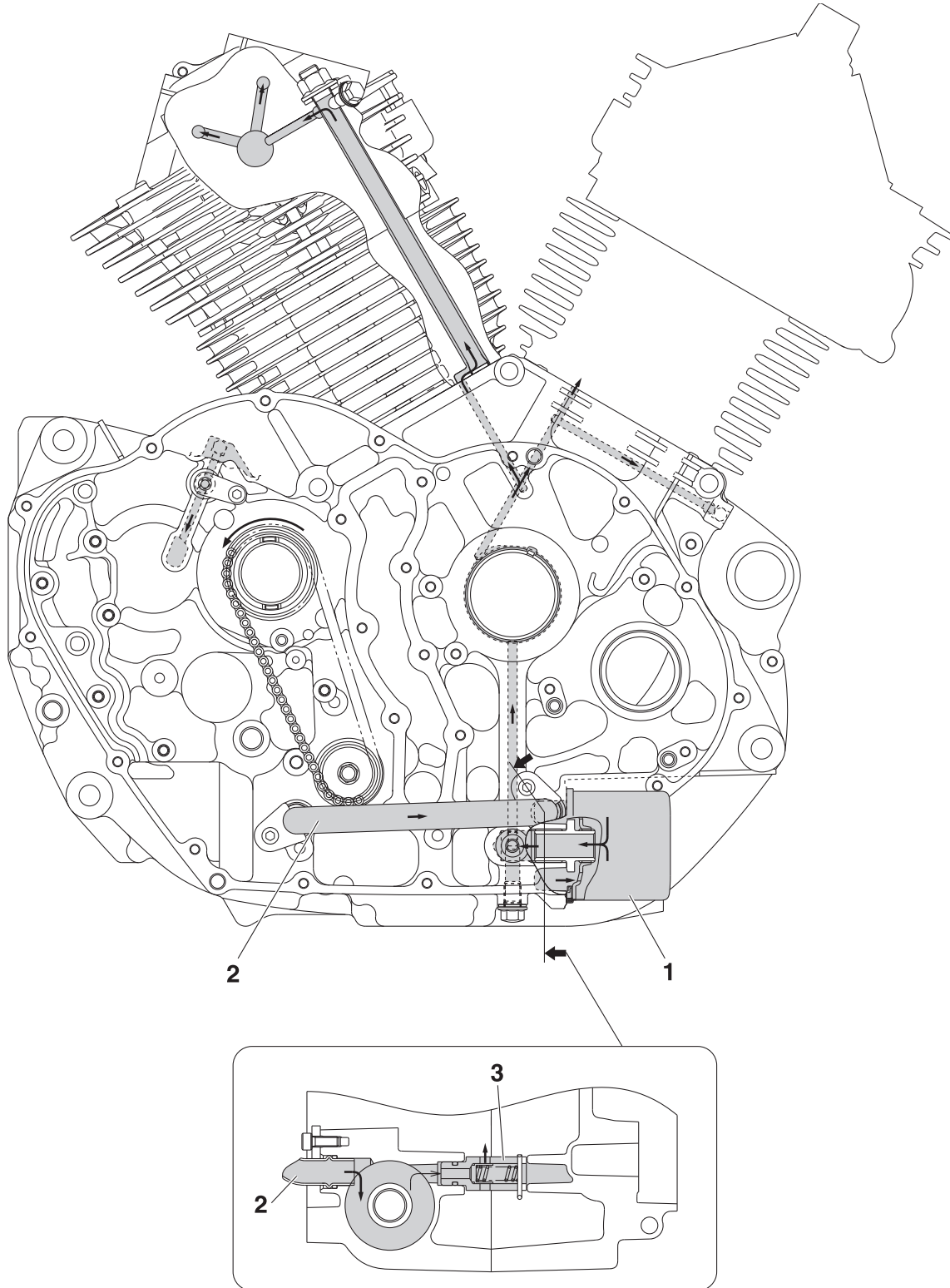
LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil strainer
2. Oil pump assembly
3. Oil delivery pipe 2
4. Relief valve assembly
5. Drive axle
6. Oil filter cartridge
7. Main axle
8. Main gallery
9. Crankshaft
10. Clutch cover
11. Valve stem end (intake side)
12. Rear cylinder camshaft
13. Front cylinder camshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS

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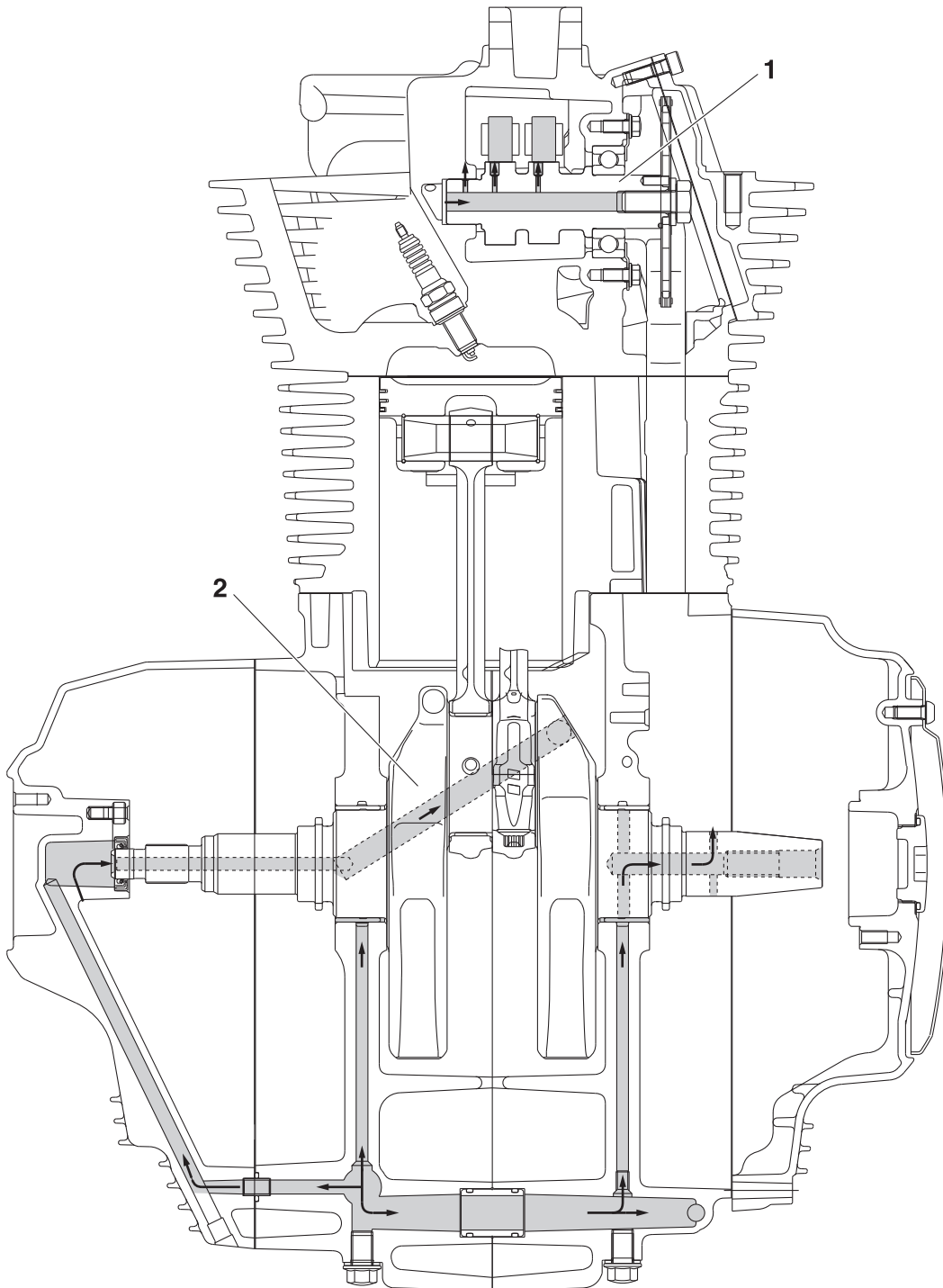
LUBRICATION DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil filter cartridge
2. Oil delivery pipe 2
3. Relief valve assembly

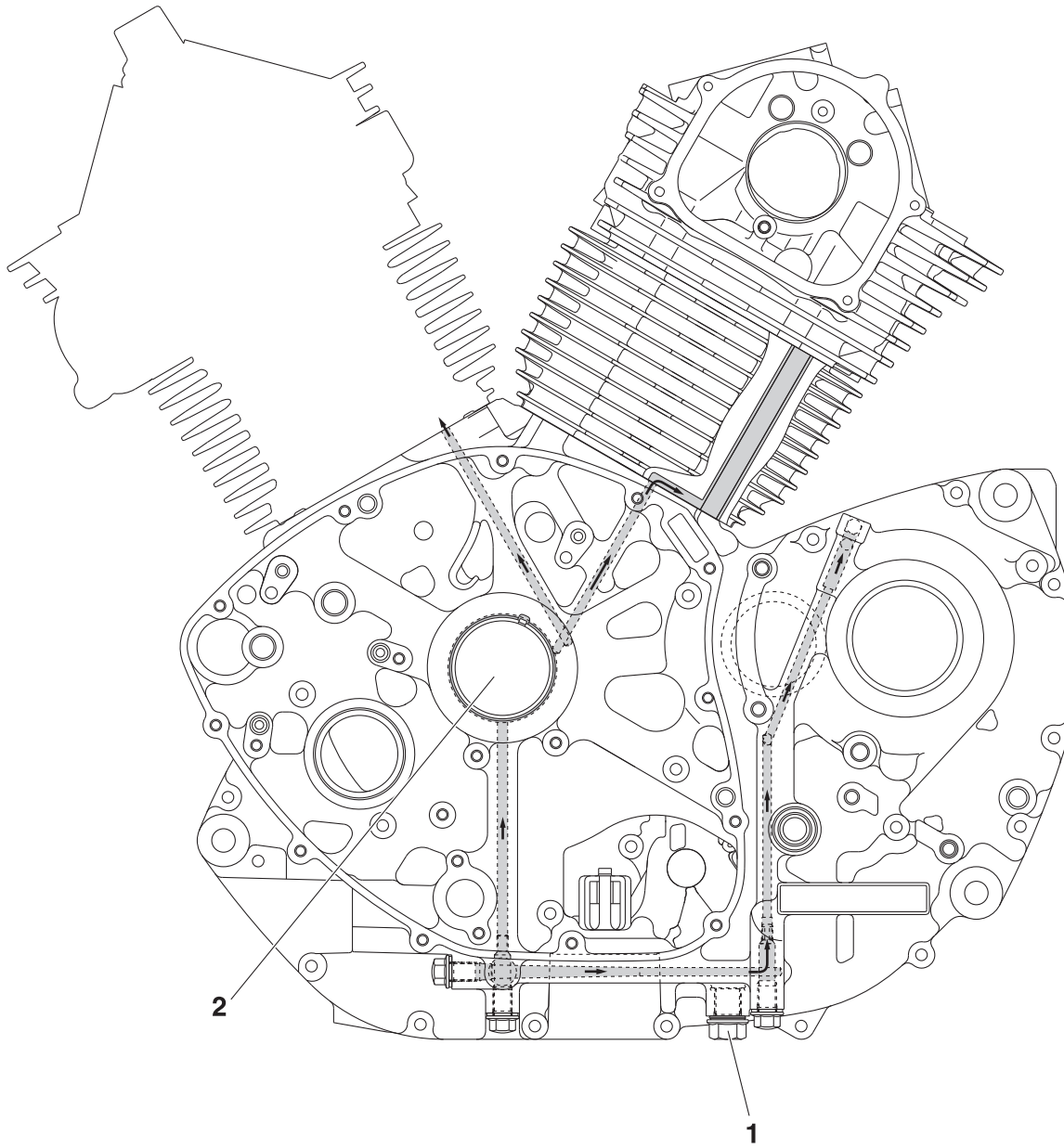
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Camshaft
2. Crankshaft

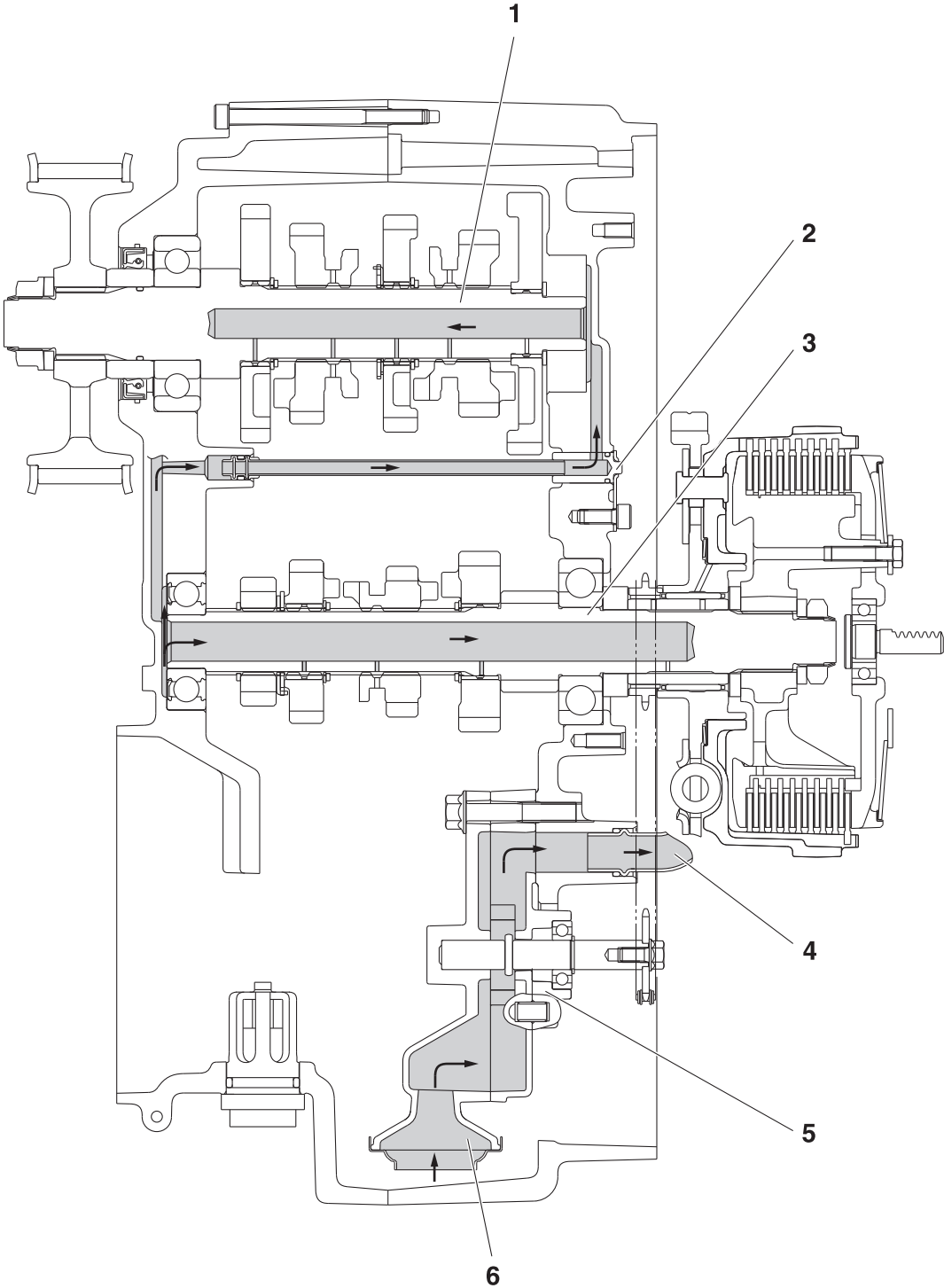
LUBRICATION SYSTEM CHART AND DIAGRAMS



LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Oil drain bolt
2. Crankshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS



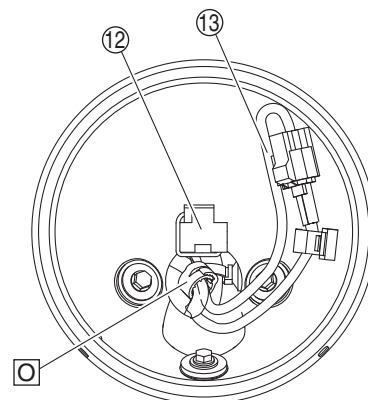
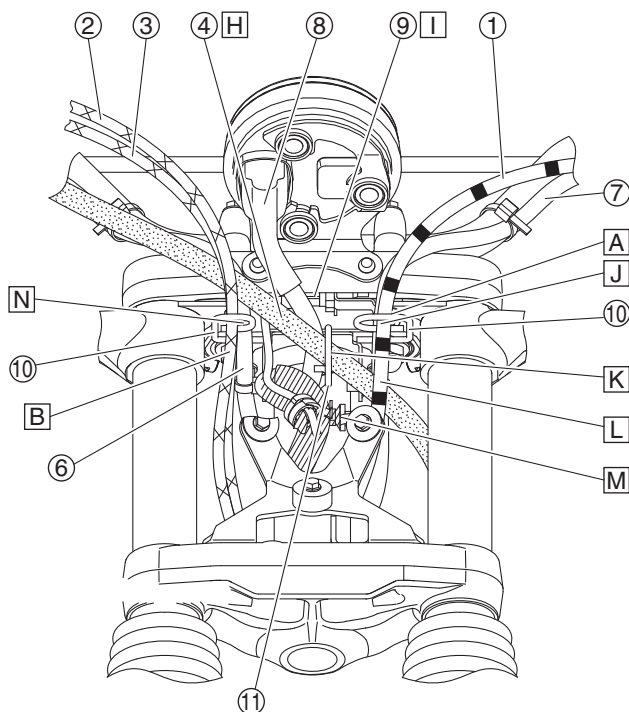
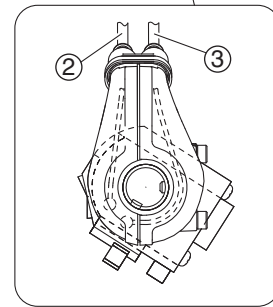
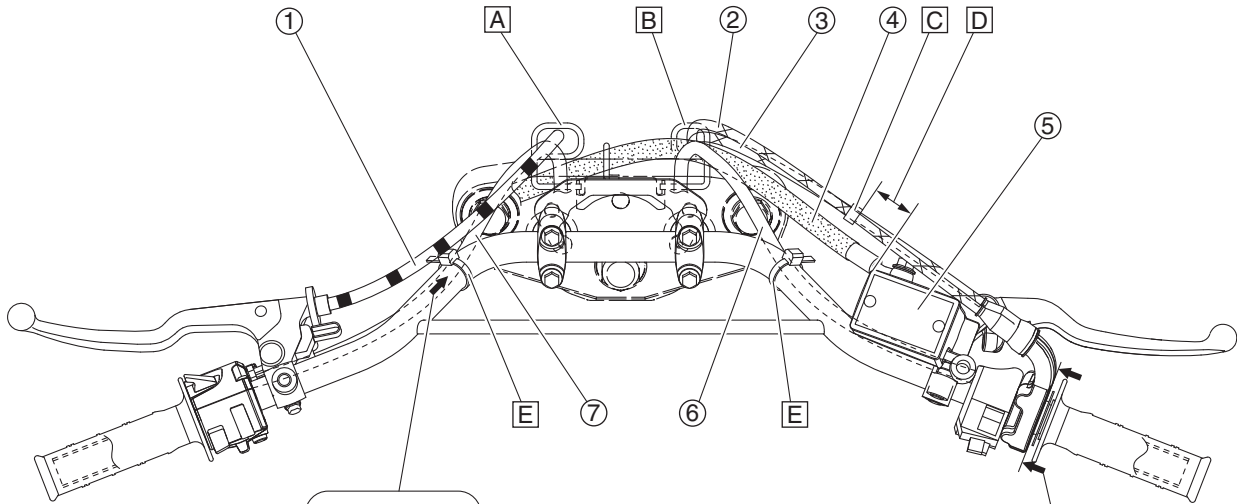
LUBRICATION SYSTEM CHART AND DIAGRAMS

1. Drive axle
2. Oil delivery pipe 1
3. Main axle
4. Oil delivery pipe 2
5. Oil pump assembly
6. Oil strainer

EAS20021

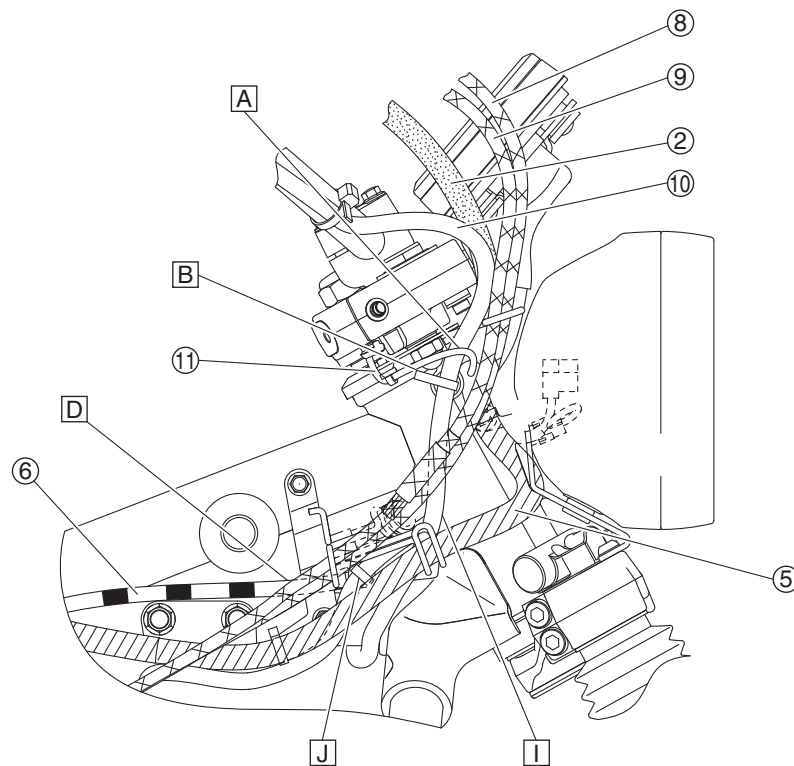
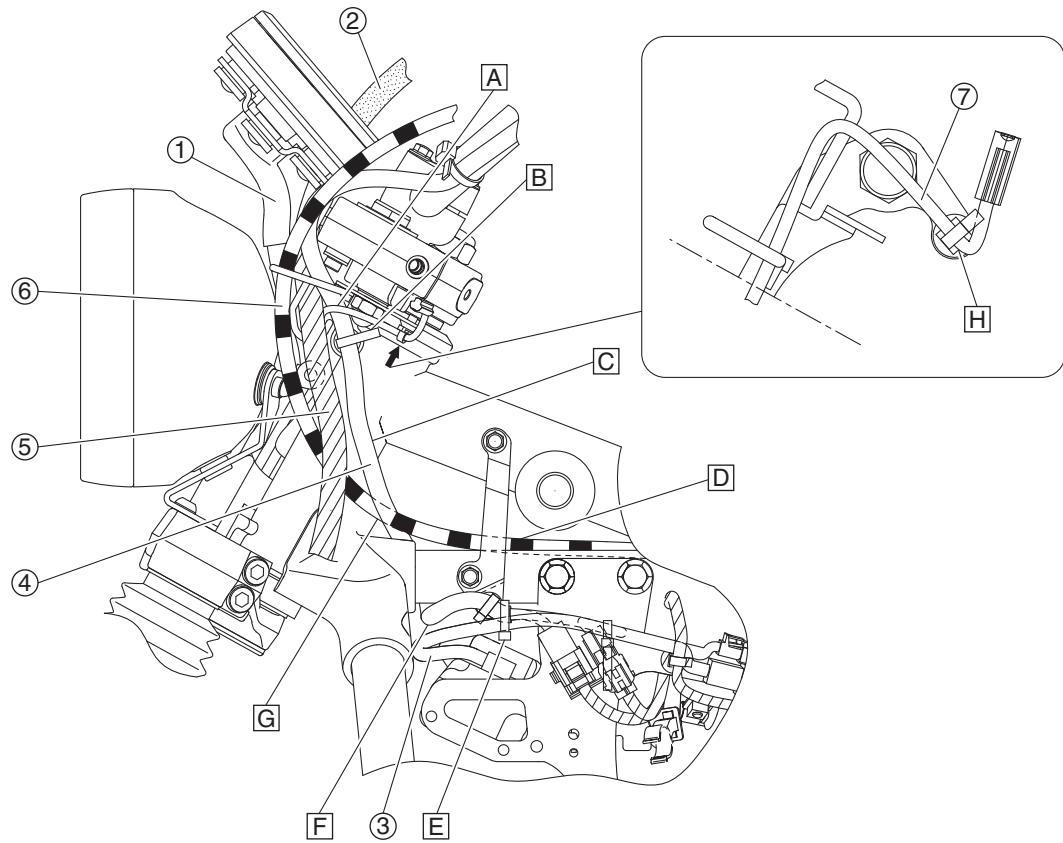
CABLE ROUTING

Handlebar and headlight (top and front view)



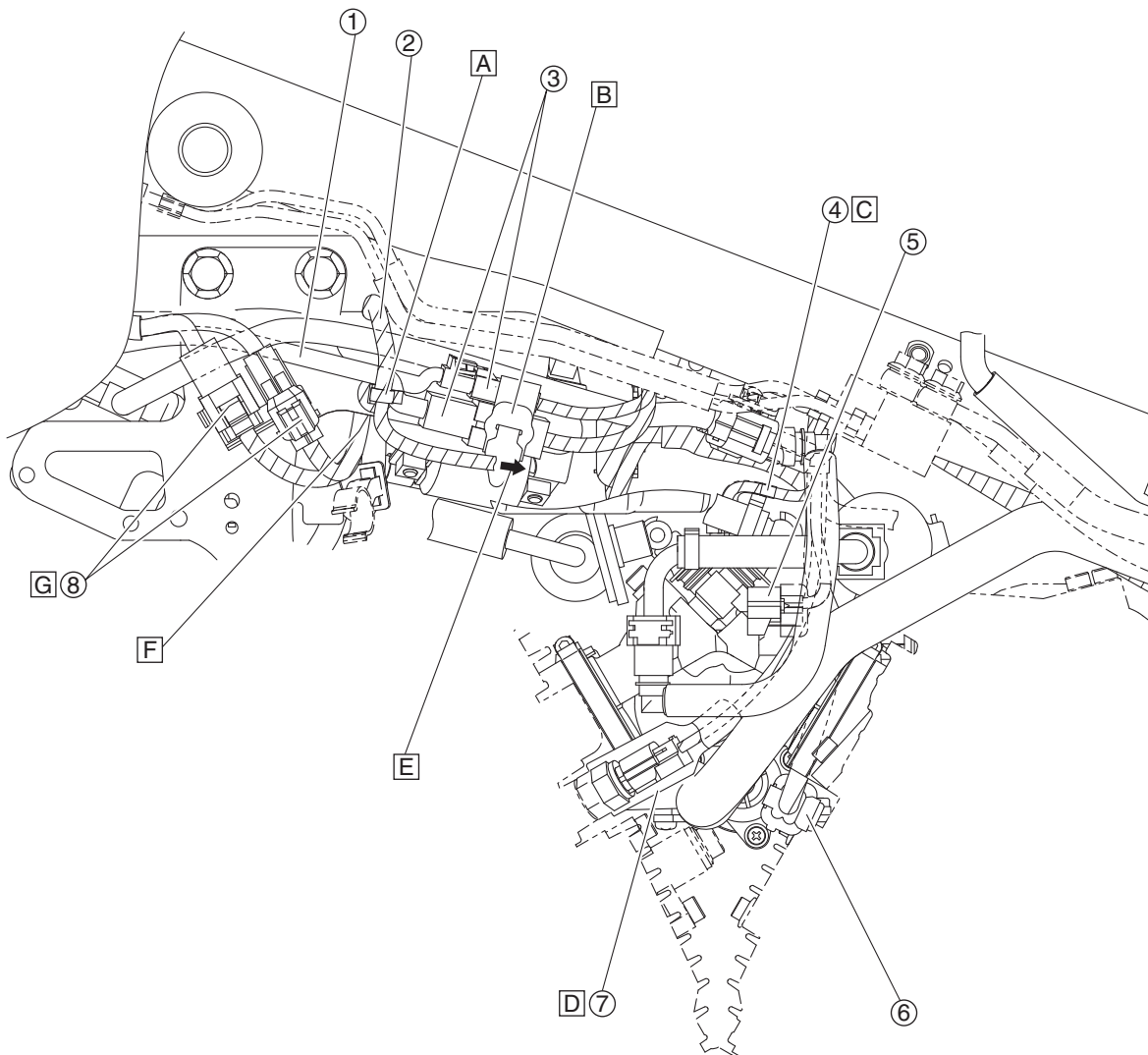
1. Clutch cable
2. Throttle cable (accelerator cable)
3. Throttle cable (decelerator cable)
4. Front brake hose
5. Front brake master cylinder
6. Handlebar switch lead (right)
7. Handlebar switch lead (left)
8. Meter assembly lead
9. Intake air temperature sensor coupler
10. Cable guide
11. Hose guide
12. Headlight coupler
13. Intake air temperature sensor lead
- A. Route the clutch cable through the cable guide.
- B. Route the throttle cable (accelerator cable) and throttle cable (decelerator cable) through the cable guide.
- C. Fasten the throttle cable (accelerator cable) and throttle cable (decelerator cable) with the holder at the location shown in the illustration. Point the open ends of the holder rearward.
- D. 10–30 mm (0.39–1.18 in)
- E. Fasten the handlebar switch lead with the plastic band at the location shown in the illustration.
- F. Point the end of the plastic band downward.
- G. Face the buckle of the plastic band forward.
- H. Route the front brake hose to the front of the meter assembly lead.
- I. Connect the intake air temperature sensor coupler to the intake air temperature sensor.
- J. Route the handlebar switch lead (left) rearward of the cable guide.
- K. Route the front brake hose through the hose guide.
- L. Route the clutch cable to the front of the front brake hose.
- M. Insert the projection on the wire harness holder into the hole in the headlight bracket.
- N. Route the handlebar switch lead (right) rearward of the cable guide.
- O. Position the holder inside the headlight body near the hole in the headlight body.

Steering head (left and right side view)



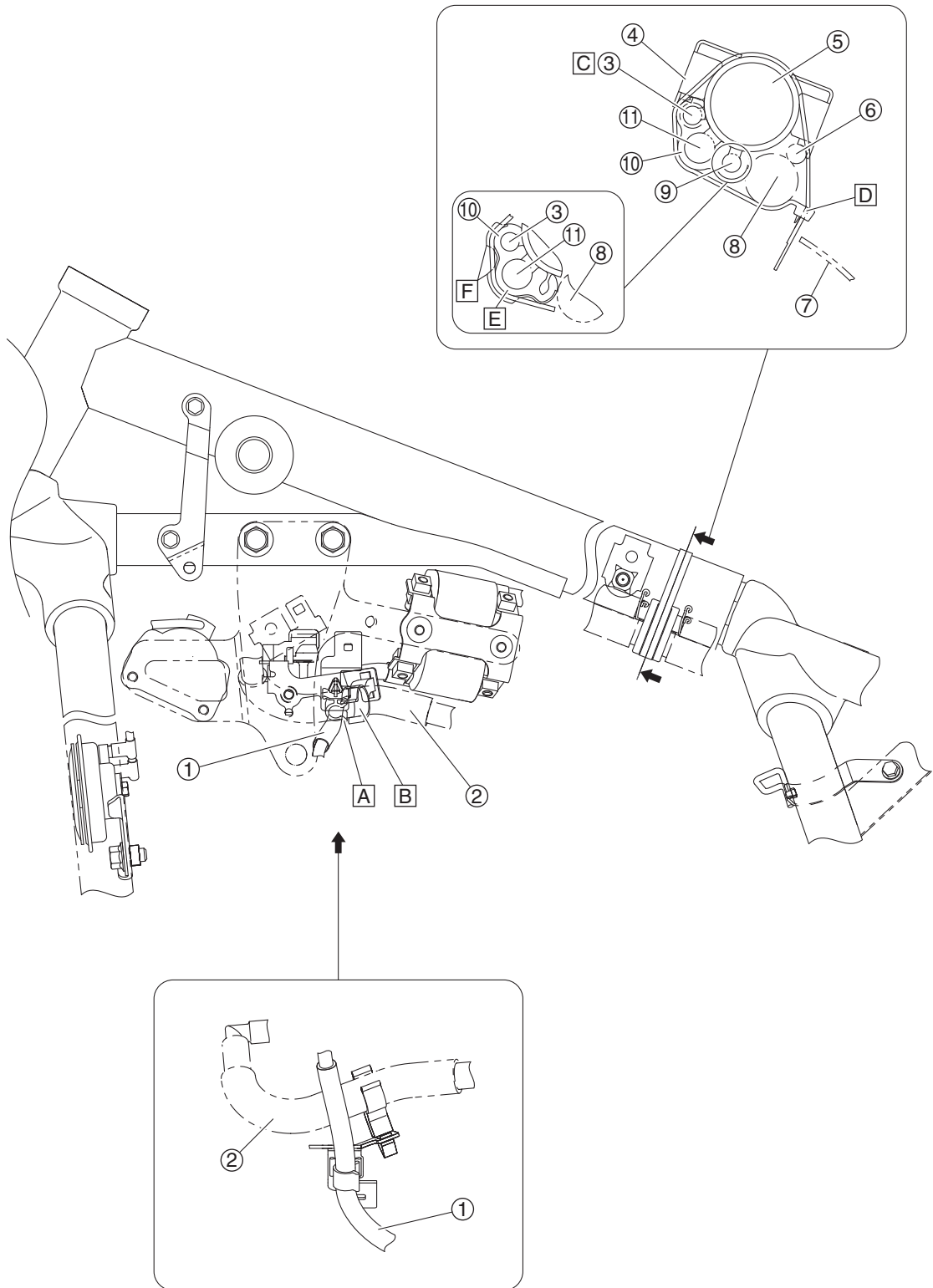
1. Meter assembly lead
2. Front brake hose
3. Main switch lead
4. Handlebar switch lead (left)
5. Wire harness
6. Clutch cable
7. Front turn signal/position light lead (left)
8. Throttle cable (decelerator cable)
9. Throttle cable (accelerator cable)
10. Handlebar switch lead (right)
11. Front turn signal/position light lead (right)
- A. Route the front turn signal/position light lead to the outside of the handlebar switch lead.
- B. Insert the projection on the handlebar switch lead holder into the hole in the headlight bracket.
- C. Route the portion of the handlebar switch lead to the rear of the holder over the frame support from left to right.
- D. Route the clutch cable to the inside of the lead holder.
- E. Fasten the main switch lead and handlebar switch lead with the plastic band. Be sure to route the main switch lead to the outside of the handlebar switch lead and position the plastic band 10 mm (0.39 in) or less to the rear of the handlebar switch lead holder. Point the end of the plastic band inward.
- F. Route the portion of the handlebar switch lead to the front of the holder under the frame pipe from left to right.
- G. Route the handlebar switch lead under the clutch cable from left to right.
- H. Securely install the holder.
- I. Route the handlebar switch lead to the inside of the throttle cables and wire harness.
- J. Insert the projection on the handlebar switch lead holder into the hole in the lead holder.

Frame (front left side view) 1



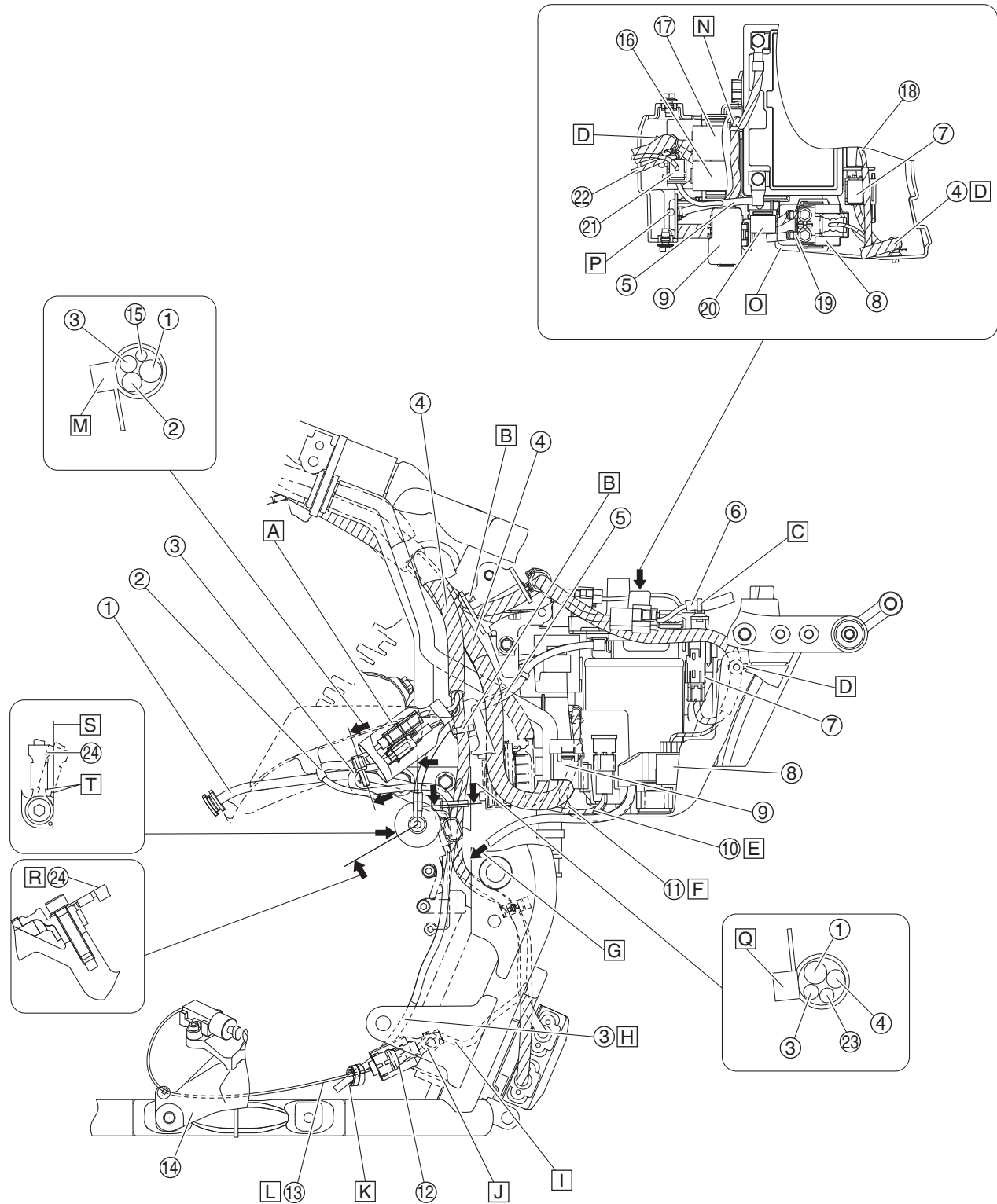
1. Main switch lead
2. Fuel pump lead
3. Main switch coupler
4. Rear cylinder injector lead
5. Front cylinder injector coupler
6. ISC (Idle Speed Control) unit coupler
7. Engine temperature sensor coupler
8. Handlebar switch coupler (right)
- A. Route the fuel pump lead to the outside of the main switch leads, and then fasten the fuel pump lead with the holder.
- B. Fasten the main switch couplers to the engine bracket (front upper side) with the plastic band. Be sure to position the smaller coupler above the larger coupler.
- C. Connect the rear cylinder injector coupler, which has white tape on the lead, to the rear cylinder injector.
- D. After connecting the engine temperature sensor coupler, cover the coupler with the coupler cover.
- E. To the fuel pump
- F. Route the right handlebar switch lead under the engine bracket (front upper side).
- G. Install the right handlebar switch coupler (2-pin) onto the tab on the engine bracket (front upper side) and insert the projection on the right handlebar switch coupler (10-pin) into the hole in the bracket.

Frame (front left side view) 2



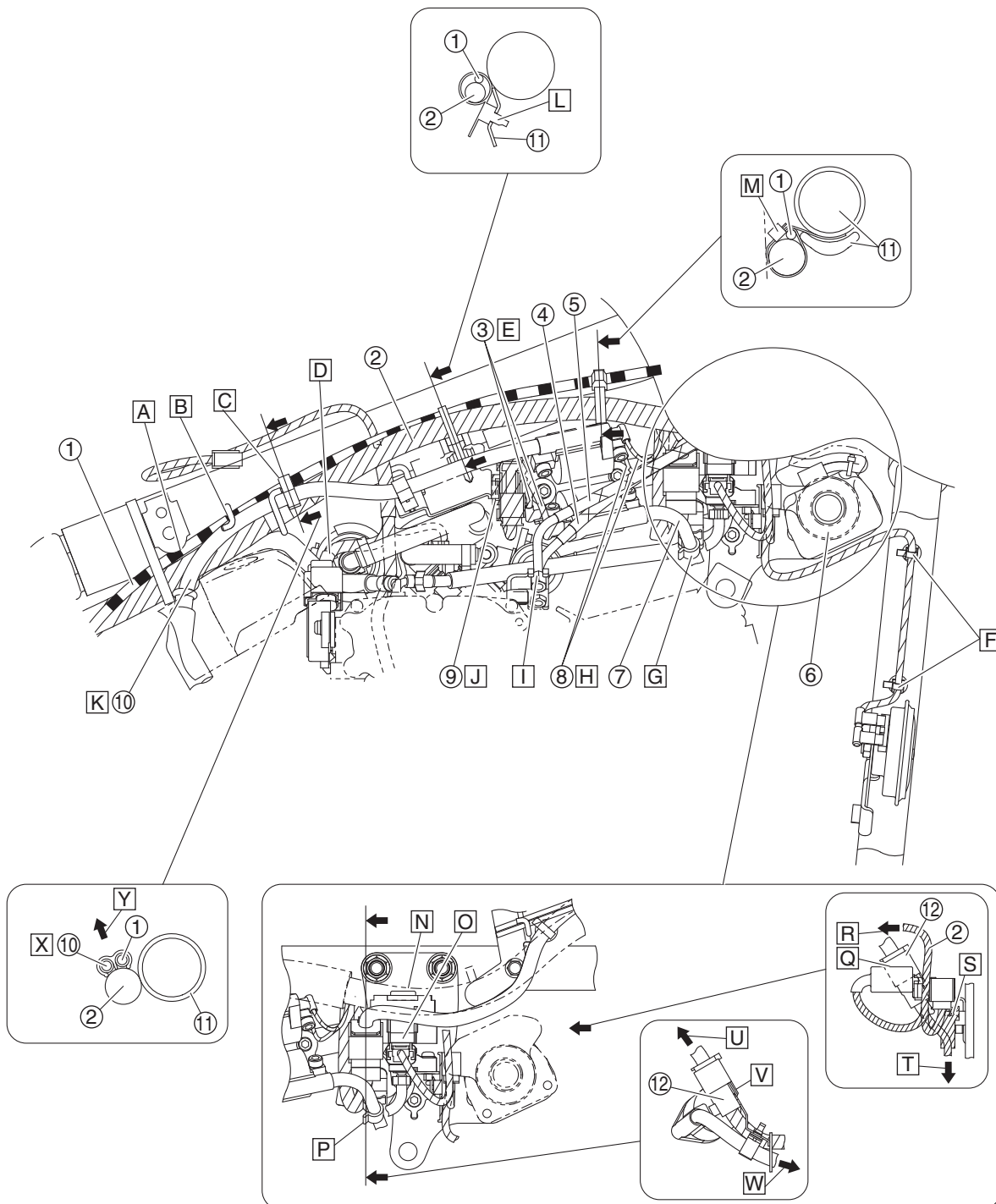
1. Front cylinder spark plug lead
 2. Fuel hose (hose joint to pressure regulator)
 3. Fuel tank breather hose
 4. Fuel tank bracket
 5. Frame
 6. Clutch cable
 7. Rear cylinder head cover (right)
 8. Wire harness
 9. Canister purge hose (for California)
 10. Hose holder
 11. Crankcase breather hose
- A. Fasten the front cylinder spark plug lead with the holder.
 - B. Fasten the fuel hose (hose joint to pressure regulator) with the holder.
 - C. Fasten the hose protector of the fuel tank breather hose with the hose holder. Make sure that the fuel tank breather hose contacts the fuel tank bracket.
 - D. Position the buckle of the plastic band below the frame, and place the end of the band to the inside of the rear cylinder head cover.
 - E. Be sure to fit the plastic band into the slots in the hose holder. (Except for California)
 - F. Slots in the hose holder

Frame (rear left side view)



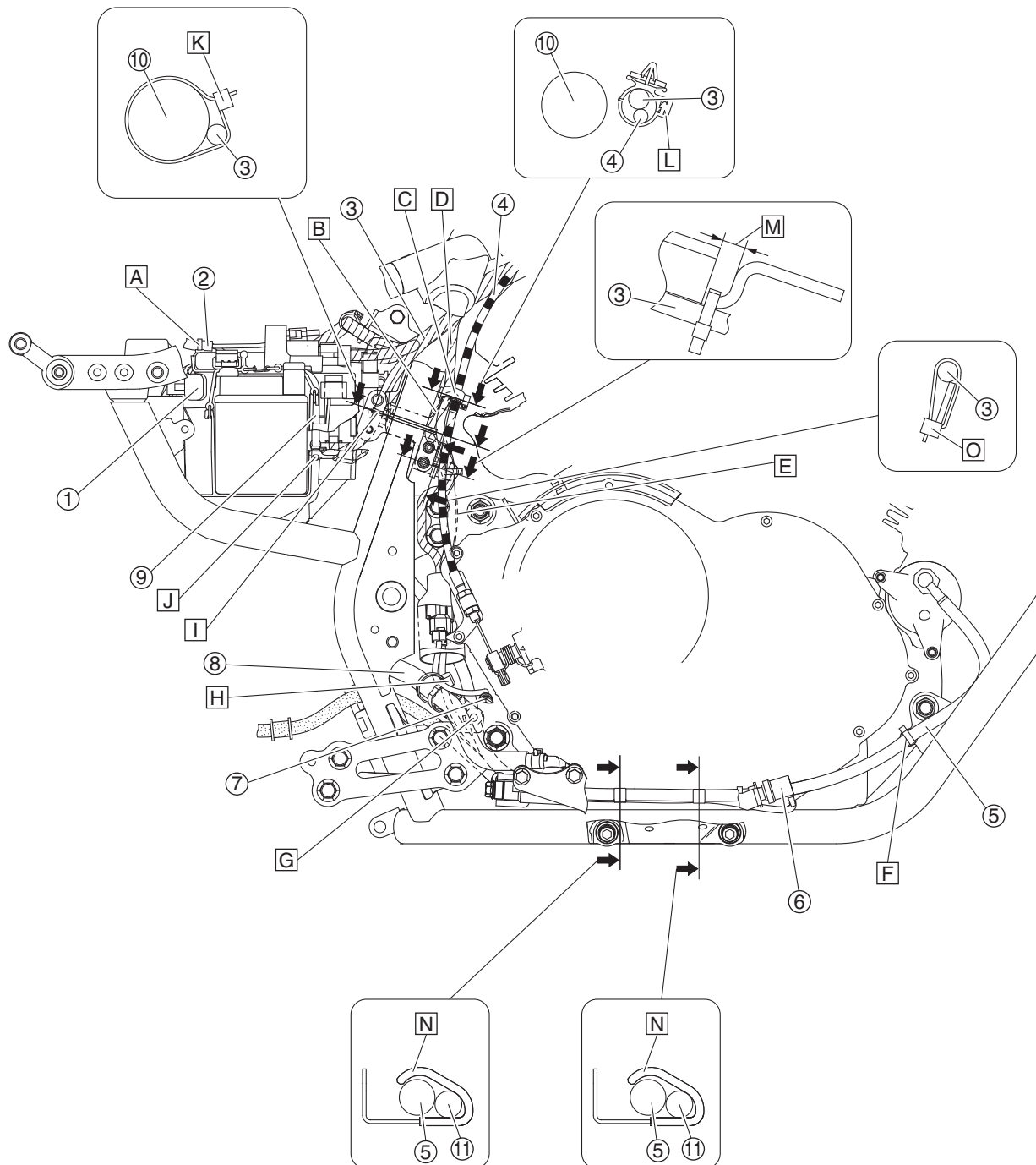
1. Stator coil lead
2. Neutral switch lead
3. Oil level switch lead
4. Wire harness
5. Negative battery lead
6. Sub-wire harness (rear turn signal light, license plate light)
7. Headlight relay
8. Starter relay
9. Fuse box
10. Main fuse lead
11. Positive battery lead
12. Sidestand switch coupler
13. Sidestand switch lead
14. Sidestand bracket
15. Crankshaft position sensor lead
16. Turn signal relay
17. Relay unit
18. Lean angle sensor lead
19. Starter motor lead
20. Main fuse
21. Sub-wire harness coupler (negative battery)
22. Yamaha diagnostic tool coupler
23. Speed sensor lead
24. Ground lead
- A. After connecting the couplers, cover the couplers with the coupler cover, and then place the couplers in the air duct.
- B. Insert the projections on the wire harness holders into the holes in the frame.
- C. Insert the projection on the sub-wire harness holder into the hole in the battery box.
- D. Insert the projection on the wire harness holder into the hole in the battery box.
- E. Route the main fuse lead under the fuse box.
- F. Route the positive battery lead under the fuse box.
- G. To the starter motor
- H. Route the oil level switch lead to the inside of the frame.
- I. Route the sidestand switch lead to the inside of the frame.
- J. After connecting the sidestand switch coupler, insert the projection on the coupler cover into the hole in the frame.
- K. Fasten the oil level switch lead and sidestand switch lead with the holder. Position the holder between the sidestand switch coupler and the plastic locking tie.
- L. Route the sidestand switch lead over the frame. Make sure that the sidestand switch lead is not pinched between the sidestand bracket and the frame.
- M. Point the end of the plastic locking tie downward.
- N. Insert the projection on the positive battery lead holder into the hole in the battery box.
- O. After connecting the positive battery lead and starter motor lead, install the starter relay cover.
- P. Insert the projection on the ground lead holder into the hole in the battery box.
- Q. Point the end of the plastic locking tie inward.
- R. Install the ground lead terminal so that the crimped section of the terminal that secures the lead is facing inward. Install the ground lead terminal and the drive pulley housing using the same bolt.
- S. Side of the drive pulley housing
- T. Install the ground lead terminal so that the indicated section of the terminal is positioned to the front of the side of the drive pulley housing.

Frame (front right side view)



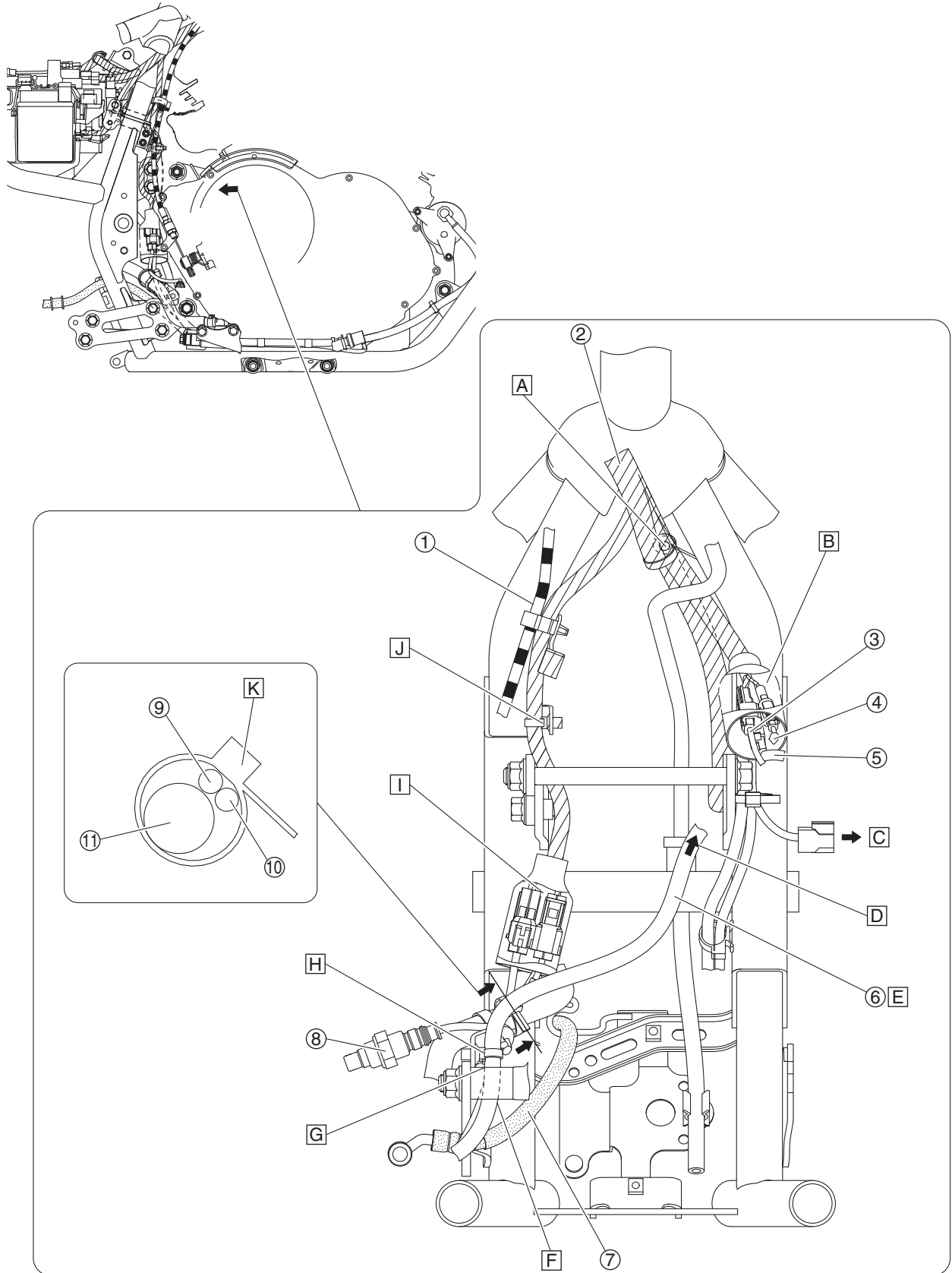
1. Clutch cable
2. Wire harness
3. Rear cylinder ignition coil lead
4. Throttle cable (accelerator cable)
5. Throttle cable (decelerator cable)
6. Main switch
7. Front cylinder spark plug lead
8. Front cylinder ignition coil lead
9. Joint coupler
10. Rear cylinder spark plug lead
11. Frame
12. Handlebar switch coupler (left)
- A. Route the clutch cable to the inside of the fuel tank bracket.
- B. Route the clutch cable through the guide on the frame.
- C. Position the holder 10 mm (0.39 in) or less to the front of the edge of the guide.
- D. Connect the wire harness to the throttle position sensor coupler, and then cover the throttle position sensor coupler with the coupler cover.
- E. Install the ignition coil connectors so that the rear cylinder ignition coil leads are routed upward.
- F. Insert the projection on the wire harness holder into the hole in the cable guide.
- G. Fasten the front cylinder spark plug lead with the holder. Point the open ends of the holder rearward.
- H. Install the ignition coil connectors so that the front cylinder ignition coil leads are routed downward.
- I. Align the paint mark on the throttle cable (decelerator cable) with the throttle cable holder.
- J. Insert the projection on the joint coupler into the hole in the frame.
- K. Make sure that the rear cylinder spark plug lead is not pinched between the rear cylinder head and the rear cylinder head cover.
- L. Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the clutch cable and wire harness with the band, making sure to point the end of the band downward.
- M. Fasten the wire harness and clutch cable with the plastic band. Position the buckle of the plastic band toward the frame so that it does not protrude to the outside of the wire harness, and place the end of the band between the frame.
- N. Install the joint coupler by sliding it onto the engine bracket from below.
- O. Connect the wire harness to the left handlebar switch, and then install the coupler onto the tab on the engine bracket (front upper side).
- P. Secure the holder by inserting the projection on the holder into the hole in the bracket, and then fasten the front cylinder spark plug lead with the holder.
- Q. Align the intake air pressure sensor cover with the handlebar switch coupler.
- R. To the main portion of the wire harness
- S. Fasten the wire harness by sliding the plastic holder on the wire harness onto the stud on the intake air pressure sensor bracket.
- T. To the horn
- U. To the left handlebar switch
- V. Install the left handlebar switch coupler onto the tab on the intake air pressure sensor bracket.
- W. To the wire harness
- X. Route the rear cylinder spark plug lead through the guide.
- Y. Upward.

Frame (rear right side view)



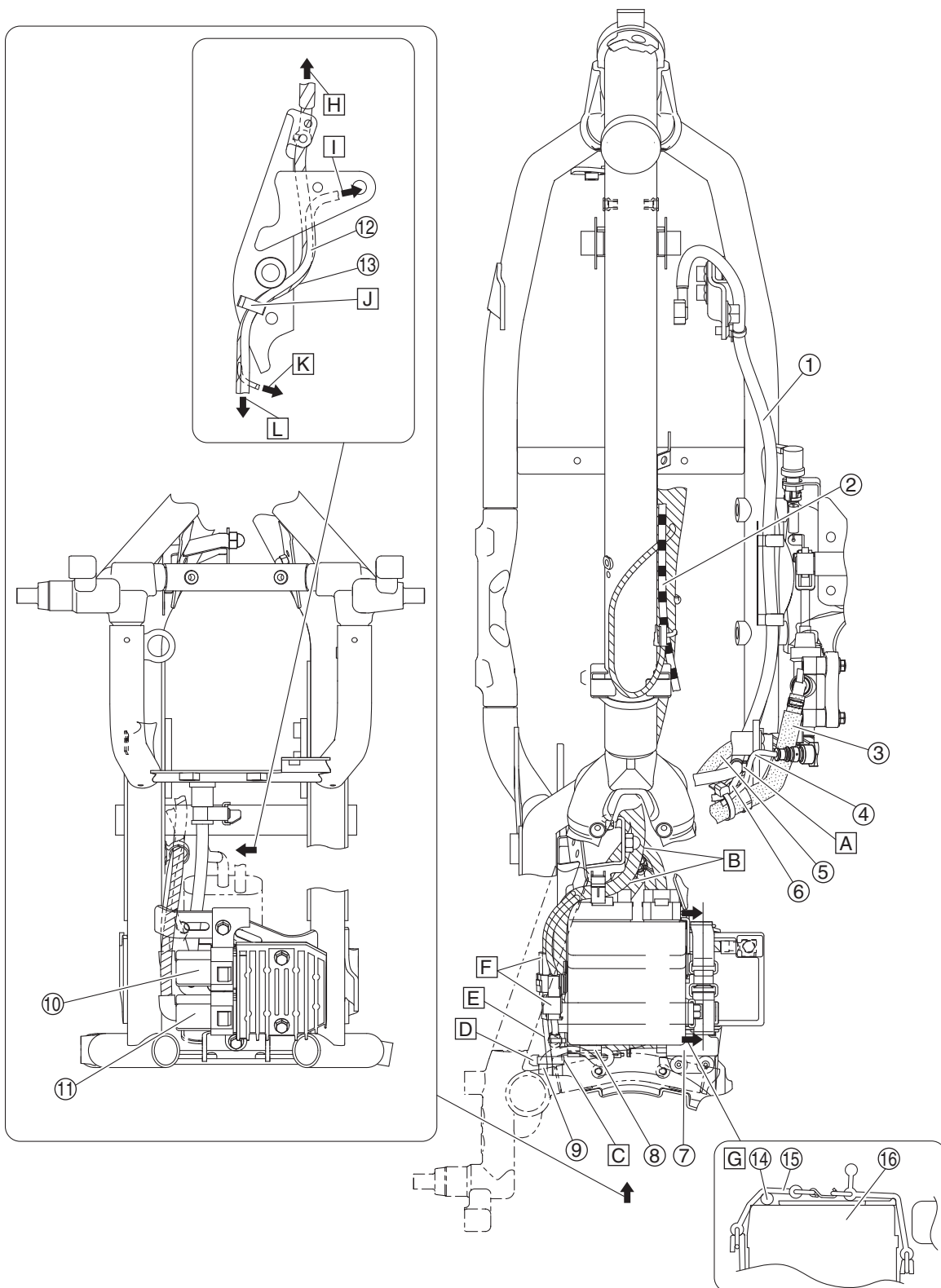
1. Lean angle sensor
2. Sub-wire harness (rear turn signal light, license plate light)
3. Wire harness
4. Clutch cable
5. Starter motor lead
6. Rear brake light switch
7. O₂ sensor
8. Brake fluid reservoir hose
9. Positive battery lead
10. Frame
11. Rear brake light switch lead
- A. Insert the projection on the sub-wire harness holder into the hole in the battery box.
- B. Route the wire harness to the inside of the clutch cable.
- C. Secure the holder by inserting the projection on the holder into the hole in the battery box bracket, and then fasten the clutch cable and wire harness with the holder.
- D. Make sure that there is no slack in the wire harness.
- E. Route the rear brake light switch lead and other leads to the inside of the engine bracket.
- F. Insert the projection on the starter motor lead holder into the hole in the engine bracket (front lower side).
- G. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
- H. Fasten the brake fluid reservoir hose, rear brake light switch lead, and O₂ sensor lead with the plastic band. Face the buckle of the plastic band upward with the end pointing downward.
- I. Insert the projection on the wire harness holder into the hole in the battery box.
- J. Insert the projection on the positive battery lead holder into the hole in the battery box.
- K. Fasten the wire harness to the frame with a plastic locking tie. Point the end of the plastic locking tie inward, and then cut off the excess end of the tie to 3 mm (0.12 in) or less.
- L. Face the catch of the holder forward. Route the clutch cable to the outside of the wire harness.
- M. Position the plastic locking tie at the location shown in the illustration.
- N. Route the rear brake light switch lead and starter motor lead through the guide, and then secure the leads by bending the guide around the leads. Route the rear brake light switch lead to the outside of the starter motor lead. Make sure that the leads do not protrude.
- O. Fasten the wire harness to the frame with the plastic locking tie. Cut off the excess end of the plastic locking tie to 3 mm (0.12 in) or less.

Frame (rear inner view)



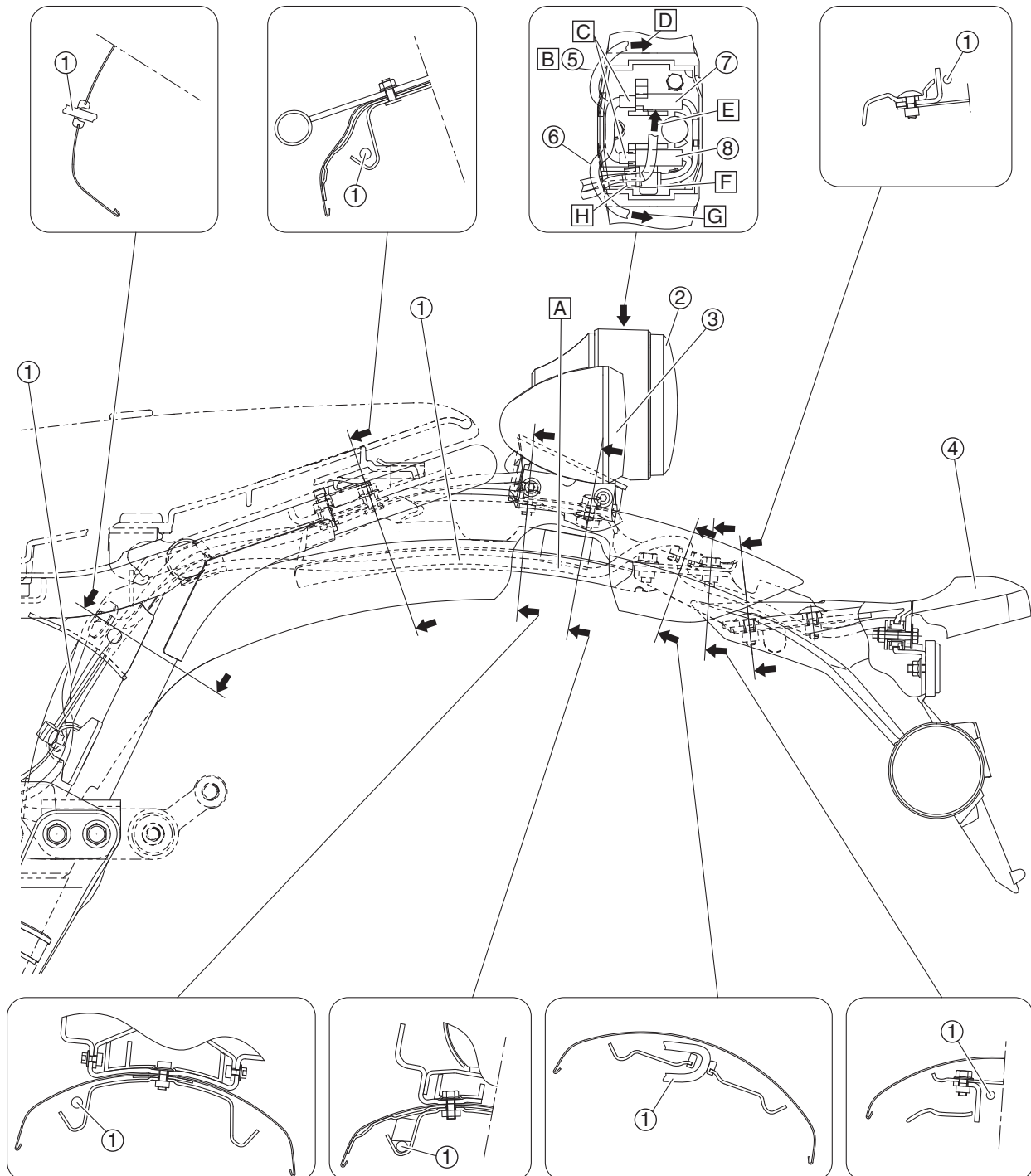
1. Clutch cable
2. Wire harness
3. Crankshaft position sensor lead
4. Oil level switch lead
5. Neutral switch lead
6. Starter motor lead
7. Rear brake hose
8. O₂ sensor
9. Rear brake light switch lead
10. O₂ sensor lead
11. Brake fluid reservoir hose
- A. Insert the projection on the wire harness holder into the hole in the frame.
- B. After connecting the crankshaft position sensor coupler, oil level switch coupler, and neutral switch coupler, cover the couplers with the coupler cover.
- C. To the speed sensor
- D. To the starter relay
- E. Route the starter motor lead to the front of the frame cross member.
- F. Route the starter motor lead and rear brake light switch lead under the engine bracket (rear lower side).
- G. Route the rear brake light switch lead under the mounting position for the starter motor lead on the engine bracket (rear lower side).
- H. Insert the projection on the starter motor lead holder into the hole in the engine bracket (rear lower side).
- I. After connecting the rear brake light switch coupler and O₂ sensor coupler, cover the couplers with the coupler cover.
- J. Insert the projection on the wire harness holder into the hole in the battery box bracket.
- K. Point the end of the plastic band downward.

Frame (top view)



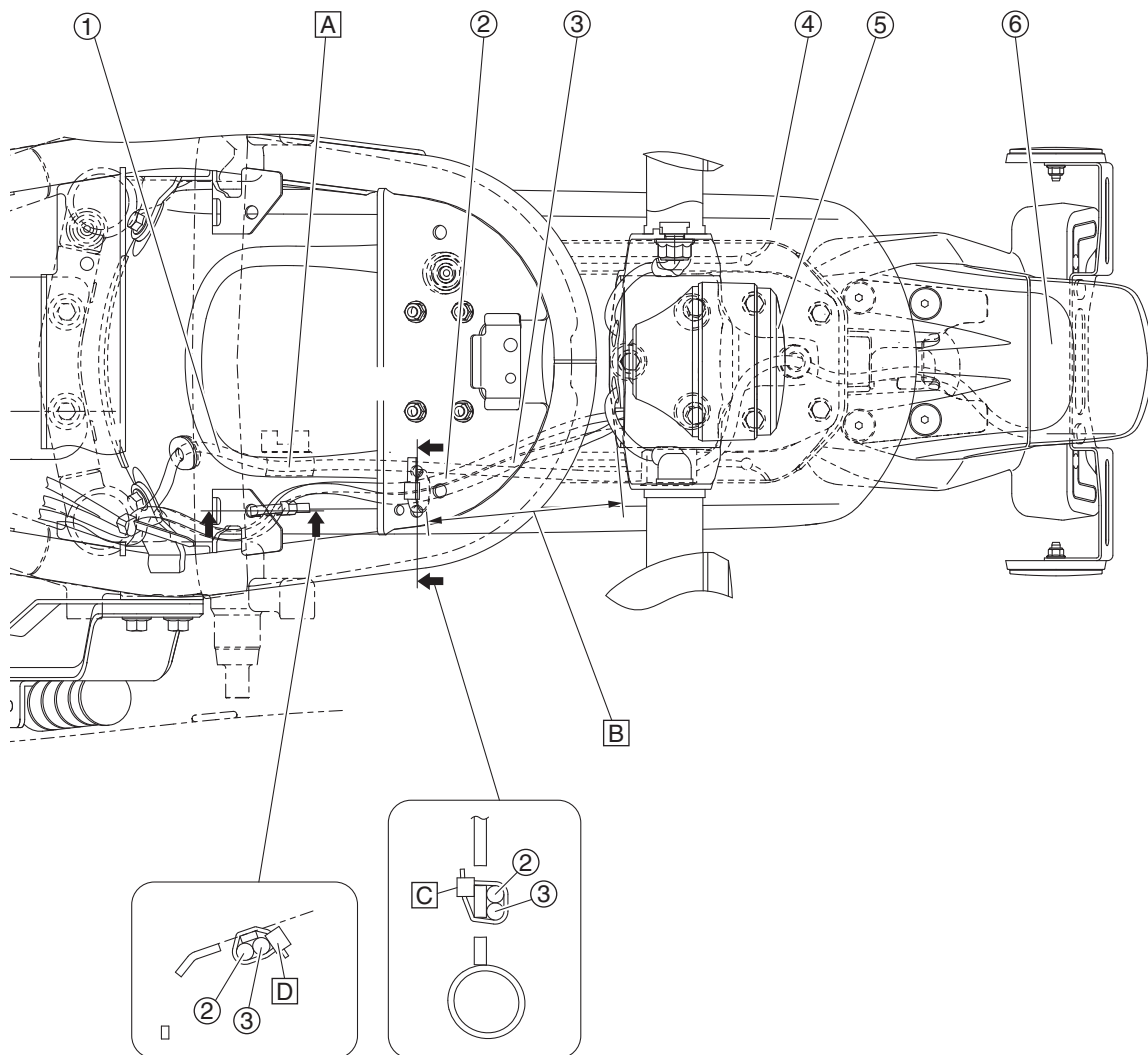
1. Starter motor lead
2. Clutch cable
3. Brake fluid reservoir hose
4. O₂ sensor lead
5. Rear brake hose
6. Rear brake light switch lead
7. Lean angle sensor
8. License plate light coupler
9. License plate light lead
10. Stator coil coupler
11. Rectifier/regulator coupler
12. Stator coil lead
13. Wire harness
14. Positive battery lead
15. Battery band
16. Battery
- A. Insert the projection the stator motor lead holder into the hole in the engine bracket (rear lower bracket).
- B. Route the wire harness above the other leads.
- C. Route the license plate light lead under the tail/brake light lead.
- D. Fasten the sub-wire harness (rear turn signal light, license plate light), license plate light lead, and tail/brake light lead with the plastic band between the frame pipes. Position the plastic band to the rear of the section of the sub-wire harness (rear turn signal light, license plate light) where the leads branch off from the harness. Point the end of the plastic band downward to the inside of the frame.
- E. Route the tail/brake light lead to the outside of the license plate light lead.
- F. Position the sub-wire harness (rear turn signal light, license plate light) coupler and tail/brake light coupler under the seat rail. Be sure to position the sub-wire harness (rear turn signal light, license plate light) coupler above the tail/brake light coupler.
- G. Route the positive battery lead on top of the battery, and then fasten the lead with the battery band.
- H. To the wire harness
- I. To the stator coil
- J. Secure the holder by inserting the projection on the holder into the hole in the frame, and then fasten the wire harness and stator coil lead with the holder.
- K. To the sidestand switch
- L. To the rectifier/regulator

Rear fender (left side view)



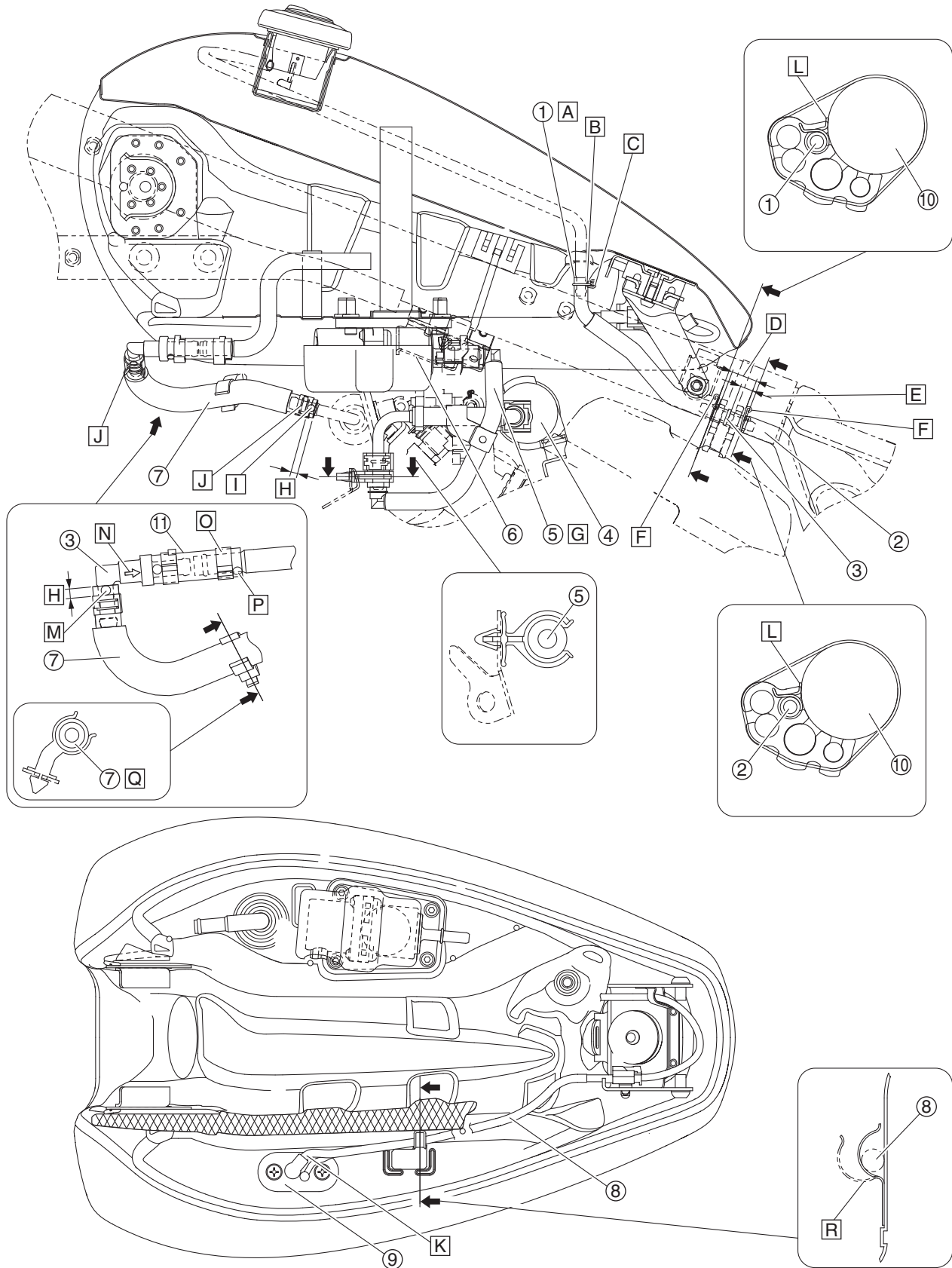
1. License plate light lead
2. Tail/brake light
3. Rear turn signal light (left)
4. License plate light
5. Rear turn signal light lead (right)
6. Rear turn signal light lead (left)
7. Rear turn signal light coupler (left)
8. Rear turn signal light coupler (right)
- A. Route the license plate light lead under the damper.
- B. Route the rear turn signal light leads through the hole in the coupler holder.
- C. After connecting the rear turn signal light couplers, fasten them with the holders.
- D. To the rear turn signal light (right)
- E. To the tail/brake light
- F. Align the white tape on the sub-wire harness (rear turn signal light, license plate light) with the clamp.
- G. To the rear turn signal light (left)
- H. Align the white tape on the tail/brake light lead with the clamp, and then secure the lead by bending the clamp around the lead.

Rear fender (top view)



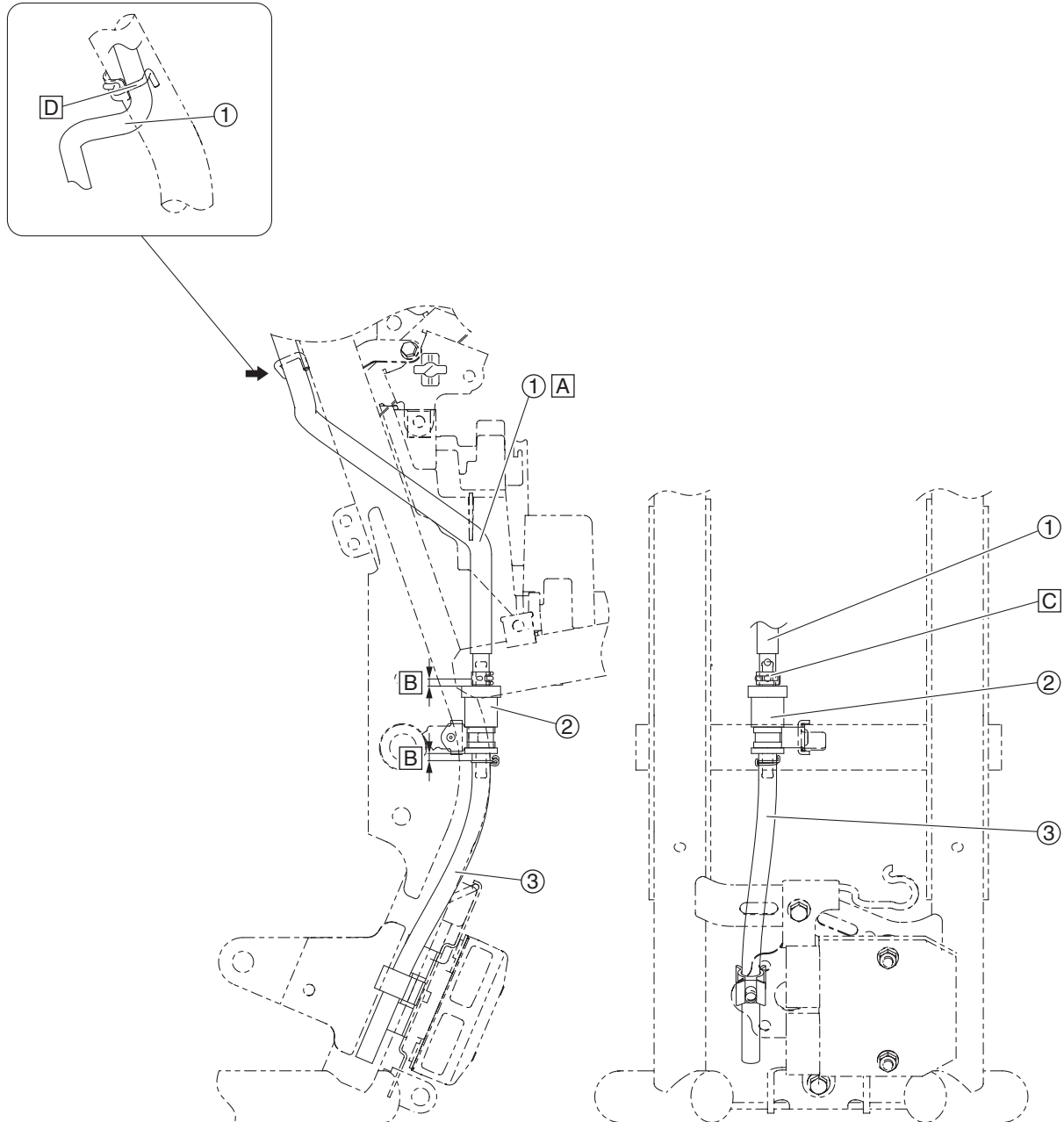
1. License plate light lead
2. Sub-wire harness (rear turn signal light, license plate light)
3. Tail/brake light lead
4. Rear fender
5. Tail/brake light
6. License plate light
 - A. Fasten the license plate light lead with the holder.
 - B. Make sure that there is no slack in the license plate light lead in the area shown in the illustration.
 - C. Fasten the sub-wire harness (rear turn signal light, license plate light) and tail/brake light lead to the frame with a plastic band. Position the buckle of the plastic band inward, and then cut off the excess end of the tie to 3 mm (0.12 in) or less.
 - D. Fasten the sub-wire harness (rear turn signal light, license plate light) and tail/brake light lead to the frame with a plastic band. Position the buckle of the plastic band downward, and then cut off the excess end of the tie to 3 mm (0.12 in) or less.

Fuel tank (left side and bottom view)



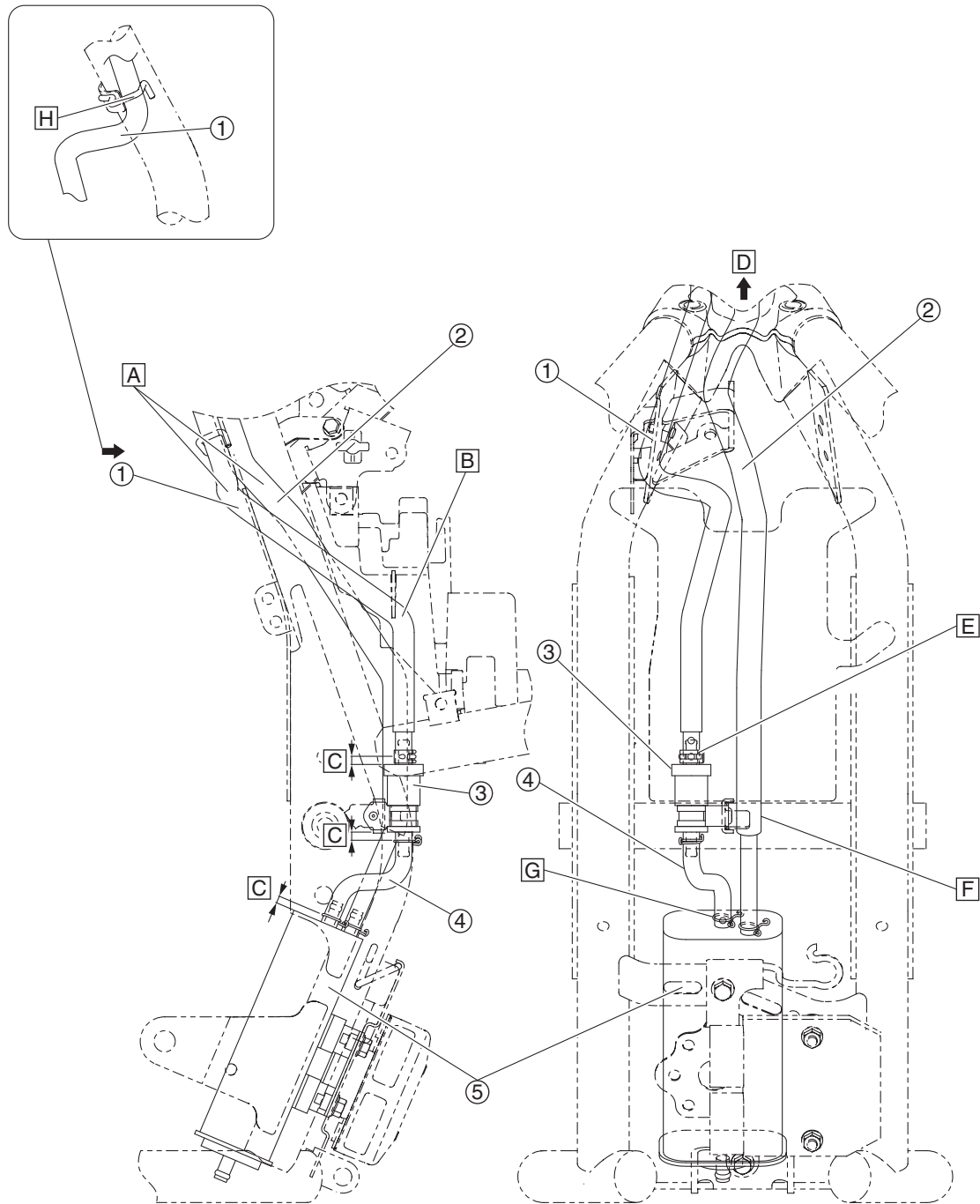
1. Fuel tank breather/overflow hose (fuel tank to hose joint)
2. Fuel tank breather/overflow hose (hose joint to rollover valve)
3. Hose joint
4. Fuel filter
5. Fuel hose (fuel pump to fuel filter)
6. Fuel pump
7. Fuel hose (hose joint to pressure regulator)
8. Fuel sender lead
9. Fuel sender
10. Frame
11. Fuel hose (hose joint to fuel tank)
- A. Install the fuel tank breather/overflow hose (fuel tank to hose joint) completely onto the hose fitting.
- B. Install the fuel tank breather/overflow hose (fuel tank to hose joint) with its white paint mark facing rearward.
- C. Align the hose clamp with the white paint mark on the fuel tank breather/overflow hose (fuel tank to hose joint) and point the ends of the clamp rearward.
- D. 18 mm (0.71 in) or more
- E. 8 mm (0.31 in) or more
- F. Make sure not to install the hose clamps on the raised portions of the hose fittings.
- G. Connect the orange connector of the fuel hose (fuel pump to fuel filter) to the fuel pump.
- H. 0 mm (0 in) or more
- I. Install the fuel hose (hose joint to pressure regulator) completely onto the hose fitting of the pressure regulator, making sure that the yellow paint mark on the hose is facing outward.
- J. Align the ends of the hose clamp with the yellow paint mark on the fuel hose (hose joint to pressure regulator). Make sure not to install the hose clamp on the raised portion of the hose fitting.
- K. Install the fuel sender so that the fuel sender lead is routed inward.
- L. Make sure that the end of the hose clamp contacts the frame.
- M. Install the fuel hose (hose joint to pressure regulator) completely onto the hose joint, making sure that the white paint mark on the hose is positioned on the same side of the hose joint as the arrow mark.
- N. Arrow mark
- O. Align the hose clamp with the edge of the white paint mark on the fuel hose (hose joint to fuel tank), making sure to align the crimped section of the clamp with the paint mark.
- P. Install the fuel hose (hose joint to fuel tank) completely onto the hose fitting, making sure that the white paint mark on the hose is facing downward.
- Q. Fasten the fuel hose (hose joint to pressure regulator) with the holder.
- R. Route the fuel sender lead through the guide, and then secure the lead by bending the guide around the lead.

Fuel tank breather hose (left side and rear view) (except for California)



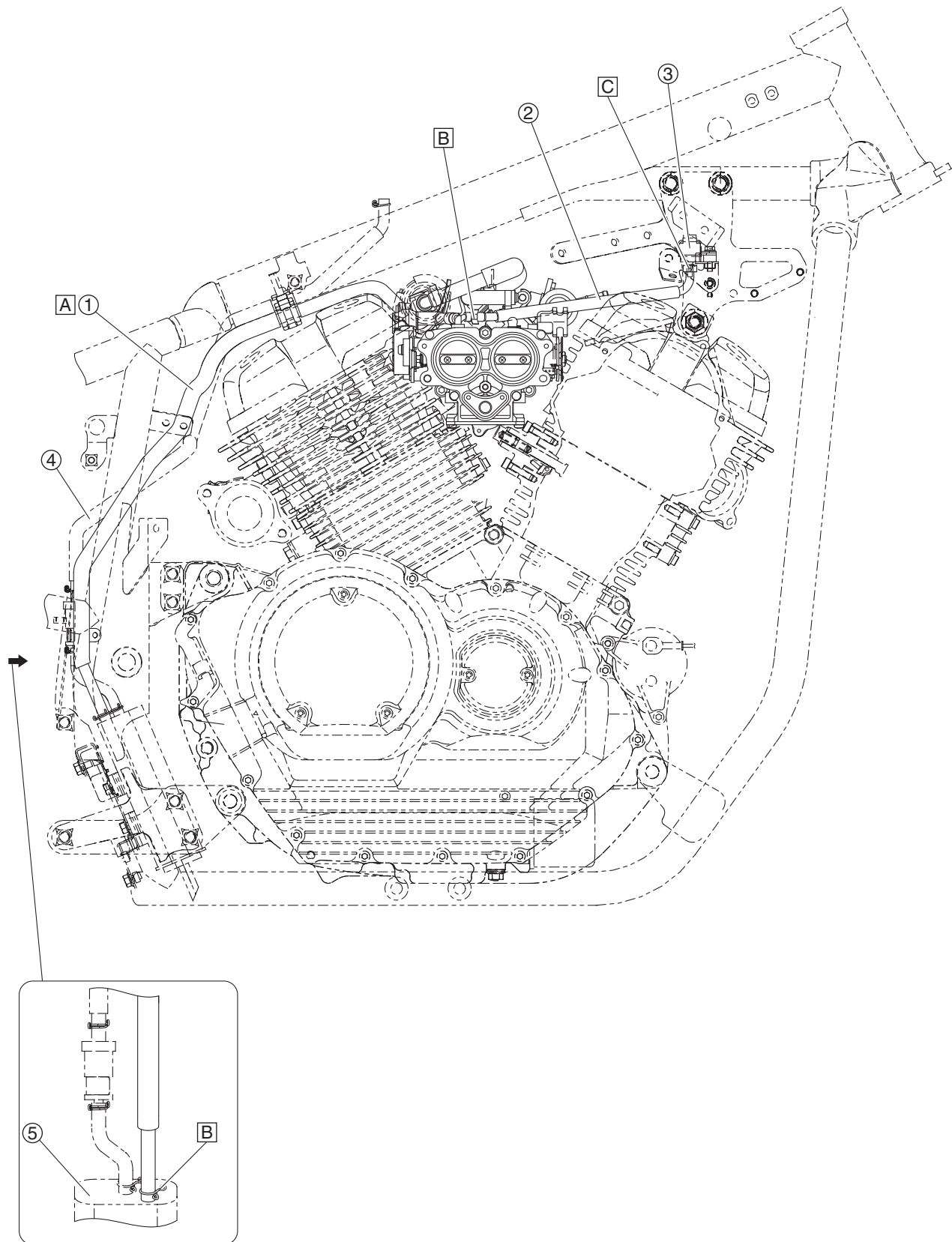
1. Fuel tank breather/overflow hose (hose joint to rollover valve)
2. Rollover valve
3. Fuel tank breather/overflow hose (from rollover valve)
- A. Route the fuel tank breather hose (hose joint to rollover valve) to the left of the battery box.
- B. 2–8 mm (0.08–0.31 in)
- C. Install the fuel tank breather hose (hose joint to rollover valve) with its white paint mark facing rearward.
- D. Route the fuel tank breather hose (hose joint to rollover valve) through the guide.

Canister (left side and rear view) (for California)



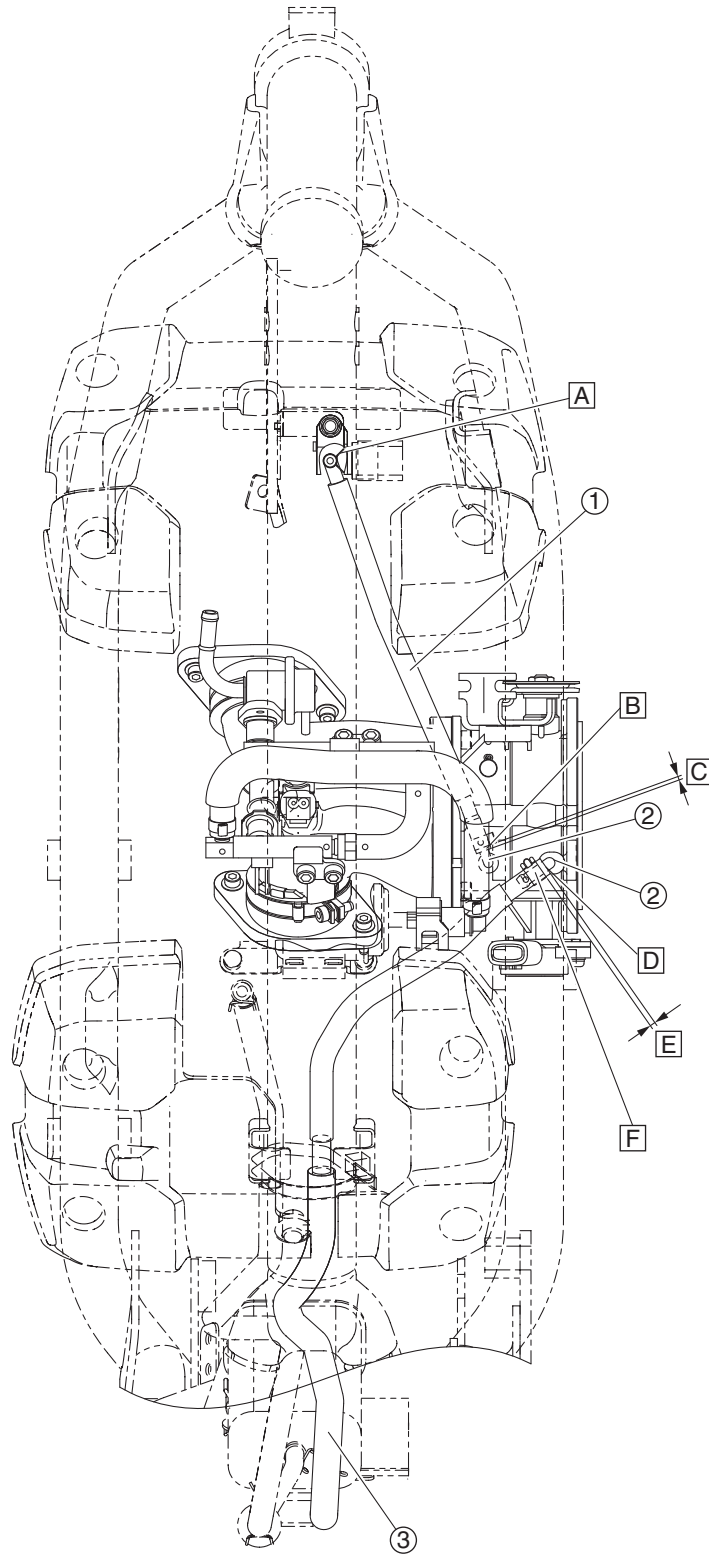
1. Fuel tank breather hose (hose joint to rollover valve)
2. Canister purge hose
3. Rollover valve
4. Fuel tank breather hose (rollover valve to canister)
5. Canister
- A. Route the fuel tank breather hose (hose joint to rollover valve) and canister purge hose between the engine mudguard and the battery box.
- B. Route the fuel tank breather hose (hose joint to rollover valve) to the left of the battery box.
- C. 2–8 mm (0.08–0.31 in)
- D. To the throttle body
- E. Install the fuel tank breather hose (hose joint to rollover valve) with its white paint mark facing rearward.
- F. Route the canister purge hose to the rear of the frame cross member.
- G. Install the fuel tank breather hose (rollover valve to canister) with its yellow paint mark facing rearward.
- H. Route the fuel tank breather hose (hose joint to rollover valve) through the guide.

Inlet (right side view)



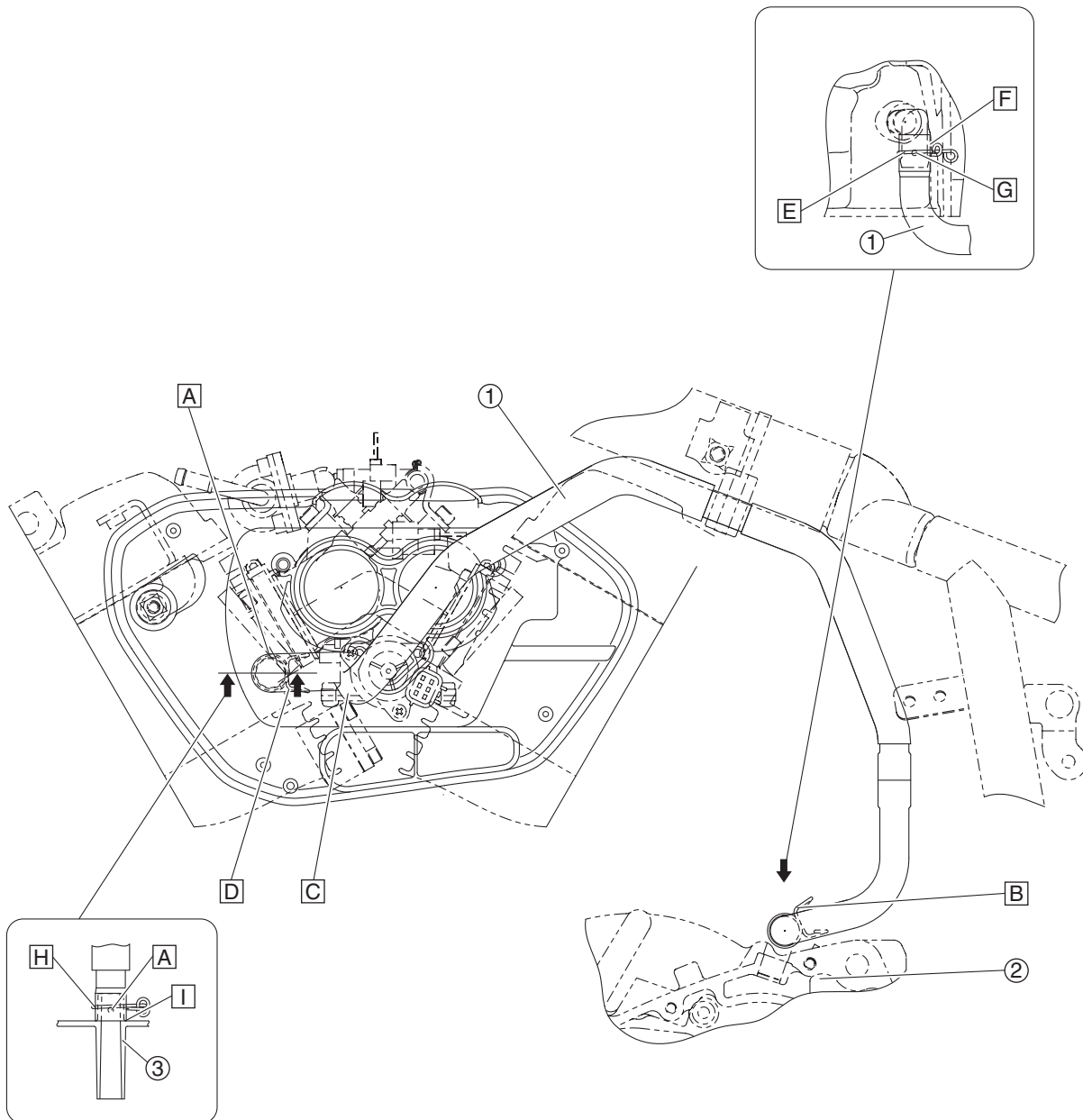
1. Canister purge hose (for California)
2. Intake air pressure hose
3. Intake air pressure sensor
4. Fuel tank breather hose (hose joint to rollover valve)
5. Canister (for California)
 - A. Route the canister purge hose along the fuel tank breather hose (hose joint to rollover valve). (for California)
 - B. Point the ends of the hose clamp to the right.
 - C. Install the intake air pressure hose with its white paint mark facing to the right.

Inlet (top view)



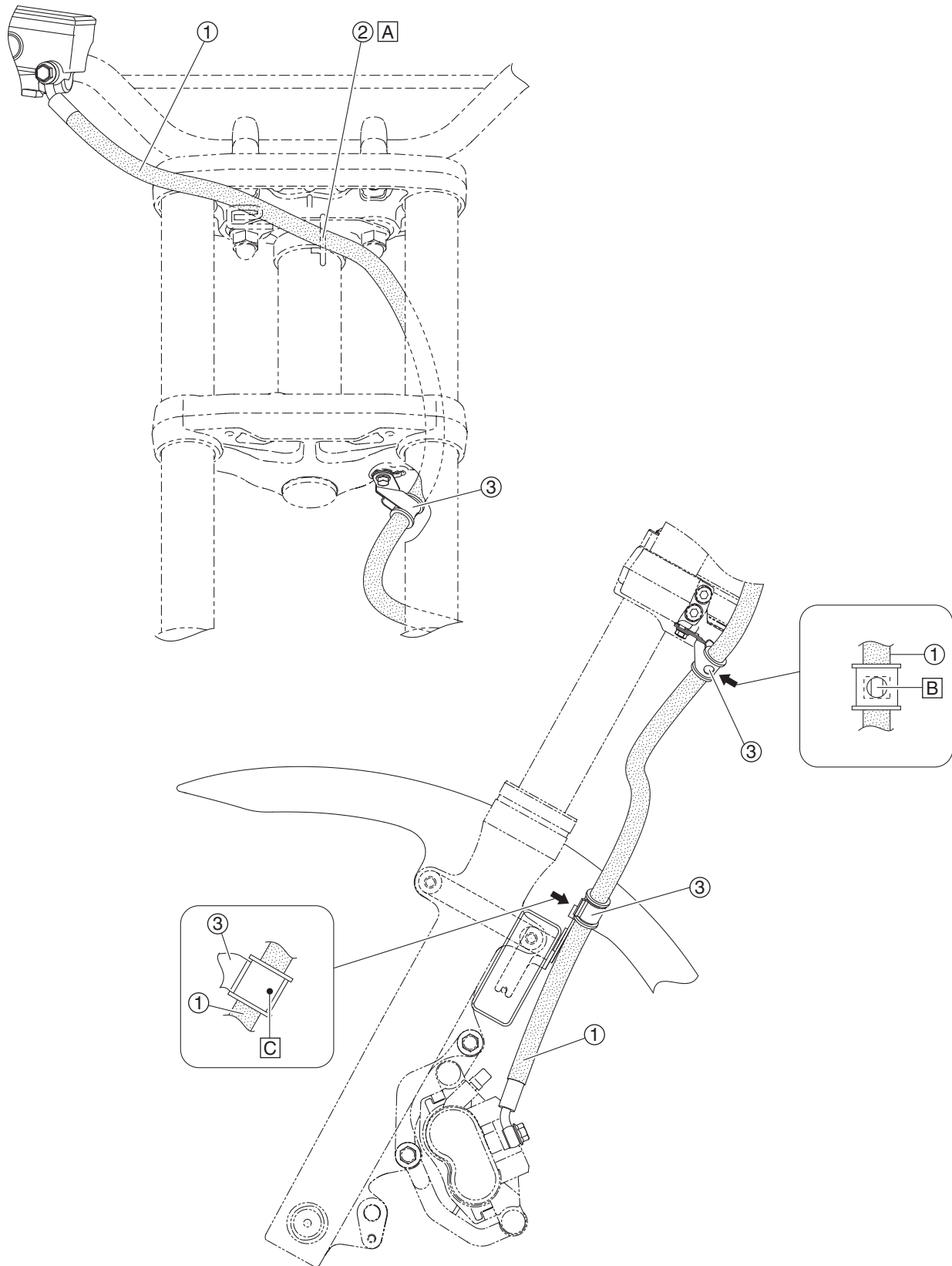
1. Intake air pressure sensor hose
2. Hose fitting
3. Canister purge hose (for California)
 - A. Point the ends of the hose clamp to the right.
 - B. Install the intake air pressure sensor hose completely onto the hose fitting, making sure that the yellow paint mark on the hose is facing upward.
 - C. 1–2 mm (0.04–0.08 in)
 - D. Install the canister purge hose completely onto the hose fitting, making sure that the blue paint mark on the hose is facing upward. (for California)
 - E. 2–4 mm (0.08–0.16 in)
 - F. Align the hose clamp with the blue paint mark on the canister purge hose and point the ends of the clamp forward.

Air filter case (left side view)



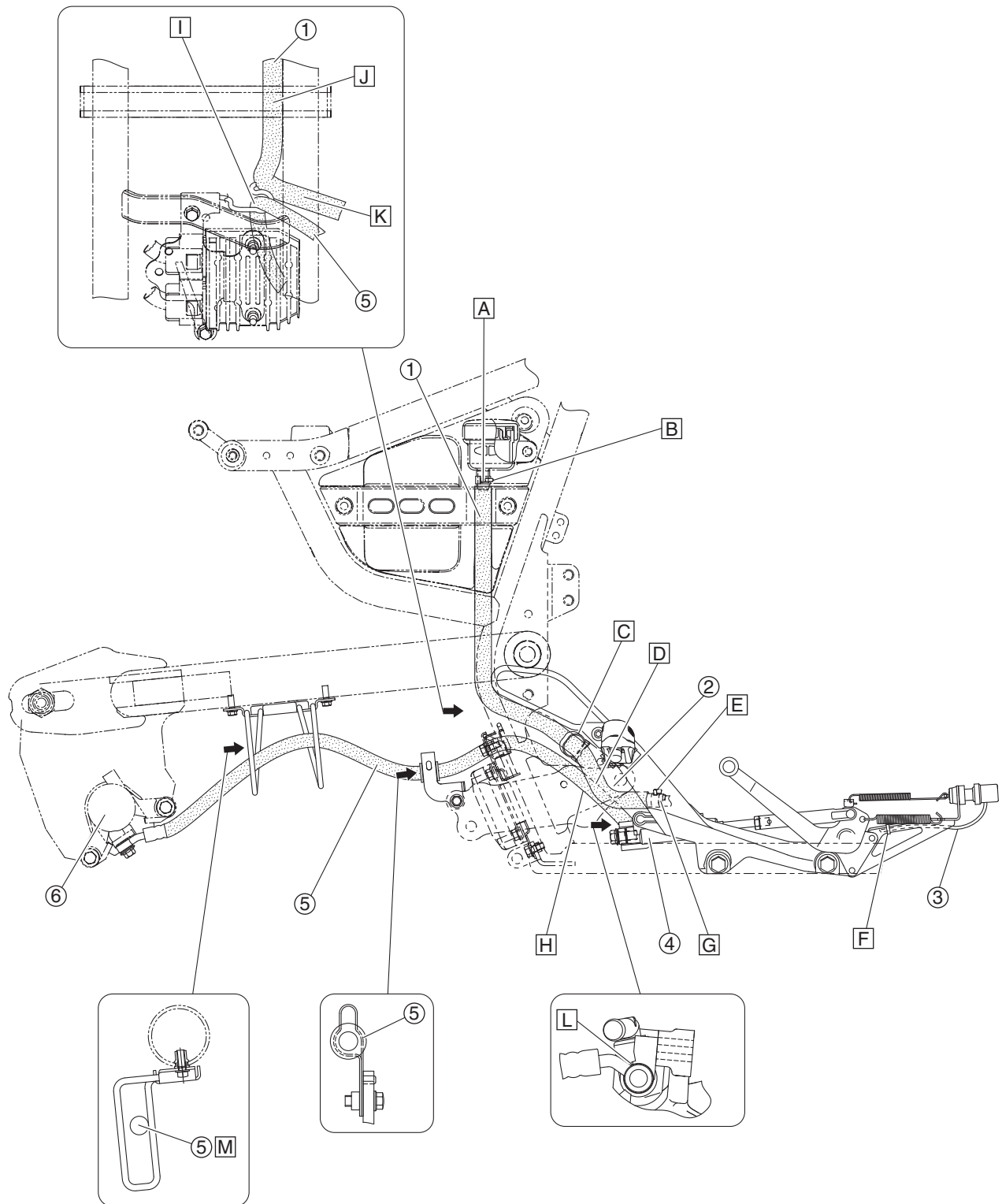
1. Crankcase breather hose
2. Crankcase
3. Air filter case
- A. Install the crankcase breather hose with its white paint mark facing upward.
- B. Point the ends of the hose clamp rearward, angled upward.
- C. Route the crankcase breather hose over the timing chain tensioner.
- D. Point the ends of the hose clamp rearward.
- E. Align the hose clamp with the yellow paint mark on the crankcase breather hose.
- F. Install the crankcase breather hose completely onto the hose joint, making sure that the yellow paint mark on the hose is facing upward.
- G. Yellow paint mark
- H. Align the hose clamp with the white paint mark on the crankcase breather hose.
- I. Install the crankcase breather hose onto the hose fitting of the air filter case, making sure that the hose contacts the case.

Front brake hose (front and left side view)



1. Front brake hose
2. Hose guide
3. Brake hose holder
 - A. Route the front brake hose through the hose guide.
 - B. Fasten the front brake hose with the holder, making sure that the paint mark on the hose is visible through the hole in the holder.
 - C. Fasten the front brake hose with the holder, making sure that the paint mark on the hose is aligned with the open ends of the holder.

Rear brake hose (right side view)



1. Brake fluid reservoir hose
2. Engine bracket (rear lower side)
3. Rear brake light switch lead
4. Rear brake master cylinder
5. Rear brake hose
6. Rear brake caliper
- A. Install the brake fluid reservoir hose with its white paint mark facing inward.
- B. Do not install the hose clamp on the flange at the end of the hose fitting. Point the ends of the hose clamp outward, making sure that the ends do not contact the battery cover holder.
- C. Fasten the brake fluid reservoir hose at the white paint mark.
- D. Route the brake fluid reservoir hose to the outside of the engine bracket (rear lower side).
- E. Point the ends of the hose clamp upward.
- F. Route the rear brake light switch lead to the inside of the rear brake light switch bracket, and then fasten the lead to the bracket with a plastic locking tie. Cut off the excess end of the plastic locking tie.
- G. Install the brake fluid reservoir hose with its white paint mark facing upward.
- H. Route the rear brake hose to the inside of the engine bracket (rear lower side).
- I. Route the rear brake hose through the guide on the rectifier/regulator bracket.
- J. Route the brake fluid reservoir hose to the rear of the frame cross member.
- K. Route the brake fluid reservoir hose to the front of the frame.
- L. Face the white paint mark on the rear brake hose upward.
- M. Route the rear brake hose through the hose guide.

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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 <ul style="list-style-type: none">• Check fuel hoses for cracks or damage.• Replace if necessary.		√	√	√	√	√	
2	*	Spark plugs <ul style="list-style-type: none">• Check condition.• Adjust gap and clean.		√		√		√	
		<ul style="list-style-type: none">• Replace.			√		√		
3	*	Valve clearance <ul style="list-style-type: none">• Check and adjust valve clearance when engine is cold.• Adjust if necessary.	Every 16000 mi (25000 km)						
4	*	Crankcase breather system <ul style="list-style-type: none">• Check breather hose for cracks or damage.• Replace if necessary.		√	√	√	√	√	
5	*	Fuel injection <ul style="list-style-type: none">• Adjust synchronization.	√	√	√	√	√	√	
6	*	Exhaust system <ul style="list-style-type: none">• Check for leakage.• Tighten if necessary.• Replace gasket(s) if necessary.	√	√	√	√	√	√	
7	*	Evaporative emission control system (for California only) <ul style="list-style-type: none">• 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.

PERIODIC MAINTENANCE

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	*	Diagnostic system check	<ul style="list-style-type: none">Perform dynamic inspection using Yamaha diagnostic tool.Check the fault codes.	√	√	√	√	√	√
2		Air filter element	<ul style="list-style-type: none">Replace.	Every 24000 mi (37000 km)					
3	*	Clutch	<ul style="list-style-type: none">Check operation.Adjust or replace cable.	√	√	√	√	√	√
4	*	Front brake	<ul style="list-style-type: none">Check operation, fluid level, and for fluid leakage.Replace brake pads if necessary.	√	√	√	√	√	√
5	*	Rear brake	<ul style="list-style-type: none">Check operation, fluid level, and for fluid leakage.Replace brake pads if necessary.	√	√	√	√	√	√
6	*	Brake hoses	<ul style="list-style-type: none">Check for cracks or damage.Check for correct routing and clamping.		√	√	√	√	√
			<ul style="list-style-type: none">Replace.	Every 4 years					
7	*	Brake fluid	<ul style="list-style-type: none">Change.	Every 2 years					
8	*	Wheels	<ul style="list-style-type: none">Check runout, spoke tightness and for damage.Tighten spokes if necessary.	√	√	√	√	√	√
9	*	Tires	<ul style="list-style-type: none">Check tread depth and for damage.Replace if necessary.Check air pressure.Correct if necessary.		√	√	√	√	√
10	*	Wheel bearings	<ul style="list-style-type: none">Check bearings for smooth operation.Replace if necessary.		√	√	√	√	√
11	*	Swingarm pivot bearings	<ul style="list-style-type: none">Check operation and for excessive play.		√	√	√	√	√
			<ul style="list-style-type: none">Moderately repack with lithium-soap-based grease.	Every 32000 mi (50000 km)					
12	*	Drive belt	<ul style="list-style-type: none">Check belt condition.Replace if damaged.Check belt tension.Adjust if necessary.	√	Every 2500 mi (4000 km)				
13	*	Steering bearings	<ul style="list-style-type: none">Check bearing assemblies for looseness.	√	√	√	√	√	√
			<ul style="list-style-type: none">Moderately repack with lithium-soap-based grease.	Every 12000 mi (19000 km)					
14	*	Chassis fasteners	<ul style="list-style-type: none">Check all chassis fitting and fasteners.Correct if necessary.		√	√	√	√	√
15		Brake lever pivot shaft	<ul style="list-style-type: none">Apply silicone grease lightly.		√	√	√	√	√
16		Brake pedal pivot shaft	<ul style="list-style-type: none">Apply lithium-soap-based grease lightly.		√	√	√	√	√
17		Clutch lever pivot shaft	<ul style="list-style-type: none">Apply lithium-soap-based grease lightly.		√	√	√	√	√
18		Shift pedal pivot shaft	<ul style="list-style-type: none">Apply lithium-soap-based grease lightly.		√	√	√	√	√
19		Sidestand pivot	<ul style="list-style-type: none">Check operation.Apply lithium-soap-based grease lightly.		√	√	√	√	√
20	*	Sidestand switch	<ul style="list-style-type: none">Check operation and replace if necessary.	√	√	√	√	√	√

PERIODIC MAINTENANCE

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	
21	*	Front fork	<ul style="list-style-type: none">• Check operation and for oil leakage.• Replace if necessary.		√	√	√	√	√	
22	*	Shock absorber assemblies	<ul style="list-style-type: none">• Check operation and for oil leakage.• Replace if necessary.		√	√	√	√	√	
23		Engine oil	<ul style="list-style-type: none">• Change (warm engine before draining).	√	√	√	√	√	√	
24	*	Engine oil filter cartridge	<ul style="list-style-type: none">• Replace.	√		√		√		
25	*	Front and rear brake switches	<ul style="list-style-type: none">• Check operation.	√	√	√	√	√	√	
26	*	Control cables	<ul style="list-style-type: none">• Apply Yamaha cable lubricant or other suitable cable lubricant thoroughly.	√	√	√	√	√	√	
27	*	Throttle grip	<ul style="list-style-type: none">• Check operation.• Check throttle grip free play, and adjust if necessary.• Lubricate cable and grip housing.		√	√	√	√	√	
28	*	Lights, signals and switches	<ul style="list-style-type: none">• 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.

EAS32024

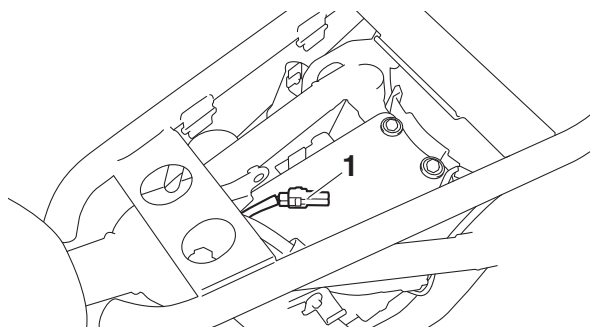
CHECKING THE VEHICLE USING THE YAMAHA DIAGNOSTIC TOOL

Use the Yamaha diagnostic tool and check the vehicle according to the following procedure.

1. Remove:
 - Seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Remove the protective cap, and then connect the Yamaha diagnostic tool to the coupler “1”.



Yamaha diagnostic tool USB (US)
90890-03251
Yamaha diagnostic tool (A/I)
90890-03252



3. Check:
 - Fault codes

TIP

Use the “Diagnosis of malfunction” function of the Yamaha diagnostic tool to check the fault codes. For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

Fault code number is displayed → Check and repair the probable cause of the malfunction. Refer to “TROUBLESHOOTING DETAILS” on page 7-31.

4. Perform:
 - Dynamic inspection

TIP

Use the “Dynamic inspection” function of the Yamaha diagnostic tool version 3.0 and after to perform the dynamic inspection. For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

5. Install:
 - Seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30619

CHECKING THE FUEL LINE

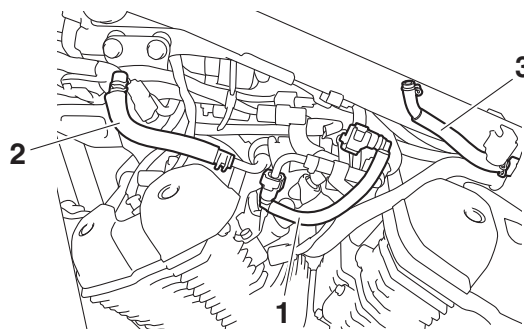
The following procedure applies to all of the fuel and breather hoses.

1. Remove:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.
2. Check:
 - Fuel hoses “1”
 - Fuel return hose “2”
 - Fuel tank breather/overflow hose “3”
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA16950

NOTICE

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



3. Install:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.

EAS30620

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
 - Rear cylinder cover (right)
Refer to “ENGINE REMOVAL” on page 5-2.
2. Disconnect:
 - Spark plug cap
3. Remove:
 - Spark plug

ECA13320

NOTICE

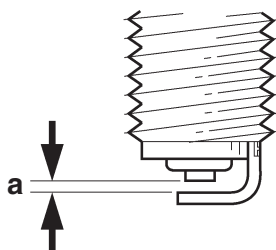
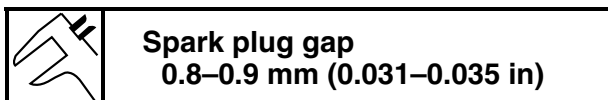
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

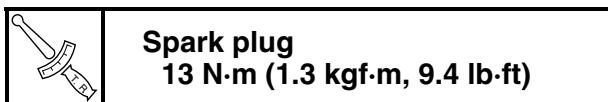


Manufacturer/model
NGK/CPR7EA-9

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



8. Install:
 - Spark plug



TIP

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

9. Connect:
 - Spark plug cap
10. Install:
 - Rear cylinder cover (right)
Refer to “ENGINE REMOVAL” on page 5-2.

EAS30622

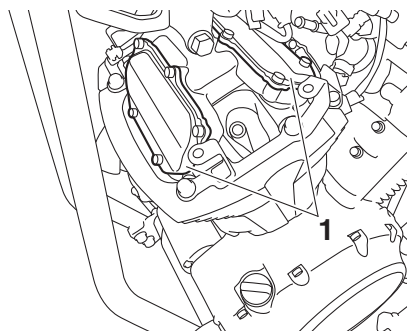
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

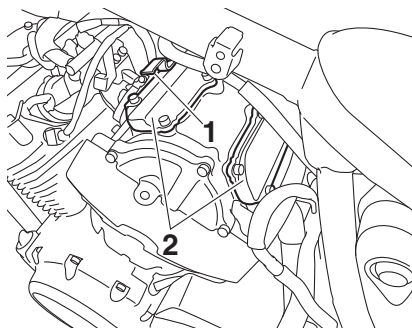
TIP

- 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. Remove:
 - Fuel tank
Refer to “FUEL TANK” on page 6-1.
 - Front cylinder cover (left)
 - Front cylinder cover (right)
 - Rear cylinder cover (left)
 - Rear cylinder cover (right)
Refer to “ENGINE REMOVAL” on page 5-2.
2. Disconnect:
 - Throttle position sensor coupler
 - Fuel hose (fuel filter to inlet pipe assembly)
Refer to “THROTTLE BODIES” on page 6-8.
3. Remove:
 - Fuel filter
Refer to “THROTTLE BODIES” on page 6-8.
 - Rear cylinder head guard
 - Rear cylinder cover bracket (left)
Refer to “ENGINE REMOVAL” on page 5-2.
4. Disconnect:
 - Crankcase breather hose
Refer to “ENGINE REMOVAL” on page 5-2.
5. Remove:
 - Hose holder
Refer to “FUEL TANK” on page 6-1.
6. Disconnect:
 - Spark plug caps
Refer to “ENGINE REMOVAL” on page 5-2.
7. Remove:
 - Spark plugs
Refer to “CAMSHAFTS” on page 5-14.
8. Remove:
 - Damper cover
 - Generator cover damper
 - Timing mark accessing screw
 - Crankshaft end accessing screw
Refer to “GENERATOR AND STARTER CLUTCH” on page 5-40.
9. Remove:
 - Front cylinder tappet covers “1”



10. Remove:
 - Fuel filter bracket “1”
 - Rear cylinder tappet covers “2”



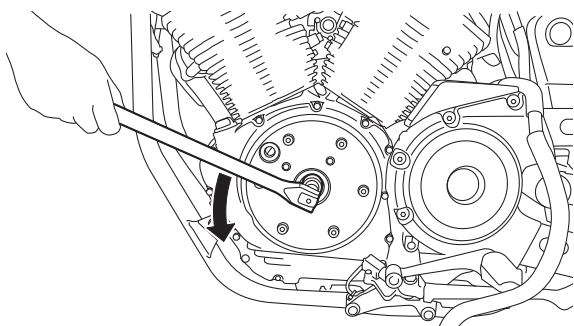
11. Measure:

- Valve clearance
Out of specification → Adjust.

	Valve clearance (cold)
	Intake
	0.08–0.12 mm (0.0032–0.0047 in)
	Exhaust
	0.22–0.26 mm (0.0087–0.0102 in)

Front cylinder

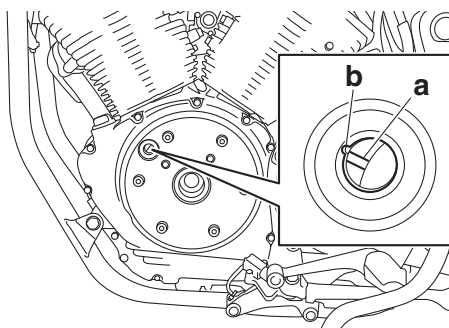
- a. Turn the crankshaft counterclockwise.



- b. When the front cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

TIP

- When the piston is at TDC on the compression stroke, there should be clearance between the valve stem tips and their respective rocker arm adjusting screws.
- If there is no clearance, rotate the crankshaft counterclockwise one turn.



- c. Measure the valve clearance with a thickness gauge.



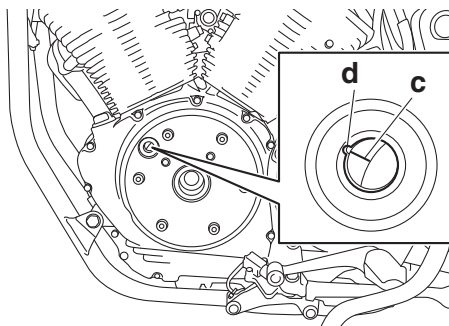
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9

Rear cylinder

- a. Turn the crankshaft counterclockwise from the front cylinder piston TDC by 300 degrees.
b. When the rear cylinder piston is at TDC on the compression stroke, align the TDC mark “c” on the generator rotor with the slot “d” in the generator cover.

TIP

- When the piston is at TDC on the compression stroke, there should be clearance between the valve stem tips and their respective rocker arm adjusting screws.
- If there is no clearance, rotate the crankshaft counterclockwise one turn.



- c. Measure the valve clearance with a thickness gauge.



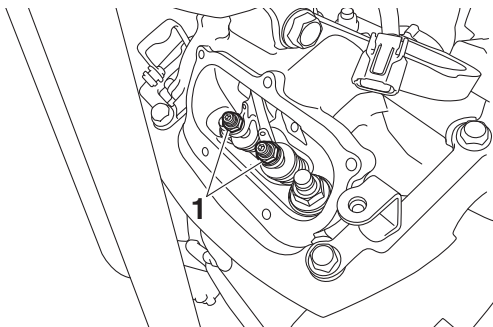
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9

12.Adjust:

- Valve clearance



a. Loosen the locknuts "1".



b. Insert a thickness gauge "2" between the end of the adjusting screw "3" and the valve tip.



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

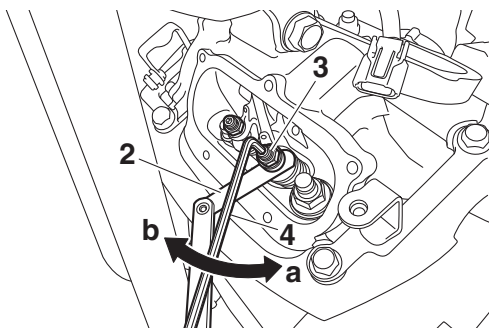
c. Turn the adjusting screw in direction "a" or "b" with the hexagon wrench "4" until the specified valve clearance is obtained.

Direction "a"

Valve clearance is increased.

Direction "b"

Valve clearance is decreased.



d. Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.



Locknut (rocker arm adjusting screw)
27 N·m (2.7 kgf·m, 20 lb·ft)

e. Measure the valve clearance again.

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



13.Install:

- Rear cylinder tappet covers
- Fuel filter bracket
- Front cylinder tappet covers



Tappet cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

14.Install:

- Crankshaft end accessing screw
(along with the O-ring **New**)
 - Timing mark accessing screw
(along with the O-ring **New**)
 - Generator cover damper
 - Damper cover
- Refer to "GENERATOR AND STARTER CLUTCH" on page 5-40.



Generator cover damper bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

15.Install:

- All removed parts

TIP

For installation, reverse the removal procedure.

EAS30800

CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:

- Air filter case
Refer to "GENERAL CHASSIS (3)" on page 4-6.
- Air duct
Refer to "BELT DRIVE" on page 4-71.
- Fuel tank
Refer to "FUEL TANK" on page 6-1.

2. Check:

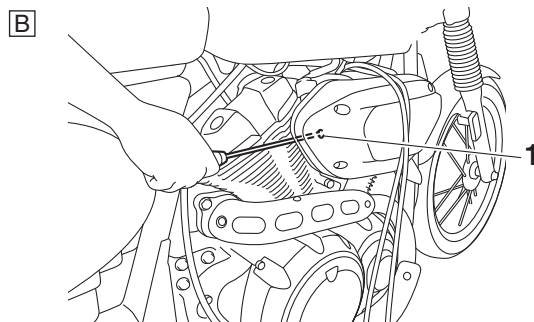
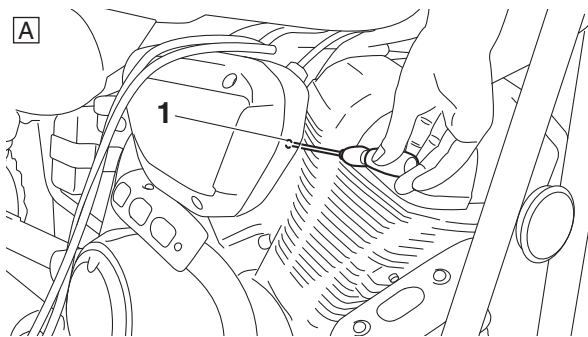
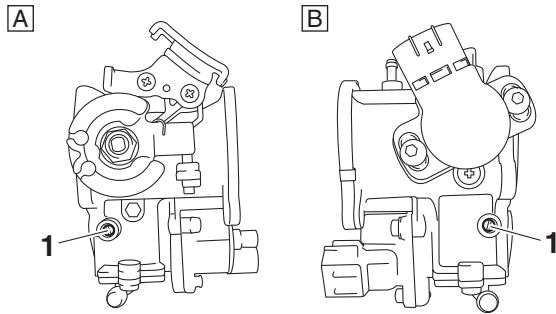
- Crankcase breather hose "1"
Cracks/damage → Replace.
Loose connection → Connect properly.

ECA13450

NOTICE

Make sure the crankcase breather hose is routed correctly.

- c. If the vacuum pressure of the throttle body with the lower pressure is out of specification, adjust it to specification first, and then synchronize the throttle bodies.



- A. Front cylinder throttle body
B. Rear cylinder throttle body

TIP

- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If the air screw was removed, turn the screw in fully, and then turn it out 1 1/4 turns. Then, synchronize the throttle bodies.

ECA14900

NOTICE

Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.



Intake vacuum
34.7–40.0 kPa (260–300 mmHg,
10.2–11.8 inHg)

TIP

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



- Measure:
 - Engine idling speed
Out of specification → Adjust.
Make sure that the vacuum pressure is within specification.
- Stop the engine and remove the measuring equipment.
- Connect:
 - Intake air pressure sensor hose
 - Cap
- Install:
 - Air filter case
Refer to “GENERAL CHASSIS (3)” on page 4-6.
- Adjust:
 - Throttle grip free play
Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-24.



Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)

EAS30625

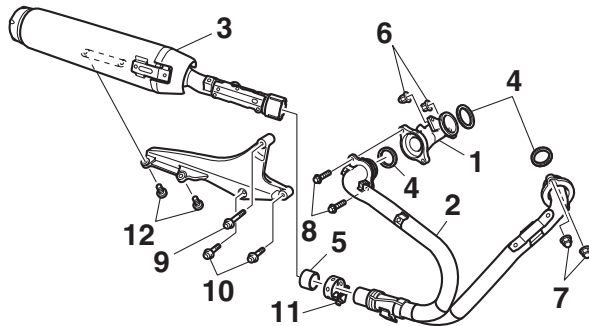
CHECKING THE EXHAUST SYSTEM

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

- Check:
 - Exhaust pipe joint “1”
 - Exhaust pipe “2”
 - Muffler “3”
 - Gaskets “4”, “5”
Exhaust gas leaks → Replace.
- Check:
 - Tightening torque
 - Exhaust pipe joint nuts “6”
 - Exhaust pipe nuts “7”
 - Exhaust pipe bolts “8”
 - Muffler bracket and flame bolt “9”
 - Muffler bracket and engine bracket (rear lower side) bolts “10”
 - Muffler and exhaust pipe bolt “11”
 - Muffler and muffler bracket bolts “12”



Exhaust pipe joint nut
15 N·m (1.5 kgf·m, 11 lb·ft)
Exhaust pipe nut
20 N·m (2.0 kgf·m, 14 lb·ft)
Exhaust pipe bolt
20 N·m (2.0 kgf·m, 14 lb·ft)
Muffler bracket and flame bolt
53 N·m (5.3 kgf·m, 38 lb·ft)
Muffler bracket and engine bracket (rear lower side) bolt
53 N·m (5.3 kgf·m, 38 lb·ft)
Muffler and exhaust pipe bolt
12 N·m (1.2 kgf·m, 8.7 lb·ft)
Muffler and muffler bracket bolt
35 N·m (3.5 kgf·m, 25 lb·ft)

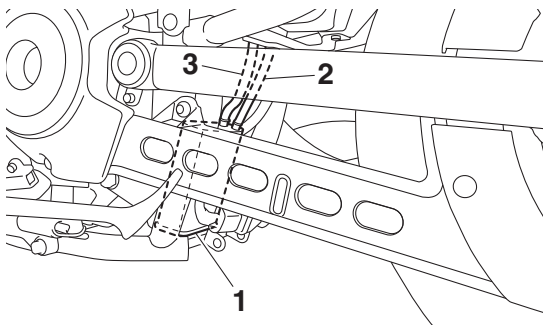


EAS30626

CHECKING THE CANISTER (for California)

1. Check:

- Canister "1"
 - Canister purge hose "2"
 - Fuel tank breather/overflow hose "3"
- Cracks/damage → Replace.

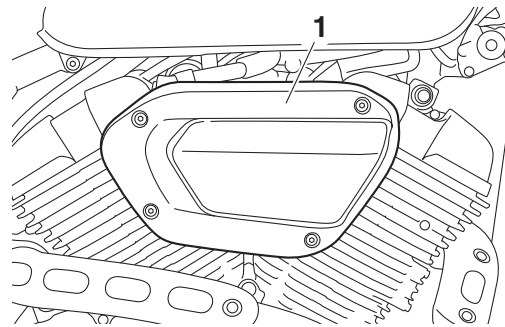


EAS30628

REPLACING THE AIR FILTER ELEMENT

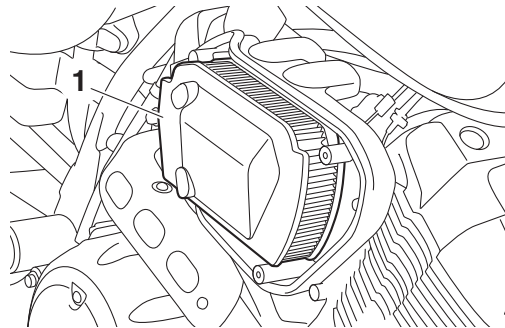
1. Remove:

- Air filter case cover "1"



2. Remove:

- Air filter element "1"



3. 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.

4. Install:

- Air filter element
- Air filter case cover



Air filter case cover bolt
2.0 N·m (0.20 kgf·m, 1.4 lb·ft)

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.

TIP

When installing the air filter element into the air filter case, make sure that the sealing surfaces are aligned to prevent any air leaks.

EAS31565

CHECKING THE CLUTCH OPERATION

1. Check:

- Clutch operation
Dysfunctional → Check the clutch system.
Refer to “CLUTCH” on page 5-46.

EWA18270

WARNING

Before checking the clutch operation, check the brake system and make sure that the brake is operating at all times during the check-up. While checking the clutch operation, do not rev up the engine.

- Place the vehicle on a level surface, and start the engine.
- Grab the clutch lever and make sure that you can shift the gear smoothly.
- Grab the clutch lever and shift to first gear.
- Operate both the front and rear brakes, release the clutch lever slowly and make sure that the engine stops.

EAS30629

ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Measure:

- 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

Clutch lever side

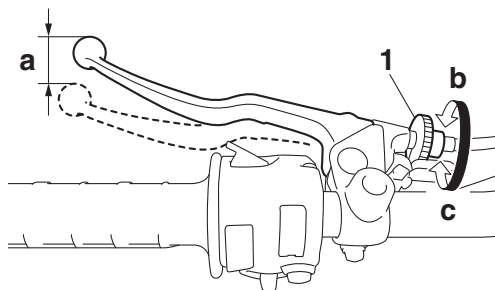
- Turn the adjusting bolt “1” in direction “b” or “c” until the specified clutch lever free play is obtained.

Direction “b”

Clutch lever free play is increased.

Direction “c”

Clutch lever free play is decreased



TIP

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

Crankcase side

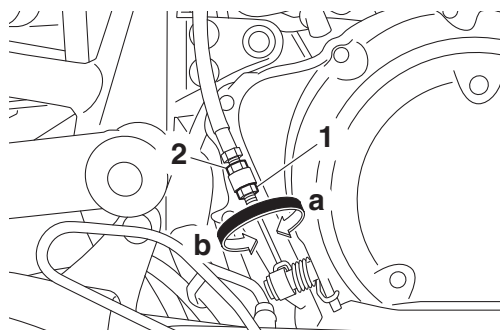
- Loosen the locknut “1”.
- Turn the adjusting nut “2” in direction “a” or “b” until the specified clutch lever free play is obtained.

Direction “a”

Clutch lever free play is increased.

Direction “b”

Clutch lever free play is decreased.



- Tighten the locknut to specification.



Clutch cable locknut (crankcase side)

7 N·m (0.7 kgf·m, 5.1 lb·ft)

EAS30801

CHECKING THE BRAKE OPERATION

1. Check:

- Brake operation
Brake not working properly → Check the brake system.
Refer to “FRONT BRAKE” on page 4-22 and “REAR BRAKE” on page 4-34.

TIP

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

EAS30632

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP

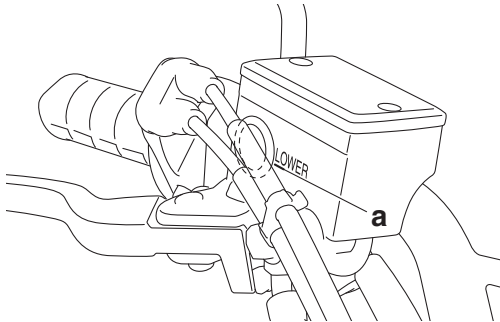
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

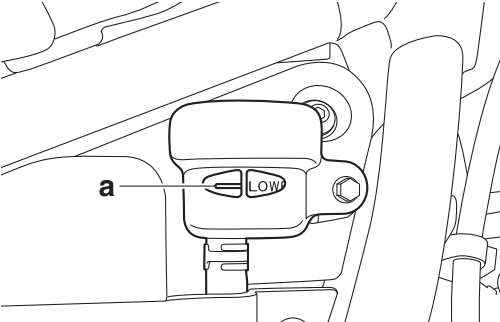
- Brake fluid level
Below the minimum level mark “a” → Add the specified brake fluid to the proper level.



A



B



- A. Front brake
B. Rear brake

EWA17280



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 or 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

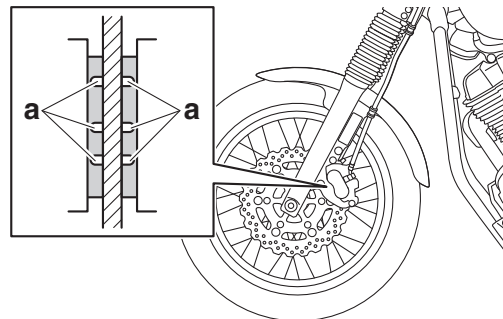
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake master cylinder reservoir or brake fluid reservoir is horizontal.

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 indicator grooves “a” almost disappeared → Replace the brake pads as a set. Refer to “FRONT BRAKE” on page 4-22.

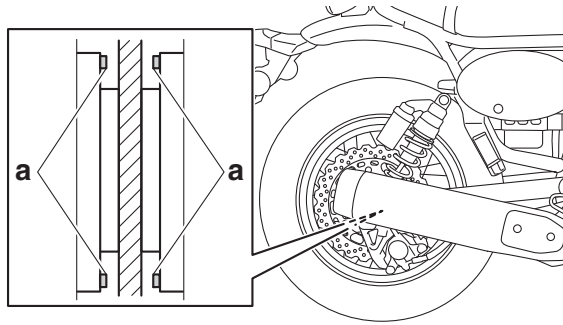


EAS30634

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 “a” almost touch the brake disc → Replace the brake pads as a set. Refer to “REAR BRAKE” on page 4-34.



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

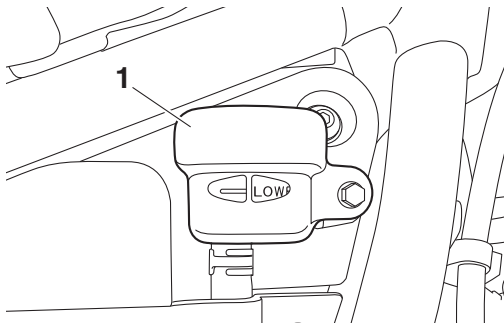
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic 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 when the tiny bubbles in the hose have disappeared.

1. Remove:

- Brake fluid reservoir cover “1”

TIP

After removing the brake fluid reservoir cover, install the brake fluid reservoir temporarily.

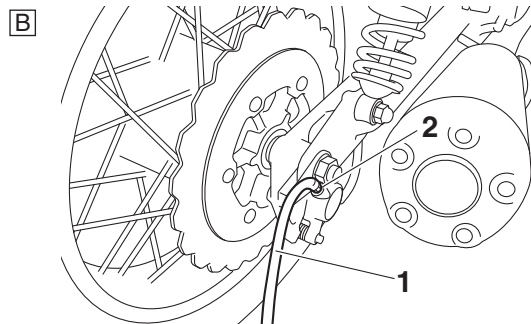
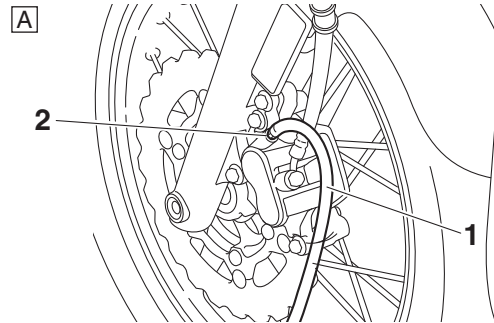


2. Bleed:

- Hydraulic brake system



- a. Fill the brake master cylinder reservoir or 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 brake caliper

B. Rear brake caliper

- d. Put the other end of the hose into an open container.
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- g. Loosen the bleed screw.

TIP

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

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



Front brake caliper bleed screw
6 N·m (0.6 kgf·m, 4.3 lb·ft)
Rear brake caliper bleed screw
6 N·m (0.6 kgf·m, 4.3 lb·ft)

- k. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
 Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-12.

EWA13110

WARNING

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



3. Install:
- Brake fluid reservoir cover

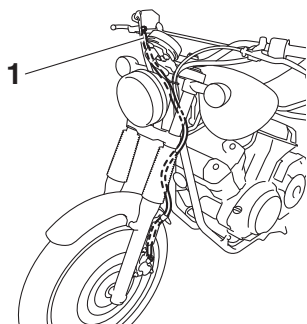


Brake fluid reservoir cover bolt
2.8 N·m (0.28 kgf·m, 2.0 lb·ft)
LOCTITE®

EAS30635

CHECKING THE FRONT BRAKE HOSE

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



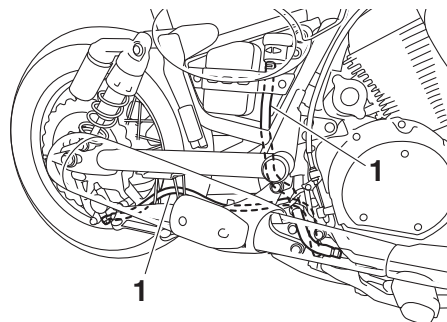
2. Check:
- Brake hose holders
- Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
- Brake hose
- Brake fluid leakage → Replace the brake hose.
- Refer to "FRONT BRAKE" on page 4-22.

EAS30636

CHECKING THE REAR BRAKE HOSES

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

1. Check:
- Brake hoses "1"
- Cracks/damage/wear → Replace.



2. Check:
- Brake hose clamp
- Loose → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
- Brake hoses
- Brake fluid leakage → Replace the damaged hose.
- Refer to "REAR BRAKE" on page 4-34.

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.

EAS30109

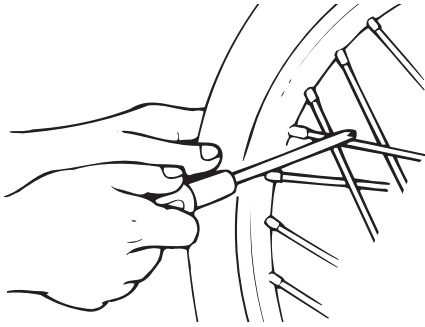
CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.

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

TIP

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



2. Tighten:

- Spoke
(with a spoke nipple wrench "1")

TIP

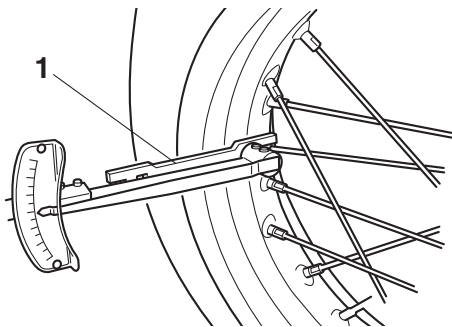
Be sure to tighten the spokes before and after break-in.



Spoke nipple wrench (8-9)
90890-01522
Spoke nipple wrench (8-9)
YM-01522



Spoke (front)
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)
Spoke (rear)
4.0 N·m (0.40 kgf·m, 2.9 lb·ft)



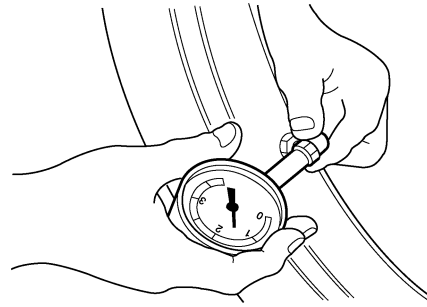
EAS30640

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:

- Tire pressure
Out of specification → Regulate.



EWA18280

⚠ 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 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)
Up to 90 kg (198 lb) load
Front
280 kPa (2.80 kgf/cm², 41 psi)
Rear
280 kPa (2.80 kgf/cm², 41 psi)
90 kg (198 lb) load - maximum load
Front
280 kPa (2.80 kgf/cm², 41 psi)
Rear
280 kPa (2.80 kgf/cm², 41 psi)
Maximum load
209 kg (461 lb)

* Total weight of rider, cargo and accessories

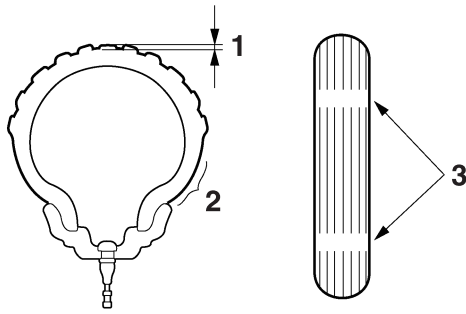
EWA13190

⚠ WARNING

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

2. Check:

- Tire surfaces
Damage/wear → Replace the tire.



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)

EWA14080

⚠ WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

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
100/90-19M/C 57H
Manufacturer/model
BRIDGESTONE/TRAIL WING
101 E



Rear tire

Size
140/80R17M/C 69H
Manufacturer/model
BRIDGESTONE/TRAIL WING
152 E

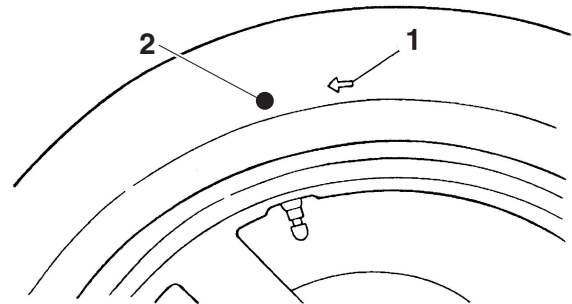
EWA13210

⚠ 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.
- Align the mark "2" with the valve installation point.



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 4-11 and "CHECKING THE REAR WHEEL" on page 4-19.

EAS31566

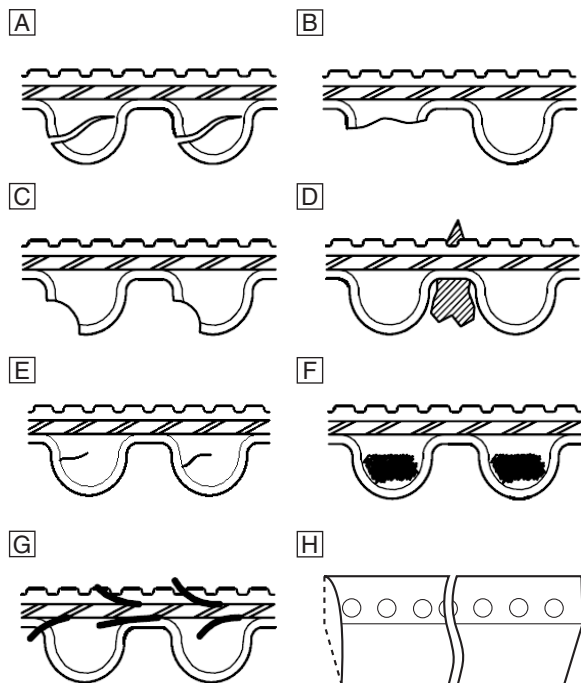
CHECKING THE SWINGARM PIVOT SHAFT BEARINGS

1. Check:
 - Swingarm pivot shaft bearings
Refer to “SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES” on page 4-66.

EAS31431

CHECKING THE DRIVE BELT

1. Remove:
 - Drive belt upper guard and lower guard
Refer to “REAR WHEEL” on page 4-15.
 2. Check:
 - Drive belt
 - External tooth cracks “A” → Replace.
 - Missing teeth “B” → Replace.
 - Hook wear “C” → Replace.
 - Stone damage “D” → Replace if damage is on the edge.
 - Internal tooth cracks (hairline) “E” → OK to run, but monitor condition.
 - Chipping (not serious) “F” → OK to run, but monitor condition.
 - Fuzzy edge cord “G” → OK to run, but monitor condition
 - Bevel wear (outboard edge only) “H” → OK to run, but monitor condition.
- Refer to “BELT DRIVE” on page 4-71



3. Install:
 - Drive belt upper guard and lower guard
Refer to “REAR WHEEL” on page 4-15.

EAS30090

ADJUSTING THE DRIVE BELT SLACK

TIP

The drive belt slack must be checked at the tightest point on the belt.

ECA14950

NOTICE

A drive belt 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 belt slack within the specified limits.

TIP

Measure the drive belt slack when the engine is cold, and when the drive belt is dry.

1. Stand the vehicle on a level surface.

EWA13120

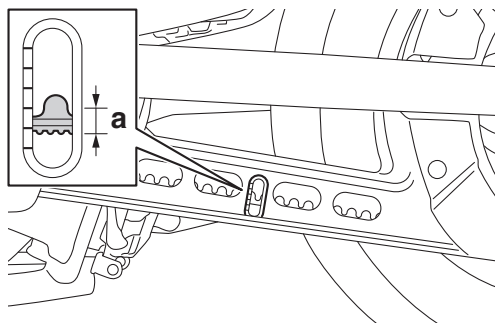
WARNING

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

TIP

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

2. Rotate the rear wheel several times and check the drive belt to locate its tightest point.
3. Check:
 - Drive belt slack “a”
Out of specification → Adjust.



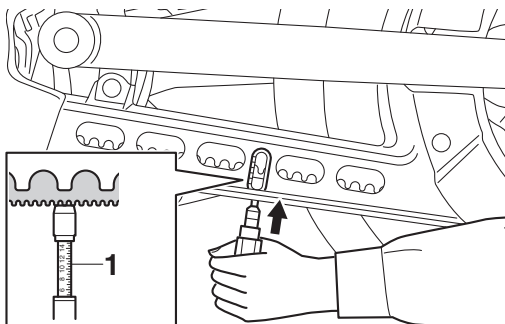
Drive belt slack (on a suitable stand)
7.0–9.0 mm (0.28–0.35 in)



Belt tension gauge
90890-03170
Rear drive belt tension gauge
YM-03170

TIP

Measure the drive belt slack when the drive belt has been pushed with 45 N (4.5 kgf, 10 lbf) of pressure using the belt tension gauge "1".



4. Remove:

- Muffler

Refer to "ENGINE REMOVAL" on page 5-2.

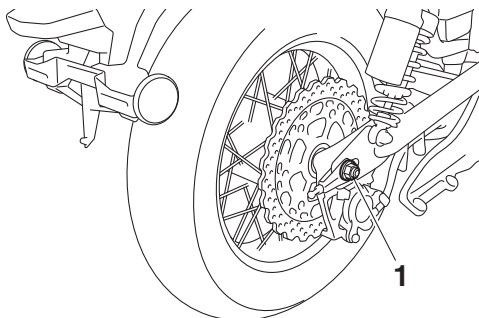
5. Adjust:

- Drive belt slack

TIP

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

a. Loosen the rear wheel axle nut "1".



b. Loosen both drive belt adjusting locknuts "2".

c. Turn both drive belt adjusting bolts "3" in direction "a" or "b" until the specified drive belt slack is obtained.

Direction "a"

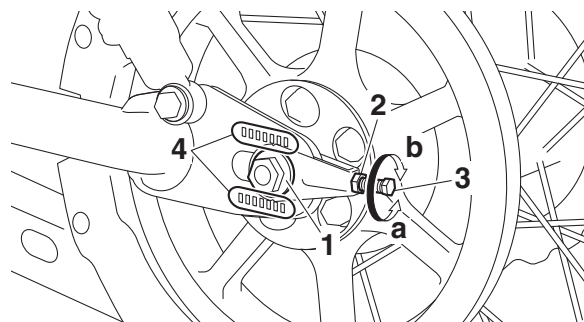
Drive belt is tightened.

Direction "b"

Drive belt is loosened.

TIP

Using the alignment marks "4" on each side of the swingarm, make sure that both belt pullers are in the same position for proper wheel alignment.



d. Tighten the drive belt adjusting locknuts to specification.



Drive belt adjusting locknut
16 N·m (1.6 kgf·m, 12 lb·ft)

e. Tighten the rear wheel axle nut to specification.



Rear wheel axle nut
150 N·m (15 kgf·m, 108 lb·ft)

6. Install:

- Muffler

Refer to "ENGINE REMOVAL" on page 5-2.

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

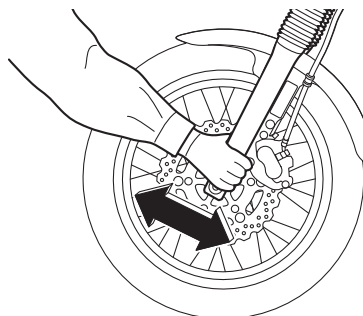
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:

- Steering head

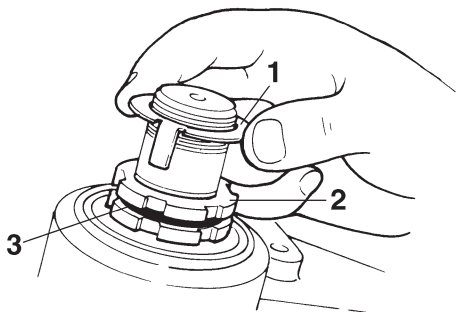
Grasp the bottom of the front fork legs and gently rock the front fork.

Blinding/looseness → Adjust the steering head.

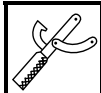


3. Remove:
 - Upper bracket
Refer to "HANDLEBAR" on page 4-46.
4. Adjust:
 - Steering head

- a. Remove the lock washer "1", the upper ring nut "2", and the rubber washer "3".



- b. Tighten the lower ring nut "4" to specification with a steering nut wrench "5".



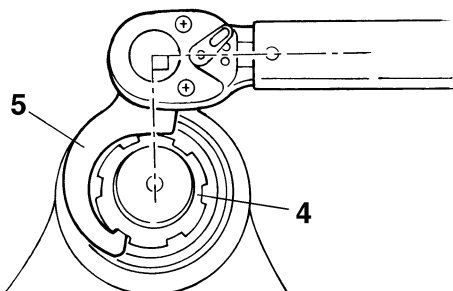
Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



Lower ring nut (initial tightening torque)
52 N·m (5.2 kgf·m, 38 lb·ft)

TIP

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



- c. Loosen the lower ring nut completely and then tighten it to specification with a steering nut wrench.

EWA13140



Do not overtighten the lower ring nut.



Lower ring nut (final tightening torque)
18 N·m (1.8 kgf·m, 13 lb·ft)

- d. 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 4-61.
- e. Install the rubber washer "3".
- f. Install the upper ring nut "2".

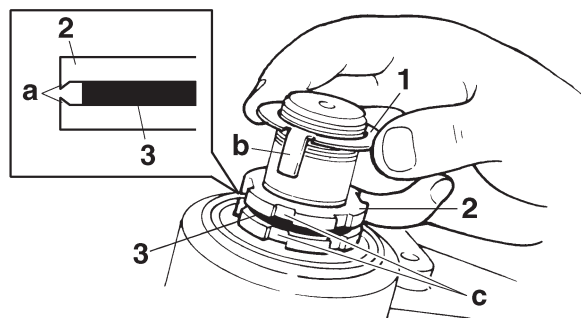
TIP

Install the upper ring nut and lower ring nut with their sharp-edged sides "a" facing each other.

- g. Finger tighten the upper ring nut "2", and then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer "1".

TIP

Make sure the lock washer tabs "b" sit correctly in the ring nut slots "c".



5. Install:
 - Upper bracket
Refer to "HANDLEBAR" on page 4-46.

EAS31567

LUBRICATING THE STEERING BEARINGS
Lubricate the steering bearings.



Recommended lubricant
Lithium-soap-based grease

EAS31186

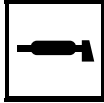
CHECKING THE CHASSIS FASTENERS

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

EAS30804

LUBRICATING THE BRAKE LEVER

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

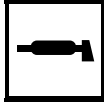


Recommended lubricant
Silicone grease

EAS31568

LUBRICATING THE BRAKE PEDAL

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



Recommended lubricant
Lithium-soap-based grease

EAS30805

LUBRICATING THE CLUTCH LEVER

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

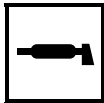


Recommended lubricant
Lithium-soap-based grease

EAS31569

LUBRICATING THE SHIFT PEDAL

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



Recommended lubricant
Lithium-soap-based grease

EAS30650

CHECKING THE SIDESTAND

1. Stand the vehicle on a level surface.

EWA13120



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 sidestand is elevated.

2. Check:

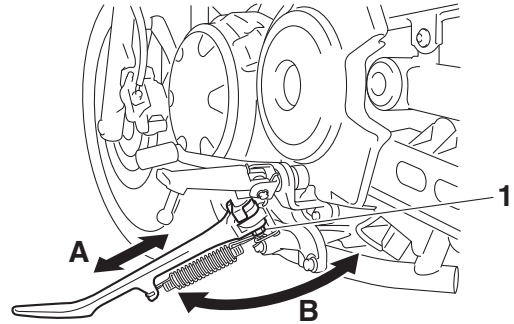
- Sidestand vertical movement “A”
Free play is noticeable → Replace the defective part(s).
- Sidestand axial movement “B”
Unsmooth operation → Replace the defective part(s).

a. Tighten the sidestand nut “1” to specification.



Sidestand nut
64 N·m (6.4 kgf·m, 46 lb·ft)
LOCTITE®

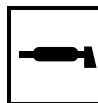
- b. Check the sidestand vertical movement “A” by moving the sidestand up and down.
- c. Check the sidestand axial movement “B” by moving the sidestand up and down.



EAS30651

LUBRICATING THE SIDESTAND

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



Recommended lubricant
Lithium-soap-based grease

EAS30652

CHECKING THE SIDESTAND SWITCH

Refer to “ELECTRICAL COMPONENTS” on page 7-67.

EAS30653

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120



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

2. Check:

- Inner tube
Damage/scratches → Replace.
- Oil seal
Oil leakage → Replace.

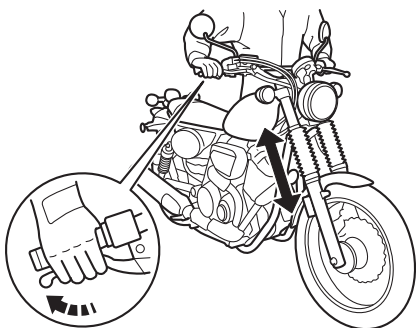
3. Hold the vehicle upright and apply the front brake.

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 4-51.



EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

1. Check:
 - Damper rod
 - Oil leakage
 - Gas leakage
 - Spring
 Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES" on page 4-69.
2. Check:
 - Operation
 Pump the rear shock absorber assemblies up and down several times.
 Unsmooth operation → Replace rear shock absorber assembly.
 Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-66.

EAS30655

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both of the rear shock absorber assemblies.

EWA17520

WARNING

- Securely support the vehicle so that there is no danger of it falling over.
- Always adjust both rear shock absorber assemblies evenly. Uneven adjustment can result in poor handling and loss of stability.

Spring preload

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
 - Spring preload

TIP

Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit 2.

- a. Turn the adjusting ring "1" in direction "a" or "b".
- b. Align the desired position on the adjusting ring with the stopper "2".

Direction "a"

Spring preload is increased (suspension is harder).

Direction "b"

Spring preload is decreased (suspension is softer).



Adjusting positions

Standard

1 notch out*

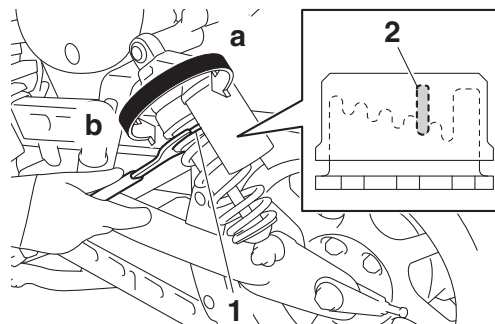
Minimum (soft)

0 notches out*

Maximum (hard)

4 notches out*

* : from the fully turned-in position



EAS30656

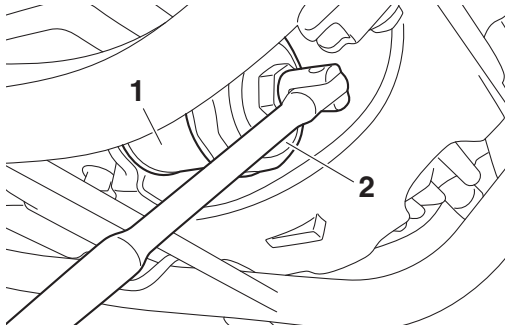
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

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

2. Let the engine idle for a few minutes, and then turn it off.
3. Remove:
 - Dipstick "1"
4. 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.

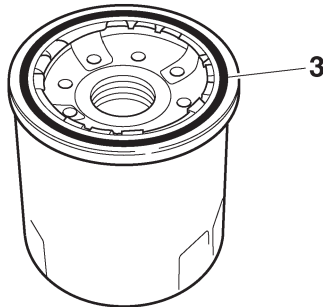


- b. Lubricate the O-ring “3” of the new oil filter cartridge with a thin coat of engine oil.

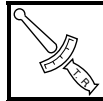
ECA13390

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 N·m (1.7 kgf·m, 12 lb·ft)



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



Engine oil drain bolt
43 N·m (4.3 kgf·m, 31 lb·ft)

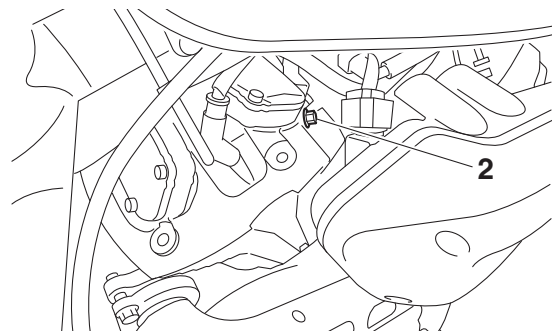
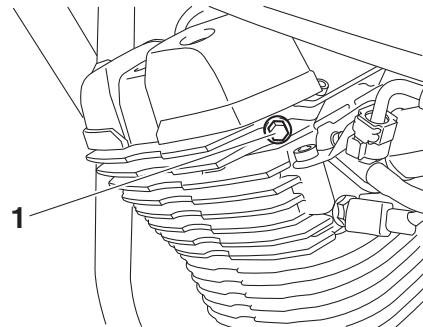
7. Fill:
- Crankcase
(with the specified amount of the recommended engine oil)
8. Install:
- Dipstick
(along with the O-ring **New**)
9. Check:
- Engine oil level
Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-21.



Engine oil quantity
Quantity (disassembled)
4.30 L (4.55 US qt, 3.78 Imp.qt)
Oil change
3.70 L (3.91 US qt, 3.26 Imp.qt)
With oil filter removal
4.00 L (4.23 US qt, 3.52 Imp.qt)

10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
- Engine
(for engine oil leaks)
12. Check:
- Engine oil level
Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-21.
13. Remove:
- Rear cylinder cover (right)
 - Rear cylinder cover bracket (right)
Refer to “ENGINE REMOVAL” on page 5-2.
14. Check:
- Engine oil pressure

- a. Slightly loosen the front cylinder oil check bolt “1” and rear cylinder oil check bolt “2”.



- b. Start the engine and keep it idling until engine oil starts to seep from the oil check bolts. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
- c. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to “OIL PUMP” on page 5-71.

- d. Start the engine after solving the problem(s) and check the engine oil pressure again.
- e. Tighten the oil check bolts to specification.



Oil check bolt
15 N·m (1.5 kgf·m, 11 lb·ft)

15. Install:

- Rear cylinder cover bracket (right)
- Rear cylinder cover (right)



Rear cylinder right cover bracket bolt
20 N·m (2.0 kgf·m, 14 lb·ft)
Rear cylinder right cover bolt
8 N·m (0.8 kgf·m, 5.8 lb·ft)

Refer to "ENGINE REMOVAL" on page 5-2.

EAS31574

CHECKING THE BRAKE LIGHT SWITCH

1. Check:

- Front brake light switch operation
- Rear brake light switch operation
When operating the brake lever and brake pedal, confirm that the brake light turns on.
Faulty → Refer to "CHECKING THE SWITCHES" on page 7-71.

EAS31146

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:

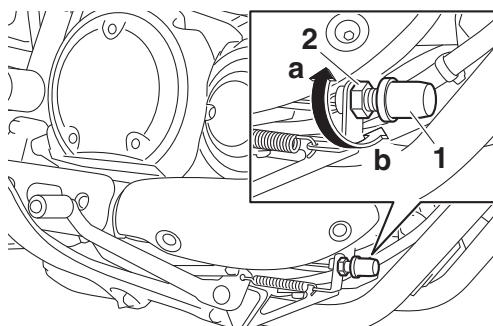
- Rear brake light operation timing
Incorrect → Adjust.

2. Adjust:

- Rear brake light operation timing

- 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.



EAS31147

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 or replace.



Recommended lubricant
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 4-46.

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.

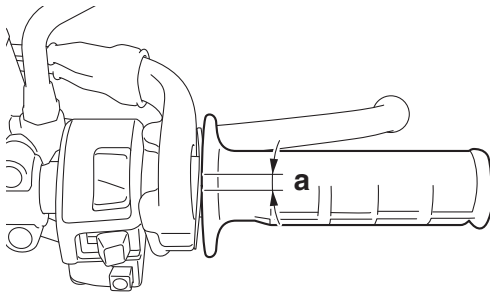
Repeat this check with the handlebar turned all the way to the left and right.

3. Measure:

- Throttle grip free play “a”
Out of specification → Adjust.



Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)



4. Remove:

- Fuel tank
Refer to “FUEL TANK” on page 6-1.

5. Adjust:

- Throttle grip free play

TIP

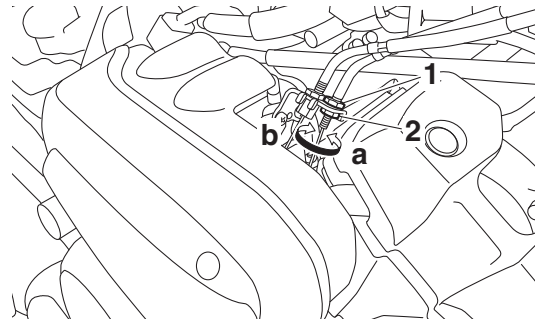
Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly.

Throttle body side

- Loosen the locknut “1” on the accelerator cable.
- 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.

- Tighten the locknut.



TIP

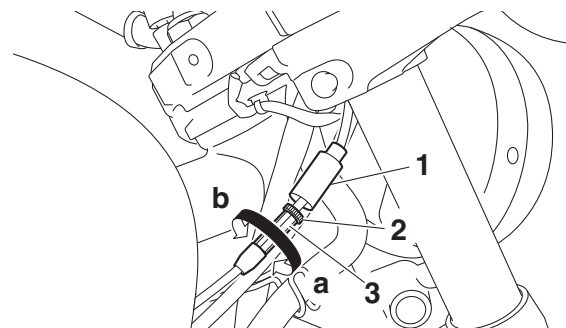
If the specified throttle grip free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

Handlebar side

- Slide back the rubber cover “1”.
- Loosen the locknut “2”.
- 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.

- Tighten the locknut.



- Slide the rubber cover to its original position.

6. Install:

- Fuel tank
Refer to “FUEL TANK” on page 6-1.

EAS31575

LUBRICATING THE THROTTLE GRIP HOUSING AND CABLE

Lubricate the throttle grip housing and cable.



Recommended lubricant
Lithium-soap-based grease

EAS30663

CHECKING THE SWITCHES, LIGHTS AND SIGNALS

1. Check that all switches operate and that all lights come on.
Refer to "Instrument and control functions" in Owner's manual.
Faulty → Refer to "CHECKING THE SWITCHES" on page 7-71 and "CHECKING THE BULBS AND BULB SOCKETS" on page 7-74.

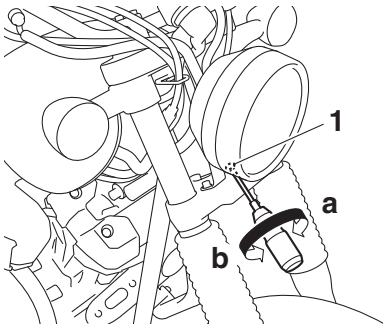
EAS30664

ADJUSTING THE HEADLIGHT BEAM

1. Adjust:
 - Headlight beam (vertically)

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

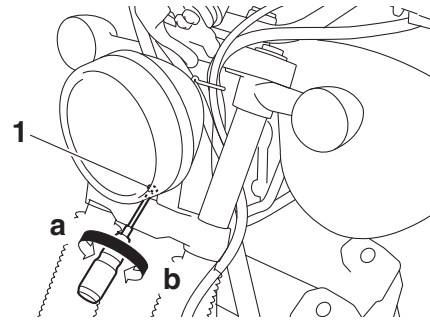
Direction "a"
Headlight beam is raised.
Direction "b"
Headlight beam is lowered.



2. Adjust:
 - Headlight beam (horizontally)

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

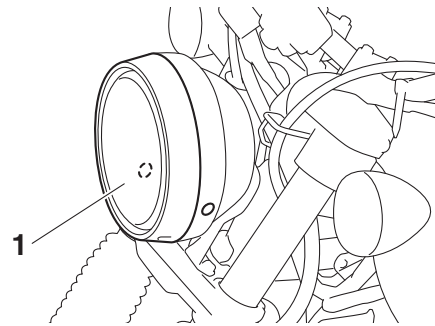
Direction "a"
Headlight beam moves to the left.
Direction "b"
Headlight beam moves to the right.



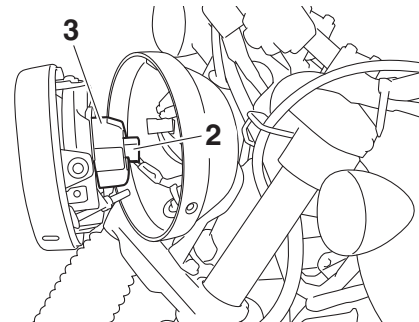
EAS30665

REPLACING THE HEADLIGHT BULB

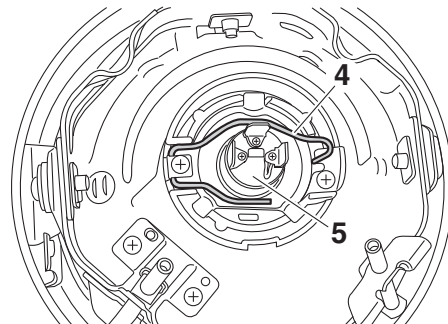
1. Remove:
 - Headlight lens unit "1"



2. Disconnect:
 - Headlight coupler "2"
3. Remove:
 - Headlight bulb cover "3"



4. Detach:
 - Headlight bulb holder "4"
5. Remove:
 - Headlight bulb "5"



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. Attach:

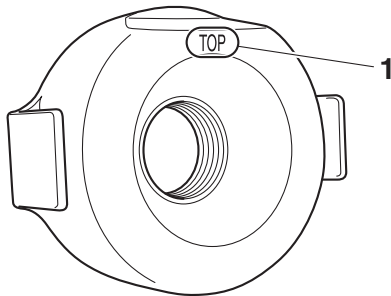
- Headlight bulb holder

8. Install:

- Bulb cover

TIP

When installing the headlight bulb cover, make sure the “TOP” mark “1” faces upwards.



9. Connect:

- Headlight coupler

10. Install:

- Headlight lens unit



Headlight lens unit screw
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

CHASSIS

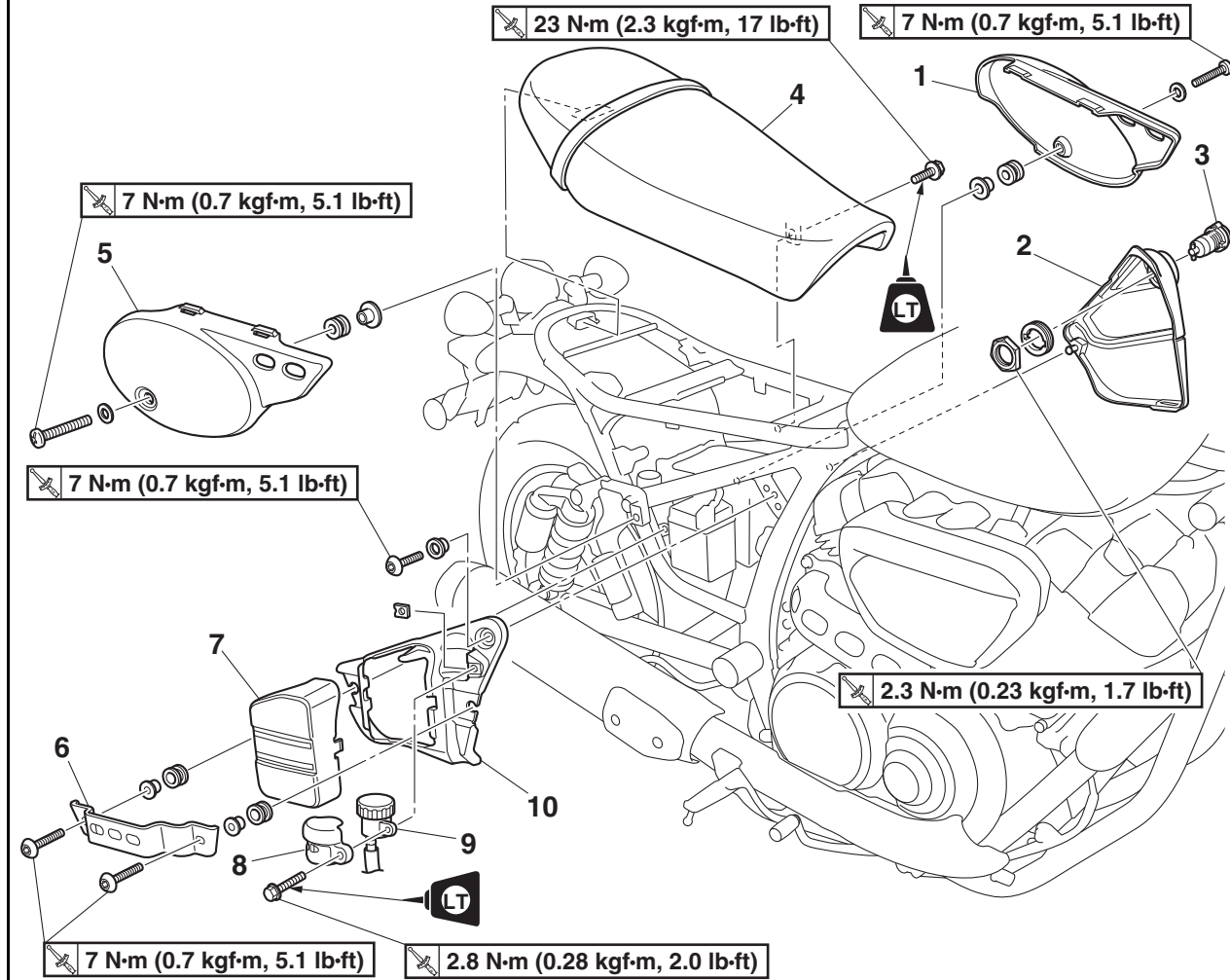
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EAS20026

GENERAL CHASSIS (1)

Removing the seat and side cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Side panel (left)	1	
2	Side cover (left)	1	
3	Key cylinder	1	
4	Seat	1	
5	Side panel (right)	1	
6	Battery cover holder	1	
7	Battery cover	1	
8	Brake fluid reservoir cover	1	
9	Brake fluid reservoir	1	
10	Side cover (right)	1	

EAS32054

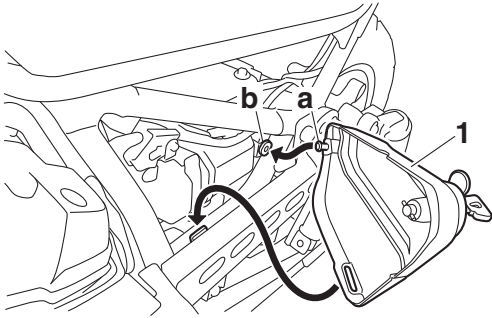
INSTALLING THE SIDE COVER AND SIDE PANELS

1. Install:

- Side cover (left) “1”

TIP

Insert the projection “a” on the side cover (left) into the grommet “b” as shown.



2. Install:

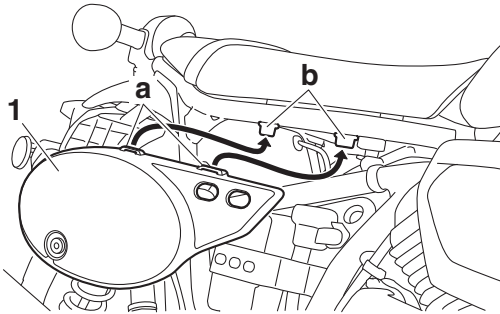
- Side panel “1”



Side panel screw
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

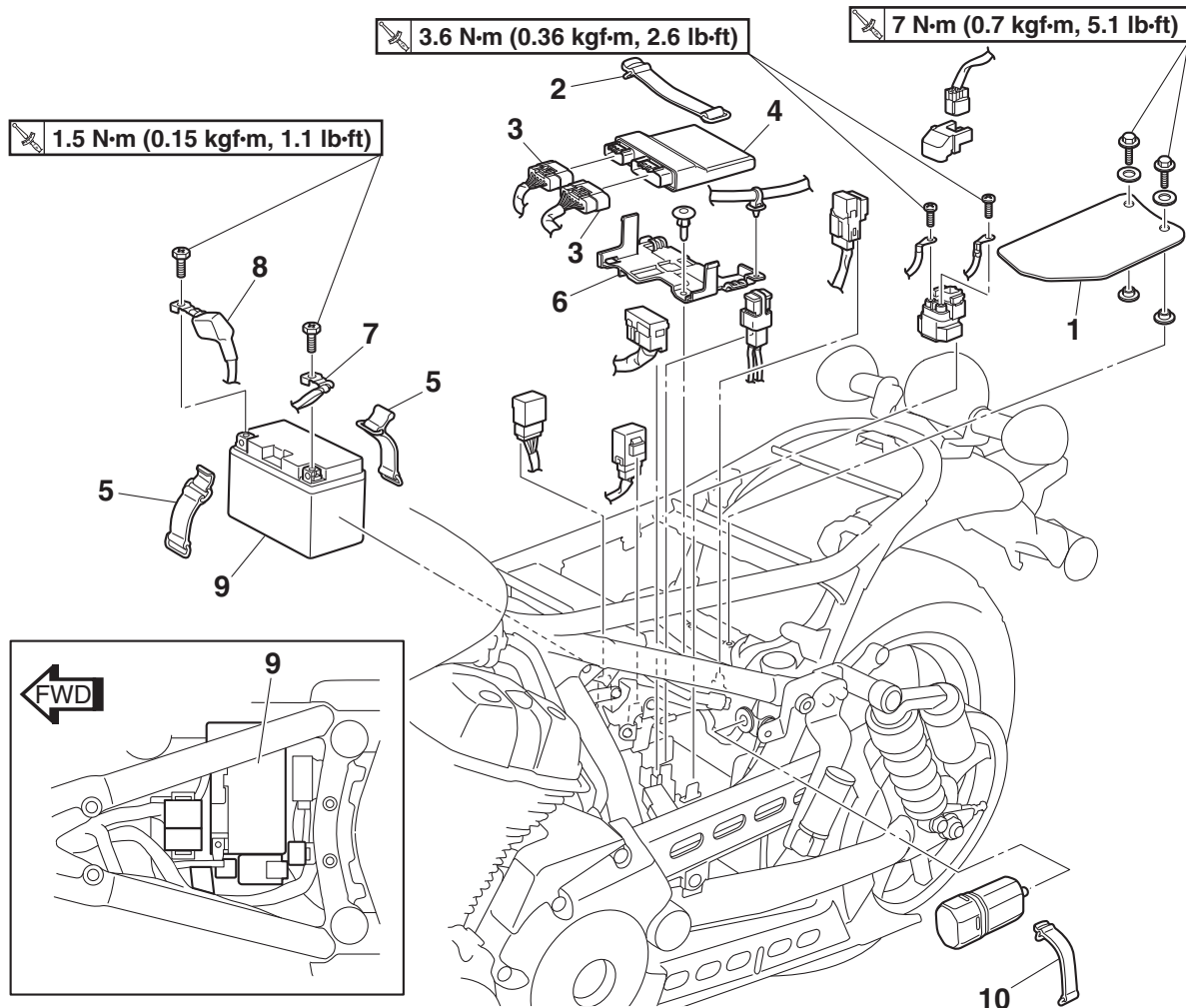
Fit the holes “a” in the side panel onto the projections “b” as shown.



EAS20155

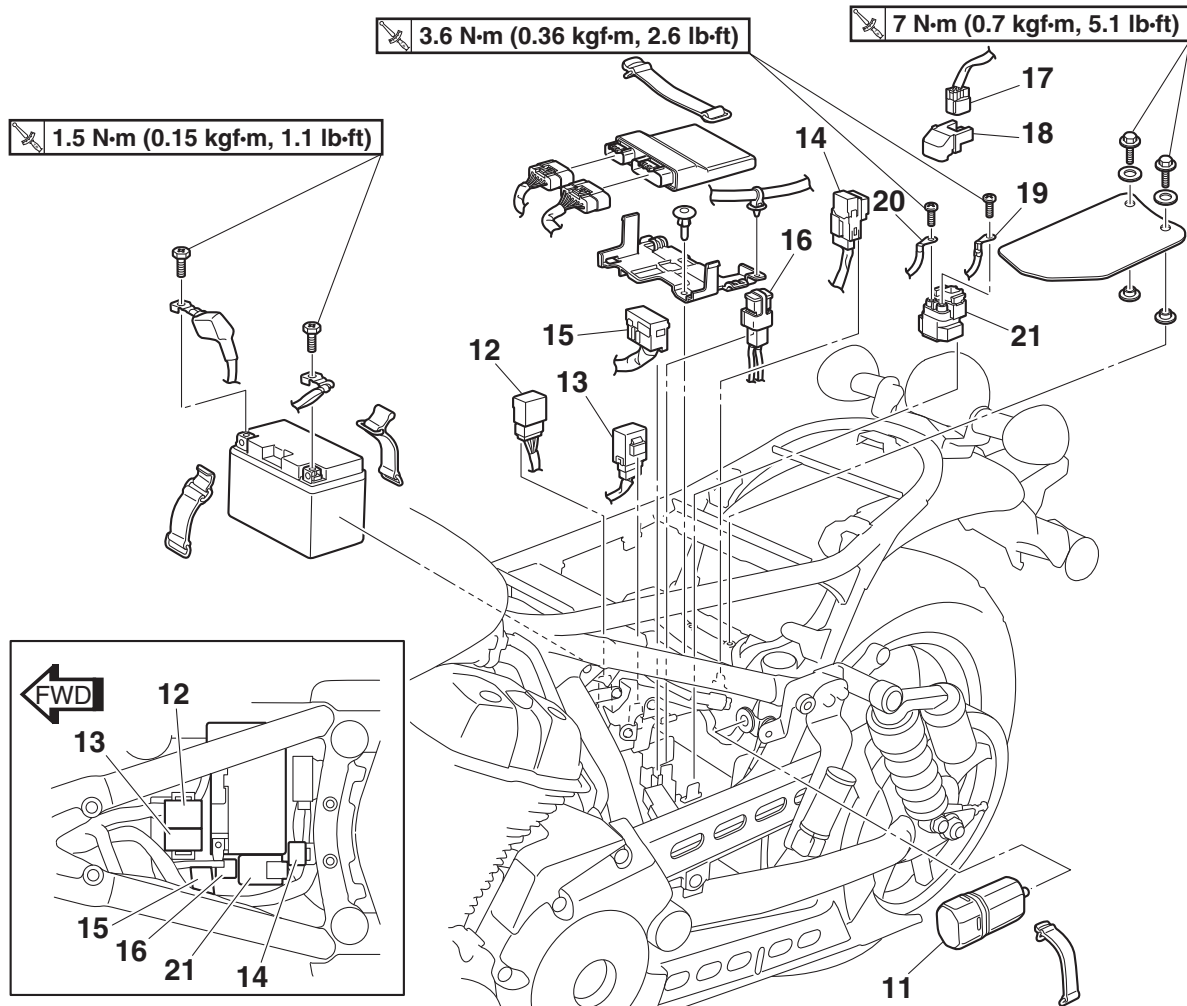
GENERAL CHASSIS (2)

Removing the battery and relays



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Side cover (right)		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	ECU cover	1	
2	ECU band	1	
3	ECU coupler	2	Disconnect.
4	ECU (Engine Control Unit)	1	
5	Battery band	2	
6	ECU bracket	1	
7	Negative battery lead	1	Disconnect.
8	Positive battery lead	1	Disconnect.
9	Battery	1	
10	Tool box band	1	

Removing the battery and relays



Order	Job/Parts to remove	Q'ty	Remarks
11	Tool box	1	
12	Relay unit	1	
13	Turn signal relay	1	
14	Headlight relay	1	
15	Fuse box	1	
16	Main fuse	1	
17	Starter relay coupler	1	Disconnect.
18	Starter relay cover	1	
19	Starter motor lead	1	Disconnect.
20	Positive battery lead (starter relay)	1	Disconnect.
21	Starter relay	1	

EAS31628

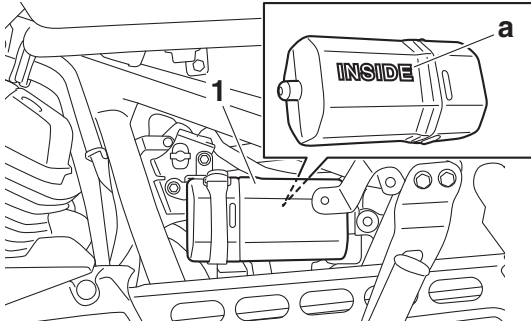
INSTALLING THE TOOL BOX

1. Install:

- Tool box “1”

TIP

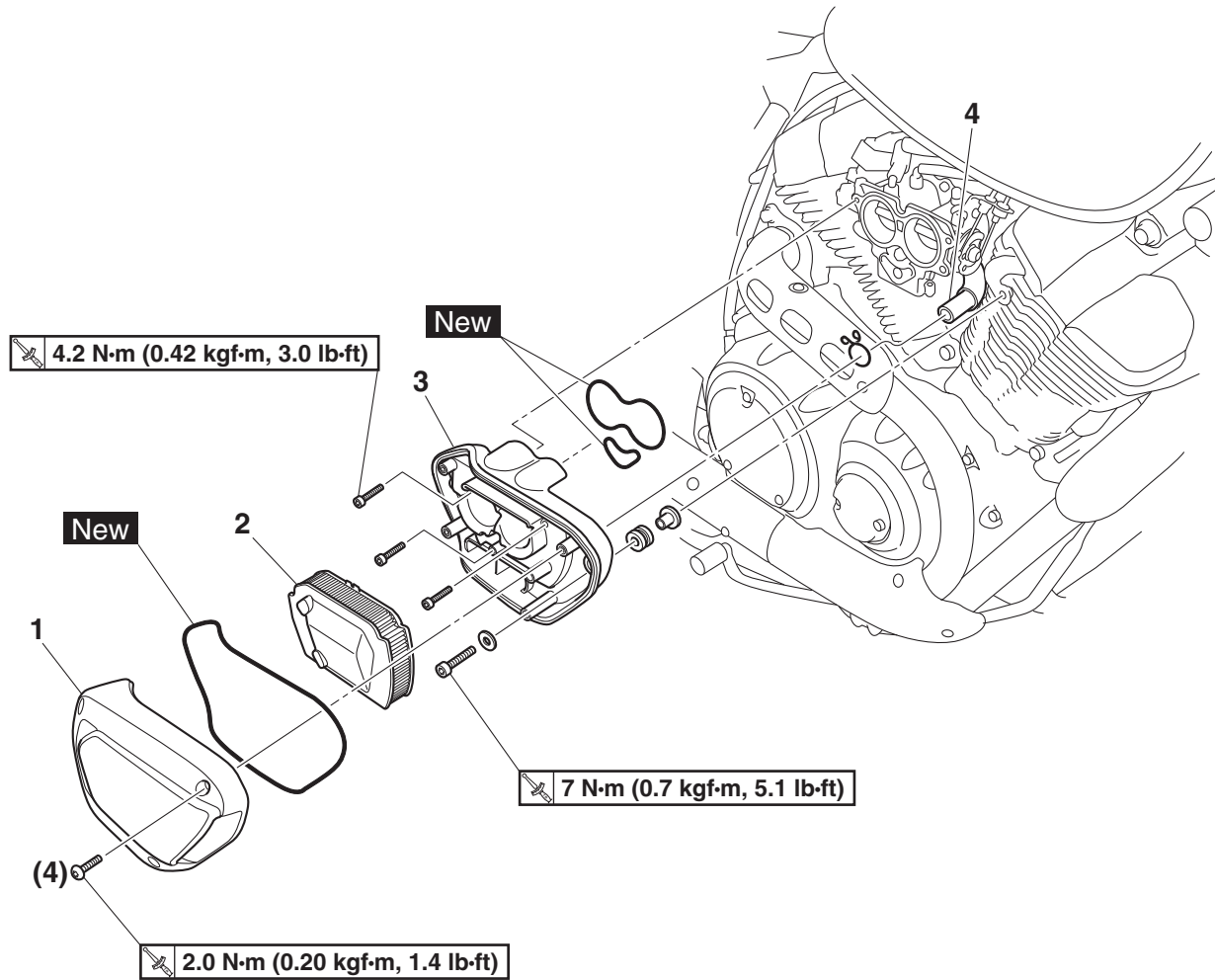
Install the tool box with the “INSIDE” mark “a” facing inward.



EAS20156

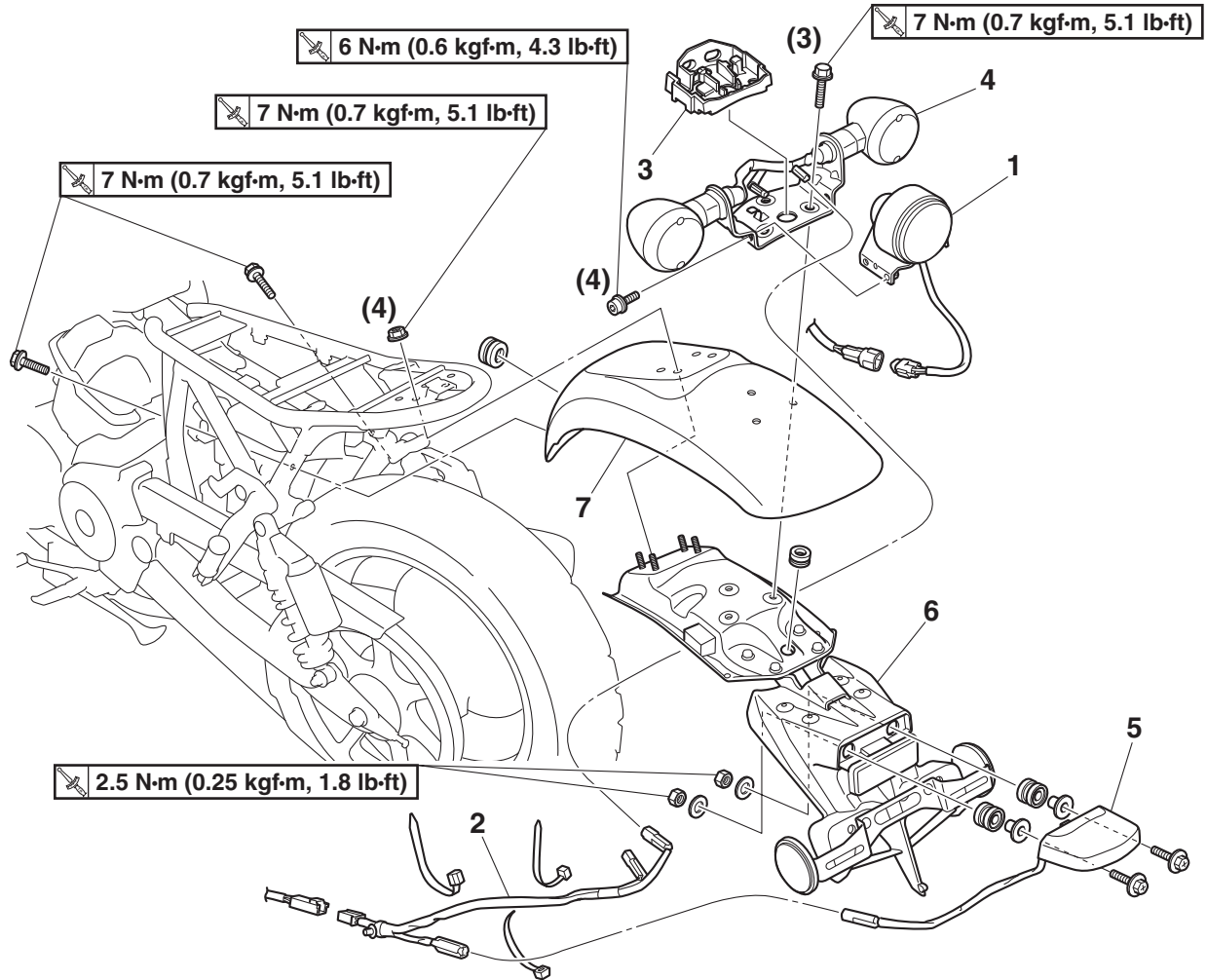
GENERAL CHASSIS (3)

Removing the air filter case



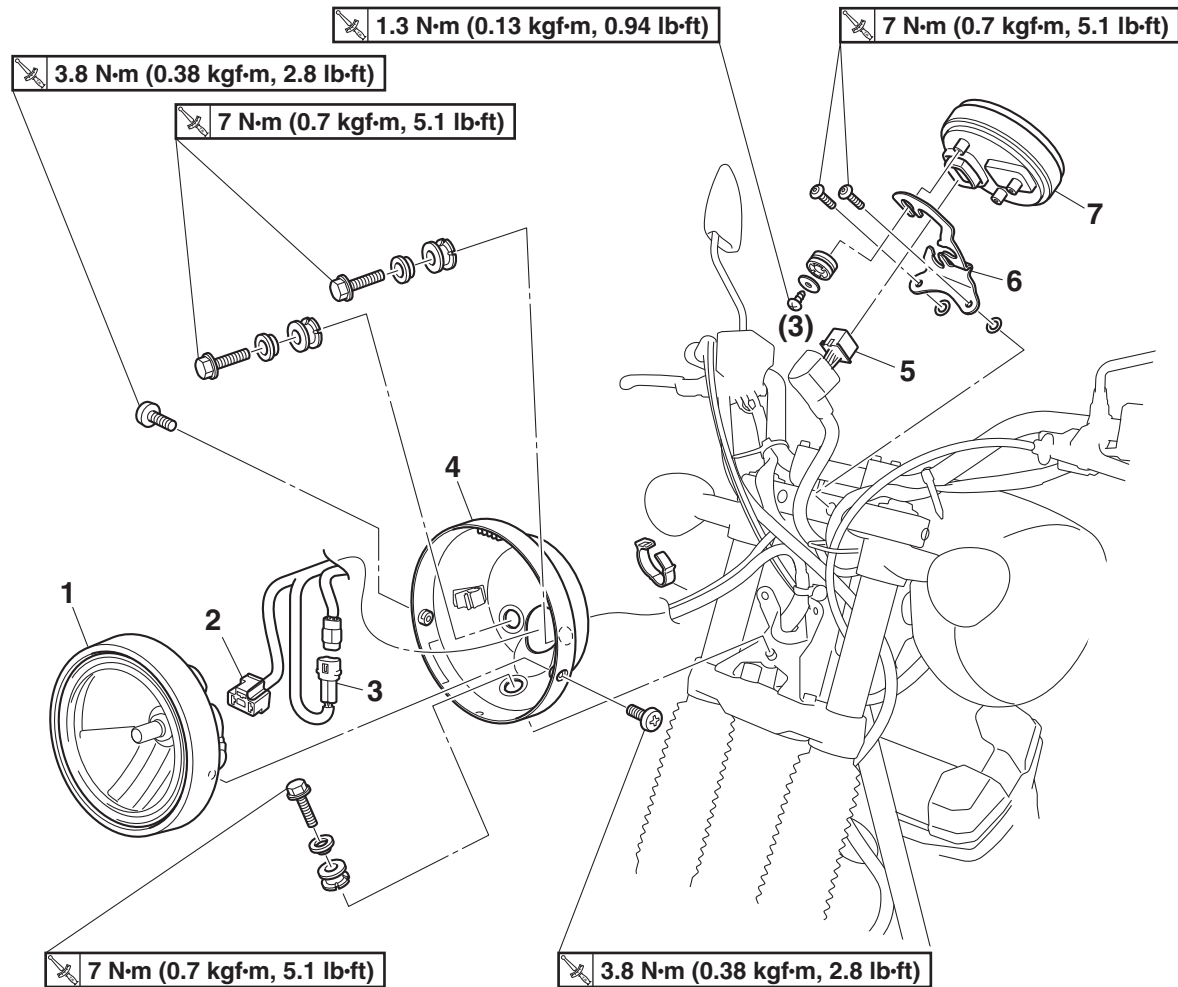
Order	Job/Parts to remove	Q'ty	Remarks
1	Air filter case cover	1	
2	Air filter element	1	
3	Air filter case	1	
4	Crankcase breather hose	1	Disconnect.

Removing the rear fender



Order	Job/Parts to remove	Q'ty	Remarks
	Seat/Side cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Tail/brake light	1	
2	Sub-wire harness (rear turn signal light, license plate light)	1	
3	Coupler holder	1	
4	Rear turn signal light	1	
5	License plate light	1	
6	Mudguard	1	
7	Rear fender	1	

Removing the headlight and meter assembly

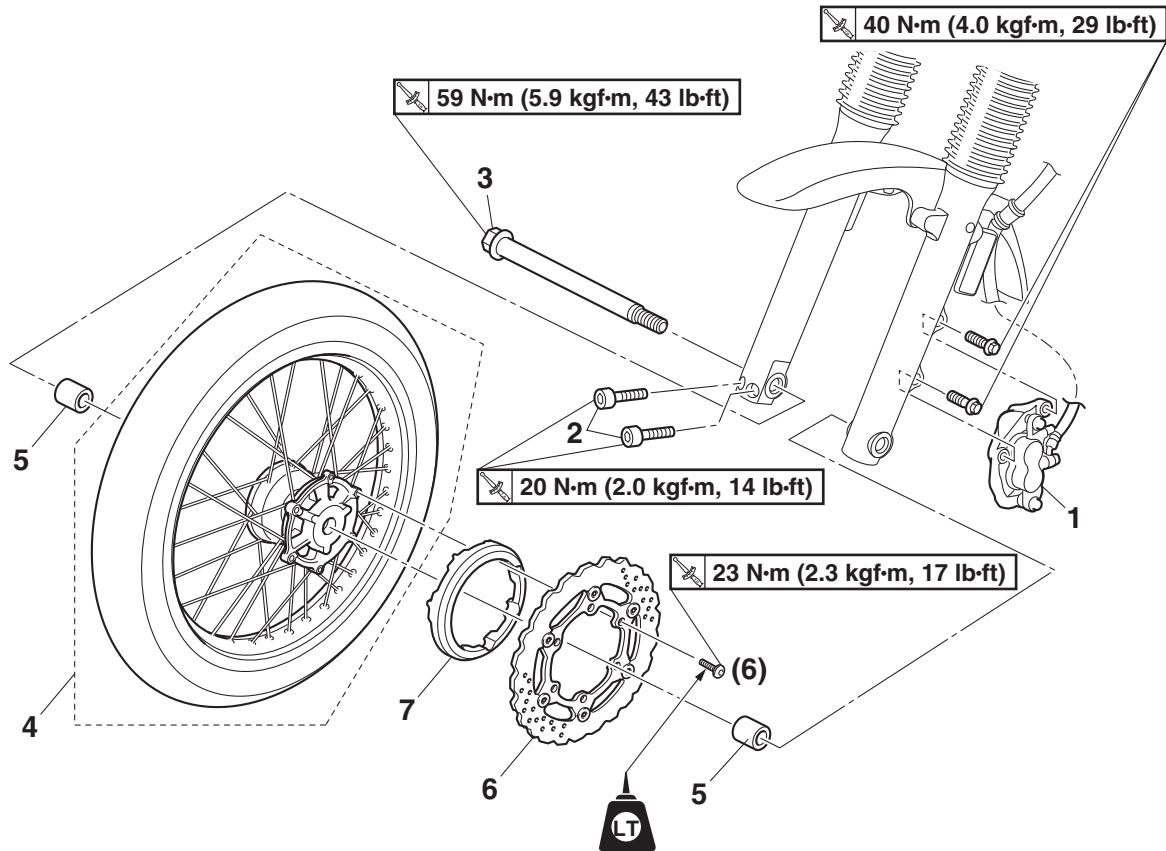


Order	Job/Parts to remove	Q'ty	Remarks
1	Headlight lens unit	1	
2	Headlight coupler	1	Disconnect.
3	Intake air temperature sensor coupler	1	Disconnect.
4	Headlight body	1	
5	Meter assembly coupler	1	Disconnect.
6	Meter assembly bracket	1	
7	Meter assembly	1	

EAS20028

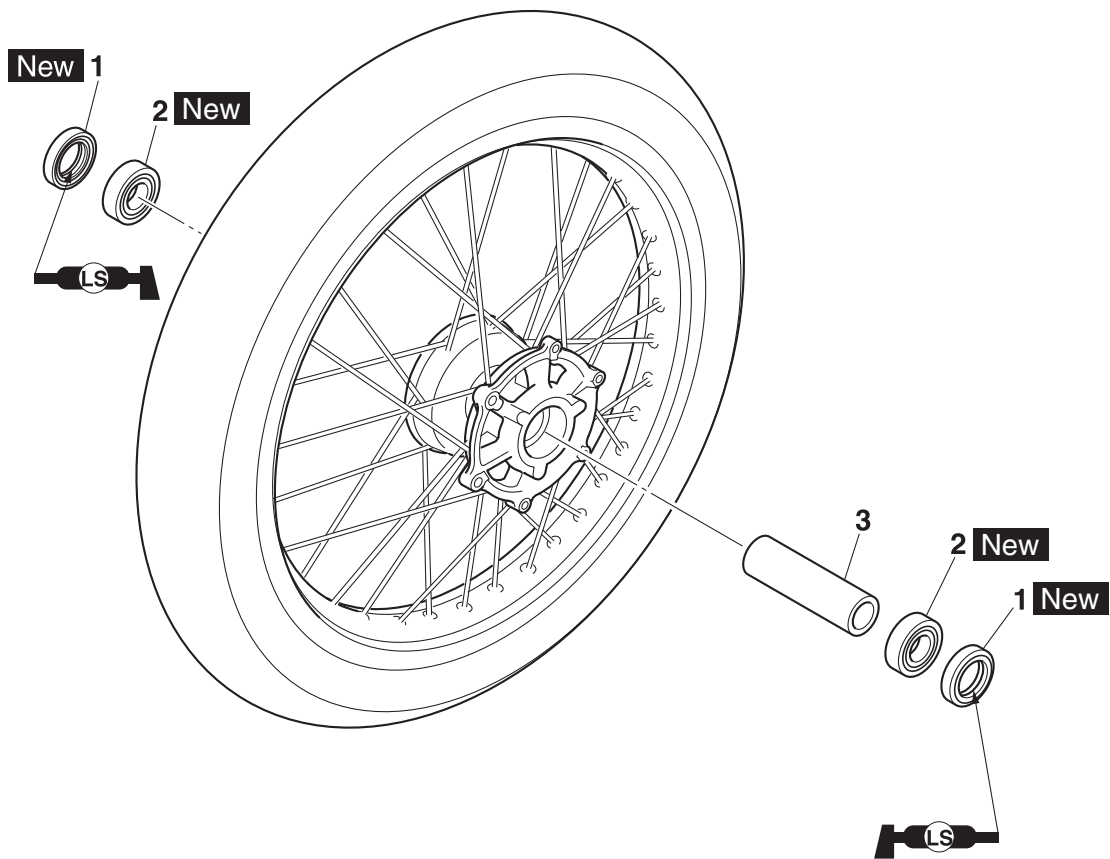
FRONT WHEEL

Removing the front wheel and brake disc



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

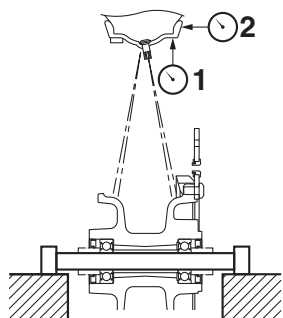
Disassembling the front wheel



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

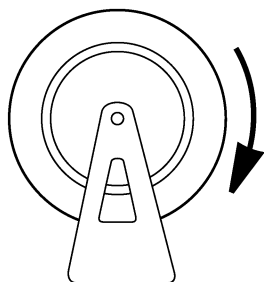


Radial wheel runout limit
2.0 mm (0.08 in)
Lateral wheel runout limit
2.0 mm (0.08 in)



5. Check:

- Wheel bearings
Front wheel turns roughly or is loose → Replace the wheel bearings.
- Oil seals
Damage/wear → Replace.



EAS30151

ASSEMBLING THE FRONT WHEEL

1. Install:

- Wheel bearings **New**
- Oil seals **New**

a. Install the new wheel bearings and oil seals in the reverse order of disassembly.

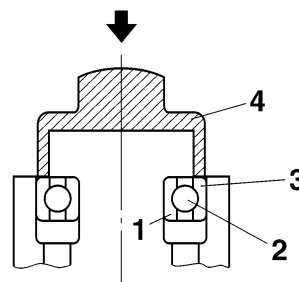
ECA18110

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 and oil seal.



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:

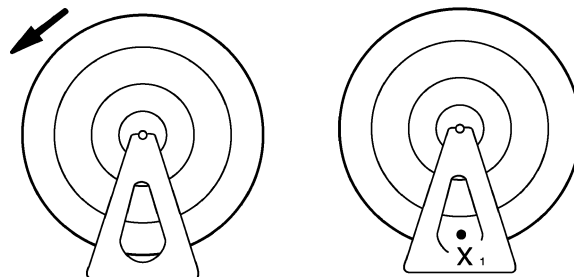
- Front wheel's heavy spot

TIP

Place the front wheel on a suitable balancing stand.

a. Spin the front wheel.

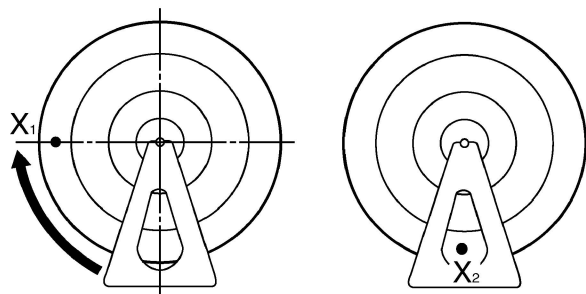
b. When the front wheel stops, put an “X₁” mark at the bottom of the wheel.



c. Turn the front wheel 90° so that the “X₁” mark is positioned as shown.

d. Release the front wheel.

e. When the wheel stops, put an “X₂” 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".



3. Adjust:

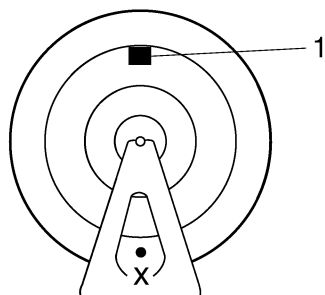
- Front wheel static balance



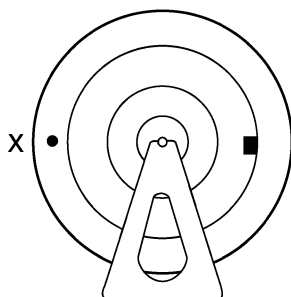
- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

TIP

Start with the lightest weight.



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



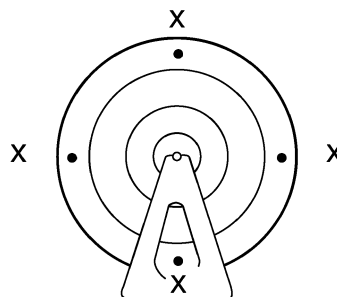
- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.



4. Check:

- Front wheel static balance

- 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.



EAS30932

INSTALLING THE FRONT WHEEL (FRONT BRAKE DISC)

1. Install:

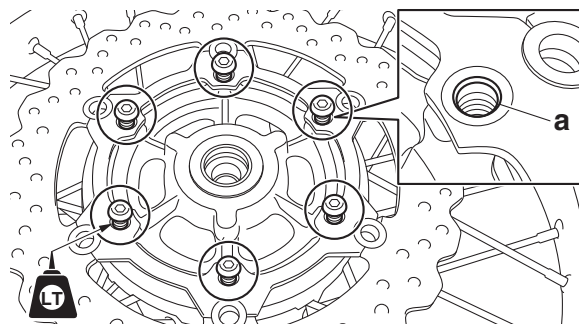
- Front brake disc



Front brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®

TIP

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



2. Check:

- Front brake disc

Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-27.

3. Lubricate:

- Oil seal lips

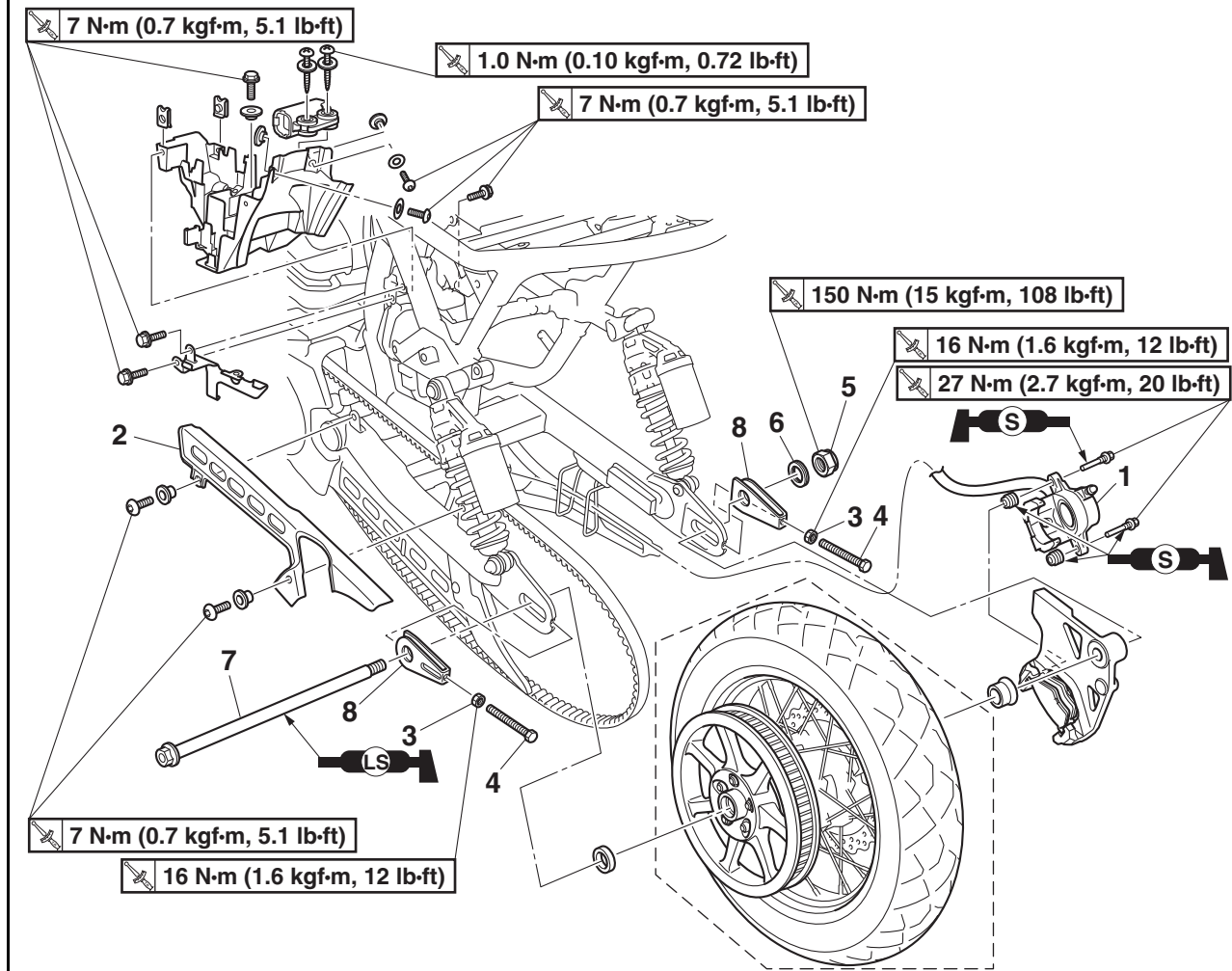


Recommended lubricant
Lithium-soap-based grease

EAS20029

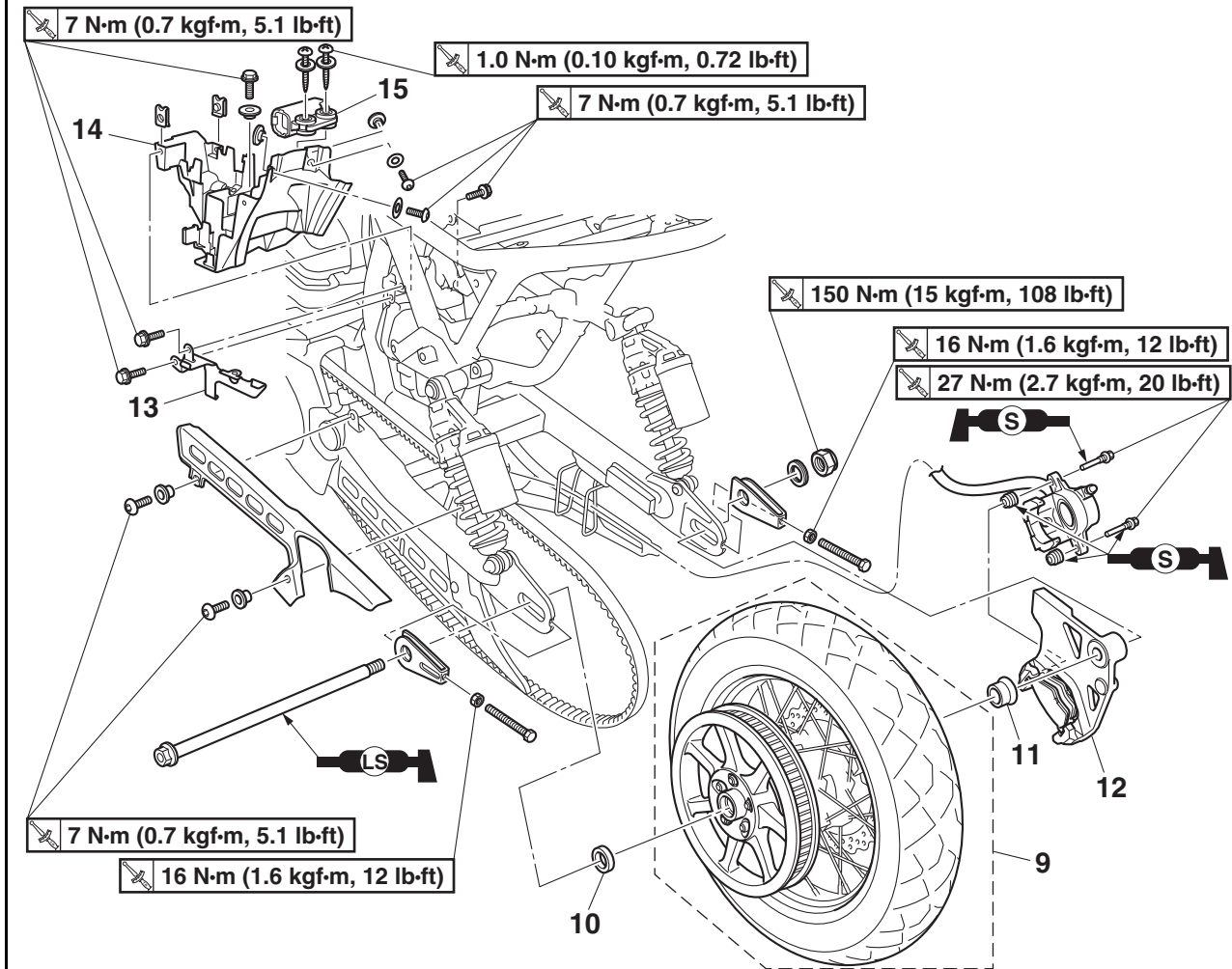
REAR WHEEL

Removing the rear wheel



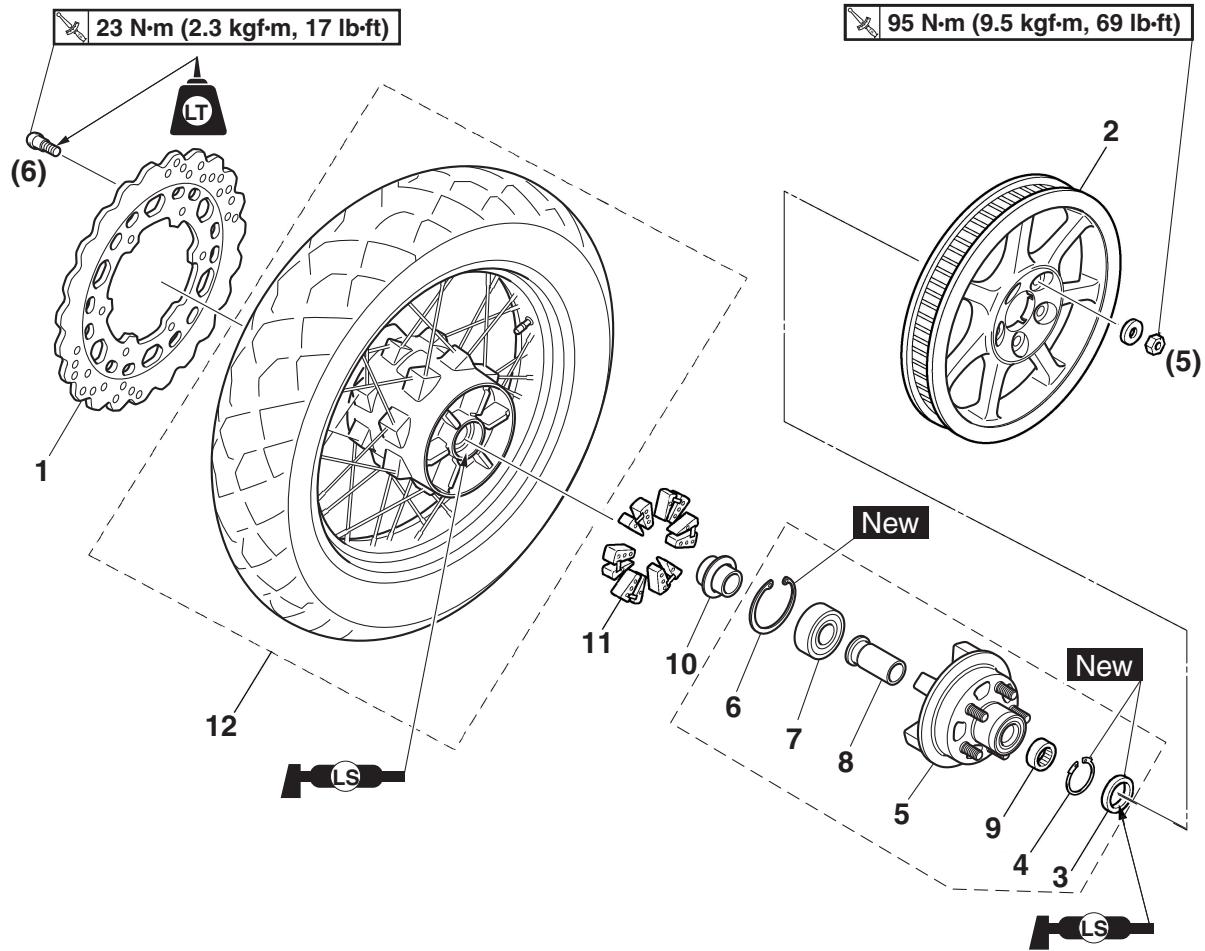
Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Rear fender assembly		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-2.
1	Rear brake caliper	1	
2	Drive belt upper guard	1	
3	Drive belt adjusting locknut	2	Loosen.
4	Drive belt adjusting bolt	2	Loosen.
5	Rear wheel axle nut	1	
6	Washer	1	
7	Rear wheel axle	1	
8	Drive belt puller	2	

Removing the rear wheel



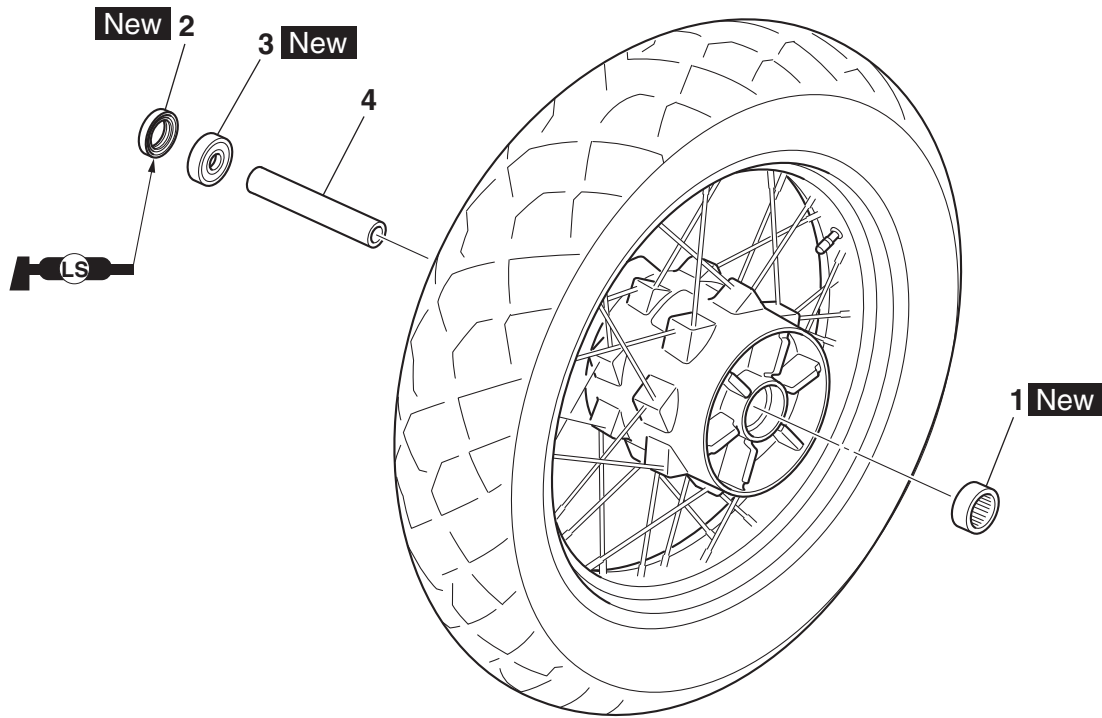
Order	Job/Parts to remove	Q'ty	Remarks
9	Rear wheel	1	
10	Collar (left)	1	
11	Collar (right)	1	
12	Rear brake caliper bracket	1	
13	Tool box guide	1	
14	Battery box	1	
15	Lean angle sensor	1	

Removing the rear brake disc and rear wheel drive hub



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

Disassembling the rear wheel



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

EAS30156

REMOVING THE REAR WHEEL (DISC)

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:

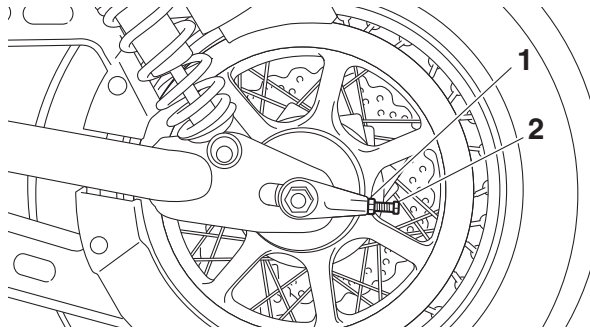
- Rear brake caliper

TIP

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

3. Loosen:

- Drive belt adjusting locknuts "1"
- Drive belt adjusting bolts "2"



4. Remove:

- Rear wheel axle nut
- Rear wheel axle
- Rear wheel

TIP

Push the rear wheel forward and remove the drive belt from the rear wheel pulley.

EAS30158

DISASSEMBLING THE REAR WHEEL

1. Remove:

- Oil seals
- Wheel bearings

Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-11.

EAS30159

CHECKING THE REAR WHEEL

1. Check:

- Rear wheel axle
- Rear wheel
- Wheel bearings

- Oil seals

Refer to "CHECKING THE FRONT WHEEL" on page 4-11.

2. Check:

- Tire
- Rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" on page 3-15 and "CHECKING THE WHEELS" on page 3-14.

3. Check:

- Spoke
- Bends/damage → Replace.

Loose → Tighten.

Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-14.

TIP

After tightening the spokes, measure the wheel runout.

4. Measure:

- Radial wheel runout
- Lateral wheel runout

Refer to "CHECKING THE FRONT WHEEL" on page 4-11.



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

EAS31577

CHECKING THE REAR BRAKE CALIPER BRACKET

1. Check:

- Rear brake caliper bracket
- Cracks/damage → Replace.

EAS30160

CHECKING THE REAR WHEEL DRIVE HUB

1. Check:

- Rear wheel drive hub
 - Rear wheel drive hub dampers
- Cracks/damage → Replace.
Damage/wear → Replace.

EAS30162

CHECKING AND REPLACING THE REAR WHEEL PULLEY

1. Check:

- Rear wheel pulley
- Surface plating has come off → Replace the rear wheel pulley.
Bent teeth → Replace the rear wheel pulley.

2. Replace:

- Rear wheel pulley



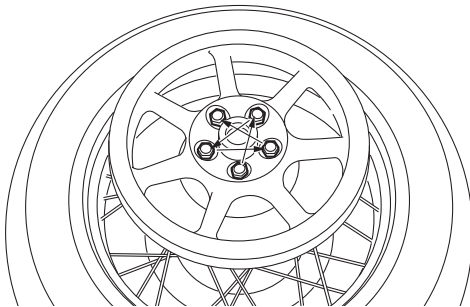
- Remove the self-locking nuts and the rear wheel pulley.
- Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the pulley.
- Install the new rear wheel pulley.



Rear wheel pulley self-locking nut
95 N·m (9.5 kgf·m, 69 lb·ft)

TIP

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



EAS30163

ASSEMBLING THE REAR WHEEL

1. Install:

- Wheel bearings **New**
- Oil seals **New**

Refer to “ASSEMBLING THE FRONT WHEEL” on page 4-12.

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 4-12.

EAS30911

INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Lubricate:

- Rear wheel axle
- Oil seal lips



Recommended lubricant
Lithium-soap-based grease

2. Install:

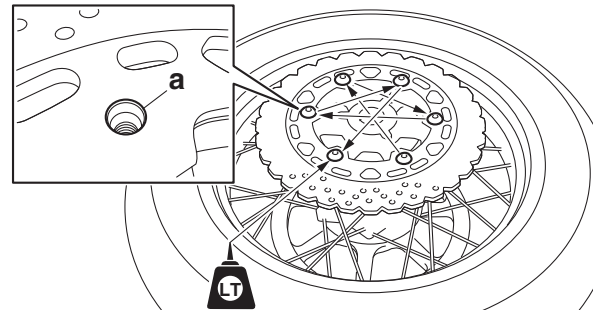
- Rear brake disc



Rear brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®

TIP

- Apply locking agent (LOCTITE®) to the threads of the brake disc bolts.
- Install the brake disc so that the chamfered portions of the bolt holes “a” face away from the hub.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



3. Check:

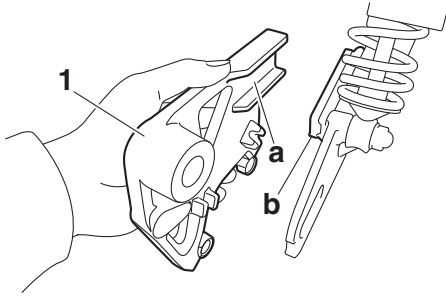
- Rear brake disc
Refer to “CHECKING THE REAR BRAKE DISC” on page 4-40.

4. Install:

- Rear brake caliper bracket “1”
- Rear wheel axle
- Washer
- Rear wheel axle nut

TIP

- Make sure that the slot “a” in the rear brake caliper bracket fits over the stopper “b” on the swingarm.
- Temporarily tighten the wheel axle nut.



5. Adjust:

- Drive belt slack

Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-17.

6. Tighten:

- Rear wheel axle nut



Rear wheel axle nut
150 N·m (15 kgf·m, 108 lb·ft)

7. Install:

- Rear brake caliper



Rear brake caliper bolt
27 N·m (2.7 kgf·m, 20 lb·ft)

EWA13500



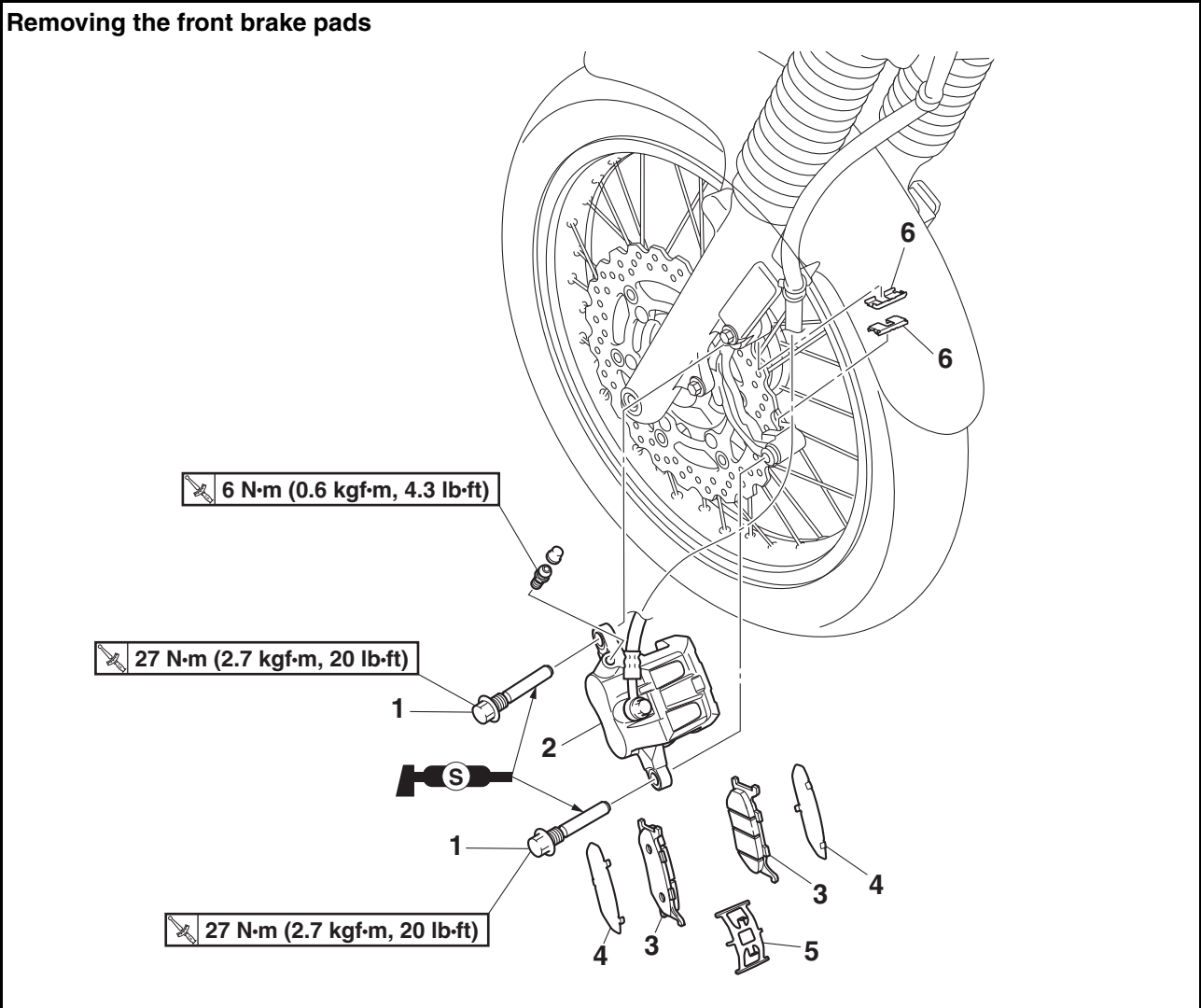
WARNING

Make sure the brake hose is routed properly.

EAS20030

FRONT BRAKE

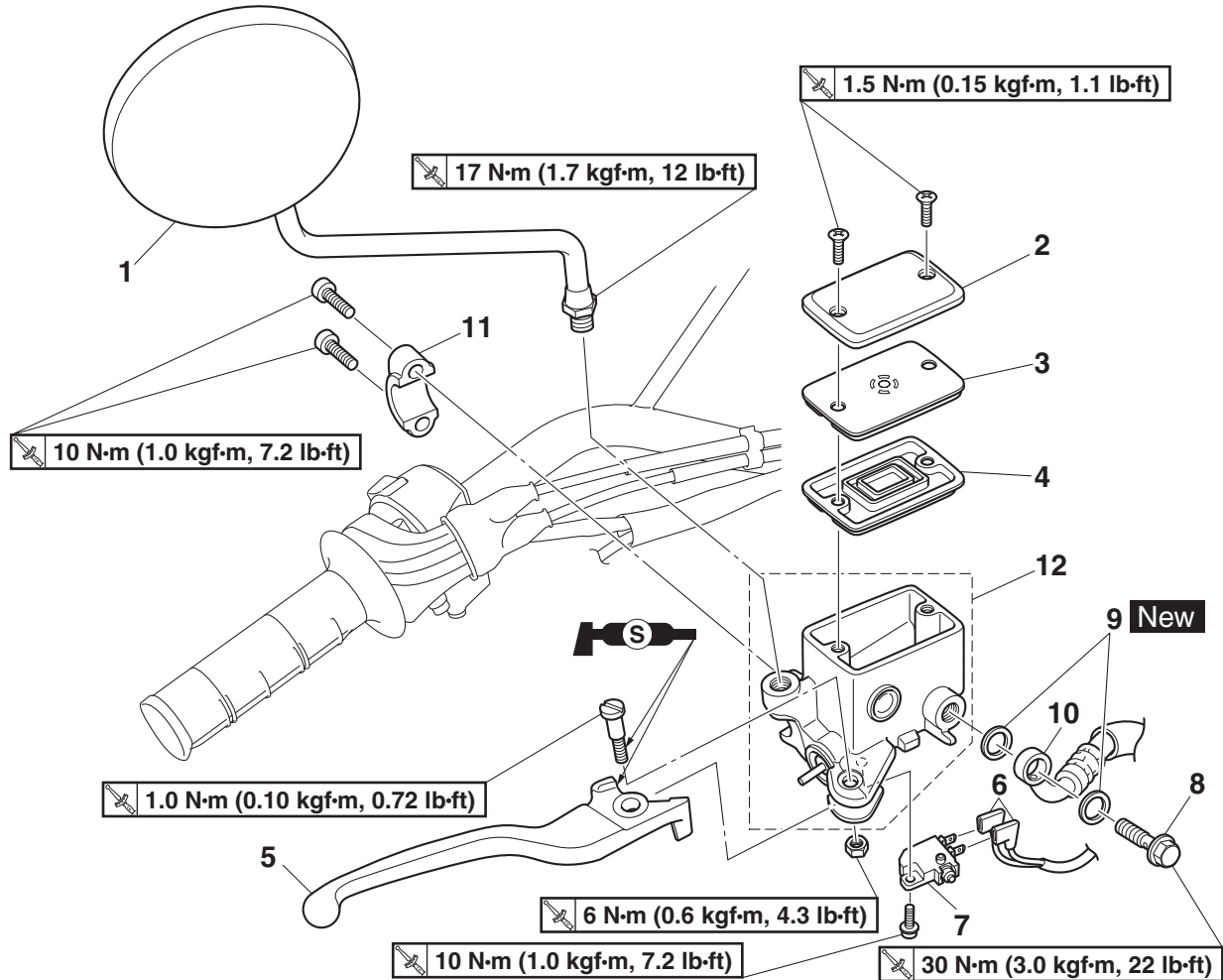
Removing the front brake pads



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper bolt	2	
2	Front brake caliper	1	
3	Front brake pad	2	
4	Brake pad shim	2	
5	Front brake pad spring	1	
6	Front brake pad support	2	

FRONT BRAKE

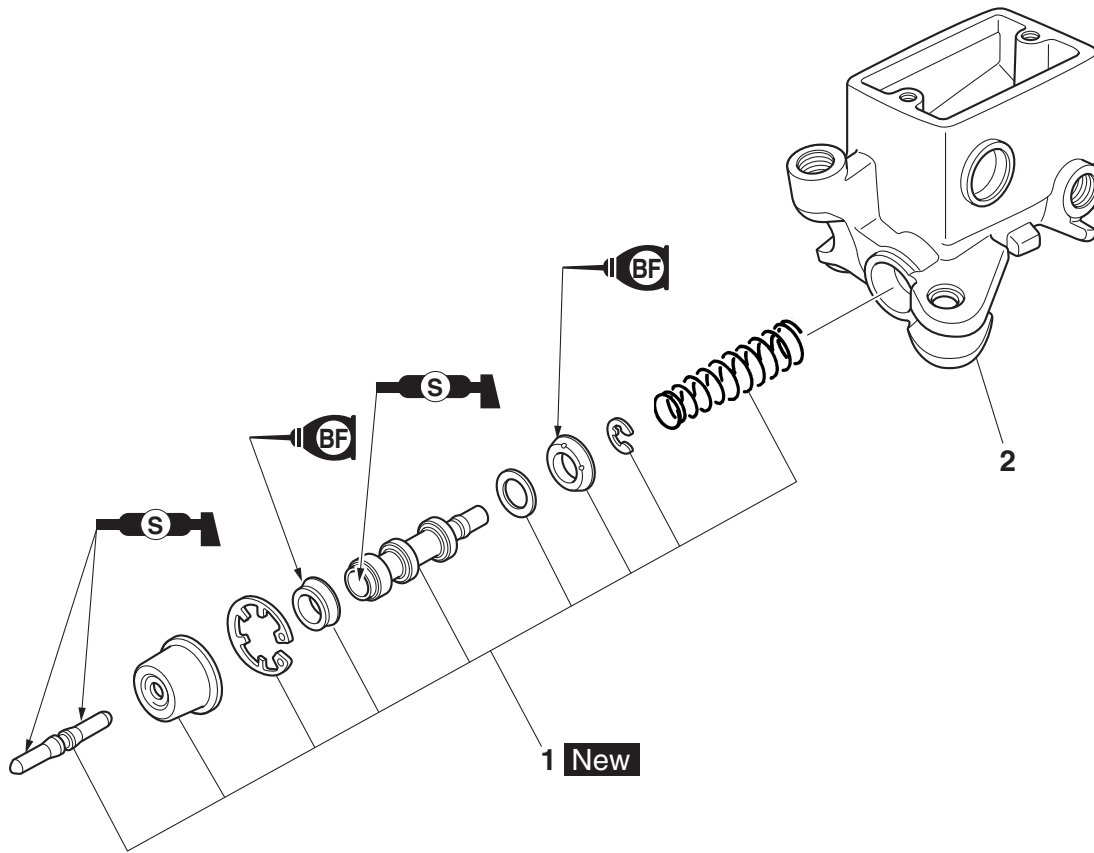
Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-13.
1	Rearview mirror (right)	1	
2	Brake master cylinder reservoir cap	1	
3	Brake master cylinder reservoir diaphragm hold- er	1	
4	Brake master cylinder reservoir diaphragm	1	
5	Brake lever	1	
6	Front brake light switch connector	2	Disconnect.
7	Front brake light switch	1	
8	Front brake hose union bolt	1	
9	Brake hose gasket	2	
10	Front brake hose	1	
11	Front brake master cylinder holder	1	
12	Front brake master cylinder	1	

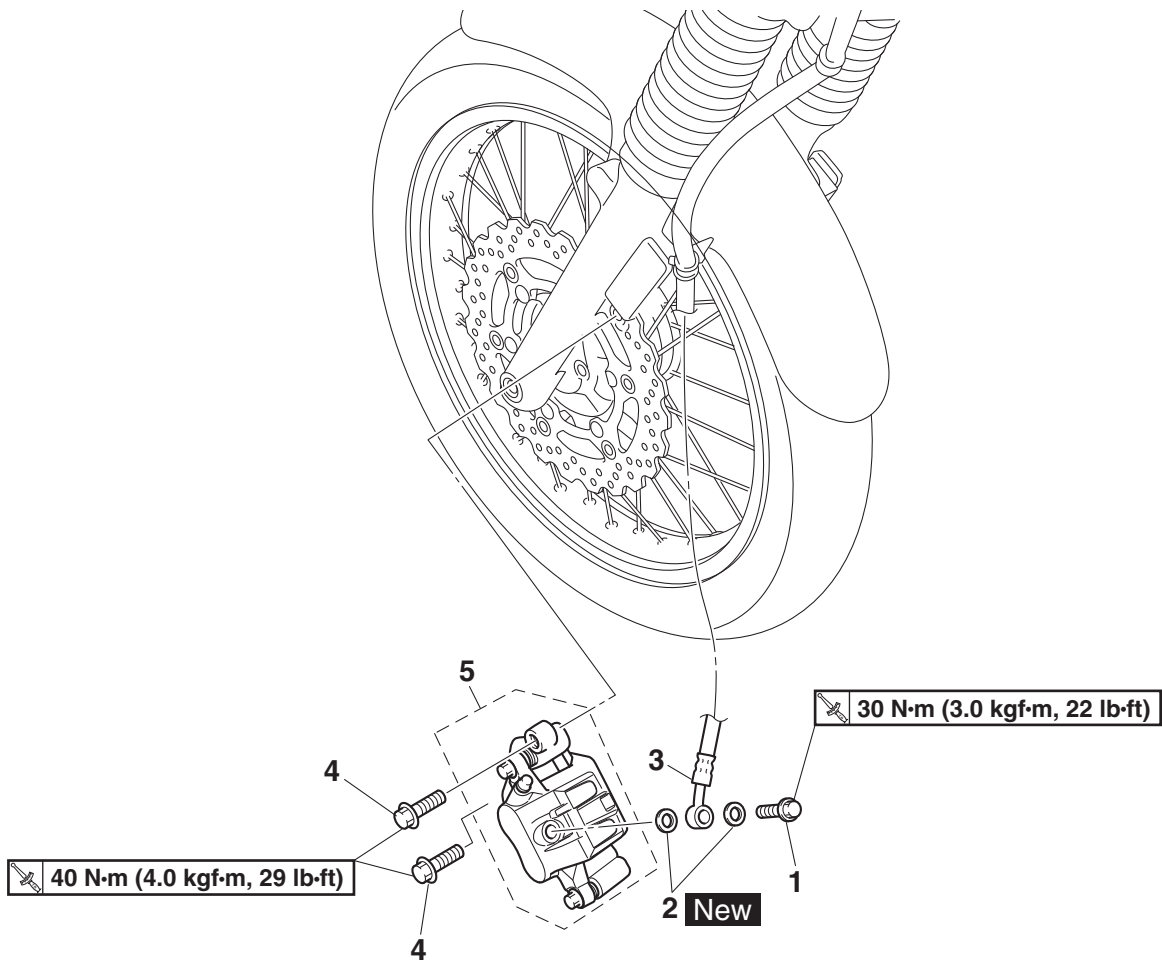
FRONT BRAKE

Disassembling the front brake master cylinder



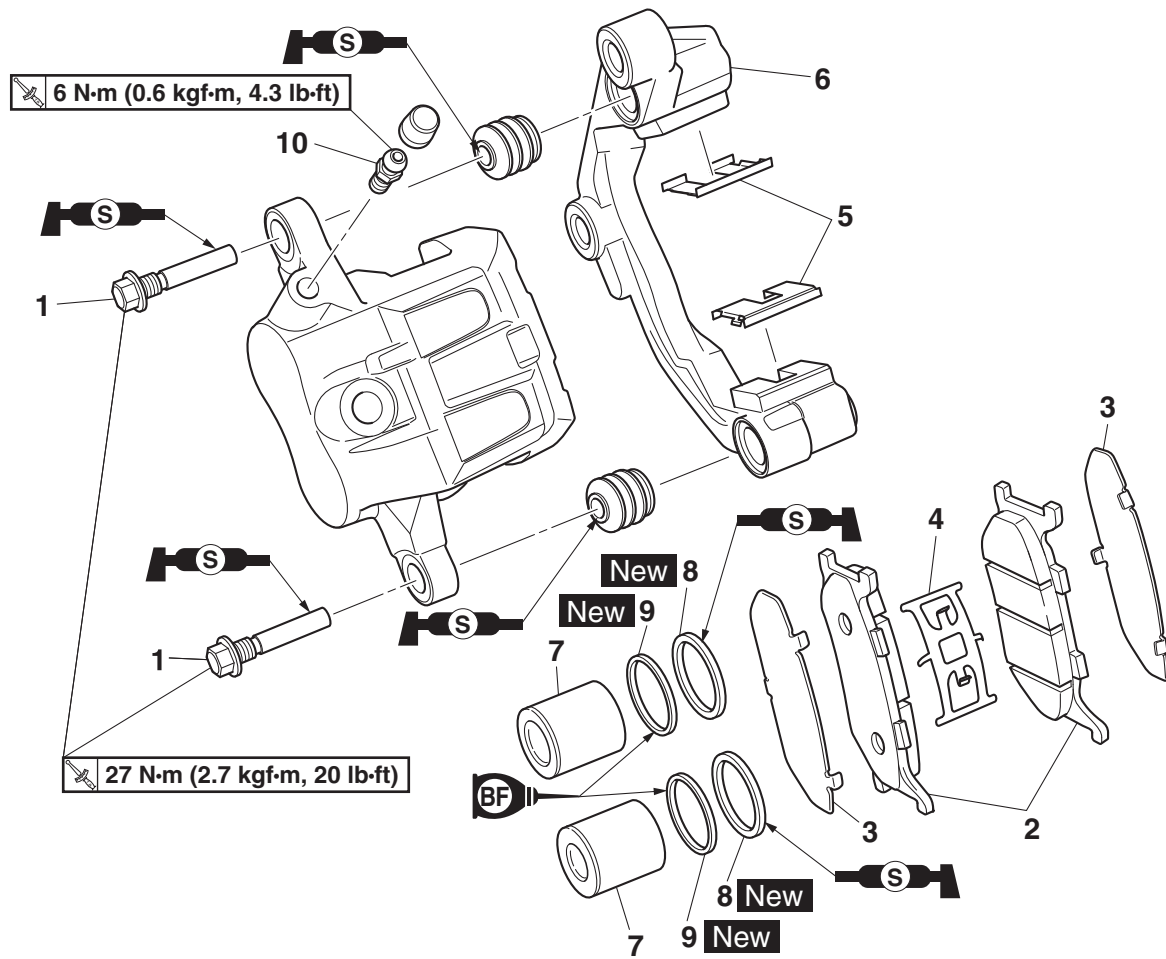
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	

Removing the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-13.
1	Front brake hose union bolt	1	
2	Brake hose gasket	2	
3	Front brake hose	1	
4	Front brake caliper bracket bolt	2	
5	Front brake caliper	1	

Disassembling the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper bolt	2	
2	Brake pad	2	
3	Brake pad shim	2	
4	Brake pad spring	1	
5	Brake pad support	2	
6	Brake caliper bracket	1	
7	Brake caliper piston	2	
8	Brake caliper piston dust seal	2	
9	Brake caliper piston seal	2	
10	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.

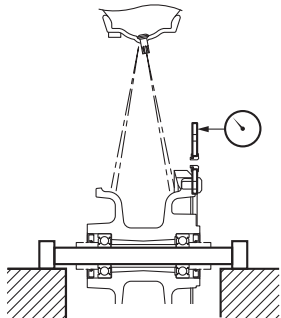
FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

- Flush with water for 15 minutes and get immediate medical attention.

EAS30169

CHECKING THE FRONT BRAKE DISC

1. Remove:
 - Front wheel
Refer to "FRONT WHEEL" on page 4-9.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.



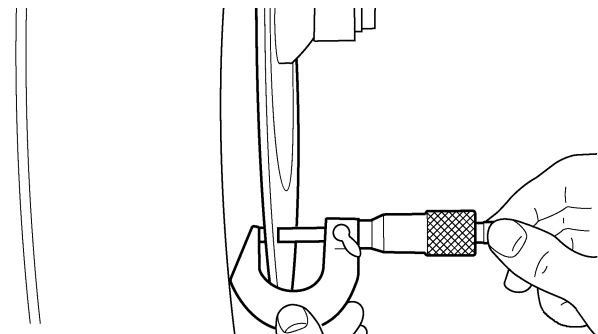
Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.
- e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.

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



Brake disc thickness limit
4.5 mm (0.18 in)



5. Adjust:
 - Brake disc deflection

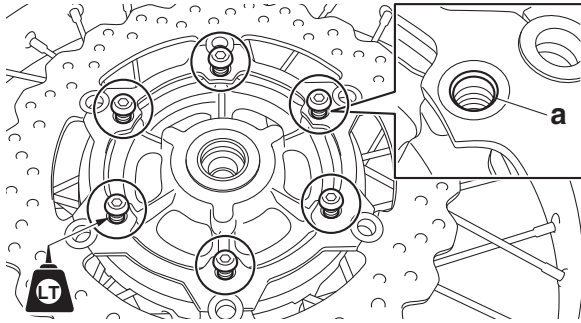
- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.



Front brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®

TIP

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



- 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.



6. Install:
 - Front wheel
 Refer to "FRONT WHEEL" on page 4-9.


EAS30170

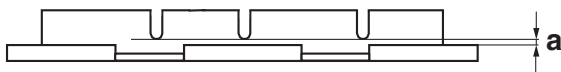
REPLACING THE FRONT BRAKE PADS

TIP

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

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

	Brake pad lining thickness
	6.0 mm (0.24 in)
	Limit
	0.8 mm (0.03 in)



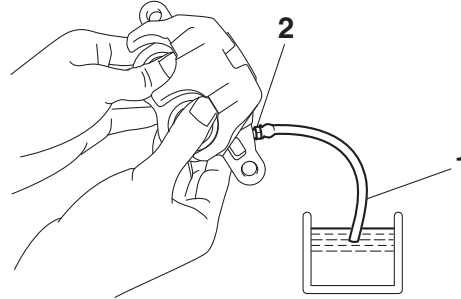
2. Install:
 - Brake pad supports
 - Brake pad spring
 - Brake pad shims (onto the brake pads)
 - Brake pads

TIP


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



- 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 to specification.

	Front brake caliper bleed screw 6 N·m (0.6 kgf·m, 4.3 lb·ft)
--	---

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



3. Lubricate:
 - Front brake caliper bolts


	Recommended lubricant Silicone grease
---	--

ECA14150

NOTICE

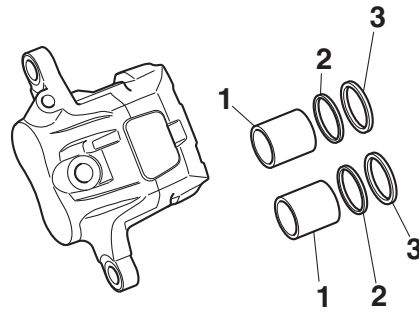
- Do not allow grease to contact the brake pads.
- Remove any excess grease.

4. Install:
 - Brake caliper bolts

	Front brake caliper bolt 27 N·m (2.7 kgf·m, 20 lb·ft)
---	--

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 3-12.

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

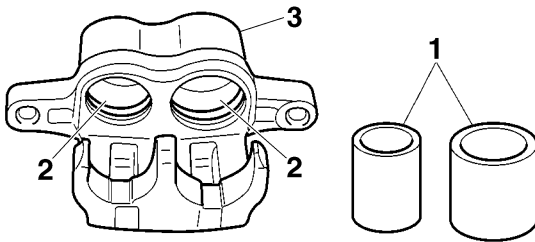


- Brake caliper cylinders “2”
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body “3”
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.

EWA13611

WARNING

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



2. Check:

- Brake caliper bracket
Cracks/damage → Replace.

EAS30174

ASSEMBLING THE FRONT BRAKE CALIPER

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**

EAS30934

INSTALLING THE FRONT BRAKE CALIPER

1. Install:

- Front brake caliper “1”
(temporarily)
- Brake hose gaskets **New**
- Front brake hose “2”
- Front brake hose union bolt “3”



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

EWA13531

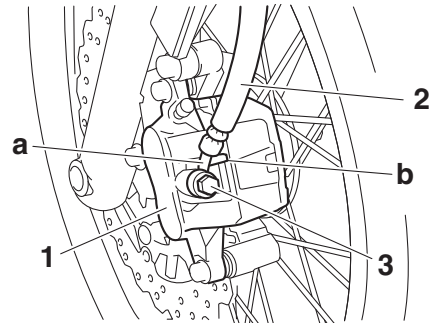
WARNING

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

ECA14170

NOTICE

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



2. Remove:

- Front brake caliper

3. Install:

- Brake pad supports
- Brake pad spring
- Brake pad shims
(onto the brake pads)
- Brake pads
- Front brake caliper



**Front brake caliper bolt
27 N·m (2.7 kgf·m, 20 lb·ft)
Front brake caliper bracket bolt
40 N·m (4.0 kgf·m, 29 lb·ft)**

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-28.

4. Fill:

- Brake master cylinder reservoir
(with the specified amount of the specified brake fluid)



**Specified brake fluid
DOT 4**

EWA13540

WARNING

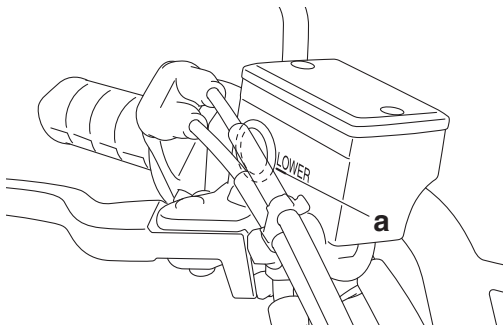
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake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

5. Bleed:
 - Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.
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 3-12.



7. Check:
 - Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

EAS30179

REMOVING THE FRONT BRAKE MASTER CYLINDER

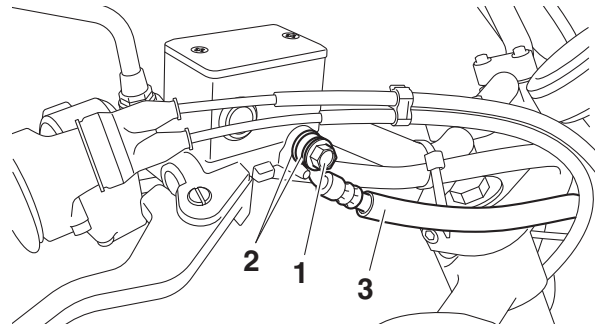
TIP

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

1. Remove:
 - Front brake hose union bolt “1”
 - Brake hose gaskets “2”
 - Front 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
Cracks/damage → Replace.
 - Brake master cylinder reservoir diaphragm
Damage/wear → Replace.
4. Check:
 - Brake hose
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:

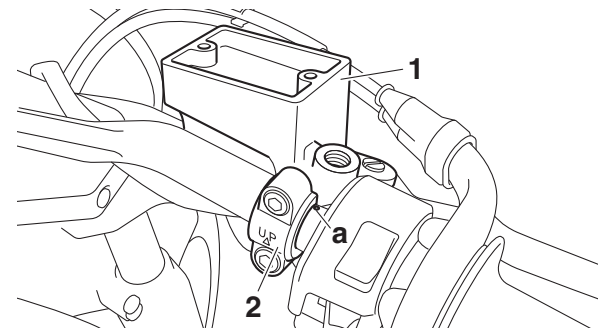
- Brake master cylinder "1"
- Front brake master cylinder holder "2"



**Front brake master cylinder holder bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)**

TIP

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark "a" on the handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:

- Brake hose gaskets **New**
- Front brake hose "1"
- Front brake hose union bolt "2"



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

EWA13531

WARNING

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

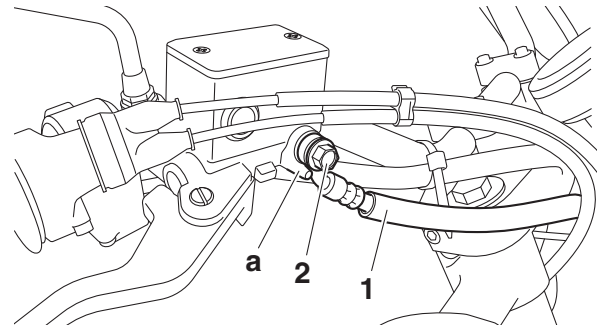
ECA14160

NOTICE

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

TIP

- While holding the brake hose, tighten the union bolt.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, and 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

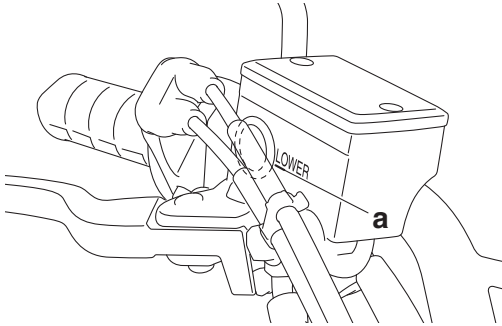
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

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 3-12.



6. Check:

- Brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

EAS20031

REAR BRAKE

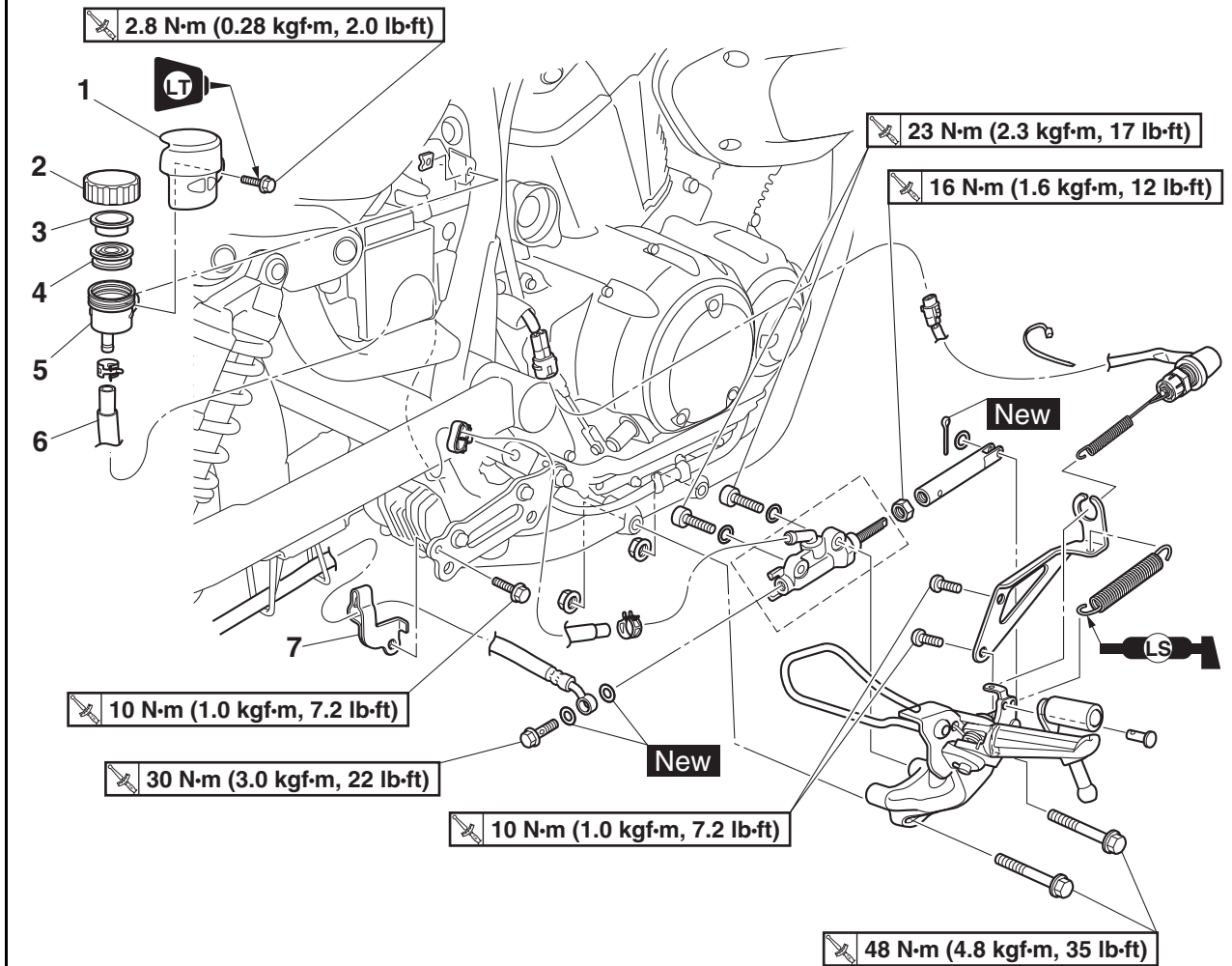
Removing the rear brake pads

6 N·m (0.6 kgf·m, 4.3 lb·ft)

27 N·m (2.7 kgf·m, 20 lb·ft)

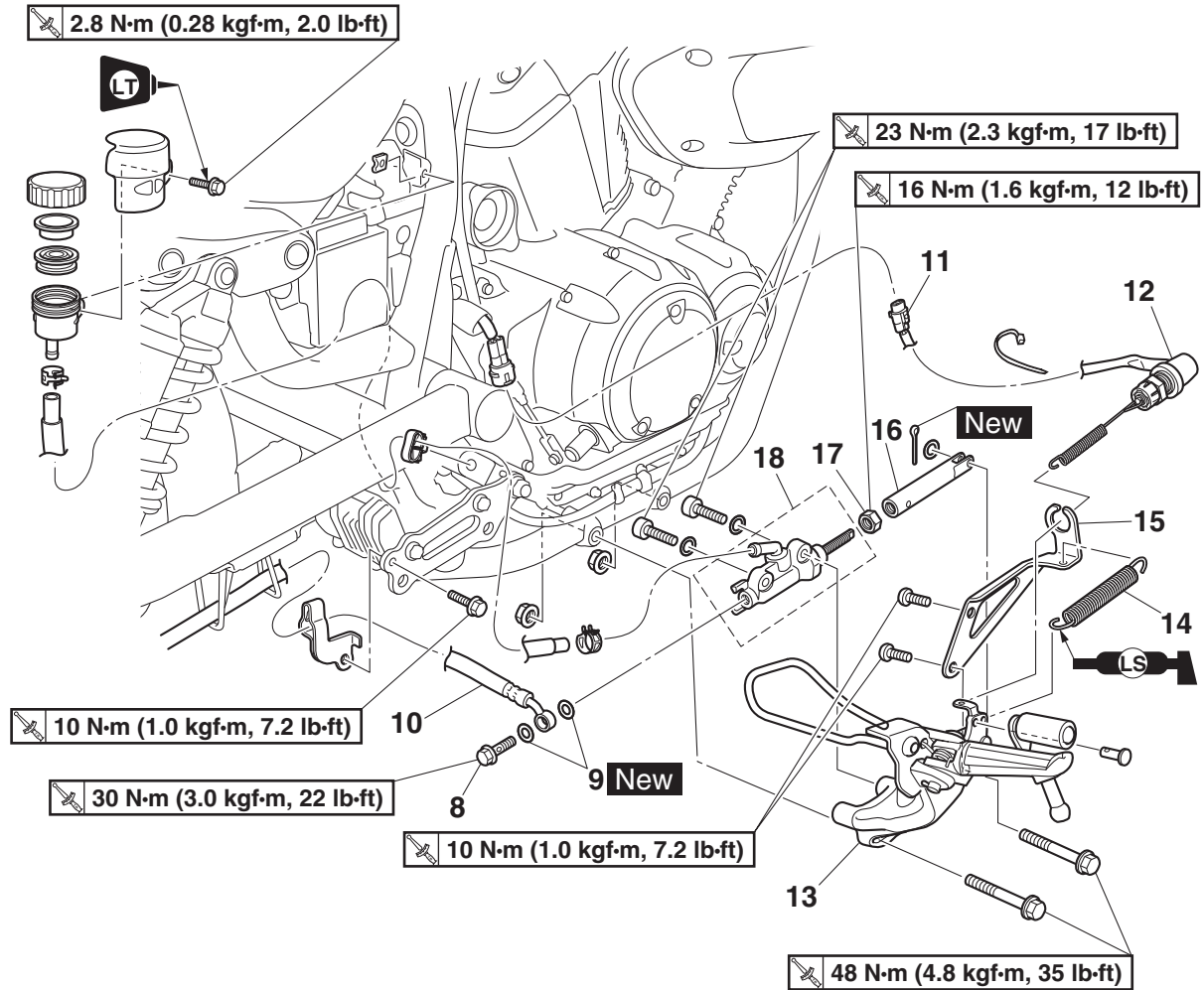
Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper bolt	2	
2	Rear brake caliper	1	
3	Rear brake pad	2	
4	Rear brake pad shim	2	
5	Rear brake pad spring	2	

Removing the rear brake master cylinder



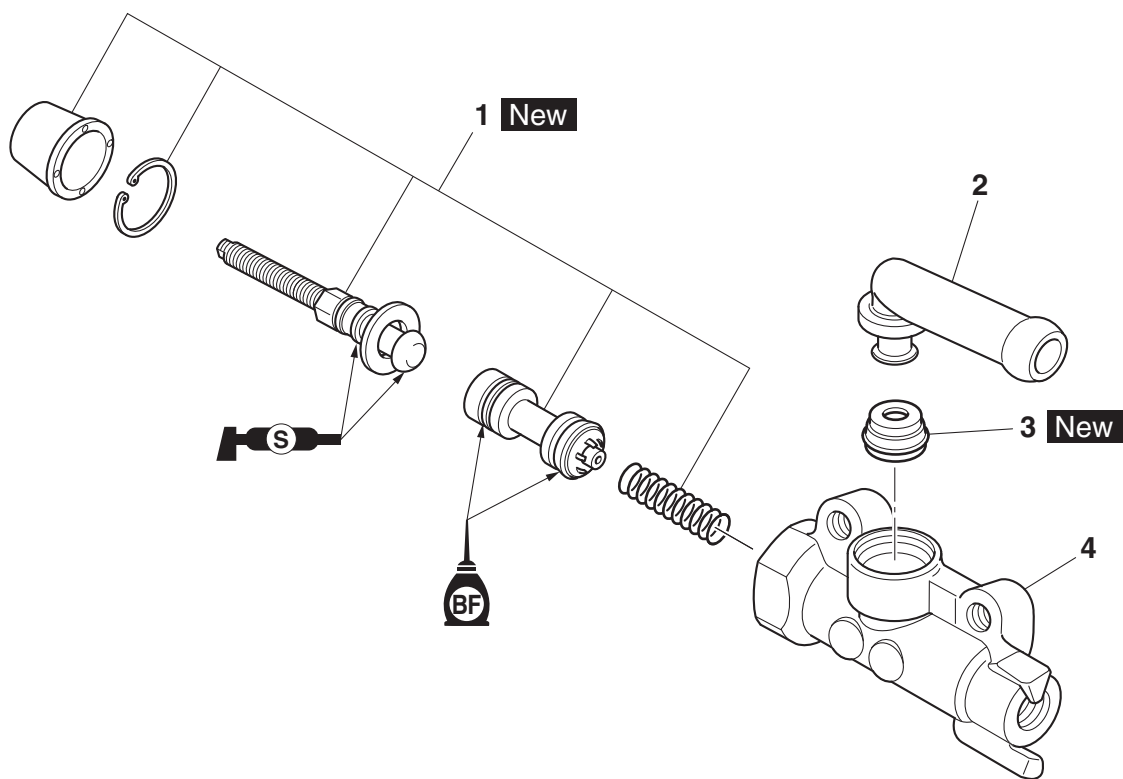
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-13.
	Battery cover holder		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Muffler bracket		Refer to "ENGINE REMOVAL" on page 5-2.
1	Brake fluid reservoir cover	1	
2	Brake fluid reservoir 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 holder	1	

Removing the rear brake master cylinder



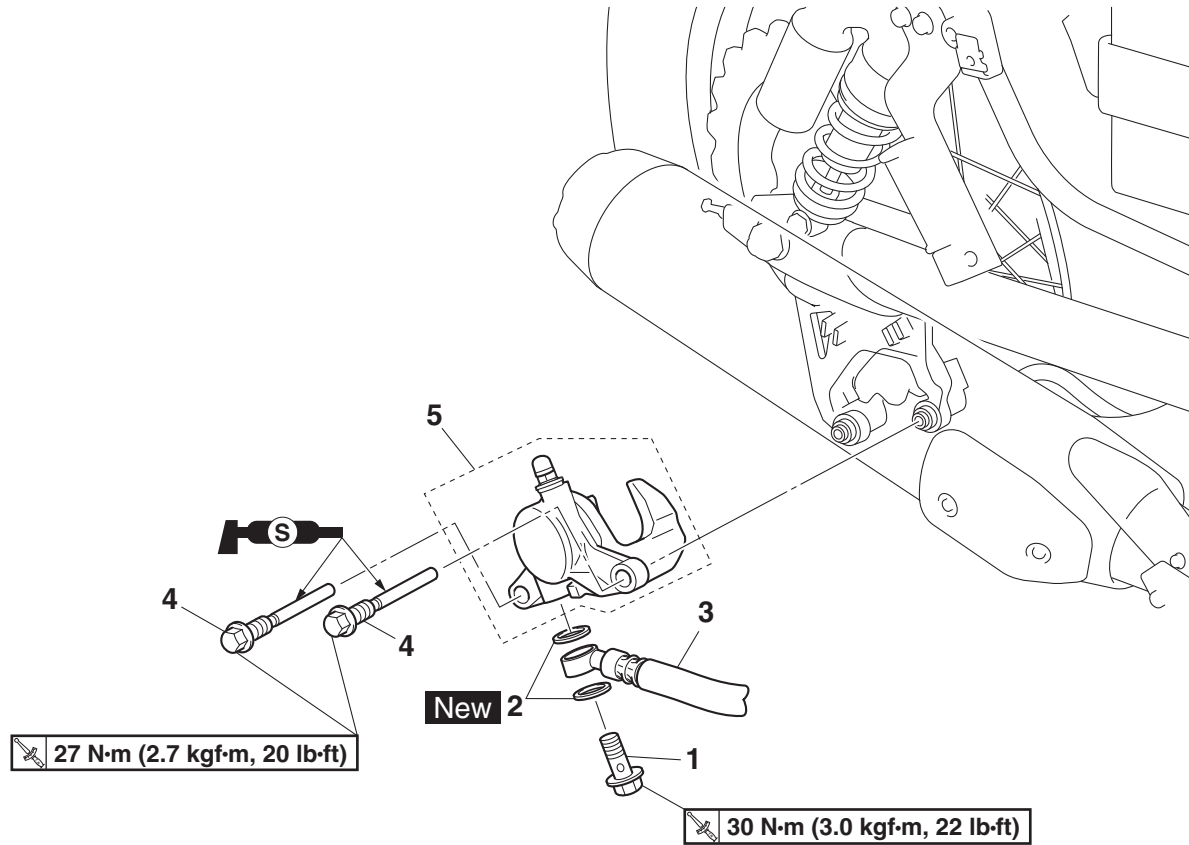
Order	Job/Parts to remove	Q'ty	Remarks
8	Rear brake hose union bolt	1	
9	Brake hose gasket	2	
10	Rear brake hose	1	
11	Rear brake light switch coupler	1	Disconnect.
12	Rear brake light switch	1	
13	Footrest assembly (right)	1	
14	Brake pedal spring	1	
15	Rear brake light switch bracket	1	
16	Brake rod	1	
17	Rear brake pedal adjusting locknut	1	
18	Rear brake master cylinder	1	

Disassembling the rear brake master cylinder



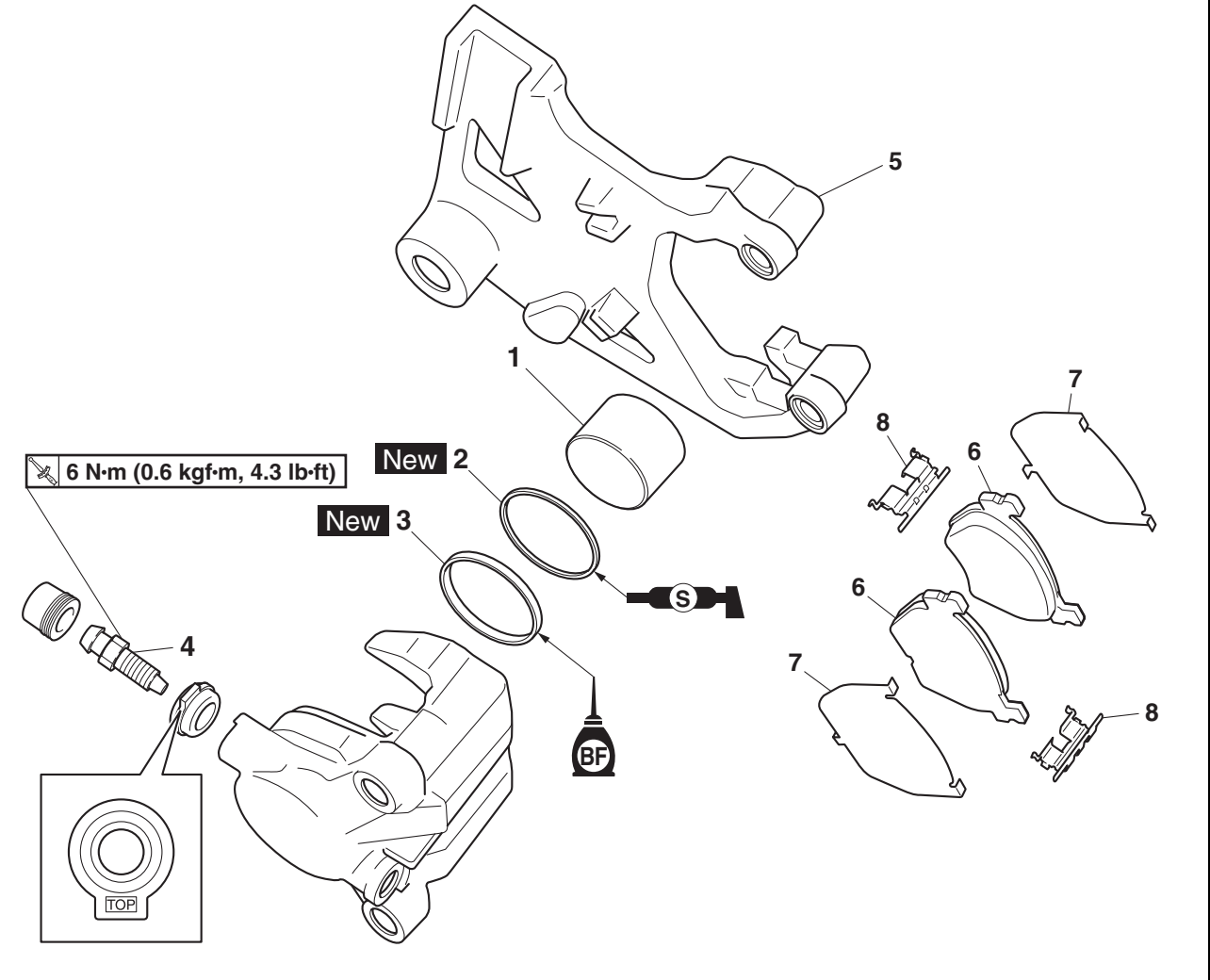
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake hose joint	1	
3	Bushing	1	
4	Brake master cylinder body	1	

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 3-13.
1	Rear brake hose union bolt	1	
2	Brake hose gasket	2	
3	Rear brake hose	1	
4	Rear brake caliper bolt	2	
5	Rear brake caliper	1	

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake caliper piston	1	
2	Brake caliper piston dust seal	1	
3	Brake caliper piston seal	1	
4	Bleed screw	1	
5	Brake caliper bracket	1	
6	Brake pad	2	
7	Brake pad shim	2	
8	Brake pad spring	2	

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 4-15.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc deflection
Out of specification → Correct the brake disc deflection or replace the brake disc.
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-27.



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 DISC" on page 4-27.



Brake disc thickness limit
5.5 mm (0.22 in)

5. Adjust:
 - Brake disc deflection
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-27.



Rear brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®

6. Install:
 - Rear wheel
Refer to "REAR WHEEL" on page 4-15.

EAS30185

REPLACING THE REAR BRAKE PADS

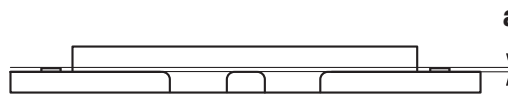
TIP

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
5.8 mm (0.23 in)
Limit
0.8 mm (0.03 in)

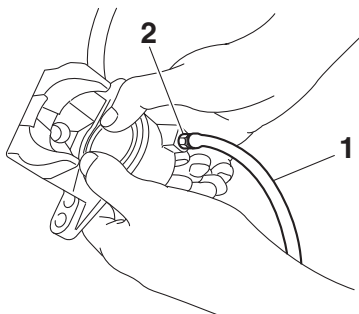


2. Remove:
 - Rear brake caliper bolts
3. Install:
 - Brake pads
 - Brake pad shims (onto the brake pads)
 - Brake pad springs

TIP

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

- 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 fingers.



- c. Tighten the bleed screw to specification.

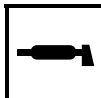


Rear brake caliper bleed screw
6 N·m (0.6 kgf·m, 4.3 lb·ft)

- d. Install new brake pad springs, brake pad shims, and brake pads.

4. Lubricate:

- Rear brake caliper bolt



Recommended lubricant
Silicone grease

ECA14150

NOTICE

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

5. Install:

- Rear brake caliper

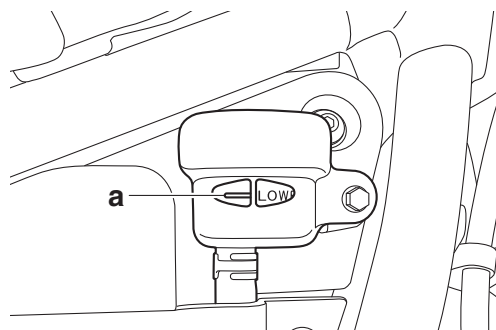


Rear brake caliper bolt
27 N·m (2.7 kgf·m, 20 lb·ft)

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 3-12.



7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

EAS30186

REMOVING THE REAR BRAKE CALIPER

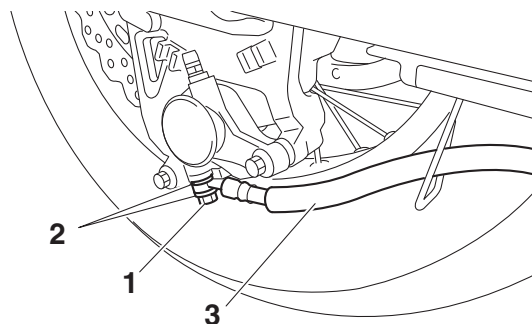
TIP Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Rear brake hose union bolt “1”
- Brake hose gaskets “2”
- Rear 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:

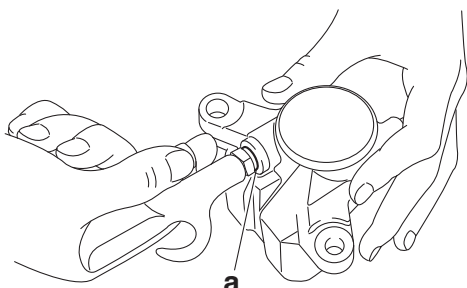
- Brake caliper piston
- Brake caliper piston dust seal
- Brake caliper piston seal

- 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.

EAS30188

CHECKING THE REAR BRAKE CALIPER

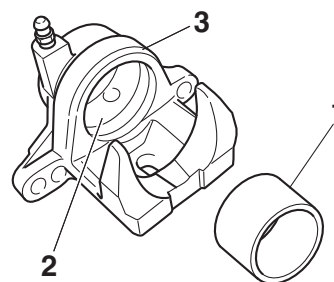
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston dust seal	Every two years
Piston seal	Every two years
Brake hose	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

- 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.

EWA13601

⚠ WARNING

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



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

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



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

EWA13531

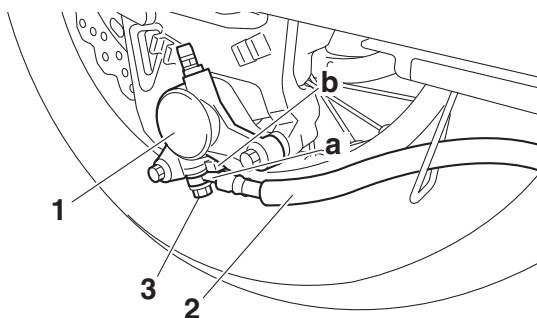
⚠ WARNING

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

ECA14170

NOTICE

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



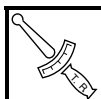
2. Remove:

- Rear brake caliper

3. Install:

- Brake pad shims (onto the brake pads)
- Brake pads
- Brake pad springs
- Rear brake caliper

Refer to “REPLACING THE REAR BRAKE PADS” on page 4-40.



Rear brake caliper bolt
27 N·m (2.7 kgf·m, 20 lb·ft)

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

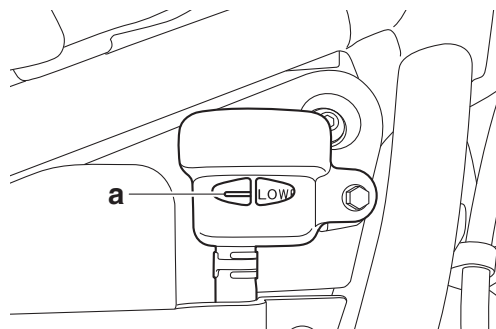
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

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 3-12.



7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

EAS30193

REMOVING THE REAR BRAKE MASTER CYLINDER

TIP

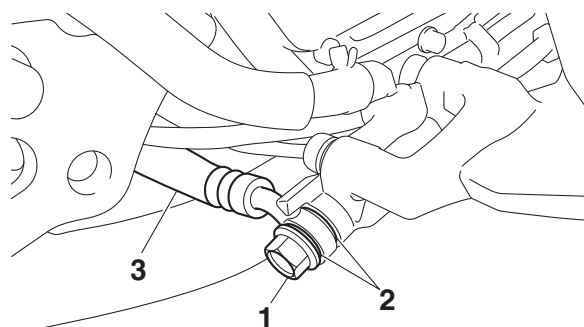
Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:

- Rear brake hose union bolt “1”
- Brake hose gaskets “2”
- Rear 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
Cracks/damage → Replace.
 - Brake fluid reservoir diaphragm
Cracks/damage → Replace.
4. Check:
 - Brake hoses
Cracks/damage/wear → 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**

EAS30196

INSTALLING THE REAR BRAKE MASTER CYLINDER

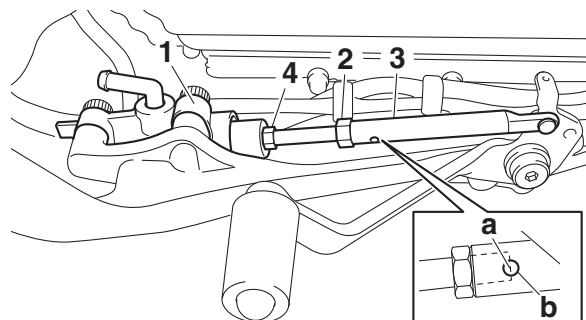
1. Install:
 - Rear brake master cylinder “1”
 - Rear brake pedal adjusting locknut “2”
 - Brake rod “3”



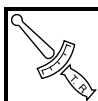
**Rear brake master cylinder bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
Rear brake pedal adjusting lock-
nut
16 N·m (1.6 kgf·m, 12 lb·ft)**

TIP

Turn the brake pedal adjusting bolt “4” in or out to position the end “a” of the bolt in the center of the hole “b” in the brake rod.



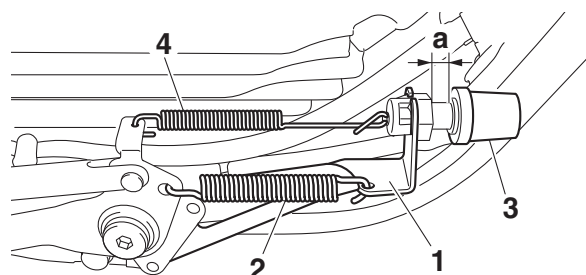
2. Install:
 - Rear brake light switch bracket “1”
 - Brake pedal spring “2”
 - Footrest assembly (right)
 - Rear brake light switch “3”



**Rear brake light switch bracket
bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)
Footrest assembly bolt (right)
48 N·m (4.8 kgf·m, 35 lb·ft)**

TIP

- Install the brake pedal spring and rear brake light switch spring “4” as shown in the illustration.
- The rear brake light switch installation length “a” should be 7.1 mm (0.28 in).



3. Install:
 - Brake hose gaskets “1” **New**
 - Rear brake hose “2”
 - Rear brake hose union bolt “3”



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

EWA13531

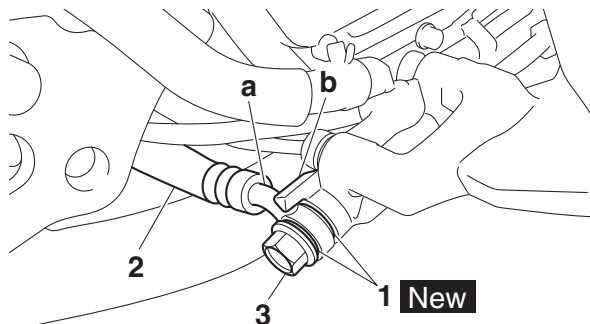
WARNING

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

ECA19780

NOTICE

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



4. Install:

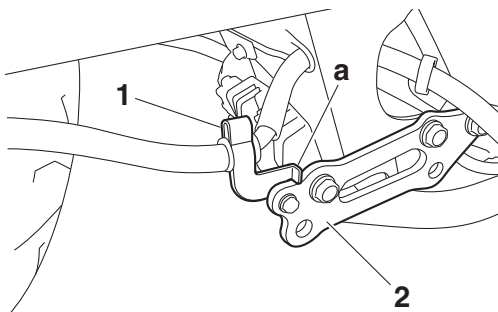
- Rear brake hose holder “1”



Rear brake hose holder bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

Make sure that the projection “a” on the rear brake hose holder contacts the engine bracket (rear lower side) “2” as shown in the illustration.



5. 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.

6. Bleed:

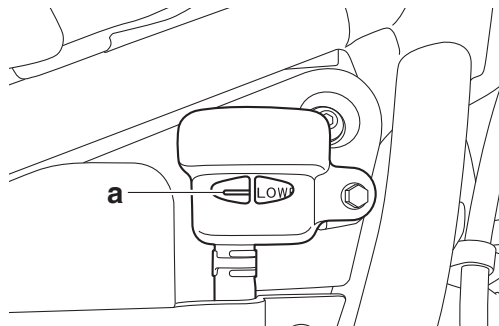
- Brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

7. 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 3-12.



8. Check:

- Brake pedal operation

Soft or spongy feeling → Bleed the brake system.

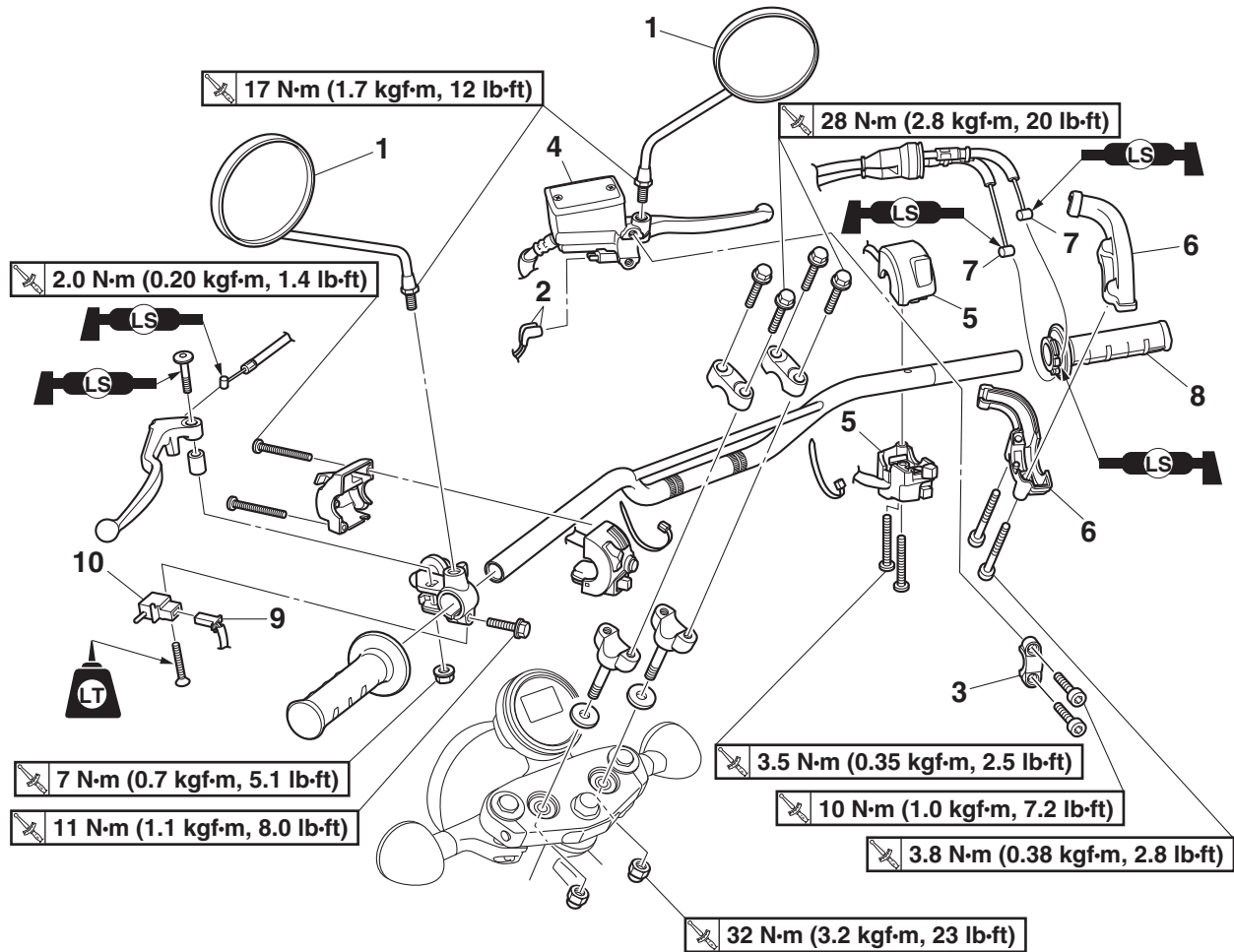
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-13.

9. Adjust:

- Rear brake light operation timing

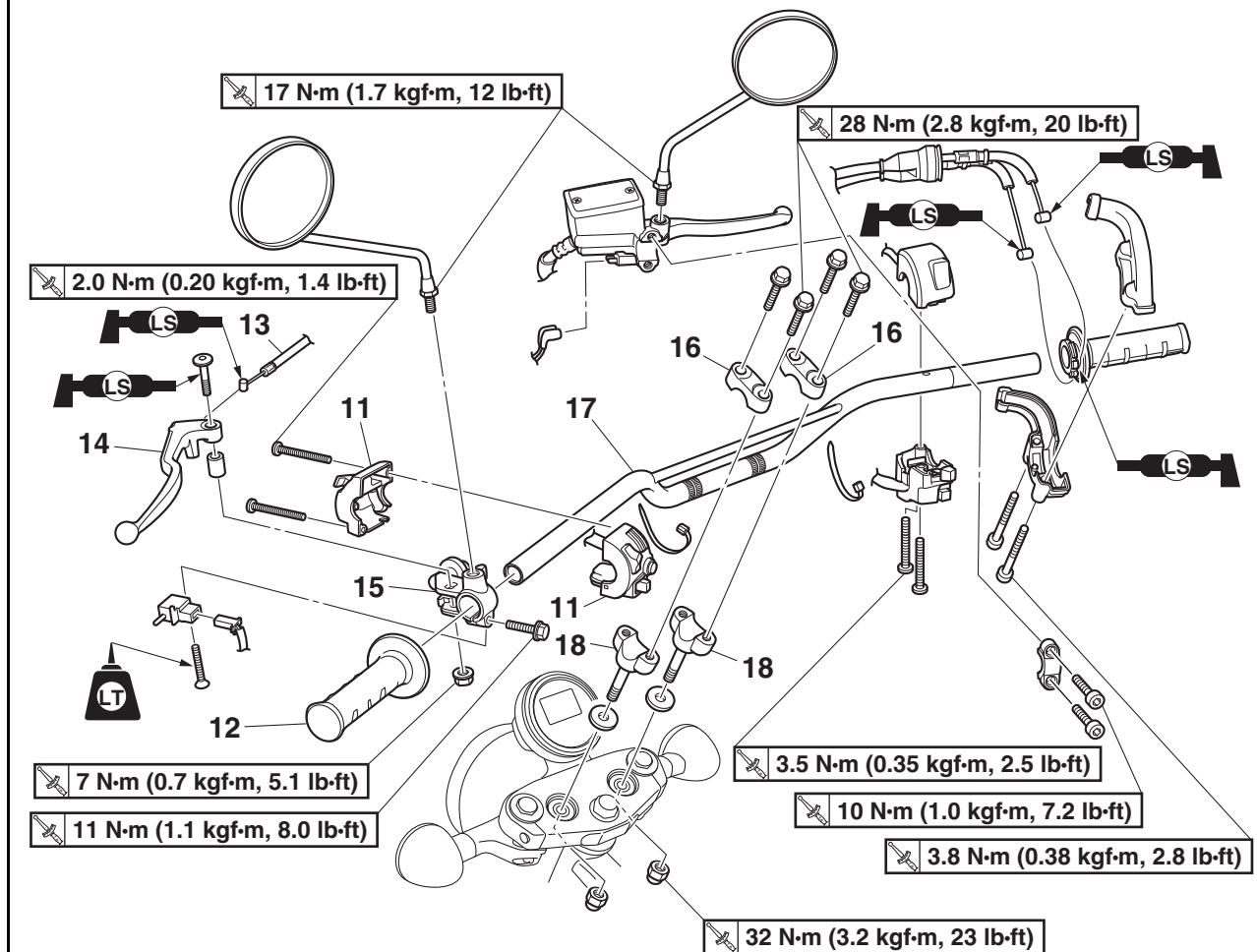
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-24.

EAS20033

HANDLEBAR**Removing the handlebar**

Order	Job/Parts to remove	Q'ty	Remarks
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	Throttle grip	1	
9	Clutch switch coupler	1	Disconnect.
10	Clutch switch	1	

Removing the handlebar



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

EAS30203

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

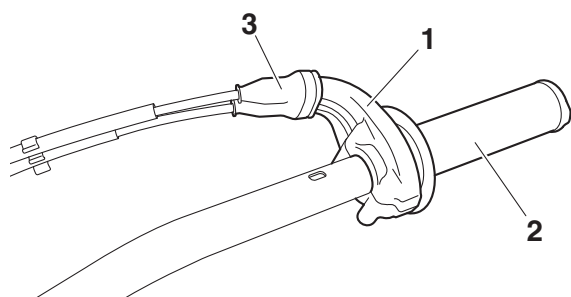
WARNING

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

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

TIP

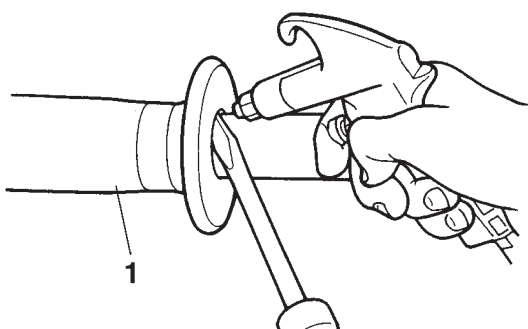
While removing the throttle cable housing, pull back the rubber cover "3".



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 holders "1"
 - Handlebar "2"
 - Upper handlebar holders "3"



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

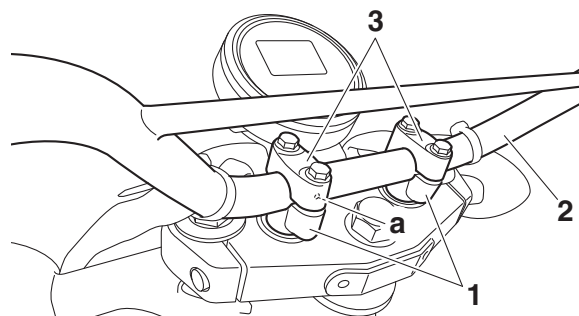
ECA18300

NOTICE

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

TIP

Align the punch mark "a" on the handlebar with the right side upper surface of the lower handlebar holder "1".



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

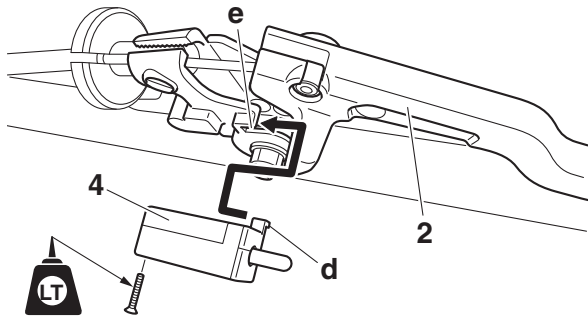
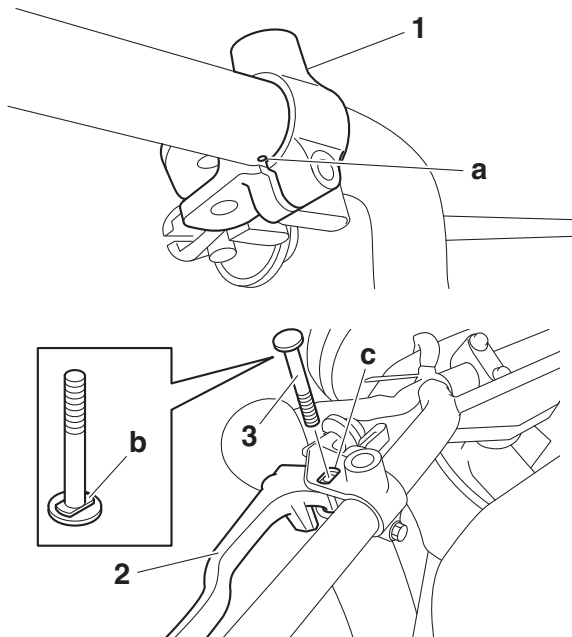


Clutch lever holder pinch bolt
11 N·m (1.1 kgf·m, 8.0 lb·ft)
Clutch lever pivot nut
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

- Lubricate the clutch lever pivot bolt with the lithium-soap-based grease.
- 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

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

EWA13700



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

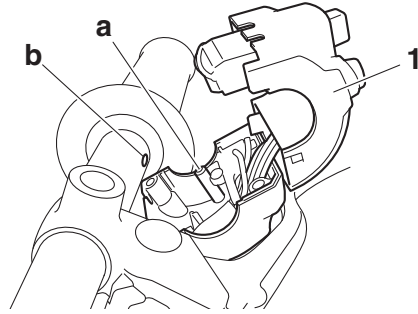
5. Install:
- Handlebar switch (left) “1”



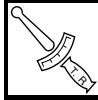
Handlebar switch screw (left)
2.0 N·m (0.20 kgf·m, 1.4 lb·ft)

TIP

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



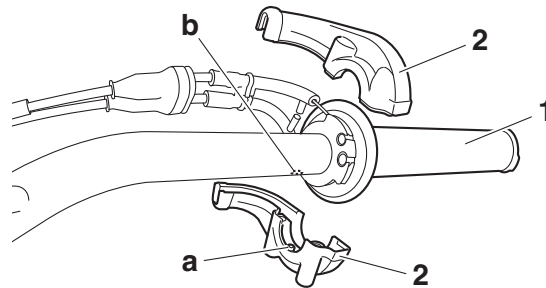
- Throttle grip “1”
- Throttle cables
- Throttle cable housings “2”



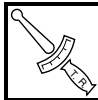
Throttle cable housing bolt
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

TIP

- Lubricate the end of the throttle cables and the inside of the throttle grip with a thin coat of lithium-soap-based grease.
- Align the projection “a” on the throttle cable housing with the hole “b” in the handlebar.



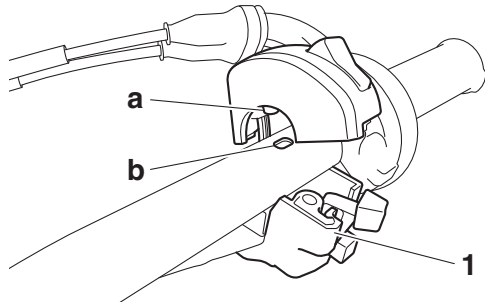
7. Install:
- Handlebar switch (right) “1”



Handlebar switch screw (right)
3.5 N·m (0.35 kgf·m, 2.5 lb·ft)

TIP

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

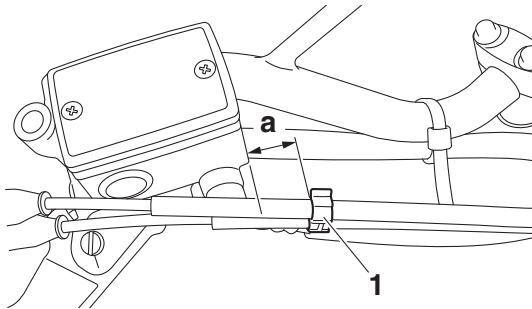


8. Install:

- Throttle cable holder “1”

TIP

Point the open ends of the throttle cable holder rearward and position the holder so that the distance “a” from the edge of the front brake master cylinder is 10–30 mm (0.39–1.18 in).



9. Install:

- Front brake master cylinder assembly
Refer to “INSTALLING THE FRONT BRAKE MASTER CYLINDER” on page 4-32.

10. Adjust:

- Throttle grip free play
Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-24.



Throttle grip free play
4.0–6.0 mm (0.16–0.24 in)

11. Adjust:

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

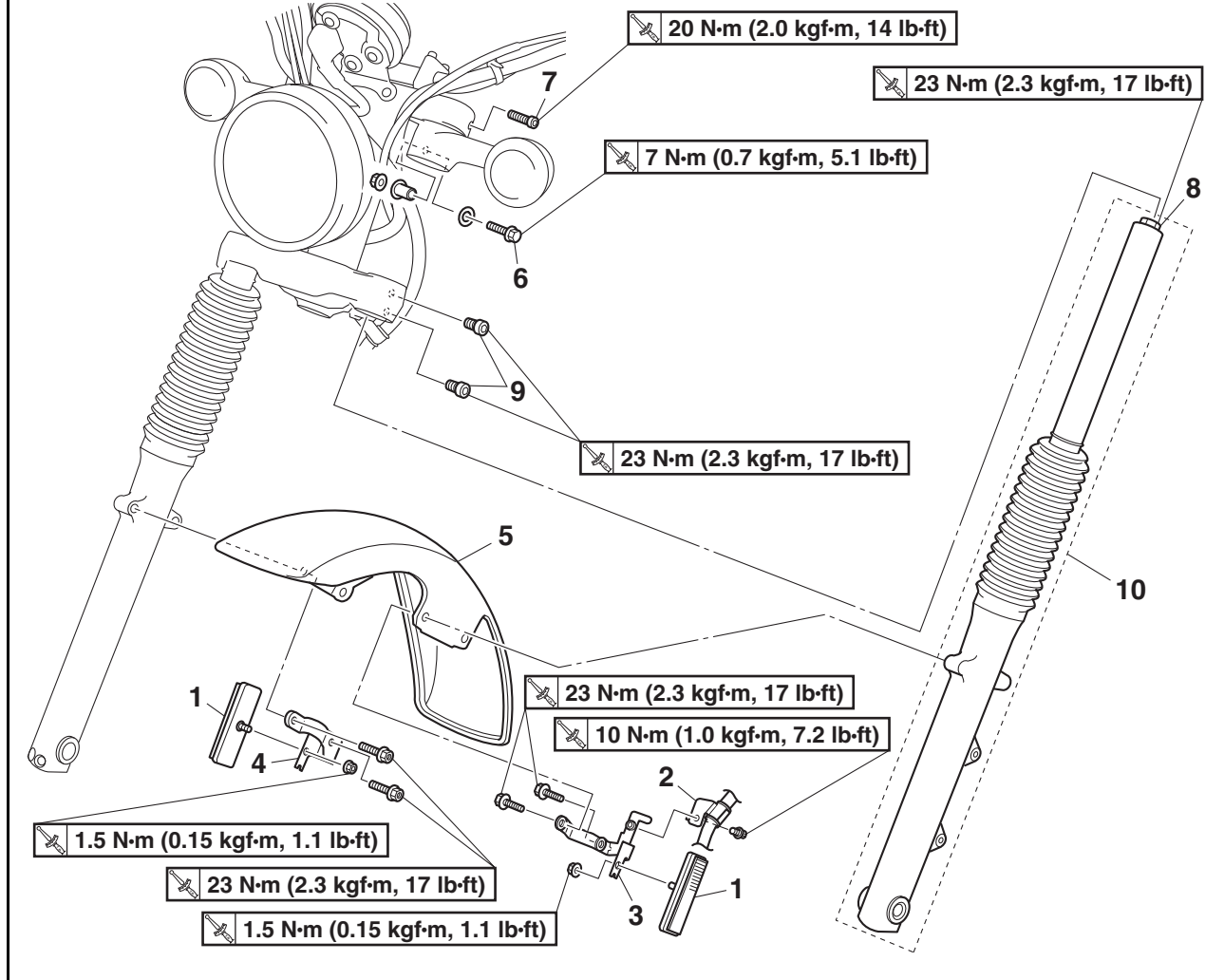


Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

EAS20034

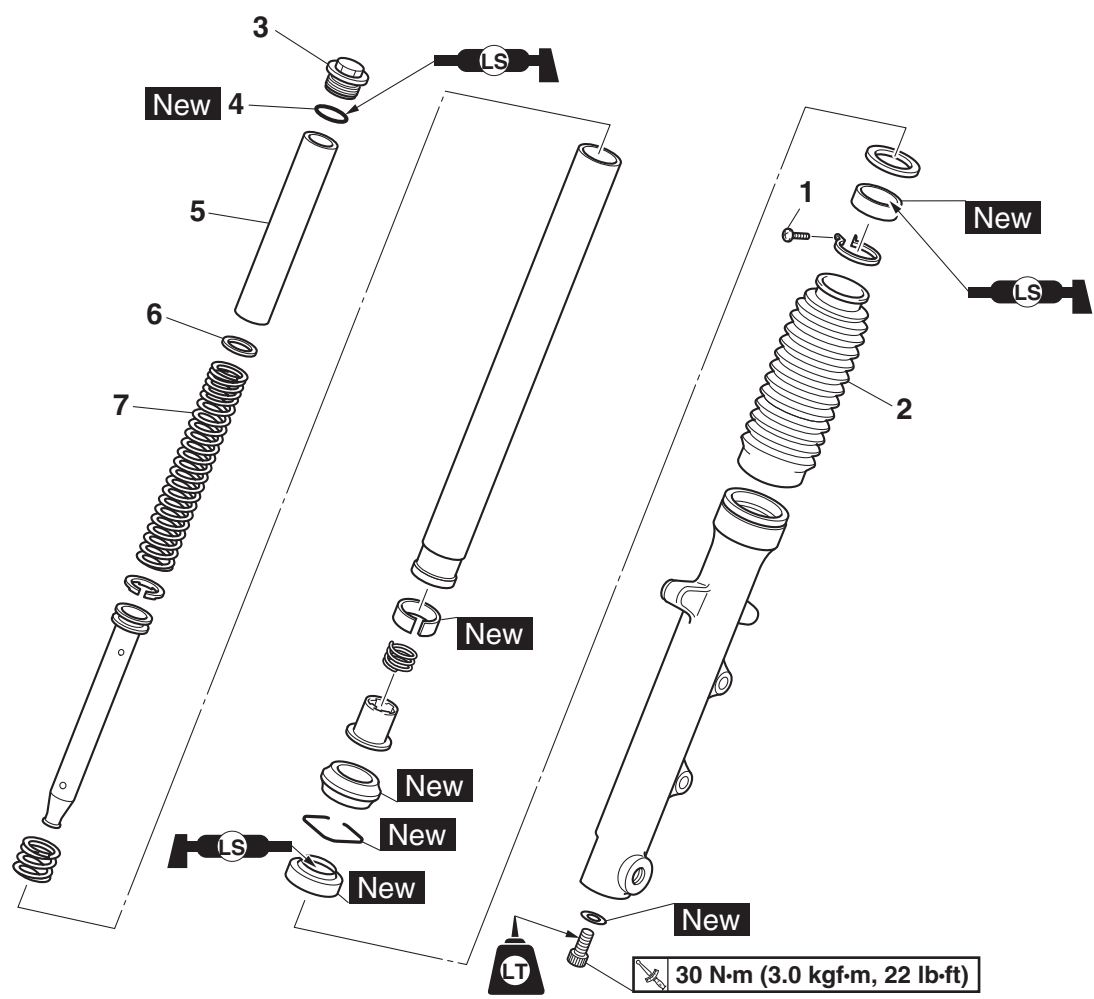
FRONT FORK

Removing the front fork legs



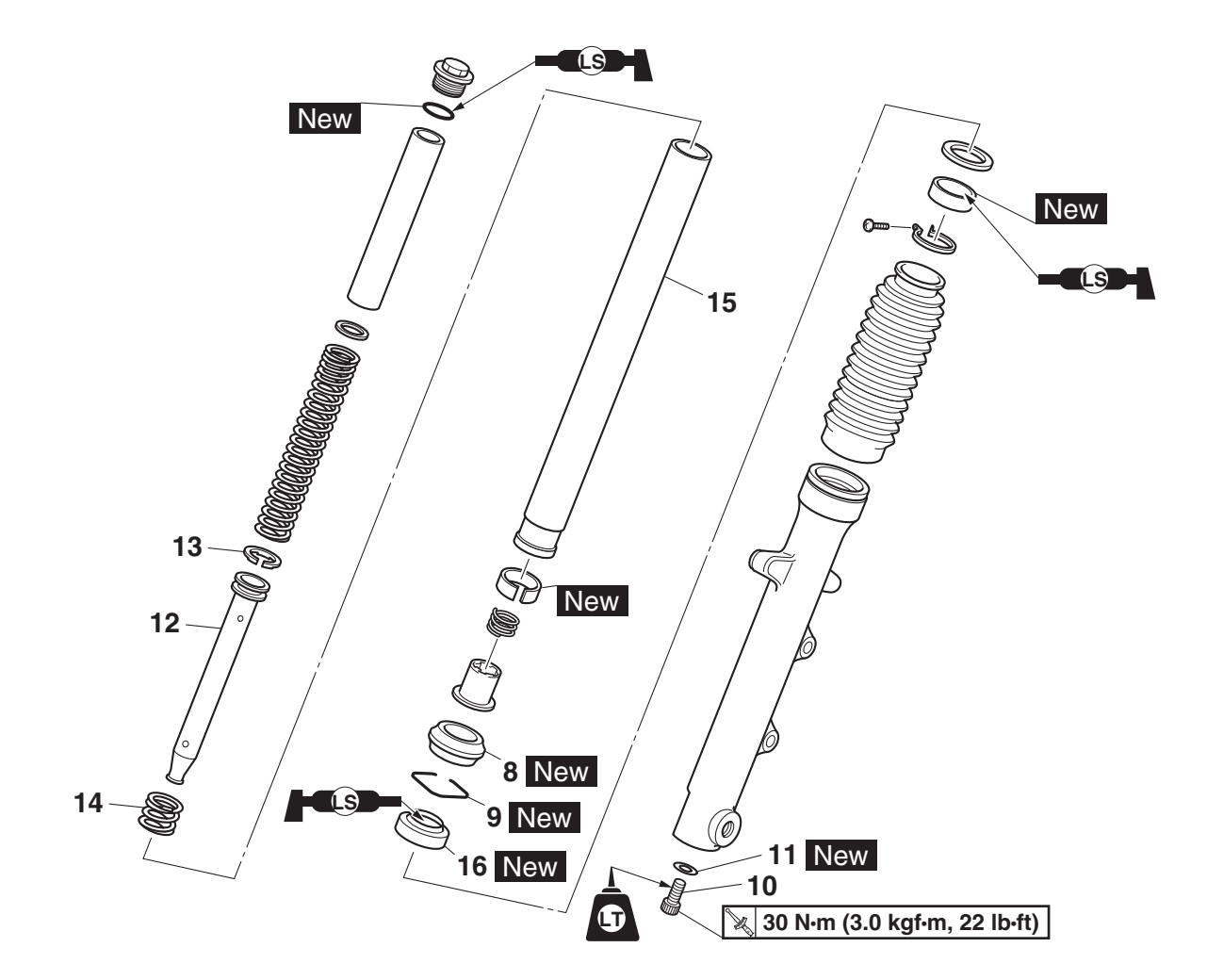
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-9.
1	Front reflector	2	
2	Front brake hose holder	1	
3	Front reflector bracket (left)	1	
4	Front reflector bracket (right)	1	
5	Front fender	1	
6	Front turn signal/position light pinch bolt	1	Loosen.
7	Upper bracket pinch bolt	1	Loosen.
8	Front fork cap bolt	1	Loosen.
9	Lower bracket pinch bolt	2	Loosen.
10	Front fork leg	1	

Disassembling the front fork legs



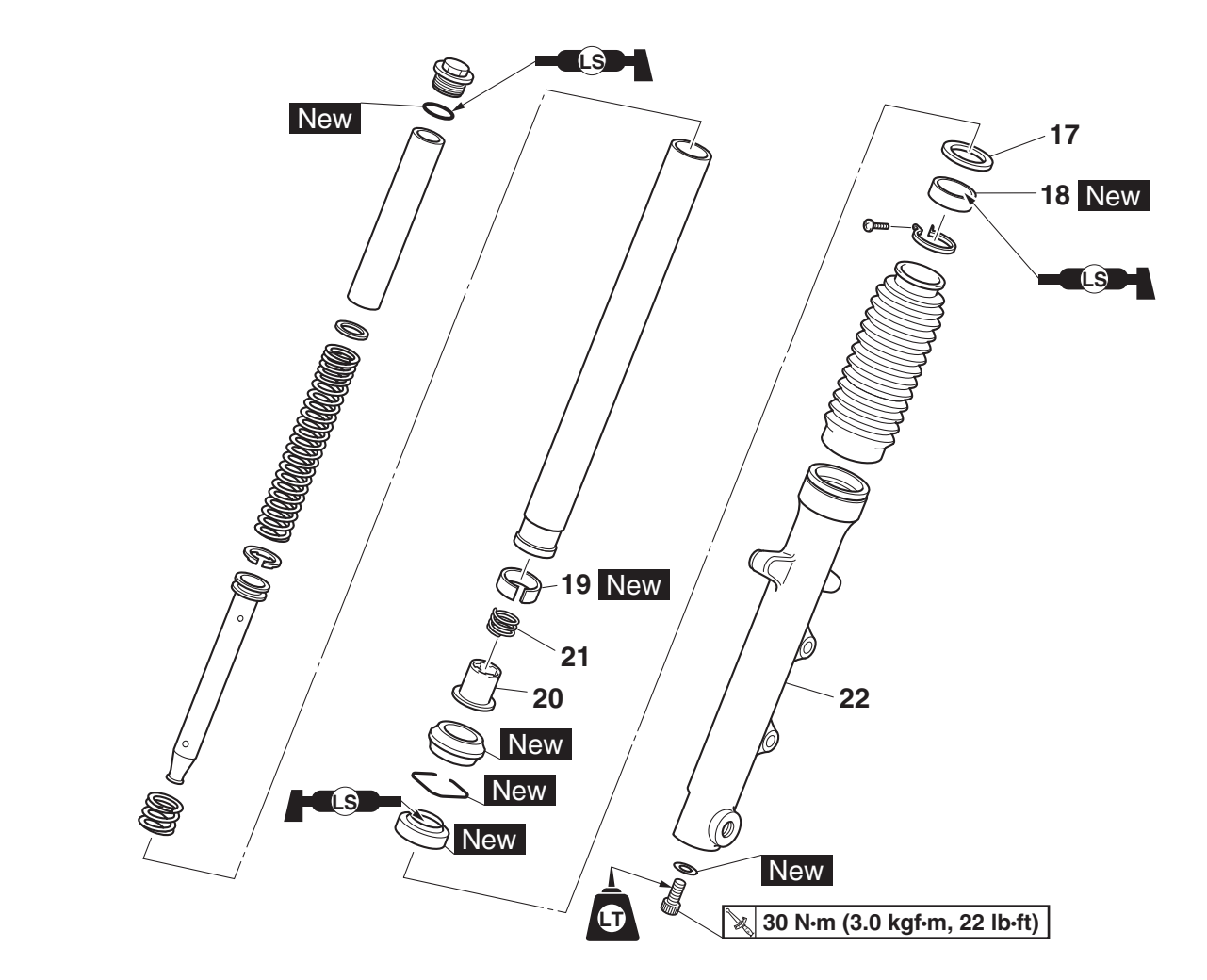
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Rubber boot clamp screw	1	Loosen.
2	Rubber boot	1	
3	Front fork cap bolt	1	
4	O-ring	1	
5	Spacer	1	
6	Spring seat	1	
7	Fork spring	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
8	Dust seal	1	
9	Oil seal clip	1	
10	Front fork damper rod bolt	1	
11	Copper washer	1	
12	Damper rod	1	
13	Damper rod ring	1	
14	Rebound spring	1	
15	Inner tube	1	
16	Oil seal	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
17	Washer	1	
18	Outer tube bushing	1	
19	Inner tube bushing	1	
20	Oil flow stopper	1	
21	Oil flow stopper spring	1	
22	Outer tube	1	

EAS30206

REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

TIP

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

2. Loosen:
 - Upper bracket pinch bolt
 - Handlebar pinch bolt

3. Remove:
 - Handlebar bolt

4. Loosen:
 - Front fork cap bolt
 - Lower bracket pinch bolts

EWA18000

WARNING

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

EAS30207

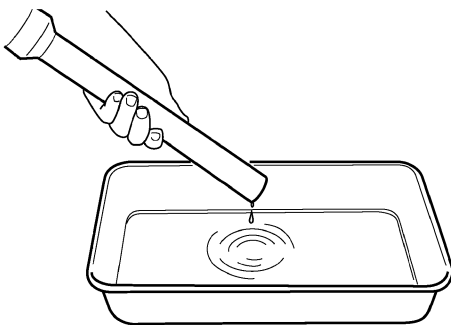
DISASSEMBLING THE FRONT FORK LEGS

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.



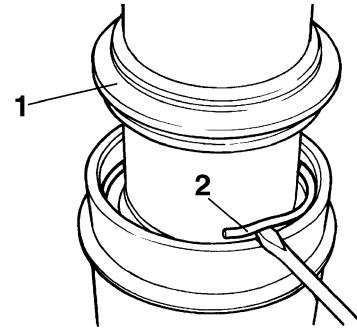
2. Remove:
 - Dust seal "1"
 - Oil seal clip "2"

(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.



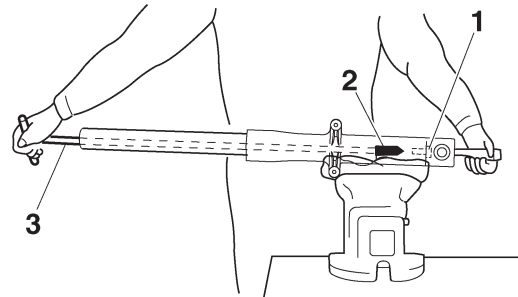
Damper rod holder

90890-01460

T-handle

90890-01326

T-handle 3/8" drive 60 cm long
YM-01326



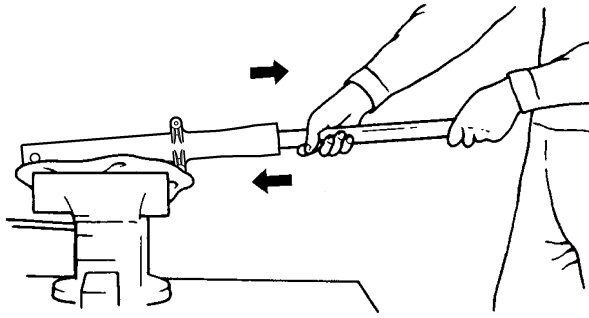
4. Remove:
 - Inner tube

- 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.**



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.

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

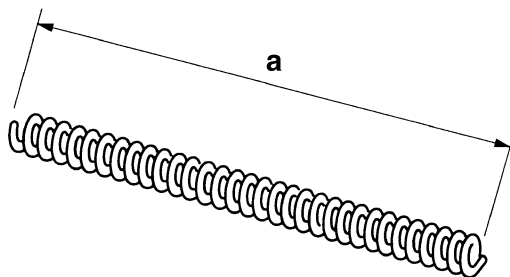
WARNING

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
343.2 mm (13.51 in)
Limit
336.3 mm (13.24 in)



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

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

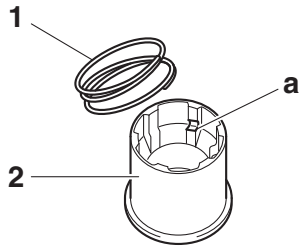
- When assembling the front fork leg, be sure to replace the following parts:
 - Inner tube bushing
 - Outer tube bushing
 - Oil seal
 - Oil seal clip
 - Dust seal
 - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

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**

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

TIP

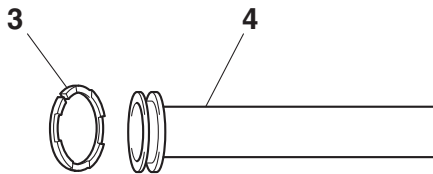
Make sure that the oil flow stopper spring is installed securely into the grooves "a" in the oil flow stopper.



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

TIP

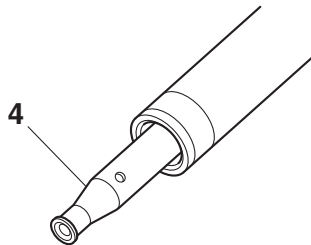
Fit the damper rod ring into the damper rod groove so that the side of the ring with the projections is facing in the direction shown in the illustration.



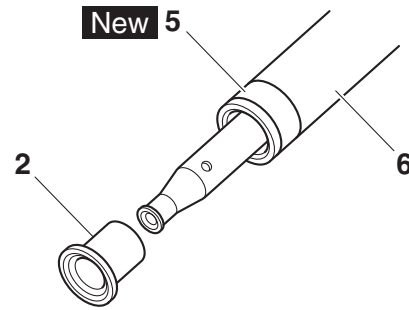
c. Install the damper rod and rebound spring to the inner tube.

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".



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"



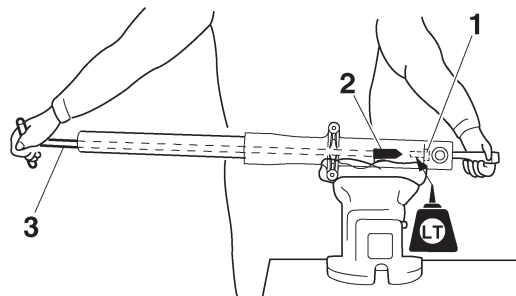
Front fork damper rod bolt
30 N·m (3.0 kgf·m, 22 lb·ft)
LOCTITE®

TIP

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

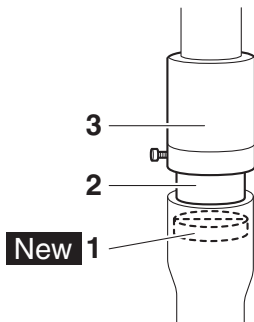
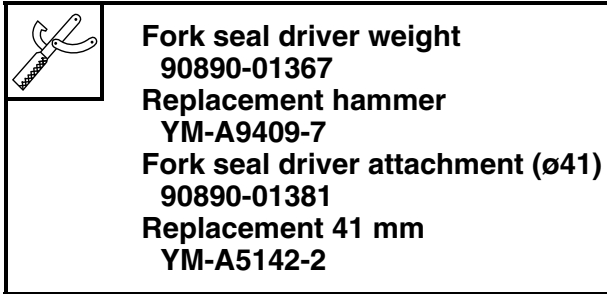


Damper rod holder
90890-01460
T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



6. Install:

- Outer tube bushing “1” **New**
- Washer
(with the fork seal driver attachment “2” and fork seal driver weight “3”)



7. Install:

- Oil seal “1” **New**
(with the fork seal driver attachment “2” and fork seal driver weight “3”)

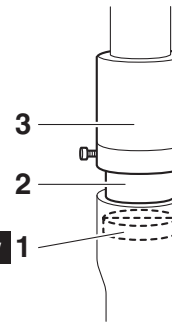
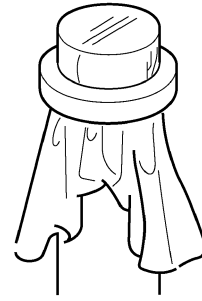
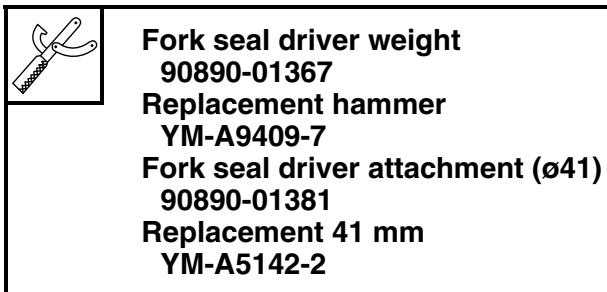
ECA14220

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.

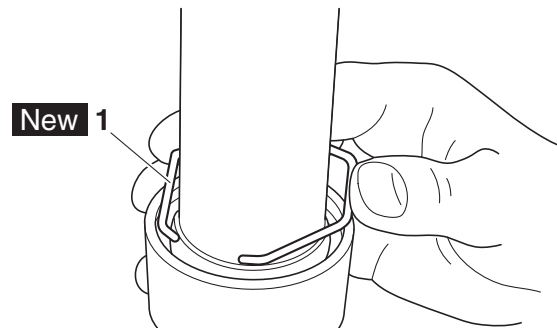


8. Install:

- Oil seal clip “1” **New**

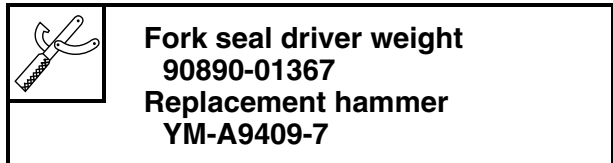
TIP

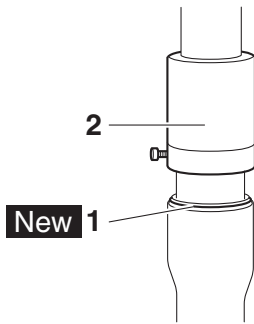
Adjust the oil seal clip so that it fits into the outer tube's groove.



9. Install:

- Dust seal “1” **New**
(with the fork seal driver weight “2”)





10.Fill:

- Front fork leg
(with the specified amount of the recommended fork oil)



Recommended oil
Yamaha Suspension Oil G10
Quantity (left)
 586.0 cm³ (19.81 US oz, 20.67 Imp.oz)
Quantity (right)
 586.0 cm³ (19.81 US oz, 20.67 Imp.oz)

11.Measure:

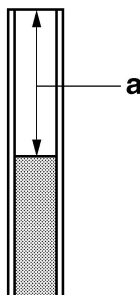
- Front fork leg oil level “a”
(from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
Out of specification → Correct.



Level (left)
 96 mm (3.8 in)
Level (right)
 96 mm (3.8 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.

EAS30210

INSTALLING THE FRONT FORK LEGS

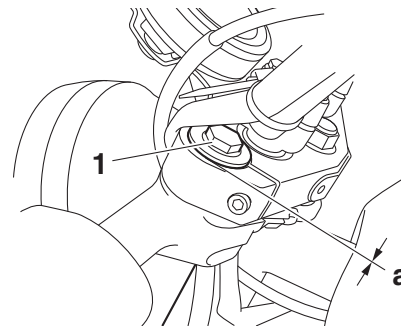
The following procedure applies to both of the front fork legs.

1. Install:

- Front fork leg “1”
Temporarily tighten the lower bracket pinch bolts.

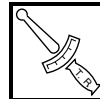
TIP

Make sure the inner tube end “a” is flush with the top of the upper bracket.



2. Tighten:

- Lower bracket pinch bolts



Lower bracket pinch bolt
 23 N·m (2.3 kgf·m, 17 lb·ft)

TIP

Tighten the lower bracket pinch bolts to specification twice. Tighten the upper and lower bolts alternately, starting with the upper bolts.

3. Tighten:

- Front fork cap bolt
- Upper bracket pinch bolt
- Front turn signal/position light pinch bolt



Front fork cap bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
Upper bracket pinch bolt
20 N·m (2.0 kgf·m, 14 lb·ft)
Front turn signal/position light
pinch bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

EWA13680

WARNING

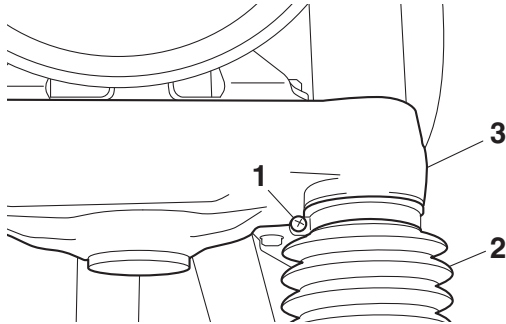
Make sure the brake hoses are routed properly.

4. Tighten:

- Rubber boot clamp screw “1”

TIP

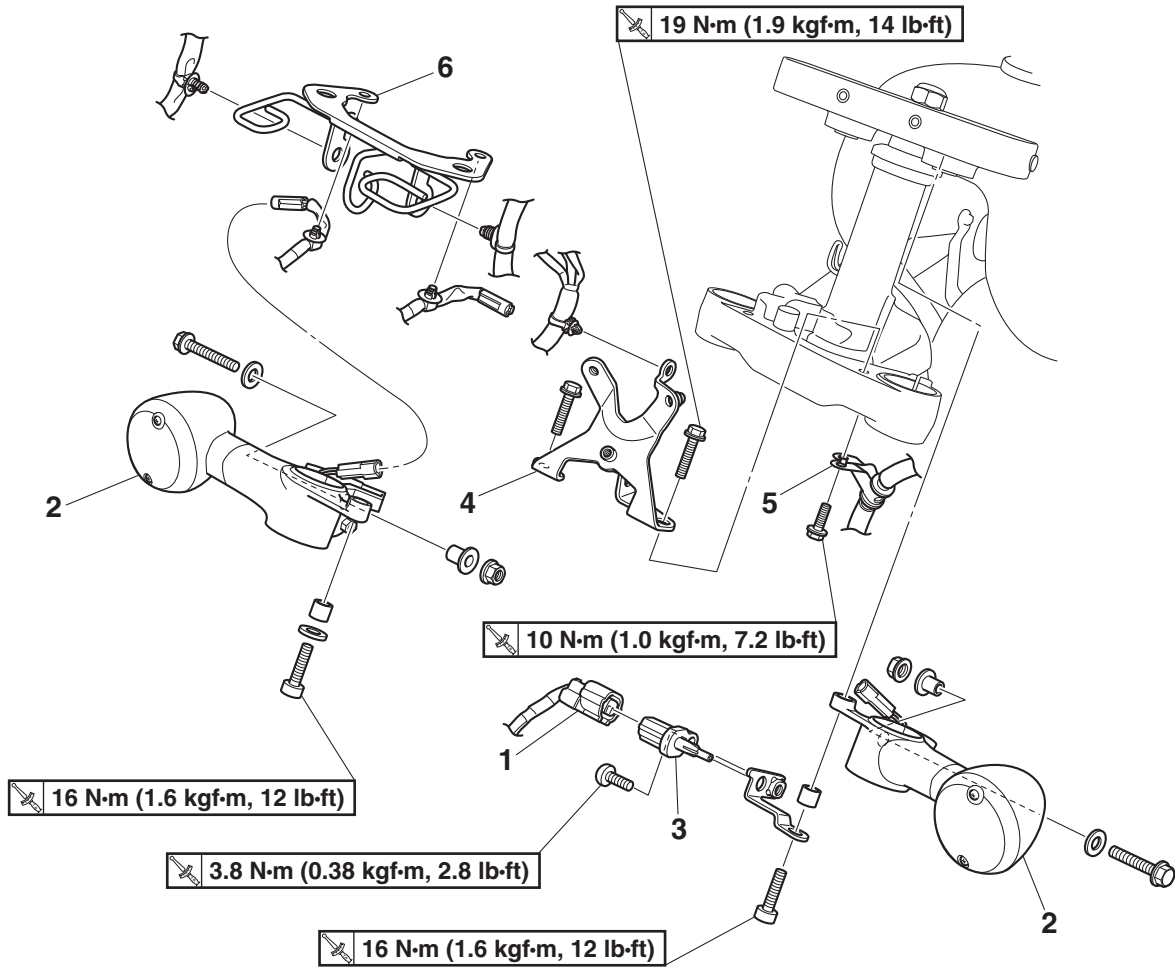
Make sure that the rubber boot “2” contacts the lower bracket “3” and that the clamp screw in positioned to the inside of the front fork leg.



EAS20035

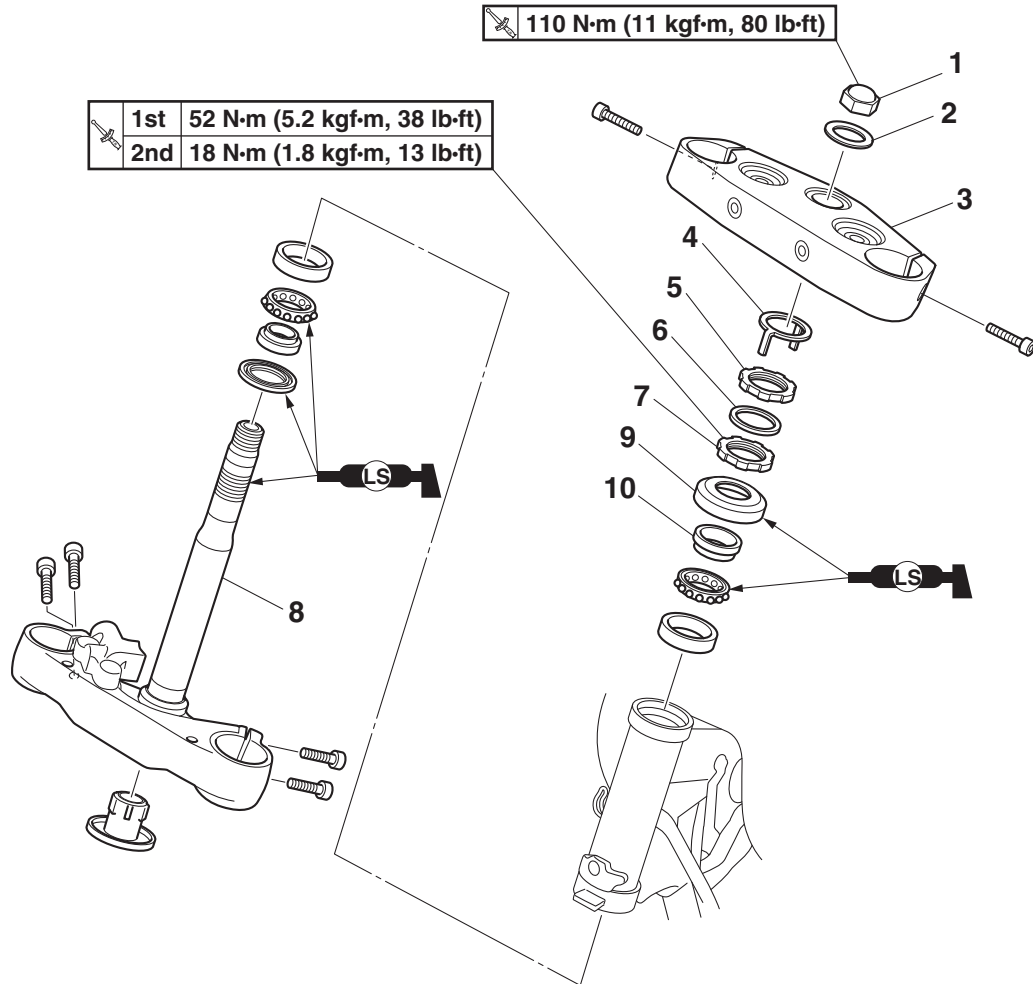
STEERING HEAD

Removing the front turn signal/position lights



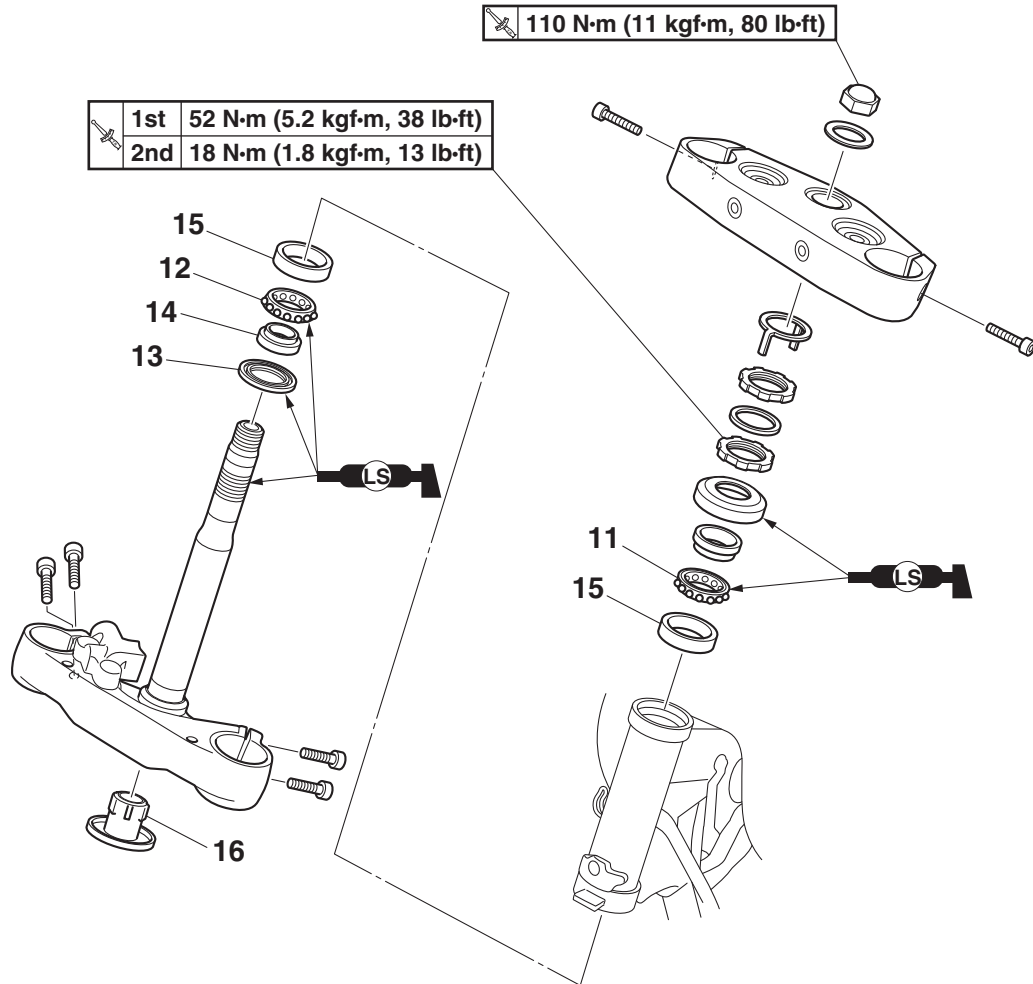
Order	Job/Parts to remove	Q'ty	Remarks
	Headlight body/Meter assembly		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Handlebar		Refer to "HANDLEBAR" on page 4-46.
	Front fork legs		Refer to "FRONT FORK" on page 4-51.
1	Intake air temperature sensor coupler	1	Disconnect.
2	Front turn signal/position light	2	
3	Intake air temperature sensor	1	
4	Headlight bracket	1	
5	Front brake hose holder	1	
6	Cable guide	1	

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
1	Steering stem nut	1	
2	Washer	1	
3	Upper bracket	1	
4	Lock washer	1	
5	Upper ring nut	1	
6	Rubber washer	1	
7	Lower ring nut	1	
8	Lower bracket	1	
9	Upper bearing cover	1	
10	Upper bearing inner race	1	

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
11	Upper bearing	1	
12	Lower bearing	1	
13	Dust seal	1	
14	Lower bearing inner race	1	
15	Bearing outer race	2	
16	Lower bracket cap	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:

- Upper ring nut
- Rubber washer
- Lower ring nut “1”
- Lower bracket

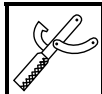
EWA13730

WARNING

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

TIP

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

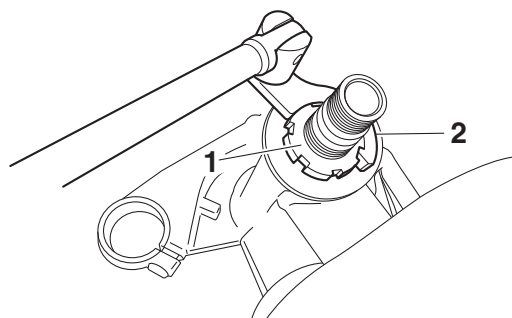


Steering nut wrench

90890-01403

Exhaust flange nut wrench

YU-A9472

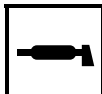


EAS30214

CHECKING THE STEERING HEAD

1. Wash:

- Bearings
- Bearing races



Recommended cleaning solvent

Kerosene

2. Check:

- Bearings
- Bearing races

Damage/pitting → Replace.

3. Replace:

- Bearings
- Bearing races

a. Remove the bearing races from the steering head pipe with a long rod “1” and hammer.

- Remove the bearing race from the lower bracket with a floor chisel “2” and hammer.
- Install a new dust seal and new bearing races.

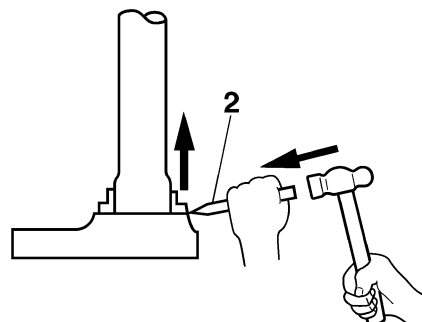
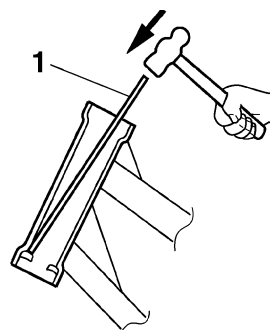
ECA14270

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.



4. Check:

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

EAS30216

INSTALLING THE STEERING HEAD

1. Lubricate:

- Upper bearing
- Lower bearing
- Bearing races



Recommended lubricant

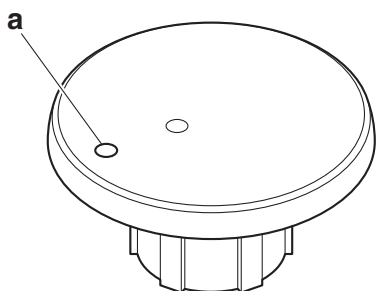
Lithium-soap-based grease

2. Install:

- Lower bracket
- Lower bracket cap

TIP

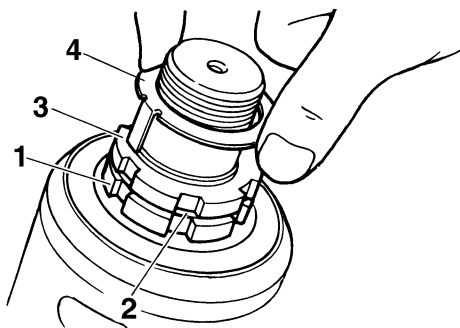
Face the hole "a" in the lower bracket cap rearward.



3. Install:

- Lower ring nut "1"
- Rubber washer "2"
- Upper ring nut "3"
- Lock washer "4"

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-18.



4. Install:

- Upper bracket
- Washer
- Steering stem nut

TIP

Temporarily tighten the steering stem nut.

5. Install:

- Front fork legs

Refer to "FRONT FORK" on page 4-51.

TIP

Temporarily tighten the upper and lower bracket pinch bolts.

6. Tighten:

- Steering stem nut



Steering stem nut
110 N·m (11 kgf·m, 80 lb·ft)

7. Install:

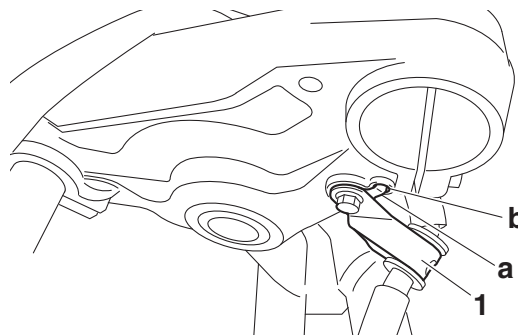
- Front brake hose holder "1"



Front brake hose holder bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

Align the projection "a" on the front brake hose holder with the hole "b" in the lower bracket.

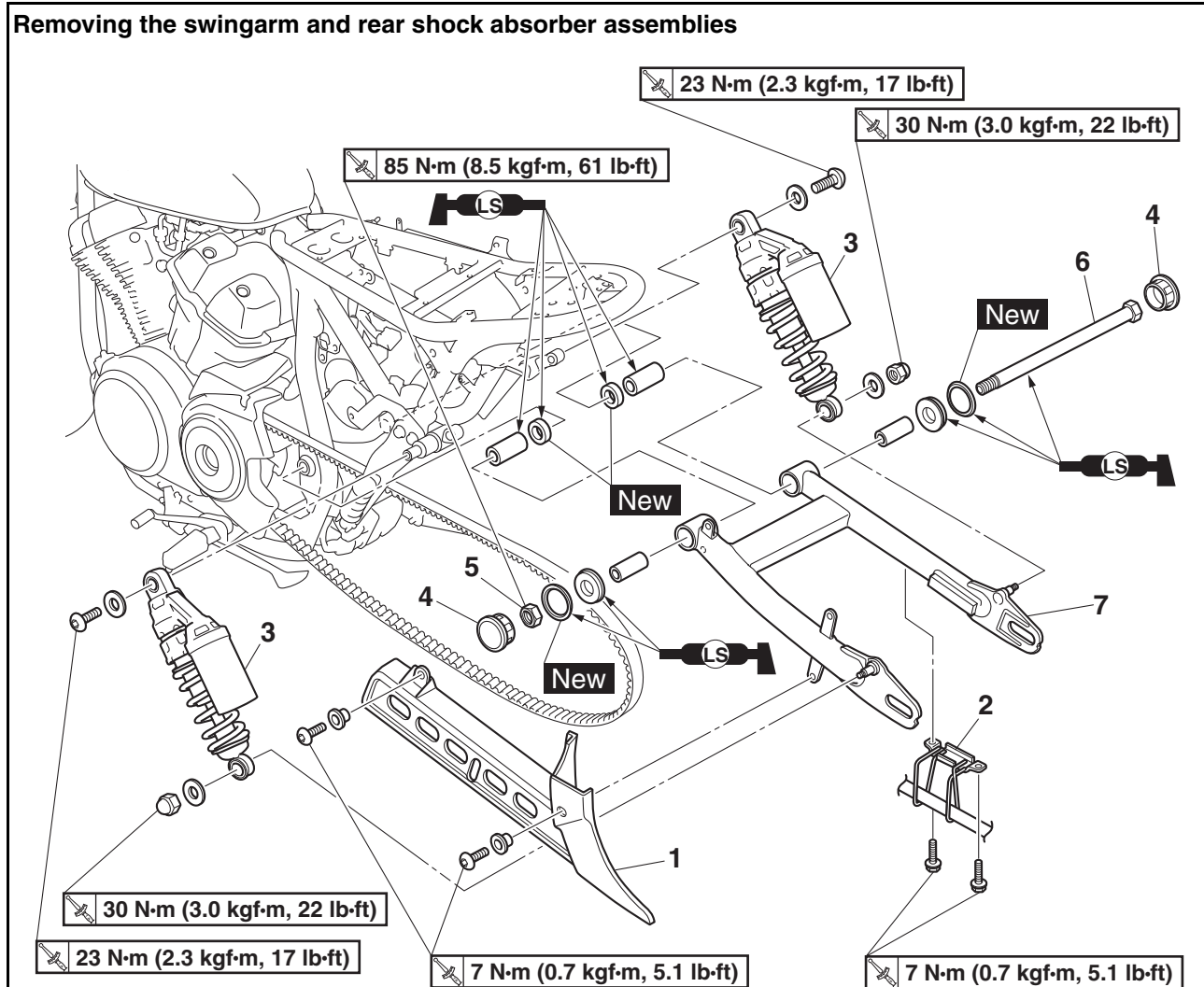


SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

EAS20197

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

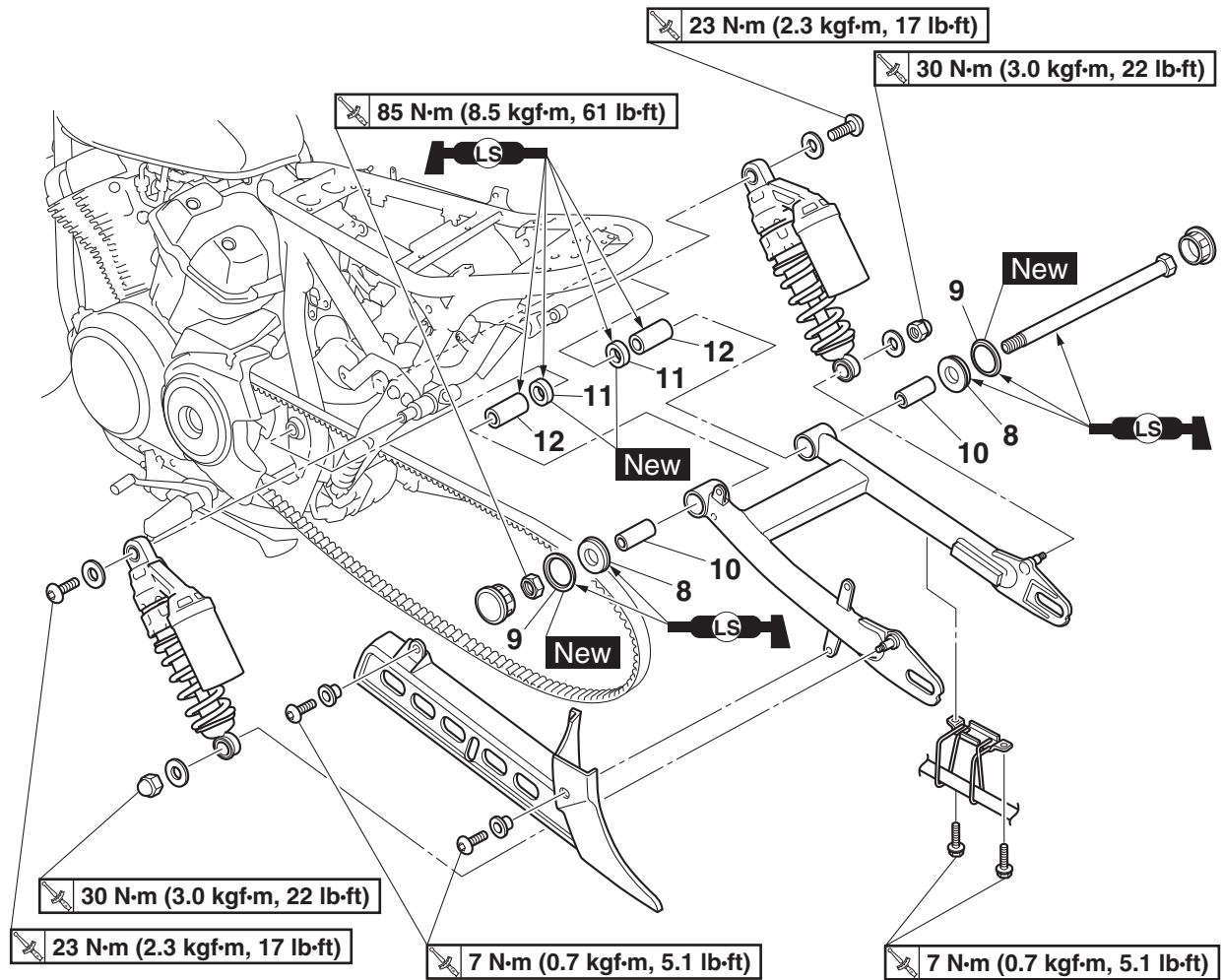
Removing the swingarm and rear shock absorber assemblies



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-15.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-2.
1	Drive belt lower guard	1	
2	Rear brake hose guide	1	
3	Rear shock absorber assembly	2	
4	Pivot shaft cap	2	
5	Pivot shaft nut	1	
6	Pivot shaft	1	
7	Swingarm	1	

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

Removing the swingarm and rear shock absorber assemblies



Order	Job/Parts to remove	Q'ty	Remarks
8	Collar	2	
9	Dust seal	2	
10	Spacer	2	
11	Dust seal	2	
12	Bearing	2	

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder 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 or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.

EAS31632

DISPOSING OF A REAR SHOCK ABSORBER

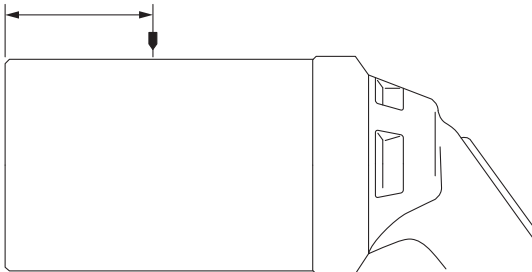
1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 40 mm (1.57 in) from its end as shown.

EWA13760



WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS31305

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

1. Check:
 - Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
 - Rear shock absorber
Oil leaks → Replace the rear shock absorber assembly. (for models not equipped with gas cylinders)
Gas leaks/oil leaks → Replace the rear shock absorber assembly. (for models equipped with gas cylinders)
 - Spring
Damage/wear → Replace the rear shock absorber assembly.

- Gas cylinder
Damage/gas leaks → Replace.
- Bushing
Damage/wear → Replace the rear shock absorber assembly.
- Bolts
Bends/damage/wear → Replace.

EAS31599

INSTALLING THE SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

1. Lubricate:

- Bearings
- Collars
- Dust seals
- Pivot shaft



Recommended lubricant
Lithium-soap-based grease

2. Install:

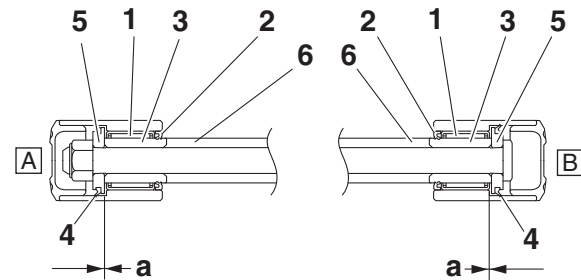
- Bearings “1”
- Dust seals “2”
- Spacers “3”
- Dust seals “4”
- Collars “5”
- Swingarm “6”



Installed depth “a”
0–1.0 mm (0–0.04 in)

TIP

Make sure that the dust seals “2” do not protrude past the edges of the swingarm.



- A. Left side
B. Right side

3. Install:

- Pivot shaft nut



Pivot shaft nut
85 N·m (8.5 kgf·m, 61 lb·ft)

SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES

4. Adjust:

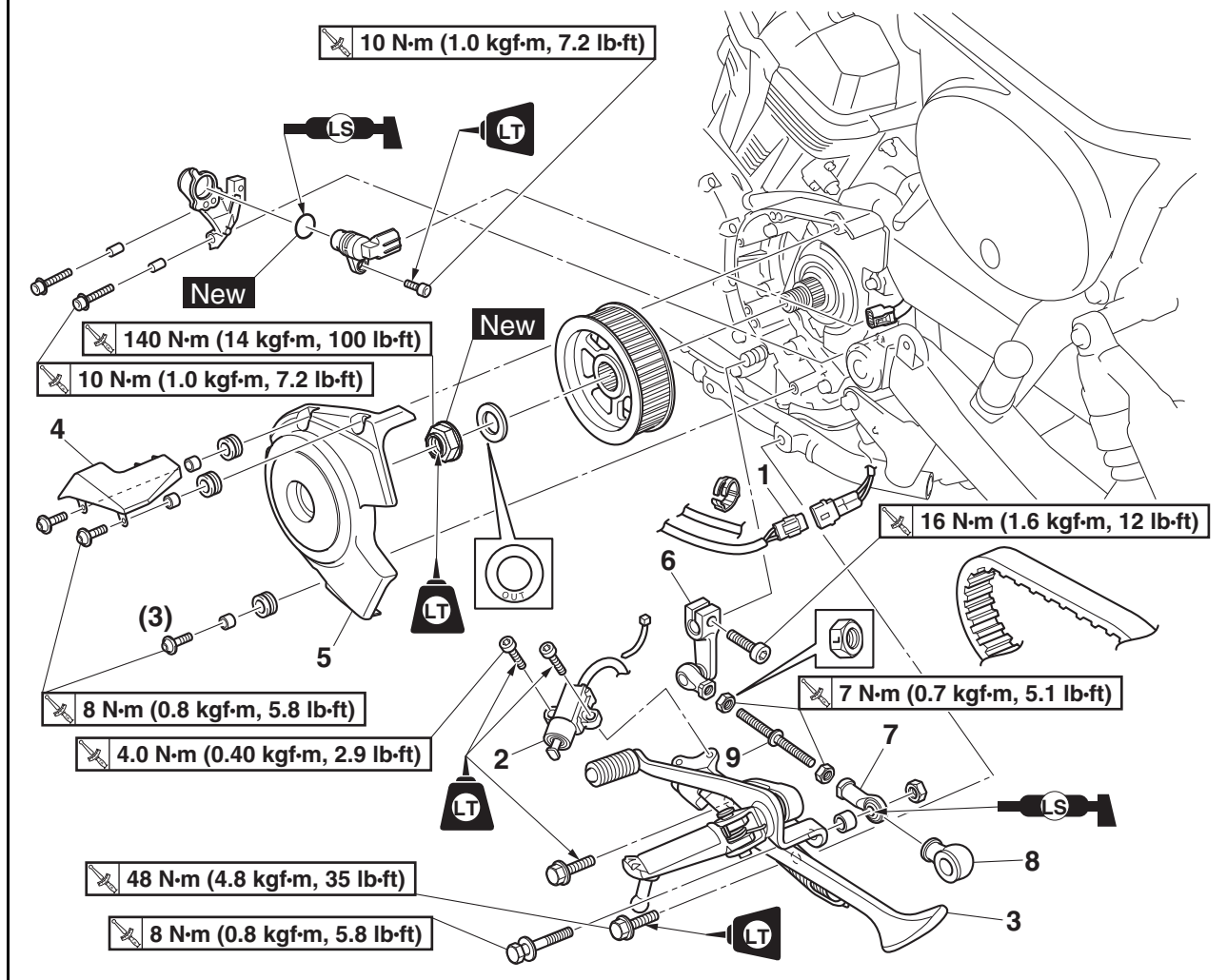
- Drive belt slack

Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-17.

EAS20039

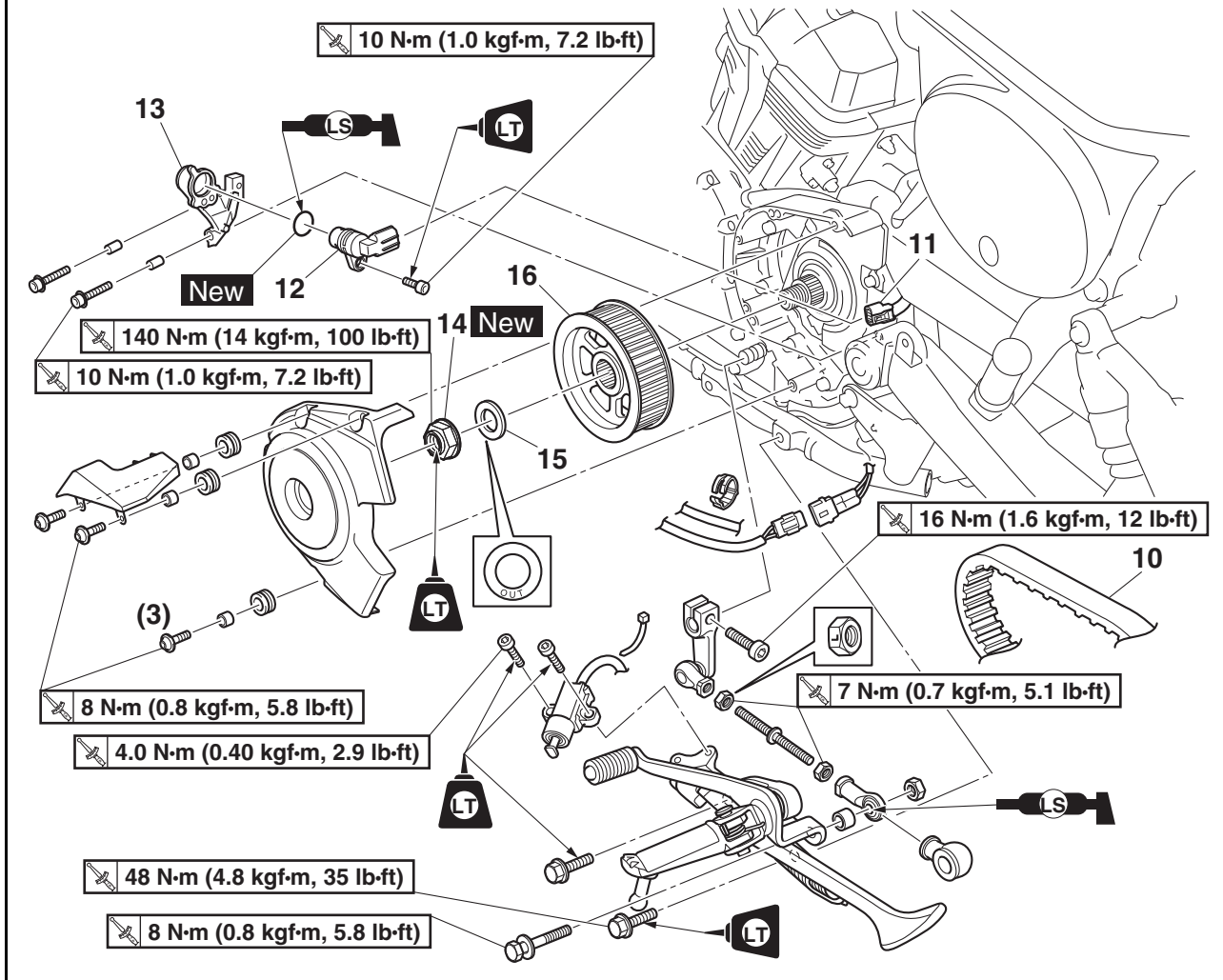
BELT DRIVE

Removing the sidestand and drive belt



Order	Job/Parts to remove	Q'ty	Remarks
	Drive belt upper guard		Refer to "REAR WHEEL" on page 4-15.
	Drive belt lower guard/Rear shock absorber		Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-66.
1	Sidestand switch coupler	1	Disconnect.
2	Sidestand switch	1	
3	Sidestand	1	
4	Air duct	1	
5	Drive pulley cover	1	
6	Shift arm	1	
7	Shift rod joint	1	
8	Shift rod joint cover	1	
9	Shift rod	1	

Removing the sidestand and drive belt

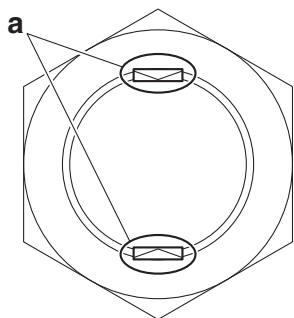


Order	Job/Parts to remove	Q'ty	Remarks
10	Drive belt	1	
11	Speed sensor coupler	1	Disconnect.
12	Speed sensor	1	
13	Speed sensor bracket	1	
14	Drive pulley nut	1	
15	Washer	1	
16	Drive pulley	1	

EAS30235

REMOVING THE DRIVE BELT AND DRIVE PULLEY

1. Straighten the drive pulley nut ribs "a".



2. Loosen:
 - Drive pulley nut

TIP

When loosening the drive pulley nut, press down on the brake pedal so the drive pulley does not move.

3. Remove:
 - Drive belt

TIP

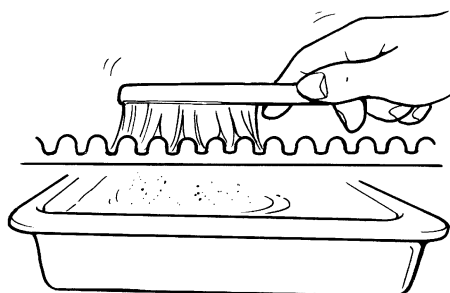
Push the rear wheel forward and remove the drive belt from the rear wheel pulley. Refer to "ADJUSTING THE DRIVE BELT SLACK" on page 3-17.

EAS30236

CHECKING THE DRIVE BELT

1. Clean:
 - Drive belt

- a. Wipe the drive belt with a clean cloth.
- b. Put the drive belt in a mixture of mild detergent and water. Then, remove any dirt from the drive belt.
- c. Remove the drive belt from the mixture and rinse it off with clean water. Then, let the drive belt thoroughly dry.

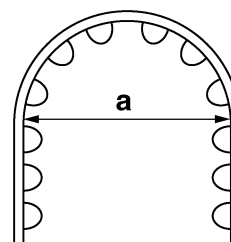


2. Check:
 - Drive belt

ECA22710

NOTICE

- To protect the drive belt from damage, handle it with care.
- The drive belt can not be bent smaller than 125 mm (4.92 in) "a".
- The removed drive belt can not be twisted inside out.



3. Check:
 - Drive pulley
 - Rear wheel pulley

Bent teeth → Replace the drive belt and pulleys as a set.

EAS31586

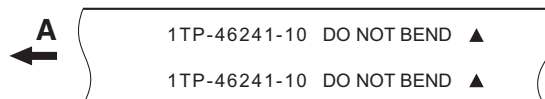
INSTALLING THE DRIVE BELT AND DRIVE PULLEY

1. Install:
 - Drive belt

ECA22720

NOTICE

Align the mark of the drive belt with the progress direction "A".
Do not twist the drive belt when installing it.

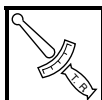


2. Install:
 - Washer
 - Drive pulley nut **New**

TIP

Install the washer with its "OUT" mark facing outward.

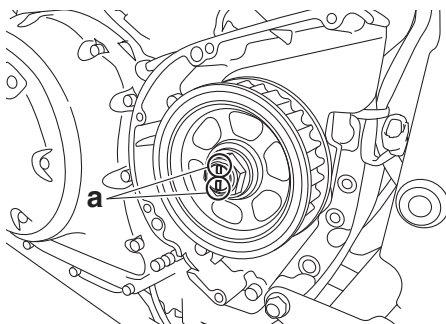
3. Tighten:
 - Drive pulley nut



Drive pulley nut
140 N·m (14 kgf·m, 100 lb·ft)
LOCTITE®

TIP

- Stake the drive pulley nut at the cutouts “a” in the drive axle.
- When tightening the drive pulley nut, press down on the brake pedal so the drive pulley does not move.



4. Adjust:

- Drive belt slack
Refer to “ADJUSTING THE DRIVE BELT SLACK” on page 3-17.

EAS31620

INSTALLING THE SHIFT ARM

1. Install:

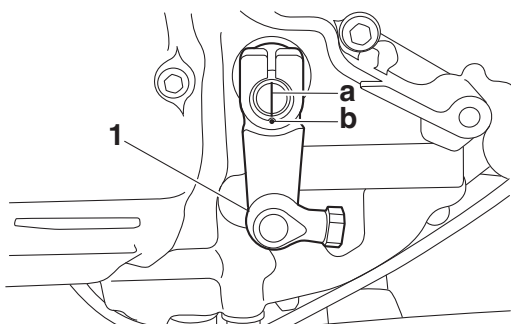
- Shift arm “1”



Shift arm pinch bolt
16 N·m (1.6 kgf·m, 12 lb·ft)

TIP

Align the “I” mark “a” in the shift shaft with the punch mark “b” in the shift arm.



EAS31621

ADJUSTING THE SHIFT PEDAL

TIP

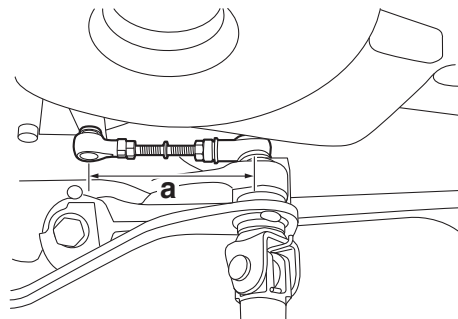
The shift pedal position is determined by the installed shift rod length.

1. Measure:

- Installed shift rod length “a”
Incorrect → Adjust.



Installed shift rod length
95.0–99.0 mm (3.74–3.90 in)



2. Adjust:

- Installed shift rod length



a. Loosen both locknuts “1”.

ECA22700

NOTICE

The shift rod locknut (shift arm side) has left-hand threads.

b. Turn the shift rod “2” in direction “a” or “b” to obtain the correct shift rod length.

TIP

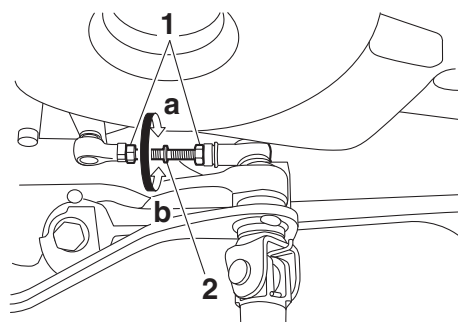
Make sure that the engaged thread length on both ends of the shift rod is 4 ridges or more.

Direction “a”

Installed shift rod length is increased.

Direction “b”

Installed shift rod length is decreased.



c. Tighten the locknuts to specification.

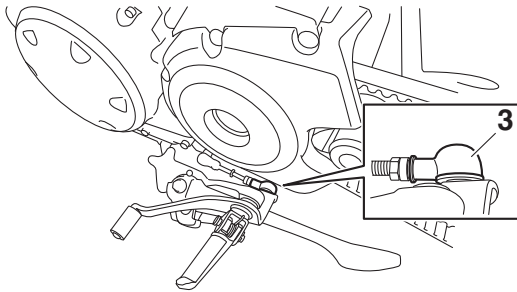


Shift rod locknut (shift arm side)
7 N·m (0.7 kgf·m, 5.1 lb·ft)
Shift rod locknut (shift pedal side)
7 N·m (0.7 kgf·m, 5.1 lb·ft)

-
- d. Make sure the installed shift rod length is within specification.

TIP

After adjusting the shift pedal position, install the shift rod joint cover “3” in its original position as shown in the illustration.



ENGINE

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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:

- Rear cylinder cover (right)
Refer to “ENGINE REMOVAL” on page 5-2.

4. Disconnect:

- Spark plug caps

5. Remove:

- Spark plug

ECA13340

NOTICE

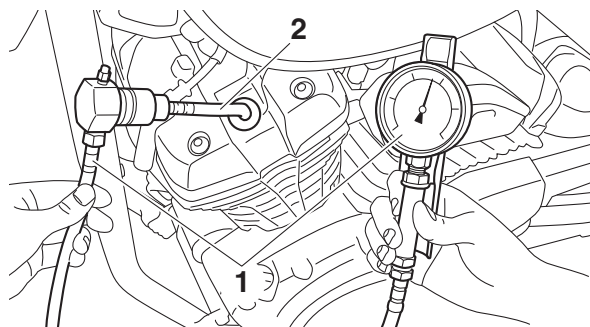
Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

6. Install:

- Compression gauge “1”
- Extension “2”



Compression gauge
90890-03081
Engine compression tester
YU-33223
Extension
90890-04136



7. Measure:

- Compression pressure
Out of specification → Refer to steps (c) and (d).



Compression pressure
1218–1568 kPa/400 r/min (12.2–
15.7 kgf/cm²/400 r/min, 173.2–
223.0 psi/400 r/min)



a. Set the main switch to “ON”.

b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1.0 kgf/cm², 14.5 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 → Replace.
Same as without oil	Piston, valves or cylinder head gasket possibly defective → Replace.



8. Install:

- Spark plug



Spark plug
13 N·m (1.3 kgf·m, 9.4 lb·ft)

9. Connect:

- Spark plug caps

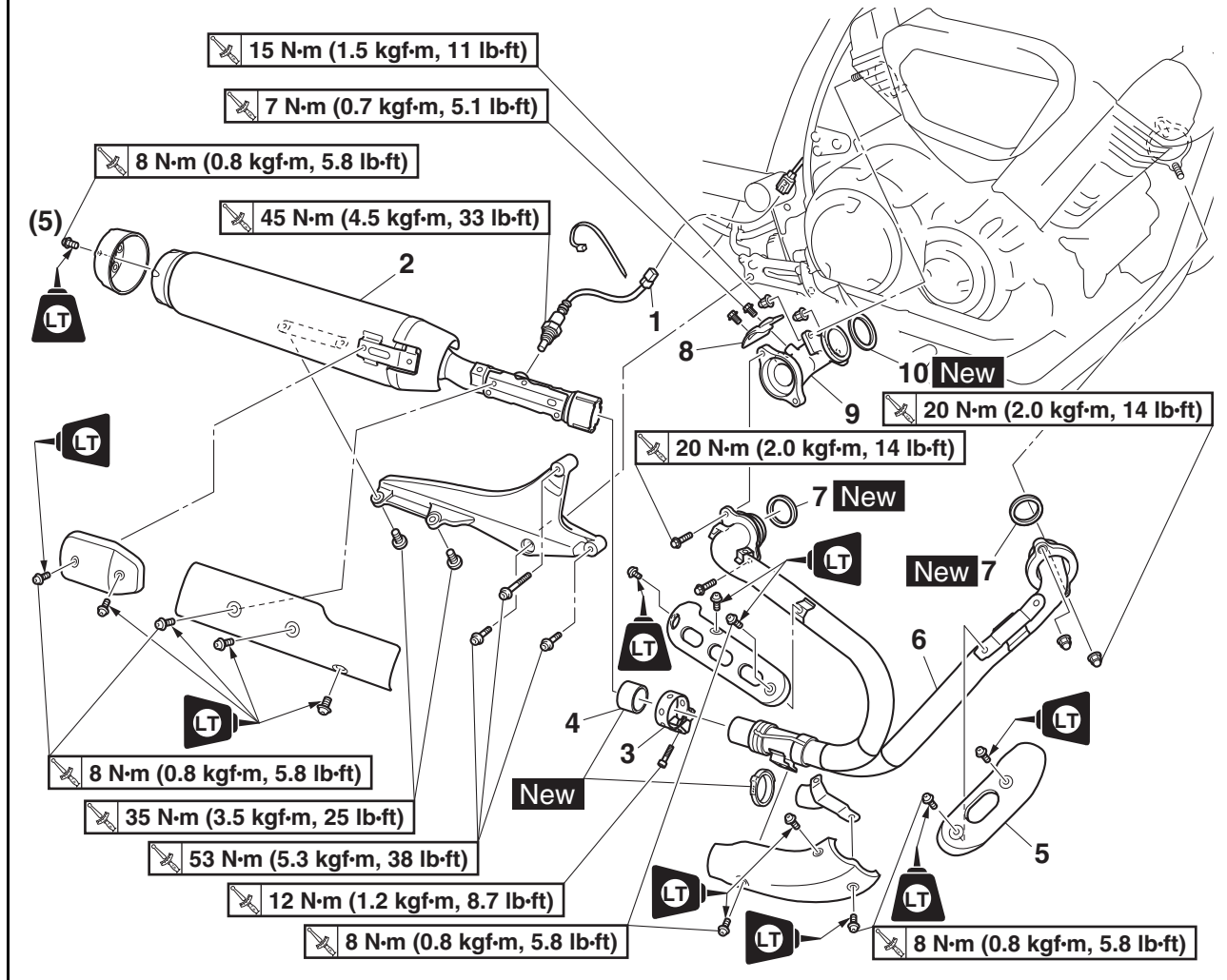
10. Install:

- Rear cylinder cover (right)
Refer to “ENGINE REMOVAL” on page 5-2.

EAS20042

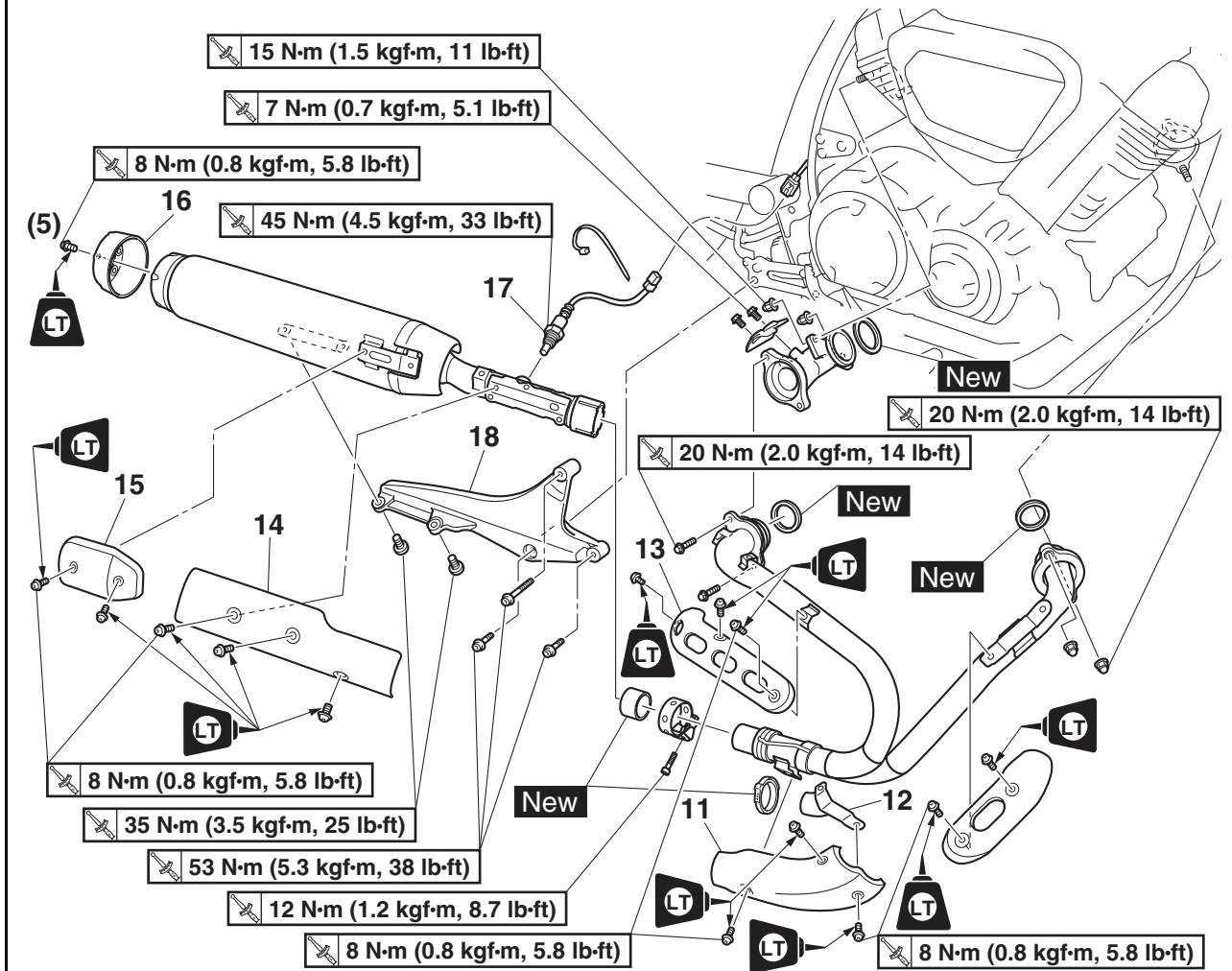
ENGINE REMOVAL

Removing the muffler and exhaust pipe



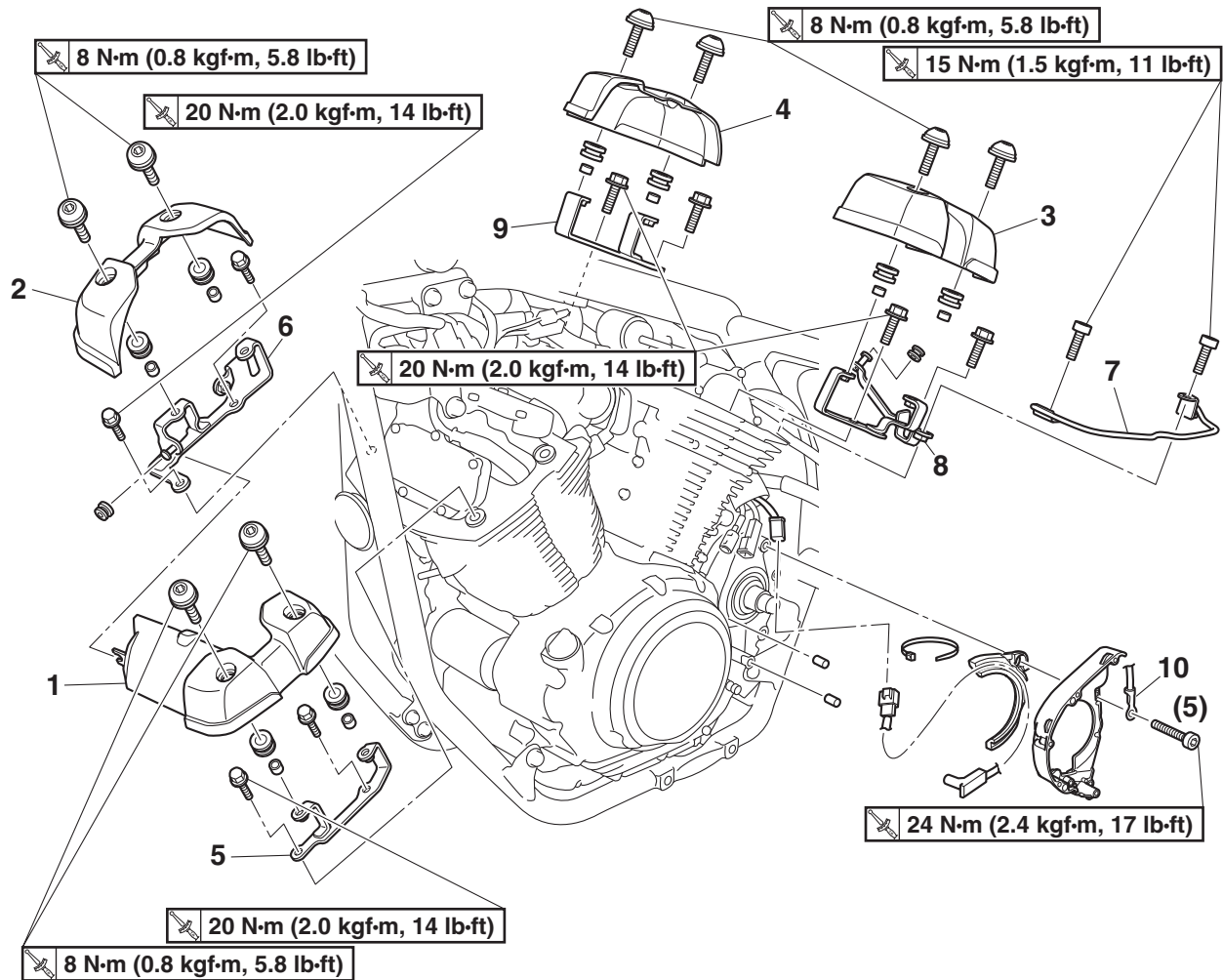
Order	Job/Parts to remove	Q'ty	Remarks
1	O ₂ sensor coupler	1	Disconnect.
2	Muffler	1	
3	Clamp	1	
4	Gasket	1	
5	Exhaust pipe protector 1	1	
6	Exhaust pipe	1	
7	Gasket	2	
8	Exhaust pipe joint cover	1	
9	Exhaust pipe joint	1	
10	Gasket	1	

Removing the muffler and exhaust pipe



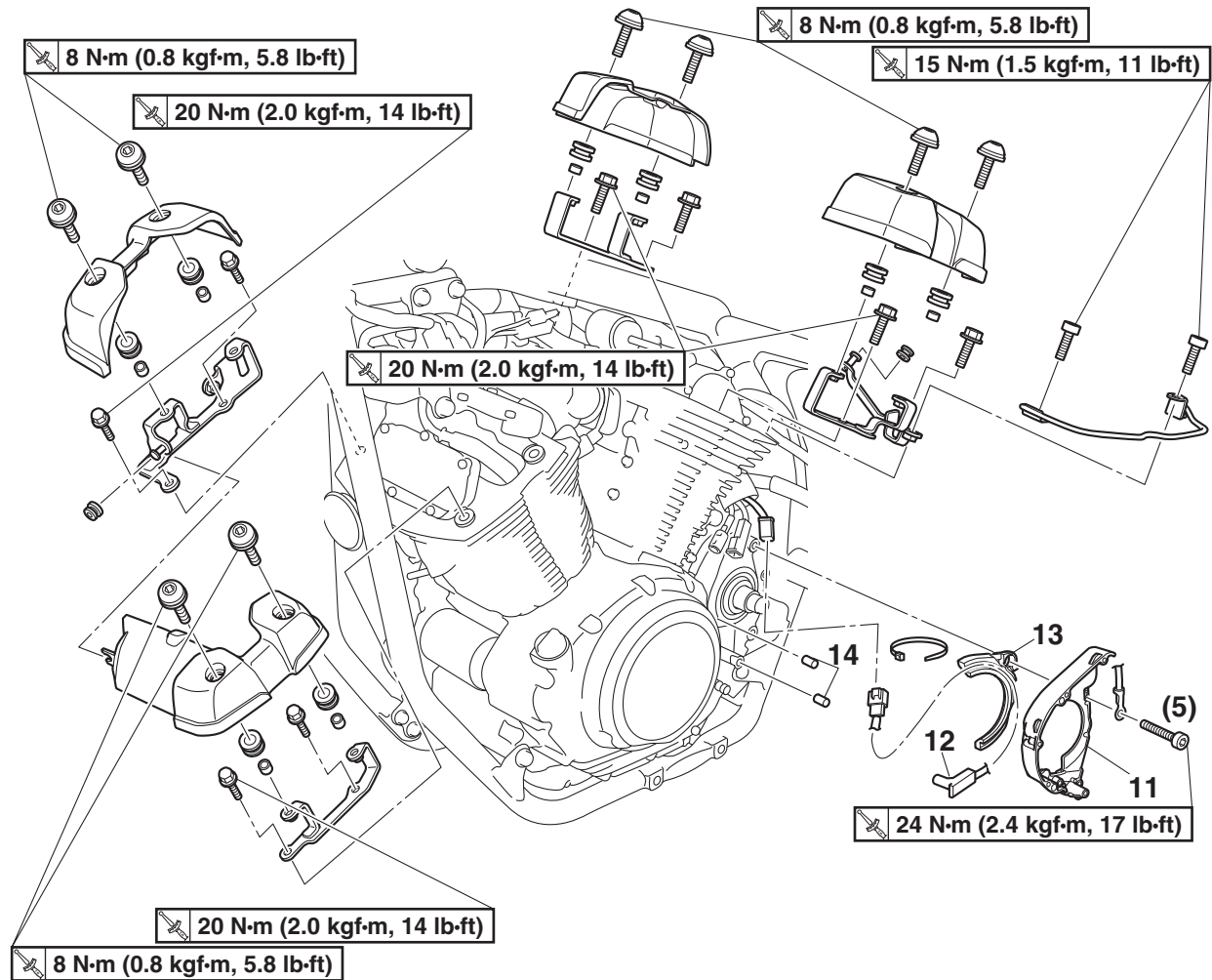
Order	Job/Parts to remove	Q'ty	Remarks
11	Exhaust pipe protector 2	1	
12	Exhaust pipe protector 2 bracket	1	
13	Exhaust pipe protector 3	1	
14	Muffler protector 1	1	
15	Muffler protector 2	1	
16	Muffler cap	1	
17	O ₂ sensor	1	Remove the O ₂ sensor only when necessary.
18	Muffler bracket	1	

Removing the drive pulley housing



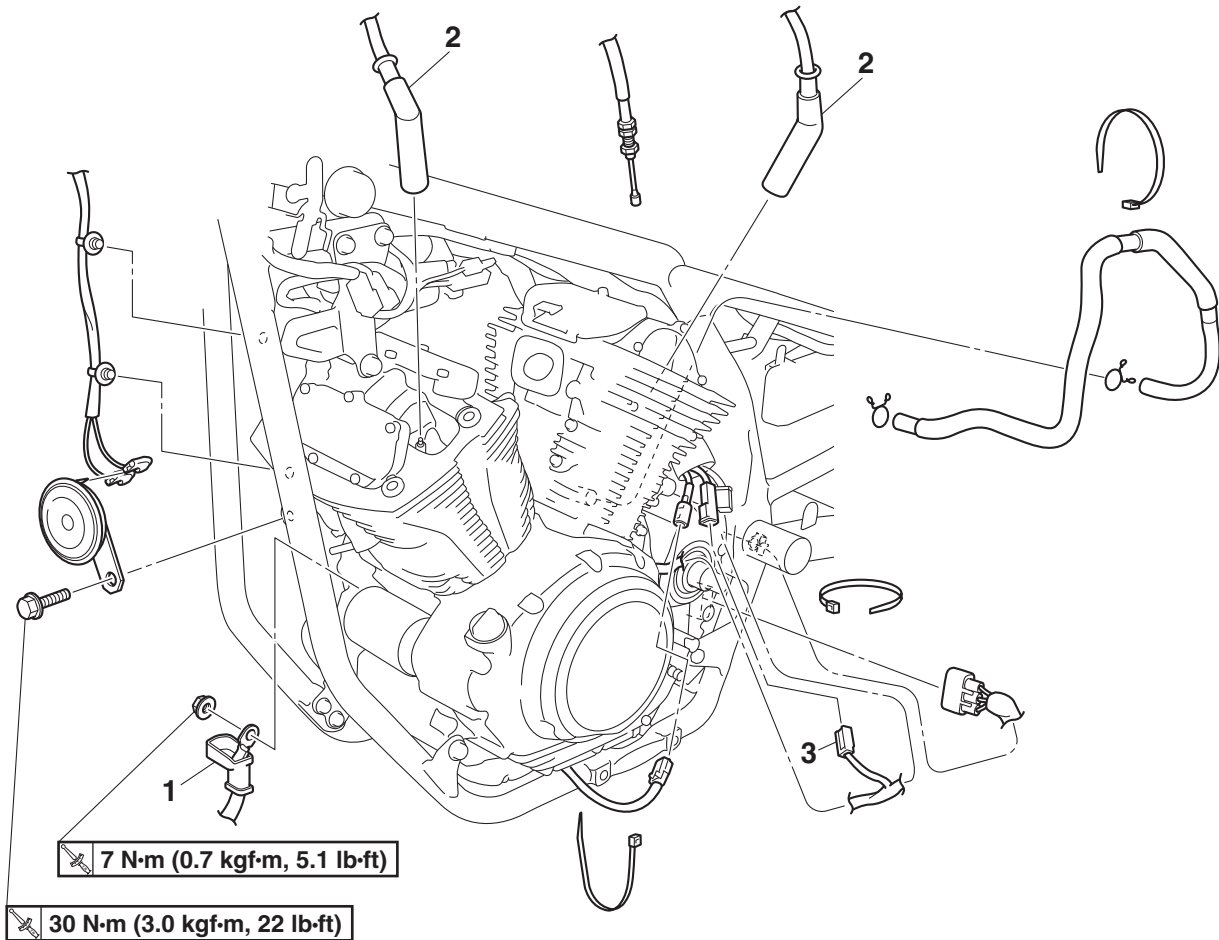
Order	Job/Parts to remove	Q'ty	Remarks
	Drive pulley		Refer to "BELT DRIVE" on page 4-71.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Front cylinder cover (left)	1	
2	Front cylinder cover (right)	1	
3	Rear cylinder cover (left)	1	
4	Rear cylinder cover (right)	1	
5	Front cylinder cover bracket (left)	1	
6	Front cylinder cover bracket (right)	1	
7	Rear cylinder head guard	1	
8	Rear cylinder cover bracket (left)	1	
9	Rear cylinder cover bracket (right)	1	
10	Ground lead	1	Disconnect.

Removing the drive pulley housing



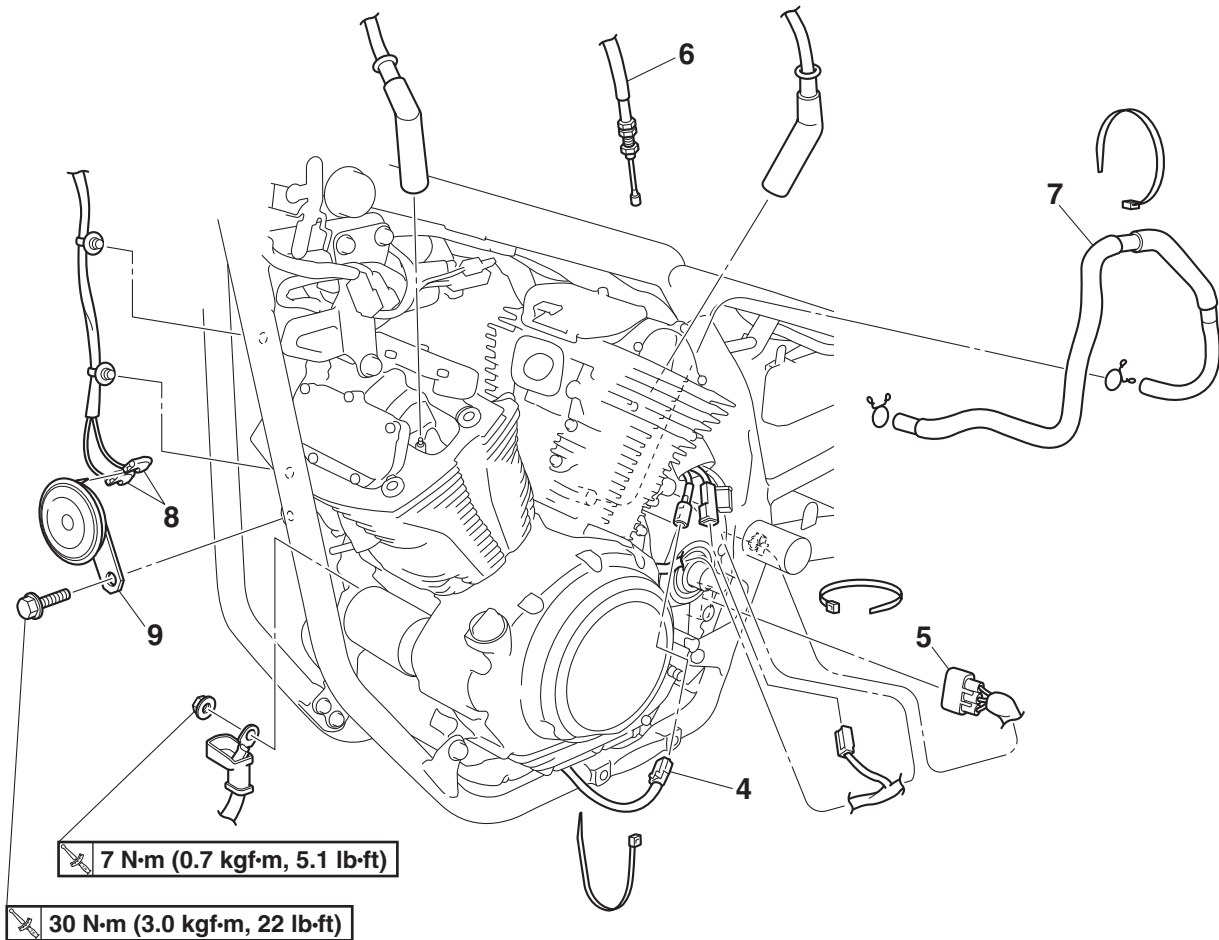
Order	Job/Parts to remove	Q'ty	Remarks
11	Drive pulley housing	1	
12	Neutral switch sub-wire harness	1	
13	Damper	1	
14	Dowel pin	2	

Disconnecting the leads and hoses



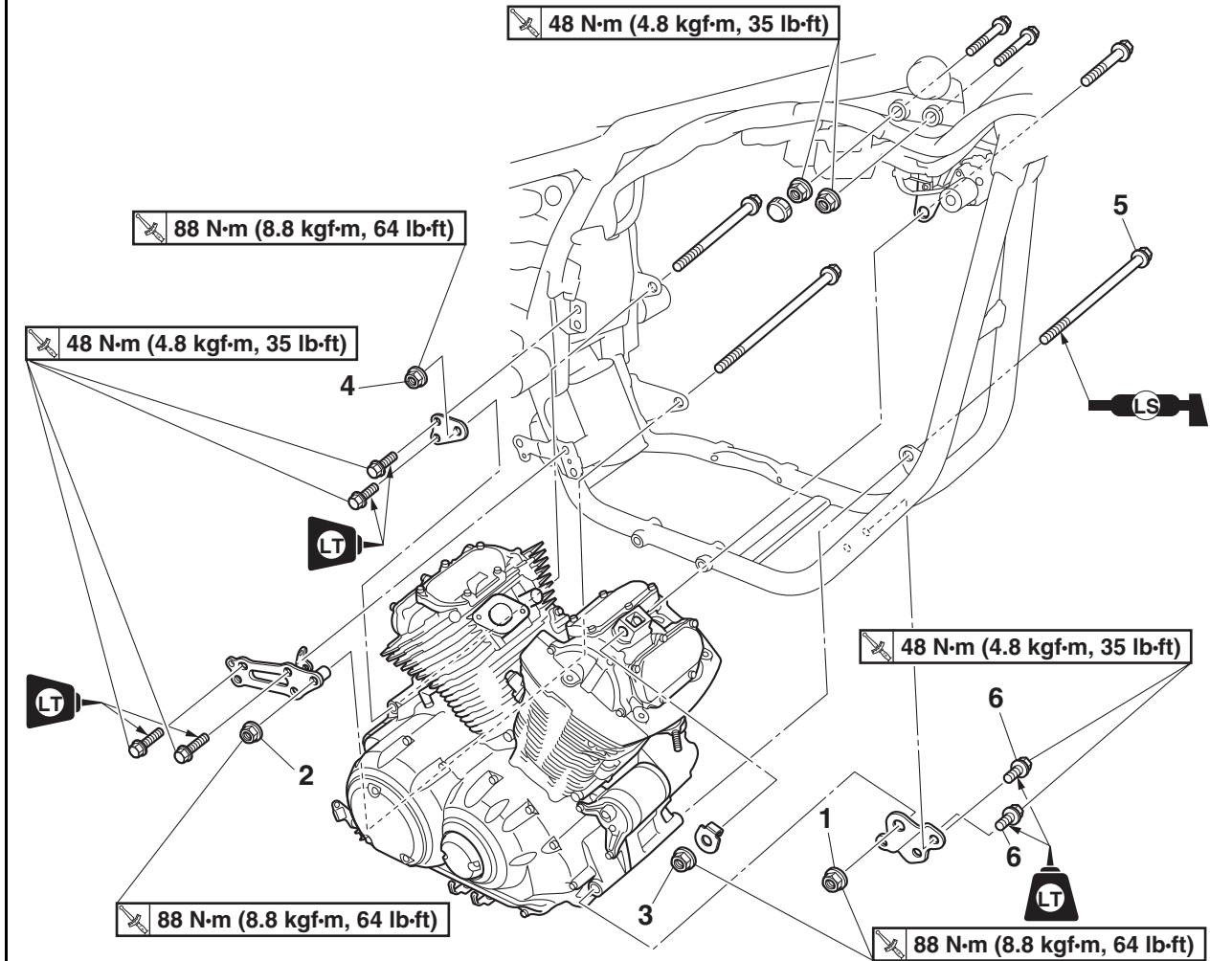
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-34.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Throttle body assembly/Intake manifold assembly		Refer to "THROTTLE BODIES" on page 6-8.
1	Starter motor lead	1	Disconnect.
2	Spark plug cap	2	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.

Disconnecting the leads and hoses



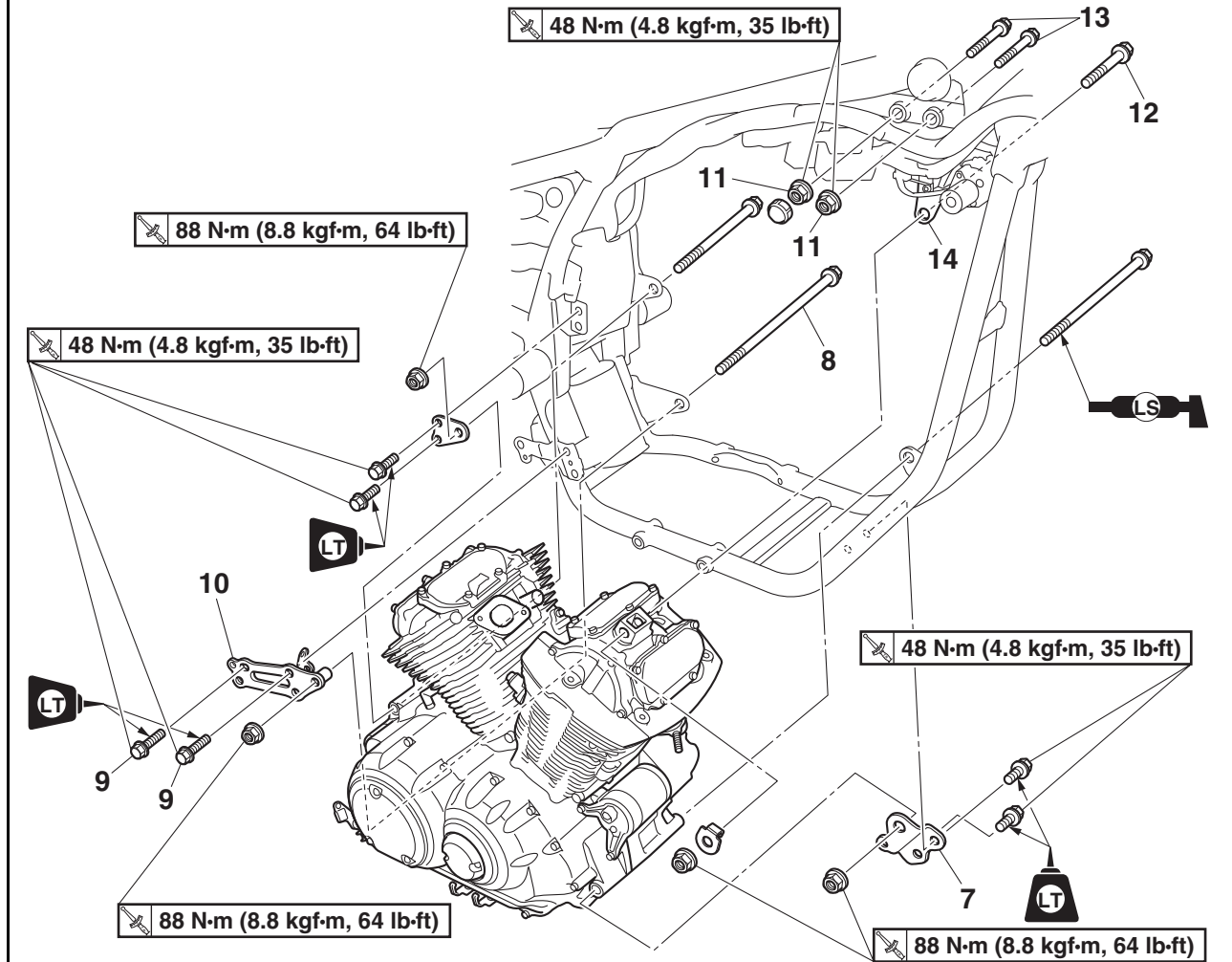
Order	Job/Parts to remove	Q'ty	Remarks
4	Oil level switch coupler	1	Disconnect.
5	Rectifier/regulator coupler	1	Disconnect.
6	Clutch cable	1	Disconnect.
7	Crankcase breather hose	1	
8	Horn connector	2	Disconnect.
9	Horn	1	

Removing the engine



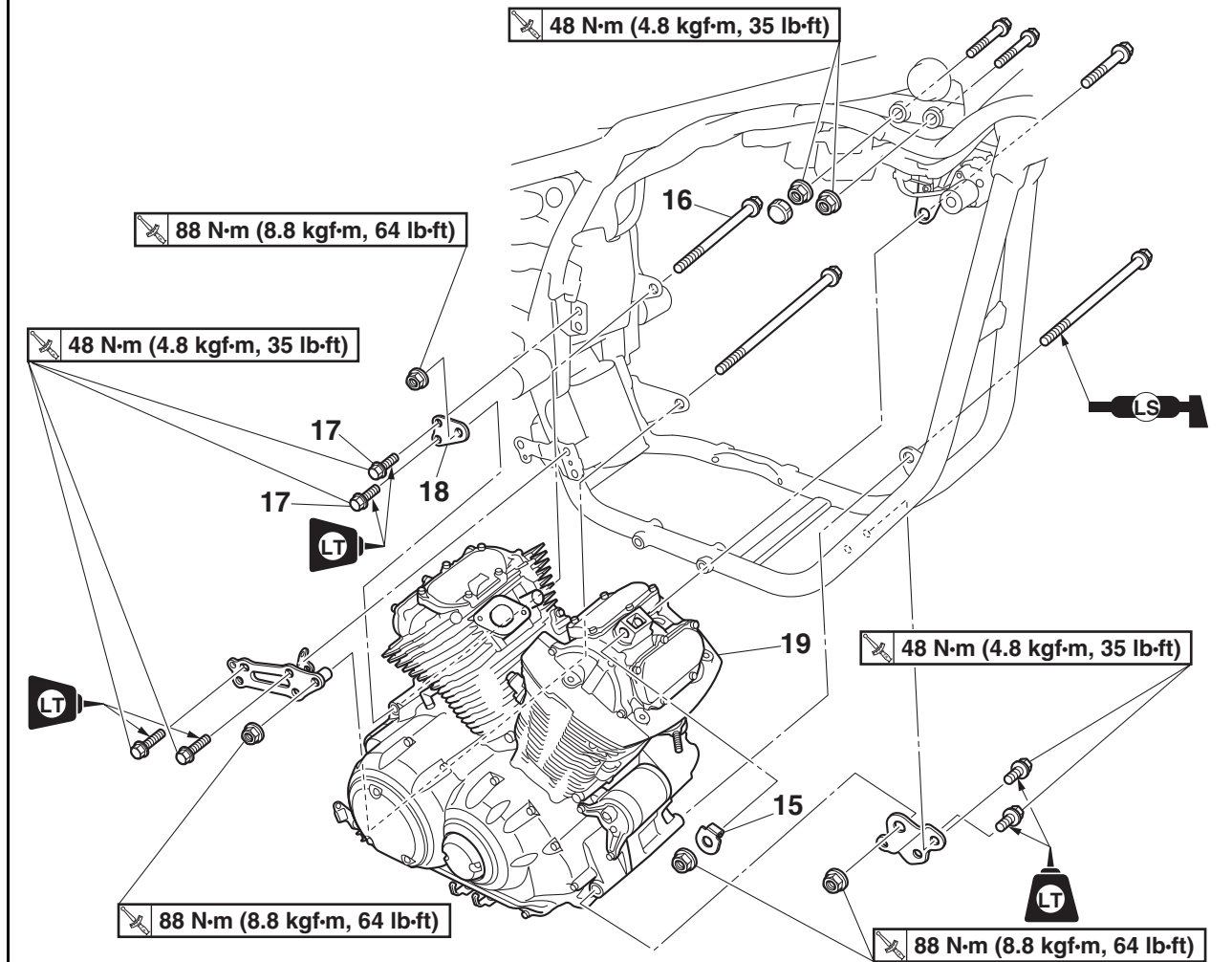
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
1	Engine mounting nut (front lower side)	1	
2	Engine mounting nut (rear lower side)	1	
3	Engine mounting nut (front upper side)	1	
4	Engine mounting nut (rear upper side)	1	
5	Engine mounting bolt (front lower side)	1	
6	Engine bracket bolt (front lower side)	2	

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
7	Engine bracket (front lower side)	1	
8	Engine mounting bolt (rear lower side)	1	
9	Engine bracket bolt (rear lower side)	2	
10	Engine bracket (rear lower side)	1	
11	Engine bracket nut (front upper side)	2	
12	Engine mounting bolt (front upper side)	1	
13	Engine bracket bolt (front upper side)	2	
14	Engine bracket (front upper side)	1	

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
15	Lock washer	1	
16	Engine mounting bolt (rear upper side)	1	
17	Engine bracket bolt (rear upper side)	2	
18	Engine bracket (rear upper side)	1	
19	Engine	1	

EAS31587

INSTALLING THE EXHAUST PIPE

1. Install:

- Exhaust pipe joint
- Exhaust pipe joint cover



Exhaust pipe joint nut
15 N·m (1.5 kgf·m, 11 lb·ft)
Exhaust pipe joint cover bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

Tighten the exhaust pipe joint nuts, and then install the exhaust pipe joint cover and bolts.

2. Install:

- Exhaust pipe protector 2 bracket band “1”

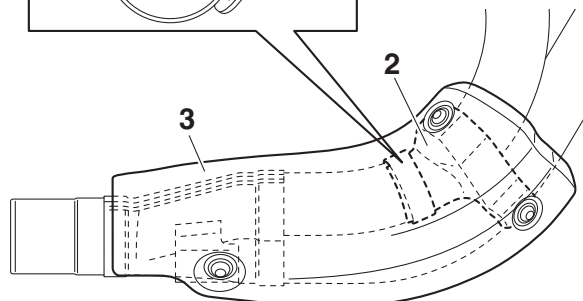
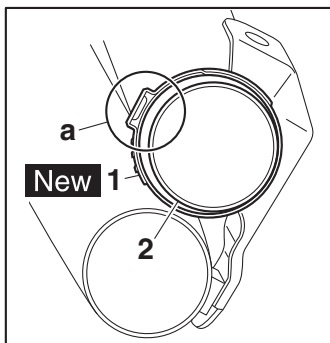
New

- Exhaust pipe protector 2 bracket “2”
- Exhaust pipe protector 2 “3”

- Fit the exhaust pipe protector 2 bracket band onto the exhaust pipe.
- Temporarily install the exhaust pipe protector 2 and exhaust pipe protector 2 bracket as shown in the illustration.
- Position the exhaust pipe protector 2 bracket band so that its section to crimp is positioned at the location “a” shown in the illustration.

TIP

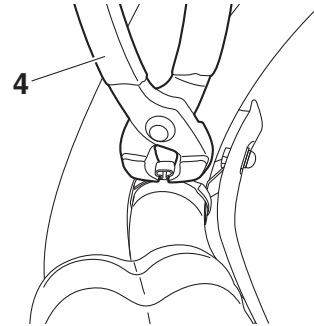
Be sure to place the exhaust pipe protector 2 bracket band over the exhaust pipe protector 2 bracket.



- Crimp the exhaust pipe protector 2 bracket band using the boots band installation tool “4”.



Boots band installation tool
90890-01526
Boots band installation tool
YM-01526



3. Tighten:

- Exhaust pipe protector 2 bolts



Exhaust pipe protector 2 bolt
8 N·m (0.8 kgf·m, 5.8 lb·ft)
LOCTITE®

4. Install:

- Exhaust pipe assembly



Exhaust pipe bolt
20 N·m (2.0 kgf·m, 14 lb·ft)
Exhaust pipe nut
20 N·m (2.0 kgf·m, 14 lb·ft)

EAS31588

INSTALLING THE MUFFLER

1. Install:

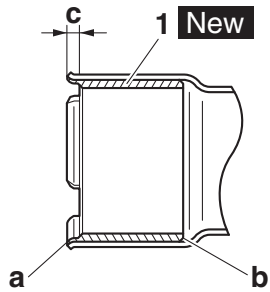
- Gasket “1” **New**
(to muffler)

TIP

Install the gasket with the chamfer “a”, located on an inner rim of the gasket, and the chamfer “b”, located on an outer rim of the gasket, as shown.



Installed depth of gasket “c”
3.5 mm (0.14 in)

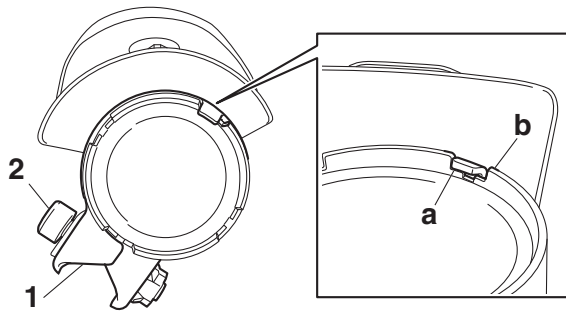


2. Install:

- Clamp “1”
(to the muffler assembly)

TIP

- Fit the projection “a” on the clamp into the slot “b” shown in the illustration.
- Temporarily tighten the clamp bolt “2”.



3. Install:

- Muffler assembly
- Muffler bracket



Muffler bolt
35 N·m (3.5 kgf·m, 25 lb·ft)
Muffler bracket bolt
53 N·m (5.3 kgf·m, 38 lb·ft)

4. Tighten:

- Clamp bolt



Clamp bolt
12 N·m (1.2 kgf·m, 8.7 lb·ft)

EAS31591

INSTALLING THE HORN

1. Install:

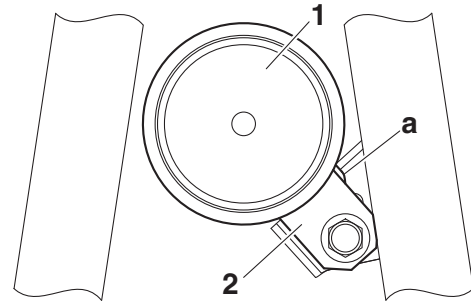
- Horn “1”



Horn bracket and down tube bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

Make sure that the horn bracket “2” contacts the portion “a” of the stay on the frame.



EAS30250

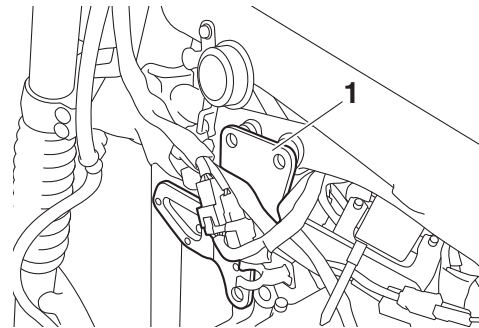
REMOVING THE ENGINE

1. Remove:

- Engine bracket (front upper side) “1”

TIP

Before removing the engine, remove the engine bracket (front upper side) so that the cylinder head does not strike the bracket.



EAS30251

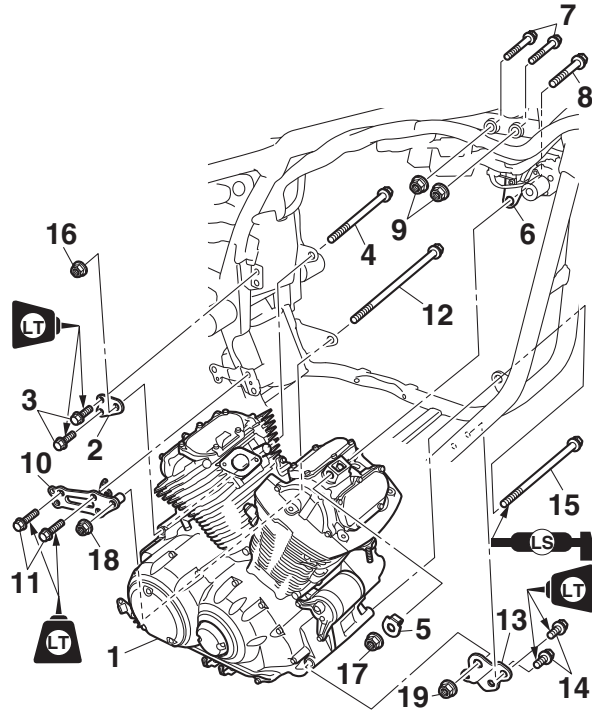
INSTALLING THE ENGINE

1. Install:

- Engine “1”
- Engine bracket (rear upper side) “2”
- Engine bracket bolts (rear upper side) “3”
- Engine mounting bolt (rear upper side) “4”
- Lock washer “5”
- Engine bracket (front upper side) “6”
- Engine bracket bolts (front upper side) “7”
- Engine mounting bolt (front upper side) “8”
- Engine bracket nuts (front upper side) “9”
- Engine bracket (rear lower side) “10”
- Engine bracket bolts (rear lower side) “11”
- Engine mounting bolt (rear lower side) “12”
- Engine bracket (front lower side) “13”
- Engine bracket bolts (front lower side) “14”
- Engine mounting bolt (front lower side) “15”
- Engine mounting nut (rear upper side) “16”
- Engine mounting nut (front upper side) “17”
- Engine mounting nut (rear lower side) “18”
- Engine mounting nut (front lower side) “19”

TIP

- Lubricate the engine mounting bolt (front lower side) threads with lithium-soap-based grease.
- Apply locking agent (LOCTITE®) to the threads of the engine bracket bolts (front lower side), engine bracket bolts (rear lower side), and engine bracket bolts (rear upper side).
- Do not tighten the bolts and nuts.



2. Tighten:

- Engine bracket bolts (rear upper side) “3”
- Engine bracket nuts (front upper side) “9”
- Engine bracket bolts (rear lower side) “11”
- Engine bracket bolts (front lower side) “14”



Engine bracket bolt (rear upper side)

48 N·m (4.8 kgf·m, 35 lb·ft)

LOCTITE®

Engine bracket nut (front upper side)

48 N·m (4.8 kgf·m, 35 lb·ft)

Engine bracket bolt (rear lower side)

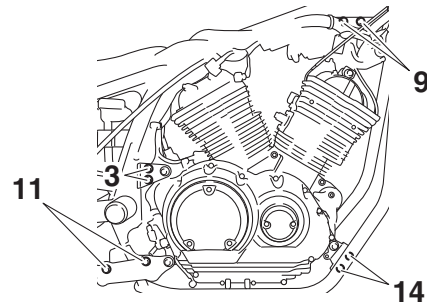
48 N·m (4.8 kgf·m, 35 lb·ft)

LOCTITE®

Engine bracket bolt (front lower side)

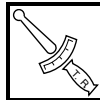
48 N·m (4.8 kgf·m, 35 lb·ft)

LOCTITE®



3. Tighten:

- Engine mounting nut (rear upper side) “16”
- Engine mounting nut (front upper side) “17”
- Engine mounting nut (rear lower side) “18”
- Engine mounting nut (front lower side) “19”



Engine mounting nut (rear upper side)

88 N·m (8.8 kgf·m, 64 lb·ft)

Engine mounting nut (front upper side)

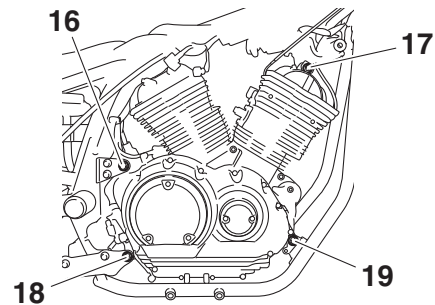
88 N·m (8.8 kgf·m, 64 lb·ft)

Engine mounting nut (rear lower side)

88 N·m (8.8 kgf·m, 64 lb·ft)

Engine mounting nut (front lower side)

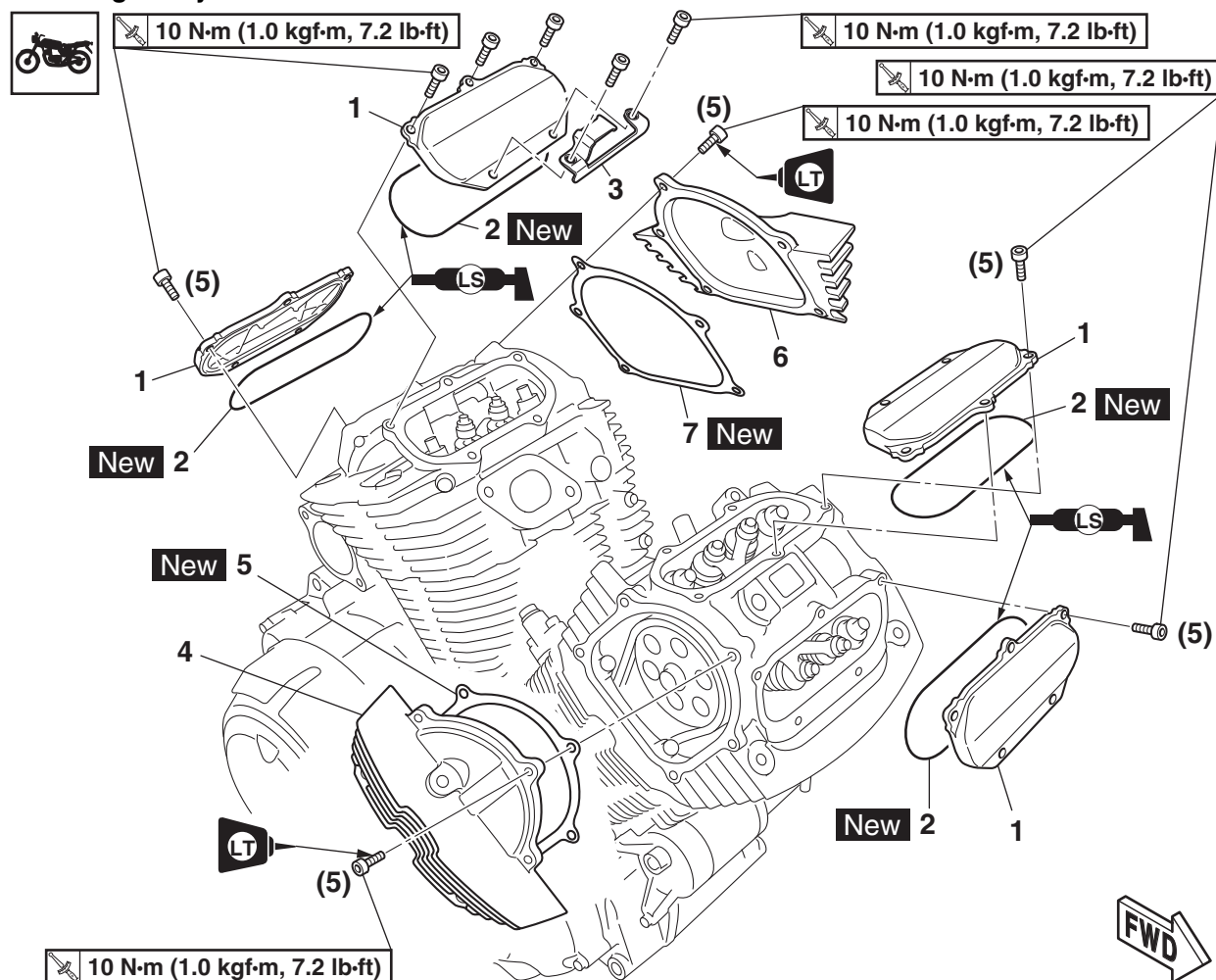
88 N·m (8.8 kgf·m, 64 lb·ft)



EAS20043

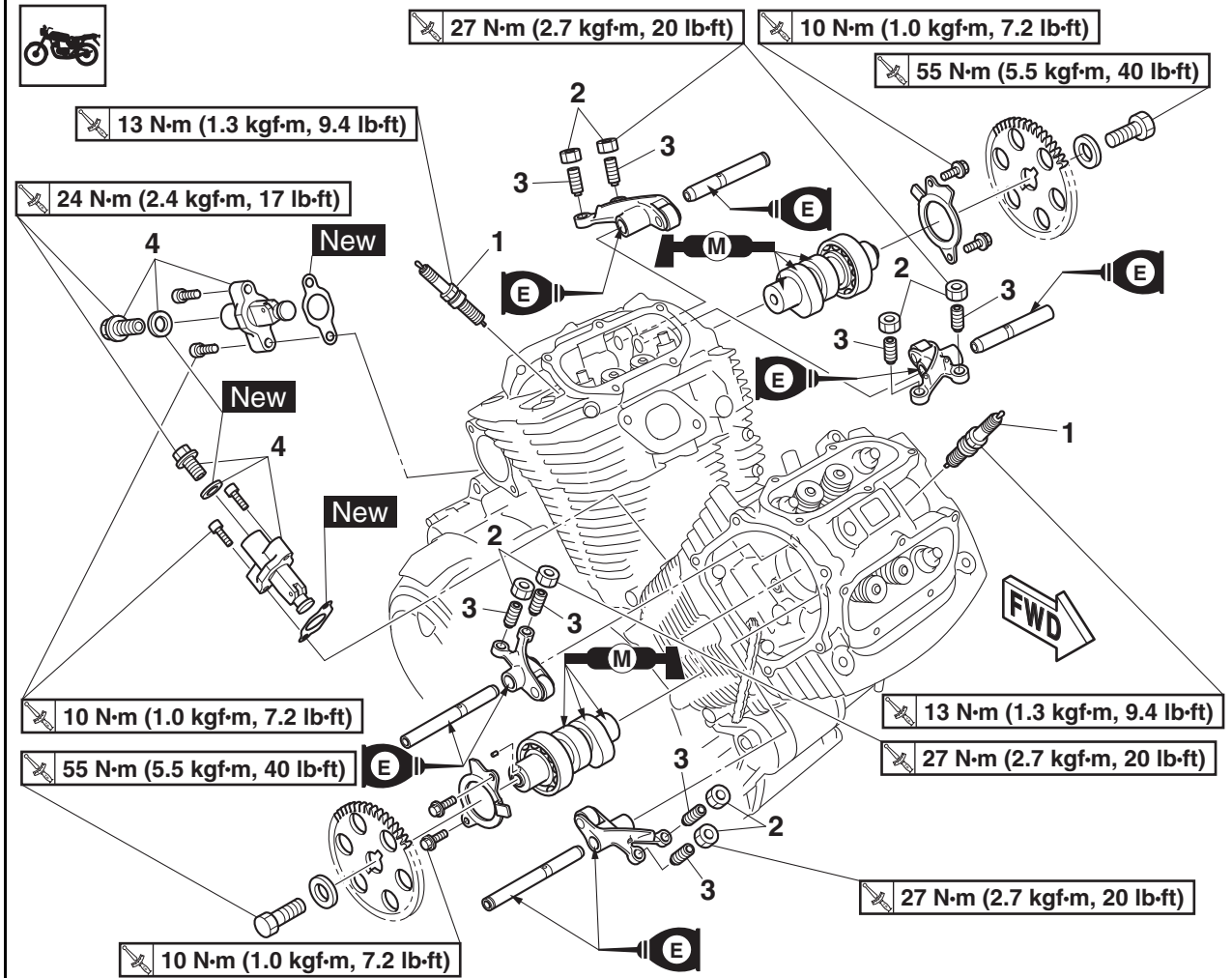
CAMSHAFTS

Removing the cylinder head covers



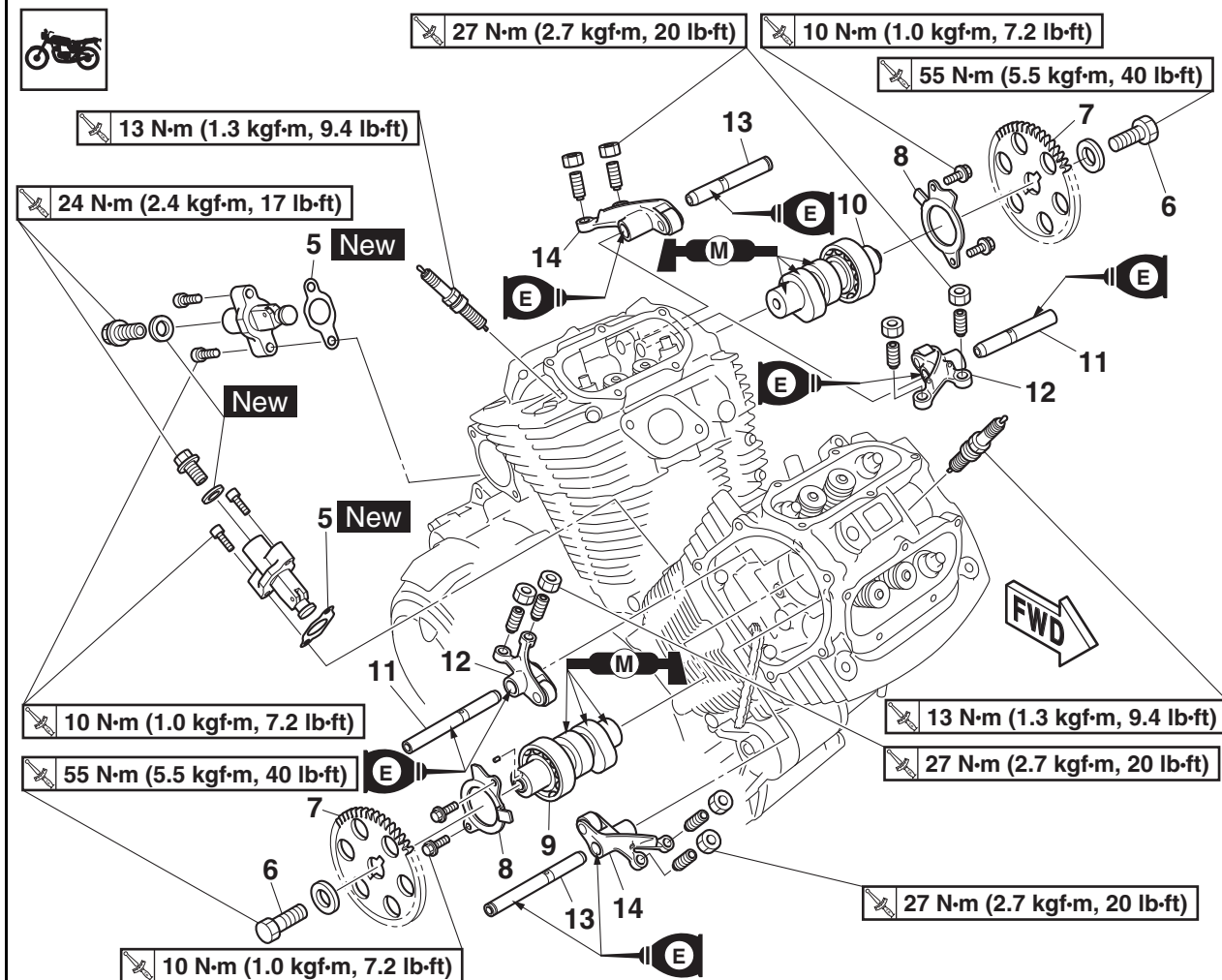
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (3)" on page 4-6
	Cylinder covers/Cylinder cover brackets/Rear cylinder head guard		Refer to "ENGINE REMOVAL" on page 5-2.
	Fuel tank/Hose holder		Refer to "FUEL TANK" on page 6-1.
	Throttle body/Intake manifold assembly		Refer to "THROTTLE BODIES" on page 6-8.
1	Tappet cover	4	
2	O-ring	4	
3	Fuel filter bracket	1	
4	Front cylinder side cover	1	
5	Front cylinder side cover gasket	1	
6	Rear cylinder side cover	1	
7	Rear cylinder side cover gasket	1	

Removing the camshafts and rocker arms



Order	Job/Parts to remove	Q'ty	Remarks
	Drive belt upper guard		Refer to "REAR WHEEL" on page 4-15.
	Drive belt lower guard		Refer to "SWINGARM AND REAR SHOCK ABSORBER ASSEMBLIES" on page 4-66.
	Air duct/Drive pulley cover/Drive pulley		Refer to "BELT DRIVE" on page 4-71.
	Drive pulley housing		Refer to "ENGINE REMOVAL" on page 5-2.
1	Spark plug	2	
2	Locknut	8	
3	Valve clearance adjusting screw	8	
4	Timing chain tensioner	2	

Removing the camshafts and rocker arms



Order	Job/Parts to remove	Q'ty	Remarks
5	Timing chain tensioner gasket	2	
6	Camshaft sprocket bolt	2	
7	Camshaft sprocket	2	
8	Camshaft retainer	2	
9	Front cylinder camshaft	1	
10	Rear cylinder camshaft	1	
11	Intake rocker arm shaft	2	
12	Intake rocker arm	2	
13	Exhaust rocker arm shaft	2	
14	Exhaust rocker arm	2	

EAS31592

REMOVING THE CAMSHAFTS AND ROCKER ARMS

1. Align:

- “I” mark on the front cylinder camshaft sprocket
(with the arrow mark on the front cylinder head)

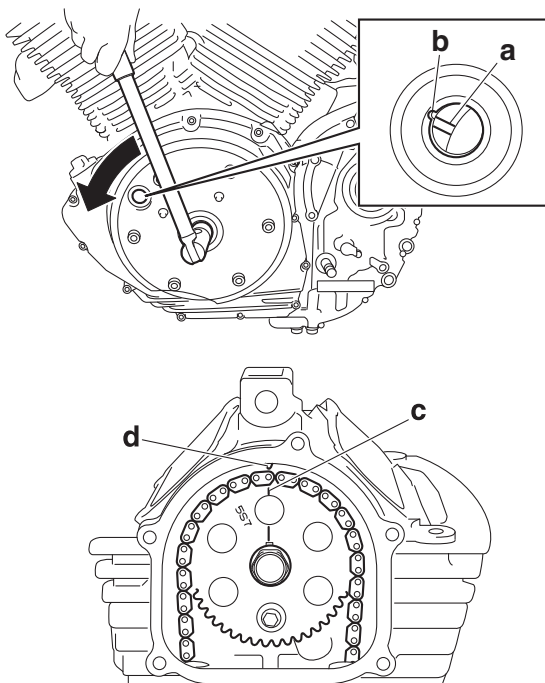


Front cylinder

- Turn the crankshaft counterclockwise.
- When the front cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

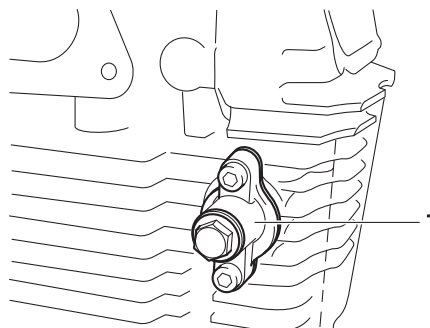
TIP

To position the front cylinder piston at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the arrow mark “d” on the front cylinder head.



2. Remove:

- Front cylinder timing chain tensioner “1”



3. Remove:

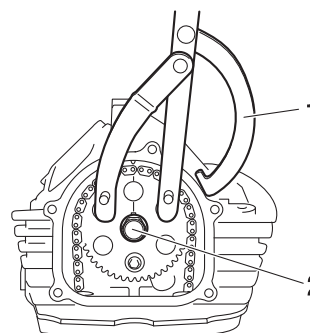
- Front cylinder camshaft sprocket

TIP

- While holding the camshaft sprocket with the rotor holding tool “1”, loosen the camshaft sprocket bolt “2”.
- To prevent the timing chain from falling into the crankcase, fasten it with a wire.



Rotor holding tool
90890-01235
Universal magneto and rotor
holder
YU-01235



4. Remove:

- Camshaft retainer
- Front cylinder camshaft

5. Remove:

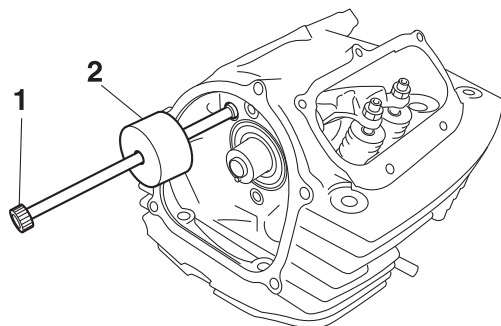
- Intake rocker arm shaft
- Exhaust rocker arm shaft
- Intake rocker arm
- Exhaust rocker arm

TIP

Remove the rocker arm shafts with the slide hammer bolt “1” and weight “2”.



Slide hammer bolt
90890-01083
Slide hammer bolt 6 mm
YU-01083-1
Weight
90890-01084
Weight
YU-01083-3



6. Align:

- “I” mark on the rear cylinder camshaft sprocket
 (with the arrow mark on the rear cylinder head)

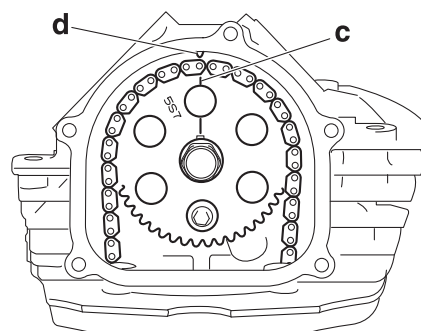
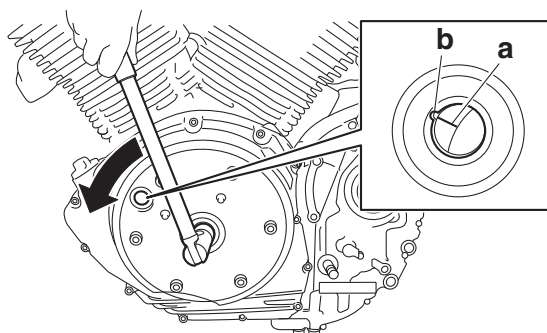


Rear cylinder

- Turn the crankshaft counterclockwise from the front cylinder piston TDC by 300 degrees.
- When the rear cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.

TIP

To position the rear cylinder piston at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the arrow mark “d” on the rear cylinder head.



7. Remove:

- Rear cylinder timing chain tensioner
- Rear cylinder camshaft sprocket
- Camshaft retainer
- Rear cylinder camshaft
- Intake rocker arm shaft
- Exhaust rocker arm shaft
- Intake rocker arm
- Exhaust rocker arm

TIP

Remove the parts using the same procedure as for the front cylinder camshaft and rocker arm.

EAS30257

CHECKING THE CAMSHAFTS

1. Check:

- Camshaft lobes
 Blue discoloration/pitting/scratches → Replace the camshaft.

2. Measure:

- Camshaft lobe dimensions “a”
 Out of specification → Replace the camshaft.



Camshaft lobe dimensions

Lobe height (Intake)

42.470–42.570 mm (1.6720–1.6760 in)

Limit

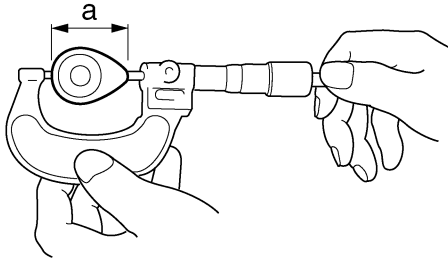
42.370 mm (1.6681 in)

Lobe height (Exhaust)

42.138–42.238 mm (1.6590–1.6629 in)

Limit

42.038 mm (1.6550 in)



3. Check:

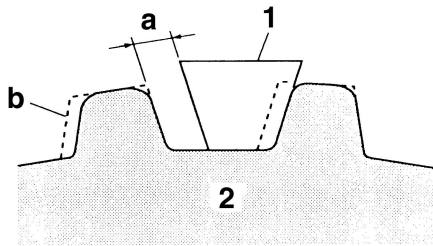
- Camshaft oil passage
Obstruction → Blow out with compressed air.

EAS30936

CHECKING THE CAMSHAFT SPROCKETS

1. Check:

- Camshaft sprockets
More than 1/4 tooth wear “a” → Replace the camshaft sprocket and the timing chain as a set.



- a. 1/4 tooth
- b. Correct
- 1. Timing chain roller
- 2. Camshaft sprocket

EAS30259

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:

- Rocker arm
- Rocker arm roller
Damage/wear → Replace.

2. Check:

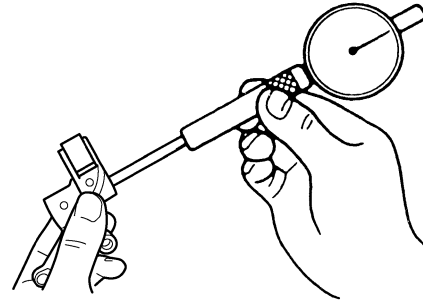
- Rocker arm shaft
Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.

3. Measure:

- Rocker arm inside diameter
Out of specification → Replace.



Rocker arm inside diameter
12.000–12.018 mm (0.4724–0.4731 in)
Limit
12.036 mm (0.4739 in)

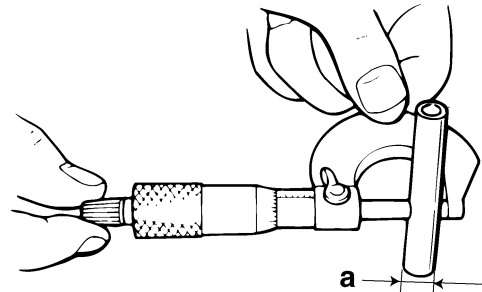


4. Measure:

- Rocker arm shaft outside diameter “a”
Out of specification → Replace.



Rocker arm shaft outside diameter
11.981–11.991 mm (0.4717–0.4721 in)
Limit
11.941 mm (0.4701 in)



EAS30266

CHECKING THE TIMING CHAIN TENSIONERS

The following procedure applies to all of the timing chain tensioners.

1. Check:

- Timing chain tensioner
Cracks/damage → Replace.

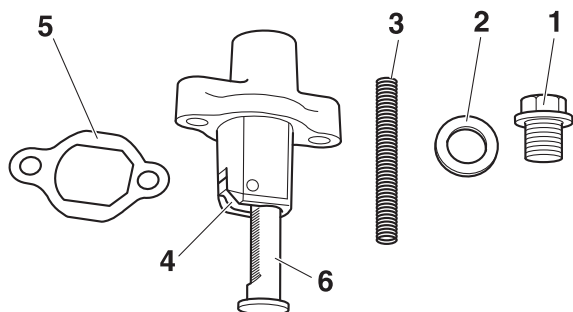
2. Check:

- One-way cam operation
Rough movement → Replace the timing chain tensioner assembly.

3. Check:

- Timing chain tensioner cap bolt “1”
- Copper washer “2”
- Timing chain tensioner spring “3”
- One-way cam “4”

- Timing chain tensioner gasket “5”
 - Timing chain tensioner rod “6”
- Damage/wear → Replace the defective part(s).



EAS31594

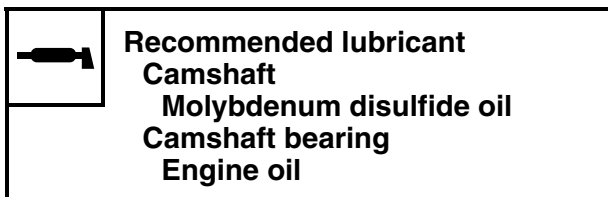
INSTALLING THE ROCKER ARMS AND CAMSHAFTS

The following procedure applies to all of the rocker arms and camshafts.

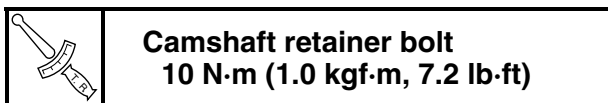
1. Lubricate:
 - Rocker arm shafts



2. Install:
 - Rocker arms
 - Rocker arm shafts
3. Lubricate:
 - Camshaft

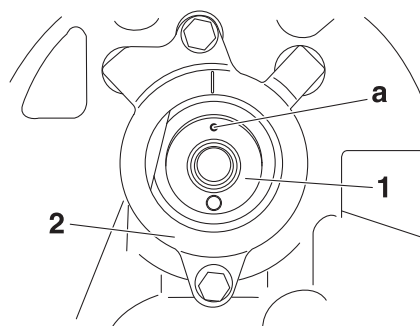


4. Install:
 - Camshaft “1”
 - Camshaft retainer “2”



TIP

The front cylinder camshaft is identified by the punch mark “a”. The rear cylinder camshaft does not have a punch mark.

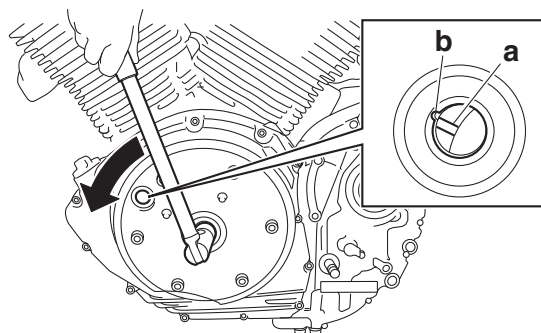


5. Install:
 - Front cylinder camshaft sprocket



Front cylinder

- a. Turn the crankshaft counterclockwise.
- b. When the front cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.



- c. Install the timing chain “1” onto the front cylinder camshaft sprocket “2”, then install the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolt “3”.

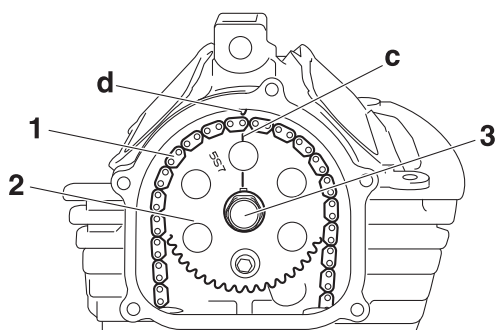
ECA13740

NOTICE

Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.

TIP

- To position the front cylinder piston at TDC on the compression stroke, align the “1” mark “c” on the camshaft sprocket with the arrow mark “d” on the front cylinder head.
- When installing the front cylinder camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.



d. Remove the wire from the timing chain.

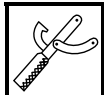


6. Tighten:

- Front cylinder camshaft sprocket bolt “1”

TIP

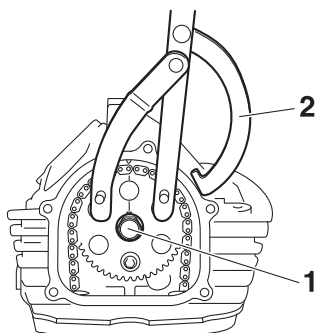
While holding the camshaft sprocket with the rotor holding tool “2”, tighten the camshaft sprocket bolt.



Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



Camshaft sprocket bolt
55 N·m (5.5 kgf·m, 40 lb·ft)



7. Install:

- Front cylinder timing chain tensioner gasket “1” **New**
- Front cylinder timing chain tensioner “2”

TIP

To push in the timing chain tensioner rod, release the lock by pushing in the one-way cam “6”.



Timing chain tensioner bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

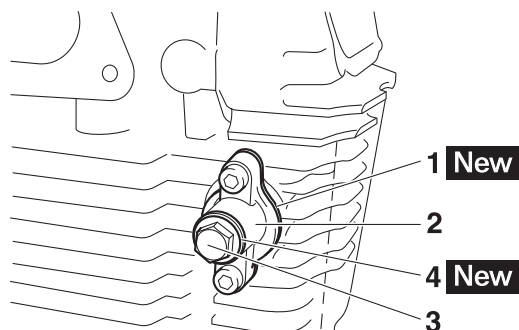
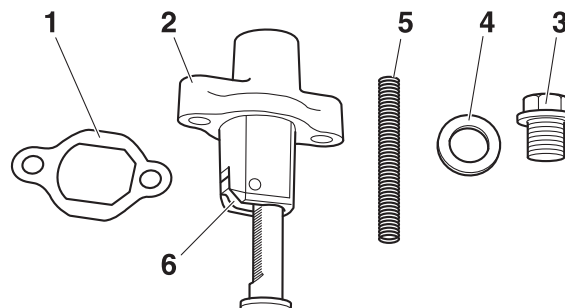
8. Install:

- Timing chain tensioner spring “5”

- Copper washer “4” **New**
- Timing chain tensioner cap bolt “3”



Timing chain tensioner cap bolt
24 N·m (2.4 kgf·m, 17 lb·ft)



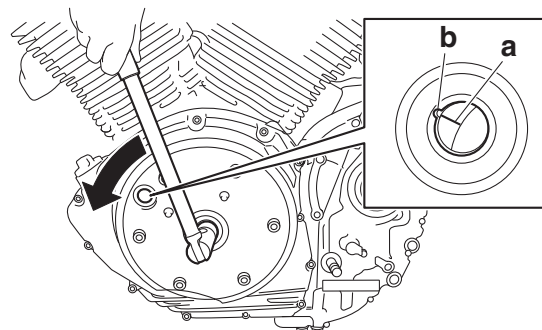
9. Install:

- Rear cylinder camshaft sprocket



Rear cylinder

- Turn the crankshaft counterclockwise from the front cylinder piston TDC by 300 degrees.
- When the rear cylinder piston is at TDC on the compression stroke, align the TDC mark “a” on the generator rotor with the slot “b” in the generator cover.



- Install the timing chain “1” onto the rear cylinder camshaft sprocket “2”, then install the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolt “3”.

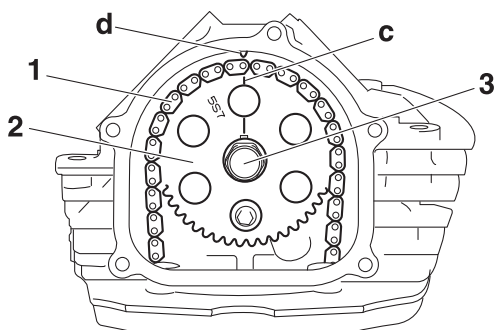
ECA13740

NOTICE

Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.

TIP

- To position the rear cylinder piston at TDC on the compression stroke, align the "I" mark "c" on the camshaft sprocket with the arrow mark "d" on the rear cylinder head.
- When installing the rear cylinder camshaft sprocket, be sure to keep the timing chain as tight as possible on the intake side.



d. Remove the wire from the timing chain.



10. Tighten:

- Rear cylinder camshaft sprocket bolt "1"

TIP

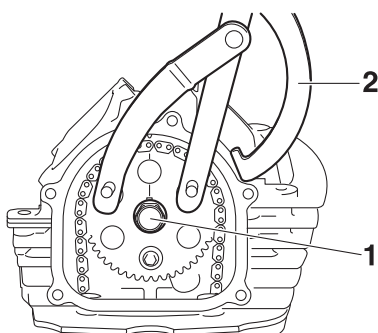
While holding the camshaft sprocket with the rotor holding tool "2", tighten the camshaft sprocket bolt.



Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



Camshaft sprocket bolt
55 N·m (5.5 kgf·m, 40 lb·ft)



11. Install:

- Rear cylinder timing chain tensioner gasket "1" **New**
- Rear cylinder timing chain tensioner "2"

TIP

To push in the timing chain tensioner rod, release the lock by pushing in the one-way cam "6".



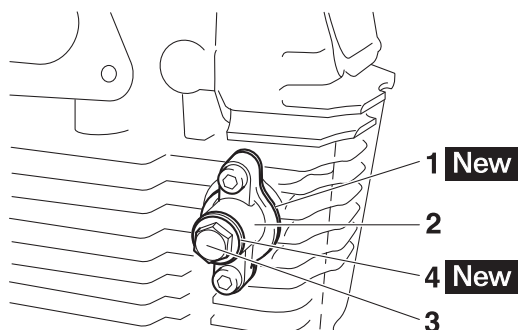
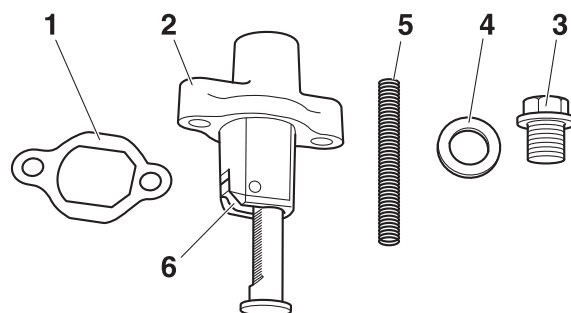
Timing chain tensioner bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

12. Install:

- Timing chain tensioner spring "5"
- Copper washer "4" **New**
- Timing chain tensioner cap bolt "3"



Timing chain tensioner cap bolt
24 N·m (2.4 kgf·m, 17 lb·ft)



13. Measure:

- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.

EAS30274

INSTALLING THE CYLINDER HEAD COVERS

1. Install:

- Rear cylinder side cover
- Fuel filter bracket
- Tappet covers



Rear cylinder side cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)
LOCTITE®
Tappet cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

2. Install:

- Front cylinder side cover
- Tappet covers

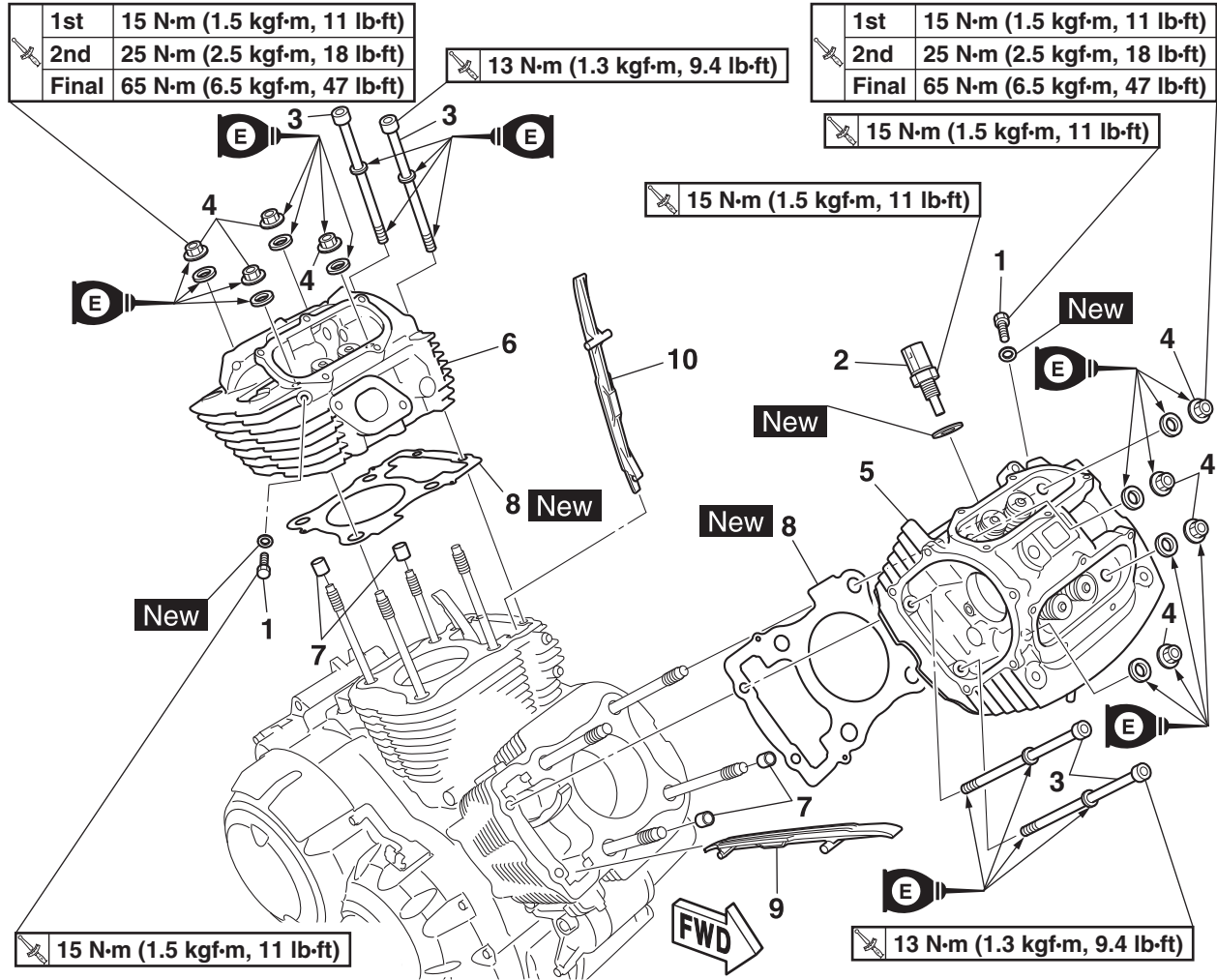


Front cylinder side cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)
LOCTITE®
Tappet cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

EAS20044

CYLINDER HEADS

Removing the cylinder heads



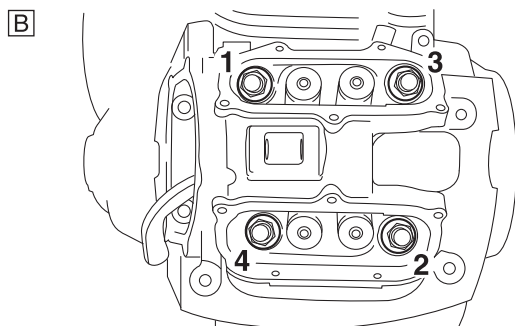
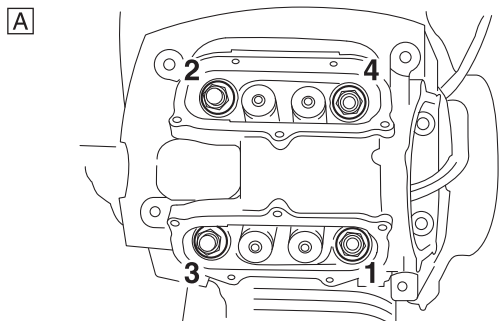
Order	Job/Parts to remove	Q'ty	Remarks
	Camshaft assemblies		Refer to "CAMSHAFTS" on page 5-14.
1	Oil check bolt	2	
2	Engine temperature sensor	1	
3	Cylinder head bolt	4	
4	Cylinder head nut	8	
5	Front cylinder head	1	
6	Rear cylinder head	1	
7	Dowel pin	4	
8	Cylinder head gasket	2	
9	Timing chain guide (exhaust side)	1	
10	Timing chain guide (intake side)	1	

1. Remove:

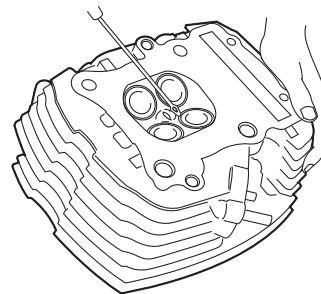
- Cylinder head bolts
- Cylinder head nuts

TIP

- Loosen the cylinder head nuts in the proper sequence as shown.
- Loosen each cylinder head nut 1/2 of a turn at a time. After all of the cylinder head nut are fully loosened, remove them.



A. Front cylinder head
B. Rear cylinder head

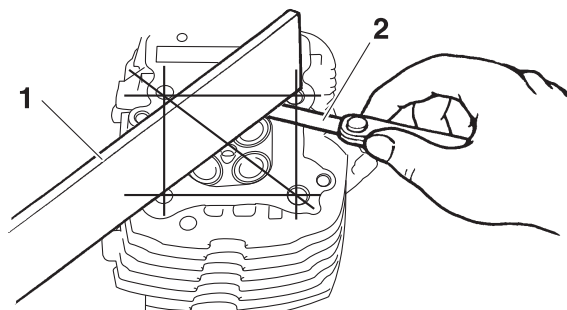


2. Check:
 - Cylinder heads
Damage/scratches → Replace.
3. Measure:
 - Cylinder head warpage
Out of specification → Resurface the cylinder head.



Warpage limit
0.03 mm (0.0012 in)

- 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 400–600 grit wet sandpaper on a surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

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



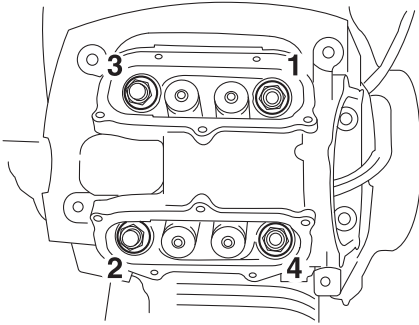
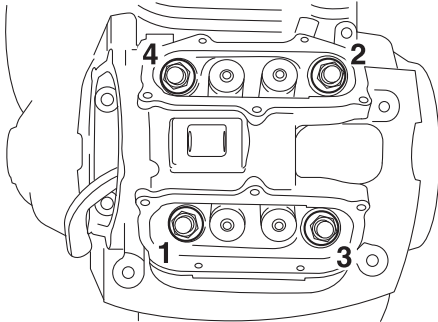
EAS30282

1. Tighten:

- Cylinder head nuts
- Cylinder head bolts

**Cylinder head nut****1st: 15 N·m (1.5 kgf·m, 11 lb·ft)****2nd: 25 N·m (2.5 kgf·m, 18 lb·ft)****Final: 65 N·m (6.5 kgf·m, 47 lb·ft)****Cylinder head bolt****13 N·m (1.3 kgf·m, 9.4 lb·ft)****TIP**

- Lubricate the cylinder head nuts and washers with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in three stages.

A**B**

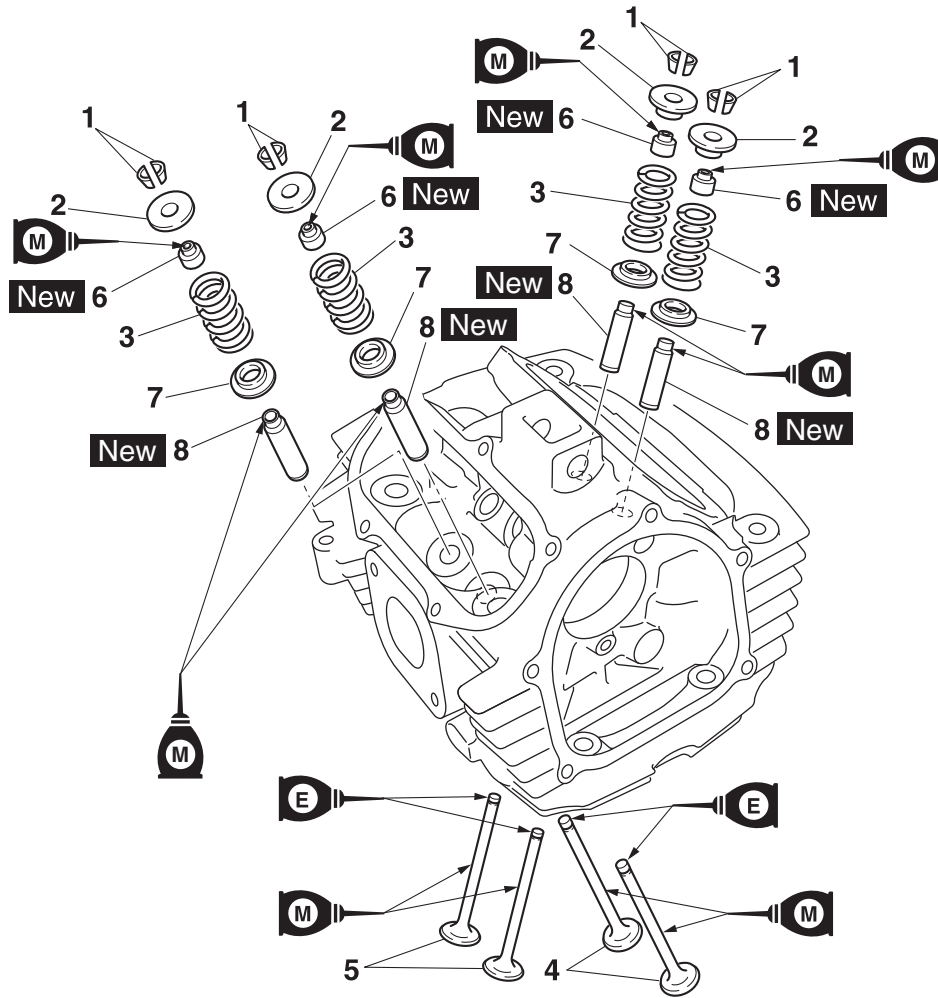
A. Front cylinder head

B. Rear cylinder head

EAS20045

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both cylinders.
	Cylinder heads		Refer to "CYLINDER HEADS" on page 5-24.
1	Valve cotter	8	
2	Upper spring seat	4	
3	Valve spring	4	
4	Intake valve	2	
5	Exhaust valve	2	
6	Valve stem seal	4	
7	Lower spring seat	4	
8	Valve guide	4	

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, and valve seats), make sure the valves properly seal.

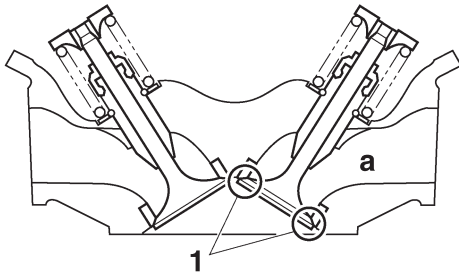
1. Check:

- 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 5-30.

- Pour a clean solvent "a" into the intake and exhaust ports.
- Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



2. Remove:

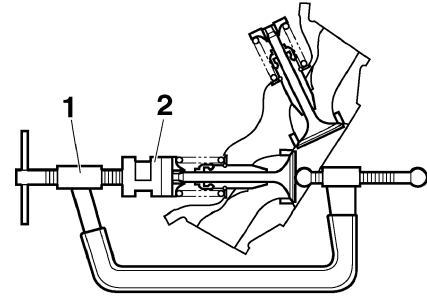
- Valve cotters

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 attach-
ment
90890-01243
Valve spring compressor adapt-
er (26 mm)
YM-01253-1

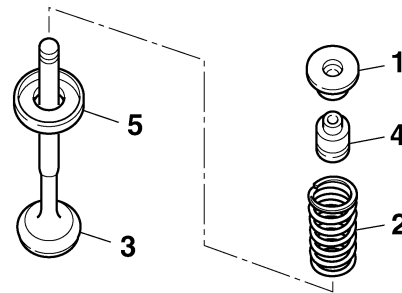


3. Remove:

- Upper spring seat "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Lower 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.

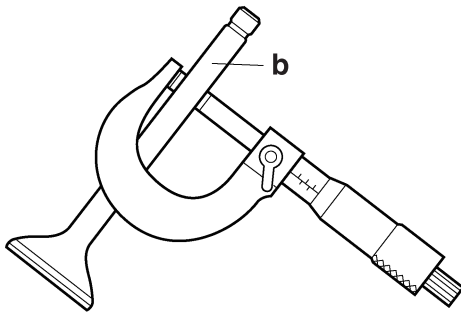
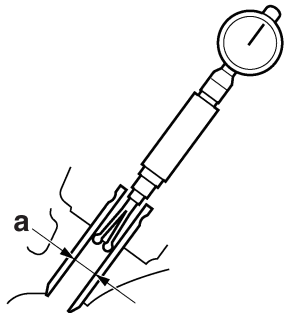
1. Measure:

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

$$\text{Valve-stem-to-valve-guide clearance} = \text{Valve guide inside diameter "a"} - \text{Valve stem diameter "b"}$$



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)

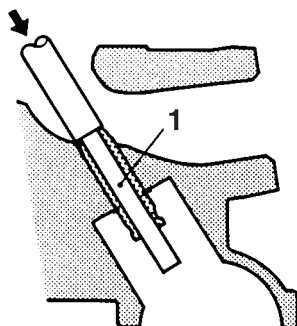


2. Replace:
- Valve guide

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.

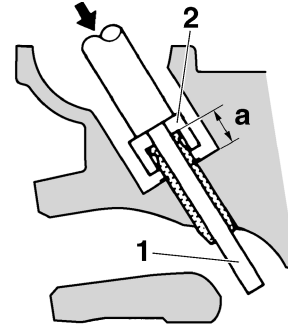
- a. Remove the valve guide with the valve guide remover “1”.



- b. Install the new valve guide with the valve guide installer “2” and valve guide remover “1”.

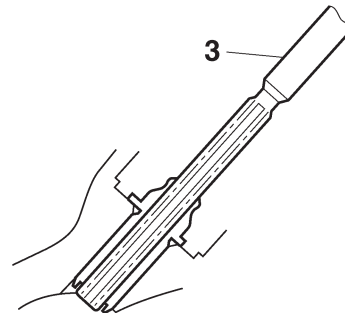


Valve guide position
 12.7–13.1 mm (0.500–0.515 in)



- 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 (ø6)
 90890-04064
Valve guide remover (6.0 mm)
 YM-04064-A
Valve guide installer (ø6)
 90890-04065
Valve guide installer (6.0 mm)
 YM-04065-A
Valve guide reamer (ø6)
 90890-04066
Valve guide reamer (6.0 mm)
 YM-04066

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:

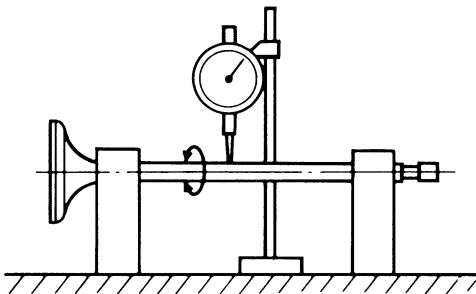
- Valve stem runout
Out of specification → Replace the valve.

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:

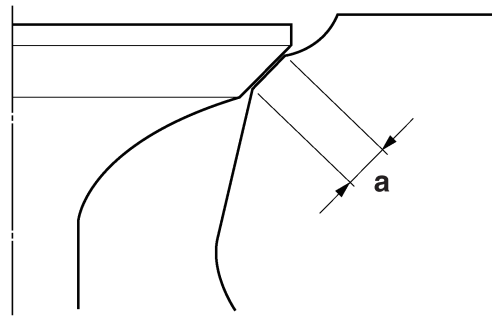
- Valve seat
Pitting/wear → Replace the cylinder head.

3. Measure:

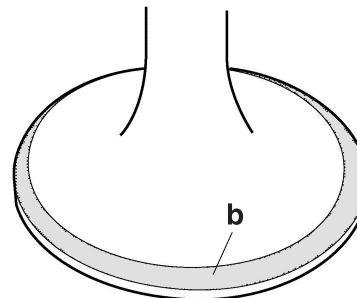
- Valve seat width "a"
Out of specification → Replace the cylinder head.



Valve seat contact width (intake)
1.00–1.20 mm (0.0394–0.0472 in)
Limit
1.6 mm (0.06 in)
Valve seat contact width (exhaust)
1.00–1.20 mm (0.0394–0.0472 in)
Limit
1.6 mm (0.06 in)



a. Apply blue layout fluid "b" onto the valve face.



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

TIP

Where the valve seat and valve face contacted one another, the blue layout fluid will have been removed.

4. Lap:

- Valve face
- Valve seat

TIP

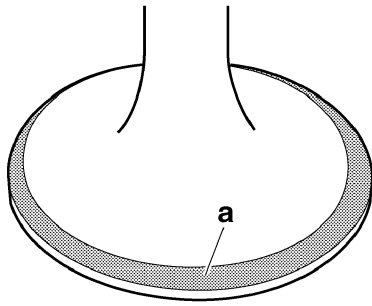
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound "a" to the valve face.

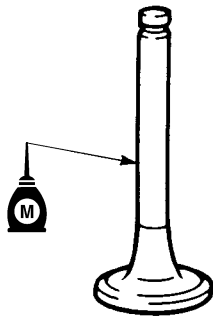
ECA13790

NOTICE

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



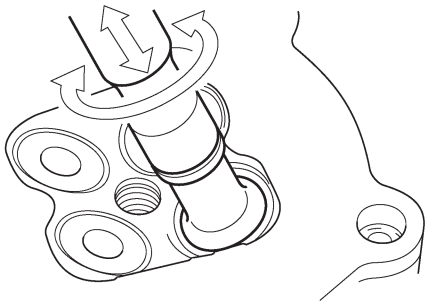
- b. Apply molybdenum disulfide oil onto the valve stem.



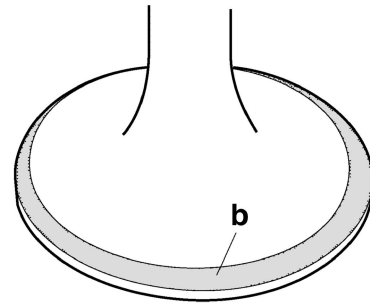
- c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

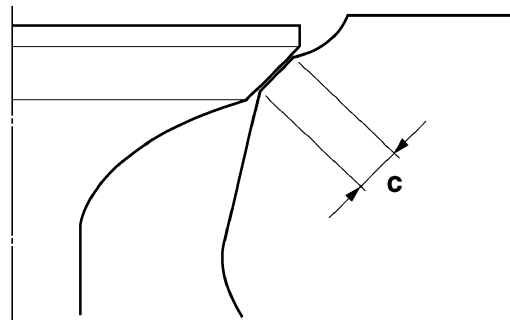
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- 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.



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)

42.43 mm (1.67 in)

Limit

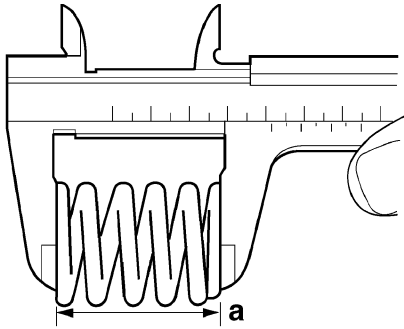
40.31 mm (1.59 in)

Free length (exhaust)

42.43 mm (1.67 in)

Limit

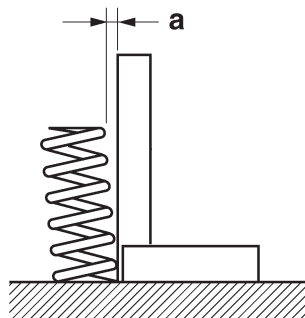
40.31 mm (1.59 in)



2. Measure:

- Valve spring tilt “a”
Out of specification → Replace the valve spring.

	Spring tilt (intake) 1.9 mm (0.07 in) Spring tilt (exhaust) 1.9 mm (0.07 in)
--	---



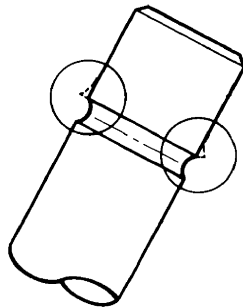
EAS30288

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:

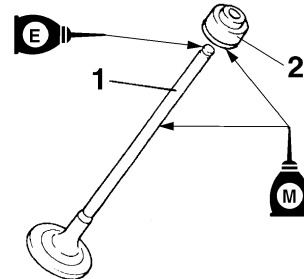
- Valve stem “1”
- Valve stem seal “2”
(with the recommended lubricant)

	Recommended lubricant Molybdenum disulfide oil
--	--

3. Lubricate:

- Valve stem end
(with the recommended lubricant)

	Recommended lubricant Engine oil
--	--

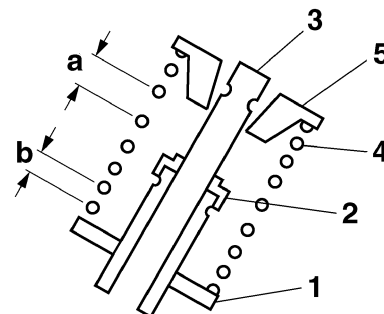
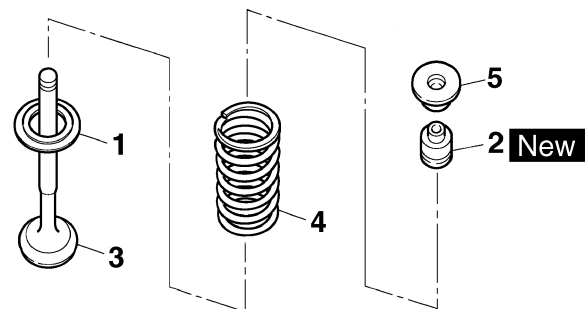


4. Install:

- Lower spring seat “1”
- Valve stem seal “2” **New**
- Valve “3”
- Valve spring “4”
- Upper spring seat “5”
(into the cylinder head)

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a” facing up.



- a. Larger pitch
- 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”.



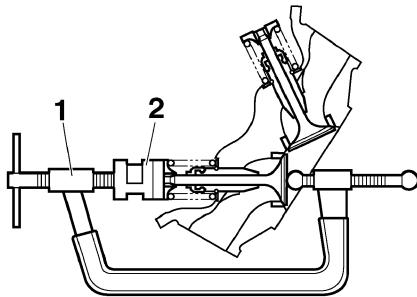
Valve spring compressor
90890-04019

Valve spring compressor
YM-04019

Valve spring compressor attach-
ment

90890-01243

Valve spring compressor adapt-
er (26 mm)
YM-01253-1

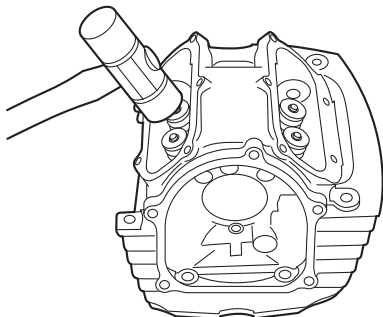


6. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

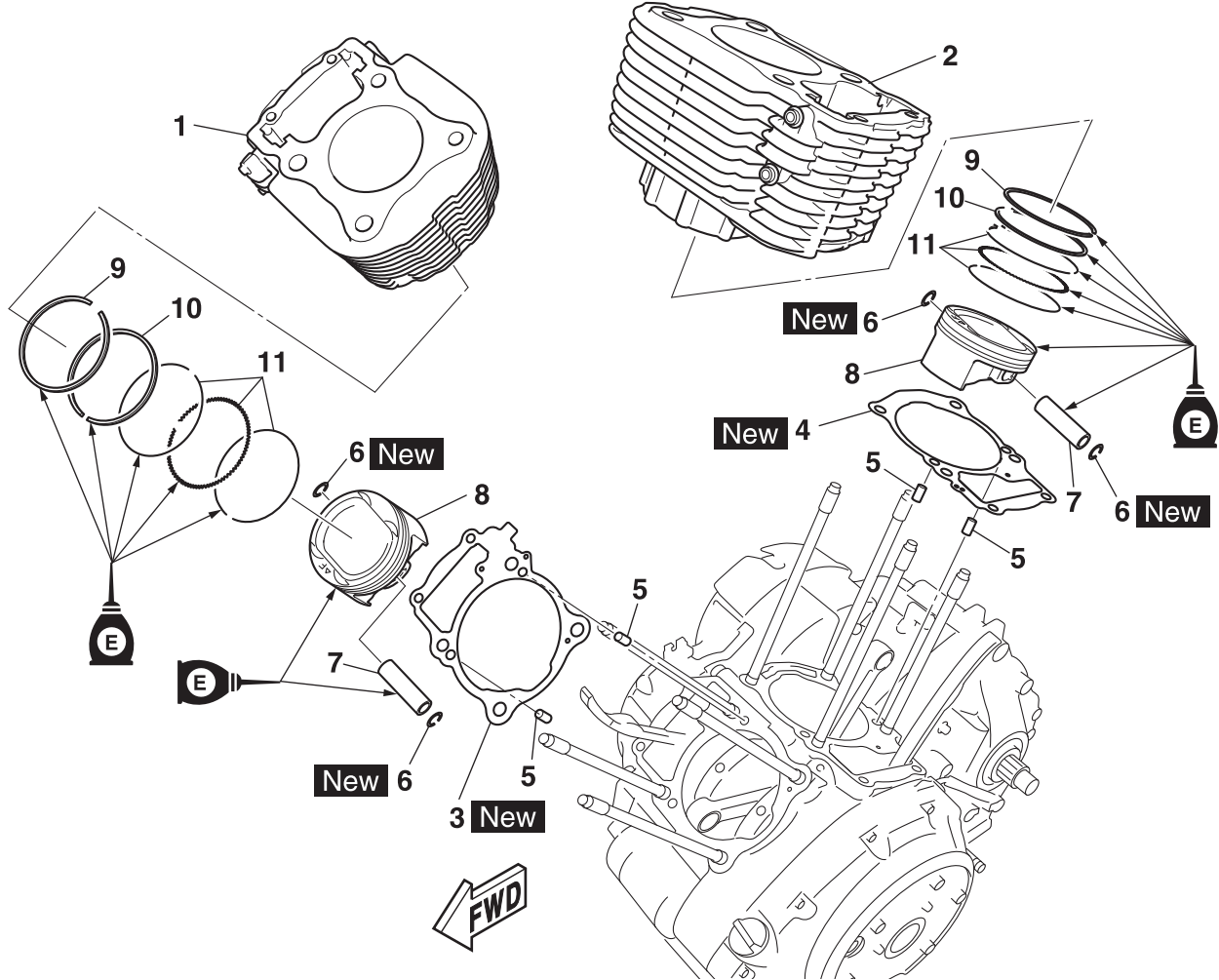
Hitting the valve tip with excessive force
could damage the valve.



EAS20046

CYLINDER AND PISTONS

Removing the cylinders and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder heads		Refer to "CYLINDER HEADS" on page 5-24.
1	Front cylinder	1	
2	Rear cylinder	1	
3	Front cylinder gasket	1	
4	Rear cylinder gasket	1	
5	Dowel pin	4	
6	Circlip	4	
7	Piston pin	2	
8	Piston	2	
9	Top ring	2	
10	2nd ring	2	
11	Oil ring	2	

The following procedure applies to all of the pistons.

1. Remove:
 - Circlips "1"
 - Piston pin "2"
 - Piston "3"

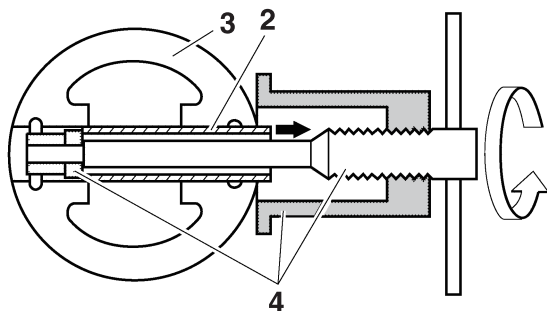
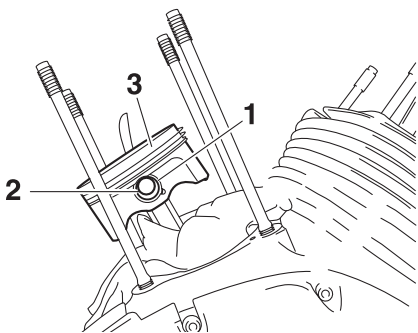
ECA13810

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

- Before removing the circlips, cover the crankcase opening with a clean rag to prevent the circlips from falling into the crankcase.
- Before removing the piston pin, deburr the circlips' groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "4".

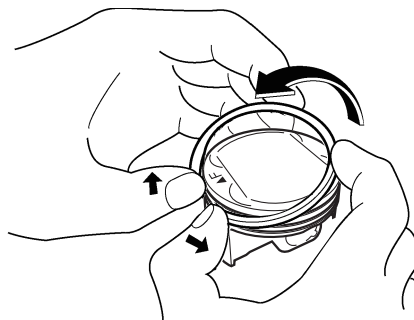


Piston pin puller set
90890-01304
Piston pin puller
YU-01304



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

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



EAS30291

The following procedure applies to all of the cylinders and pistons.

1. Check:
 - Piston wall
 - Cylinder wallVertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
 - Piston-to-cylinder clearance

a. Measure the cylinder bore with the cylinder bore gauge.

Measure the cylinder bore by taking side-to-side and front-to-back measurements of the cylinder.

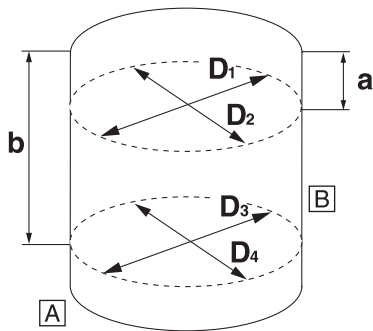


Bore
85.000–85.010 mm (3.3465–
3.3468 in)
Out of round limit
0.050 mm (0.0020 in)

Bore = maximum of D_1, D_2, D_3, D_4

Out of round limit (top) = difference between D_1 , D_2

Out of round limit (bottom) = difference between D_3, D_4



a. 10.0 mm (0.39 in)

b. 85.6 mm (3.37 in)

A. Intake side

B. Exhaust side

- b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

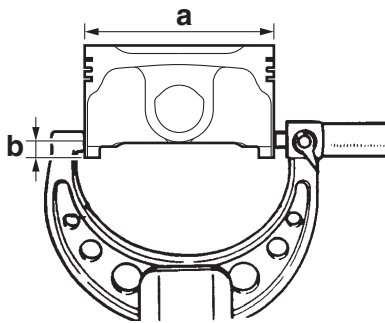
- c. Measure the piston skirt diameter “D” “a” with the micrometer.



Piston

Diameter

84.955–84.970 mm (3.3447–3.3453 in)



- b. 8 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 “C” -
Piston skirt diameter “D”



Piston-to-cylinder clearance

0.030–0.055 mm (0.0012–0.0022 in)

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



EAS30292

CHECKING THE PISTON RINGS

The following procedure applies to all of the piston rings.

1. Measure:

- Piston ring side clearance

Out of specification → Replace the piston and piston rings as a set.

TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



Piston ring

Top ring

Ring side clearance

0.040–0.080 mm (0.0016–0.0032 in)

Side clearance limit

0.100 mm (0.0039 in)

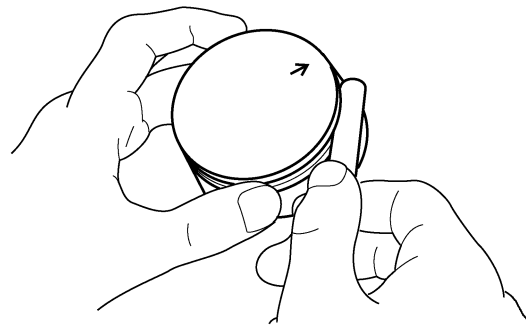
2nd ring

Ring side clearance

0.030–0.070 mm (0.0012–0.0028 in)

Side clearance limit

0.100 mm (0.0039 in)

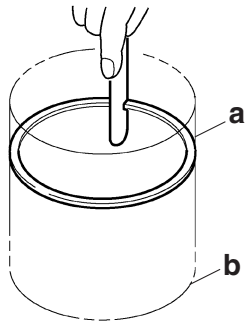


2. Install:

- Piston ring
(into the cylinder)

TIP

Use the piston crown to level the piston ring near the bottom “a” of the cylinder where the cylinder wear is lowest.



b. Upper of cylinder

3. Measure:

- Piston ring end gap
Out of specification → Replace the piston ring.

TIP

The oil ring expander spacer end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.



Piston ring
Top ring
End gap limit
0.60 mm (0.0236 in)
2nd ring
End gap limit
0.80 mm (0.0315 in)

EAS30293

CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

1. Check:

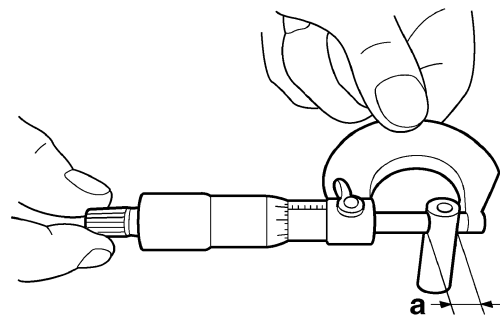
- Piston pin
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.

2. Measure:

- Piston pin outside diameter "a"
Out of specification → Replace the piston pin.



Piston pin outside diameter
20.991–21.000 mm (0.8264–0.8268 in)
Limit
20.971 mm (0.8256 in)

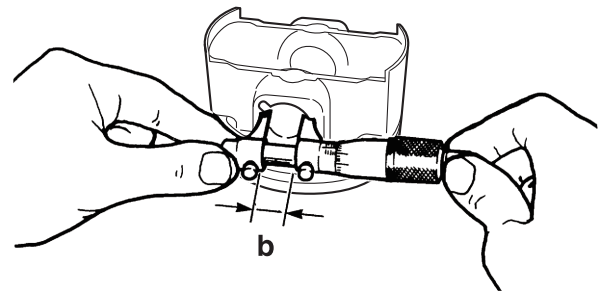


3. Measure:

- Piston pin bore diameter "b"
Out of specification → Replace the piston.



Piston pin bore inside diameter
21.004–21.015 mm (0.8269–0.8274 in)
Limit
21.045 mm (0.8285 in)



4. Calculate:

- Piston-pin-to-piston-pin-bore clearance
Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter "b" -
Piston pin outside diameter "a"



Piston-pin-to-piston-pin-bore clearance
0.004–0.024 mm (0.0002–0.0009 in)

EAS30866

INSTALLING THE PISTONS AND CYLINDERS

The following procedure applies to all of the pistons and cylinders.

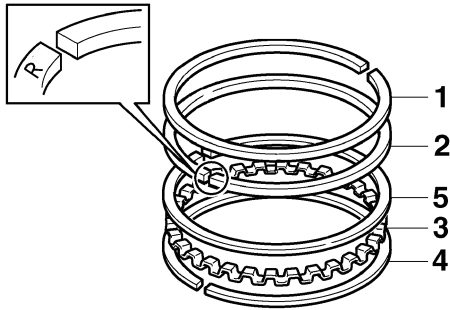
1. Install:

- Top ring "1"
- 2nd ring "2"
- Oil ring expander "3"
- Lower oil ring rail "4"
- Upper oil ring rail "5"

CYLINDER AND PISTONS

TIP

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.

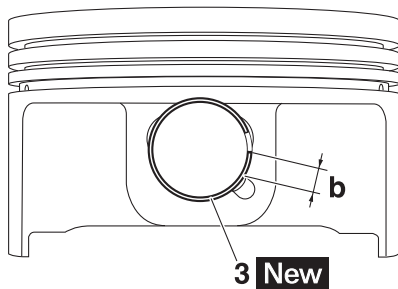
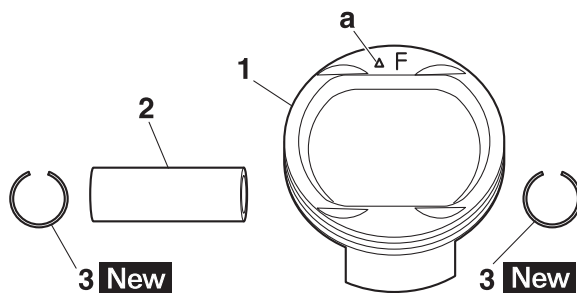


2. Install:

- Piston "1"
- Piston pin "2"
- Circlips "3" **New**

TIP

- Apply engine oil onto the piston pin.
- Make sure the arrow mark "a" on the piston faces towards the front side of the cylinder.
- Before installing the circlips, cover the crankcase opening with a clean rag to prevent the clips from falling into the crankcase.
- Install the circlips so that the clip ends are 3 mm (0.12 in) "b" or more from the cutout in the piston.
- Reinstall each piston into its original cylinder.



3. Lubricate:

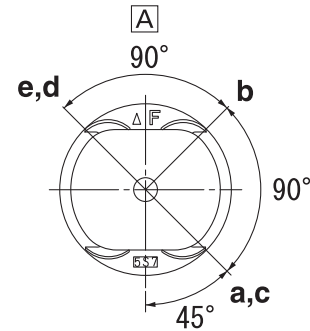
- Piston
- Piston rings

- Cylinder
(with the recommended lubricant)



4. Offset:

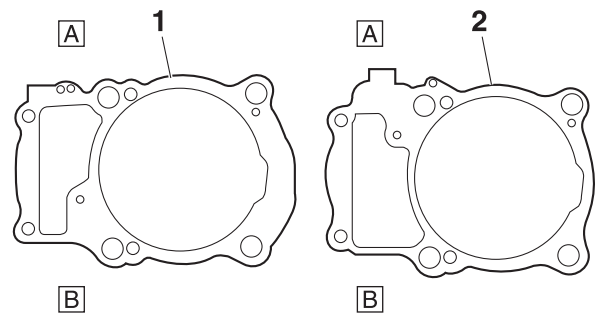
- Piston ring end gaps



- a. Top ring
- b. Upper oil ring rail
- c. Oil ring expander
- d. Lower oil ring rail
- e. 2nd ring
- A. forward

5. Install:

- Rear cylinder gasket "1"
- Front cylinder gasket "2"



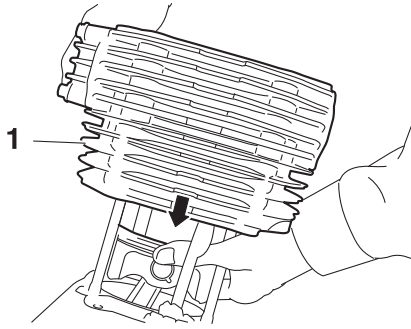
- A. Intake side
- B. Exhaust side

6. Install:

- Cylinder "1"

TIP

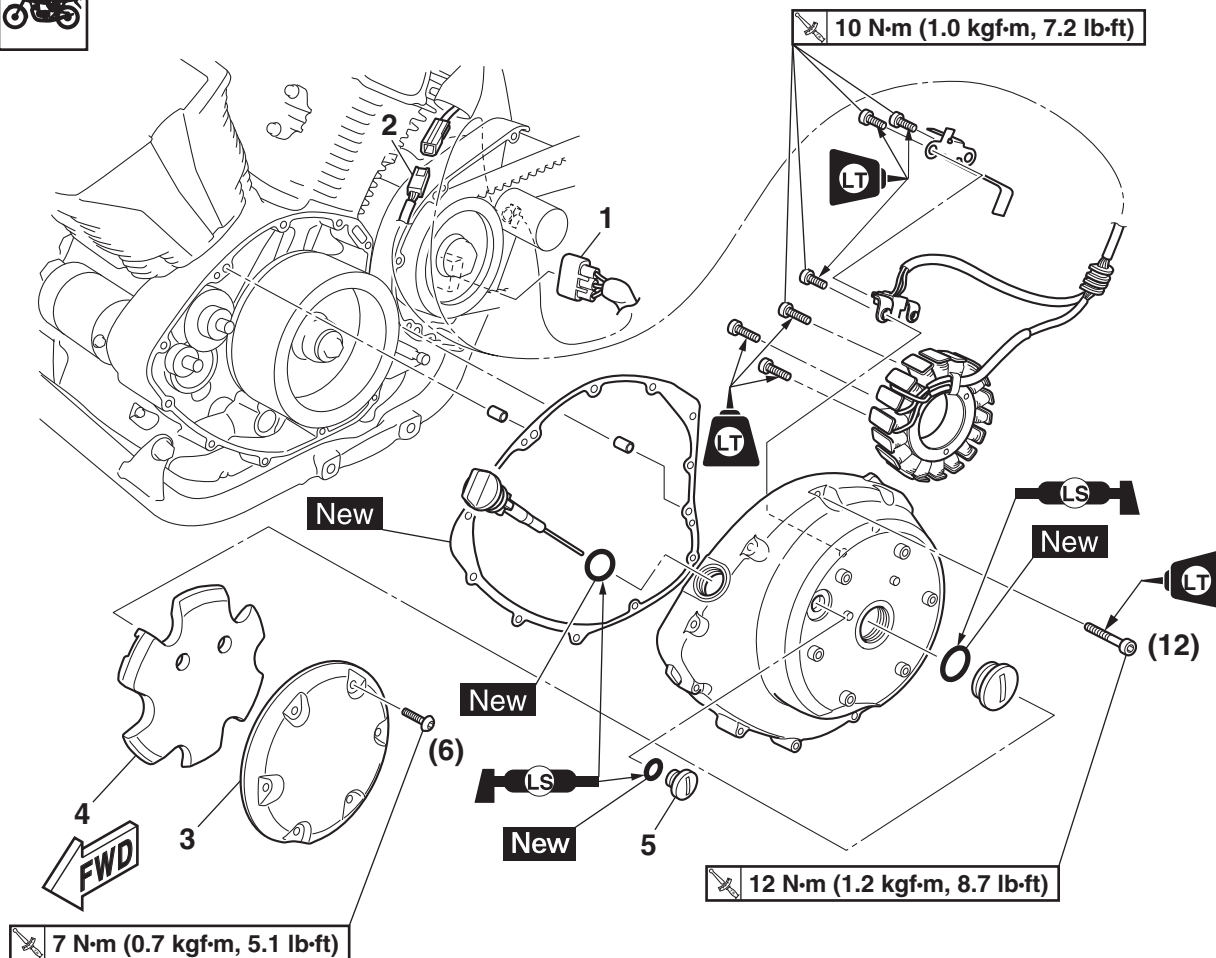
- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide through the timing chain cavity.



EAS20140

GENERATOR AND STARTER CLUTCH

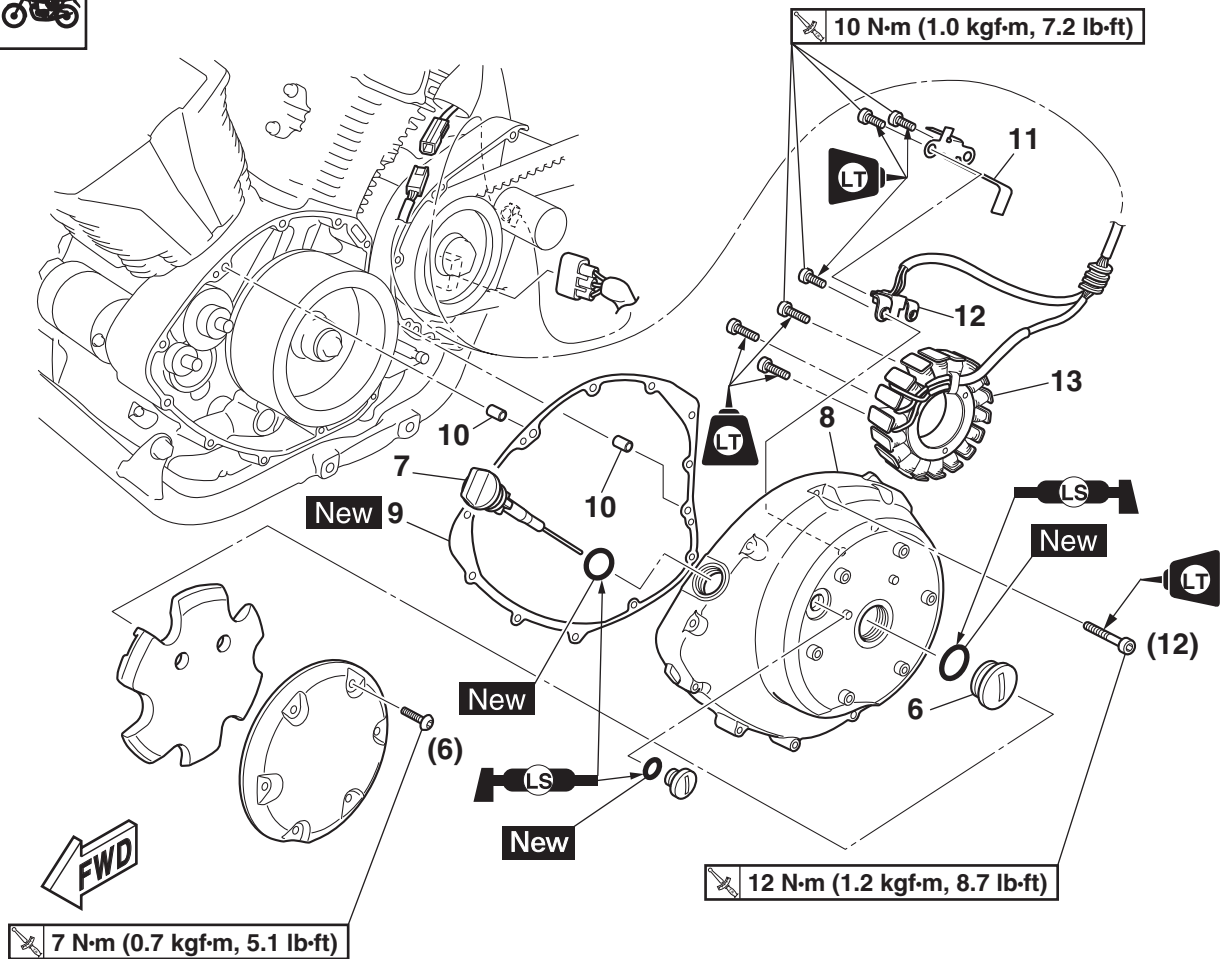
Removing the stator coil



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-22.
	Sidestand/Drive pulley cover		Refer to "BELT DRIVE" on page 4-71.
1	Rectifier/regulator coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Damper cover	1	
4	Generator cover damper	1	
5	Crankshaft end accessing screw	1	

GENERATOR AND STARTER CLUTCH

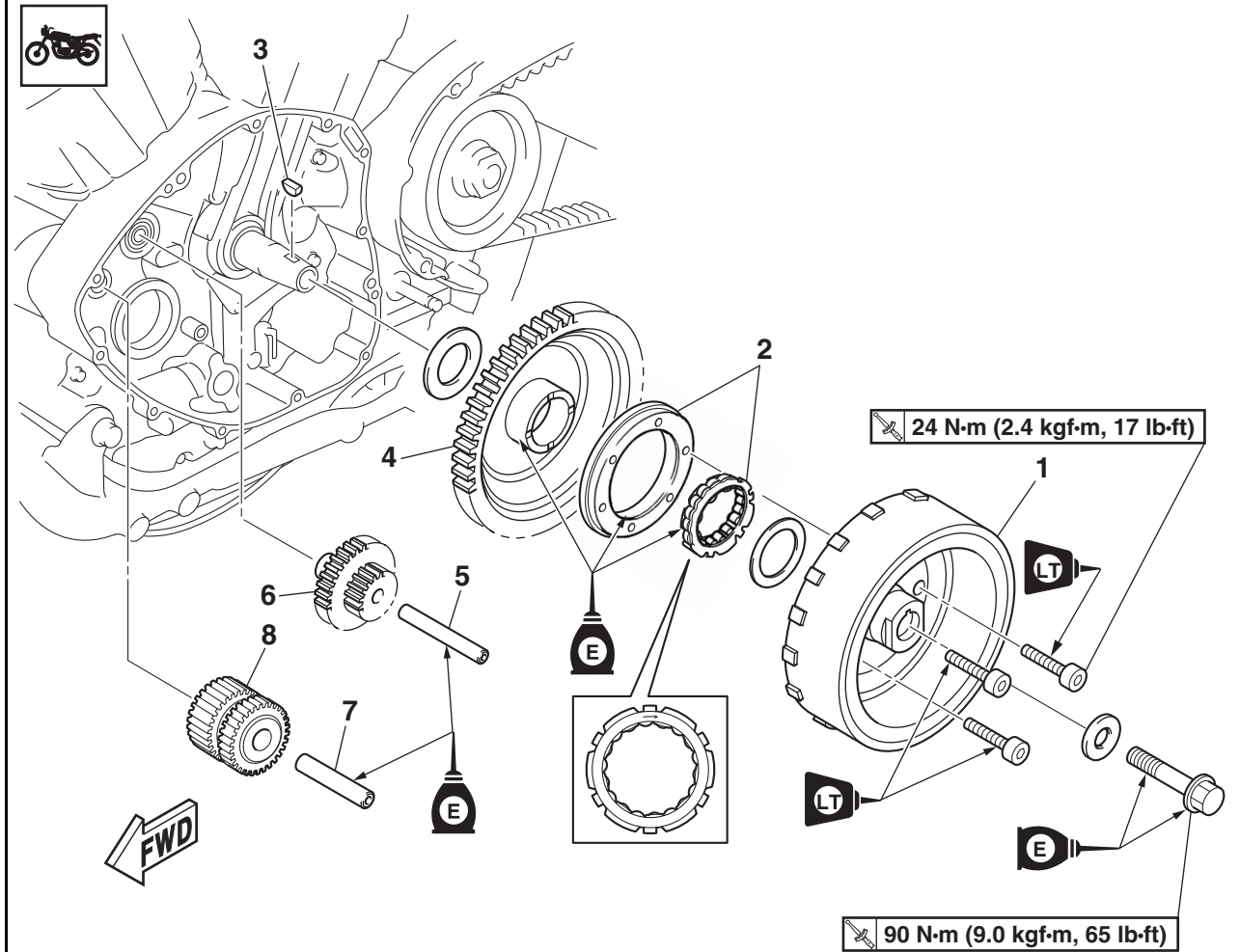
Removing the stator coil



Order	Job/Parts to remove	Q'ty	Remarks
6	Timing mark accessing screw	1	
7	Oil level gauge	1	
8	Generator cover	1	
9	Generator cover gasket	1	
10	Dowel pin	2	
11	Crankshaft position sensor lead holder	1	
12	Crankshaft position sensor	1	
13	Stator coil	1	

GENERATOR AND STARTER CLUTCH

Removing the generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Generator rotor	1	
2	Starter clutch	1	
3	Woodruff key	1	
4	Starter clutch gear	1	
5	Starter clutch idle gear 2 shaft	1	
6	Starter clutch idle gear 2	1	
7	Starter clutch idle gear 1 shaft	1	
8	Starter clutch idle gear 1	1	

EAS30867

REMOVING THE GENERATOR

1. Remove:

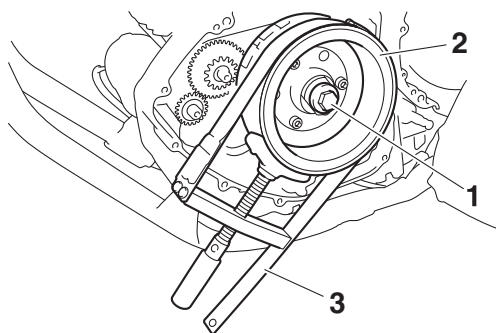
- Generator rotor bolt “1”
- Washer

TIP

- While holding the generator rotor “2” with the sheave holder “3”, loosen the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.



Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



2. Remove:

- Generator rotor “1”
(with the flywheel puller “2”)
- Woodruff key

ECA13880

NOTICE

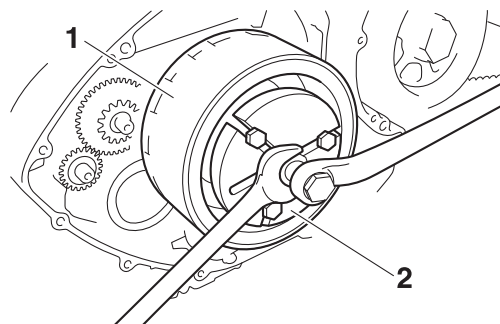
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

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:

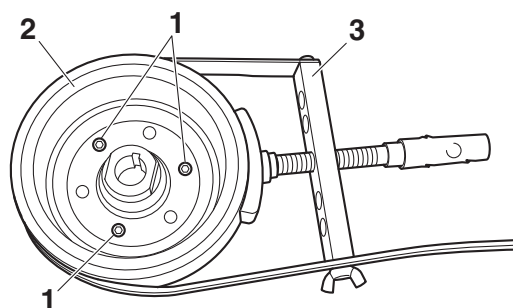
- Starter clutch bolts “1”
- Starter clutch

TIP

While holding the generator rotor “2” with the sheave holder “3”, loosen the starter clutch bolts.



Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS30869

CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers
Damage/wear → Replace.

2. Check:

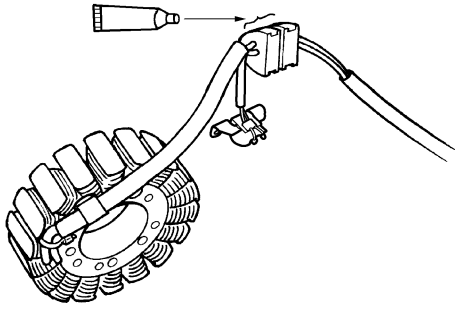
- Starter clutch idle gears
- Starter clutch gear
Burr/chips/roughness/wear → Replace the defective part(s).

3. Check:

- Starter clutch gear's contacting surfaces
Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

- Starter clutch operation



EAS31600

INSTALLING THE GENERATOR COVER

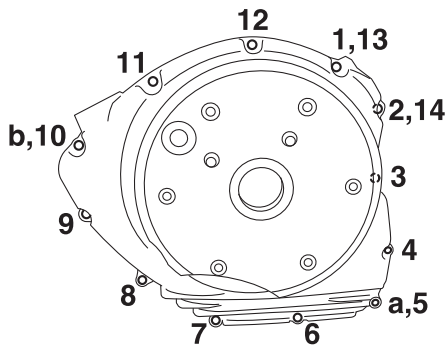
1. Install:



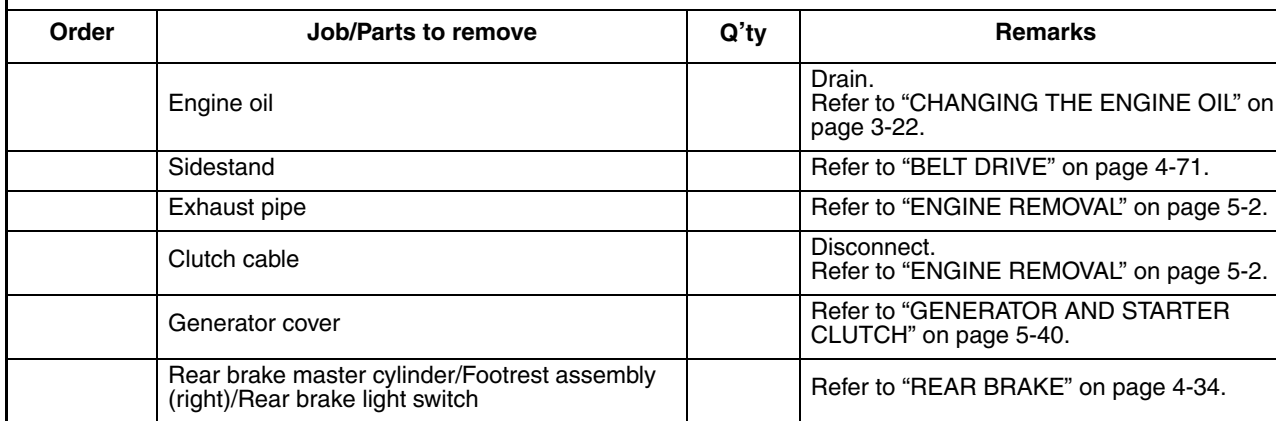
Generator cover bolt
12 N·m (1.2 kgf·m, 8.7 lb·ft)
LOCTITE®

TIP

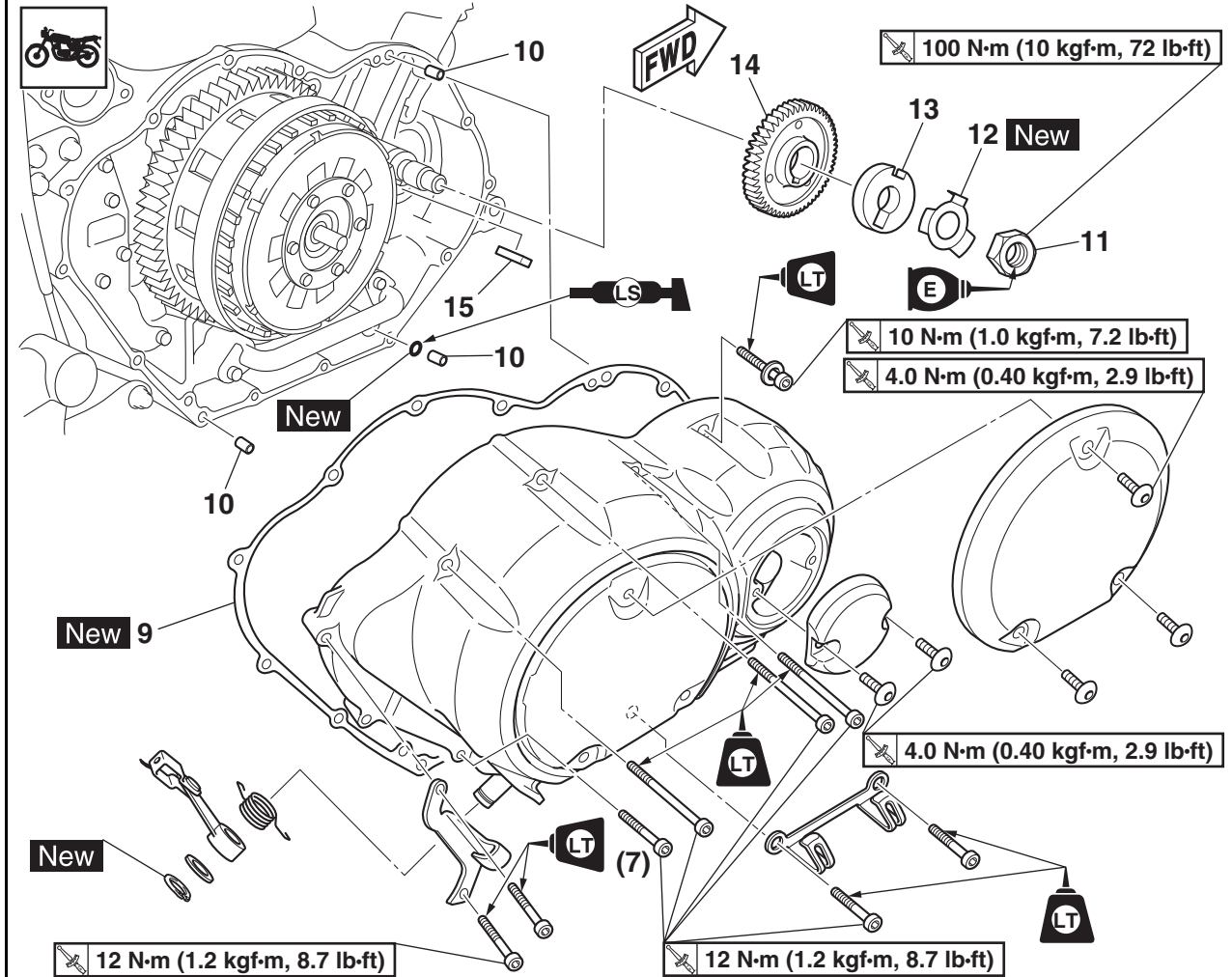
Temporarily tighten “a” and “b” and then tighten the generator cover bolts in the order shown in the illustration.



Removing the primary drive gear

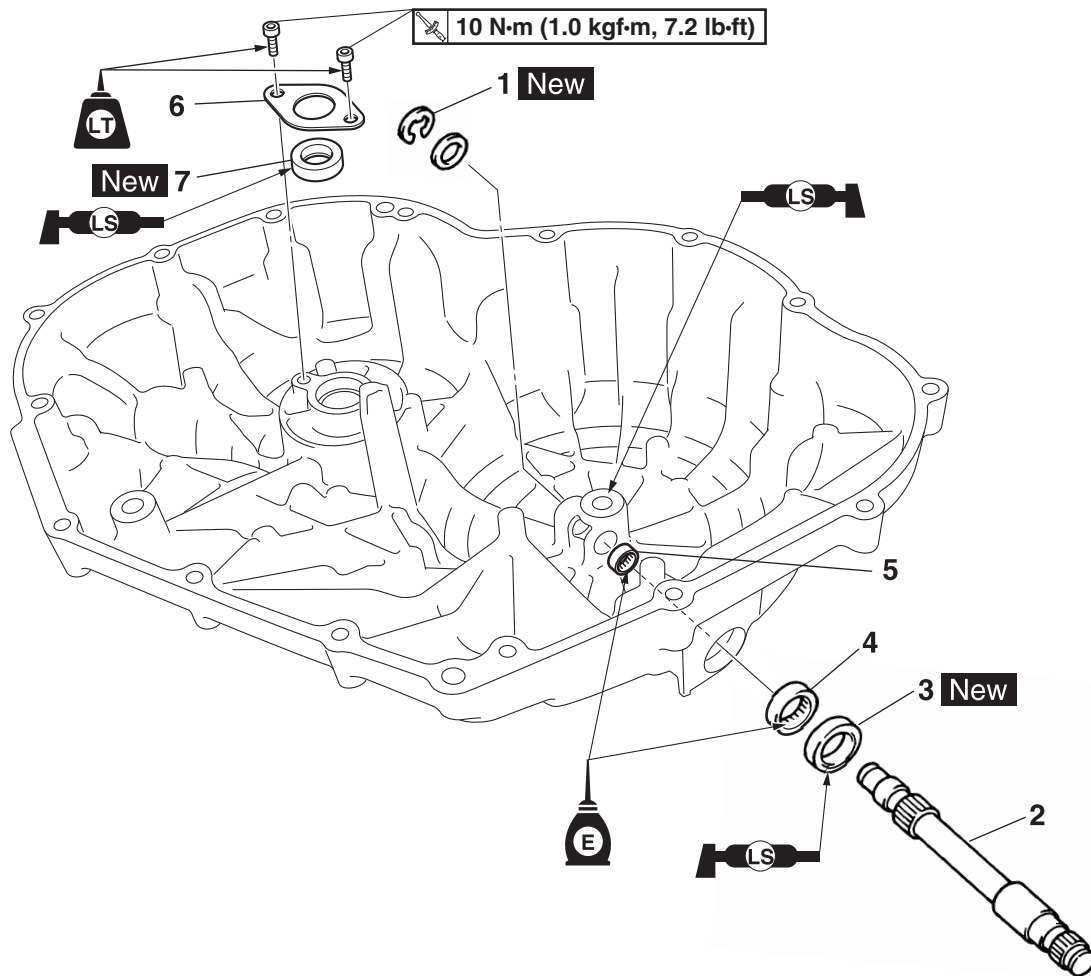


Removing the primary drive gear



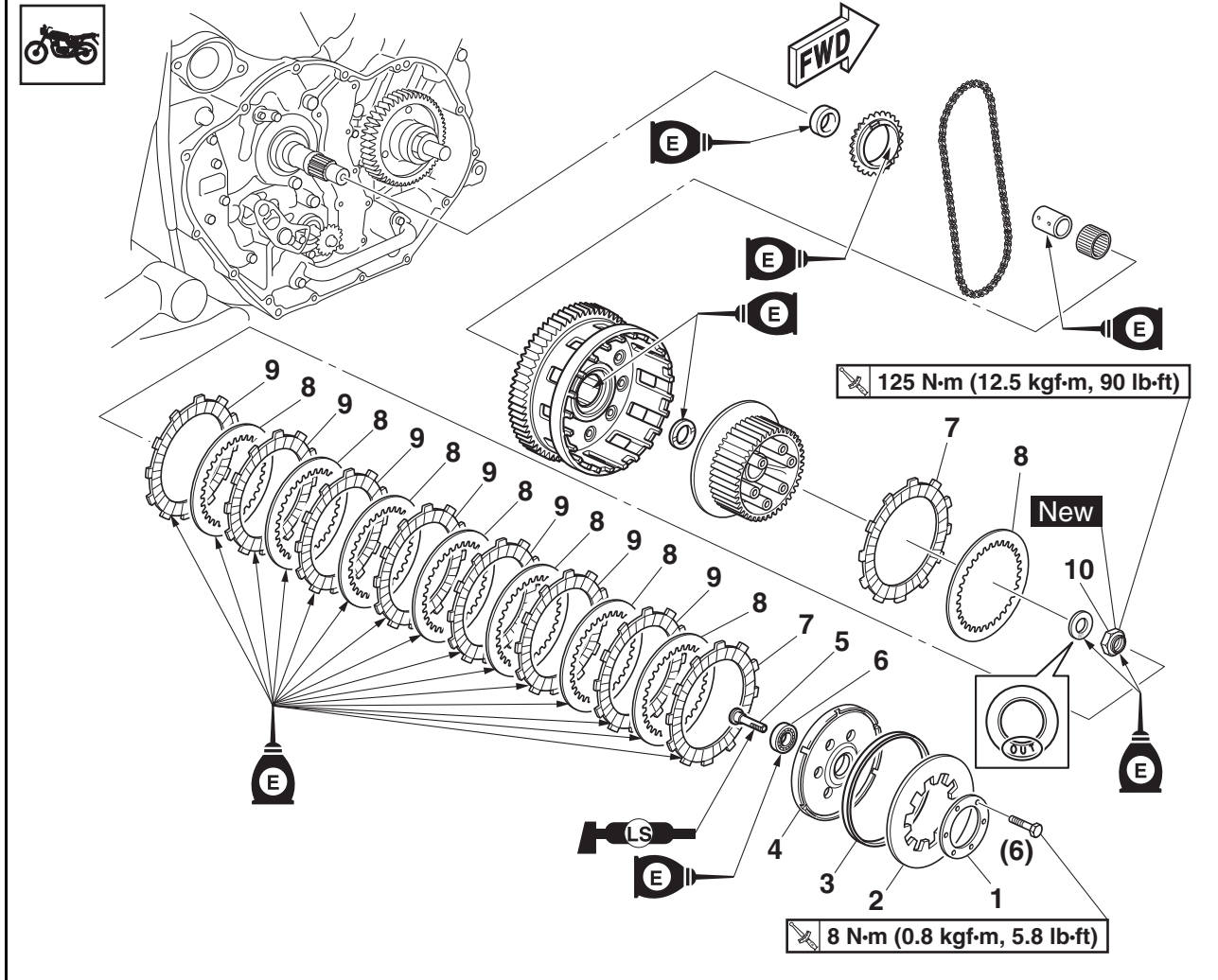
Order	Job/Parts to remove	Q'ty	Remarks
9	Clutch cover gasket	1	
10	Dowel pin	3	
11	Primary drive gear nut	1	
12	Lock washer	1	
13	Spacer	1	
14	Primary drive gear	1	
15	Woodruff key	1	

Removing the pull lever shaft



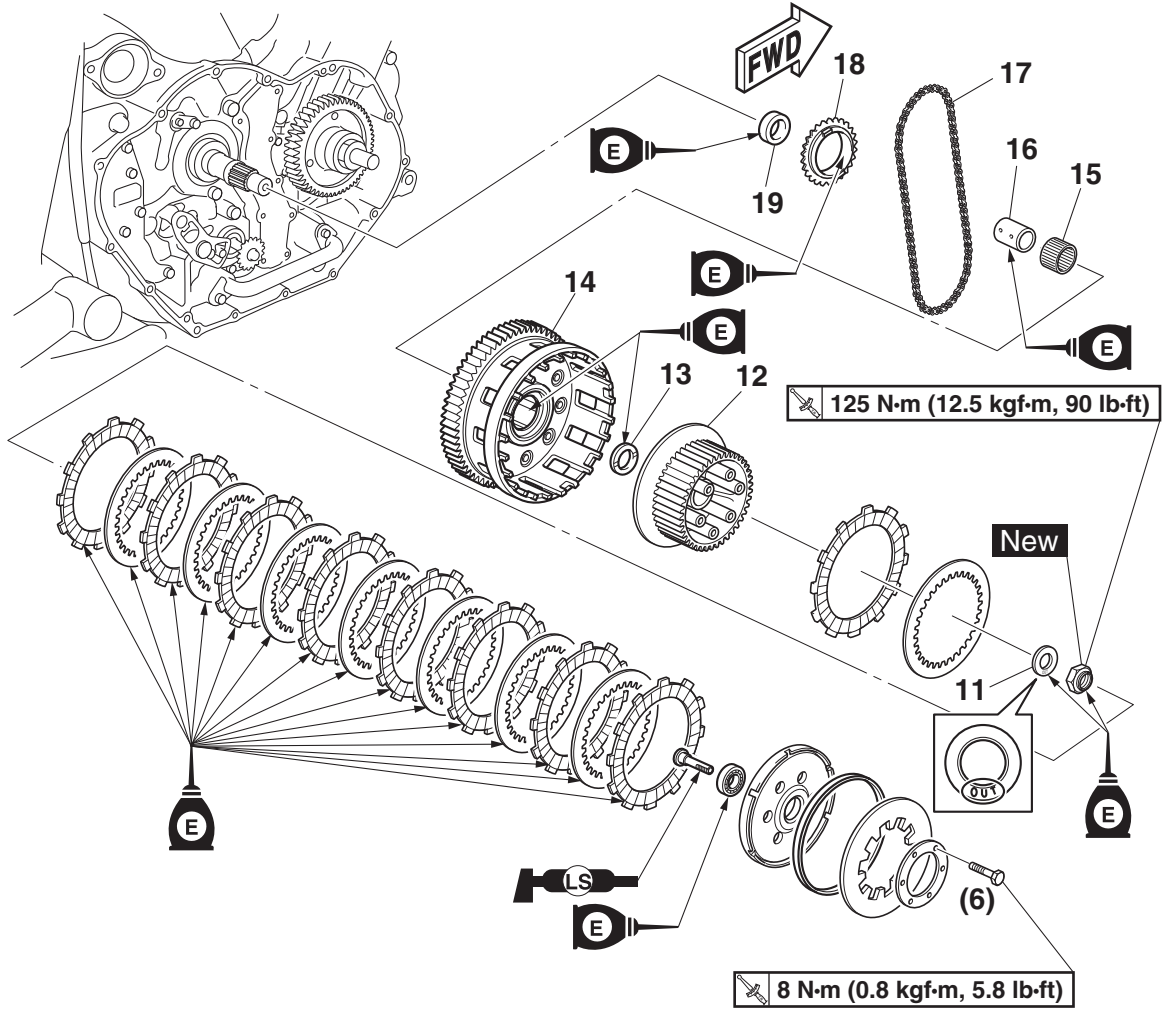
Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Pull lever shaft	1	
3	Oil seal	1	
4	Bearing	1	
5	Bearing	1	
6	Oil seal retainer	1	
7	Oil seal	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch spring plate retainer	1	
2	Clutch spring plate	1	
3	Clutch spring plate seat	1	
4	Pressure plate	1	
5	Pull rod	1	
6	Bearing	1	
7	Friction plate 1	2	Inside diameter: 124 mm (4.88 in)
8	Clutch plate	8	
9	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
10	Clutch boss nut	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
11	Conical spring washer	1	
12	Clutch boss	1	
13	Thrust washer 1	1	
14	Clutch housing	1	
15	Bearing	1	
16	Collar	1	
17	Oil pump drive chain	1	
18	Oil pump drive sprocket	1	
19	Thrust washer 2	1	

EAS30347

REMOVING THE PRIMARY DRIVE GEAR

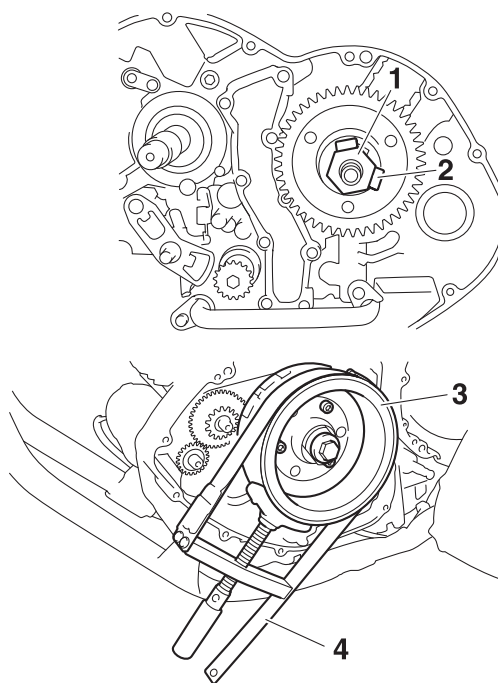
1. Straighten the lock washer tab.
2. Remove:
 - Primary drive gear nut “1”
 - Lock washer “2”

TIP

- While holding the generator rotor “3” with the sheave holder “4”, loosen the primary drive gear nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.



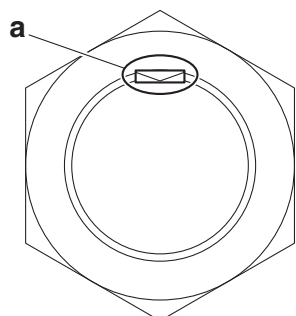
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS30346

REMOVING THE CLUTCH

1. Straighten the clutch boss nut rib “a”.



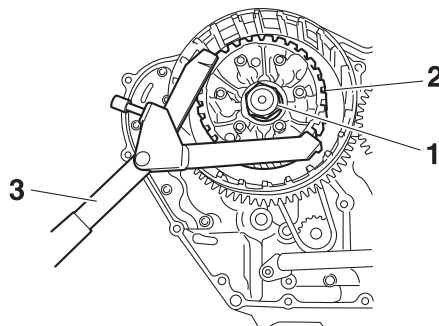
2. Loosen:
 - Clutch boss nut “1”

TIP

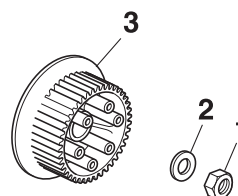
While holding the clutch boss “2” with the universal clutch holder “3”, loosen the clutch boss nut.



Universal clutch holder
90890-04086
Universal clutch holder
YM-91042



3. Remove:
 - Clutch boss nut “1”
 - Conical spring washer “2”
 - Clutch boss “3”



EAS30348

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

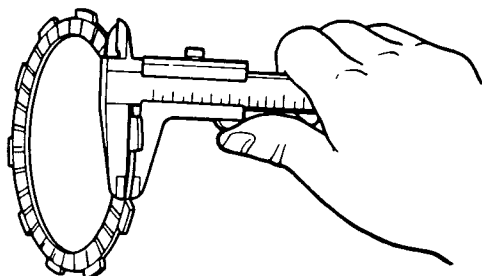
1. Check:
 - Friction plate
 Damage/wear → Replace the friction plates as a set.
2. Measure:
 - Friction plate thickness
 Out of specification → Replace the friction plates as a set.

TIP

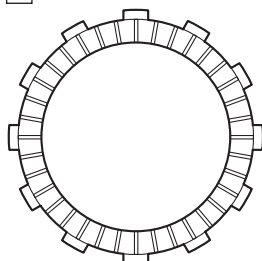
Measure each friction plate at four places.



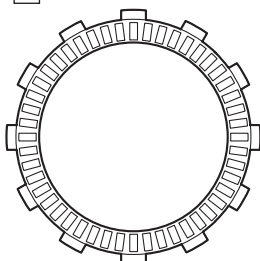
Friction plate 1 thickness
2.90–3.10 mm (0.114–0.122 in)
Wear limit
2.80 mm (0.110 in)
Friction plate 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)



A



B



- A. Friction plate 1
- B. Friction plate 2

EAS30349

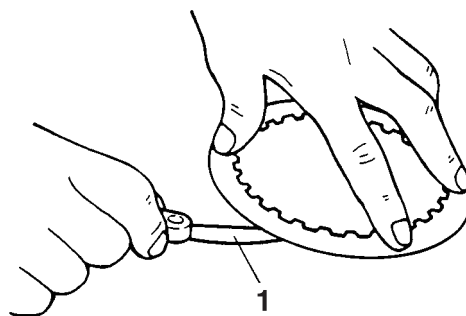
CHECKING THE CLUTCH PLATES

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.



Warpage limit
0.20 mm (0.008 in)



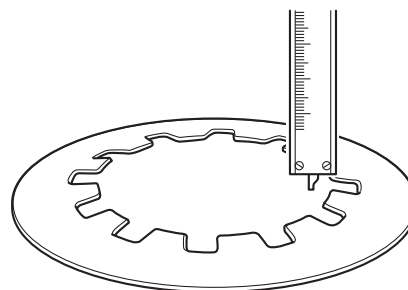
EAS30350

CHECKING THE CLUTCH SPRING PLATE

1. Check:
 - Clutch spring plate
Damage → Replace.
2. Check:
 - Clutch spring plate seat
Damage → Replace.
3. Measure:
 - Clutch spring free height
Out of specification → Replace the clutch spring plate.



Clutch spring height
7.40 mm (0.29 in)
Minimum height
7.03 mm (0.28 in)



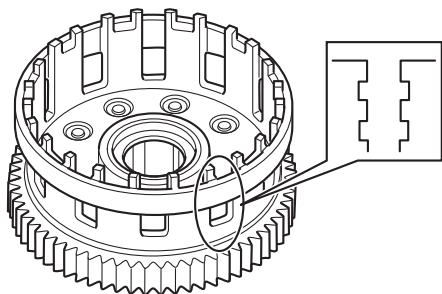
EAS30352

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:

- Bearing
Damage/wear → Replace the bearing and clutch housing.

EAS30353

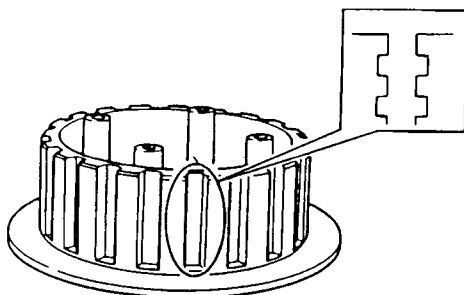
CHECKING THE CLUTCH BOSS

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
Cracks/damage → Replace.
- Bearing
Damage/wear → Replace.

EAS30356

CHECKING THE PRIMARY DRIVE GEAR

1. Check:

- Primary drive gear
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS30357

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:

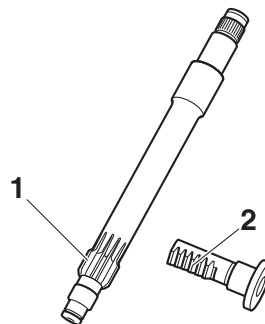
- Primary driven gear
Damage/wear → Replace the primary drive and primary driven gears as a set.
Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

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 pinion gear as a set.



2. Check:

- Pull rod bearing
Damage/wear → Replace.

EAS31601

CHECKING THE OIL PUMP DRIVE SPROCKET AND OIL PUMP DRIVE CHAIN

1. Check:

- Oil pump drive sprocket
Cracks/damage/wear → Replace the oil pump drive chain, and oil pump drive and driven sprockets as a set.

2. Check:

- Oil pump drive chain
Damage/stiffness → Replace the oil pump drive chain, and oil pump drive and driven sprockets as a set.

EAS30363

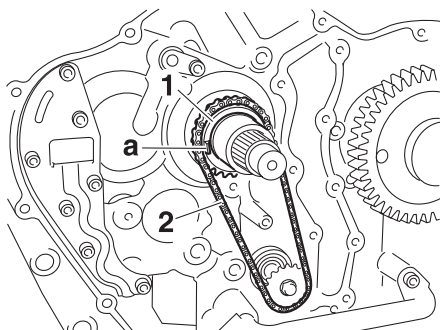
INSTALLING THE CLUTCH

1. Install:

- Oil pump drive sprocket “1”
- Oil pump drive chain “2”

TIP

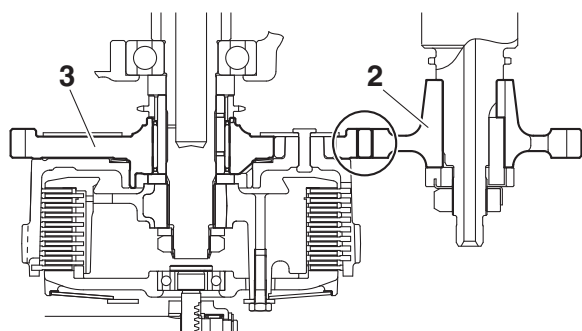
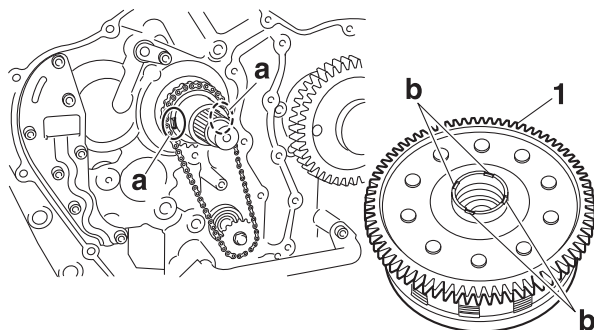
Install the oil pump drive sprocket with its projections “a” facing outward.



2. Install:
- Clutch housing “1”

TIP

- Fit the projections “a” on the oil pump drive sprocket into the grooves “b” in the clutch housing.
- Lubricate the clutch housing bearing with engine oil.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- After installing the clutch housing, make sure that the primary drive gear “2” and clutch housing primary driven gear “3” are aligned as shown in the illustration.



3. Install:
- Clutch boss “1”
 - Washer
 - Conical spring washer “2”
 - Clutch boss nut “3” **New**



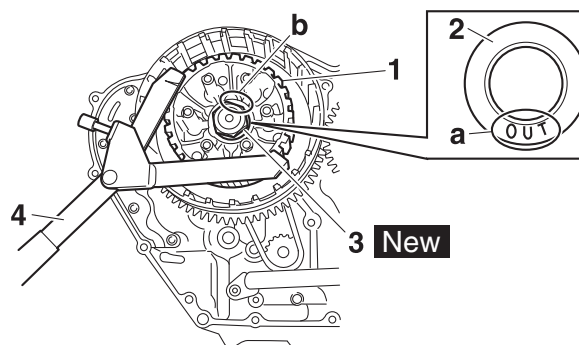
Clutch boss nut
125 N·m (12.5 kgf·m, 90 lb·ft)

TIP

- Lubricate the clutch boss nut threads and conical spring washer mating surfaces with engine oil.
- Install the conical spring washer with the “OUT” mark “a” facing out.
- While holding the clutch boss with the universal clutch holder “4”, tighten the clutch boss nut.
- Stake the clutch boss nut “3” at cutout “b” in the main axle.



Universal clutch holder
90890-04086
Universal clutch holder
YM-91042



4. Lubricate:
- Friction plates
 - Clutch plates
- (with the recommended lubricant)

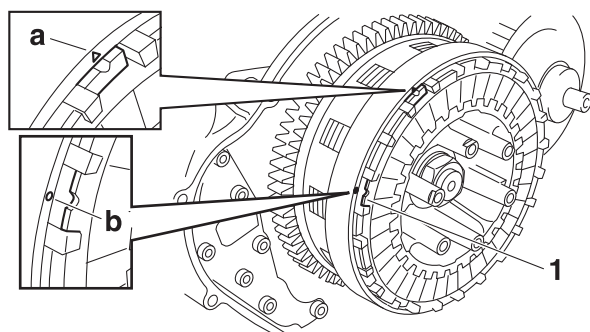


Recommended lubricant
Engine oil

5. Install:
- Friction plates 2
 - Clutch plates
 - Friction plates 1

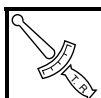
TIP

- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Align the cutout in the tab of each friction plate 1 and 2 with the “△” mark “a” on the clutch housing and align the cutout in the tab of the last friction plate 1 “1” with the punch mark “b” on the housing.



6. Install:

- Clutch spring plate
- Clutch spring plate retainer



Clutch spring plate retainer bolt
8 N·m (0.8 kgf·m, 5.8 lb·ft)

TIP

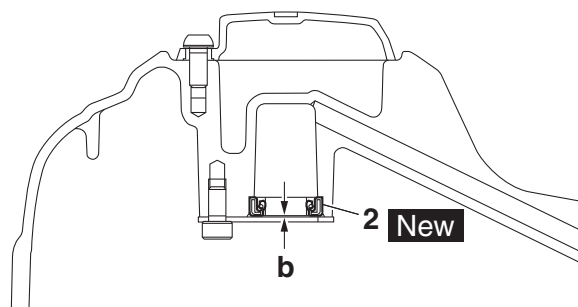
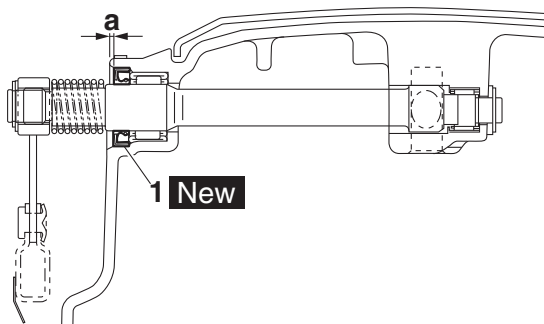
Tighten the clutch spring plate retainer bolts in stages and in a crisscross pattern.

7. Install:

- Oil seals “1”, “2” **New**
(to the clutch cover)



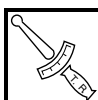
Installed depth “a”
1.0–1.5 mm (0.04–0.06 in)
Installed depth “b”
0–0.5 mm (0–0.02 in)



8. Install:

- Clutch cover
- Clutch cable holder

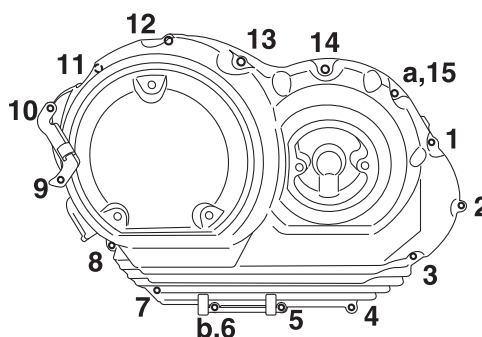
- Starter motor lead and rear brake light switch lead holder



Clutch cover bolt “1”–“13”, “15”
12 N·m (1.2 kgf·m, 8.7 lb·ft)
Clutch cover bolt (with washer)
“14”
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

Temporarily tighten the bolts “a” and “b”, and then tighten the clutch cover bolts in the order shown in the illustration.

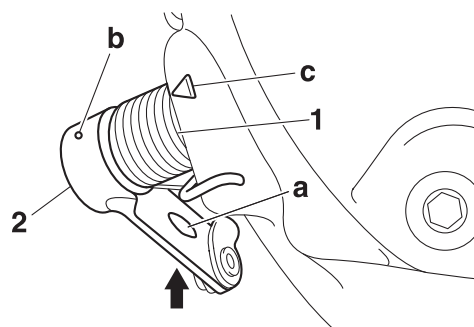


9. Install:

- Pull lever spring “1”
- Pull lever “2”
- Washer
- Circlip **New**

TIP

- Make sure that the mark “a” on the pull lever is facing forward.
- When installing the pull lever, push it and check that its punch mark “b” aligns with the mark “c” on the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.



10. Adjust:

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

EAS30362

INSTALLING THE PRIMARY DRIVE GEAR**1. Install:**

- Primary drive gear “1”
- Spacer “2”
- Lock washer “3” **New**
- Primary drive gear nut



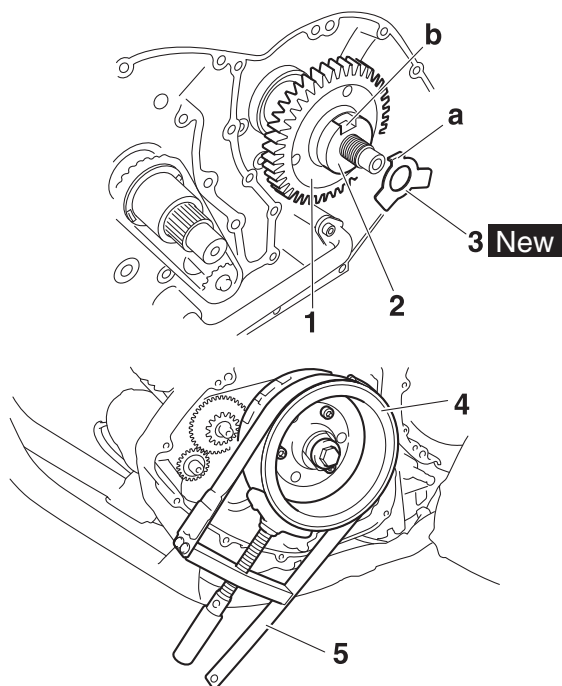
Primary drive gear nut
100 N·m (10 kgf·m, 72 lb·ft)

TIP

- Make sure that the shorter side of the primary drive gear is facing outward.
- Align the tab “a” on the lock washer with the groove “b” in the spacer.
- While holding the generator rotor “4” with the sheave holder “5”, tighten the primary drive gear nut.
- Do not allow the sheave holder to touch the projection on the generator rotor.
- Lubricate the primary drive gear nut threads with engine oil.



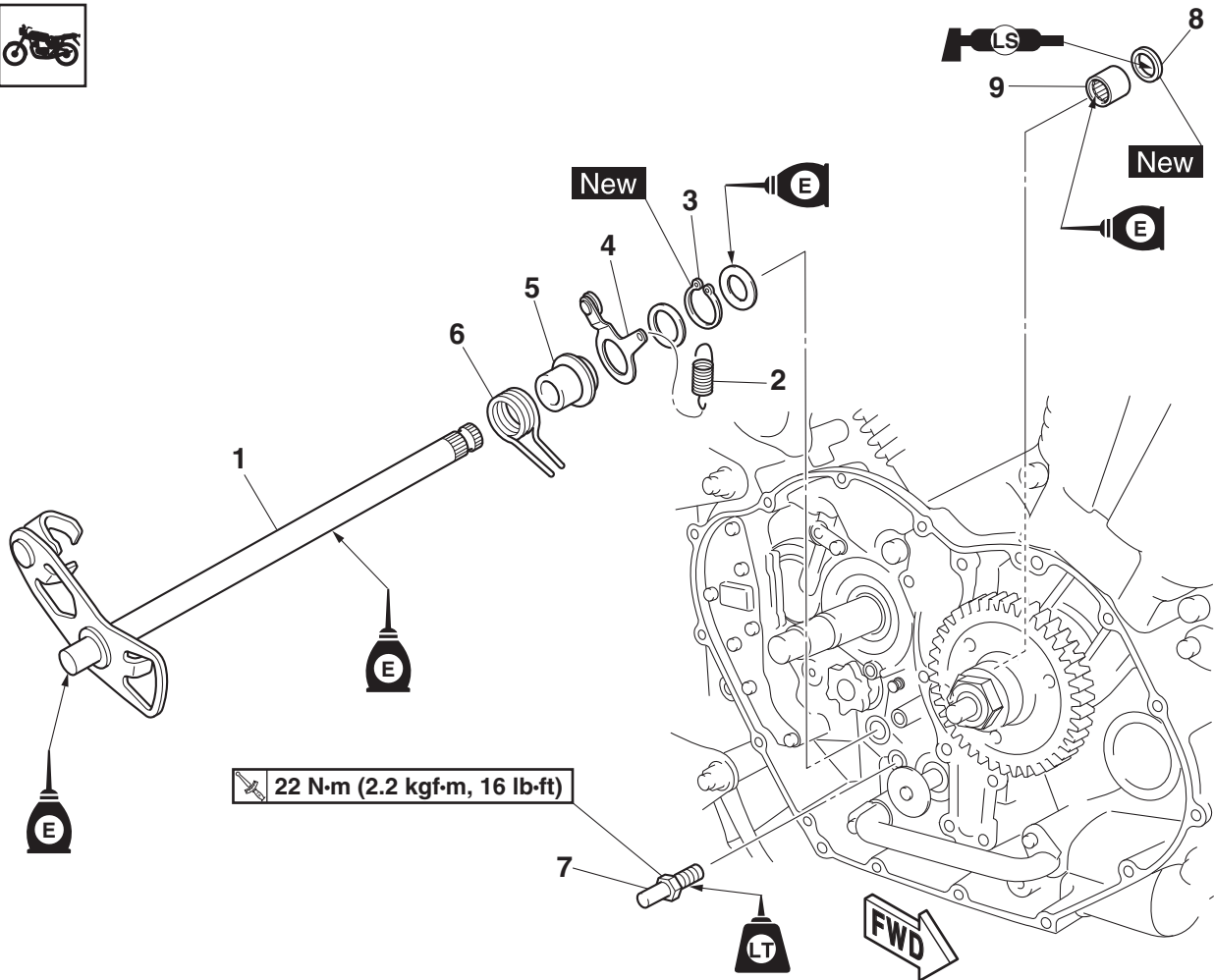
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



- 2. Bend lock washer tab along a flat side of the nut.**

SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Drive pulley cover/Shift arm		Refer to "BELT DRIVE" on page 4-71.
	Clutch cover/Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Shift shaft	1	
2	Stopper lever spring	1	
3	Circlip	1	
4	Stopper lever	1	
5	Collar	1	
6	Shift shaft spring	1	
7	Shift shaft spring stopper	1	
8	Oil seal	1	
9	Bearing	1	

EAS30377

CHECKING THE SHIFT SHAFT

1. Check:

- Shift shaft
Bends/damage/wear → Replace.
- Shift shaft spring
Damage/wear → Replace.

EAS30378

CHECKING THE STOPPER LEVER

1. Check:

- Stopper lever
Bends/damage → Replace.
Roller turns roughly → Replace the stopper lever.

EAS30381

INSTALLING THE SHIFT SHAFT

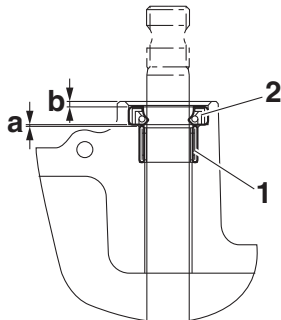
1. Install:

- Bearing “1”
- Oil seals “2”
(to the crankcase)



Installed depth “a”
0–0.5 mm (0–0.02 in)

Installed depth “b”
1.0–1.5 mm (0.04–0.06 in)

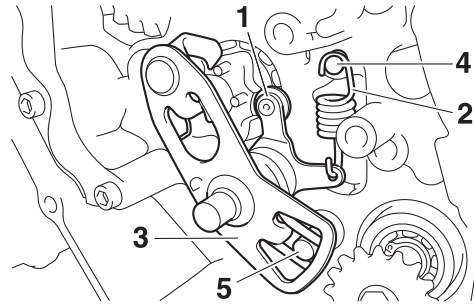


2. Install:

- Stopper lever “1”
- Stopper lever spring “2”
- Shift shaft “3”

TIP

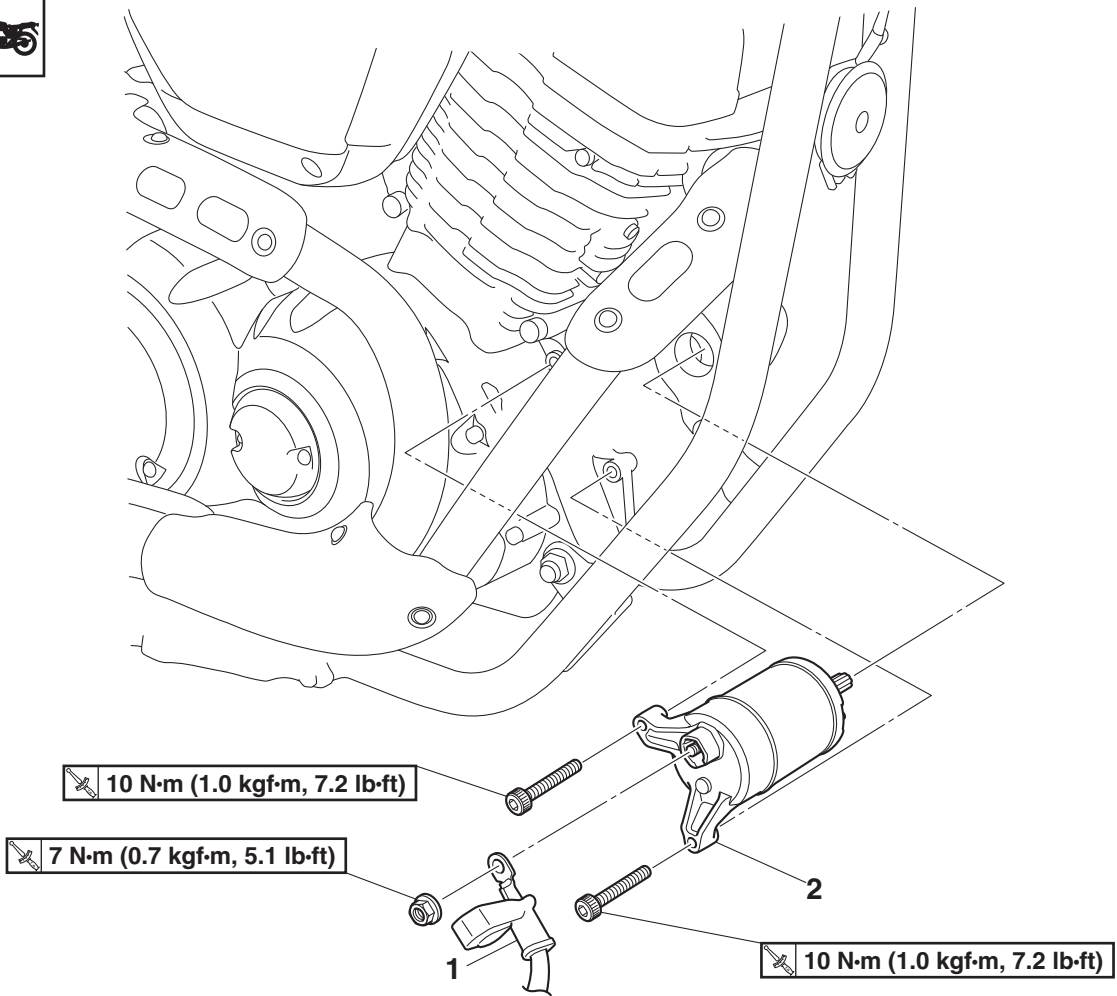
- Lubricate the oil seal lips with lithium-soap-based grease.
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss “4”.
- Mesh the stopper lever with the shift drum segment assembly.
- Hook the end of the shift shaft spring onto the shift shaft spring stopper “5”.



EAS20052

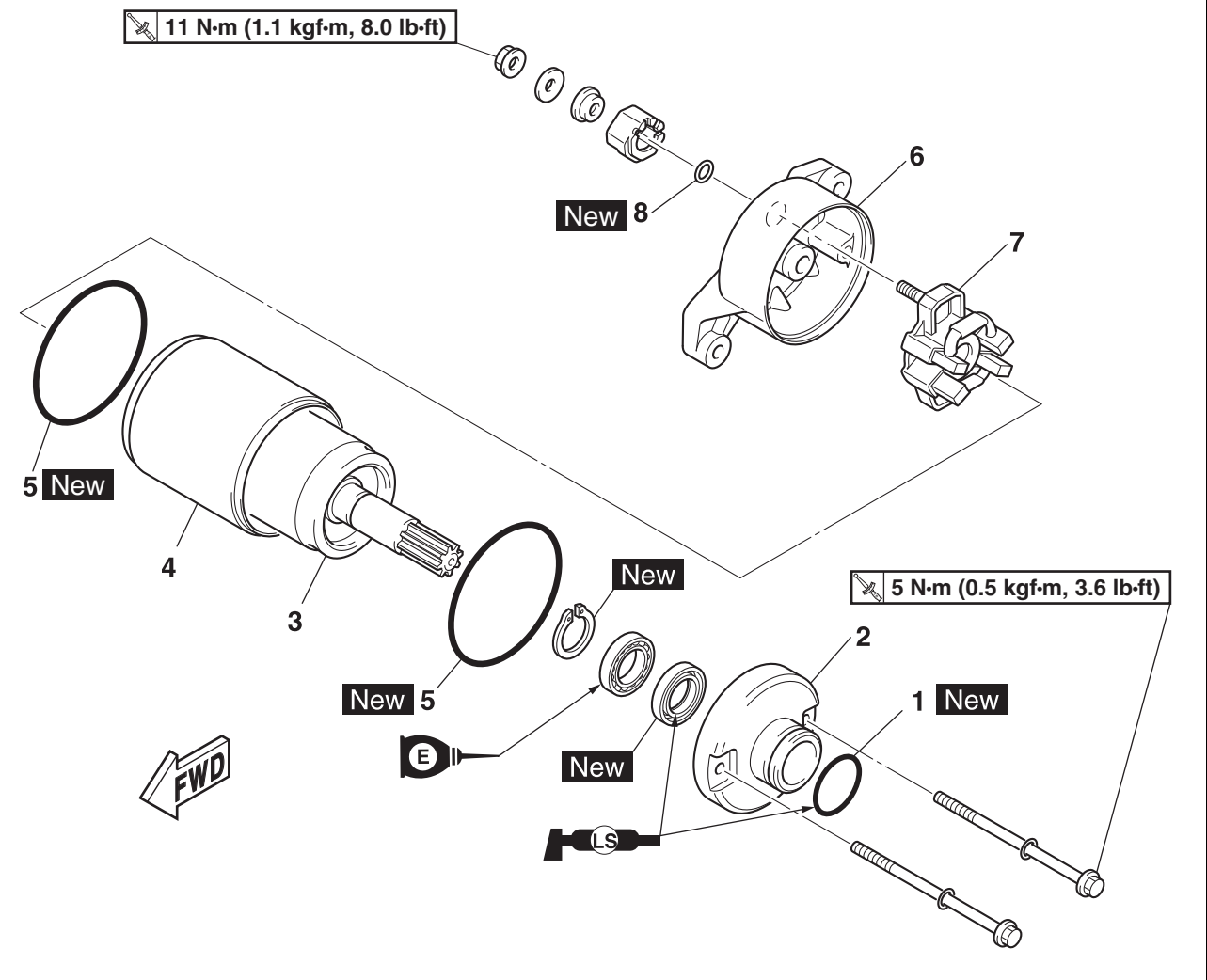
ELECTRIC STARTER

Removing the starter motor



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

EAS30325

CHECKING THE STARTER MOTOR

1. Check:

- Commutator
Dirt → Clean with 600 grit sandpaper.

2. Measure:

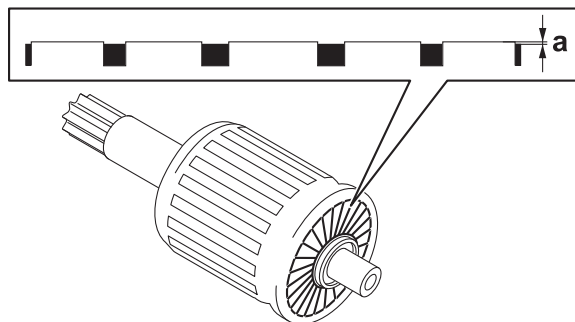
- Mica undercut "a"
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



Mica undercut (depth)
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
Out of specification → Replace the starter motor.

- a. Measure the armature assembly resistance with the digital circuit tester.

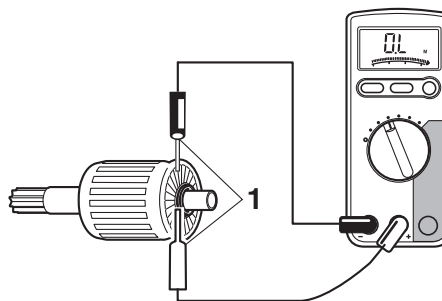


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927



Armature coil resistance
0.0050–0.0150 Ω

- b. If the resistance is out of specification, replace the starter motor.



1. Armature coil resistance

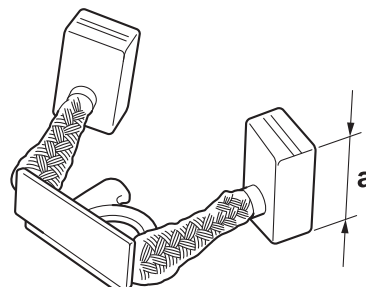


4. Measure:

- Brush length "a"
Out of specification → Replace the brush set.



Brush overall length
12.0 mm (0.47 in)
Limit
6.50 mm (0.26 in)

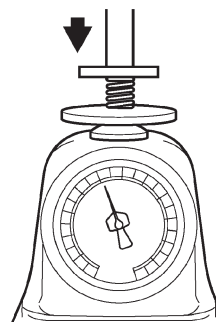


5. Measure:

- Brush spring force
Out of specification → Replace the brush set.



Brush spring force
6.02–6.51 N (614–664 gf, 21.69–
23.45 oz)



6. Check:

- Gear teeth
Damage/wear → Replace the starter motor.

7. Check:

- Bearing

Damage/wear → Replace the starter motor.

EAS30326

ASSEMBLING THE STARTER MOTOR

1. Install:

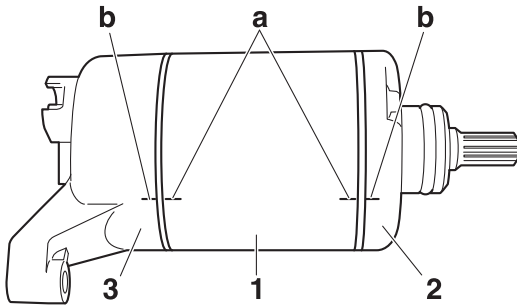
- Brush set

2. Install:

- Starter motor yoke "1"
- Starter motor front cover "2"
- Starter motor rear cover "3"

TIP

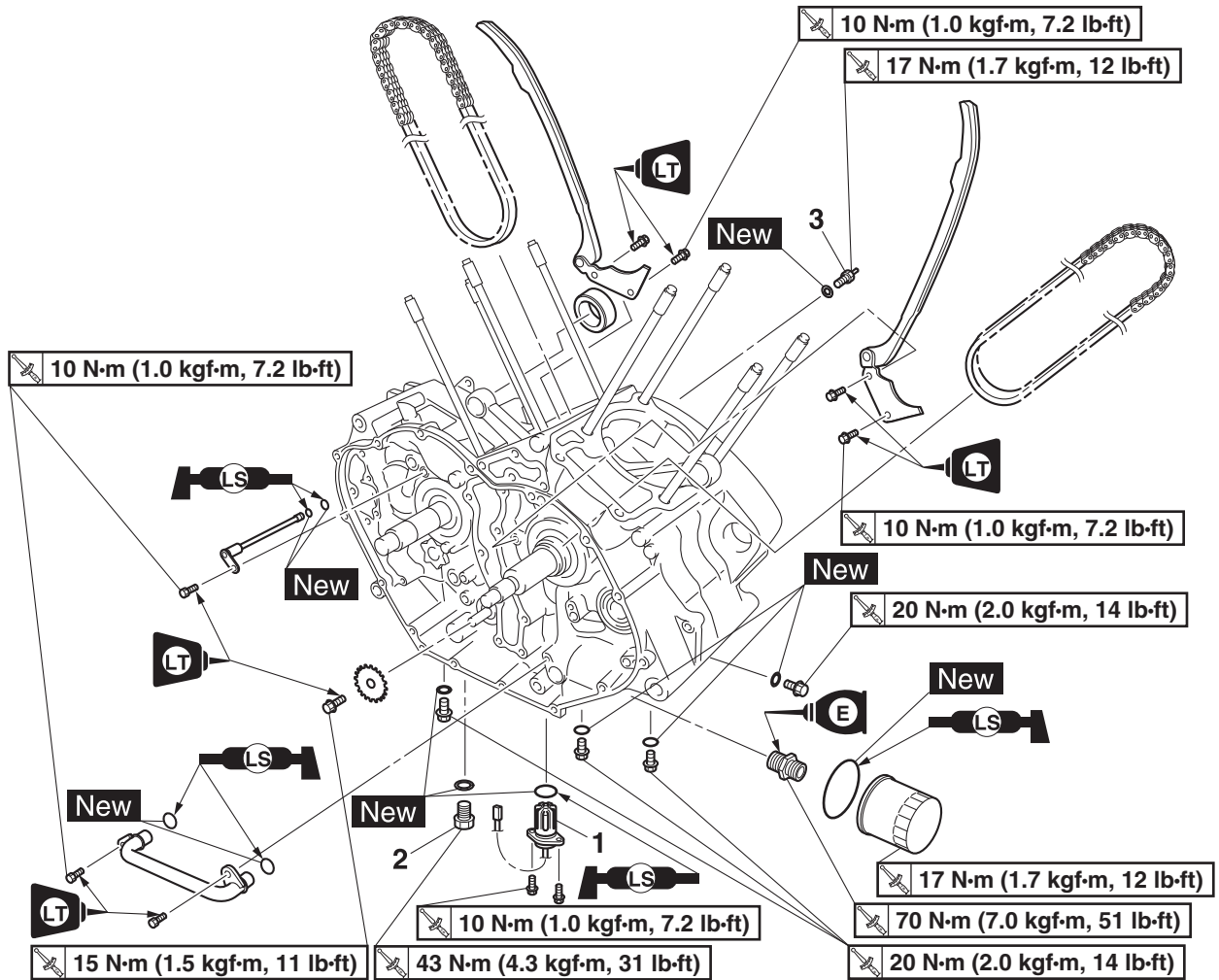
Align the match marks "a" on the starter motor yoke with the match marks "b" on the starter motor front and rear covers.



EAS20059

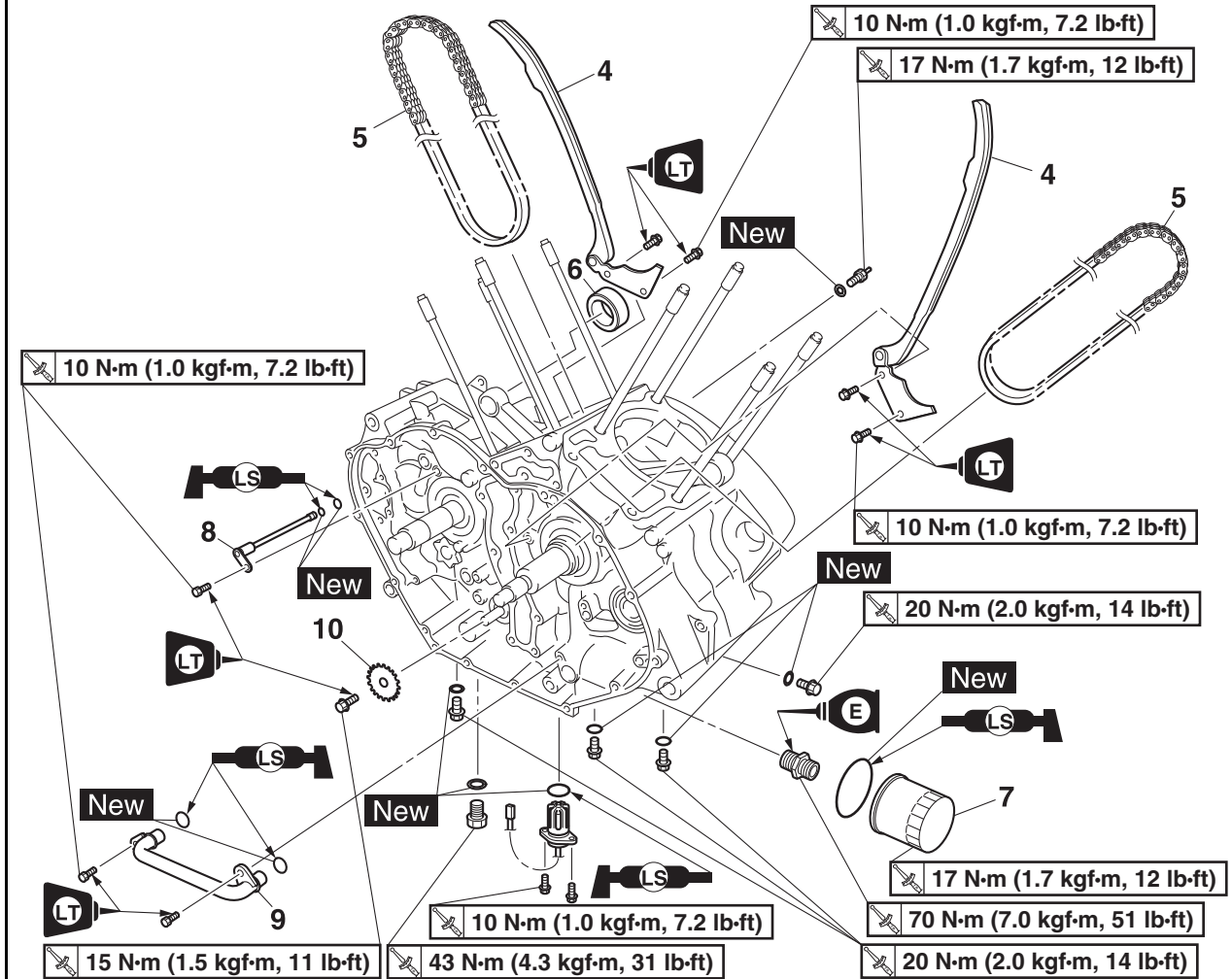
CRANKCASE

Removing the oil delivery pipes and timing chains



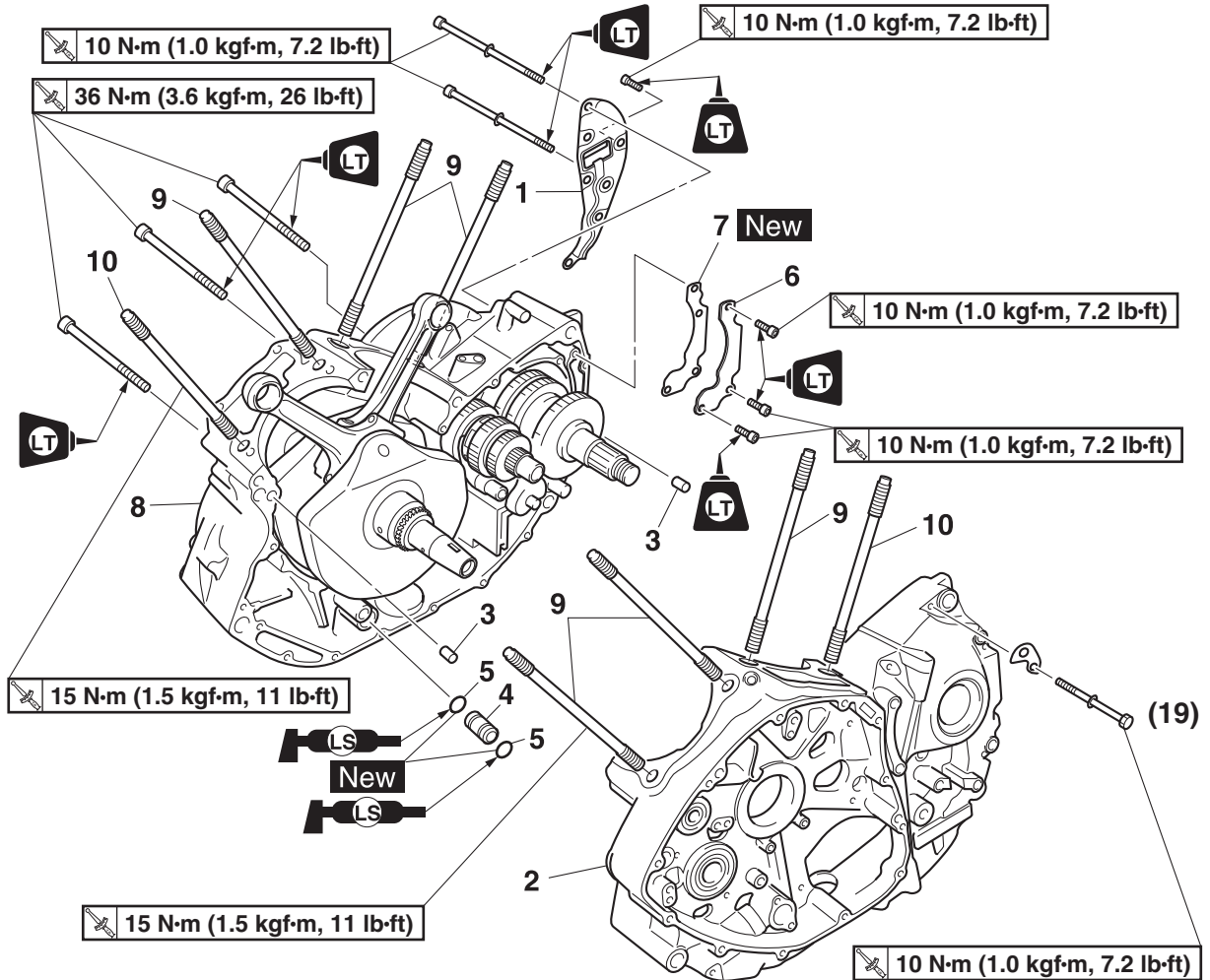
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-2.
	Piston		Refer to "CYLINDER AND PISTONS" on page 5-34.
	Clutch		Refer to "CLUTCH" on page 5-46.
	Primary drive gear		Refer to "CLUTCH" on page 5-46.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-58.
1	Oil level switch	1	
2	Engine oil drain bolt	1	
3	Neutral switch	1	

Removing the oil delivery pipes and timing chains



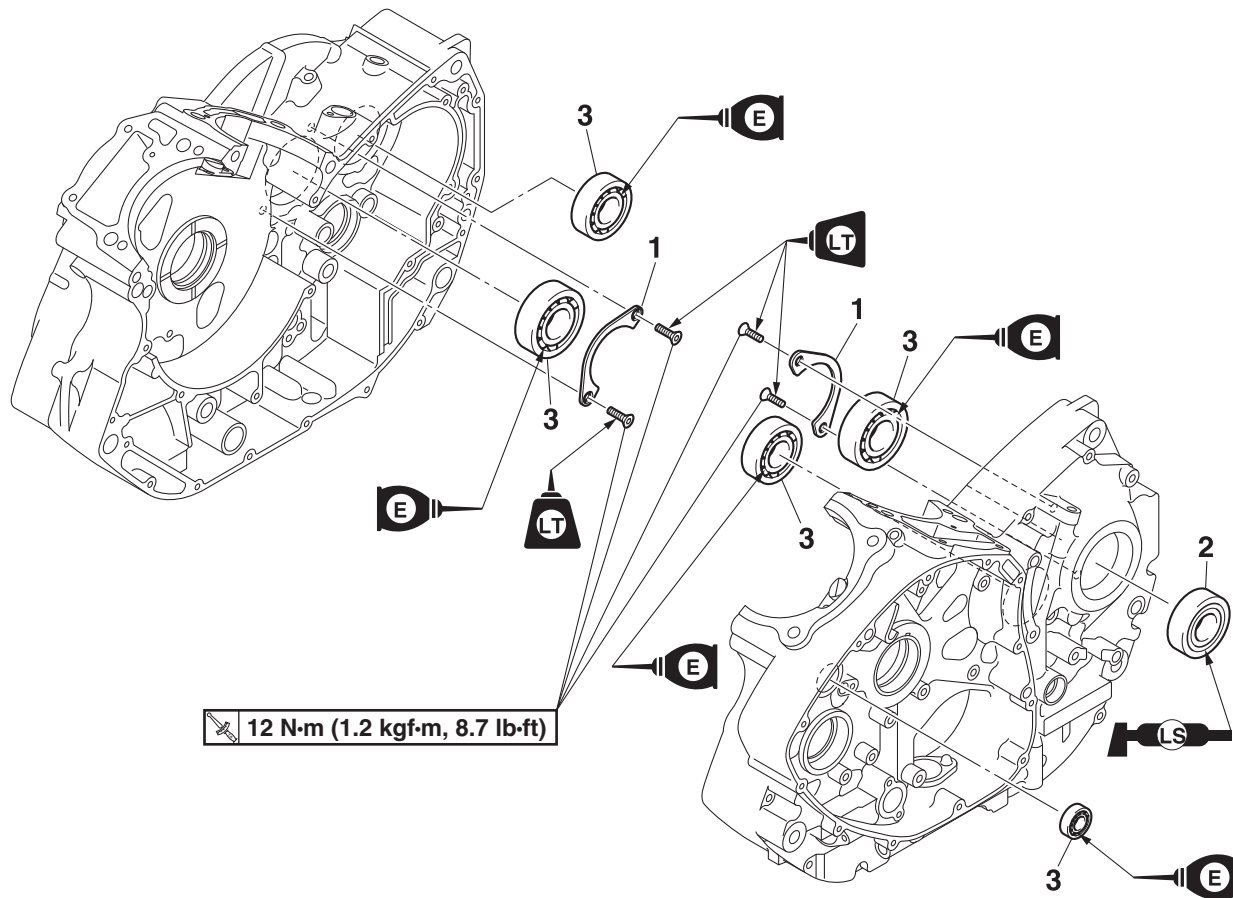
Order	Job/Parts to remove	Q'ty	Remarks
4	Timing chain guide	2	
5	Timing chain	2	
6	Spacer	1	
7	Oil filter cartridge	1	
8	Oil delivery pipe 1	1	
9	Oil delivery pipe 2	1	
10	Oil pump driven sprocket	1	

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil baffle plate 1	1	
2	Crankcase (left)	1	
3	Dowel pin	2	
4	Joint pipe	1	
5	O-ring	2	
6	Oil baffle plate 2	1	
7	Gasket	1	
8	Crankcase (right)	1	
9	Crankcase stud bolt	6	l = 239 mm (9.41 in)
10	Crankcase stud bolt	2	l = 210 mm (8.27 in)

Removing the oil seal and bearings



Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump assembly		Refer to "OIL PUMP" on page 5-71.
	Crankshaft		Refer to "CRANKSHAFT" on page 5-74.
	Transmission		Refer to "TRANSMISSION" on page 5-79.
1	Bearing retainer	2	
2	Oil seal	1	
3	Bearing	5	

EAS30389

DISASSEMBLING THE CRANKCASE

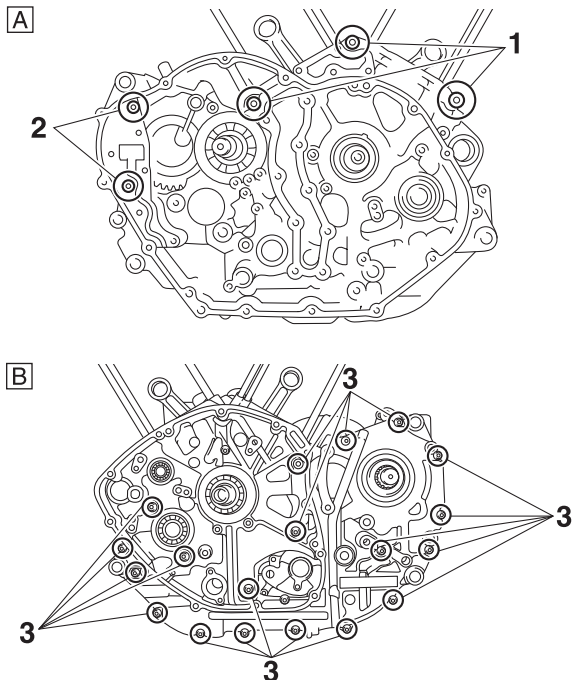
1. Remove:

- Crankcase bolts

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.

- M10 × 110 mm bolts “1”
- M6 × 120 mm bolts “2”
- M6 × 80 mm bolts “3”



- A. Crankcase (right)
B. Crankcase (left)

2. Remove:

- Crankcase (left)

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.

EAS30787

CHECKING THE BEARINGS AND OIL SEAL

1. Check:
 - Bearings
Clean and lubricate the bearings, then rotate the inner race with your finger.
Rough movement → Replace.
 - Oil seals
Damage/wear → Replace.

EAS30393

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes and joint pipe.

1. Check:
 - Oil delivery pipe
 - Joint pipe
Damage → Replace.
Obstruction → Wash and blow out with compressed air.

EAS31445

CHECKING THE TIMING CHAINS

1. Check:
 - Timing chains
Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.

EAS31602

CHECKING THE OIL PUMP DRIVEN SPROCKET

1. Check:
 - Oil pump driven sprocket
Cracks/damage/wear → Replace the oil pump driven sprocket and the oil pump drive chain as a set.

EAS31603

INSTALLING THE BEARING RETAINERS

1. Install:
 - Bearing retainers “1”

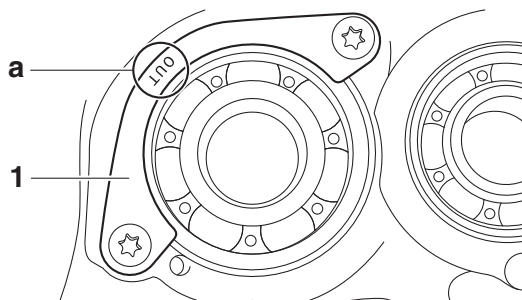
TIP

- Install each bearing retainer “1” with its “OUT” mark “a” facing outward.

- Apply locking agent (LOCTITE®) to the threads of the bearing retainer bolt.



Bearing retainer bolt
12 N·m (1.2 kgf·m, 8.7 lb·ft)
LOCTITE®



EAS30397

ASSEMBLING THE CRANKCASE

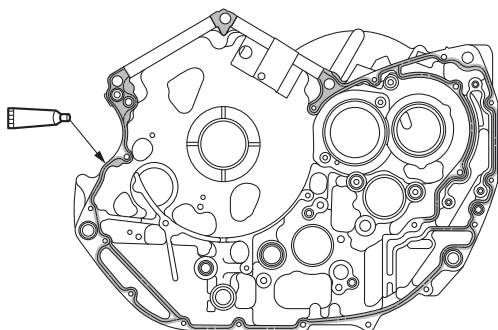
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
 - Sealant
(onto the crankcase mating surfaces)



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

TIP

Do not allow any sealant to come into contact with the oil gallery.



3. Install:
 - Crankcase (left)
(onto the right crankcase)

TIP

Tap lightly on the left crankcase with a soft-face hammer.

4. Install:
 - Crankcase bolts (M10)
 - Crankcase bolts (M6)
 - Oil baffle plate 1 bolts



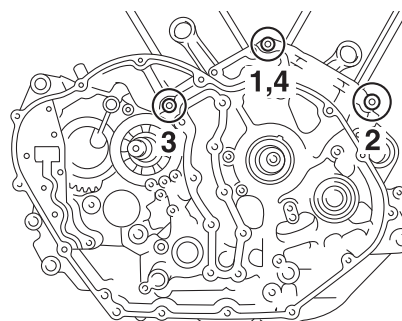
Crankcase bolt (M10)
36 N·m (3.6 kgf·m, 26 lb·ft)
Crankcase bolt (M6)
10 N·m (1.0 kgf·m, 7.2 lb·ft)
Oil baffle plate 1 bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)
LOCTITE®

TIP

- Apply locking agent (LOCTITE®) to the threads of the right crankcase bolts and oil baffle plate 1 bolts.
- Tighten the crankcase bolts in the proper tightening sequence as shown in the illustration.

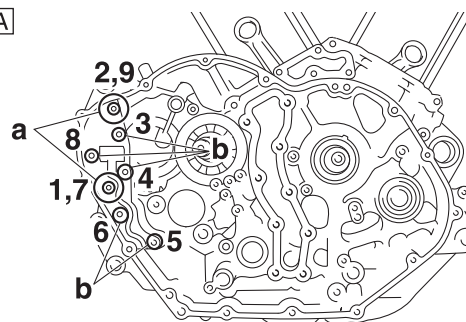
- M10 × 110 mm bolts

A



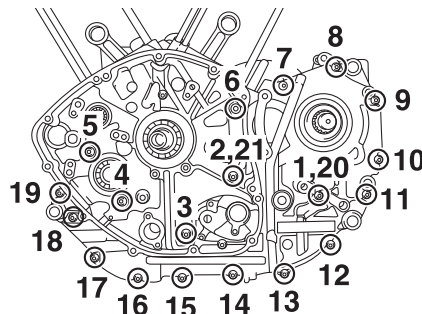
- M6 × 120 mm bolts: "a"
- Oil baffle plate 1 bolts: "b"

A



- M6 × 80 mm bolts

B



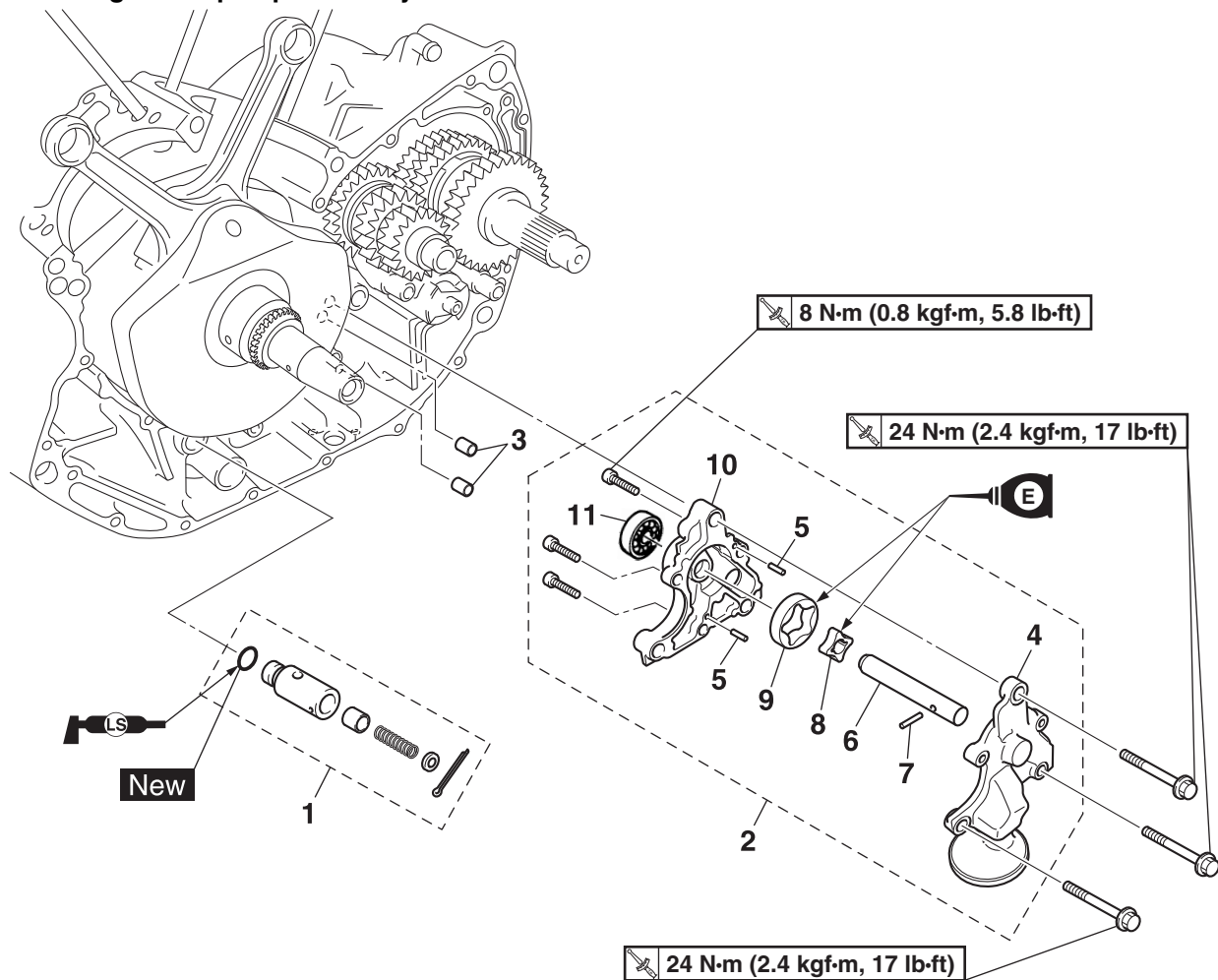
- A. Crankcase (right)
- B. Crankcase (left)

5. Apply:
 - Engine oil
(onto the crankshaft pin bearings and oil delivery holes)
6. Check:
 - Crankshaft and transmission operation
Rough movement → Repair.

EAS20054

OIL PUMP

Removing the oil pump assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Refer to "CRANKCASE" on page 5-64.
1	Relief valve assembly	1	
2	Oil pump assembly	1	
3	Dowel pin	2	
4	Oil pump housing	1	
5	Dowel pin	2	
6	Impeller shaft	1	
7	Pin	1	
8	Oil pump inner rotor	1	
9	Oil pump outer rotor	1	
10	Oil pump housing cover	1	
11	Bearing	1	

EAS30337

CHECKING THE OIL PUMP

1. Check:

- Oil pump housing
Cracks/damage/wear → Replace the oil pump assembly.

2. Measure:

- Inner-rotor-to-outer-rotor-tip clearance “a”
- Outer-rotor-to-oil-pump-housing clearance “b”

Out of specification → Replace the oil pump assembly.



Inner-rotor-to-outer-rotor-tip clearance

0.000–0.120 mm (0.0000–0.0047 in)

Limit

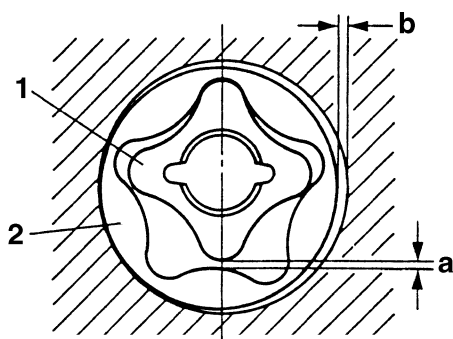
0.20 mm (0.0079 in)

Outer-rotor-to-oil-pump-housing clearance

0.09–0.19 mm (0.0035–0.0075 in)

Limit

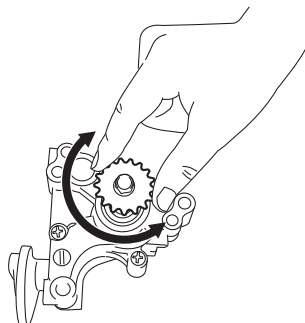
0.26 mm (0.0102 in)



1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:

- Oil pump operation
Rough movement → Repeat steps (1) and (2) or replace the oil pump assembly.



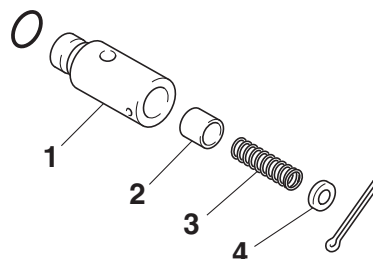
EAS30338

CHECKING THE RELIEF VALVE

1. Check:

- Relief valve body “1”
- Relief valve “2”
- Spring “3”
- Spring retainer “4”

Damage/wear → Replace the relief valve assembly.

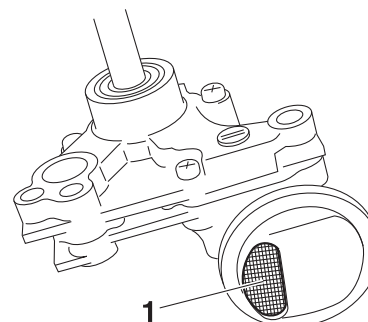


EAS30340

CHECKING THE OIL STRAINER

1. Check:

- Oil strainer “1”
Damage → Replace.
Contaminants → Clean with solvent.



EAS30342

ASSEMBLING THE OIL PUMP

1. Lubricate:

- Inner rotor
- Outer rotor
(with the recommended lubricant)



Recommended lubricant
Engine oil

2. Install:

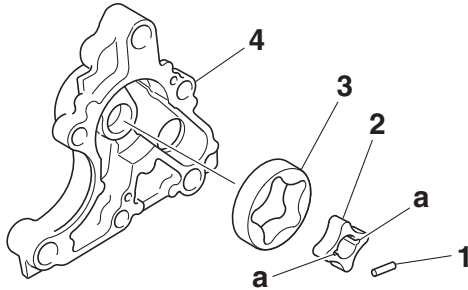
- Pin “1”
- Oil pump inner rotor “2”
- Oil pump outer rotor “3”
- Dowel pin
- Oil pump housing “4”

TIP

When installing the inner rotor, align the pin in the impeller shaft with the grooves “a” in the inner rotor.



Oil pump housing screw
8 N·m (0.8 kgf·m, 5.8 lb·ft)



3. Check:

- Oil pump operation
Refer to “CHECKING THE OIL PUMP” on page 5-72.

EAS31604

INSTALLING THE OIL PUMP ASSEMBLY

1. Install:

- Oil pump assembly

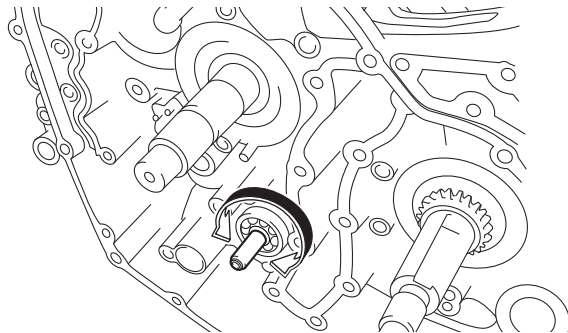


Oil pump assembly bolt
24 N·m (2.4 kgf·m, 17 lb·ft)

ECA13890

NOTICE

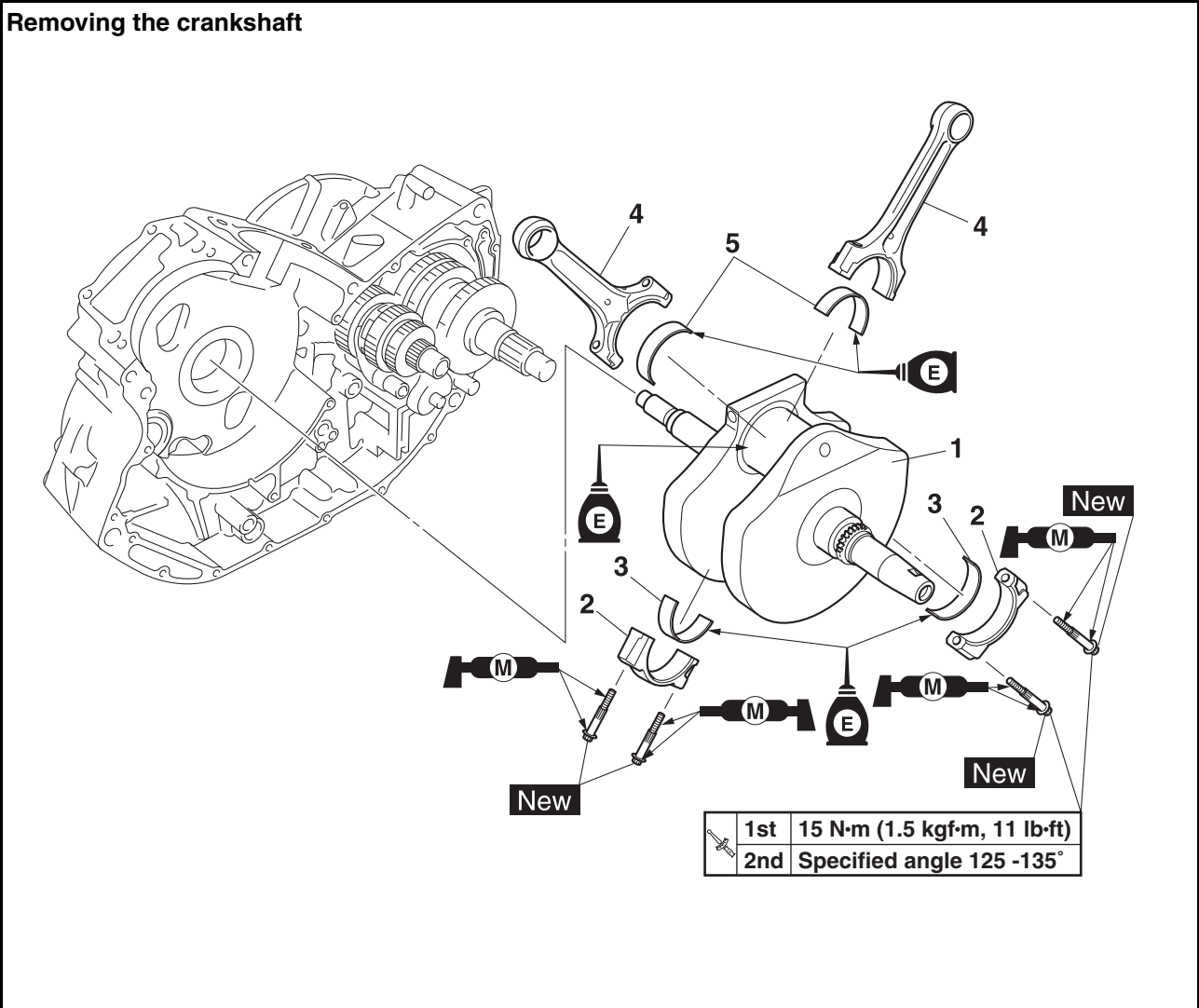
After tightening the bolts, make sure the oil pump turns smoothly.



EAS20061

CRANKSHAFT

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-64.
1	Crankshaft	1	
2	Connecting rod cap	2	
3	Big end lower bearing	2	
4	Connecting rod	2	
5	Big end upper bearing	2	

EAS30415

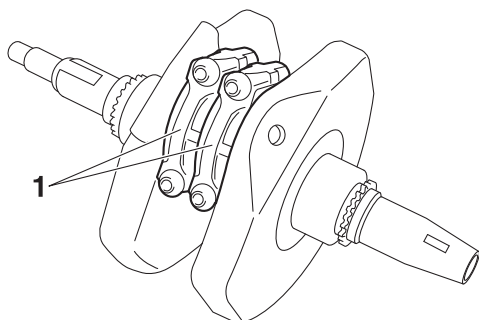
REMOVING THE CONNECTING RODS

1. Remove:

- Connecting rod caps “1”
- Connecting rods
- Big end bearings

TIP

Identify the position of each big end bearing so that it can be reinstalled in its original place.



EAS30423

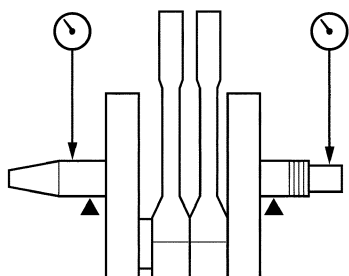
CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:

- Crankshaft runout
Out of specification → Replace the crankshaft.



Runout limit
0.020 mm (0.0008 in)



2. Check:

- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces
Scratches/wear → Replace the crankshaft.

3. Measure:

- Crankshaft-pin-to-big-end-bearing clearance
Out of specification → Replace the big end bearings.



Oil clearance
0.023–0.046 mm (0.0009–0.0018 in)

The following procedure applies to all of the connecting rods.

ECA13930

NOTICE

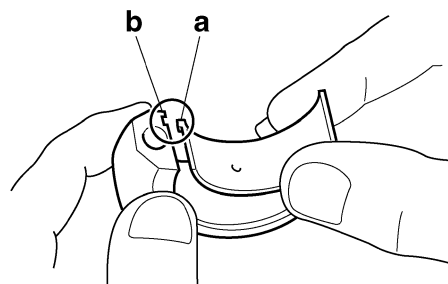
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.



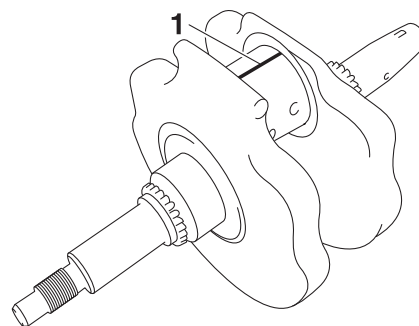
- a. Clean the big end bearings, crankshaft pin, and the inside of the connecting rod halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

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.

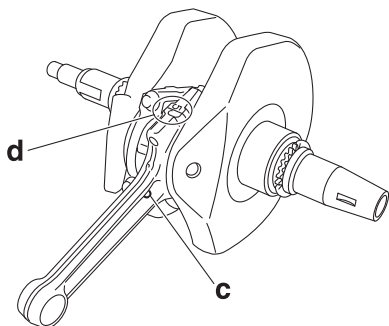


- d. Assemble the connecting rod halves.

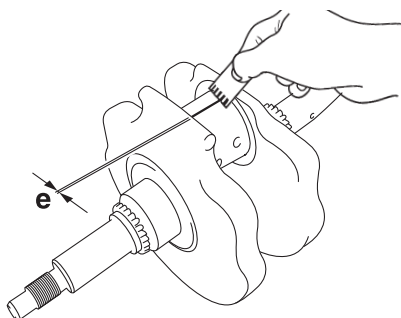
TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolts threads and nut seats with molybdenum disulfide grease.
- Make sure the projection “c” on the connecting rod faces towards the left side of the crankshaft.

- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.



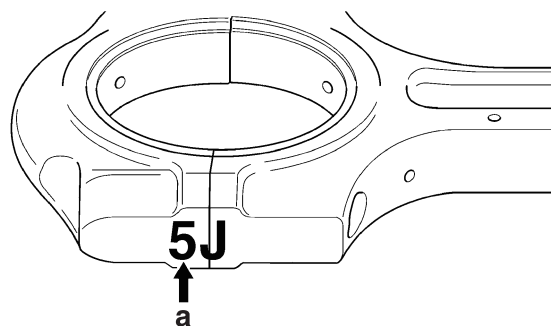
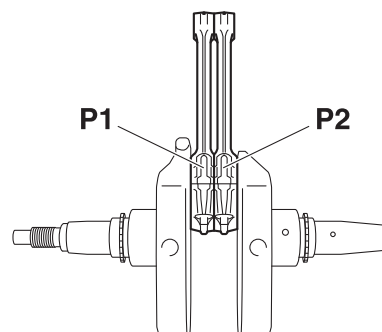
- e. Tighten the connecting rod bolts.
Refer to “INSTALLING THE CONNECTING RODS” on page 5-77.
- f. Remove the connecting rod and big end bearings.
Refer to “INSTALLING THE CONNECTING RODS” on page 5-77.
- g. Measure the compressed Plastigauge® width “e” on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

[illegible]

4. Select:
- Big end bearings (P_1-P_2)

TIP

- The numbers “a” on the connecting rods are used to determine the replacement big end bearing sizes.
- P₁–P₂ refer to the bearings shown in the crankshaft illustration.



For example, if the connecting rod P₁ number is 5, then the bearing size for P₁ is 5 (brown).



Bearing color code

4 Black

5 Brown

6 Green

5. Measure:
- Crankshaft journal diameter “a”
Out of specification → Replace the crankshaft.

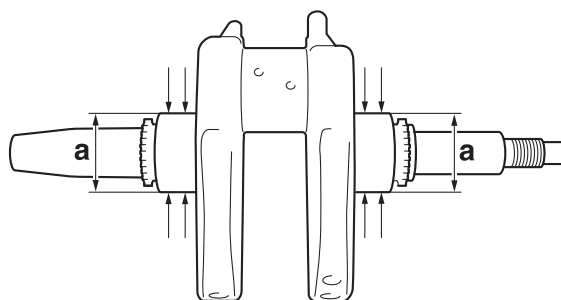
TIP

Measure the diameter of each crankshaft journal at two places.



Crankshaft journal diameter

49.968–49.980 mm (1.9672–1.9677 in)



6. Measure:

- Crankshaft journal bearing inside diameter “a”

Out of specification → Replace the crankcase assembly.

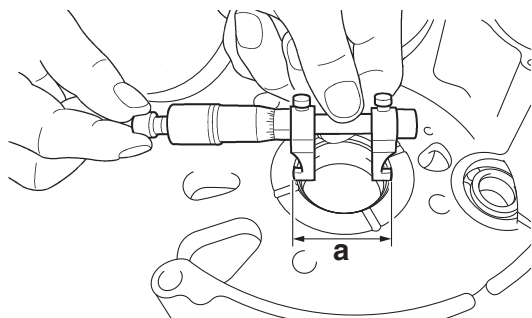
TIP

Measure the inside diameter of each crankshaft journal bearing at two places.



Crankshaft journal bearing inside diameter

50.010–50.028 mm (1.9689–1.9696 in)



7. Calculate:

- Crankshaft-journal-to-crankshaft-journal-bearing clearance
- Out of specification → Replace the crankshaft and crankcase as a set.

TIP

Calculate the clearance by subtracting the crankshaft journal diameter from the crankshaft journal bearing inside diameter.



Journal oil clearance

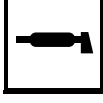
0.030–0.060 mm (0.0012–0.0024 in)

EAS30426

INSTALLING THE CONNECTING RODS

1. Lubricate:

- Bolt threads
- (with the recommended lubricant)



Recommended lubricant Molybdenum disulfide grease

2. Lubricate:

- Crankshaft pin
 - Big end bearings
 - Connecting rod inner surface
- (with the recommended lubricant)



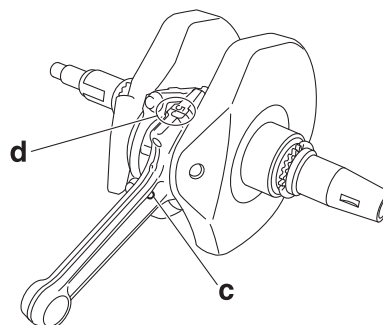
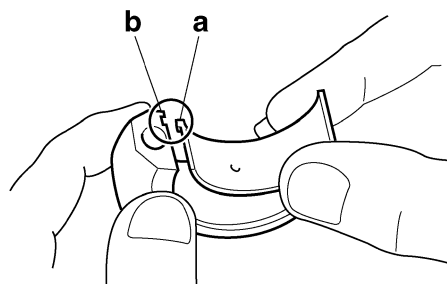
Recommended lubricant Engine oil

3. Install:

- Big end bearings
 - Connecting rods
 - Connecting rod caps
- (onto the crankshaft pin)

TIP

- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure the projection “c” on each connecting rod faces towards the left side of the crankshaft.
- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.



4. Tighten:

- Connecting rod bolts

EWA12890

WARNING

- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts.

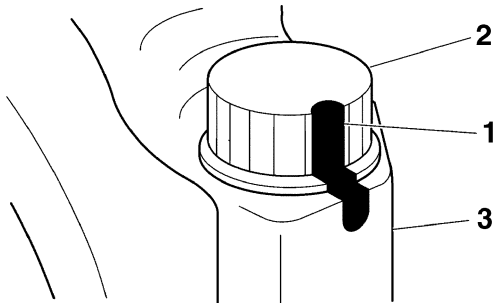
TIP

Tighten the connecting rod bolts using the following procedure.

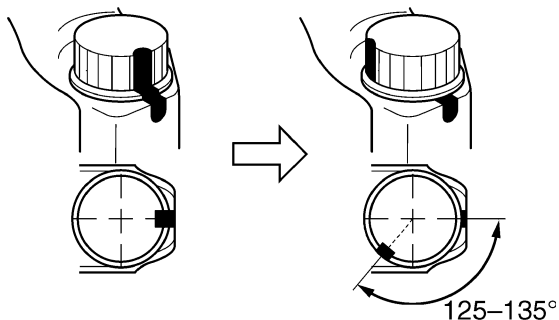
- a. Tighten the connecting rod bolts to specification with a torque wrench.



- 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 125–135°.



EWA12900



When the bolts are tightened more than the specified angle, do not loosen the bolt and then retighten it.

Replace the bolt with a new one and perform the procedure again.

ECA18350

NOTICE

- Do not use a torque wrench to tighten the bolt to the specified angle.
- Tighten the bolt until it is at the specified angle.

[illegible]

EAS30428

INSTALLING THE CRANKSHAFT ASSEMBLY

1. Install:
 - Crankshaft assembly

ECA22650

NOTICE

To avoid scratching the crankshaft and to ease the installation procedure, lubricate each bearing with engine oil.

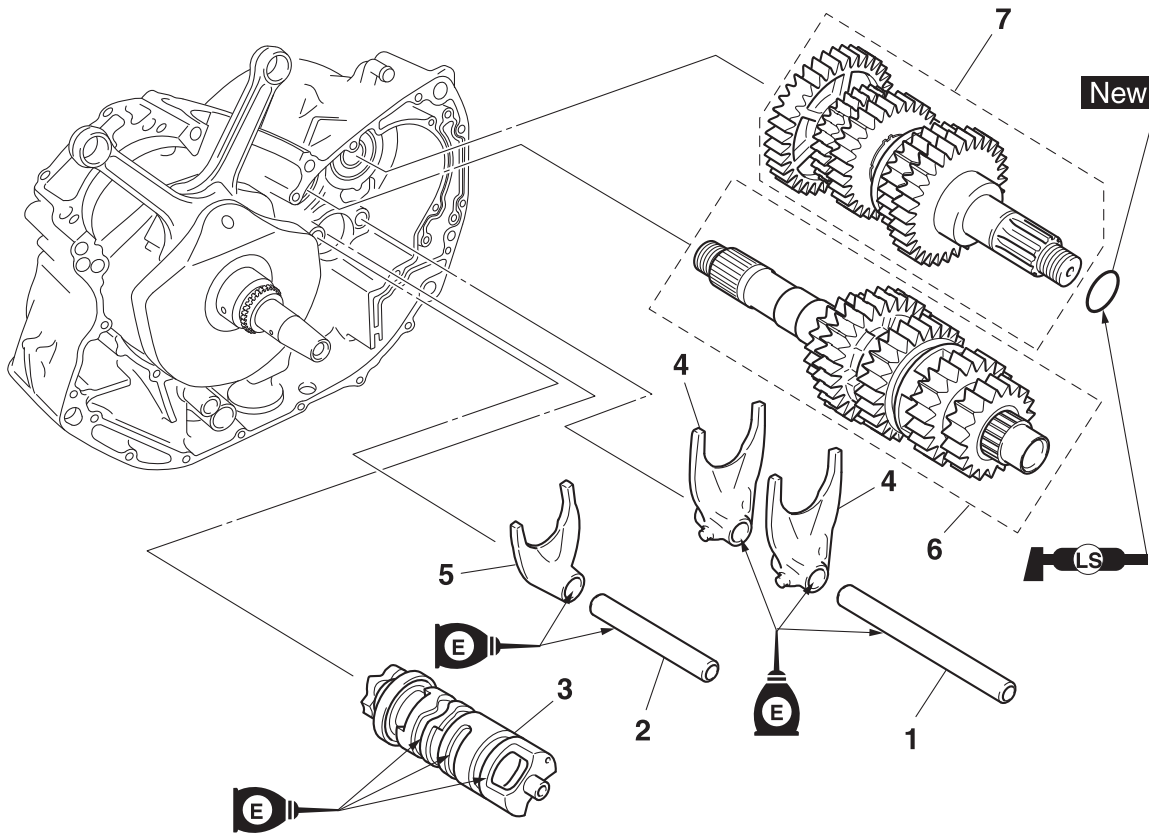
TIP

Align the right connecting rod with the rear cylinder sleeve hole.

EAS20062

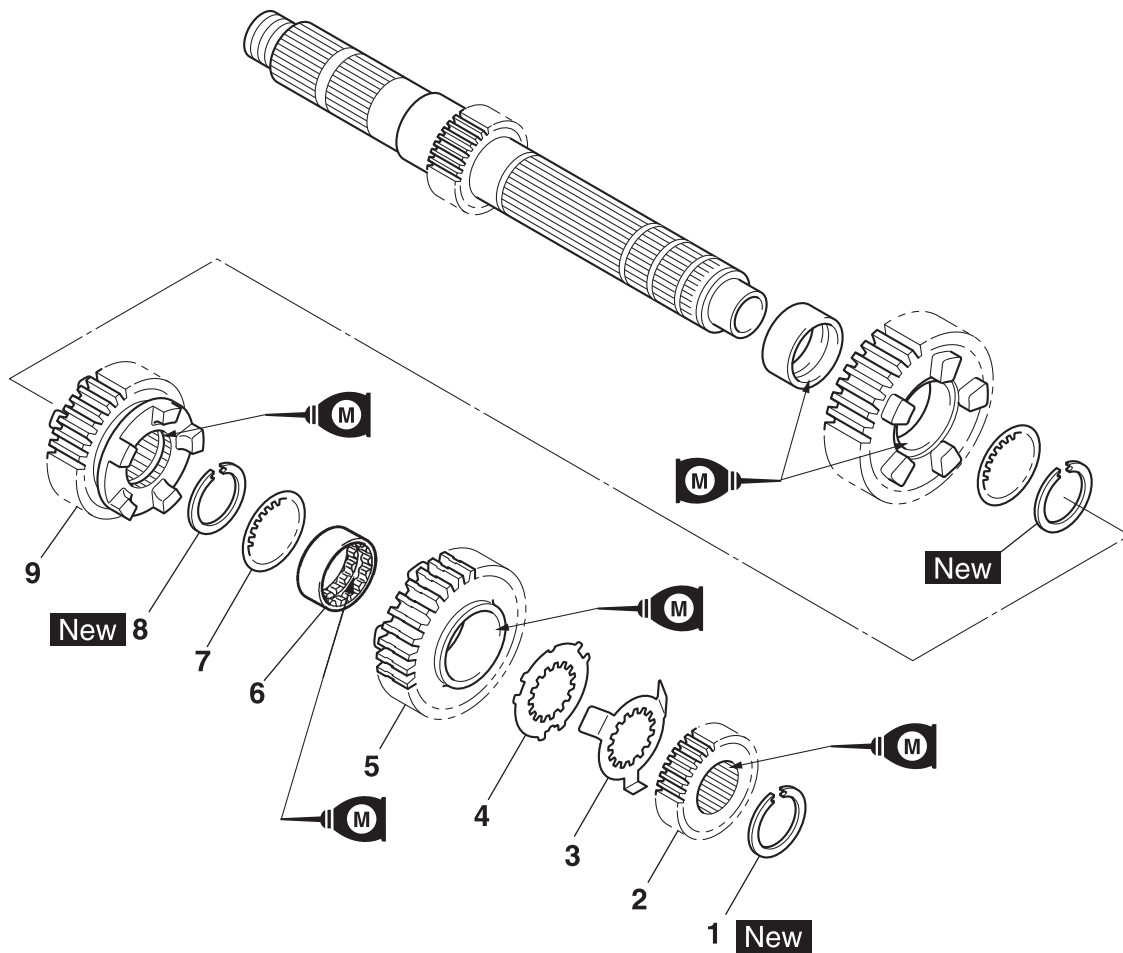
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



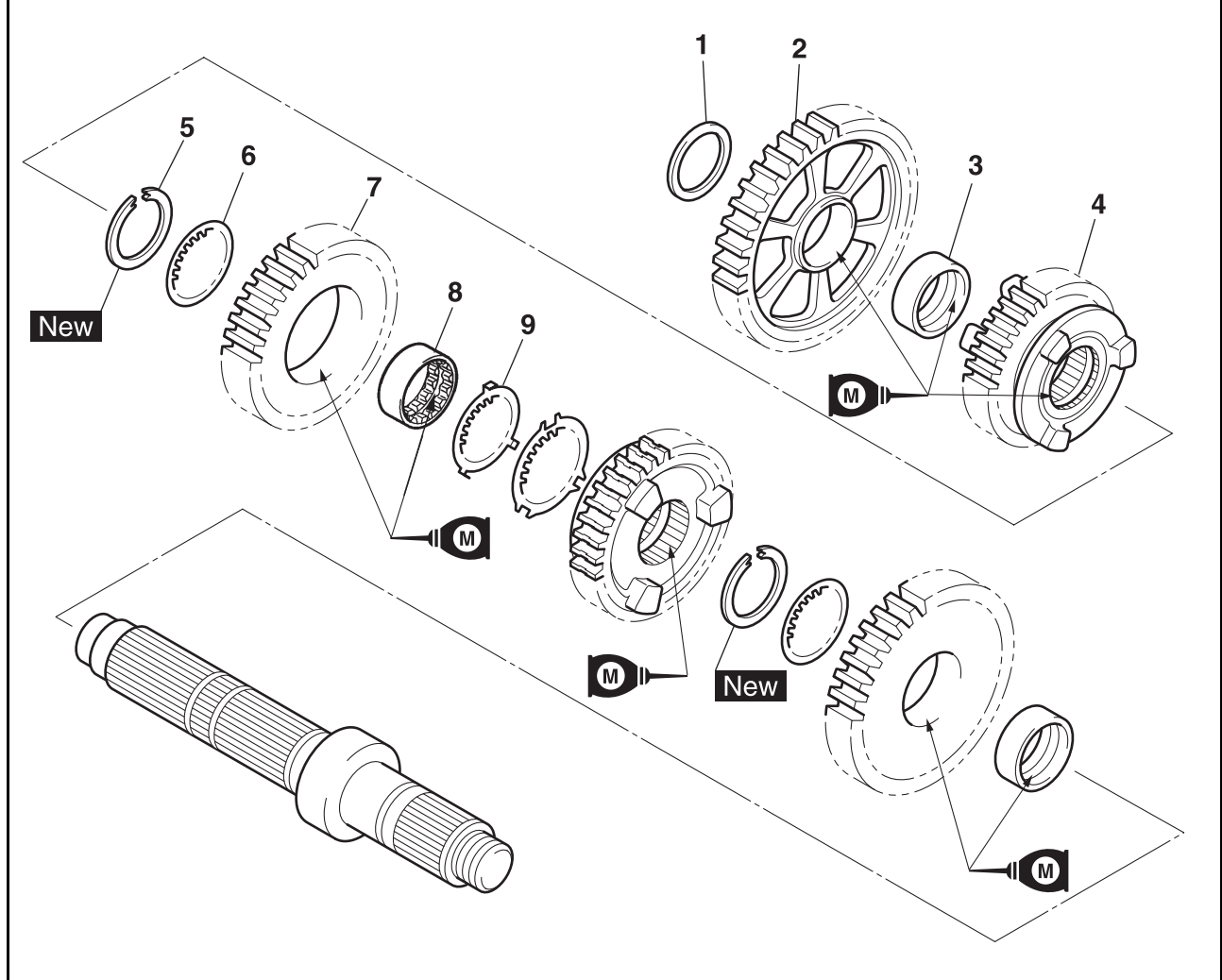
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-64.
1	Long shift fork guide bar	1	
2	Short shift fork guide bar	1	
3	Shift drum assembly	1	
4	Shift fork 1	2	
5	Shift fork 2	1	
6	Main axle assembly	1	
7	Drive axle assembly	1	

Disassembling the main axle assembly



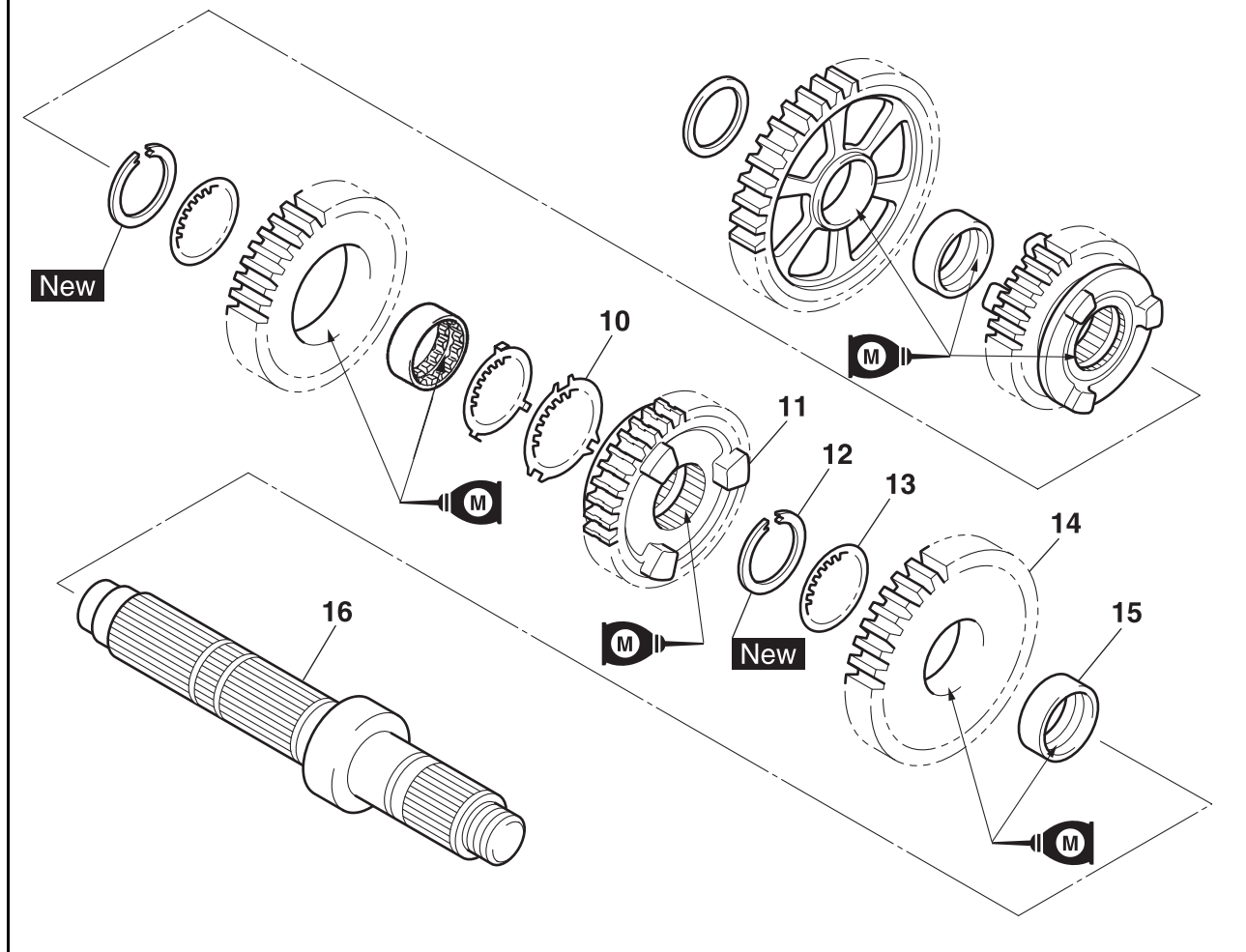
Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	2nd pinion gear	1	
3	Toothed lock washer	1	
4	Toothed lock washer retainer	1	
5	4th pinion gear	1	
6	Collar	1	
7	Toothed washer	1	
8	Circlip	1	
9	3rd pinion gear	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Washer	1	
2	1st wheel gear	1	
3	Collar	1	
4	5th wheel gear	1	
5	Circlip	1	
6	Toothed washer	1	
7	3rd wheel gear	1	
8	Collar	1	
9	Toothed lock washer	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
10	Toothed lock washer retainer	1	
11	4th wheel gear	1	
12	Circlip	1	
13	Toothed washer	1	
14	2nd wheel gear	1	
15	Collar	1	
16	Drive axle	1	

EAS30431

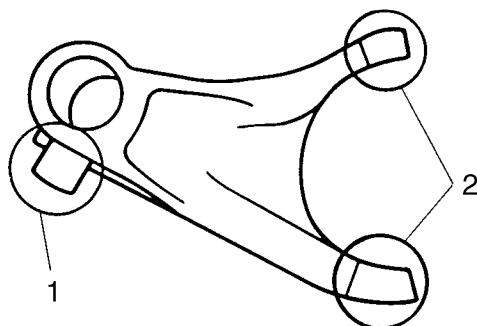
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks and shift fork guide bars.

1. Check:

- Shift fork cam follower "1"
- Shift fork pawls "2"

Bends/damage/scoring/wear → Replace the shift fork.



2. Check:

- Shift fork guide bar

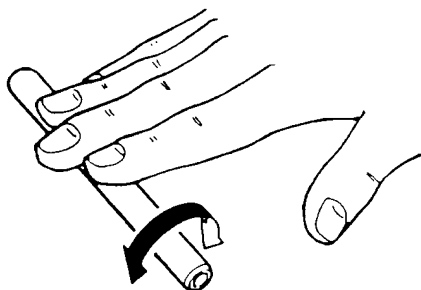
Roll the shift fork guide bar on a flat surface.

Bends → Replace.

EWA12840

WARNING

Do not attempt to straighten a bent shift fork guide bar.

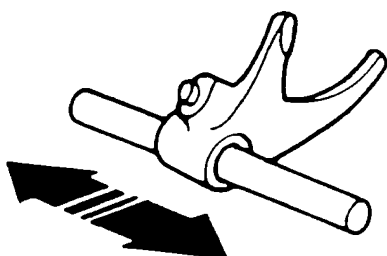


3. Check:

- Shift fork movement

(along the shift fork guide bar)

Rough movement → Replace the shift forks and shift fork guide bar as a set.

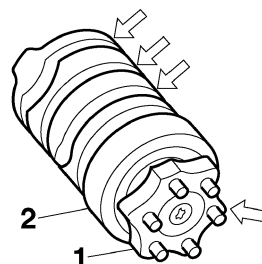


EAS30432

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- Shift drum grooves
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

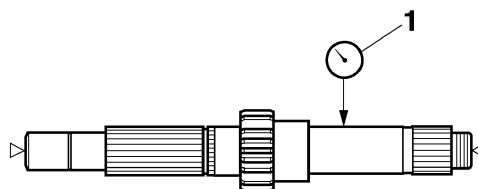
CHECKING THE TRANSMISSION

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)**

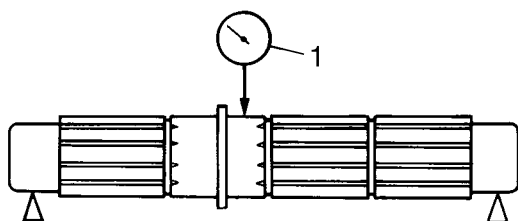


2. Measure:

- Drive axle runout
(with a centering device and dial gauge "1")
Out of specification → Replace the drive axle.

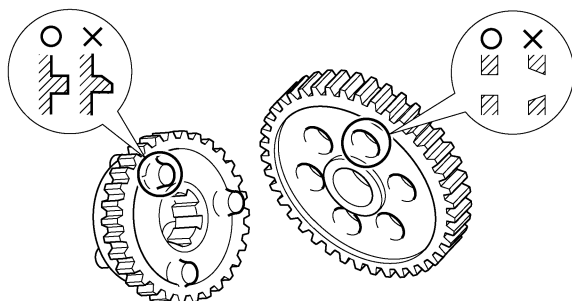


**Drive axle runout limit
0.08 mm (0.0032 in)**



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).

EAS30435

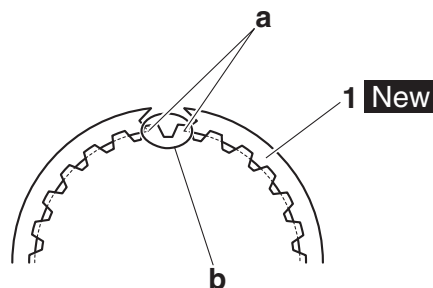
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:

- Toothed washer
- Circlip "1" **New**

TIP

Install the circlip so that both ends "a" rest on the sides of a spline "b" with both axles aligned.

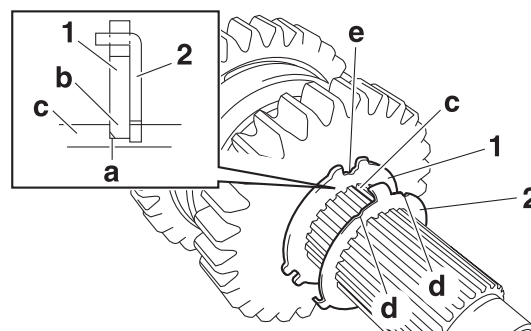


2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

TIP

- With the toothed lock washer retainer in the groove "a" in the drive 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 "d" with the alignment mark "e" on the retainer.



EAS30437

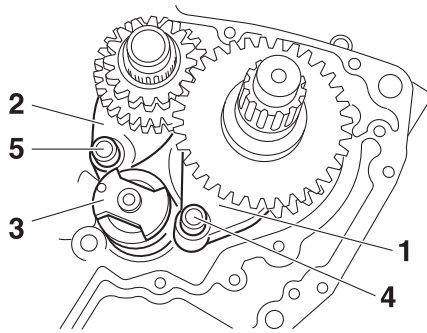
INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

1. Install:

- Shift forks 1 "1"
- Shift forks 2 "2"
- Shift drum assembly "3"
- Long shift fork guide bar "4"
- Short shift fork guide bar "5"

TIP

The embossed marks "3D8" on the shift forks should face towards the left side of the engine.



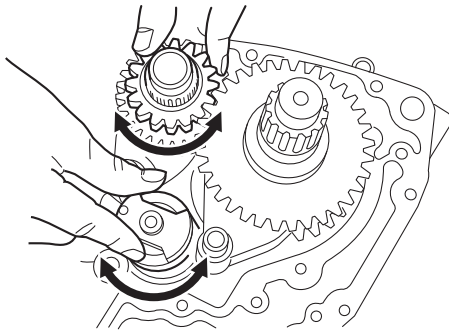
2. Check:

- Transmission

Rough movement → Repair.

TIP

- Apply molybdenum disulfide grease to each gear and bearing thoroughly.
- Before assembling the crankcase, make sure that the transmission is in neutral and that the gears turn freely.



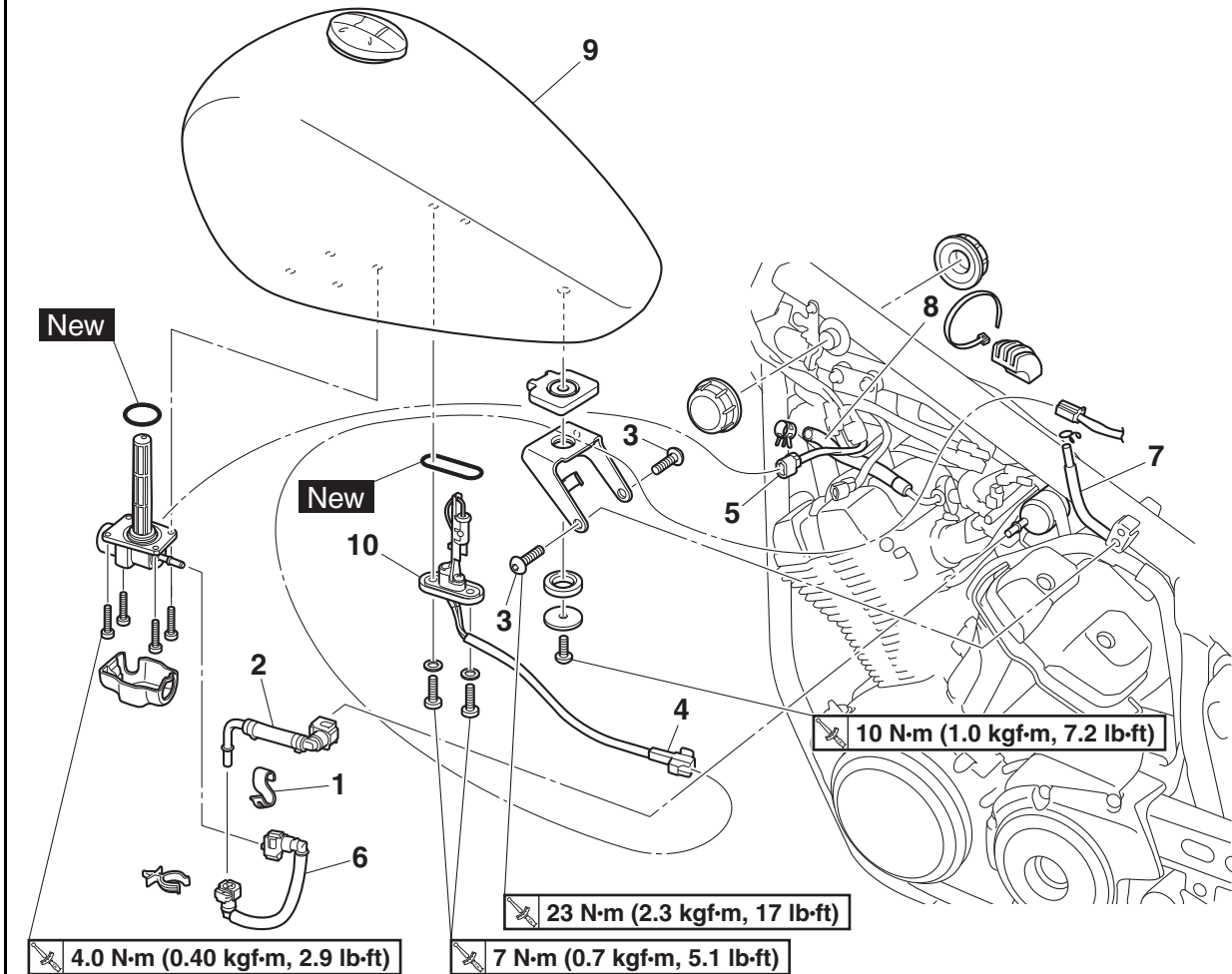
FUEL SYSTEM

FUEL TANK	6-1
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REMOVING THE FUEL PUMP	6-5
CHECKING THE FUEL PUMP BODY	6-5
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CHECKING THE THROTTLE BODIES	6-11
CHECKING THE INTAKE MANIFOLD JOINTS	6-11
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EAS20067

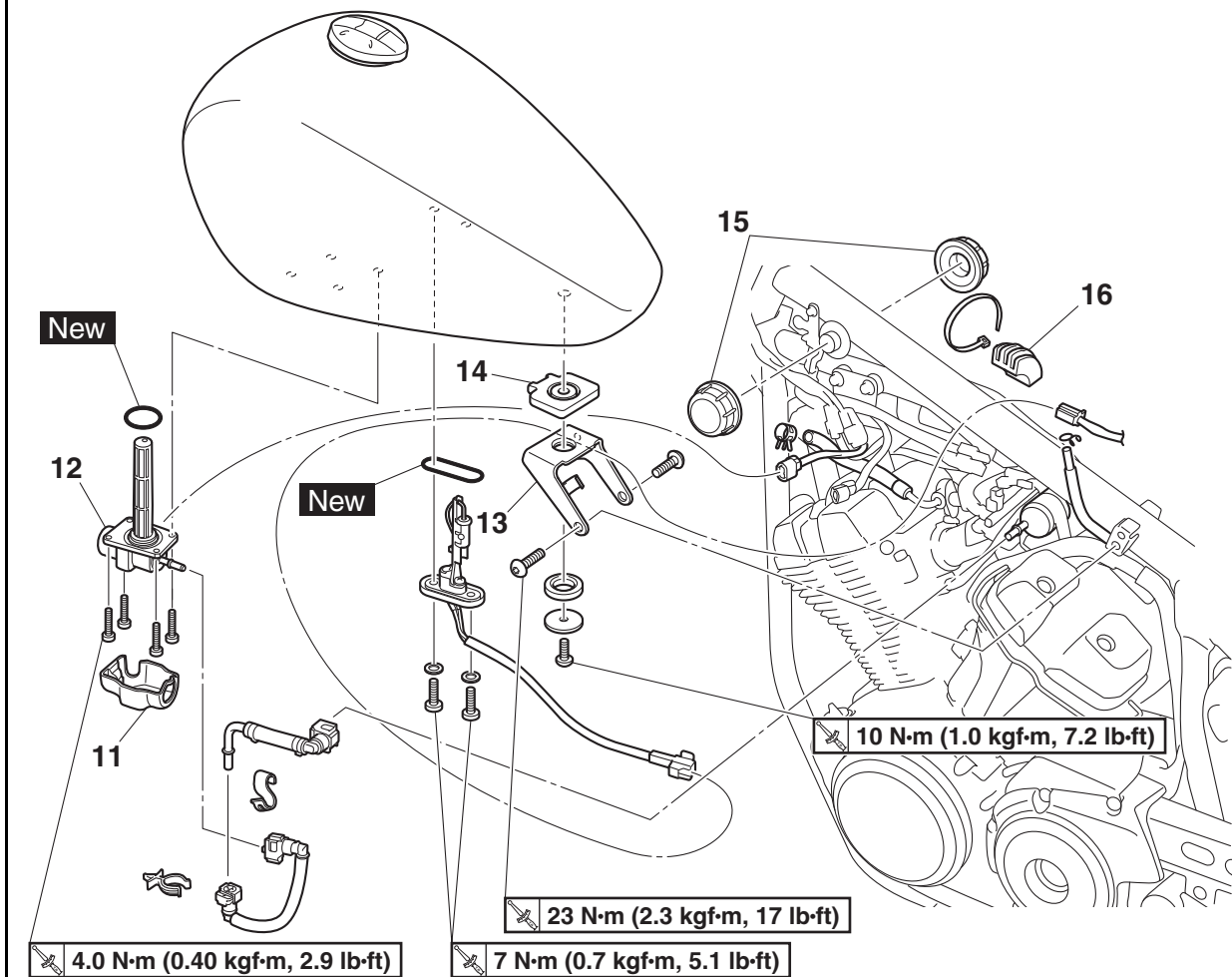
FUEL TANK

Removing the fuel tank



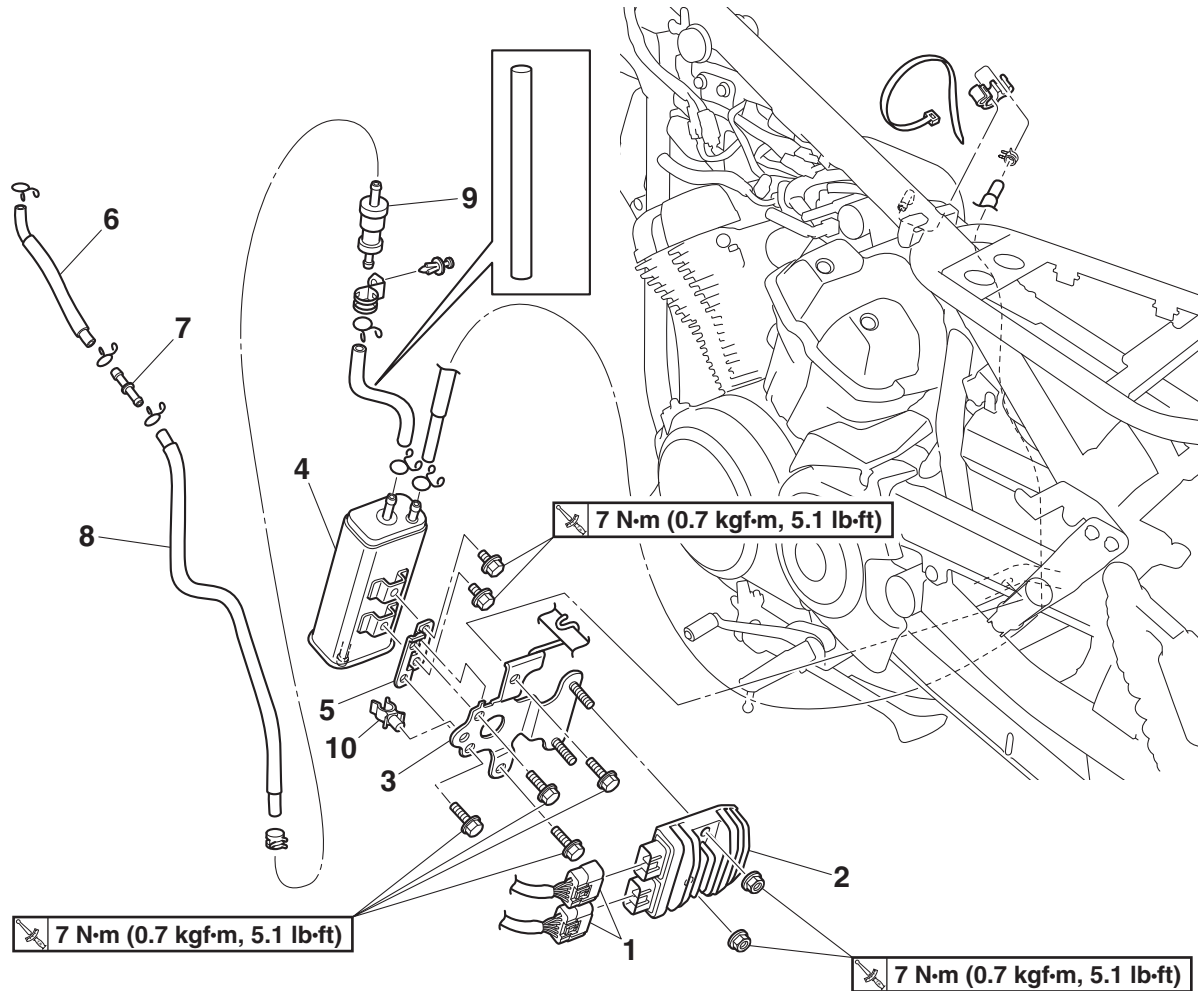
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Fuel hose holder	1	
2	Fuel hose (fuel hose to fuel filter)	1	
3	Fuel tank bracket bolt	2	
4	Fuel sender coupler	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel hose (fuel pump to fuel hose)	1	
7	Fuel tank breather/overflow hose (fuel tank to fuel hose joint)	1	Disconnect.
8	Fuel return hose	1	Disconnect.
9	Fuel tank	1	
10	Fuel sender	1	

Removing the fuel tank



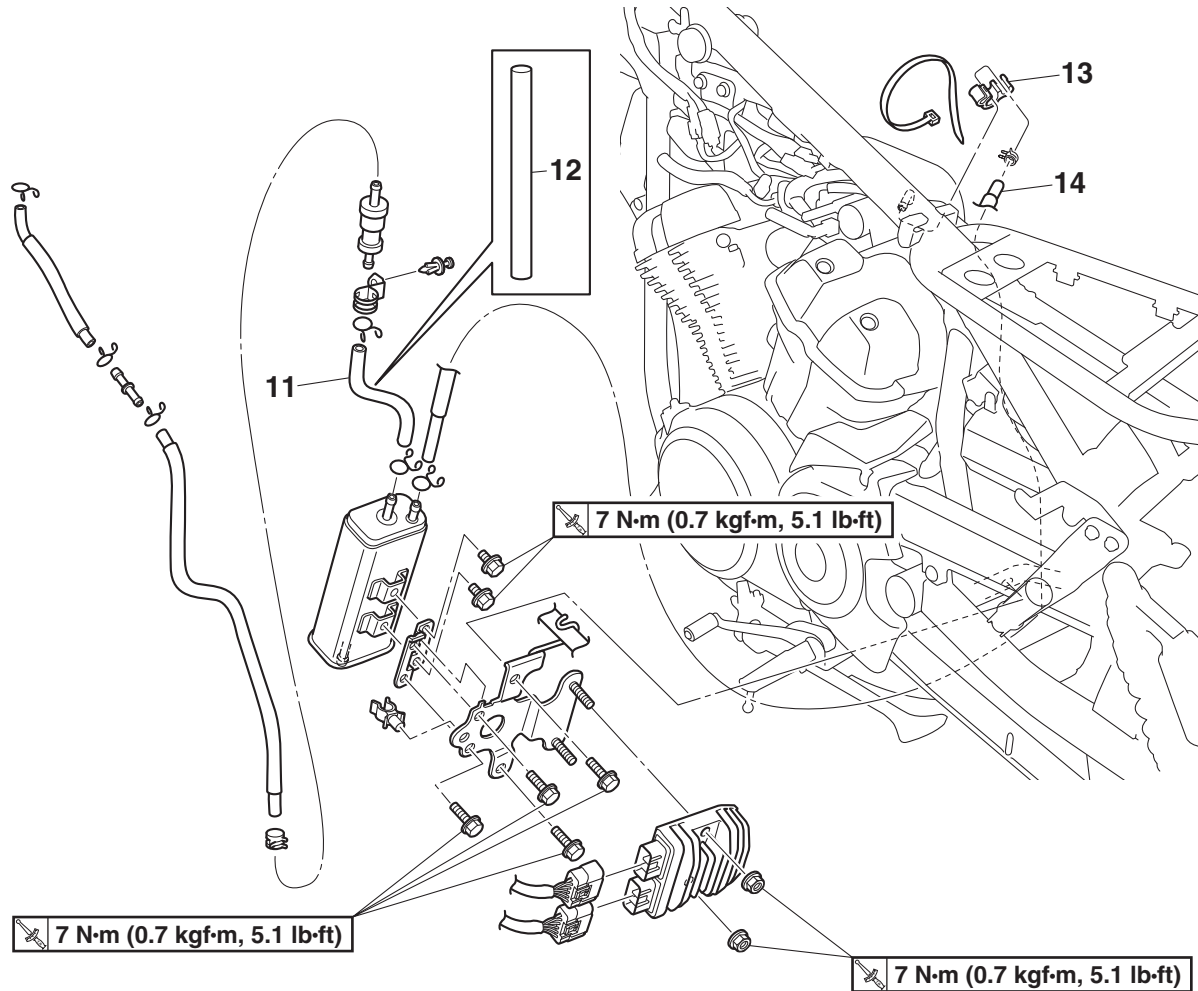
Order	Job/Parts to remove	Q'ty	Remarks
11	Fuel pump cover	1	
12	Fuel pump	1	
13	Fuel tank bracket	1	
14	Fuel tank bracket damper	1	
15	Fuel tank stopper	2	
16	Fuel tank damper	1	

Removing the rollover valve and canister



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (3)" on page 4-6.
1	Rectifier/regulator coupler	2	Disconnect.
2	Rectifier/regulator	1	
3	Rectifier/regulator bracket	1	
4	Canister	1	For California
5	Canister bracket	1	For California
6	Fuel tank breather/overflow hose (fuel tank to fuel hose joint)	1	
7	Fuel hose joint	1	
8	Fuel tank breather/overflow hose (fuel hose joint to rollover valve)	1	
9	Rollover valve	1	
10	Fuel tank breather/overflow hose holder	1	Except for California

Removing the rollover valve and canister



Order	Job/Parts to remove	Q'ty	Remarks
11	Fuel tank breather/overflow hose (rollover valve to canister)	1	For California
12	Fuel tank breather/overflow hose	1	Except for California
13	Hose holder	1	
14	Canister purge hose	1	For California

EAS30450

REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
 - Fuel tank

EAS30451

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel hose

EWA16640

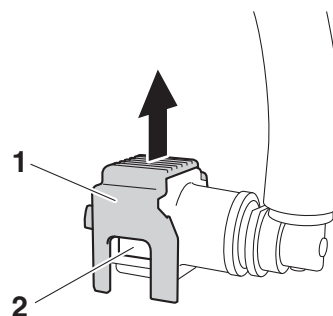
WARNING

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.

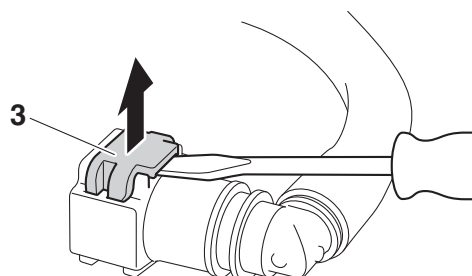
TIP

- To disconnect the fuel hose from the fuel pump or fuel filter, 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 disconnect the hose.
- To disconnect the fuel hose (fuel pump to fuel hose) from the fuel hose (fuel hose to fuel filter), slide the fuel hose connector lock “3” in the direction of the arrow shown using a slotted head screwdriver, and then disconnect the hose.
- Disconnect the fuel hose from the fuel pump and fuel filter manually without using any tools.
- Before disconnecting the hose, place a few rags in the area under where it will be removed.

A



B



A. Connection to fuel pump and fuel filter

B. Connection between fuel hoses

2. Remove:

- Fuel pump cover

TIP

When removing the fuel pump cover, remove the cover from the fuel hose end of the fuel pump first.

3. Remove:

- Fuel pump

ECA22660

NOTICE

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the filter portion of the fuel pump.**

EAS30454

CHECKING THE FUEL PUMP BODY

1. Check:

- Fuel pump body
 - Obstruction → Clean.
 - Cracks/damage → Replace the fuel pump.

EAS30699

CHECKING THE ROLLOVER VALVE

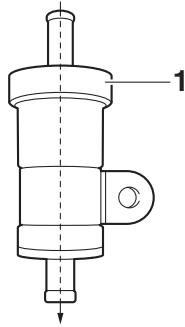
1. Check:

- 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.



EAS32055

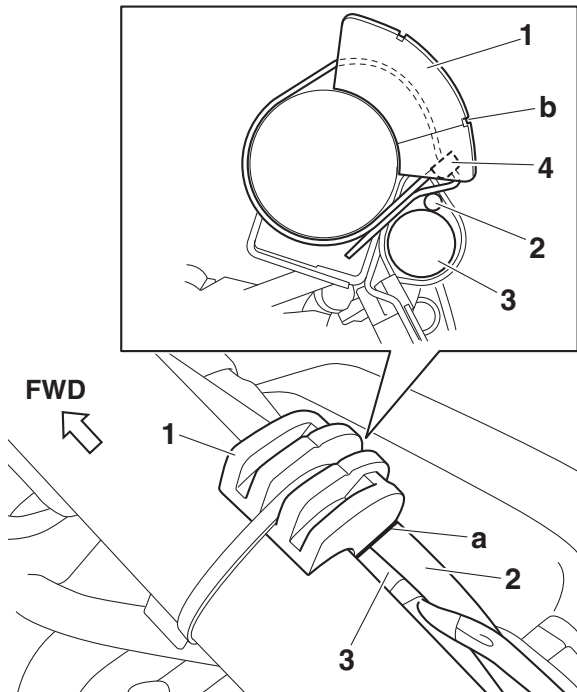
INSTALLING THE FUEL TANK DAMPER

1. Install:

- Fuel tank damper “1”

TIP

Position the fuel tank damper “1” so that the side “a” of the damper contacts the clutch cable “2” and wire harness “3”. In addition, be sure to position the buckle “4” of the plastic band to the outside of the indentation “b” in the fuel tank damper.



EAS30456

INSTALLING THE FUEL PUMP

1. Install:

- Fuel pump
- Gasket **New**



Fuel pump bolt
4.0 N·m (0.40 kgf·m, 2.9 lb·ft)

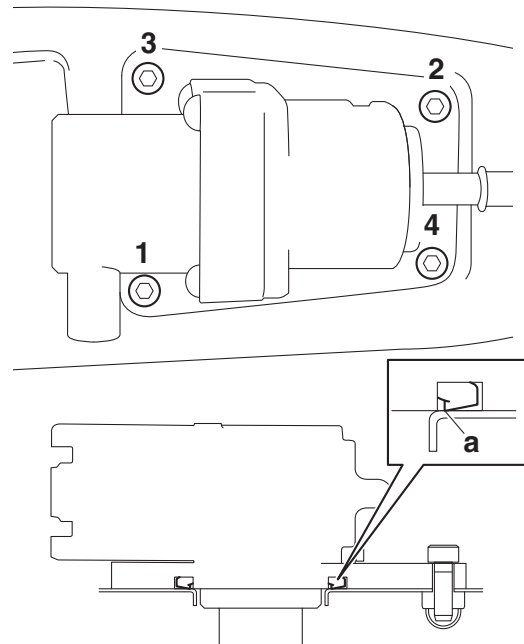
ECA22670

NOTICE

Do not touch the filter portion of the fuel pump.

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- The gasket lip “a” shall face toward the fuel tank.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



2. Install:

- Fuel hoses

ECA22680

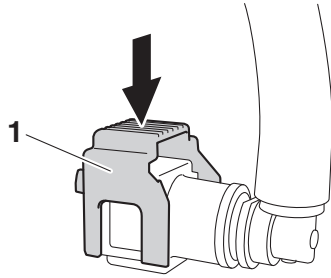
NOTICE

When installing a fuel hose, make sure that it is securely connected, and that the fuel hose connector cover or fuel hose connector lock is in the correct position, otherwise the fuel hose will not be properly installed.

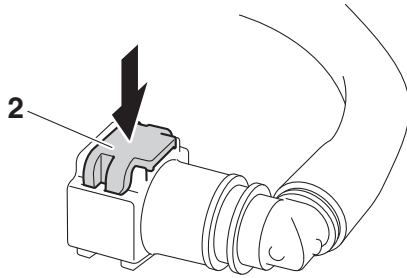
TIP

- Connect the fuel hoses until a distinct “click” is heard.
- To connect a fuel hose, slide the fuel hose connector cover “1” or fuel hose connector lock “2” in the direction of the arrow.

A



B



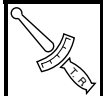
- A. Connection to fuel pump and fuel filter
B. Connection between fuel hoses

EAS31605

INSTALLING THE FUEL SENDER

1. Install:

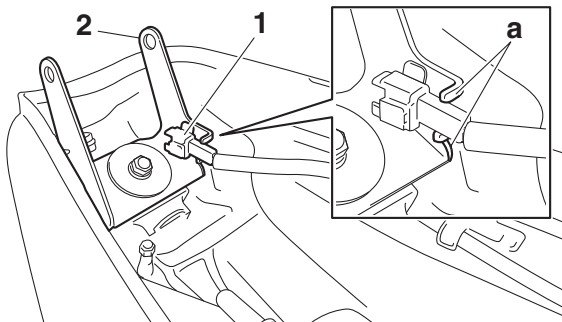
- Fuel sender
- O-ring **New**



Fuel sender screw
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

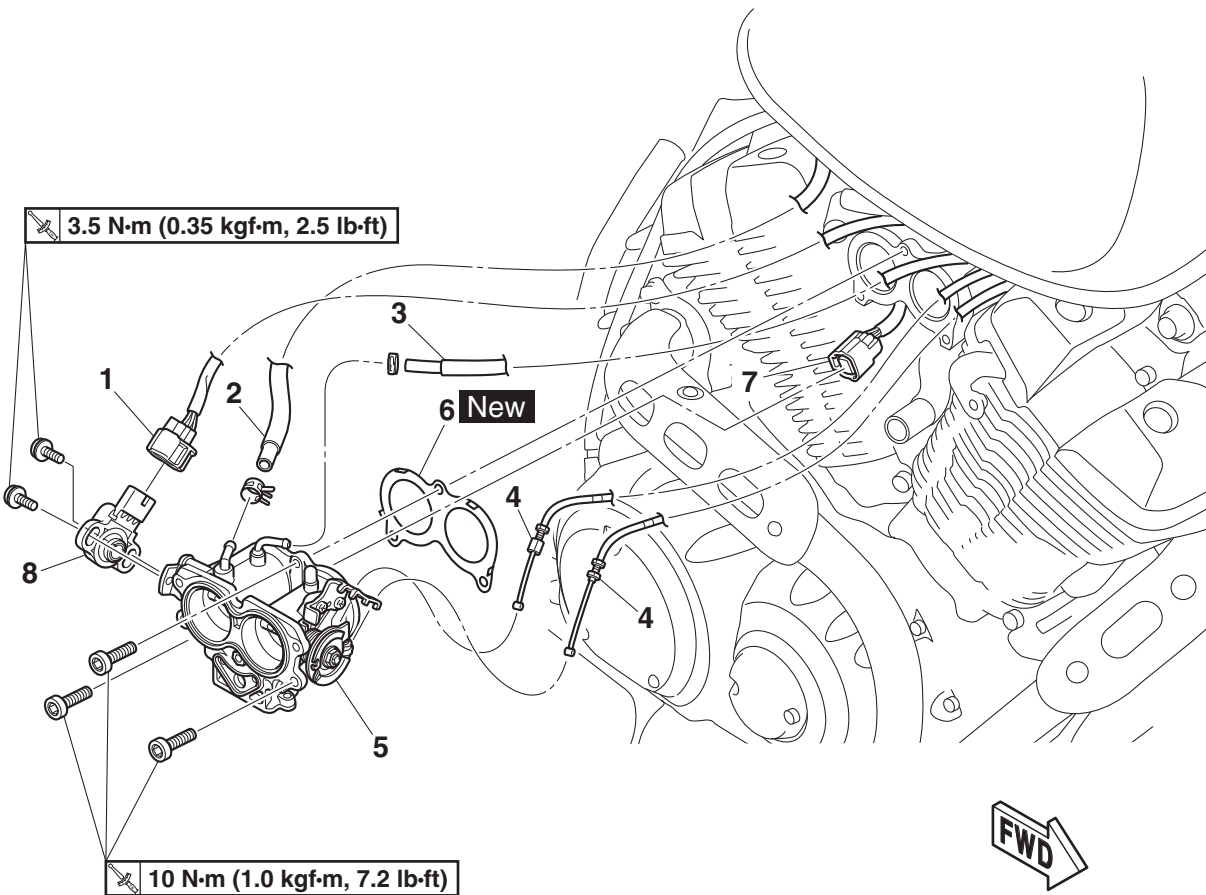
Position the fuel sender coupler “1” between the guides “a” on the fuel tank bracket “2”.



EAS20070

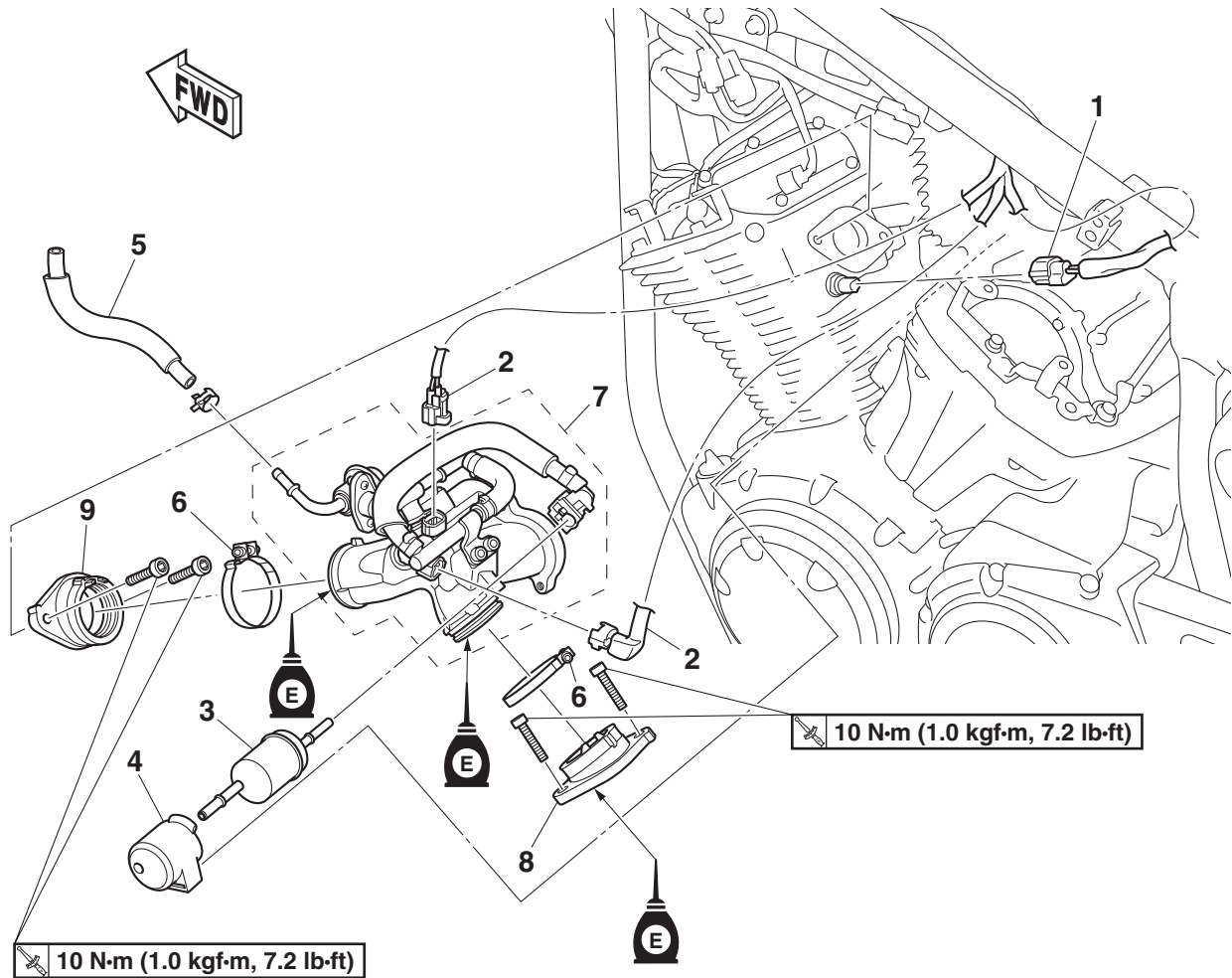
THROTTLE BODIES

Removing the throttle body



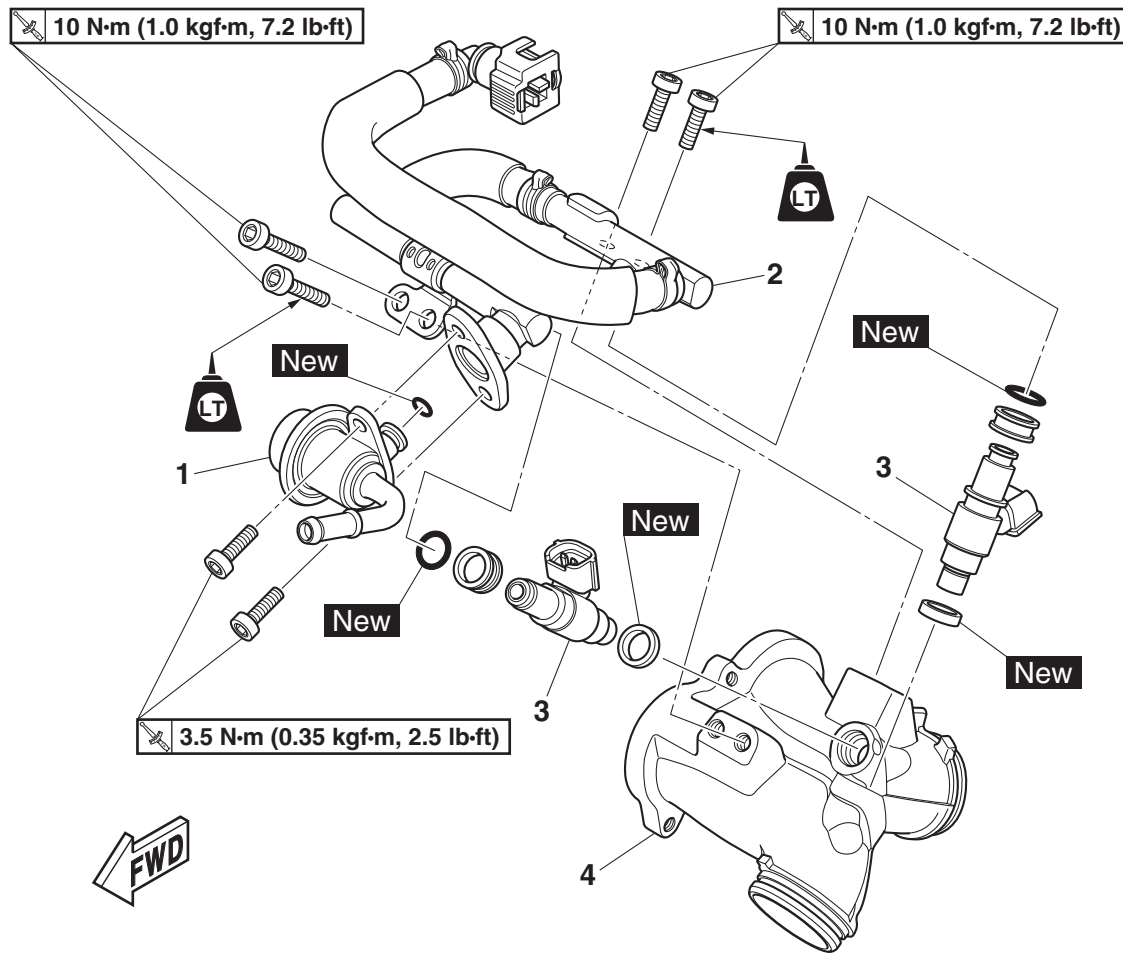
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (3)" on page 4-6.
1	Throttle position sensor coupler	1	Disconnect.
2	Canister purge hose	1	Disconnect. For California
3	Intake air pressure sensor hose	1	Disconnect.
4	Throttle cable	2	Disconnect.
5	Throttle body	1	
6	Gasket	1	
7	ISC (Idle Speed Control) unit coupler	1	Disconnect.
8	Throttle position sensor	1	

Removing the intake manifold assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Throttle body		Refer to "THROTTLE BODIES" on page 6-8.
	Canister purge hose		For California Refer to "FUEL TANK" on page 6-1.
1	Engine temperature sensor coupler	1	Disconnect.
2	Fuel injector coupler	2	Disconnect.
3	Fuel filter	1	
4	Fuel filter cover	1	
5	Fuel return hose	1	
6	Intake manifold joint clamp screw	2	Loosen.
7	Intake manifold assembly	1	
8	Rear cylinder intake manifold joint	1	
9	Front cylinder intake manifold joint	1	

Disassembling the intake manifold



Order	Job/Parts to remove	Q'ty	Remarks
1	Pressure regulator	1	
2	Inlet pipe assembly	1	
3	Injector	2	
4	Intake manifold	1	

EAS30477

CHECKING THE INJECTORS

EWA15920

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 hoses. Any remaining pressure in the fuel hoses may cause the fuel to spray out. Place a container or rag under the hoses 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 checking the injectors.

ECA18430

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 bolts, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the bolt seats could prevent the bolts from being tightened to the specified torque.

1. Check:
 - Injectors
 Damage/defective → Replace.
 Refer to “FUEL INJECTION SYSTEM” on page 7-27.

EAS30480

INSTALLING THE INJECTORS

1. Install the injectors to the inlet pipe assembly.
2. Install a seal onto the end of each injector.
3. Install the inlet pipe assembly to the intake manifold.



Inlet pipe assembly bolt
 10 N·m (1.0 kgf·m, 7.2 lb·ft)
 LOCTITE®

EAS30479

CHECKING THE THROTTLE BODIES

ECA22690

NOTICE

The throttle body should not be disassembled.

1. Check:
 - Throttle bodies
 Cracks/damage → Replace the throttle bodies as a set.
2. Check:
 - Fuel passages
 Obstructions → Clean.

EAS31606

CHECKING THE INTAKE MANIFOLD JOINTS

1. Check:
 - Intake manifold joints
 Cracks/damage → Replace.

EAS30484

CHECKING THE PRESSURE REGULATOR OPERATION

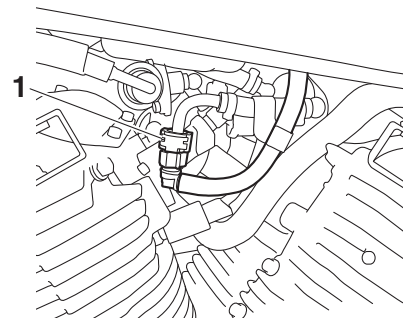
1. Check:
 - Fuel pressure

- a. Disconnect the fuel hose (fuel pump to fuel hose) “1” from the fuel hose (fuel hose to fuel filter).

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.



- b. Connect the fuel pressure adapter “2” between the fuel hose (fuel pump to fuel hose) “1” and fuel hose (fuel hose to fuel filter) “3”.
- c. Connect the pressure gauge “4” to the fuel pressure adapter “3”.
- d. Connect the vacuum/pressure pump gauge set “5” to the pressure regulator “6”.



Vacuum/pressure pump gauge set

90890-06756

Mityvac brake bleeding tool

YS-42423

Pressure gauge

90890-03153

Pressure gauge

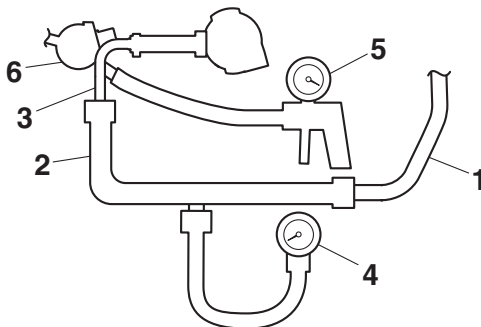
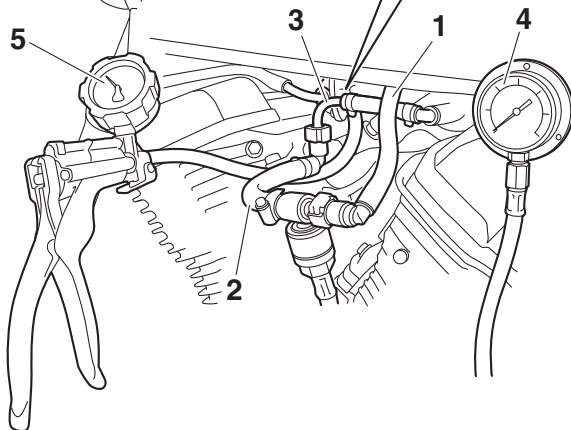
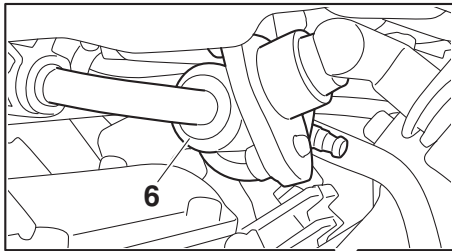
YU-03153

Fuel pressure adapter

90890-03176

Fuel pressure adapter

YM-03176



e. Start the engine.

f. Measure the fuel pressure.



Fuel line pressure (at idle)

220.0–300.0 kPa (2.20–3.00 kgf/cm², 31.9–43.5 psi)

- g. Use the vacuum/pressure pump gauge set to adjust the fuel pressure in relation to the vacuum pressure as described below.

TIP

The vacuum pressure should not exceed 100 kPa (760 mmHg).

- Increase the vacuum pressure → Fuel pressure is decreased
- Decrease the vacuum pressure → Fuel pressure is increased

Faulty → Replace the fuel pump and pressure regulator.

EAS30485

ADJUSTING THE THROTTLE POSITION SENSOR

1. Adjust:

- Throttle position sensor angle

a. Connect the Test harness-TPS(3P) “1” to the throttle position sensor and wire harness as shown.

b. Connect the digital circuit tester to the Test harness-TPS(3P).

- Positive tester probe → yellow (wire harness color)
- Negative tester probe → black/blue (wire harness color)



Digital circuit tester (CD732)

90890-03243

Model 88 Multimeter with tachometer

YU-A1927

Test harness– TPS (3P)

90890-03204

Test harness– TPS (3P)

YU-03204

c. Turn the main switch to “ON”.

d. Measure the throttle position sensor output voltage.

e. Adjust the throttle position sensor angle so that the output voltage is within the specified range.



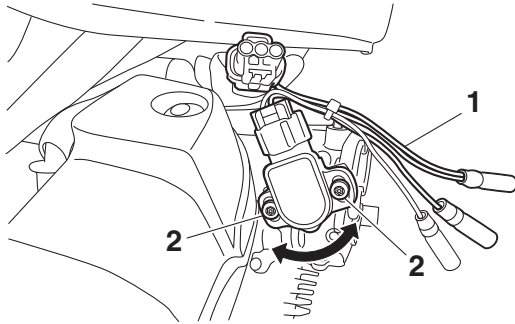
Output voltage (at idle)

0.63–0.73 V

f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws “2”.



Throttle position sensor screw
3.5 N·m (0.35 kgf·m, 2.5 lb·ft)



EAS31607

REMOVING THE INTAKE MANIFOLD ASSEMBLY

1. Remove:
 - Intake manifold assembly

TIP

Remove the rear cylinder intake manifold joint together with the intake manifold assembly.

EAS31608

INSTALLING THE INTAKE MANIFOLD ASSEMBLY

1. Install:
 - Intake manifold assembly

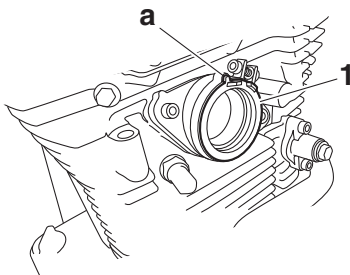
- a. Install the front cylinder intake manifold joint “1” to the front cylinder head.



Front cylinder intake manifold joint bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

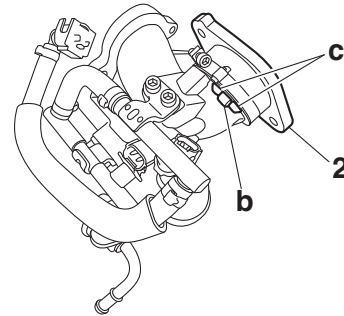
Install the front cylinder intake manifold joint with its projection “a” facing up as shown in the illustration.



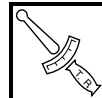
- b. Install the rear cylinder intake manifold joint “2” to the intake manifold assembly.

TIP

Be sure to fit the projection “b” on the intake manifold assembly between the projections “c” on the rear cylinder intake manifold joint.



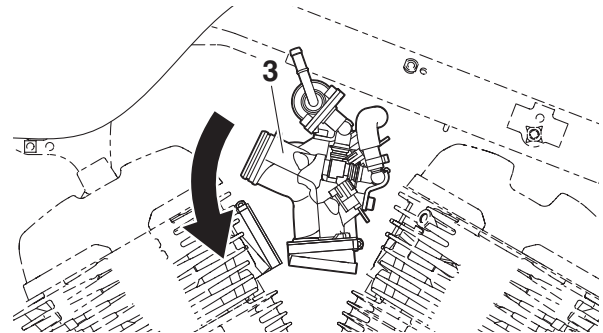
- c. Install the intake manifold assembly.



Rear cylinder intake manifold joint bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Lubricate the rear cylinder intake manifold joint and rear cylinder head mating surfaces with engine oil.
- Position the intake manifold assembly “3” as shown in the illustration, and then rotate it in the direction of the arrow shown to install it.



ELECTRICAL SYSTEM

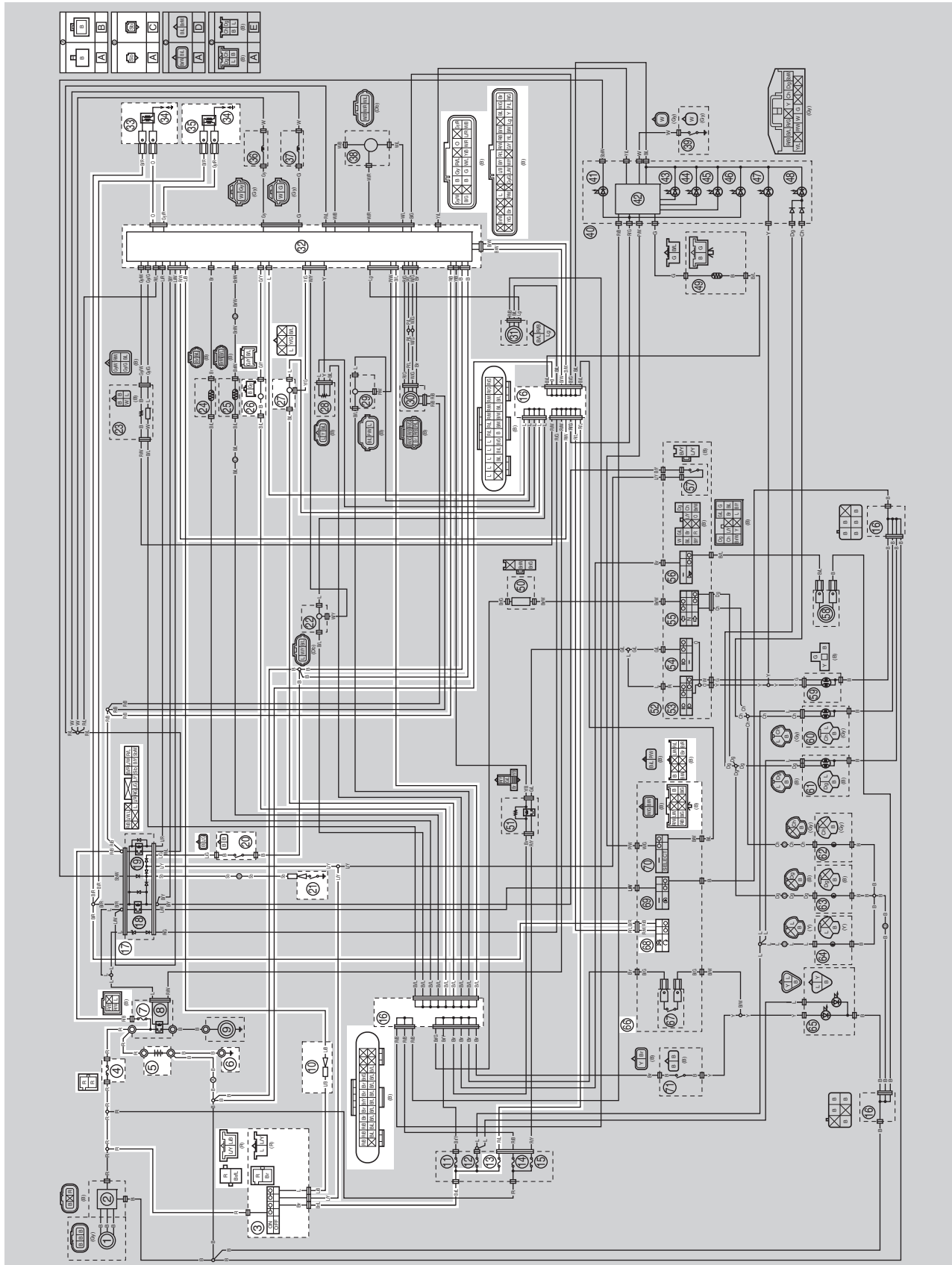
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IGNITION SYSTEM

EAS30490

CIRCUIT DIAGRAM



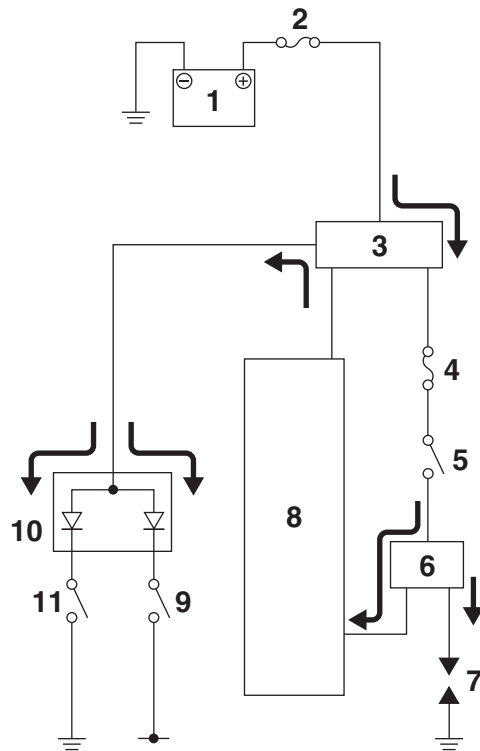
- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 10. Joint connector
- 13. Ignition fuse
- 16. Joint coupler
- 17. Relay unit
- 20. Sidestand switch
- 21. Neutral switch
- 26. Crankshaft position sensor
- 27. Lean angle sensor
- 32. ECU (Engine Control Unit)
- 33. Front cylinder ignition coil
- 34. Spark plug
- 35. Rear cylinder ignition coil
- 66. Handlebar switch (right)
- 68. Engine stop switch
- A. Wire harness
- B. Sub-wire harness (negative battery)
- C. Sub-wire harness (neutral switch)

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 ignition coils does not flow to the ECU when both the neutral switch and sidestand switch are set to “OFF”, thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral switch is open) and the sidestand is up (the sidestand switch is closed).
- The transmission is in neutral (the neutral switch is closed) and the sidestand is down (the sidestand switch is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Sidestand switch
10. Relay unit (diode)
11. Neutral switch

EAS30492

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):

1. Side cover (left)
2. Seat
3. Fuel tank
4. Rear cylinder cover (right)
5. Air duct
6. Drive pulley

1. Check the fuses. (Main and ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 7-75.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • 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 →	Regap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 7-81.	OK →	Ignition system is OK.
NG ↓		
5. Check the spark plug caps. Refer to "CHECKING THE SPARK PLUG CAPS" on page 7-81.	NG →	Replace the spark plug cap(s).
OK ↓		
6. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 7-82.	NG →	Replace the ignition coil(s).
OK ↓		
7. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 7-82.	NG →	Replace the crankshaft position sensor/stator assembly.
OK ↓		

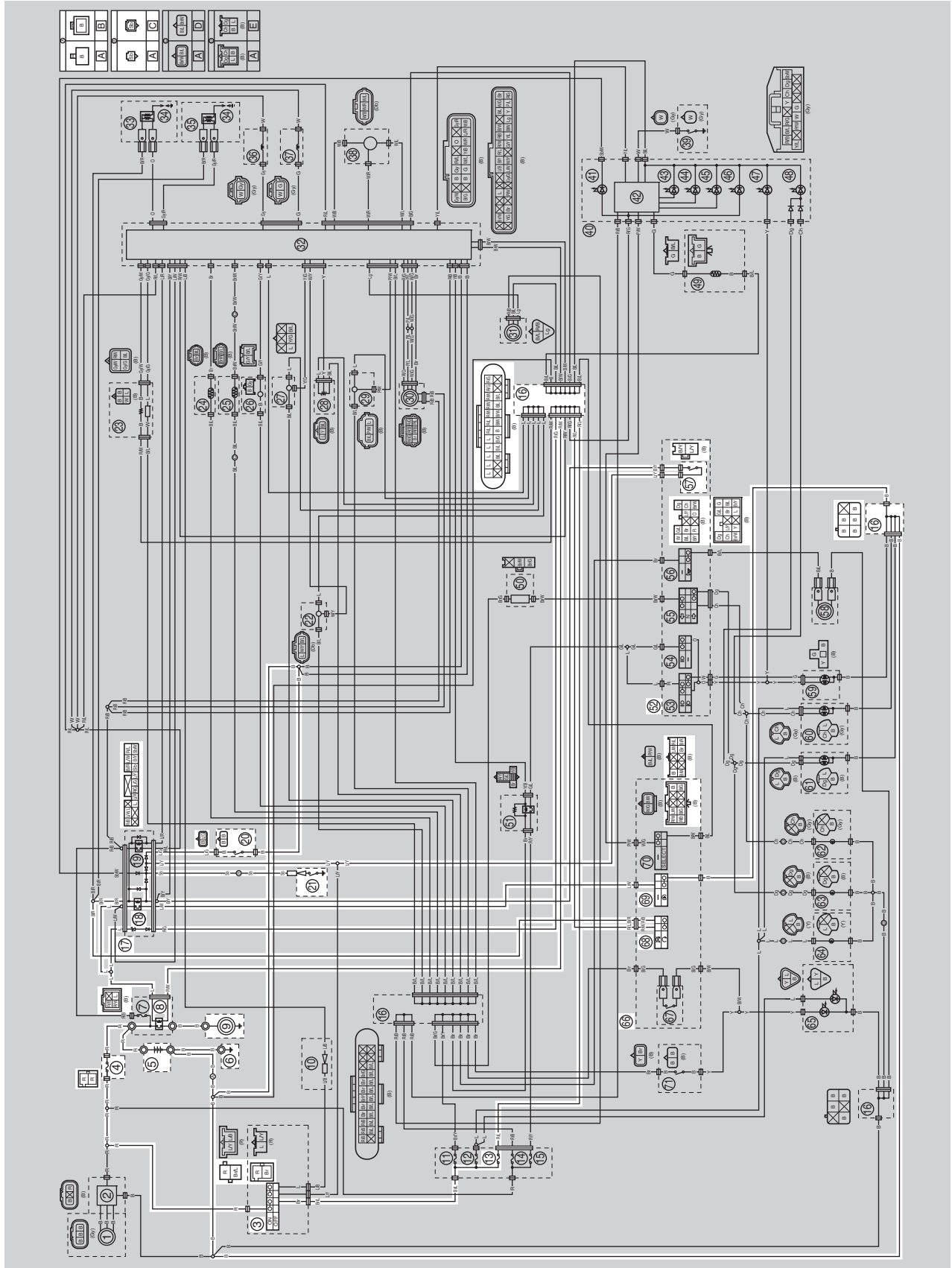
<p>8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<p>Replace the main switch.</p>
OK ↓		
<p>9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<ul style="list-style-type: none"> • The engine stop switch is faulty. • Replace the right handlebar switch.
OK ↓		
<p>10. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<p>Replace the neutral switch.</p>
OK ↓		
<p>11. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<p>Replace the sidestand switch.</p>
OK ↓		
<p>12. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-80.</p>	NG →	<p>Replace the relay unit.</p>
OK ↓		
<p>13. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 7-83.</p>	NG →	<p>Replace the lean angle sensor.</p>
OK ↓		
<p>14. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-1.</p>	NG →	<p>Properly connect or replace the wire harness.</p>
OK ↓		
<p>Replace the ECU.</p>		

EAS20073

ELECTRIC STARTING SYSTEM

EAS30493

CIRCUIT DIAGRAM



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 8. Starter relay
- 9. Starter motor
- 13. Ignition fuse
- 16. Joint coupler
- 17. Relay unit
- 18. Starting circuit cut-off relay
- 20. Sidestand switch
- 21. Neutral switch
- 52. Handlebar switch (left)
- 57. Clutch switch
- 66. Handlebar switch (right)
- 68. Engine stop switch
- 69. Start switch
- A. Wire harness
- B. Sub-wire harness (negative battery)
- C. Sub-wire harness (neutral switch)

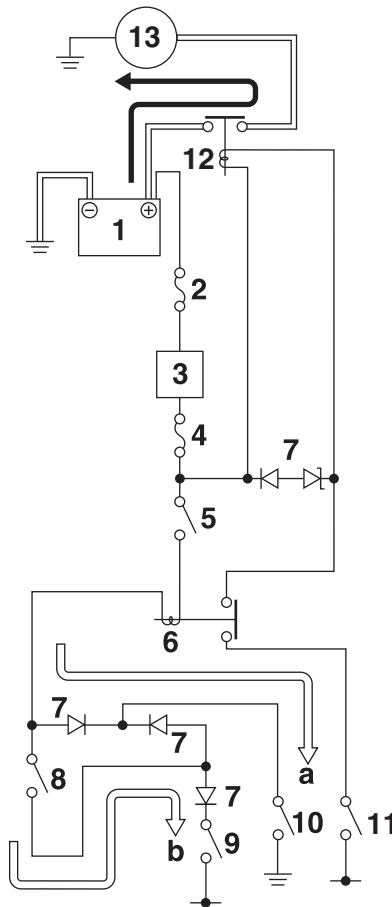
EAS30494

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to “ON” and the engine stop switch is set to “○”, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) 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 start 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. Engine stop switch
- 6. Relay unit (starting circuit cut-off relay)
- 7. Relay unit (diode)

- 8. Clutch switch
- 9. Sidestand switch
- 10. Neutral switch
- 11. Start switch
- 12. Starter relay
- 13. Starter motor

EAS30495

TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cover (left)
2. Seat
3. Fuel tank
4. Air duct
5. Drive pulley

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 7-75.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • 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 7-83.	OK →	The 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 5-62.	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 7-79.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-80.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 7-79.	NG →	Replace the starter relay.
OK ↓		

ELECTRIC STARTING SYSTEM

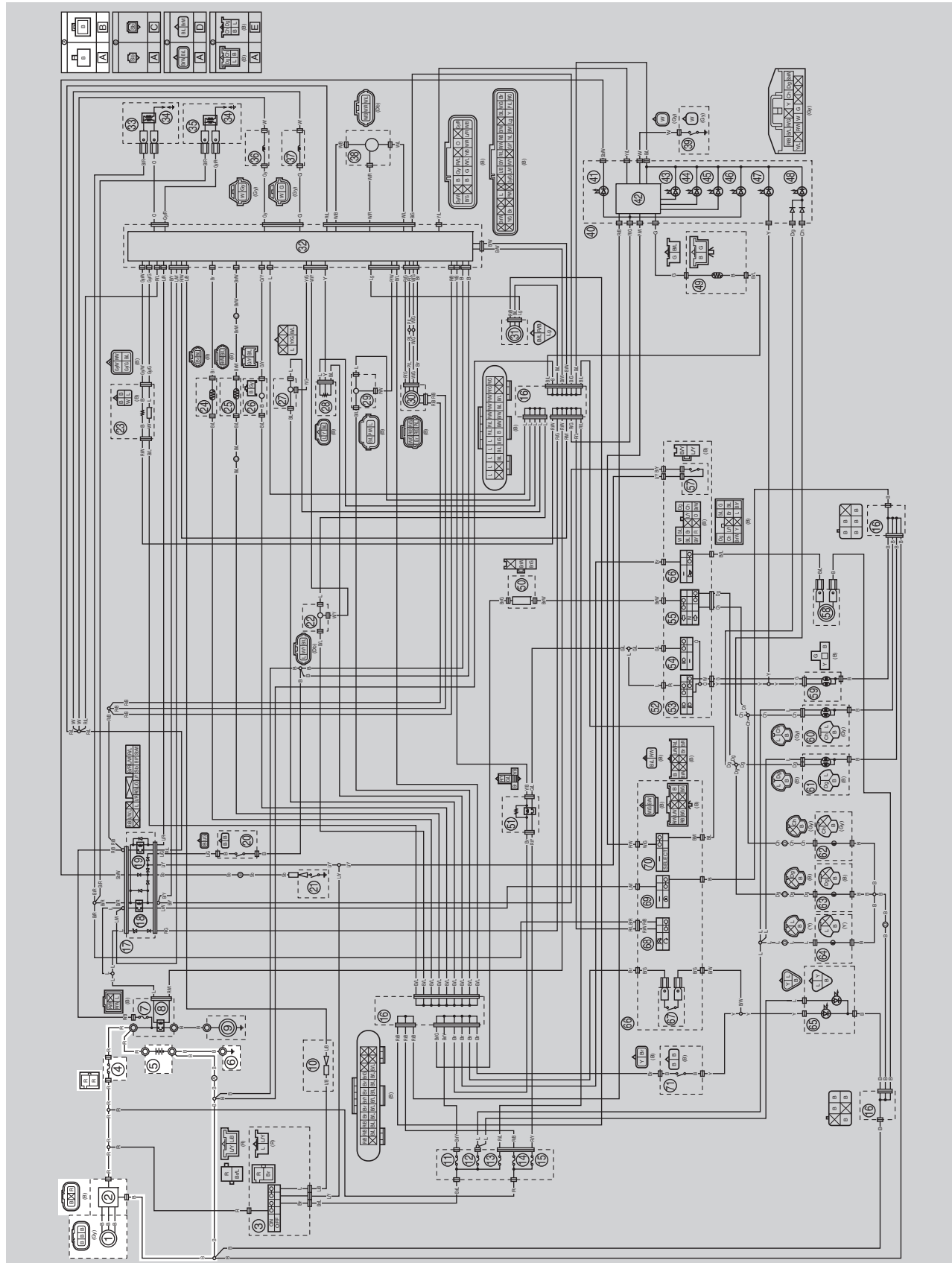
8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the main switch.
OK ↓		
9. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	<ul style="list-style-type: none">• The engine stop switch is faulty.• Replace the right handlebar switch.
OK ↓		
10. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the neutral switch.
OK ↓		
11. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the sidestand switch.
OK ↓		
12. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the clutch switch.
OK ↓		
13. Check the start switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	<ul style="list-style-type: none">• The start switch is faulty.• Replace the right handlebar switch.
OK ↓		
14. Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-7.	NG →	Properly connect or replace the wire harness.
OK ↓		
The starting system circuit is OK.		

EAS20074

CHARGING SYSTEM

EAS30496

CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
4. Main fuse
5. Battery
6. Engine ground
- A. Wire harness
- B. Sub-wire harness (negative battery)

EAS30497

TROUBLESHOOTING

The battery is not being charged.

TIP

• Before troubleshooting, remove the following part(s):

1. Side cover (left)
2. Seat
3. Air duct

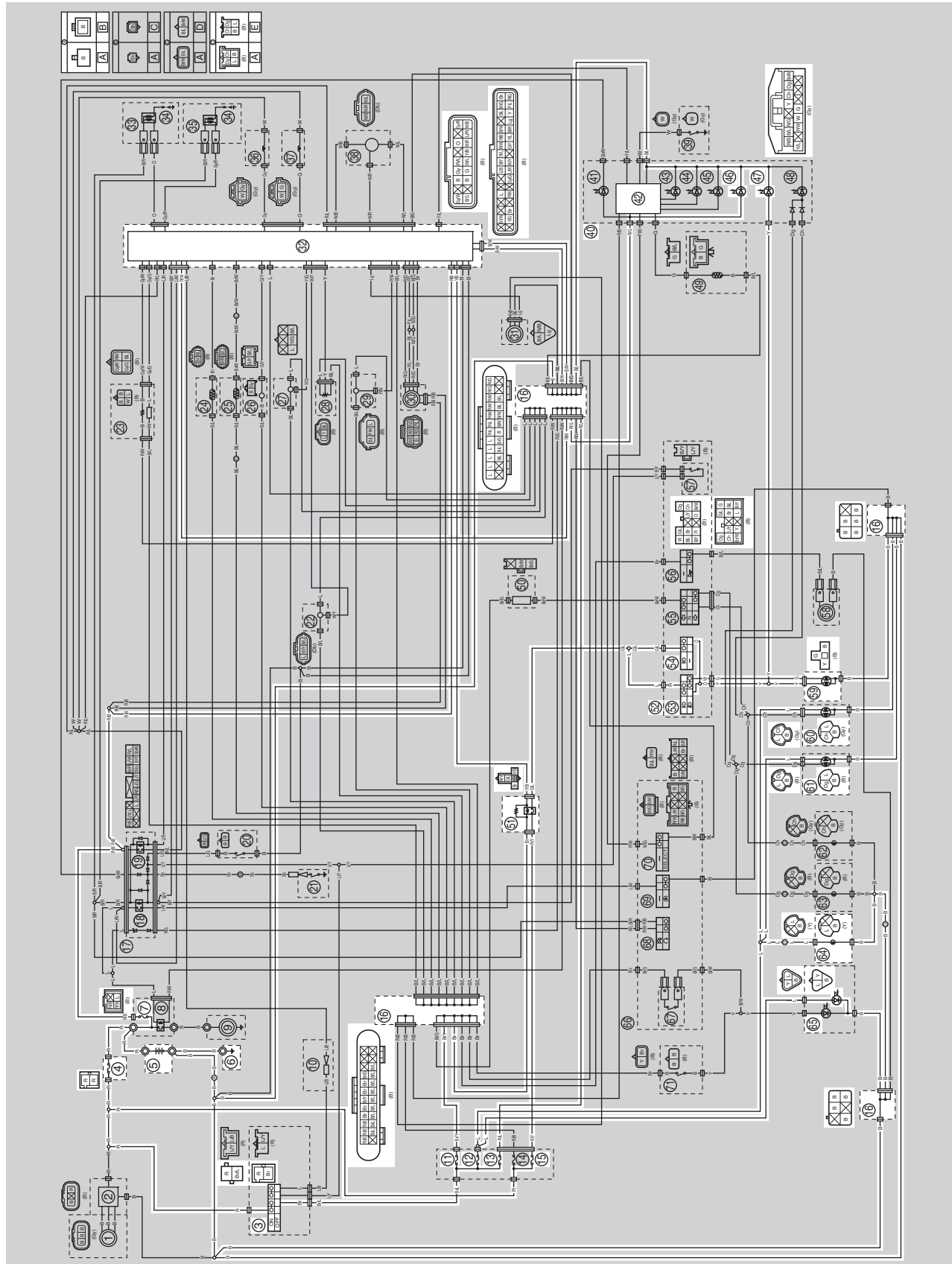
1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 7-75.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 7-84.	NG →	Replace the crankshaft position sensor/stator assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 7-84.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-13.	NG →	Properly connect or replace the wire harness.
OK ↓		
The charging system circuit is OK.		

EAS20075

LIGHTING SYSTEM

EAS30498

CIRCUIT DIAGRAM



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 11. Signaling system fuse
- 12. Taillight fuse
- 13. Ignition fuse
- 15. Headlight fuse
- 16. Joint coupler
- 32. ECU (Engine Control Unit)
- 40. Meter assembly
- 42. Multi-function meter
- 46. Meter light
- 47. High beam indicator light
- 51. Headlight relay
- 52. Handlebar switch (left)
- 53. Dimmer switch
- 54. Pass switch
- 59. Headlight
- 60. Front turn signal/position light (left)
- 61. Front turn signal/position light (right)
- 64. License plate light
- 65. Tail/brake light
- A. Wire harness
- B. Sub-wire harness (negative battery)
- E. Sub-wire harness (rear turn signal light, license plate light)

EAS30499

TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, license plate light, position light or meter light.

TIP

1. Side cover (left)
2. Seat
3. Fuel tank
4. Tail/brake light

1. Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-74.	NG →	Replace the bulb(s) and bulb socket(s).
OK ↓		
2. Check the fuses. (Main, headlight, fuel injection system, signaling system, taillight and ignition) Refer to "CHECKING THE FUSES" on page 7-75.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the main switch.
OK ↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	<ul style="list-style-type: none"> • The dimmer switch is faulty. • Replace the left handlebar switch.
OK ↓		
6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	<ul style="list-style-type: none"> • The pass switch is faulty. • Replace the left handlebar switch.
OK ↓		
7. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 7-79.	NG →	Replace the headlight relay.
OK ↓		

8. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-17.

NG →

Properly connect or replace the wire harness.

OK ↓

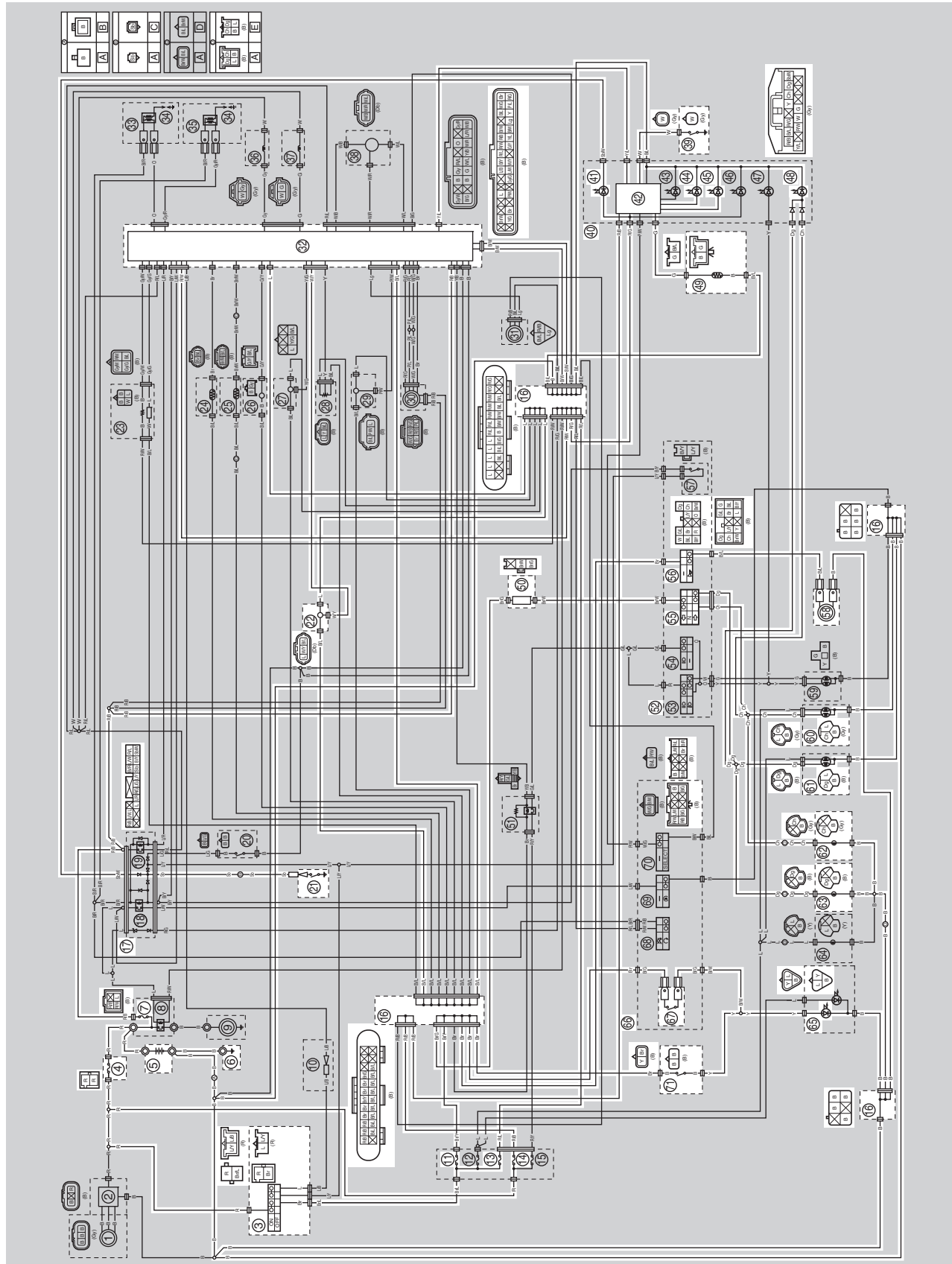
Replace the ECU, meter assembly or tail/brake light.

EAS20076

SIGNALING SYSTEM

EAS30500

CIRCUIT DIAGRAM



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 11. Signaling system fuse
- 13. Ignition fuse
- 14. Backup fuse
- 16. Joint coupler
- 17. Relay unit
- 21. Neutral switch
- 22. Speed sensor
- 32. ECU (Engine Control Unit)
- 39. Oil level switch
- 40. Meter assembly
- 41. Neutral indicator light
- 42. Multi-function meter
- 44. Oil level warning light
- 45. Fuel level warning light
- 48. Turn signal indicator light
- 49. Fuel sender
- 50. Turn signal relay
- 52. Handlebar switch (left)
- 55. Turn signal switch
- 56. Horn switch
- 58. Horn
- 60. Front turn signal/position light (left)
- 61. Front turn signal/position light (right)
- 62. Rear turn signal light (left)
- 63. Rear turn signal light (right)
- 65. Tail/brake light
- 66. Handlebar switch (right)
- 67. Front brake light switch
- 71. Rear brake light switch
- A. Wire harness
- B. Sub-wire harness (negative battery)
- C. Sub-wire harness (neutral switch)
- E. Sub-wire harness (rear turn signal light, license plate light)

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. Side cover (left)
2. Seat
3. Fuel tank
4. Air duct
5. Drive pulley
6. Tail/brake light

1. Check the fuses. (Main, signaling system, ignition, fuel injection system and backup) Refer to "CHECKING THE FUS- ES" on page 7-75.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the main switch.
OK ↓		
4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-21.	NG →	Properly connect or replace the wire har- ness.
OK ↓		
Check the condition of each of the sig- naling system's 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 7-71.	NG →	<ul style="list-style-type: none"> • The horn switch is faulty. • Replace the left handlebar switch.
OK ↓		

<p>2. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-21.</p>	NG →	<p>Properly connect or replace the wire harness.</p>
<p>OK ↓</p> <p>Replace the hone.</p>		
<p><u>The tail/brake light fails to come on.</u></p>		
<p>1. Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<p>Replace the front brake light switch.</p>
<p>OK ↓</p>		
<p>2. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<p>Replace the rear brake light switch.</p>
<p>OK ↓</p>		
<p>3. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-21.</p>	NG →	<p>Properly connect or replace the wire harness.</p>
<p>OK ↓</p>		
<p>Replace the tail/brake light.</p>		
<p><u>The turn signal light, turn signal indicator light or both fail to blink.</u></p>		
<p>1. Check the turn signal light bulbs and sockets. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 7-74.</p>	NG →	<p>Replace the turn signal light bulb(s), socket(s) or both.</p>
<p>OK ↓</p>		
<p>2. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 7-71.</p>	NG →	<ul style="list-style-type: none"> • The turn signal switch is faulty. • Replace the left handlebar switch.
<p>OK ↓</p>		
<p>3. Check the turn signal relay. Refer to "CHECKING THE RELAYS" on page 7-79.</p>	NG →	<p>Replace the turn signal relay.</p>
<p>OK ↓</p>		

4. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The neutral indicator light fails to come on.

1. Check the neutral switch.
Refer to "CHECKING THE SWITCHES" on page 7-71.

NG →

Replace the neutral switch.

OK ↓

2. Check the relay unit (diode).
Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-80.

NG →

Replace the relay unit.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The oil level warning light fails to come on.

1. Check the oil level switch.
Refer to "CHECKING THE OIL LEVEL SWITCH" on page 7-85.

NG →

Replace the oil level switch.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The fuel level warning light fails to come on.

1. Check the fuel sender.
Refer to "CHECKING THE FUEL SENDER" on page 7-85.

NG →

Replace the fuel sender.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-21.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The speedometer fails to operate.

1. Check the speed sensor.

NG →

Replace the speed sensor.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 7-21.

NG →

Properly connect or replace the wire harness.

OK ↓

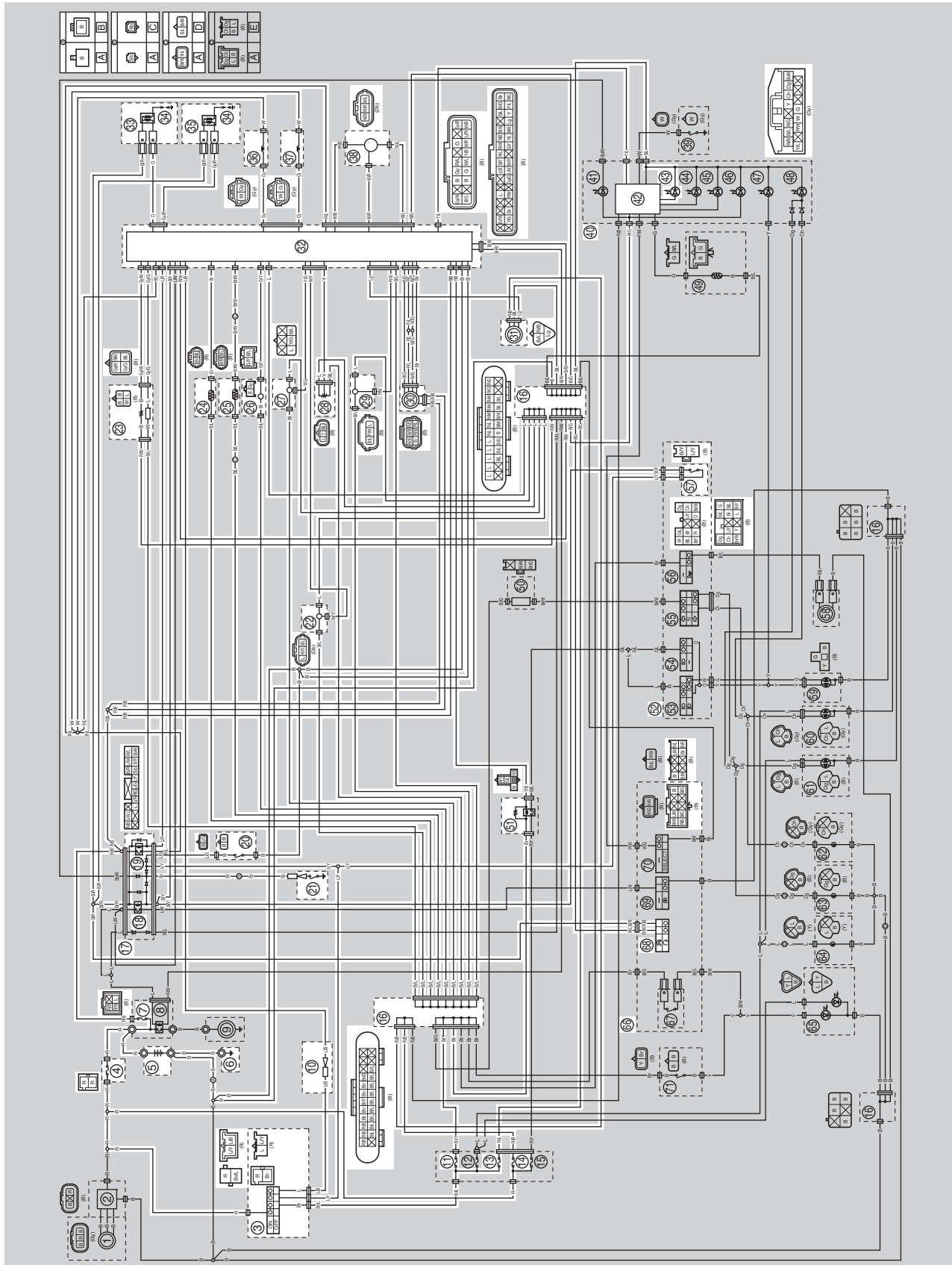
Replace the ECU or meter assembly.

EAS20078

FUEL INJECTION SYSTEM

EAS30504

CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
10. Joint connector
11. Signaling system fuse
13. Ignition fuse
14. Backup fuse
16. Joint coupler
17. Relay unit
18. Starting circuit cut-off relay
19. Fuel pump relay
20. Sidestand switch
21. Neutral switch
22. Speed sensor
23. O₂ sensor
24. Engine temperature sensor
25. Intake air temperature sensor
26. Crankshaft position sensor
27. Lean angle sensor
28. Throttle position sensor
29. Intake air pressure sensor
30. ISC (Idle Speed Control) unit
31. Yamaha diagnostic tool coupler
32. ECU (Engine Control Unit)
33. Front cylinder ignition coil
34. Spark plug
35. Rear cylinder ignition coil
36. Front cylinder injector
37. Rear cylinder injector
38. Fuel pump
40. Meter assembly
42. Multi-function meter
43. Engine trouble warning light
51. Headlight relay
52. Handlebar switch (left)
57. Clutch switch
66. Handlebar switch (right)
68. Engine stop switch
- A. Wire harness
- B. Sub-wire harness (negative battery)
- C. Sub-wire harness (neutral switch)
- D. Sub-wire harness (intake air temperature sensor)

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 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 when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter/clock LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and fuel injection system operation

Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the following conditions is present and the start switch is pushed:

12:	Crankshaft position sensor	41:	Lean angle sensor (open or short-circuit)
19:	Blue/black 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 start 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.

7-30

EAS30951

YAMAHA DIAGNOSTIC TOOL

This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



Yamaha diagnostic tool USB (US)

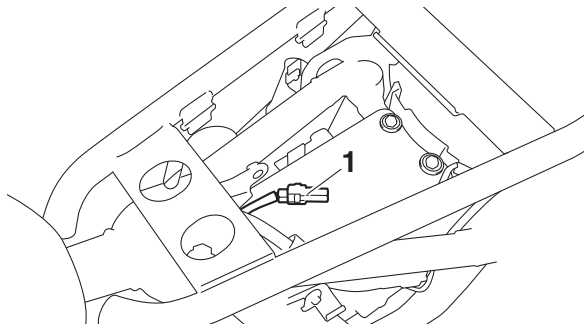
90890-03251

Yamaha diagnostic tool (A/I)

90890-03252

Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



EAS30508

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the multi-function meter display. 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 has been completed, reset the multi-function meter display according to the reinstatement method.

Fault code No.:

Code number displayed on the multi-function meter when the engine failed to work normally. Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 8-5.

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 8-5.

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.	—		
Indicated	—		
Procedure	—		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
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.
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. green/yellow–green/yellow 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.	Improperly installed sensor → Reinstall or replace the sensor.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 7-82. 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.	


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

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
Indicated		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch “  ”. (If the display value changes, the performance is OK.)	
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	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or 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 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between intake air pressure sensor coupler and ECU coupler. pink/white–pink/white Between intake air pressure sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue 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 5.
5	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 6.

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
6	Defective intake air pressure sensor.	<p>Execute the diagnostic mode. (Code No. 03)</p> <p>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)</p> <p>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.</p>	<p>Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.</p>
7	Malfunction in ECU.	Replace the ECU.	

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	
Indicated		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch "⊗". (If the display value changes, the performance is OK.)	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
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.

FUEL INJECTION SYSTEM

Fault code No.		14	
Item		Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
2	Defective intake air pressure sensor.	<p>Execute the diagnostic mode. (Code No. 03)</p> <p>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)</p> <p>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.</p>	

Fault code No. 15

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		01	
Indicated		Throttle position sensor signal <ul style="list-style-type: none"> • 14–20 (fully closed position) • 92–102 (fully open position) 	
Procedure		<ul style="list-style-type: none"> • 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
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.

FUEL INJECTION SYSTEM

Fault code No.		15	
Item		Throttle position 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 throttle position sensor coupler and ECU coupler. yellow–yellow Between throttle position sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue 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 6-12.	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 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 14–20 is indicated. When throttle valves are fully open: A value of 92–102 is indicated. An indicated value is out of the specified range → Replace the throttle position sensor.	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.	

Fault code No. 19

Fault code No.	19
Item	Sidestand switch: a break or disconnection of the blue/black lead of the ECU (Engine Control Unit) is detected.
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	20
Indicated	Sidestand switch <ul style="list-style-type: none"> • "ON" (sidestand retracted) • "OFF" (sidestand extended)
Procedure	Extend and retract the sidestand (with the transmission in gear).

FUEL INJECTION SYSTEM

Fault code No.		19	
Item		Sidestand switch: a break or disconnection of the blue/black lead of the ECU (Engine Control Unit) is detected.	
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 main 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 4.
4	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 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between main switch coupler and relay unit coupler. blue/yellow–blue/yellow Between main switch coupler and joint connector. blue/black–blue/black Between joint connector and ECU coupler. blue/black–blue/black	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	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 7.
7	Malfunction in ECU.	Replace the ECU.	

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		
Indicated	Displays the air temperature.		
Procedure	Compare the actually measured intake air temperature with the indicated 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	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or 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 4.
4	Wire harness continuity and/or sub-wire harness (intake air temperature sensor).	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 5.
5	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 6.

FUEL INJECTION SYSTEM

Fault code No.		22	
Item		Intake air temperature sensor: open or short circuit detected.	
6	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 7-86.	Turn the main switch to "ON". 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.	

Fault code No. 24

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
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.

FUEL INJECTION SYSTEM

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between O ₂ sensor coupler and ECU coupler. gray/white–gray/white gray/green–gray/green Between O ₂ sensor coupler and joint coupler. red/white–red/white black/blue–black/blue Between joint coupler and ECU coupler. black/blue–black/blue 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.
5	Check fuel pressure.	Refer to “CHECKING THE PRESSURE REGULATOR OPERATION” on page 6-11.	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 5-2.	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.	

Fault code No. 28

TIP

If fault code numbers “28” and “37” are both indicated, take the actions specified for fault code number “28” first.

Fault code No.		28	
Item		Engine temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		11	
Indicated		Displays the engine temperature.	
Procedure		Make sure that the display is close to the ambient temperature during cold starting.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		28	
Item		Engine temperature sensor: open or short circuit detected.	
1	Connection of engine 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 engine temperature sensor coupler and ECU coupler. brown–brown Between engine 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 engine 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 engine temperature sensor.	Execute the diagnostic mode. (Code No. 11) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the engine temperature sensor. Replace if defective. Refer to "CHECKING THE ENGINE TEMPERATURE SENSOR" on page 7-86.	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.	


Fault code No. 30

Fault code No.		30
Item		Latch up detected.
Fail-safe system		Unable to start engine
		Unable to drive vehicle

FUEL INJECTION SYSTEM

Fault code No.		30	
Item		Latch up detected.	
Diagnostic code No.		08	
Indicated		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
Procedure		Remove the lean angle sensor and incline it more than 45 degrees.	
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.
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) An indicated value is out of the specified range → Replace the lean angle 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 4.
4	Malfunction in ECU.	Replace the ECU.	


Fault code No. 33

Fault code No.		33	
Item		Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder 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 front cylinder 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

FUEL INJECTION SYSTEM

Fault code No.		33	
Item		Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder ignition coil.	
1	Connection of front cylinder 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 front cylinder ignition coil coupler and ECU coupler. orange–orange	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of front cylinder 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 front cylinder ignition coil.	Measure the primary coil resistance of the front cylinder ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 7-82.	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.	

Fault code No. 34

Fault code No.		34	
Item		Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder 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 rear cylinder 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.	


FUEL INJECTION SYSTEM

Fault code No.		34	
Item		Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder ignition coil.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of rear cylinder 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 rear cylinder ignition coil coupler and ECU coupler. gray/red-gray/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	Installed condition of rear cylinder 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 rear cylinder ignition coil.	Measure the primary coil resistance of the rear cylinder ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 7-82.	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.	

Fault code No. 37

TIP

- Do not remove the ISC (Idle Speed Control) valve.
- If fault code numbers “28” and “37” are both indicated, take the actions specified for fault code number “28” first.
- 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 4 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
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 2. ISC operating sound is not heard → Go to item 2 in section B 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 3.
A-3	Throttle valve does not fully close.	Check the throttle body assembly. Refer to “THROTTLE BODIES” on page 6-8. Check the throttle grip free play. Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-24.	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 4.
A-4	ISC valve is not moving correctly.	Replace the throttle body assembly.	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 5.
A-5	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

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 4 seconds each time. The "CHECK" indicator and "ISC" 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
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 2 in section A for the component other than ISC (Idle Speed Control) unit is defective. ISC operating sound is not heard → Go to item 2.
B-2	Connection of ISC (Idle Speed Control) 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 8 and delete the fault code. ISC operating sound is not heard → Go to item 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 8 and delete the fault code. ISC operating sound is not heard → Go to item 4.
B-4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ISC (Idle Speed Control) coupler and ECU coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown–brown Between ISC (Idle Speed Control) coupler and relay unit coupler. red/black–red/black red/black–red/black	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 5.

FUEL INJECTION SYSTEM

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-5	Installed condition of ISC (Idle Speed Control). Check for looseness or pinching.	Improperly installed ISC (Idle Speed Control) → Reinstall the ISC (Idle Speed Control).	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 6.
B-6	ISC valve is not moving correctly.	Replace the throttle body assembly.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item 8 and delete the fault code. ISC operating sound is not heard → Go to item 7.
B-7	Malfunction in ECU.	Replace the ECU.	
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		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 front cylinder injector 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 front cylinder injector is actuated five times by listening for the operating sound.	
37	Actuation	Actuates rear cylinder injector 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 rear cylinder injector is actuated five times by listening for the operating sound.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		39	
Item		Injector: open or short circuit detected.	
1	Identify the malfunctioning injector.	Execute the diagnostic mode. (Code Nos. 36, 37) Identify the injector that does not produce an operating sound. Perform the following procedures for the defective injector. Refer to "CHECKING THE FUEL INJECTORS" on page 7-87.	—
2	Connection of front cylinder injector and/or rear cylinder injector coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or 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.
3	Defective injector front, and/or rear injector.	Measure the injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 7-87.	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 injector coupler and ECU coupler. Front cylinder injector gray-gray Rear cylinder injector green-green Between injector coupler and relay unit coupler. Front cylinder white-red/blue Rear cylinder white-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.	
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		
Indicated	Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)		
Procedure	Remove the lean angle sensor and incline it more than 45 degrees.		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of lean angle sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or 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. yellow/green–yellow/green Between lean angle sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue 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.	Execute the diagnostic mode. (Code No. 08) An indicated value is out of the specified range → Replace the lean angle 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 5.
5	Malfunction in ECU.	Replace the ECU.	

Fault code No. 42

TIP

If fault code numbers “37” and “42” are both indicated, take the actions specified for fault code number “42” first.

Fault code No.		42	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral 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	
Indicated		Vehicle speed pulse 0–999	
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. 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” When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: “ON”	Value does not increase → Go to item 2. Incorrect indication → Go to item 2 in section B for the neutral switch. Incorrect indication → Go to item 2 in section C 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 6 and delete the fault code. Value does not increase → Go to item 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 6 and delete the fault code. Value does not increase → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Neutral 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 ECU coupler. white/yellow–white/yellow Between speed sensor coupler and joint coupler. blue–blue black/blue–black/blue Between joint coupler and ECU coupler. blue–blue 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 6 and delete the fault code. Value does not increase → Go to item 5.
A-5	Malfunction in ECU.	Replace the ECU.	
A-6	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 (19 mph). Check that the fault code number is not displayed.

Fault code No.		42	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral 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	
Indicated		Neutral <ul style="list-style-type: none">• “ON” (when the transmission is in neutral)• “OFF” (when the transmission is in gear or the clutch lever released)	
Procedure		Shift the transmission.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Neutral switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
B-1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.</p> <p>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"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"</p>	<p>Value does not increase → Go to item 2 in section A for the speed sensor.</p> <p>Incorrect indication → Go to item 2.</p> <p>Incorrect indication → Go to item 2 in section C for the clutch switch.</p>
B-2	Connection of neutral 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.	<p>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"</p> <p>Correct indication → Go to item 9. Incorrect indication → Go to item 3.</p>
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.	<p>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"</p> <p>Correct indication → Go to item 9. Incorrect indication → Go to item 4.</p>
B-4	Wire harness continuity and/or sub-wire harness (neutral switch).	<p>Open or short circuit → Replace the wire harness.</p> <p>Between neutral switch connector and sub-wire harness coupler. sky blue—sky blue</p> <p>Between sub-wire harness coupler and relay unit coupler. sky blue—sky blue</p> <p>Between relay unit coupler and ECU coupler. black/yellow—black/yellow</p>	<p>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"</p> <p>Correct indication → Go to item 9. Incorrect indication → Go to item 5.</p>

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Neutral switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
B-5	Defective relay unit.	Check the relay unit. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 7-80.	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 9. Incorrect indication → Go to item 6.
B-6	Defective neutral switch.	Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	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 9. Incorrect indication → Go to item 7.
B-7	Faulty shift drum (neutral detection area).	Malfunction → Replace the shift drum assembly. Refer to "TRANSMISSION" on page 5-79.	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 9. Incorrect indication → Go to item 8.
B-8	Malfunction in ECU.	Replace the ECU.	
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 (19 mph). Check that the fault code number is not displayed.

FUEL INJECTION SYSTEM

Fault code No.		42	
Item	A	Speed sensor: no normal signals are received from the speed sensor.	
	B	Neutral 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	
Indicated		Neutral <ul style="list-style-type: none"> • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released) 	
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. 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" When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"	Value does not increase → Go to item 2 in section A for the speed sensor. Incorrect indication → Go to item 2 in section B for the neutral switch. Incorrect indication → Go to item 2.
C-2	Clutch lever adjustment.	Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-11.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 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 transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 4.

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Neutral switch: open or short circuit is detected.
		C	Clutch switch: open or short circuit is detected.
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 transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 5.
C-5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between clutch switch coupler and relay unit coupler. black/yellow–black/yellow blue/yellow–blue/yellow Between relay unit coupler and ECU coupler. black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 6.
C-6	Wire harness continuity.	Between clutch switch coupler and relay unit coupler. blue/yellow–black/yellow When the clutch lever is released: open circuit When the clutch lever is squeezed: short circuit Open or short circuit → Replace the clutch switch.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 7.
C-7	Defective clutch switch.	Check the clutch switch. Replace if defective. Refer to "CHECKING THE SWITCHES" on page 7-71.	Execute the diagnostic mode. (Code No. 21) When the transmission is in gear with the clutch lever is released and the sidestand retracted: "OFF" When the clutch lever is squeezed: "ON" Correct indication → Go to item 9. Incorrect indication → Go to item 8.
C-8	Malfunction in ECU.	Replace the ECU.	

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		A	Speed sensor: no normal signals are received from the speed sensor.
		B	Neutral 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 (19 mph). Check that the fault code number is not displayed.

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	
Indicated		Fuel system voltage (battery voltage) Approximately 12.0	
09	Procedure	Set the engine stop switch to "○", and then compare the actually measured battery voltage with the 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.
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.

FUEL INJECTION SYSTEM

Fault code No.		43	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. red/blue–red/blue Between starter relay coupler and relay unit coupler. red/black–red/black Between starter relay coupler and battery. 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.	

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 to start engine	
		Able to drive vehicle	
Diagnostic code No.		60	
Indicated		The self diagnostic code 44 detected EEPROM errors are indicated. If there are multiple errors, they are indicated in 2 seconds intervals. 00 indication: Normal status	
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)	—
2	Malfunction in ECU.	Replace the ECU.	

Fault code No. 46

TIP

If fault code numbers “37” and “46” are both indicated, take the actions specified for fault code number “46” first.

Fault code No.		46	
Item		Charging voltage is abnormal.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
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 7-13. 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 (Engine Control Unit) memory. (When this malfunction is detected in the ECU, the fault code number might not appear.)	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU.	Turn the main switch to “ON”. Check that the fault code number is not displayed.

Fault code No. Er-1

Fault code No.		Er-1	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): 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.		—	
Indicated		—	

FUEL INJECTION SYSTEM

Fault code No.		Er-1	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.	
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 coupler and ECU coupler. yellow/blue–yellow/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	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.	

Fault code No. Er-2

Fault code No.		Er-2	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
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.

FUEL INJECTION SYSTEM

Fault code No.		Er-2	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.	
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 coupler and ECU coupler. yellow/blue–yellow/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	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.	

Fault code No. Er-3

Fault code No.		Er-3	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
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 coupler and ECU coupler. yellow/blue–yellow/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.

FUEL INJECTION SYSTEM

Fault code No.		Er-3	
Item		ECU (Engine Control Unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.	
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.	

Fault code No. Er-4

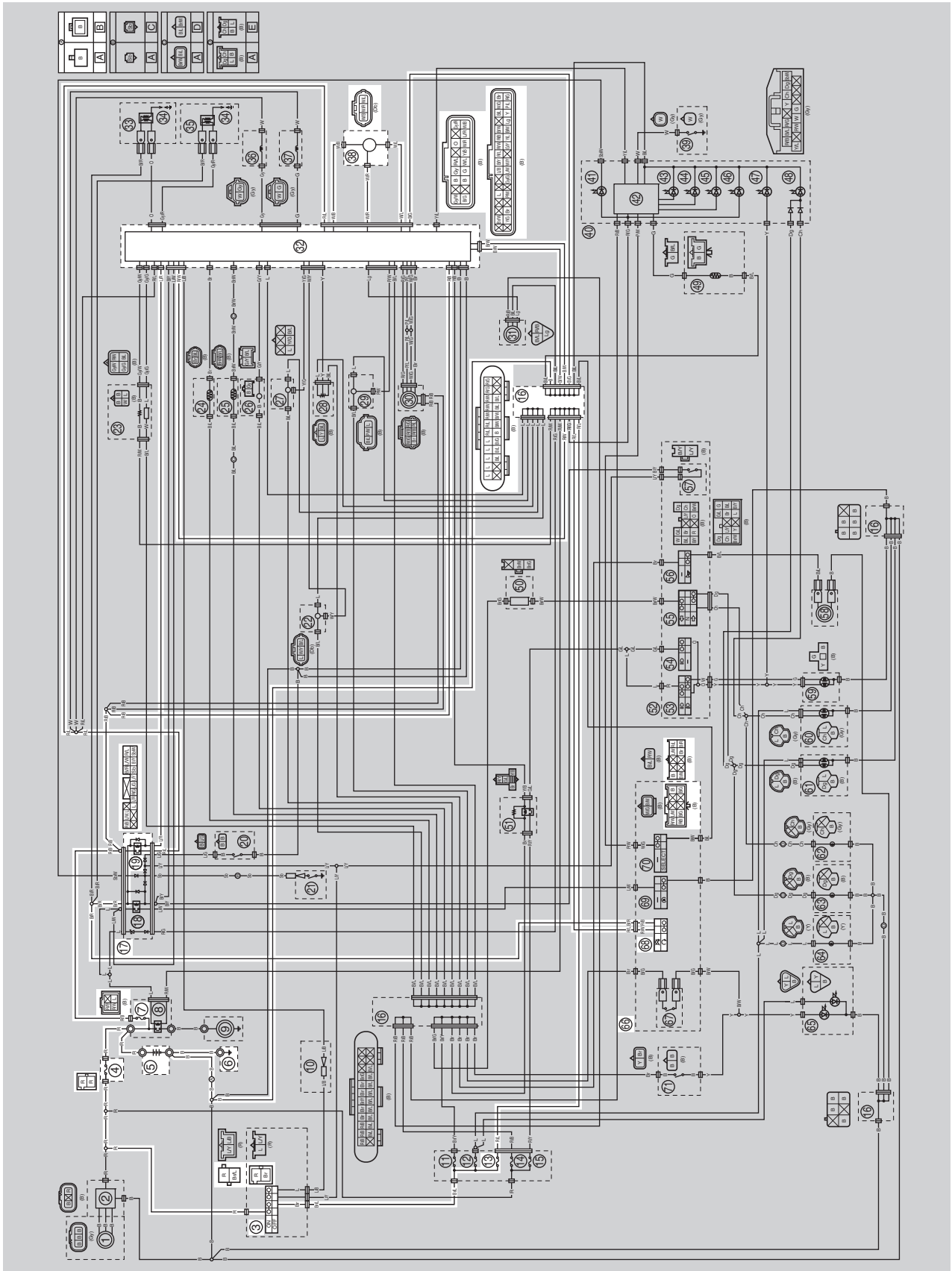
Fault code No.		Er-4	
Item		ECU (Engine Control Unit) internal malfunction (input signal error): non-registered data has been received from the meter.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Indicated		—	
Procedure		—	
Item	Probable cause of malfunction 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 coupler and ECU coupler. yellow/blue–yellow/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	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.	

EAS20081

FUEL PUMP SYSTEM

EAS30513

CIRCUIT DIAGRAM



- 3. Main switch
- 4. Main fuse
- 5. Battery
- 6. Engine ground
- 7. Fuel injection system fuse
- 13. Ignition fuse
- 16. Joint coupler
- 17. Relay unit
- 19. Fuel pump relay
- 32. ECU (Engine Control Unit)
- 38. Fuel pump
- 66. Handlebar switch (right)
- 68. Engine stop switch
- A. Wire harness
- B. Sub-wire harness (negative battery)

EAS30514

TROUBLESHOOTING

The fuel pump fails to operate.

TIP

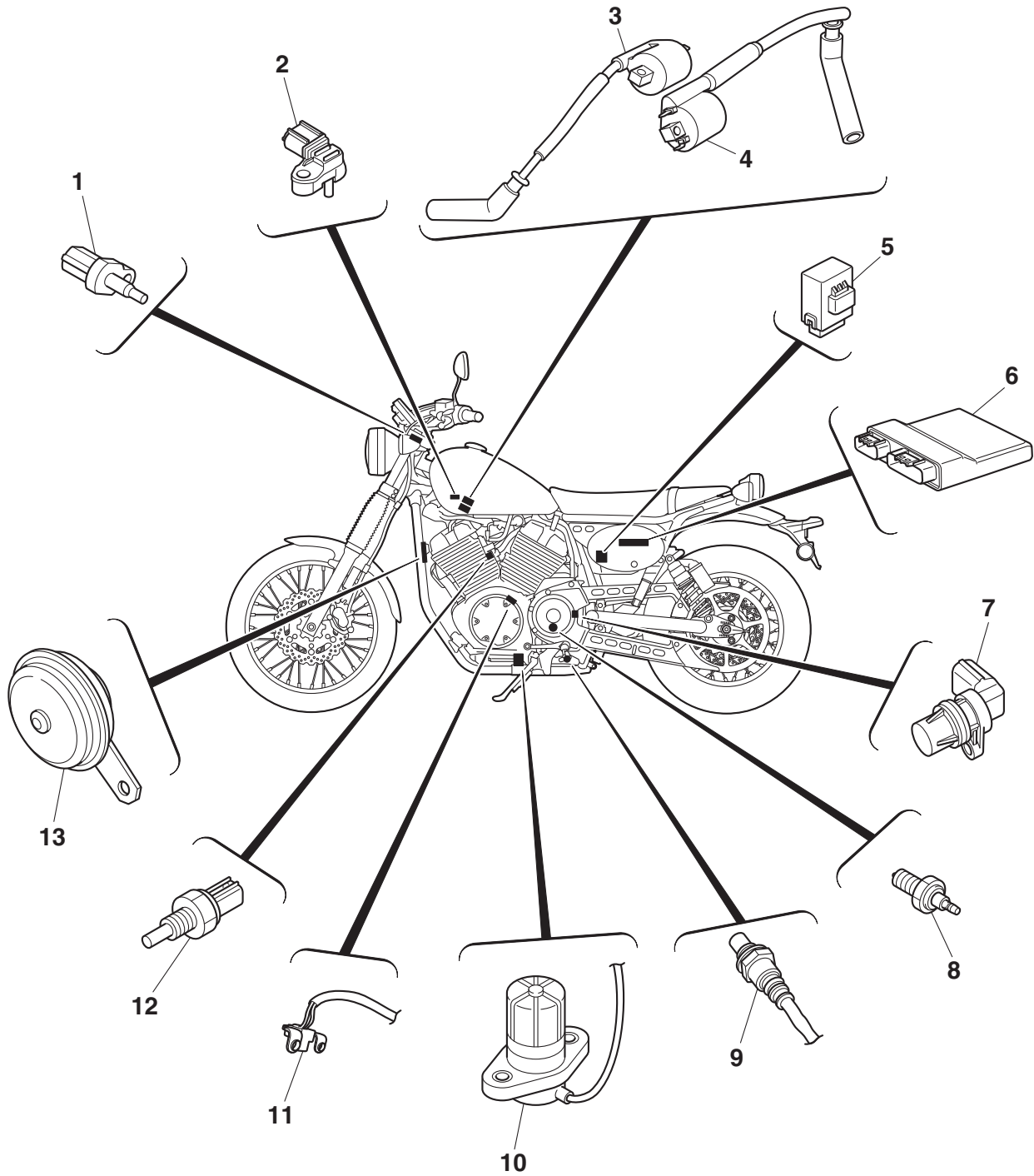
• Before troubleshooting, remove the following part(s):

1. Side cover (left)
2. Seat
3. Fuel tank

1. Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 7-75.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-75.	NG →	<ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the main switch.
OK ↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-71.	NG →	Replace the right handlebar switch.
OK ↓		
5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 7-79.	NG →	Replace the relay unit.
OK ↓		
6. Check the fuel pump. Refer to "FUEL TANK" on page 6-1.	NG →	Replace the fuel pump.
OK ↓		
7. Check the entire fuel pump system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-63.	NG →	Properly connect or replace the wire harness.
OK ↓		
Replace the ECU.		

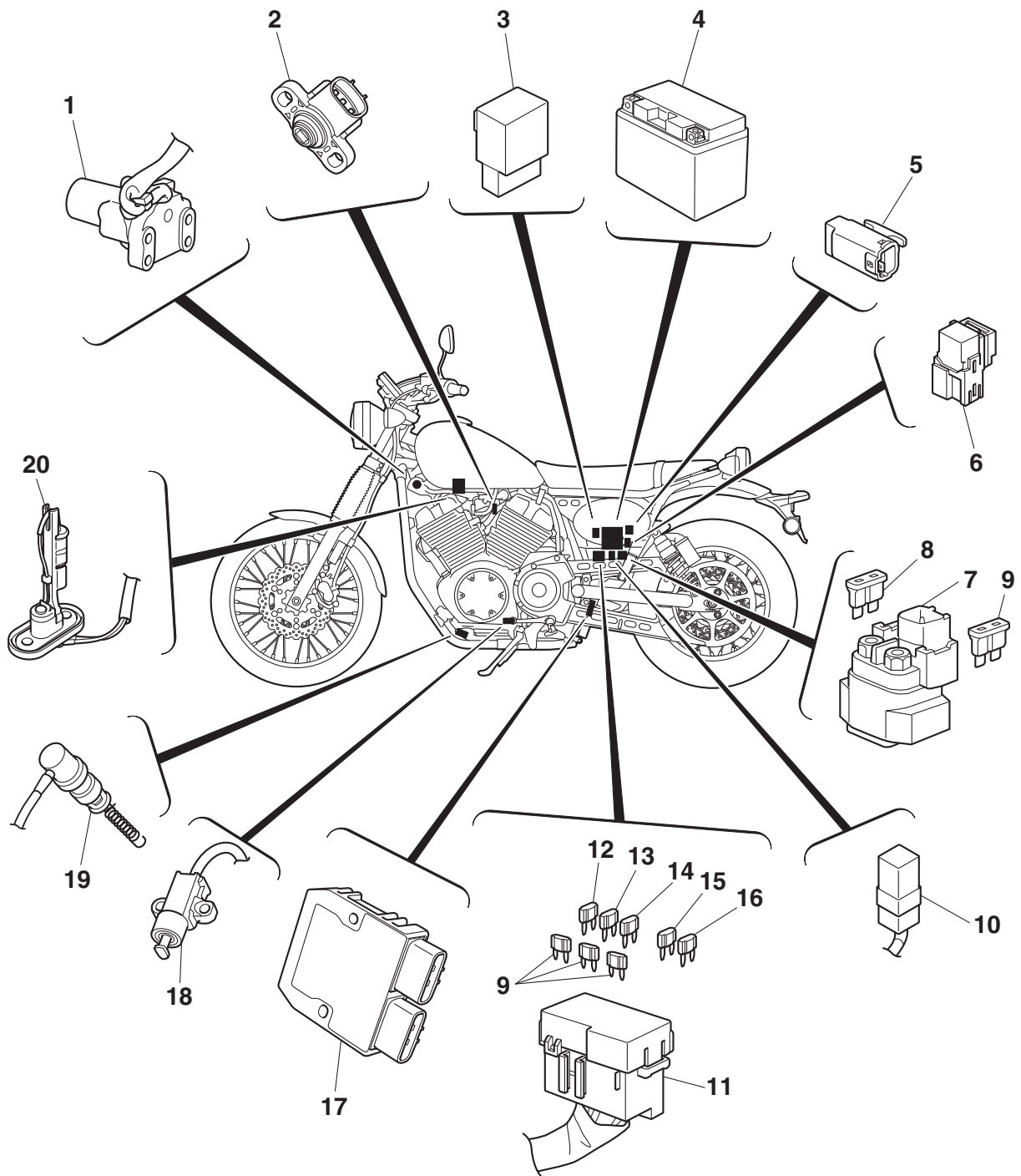
EAS20089

ELECTRICAL COMPONENTS



1. Intake air temperature sensor
2. Intake air pressure sensor
3. Front cylinder ignition coil
4. Rear cylinder ignition coil
5. Turn signal relay
6. ECU (Engine Control Unit)
7. Speed sensor
8. Neutral switch
9. O₂ sensor
10. Oil level switch
11. Crankshaft position sensor
12. Engine temperature sensor
13. Horn

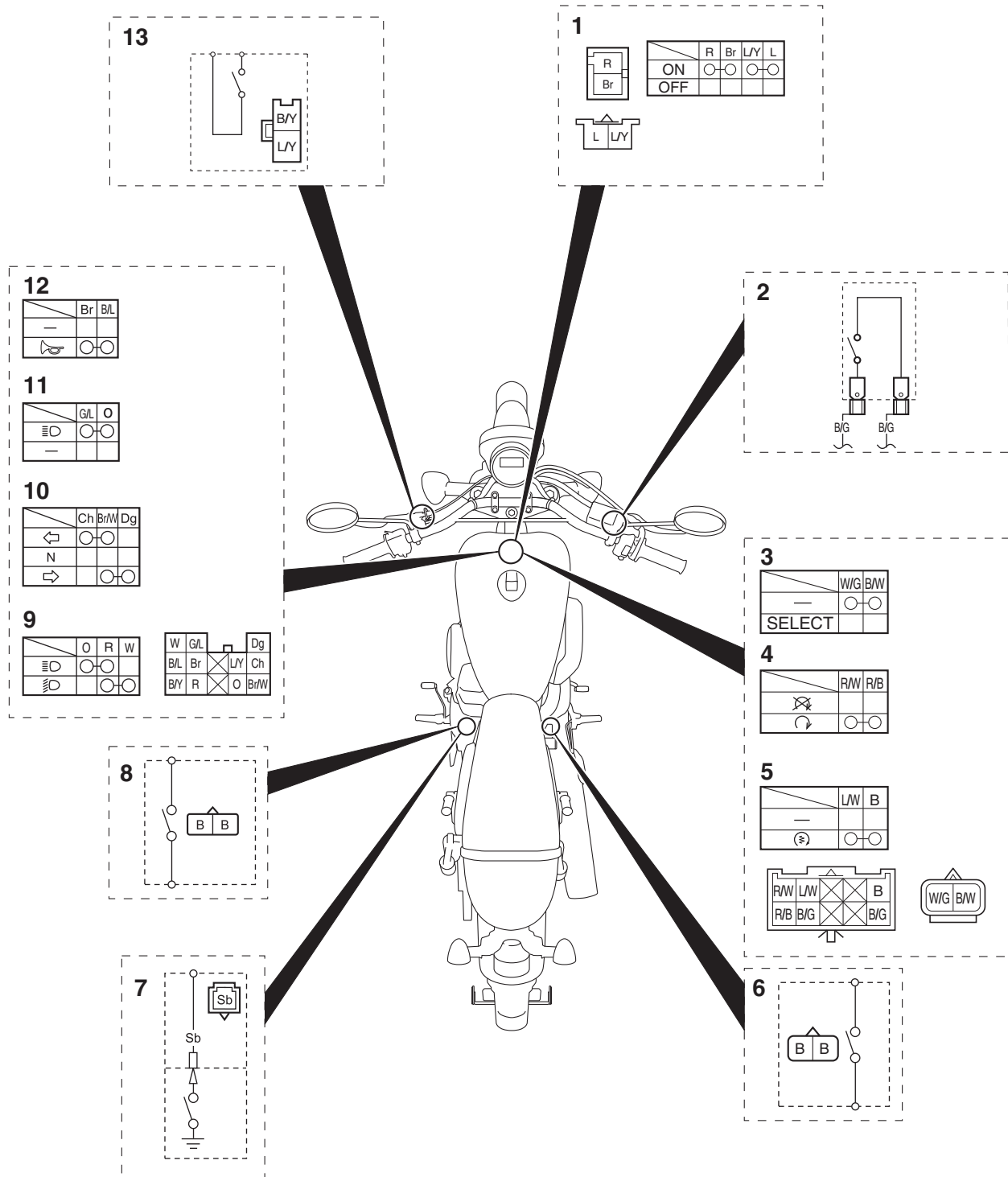
ELECTRICAL COMPONENTS



1. Main switch
2. Throttle position sensor
3. Relay unit
4. Battery
5. Lean angle sensor
6. Headlight relay
7. Starter relay
8. Fuel injection system fuse
9. Spare fuse
10. Main fuse
11. Fuse box
12. Ignition fuse
13. Signaling system fuse
14. Taillight fuse
15. Backup fuse
16. Headlight fuse
17. Rectifier/regulator
18. Sidestand switch
19. Rear brake light switch
20. Fuel sender

EAS30549

CHECKING THE SWITCHES



1. Main switch
2. Front brake light switch
3. Select switch
4. Engine stop switch
5. Start switch
6. Rear brake light switch
7. Neutral switch
8. Sidestand switch
9. Dimmer switch
10. Turn signal switch
11. Pass switch
12. Horn switch
13. Clutch switch

ELECTRICAL COMPONENTS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14371

NOTICE

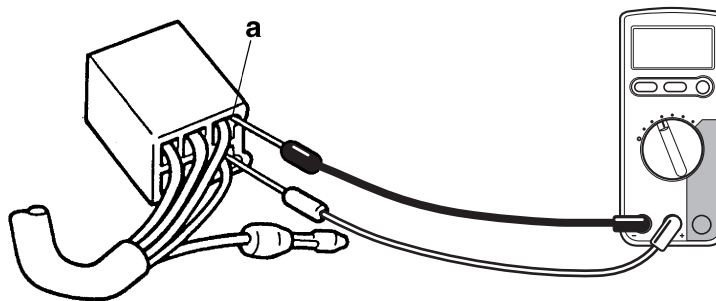
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.



Digital circuit tester (CD732)
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Model 88 Multimeter with ta-
chometer
YU-A1927

TIP

When checking for continuity, switch back and forth between the switch positions a few times.

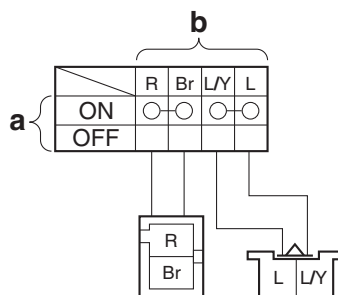


The switches and their terminal connections are illustrated as in the following example of the main switch.

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 “○—○”.

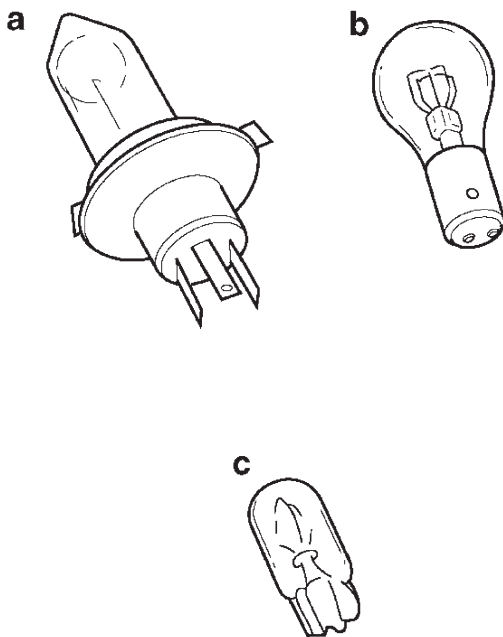
There is continuity between red and brown and between blue/yellow and blue when the switch is set to “ON”.



TIP

No continuity → Repair or replace the bulb, bulb socket or both.

- 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 sockets 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 lights and can be removed from their respective sockets by carefully pulling them out.



EWA13320



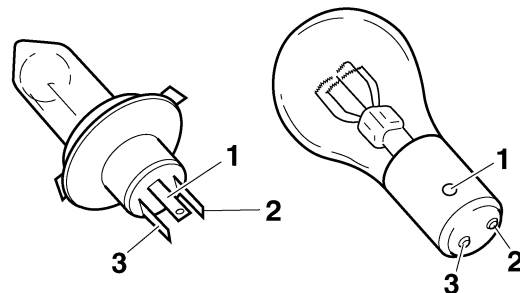
ECA14381

- Bulb (for continuity)
(with the digital circuit tester)
No continuity → Replace.



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90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927**

- Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “2”, and check the continuity.
- Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “3”, and check the continuity.
- If either of the readings indicates 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 digital circuit tester)
No continuity → Replace.



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Model 88 Multimeter with ta-
chometer
YU-A1927

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

- Install a good bulb into the bulb socket.
- Connect the digital circuit tester probes to the respective leads of the bulb socket.
- Check the bulb socket for continuity. If any of the readings indicates no continuity, replace the bulb socket.

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:

- Side cover (left)
- Tool box
Refer to “GENERAL CHASSIS (2)” on page 4-3.

2. Check:

- Fuse

- Connect the digital circuit tester to the fuse and check the continuity.



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

- If there is no continuity, replace the fuse.

3. Replace:

- Blown fuse

- Set the main switch to “OFF”.
- Install a new fuse of the correct amperage rating.
- Set on the switches to verify if the electrical circuit is operational.
- If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	40 A	1
Headlight	20 A	1
Ignition	15 A	1
Fuel injection system	10 A	1
Signaling system	7.5 A	1
Taillight	7.5 A	1
Backup	7.5 A	1
Spare	20 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1

EWA13310

WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

4. Install:

- Tool box
- Side cover (left)
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30552

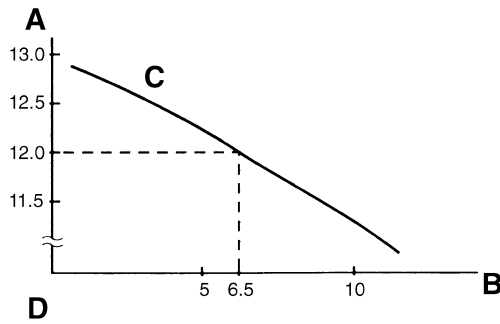
CHECKING AND CHARGING THE BATTERY

EWA13290

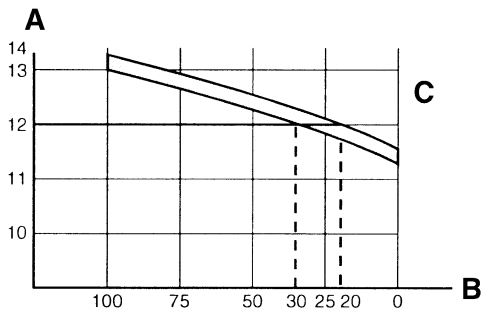
WARNING

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.



- 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)



5. Charge:

- Battery
 (refer to the appropriate charging method)

EWA13300



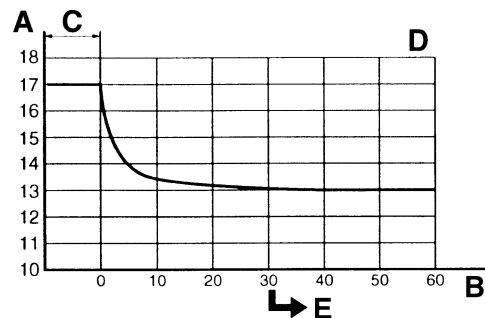
Do not quick charge a battery.

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.

Charging method using a variable-current (voltage) charger

- Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

- 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 overcharged.

- 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 adjusting dial to 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.



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 to 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.



6. Install:
 - Battery
7. Connect:
 - Battery leads
(to the battery terminals)

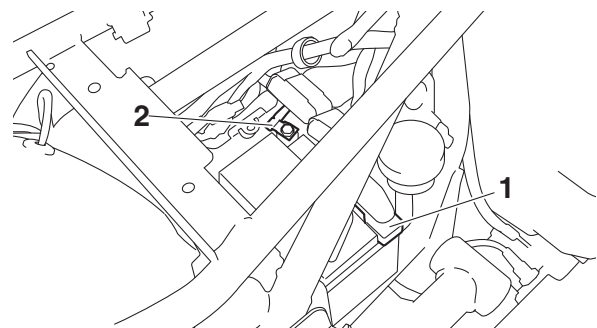
TIP

Route the positive battery lead under the negative battery lead, making sure not to route it on top of the relay unit.

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:

- ECU bracket
Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Battery cover
- Seat
- Side cover (left)
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

CHECKING THE RELAYS

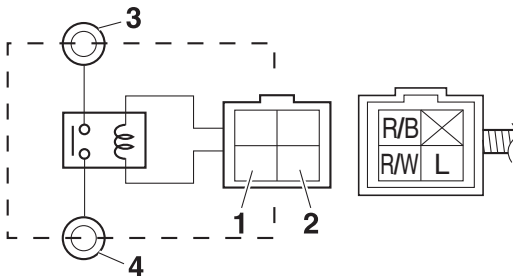
Check each relay for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



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

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown.
Check the relay operation.
Out of specification → Replace.

Starter relay

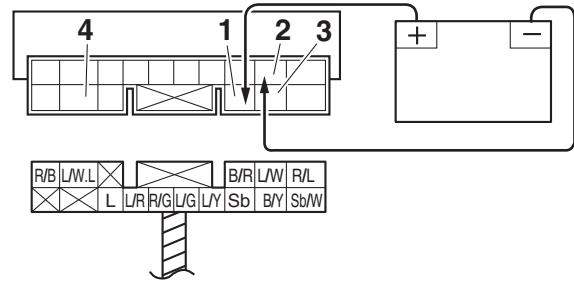


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

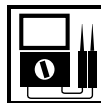


Result
Continuity
(between "3" and "4")

Relay unit (starting circuit cut-off relay)

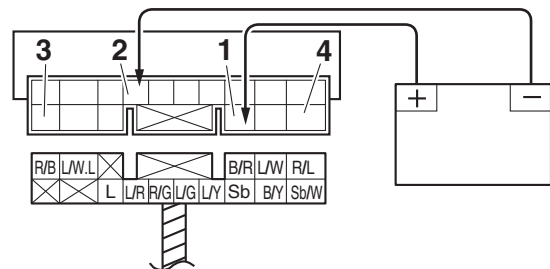


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

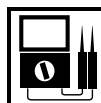


Result
Continuity
(between "3" and "4")

Relay unit (fuel pump relay)

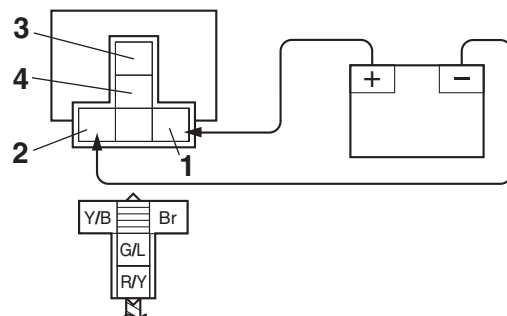


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



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”)

EAS30554

CHECKING THE TURN SIGNAL RELAY

1. Check:

- Turn signal relay input voltage
Out of specification → The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.



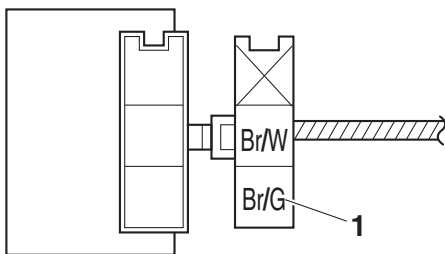
Turn signal relay input voltage
DC 12 V

- a. Connect the digital circuit tester to the turn signal relay terminal as shown.



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

- Positive tester probe → brown/green “1”
- Negative tester probe → ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal relay input voltage.

2. Check:

- Turn signal relay output voltage
Out of specification → Replace.



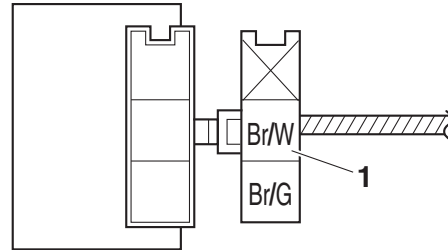
Turn signal relay output voltage
DC 12 V

- a. Connect the digital circuit tester to the turn signal relay terminal as shown.



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

- Positive tester probe → brown/white “1”
- Negative tester probe → ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal relay output voltage.

EAS30795

CHECKING THE RELAY UNIT (DIODE)

Relay unit (diode)

1. Check:

- Relay unit (diode)
Out of specification → Replace.



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



Continuity

Positive tester probe → black/yellow “1”

Negative tester probe → sky blue “2”

No continuity

Positive tester probe → sky blue “2”

Negative tester probe → black/yellow “1”

Continuity

Positive tester probe → blue/yellow “3”

Negative tester probe → sky blue “2”

No continuity

Positive tester probe → sky blue “2”

Negative tester probe → blue/yellow “3”

Continuity

Positive tester probe → sky blue/white “4”

Negative tester probe → sky blue “2”

No continuity

Positive tester probe → sky blue “2”

Negative tester probe → sky blue/white “4”

Continuity

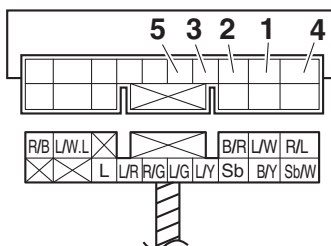
Positive tester probe → blue/yellow “3”

Negative tester probe → blue/green “5”

No continuity

Positive tester probe → blue/green “5”

Negative tester probe → blue/yellow “3”



- Disconnect the relay unit from the wire harness.
- Connect the digital circuit tester to the relay unit terminals as shown.

- Check the relay unit (diode) for continuity.
- Check the relay unit (diode) for no continuity.

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 7-4.



Minimum ignition spark gap
6.0 mm (0.24 in)

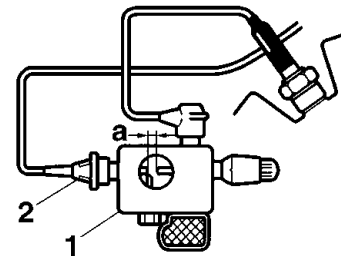
TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker “1” as shown.



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



- Spark plug cap
- Turn the main switch to “ON” and set the engine stop switch to “○”.
- Measure the ignition spark gap “a”.
- Crank the engine by pushing the start switch “⊞” and gradually increase the spark gap until a misfire occurs.

EAS30557

CHECKING THE SPARK PLUG CAPS

The following procedure applies to all of the spark plug caps.

1. Check:

- Spark plug cap resistance
Out of specification → Replace.

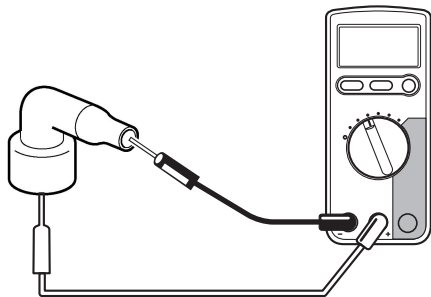


Resistance
7.50–12.50 k Ω

- Remove the spark plug cap from the spark plug lead.
- Connect the digital circuit tester to the spark plug cap as shown.



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



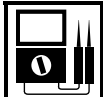
- Measure the spark plug cap resistance.

EAS30558

CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

- Check:
 - Primary coil resistance
 Out of specification → Replace.



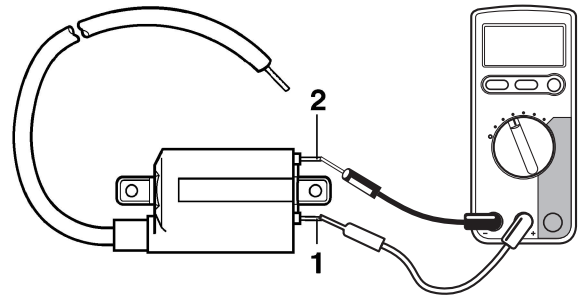
Primary coil resistance
2.16–2.64 Ω

- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the digital circuit tester to the ignition coil as shown.



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

- Positive tester probe → black/red “1”
- Negative tester probe → orange or gray/red “2”



- Measure the primary coil resistance.

- Check:
 - Secondary coil resistance
 Out of specification → Replace.



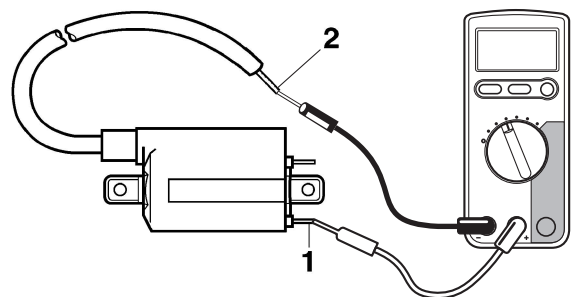
Secondary coil resistance
8.64–12.96 k Ω

- Disconnect the spark plug cap from the ignition coil.
- Connect the digital circuit tester to the ignition coil as shown.



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

- Positive tester probe → black/red “1”
- Negative tester probe → Spark plug lead “2”



- Measure the secondary coil resistance.

EAS30560

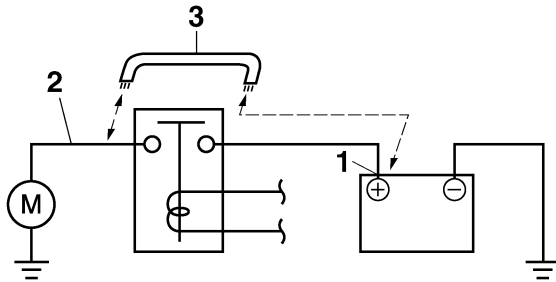
CHECKING THE CRANKSHAFT POSITION SENSOR

- Disconnect:
 - Crankshaft position sensor coupler (from the wire harness)

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.



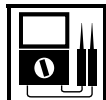
b. Check the starter motor operation.



EAS30566

CHECKING THE STATOR COIL

1. Disconnect:
 - Stator coil coupler (from the wire harness)
2. Check:
 - Stator coil resistance
Out of specification → Replace the crankshaft position sensor/stator assembly.



Stator coil resistance
0.128–0.192 Ω (B-B)



a. Connect the digital circuit tester to the stator coil coupler as shown.

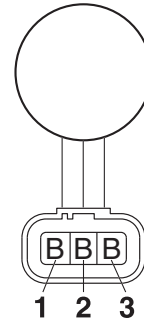


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → black “1”
- Negative tester probe → black “2”

- Positive tester probe → black “1”
- Negative tester probe → black “3”

- Positive tester probe → black “2”
- Negative tester probe → black “3”



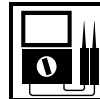
b. Measure the stator coil resistance.



EAS30680

CHECKING THE RECTIFIER/REGULATOR

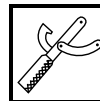
1. Check:
 - Charging voltage
Out of specification → Replace the rectifier/regulator.



Charging voltage
14 V at 5000 r/min

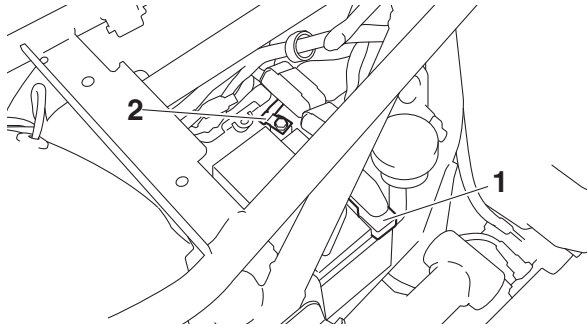


- a. Attach the engine tachometer to the spark plug lead of the front cylinder.
- b. Connect the digital circuit tester to the battery terminals as shown.



Digital tachometer
90890-06760
Digital tachometer
YU-39951-B
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Positive battery terminal “1”
- Negative tester probe → Negative battery terminal “2”



- c. Start the engine and operate it run at approximately 5000 r/min.
- d. Measure the charging voltage.



EAS30796

CHECKING THE OIL LEVEL SWITCH

1. Drain:
 - Engine oil
2. Remove:
 - Oil level switch (from the crankcase)
3. Check:
 - Oil level switch resistance

Out of specification → Replace the oil level switch.



Oil level switch
Oil level switch resistance (maximum level position)
 484.0–536.0 Ω
Oil level switch resistance (minimum level position)
 114.0–126.0 Ω



- a. Connect the digital circuit tester to the oil level switch terminal as shown.



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

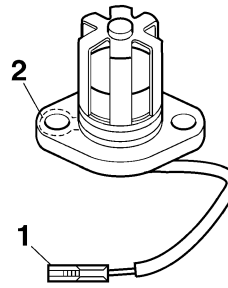
Minimum level position “A”

- Positive tester probe → Connector (white) “1”
- Negative tester probe → Body ground “2”

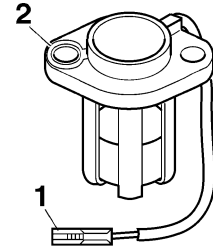
Maximum level position “B”

- Positive tester probe → Connector (white) “1”
- Negative tester probe → Body ground “2”

A



B



- b. Measure the oil level switch resistance.



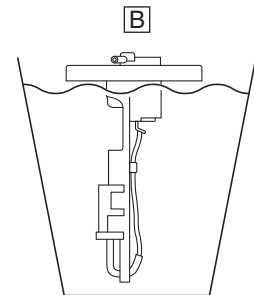
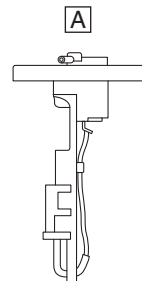
EAS30573

CHECKING THE FUEL SENDER

1. Disconnect:
 - Fuel sender coupler (from the wire harness)
2. Remove:
 - Fuel sender (from the fuel tank)
3. Connect:
 - Fuel sender coupler
4. Turn the main switch to “ON”.
5. Check:
 - Fuel level warning light

Out of specification → Replace the fuel sender.

Fuel sender is exposed to the atmosphere as shown in “A”
 → Fuel level warning light comes on.
 Fuel sender is immersed in fuel as shown in “B”
 → Fuel level warning light goes off.



EAS30574

CHECKING THE FUEL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

1. Check:
 - 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.

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 FAILURES

Engine

1. Cylinder(s) and cylinder head(s)
 - 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 filter
 - Clogged fuel tank breather hose
 - Clogged rollover valve
 - Deteriorated or contaminated fuel
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
 - Faulty spark plug cap
4. Ignition coil(s)
 - Cracked or broken ignition coil body
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
5. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Broken generator rotor Woodruff key
6. Switches and wiring
 - Faulty main switch
 - Faulty engine stop switch
 - Broken or shorted wiring
 - Faulty neutral switch
 - 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(s)
 - 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

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
 - Faulty spark plug cap
3. Ignition coil(s)
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
 - Cracked or broken ignition coil
4. Ignition system
 - Faulty ECU
 - Faulty crankshaft position sensor
 - Broken generator rotor Woodruff key

EAS30602

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 8-1.

Engine

1. Air filter
 - Clogged air filter element

Fuel system

1. 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. Cylinder head(s) and piston(s)
 - Heavy carbon buildup
2. Engine oil
 - Incorrect oil level

- Incorrect oil viscosity
- Inferior oil quality

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

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

1. Handlebar
 - Bent or improperly installed handlebar (right)
 - Bent or improperly installed handlebar (left)
2. Steering head components
 - Improperly installed upper bracket
 - Improperly installed lower bracket (improperly tightened ring nut)
 - Bent steering stem
 - Damaged ball bearing or bearing race
3. Front fork leg(s)
 - Uneven oil levels (both front fork legs)
 - Unevenly tensioned fork spring (both front fork legs)
 - Broken fork spring
 - Bent or damaged inner tube
 - Bent or damaged outer tube
4. Swingarm
 - Worn bearing or bushing
 - Bent or damaged swingarm
5. Rear shock absorber assembly
 - Faulty rear shock absorber spring
 - Leaking oil
6. Tire(s)
 - Uneven tire pressures (front and rear)
 - Incorrect tire pressure
 - Uneven tire wear
7. Wheel(s)
 - Incorrect wheel balance
 - Broken or loose spoke
 - Damaged wheel bearing
 - Bent or loose wheel axle
 - Excessive wheel runout
8. Frame
 - Bent frame
 - Damaged steering head pipe
 - Improperly installed bearing race

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

Turn signal does not come on

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal/position light bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

Turn signal blinks slowly

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal/position light bulb

Turn signal remains lit

- Faulty turn signal relay
- Burnt-out turn signal/position light bulb

Turn signal blinks quickly

- Incorrect turn signal/position light bulb
- Faulty turn signal relay
- Burnt-out turn signal/position light 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

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

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 7-30.

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 blue/black lead of the ECU (Engine Control Unit) is 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.
28	Engine temperature sensor: open or short circuit detected.
30	Latch up detected.
33	Front cylinder ignition coil: open or short circuit detected in the primary lead of the front cylinder ignition coil.
34	Rear cylinder ignition coil: open or short circuit detected in the primary lead of the rear cylinder 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.
	Neutral 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 (Engine Control Unit) memory. (When this malfunction is detected in the ECU, the fault code number might not appear.)
70	Engine idling stop

EAS31119

COMMUNICATION ERROR WITH THE METER

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 7-30.

Fault code No.	Item
Er-1	ECU (Engine Control Unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE



Fault code No.	Item
Er-2	ECU (Engine Control Unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.
Er-3	ECU (Engine Control Unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.
Er-4	ECU (Engine Control Unit) internal malfunction (input signal error): non-registered data has been received from the meter.

EAS31120


DIAGNOSTIC CODE: SENSOR OPERATION TABLE

TIP

The diagnostic code numbers cannot be displayed on the multi-function meter. To display the diagnostic code numbers, use the Yamaha diagnostic tool.

Diagnostic code No.	Item	Display	Procedure
01	Throttle position sensor signal <ul style="list-style-type: none"> Fully closed position Fully open position 	14–20 92–102	Check with throttle valves fully closed. Check with throttle valves fully open.
03	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pushing the start switch “  ”. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured air temperature with the display value.
07	Vehicle speed pulses	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 <ul style="list-style-type: none"> Upright Overturned 	Lean angle sensor output voltage 0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 45 degrees.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the 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.)
11	Engine temperature	Displays the engine temperature.	Compare the actually measured engine temperature with the display value.
20	Sidestand switch <ul style="list-style-type: none"> Stand retracted Stand extended 	ON OFF	Extend and retract the sidestand (with the transmission in gear).

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Display	Procedure
21	Neutral switch and clutch switch <ul style="list-style-type: none"> • Transmission is in neutral • Transmission is in gear or the clutch lever released • Clutch lever is squeezed with the transmission in gear and when the side-stand is retracted • Clutch lever is squeezed with the transmission in gear and when the side-stand is extended 	ON OFF ON OFF	Operate the transmission, clutch lever, and sidestand.
60	EEPROM fault code display <ul style="list-style-type: none"> • No history • History exists 	00 <ul style="list-style-type: none"> • No malfunctions detected (If the self-diagnosis fault code 44 is indicated, the ECU is defective.) 01 or 02 (Cylinder fault code) <ul style="list-style-type: none"> • (If both cylinders are defective, the display alternates every two seconds.) 	— —
61	Malfunction history code display <ul style="list-style-type: none"> • No history • History exists 	00 Fault codes 12–70 <ul style="list-style-type: none"> • (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 <ul style="list-style-type: none"> • No history • History exists 	00 <ul style="list-style-type: none"> • 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.) 	— To erase the history, set the engine stop switch from “  <p>8-7</p>

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Display	Procedure
70	Control number	0-254 [-]	—

EAS31121

DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Front cylinder ignition coil	Actuates the front cylinder ignition coil five times at one-second intervals. The "CHECK" indicator 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	Rear cylinder ignition coil	Actuates the rear cylinder ignition coil five times at one-second intervals. The "CHECK" indicator 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	Front cylinder injector	Actuates the front cylinder injector five times at one-second intervals. The "CHECK" indicator on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that the front cylinder injector is actuated five times by listening for the operating sound.
37	Rear cylinder injector	Actuates the rear cylinder injector five times at one-second intervals. The "CHECK" indicator on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Check that the rear cylinder injector 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 on the Yamaha diagnostic tool screen come on each time the relay is actuated. (When the relay is on, the "CHECK" indicator on the Yamaha diagnostic tool screen go off. When the relay is off, the "CHECK" indicator on the Yamaha diagnostic tool screen come on.)	Check that the relay unit 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 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.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
54	ISC valve	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 4 seconds each time. The "CHECK" indicator on the Yamaha diagnostic tool screen come on during the operation.	The ISC unit vibrates when the ISC valve operates.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

WIRING DIAGRAM**SCR95H/SCR95HC 2017**

1. AC magneto
2. Rectifier/regulator
3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
8. Starter relay
9. Starter motor
10. Joint connector
11. Signaling system fuse
12. Taillight fuse
13. Ignition fuse
14. Backup fuse
15. Headlight fuse
16. Joint coupler
17. Relay unit
18. Starting circuit cut-off relay
19. Fuel pump relay
20. Sidestand switch
21. Neutral switch
22. Speed sensor
23. O₂ sensor
24. Engine temperature sensor
25. Intake air temperature sensor
26. Crankshaft position sensor
27. Lean angle sensor
28. Throttle position sensor
29. Intake air pressure sensor
30. ISC (Idle Speed Control) unit
31. Yamaha diagnostic tool coupler
32. ECU (Engine Control Unit)
33. Front cylinder ignition coil
34. Spark plug
35. Rear cylinder ignition coil
36. Front cylinder injector
37. Rear cylinder injector
38. Fuel pump
39. Oil level switch
40. Meter assembly
41. Neutral indicator light
42. Multi-function meter
43. Engine trouble warning light
44. Oil level warning light
45. Fuel level warning light
46. Meter light
47. High beam indicator light
48. Turn signal indicator light
49. Fuel sender
50. Turn signal relay
51. Headlight relay
52. Handlebar switch (left)
53. Dimmer switch
54. Pass switch
55. Turn signal switch
56. Horn switch
57. Clutch switch

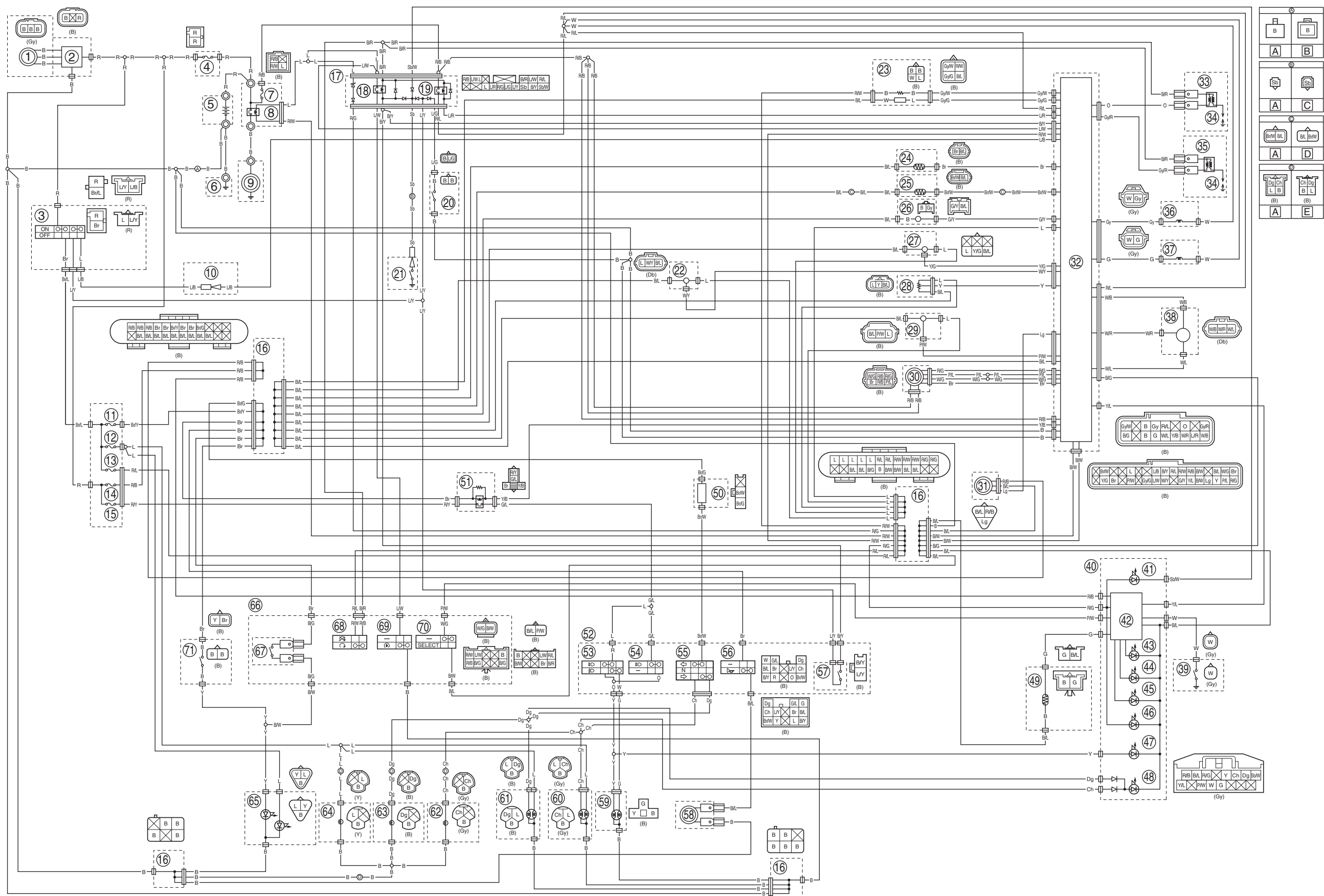
58. Horn
59. Headlight
60. Front turn signal/position light (left)
61. Front turn signal/position light (right)
62. Rear turn signal light (left)
63. Rear turn signal light (right)
64. License plate light
65. Tail/brake light
66. Handlebar switch (right)
67. Front brake light switch
68. Engine stop switch
69. Start switch
70. Select switch
71. Rear brake light switch
- A. Wire harness
- B. Sub-wire harness (negative battery)
- C. Sub-wire harness (neutral switch)
- D. Sub-wire harness (intake air temperature sensor)
- E. Sub-wire harness (rear turn signal light, license plate light)

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Db	Dark blue
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
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/B	Brown/Black
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/L	Green/Blue
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
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/B	White/Black
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



SCR95H/SCR95HC 2017 WIRING DIAGRAM



SCR95H/SCR95HC 2017 WIRING DIAGRAM

