YAMAHA 2017

SERVICE MANUAL

YZF-R6

YZFR6H
YZFR6HC

LIT-11616-30-60 BN6-28197-10

EAS20003

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Please refer to “BASIC INFORMATION” (separate volume, Y0A-28197-10*) for basic instructions that must be observed during servicing. 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

- * If the contents of the manual are revised, the last digit of the manual number will be increased by one.
- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

EAS30001

IMPORTANT MANUAL INFORMATION

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

⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**

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

EAS20002

YZFR6H/YZFR6HC
SERVICE MANUAL

First edition, March 2017

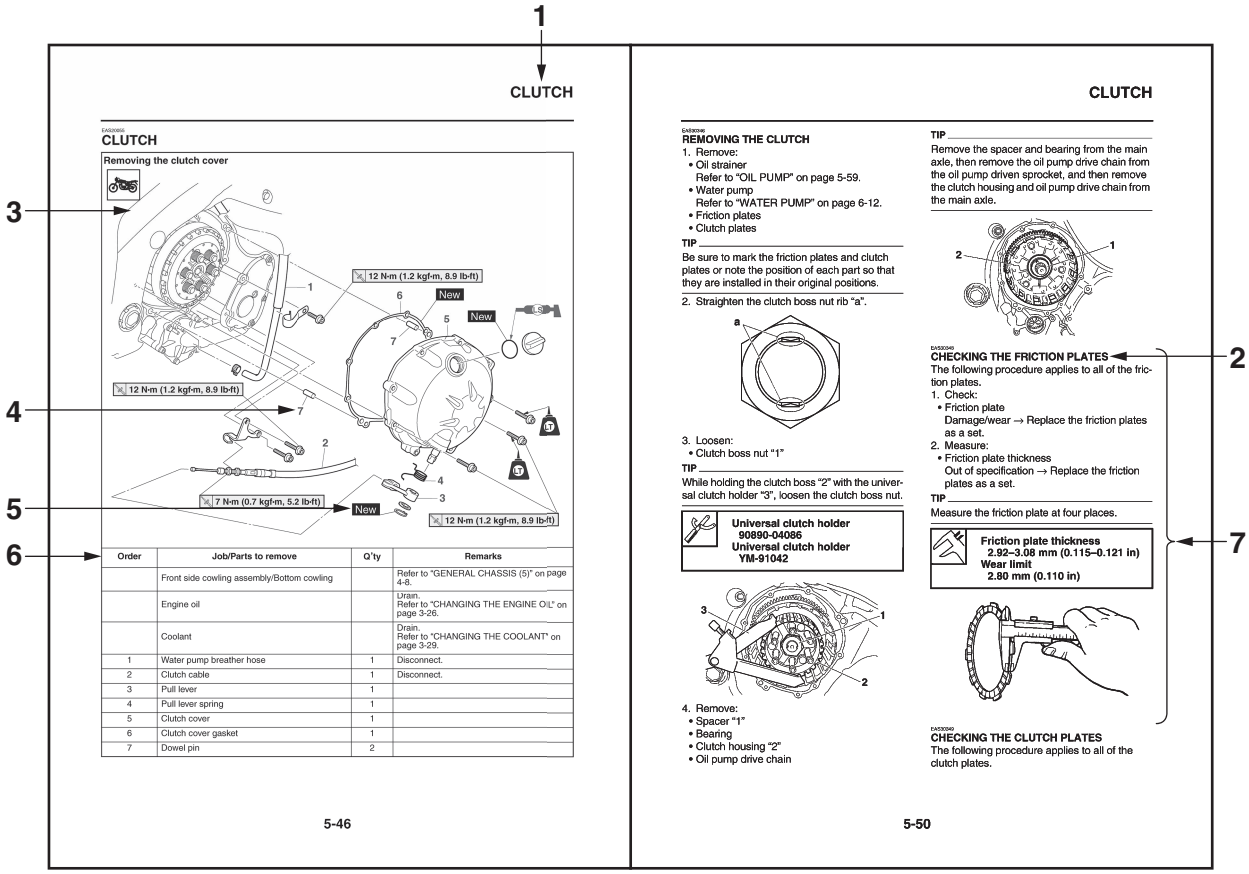
Printed in U.S.A.
P/N LIT-11616-30-60

EAS20004

HOW TO USE THIS MANUAL

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

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



EAS20005

SYMBOLS

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

TIP

The following symbols are not relevant to every vehicle.

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

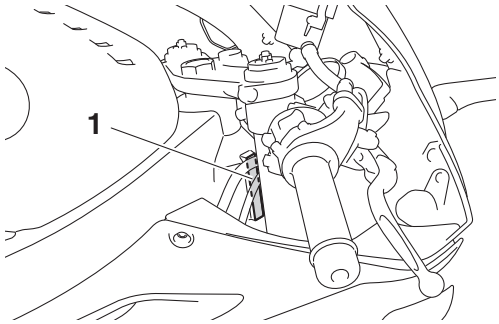
EAS10003

TABLE OF CONTENTS

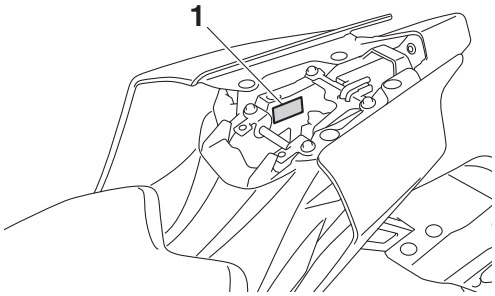
GENERAL INFORMATION

EAS20007
IDENTIFICATION

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



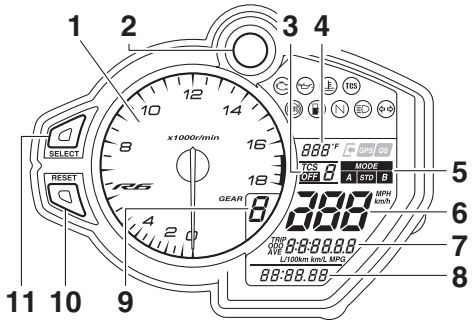
EAS30003
MODEL LABEL
The model label “1” is affixed to the frame under the passenger seat. This information will be needed to order spare parts.



EAS20008
FEATURES

EAS30682
INSTRUMENT FUNCTIONS

Multi-function meter unit



1. Tachometer
2. Shift light
3. TCS display
4. Coolant/air intake temperature display
5. Drive mode display
6. Speedometer
7. Multi-function display
8. Clock/lap timer
9. Transmission gear display
10. "RESET" button
11. "SELECT" button

EWA17650
⚠ WARNING

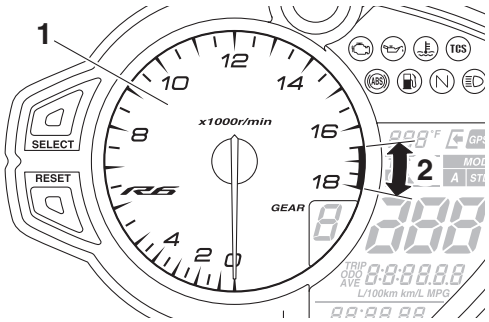
Be sure to stop the vehicle before making any setting changes to the multi-function meter unit. Changing settings while riding can distract the operator and increase the risk of an accident.

The multi-function meter unit is equipped with the following:
- speedometer
- tachometer
- clock
- lap timer
- coolant temperature display
- air intake temperature display
- transmission gear display
- drive mode display
- TCS display
- multi-function display
- display brightness and shift light control mode

TIP
- To switch the multi-function meter unit between miles and kilometers, push the "SELECT" button for one second.
- The "", "GPS", and "QS" icons require accessory parts to function.

Speedometer
The speedometer shows the vehicle's traveling speed.

Tachometer



1. Tachometer
2. Tachometer red zone

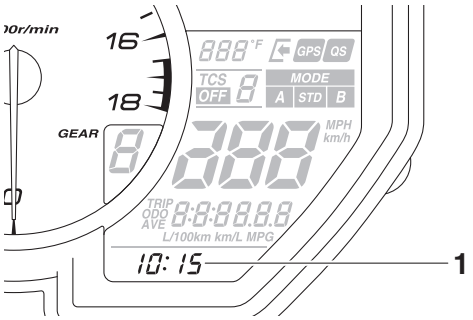
The electric tachometer shows the engine speed, as measured by the rotational velocity of the crankshaft, in revolutions per minute (r/min). When the vehicle is first powered on, the tachometer needle will sweep once across the r/min range and then return to zero.

ECA19660
NOTICE

Do not operate the engine in the tachometer red zone.

	Red zone **16500 r/min and above**

Clock and lap timer

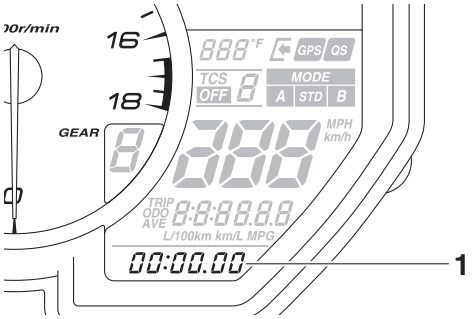


1. Clock

The clock uses a 12-hour time system.

[To set the clock:]
1. Turn the key to “ON”.
2. Push the “SELECT” button and the “RESET” button for two seconds. The hour digits will start flashing.
3. Push the “RESET” button to set the hours.
4. Push the “SELECT” button, and the minute digits will start flashing.
5. Push the “RESET” button to set the minutes.
6. Push the “SELECT” button to confirm the settings and start the clock.

[To switch between the clock and lap timer]
Push and release the “SELECT” button and the “RESET” button at the same time.

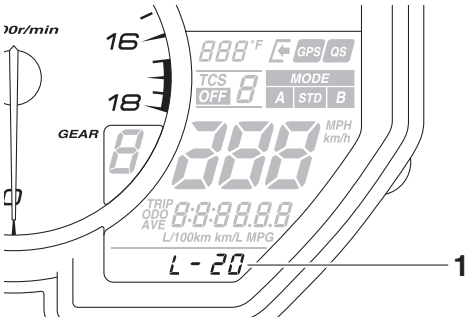


1. Lap timer

The lap timer records and stores up to 20 lap times. The lap time history records are divided into two groups, “L” for lap order and “F” for fastest order. For lap order, the most recent lap is designated L1 (and L19 will become L20). In the case of fast lap history, any new fast lap within the top 20 will be inserted and the previous F20 will be pushed out of the history.

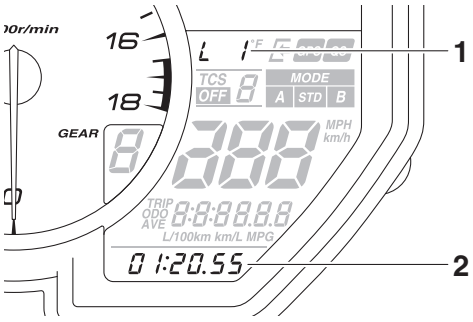
[To use the lap timer]
1. Push the “RESET” button for one second to set the lap timer to the counting-ready state (the colon “:” and period “.” will flash).
2. Push the pass switch “≣D” to start the lap timer.
3. Push the pass switch “≣D” to mark the start of each new lap.
4. Push the “SELECT” button to stop the lap timer.
5. Push the “SELECT” button again to reset the lap timer (or push the “RESET” button for one second to reset the lap timer and set it to the counting-ready state).

[To view the lap time history]
1. Push the “SELECT” button for one second. Lap order history is selected (indicated by “L-20” in the lower part of the display), or push the “SELECT” button again to select fast lap history (indicated by “F-20”).
   - “L-20” = lap order (most recent is L1)
   - “F-20” = fastest order (fastest lap time is F1)



1. History type (L-20 or F-20)

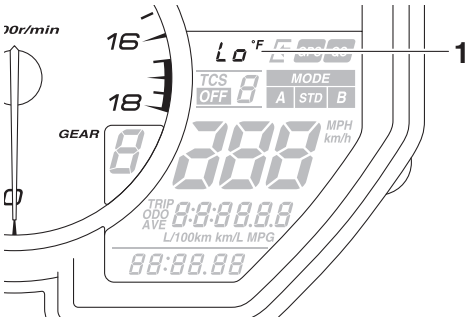
2. Push the “RESET” button and the 1st lap time of that history group (indicated by “L1” or “F1”) is shown.



1. Lap number/Fastest rank
2. Lap time

3. Use the “SELECT” button to scroll the history in ascending order, or use the “RESET” button to scroll the history in descending order.
4. When you have finished viewing the lap records you can:
   • push the “RESET” button for one second to delete that group of lap records.
   • push the “SELECT” button for one second to exit and return to the lap timer.

Coolant temperature display



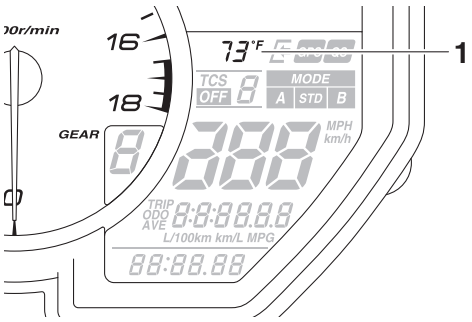
1. Coolant temperature display

This display indicates the temperature of the coolant from 105 °F to 255 °F in 1 °F increments. If the coolant temperature is between 242 and 255 °F, the coolant temperature display flashes and the coolant temperature warning light comes on. If this occurs, reduce the load on the engine by riding at a moderate pace, at low rpm, until the coolant temperature goes down. If the temperature does not go down, or if the message “HI” flashes, stop the engine and let it cool.

TIP

- When the vehicle is turned on, the coolant temperature display is automatically selected.
- When the coolant temperature is below 105 °F, “Lo” will be displayed.

Air intake temperature display



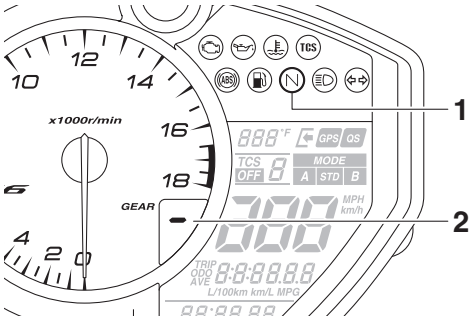
1. Air intake temperature display

This display indicates the temperature of the air drawn into the air intake duct.
Push the “RESET” button to switch the display between the coolant temperature and the air intake temperature.

TIP

- When the coolant temperature display is selected, “C” is displayed for one second, and then the coolant temperature is displayed.
- When the air intake temperature display is selected, “A” is displayed for one second, and then the air intake temperature is displayed.
- When the air temperature is below 16 °F, “16 °F” will be displayed.

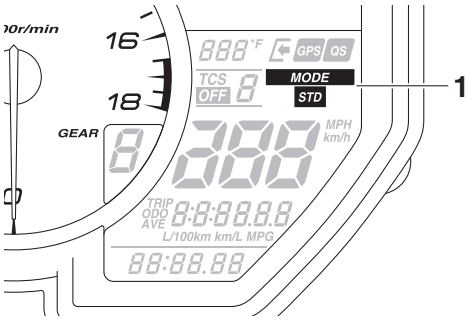
Transmission gear display



1. Neutral indicator light “ **N** ”
2. Transmission gear display

This display shows the selected gear. The neutral position is indicated by “ **-** ” and by the neutral indicator light.

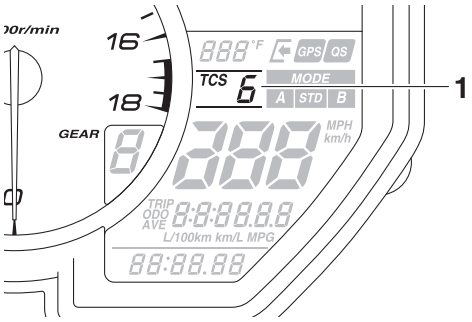
Drive mode display



1. Drive mode display

This display indicates which drive mode has been selected: “STD”, “A” or “B”.

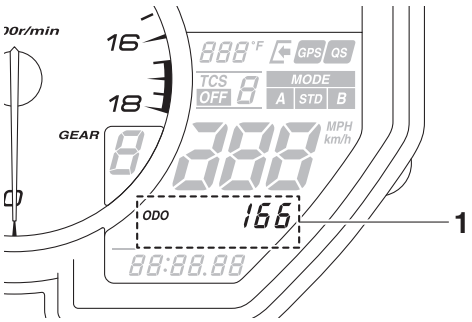
TCS display



1. TCS display

This display indicates which traction control system setting has been selected: “1” through “6” or “OFF”.

Multi-function display



1. Multi-function display

The multi-function display is equipped with the following:
- odometer
- two tripmeters
- fuel reserve tripmeter
- instantaneous fuel consumption
- average fuel consumption
- total fuel used

Navigating the multi-function display

Push the “SELECT” button to change between the odometer “ODO”, tripmeters “TRIP 1” and “TRIP 2”, instantaneous fuel consumption “km/L”, “L/100 km” or “MPG”, average fuel consumption “AVE _ _ _._ km/L”, “AVE _ _ _._ L/100 km” or “AVE _ _ _._ MPG”, and total fuel used “_ _._” in the following order:

ODO → TRIP 1 → TRIP 2 → km/L, L/100 km or MPG → AVE _ _ _._ km/L, AVE _ _ _._ L/100 km or AVE _ _ _._ MPG → _ _._ → ODO

Odometer and tripmeters

The odometer shows the total distance traveled by the vehicle.
The tripmeters show the distance traveled since they were last reset. To reset a tripmeter, push the “RESET” button for one second.

TIP

- The odometer will lock at 999999.
- The tripmeters will reset and continue counting after 9999.9 is reached.

Fuel reserve tripmeter

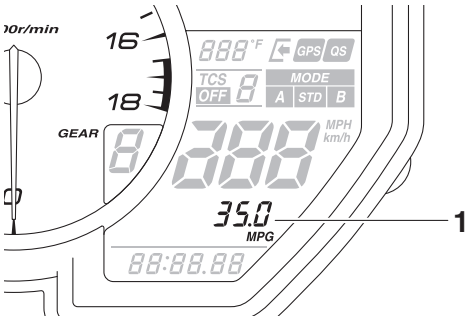
If the fuel level warning light comes on, the display will automatically change to the fuel reserve tripmeter “TRIP F” and start counting the distance traveled from that point. In this case, push the “SELECT” button to switch the display in the following order:

TRIP F → km/L, L/100 km or MPG → AVE _ _ _._ km/L, AVE _ _ _._ L/100 km or AVE _ _ _._ MPG → _ _._ → ODO → TRIP 1 → TRIP 2 → TRIP F

TIP

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.

Instantaneous fuel consumption



1. Instantaneous fuel consumption display

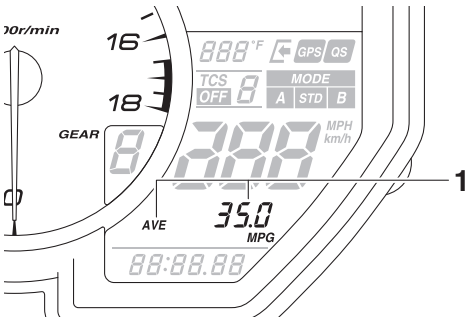
This function calculates the fuel consumption under current riding conditions.
The instantaneous fuel consumption display is set to “MPG”, or when using kilometers to “km/L” or “L/100 km”. To switch between “km/L” and “L/100 km”, push the “SELECT” button for one second.

- "km/L": The distance that can be traveled on 1.0 L of fuel under the current riding conditions is shown.
- "L/100 km": The amount of fuel necessary to travel 100 km under the current riding conditions is shown.
- "MPG": The distance that can be traveled on 1.0 US gal of fuel under the current riding conditions is shown.

TIP

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

Average fuel consumption



1. Average fuel consumption display

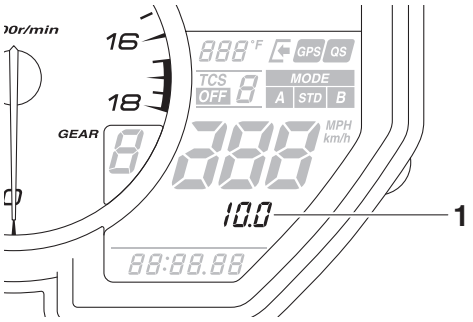
This function calculates the average fuel consumption since it was last reset.
The average fuel consumption display is set to "AVE _ _ _._ MPG", or when using kilometers to "AVE _ _ _._ km/L" or "AVE _ _ _._ L/100 km". When using kilometers, push the "SELECT" button for one second to switch between "AVE _ _ _._ km/L" and "AVE _ _ _._ L/100 km".

- "AVE _ _ _._ km/L": The average distance that can be traveled on 1.0 L of fuel is shown.
- "AVE _ _ _._ L/100 km": The average amount of fuel necessary to travel 100 km is shown.
- "AVE _ _ _._ MPG": The average distance that can be traveled on 1.0 US gal of fuel is shown.

TIP

- To reset the average fuel consumption display, push the "RESET" button for one second.
- After resetting the average fuel consumption display, "_ _ _._" will be shown until the vehicle has traveled 1 km (0.6 mi).

Total fuel used



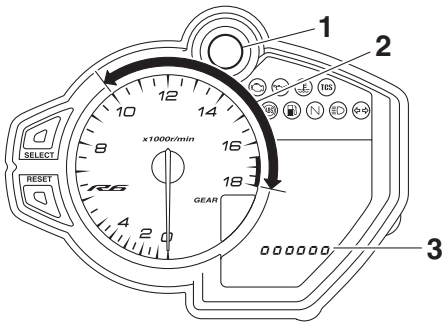
1. Total fuel used display

This display shows the total amount of fuel that has been used since it was last reset.
When using miles, this figure is shown in gallons. When using kilometers, this figure is shown in liters.
To reset the total fuel used display, push the "RESET" button for one second.

TIP

After the total fuel used display is reset, "_ _. _" will be shown until the vehicle has traveled a sufficient distance.

Display brightness and shift light control mode



1. Shift light
2. Shift light activation range
3. Brightness level display

This mode cycles through five control functions, allowing you to make the following settings in the order listed below.

- Display brightness – adjust the brightness of the displays and tachometer.
- Shift light activity function – set the shift light to on, flash, or off.
- Shift light activation – set the engine speed at which the shift light will be come on.
- Shift light deactivation – set the engine speed at which the shift light will be go off.

• Shift light brightness – adjust the brightness of the shift light.

TIP

Refer to the brightness level display when adjusting brightness levels.

[To adjust the display and tachometer brightness]

1. Turn the key to "OFF".
2. Push and hold the "SELECT" button.
3. Turn the key to "ON", and then release the "SELECT" button after five seconds.
4. Push the "RESET" button to set the brightness level.
5. Push the "SELECT" button to confirm the setting. The control mode changes to the shift light activity function.

[To set the shift light activity function]

1. Push the "RESET" button to select one of the following shift light activity settings:
   • On – the shift light will come on when activated. (This setting is selected when the shift light stays on.)
   • Flash – the shift light will flash when activated. (This setting is selected when the shift light flashes four times per second.)
   • Off – the shift light is deactivated; in other words, it will not come on or flash. (This setting is selected when the shift light flashes once every two seconds.)
2. Push the "SELECT" button to confirm the selected shift light activity. The control mode changes to the shift light activation point setting function.

[To set the shift light activation point]

TIP

The shift light activation point can be set between 10000 r/min and 18000 r/min. From 10000 r/min to 13000 r/min, the shift light can be set in increments of 500 r/min. From 13000 r/min to 18000 r/min, the shift light can be set in increments of 200 r/min.

1. Push the "RESET" button to set the activation point engine speed.
2. Push the "SELECT" button to confirm the setting. The control mode changes to the shift light deactivation point setting function.

[To set the shift light deactivation point]

TIP

The deactivation range is the same as the activation range. However, be sure to set the deactivation point to a higher engine speed than the activation point, otherwise the shift light will not come on.

1. Push the "RESET" button to set the deactivation point engine speed.
2. Push the "SELECT" button to confirm the setting. The control mode changes to the shift light brightness function.

[To adjust the shift light brightness]

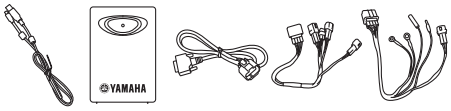
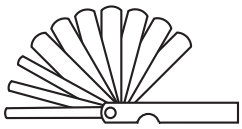
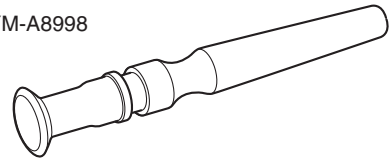
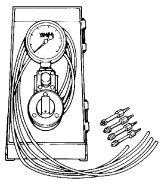
1. Push the "RESET" button to set the shift light brightness level.
2. Push the "SELECT" button to confirm the setting and exit the display brightness and shift light control mode.

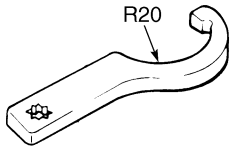
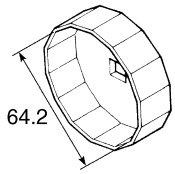
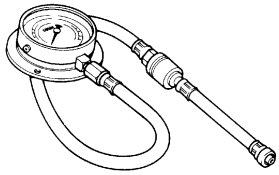
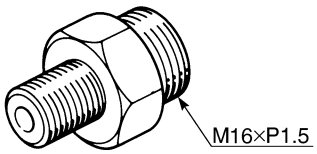
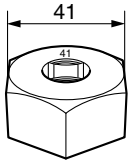
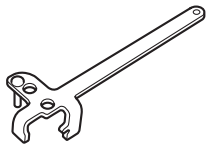
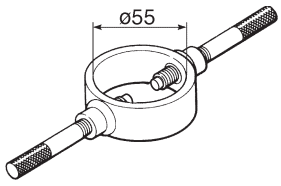
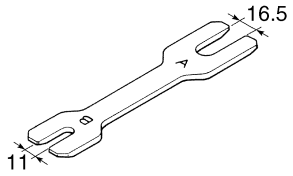
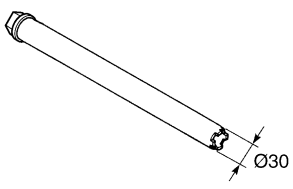
EAS20012
SPECIAL TOOLS

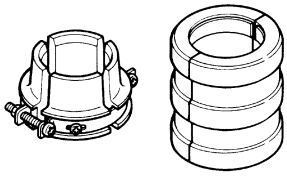
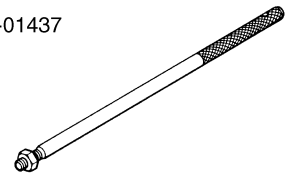
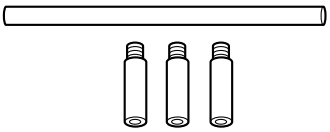
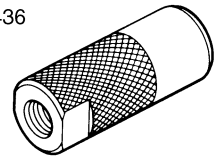
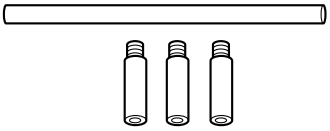
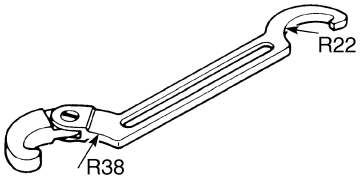
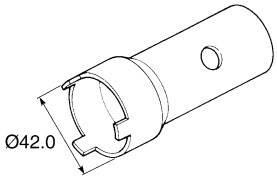
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

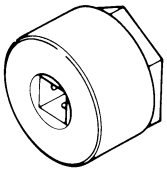
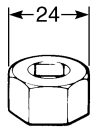
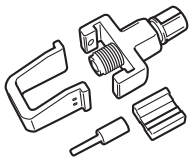
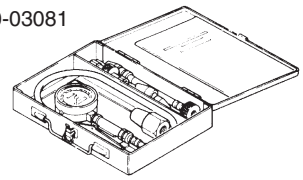
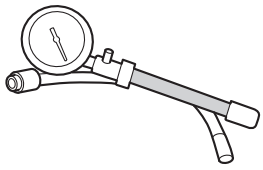
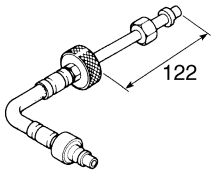
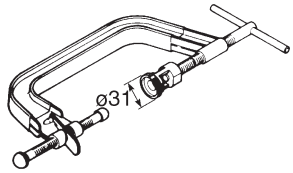
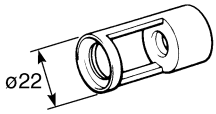
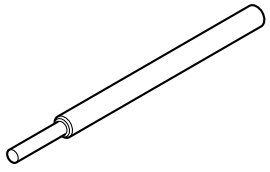
TIP

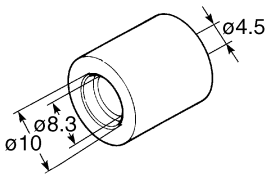
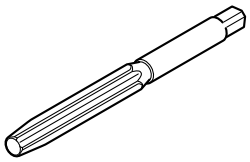
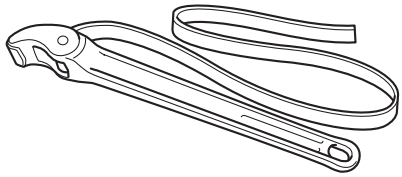
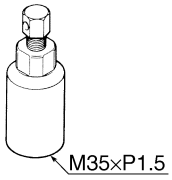
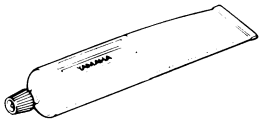
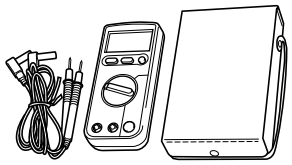
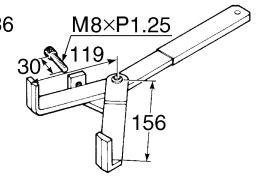
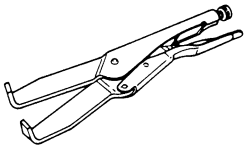
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

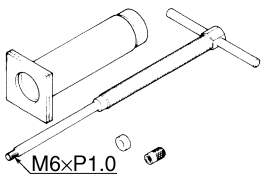
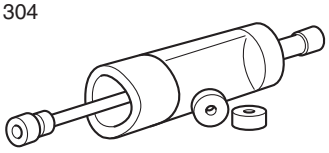
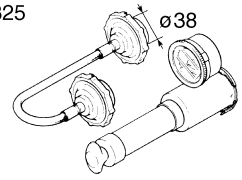
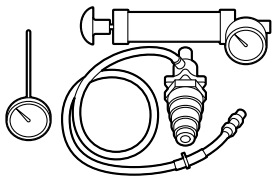
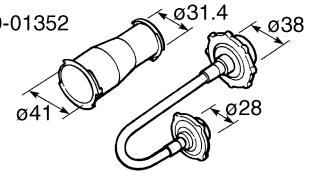
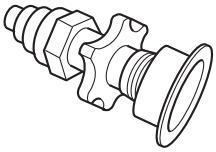
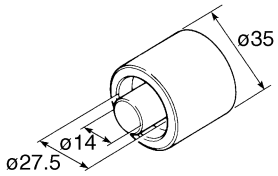
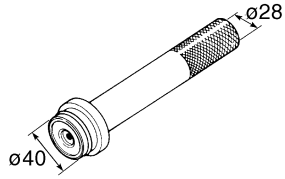
Tool name/Tool No.	Illustration	Reference pages
Yamaha diagnostic tool USB (US) 90890-03257		3-4, 4-62, 4-63, 8-32, 8-130, 8-146, 8-151
Yamaha diagnostic tool (A/I) 90890-03254		3-4, 4-62, 4-63, 8-32, 8-130, 8-146, 8-151
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 4-22, 4-32, 5-51
Valve lapper 90890-04101 Valve lapping tool YM-A8998	90890-04101  YM-A8998 	3-7
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-10

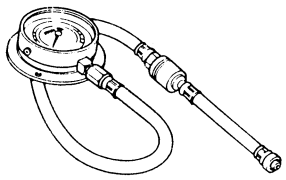
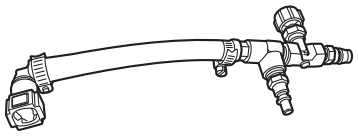
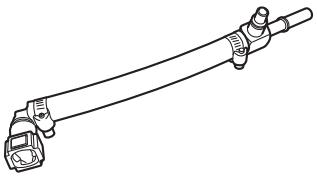
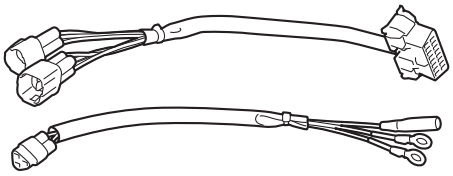
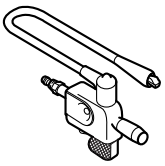
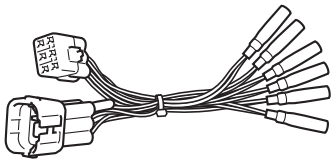
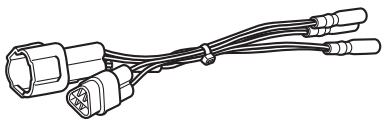
Tool name/Tool No.	Illustration	Reference pages
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-20, 4-84
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-26
Oil pressure gauge set 90890-03120		3-28
Oil pressure adapter H 90890-03139		3-28
Hexagon wrench (41) 90890-01525 Hexagon wrench (41) YM-01525		4-28, 4-29
Hydraulic unit holding tool 90890-01594		4-59, 4-60
Fork spring compressor 90890-01441 Fork spring compressor YM-01441		4-74, 4-80
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-74, 4-80
Damper rod holder (ø30) 90890-01506 Damper rod holder YM-01506		4-75, 4-77

Tool name/Tool No.	Illustration	Reference pages
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-77, 4-78, 4-78
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437  YM-A8703 	4-78, 4-80
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436  YM-A8703 	4-78, 4-80
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-84
Ring nut wrench 90890-01507 Ring nut wrench YM-01507		4-92, 4-94

Tool name/Tool No.	Illustration	Reference pages
Damper rod holder (ø24) 90890-01328 Damper rod holder YM-01328	90890-01328  YM-01328 	4-92, 4-93
Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550		4-97
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081  YU-33223 	5-8
Extension 90890-04136		5-8
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-30, 5-35
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-30, 5-35
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-32

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-32
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-32
Rotor holding tool 90890-04166 Rotor holding tool YM-04166		5-37, 5-38, 5-40, 5-40
Flywheel puller 90890-01404 Flywheel puller YM-01404		5-37
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-38, 5-41, 5-66
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		5-44, 8-151, 8-152, 8-153, 8-154, 8-155, 8-155, 8-156, 8-156, 8-157, 8-157, 8-158, 8-159, 8-160, 8-160, 8-161, 8-161, 8-162, 8-163
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	90890-04086  YM-91042 	5-50, 5-54

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-70
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	6-5, 6-6
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984 	6-5
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A	 	6-15
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058	 	6-15

Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-15, 7-16
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-15
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-16
OBD/ GST Leadwire kit 90890-03249		8-32
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-155
Test harness– lean angle sensor (6P) 90890-03209 Test harness– lean angle sensor (6P) YU-03209		8-156
Test harness– speed sensor (3P) 90890-03208 Test harness– speed sensor (3P) YU-03208		8-160

SPECIFICATIONS

EAS20013
GENERAL SPECIFICATIONS

Model	
Model	BN61 (YZFR6H_U49) BN62 (YZFR6HC_CAL)
Dimensions	
Overall length	2040 mm (80.3 in)
Overall width	695 mm (27.4 in)
Overall height	1150 mm (45.3 in)
Wheelbase	1375 mm (54.1 in)
Ground clearance	130 mm (5.12 in)
Minimum turning radius	3.6 m (11.81 ft)
Weight	
Curb weight	190 kg (419 lb)
Loading	
Maximum load	185 kg (408 lb)
Riding capacity	2 person

EAS20014
ENGINE SPECIFICATIONS

Engine	
Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	599 cm³
Cylinder arrangement	Inline
Number of cylinders	4-cylinder
Bore × stroke	67.0 × 42.5 mm (2.64 × 1.67 in)
Compression ratio	13.1 : 1
Compression pressure	1392–1792 kPa/400 r/min (13.9–17.9 kgf/cm²/400 r/min, 198.0–254.9 psi/400 r/min)
Starting system	Electric starter
Fuel	
Recommended fuel	Premium unleaded gasoline (Gasohol [E10] acceptable)
Fuel tank capacity	17 L (4.5 US gal, 3.7 Imp.gal)
Fuel reserve amount	3.4 L (0.90 US gal, 0.75 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	2.40 L (2.54 US qt, 2.11 Imp.qt)
With oil filter removal	2.60 L (2.75 US qt, 2.29 Imp.qt)
Quantity (disassembled)	3.40 L (3.59 US qt, 2.99 Imp.qt)
Oil filter	
Oil filter type	Cartridge
Oil pump	
Inner-rotor-to-outer-rotor-tip clearance	0–0.120 mm (0–0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09–0.15 mm (0.0035–0.0059 in)
Limit	0.22 mm (0.0087 in)
Oil pressure	40.0 kPa/1300 r/min (0.40 kgf/cm²/1300 r/min, 5.8 psi/1300 r/min)
Relief valve operating pressure	700.0 kPa (7.00 kgf/cm², 101.5 psi)
Cooling system	
Coolant quantity	
Radiator (including all routes)	2.30 L (2.43 US qt, 2.02 Imp.qt)
Coolant reservoir (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap valve opening pressure	107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

Thermostat	
Valve opening temperature	69.0–73.0 °C (156.20–163.40 °F)
Valve full open temperature	85.0 °C (185.00 °F)
Valve lift (full open)	8.0 mm (0.31 in)
Water pump	
Water pump type	Single suction centrifugal pump
Impeller shaft tilt limit	0.15 mm (0.006 in)
Spark plug(s)	
Manufacturer/model	NGK/CR10EK
Spark plug gap	0.6–0.7 mm (0.024–0.028 in)
Cylinder head	
Warpage limit	0.05 mm (0.0020 in)
Camshaft	
Camshaft cap inside diameter	22.500–22.521 mm (0.8858–0.8867 in)
Camshaft journal diameter	22.459–22.472 mm (0.8842–0.8847 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	33.750–33.850 mm (1.3287–1.3327 in)
Limit	33.675 mm (1.3258 in)
Lobe height (Exhaust)	32.950–33.050 mm (1.2972–1.3012 in)
Limit	32.875 mm (1.2943 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.12–0.19 mm (0.0047–0.0075 in)
Exhaust	0.16–0.23 mm (0.0063–0.0091 in)
Valve dimensions	
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve seat contact width (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.8 mm (0.07 in)
Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.460 mm (0.1756 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.445 mm (0.1750 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.095 mm (0.0037 in)
Valve stem runout	0.040 mm (0.0016 in)
Valve spring	
Free length (intake)	37.47 mm (1.48 in)
Limit	35.60 mm (1.40 in)
Free length (exhaust)	37.67 mm (1.48 in)

Limit	35.79 mm (1.41 in)
Spring tilt (intake)	1.6 mm (0.06 in)
Spring tilt (exhaust)	1.6 mm (0.06 in)
Cylinder	
Bore	67.000–67.010 mm (2.6378–2.6382 in)
Wear limit	67.060 mm (2.6402 in)
Piston	
Diameter	66.975–66.990 mm (2.6368–2.6374 in)
Measuring point (from piston skirt bottom)	10.0 mm (0.39 in)
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Piston pin bore inside diameter	15.002–15.013 mm (0.5906–0.5911 in)
Limit	15.043 mm (0.5922 in)
Piston pin outside diameter	14.991–15.000 mm (0.5902–0.5906 in)
Limit	14.971 mm (0.5894 in)
Piston-pin-to-piston-pin-bore clearance	0.002–0.022 mm (0.0001–0.0009 in)
Piston ring	
Top ring	
Ring type	Barrel
End gap limit	0.60 mm (0.0236 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
2nd ring	
Ring type	Taper
End gap limit	1.15 mm (0.0453 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Connecting rod	
Oil clearance	0.037–0.061 mm (0.0015–0.0024 in)
Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Crankshaft	
Runout limit	0.030 mm (0.0012 in)
Journal oil clearance	0.020–0.044 mm (0.0008–0.0017 in)
Bearing color code	
Code 0	White
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Clutch	
Clutch type	Wet, multiple-disc
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in)
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.80 mm (0.110 in)
Plate quantity	9 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)

Plate quantity	8 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch spring free length	55.00 mm (2.17 in)
Limit	54.00 mm (2.13 in)
Spring quantity	6 pcs
Drivetrain	
Primary reduction ratio	2.073 (85/41)
Transmission type	Constant mesh 6-speed
Gear ratio	
1st	2.583 (31/12)
2nd	2.000 (32/16)
3rd	1.667 (30/18)
4th	1.444 (26/18)
5th	1.286 (27/21)
6th	1.150 (23/20)
Main axle runout limit	0.02 mm (0.0008 in)
Drive axle runout limit	0.02 mm (0.0008 in)
Secondary reduction ratio	2.813 (45/16)
Final drive	Chain
Shifting mechanism	
Installed shift rod length	267.2–269.2 mm (10.52–10.60 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Maximum consumption amperage	3.3 A
Throttle body	
ID mark	BN61 00 (YZFR6H_U49) BN62 10 (YZFR6HC_CAL)
Fuel injector	
Resistance	12.0 Ω
Accelerator position sensor	
Resistance	1.26–2.34 kΩ
Throttle position sensor	
Resistance	1.4–2.6 kΩ
Idling condition	
Engine idling speed	1250–1350 r/min
AI system	Active
O2 feedback control	Inactive
Exhaust gas sampling point	Sampling port on the exhaust pipe
Coolant temperature	95–105 °C (203–221 °F)
Difference in vacuum pressure between the cylinders	0–1.3 kPa (10 mmHg, 0.4 inHg)
CO%	2.5–4.5 %

Fuel line pressure (at idle)	300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)
Air induction system	
Solenoid resistance	20–23 Ω

EAS20015
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	24.0 °
Trail	97 mm (3.8 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT5.50
Rim material	Aluminum
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70ZR17M/C (58W)
Manufacturer/model	DUNLOP/SPORTMAX D214F
Manufacturer/model	BRIDGESTONE/BATTLAX S21F
Rear tire	
Type	Tubeless
Size	180/55ZR17M/C (73W)
Manufacturer/model	DUNLOP/SPORTMAX D214
Manufacturer/model	BRIDGESTONE/BATTLAX S21R
Tire air pressure (measured on cold tires)	
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
Front brake	
Disc outside diameter × thickness	320.0 × 5.0 mm (12.60 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc runout limit (as measured on wheel)	0.10 mm (0.0039 in)
Brake pad lining thickness	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.87 mm (0.62 in)
Caliper cylinder inside diameter (Left)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Caliper cylinder inside diameter (Right)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Specified brake fluid	DOT 4
Rear brake	
Disc outside diameter × thickness	220.0 × 5.0 mm (8.66 × 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	4.5 mm (0.18 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	30.23 mm (1.1902 in)
Specified brake fluid	DOT 4

Front suspension

Type	Telescopic fork
Spring	Coil spring
Shock absorber	Hydraulic damper
Front fork travel	120.0 mm (4.72 in)
Wheel travel	120 mm (4.7 in)
Fork spring free length	219.5 mm (8.64 in)
Limit	215.1 mm (8.47 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil 01
Quantity (left)	390.0 cm³ (13.19 US oz, 13.73 Imp.oz)
Quantity (right)	390.0 cm³ (13.19 US oz, 13.73 Imp.oz)
Level (left)	80 mm (3.1 in)
Level (right)	80 mm (3.1 in)
Spring preload	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Turn
Adjustment value (Soft)	0
Adjustment value (STD)	6
Adjustment value (Hard)	15
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	14
Adjustment value from the start position (STD)	7
Adjustment value from the start position (Hard)	1
Compression damping	
Adjusting system	Mechanical adjustable type
Unit for compression damping adjustment	Click
Adjustment value from the start position (Soft)	23
Adjustment value from the start position (STD)	14
Adjustment value from the start position (Hard)	1

Rear suspension

Type	Swingarm (link suspension)
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Wheel travel	120 mm (4.7 in)
Spring preload	
Adjusting system	Mechanical adjustable type
Adjustment value (Soft)	84.9 mm (3.34 in)
Adjustment value (STD)	89.9 mm (3.54 in)
Adjustment value (Hard)	92.9 mm (3.66 in)
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click

Adjustment value from the start position (Soft)	23
Adjustment value from the start position (STD)	12
Adjustment value from the start position (Hard)	1
Compression damping	
Adjusting system	Mechanical adjustable type
Fast compression damping	
Unit for adjustment	Turn
Adjustment value from the start position (Soft)	5.5
Adjustment value from the start position (STD)	3
Adjustment value from the start position (Hard)	0
Slow compression damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	18
Adjustment value from the start position (STD)	14
Adjustment value from the start position (Hard)	1

Drive chain

Size	525V11
Chain type	Sealed type
Number of links	114
Drive chain slack (Maintenance stand)	30.0–45.0 mm (1.18–1.77 in)
Drive chain slack (Sidestand)	30.0–45.0 mm (1.18–1.77 in)
Limit	50.0 mm (1.97 in)
15-link length limit	239.3 mm (9.42 in)

EAS20016
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Engine control unit	
Model/manufacturer	TBDFY7/DENSO
Ignition system	
Ignition system	TCI
Advancer type	Digital
Ignition timing (B.T.D.C.)	10.0 °/1300 r/min
Ignition coil	
Primary coil resistance	1.19–1.61 Ω
Secondary coil resistance	9.35–12.65 kΩ
Charging system	
Charging system	AC magneto
Standard output	14.0 V, 30.2 A at 5000 r/min
Standard output	14.0 V, 420 W at 5000 r/min
Stator coil resistance	0.120–0.180 Ω
Rectifier/regulator	
Regulator type	Three-phase
Regulated voltage (DC)	14.3–14.7 V
Rectifier capacity (DC)	35.0 A
Battery	
Model	YTZ7S
Voltage, capacity	12 V, 6.0 Ah (10 HR)
Bulb wattage	
Headlight	LED
Brake/tail light	LED
Front turn signal/position light	LED
Rear turn signal light	LED
Auxiliary light	LED
License plate light	5.0 W
Meter lighting	LED
Indicator light	
Neutral indicator light	LED
High beam indicator light	LED
Oil level warning light	LED
Turn signal indicator light	LED
Fuel level warning light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
ABS warning light	LED
Shift timing indicator light	LED
Traction control system indicator/warning light	LED

Starter motor	
Power output	0.60 kW
Armature coil resistance	0.0012–0.0022 Ω
Brush overall length	10.0 mm (0.39 in)
Limit	3.50 mm (0.14 in)
Brush spring force	7.16–9.52 N (730–971 gf, 25.77–34.27 oz)
Commutator diameter	28.0 mm (1.10 in)
Limit	27.0 mm (1.06 in)
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 sender unit	
Sender unit resistance (empty)	137.0–185.0 Ω
Fuel injection sensor	
Crankshaft position sensor resistance	248–372 Ω
Cylinder identification sensor output voltage (ON)	4.8 V or more
Cylinder identification sensor output voltage (OFF)	0.8 V or less
Intake air temperature sensor resistance	5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance	289–391 Ω at 80 °C (289–391 Ω at 176 °F)
Coolant temperature sensor resistance	2320–2590 Ω at 20 °C (2320–2590 Ω at 68 °F)
Lean angle sensor output voltage	
Operating angle	65 °
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	50.0 A
Headlight fuse	7.5 A
Signaling system fuse	10.0 A
Ignition fuse	15.0 A
Radiator fan motor fuse	15.0 A × 2
Turn signal light fuse	7.5 A
ABS ECU fuse	7.5 A
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A
ABS solenoid fuse	10.0 A
Terminal fuse 1	2.0 A
Backup fuse	7.5 A
Electronic throttle valve fuse	7.5 A

EAS20017
TIGHTENING TORQUES

EAS30016
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	4	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Cylinder head cover bolt	M6	6	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Oil filter cartridge	M20	1	17 N·m (1.7 kgf·m, 13 lb·ft)	
Oil filter cartridge bolt	M20	1	70 N·m (7.0 kgf·m, 52 lb·ft)	E
Engine oil drain bolt	M14	1	43 N·m (4.3 kgf·m, 32 lb·ft)	
Coolant drain bolt (water pump)	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Muffler bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Muffler clamp bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Exhaust pipe assembly nut	M8	8	20 N·m (2.0 kgf·m, 15 lb·ft)	
Exhaust pipe assembly bolt	M8	2	20 N·m (2.0 kgf·m, 15 lb·ft)	
Exhaust pipe assembly bracket bolt (left upper side and right side)	M8	2	30 N·m (3.0 kgf·m, 22 lb·ft)	LT
Exhaust pipe assembly bracket bolt (left lower side)	M8	1	34 N·m (3.4 kgf·m, 25 lb·ft)	
Generator cover bolt	M6	9	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Generator rotor bolt	M12	1	70 N·m (7.0 kgf·m, 52 lb·ft)	E
Clutch cover bolt	M6	7	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Clutch cover bolt	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Drive sprocket nut	M20	1	85 N·m (8.5 kgf·m, 63 lb·ft)	Stake LT

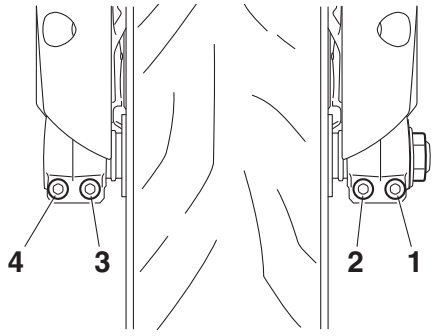
EAS30017
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle nut	M24	1	115 N·m (11.5 kgf·m, 85 lb·ft)	LS
Front wheel axle pinch bolt	M8	4	21 N·m (2.1 kgf·m, 15 lb·ft)	See TIP.
Front brake caliper bolt	M10	4	35 N·m (3.5 kgf·m, 26 lb·ft)	
Brake caliper bleed screw (front and rear)	M8	3	5 N·m (0.5 kgf·m, 3.7 lb·ft)	
Rear wheel axle nut	M24	1	110 N·m (11 kgf·m, 81 lb·ft)	LS
Rear brake caliper bolt (M8)	M8	1	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Rear brake caliper bolt (M12)	M12	1	27 N·m (2.7 kgf·m, 20 lb·ft)	S
Handlebar bolt	M6	2	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Handlebar pinch bolt	M8	2	32 N·m (3.2 kgf·m, 24 lb·ft)	
Upper bracket pinch bolt	M8	2	26 N·m (2.6 kgf·m, 19 lb·ft)	
Lower bracket pinch bolt	M8	4	23 N·m (2.3 kgf·m, 17 lb·ft)	See TIP.
Steering stem nut	M28	1	115 N·m (11.5 kgf·m, 85 lb·ft)	
Lower ring nut (initial tightening torque)	M30	1	52 N·m (5.2 kgf·m, 38 lb·ft)	See TIP.
Lower ring nut (final tightening torque)	M30	1	14 N·m (1.4 kgf·m, 10 lb·ft)	See TIP.

TIP

Front wheel axle pinch bolt

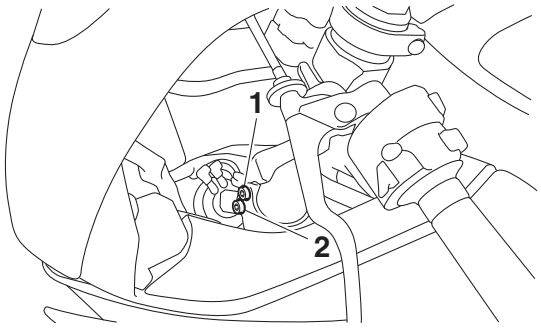
1. Tighten the pinch bolt "2", pinch bolt "1", and pinch bolt "2" to 21 N·m (2.1 kgf·m, 15 lb·ft) in this order.
2. Check that the right end of the front axle is flush with the front fork. If necessary, manually push the front axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
3. Tighten the pinch bolt "4", pinch bolt "3", and pinch bolt "4" to 21 N·m (2.1 kgf·m, 15 lb·ft) in this order.



TIP

Lower bracket pinch bolt

Tighten each bolt to 23 N·m (2.3 kgf·m, 17 lb·ft) in the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1" → pinch bolt "2".



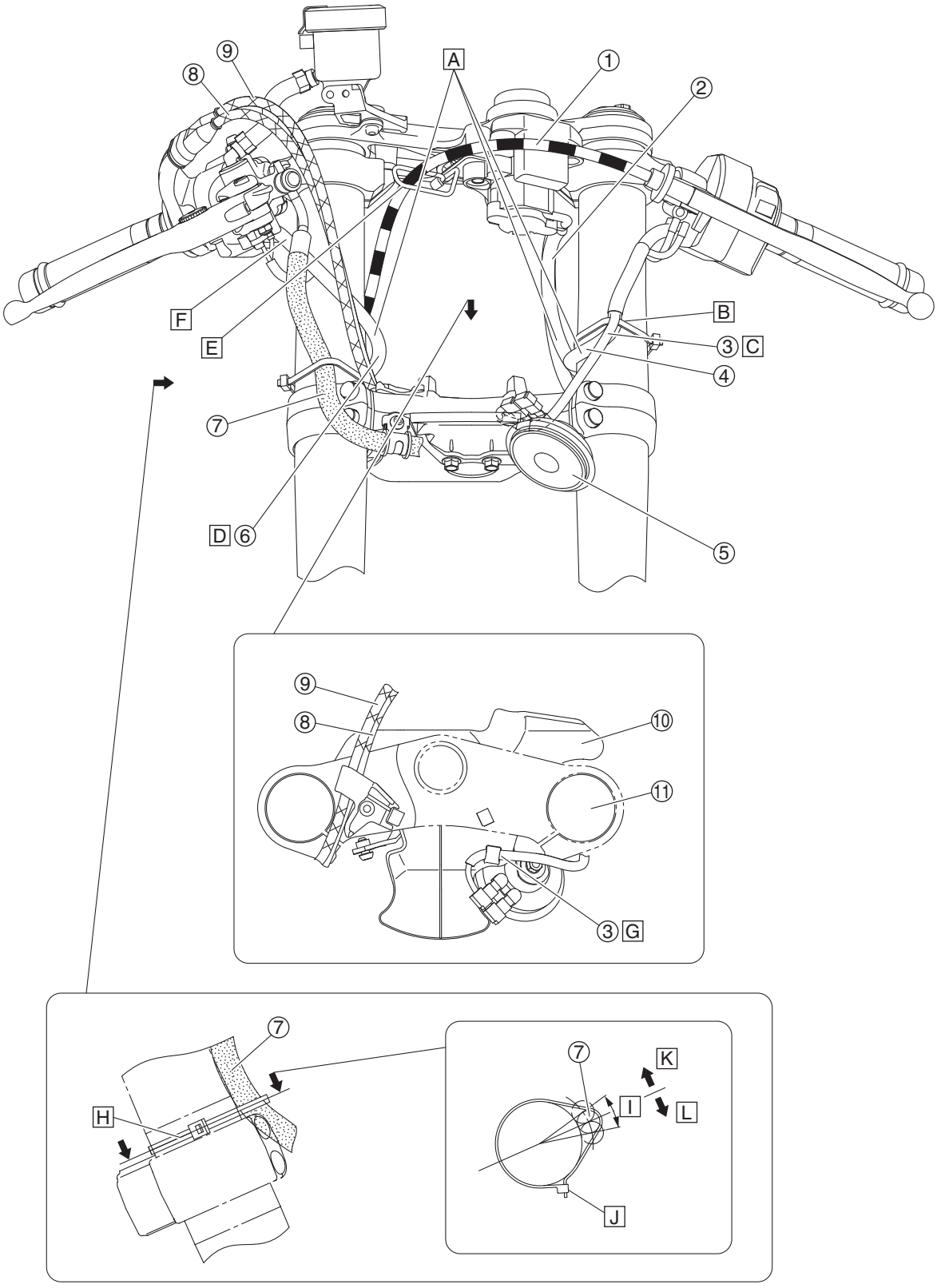
TIP

Lower ring nut

1. Tighten the ring nut to 52 N·m (5.2 kgf·m, 38 lb·ft) with a torque wrench, then loosen the lower ring nut completely.
2. Tighten the lower ring nut to 14 N·m (1.4 kgf·m, 10 lb·ft).

EAS20021
CABLE ROUTING

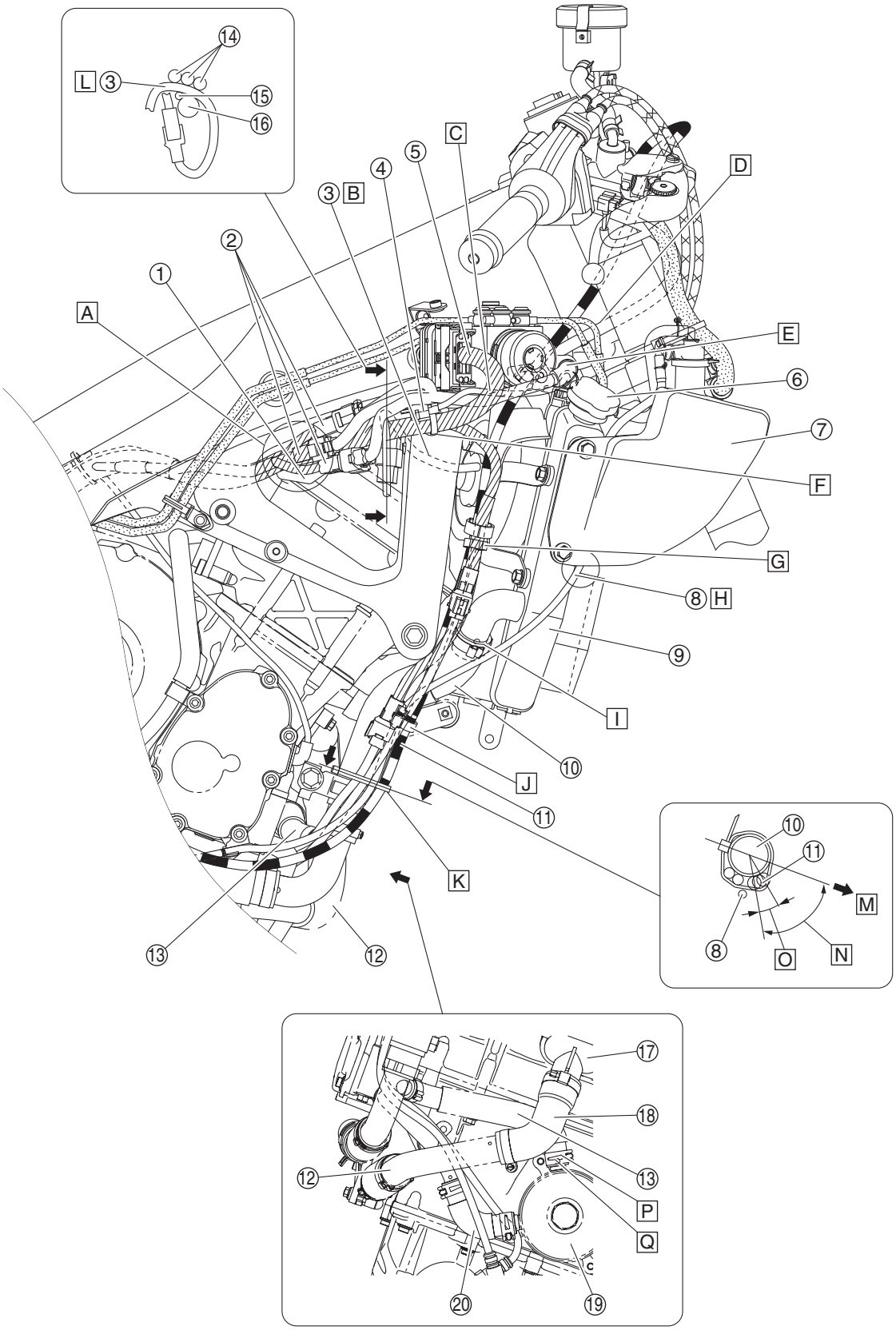
Handlebar (front view)



1. Clutch cable
2. Main switch lead
3. Horn lead
4. Handlebar switch lead (left)
5. Horn
6. Handlebar switch lead (right)
7. Brake hose (front brake master cylinder to hydraulic unit)
8. Throttle cable (decelerator cable)
9. Throttle cable (accelerator cable)
10. Lower bracket cover
11. Front fork

A. Route the left and right handlebar switch leads and main switch lead to the inside of the front fork.
B. Fasten the left handlebar switch lead in front of the front fork with a plastic locking tie. Point the end of the plastic locking tie outward and cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
C. Do not fasten the horn lead with the plastic locking tie.
D. Route the right handlebar switch lead to the rear of the throttle cables and under the clutch cable.
E. Route the clutch cable through the guide.
F. Route the right handlebar switch lead to the rear of the brake hose (front brake master cylinder to hydraulic unit).
G. Route the horn lead through the guide on the lower bracket cover. Align the blue tape on the horn lead with the guide.
H. Make sure that the plastic locking tie contacts the lower bracket.
I. Fasten the brake hose (front brake master cylinder to hydraulic unit) with a plastic locking tie, making sure that the brake hose is positioned as shown in the illustration.
J. Point the end of the plastic locking tie outward and cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
K. Inward
L. Outward

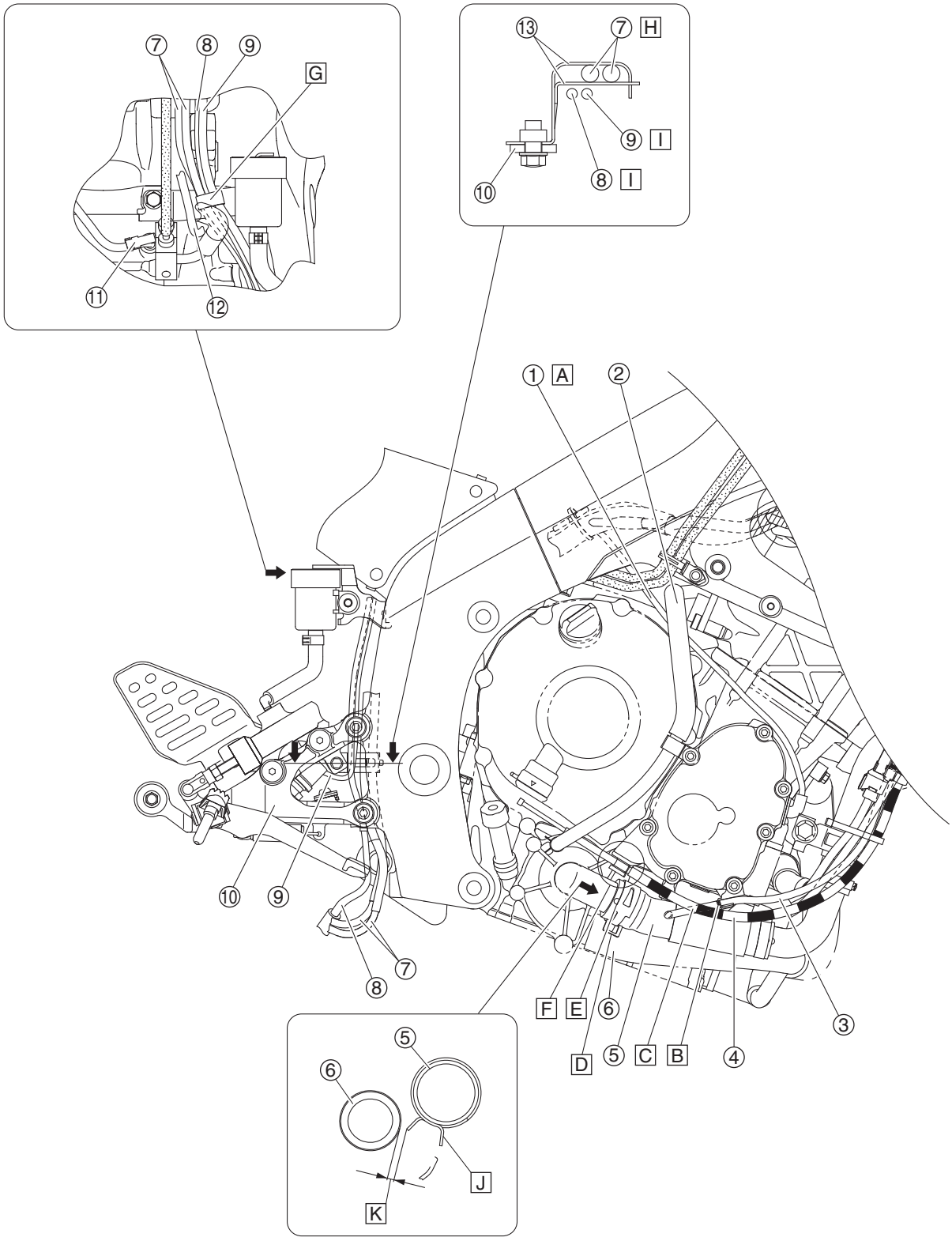
Clutch cable (right side view)



1. Heat protector
2. Handlebar switch coupler (right)
3. Radiator fan motor lead (right)
4. Front wheel sensor coupler
5. ABS ECU lead
6. Radiator cap
7. Coolant reservoir
8. Coolant reservoir breather hose
9. Radiator
10. Radiator outlet hose
11. Clutch cable
12. Water pump outlet pipe
13. Oil cooler outlet hose
14. Handlebar switch lead (right)
15. Front wheel sensor lead
16. Wire harness
17. Water jacket joint
18. Water jacket joint inlet hose
19. Oil cooler
20. Oil cooler inlet hose

A. Route the leads over the heat protector.
B. Route the right radiator fan motor lead to the inside of the frame.
C. Route the right handlebar switch lead and front wheel sensor lead to the inside of the ABS ECU lead.
D. Route the right handlebar switch lead to the inside of the brake hoses and under the clutch cable.
E. Route the right handlebar switch lead over the radiator cap.
F. Insert the projection on the wire harness holder completely into the hole in the hydraulic unit bracket.
G. Fasten the clutch cable with the holder. Align the bottom of the positioning guide on the clutch cable with the top of the holder.
H. Route the coolant reservoir breather hose between the radiator and the coolant reservoir and to the outside of the damper attached to the radiator.
I. Align the paint mark on the radiator outlet hose with the projection on the radiator pipe. Install the radiator outlet hose onto the radiator pipe until the end of the hose contacts the projection on the pipe.
J. Cross the clutch cable and coolant reservoir breather hose, and then fasten them with the holder. Align the holder with the lower edge of the white paint mark on the coolant reservoir breather hose. Face the holder opening to the inward.
K. Fasten the clutch cable to the radiator outlet hose with the plastic band. Make sure that the plastic band contacts the top of the radiator outlet hose holder. Point the end of the plastic band inward, angled rearward.
L. Route the right radiator fan motor lead over and to the outside of the wire harness as shown in the illustration, and then connect the right radiator fan motor coupler so that the coupler is positioned to the inside of the harness.
M. Forward
N. 60°
O. Position the clutch cable within the 20° angle shown in the illustration.
P. Point the ends of the hose clamp to the left.
Q. Face the yellow paint mark on the oil cooler outlet hose forward.

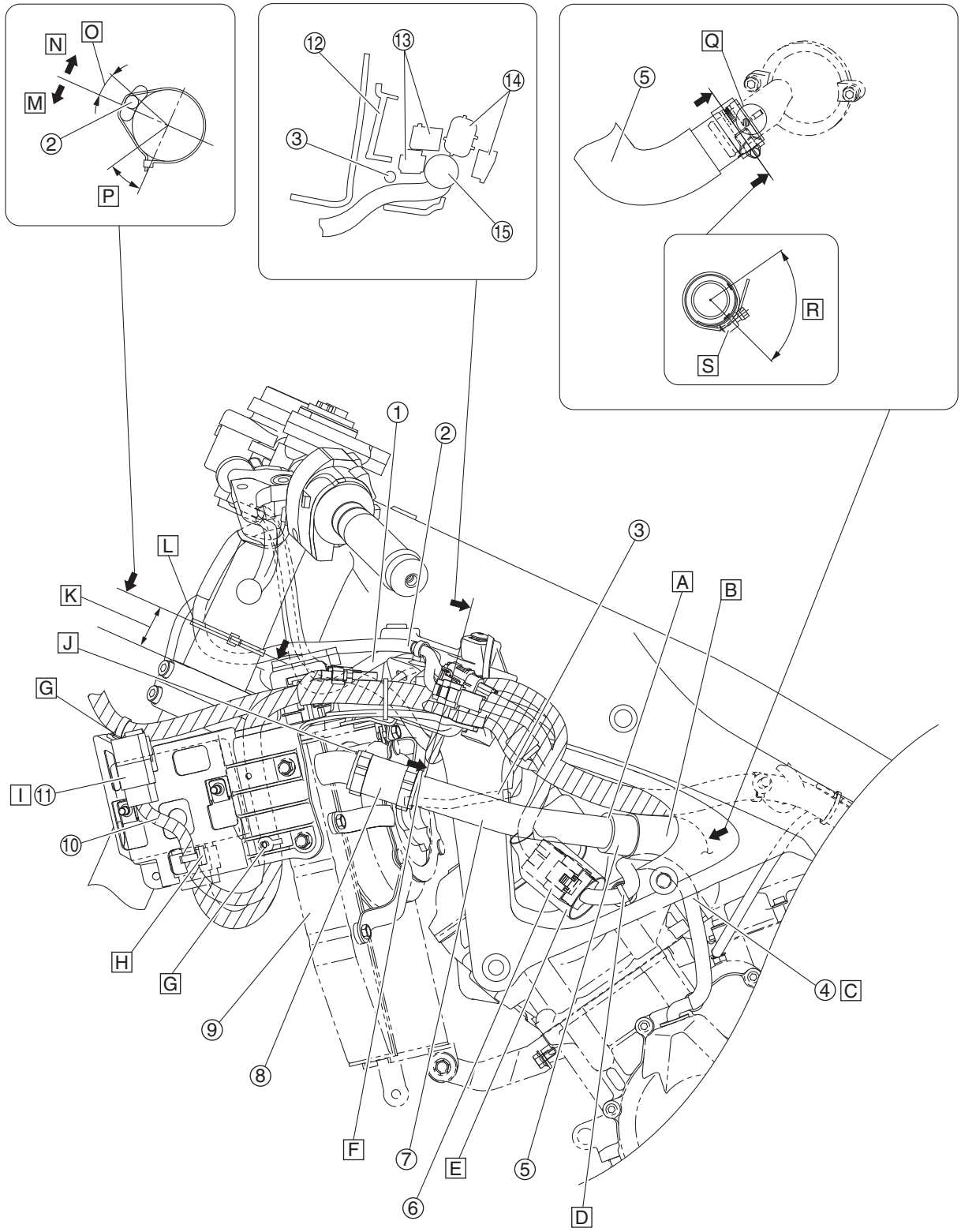
Engine (right side view)



1. Crankshaft position sensor lead
2. Water pump breather hose
3. Coolant reservoir breather hose
4. Clutch cable
5. Water pump inlet hose
6. Water pump outlet hose
7. EXUP cable
8. O_2 sensor lead
9. Rear brake light switch lead
10. Footrest bracket
11. Neutral switch connector
12. Rear wheel sensor lead
13. EXUP cable holder

A. Route the crankshaft position sensor lead to the inside of the water pump breather hose.
B. Fasten the coolant reservoir breather hose with the holder, making sure that the white paint mark on the hose is positioned to the rear of the holder.
C. Route the coolant reservoir breather hose to the inside of the clutch cable.
D. Point the ends of the hose clamp downward.
E. Align the paint mark on the water pump inlet hose with the projection on the hose fitting of the water pump. Install the water pump inlet hose onto the hose fitting of the water pump until the end of the hose contacts the projection on the hose fitting.
F. Route the clutch cable through the guide on the engine.
G. Fasten the EXUP cables, rear brake light switch lead, and O_2 sensor lead with the holder. Do not fasten the rear wheel sensor lead with the holder.
H. Temporally install the EXUP cables by aligning the paint marks on the cables with the upper edge of the EXUP cable holder. The paint marks may be positioned anywhere after the EXUP cable holder is installed to the footrest bracket.
I. The leads may be routed in any order.
J. Point the ends of the hose clamp downward as shown in the illustration.
K. 3–12 mm (0.12–0.47 in)

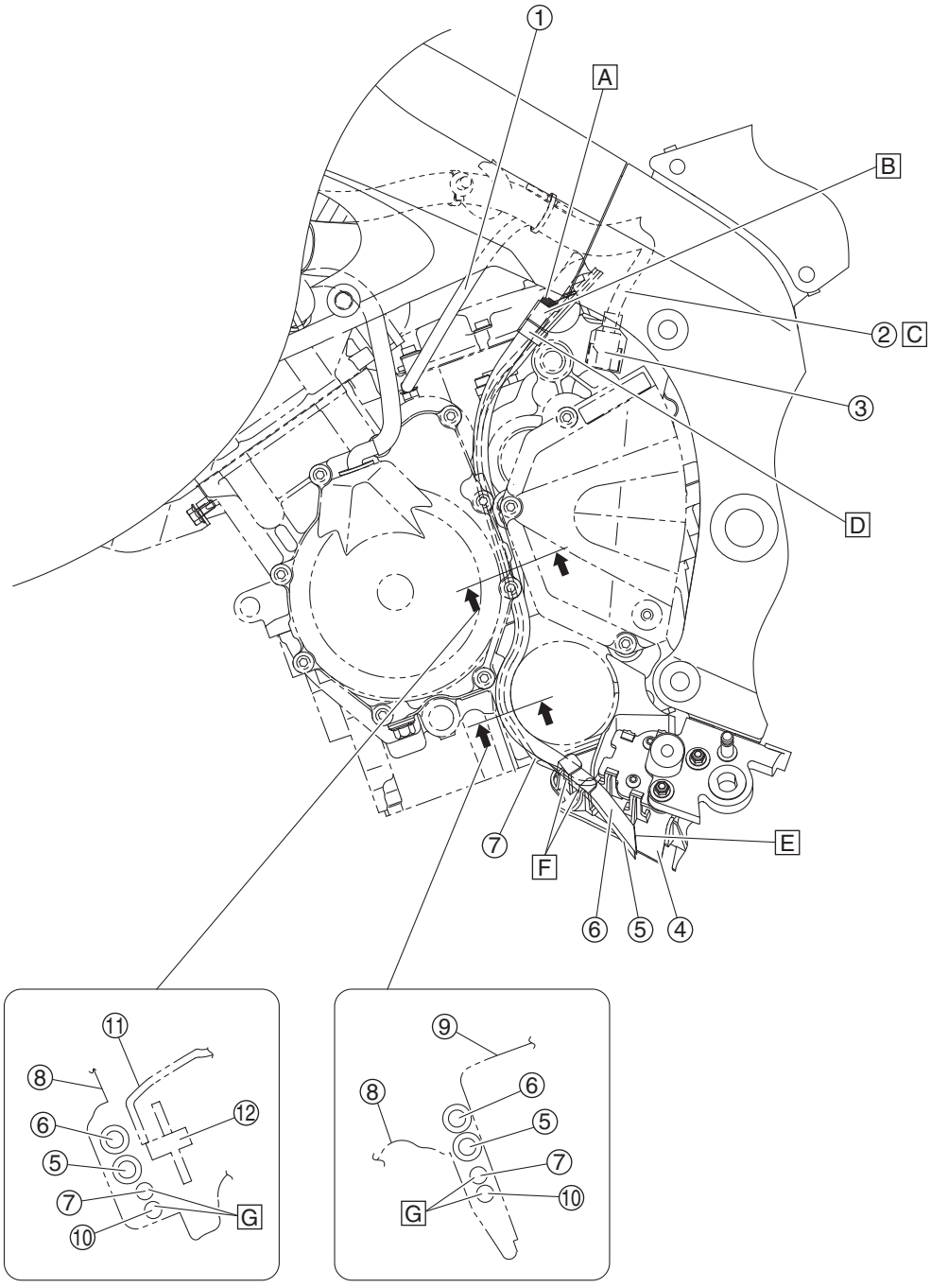
Rectifier/regulator bracket and coupler holder (left side view)



1. Main switch lead
2. Handlebar switch lead (left)
3. Radiator fan motor lead (left)
4. AC magneto lead
5. Thermostat outlet hose
6. AC magneto coupler
7. Radiator inlet pipe
8. Radiator inlet hose
9. Radiator
10. Radiator fan motor relay lead
11. Radiator fan motor relay
12. Coupler holder
13. Main switch coupler
14. Handlebar switch coupler (left)
15. Wire harness

A. Align the white paint mark on the thermostat outlet hose with the black paint mark on the radiator inlet pipe.
B. Route the thermostat outlet hose to the inside of the frame.
C. Route the AC magneto lead between the frame and the throttle body and under the thermostat outlet hose.
D. Secure the plastic locking tie by inserting the projection on the tie into the hole in the frame, and then fasten the AC magneto lead at the blue tape with the tie. Point the end of the plastic locking tie downward, and then cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
E. After connecting the AC magneto coupler, cover the coupler with the coupler cover.
F. Align the paint mark on the radiator inlet hose with the paint mark on the radiator inlet pipe.
G. Secure the plastic locking tie by inserting the projection on the tie into the hole in the rectifier/regulator bracket.
H. Fasten the radiator fan motor relay lead to the rectifier/regulator bracket with a plastic locking tie.
I. Install the radiator fan motor relay completely onto the tab on the rectifier/regulator bracket.
J. Align the paint mark on the radiator inlet hose with the projection on the radiator pipe. Install the radiator inlet hose onto the radiator pipe until the end of the hose contacts the projection on the pipe.
K. 45–55 mm (1.77–2.17 in)
L. Fasten the left handlebar switch lead with the plastic locking tie at the location shown in the illustration.
M. Outward
N. Inward
O. Fasten the left handlebar switch lead with a plastic locking tie, making sure that the lead is positioned as shown in the illustration.
P. Position the end of the plastic locking tie within the 30° range shown in the illustration.
Q. Align the yellow paint mark on the thermostat outlet hose with the projection on the thermostat cover. Install the thermostat outlet hose onto the thermostat cover until the end of the hose contacts the projection on the cover.
R. 80°
S. Align the edge of the screw clamp fastener with the white paint mark on the thermostat outlet hose. Make sure that the white paint mark does not protrude past the screw clamp fastener and the fastener is not positioned within the 80° range shown in the illustration.

Engine (left side view)



1. Starter motor lead
2. Gear position sensor lead
3. Gear position sensor coupler
4. Sidestand bracket cover
5. Fuel tank overflow hose (hose joint to atmosphere)
6. Fuel tank breather hose (hose joint to atmosphere) (except for California)
7. Sidestand switch lead
8. Crankcase
9. Oil filter cartridge
10. Oil level switch lead
11. Drive sprocket cover
12. Drive chain guide

A. Align the lower edge of the paint marks on the fuel tank overflow hose (hose joint to atmosphere) and fuel tank breather hose (hose joint to atmosphere) with the upper edge of the holder. (except for California)
Align the lower edge of the paint mark on the fuel tank overflow hose (hose joint to atmosphere) with the upper edge of the holder. (for California only)

B. Fasten the fuel tank overflow hose (hose joint to atmosphere) and fuel tank breather hose (hose joint to atmosphere) with the holder. Route the fuel tank overflow hose (hose joint to atmosphere) (white paint mark) to the inside of the fuel tank breather hose (hose joint to atmosphere) (blue paint mark). (except for California)
Fasten the fuel tank overflow hose (hose joint to atmosphere) with the holder. (for California only)

C. Route the gear position sensor lead to the outside of the other leads.

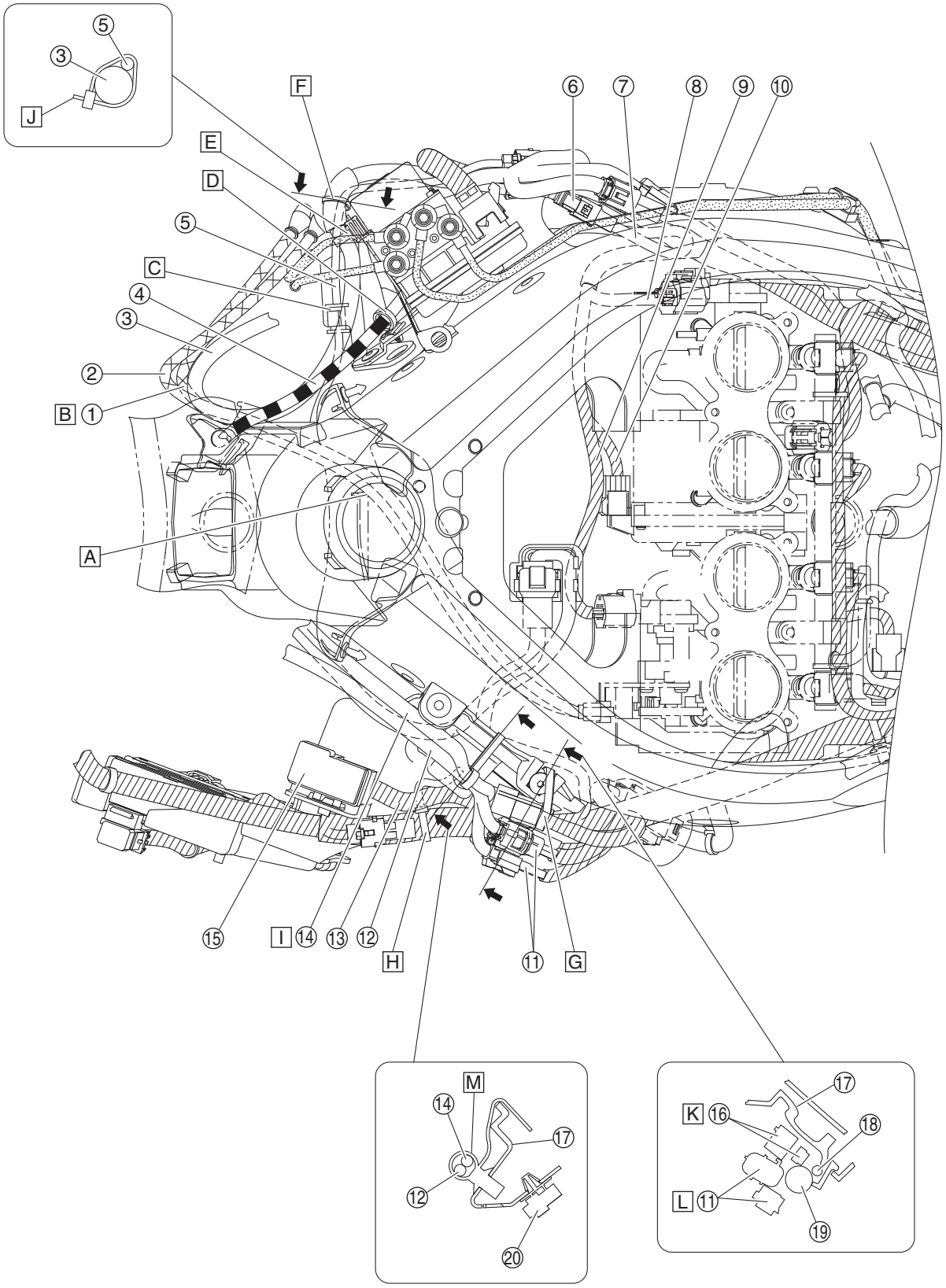
D. Fasten the fuel tank breather hose (hose joint to atmosphere), sidestand switch lead, and oil level switch lead with the holder. Make sure that the holder contacts the bottom of the other holder. Close the holder until two clicks or more are heard. (Except for California)
Fasten the fuel tank overflow hose (hose joint to atmosphere), sidestand switch lead, and oil level switch lead with the holder. Make sure that the holder contacts the bottom of the other holder. Close the holder until two clicks or more are heard. (for California only)

E. The cut angled ends of the fuel tank overflow hose (hose joint atmosphere) and fuel tank breather hose (hose joint to atmosphere) (except for California) may be pointing in any direction.

F. Route the fuel tank overflow hose (hose joint to atmosphere) and fuel tank breather hose (hose joint to atmosphere) (except for California) through the guide on the sidestand bracket cover. Route the sidestand switch lead from between the guides to the inside of the hose.

G. The leads may be routed in any order.

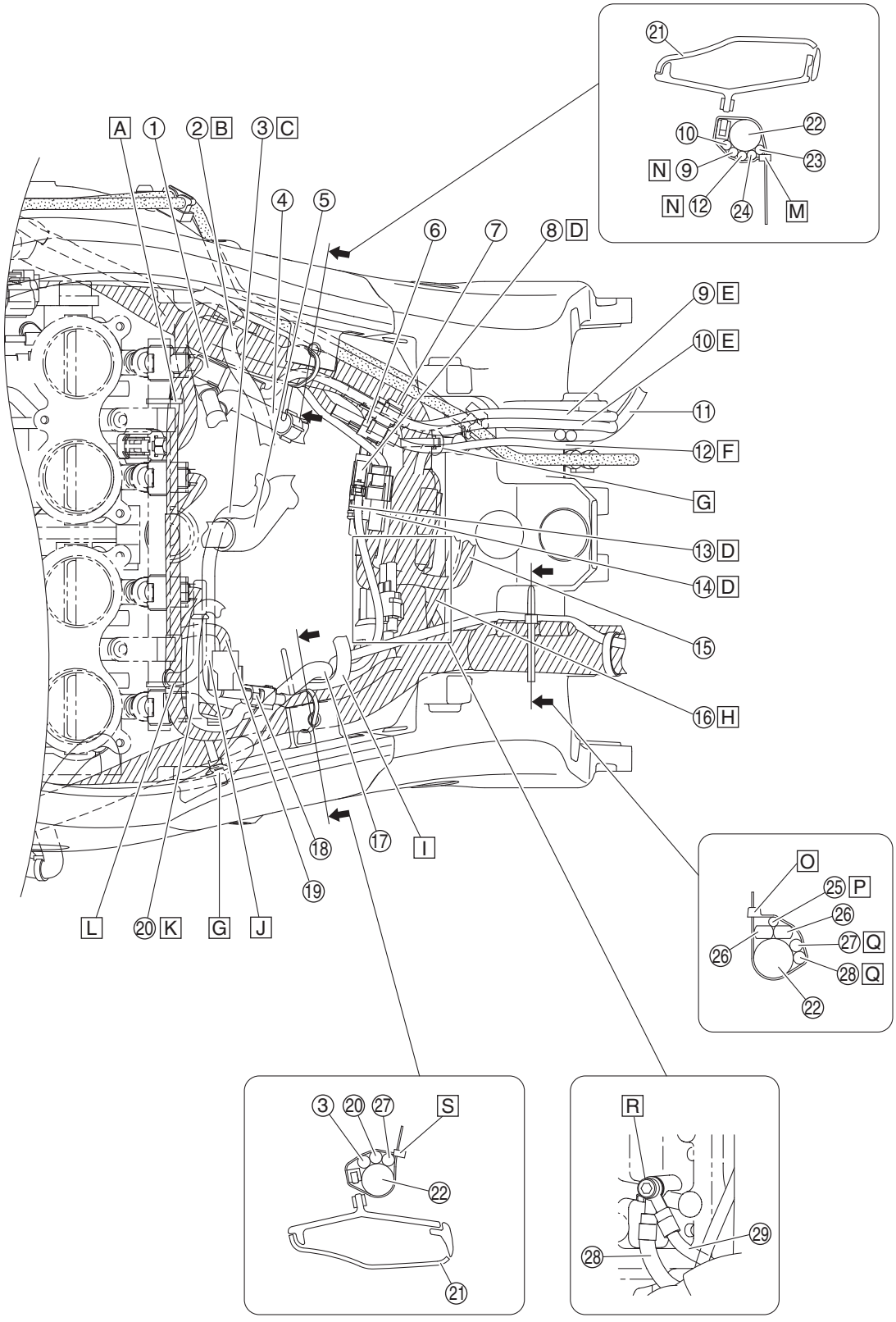
Frame (front top view)



1. Throttle cable (decelerator cable)
2. Throttle cable (accelerator cable)
3. Handlebar switch lead (right)
4. Clutch cable
5. Front wheel sensor lead
6. Radiator fan motor coupler (right)
7. Radiator fan motor lead (right)
8. Throttle position sensor lead
9. Accelerator position sensor lead
10. Throttle servo motor lead
11. Handlebar switch coupler (left)
12. Handlebar switch lead (left)
13. Fuse box 2 lead
14. Main switch lead
15. Fuse box 2
16. Main switch coupler
17. Coupler holder
18. Radiator fan motor lead (left)
19. Wire harness
20. Radiator fan motor coupler (left)

A. Route the throttle cables to the right of the projection on the plate on top of the radiator, making sure not to twist them.
B. Make sure that the throttle cable (decelerator cable) is not twisted or crossed.
C. Fasten the grommet on the front wheel sensor lead with the holder on the radiator cover.
D. Secure the holder by inserting the projection on the holder into the hole in the radiator cover, and then fasten the clutch cable with the holder.
E. Fasten the right handlebar switch lead to the hydraulic unit assembly bracket with a plastic locking tie.
F. Fasten the right handlebar switch lead and front wheel sensor lead with a plastic locking tie. Position the plastic locking tie at the middle of the protective tube on the right handlebar switch lead.
G. Secure the plastic band by inserting the projection on the band into the hole in the coupler holder, and then fasten the wire harness with the band. Point the end of the plastic band inward and insert it between the coupler holder and the frame.
H. Pass a plastic locking tie through the hole in the rectifier/regulator bracket, and then fasten the wire harness at the white tape with the tie. Point the end of the plastic locking tie inward under the fuse box 2 lead and insert it into the hole in the coupler holder. Route the wire harness above the rectifier/regulator bracket.
I. Route the main switch lead to the inside of the left handlebar switch lead. Make sure that the leads do not cross.
J. Point the end of the plastic locking tie outward and cut off the excess end of the tie to 1–5 mm (0.04–0.20 in).
K. Fit the main switch couplers between the left handlebar switch couplers and the coupler holder.
L. The couplers may be positioned in any order.
M. Fasten the main switch lead and left handlebar switch lead at the blue tape on each lead with the plastic band. Route the main switch lead to the inside of the left handlebar switch lead. Point the end of the plastic band inward and insert it between the coupler holder and the frame.

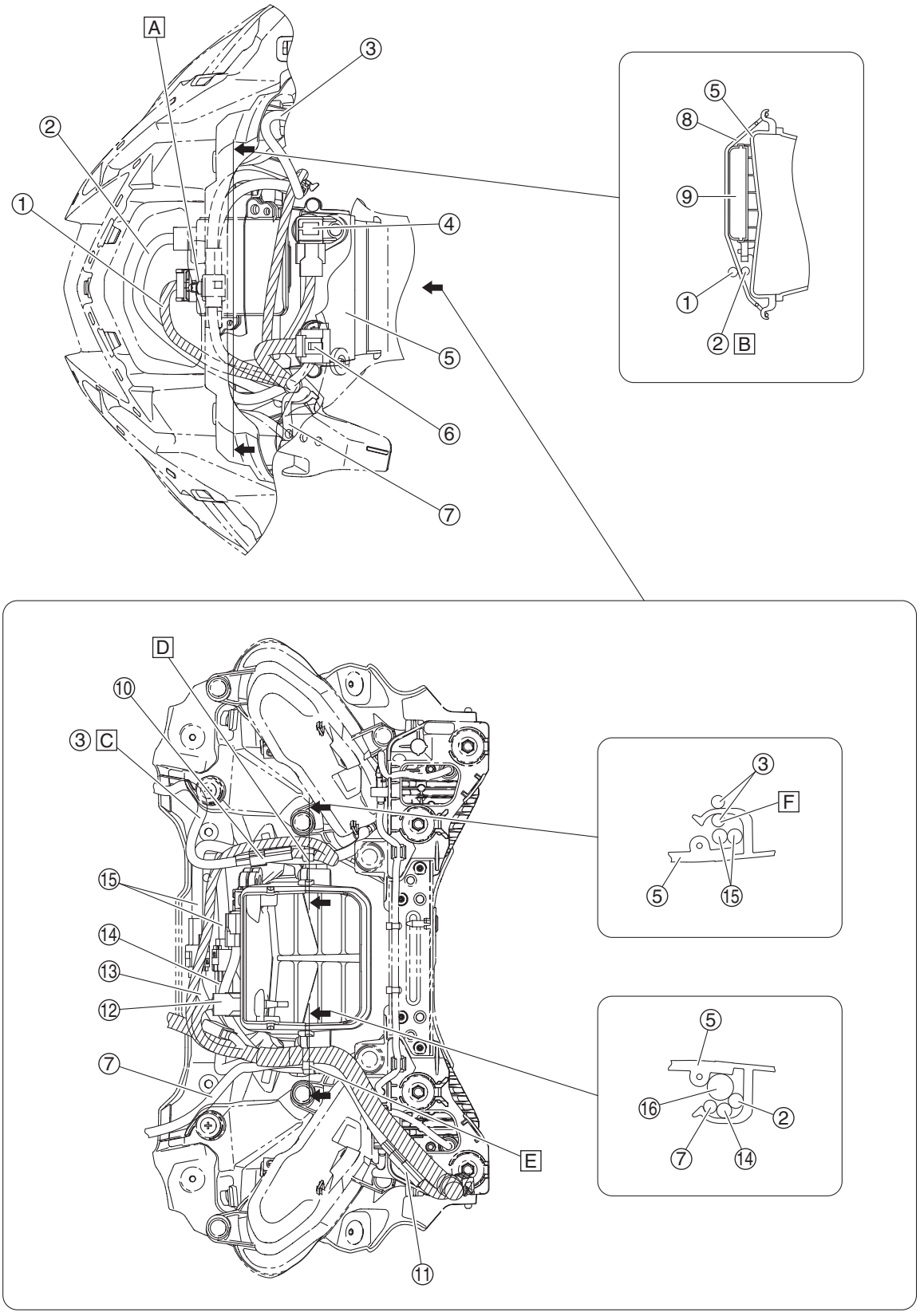
Frame (center top view)



1. O_2 sensor coupler
2. Fuel tank breather hose (hose joint to atmosphere) (except for California)
   Fuel tank breather hose (hose joint to canister) (for California only)
3. Intake funnel servo motor lead
4. Fuel hose
5. Crankcase breather hose
6. Rear wheel sensor coupler
7. Rear brake light switch coupler (black)
8. Oil level switch coupler
9. Rear brake light switch lead
10. O_2 sensor lead
11. EXUP cable
12. Rear wheel sensor lead
13. Sub-wire harness coupler (secondary injector)
14. Crankshaft position sensor coupler
15. Fuel pump lead
16. Neutral switch lead
17. Fuel tank overflow hose (hose joint to atmosphere)
18. Intake funnel servo motor coupler
19. Intake air pressure sensor lead
20. Sub-wire harness (secondary injector)
21. Frame
22. Wire harness
23. Crankshaft position sensor lead
24. Sub-wire harness (ignition)
25. Sidestand switch lead
26. Wire harness end cap
27. Starter motor lead
28. Battery negative lead
29. Engine ground lead

A. Fasten the wire harness at the white tape to the fuel rail with the plastic band. Do not cut off the excess end of the plastic band. Point the end of the plastic band downward.
B. Route the fuel tank breather hose (hose joint to atmosphere) under the fuel hose. (except for California)
   Route the fuel tank breather hose (hose joint to canister) under the fuel hose. (for California only)
C. Route the intake funnel servo motor lead to the front of the crankcase breather hose.
D. Position the coupler and lead to the front and below the wire harness.
E. Route the lead to the outside of the EXUP cables.
F. Route the rear wheel sensor lead to the front of the EXUP cables.
G. Secure the plastic locking tie by inserting the projection on the tie into the hole in the frame, and then fasten the wire harness with the tie.
H. Route the neutral switch lead to the rear of the wire harness and between the crankcase and the frame.
I. Route the fuel tank breather hose (hose joint to atmosphere) to the rear of the fuel tank overflow hose (hose joint to atmosphere). (except for California)
J. Route the intake funnel servo motor lead to the front of the intake air pressure sensor lead.
K. Route the secondary injector sub-wire harness to the outside of the intake air pressure sensor and under the fuel tank overflow hose (hose joint to atmosphere).
L. Fasten the wire harness to the fuel rail with the plastic band. Do not cut off the excess end of the plastic band. Point the end of the plastic band downward.
M. Route the leads below the stay on the frame. The leads may be routed in any order. Pass the plastic locking tie through the hole in the stay on the frame from the top. Point the end of the plastic locking tie inward.
N. Route the rear brake light switch lead and rear wheel sensor lead to the inside of the wire harness.
O. Point the end of the plastic locking tie inward. Do not cut off the excess end of the plastic locking tie.
P. Route the sidestand switch lead between the wire harness end caps.
Q. Route the starter motor lead and battery negative lead under the wire harness. The leads may be routed in any order.
R. Make sure that the engine ground lead terminal and negative battery lead terminal contact the stopper on the crankcase as shown in the illustration. Either terminal may be installed on top. Install the terminals so that the crimped section of each terminal that secures the lead is facing upward.
S. Route the leads below the stay on the frame. The leads may be routed in any order. Pass the plastic locking tie through the hole in the stay on the frame from the top. Point the end of the plastic locking tie inward. Align the white tape on the wire harness with the plastic locking tie.

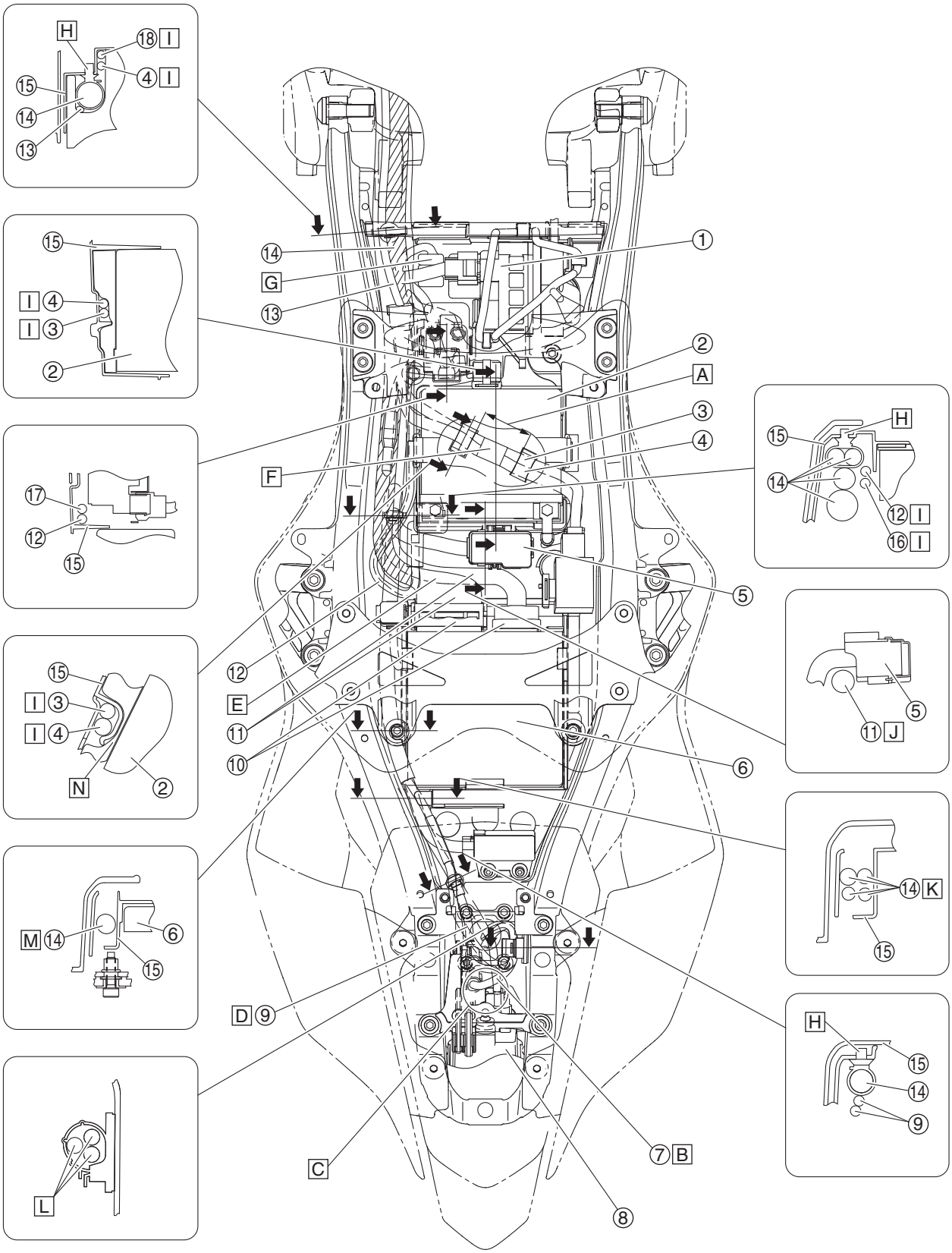
Headlight (top view)



1. Headlight assembly lead
2. Headlight control unit lead
3. Front turn signal/position light lead (right)
4. Atmospheric pressure sensor
5. Air duct
6. Meter assembly coupler
7. Front turn signal/position light lead (left)
8. Band
9. Headlight control unit
10. Front turn signal/position light coupler (right)
11. Front turn signal/position light coupler (left)
12. Intake air temperature sensor coupler
13. Auxiliary light lead (right)
14. Auxiliary light lead (left)
15. Sub-wire harness (auxiliary light)
16. Wire harness

A. Insert the projection on the left auxiliary light coupler into the lower hole in the headlight cover. Insert the projection on the right auxiliary light coupler into the upper hole in the headlight cover. When connecting the right auxiliary light coupler, make sure that the leads for both sections of the coupler have white tape.
B. Route the headlight control unit lead between the band and the air duct, and to the outside of the projection on the air duct.
C. After connecting the coupler, position the slack in the right front turn signal/position light lead above the air duct.
D. After connecting the right front turn signal/position light coupler, fit the loop in the wire harness onto the holder.
E. Align the lower edge of the blue tape on the wire harness with the upper edge of the holder on the air duct.
F. Position the portion of the right front turn signal/position light lead with the coupler to the inside of the holder.

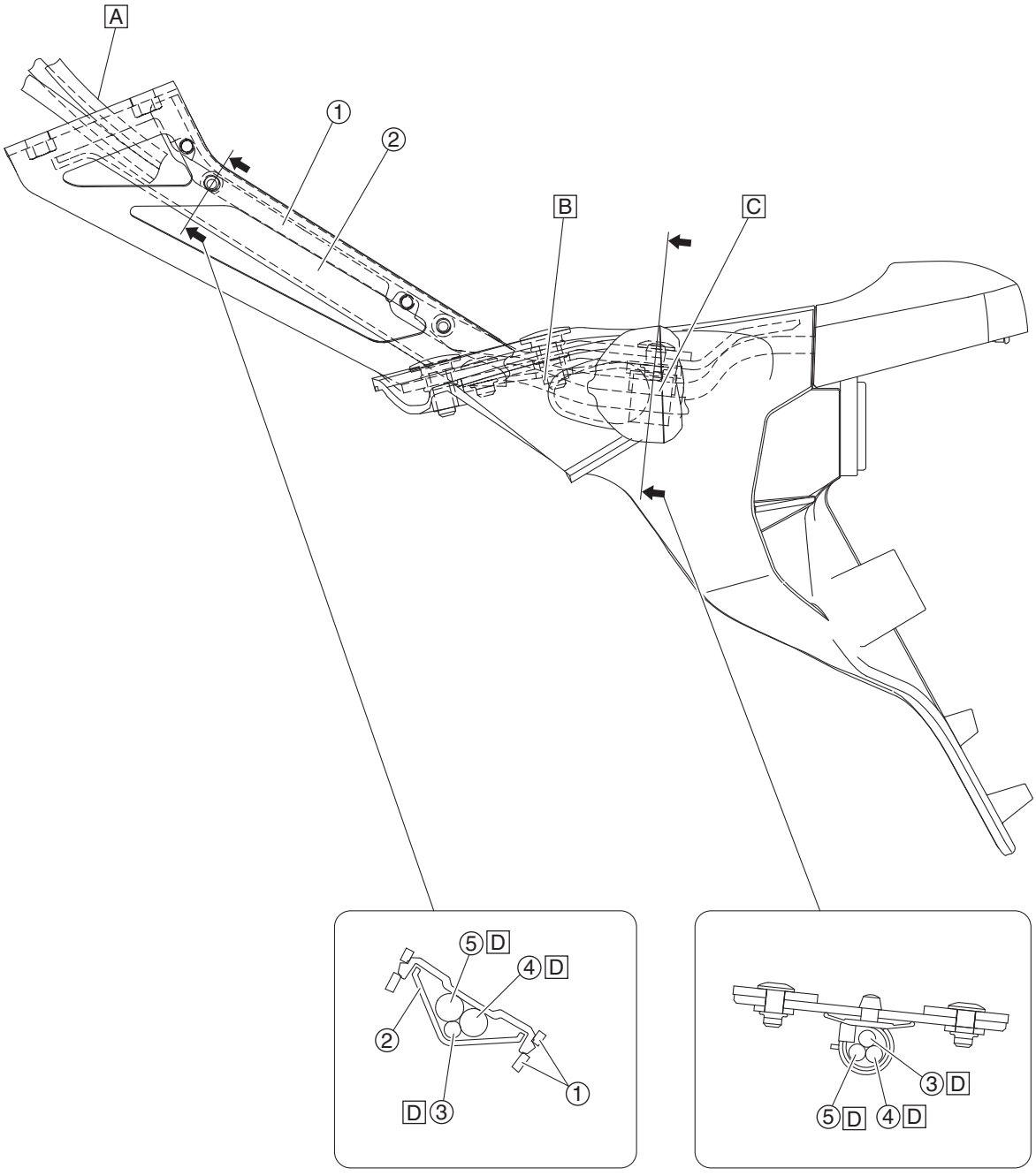
Rear fender (top view)



1. EXUP servo motor
2. Battery
3. Relay unit lead
4. Battery negative lead
5. Fuse box 1
6. ECU (Engine Control Unit)
7. Tail/brake light lead
8. Tail/brake light assembly
9. License plate light lead
10. ECU coupler
11. ECU lead
12. Battery positive lead
13. Sidestand switch lead
14. Wire harness
15. Battery box
16. Starter relay lead
17. Main fuse lead
18. Starter motor lead

A. Position the white tape on the battery negative lead and relay unit lead within the range shown in the illustration.
B. Route the tail/brake light lead over the license plate light lead and rear turn signal light leads.
C. Route the rear turn signal light lead to the front of the tail/brake light coupler.
D. Route the license plate light lead under the tail/brake light lead and rear turn signal light leads.
E. Route the ECU lead (small coupler) under the ECU lead (large coupler).
F. White tape
G. Position the joint coupler so that its lead is routed downward.
H. Insert the projection on the wire harness holder into the hole in the battery box.
I. The leads may be routed in any order.
J. Route the ECU lead (small coupler) under the fuse box 2.
K. Route the wire harness under the guide on the battery box.
L. Fasten the rear turn signal light leads and license plate light lead with the holder. The leads may be routed in any order.
M. Route the wire harness under the guide on the battery box.
N. Make sure that the battery negative lead and relay unit lead are not pinched between the battery and the holder on the battery box.

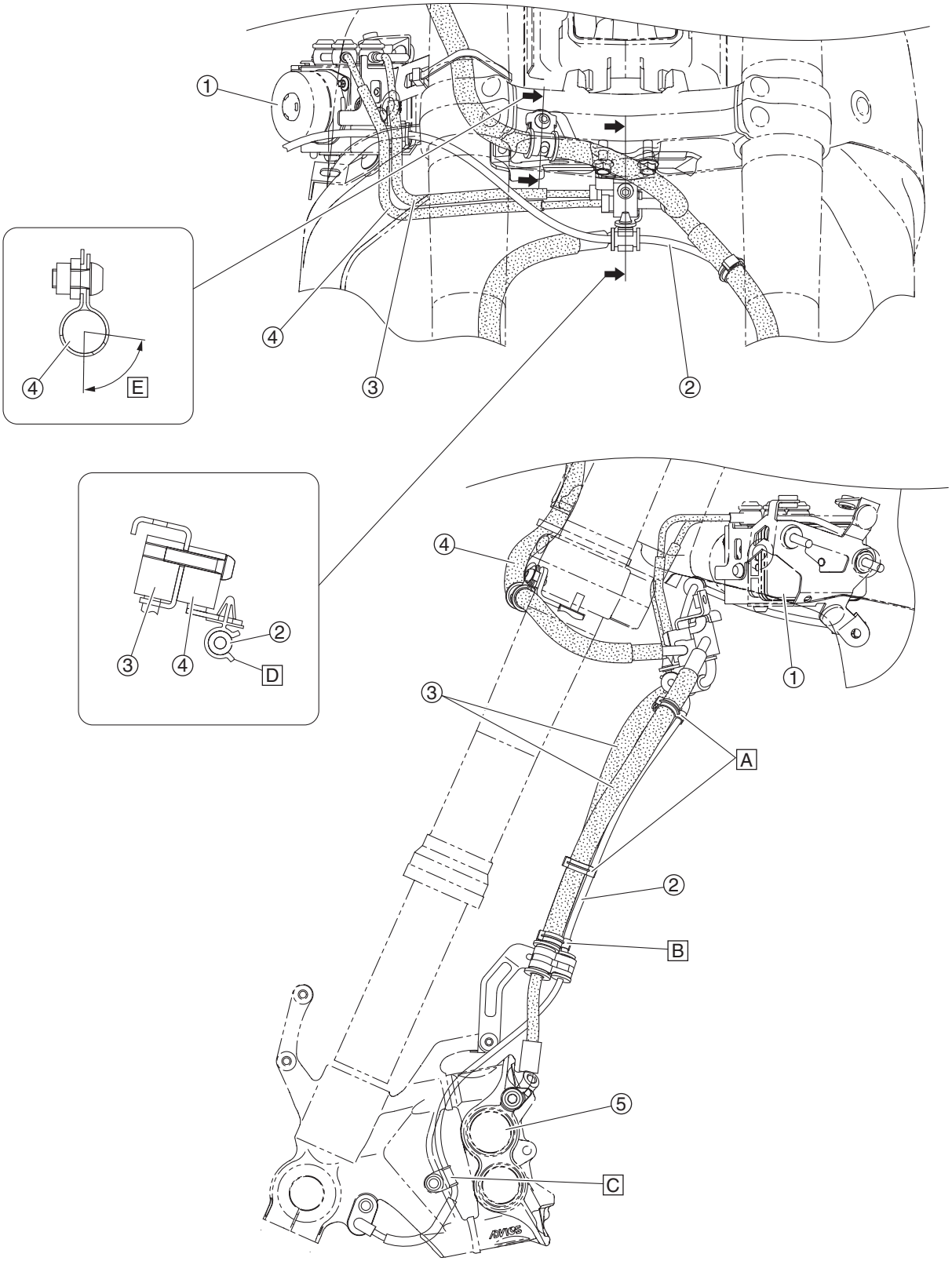
License plate light assembly (left side view)



1. License plate light bracket
2. License plate light lead cover
3. License plate light lead
4. Rear turn signal light lead (right)
5. Rear turn signal light lead (left)

A. Route the right rear turn signal light lead, left rear turn signal light lead, and license plate light lead through the hole in the license plate light bracket.
B. Make sure that there is no slack in the right rear turn signal light lead, left rear turn signal light lead, or license plate light lead.
C. Fasten the right rear turn signal light lead, left rear turn signal light lead, and license plate light lead with the holder.
D. The leads may be routed in any order.

Front brake hose (front and left side view)



1. Hydraulic unit
2. Front wheel sensor lead
3. Brake hose (hydraulic unit to front brake calipers)
4. Brake hose (front brake master cylinder to hydraulic unit)
5. Front brake caliper

A. Fasten the front wheel sensor lead to the brake hose (hydraulic unit to front brake calipers) with the holder. Align the holder with the white paint mark on the brake hose (hydraulic unit to front brake calipers). Route the front wheel sensor lead to the rear of the brake hose (hydraulic unit to front brake calipers).

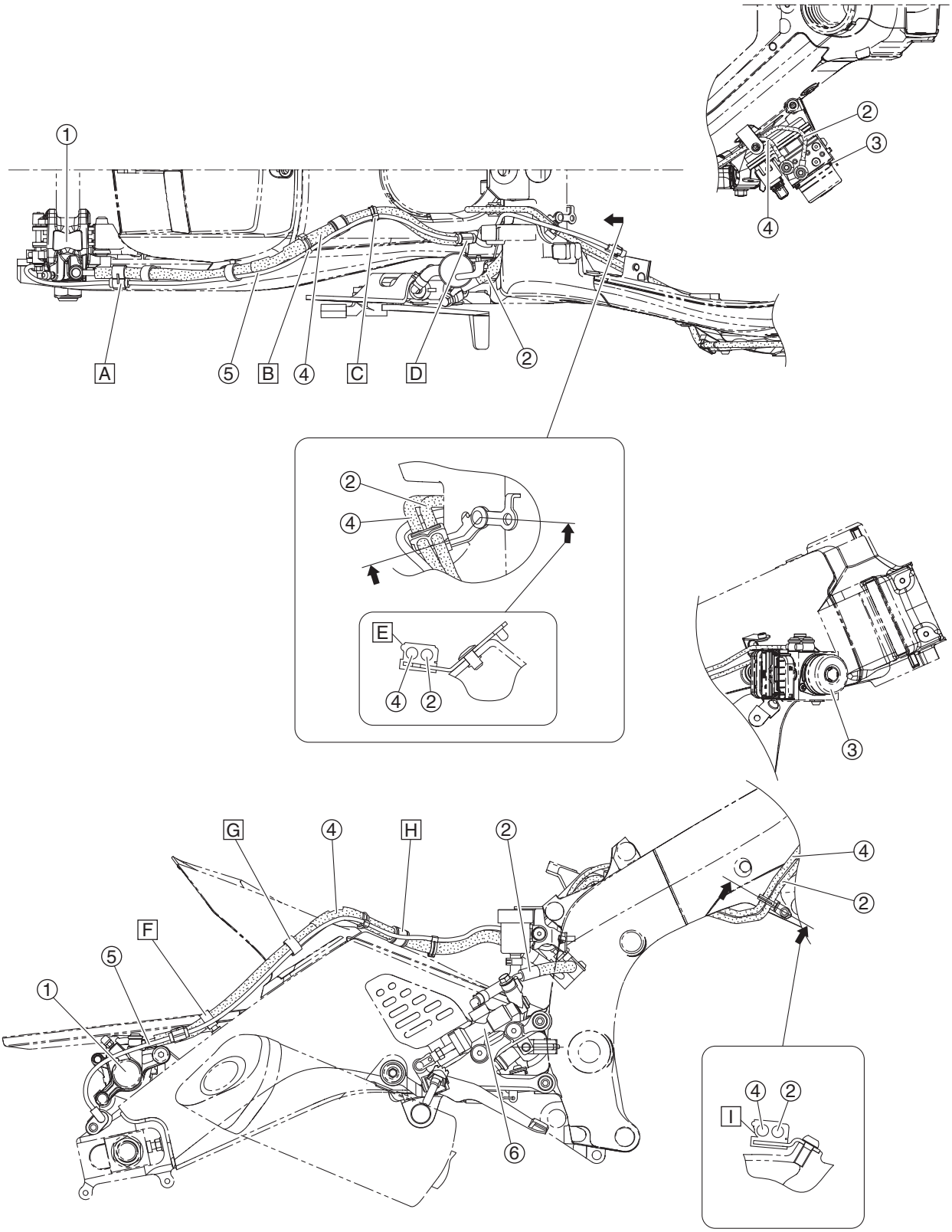
B. Fasten the front wheel sensor lead to the brake hose (hydraulic unit to front brake calipers) with the holder. Make sure that the holder contacts the grommet on the brake hose (hydraulic unit to front brake calipers). Route the front wheel sensor lead to the rear of the brake hose (hydraulic unit to front brake calipers).

C. Fasten the front wheel sensor lead at the white tape with the holder.

D. Point the open ends of the holder forward.

E. Fasten the brake hose (front brake master cylinder to hydraulic unit) with the holder, making sure that the white paint mark on the hose is visible through the hole in the holder.

Rear brake hose (top and right side view)



1. Rear brake caliper
2. Brake hose (rear brake master cylinder to hydraulic unit)
3. Hydraulic unit
4. Brake hose (hydraulic unit to rear brake caliper)
5. Rear wheel sensor lead
6. Rear brake master cylinder

A. Fasten the rear wheel sensor lead to the brake hose (hydraulic unit to rear brake caliper) with the holder. Install the holder on the shrink-tubing portion of the brake hose and make sure that the holder contacts the edge of the metal section of the brake hose. Route the rear wheel sensor lead to the outside of the brake hose (hydraulic unit to rear brake caliper).

B. Fasten the rear wheel sensor lead at the white tape to the brake hose (hydraulic unit to rear brake caliper) with the holder. Align the rear edge of the holder with the front end of the shrink-tubing portion of the brake hose. Route the rear wheel sensor lead to the outside of the brake hose (hydraulic unit to rear brake caliper).

C. Fasten the rear wheel sensor lead at the white tape to the brake hose (hydraulic unit to rear brake caliper) with the holder. Route the rear wheel sensor lead over the brake hose (hydraulic unit to rear brake caliper).

D. Fasten the rear wheel sensor lead to the brake hose (hydraulic unit to rear brake caliper) with the holder. Install the holder on the shrink-tubing portion of the brake hose and align the rear edge of the holder with the rear end of the shrink-tubing portion of the brake hose. Route the rear wheel sensor lead over the brake hose (hydraulic unit to rear brake caliper).

E. Install the holder completely onto the projection on the frame.

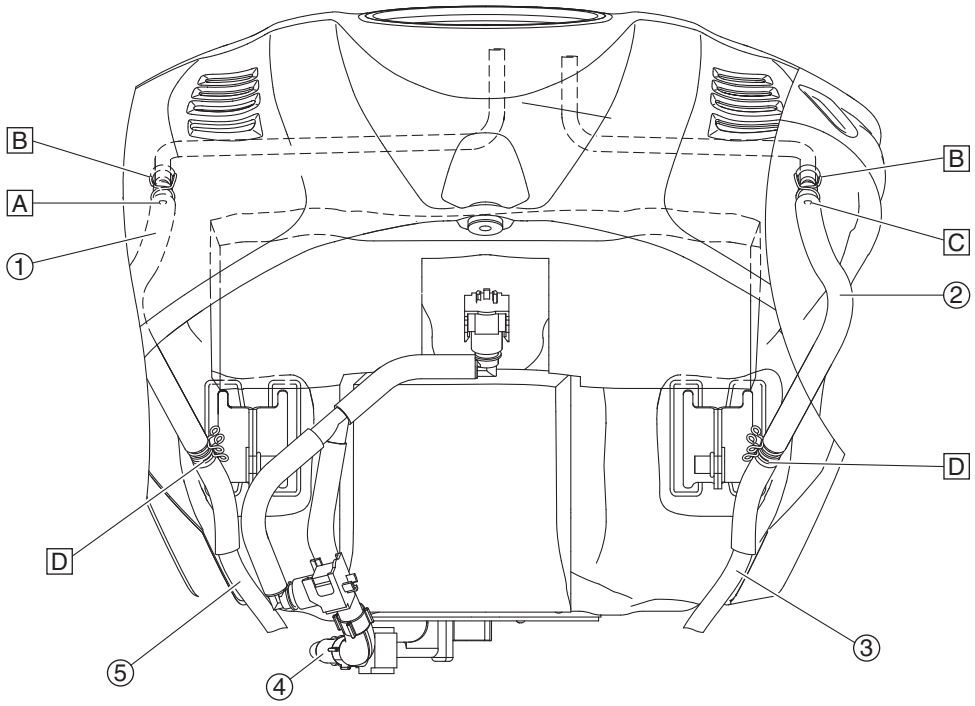
F. Fasten the brake hose (hydraulic unit to rear brake caliper) with the holder. Face the catch of the holder outward.

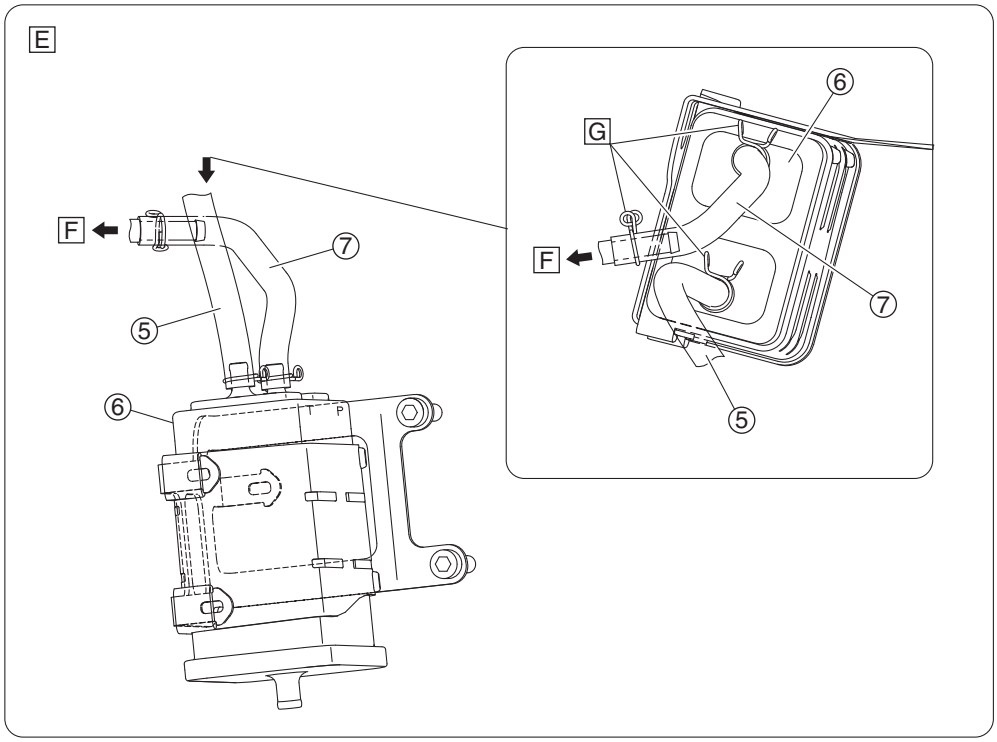
G. Fasten the rear wheel sensor lead to the brake hose (hydraulic unit to rear brake caliper) with the holder. Face the catch of the holder downward. Route the rear wheel sensor lead to the outside of the brake hose (hydraulic unit to rear brake caliper).

H. Fasten the grommet on the brake hose (hydraulic unit to rear brake caliper) with the holder. Face the catch of the holder outward.

I. Install the holder completely onto the projection on the bracket.

Fuel tank and canister (front view)

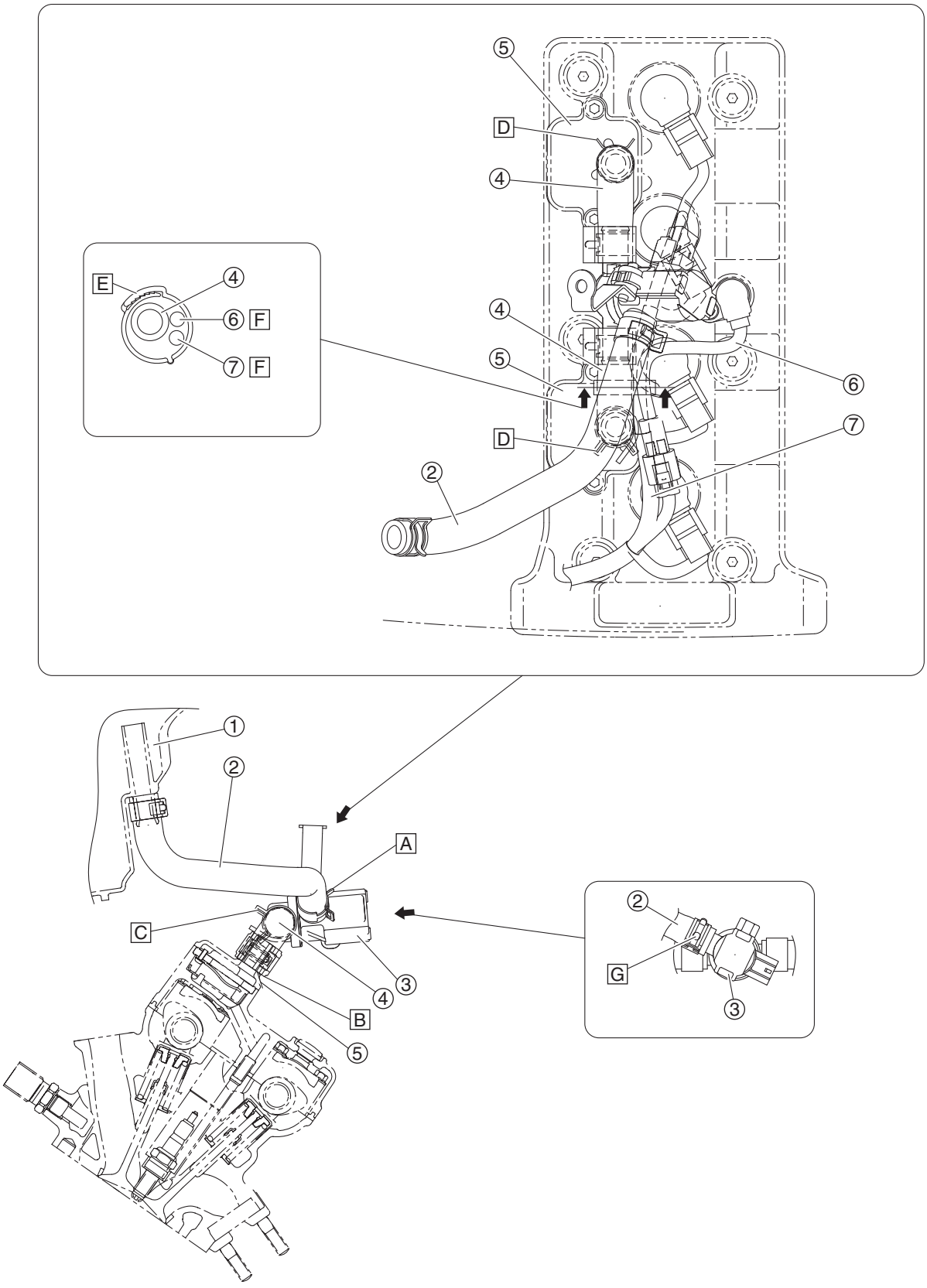




1. Fuel tank breather hose (fuel tank to hose joint)
2. Fuel tank overflow hose (fuel tank to hose joint)
3. Fuel tank overflow hose (hose joint to atmosphere)
4. Fuel hose
5. Fuel tank breather hose (hose joint to atmosphere) (except for California)
   Fuel tank breather hose (hose joint to canister) (for California only)
6. Canister
7. Canister purge hose

A. Face the yellow paint mark on the fuel tank breather hose (fuel tank to hose joint) downward.
B. The ends of the hose clamp may be pointing in any direction. Make sure not to install the hose clamp on the raised portion of the hose fitting.
C. Face the white paint mark on the fuel tank overflow hose (fuel tank to hose joint) downward.
D. Point the ends of the hose clamp inward.
E. For California only
F. To the throttle body
G. Point the ends of the hose clamp in the direction shown in the illustration.

Air cut-off valve (right side view)



1. Air filter case
2. Air induction system hose (air filter case to air cut-off valve)
3. Air cut-off valve
4. Air induction system hose (air cut-off valve to reed valve cover)
5. Reed valve cover
6. Cylinder identification sensor lead
7. Wire harness (to ignition coil and air cut-off valve)

A. Point the ends of the hose clamp forward.
B. Install the air induction system hose (air cut-off valve to reed valve cover) completely onto the hose fitting of the reed valve cover.
   Perform this procedure for both the left and right sides.
C. Point the ends of the hose clamp rearward.
   Perform this procedure for both the left and right sides.
D. Point the ends of the hose clamp outward.
E. The catch of the holder may be facing in any direction.
F. The leads may be routed in any order.
G. Face the paint mark on the air induction system hose (air filter case to air cut-off valve) forward.

PERIODIC CHECKS AND ADJUSTMENTS

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				
			× 1000 mi	0.6	4	8	12	16	20
			× 1000 km	1	7	13	19	25	31
			month	1	6	12	18	24	30
1	*	**Fuel line**	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Adjust gap and clean.		√		√		√
			• Replace.			√		√	
3	*	**Valve clearance**	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	**Crankcase breather system**	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	**Fuel injection**	• Adjust synchronization.		√	√	√	√	√
6	*	**Exhaust system**	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√
7	*	**Evaporative emission control system (for California only)**	• Check control system for damage. • Replace if necessary.				√		√
8	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts.			√		√	

EAS30615
GENERAL MAINTENANCE AND LUBRICATION CHART

TIP

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

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
			× 1000 mi	0.6	4	8	12	16	20
			× 1000 km	1	7	13	19	25	31
			month	1	6	12	18	24	30
1	*	**Diagnostic system check**	• Perform dynamic inspection using Yamaha diagnostic tool. • Check the fault codes.	√	√	√	√	√	√
2	*	**Air filter element**	• Replace.	Every 24000 mi (37000 km)					
3	*	**Clutch**	• Check operation. • Adjust or replace cable.	√	√	√	√	√	√
4	*	**Front brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
5	*	**Rear brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
6	*	**Brake hoses**	• Check for cracks or damage. • Check for correct routing and clamping.		√	√	√	√	√
			• Replace.	Every 4 years					
7	*	**Brake fluid**	• Change.	Every 2 years					
8	*	**Wheels**	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
9	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
10	*	**Wheel bearings**	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
11	*	**Swingarm pivot bearings**	• Check bearing assemblies for looseness.			√			
			• Moderately repack with lithium-soap-based grease.					√	
12		**Drive chain**	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 600 mi (1000 km) and after washing the motorcycle, riding in the rain or riding in wet areas					
13	*	**Steering bearings**	• Check bearing assemblies for looseness.	√	√	√	√	√	√
			• Moderately repack with lithium-soap-based grease.	Every 16000 mi (25000 km)					
14	*	**Chassis fasteners**	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
15		**Brake lever pivot shaft**	• Apply silicone grease lightly.		√	√	√	√	√
16		**Brake pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
			× 1000 mi	0.6	4	8	12	16	20
			× 1000 km	1	7	13	19	25	31
			month	1	6	12	18	24	30
17		Clutch lever pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
18		Shift pedal pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
19		Sidestand pivot	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
20	*	Sidestand switch	• Check operation and replace if necessary.	√	√	√	√	√	√
21	*	Front fork	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
22	*	Shock absorber assembly	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
23	*	Rear suspension link pivots	• Check operation. • Correct if necessary.			√		√	
24		Engine oil	• Change (warm engine before draining).	√	√	√	√	√	√
25	*	Engine oil filter cartridge	• Replace.	√		√		√	
26	*	Cooling system	• Check hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
			• Change coolant.					√	
27	*	Front and rear brake switches	• Check operation.	√	√	√	√	√	√
28	*	Control cables	• Apply Yamaha cable lubricant or other suitable cable lubricant thoroughly.	√	√	√	√	√	√
29	*	Throttle grip	• Check operation. • Check throttle grip free play, and adjust if necessary. • Lubricate cable and grip housing.		√	√	√	√	√
30	*	Lights, signals and switches	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

TIP

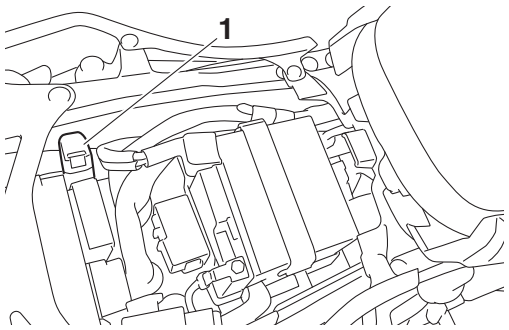
- Air filter
  - This model's air filter uses a disposable oil-coated paper element. This element cannot be cleaned with compressed air, doing so will only damage it.
  - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
  - Regularly check the front and rear brake fluid levels. Replenish if necessary.
  - Every two years replace the rear brake master cylinder, the internal components of the front brake master cylinder, the brake calipers, and change the brake fluid.
  - Replace the brake hoses every four years or sooner 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:
   - Rider 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)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254



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 (FAULT CODE)" on page 8-33.

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:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30057
CHECKING THE FUEL LINE

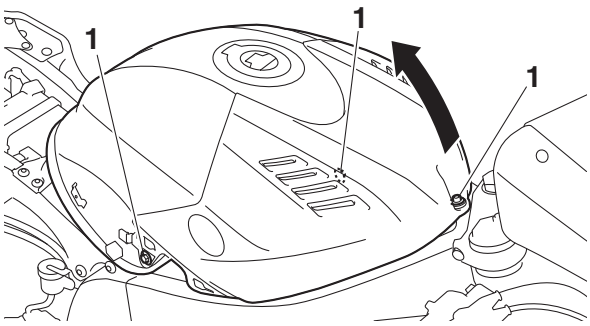
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank cover (left)
   - Fuel tank cover (right)
     Refer to "FUEL TANK" on page 7-1.
2. Remove:
   - Fuel tank bolts "1"

TIP

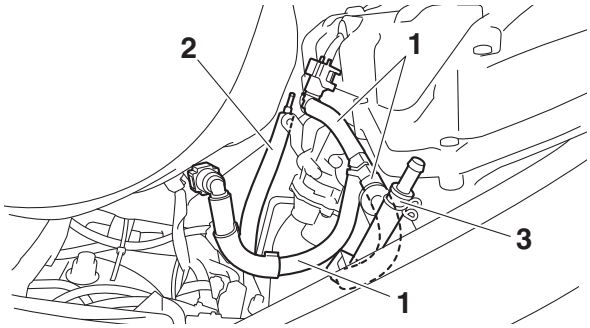
After removing the fuel tank bolts, lift up the front of the fuel tank.

ECA20070
NOTICE

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



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



4. Install:
   - Fuel tank bolts

Fuel tank bolt (left and right)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Fuel tank bolt (front)
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

5. Install:
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   Refer to "FUEL TANK" on page 7-1.
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30035
CHECKING THE SPARK PLUGS
The following procedure applies to all of the spark plugs.
1. Remove:
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Air filter case
   Refer to "AIR FILTER CASE" on page 7-5.
   • Air induction system solenoid
   Refer to "AIR INDUCTION SYSTEM" on page 7-19.
2. Remove:
   • Ignition coils
   • Spark plugs

ECA13320
NOTICE

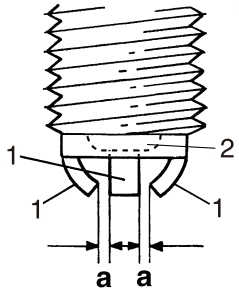
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

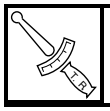
Manufacturer/model
NGK/CR10EK

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

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



7. Install:
   • Spark plugs
   • Ignition coils



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

TIP

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

8. Install:
   • Air induction system solenoid
   Refer to "AIR INDUCTION SYSTEM" on page 7-19.
   • Air filter case
   Refer to "AIR FILTER CASE" on page 7-5.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30023
ADJUSTING THE VALVE CLEARANCE
The following procedure applies to all of the valves.

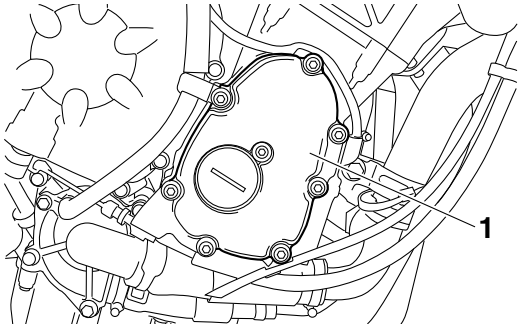
TIP

- 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:
   • Front side cowling assembly
   Refer to "GENERAL CHASSIS (5)" on page 4-8.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.

- Air filter case
  Refer to "AIR FILTER CASE" on page 7-5.
- Throttle body
  Refer to "THROTTLE BODIES" on page 7-10.
- Air cut-off valve
  Refer to "AIR INDUCTION SYSTEM" on page 7-19.
- Radiator
  Refer to "RADIATOR" on page 6-3.

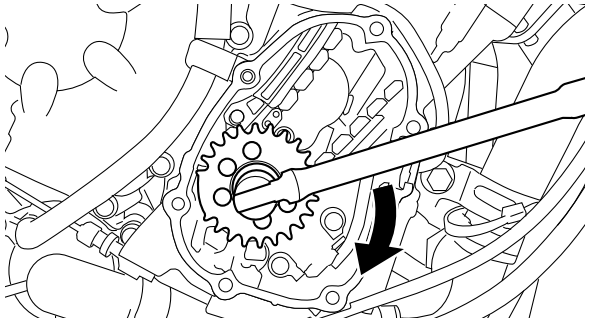
2. Remove:
   - Ignition coils
   - Spark plugs
   - Cylinder head cover
     Refer to "CAMSHAFTS" on page 5-18.
3. Remove:
   - Pickup rotor cover "1"



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

Valve clearance (cold)
Intake
0.12–0.19 mm (0.0047–0.0075 in)
Exhaust
0.16–0.23 mm (0.0063–0.0091 in)

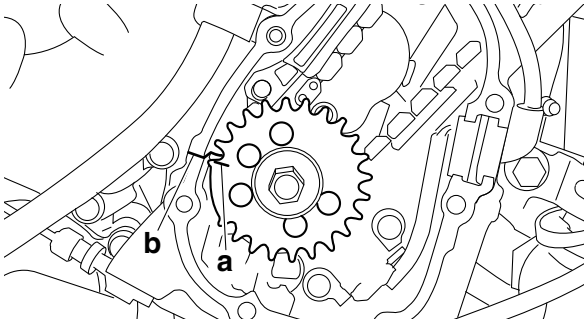
a. Turn the crankshaft clockwise.

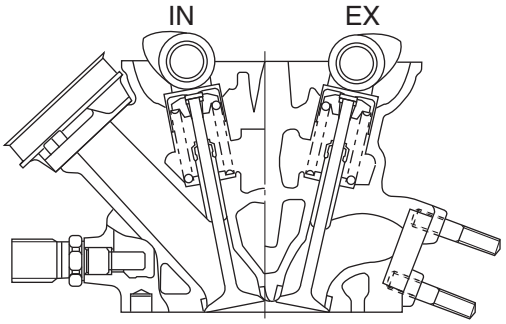


b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".

TIP

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.





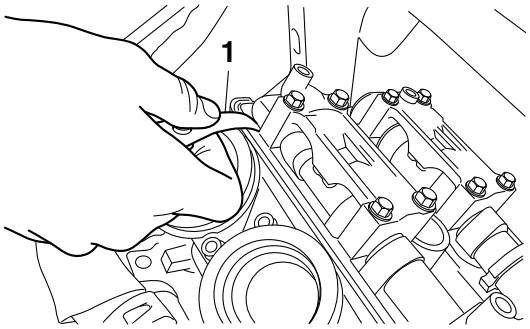
c. Measure the valve clearance with a thickness gauge "1".

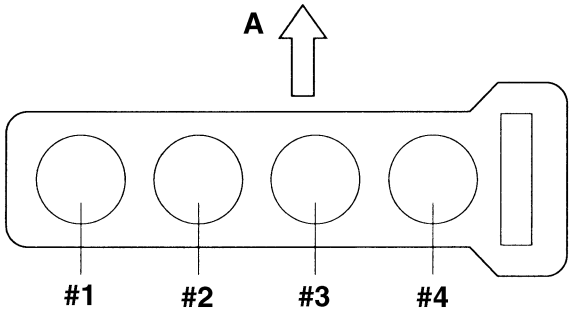
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9

TIP

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

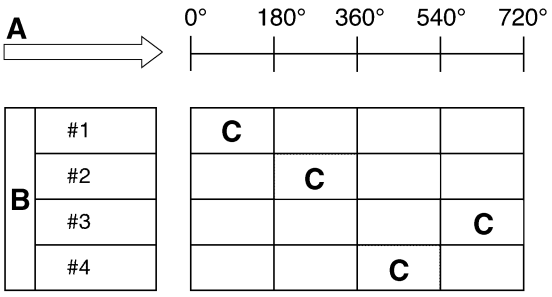
Valve clearance measuring sequence
Cylinder #1 → #2 → #4 → #3





A. Front

d. To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft clockwise as specified in the following table.



A. Degrees that the crankshaft is turned clockwise
B. Cylinder
C. Combustion cycle

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°

5. Remove:
   • Camshafts

TIP

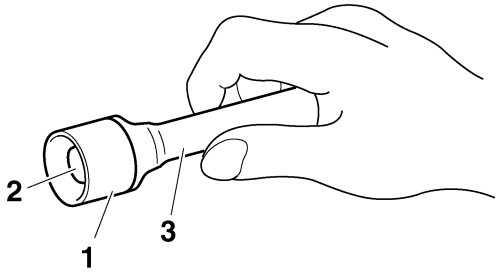
- Refer to "CAMSHAFTS" on page 5-18.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

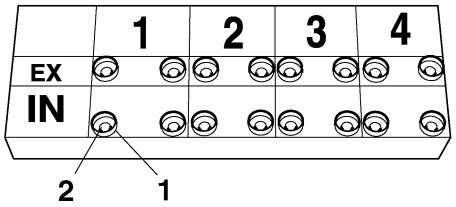
6. Adjust:
   • Valve clearance
   a. Remove the valve lifter "1" and the valve pad "2" with a valve lapper "3".

Valve lapper
90890-04101
Valve lapping tool
YM-A8998

TIP

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



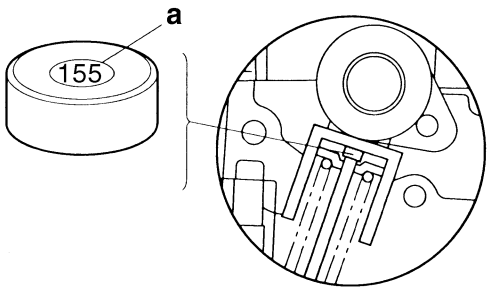


b. Calculate the difference between the specified valve clearance and the measured valve clearance.
   Example:
   Specified valve clearance = 0.11–0.20 mm (0.004–0.008 in)
   Measured valve clearance = 0.23 mm (0.009 in)
   0.23 mm (0.009 in) – 0.20 mm (0.008 in) = 0.03 mm (0.001 in)
c. Check the thickness of the current valve pad.

TIP

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

Example:
If the valve pad is marked "155", the pad thickness is 1.55 mm (0.061 in).



d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
Example:
1.55 mm (0.061 in) + 0.03 mm (0.001 in) = 1.58 mm (0.062 in)
The valve pad number is 158.
e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

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

TIP

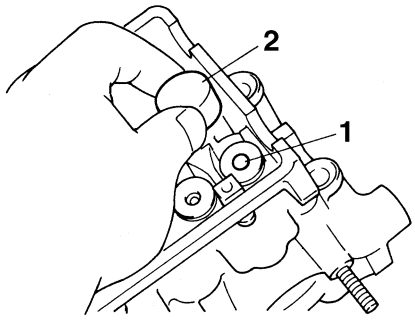
Refer to the following table for the available valve pads.

Valve pad range	Nos. 150–240
Valve pad thickness	1.50–2.40 mm (0.0591–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

Example:
Valve pad number = 158
Rounded value = 160
New valve pad number = 160
f. Install the new valve pad "1" and the valve lifter "2".

TIP

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



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

Camshaft cap bolt (intake and exhaust)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Refer to "CAMSHAFTS" on page 5-18.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft clockwise several full turns to seat the parts.

h. Measure the valve clearance again.
i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

7. Install:
- All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017
CHECKING THE ENGINE IDLING SPEED

TIP

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

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

Engine idling speed
1250–1350 r/min

3. Check:
   • ISC (idle speed control) learning value
   "00" or "01" → Check the intake system.
   "02" → Clean the throttle bodies.
   Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-13.
   a. Connect the Yamaha diagnostic tool.
      Use the diagnostic code number "67".
      Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.
   b. Check the ISC (idle speed control) leaning value.

EAS30061
CHECKING THE CRANKCASE BREATHER HOSE

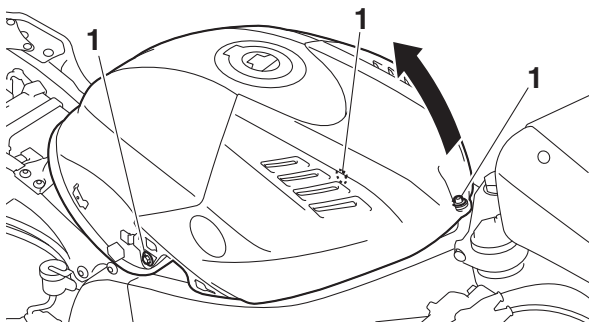
1. Remove:
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   Refer to "FUEL TANK" on page 7-1.
2. Remove:
   • Fuel tank bolts "1"

TIP

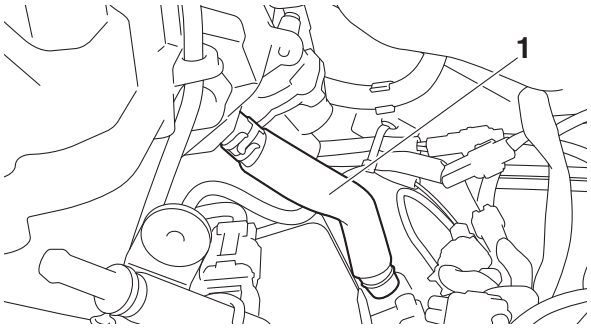
After removing the fuel tank bolts, lift up the front of the fuel tank.

ECA20070
NOTICE

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



3. Check:
   • Crankcase breather hose "1"
   Cracks/damage → Replace.
   Loose connection → Connect properly.



4. Install:
   • Fuel tank bolts

	**Fuel tank bolt (left and right)** **7 N·m (0.7 kgf·m, 5.2 lb·ft)** **Fuel tank bolt (front)** **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

5. Install:
   • Fuel tank cover (left)
   • Fuel tank cover (right)
   Refer to "FUEL TANK" on page 7-1.
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30027
SYNCHRONIZING THE THROTTLE BODIES

TIP

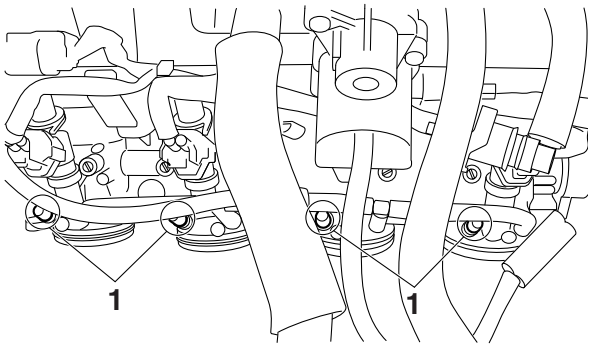
Prior to synchronizing the throttle bodies, the valve clearance and the engine idling speed should be properly adjusted.

1. Stand the vehicle on a level surface.

TIP

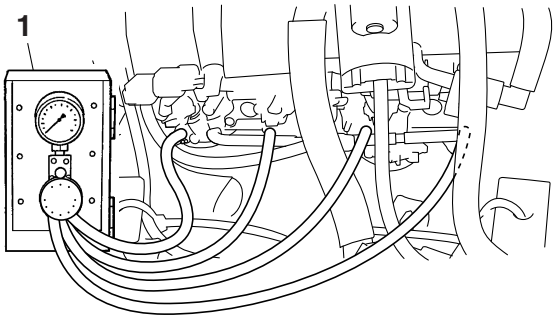
Place the vehicle on a suitable stand.

2. Remove:
   • Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Canister (for California only)
   Refer to "FUEL TANK" on page 7-1.
3. Remove:
   • Caps "1"



4. Install:
   • Vacuum gauge "1"
   • Digital tachometer

Vacuum gauge
90890-03094
Vacuummate
YU-44456



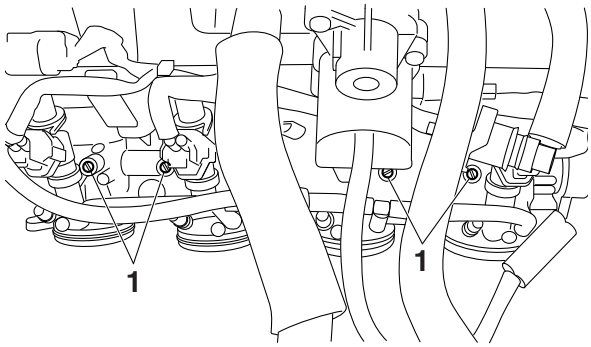
5. Install:
   • Canister (for California only)
   Refer to "FUEL TANK" on page 7-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
6. Adjust:
   • Throttle body synchronization

Basic procedure

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

Engine idling speed
1250–1350 r/min

b. Turn the bypass air screw "1" with a white paint mark out a little, and then turn it in fully.



c. Using the throttle body that has the bypass air screw with a white paint mark as the standard, turn the bypass air screws without white paint marks in or out to the adjust the other throttle bodies.

TIP

- If more than one throttle body has a bypass air screw with a white paint mark, use the one with the lowest vacuum pressure as the standard.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If an air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.

Difference in vacuum pressure between the cylinders
0–1.3 kPa (10 mmHg, 0.4 inHg)

TIP

- The difference in vacuum pressure between two throttle bodies should not exceed 1.3 kPa (10 mmHg).
- If you are unable to adjust the throttle body synchronization using this procedure, use the following procedure instead.

Alternate procedure

TIP

Use this alternate procedure if you are unable to adjust the throttle body synchronization using the basic procedure.

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

Engine idling speed
1250–1350 r/min

b. Turn all of the bypass air screws in fully.

c. Using the throttle body with the lowest vacuum pressure as the standard, turn out the bypass air screws of the other throttle bodies to adjust them.

TIP

- Do not turn out the bypass air screw of the throttle body with the lowest vacuum pressure.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If an air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.

Difference in vacuum pressure between the cylinders
0–1.3 kPa (10 mmHg, 0.4 inHg)

TIP

The difference in vacuum pressure between two throttle bodies should not exceed 1.3 kPa (10 mmHg).

7. Stop the engine and remove the measuring equipment.
8. Allow the engine to cool, and then start the engine and check that the engine speed does not rise abnormally high.
9. Adjust:
   - Throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-32.

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

10. Install:
    - Caps
    - Canister (for California only)
      Refer to "FUEL TANK" on page 7-1.
    - Fuel tank
      Refer to "FUEL TANK" on page 7-1.
    - Rider seat
      Refer to "GENERAL CHASSIS (1)" on page 4-1.

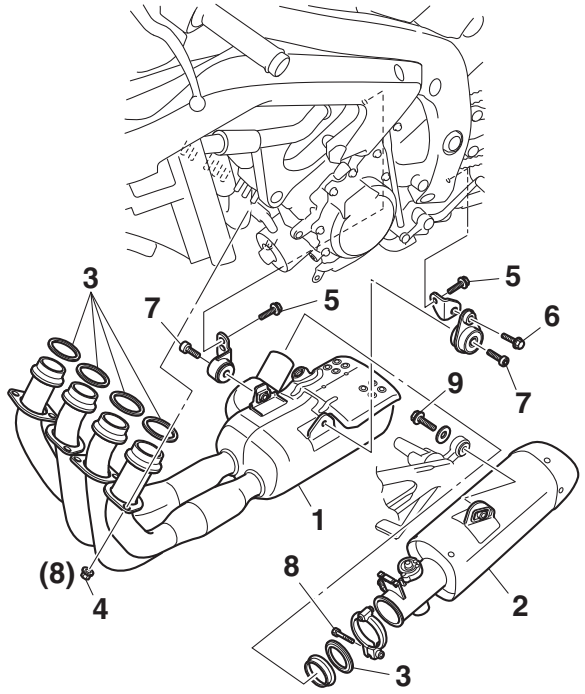
EAS30062

CHECKING THE EXHAUST SYSTEM

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

1. Remove:
   - Front side cowling assembly
   - Bottom cowling
     Refer to "GENERAL CHASSIS (5)" on page 4-8.
2. Check:
   - Exhaust pipe assembly "1"
   - Muffler "2"
     Cracks/damage → Replace.
   - Gaskets "3"
     Exhaust gas leaks → Replace.
3. Check:
   Tightening torque
   - Exhaust pipe assembly nuts "4"
   - Exhaust pipe assembly bracket bolts (left upper side and right side) "5"
   - Exhaust pipe assembly bracket bolt (left lower side) "6"
   - Exhaust pipe assembly bolts "7"
   - Muffler clamp bolt "8"
   - Muffler bolt "9"

Exhaust pipe assembly nut
20 N·m (2.0 kgf·m, 15 lb·ft)
Exhaust pipe assembly bracket bolt (left upper side and right side)
30 N·m (3.0 kgf·m, 22 lb·ft)
LOCTITE®
Exhaust pipe assembly bracket bolt (left lower side)
34 N·m (3.4 kgf·m, 25 lb·ft)
Exhaust pipe assembly bolt
20 N·m (2.0 kgf·m, 15 lb·ft)
Muffler clamp bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
Muffler bolt
20 N·m (2.0 kgf·m, 15 lb·ft)

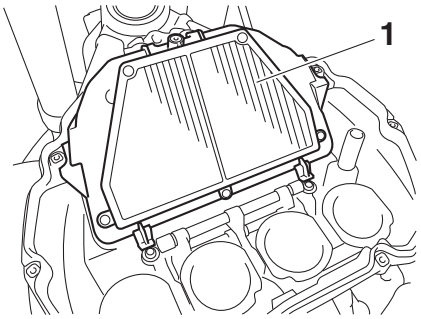


4. Install:
   - Bottom cowling
   - Front side cowling assembly
   Refer to "GENERAL CHASSIS (5)" on page 4-8.

EAS30626
CHECKING THE CANISTER (for California only)
1. Remove:
   - Fuel tank
   Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Canister
   - Canister purge hoses
   - Fuel tank breather hoses
   Cracks/damage→ Replace.
3. Install:
   - Fuel tank
   Refer to "FUEL TANK" on page 7-1.

EAS30627
CHECKING THE AIR INDUCTION SYSTEM
Refer to "CHECKING THE AIR INDUCTION SYSTEM" on page 7-22.

EAS30051
REPLACING THE AIR FILTER ELEMENT
1. Remove:
   - Rider seat
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   - Upper air filter case
   Refer to "AIR FILTER CASE" on page 7-5.
2. Remove:
   - Air filter element "1"



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

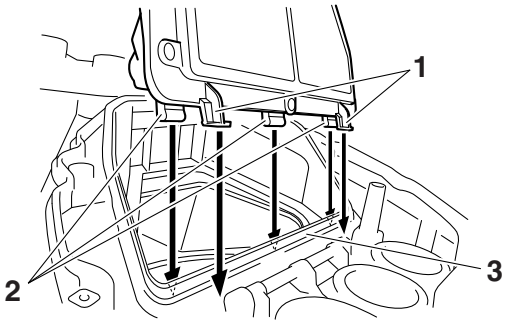
TIP
- Replace the air filter element every 37000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
   - Air filter element

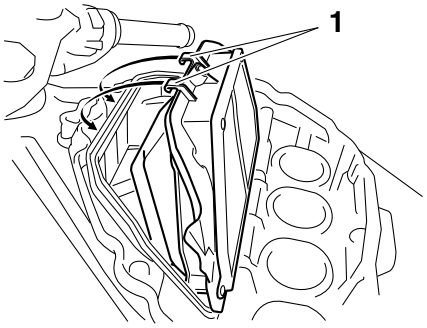
ECA20710
NOTICE
Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body synchronization, leading to poor engine performance and possible overheating.

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

a. Insert the air filter projections "1" "2" into the part of the air filter case "3".



b. Fold the air filter "1" forward and then fit into the air filter case.

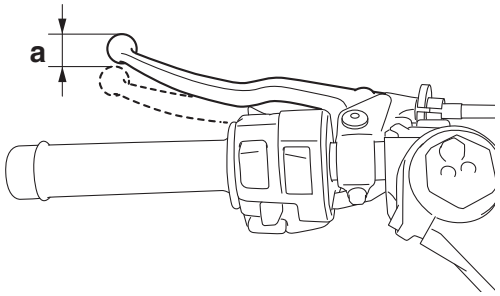


5. Install:
   - Upper air filter case
     Refer to "AIR FILTER CASE" on page 7-5.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS31089
ADJUSTING THE CLUTCH LEVER FREE PLAY

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

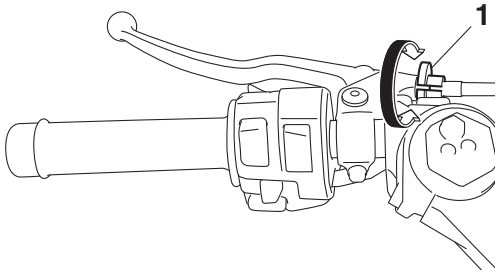
	Clutch lever free play **10.0–15.0 mm (0.39–0.59 in)**



2. Adjust:
   - Clutch lever free play

Handlebar side

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



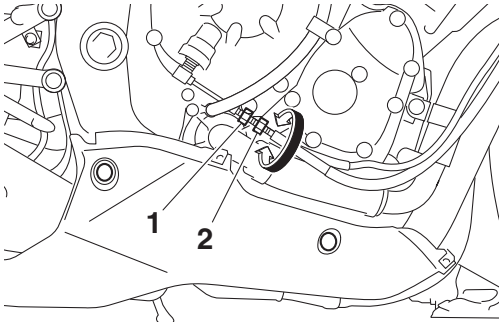
TIP

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

Engine side

a. Remove the front side cowling assembly.
   Refer to "GENERAL CHASSIS (5)" on page 4-8.
b. Loosen the locknut "1".
c. Turn the adjusting nut "2" until the specified clutch lever free play is obtained.
d. Tighten the locknut "1".

	Clutch cable locknut **7 N·m (0.7 kgf·m, 5.2 lb·ft)**



e. Install the front side cowling assembly.
   Refer to "GENERAL CHASSIS (5)" on page 4-8.

EAS30801
CHECKING THE BRAKE OPERATION

1. Check:
   - Brake operation
     Brake not working properly → Check the brake system.
     Refer to "FRONT BRAKE" on page 4-33 and "REAR BRAKE" on page 4-46.

TIP

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

EAS30074
CHECKING THE BRAKE FLUID LEVEL

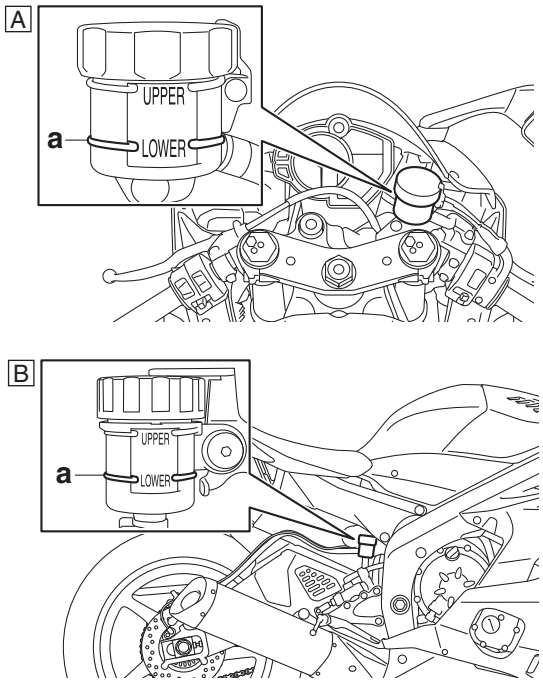
1. Stand the vehicle on a level surface.

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.

Front brake
Specified brake fluid
DOT 4
Rear brake
Specified brake fluid
DOT 4



A. Front brake
B. Rear brake

EWA13090
⚠ WARNING

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

ECA13540
NOTICE

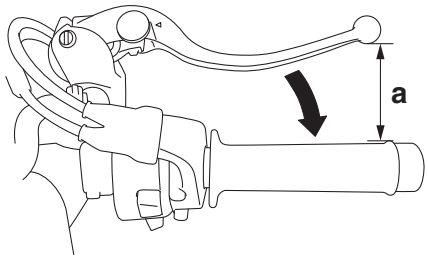
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

TIP

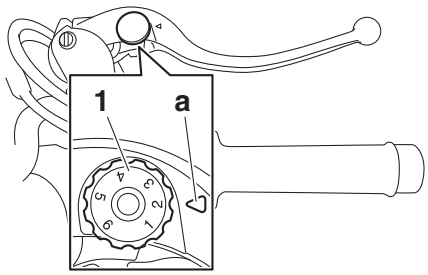
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

EAS30070
ADJUSTING THE FRONT DISC BRAKE

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



a. Push the brake lever forward.
b. Turn the adjusting dial “1” until the brake lever is in the desired position.
c. Align the appropriate setting on the adjusting dial with the mark “a” on the brake lever.



EWA13050
⚠ WARNING

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

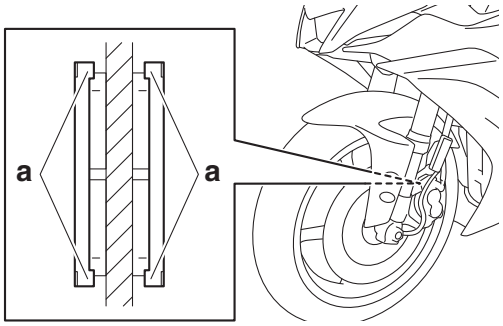
ECA13490
NOTICE

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

EAS30075
CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicators "a" almost touch the brake disc → Replace the brake pads as a set.
     Refer to "FRONT BRAKE" on page 4-33.

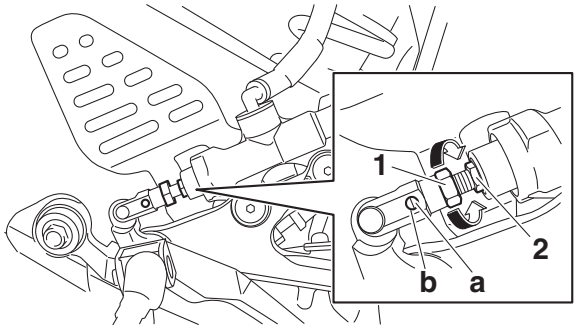


EAS30072
ADJUSTING THE REAR DISC BRAKE

1. Adjust:
   - Brake pedal position
     a. Loosen the locknut "1".
     b. Turn the adjusting bolt "2" until the specified brake pedal position is obtained.

EWA18830
⚠ WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt "a" is visible through the hole "b".



   c. Tighten the locknut "1" to specification.

	**Rear brake pedal adjusting locknut** **16 N·m (1.6 kgf·m, 12 lb·ft)**

EWA17030
⚠ WARNING

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

ECA13510
NOTICE

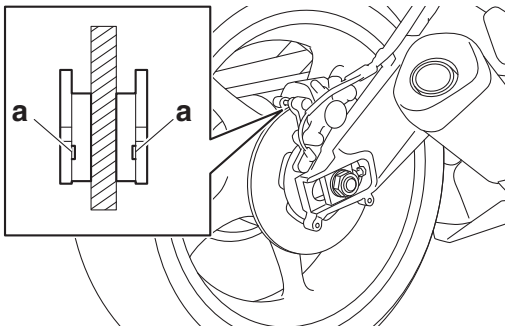
After adjusting the brake pedal position, make sure there is no brake drag.

2. Adjust:
   - Rear brake light switch
     Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-31.

EAS30076
CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

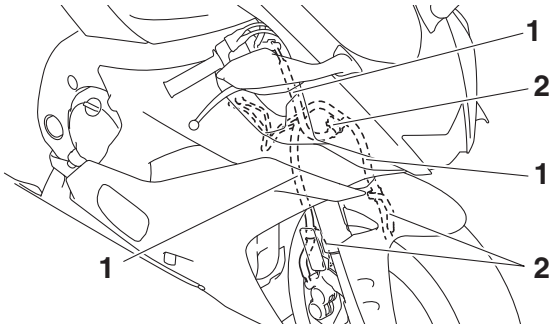
1. Operate the brake.
2. Check:
   - Rear brake pad
     Wear indicator groove "a" almost appears → Replace the brake pads as a set.
     Refer to "REAR BRAKE" on page 4-46.



EAS30077
CHECKING THE FRONT BRAKE HOSES

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

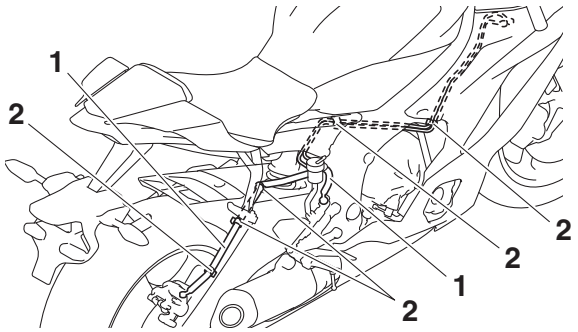
1. Check:
   - Brake hoses "1"
     Cracks/damage/wear → Replace.
2. Check:
   - Brake hose holders "2"
     Loose → Tighten the holder bolt.



3. Hold the vehicle upright and apply the brake several times.
4. Check:
   • Brake hoses
   Brake fluid leakage → Replace the damaged hose.
   Refer to "FRONT BRAKE" on page 4-33 and "ABS (Anti-lock Brake System)" on page 4-57.

EAS30078
CHECKING THE REAR BRAKE HOSES

1. Check:
   • Brake hoses "1"
   Cracks/damage/wear → Replace.
2. Check:
   • Brake hose holders "2"
   Loose connection → Connect.



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 4-46 and "ABS (Anti-lock Brake System)" on page 4-57.

EAS30893
BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000
⚠ WARNING

Always bleed the brake system when the brake related parts are removed.

ECA22640
NOTICE

- **Bleed the brake system in the following order.**
- **1st step: Front brake master cylinder**
- **2nd step: Front brake calipers**
- **3rd step: Rear brake caliper**

EWA16530
⚠ WARNING

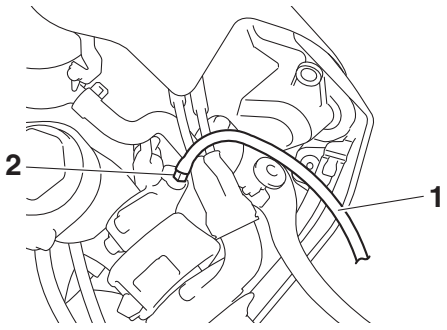
Bleed the ABS whenever:
- **the system is disassembled.**
- **a brake hose is loosened, disconnected or replaced.**
- **the brake fluid level is very low.**
- **brake operation is faulty.**

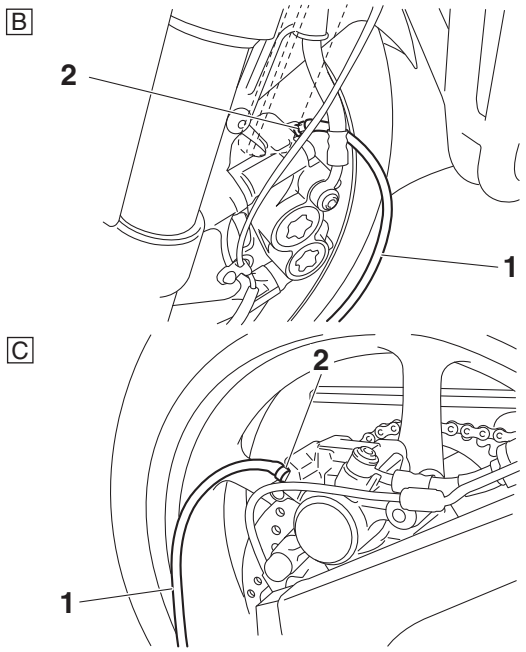
TIP

- Be careful not to spill any brake fluid or allow the brake fluid reservoir to overflow.
- When bleeding the ABS, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, 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. Bleed:
   • ABS
   a. Fill the brake fluid reservoir to the proper level with the specified brake fluid.
   b. Install the diaphragm (brake fluid reservoir).
   c. Connect a clear plastic hose "1" tightly to the bleed screw "2".

A





A. Front brake master cylinder
B. Front brake caliper (left/right)
C. Rear brake caliper

d. Place the other end of the hose into a 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. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TEST" on page 4-61.

ECA17061

NOTICE

Make sure that the main switch is turned to "OFF" before checking the operation of the hydraulic unit.

k. After operating the ABS, repeat steps (e) to (i), and then fill the brake fluid reservoir to the proper level with the specified brake fluid.
l. Tighten the bleed screw to specification.

Front brake master cylinder bleed screw
5 N·m (0.5 kgf·m, 3.7 lb·ft)
Brake caliper bleed screw
5 N·m (0.5 kgf·m, 3.7 lb·ft)

m. Fill the brake fluid reservoir to the proper level with the specified brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.

EWA13110

⚠ WARNING

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

EAS30105

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

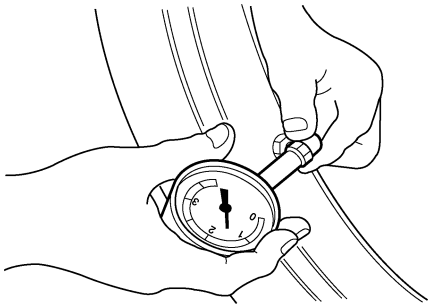
After a tire or wheel has been changed or replaced, always balance the wheel.

EAS30104

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
   • Tire pressure
   Out of specification → Regulate.



EWA13181

⚠ WARNING

- **The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.**

• The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
• Operation of an overloaded vehicle could cause tire damage, an accident or an injury.

NEVER OVERLOAD THE VEHICLE.

Tire air pressure (measured on cold tires)
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
Maximum load
185 kg (408 lb)
*** Total weight of rider, passenger, cargo and accessories**

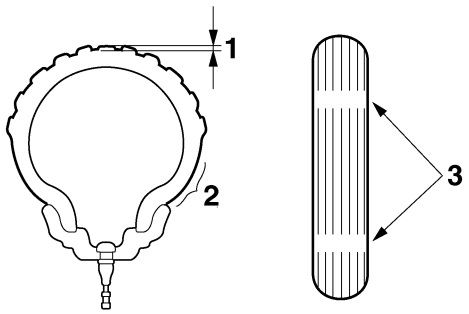
EWA13190

⚠ 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.

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



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

EWA14090

⚠ WARNING

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

Front tire
Size
120/70ZR17M/C (58W)
Manufacturer/model
DUNLOP/SPORTMAX D214F
Manufacturer/model
BRIDGESTONE/BATTLAX S21F

Rear tire
Size
180/55ZR17M/C (73W)
Manufacturer/model
DUNLOP/SPORTMAX D214
Manufacturer/model
BRIDGESTONE/BATTLAX S21R

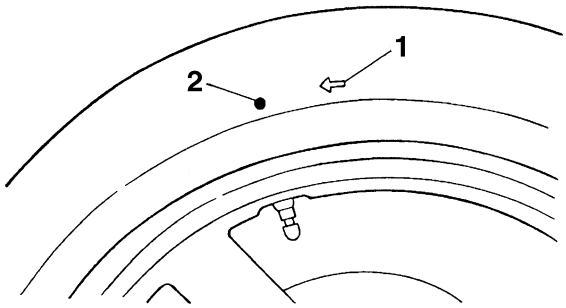
EWA13210

⚠ 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 4-18 and "CHECKING THE REAR WHEEL" on page 4-28.

EAS30802
CHECKING THE SWINGARM OPERATION

1. Check:
   • Swingarm operation
   Swingarm not working properly → Check the swingarm.
   Refer to "SWINGARM" on page 4-90.
2. Check:
   • Swingarm excessive play
   Refer to "SWINGARM" on page 4-90.

EAS30643
LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
   • Bearings
   • Dust covers
   • Pivot shaft
   • Pivot shaft ring nut

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

Refer to "INSTALLING THE SWINGARM" on page 4-93.

EAS31923
DRIVE CHAIN SLACK

Checking the drive chain slack

EWA13120
⚠ WARNING

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

ECA13550
NOTICE

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

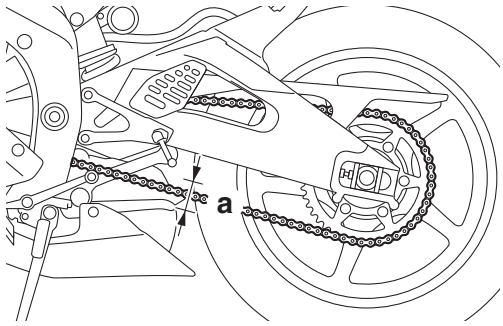
1. Stand the vehicle on a level surface.

TIP

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

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

	Drive chain slack (Maintenance stand) **30.0–45.0 mm (1.18–1.77 in)** **Drive chain slack (Sidestand)** **30.0–45.0 mm (1.18–1.77 in)** **Limit** **50.0 mm (1.97 in)**

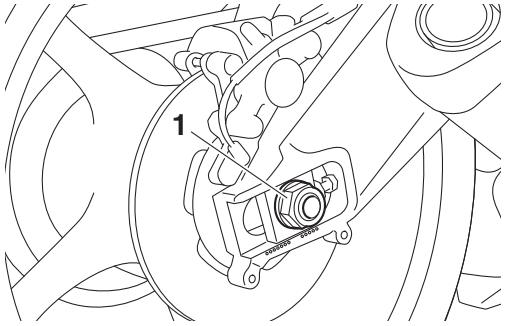


Adjusting the drive chain slack

EWA13120
⚠ WARNING

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

1. Loosen:
   • Wheel axle nut "1"

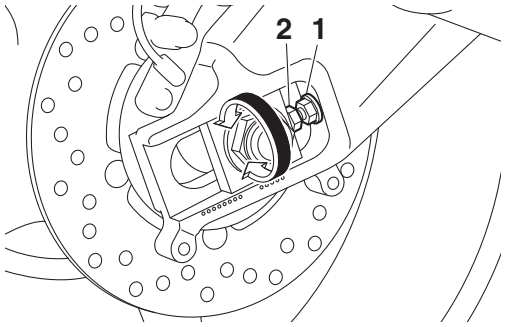


2. Adjust:
   • Drive chain slack
   a. Loosen both of the drive chain puller locknuts "1".
   b. Turn both of the drive chain puller adjusting bolts "2" until the specified drive chain slack is obtained.

TIP

• To maintain the proper wheel alignment, adjust both sides evenly.

• There should be no clearance between the adjusting block and the adjusting bolts.



c. Tighten the wheel axle nut to specification.

Wheel axle nut
110 N·m (11 kgf·m, 81 lb·ft)

d. Tighten the drive chain puller locknuts to specification.

Drive chain puller locknut
16 N·m (1.6 kgf·m, 12 lb·ft)

EAS30091
LUBRICATING THE DRIVE CHAIN

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

Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

EAS30096
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

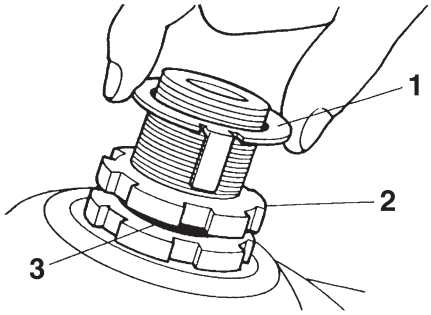
EWA13120
⚠ WARNING

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.
   Binding/looseness → Adjust the steering head.
3. Remove:
   • Upper bracket
   Refer to “HANDLEBARS” on page 4-66.
4. Adjust:
   • Steering head
   a. Remove the lock washer “1”, upper ring nut “2”, and rubber washer “3”.



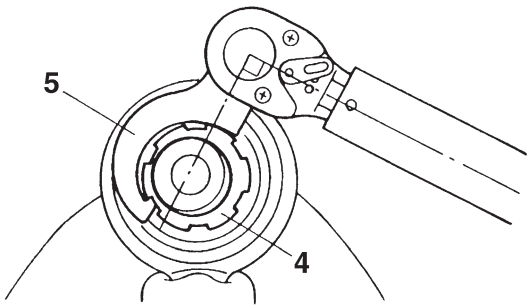
   b. Loosen the lower ring nut “4” and then tighten it to specification with a steering nut wrench “5”.

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, then tighten it to specification.

EWA13140

⚠ WARNING

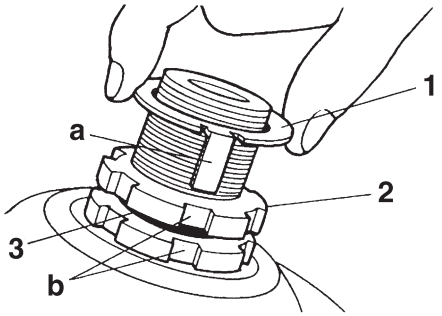
Do not overtighten the lower ring nut.

	Lower ring nut (final tightening torque) **14 N·m (1.4 kgf·m, 10 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 4-82.
e. Install the rubber washer "3".
f. Install the upper ring nut "2".
g. Finger tighten the upper ring nut "2", 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 "a" sit correctly in the ring nut slots "b".



5. Install:
• Upper bracket
Refer to "HANDLEBARS" on page 4-66.

EAS30646

LUBRICATING THE STEERING HEAD

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

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

EAS31186

CHECKING THE CHASSIS FASTENERS

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

EAS30720

LUBRICATING THE LEVERS

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

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

EAS30721

LUBRICATING THE PEDALS

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

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

EAS30650

CHECKING THE SIDESTAND

1. Check:
• Sidestand operation
Check that the sidestand moves smoothly.
Rough movement → Repair or replace.

EAS30117

LUBRICATING THE SIDESTAND

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

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

EAS30652

CHECKING THE SIDESTAND SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-150.

EAS30099

CHECKING THE FRONT FORK

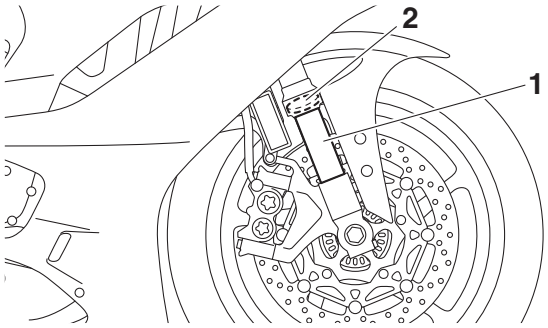
1. Stand the vehicle on a level surface.

EWA13120

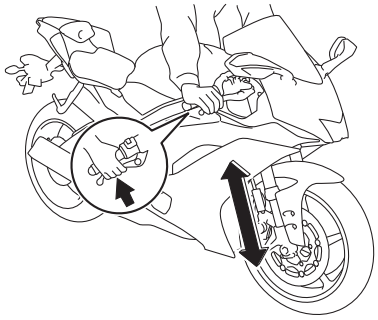
⚠ WARNING

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

2. Check:
• Inner tube "1"
Damage/scratches → Replace.
• Oil seal "2"
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 4-71.



EAS30101
ADJUSTING THE FRONT FORK LEGS

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

EWA13120
⚠ WARNING

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

Spring preload

EWA17040
⚠ WARNING

Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.

ECA13590
NOTICE

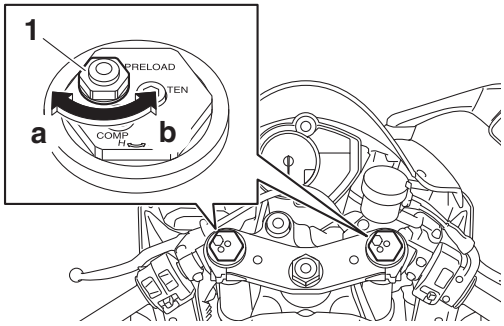
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Spring preload
   a. Turn the adjusting nut "1" in direction "a" or "b".

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

Spring preload
Minimum (soft)
0 turn(s) in direction "a"*
Standard
6 turn(s) in direction "a"*
Maximum (hard)
15 turn(s) in direction "a"*

*** With the adjusting nut fully turned in direction "b"**



Rebound damping

ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Rebound damping
   a. Turn the adjusting bolt "1" in direction "a" or "b".

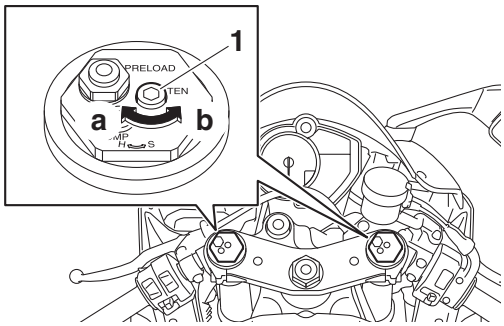
Direction "a"
Rebound damping is increased (suspension is harder).
Direction "b"
Rebound damping is decreased (suspension is softer).

Rebound damping
Minimum (soft)
14 click(s) in direction “b”*
Standard
7 click(s) in direction “b”*
Maximum (hard)
1 click(s) in direction “b”*

*** With the adjusting bolt fully turned in direction “a”**

TIP

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



Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Compression damping
     a. Turn the adjusting bolt “1” in direction “a” or “b”.

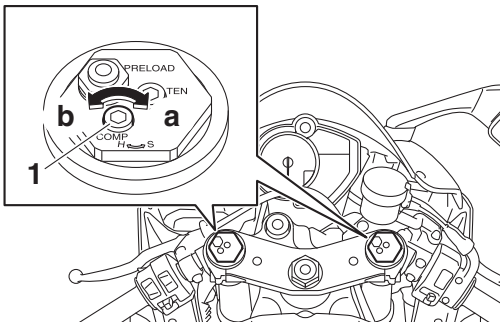
Direction “a”
Compression damping is increased (suspension is harder).
Direction “b”
Compression damping is decreased (suspension is softer).

Compression damping
Minimum (soft)
23 click(s) in direction “b”*
Standard
14 click(s) in direction “b”*
Maximum (hard)
1 click(s) in direction “b”*

*** With the adjusting bolt fully turned in direction “a”**

TIP

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



EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to “CHECKING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-87.

EAS30103

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120

⚠ WARNING

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

Spring preload

ECA13590

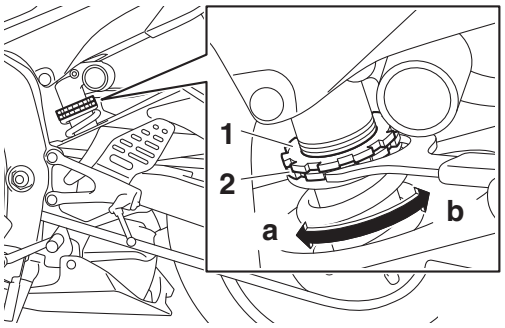
NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Spring preload
     a. Loosen the locknut “1”.

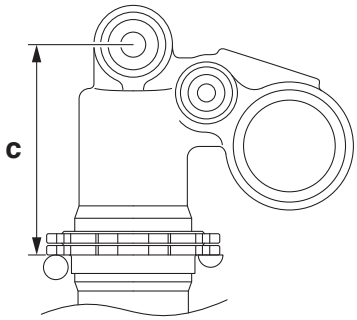
b. Adjust the spring preload with the special wrench included in the owner's tool kit.
c. Turn the adjusting ring "2" in direction "a" or "b".

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



TIP

The spring preload setting is determined by measuring distance "c". The longer distance "c" is, the higher the spring preload; the shorter distance "c" is, the lower the spring preload.



Spring preload
Minimum (soft)
84.9 mm (3.34 in)
Standard
89.9 mm (3.54 in)
Maximum (hard)
92.9 mm (3.66 in)

d. Tighten the locknut to the specified torque.

Spring preload adjusting ring locknut
28 N·m (2.8 kgf·m, 21 lb·ft)

Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
• Rebound damping
a. Turn the adjusting bolt "1" in direction "a" or "b".

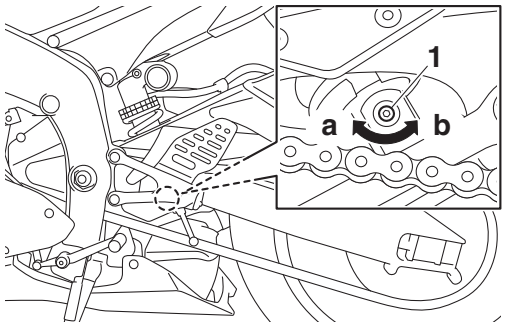
Direction "a"
Rebound damping is increased (suspension is harder).
Direction "b"
Rebound damping is decreased (suspension is softer).

Rebound damping
Minimum (soft)
23 click(s) in direction "b"*
Standard
12 click(s) in direction "b"*
Maximum (hard)
1 click(s) in direction "b"*

*** With the adjusting screw fully turned in direction "a"**

TIP

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



Compression damping (for fast compression damping)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Compression damping (for fast compression damping)
     a. Turn the adjusting bolt “1” in direction “a” or “b”.

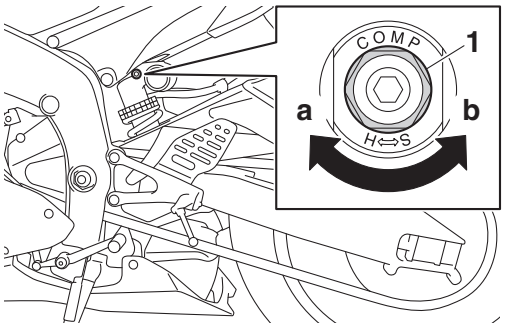
Direction “a”
Compression damping is increased (suspension is harder).
Direction “b”
Compression damping is decreased (suspension is softer).

Fast compression damping
Minimum (soft)
5.5 turn(s) in direction “b”*
Standard
3 turn(s) in direction “b”*
Maximum (hard)
0 turn(s) in direction “b”*

*** With the adjusting bolt fully turned in direction “a”**

TIP

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



Compression damping (for slow compression damping)

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Compression damping (for slow compression damping)
     a. Turn the adjusting bolt “1” in direction “a” or “b”.

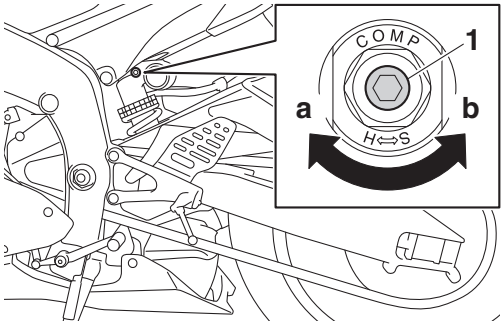
Direction “a”
Compression damping is increased (suspension is harder).
Direction “b”
Compression damping is decreased (suspension is softer).

Slow compression damping
Minimum (soft)
18 click(s) in direction “b”*
Standard
14 click(s) in direction “b”*
Maximum (hard)
1 click(s) in direction “b”*

*** With the adjusting screw fully turned in direction “a”**

TIP

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



EAS30809

CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to “CHECKING THE CONNECTING ARM AND RELAY ARM” on page 4-88.

EAS30038

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

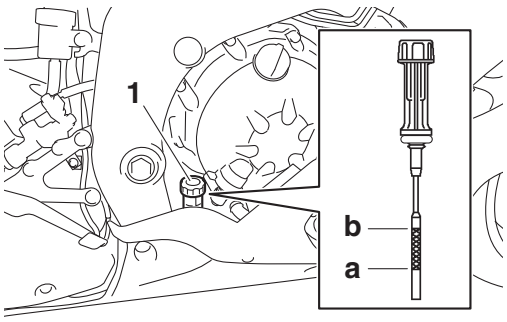
• Place the vehicle on a suitable stand.
• Make sure the vehicle is upright.

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

TIP

- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the dipstick in when inspecting the oil level.



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

ECA13361

NOTICE

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

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

TIP

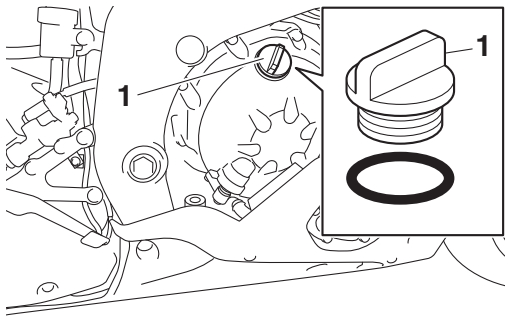
Before checking the engine oil level, wait a few minutes until the oil has settled.

7. Install:
   • Dipstick

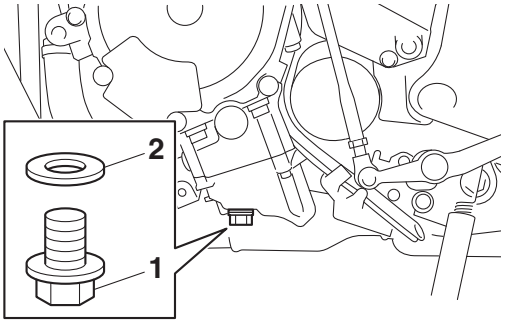
EAS30039

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Remove:
   • Bottom cowling
   Refer to “GENERAL CHASSIS (5)” on page 4-8.
3. Place a container under the engine oil drain bolt.
4. Remove:
   • Engine oil filler cap “1”

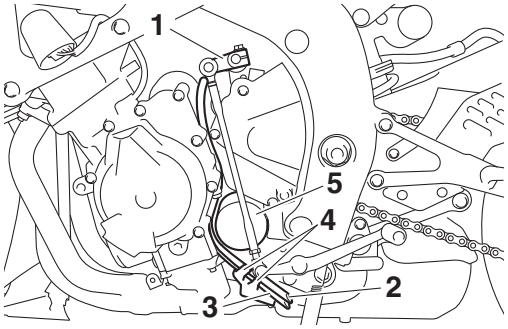


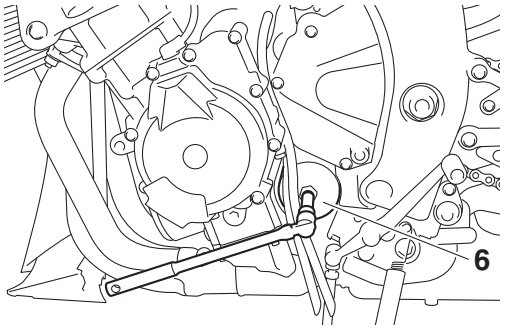
5. Remove:
   • Engine oil drain bolt “1”
   (along with the gasket “2”)



6. Drain:
   • Engine oil
   (completely from the crankcase)
7. If the oil filter cartridge is also to be replaced, perform the following procedure.
   a. Remove the shift arm “1”.
   b. Pull the fuel tank breather hose “2” (except for California) and fuel tank over flow hose “3” upward to remove them from the guide “4”.
   c. Remove the oil filter cartridge “5” with an oil filter wrench “6”.

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



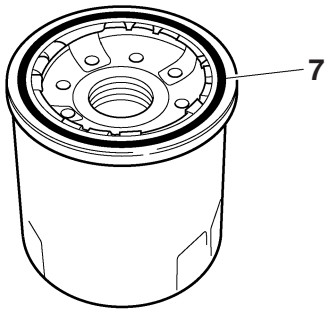


d. Lubricate the O-ring "7" of the new oil filter cartridge with a thin coat of engine oil.

ECA23090

NOTICE

Make sure the O-ring "7" is positioned correctly in the groove of the oil filter cartridge.



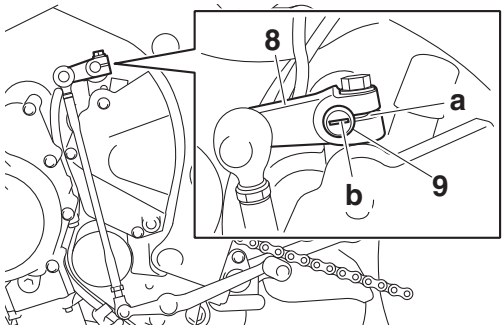
e. Tighten the new oil filter cartridge to specification with an oil filter wrench.

Oil filter cartridge
17 N·m (1.7 kgf·m, 13 lb·ft)

f. Insert the fuel tank breather hose and fuel tank overflow hose into the guide and place them in their original position.

g. Install the shift arm "8" by aligning the slot "a" in the shift arm with the notch "b" in the shift shaft "9".

Shift arm bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)



8. Check:
   - Engine oil drain bolt gasket
     Damage → Replace.
9. Install:
   - Engine oil drain bolt
     (along with the gasket)

Engine oil drain bolt
43 N·m (4.3 kgf·m, 32 lb·ft)

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

Engine oil quantity
Quantity (disassembled)
3.40 L (3.59 US qt, 2.99 Imp.qt)
Oil change
2.40 L (2.54 US qt, 2.11 Imp.qt)
With oil filter removal
2.60 L (2.75 US qt, 2.29 Imp.qt)

11. Install:
    - Engine oil filler cap
12. Start the engine, warm it up for several minutes, and then turn it off.
13. Check:
    - Engine
      (for engine oil leaks)
14. Check:
    - Engine oil level
      Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-25.

EAS30040

MEASURING THE ENGINE OIL PRESSURE

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

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

ECA13410

NOTICE

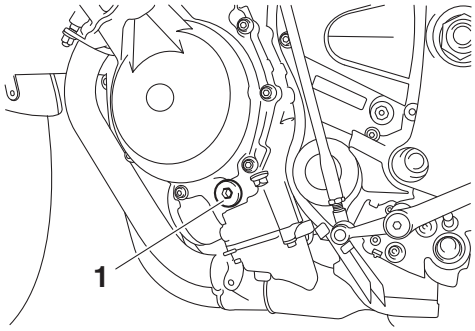
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:
   - Front side cowling assembly
     Refer to "GENERAL CHASSIS (5)" on page 4-8.
4. Remove:
   - Main gallery bolt "1"

EWA12980

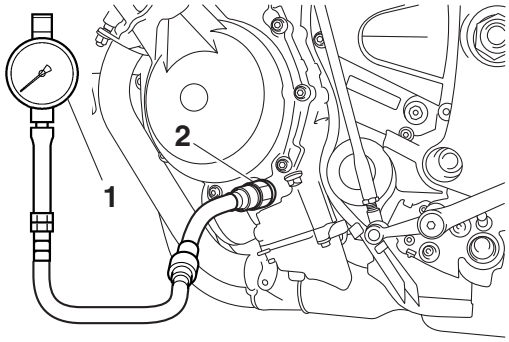
WARNING

The engine, muffler and engine oil are extremely hot.



5. Install:
   - Oil pressure gauge set "1"
   - Oil pressure adapter H "2"

Oil pressure gauge set
90890-03120
Oil pressure adapter H
90890-03139



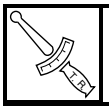
6. Measure:
   - Engine oil pressure
     (at the following conditions)

Oil pressure
40.0 kPa/1300 r/min (0.40 kgf/cm²/1300 r/min, 5.8 psi/1300 r/min)

Out of specification → Adjust.

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

7. Install:
   - Main gallery bolt



Main gallery bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)

8. Install:
   - Front side cowling assembly
     Refer to "GENERAL CHASSIS (5)" on page 4-8.

EAS30066

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

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

2. Check:
   - Coolant level
     The coolant level should be between the minimum level mark "a" and maximum level mark "b".
     Below the minimum level mark → Remove the coolant reservoir cap, add the recommended coolant to the proper level.

TIP

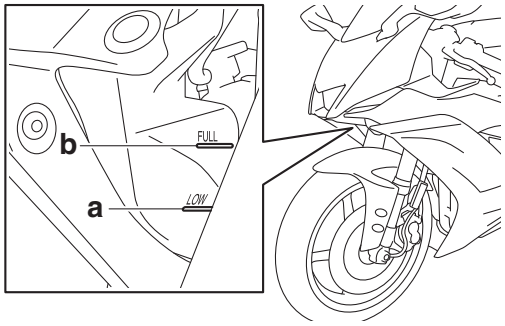
To access the coolant reservoir cap, remove the right front upper panel. Refer to "GENERAL CHASSIS (5)" on page 4-8.

ECA13470

NOTICE

- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.**

• Use only distilled water. However, if distilled water is not available, soft water may be used.



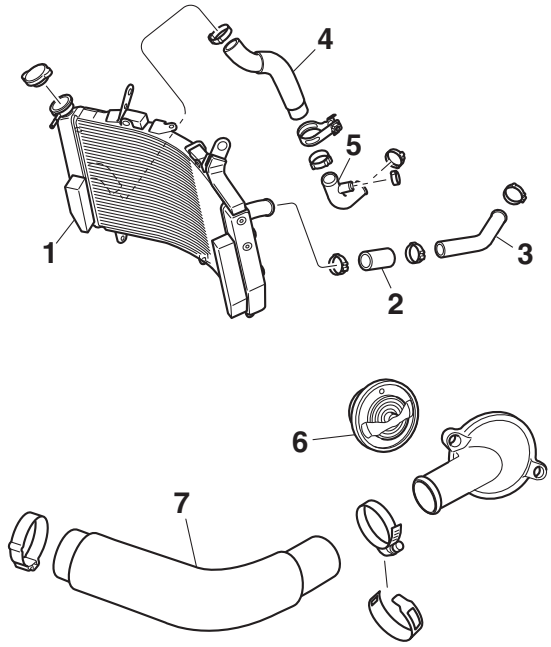
3. Start the engine, warm it up for several minutes, and then turn it off.
4. Check:
   • Coolant level

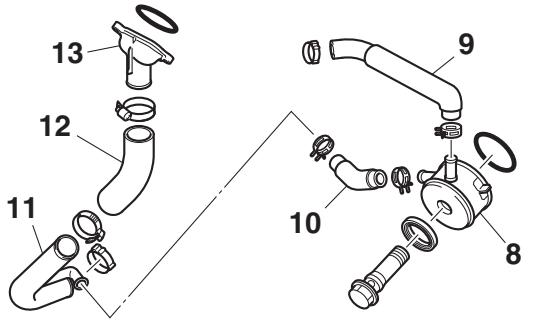
TIP

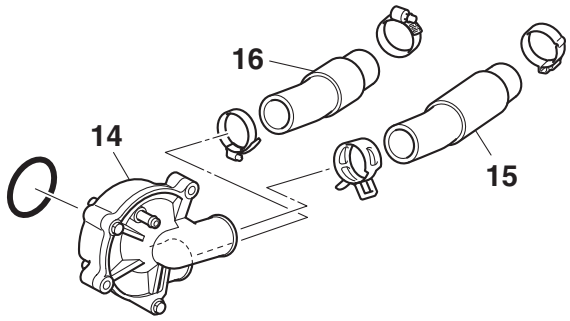
Before checking the coolant level, wait a few minutes until it settles.

EAS30067
CHECKING THE COOLING SYSTEM

1. Remove:
   • Front side cowling assembly
   Refer to "GENERAL CHASSIS (5)" on page 4-8.
   • Exhaust pipe assembly
   Refer to "ENGINE REMOVAL" on page 5-9.
2. Check:
   • Radiator "1"
   • Radiator inlet hose "2"
   • Radiator inlet pipe "3"
   • Radiator outlet hose "4"
   • Radiator outlet pipe "5"
   • Thermostat "6"
   • Thermostat outlet hose "7"
   • Oil cooler "8"
   • Oil cooler outlet hose "9"
   • Oil cooler inlet hose "10"
   • Water pump outlet pipe "11"
   • Water jacket joint inlet hose "12"
   • Water jacket joint "13"
   • Water pump "14"
   • Water pump inlet hose "15"
   • Water pump outlet hose "16"
   Cracks/damage → Replace.
   Refer to "RADIATOR" on page 6-3.
   Refer to and "OIL COOLER" on page 6-7.
   Refer to "THERMOSTAT" on page 6-10.
   Refer to "WATER PUMP" on page 6-12.







3. Install:
   • Exhaust pipe assembly
   Refer to "ENGINE REMOVAL" on page 5-9.
   • Front side cowling assembly
   Refer to "GENERAL CHASSIS (5)" on page 4-8.

EAS30068
CHANGING THE COOLANT

1. Remove:
   • Front upper panel
   • Front side cowling assembly

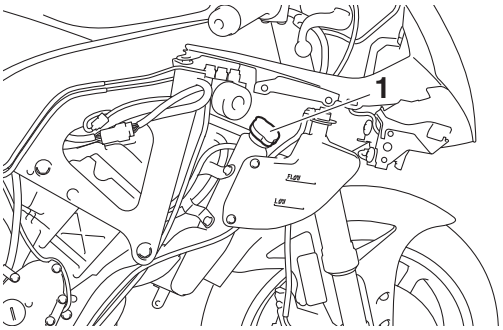
• Bottom cowling
Refer to "GENERAL CHASSIS (5)" on page 4-8.

2. Remove:
• Radiator cap "1"

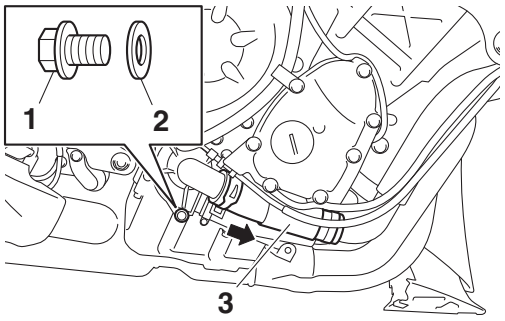
EWA13030

⚠ WARNING

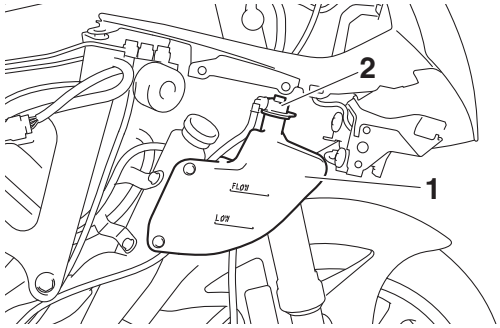
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly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



3. Remove:
• Coolant drain bolt (water pump) "1"
(along with the copper washer "2")
4. Disconnect:
• Water pump inlet hose "3"



5. Drain:
• Coolant
(from the engine and radiator)
6. Remove:
• Coolant reservoir "1"
• Coolant reservoir cap "2"



7. Drain:
• Coolant
(from the coolant reservoir)
8. Install:
• Coolant reservoir
9. Connect:
• Water pump inlet hose
10. Install:
• Coolant drain bolt (water pump)
(along with the copper washer New)

Coolant drain bolt (water pump)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

11. Fill:
• Cooling system
(with the specified amount of the recommended coolant)

Mixing ratio
1:1 (antifreeze:water)
Radiator (including all routes)
2.30 L (2.43 US qt, 2.02 Imp.qt)
Coolant reservoir (up to the maximum level mark)
0.25 L (0.26 US qt, 0.22 Imp.qt)

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

EWA13040

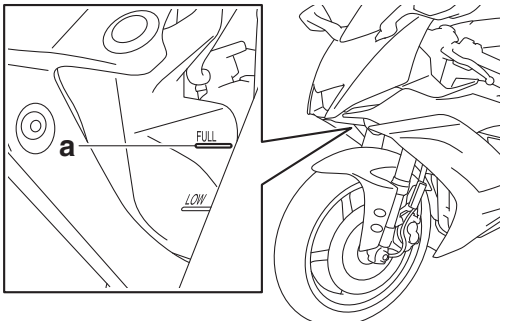
⚠ WARNING

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

ECA13481
NOTICE

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

12. Install:
    - Radiator cap
13. Fill:
    - Coolant reservoir
      (with the recommended coolant to the maximum level mark "a")



14. Install:
    - Coolant reservoir cap
15. Start the engine, warm it up for several minutes, and then stop it.
16. Check:
    - Coolant level
      Refer to "CHECKING THE COOLANT LEVEL" on page 3-28.

TIP

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

17. Install:
    - Bottom cowling
    - Front side cowling assembly
    - Front upper panel
      Refer to "GENERAL CHASSIS (5)" on page 4-8.

EAS30658
CHECKING THE BRAKE LIGHT SWITCHES

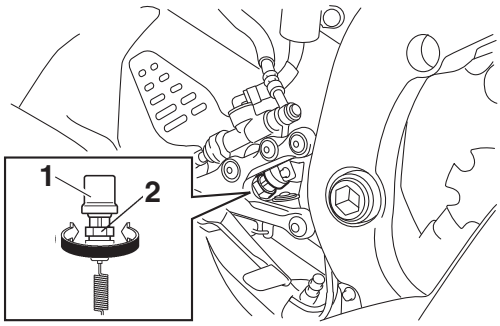
1. Check:
   - Front brake light switch operation
   - Rear brake light switch operation
     When operating the brake lever and brake pedal, confirm that the brake light turns on.
     Faulty → Refer to "CHECKING THE SWITCHES" on page 8-150.

EAS30083
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" until the rear brake light comes on at the proper time.



EAS30114
CHECKING AND LUBRICATING THE CABLES

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

EWA13270
⚠ WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

TIP

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

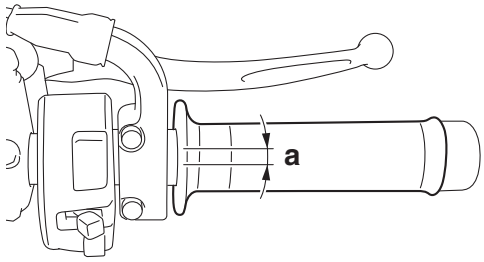
EAS30707
ADJUSTING THE THROTTLE CABLE FREE PLAY

TIP

Prior to adjusting the throttle cable free play, the engine idling speed and throttle body synchronization should be adjusted properly.

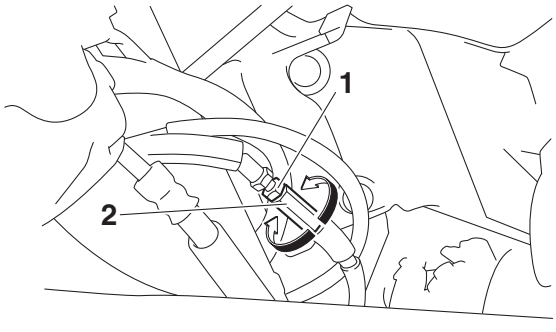
1. Check:
   • Throttle cable free play "a"
   Out of specification → Adjust.

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



2. Adjust:
   • Throttle cable free play
   a. Loosen the locknut "1".
   b. Turn the adjusting nut "2" until the specified throttle cable free play is obtained.
   c. Tighten the locknut "1".

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



EWA12910
WARNING

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

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 8-150 and "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).

EAS30120
CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.

EAS30121
CHECKING THE FUSES

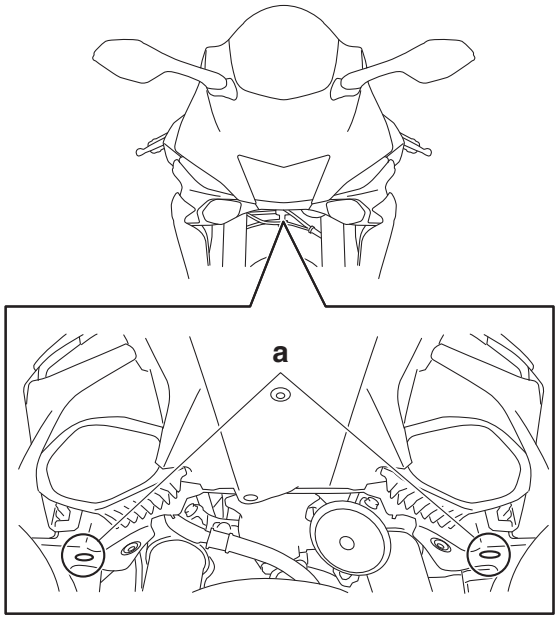
Refer to "CHECKING THE FUSES" on page 8-151.

EAS30124
ADJUSTING THE HEADLIGHT BEAMS

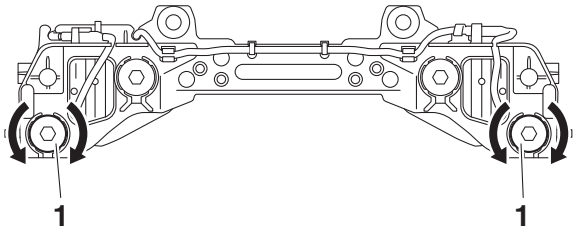
1. Adjust:
   • Headlight beam (vertically)

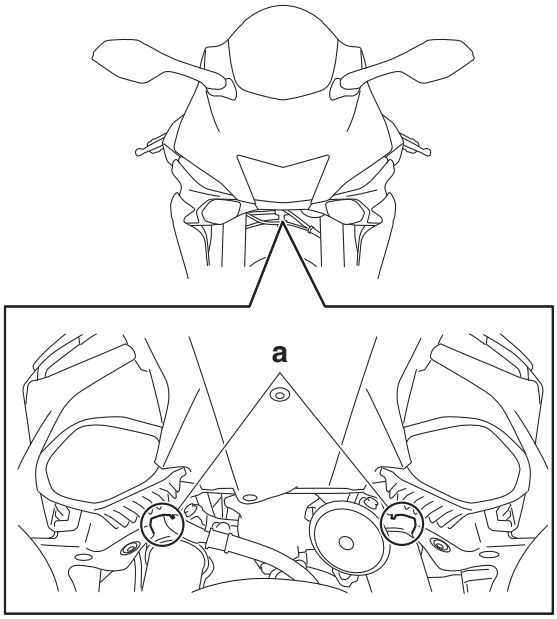
TIP

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

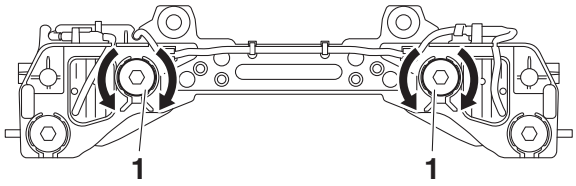


a. Turn the adjusting screw “1”.





a. Turn the adjusting screw “1”.



2. Adjust:
   • Headlight beam (horizontally)

TIP

To adjust the headlight beam (horizontally), insert a crosshead screwdriver into holes “a” in the headlight cover and turn the adjusting screw.

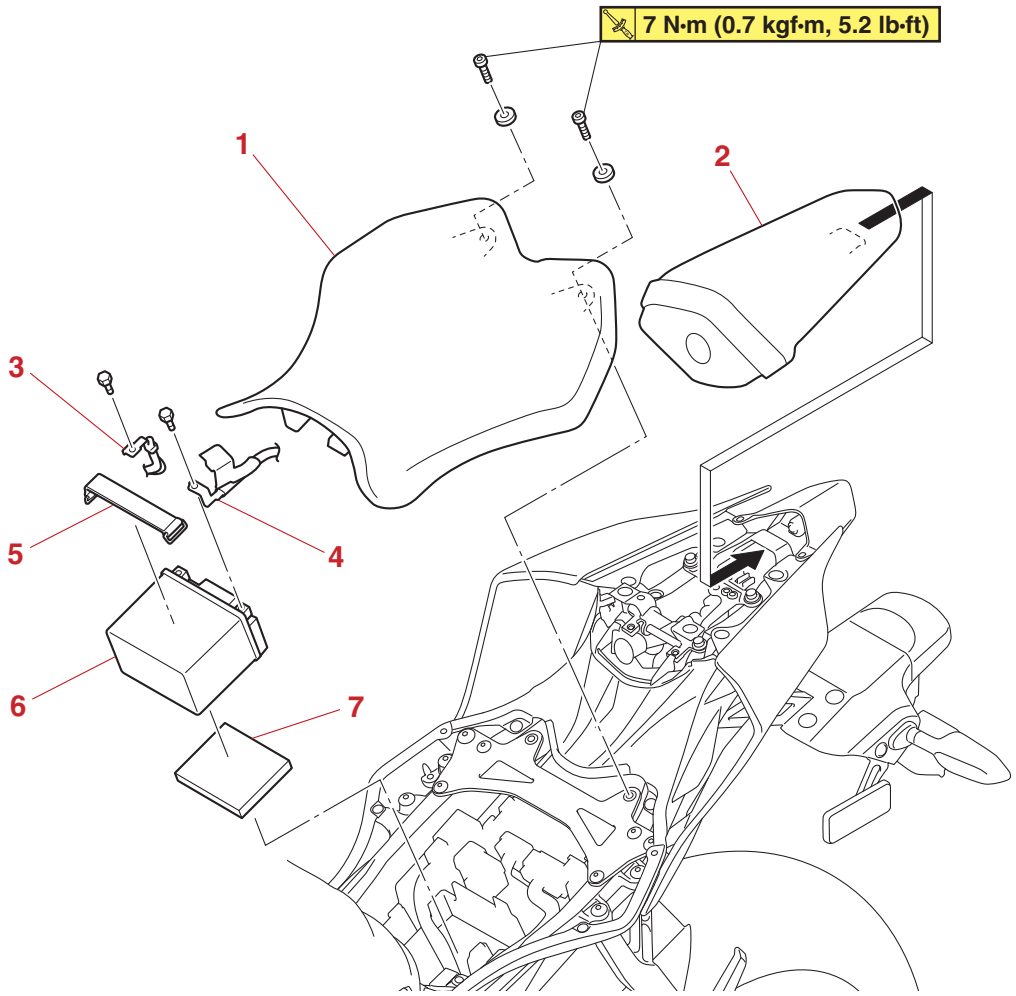
CHASSIS

4

EAS20026

GENERAL CHASSIS (1)

Removing the seat and battery

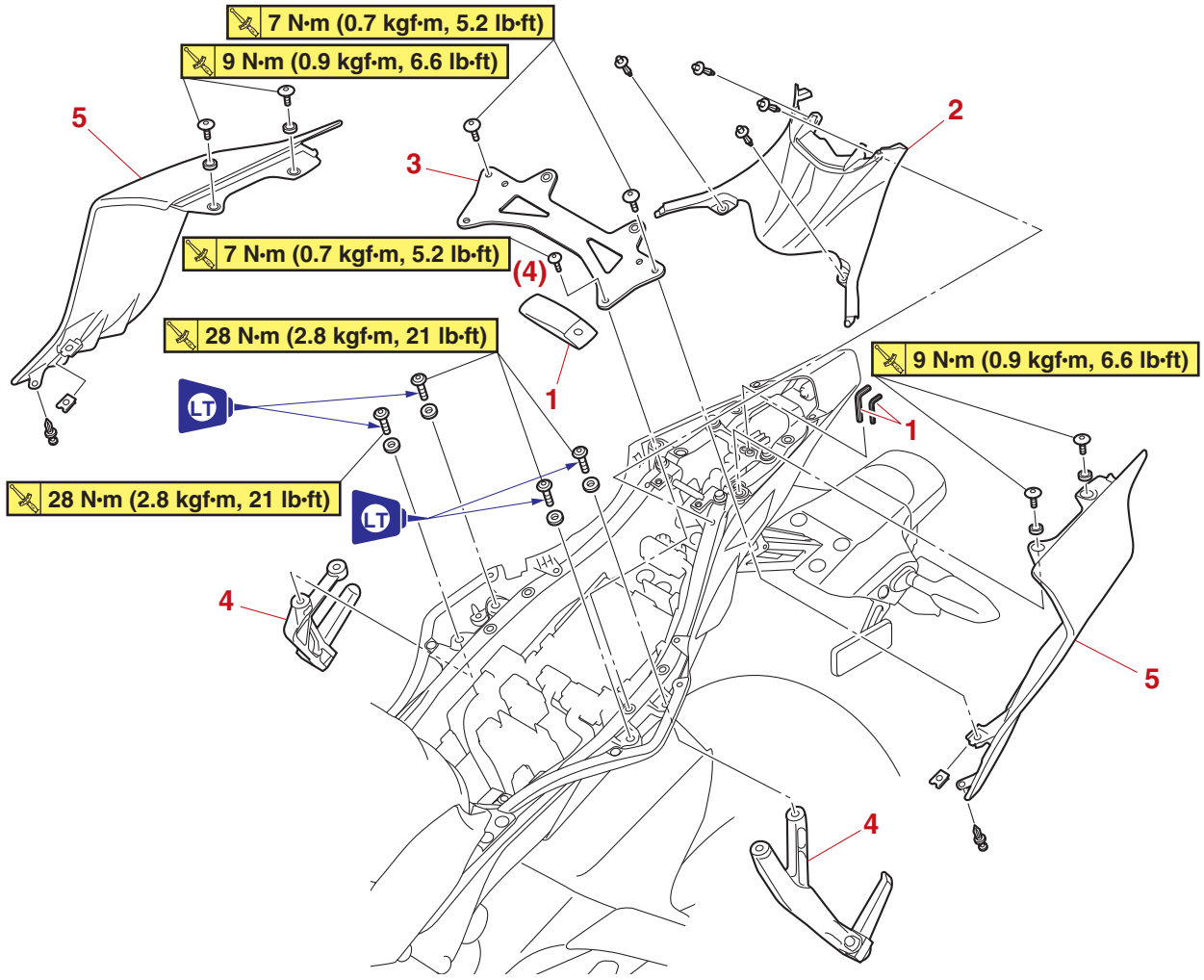


Order	Job/Parts to remove	Q'ty	Remarks
1	Rider seat	1	
2	Passenger seat	1	
3	Negative battery lead	1	Disconnect.
4	Positive battery lead	1	Disconnect.
5	Battery band	1	
6	Battery	1	
7	Damper	1	

EAS20155

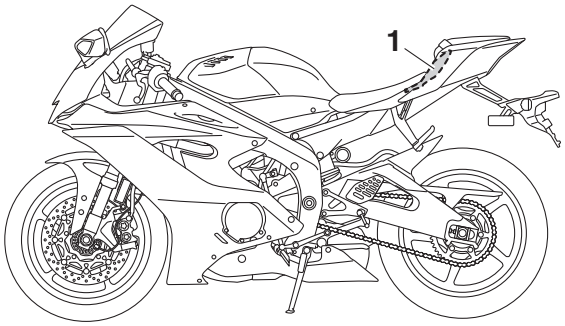
GENERAL CHASSIS (2)

Removing the rear side cowlings

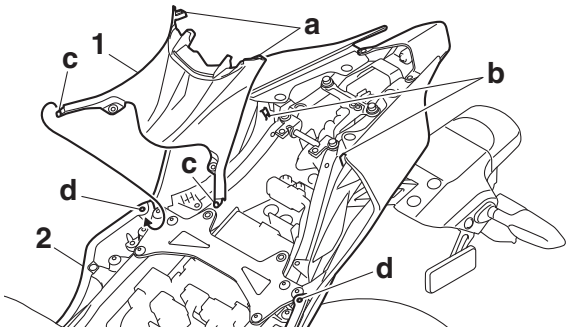


Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Passenger seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Owner's tool kit	1	
2	Rear center cover	1	
3	Rider seat bracket	1	
4	Passenger footrest	2	
5	Rear side cowling	2	

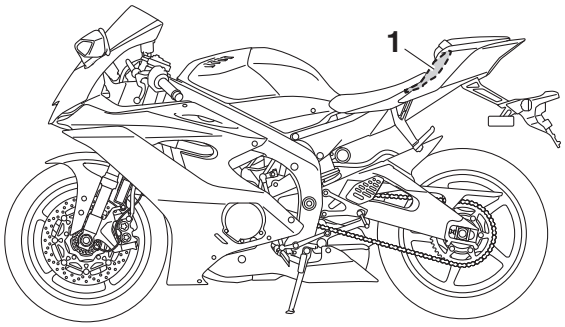
EAS32351
REMOVING THE REAR CENTER COVER
1. Remove:
   • Rear center cover “1”



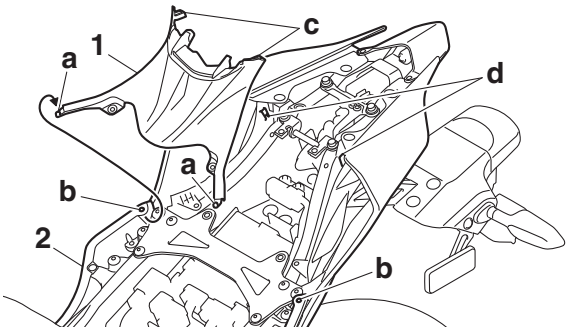
   a. Remove the quick fasteners.
   b. Unhook the holes “a” in the rear center cover from the projections “b” on the rear lower cover “2”, and unhook the projections “c” on the rear center cover from the holes “d” in the rear lower cover, and then remove the rear center cover.



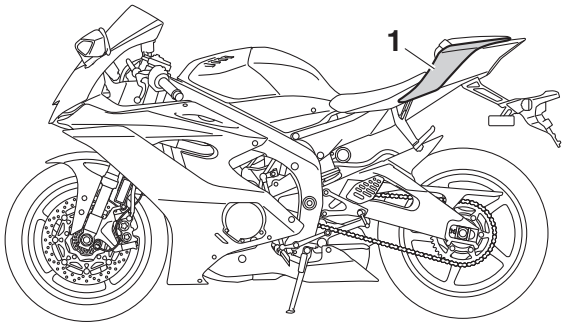
EAS32352
INSTALLING THE REAR CENTER COVER
1. Install:
   • Rear center cover “1”



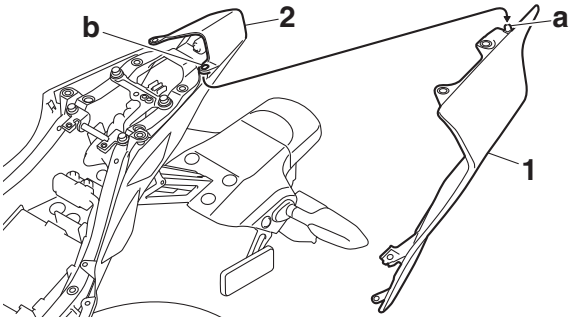
   a. Fit the projections “a” on the rear center cover into the holes “b” in the rear lower cover “2”, and fit the holes “c” in the rear center cover onto the projections “d” on the rear lower cover, and then install the quick fasteners.



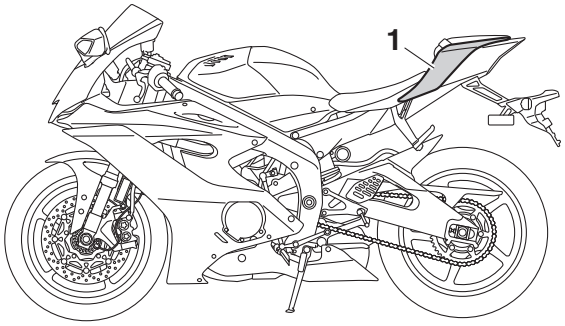
EAS32386
REMOVING THE REAR SIDE COWLING
The following procedure applies to both of the rear side cowlings.
1. Remove:
   • Rear side cowling “1”



   a. Remove the bolts and quick fastener.
   b. Unhook the projection “a” on the rear side cowling from the hole “b” in the rear lower cover “2”, and then remove the rear side cowling.

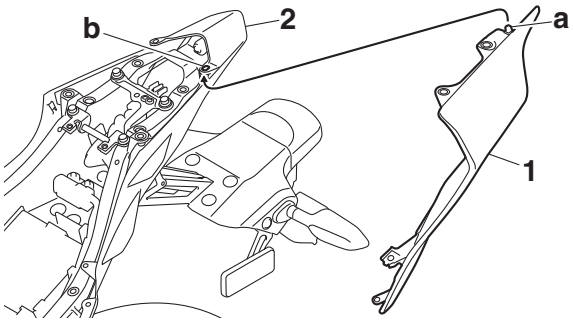


EAS32387
INSTALLING THE REAR SIDE COWLING
The following procedure applies to both of the rear side cowlings.
1. Install:
   • Rear side cowling “1”



a. Fit the projection “a” on the rear side cowling into the hole “b” in the rear lower cover “2”, and then tighten the rear side cowling bolts.

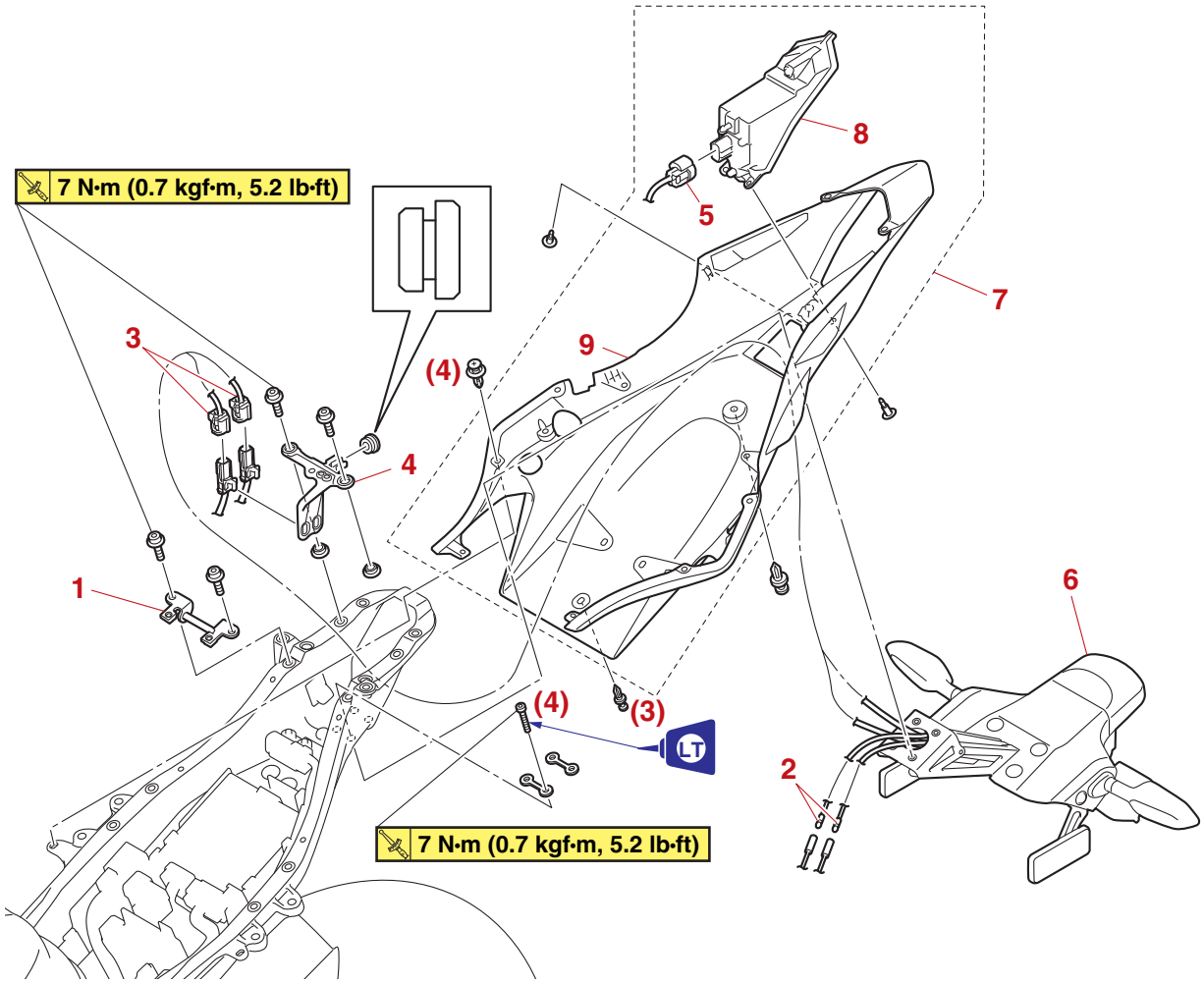
	Rear side cowling bolt **9 N·m (0.9 kgf·m, 6.6 lb·ft)**



EAS20156

GENERAL CHASSIS (3)

Removing the tail/brake light assembly

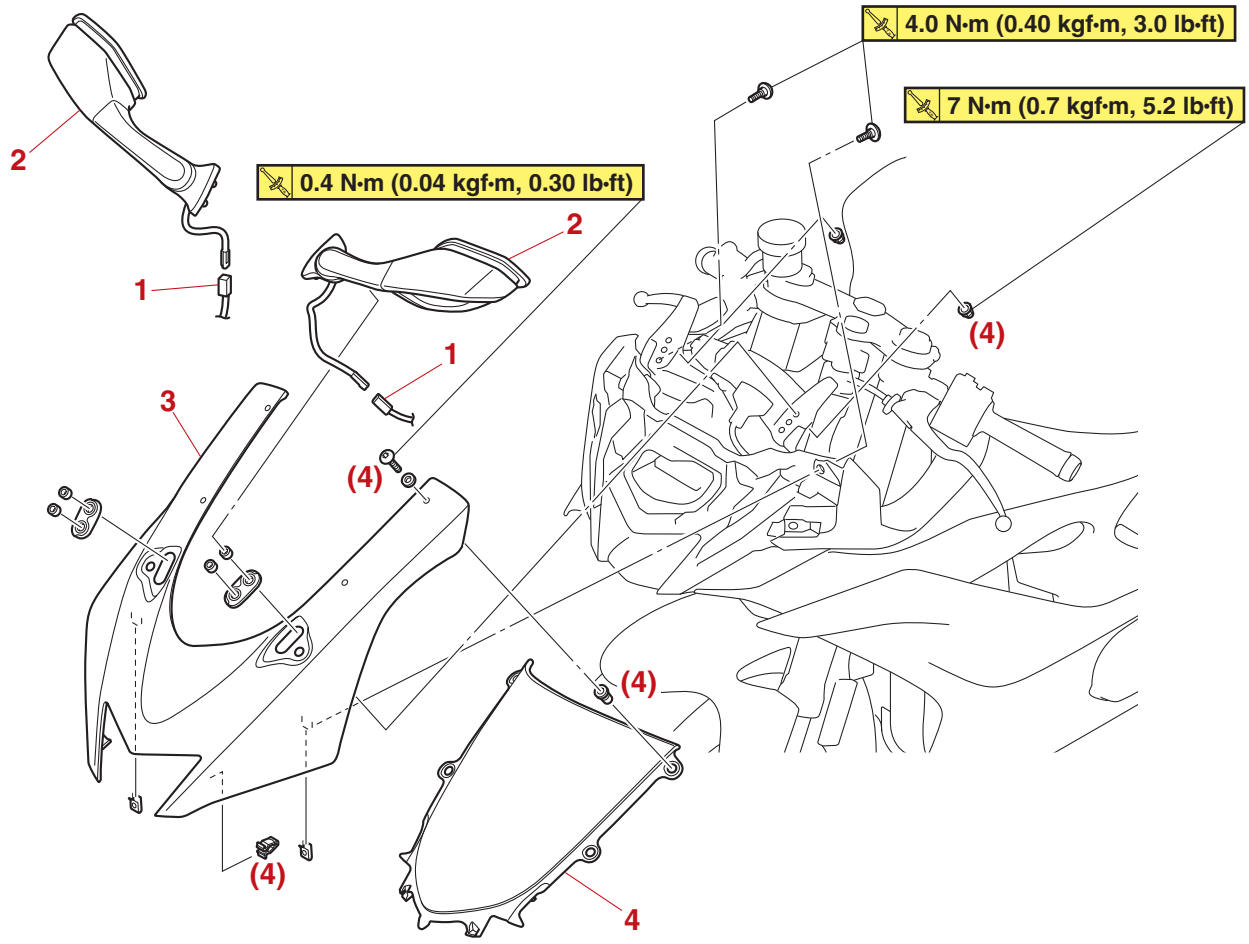


Order	Job/Parts to remove	Q'ty	Remarks
	Rear side cowling		Refer to "GENERAL CHASSIS (2)" on page 4-2.
1	Passenger seat bracket	1	
2	License plate light connector	2	Disconnect.
3	Rear turn signal light coupler	2	Disconnect.
4	Coupler holder	1	
5	Tail/brake light coupler	1	Disconnect.
6	License plate light assembly	1	
7	Rear lower cover assembly	1	
8	Tail/brake light assembly	1	
9	Rear lower cover	1	

EAS20157

GENERAL CHASSIS (4)

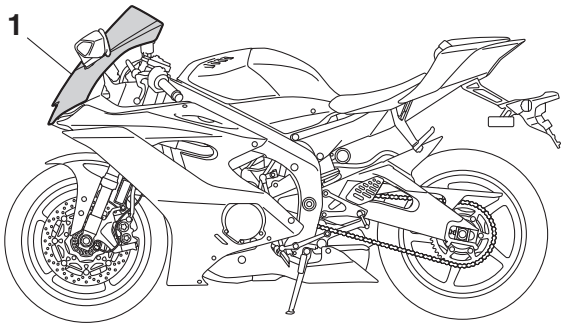
Removing the front upper cowling



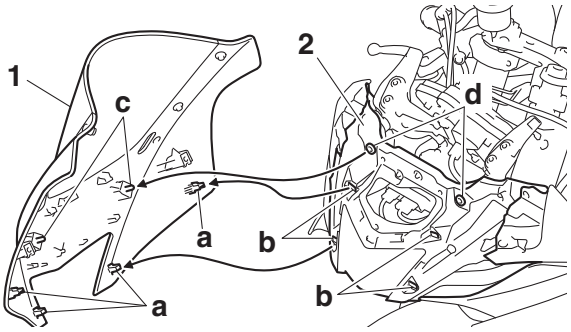
Order	Job/Parts to remove	Q'ty	Remarks
1	Front turn signal/position light coupler	2	Disconnect.
2	Rearview mirror	2	
3	Front upper cowling	1	
4	Windshield	1	

EAS31362
REMOVING THE FRONT UPPER COWLING

1. Remove:
   • Front upper cowling “1”

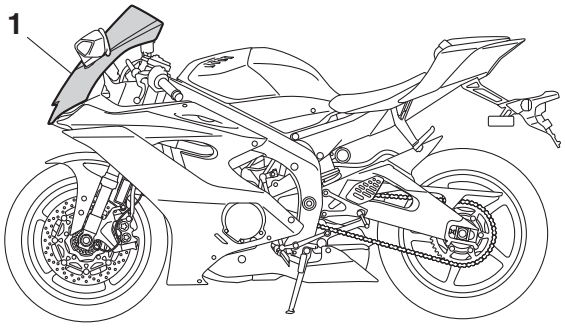


   a. Remove the bolts.
   b. Unhook the projections “a” on the front upper cowling from the holes “b” in the headlight assembly “2”, and remove the projections “c” on the front upper cowling from the grommets “d”, and then remove the front upper cowling.



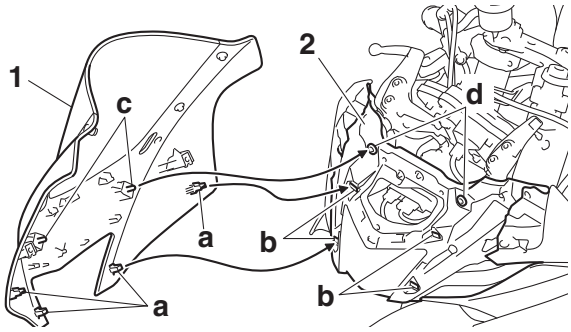
EAS31363
INSTALLING THE FRONT UPPER COWLING

1. Install:
   • Front upper cowling “1”



   a. Fit the projections “a” on the front upper cowling into the holes “b” in the headlight assembly “2”, and insert the projections “c” on the front upper cowling into the grommets “d”.
   b. Install the bolts.

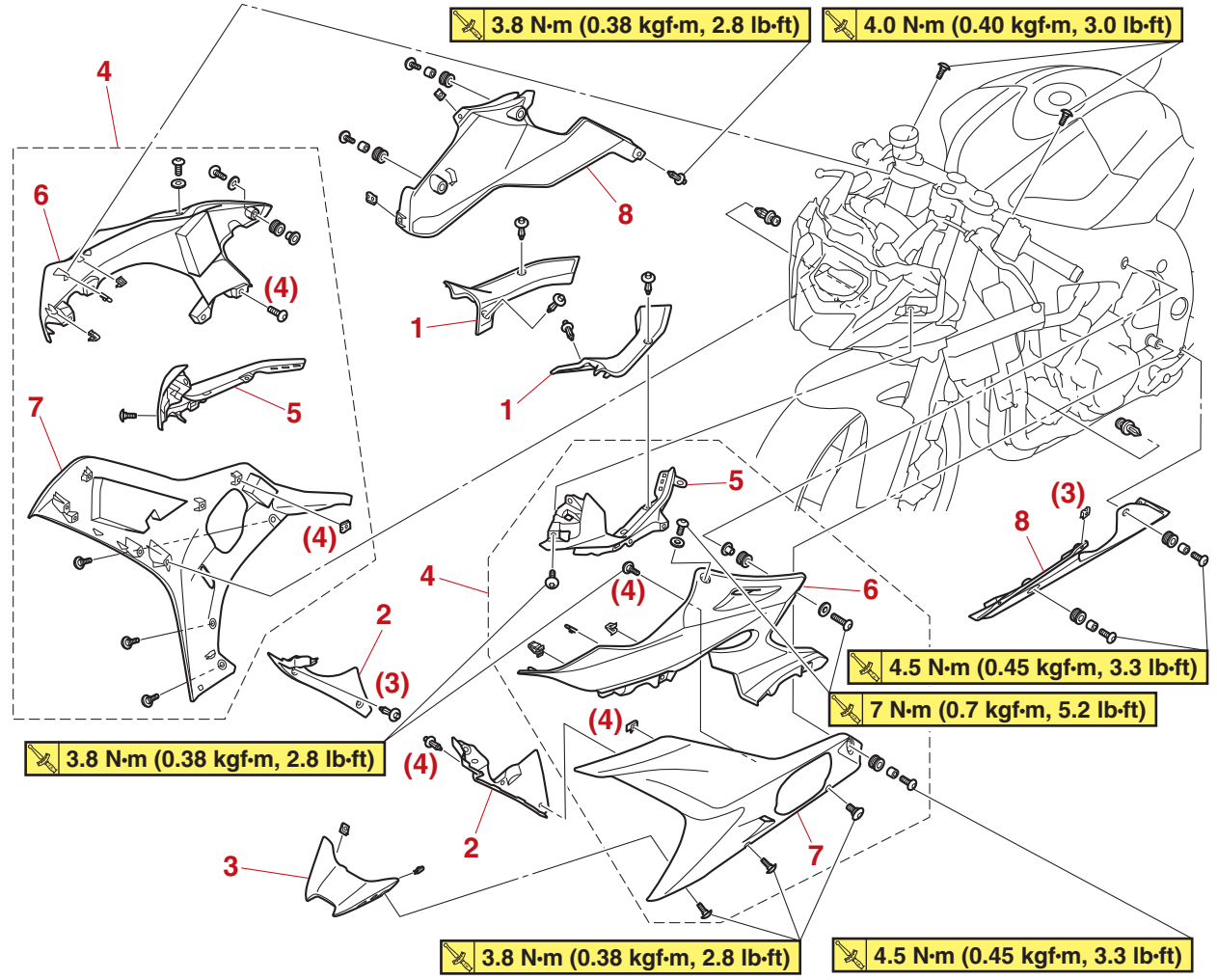
T.R.	**Front center cowling bolt** **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**



EAS20158

GENERAL CHASSIS (5)

Removing the front side cowlings

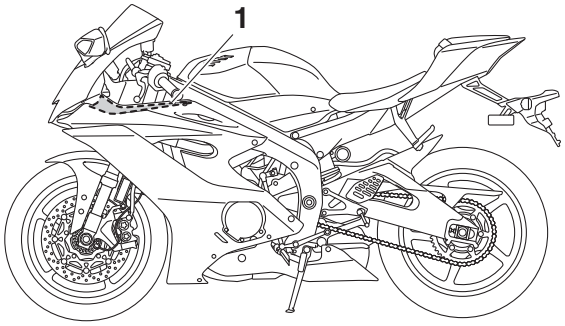


Order	Job/Parts to remove	Q'ty	Remarks
	Front upper cowling		Refer to "GENERAL CHASSIS (4)" on page 4-6.
1	Front upper panel	2	
2	Front side cowling upper inner panel	2	
3	Front side cowling lower inner panel	1	
4	Front side cowling assembly	2	
5	Front lower panel	2	
6	Upper front side cowling	2	
7	Lower front side cowling	2	
8	Bottom cowling	2	

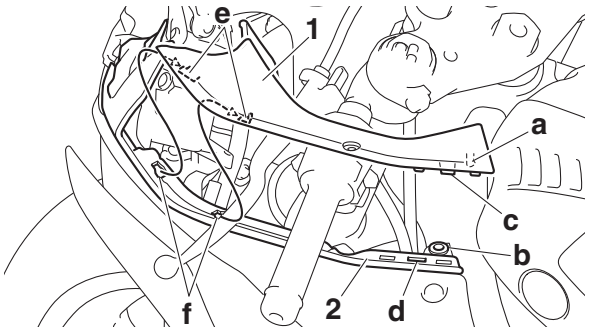
EAS31266
REMOVING THE FRONT UPPER PANEL

The following procedure applies to both of the front upper panels.

1. Remove:
   • Front upper panel “1”



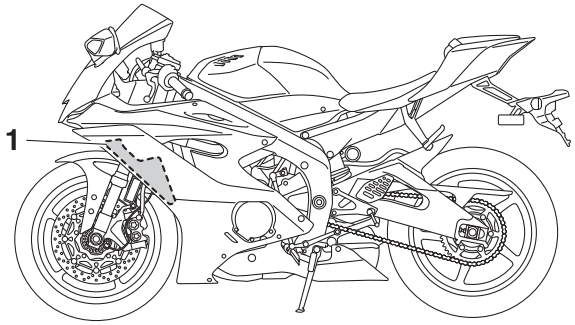
   a. Remove the quick fasteners.
   b. Remove the projection “a” on the front upper panel from the grommet “b”, and unhook the projection “c” on the front upper panel from the hole “d” in the front lower panel “2”.
   c. Slide the front upper panel rearward and remove the projections “e” on the front upper panel from the holes “f” in the front lower panel.



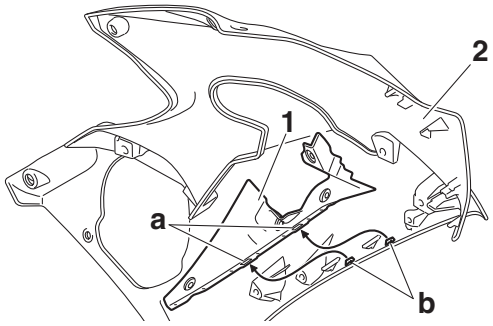
EAS32390
REMOVING THE FRONT SIDE COWLING UPPER INNER PANEL

The following procedure applies to both of the front side cowling upper inner panels.

1. Remove:
   • Front side cowling upper inner panel “1”

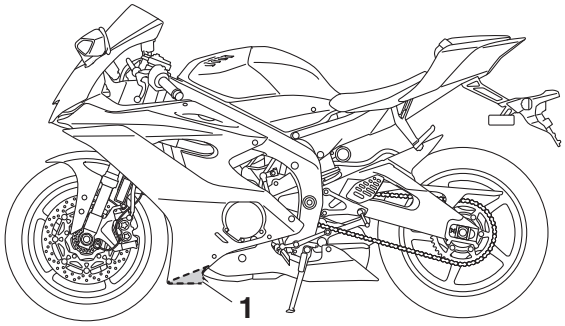


   a. Remove the quick fasteners.
   b. Unhook the holes “a” in the front side cowling upper inner panel from the projections “b” on the side cowling assembly “2”, and then remove the front side cowling upper inner panel.

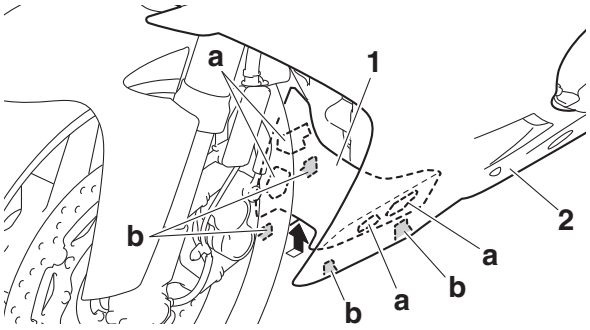


EAS32391
REMOVING THE FRONT SIDE COWLING LOWER INNER PANEL

1. Remove:
   • Front side cowling lower inner panel “1”



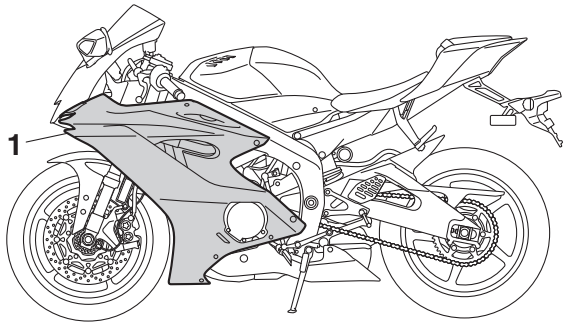
   a. Remove the bolts.
   b. Slide the front side cowling lower inner panel in the direction of the arrow shown in the illustration to remove the holes “a” in the front side cowling lower inner panel from the projections “b” on the front side cowling assemblies “2”.



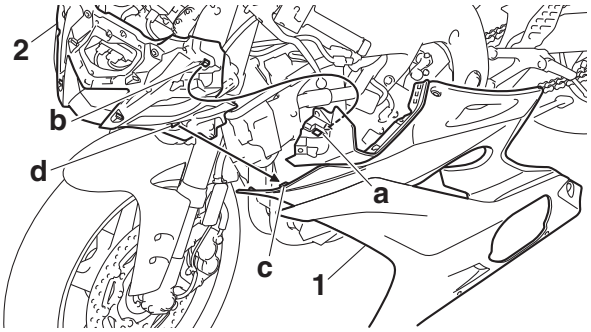
EAS31360
REMOVING THE FRONT SIDE COWLING ASSEMBLY

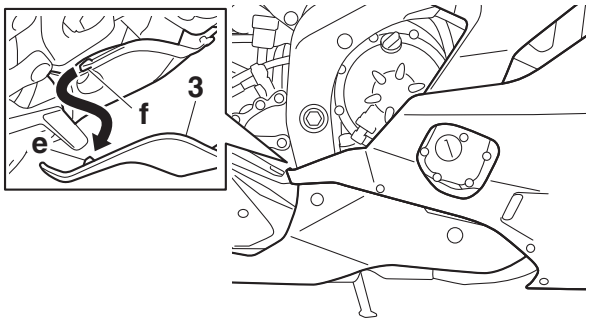
The following procedure applies to both of the front side cowling assemblies.

1. Remove:
   • Front side cowling assembly “1”

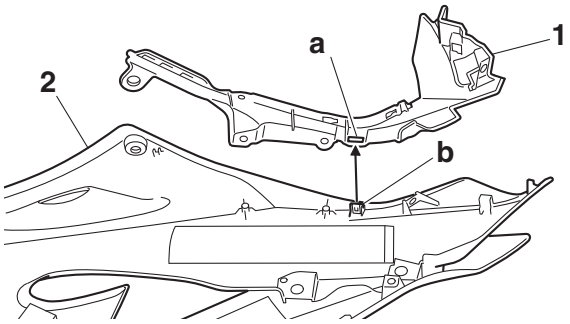


   a. Remove the bolts and quick fastener.
   b. Unhook the hole “a” in the front side cowling assembly from the projection “b” on the headlight cover “2”, and unhook the projection “c” on the front side cowling assembly from the hole “d” in the headlight cover.
   c. Slide the front side cowling assembly rearward to remove the hole “e” in the front side cowling assembly from the projection “f” on the bottom cowling “3”. (right side only)
   d. Remove the front side cowling assembly.

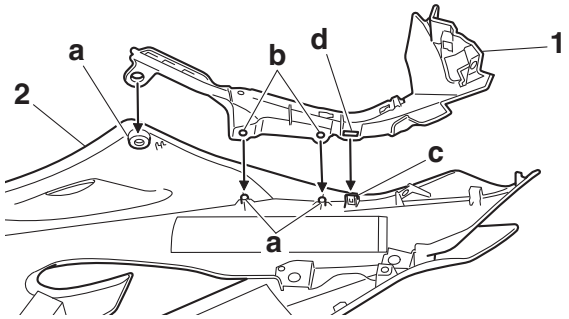




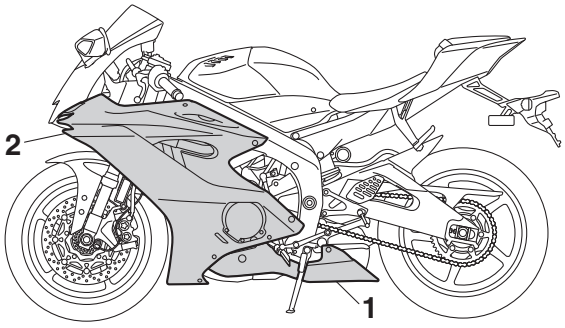
EAS31274
REMOVING THE FRONT LOWER PANEL
The following procedure applies to both of the front lower panels.
1. Remove:
   • Front lower panel “1”
   a. Unhook the hole “a” in the front lower panel from the projection “b” on the upper front side cowling “2”.



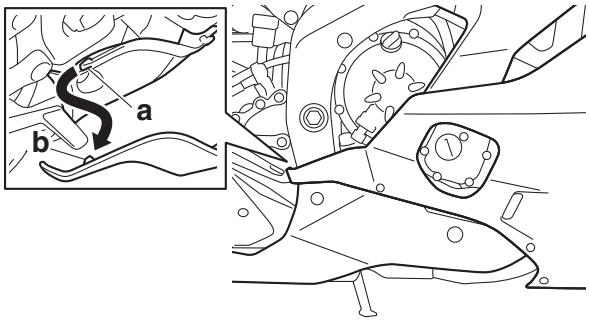
EAS31275
INSTALLING THE FRONT LOWER PANEL
The following procedure applies to both of the front lower panels.
1. Install:
   • Front lower panel “1”
   a. Fit the projections “a” on the upper front side cowling “2” into the holes “b” in the front lower panel, and then insert the projection “c” on the upper front side cowling into the hole “d” in the front lower panel.



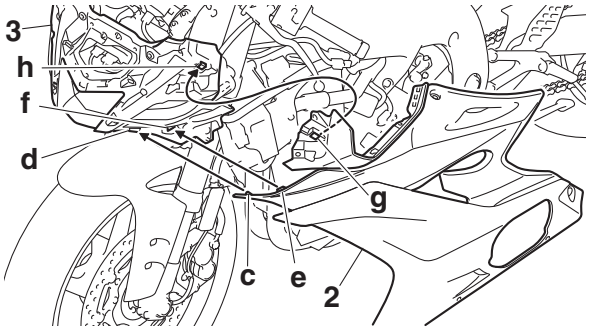
EAS32392
INSTALLING THE BOTTOM COWLING AND FRONT SIDE COWLING ASSEMBLY
The following procedure applies to both of the bottom cowlings and front side cowling assemblies.
1. Install:
   • Bottom cowling “1”
   • Bottom cowling bolt (temporarily tighten)
   • Front side cowling assembly “2”
   • Front side cowling assembly bolt (temporarily tighten)



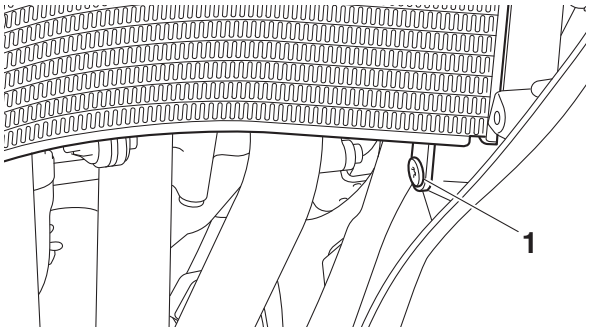
a. Install the bottom cowling temporarily.
b. Fit the projection “a” on the bottom cowling into the hole “b” in the front side cowling assembly, and then slide the front side cowling forward. (right side only)



c. Fit the projection “c” on the front side cowling assembly into the hole “d” in the headlight cover “3”, and then insert the projection “e” on the front side cowling assembly into the hole “f” in the headlight cover.
d. Fit the hole “g” in the front side cowling assembly onto the projection “h” on the headlight cover, and then install the front side cowling assembly bolts temporarily.

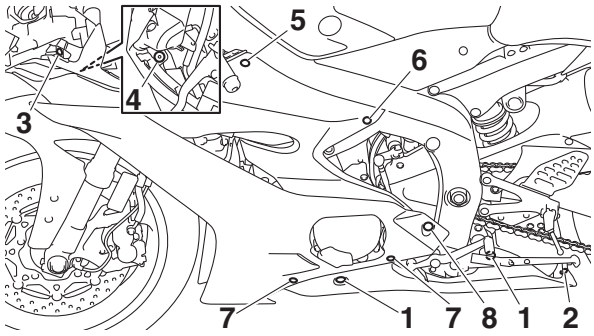


2. Install:
• Quick fastener “1”



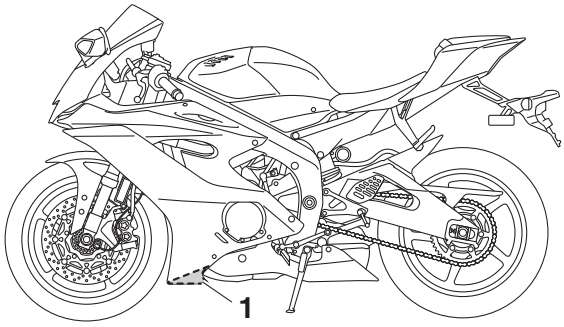
3. Tighten:
• Bottom cowling bolt (M6 × 20) “1”
• Bottom cowling bolt (M5 × 9) “2”
• Front lower panel bolt (M5 × 9) “3”
• Front lower panel bolt (M6 × 12) “4”
• Front side cowling assembly bolt (M6 × 12) “5”
• Front side cowling assembly bolt (M6 × 30) “6”
• Front side cowling assembly bolt (M5 × 9) “7”
• Front side cowling assembly bolt (M6 × 20) (left side only) “8”

Bottom cowling bolt (M6 × 20)
4.5 N·m (0.45 kgf·m, 3.3 lb·ft)
Bottom cowling bolt (M5 × 9)
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)
Front lower panel bolt (M5 × 9)
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)
Front lower panel bolt (M6 × 12)
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)
Front side cowling assembly bolt (M6 × 12)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Front side cowling assembly bolt (M6 × 30)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Front side cowling assembly bolt (M5 × 9)
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)
Front side cowling assembly bolt (M6 × 20) (left side only)
4.5 N·m (0.45 kgf·m, 3.3 lb·ft)



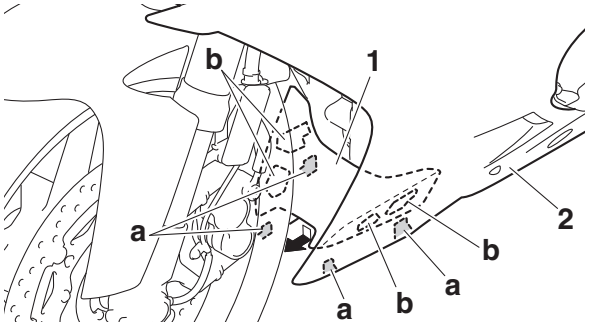
EAS32393
INSTALLING THE FRONT SIDE COWLING LOWER INNER PANEL

1. Install:
• Front side cowling lower inner panel “1”



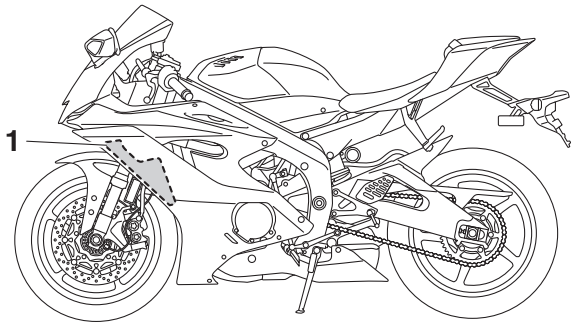
a. Fit the projection “a” on the front side cowling assembly “2” into the holes “b” in the front side cowling lower inner panel, and then slide the front side cowling lower inner panel in the direction of the arrow shown in the illustration.
b. Install the front side cowling lower inner panel bolts.

	Front side cowling lower inner panel bolt **3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

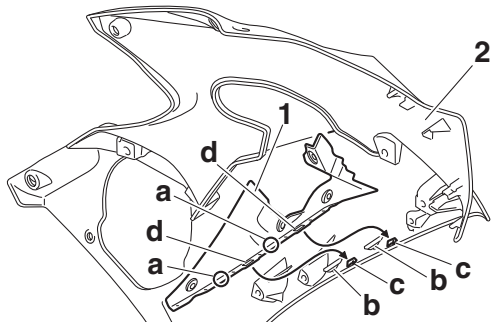


EAS32394
INSTALLING THE FRONT SIDE COWLING UPPER INNER PANEL

The following procedure applies to both of the front side cowling upper inner panels.
1. Install:
   • Front side cowling upper inner panel “1”



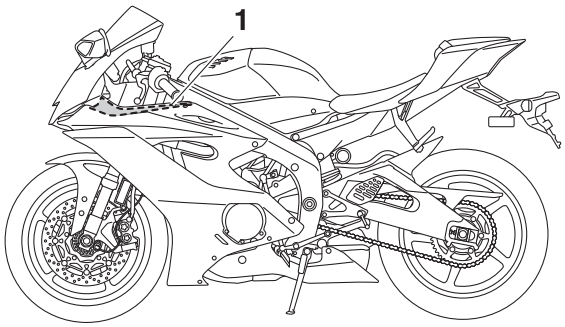
a. Fit the portions “a” of the front side cowling upper inner panel into the slots “b” in the front side cowling assembly “2”, and then fit the projections “c” on the front side cowling assembly into the holes “d” in the front side cowling upper inner panel.



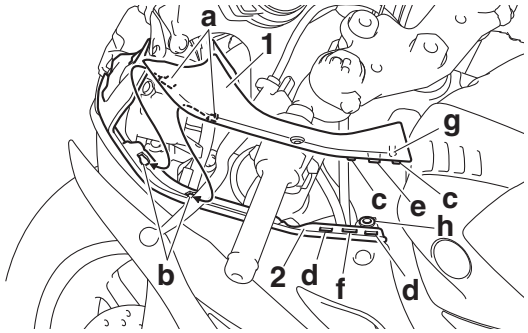
b. Install the quick fasteners.

EAS31267
INSTALLING THE FRONT UPPER PANEL

The following procedure applies to both of the front upper panels.
1. Install:
   • Front upper panel “1”



a. Fit the projections “a” on the front upper panel into the holes “b” in the front lower panel “2”, and then slide the front upper panel forward.
b. Fit the projections “c” on the front upper panel into the holes “d” in the front lower panel.
c. Fit the projection “e” on the front upper panel into the hole “f” in the front lower panel, and then insert the projection “g” on the front upper panel into the grommet “h”.

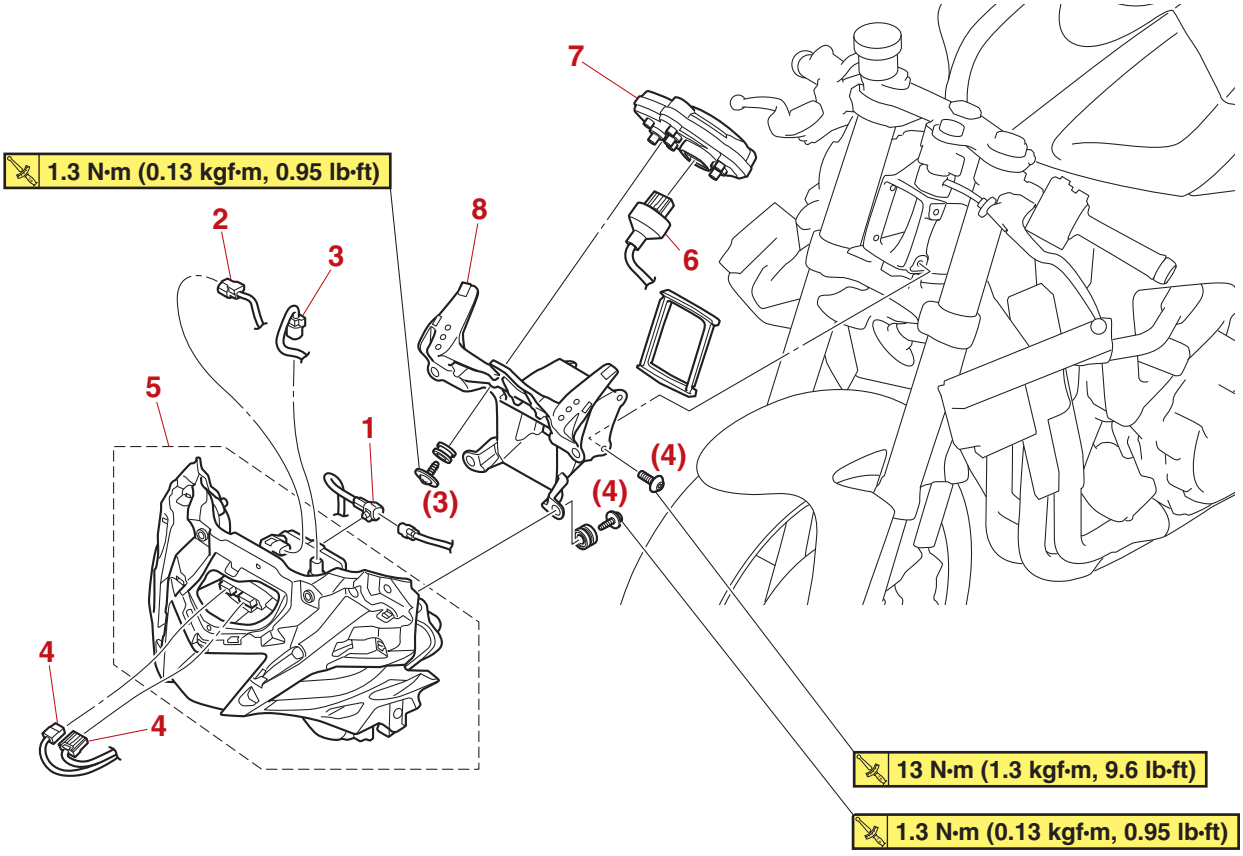


d. Install the quick fasteners.

EAS20159

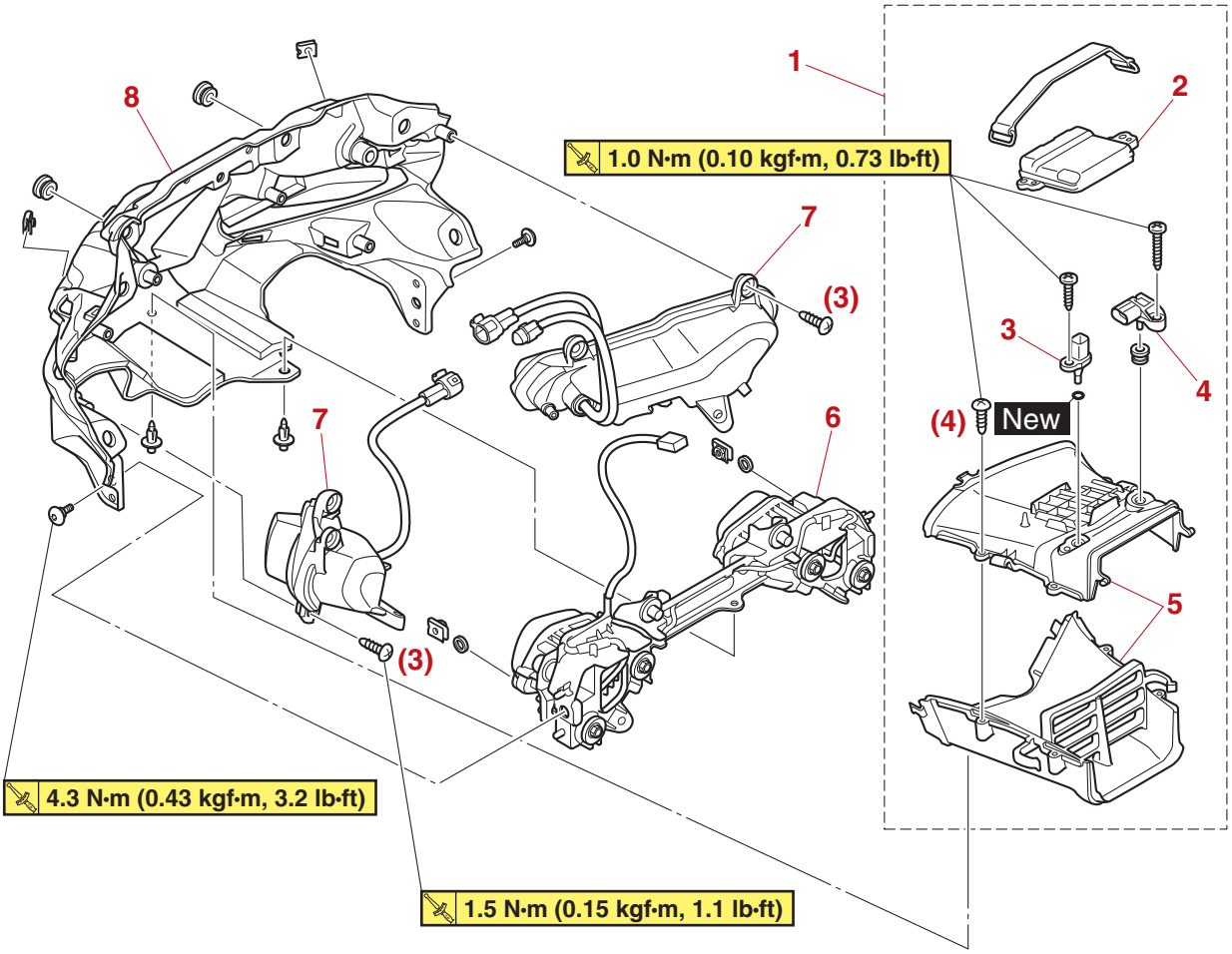
GENERAL CHASSIS (6)

Removing the headlight assembly



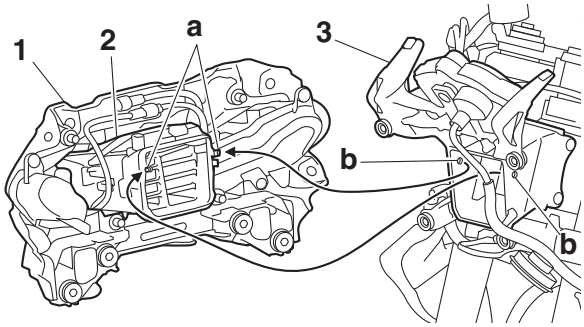
Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-8.
1	Auxiliary light coupler	1	Disconnect.
2	Atmospheric pressure sensor coupler	1	Disconnect.
3	Intake air temperature sensor coupler	1	Disconnect.
4	Headlight coupler	2	Disconnect.
5	Headlight assembly	1	
6	Meter coupler	1	Disconnect.
7	Meter	1	
8	Headlight bracket	1	

Disassembling the headlight assembly



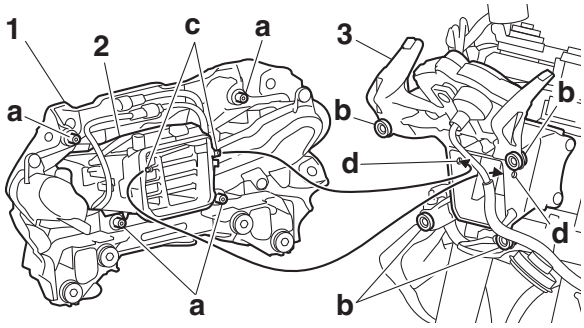
Order	Job/Parts to remove	Q'ty	Remarks
1	Air duct assembly	1	
2	Headlight control unit	1	
3	Intake air temperature sensor	1	
4	Atmospheric pressure sensor	1	
5	Air duct	1	
6	Headlight assembly	1	
7	Auxiliary light	2	
8	Headlight cover	1	

EAS32395
REMOVING THE HEADLIGHT ASSEMBLY
1. Remove:
   • Headlight assembly “1”
     a. Remove the screws.
     b. Unhook the projections “a” on the air duct “2” from the holes “b” in the headlight bracket “3”, and then remove the headlight assembly.

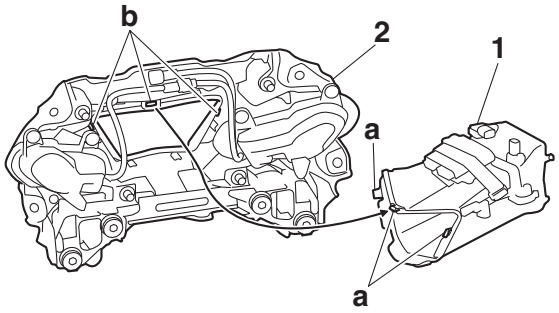


EAS31128
INSTALLING THE HEADLIGHT ASSEMBLY
1. Install:
   • Headlight assembly “1”
     a. Insert the projections “a” on the headlight assembly into the grommet “b”, and fit the projections “c” on the air duct “2” into the holes “d” in the headlight bracket “3”.
     b. Install the screws.

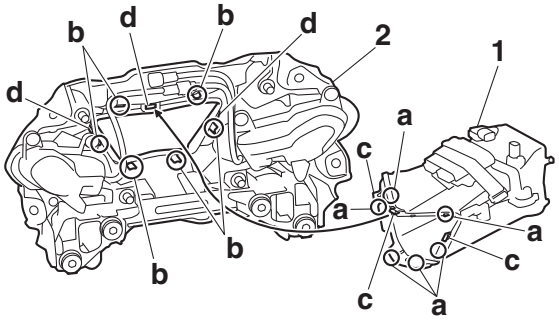
	**Headlight assembly screw 1.3 N·m (0.13 kgf·m, 0.95 lb·ft)**



EAS32396
REMOVING THE AIR DUCT
1. Remove:
   • Air duct “1”
     a. Remove the quick fastener.
     b. Unhook the projections “a” on the air duct from the holes “b” in the headlight cover “2”.



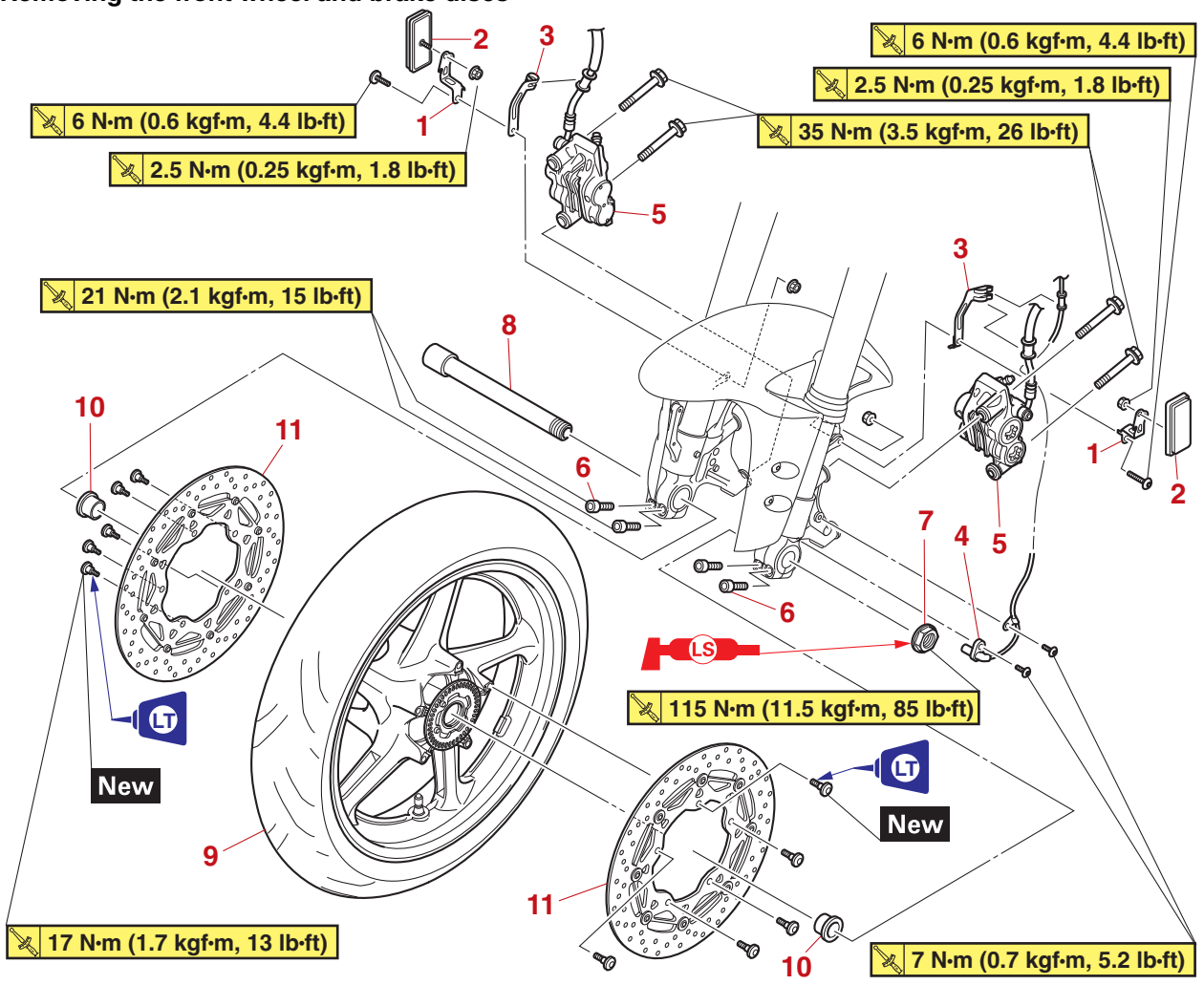
EAS31797
INSTALLING THE AIR DUCT
1. Install:
   • Air duct “1”
     a. Fit the portions “a” of the air duct into the slots “b” in the headlight cover “2”, and then fit the projections “c” on the air duct into the holes “d” in the headlight cover.
     b. Install the quick fastener.



EAS20028

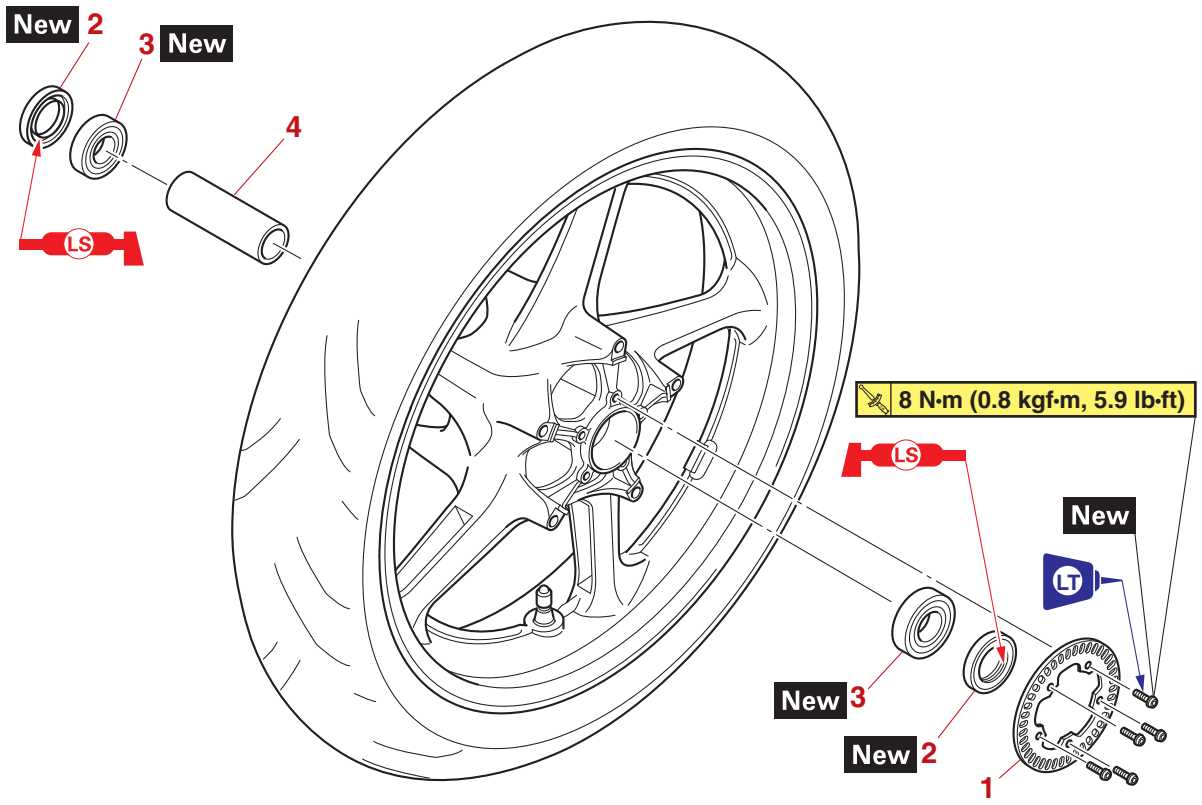
FRONT WHEEL

Removing the front wheel and brake discs



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

Disassembling the front wheel

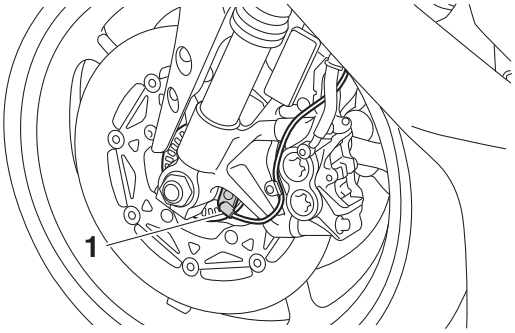


Order	Job/Parts to remove	Q'ty	Remarks
1	Front wheel sensor rotor	1	
2	Oil seal	2	
3	Wheel bearing	2	
4	Spacer	1	

EAS30145
REMOVING THE FRONT WHEEL

ECA21380
NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor "1", otherwise the wheel sensor may be damaged, resulting in improper performance of the ABS.



1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Remove:
   - Front brake caliper (left)
   - Front brake caliper (right)
   - Front wheel sensor

ECA21440
NOTICE

- **Do not apply the brake lever when removing the brake calipers.**
- **Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.**

3. Elevate:
   - Front wheel

TIP

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

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

EAS30146
DISASSEMBLING THE FRONT WHEEL

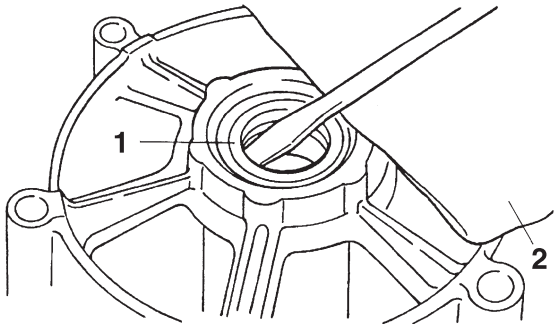
ECA21340
NOTICE

- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

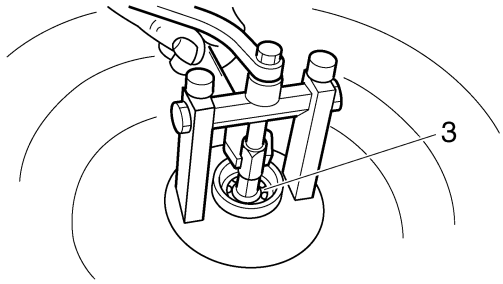
1. Remove:
   - Oil seals
   - Wheel bearings
   a. Clean the surface of the front wheel hub.
   b. Remove the oil seals "1" with a flat-head screwdriver.

TIP

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



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

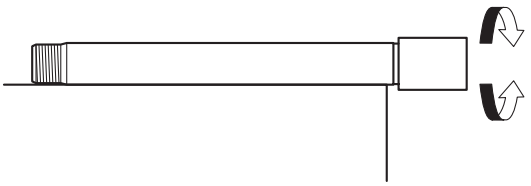


EAS30147
CHECKING THE FRONT WHEEL

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

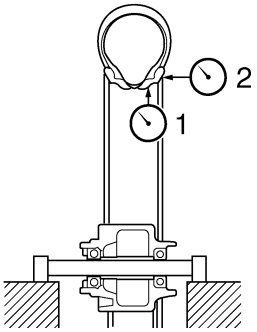
EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

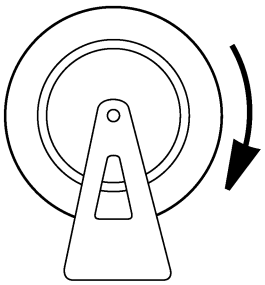


2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.
3. Measure:
   - Radial wheel runout "1"
   - Lateral wheel runout "2"
     Over the specified limits → Replace.

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



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



EAS30151
ASSEMBLING THE FRONT WHEEL

ECA21340
NOTICE

- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

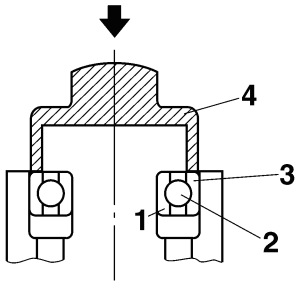
1. Install:
   - Wheel bearings New
   - Oil seals New
     a. Install the new wheel bearing (left side).

ECA18110
NOTICE

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

TIP

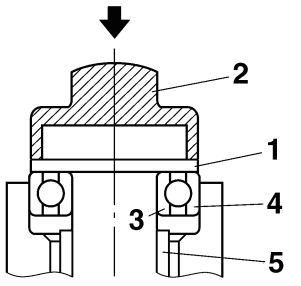
Use a socket "4" that matches the diameter of the wheel bearing outer race.



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

TIP

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



   d. Install the new oil seals.

2. Install:
   • Front wheel sensor rotor

	**Wheel sensor rotor bolt** **8 N·m (0.8 kgf·m, 5.9 lb·ft)** **LOCTITE®**

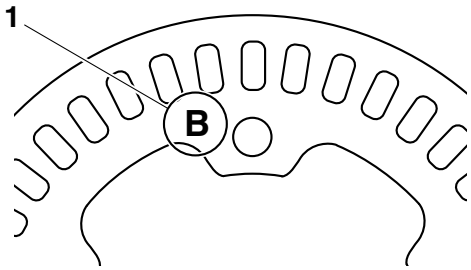
ECA17200

NOTICE

Replace the wheel sensor rotor bolts with new ones.

TIP

Install the wheel sensor rotor with the stamped mark "1" facing outward.



3. Measure:
   • Wheel sensor rotor runout
   Out of specification → Correct the wheel sensor rotor runout or replace the wheel sensor rotor.
   Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.

	**Wheel sensor rotor runout limit** **0.25 mm (0.01 in)**

EAS30155

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA21070

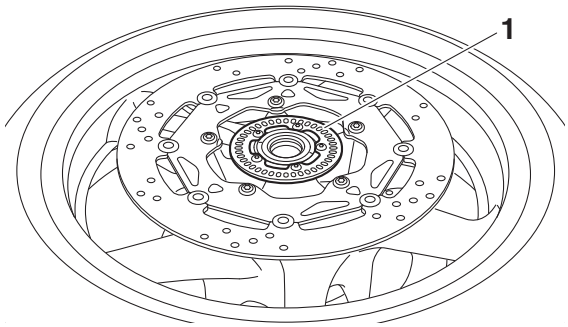
NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**
- **Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor.**
- **Do not drop or shock the wheel sensor or the wheel sensor rotor.**

1. Check:
   • Front wheel sensor
   Cracks/bends/distortion → Replace.
   Iron powder/dust → Clean.
2. Check:
   • Front wheel sensor rotor "1"
   Cracks/damage/scratches → Replace the front wheel sensor rotor.
   Iron powder/dust/solvent → Clean.

TIP

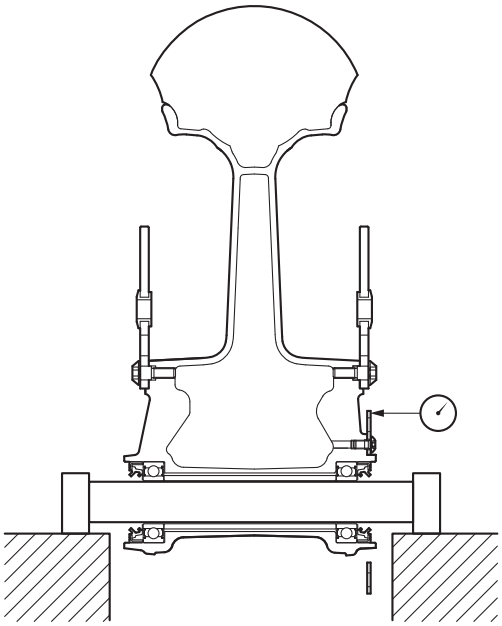
- The wheel sensor rotor is installed on the inner side of the wheel hub.
- When cleaning the wheel sensor rotor, be careful not to damage the surface of the sensor rotor.



3. Measure:
   • Wheel sensor rotor runout
   Out of specification → Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor runout, or replace the wheel sensor rotor.

	**Wheel sensor rotor runout limit** **0.25 mm (0.01 in)**

   a. Hold the dial gauge at a right angle against the wheel sensor rotor surface.
   b. Measure the wheel sensor rotor runout.



c. If the runout is above specification, remove the sensor rotor from the wheel, rotate it by two bolt holes, and then install it.

	Wheel sensor rotor bolt **8 N·m (0.8 kgf·m, 5.9 lb·ft)** **LOCTITE®**

ECA17200

NOTICE

Replace the wheel sensor rotor bolts with new ones.

d. If the runout is still above specification, replace the wheel sensor rotor.

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
3. Adjust:
   - Front wheel static balance
4. Check:
   - Front wheel static balance

EAS30154

INSTALLING THE FRONT WHEEL (DISC BRAKE)

1. Install:
   - Front brake discs

	Front brake disc bolt **17 N·m (1.7 kgf·m, 13 lb·ft)** **LOCTITE®**

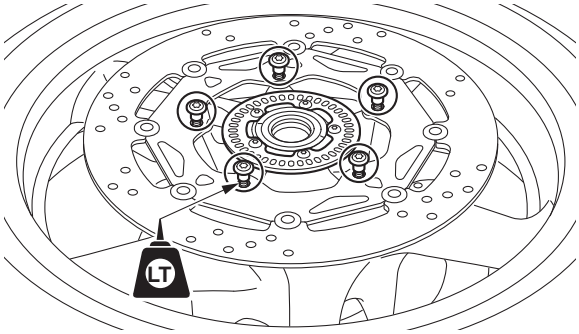
ECA19150

NOTICE

Replace the brake disc bolts with new ones.

TIP

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



2. Check:
   - Front brake discs
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-39.
3. Lubricate:
   - Oil seal lips

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

4. Install:
   - Collars
   - Front wheel
   - Front wheel axle
   - Front wheel axle nut

TIP

Apply lithium soap-based grease onto the mating surface of the front wheel axle nut.

5. Tighten:
   - Front wheel axle nut

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

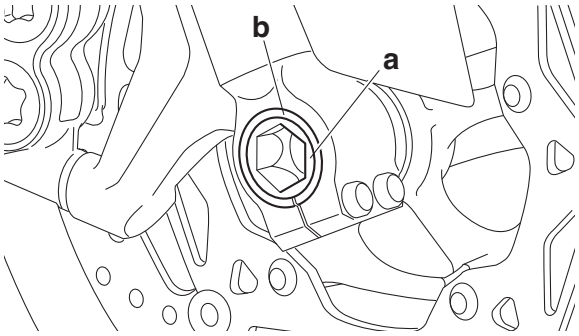
ECA14140
NOTICE

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

6. Tighten:
   • Front wheel axle pinch bolt
   a. Tighten the pinch bolt "2", pinch bolt "1", and pinch bolt "2" to the specified torque in this order.

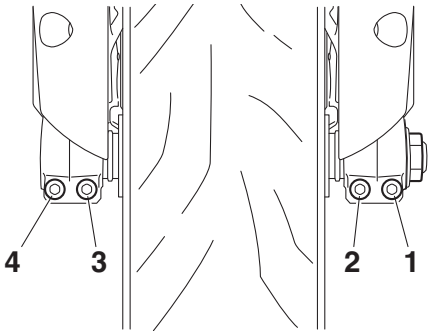
	Front wheel axle pinch bolt 21 N·m (2.1 kgf·m, 15 lb·ft)

   b. Check that the right end "a" of the front axle is flush with the front fork "b". If necessary, manually push the front axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.



   c. Tighten the pinch bolt "4", pinch bolt "3", and pinch bolt "4" to the specified torque in this order.

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



7. Install:
   • Front wheel sensor

	Front wheel sensor bolt 7 N·m (0.7 kgf·m, 5.2 lb·ft)

ECA21020
NOTICE

Make sure there are no foreign materials in the front wheel sensor rotor and front wheel sensor. Foreign materials cause damage to the front wheel sensor rotor and front wheel sensor.

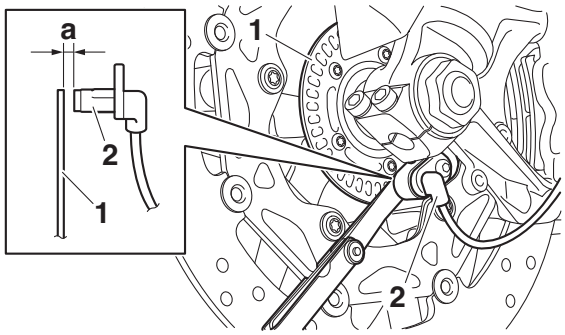
TIP
- When installing the front wheel sensor, check the front wheel sensor lead for twists.
- To route the front wheel sensor lead, refer to "CABLE ROUTING" on page 2-15.

8. Measure:
   • Distance "a"
   (between the wheel sensor rotor "1" and front wheel sensor "2")
   Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.

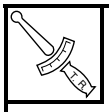
	Distance "a" (between the front wheel sensor rotor and front wheel sensor) 0.9–1.7 mm (0.035–0.067 in)

TIP
Measure the distance between the front wheel sensor rotor and front wheel sensor in several places in one rotation of the front wheel. Do not turn the front wheel while the thickness gauge is installed. This may damage the front wheel sensor rotor and the front wheel sensor.

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



9. Install:
   - Front brake calipers
   - Front brake hose holder

	**Front brake caliper bolt** **35 N·m (3.5 kgf·m, 26 lb·ft)** **Front brake hose holder bolt** **6 N·m (0.6 kgf·m, 4.4 lb·ft)**

EWA13500

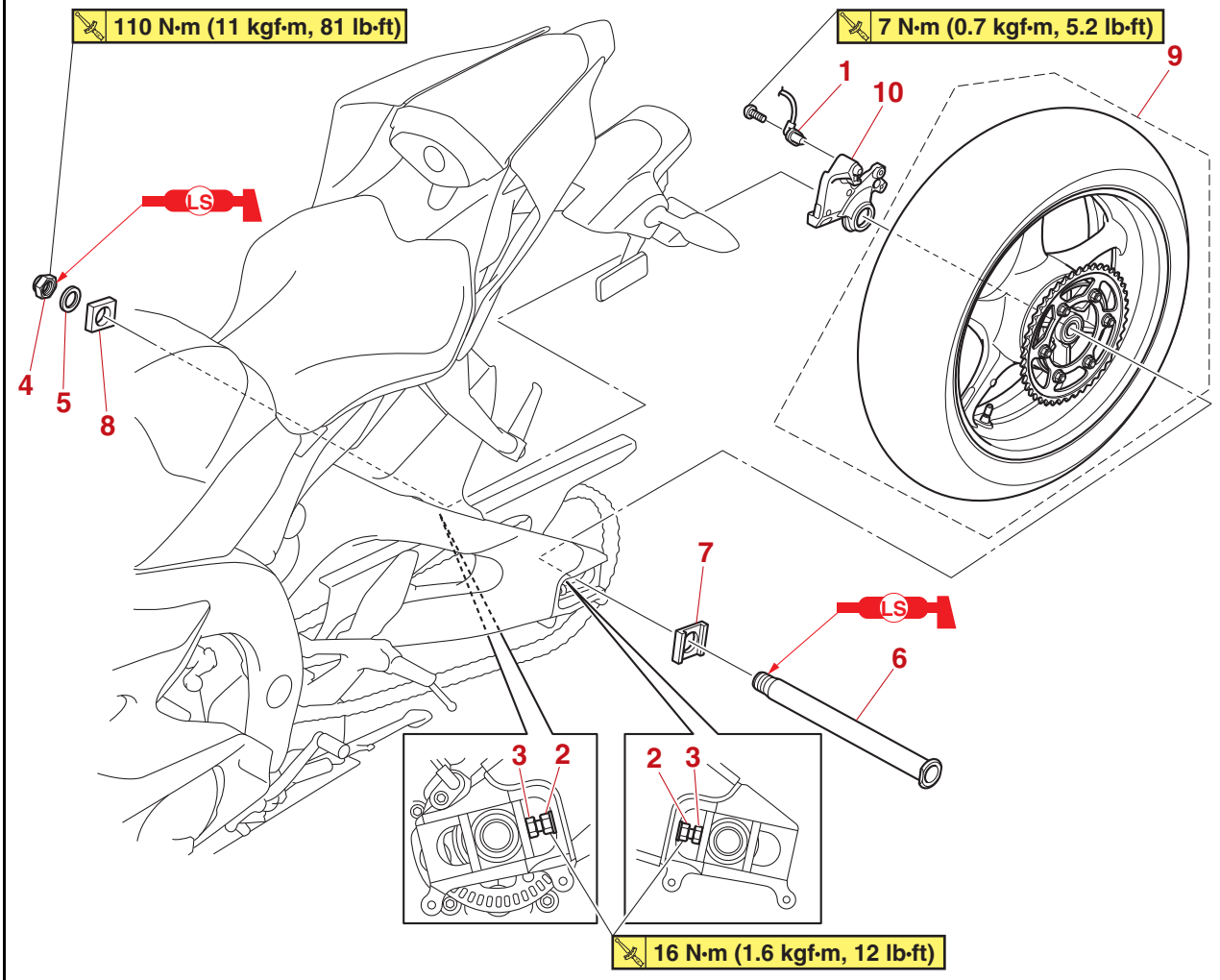
⚠ WARNING

Make sure the brake hose is routed properly.

EAS20029

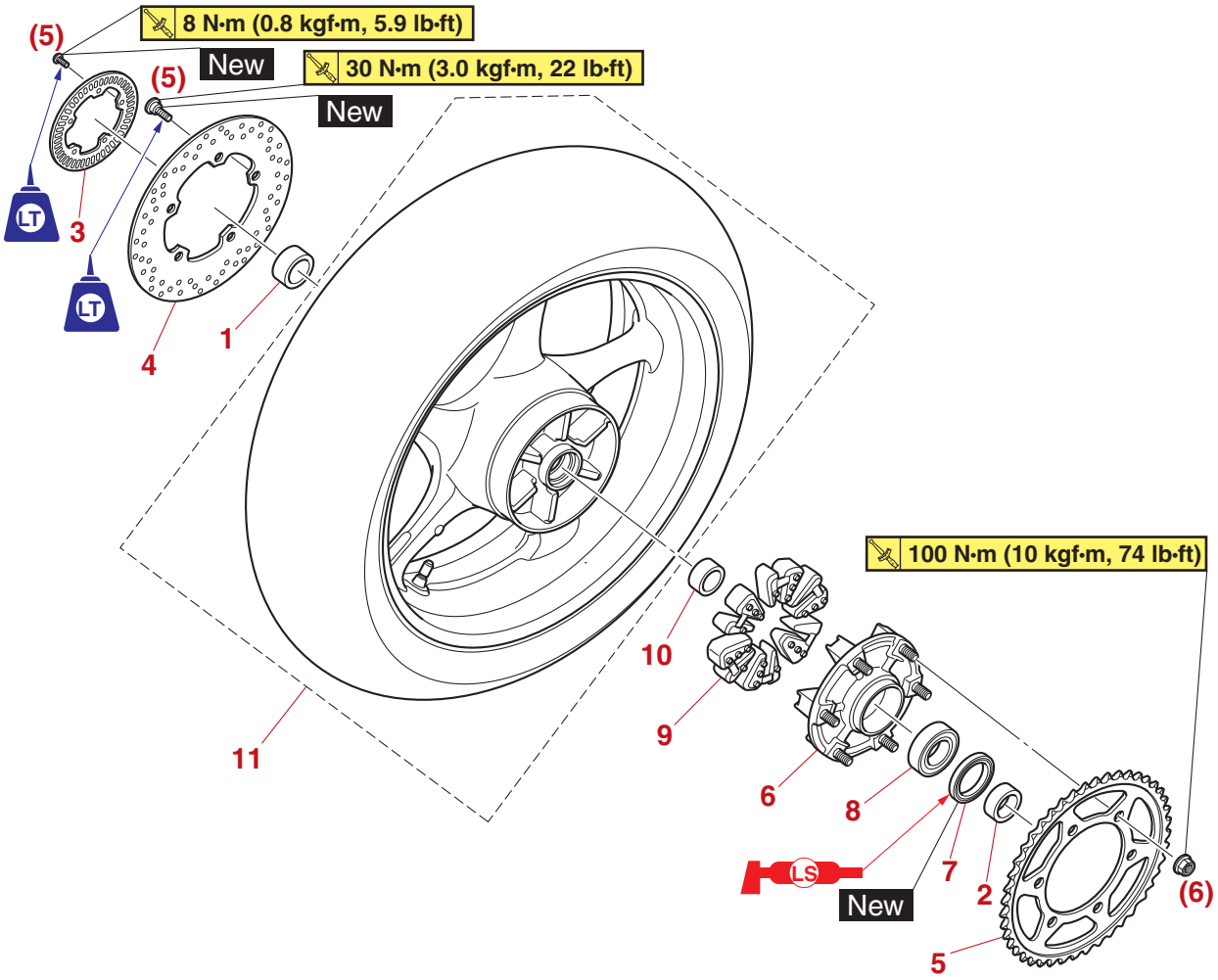
REAR WHEEL

Removing the rear wheel



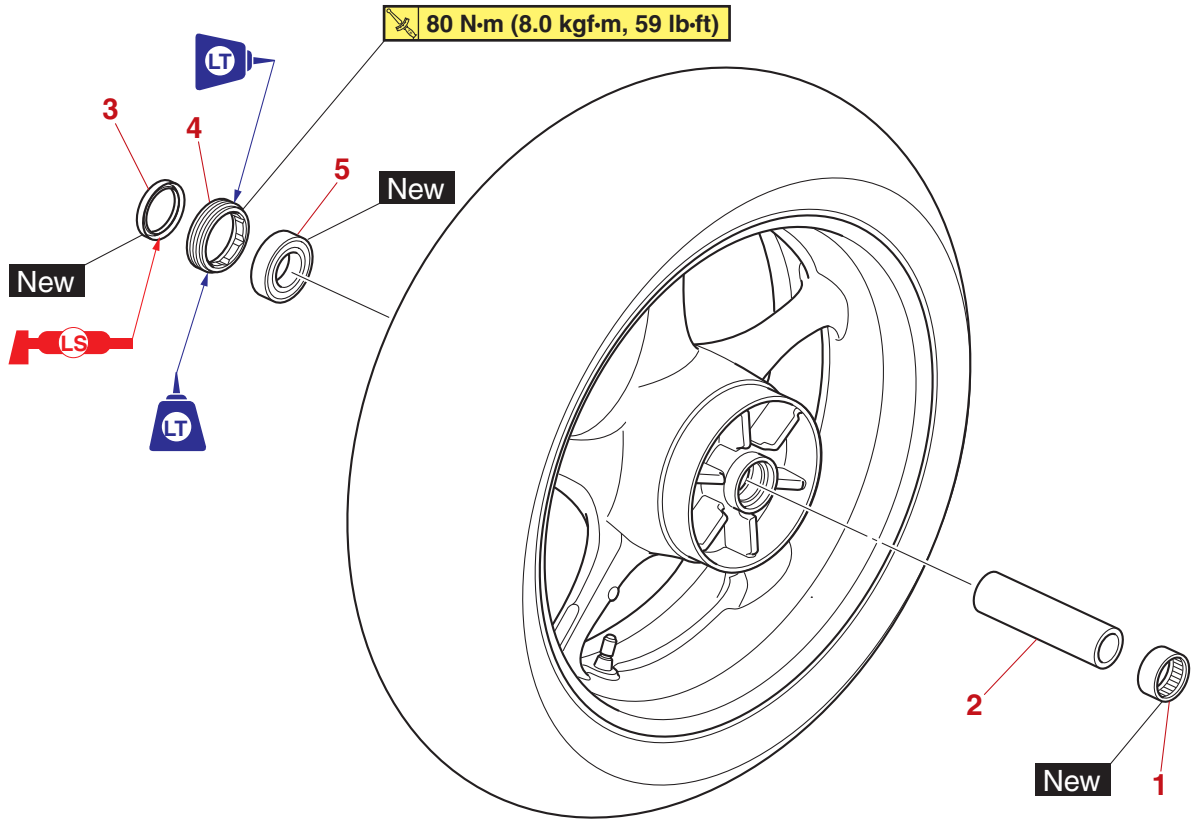
Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-46.
1	Rear wheel sensor	1	
2	Locknut	2	Loosen.
3	Adjusting bolt	2	Loosen.
4	Rear wheel axle nut	1	
5	Washer	1	
6	Rear wheel axle	1	
7	Adjusting block (left)	1	
8	Adjusting block (right)	1	
9	Rear wheel	1	
10	Brake caliper bracket	1	

Removing the brake disc and rear wheel sprocket



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

Disassembling the rear wheel

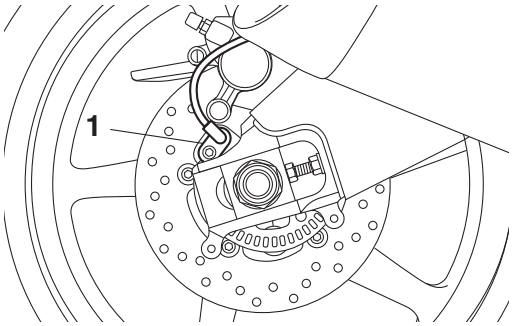


Order	Job/Parts to remove	Q'ty	Remarks
1	Wheel bearing	1	
2	Spacer	1	
3	Oil seal	1	
4	Wheel bearing ring nut	1	
5	Wheel bearing	1	

EAS30910
REMOVING THE REAR WHEEL

ECA21390
NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor "1", otherwise the wheel sensor may be damaged, resulting in improper performance of the ABS.



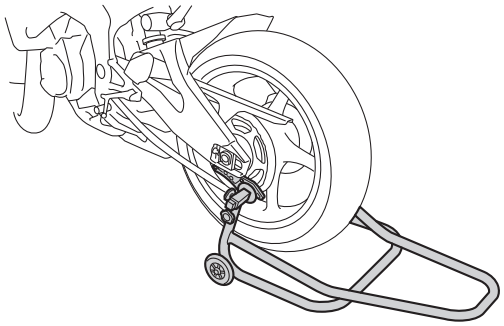
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

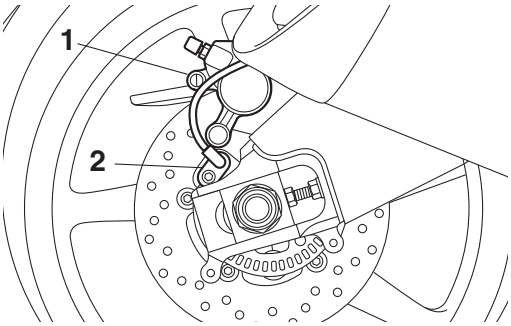
Place the vehicle on a maintenance stand so that the rear wheel is elevated.



2. Remove:
   - Rear brake caliper "1"
   - Rear wheel sensor "2"

ECA21040
NOTICE

- **Do not depress the brake pedal when removing the brake caliper.**
- **Be sure not to contact the sensor electrode to any metal part when removing the rear wheel sensor from the rear brake caliper bracket.**



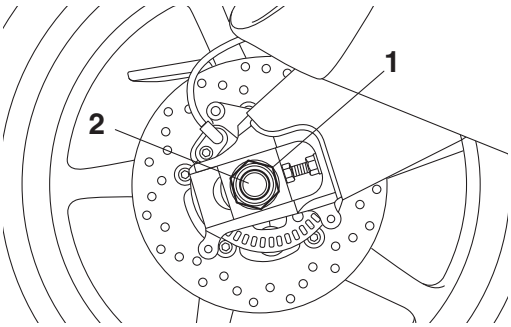
3. Remove:
   - Rear wheel axle nut "1"
   - Washer
   - Rear wheel axle "2"
   - Rear wheel
   - Brake caliper bracket

ECA21400
NOTICE

Be sure to remove the rear wheel sensor before removing the brake caliper bracket, otherwise the sensor could be damaged.

TIP

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



EAS30158
DISASSEMBLING THE REAR WHEEL

ECA21340
NOTICE

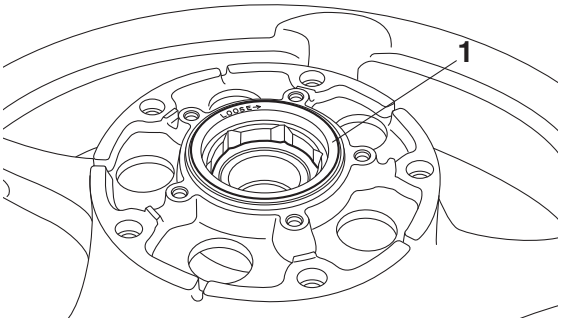
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

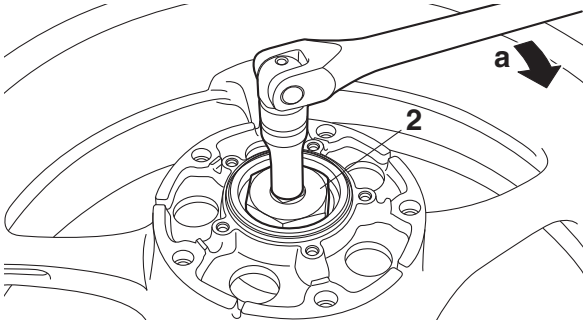
1. Remove:
   - Wheel bearing ring nut "1"

TIP

Use the hexagon wrench (41) "2" to remove the wheel bearing ring nut by turning it clockwise "a".

Hexagon wrench (41)
90890-01525
Hexagon wrench (41)
YM-01525





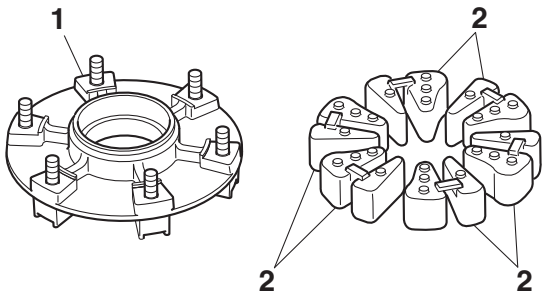
2. Remove:
   • Wheel bearings
   Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-18.

EAS30159
CHECKING THE REAR WHEEL

1. Check:
   • Wheel axle
   • Wheel bearings
   • Oil seals
   Refer to "CHECKING THE FRONT WHEEL" on page 4-18.
2. Check:
   • Tire
   • Rear wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-17.
3. Measure:
   • Radial wheel runout
   • Lateral wheel runout
   Refer to "CHECKING THE FRONT WHEEL" on page 4-18.

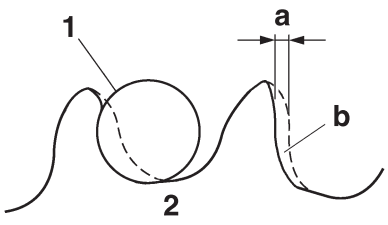
EAS30160
CHECKING THE REAR WHEEL DRIVE HUB

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



EAS30161
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

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



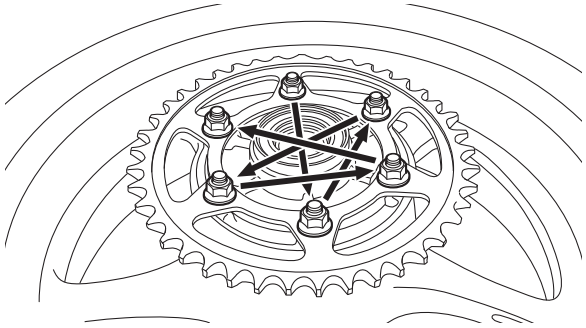
b. Correct
1. Drive chain roller
2. Rear wheel sprocket

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

Rear wheel sprocket nut
100 N·m (10 kgf·m, 74 lb·ft)

TIP

Tighten the rear wheel sprocket nuts in stages and in a crisscross pattern.



EAS30163

ASSEMBLING THE REAR WHEEL

ECA21340

NOTICE

- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Install:
   - Wheel bearings New
     a. Install the new wheel bearing (right side).

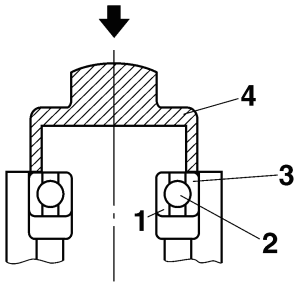
ECA18110

NOTICE

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

TIP

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

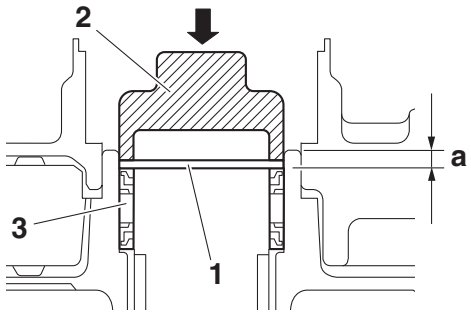


b. Install the new wheel bearing (left side).

TIP

Place a suitable washer "1" between the socket "2" and the bearing "3" outside diameter.

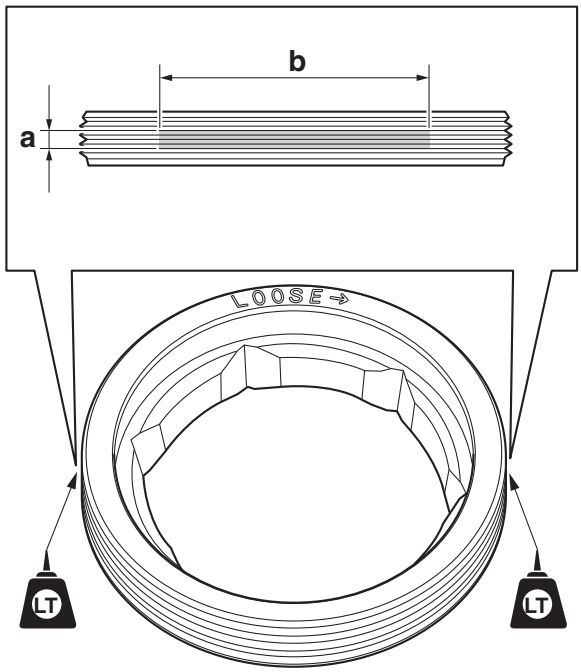
Install depth "a"
4.5–5.5 mm (0.18–0.22 in)



2. Install:
   - Wheel bearing ring nut

TIP

Apply locking agent (LOCTITE®) onto the two symmetric places on the circumference of the threads of the wheel bearing ring nut.



a. Width: two grooves of the threaded portion
b. Length: more than 40 mm (1.57 in)

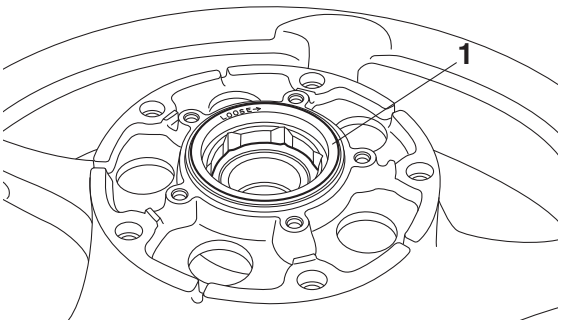
3. Tighten:
   - Wheel bearing ring nut "1"

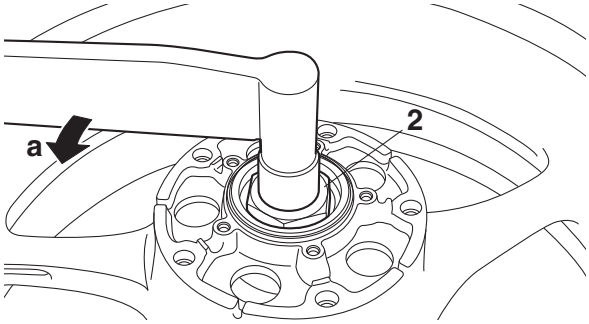
TIP

Use the hexagon wrench (41) "2" to tighten the wheel bearing ring nut by turning it counterclockwise "a".

Hexagon wrench (41)
90890-01525
Hexagon wrench (41)
YM-01525

Wheel bearing ring nut
80 N·m (8.0 kgf·m, 59 lb·ft)
LOCTITE®





EAS30167
MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA21060
NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The rear wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**
- **Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor.**
- **Do not drop or shock the wheel sensor or the wheel sensor rotor.**

1. Check:
   - Rear wheel sensor
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.
2. Check:
   - Rear wheel sensor rotor
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.
3. Measure:
   - Wheel sensor rotor runout
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.

EAS30164
ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

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

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

EAS30165
INSTALLING THE REAR WHEEL (DISC BRAKE)

1. Install:
   - Rear brake disc
   - Rear wheel sensor rotor

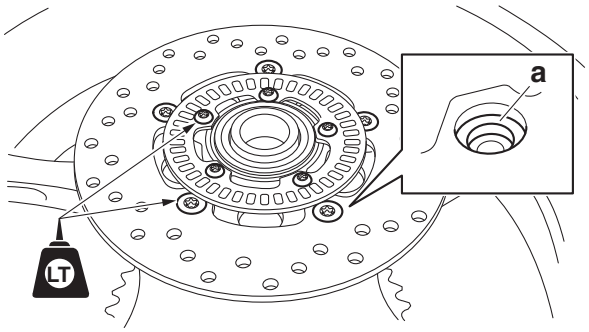
Rear brake disc bolt
30 N·m (3.0 kgf·m, 22 lb·ft)
LOCTITE®
Rear wheel sensor rotor bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)

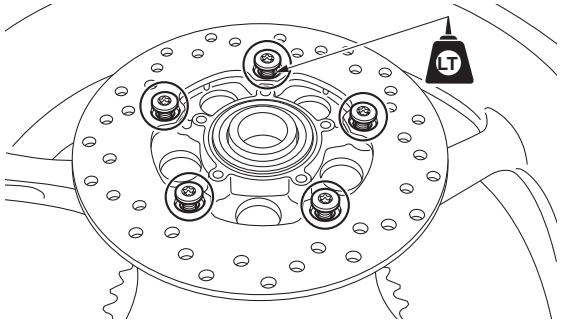
ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

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





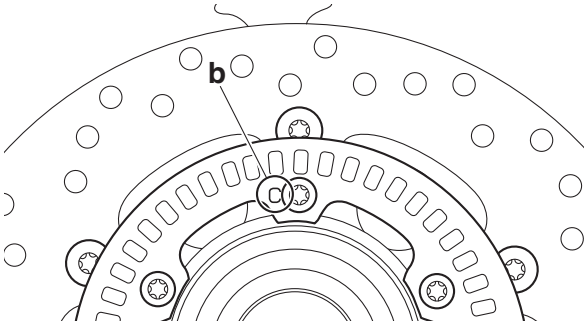
ECA21011

NOTICE

- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**
- **Replace the brake disc bolts and wheel sensor rotor bolts with new ones.**

TIP

Install the wheel sensor rotor with the stamped mark "b" facing outward.



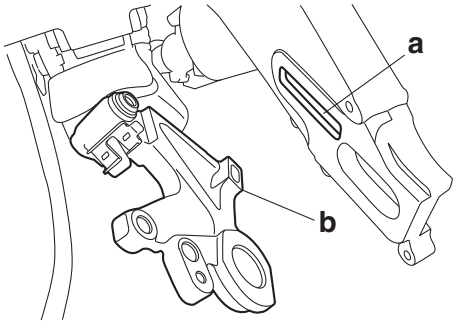
2. Install:
   - Rear wheel sprocket
     Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-28.
3. Check:
   - Rear brake disc
     Refer to "CHECKING THE REAR BRAKE DISC" on page 4-50.
4. Lubricate:
   - Oil seal lips

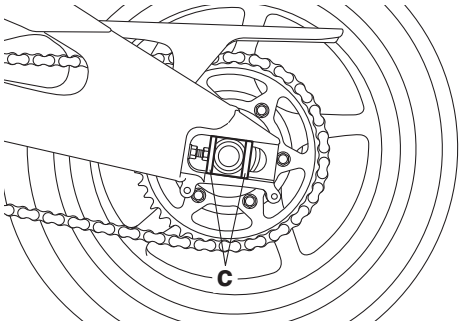
	Recommended lubricant **Lithium-soap-based grease**

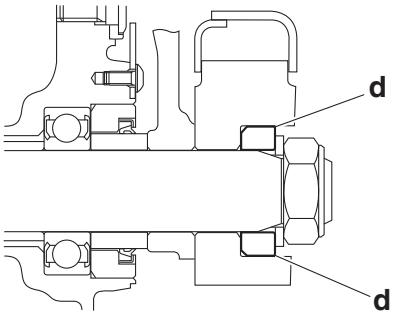
5. Install:
   - Collars
   - Brake caliper bracket
   - Rear wheel
   - Adjusting blocks
   - Rear wheel axle
   - Washer
   - Rear wheel axle nut

TIP

- Do not install the brake caliper.
- Align the slot "a" in the swingarm with the projection "b" of the brake caliper bracket.
- Install the adjusting block (left side) so that projections "c" is facing outward.
- Install the adjusting block (right side) so that sharp-edged corner "d" is facing outward.







6. Install:
   - Rear brake caliper
   - Rear brake caliper bolts
7. Adjust:
   - Drive chain slack
     Refer to "Adjusting the drive chain slack" on page 3-19.

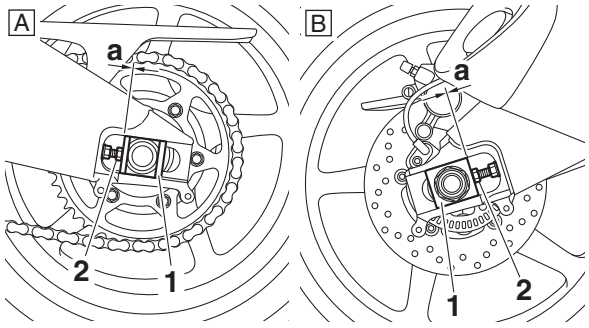
Drive chain slack (Maintenance stand)
30.0–45.0 mm (1.18–1.77 in)
Drive chain slack (Sidestand)
30.0–45.0 mm (1.18–1.77 in)

8. Tighten:
   • Rear wheel axle nut
   • Rear brake caliper bolts

Rear wheel axle nut
110 N·m (11 kgf·m, 81 lb·ft)
Rear brake caliper bolt (front)
27 N·m (2.7 kgf·m, 20 lb·ft)
Rear brake caliper bolt (rear)
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

EWA13500
WARNING
Make sure the brake hose is routed properly.

TIP
When tightening the wheel axle nut, there should be no clearance “a” between the adjusting block “1” and adjusting bolt “2”.



A. Left side
B. Right side

9. Install:
   • Rear wheel sensor

Rear wheel sensor bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

ECA21080
NOTICE
Make sure there are no foreign materials in the rear wheel sensor rotor and rear wheel sensor. Foreign materials cause damage to the rear wheel sensor rotor and rear wheel sensor.

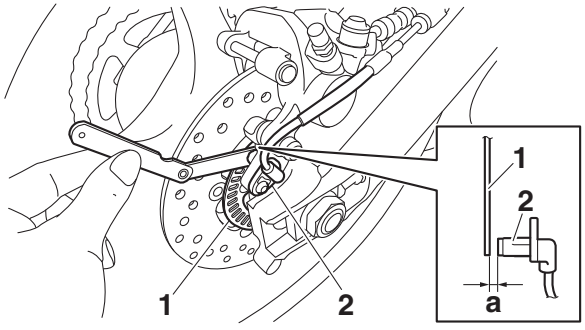
TIP
When installing the rear wheel sensor, check the rear wheel sensor lead for twists.

10. Measure:
   • Distance “a”
   (between the wheel sensor rotor “1” and rear wheel sensor “2”)
   Out of specification → Check the wheel bearing for looseness, and the rear wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.

Distance “a” (between the rear wheel sensor rotor and rear wheel sensor)
1.1–1.7 mm (0.043–0.067 in)

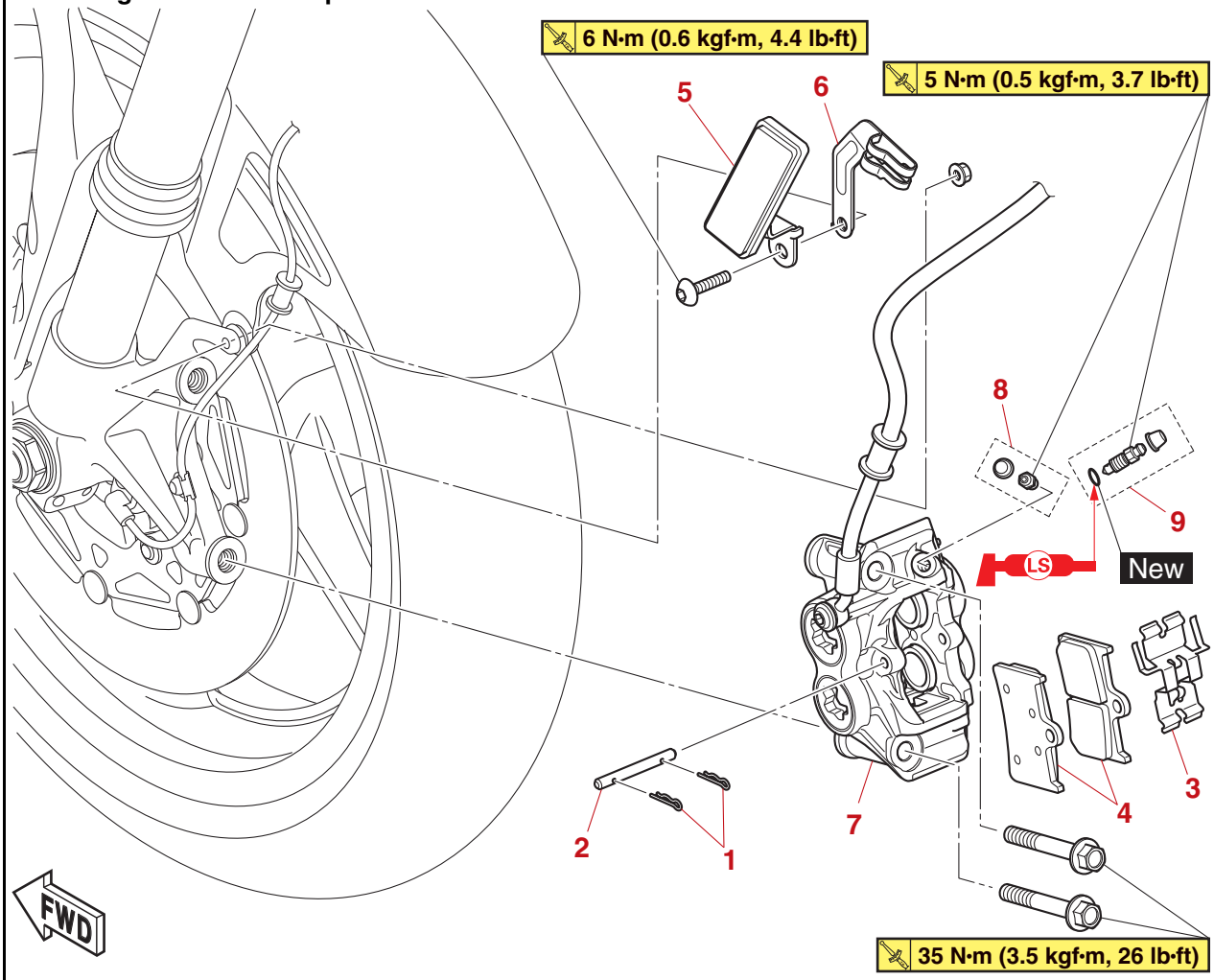
TIP
Measure the distance between the rear wheel sensor rotor and rear wheel sensor in several places in one rotation of the rear wheel. Do not turn the rear wheel while the thickness gauge is installed. This may damage the rear wheel sensor rotor and the rear wheel sensor.

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



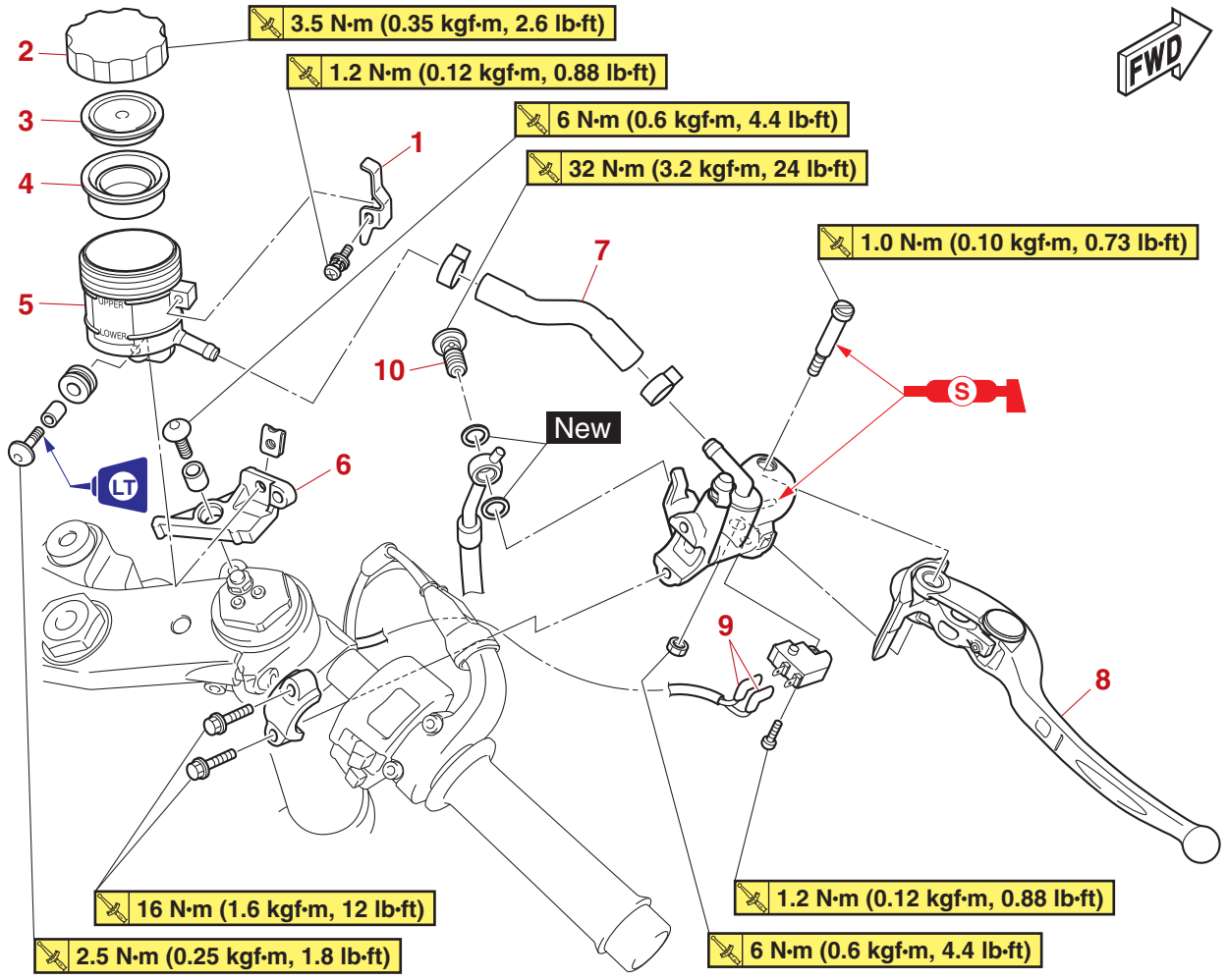
EAS20030
FRONT BRAKE

Removing the front brake pads



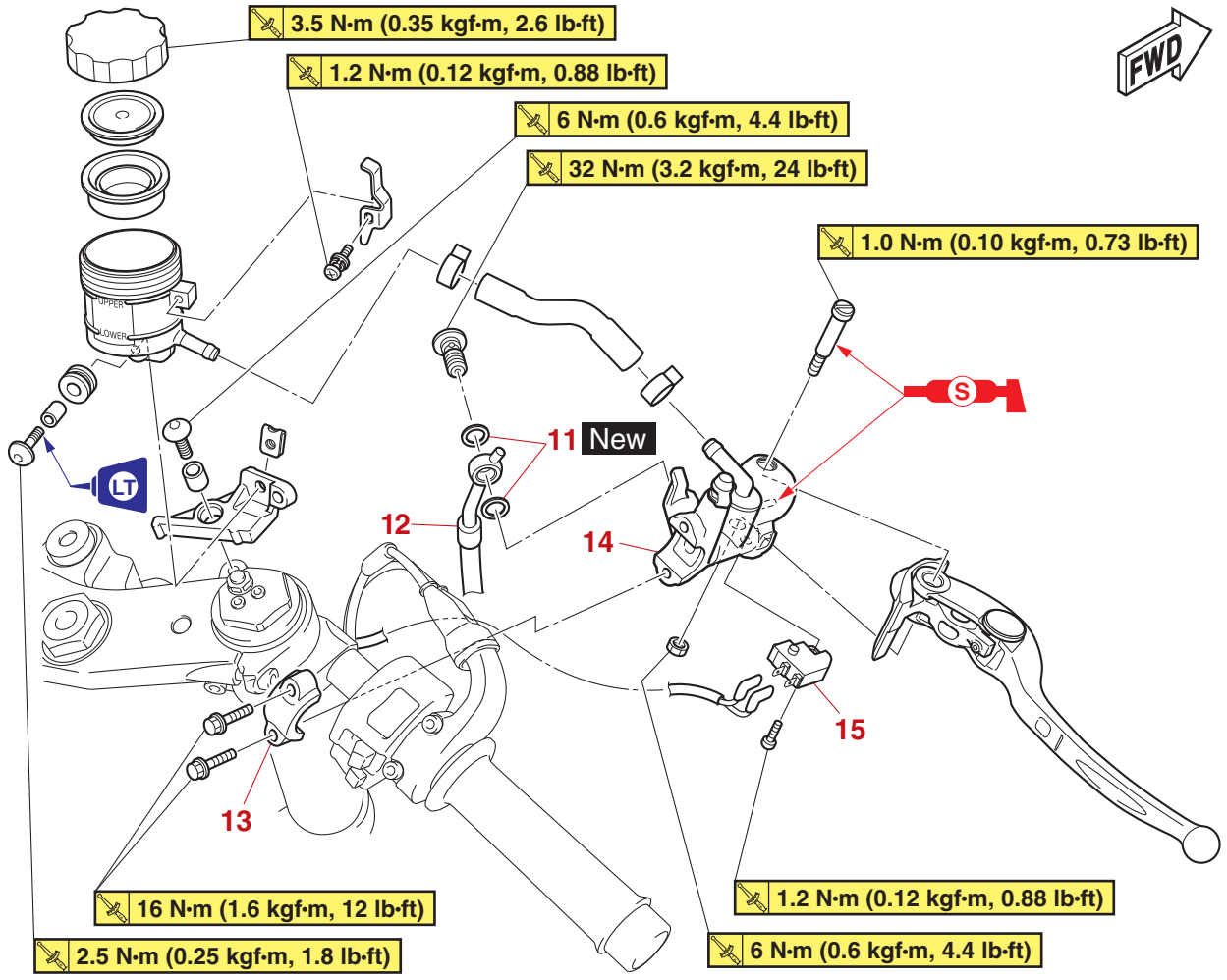
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Front reflector	1	
6	Front brake hose holder	1	
7	Front brake caliper	1	
8	Bleed screw	1	
9	Bleed screw	1	Right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

Removing the front brake master cylinder



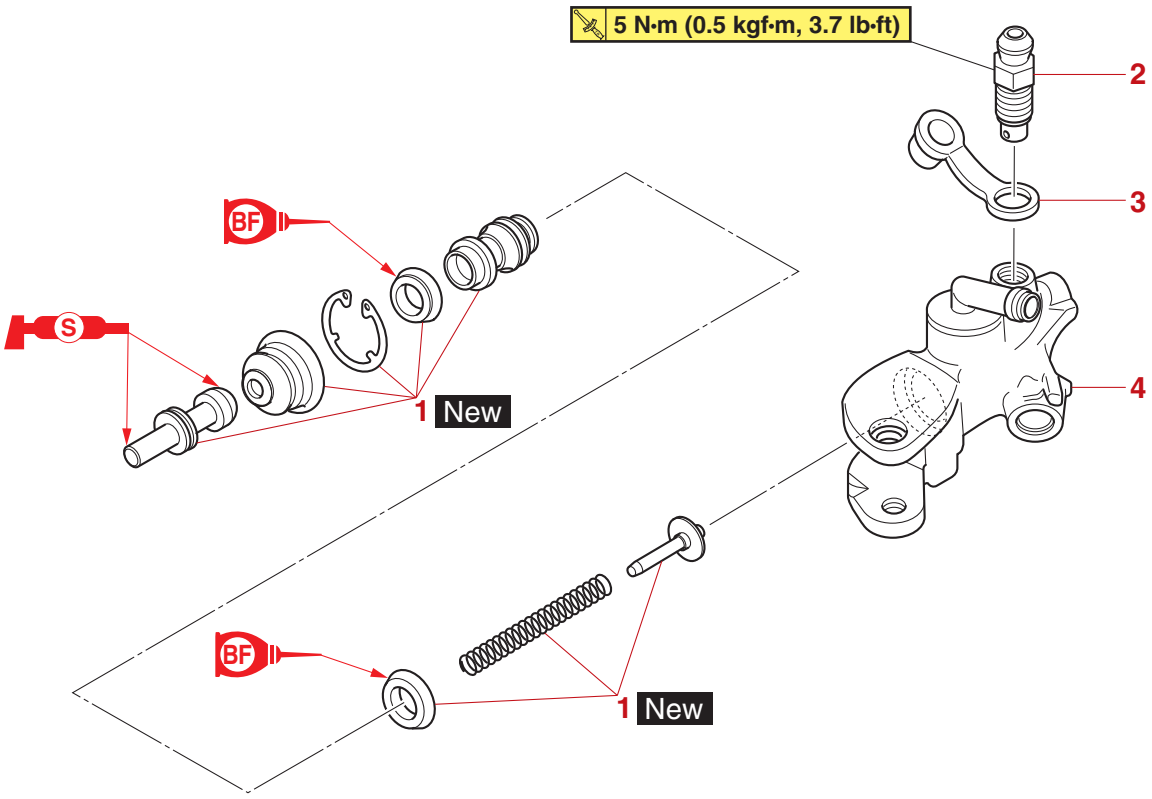
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
1	Brake fluid reservoir cap stopper	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir bracket	1	
7	Brake fluid reservoir hose	1	
8	Brake lever	1	
9	Front brake light switch lead connector	2	Disconnect.
10	Brake hose union bolt	1	

Removing the front brake master cylinder



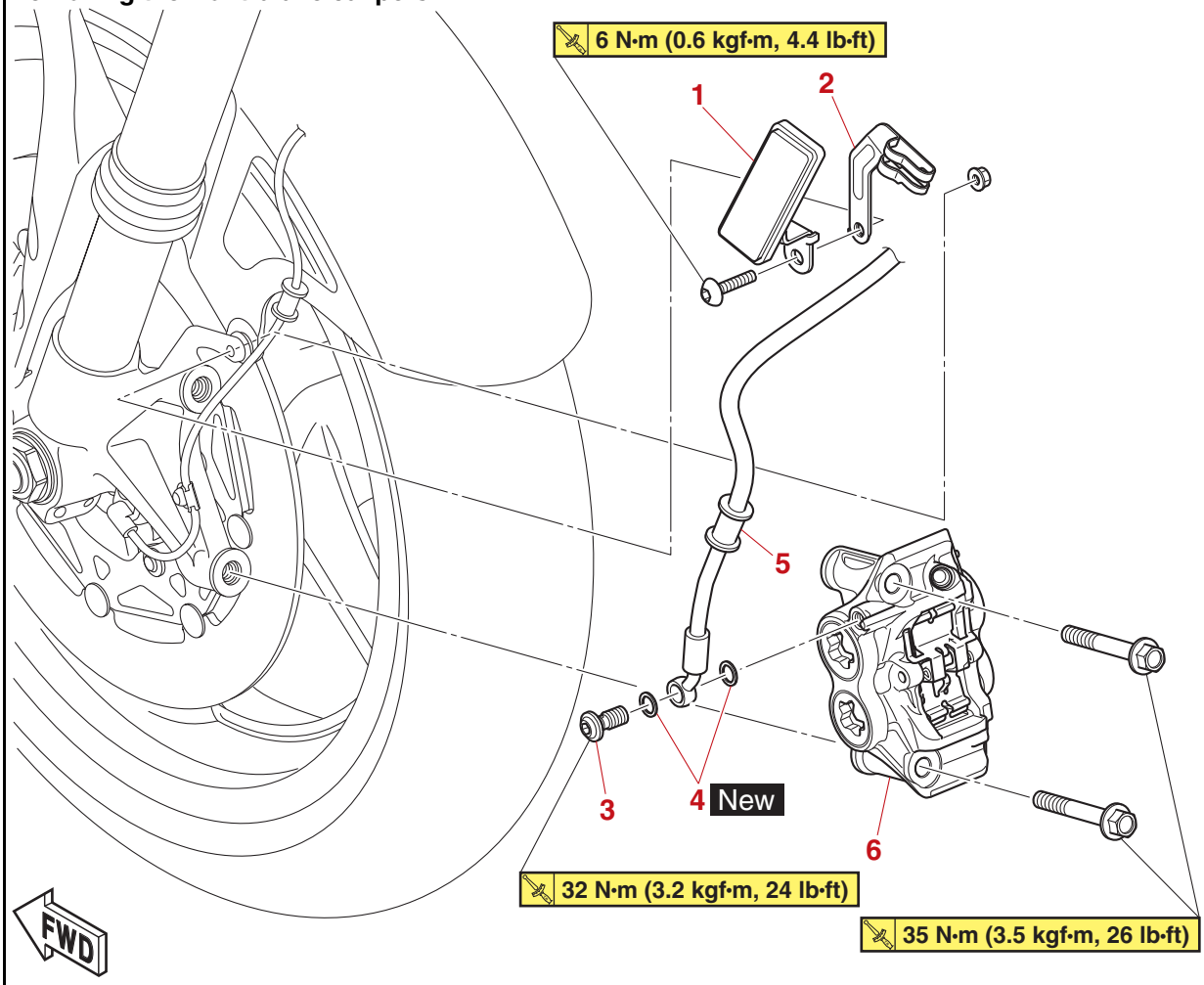
Order	Job/Parts to remove	Q'ty	Remarks
11	Brake hose gasket	2	
12	Brake hose	1	
13	Front brake master cylinder holder	1	
14	Front brake master cylinder	1	
15	Front brake light switch	1	

Disassembling the front brake master cylinder



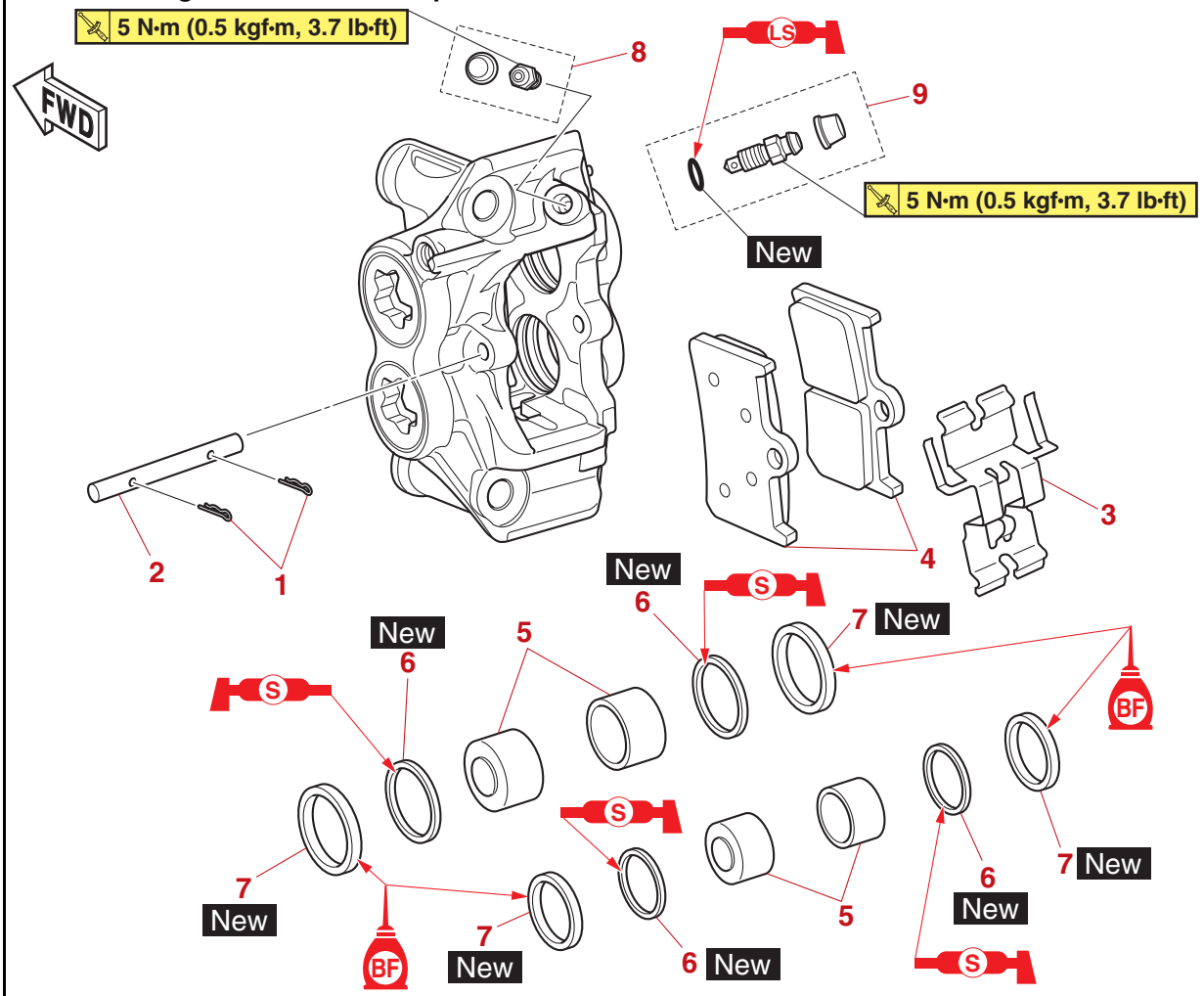
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Bleed screw	1	
3	Cap	1	
4	Brake master cylinder body	1	

Removing the front brake calippers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
1	Front reflector	1	
2	Front brake hose holder	1	
3	Brake hose union bolt	1	
4	Brake hose gasket	2	
5	Brake hose	1	
6	Front brake caliper	1	

Disassembling the front brake calipers



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

EAS30168
INTRODUCTION
EWA14101
⚠ WARNING

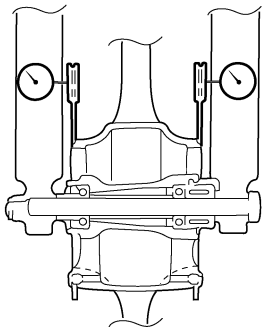
Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned,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

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS30169
CHECKING THE FRONT BRAKE DISCS
The following procedure applies to both brake discs.
1. Remove:
   - Front wheel
     Refer to “FRONT WHEEL” on page 4-16.
2. Check:
   - Front brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc runout
     Out of specification → Correct the brake disc runout or replace the brake disc.

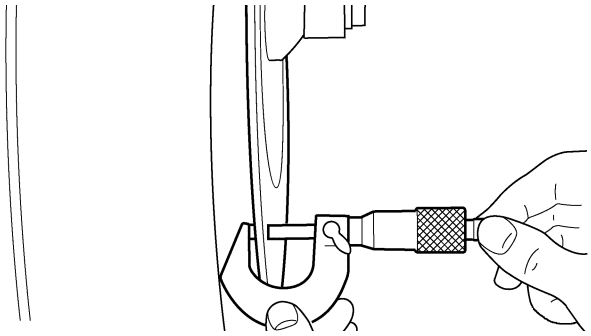
Brake disc runout limit (as measured on wheel)
0.10 mm (0.0039 in)

   a. Place the vehicle on a maintenance stand so that the front wheel is elevated.
   b. Before measuring the brake disc runout, 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 runout 1.5 mm (0.06 in) below the edge of the brake disc.

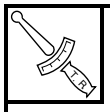


4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

Brake disc thickness limit
4.5 mm (0.18 in)



5. Adjust:
   - Brake disc runout
     a. Remove the brake disc.
     b. Rotate the brake disc by two bolt holes.
     c. Install the brake disc.



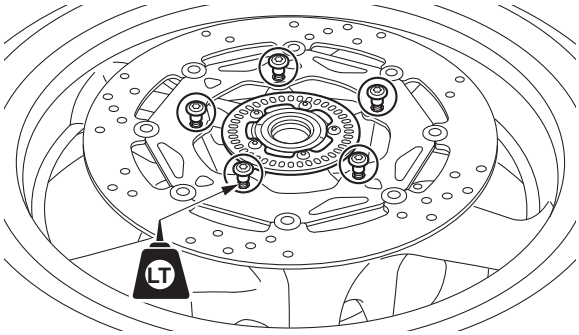
Front brake disc bolt
17 N·m (1.7 kgf·m, 13 lb·ft)
LOCTITE®

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

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



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

6. Install:
   • Front wheel
   Refer to “FRONT WHEEL” on page 4-16.

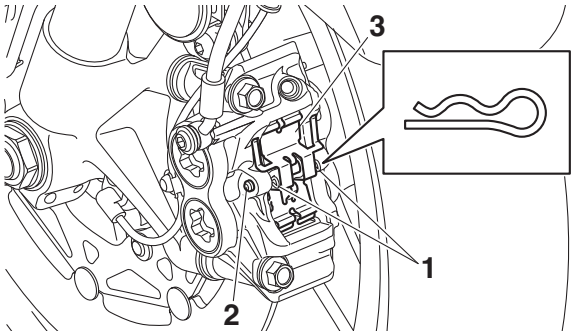
EAS30170
REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

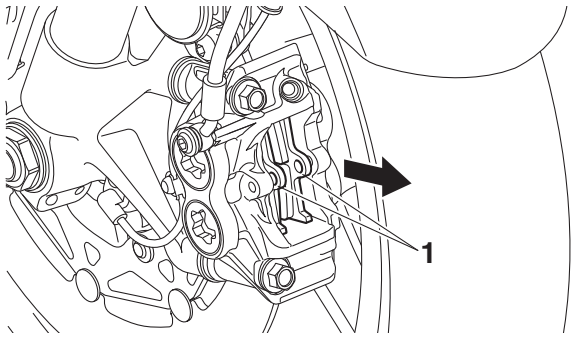
TIP

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

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

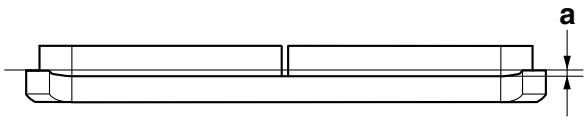


2. Remove:
   • Brake pads “1”



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

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

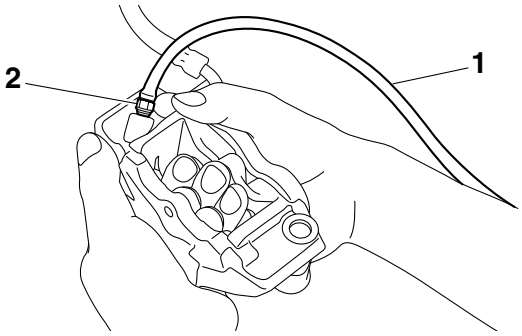


4. Remove:
   • Brake caliper
5. Install:
   • Brake pads
   • Brake pad spring

TIP

Always install new brake pads and new 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.



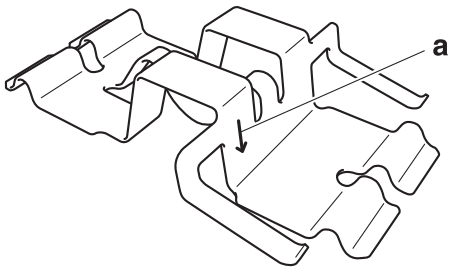
c. Tighten the bleed screw.

	Brake caliper bleed screw **5 N·m (0.5 kgf·m, 3.7 lb·ft)**

d. Install the brake pads and brake pad spring.

TIP

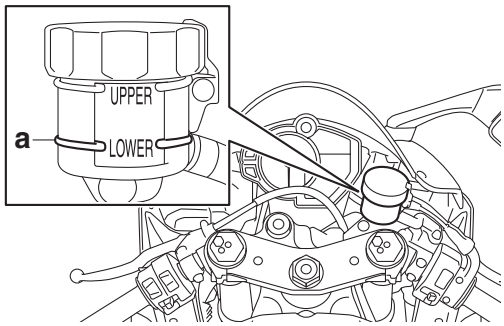
The arrow mark "a" on the brake pad spring must point in the direction of disc rotation.



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

	Front brake caliper bolt **35 N·m (3.5 kgf·m, 26 lb·ft)**

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 3-13.



8. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.

EAS30171

REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

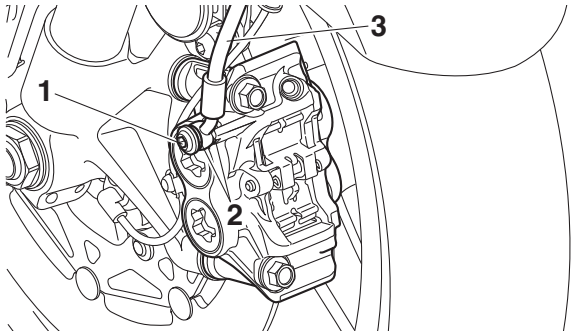
TIP

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

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

TIP

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

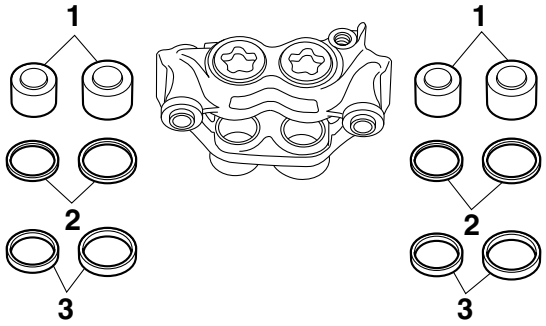


EAS30172

DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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

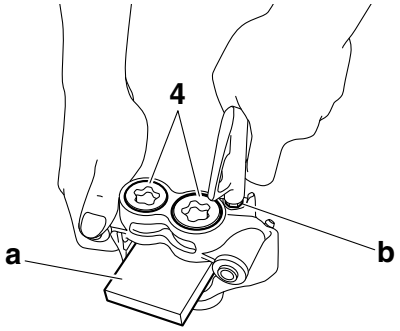


a. Secure the right side brake caliper pistons with a piece of wood “a”.
b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWA17060

WARNING

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



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

EAS30173

CHECKING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

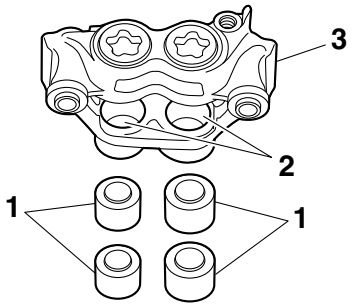
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Piston dust seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

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

EWA13611

WARNING

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



EAS30174

ASSEMBLING THE FRONT BRAKE CALIPERS

EWA16560

WARNING

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

Specified brake fluid
DOT 4

EAS30175

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   • Front brake caliper “1” (temporarily)
   • Brake hose gaskets New
   • Brake hose “2”
   • Brake hose union bolt “3”

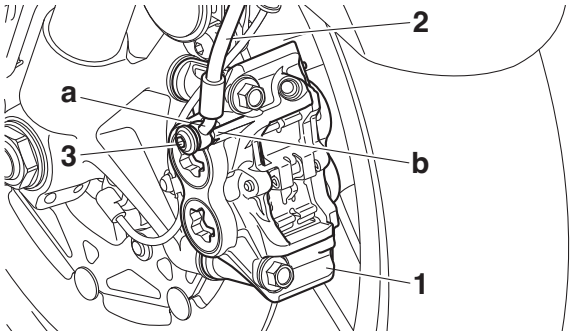
Front brake hose union bolt
32 N·m (3.2 kgf·m, 24 lb·ft)

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 pads
   • Brake pad spring
   • Brake pad pin
   • Brake pad clips
   • Front brake caliper

Front brake caliper bolt
35 N·m (3.5 kgf·m, 26 lb·ft)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-40.

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

Specified brake fluid
DOT 4

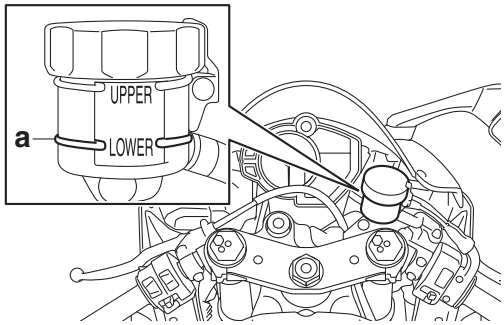
EWA13090
WARNING

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

ECA13540
NOTICE

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

5. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
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 3-13.



7. Check:
   • Brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.

EAS30179
REMOVING THE FRONT BRAKE MASTER CYLINDER

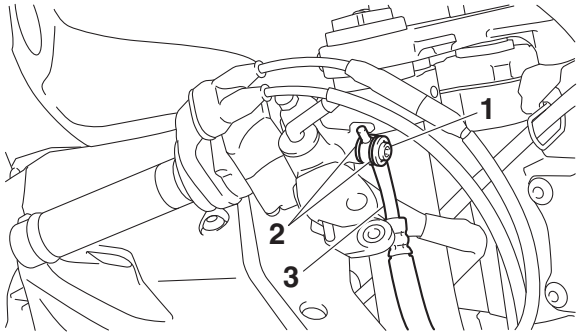
TIP

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

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

TIP

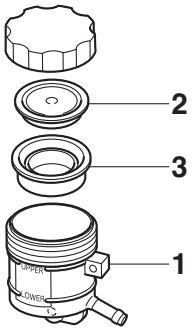
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS30725

CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder
     Damage/scratches/wear → Replace.
   - Brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake fluid reservoir "1"
   - Brake fluid reservoir diaphragm holder "2"
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm "3"
     Damage/wear → Replace.



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

EAS30181

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

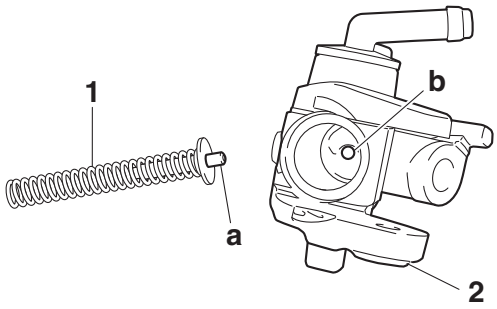
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

Specified brake fluid
DOT 4

1. Install:
   Brake master cylinder kit "1"
   (to the brake master cylinder body "2")

TIP

Align the projection "a" on the brake master cylinder kit with the hole "b" in the brake master cylinder body.



EAS30182

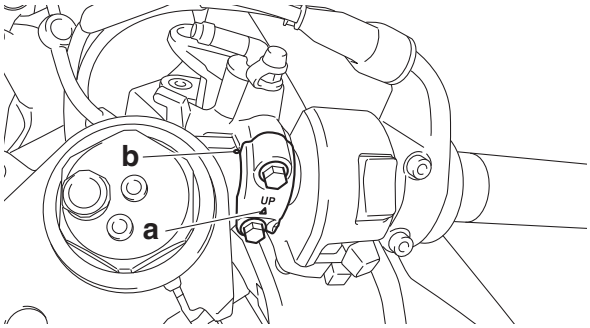
INSTALLING THE FRONT BRAKE MASTER CYLINDER

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

Front brake master cylinder holder bolt
16 N·m (1.6 kgf·m, 12 lb·ft)

TIP

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



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

	Front brake hose union bolt **32 N·m (3.2 kgf·m, 24 lb·ft)**

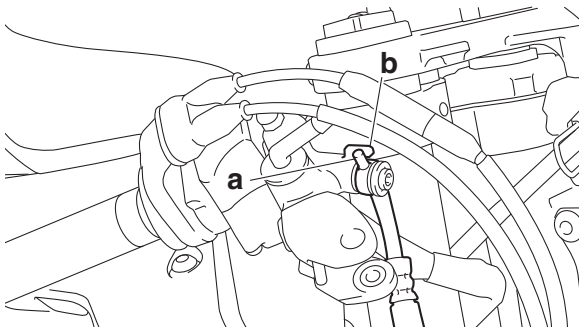
EWA13531

⚠ WARNING

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

TIP

- When installing the brake hose onto the master cylinder, make sure the projection "a" on the brake hose touches the projection "b" on the master cylinder.
- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebars to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



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

	Specified brake fluid **DOT 4**

EWA13540

⚠ WARNING

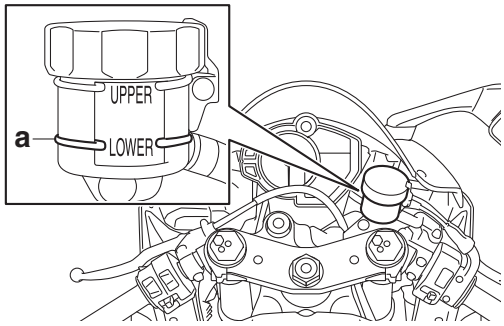
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

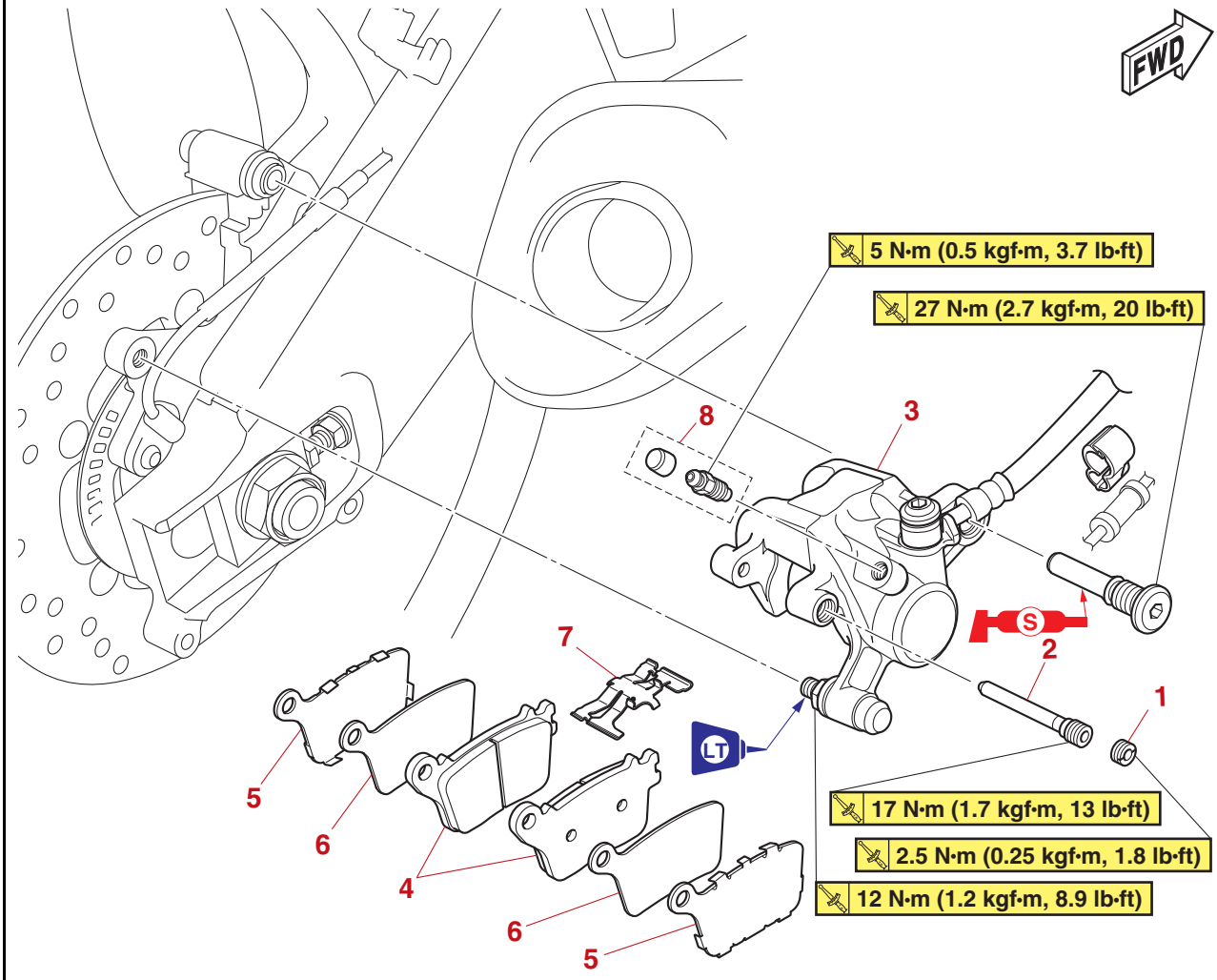
4. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
5. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.



6. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.

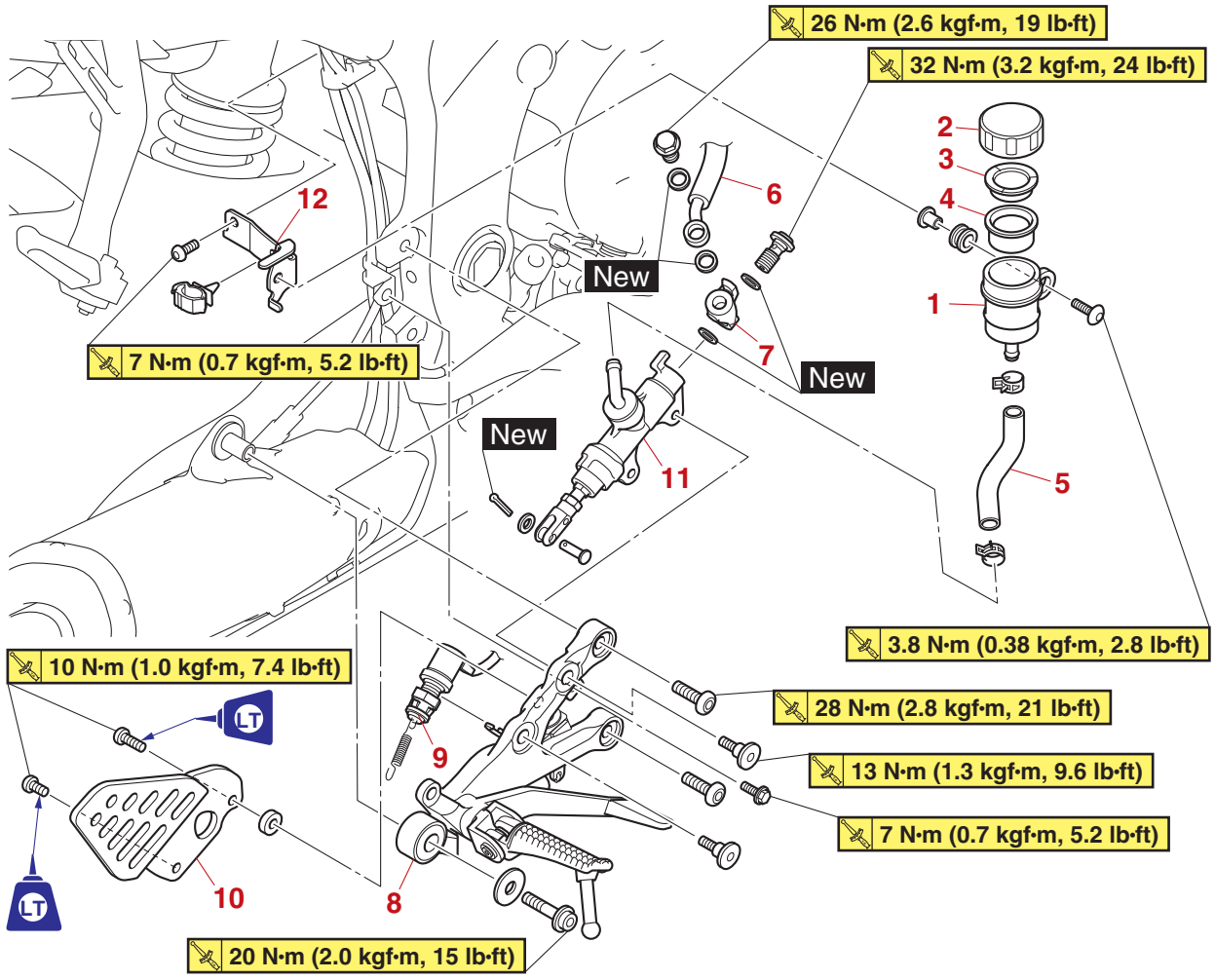
EAS20031
REAR BRAKE

Removing the rear brake pads



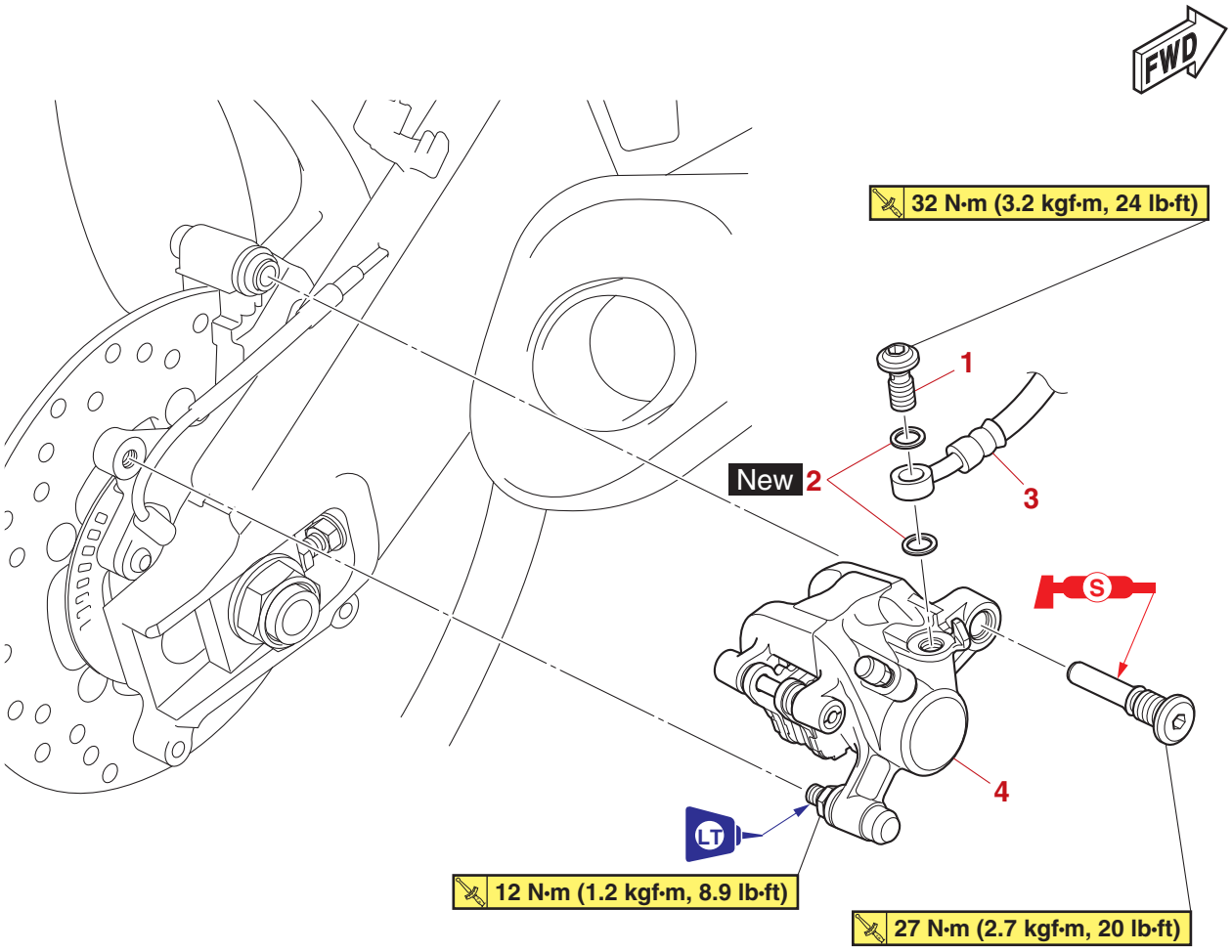
Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad retaining bolt	1	
3	Rear brake caliper	1	
4	Brake pad	2	
5	Brake pad shim	2	
6	Brake pad insulator	2	
7	Brake pad spring	1	
8	Bleed screw	1	

Removing the rear brake master cylinder



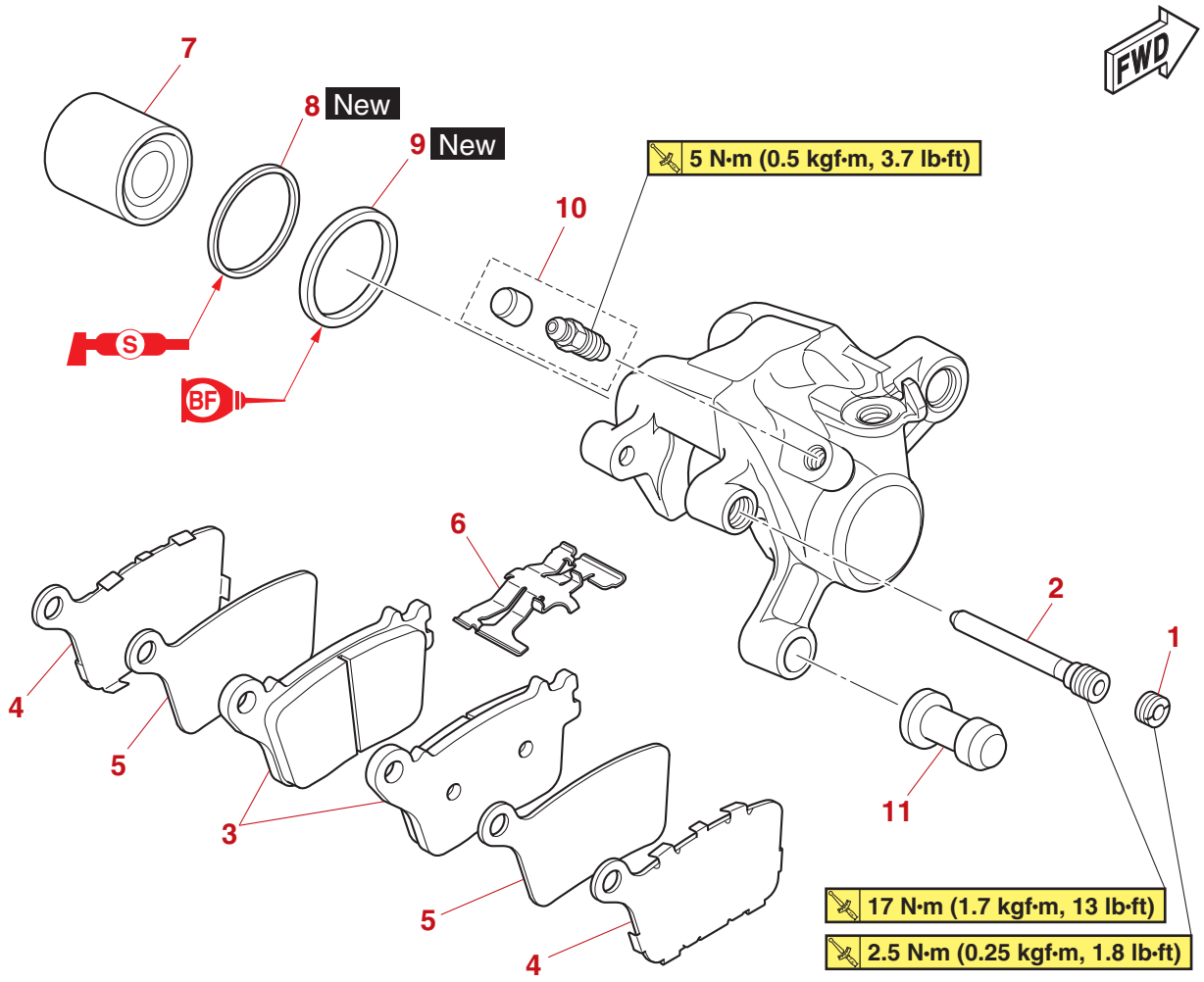
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
1	Brake fluid reservoir	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir hose	1	
6	Rear brake hose	1	
7	Rear brake hose joint	1	
8	Footrest assembly (right)	1	
9	Rear brake light switch	1	
10	Footrest plate	1	
11	Rear brake master cylinder	1	Do not disassemble the rear brake master cylinder.
12	Brake fluid reservoir bracket	1	

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
1	Brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose	1	
4	Rear brake caliper	1	

Disassembling the rear brake caliper



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

EAS30183
INTRODUCTION

EWA14101
⚠ WARNING

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

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS30184
CHECKING THE REAR BRAKE DISC

1. Remove:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-24.
2. Check:
   - Rear brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc runout
     Out of specification → Correct the brake disc runout or replace the brake disc.
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-39.

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

4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-39.

Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
   - Brake disc runout
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-39.

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

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

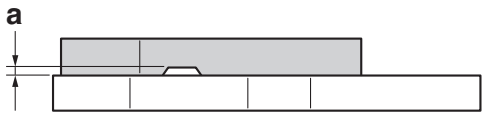
EAS30185
REPLACING THE REAR BRAKE PADS

TIP

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

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

Brake pad lining thickness
4.5 mm (0.18 in)
Limit
1.0 mm (0.04 in)

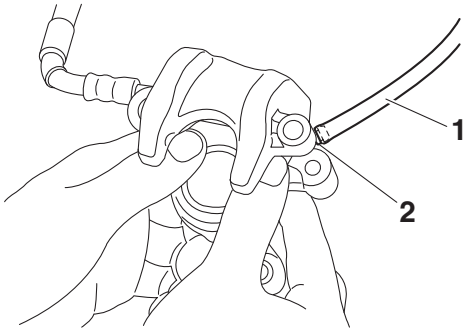


2. Install:
   - Brake pad insulators
   - Brake pad shims
     (onto the brake pads)
   - Brake pad spring
     (into the rear brake caliper)
   - Brake pads

TIP

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

a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.

Brake caliper bleed screw
5 N·m (0.5 kgf·m, 3.7 lb·ft)

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

TIP

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

ECA14150

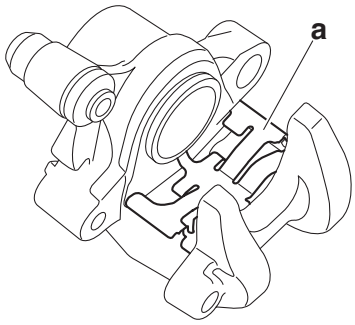
NOTICE

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

e. Install the brake pads and brake pad spring.

TIP

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



3. Lubricate:
   - Rear brake caliper bolts

Recommended lubricant
Silicone grease

ECA14150

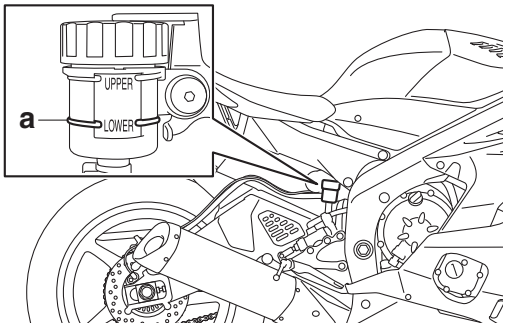
NOTICE

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

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

Rear brake caliper bolt (front)
27 N·m (2.7 kgf·m, 20 lb·ft)
Rear brake caliper bolt (rear)
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®
Rear brake pad retaining bolt
17 N·m (1.7 kgf·m, 13 lb·ft)
Rear brake caliper screw plug
2.5 N·m (0.25 kgf·m, 1.8 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 3-13.



6. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.

EAS30186
REMOVING THE REAR BRAKE CALIPER

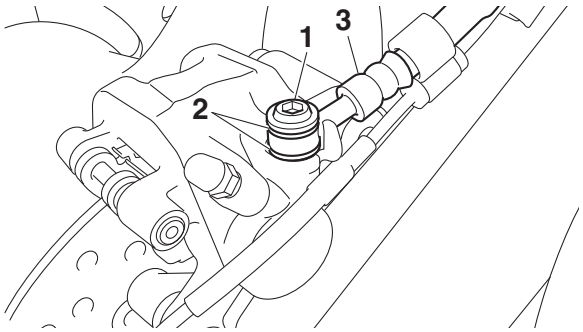
TIP

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

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

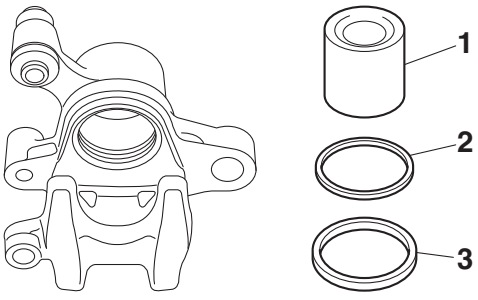
TIP

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



EAS30187
DISASSEMBLING THE REAR BRAKE CALIPER

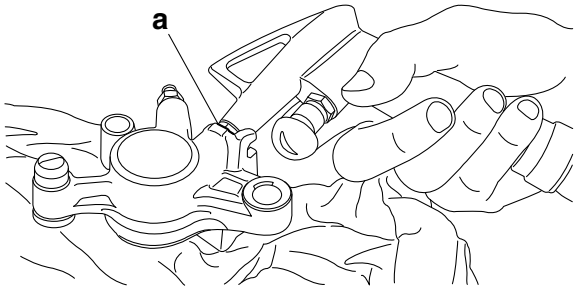
1. Remove:
   • Brake caliper piston "1"
   • Brake caliper piston dust seal "2"
   • Brake caliper piston seal "3"



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.

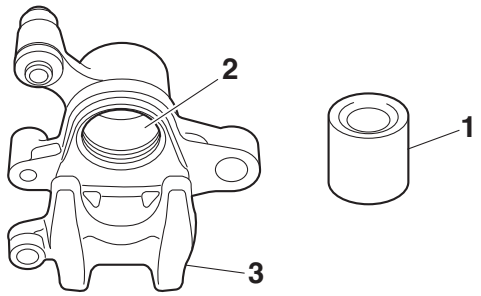
EAS30188
CHECKING THE REAR BRAKE CALIPER

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

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

EWA13601
⚠ WARNING

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



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

EAS30189
ASSEMBLING THE REAR BRAKE CALIPER

EWA17080
WARNING

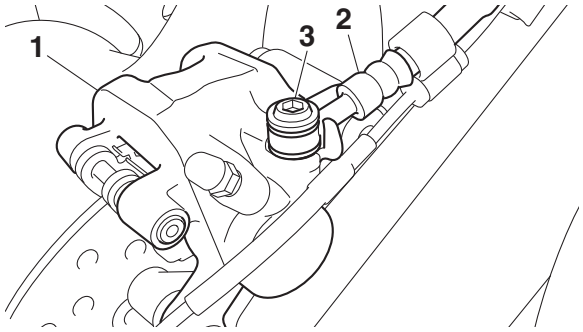
• Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
• Never use solvents on internal brake components as they will cause the brake caliper piston dust seal and brake caliper piston seal to swell and distort.
• Whenever a brake caliper is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

	Specified brake fluid **DOT 4**

EAS30190
INSTALLING THE REAR BRAKE CALIPER

1. Install:
   • Rear brake caliper "1"
   (temporarily)
   • Brake hose gaskets New
   • Brake hose "2"
   • Brake hose union bolt "3"

	Rear brake hose union bolt **32 N·m (3.2 kgf·m, 24 lb·ft)**

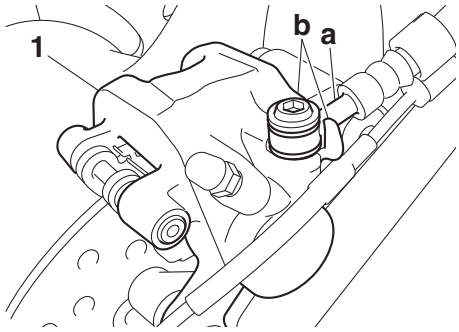


EWA13531
WARNING

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

ECA19080
NOTICE

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



2. Remove:
   • Rear brake caliper
3. Install:
   • Brake pad insulators
   • Brake pad shims
   (onto the brake pads)
   • Brake pad spring
   (into the rear brake caliper)
   • Brake pads
   • Rear brake caliper
   Refer to "REPLACING THE REAR BRAKE PADS" on page 4-50.

	Rear brake caliper bolt (front) **27 N·m (2.7 kgf·m, 20 lb·ft)** **Rear brake caliper bolt (rear)** **12 N·m (1.2 kgf·m, 8.9 lb·ft)** **LOCTITE®** **Rear brake pad retaining bolt** **17 N·m (1.7 kgf·m, 13 lb·ft)** **Rear brake caliper screw plug** **2.5 N·m (0.25 kgf·m, 1.8 lb·ft)**

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

	Specified brake fluid **DOT 4**

EWA13090

⚠ WARNING

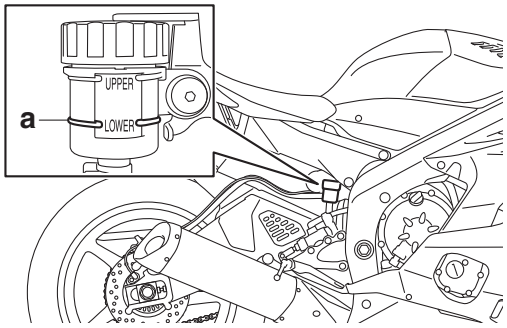
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor 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 (ABS)" on page 3-16.
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 3-13.



7. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.

EAS30193

REMOVING THE REAR BRAKE MASTER CYLINDER

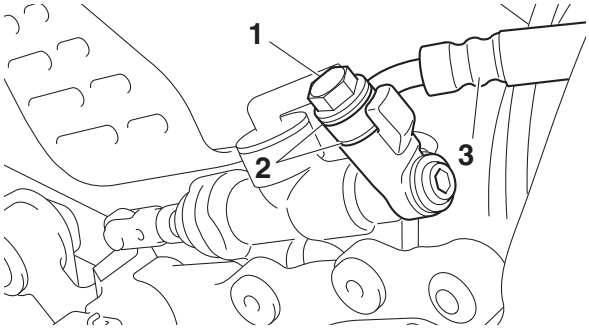
TIP

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 fluid reservoir
   Cracks/damage → Replace.
   • Brake fluid reservoir diaphragm
   Cracks/damage → Replace.
3. Check:
   • Rear brake hose
   • Rear brake hose joint
   • Brake fluid reservoir hose
   Cracks/damage/wear → Replace.

EAS31743
THE REAR BRAKE MASTER CYLINDER

ECA23000
NOTICE

Do not disassemble the rear brake master cylinder. If the master cylinder malfunctions, replace the rear brake master cylinder assembly.

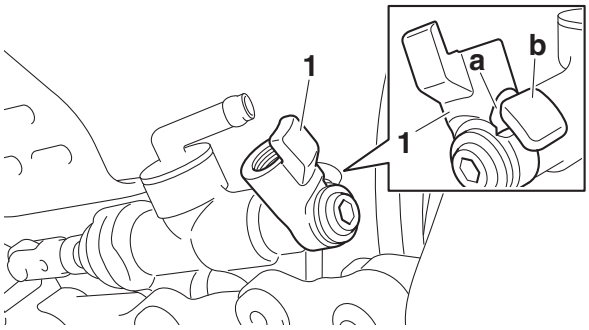
EAS30196
INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - Rear brake hose joint "1"

	Rear brake hose joint union bolt 32 N·m (3.2 kgf·m, 24 lb·ft)

TIP

Make sure that the side "a" of the rear brake hose joint contacts the projection "b" on the rear brake master cylinder.



2. Install:
   - Rear brake hose "1"
   - Brake hose gaskets "2" New
   - Rear brake hose union bolt "3"

	Rear brake hose union bolt 26 N·m (2.6 kgf·m, 19 lb·ft)

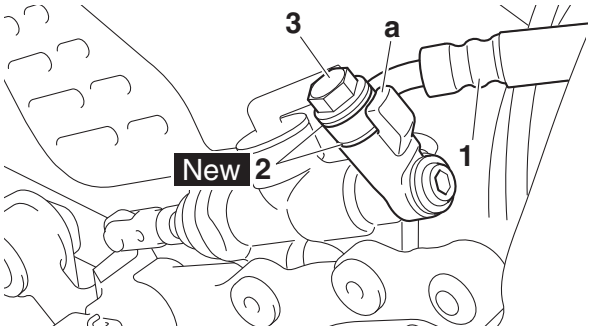
EWA13531
WARNING

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

Refer to "CABLE ROUTING" on page 2-15.

ECA14160
NOTICE

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



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

	Specified brake fluid DOT 4

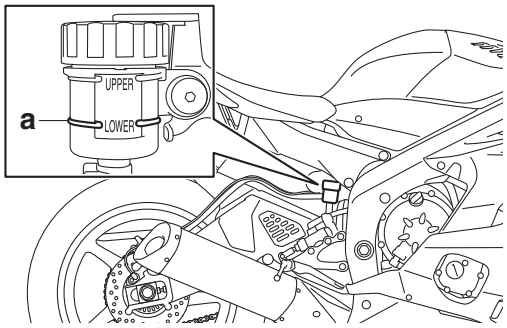
EWA13090
WARNING

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

ECA13540
NOTICE

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

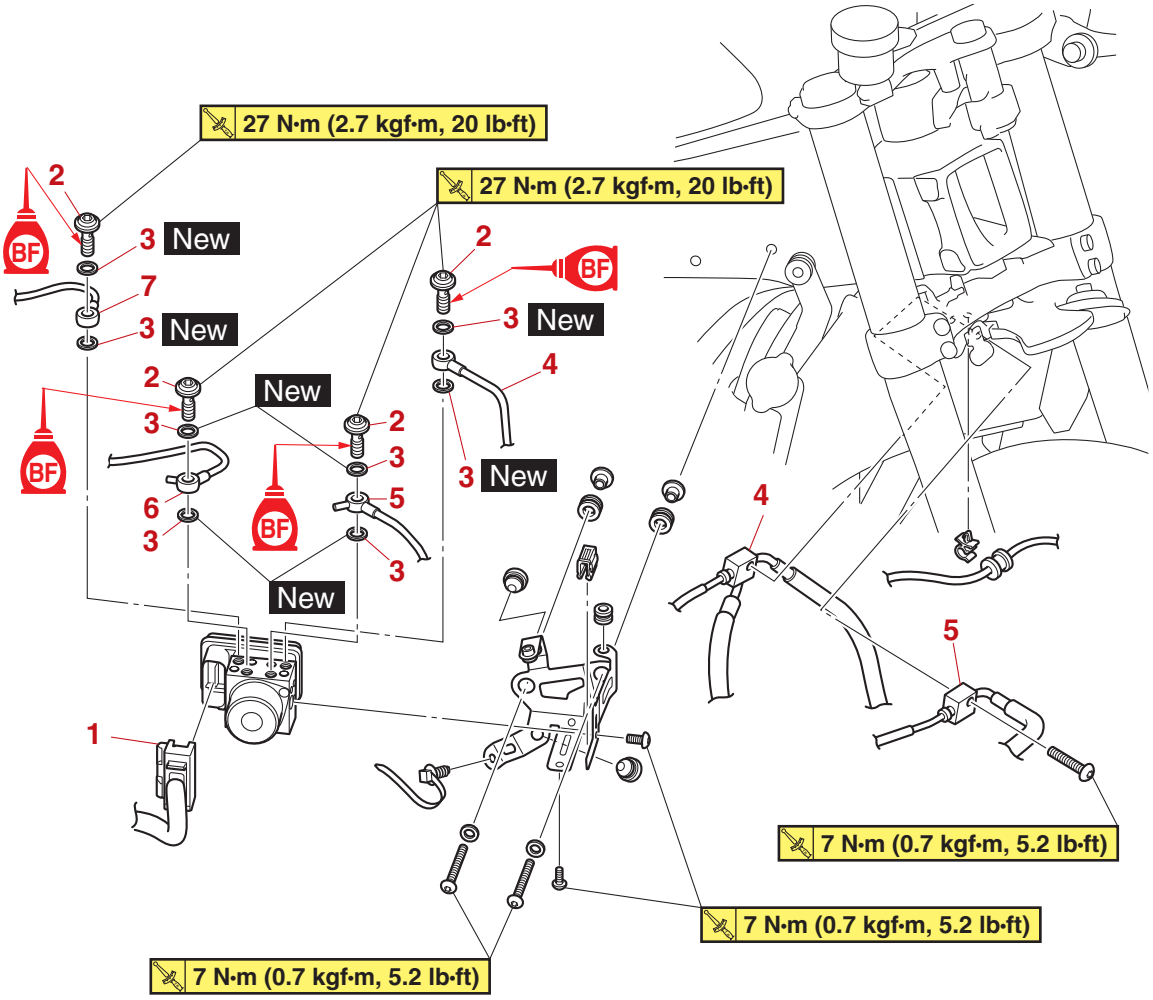
4. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
5. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.



6. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-16.
7. Adjust:
   - Brake pedal position
     Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-15.
8. Adjust:
   - Rear brake light operation timing
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-31.

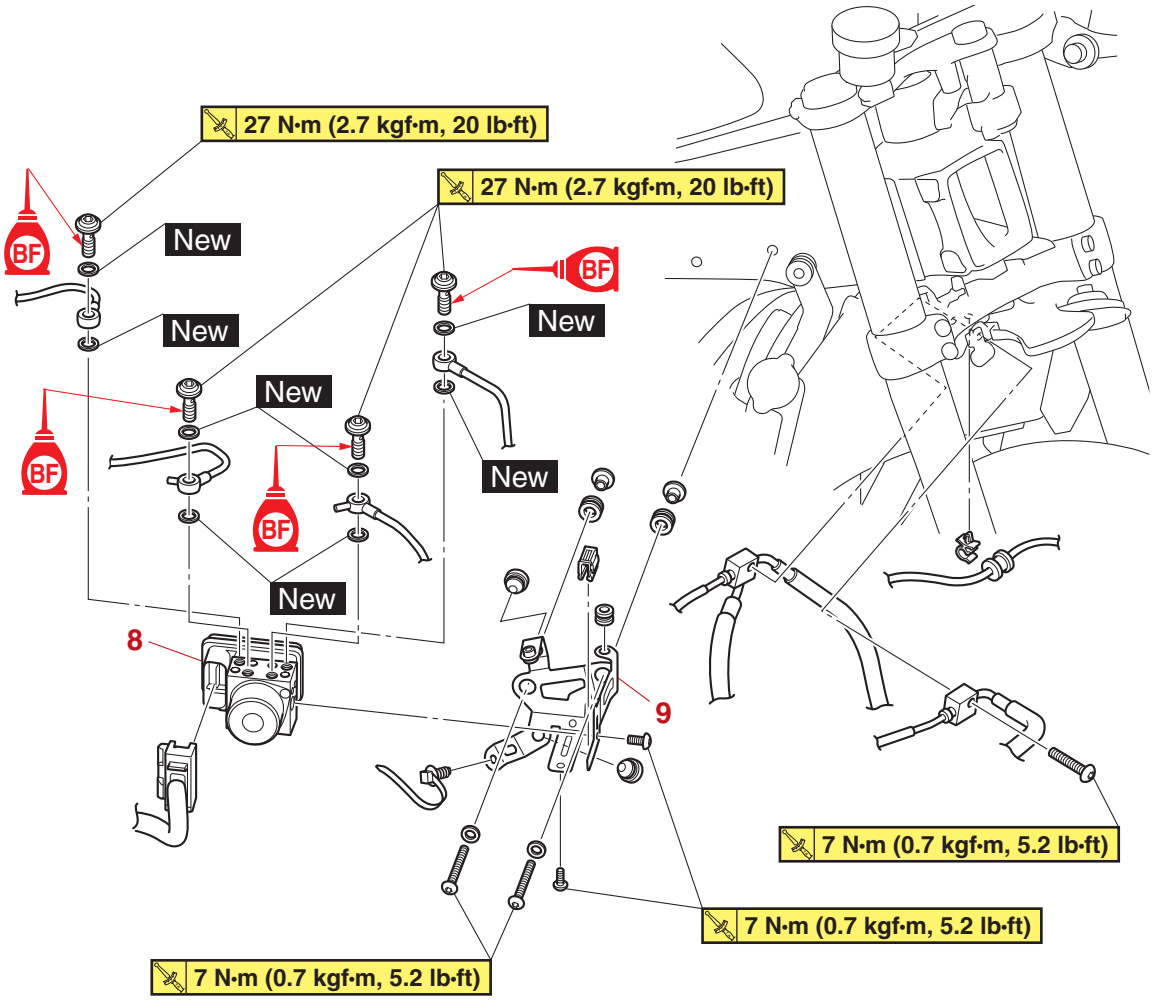
EAS20032
ABS (Anti-lock Brake System)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-16.
	Front side cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-8.
1	ABS ECU coupler	1	Disconnect.
2	Brake hose union bolt	4	
3	Gasket	8	
4	Front brake hose (hydraulic unit to front brake calipers)	1	
5	Front brake hose (front brake master cylinder to hydraulic unit)	1	
6	Rear brake hose (rear brake master cylinder to hydraulic unit)	1	
7	Rear brake hose (hydraulic unit to rear brake caliper)	1	

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
8	Hydraulic unit	1	
9	Hydraulic unit bracket	1	

EAS30197
REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA18230
NOTICE

Unless necessary, avoid removing and installing the brake pipes of the hydraulic unit assembly.

EWA13930
⚠ WARNING

Refill with the same type of brake fluid that is already in the system. Mixing fluids may result in a harmful chemical reaction, leading to poor braking performance.

ECA19790
NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **Do not set the main switch to "ON" when removing the hydraulic unit assembly.**
- **Do not clean with compressed air.**
- **Do not reuse the brake fluid.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.**
- **If the brake pipe flare nuts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.**

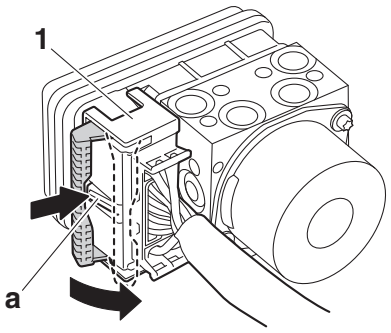
1. Disconnect:
   - ABS ECU coupler "1"

TIP

While pushing the portion "a" of the ABS ECU coupler, pull the lock lever up to release the lock.

ECA20080
NOTICE

Do not use a tool to disconnect the ABS ECU coupler.

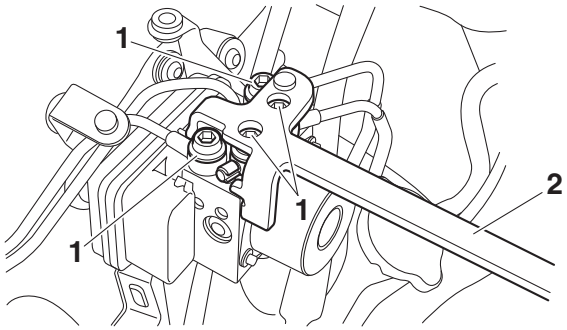


2. Remove:
   - Brake hose union bolt "1"

TIP

Hold the hydraulic unit holding tool "2" with one hand to secure the hydraulic unit, and then loosen the brake hose union bolt.

	**Hydraulic unit holding tool 90890-01594**



3. Remove:
   - Brake hoses

TIP

Do not operate the brake lever and brake pedal while removing the brake hoses.

ECA18251
NOTICE

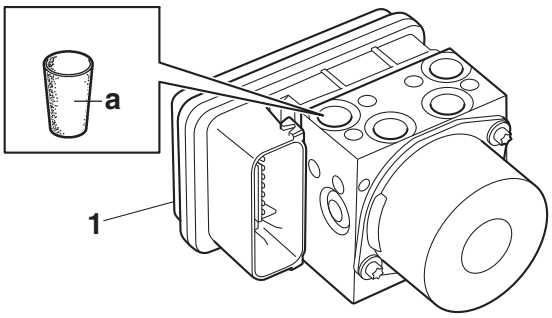
When removing the brake hoses, cover the area around the hydraulic unit assembly to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

4. Remove:
   - Hydraulic unit assembly "1"

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug "a" or a bolt (M10 × 1.0) into each brake hose union bolt hole.

• When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake hose union bolt seating surface could be deformed.



EAS30198
CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:
   • Hydraulic unit assembly
   Cracks/damage → Replace the hydraulic unit assembly and the brake hoses that are connected to the assembly as a set.

EAS30200
INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
   • Hydraulic unit assembly

ECA21371
NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.0) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.

TIP

Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses when installing the hydraulic unit assembly.

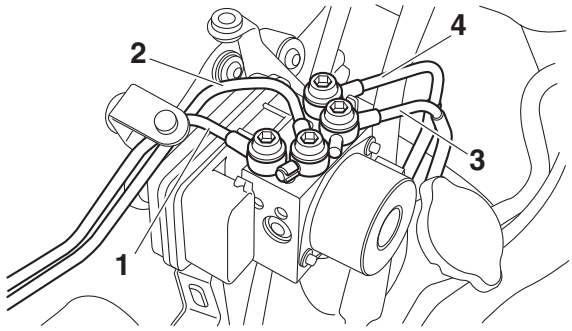
2. Remove:
   • Rubber plugs or bolts (M10 × 1.0)
3. Install:
   • Rear brake hose (hydraulic unit to rear brake caliper) “1”
   • Rear brake hose (rear brake master cylinder to hydraulic unit) “2”
   • Front brake hose (front brake master cylinder to hydraulic unit) “3”
   • Front brake hose (hydraulic unit to front brake calipers) “4”
   • Gasket New
   • Brake hose union bolts (temporarily)

ECA21121
NOTICE

If the brake hose union bolt does not turn easily, replace the hydraulic unit assembly, brake hoses, and related parts as a set.

TIP

• Apply brake fluid to the threads of the brake hose union bolts.
• Temporarily tighten the brake hose union bolts.
• To route the brake hose, refer to “CABLE ROUTING” on page 2-15.



4. Tighten:
   • Brake hose union bolt

	**Brake hose union bolt 27 N·m (2.7 kgf·m, 20 lb·ft)**

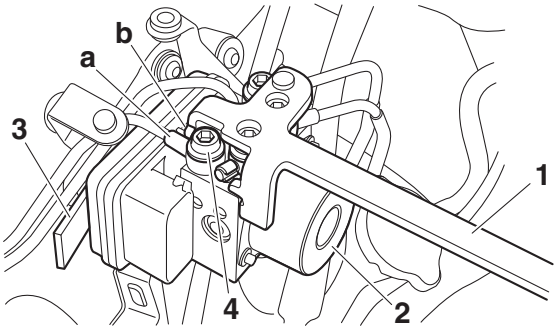
   a. Set the hydraulic unit holding tool “1” on the hydraulic unit “2”.

	**Hydraulic unit holding tool 90890-01594**

   b. Insert a plate “3” that has a thickness of approximately 6 mm (0.24 in) between the hydraulic unit “2” and the hydraulic unit bracket bolt.
   c. Tighten the union bolt “4” for the rear brake hose (hydraulic unit to rear brake caliper).

TIP

Make sure that the pipe section “a” of the rear brake hose contacts the projection “b” on the hydraulic unit holding tool.



d. Tighten the union bolts “5” for the rear brake hose (rear brake master cylinder to hydraulic unit) and front brake hose (front brake master cylinder to hydraulic unit).

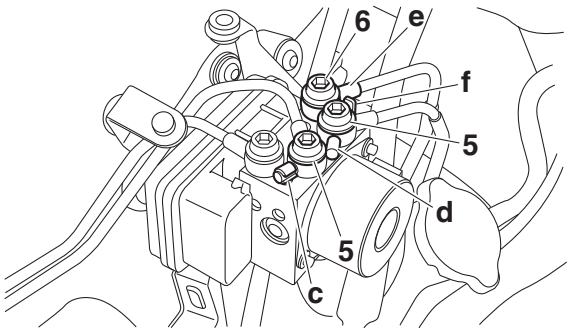
TIP

Make sure that the projection “c” on the rear brake hose and the projection “d” on the front brake hose contact the other brake hoses as shown in the illustration.

e. Tighten the union bolt “6” for the front brake hose (hydraulic unit to front brake calipers).

TIP

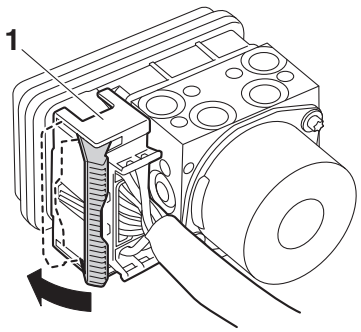
Make sure that the pipe section “e” of the front brake hose contacts the projection “f” on the hydraulic unit bracket.



5. Connect:
   • ABS ECU coupler “1”

TIP

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



6. Fill:
   • Brake master cylinder reservoir
   • 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.

7. Bleed:
   • Brake system
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-16.
8. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to “HYDRAULIC UNIT OPERATION TEST” on page 4-61.)

ECA14770

NOTICE

Always check the operation of the hydraulic unit according to the brake lever and the brake pedal response.

9. Delete the fault codes. (Refer to “[B-3] DELETING THE FAULT CODES” on page 8-146.)
10. Perform a trial run. (Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-65.)

EAS30201

HYDRAULIC UNIT OPERATION TEST

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

- Brake line routing confirmation: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- ABS reaction-force confirmation: this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

Brake line routing confirmation

EWA13120

⚠ WARNING

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

TIP

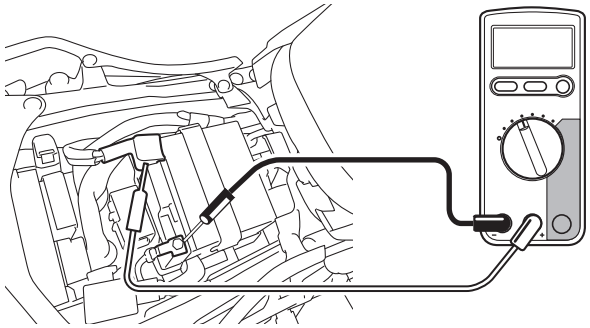
- For the brake line routing confirmation, use the diagnosis of function of the Yamaha diagnostic tool.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

1. Place the vehicle on a maintenance stand.
2. Turn the main switch to "OFF".
3. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.

Battery voltage
Higher than 12.8 V

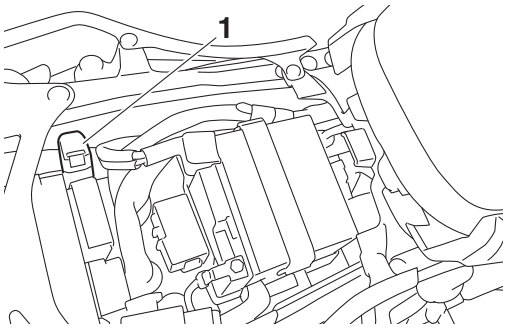
TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform brake line routing confirmation.



5. Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler (4P).

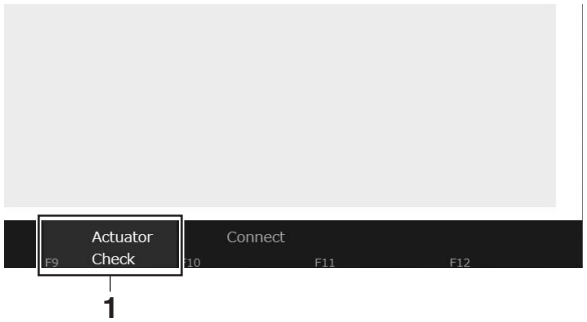
Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

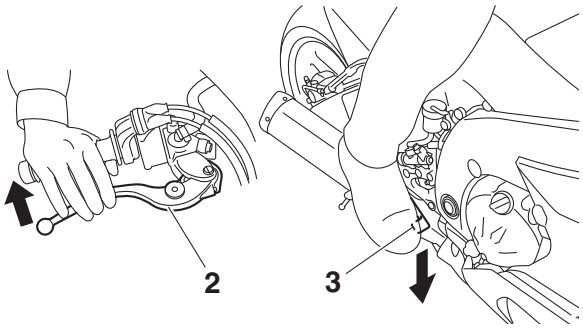


6. Start the Yamaha diagnostic tool and display the diagnosis of function screen.
7. Select code No. 2, "Brake line routing confirmation".
8. Click "Actuator Check" "1", and then operate the brake lever "2" and brake pedal "3" simultaneously.

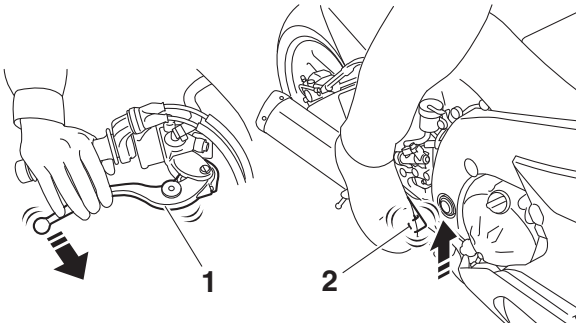
TIP

- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
  On: The hydraulic unit is operating.
  Flashing: The conditions for operating the hydraulic unit have not been met.
  Off: The brake lever and brake pedal are not being operated.





9. Check:
   • Hydraulic unit operation
   Click “Actuator Check”, a single pulse will be generated in the brake lever “1”, brake pedal “2”, and again in the brake lever “1”, in this order.



TIP

“ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.

ECA17371

NOTICE

- **Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.**
- **If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

10. If the operation of the hydraulic unit is normal, delete all of the fault codes.

ABS reaction-force confirmation

EWA13120

⚠ WARNING

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

TIP

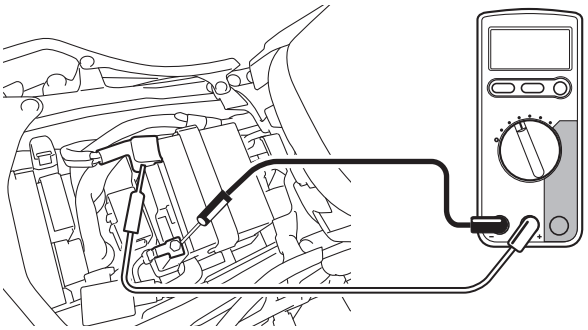
- For the ABS reaction-force confirmation, use the diagnosis of function of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

1. Place the vehicle on a maintenance stand.
2. Turn the main switch to “OFF”.
3. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
4. Check:
   • Battery voltage
   Lower than 12.8 V → Charge or replace the battery.

Battery voltage
Higher than 12.8 V

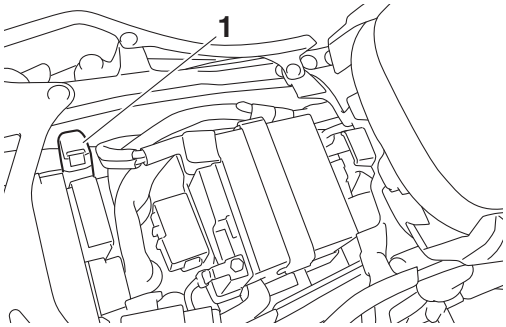
TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform ABS reaction-force confirmation.



5. Removing the protective cap “1”, and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler (4P).

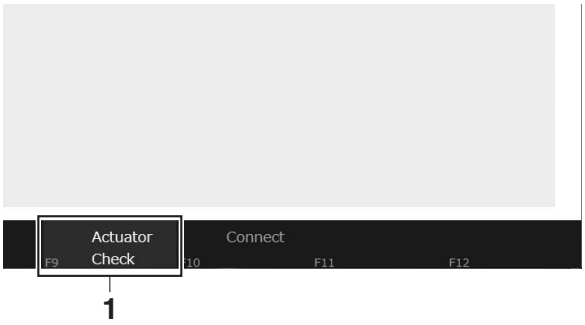
Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

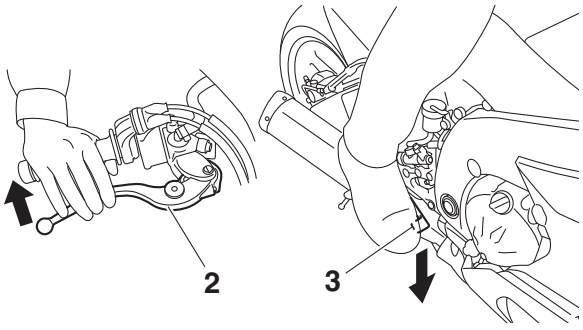


6. Start the Yamaha diagnostic tool and display the diagnosis of function screen.
7. Select code No. 1, “ABS reaction-force confirmation”.
8. Click “Actuator Check” “1”, and then operate the brake lever “2” and brake pedal “3” simultaneously.

TIP

- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
  On: The hydraulic unit is operating.
  Flashing: The conditions for operating the hydraulic unit have not been met.
  Off: The brake lever and brake pedal are not being operated.

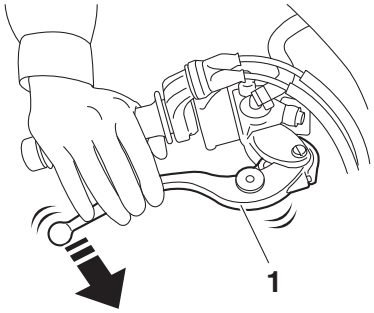




9. A reaction-force pulsating action is generated in the brake lever “1” and continues for a few seconds.

TIP

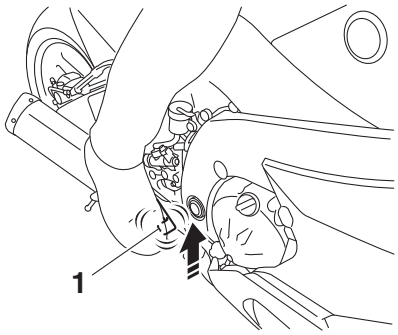
- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.



10. After the pulsating action has stopped in the brake lever, it is generated in the brake pedal “1” and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.



11. After the pulsating action has stopped in the brake pedal, it is generated in the brake lever and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.

ECA17371

NOTICE

- **Check that the pulse is felt in the brake lever, brake pedal, and again in the brake lever, in this order.**
- **If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

• If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

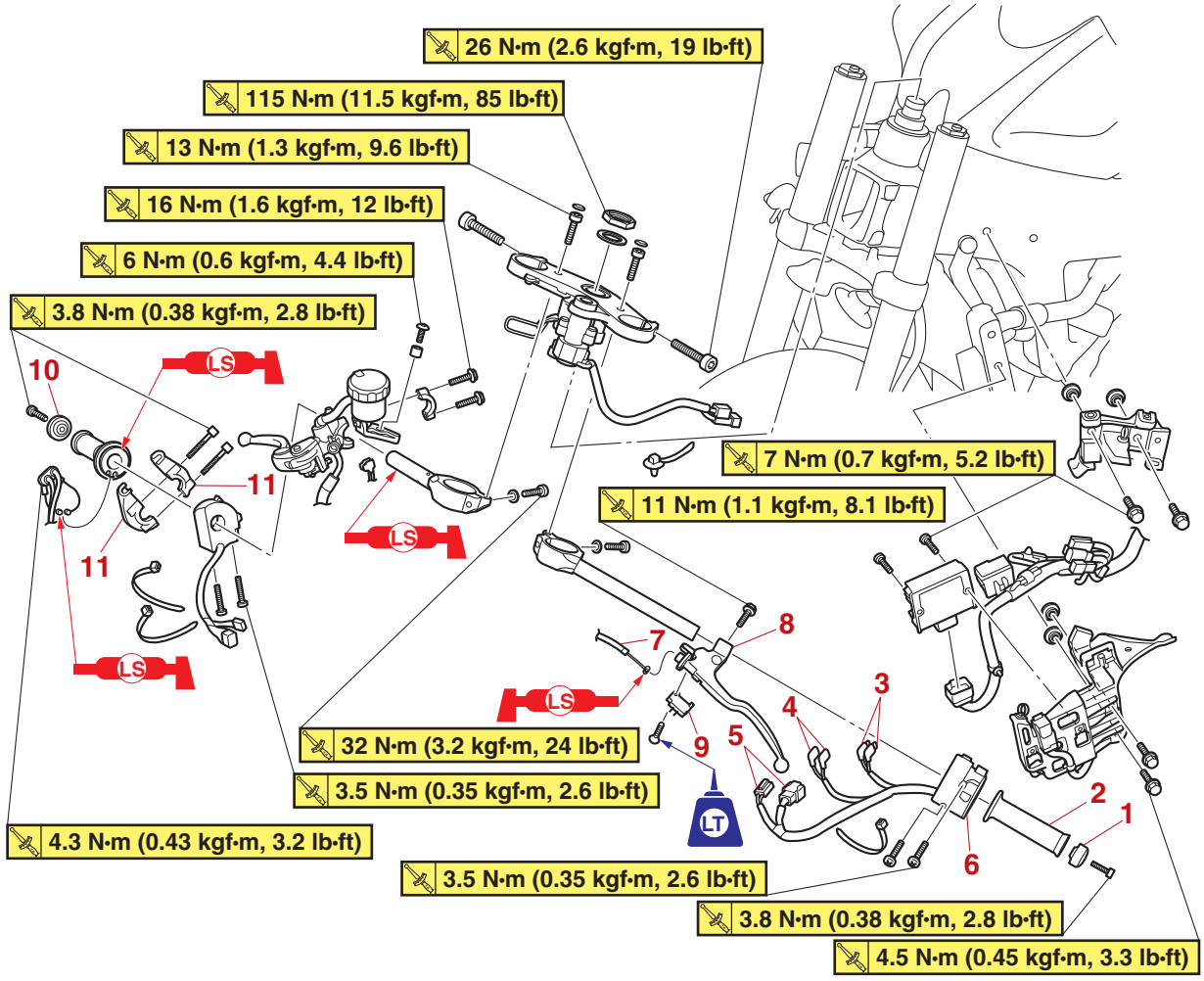
12. Turn the main switch to “OFF”.
13. Remove the Yamaha diagnostic tool from the Yamaha diagnostic tool coupler, and then install the protective cap.
14. Turn the main switch to “ON”.
15. Set the engine stop switch to “ ”.
16. Check for brake fluid leakage around the hydraulic unit.
    Brake fluid leakage → Replace the hydraulic unit, brake pipes, and related parts as a set.
17. If the operation of the hydraulic unit is normal, delete all of the fault codes.

EAS30202
CHECKING THE ABS WARNING LIGHT

After all checks and servicing are completed, ensure that the ABS warning light goes off by walking the vehicle at a speed of faster than 5 km/h (3.1 mi/h) or performing a trial run.

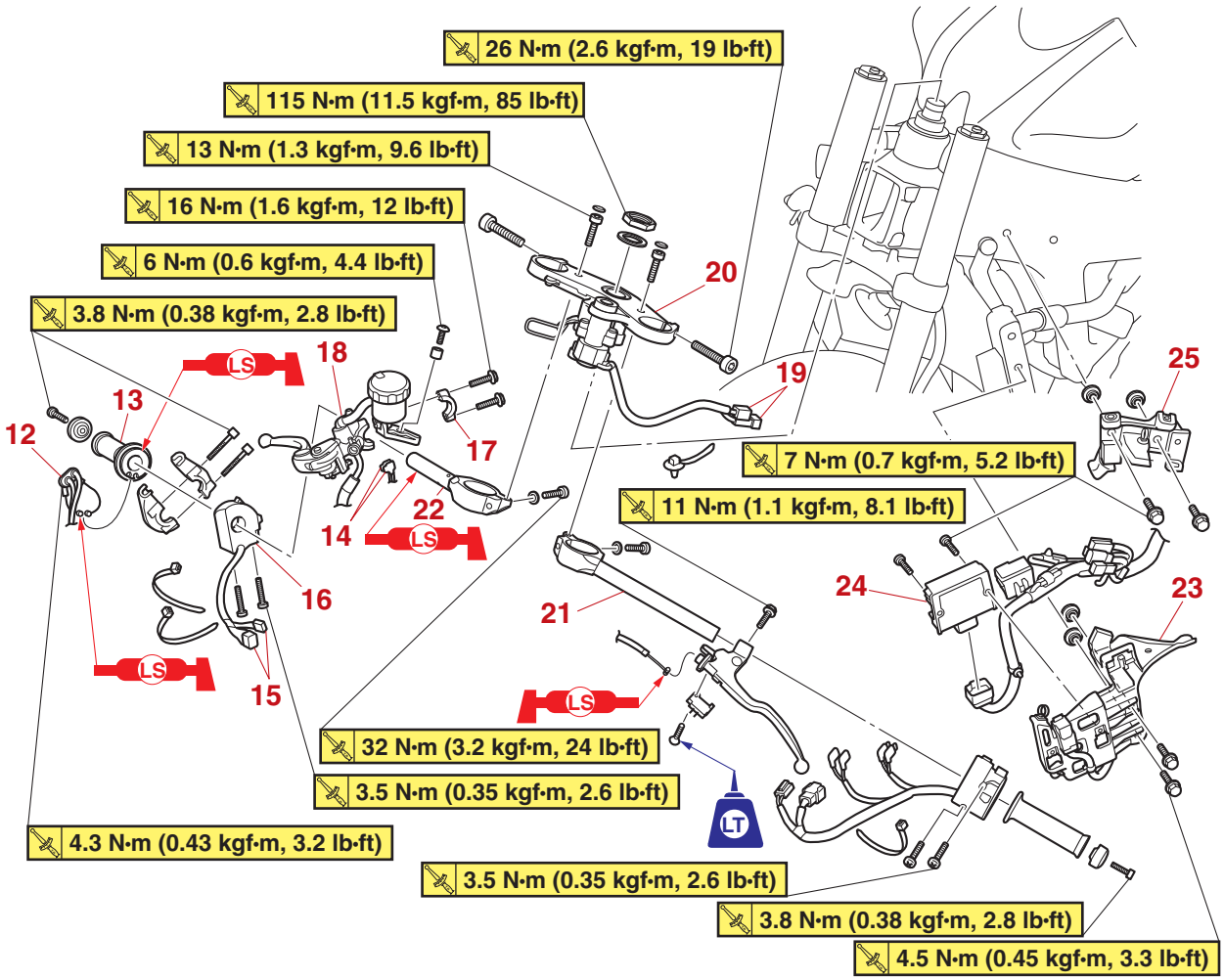
EAS20033
HANDLEBARS

Removing the handlebars



Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Headlight assembly		Refer to "GENERAL CHASSIS (6)" on page 4-13.
1	Grip end (left)	1	
2	Handlebar grip	1	
3	Clutch switch connector	2	Disconnect.
4	Horn connector	2	Disconnect.
5	Handlebar switch coupler (left)	2	Disconnect.
6	Handlebar switch (left)	1	
7	Clutch cable	1	Disconnect.
8	Clutch lever assembly	1	
9	Clutch switch	1	
10	Grip end (right)	1	
11	Throttle cable housing	1	

Removing the handlebars



Order	Job/Parts to remove	Q'ty	Remarks
12	Throttle cable	2	Disconnect.
13	Throttle grip	1	
14	Front brake light switch connector	2	Disconnect.
15	Handlebar switch coupler (right)	2	Disconnect.
16	Handlebar switch (right)	1	
17	Front brake master cylinder holder	1	
18	Front brake master cylinder assembly	1	
19	Main switch coupler	2	Disconnect.
20	Upper bracket	1	
21	Handlebar (left)	1	
22	Handlebar (right)	1	
23	Rectifier/regulator bracket	1	
24	Rectifier/regulator	1	
25	Coupler holder (left)	1	

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

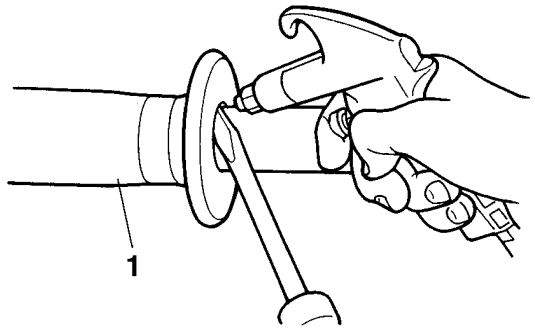
EWA13120
⚠ WARNING

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

2. Remove:
   • Handlebar grip “1”

TIP

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



EAS30204
CHECKING THE HANDLEBARS
1. Check:
   • Handlebar (left)
   • Handlebar (right)
   Bends/cracks/damage → Replace.

EWA13690
⚠ WARNING

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

EAS30205
INSTALLING THE HANDLEBARS
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

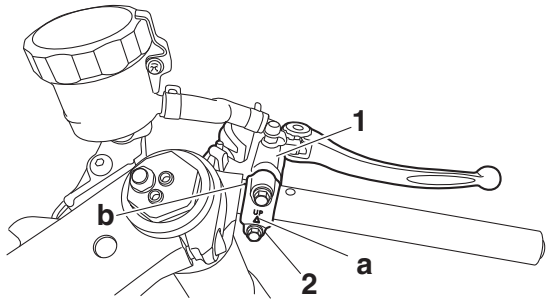
Securely support the vehicle so that there is no danger of it falling over.

2. Install:
   • Front brake master cylinder “1”
   • Front brake master cylinder holder “2”

	Front brake master cylinder bolt 16 N·m (1.6 kgf·m, 12 lb·ft)

TIP

• Install the brake master cylinder holder with the “UP” mark “a” facing up.
• Align the mating surfaces of the brake master cylinder holder with the punch mark “b” on the handlebar.

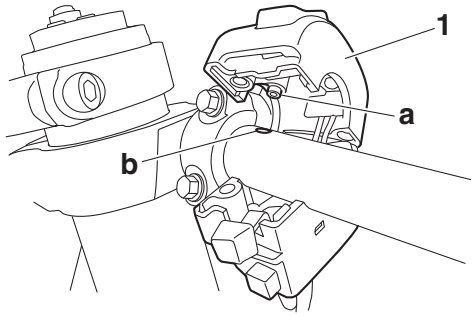


3. Install:
   • Handlebar switch (right) “1”

	Handlebar switch screw 3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

TIP

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

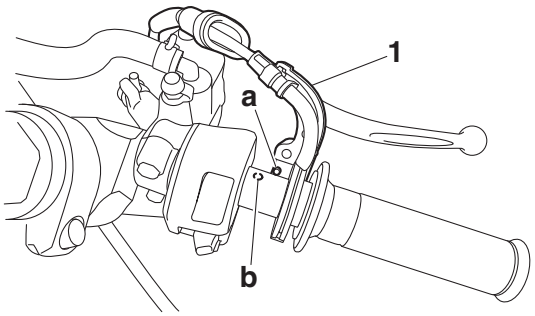


4. Install:
   • Throttle grip
   • Throttle cables
   • Throttle cable housing “1”

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

TIP

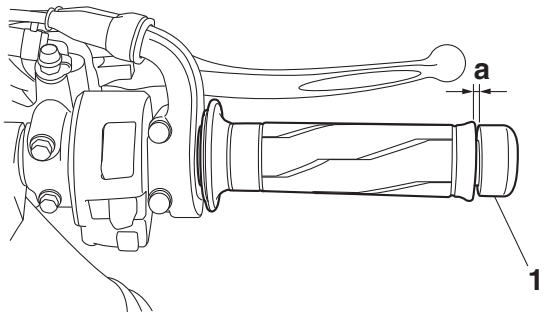
Align the projection “a” on the throttle cable housing with the hole “b” in the right handlebar.



5. Install:
   • Grip end (right) “1”

TIP

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

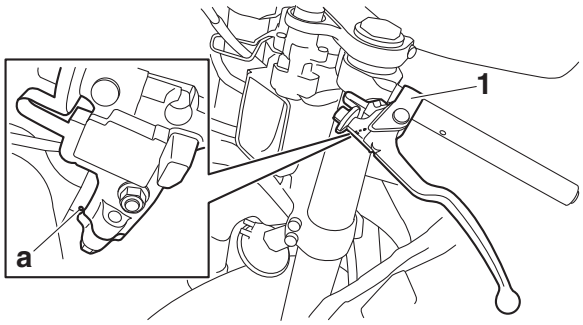


6. Install:
   • Clutch lever assembly “1”

	Clutch lever assembly bolt 11 N·m (1.1 kgf·m, 8.1 lb·ft)

TIP

Align the mating surfaces of the clutch lever assembly with the punch mark “a” on the left handlebar.

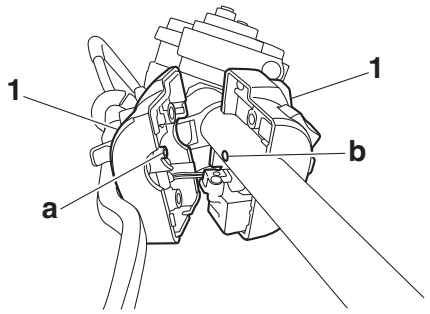


7. Install:
   • Handlebar switch (left) “1”

	Handlebar switch screw 3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

TIP

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



8. Install:
   • Handlebar grip “1”
   • Grip end (left) “2”

	Grip end bolt 3.8 N·m (0.38 kgf·m, 2.8 lb·ft)

   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.

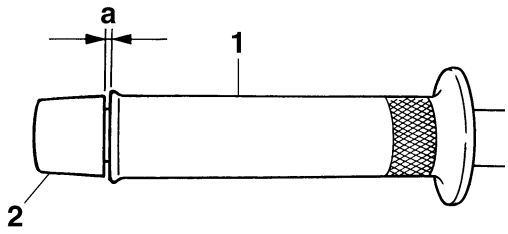
EWA13700

⚠ WARNING

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

TIP

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



9. Check:
   • Cable routing

TIP

Make sure the main switch lead, brake hoses, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to “CABLE ROUTING” on page 2-15.

10.Adjust:
- Clutch cable free play
  Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

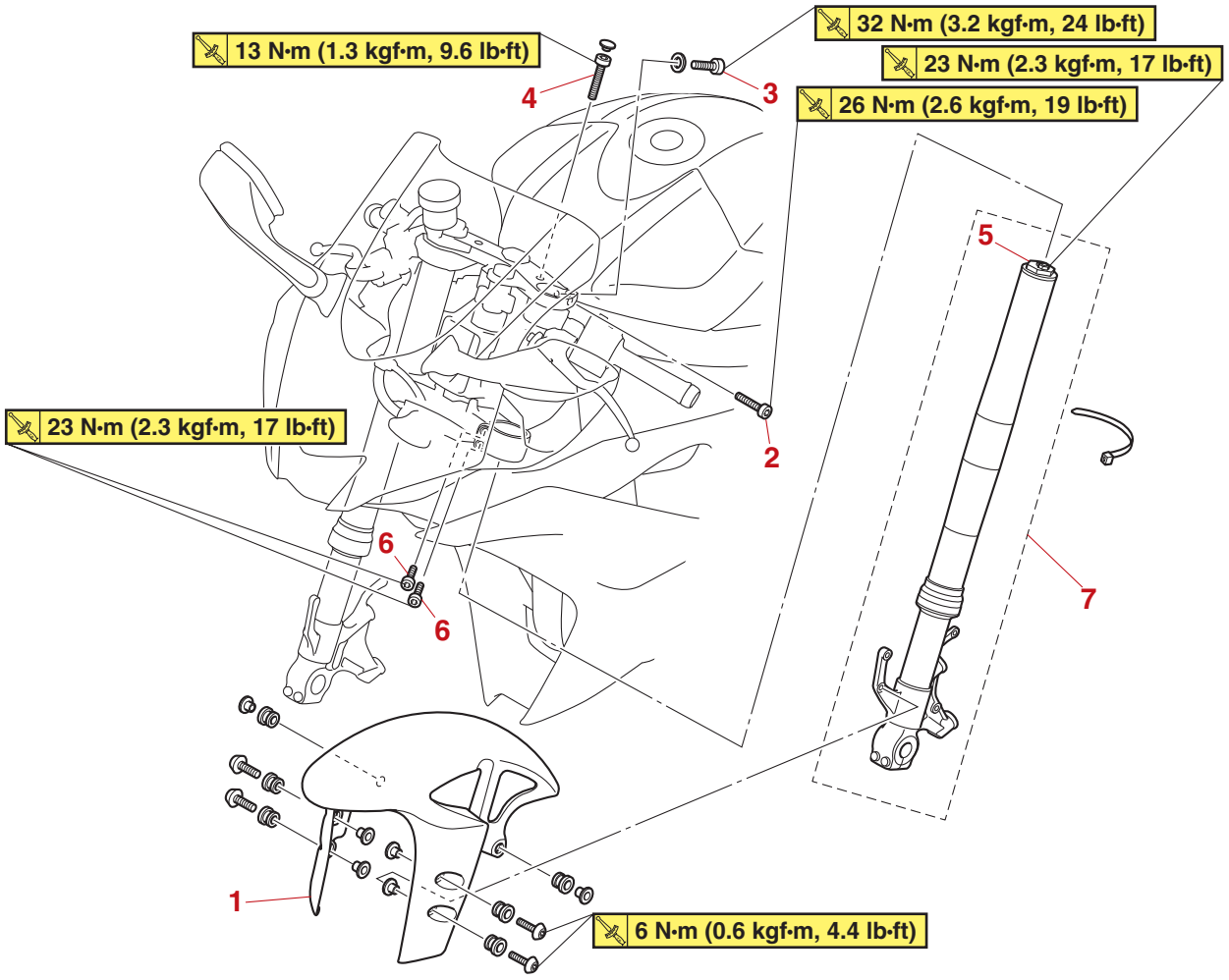
Clutch lever free play
10.0–15.0 mm (0.39–0.59 in)

11.Adjust:
- Throttle cable free play
  Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-32.

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

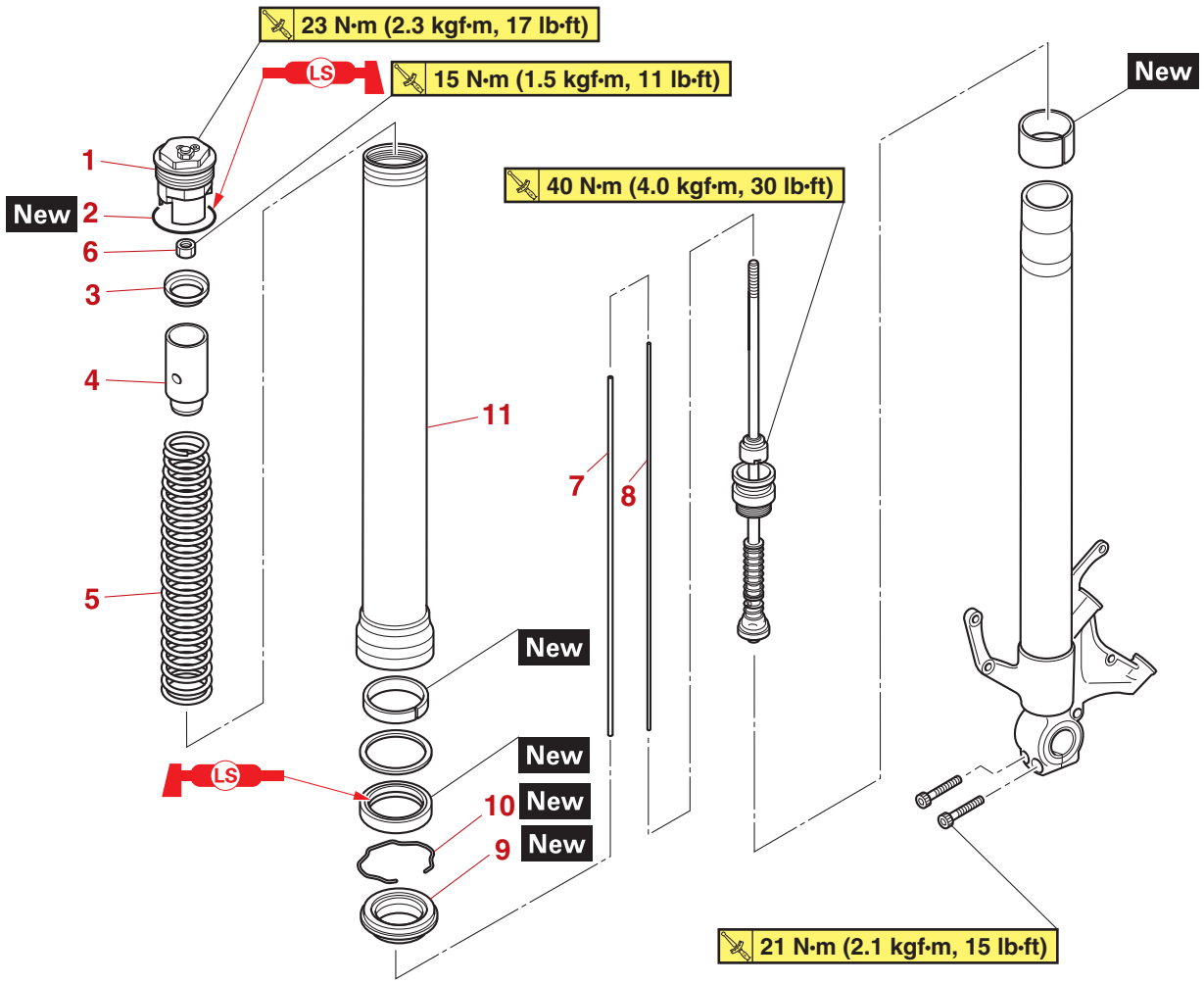
EAS20034
FRONT FORK

Removing the front fork legs



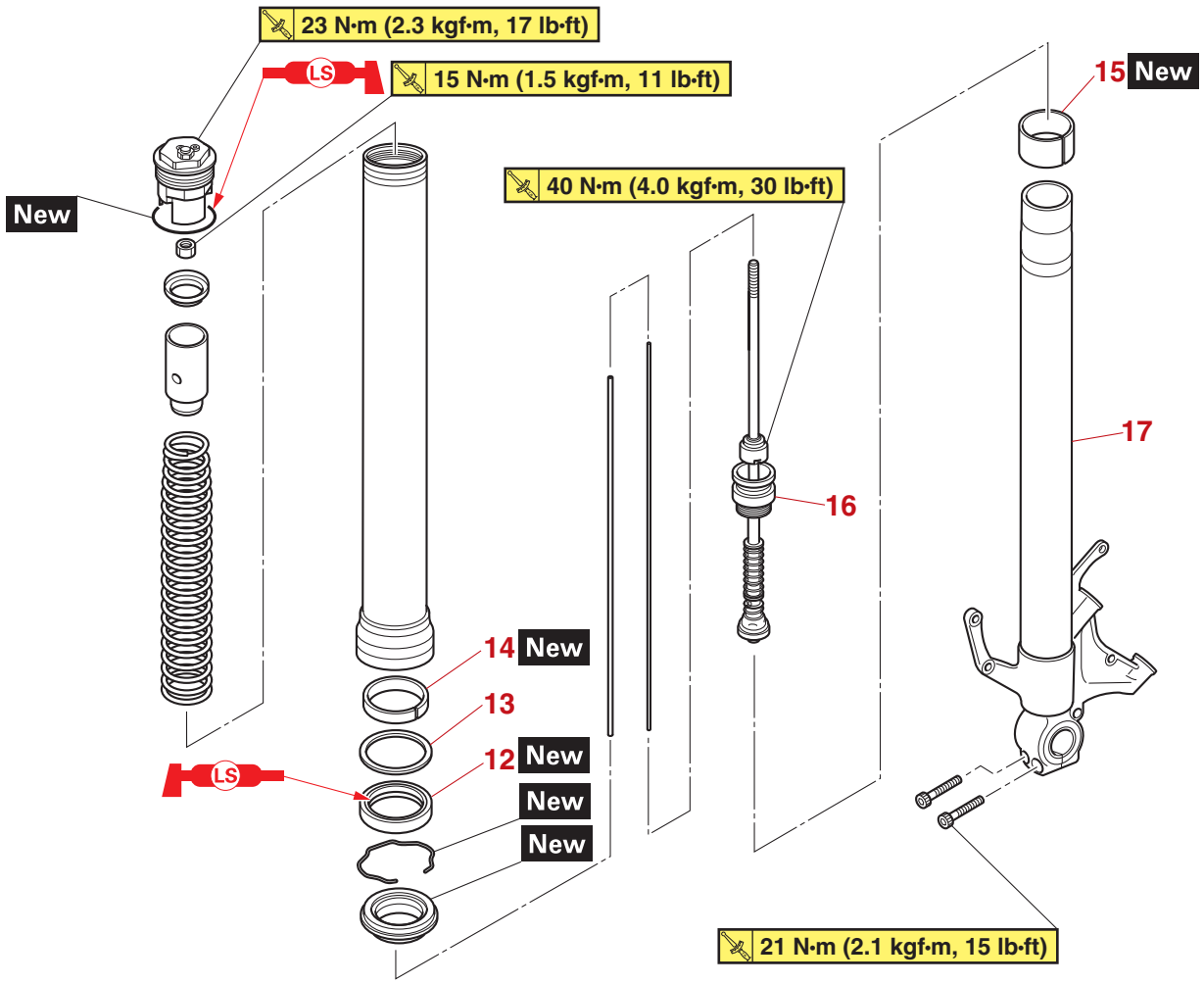
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-16.
1	Front fender	1	
2	Upper bracket pinch bolt	1	Loosen.
3	Handlebar pinch bolt	1	Loosen.
4	Handlebar bolt	1	Loosen.
5	Cap bolt	1	Loosen.
6	Lower bracket pinch bolt	2	Loosen.
7	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	Cap bolt	1	
2	O-ring	1	
3	Guide	1	
4	Spacer	1	
5	Fork spring	1	
6	Locknut	1	
7	Damper adjusting rod 1	1	
8	Damper adjusting rod 2	1	
9	Dust seal	1	
10	Oil seal clip	1	
11	Outer tube	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
12	Oil seal	1	
13	Washer	1	
14	Outer tube bushing	1	
15	Inner tube bushing	1	
16	Damper rod assembly	1	
17	Inner 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.

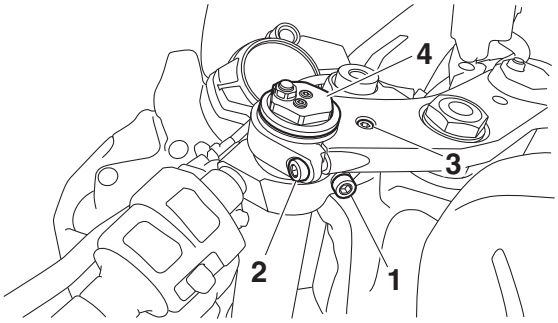
TIP

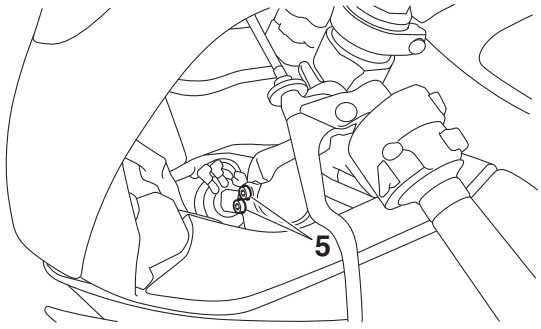
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Remove:
   - Front brake caliper
     Refer to "FRONT BRAKE" on page 4-33.
   - Front wheel
     Refer to "FRONT WHEEL" on page 4-16.
3. Loosen:
   - Handlebar pinch bolt "1"
   - Upper bracket pinch bolt "2"
   - Handlebar bolt "3"
   - Cap bolt "4"
   - Lower bracket pinch bolts "5"

EWA13640
⚠ WARNING

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



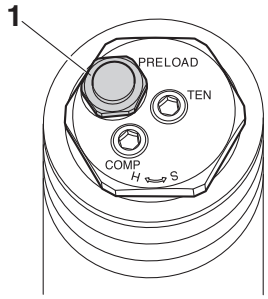


4. Remove:
   - Front fork leg

EAS30207
DISASSEMBLING THE FRONT FORK LEGS

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

1. Turn the spring preload adjusting nut "1" counterclockwise until it stops.

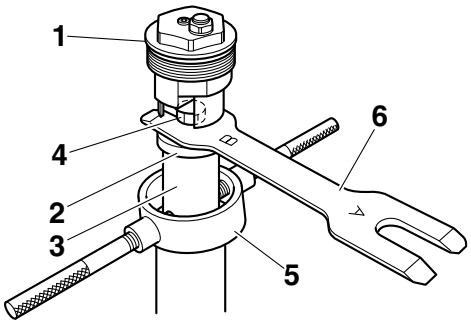


2. Remove:
   - Cap bolt "1"
     (from the damper rod assembly)
   - Guide "2"
   - Spacer "3"
   - Locknut "4"
   a. Press down on the spacer with the fork spring compressor "5".
   b. Install the rod holder "6" between the locknut "4" and the guide "2".

Fork spring compressor
90890-01441
Fork spring compressor
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

TIP

Use the side of the rod holder that is marked "B".

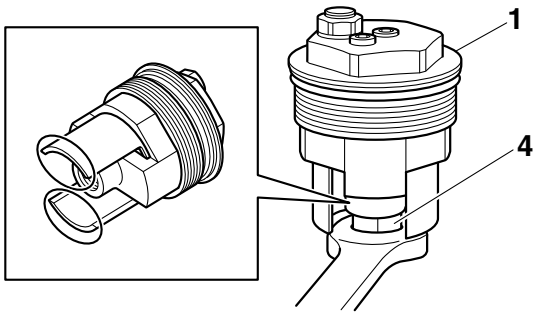


   c. Hold the cap bolt "1" and loosen the locknut "4".

ECA17390

NOTICE

When loosening the nut, be sure not to break the projections on the cap bolt collar of the cap bolt.

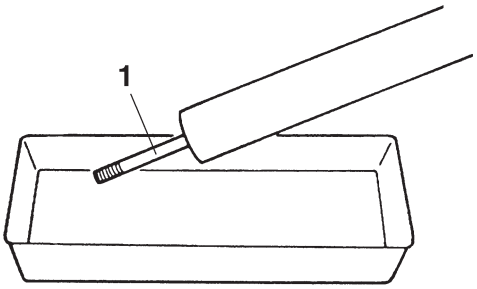


d. Remove the cap bolt and guide.
e. Remove the rod holder and fork spring compressor.
f. Remove the spacer and locknut.

3. Drain:
   • Fork oil

TIP

Stroke the damper rod assembly "1" several times while draining the fork oil.

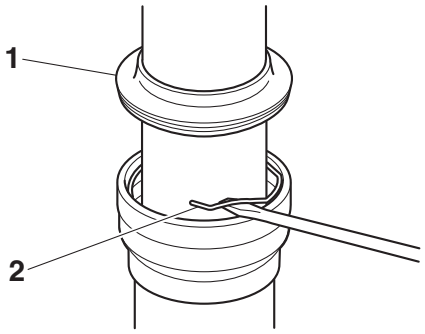


4. Remove:
   • Dust seal "1"
   • Oil seal clip "2"
   (with a flat-head screwdriver)

ECA19100

NOTICE

Do not scratch the outer tube.

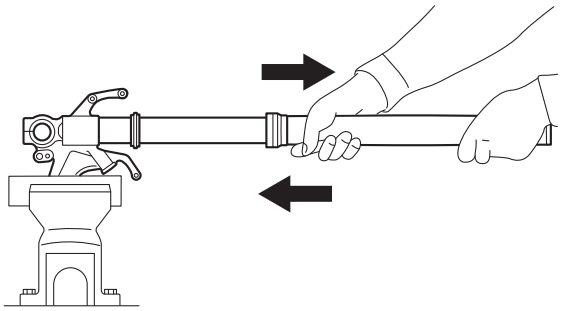


5. Remove:
   • Outer tube
   a. Hold the front fork leg horizontally.
   b. Securely clamp the brake caliper bracket in a vise with soft jaws.
   c. Separate the outer tube from the inner tube by pulling the outer tube forcefully but carefully.

ECA19880

NOTICE

Excessive force will damage the bushings. Damaged bushings must be replaced.

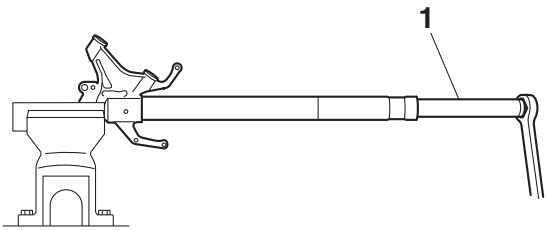


6. Remove:
   • Damper rod assembly

TIP

Remove the damper rod assembly with the damper rod holder "1".

Damper rod holder (ø30)
90890-01506
Damper rod holder
YM-01506



EAS30208

CHECKING THE FRONT FORK LEGS

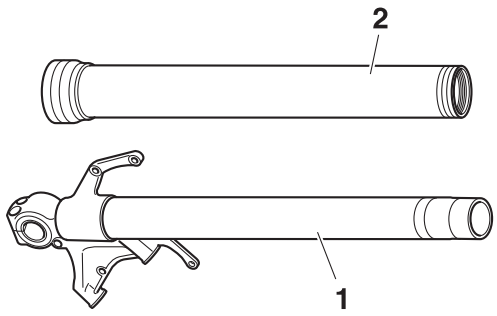
The following procedure applies to both of the front fork legs.

1. Check:
   • Inner tube "1"
   • Outer tube "2"
   Bends/damage/scratches → Replace.

EWA13650

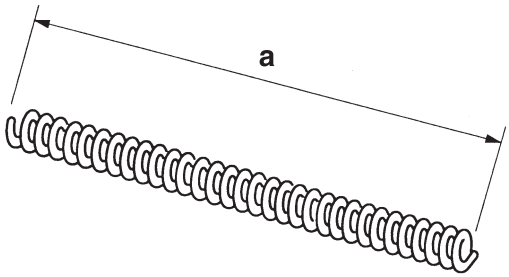
⚠ WARNING

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



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

Fork spring free length
219.5 mm (8.64 in)
Limit
215.1 mm (8.47 in)

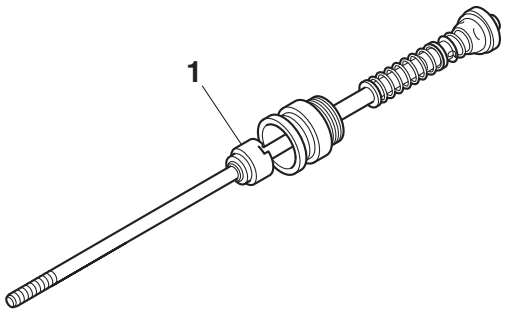


3. Check:
   • Damper rod “1”
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.

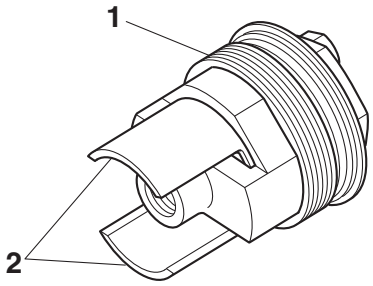
ECA19110

NOTICE

- **The front fork leg has 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.**



4. Check:
   • Cap bolt “1”
   • Cap bolt collar projection “2”
   Cracks/damage → Replace.



EAS30209

ASSEMBLING THE FRONT FORK LEGS

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

EWA18360

⚠ WARNING

If both front fork legs are not filled with the specified amount of the fork oil, it may cause poor handling and a loss of stability.

TIP

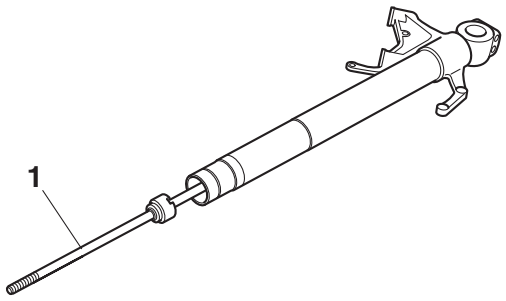
- When assembling the front fork leg, be sure to replace the following parts:
  –Inner tube bushing
  –Outer tube bushing
  –Oil seal
  –Oil seal clip
  –Dust seal
  –O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
   • Damper rod assembly “1”

ECA22560

NOTICE

Allow the damper rod assembly to slide slowly down the inner tube. Be careful not to damage the inner tube.



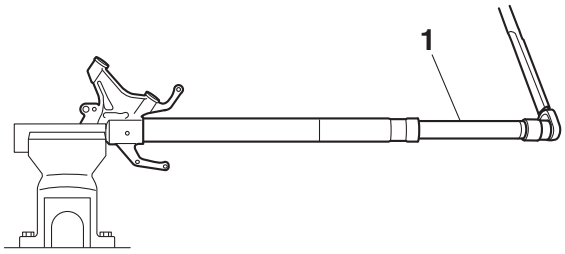
2. Tighten:
   • Damper rod assembly

	Front fork damper rod assembly 40 N·m (4.0 kgf·m, 30 lb·ft)

TIP

Tighten the damper rod assembly with the damper rod holder "1".

	Damper rod holder (ø30) 90890-01506 Damper rod holder YM-01506



3. Lubricate:
   • Inner tube's outer surface

	Recommended oil Yamaha Suspension Oil 01

4. Install:
   • Dust seal "1" New
   • Oil seal clip "2" New
   • Oil seal "3" New
   • Washer "4"
   • Outer tube bushing "5" New
   • Inner tube bushing "6" New

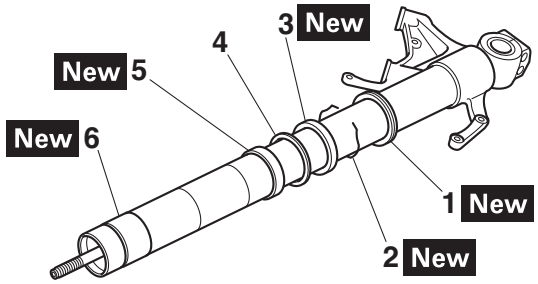
ECA19170

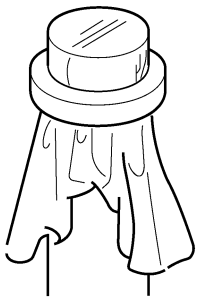
NOTICE

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

TIP

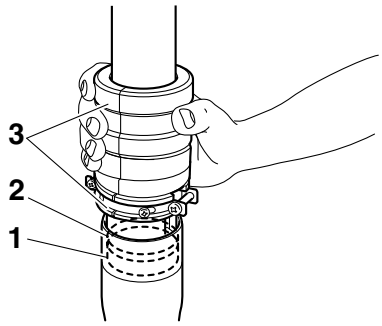
- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.





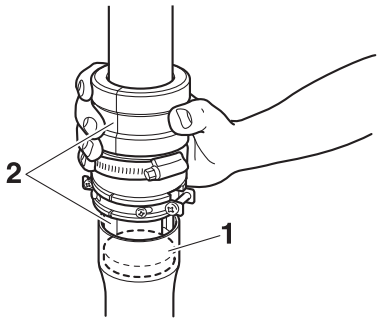
5. Install:
   • Outer tube
   (to the inner tube)
6. Install:
   • Outer tube bushing "1"
   • Washer "2"
   (with the fork seal driver "3")

	Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442



7. Install:
   • Oil seal “1”
   (with the fork seal driver “2”)

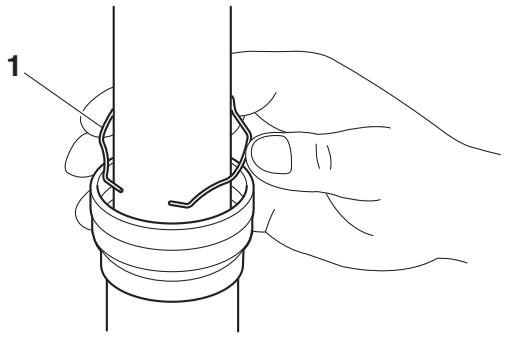
Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



8. Install:
   • Oil seal clip “1”

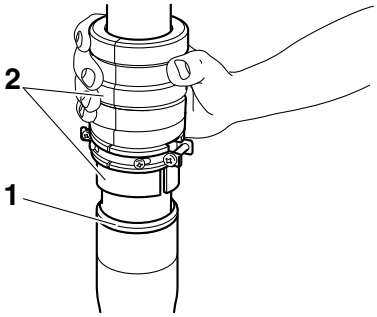
TIP

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



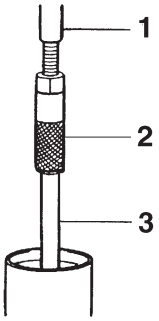
9. Install:
   • Dust seal “1”
   (with the fork seal driver “2”)

Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



10. Install:
   • Rod puller “1”
   • Rod puller attachment (M10) “2”
   (onto the damper rod “3”)

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703



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

Recommended oil
Yamaha Suspension Oil 01
Quantity (left)
390.0 cm³ (13.19 US oz, 13.73 Imp.oz)
Quantity (right)
390.0 cm³ (13.19 US oz, 13.73 Imp.oz)

ECA14230

NOTICE

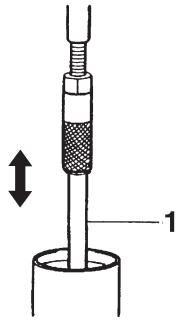
• Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.

- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

12. After filling the front fork leg, slowly stroke the damper rod "1" up and down (at least ten times) to distribute the fork oil.

TIP

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



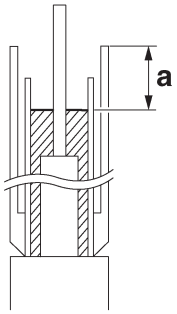
13. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

TIP

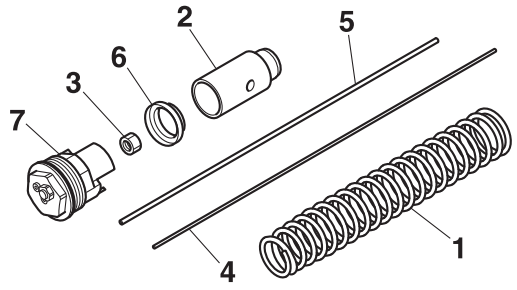
Be sure to bleed the front fork leg of any residual air.

14. Measure:
- Front fork leg oil level "a"
  (from the top of the outer tube, with the outer tube fully compressed and without the fork spring)
  Out of specification → Correct.

Level (left)
80 mm (3.1 in)
Level (right)
80 mm (3.1 in)



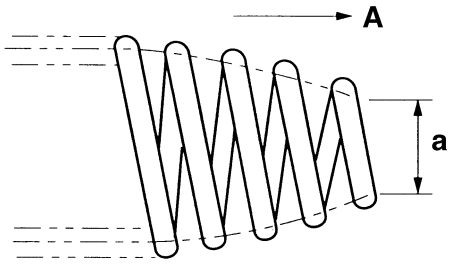
15. Install:
- Fork spring "1"
- Spacer "2"
- Locknut "3"
- Damper adjusting rod 2 "4"
- Damper adjusting rod 1 "5"
- Guide "6"
- Cap bolt "7"
  (along with the O-ring New)



a. Remove the rod puller and rod puller attachment.
b. Install the fork spring.

TIP

Install the fork spring with the smaller diameter "a" facing up "A".

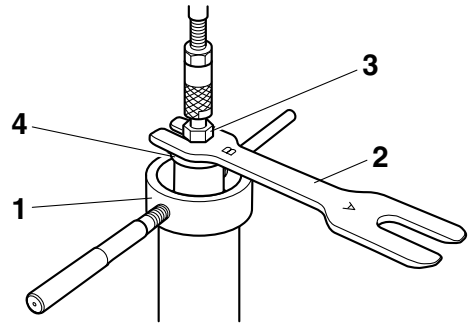


c. Install the locknut all the way onto the damper rod assembly.
d. Install the rod puller and rod puller attachment.
e. Install the spacer and guide.
f. Install the fork spring compressor.
g. Press down on the spacer with the fork spring compressor "1".
h. Pull up the rod puller and install the rod holder "2" between the locknut "3" and the guide "4".

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703
Fork spring compressor
90890-01441
Fork spring compressor
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

TIP

Use the side of the rod holder that is marked "B".



i. Remove the rod puller and rod puller attachment.
j. Install the damper adjusting rods and cap bolt, and then finger tighten the cap bolt.

EWA13670

⚠ WARNING

Always use a new cap bolt O-ring.

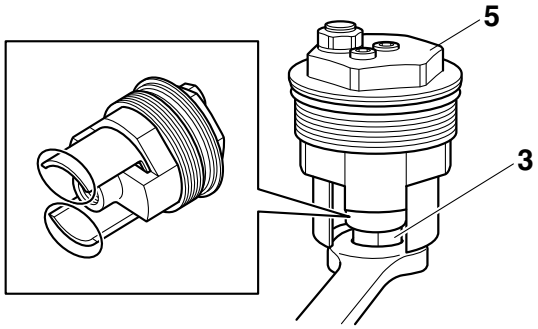
k. Hold the cap bolt "5" and tighten the locknut "3" to specification.

ECA17390

NOTICE

When loosening the nut, be sure not to break the projections on the cap bolt collar of the cap bolt.

Front fork cap bolt locknut
15 N·m (1.5 kgf·m, 11 lb·ft)



l. Remove the rod holder and fork spring compressor.

16. Install:
- Cap bolt
  (to the outer tube)

TIP

- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS30210

INSTALLING THE FRONT FORK LEGS

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

1. Install:
- Front fork leg
  Temporarily tighten the upper and lower bracket pinch bolts.

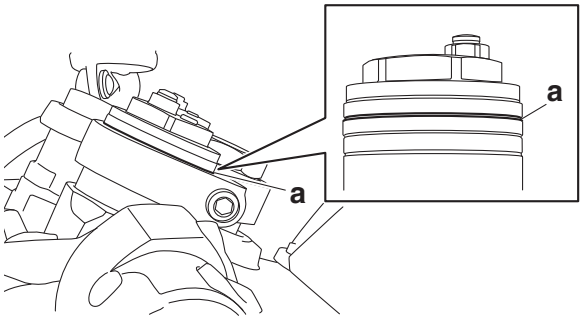
EWA13680

⚠ WARNING

Make sure the brake hoses are routed properly.

TIP

Align the outer tube with the position "a" as shown in the illustration.

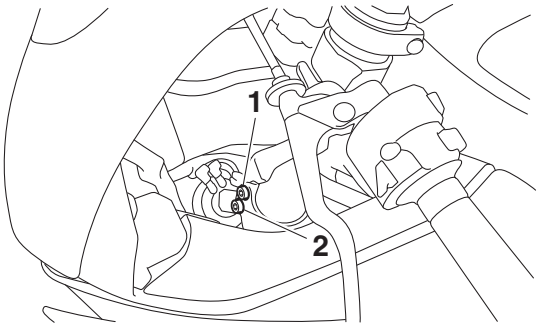


2. Tighten:
- Lower bracket pinch bolts "1" and "2"

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

TIP

Tighten each bolt to 23 N·m (2.3 kgf·m, 17 lb·ft) in the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1" → pinch bolt "2".



3. Tighten:
   • Cap bolt "1"

	Front fork cap bolt **23 N·m (2.3 kgf·m, 17 lb·ft)**

   • Handlebar bolt "2"

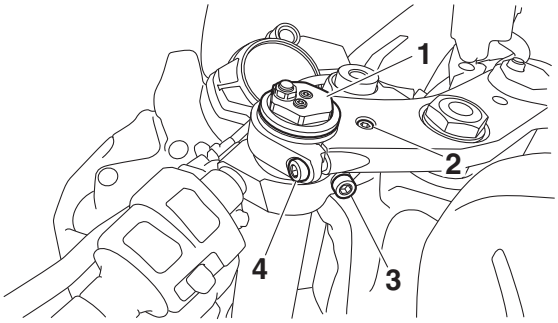
	Handlebar bolt **13 N·m (1.3 kgf·m, 9.6 lb·ft)**

   • Handlebar pinch bolt "3"

	Handlebar pinch bolt **32 N·m (3.2 kgf·m, 24 lb·ft)**

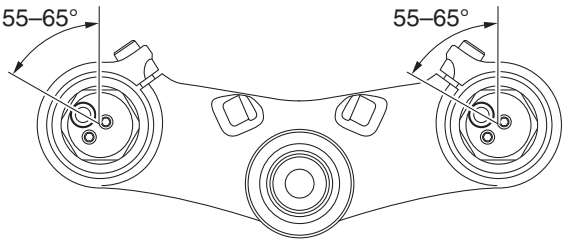
   • Upper bracket pinch bolt "4"

	Upper bracket pinch bolt **26 N·m (2.6 kgf·m, 19 lb·ft)**



TIP

When installing the front fork legs, make sure that the spring preload adjusting nuts are positioned at the angles shown in the illustration.



4. Check:
   • Cable routing

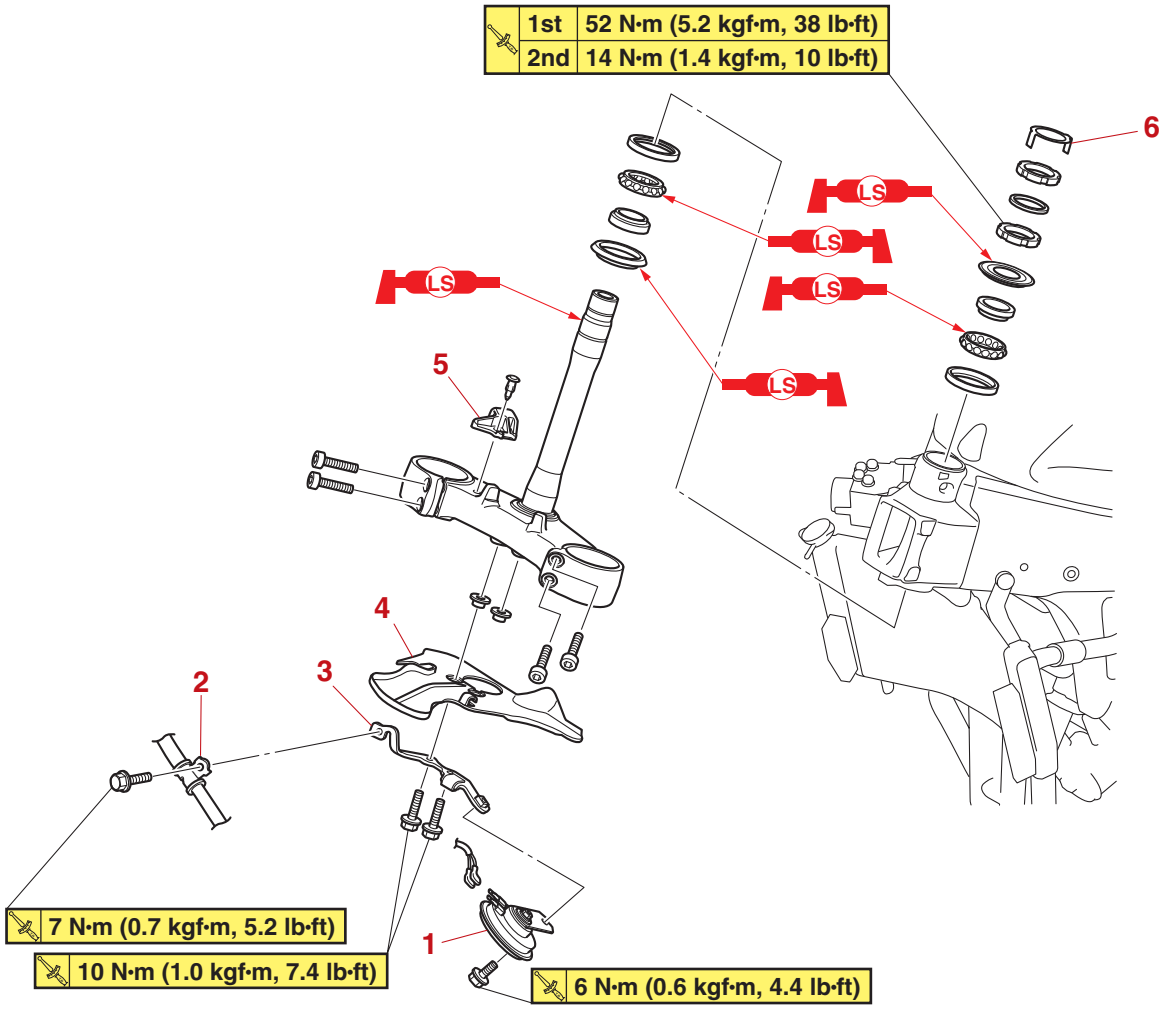
TIP

Make sure the brake hose, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to "CABLE ROUTING" on page 2-15.

5. Adjust:
   • Spring preload
   • Rebound damping
   • Compression damping
   Refer to "ADJUSTING THE FRONT FORK LEGS" on page 3-22.

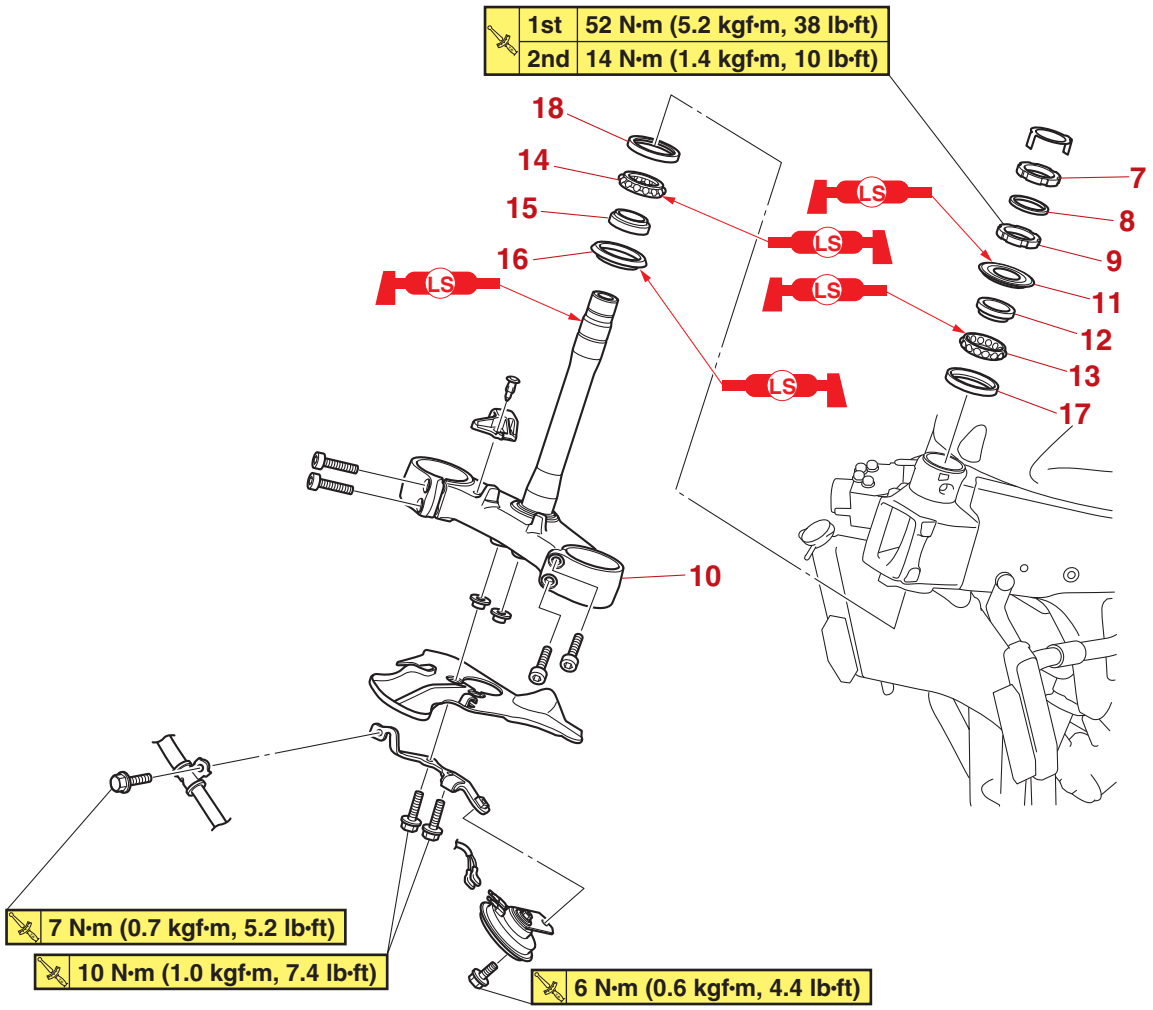
EAS20035
STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Headlight bracket		Refer to "GENERAL CHASSIS (6)" on page 4-13.
	Front fork legs		Refer to "FRONT FORK" on page 4-71.
	Handlebars		Refer to "HANDLEBARS" on page 4-66.
1	Horn	1	
2	Front brake hose holder	1	
3	Front brake hose holder bracket	1	
4	Lower bracket cover	1	
5	Throttle cable guide	1	
6	Lock washer	1	

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
7	Upper ring nut	1	
8	Rubber washer	1	
9	Lower ring nut	1	
10	Lower bracket	1	
11	Upper bearing cover	1	
12	Upper bearing inner race	1	
13	Upper bearing	1	
14	Lower bearing	1	
15	Lower bearing inner race	1	
16	Lower bearing dust seal	1	
17	Upper bearing outer race	1	
18	Lower bearing outer race	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 “1”
   - Rubber washer
   - Lower ring nut “2”
   - Lower bracket

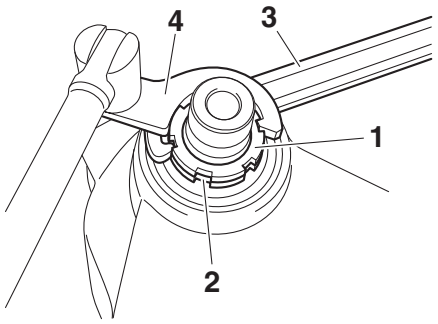
EWA13730
WARNING

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

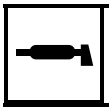
TIP

Hold the lower ring nut with the ring nut wrench “3”, and then remove the upper ring nut with the steering nut wrench “4”.

Ring nut wrench
90890-01268
Spanner wrench
YU-01268
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

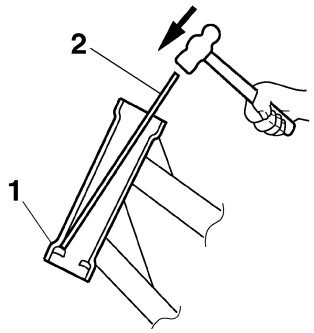
2. Check:
   - Bearings
   - Bearing races
     Damage/pitting → Replace.
3. Replace:
   - Bearings
   - Bearing races
     a. Remove the bearing race from the steering head pipe “1” with a long rod “2” and hammer.
     b. Remove the bearing race from the lower bracket “3” with a floor chisel “4” and hammer.
     c. Install new bearing races.

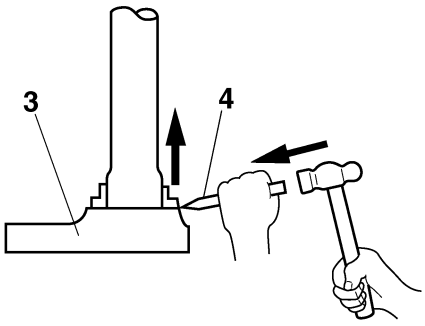
ECA14270
NOTICE

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.





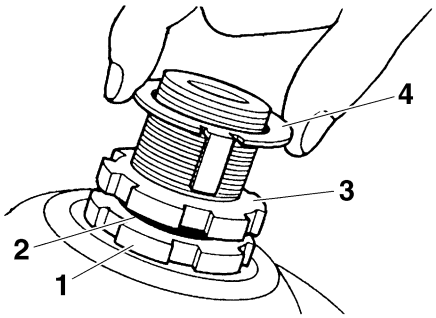
4. Check:
   - Upper bracket
     Refer to “HANDLEBARS” on page 4-66.
   - Lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

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

Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Lower ring nut “1”
   - Rubber washer “2”
   - Upper ring nut “3”
   - Lock washer “4”

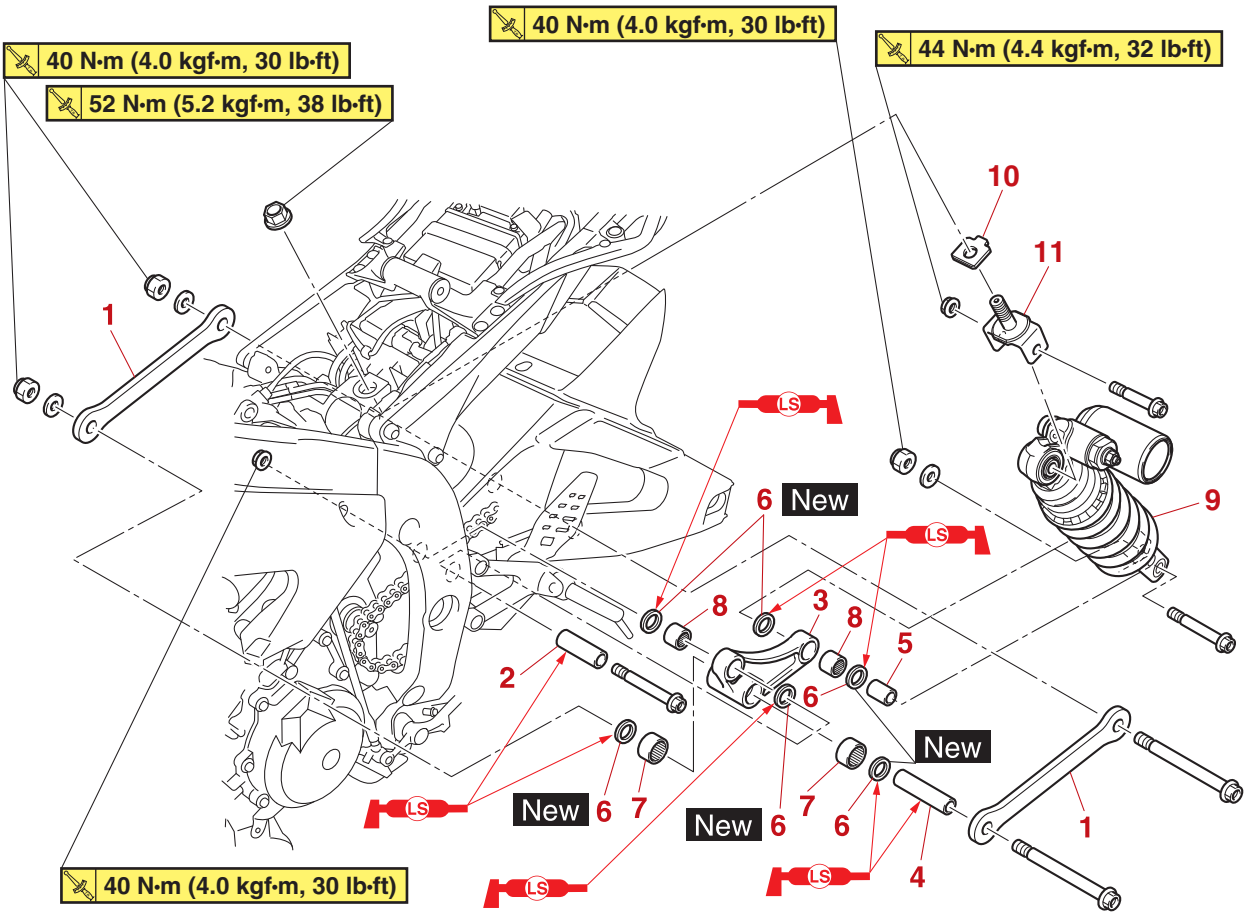
   Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-20.



EAS20036

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Exhaust pipe assembly brackets		Refer to "ENGINE REMOVAL" on page 5-9.
	Rear wheel		Refer to "REAR WHEEL" on page 4-24.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Connecting arm	2	
2	Relay arm collar	1	
3	Relay arm	1	
4	Collar	1	
5	Collar	1	
6	Oil seal	6	
7	Bearing	2	
8	Bearing	2	
9	Rear shock absorber assembly	1	
10	Washer	1	
11	Rear shock absorber assembly bracket	1	

EAS30826
HANDLING THE REAR SHOCK ABSORBER

EWA13740
⚠ WARNING

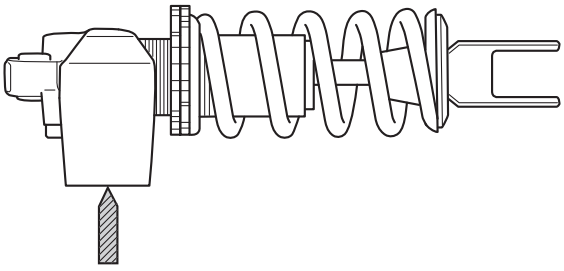
This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

EAS30729
DISPOSING OF A REAR SHOCK ABSORBER

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

EWA13760
⚠ WARNING

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



EAS30219
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

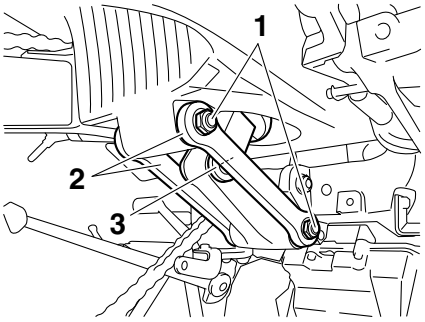
TIP

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

2. Remove:
   - Connecting arm bolts “1”
   - Connecting arms “2”
   - Rear shock absorber assembly lower bolt “3”

TIP

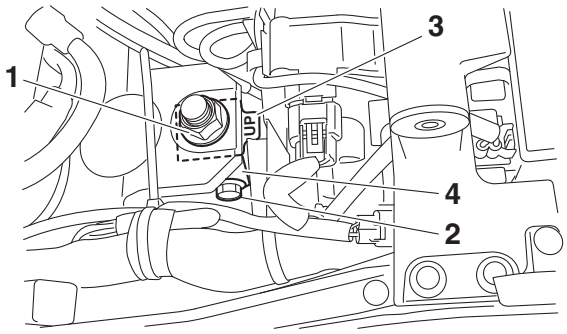
While removing the connecting arm bolts, hold the swingarm so that it does not drop down.



3. Remove:
   - Rear shock absorber assembly bracket nut “1”
   - Rear shock absorber assembly upper bolt “2”
   - Washer “3”
   - Rear shock absorber assembly bracket “4”
   - Rear shock absorber assembly

TIP

Lower the swingarm, and then remove the rear shock absorber assembly from between the swingarm and frame.



EAS30220
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.
   - Rear shock absorber
     Gas leaks/oil leaks → Replace the rear shock absorber assembly.

- Spring
  Damage/wear → Replace the rear shock absorber assembly.
- Bushing
  Damage/wear → Replace.
- Collar
  Damage/scratches → Replace.
- Bolts
  Bends/damage/wear → Replace.

EAS30221
CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
   - Connecting arms
   - Relay arm
     Damage/wear → Replace.
2. Check:
   - Bearings
   - Oil seals
     Damage/pitting → Replace.
3. Check:
   - Collars
     Damage/scratches → Replace.

EAS30222
INSTALLING THE RELAY ARM

1. Lubricate:
   - Collars
   - Bearings

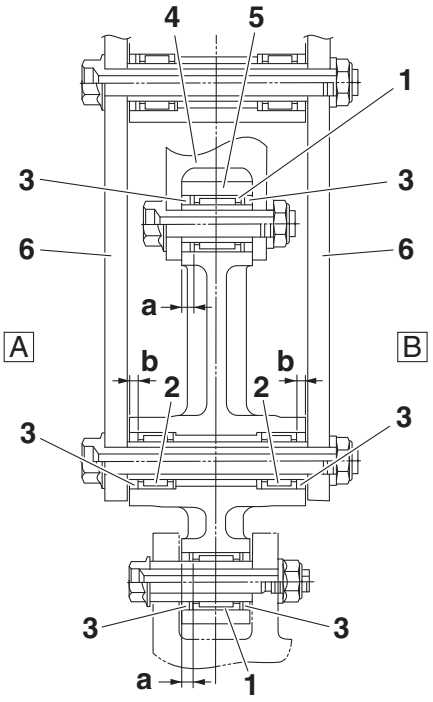
	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Bearings “1”, “2”
     (to the relay arm)
   - Oil seals “3”

	Installed depth of bearing “a” **4.5 mm (0.18 in)** **Installed depth of bearing “b”** **3.5 mm (0.14 in)**

TIP

When installing the oil seals to the relay arm, face the character stamp of the oil seals outside.



4. Rear shock absorber
5. Relay arm
6. Connecting arms

A. Left side
B. Right side

EAS30225
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - Collar
   - Bearings

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

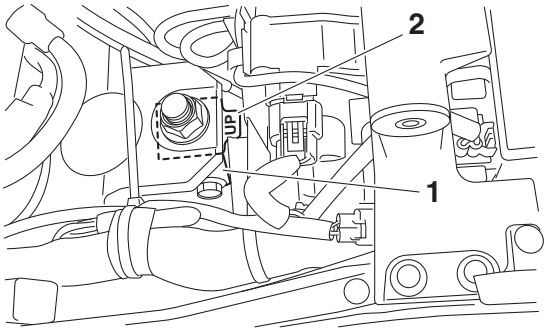
2. Tighten:
   - Relay arm nut

	Relay arm and frame nut **40 N·m (4.0 kgf·m, 30 lb·ft)**

3. Install:
   - Rear shock absorber assembly bracket “1”
     (onto the rear shock absorber assembly)
   - Washer “2”
     (onto the rear shock absorber assembly)

TIP

- Temporarily tighten the rear shock absorber assembly bracket nut.
- Install the washer with the brim pointing back of the vehicle and the “UP” punch mark facing up.



4. Tighten:
   • Rear shock absorber assembly lower nut

	Rear shock absorber assembly lower nut **40 N·m (4.0 kgf·m, 30 lb·ft)**

   • Rear shock absorber assembly upper nut

	Rear shock absorber assembly upper nut **44 N·m (4.4 kgf·m, 32 lb·ft)**

   • Rear shock absorber assembly bracket nut

	Rear shock absorber assembly bracket nut **52 N·m (5.2 kgf·m, 38 lb·ft)**

5. Install:
   • Connecting arms

TIP

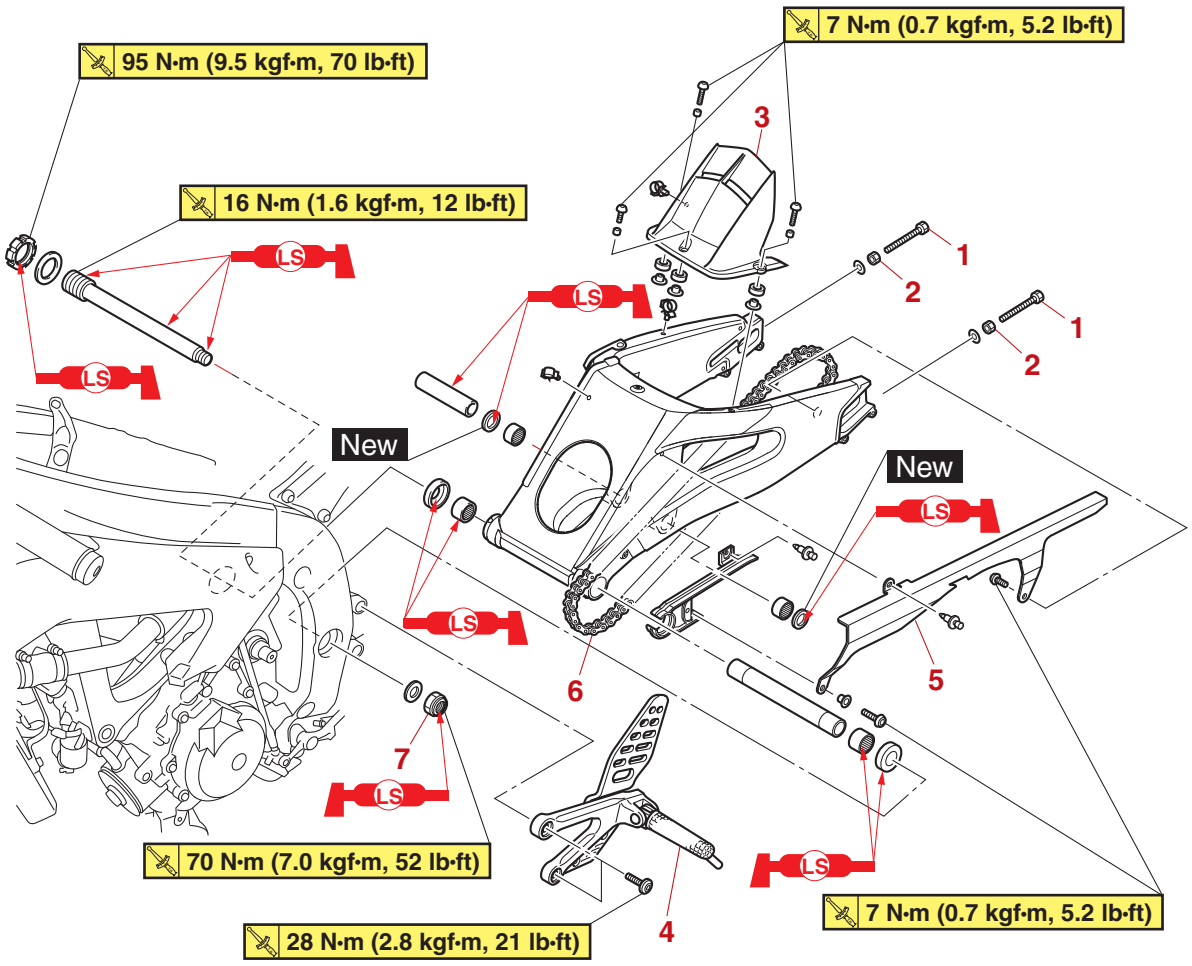
When installing the connecting arms, lift up the swingarm.

6. Tighten:
   • Connecting arm nuts

	Connecting arm and relay arm nut **40 N·m (4.0 kgf·m, 30 lb·ft)** **Connecting arm and swingarm nut** **40 N·m (4.0 kgf·m, 30 lb·ft)**

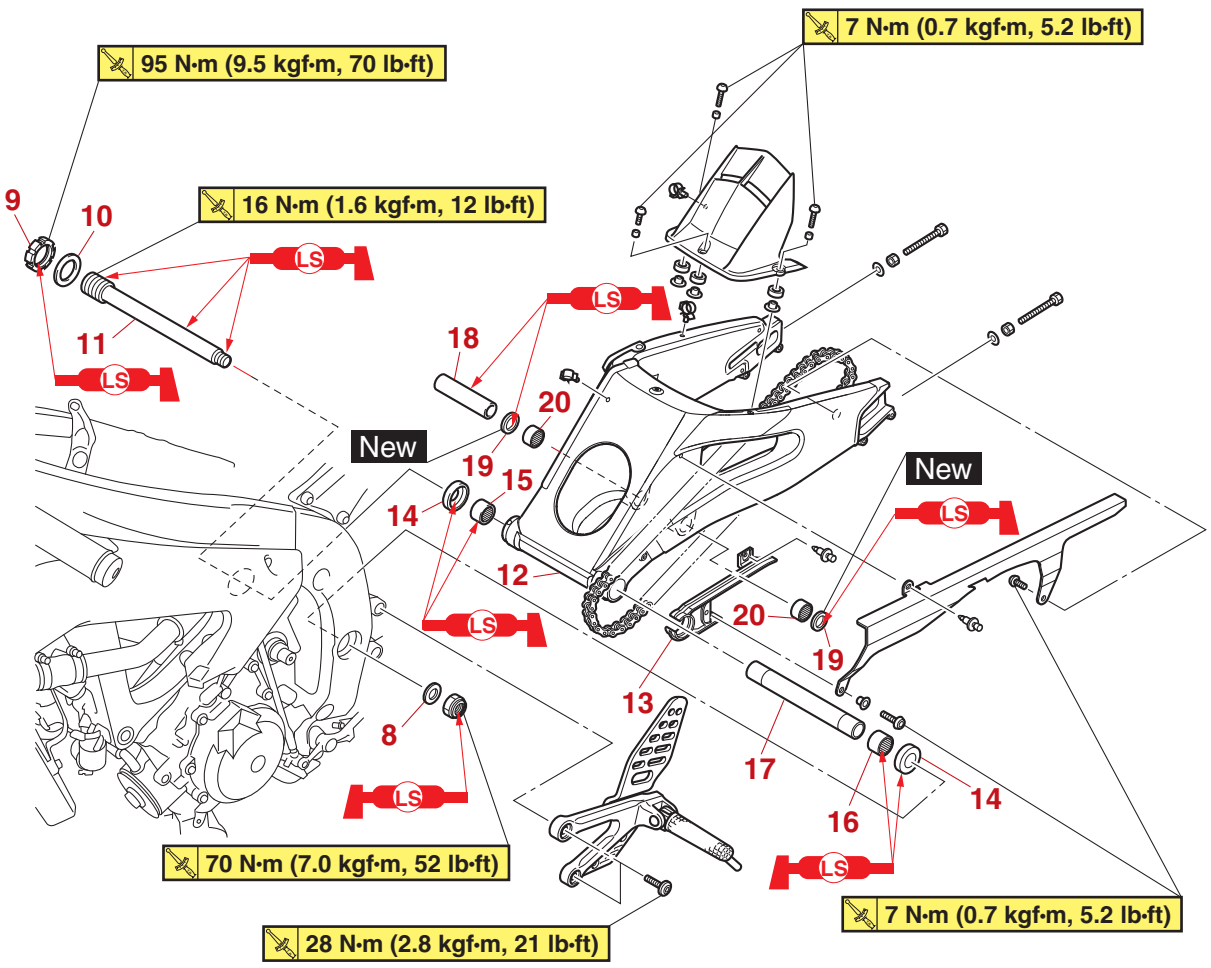
EAS20037
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-24.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-86.
	Drive chain guide (drive sprocket side)		Refer to "CHAIN DRIVE" on page 4-95.
1	Drive chain adjusting bolt	2	
2	Drive chain adjusting locknut	2	
3	Rear fender	1	
4	Footrest assembly (left)	1	
5	Drive chain guard	1	
6	Drive chain	1	
7	Swingarm pivot shaft nut	1	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
8	Washer	1	
9	Swingarm pivot shaft ring nut	1	
10	Washer	1	
11	Swingarm pivot shaft	1	
12	Swingarm	1	
13	Drive chain guide (swingarm side)	1	
14	Dust cover	2	
15	Bearing	1	
16	Bearing	1	
17	Collar	1	
18	Collar	1	
19	Oil seal	2	
20	Bearing	2	

EAS30226
REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

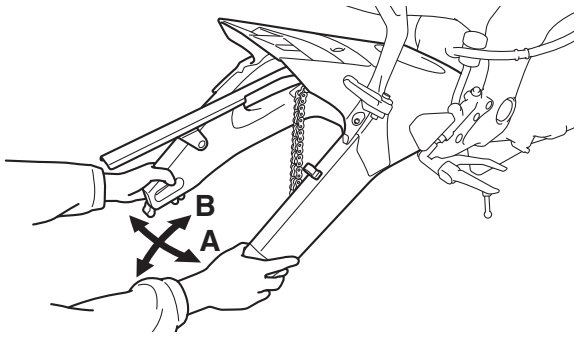
2. Measure:
   - Swingarm side play
   - Swingarm vertical movement
   a. Measure the tightening torque of the pivot shaft nut, pivot shaft ring nut, and pivot shaft.

Swingarm pivot shaft nut
70 N·m (7.0 kgf·m, 52 lb·ft)
Swingarm pivot shaft ring nut
95 N·m (9.5 kgf·m, 70 lb·ft)
Swingarm pivot shaft
16 N·m (1.6 kgf·m, 12 lb·ft)

   b. Measure the swingarm side play "A" by moving the swingarm from side to side.
   c. If the swingarm side play is out of specification, check the collars, bearings, washers, and dust covers.

Swingarm side play (at the end of the swingarm)
1.0 mm (0.04 in)

   d. Check the swingarm vertical movement "B" by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the collars, bearings, washers, and dust covers.

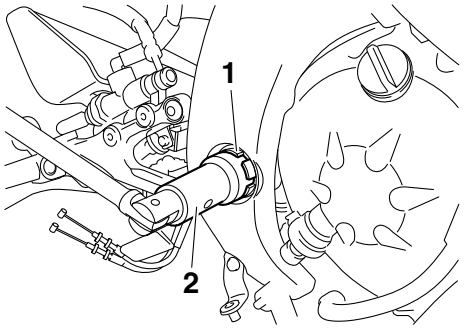


3. Remove:
   - Drive chain
   Refer to "REMOVING THE DRIVE CHAIN" on page 4-96.
4. Remove:
   - Swingarm pivot shaft ring nut "1"

TIP

Loosen the swingarm pivot shaft ring nut with the ring nut wrench "2".

Ring nut wrench
90890-01507
Ring nut wrench
YM-01507

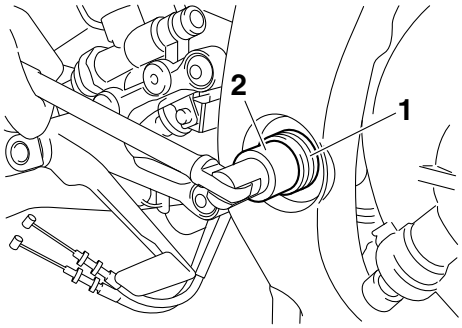


5. Remove:
   - Swingarm pivot shaft "1"

TIP

Loosen the swingarm pivot shaft with the damper rod holder (24 mm) "2".

Damper rod holder (ø24)
90890-01328
Damper rod holder
YM-01328



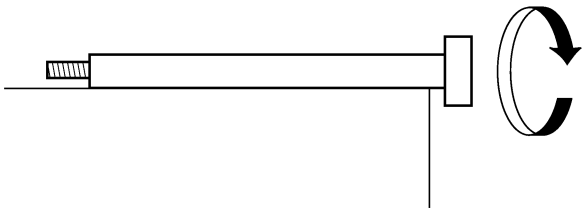
EAS30227
CHECKING THE SWINGARM

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

EWA13770

⚠ WARNING

Do not attempt to straighten a bent pivot shaft.



3. Wash:
   - Pivot shaft
   - Dust covers
   - Collars
   - Washers
   - Bearings

	Recommended cleaning solvent **Kerosene**

4. Check:
   - Dust covers
   - Collars
   - Oil seals
     Damage/wear → Replace.
   - Bearings
     Damage/pitting → Replace.

EAS30228

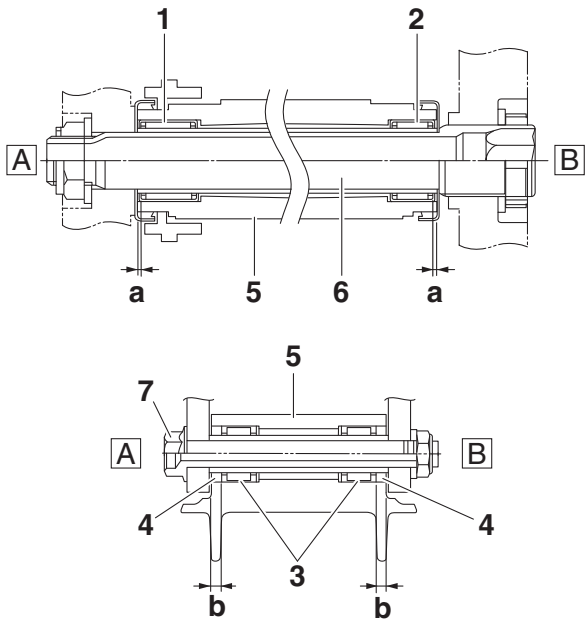
INSTALLING THE SWINGARM

1. Lubricate:
   - Bearings
   - Collars
   - Dust covers
   - Pivot shaft

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

2. Install:
   - Bearing “1”
   - Bearing “2”
   - Bearings “3”
   - Oil seals “4”

	Installed depth of bearing “a” **0–1.0 mm (0–0.04 in)** **Installed depth of bearing “b”** **4.0 mm (0.16 in)**



5. Swingarm
6. Swingarm pivot shaft
7. Bolt

A. Left side
B. Right side

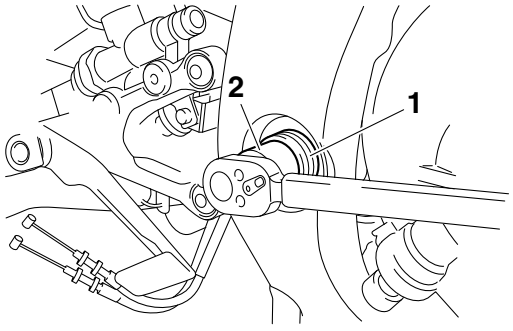
3. Install:
   - Swingarm pivot shaft “1”

	Swingarm pivot shaft **16 N·m (1.6 kgf·m, 12 lb·ft)**

TIP

Tighten the swingarm pivot shaft with the damper rod holder (24 mm) “2”.

	Damper rod holder (ø24) **90890-01328** **Damper rod holder** **YM-01328**



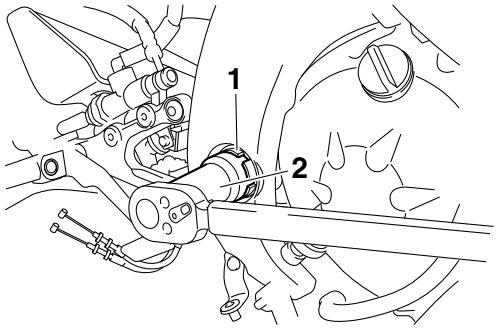
4. Install:
   - Swingarm pivot shaft ring nut “1”

Swingarm pivot shaft ring nut
95 N·m (9.5 kgf·m, 70 lb·ft)

TIP

- Lubricate the swingarm pivot ring nut threads and mating surfaces with lithium-soap-based grease.
- Tighten the swingarm pivot shaft ring nut with the ring nut wrench "2".

Ring nut wrench
90890-01507
Ring nut wrench
YM-01507



5. Install:
   - Swingarm pivot shaft nut

Swingarm pivot shaft nut
70 N·m (7.0 kgf·m, 52 lb·ft)

TIP

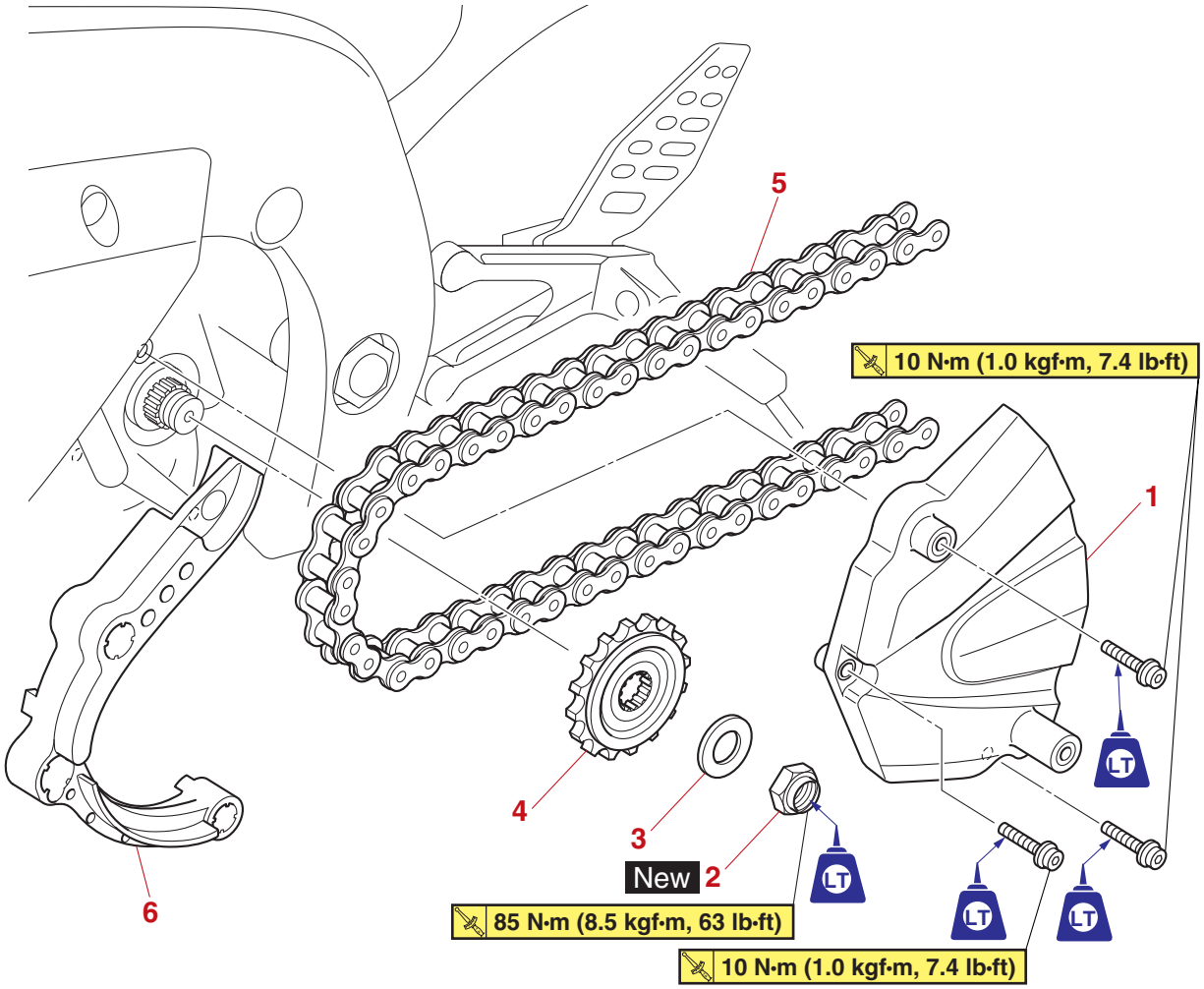
Lubricate the swingarm pivot shaft nut threads and mating surfaces with lithium-soap-based grease.

6. Adjust:
   - Drive chain slack
     Refer to "Adjusting the drive chain slack" on page 3-19.

Drive chain slack (Maintenance stand)
30.0–45.0 mm (1.18–1.77 in)
Drive chain slack (Sidestand)
30.0–45.0 mm (1.18–1.77 in)

EAS20038
CHAIN DRIVE

Removing the drive sprocket and drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Shift rod		Refer to "ENGINE REMOVAL" on page 5-9.
1	Drive sprocket cover	1	
2	Drive sprocket nut	1	
3	Washer	1	
4	Drive sprocket	1	
5	Drive chain	1	
6	Drive chain guide (drive sprocket side)	1	

EAS30229
REMOVING THE DRIVE CHAIN
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

2. Remove:
   - Drive chain
     (with the drive chain cutter)

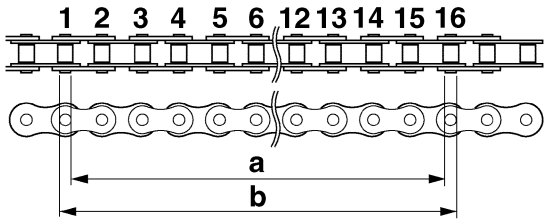
TIP

Only cut the drive chain if it or the swingarm is to be replaced.

EAS30230
CHECKING THE DRIVE CHAIN
1. Measure:
   - 15-link section "a" of the drive chain
     Out of specification → Replace the drive chain.

15-link length limit
239.3 mm (9.42 in)

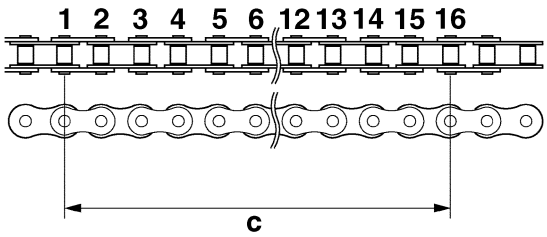
   a. Measure the length "a" between the inner sides of the pins and the length "b" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.



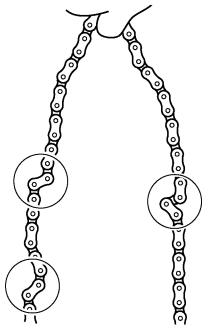
   b. Calculate the length "c" of the 15-link section of the drive chain using the following formula.
      Drive chain 15-link section length "c" = (length "a" between pin inner sides + length "b" between pin outer sides)/2

TIP

- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.



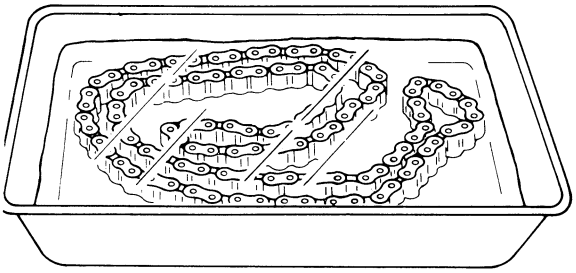
2. Check:
   - Drive chain
     Stiffness → Clean and lubricate or replace.

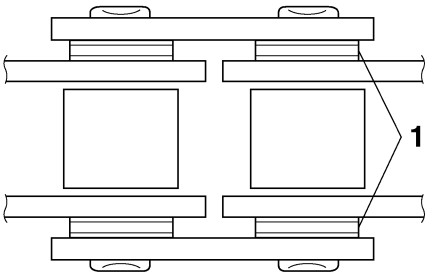


3. Clean:
   - Drive chain
     a. Wipe the drive chain with a clean cloth.
     b. Put the drive chain in kerosene and remove any remaining dirt.
     c. Remove the drive chain from the kerosene and completely dry it.

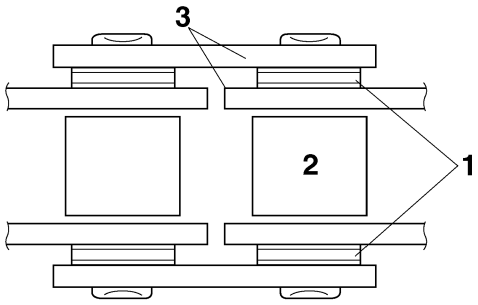
ECA14290
NOTICE

- **This motorcycle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.**
- **Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.**





4. Check:
   • O-rings “1”
   Damage → Replace the drive chain.
   • Drive chain rollers “2”
   Damage/wear → Replace the drive chain.
   • Drive chain side plates “3”
   Damage/wear/cracks → Replace the drive chain.

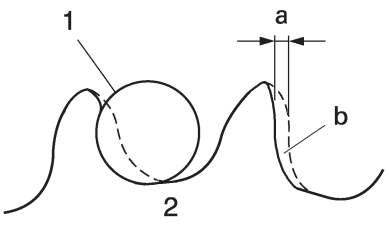


5. Lubricate:
   • Drive chain

Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

EAS30231
CHECKING THE DRIVE SPROCKET

1. Check:
   • Drive sprocket
   More than 1/4 tooth “a” wear → Replace the drive sprockets as a set.
   Bent teeth → Replace the drive sprockets as a set.



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

EAS30232
CHECKING THE REAR WHEEL SPROCKET

Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-28.

EAS30233
CHECKING THE REAR WHEEL DRIVE HUB

Refer to “CHECKING THE REAR WHEEL DRIVE HUB” on page 4-28.

EAS30234
INSTALLING THE DRIVE CHAIN

1. Install:
   • Drive chain

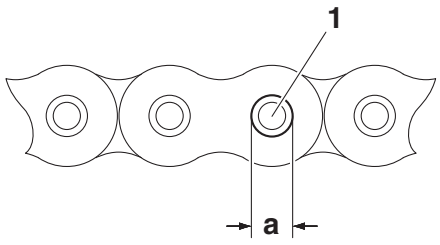
ECA17410
NOTICE

Be sure to put on safety goggles when working.

TIP

- Install the drive chain joint with the drive chain cut & rivet tool.
- After riveting, make sure the diameter between the edges “a” of the connecting pin “1” is 5.5–5.8 mm (0.22–0.23 in).

Drive chain cut & rivet tool
90890-01550
Drive chain cut & rivet tool
YM-01550



2. Lubricate:
   • Drive chain

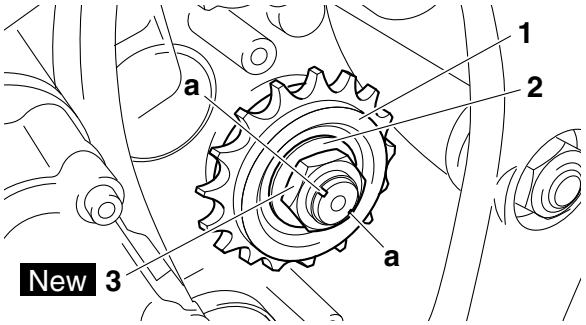
Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

3. Install:
   • Drive sprocket “1”
   • Washer “2”
   • Drive sprocket nut “3” New

TIP

- While applying the rear brake, tighten the drive sprocket nut.
- Stake the drive sprocket nut “3” at a cutout “a” in the drive axle.

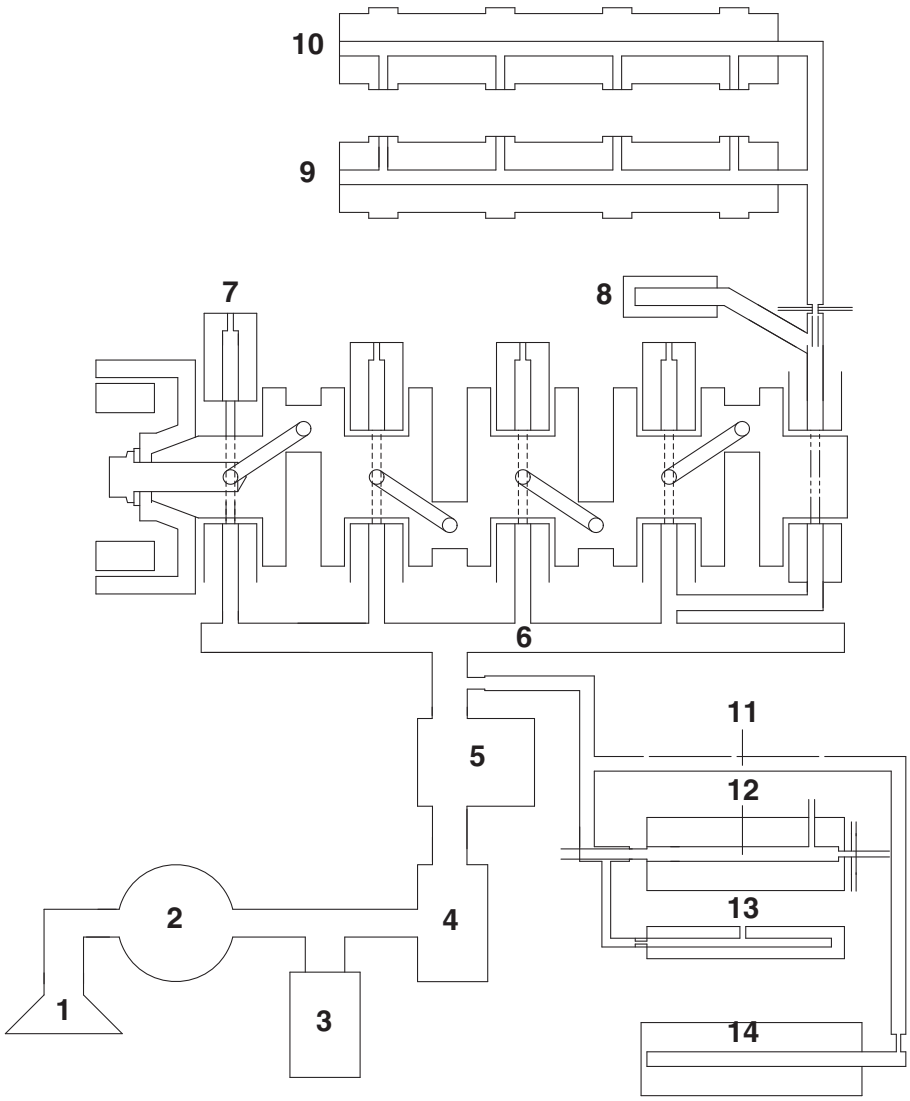
Drive sprocket nut
85 N·m (8.5 kgf·m, 63 lb·ft)
LOCTITE®



ENGINE

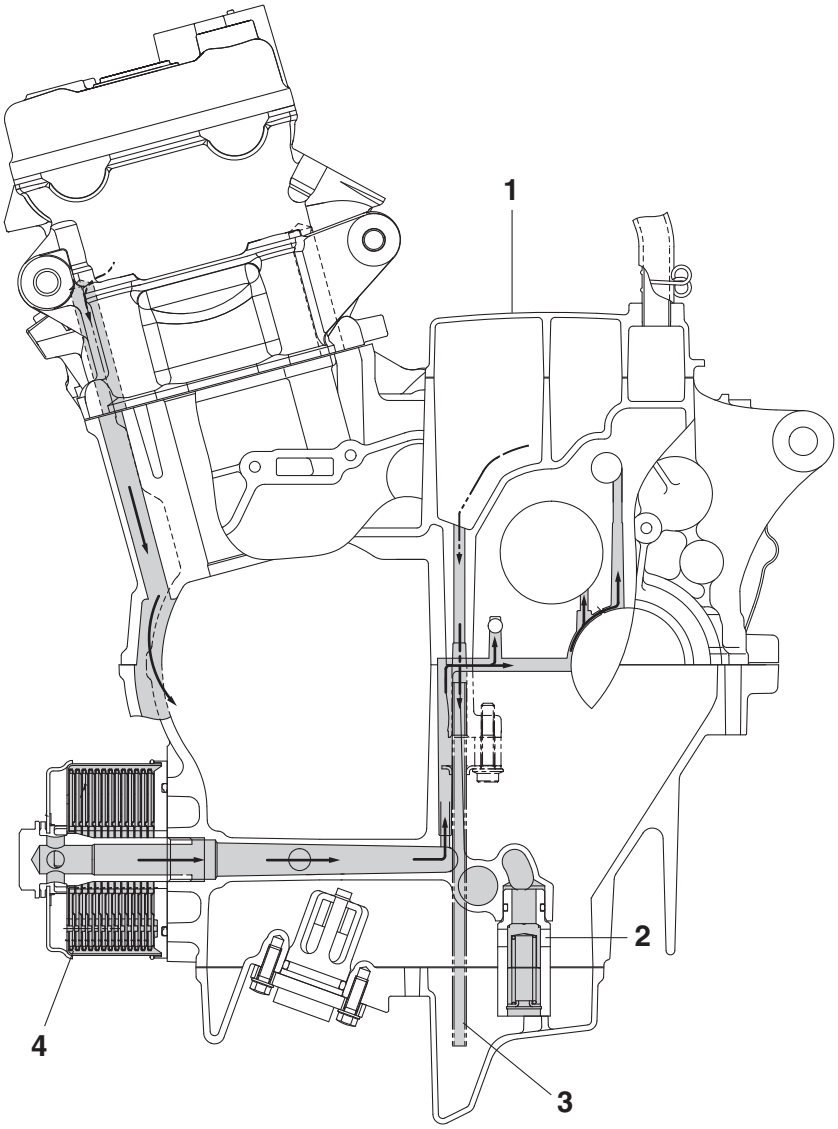
EAS20298
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32362
ENGINE OIL LUBRICATION CHART

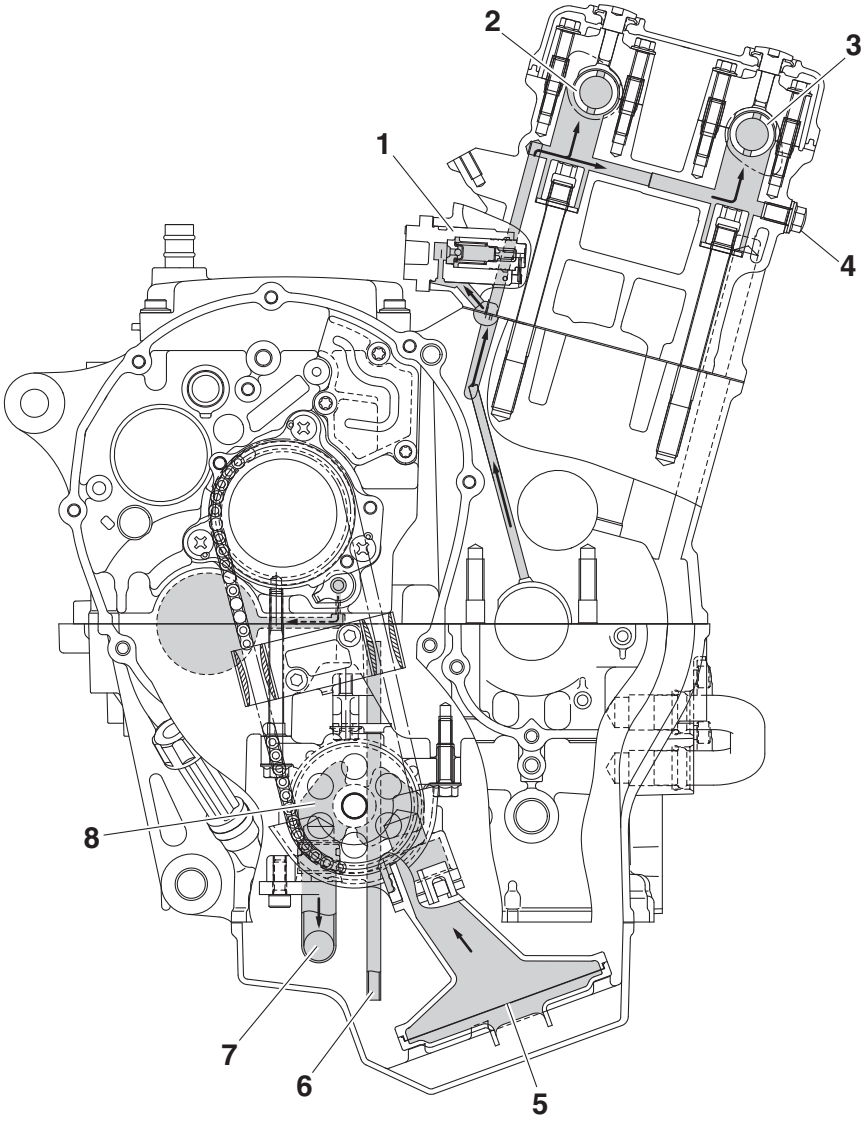


1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil filter
5. Oil cooler
6. Main gallery
7. Oil nozzle
8. Timing chain tensioner
9. Intake camshaft
10. Exhaust camshaft
11. Oil pipe
12. Main axle
13. Shift fork
14. Drive axle

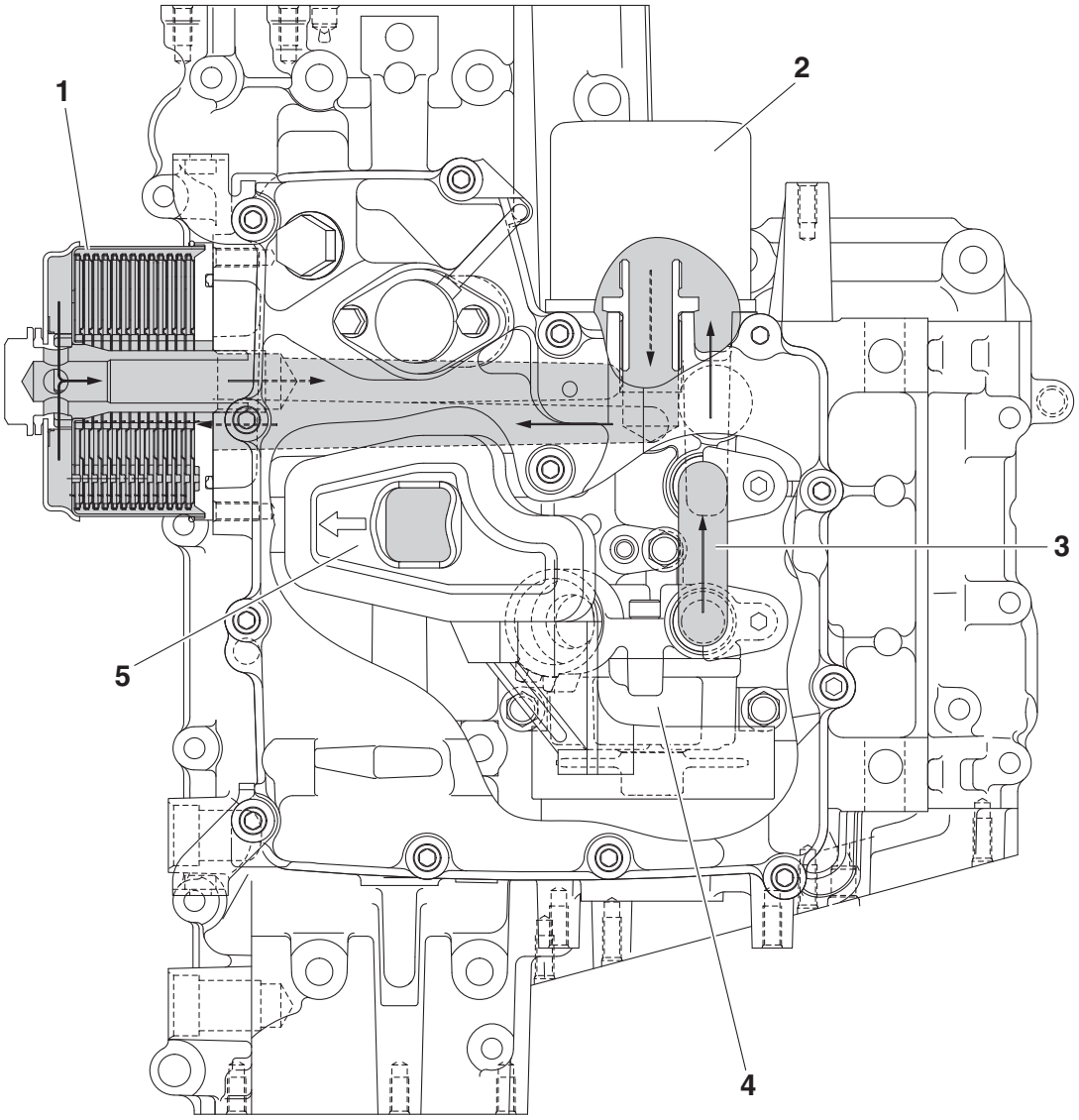
EAS32363
LUBRICATION DIAGRAMS



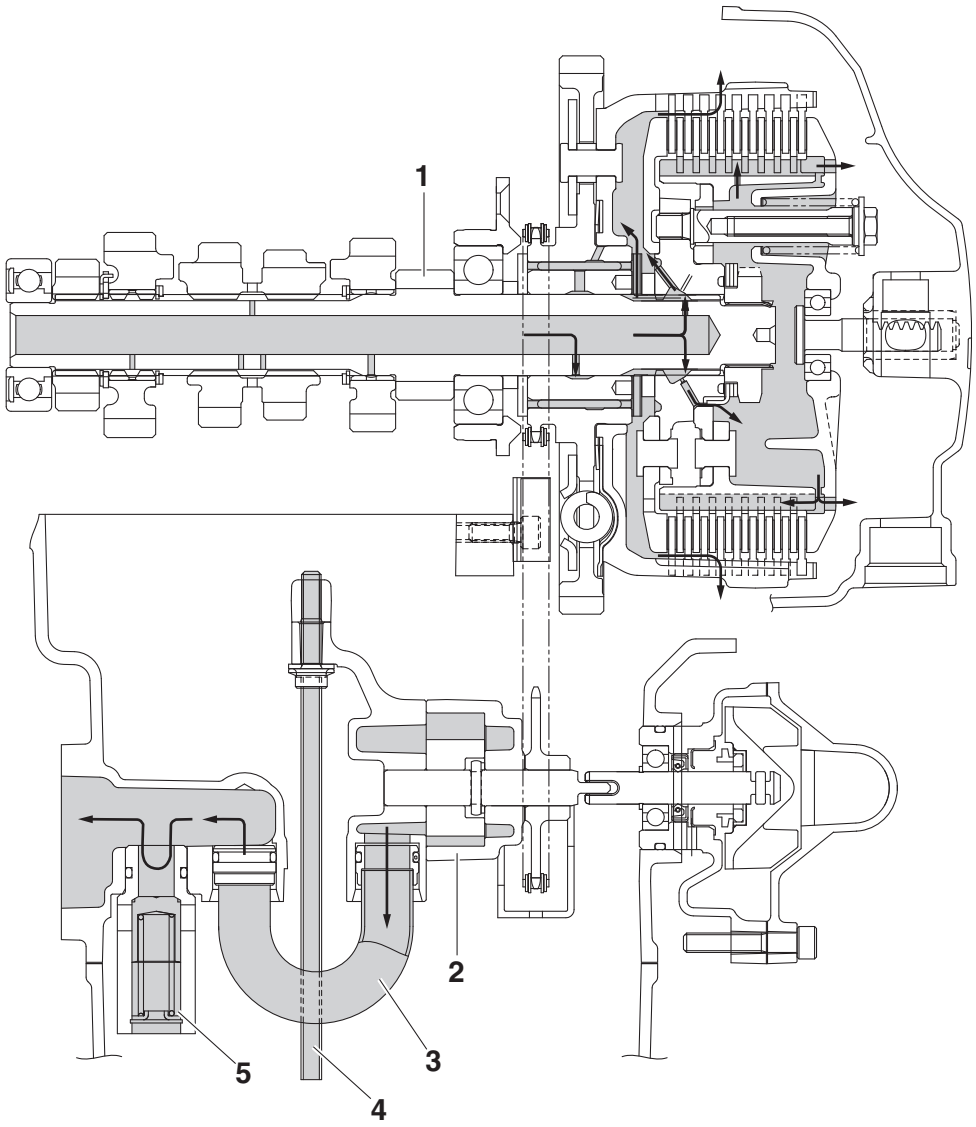
1. Ventilation chamber cover
2. Relief valve
3. Ventilation chamber oil drain pipe
4. Oil cooler



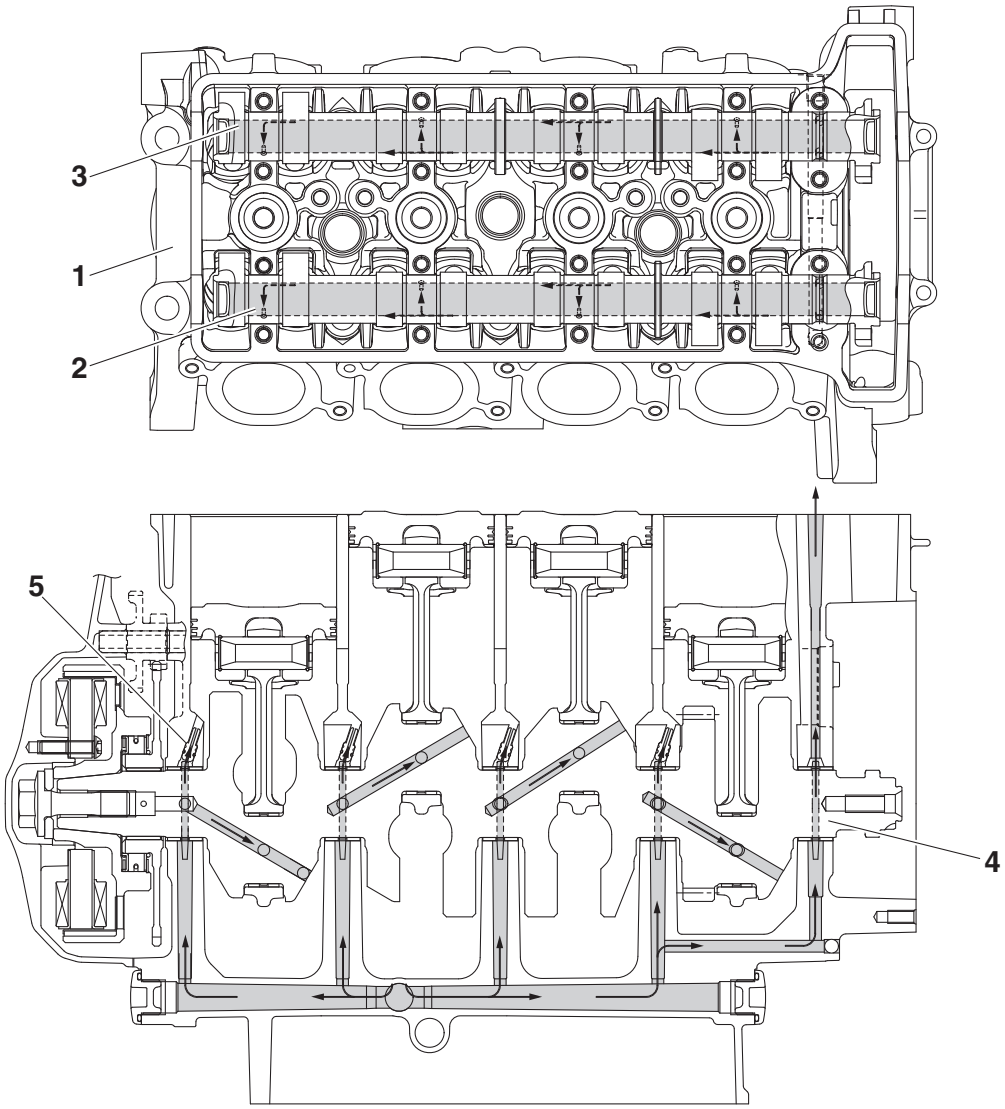
1. Timing chain tensioner
2. Intake camshaft
3. Exhaust camshaft
4. Oil check bolt
5. Oil strainer
6. Ventilation chamber oil drain pipe
7. Oil pipe
8. Oil pump



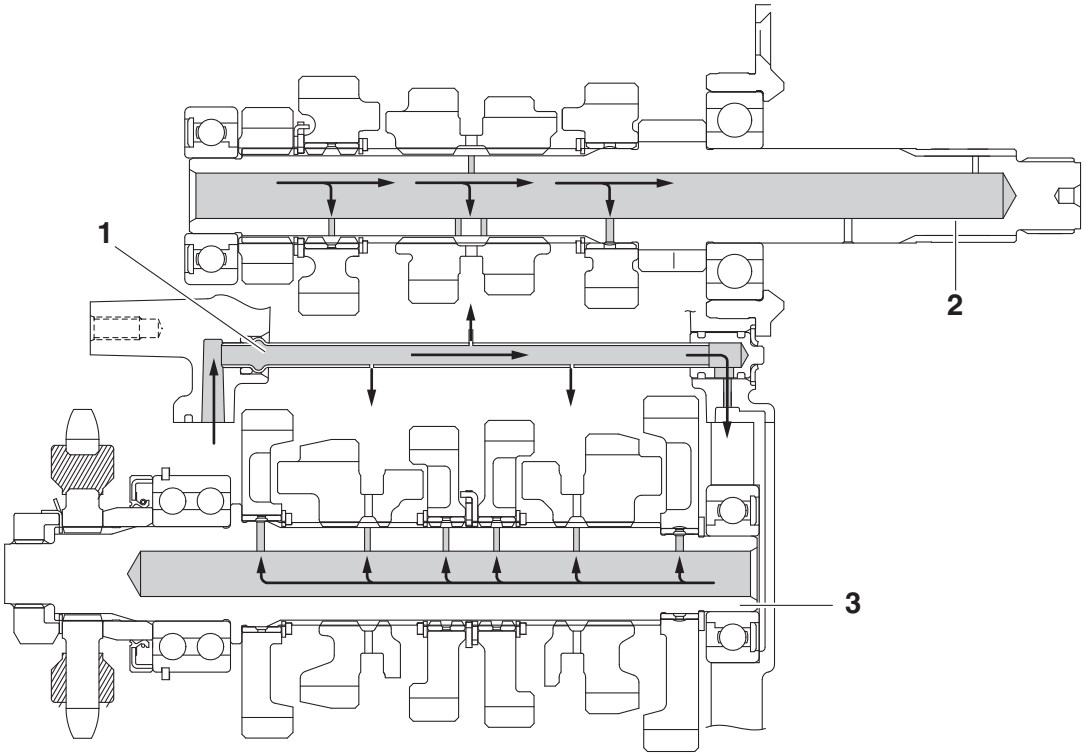
1. Oil cooler
2. Oil filter
3. Oil pipe
4. Oil pump
5. Oil strainer



1. Main axle
2. Oil pump
3. Oil pipe
4. Ventilation chamber oil drain pipe
5. Relief valve



1. Cylinder head
2. Intake camshaft
3. Exhaust camshaft
4. Crankshaft
5. Oil nozzle



1. Oil pipe
2. Main axle
3. Drive axle

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.

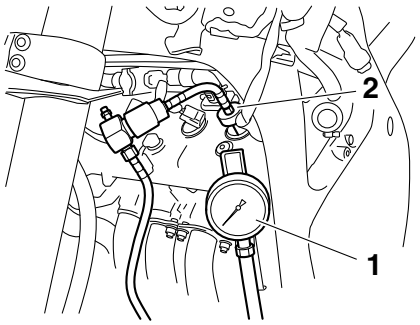
1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Radiator
     Refer to "RADIATOR" on page 6-3.
4. Remove:
   - Ignition coils
   - Spark plugs

ECA13340
NOTICE

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

5. Install:
   - Compression gauge "1"
   - Extension "2"

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



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

Compression pressure
1392–1792 kPa/400 r/min (13.9–17.9 kgf/cm²/400 r/min, 198.0–254.9 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.

EWA12940
⚠ WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

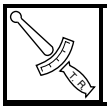
TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

   c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
      Carbon deposits → Eliminate.
   d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
      Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Pistons, valves, cylinder head gasket or piston ring(s) possibly defective → Repair.

7. Install:
   - Spark plugs
   - Ignition coils



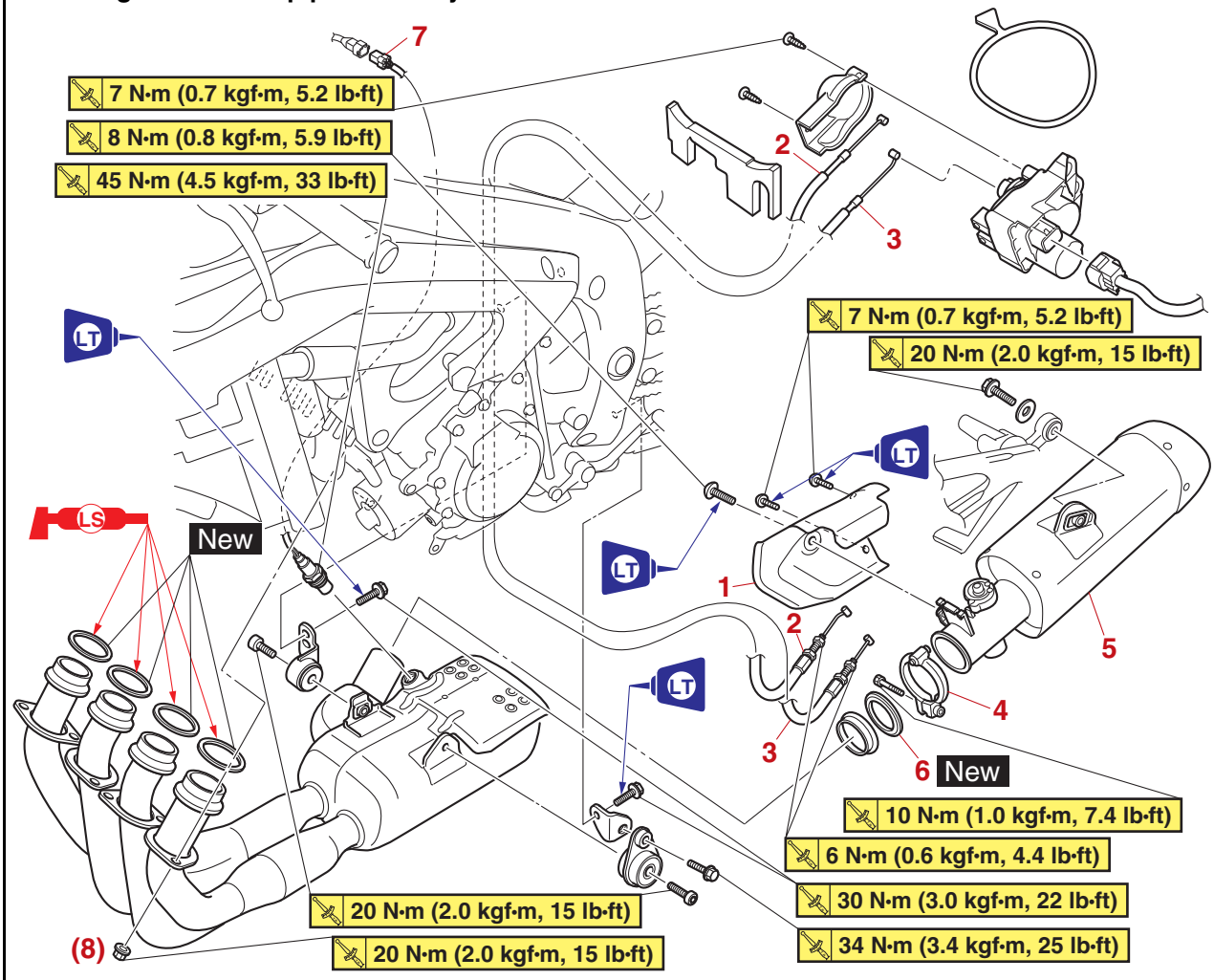
Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

8. Install:
   - Radiator
     Refer to "RADIATOR" on page 6-3.

EAS20042

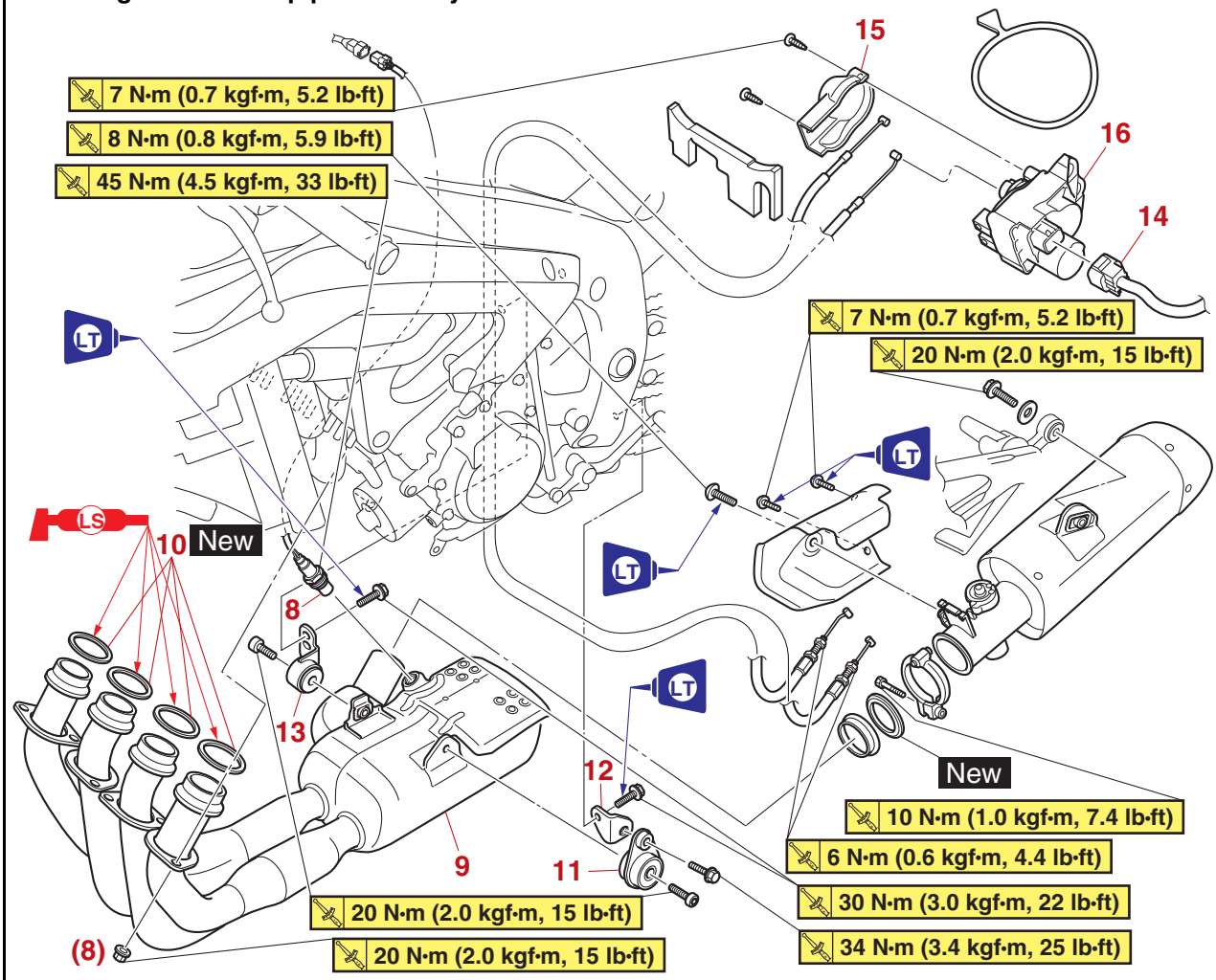
ENGINE REMOVAL

Removing the exhaust pipe assembly



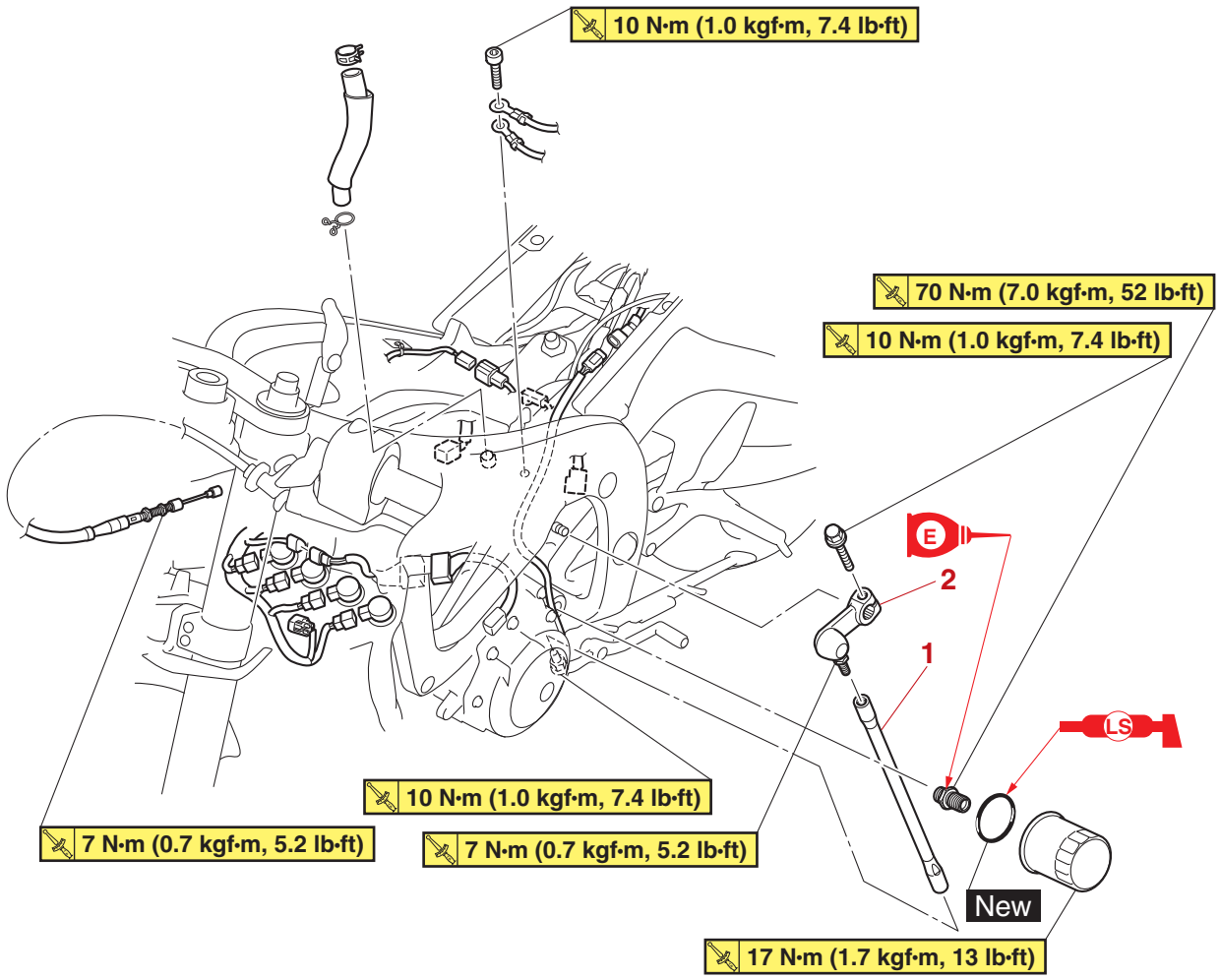
Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Radiator bracket		Refer to "RADIATOR" on page 6-3.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	EXUP valve pulley cover	1	
2	EXUP cable	1	Black adjusting bolt
3	EXUP cable	1	
4	Clamp	1	
5	Muffler	1	
6	Gasket	1	
7	O_2 sensor coupler	1	Disconnect.

Removing the exhaust pipe assembly



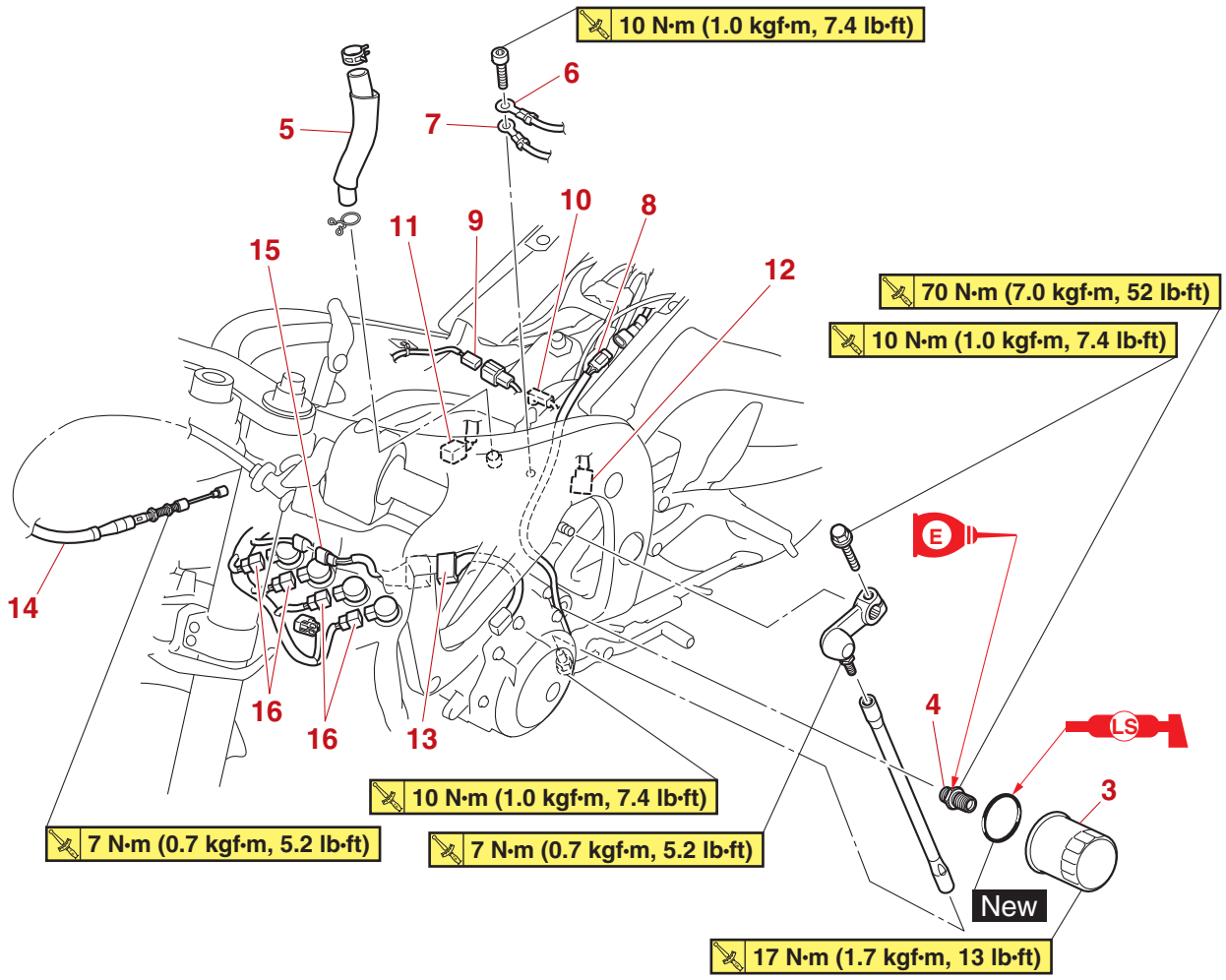
Order	Job/Parts to remove	Q'ty	Remarks
8	O_2 sensor	1	Remove the O_2 sensor only when necessary.
9	Exhaust pipe assembly	1	
10	Gasket	4	
11	Exhaust pipe assembly bracket (left lower side)	1	
12	Exhaust pipe assembly bracket (left upper side)	1	
13	Exhaust pipe assembly bracket (right side)	1	
14	EXUP servo motor coupler	1	Disconnect.
15	EXUP servo motor cover	1	
16	EXUP servo motor	1	

Disconnecting the leads and hoses



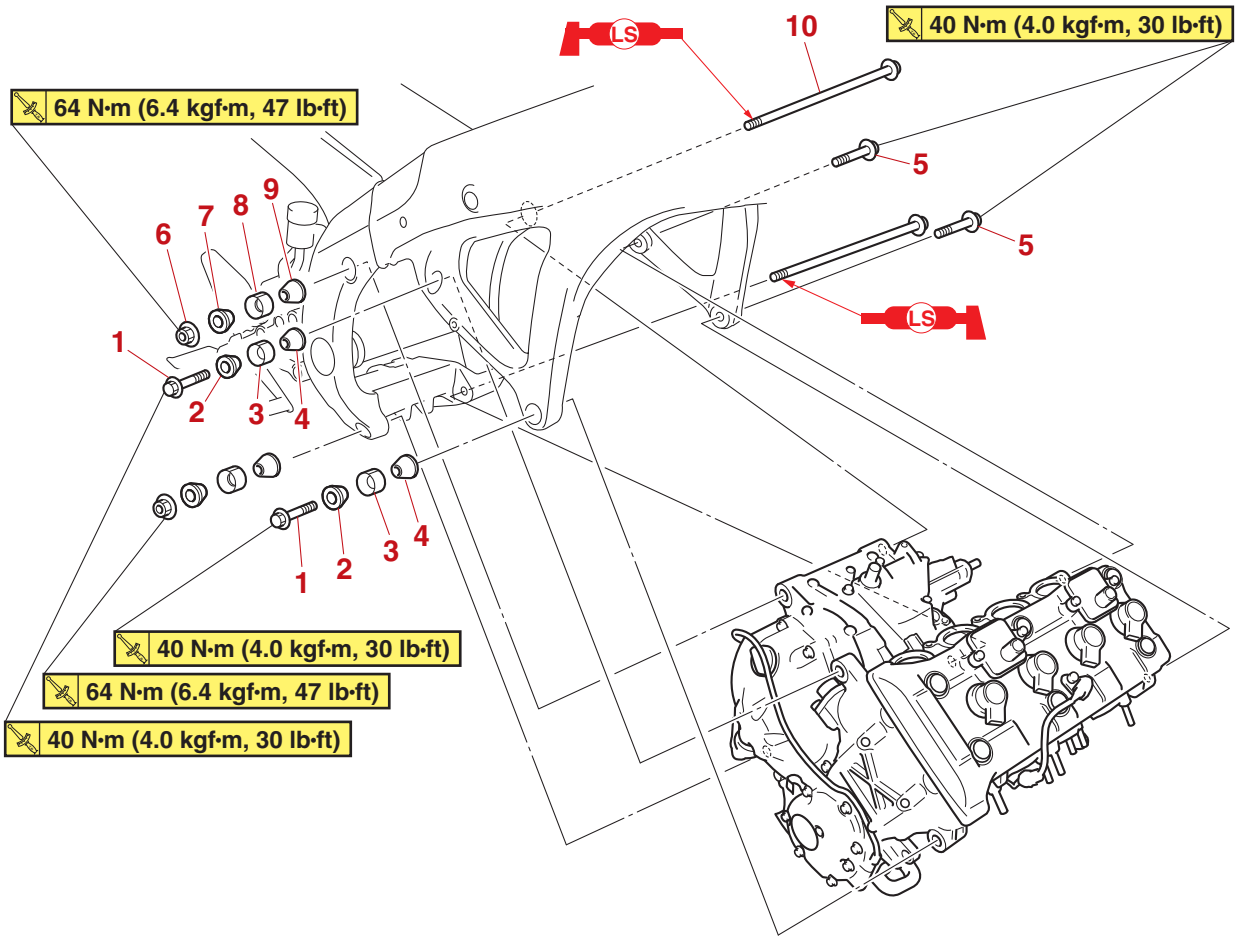
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
	Throttle body		Refer to "THROTTLE BODIES" on page 7-10.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-19.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-42.
	Thermostat		Refer to "THERMOSTAT" on page 6-10.
	Radiator		Refer to "RADIATOR" on page 6-3.
	Oil cooler		Refer to "OIL COOLER" on page 6-7.
	Water pump		Refer to "WATER PUMP" on page 6-12.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-95.
1	Shift rod	1	
2	Shift arm	1	

Disconnecting the leads and hoses



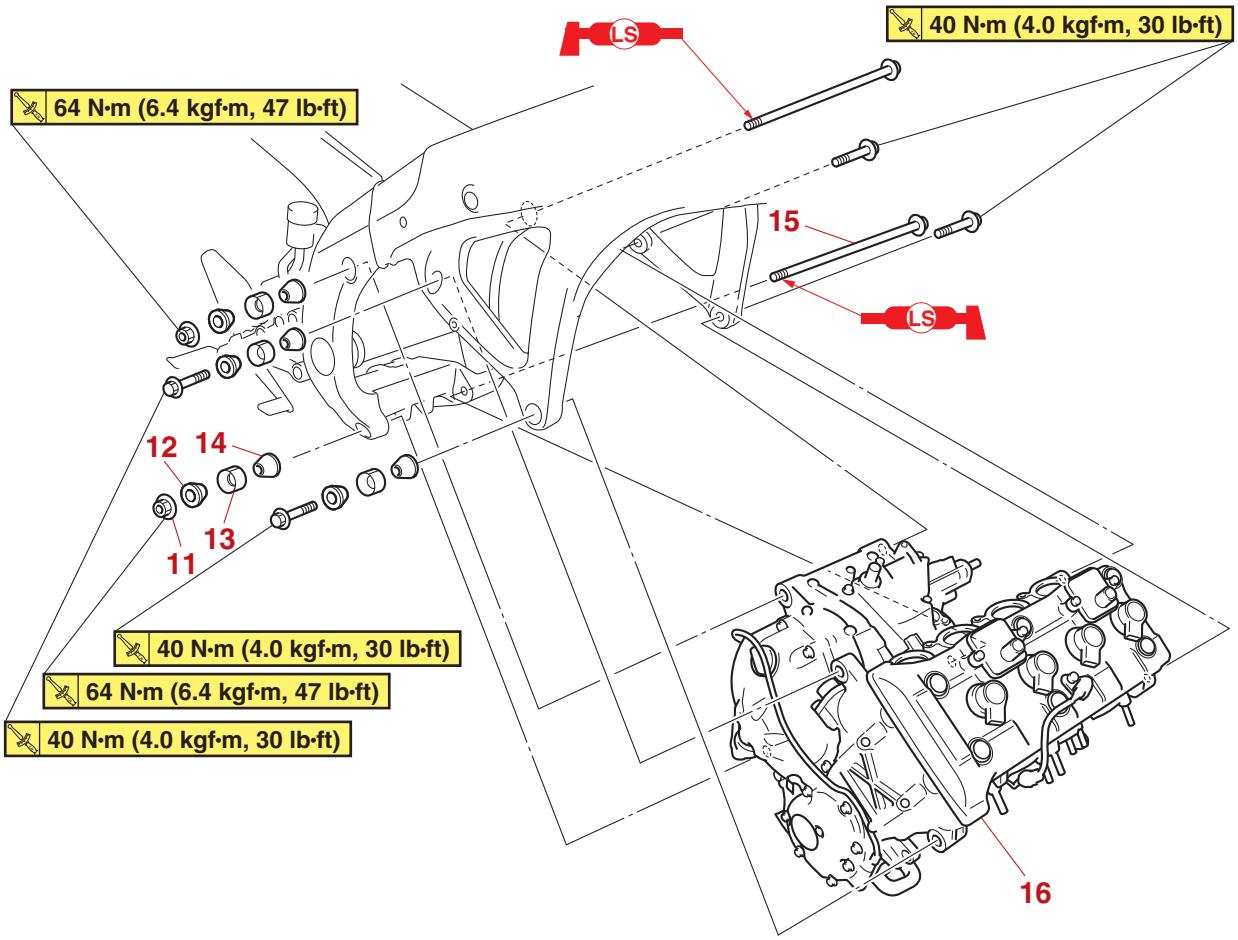
Order	Job/Parts to remove	Q'ty	Remarks
3	Oil filter cartridge	1	
4	Oil filter cartridge bolt	1	
5	Crankcase breather hose	1	
6	Negative battery terminal	1	Disconnect.
7	Engine ground terminal	1	Disconnect.
8	Oil level switch coupler	1	Disconnect.
9	Crankshaft position sensor coupler	1	Disconnect.
10	Neutral switch connector	1	Disconnect.
11	Coolant temperature sensor coupler	1	Disconnect.
12	Gear position sensor coupler	1	Disconnect.
13	Stator coil assembly coupler	1	Disconnect.
14	Clutch cable	1	Disconnect.
15	Cylinder identification sensor coupler	1	Disconnect.
16	Ignition coil coupler	4	Disconnect.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Engine mounting bolt (front right side)	2	
2	Engine mounting collar (outside)	2	
3	Engine mounting collar (center)	2	
4	Engine mounting collar (inside)	2	
5	Engine mounting bolt (front left side)	2	
6	Engine mounting nut (rear upper side)	1	
7	Engine mounting collar (outside)	1	
8	Engine mounting collar (center)	1	
9	Engine mounting collar (inside)	1	
10	Engine mounting bolt (rear upper side)	1	

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
11	Engine mounting nut (rear lower side)	1	
12	Engine mounting collar (outside)	1	
13	Engine mounting collar (center)	1	
14	Engine mounting collar (inside)	1	
15	Engine mounting bolt (rear lower side)	1	
16	Engine	1	

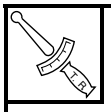
EAS30251
INSTALLING THE ENGINE

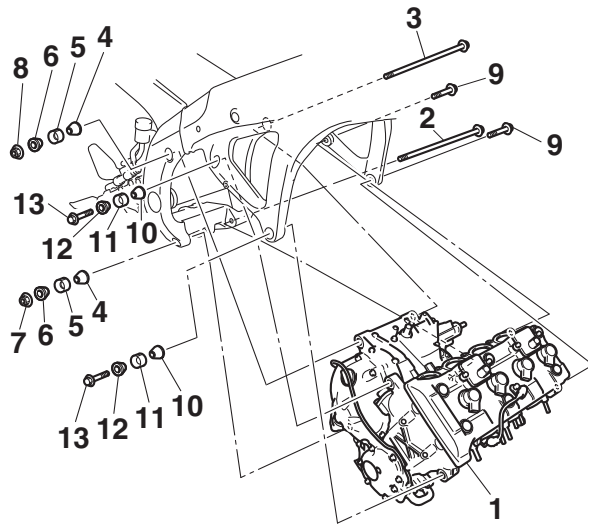
1. Install:
   - Engine “1”
   - Engine mounting bolt (rear lower side) “2”
   - Engine mounting bolt (rear upper side) “3”
   - Engine mounting collars (inside) “4”
   - Engine mounting collar (center) “5”
   - Engine mounting collars (outside) “6”
   - Engine mounting nut (rear lower side) “7” (temporarily tighten)
   - Engine mounting nut (rear upper side) “8” (temporarily tighten)
   - Engine mounting bolts (front left side) “9” (temporarily tighten)
   - Engine mounting collars (inside) “10”
   - Engine mounting collar (center) “11”
   - Engine mounting collars (outside) “12”
   - Engine mounting bolts (front right side) “13” (temporarily tighten)

TIP

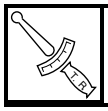
- Be sure to pass the drive axle through the drive chain when installing the engine “1”.
- Do not fully tighten the bolts and nuts.

2. Tighten:
   - Engine mounting nut (rear lower side) “7”
   - Engine mounting nut (rear upper side) “8”
   - Engine mounting bolts (front left side) “9”
   - Engine mounting bolts (front right side) “13”

	**Engine mounting nut (rear lower side)** **64 N·m (6.4 kgf·m, 47 lb·ft)** **Engine mounting nut (rear upper side)** **64 N·m (6.4 kgf·m, 47 lb·ft)** **Engine mounting bolt (front left side)** **40 N·m (4.0 kgf·m, 30 lb·ft)** **Engine mounting bolt (front right side)** **40 N·m (4.0 kgf·m, 30 lb·ft)**

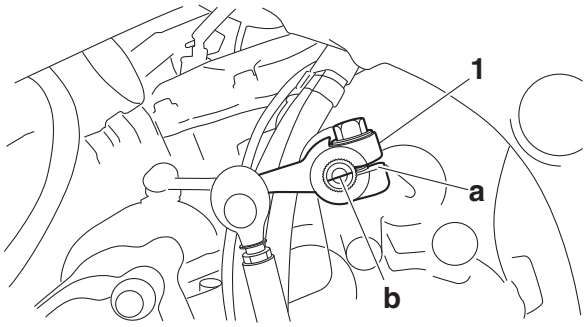


3. Install:
   - Shift arm “1”

	**Shift arm bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

Install the shift arm “1” with its slot “a” aligned with the notch “b” in end of the shift shaft.



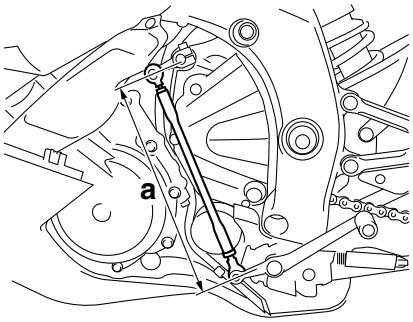
EAS31590
ADJUSTING THE SHIFT PEDAL

TIP

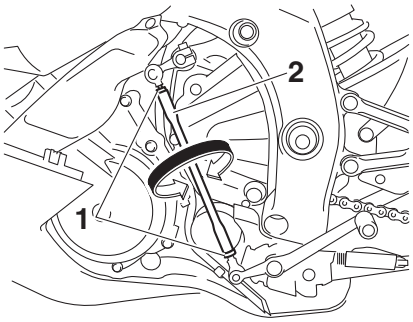
The shift pedal position is determined by the installed shift rod length “a”.

1. Remove:
   - Side cowling assembly
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Measure:
   - Installed shift rod length “a”
     Incorrect → Adjust.

Installed shift rod length
267.2–269.2 mm (10.52–10.60 in)



3. Adjust:
   • Installed shift rod length
   a. Loosen both locknuts “1”.
   b. Turn the shift rod “2” until the specified installed shift rod length is obtained.



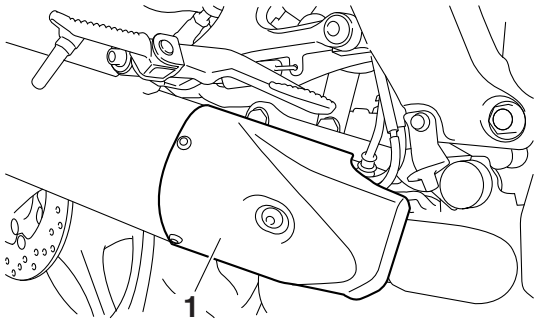
   c. Tighten both locknuts to specification.

Locknut (shift rod upper side)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Locknut (shift rod lower side)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

   d. Make sure the installed shift rod length is within specification.
4. Install:
   • Side cowling assembly
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS31788
ADJUSTING THE EXUP CABLES

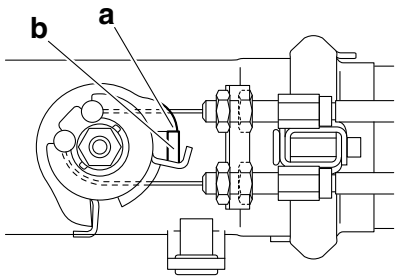
1. Remove:
   • EXUP valve pulley cover “1”



2. Check:
   • EXUP system operation
   a. Activate the diagnostic mode and select the diagnostic code number “53”.
   Refer to “FUEL INJECTION SYSTEM” on page 8-29.
   b. Set the engine stop switch to “ ”.
   c. Check that the EXUP valve operates properly.

TIP

Check that the projection “a” on the EXUP valve pulley contacts the stopper “b” (fully open position). If the projection does not contact the stopper, adjust the EXUP cable free play.



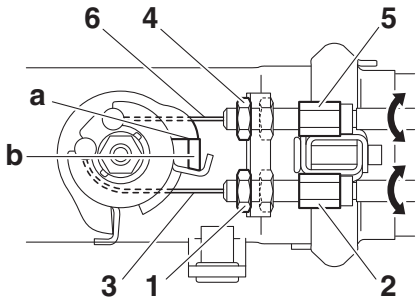
3. Adjust:
   • EXUP cable free play
   a. Turn the main switch to “ON”.
   b. Loosen the locknut “1”.
   c. Turn the adjusting nut “2” until the projection “a” on the EXUP valve pulley slightly contacts the stopper “b” and make sure the EXUP cable (black metal) “3” is not slack.
   d. Tighten the locknut “1” to specification.

Locknut (EXUP cable adjusting nut)
6 N·m (0.6 kgf·m, 4.4 lb·ft)

   e. Loosen the locknut “4”.

f. Turn the adjusting nut “5” until the tension of the EXUP cable (white metal) “6” is the same as that of the EXUP cable (black metal) “3”.
g. Tighten the locknut “4” to specification.

	Locknut (EXUP cable adjusting nut) **6 N·m (0.6 kgf·m, 4.4 lb·ft)**

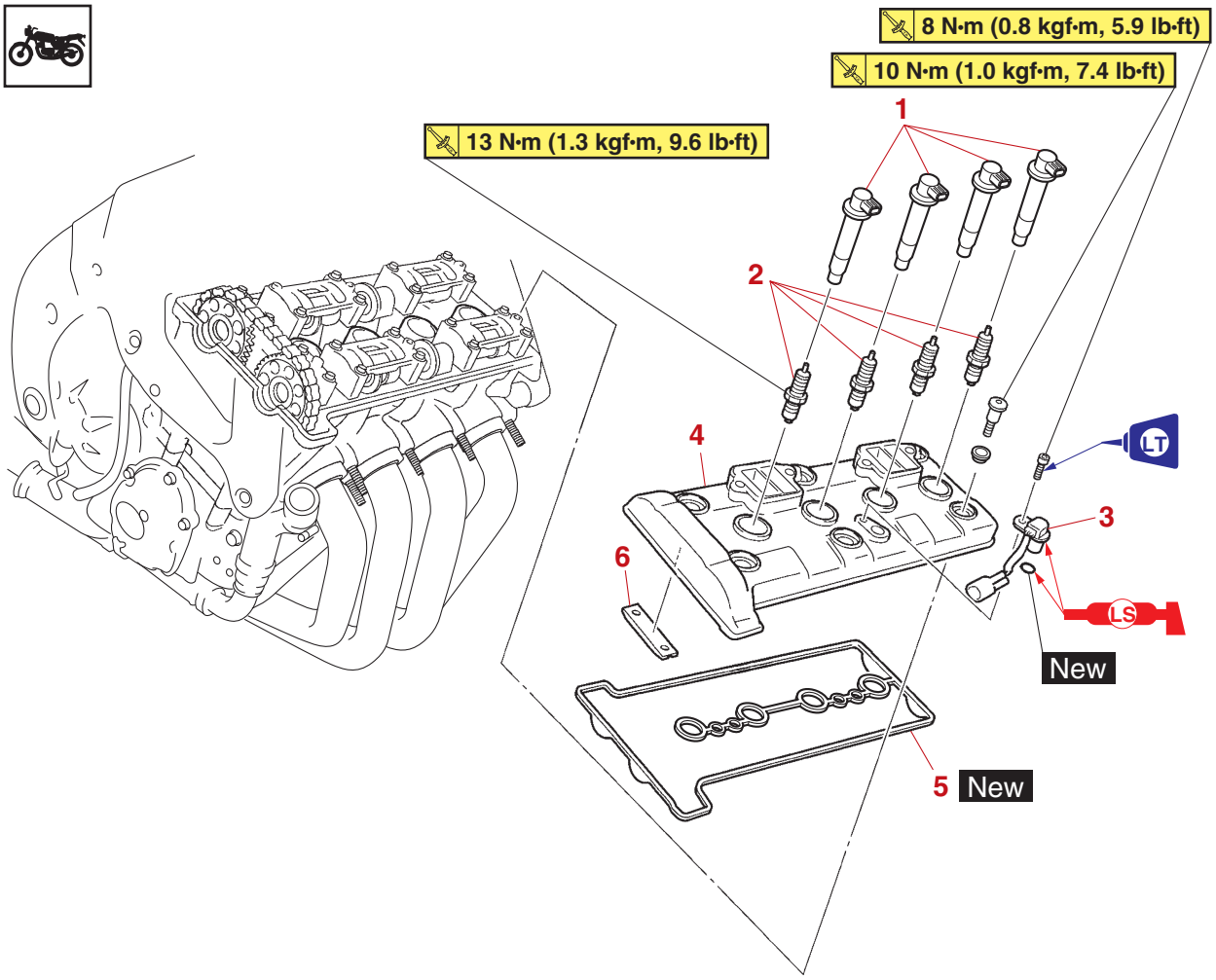


4. Install:
• EXUP valve pulley cover

	EXUP valve pulley cover bolt (front side) **8 N·m (0.8 kgf·m, 5.9 lb·ft)** **LOCTITE®** **EXUP valve pulley cover bolt (rear side)** **7 N·m (0.7 kgf·m, 5.2 lb·ft)** **LOCTITE®**

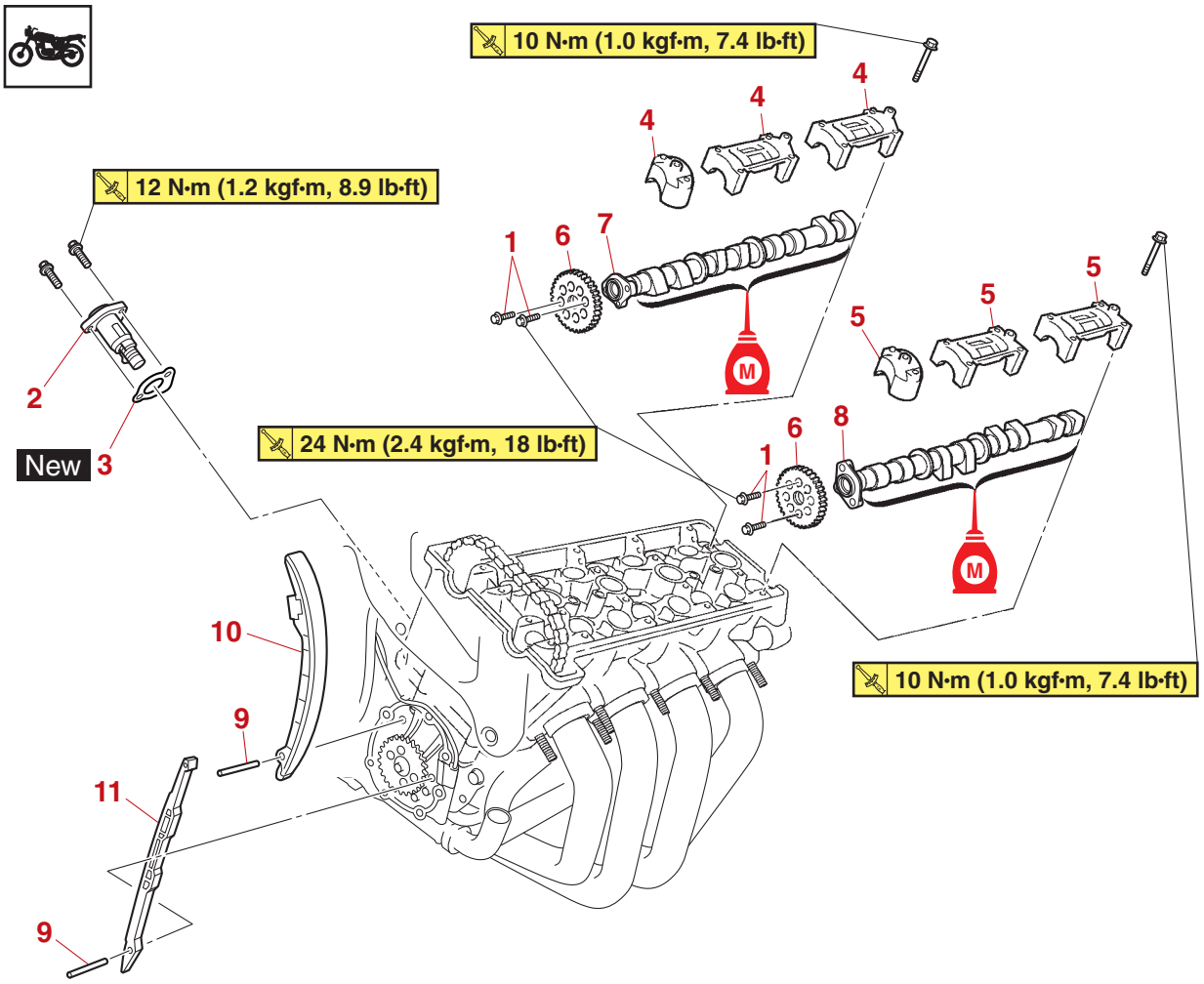
EAS20043
CAMSHAFTS

Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Radiator		Refer to "RADIATOR" on page 6-3.
	Throttle body		Refer to "THROTTLE BODIES" on page 7-10.
	Air cut-off valve/Reed valve assembly		Refer to "AIR INDUCTION SYSTEM" on page 7-19.
1	Ignition coil	4	
2	Spark plug	4	
3	Cylinder identification sensor	1	
4	Cylinder head cover	1	
5	Cylinder head cover gasket	1	
6	Timing chain guide (upper side)	1	

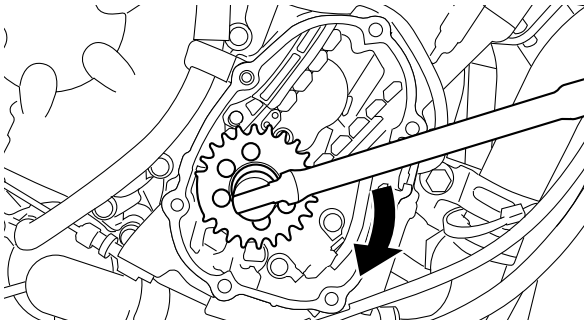
Removing the camshafts



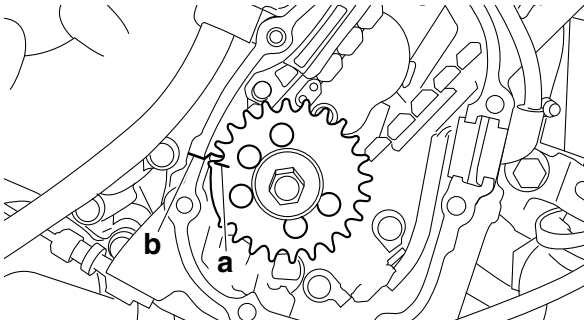
Order	Job/Parts to remove	Q'ty	Remarks
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-39.
1	Camshaft sprocket bolt	4	Loosen.
2	Timing chain tensioner	1	
3	Timing chain tensioner gasket	1	
4	Intake camshaft cap	3	
5	Exhaust camshaft cap	3	
6	Camshaft sprocket	2	
7	Intake camshaft	1	
8	Exhaust camshaft	1	
9	Pin	2	
10	Timing chain guide (intake side)	1	
11	Timing chain guide (exhaust side)	1	

EAS30256
REMOVING THE CAMSHAFTS

1. Remove:
   - Pickup rotor cover
     Refer to "PICKUP ROTOR" on page 5-39.
2. Align:
   - TDC mark on the pickup rotor
     (with the crankcase mating surface)
     a. Turn the crankshaft clockwise.

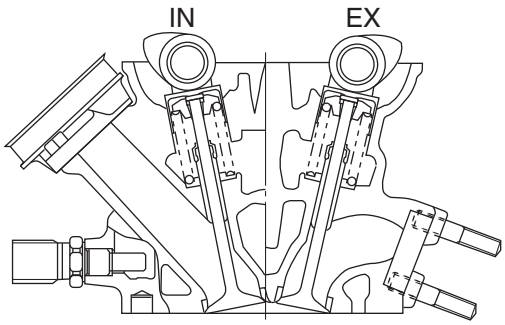


     b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".



TIP

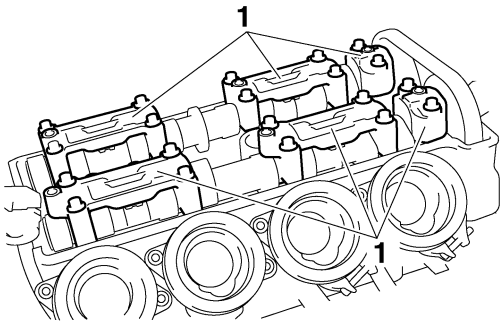
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



3. Remove:
   - Camshaft caps "1"

ECA13720
NOTICE

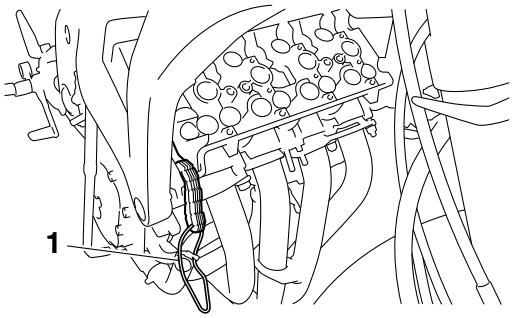
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.



4. Remove:
   - Intake camshaft
   - Exhaust camshaft

TIP

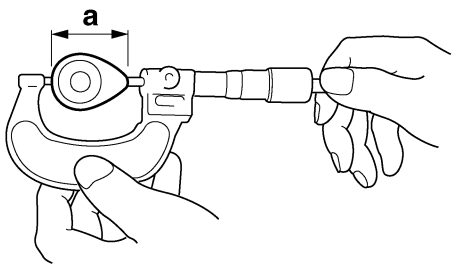
To prevent the timing chain from falling into the crankcase, fasten it with a wire "1".



EAS30257
CHECKING THE CAMSHAFTS

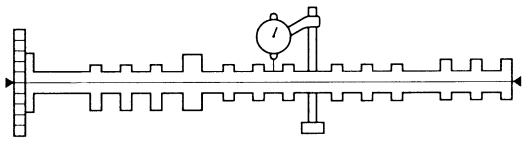
1. Check:
   - Camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   - Camshaft lobe dimensions "a"
     Out of specification → Replace the camshaft.

Camshaft lobe dimensions
Lobe height (Intake)
33.750–33.850 mm (1.3287–1.3327 in)
Limit
33.675 mm (1.3258 in)
Lobe height (Exhaust)
32.950–33.050 mm (1.2972–1.3012 in)
Limit
32.875 mm (1.2943 in)



3. Measure:
   • Camshaft runout
   Out of specification → Replace.

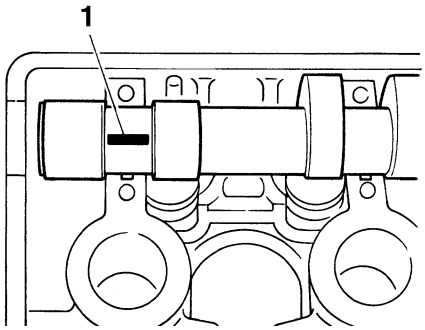
Camshaft runout limit
0.030 mm (0.0012 in)



4. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance
0.028–0.062 mm (0.0011–0.0024 in)
Limit
0.080 mm (0.0032 in)

   a. Install the camshaft into the cylinder head (without the camshaft caps).
   b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.

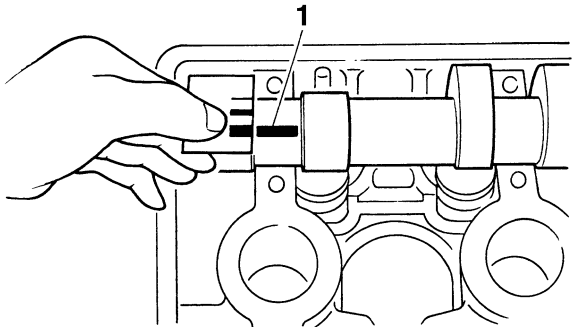


   c. Install the camshaft caps.

TIP
- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.

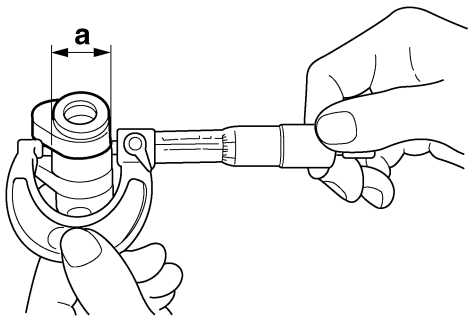
Camshaft cap bolt (intake and exhaust)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

   d. Remove the camshaft caps and then measure the width of the Plastigauge® “1”.



5. Measure:
   • Camshaft journal diameter “a”
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

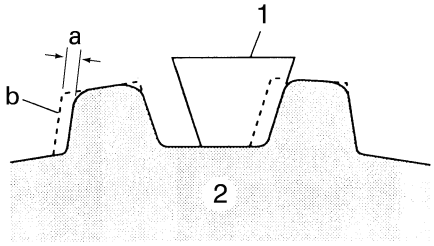
Camshaft journal diameter
22.459–22.472 mm (0.8842–0.8847 in)



EAS31784
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

1. Check:
   • Timing chain “1”
   Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.

2. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear “a” → Replace the camshaft sprocket and the timing chain as a set.



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

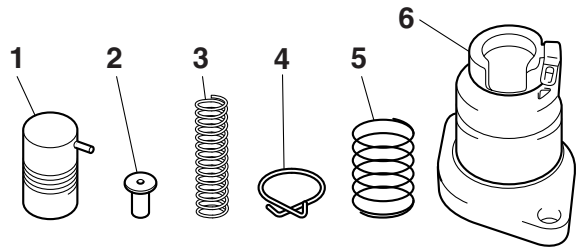
3. Check:
   • Timing chain guide (exhaust side)
   • Timing chain guide (intake side)
   • Timing chain guide (upper side)
   Damage/wear → Replace the defective part(s).

EAS30266
CHECKING THE TIMING CHAIN TENSIONER

1. Remove:
   • Timing chain tensioner rod “1”
   • Timing chain tensioner spring seat “2”
   • Timing chain tensioner inner spring “3”
   • Timing chain tensioner outer spring “5”
   • Timing chain tensioner housing “6”

TIP

Squeeze the timing chain tensioner clip “4”, and then remove the timing chain tensioner springs and timing chain tensioner rod.

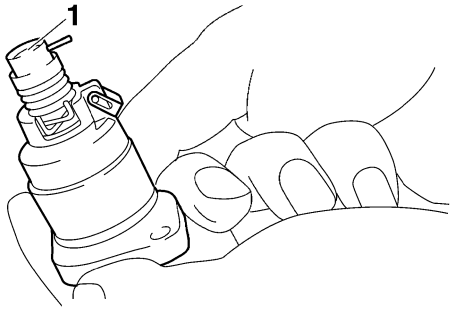


2. Check:
   • Timing chain tensioner housing
   • Timing chain tensioner rod
   • Timing chain tensioner spring seat
   • Timing chain tensioner springs
   Damage/wear → Replace the as a set.
3. Assemble:
   • Timing chain tensioner springs
   • Timing chain tensioner spring seat
   • Timing chain tensioner rod

TIP

Prior to installing the timing chain tensioner rod, drain the engine oil from the timing chain tensioner housing.

a. Install the timing chain tensioner springs, timing chain tensioner spring seat, and timing chain tensioner rod “1”.



b. Squeeze the timing chain tensioner clip “2”, and then push the timing chain tensioner rod “3” into the timing chain tensioner housing.

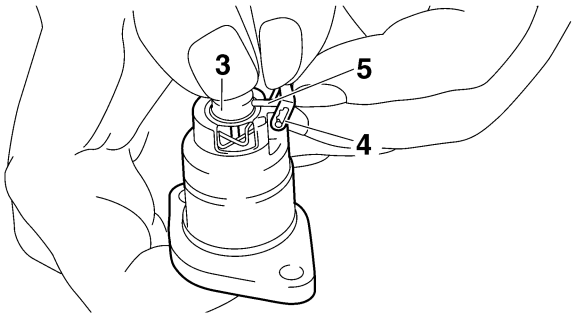
TIP

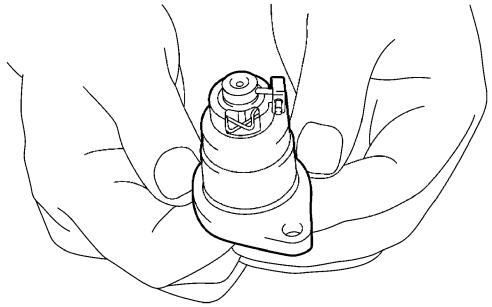
Do not release the timing chain tensioner clip while pushing the rod into the housing, otherwise the rod may be ejected.

c. Hook the clip “4” to the timing chain tensioner rod “3”.

TIP

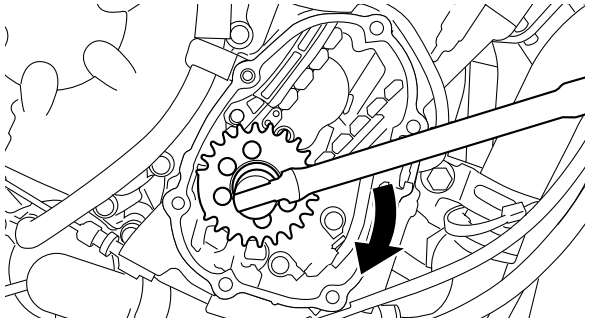
Hook the timing chain tensioner rod pin “5” to the center of the clip “4”. After the installation, check that the clip “4” can come off by its own weight by pushing the timing chain tensioner rod “3” at the position of installation.



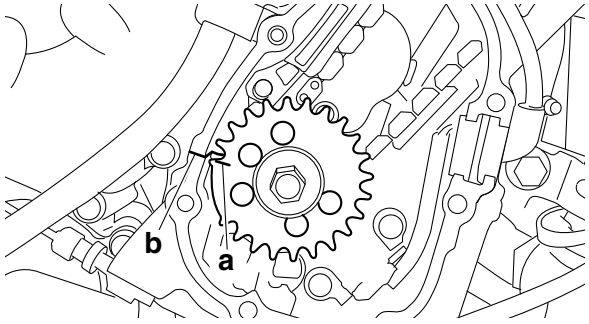


EAS30269
INSTALLING THE CAMSHAFTS

1. Align:
   - TDC mark on the pickup rotor (with the crankcase mating surface)
     a. Turn the crankshaft clockwise.



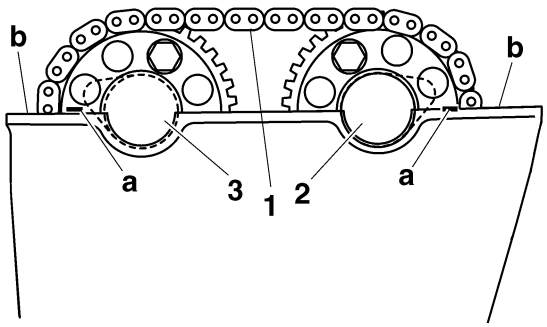
     b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".



2. Install:
   - Timing chain "1"
   - Exhaust camshaft "2"
   - Intake camshaft "3" (with the camshaft sprockets temporarily tightened)

TIP

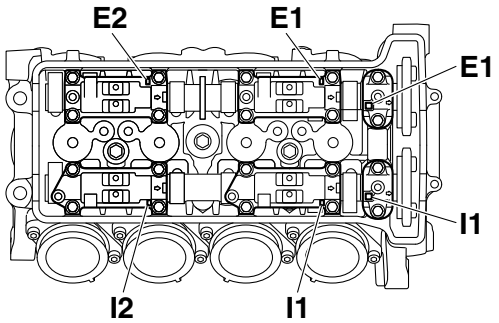
- Make sure the match marks "a" on the camshaft sprockets are aligned with the cylinder head edge "b".
- Be sure to install the timing chain so that the exhaust side of the chain is taut and the intake side is slack.

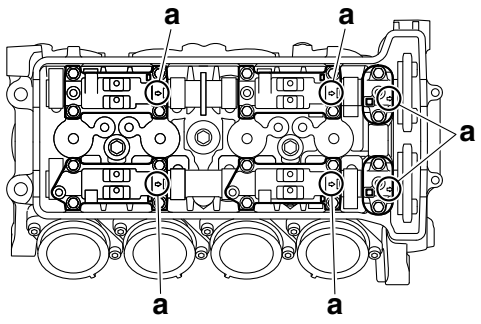


3. Install:
   - Intake camshaft caps
   - Exhaust camshaft caps

TIP

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
  "I1", "I2": Intake
  "E1", "E2": Exhaust
- Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.





4. Install:
   • Camshaft cap bolts

	Camshaft cap bolt (intake and exhaust) **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

ECA13730

NOTICE

The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.

TIP

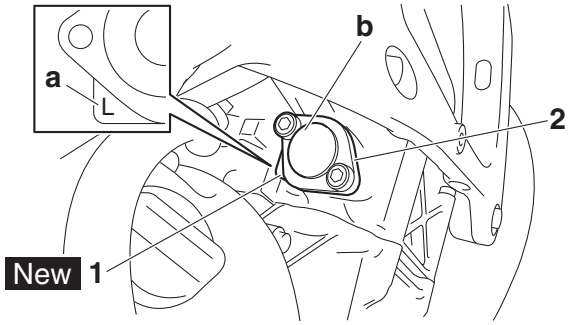
Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

5. Install:
   • Timing chain tensioner gasket "1" New
   • Timing chain tensioner "2"

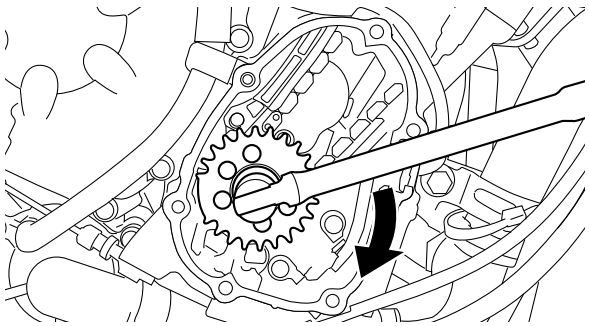
	Timing chain tensioner bolt **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

TIP

- Be sure to install the timing chain tensioner gasket so that its section with the "L" mark "a" is protruding from the lower left side of the timing chain tensioner.
- The punch mark "b" on the timing chain tensioner should face up.



6. Rotate the crankshaft a few times to release the timing chain tensioner rod.



TIP

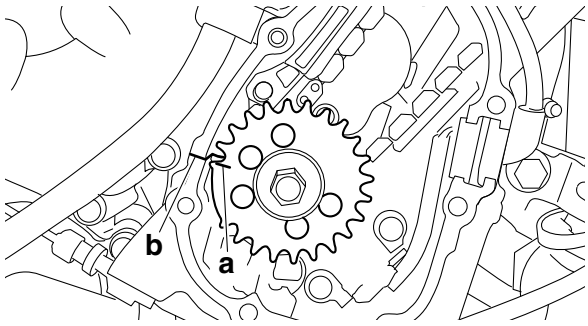
If the engine is not disassembled, set the engine stop switch to "⊗", and then crank the engine a few times by pressing the start switch for approximately 0.5–1.0 second each time.

7. Check that the timing chain is taut. If the chain is slack, reinstall the timing chain tensioner.

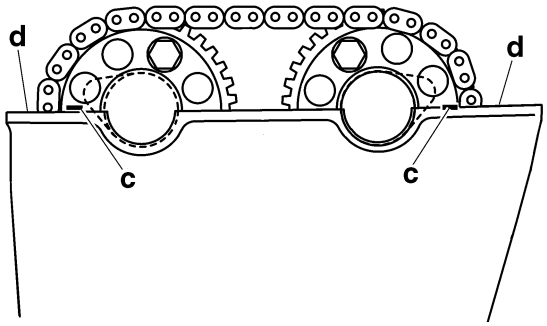
TIP

If the engine is not disassembled, start the engine and check for any abnormal noise. If any abnormal noise is heard, reinstall the timing chain tensioner.

8. Check:
   • TDC mark "a"
   Make sure the TDC mark on the pickup rotor is aligned with the crankcase mating surface "b".



   • Camshaft sprocket match mark "c"
   Make sure the marks on the camshaft sprockets are aligned with the edge of the cylinder head "d".
   Out of alignment → Adjust.
   Refer to the installation steps above.



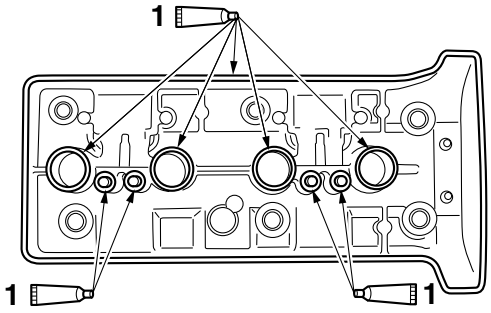
9. Measure:
   • Valve clearance
   Out of specification → Adjust.
   Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
10. Install:
   • Cylinder head cover gasket New

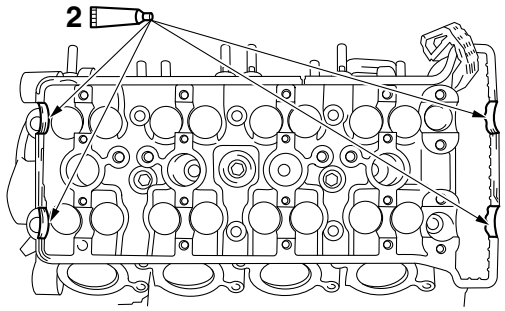
• Cylinder head cover

	**Cylinder head cover bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

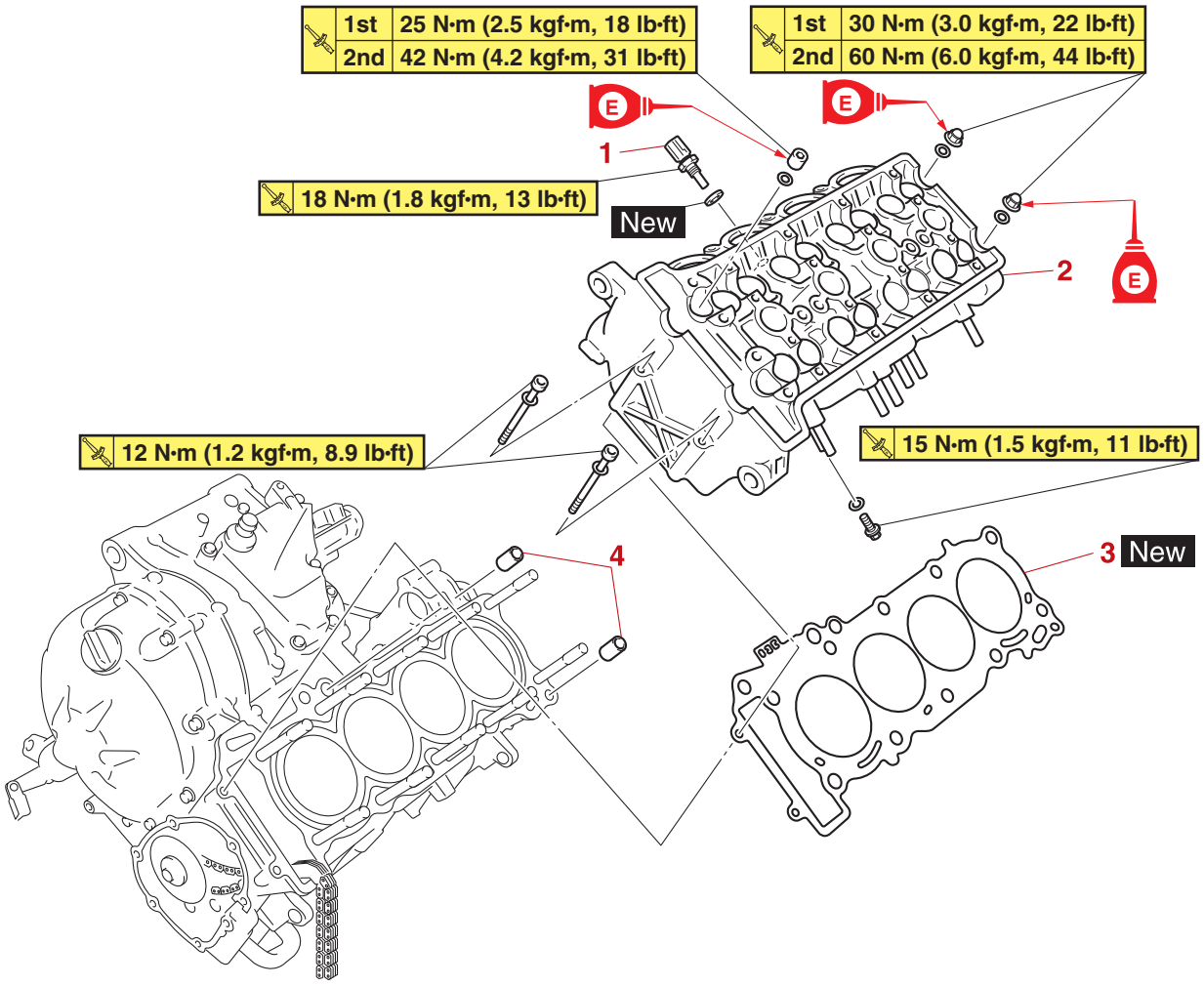
- Apply bond TB1541C “1” onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply bond TB1215B “2” onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts stages and in a crisscross pattern.





EAS20044
CYLINDER HEAD

Removing the cylinder head



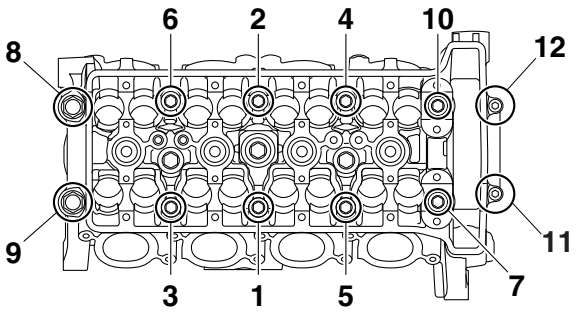
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-9.
	Camshafts		Refer to "CAMSHAFTS" on page 5-18.
1	Coolant temperature sensor	1	
2	Cylinder head	1	
3	Cylinder head gasket	1	
4	Dowel pin	2	

EAS30276
REMOVING THE CYLINDER HEAD

1. Remove:
   - Cylinder head bolts
   - Cylinder head nuts

TIP

- Loosen the nuts, cap nuts, and bolts in decreasing numerical order (refer to the numbers in the illustration).
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.

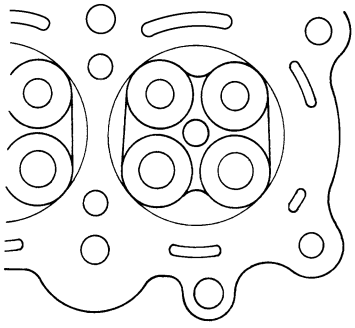


EAS30277
CHECKING THE CYLINDER HEAD

1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:
- Spark plug bore threads
- Valve seats



2. Check:
   - Cylinder head
     Damage/scratches → Replace.

TIP

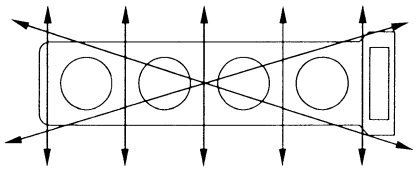
Replace the titanium valves with the cylinder head.

Refer to "CHECKING THE VALVE SEATS" on page 5-32.

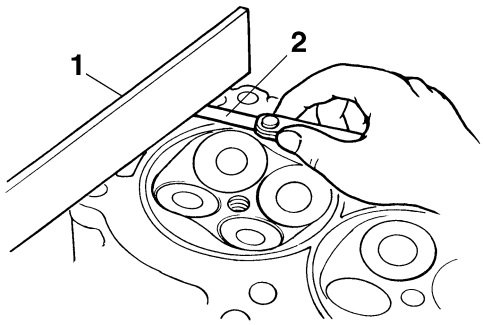
- Cylinder head water jacket
  Mineral deposits/rust → Eliminate.

3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

Warpage limit
0.05 mm (0.0020 in)



a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

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

EAS30282
INSTALLING THE CYLINDER HEAD

1. Install:
   - Cylinder head

TIP

Pass the timing chain through the timing chain cavity.

2. Tighten:
   - Cylinder head nuts "1"–"7", "10"

Cylinder head nut (1st)
25 N·m (2.5 kgf·m, 18 lb·ft)
Cylinder head nut (final)
42 N·m (4.2 kgf·m, 31 lb·ft)

• Cylinder head cap nuts “8”, “9”

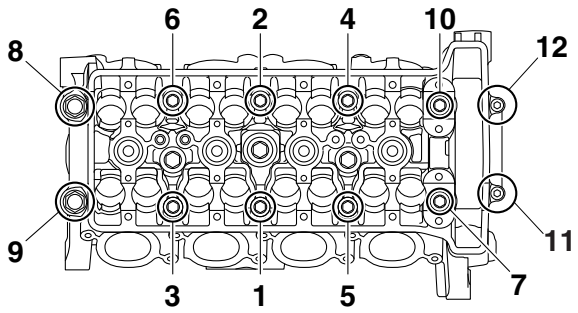
Cylinder head cap nut (1st)
30 N·m (3.0 kgf·m, 22 lb·ft)
Cylinder head cap nut (final)
60 N·m (6.0 kgf·m, 44 lb·ft)

• Cylinder head bolts “11”, “12”

Cylinder head bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)

TIP

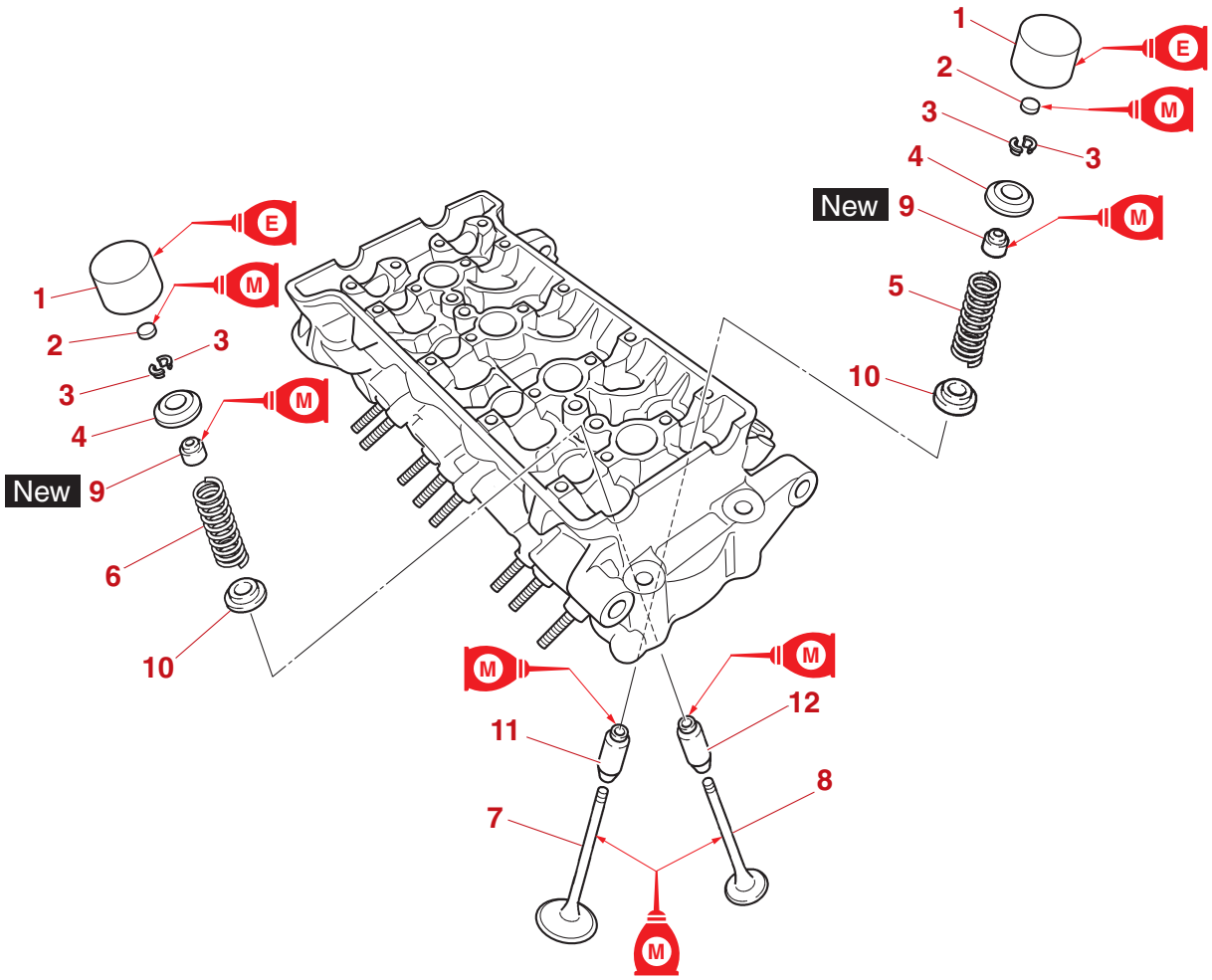
- Lubricate the bolt threads and the bearing surfaces with engine oil.
- Tighten the cylinder head nuts, cap nuts, and bolts in the proper tightening sequence as shown and torque them in two stages.



EAS20045

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-26.
1	Valve lifter	16	
2	Valve pad	16	
3	Valve cotter	32	
4	Upper spring seat	16	
5	Intake valve spring	8	
6	Exhaust valve spring	8	
7	Intake valve	8	
8	Exhaust valve	8	
9	Valve stem seal	16	
10	Lower spring seat	16	
11	Intake valve guide	8	
12	Exhaust valve guide	8	

EAS30283
REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

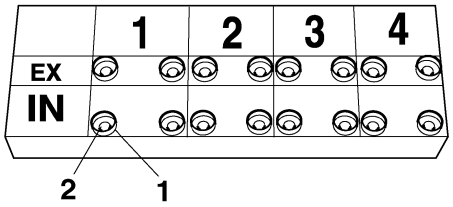
TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
   - Valve lifter "1"
   - Valve pad "2"

TIP

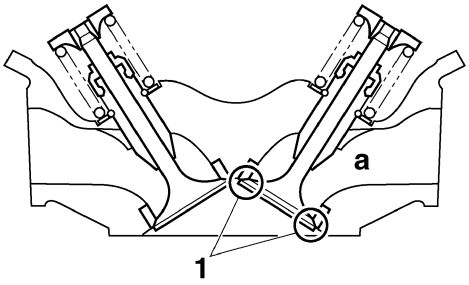
Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



2. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to "CHECKING THE VALVE SEATS" on page 5-32.
     a. Pour a clean solvent "a" into the intake and exhaust ports.
     b. Check that the valves properly seal.

TIP

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

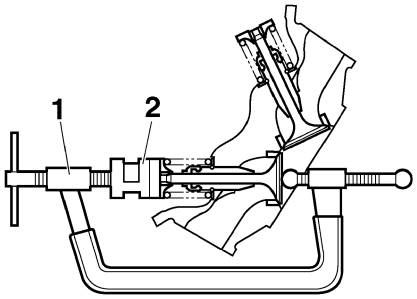


3. Remove:
   - Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

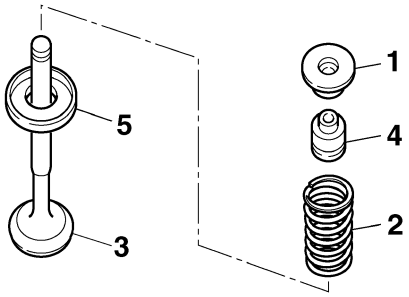
Valve spring compressor
90890-04019
Valve spring compressor
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



4. 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.



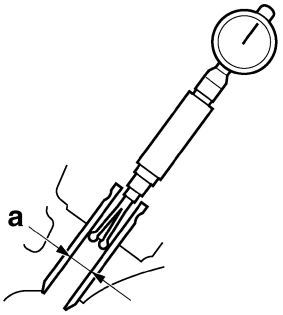
EAS30284
CHECKING THE VALVES AND VALVE GUIDES

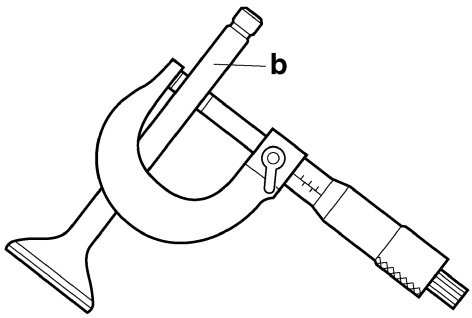
The following procedure applies to all of the valves and valve guides.

1. Measure:
   • Valve-stem-to-valve-guide clearance
   Out of specification → Replace the valve guide.

• Valve-stem-to-valve-guide clearance = Valve guide inside diameter “a” - Valve stem diameter “b”

Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.025–0.052 mm (0.0010–0.0020 in)
Limit
0.095 mm (0.0037 in)



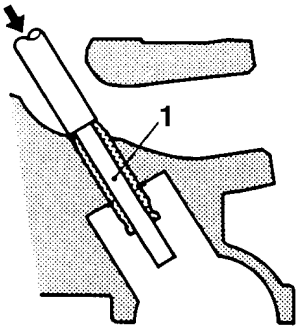


2. Replace:
   • Valve guide

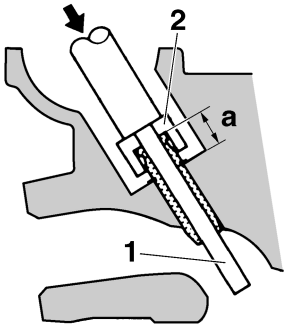
TIP

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”.

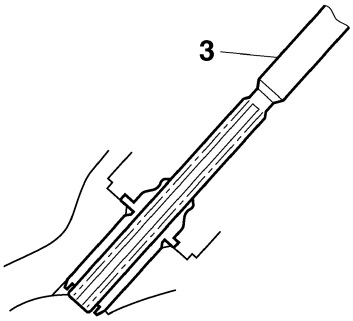


b. Install the new valve guide with the valve guide installer “2” and valve guide remover “1”.



a. Valve guide position

c. After installing the valve guide, bore the valve guide with the valve guide reamer “3” to obtain the proper valve-stem-to-valve-guide clearance.



TIP

After replacing the valve guide, reface the valve seat.

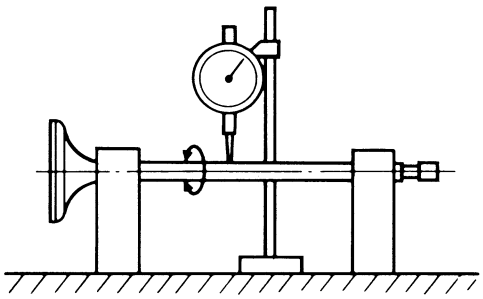
Valve guide remover (ø4.5)
90890-04116
Valve guide remover (4.5 mm)
YM-04116
Valve guide installer (ø4.5)
90890-04117
Valve guide installer (4.5 mm)
YM-04117
Valve guide reamer (ø4.5)
90890-04118
Valve guide reamer (4.5 mm)
YM-04118

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
0.040 mm (0.0016 in)

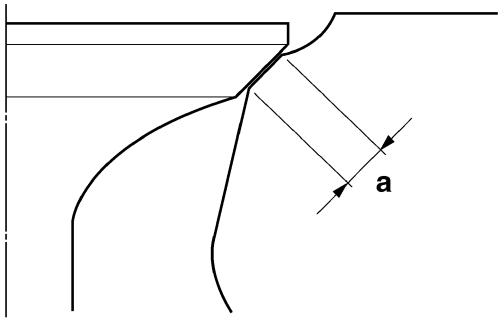


EAS30285
CHECKING THE VALVE SEATS

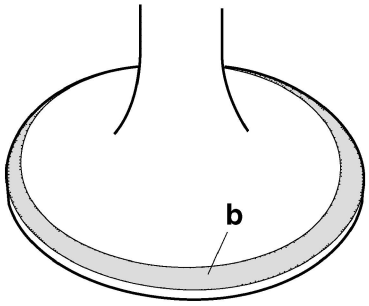
The following procedure applies to all of the valves and valve seats.

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 C “a”
   Out of specification → Replace the cylinder head.

Valve seat contact width (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)
Valve seat contact width (exhaust)
1.10–1.30 mm (0.0433–0.0512 in)
Limit
1.8 mm (0.07 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 blueing will have been removed.

4. Lap:
   • Valve face
   • Valve seat

ECA23100

NOTICE

This model uses titanium intake and exhaust valves.
Titanium valves that have been used to lap the valve seats must not be used. Always replace lapped valves with new valves.

TIP

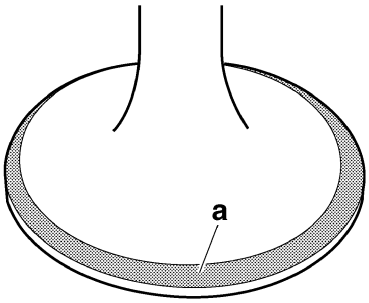
- When replacing the cylinder head, replace the valves without lapping the valve seats and valve faces.
- When replacing the valves or valve guides, use new valves to lap the valve seats, and then replace them with new valves.

a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

NOTICE

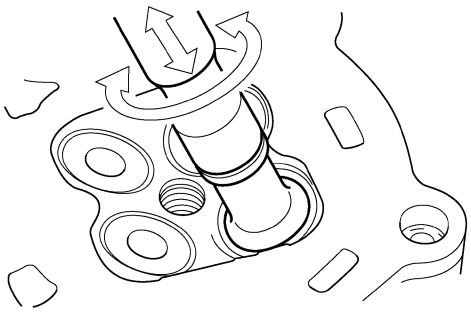
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



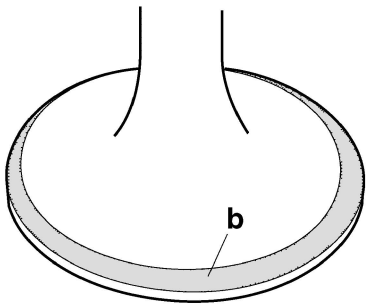
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

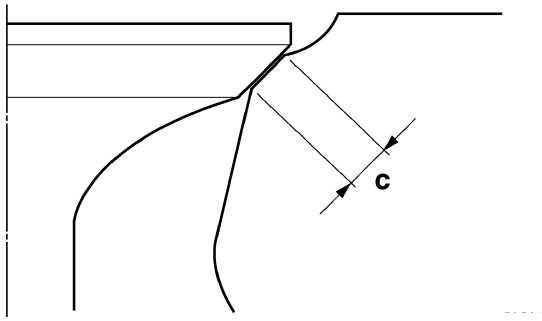
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



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.



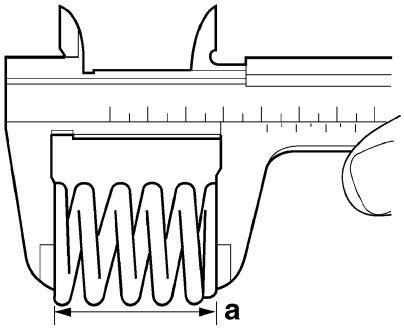
EAS30286

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

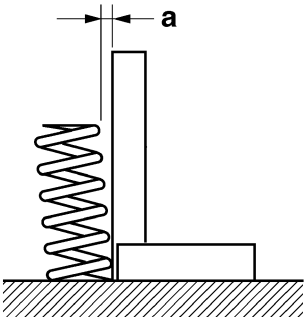
1. Measure:
   - Valve spring free length “a”
     Out of specification → Replace the valve spring.

Free length (intake)
37.47 mm (1.48 in)
Limit
35.60 mm (1.40 in)
Free length (exhaust)
37.67 mm (1.48 in)
Limit
35.79 mm (1.41 in)



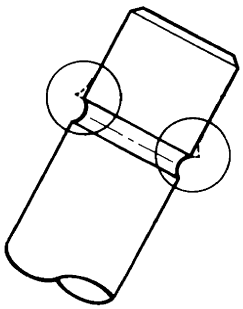
2. Measure:
   • Valve spring tilt “a”
   Out of specification → Replace the valve spring.

	Spring tilt (intake) **1.6 mm (0.06 in)** **Spring tilt (exhaust)** **1.6 mm (0.06 in)**



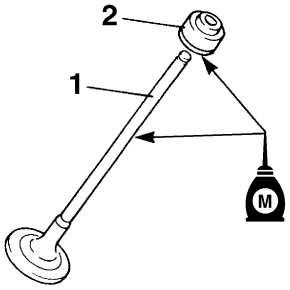
EAS30287
CHECKING THE VALVE LIFTERS
The following procedure applies to all of the valve lifters.
1. Check:
   • Valve lifter
   Damage/scratches → Replace the valve lifters and cylinder head.

EAS30288
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • Valve stem end
   (with an oil stone)



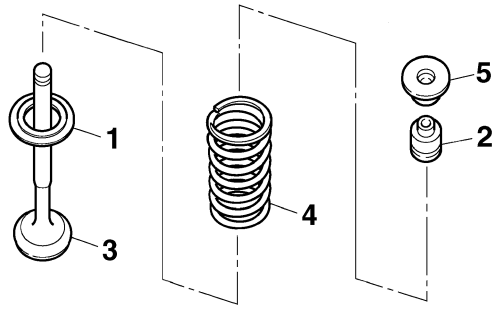
2. Lubricate:
   • Valve stem “1”
   • Valve stem seal “2”
   (with the recommended lubricant)

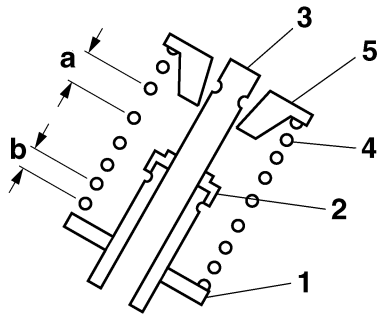
	Recommended lubricant **Molybdenum disulfide oil**



3. Install:
   • Lower spring seat “1”
   • Valve stem seal “2”
   • 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.





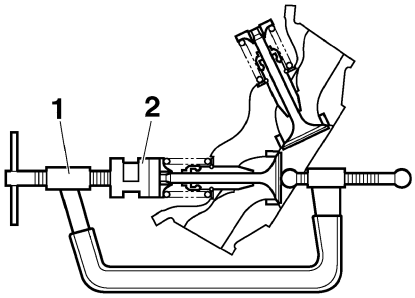
b. Smaller pitch

4. Install:
   • Valve cotters

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

	Valve spring compressor **90890-04019** **Valve spring compressor** **YM-04019** **Valve spring compressor attachment** **90890-04108** **Valve spring compressor adapter 22 mm** **YM-04108**

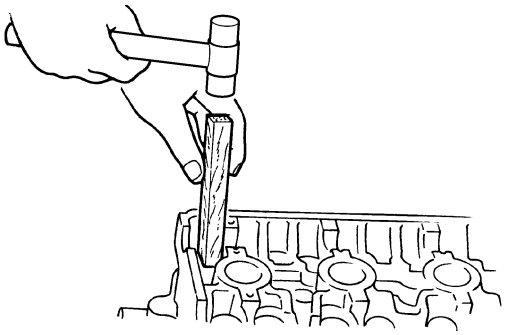


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

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



6. Lubricate:
   • Valve lifter
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

7. Install:
   • Valve pad
   • Valve lifter

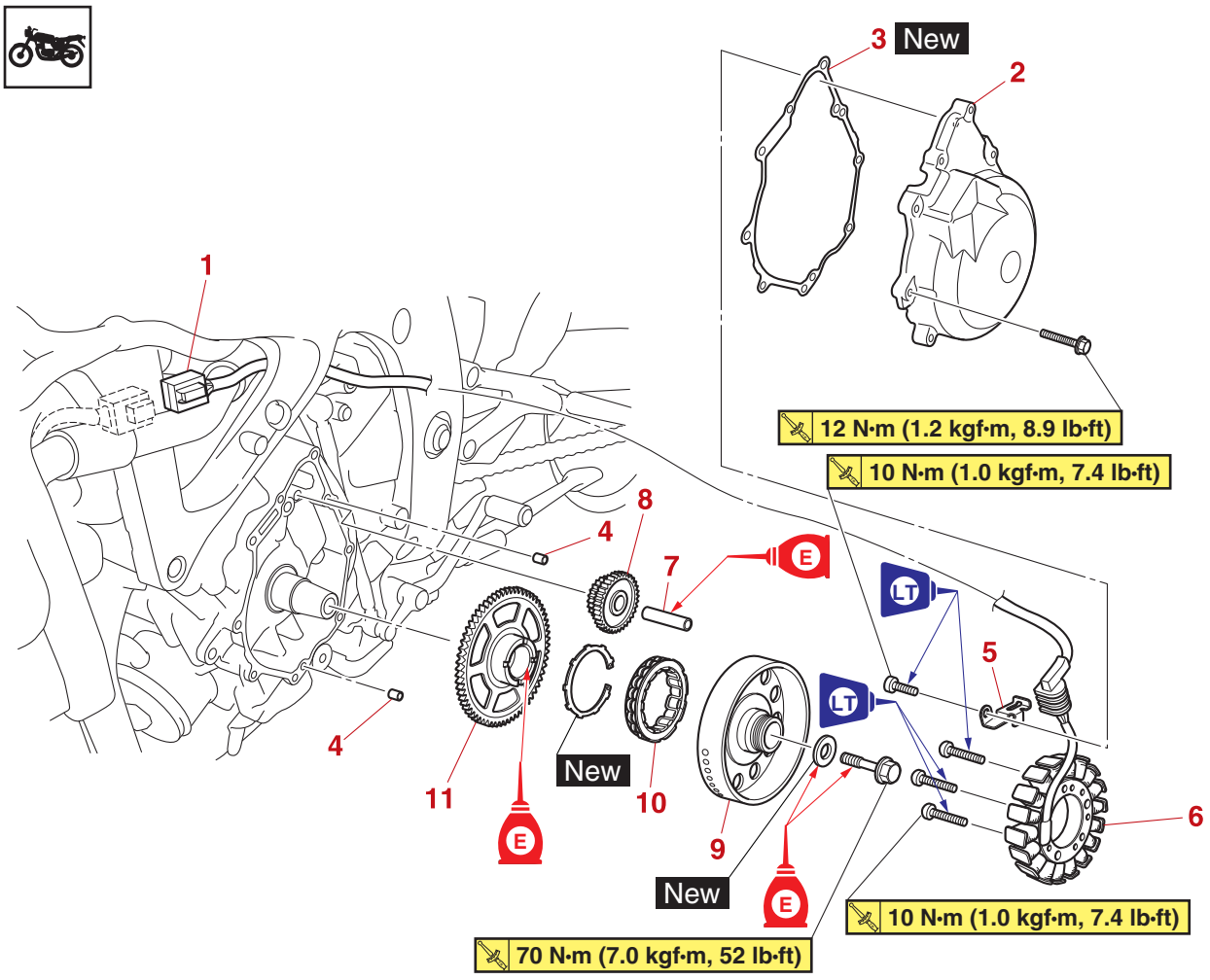
TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

EAS20047

GENERATOR AND STARTER CLUTCH

Removing the generator and starter clutch



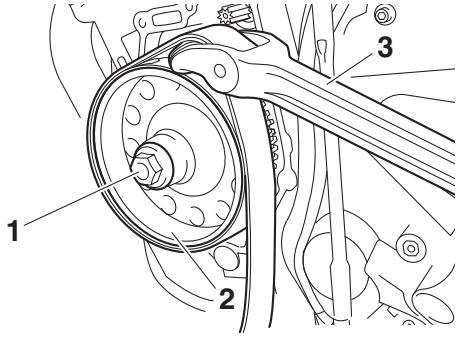
Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-26.
1	Stator coil assembly coupler	1	Disconnect.
2	Generator cover	1	
3	Generator cover gasket	1	
4	Dowel pin	2	
5	Stator coil assembly lead holder	1	
6	Stator coil assembly	1	
7	Starter clutch idle gear shaft	1	
8	Starter clutch idle gear	1	
9	Generator rotor	1	
10	Starter clutch	1	
11	Starter clutch gear	1	

EAS30295
REMOVING THE GENERATOR
1. Remove:
   - Generator rotor bolt “1”
   - Washer

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, loosen the generator rotor bolt.

Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



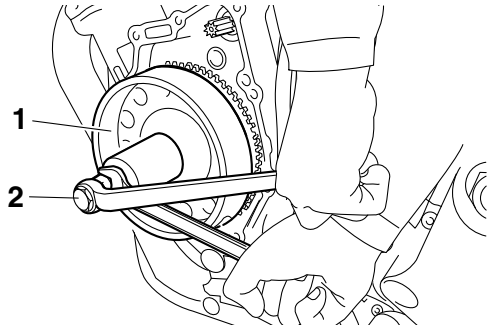
2. Remove:
   - Generator rotor “1”
     (with the flywheel puller “2”)

ECA13880

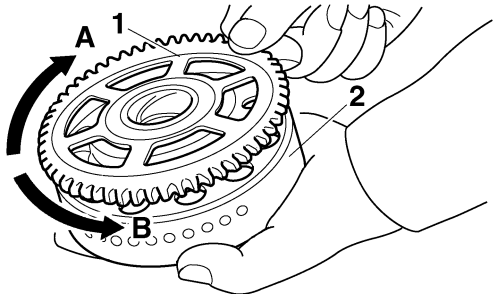
NOTICE

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

Flywheel puller
90890-01404
Flywheel puller
YM-01404



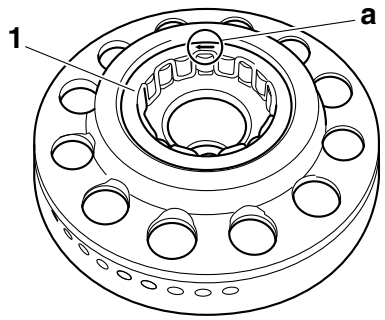
EAS30299
CHECKING THE STARTER CLUTCH
1. Check:
   - Starter clutch rollers
     Damage/wear → Replace.
2. Check:
   - Starter clutch idle gear
   - Starter clutch gear
     Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   - Starter clutch gear’s contacting surfaces
     Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   - Starter clutch operation
     a. Install the starter clutch gear “1” onto the generator rotor “2” and hold the generator rotor.
     b. When turning the starter clutch gear clockwise “A”, the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
     c. When turning the starter clutch gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



EAS30300
INSTALLING THE STARTER CLUTCH
1. Install:
   - Starter clutch “1”

TIP

Be sure to install the starter clutch so that its side with the arrow mark “a” is facing inward, away from the rotor.



EAS30302
INSTALLING THE GENERATOR

1. Install:
   - Generator rotor
   - Washer New
   - Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

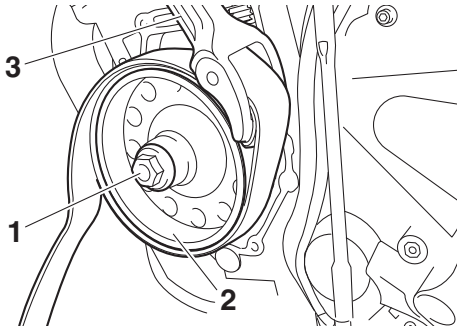
2. Tighten:
   - Generator rotor bolt “1”

	Generator rotor bolt **70 N·m (7.0 kgf·m, 52 lb·ft)**

TIP

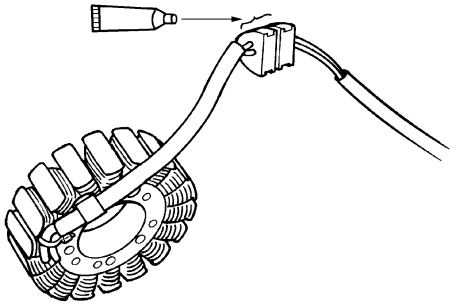
While holding the generator rotor “2” with the rotor holding tool “3”, tighten the generator rotor bolt.

	Rotor holding tool **90890-04166** **Rotor holding tool** **YM-04166**



3. Apply:
   - Sealant
     (onto the stator coil assembly lead grommet)

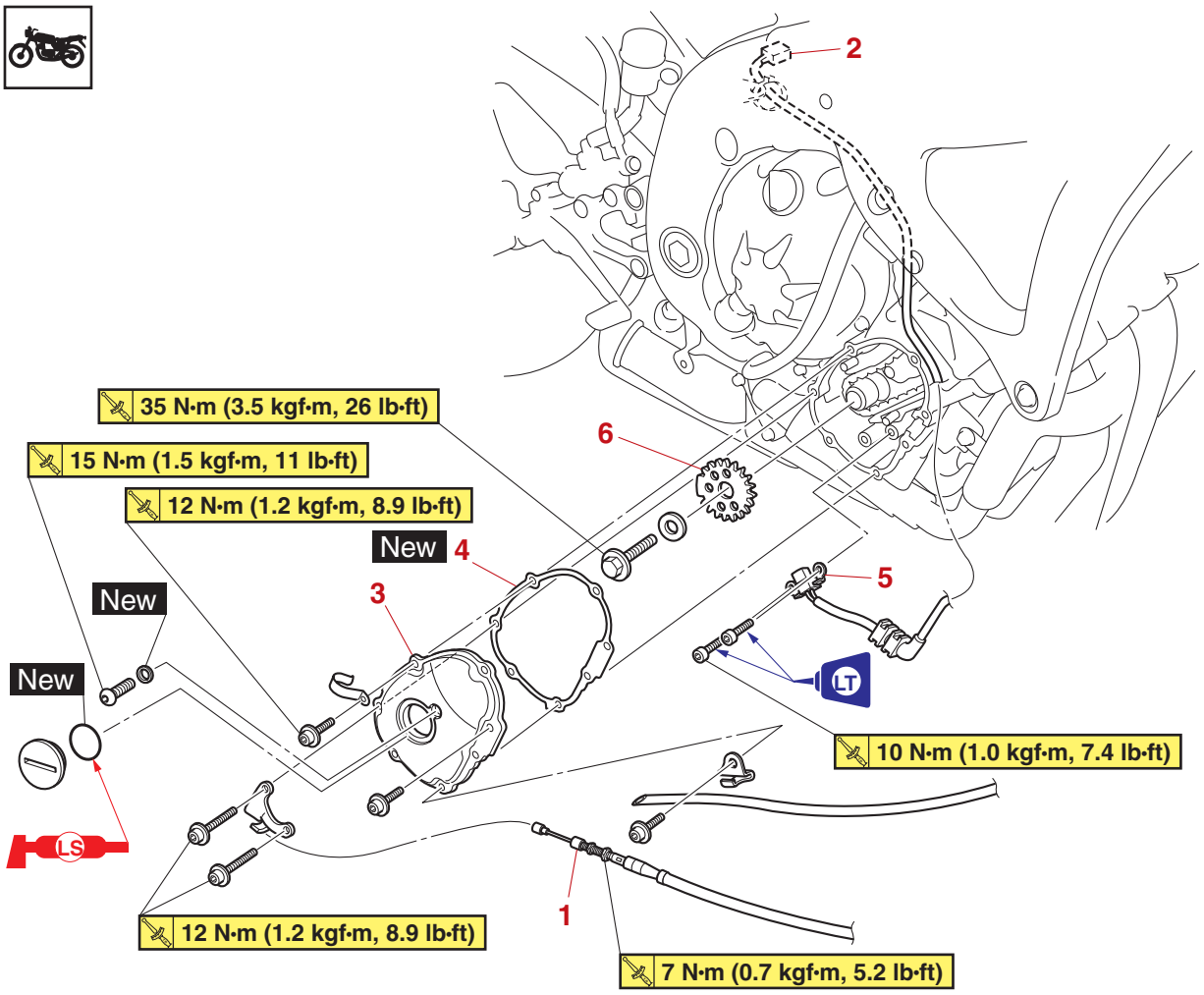
	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**



EAS20147

PICKUP ROTOR

Removing the pickup rotor



Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Generator cover		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-36.
1	Clutch cable	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Pickup rotor cover	1	
4	Pickup rotor cover gasket	1	
5	Crankshaft position sensor	1	
6	Pickup rotor	1	

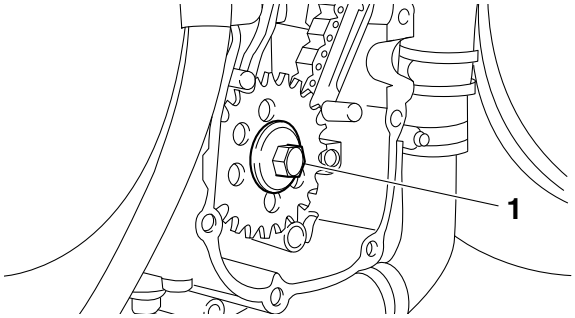
EAS30873
REMOVING THE PICKUP ROTOR

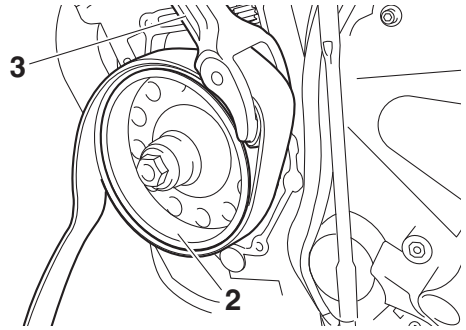
1. Remove:
   - Pickup rotor bolt “1”
   - Washer
   - Pickup rotor

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, loosen the pickup rotor bolt.

Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



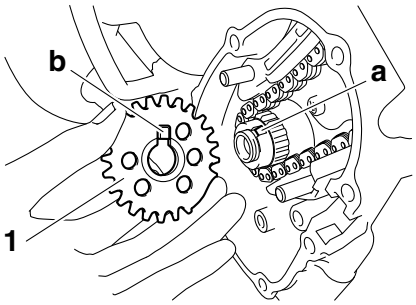


EAS30874
INSTALLING THE PICKUP ROTOR

1. Install:
   - Pickup rotor “1”
   - Washer
   - Pickup rotor bolt

TIP

When installing the pickup rotor, align the groove “a” in the crankshaft with the projection “b” on the pickup rotor.



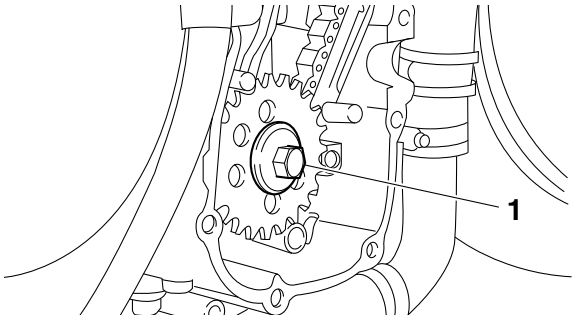
2. Tighten:
   - Pickup rotor bolt “1”

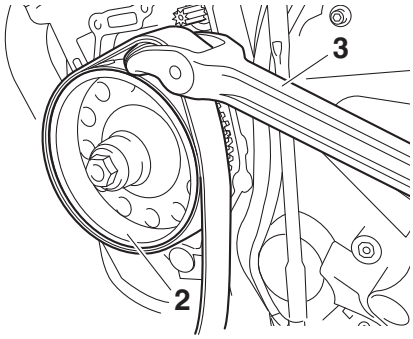
Pickup rotor bolt
35 N·m (3.5 kgf·m, 26 lb·ft)

TIP

While holding the generator rotor “2” with the rotor holding tool “3”, tighten the pickup rotor bolt.

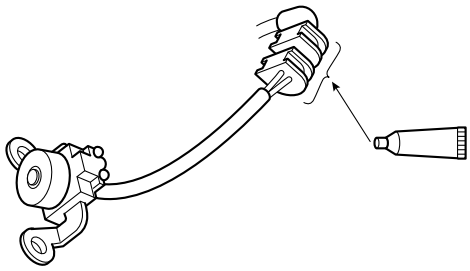
Rotor holding tool
90890-04166
Rotor holding tool
YM-04166





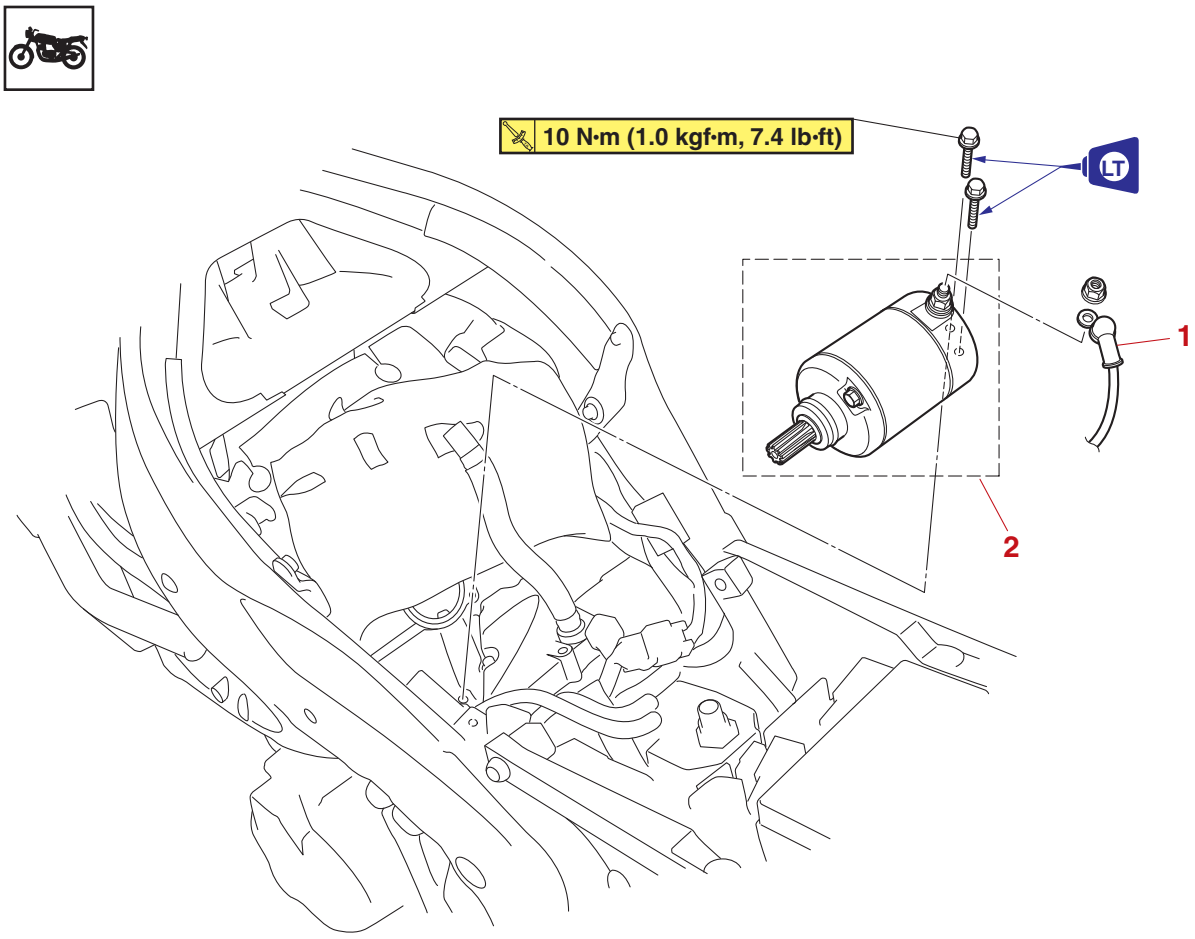
3. Apply:
   • Sealant
   (onto the crankshaft position sensor lead grommet)

	**Yamaha bond No. 1215** **90890-85505** **(Three bond No.1215®)**



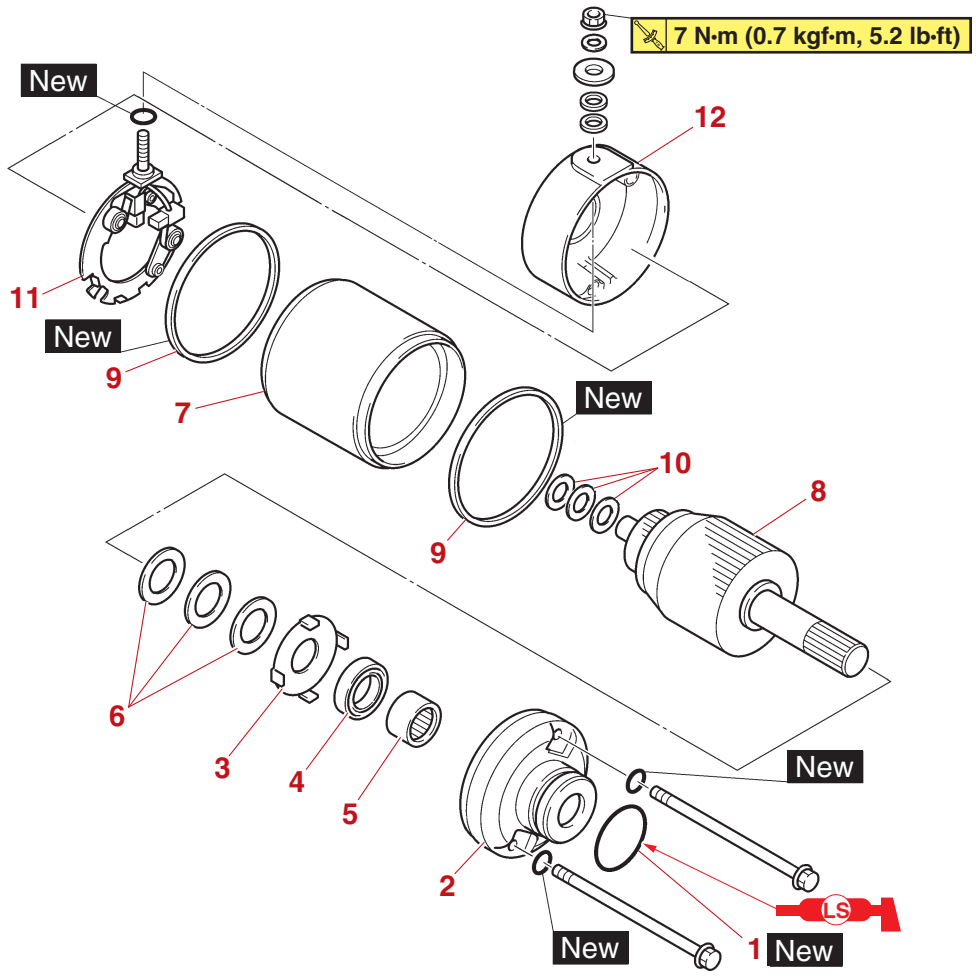
EAS20052
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
	Thermostat		Refer to "THERMOSTAT" on page 6-10.
1	Starter motor lead	1	
2	Starter motor assembly	1	

Disassembling the starter motor

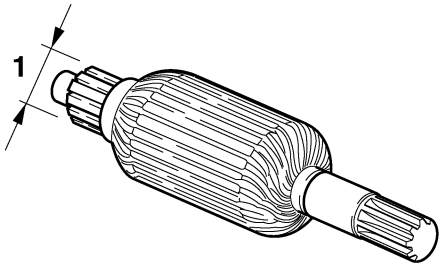


Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Lock washer	1	
4	Oil seal	1	
5	Bearing	1	
6	Washer set	1	
7	Starter motor yoke	1	
8	Armature assembly	1	
9	Gasket	2	
10	Washer set	2	
11	Brush holder (along with the brushes)	1	
12	Starter motor rear cover	1	

EAS30325
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600 grit sandpaper.
2. Measure:
   • Commutator diameter “1”
   Out of specification → Replace the starter motor.

Limit
27.0 mm (1.06 in)



3. Measure:
   • Mica undercut “a”
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
0.70 mm (0.03 in)

TIP

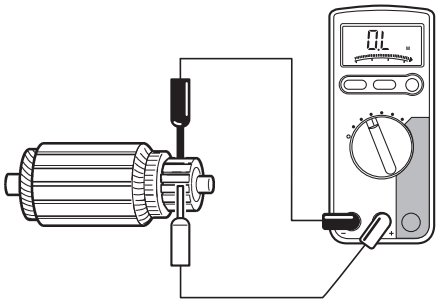
The mica of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:
   • Armature assembly resistance
   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 tachometer
YU-A1927

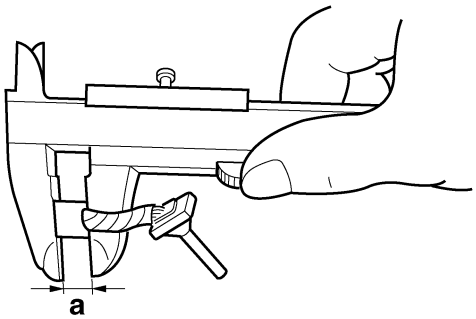
Armature coil resistance
0.0012–0.0022 Ω

   b. If the resistance is out of specification, replace the starter motor.



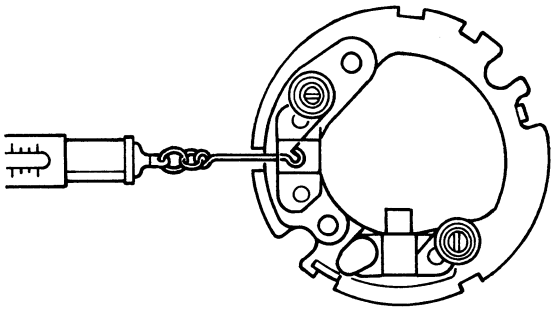
5. Measure:
   • Brush length “a”
   Out of specification → Replace the brushes as a set.

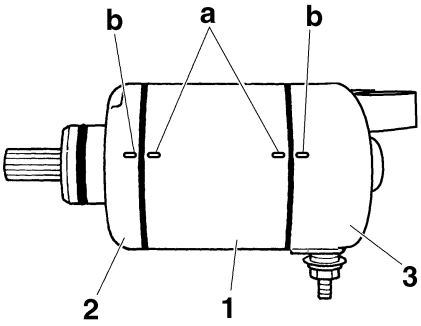
Limit
3.50 mm (0.14 in)



6. Measure:
   • Brush spring force
   Out of specification → Replace the brush springs as a set.

Brush spring force
7.16–9.52 N (730–971 gf, 25.77–34.27 oz)





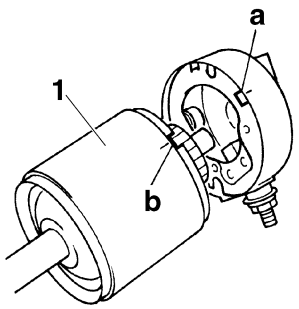
7. Check:
   • Gear teeth
   Damage/wear → Replace the gear.
8. Check:
   • Bearing
   • Oil seal
   Damage/wear → Replace the defective part(s).

EAS30326
ASSEMBLING THE STARTER MOTOR

1. Install:
   • Starter motor yoke “1”

TIP

Align the tab “a” on the brush holder with the slot “b” in the starter motor yoke.



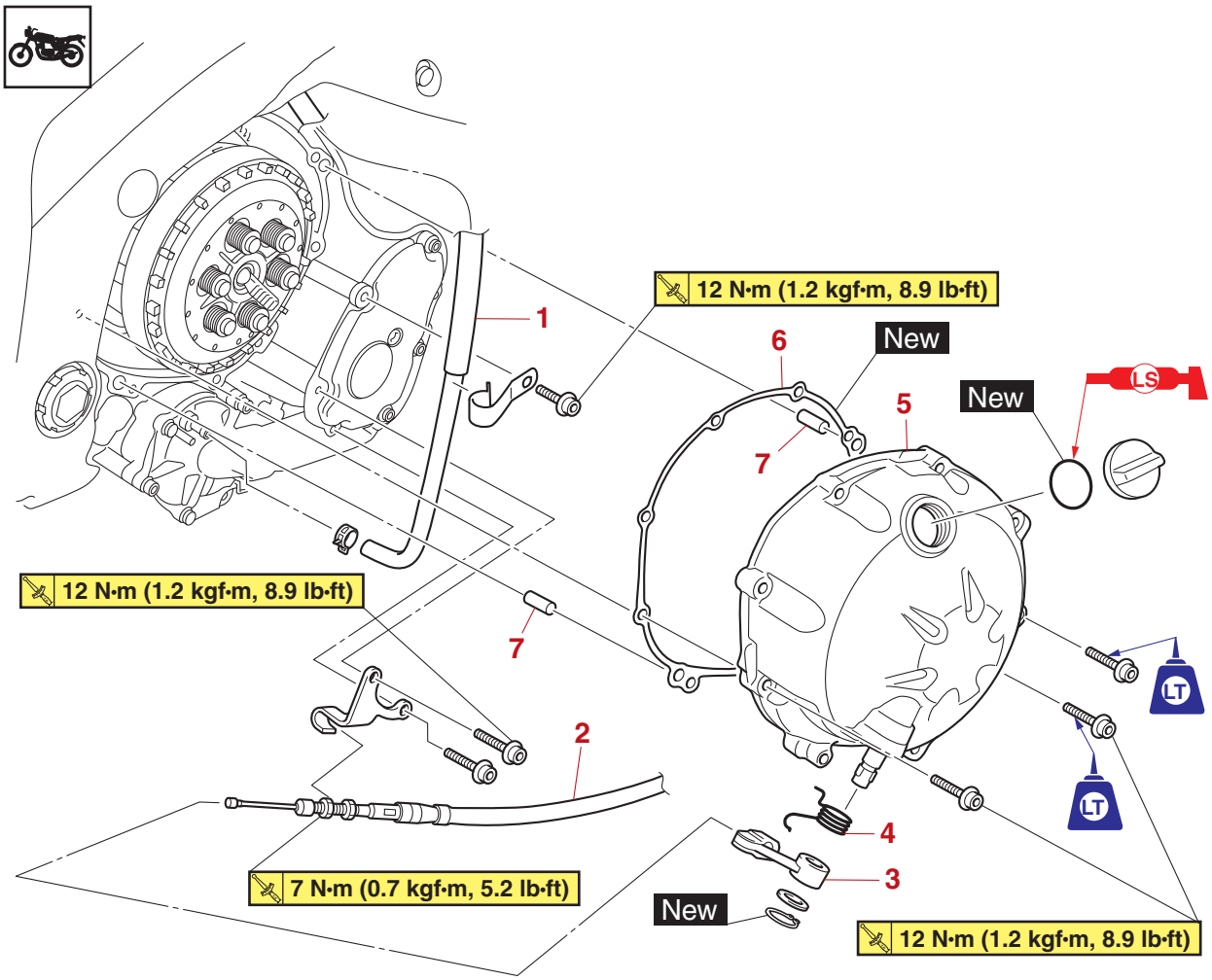
2. Install:
   • Starter motor yoke “1”
   • Starter motor front cover “2”
   • Starter motor rear cover “3”

TIP

Align the match marks “a” on the starter motor yoke with the match marks “b” on the front and starter motor rear covers.

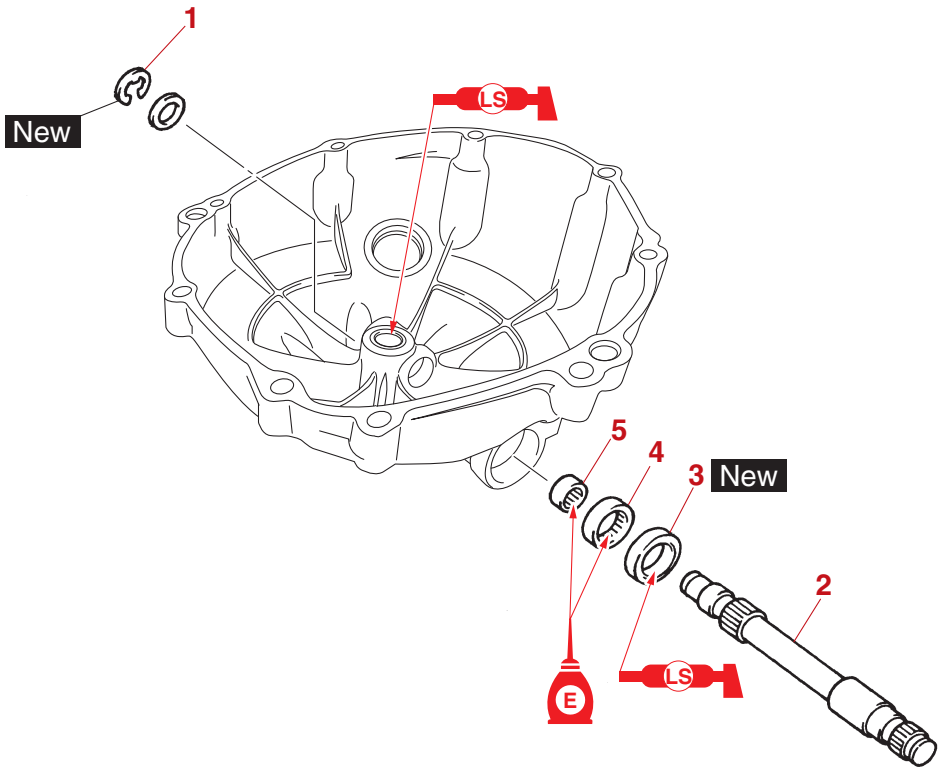
EAS20055
CLUTCH

Removing the clutch cover



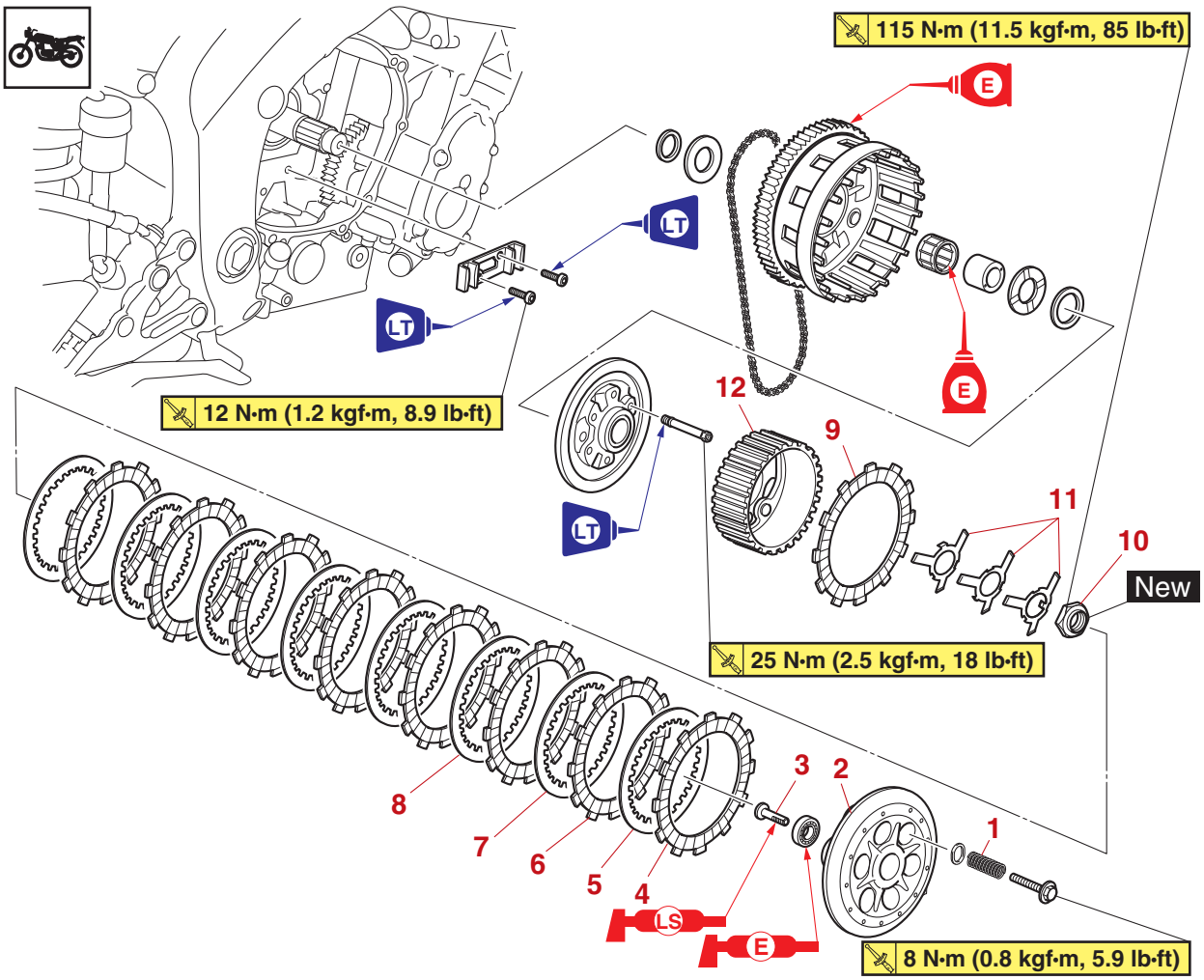
Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-26.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
1	Water pump breather hose	1	Disconnect.
2	Clutch cable	1	Disconnect.
3	Pull lever	1	
4	Pull lever spring	1	
5	Clutch cover	1	
6	Clutch cover gasket	1	
7	Dowel pin	2	

Removing the pull lever shaft



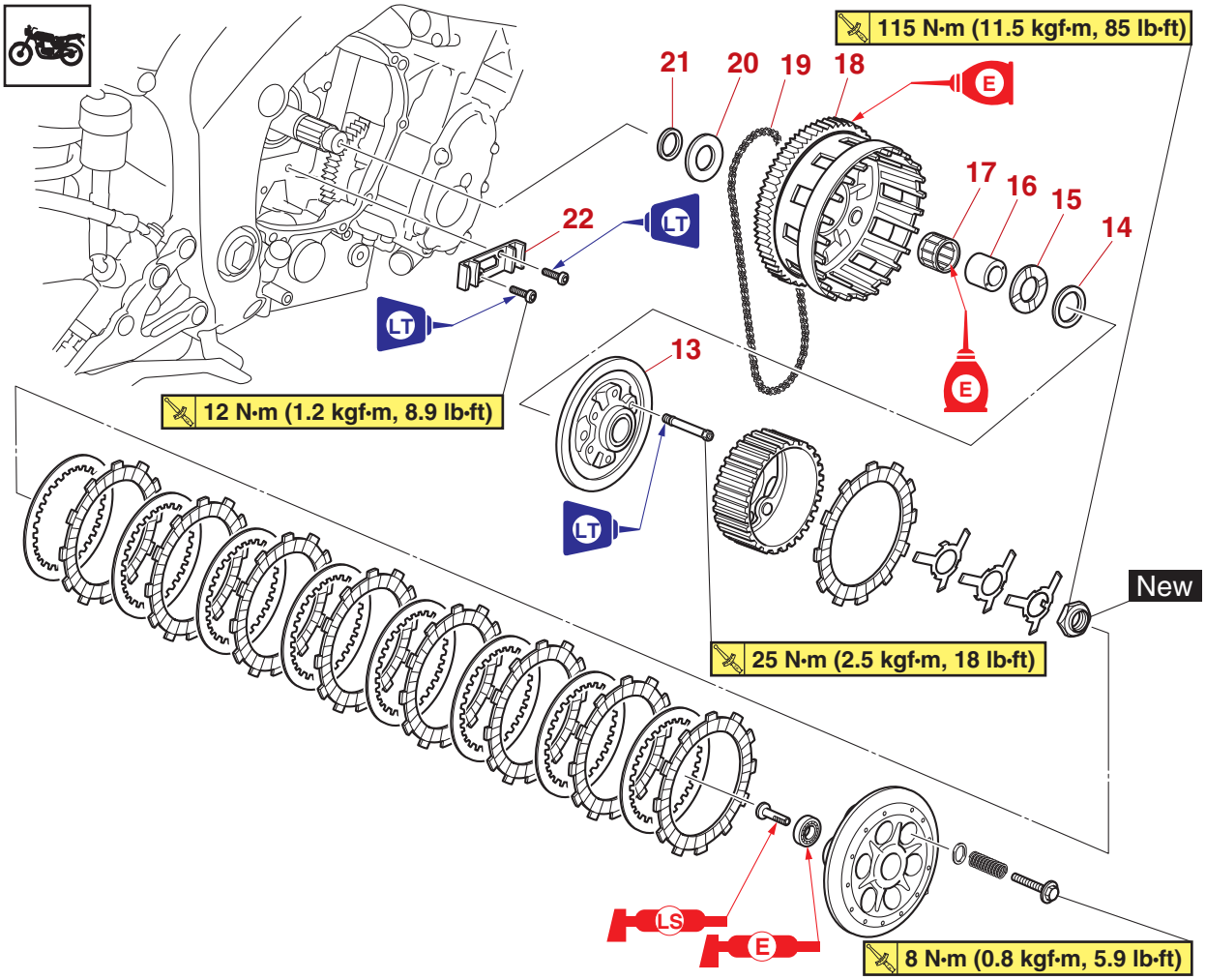
Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Pull lever shaft	1	
3	Oil seal	1	
4	Bearing	1	
5	Bearing	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Oil strainer		Refer to "OIL PUMP" on page 5-59.
	Water pump		Refer to "WATER PUMP" on page 6-12.
1	Clutch spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Friction plate 1	1	brown painting
5	Clutch plate 1	1	
6	Friction plate 2	7	black painting
7	Clutch plate 2	1	
8	Clutch plate 3	6	
9	Friction plate 3	1	purple painting
10	Clutch boss nut	1	
11	Spring	3	
12	Clutch boss	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
13	Clutch boss plate	1	
14	Washer	1	
15	Thrust washer 1	1	
16	Spacer	1	
17	Bearing	1	
18	Clutch housing	1	
19	Oil pump drive chain	1	
20	Thrust washer 2	1	
21	Thrust washer 3	1	
22	Oil pump drive chain guide	1	

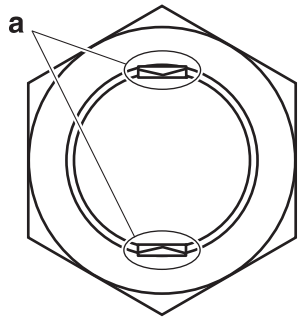
EAS30346
REMOVING THE CLUTCH

1. Remove:
   - Oil strainer
     Refer to “OIL PUMP” on page 5-59.
   - Water pump
     Refer to “WATER PUMP” on page 6-12.
   - Friction plates
   - Clutch plates

TIP

Be sure to mark the friction plates and clutch plates or note the position of each part so that they are installed in their original positions.

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

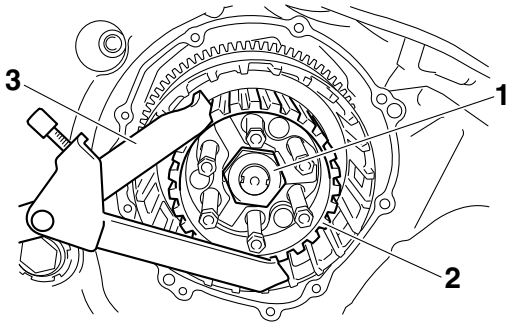


3. Loosen:
   - Clutch boss nut “1”

TIP

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

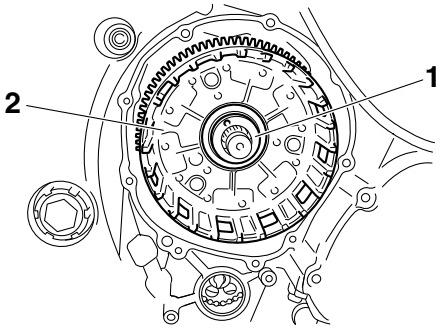
Universal clutch holder
90890-04086
Universal clutch holder
YM-91042



4. Remove:
   - Spacer “1”
   - Bearing
   - Clutch housing “2”
   - Oil pump drive chain

TIP

Remove the spacer and bearing from the main axle, then remove the oil pump drive chain from the oil pump driven sprocket, and then remove the clutch housing and oil pump drive chain from the main axle.



EAS30348
CHECKING THE FRICTION PLATES

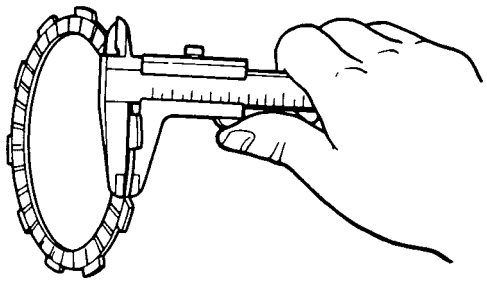
The following procedure applies to all of the friction plates.

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

TIP

Measure the friction plate at four places.

Friction plate thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.80 mm (0.110 in)



EAS30349
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

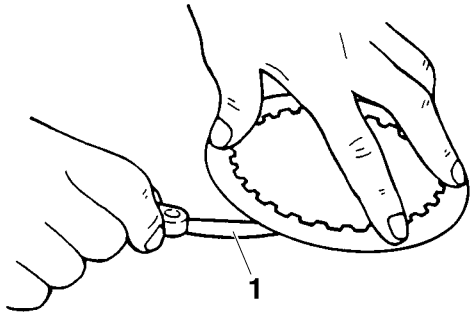
1. Check:
   • Clutch plate
   Damage → Replace the clutch plates as a set.
2. Measure:
   • Clutch plate warpage
   (with a surface plate and thickness gauge “1”)
   Out of specification → Replace the clutch plates as a set.

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

Clutch plate thickness
1.90–2.10 mm (0.075–0.083 in)
Warpage limit
0.10 mm (0.004 in)

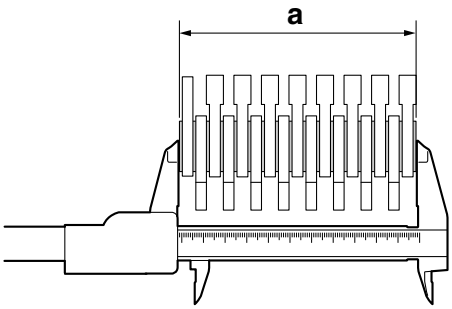
TIP

The clutch plate thickness specification listed above is for the plates with the standard thickness only. If a clutch plate with one of the other two plate thicknesses is installed, use 1.50–1.70 mm (0.059–0.067 in) or 2.20–2.40 mm (0.086–0.094 in) for the specification according to the plate.



3. Measure:
   • Assembly width “a” of the friction plates and clutch plates
   Out of specification → Adjust.

Assembly width
42.4–43.0 mm (1.67–1.69 in)



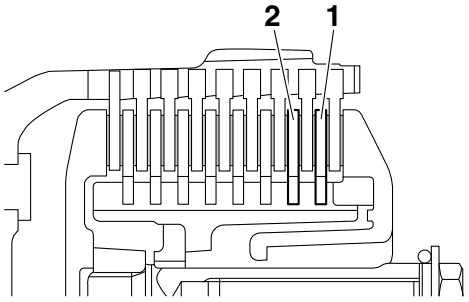
a. Adjust the assembly width by replacing the clutch plate “1” and, if necessary, clutch plate “2”.
b. Select the clutch plate from the following table.

Clutch plate “1”		
Part No.	**Thickness**	
168-16325-00	1.6 mm (0.063 in)	
3J2-16324-00	2.0 mm (0.079 in)	STD
168-16324-00	2.3 mm (0.091 in)	

Clutch plate “2”		
Part No.	**Thickness**	
3J2-16324-00	2.0 mm (0.079 in)	STD
168-16324-00	2.3 mm (0.091 in)	

TIP

When adjusting the clutch assembly width (by replacing the clutch plate(s)), be sure to replace the clutch plate “1” first. After replacing the clutch plate “1”, if specifications cannot be met, replace the clutch plate “2”.



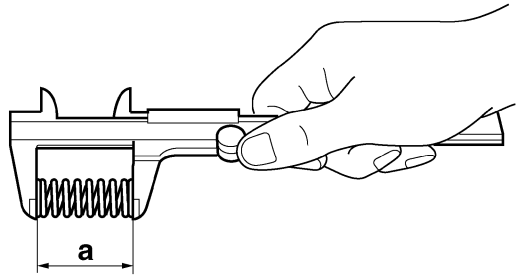
EAS30351
CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
   • Clutch spring
   Damage → Replace the clutch springs as a set.

2. Measure:
   • Clutch spring free length “a”
   Out of specification → Replace the clutch springs as a set.

Clutch spring free length
55.00 mm (2.17 in)
Limit
54.00 mm (2.13 in)

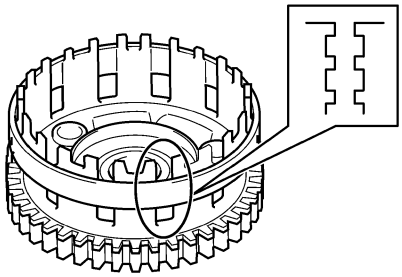


EAS30352
CHECKING THE CLUTCH HOUSING

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.



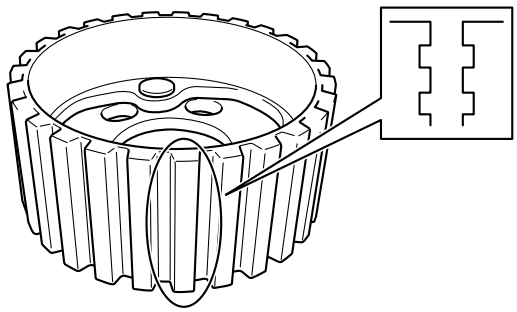
2. Check:
   • Bearing
   Damage/wear → Replace the bearing and clutch housing.

EAS30353
CHECKING THE CLUTCH BOSS

1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

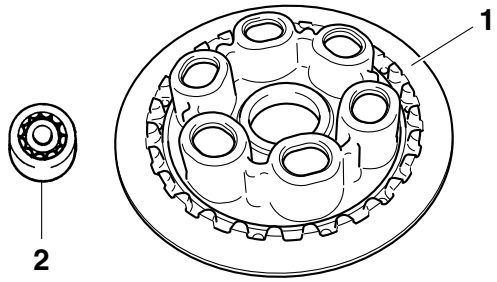
TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



EAS30354
CHECKING THE PRESSURE PLATE

1. Check:
   • Pressure plate “1”
   Cracks/damage → Replace.
   • Bearing “2”
   Damage/wear → Replace.

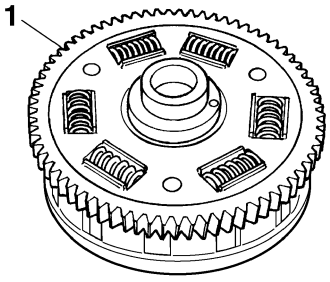


EAS30356
CHECKING THE PRIMARY DRIVE GEAR

1. Check:
   • Primary drive gear
   Damage/wear → Replace the clutch housing and crankshaft as a set.
   Excessive noise during operation → Replace the clutch housing and crankshaft as a set.

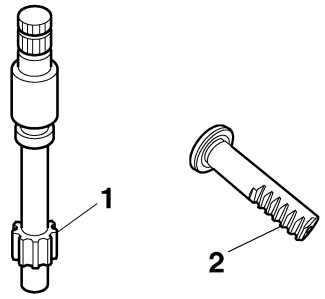
EAS30357
CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
   • Primary driven gear “1”
   Damage/wear → Replace the clutch housing and crankshaft as a set.
   Excessive noise during operation → Replace the clutch housing and crankshaft as a set.



EAS30358
CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:
   - Pull lever shaft pinion gear teeth “1”
   - Pull rod teeth “2”
     Damage/wear → Replace the pull rod and pull lever shaft pinion gear as a set.



2. Check:
   - Bearing
     Damage/wear → Replace.

EAS31601
CHECKING THE OIL PUMP DRIVE SPROCKET AND OIL PUMP DRIVE CHAIN

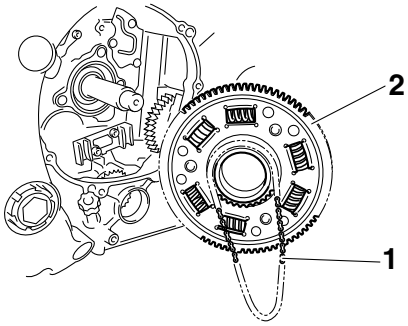
1. Check:
   - Oil pump drive sprocket
     Cracks/damage/wear → Replace the clutch housing, oil pump drive chain, and oil pump driven sprocket as a set.
2. Check:
   - Oil pump drive chain
     Damage/stiffness → Replace the clutch housing, oil pump drive chain, and oil pump driven sprocket as a set.

EAS30363
INSTALLING THE CLUTCH

1. Install:
   - Oil pump drive chain “1”
   - Clutch housing “2”

TIP

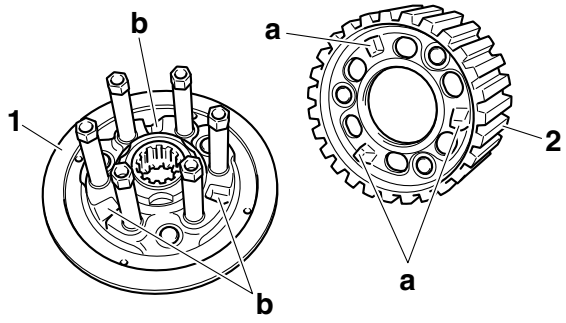
- Install the oil pump drive chain onto the clutch housing, and then install the chain onto the oil pump driven sprocket while installing the clutch housing onto the main axle.
- Make sure that the oil pump drive chain passes through the oil pump drive chain guide.



2. Install:
   - Clutch boss plate “1”
   - Clutch boss “2”

TIP

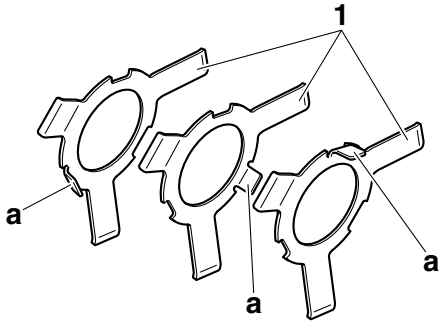
Fit the projections “a” on the clutch boss into the grooves “b” in the clutch boss plate.

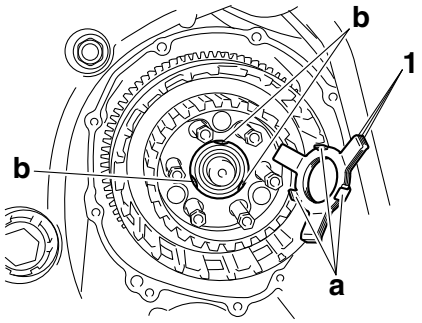


3. Install:
   - Springs “1”

TIP

- Stack the springs on top of each other, making sure that the tab “a” on each spring is in a different position.
- Fit the tabs “a” on the springs into the grooves “b” in the clutch boss plate.





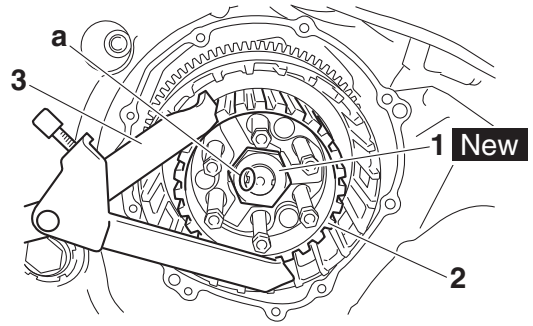
4. Tighten:
   • Clutch boss nut "1" New

	Clutch boss nut **115 N·m (11.5 kgf·m, 85 lb·ft)**

TIP

- While holding the clutch boss "2" with the universal clutch holder "3", tighten the clutch boss nut.
- Stake the clutch boss nut at a cutout "a" in the main axle.

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



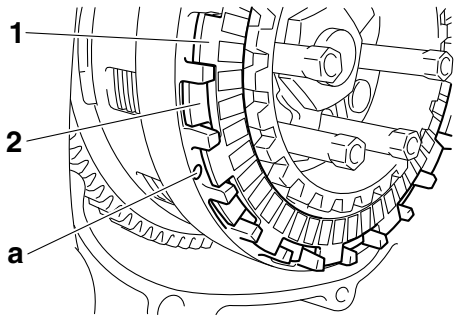
5. Lubricate:
   • Friction plates
   • Clutch plates
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

6. Install:
   • Friction plates
   • Clutch plates

TIP

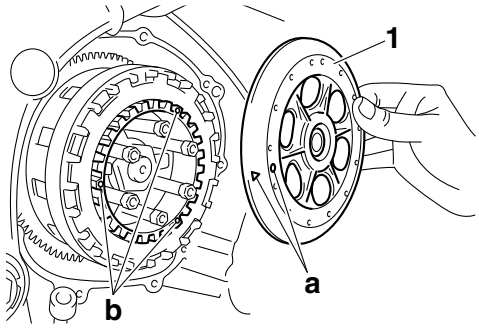
- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Install the last friction plate "1" offset from the other friction plates "2", making sure to align a projection on the friction plate with the punch mark "a" on the clutch housing.



7. Install:
   • Pressure plate "1"

TIP

Align the punch marks "a" in the pressure plate with one of the three punch marks "b" in the clutch boss.

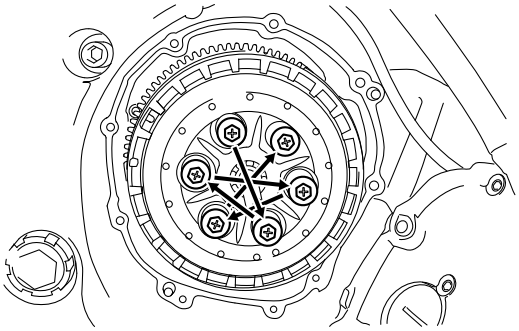


8. Install:
   • Seat plate
   • Clutch springs
   • Clutch spring bolts

	Clutch spring bolt **8 N·m (0.8 kgf·m, 5.9 lb·ft)**

TIP

Tighten the clutch spring bolts in stages and in a crisscross pattern.

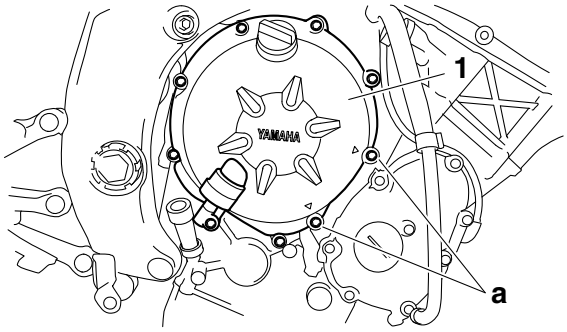


9. Install:
   - Dowel pins
   - Clutch cover gasket New
   - Clutch cover "1"

	Clutch cover bolt **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

TIP

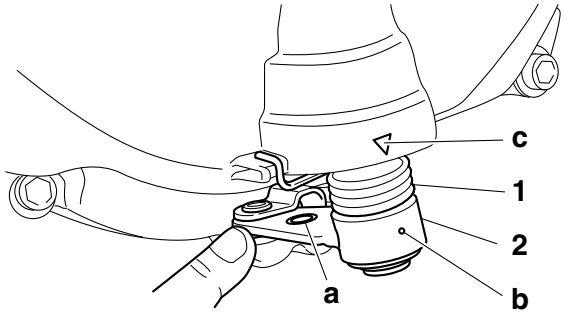
- Position the pull rod so that the teeth "a" face towards the rear of the vehicle. Then, install the clutch cover.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cover bolts "a" shown in the illustration.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



10. Install:
    - Pull lever spring "1"
    - Pull lever "2"
    - Washer
    - Circlip New

TIP

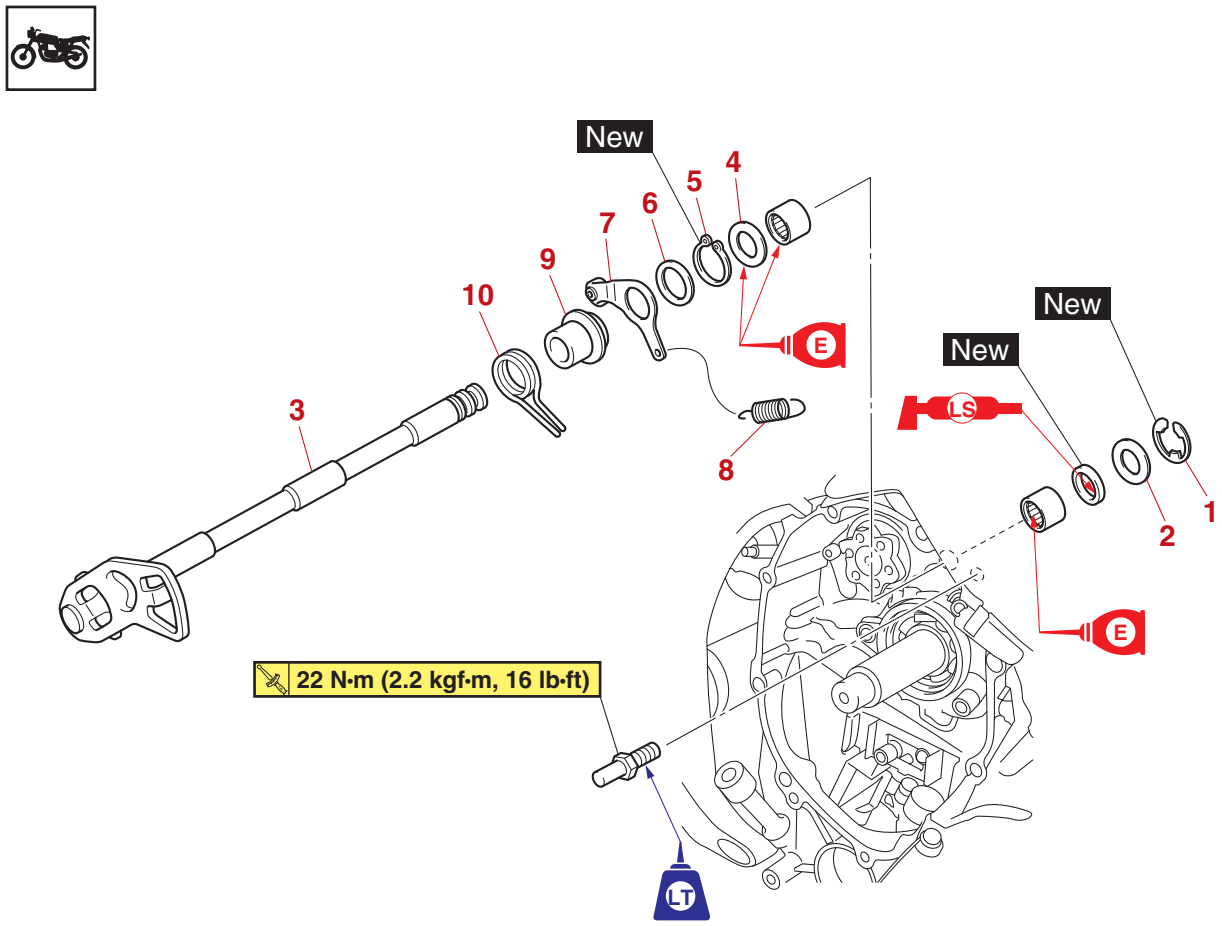
- Make sure that the mark "a" on the pull lever is facing up.
- When installing the pull lever, push it and check that its punch mark "b" aligns with the mark "c" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.



11. Adjust:
    - Clutch cable free play
      Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.

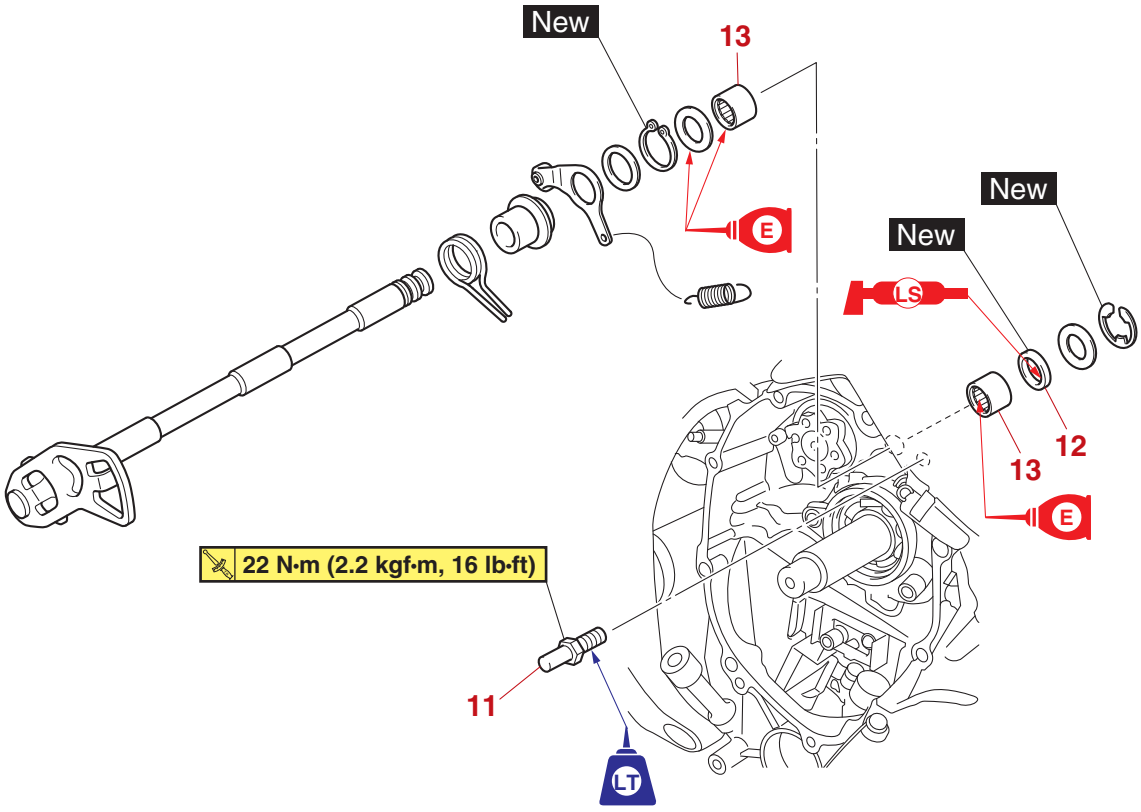
EAS20057
SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Shift arm		Refer to "ENGINE REMOVAL" on page 5-9.
	Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	
7	Stopper lever	1	
8	Stopper lever spring	1	
9	Spacer	1	
10	Shift shaft spring	1	

Removing the shift shaft and stopper lever

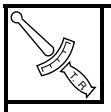


Order	Job/Parts to remove	Q'ty	Remarks
11	Shift shaft spring stopper	1	
12	Oil seal	1	
13	Bearing	2	

EAS30377
CHECKING THE SHIFT SHAFT
1. Check:
   - Shift shaft
     Bends/damage/wear → Replace.
   - Shift shaft spring
     Damage/wear → Replace.

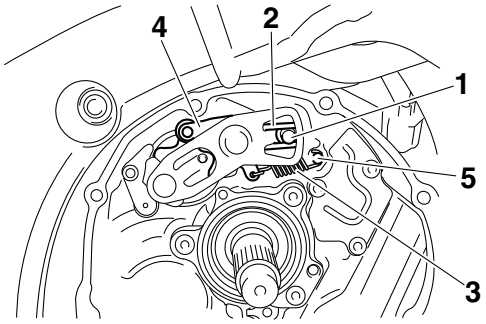
EAS30378
CHECKING THE STOPPER LEVER
1. Check:
   - Stopper lever
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.
   - Stopper lever spring
     Damage/wear → Replace.

EAS30381
INSTALLING THE SHIFT SHAFT
1. Install:
   - Shift shaft spring stopper “1”
   - Shift shaft assembly
   - Shift shaft spring “2”

	**Shift shaft spring stopper** **22 N·m (2.2 kgf·m, 16 lb·ft)** **LOCTITE®**

TIP

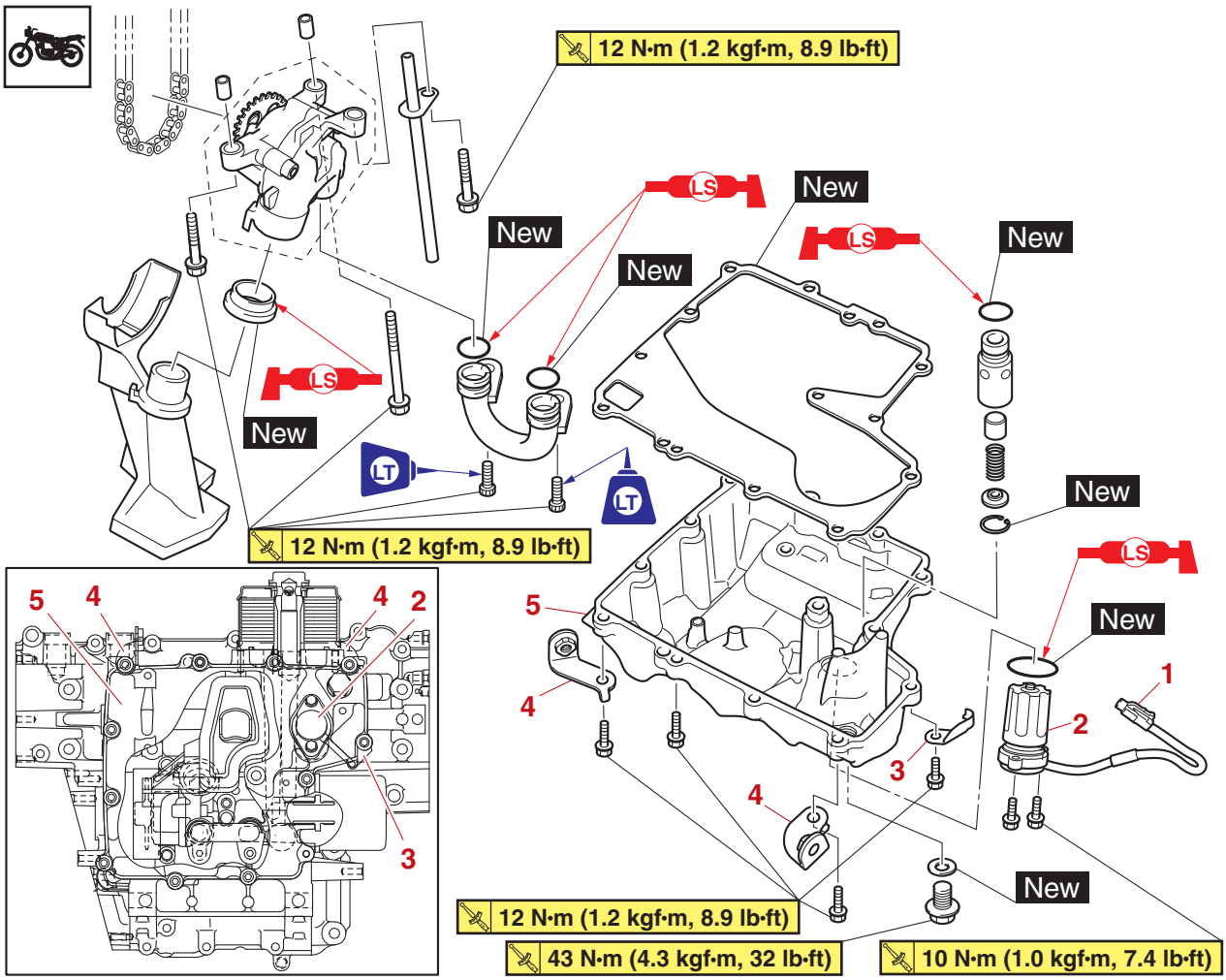
- Lubricate the oil seal lips with lithium-soap-based grease.
- Hook the end of the shift shaft spring onto the shift shaft spring stopper.
- Hook the ends of the stopper lever spring “3” onto the stopper lever “4” and the crankcase boss “5”.
- Mesh the stopper lever with the shift drum segment assembly.



EAS20054

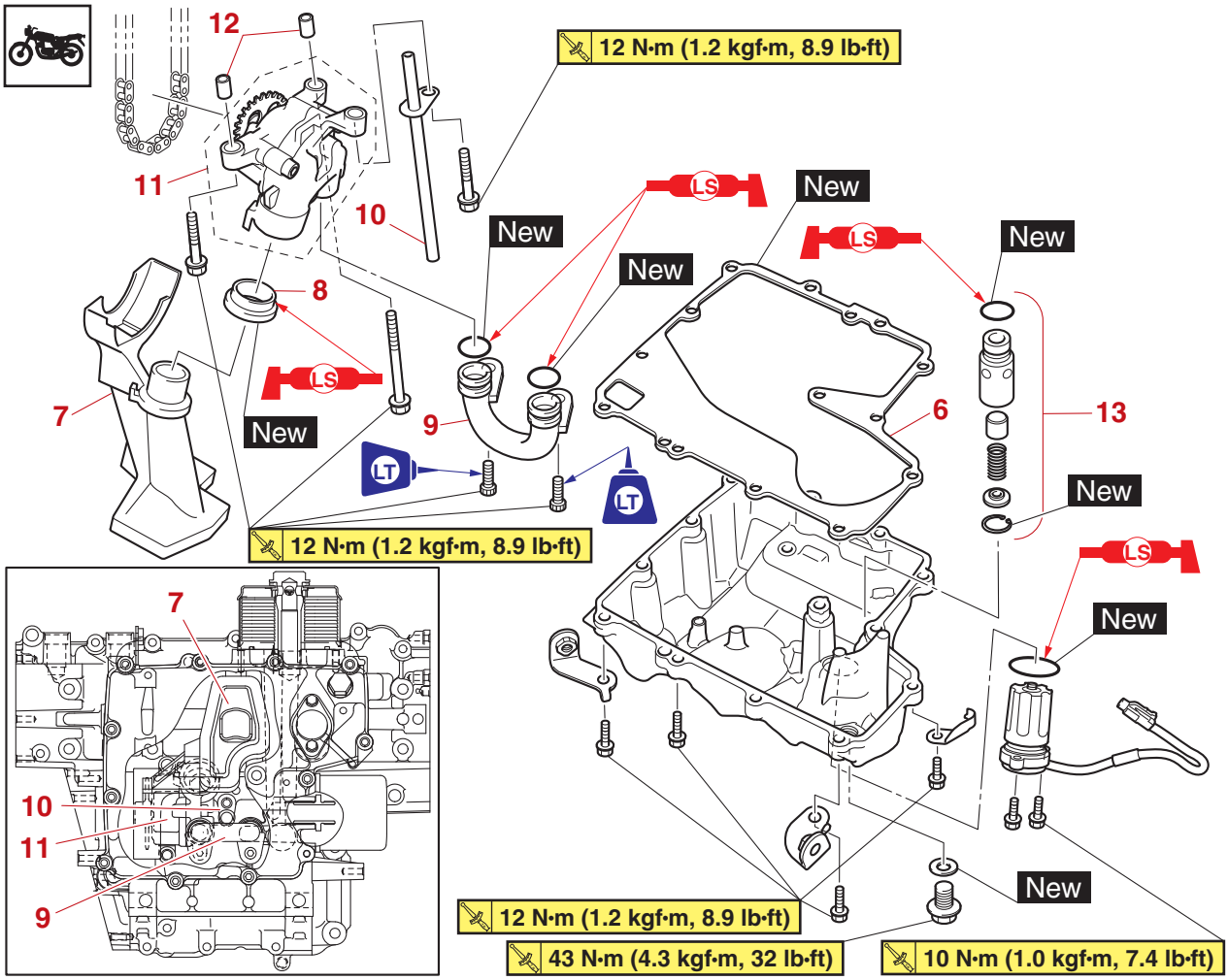
OIL PUMP

Removing the oil pan and oil pump



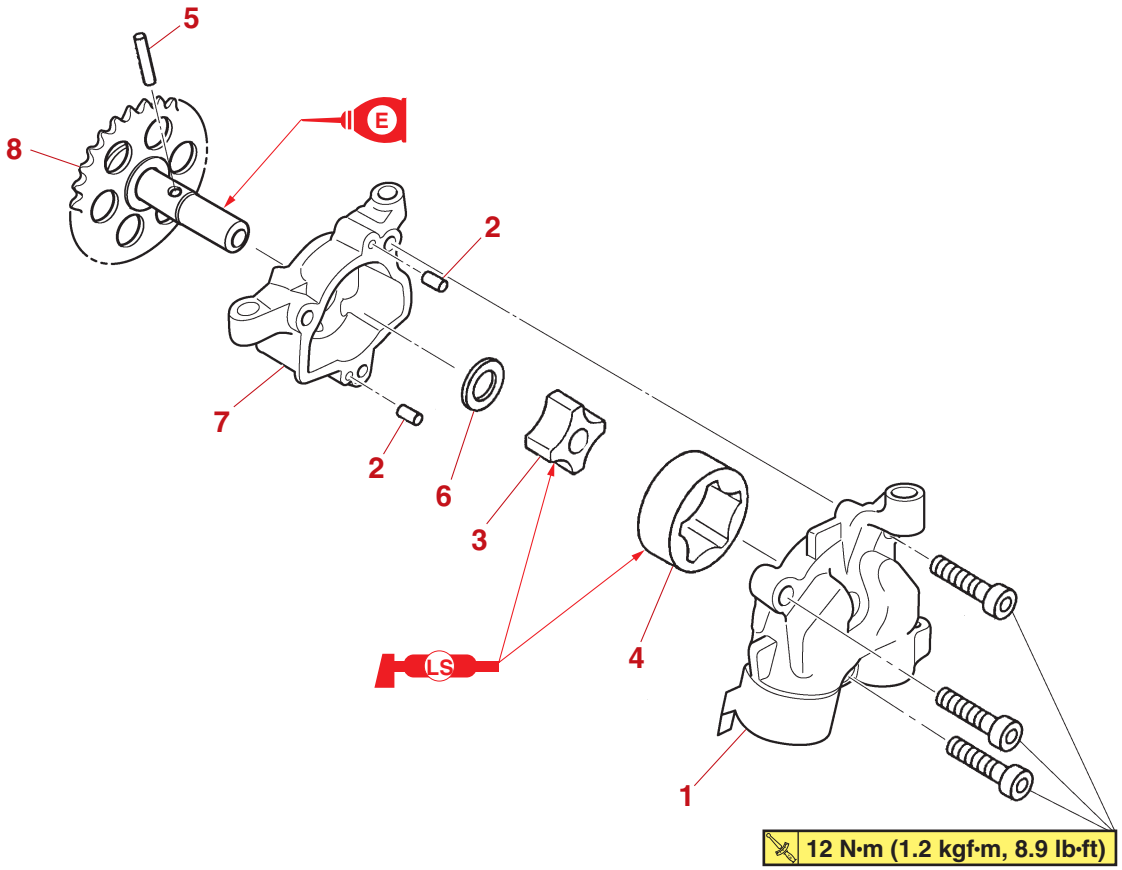
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-26.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-9.
	Water pump		Refer to "WATER PUMP" on page 6-12.
	Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Oil level switch coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil level switch lead holder	1	
4	Bottom cowling bracket	2	
5	Oil pan	1	

Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
6	Oil pan gasket	1	
7	Oil strainer	1	
8	Oil strainer gasket	1	
9	Oil pipe	1	
10	Ventilation chamber oil drain pipe	1	
11	Oil pump assembly	1	
12	Dowel pin	2	
13	Relief valve assembly	1	

Disassembling the oil pump



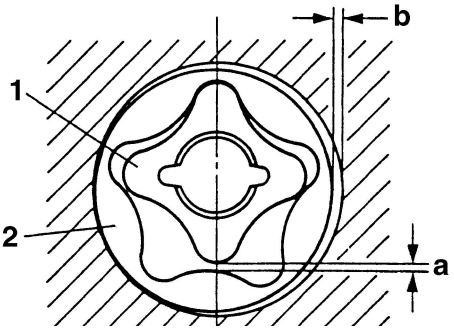
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump housing	1	
8	Oil pump driven sprocket	1	

EAS30333
REMOVING THE OIL PAN
1. Remove:
   - Oil level switch lead holder
   - Bottom cowling brackets
   - Oil pan
   - Oil pan gasket

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

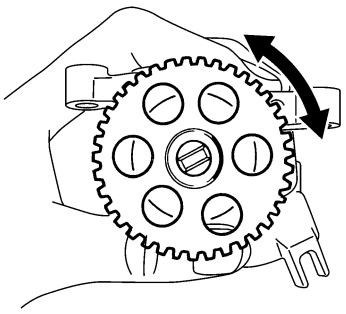
EAS30337
CHECKING THE OIL PUMP
1. Check:
   - Oil pump driven sprocket
   - Oil pump housing
   - Oil pump housing cover
     Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance “a”
   - Outer-rotor-to-oil-pump-housing clearance “b”



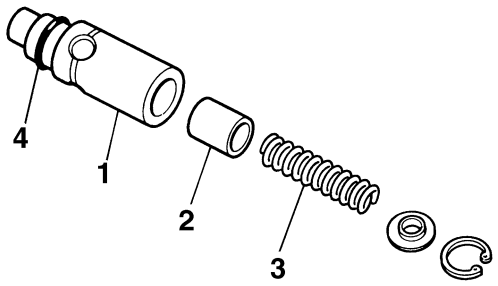
1. Inner rotor
2. Outer rotor

Inner-rotor-to-outer-rotor-tip clearance
0–0.120 mm (0–0.0047 in)
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.09–0.15 mm (0.0035–0.0059 in)
Limit
0.22 mm (0.0087 in)

3. Check:
   - Oil pump operation
     Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS30338
CHECKING THE RELIEF VALVE
1. Check:
   - Relief valve body “1”
   - Relief valve “2”
   - Spring “3”
   - O-ring “4”
     Damage/wear → Replace the defective part(s).



EAS30742
CHECKING THE OIL PIPES
The following procedure applies to all of the oil delivery pipes.
1. Check:
   - Ventilation chamber oil drain pipe
   - Oil pipe
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

EAS30340
CHECKING THE OIL STRAINER
1. Check:
   - Oil strainer
     Damage → Replace.
     Contaminants → Clean with solvent.

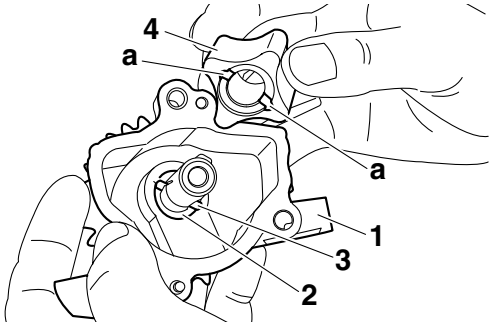
EAS30342
ASSEMBLING THE OIL PUMP
1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft
     (with the recommended lubricant)

Recommended lubricant
Engine oil and lithium-soap-based grease

2. Install:
   - Oil pump driven sprocket
   - Oil pump housing “1”
   - Washer “2”
   - Pin “3”
   - Oil pump inner rotor “4”
   - Oil pump outer rotor

TIP

When installing the inner rotor, align the pin “3” in the oil pump shaft with the groove “a” in the inner rotor “4”.



3. Check:
   - Oil pump operation
     Refer to “CHECKING THE OIL PUMP” on page 5-62.

EAS30345
INSTALLING THE OIL PAN

1. Install:
   - Oil pan gasket New
   - Oil pan
   - Bottom cowling brackets
   - Oil level switch lead holder

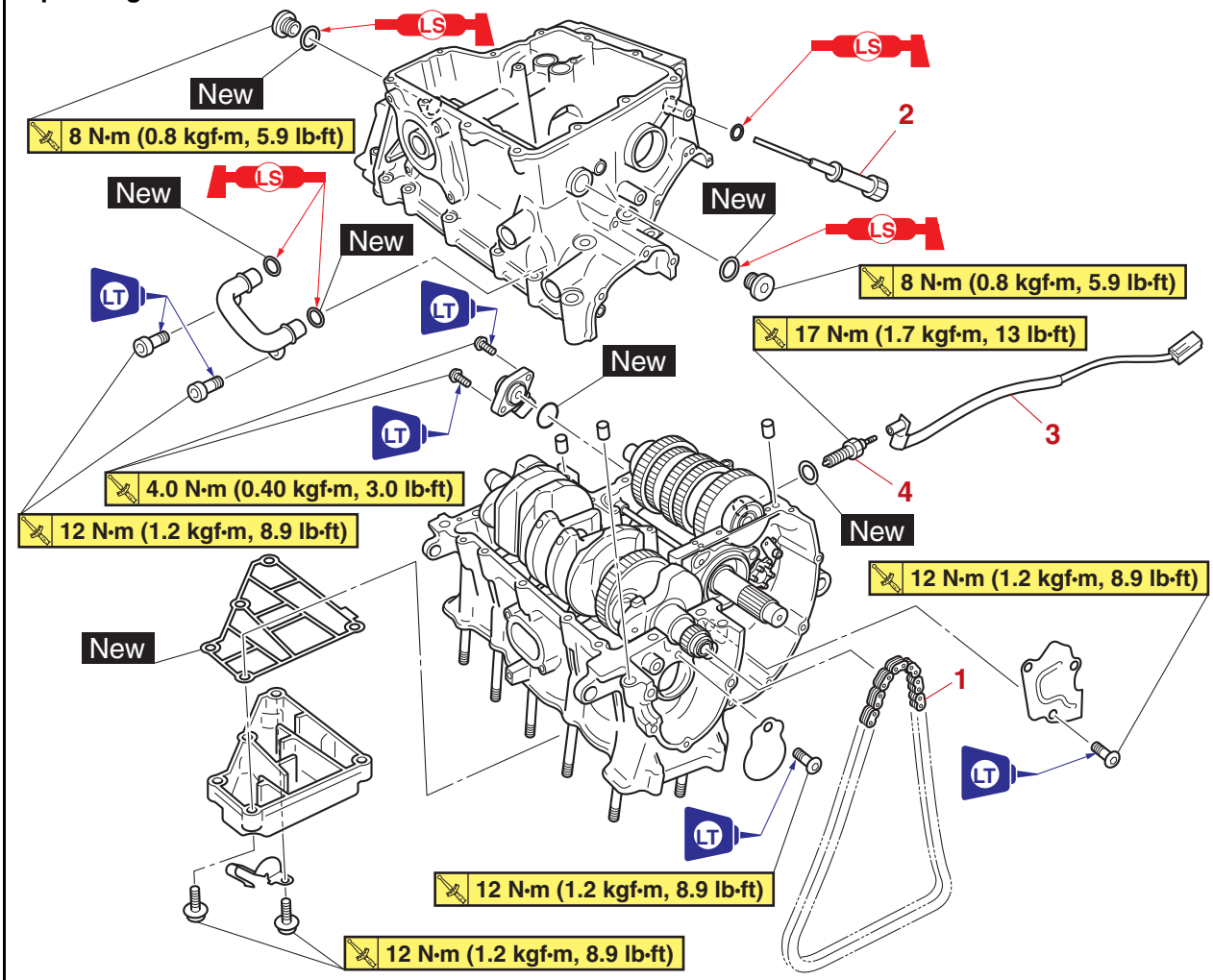
Oil pan bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)

TIP

Tighten the oil pan bolts in stages and in a criss-cross pattern.

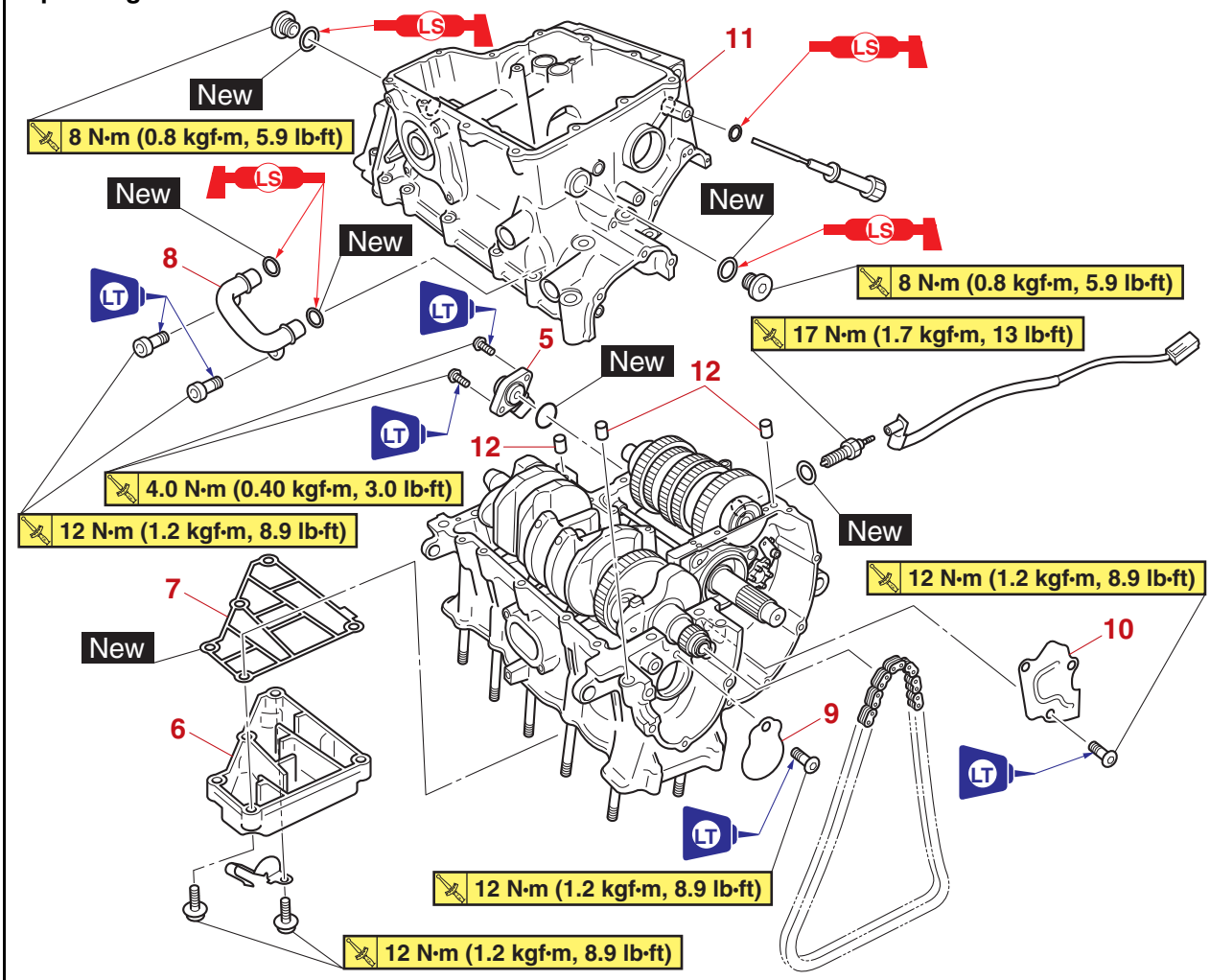
EAS20059
CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-9.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-26.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-36.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-56.
	Pickup rotor		Refer to "PICKUP ROTOR" on page 5-39.
	Oil pump drive chain guide		Refer to "CLUTCH" on page 5-46.
	Oil pump assembly		Refer to "OIL PUMP" on page 5-59.
1	Timing chain	1	
2	Dipstick	1	
3	Neutral switch lead	1	
4	Neutral switch	1	

Separating the crankcase



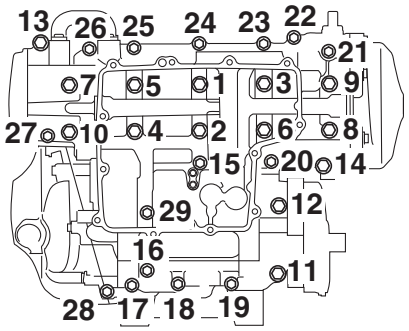
Order	Job/Parts to remove	Q'ty	Remarks
5	Gear position sensor	1	
6	Ventilation chamber cover	1	
7	Ventilation chamber cover gasket	1	
8	Oil pipe	1	
9	Oil baffle plate 1	1	
10	Oil baffle plate 2	1	
11	Lower crankcase	1	
12	Dowel pin	3	

EAS30389
DISASSEMBLING THE CRANKCASE
1. Place the engine upside down.
2. Remove:
   • Crankcase bolts

TIP

- Loosen each bolt 1/4 of a turn at a time. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

- M8 × 115 mm bolts: “8”, “9”
- M8 × 85 mm bolts: “1”–“7”, “10”
- M8 × 65 mm bolts: “11”, “12”
- M6 × 80 mm bolt: “29”
- M6 × 65 mm shoulder bolts: “13”, “14”
- M6 × 65 mm bolts: “16”, “20”, “21”
- M6 × 55 mm bolts: “15”, “22”–“27”
- M6 × 45 mm bolts: “17”–“19”
- M6 × 30 mm bolt: “28”



3. Remove:
   • Lower crankcase

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.

EAS30743
CHECKING THE OIL PIPE
1. Check:
   • Oil pipe
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

EAS31445
CHECKING THE TIMING CHAIN
Refer to “CAMSHAFTS” on page 5-18.

EAS30397
ASSEMBLING THE CRANKCASE
1. Lubricate:
   • Crankshaft journal bearings
   (with the recommended lubricant)

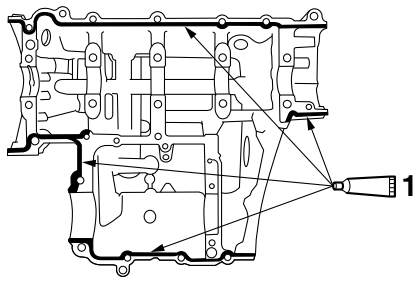
	Recommended lubricant **Engine oil**

2. Apply:
   • Sealant
   (onto the crankcase mating surfaces)

	Yamaha bond No. 1215 **90890-85505** **(Three bond No.1215®)**

TIP

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2–3 mm (0.08–0.12 in) of the crankshaft journal bearings.



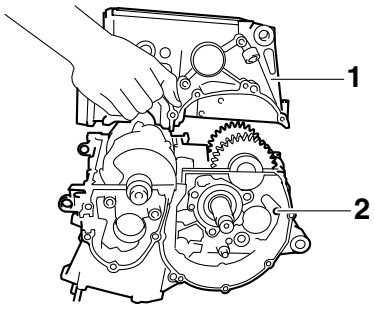
1. Three Bond No.1215®

3. Install:
   • Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
   • Lower crankcase “1”
   (onto the upper crankcase “2”)

ECA13980

NOTICE

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.

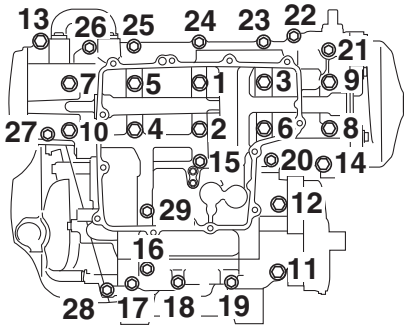


6. Install:
   • Crankcase bolts

TIP

- Lubricate the bolts “1”–“10” thread part and washers with engine oil.
- Lubricate the bolts “11”–“29” thread part and mating surfaces with engine oil.
- Finger tighten the crankcase bolts.

- M8 × 115 mm bolts: “8”, “9”
- M8 × 85 mm bolts: “1”–“7”, “10”
- M8 × 65 mm bolts: “11”, “12”
- M6 × 80 mm bolt: “29”
- M6 × 65 mm shoulder bolts: “13”, “14”
- M6 × 65 mm bolts: “16”, “20”, “21”
- M6 × 55 mm bolts: “15”, “22”–“27”
- M6 × 45 mm bolts: “17”–“19”
- M6 × 30 mm bolt: “28”



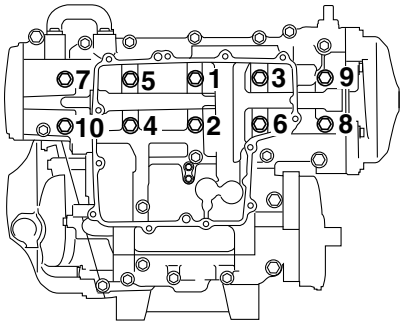
7. Tighten:
   • Crankcase bolts “1”–“10”

Crankcase bolt (M8 × 115 mm, M8 × 85 mm)
1st: 20 N·m (2.0 kgf·m, 15 lb·ft)
***2nd: 12 N·m (1.2 kgf·m, 8.9 lb·ft)**
3rd: Bolt “1”–“7”, “10” +50° Bolt “8”, “9” +75°

*Loosen all bolts following the tightening order and then tighten to specification torque.

TIP

- Lubricate the bolt threads and the bearing surfaces with engine oil.
- Tighten the bolts in the tightening sequence cast on the crankcase.

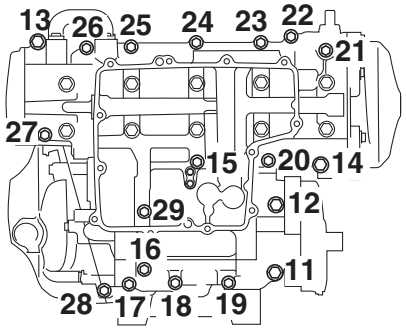


8. Tighten:
   • Crankcase bolts “11”–“29”

Crankcase bolt (M8 × 65 mm)
24 N·m (2.4 kgf·m, 18 lb·ft)
Crankcase bolt (M6)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Lubricate the bolt threads and the bearing surfaces with engine oil.
- Tighten the bolts in the tightening sequence cast on the crankcase.



EAS31658

INSTALLING THE GEAR POSITION SENSOR

ECA22630

NOTICE

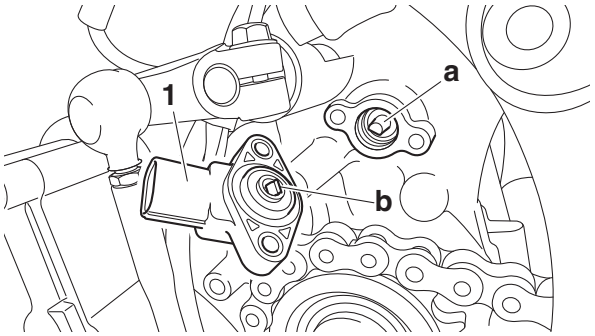
To prevent damage to the gear position sensor, keep magnets (including any pickup tool with a magnet, magnetized screwdrivers, etc.) away from the gear position sensor.

1. Install:
   • O-ring New
   • Gear position sensor “1”

Gear position sensor bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)
LOCTITE®

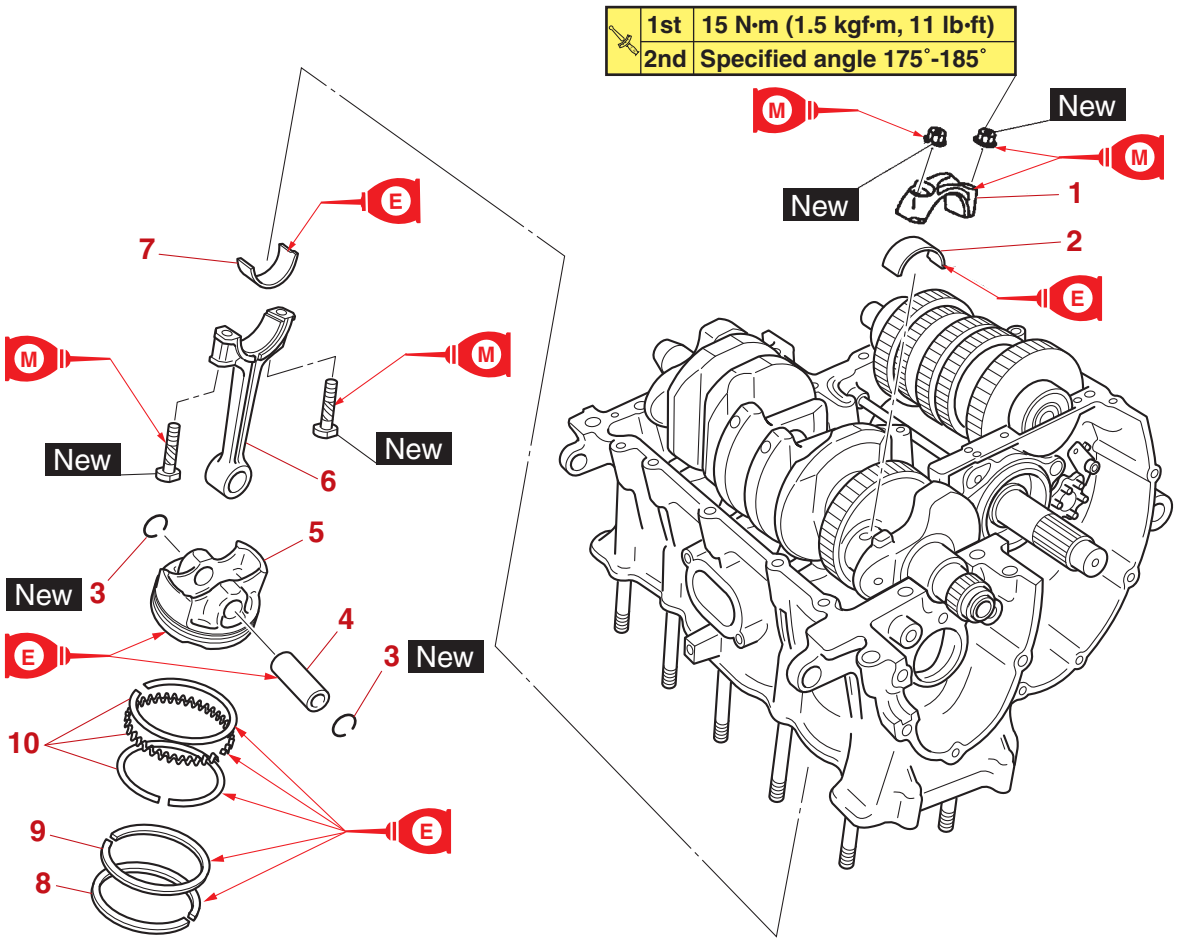
TIP

- Lubricate the O-ring with lithium-soap-based grease.
- Fit the end “a” of the shift drum assembly into the opening “b” in the gear position sensor “1”.



EAS20132
CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-64.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Piston pin clip	8	
4	Piston pin	4	
5	Piston	4	
6	Connecting rod	4	
7	Big end upper bearing	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	

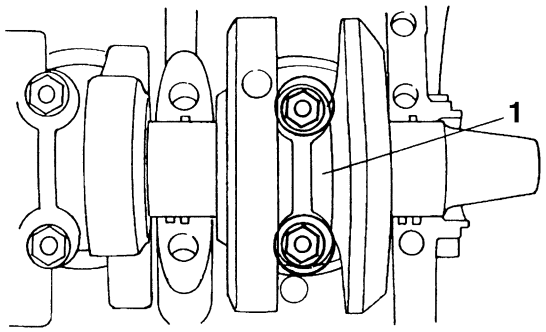
EAS30745
REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
   • Connecting rod cap “1”

TIP

Identify the position of each connecting rod so that it can be reinstalled in its original place.



2. Remove:
   • Big end bearings
   (from the connecting rods and connecting rod caps)

TIP

Identify the position of each big end bearing so that it can be reinstalled in its original place.

3. Remove:
   • Piston pin clips “1”
   • Piston pin “2”
   • Piston “3”
   • Connecting rod “4”

ECA13810

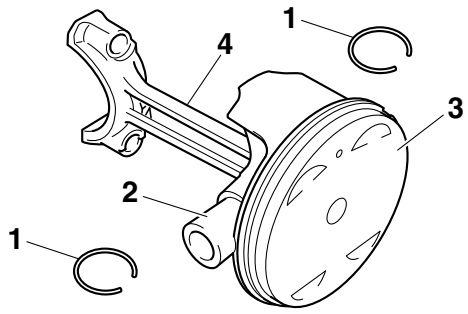
NOTICE

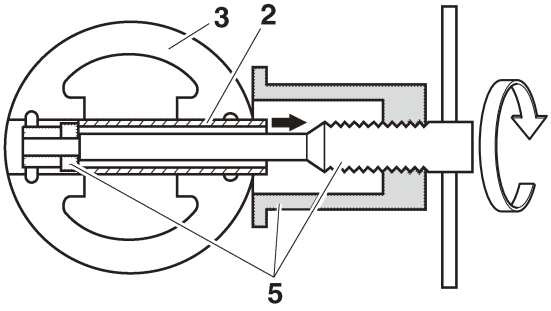
Do not use a hammer to drive the piston pin out.

TIP

- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip’s 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 “5”.

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

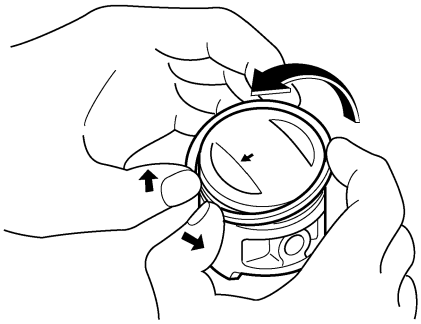




4. Remove:
   • Top ring
   • 2nd ring
   • Oil ring

TIP

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



EAS30747
CHECKING THE CYLINDERS AND PISTONS

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

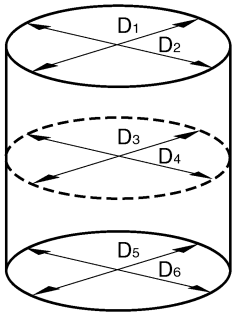
1. Check:
   • Piston wall
   • Cylinder wall
   Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   • Piston-to-cylinder clearance
   a. Measure cylinder bore “C” with the cylinder bore gauge.

TIP

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

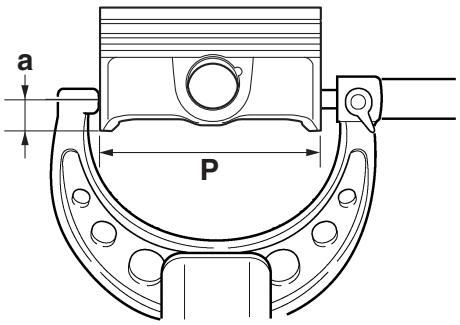
Bore
67.000–67.010 mm (2.6378–2.6382 in)
Wear limit
67.060 mm (2.6402 in)

"C" = maximum of D_1, D_2, D_3, D_4, D_5, D_6



b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "P" with the micrometer.

Piston
Diameter
66.975–66.990 mm (2.6368–2.6374 in)



a. 10 mm (0.39 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 "P"

Piston-to-cylinder clearance
0.010–0.035 mm (0.0004–0.0014 in)

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

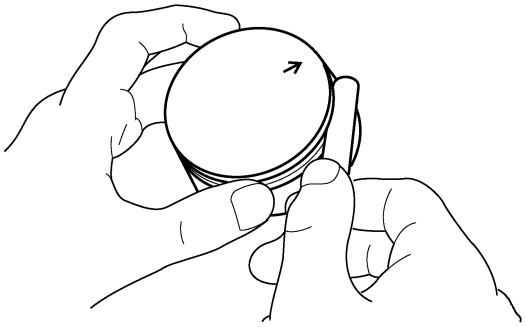
EAS30748
CHECKING THE PISTON RINGS

1. Measure:
• Piston ring side clearance
Out of specification → Replace the piston and piston rings as a set.

TIP

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

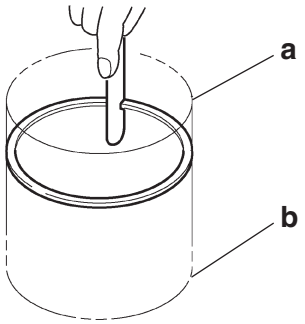
Piston ring
Top ring
Ring side clearance
0.030–0.065 mm (0.0012–0.0026 in)
2nd ring
Ring side clearance
0.020–0.055 mm (0.0008–0.0022 in)



2. Install:
• Piston ring
(into the cylinder)

TIP

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



b. Upper of cylinder

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

TIP

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

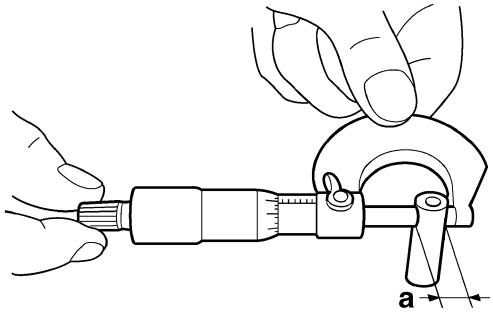
Piston ring
Top ring
End gap limit
0.60 mm (0.0236 in)
2nd ring
End gap limit
1.15 mm (0.0453 in)

EAS30749
CHECKING THE PISTON PINS

The following procedure applies to all of the piston pins.

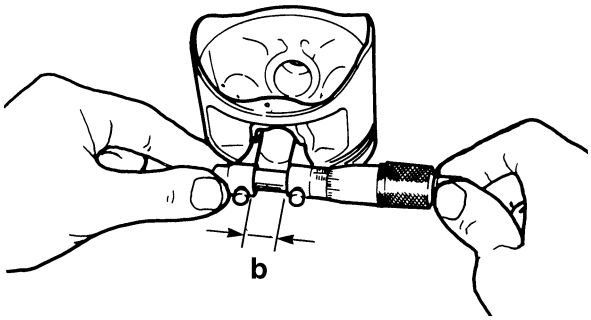
1. Check:
   • Piston pin
   Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   • Piston pin outside diameter "a"
   Out of specification → Replace the piston pin.

Piston pin outside diameter
14.991–15.000 mm (0.5902–0.5906 in)
Limit
14.971 mm (0.5894 in)



3. Measure:
   • Piston pin bore diameter "b"
   Out of specification → Replace the piston.

Piston pin bore inside diameter
15.002–15.013 mm (0.5906–0.5911 in)
Limit
15.043 mm (0.5922 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
0.002–0.022 mm (0.0001–0.0009 in)

EAS30750
CHECKING THE CONNECTING RODS

1. Measure:
   • Crankshaft-pin-to-big-end-bearing clearance
   Out of specification → Replace the big end bearings.

Oil clearance
0.037–0.061 mm (0.0015–0.0024 in)

The following procedure applies to all of the connecting rods.

ECA13930

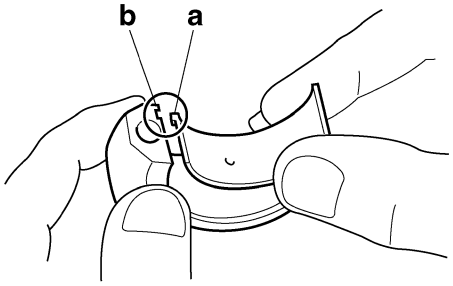
NOTICE

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.

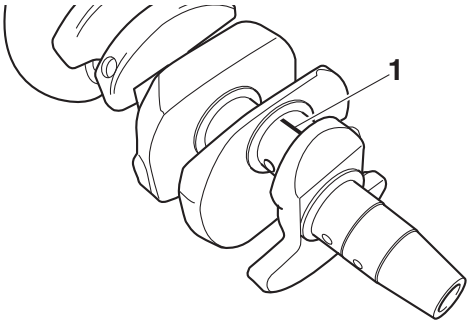
a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

TIP

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



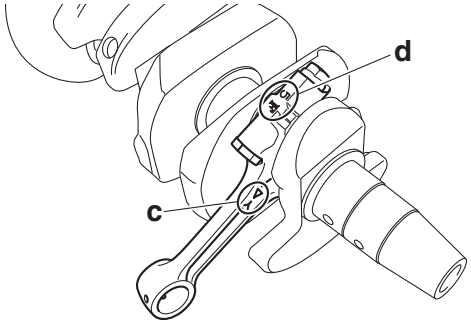
c. Put a piece of Plastigauge® "1" on the crankshaft pin.



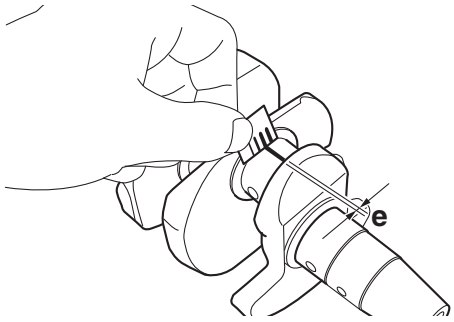
d. Assemble the connecting rod halves.

TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the "Y" mark "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.



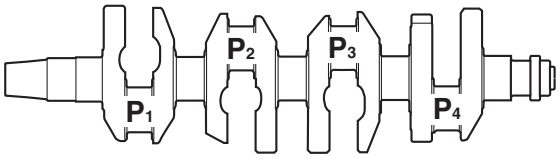
e. Tighten the connecting rod nuts.
Refer to "INSTALLING THE CONNECTING RODS AND PISTONS" on page 5-74.
f. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-70.
g. Measure the compressed Plastigauge® width "e" on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

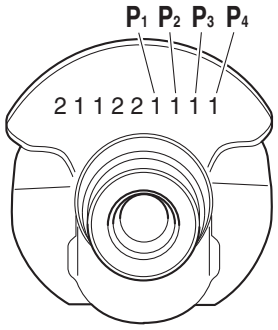


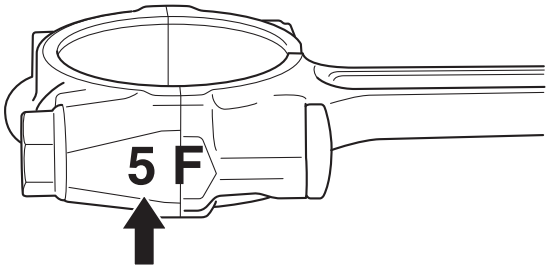
2. Select:
- Big end bearings (P_1–P_4)

TIP

- The numbers stamped into the crankshaft web and the numbers on the connecting rods are used to determine the replacement big end bearing sizes.
- P_1–P_4 refer to the bearings shown in the crankshaft illustration.







For example, if the connecting rod P_1 and the crankshaft web P_1 numbers are 5 and 1 respectively, then the bearing size for P_1 is:

P_1 (connecting rod) - P_1 (crankshaft) = 5 - 1 = 4 (green)

Bearing color code
Code 1
Blue
Code 2
Black
Code 3
Brown
Code 4
Green

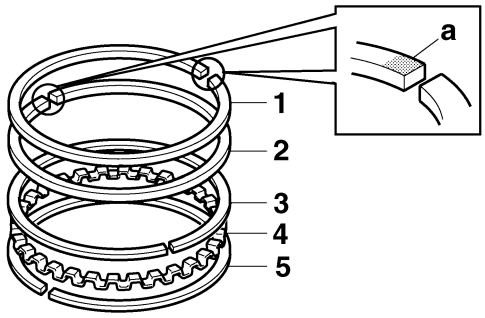
EAS30751
INSTALLING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the pistons and connecting rods.

1. Install:
   - Top ring “1”
   - 2nd ring “2”
   - Upper oil ring rail “3”
   - Oil ring expander “4”
   - Lower oil ring rail “5”

TIP

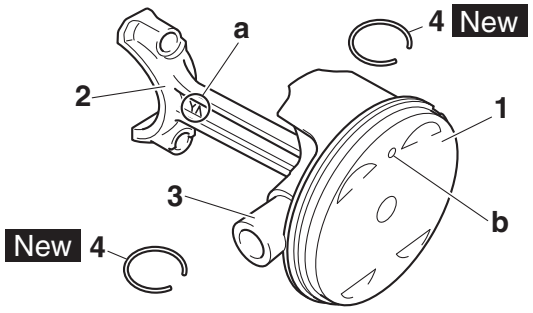
Be sure to install the piston rings so that the manufacturer’s marks or numbers “a” face up.

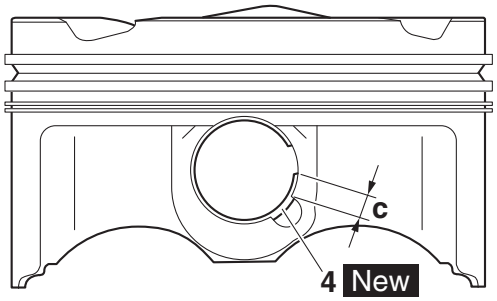


2. Install:
   - Piston “1”
     (onto the respective connecting rod “2”)
   - Piston pin “3”
   - Piston pin clips “4” New

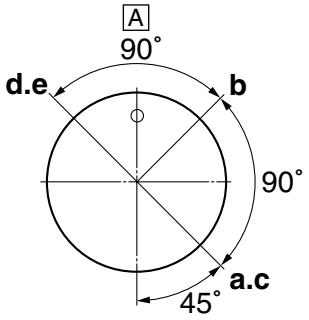
TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod left when the punch mark “b” on the piston is pointing up. Refer to the illustration.
- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) “c” or more from the cutout in the piston.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).





3. Offset:
   • Piston ring end gaps



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

4. Lubricate:
   • Piston
   • Piston rings
   • Cylinder
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

5. Lubricate:
   • Bolt threads
   • Nut seats
   (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

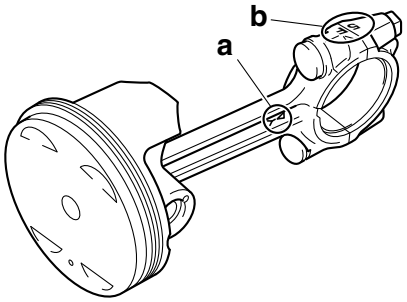
6. Lubricate:
   • Crankshaft pins
   • Connecting rod big end bearing inner surface
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

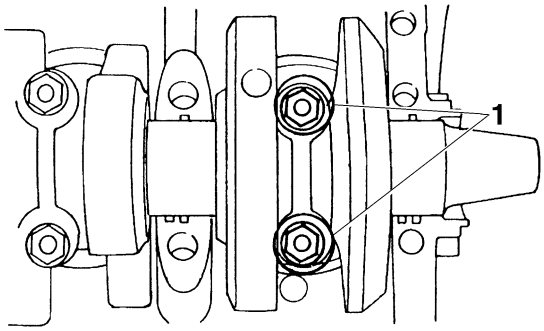
7. Install:
   • Big end bearings
   • Connecting rod and piston assembly
   • Connecting rod cap

TIP

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure the characters “b” on both the connecting rod and connecting rod cap are aligned.



8. Tighten:
   • Connecting rod nuts “1”



EWA13390

WARNING

- **Replace the connecting rod bolts and nuts with new ones.**
- **Clean the connecting rod bolts and nuts.**

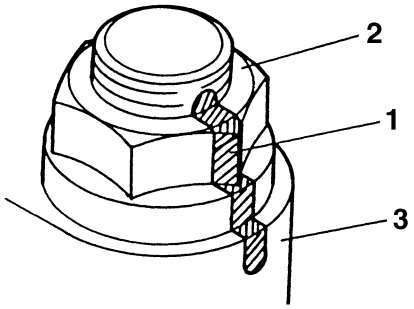
TIP

Tighten the connecting rod nuts using the following procedure.

a. Tighten the connecting rod nuts with a torque wrench.

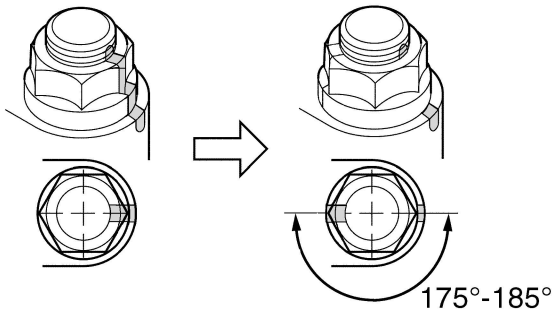
Connecting rod nut (1st)
15 N·m (1.5 kgf·m, 11 lb·ft)

b. Put a mark “1” on the corner of the connecting rod nut “2” and the connecting rod “3”.



c. Tighten the connecting rod nuts further to reach the specified angle 175°–185°.

Connecting rod nut (final)
Specified angle 175°–185°



EWA13400

WARNING

If the connecting rod nut is tightened more than the specified angle, do not loosen the nut and then retighten it. Instead, replace the connecting rod bolt and nut with a new one and perform the procedure again.

ECA13950

NOTICE

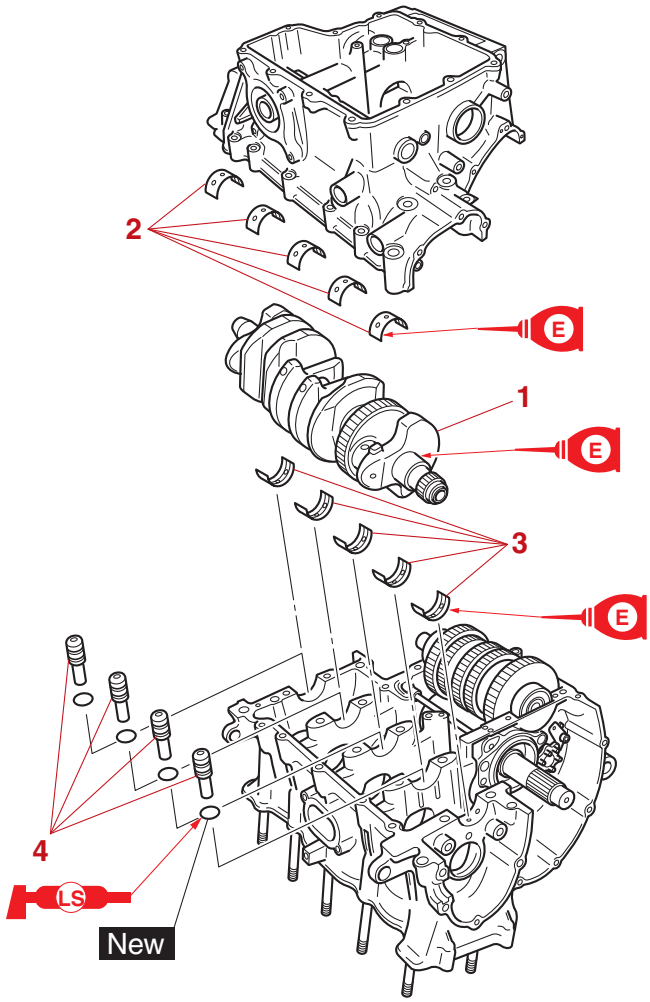
Do not use a torque wrench to tighten the connecting rod nut to the specified angle.

TIP

On a hexagonal nut, note that the angle from one corner to another is 60°.

EAS20061
CRANKSHAFT

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-64.
	Connecting rod caps		Refer to "CONNECTING RODS AND PISTONS" on page 5-69.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Oil nozzle	4	

EAS30419
REMOVING THE CRANKSHAFT JOURNAL BEARINGS
1. Remove:
   - Crankshaft journal lower bearings (from the lower crankcase)
   - Crankshaft journal upper bearings (from the upper crankcase)

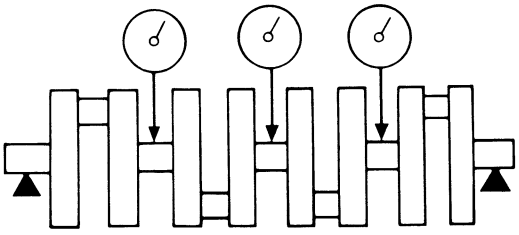
TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

EAS30837
CHECKING THE OIL NOZZLES
The following procedure applies to all of the oil nozzles.
1. Check:
   - Oil nozzle
     Damage/wear → Replace the oil nozzle.
   - O-ring
     Damage/wear → Replace.
   - Oil passage
     Obstruction → Blow out with compressed air.

EAS30423
CHECKING THE CRANKSHAFT AND CONNECTING RODS
1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Runout limit
0.030 mm (0.0012 in)



2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
3. Measure:
   - Crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance
0.020–0.044 mm (0.0008–0.0017 in)

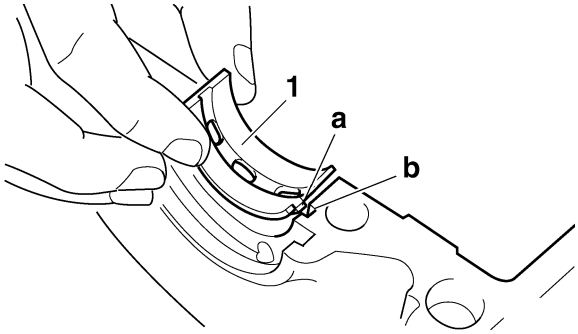
ECA13920
NOTICE

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.
c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

TIP

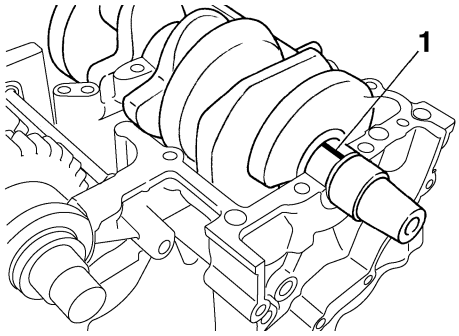
Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.



d. Put a piece of Plastigauge® “1” on each crankshaft journal.

TIP

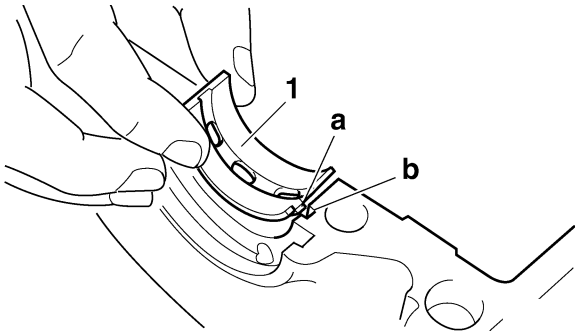
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



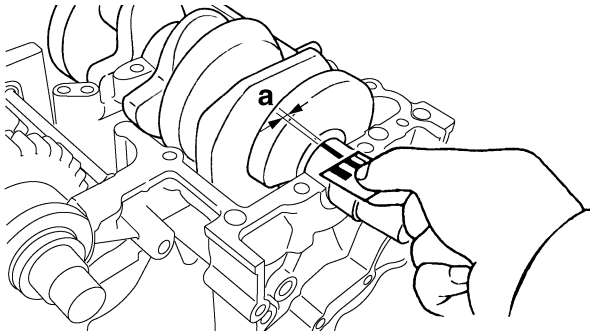
e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

TIP

- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



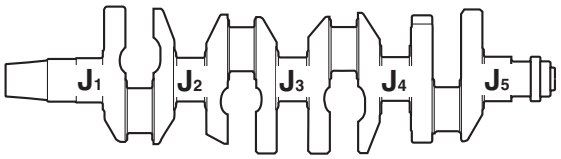
f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
   Refer to "CRANKCASE" on page 5-64.
g. Remove the lower crankcase and the crankshaft journal lower bearings.
h. Measure the compressed Plastigauge® width "a" on each crankshaft journal.
   If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

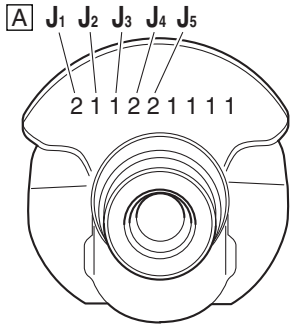


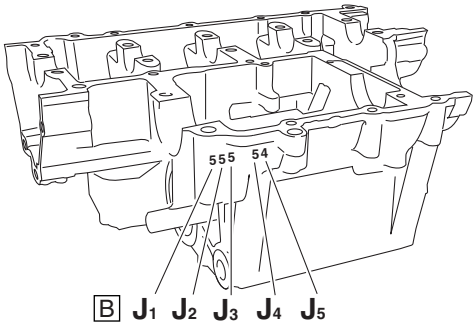
4. Select:
   - Crankshaft journal bearings (J_1–J_5)

TIP

- The numbers "A" stamped into the crankshaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- J_1–J_5 refer to the bearings shown in the crankshaft illustration.
- If J_1–J_5 of crankcase are the same, only J_1 is stamped.







For example, if the crankcase J_1 and crankshaft web J_1 numbers are 6 and 2 respectively, then the bearing size for J_1 is:

J_1 (crankcase) - J_1 (crankshaft web) - 1 = 6 - 2 - 1 = 3 (brown)

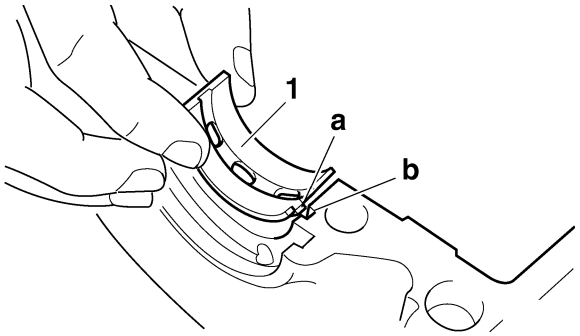
Bearing color code
Code 0
White
Code 1
Blue
Code 2
Black
Code 3
Brown
Code 4
Green

EAS30791
INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft journal upper bearings (into the upper crankcase)
   - Crankshaft journal lower bearings (into the lower crankcase)

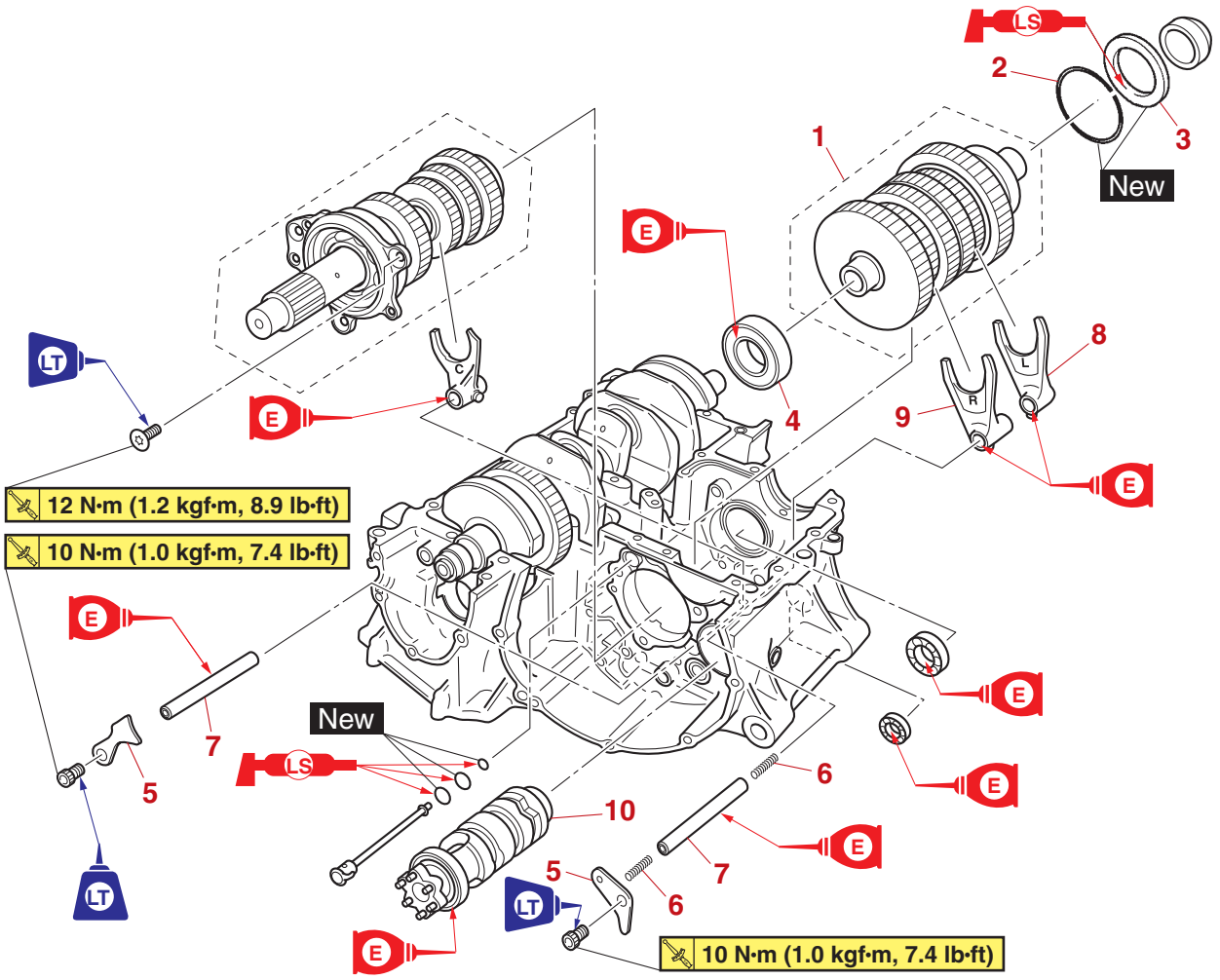
TIP

- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcases.
- Be sure to install each crankshaft journal bearing in its original place.



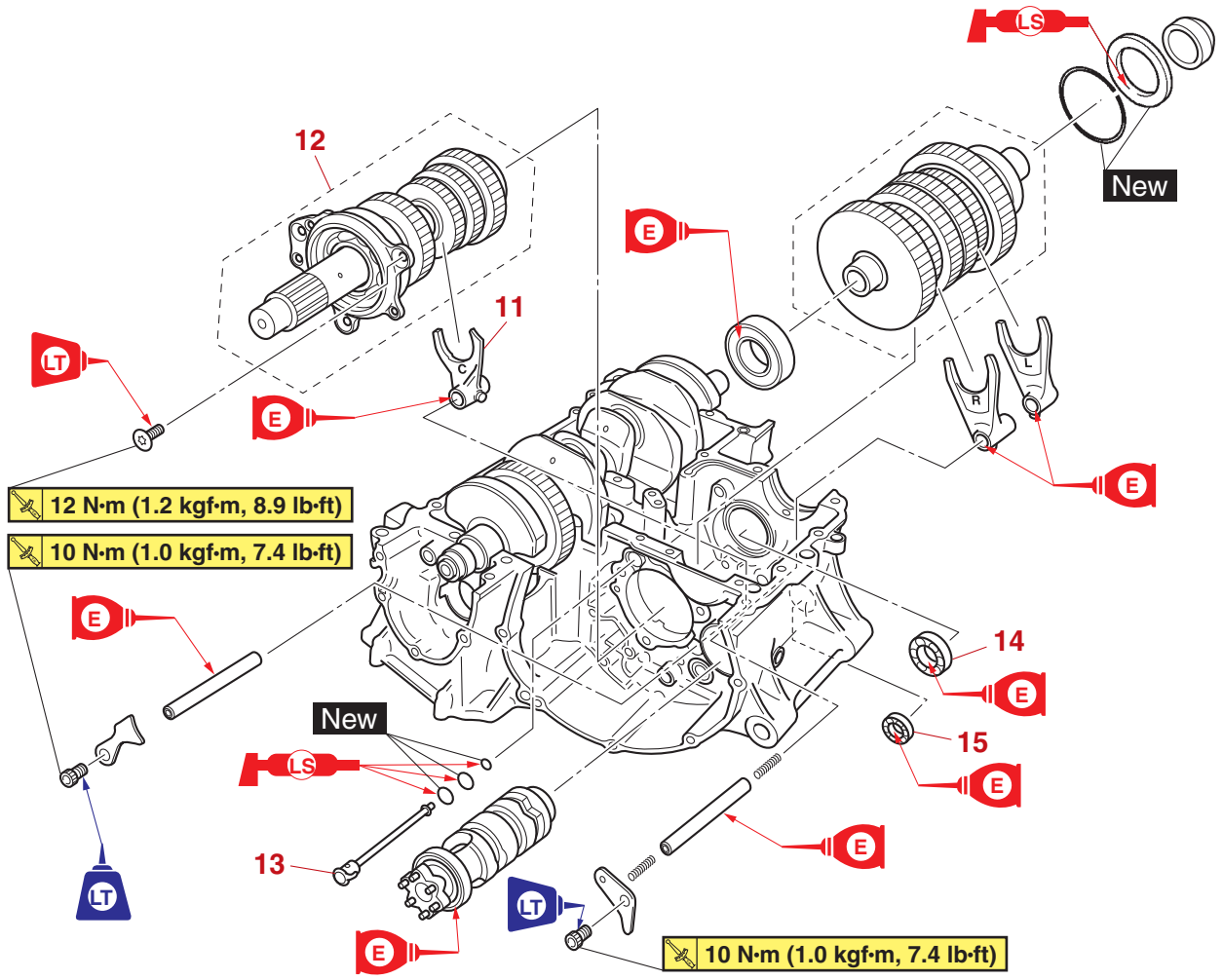
EAS20062
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



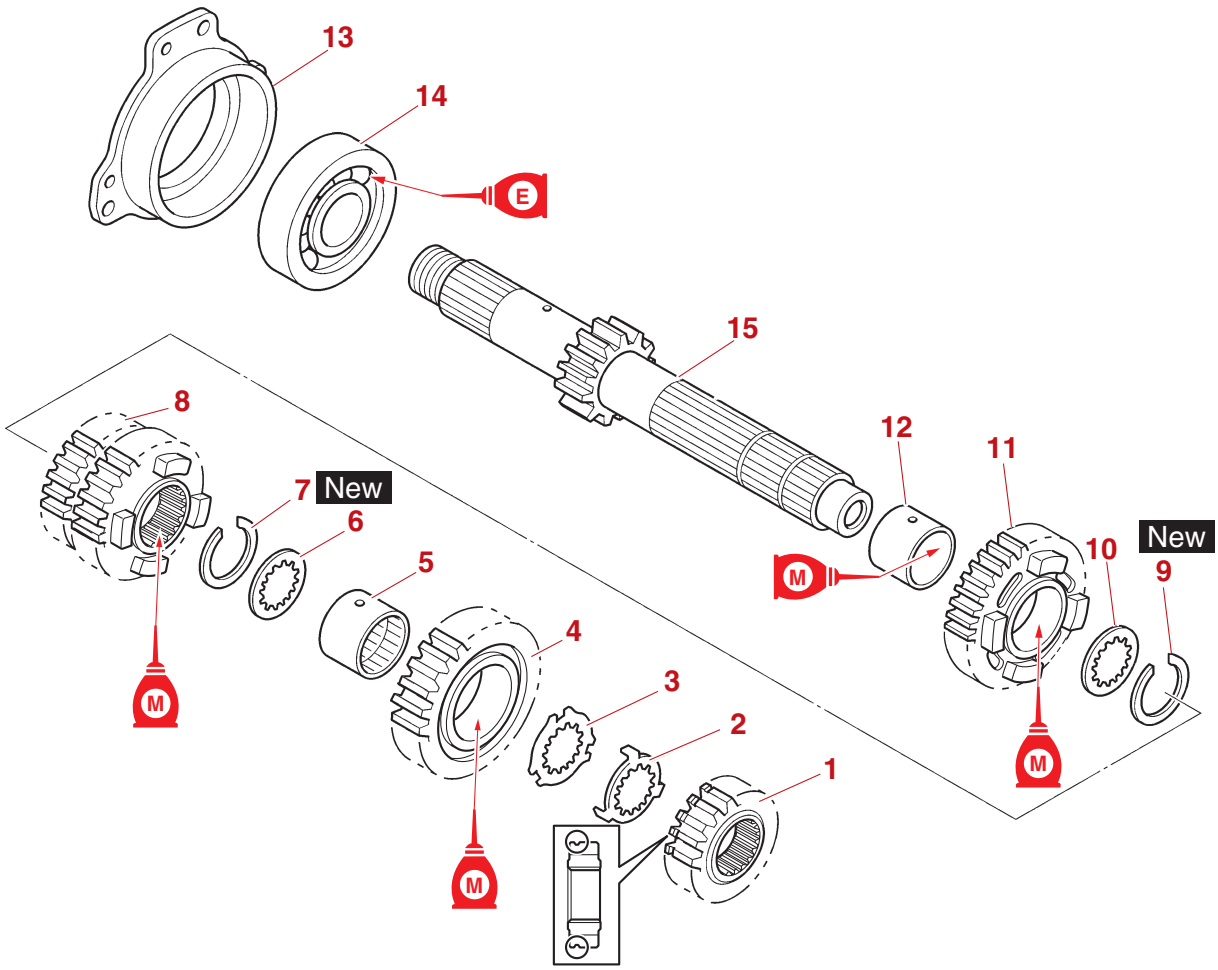
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-64.
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Shift drum retainer	2	
6	Spring	2	
7	Shift fork guide bar	2	
8	Shift fork-L	1	
9	Shift fork-R	1	
10	Shift drum assembly	1	

Removing the transmission, shift drum assembly, and shift forks



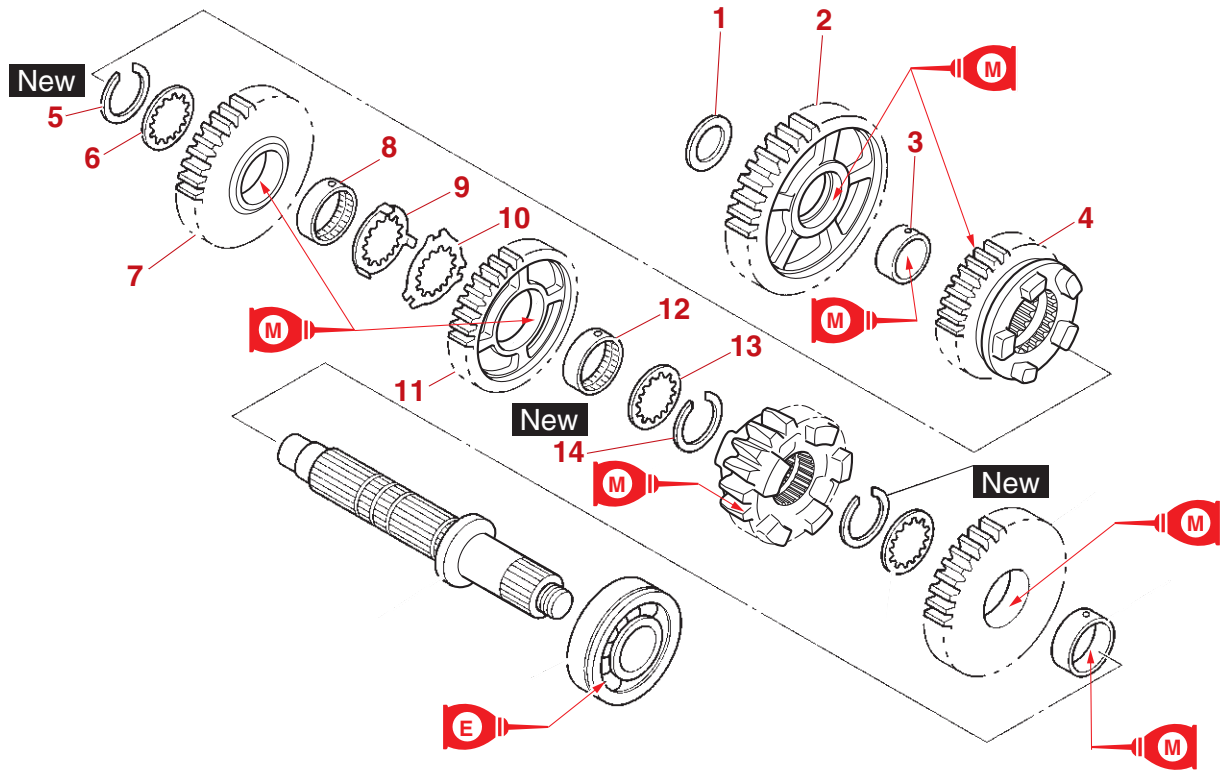
Order	Job/Parts to remove	Q'ty	Remarks
11	Shift fork-C	1	
12	Main axle assembly	1	
13	Oil pipe	1	
14	Bearing	1	
15	Bearing	1	

Disassembling the main axle assembly



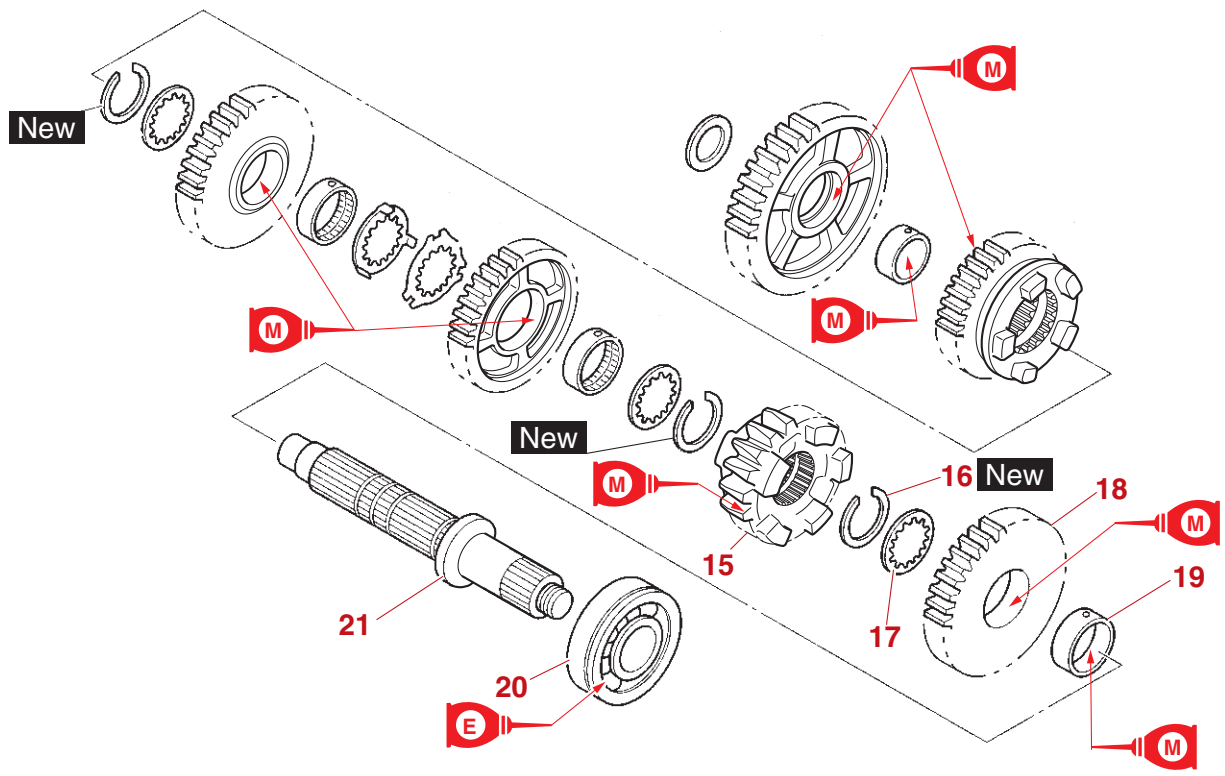
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd/4th pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Bearing housing	1	
14	Bearing	1	
15	Main axle/1st 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	Washer	1	
7	3rd wheel gear	1	
8	Collar	1	
9	Toothed lock washer	1	
10	Toothed lock washer retainer	1	
11	4th wheel gear	1	
12	Collar	1	
13	Washer	1	
14	Circlip	1	

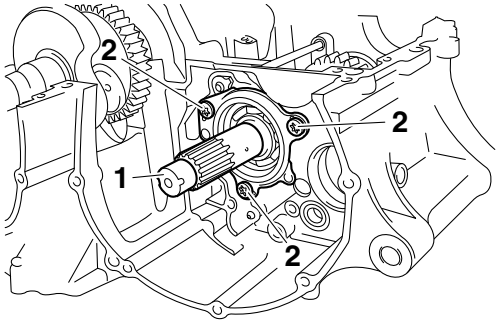
Disassembling the drive axle assembly



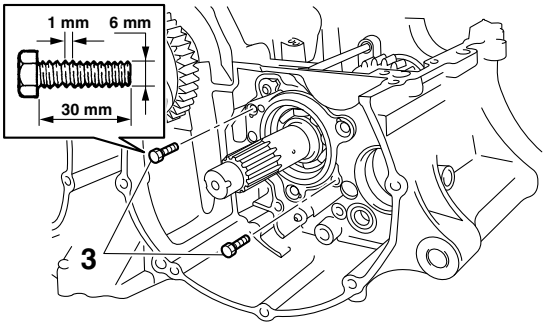
Order	Job/Parts to remove	Q'ty	Remarks
15	6th wheel gear	1	
16	Circlip	1	
17	Washer	1	
18	2nd wheel gear	1	
19	Collar	1	
20	Bearing	1	
21	Drive axle	1	

EAS30430
REMOVING THE TRANSMISSION

1. Remove:
   - Main axle assembly “1”
     a. Remove the main axle assembly bearing housing bolts “2”



     b. Insert two bolts “3” of the proper size, as shown in the illustration, into the main axle assembly bearing housing.

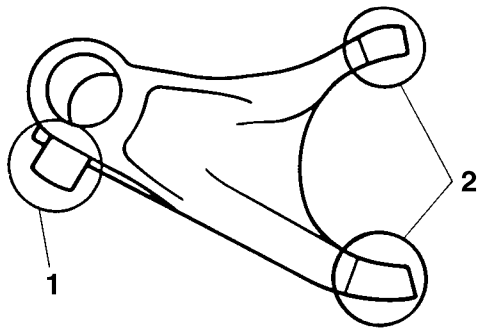


     c. Tighten the bolts until they contact the crankcase surface.
     d. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.

EAS30431
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
   - Shift fork cam follower “1”
   - Shift fork pawl “2”
     Bends/damage/scoring/wear → Replace the shift fork.

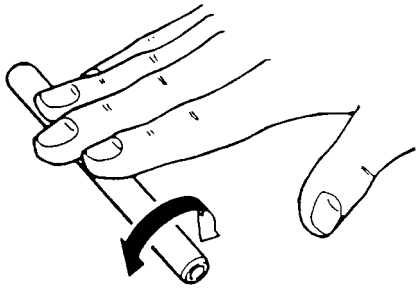


2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

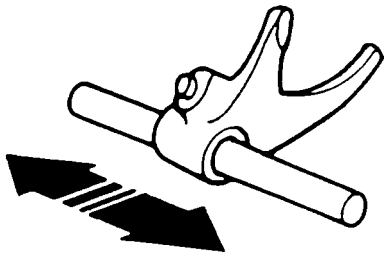
EWA12840

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



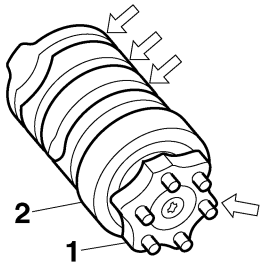
3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



4. Check:
   - Shift fork guide bar (for the shift fork-C) oil passage
     Clogging/damage → Replace the shift fork guide bar (for the shift fork-C).

EAS30432
CHECKING THE SHIFT DRUM ASSEMBLY

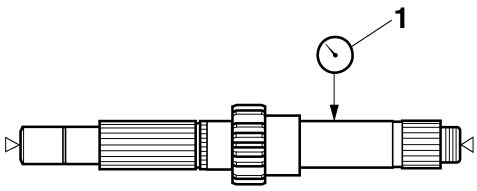
1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment “1”
     Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing “2”
     Damage/pitting → Replace the shift drum assembly.



EAS30433
CHECKING THE TRANSMISSION

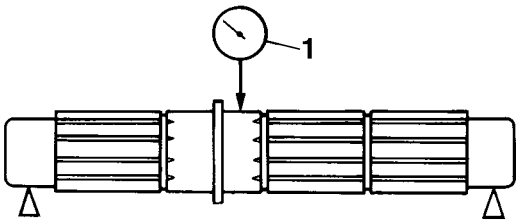
1. Measure:
   • Main axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the main axle.

	Main axle runout limit **0.02 mm (0.0008 in)**

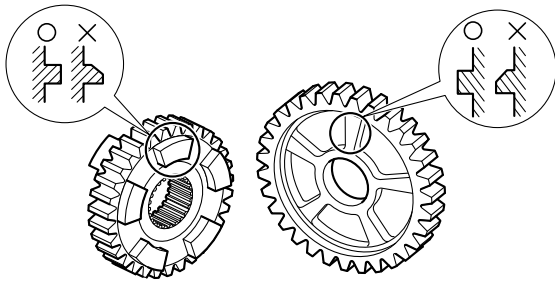


2. Measure:
   • Drive axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the drive axle.

	Drive axle runout limit **0.02 mm (0.0008 in)**



3. Check:
   • Transmission gears
   Blue discoloration/pitting/wear → Replace the defective gear(s).
   • Transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(s).



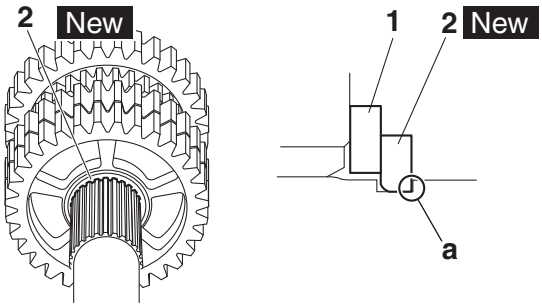
4. Check:
   • Transmission gear engagement
   (each pinion gear to its respective wheel gear)
   Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   • Transmission gear movement
   Rough movement → Replace the defective part(s).
6. Check:
   • Circlips
   Bends/damage/looseness → Replace.

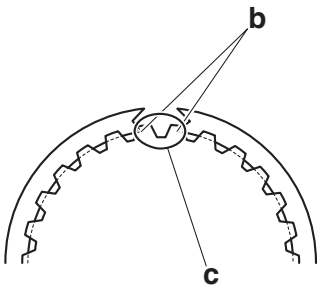
EAS30435
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
   • Toothed washer “1”
   • Circlip “2” New

TIP

- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the toothed washer and gear.
- Install the circlip so that both ends “b” rest on the sides of a spline “c” with both axles aligned.

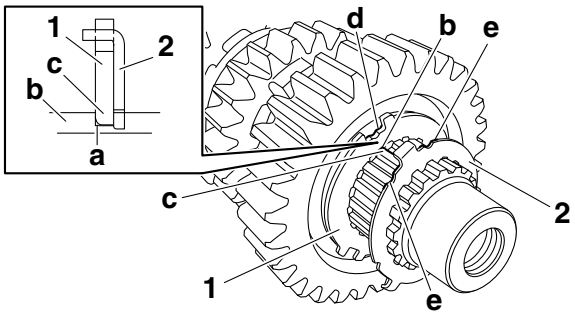




2. Install:
   - Toothed lock washer retainer “1”
   - Toothed lock washer “2”

TIP

- With the toothed lock washer retainer “1” in the groove “a” in the axle, align the projection “c” on the retainer with an axle spline “b”, and then install the toothed lock washer “2”.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks “e” with the alignment mark “d” on the retainer.



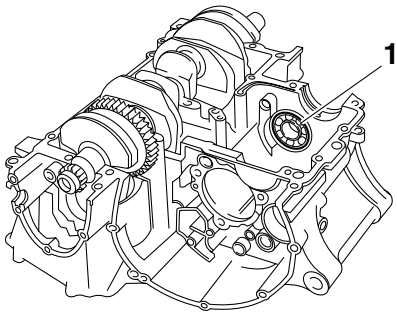
EAS30438

INSTALLING THE TRANSMISSION

1. Install:
   - Bearing “1”

TIP

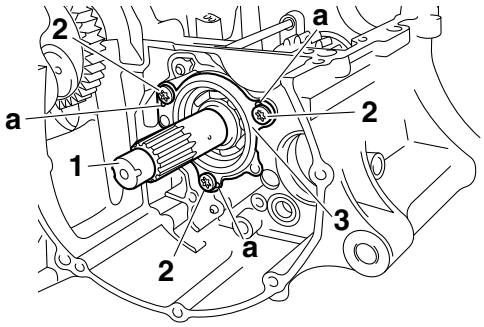
Face the seal side of the bearing to the outside and install it close to the right side end of the crankcase.



2. Install:
   - Main axle assembly “1”

TIP

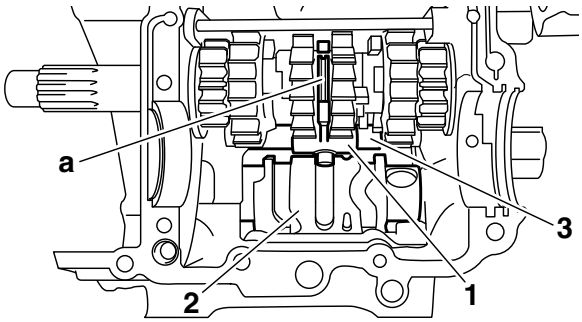
Stake the main axle assembly bearing housing bolts “2” at a cutout “a” in the main axle assembly bearing housing “3”.

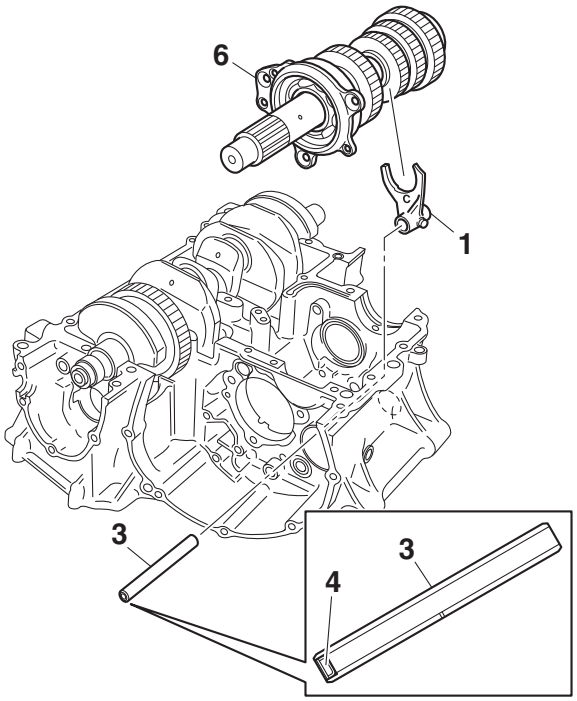


3. Install:
   - Shift fork-C “1”
   - Shift drum assembly “2”
   - Shift fork guide bar “3”

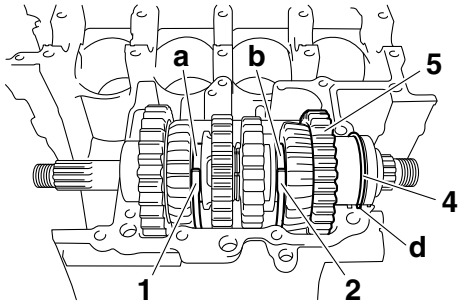
TIP

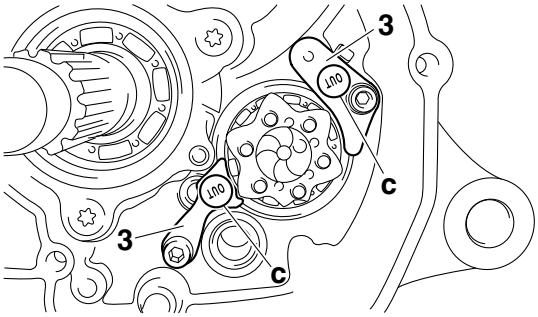
- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork-C into the groove “a” in the 3rd and 4th pinion gear on the main axle.
- Install the shift fork guide bar “3” in the crankcase with the plug “4” facing in the direction shown in the illustration.



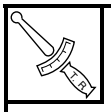


6. Main axle assembly





4. Install:
   - Shift fork-R “1”
   - Shift fork-L “2”
   - Shift fork guide bar
   - Springs
   - Shift drum retainers “3”
   - Bearing
   - Oil seal
   - Circlip “4”
   - Drive axle assembly “5”

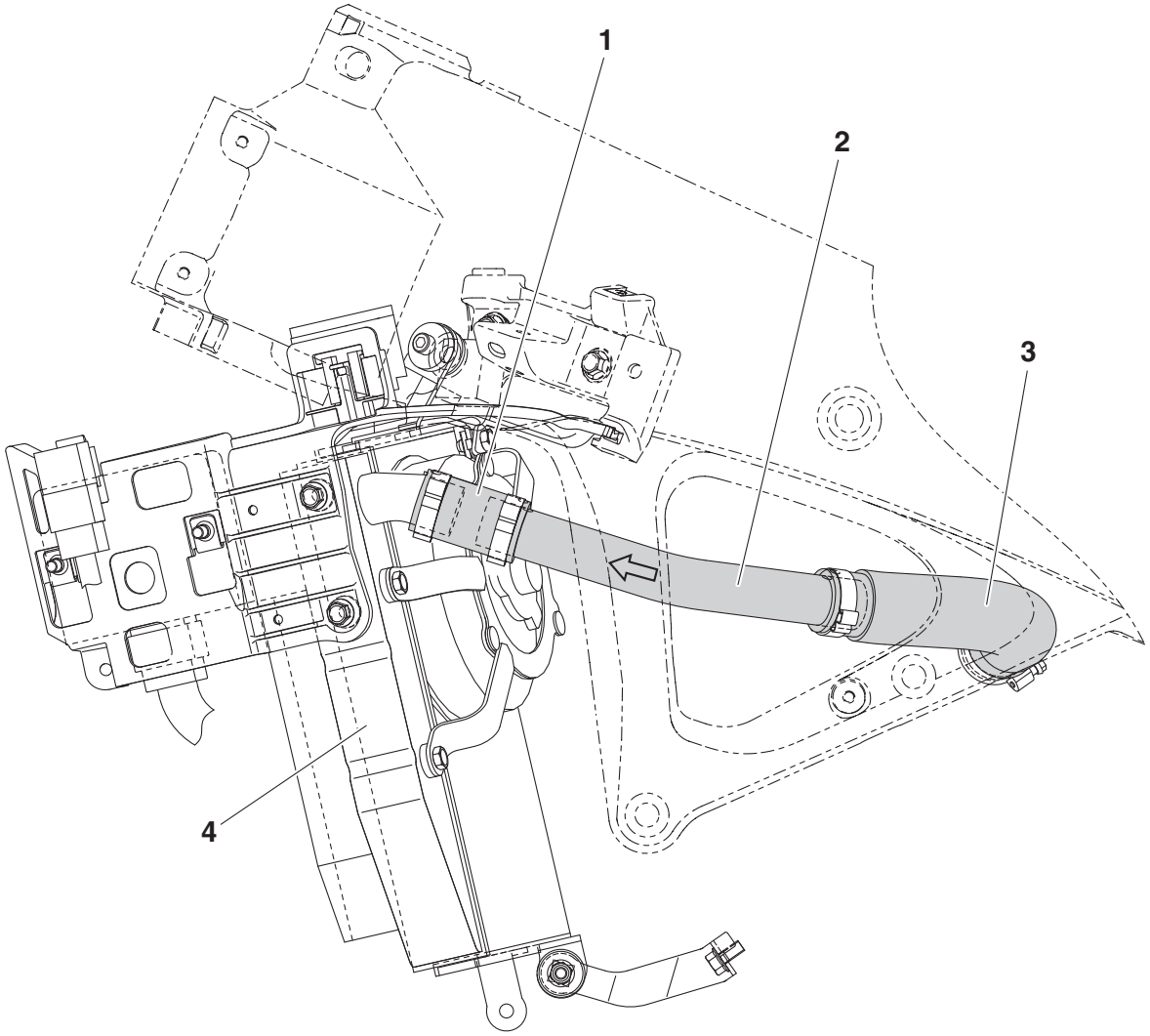
	**Shift drum retainer bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)** **LOCTITE®**

TIP

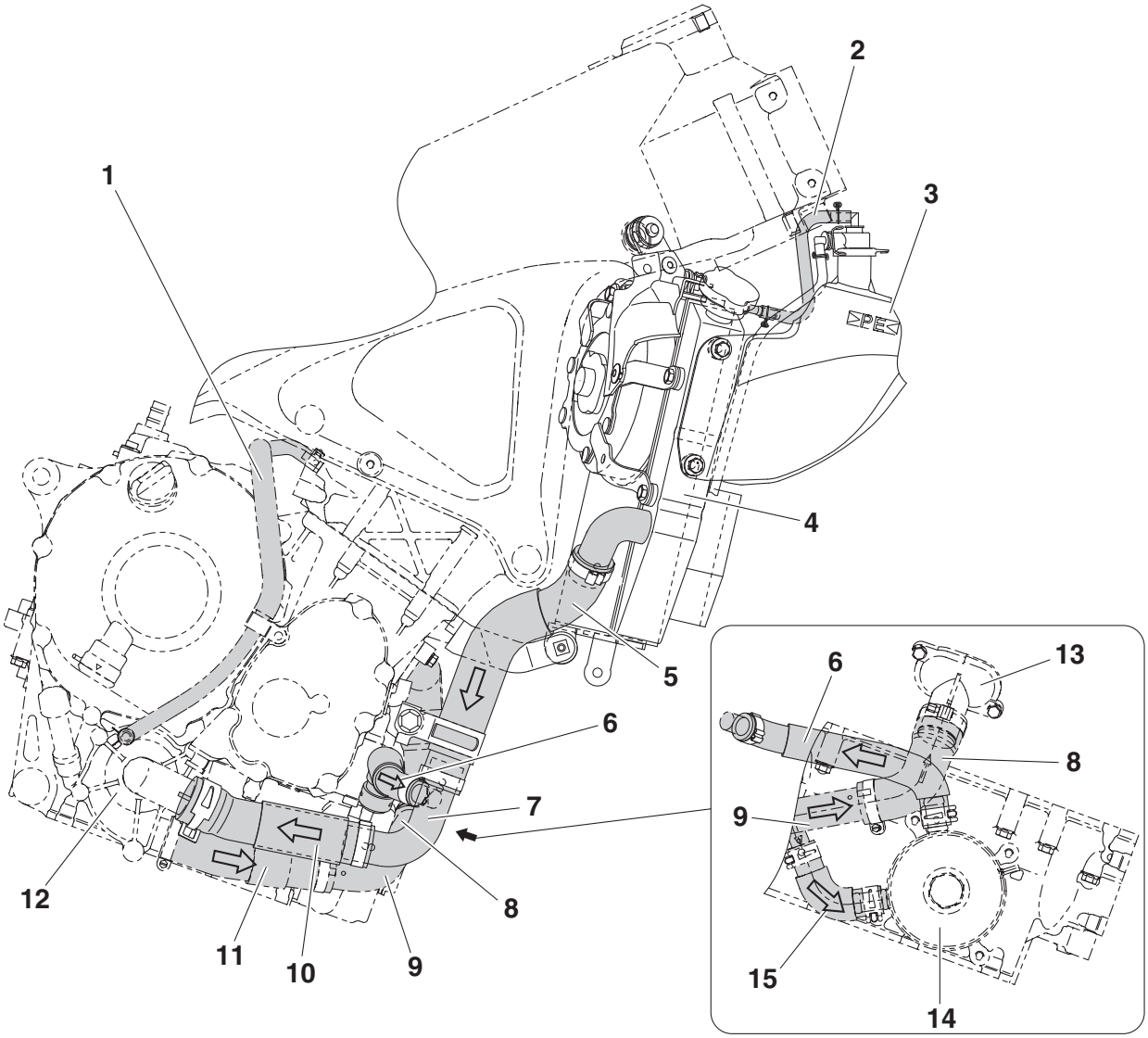
- Install shift fork-R into the groove “a” in the 5th wheel gear and shift fork-L into the groove “b” in the 6th wheel gear on the drive axle.
- Install the shift drum retainer with its “OUT” mark “c” facing outward.
- Make sure that the drive axle bearing circlip “4” is inserted into the grooves “d” in the upper crankcase.

COOLING SYSTEM

EAS20299
COOLING SYSTEM DIAGRAMS



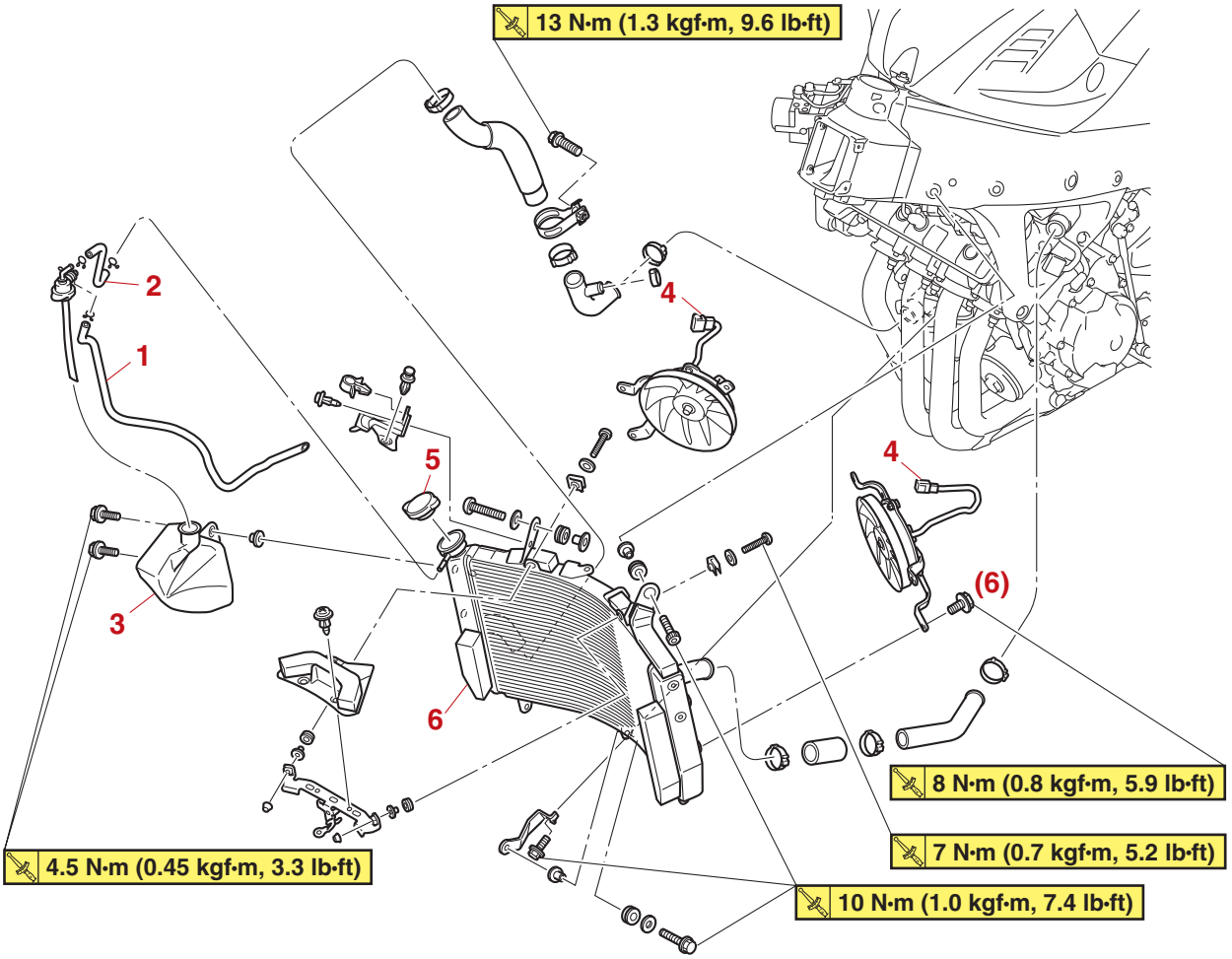
1. Radiator inlet hose
2. Radiator inlet pipe
3. Thermostat outlet hose
4. Radiator



1. Water pump breather hose
2. Coolant reservoir hose
3. Coolant reservoir
4. Radiator
5. Radiator outlet hose
6. Oil cooler outlet hose
7. Radiator outlet pipe
8. Water jacket joint inlet hose
9. Water pump outlet pipe
10. Water pump inlet hose
11. Water pump outlet hose
12. Water pump
13. Water jacket joint
14. Oil cooler
15. Oil cooler inlet hose

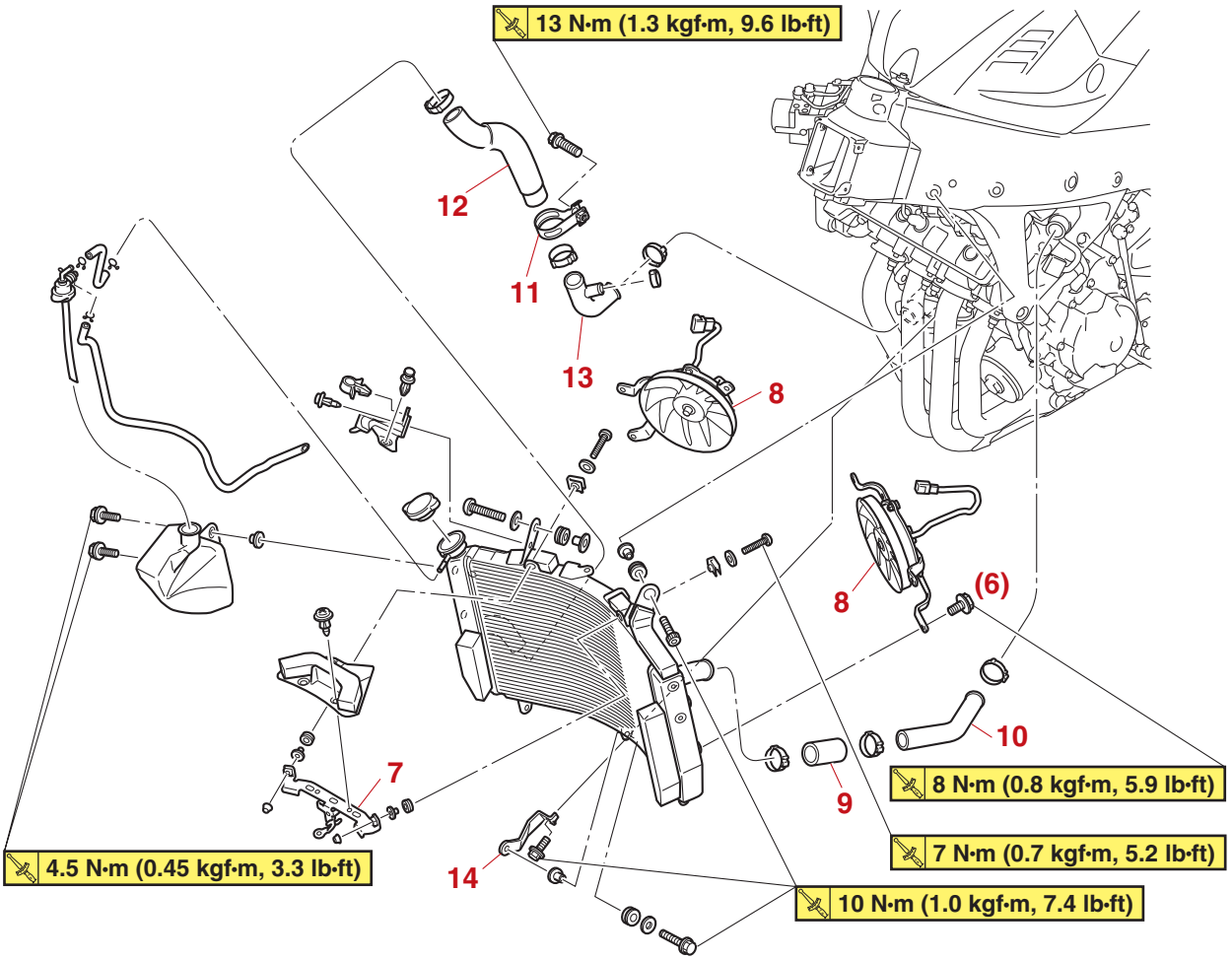
EAS20063
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Front side cowling assembly/Bottom cowlings		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
	Rectifier/regulator bracket		Refer to "HANDLEBARS" on page 4-66.
	Front brake hose joint		Refer to "ABS (Anti-lock Brake System)" on page 4-57.
1	Coolant reservoir breather hose	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir	1	
4	Radiator fan motor coupler	2	Disconnect.
5	Radiator cap	1	
6	Radiator	1	

Removing the radiator



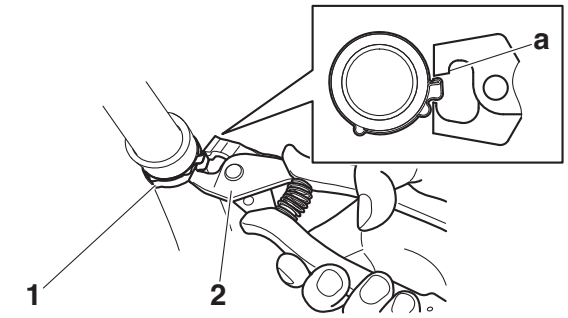
Order	Job/Parts to remove	Q'ty	Remarks
7	Front brake hose joint bracket	1	
8	Radiator fan	2	
9	Radiator inlet hose	1	
10	Radiator inlet pipe	1	
11	Radiator outlet hose holder	1	
12	Radiator outlet hose	1	
13	Radiator outlet pipe	1	
14	Radiator bracket	1	

EAS31659
REMOVING THE RADIATOR

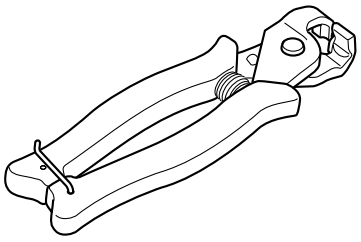
1. Remove:
   • Hose clamp (Clic-R) “1”

TIP

- Remove the hose clamp using the hose clamp pliers “2”.
- When removing the hose clamp, make sure that the thick tip “a” of the hose clamp pliers is directed as shown in the illustration.



A



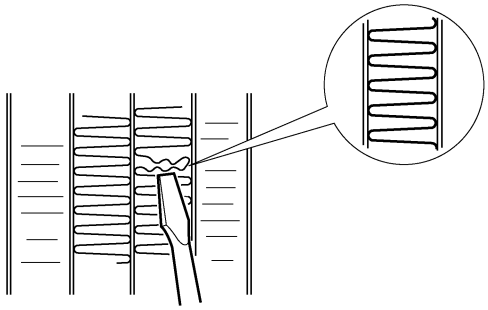
A. Hose clamp pliers

EAS30439
CHECKING THE RADIATOR

1. Check:
   • Radiator fins
   Obstruction → Clean.
   Apply compressed air to the rear of the radiator.
   Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.

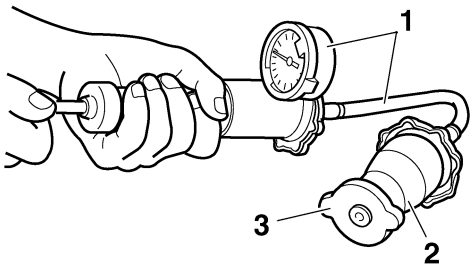


2. Check:
   • Radiator hoses
   • Radiator pipes
   Cracks/damage → Replace.
3. Measure:
   • Radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.

Radiator cap valve opening pressure
107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

   a. Install the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator cap “3”.

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



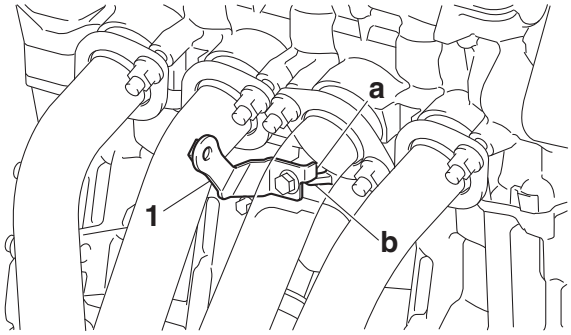
   b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.
4. Check:
   • Radiator fan
   Damage → Replace.
   Malfunction → Check and repair.
   Refer to “COOLING SYSTEM” on page 8-25.

EAS30440
INSTALLING THE RADIATOR

1. Install:
   • Radiator bracket “1”

TIP

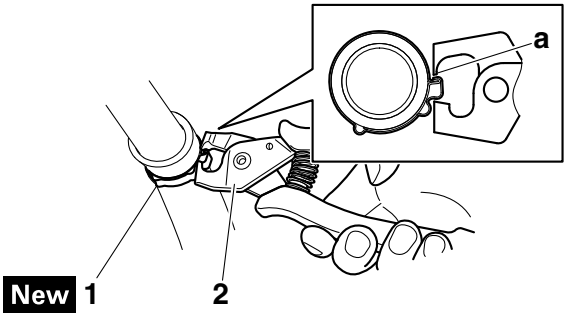
Make sure the projection “a” on the radiator bracket touches the projection “b” on the crankcase.



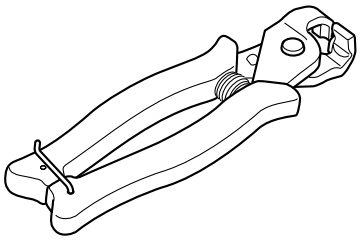
2. Install:
   • Hose clamp (Clic-R) “1” New

TIP

- Install the hose clamp using the hose clamp pliers “2”.
- When installing the hose clamp, make sure that the thin tip “a” of the hose clamp pliers is directed as shown in the illustration.
- For more information about installing the hose, refer to “CABLE ROUTING” on page 2-15.



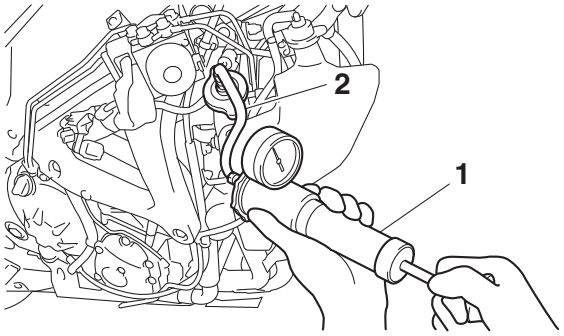
A



A. Hose clamp pliers

3. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-29.
4. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.
   a. Attach the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator.

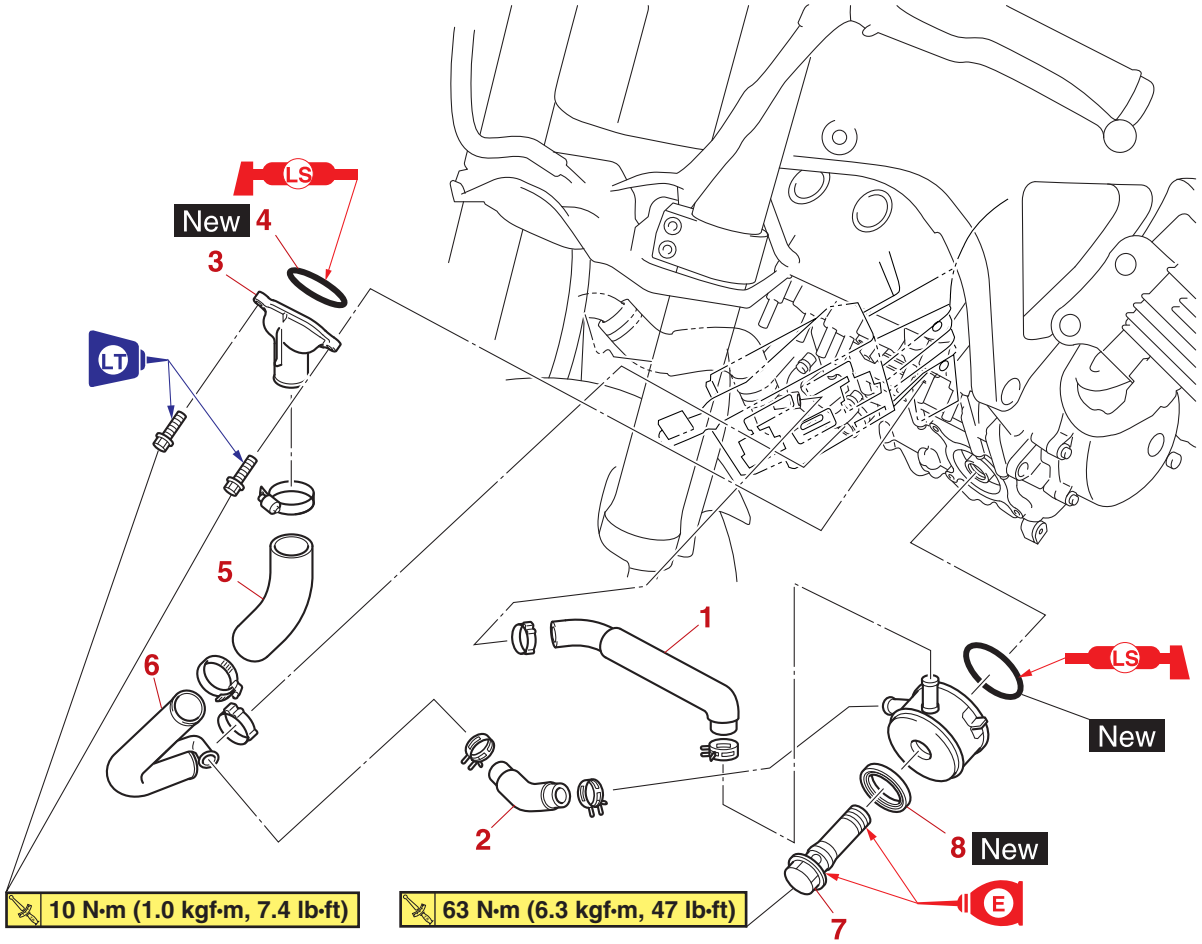
Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A



   b. Apply 100 kPa (14.50 psi) (1.0 kg/cm²) of pressure.
   c. Measure the indicated pressure with the gauge.

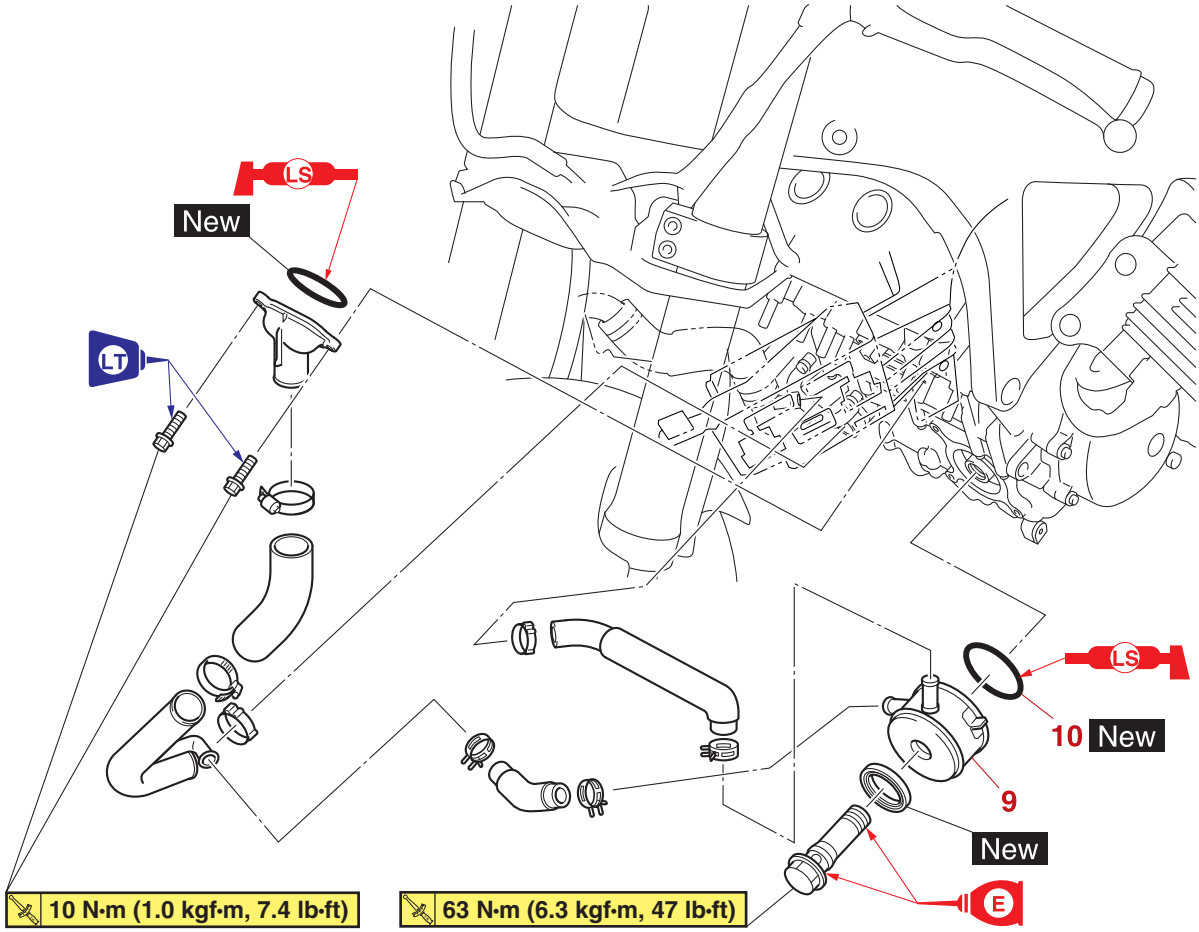
EAS20064
OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-26.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-9.
1	Oil cooler outlet hose	1	
2	Oil cooler inlet hose	1	
3	Water jacket joint	1	
4	O-ring	1	
5	Water jacket joint inlet hose	1	
6	Water pump outlet pipe	1	
7	Oil cooler union bolt	1	
8	Gasket	1	

Removing the oil cooler

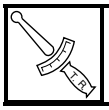


Order	Job/Parts to remove	Q'ty	Remarks
9	Oil cooler	1	
10	O-ring	1	

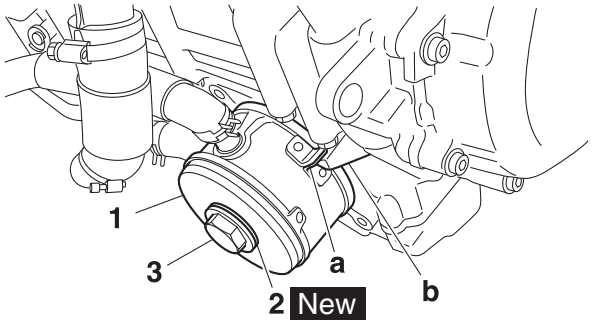
EAS32365
REMOVING THE OIL COOLER
1. Remove:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.

EAS30441
CHECKING THE OIL COOLER
1. Check:
   • Oil cooler
   Cracks/damage → Replace.
2. Check:
   • Oil cooler inlet hose
   • Oil cooler outlet hose
   • Water jacket joint inlet hose
   Cracks/damage/wear → Replace.
3. Check:
   • Water pump outlet pipe
   Damage → Replace.
   Obstruction → Wash and blow out with compressed air.

EAS30442
INSTALLING THE OIL COOLER
1. Clean:
   • Mating surfaces of the oil cooler and the crankcase
   (with a cloth dampened with lacquer thinner)
2. Install:
   • O-ring New
   • Oil cooler “1”
   • Gasket “2” New
   • Oil cooler union bolt “3”

	**Oil cooler union bolt** **63 N·m (6.3 kgf·m, 47 lb·ft)**

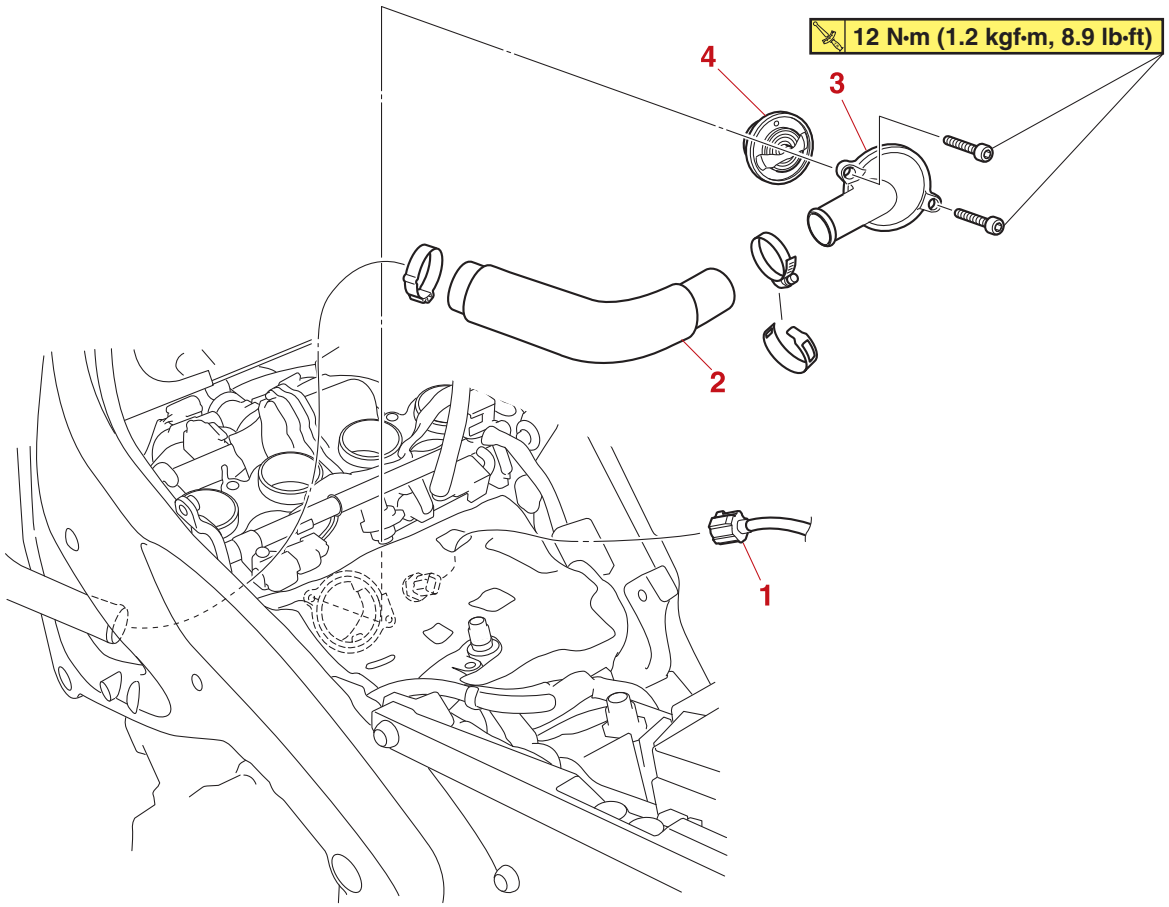
TIP
- Before installing the oil cooler, lubricate the its union bolt with a thin coat of engine oil.
- Make sure the O-ring is positioned properly.
- Make sure the projection “a” on the oil cooler touches the projection “b” on the crankcase.



3. Install:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.
4. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-29.
   • Crankcase
   (with the specified amount of the recommended engine oil)
   Refer to “CHANGING THE ENGINE OIL” on page 3-26.
5. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.

EAS20065
THERMOSTAT

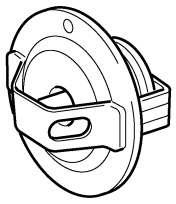
Removing the thermostat



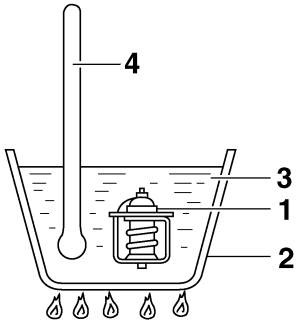
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
1	Coolant temperature sensor coupler	1	Disconnect.
2	Thermostat outlet hose	1	
3	Thermostat cover	1	
4	Thermostat	1	

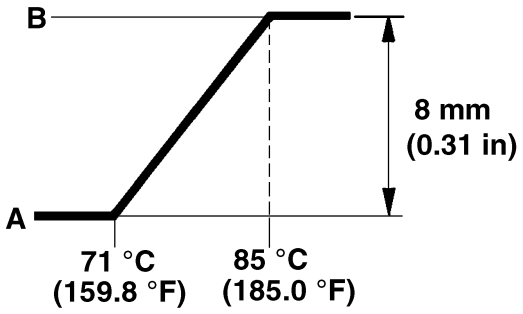
EAS32366
REMOVING THE THERMOSTAT
1. Remove:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.

EAS30443
CHECKING THE THERMOSTAT
1. Check:
   • Thermostat
   Does not open at 71–85 °C (159.8–185.0 °F)
   → Replace.



a. Suspend the thermostat “1” in a container “2” filled with water.
b. Slowly heat the water “3”.
c. Place a thermometer “4” in the water.
d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.





A. Fully closed
B. Fully open

TIP

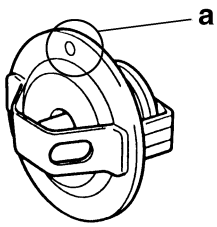
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:
   • Thermostat cover
   Cracks/damage → Replace.

EAS30939
INSTALLING THE THERMOSTAT
1. Install:
   • Thermostat

TIP

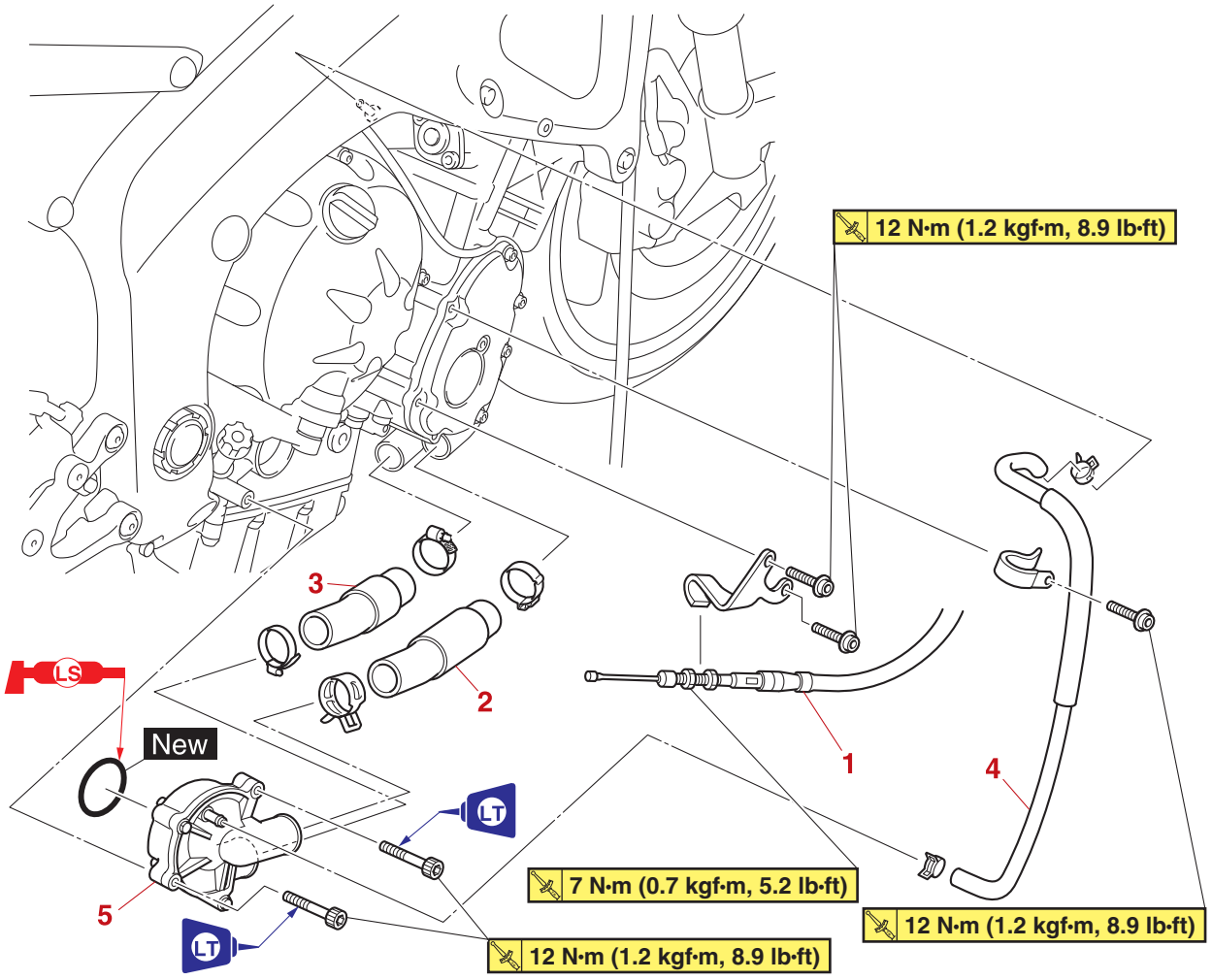
Install the thermostat with its breather hole “a” facing up.



2. Install:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.
3. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-29.
4. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.

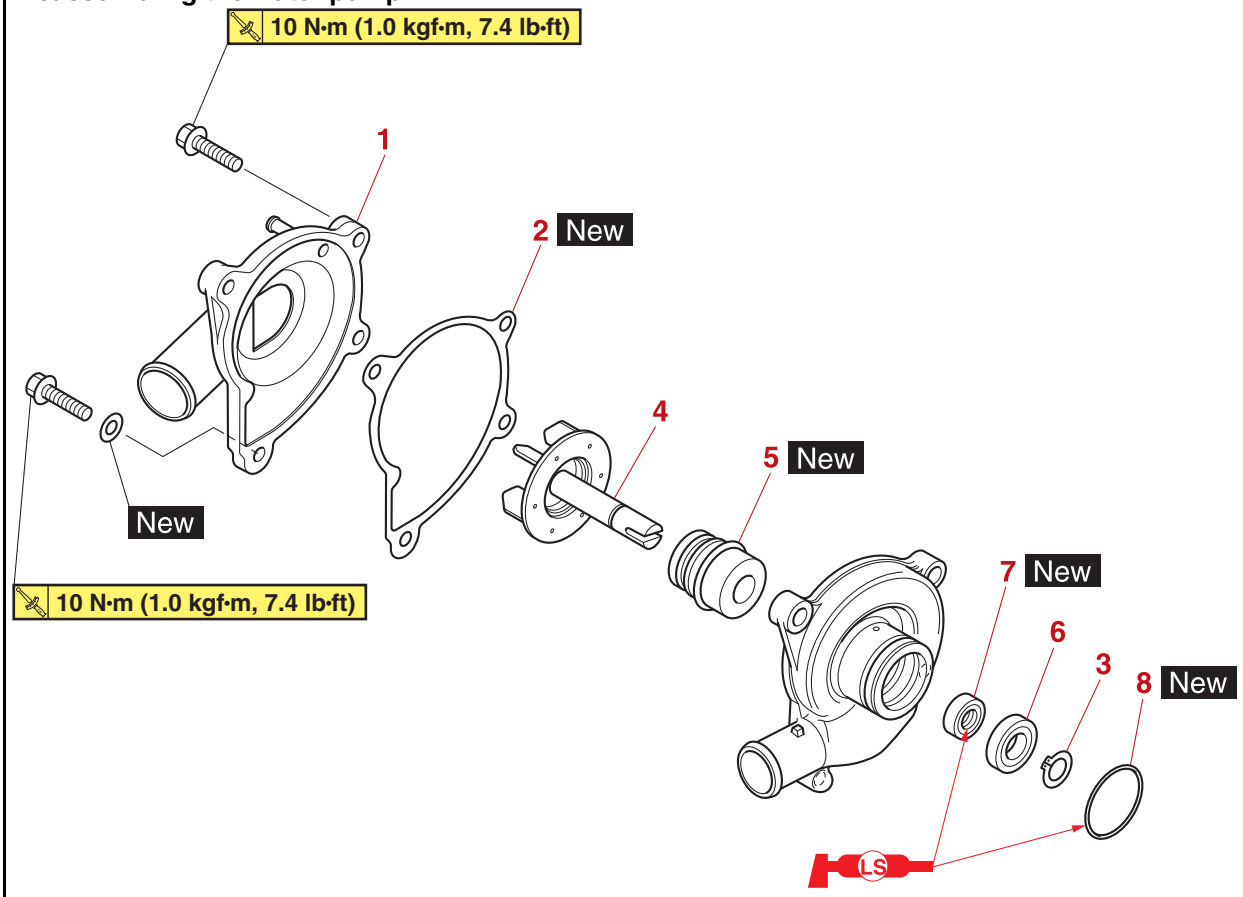
EAS20066
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
			It is not necessary to remove the water pump unless the coolant level is extremely low or the coolant contains engine oil.
	Front side cowling/Bottom cowling		Refer to "GENERAL CHASSIS (5)" on page 4-8.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-29.
1	Clutch cable	1	Disconnect.
2	Water pump inlet hose	1	
3	Water pump outlet hose	1	
4	Water pump breather hose	1	
5	Water pump assembly	1	

Disassembling the water pump



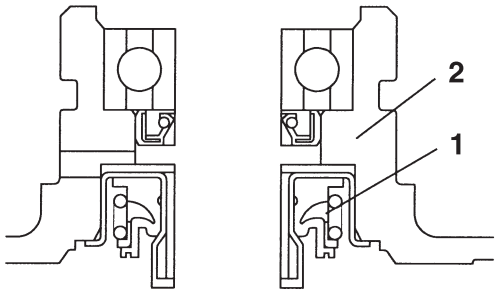
Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	Gasket	1	
3	Circlip	1	
4	Impeller shaft (along with the impeller)	1	
5	Mechanical seal	1	
6	Bearing	1	
7	Oil seal	1	
8	O-ring	1	

EAS32367
REMOVING THE WATER PUMP
1. Remove:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.

EAS30446
DISASSEMBLING THE WATER PUMP
1. Remove:
   • Circlip
   • Impeller shaft
2. Remove:
   • Mechanical seal (housing side) “1”

TIP

Remove the mechanical seal (housing side) from the outside of the water pump housing.

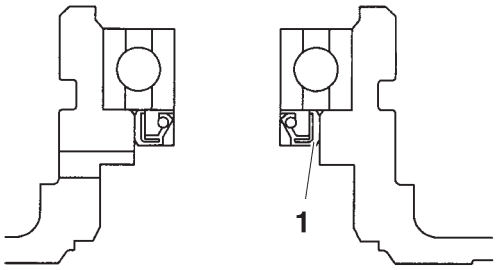


2. Water pump housing

3. Remove:
   • Oil seal “1”
   (with a thin, flat-head screwdriver)

TIP

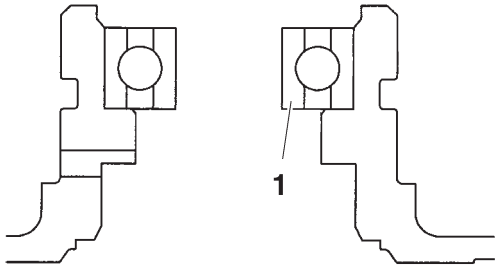
Remove the oil seal from the outside of the water pump housing.



4. Remove:
   • Bearing “1”

TIP

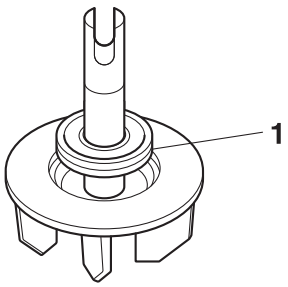
Remove the bearing from inside of the water pump housing.



5. Remove:
   • Mechanical seal (impeller side) “1”
   (from the impeller, with a thin, flat-head screwdriver)

TIP

Do not scratch the impeller shaft.

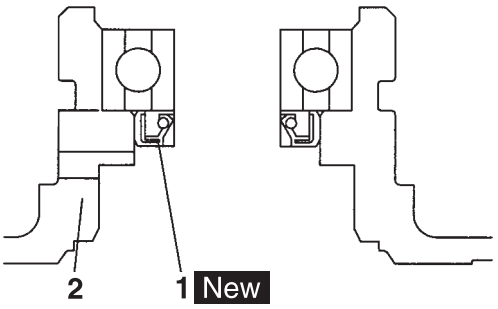


EAS30447
CHECKING THE WATER PUMP
1. Check:
   • Water pump housing cover
   • Water pump housing
   • Impeller shaft
   Cracks/damage/wear → Replace.
2. Check:
   • Bearing
   Rough movement → Replace.
3. Check:
   • Water pump inlet pipe
   • Water pump outlet hose
   • Water pump breather hose
   Cracks/damage/wear → Replace.

EAS30448
ASSEMBLING THE WATER PUMP
1. Install:
   • Oil seal “1” New
   (into the water pump housing “2”)

TIP

- Before installing the oil seal, apply tap water or coolant onto its out surface.
- Install the oil seal with a socket that matches its outside diameter.



2. Install:
   • Mechanical seal (housing side) “1” New (into the water pump housing “2”)

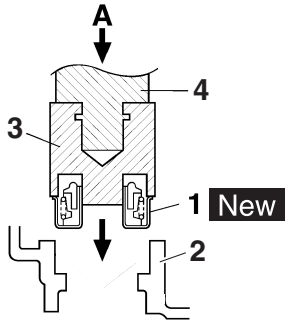
ECA20330
NOTICE

Never lubricate the mechanical seal (housing side) surface with oil or grease.

TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the water pump housing.

Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058

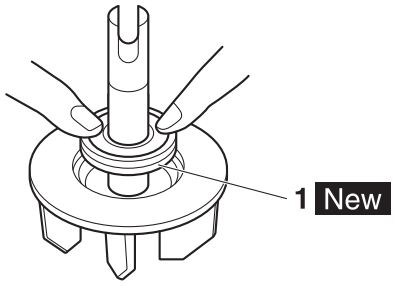


A. Push down
3. Mechanical seal installer
4. Middle driven shaft bearing driver

3. Install:
   • Mechanical seal (impeller side) “1” New

TIP

Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.

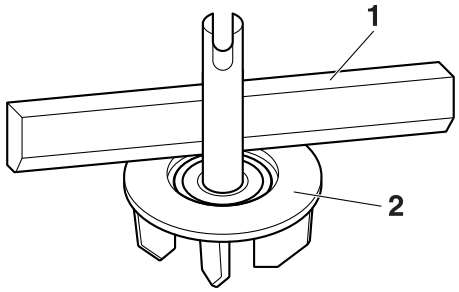


4. Measure:
   • Impeller shaft tilt
   Out of specification → Repeat steps (3) and (4).

ECA20340
NOTICE

Make sure the mechanical seal (impeller side) is flush with the impeller.

Impeller shaft tilt limit
0.15 mm (0.006 in)



1. Straightedge
2. Impeller

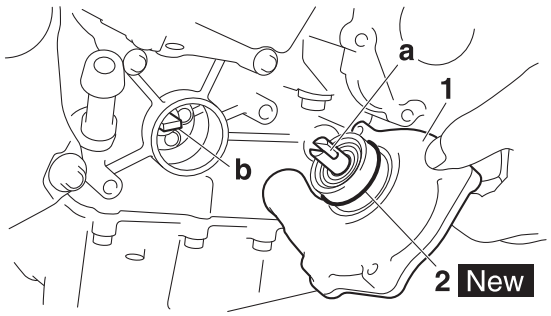
EAS30449
INSTALLING THE WATER PUMP

1. Install:
   • Water pump assembly “1”
   • O-ring “2” New

Water pump assembly bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

• Align the slit “a” on the impeller shaft with the projection “b” on the oil pump shaft.
• Lubricate the O-ring with a thin coat of lithium-soap-based grease.



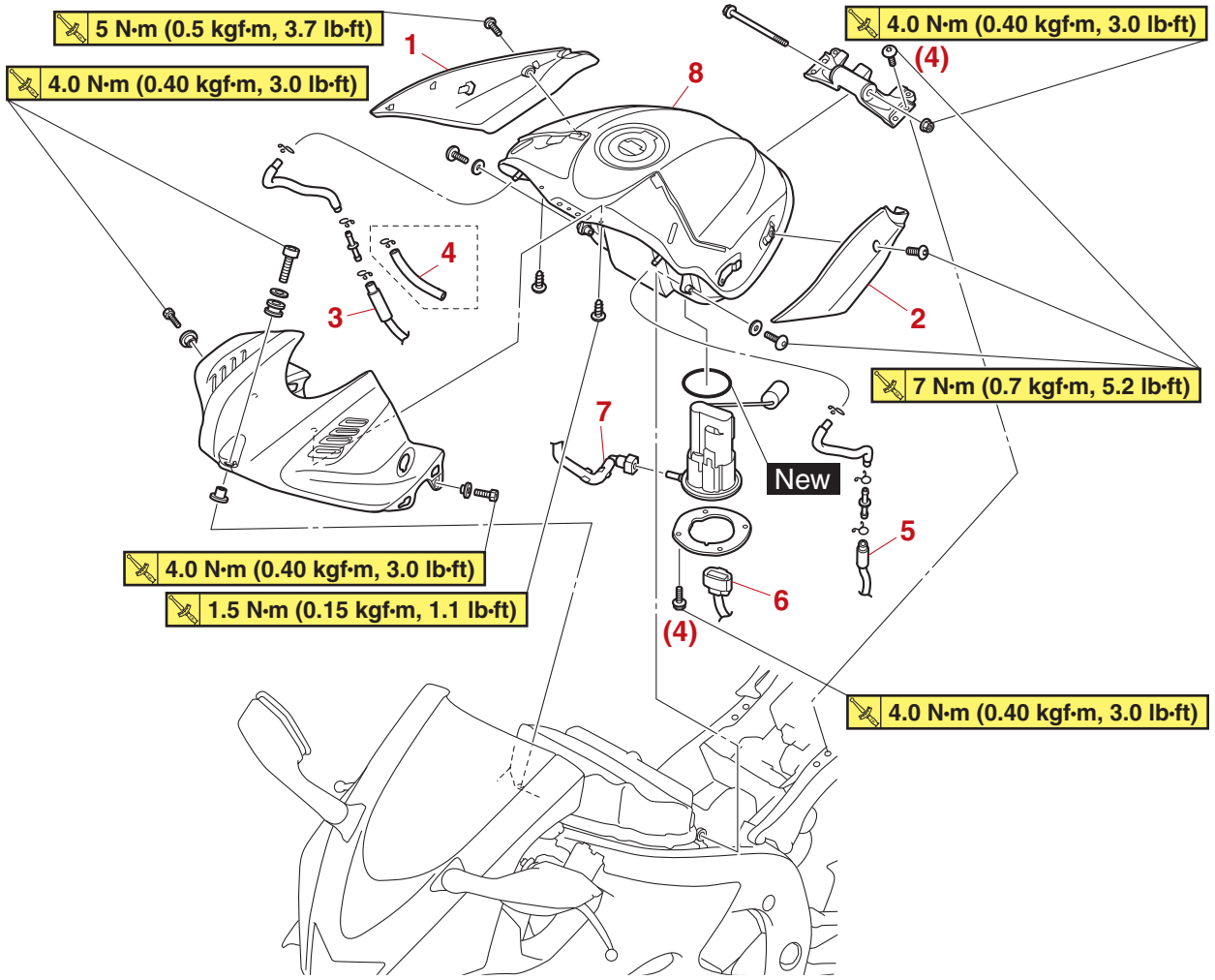
2. Install:
   • Hose clamp (Clic-R)
   Refer to “RADIATOR” on page 6-3.
3. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-29.
4. Check:
   • Cooling system
   Leaks → Repair or replace the faulty part.

FUEL SYSTEM

EAS20067

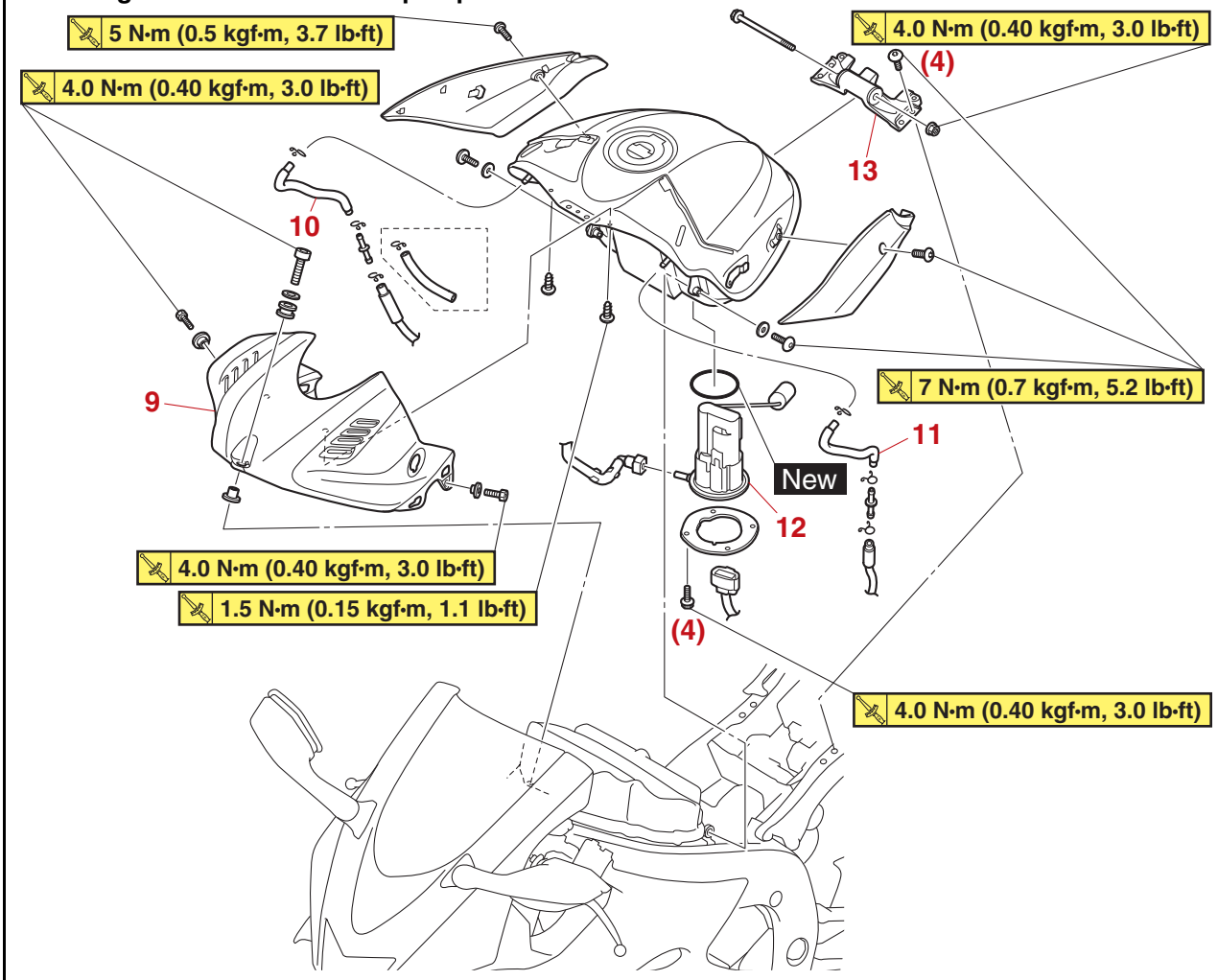
FUEL TANK

Removing the fuel tank and fuel pump



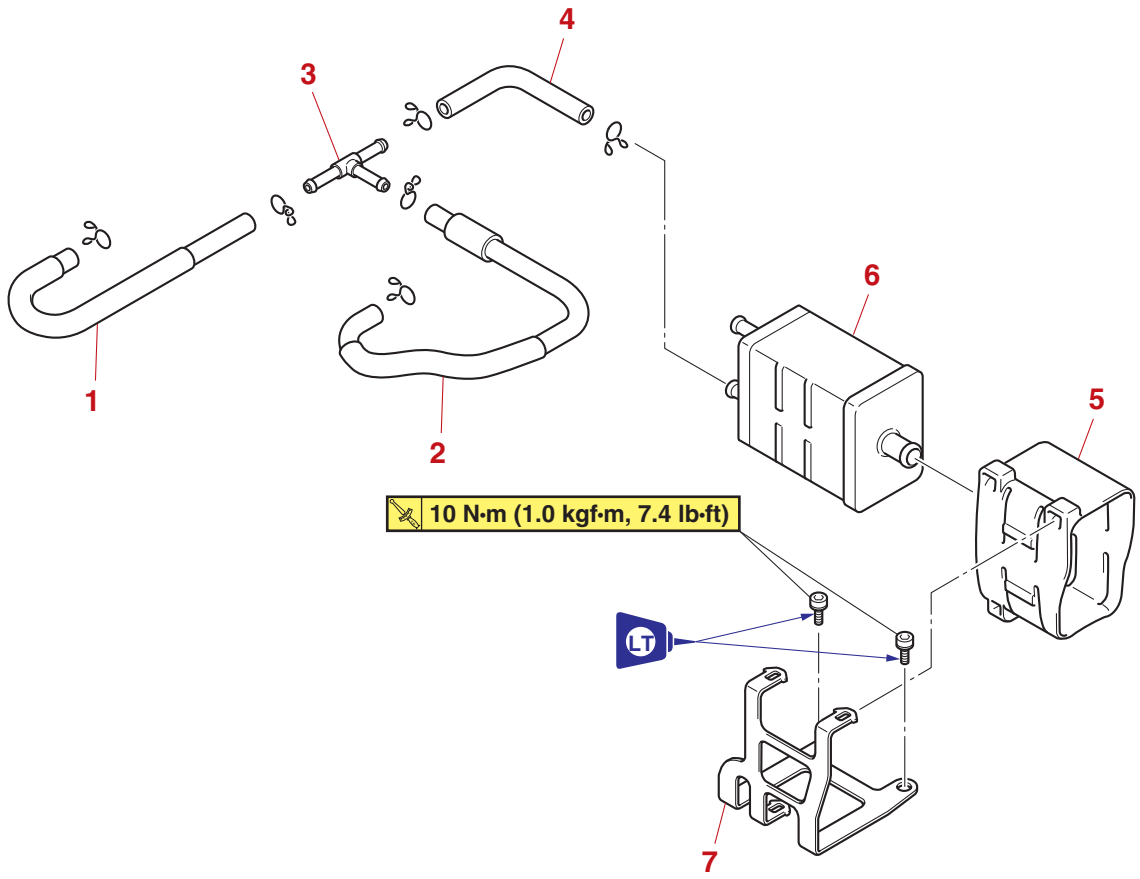
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Fuel tank cover (right)	1	
2	Fuel tank cover (left)	1	
3	Fuel tank breather hose (hose joint to atmosphere)	1	Disconnect. Except for California
4	Fuel tank breather hose (hose joint to canister)	1	Disconnect. For California only
5	Fuel tank overflow hose (hose joint to atmosphere)	1	Disconnect.
6	Fuel pump coupler	1	Disconnect.
7	Fuel hose (fuel tank side)	1	Disconnect.
8	Fuel tank	1	

Removing the fuel tank and fuel pump



Order	Job/Parts to remove	Q'ty	Remarks
9	Fuel tank cover (top)	1	
10	Fuel tank breather hose (fuel tank to hose joint)	1	
11	Fuel tank overflow hose (fuel tank to hose joint)	1	
12	Fuel pump	1	
13	Fuel tank bracket	1	

Removing the canister (for California only)



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
1	Canister purge hose (throttle body-#4 to 3-way joint)	1	
2	Canister purge hose (throttle body-#2 to 3-way joint)	1	
3	3-way joint	1	
4	Canister purge hose (3-way joint to canister)	1	
5	Canister holder	1	
6	Canister	1	
7	Canister bracket	1	

EAS30450
REMOVING THE FUEL TANK

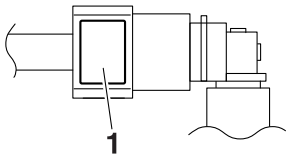
1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel pump coupler
   - Fuel hose (fuel tank side)
   - Fuel tank breather hose (hose joint to atmosphere) (except for California)
   - Fuel tank breather hose (hose joint to canister) (for California only)
   - Fuel tank overflow hose (hose joint to atmosphere)

EWA17610
⚠ 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 remove the fuel hose from the fuel pump, press the two buttons “1” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



3. Remove:
   - Fuel tank

TIP

- Place the fuel tank on a level surface.
- Make sure that the fuel pipe does not contact the ground; otherwise, the fuel pump could be damaged.

EAS30451
REMOVING THE FUEL PUMP

1. Remove:
   - Fuel pump

ECA14721
NOTICE

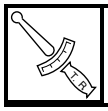
- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

EAS30454
CHECKING THE FUEL PUMP BODY

1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.

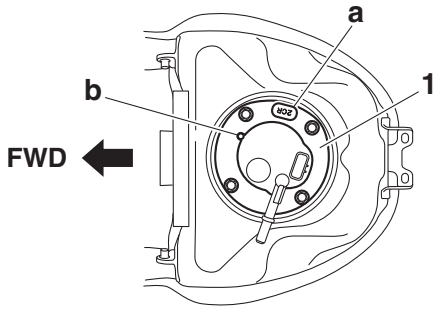
EAS30456
INSTALLING THE FUEL PUMP

1. Tighten:
   - Fuel pump

	**Fuel pump bolt** **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

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.
- Install the fuel pump bracket “1” with the stamped mark “a” facing outward.
- Align the projection “b” on the fuel pump with the slot in the fuel pump bracket.



EAS30457
INSTALLING THE FUEL TANK

1. Connect:
   - Fuel hose (fuel tank side)

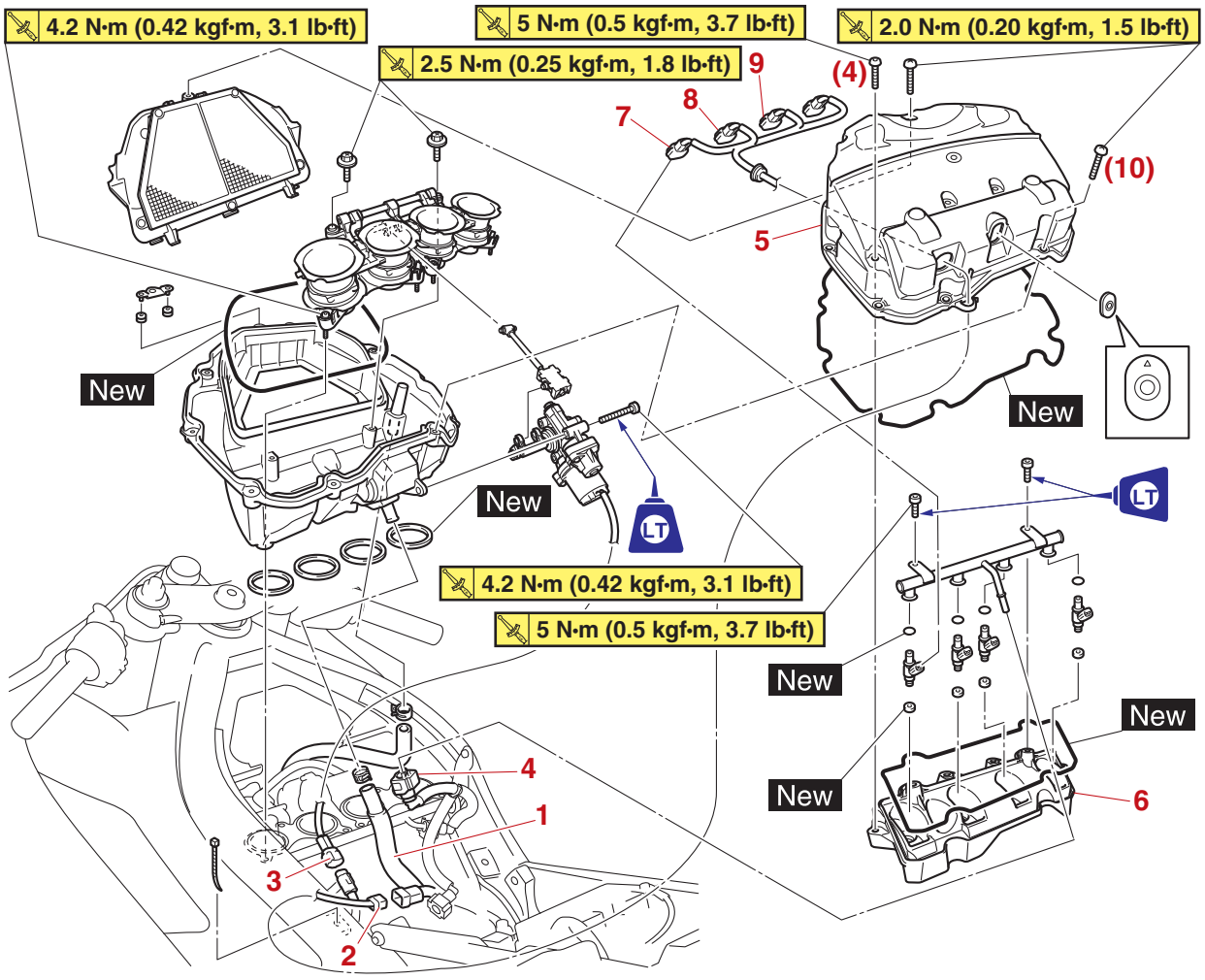
TIP

Install the fuel hose securely onto the fuel pump until a distinct “click” is heard.

EAS20068

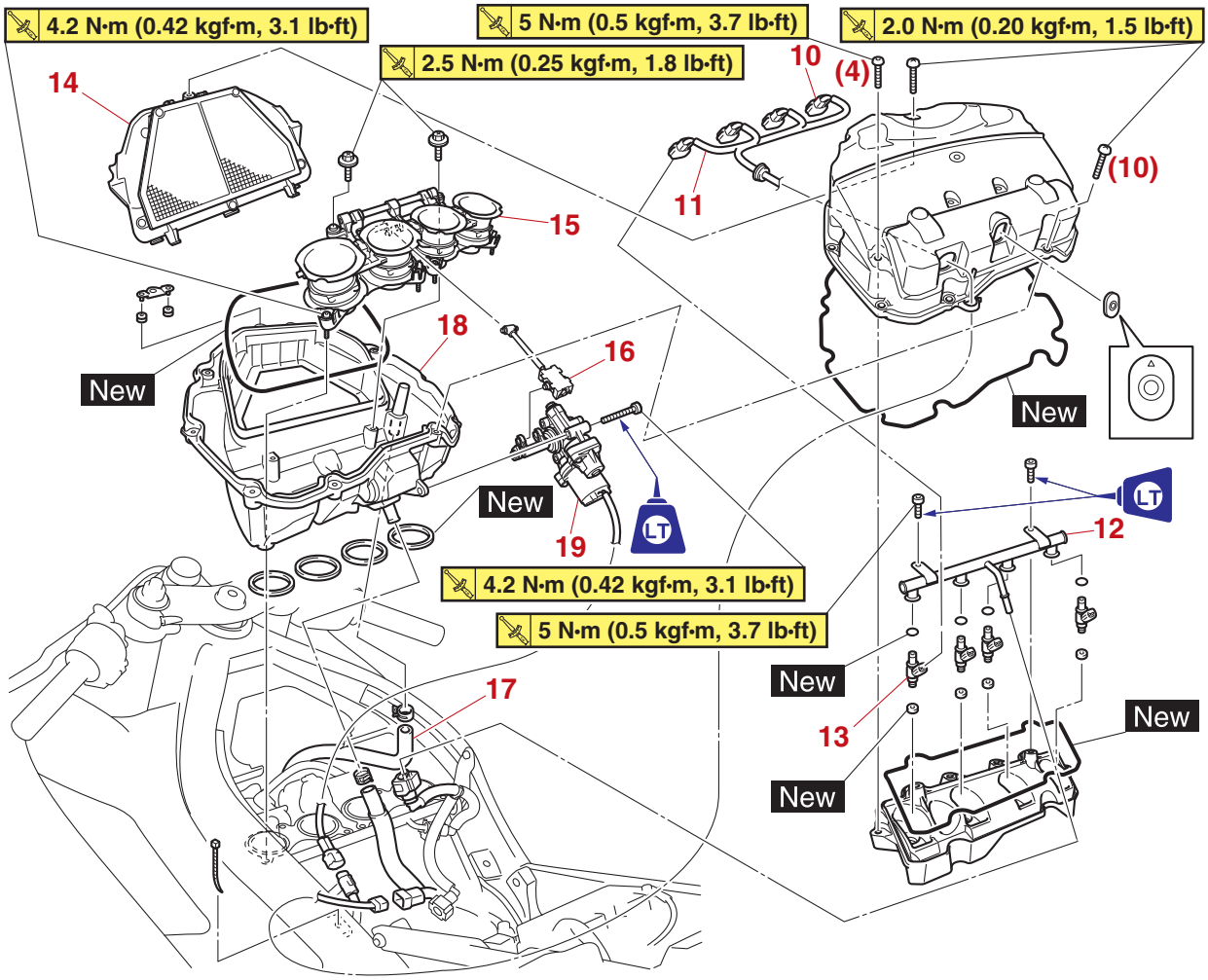
AIR FILTER CASE

Removing the air filter case and secondary injectors



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Crankcase breather hose	1	Disconnect.
2	Sub-wire harness coupler	1	Disconnect.
3	Intake funnel servo motor coupler	1	
4	Fuel hose (secondary injector fuel rail side)	1	Disconnect.
5	Upper air filter case	1	
6	Secondary injector holder	1	
7	Cylinder-#1 secondary injector coupler	1	Disconnect.
8	Cylinder-#2 secondary injector coupler	1	Disconnect.
9	Cylinder-#3 secondary injector coupler	1	Disconnect.

Removing the air filter case and secondary injectors



Order	Job/Parts to remove	Q'ty	Remarks
10	Cylinder-#4 secondary injector coupler	1	Disconnect.
11	Sub-wire harness	1	
12	Secondary injector fuel rail	1	
13	Secondary injector	4	
14	Air filter element	1	
15	Intake funnel assembly	1	
16	Intake funnel servo motor rod assembly	1	
17	Air induction system hose (air filter case to air cut-off valve)	1	Disconnect.
18	Lower air filter case	1	
19	Intake funnel servo motor	1	

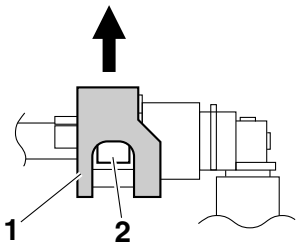
EAS30459
REMOVING THE FUEL HOSE (PRIMARY INJECTOR FUEL RAIL SIDE AND SECONDARY INJECTOR FUEL RAIL SIDE)
1. Remove:
   • Fuel hose (primary injector fuel rail side and secondary injector fuel rail side)

EWA17610
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

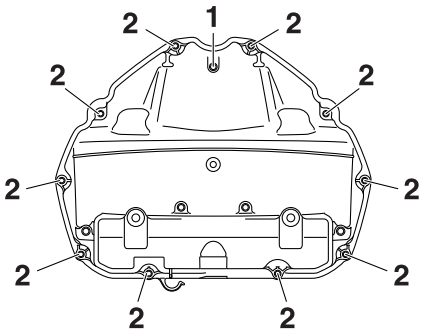
- To remove the fuel hose from the secondary injector fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



EAS31663
REMOVING THE AIR FILTER CASE
1. Remove:
   • Upper air filter case

TIP

Loosen the upper air filter case bolts in proper sequence as shown.



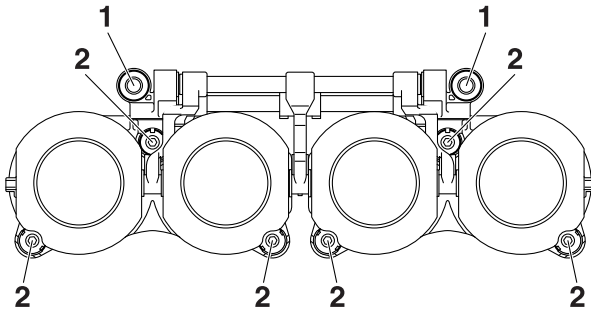
EAS30458
CHECKING THE SECONDARY INJECTORS (BEFORE REMOVING)
1. Check:
   • Injectors
   Use the diagnostic code numbers "40"–"43". Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.

EAS30462
CHECKING THE SECONDARY INJECTORS
1. Check:
   • Injectors
   Damage → Replace.

EAS30461
REMOVING THE INTAKE FUNNEL
1. Remove:
   • Intake funnel joint bolts
   • Intake funnel assembly
   • Intake funnel servo motor rod assembly

TIP

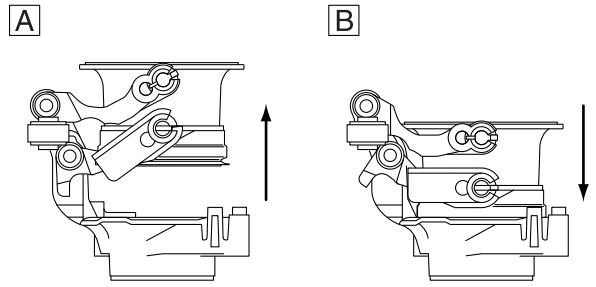
Loosen the intake funnel joint bolts in proper sequence as shown.



EAS30463
CHECKING THE INTAKE FUNNEL
1. Check:
   • Intake funnel servo motor rod assembly
   Damage/scratches → Replace.
   • Intake funnel assembly
   Cracks/damage → Replace.
2. Check:
   • Intake funnel movement
   Sticks → Replace the intake funnel assembly.

ECA17550
NOTICE

- **Make sure that the intake funnel smoothly moves to the contacting surface between upper stopper and lower seating position when it is moved by hand.**
- **Make sure that the intake funnel smoothly strokes from the upper position to the seating position by its own weight.**



A. Upper
B. Lower

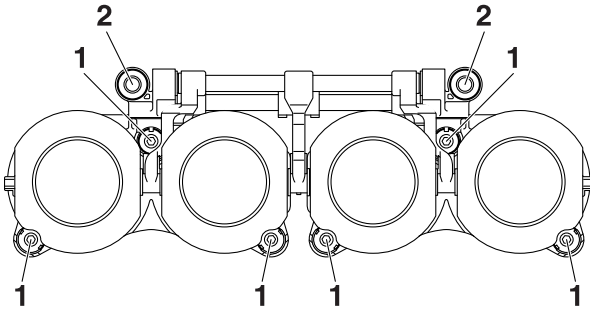
EAS30464
INSTALLING THE INTAKE FUNNEL

1. Install:
   - Intake funnel servo motor rod assembly
   - Intake funnel assembly
2. Tighten:
   - Intake funnel joint bolts "1"

	Intake funnel joint bolt 1 **4.2 N·m (0.42 kgf·m, 3.1 lb·ft)**

   - Intake funnel joint bolts "2"

	Intake funnel joint bolt 2 **2.5 N·m (0.25 kgf·m, 1.8 lb·ft)**



EAS30465
CHECKING THE INTAKE FUNNEL OPERATION

1. Check:
   - Intake funnel operation
     a. Activate the diagnostic mode and select the diagnostic code number "34". Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.
     b. Set the engine stop switch to "○".
     c. Check that the intake funnel operate smoothly strokes from the upper position to the lower seating position.

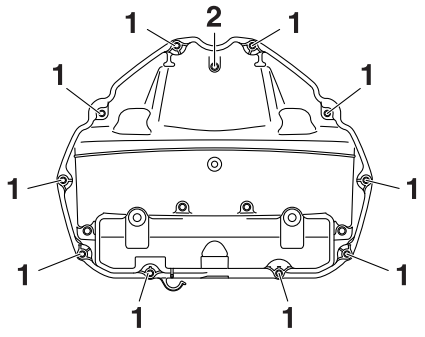
EAS31618
INSTALLING THE AIR FILTER CASE

1. Install:
   - Upper air filter case

	Upper air filter case to lower air filter case bolt **2.0 N·m (0.20 kgf·m, 1.5 lb·ft)** **Air filter bolt** **2.0 N·m (0.20 kgf·m, 1.5 lb·ft)**

TIP

Tighten the upper air filter case to lower air filter case bolts and air filter bolt in proper sequence as shown.



EAS30468
INSTALLING THE FUEL HOSE (PRIMARY INJECTOR FUEL RAIL SIDE AND SECONDARY INJECTOR FUEL RAIL SIDE)

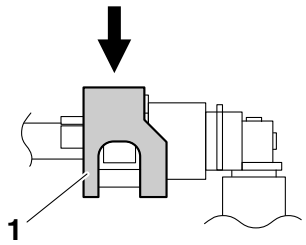
1. Connect:
   - Fuel hose (primary injector fuel rail side and secondary injector fuel rail side)

ECA17500
NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

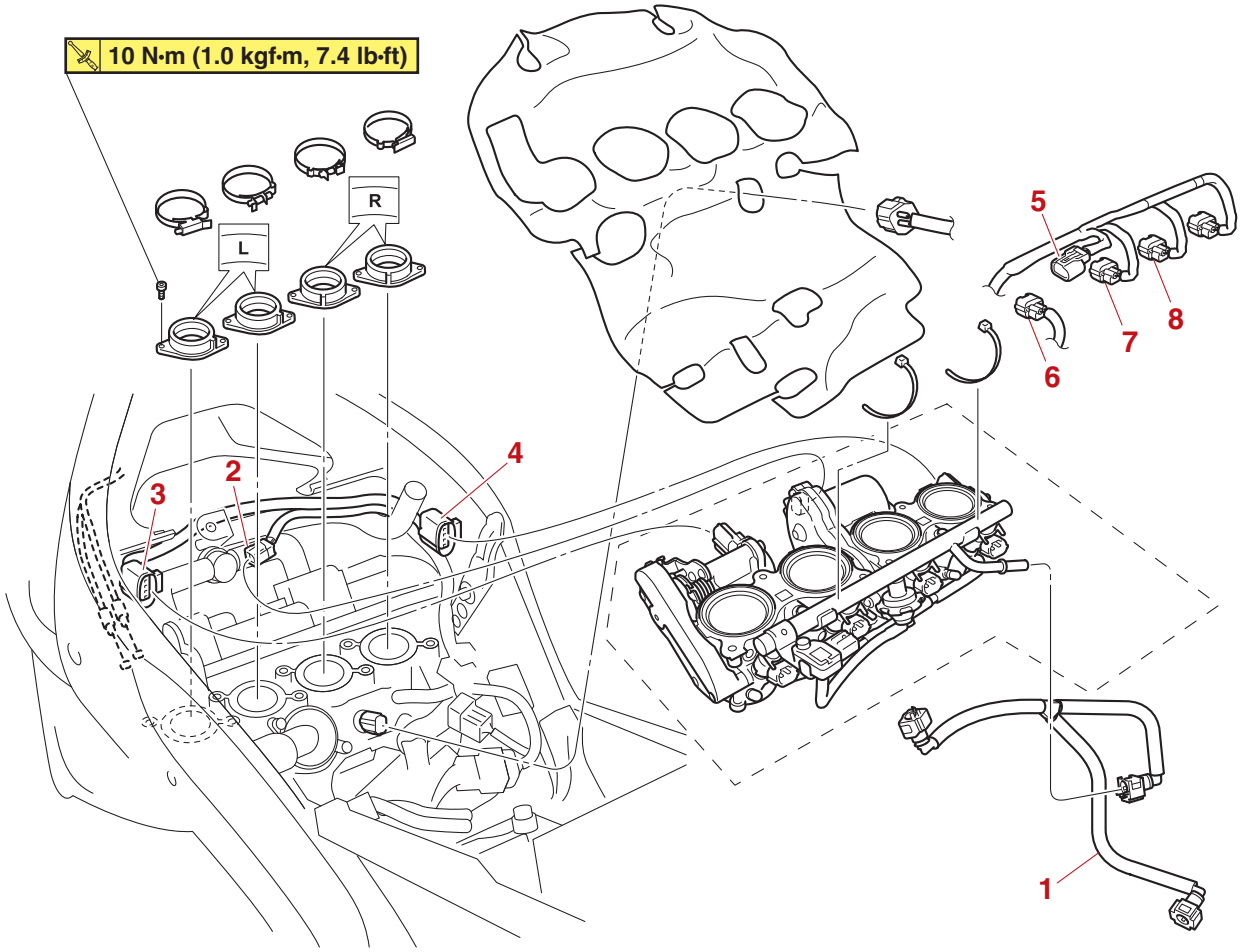
TIP

- Install the fuel hose securely onto the secondary injector fuel rail until a distinct "click" is heard.
- To install the fuel hose onto the secondary injector fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.


1

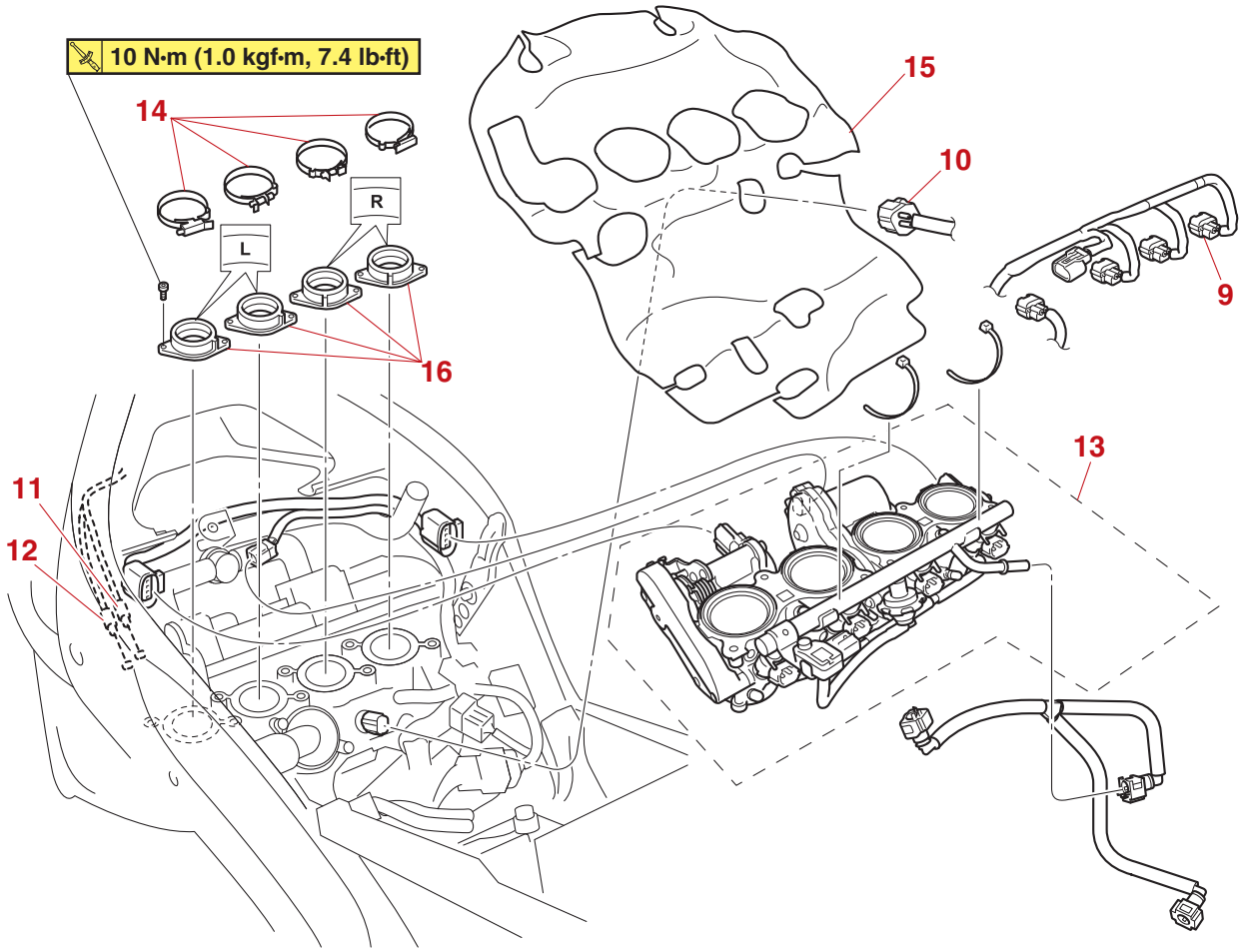
EAS20070
THROTTLE BODIES

Removing the throttle body assembly



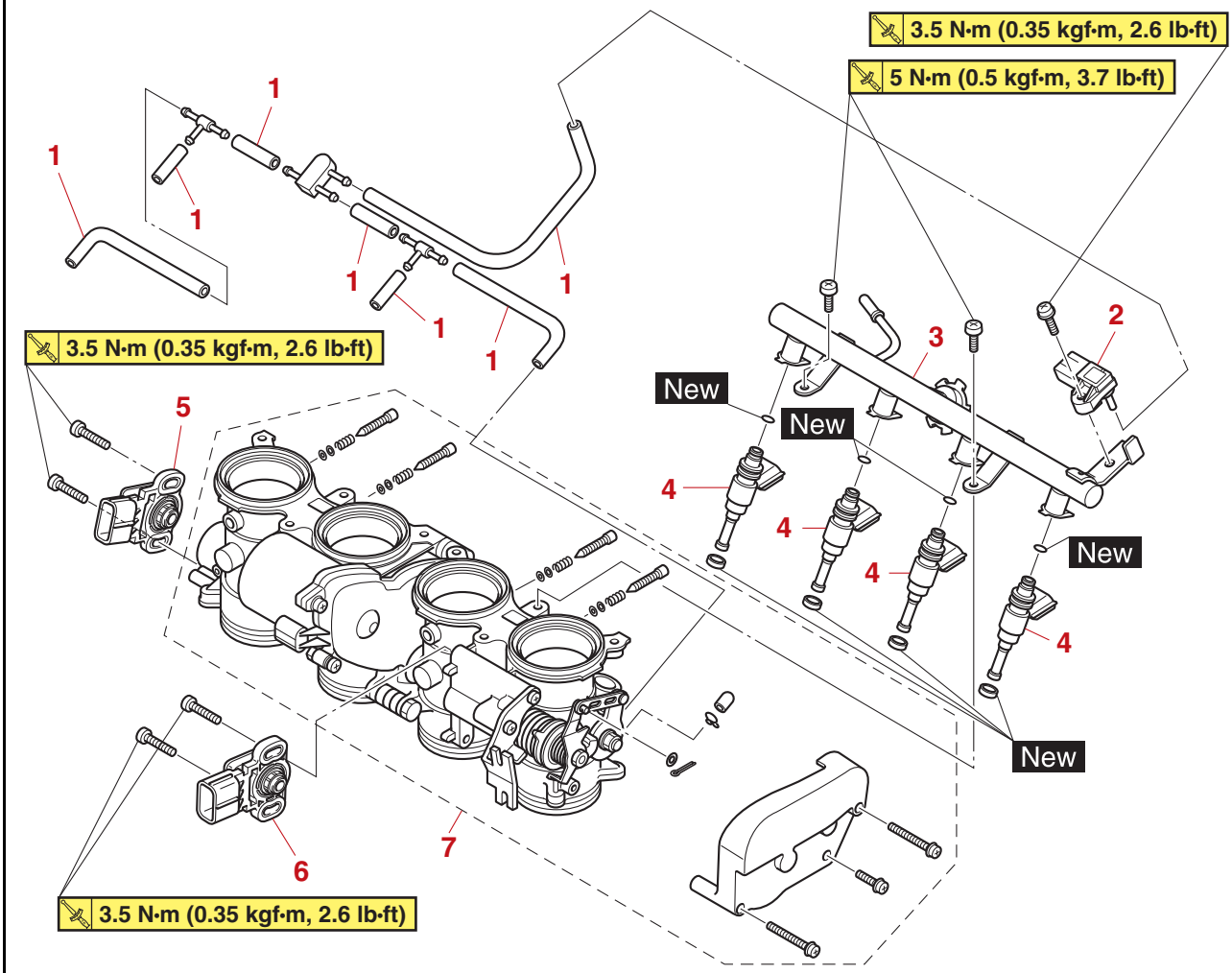
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
	Canister		Refer to "FUEL TANK" on page 7-1. For California only
	Air induction system cover		Refer to "AIR INDUCTION SYSTEM" on page 7-19.
1	Fuel hose	1	
2	Throttle servo motor coupler	1	Disconnect.
3	Accelerator position sensor	1	Disconnect.
4	Throttle position sensor	1	Disconnect.
5	Intake air pressure sensor coupler	1	Disconnect.
6	Cylinder-#1 primary injector coupler	1	Disconnect.
7	Cylinder-#2 primary injector coupler	1	Disconnect.
8	Cylinder-#3 primary injector coupler	1	Disconnect.

Removing the throttle body assembly



Order	Job/Parts to remove	Q'ty	Remarks
9	Cylinder-#4 primary injector coupler	1	Disconnect.
10	Coolant temperature sensor coupler	1	Disconnect.
11	Throttle cable (decelerator cable)	1	
12	Throttle cable (accelerator cable)	1	
13	Throttle body assembly	1	
14	Throttle body joint clamp	4	
15	Heat protector	1	
16	Throttle body joint	4	

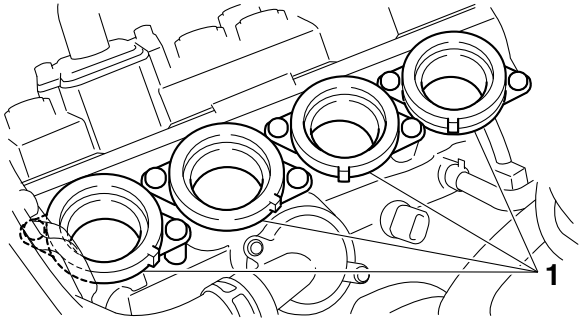
Removing the primary injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Intake air pressure sensor hose	7	
2	Intake air pressure sensor	1	
3	Primary injector fuel rail	1	
4	Primary injector	4	
5	Throttle position sensor	1	
6	Accelerator position sensor	1	
7	Throttle bodies	1	

EAS31666
CHECKING THE PRIMARY INJECTORS (BEFORE REMOVING)
1. Check:
   • Injectors
   Use the diagnostic code numbers “36”–“39”.
   Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.

EAS30792
CHECKING THE THROTTLE BODY JOINTS
The following procedure applies to all of the throttle body joints.
1. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Air filter case
   Refer to “AIR FILTER CASE” on page 7-5.
   • Throttle body
   Refer to “THROTTLE BODIES” on page 7-10.
2. Check:
   • Throttle body joints “1”
   Cracks/damage → Replace.



3. Install:
   • Throttle body
   Refer to “THROTTLE BODIES” on page 7-10.
   • Air filter case
   Refer to “AIR FILTER CASE” on page 7-5.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS31668
CHECKING THE PRIMARY INJECTORS
1. Check:
   • Injectors
   Damage → Replace.

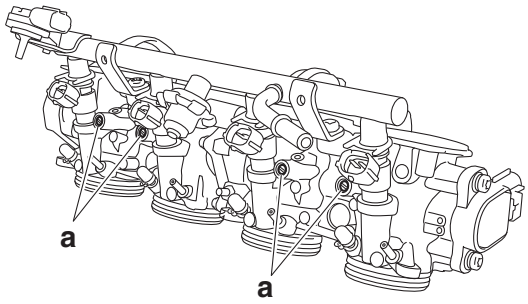
EAS30769
CHECKING AND CLEANING THE THROTTLE BODIES
TIP
Before cleaning the throttle bodies, check the following items:
- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Crankcase breather hose
- Vacuum hose

EWA17340
⚠ WARNING
If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.

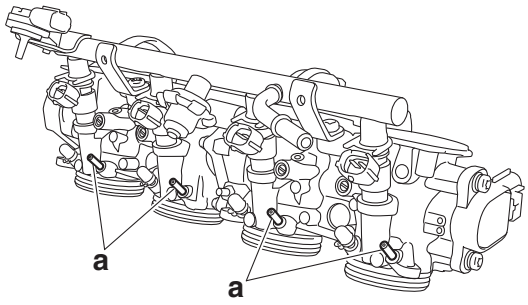
1. Check:
   • Throttle bodies
   Cracks/damage → Replace the throttle bodies as a set.
2. Clean:
   • Throttle bodies

ECA21540
NOTICE
- **Observe the following precautions; otherwise, the throttle bodies may not operate properly.**
- **Do not subject the throttle bodies to excessive force.**
- **Clean the throttle bodies in the recommended cleaning solvent.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.**
- **Be careful not to remove the white paint mark that identifies the standard throttle body.**
- **Do not turn the bypass air screws “a”; otherwise, the throttle body synchronization will be affected.**

	Recommended cleaning solvent **Yamaha Oil & Brake Cleaner**



a. Place the throttle bodies on a flat surface with the air filter case side facing up.
b. Install the suitable caps onto the hose fittings "a".



c. Hold the throttle valves in the open position.

EWA15940

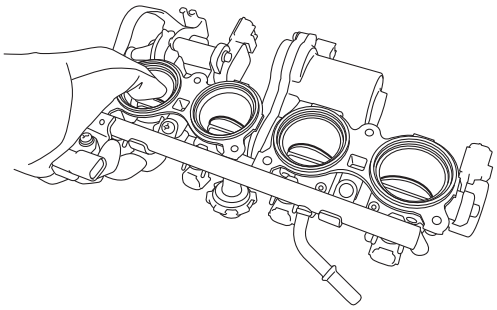
⚠ WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA20380

NOTICE

- **Do not open the throttle valves by supplying electrical power to the throttle bodies.**
- **Do not use tools to open the throttle valves or to keep them in the open position.**
- **Do not open the throttle valves quickly.**



d. Apply the recommended cleaning solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any cleaning solvent to enter the opening for the injectors.
- Do not apply any cleaning solvent to the portions of the throttle valve shafts between the throttle bodies.

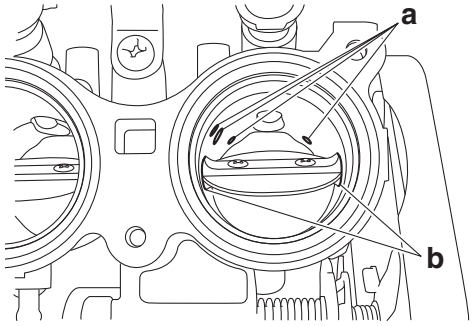
e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ECA17590

NOTICE

- **Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.**
- **Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.**

f. After removing the carbon deposits, clean the inside of the throttle bodies with the recommended cleaning solvent, and then dry the throttle bodies using compressed air.
g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



3. Install the throttle bodies.
4. Reset:
   - ISC (Idle Speed Control) learning values
     Use the diagnostic code number "67".
     Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.
5. Reset:
   - A/F control learning value
     Use the diagnostic code number "87".

Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.
6. Adjust:
   • Throttle bodies synchronizing
   Out of specification → Replace the throttle bodies.
   Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-9.

EAS31160
REPLACING THE THROTTLE BODIES

1. Remove the throttle bodies from the vehicle.
2. Install a new throttle bodies to the vehicle.
3. Reset:
   • ISC (Idle Speed Control) learning values
   Use the diagnostic code number “67”.
   Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.
4. Reset:
   • A/F control learning value
   Use the diagnostic code number “87”.
   Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.
5. Adjust:
   • Throttle bodies synchronizing
   Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-9.
6. Place the vehicle on a maintenance stand so that the rear wheel is elevated.
7. Check:
   • Engine idling speed
   Start the engine, warm it up, and then measure the engine idling speed.

	Engine idling speed **1250–1350 r/min**

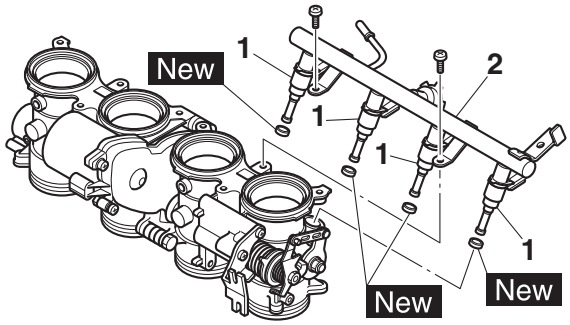
EAS30480
INSTALLING THE INJECTORS

ECA21550
NOTICE

- **Always use new O-rings.**
- **When installing the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rails, or O-rings.**
- **Be careful not to twist or pinch the O-rings when installing the injectors.**
- **When installing the injector, install it at the same position as the removed cylinder.**
- **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. Install a new seal onto the end of each injector.
2. Install the injectors “1” to the fuel rail “2”.
3. Install the injector assemblies to the throttle bodies.

	Fuel rail screw (throttle body) **5 N·m (0.5 kgf·m, 3.7 lb·ft)**



4. Check the injector pressure after the injectors are installed.
   Refer to “CHECKING THE INJECTOR PRESSURE” on page 7-15.

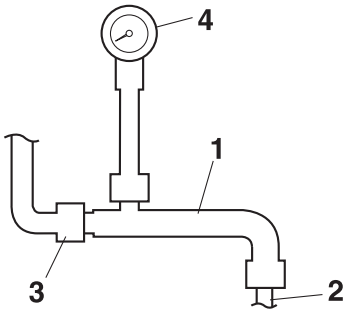
EAS30481
CHECKING THE INJECTOR PRESSURE

TIP

- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

1. Check:
   • Injector pressure
   a. Connect the fuel injector pressure adapter “1” to the injector joint “2”, and then connect an air compressor “3” to the adapter.
   b. Connect the pressure gauge “4” to the fuel injector pressure adapter “1”.

	Pressure gauge **90890-03153** **Pressure gauge** **YU-03153** **Fuel injector pressure adapter** **90890-03210** **Fuel injector pressure adapter** **YU-03210**



c. Close the valve on the injector pressure adapter.
d. Apply air pressure with the air compressor.
e. Open the valve on the injector pressure adapter until the specified pressure is reached.

Specified air pressure
490 kPa (5.0 kgf/cm², 71.1 psi)

ECA17600
NOTICE

Never exceed the specified air pressure or damage could occur.

f. Close the valve on the injector pressure adapter.
g. Check that the specified air pressure is held at least one minute.
Pressure drops → Check the pressure gauge and adapter.
Check the seals and O-rings and then reinstall.
Out of specification → Replace the fuel injectors.

EAS30482
CHECKING THE FUEL PRESSURE

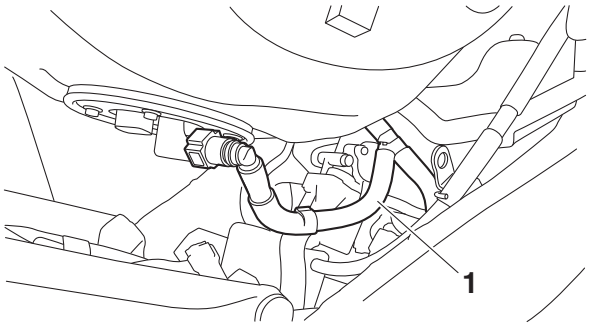
1. Remove:
• Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
2. Check:
• Fuel pressure
a. Remove the fuel tank bolts and hold up the fuel tank.
b. Disconnect the fuel hose "1" from the fuel pump.
Refer to "FUEL TANK" on page 7-1.

EWA17320
WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

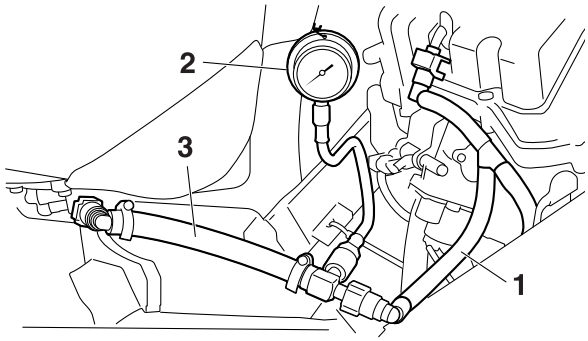
ECA17490
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



c. Connect the pressure gauge "2" and fuel pressure adapter "3" to the fuel hose.

Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel pressure adapter
90890-03176
Fuel pressure adapter
YM-03176



d. Start the engine.
e. Measure the fuel pressure.
Faulty → Replace the fuel pump.

Fuel line pressure (at idle)
300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)

3. Install:
• Fuel tank
Refer to "FUEL TANK" on page 7-1.

• Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30485
ADJUSTING THE THROTTLE POSITION SENSOR

ECA17540
NOTICE

• Handle the throttle position sensor with special care.
• Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

1. Check:
   • Throttle position sensor
   Refer to “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-11.
2. Adjust:
   • Throttle position sensor angle

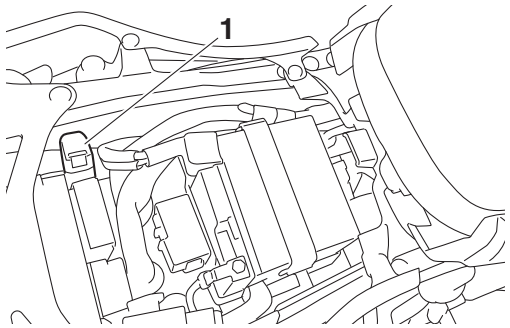
TIP

Before adjusting the throttle position sensor, the throttle bodies must be removed.

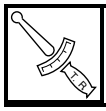
a. Temporary tighten the throttle position sensor bolts.
b. Check that the throttle valves are fully closed.
c. Connect the throttle position sensor to the wire harness.
d. Remove the protective cap “1”, and then connect the Yamaha diagnostic tool to coupler.

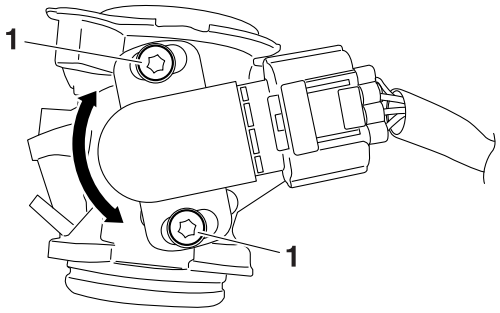
TIP

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



e. Diagnostic code number “01” is selected.
f. Adjust the position of the throttle position sensor angle so that 11–21 can appear in the Yamaha diagnostic tool screen.
g. After adjusting the throttle position sensor angle, tighten the throttle position sensor bolts “1”.

	**Throttle position sensor bolt 3.5 N·m (0.35 kgf·m, 2.6 lb·ft)**



EAS30486
ADJUSTING THE ACCELERATOR POSITION SENSOR

EWA15960
⚠ WARNING

• Handle the accelerator position sensor with special care.
• Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.

1. Check:
   • Accelerator position sensor
   Refer to “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-11.
2. Adjust:
   • Accelerator position sensor angle

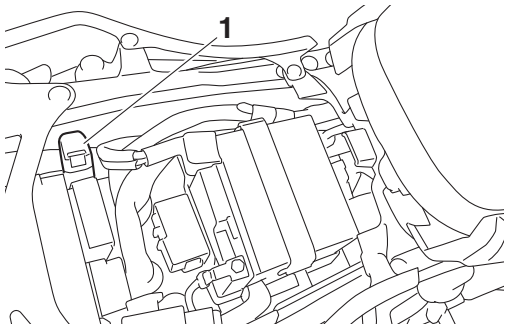
TIP

Before adjusting the accelerator position sensor, the throttle bodies must be removed.

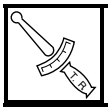
a. Temporary tighten the accelerator position sensor bolts.
b. Check that the throttle valves are fully closed.
c. Connect the accelerator position sensor to the wire harness.
d. Connect the throttle cables to the throttle bodies.
e. Remove the protective cap “1”, and then connect the Yamaha diagnostic tool to coupler.

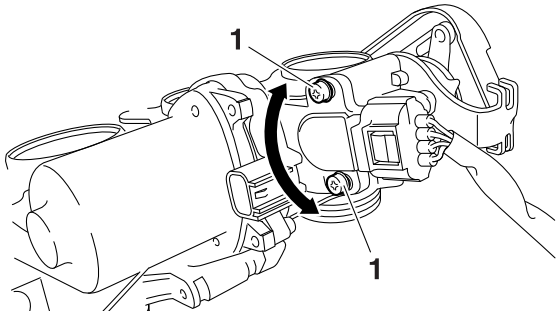
TIP

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



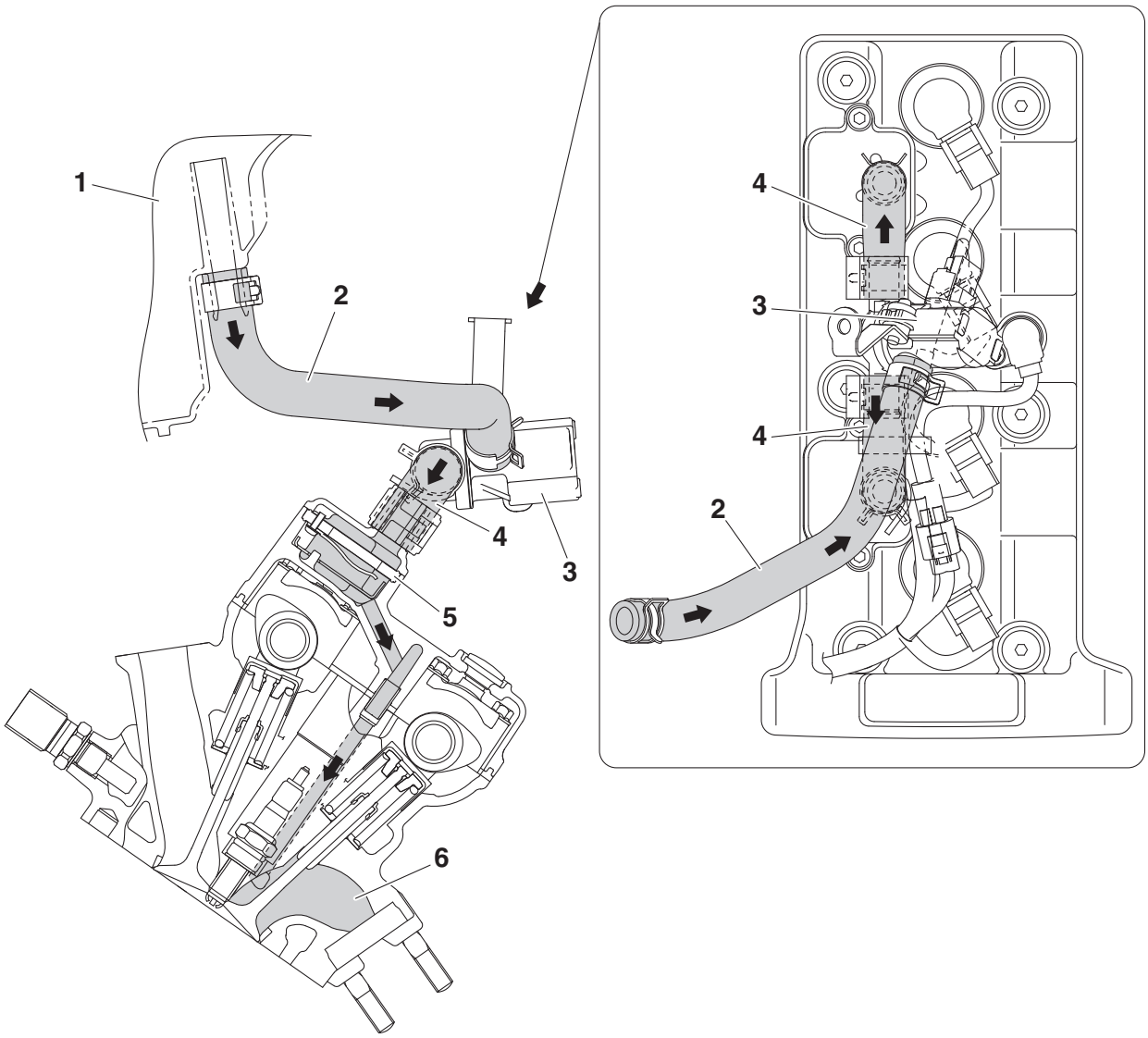
f. Diagnostic code number “14” is selected.
g. Turn the throttle grip to the fully closed position.
h. Adjust the position of the accelerator position sensor angle so that 11–21 can appear in the Yamaha diagnostic tool screen.
i. After adjusting the accelerator position sensor angle, tighten the accelerator position sensor bolts “1”.

	**Accelerator position sensor bolt 3.5 N·m (0.35 kgf·m, 2.6 lb·ft)**



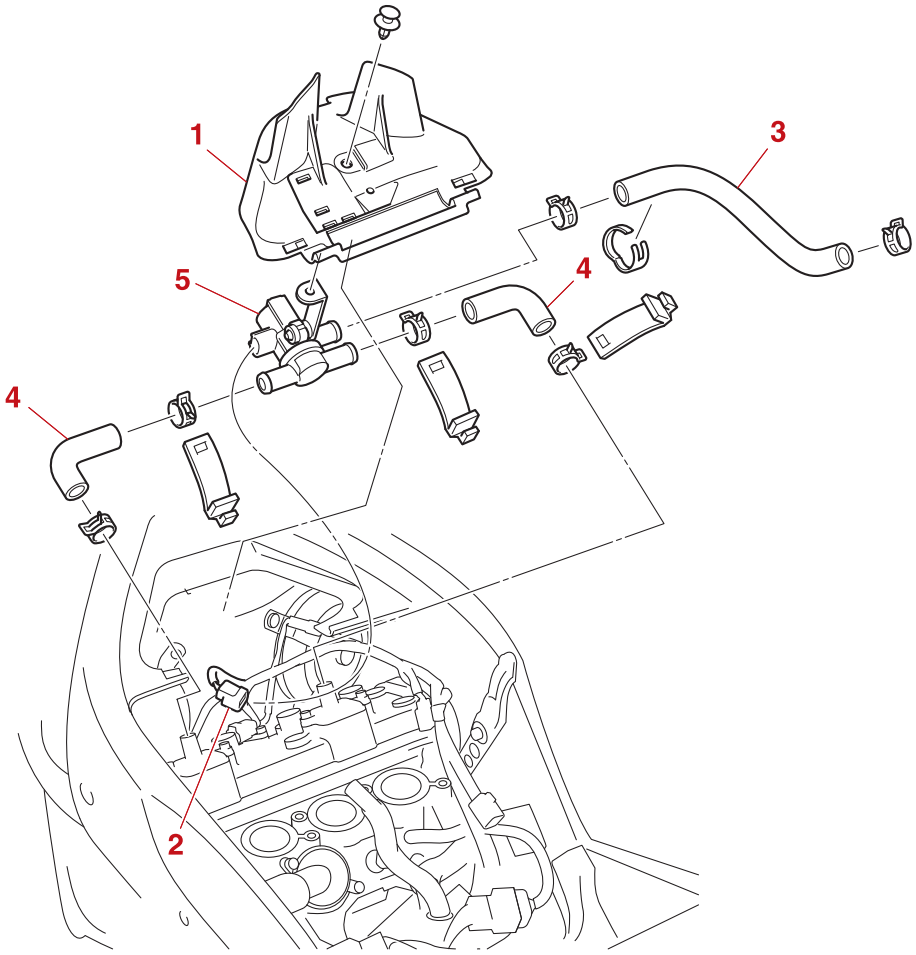
j. Turn the throttle grip to the fully open position.
k. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 96–106, adjust the accelerator position sensor angle.
l. Select the diagnostic code number “15”.
m. Turn the throttle grip to the fully closed position.
n. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 9–23, adjust the accelerator position sensor angle.
o. Turn the throttle grip to the fully open position.
p. Check the Yamaha diagnostic tool screen value. If the Yamaha diagnostic tool screen value is not 93–109, adjust the accelerator position sensor angle.
q. Repeat steps (f) to (p) until the Yamaha diagnostic tool screen values are within the specified ranges.
r. If the Yamaha diagnostic tool screen values are not within the specified ranges after repeating steps (f) to (p) several times, replace the accelerator position sensor.

EAS20071
AIR INDUCTION SYSTEM



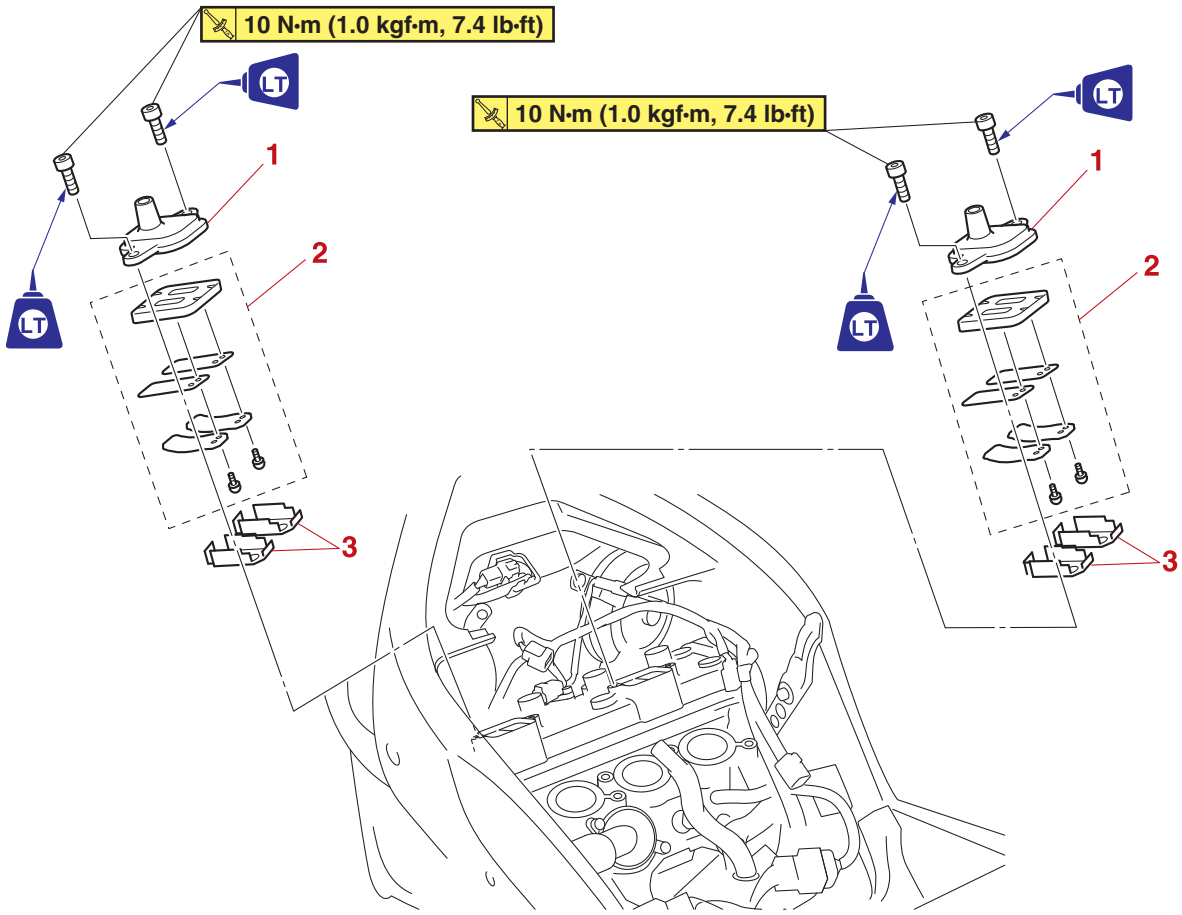
1. Lower air filter case
2. Air induction system hose (air filter case to air cut-off valve)
3. Air cut-off valve
4. Air induction system hose (air cut-off valve to cylinder head cover)
5. Reed valve assembly
6. Exhaust port

Removing the air cut-off valve



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-5.
1	Air induction system cover	1	
2	Air induction system solenoid coupler	1	Disconnect.
3	Air induction system hose (air filter case to air cut-off valve)	1	
4	Air induction system hose (air cut-off valve to cylinder head cover)	2	
5	Air cut-off valve	1	

Removing the reed valves

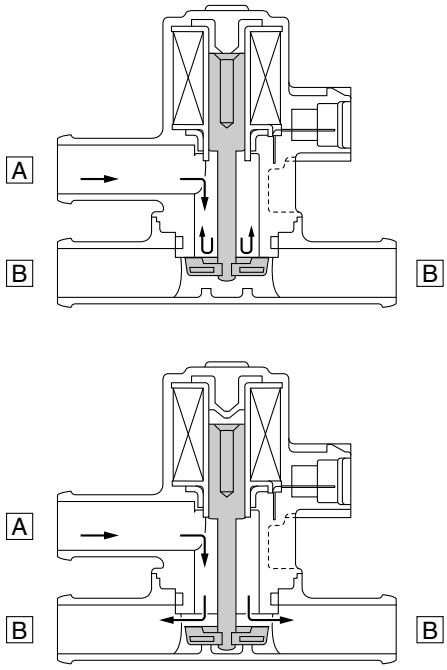


Order	Job/Parts to remove	Q'ty	Remarks
1	Reed valve cover	2	
2	Reed valve assembly	2	
3	Reed valve plate	4	

EAS30488
CHECKING THE AIR INDUCTION SYSTEM

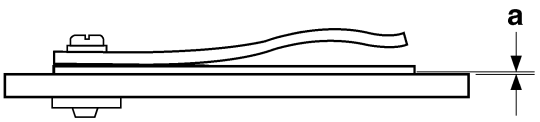
Air injection
The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1112 to 1292 °F).

Air cut-off valve
The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe assembly until the temperature becomes higher than the specified value.



A. From the air filter case
B. To the cylinder head

1. Check:
   • Hoses
   Loose connections → Connect properly.
   Cracks/damage → Replace.
2. Check:
   • Reed valve
   • Reed valve stopper
   • Reed valve seat
   Cracks/damage → Replace the reed valve assembly.
   There is a gap “a” between the reed valve and the reed valve seat → Replace the reed valve assembly.

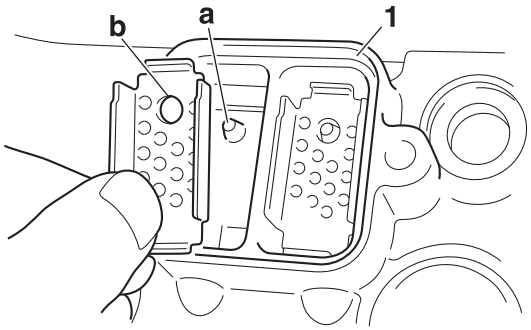


3. Check:
   • Air cut-off valve
   Cracks/damage → Replace.
4. Check:
   • Air induction system solenoid
   Refer to “CHECKING THE AIR INDUCTION SYSTEM SOLENOID” on page 8-159.

EAS30489
INSTALLING THE AIR INDUCTION SYSTEM
1. Install:
   • Reed valve plate

TIP

Align the projection “a” on the cylinder head cover “1” with the hole “b” in the reed valve plate.



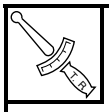
2. Install:
   • Reed valve assembly

TIP

Install the reed valve assembly so that the open side turns to the exhaust side of the engine.

A. Exhaust side

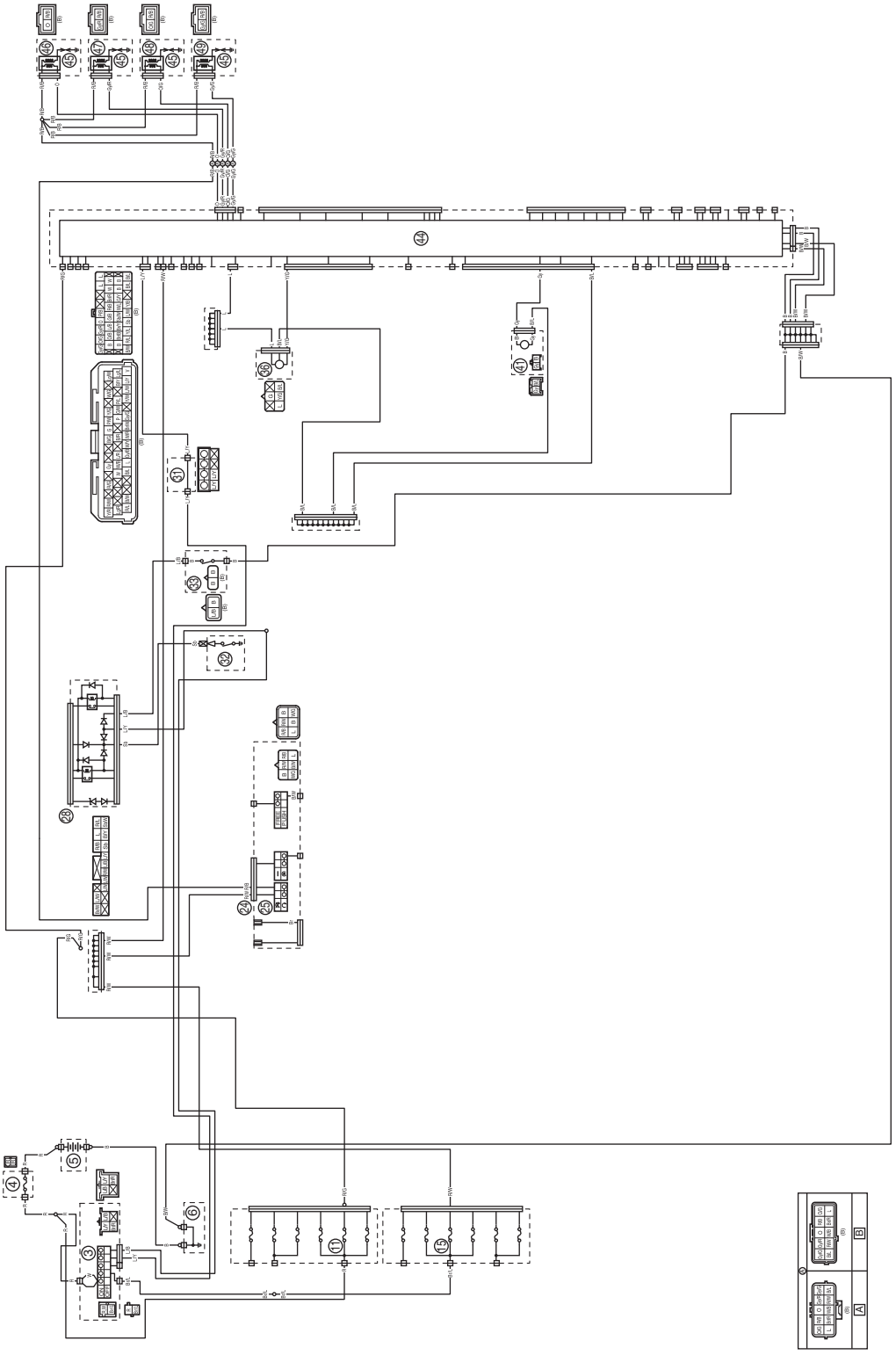
3. Install:
   • Reed valve cover

	**Reed valve cover bolt** **10 N·m (1.0 kgf·m, 7.4 lb·ft)** **LOCTITE®**

ELECTRICAL SYSTEM

EAS20072
IGNITION SYSTEM

EAS30490
CIRCUIT DIAGRAM

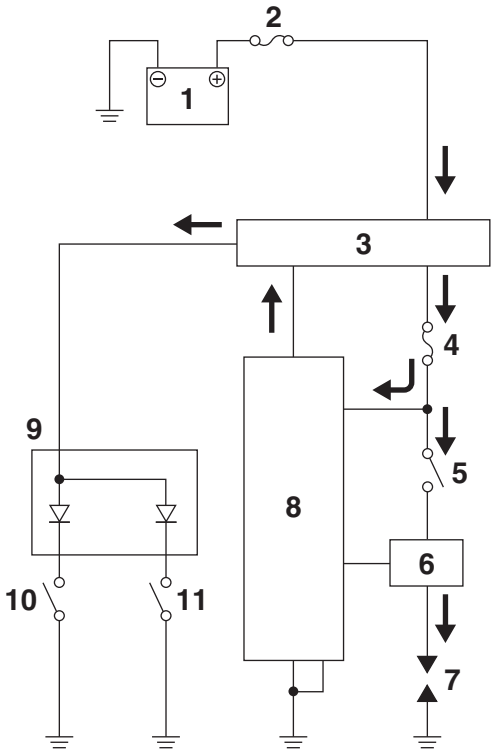


3. Main switch
4. Main fuse
5. Battery
6. Engine ground
11. Backup fuse
15. Ignition fuse
24. Handlebar switch (right)
25. Engine stop switch
28. Relay unit
31. Joint coupler
32. Neutral switch
33. Sidestand switch
36. Lean angle sensor
41. Crankshaft position sensor
44. ECU (Engine Control Unit)
45. Spark plug
46. Ignition coil #1
47. Ignition coil #2
48. Ignition coil #3
49. Ignition coil #4
A. Wire harness
B. Sub-wire harness (ignition)

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 circuit is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral switch circuit is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Relay unit (diode)
10. Sidestand switch
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. Rider seat
2. Fuel tank
3. Air filter case
4. Front side cowling assemblies
5. Rear center cover
6. Air induction system solenoid

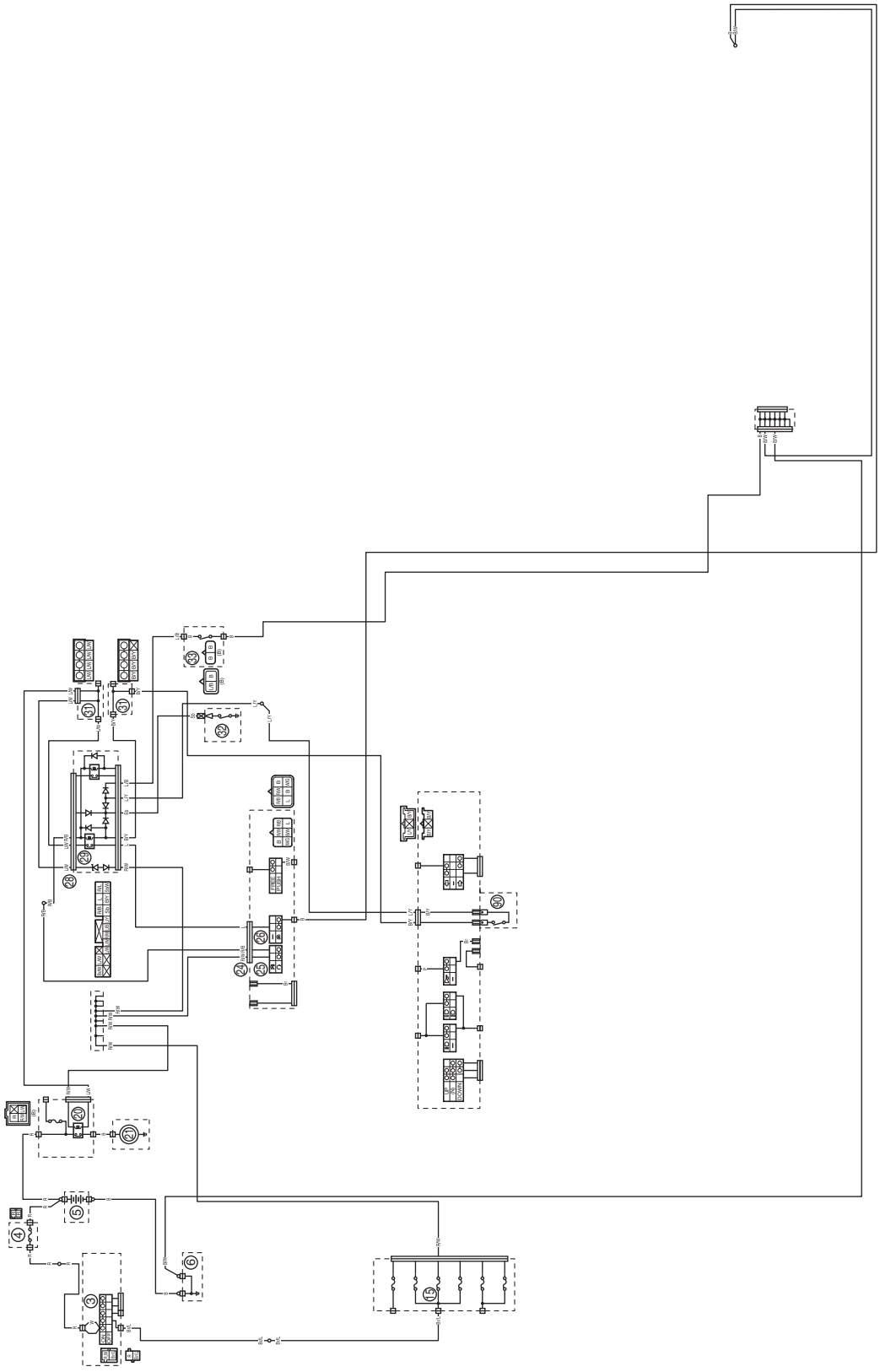
1. Check the fuses. (Main, backup, and ignition) Refer to “CHECKING THE FUSES” on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to “CHECKING THE SPARK PLUGS” on page 3-5.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to “CHECKING THE IGNITION COILS” on page 8-154.	OK →	Ignition system is OK.
NG ↓		
5. Check the ignition coils. Refer to “CHECKING THE IGNITION COILS” on page 8-154.	NG →	Replace the ignition coil(s).
OK ↓		
6. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-155.	NG →	Replace the crankshaft position sensor.
OK ↓		
7. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-150.	NG →	Replace the main switch.
OK ↓		

8. Check the engine stop switch.
   Refer to "CHECKING THE SWITCHES" on page 8-150.
   NG → • The engine stop switch is faulty.
   • Replace the right handlebar switch.
   OK ↓
9. Check the neutral switch.
   Refer to "CHECKING THE SWITCHES" on page 8-150.
   NG → Replace the neutral switch.
   OK ↓
10. Check the sidestand switch.
    Refer to "CHECKING THE SWITCHES" on page 8-150.
    NG → Replace the sidestand switch.
    OK ↓
11. Check the relay unit (diode).
    Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-153.
    NG → Replace the relay unit.
    OK ↓
12. Check the lean angle sensor.
    Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-155.
    NG → Replace the lean angle sensor.
    OK ↓
13. Check the entire ignition system wiring.
    Refer to "CIRCUIT DIAGRAM" on page 8-1.
    NG → Properly connect or replace the wiring harness.
    OK ↓

Replace the ECU.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.

EAS20073
ELECTRIC STARTING SYSTEM

EAS30493
CIRCUIT DIAGRAM



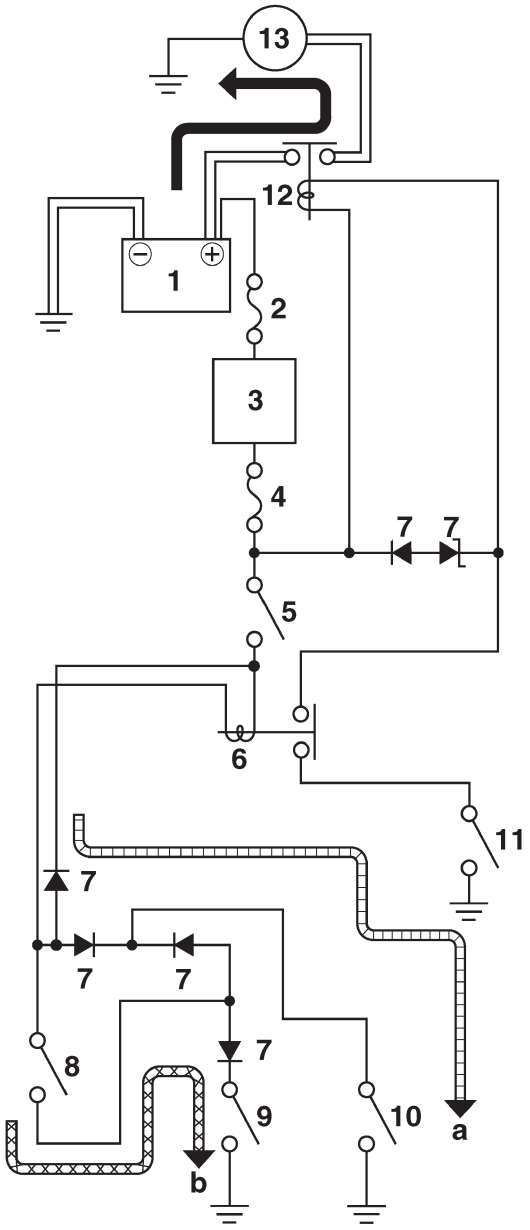
3. Main switch
4. Main fuse
5. Battery
6. Engine ground
15. Ignition fuse
20. Starter relay
21. Starter motor
24. Handlebar switch (right)
25. Engine stop switch
26. Start switch
28. Relay unit
29. Starting circuit cut-off relay
31. Joint coupler
32. Neutral switch
33. Sidestand switch
90. Clutch switch

EAS30494
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the engine stop switch is set to "◯" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) 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. Rider seat
2. Fuel tank bracket
3. Front side cowling assemblies
4. Thermostat

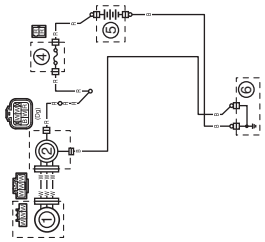
1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-156.	OK →	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG ↓		
4. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-44.	NG →	Repair or replace the starter motor.
OK ↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 8-152.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-153.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-152.	NG →	Replace the starter relay.
OK ↓		

8. Check the main switch.
   Refer to “CHECKING THE SWITCHES” on page 8-150.
   NG → Replace the main switch.
   OK ↓
9. Check the engine stop switch.
   Refer to “CHECKING THE SWITCHES” on page 8-150.
   NG → • The engine stop switch is faulty.
   • Replace the right handlebar switch.
   OK ↓
10. Check the neutral switch.
    Refer to “CHECKING THE SWITCHES” on page 8-150.
    NG → Replace the neutral switch.
    OK ↓
11. Check the sidestand switch.
    Refer to “CHECKING THE SWITCHES” on page 8-150.
    NG → Replace the sidestand switch.
    OK ↓
12. Check the clutch switch.
    Refer to “CHECKING THE SWITCHES” on page 8-150.
    NG → Replace the clutch switch.
    OK ↓
13. Check the start switch.
    Refer to “CHECKING THE SWITCHES” on page 8-150.
    NG → • The start switch is faulty.
    • Replace the right handlebar switch.
    OK ↓
14. Check the entire starting system wiring.
    Refer to “CIRCUIT DIAGRAM” on page 8-7.
    NG → Properly connect or replace the wiring 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

EAS30497
TROUBLESHOOTING

The battery is not being charged.

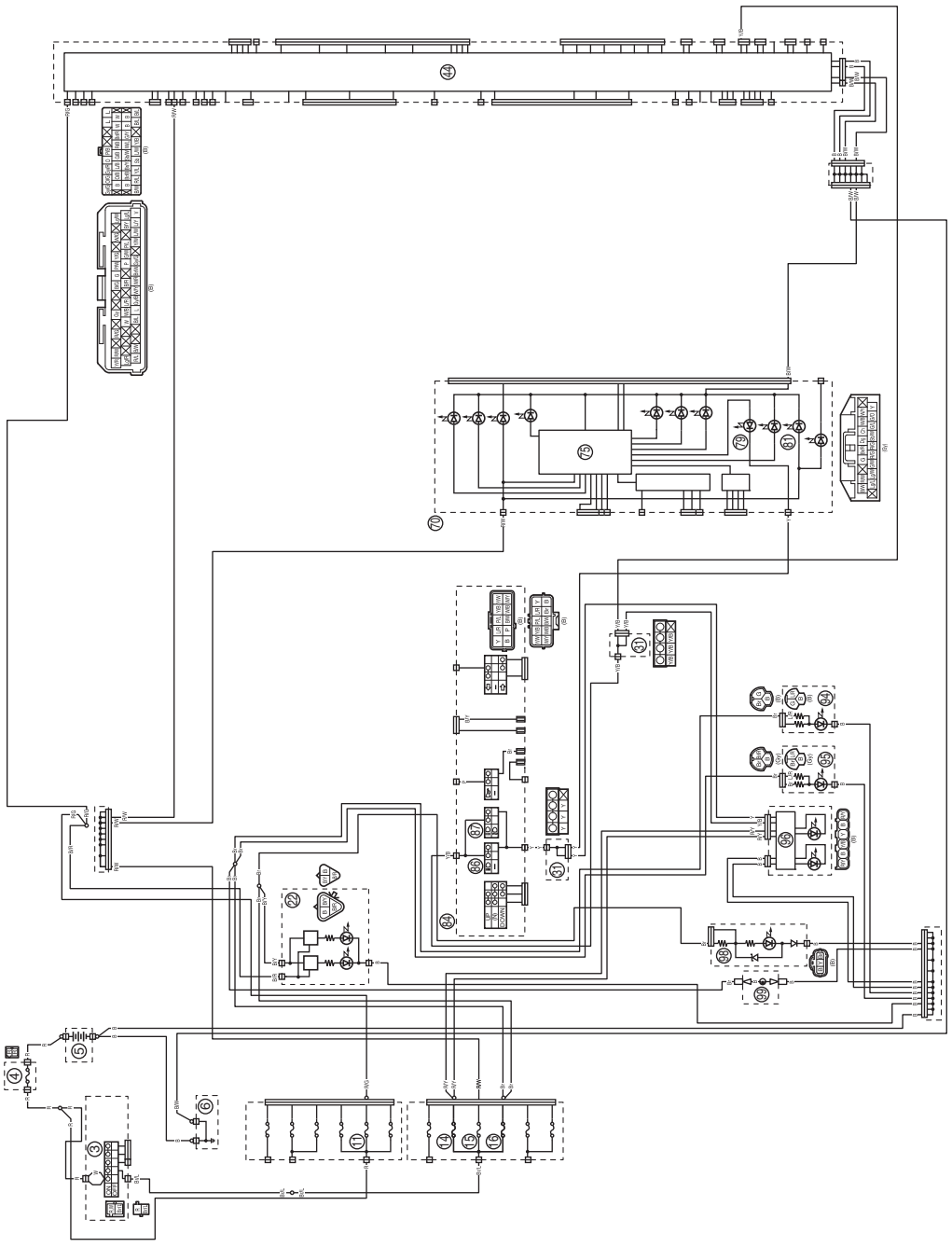
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Front side cowling assembly (left)
3. Fuel tank

1. Check the fuse. (Main) Refer to “CHECKING THE FUSES” on page 8-151.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to “CHECKING THE STATOR COIL” on page 8-156.	NG →	• Replace the stator coil assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to “CHECKING THE RECTIFIER/REGULATOR” on page 8-157.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-13.	NG →	Properly connect or replace the wiring harness.
OK ↓		
The charging system circuit is OK.		

EAS20075
LIGHTING SYSTEM

EAS30498
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
11. Backup fuse
14. Headlight fuse
15. Ignition fuse
16. Signaling system fuse
22. Auxiliary light
31. Joint coupler
44. ECU (Engine Control Unit)
70. Meter assembly
75. Multi-function meter
79. High beam indicator light
81. Meter light
84. Handlebar switch (left)
86. Pass switch
87. Dimmer switch
94. Front turn signal/position light (right)
95. Front turn signal/position light (left)
96. Headlight assembly
98. Tail/brake light assembly
99. License plate light

EAS30499
TROUBLESHOOTING

Any of the following fail to light: headlight (high beam), headlight (low beam), auxiliary light, high beam indicator light, taillight, position light, license plate light or meter light.

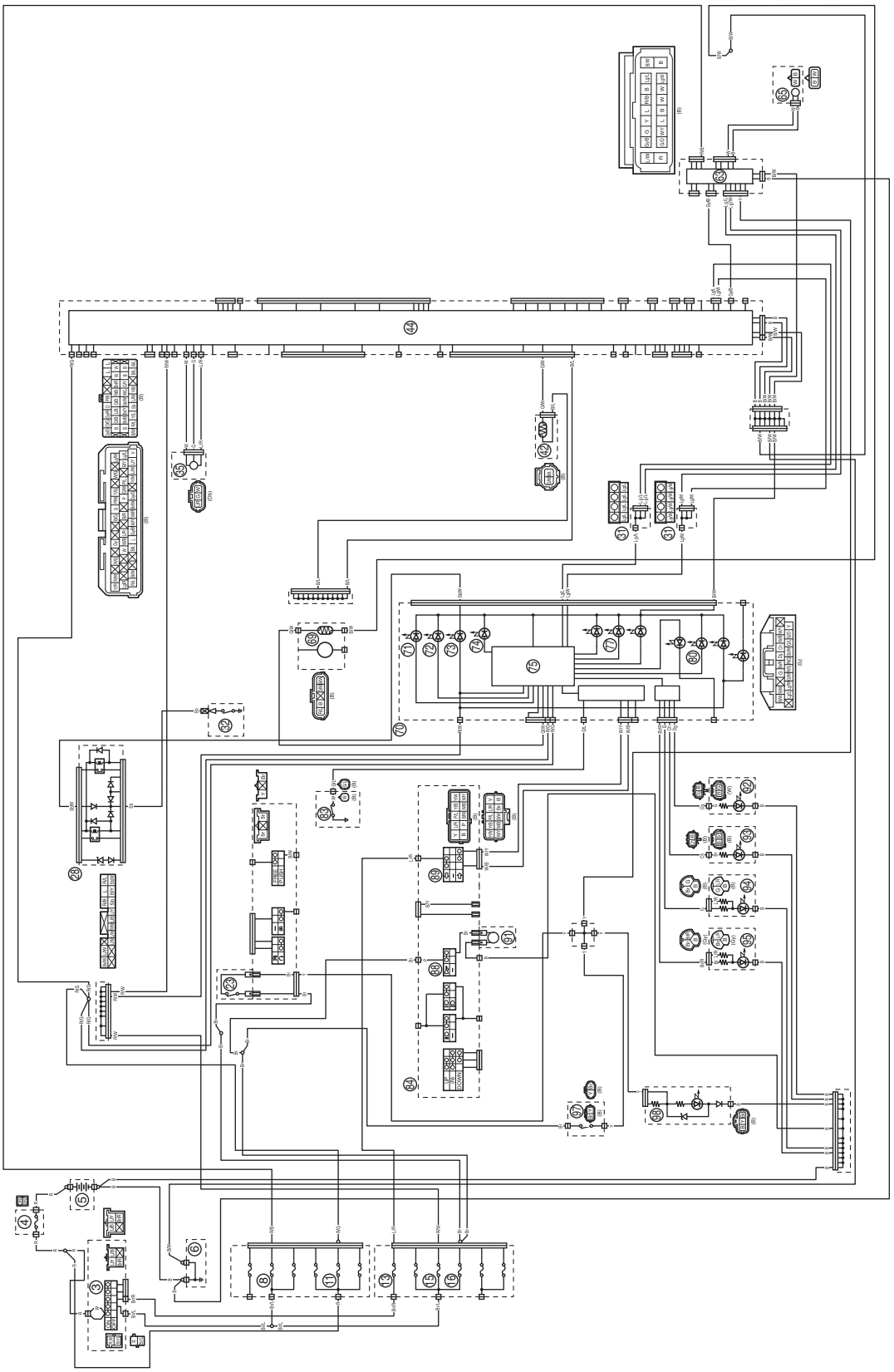
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank
3. Front side cowling assembly (left)
4. Rear center cover

1. Check the condition of each bulb and bulb socket. Refer to “CHECKING THE BULBS AND BULB SOCKETS” in “BASIC INFORMATION” (separate volume).	NG →	Replace the bulb and bulb socket.
OK ↓		
2. Check the fuses. (Main, backup, headlight, ignition, and signaling system) Refer to “CHECKING THE FUSES” on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-150.	NG →	Replace the main switch.
OK ↓		
5. Check the dimmer switch. Refer to “CHECKING THE SWITCHES” on page 8-150.	NG →	• The dimmer switch is faulty. • Replace the left handlebar switch.
OK ↓		
6. Check the entire lighting system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-15.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the ECU, meter assembly, headlight assembly, front turn signal/position light, license plate light, tail/brake light or auxiliary light. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.		

EAS20076
SIGNALING SYSTEM

EAS30500
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
8. ABS ECU fuse
11. Backup fuse
13. Turn signal light fuse
15. Ignition fuse
16. Signaling system fuse
23. Front brake light switch
28. Relay unit
31. Joint coupler
32. Neutral switch
35. Gear position sensor
42. Coolant temperature sensor
44. ECU (Engine Control Unit)
63. ABS ECU
65. Rear wheel sensor
69. Fuel sender
70. Meter assembly
71. Fuel level warning light
72. Oil level warning light
73. Neutral indicator light
74. Shift light
75. Multi-function meter
77. Coolant temperature warning light
80. Turn signal indicator light
83. Oil level switch
84. Handlebar switch (left)
88. Horn switch
89. Turn signal switch
91. Horn
92. Rear turn signal light (right)
93. Rear turn signal light (left)
94. Front turn signal/position light (right)
95. Front turn signal/position light (left)
97. Rear brake light switch
98. Tail/brake light assembly

EAS30501
TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The speedometer fail to operate

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Fuel tank
3. Front side cowling assemblies
4. Bottom cowlings
5. Rear center cover

1. Check the fuses. (Main, ABS ECU, backup, turn signal light, ignition and signaling system) Refer to "CHECKING THE FUSES" on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-150.	NG →	Replace the main switch.
OK ↓		
4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Check the condition of each of the signaling system circuits. Refer to "Checking the signaling system".		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-150.	NG →	• The horn switch is faulty. • Replace the left handlebar switch.
OK ↓		

2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19. NG → Properly connect or replace the wiring harness.

OK ↓

Replace the horn.

The tail/brake light fails to come on.

1. Check the front brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-150. NG → Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-150. NG → Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19. NG → Properly connect or replace the wiring harness.

OK ↓

Replace the tail/brake light.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal switch. Refer to “CHECKING THE SWITCHES” on page 8-150. NG → • The turn signal switch is faulty.
• Replace the left handlebar switch.

OK ↓

2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19. NG → Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly, front turn signal/position light, or rear turn signal light.

The neutral indicator light fails to come on.

1. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-150. NG → Replace the neutral switch.

OK ↓

2. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-153.
NG → Replace the relay unit.
OK ↓
3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19.
NG → Properly connect or replace the wiring 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 8-157.
NG → Replace the oil level switch.
OK ↓
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19.
NG → Properly connect or replace the wiring 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 8-158.
NG → Replace the fuel pump assembly.
OK ↓
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19.
NG → Properly connect or replace the wiring harness.
OK ↓
Replace the meter assembly.

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-159.
NG → Replace the coolant temperature sensor.
OK ↓

2. Check the entire signaling system wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-19.

NG → Properly connect or replace the wiring harness.

OK ↓

Replace the ECU or meter assembly.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.

The speedometer fails to operate.

1. Check the rear wheel sensor.
   Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.

NG → Replace the rear wheel sensor.

OK ↓

2. Check the entire rear wheel sensor wiring.
   Refer to TIP.

NG → Properly connect or replace the wire harness.

OK ↓

Replace the hydraulic unit assembly, ECU or meter assembly.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.

TIP

Replace the wire harness if there is an open or short circuit.
- Between rear wheel sensor coupler and ABS ECU coupler.
  (white–white)
  (black–black)
- Between ABS ECU coupler and ECU coupler.
  (gray/black–gray/black)
  (white/yellow–white/yellow)
- Between ECU coupler and meter assembly coupler.
  (light green/blue–light green/blue)
  (light green/white–light green/white)

The shift light fails to come on.

1. Check that the shift light activation function is set correctly.
   Refer to “INSTRUMENT FUNCTIONS” on page 1-2.

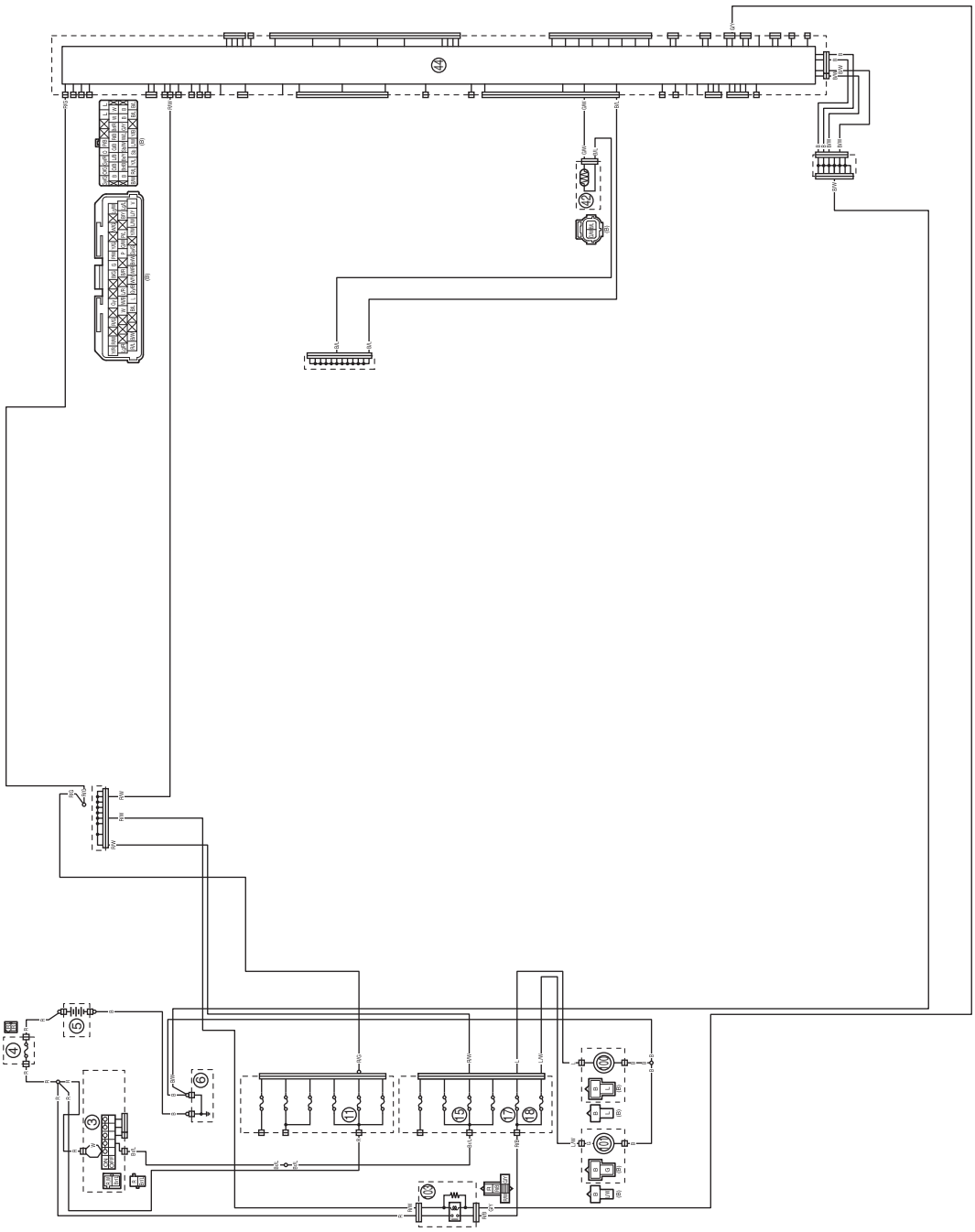
NG → Set the shift light activation function.

OK ↓

Replace the meter assembly.

EAS20077
COOLING SYSTEM

EAS30502
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
11. Backup fuse
15. Ignition fuse
17. Radiator fan motor fuse (right)
18. Radiator fan motor fuse (left)
42. Coolant temperature sensor
44. ECU (Engine Control Unit)
100. Radiator fan motor (right)
101. Radiator fan motor (left)
103. Radiator fan motor relay

EAS30503
TROUBLESHOOTING

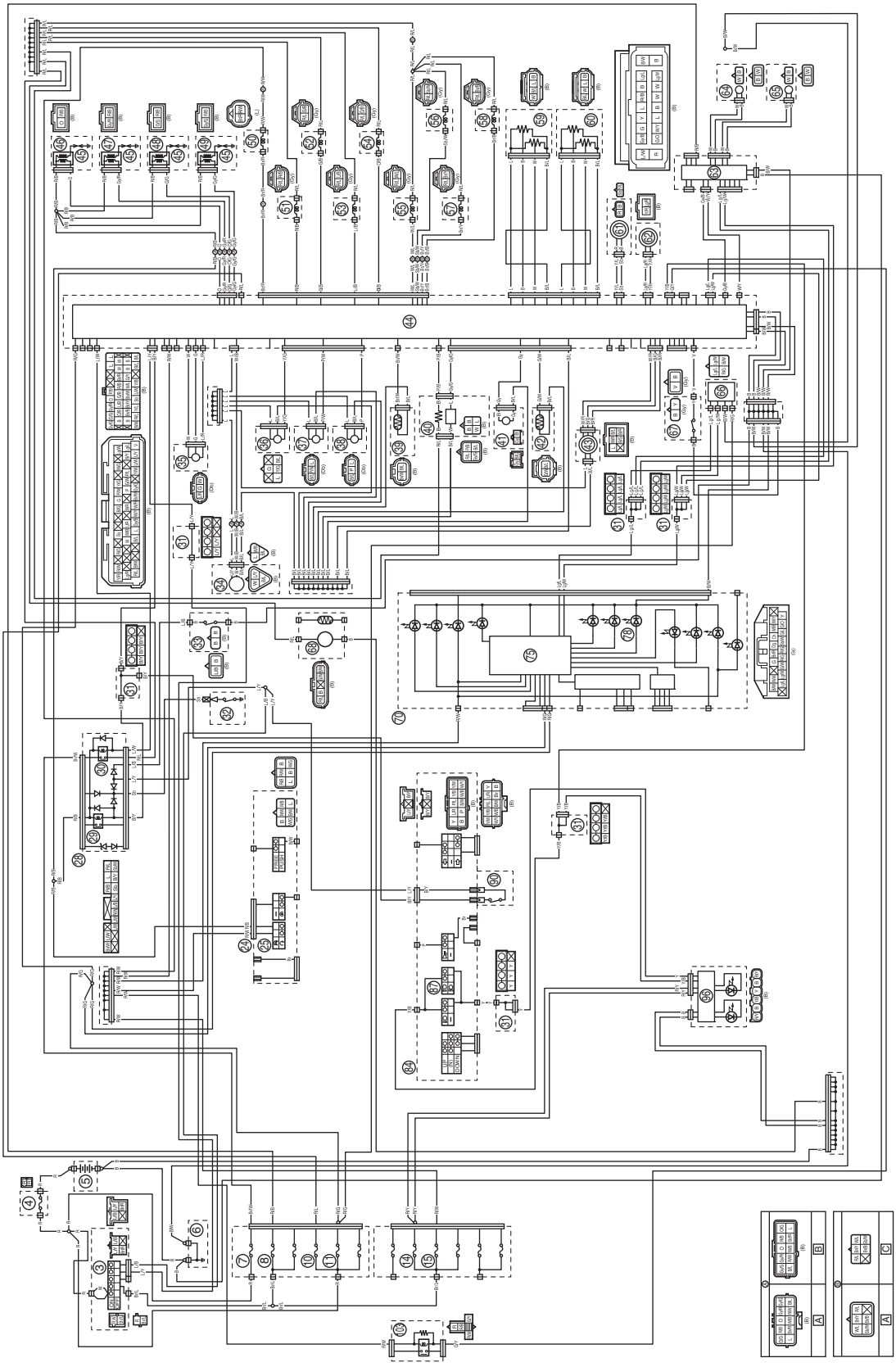
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank
3. Front side cowling assemblies

1. Check the fuses. (Main, backup, ignition and radiator fan motor) Refer to “CHECKING THE FUSES” on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-150.	NG →	Replace the main switch.
OK ↓		
4. Check the radiator fan motors. Refer to “CHECKING THE RADIATOR FAN MOTORS” on page 8-159.	NG →	Replace the radiator fan motor(s).
OK ↓		
5. Check the radiator fan motor relay. Refer to “CHECKING THE RELAYS” on page 8-152.	NG →	Replace the radiator fan motor relay.
OK ↓		
6. Check the coolant temperature. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-159.	NG →	Replace the coolant temperature sensor.
OK ↓		
7. Check the entire cooling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-25.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.		

EAS20078
FUEL INJECTION SYSTEM

EAS30504
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
8. ABS ECU fuse
10. Electronic throttle valve fuse
11. Backup fuse
14. Headlight fuse
15. Ignition fuse
24. Handlebar switch (right)
25. Engine stop switch
28. Relay unit
29. Starting circuit cut-off relay
30. Fuel pump relay
31. Joint coupler
32. Neutral switch
33. Sidestand switch
34. Cylinder identification sensor
35. Gear position sensor
36. Lean angle sensor
37. Intake air pressure sensor
38. Atmospheric pressure sensor
39. Intake air temperature sensor
40. O_2 sensor
41. Crankshaft position sensor
42. Coolant temperature sensor
43. EXUP servo motor
44. ECU (Engine Control Unit)
45. Spark plug
46. Ignition coil #1
47. Ignition coil #2
48. Ignition coil #3
49. Ignition coil #4
50. Air induction system solenoid
51. Primary injector #1
52. Primary injector #2
53. Primary injector #3
54. Primary injector #4
55. Secondary injector #1
56. Secondary injector #2
57. Secondary injector #3
58. Secondary injector #4
59. Accelerator position sensor
60. Throttle position sensor
61. Intake funnel servo motor
62. Throttle servo motor
63. ABS ECU
64. Front wheel sensor
65. Rear wheel sensor
66. Yamaha diagnostic tool coupler
67. Shift switch (OPTION)
68. Fuel pump
70. Meter assembly
75. Multi-function meter
78. Engine trouble warning light
84. Handlebar switch (left)
87. Dimmer switch
90. Clutch switch
96. Headlight assembly
103. Radiator fan motor relay

A. Wire harness
B. Sub-wire harness (ignition)
C. Sub-wire harness (secondary injector)

EAS30505
ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code number is stored in the memory of the ECU.

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". If the warning light does not come on, the warning light (LED) may be defective.

ECU detects an abnormal signal from a sensor

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.
When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue operating or stop operating, depending on the conditions.

EAS30506
TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   - Fault code number
     a. Check the fault code numbers that have a condition of "Malfunction" using the Yamaha diagnostic tool.
     b. Identify the faulty system with the fault code number.
     c. Identify the probable cause of the malfunction.
2. Check and repair the probable cause of the malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-33. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-33 and "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.	Check and repair.

3. Perform the reinstatement action for the fuel injection system.
   Refer to "Confirmation of service completion" in the appropriate table in "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-33.

TIP

- If another fault code number is displayed, repeat steps (1) to (3) until no fault code number is displayed.
- Turning the main switch to "OFF" will not erase the malfunction history.

The engine operation is not normal, but the engine trouble warning light does not come on.

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-11 and "DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE" on page 9-14.

01: Throttle position sensor signal 1 (throttle angle) 13: Throttle position sensor signal 2 (throttle angle) 14: Accelerator position sensor signal 1 (throttle angle) 15: Accelerator position sensor signal 2 (throttle angle) 30: Cylinder-#1 ignition coil 31: Cylinder-#2 ignition coil 32: Cylinder-#3 ignition coil 33: Cylinder-#4 ignition coil 36: Primary injector #1 37: Primary injector #2 38: Primary injector #3 39: Primary injector #4 40: Secondary injector #1 41: Secondary injector #2 42: Secondary injector #3 43: Secondary injector #4 48: Air induction system solenoid

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.
If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS30951

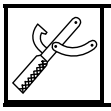
YAMAHA DIAGNOSTIC TOOL

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)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

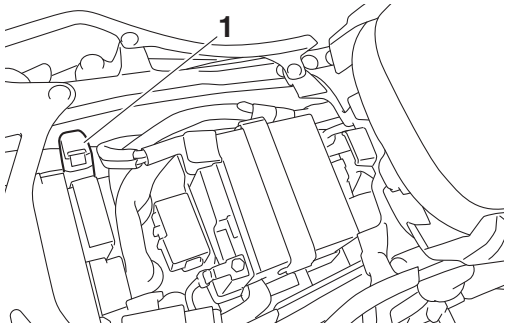
TIP

A generic scan tool can also be used to identify malfunctions.



OBD/ GST Leadwire kit
90890-03249

Connecting the Yamaha diagnostic tool
Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



EAS31791
TROUBLESHOOTING DETAILS (FAULT CODE)

This section describes the measures per fault code number displayed on the Yamaha diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.
After the check and service of the malfunctioning part have been completed, delete the fault codes displayed on the Yamaha diagnostic tool according to the reinstatement method.
Fault code No.:
Fault code number displayed on the Yamaha diagnostic tool when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.

Parts connected to the ECU

The following parts are connected to the ECU.
When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Primary injector #1
- Primary injector #2
- Primary injector #3
- Primary injector #4
- Accelerator position sensor
- Throttle position sensor
- Intake air pressure sensor
- Atmospheric pressure sensor
- Coolant temperature sensor
- Intake air temperature sensor
- O_2 sensor
- Lean angle sensor
- ABS ECU
- Throttle servo motor
- Handlebar switch (left and right)
- Gear position sensor
- Headlight assembly
- Relay unit
- Radiator fan motor relay
- Meter assembly
- Starter relay
- EXUP servo motor
- Intake funnel servo motor
- Sub-wire harness (ignition)
- Sub-wire harness (secondary injector)
- Shift switch (OPTION)

Fault code No. P0030

TIP

- If fault code numbers “P0030” and “P0112” are both indicated, take the actions specified for fault code number “P0112” first.
- If fault code numbers “P0030” and “P0113” are both indicated, take the actions specified for fault code number “P0113” first.
- If fault code numbers “P0030” and “P0122” are both indicated, take the actions specified for fault code number “P0122” first.
- If fault code numbers “P0030” and “P0123” are both indicated, take the actions specified for fault code number “P0123” first.
- If fault code numbers “P0030” and “P0222” are both indicated, take the actions specified for fault code number “P0222” first.
- If fault code numbers “P0030” and “P0223” are both indicated, take the actions specified for fault code number “P0223” first.
- If fault code numbers “P0030” and “P2135” are both indicated, take the actions specified for fault code number “P2135” first.

Fault code No.	**P0030**
Item	**O_2 sensor heater: defective heater controller detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	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.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 2. **TIP** For this check, also set the engine stop switch to “ON”.

Fault code No.		P0030	
Item		O_2 sensor heater: defective heater controller 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 3. **TIP** For this check, also set the engine stop switch to “ON”.
3	Wire harness continuity.	Open or short circuit → Properly connect or replace the wire harness. Between O_2 sensor coupler and ECU coupler. pink/black–pink/black Between O_2 sensor coupler and relay unit coupler. red/blue–red/blue	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 4. **TIP** For this check, also set the engine stop switch to “ON”.
4	Defective O_2 sensor heater.	Replace the O_2 sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 5. **TIP** For this check, also set the engine stop switch to “ON”.

Fault code No.		P0030	
Item		O_2 sensor heater: defective heater controller detected.	
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
6	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

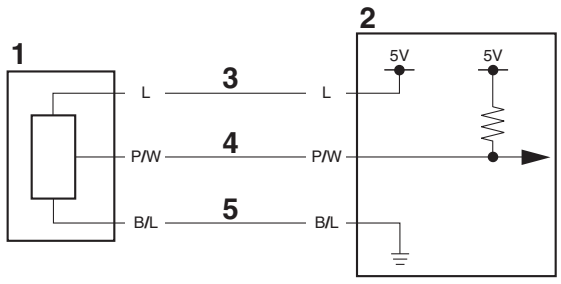
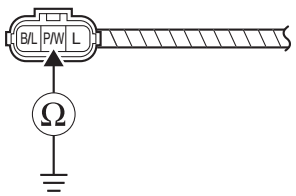
Fault code No. P0069

Fault code No.		P0069	
Item		Intake air pressure sensor or atmospheric pressure sensor: when the main switch is turned to “ON”, the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03, 02	
03	Tool display	Displays the intake air pressure.	
	Procedure	Operate the throttle while pushing the start switch “”. (If the display value changes, the performance is OK.)	
02	Tool display	Displays the atmospheric pressure.	
	Procedure	Compare the actually measured atmospheric pressure with the tool display value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Replace the intake air pressure sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 4 and finish the service. Condition is “Malfunction” → Go to item 2.

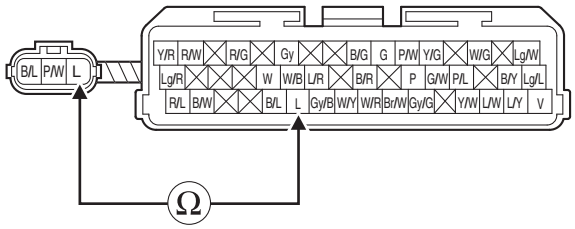
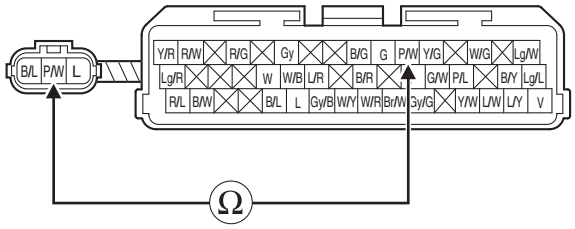
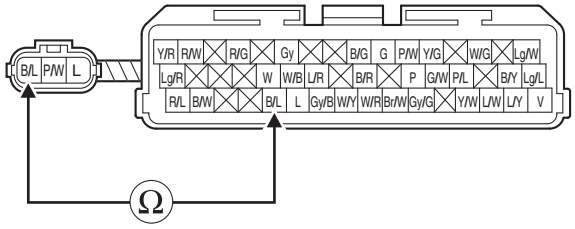
Fault code No.		P0069	
Item		Intake air pressure sensor or atmospheric pressure sensor: when the main switch is turned to "ON", the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.	
2	Defective atmospheric pressure sensor.	Execute the diagnostic mode. (Code No. 02) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) Displayed value is incorrect → Replace the atmospheric pressure sensor.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 4 and finish the service. Condition is "Malfunction" → Go to item 3.
3	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.	
4	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of "Recover" using the Yamaha diagnostic tool, and then delete the fault code.	

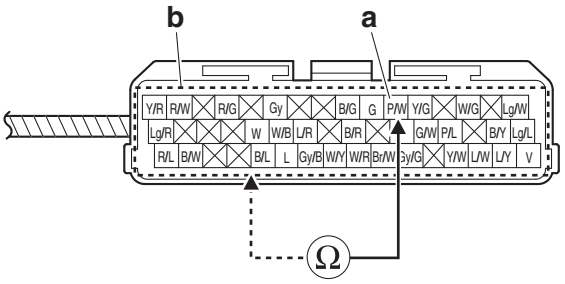
Fault code No. P0107, P0108

Fault code No.		P0107, P0108	
Item		[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Tool display		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)	
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", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 7 and finish the service. Condition is "Malfunction" → Go to item 2.

Fault code No.		P0107, P0108	
Item		[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
3-1	 1. Intake air pressure sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the intake air pressure sensor coupler from the intake air pressure sensor.		
3-3	[For P0107] Ground short circuit Between intake air pressure sensor coupler and ground: pink/white–ground If there is continuity, replace the wire harness. 		

Fault code No.	P0107, P0108
Item	[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.

3-4	[For P0108] Open circuit Between intake air pressure sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness. 
3-5	[For P0108] Open circuit Between intake air pressure sensor coupler and ECU coupler: pink/white–pink/white If there is no continuity, replace the wire harness. 
3-6	[For P0108] Open circuit Between intake air pressure sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 
3-7	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.

Fault code No.		P0107, P0108	
Item		[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.	
3-8	[For P0107, P0108] Short circuit Between intake air pressure sensor output terminal (pink/white) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 		
4	Installed condition of intake air pressure sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Replace the intake air pressure sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

Fault code No.		P0107, P0108	
Item		[P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0112, P0113

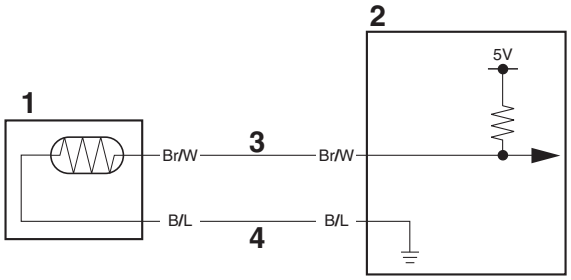
TIP

Perform this procedure when the engine is cold.

Fault code No.		P0112, P0113	
Item		[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		05	
Tool display		Displays the air temperature.	
Procedure		Compare the actually measured air temperature with the tool display value.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of intake air temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.

Fault code No.	P0112, P0113
Item	[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.

3-1



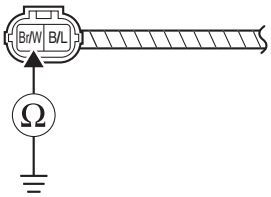
1. Intake air temperature sensor
2. ECU
3. Sensor output lead
4. Sensor ground lead

3-2

Disconnect the ECU coupler from the ECU.
Disconnect the intake air temperature sensor coupler from the intake air temperature sensor.

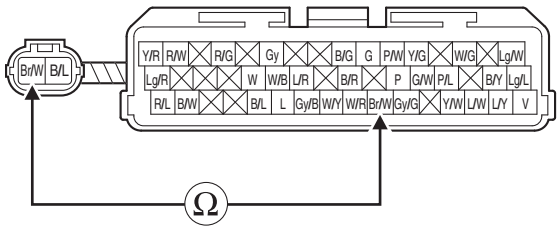
3-3

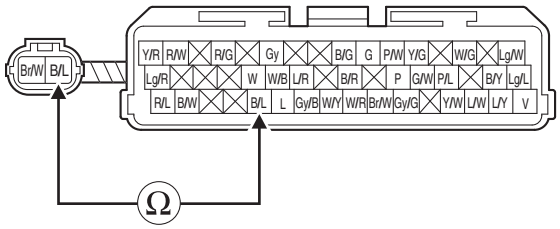
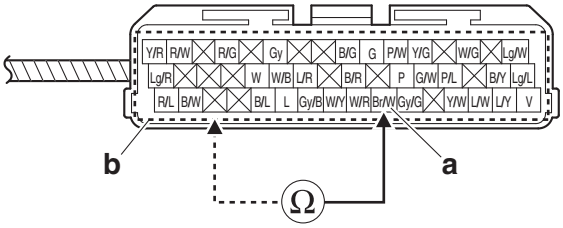
[For P0112] Ground short circuit
Between intake air temperature sensor coupler and ground: brown/white–ground
If there is continuity, replace the wire harness.



3-4

[For P0113] Open circuit
Between intake air temperature sensor coupler and ECU coupler: brown/white–brown/white
If there is no continuity, replace the wire harness.



Fault code No.		P0112, P0113	
Item		[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.	
3-5	[For P0113] Open circuit Between intake air temperature sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 		
3-6	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.		
3-7	[For P0112, P0113] Short circuit Between intake air temperature sensor output terminal (brown/white) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 		
4	Installed condition of intake air temperature sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. 05) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature. → Replace the intake air temperature sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

Fault code No.		P0112, P0113	
Item		[P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0117, P0118

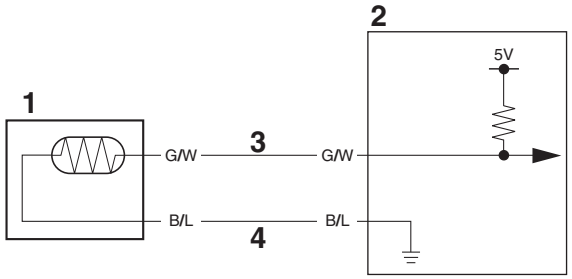
TIP

Perform this procedure when the engine is cold.

Fault code No.		P0117, P0118	
Item		[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		06	
Tool display		When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	
Procedure		Compare the actually measured coolant temperature with the tool display value.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of coolant temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.

Fault code No.	P0117, P0118
Item	[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.

3-1



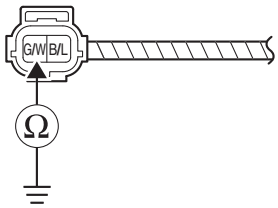
1. Coolant temperature sensor
2. ECU
3. Sensor output lead
4. Sensor ground lead

3-2

Disconnect the ECU coupler from the ECU.
Disconnect the coolant temperature sensor coupler from the coolant temperature sensor.

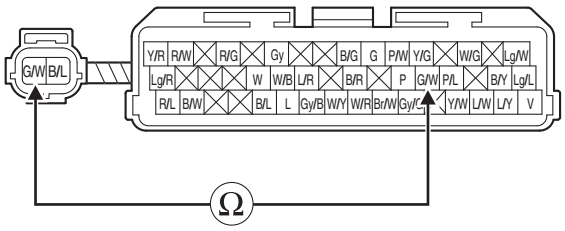
3-3

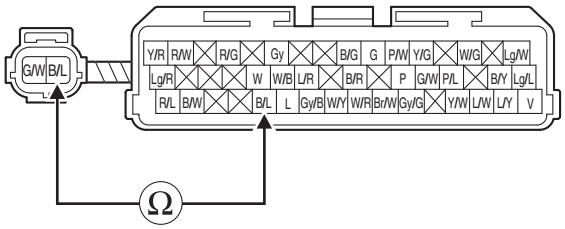
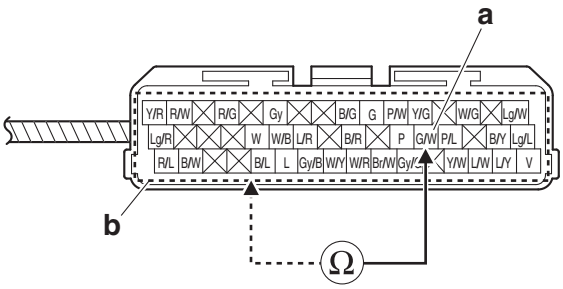
[For P0117] Ground short circuit
Between coolant temperature sensor coupler and ground: green/white–ground
If there is continuity, replace the wire harness.



3-4

[For P0118] Open circuit
Between coolant temperature sensor coupler and ECU coupler: green/white–green/white
If there is no continuity, replace the wire harness.



Fault code No.		P0117, P0118	
Item		[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	
3-5	[For P0118] Open circuit Between coolant temperature sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 		
3-6	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.		
3-7	[For P0117, P0118] Short circuit Between coolant temperature sensor output terminal (green/white) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 		
4	Installed condition of coolant temperature sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Replace the coolant temperature sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

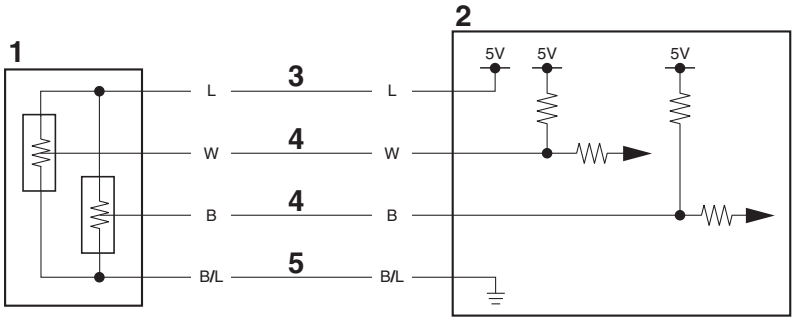
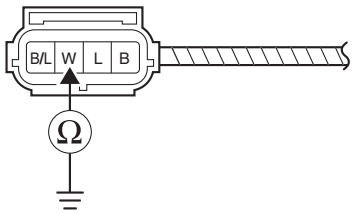
Fault code No.		P0117, P0118	
Item		[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

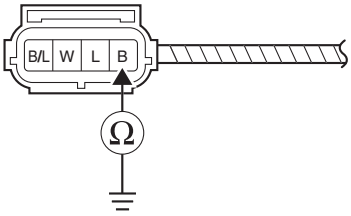
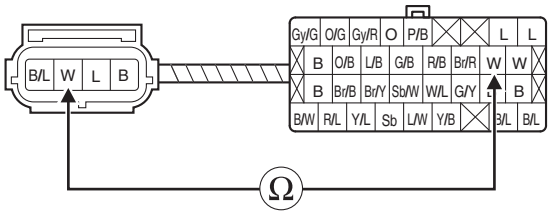
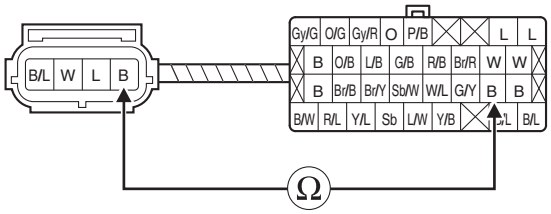
Fault code No. P0122, P0123, P0222, P0223, P2135

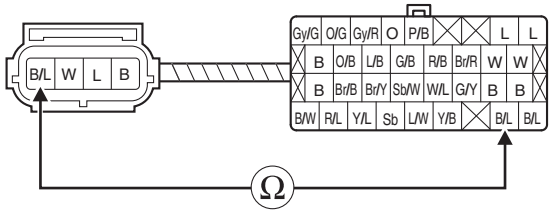
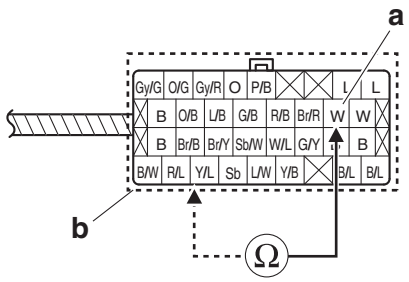
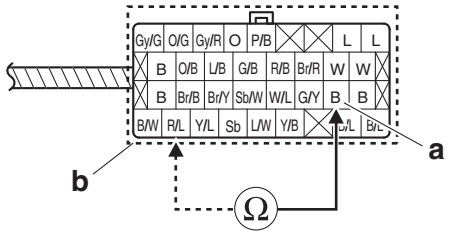
TIP

If a fault code number (“P0122”, “P0123”, “P0222”, or “P0223”) other than “P2135” is indicated, take the actions specified for that fault code number first.

Fault code No.		P0122, P0123, P0222, P0223, P2135	
Item		[P0122, P0222] Throttle position sensor: ground short circuit detected. [P0123, P0223] Throttle position sensor: open or power short circuit detected. [P2135] Deviation error	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		01, 13	
01	Tool display	Throttle position sensor signal 1 • 11–21 (fully closed position) • 96–106 (fully open position)	
	Procedure	• Check with throttle valves fully closed. • Check with throttle valves fully open.	
13	Tool display	Throttle position sensor signal 2 • 9–23 (fully closed position) • 93–109 (fully open position)	
	Procedure	• Check with throttle valves fully closed. • Check with throttle valves fully open.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 3.

Fault code No.		P0122, P0123, P0222, P0223, P2135	
Item		[P0122, P0222] Throttle position sensor: ground short circuit detected. [P0123, P0223] Throttle position sensor: open or power short circuit detected. [P2135] Deviation error	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.
3-1	 1. Throttle position sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the throttle position sensor coupler from the throttle position sensor.		
3-3	[For P0122] Ground short circuit [For P2135] Deviation error Between throttle position sensor coupler and ground: white–ground If there is continuity, replace the wire harness. 		

Fault code No.		P0122, P0123, P0222, P0223, P2135
Item		[P0122, P0222] Throttle position sensor: ground short circuit detected. [P0123, P0223] Throttle position sensor: open or power short circuit detected. [P2135] Deviation error
3-4	[For P0222] Ground short circuit [For P2135] Deviation error Between throttle position sensor coupler and ground: black–ground If there is continuity, replace the wire harness. 	
3-5	[For P0123] Open circuit [For P2135] Deviation error Between throttle position sensor coupler and ECU coupler: white–white If there is no continuity, replace the wire harness. 	
3-6	[For P0223] Open circuit [For P2135] Deviation error Between throttle position sensor coupler and ECU coupler: black–black If there is no continuity, replace the wire harness. 	

Fault code No.	P0122, P0123, P0222, P0223, P2135
Item	[P0122, P0222] Throttle position sensor: ground short circuit detected. [P0123, P0223] Throttle position sensor: open or power short circuit detected. [P2135] Deviation error
3-7	[For P0123, P0223] Open circuit Between throttle position sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 
3-8	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.
3-9	[For P0122, P0123] Short circuit [For P2135] Deviation error Between throttle position sensor output terminal (white) “a” of ECU coupler and any other ECU coupler terminal “b” If there is continuity, replace the wire harness. 
3-10	[For P0222, P0223] Short circuit [For P2135] Deviation error Between throttle position sensor output terminal (black) “a” of ECU coupler and any other ECU coupler terminal “b” If there is continuity, replace the wire harness. 

Fault code No.		P0122, P0123, P0222, P0223, P2135	
Item		[P0122, P0222] Throttle position sensor: ground short circuit detected. [P0123, P0223] Throttle position sensor: open or power short circuit detected. [P2135] Deviation error	
4	Installed condition of throttle position sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or adjust the sensor. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-17.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Throttle position sensor resistance.	Measure the throttle position sensor resistance. black/blue–blue Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-161.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Defective throttle position sensor.	Check throttle position sensor signal 1. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 11–21 is indicated. When throttle valves are fully open: A value of 96–106 is indicated. Check throttle position sensor signal 2. Execute the diagnostic mode. (Code No. 13) When the throttle valves are fully closed: A value of 9–23 is indicated. When the throttle valves are fully open: A value of 93–109 is indicated. An indicated value is out of the specified range → Replace the throttle position sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0132

Fault code No.	**P0132**
Item	**O_2 sensor: short circuit detected (power short circuit).**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of O_2 sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Properly connect or replace the wire harness. Between O_2 sensor coupler and ECU coupler. black/blue–black/blue gray/green–gray/green	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective O_2 sensor.	Check the O_2 sensor. Defective → Replace the O_2 sensor. Refer to “ENGINE REMOVAL” on page 5-9.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.

Fault code No.		P0132	
Item		O_2 sensor: short circuit detected (power short circuit).	
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0201

Fault code No.		P0201	
Item		Primary injector #1: malfunction in primary injector #1.	
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	
Actuation		Actuates primary injector #1 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the primary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that primary injector #1 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 primary injector #1 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. 36) Operating sound → Go to item 6. No operating sound → Go to item 2.
2	Defective primary injector #1.	Measure the primary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → 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.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between primary injector coupler and ECU coupler. red/black–red/black Between primary injector coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 6. No operating sound → Go to item 5.

Fault code No.		P0201	
Item		**Primary injector #1: malfunction in primary injector #1.**	
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
6	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0202

Fault code No.		P0202	
Item		**Primary injector #2: malfunction in primary injector #2.**	
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.		37	
Actuation		Actuates primary injector #2 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the primary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that primary injector #2 is actuated five times by listening for the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of primary injector #2 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 6. No operating sound → Go to item 2.
2	Defective primary injector #2.	Measure the primary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 6. No operating sound → 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.	Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 6. No operating sound → Go to item 4.

Fault code No.		P0202	
Item		**Primary injector #2: malfunction in primary injector #2.**	
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between primary injector coupler and ECU coupler. green/black–green/black Between primary injector coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 6. No operating sound → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
6	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0203

Fault code No.		P0203	
Item		**Primary injector #3: malfunction in primary injector #3.**	
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.		38	
Actuation		Actuates primary injector #3 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the primary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that primary injector #3 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 primary injector #3 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. 38) Operating sound → Go to item 6. No operating sound → Go to item 2.
2	Defective primary injector #3.	Measure the primary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 3.

Fault code No.		P0203	
Item		Primary injector #3: malfunction in primary injector #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.	Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between primary injector coupler and ECU coupler. blue/black–blue/black Between primary injector coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 38) Operating sound → Go to item 6. No operating sound → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
6	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0204

Fault code No.		P0204	
Item		Primary injector #4: malfunction in primary injector #4.	
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.		39	
Actuation		Actuates primary injector #4 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the primary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that primary injector #4 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 primary injector #4 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. 39) Operating sound → Go to item 6. No operating sound → Go to item 2.

Fault code No.		P0204	
Item		Primary injector #4: malfunction in primary injector #4.	
2	Defective primary injector #4.	Measure the primary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 39) Operating sound → Go to item 6. No operating sound → 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.	Execute the diagnostic mode. (Code No. 39) Operating sound → Go to item 6. No operating sound → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between primary injector coupler and ECU coupler. orange/black–orange/black Between primary injector coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 39) Operating sound → Go to item 6. No operating sound → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
6	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0335

Fault code No.		P0335	
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.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

Fault code No.		P0335	
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, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and ECU coupler. gray–gray black/blue–black/blue	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Installed condition of crankshaft position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor. Refer to “PICKUP ROTOR” on page 5-39.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective crankshaft position sensor.	Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-155. Replace if defective.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0340

Fault code No.	**P0340**
Item	**Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.**
Fail-safe system	Unable to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder identification 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 sub-wire harness.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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 sub-wire harness.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between cylinder identification sensor coupler and sub-wire harness coupler. blue–blue white/black–white/black black/blue–black/blue Between sub-wire harness coupler and ECU coupler. blue–blue white/black–white/black black/blue–black/blue	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5.

Fault code No.		P0340	
Item		Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.	
5	Installed condition of cylinder identification sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Defective cylinder identification sensor.	Check the cylinder identification sensor. Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-160. Replace if defective.	Crank the engine, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0351

Fault code No.		P0351	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		30	
Actuation		Actuates the cylinder-#1 ignition coil five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of cylinder-#1 ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 2.

Fault code No.		P0351	
Item		Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.	
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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between cylinder-#1 ignition coil coupler and sub-wire harness coupler. orange–orange Between sub-wire harness coupler and ECU coupler. orange–orange	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5
5	Installed condition of cylinder-#1 ignition coil.	Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Defective cylinder-#1 ignition coil.	Measure the primary coil resistance of the cylinder-#1 ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 8-154.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.

Fault code No.		P0351	
Item		**Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.**	
7	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 30) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of "Recover" using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0352

Fault code No.		P0352	
Item		**Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.**	
Fail-safe system		Able to start engine (depending on the number of faulty cylinders)	
		Able to drive vehicle (depending on the number of faulty cylinders)	
Diagnostic code No.		31	
Actuation		Actuates the cylinder-#2 ignition coil five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.	
Procedure		Check that a spark is generated five times. • Connect an ignition checker.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of cylinder-#2 ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → Go to item 3.

Fault code No.		P0352	
Item		Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	
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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between cylinder-#2 ignition coil coupler and sub-wire harness coupler. gray/red–gray/red Between sub-wire harness coupler and ECU coupler. gray/red–gray/red	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Installed condition of cylinder-#2 ignition coil.	Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Defective cylinder-#2 ignition coil.	Measure the primary coil resistance of the cylinder-#2 ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 8-154.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 31) No spark → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0353

Fault code No.	**P0353**
Item	**Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 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.	32
Actuation	Actuates the cylinder-#3 ignition coil five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.
Procedure	Check that a spark is generated five times. • Connect an ignition checker.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of cylinder-#3 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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → 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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder-#3 ignition coil coupler and sub-wire harness coupler. orange/green–orange/green Between sub-wire harness coupler and ECU coupler. orange/green–orange/green	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → Go to item 5.

Fault code No.		P0353	
Item		Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	
5	Installed condition of cylinder-#3 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → Go to item 6.
6	Defective cylinder-#3 ignition coil.	Measure the primary coil resistance of the cylinder-#3 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-154.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 8 and finish the service. Condition is "Malfunction" → Go to item 7.
7	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 32) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of "Recover" using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0354

Fault code No.		P0354	
Item		Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 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.		33	
Actuation		Actuates the cylinder-#4 ignition coil five times at one-second intervals. The "check" indicator 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**

Fault code No.		P0354	
Item		Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.	
1	Connection of cylinder-#4 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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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 sub-wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder-#4 ignition coil coupler and sub-wire harness coupler. gray/green–gray/green Between sub-wire harness coupler and ECU coupler. gray/green–gray/green	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Installed condition of cylinder-#4 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.

Fault code No.		P0354	
Item		Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.	
6	Defective cylinder-#4 ignition coil.	Measure the primary coil resistance of the cylinder-#4 ignition coil. Replace if out of specification. Refer to “CHECKING THE IGNITION COILS” on page 8-154.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Malfunction in ECU.	Execute the diagnostic mode. (Code No. 33) No spark → Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0476

TIP

If fault code numbers “P048D/P048E” and “P0476” are both indicated, take the actions specified for fault code number “P048D/P048E” first.

Fault code No.		P0476	
Item		EXUP servo motor: stuck EXUP servo motor is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		53	
Actuation		After the EXUP is fully closed, it stops at the opening base position (intermediate position). This operation takes approximately 3 seconds during which the “check” indicator is displayed on the Yamaha diagnostic tool.	
Procedure		Check the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of EXUP servo motor 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 2.

Fault code No.		P0476	
Item		EXUP servo motor: stuck EXUP servo motor is 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between EXUP servo motor coupler and ECU coupler. black/green–black/green black/red–black/red	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Defective EXUP servo motor.	Disconnect the cables and execute the diagnostic code. (Code No. 53) Check the operating sound of the motor. Replace if defective.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective EXUP valve, pulley, and cables.	Turn the EXUP valve manually with the cables disconnected. Replace the muffler or EXUP cable if defective.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0480

Fault code No.	**P0480**
Item	**Radiator fan motor relay: open or short circuit is detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	51
Actuation	Radiator fan motor relay five times at one-second intervals. The "check" indicator on the Yamaha diagnostic tool screen comes on each time the Radiator fan motor relay is actuated.
Procedure	Check that Radiator fan motor relay 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 radiator fan motor relay coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between radiator fan motor relay coupler and ECU coupler. green/yellow–green/yellow Between radiator fan motor relay coupler and ignition fuse. red/white–red/white	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 4.
4	Defective radiator fan motor relay.	Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-152. Replace if defective.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.	Service is finished.

Fault code No.		P0480	
Item		Radiator fan motor relay: open or short circuit is detected.	
6	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P048D, P048E

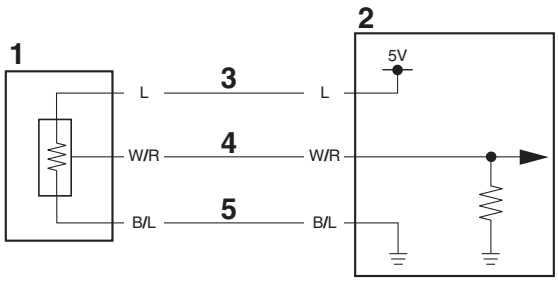
TIP

If fault code numbers “P048D/P048E” and “P0476” are both indicated, take the actions specified for fault code number “P048D/P048E” first.

Fault code No.		P048D, P048E	
Item		[P048D] EXUP servo motor: open or ground short circuit detected. [P048E] EXUP servo motor: power short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		53	
Actuation		After the EXUP is fully closed, it stops at the opening base position (intermediate position). This operation takes approximately 3 seconds during which the “check” indicator is displayed on the Yamaha diagnostic tool.	
Procedure		Check the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of EXUP servo motor 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 4.

Fault code No.	P048D, P048E
Item	[P048D] EXUP servo motor: open or ground short circuit detected. [P048E] EXUP servo motor: power short circuit detected.

3-1



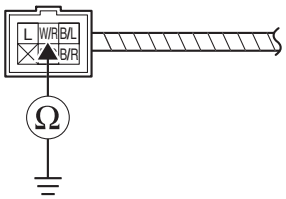
1. EXUP servo motor
2. ECU
3. Sensor input lead
4. Sensor output lead
5. Sensor ground lead

3-2

Disconnect the ECU coupler from the ECU.
Disconnect the EXUP servo motor coupler from the EXUP servo motor.

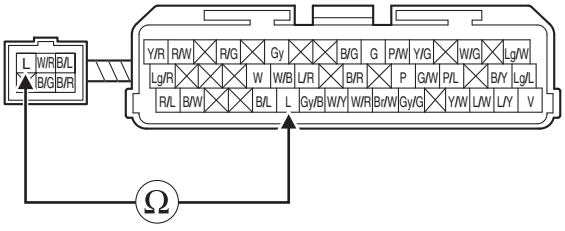
3-3

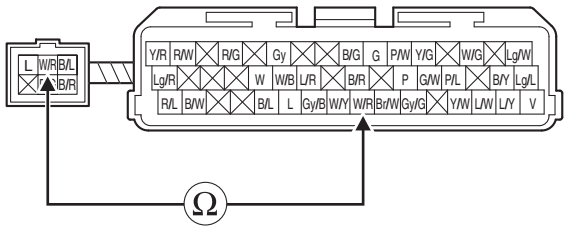
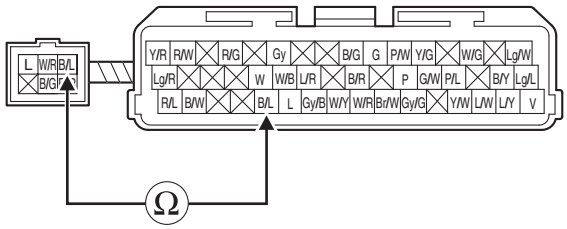
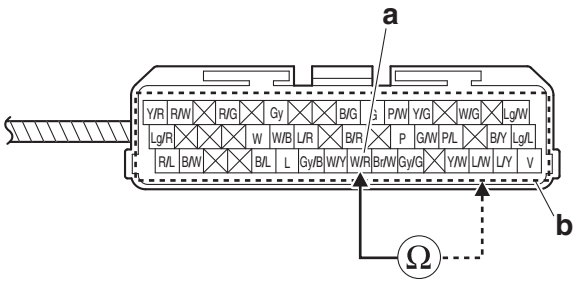
[For P048D] Ground short circuit
Between EXUP servo motor coupler and ground: white/red–ground
If there is continuity, replace the wire harness.



3-4

[For P048D] Open circuit
Between EXUP servo motor coupler and ECU coupler: blue–blue
If there is no continuity, replace the wire harness.



Fault code No.	P048D, P048E		
Item	[P048D] EXUP servo motor: open or ground short circuit detected. [P048E] EXUP servo motor: power short circuit detected.		
3-5	[For P048D] Open circuit Between EXUP servo motor coupler and ECU coupler: white/red–white/red If there is no continuity, replace the wire harness.  		
3-6	[For P048D] Open circuit Between EXUP servo motor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness.  		
3-7	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.		
3-8	[For P048D/P048E] Short circuit Between EXUP servo motor output terminal (white/red) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness.  		
4	Defective EXUP servo motor.	Execute the diagnostic mode. (Code No. 53) Check the operating sound of the motor. Replace if defective.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 5.

Fault code No.		P048D, P048E	
Item		[P048D] EXUP servo motor: open or ground short circuit detected. [P048E] EXUP servo motor: power short circuit detected.	
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
6	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0500, P1500

TIP

In case “P0500” is detected, or both “P0500” and “P1500” are detected, proceed from item A-1.

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		07	
Tool display		Rear wheel 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.	Fault code No. P0500 or P0500 and P1500 detected. Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2.
		Fault code No. P1500 detected. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF”	Incorrect indication → Go to item B-2 for the neutral switch.
		When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: “ON”	Incorrect indication → Go to item C-2 for the clutch switch.

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
A-2	Connection of rear wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-3.
A-3	Connection of ABS ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-4.
A-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. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-5.
A-5	Rear wheel sensor lead continuity, or defective rear wheel sensor.	Open or short circuit, or defective sensor → Replace the rear wheel sensor. Between rear wheel sensor coupler and ABS ECU coupler. black–black white–white Between ABS ECU coupler and ECU coupler. white/yellow–white/yellow	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-6.
A-6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases. Value increases → Go to item A-8. Value does not increase → Go to item A-7.
A-7	Malfunction in ABS ECU.	Replace the Hydraulic unit assembly.	Go to item A-8.

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
A-8	Delete the fault code and check that the engine trouble warning light goes off.	Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of “Malfunction”.	

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		21	
Tool display		Neutral switch • “ON” (when the transmission is in neutral) • “OFF” (when the transmission is in gear with the clutch lever released)	
Procedure		Operate the transmission and clutch lever.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
B-1	Locate the malfunction.	Fault code No. P0500 or P0500 and P1500 detected. Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2 for the rear wheel sensor.
		Fault code No. P1500 detected. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF”	Incorrect indication → Go to item B-2.
		When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: “ON”	Incorrect indication → Go to item C-2 for the clutch switch.
B-2	Connection of 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.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF” Correct indication → Go to item B-8. Incorrect indication → Go to item B-3.
B-3	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF” Correct indication → Go to item B-8. Incorrect indication → Go to item B-4.
B-4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and joint coupler. black/yellow–black/yellow Between joint coupler and ECU coupler. black/yellow–black/yellow Between relay unit coupler and neutral switch connector. sky blue–sky blue	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF” Correct indication → Go to item B-8. Incorrect indication → Go to item B-5.

Fault code No.		P0500, P1500		
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
		B	[P1500] Neutral switch: open or short circuit is detected.	
		C	[P1500] Clutch switch: open or short circuit is detected.	
B-5	Defective neutral switch.		Check the neutral switch. Replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-150.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF” Correct indication → Go to item B-8. Incorrect indication → Go to item B-6.
B-6	Faulty shift drum (neutral detection area).		Malfunction → Replace the shift drum. Refer to “TRANSMISSION” on page 5-81.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: “ON” When the transmission is in gear with the clutch lever released: “OFF” Correct indication → Go to item B-8. Incorrect indication → Go to item B-7.
B-7	Malfunction in ECU.		Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
B-8	Delete the fault code and check that the engine trouble warning light goes off.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of “Malfunction”.	

Fault code No.	**P0500, P1500**	
Item	**A**	**[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.**
	B	**[P1500] Neutral switch: open or short circuit is detected.**
	C	**[P1500] Clutch switch: open or short circuit is detected.**
Fail-safe system	Able to start engine	
	Able to drive vehicle	
Diagnostic code No.	21	
Tool display	Clutch switch • "ON" (when the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted) • "OFF" (when the clutch lever is squeezed with the transmission in gear and when the sidestand is extended)	
Procedure	Operate the transmission, clutch lever, and sidestand.	

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
C-1	Locate the malfunction.	Fault code No. P0500 or P0500 and P1500 detected. Execute the diagnostic mode. (Code No. 07) Rotate the rear wheel by hand and check that the indicated value increases.	Value does not increase → Go to item A-2 for the rear wheel sensor.
		Fault code No. P1500 detected. Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"	Incorrect indication → Go to item B-2 for the neutral switch.
		When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"	Incorrect indication → Go to item C-2.
C-2	Clutch lever adjustment.	Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: "OFF" When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: "ON" Correct indication→ Go to item C-8. Incorrect indication → Go to item C-3.

Fault code No.		P0500, P1500	
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.
		B	[P1500] Neutral switch: open or short circuit is detected.
		C	[P1500] Clutch switch: open or short circuit is detected.
C-3	Connection of clutch switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-8. Incorrect indication → Go to item C-4.
C-4	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-8. Incorrect indication → Go to item C-5.
C-5	Wire harness continuity.	Open or short circuit → Replace the wire harness or left handlebar switch. Between ECU coupler and joint coupler. black/yellow–black/yellow Between joint coupler and relay unit coupler. black/yellow–black/yellow Between joint coupler and left handlebar switch coupler. black/yellow–black/yellow Between relay unit coupler and left handlebar switch coupler. blue/yellow–blue/yellow Between left handlebar switch coupler and clutch switch connector. black/yellow–black/yellow black/yellow–black/yellow	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-8. Incorrect indication → Go to item C-6.

Fault code No.		P0500, P1500		
Item		A	[P0500, P1500] Rear wheel sensor: no normal signals are received from the rear wheel sensor.	
		B	[P1500] Neutral switch: open or short circuit is detected.	
		C	[P1500] Clutch switch: open or short circuit is detected.	
C-6	Defective clutch switch.		Check the clutch switch. Replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-150.	Execute the diagnostic mode. (Code No. 21) When the clutch lever is released with the transmission in gear and when the sidestand is retracted: “OFF” When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted: “ON” Correct indication→ Go to item C-8. Incorrect indication → Go to item C-7.
C-7	Malfunction in ECU.		Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
C-8	Delete the fault code and check that the engine trouble warning light goes off.		Turn the main switch to “ON”, and then rotate the rear wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph). Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of “Malfunction”.	

Fault code No. P0560

Fault code No.	**P0560**
Item	**Charging voltage is abnormal.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in charging system.	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-13. Defective rectifier/regulator or AC magneto → Replace. Defective connection in the charging system circuit → Properly connect or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 2 and finish the service. Condition is “Malfunction” → Repeat item 1.
2	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0601

Fault code No.	**P0601**
Item	**Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Turn the main switch to “ON”. Check that the engine trouble warning light does not come on.

Fault code No. P0606

Fault code No.	**P0606**
Item	**ECU internal malfunction. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—

Fault code No.	P0606
Item	ECU internal malfunction. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Turn the main switch to “ON”. Check that the engine trouble warning light does not come on.

Fault code No. P062F

Fault code No.	P062F
Item	EEPROM fault code number: an error is detected while reading or writing on EEPROM.
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	60
Tool display	00 • No malfunctions detected (If the self-diagnosis fault code P062F is indicated, the ECU is defective.) 01–04 (CO adjustment value) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) 11 (Data error for ISC (idle speed control) learning values) 12 (O_2 feedback learning value) 13 (OBD memory value)
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. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
3	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0638

Fault code No.	**P0638**
Item	**YCC-T drive system: malfunction detected.**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of throttle servo motor 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Check the electronic throttle valve fuse.	Blown fuse → Replace the fuse.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between electronic throttle valve fuse and ECU coupler. red/blue–red/blue Between throttle servo motor coupler and ECU coupler. light green/red–light green/red yellow/red–yellow/red	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective throttle bodies.	Check the throttle bodies. Replace if defective. Refer to “CHECKING THE THROTTLE SERVO MOTOR” on page 8-162.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.

Fault code No.		P0638	
Item		YCC-T drive system: malfunction detected.	
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0657

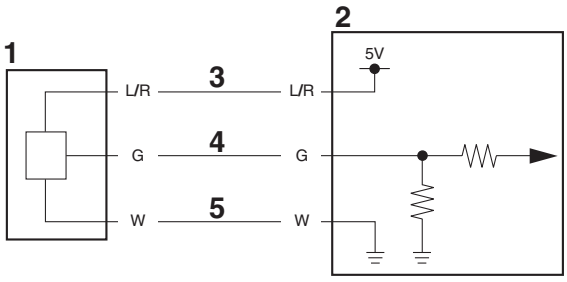
Fault code No.		P0657	
Item		Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		09, 50	
09	Tool display	Fuel system voltage (battery voltage) Approximately 12.0	
	Procedure	Set the engine stop switch to “○”, and then compare the actually measured battery voltage with the tool 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 on the Yamaha diagnostic tool screen come on each time the relay is actuated.	
	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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.

Fault code No.		P0657	
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 fuel injection system fuse and relay unit coupler. brown/white–brown/white Between ignition fuse and right handlebar switch coupler. red/white–red/white Between right handlebar switch coupler and relay unit coupler. red/black–red/black Between relay unit coupler and ECU coupler. red/blue–red/blue blue/white–blue/white	Start the engine and let it idle for approximately 5 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

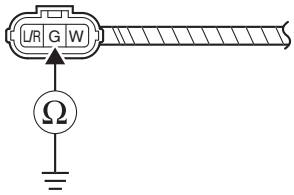
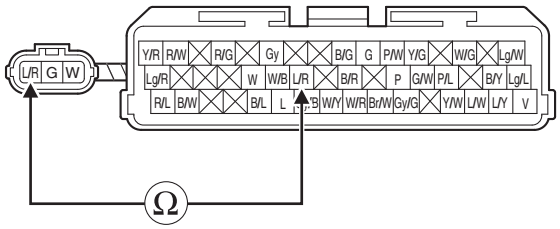
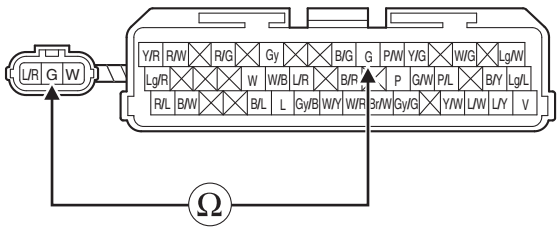
Fault code No. P0916, P0917

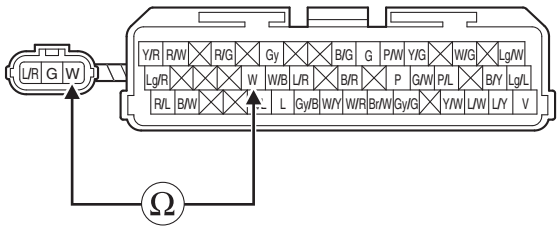
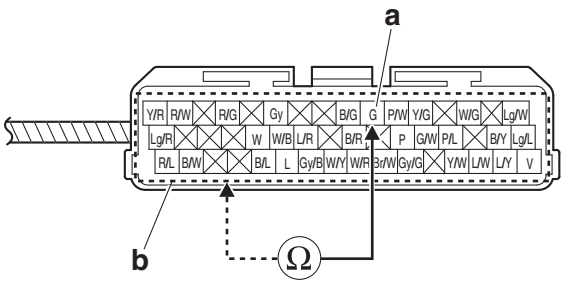
Fault code No.	P0916, P0917
Item	**[P0916] Gear position sensor: open or ground short circuit detected.** **[P0917] Gear position sensor: power short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle However, the vehicle cannot start off again after stopping without changing gears.

Fault code No.	**P0916, P0917**
Item	**[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.**
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of gear 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is ”Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
3-1	 1. Gear position sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the gear position sensor coupler from the gear position sensor.		

Fault code No.	P0916, P0917
Item	[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.

3-3	[For P0916] Ground short circuit Between gear position sensor coupler and ground: green–ground If there is continuity, replace the wire harness. 
3-4	[For P0916] Open circuit Between gear position sensor coupler and ECU coupler: blue/red–blue/red If there is no continuity, replace the wire harness. 
3-5	[For P0916] Open circuit Between gear position sensor coupler and ECU coupler: green–green If there is no continuity, replace the wire harness. 

Fault code No.	P0916, P0917		
Item	[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.		
3-6	[For P0916] Open circuit Between gear position sensor coupler and ECU coupler: white–white If there is no continuity, replace the wire harness. 		
3-7	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.		
3-8	[For P0916/P0917] Short circuit Between gear position sensor output terminal (green) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 		
4	Installed condition of gear position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or adjust the sensor. Refer to “INSTALLING THE GEAR POSITION SENSOR” on page 5-67.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective gear position sensor.	Make sure that the position of each gear is correctly displayed on the meter. If incorrect → Replace the gear position sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

Fault code No.		P0916, P0917	
Item		[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P1400

Fault code No.		P1400	
Item		Air induction system solenoid: open or short circuit is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		48	
Actuation		Actuates air induction system solenoid five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the air induction system solenoid is actuated.	
Procedure		Check that air induction system solenoid 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 air induction system solenoid 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 sub-wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.

Fault code No.		P1400	
Item		Air induction system solenoid: open or short circuit is detected.	
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 sub-wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ECU coupler and sub-wire harness coupler. brown/red–brown/red Between sub-wire harness coupler and air induction system solenoid coupler. brown/red–brown/red Between air induction system solenoid coupler and sub-wire harness coupler. red/white–red/white Between sub-wire harness coupler and ignition fuse. red/white–red/white	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective air induction system solenoid.	Check the air induction system solenoid. Refer to “CHECKING THE AIR INDUCTION SYSTEM SOLENOID” on page 8-159. Replace if defective.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Start the engine, and then check the condition of the fault code. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P1602

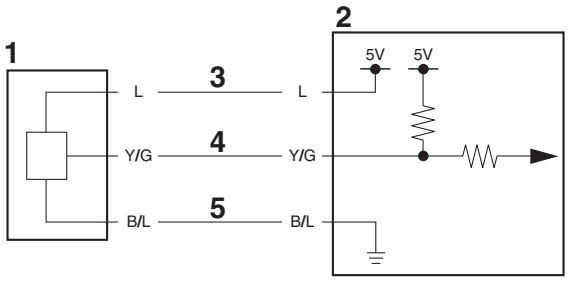
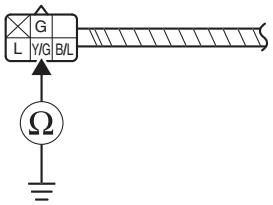
Fault code No.	**P1602**
Item	**Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of battery leads. Check the installed condition of the battery and battery leads (loose bolts).	Improperly installed battery or battery leads → Reinstall or replace the battery leads.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 2.
2	Connection of starter relay coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Check the backup fuse.	Blown fuse → Replace the fuse or wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.
4	Wire harness continuity between battery and ECU coupler.	Open or short circuit → Replace the wire harness. Between battery terminal and main fuse coupler. red–red Between main fuse coupler and backup fuse. red–red Between backup fuse and ECU coupler. red/green–red/green	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.

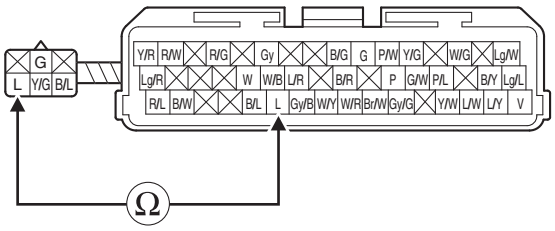
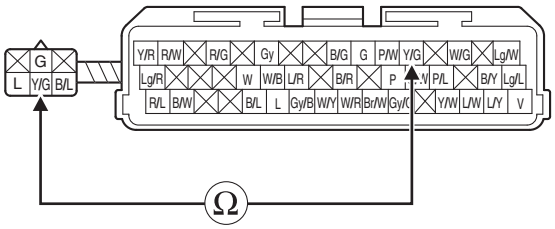
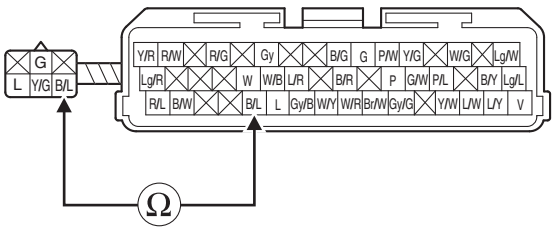
Fault code No.		P1602	
Item		Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	
5	Wire harness continuity between main switch and ECU coupler.	Open or short circuit → Replace the wire harness. Between main switch coupler and ignition fuse. brown/blue–brown/blue Between ignition fuse and ECU coupler. red/white–red/white	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 7 and finish the service. Condition is "Malfunction" → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of "Recover" using the Yamaha diagnostic tool, and then delete the fault code.	

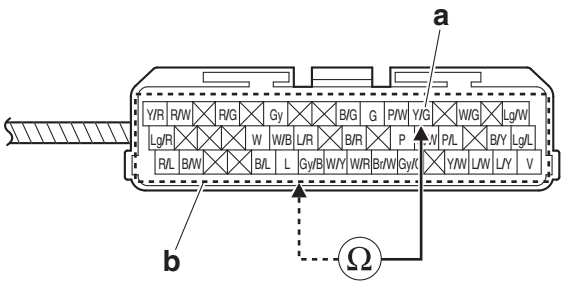
Fault code No. P1604, P1605

Fault code No.		P1604, P1605	
Item		[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	
Tool display		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
Procedure		Remove the lean angle sensor and incline it more than 65 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". Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 2.

Fault code No.		P1604, P1605	
Item		[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit.	
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”. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 4.
3-1	 1. Lean angle sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the lean angle sensor coupler from the lean angle sensor.		
3-3	[For P1604] Ground short circuit Between lean angle sensor coupler and ground: yellow/green–ground If there is continuity, replace the wire harness. 		

Fault code No.	P1604, P1605
Item	[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit.

3-4	[For P1605] Open circuit Between lean angle sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness. 
3-5	[For P1605] Open circuit Between lean angle sensor coupler and ECU coupler: yellow/green–yellow/green If there is no continuity, replace the wire harness. 
3-6	[For P1605] Open circuit Between lean angle sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 
3-7	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.

Fault code No.		P1604, P1605	
Item		[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit.	
3-8	[For P1604, P1605] Short circuit Between lean angle sensor output terminal (yellow/green) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 		
4	Defective lean angle sensor.	Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-155.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 6 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
6	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P2122, P2123, P2127, P2128, P2138

TIP

If a fault code number (“P2122”, “P2123”, “P2127”, or “P2128”) other than “P2138” is indicated, take the actions specified for that fault code number first.

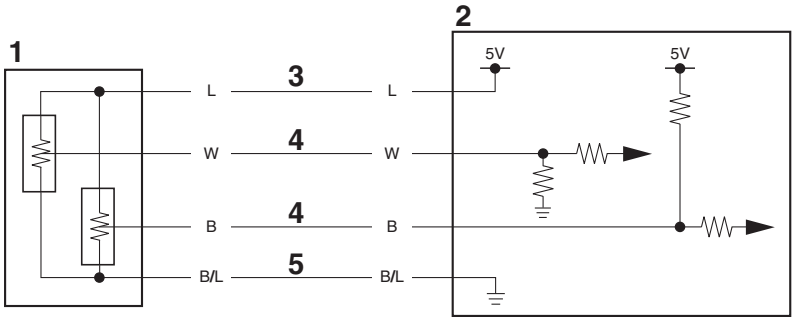
Fault code No.	P2122, P2123, P2127, P2128, P2138
Item	[P2122] Accelerator position sensor: open or ground short circuit detected. [P2123] Accelerator position sensor: power short circuit detected. [P2127] Accelerator position sensor: ground short circuit detected. [P2128] Accelerator position sensor: open or power short circuit detected. [P2138] Deviation error
Fail-safe system	Able/unable to start engine
	Able/unable to drive vehicle
Diagnostic code No.	14, 15

Fault code No.		P2122, P2123, P2127, P2128, P2138
Item		**[P2122] Accelerator position sensor: open or ground short circuit detected.** **[P2123] Accelerator position sensor: power short circuit detected.** **[P2127] Accelerator position sensor: ground short circuit detected.** **[P2128] Accelerator position sensor: open or power short circuit detected.** **[P2138] Deviation error**
14	**Tool display**	Accelerator position sensor signal 1 • 11–21 (fully closed position) • 96–106 (fully open position)
	Procedure	• Check with throttle grip fully closed position. • Check with throttle grip fully open position.
15	**Tool display**	Accelerator position sensor signal 2 • 9–23 (fully closed position) • 93–109 (fully open position)
	Procedure	• Check with throttle grip fully closed position. • Check with throttle grip fully open position.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of accelerator 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4.

Fault code No.	P2122, P2123, P2127, P2128, P2138
Item	**[P2122] Accelerator position sensor: open or ground short circuit detected.** **[P2123] Accelerator position sensor: power short circuit detected.** **[P2127] Accelerator position sensor: ground short circuit detected.** **[P2128] Accelerator position sensor: open or power short circuit detected.** **[P2138] Deviation error**

3-1



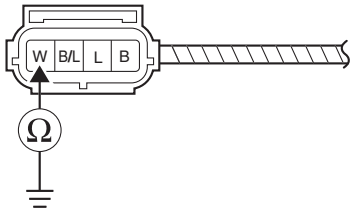
1. Accelerator position sensor
2. ECU
3. Sensor input lead
4. Sensor output lead
5. Sensor ground lead

3-2

Disconnect the ECU coupler from the ECU.
Disconnect the accelerator position sensor coupler from the accelerator position sensor.

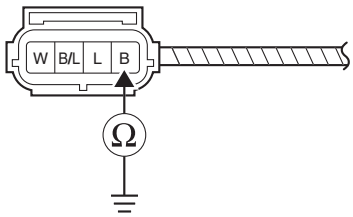
3-3

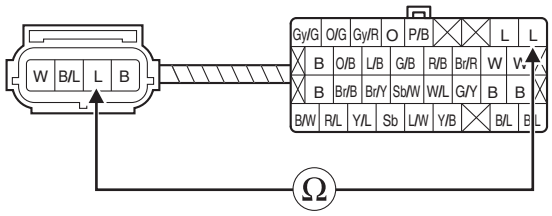
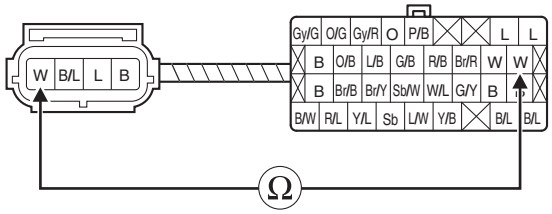
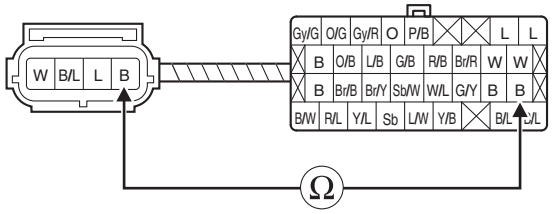
[For P2122] Ground short circuit
[For P2138] Deviation error
Between accelerator position sensor coupler and ground: white–ground
If there is continuity, replace the wire harness.

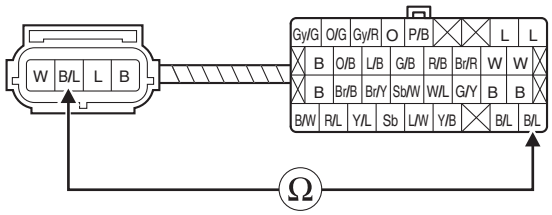
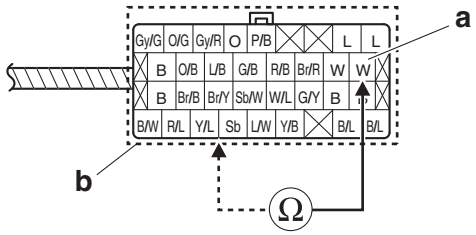
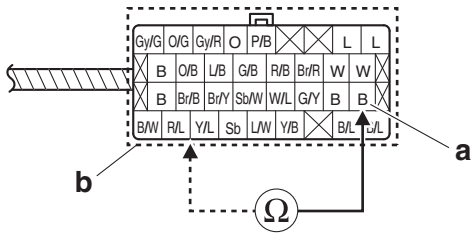


3-4

[For P2127] Ground short circuit
[For P2138] Deviation error
Between accelerator position sensor coupler and ground: black–ground
If there is continuity, replace the wire harness.



Fault code No.		P2122, P2123, P2127, P2128, P2138
Item		**[P2122] Accelerator position sensor: open or ground short circuit detected.** **[P2123] Accelerator position sensor: power short circuit detected.** **[P2127] Accelerator position sensor: ground short circuit detected.** **[P2128] Accelerator position sensor: open or power short circuit detected.** **[P2138] Deviation error**
3-5	[For P2122] Open circuit Between accelerator position sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness. 	
3-6	[For P2122] Open circuit [For P2138] Deviation error Between accelerator position sensor coupler and ECU coupler: white–white If there is no continuity, replace the wire harness. 	
3-7	[For P2128] Open circuit [For P2138] Deviation error Between accelerator position sensor coupler and ECU coupler: black–black If there is no continuity, replace the wire harness. 	

Fault code No.	P2122, P2123, P2127, P2128, P2138
Item	**[P2122] Accelerator position sensor: open or ground short circuit detected.** **[P2123] Accelerator position sensor: power short circuit detected.** **[P2127] Accelerator position sensor: ground short circuit detected.** **[P2128] Accelerator position sensor: open or power short circuit detected.** **[P2138] Deviation error**
3-8	[For P2122, P2128] Open circuit Between accelerator position sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 
3-9	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.
3-10	[For P2122, P2123] Short circuit [For P2138] Deviation error Between accelerator position sensor output terminal (white) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 
3-11	[For P2127, P2128] Short circuit [For P2138] Deviation error Between accelerator position sensor output terminal (black) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 

Fault code No.		P2122, P2123, P2127, P2128, P2138	
Item		[P2122] Accelerator position sensor: open or ground short circuit detected. [P2123] Accelerator position sensor: power short circuit detected. [P2127] Accelerator position sensor: ground short circuit detected. [P2128] Accelerator position sensor: open or power short circuit detected. [P2138] Deviation error	
4	Installed condition of accelerator position sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or adjust the sensor. Refer to “ADJUSTING THE ACCELERATOR POSITION SENSOR” on page 7-17.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Accelerator position sensor resistance.	Measure the accelerator position sensor resistance. black/blue–blue Refer to “CHECKING THE ACCELERATOR POSITION SENSOR” on page 8-161.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Defective accelerator position sensor.	Check accelerator position sensor signal 1. Execute the diagnostic mode. (Code No. 14) When the throttle valves are fully closed: A value of 11–21 is indicated. When throttle valves are fully open: A value of 96–106 is indicated. Check accelerator position sensor signal 2. Execute the diagnostic mode. (Code No. 15) When the throttle valves are fully closed: A value of 9–23 is indicated. When the throttle valves are fully open: A value of 93–109 is indicated. An indicated value is out of the specified range → Replace the accelerator position sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P2158

Fault code No.	**P2158**
Item	**Front wheel sensor: no normal signals are received from the front wheel sensor.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	16
Tool display	Front wheel speed pulse 0–999
Procedure	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of front wheel 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. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 2.
2	Connection of ABS 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. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → 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.	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between front wheel sensor coupler and ABS ECU coupler. black–black white–white Between ABS ECU coupler and ECU coupler. gray/black–gray/black	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 5.

Fault code No.		P2158	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
5	Defective front wheel sensor.	Improperly installed sensor → Reinstall or replace the sensor.	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Execute the diagnostic mode. (Code No. 16) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 8 and delete the fault code. Value does not increase → Go to item 7.
7	Malfunction in ABS ECU.	Replace the Hydraulic unit assembly.	Go to item 8.
8	Delete the fault code and check that the engine trouble warning light goes off.	Turn the main switch to “ON”, and then rotate the front wheel by hand. Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h(12 to 19 mph). Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code. Delete this fault code even if it has a condition of “Malfunction”.	

Fault code No. P2195

TIP

If fault code numbers “P2195” and “P0030” are both indicated, take the actions specified for fault code number “P0030” first.

Fault code No.	**P2195**
Item	**O_2 sensor: Open circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of O_2 sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 2. Also, delete this fault code, which has a condition of “Malfunction”.
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 and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 3. Also, delete this fault code, which has a condition of “Malfunction”.
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 and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 4. Also, delete this fault code, which has a condition of “Malfunction”.

Fault code No.		P2195	
Item		O_2 sensor: Open circuit detected.	
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between O_2 sensor coupler and ECU coupler. black/blue–black/blue gray/green–gray/green pink/black–pink/black Between O_2 sensor coupler and relay unit. red/blue–red/blue	Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 5. Also, delete this fault code, which has a condition of “Malfunction”.
5	Check fuel pressure.	Refer to “CHECKING THE FUEL PRESSURE” on page 7-16.	Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 6. Also, delete this fault code, which has a condition of “Malfunction”.
6	Defective O_2 sensor.	Check the O_2 sensor. Replace if defective. Refer to “ENGINE REMOVAL” on page 5-9.	Start the engine and let it idle for approximately 10 seconds. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 8 and finish the service. Condition is “Malfunction” → Go to item 7. Also, delete this fault code, which has a condition of “Malfunction”.
7	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
8	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P21CF

Fault code No.	**P21CF**
Item	**Secondary injector #1: malfunction in secondary injector #1.**
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.	40
Actuation	Actuates secondary injector #1 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the secondary injector is actuated.
Procedure	Disconnect the fuel pump coupler. Check that secondary injector #1 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 secondary injector #1 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 sub-wire harness.	Execute the diagnostic mode. (Code No. 40) Operating sound → Go to item 7. No operating sound → Go to item 2.
2	Defective secondary injector #1.	Measure the secondary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 40) Operating sound → Go to item 7. No operating sound → 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.	Execute the diagnostic mode. (Code No. 40) Operating sound → Go to item 7. No operating sound → Go to item 4.
4	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Execute the diagnostic mode. (Code No. 40) Operating sound → Go to item 7. No operating sound → Go to item 5.

Fault code No.		P21CF	
Item		**Secondary injector #1: malfunction in secondary injector #1.**	
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between secondary injector coupler and sub-wire harness coupler. white/blue–white/blue Between sub-wire harness coupler and ECU coupler. white/blue–white/blue Between secondary injector coupler and sub-wire harness coupler. red/blue–red/blue Between sub-wire harness coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 40) Operating sound → Go to item 7. No operating sound → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P21D0

Fault code No.		P21D0	
Item		**Secondary injector #2: malfunction in secondary injector #2.**	
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.		41	
Actuation		Actuates secondary injector #2 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the secondary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that secondary injector #2 is actuated five times by listening for the operating sound.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of secondary injector #2 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 41) Operating sound → Go to item 7. No operating sound → Go to item 2.

Fault code No.		P21D0	
Item		Secondary injector #2: malfunction in secondary injector #2.	
2	Defective secondary injector #2.	Measure the secondary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 41) Operating sound → Go to item 7. No operating sound → 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.	Execute the diagnostic mode. (Code No. 41) Operating sound → Go to item 7. No operating sound → Go to item 4.
4	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Execute the diagnostic mode. (Code No. 41) Operating sound → Go to item 7. No operating sound → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between secondary injector coupler and sub-wire harness coupler. sky blue/white–sky blue/white Between sub-wire harness and ECU coupler. sky blue/white–sky blue/white Between secondary injector coupler and sub-wire harness coupler. red/blue–red/blue Between sub-wire harness coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 41) Operating sound → Go to item 7. No operating sound → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P21D1

Fault code No.	**P21D1**
Item	**Secondary injector #3: malfunction in secondary injector #3.**
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.	42
Actuation	Actuates secondary injector #3 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the secondary injector is actuated.
Procedure	Disconnect the fuel pump coupler. Check that secondary injector #3 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 secondary injector #3 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. 42) Operating sound → Go to item 7. No operating sound → Go to item 2.
2	Defective secondary injector #3.	Measure the secondary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 42) Operating sound → Go to item 7. No operating sound → 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.	Execute the diagnostic mode. (Code No. 42) Operating sound → Go to item 7. No operating sound → Go to item 4.
4	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Execute the diagnostic mode. (Code No. 42) Operating sound → Go to item 7. No operating sound → Go to item 5.

Fault code No.		P21D1	
Item		**Secondary injector #3: malfunction in secondary injector #3.**	
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between secondary injector coupler and sub-wire harness coupler. brown/yellow–brown/yellow Between sub-wire harness coupler and ECU coupler. brown/yellow–brown/yellow Between secondary injector coupler and sub-wire harness coupler. red/blue–red/blue Between sub-wire harness coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 42) Operating sound → Go to item 7. No operating sound → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P21D2

Fault code No.		P21D2	
Item		**Secondary injector #4: malfunction in secondary injector #4.**	
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.		43	
Actuation		Actuates secondary injector #4 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen comes on each time the secondary injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that secondary injector #4 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 secondary injector #4 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. 43) Operating sound → Go to item 7. No operating sound → Go to item 2.

Fault code No.		P21D2	
Item		Secondary injector #4: malfunction in secondary injector #4.	
2	Defective secondary injector #4.	Measure the secondary injector resistance. Replace if out of specification. Refer to “CHECKING THE FUEL INJECTORS” on page 8-162.	Execute the diagnostic mode. (Code No. 43) Operating sound → Go to item 7. No operating sound → 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.	Execute the diagnostic mode. (Code No. 43) Operating sound → Go to item 7. No operating sound → Go to item 4.
4	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Execute the diagnostic mode. (Code No. 43) Operating sound → Go to item 7. No operating sound → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between secondary injector coupler and sub-wire harness coupler. brown/black–brown/black Between sub-wire harness coupler and ECU coupler. brown/black–brown/black Between secondary injector coupler and sub-wire harness coupler. red/blue–red/blue Between sub-wire harness coupler and relay unit coupler. red/blue–red/blue	Execute the diagnostic mode. (Code No. 43) Operating sound → Go to item 7. No operating sound → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 5 seconds. Confirm that the fault code has a condition of “Recover” using the malfunction mode of the Yamaha diagnostic tool, and then delete the fault code.	

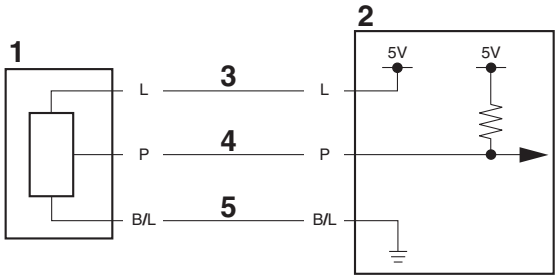
Fault code No. P2228, P2229

Fault code No.	**P2228, P2229**
Item	**[P2228] Atmospheric pressure sensor: ground short circuit detected.** **[P2229] Atmospheric pressure sensor: open or power short circuit detected.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	02
Tool display	Displays the atmospheric pressure.
Procedure	Compare the actually measured atmospheric pressure with the tool display value.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of atmospheric 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”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 4.

Fault code No.	P2228, P2229
Item	[P2228] Atmospheric pressure sensor: ground short circuit detected. [P2229] Atmospheric pressure sensor: open or power short circuit detected.

3-1



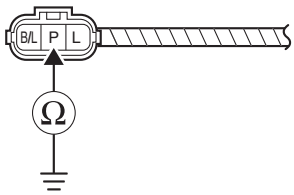
1. Atmospheric pressure sensor
2. ECU
3. Sensor input lead
4. Sensor output lead
5. Sensor ground lead

3-2

Disconnect the ECU coupler from the ECU.
Disconnect the atmospheric pressure sensor coupler from the atmospheric pressure sensor.

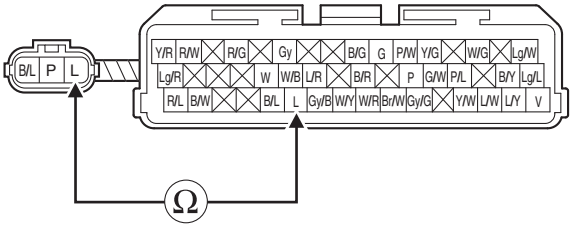
3-3

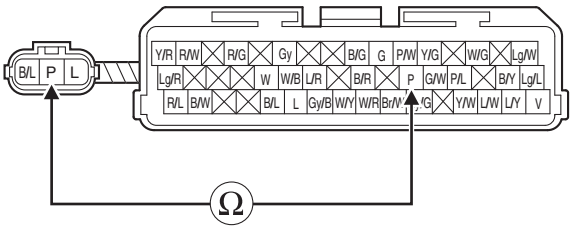
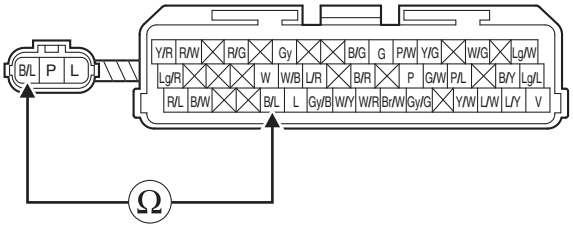
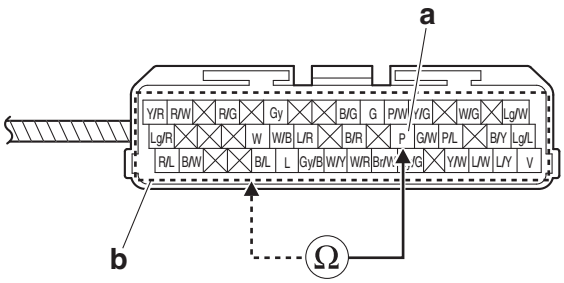
[For P2228] Ground short circuit
Between atmospheric pressure sensor coupler and ground: pink–ground
If there is continuity, replace the wire harness.



3-4

[For P2229] Open circuit
Between atmospheric pressure sensor coupler and ECU coupler: blue–blue
If there is no continuity, replace the wire harness.



Fault code No.		P2228, P2229
Item		**[P2228] Atmospheric pressure sensor: ground short circuit detected.** **[P2229] Atmospheric pressure sensor: open or power short circuit detected.**
3-5	[For P2229] Open circuit Between atmospheric pressure sensor coupler and ECU coupler: pink–pink If there is no continuity, replace the wire harness. 	
3-6	[For P2229] Open circuit Between atmospheric pressure sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness. 	
3-7	Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-33.	
3-8	[For P2228, P2229] Short circuit Between atmospheric pressure sensor output terminal (pink) “a” of ECU coupler and any other ECU coupler terminal “b”. If there is continuity, replace the wire harness. 	

Fault code No.		P2228, P2229	
Item		[P2228] Atmospheric pressure sensor: ground short circuit detected. [P2229] Atmospheric pressure sensor: open or power short circuit detected.	
4	Installed condition of atmospheric pressure sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 5.
5	Defective atmospheric pressure sensor.	Execute the diagnostic mode. (Code No. 02) 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) Displayed value is incorrect → Replace the atmospheric pressure sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 7 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. U0155 or "Err"

TIP

"Err" is displayed on the clock display of the multi-function meter, but the engine trouble warning light does not come on.

Event code No.	**U0155 or "Err"**
Item	**CAN communication error (with the meter): communication between the ECU and the meter is not possible.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → 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 check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between meter assembly coupler and joint coupler. light green/blue–light green/blue light green/white–light green/white Between joint coupler and ECU coupler. light green/blue–light green/blue light green/white–light green/white	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → Go to item 5.

5	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.
6	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.	

EAS31790
TROUBLESHOOTING DETAILS (EVENT CODE)

Event code No. 30

Event code No.	**30**
Item	**Latch up detected.**
Fail-safe system	Unable to start engine
	Unable to drive vehicle
Diagnostic code No.	08
Tool display	Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)
Procedure	Remove the lean angle sensor and incline it more than 65 degrees.

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	The vehicle has overturned.	Raise the vehicle upright.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Engine trouble warning light does not come on → Service is finished. Engine trouble warning light comes on → 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”. Engine trouble warning light does not come on → Service is finished. Engine trouble warning light comes on → Go to item 3.
3	Defective lean angle sensor.	Execute the diagnostic mode. (Code No. 08) Incorrect indication → Replace the lean angle sensor.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Engine trouble warning light does not come on → Service is finished. Engine trouble warning light comes on → Go to item 4.
4	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

Event code No. 70

TIP

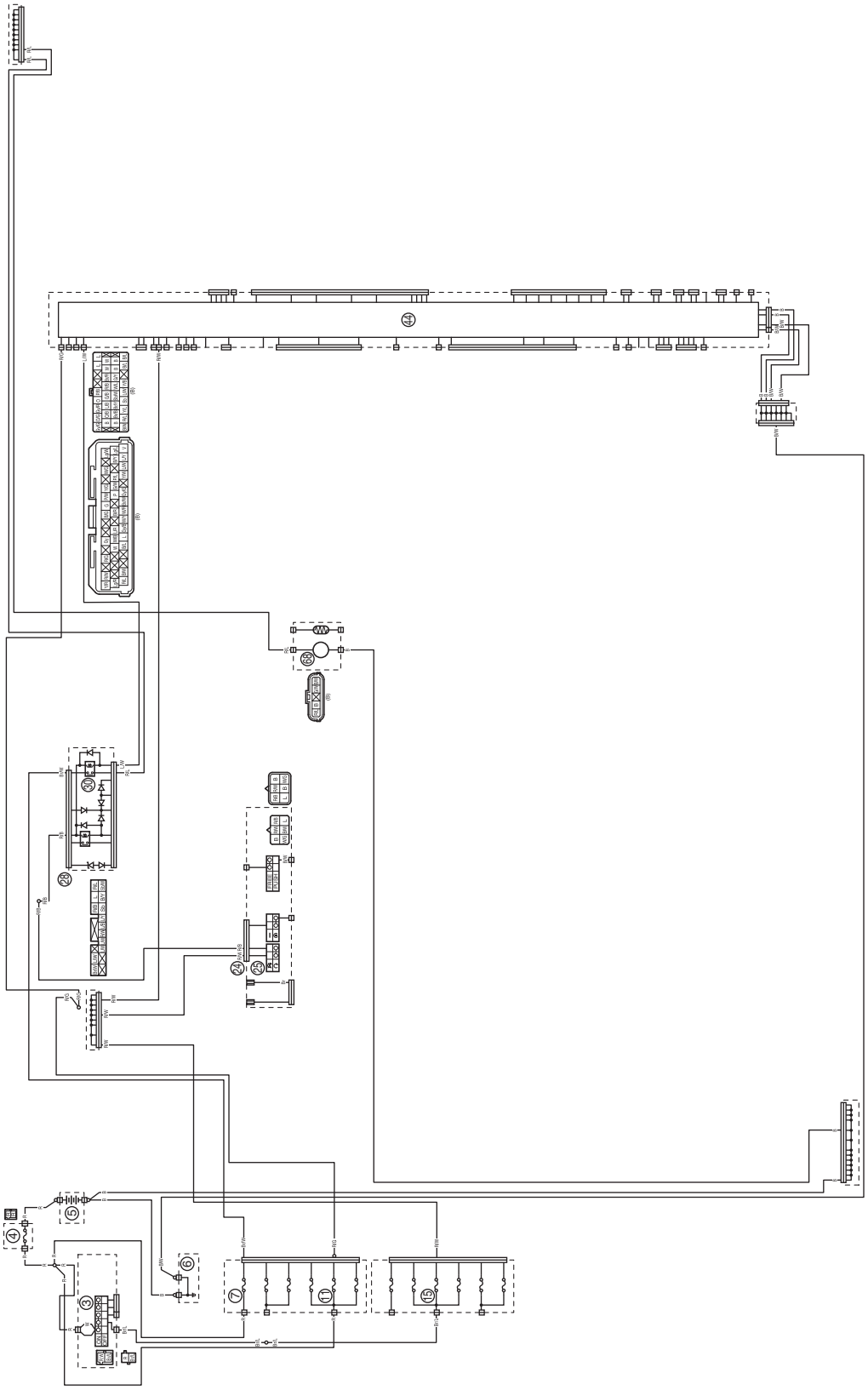
If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.

Event code No.	**70**
Item	**Engine idling stop: engine is forcefully stopped because it was left idling for a long time.**
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	—

Tool display	—		
Procedure	—		
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Engine has been left idling for a long time.	Turn the main switch “OFF”.	Start the engine. Able to start engine → Service is finished. Unable to start engine → Go to item 2.
2	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-151.	Service is finished.

EAS20081
FUEL PUMP SYSTEM

EAS30513
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
11. Backup fuse
15. Ignition fuse
24. Handlebar switch (right)
25. Engine stop switch
28. Relay unit
30. Fuel pump relay
44. ECU (Engine Control Unit)
68. Fuel pump

EAS30514
TROUBLESHOOTING

If the fuel pump fails to operate.

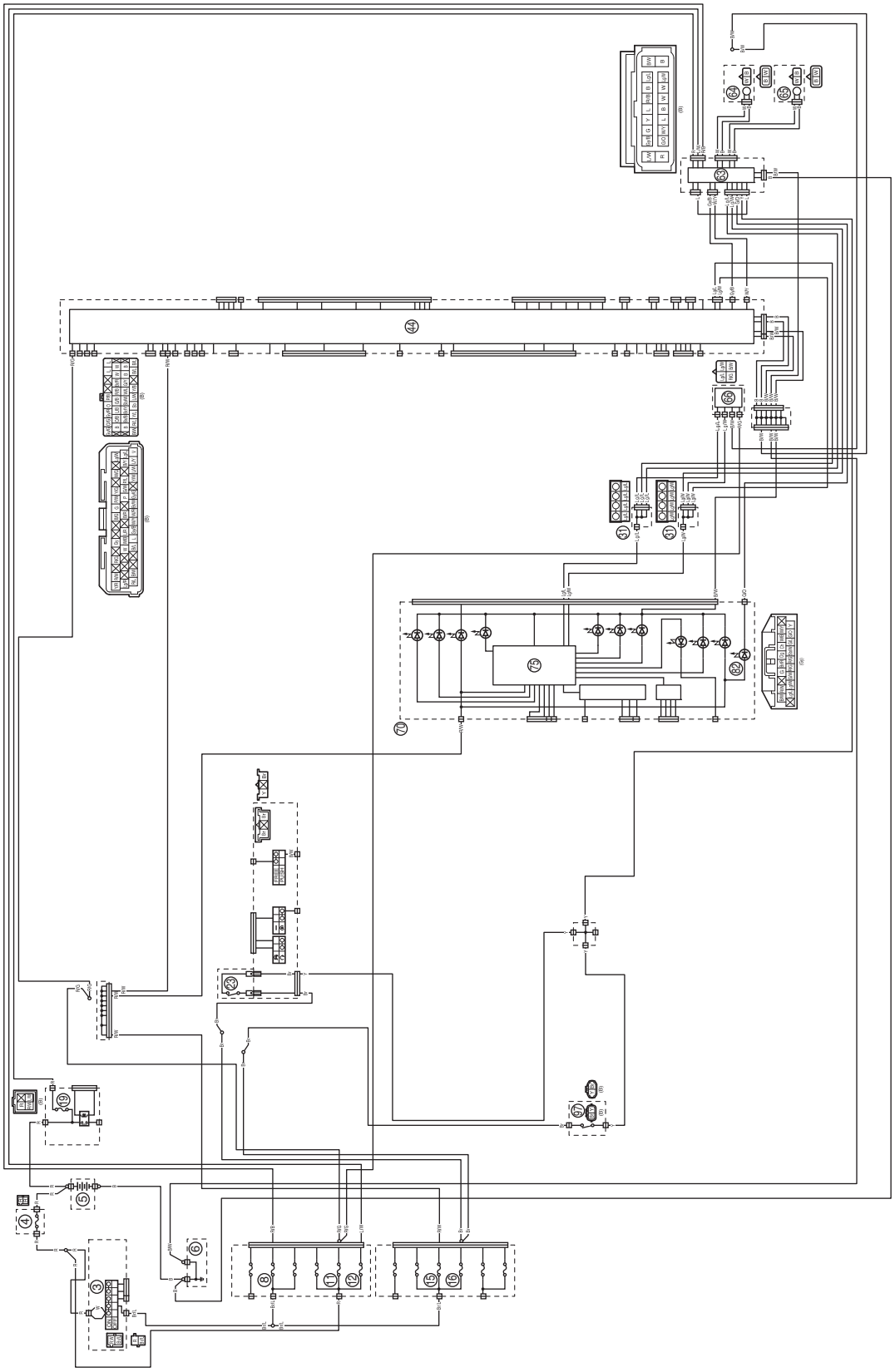
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank
3. Front side cowling assemblies

1. Check the fuses. (Main, fuel injection, backup, and ignition) Refer to "CHECKING THE FUSES" on page 8-151.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-150.	NG →	Replace the main switch.
OK ↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-150.	NG →	• The engine stop switch is faulty. • Replace the right handlebar switch.
OK ↓		
5. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-152.	NG →	Replace the relay unit.
OK ↓		
6. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-4.	NG →	Replace the fuel pump.
OK ↓		
7. Check the entire fuel pump system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-119.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-151.		

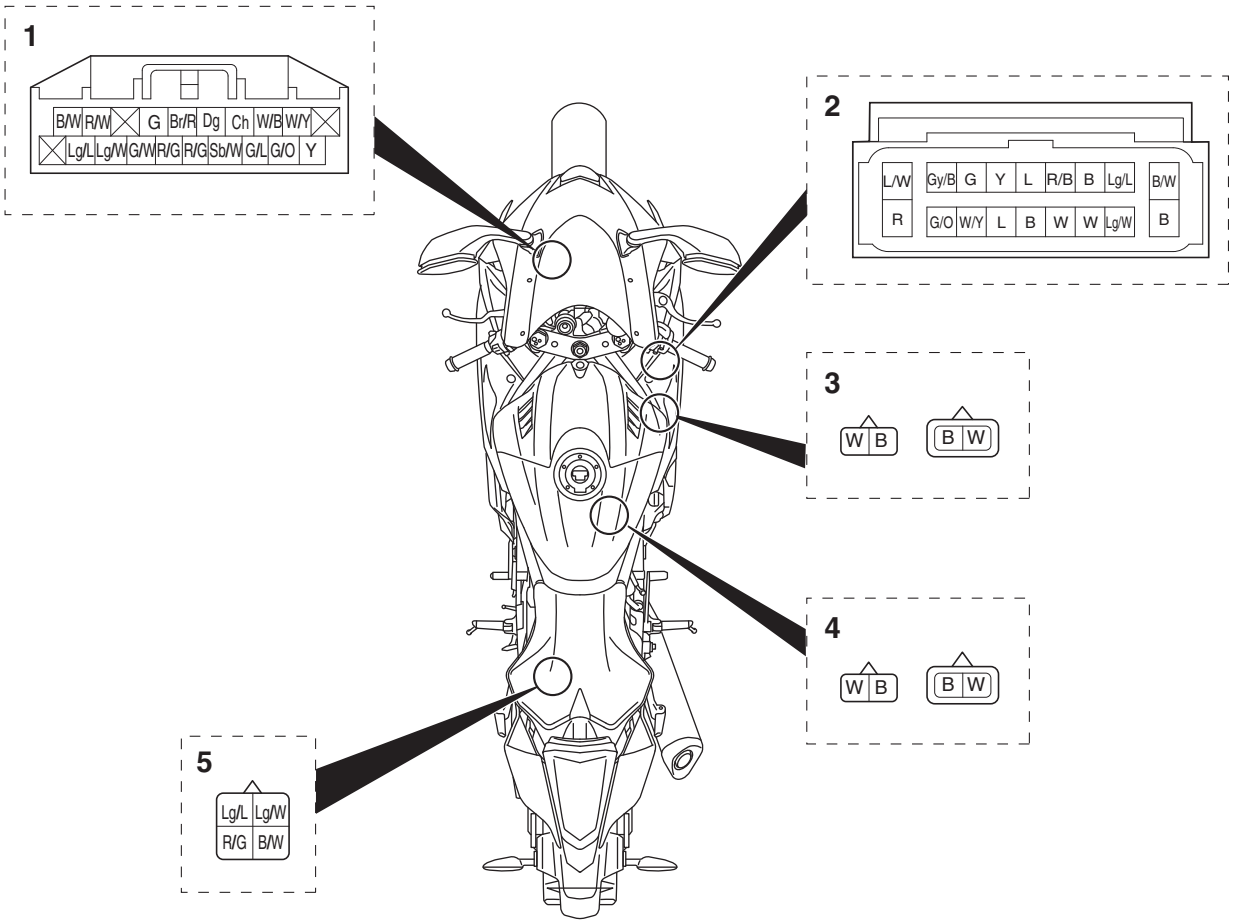
EAS20085
ABS (Anti-lock Brake System)

EAS30843
CIRCUIT DIAGRAM



3. Main switch
4. Main fuse
5. Battery
6. Engine ground
8. ABS ECU fuse
11. Backup fuse
12. ABS solenoid fuse
15. Ignition fuse
16. Signaling system fuse
19. ABS motor fuse
23. Front brake light switch
31. Joint coupler
44. ECU (Engine Control Unit)
63. ABS ECU
64. Front wheel sensor
65. Rear wheel sensor
66. Yamaha diagnostic tool coupler
70. Meter assembly
75. Multi-function meter
82. ABS warning light
97. Rear brake light switch

EAS30844
ABS COUPLER LOCATION CHART



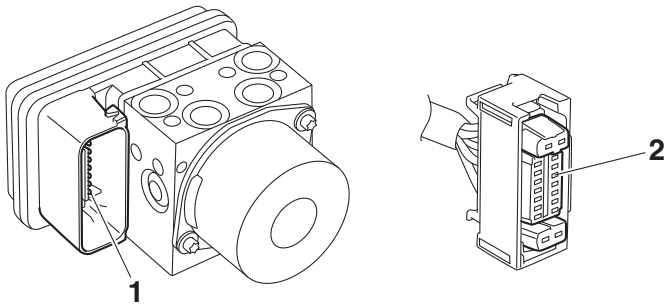
1. Meter assembly coupler
2. ABS ECU coupler
3. Front wheel sensor coupler
4. Rear wheel sensor coupler
5. Yamaha diagnostic tool coupler

EAS30845
MAINTENANCE OF THE ABS ECU

Checking the ABS ECU
1. Check:
   - Terminals “1” of the ABS ECU
     Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.
   - Terminals “2” of the ABS ECU coupler
     Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS30528
ABS TROUBLESHOOTING OUTLINE
This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.
The ABS ECU (Electronic Control Unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.
The following troubleshooting describes the problem identification and service method using the Yamaha diagnostic tool. For information about using the Yamaha diagnostic tool, refer to “[B-2] DIAGNOSIS USING THE FAULT CODES” on page 8-130. For troubleshooting items other than the following items, follow the normal service method.

EWA16710
⚠ WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to “[C-1] FINAL CHECK” on page 8-147.

ABS operation when the ABS warning light comes on
1. The ABS warning light remains on → ABS operates as a normal brake system.
   - A malfunction was detected using the ABS self-diagnosis function.
   - The ABS self-diagnosis has not been completed.
     The ABS self-diagnosis starts when the main switch is turned to “ON” and finishes when the vehicle has traveled at a speed of approximately 5 km/h (3 mi/h).
2. The ABS warning light comes on after the engine starts, and then goes off when the vehicle starts moving (traveling at a speed of approximately 5 km/h (3 mi/h)) → ABS operation is normal.
3. The ABS warning light flashes → ABS operation is normal.
   - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-127.

Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.

The fault codes recorded in the ABS ECU can be checked using the Yamaha diagnostic tool. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). For information about deleting the fault codes, refer to "[B-3] DELETING THE FAULT CODES" on page 8-146. By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned to "ON". During this test, a "clicking" noise can be heard from inside of the right side cowling, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

Self-diagnosis using the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the Yamaha diagnostic tool when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA17620

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS30529

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA17420

⚠ WARNING

- **Perform the troubleshooting [A]→[B]→[C] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.**
- **Use sufficiently charged regular batteries only.**

[A] Malfunction check using the ABS warning light

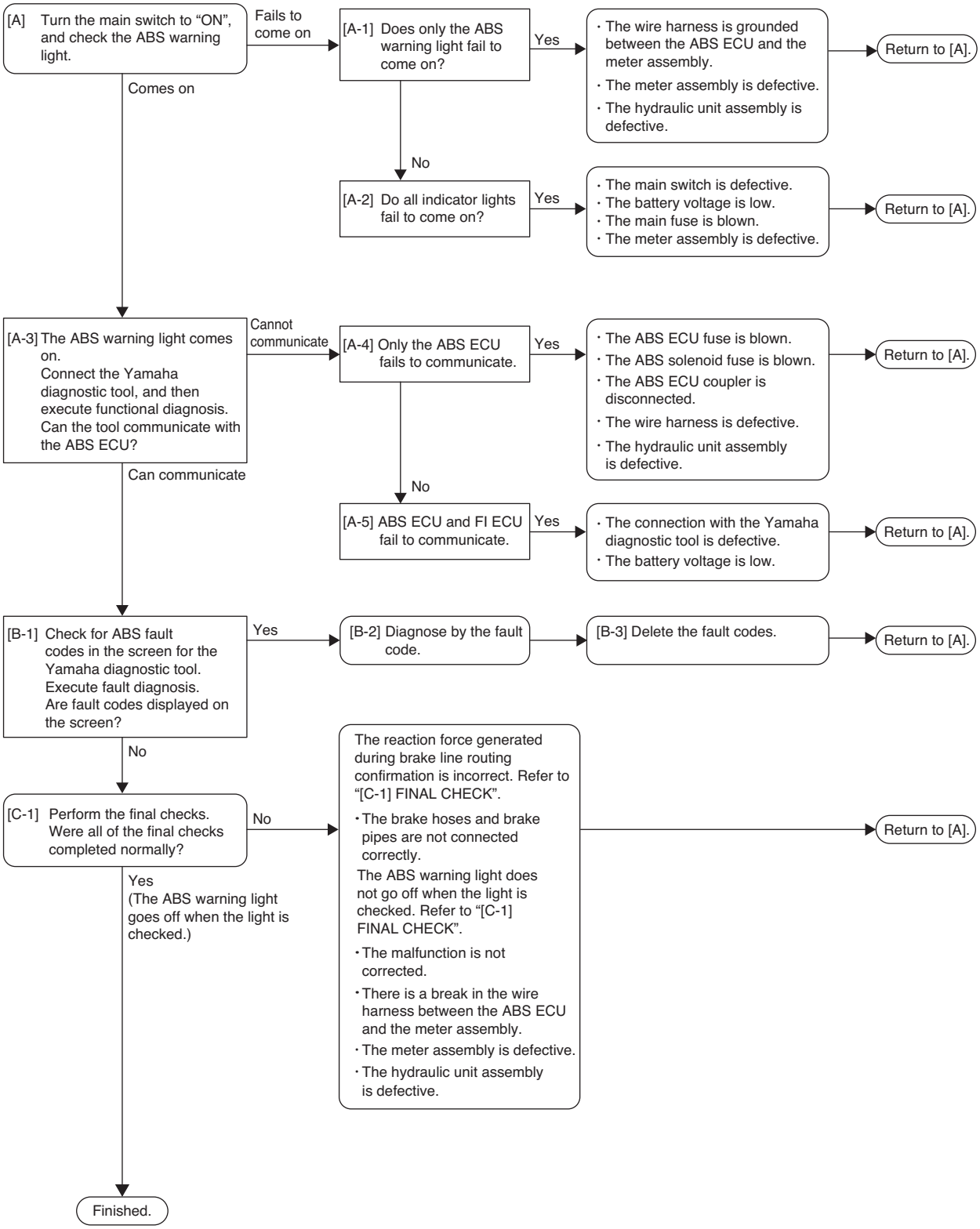
[B] Use the Yamaha diagnostic tool and determine the location of the malfunction and the cause from the recorded fault code.

Determine the cause of the malfunction from the condition and place where the malfunction occurred.

[C] Servicing the ABS

Execute the final check after disassembly and assembly.

EAS30530
BASIC PROCESS FOR TROUBLESHOOTING



EWA16710

⚠ WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to "[C-1] FINAL CHECK" on page 8-147.

EAS30531

[A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

1. The ABS warning light does not come on.
   - Only the ABS warning light fails to come on. [A-1]
   - The ABS warning light and all other indicator lights fail to come on. [A-2]
2. The ABS warning light comes on. [A-3]

EAS30532

[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the green/orange terminal of the ABS ECU coupler and green/orange terminal of the meter assembly.
   - If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
   - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
   - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS30533

[A-2] THE ABS WARNING LIGHT AND OTHER INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
   - Check the main switch for continuity.
     Refer to "CHECKING THE SWITCHES" on page 8-150.
   - If there is no continuity, replace the main switch.
2. Battery
   - Check the condition of the battery.
     Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-152.
   - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
3. Main fuse
   - Check the fuse for continuity.
     Refer to "CHECKING THE FUSES" on page 8-151.
   - If the main fuse is blown, replace the fuse.
4. Circuit
   - Check the meter assembly circuit.
     Refer to "CIRCUIT DIAGRAM" on page 8-123.
   - If the meter assembly circuit is open, replace the wire harness.

EAS31162

[A-3] THE ABS WARNING LIGHT COMES ON

Connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler and execute functional diagnosis. (For information about how to execute functional diagnosis, refer to the operation manual that is included with the tool.)

Check that communication with the ABS ECU is possible.

- Only the ABS ECU fails to communicate. [A-4]
- ABS ECU and FI ECU fail to communicate. [A-5]
- Communication is possible with the ABS ECU. [B-1] (The ABS is displayed on the select unit screen.)

EAS31163
[A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE

1. ABS ECU fuse
   - Check the ABS ECU fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-151.
   - If the ABS ECU fuse is blown, replace the fuse.
2. ABS ECU coupler
   - Check that the ABS ECU coupler is connected properly.
     For information about connecting the ABS ECU coupler properly, refer to “INSTALLING THE HYDRAULIC UNIT ASSEMBLY” on page 4-60.
3. Wire harness
   - Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground.
     Check for continuity between brown/blue terminal of the main switch coupler and red/black terminal of the ABS ECU coupler.
     Check for continuity between black terminal of the ABS ECU coupler and the ground.
     If there is no continuity, the wire harness is defective. Replace the wire harness.
   - Open circuit in the wire harness between the ABS ECU coupler and the Yamaha diagnostic tool coupler.
     Check for continuity between light green/blue terminal of the ABS ECU coupler and light green/blue terminal of the Yamaha diagnostic tool coupler. (CANH)
     Check for continuity between light green/white terminal of the ABS ECU coupler and light green/white terminal of the Yamaha diagnostic tool coupler. (CANL)
4. ABS ECU malfunction
   Replace the hydraulic unit assembly.

EAS31164
[A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE

1. Yamaha diagnostic tool
   Check that the Yamaha diagnostic tool is properly connected.
2. Wire harness
   - Open circuit in the wire harness between the ABS ECU coupler and the Yamaha diagnostic tool coupler.
     Check for continuity between light green/blue terminal of the ABS ECU coupler and light green/blue terminal of the Yamaha diagnostic tool coupler. (CANH)
     Check for continuity between light green/white terminal of the ABS ECU coupler and light green/white terminal of the Yamaha diagnostic tool coupler. (CANL)

EAS31165
[B-1] MALFUNCTION ARE CURRENTLY DETECTED

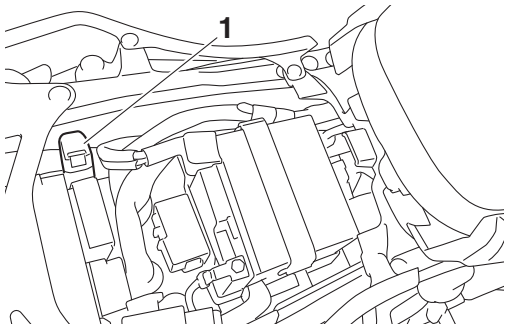
When the Yamaha diagnostic tool is connected to the Yamaha diagnostic tool coupler, the fault codes will be displayed on the computer screen.
- A fault code is displayed. [B-2]
- A fault code is not displayed. [C-1]

EAS31166
[B-2] DIAGNOSIS USING THE FAULT CODES

This model uses the Yamaha diagnostic tool to identify malfunctions.
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

Connecting the Yamaha diagnostic tool
Removing the rider seat. Refer to “GENERAL CHASSIS (1)” on page 4-1.
Removing the protective cap “1”, and then connect the Yamaha diagnostic tool to the coupler.



Details about the displayed fault codes are shown in the following chart. Refer to this chart and check the vehicle.
Once all the work is complete, delete the fault codes. [B-3]

TIP

Check the inspection points after terminating the connection with the Yamaha diagnostic tool and turning the main switch off.

Fault code table

TIP

Record all of the fault codes displayed and inspect the check points.

Fault code No.	Item	Symptom	Check point
11	Front wheel sensor (intermittent pulses or no pulses)	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
12	Rear wheel sensor (intermittent pulses or no pulses)	Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor

Fault code No.	Item	Symptom	Check point
13* 26*	Front wheel sensor (abnormal pulse period)	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
14* 27*	Rear wheel sensor (abnormal pulse period)	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	• Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly
16	Rear wheel sensor (open or short circuit)	Open or short circuit is detected in the rear wheel sensor.	• Defective coupler between the rear wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor or hydraulic unit assembly
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	• Defective hydraulic unit assembly
31	Hydraulic unit assembly (defective ABS solenoid power circuit)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	• Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly

Fault code No.	Item	Symptom	Check point
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	• Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
34	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.	• Defective hydraulic unit assembly
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.	• Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly
42	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.	• Incorrect installation of the rear wheel sensor • Incorrect rotation of the rear wheel • Rear brake dragging • Defective hydraulic unit assembly
43* 45*	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
44* 46*	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor

Fault code No.	Item	Symptom	Check point
51	Vehicle system power supply (voltage of ABS ECU power supply is high)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high.	• Defective battery • Disconnected battery terminal • Defective charging system
53	Vehicle system power supply (voltage of ABS ECU power supply is low)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.	• Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system
55	Hydraulic unit assembly (defective ABS ECU)	Abnormal data is detected in the hydraulic unit assembly.	• Defective hydraulic unit assembly
56	Hydraulic unit assembly (abnormal internal circuit)	Abnormality detected in internal circuit of hydraulic unit assembly.	• Defective hydraulic unit assembly
57	Vehicle CAN communication line or power source of vehicle system	Short-circuit in CAN communication line or the voltage that supplies the hydraulic unit assembly is too low.	• Short-circuit in CAN communication line • Defective battery • Defective coupler between battery and hydraulic unit assembly • Wire harness between battery and hydraulic unit is interrupted or has short-circuited • Defective charging system
62	Power supply voltage failure in pressure sensor	Abnormality detected in pressure sensor power supply circuit of hydraulic unit assembly.	• Defective hydraulic unit assembly
68	Hydraulic unit assembly (defective front pressure sensor)	Abnormality detected in pressure sensor circuit at front caliper side of hydraulic unit assembly.	• Defective front brake line • Defective hydraulic unit assembly

* The fault code number varies according to the vehicle conditions.

Fault code No. 11

TIP

If the rear wheel continues to turn for more than 20 seconds after the front wheel has stopped, this will be recorded.

Fault code No.	**11**	
Item	**Front wheel sensor (intermittent pulses or no pulses)**	
Symptom	**Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-18.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.

Fault code No. 12

Fault code No.	**12**	
Item	**Rear wheel sensor (intermittent pulses or no pulses)**	
Symptom	**Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.

Fault code No. 13, 26

TIP

- If the front brake ABS operates continuously for 20 seconds or more, fault code No. 26 will be recorded. If the front brake ABS operates continuously for 36 seconds or more, fault code No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

Fault code No.	**13 26**	
Item	**Front wheel sensor (abnormal pulse period)**	
Symptom	**Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-18.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.

Fault code No. 14, 27

TIP

- If the rear brake ABS operates continuously for 20 seconds or more, fault code No. 27 will be recorded. If the rear brake ABS operates continuously for 36 seconds or more, fault code No. 14 will be recorded.
- Vehicle possibly ridden on uneven roads.

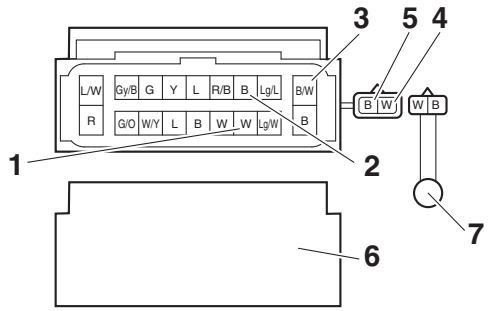
Fault code No.	**14 27**	
Item	**Rear wheel sensor (abnormal pulse period)**	
Symptom	**Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.

Fault code No.	14 27	
Item	Rear wheel sensor (abnormal pulse period)	
Symptom	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
Order	**Item/components and probable cause**	**Check or maintenance job**
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.

Fault code No. 15

Fault code No.	15	
Item	Front wheel sensor (open or short circuit)	
Symptom	Open or short circuit is detected in the front wheel sensor.	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective coupler between the front wheel sensor and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Fault code No.	15
Item	Front wheel sensor (open or short circuit)
Symptom	Open or short circuit is detected in the front wheel sensor.

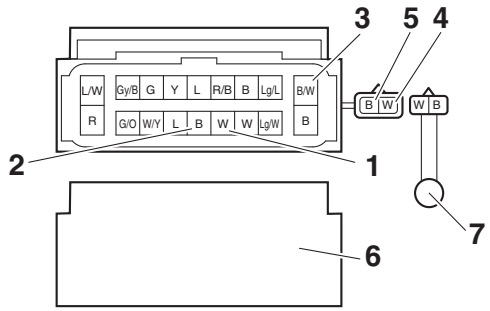
Order	Item/components and probable cause	Check or maintenance job
2	Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	• Check for continuity between the white terminal “1” and the white terminal “4” and between the black terminal “2” and the black terminal “5”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the white terminal “1” and the black terminal “2” and between the white terminal “4” and the black terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the black/white terminal “3” and the white terminal “4” and between the black/white terminal “3” and the black terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness.  6. ABS ECU 7. Wheel sensor
3	Defective front wheel sensor or hydraulic unit assembly	If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly. Refer to “FRONT WHEEL” on page 4-16 and “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 16

Fault code No.	16
Item	Rear wheel sensor (open or short circuit)
Symptom	Open or short circuit is detected in the rear wheel sensor.

Order	Item/components and probable cause	Check or maintenance job
1	Defective coupler between the rear wheel sensor and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Fault code No.	16
Item	Rear wheel sensor (open or short circuit)
Symptom	Open or short circuit is detected in the rear wheel sensor.

Order	Item/components and probable cause	Check or maintenance job
2	Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly	• Check for continuity between the white terminal “1” and the white terminal “4” and between the black terminal “2” and the black terminal “5”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the white terminal “1” and the black terminal “2” and between the white terminal “4” and the black terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the black/white terminal “3” and the white terminal “4” and between the black/white terminal “3” and the black terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness.  6. ABS ECU 7. Wheel sensor
3	Defective rear wheel sensor or hydraulic unit assembly	If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly. Refer to “REAR WHEEL” on page 4-24 and “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 21

Fault code No.	21
Item	Hydraulic unit assembly (defective solenoid drive circuit)
Symptom	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.

Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 31

Fault code No.	31
Item	Hydraulic unit assembly (defective ABS solenoid power circuit)
Symptom	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.

Order	Item/components and probable cause	Check or maintenance job
1	Blown ABS solenoid fuse	Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 8-151.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (blue/white–blue/white)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 33

Fault code No.	33
Item	Hydraulic unit assembly (abnormal ABS motor power supply)
Symptom	Power is not supplied to the motor circuit in the hydraulic unit assembly.

Order	Item/components and probable cause	Check or maintenance job
1	Blown ABS motor fuse	Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 8-151.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler (ABS motor fuse). (red–red) • Between ABS ECU coupler and ground. (black–black)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 34

Fault code No.	**34**	
Item	**Hydraulic unit assembly (short circuit in ABS motor power supply circuit)**	
Symptom	**Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 41

Fault code No.	**41**	
Item	**Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)**	
Symptom	**• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Incorrect installation of the front wheel sensor	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-18.
2	Incorrect rotation of the front wheel	Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. Refer to “CHECKING THE FRONT WHEEL” on page 4-18 and “CHECKING THE FRONT BRAKE DISCS” on page 4-39.
3	Front brake dragging	Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released. Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-39.
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 42

Fault code No.	**42**
Item	**Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)**
Symptom	**• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.**

Order	Item/components and probable cause	Check or maintenance job
1	Incorrect installation of the rear wheel sensor	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.
2	Incorrect rotation of the rear wheel	Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly. Refer to “CHECKING THE REAR WHEEL” on page 4-28 and “CHECKING THE REAR BRAKE DISC” on page 4-50.
3	Rear brake dragging	Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released. Refer to “CHECKING THE REAR BRAKE DISC” on page 4-50.
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 43, 45

TIP

After the fault code No. 45 is recorded, fault code No. 43 will be recorded if a certain speed and time are exceeded.

Fault code No.	**43 45**
Item	**Front wheel sensor (missing pulses)**
Symptom	**Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)**

Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-18.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.

Fault code No.	43 45	
Item	Front wheel sensor (missing pulses)	
Symptom	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
Order	**Item/components and probable cause**	**Check or maintenance job**
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.

Fault code No. 44, 46

TIP

After the fault code No. 46 is recorded, fault code No. 44 will be recorded if a certain speed and time are exceeded.

Fault code No.	44 46	
Item	Rear wheel sensor (missing pulses)	
Symptom	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Foreign material adhered around the rear wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the rear wheel	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.
4	Defective rear wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-30.

Fault code No. 51

Fault code No.	**51**	
Item	**Vehicle system power supply (voltage of ABS ECU power supply is high)**	
Symptom	**Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective battery	Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.
2	Disconnected battery terminal	Check the connection. Replace or reconnect the terminal if necessary.
3	Defective charging system	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-13.

Fault code No. 53

Fault code No.	**53**	
Item	**Vehicle system power supply (voltage of ABS ECU power supply is low)**	
Symptom	**Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective battery	Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS ECU fuse. (red/black–red/black)
4	Defective charging system	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-13.

Fault code No. 55

Fault code No.	**55**	
Item	**Hydraulic unit assembly (defective ABS ECU)**	
Symptom	**Abnormal data is detected in the hydraulic unit assembly.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 56

Fault code No.	**56**	
Item	**Hydraulic unit assembly (abnormal internal circuit)**	
Symptom	**Abnormality detected in internal circuit of hydraulic unit assembly.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 57

Fault code No.	**57**	
Item	**Vehicle CAN communication line or power source of vehicle system**	
Symptom	**Short-circuit in CAN communication line or the voltage that supplies the hydraulic unit assembly is too low.**	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Short-circuit in CAN communication line	Replace if there is an open or short circuit. • Between ABS ECU coupler and joint coupler. (light green/white–light green/white) (light green/blue–light green/blue) • Between joint coupler and ECU coupler. (light green/white–light green/white) (light green/blue–light green/blue)
2	Defective battery	Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-152.
3	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.
4	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	Replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler (ABS motor fuse). (red–red) • Between ABS ECU coupler and ABS solenoid fuse. (blue/white–blue/white)
5	Defective charging system	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-13.

Fault code No. 62

Fault code No.	62	
Item	Power supply voltage failure in pressure sensor	
Symptom	Abnormality detected in pressure sensor power supply circuit of hydraulic unit assembly.	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

Fault code No. 68

Fault code No.	68	
Item	Hydraulic unit assembly (defective front pressure sensor)	
Symptom	Abnormality detected in pressure sensor circuit at front caliper side of hydraulic unit assembly.	
Order	**Item/components and probable cause**	**Check or maintenance job**
1	Defective front brake line	Check the front brake line and if there is bending or blocking, replace the front brake line.
2	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (Anti-lock Brake System)” on page 4-57.

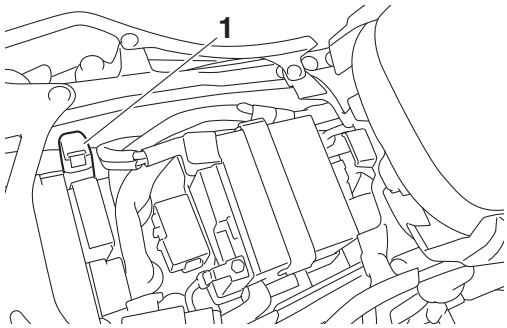
EAS31167
[B-3] DELETING THE FAULT CODES

To delete the fault codes, use the Yamaha diagnostic tool. For information about deleting the fault codes, refer to the operation manual of the Yamaha diagnostic tool.
Check that all the displayed fault codes are deleted.

Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

Connecting the Yamaha diagnostic tool

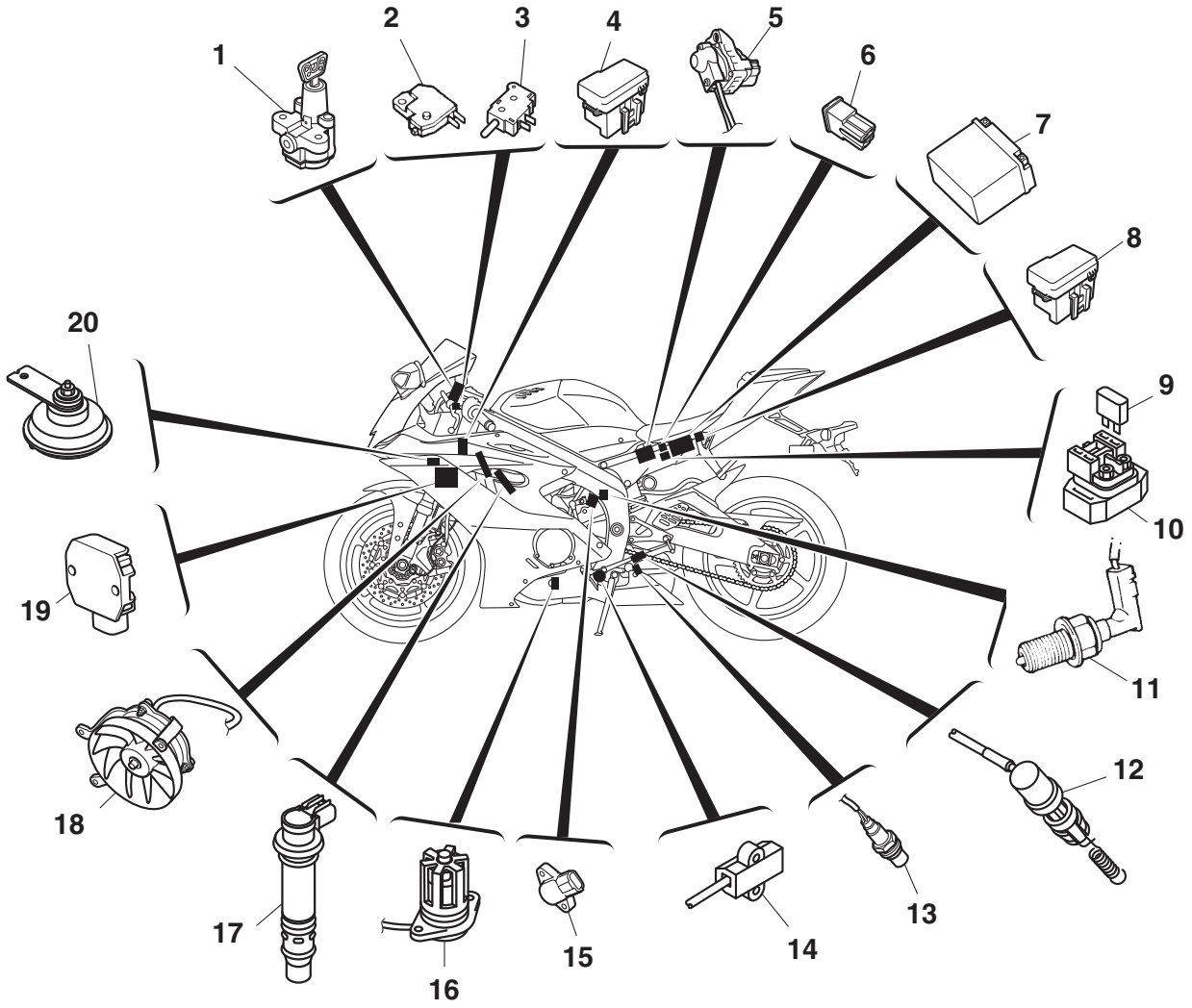
Remove the protective cap “1”, and then connect the Yamaha diagnostic tool to the coupler.



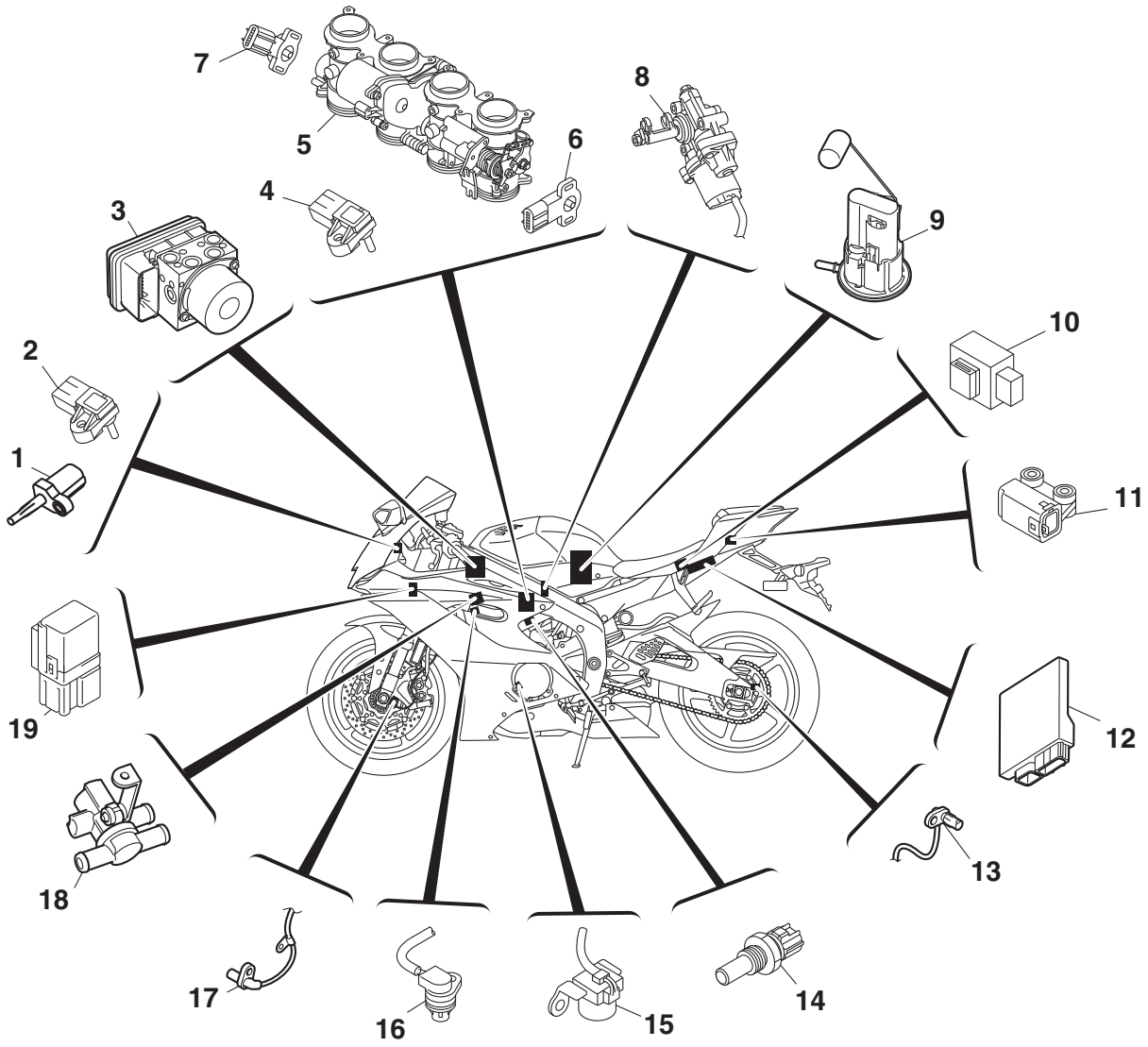
EAS31168
[C-1] FINAL CHECK
Check all the following items to complete the inspection.
If the process is not completed properly, start again from the beginning.

Checking procedures
1. Check the brake fluid level in the brake master cylinder reservoir and brake fluid reservoir.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-13.
2. Check the wheel sensors for proper installation.
   Refer to “INSTALLING THE FRONT WHEEL (DISC BRAKE)” on page 4-21 and “INSTALLING THE REAR WHEEL (DISC BRAKE)” on page 4-30.
3. Perform brake line routing confirmation.
   Refer to “HYDRAULIC UNIT OPERATION TEST” on page 4-61.
   If it does not have reaction-force properly, the brake hose is not properly routed or connected.
4. Delete the fault codes.
   Refer to “[B-3] DELETING THE FAULT CODES” on page 8-146.
5. Checking the ABS warning light.
   Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-65.
   If the ABS warning light does not turn off, the possible causes are following:
   - The problem is not solved.
   - Open circuit between the ABS ECU and the meter assembly.
     Check for continuity between green/orange terminal of the ABS ECU coupler and green/orange terminal of the meter assembly coupler.
   - Malfunction in the meter assembly circuit.
   - Malfunction in the ABS warning light circuit in the hydraulic unit assembly.

EAS20089
ELECTRICAL COMPONENTS

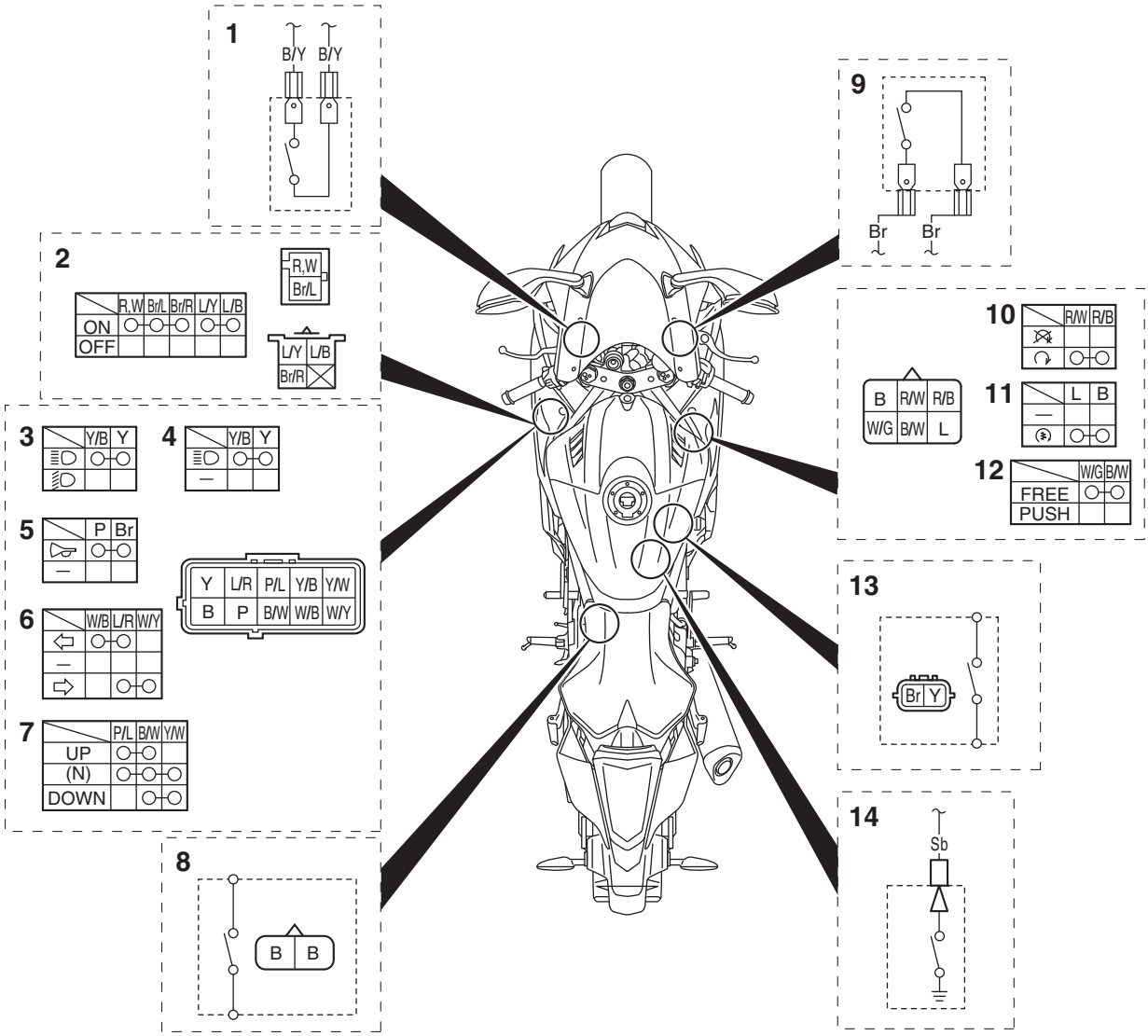


1. Main switch
2. Front brake light switch
3. Clutch switch
4. Fuse box 2
5. EXUP servo motor
6. Main fuse
7. Battery
8. Fuse box 1
9. ABS motor fuse
10. Starter relay
11. Neutral switch
12. Rear brake light switch
13. O_2 sensor
14. Sidestand switch
15. Gear position sensor
16. Oil level switch
17. Ignition coil
18. Radiator fan motor
19. Rectifier/regulator
20. Horn



1. Intake air temperature sensor
2. Atmospheric pressure sensor
3. Hydraulic unit assembly
4. Intake air pressure sensor
5. Throttle servo motor
6. Accelerator position sensor
7. Throttle position sensor
8. Intake funnel servo motor
9. Fuel pump
10. Relay unit
11. Lean angle sensor
12. ECU (Engine Control Unit)
13. Rear wheel sensor
14. Coolant temperature sensor
15. Crankshaft position sensor
16. Cylinder identification sensor
17. Front wheel sensor
18. Air induction system solenoid
19. Radiator fan motor relay

EAS30549
CHECKING THE SWITCHES
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.



1. Clutch switch
2. Main switch
3. Dimmer switch
4. Pass switch
5. Horn switch
6. Turn signal switch
7. Traction control system switch
8. Sidestand switch
9. Front brake light switch
10. Engine stop switch
11. Start switch
12. Mode switch
13. Rear brake light switch
14. Neutral switch

EAS30551
CHECKING THE FUSES
The following procedure applies to all of the fuses.

ECA13680
NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Front upper panel (left)
     Refer to "GENERAL CHASSIS (5)" on page 4-8.
2. Check:
   - Fuse
     a. Connect the digital circuit tester to the fuse and check the continuity.

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

     b. If there is no continuity, replace the fuse.
3. Replace:
   - Blown fuse
     a. Set the main switch to "OFF".
     b. Install a new fuse of the correct amperage rating.
     c. Set on the switches to verify if the electrical circuit is operational.
     d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
ABS motor	30 A	1
Ignition	15 A	1
Radiator fan motor (right)	15 A	1
Radiator fan motor (left)	15 A	1
Fuel injection system	15 A	1
Signaling system	10 A	1
ABS solenoid	10 A	1
Turn signal light	7.5 A	1
Headlight	7.5 A	1
ABS ECU	7.5 A	1
Electronic throttle valve	7.5 A	1
Backup	7.5 A	1
Terminal	2 A	1
Spare	30 A	1
Spare	15 A	1
Spare	10 A	1
Spare	7.5 A	1
Spare	2 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:
   - Front upper panel (left)
     Refer to "GENERAL CHASSIS (5)" on page 4-8.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS31006
REPLACING THE ECU (engine control unit)
1. Turn the main switch to "OFF".
2. Replace the ECU (engine control unit).
3. Clean the throttle bodies and reset the ISC (idle speed control) learning value.
   Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-13.
4. Reset the A/F control learning value.
   Use the diagnostic code number "87".
   Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.

Yamaha diagnostic tool USB (US)
90890-03257
Yamaha diagnostic tool (A/I)
90890-03254

5. Check:
   - Engine idling speed
     Start the engine, warm it up, and then measure the engine idling speed.

Engine idling speed
1250–1350 r/min

EAS30552
CHECKING AND CHARGING THE BATTERY

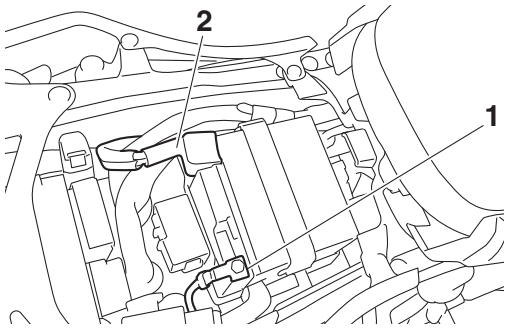
TIP

Refer to "CHECKING AND CHARGING THE BATTERY" in "BASIC INFORMATION" (separate volume).

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
2. Disconnect:
   - Battery leads
     (from the battery terminals)

ECA13640
NOTICE

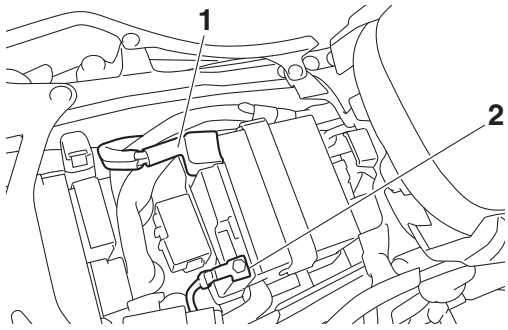
First, disconnect the negative battery lead "1", and then positive battery lead "2".



3. Remove:
   - Battery band
   - Battery
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
   - Battery charge
5. Charge:
   - Battery
6. Install:
   - Battery
   - Battery band
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
7. Connect:
   - Battery leads
     (to the battery terminals)

ECA13630
NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



8. Check:
   - Battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
9. Lubricate:
   - Battery terminals

	Recommended lubricant **Dielectric grease**

10. Install:
    - Rider seat
      Refer to "GENERAL CHASSIS (1)" on page 4-1.

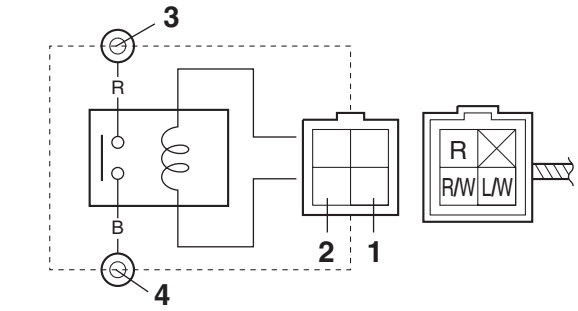
EAS30553
CHECKING THE RELAYS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.

	Digital circuit tester (CD732) **90890-03243** **Model 88 Multimeter with tachometer** **YU-A1927**

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

Starter relay

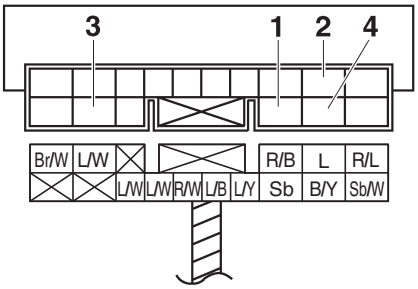


1. Positive battery terminal

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

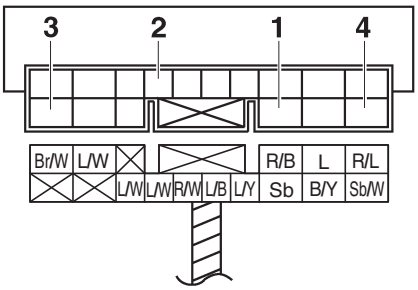
Relay unit (starting circuit cut-off relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

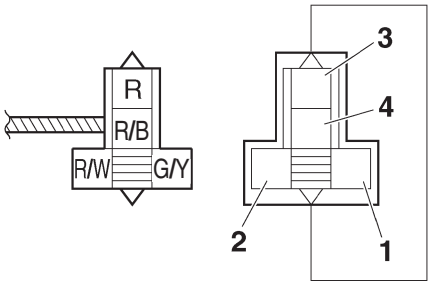
Relay unit (fuel pump relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

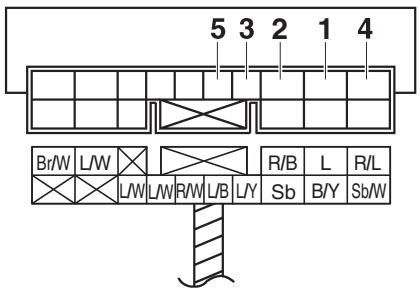
Result
Continuity
(between "3" and "4")

EAS30795
CHECKING THE RELAY UNIT (DIODE)

1. Check:
   • Relay unit (diode)
   Out of specification → Replace.

Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
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/black “5”
No continuity
Positive tester probe → blue/black “5”
Negative tester probe → blue/yellow “3”



a. Disconnect the relay unit coupler from the wire harness.
b. Connect the digital circuit tester to the relay unit terminal as shown.
c. Check the relay unit (diode) for continuity.
d. Check the relay unit (diode) for no continuity.

EAS30558
CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

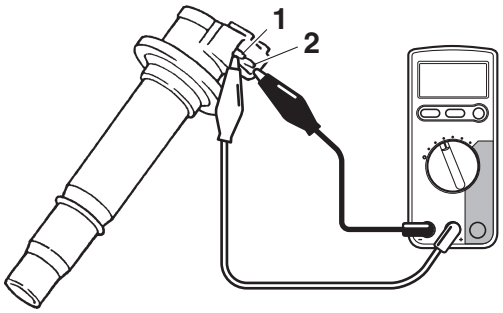
1. Check:
   • Primary coil resistance
   Out of specification → Replace.

Primary coil resistance
1.19–1.61 Ω

a. Remove the ignition coil from the spark plug.
b. Connect the digital circuit tester to the ignition coil as shown.

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

• Positive tester probe → red/black “1”
• Negative tester probe → orange or gray/red or orange/green or gray/green “2”



c. Measure the primary coil resistance.

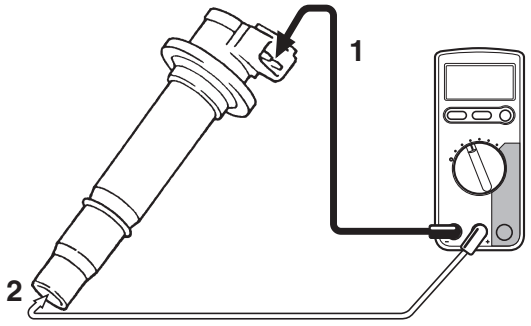
2. Check:
   • Secondary coil resistance
   Out of specification → Replace.

Secondary coil resistance
9.35–12.65 kΩ

a. Connect the digital circuit tester to the ignition coil as shown.

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

- Negative tester probe → red/black "1"
- Positive tester probe → spark plug terminal "2"



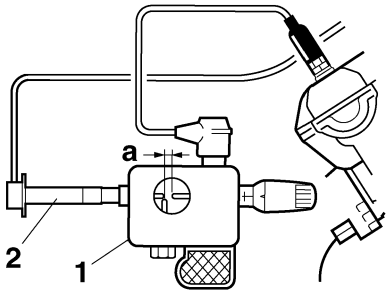
b. Measure the secondary coil resistance.

3. Check:
   - Ignition spark gap "a"
     Out of specification → Replace.

Minimum ignition spark gap
6.0 mm (0.24 in)

a. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Oppama pet–4000 spark checker
YM-34487



2. Ignition coil

b. Turn the main switch to "ON" and engine stop switch to "○".
c. Measure the ignition spark gap "a".
d. Crank the engine by pushing the start switch "≋" and gradually increase the spark gap until a misfire occurs.

EAS30560
CHECKING THE CRANKSHAFT POSITION SENSOR

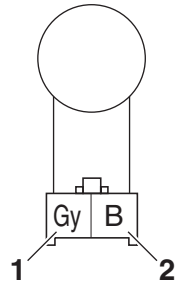
1. Disconnect:
   - Crankshaft position sensor coupler (from the wire harness)
2. Check:
   - Crankshaft position sensor resistance
     Out of specification → Replace the crankshaft position sensor.

Crankshaft position sensor resistance
248–372 Ω

a. Connect the digital circuit tester to the crankshaft position sensor coupler as shown.

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

- Positive tester probe → gray "1"
- Negative tester probe → black "2"



b. Measure the crankshaft position sensor resistance.

EAS30561
CHECKING THE LEAN ANGLE SENSOR

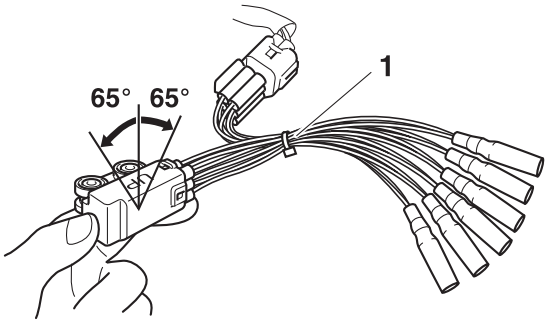
1. Remove:
   - Lean angle sensor (from the bracket)
2. Check:
   - Lean angle sensor output voltage
     Out of specification → Replace.

Lean angle sensor output voltage
Operating angle
65 °
Output voltage up to operating angle
0.4–1.4 V
Output voltage over operating angle
3.7–4.4 V

a. Connect the test harness-lean angle sensor (6P) "1" to the lean angle sensor and wire harness as shown.
b. Connect the digital circuit tester to the test harness-lean angle sensor (6P).

Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
Test harness– lean angle sensor (6P)
90890-03209
Test harness– lean angle sensor (6P)
YU-03209

- Positive tester probe → yellow/green (wire harness color)
- Negative tester probe → black/blue (wire harness color)

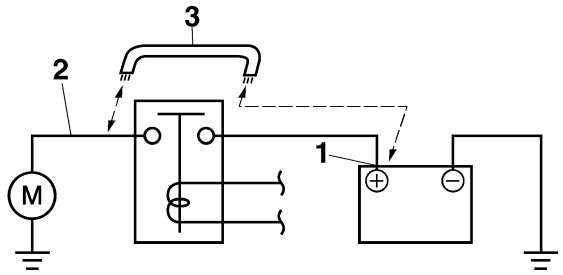


c. Turn the main switch to "ON".
d. Turn the lean angle sensor to 65°.
e. Measure the lean angle sensor output voltage.

EAS30562
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   - Starter motor operation
     Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
     Refer to "TROUBLESHOOTING" on page 8-14.
     a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810
WARNING
- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**



b. Check the starter motor operation.

EAS30566
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the stator coil.

Stator coil resistance
0.120–0.180 Ω

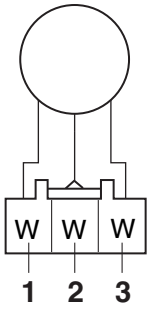
a. Connect the digital circuit tester to the stator coil coupler as shown.

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

• Positive tester probe → white “1” • Negative tester probe → white “2”

• Positive tester probe → white “1” • Negative tester probe → white “3”

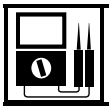
• Positive tester probe → white “2” • Negative tester probe → white “3”



b. Measure the stator coil resistance.

EAS30680
CHECKING THE RECTIFIER/REGULATOR

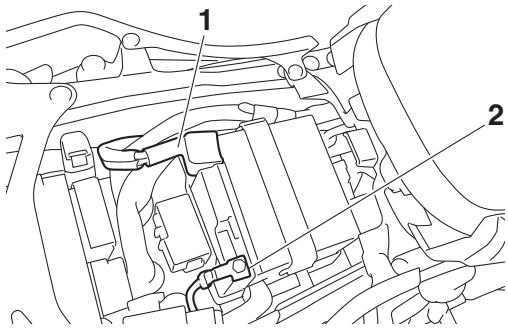
1. Check:
   • Charging voltage
   Out of specification → Replace the rectifier/regulator.

	**Charging voltage** **14 V at 5000 r/min**

a. Connect the digital circuit tester to the battery terminals as shown.

	**Digital circuit tester (CD732)** **90890-03243** **Model 88 Multimeter with tachometer** **YU-A1927**

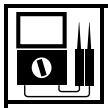
• Positive tester probe → Positive battery terminal “1” • Negative tester probe → Negative battery terminal “2”



b. Start the engine and let it run at approximately 5000 r/min.
c. Measure the charging voltage.

EAS30796
CHECKING THE OIL LEVEL SWITCH

1. Drain:
   • Engine oil
2. Remove:
   • Oil level switch
   (from the oil pan)
3. Check:
   • Oil level switch resistance
   Out of specification → Replace the oil level switch.

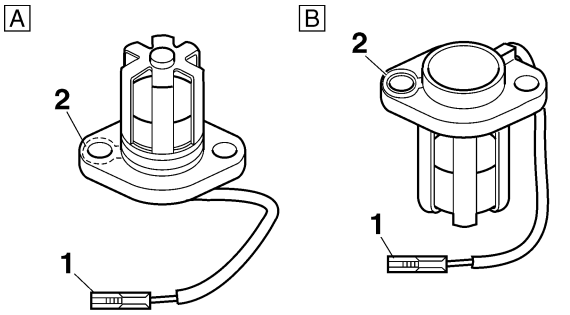
	**Oil level switch resistance (maximum level position)** **484.0–536.0 Ω** **Oil level switch resistance (minimum level position)** **114.0–126.0 Ω**

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 earth “2”

Maximum level position “B” • Positive tester probe → connector (white) “1” • Negative tester probe → body earth “2”



b. Measure the oil level switch resistance.

EAS30573
CHECKING THE FUEL SENDER

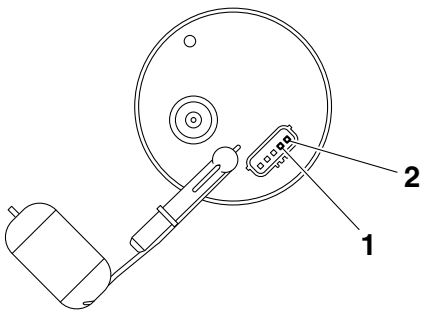
1. Disconnect:
   • Fuel pump coupler
   (from the fuel pump)
2. Remove:
   • Fuel tank
3. Remove:
   • Fuel pump
   (from the fuel tank)
4. Check:
   • Fuel sender resistance
   Out of specification → Replace the fuel pump assembly.

Sender unit resistance (empty)
137.0–185.0 Ω

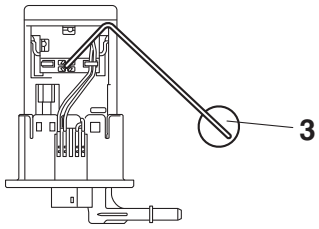
a. Connect the digital circuit tester to the fuel sender terminals as shown.

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

• Positive tester probe →
Fuel sender terminal "1"
• Negative tester probe →
Fuel sender terminal "2"



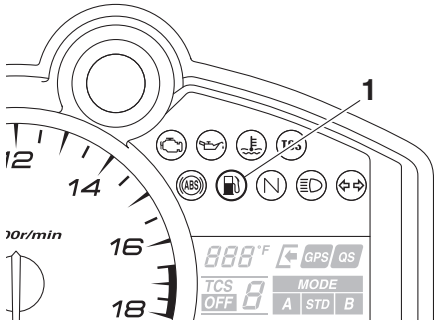
b. Set the fuel sender float to minimum "3" level position.



EAS30574
CHECKING THE FUEL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

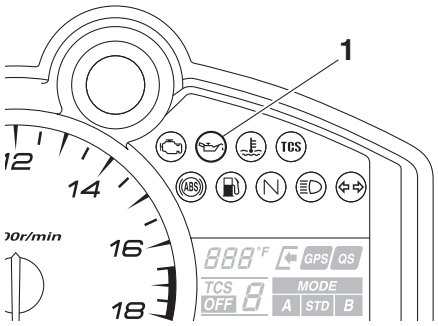
1. Check:
   • Fuel level warning light "1"
   (Turn the main switch to "ON".)
   Warning light comes on for a few seconds, then goes off → Warning light is OK.
   Warning light does not come on → Replace the meter assembly.
   Warning light flashes eight times, then goes off for 3 seconds in a repeated cycle (malfunction detected in fuel sender) → Replace the fuel pump assembly.



EAS30575
CHECKING THE OIL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the oil level detection circuit.

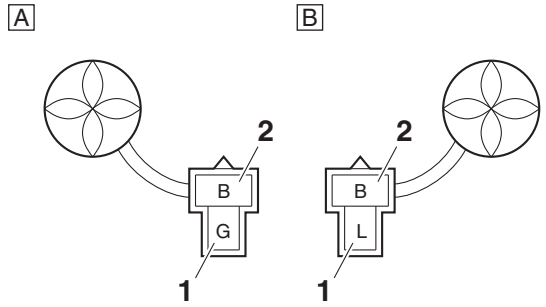
1. Check:
   • Oil level warning light "1"
   (Turn the main switch to "ON".)
   Warning light comes on for a few seconds, then goes off → Warning light is OK.
   Warning light does not come on → Replace the meter assembly.
   Warning light flashes ten times, then goes off for 2.5 seconds in a repeated cycle (malfunction detected in oil level switch) → Replace the oil level switch.



EAS30577
CHECKING THE RADIATOR FAN MOTORS

1. Check:
   - Radiator fan motor
     Faulty/rough movement → Replace.
     a. Disconnect the radiator fan motor coupler from the wire harness.
     b. Connect the battery (DC 12 V) as shown.

• Positive tester probe → blue or green “1” • Negative tester probe → black “2”



A. Radiator fan motor (left)
B. Radiator fan motor (right)

     c. Measure the radiator fan motor movement.

EAS30578
CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   - Coolant temperature sensor
     Refer to “CYLINDER HEAD” on page 5-26.

EWA14130
⚠ WARNING

- **Handle the coolant temperature sensor with special care.**
- **Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.**

2. Check:
   - Coolant temperature sensor resistance
     Out of specification → Replace.

	Coolant temperature sensor resistance **2320–2590 Ω at 20 °C (2320–2590 Ω at 68 °F)**

     a. Connect the digital circuit tester to the coolant temperature sensor as shown.

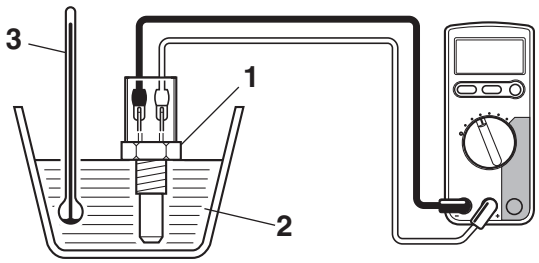
	Digital circuit tester (CD732) **90890-03243** **Model 88 Multimeter with tachometer** **YU-A1927**

     b. Immerse the coolant temperature sensor “1” in a container filled with coolant “2”.

TIP

Make sure the coolant temperature sensor terminals do not get wet.

     c. Place a thermometer “3” in the coolant.
     d. Slowly heat the coolant, then let it cool down to the specified temperature.
     e. Measure the coolant temperature sensor resistance.



EAS30587
CHECKING THE AIR INDUCTION SYSTEM SOLENOID

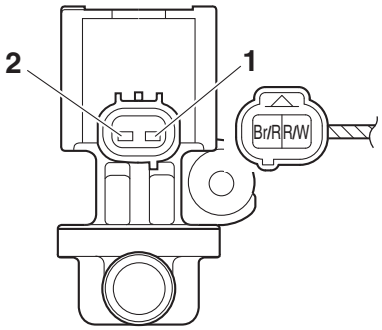
1. Check:
   - Air induction system solenoid resistance
     Out of specification → Replace.

	Solenoid resistance **20–23 Ω**

     a. Disconnect the air induction system solenoid coupler from the air induction system solenoid.
     b. Connect the digital circuit tester to the air induction system solenoid terminal as shown.

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

- Positive tester probe → brown/red "1"
- Negative tester probe → red/white "2"



c. Measure the air induction system solenoid resistance.

EAS30589
CHECKING THE CYLINDER IDENTIFICATION SENSOR

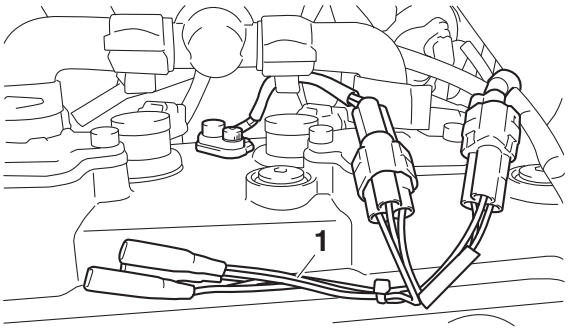
1. Remove:
   - Air filter case
     Refer to "AIR FILTER CASE" on page 7-5.
   - Air induction system cover
     Refer to "AIR INDUCTION SYSTEM" on page 7-19.
   - Side cowling (right)
     Refer to "GENERAL CHASSIS (5)" on page 4-8.
   - Crankshaft end access cover
2. Check:
   - Cylinder identification sensor output voltage
     Out of specification → Replace.

Cylinder identification sensor output voltage (ON)
4.8 V or more
Cylinder identification sensor output voltage (OFF)
0.8 V or less

a. Connect the test harness-speed sensor (3P) "1" to the cylinder identification sensor coupler and wire harness as shown.
b. Connect the digital circuit tester to the test harness-speed sensor (3P).

Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
Test harness– speed sensor (3P)
90890-03208
Test harness– speed sensor (3P)
YU-03208

- Positive tester probe → white/black (wire harness color)
- Negative tester probe → black/blue (wire harness color)



c. Turn the main switch to "ON".
d. Rotate the crankshaft.
e. Measure the voltage. With each full rotation of the crankshaft, the voltage reading should cycle from 0.8 V to 4.8 V to 0.8 V to 4.8 V.

EAS30594
CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   - Intake air temperature sensor

EWA14110
WARNING

- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

2. Check:
   - Intake air temperature sensor resistance
     Out of specification → Replace.

Intake air temperature sensor resistance
5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance
289–391 Ω at 80 °C (289–391 Ω at 176 °F)

a. Connect the digital circuit tester to the intake air temperature sensor terminal as shown.

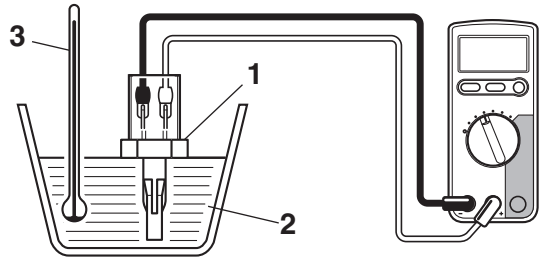
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the water.
d. Slowly heat the water, then let it cool down to the specified temperature.
e. Measure the intake air temperature sensor resistance.



EAS30581
CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   • Throttle position sensor (from the throttle bodies)

EWA16690
WARNING

• Handle the throttle position sensor with special care.
• Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

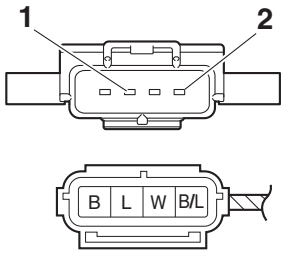
2. Check:
   • Throttle position sensor maximum resistance
   Out of specification → Replace the throttle position sensor.

Resistance
1.4–2.6 kΩ

a. Connect the digital circuit tester to the throttle position sensor terminals as shown.

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

• Positive tester probe → blue "1"
• Negative tester probe → black/blue "2"



b. Measure the throttle position sensor maximum resistance.

3. Install:
   • Throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-17.

EAS30582
CHECKING THE ACCELERATOR POSITION SENSOR

1. Remove:
   • Accelerator position sensor (from the throttle bodies)

EWA16700
WARNING

• Handle the accelerator position sensor with special care.

• Never subject the accelerator position sensor to strong shocks. If the accelerator position sensor is dropped, replace it.

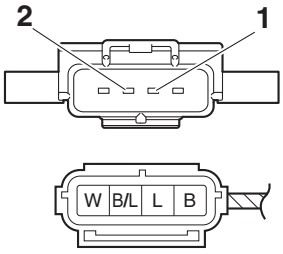
2. Check:
   • Accelerator position sensor maximum resistance
   Out of specification → Replace the accelerator position sensor.

	Resistance **1.26–2.34 kΩ**

a. Connect the digital circuit tester to the accelerator position sensor terminals as shown.

	Digital circuit tester (CD732) **90890-03243** **Model 88 Multimeter with tachometer** **YU-A1927**

• Positive tester probe → blue “1” • Negative tester probe → black/blue “2”



b. Measure the accelerator position sensor maximum resistance.
3. Install:
   • Accelerator position sensor

TIP

When installing the accelerator position sensor, adjust its angle properly. Refer to “ADJUSTING THE ACCELERATOR POSITION SENSOR” on page 7-17.

EAS30592
CHECKING THE THROTTLE SERVO MOTOR

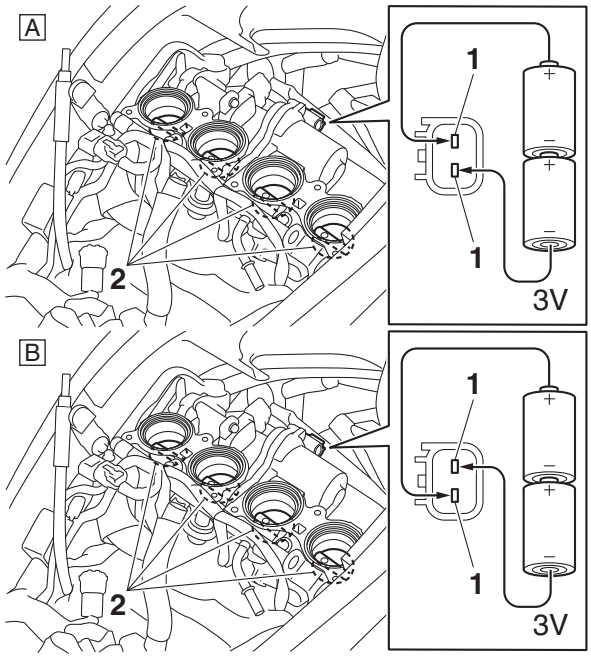
1. Remove:
   • Air filter case
   Refer to “AIR FILTER CASE” on page 7-5.
2. Check:
   • Throttle valve operation
   Throttle valves do not fully close → Replace the throttle bodies.
   a. Connect two C-size batteries to the throttle servo motor terminals “1” as shown.

ECA20060
NOTICE

Do not use a 12 V battery to operate the throttle servo motor.

TIP

Do not use old batteries to operate the throttle servo motor.



A. Check that the throttle valves “2” open.
B. Check that the throttle valves “2” fully close.

EAS30681
CHECKING THE FUEL INJECTORS

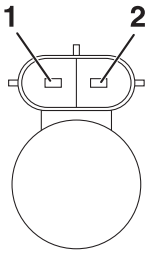
1. Check:
   • Fuel injector resistance
   Out of specification → Replace the fuel injector.

	Resistance **12.0 Ω**

a. Disconnect the fuel injector coupler from wire harness.
b. Connect the digital circuit tester to the fuel injector terminals as shown.

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

- Positive tester probe
  Injector terminal “1”
- Negative tester probe
  Injector terminal “2”



c. Measure the fuel injector resistance.

TROUBLESHOOTING

EAS20116
SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS31118
SELF-DIAGNOSTIC FUNCTION TABLE

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 8-31.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0030	O_2 sensor heater (defective heater controller detected)	• Open circuit in wire harness. • Disconnected coupler. • Defective O_2 sensor driver (malfunction in ECU). • Open circuit in O_2 sensor heater lead.	(When the O_2 sensor does not operate because the exhaust temperature is low) Increased exhaust emissions. Fuel learning cannot be carried out.	If the O_2 sensor does not operate, O_2 feedback is not carried out.
P0069	Intake air pressure sensor or atmospheric pressure sensor (When the main switch is turned to “ON”, the intake air pressure sensor voltage and atmospheric pressure sensor voltage differ greatly.)	• Malfunction in ECU. • Intake air pressure sensor hose is disconnected, clogged, kinked, or pinched. • Defective intake air pressure sensor or atmospheric pressure sensor.	Engine is difficult to start. Engine idling speed is unstable. Increased exhaust emissions. Loss of engine power.	Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. α–N is fixed. Fuel is not cut off due to the intake air pressure difference. Atmospheric pressure sensor output correction value is fixed to 0. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0107 P0108	[P0107] Intake air pressure sensor (ground short circuit detected) [P0108] Intake air pressure sensor (open or power short circuit detected)	[P0107] Low voltage of the intake air pressure sensor circuit (0.5 V or less) [P0108] High voltage of the intake air pressure sensor circuit (4.8 V or more) • Defective coupler between intake air pressure sensor and ECU. • Open or short circuit in wire harness between intake air pressure sensor and ECU. • Defective intake air pressure sensor. • Malfunction in ECU.	Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions.	Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. α–N is fixed. Fuel is not cut off due to the intake air pressure difference. Atmospheric pressure sensor output correction value is fixed to 0. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0112 P0113	[P0112] Air temperature sensor (ground short circuit detected) [P0113] Air temperature sensor (open or power short circuit detected)	[P0112] Low voltage of the air temperature sensor circuit (0.1 V or less) [P0113] High voltage of the air temperature sensor circuit (4.8 V or more) • Defective coupler between air temperature sensor and ECU. • Open or short circuit in wire harness between air temperature sensor and ECU. • Improperly installed air temperature sensor. • Defective air temperature sensor. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The intake air temperature is fixed to 20 [°C]. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0117 P0118	[P0117] Coolant temperature sensor (ground short circuit detected) [P0118] Coolant temperature sensor (open or power short circuit detected)	[P0117] Low voltage of the coolant temperature sensor circuit (0.1 V or less) [P0118] High voltage of the coolant temperature sensor circuit (4.9 V or more) • Defective coupler between coolant temperature sensor and ECU. • Open or short circuit in wire harness between coolant temperature sensor and ECU. • Improperly installed coolant temperature sensor. • Defective coolant temperature sensor. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The coolant temperature is fixed to 60 [°C]. The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0122 P0123 P0222 P0223 P2135	[P0122, P0222] Throttle position sensor (ground short circuit detected) [P0123, P0223] Throttle position sensor (open or power short circuit detected) [P2135] Deviation error	[P0122, P0222] Low voltage of the throttle position sensor circuit (0.25 V or less) [P0123, P0223] High voltage of the throttle position sensor circuit (4.75 V or more) [P2135] Difference in output voltage 1 and output voltage 2 of the throttle position sensor • Defective coupler between throttle position sensor and ECU. • Open or short circuit in wire harness between throttle position sensor and ECU. • Improperly installed throttle position sensor. • Defective throttle position sensor. • Malfunction in ECU.	Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Deceleration is poor. Increased exhaust emissions. Vehicle cannot be driven.	Change in the throttle opening is 0 (transient control is not carried out). D–j is fixed. Throttle opening is fixed to 125 [°]. O_2 feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off). ISC feedback is not carried out. ISC learning is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0132	O_2 sensor (power short circuit detected)	[P0132] High voltage of the O_2 sensor circuit (4.8 V or more) • Improperly installed O_2 sensor. • Defective coupler between O_2 sensor and ECU. • Open or short circuit in wire harness between O_2 sensor and ECU. • Incorrect fuel pressure. • Defective O_2 sensor. • Malfunction in ECU.	Increased exhaust emissions.	O_2 feedback is not carried out. O_2 feedback learning is not carried out. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off).
P0201 P0202 P0203 P0204	[P0201] Primary injector #1 (malfunction in primary injector #1) [P0202] Primary injector #2 (malfunction in primary injector #2) [P0203] Primary injector #3 (malfunction in primary injector #3) [P0204] Primary injector #4 (malfunction in primary injector #4)	• Defective coupler between injector and ECU. • Open or short circuit in wire harness between injector and ECU. • Defective injector. • Malfunction in ECU. • Improperly installed injector.	Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine stops. Engine idling speed is unstable. Increased exhaust emissions.	O_2 feedback is not carried out. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off). ISC feedback is not carried out. ISC learning is not carried out. Injection to the applicable cylinder group (cylinders #1 and #4 or cylinders #2 and #3) is cut off.
P0335	Crankshaft position sensor (no normal signals are received from the crankshaft position sensor)	• Defective coupler between crankshaft position sensor and ECU. • Open or short circuit in wire harness between crankshaft position sensor and ECU. • Improperly installed crankshaft position sensor. • Defective pickup rotor. • Defective crankshaft position sensor. • Malfunction in ECU.	Engine cannot be started.	Does not operate. ISC feedback is not carried out. ISC learning is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0340	Cylinder identification sensor (no normal signals are received from the cylinder identification sensor)	• Defective coupler between cylinder identification sensor and ECU. • Open or short circuit in wire harness between cylinder identification sensor and ECU. • Improperly installed cylinder identification sensor. • Defective pickup rotor. • Defective cylinder identification sensor. • Malfunction in ECU.	Engine cannot be started.	The vehicle is operated using only the cylinder identification information stored during operation. ISC feedback is not carried out. ISC learning is not carried out.
P0351 P0352 P0353 P0354	[P0351] Cylinder-#1 ignition coil (open or short circuit detected in the primary lead of the cylinder-#1 ignition coil) [P0352] Cylinder-#2 ignition coil (open or short circuit detected in the primary lead of the cylinder-#2 ignition coil) [P0353] Cylinder-#3 ignition coil (open or short circuit detected in the primary lead of the cylinder-#3 ignition coil) [P0354] Cylinder-#4 ignition coil (open or short circuit detected in the primary lead of the cylinder-#4 ignition coil)	• Defective coupler between ignition coil and ECU. • Open or short circuit in wire harness between ignition coil and ECU. • Improperly installed ignition coil. • Defective ignition coil. • Malfunction in ECU.	Engine stops. Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine idling speed is unstable. Increased exhaust emissions.	Injection to the applicable cylinder group (cylinders #1 and #4 or cylinders #2 and #3) is cut off. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off). O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P0476	EXUP servo motor (stuck EXUP servo motor is detected)	• Defective coupler between EXUP servo motor and ECU. • Open or short circuit in wire harness between EXUP servo motor and ECU. • Improperly installed EXUP servo motor and cables. • Defective EXUP servo motor. • Stuck EXUP servo motor (mechanism or motor). • Malfunction in ECU.	Loss of engine power.	Learning values for fully closed EXUP are fixed. Learning values for fully open EXUP are fixed. O_2 feedback is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0480	Radiator fan motor relay (open or short circuit is detected)	• Open or short circuit in wire harness between radiator fan motor relay and ECU. • Disconnected coupler. • Defective radiator fan motor. • Defective driver (malfunction in ECU).	Engine is difficult to start. Loss of engine power. Engine overheats. Increased exhaust emissions.	Radiator fan is always off (stopped). O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
P048D P048E	[P048D] EXUP servo motor (open or ground short circuit detected) [P048E] EXUP servo motor (power short circuit detected)	• Defective coupler between EXUP servo motor and ECU. • Open or short circuit in wire harness between EXUP servo motor and ECU. • Defective EXUP servo motor. • Malfunction in ECU.	Loss of engine power.	Learning values for fully closed EXUP are fixed. Learning values for fully open EXUP are fixed. O_2 feedback is not carried out.
P0500 P1500	[P0500, P1500] Rear wheel sensor (no normal signals are received from the rear wheel sensor) [P1500] Neutral switch (open or short circuit detected) [P1500] Clutch switch (open or short circuit detected)	• Open or short circuit in wire harness between rear wheel sensor and ABS unit. • Open or short circuit in wire harness between ABS unit and ECU. • Open or short circuit in wire harness between neutral switch and ECU. • Open or short circuit in wire harness between clutch switch and ECU. • Defective rear wheel sensor. • Defective neutral switch. • Defective clutch switch. • Improper adjustment of clutch lever. • Malfunction in ECU.	Vehicle speed is not displayed on the meter. Indication of the neutral indicator light is incorrect. Engine idling speed is unstable. Traction control system does not operate.	Vehicle speed displayed on the meter = 0 [km/h] O_2 feedback is not carried out. Fuel cut-off control when the rear wheel sensor or neutral switch malfunctions is carried out. ISC feedback is not carried out. ISC learning is not carried out. Traction control system does not operate.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0560	Charging voltage is abnormal.	• Battery overcharging (defective rectifier/regulator). • Battery overcharging (broken or disconnected rectifier/regulator lead). • Battery over-discharging (broken or disconnected lead in charging system). • Battery over-discharging (defective rectifier/regulator).	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O_2 feedback is not carried out.
P0601	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)	• Malfunction in ECU.	Engine cannot be started.	Engine cannot be started.
P0606	ECU internal malfunction. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)	• Malfunction in ECU.	Engine cannot be started. Engine response is poor. Loss of engine power.	Engine cannot be started. Ignition and injection are not carried out. Judgment for other fault codes is not carried out. Load control is not carried out. (The relay unit and other relays are all turned off.) The CO adjustment mode and diagnostic mode cannot be activated. Output is restricted.
P062F	EEPROM fault code number (an error is detected while reading or writing on EEPROM)	• CO adjustment value is not properly written. • ISC learning value is not properly written. • OBD memory value is not properly written. • Malfunction in ECU.	Increased exhaust emissions. Engine cannot be started or is difficult to start. Engine idling speed is unstable. OBD memory value is not correct.	CO adjustment value for the faulty cylinder = 0 (default value) ISC learning values = Default values OBD memory value is initialized. O_2 feedback learning value is initialized.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0638	YCC-T drive system (malfunction detected)	• Defective coupler between throttle servo motor and ECU. • Open or short circuit in wire harness between throttle servo motor and ECU. • Defective throttle servo motor. • Stuck throttle servo motor (mechanism or motor). • Malfunction in ECU. • Blown electronic throttle valve fuse.	Engine response is poor. Loss of engine power. Engine idling speed is unstable.	O_2 feedback is not carried out. YCC-T evacuation is activated. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out.
P0657	Fuel system voltage (incorrect voltage supplied to the fuel injector and fuel pump)	• Open or short circuit in wire harness between relay unit and ECU. • Open circuit in wire harness between battery and ECU. • Defective relay unit. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions.	Monitor voltage = 12 [V] O_2 feedback is not carried out.
P0916 P0917	[P0916] Gear position sensor (open or ground short circuit detected) [P0917] Gear position sensor (power short circuit detected)	• Defective coupler between gear position sensor and ECU. • Open or power short circuit in wire harness between gear position sensor and ECU. • Improperly installed gear position sensor. • Defective gear position sensor. • Malfunction in ECU.	Improper display for gear position. Defective engine response.	Maintains the gear position value at the previous value.
P1400	Air induction system solenoid (open or short circuit detected)	• Open circuit in wire harness. • Disconnected coupler. • Defective air induction system solenoid. • Defective driver (malfunction in ECU).	Increased exhaust emissions.	No power is supplied to the air induction system solenoid (air induction system air is supplied). O_2 feedback is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P1602	Malfunction in ECU internal circuit (malfunction of ECU power cut-off function)	• Open or short circuit in wire harness between battery and ECU. • Open or short circuit in wire harness between main switch and ECU. • Blown backup fuse. • Malfunction in ECU.	Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start.	O_2 feedback learning is not carried out. O_2 feedback learning value writing error.
P1604 P1605	[P1604] Lean angle sensor (ground short circuit detected) [P1605] Lean angle sensor (open or power short circuit detected)	[P1604] Low voltage of the lean angle sensor circuit (0.2 V or less) [P1605] High voltage of the lean angle sensor circuit (4.8 V or more) • Open or short circuit in wire harness between lean angle sensor and ECU. • Defective lean angle sensor. • Malfunction in ECU.	Engine cannot be started.	Engine cannot be started.
P2122 P2123 P2127 P2128 P2138	[P2122] Accelerator position sensor (open or ground short circuit detected) [P2123] Accelerator position sensor (power short circuit detected) [P2127] Accelerator position sensor (ground short circuit detected) [P2128] Accelerator position sensor (open or power short circuit detected) [P2138] Deviation error	[P2122, P2127] Low voltage of the accelerator position sensor circuit (0.25 V or less) [P2123, P2128] High voltage of the accelerator position sensor circuit (4.75 V or more) [P2138] Difference in output voltage 1 and output voltage 2 of the accelerator position sensor. • Defective coupler between accelerator position sensor and ECU. • Open or short circuit in wire harness between accelerator position sensor and ECU. • Improperly installed accelerator position sensor. • Defective accelerator position sensor. • Malfunction in ECU.	Engine response is poor. Loss of engine power. Engine idling speed is unstable.	Change in the accelerator angle is 0 (transient control is not carried out). Accelerator angle is fixed to 0 [°]. O_2 feedback is not carried out. YCC-T evacuation is activated. Output is restricted. Fuel is not cut off due to the accelerator angle. ISC feedback is not carried out. ISC learning is not carried out.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P2158	Front wheel sensor (no normal signals are received from the front wheel sensor)	• Open or short circuit in wire harness between front wheel sensor and ECU. • Defective front wheel sensor. • Malfunction in ECU.	Traction control system does not operate. Traction control system indicator/warning light on the multi-function meter comes on. "TCS" switch on the left handlebar switch cannot be used (the traction control system is turned off).	Traction control system does not operate.
P2195	O_2 sensor (open circuit detected)	• Signal voltage is 0.25–0.45 V. • Improperly installed O_2 sensor. • Defective coupler between O_2 sensor and ECU. • Open or short circuit in wire harness between O_2 sensor and ECU. • Defective O_2 sensor. • Malfunction in ECU.	Increased exhaust emissions.	O_2 feedback is not carried out. O_2 feedback learning is not carried out. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off).
P21CF P21D0 P21D1 P21D2	[P21CF] Secondary injector #1 (malfunction in secondary injector #1) [P21D0] Secondary injector #2 (malfunction in secondary injector #2) [P21D1] Secondary injector #3 (malfunction in secondary injector #3) [P21D2] Secondary injector #4 (malfunction in secondary injector #4)	• Defective coupler between injector and ECU. • Open or short circuit in wire harness between injector and ECU. • Defective injector. • Malfunction in ECU. • Improperly installed injector.	Loss of engine power.	O_2 feedback is not carried out. Power is constantly supplied to the air induction system solenoid (air induction system air is cut off). ISC feedback is not carried out. ISC learning is not carried out. Injection to the applicable cylinder group (cylinders #1 and #4 or cylinders #2 and #3) is cut off.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P2228 P2229	[P2228] Atmospheric pressure sensor (ground short circuit detected) [P2229] Atmospheric pressure sensor (open or power short circuit detected)	[P2228] Low voltage of the atmospheric pressure sensor circuit (0.5 V or less) [P2229] High voltage of the atmospheric pressure sensor circuit (4.8 V or more) • Defective coupler between atmospheric pressure sensor and ECU. • Open or short circuit in wire harness between atmospheric pressure sensor and ECU. • Improperly installed atmospheric pressure sensor. • Defective atmospheric pressure sensor. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Insufficient power at high altitudes. Engine idling speed is unstable.	α–N is fixed. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. Atmospheric pressure sensor output correction value is fixed to 0. Fuel is not cut off due to the intake air pressure difference. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
U0155	CAN communication error (with the meter)	• Defective coupler between meter coupler and ECU coupler. • Open or short circuit in the wire harness between the meter and the ECU. • Defective meter. • Malfunction in ECU.	Communication between the ECU and the meter is not possible	MAP changeover: State is fixed. Traction control system does not operate. Meter switch input: OFF is fixed.

EAS31057
DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Tool display	Procedure
01	Throttle position sensor signal 1		
	• Fully closed position	11–21	Check with throttle valves fully closed.
	• Fully open position	96–106	Check with throttle valves fully open.
02	Atmospheric pressure	Displays the atmospheric pressure.	Compare the actually measured atmospheric pressure with the tool display value.
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	Air temperature	Displays the air temperature.	Compare the actually measured air temperature with the tool display value.

Diagnostic code No.	Item	Tool display	Procedure
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the tool display value.
07	Rear wheel vehicle speed pulses	Rear wheel speed pulse 0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
08	Lean angle sensor • 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 65 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 tool display value. (If the actually measured battery voltage is low, recharge the battery.)
13	Throttle position sensor signal 2 • Fully closed position • Fully open position	 9–23 93–109	 Check with throttle valves fully closed. Check with throttle valves fully open.
14	Accelerator position sensor signal 1 • Fully closed position • Fully open position	 11–21 96–106	 Check with throttle grip fully closed position. Check with throttle grip fully open position.
15	Accelerator position sensor signal 2 • Fully closed position • Fully open position	 9–23 93–109	 Check with throttle grip fully closed position. Check with throttle grip fully open position.
16	Front wheel vehicle speed pulses	Front wheel speed pulse 0–999	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
20	Sidestand switch • Stand retracted • Stand extended	 ON OFF	Extend and retract the sidestand (with the transmission in gear).

Diagnostic code No.	Item	Tool display	Procedure
21	Neutral switch and clutch switch • 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 side stand.
60	EEPROM fault code display • No history • History exists Display the EEPROM writing error for fault code No. P062F. If more than one item is defective, the displays alternates every two seconds to show all the detected numbers.	 00 • No malfunctions detected (If the self-diagnosis fault code P062F is indicated, the ECU is defective.) 01–04 (CO adjustment value) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) 11 (Data error for ISC (idle speed control) learning values) 12 (O_2 feedback learning value) 13 (OBD memory value)	 — —
67	ISC (idle speed control) learning condition display ISC (idle speed control) learning data erasure	00 ISC (idle speed control) learning data has been erased. 01 It is not necessary to erase the ISC (idle speed control) learning data. 02 It is necessary to erase the ISC (idle speed control) learning data.	To erase the ISC (idle speed control) learning data, set the engine stop switch from "⊠" to "∩" 3 times in 5 seconds.
70	Program version number	0–254 [-]	—
86*	Shift switch • Shift pedal up position • Other position than the shift pedal up position	 ON OFF	Check the switch condition by operating the shift pedal.

Diagnostic code No.	Item	Tool display	Procedure
87	A/F control learning data erasure	00 A/F control learning data has been erased. 01 A/F control learning data has not been erased.	To erase the O_2 feedback learning data, set the engine stop switch from "⊗" to "∩" 3 times in 5 seconds.

* Diagnostic code No. 86 is the diagnostic code number for the optional shift switch.

EAS31121
DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Cylinder-#1 ignition coil	Actuates the cylinder-#1 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	Cylinder-#2 ignition coil	Actuates the cylinder-#2 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.
32	Cylinder-#3 ignition coil	Actuates the cylinder-#3 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.
33	Cylinder-#4 ignition coil	Actuates the cylinder-#4 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.
34	Intake funnel	Actuates the intake funnel (up position down position for each 6 seconds). The "check" indicator on the Yamaha diagnostic tool screen come on each time the intake funnel servo motor is actuated.	Check the operating of the intake funnel servo motor.

Diagnostic code No.	Item	Actuation	Procedure
36	Primary injector #1	Actuates the primary injector #1 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the primary injector is actuated.	Disconnect the fuel pump coupler. Check that primary injector #1 is actuated five times by listening for the operating sound.
37	Primary injector #2	Actuates the primary injector #2 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the primary injector is actuated.	Disconnect the fuel pump coupler. Check that primary injector #2 is actuated five times by listening for the operating sound.
38	Primary injector #3	Actuates the primary injector #3 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the primary injector is actuated.	Disconnect the fuel pump coupler. Check that primary injector #3 is actuated five times by listening for the operating sound.
39	Primary injector #4	Actuates the primary injector #4 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the primary injector is actuated.	Disconnect the fuel pump coupler. Check that primary injector #4 is actuated five times by listening for the operating sound.
40	Secondary injector #1	Actuates the secondary injector #1 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the secondary injector is actuated.	Disconnect the fuel pump coupler. Check that secondary injector #1 is actuated five times by listening for the operating sound.
41	Secondary injector #2	Actuates the secondary injector #2 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the secondary injector is actuated.	Disconnect the fuel pump coupler. Check that secondary injector #2 is actuated five times by listening for the operating sound.
42	Secondary injector #3	Actuates the secondary injector #3 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the secondary injector is actuated.	Disconnect the fuel pump coupler. Check that secondary injector #3 is actuated five times by listening for the operating sound.

Diagnostic code No.	Item	Actuation	Procedure
43	Secondary injector #4	Actuates the secondary injector #4 five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the secondary injector is actuated.	Disconnect the fuel pump coupler. Check that secondary injector #4 is actuated five times by listening for the operating sound.
47*	Steering damper solenoid	—	—
48	Air induction system solenoid	Actuates the air induction system solenoid five times at one-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the air induction system solenoid is actuated.	Check that the air induction system solenoid 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.	Check that the relay unit is actuated five times by listening for the operating sound.
51	Radiator fan motor relay	Actuates the radiator fan motor relay five times at five-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.	Check that the radiator fan motor relay is actuated five times by listening for the operating sound.
52	Headlight	Actuates the headlight five times at five-second intervals. The “check” indicator on the Yamaha diagnostic tool screen come on each time the headlight is actuated.	Check that the headlight comes on five times.
53	EXUP servo motor	After the EXUP is fully closed, it stops at the opening base position (intermediate position). This operation takes approximately 3 seconds during which the “check” indicator is displayed on the Yamaha diagnostic tool.	Check the operating sound.

* Although this diagnostic code number is displayed, the device will not be actuated because the vehicle is not equipped with this device.

EAS20164
EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
30	Latch up detected	Latch up detected	• Vehicle has overturned • Improperly installed sensor • Sensor malfunction • Defective ECU	Perform the checks and maintenance jobs for event code number 30.
70	Engine idling stop	Engine is forcefully stopped because it was left idling for a long time	This is not a malfunction.	Activation of the engine idling stop control is not a system malfunction.
192	Intake air pressure sensor	Brief abnormality detected in intake air pressure sensor	Same as for fault code number P0107 and P0108	Perform the checks and maintenance jobs for fault code number P0107 and P0108.
193	Throttle position sensor	Brief abnormality detected in throttle position sensor	Same as for fault code number P0122, P0123, P0222 and P0223	Perform the checks and maintenance jobs for fault code number P0122, P0123, P0222 and P0223.
194	EXUP servo motor circuit	Brief abnormality detected in EXUP servo motor circuit	Same as for fault code number P048D and P048E	Perform the checks and maintenance jobs for fault code number P048D and P048E.
196	Coolant temperature sensor	Brief abnormality detected in coolant temperature sensor	Same as for fault code number P0117 and P0118	Perform the checks and maintenance jobs for fault code number P0117 and P0118.
197	Intake air temperature sensor	Brief abnormality detected in intake air temperature sensor	Same as for fault code number P0112 and P0113	Perform the checks and maintenance jobs for fault code number P0112 and P0113.
198	Atmospheric pressure sensor	Brief abnormality detected in atmospheric pressure sensor	Same as for fault code number P2228 and P2229	Perform the checks and maintenance jobs for fault code number P2228 and P2229.
203	Lean angle sensor	Brief abnormality detected in lean angle sensor	Same as for fault code number P1604 and P1605	Perform the checks and maintenance jobs for fault code number P1604 and P1605.
207	Accelerator position sensor	Brief abnormality detected in the accelerator position sensor	Same as for fault code number P2122, P2123, P2127 and P2128	Perform the checks and maintenance jobs for fault code number P2122, P2123, P2127 and P2128.
220	Gear position sensor	Brief abnormality detected in the gear position sensor	Same as for fault code number P0916 and P0917	Perform the checks and maintenance jobs for fault code number P0916 and P0917.

No.	Item	Symptom	Possible cause	Remarks
240	O_2 sensor (Correction value remains at upper limit)	Correction value remains at upper limit during O_2 feedback	• Open or short circuit in the wire harness between the sensor and the ECU • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective ECU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 240 may be indicated even if the system is normal.
241	O_2 sensor (Correction value remains at lower limit)	Correction value remains at lower limit during O_2 feedback	• Open or short circuit in the wire harness between the sensor and the ECU • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective ECU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 241 may be indicated even if the system is normal.
242	ISC (idle speed control) (Correction value remains at upper limit)	Correction value remains at upper limit while the engine is idling	Low engine idling speed • Clogged throttle body • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• Execute the diagnostic mode (diagnostic code number 67) and check the ISC maintenance requirements. • If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 242 may be indicated even if the system is normal.
243	ISC (idle speed control) (Correction value remains at lower limit)	Correction value remains at lower limit while the engine is idling	High engine idling speed • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 243 may be indicated even if the system is normal.
244	Difficult/unable to start engine	Engine starting difficult/unable condition detected	• Empty fuel tank • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 244 may be indicated even if the system is normal.

No.	Item	Symptom	Possible cause	Remarks
245	Engine stall	Engine stall detected	• Empty fuel tank • Improperly adjusted throttle cable • Improperly adjusted clutch cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective ECU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 245 may be indicated even if the system is normal.

EAS20091

WIRING DIAGRAM

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1. AC magneto
2. Rectifier/regulator
3. Main switch
4. Main fuse
5. Battery
6. Engine ground
7. Fuel injection system fuse
8. ABS ECU fuse
9. Terminal fuse (for optional equipment)
10. Electronic throttle valve fuse
11. Backup fuse
12. ABS solenoid fuse
13. Turn signal light fuse
14. Headlight fuse
15. Ignition fuse
16. Signaling system fuse
17. Radiator fan motor fuse (right)
18. Radiator fan motor fuse (left)
19. ABS motor fuse
20. Starter relay
21. Starter motor
22. Auxiliary light
23. Front brake light switch
24. Handlebar switch (right)
25. Engine stop switch
26. Start switch
27. D-Mode switch
28. Relay unit
29. Starting circuit cut-off relay
30. Fuel pump relay
31. Joint coupler
32. Neutral switch
33. Sidestand switch
34. Cylinder identification sensor
35. Gear position sensor
36. Lean angle sensor
37. Intake air pressure sensor
38. Atmospheric pressure sensor
39. Intake air temperature sensor
40. O_2 sensor
41. Crankshaft position sensor
42. Coolant temperature sensor
43. EXUP servo motor
44. ECU (Engine Control Unit)
45. Spark plug
46. Ignition coil #1
47. Ignition coil #2
48. Ignition coil #3
49. Ignition coil #4
50. Air induction system solenoid
51. Primary injector #1
52. Primary injector #2
53. Primary injector #3
54. Primary injector #4
55. Secondary injector #1
56. Secondary injector #2
57. Secondary injector #3
58. Secondary injector #4
59. Accelerator position sensor
60. Throttle position sensor
61. Intake funnel servo motor
62. Throttle servo motor
63. ABS ECU
64. Front wheel sensor
65. Rear wheel sensor
66. Yamaha diagnostic tool coupler
67. Shift switch (OPTION)
68. Fuel pump
69. Fuel sender
70. Meter assembly
71. Fuel level warning light
72. Oil level warning light
73. Neutral indicator light
74. Shift light
75. Multi-function meter
76. Traction control system indicator light
77. Coolant temperature warning light
78. Engine trouble warning light
79. High beam indicator light
80. Turn signal indicator light
81. Meter light
82. ABS warning light
83. Oil level switch
84. Handlebar switch (left)
85. Traction control system switch
86. Pass switch
87. Dimmer switch
88. Horn switch
89. Turn signal switch
90. Clutch switch
91. Horn
92. Rear turn signal light (right)
93. Rear turn signal light (left)
94. Front turn signal/position light (right)
95. Front turn signal/position light (left)
96. Headlight assembly
97. Rear brake light switch
98. Tail/brake light assembly
99. License plate light
100. Radiator fan motor (right)
101. Radiator fan motor (left)
102. Auxiliary DC jack (OPTION)
103. Radiator fan motor relay

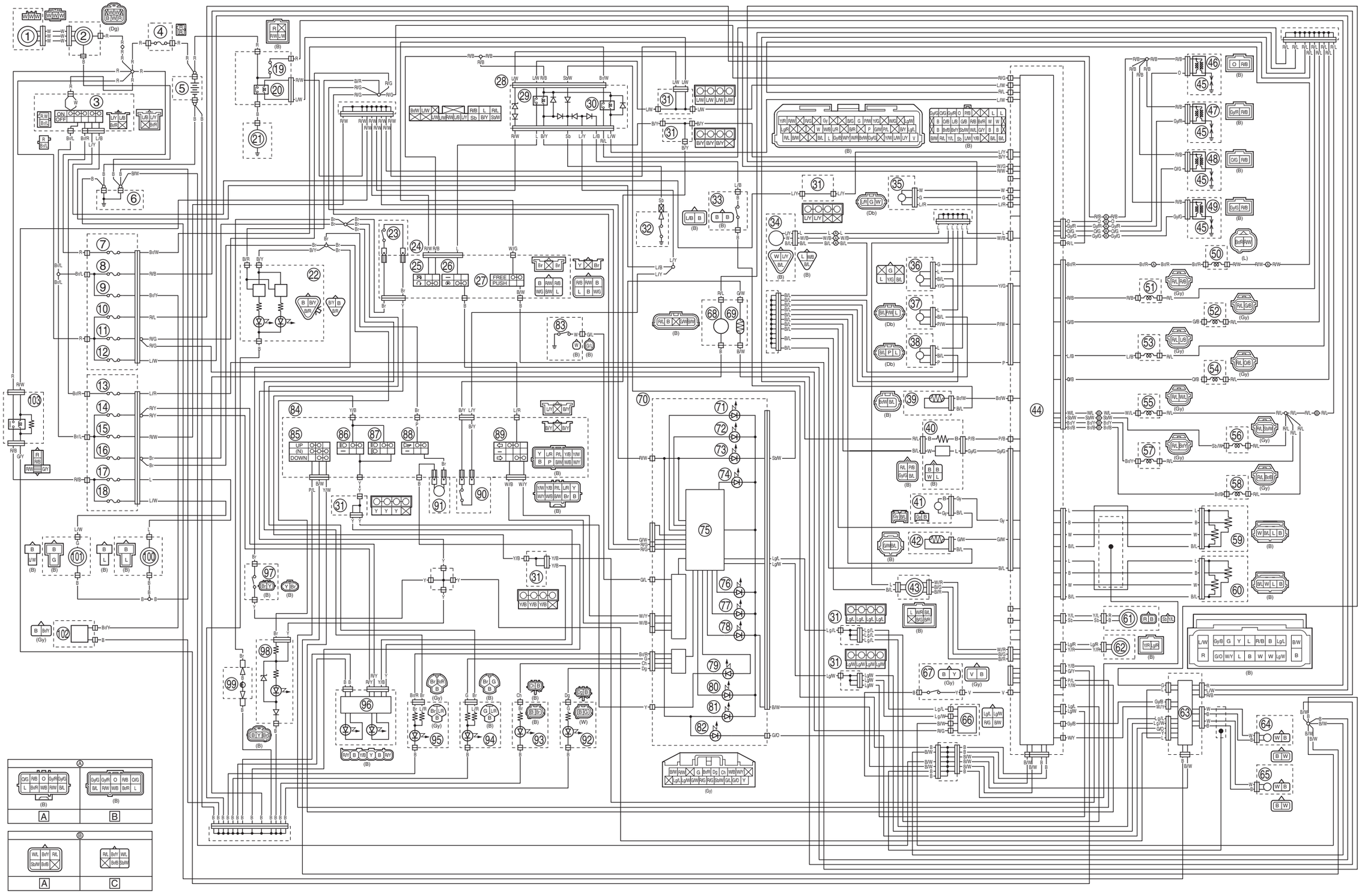
A. Wire harness
B. Sub-wire harness (ignition)
C. Sub-wire harness (secondary injector)

EAS30613

COLOR CODE

B	Black
Dg	Dark green
Db	Dark blue
Gy	Gray
L	Blue
W	White
Br	Brown
Ch	Chocolate
G	Green
O	Orange
P	Pink
R	Red
Sb	Sky blue
V	Violet
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/B	Green/Black
G/L	Green/Blue
G/O	Green/Orange
G/W	Green/White
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/L	Light green/Blue
Lg/R	Light green/Red
Lg/W	Light green/White
O/B	Orange/Black
O/G	Orange/Green
P/B	Pink/Black
P/L	Pink/Blue
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/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
Y/R	Yellow/Red
Y/W	Yellow/White

YZFR6H/YZFR6HC 2017 WIRING DIAGRAM



YZFR6H/YZFR6HC 2017 WIRING DIAGRAM