



**YAMAHA**

**2020**

**SERVICE MANUAL**

**Ténéré 700**

**XTZ690  
XTZ690-U**

**BW3-F8197-E0**



## IMPORTANT

This manual was produced by MBK industrie 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-E0\*) 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.




Yamaha Motor Company, Ltd. and MBK industrie are 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.

## IMPORTANT MANUAL INFORMATION

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

	<b>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.</b>
	<b>A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</b>
	<b>A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.</b>
<b>TIP</b>	<b>A TIP provides key information to make procedures easier or clearer.</b>

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SERVICE MANUAL  
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# HOW TO USE THIS MANUAL

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

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

1  
↓  
**CLUTCH**

### 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 castle	1	Disconnect.
3	Pull lever	1	
4	Pull lever spring	1	
5	Clutch cover	1	
6	Clutch cover gasket	1	
7	Dowel pin	2	

5-46

### CLUTCH

**REMOVING THE CLUTCH**

1. **Prep work.**
  - Oil strainer
  - Refer to "OIL LUMP" on page 5-59
  - Water pump
2. **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 "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  
9090-04086

Universal clutch holder  
YK-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 drive sprocket, and then remove the clutch housing and oil pump drive chain from the main axle.

**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  
2.92-3.05 mm (0.115-0.121 in)

Wear limit  
2.80 mm (0.110 in)

**CHECKING THE CLUTCH PLATES**  
The following procedure applies to all of the clutch plates.













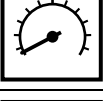

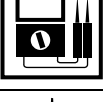





## SYMBOLS

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

### TIP

The following symbols are not relevant to every vehicle.

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

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## GENERAL INFORMATION

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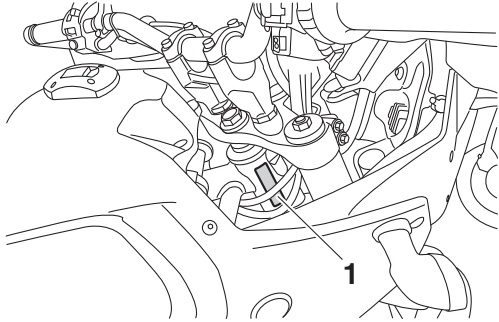
EAS20007

## IDENTIFICATION

EAS30002

### VEHICLE IDENTIFICATION NUMBER

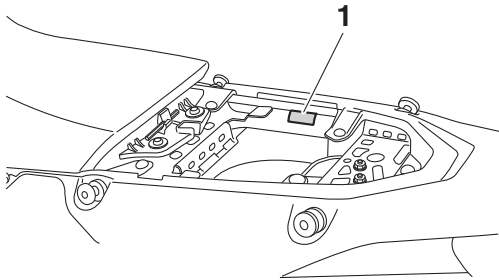
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS30003

### MODEL LABEL

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

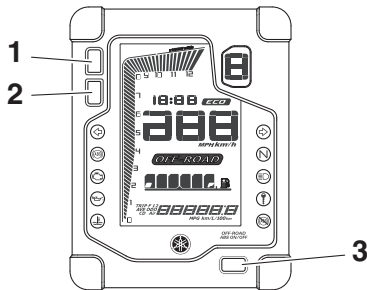


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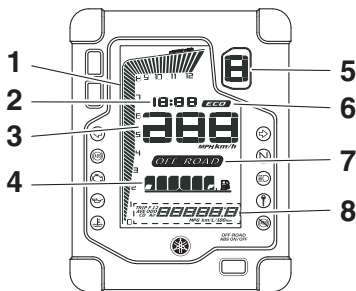
## FEATURES

EAS30982

### MULTI-FUNCTION METER UNIT



1. Top set button
2. Bottom set button
3. "OFF-ROAD ABS ON/OFF" button



1. Tachometer
2. Clock
3. Speedometer
4. Fuel meter
5. Transmission gear display
6. Eco indicator "ECO"
7. "OFF-ROAD" indicator
8. Multi-function display

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

- speedometer
- tachometer
- fuel meter
- clock
- eco indicator
- transmission gear display
- OFF-ROAD indicator
- multi-function display

#### TIP

- To switch between kilometers and miles, set the multi-function display to the odometer or a tripmeter, and then push the top set button until the display units change.

- The display units will return to factory settings in case of battery disconnection.

EWA12423

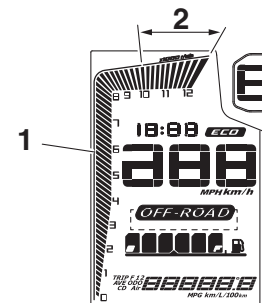
#### **WARNING**

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

#### Speedometer

The speedometer shows the vehicle's traveling speed.

#### Tachometer



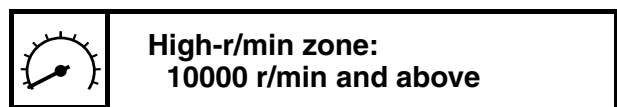
1. Tachometer
2. Tachometer red zone

The tachometer shows the engine speed.

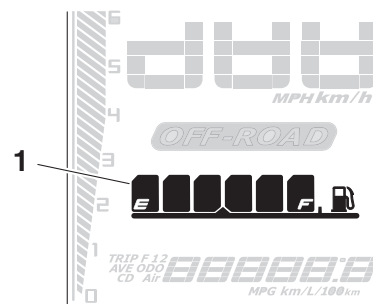
ECA26220

#### **NOTICE**

Do not operate the engine in the tachometer high-r/min zone.



#### Fuel meter



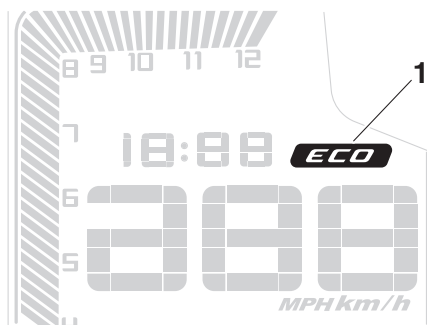
1. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The segments of the fuel meter disappear from “F” (full) towards “E” (empty) as the fuel level decreases. When the last segment of the fuel meter starts flashing, refuel as soon as possible.

**TIP**

If a problem is detected in the electrical circuit, the fuel meter segments will flash repeatedly. If this occurs, check the electrical circuit. Refer to “SIGNALING SYSTEM” on page 8-19.

**Eco indicator**



1. Eco indicator “ECO”

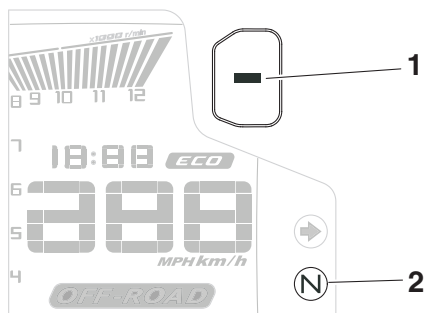
This indicator comes on when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator goes off when the vehicle is stopped.

**TIP**

Consider the following tips to reduce fuel consumption:

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

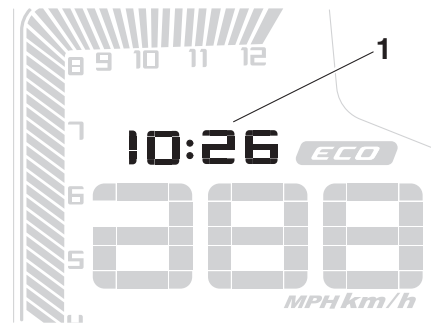
**Transmission gear display**



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

The transmission gear display shows the selected gear. The neutral position is indicated by “N”.

**Clock**



1. Clock

The clock uses a 12-hour time system.

**TIP**

When the main switch is turned off, the clock can be viewed by pushing the top set button.

To set the clock

1. Turn the key to “ON”.
2. Push the bottom set button and top set button together until the hour digits start flashing.
3. Push the bottom set button to set the hours.
4. Push the top set button and the minute digits will start flashing.
5. Push the bottom set button to set the minutes.
6. Push the top set button to confirm settings and start the clock.

**TIP**

When setting the hours and minutes, push the bottom set button briefly to increase the increment value one by one, or push and hold the button to increase the increment value continuously.

**OFF-ROAD Indicator**


This indicator comes on when the ABS has been manually disabled.

To switch off the ABS

1. Turn the key to “ON”.
2. The vehicle being stationary, push the “OFF-ROAD ABS ON/OFF” button until the “ABS OFF” warning light starts flashing, then release the button.
3. The “ABS OFF” warning light and “OFF-ROAD” indicator will come on simultaneously.



## TIP

The ABS will be disabled until the key is turned to “OFF”, or the engine stop switch is turned to “” (stop) when the engine is running or you stop the vehicle and push the “OFF-ROAD ABS ON/OFF” button again. The “ABS OFF” warning light and the “OFF-ROAD” indicator will turn off.

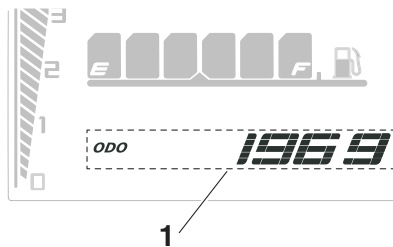
EWAM1050



**WARNING**

**Always ride on paved roads with the ABS turned on. Riding on public roads with the ABS disabled may be illegal and void your insurance. Turn the ABS off only when riding on non-paved surfaces.**

## Multi-function display



### 1. Multi-function display

The multi-function display can show:

- an odometer
- two tripmeters
- a countdown tripmeter
- a fuel reserve tripmeter
- an instantaneous fuel consumption display
- an average fuel consumption display
- a coolant temperature display
- an air temperature display
- a brightness control mode

The odometer shows the total distance the vehicle has traveled. The standard tripmeters show the distance traveled since they were last reset. The countdown tripmeter shows the remaining distance to travel since it was last set. The fuel reserve tripmeter shows the distance traveled since the last segment of the fuel meter began flashing.

## TIP

- The odometer will lock at 999999 and cannot be reset.
- The tripmeter will reset to 0 and continue counting after 9999.9 is reached.

- The countdown tripmeter does not automatically reset.

Push the top set button to switch the display in the following order:

ODO → TRIP 1 → TRIP 2 → TRIP CD → TRIP F → km/L or L/100 km or MPG → AVE\_ \_ \_ km/L or AVE\_ \_ \_ L/100 km or AVE\_ \_ \_ MPG → \_ \_ °C → Air\_ \_ °C → ODO

## TIP

- Push the bottom set button to switch the display in the reverse order.
- The display changes to fuel reserve tripmeter “TRIP F” when the last segment of the fuel meter starts flashing.
- To reset a tripmeter, select it by pushing the top set button, and while the digits flash, push the bottom set button until it is reset.
- If you do not reset the fuel reserve tripmeter manually, it will reset automatically and disappear from the display after refueling and traveling 5 km (3 mi).

## Fuel reserve tripmeter

When the fuel level becomes low, the last segment of the fuel meter will start flashing. The fuel reserve tripmeter “TRIP F” will automatically appear and start counting the distance traveled from that point. In this case, push the top set button to switch the display in the following order:

TRIP F → km/L or L/100 km → AVE\_ \_ \_ km/L or AVE\_ \_ \_ L/100 km → \_ \_ °C → Air\_ \_ °C → ODO → TRIP 1 → TRIP 2 → TRIP CD → TRIP F

For the UK:

TRIP F → km/L, L/100 km or MPG → AVE\_ \_ \_ km/L, AVE\_ \_ \_ L/100 km or AVE\_ \_ \_ MPG → \_ \_ °C → Air\_ \_ °C → ODO → TRIP 1 → TRIP 2 → TRIP CD → TRIP F

## TIP

- Push the bottom set button to change the display in the reverse order.
- You can manually reset the fuel reserve tripmeter, or after refueling and traveling 5 km (3 mi) it will reset automatically and disappear from the display.

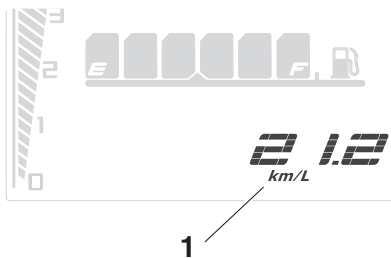
## Countdown tripmeter settings

To set the countdown tripmeter, select it by pushing the top set button. When the units stop flashing, push the top and bottom set buttons simultaneously until the first digit starts flashing. A short press on the top button will increment the unit from “9” to “0”. Push the bottom set button to select the next digit and set it following the same procedure as the first digit. Push the bottom set button to select the last digit and follow the same procedure. Push the bottom set button to confirm the value.

### TIP

- The maximum possible entering value is 900 km or 600 mi.
- The countdown tripmeter will start as soon as you begin riding. When the countdown reaches “0” the display changes to the countdown tripmeter “TRIP CD” and flashes 10 times.
- To reset the countdown tripmeter, select it and while the digits flash, push the bottom set button until it is reset.

## Instantaneous fuel consumption



1. Instantaneous fuel consumption display

This function calculates the fuel consumption under current riding conditions.

The instantaneous fuel consumption display can be set to either “km/L”, “L/100 km” when using kilometers.

To switch the fuel consumption units, push the top set button until the measurement units change. When using miles, the fuel consumption unit is “MPG”.

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

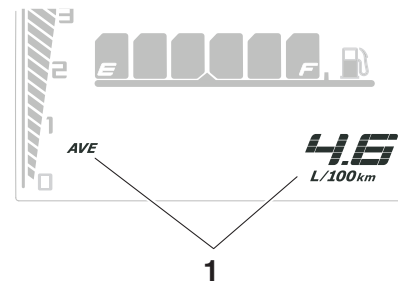
- “MPG”: The distance that can be traveled on 1.0 Imp.gal of fuel under the current riding conditions is shown.

To switch the instantaneous fuel consumption settings, push and hold the left set button until the display changes.

### TIP

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

## Average fuel consumption



1. Average fuel consumption display

This display shows the average fuel consumption since it was last reset.

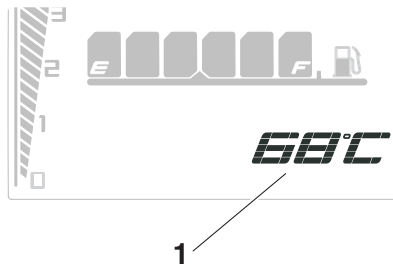
The average fuel consumption can be set to either “AVE\_ \_ \_ km/L”, “AVE\_ \_ \_ L/100 km” when using kilometers. To switch the fuel consumption units, push the top set button until the measurement units change. When using miles, the fuel consumption is “AVE\_ \_ \_ MPG”.

- “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 Imp.gal of fuel is shown.
- To reset the average fuel consumption, select it and while the digits flash push the bottom set button until it is reset.

### TIP

After resetting the average fuel consumption, “\_ \_.” will be shown until the vehicle has traveled 1 km (0.6 mi).

## Coolant temperature



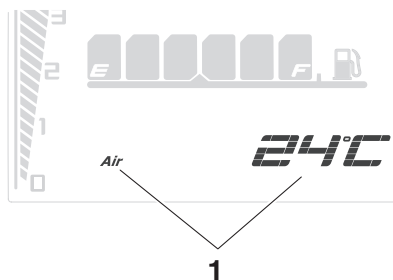
### 1. Coolant temperature display

This display shows the coolant temperature from 40 °C to 116 °C in 1 °C increments. If the message “Hi” flashes, stop the vehicle, then stop the engine, and let it cool.

#### TIP

- When the coolant temperature is below 40 °C, “Lo” will be displayed.
- The coolant temperature varies with changes in the weather and engine load.

## Air temperature



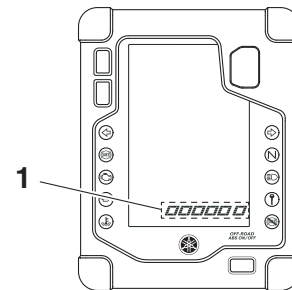
### 1. Air temperature display

This display shows the air temperature from –9 °C to 99 °C in 1 °C increments.

#### TIP

- When the temperature is below –9 °C, “Lo” will be displayed.
- The temperature displayed may vary from the ambient temperature.

## Brightness control mode



### 1. Brightness level display

The brightness level of the multi-function meter unit panel can be adjusted.

#### To adjust the brightness

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

#### TIP

There are 6 brightness level settings.


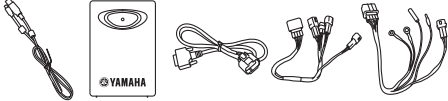
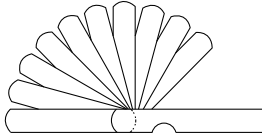
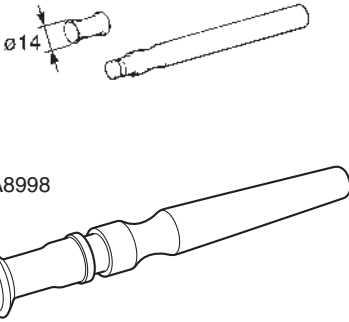
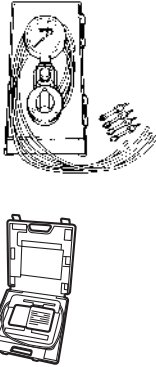
EAS20012

## SPECIAL TOOLS

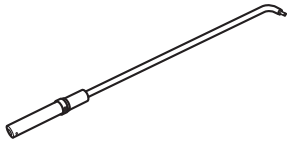
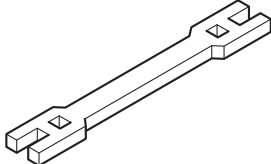
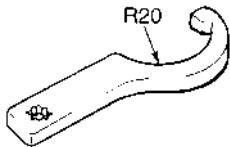
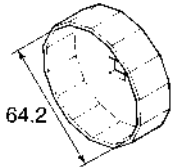
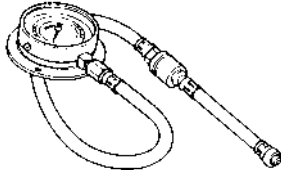
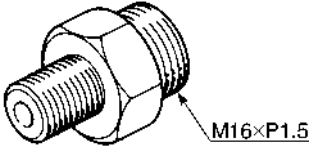
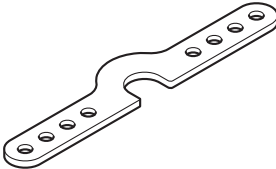
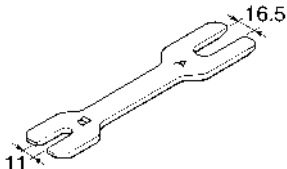
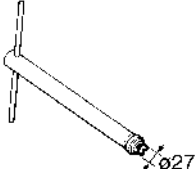
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

### TIP

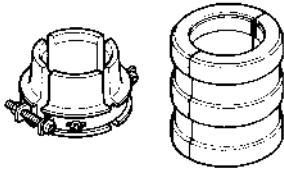
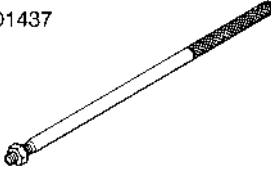
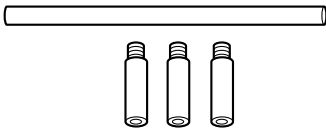
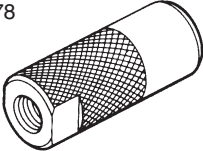
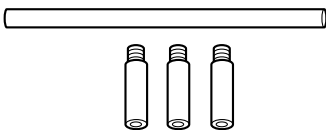
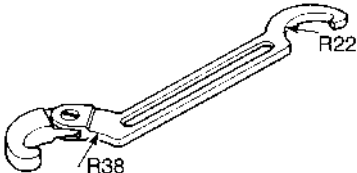
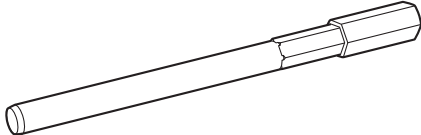
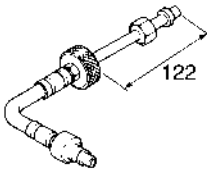
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Yamaha diagnostic tool USB 90890-03267		3-4, 3-9, 4-49, 4-50, 8-34, 8-105, 8-125
Yamaha diagnostic tool (A/I) 90890-03262		3-4, 3-9, 4-49, 4-50, 8-34, 8-105, 8-125
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-7, 4-17, 4-24, 5-47
Valve lapper (ø14) 90890-04101 Valve lapping tool (14mm) YM-A8998		3-8
Vacuum gauge 90890-03094 Vacuummate YU-44456		3-9

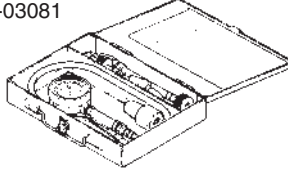

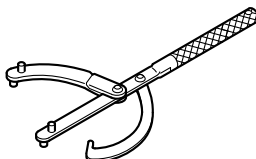

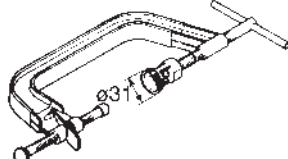
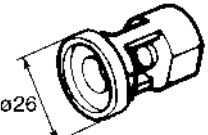
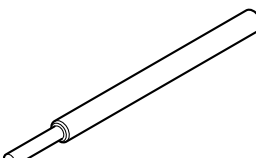
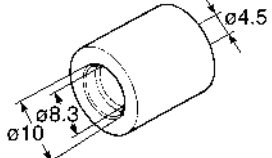
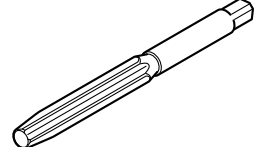
## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Carburetor angle driver 2 90890-03173		3-10
Spoke nipple wrench (6-7) 90890-01521 Spoke nipple wrench (6-7) YM-01521		3-16
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-20, 4-70
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-24
Pressure gauge 90890-03153 Pressure gauge YU-03153		3-26, 7-12, 7-13
Oil pressure adapter H 90890-03139		3-26
Fork spring compression tool 90890-01573 Fork spring compression tool YM-01573		4-61, 4-66
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-61, 4-66
Damper rod holder (ø27) 90890-01423 Damping rod holder YM-01423		4-62, 4-63

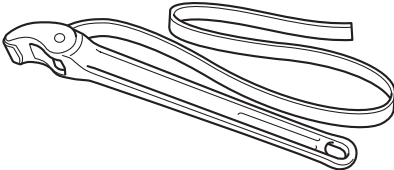
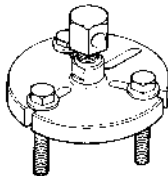

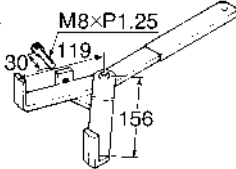
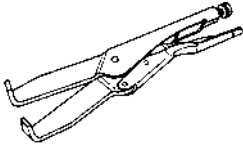
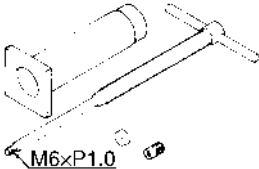
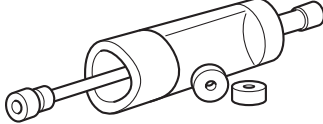
# SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-64, 4-64, 4-64
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437  YM-A8703 	4-65
Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703	90890-01578  YM-A8703 	4-65
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-70
Engine alignment tool 90890-11097		4-77, 4-78
Compression gauge extension 122mm 90890-04136 Compression gauge extension 122mm YM-04136		5-1

# SPECIAL TOOLS

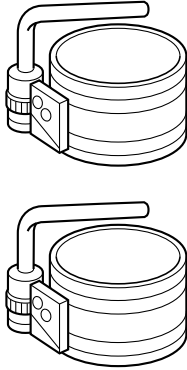
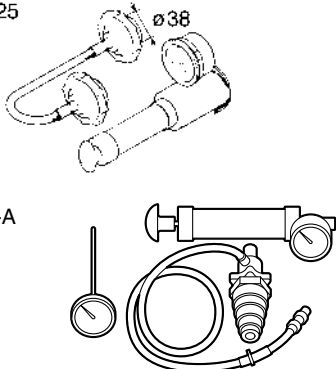
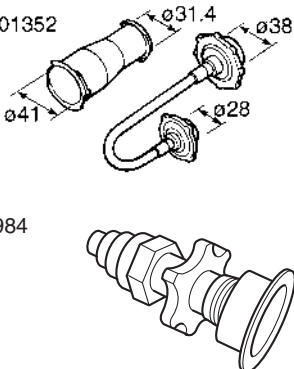
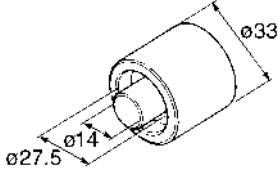
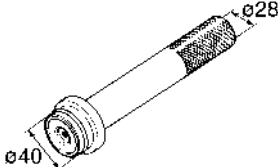
Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081  YU-33223 	5-1
Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235		5-13, 5-16
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-19, 5-37, 5-62, 5-64
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-28, 5-32
Valve spring compressor attachment (ø26) 90890-01243 Valve spring compressor adapter (26 mm) YM-01253-1		5-28, 5-32
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-29
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-29
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-29

# SPECIAL TOOLS

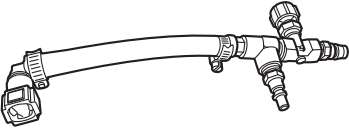
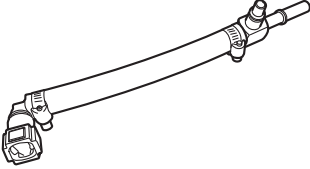
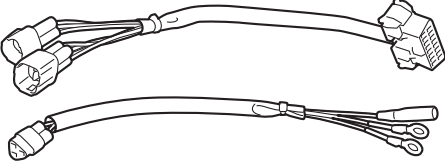
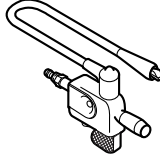
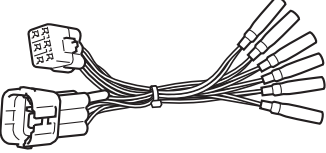
Tool name/Tool No.	Illustration	Reference pages
Rotor holding tool 90890-04166 Rotor holding tool YM-04166		5-35, 5-35, 5-36, 5-36
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-35
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		5-40, 8-130, 8-131, 8-132, 8-133, 8-133, 8-133, 8-134, 8-135, 8-135, 8-136, 8-137, 8-137, 8-137, 8-138, 8-139, 8-139, 8-140
Universal clutch holder 90890-04086 Universal clutch holder YM-91042	<p>90890-04086</p>  <p>YM-91042</p> 	5-46, 5-48
Piston pin puller set 90890-01304 Piston pin puller YU-01304	<p>90890-01304</p>  <p>YU-01304</p> 	5-67



# SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Piston ring compressor 90890-05158 Piston ring compressor YM-08037		5-74
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A		6-4
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984		6-4
Mechanical seal installer (ø33) 90890-04132 Water pump seal installer (ø33) YM-33221-A		6-13
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058		6-13

## SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-12
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-13
OBD/ GST Leadwire kit 90890-03249		8-34
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-135
Test harness- lean angle sensor (6P) 90890-03209 Test harness- lean angle sensor (6P) YU-03209		8-136

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## SPECIFICATIONS

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<b>CHASSIS SPECIFICATIONS .....</b>	<b>2-7</b>
<b>ELECTRICAL SPECIFICATIONS .....</b>	<b>2-10</b>
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# GENERAL SPECIFICATIONS

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EAS20013

## GENERAL SPECIFICATIONS

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### Model

Model	BW31 (XTZ690_EUR) BW32 (XTZ690-U) BW33 (XTZ690P-B) BW34 (XTZ690_AUS)
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### Dimensions

Overall length	2370 mm (93.3 in)
Overall width	905 mm (35.6 in)
Overall height	1455 mm (57.3 in)
Wheelbase	1595 mm (62.8 in)
Ground clearance	240 mm (9.45 in)
Minimum turning radius	2.8 m (9.47 ft)

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### Weight

Curb weight	204 kg (450 lb)
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### Loading

Maximum load	190 kg (419 lb)
Riding capacity	2 person

# ENGINE SPECIFICATIONS

EAS20014

## ENGINE SPECIFICATIONS

### Engine

Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	689 cm <sup>3</sup>
Cylinder arrangement	Inline
Number of cylinders	2-cylinder
Bore × stroke	80.0 × 68.6 mm (3.15 × 2.70 in)
Compression ratio	11.5 : 1
Compression pressure	770–990 kPa/355 r/min (7.7–9.9 kgf/cm <sup>2</sup> /355 r/min, 109.5–140.8 psi/355 r/min)
Compression pressure (#2 cylinder)	690–880 kPa/355 r/min (6.9–8.8 kgf/cm <sup>2</sup> /355 r/min, 98.1–125.2 psi/355 r/min)
Starting system	Electric starter

### Fuel

Recommended fuel	Premium unleaded gasoline (E10 acceptable)
Fuel tank capacity	16 L (4.2 US gal, 3.5 Imp.gal)
Fuel reserve amount	4.3 L (1.14 US gal, 0.95 Imp.gal)

### Engine oil

Recommended brand	YAMALUBE
SAE viscosity grades	10W-40
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Without oil filter cartridge replacement	2.30 L (2.43 US qt, 2.02 Imp.qt)
With oil filter cartridge replacement	2.60 L (2.75 US qt, 2.29 Imp.qt)
Quantity (disassembled)	3.00 L (3.17 US qt, 2.64 Imp.qt)

### Oil filter

Oil filter type	Cartridge
Relief valve operating pressure	630.0–810.0 kPa (6.30–8.10 kgf/cm <sup>2</sup> , 91.4–117.5 psi)

### Oil pump

Inner-rotor-to-outer-rotor-tip clearance	0.080 mm (0.0031 in)
Limit	0.120 mm (0.0047 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.030–0.080 mm (0.0012–0.0032 in)
Limit	0.150 mm (0.0059 in)
Oil pressure	280.0 kPa/5000 r/min (2.80 kgf/cm <sup>2</sup> /5000 r/min, 40.6 psi/5000 r/min)

### Cooling system

Coolant quantity	
Radiator (including all routes)	1.60 L (1.69 US qt, 1.41 Imp.qt)

# ENGINE SPECIFICATIONS

Coolant reservoir (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap valve opening pressure	108.0–137.4 kPa (1.08–1.37 kgf/cm <sup>2</sup> , 15.7–19.9 psi)
Thermostat	
Valve opening temperature	80.0–84.0 °C (176.00–183.20 °F)
Valve full open temperature	95.0 °C (203.00 °F)
Valve lift (full open)	8.0 mm (0.31 in)
Radiator core	
Width	322.6 mm (12.70 in)
Height	180.0 mm (7.09 in)
Depth	24.0 mm (0.94 in)
<b>Spark plug(s)</b>	
Manufacturer/model	NGK/LMAR8A-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
<b>Cylinder head</b>	
Warpage limit	0.05 mm (0.0020 in)
<b>Camshaft</b>	
Camshaft cap inside diameter	22.000–22.021 mm (0.8661–0.8670 in)
Camshaft journal diameter	21.959–21.972 mm (0.8645–0.8650 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	35.610–35.710 mm (1.4020–1.4059 in)
Limit	35.510 mm (1.3980 in)
Lobe height (Exhaust)	35.710–35.810 mm (1.4059–1.4098 in)
Limit	35.610 mm (1.4020 in)
Camshaft runout limit	0.030 mm (0.0012 in)
<b>Valve, valve seat, valve guide</b>	
Valve clearance (cold)	
Intake	0.11–0.20 mm (0.0043–0.0079 in)
Exhaust	0.24–0.30 mm (0.0094–0.0118 in)
Valve dimensions	
Valve 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)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.445 mm (0.1750 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
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	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)

# ENGINE SPECIFICATIONS

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## Valve spring

Free length (intake)	40.30 mm (1.59 in)
Limit	38.29 mm (1.51 in)
Free length (exhaust)	41.39 mm (1.63 in)
Limit	39.32 mm (1.55 in)

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## Cylinder

Bore	80.000–80.010 mm (3.1496–3.1500 in)
Wear limit	80.060 mm (3.1520 in)

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## Piston

Diameter	79.970–79.985 mm (3.1484–3.1490 in)
Measuring point (from piston skirt bottom)	8.0 mm (0.31 in)
Piston-to-cylinder clearance	0.015–0.040 mm (0.0006–0.0016 in)
Piston pin bore inside diameter	18.004–18.015 mm (0.7088–0.7093 in)
Limit	18.045 mm (0.7104 in)
Piston pin outside diameter	17.990–17.995 mm (0.7083–0.7085 in)
Limit	17.970 mm (0.7075 in)
Piston-pin-to-piston-pin-bore clearance	0.009–0.025 mm (0.0004–0.0010 in)

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## Piston ring

Top ring	
End gap limit	0.50 mm (0.0197 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Side clearance limit	0.115 mm (0.0045 in)
2nd ring	
End gap limit	0.80 mm (0.0315 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Side clearance limit	0.115 mm (0.0045 in)

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## Connecting rod

Oil clearance	0.027–0.051 mm (0.0011–0.0020 in)
Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green

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## Crankshaft

Runout limit	0.030 mm (0.0012 in)
Journal oil clearance	0.018–0.042 mm (0.0007–0.0017 in)
Bearing color code	
Model identification color	Pink
Code -1	Purple
Code 0	White
Code 1	Blue
Code 2	Black
Code 3	Brown

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## Balancer

Balancer shaft runout limit	0.030 mm (0.0012 in)
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# ENGINE SPECIFICATIONS

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Bearing color code	
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
Code 5	Yellow
Balancer shaft journal to balancer shaft bearing clearance	0.020–0.054 mm (0.0008–0.0021 in)

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## Clutch

Clutch type	Wet, multiple-disc
Clutch lever free play	5.0–10.0 mm (0.20–0.39 in)
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)
Plate quantity	5 pcs
Wear limit	2.82 mm (0.111 in)
Friction plate 1 thickness	2.90–3.10 mm (0.114–0.122 in)
Plate quantity	2 pcs
Wear limit	2.80 mm (0.110 in)
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	6 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch spring free length	50.00 mm (1.97 in)
Limit	47.50 mm (1.87 in)

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## Drivetrain

Primary reduction ratio	1.925 (77/40)
Transmission type	Constant mesh 6-speed
Gear ratio	
1st	2.846 (37/13)
2nd	2.125 (34/16)
3rd	1.632 (31/19)
4th	1.300 (26/20)
5th	1.091 (24/22)
6th	0.964 (27/28)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	3.067 (46/15)
Final drive	Chain

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## Shifting mechanism

Installed shift rod length	217.5–219.5 mm (8.56–8.64 in)
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## Air filter

Air filter element	Oil-coated paper element
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## Fuel pump

Pump type	Electrical
Maximum consumption amperage	3.3 A

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## Fuel injector

Resistance	12.0 $\Omega$
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# ENGINE SPECIFICATIONS

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## Throttle body

ID mark 1WS1 10

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## Idling condition

Engine idling speed 1250–1450 r/min

O<sub>2</sub> feedback control Active

Coolant temperature 85–105 °C (185–221 °F)

Engine oil temperature 60–80 °C (140–176 °F)

Intake vacuum 39.3–41.6 kPa (295–312 mmHg, 11.6–12.3 inHg)

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

CO% 0.0–2.0 %

Fuel line pressure (at idle) 300–390 kPa (3.0–3.9 kgf/cm<sup>2</sup>, 43.5–56.6 psi)

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

# CHASSIS SPECIFICATIONS

EAS20015

## CHASSIS SPECIFICATIONS

### Chassis

Frame type	Double cradle
Caster angle	27.0 °
Trail	105 mm (4.1 in)

### Front wheel

Wheel type	Spoke wheel
Rim size	21 × 1.85
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)

### Rear wheel

Wheel type	Spoke wheel
Rim size	18M/CxMT4.00
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)

### Front tire

Type	With tube
Size	90/90 – 21 M/C 54V M+S
Manufacturer/model	PIRELLI/SCORPION RALLY STR A

### Rear tire

Type	With tube
Size	150/70 R18 M/C 70V M+S
Manufacturer/model	PIRELLI/SCORPION RALLY STR

### Tire air pressure (measured on cold tires)

1 person	
Front	220 kPa (2.20 kgf/cm <sup>2</sup> , 32 psi)
Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
2 persons	
Front	220 kPa (2.20 kgf/cm <sup>2</sup> , 32 psi)
Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)
Off-road riding	
Front	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)
Rear	200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi)

### Front brake

Type	Hydraulic dual disc brake
Front disc brake	
Disc outside diameter × thickness	282.0 × 4.5 mm (11.10 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	4.0 mm (0.16 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter (Left)	28.00 mm, 28.00 mm (1.10 in, 1.10 in)
Caliper cylinder inside diameter (Right)	28.00 mm, 28.00 mm (1.10 in, 1.10 in)
Specified brake fluid	DOT 4

# CHASSIS SPECIFICATIONS

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## Rear brake

Type	Hydraulic single disc brake
Rear disc brake	
Disc outside diameter × thickness	245.0 × 5.0 mm (9.65 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness limit	3.9 mm (0.15 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	34.00 mm (1.34 in)
Specified brake fluid	DOT 4

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## Front suspension

Type	Telescopic fork
Spring	Coil spring
Shock absorber	Hydraulic damper
Wheel travel	210 mm (8.3 in)
Fork spring free length	422.0 mm (16.61 in)
Limit	413.6 mm (16.28 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil G10
Quantity (left)	624.0 cm <sup>3</sup> (21.10 US oz, 21.96 Imp. oz)
Quantity (right)	624.0 cm <sup>3</sup> (21.10 US oz, 21.96 Imp. oz)
Level	85.0 mm (3.35 in)
Rebound damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	31
Adjustment value from the start position (STD)	17
Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Unit for compression damping adjustment	Click
Adjustment value from the start position (Soft)	22
Adjustment value from the start position (STD)	11
Adjustment value from the start position (Hard)	0

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## Rear suspension

Type	Swingarm (link suspension)
Spring	Coil spring
Shock absorber	Gas-hydraulic damper
Wheel travel	200 mm (7.9 in)
Spring preload	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value (Soft)	0
Adjustment value (STD)	10
Adjustment value (Hard)	24
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)	13

## CHASSIS SPECIFICATIONS

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Adjustment value from the start position (Hard)	0
Compression damping	
Adjusting system	Mechanical adjustable type
Unit for adjustment	Click
Adjustment value from the start position (Soft)	18
Adjustment value from the start position (STD)	15
Adjustment value from the start position (Hard)	0

---

### Drive chain

Size	525V11
Chain type	Sealed type
Number of links	122
Drive chain slack	43.0–48.0 mm (1.69–1.89 in)
Limit	55.0 mm (2.17 in)
15-link length limit	239.3 mm (9.42 in)

# ELECTRICAL SPECIFICATIONS

EAS20016

## ELECTRICAL SPECIFICATIONS

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### Voltage

System voltage 12 V

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### Ignition system

Ignition system TCI  
Ignition timing (B.T.D.C.) 10.0 °/1200 r/min

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### Engine control unit

Model TBDF2B (XTZ690, XTZ690P-B)  
TBDF4K (XTZ690-U)

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### Ignition coil

Primary coil resistance 1.19–1.61 Ω  
Secondary coil resistance 8.50–11.50 kΩ

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### 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

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### Charging system

Charging system AC magneto  
Standard output 14.0 V, 29.3 A at 5000 r/min  
Stator coil resistance 0.128–0.192 Ω

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### Rectifier/regulator

Regulator type Three-phase  
Regulated voltage (DC) 14.3–14.7 V

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### Battery

Model YTZ10S  
Voltage, capacity 12 V, 8.6 Ah (10 HR)

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### Bulb wattage

Headlight LED  
Brake/tail light LED  
Front turn signal light 10.0 W × 2  
Rear turn signal light 10.0 W × 2  
Auxiliary light LED  
License plate light 5.0 W × 1  
Meter lighting LED

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### Indicator light

Neutral indicator light LED  
Oil pressure warning light LED  
High beam indicator light LED  
Turn signal indicator light LED  
Coolant temperature warning light LED  
Engine trouble warning light LED  
ABS warning light LED

## ELECTRICAL SPECIFICATIONS

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ABS on/off indicator light	LED
Immobilizer system indicator light	LED

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<b>Starter motor</b>	
Brush overall length limit	6.5 mm (0.26 in)
Brush spring force	6.03–6.52 N (615–665 gf, 21.71–23.47 oz)
Mica undercut (depth)	0.70 mm (0.03 in)

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<b>Fuel sender unit</b>	
Sender unit resistance (full)	12.0–14.0 $\Omega$
Sender unit resistance (empty)	118.0–122.0 $\Omega$

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<b>Fuel injection sensor</b>	
Crankshaft position sensor resistance	228–342 $\Omega$
Intake air temperature sensor resistance	5400–6600 $\Omega$ at 0 °C (5400–6600 $\Omega$ at 32 °F)
Intake air temperature sensor resistance	290–390 $\Omega$ at 80 °C (290–390 $\Omega$ at 176 °F)
Coolant temperature sensor resistance	2510–2780 $\Omega$ at 20 °C (2510–2780 $\Omega$ at 68 °F)
Coolant temperature sensor resistance	210–221 $\Omega$ at 100 °C (210–221 $\Omega$ at 212 °F)

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<b>Fuse(s)</b>	
Main fuse	30.0 A
Headlight fuse	10.0 A
Signaling system fuse	7.5 A
Ignition fuse	10.0 A
Parking lighting fuse	7.5 A
Radiator fan motor fuse	10.0 A
Fuel injection system fuse	10.0 A
ABS control unit fuse	7.5 A
ABS motor fuse	30.0 A
ABS solenoid fuse	20.0 A
Auxiliary fuse	2.0 A
Backup fuse	7.5 A



# TIGHTENING TORQUES

EAS20017

## TIGHTENING TORQUES

EAS30016

### ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe nut	M8	4	20 N·m (2.0 kgf·m, 15 lb·ft)	
Exhaust pipe bracket bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Muffler bolt	M10	1	47 N·m (4.7 kgf·m, 35 lb·ft)	
Muffler joint bolt	M8	1	20 N·m (2.0 kgf·m, 15 lb·ft)	
Muffler protector bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Spark plug	M10	2	13 N·m (1.3 kgf·m, 9.6 lb·ft)	
Cylinder head cover bolt	M6	4	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Generator rotor bolt	M12	1	70 N·m (7.0 kgf·m, 52 lb·ft)	
Generator cover bolt	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Generator cover bolt	M6	8	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Clutch boss nut	M20	1	95 N·m (9.5 kgf·m, 70 lb·ft)	Stake. 
Clutch spring bolt	M6	6	8 N·m (0.8 kgf·m, 5.9 lb·ft)	
Clutch cover bolt	M6	10	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Oil filter cartridge	M20	1	17 N·m (1.7 kgf·m, 13 lb·ft)	
Oil filter cartridge union bolt	M20	1	40 N·m (4.0 kgf·m, 30 lb·ft)	
Coolant drain bolt	M6	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Engine oil drain bolt	M14	1	43 N·m (4.3 kgf·m, 32 lb·ft)	

# TIGHTENING TORQUES

EAS30017

## CHASSIS TIGHTENING TORQUES

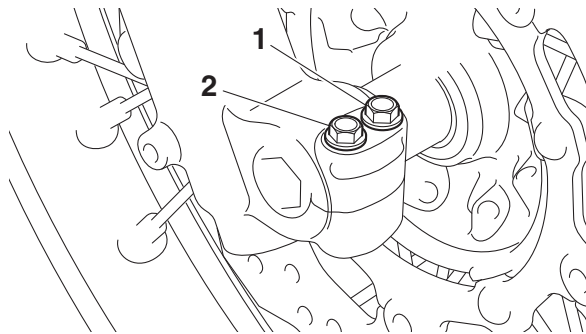
Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle	M18	1	72 N·m (7.2 kgf·m, 53 lb·ft)	
Front wheel axle pinch bolt	M8	2	21 N·m (2.1 kgf·m, 15 lb·ft)	See TIP.
Rear wheel sprocket nut	M10	1	80 N·m (8.0 kgf·m, 59 lb·ft)	
Rear wheel axle nut	M18	1	105 N·m (10.5 kgf·m, 77 lb·ft)	
Brake caliper bleed screw	M8	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Front brake caliper bolt	M10	4	40 N·m (4.0 kgf·m, 30 lb·ft)	
Upper handlebar holder bolt	M8	4	28 N·m (2.8 kgf·m, 21 lb·ft)	See TIP.
Lower handlebar holder nut	M10	2	32 N·m (3.2 kgf·m, 24 lb·ft)	
Clutch cable locknut	M8	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Lower bracket pinch bolt	M8	4	20 N·m (2.0 kgf·m, 15 lb·ft)	See TIP.
Upper bracket pinch bolt	M8	4	23 N·m (2.3 kgf·m, 17 lb·ft)	
Steering stem nut	M22	1	148 N·m (14.8 kgf·m, 110 lb·ft)	
Drive sprocket nut	M22	1	95 N·m (9.5 kgf·m, 70 lb·ft)	

### TIP

#### Front wheel axle pinch bolt

Tighten the pinch bolt to specification in order

Pinch bolt "1" → Pinch bolt "2" → Pinch bolt "1"





# TIGHTENING TORQUES

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## TIP

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### Upper handlebar holder bolt

1. Tighten the upper handlebar holder bolts less than 20 N·m (2.0 kgf·m, 15 lb·ft) temporarily.
  2. Tighten the upper handlebar holder bolt on the front side, and then on the rear side to specified torque.
- 

## TIP

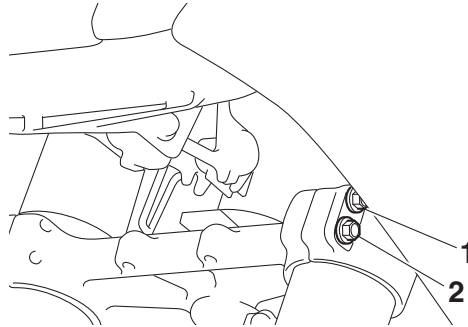
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### Lower bracket pinch bolt

Tighten the pinch bolt to specification in order

Pinch bolt “1” → Pinch bolt “2” → Pinch bolt “1” → Pinch bolt “2”

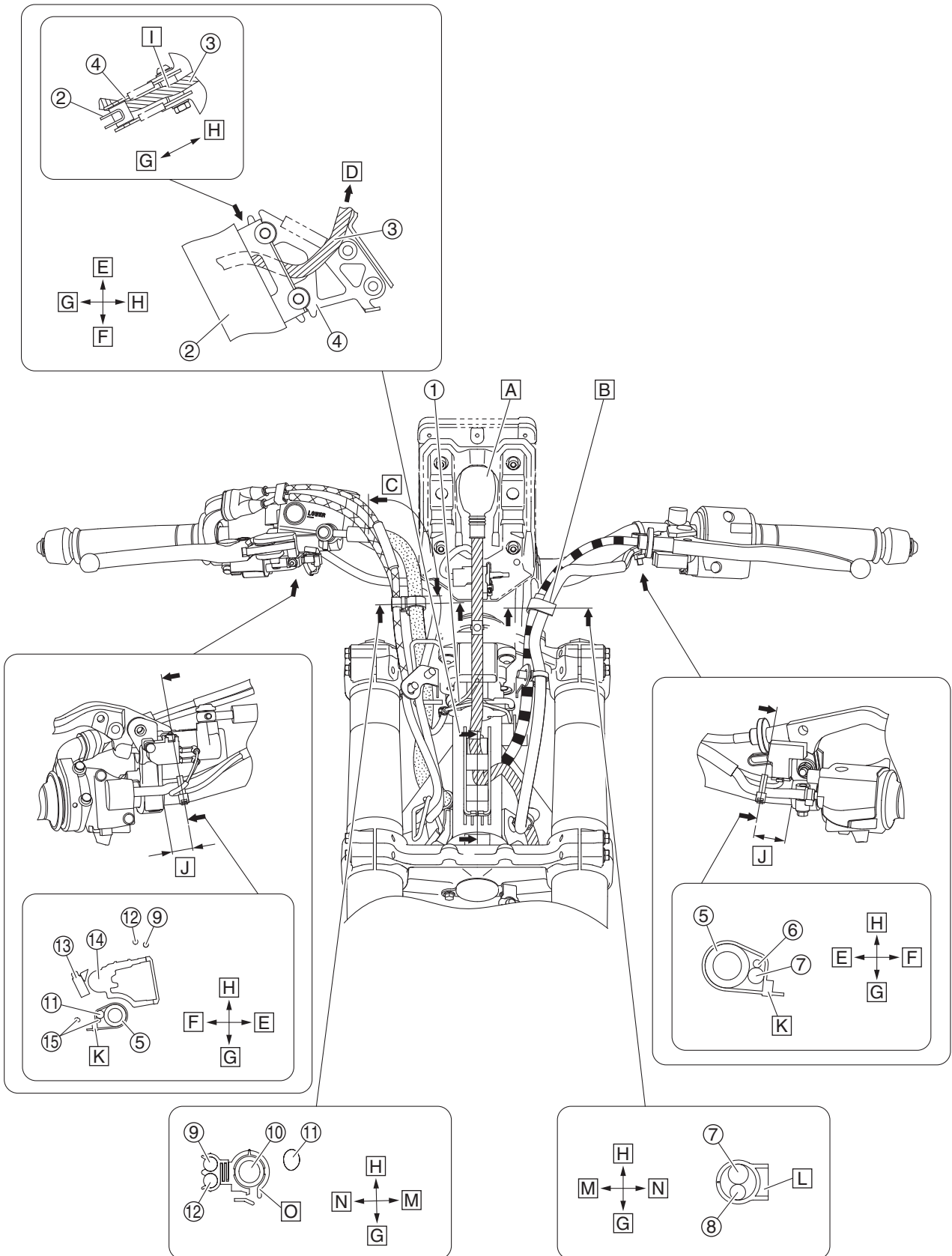
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EAS20021

## CABLE ROUTING

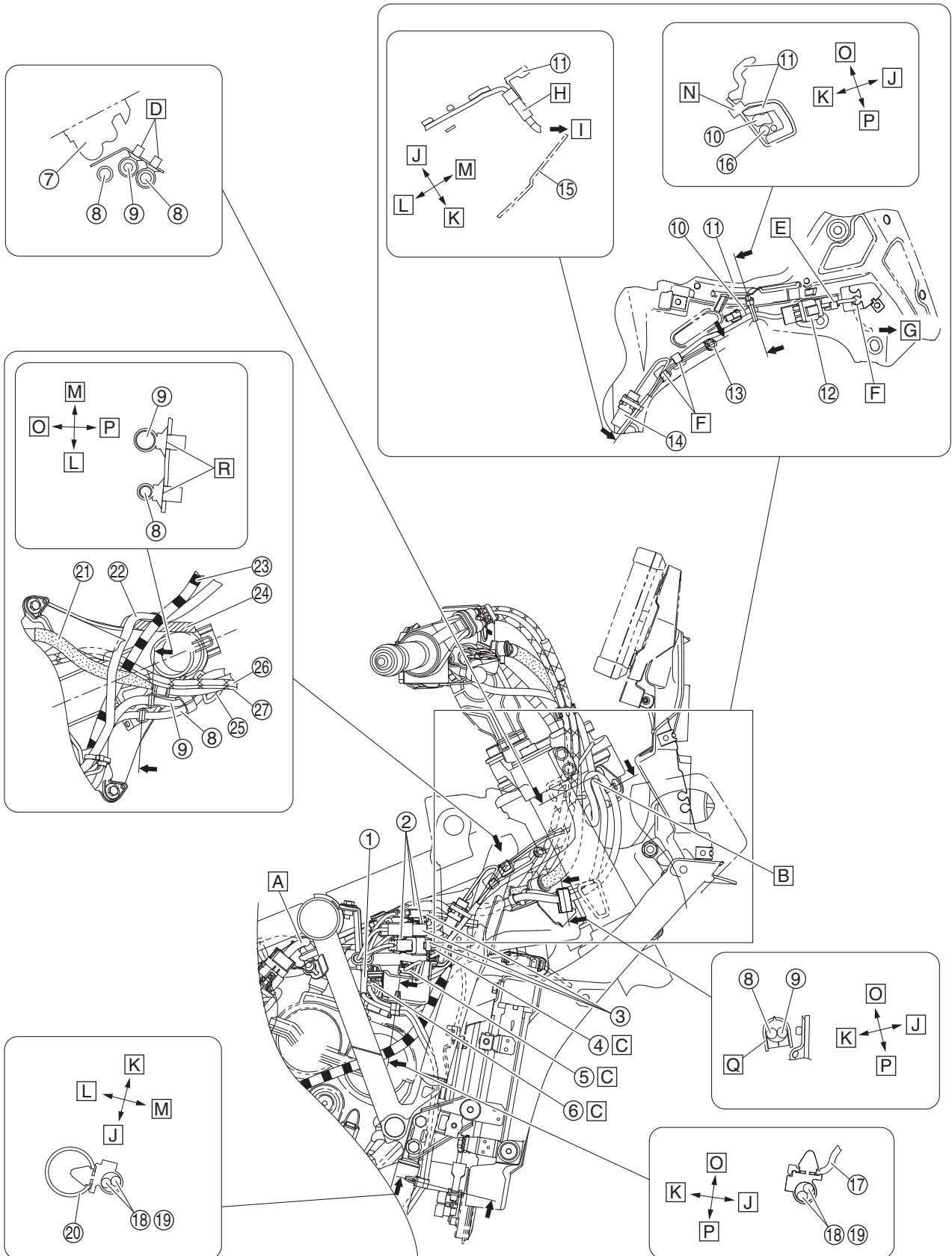
Handlebar (front view)



1. Main switch lead
2. Frame
3. Wire harness
4. Headlight stay
5. Handlebar
6. Clutch switch lead
7. Handlebar switch lead (left)
8. Clutch cable
9. Throttle cable (accelerator cable)
10. Brake hose (front brake master cylinder to hydraulic unit)
11. Handlebar switch lead (right)
12. Throttle cable (decelerator cable)
13. Front brake light switch
14. Front brake master cylinder assembly
15. Front brake light switch lead
- A. Install the connector cover completely till contact with the meter assembly.
- B. Fasten the left handlebar switch lead and clutch cable with the holder. Position the holder to the upper edge of the clutch cable protector.
- C. 90–100 mm (3.54–3.94 in)
- D. To meter assembly
- E. Upward
- F. Downward
- G. Rearward
- H. Forward
- I. Route the wire harness through the hole in the headlight stay.
- J. 15–25 mm (0.59–0.98 in)
- K. Face the buckle of the plastic locking tie downward with the end pointing downward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- L. Face the catch of the holder outward, and then engage the holder by at least three notches.
- M. Inward
- N. Outward
- O. Face the catch of the holder rearward, and then engage the holder.

# CABLE ROUTING

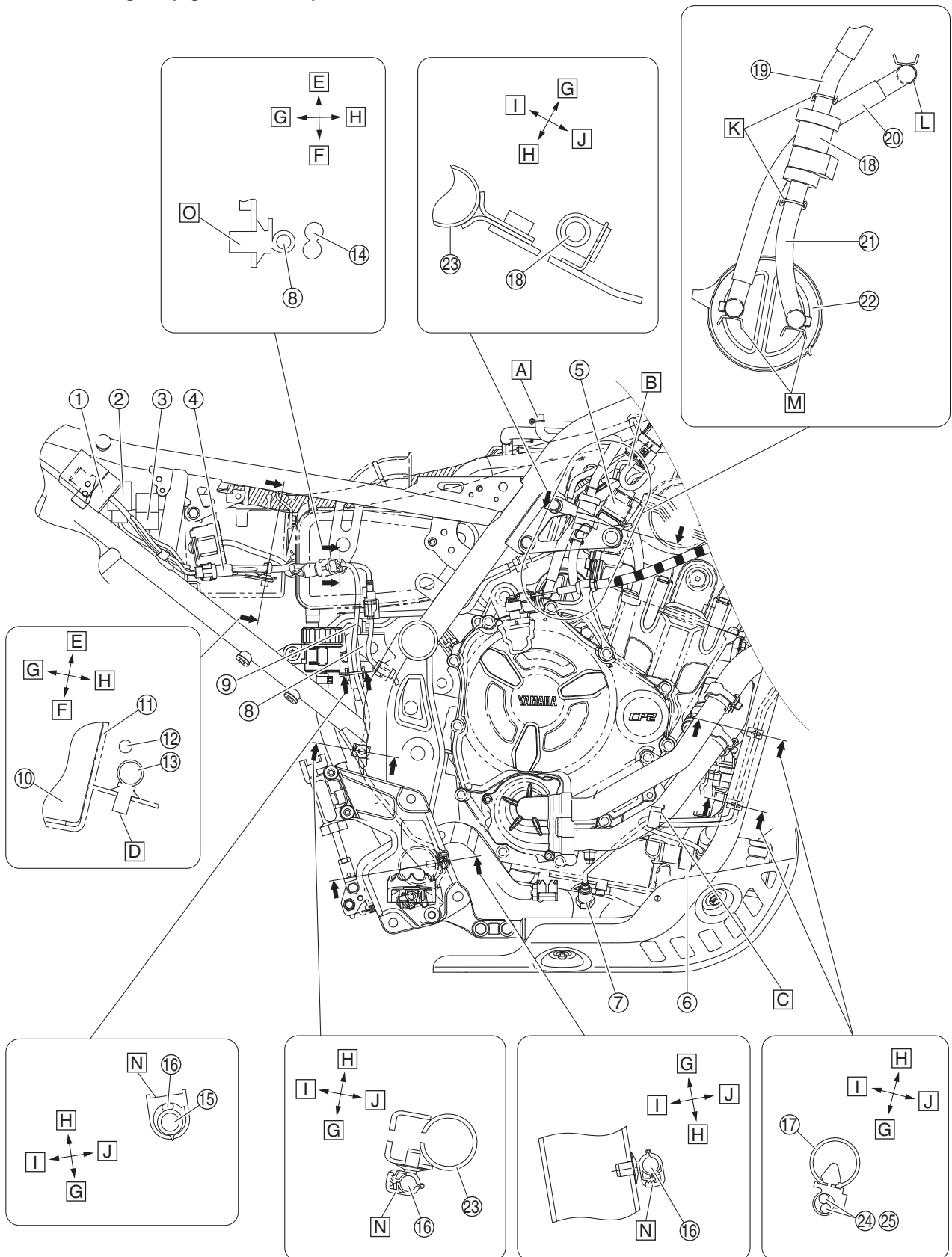
Frame (front right side view)



1. Oil temperature sensor connector
2. Handlebar switch coupler (right/left)
3. Main switch/immobilizer coupler
4. Radiator fan motor coupler
5. Front wheel sensor coupler
6. O<sub>2</sub> sensor coupler
7. Main switch
8. Main switch lead
9. Handlebar switch lead (right)
10. Auxiliary DC jack coupler (right)
11. Windshield inner panel (right)
12. Headlight coupler
13. Front turn signal light coupler (right)
14. Grip warmer coupler
15. Air scoop (right)
16. Headlight lead
17. Coupler holder
18. O<sub>2</sub> sensor lead
19. Oil pressure switch lead
20. Down tube
21. Brake hose (front brake master cylinder to hydraulic unit)
22. Handlebar switch lead (left)
23. Clutch cable
24. Wire harness
25. Cable guide
26. Throttle cable (accelerator cable)
27. Throttle cable (decelerator cable)
- A. Route the sub-wire harness over the rear brake hoses and under the frame.
- B. Route the main switch lead outside of the bracket.
- C. Insert the projection on the coupler into the hole in the coupler holder.
- D. Insert the projection on the handlebar switch lead and main switch lead into the hole in the bracket.
- E. Route the headlight lead through the guide on the right windshield inner panel.
- F. Route the headlight lead through the lower hole in the right windshield inner panel.
- G. To headlight
- H. Route the front turn signal light coupler through the hole in the right windshield inner panel, and then connect the coupler.
- I. To front turn signal light
- J. Inward
- K. Outward
- L. Rearward
- M. Forward
- N. Fasten the right auxiliary DC jack coupler and headlight lead with the plastic locking tie. Face the buckle of the plastic locking tie upward with the end pointing upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- O. Upward
- P. Downward
- Q. Face the catch of the holder downward, and then engage the holder at least three notches.
- R. Insert the projection on the lead holder into the hole in the frame.

# CABLE ROUTING

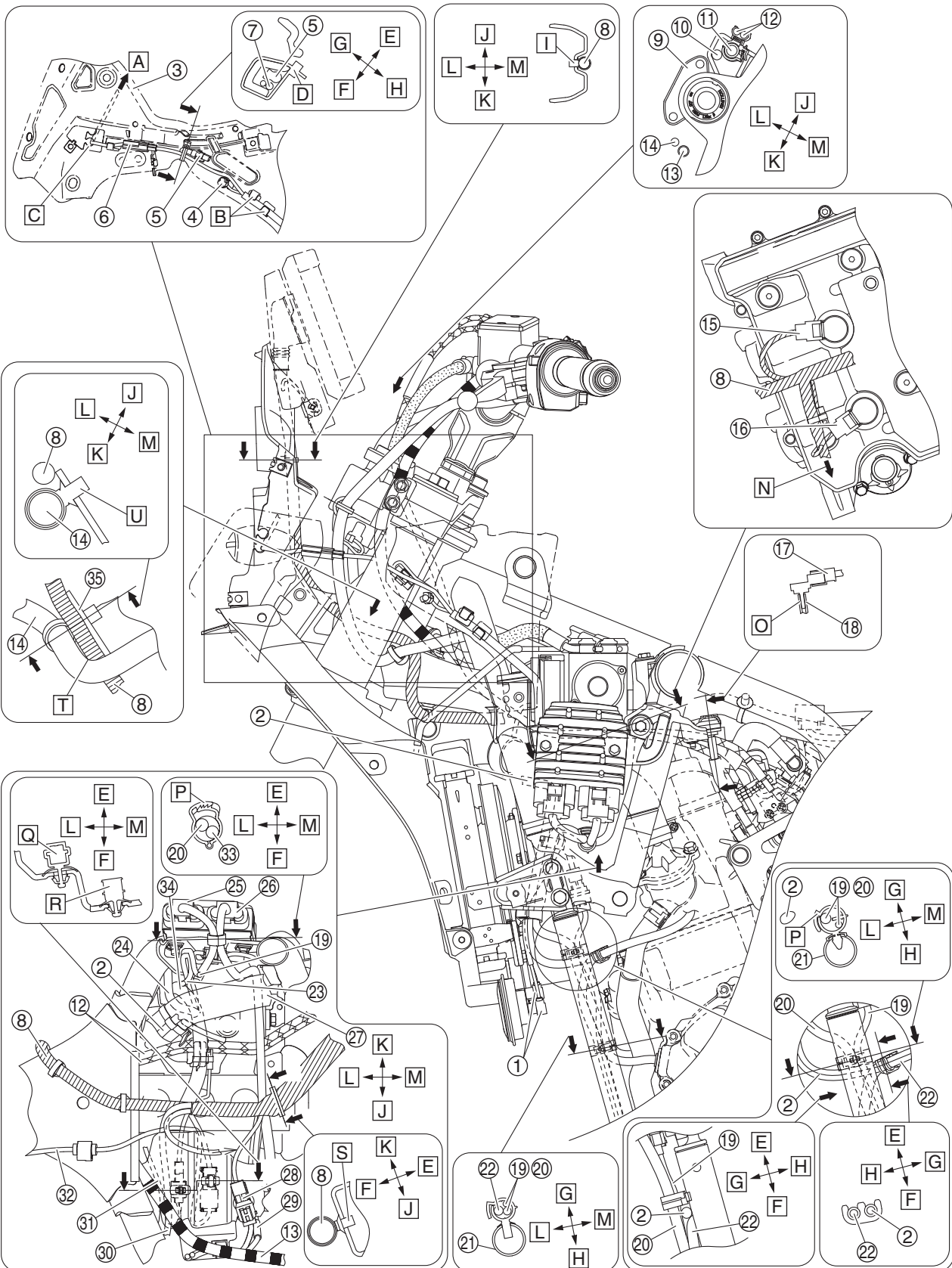
## Frame and engine (right side view)



1. Relay unit
  2. Turn signal relay
  3. Radiator fan motor relay
  4. Resistor coupler
  5. Throttle position sensor
  6. Oil pressure switch
  7. O<sub>2</sub> sensor
  8. Rear wheel sensor lead
  9. Rear brake light switch lead
  10. Battery
  11. Battery box
  12. Wire harness (to joint coupler)
  13. Wire harness (to relays)
  14. Rear brake light switch coupler
  15. Rear brake hose
  16. Rear brake light switch lead
  17. Down tube
  18. Rollover valve
  19. Fuel tank breather/overflow hose (fuel tank to rollover valve)
  20. Canister purge hose
  21. Fuel tank breather/overflow hose (rollover valve to canister)
  22. Canister
  23. Frame
  24. O<sub>2</sub> sensor lead
  25. Oil pressure switch lead
- A. Face the blue paint mark on the fuel tank breather hose outward.
  - B. Route the sub-wire harness above the rear brake pipes and under the frame.
  - C. Fasten the O<sub>2</sub> sensor lead and oil pressure switch lead with the holder on the engine.
  - D. Insert the projection on the wire harness holder into the hole in the battery box.
  - E. Upward
  - F. Downward
  - G. Inward
  - H. Outward
  - I. Rearward
  - J. Forward
  - K. Point the end of the hose clamp inward.
  - L. Point the end of the hose clamp upward.
  - M. Point the end of the hose clamp downward.
  - N. Engage the clamp by at least three notches.
  - O. Insert the projection on the wire harness holder into the hole in the frame.

# CABLE ROUTING

Frame (front left side view)





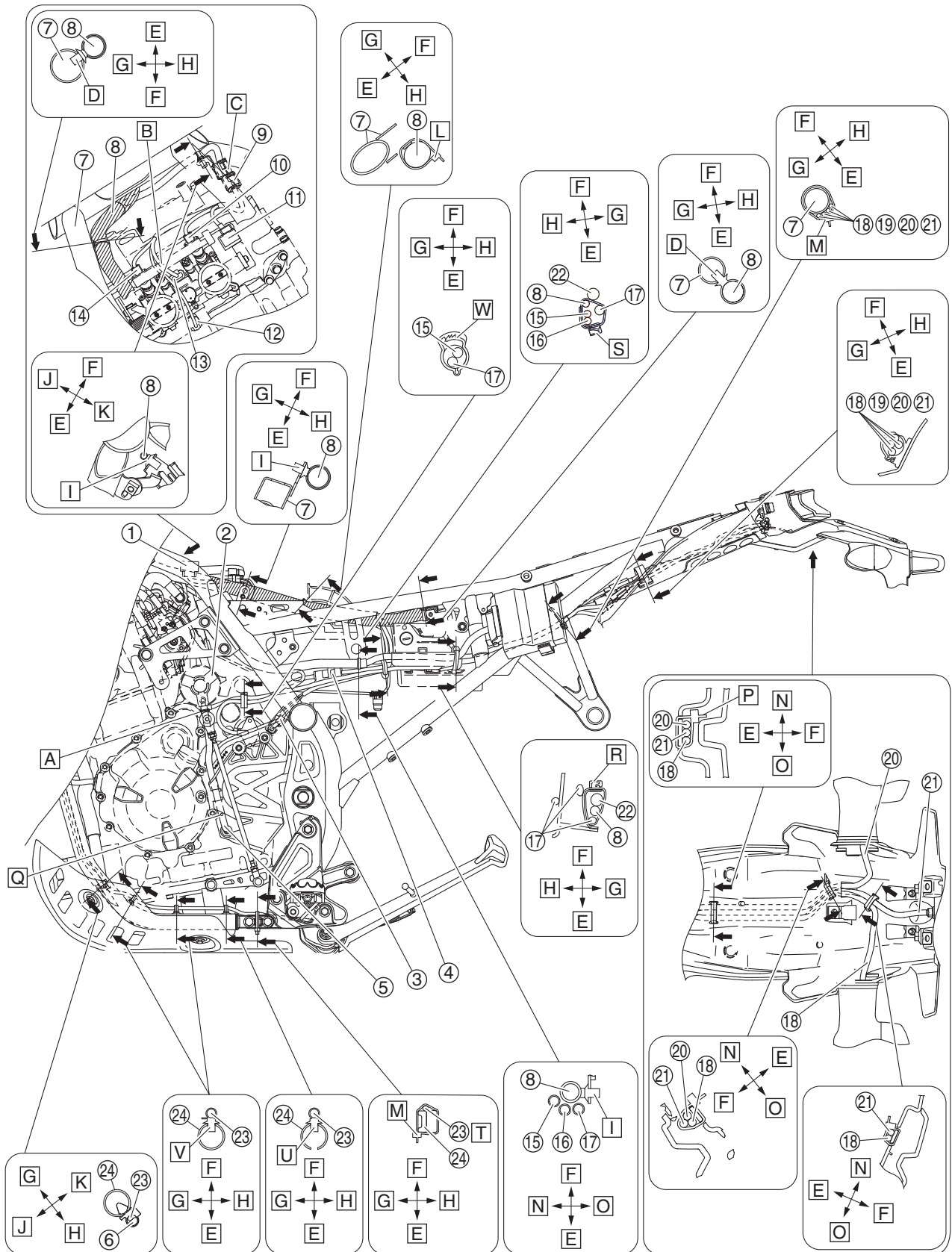
# CABLE ROUTING

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1. Horn connector
2. Coolant reservoir hose
3. Windshield inner panel (left)
4. Front turn signal light coupler (left)
5. Fog light coupler
6. Auxiliary DC jack coupler (left)
7. Auxiliary DC jack lead
8. Wire harness
9. Main switch
10. Handlebar switch lead (right)
11. Brake hose (front brake master cylinder to hydraulic unit)
12. Throttle cables
13. Clutch cable
14. Handlebar switch lead (left)
15. Ignition coil #2 coupler
16. Ignition coil #1 coupler
17. Intake air pressure sensor coupler
18. Intake air pressure sensor hose
19. Sidestand switch lead
20. Stator coil lead
21. Down tube
22. Coolant reservoir breather hose
23. Wire harness (to horn)
24. Wire harness (to front left turn signal light/auxiliary DC jack/fog light)
25. Stator coil coupler (gray)
26. Rectifier/regulator coupler (black)
27. Radiator inlet hose
28. O<sub>2</sub> sensor coupler
29. Oil pressure switch lead
30. Wire harness (to headlight/front left turn signal light/grip warmer)
31. Radiator fan motor lead
32. Front wheel sensor lead
33. Rectifier/regulator lead
34. Wire harness (to hydraulic unit)
35. Frame
  - A. To Auxiliary DC jack
  - B. Route the wire harness through the guide on the left windshield inner panel.
  - C. Route the auxiliary DC jack lead through the lower hole in the left windshield inner panel.
  - D. Fasten the fog light coupler and auxiliary DC jack lead with the plastic locking tie. Face the buckle of the plastic locking tie upward with the end pointing upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
  - E. Upward
  - F. Downward
  - G. Inward
  - H. Outward
  - I. Insert the projection on the wire harness holder into the hole in the headlight inner cover.
  - J. Right side
  - K. Left side
  - L. Forward
  - M. Rearward
  - N. To hydraulic unit
  - O. Install the intake air pressure sensor hose until it bottoms out the intake air pressure sensor.
  - P. Engage the clamp by at least three notches.
  - Q. Insert the projection on the radiator fan motor coupler into the hole in the coupler holder.
  - R. Insert the projection on the front wheel sensor coupler into the hole in the coupler holder.
  - S. Insert the projection on the wire harness holder into the hole in the frame.
  - T. Route the wire harness between the frame and the left handlebar switch lead.
  - U. Insert the projection on the holder into the hole in the frame.

# CABLE ROUTING

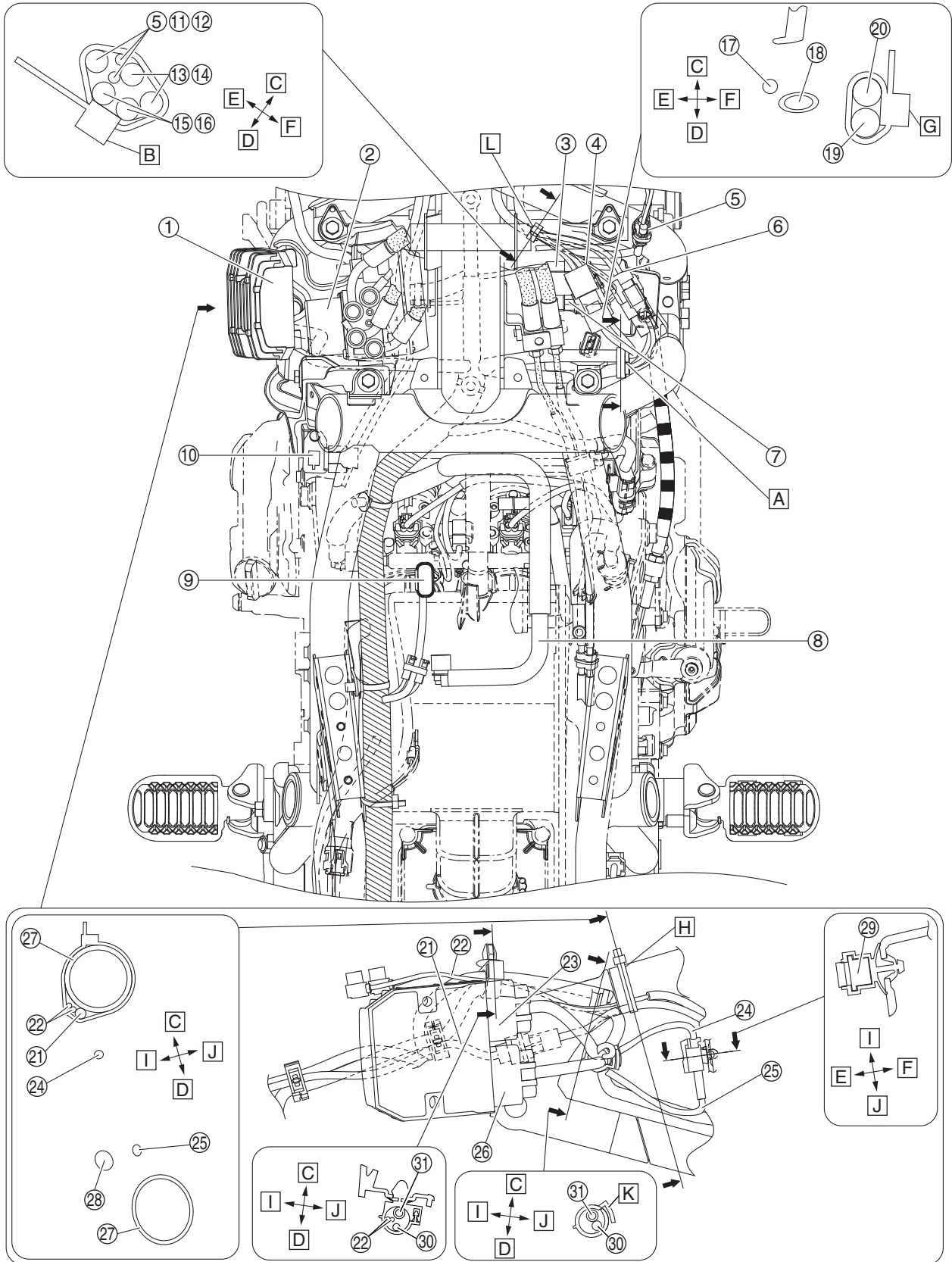
## Engine (left side view)



1. Fuel pump coupler
2. Canister
3. Engine ground lead terminal
4. Gear position switch coupler
5. Canister breather hose
6. Coolant reservoir breather hose
7. Frame
8. Wire harness
9. Sub-wire harness coupler
10. Fuel injector coupler (#2)
11. Throttle position sensor coupler
12. Coolant temperature sensor coupler
13. ISC (Idle Speed Control) unit coupler
14. Fuel injector coupler (#1)
15. Gear position switch lead
16. Engine ground lead
17. Starter motor lead
18. Rear turn signal light lead (right)
19. Tail/brake light lead
20. Rear turn signal light lead (left)
21. License plate light lead
22. ECU (Engine Control Unit) lead
23. Sidestand switch lead
24. Down tube
  - A. Point the ends of the hose clamp inward.
  - B. Route the ISC (Idle Speed Control) unit lead and coolant temperature sensor lead under the fuel rail.
  - C. Install the wire harness coupler onto the bracket.
  - D. Insert the projection on the wire harness holder into the hole in the frame.
    - E. Downward
    - F. Upward
    - G. Outward
    - H. Inward
  - I. Insert the projection on the wire harness holder into the hole in the bracket.
    - J. Forward
    - K. Rearward
  - L. Face the buckle of the plastic locking tie upward with the end pointing inward.
  - M. Face the buckle of the plastic locking tie downward with the end pointing downward.
  - N. Left side
  - O. Right side
  - P. Face the buckle of the plastic band inward.
  - Q. Face the paint mark of the canister breather hose outward.
  - R. Face the buckle of the plastic band upward with the end pointing inward. Do not cut off the excess end of the plastic band.
  - S. Face the buckle of the plastic band downward with the end pointing inward. Do not cut off the excess end of the plastic band.
  - T. Do not fasten the corrugate protector portion of the sidestand switch lead.
  - U. Insert the projection on the sidestand switch lead holder into the hole in the down tube.
- V. Insert the projection on the sidestand switch lead holder into the hole in the down tube. Point the end of the plastic band outward, and cut off the excess end of the tie. Cut off the excess end of the plastic locking tie.
- W. Engage the clamp by at least three notches.

# CABLE ROUTING

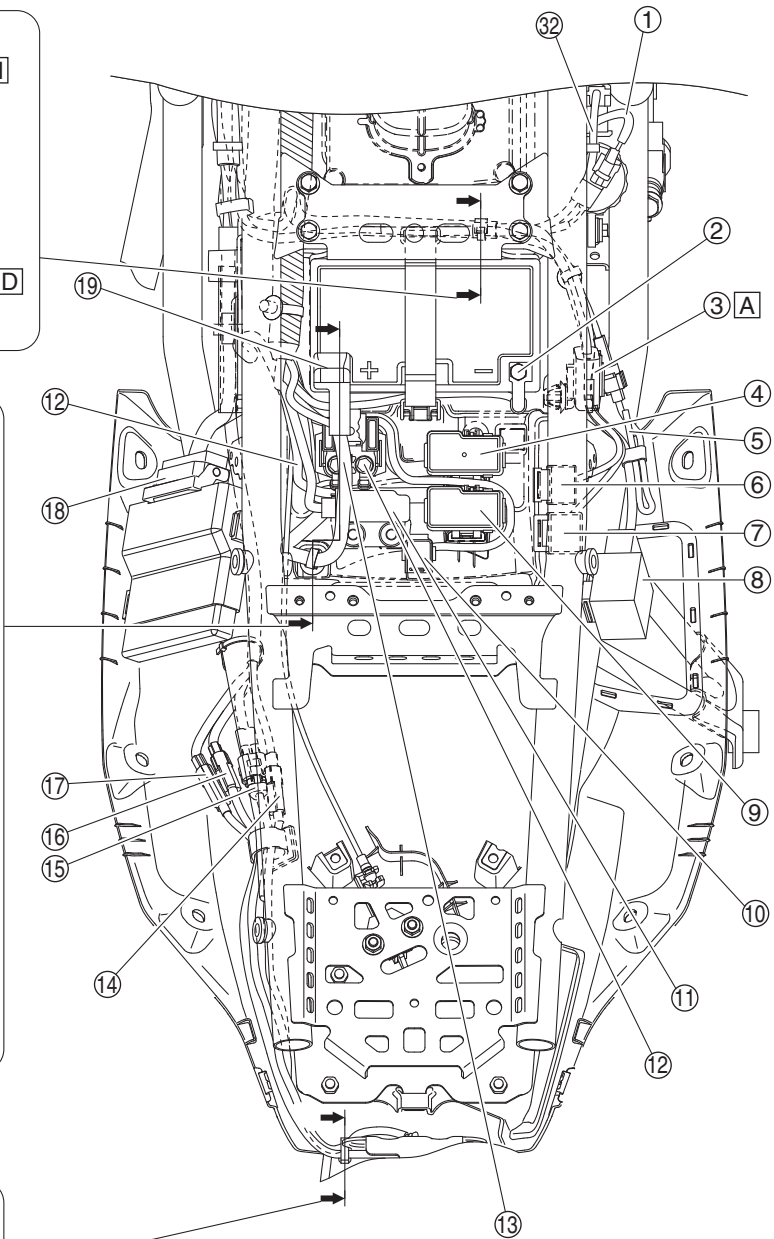
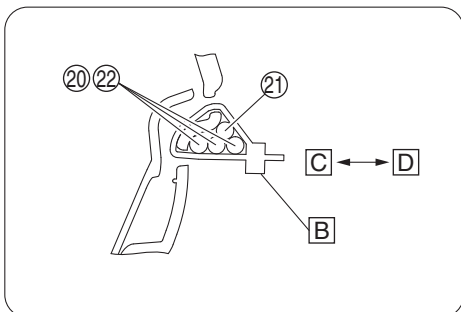
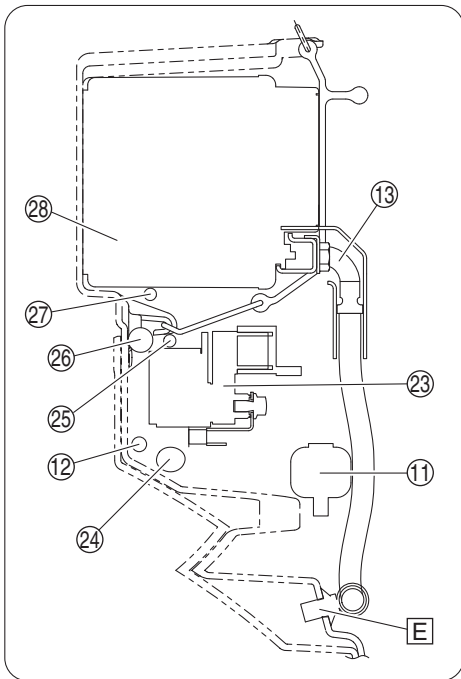
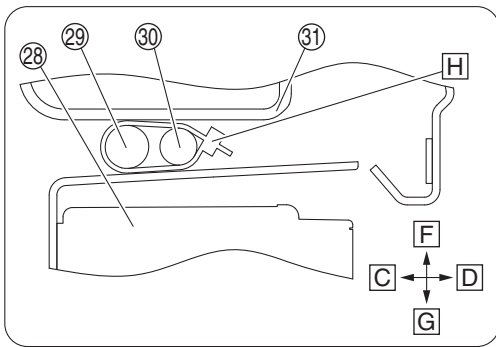
## Frame (top view)



1. Rectifier/regulator
  2. Hydraulic unit
  3. Radiator fan motor coupler
  4. Handlebar switch coupler (right /left)
  5. Wire harness (to headlight assembly)
  6. Main switch/immobilizer unit coupler
  7. Front wheel sensor coupler
  8. Fuel hose
  9. Fuel pump coupler
  10. Intake air pressure sensor
  11. Front wheel sensor lead
  12. Radiator fan motor lead
  13. Immobilizer unit lead
  14. Main switch lead
  15. Handlebar switch lead (left)
  16. Handlebar switch lead (right)
  17. O<sub>2</sub> sensor lead
  18. Oil pressure switch lead
  19. Main switch/immobilizer unit lead
  20. Handlebar switch lead (right/left)
  21. Sidestand switch lead
  22. Horn lead
  23. Stator coil coupler (gray)
  24. Crankshaft position sensor lead
  25. Wire harness (to crankshaft position sensor coupler)
  26. Rectifier/regulator coupler (black)
  27. Frame
  28. Rectifier/regulator lead
  29. Crankshaft position sensor coupler
  30. Stator coil lead
  31. Coolant reservoir hose
- A. Fasten the leads at the ends of wire harness protectors.
  - B. Face the buckle of the plastic band rearward with the end pointing downward. Do not cut off the excess end of the plastic band.
  - C. Forward
  - D. Rearward
  - E. Downward
  - F. Upward
  - G. Face the buckle of the plastic band upward with the end pointing forward. Do not cut off the excess end of the plastic band.
  - H. Position the plastic locking tie above the welded portion of the frame. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
  - I. Inward
  - J. Outward
  - K. Engage the clamp by at least three notches.
  - L. Fasten the leads at the ends of wire harness protectors before the gray tape. Do not fasten the leads at the naked portion of the leads.

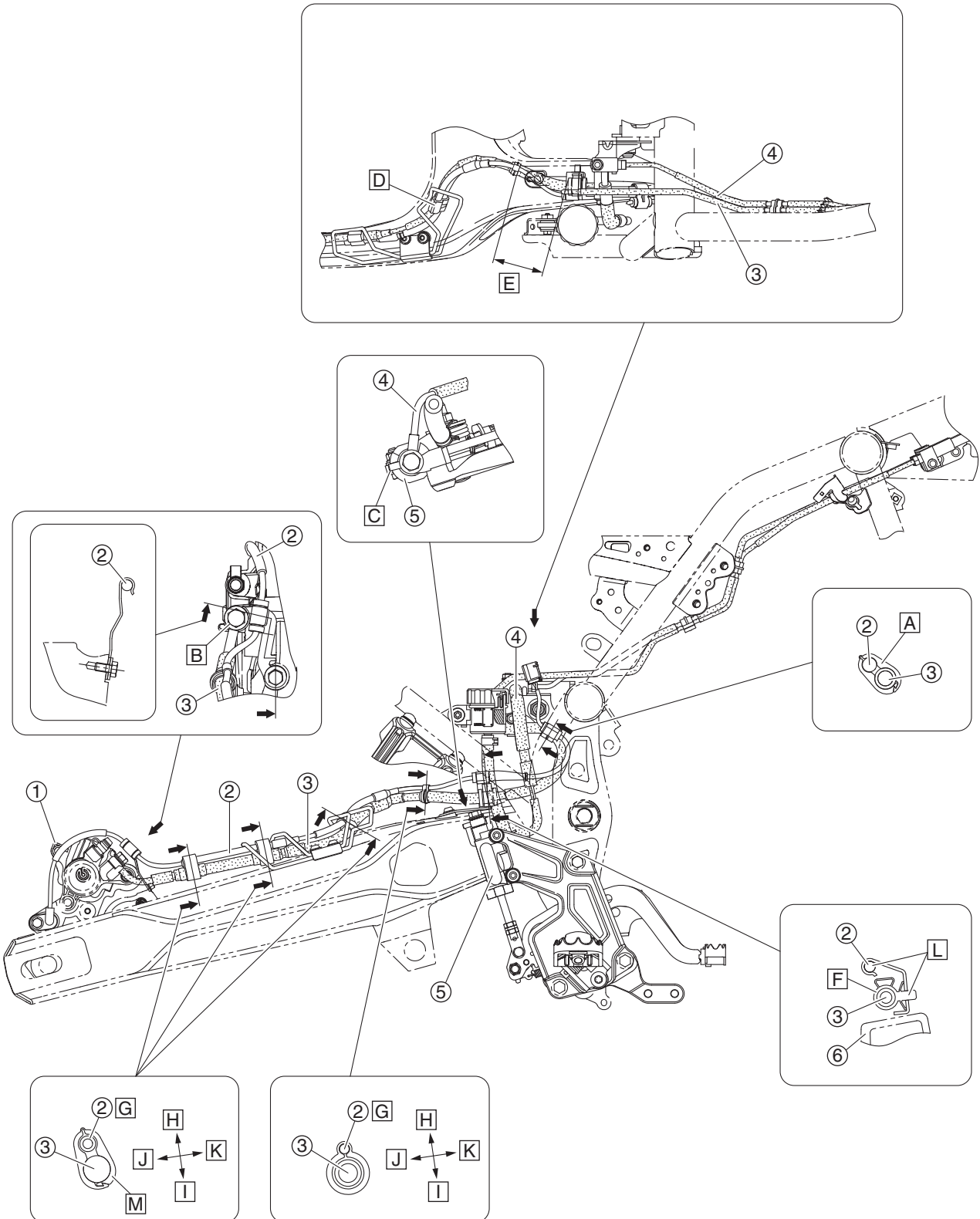
# CABLE ROUTING

## Battery and rear fender (top view)



1. Rear brake light switch lead
2. Negative battery terminal
3. Joint coupler
4. Fuse box 1
5. Resistor
6. Radiator fan motor relay
7. Turn signal/hazard relay
8. Relay unit
9. Fuse box 2
10. FI diagnostic tool connector
11. Lean angle sensor
12. Starter motor lead
13. Positive battery lead
14. Rear turn signal light coupler (right)
15. Tail/brake light coupler
16. Rear turn signal light coupler (left)
17. License plate light coupler
18. ECU (engine control unit) coupler
19. Positive battery terminal
20. Rear turn signal light lead (left/right)
21. License plate light lead
22. Tail/brake light lead
23. Starter relay
24. Fuse box 2 lead
25. FI diagnostic tool connector lead
26. Fuse box 1 lead
27. Negative battery lead
28. Battery
29. Wire harness (to joint coupler)
30. Wire harness (to relay unit)
31. Air filter case
32. Rear wheel sensor lead
  - A. Insert the projection on the joint coupler holder into the hole in the battery box.
  - B. Face the buckle of the plastic locking tie upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
  - C. Downward
  - D. Upward
  - E. Insert the projection on the lead holder into the hole in the battery box.
  - F. Forward
  - G. Rearward
  - H. Face the buckle of the plastic locking tie upward. Position the plastic locking tie to the edge of the label on the wire harness. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.

## Rear brake hose (right side view)

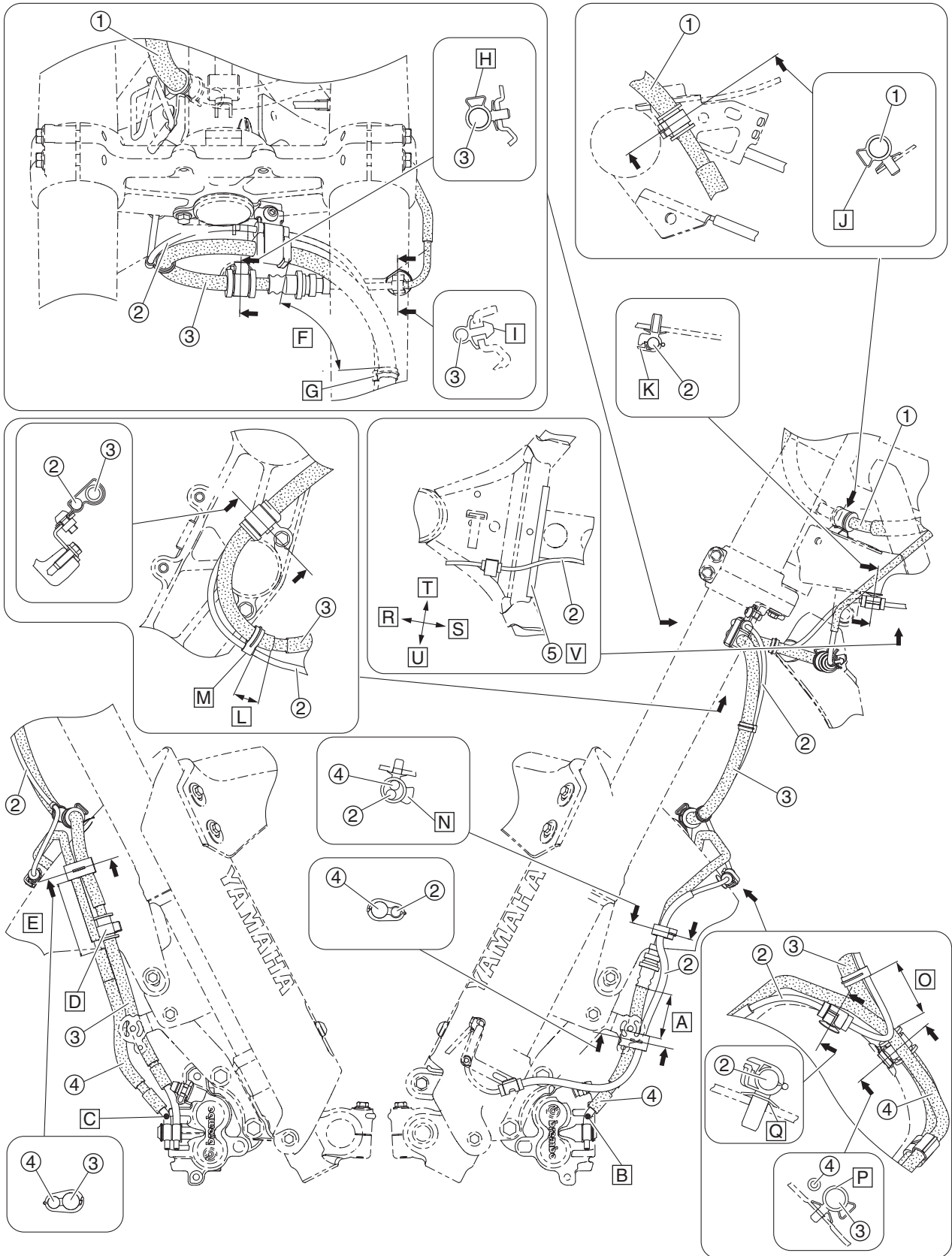




1. Rear brake caliper
2. Rear wheel sensor lead
3. Brake hose (hydraulic unit to rear brake caliper)
4. Brake hose (rear brake master cylinder to hydraulic unit)
5. Rear brake master cylinder
6. Swingarm
  - A. Fasten the brake hose (hydraulic unit to rear brake caliper) and rear wheel sensor lead with the clamp. Position the clamp where the distance between the end of the brake hose and the rear edge of the clamp is 5–15 mm (0.20–0.59 in).
  - B. Make sure that the pipe section of the brake hose contacts the stopper on the rear brake caliper.
  - C. Make sure that the pin of the brake hose contacts the stopper on the rear brake master cylinder.
  - D. Fasten the rear wheel sensor lead and the brake hose with the holder. Position the holder between the rear brake hose/lead guide wire.
  - E. Position the holder within the 50–70 mm (1.97–2.76 in) range from the grommet of the brake hose as shown in the illustration.
  - F. Face the catch of the holder upward.
  - G. Route the rear wheel sensor lead over the brake hose.
  - H. Upward
  - I. Downward
  - J. Inward
  - K. Outward
  - L. Install the grommet on the rear wheel sensor lead onto the bracket at first, and then install the brake hose holder.
  - M. Fasten the brake hose at the hose protector portion with the clamp.

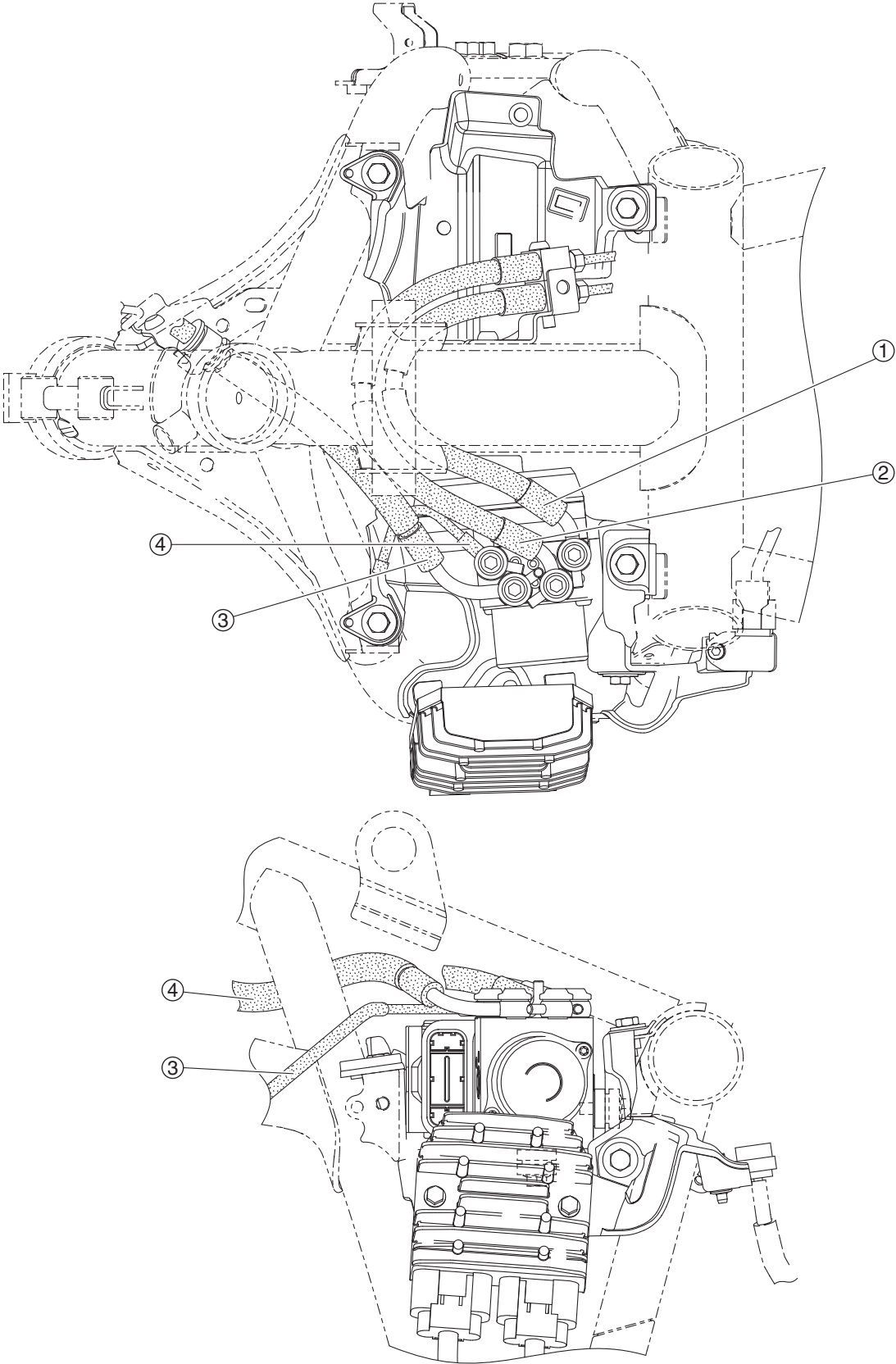
# CABLE ROUTING

## Front brake hose (left and right side view)



1. Brake hose (front brake master cylinder to hydraulic unit)
2. Front wheel sensor lead
3. Brake hose (hydraulic unit to right front brake caliper)
4. Brake hose (right front brake caliper to left front brake caliper)
5. Protector
  - A. 39–49 mm (1.54–1.93 in)
  - B. White paint mark
  - C. Yellow paint mark
  - D. Insert the holder into the hole in the fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
  - E. 69–79 mm (2.72–3.11 in)
  - F. 105–115°
  - G. Route the front wheel sensor lead to the rear of the brake hose and inward of vehicle.
  - H. Insert the holder into the hole in the radiator cover. Face the catch of the holder upward, and then close the holder until three clicks or more are heard.
  - I. Insert the holder into the hole in the radiator cover.
  - J. Insert the holder into the hole in the frame. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
  - K. Insert the holder into the hole in the frame. Face the catch of the holder outward, and then close the holder until three clicks or more are heard.
  - L. 5–15 mm (0.20–0.59 in)
  - M. Route the front wheel sensor lead to the outside of the brake hose.
  - N. Insert the holder into the hole in the front fender. Face the catch of the holder rearward, and then close the holder until three clicks or more are heard.
  - O. 36–46 mm (1.42–1.81 in)
  - P. Insert the holder into the hole in the front fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
  - Q. Insert the holder into the hole in the front fender.
  - R. Forward
  - S. Rearward
  - T. Left side
  - U. Right side
  - V. Install the protector at the right side of the frame as shown in the illustration.

**Hydraulic unit assembly (top and left side view)**

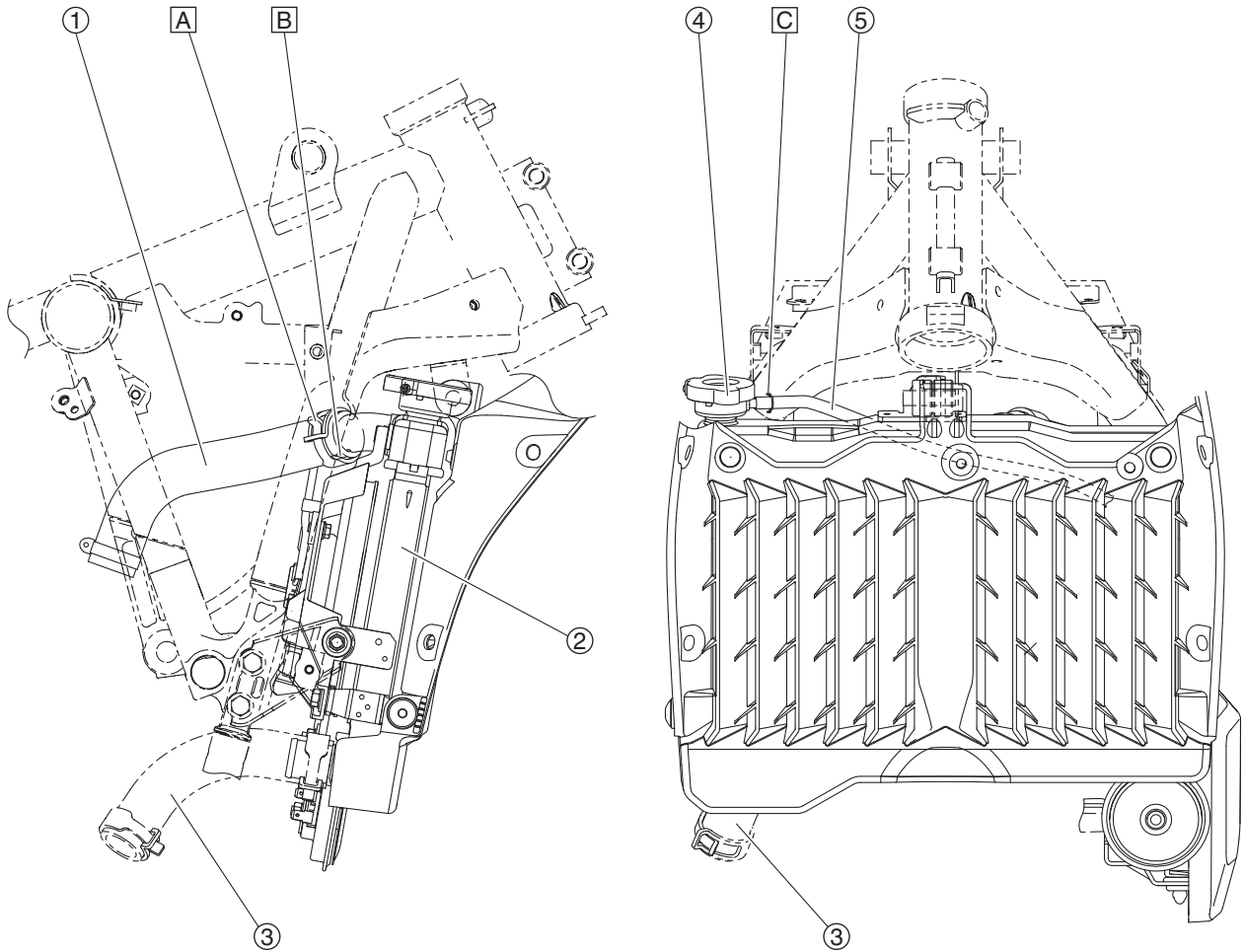


## CABLE ROUTING

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1. Brake hose (hydraulic unit to rear brake caliper)
2. Brake hose (rear brake master cylinder to hydraulic unit)
3. Brake hose (front brake master cylinder to hydraulic unit)
4. Brake hose (hydraulic unit to right front brake caliper)

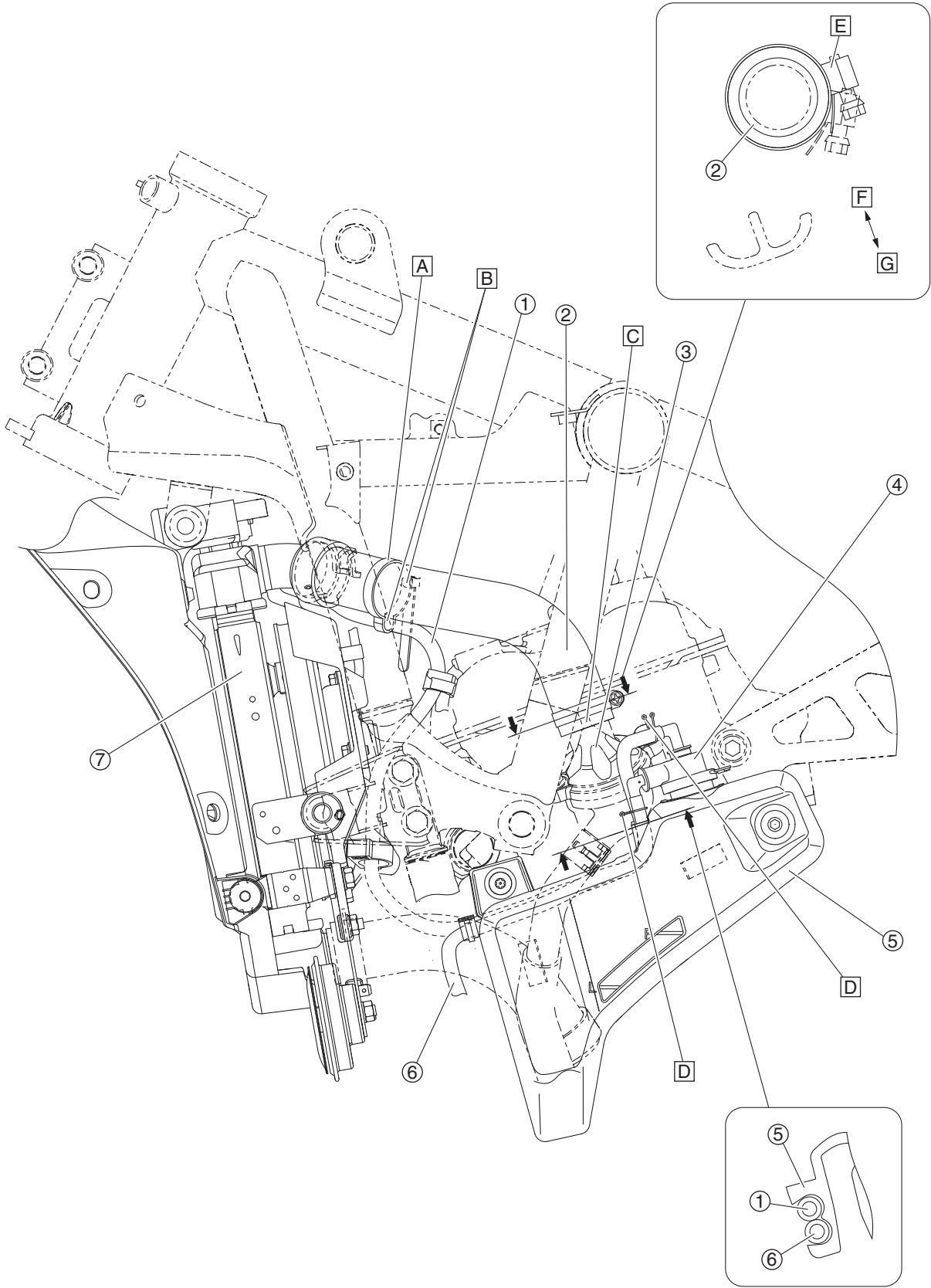
## Radiator (front and right side view)



1. Radiator inlet hose
  2. Radiator
  3. Radiator outlet hose
  4. Radiator cap
  5. Coolant reservoir hose
- A. Point the ends of the hose clamp inward. Make sure that the ends of the hose clamp do not contact the coolant reservoir hose. Position the hose clamp 3 mm (0.12 in) or more away from the end of the radiator inlet hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
  - B. Align the yellow paint mark on the radiator inlet hose with the projection on the radiator pipe. Install the radiator inlet hose onto the radiator pipe so that the hose contacts the projection on the pipe.
  - C. Point the ends of the hose clamp rearward. Position the hose clamp 3 mm (0.12 in) or more away from the end of the coolant reservoir hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.

# CABLE ROUTING

Radiator (left side view)





1. Coolant reservoir hose
  2. Radiator inlet hose
  3. Thermostat housing
  4. Coolant reservoir cap
  5. Coolant reservoir cover
  6. Coolant reservoir breather hose
  7. Radiator
- A. Fasten the coolant reservoir hose to the radiator inlet hose with the plastic locking tie. Position the coolant reservoir hose directly under the radiator inlet hose. Face the buckle of the plastic locking tie inward with the end pointing downward.
  - B. Fasten the radiator inlet hose and coolant reservoir hose at the white paint mark on each hose with the holder.
  - C. Align the white paint mark on the radiator inlet hose with the projection on the thermostat housing. Install the radiator inlet hose onto the thermostat housing so that the hose contacts the projection on the housing.
  - D. Point the ends of the hose clamp in the direction shown in the illustration. Position the hose clamp 3 mm (0.12 in) or more away from the end of the hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
  - E. Position the clamp screw is free.
  - F. Inward
  - G. Outward



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# PERIODIC MAINTENANCE

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

- Items marked with an asterisk should be performed by your Yamaha dealer because these items require special tools, data, and technical skills.
- From 50000 km (30000 mi), repeat the maintenance intervals starting from 10000 km (6000 mi).
- **The annual checks must be performed every year, except if a distance-based maintenance is performed instead.**

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
			1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
1	* Fuel line	<ul style="list-style-type: none"> <li>• Check fuel hoses for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>		√	√	√	√	√
2	* Spark plugs	<ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Adjust gap and clean.</li> </ul>		√		√		
		<ul style="list-style-type: none"> <li>• Replace.</li> </ul>			√		√	
3	* Valve clearance	<ul style="list-style-type: none"> <li>• Check and adjust.</li> </ul>	Every 40000 km (24000 mi)					
4	* Fuel injection	<ul style="list-style-type: none"> <li>• Check engine idle speed.</li> </ul>	√	√	√	√	√	√
		<ul style="list-style-type: none"> <li>• Check and adjust synchronization.</li> </ul>		√	√	√	√	√
5	* Exhaust system	<ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Tighten if necessary.</li> <li>• Replace gaskets if necessary.</li> </ul>	√	√	√	√	√	
6	* Evaporative emission control system	<ul style="list-style-type: none"> <li>• Check control system for damage.</li> <li>• Replace if necessary.</li> </ul>			√		√	

EAS30615

### GENERAL MAINTENANCE AND LUBRICATION CHART

#### TIP

- Items marked with an asterisk should be performed by your Yamaha dealer because these items require special tools, data, and technical skills.
- From 50000 km (30000 mi), repeat the maintenance intervals starting from 10000 km (6000 mi).
- **The annual checks must be performed every year, except if a distance-based maintenance is performed instead.**

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
			1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
1	* Diagnostic system check	<ul style="list-style-type: none"> <li>• Perform dynamic inspection using Yamaha diagnostic tool.</li> <li>• Check the fault codes.</li> </ul>	√	√	√	√	√	√
2	* Air filter element	<ul style="list-style-type: none"> <li>• Replace.</li> </ul>			√		√	
3	Air filter case check hose	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	√	√	√	√	√	

# PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
			1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
4	Clutch	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust.</li> </ul>	√	√	√	√	√	
5 *	Front brake	<ul style="list-style-type: none"> <li>• Check operation, fluid level, and for fluid leakage.</li> <li>• Replace brake pads if necessary.</li> </ul>	√	√	√	√	√	√
6 *	Rear brake	<ul style="list-style-type: none"> <li>• Check operation, fluid level, and for fluid leakage.</li> <li>• Replace brake pads if necessary.</li> </ul>	√	√	√	√	√	√
7 *	Brake hoses	<ul style="list-style-type: none"> <li>• Check for cracks or damage.</li> </ul>		√	√	√	√	√
		<ul style="list-style-type: none"> <li>• Replace.</li> </ul>	Every 4 years					
8 *	Brake fluid	<ul style="list-style-type: none"> <li>• Change.</li> </ul>	Every 2 years					
9 *	Wheels	<ul style="list-style-type: none"> <li>• Check runout, spoke tightness and for damage.</li> <li>• Tighten spokes if necessary.</li> </ul>	√	√	√	√	√	
10 *	Tires	<ul style="list-style-type: none"> <li>• Check tread depth and for damage.</li> <li>• Replace if necessary.</li> <li>• Check air pressure.</li> <li>• Correct if necessary.</li> </ul>		√	√	√	√	√
11 *	Wheel bearings	<ul style="list-style-type: none"> <li>• Check bearing for looseness or damage.</li> </ul>		√	√	√	√	
12 *	Swingarm pivot bearings	<ul style="list-style-type: none"> <li>• Check operation and for excessive play.</li> </ul>		√	√	√	√	
		<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>	Every 50000 km (30000 mi)					
13	Drive chain	<ul style="list-style-type: none"> <li>• Check chain slack, alignment and condition.</li> <li>• Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.</li> </ul>	Every 1000 km (600 mi) and after washing the motorcycle, riding in the rain or riding in wet areas					
14 *	Steering bearings	<ul style="list-style-type: none"> <li>• Check bearing assemblies for looseness.</li> </ul>	√	√		√		
		<ul style="list-style-type: none"> <li>• Moderately repack with lithium-soap-based grease.</li> </ul>			√		√	
15 *	Chassis fasteners	<ul style="list-style-type: none"> <li>• Make sure that all nuts, bolts and screws are properly tightened.</li> </ul>		√	√	√	√	√
16	Brake lever pivot shaft	<ul style="list-style-type: none"> <li>• Lubricate with silicone grease.</li> </ul>		√	√	√	√	√
17	Brake pedal pivot shaft	<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
18	Clutch lever pivot shaft	<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
19	Shift pedal pivot shaft	<ul style="list-style-type: none"> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
20	Sidestand	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Lubricate with lithium-soap-based grease.</li> </ul>		√	√	√	√	√
21 *	Sidestand switch	<ul style="list-style-type: none"> <li>• Check operation and replace if necessary.</li> </ul>	√	√	√	√	√	√
22 *	Front fork	<ul style="list-style-type: none"> <li>• Check operation and for oil leakage.</li> <li>• Replace if necessary.</li> </ul>		√	√	√	√	
23 *	Shock absorber assembly	<ul style="list-style-type: none"> <li>• Check operation and for oil leakage.</li> <li>• Replace if necessary.</li> </ul>		√	√	√	√	
24 *	Rear suspension relay arm and connecting arm pivoting points	<ul style="list-style-type: none"> <li>• Check operation.</li> </ul>		√	√	√	√	

## PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
			1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
25	Engine oil	<ul style="list-style-type: none"> <li>Change (warm engine before draining).</li> <li>Check oil level and vehicle for oil leakage.</li> </ul>	√	√	√	√	√	√
26	Engine oil filter cartridge	<ul style="list-style-type: none"> <li>Replace.</li> </ul>	√		√		√	
27 *	Cooling system	<ul style="list-style-type: none"> <li>Check coolant level and vehicle for coolant leakage.</li> </ul>		√	√	√	√	√
		<ul style="list-style-type: none"> <li>Change.</li> </ul>	Every 3 years					
28 *	Front and rear brake switches	<ul style="list-style-type: none"> <li>Check operation.</li> </ul>	√	√	√	√	√	√
29 *	Moving parts and cables	<ul style="list-style-type: none"> <li>Lubricate.</li> </ul>		√	√	√	√	√
30 *	Throttle grip housing and cable	<ul style="list-style-type: none"> <li>Check operation and free play.</li> <li>Adjust the throttle cable free play if necessary.</li> <li>Lubricate the throttle grip housing and cable.</li> </ul>		√	√	√	√	√
31 *	Lights, signals and switches	<ul style="list-style-type: none"> <li>Check operation.</li> <li>Adjust headlight beam.</li> </ul>	√	√	√	√	√	√

### TIP

- Air filter
  - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
  - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
  - Regularly check and, if necessary, correct the brake fluid level.
  - Every two years replace the internal components of the brake master cylinders 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.



**Yamaha diagnostic tool USB**  
90890-03267  
**Yamaha diagnostic tool (A/I)**  
90890-03262

Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-34.

3. Check:
  - Fault codes (fuel injection system and ABS)

### 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 8-34 and "[B-2] DIAGNOSIS USING THE FAULT CODES" on page 8-104.

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.

EAS30619

## CHECKING THE FUEL LINE

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

- Air scoops
  - Air ducts
  - Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
2. Remove:
    - Rear fuel tank mounting bracket bolts "1"
    - Quick fasteners "2"

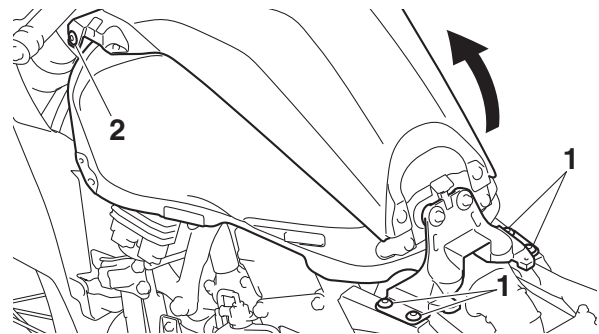
### TIP

After removing the rear fuel tank mounting bracket bolts and quick fasteners, lift up the rear of the fuel tank.

ECA23360

### NOTICE

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

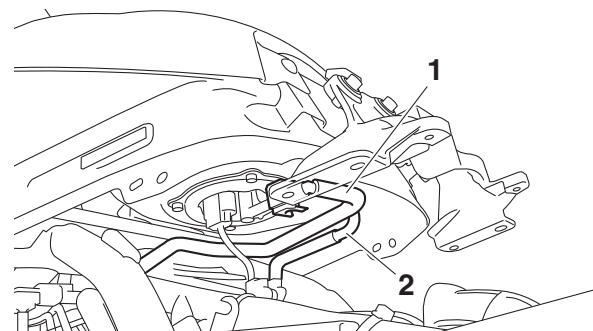


3. Check:
  - Fuel hose "1"
  - Fuel tank breather/overflow hose "2"  
Cracks/damage → Replace.  
Loose connection → Connect properly.

ECA16950

### NOTICE

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



4. Install:
  - Rear fuel tank mounting bracket bolts
  - Quick fasteners



**Rear fuel tank bracket bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

# PERIODIC MAINTENANCE

## 5. Install:

- Fuel tank side covers
- Air ducts
- Air scoops  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30620

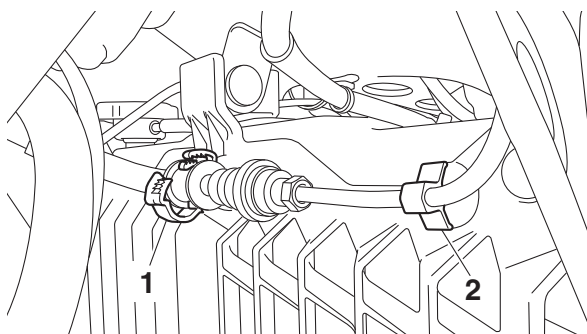
## CHECKING THE SPARK PLUGS

### 1. Remove:

- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Fuel tank  
Refer to "FUEL TANK" on page 7-1.
- Windshield inner panel (left)  
Refer to "GENERAL CHASSIS (4)" on page 4-8.
- Rectifier/regulator  
Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### 2. Remove:

- Brake hose  
(from the holder "1")
- Holder "2"  
(from the radiator cover)

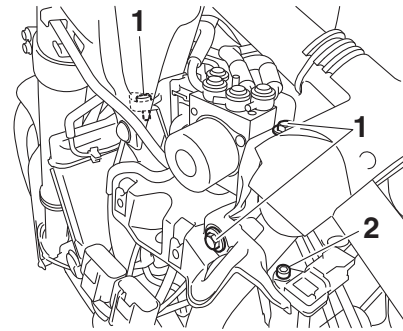


### 3. Remove:

- Hydraulic unit bracket bolts "1"
- Intake air pressure sensor bolt "2"

### TIP

Remove the hydraulic unit assembly bracket bolts "1" and intake air pressure sensor bolt "2". Then, move the hydraulic unit assembly together with the bracket to the left.

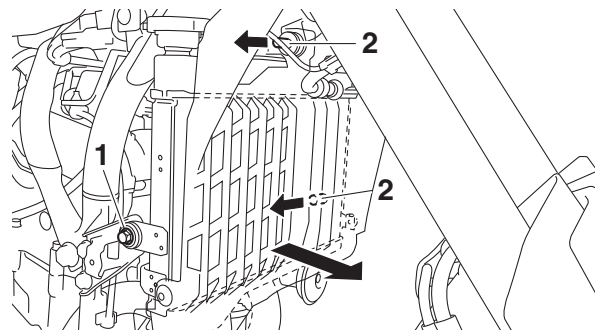


### 4. Remove:

- Radiator bolt "1"

### TIP

Remove the radiator bolt "1", and then move the radiator to the right to remove it from the projections "2". Then, move the radiator forward.

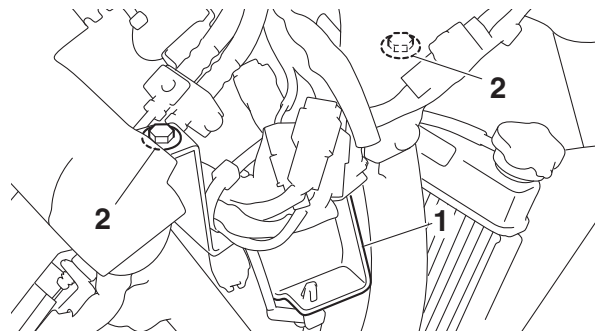


### 5. Remove:

- Coupler holder "1"

### TIP

Disconnect all of the couplers installed to the coupler holder and the couplers above the coupler holder, and then remove the coupler holder bolts "2" and coupler holder.



### 6. Remove:

- Ignition coils
- Spark plugs

# PERIODIC MAINTENANCE

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.

### 7. Check:

- Spark plug type  
Incorrect → Change.



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

### 8. Check:

- Electrode "1"  
Damage/wear → Replace the spark plug.
- Insulator "2"  
Abnormal color → Replace the spark plug.  
Normal color is medium-to-light tan.

### 9. Clean:

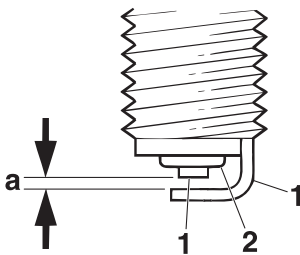
- Spark plug  
(with a spark plug cleaner or wire brush)

### 10. Measure:

- Spark plug gap "a"  
(with a wire thickness gauge)  
Out of specification → Regap.



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



G088879

### 11. Install:

- Spark plugs
- Ignition coils



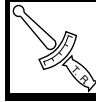
**Spark plug**  
**13 N·m (1.3 kgf·m, 9.6 lb·ft)**

### TIP

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

### 12. Install:

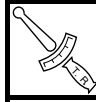
- Coupler holder



**Coupler holder bolt**  
**7 N·m (0.7 kgf·m, 5.2 lb·ft)**

### 13. Install:

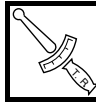
- Intake air pressure sensor bolt
- Hydraulic unit bracket bolts



**Hydraulic unit bracket bolt**  
**7 N·m (0.7 kgf·m, 5.2 lb·ft)**  
**Intake air pressure sensor bolt**  
**3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

### 14. Install:

- Radiator bolt
- Holder  
(to the radiator cover)
- Brake hose  
(to the holder)



**Radiator bolt**  
**7 N·m (0.7 kgf·m, 5.2 lb·ft)**

### 15. Install:

- Rectifier/regulator  
Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.
- Windshield inner panel (left)  
Refer to "GENERAL CHASSIS (4)" on page 4-8.
- Fuel tank  
Refer to "FUEL TANK" on page 7-1.
- Fuel tank side covers
- Air ducts
- Air scoops  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30622

## ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

### TIP


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

### 1. Drain:

- Coolant  
Refer to "CHANGING THE COOLANT" on page 3-27.

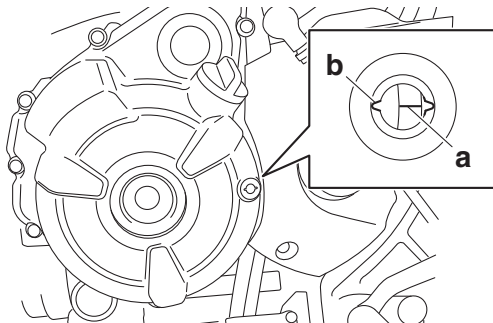
# PERIODIC MAINTENANCE

2. Remove:
  - Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Air scoops
  - Air ducts
  - Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Radiator  
Refer to "RADIATOR" on page 6-2.
  - Clutch cable guide  
Refer to "ENGINE REMOVAL" on page 5-3.
3. Remove:
  - Cylinder head cover  
Refer to "CAMSHAFTS" on page 5-10.
4. Remove:
  - Timing mark accessing bolt
  - Crankshaft end cover  
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.
5. Measure:
  - Valve clearance  
Out of specification → Adjust.



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

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



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

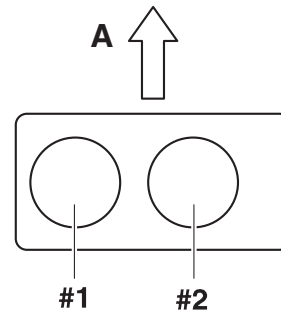


**Thickness gauge**  
 90890-03268  
**Feeler gauge set**  
 YU-26900-9

**TIP** \_\_\_\_\_

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

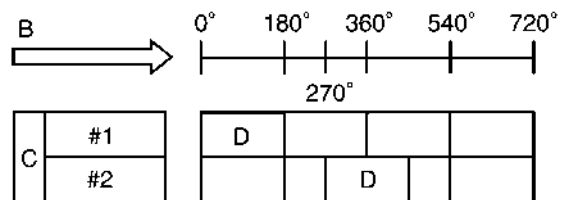
**Valve clearance measuring sequence**  
**Cylinder #1 → #2**



G088881

A. Front

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



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

6. Remove:
  - Camshaft

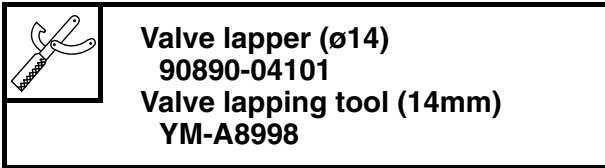
**TIP** \_\_\_\_\_

- Refer to "CAMSHAFTS" on page 5-10.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

## PERIODIC MAINTENANCE

### 7. Adjust:

- Valve clearance
  - a. Remove the valve lifter and the valve pad with a valve lapper.



#### 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 and valve pad so that they can be installed in the correct place.

- b. Calculate the difference between the specified valve clearance and the measured valve clearance.

Example:

Specified valve clearance = 0.11–0.20 mm (0.0043–0.0079 in)

Measured valve clearance = 0.25 mm (0.0098 in)

0.25 mm (0.0098 in)–0.20 mm (0.0079 in) = 0.05 mm (0.0020 in)

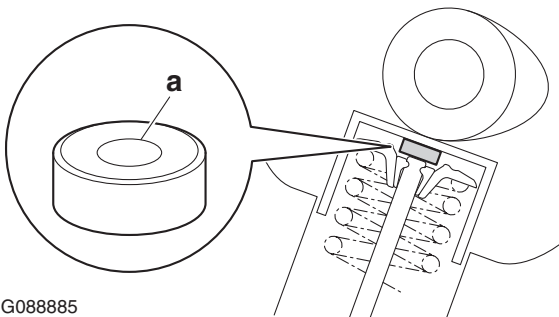
- c. Check the thickness of the current valve pad.

#### TIP

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

Example:

If the valve pad is marked “158”, the pad thickness is 1.58 mm (0.0622 in).



G088885

- d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.

Example:

1.58 mm (0.0622 in) + 0.05 mm (0.0020 in) = 1.63 mm (0.0641 in)

The valve pad number is 163.

- e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

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

#### TIP

Refer to the following table for the available valve pads.

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

Example:

Valve pad number = 163

Rounded value = 165

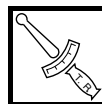
New valve pad number = 165

- f. Install the new valve pad and the valve lifter.

#### TIP

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

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



**Exhaust camshaft cap bolt  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
Intake camshaft cap bolt  
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

#### TIP

- Refer to “CAMSHAFTS” on page 5-10.
- Lubricate the camshaft lobes and camshaft journals with molybdenum disulfide oil.
- First, install the exhaust camshaft.
- Align the camshafts sprocket marks with the cylinder head edge.

# PERIODIC MAINTENANCE

- Turn the crankshaft counterclockwise several full turns to seat the parts.

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

## 8. Install:

- All removed parts

### TIP

For installation, reverse the removal procedure.

EAS31017

## CHECKING THE ENGINE IDLING SPEED

### TIP

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

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



**Engine idling speed**  
1250–1450 r/min

## 3. Check:

- ISC (idle speed control) learning value “00” or “01” → Check the intake system.
- “02” → Clean the ISC (idle speed control) valve.

Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-8.

- 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.



**Yamaha diagnostic tool USB**  
90890-03267  
**Yamaha diagnostic tool (A/I)**  
90890-03262

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

EAS30797

## SYNCHRONIZING THE THROTTLE BODIES

### TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Vacuum hoses

## Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

### TIP

Place the vehicle on a suitable stand.

## 2. Remove:

- Rider seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side cover  
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Fuel tank  
Refer to “FUEL TANK” on page 7-1.

## 3. Disconnect:

- Intake air pressure sensor hose
- Cap  
Refer to “THROTTLE BODIES” on page 7-5.

## 4. Install:

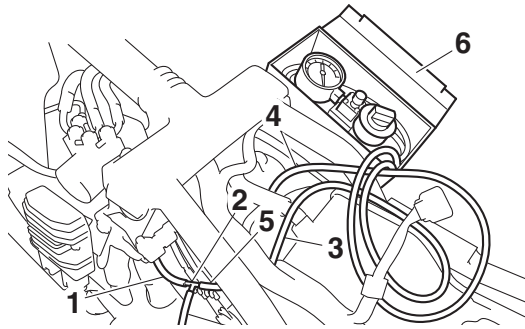
- Hose “1” (Parts No.: 5JW-24311-00)
- 3-way joint “2” (Parts No.: 90413-05014)
- Vacuum gauge hose #1 “3” (to throttle body #1)
- Vacuum gauge hose #2 “4” (to throttle body #2)
- Intake air pressure sensor hose “5”
- Vacuum gauge “6”



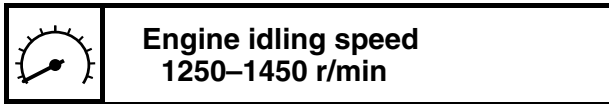
**Vacuum gauge**  
90890-03094  
**Vacuummate**  
YU-44456



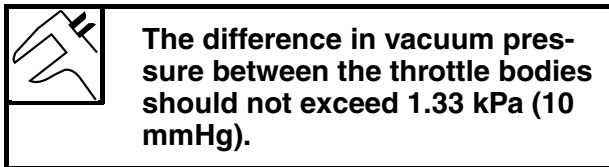
## PERIODIC MAINTENANCE



5. Install:
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
6. Check:
  - Throttle body synchronization
    - a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.



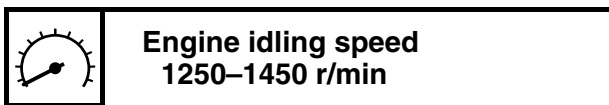
- b. Check the vacuum pressure.



If out of specification → Adjust the throttle body synchronization.

### Adjusting the throttle body synchronization

1. Adjust:
  - Throttle body synchronization
    - a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

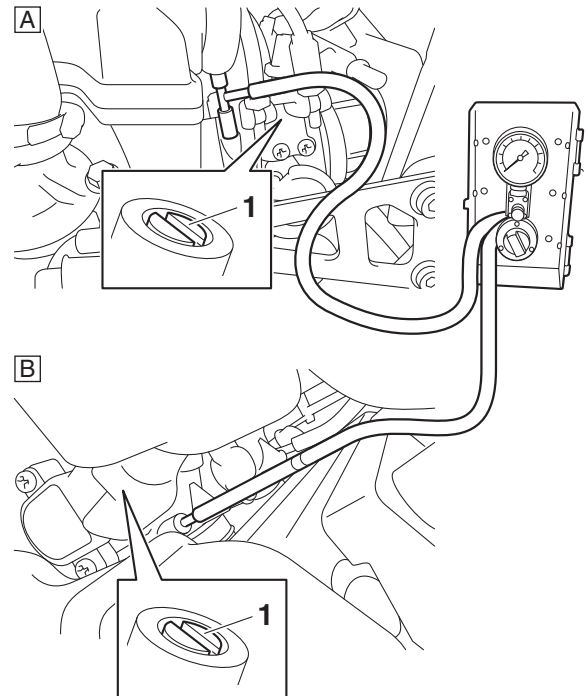


- b. With throttle body #1 as standard, adjust throttle body #2 using the air screw “1”.

#### TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.

- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.
- The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).



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

2. Stop the engine and remove the measuring equipment.
3. Connect:
  - Intake air pressure sensor hose
  - Cap  
Refer to “THROTTLE BODIES” on page 7-5.
4. Install:
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
  - Fuel tank side cover
  - Air ducts
  - Air scoops  
Refer to “GENERAL CHASSIS (3)” on page 4-5.
  - Rider seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.

## 5. Adjust:

- Throttle grip free play  
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-29.



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

EAS30062

## CHECKING THE EXHAUST SYSTEM

### 1. Check:

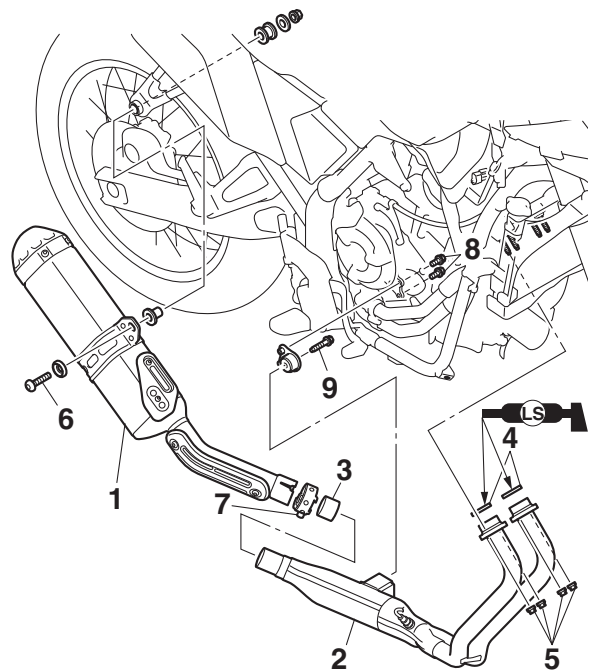
- Muffler assembly "1"
- Exhaust pipe "2"  
Cracks/damage → Replace.
- Gaskets "3", "4"  
Exhaust gas leaks → Replace.

### 2. Check:

- Tightening torque
- Exhaust pipe nuts "5"
- Muffler bolt "6"
- Exhaust pipe joint bolt "7"
- Exhaust pipe bracket bolts "8"
- Exhaust pipe bracket bolt "9"



**Exhaust pipe nut "5"**  
20 N·m (2.0 kgf·m, 15 lb-ft)  
**Muffler bolt "6"**  
47 N·m (4.7 kgf·m, 35 lb-ft)  
**Exhaust pipe joint bolt "7"**  
20 N·m (2.0 kgf·m, 15 lb-ft)  
**Exhaust pipe bracket bolt "8"**  
10 N·m (1.0 kgf·m, 7.4 lb-ft)  
**Exhaust pipe bracket bolt "9"**  
20 N·m (2.0 kgf·m, 15 lb-ft)



EAS30626

## CHECKING THE CANISTER

### 1. Remove:

- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Air scoops
- Air ducts
- Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Fuel tank  
Refer to "FUEL TANK" on page 7-1.

### 2. Check:

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

### 3. Install:

- Fuel tank  
Refer to "FUEL TANK" on page 7-1.
- Fuel tank side covers
- Air ducts
- Air scoops  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.



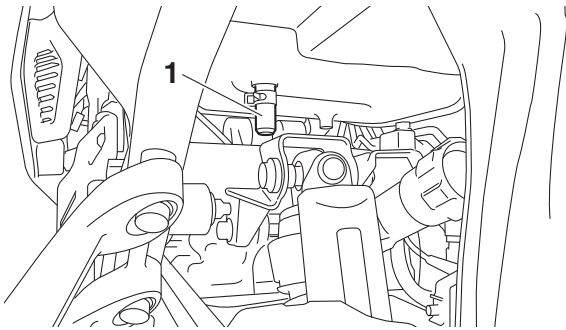
# PERIODIC MAINTENANCE

EAS31130

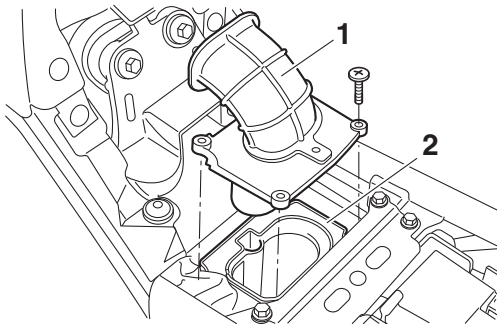
## REPLACING THE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

### TIP

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



1. Remove:
  - Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Air scoops
  - Air ducts
  - Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
2. Remove:
  - Air filter case cover "1"
  - Air filter element "2"



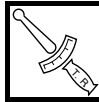
3. Check:
  - Air filter element  
Damage → Replace.

### TIP

- Replace the air filter element every 20000 km (12000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
  - Air filter element

- Air duct cover



**Air filter element screw**  
1.6 N·m (0.16 kgf·m, 1.2 lb·ft)  
**Air duct cover screw**  
1.6 N·m (0.16 kgf·m, 1.2 lb·ft)

ECA14401

### 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 carburetor synchronization, leading to poor engine performance and possible overheating.

5. Install:
  - Fuel tank  
Refer to "FUEL TANK" on page 7-1.
  - Fuel tank side covers
  - Air ducts
  - Air scoops  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
  - Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

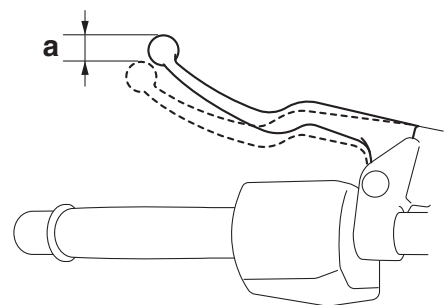
EAS30629

## ADJUSTING THE CLUTCH LEVER FREE PLAY

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



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

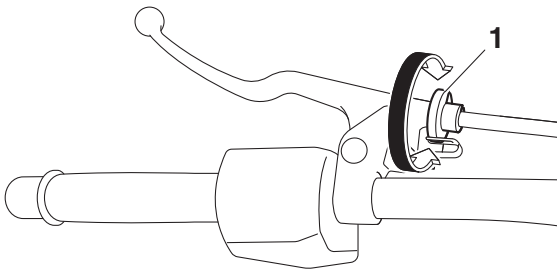


G088887

2. Adjust:
  - Clutch lever free play

### Handlebar side

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




G088888

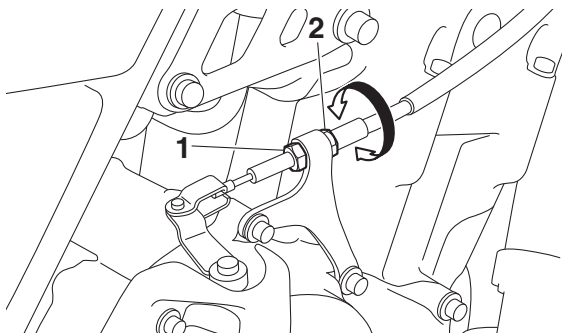
**TIP**

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. Loosen the locknut "1".
- b. Turn the adjusting nut "2" until the specified clutch lever free play is obtained.
- c. Tighten the locknut "1".

	<p><b>Clutch cable locknut</b> 7 N·m (0.7 kgf·m, 5.2 lb·ft)</p>
--	---



EAS30801

**CHECKING THE BRAKE OPERATION**

1. Check:
  - Brake operation  
Brake not working properly → Check the brake system.  
Refer to "FRONT BRAKE" on page 4-25 and "REAR BRAKE" on page 4-35.

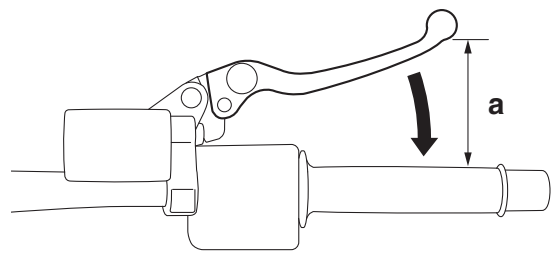
**TIP**

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

EAS30630

**ADJUSTING THE FRONT DISC BRAKE**

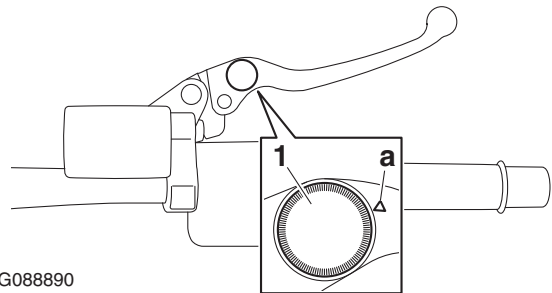
1. Adjust:
  - Brake lever position  
(distance "a" from the throttle grip to the brake lever)



G088889

**TIP**

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



G088890

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**

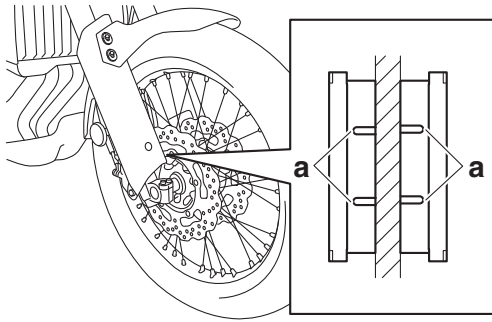
After adjusting the brake lever position, make sure there is no brake drag.

EAS30633

**CHECKING THE FRONT BRAKE PADS**

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
  - Front brake pad  
Wear indicator groove "a" has almost disappeared → Replace the brake pads as a set.  
Refer to "FRONT BRAKE" on page 4-25.



EAS30631

## 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**  
18 N·m (1.8 kgf·m, 13 lb·ft)

EWA17030

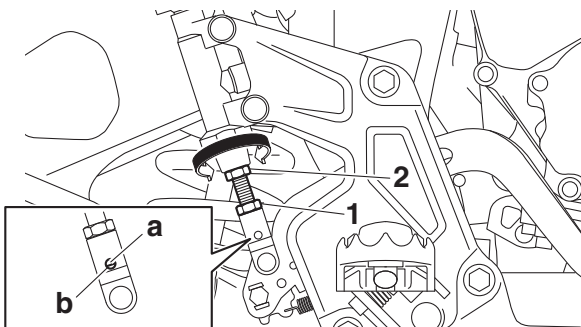
### **WARNING**

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:

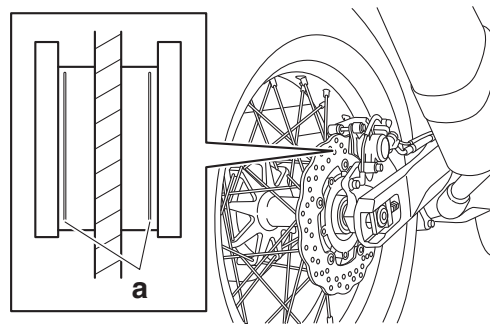
- Rear brake light switch  
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-29.

EAS30634

## CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
  - Rear brake pad  
Worn almost to the wear indicator "a" → Replace the brake pads as a set.  
Refer to "REAR BRAKE" on page 4-35.



EAS30894

## CHECKING THE BRAKE HOSES

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

1. Check:
  - Brake hoses  
Cracks/damage/wear → Replace.
2. Check:
  - Brake hose holders  
Loose → Tighten the holder bolts.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
  - Brake hose  
Brake fluid leakage → Replace the damaged hose.  
Refer to "FRONT BRAKE" on page 4-25, "REAR BRAKE" on page 4-35 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

EAS30893

## BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

### **WARNING**

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

ECA18050

## NOTICE

- Bleed the brake system in the following order.
- 1st step: Front brake calipers
- 2nd step: Rear brake caliper

EWA16530

## WARNING

Bleed the ABS whenever:

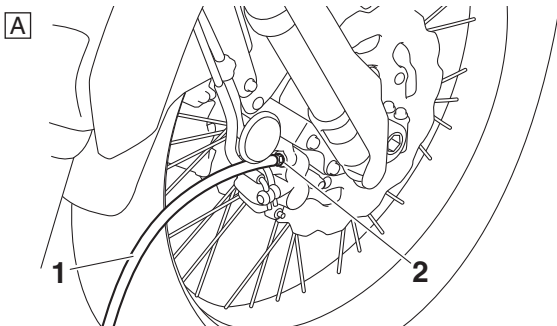
- the system is disassembled.
- a brake hose is loosened, disconnected or replaced.
- the brake fluid level is very low.
- brake operation is faulty.

## TIP

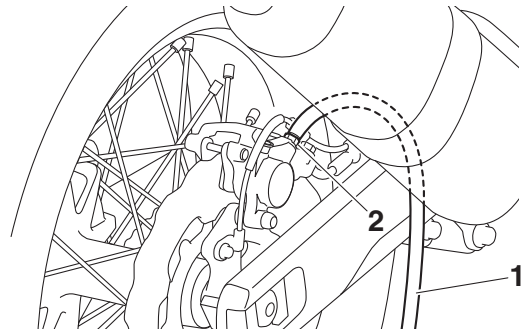
- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the ABS, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, considerably lengthening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



B



- A. Front brake caliper  
B. 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.

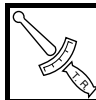
- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-48.

ECA18060

## 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 master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid.
- l. Tighten the bleed screw to specification.



**Brake caliper bleed screw  
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

- m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the specified brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.

# PERIODIC MAINTENANCE

EWA13110

## **WARNING**

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

EAS30632

## **CHECKING THE BRAKE FLUID LEVEL**

1. Stand the vehicle on a level surface.

### **TIP**

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

2. Check:

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



**Specified brake fluid  
DOT 4**

EWA13090

## **WARNING**

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

ECA13540

## **NOTICE**

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

### **TIP**

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

EAS30638

## **CHECKING THE WHEELS**

The following procedure applies to both of the wheels.

1. Check:

- Wheel  
Damage/out-of-round → Replace.

EWA13260

## **WARNING**

Never attempt to make any repairs to the wheel.

### **TIP**

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

EAS30109

## **CHECKING AND TIGHTENING THE SPOKES**

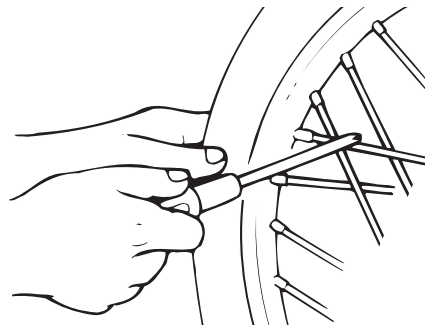
The following procedure applies to all of the spokes.

1. Check:

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

### **TIP**

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



2. Tighten:

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

### **TIP**

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

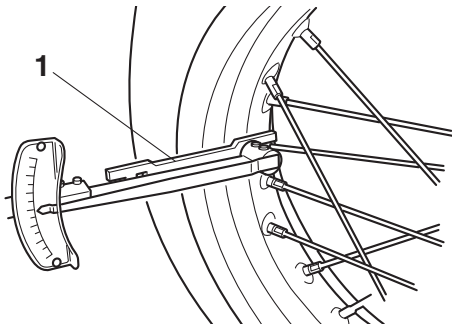


**Spoke nipple wrench (6-7)  
90890-01521  
Spoke nipple wrench (6-7)  
YM-01521**



**Spoke (front)  
4.3 N·m (0.43 kgf·m, 3.2 lb·ft)  
Spoke (rear)  
4.3 N·m (0.43 kgf·m, 3.2 lb·ft)**

# PERIODIC MAINTENANCE



EAS30640

## 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)

1 person

Front

220 kPa (2.20 kgf/cm<sup>2</sup>, 32 psi)

Rear

250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

2 persons

Front

220 kPa (2.20 kgf/cm<sup>2</sup>, 32 psi)

Rear

250 kPa (2.50 kgf/cm<sup>2</sup>, 36 psi)

Off-road riding

Front

200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)

Rear

200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)

Maximum load

190 kg (419 lb)

\* Total weight of rider, passenger, cargo and accessories

### 2. Check:

- Tire surfaces  
Damage/wear → Replace the tire.

EWA13190

### **WARNING**

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



Wear limit (front)

1.6 mm (0.06 in)

Wear limit (rear)

1.6 mm (0.06 in)

EWA14090

### **WARNING**

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



Front tire

Size

90/90 – 21 M/C 54V M+S

Manufacturer/model

PIRELLI/SCORPION RALLY STR  
A



Rear tire

Size

150/70 R18 M/C 70V M+S

Manufacturer/model

PIRELLI/SCORPION RALLY STR

EWA13210

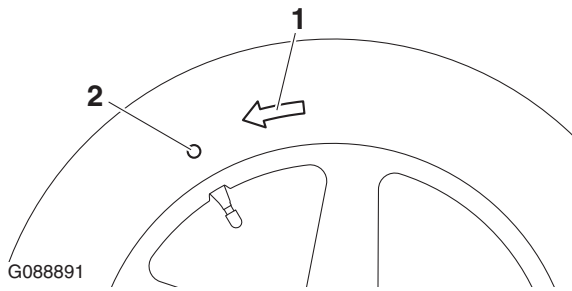
### **WARNING**

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.





G088891

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 4-13 and "CHECKING THE REAR WHEEL" on page 4-21.

EAS30802

## CHECKING THE SWINGARM OPERATION

### 1. Check:

- Swingarm operation  
Swingarm not working properly → Check the swingarm.  
Refer to "SWINGARM" on page 4-75.

### 2. Check:

- Swingarm excessive play  
Refer to "SWINGARM" on page 4-75.

EAS30643

## LUBRICATING THE SWINGARM PIVOT

### 1. Lubricate:

- Oil seals
- Pivot shaft



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

Refer to "INSTALLING THE SWINGARM" on page 4-78.

EAS30644

## ADJUSTING THE DRIVE CHAIN SLACK

ECA13550

### NOTICE

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

### 1. Place the vehicle on the sidestand.

EWA13120

### WARNING

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

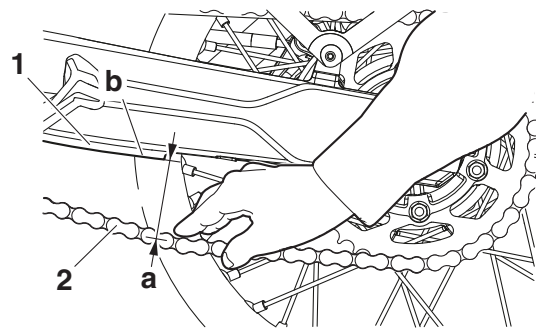
### 2. Shift the transmission into the neutral position.

### 3. Check:

- Drive chain slack  
Out of specification → Adjust.

### TIP

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



**Drive chain slack**  
43.0–48.0 mm (1.69–1.89 in)  
**Limit**  
55.0 mm (2.17 in)

ECA20870

### NOTICE

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

### 4. Loosen:

- Wheel axle nut  
Refer to "REAR WHEEL" on page 4-18.

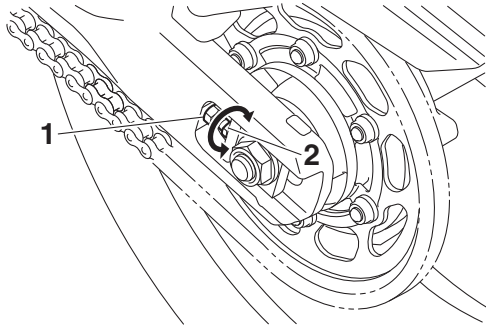
### 5. Adjust:

- Drive chain slack
  - a. Loosen both of the drive chain puller lock-nuts "1".
  - b. Turn both of the drive chain puller adjusting bolts "2" until the specified drive chain slack is obtained.

# PERIODIC MAINTENANCE

## TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
- There should be no clearance between the adjusting blocks and the head of adjusting bolts.



c. Tighten the wheel axle nut to specification.



**Wheel axle nut**  
105 N·m (10.5 kgf·m, 77 lb·ft)

d. Tighten the drive chain puller locknuts to specification.



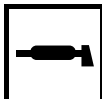
**Drive chain puller locknut**  
16 N·m (1.6 kgf·m, 12 lb·ft)

EAS30803

## LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

This vehicle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.



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

EAS30645

## CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

## WARNING

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

## TIP

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

2. Check:

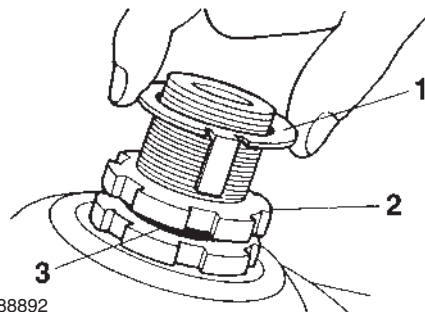
- Steering head  
Grasp the bottom of the front fork legs and gently rock the front fork.  
Blinding/looseness → Adjust the steering head.

3. Remove:

- Upper bracket  
Refer to “STEERING HEAD” on page 4-68.

4. Adjust:

- Steering head  
a. Remove the lock washer “1”, upper ring nut “2”, and rubber washer “3”.

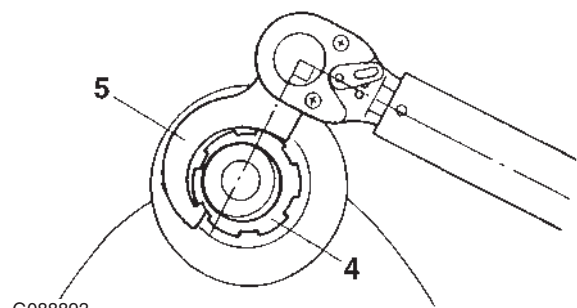


G088892

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

## TIP

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



G088893





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



**Lower ring nut (initial tightening torque)**  
75 N·m (7.5 kgf·m, 55 lb·ft)

c. Loosen the lower ring nut 165–195°, then tighten it to specification.

EWA13140



**WARNING**

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

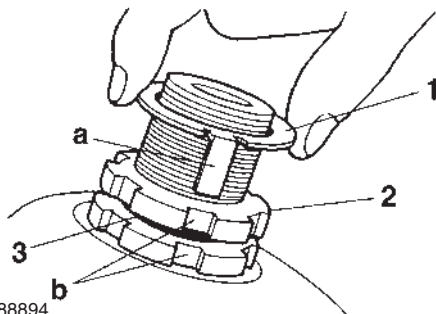


**Lower ring nut (final tightening torque)**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

- 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 4-68.
- 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”.



G088894

5. Install:
- Upper bracket
- Refer to “STEERING HEAD” on page 4-68.

EAS30646

**LUBRICATING THE STEERING HEAD**

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



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

EAS31802

**CHECKING THE CHASSIS FASTENERS**

Make sure that all nuts, bolts, and screws are properly tightened.

EAS30804

**LUBRICATING THE BRAKE LEVER**

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



**Recommended lubricant**  
Silicone grease

EAS30895

**LUBRICATING THE PEDALS**

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



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

EAS30805

**LUBRICATING THE CLUTCH LEVER**

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



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

EAS30650

**CHECKING THE SIDESTAND**

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

EAS30651

**LUBRICATING THE SIDESTAND**

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



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

EAS30652

## CHECKING THE SIDESTAND SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-129.

EAS30653

## CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120



**WARNING**

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

2. Check:

- Inner tube  
Damage/scratches → Replace.
- Front fork leg  
Oil leaks between inner tube and outer tube → Replace the oil seal.

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

4. Check:

- Front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.

Rough movement → Repair.

Refer to "FRONT FORK" on page 4-58.

EAS30806

## 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.

### Rebound damping

ECA13590

**NOTICE**

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:

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

**Direction "a"**

Rebound damping is increased (suspension is harder).

**Direction "b"**

Rebound damping is decreased (suspension is softer).



### Rebound damping

Adjustment value from the start position (Soft)

31

Adjustment value from the start position (STD)

17

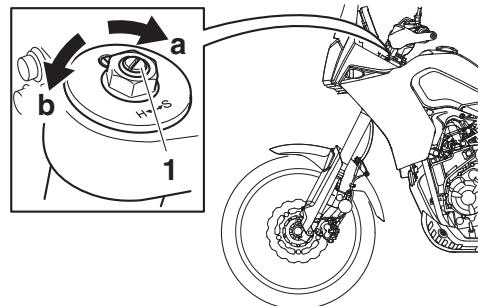
Adjustment value from the start position (Hard)

0

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

### TIP

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



### Compression damping

ECA13590

**NOTICE**

Never go beyond the maximum or minimum adjustment positions.

### TIP

Before adjusting the compression damping, remove the rubber cap.

1. Adjust:

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

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

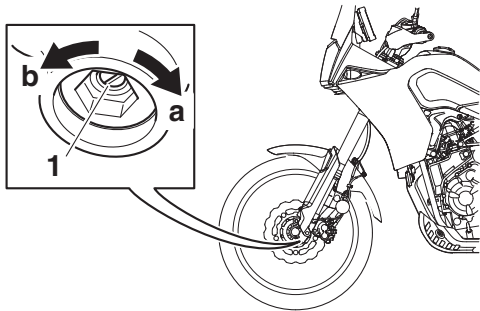


**Compression damping**  
 Adjustment value from the start  
 position (Soft)  
 22  
 Adjustment value from the start  
 position (STD)  
 11  
 Adjustment value from the start  
 position (Hard)  
 0

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

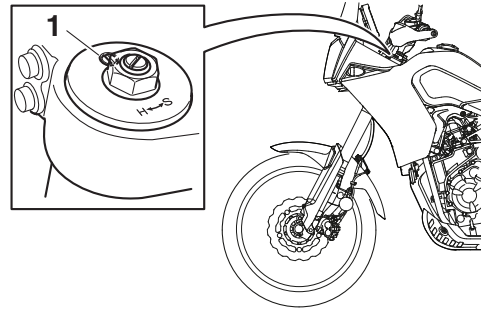
## TIP

Although the total number of clicks of a damping  
 force adjusting mechanism may not exactly  
 match the above specifications due to small dif-  
 ferences 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.



## Bleeding the front fork

1. Place the motorcycle on a suitable stand.
2. Make sure the front wheel is off the ground  
 and the area near the bleed screws is clean.
3. Remove:
  - Bleed screw “1”



4. Wait a few seconds, and then install the bleed  
 screws.

EAS30808

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to “CHECKING THE REAR SHOCK AB-  
 SORBER ASSEMBLY” on page 4-73.

EAS30655

## ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120



**WARNING**

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

## Spring preload

ECA13590



**NOTICE**

**Never go beyond the maximum or minimum  
 adjustment positions.**

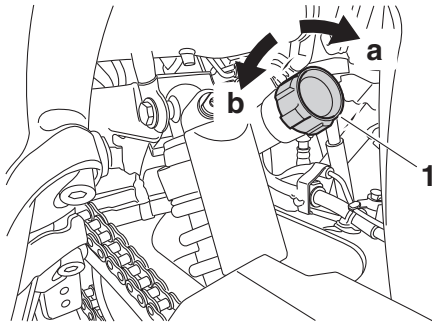
1. Adjust:
  - Spring preload
    - a. Turn the adjusting knob “1” in direction “a”  
 or “b”.

**Direction “a”**  
 Spring preload is increased (suspen-  
 sion is harder).  
**Direction “b”**  
 Spring preload is decreased (suspen-  
 sion is softer).



**Spring preload**  
 Adjustment value (Soft)  
 0  
 Adjustment value (STD)  
 10  
 Adjustment value (Hard)  
 24

\* With the adjusting knob fully turned in di-  
 rection “b”



## Rebound damping

ECA13590

### NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Rebound damping
    - a. Turn the adjusting screw "1" in direction "a" or "b".

#### Direction "a"

Rebound damping is increased (suspension is harder).

#### Direction "b"

Rebound damping is decreased (suspension is softer).



#### Rebound damping

Adjustment value from the start position (Soft)

23

Adjustment value from the start position (STD)

13

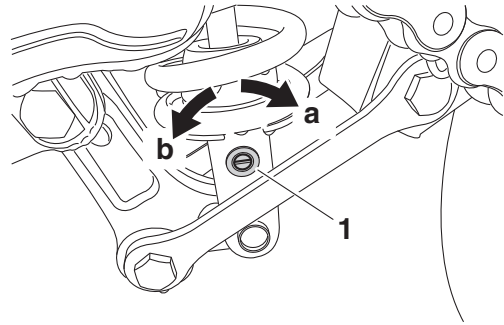
Adjustment value from the start position (Hard)

0

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

### TIP

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



## Compression damping

ECA13590

### NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - Compression damping
    - a. Turn the adjusting screw "1" in direction "a" or "b".

#### Direction "a"

Compression damping is increased (suspension is harder).

#### Direction "b"

Compression damping is decreased (suspension is softer).



#### Compression damping

Adjustment value from the start position (Soft)

18

Adjustment value from the start position (STD)

15

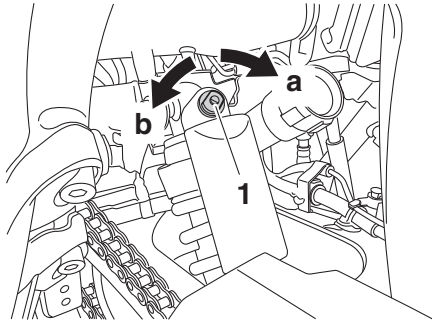
Adjustment value from the start position (Hard)

0

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

### TIP

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



EAS32816

## CHECKING THE CONNECTING ARMS AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARMS AND RELAY ARM" on page 4-73.

EAS30656

## CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

### TIP

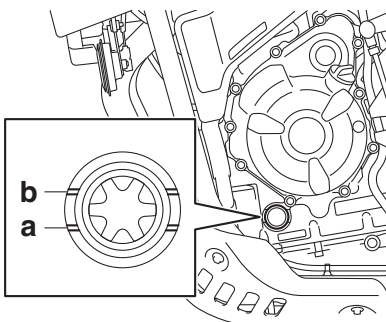
- Place the vehicle on a suitable stand.
  - Make sure the vehicle is upright.
2. Start the engine, warm it up for several minutes, and then turn it off.
  3. Check:
    - Engine oil level

The engine oil level should be between the minimum level mark "a" and maximum level mark "b".

Below the minimum level mark → Add the recommended engine oil to the proper level.

### TIP

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



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

ECA13361

### NOTICE

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

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

### TIP

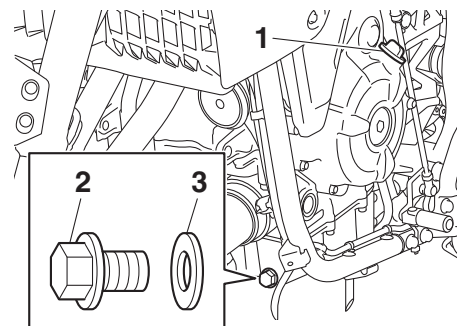
Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS30657

## CHANGING THE ENGINE OIL

1. Remove:
  - Engine guard

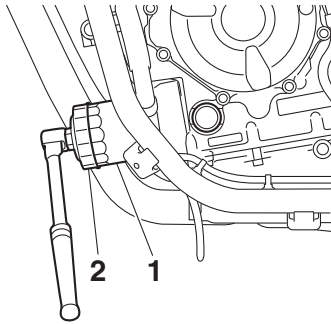
Refer to "ENGINE REMOVAL" on page 5-3.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the engine oil drain bolt.
4. Remove:
  - Engine oil filler cap "1"
  - Engine oil drain bolt "2" (along with the gasket "3")



5. Drain:
  - Engine oil (completely from the oil pan)
6. If the oil filter cartridge is also to be replaced, perform the following procedure.
  - a. Remove the oil filter cartridge "1" with an oil filter wrench "2".



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



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

ECA25890

**NOTICE**

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

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



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

7. Install:

- Engine oil drain bolt  
(along with the gasket **New**)



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

8. Fill:

- Oil pan  
(with the specified amount of the recommended engine oil)



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

9. Install:

- Engine oil filler cap  
(along with the O-ring **New**)

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

11. Check:

- Engine  
(for engine oil leaks)

12. Check:

- Engine oil level  
Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-24.

13. Install:

- Engine guard  
Refer to “ENGINE REMOVAL” on page 5-3.

EAS30810

**MEASURING THE ENGINE OIL PRESSURE**

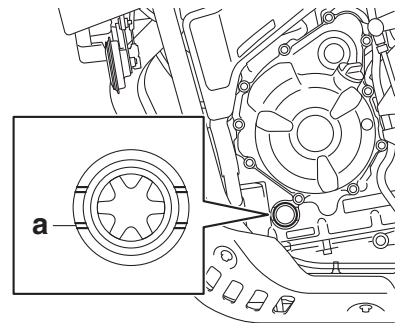
1. Stand the vehicle on a level surface.

**TIP**

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

2. Check:

- Engine oil level  
Below the minimum level mark “a” → Add the recommended engine oil to the proper level.



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

ECA13410

**NOTICE**

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

4. Remove:

- Engine guard  
Refer to “ENGINE REMOVAL” on page 5-3.

5. Tilt the vehicle to the left so that oil does not flow out of the main gallery.

6. Remove:

- Main gallery bolt “1”

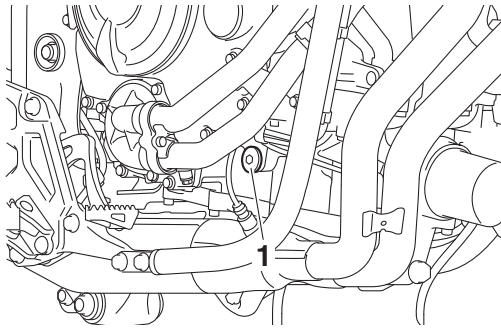
EWA12980

**WARNING**


**The engine, muffler and engine oil are extremely hot.**

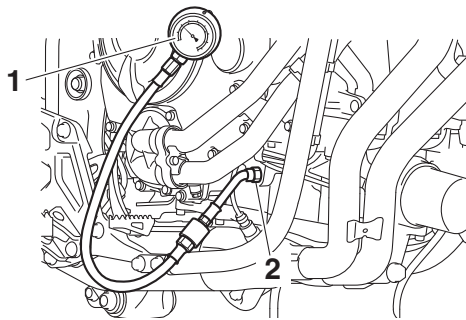


# PERIODIC MAINTENANCE



7. Install:
- Oil pressure gauge “1”
  - Adapter “2”

	<p><b>Pressure gauge</b> 90890-03153</p> <p><b>Pressure gauge</b> YU-03153</p> <p><b>Oil pressure adapter H</b> 90890-03139</p>
---	---




8. Stand the vehicle on a level surface.

**TIP** \_\_\_\_\_

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

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

	<p><b>Oil pressure</b> 280.0 kPa/5000 r/min (2.80 kgf/cm<sup>2</sup>/5000 r/min, 40.6 psi/5000 r/min)</p>
---	---

Out of specification → Check.

Engine oil pressure	Possible causes
Below specification	<ul style="list-style-type: none"> <li>• Faulty oil pump</li> <li>• Clogged oil filter</li> <li>• Leaking oil passage</li> <li>• Broken or damaged oil seal</li> </ul>

Engine oil pressure	Possible causes
Above specification	<ul style="list-style-type: none"> <li>• Leaking oil passage</li> <li>• Faulty oil filter</li> <li>• Oil viscosity too high</li> </ul>


10. Install:
- Main gallery bolt
  - O-ring **New**

	<p><b>Main gallery bolt</b> 8 N·m (0.8 kgf·m, 5.9 lb·ft)</p>
---	--

**TIP** \_\_\_\_\_

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

11. Install:
- Engine guard

	<p><b>Engine guard bolt</b> 11 N·m (1.1 kgf·m, 8.1 lb·ft)</p>
---	---

EAS30811

## CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

**TIP** \_\_\_\_\_

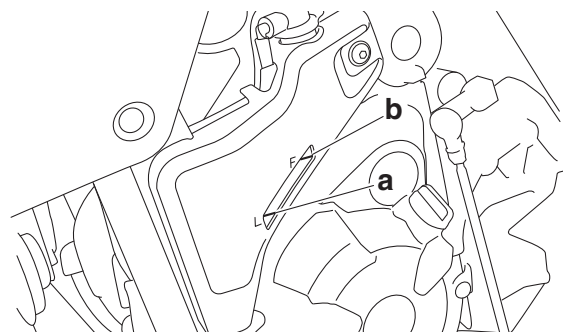
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

- Coolant level

The coolant level should be between the minimum level mark “a” and maximum level mark “b”.

Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

## NOTICE

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

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

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

### TIP

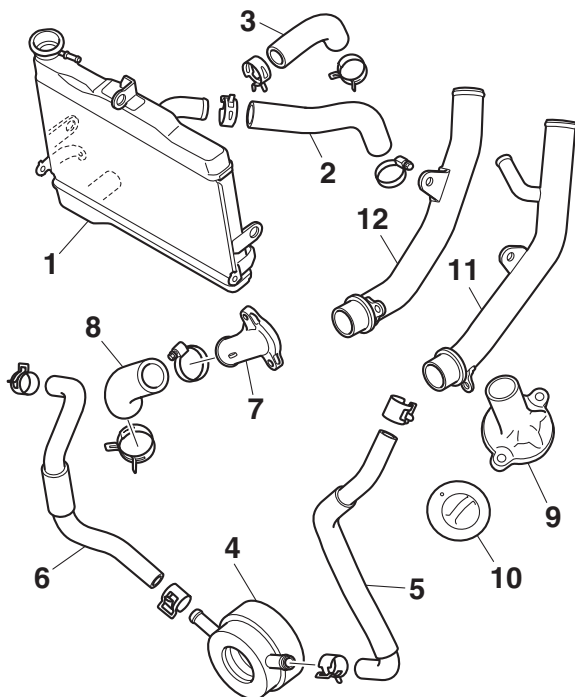
Before checking the coolant level, wait a few minutes until it settles.

EAS30812

### CHECKING THE COOLING SYSTEM

1. Check:
  - Radiator "1"
  - Radiator inlet hose "2"
  - Radiator outlet hose "3"
  - Oil cooler "4"
  - Oil cooler inlet hose "5"
  - Oil cooler outlet hose "6"
  - Water jacket joint "7"
  - Water jacket joint inlet hose "8"
  - Thermostat cover "9"
  - Thermostat "10"
  - Water pump inlet pipe "11"
  - Water pump outlet pipe "12"

Cracks/damage → Replace.  
Refer to "RADIATOR" on page 6-2, "OIL COOLER" on page 6-5, and "WATER PUMP" on page 6-10.



EAS30813

### CHANGING THE COOLANT

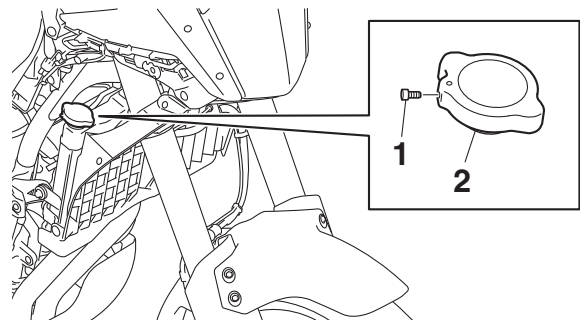
1. Remove:
  - Air scoop (right)  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
2. Remove:
  - Radiator cap bolt "1"
  - Radiator cap "2"

EWA13030

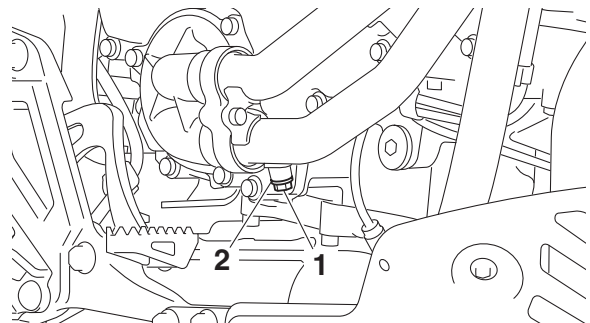
### WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.



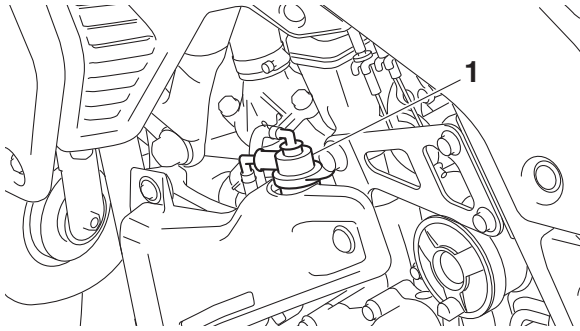
3. Remove:
  - Coolant drain bolt "1"
  - Copper washer "2"




4. Drain:
  - Coolant  
(from the engine and radiator)
5. Remove:
  - Coolant reservoir cap "1"




# PERIODIC MAINTENANCE



6. Drain:
  - Coolant  
(from the coolant reservoir)
7. Install:
  - Coolant drain bolt
  - Copper washer **New**

	<b>Coolant drain bolt</b> <b>7 N·m (0.7 kgf·m, 5.2 lb·ft)</b>
---	--

8. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)

	<b>Recommended antifreeze</b> <b>High-quality ethylene glycol anti-freeze containing corrosion inhibitors for aluminum engines</b> <b>Mixing ratio</b> <b>1:1 (antifreeze: water)</b> <b>Coolant quantity</b> <b>Radiator (including all routes)</b> <b>1.60 L (1.69 US qt, 1.41 Imp.qt)</b> <b>Coolant reservoir (up to the maximum level mark)</b> <b>0.25 L (0.26 US qt, 0.22 Imp.qt)</b>
---	--

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

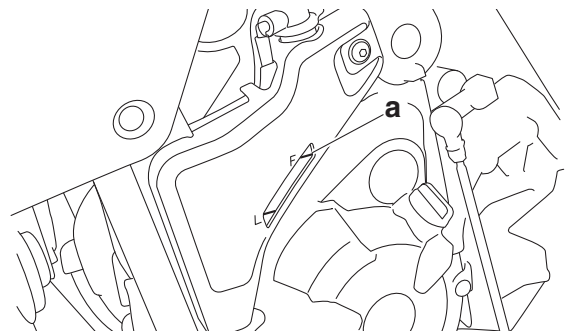
## **NOTICE**

- **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.**

9. Install:
  - Radiator cap
  - Radiator cap bolt

	<b>Radiator cap bolt</b> <b>1.0 N·m (0.10 kgf·m, 0.73 lb·ft)</b>
---	---

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



- 11.Install:
  - Coolant reservoir cap
- 12.Start the engine, warm it up for several minutes, and then turn it off.
- 13.Check:
  - Coolant level  
Refer to "CHECKING THE COOLANT LEVEL" on page 3-26.

## **TIP**

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

- 14.Install:
  - Air scoop (right)  
Refer to "GENERAL CHASSIS (3)" on page 4-5.

EAS30814

## CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-129.

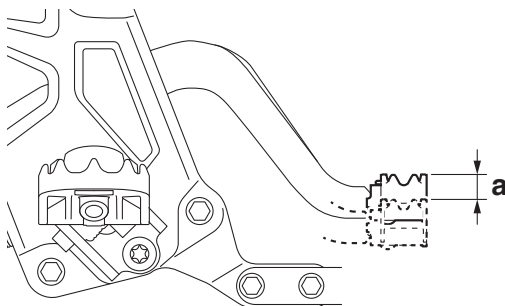
EAS30659

## ADJUSTING THE REAR BRAKE LIGHT SWITCH

1. Check:
  - Rear brake light operation timing "a"  
Out of specification → Adjust.



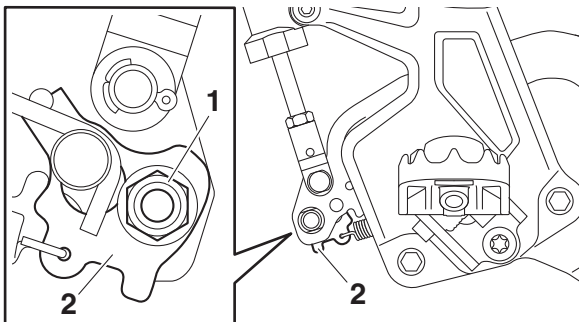
**Rear brake light operation timing  
12–18 mm (0.47–0.71 in)**



2. Adjust:
  - Rear brake light operation timing
    - a. Loosen the nut "1".
    - b. Adjust the rear brake plate "2" until the specified rear brake light operation timing is obtained.
    - c. Tighten the nut to specification.



**Nut  
7 N·m (0.7 kgf·m, 5.2 lb·ft)**



EAS30660

## CHECKING AND LUBRICATING THE CABLES

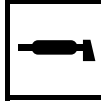
The following procedure applies to all of the inner and outer cables.

EWA13270

### **WARNING**

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

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



**Recommended lubricant  
Engine oil or a suitable cable lubricant**

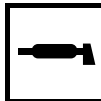
### TIP

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

EAS30861

## CHECKING THE THROTTLE GRIP OPERATION

1. Check:
  - Throttle cables  
Damage/deterioration → Replace.
  - Throttle cable installation  
Incorrect → Reinstall the throttle cables.  
Refer to "CABLE ROUTING" on page 2-15 and "HANDLEBAR" on page 4-52.
2. Check:
  - Throttle grip movement  
Rough movement → Lubricate or replace the defective part(s).



**Recommended lubricant  
Suitable cable lubricant**

### TIP

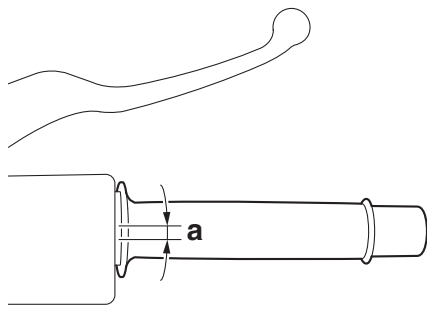
With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.

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

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



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



G088895

4. Adjust:
- Throttle grip free play

**TIP**

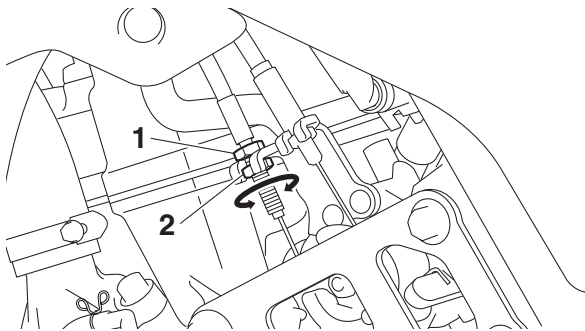
Prior to adjusting the throttle grip free play, throttle body synchronization should be adjusted properly.

**Throttle body side**

- Loosen the locknut "1" on the accelerator cable.
- Turn the adjusting nut "2" until the specified throttle grip free play is obtained.
- Tighten the locknut.



**Throttle cable locknut (throttle body side)**  
4.5 N·m (0.45 kgf·m, 3.3 lb·ft)

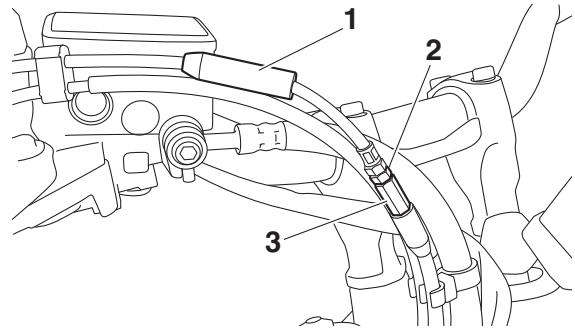


**TIP**

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

**Handlebar side**

- Slide back the rubber cover "1".
- Loosen the locknut "2".
- Turn the adjusting nut "3" until the specified throttle grip free play is obtained.



- Tighten the locknut.



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

- Slide the rubber cover to its original position.

**TIP**

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

EAS30816

**CHECKING AND CHARGING THE BATTERY**

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.

EAS30662

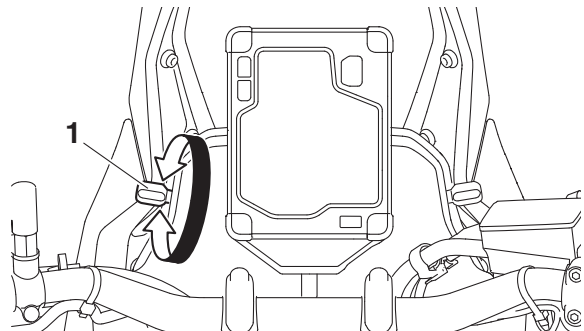
**CHECKING THE FUSES**

Refer to "CHECKING THE FUSES" on page 8-130.

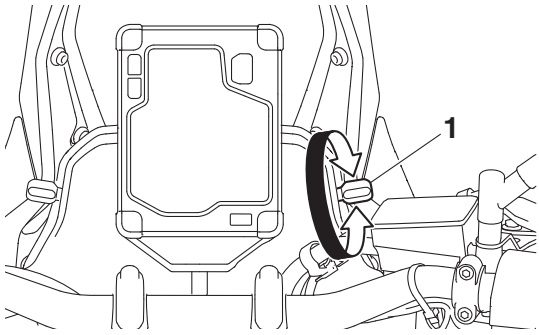
EAS30818

**ADJUSTING THE HEADLIGHT BEAMS**

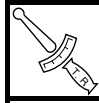
- Adjust:
  - Headlight beams (vertically-left side)
    - Turn the adjusting knob "1".



- Adjust:
  - Headlight beams (vertically-right side)
    - Turn the adjusting knob "1".



5. Install:
- License plate light cover
  - License plate light unit
  - Lower fender cover

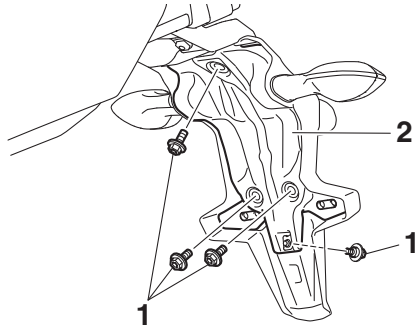


License plate light cover nut  
3.8 N·m (0.38 kgf·m, 2.8 lb·ft)  
Lower fender cover bolt  
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

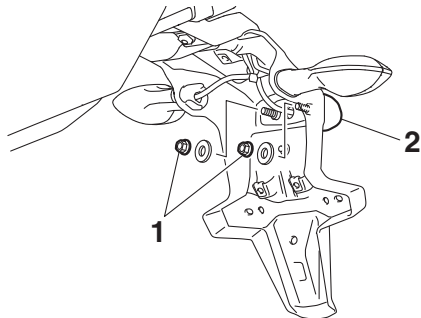
EAS31831

## REPLACING THE LICENSE PLATE LIGHT BULB

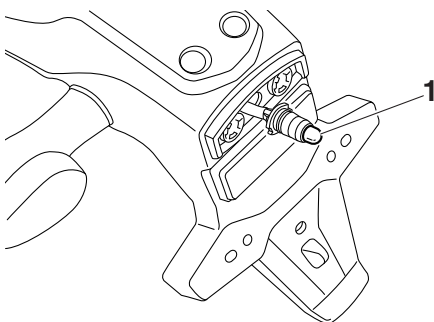
1. Remove:
- Lower fender cover bolts "1"
  - Lower fender cover "2"



2. Remove:
- License plate light unit nuts "1"
  - License plate light cover "2"



3. Remove:
- License plate light bulb "1"



4. Install:
- License plate light bulb **New**

---

# CHASSIS

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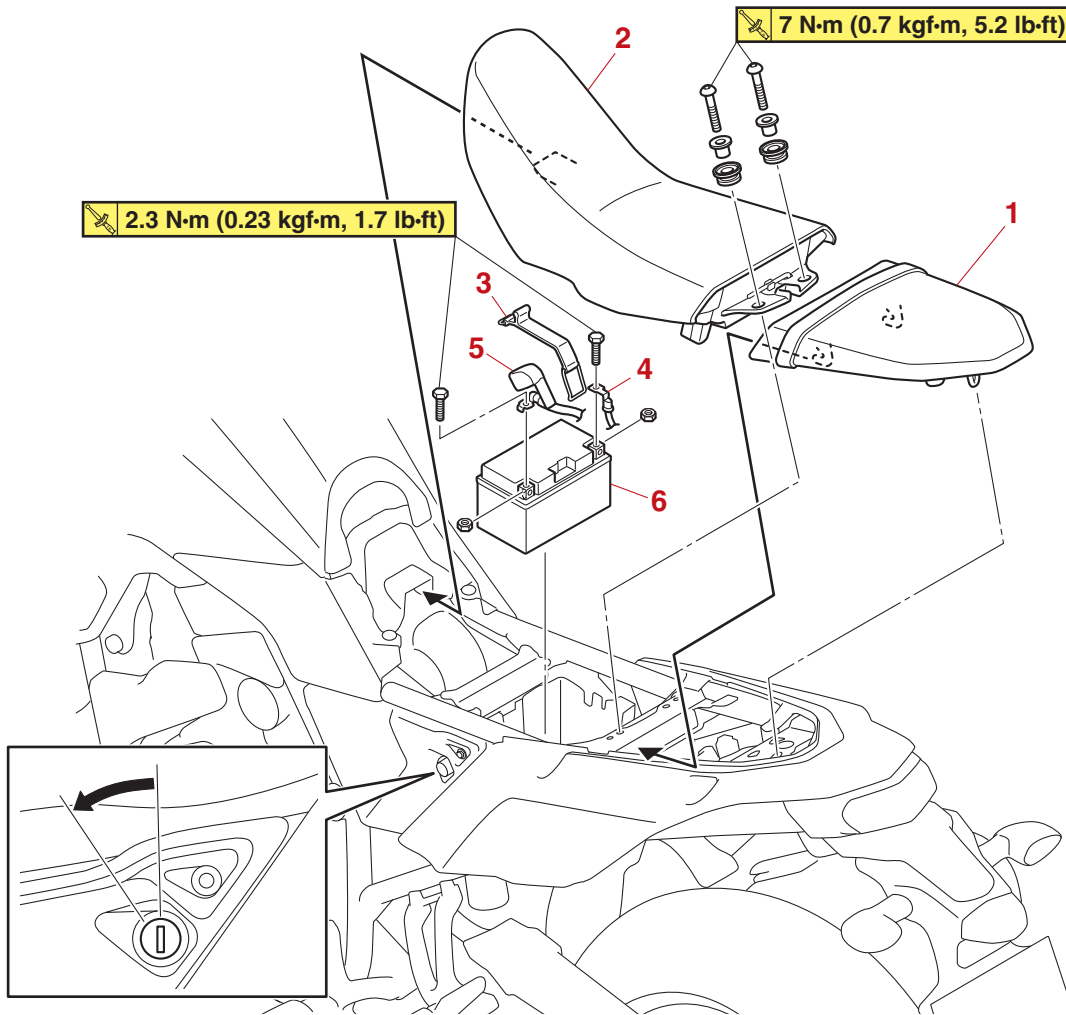
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CHECKING THE REAR WHEEL SPROCKET .....	4-83
CHECKING THE REAR WHEEL DRIVE HUB .....	4-83
INSTALLING THE DRIVE SPROCKET.....	4-83
INSTALLING THE DRIVE CHAIN .....	4-84

EAS20026

## GENERAL CHASSIS (1)

### Removing the seats and battery



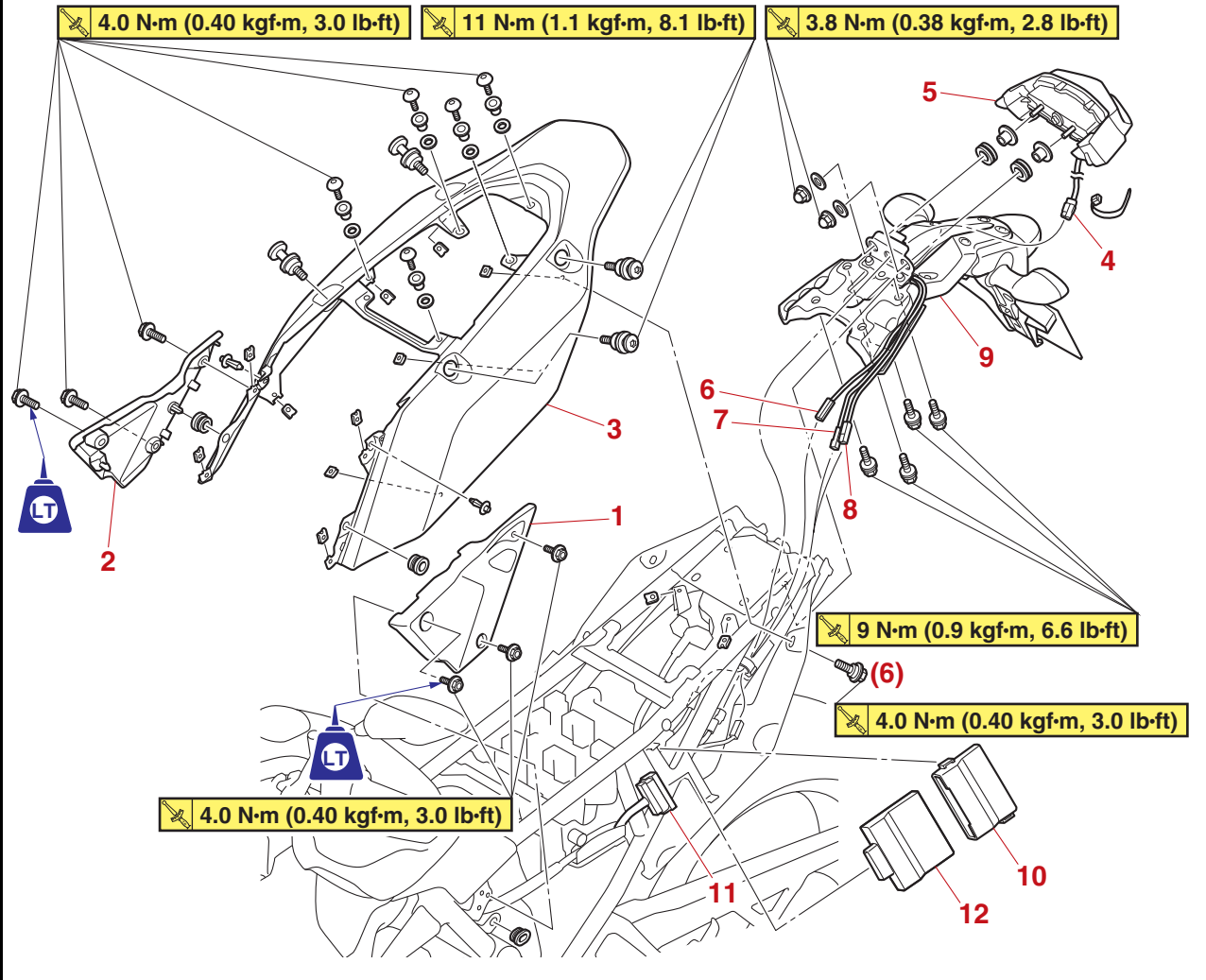
Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Rider seat	1	
3	Battery band	1	
4	Negative battery lead	1	Disconnect.
5	Positive battery lead	1	Disconnect.
6	Battery	1	



EAS20155

## GENERAL CHASSIS (2)

### Removing the tail/brake light assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Side cover (left)	1	
2	Side cover (right)	1	
3	Tail cover	1	
4	Tail/brake light coupler	1	Disconnect.
5	Tail/brake light assembly	1	
6	License plate light coupler	1	
7	Rear turn signal light coupler (right)	1	Disconnect.
8	Rear turn signal light coupler (left)	1	Disconnect.
9	Rear fender assembly	1	
10	ECU cover	1	
11	ECU coupler	1	Disconnect.
12	ECU (Engine Control Unit)	1	

EAS31264

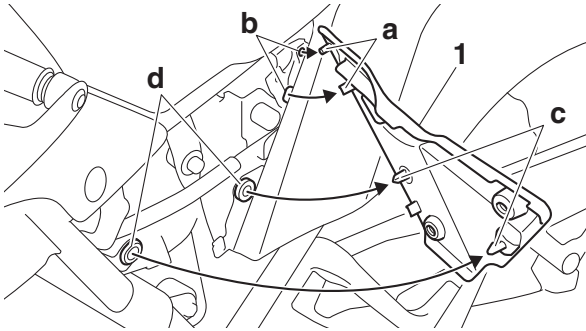
### REMOVING THE SIDE COVERS

The following procedure applies to both of the side covers.

1. Remove:
  - Side cover "1"

#### TIP

Remove the projections "a" on the side cover from holes "b" on the tail cover, and then remove the projections "c" from the grommets "d".



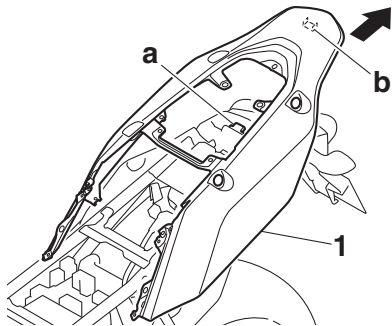
EAS33139

### REMOVING THE TAIL COVER

1. Remove:
  - Tail cover "1"

#### TIP

Unhook the projection "a" on the rear fender assembly from the hole "b" on tail cover.



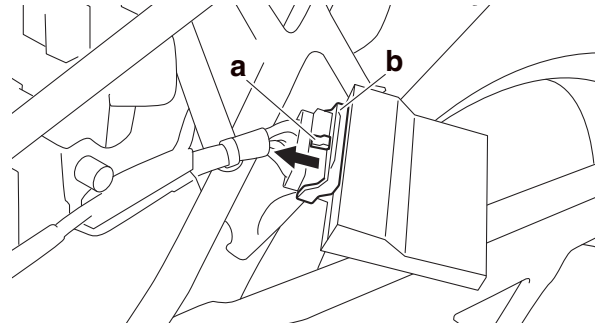
EAS31641

### REMOVING THE ECU (engine control unit)

1. Disconnect:
  - ECU coupler

#### TIP

While pushing the projection "a" and move the lock lever "b" of the ECU coupler in the direction of the arrow shown in the illustration to disconnect the coupler.



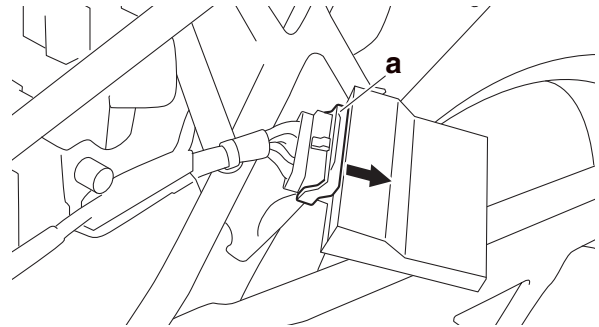
EAS31642

### INSTALLING THE ECU (engine control unit)

1. Connect:
  - ECU coupler

#### TIP

Push the lock lever "a" of the ECU coupler in the direction of the arrow shown in the illustration to connect the coupler.



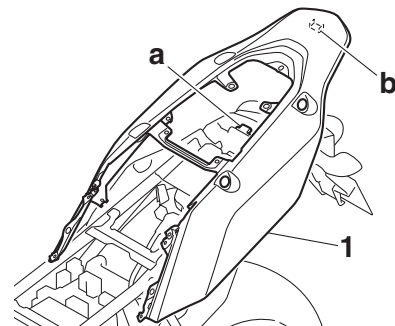
EAS33140

### INSTALLING THE TAIL COVER

1. Install:
  - Tail cover "1"

#### TIP

Fit the projection "a" on the rear fender assembly into the hole "b" on the tail cover.



EAS31265

### INSTALLING THE SIDE COVERS

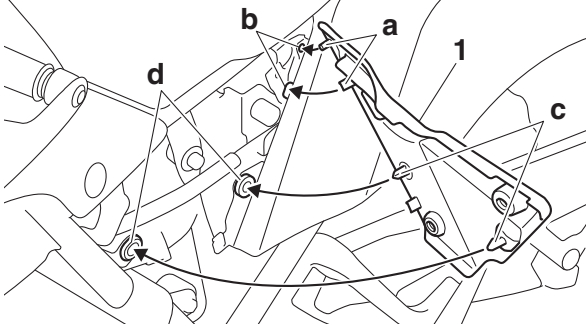
The following procedure applies to both of the side covers.

1. Install:
  - Side cover "1"

### TIP

Fit the projections "a" on the side cover to the holes "b" in the tail cover, and then fit the projections "c" to the grommets "d".

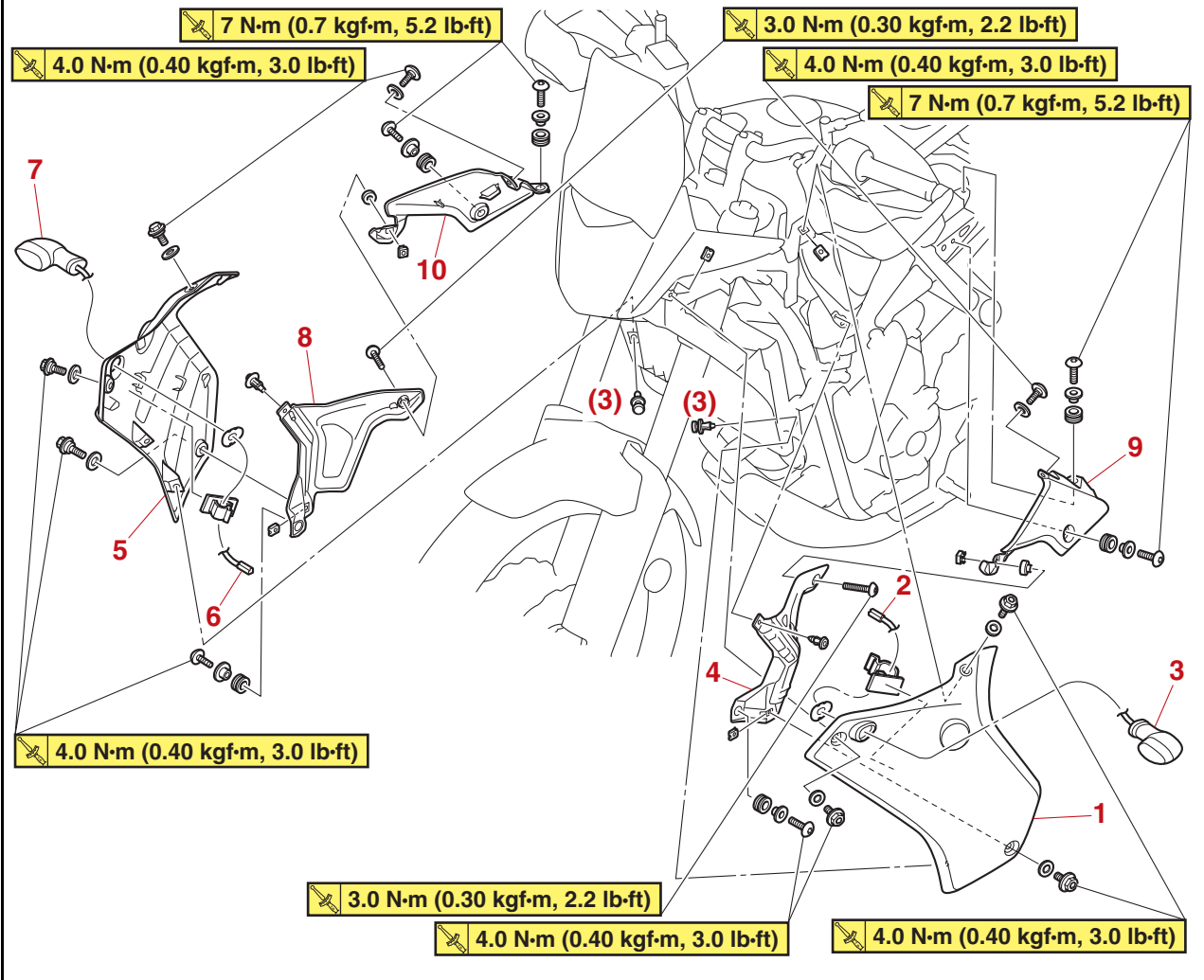
---



EAS20156

## GENERAL CHASSIS (3)

### Removing the air scoops



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Air scoop (left)	1	
2	Front turn signal light coupler (left)	1	Disconnect.
3	Front turn signal light (left)	1	
4	Air duct (left)	1	
5	Air scoop (right)	1	
6	Front turn signal light coupler (right)	1	Disconnect.
7	Front turn signal light (right)	1	
8	Air duct (right)	1	
9	Fuel tank side cover (left)	1	
10	Fuel tank side cover (right)	1	

## GENERAL CHASSIS (3)

EAS31772

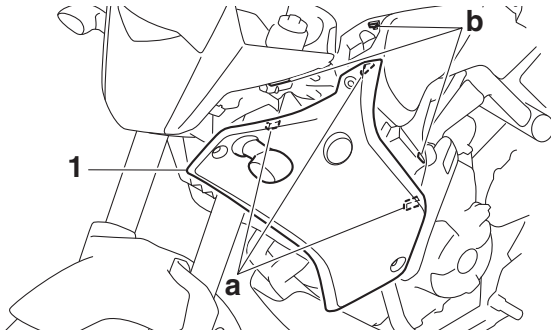
### REMOVING THE AIR SCOOPS

The following procedure applies to both of the air scoops.

1. Remove:
  - Air scoop "1"

#### TIP

Remove the projections "a" on the air scoop from the holes "b".



EAS32396

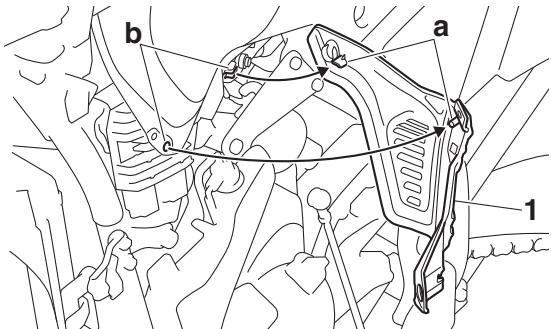
### REMOVING THE AIR DUCTS

The following procedure applies to both of the air ducts.

1. Remove:
  - Air duct "1"

#### TIP

Remove the projections "a" on the air duct from the holes "b".



EAS32777

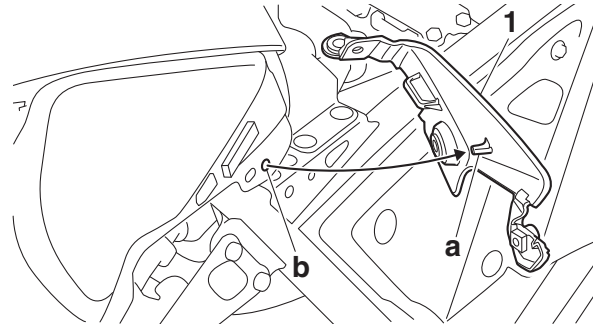
### REMOVING THE FUEL TANK SIDE COVERS

The following procedure applies to both of the fuel tank side covers.

1. Remove:
  - Fuel tank side cover "1"

#### TIP

Remove the projection "a" on the fuel tank side cover from the hole "b".



EAS32778

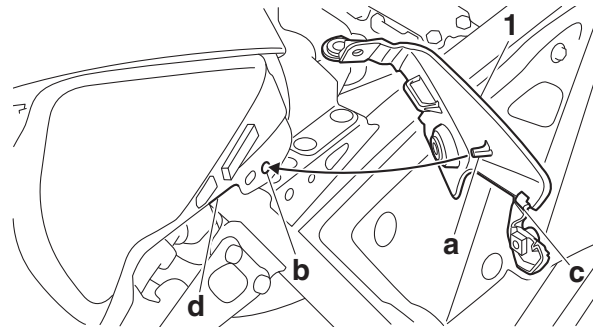
### INSTALLING THE FUEL TANK SIDE COVERS

The following procedure applies to both of the fuel tank side covers.

1. Install:
  - Fuel tank side cover "1"

#### TIP

- Fit the projection "a" on the fuel tank side cover to the hole "b" in the fuel tank.
- Engage the hook "c" on the fuel tank side cover to the fuel tank "d".



EAS31797

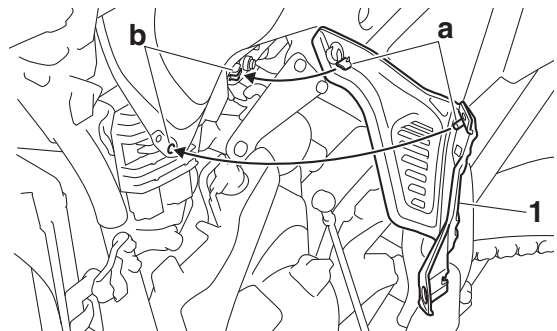
### INSTALLING THE AIR DUCTS

The following procedure applies to both of the air ducts.

1. Install:
  - Air duct "1"

#### TIP

Fit the projections "a" on the air duct to the holes "b".



EAS31773

### INSTALLING THE AIR SCOOPS

The following procedure applies to both of the air scoops.

1. Install:

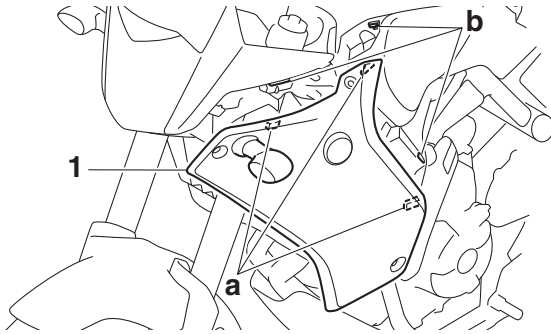
- Air scoop "1"

#### TIP

---

Fit the projections "a" on the air scoop to the holes "b".

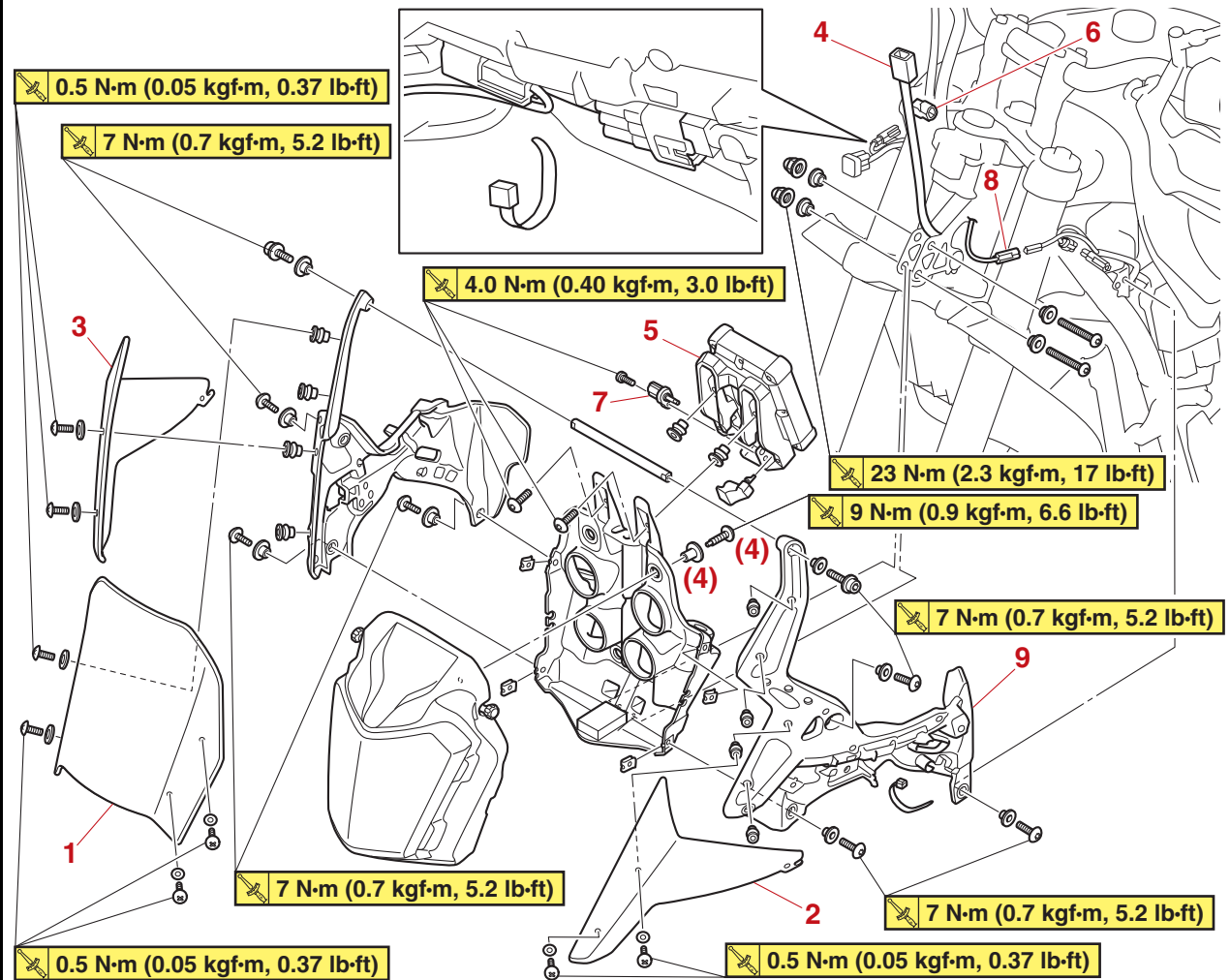
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EAS20157

## GENERAL CHASSIS (4)

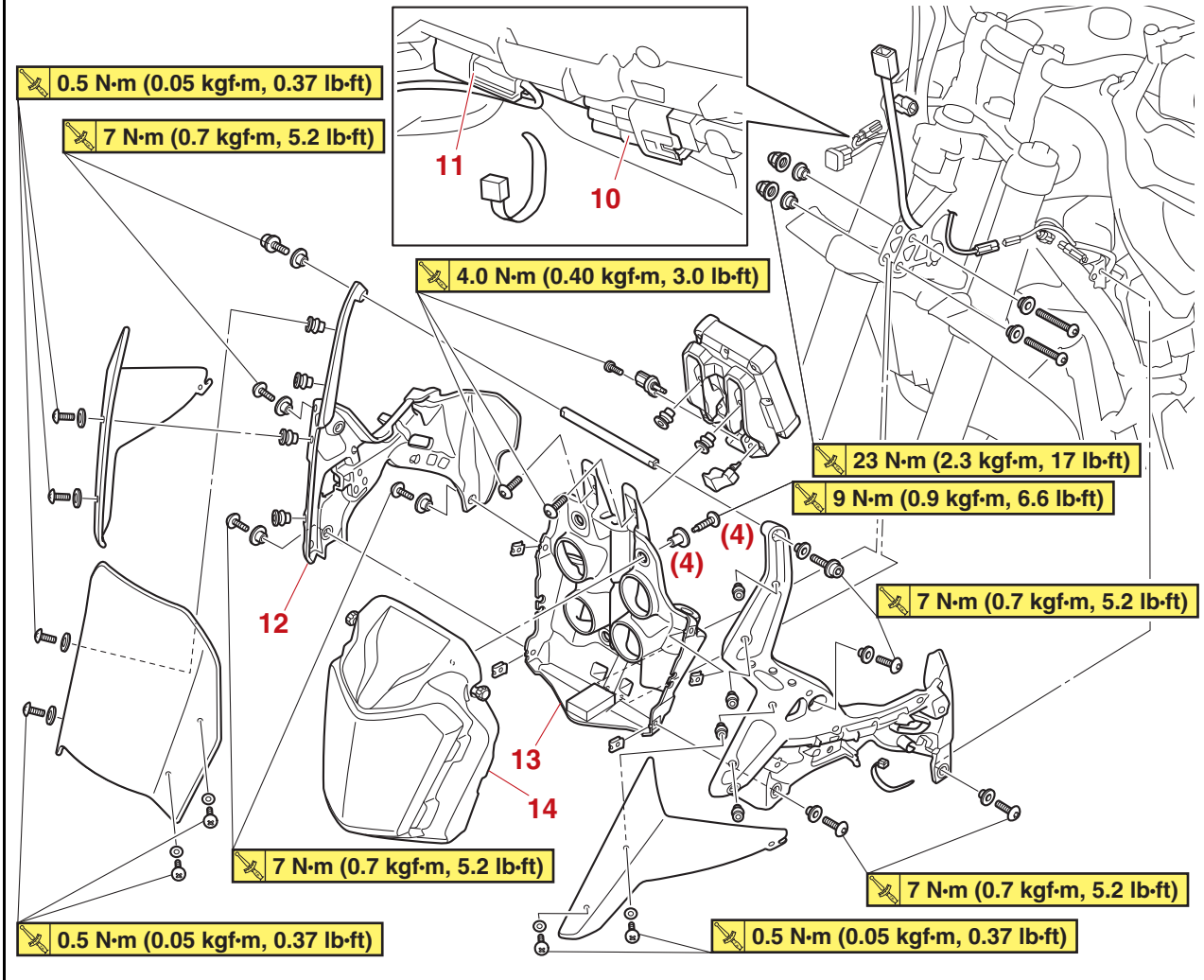
### Removing the windshields and headlight assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank cover		Refer to "FUEL TANK" on page 7-1.
1	Windshield (center)	1	
2	Windshield (left)	1	
3	Windshield (right)	1	
4	Meter assembly coupler	1	Disconnect.
5	Meter assembly	1	
6	Intake air temperature sensor coupler	1	Disconnect.
7	Intake air temperature sensor	1	
8	Auxiliary DC jack coupler (left)	1	Disconnect.
9	Windshield inner panel (left)	1	



## Removing the windshields and headlight assembly



Order	Job/Parts to remove	Q'ty	Remarks
10	Headlight coupler	1	Disconnect.
11	Auxiliary DC jack coupler (right)	1	
12	Windshield inner panel (right)	1	
13	Headlight inner cover	1	
14	Headlight assembly	1	



EAS33141

### REMOVING THE METER ASSEMBLY

1. Remove:
  - Meter assembly

#### TIP

---

Pull the meter assembly upward and remove the meter assembly from the headlight inner cover.

---

EAS30141

### INSTALLING THE WINDSHIELDS

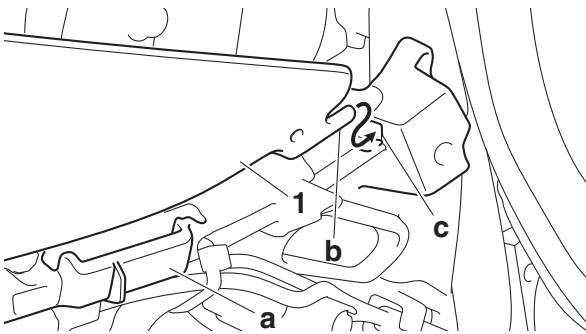
The following procedure applies to both of windshields.

1. Install:
  - Windshield (left/right) "1"

#### TIP

---

- Install the windshield to the inward of the portion "a" on the windshield inner panel.
  - Fit the projection "b" on the windshield to the hole "c" in the windshield inner panel.
- 



EAS31774

### INSTALLING THE METER ASSEMBLY

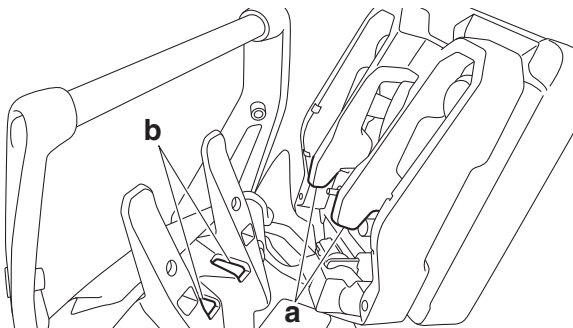
1. Install:
  - Meter assembly

#### TIP

---

Fit the projections "a" on the meter assembly to the holes "b" in the headlight inner cover.

---

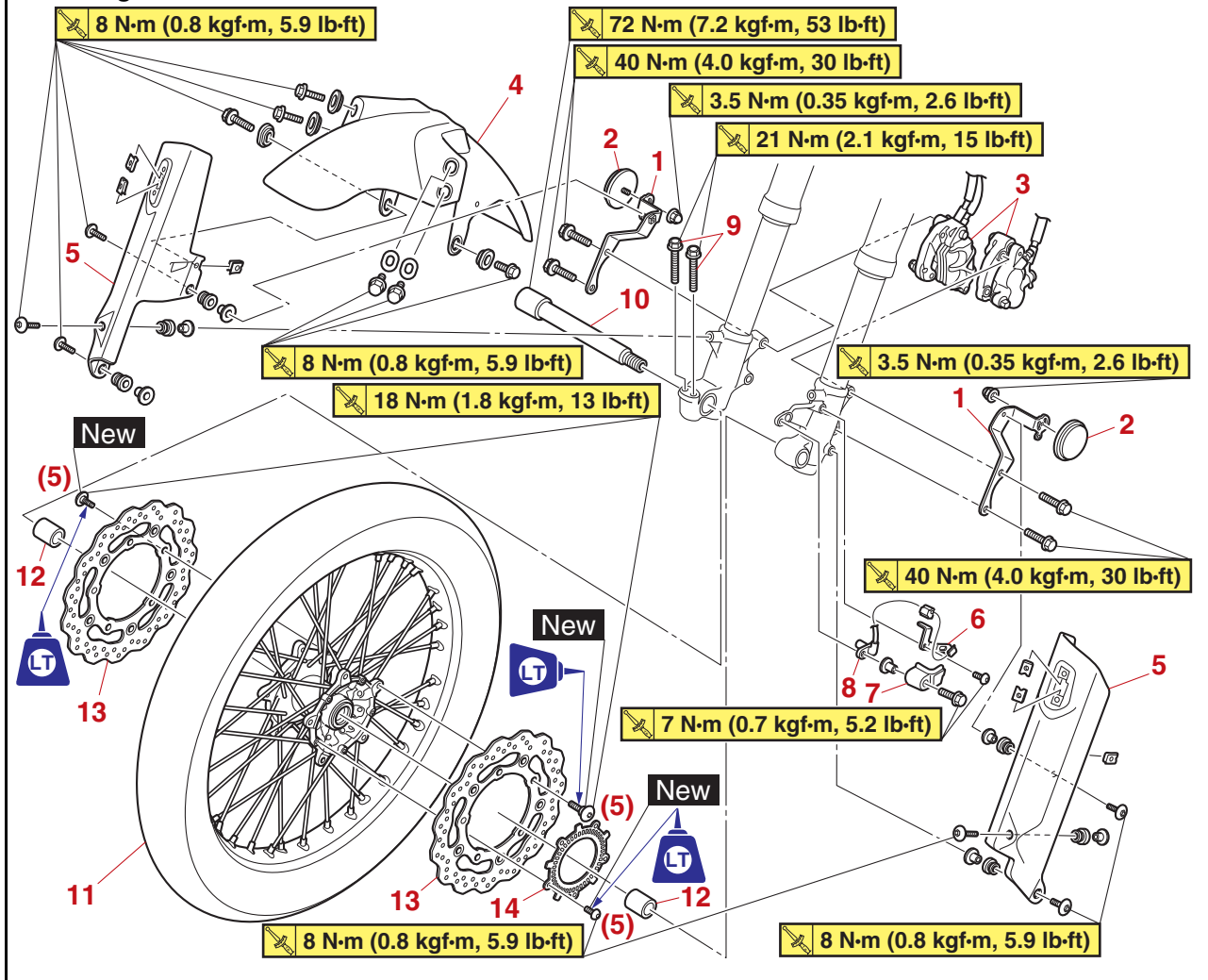


# FRONT WHEEL

EAS20028

## FRONT WHEEL

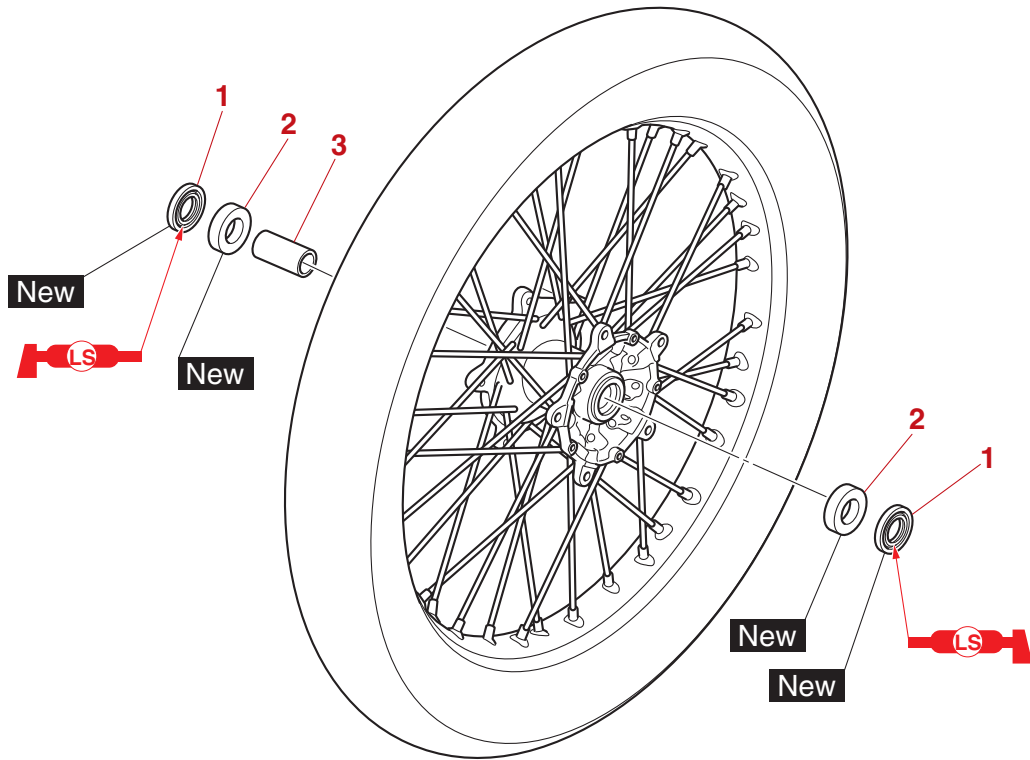
### Removing the front wheel and brake discs



Order	Job/Parts to remove	Q'ty	Remarks
1	Reflector bracket	2	
2	Reflector	2	
3	Front brake caliper	2	
4	Front fender	1	
5	Front fork protector	2	
6	Front wheel sensor lead holder	1	
7	Front wheel sensor protector	1	
8	Front wheel sensor	1	
9	Front wheel axle pinch bolt	2	Loosen.
10	Front wheel axle	1	
11	Front wheel	1	
12	Collar	2	
13	Front brake disc	2	
14	Front wheel sensor rotor	1	

# FRONT WHEEL

## Disassembling the front wheel



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

EAS30145

## REMOVING THE FRONT WHEEL

ECA20981

### NOTICE

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the front wheel sensor rotor or subject it to shocks.
- If any solvent gets on the front wheel sensor rotor, wipe it off immediately.

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 calipers
- Front wheel sensor

ECA20990

### 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 outer tube.

3. Elevate:

- Front wheel

### TIP

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

EAS30146

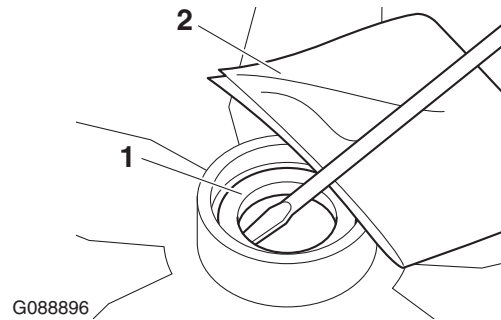
## DISASSEMBLING THE FRONT WHEEL

1. Remove:

- Oil seal
- 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 with a general bearing puller.

EAS30147

## CHECKING THE FRONT WHEEL

1. Check:

- Front 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 3-16.

3. Check:

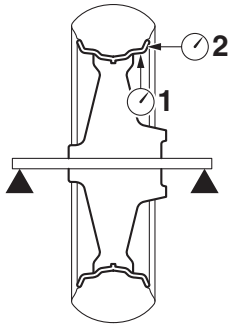
- Spokes
  - Bends/damage → Replace.
  - Loose → Tighten.
  - Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-16.

4. Measure:

- Radial wheel runout "1"
- Lateral wheel runout "2"
- Over the specified limits → Replace.



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



G088897

5. Check:

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

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  
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 deflection  
Out of specification → Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor deflection, or replace the wheel sensor rotor.

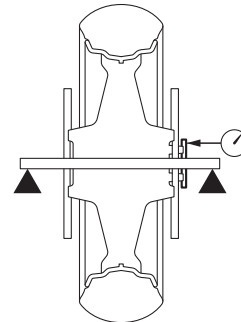


**Wheel sensor rotor deflection limit**  
**0.25 mm (0.0098 in)**

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

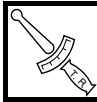
### TIP

Do not touch the surface of the wheel sensor rotor with a sharp object.



G088902

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



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

ECA18100

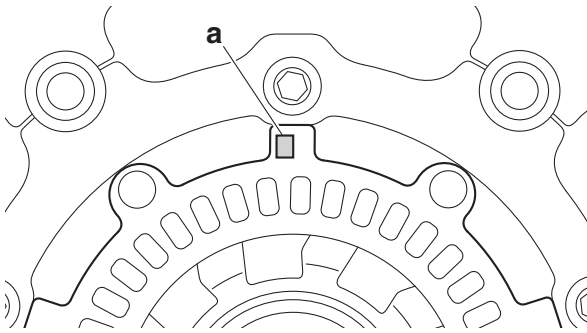
### NOTICE

**Replace the wheel sensor rotor bolts with new ones.**

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

### TIP

- Install the wheel sensor rotor with the stamped mark "a" facing outward.
- Tighten the front wheel sensor rotor bolts in stages and in a crisscross pattern.



EAS30151

## ASSEMBLING THE FRONT WHEEL

1. Install:

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

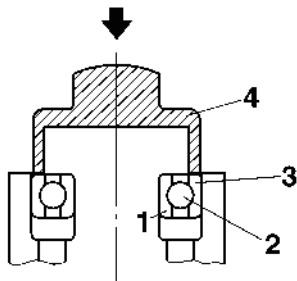
ECA18110

### 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.

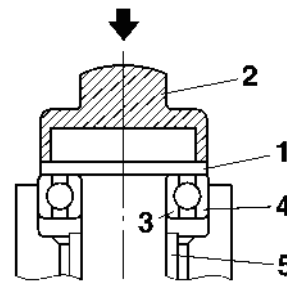


G088898

- 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".



G088899

EAS30152

## ADJUSTING THE FRONT WHEEL STATIC BALANCE

### TIP

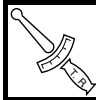
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

1. Remove:
  - Balancing weight(s)
2. Find:
  - Front wheel's heavy spot
3. Adjust:
  - Front wheel static balance
4. Check:
  - Front wheel static balance

EAS32231

## INSTALLING THE FRONT WHEEL

1. Install:
  - Front wheel sensor rotor
  - Front brake discs



**Front wheel sensor rotor bolt**  
**8 N·m (0.8 kgf·m, 5.9 lb·ft)**  
**LOCTITE®**  
**Front brake disc bolt**  
**18 N·m (1.8 kgf·m, 13 lb·ft)**  
**LOCTITE®**

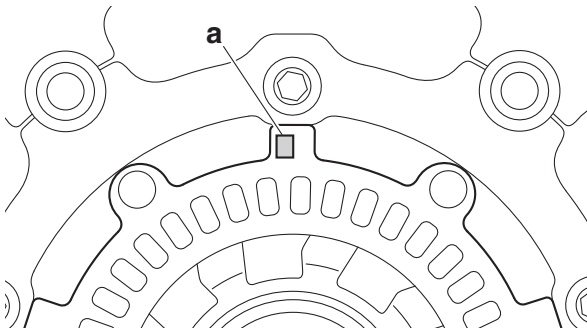
ECA21011

### 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 "a" facing outward.
- Tighten the brake disc bolts and wheel sensor rotor bolts in stages and in a crisscross pattern.



2. Lubricate:
- Oil seal lips

	<b>Recommended lubricant</b> Lithium-soap-based grease
---	---

3. Install:
- Collars
  - Front wheel
  - Front wheel axle
  - Front wheel axle pinch bolts

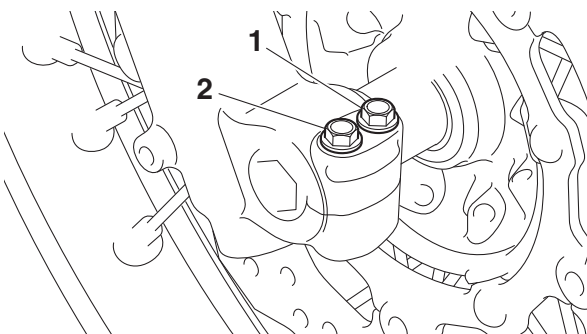
	<b>Front wheel axle</b> 72 N·m (7.2 kgf·m, 53 lb·ft) <b>Front wheel axle pinch bolt</b> 21 N·m (2.1 kgf·m, 15 lb·ft)
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ECA14140

### NOTICE

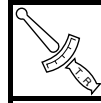
Before tightening the wheel axle nut, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.

- Insert the front wheel axle from the right side and tighten it to specification.
- In the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1", tighten each bolt to specification without performing temporary tightening.



4. Check:
- Front brake discs
- Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-30.

5. Install:
- Front wheel sensor
  - Front wheel sensor protector
  - Front wheel sensor lead holder "1"



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

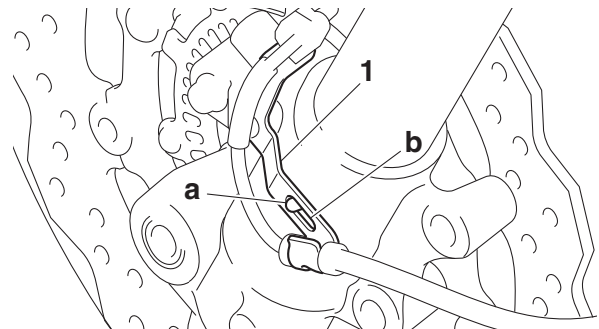
ECA21020

### 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

- Fit the projection "a" on the front fork into the hole "b" on the front wheel sensor lead holder.
- When installing the front wheel sensor, check the wheel sensor lead for twists.
- To route the front wheel sensor lead, refer to "CABLE ROUTING" on page 2-15.



6. Measure:
- Distance "a" (between the front 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 (warping caused by overtorque, wrong installation direction, rotor decentering, LOC-TITE® 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.



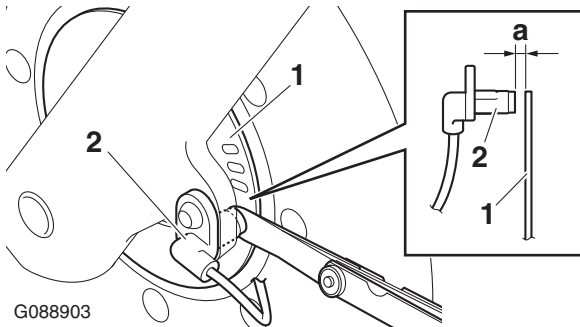
**Distance “a” (between the front wheel sensor rotor and front wheel sensor)**  
**0.7–1.6 mm (0.03–0.06 in)**

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

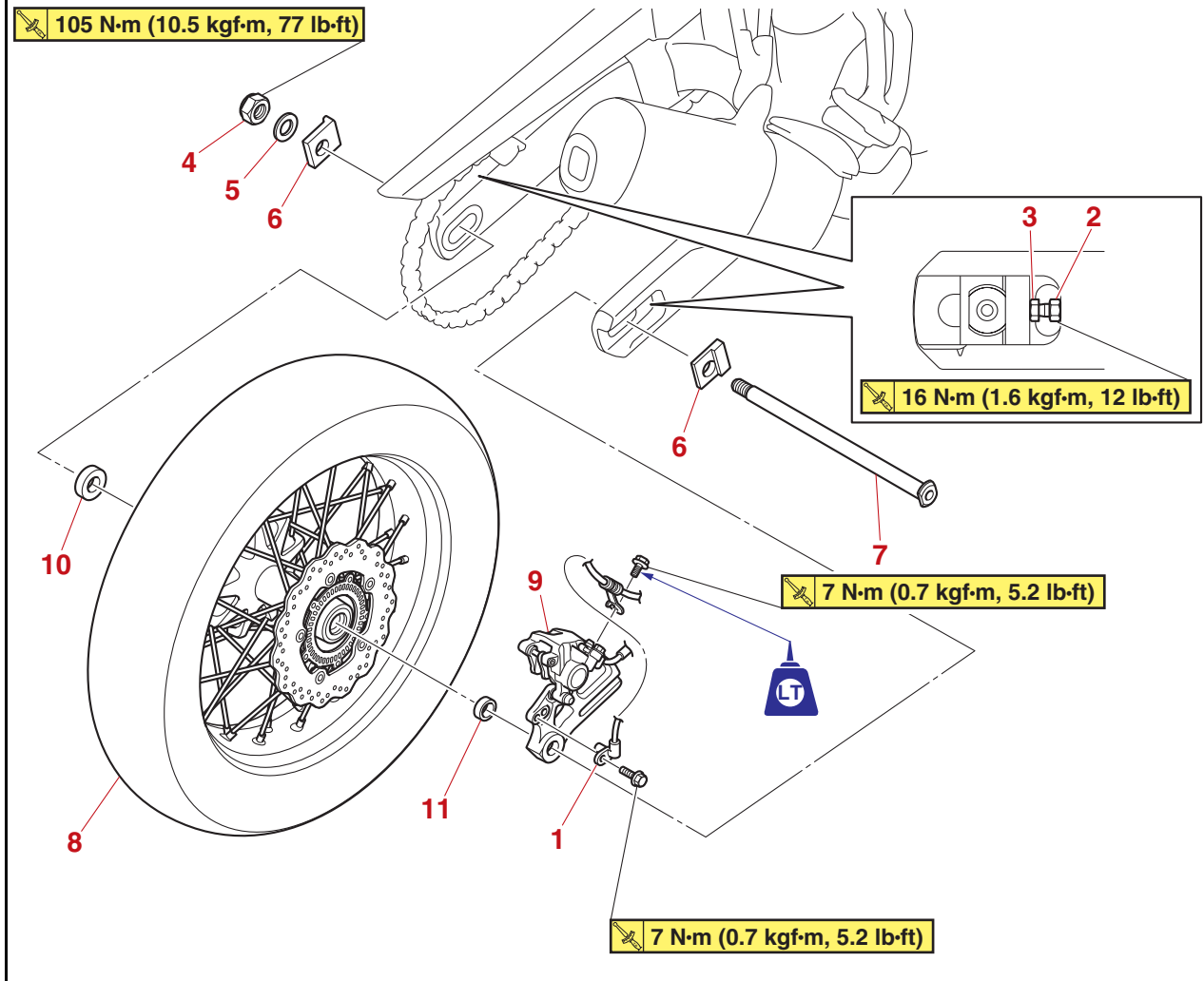




EAS20029

## REAR WHEEL

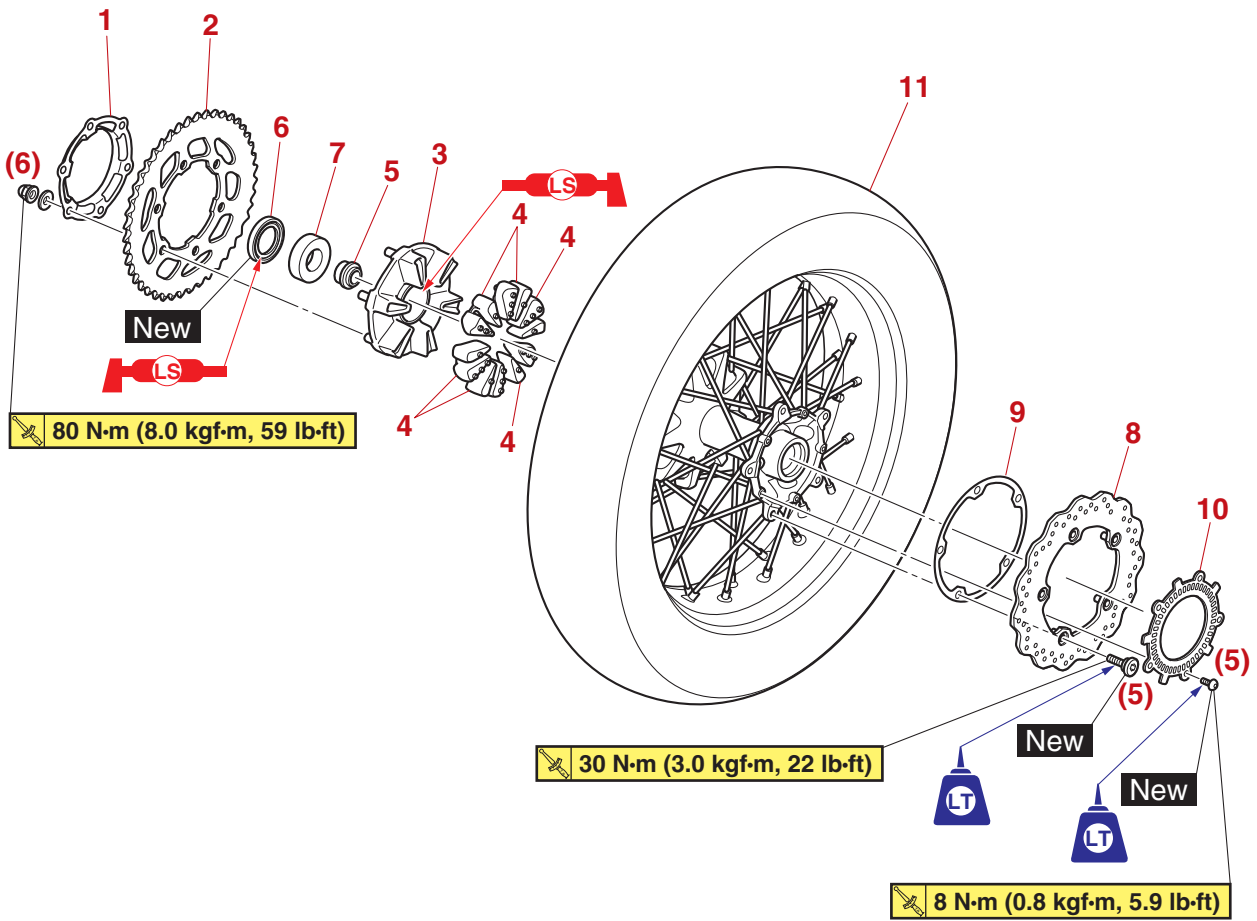
### Removing the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear wheel sensor	1	
2	Locknut	2	Loosen.
3	Adjusting bolt	2	Loosen.
4	Rear wheel axle nut	1	
5	Washer	1	
6	Adjusting block	2	
7	Rear wheel axle	1	
8	Rear wheel	1	
9	Rear brake caliper	1	
10	Collar (left)	1	
11	Collar (right)	1	

# REAR WHEEL

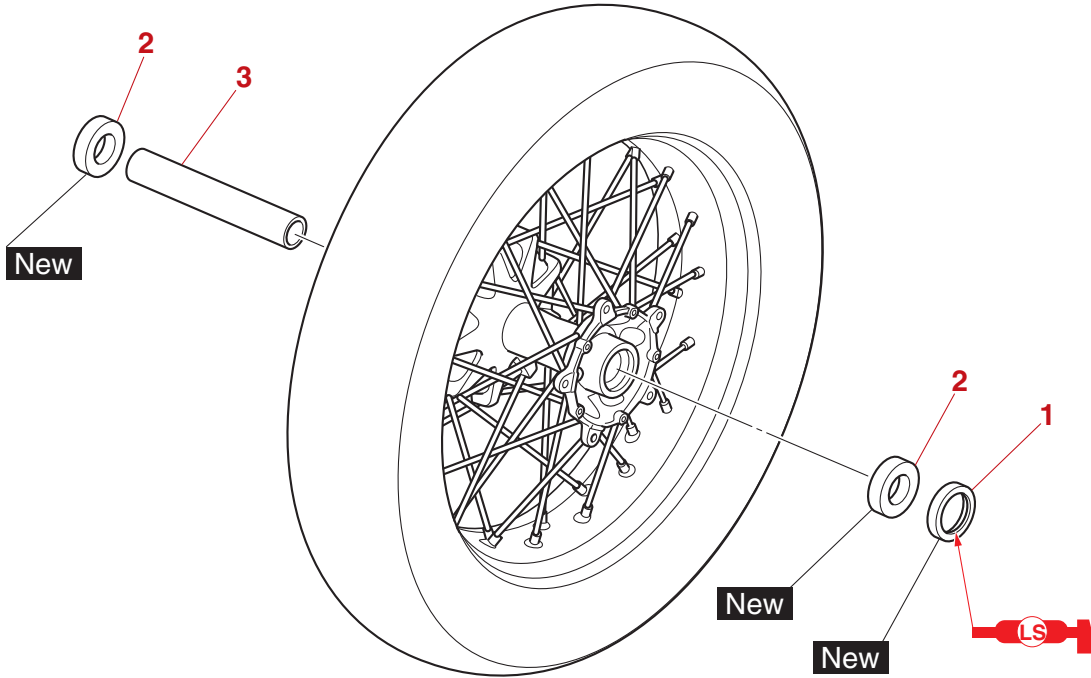
## Removing the rear brake disc and rear wheel sprocket



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

# REAR WHEEL

## Disassembling the rear wheel



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

EAS30910

## REMOVING THE REAR WHEEL

ECA21030

### NOTICE

- **Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.**
- **Do not drop the rear wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the rear wheel sensor rotor, wipe it off immediately.**

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:
  - Rear wheel sensor
  - Rear brake caliper

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. Loosen:
  - Locknuts
  - Adjusting bolts

4. Remove:
  - Rear wheel axle nut
  - Washer
  - Rear wheel axle
  - Adjusting blocks
  - Rear wheel

### TIP

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

EAS30158

## DISASSEMBLING THE REAR WHEEL

1. Remove:
  - Oil seal
  - Wheel bearingsRefer to "DISASSEMBLING THE FRONT WHEEL" on page 4-13.

EAS30159

## CHECKING THE REAR WHEEL

1. Check:
  - Rear wheel axle
  - Wheel bearings
  - Oil sealRefer to "CHECKING THE FRONT WHEEL" on page 4-13.
2. Check:
  - Tire
  - Rear wheelDamage/wear → Replace.  
Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-16.
3. Check:
  - SpokesBends/damage → Replace.  
Loose → Tighten.  
Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-16.
4. Measure:
  - Radial wheel runout
  - Lateral wheel runoutRefer to "CHECKING THE FRONT WHEEL" on page 4-13.

EAS30160

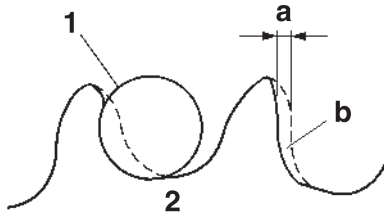
## CHECKING THE REAR WHEEL DRIVE HUB

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

EAS30161

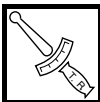
## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
  - Rear wheel sprocketMore than 1/4 tooth "a" wear → Replace the drive sprockets as a set.  
Bent teeth → Replace the drive sprockets as a set.



G088904

- b. Correct
  - 1. Drive chain roller
  - 2. Rear wheel sprocket
2. Replace:
- Rear wheel sprocket
    - a. Remove the rear wheel sprocket nuts, bracket, and the rear wheel sprocket.
    - b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
    - c. Install a new rear wheel sprocket.



**Rear wheel sprocket nut  
80 N·m (8.0 kgf·m, 59 lb·ft)**

#### TIP

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

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 4-14.
2. Check:
  - Rear wheel sensor rotor  
Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-14.
3. Measure:
  - Wheel sensor rotor deflection  
Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-14.



**Wheel sensor rotor deflection limit  
0.25 mm (0.0098 in)**

EAS30163

## ASSEMBLING THE REAR WHEEL

ECA21050

### 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 seal **New**  
Refer to “ASSEMBLING THE FRONT WHEEL” on page 4-15.

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 4-15.

EAS32053

## INSTALLING THE REAR WHEEL

#### 1. Install:

- Rear wheel sensor rotor
- Rear brake disc

# REAR WHEEL



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

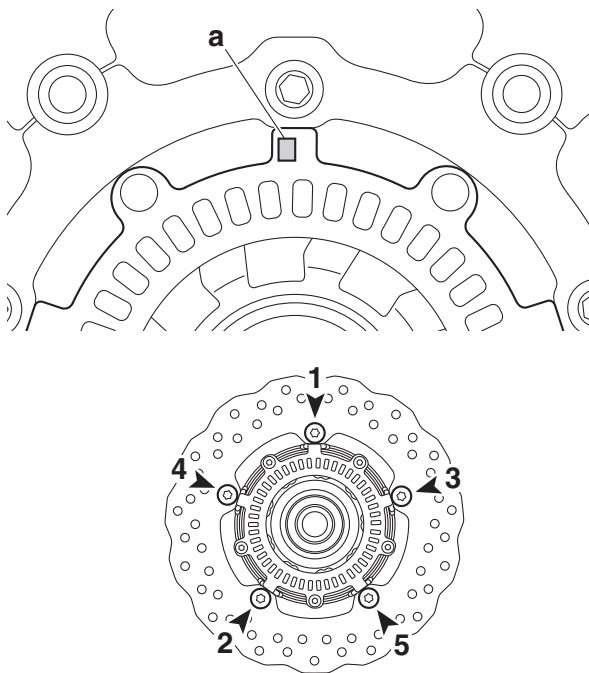
ECA21011

## 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 “a” facing outward.
- Tighten the brake disc bolts and wheel sensor rotor bolts in stages and in a crisscross pattern.
- Tighten the rear brake disc bolt as illustration.



## 2. Install:

- Rear wheel sprocket  
Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-21.

## 3. Check:

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

## 4. Lubricate:

- Oil seal lips

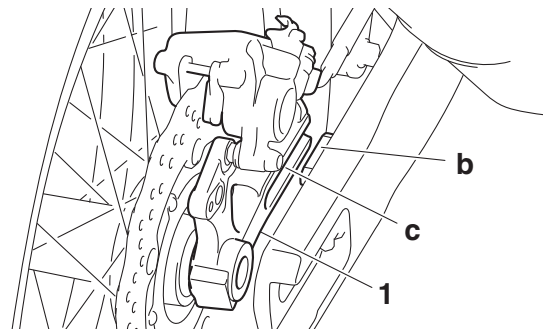
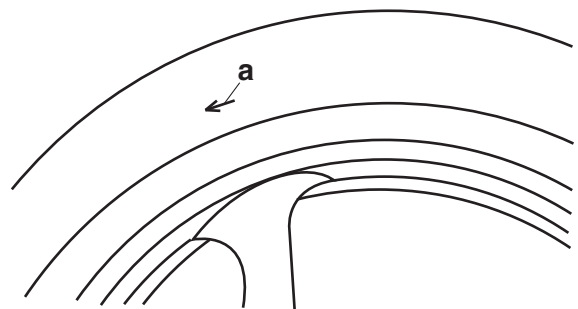


Recommended lubricant  
Lithium-soap-based grease

5. Install:
- Collar (right)
  - Collar (left)
  - Rear brake caliper “1”
  - Rear wheel
  - Adjusting blocks
  - Rear wheel axle
  - Washer
  - Rear wheel axle nut

## TIP

- Install the rear wheel with the mark “a” on the rear tire pointing in the direction of wheel rotation.
- Align the projection “b” in the swingarm with the slot “c” of the brake caliper bracket.



## 6. Install:

- Rear wheel sensor lead holder “1”

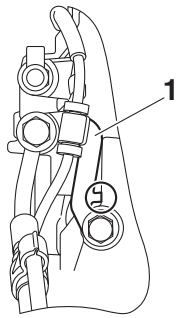
## TIP

Contact the rear wheel sensor lead holder to the caliper bracket.

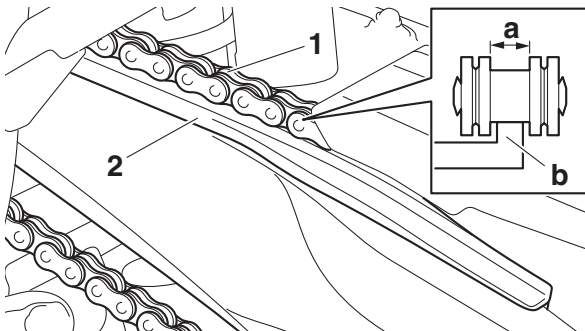


Rear wheel sensor lead holder bolt  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

# REAR WHEEL



7. Fit the space “a” between the side plates of the drive chain “1” onto the rib “b” on the drive chain guide “2”.



8. Adjust:
- Drive chain slack  
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.



**Drive chain slack**  
43.0–48.0 mm (1.69–1.89 in)

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

To route the rear wheel sensor lead, refer to “CABLE ROUTING” on page 2-15.

10. Measure:
- Distance “a”  
(between the rear 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, LOC-TITE® 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.



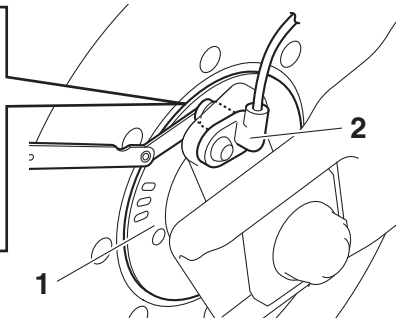
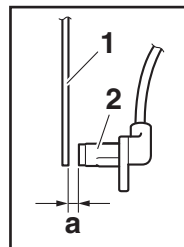
**Distance “a” (between the rear wheel sensor rotor and rear wheel sensor)**  
0.8–1.6 mm (0.03–0.06 in)

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

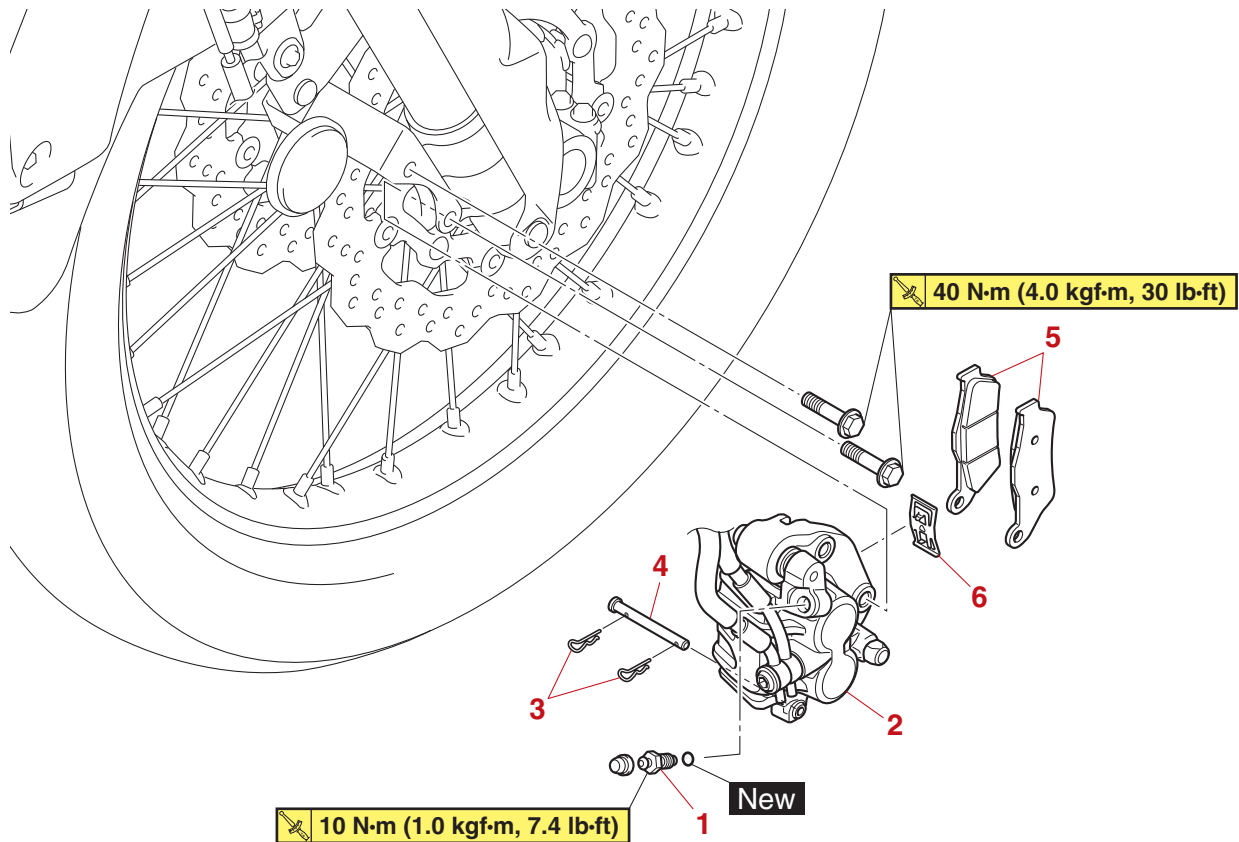


G088906

EAS20030

## FRONT BRAKE

### Removing the front brake pads

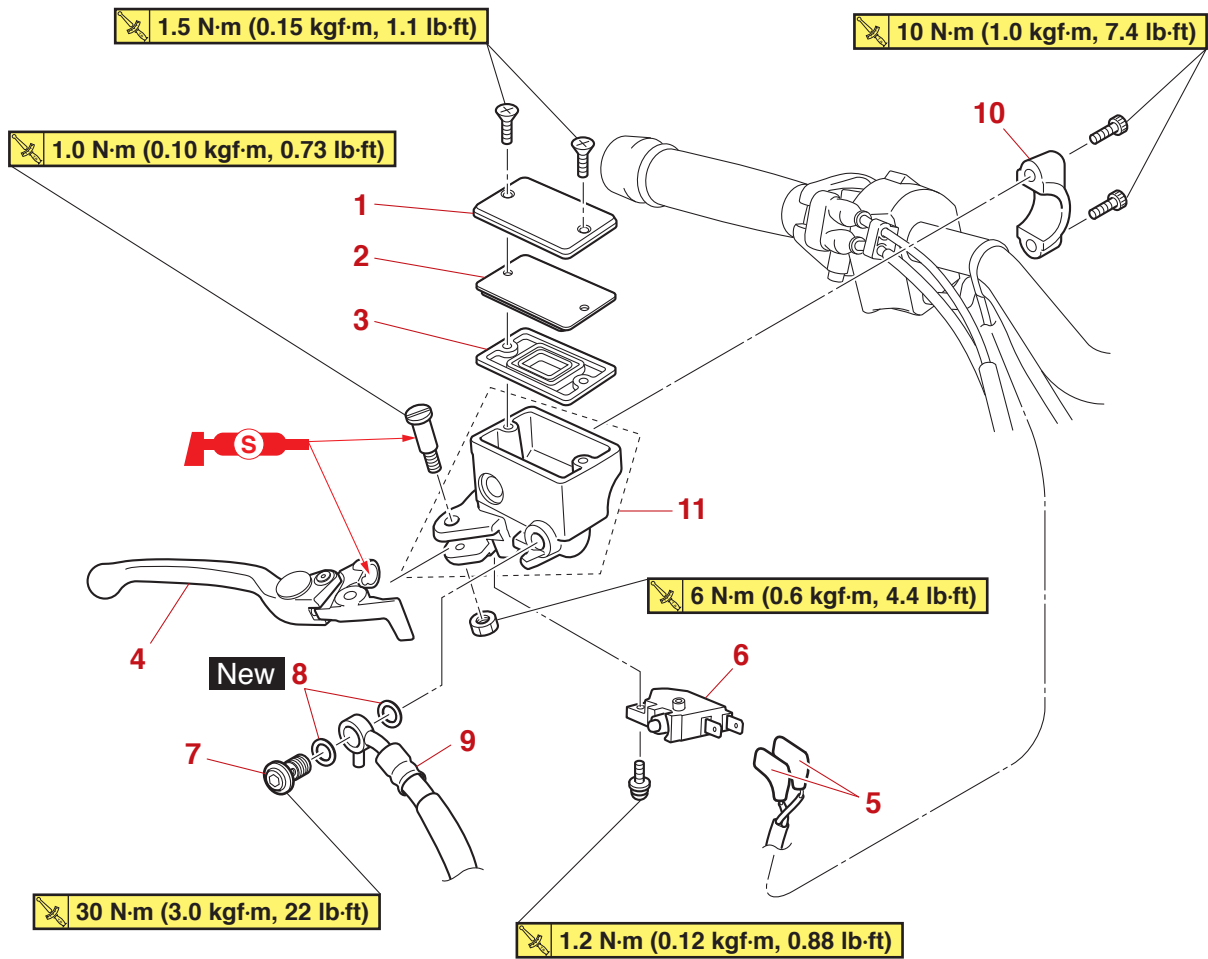


Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake caliper bleed screw	1	Loosen.
2	Front brake caliper	1	
3	Brake pad clip	2	
4	Brake pad pin	1	
5	Brake pad	2	
6	Brake pad spring	1	



# FRONT BRAKE

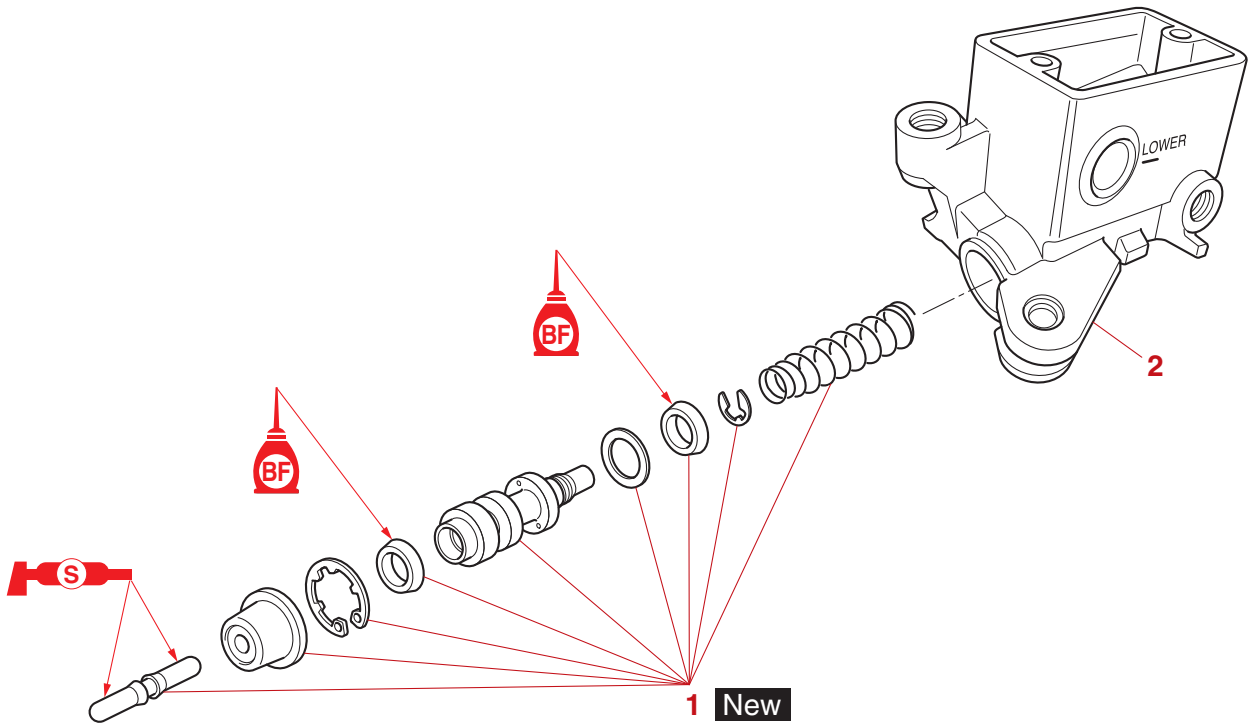
## Removing the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
	Rearview mirror (right)		Refer to "HANDLEBAR" on page 4-52.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.
6	Front brake light switch	1	
7	Front brake hose union bolt	1	
8	Brake hose gasket	2	
9	Brake hose (front brake master cylinder to hydraulic unit)	1	
10	Front brake master cylinder holder	1	
11	Front brake master cylinder assembly	1	

# FRONT BRAKE

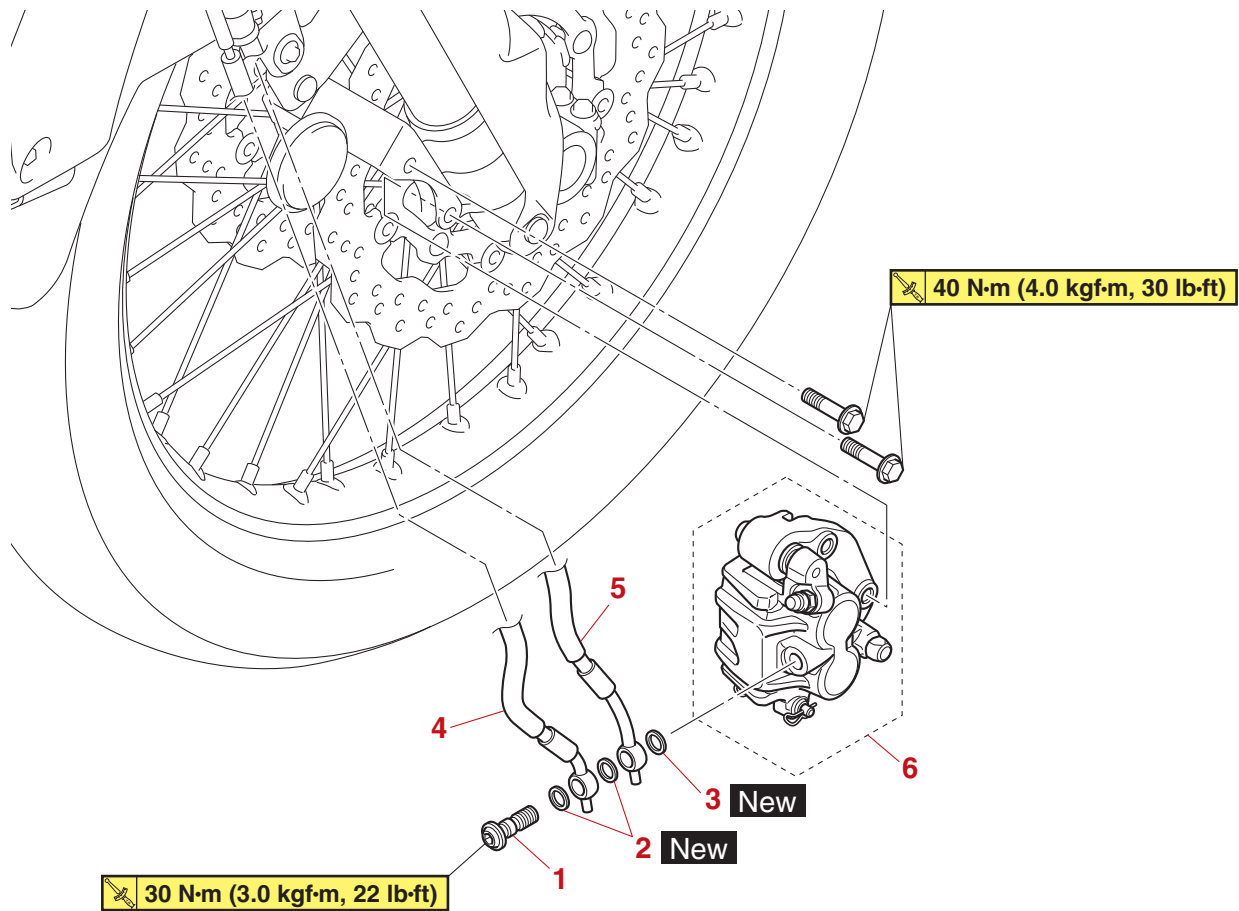
## Disassembling the front brake master cylinder



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

# FRONT BRAKE

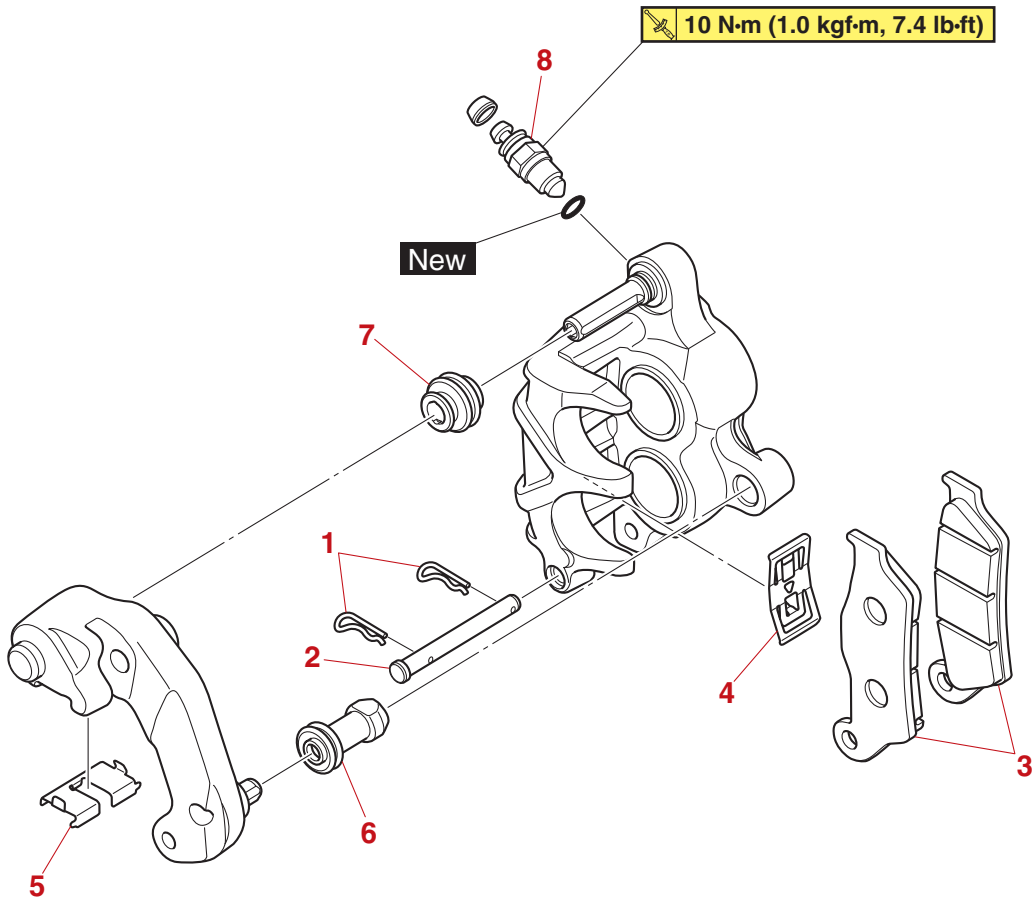
## Removing the front brake calipers



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

# FRONT BRAKE

## 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	2	
4	Brake pad spring	1	
5	Brake pad support	1	
6	Boot	1	
7	Boot	1	
8	Brake caliper bleed screw	1	

EAS30168

## INTRODUCTION

EWA14101

### **WARNING**

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilled 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

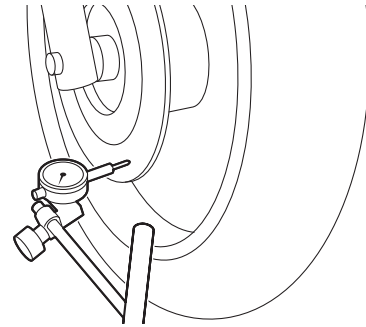
The following procedure applies to both brake discs.

1. Check:
  - Front brake disc  
Damage/galling → Replace.
2. Measure:
  - Brake disc deflection  
Out of specification → Correct the brake disc deflection or replace the brake disc.



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

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



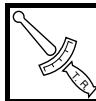
G098641

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



**Brake disc thickness limit**  
**4.0 mm (0.16 in)**

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



**Front brake disc bolt**  
**18 N·m (1.8 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 deflection.
- e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
- f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

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.

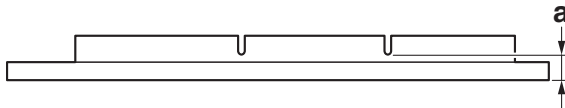
# FRONT BRAKE

## 1. Measure:

- Brake pad wear “a”  
Out of specification → Replace the brake pads as a set.



**Brake pad lining thickness limit**  
**4.0 mm (0.16 in)**



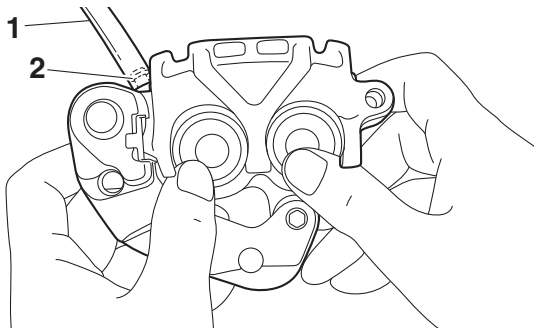
## 2. Install:

- Brake pad spring
- Brake pads

### TIP

Always install new brake pads and a 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 fingers.



- c. Tighten the bleed screw.



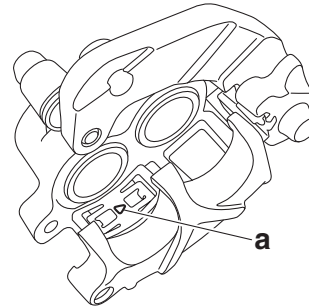
**Front brake caliper bleed screw**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

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

### TIP

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

- Install the brake pad spring in the brake caliper in the recessed portion that is near the brake pad pin.



## 3. Install:

- Brake pad pin
- Brake pad clips
- Front brake caliper



**Front brake caliper bolt**  
**40 N·m (4.0 kgf·m, 30 lb·ft)**

## 4. Check:

- Brake fluid level  
Below the minimum level mark → Add the specified brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.

## 5. Check:

- Brake lever operation  
Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS30724

## REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

### TIP

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

## 1. Remove:

- Brake hose union bolt
- Brake hose gaskets
- Brake hose (hydraulic unit to right front brake caliper) (right side only)
- Brake hose (right front brake caliper to left front brake caliper)

### TIP

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

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
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

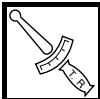
- Check:
  - Brake caliper body  
Cracks/damage → Replace the brake caliper assembly.
  - Brake fluid delivery passages (brake caliper body)  
Obstruction → Blow out with compressed air.

EAS30175

## INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

- Install:
  - Front brake caliper (temporarily)
  - Brake hose gaskets **New**
  - Brake hose (hydraulic unit to right front brake caliper)
  - Brake hose (right front brake caliper to left front brake caliper)
  - Brake hose union bolt



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

EWA13531



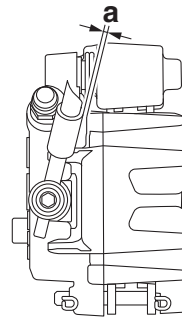
**WARNING**

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

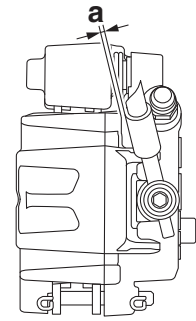
### TIP

- There should be 1.5–2.5 mm (0.06–0.10 in) clearance between the brake pipe and brake caliper as shown in the illustration.
- Align the pins “b” of the brake hose (hydraulic unit to right front brake) and brake hose (right front brake caliper to left brake caliper).

A



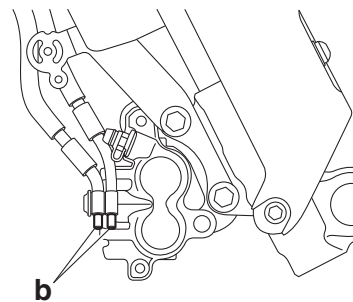
B



A. Left side

B. Right side

a. 1.5–2.5 mm (0.059–0.098 in)



- Remove:

- Front brake caliper

- Install:

- Brake pad spring
  - Brake pads
  - Brake pad pin
  - Brake pad clips
- Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-30.

- 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 spilled brake fluid immediately.**

5. Bleed:
  - Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
6. Check:
  - Brake fluid level  
Below the minimum level mark → Add the specified brake fluid to the proper level.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-16.
7. Check:
  - Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

EAS30179

## REMOVING THE FRONT BRAKE MASTER CYLINDER

### TIP

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

1. Disconnect:
  - Brake light switch connectors (from the front brake light switch)
2. Remove:
  - Brake hose union bolt
  - Brake hose gaskets
  - Brake hose (front brake master cylinder to hydraulic unit)

### TIP

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

EAS30725

## CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
  - Brake master cylinder  
Damage/scratches/wear → Replace.

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

EAS30181

## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

### WARNING

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

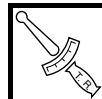


**Specified brake fluid  
DOT 4**

EAS30182

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

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

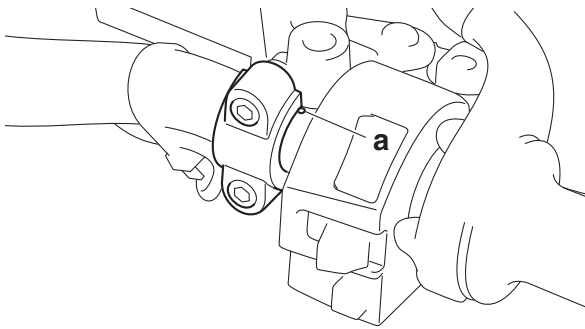


**Front brake master cylinder holder bolt  
10 N·m (1.0 kgf·m, 7.4 lb·ft)**

### TIP

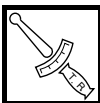
Align the end of the front brake master cylinder holder with the punch mark "a" on the handlebar.





2. Install:

- Brake hose (front brake master cylinder to hydraulic unit)
- Brake hose gaskets **New**
- Brake hose union bolt



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

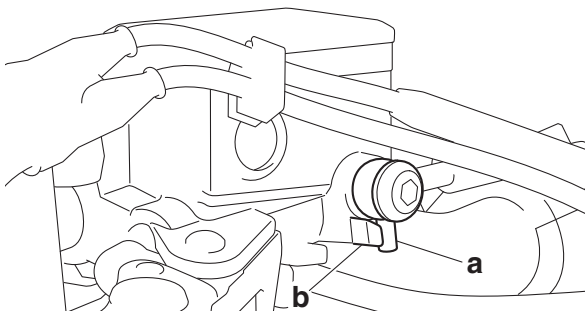
EWA13531

**WARNING**

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

**TIP**

- Fit the projection “a” on the brake hose to the projection “b” on the front brake master cylinder.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

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



**Specified brake fluid**  
DOT 4

EWA13540

**WARNING**

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

ECA13540

**NOTICE**

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

4. Bleed:

- Brake system

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

5. Check:

- Brake fluid level

Below the minimum level mark → Add the specified brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.

6. Check:

- Brake lever operation

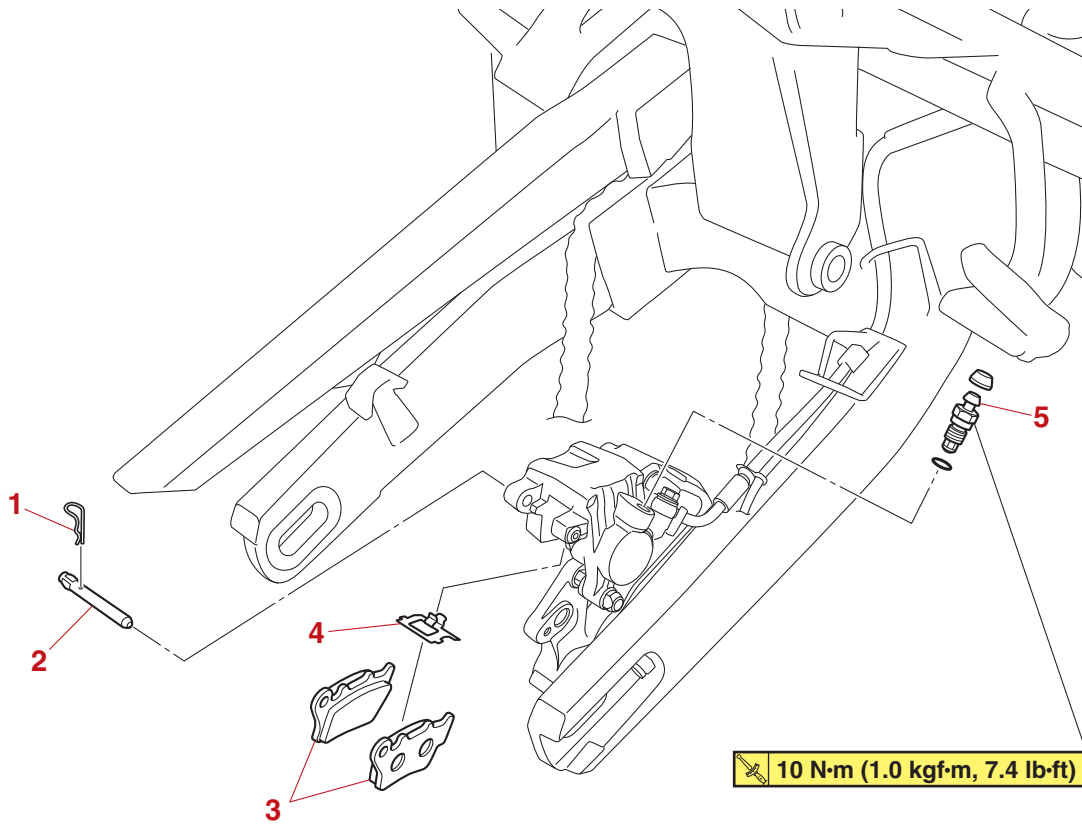
Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS20031

## REAR BRAKE

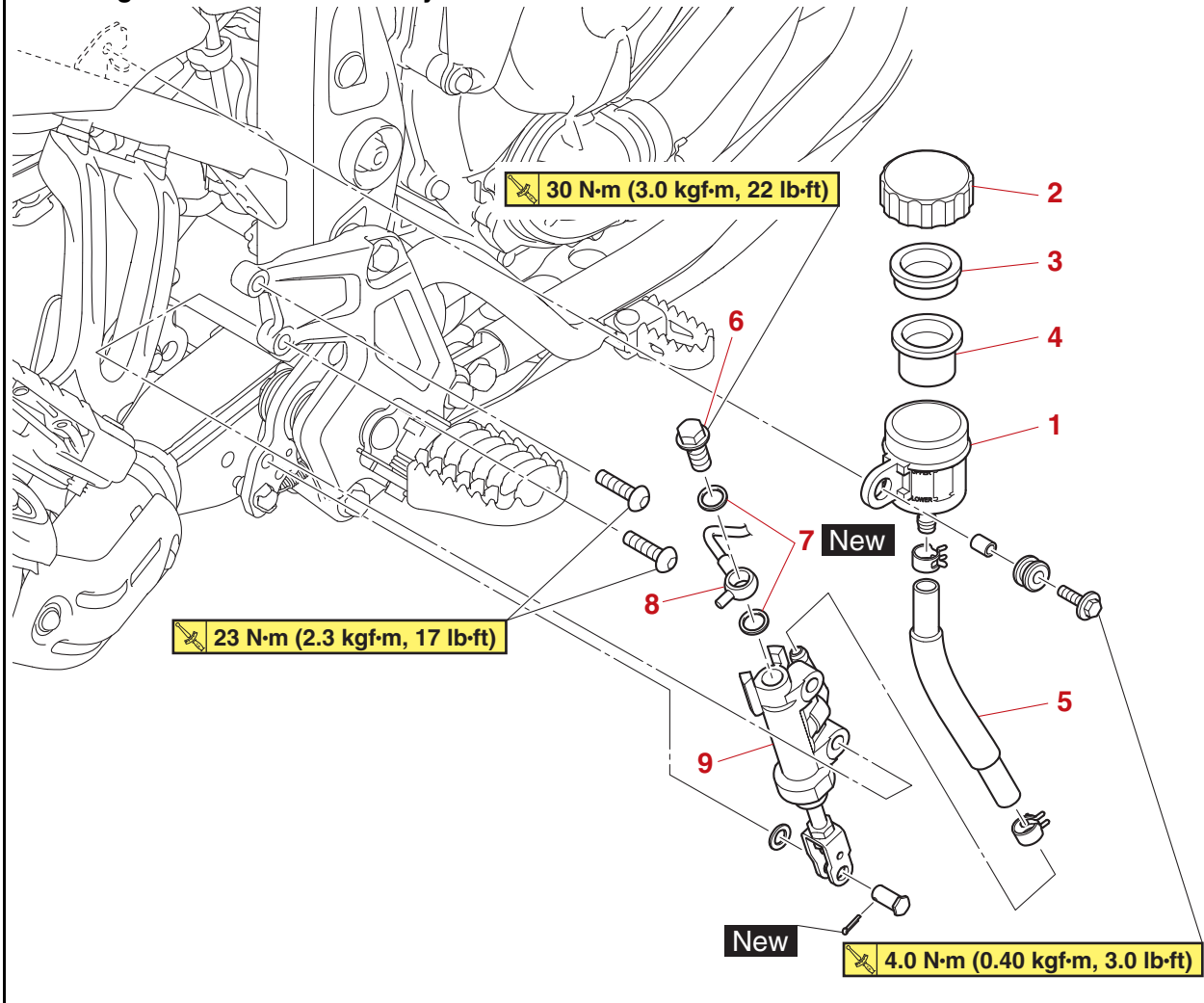
### Removing the rear brake pads



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
1	Brake pad clip	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	1	
5	Brake caliper bleed screw	1	Loosen.

# REAR BRAKE

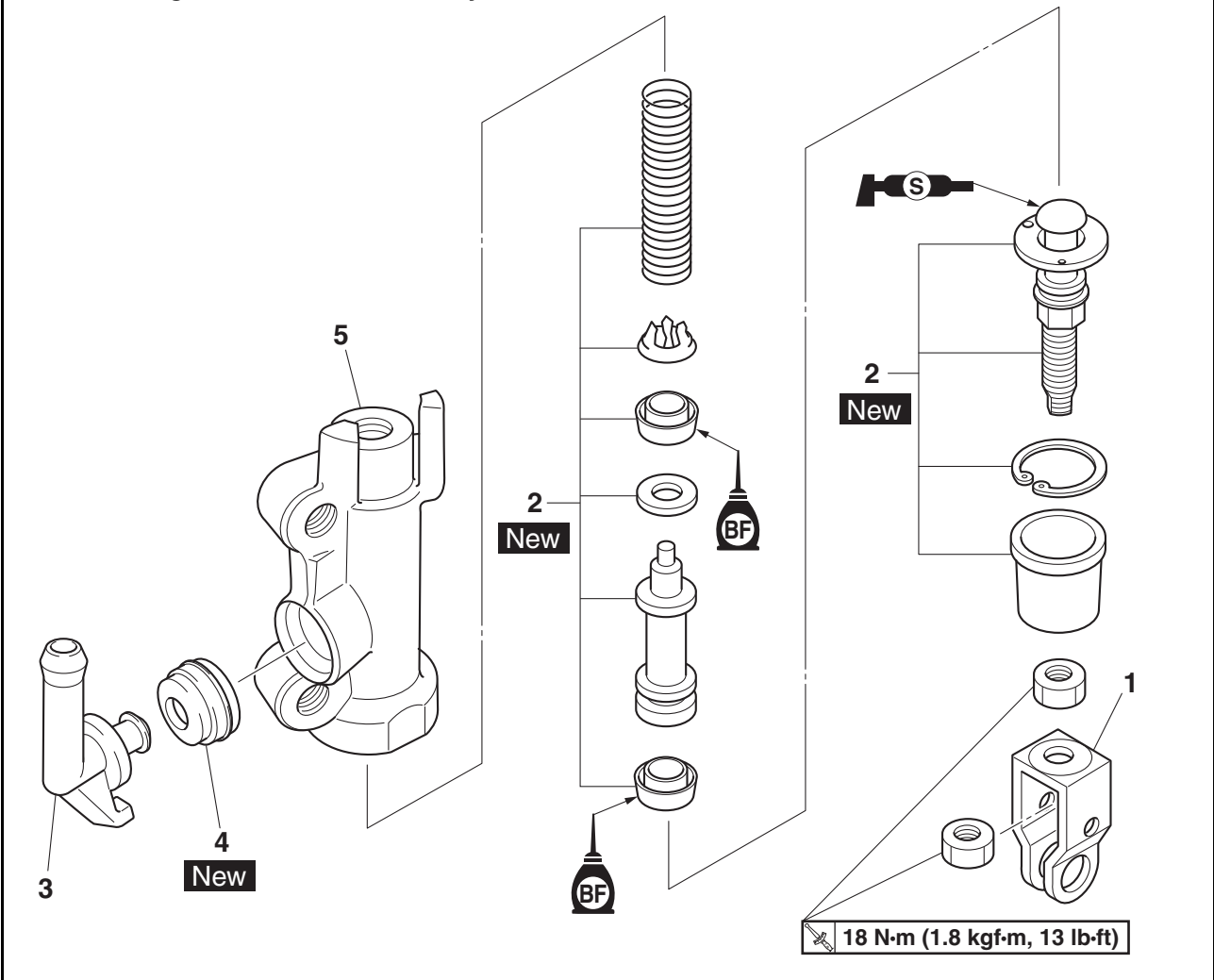
## Removing the rear brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
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 union bolt	1	
7	Brake hose gasket	2	
8	Brake hose (rear brake master cylinder to hydraulic unit)	1	
9	Rear brake master cylinder	1	

# REAR BRAKE

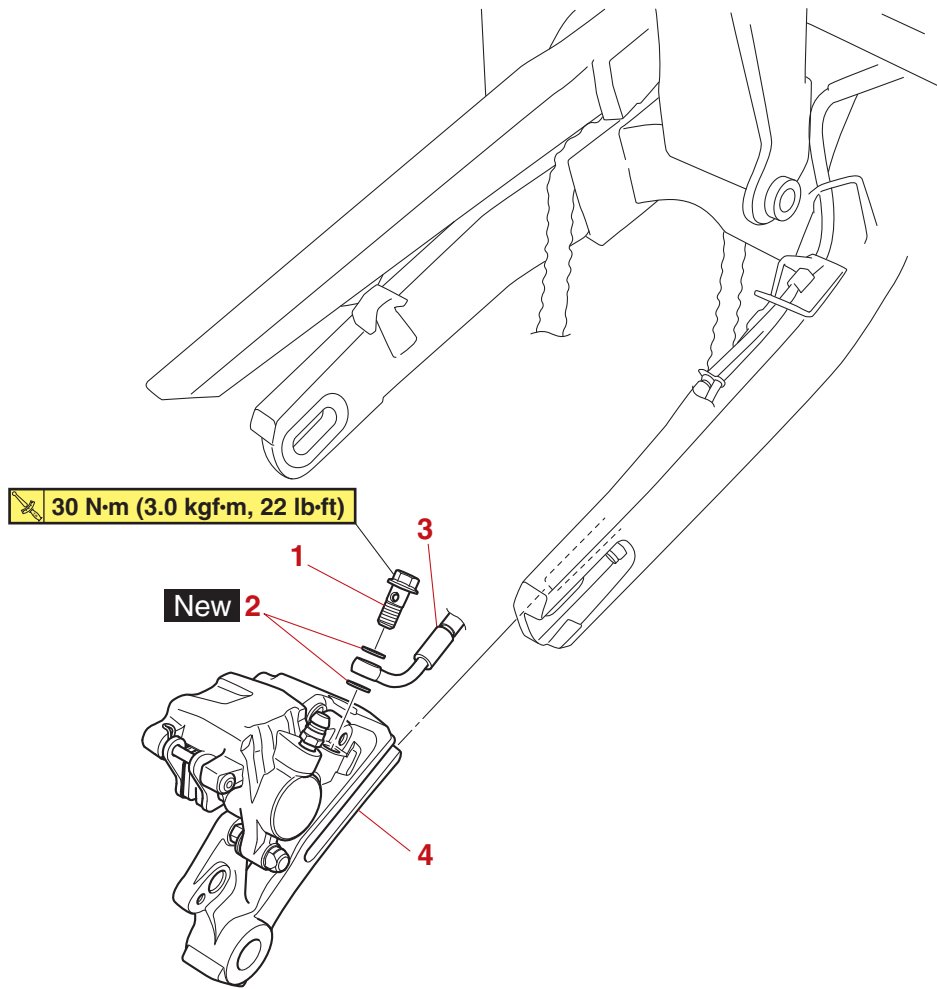
## Disassembling the rear brake master cylinder



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

# REAR BRAKE

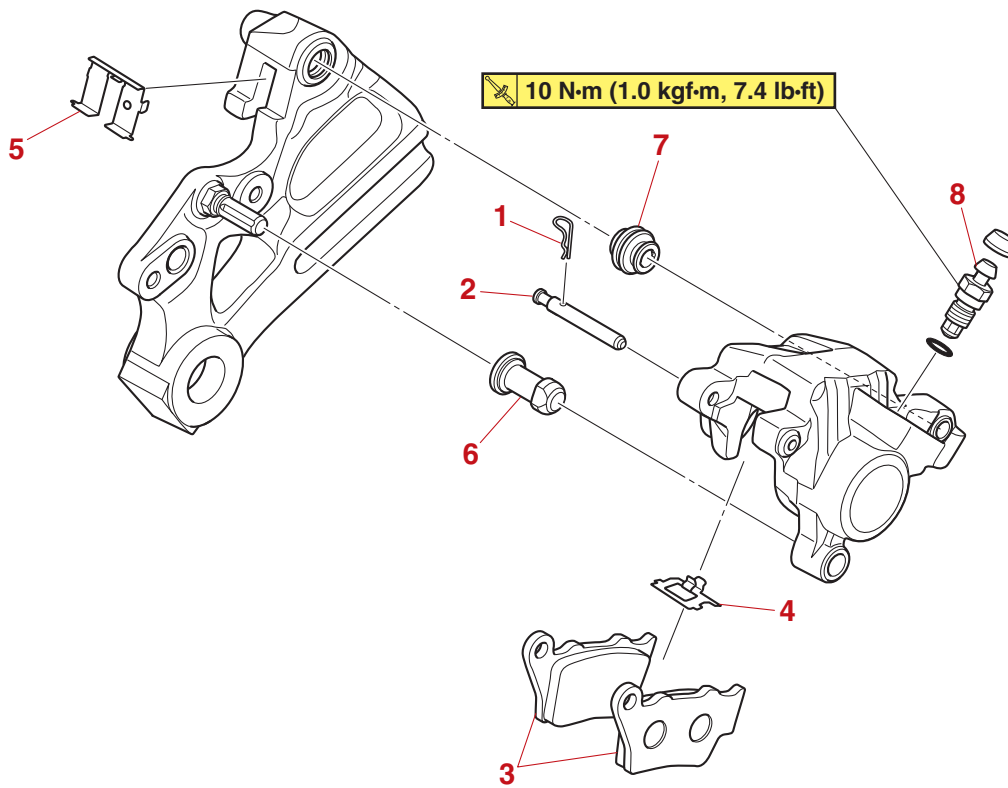
## Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
1	Rear brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose (hydraulic unit to rear brake caliper)	1	
4	Rear brake caliper	1	

# REAR BRAKE

## Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad clip	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	1	
5	Brake pad support	1	
6	Boot	1	
7	Boot	1	
8	Brake caliper bleed screw	1	

EAS30183

## INTRODUCTION

EWA14101

### WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

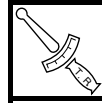
- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only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

### FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

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

#### 4. Adjust:

- Brake disc deflection  
Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-30.



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

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. Remove:

- Rear wheel  
Refer to “REMOVING THE REAR WHEEL” on page 4-21.

#### 2. Measure:

- Brake pad wear limit “a”  
Out of specification → Replace the brake pads as a set.



**Brake pad lining thickness limit**  
3.9 mm (0.15 in)

EAS30184

## CHECKING THE REAR BRAKE DISC

#### 1. Check:

- Rear brake disc  
Damage/galling → Replace.

#### 2. Measure:

- Brake disc deflection  
Out of specification → Correct the brake disc deflection or replace the brake disc.  
Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-30.



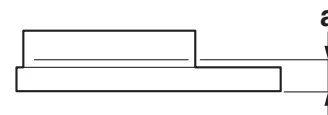
**Brake disc runout limit (as measured on wheel)**  
0.15 mm (0.0059 in)

#### 3. 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 4-30.

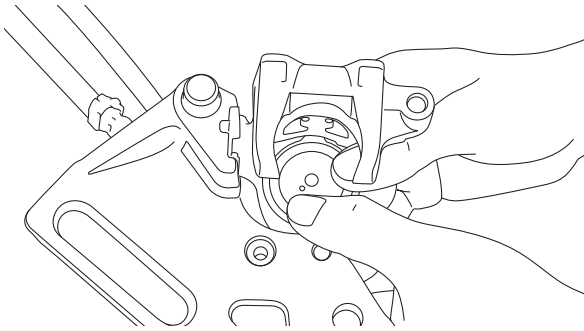


**Brake disc thickness limit**  
4.5 mm (0.18 in)



#### 3. Install:

- Brake pad spring  
(into the rear brake caliper)
- Brake pads
  - a. Connect a clear plastic hose tightly to the bleed screw. 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.

	<b>Rear brake caliper bleed screw 10 N·m (1.0 kgf·m, 7.4 lb·ft)</b>
---	---

d. Install the brake pads and brake pad spring.

4. Install:
  - Brake pad pin
  - Brake pad clip
  - Rear brake caliper
5. Install:
  - Rear wheel

Refer to “INSTALLING THE REAR WHEEL” on page 4-22.
6. Check:
  - Brake fluid level

Below the minimum level mark → Add the specified brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.
7. Check:
  - Brake pedal operation

Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS30186  
**REMOVING THE REAR BRAKE CALIPER TIP**

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

1. Remove:
  - Rear brake hose union bolt
  - Brake hose gaskets
  - Brake hose (hydraulic unit to rear brake caliper)

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

2. Remove:
  - Rear wheel

- Rear brake caliper  
Refer to “REMOVING THE REAR WHEEL” on page 4-21.

EAS30188  
**CHECKING THE REAR BRAKE CALIPER**

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


- Brake caliper body  
Cracks/damage → Replace the brake caliper assembly.

1. Check:
  - Rear brake caliper bracket  
Cracks/damage → Replace.

EAS30190  
**INSTALLING THE REAR BRAKE CALIPER**

1. Install:
  - Rear brake caliper
  - Rear wheel

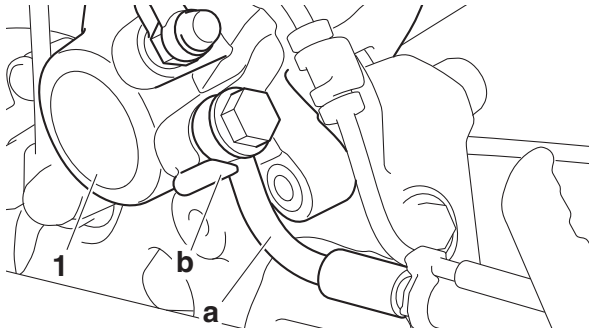
Refer to “INSTALLING THE REAR WHEEL” on page 4-22.
2. Install:
  - Brake hose gaskets **New**
  - Brake hose (hydraulic unit to rear brake caliper)
  - Rear brake hose union bolt

	<b>Rear brake hose union bolt 30 N·m (3.0 kgf·m, 22 lb·ft)</b>
---	--

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.





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



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 3-14.
5. Check:
  - Brake fluid level  
Below the minimum level mark → Add the specified brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.
6. Check:
  - Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

EAS30193

## REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:
  - Brake hose union bolt
  - Brake hose gaskets
  - Brake hose (rear brake master cylinder to hydraulic unit)

### **TIP**

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

EAS30194

## CHECKING THE REAR BRAKE MASTER CYLINDER

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

EAS30195

## ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

### **WARNING**

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



1. Install:
  - Brake master cylinder kit **New**

EAS30196

## INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:

- Brake hose gaskets **New**
- Brake hose (rear brake master cylinder to hydraulic unit)
- Brake hose union bolt
- Brake fluid reservoir hose



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

EWA13531

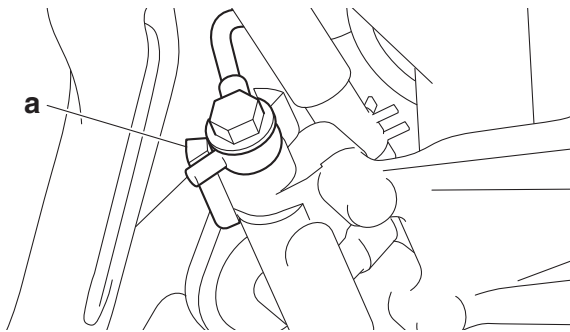
### **WARNING**

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

ECA14160

### **NOTICE**

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



2. 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.

3. Bleed:

- Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-14.

4. Check:

- Brake fluid level  
Below the minimum level mark → Add the specified brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.

EAS33281

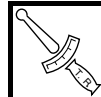
## ASSEMBLING THE BRAKE PEDAL

1. Install:

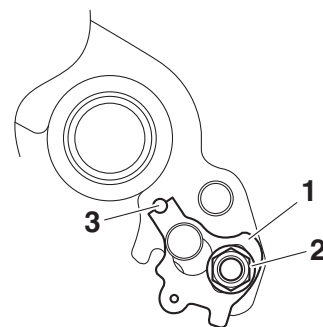
- Brake pedal plate “1”

**TIP**

Before tightening the brake pedal plate nut “2”, insert the suitable pin (d=4 mm (0.16 in)) “3”, into the brake pedal and brake pedal plate as illustration.



**Brake pedal plate nut**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

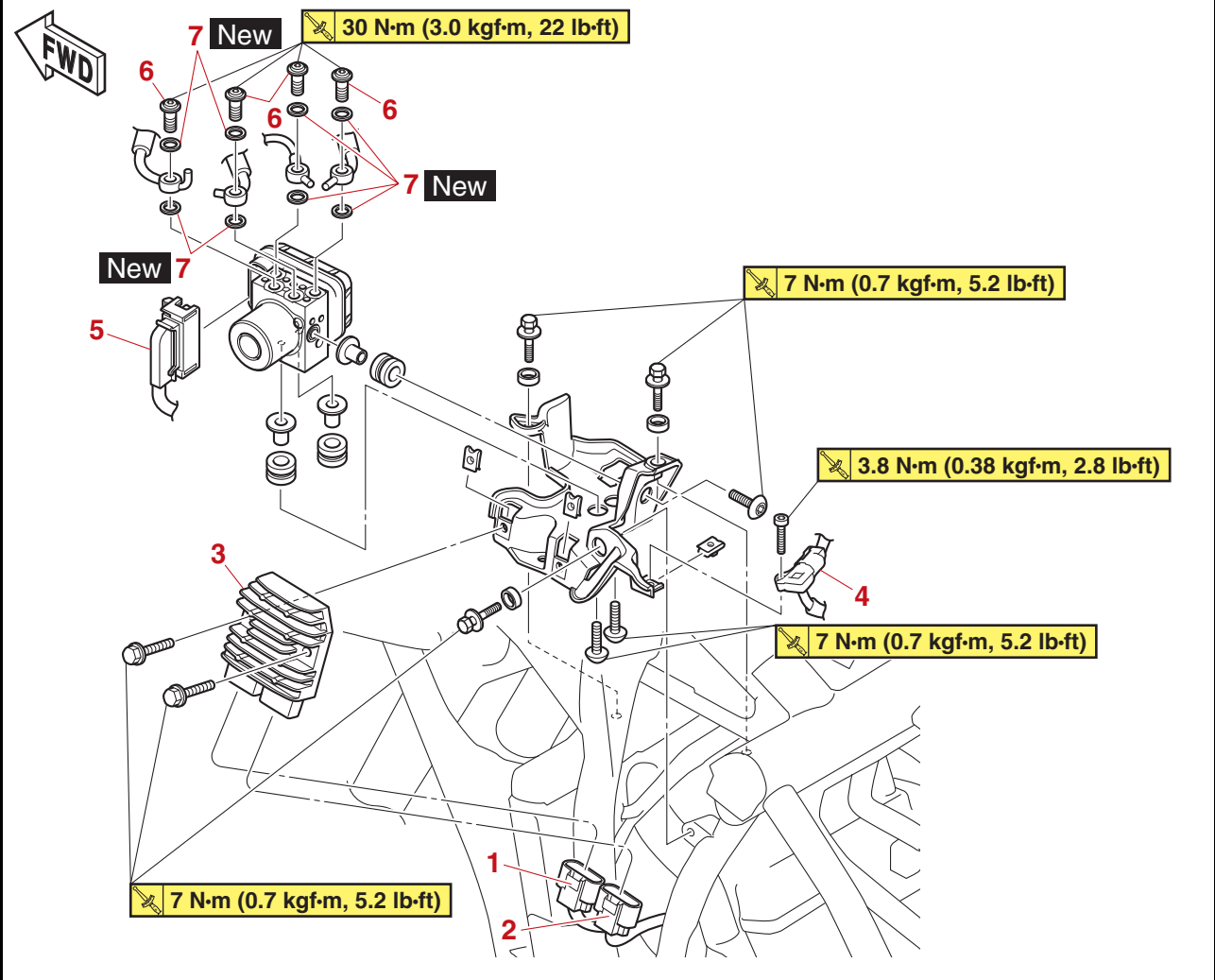


# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS20032

## ABS (ANTI-LOCK BRAKE SYSTEM)

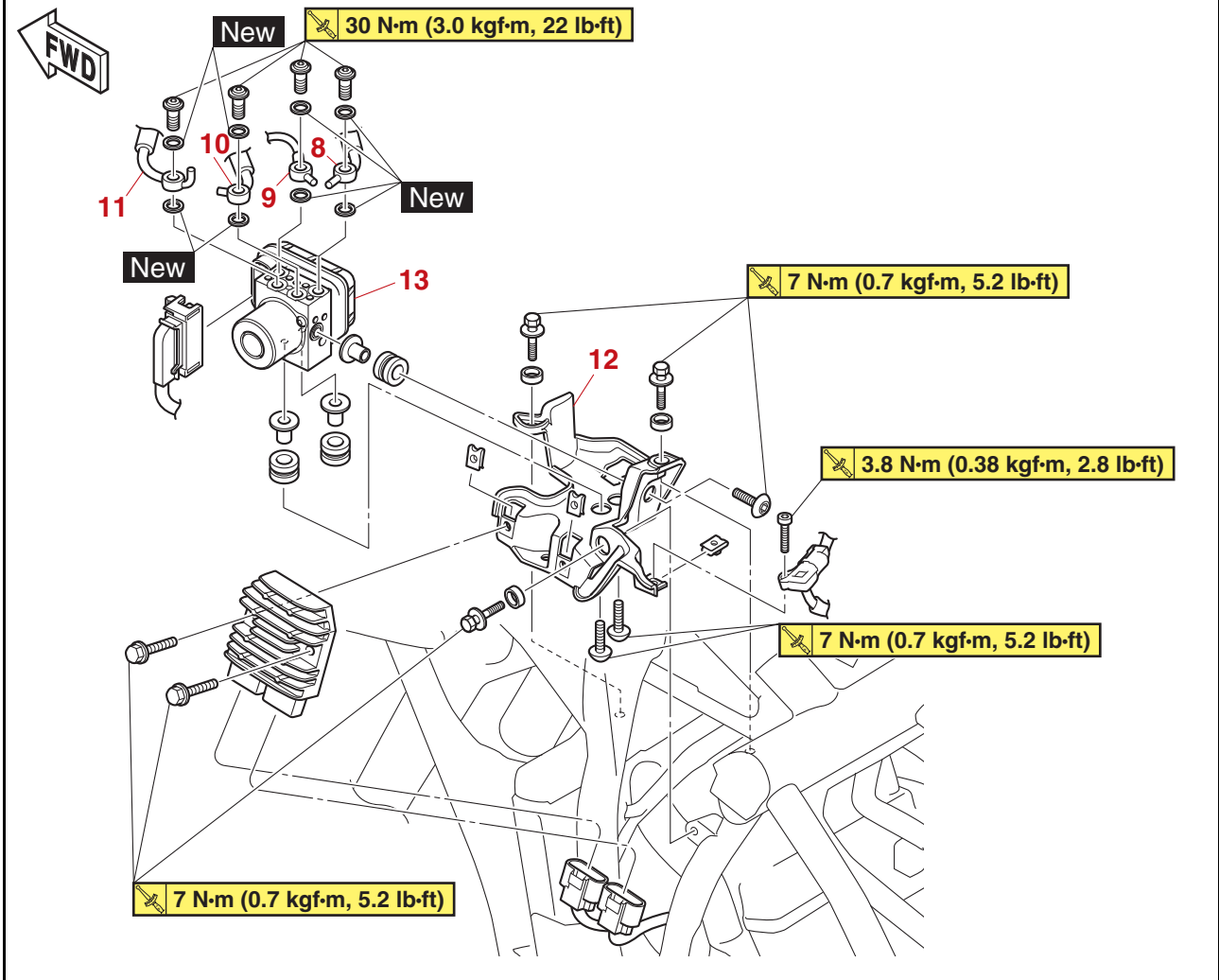
### Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.
1	Stator coil coupler	1	Disconnect.
2	Rectifier/regulator coupler	1	Disconnect.
3	Rectifier/regulator	1	
4	Intake air pressure sensor	1	
5	ABS ECU coupler	1	Disconnect.
6	Brake hose union bolt	4	
7	Gasket	8	

# ABS (ANTI-LOCK BRAKE SYSTEM)

## Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
8	Brake hose (hydraulic unit to rear brake caliper)	1	Disconnect.
9	Brake hose (hydraulic unit to right front brake caliper)	1	Disconnect.
10	Brake hose (rear brake master cylinder to hydraulic unit)	1	Disconnect.
11	Brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
12	Hydraulic unit bracket	1	
13	Hydraulic unit assembly	1	

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS31036

## REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA21091

### NOTICE

Unless necessary, avoid removing and installing the brake hoses 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.

ECA18241

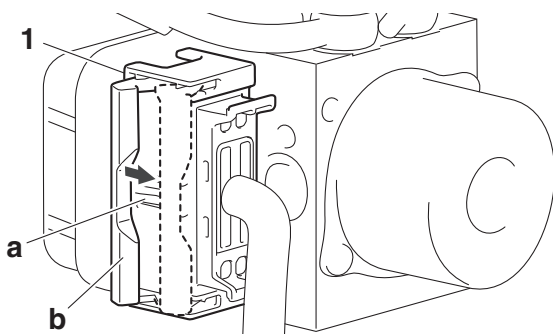
### NOTICE

- 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 turn 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 spill 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 union bolts 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, move the lock lever “b” in the direction of the arrow shown to disconnect the coupler.



2. Remove:
  - Brake hoses

### TIP

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

ECA14530

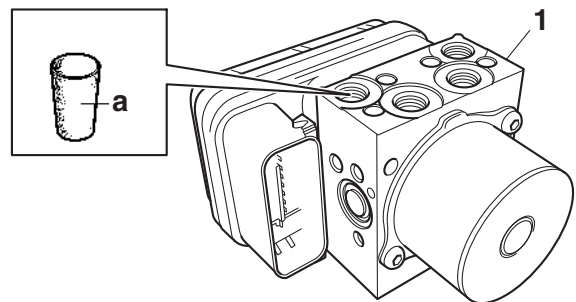
### NOTICE

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

3. 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 × 1.25) 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.



EAS31037

## 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.

EAS31039

## INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
  - Hydraulic unit assembly
  - Hydraulic unit bracket



Hydraulic unit assembly bolt  
7 N·m (0.7 kgf·m, 5.2 lb·ft)  
Hydraulic unit bracket bolt  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

# ABS (ANTI-LOCK BRAKE SYSTEM)

## TIP

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

ECA21110

## NOTICE

**Do not remove the rubber plugs or bolts (M10 × 1.25) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.**

### 2. Remove:

- Rubber plugs or bolts (M10 × 1.25)

### 3. Install:

- Brake hose (front brake master cylinder to hydraulic unit) "1"
- Brake hose (hydraulic unit to right front brake caliper) "2"
- Brake hose (hydraulic unit to rear brake caliper) "3"
- Brake hose (rear brake master cylinder to hydraulic unit) "4"



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

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.**

- Temporarily install the brake hoses as shown in the illustration.
- Position the brake hose (front brake master cylinder to hydraulic unit) "1" so that its projection "a" contacts the brake hose (rear brake master cylinder to hydraulic unit) "4", and then temporarily tighten the union bolt for the brake hose (front brake master cylinder to hydraulic unit).
- Temporarily tighten the union bolt for the brake hose (rear brake master cylinder to hydraulic unit) "4".

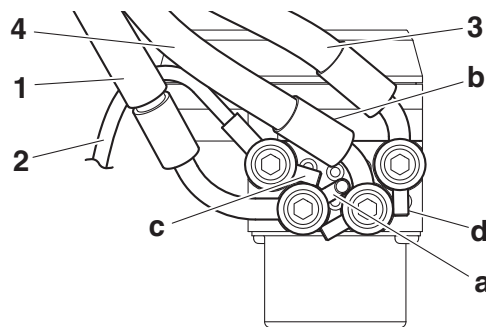
## TIP

Make sure that the pipe section "b" of the brake hose (rear brake master cylinder to hydraulic unit) does not contact the hydraulic unit.

- Position the brake hose (hydraulic unit to right front brake caliper) "2" so that its projection "c" contacts the brake hose (front brake master cylinder to hydraulic unit)

"1", and then temporarily tighten the union bolt for the brake hose (hydraulic unit to right front brake caliper).

- Position the brake hose (hydraulic unit to rear brake caliper) "3" so that its projection "d" contacts the brake hose (rear brake master cylinder to hydraulic unit) "4", and then temporarily tighten the union bolt for the brake hose (hydraulic unit to rear brake caliper).
- Tighten the brake hose union bolts to specification.

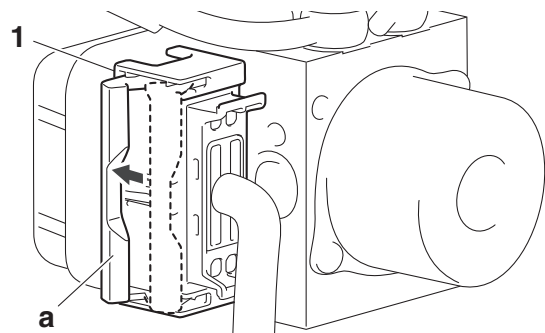


### 4. Connect:

- ABS ECU coupler "1"

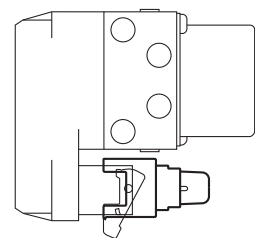
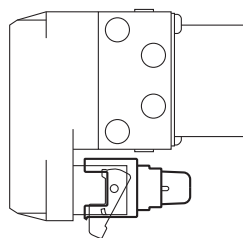
## TIP

- Connect the ABS ECU coupler, and then push the lock lever "a" of the coupler in the direction of the arrow shown.
- Make sure that the ABS ECU coupler is connected in the correct position as shown in illustration "A".



A

B



A. The ABS ECU coupler is connected correctly.

# ABS (ANTI-LOCK BRAKE SYSTEM)

B. The ABS ECU coupler is not connected.

5. Fill:

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



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 spilled brake fluid immediately.**

6. Bleed:

- Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-14.

7. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-48.)

ECA14770

## NOTICE

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

8. Delete the fault codes. (Refer to "[B-3] DELETING THE FAULT CODES" on page 8-125.)
9. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-51.)

EAS31040

## HYDRAULIC UNIT OPERATION TESTS

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

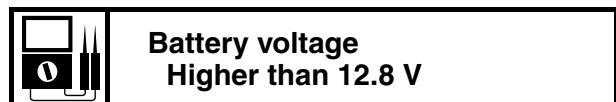
## WARNING

**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 suitable 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.





# ABS (ANTI-LOCK BRAKE SYSTEM)

## 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, and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler.



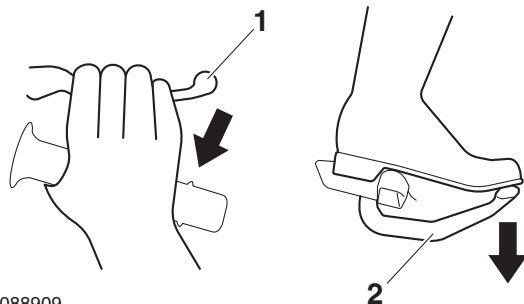
**Yamaha diagnostic tool USB  
90890-03267**  
**Yamaha diagnostic tool (A/I)  
90890-03262**

Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-34.

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", and then operate the brake lever "1" and brake pedal "2" simultaneously.

## TIP

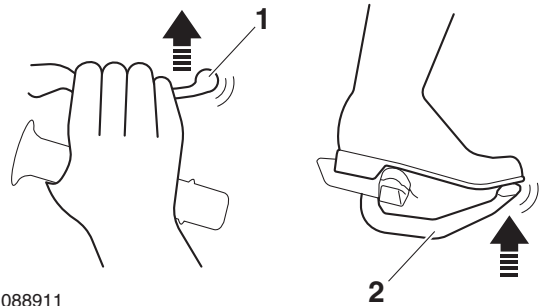
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.  
On: The hydraulic unit is operating.  
Flashing: The conditions for operating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



G088909

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.



G088911

## TIP

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

ECA18280

## 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 suitable stand.
2. Turn the main switch to "OFF".
3. Remove:
  - Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.



# ABS (ANTI-LOCK BRAKE SYSTEM)

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, and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler.



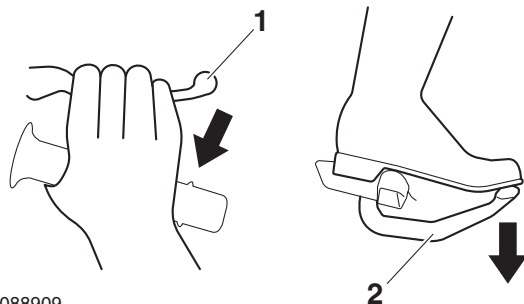
**Yamaha diagnostic tool USB  
90890-03267  
Yamaha diagnostic tool (A/I)  
90890-03262**

Refer to “YAMAHA DIAGNOSTIC TOOL” on page 8-34.

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”, and then operate the brake lever “1” and brake pedal “2” 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.

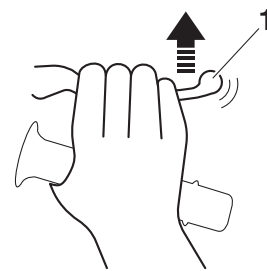


G088909

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.

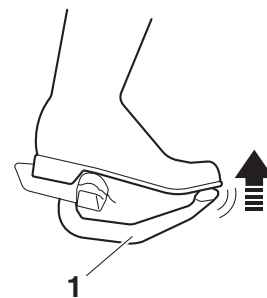


G088913

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.



G088914

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.

## ABS (ANTI-LOCK BRAKE SYSTEM)

---

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

ECA18280

### **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 start/engine stop switch to “○”.
16. Check for brake fluid leakage around the hydraulic unit.  
Brake fluid leakage → Replace the hydraulic unit, brake hoses, and related parts as a set.
17. If the operation of the hydraulic unit is normal, delete all of the fault codes.

EAS31041

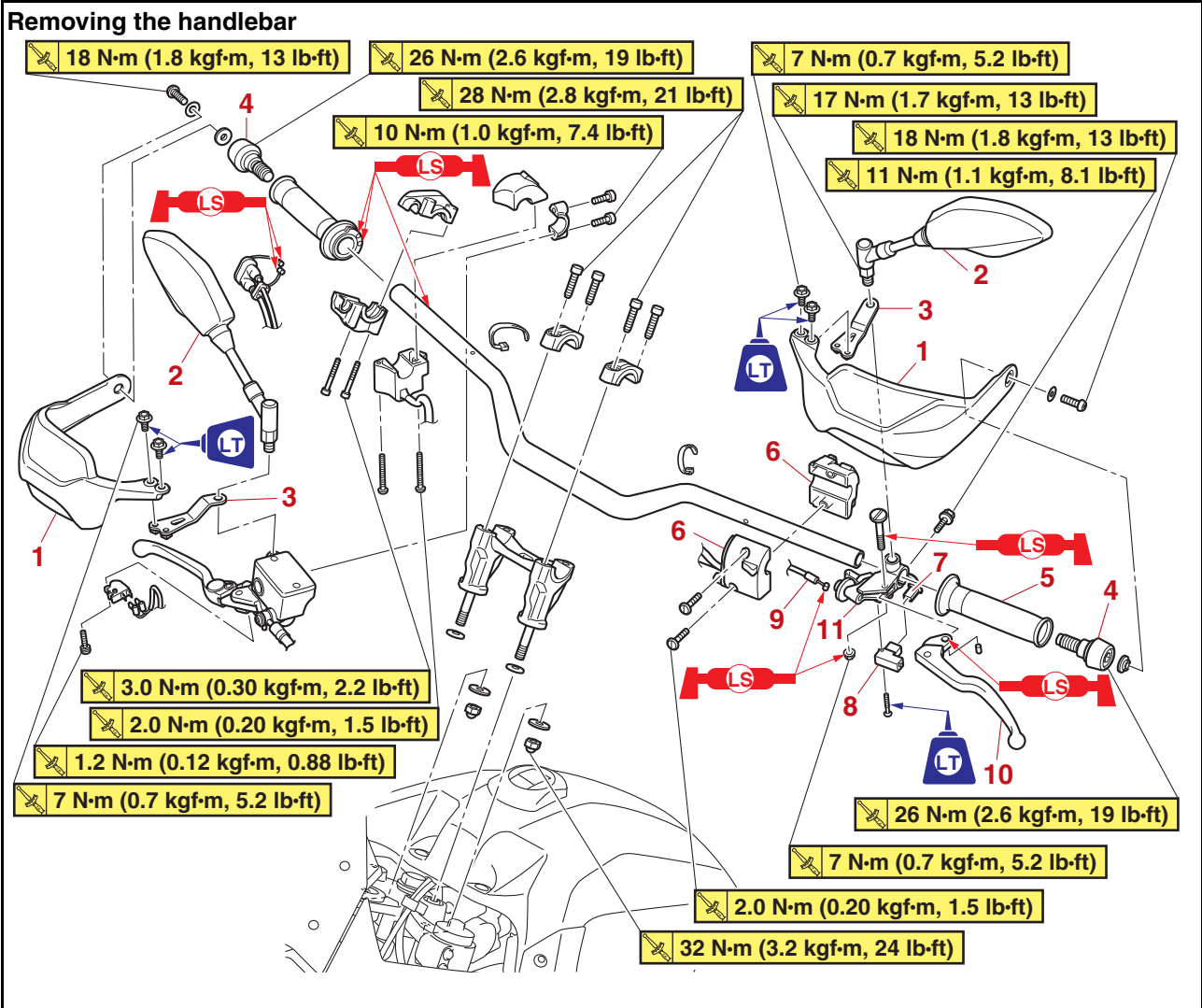
### **CHECKING THE ABS WARNING LIGHT**

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 10 km/h (6 mph) or performing a trial run.

EAS20033

## HANDLEBAR

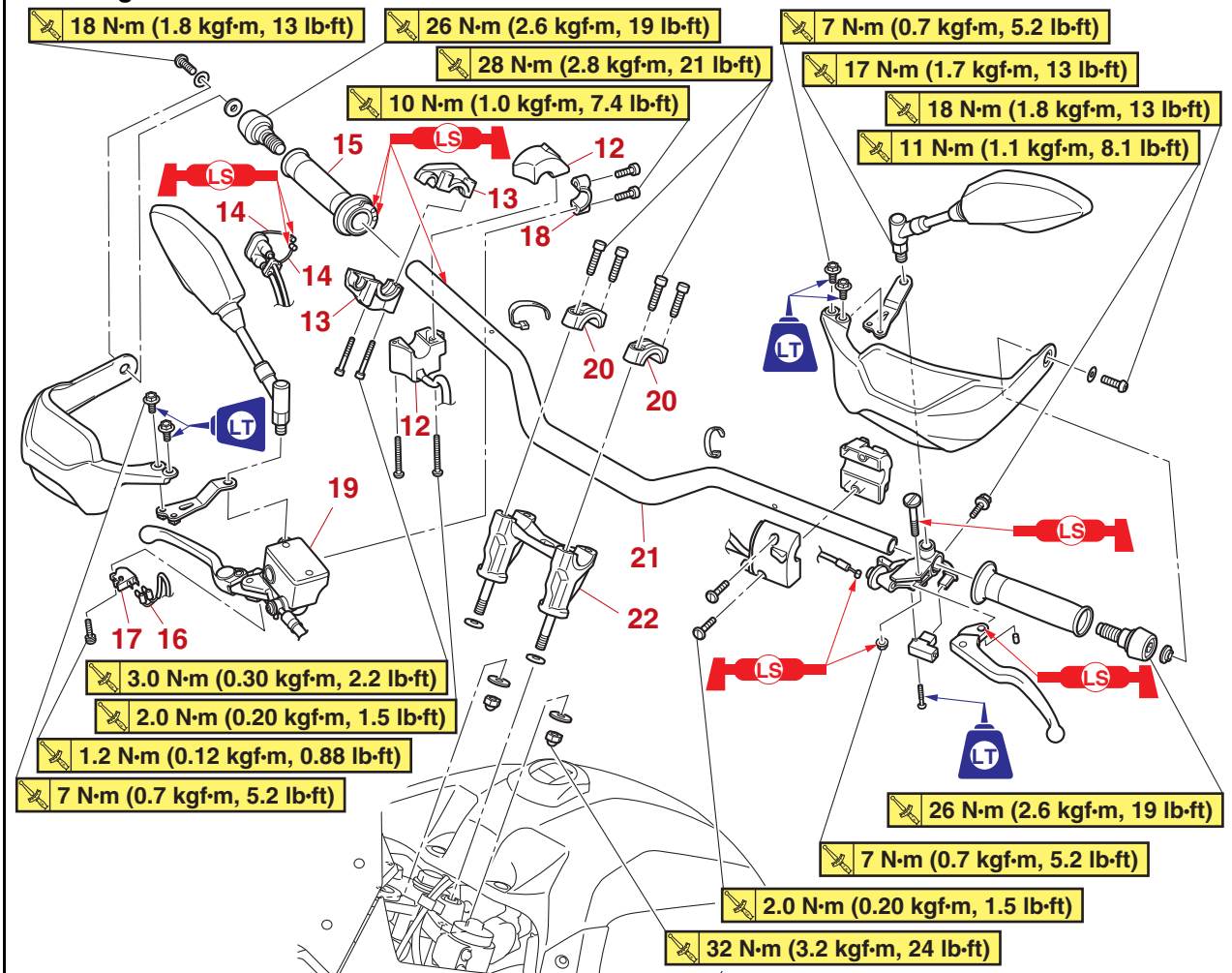
### Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
1	Handguard	2	
2	Rearview mirror	2	
3	Handguard bracket	2	
4	Grip end	2	
5	Handlebar grip	1	
6	Handlebar switch (left)	1	
7	Clutch switch coupler	1	Disconnect.
8	Clutch switch	1	
9	Clutch cable	1	Disconnect.
10	Clutch lever	1	
11	Clutch lever holder	1	

# HANDLEBAR

## Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
12	Handlebar switch (right)	1	
13	Throttle cable housing	1	
14	Throttle cable	2	Disconnect.
15	Throttle grip	1	
16	Front brake light switch connector	2	Disconnect.
17	Front brake light switch	1	
18	Front brake master cylinder holder	1	
19	Front brake master cylinder	1	
20	Upper handlebar holder	2	
21	Handlebar	1	
22	Lower handlebar holder	1	

EAS30203

## REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

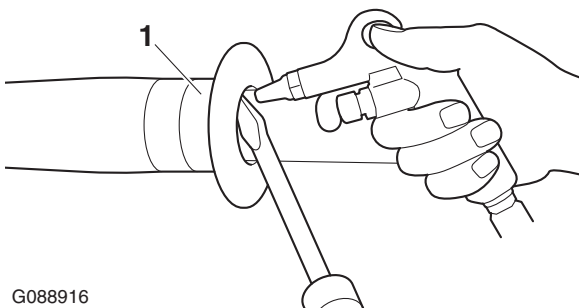
### **WARNING**

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

2. Remove:
  - Handlebar grip "1"

### TIP

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

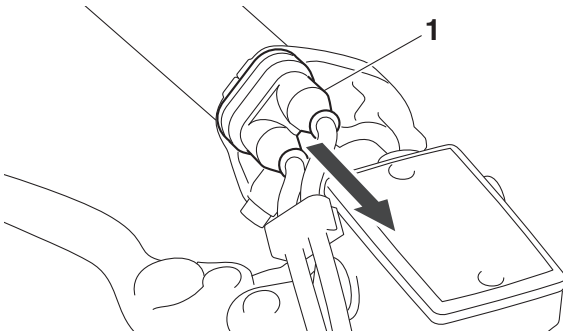


G088916

3. Remove:
  - Throttle cable housings

### TIP

While removing the throttle cable housing, pull back the rubber cover "1".



EAS30204

## CHECKING THE HANDLEBAR

1. Check:
  - Handlebar

Bends/cracks/damage → Replace.

EWA13690

### **WARNING**

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

EAS30205

## INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

2. Install:
  - Lower handlebar holder "1"
  - Handlebar "2"
  - Upper handlebar holder "3"



**Lower handlebar holder nut**  
32 N·m (3.2 kgf·m, 24 lb·ft)  
**Upper handlebar holder bolt**  
28 N·m (2.8 kgf·m, 21 lb·ft)

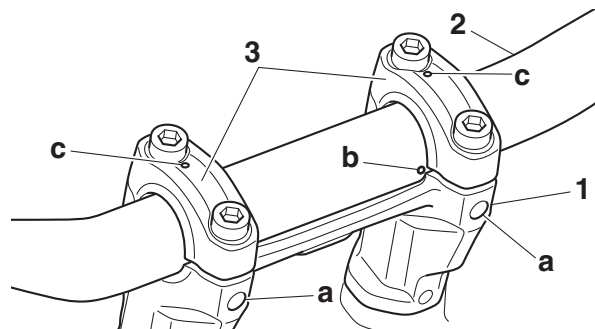
ECA19130

### **NOTICE**

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

### TIP

- The lower handlebar holder should be installed with the projections "a" facing rearward.
- Align the punch mark "b" on the handlebar with the right inner side of the lower handlebar holder.
- The upper handlebar holders should be installed with the punch marks "c" facing forward.



3. Install:
  - Front brake master cylinder

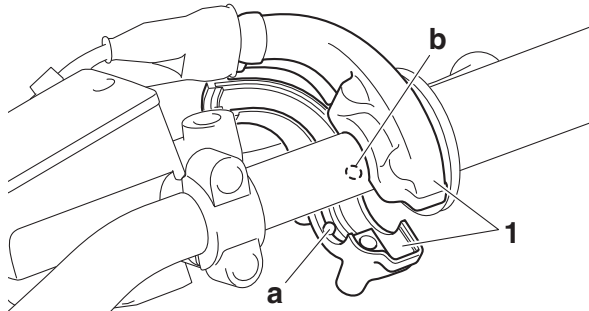
Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-33.
4. Install:
  - Throttle grip
  - Throttle cables
  - Throttle cable housing "1"



**Throttle cable housing bolt**  
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

**TIP**

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



5. Install:

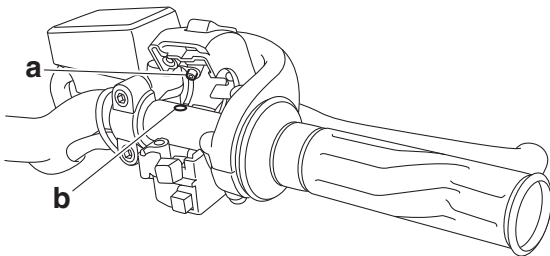
- Handlebar switch (right)



**Handlebar switch screw (right)**  
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

**TIP**

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



6. Install:

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

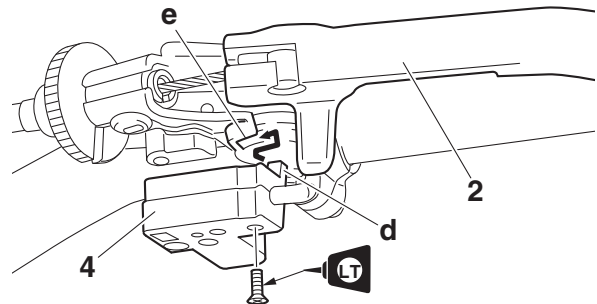
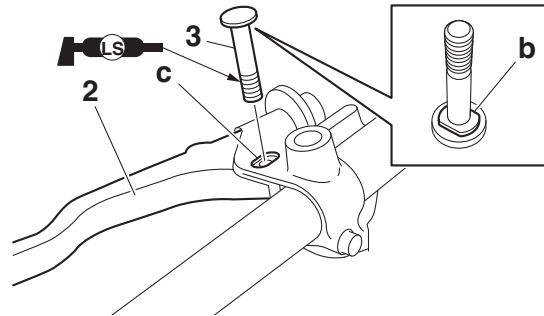
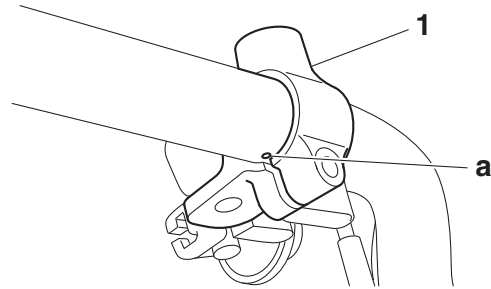


**Clutch lever holder pinch bolt**  
11 N·m (1.1 kgf·m, 8.1 lb·ft)  
**Clutch lever pivot nut**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

**TIP**

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

- Lubricate the clutch lever pivot bolt and nut with the lithium-soap-based grease.
- Fit the projection “b” on the bottom of the bolt head into the slot “c” in the bolt hole in the clutch lever holder.
- While squeezing the clutch lever, fit the projection “d” on the clutch switch into the slot “e” in the clutch lever holder.



7. Install:

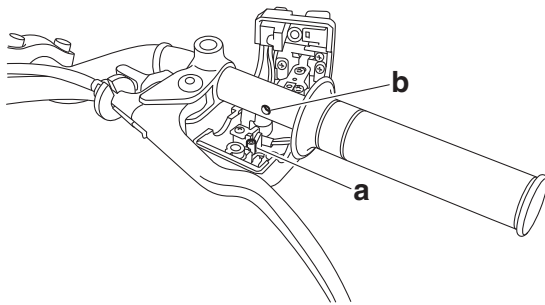
- Handlebar switch (left)



**Handlebar switch screw (left)**  
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

**TIP**

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



8. Install:
- Handlebar grip
  - Grip end (left) "1"

**Grip end**  
**26 N·m (2.6 kgf·m, 19 lb·ft)**

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

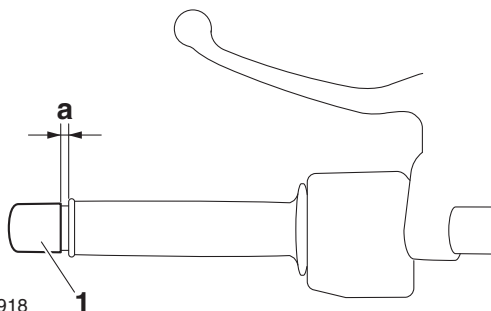
EWA13700

**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.

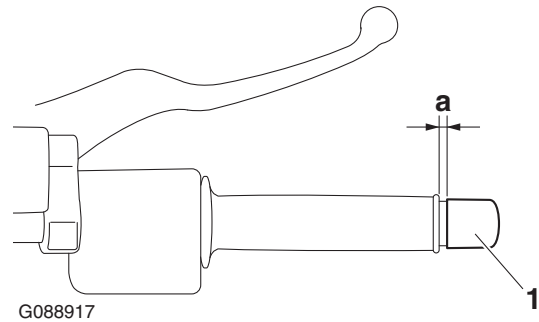


9. Install:
- Grip end (right) "1"

**Grip end**  
**26 N·m (2.6 kgf·m, 19 lb·ft)**

**TIP**

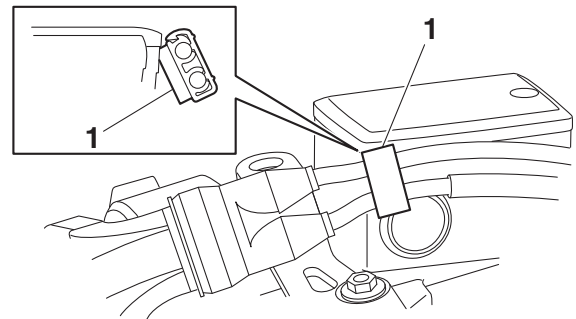
There should be 1–6 mm (0.04–0.24 in) of clearance "a" between the throttle grip and the grip end.



10. Install:
- Throttle cable holder "1"

**TIP**

Align the throttle cable holder "1" with the edge of the front brake master cylinder.



11. Adjust:
- Throttle grip free play  
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-29.

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

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

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

13. Install:
- Handguard brackets
  - Rearview mirrors
  - Handguards (temporarily)

14. Tighten:
- Rearview mirrors
  - Handguard bolts



**Rearview mirror (left)**  
**17 N·m (1.7 kgf·m, 13 lb·ft)**

**Rearview mirror (right)**  
**17 N·m (1.7 kgf·m, 13 lb·ft)**

**Left-hand threads**

**Handguard bolt (grip end)**  
**18 N·m (1.8 kgf·m, 13 lb·ft)**

**Handguard bolt (rearview mirror)**  
**7 N·m (0.7 kgf·m, 5.2 lb·ft)**

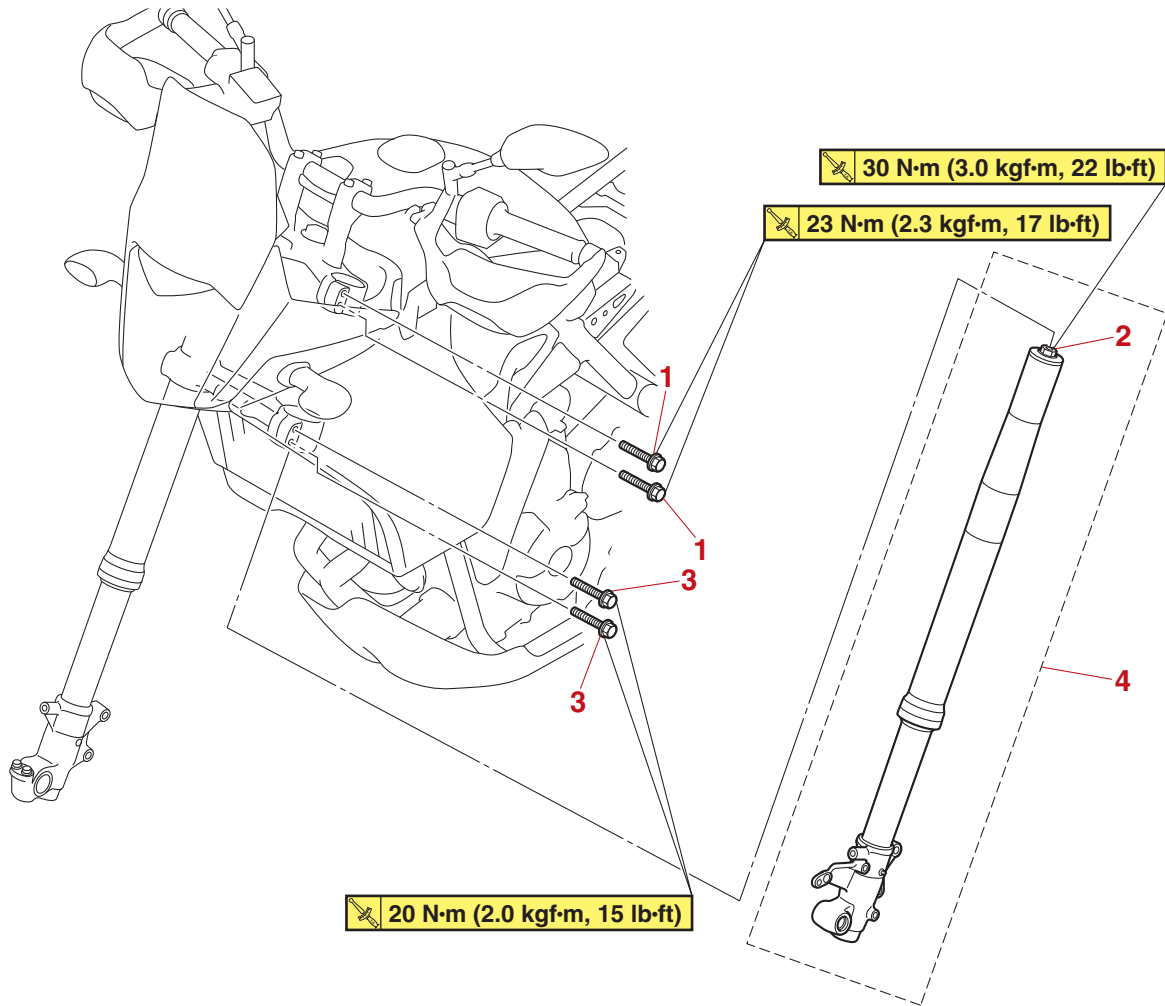
**LOCTITE®**



EAS20034

## FRONT FORK

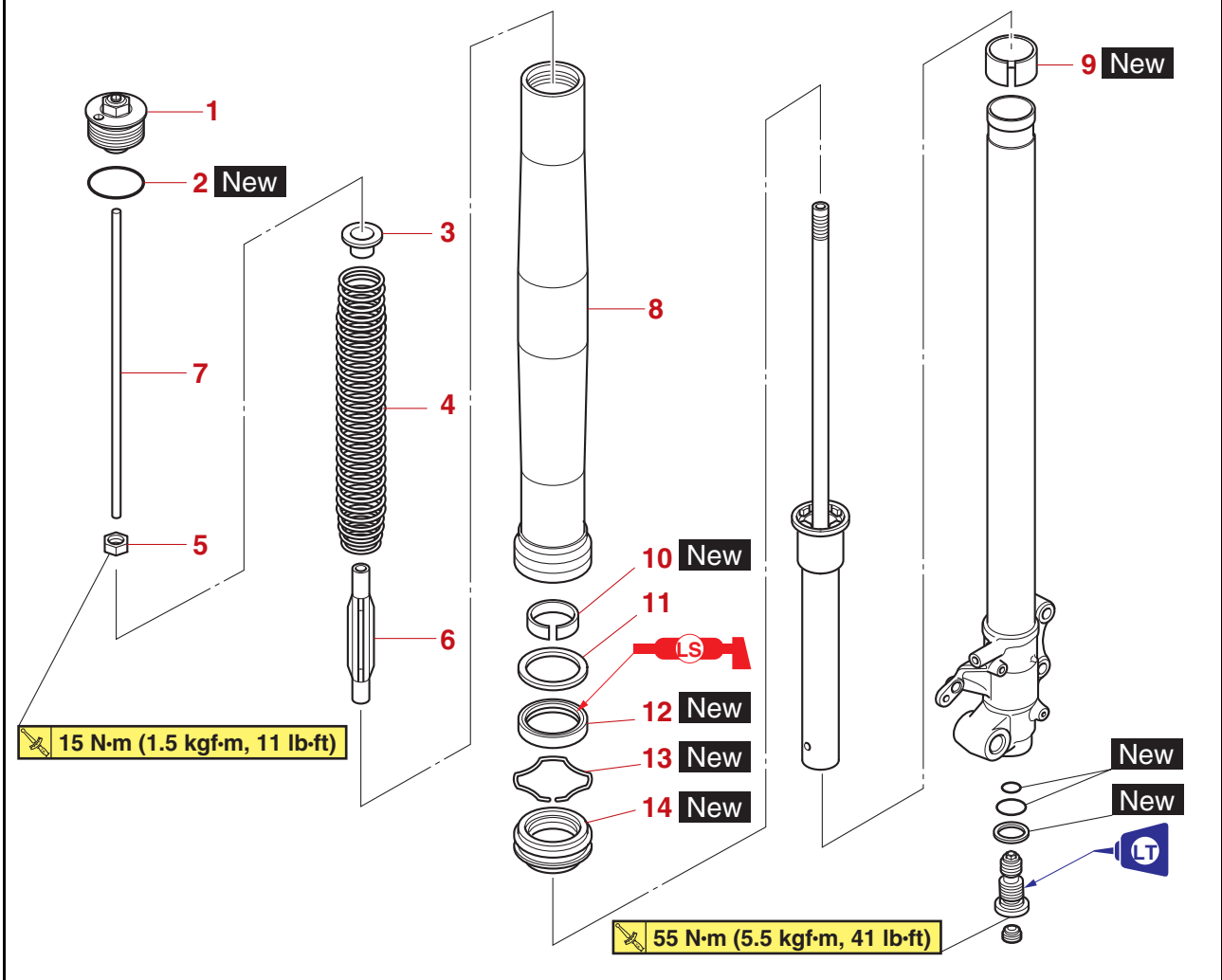
### Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front brake calipers/Front fender/Front wheel		Refer to "FRONT WHEEL" on page 4-11.
1	Upper bracket pinch bolt	2	Loosen.
2	Front fork cap bolt	1	Loosen.
3	Lower bracket pinch bolt	2	Loosen.
4	Front fork leg	1	

# FRONT FORK

## 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	Fork spring seat	1	
4	Fork spring	1	
5	Damper rod locknut	1	
6	Fork spring guide	1	
7	Damper adjusting rod	1	
8	Outer tube	1	
9	Inner tube bushing	1	
10	Outer tube bushing	1	
11	Washer	1	
12	Oil seal	1	
13	Oil seal clip	1	
14	Dust seal	1	



# FRONT FORK

EAS31648

## REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

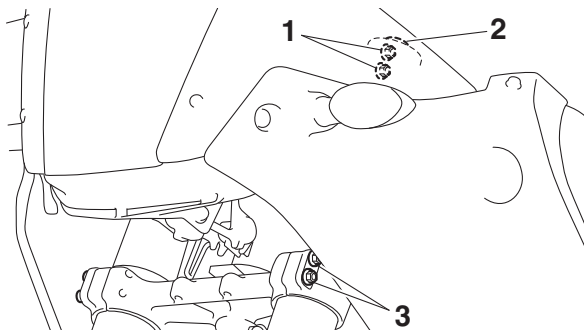
Securely support the vehicle so that there is no danger of it falling over.

### TIP

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

2. Loosen:

- Upper bracket pinch bolts "1"
- Front fork cap bolt "2"
- Lower bracket pinch bolts "3"



EWA13640

### **WARNING**

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

3. Remove:

- Front fork leg

EAS30207

## DISASSEMBLING THE FRONT FORK LEGS

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

1. Remove:

- Cap bolt "1" (from the damper rod assembly)
- Locknut "2"
- Fork spring seat "3"
- Fork spring
  - a. Press down on the fork spring with the fork spring compression tool "4".
  - b. Install the rod holder "5" between the locknut "2" and the fork spring seat "3".



Fork spring compression tool  
90890-01573

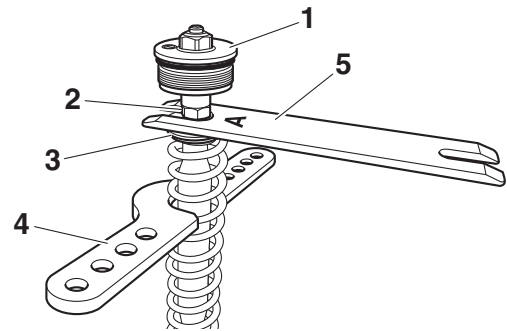
Fork spring compression tool  
YM-01573

Rod holder  
90890-01434

Damper rod holder double ended  
YM-01434

### TIP

Use the side of the rod holder that is marked "A".



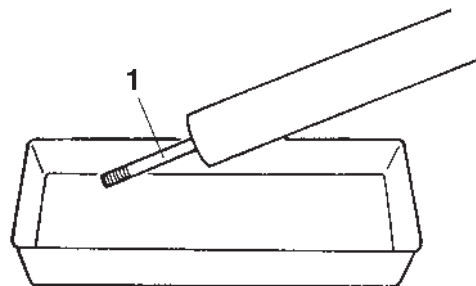
- c. Hold the locknut and remove the cap bolt.
- d. Remove the rod holder and fork spring compression tool.
- e. Remove the fork spring seat and locknut.
- f. Remove the fork spring and fork spring guide.

2. Drain:

- Fork oil

### TIP

Stroke the damper rod assembly "1" several times while draining the fork oil.



G088919

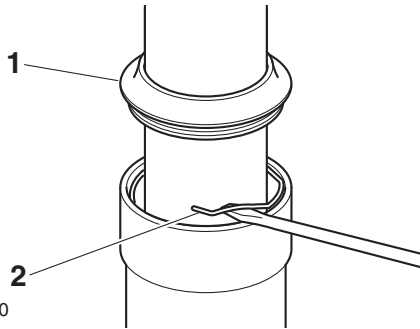
3. Remove:

- Dust seal "1"
- Oil seal clip "2" (with a flat-head screwdriver)

ECA14180

### **NOTICE**

Do not scratch the inner tube.



G088920

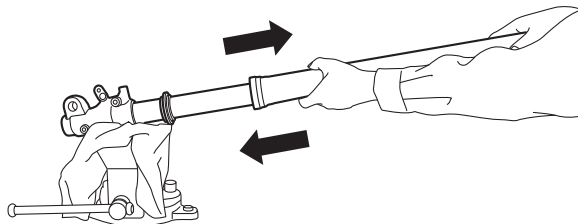
#### 4. Remove:

- 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.**



#### 5. Remove:

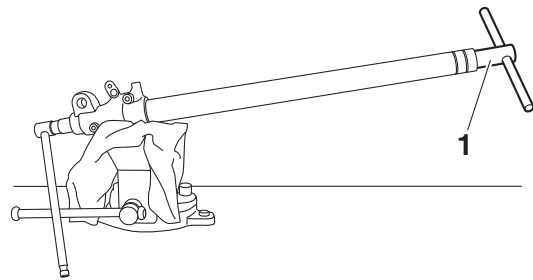
- Damper rod assembly bolt
- Damper rod assembly

#### **TIP**

While holding the damper rod with the damper rod holder "1", loosen the damper rod assembly bolt.



**Damper rod holder (ø27)**  
**90890-01423**  
**Damping rod holder**  
**YM-01423**



EAS30208

#### **CHECKING THE FRONT FORK LEGS**

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

#### 1. Check:

- Inner tube
  - Outer tube
- Bends/damage/scratches → Replace.

EWA13650

#### **WARNING**

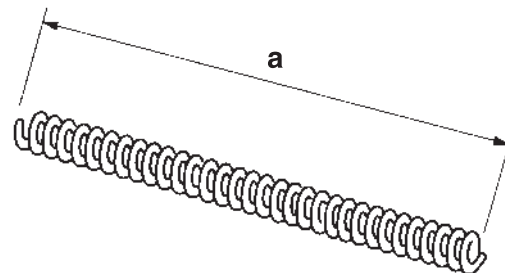
**Do not attempt to straighten a bent inner tube as this may dangerously weaken it.**

#### 2. Measure:

- Fork spring free length "a"
- Out of specification → Replace.



**Fork spring free length**  
**422.0 mm (16.61 in)**  
**Limit**  
**413.6 mm (16.28 in)**



G088921

#### 3. Check:

- Damper rod assembly
- 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.

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
  - Copper washer
  - O-rings
- Before assembling the front fork leg, make sure all of the components are clean.

### 1. Install:

- Damper rod assembly

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 bolt  
(along with the O-rings **New** and the copper washer **New**)



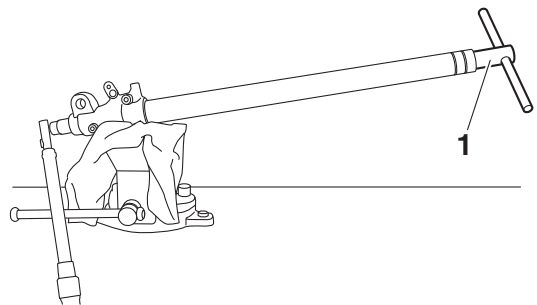
**Front fork damper rod assembly bolt**  
55 N·m (5.5 kgf·m, 41 lb·ft)  
LOCTITE®

### TIP

While holding the damper rod assembly with the damper rod holder “1”, tighten the damper rod assembly bolt.



**Damper rod holder (ø27)**  
90890-01423  
**Damping rod holder**  
YM-01423



### 3. Lubricate:

- Inner tube's outer surface



**Recommended oil**  
Yamaha Suspension Oil G10

### 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**

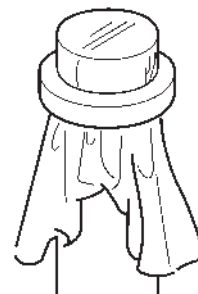
ECA19170

### NOTICE

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

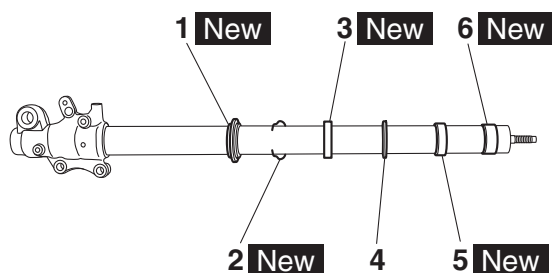
### TIP

- 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.



G088922

# FRONT FORK



5. Install:

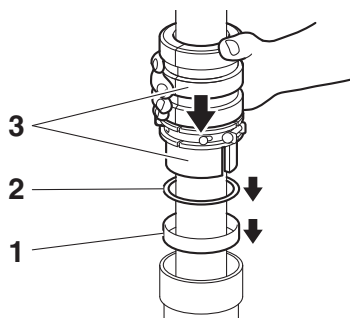
- Outer tube  
(to the inner tube)

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



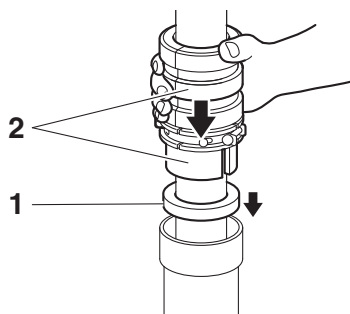
G088923

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



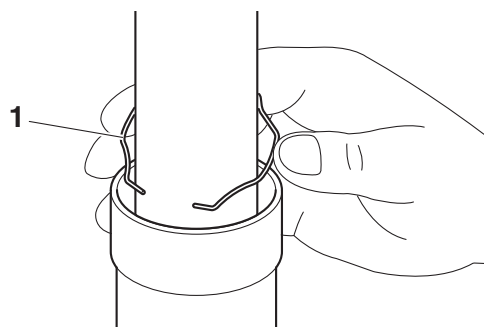
G088924

8. Install:

- Oil seal clip "1"

**TIP**

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



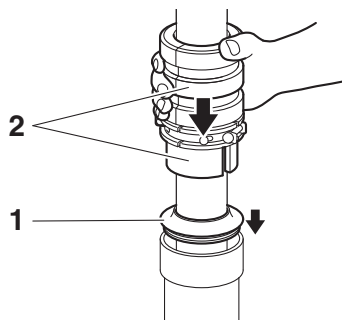
G088925

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



G088926

10. Fill:

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



**Recommended oil**  
Yamaha Suspension Oil G10  
Quantity (left)  
624.0 cm<sup>3</sup> (21.10 US oz, 21.96 Imp. oz)  
Quantity (right)  
624.0 cm<sup>3</sup> (21.10 US oz, 21.96 Imp. oz)

ECA14230

**NOTICE**

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.

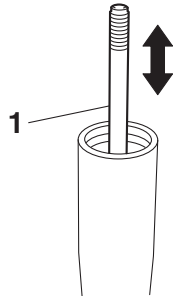
# FRONT FORK

- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

11. 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.



12. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

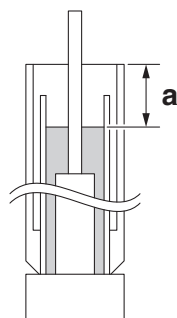
**TIP**

Be sure to bleed the front fork leg of any residual air.

13. 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.

	<p><b>Level</b> 85.0 mm (3.35 in)</p>
--	---



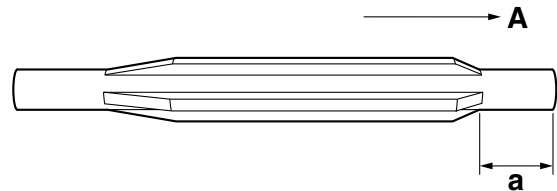
G088930

14. Install:

- Damper adjusting rod
- Fork spring guide
- Locknut
  - a. Install the fork spring guide.

**TIP**

Install the fork spring guide with its shorter end "a" pointing up "A".



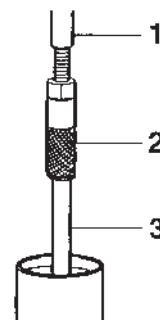
- b. Install the locknut all the way onto the damper rod assembly.

15. Install:

- Rod puller "1"
- Rod puller attachment (M10 long) "2" (onto the damper rod "3")



**Rod puller**  
90890-01437  
**Universal damping rod bleeding tool set**  
YM-A8703  
**Rod puller attachment (M10 long)**  
90890-01578  
**Universal damping rod bleeding tool set**  
YM-A8703



G088927

16. Install:

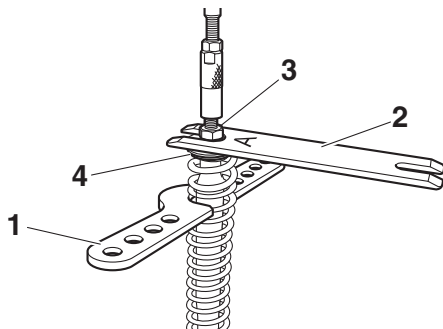
- Fork spring
- Fork spring seat
  - a. Install the fork spring.
  - b. Install the fork spring seat.
  - c. Install the fork spring compression tool "1".
  - d. Press down on the fork spring with the fork spring compression tool "1".
  - e. Pull up the rod puller and install the rod holder "2" between the locknut "3" and the fork spring seat "4".





**Fork spring compression tool**  
**90890-01573**  
**Fork spring compression tool**  
**YM-01573**  
**Rod holder**  
**90890-01434**  
**Damper rod holder double ended**  
**YM-01434**

**TIP**  
 Use the side of the rod holder that is marked "A".



- f. Remove the rod puller and rod puller attachment.
- g. Install the cap bolt, and then finger tighten the cap bolt.

**TIP**  
 Tighten the cap bolt until it contacts the end of the damper rod assembly.

EWA13670



**WARNING**

**Always use a new cap bolt O-ring.**

- h. Hold the cap bolt and tighten the locknut to specification.



**Damper rod locknut**  
**15 N·m (1.5 kgf·m, 11 lb·ft)**

- i. Remove the rod holder and fork spring compression tool.

17. 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

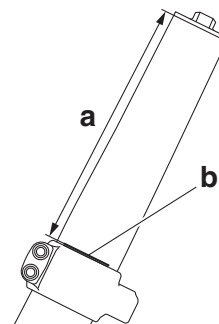
The following procedure applies to both of the front fork legs.

1. Install:
  - Front fork leg  
 Temporarily tighten the lower bracket pinch bolts.



**Installed length (from the top of the outer tube) "a"**  
**215.0 mm (8.46 in)**

**TIP**  
 Put the mark "b" to specified length, and then install the front fork legs to align the mark "b" with the top of the lower bracket.

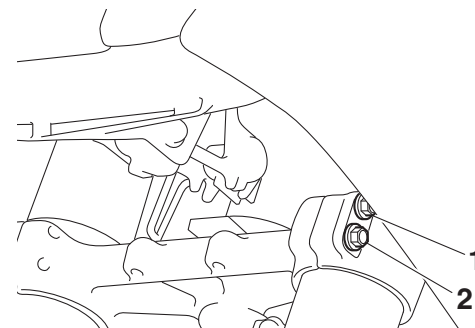


2. Tighten:
  - Lower bracket pinch bolts



**Lower bracket pinch bolt**  
**20 N·m (2.0 kgf·m, 15 lb·ft)**

**TIP**  
 Tighten each bolt to specification in the order pinch bolt "1" → pinch bolt "2" → pinch bolt "1" → pinch bolt "2".



3. Tighten:
  - Front fork cap bolt
  - Upper bracket pinch bolt

## FRONT FORK

---

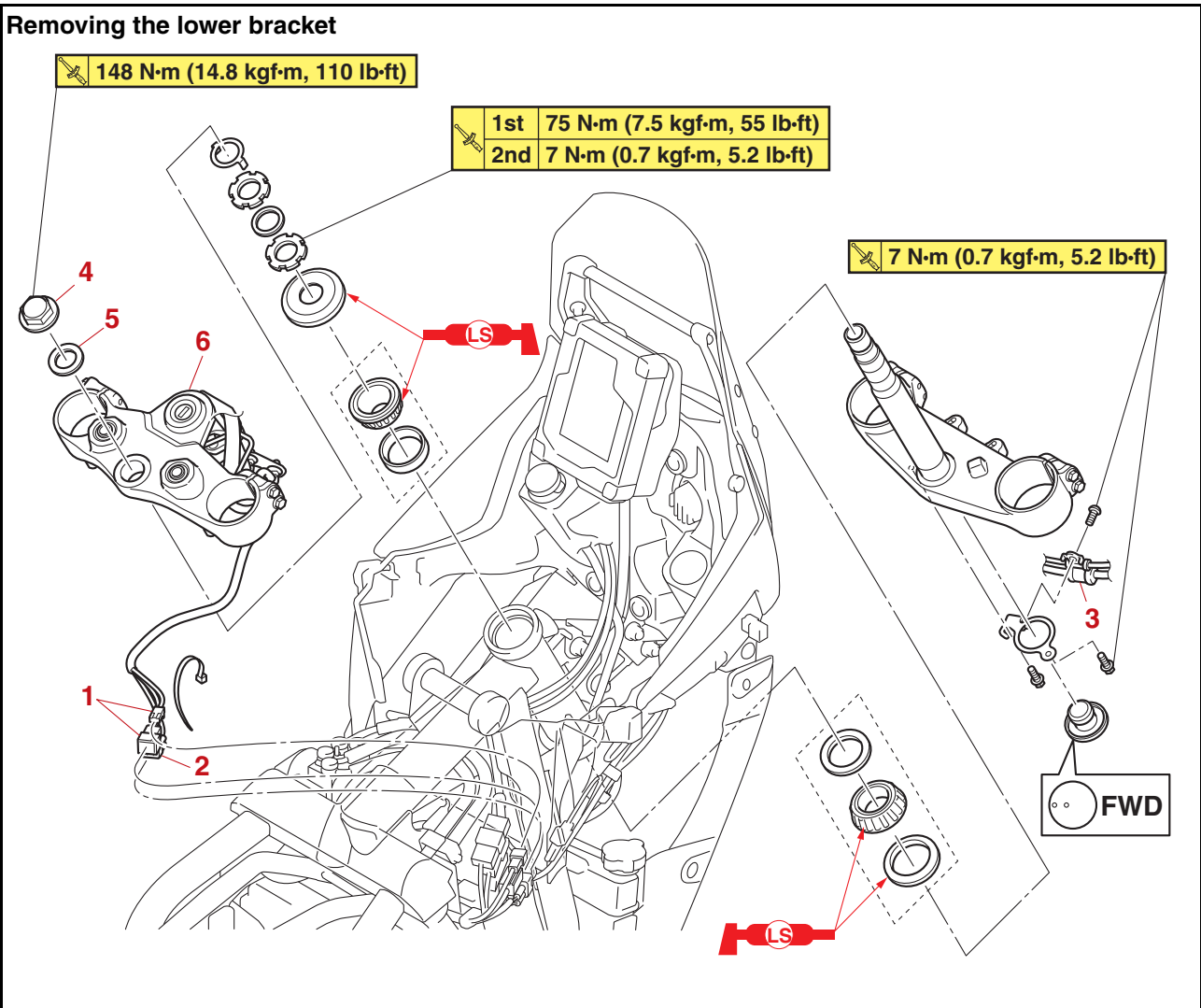


**Front fork cap bolt**  
**30 N·m (3.0 kgf·m, 22 lb·ft)**  
**Upper bracket pinch bolt**  
**23 N·m (2.3 kgf·m, 17 lb·ft)**

EAS20035

## STEERING HEAD

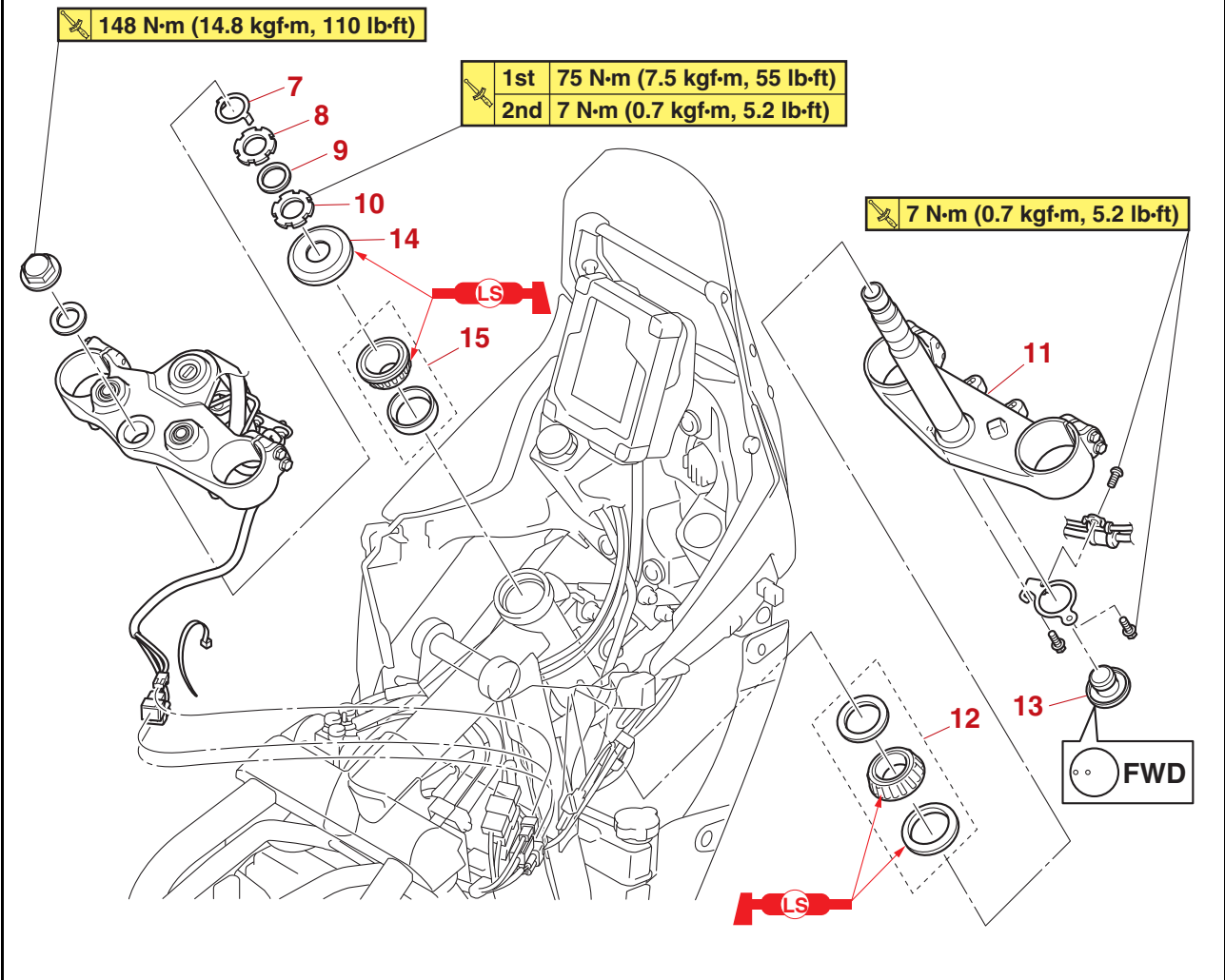
### Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Front brake calipers/Front fender/Front wheel		Refer to "FRONT WHEEL" on page 4-11.
	Front fork legs		Refer to "FRONT FORK" on page 4-58.
	Handlebar		Refer to "HANDLEBAR" on page 4-52.
1	Main switch coupler	2	Disconnect.
2	Immobilizer coupler	1	Disconnect.
3	Front brake hose/wheel sensor lead holder	1	
4	Steering stem nut	1	
5	Washer	1	
6	Upper bracket	1	

# STEERING HEAD

## Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
7	Lock washer	1	
8	Upper ring nut	1	
9	Rubber washer	1	
10	Lower ring nut	1	
11	Lower bracket	1	
12	Lower bearing	1	
13	Lower bracket cap	1	
14	Upper bearing cover	1	
15	Upper bearing	1	

EAS30213

## REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120

### WARNING

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

2. Remove:

- Upper ring nut "1"
- Rubber washer
- Lower ring nut "2"
- Lower bracket

EWA13730

### WARNING

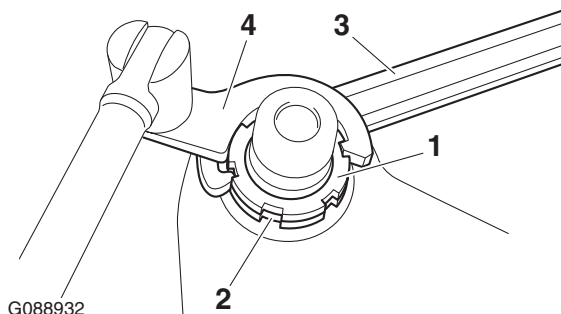
Securely support the lower bracket so that there is no danger of it falling.

### TIP

- Hold the lower ring nut with ring nut wrench "3", and then remove the upper ring nut with the steering nut wrench "4".
- Remove the lower ring nut with the steering nut wrench.



Ring nut wrench  
90890-01268  
Spanner wrench  
YU-01268  
Steering nut wrench  
90890-01403  
Exhaust flange nut wrench  
YU-A9472



G088932

EAS30214

## CHECKING THE STEERING HEAD

1. Wash:

- Bearings
- Bearing races



Recommended cleaning solvent  
Kerosene

2. Check:

- Bearings

- Bearing races

Damage/pitting → Replace the bearings and bearing races as a set.

3. Replace:

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

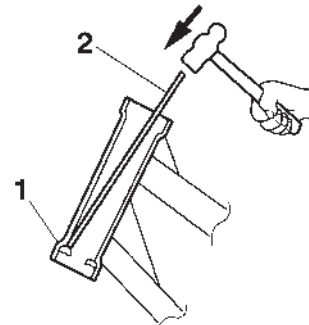
ECA14270

### NOTICE

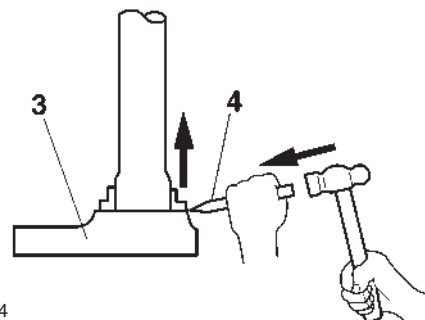
If the bearing race is not installed properly, the steering head pipe could be damaged.

### TIP

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.



G088933



G088934

4. Check:

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

EAS30216

## INSTALLING THE STEERING HEAD

### 1. Lubricate:

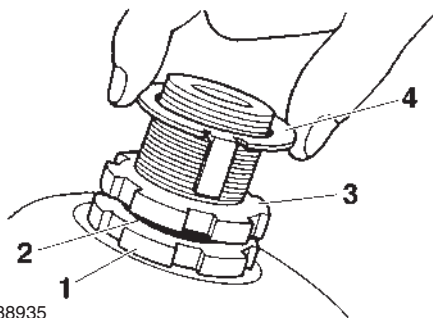
- Upper bearing
- Lower bearing

	<p><b>Recommended lubricant</b> Lithium-soap-based grease</p>
---	---

### 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 3-19.



### 3. Install:

- Upper bracket
- Washer
- Steering stem nut

### TIP

Temporarily tighten the steering stem nut.

### 4. Install:


- Front fork legs
- Refer to "INSTALLING THE FRONT FORK LEGS" on page 4-66.

### TIP

Temporarily tighten the upper and lower bracket pinch bolts.


### 5. Tighten:

- Steering stem nut

	<p><b>Steering stem nut</b> 148 N·m (14.8 kgf·m, 110 lb·ft)</p>
---	---

### 6. Tighten:

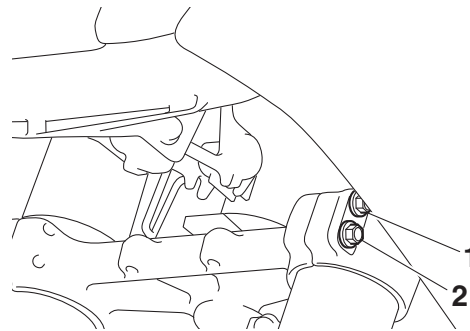
- Upper and lower bracket pinch bolts

	<p><b>Upper bracket pinch bolt</b> 23 N·m (2.3 kgf·m, 17 lb·ft)</p> <p><b>Lower bracket pinch bolts</b> 20 N·m (2.0 kgf·m, 15 lb·ft)</p>
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### TIP

Tighten each lower bracket pinch bolt to specification in the order.

Pinch bolt "1" → Pinch bolt "2" → Pinch bolt "1"  
→ Pinch bolt "2".

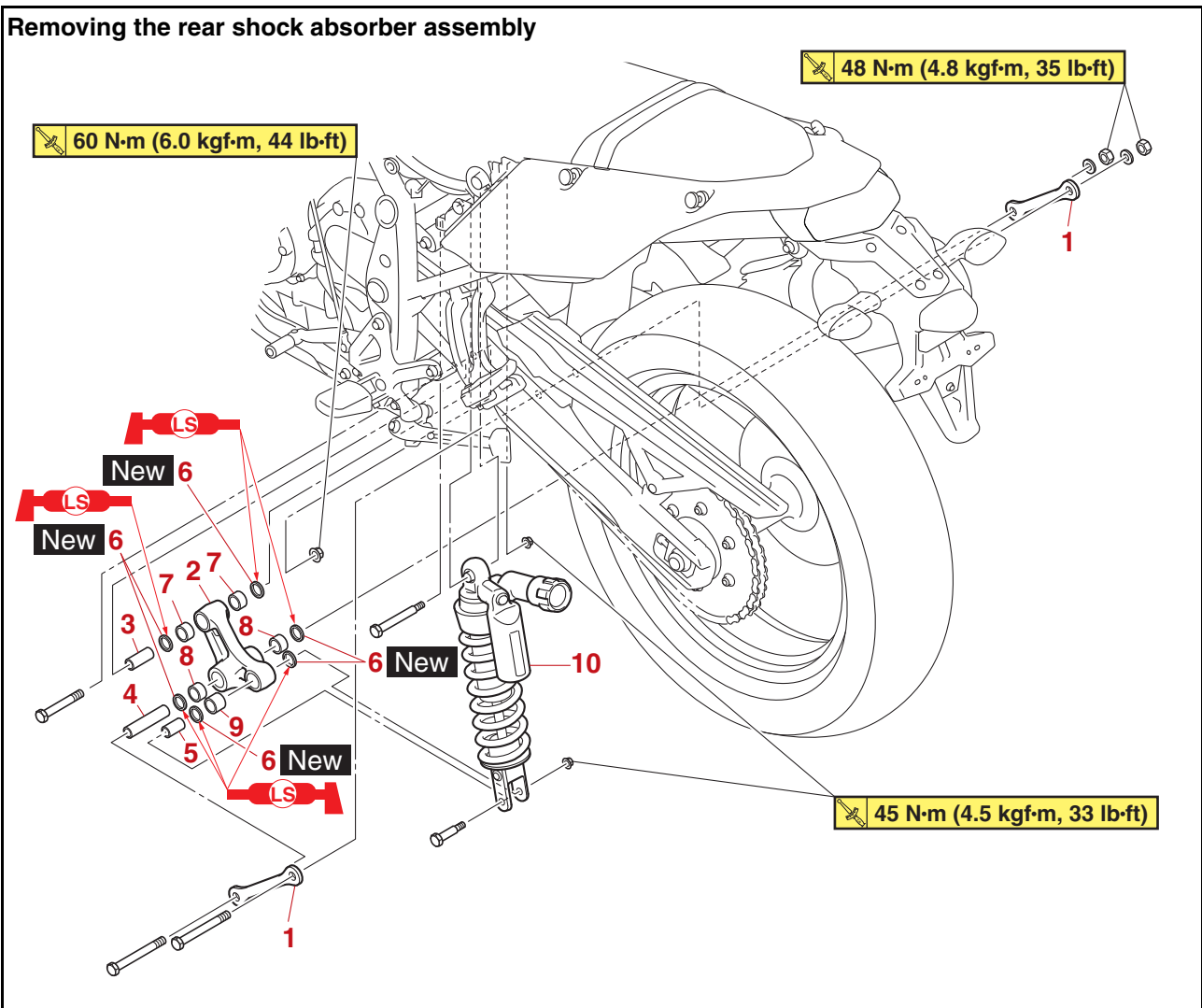


# REAR SHOCK ABSORBER ASSEMBLY

EAS20036

## REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-3.
1	Connecting arm	2	
2	Relay arm	1	
3	Collar	1	
4	Collar	1	
5	Collar	1	
6	Oil seal	6	
7	Bearing	2	
8	Bearing	2	
9	Bearing	1	
10	Rear shock absorber assembly	1	

# REAR SHOCK ABSORBER ASSEMBLY

EAS30826

## HANDLING THE REAR SHOCK ABSORBER

EWA13740

### WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

EAS30729

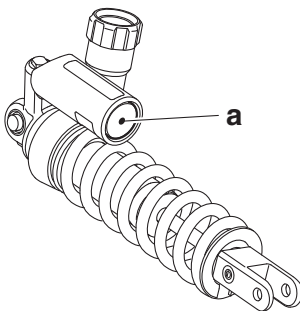
## DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at the point “a” 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.

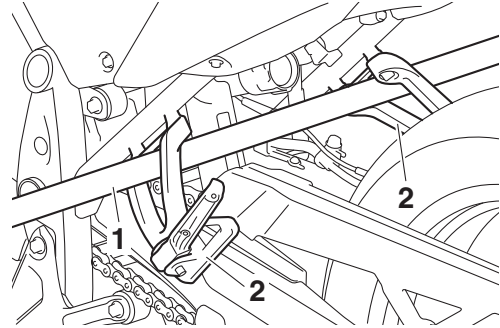
EWA13120

### WARNING

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

### TIP

Pass a suitable rod “1” through the holes in the brackets of the passenger footrests “2” and secure the rod to support the vehicle.



EAS30220

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
  - Rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.
  - Rear shock absorber assembly  
Gas leaks → Replace the rear shock absorber assembly.
  - Spring  
Damage/wear → Replace the rear shock absorber assembly.
  - Bolts  
Bends/damage/wear → Replace.

EAS32678

## CHECKING THE CONNECTING ARMS AND RELAY ARM

1. Check:
  - Connecting arms
  - Relay arm  
Damage/wear → Replace.
2. Check:
  - Bearings
  - Oil seals  
Damage → Replace.
3. Check:
  - Collars  
Damage/scratches → Replace.

EAS30225

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

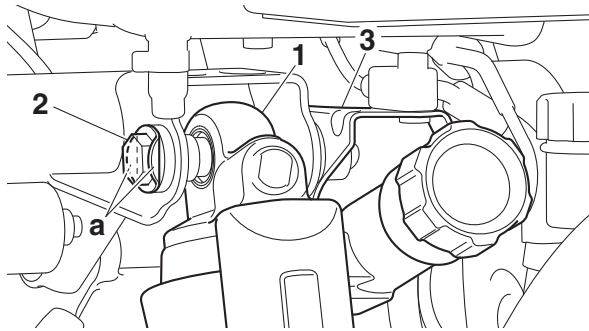
1. Install:
  - Rear shock absorber assembly “1”



# REAR SHOCK ABSORBER ASSEMBLY

## TIP

- Install both the rear shock absorber assembly and brake hose bracket “3” using the rear shock absorber assembly bolt.
- Install the rear shock absorber assembly bolt “2” so that the bolt head fits between the projections “a” on the frame as shown in the illustration.



## 2. Tighten:

- Rear shock absorber assembly nut (upper side)



**Rear shock absorber assembly nut (upper side)**  
45 N·m (4.5 kgf·m, 33 lb·ft)

EAS30222

## INSTALLING THE RELAY ARM

### 1. Install:

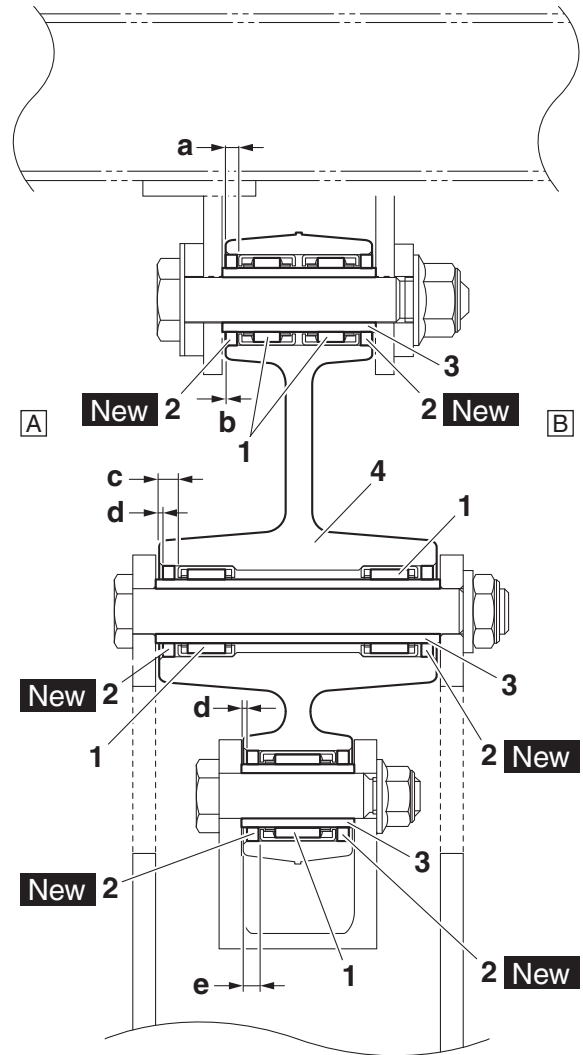
- Bearings “1”
- Oil seals “2” **New**
- Collars “3”  
(to the relay arm “4”)



**Installed depth “a” (bearing)**  
3.5 mm (0.14 in)  
**Installed depth “b” (oil seal)**  
0.0 mm (0.00 in)  
**Installed depth “c” (bearing)**  
5.0 mm (0.20 in)  
**Installed depth “d” (oil seal)**  
1.0 mm (0.04 in)  
**Installed depth “e” (bearing)**  
4.5 mm (1.77 in)

## TIP

When installing the oil seals to the relay arm, face the character stamps of the oil seals outward.



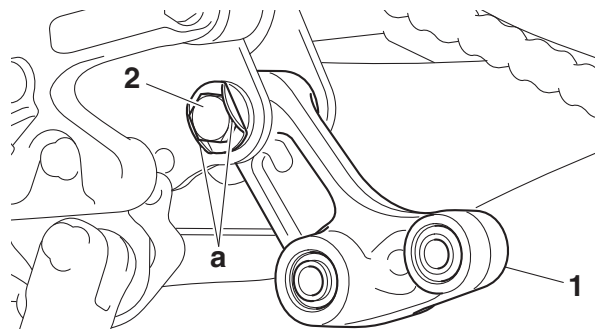
- A. Left side  
B. Right side

### 2. Install:

- Relay arm “1”

## TIP

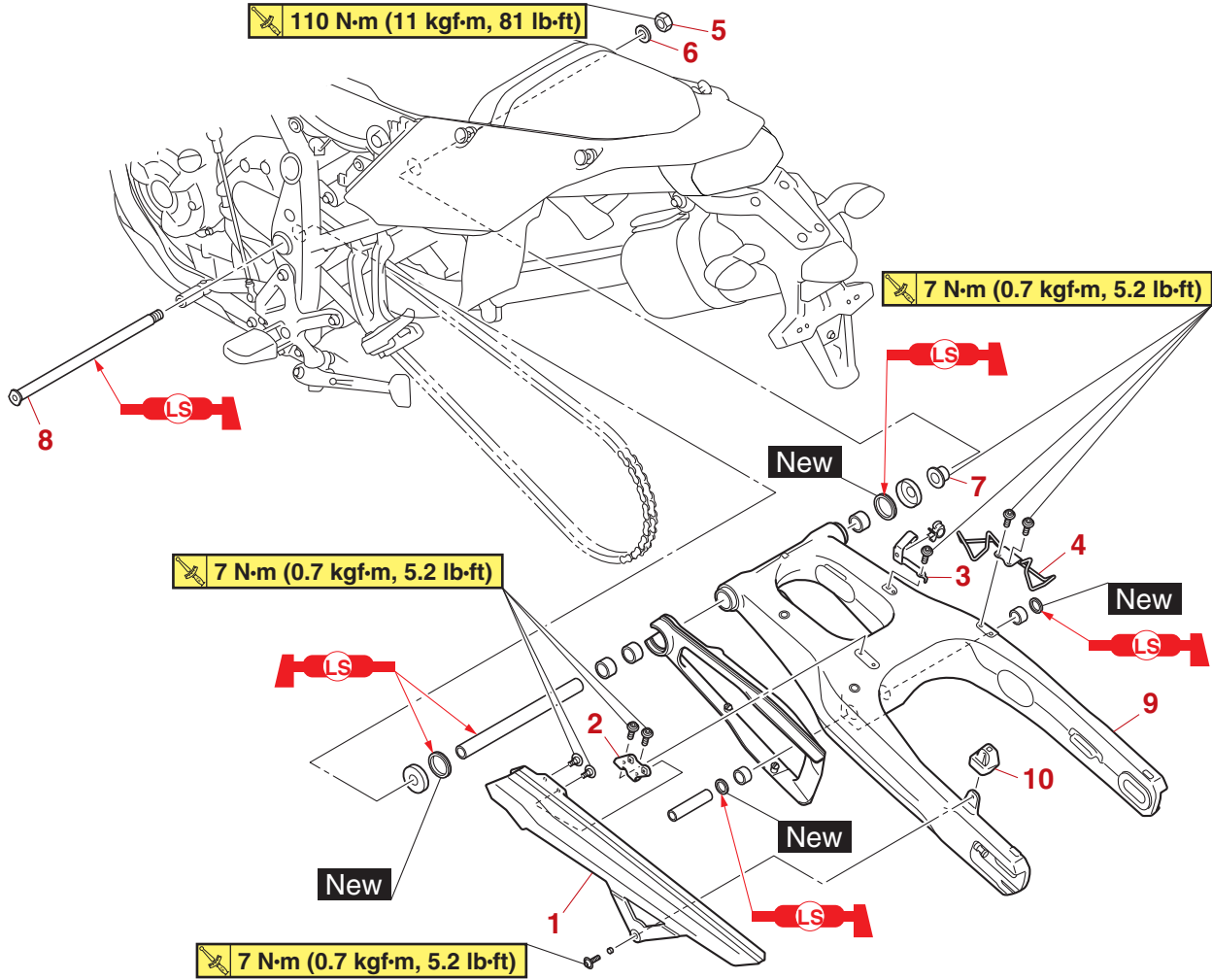
Install the relay arm bolt “2” so that the bolt head fits between the projections “a” on the frame as shown in the illustration.



EAS20037

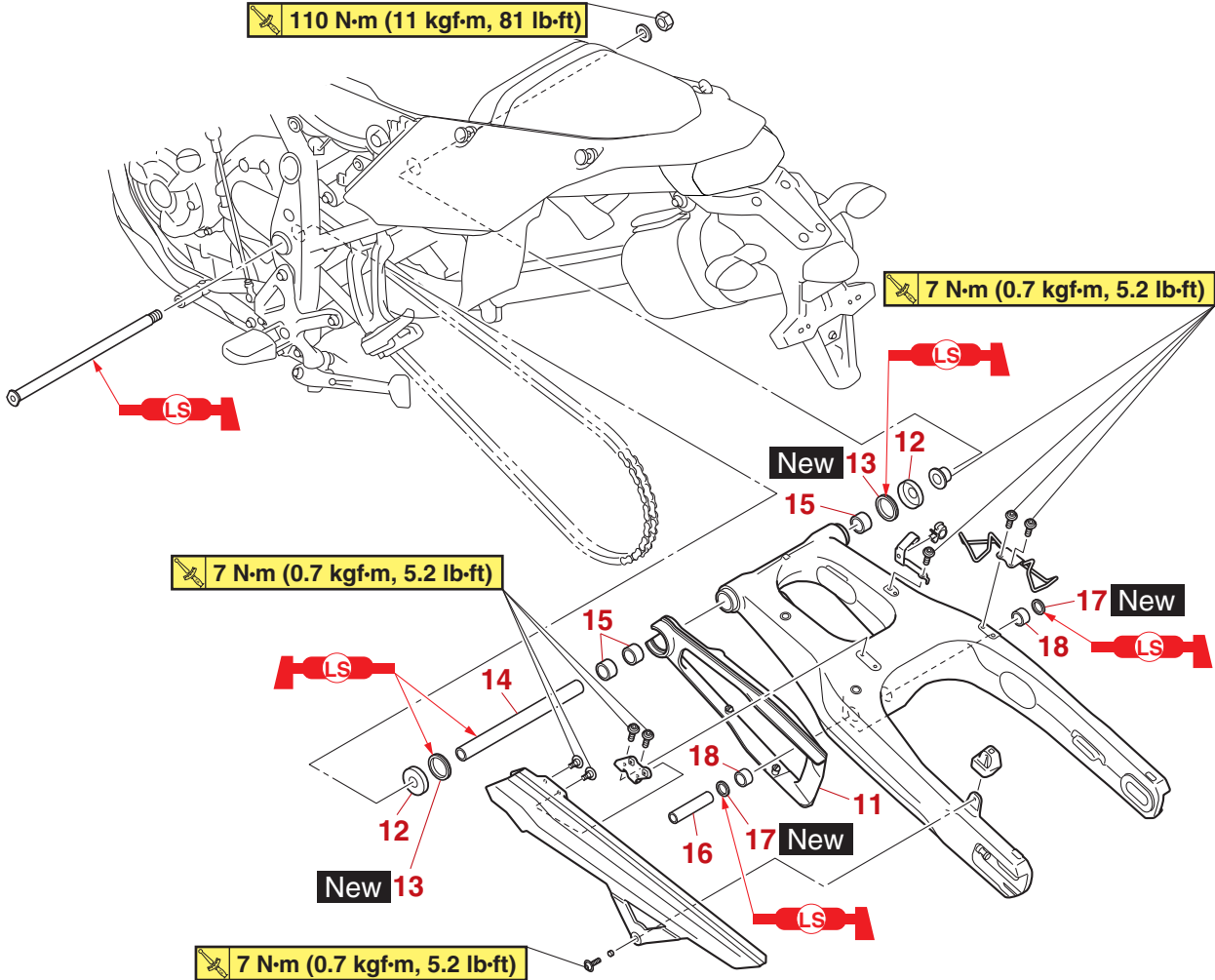
## SWINGARM

### Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-72.
1	Drive chain case	1	
2	Stay	1	
3	Rear brake hose/lead holder	1	
4	Rear brake hose/lead guide	1	
5	Pivot shaft nut	1	
6	Washer	1	
7	Adjusting bolt	1	Loosen.
8	Pivot shaft	1	
9	Swingarm	1	
10	Damper	1	

## Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
11	Drive chain guide	1	
12	Dust cover	2	
13	Oil seal	2	
14	Collar	1	
15	Bearing	3	
16	Collar	1	
17	Oil seal	2	
18	Bearing	2	

EAS30226

## REMOVING THE SWINGARM

- Stand the vehicle on a level surface.

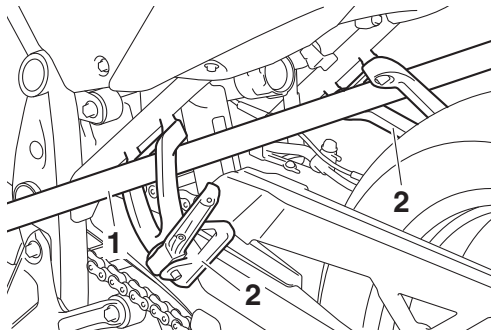
EWA13120

### **WARNING**

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

### TIP

Pass a suitable rod "1" through the holes in the brackets of the passenger footrests "2" and secure the rod to support the vehicle.

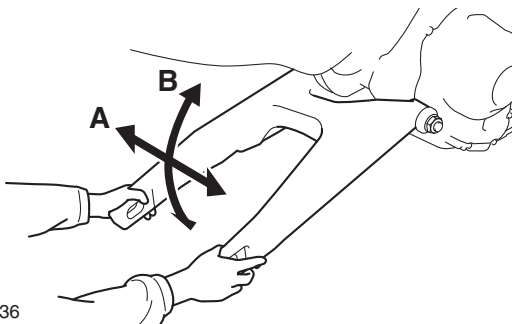


- Measure:
  - Swingarm side play
  - Swingarm vertical movement
    - Measure the tightening torque of the pivot shaft nut.



**Pivot shaft nut**  
**110 N·m (11 kgf·m, 81 lb·ft)**

- Check the swingarm side play "A" by moving the swingarm from side to side. If the swingarm has side-to-side play, check the collars, bearings, dust covers, and adjusting bolt.
- Check the swingarm vertical movement "B" by moving the swingarm up and down. If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, collars, bearings, dust covers, and adjusting bolt.



G088936

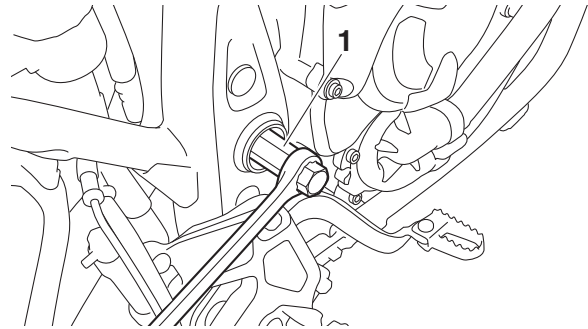
- Loosen:
  - Adjusting bolt

### TIP

Loosen the adjusting bolt with the engine alignment tool "1".



**Engine alignment tool**  
**90890-11097**



- Remove:
  - Pivot shaft
  - Swingarm

EAS30227

## CHECKING THE SWINGARM

- Check:
  - Swingarm  
Bends/cracks/damage → Replace.
- Check:
  - Pivot shaft  
Roll the pivot shaft on a flat surface.  
Bends → Replace.

EWA13770

### **WARNING**

**Do not attempt to straighten a bent pivot shaft.**

- Wash:
  - Pivot shaft
  - Dust covers
  - Collars
  - Bearings
  - Washer



**Recommended cleaning solvent**  
**Kerosene**

- Check:
  - Dust covers  
Damage/wear → Replace.
  - Bearings  
Damage/pitting → Replace.
  - Collars  
Damage/scratches → Replace.


EAS30228

## INSTALLING THE SWINGARM

- Lubricate:
  - Oil seals
  - Pivot shaft

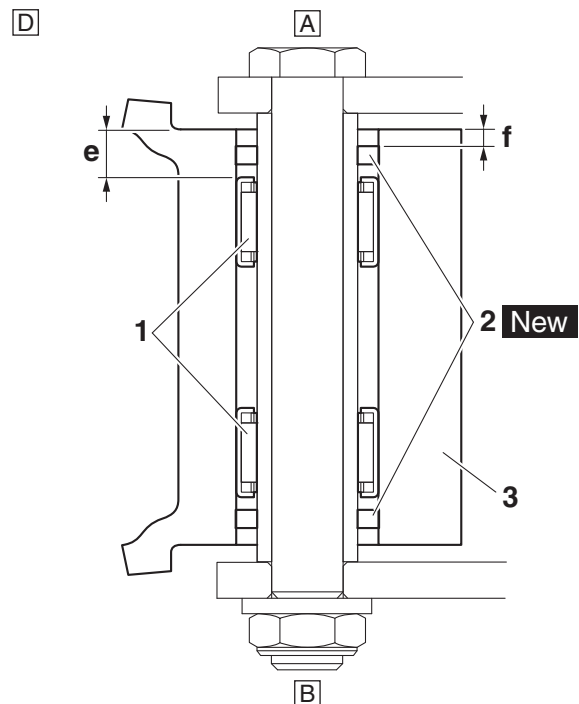
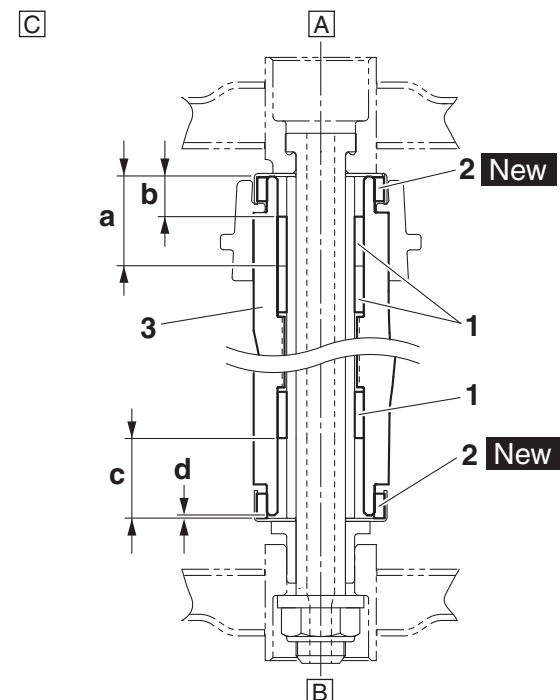
	<b>Recommended lubricant</b> Lithium-soap-based grease
---	---

- Install:
  - Bearings "1"
  - Oil seals "2" **New**  
(to the swingarm "3")

	<p>Installed depth "a" 28.3–29.7 mm (1.11–1.17 in)</p> <p>Installed depth "b" 11.5–13.0 mm (0.45–0.51 in)</p> <p>Installed depth "c" 24.3–25.7 mm (0.96–1.01 in)</p> <p>Installed depth "d" 1.0 mm (0.04 in)</p> <p>Installed depth "e" 8.0 mm (0.31 in)</p> <p>Installed depth "f" 3.0 mm (0.12 in)</p>
---	--

### TIP

Install the bearings to the swingarm so that the marks are facing outward.



- A. Left side
- B. Right side
- C. Pivot shaft side
- D. Connecting rod bolt side

- Install:
  - Adjusting bolt  
(to the frame)

### TIP


Temporarily tighten the adjusting bolt until its flange contacts the frame.

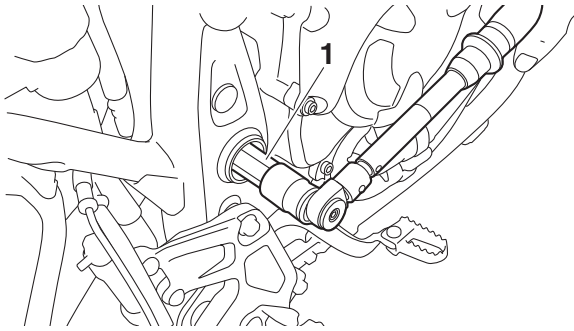
- Install:
  - Swingarm
  - Pivot shaft
- Tighten:
  - Adjusting bolt

### TIP

- Tighten the adjusting bolt to specification with the engine alignment tool "1".
- Make sure that the flange on the adjusting bolt contacts the dust cover on the swingarm.

	<b>Engine alignment tool</b> 90890-11097
---	---

	<b>Adjusting bolt</b> 7 N·m (0.7 kgf·m, 5.2 lb·ft)
---	---



6. Install:
- Washer
  - Pivot shaft nut



**Pivot shaft nut**  
**110 N·m (11 kgf·m, 81 lb·ft)**

7. Install:
- Rear wheel  
Refer to “REAR WHEEL” on page 4-18.
8. Adjust:
- Drive chain slack  
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.

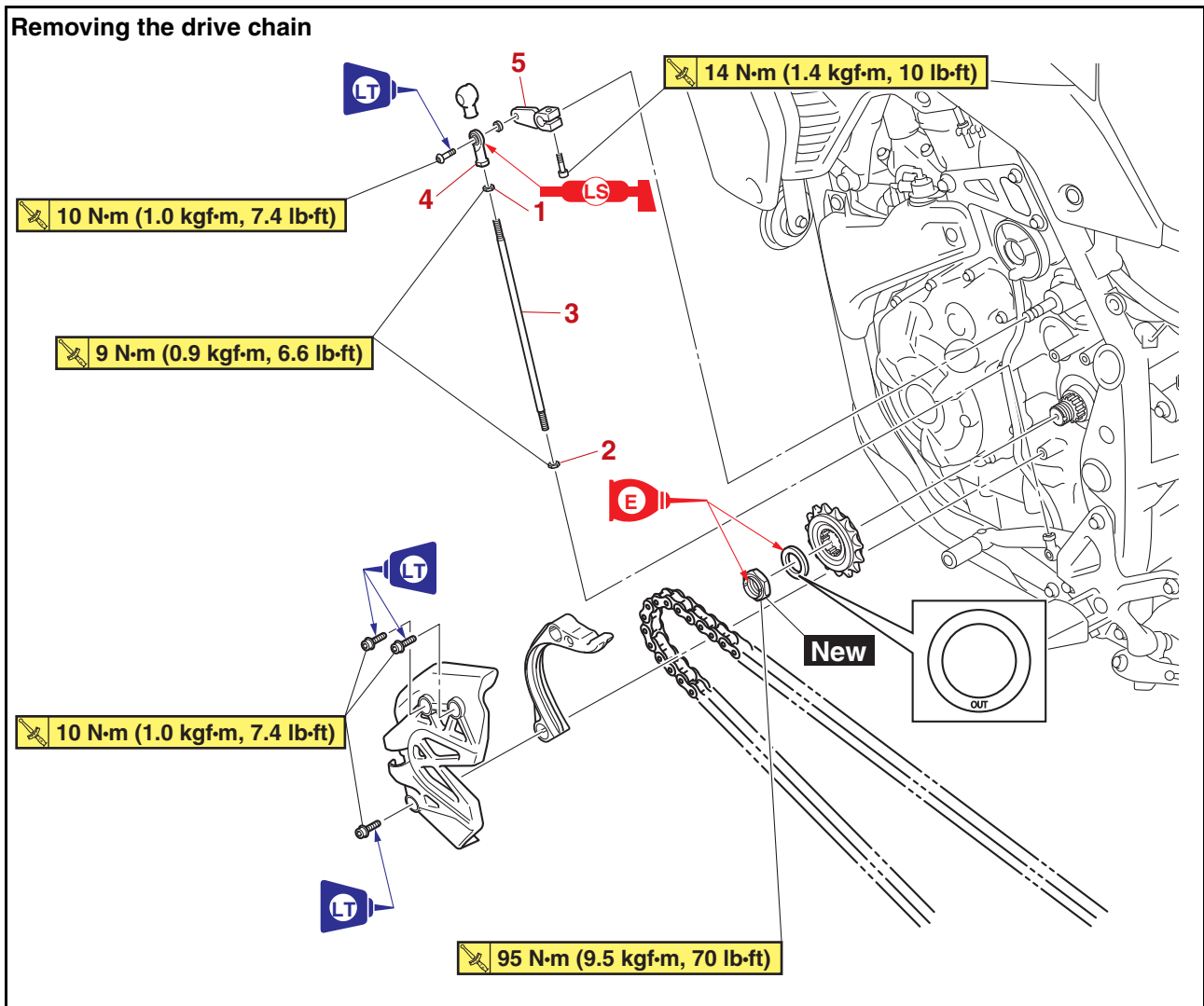


**Drive chain slack**  
**43.0–48.0 mm (1.69–1.89 in)**

EAS20038

## CHAIN DRIVE

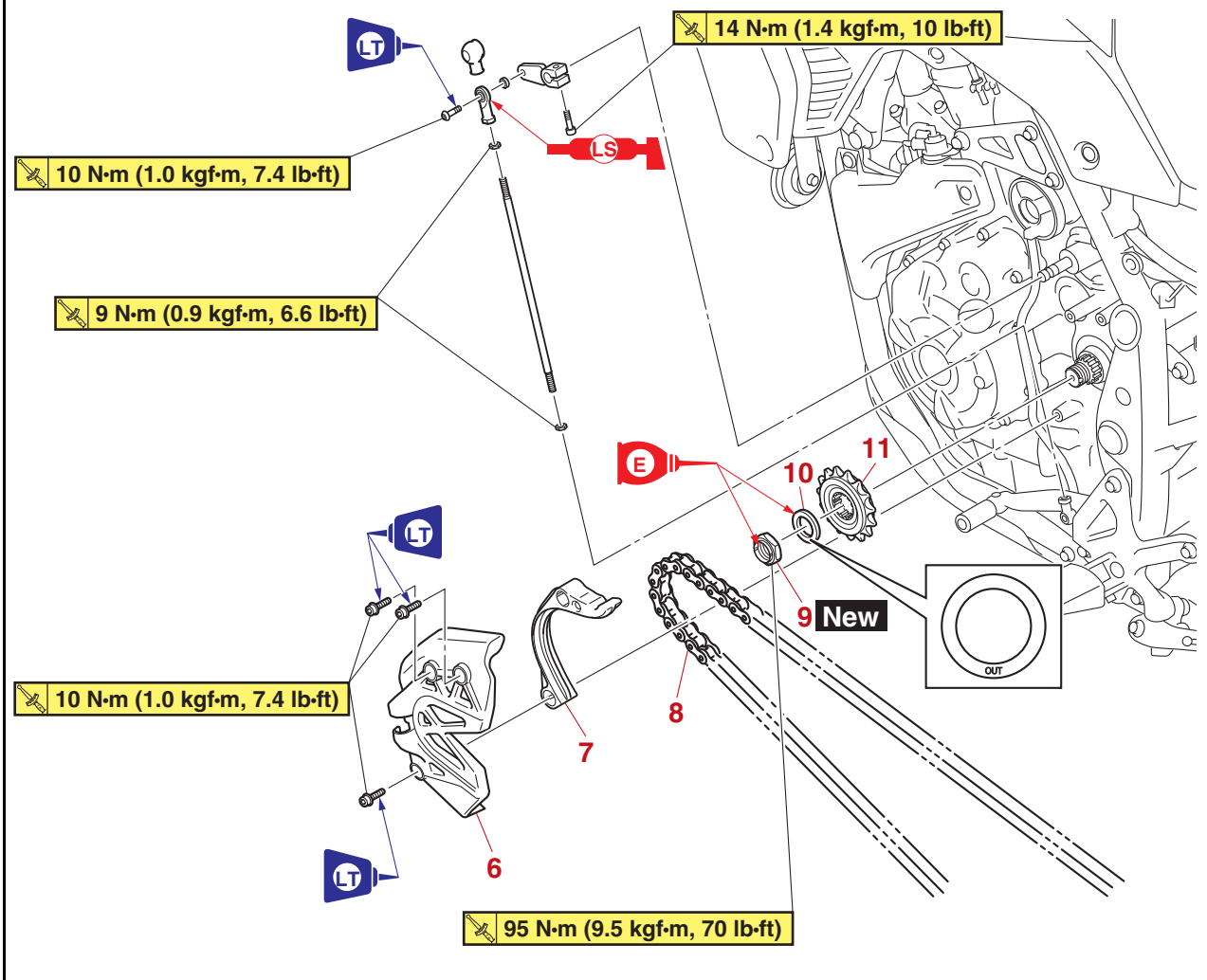
### Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Rear wheel		<b>TIP</b> Loosen the drive sprocket nut before removing the rear wheel. Refer to "REAR WHEEL" on page 4-18.
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-72.
	Swingarm		Refer to "SWINGARM" on page 4-75.
1	Shift rod locknut (shift arm side)	1	Loosen.
2	Shift rod locknut (shift pedal side)	1	Loosen. Left-hand threads
3	Shift rod	1	
4	Shift rod joint	1	
5	Shift arm	1	

# CHAIN DRIVE

## Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
6	Drive sprocket cover	1	
7	Drive chain guide	1	
8	Drive chain	1	
9	Drive sprocket nut	1	
10	Washer	1	
11	Drive sprocket	1	



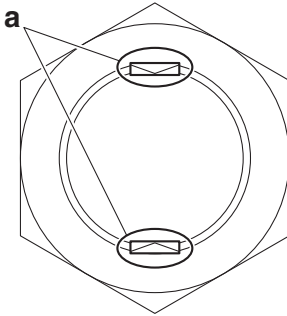
EAS31115

## REMOVING THE DRIVE SPROCKET

### TIP

Loosen the drive sprocket nut before removing the rear wheel.

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



2. Loosen:

- Drive sprocket nut

### TIP

Loosen the drive sprocket nut while pressing the brake pedal.

EAS30230

## CHECKING THE DRIVE CHAIN

1. Measure:

- 15-link section "a" of the drive chain  
Out of specification → Replace the drive chain.

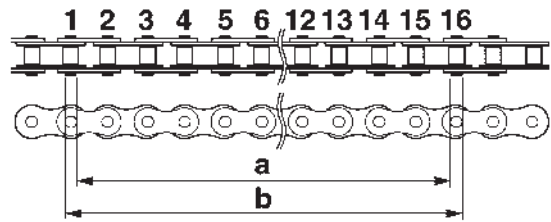


**15-link length limit**  
**239.3 mm (9.42 in)**

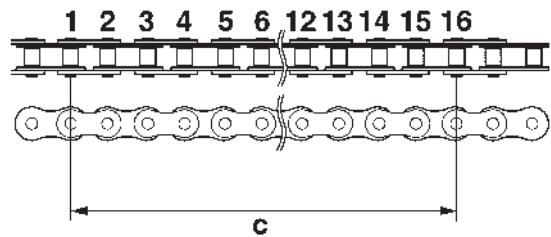
- Measure the length "b" between the inner sides of the pins and the length "c" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
- Calculate the length "a" of the 15-link section of the drive chain using the following formula.  
Drive chain 15-link section length "a" =  
(length "b" between pin inner sides + length "c" between pin outer sides)/2

### TIP

- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.



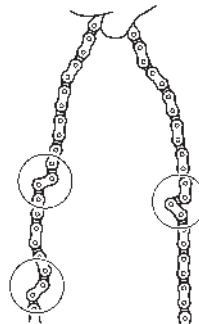
G088937



G088938

2. Check:

- Drive chain  
Stiffness → Clean and lubricate or replace.



G088939

3. Clean:

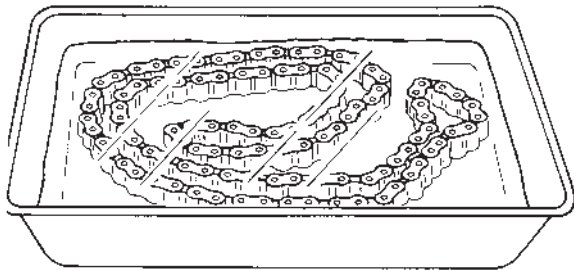
- Drive chain
  - Wipe the drive chain with a clean cloth.
  - Put the drive chain in kerosene and remove any remaining dirt.
  - Remove the drive chain from the kerosene and completely dry it.

ECA14290

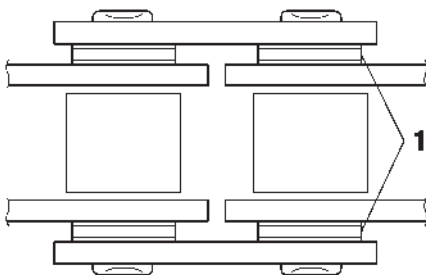
### NOTICE

- 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., benzene), 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.

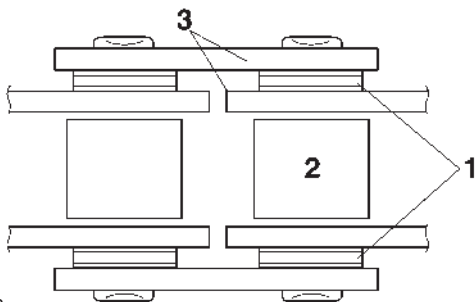


G088940



G088941

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.



G088943

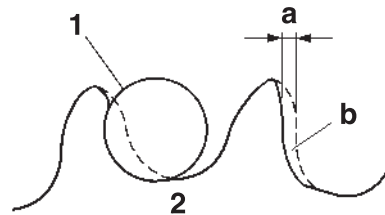
5. Lubricate:
- Drive chain



EAS30231

## CHECKING THE DRIVE SPROCKET

1. Check:
- Drive sprocket  
More than 1/4 tooth “a” wear → Replace the drive sprocket, drive chain, and rear wheel sprocket as a set.  
Bent teeth → Replace the drive sprocket, drive chain, and rear wheel sprocket as a set.



G088904

- 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 4-21.

EAS30233

## CHECKING THE REAR WHEEL DRIVE HUB

Refer to “CHECKING THE REAR WHEEL DRIVE HUB” on page 4-21.

EAS31116

## INSTALLING THE DRIVE SPROCKET

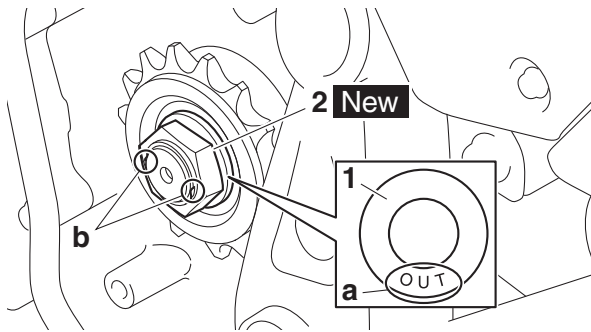
1. Install:
- Drive sprocket
  - Washer “1”
  - Drive sprocket nut “2” **New**



**Drive sprocket nut**  
95 N·m (9.5 kgf·m, 70 lb·ft)

### TIP

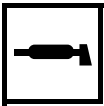
- While applying the rear brake, tighten the drive sprocket nut.
- Install washer with the “OUT” mark “a” facing out.
- Stake the drive sprocket nut at cutouts “b” in the drive axle.



EAS30234

## INSTALLING THE DRIVE CHAIN

1. Install:
  - Drive chain
2. Lubricate:
  - Drive chain

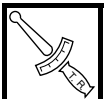


**Recommended lubricant**  
Chain lubricant suitable for O-ring chains

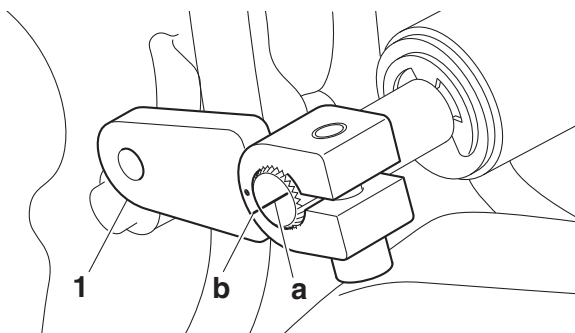
3. Install:
  - Shift arm "1"
  - Shift rod joint
  - Shift rod
  - Shift rod locknuts

### TIP

Before installing, make sure to align the mark "a" of the shift shaft with the mark "b" of the shift arm.



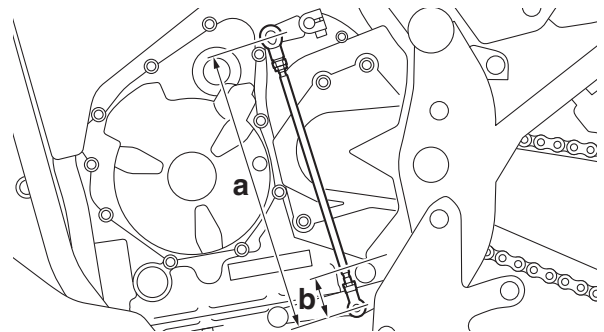
**Shift arm pinch bolt**  
14 N·m (1.4 kgf·m, 10 lb-ft)



4. Measure:
  - Installed shift rod length "a" and "b"
 Incorrect → Adjust.



**Installed length "a"**  
273–275 mm (10.7–10.8 in)  
**Installed length "b"**  
35–36 mm (1.38–1.42 in)

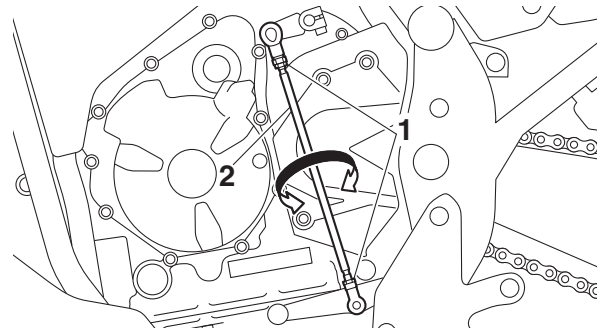


5. Adjust:
  - Installed shift rod length
    - a. Loosen both locknuts "1".

### TIP

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

- b. Turn the shift rod "2" to obtain the correct shift pedal position.

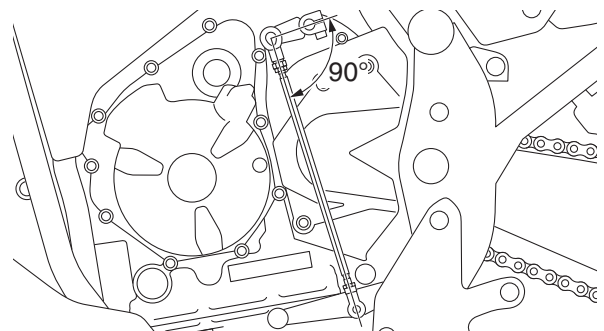


- c. Tighten both locknuts.



**Shift rod locknut (shift arm side)**  
9 N·m (0.9 kgf·m, 6.6 lb-ft)  
**Shift rod locknut (shift pedal side)**  
9 N·m (0.9 kgf·m, 6.6 lb-ft)  
Left-hand threads

- d. Make sure that the angle between the shift arm and the shift rod is about 90°.



6. Adjust:
  - Drive chain slack  
Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-18.



**Drive chain slack**  
43.0–48.0 mm (1.69–1.89 in)

ECA13550

**NOTICE**

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

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EAS20041

## ENGINE INSPECTION

EAS30249

### MEASURE THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

#### TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
  - Valve clearance  
Out of specification → Adjust.  
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-6.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
  - Ignition coils  
Refer to “CHECKING THE SPARK PLUGS” on page 3-5.
4. Remove:
  - Spark plugs

ECA13340

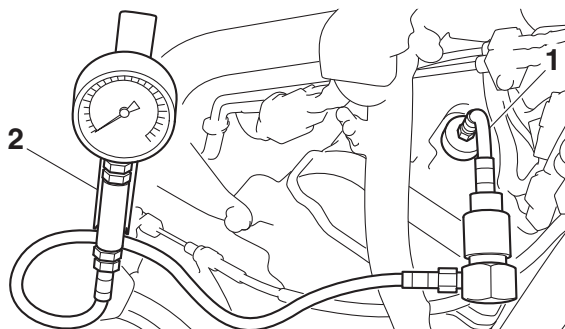
#### NOTICE

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

5. Install:
  - Extension “1”
  - Compression gauge “2”



**Compression gauge extension**  
122mm  
90890-04136  
**Compression gauge extension**  
122mm  
YM-04136  
**Compression gauge**  
90890-03081  
**Engine compression tester**  
YU-33223



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

#### TIP

Due to the engine characteristics, the compression pressure is different for cylinder #1 and cylinder #2.



#### Compression pressure

770–990 kPa/355 r/min (7.7–9.9 kgf/cm<sup>2</sup>/355 r/min, 109.5–140.8 psi/355 r/min)

#### Compression pressure (#2 cylinder)

690–880 kPa/355 r/min (6.9–8.8 kgf/cm<sup>2</sup>/355 r/min, 98.1–125.2 psi/355 r/min)

- a. Turn the main switch to “ON”.
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12940

#### WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

#### TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm<sup>2</sup>, 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

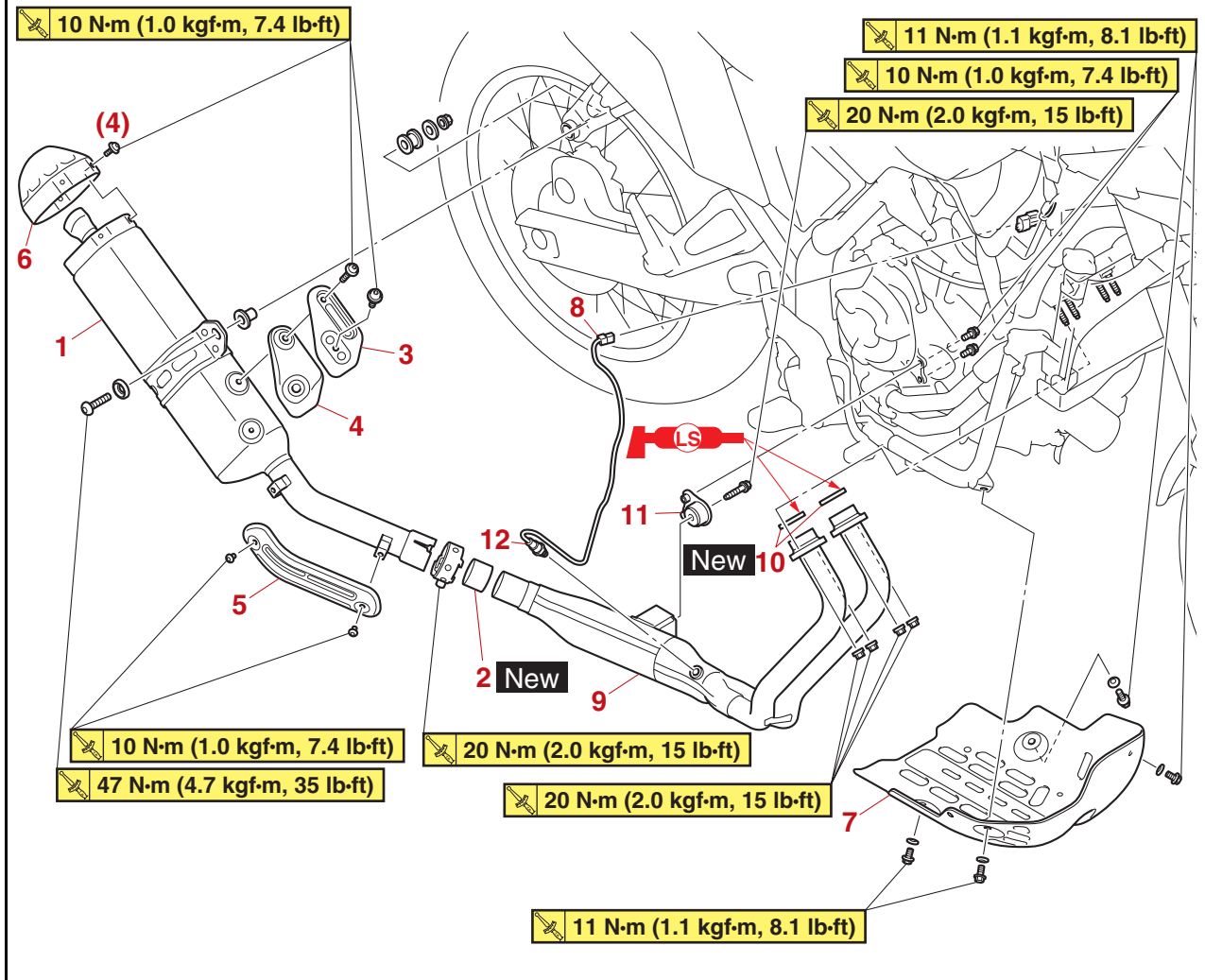


**Spark plug**  
**13 N·m (1.3 kgf·m, 9.6 lb·ft)**

EAS20042

## ENGINE REMOVAL

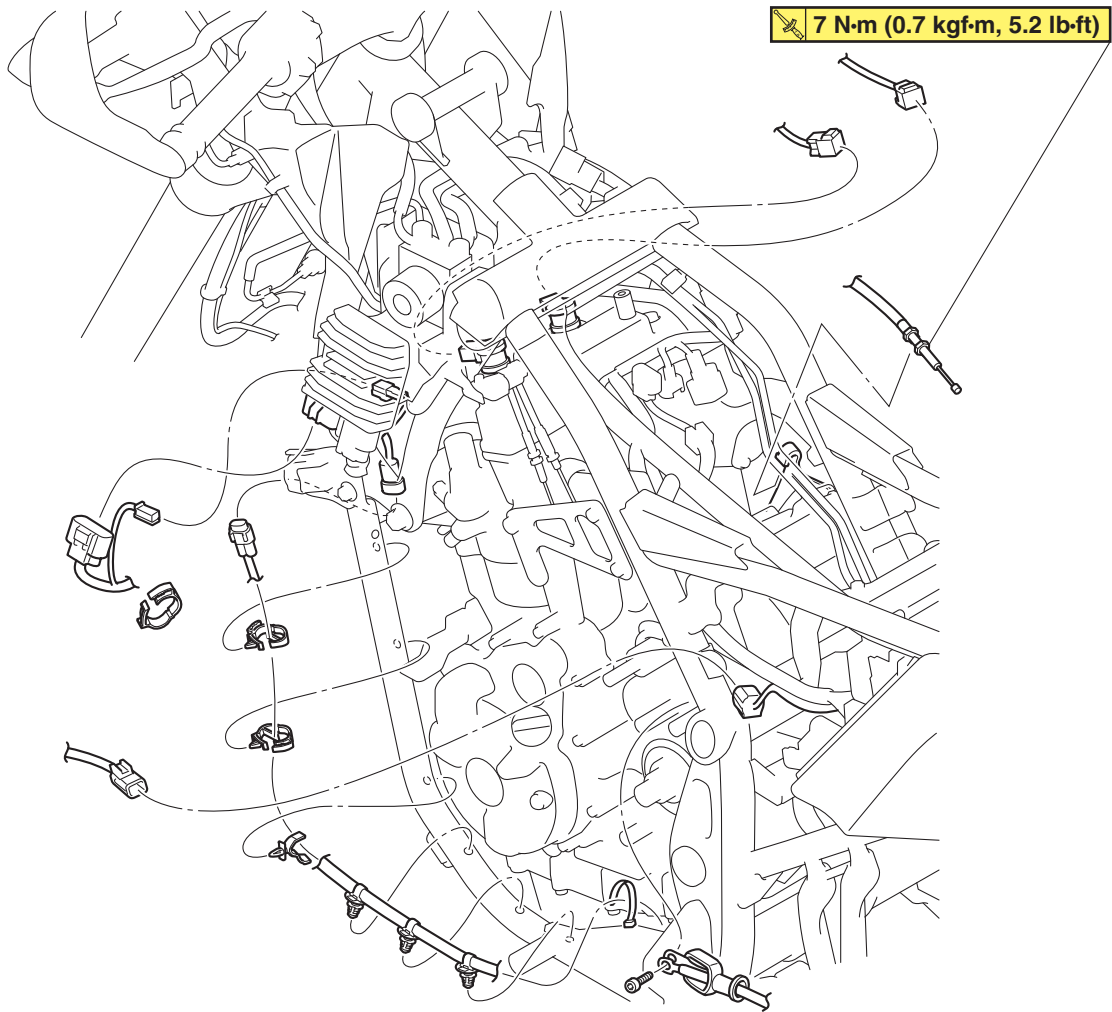
### Removing the exhaust pipe



Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (right)/Air duct (right)		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Muffler	1	
2	Gasket	1	
3	Muffler protector 2	1	
4	Muffler protector 3	1	
5	Muffler protector 1	1	
6	Muffler cap	1	
7	Engine guard	1	
8	O <sub>2</sub> sensor coupler	1	Disconnect.
9	Exhaust pipe	1	
10	Gasket	2	
11	Exhaust pipe bracket	1	
12	O <sub>2</sub> sensor	1	Remove the O <sub>2</sub> sensor only when necessary.

# ENGINE REMOVAL

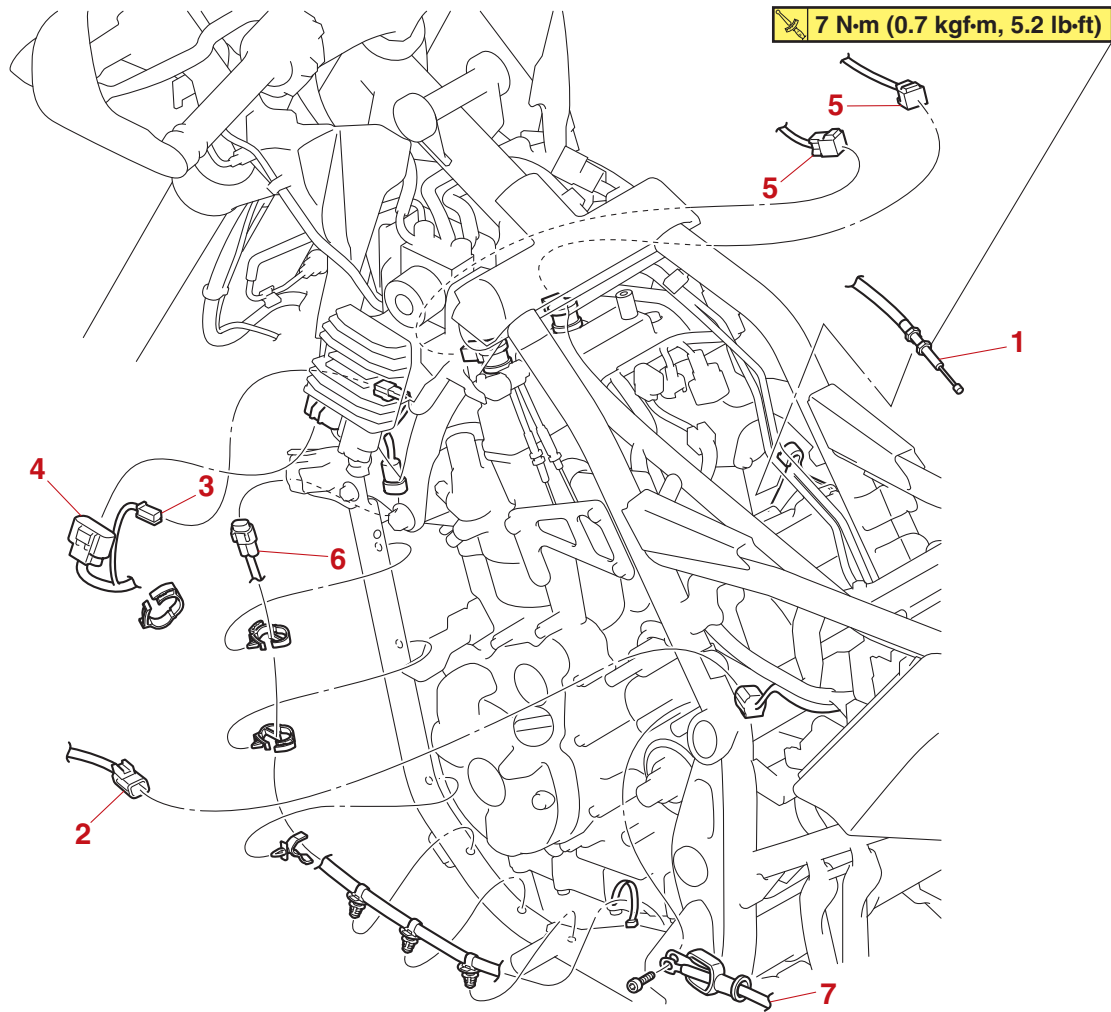
## Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Air scoop (left)/Air duct (left)/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank/Canister		Refer to "FUEL TANK" on page 7-1.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-80.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-38.
	Oil pressure switch		Refer to "CRANKCASE" on page 5-60.
	Coolant reservoir/Radiator		Refer to "RADIATOR" on page 6-2.
	Water jacket joint/Oil cooler/Thermostat		Refer to "OIL COOLER" on page 6-5.
	Water pump		Refer to "WATER PUMP" on page 6-10.

# ENGINE REMOVAL

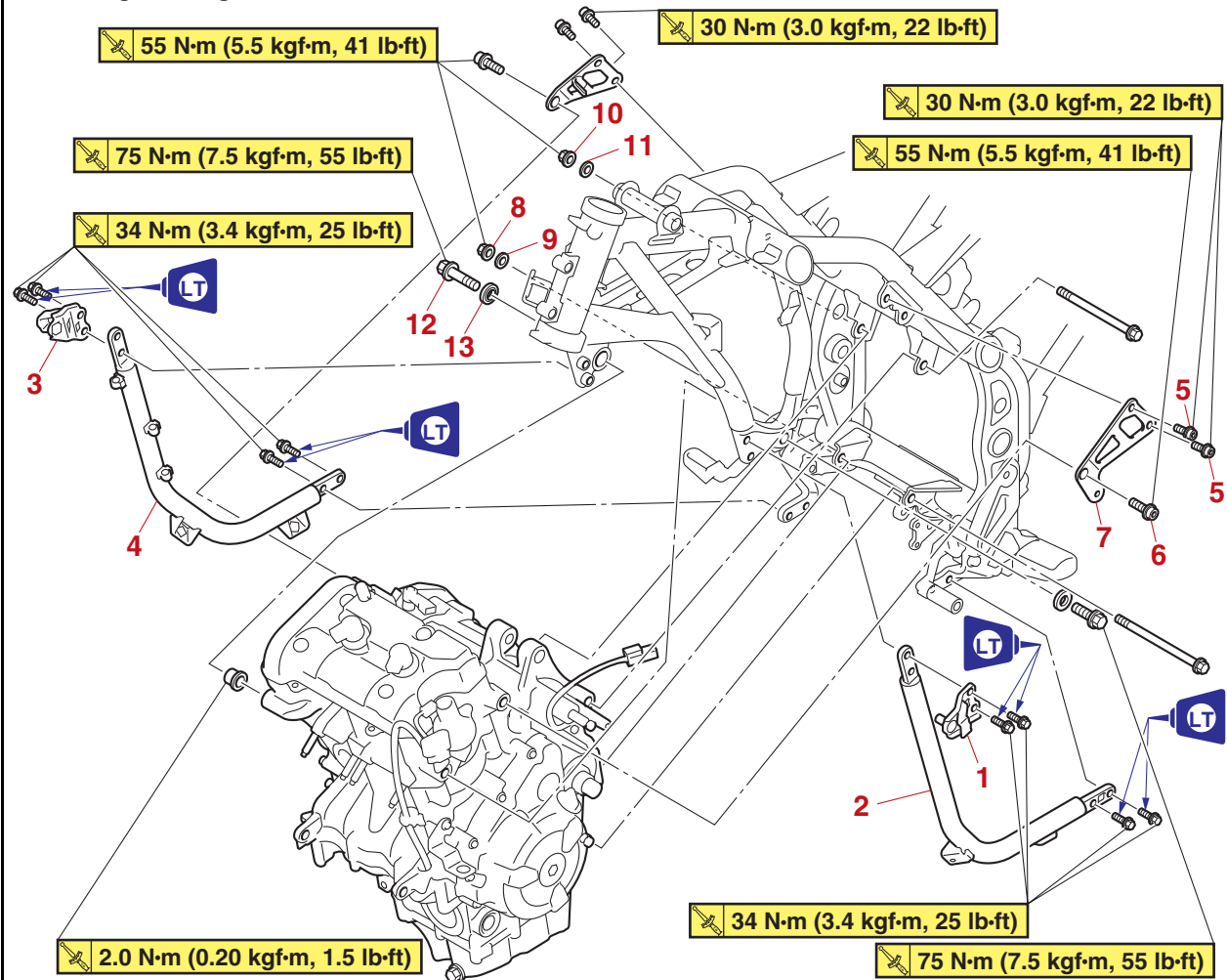
## Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head breather hose/Sub-wire harness/ Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Clutch cable	1	Disconnect.
2	Gear position sensor coupler	1	Disconnect.
3	Crankshaft position sensor coupler	1	Disconnect.
4	Stator coil coupler	1	Disconnect.
5	Ignition coil coupler	2	Disconnect.
6	Sidestand switch coupler and lead	1	Disconnect the coupler and then remove the lead from the down tube (left).
7	Engine ground lead	1	Disconnect.

# ENGINE REMOVAL

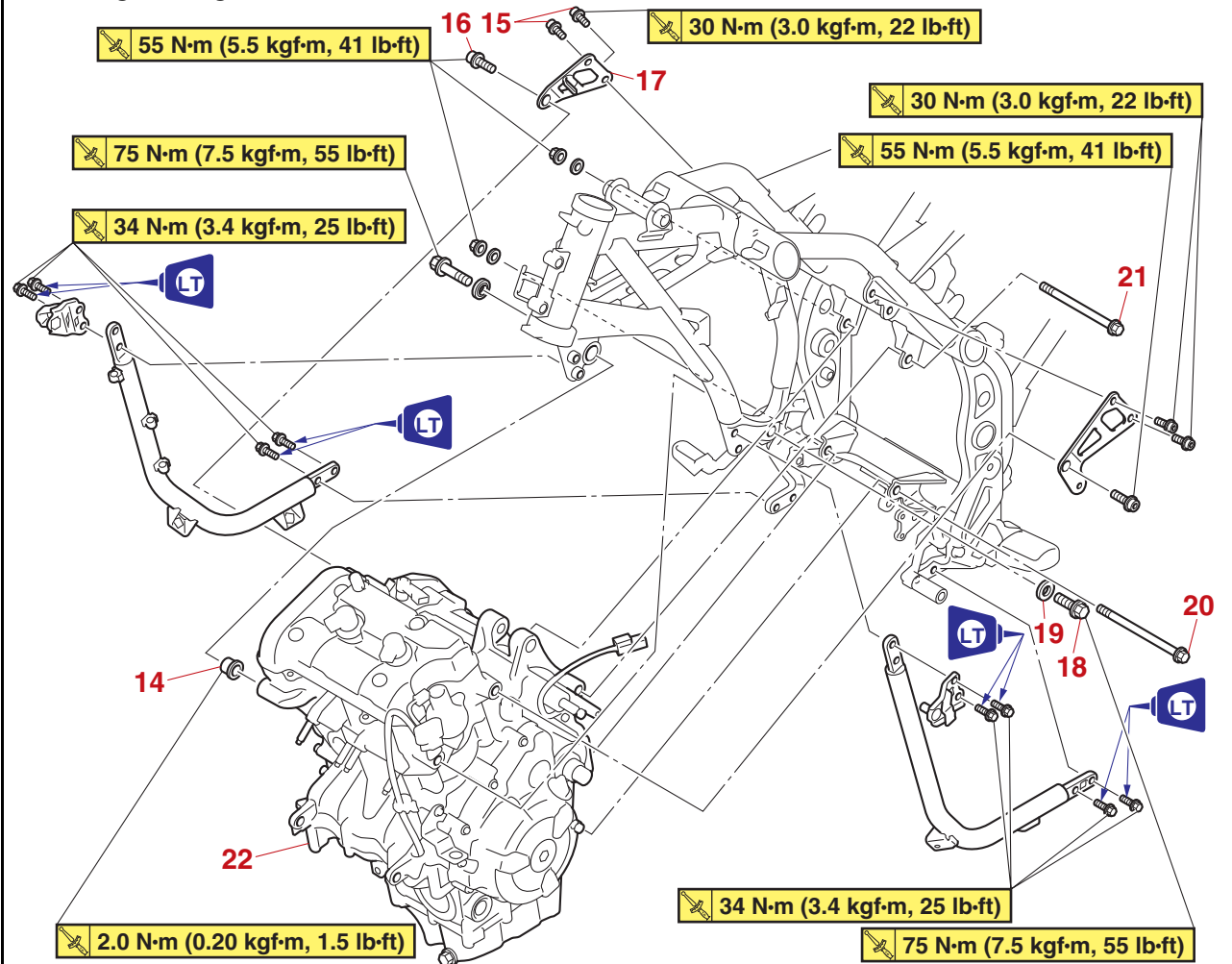
## Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Radiator bracket (left)	1	
2	Down tube (left)	1	
3	Radiator bracket (right)	1	
4	Down tube (right)	1	
5	Engine bracket bolt (left)	2	
6	Engine mounting bolt (left upper side)	1	
7	Engine bracket (left)	1	
8	Engine mounting nut (rear lower side)	1	
9	Washer	1	
10	Engine mounting nut (rear upper side)	1	
11	Washer	1	
12	Engine mounting bolt (front right side)	1	
13	Collar	1	

# ENGINE REMOVAL

## Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
14	Engine mounting adjust bolt	1	Loosen. <b>TIP</b> _____ Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket.
15	Engine bracket bolt (right)	2	
16	Engine mounting bolt (right upper side)	1	
17	Engine bracket (right)	1	
18	Engine mounting bolt (front left side)	1	
19	Washer	1	
20	Engine mounting bolt (rear lower side)	1	
21	Engine mounting bolt (rear upper side)	1	
22	Engine	1	

# ENGINE REMOVAL

EAS30250

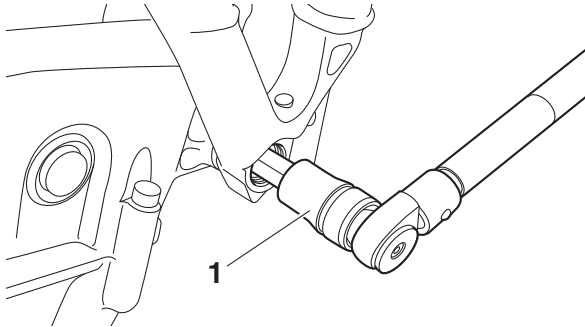
## REMOVING THE ENGINE

1. Loosen:

- Engine mounting adjust bolt

### TIP

Loosen the engine mounting adjust bolt using a 1/2 inch hexagon bit socket "1"



EAS30251

## INSTALLING THE ENGINE

1. Install:

- Engine mounting adjust bolt "1"
- Engine "2"
- Engine mounting bolt (rear upper side) "3"
- Washer "4"
- Engine mounting nut (rear upper side) "5"
- Engine mounting bolt (rear lower side) "6"
- Washer "7"
- Engine mounting nut (rear lower side) "8"
- Washer "9"
- Engine mounting bolt (front left side) "10"
- Engine bracket (right) "11"
- Engine mounting bolt (right upper side) "12"
- Engine bracket bolts (right) "13"

### TIP

Temporarily tighten the bolts and nuts.

2. Tighten:

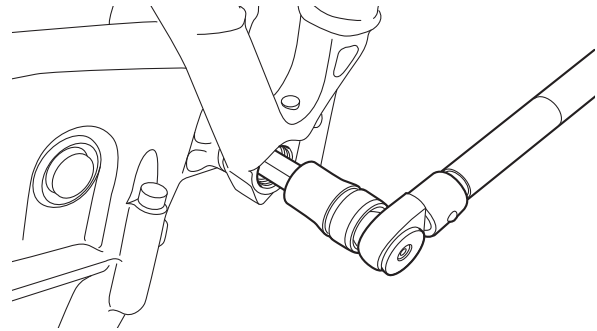
- Engine mounting adjust bolt "1"

### TIP

- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the engine mounting adjust bolt contacts the engine.



**Engine mounting adjust bolt**  
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)



3. Install:

- Collar "14"
- Engine mounting bolt (front right side) "15"

### TIP

Temporarily tighten the bolt.

4. Tighten:

- Engine mounting nut (rear upper side) "5"



**Engine mounting nut (rear upper side)**  
55 N·m (5.5 kgf·m, 41 lb·ft)

5. Tighten:

- Engine mounting nut (rear lower side) "8"



**Engine mounting nut (rear lower side)**  
55 N·m (5.5 kgf·m, 41 lb·ft)

6. Tighten:

- Engine mounting bolt (front left side) "10"



**Engine mounting bolt (front left side)**  
75 N·m (7.5 kgf·m, 55 lb·ft)

7. Install:

- Engine bracket (left) "16"
- Engine mounting bolt (left upper side) "17"
- Engine bracket bolts (left) "18"

### TIP

Temporarily tighten the bolts.

8. Tighten:

- Engine mounting bolt (left upper side) "17"



**Engine mounting bolt (left upper side)**  
55 N·m (5.5 kgf·m, 41 lb·ft)

9. Tighten:

- Engine mounting bolt (right upper side) "12"



# ENGINE REMOVAL



**Engine mounting bolt (right upper side)**  
**55 N·m (5.5 kgf·m, 41 lb·ft)**

10. Tighten:

- Engine bracket bolts (left and right) “13”, “18”



**Engine bracket bolts**  
**30 N·m (3.0 kgf·m, 22 lb·ft)**

**TIP**

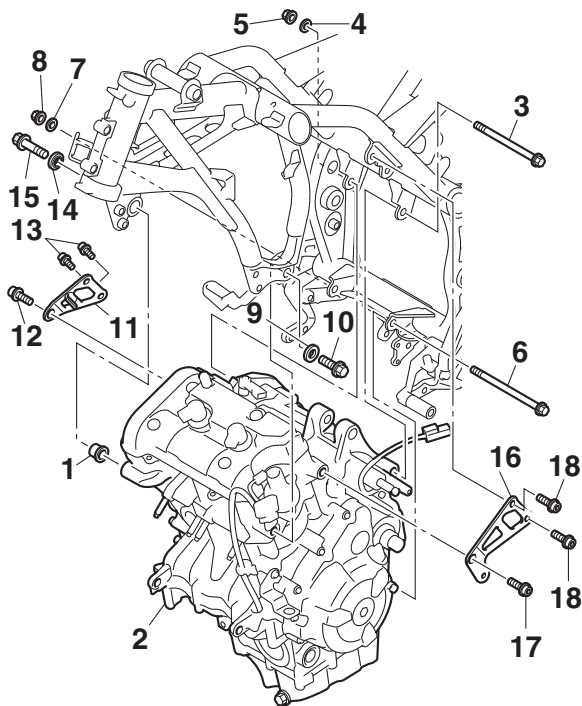
Tighten the engine bracket bolts in any order.

11. Tighten:

- Engine mounting bolt (front right side) “15”



**Engine mounting bolt (front right side)**  
**75 N·m (7.5 kgf·m, 55 lb·ft)**



EAS30252

## INSTALLING THE EXHAUST PIPE AND MUFFLER

1. Install:

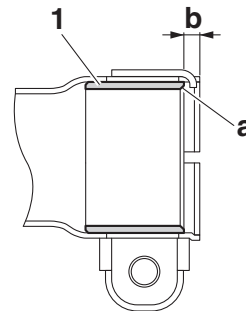
- Gasket “1” **New**  
 (to the muffler)

**TIP**

Install the gasket with the chamfer “a”, located on an inner rim of the gasket, as shown in the illustration.



**Installed depth of gasket “b”**  
**5.0 mm (0.20 in)**

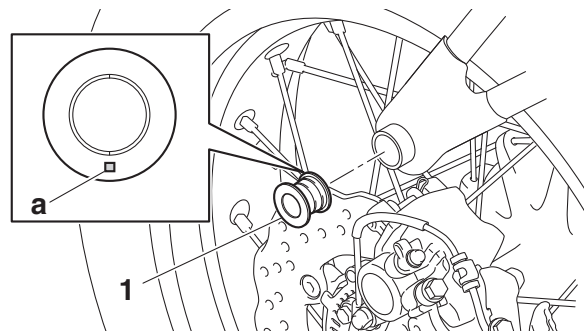


2. Install:

- Damper “1”  
 (to the frame)

**TIP**

Install the damper with the mark “a” facing rear wheel side.



3. Install:

- Exhaust pipe bracket “1”  
 (to the frame)

**TIP**

Install the exhaust pipe bracket with the mark “a” facing the left side of the vehicle.

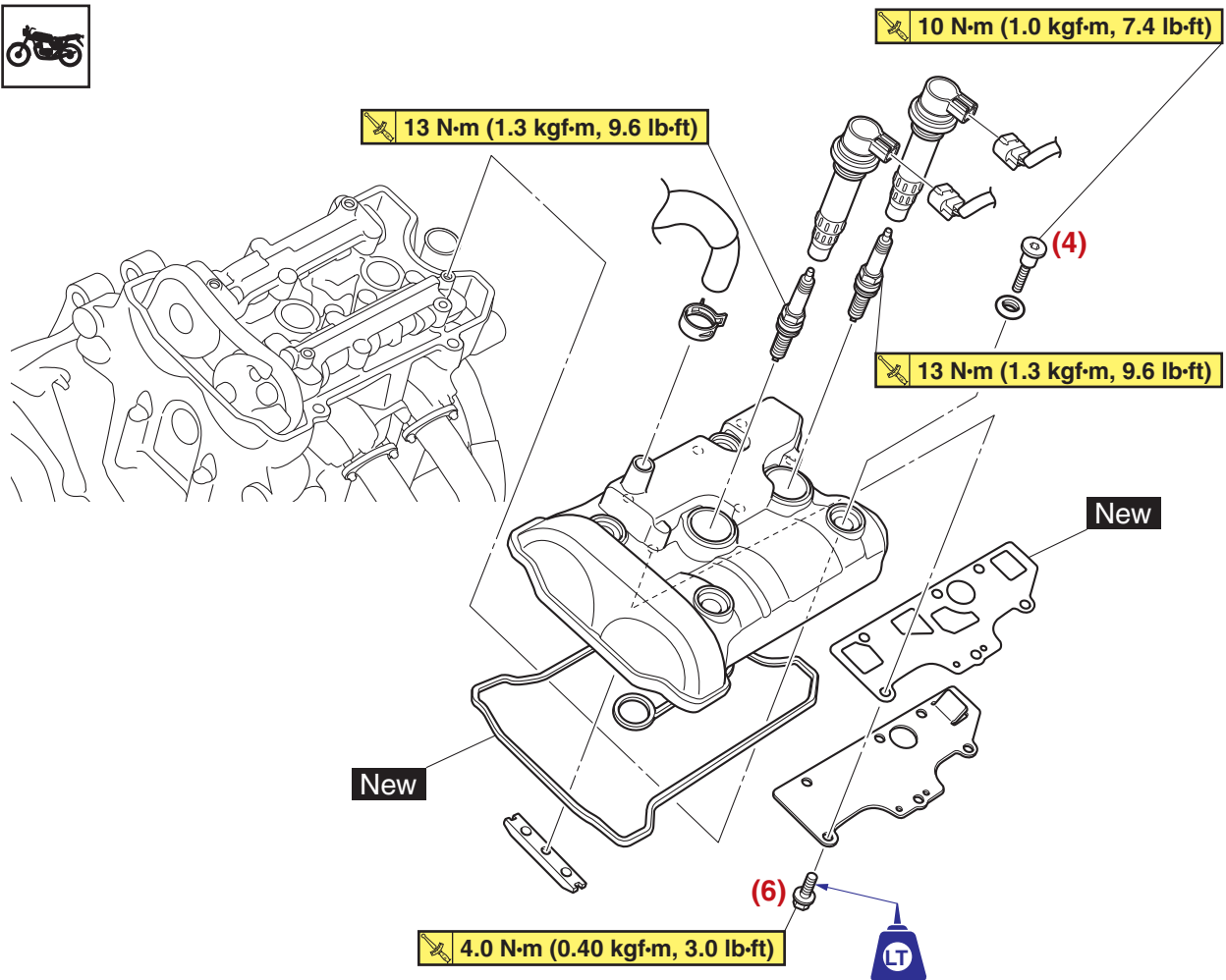




EAS20043

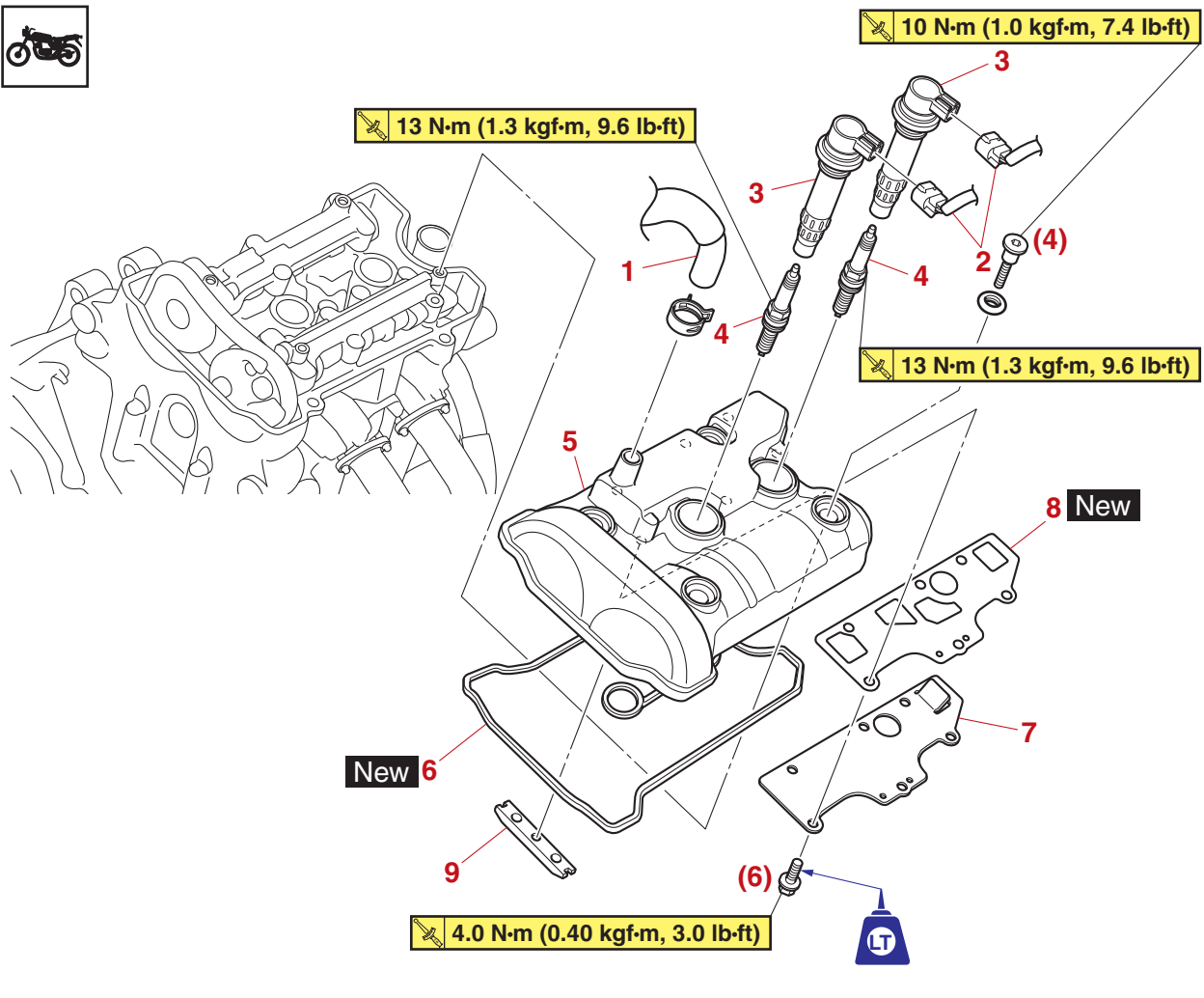
## CAMSHAFTS

### Removing the cylinder head cover



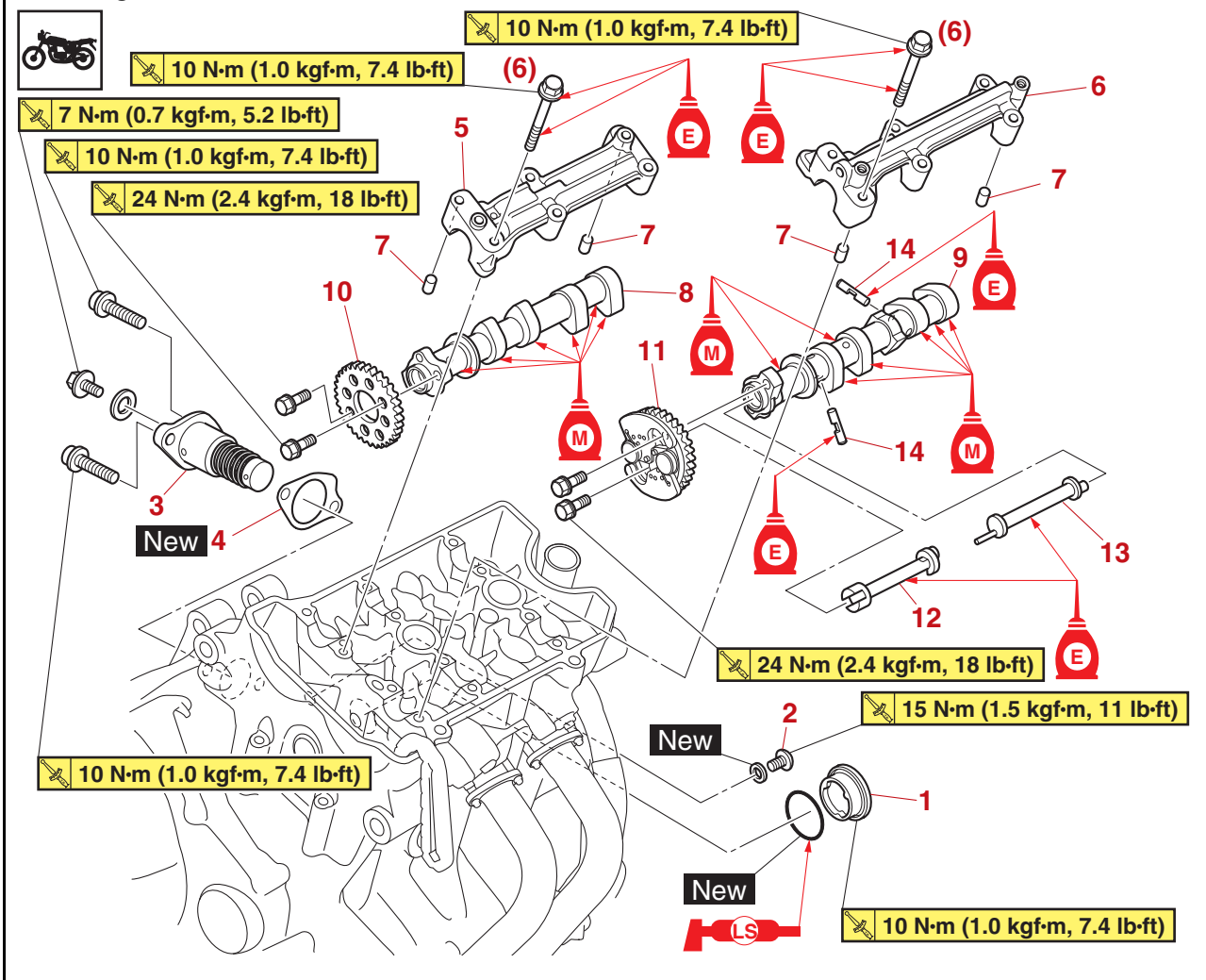
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Radiator		Refer to "RADIATOR" on page 6-2.
	Throttle cables		Disconnect. Refer to "THROTTLE BODIES" on page 7-5.

## Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Cylinder head breather hose	1	Disconnect.
2	Ignition coil coupler	2	Disconnect.
3	Ignition coil	2	
4	Spark plug	2	
5	Cylinder head cover	1	
6	Cylinder head cover gasket	1	
7	Breather plate	1	
8	Breather plate gasket	1	
9	Timing chain guide (upper side)	1	

## Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
1	Crankshaft end cover	1	
2	Timing mark accessing bolt	1	
3	Timing chain tensioner	1	
4	Timing chain tensioner gasket	1	
5	Intake camshaft cap	1	
6	Exhaust camshaft cap	1	
7	Dowel pin	4	
8	Intake camshaft	1	
9	Exhaust camshaft	1	
10	Intake camshaft sprocket	1	
11	Exhaust camshaft sprocket	1	
12	Decompressor lever #2	1	
13	Decompressor lever #1	1	
14	Decompressor lever pin	2	

EAS33146

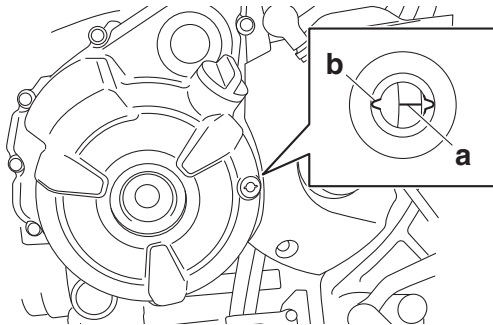
## REMOVING THE IGNITION COILS

- Remove:
  - Ignition coil  
Refer to "CHECKING THE SPARK PLUGS" on page 3-5.

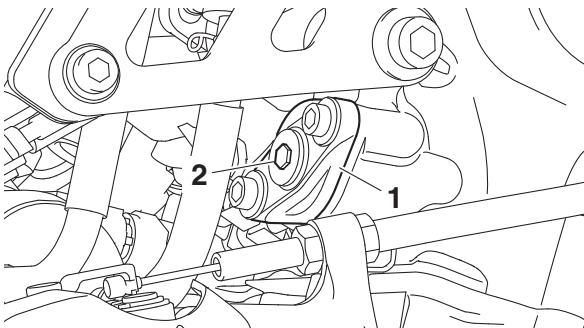
EAS30256

## REMOVING THE CAMSHAFTS

- Remove:
  - Crankshaft end cover
  - Timing mark accessing bolt  
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.
- Align:
  - Mark "a" on the generator rotor (with the slot "b" in the generator rotor cover)
    - Turn the crankshaft counterclockwise.
    - When piston #1 is at TDC on the exhaust stroke, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



- Remove:
  - Timing chain tensioner "1"
  - Timing chain tensioner gasket
    - Insert the hexagon wrench "2" (part No.: 1WS-12228-00) into the timing chain tensioner.
    - Remove the timing chain tensioner.



- Remove:
  - Intake camshaft cap
  - Exhaust camshaft cap

ECA13720

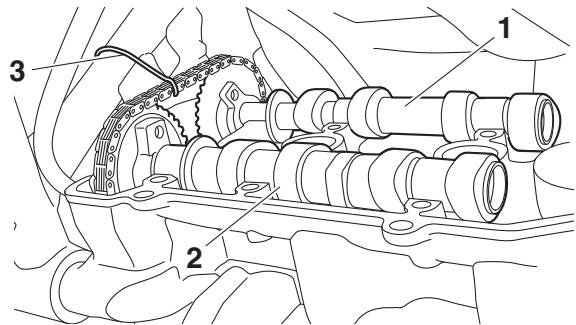
## NOTICE

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.

- Remove:
  - Intake camshaft "1"
  - Exhaust camshaft "2"

## TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".



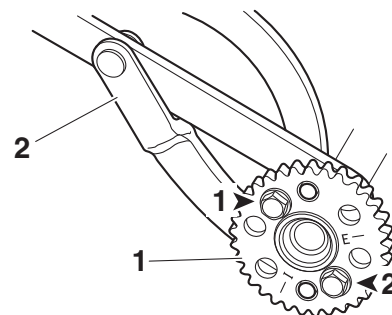
- Remove:
  - Intake camshaft sprocket "1"

## TIP

While holding the intake camshaft sprocket with the rotor holding tool "2", loosen the intake camshaft sprocket bolts.



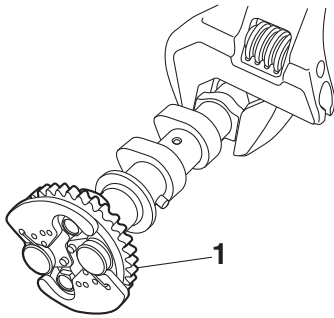
**Rotor holding tool**  
90890-01235  
**Universal magneto and rotor holder**  
YU-01235



- Remove:
  - Exhaust camshaft sprocket "1"

## TIP

While holding the exhaust camshaft with a suitable tool, loosen the exhaust camshaft sprocket bolts.



EAS30257

## CHECKING THE CAMSHAFTS

1. Check:
  - Camshaft lobes  
Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
  - Camshaft lobe dimensions “a” and “b”  
Out of specification → Replace the camshaft.



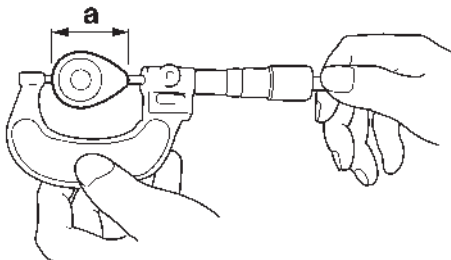
### Camshaft lobe dimensions

**Lobe height (Intake)**  
35.610–35.710 mm (1.4020–1.4059 in)

**Limit**  
35.510 mm (1.3980 in)

**Lobe height (Exhaust)**  
35.710–35.810 mm (1.4059–1.4098 in)

**Limit**  
35.610 mm (1.4020 in)

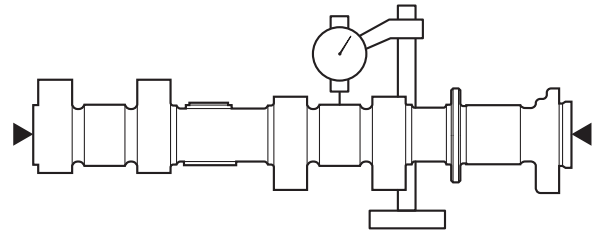


G088946

3. Measure:
  - Camshaft runout  
Out of specification → Replace.



**Camshaft runout limit**  
0.030 mm (0.0012 in)



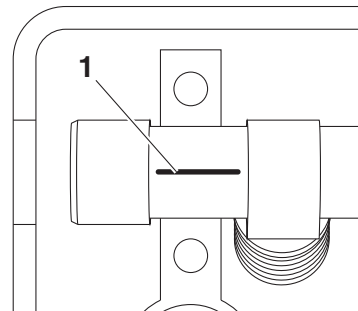
4. Measure:
  - Camshaft-journal-to-camshaft-cap clearance  
Out of specification → Measure the camshaft journal diameter.



**Camshaft-journal-to-camshaft-cap clearance**  
0.028–0.062 mm (0.0011–0.0024 in)

- a. Install the camshafts into the cylinder head (without the camshaft caps).
- b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.

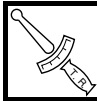
G088947



- c. Install the dowel pins and camshaft caps.

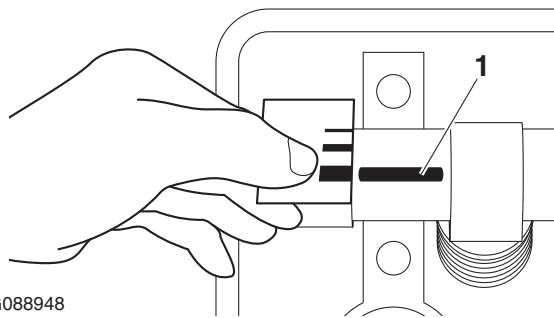
### TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



**Exhaust camshaft cap bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
**Intake camshaft cap bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

- d. Remove the camshaft caps, and then measure the width of the Plastigauge® “1”.



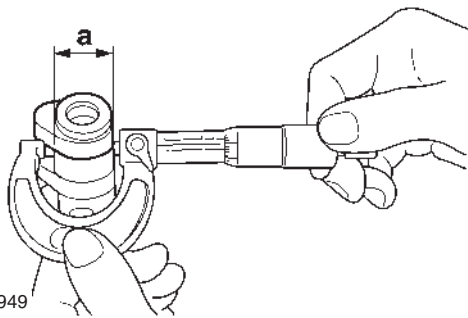
G088948

5. Measure:

- Camshaft journal diameter “a”  
Out of specification → Replace the camshaft.  
Within specification → Replace the cylinder head and camshaft caps as a set.



**Camshaft journal diameter**  
**21.959–21.972 mm (0.8645–0.8650 in)**



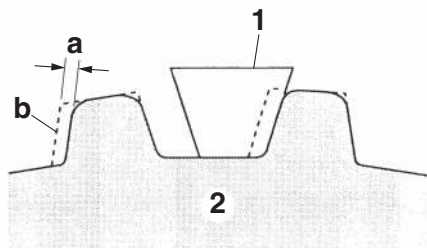
G088949

EAS30936

## CHECKING THE CAMSHAFT SPROCKETS

1. Check:

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



G088950

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

EAS30266

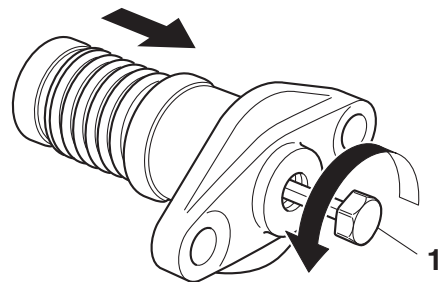
## CHECKING THE TIMING CHAIN TENSIONER

1. Check:

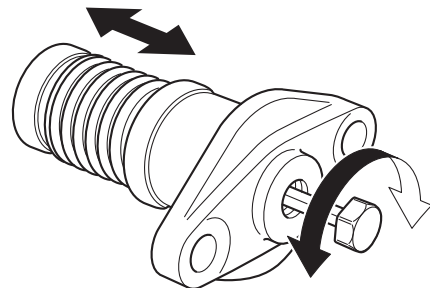
- Timing chain tensioner  
Cracks/damage/rough movement → Replace.
  - a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

**TIP**

While pressing the timing chain tensioner rod, wind it counterclockwise with a hexagon wrench “1” (Parts No.: 1WS-12228-00) until it stops.



- b. Make sure that the timing chain tensioner rod moves in and out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



EAS30267

## CHECKING THE DECOMPRESSION SYSTEM

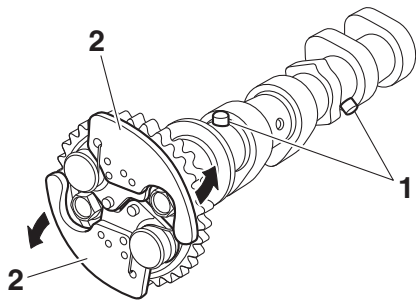
1. Check:

- Decompression system

**TIP**

- Check that the decompressor lever pins “1” projects from the camshaft.
- Check that the decompressor cams “2” and decompressor lever pins “1” moves smoothly.





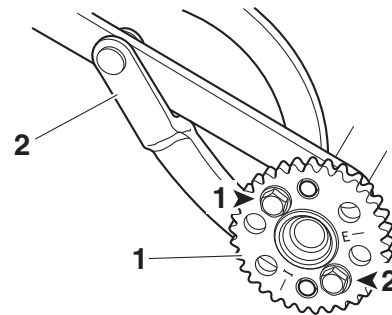
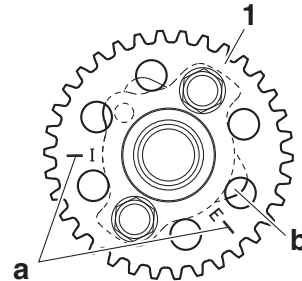
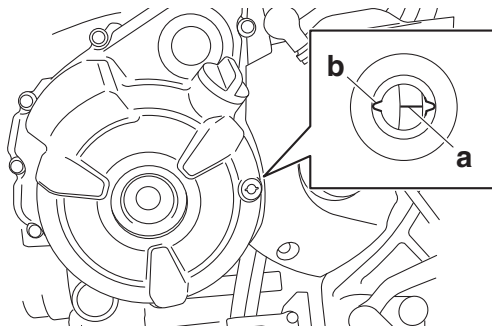
**Rotor holding tool**  
**90890-01235**  
**Universal magneto and rotor**  
**holder**  
**YU-01235**

EAS30269

## INSTALLING THE CAMSHAFTS

### 1. Align:

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



### 2. Install:

- Intake camshaft sprocket "1"



**Intake camshaft sprocket bolt**  
**24 N·m (2.4 kgf·m, 18 lb·ft)**

ECA19980

### NOTICE

**Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.**

### TIP

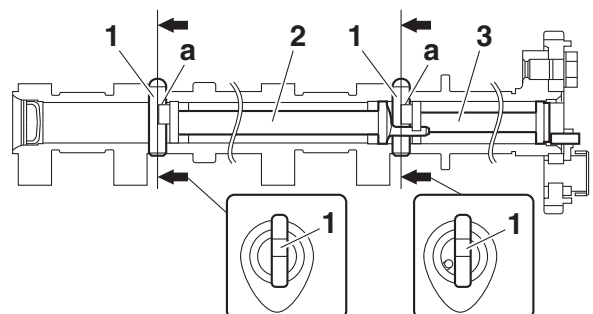
- Make sure that the marks "a" on the intake camshaft sprocket are aligned with cam lobe #1 "b" as shown in the illustration.
- While holding the intake camshaft sprocket with the rotor holding tool "2", tighten the intake camshaft sprocket bolts in the proper tightening sequence as shown.

### 3. Install:

- Decompressor lever pins "1"
- Decompressor lever #1 "2"
- Decompressor lever #2 "3"

### TIP

- Face the cutout "a" in each decompressor lever pin toward the exhaust camshaft sprocket.
- Install the decompressor lever pins, decompressor lever #1, and decompressor lever #2 into the exhaust camshaft as shown in the illustration.



### 4. Install:

- Exhaust camshaft sprocket "1"



**Exhaust camshaft sprocket bolt**  
**24 N·m (2.4 kgf·m, 18 lb·ft)**

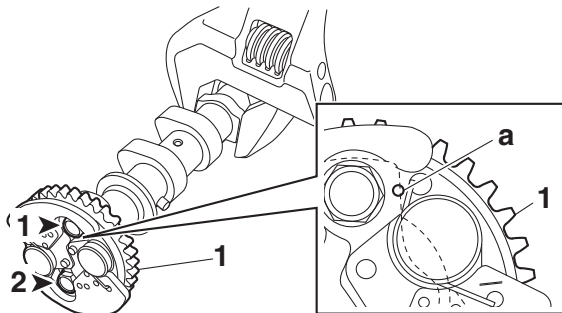
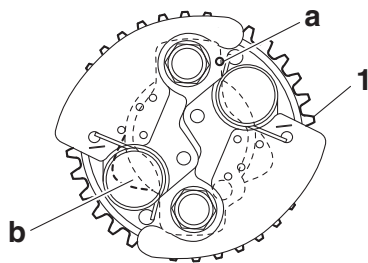
ECA19980

## NOTICE

**Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.**

## TIP

- Make sure that the mark “a” on the exhaust camshaft sprocket is aligned with cam lobe #1 “b” as shown in the illustration.
- While holding the exhaust camshaft with a suitable tool, tighten the exhaust camshaft sprocket bolts.
- Tighten the camshaft sprocket bolts in the tightening sequence as shown.



## 5. Install:

- Timing chain “1”  
(onto the exhaust camshaft sprocket “2”)
- Exhaust camshaft
- Exhaust camshaft cap

ECA20930

## NOTICE

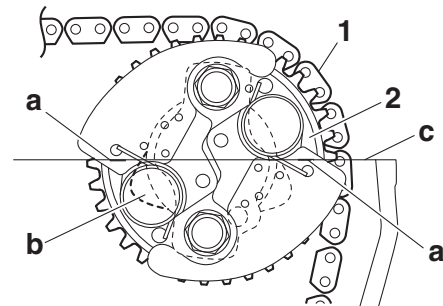
- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

## TIP

- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- Make sure that the match marks “a” on the exhaust camshaft sprocket and cam lobe #1 “b” are aligned with the cylinder head edge “c” as shown in the illustration.
- Temporarily tighten the exhaust camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.



**Exhaust camshaft cap bolt  
10 N·m (1.0 kgf·m, 7.4 lb·ft)**



## 6. Install:

- Timing chain “1”  
(onto the intake camshaft sprocket “2”)
- Intake camshaft
- Intake camshaft cap

ECA20930

## NOTICE

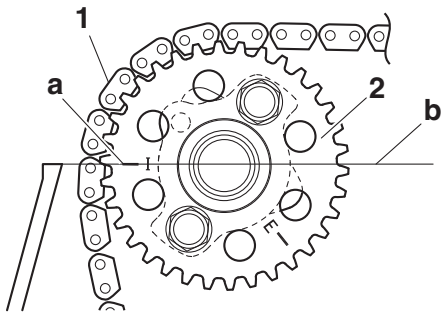
- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

- Install the timing chain onto intake camshaft sprocket, and then install the intake camshaft onto the cylinder head.

## TIP

Make sure the match mark “a” on the intake camshaft sprocket is aligned with the cylinder head edge “b”.






b. Tighten the intake camshaft cap bolts.

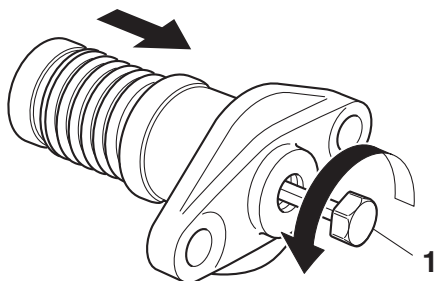
**TIP**

Temporarily tighten the intake camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.

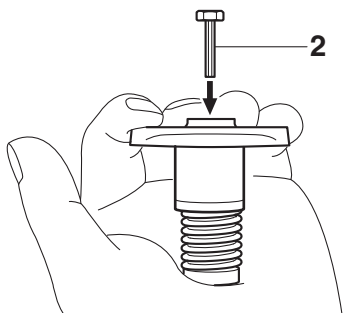
	<p><b>Intake camshaft cap bolt</b>  <b>10 N·m (1.0 kgf·m, 7.4 lb·ft)</b></p>
---	--

7. Install:

- Timing chain tensioner
- Timing chain tensioner gasket **New**
  - a. While lightly pressing the timing chain tensioner rod by hand, turn the timing chain tensioner rod fully counterclockwise with a hexagon wrench "1".



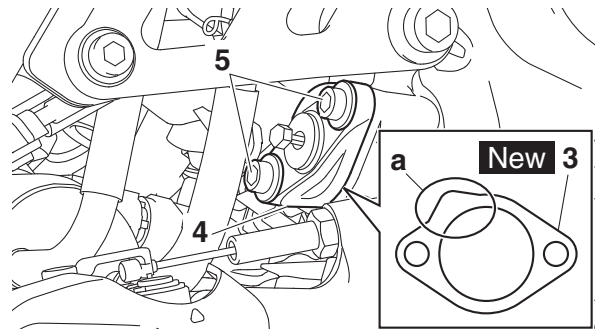
b. Keep pressing the timing chain tensioner rod by hand, remove the hexagon wrench, and then insert the hexagon wrench "2" (Parts No.: 1WS-12228-00) into the timing chain tensioner rod.




- c. Install a new timing chain tensioner gasket "3", the timing chain tensioner "4", and the timing chain tensioner bolts "5" on the cylinder block.

**TIP**

Be sure to install the timing chain tensioner gasket so that the portion "a" of the gasket is protruding from the upper inner side of the timing chain tensioner.



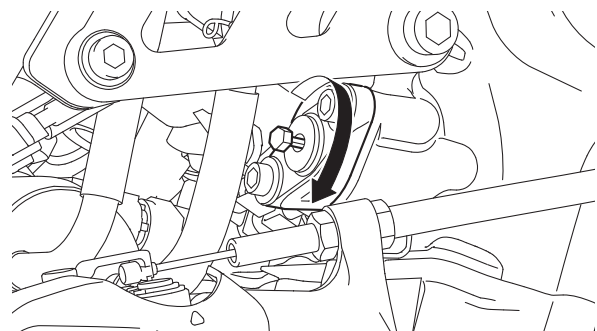
d. Tighten the timing chain tensioner bolts to specification.

	<p><b>Timing chain tensioner bolt</b>  <b>10 N·m (1.0 kgf·m, 7.4 lb·ft)</b></p>
--	---

- e. Screw the hexagon wrench by hand until the timing chain tensioner rod touches the timing chain guide, and then tighten 1/4 turn by tool.

**TIP**

The timing chain tensioner rod is extended by turning the hexagon wrench clockwise.



- f. Remove the hexagon wrench.
- g. Install the timing chain tensioner cap bolt and gasket, and then tighten the timing chain tensioner cap bolt to specification.

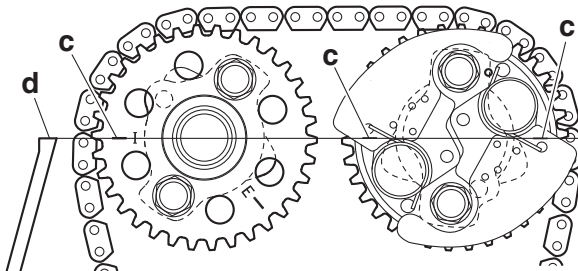
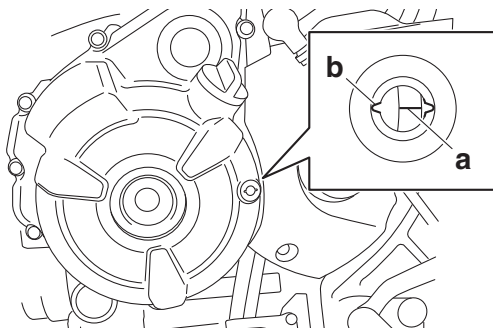
	<p><b>Timing chain tensioner cap bolt</b>  <b>7 N·m (0.7 kgf·m, 5.2 lb·ft)</b></p>
---	--

## 8. Turn:

- Crankshaft  
(several turns counterclockwise)

## 9. Check:

- Mark "a"  
Make sure the mark "a" on the generator rotor is aligned with the slot "b" in the generator rotor cover.
- Camshaft sprocket match mark  
Make sure the match marks "c" on the camshaft sprockets are aligned with the cylinder head mating surface "d".  
Out of alignment → Adjust.  
Refer to the installation steps above.



## 10. Measure:

- Valve clearance  
Out of specification → Adjust.  
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-6.

## 11. Install:

- Timing mark accessing bolt "1"

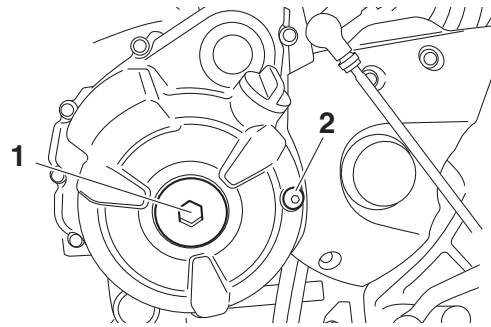


**Timing mark accessing bolt**  
15 N·m (1.5 kgf·m, 11 lb·ft)

- Crankshaft end cover "2"



**Crankshaft end cover**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)



EAS30274

## INSTALLING THE CYLINDER HEAD COVER

### 1. Install:

- Timing chain guide (top side)
- Cylinder head cover gasket "1" **New**  
(to the cylinder head cover)
- Cylinder head cover "2"



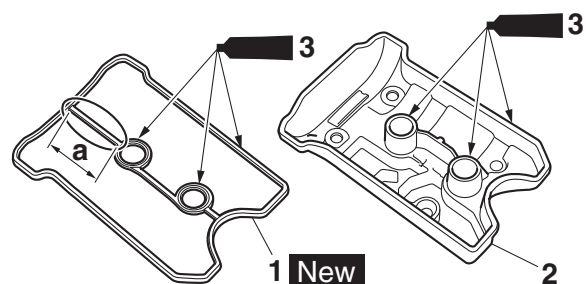
**Cylinder head cover bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

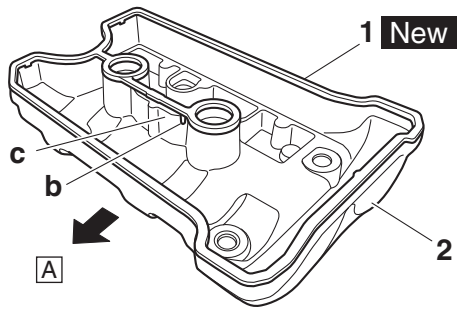
### TIP

- Apply Yamaha bond No.1215 "3" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- After installing the cylinder head cover gasket "1" to the cylinder head cover, cut off the "a" section.
- Make sure that the projection "b" on the cylinder head cover gasket is positioned on the exhaust side of the rib "c" on the cylinder head cover.



**Yamaha bond No. 1215**  
90890-85505  
(Three bond No.1215®)

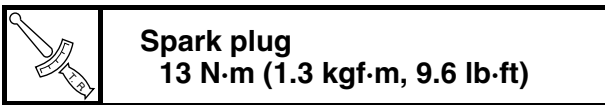




A. Exhaust side

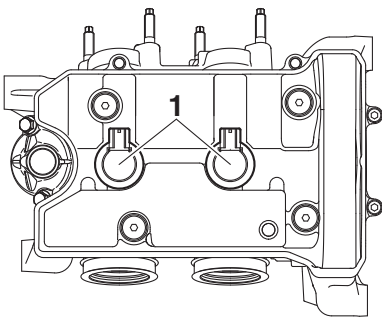
2. Install:

- Spark plugs
- Ignition coils "1"



**TIP**

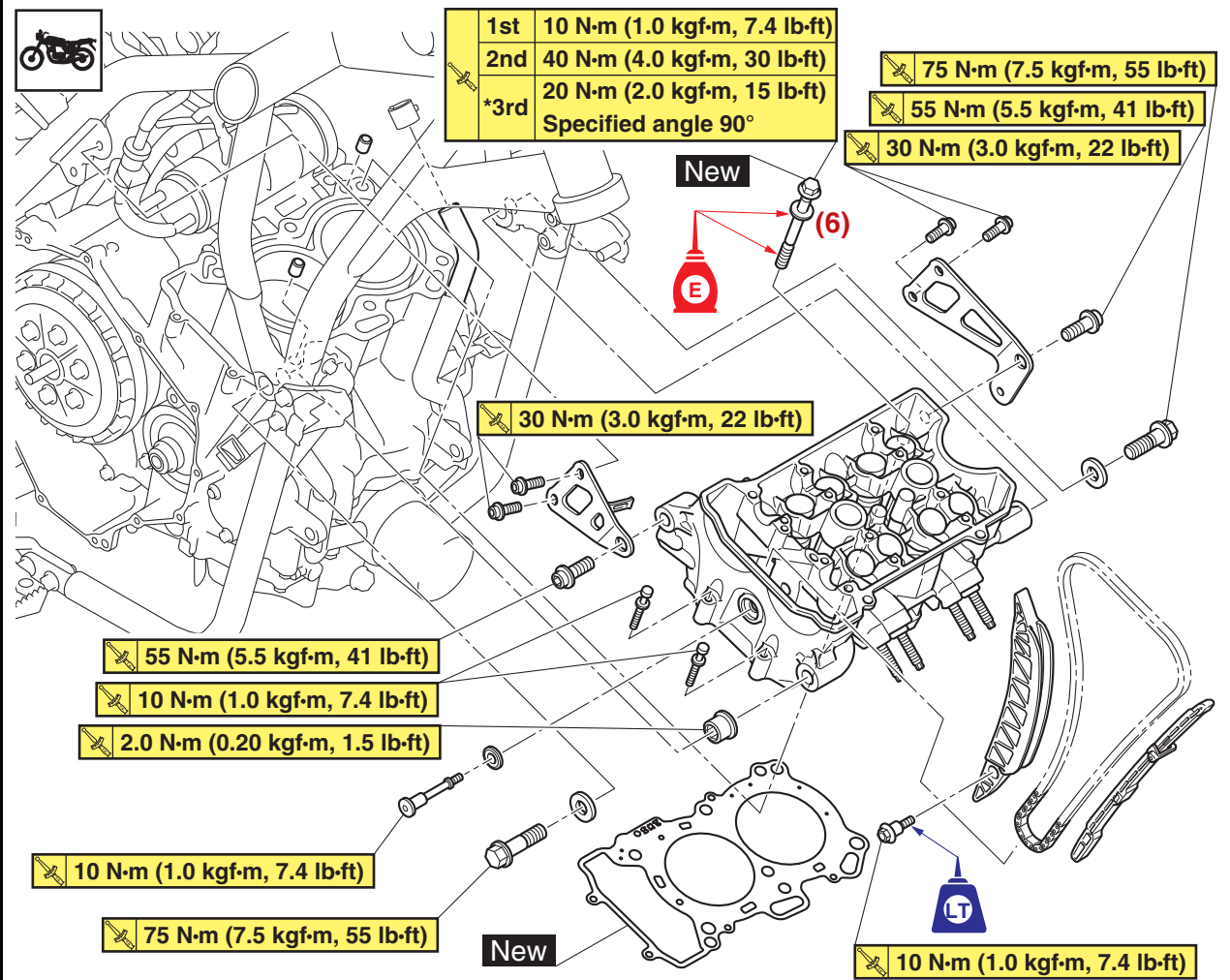
Install the ignition coils "1" in the direction shown in the illustration.



EAS20044

## CYLINDER HEAD

### Removing the cylinder head

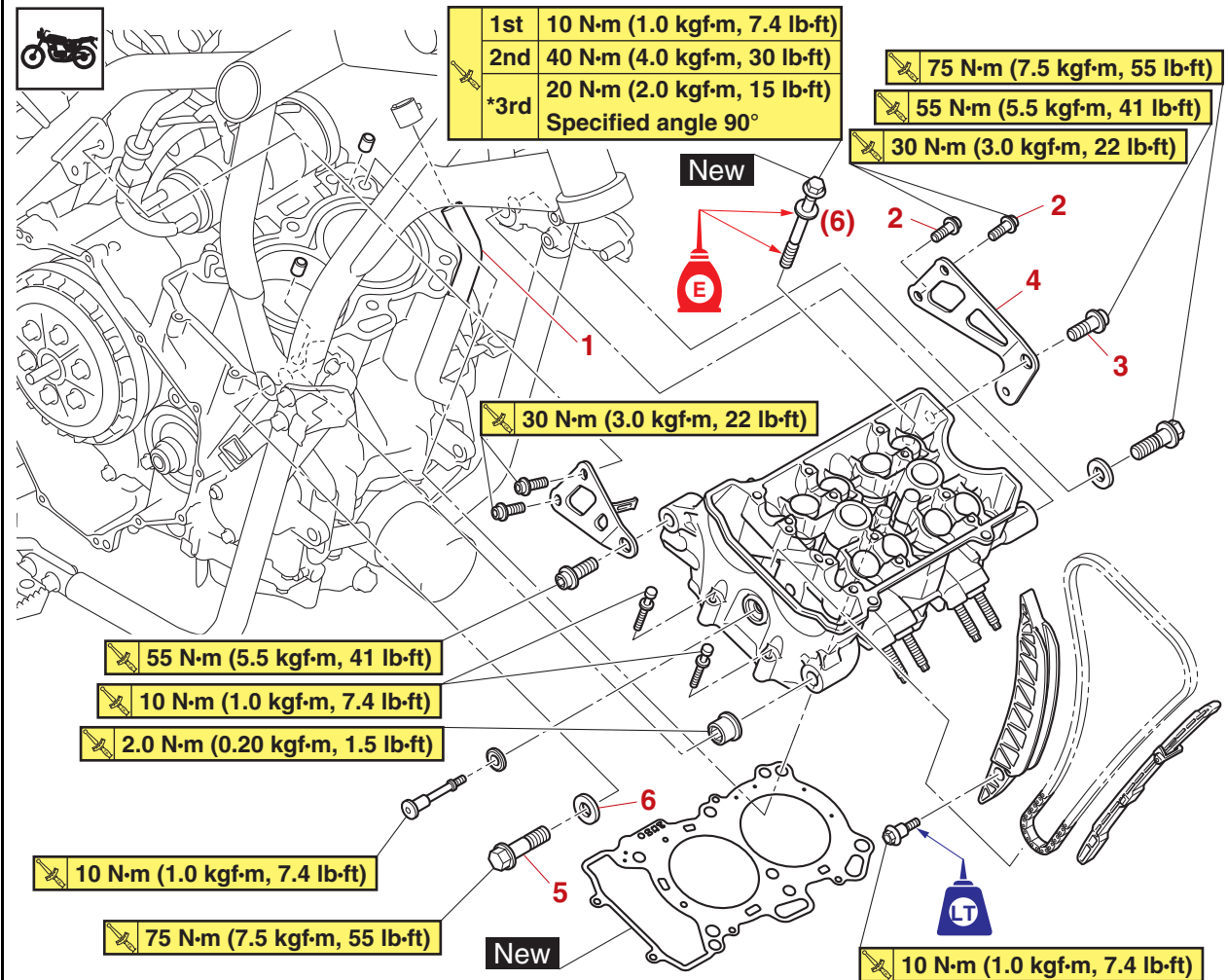


\* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Radiator		Refer to "RADIATOR" on page 6-2.

# CYLINDER HEAD

## Removing the cylinder head

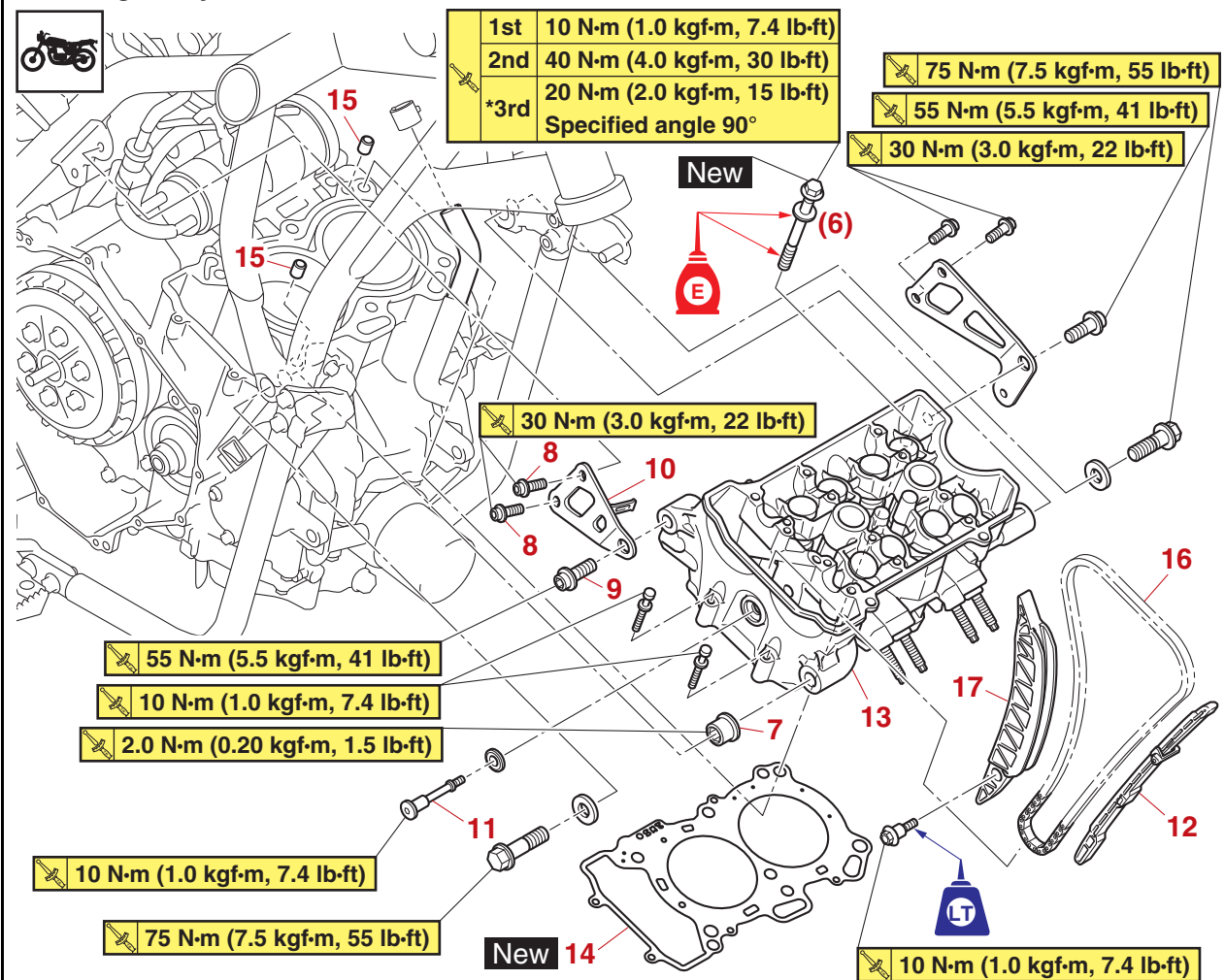


\* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Thermostat		Refer to "OIL COOLER" on page 6-5.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-3.
	Intake camshaft/Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-10.
	Water pump housing		Refer to "WATER PUMP" on page 6-10.
	Clutch cover		Refer to "CLUTCH" on page 5-42.
1	Oil cooler inlet hose	1	Disconnect.
2	Engine bracket bolt (left)	2	
3	Engine mounting bolt (left upper side)	1	
4	Engine bracket (left)	1	
5	Engine mounting bolt (front right side)	1	
6	Collar	1	

# CYLINDER HEAD

## Removing the cylinder head



\* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
7	Engine mounting adjust bolt	1	Loosen. <b>TIP</b> _____ Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket.
8	Engine bracket bolt (right)	2	
9	Engine mounting bolt (right upper side)	1	
10	Engine bracket (right)	1	
11	Timing chain bolt (right side of cylinder head)	1	
12	Timing chain guide (exhaust side)	1	
13	Cylinder head	1	
14	Cylinder head gasket	1	
15	Dowel pin	2	
16	Timing chain	1	
17	Timing chain guide (intake side)	1	



EAS30276

## REMOVING THE CYLINDER HEAD

### 1. Remove:

- Engine bracket bolts (left)
- Engine mounting bolt (left upper side)
- Engine bracket (left)
- Engine mounting bolt (front right side)
- Collar

### TIP

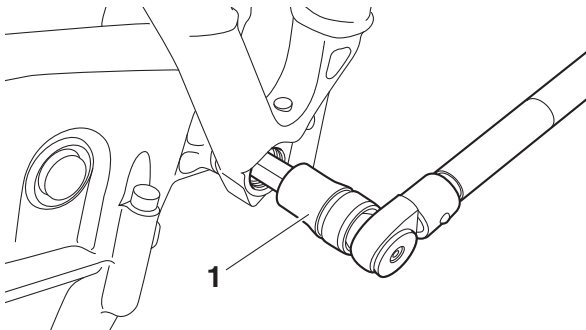
Place a suitable stand under the engine.

### 2. Loosen:

- Engine mounting adjust bolt

### TIP

Loosen the engine mounting adjust bolt using a 1/2 inch hexagon bit socket "1".



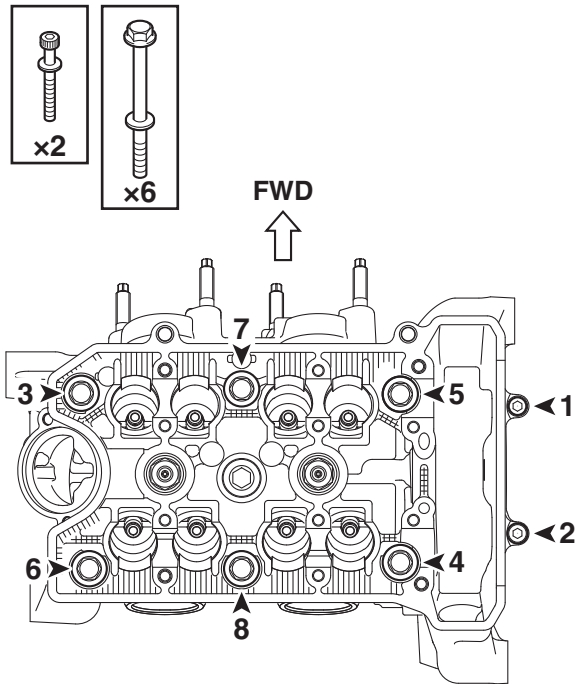
### 3. Remove:

- Cylinder head bolt (M6) (×2)
- Cylinder head bolt (M10) (×6)

### TIP

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

- M6 × 45 mm: "1", "2"
- M10 × 100 mm: "3"–"8"



EAS30278

## CHECKING THE TIMING CHAIN GUIDES

### 1. Check:

- Timing chain guide (exhaust side)
  - Timing chain guide (intake side)
- Damage/wear → Replace.

EAS30277

## CHECKING THE CYLINDER HEAD

### 1. Eliminate:

- Combustion chamber carbon deposits (with a rounded scraper)

### TIP

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats

### 2. Check:

- Cylinder head  
Damage/scratches → Replace.
- Cylinder head water jacket  
Mineral deposits/rust → Eliminate.

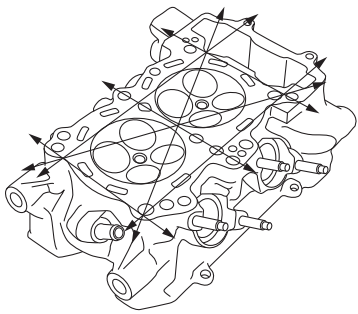
### 3. Measure:

- Cylinder head warpage  
Out of specification → Resurface the cylinder head.

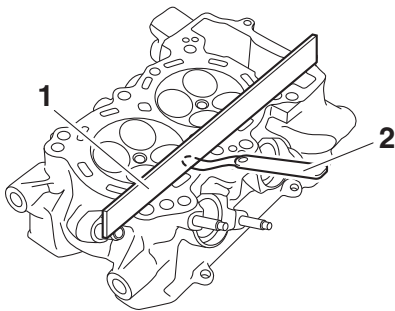


**Warpage limit**  
0.05 mm (0.0020 in)

# CYLINDER HEAD



- 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
- Cylinder head bolt (M10) (×6) **New**
- Cylinder head bolt (M6) (×2)

**TIP**

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M10) threads and mating surface with engine oil.

2. Tighten:

- Cylinder head bolts "1"–"6"
- Cylinder head bolts "7", "8"

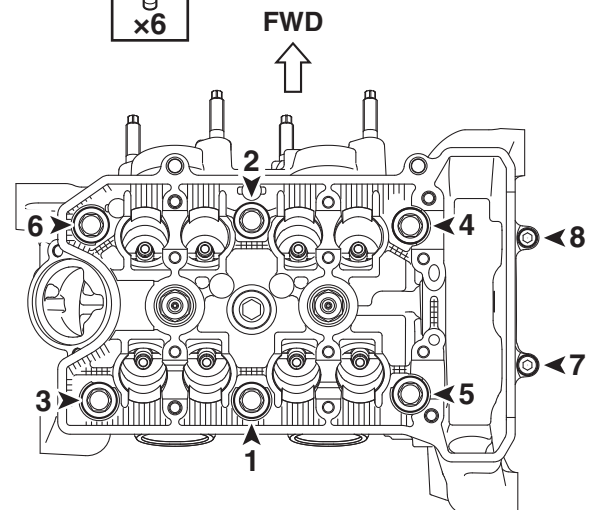
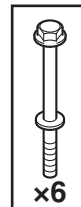
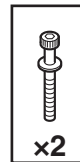


**Cylinder head bolt ("1"–"6")**  
 1st: 10 N·m (1.0 kgf·m, 7.4 lb·ft)  
 2nd: 40 N·m (4.0 kgf·m, 30 lb·ft)  
 \*3rd: 20 N·m (2.0 kgf·m, 15 lb·ft)  
 Specified angle 90°  
**Cylinder head bolt ("7", "8")**  
 10 N·m (1.0 kgf·m, 7.4 lb·ft)

\* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and angle.

**TIP**

Tighten the cylinder head bolts in the tightening sequence as shown and torque them in 3 stages.



3. Tighten:

- Engine mounting adjust bolt

**TIP**

- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the engine mounting adjust bolt contacts the engine.

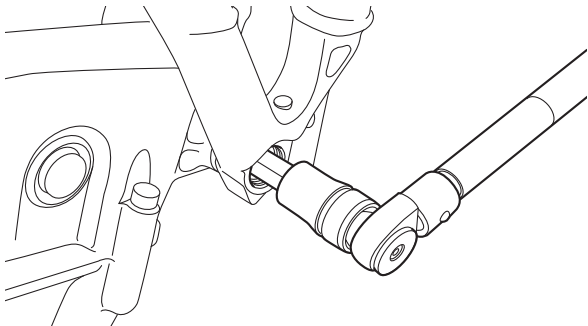


**Engine mounting adjust bolt**  
 2.0 N·m (0.20 kgf·m, 1.5 lb·ft)



# CYLINDER HEAD

---

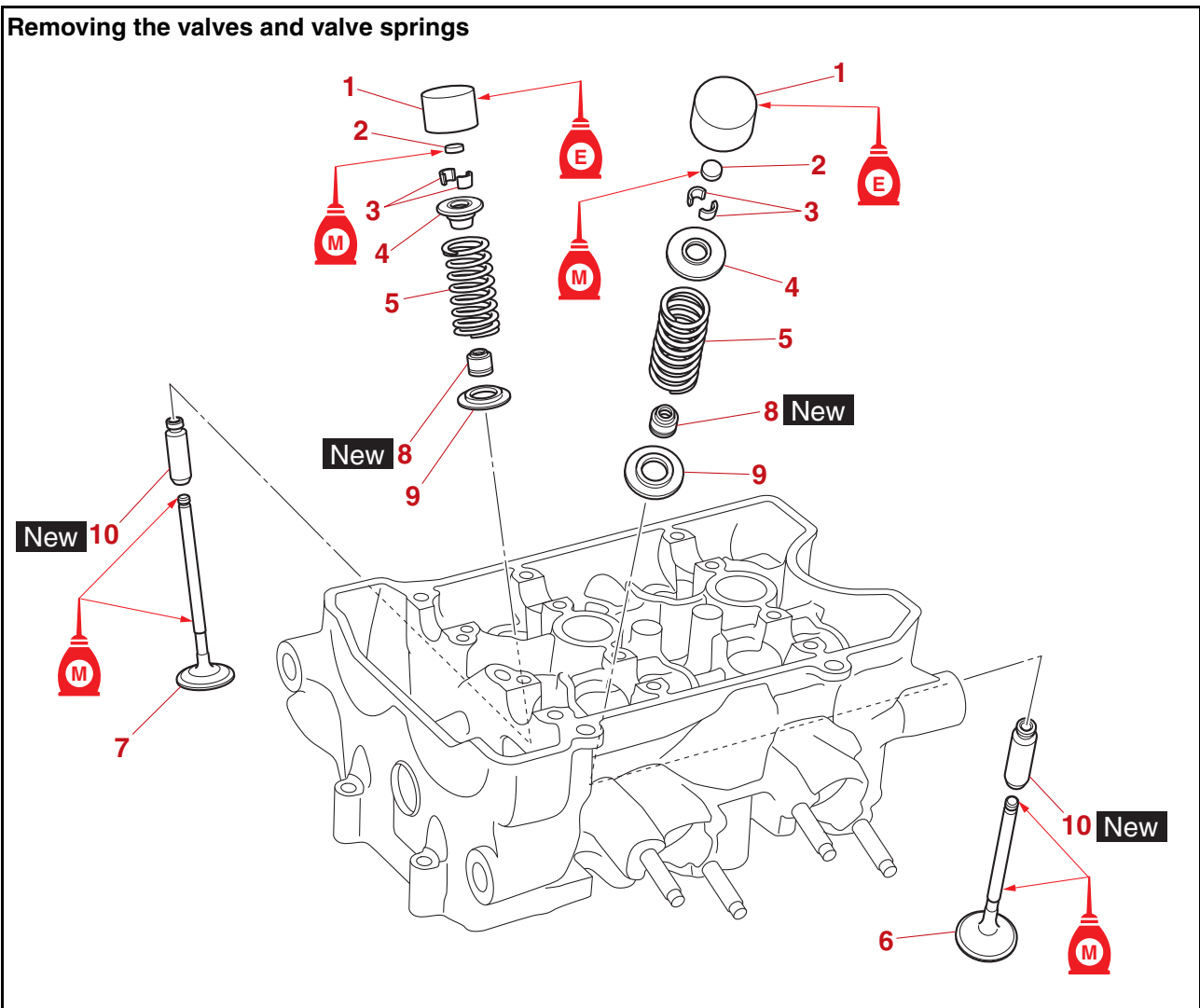


# VALVES AND VALVE SPRINGS

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 5-21.
1	Valve lifter	8	
2	Valve pad	8	
3	Valve cotter	16	
4	Valve spring retainer	8	
5	Valve spring	8	
6	Exhaust valve	4	
7	Intake valve	4	
8	Valve stem seal	8	
9	Valve spring seat	8	
10	Valve guide	8	

# VALVES AND VALVE SPRINGS

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
- Valve pad

### TIP

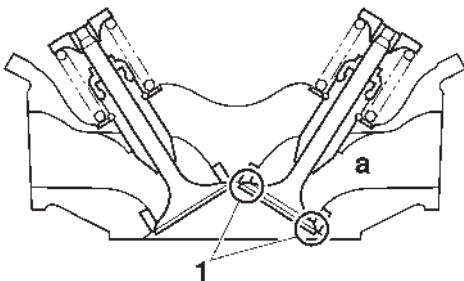
Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

### 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 5-30.
  - 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”.



G088958

### 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”.

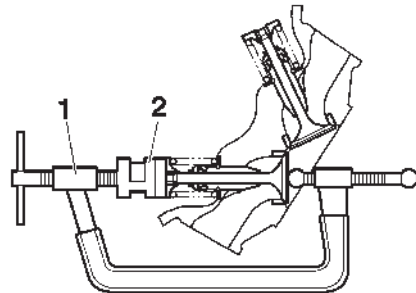


Valve spring compressor  
90890-04019

Valve spring compressor  
YM-04019

Valve spring compressor attach-  
ment (ø26)  
90890-01243

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



G088959

### 4. Remove:

- Valve spring retainer
- Valve spring
- Valve
- Valve stem seal
- Valve spring seat

### 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:

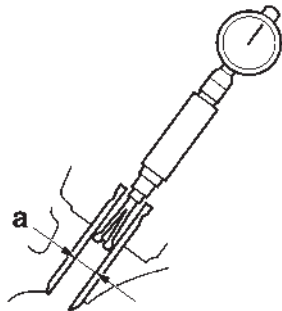
- Valve-stem-to-valve-guide clearance  
Out of specification → Replace the valve guide.

• Valve-stem-to-valve-guide clearance =  
Valve guide inside diameter “a” -  
Valve stem diameter “b”

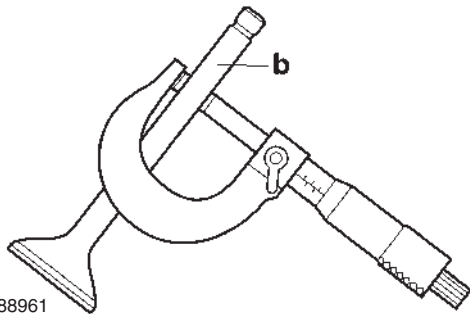
# VALVES AND VALVE SPRINGS



**Valve-stem-to-valve-guide clearance (intake)**  
 0.010–0.037 mm (0.0004–0.0015 in)  
**Limit**  
 0.080 mm (0.0032 in)  
**Valve-stem-to-valve-guide clearance (exhaust)**  
 0.025–0.052 mm (0.0010–0.0020 in)  
**Limit**  
 0.100 mm (0.0039 in)



G088960



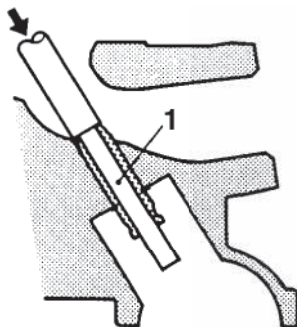
G088961

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”.

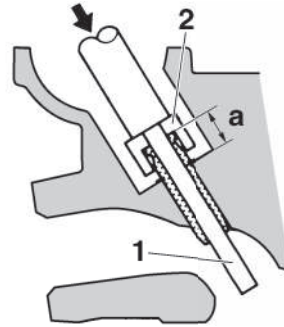


G088962

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



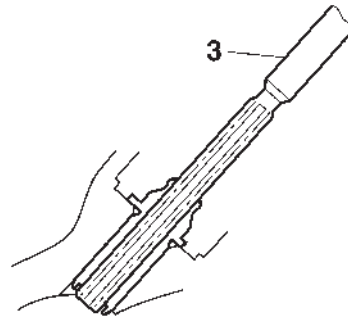
**Valve guide position**  
 14.8–15.2 mm (0.58–0.60 in)



G088963

- 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.



G088964

**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)

# VALVES AND VALVE SPRINGS

## 4. Check:

- Valve face  
Pitting/wear → Grind the valve face.
- Valve stem end  
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

## 5. Measure:

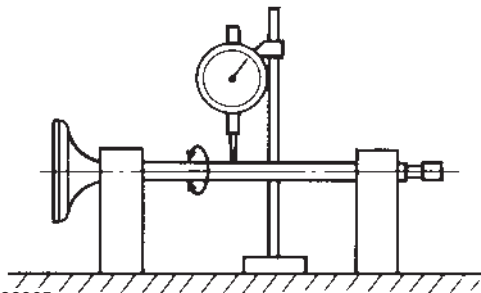
- Valve stem runout  
Out of specification → Replace the valve.

### TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



**Valve stem runout**  
0.010 mm (0.0004 in)



G088965

EAS30285

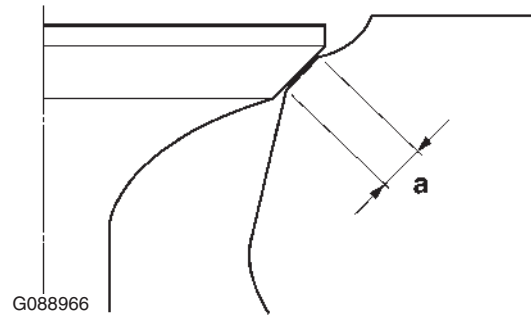
## CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:
  - Carbon deposits  
(from the valve face and valve seat)
2. Check:
  - Valve seat  
Pitting/wear → Replace the cylinder head.
3. Measure:
  - Valve seat width "a"  
Out of specification → Replace the cylinder head.

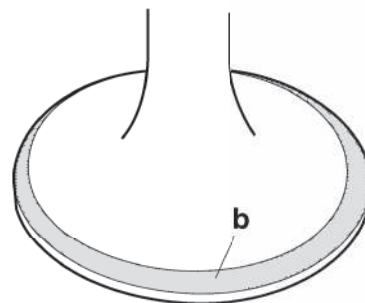


**Valve seat contact width (intake)**  
0.90–1.10 mm (0.0354–0.0433 in)  
**Valve seat contact width (exhaust)**  
0.90–1.10 mm (0.0354–0.0433 in)



G088966

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



G088967

- 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

### TIP

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

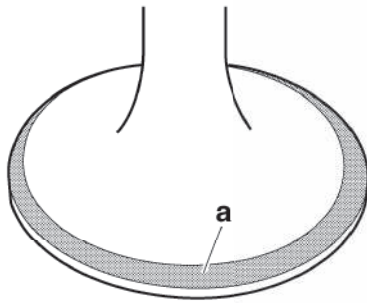
- a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

### NOTICE

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

# VALVES AND VALVE SPRINGS

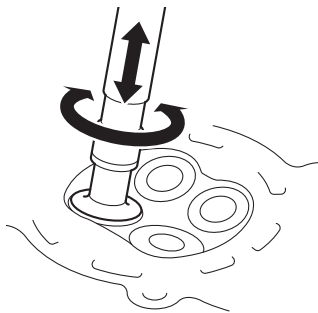


G088968

- 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.

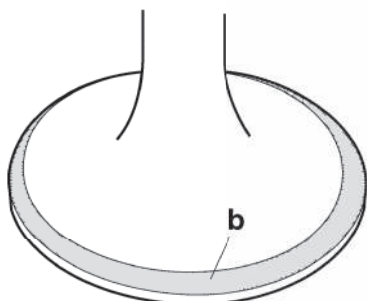
### TIP

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



G088969

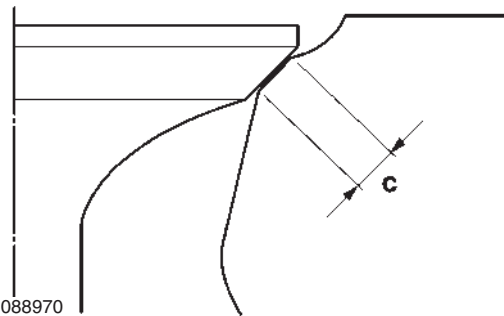
- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid "b" onto the valve face.



G088967

- 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.



G088970

EAS30286

### CHECKING THE VALVE SPRINGS

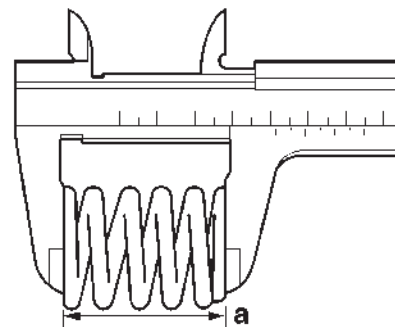
The following procedure applies to all of the valve springs.

1. Measure:

- Valve spring free length "a"  
Out of specification → Replace the valve spring.



<b>Free length (intake)</b>	<b>40.30 mm (1.59 in)</b>
<b>Limit</b>	<b>38.29 mm (1.51 in)</b>
<b>Free length (exhaust)</b>	<b>41.39 mm (1.63 in)</b>
<b>Limit</b>	<b>39.32 mm (1.55 in)</b>



G088971

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

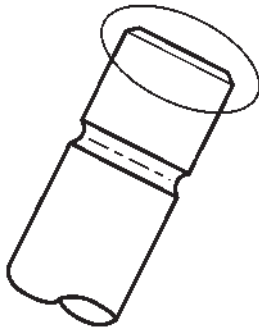
### INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

# VALVES AND VALVE SPRINGS


## 1. Deburr:

- Valve stem end  
(with an oil stone)



## 2. Lubricate:

- Valve stem
- Valve stem end  
(with the recommended lubricant)

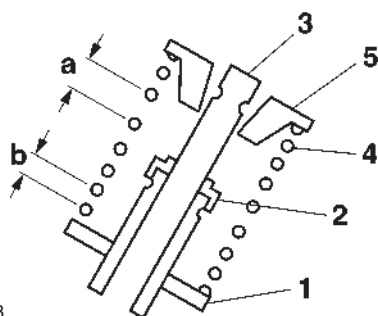
	<b>Recommended lubricant</b> <b>Molybdenum disulfide oil</b>
---	---

## 3. Install:

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

### TIP

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



G088973

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”.

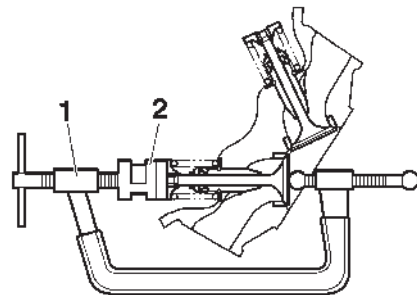


**Valve spring compressor**  
**90890-04019**

**Valve spring compressor**  
**YM-04019**

**Valve spring compressor attach-**  
**ment (ø26)**  
**90890-01243**

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



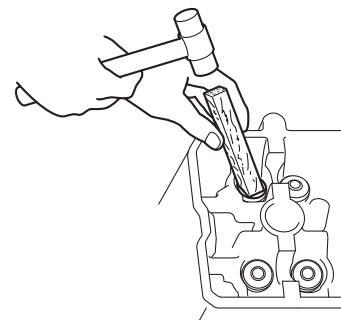
G088959

- 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.**



G088975

## 6. Lubricate:

- Valve lifter  
(with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---

## 7. Install:

- Valve pad
- Valve lifter

### TIP

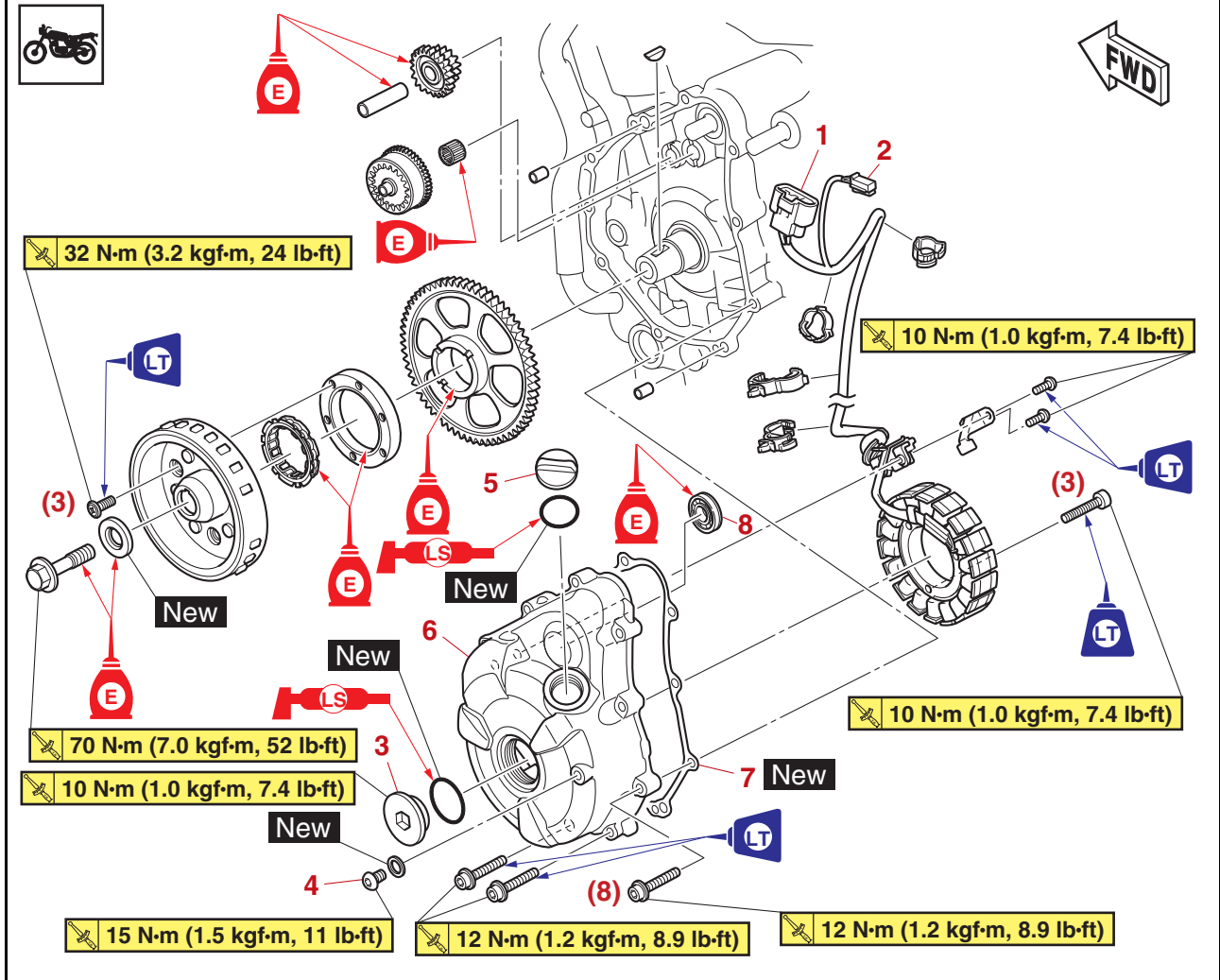
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in their original position.

# GENERATOR AND STARTER CLUTCH

EAS20140

## GENERATOR AND STARTER CLUTCH

Removing the stator coil, generator rotor and starter clutch

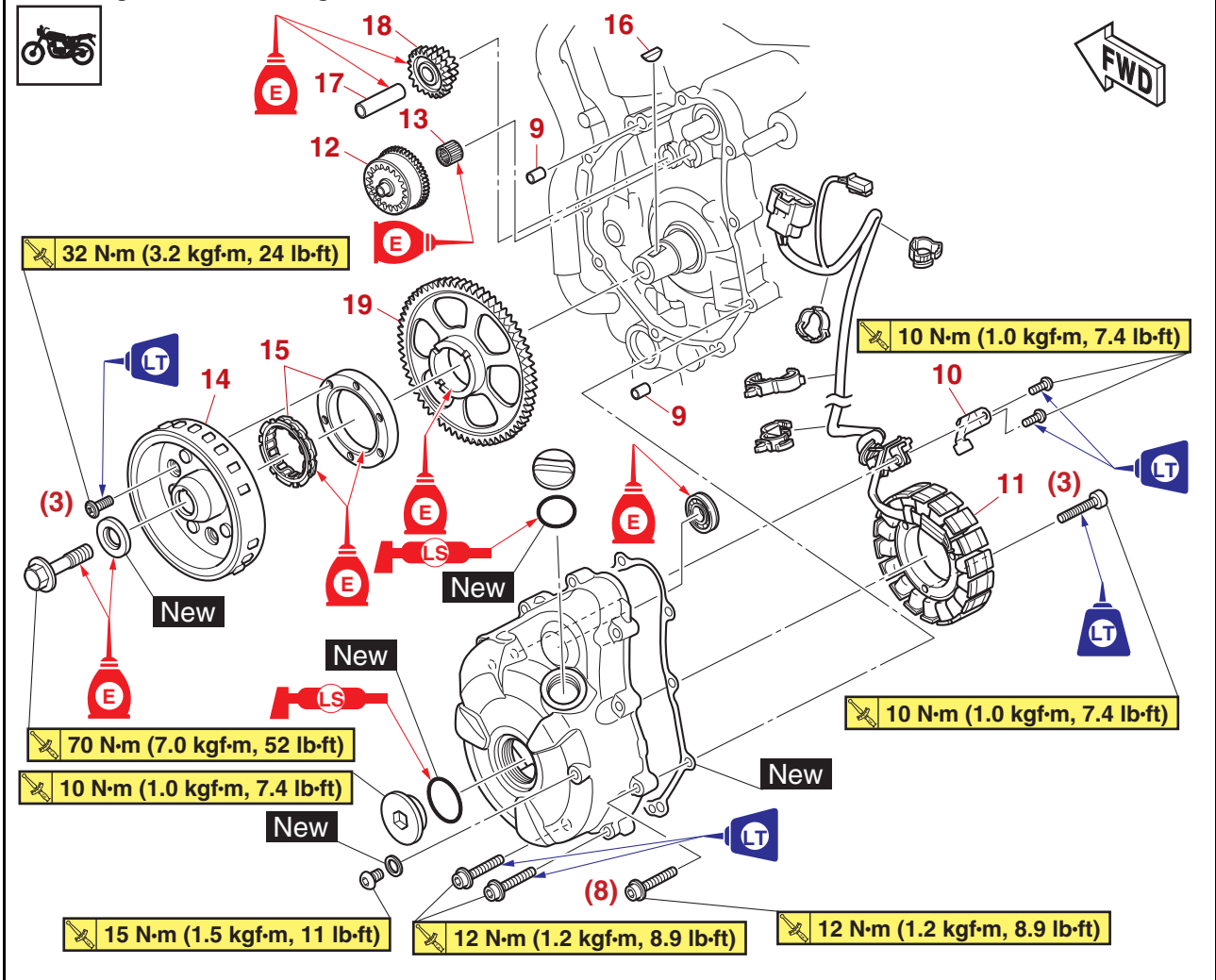


Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (left)/Air duct (left)		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Stator coil coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Crankshaft end cover	1	
4	Timing mark accessing bolt	1	
5	Oil filler cap	1	
6	Generator cover	1	
7	Generator cover gasket	1	
8	Bearing	1	



# GENERATOR AND STARTER CLUTCH

## Removing the stator coil, generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
9	Dowel pin	2	
10	Stator coil lead holder	1	
11	Stator coil assembly (Stator coil/Crankshaft position sensor)	1	
12	Torque limiter	1	
13	Bearing	1	
14	Generator rotor	1	
15	Starter clutch	1	
16	Woodruff key	1	
17	Starter clutch idle gear shaft	1	
18	Starter clutch idle gear	1	
19	Starter clutch gear	1	

# GENERATOR AND STARTER CLUTCH

EAS30867

## REMOVING THE GENERATOR

1. Remove:

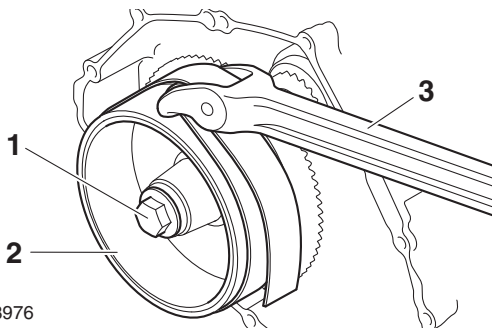
- Generator rotor bolt "1"
- Washer

### TIP

While holding the generator rotor "2" with the rotor holding tool "3", loosen the generator rotor bolt.



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**



G088976

2. Remove:

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

ECA13880

### NOTICE

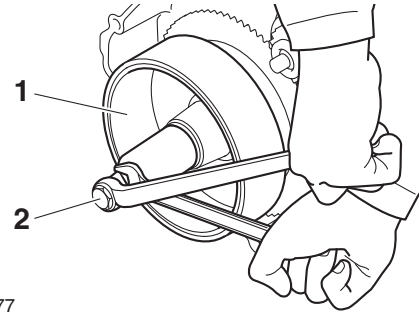
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

### TIP

- Install the flywheel puller bolts to the threaded holes of the starter clutch.
- Make sure the flywheel puller is centered over the generator rotor.



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



G088977

EAS30868

## REMOVING THE STARTER CLUTCH

1. Remove:

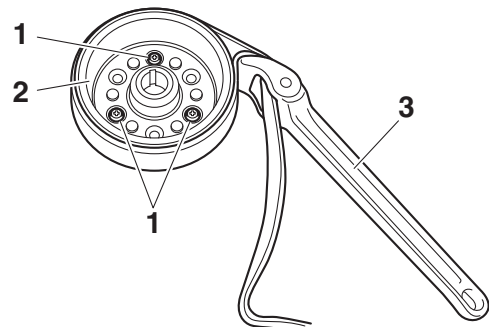
- Starter clutch bolts "1"
- Starter clutch

### TIP

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



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**



EAS30869

## CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers  
Damage/wear → Replace.

2. Check:

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

3. Check:

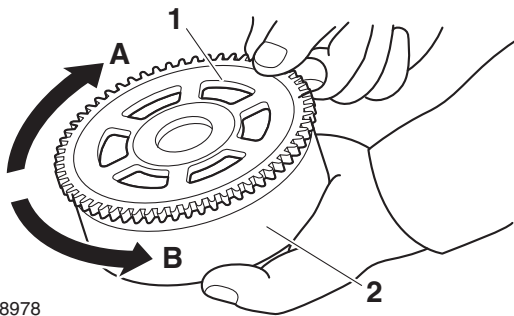
- Starter clutch gear contact surfaces  
Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

- Starter clutch operation

# GENERATOR AND STARTER CLUTCH

- Install the starter clutch gear "1" onto the generator rotor "2" and hold the generator rotor.
- 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.
- When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



G088978

EAS30870

## CHECKING THE TORQUE LIMITER

### 1. Check:

- Torque limiter  
Damage/wear → Replace.

### TIP

Do not disassemble the torque limiter.

EAS30871

## INSTALLING THE STARTER CLUTCH

### 1. Install:

- Starter clutch "1"



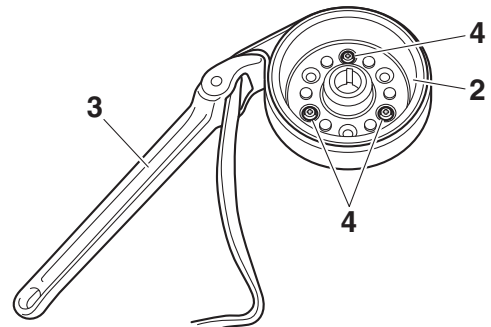
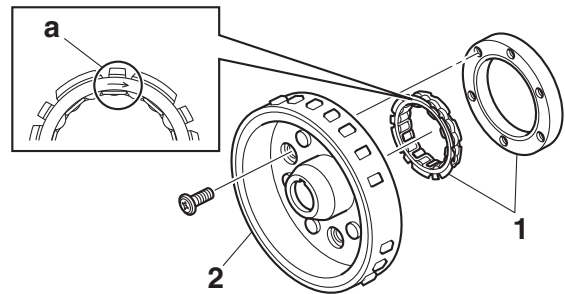
**Starter clutch bolt**  
32 N·m (3.2 kgf·m, 24 lb·ft)  
LOCTITE®

### TIP

- Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark "a" is toward the generator rotor "2".
- While holding the generator rotor with the rotor holding tool "3", tighten the starter clutch bolts "4".



**Rotor holding tool**  
90890-04166  
**Rotor holding tool**  
YM-04166



EAS30872

## INSTALLING THE GENERATOR

### 1. Install:

- Woodruff key
- Generator rotor
- Washer **New**
- Generator rotor bolt

### TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

### 2. Tighten:

- Generator rotor bolt "1"



**Generator rotor bolt**  
70 N·m (7.0 kgf·m, 52 lb·ft)

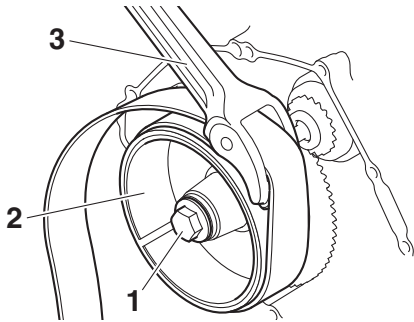
### TIP

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

# GENERATOR AND STARTER CLUTCH

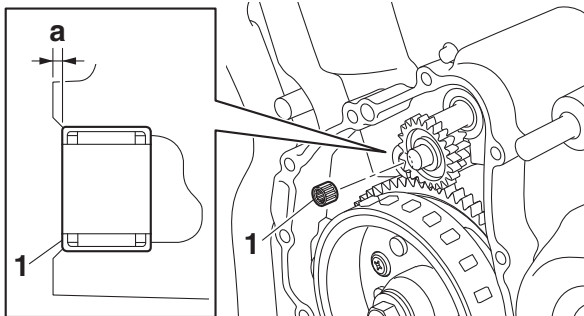


G088979

3. Install:
- Bearing "1"

**TIP**

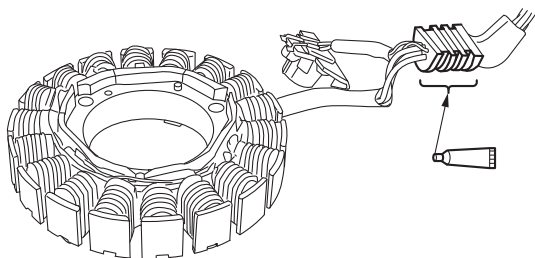
Make sure that the bearing does not protrude past the surface "a" of the cylinder.



4. Apply:
- Sealant  
(onto the stator coil lead grommet)



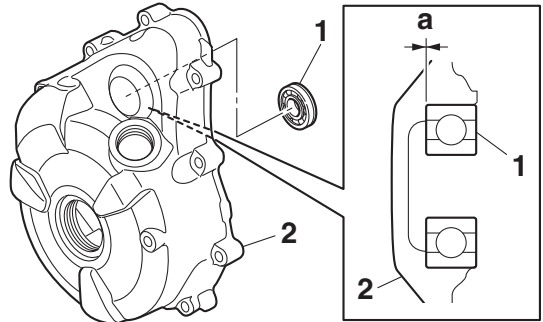
**Yamaha bond No. 1215**  
**90890-85505**  
**(Three bond No.1215®)**



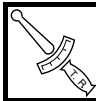
5. Install:
- Bearing "1"

**TIP**

Make sure that the bearing contacts the surface "a" of the generator cover "2".



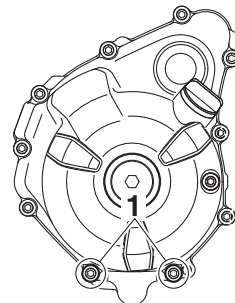
6. Install:
- Generator cover gasket **New**
  - Generator cover



**Generator cover bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb-ft)**  
**LOCTITE®**  
**Generator cover bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb-ft)**

**TIP**

- Tighten the generator cover bolts in stages and in a crisscross pattern.
- Apply LOCTITE® to the threads of only the generator cover bolts "1" shown in the illustration.



7. Connect:
- Stator coil coupler
  - Crankshaft position sensor coupler

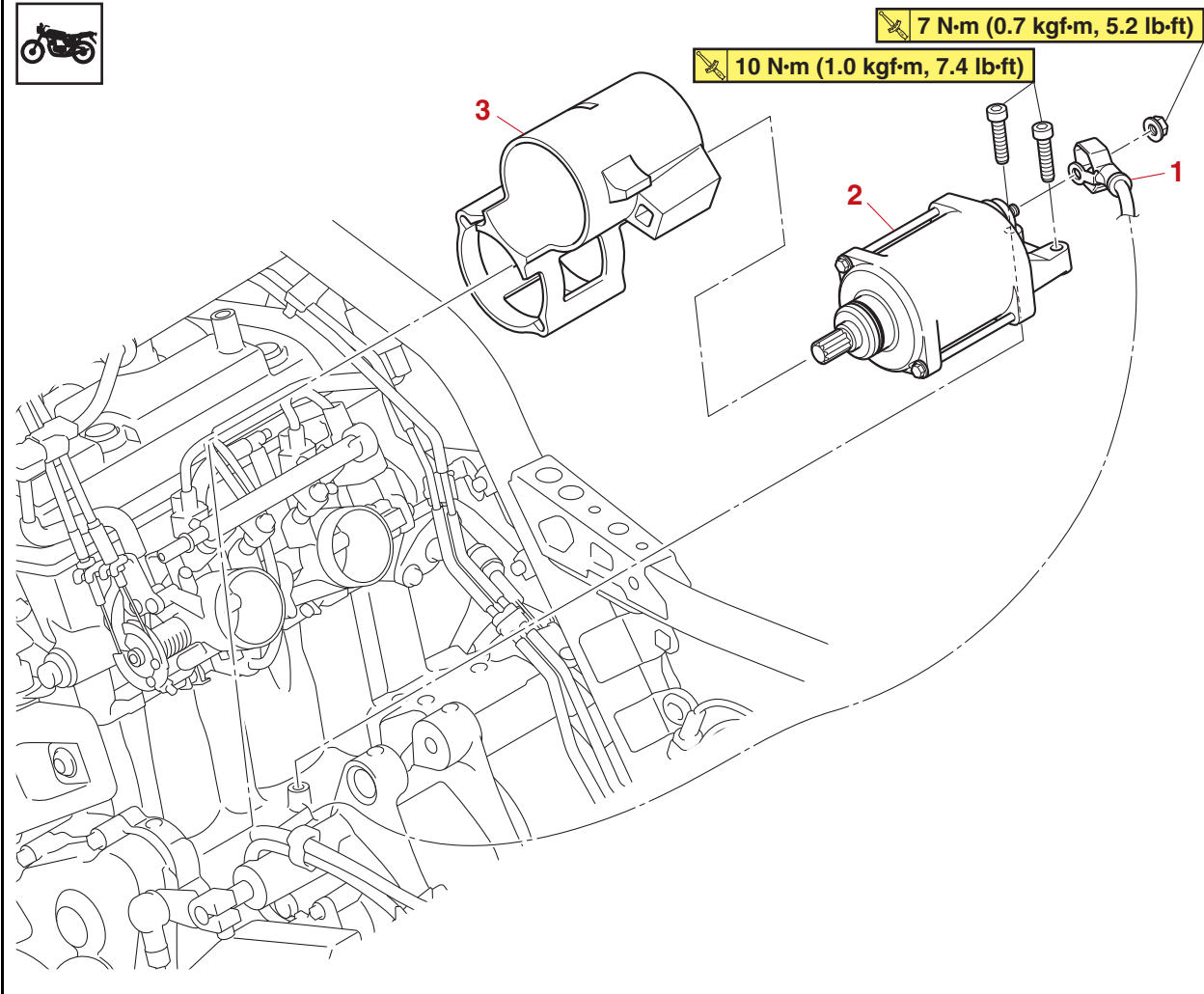
**TIP**

To route the stator coil lead, refer to "CABLE ROUTING" on page 2-15.

EAS20052

## ELECTRIC STARTER

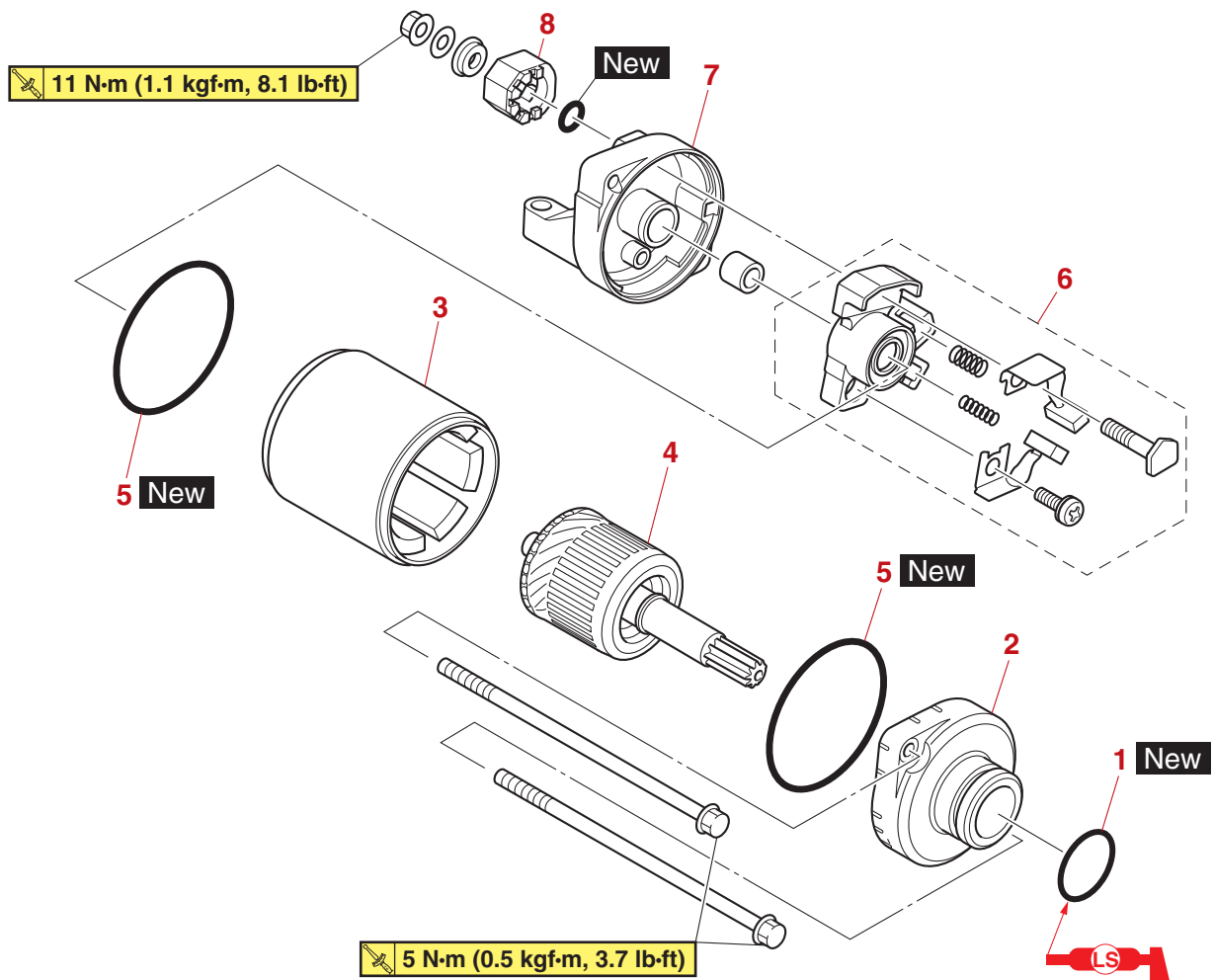
### Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Canister		Refer to "FUEL TANK" on page 7-1.
1	Starter motor lead	1	Disconnect.
2	Starter motor	1	
3	Canister holder	1	

# ELECTRIC STARTER

## Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Starter motor yoke	1	
4	Armature assembly	1	
5	Gasket	2	
6	Brush holder set	1	
7	Starter motor rear cover	1	
8	Lead guide	1	

# ELECTRIC STARTER

EAS30325

## CHECKING THE STARTER MOTOR

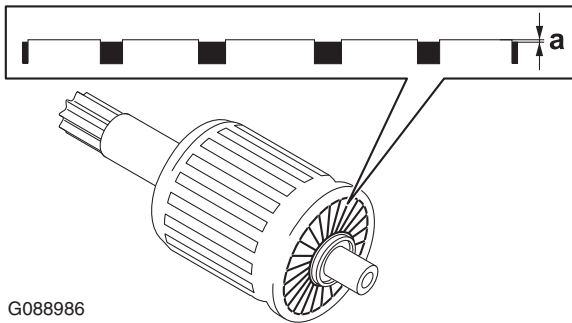
1. Check:
  - Commutator  
Dirt → Clean with 600 grit sandpaper.
2. Measure:
  - Mica undercut "a"  
Out of specification → Cut the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



**Mica undercut (depth)**  
**0.70 mm (0.03 in)**

### TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



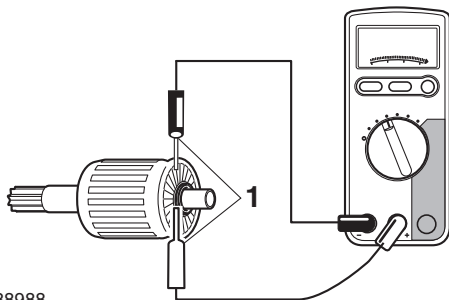
G088986

3. Check:
  - Armature assembly
    - a. Connect the digital circuit tester and check the continuity.



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

- b. If there is no continuity, replace the starter motor.

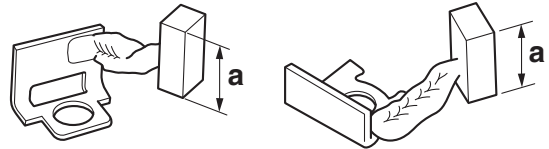


G088988

4. Measure:
  - Brush length "a"  
Out of specification → Replace the brush holder set.



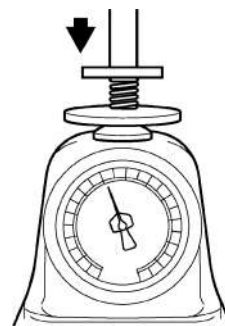
**Brush overall length limit**  
**6.5 mm (0.26 in)**



5. Measure:
  - Brush spring force  
Out of specification → Replace the brush holder set.



**Brush spring force**  
**6.03–6.52 N (615–665 gf, 21.71–**  
**23.47 oz)**



6. Check:
  - Gear teeth  
Damage/wear → Replace the starter motor.
7. Check:
  - Bearing
  - Oil seal  
Damage/wear → Replace the starter motor front cover.

EAS30326

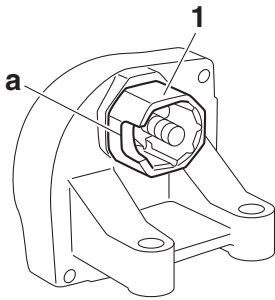
## ASSEMBLING THE STARTER MOTOR

1. Install:
  - Lead guide "1"

### TIP

Make sure that the slot "a" in the lead guide is facing in the direction shown in the illustration.





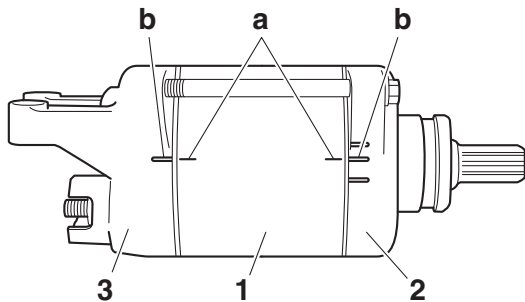
2. Install:

- Starter motor yoke "1"
- Starter motor front cover "2"
- Starter motor rear cover "3"

**TIP**

Align the match marks "a" on the starter motor yoke with the match marks "b" on the front cover and rear covers.

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EAS30327

## INSTALLING THE STARTER MOTOR

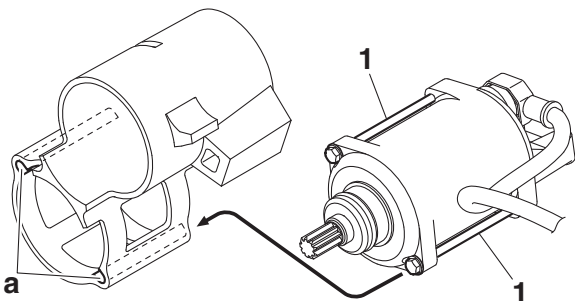
1. Install:

- Canister holder
- Starter motor

**TIP**

Pass the starter motor front cover bolts "1" through the slots "a" in the canister holder to secure it.

---

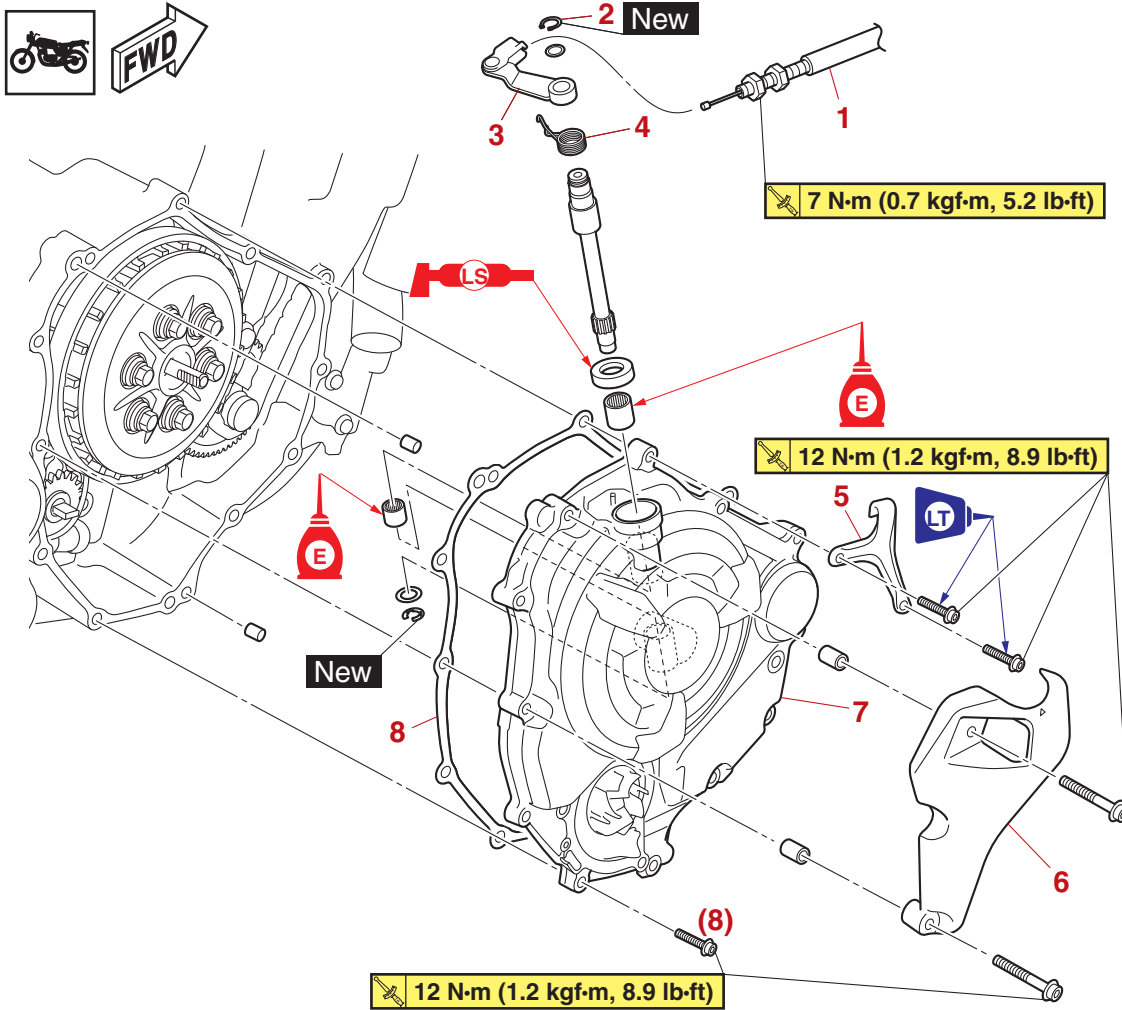




EAS20055

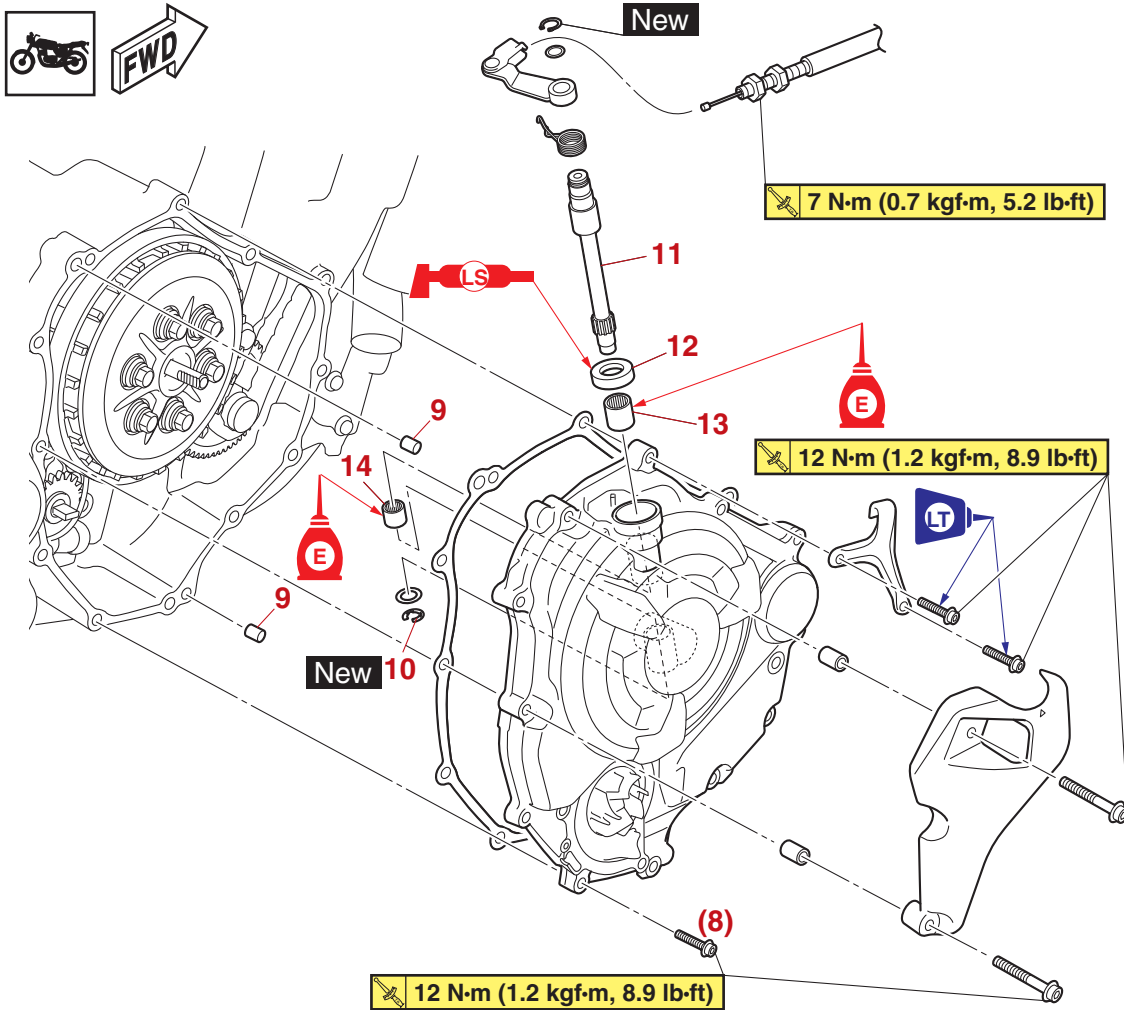
## CLUTCH

### Removing the clutch cover and pull lever shaft



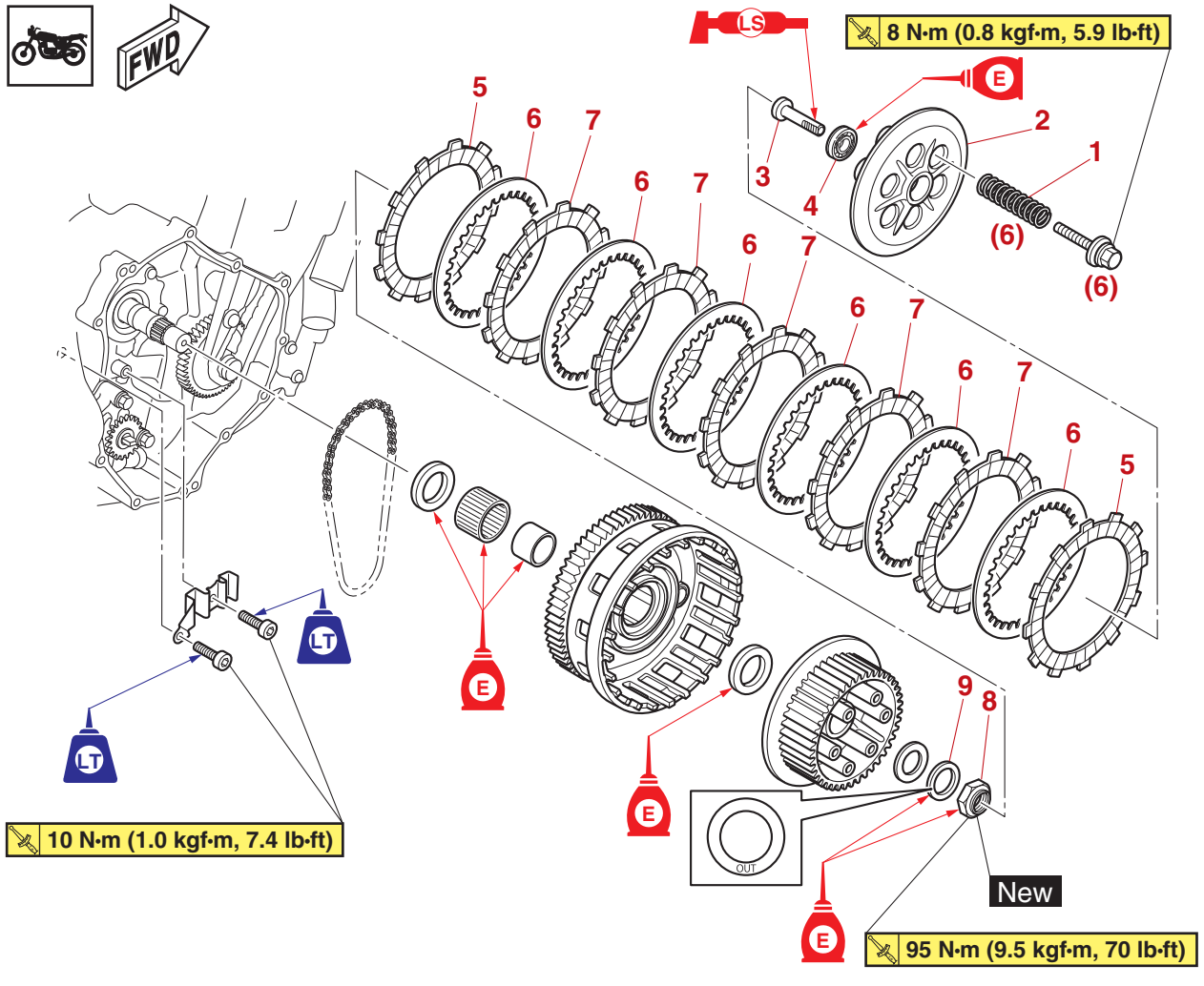
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Water pump housing		Refer to "WATER PUMP" on page 6-10.
1	Clutch cable	1	Disconnect.
2	Circlip	1	
3	Pull lever	1	
4	Pull lever spring	1	
5	Clutch cable holder	1	
6	Pull lever shaft cover	1	
7	Clutch cover	1	
8	Clutch cover gasket	1	

## Removing the clutch cover and pull lever shaft



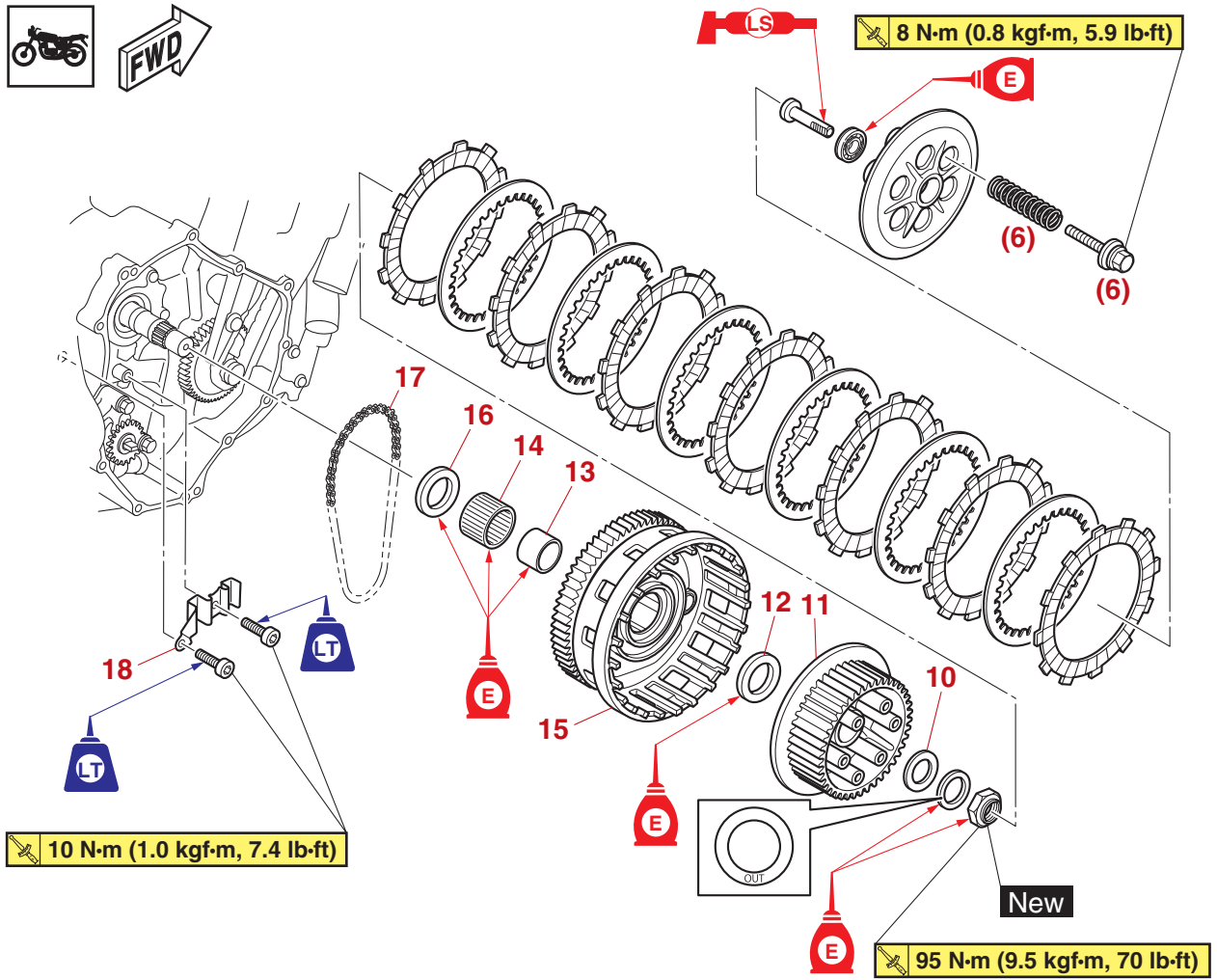
Order	Job/Parts to remove	Q'ty	Remarks
9	Dowel pin	2	
10	Circlip	1	
11	Pull lever shaft	1	
12	Oil seal	1	
13	Bearing	1	
14	Bearing	1	

## Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	2	
6	Clutch plate	6	
7	Friction plate 2	5	
8	Clutch boss nut	1	
9	Conical spring washer	1	

## Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
10	Washer	1	
11	Clutch boss	1	
12	Thrust plate	1	
13	Spacer	1	
14	Bearing	1	
15	Clutch housing	1	
16	Thrust plate	1	
17	Oil pump drive chain	1	
18	Oil pump drive chain guide	1	

EAS30346

## REMOVING THE CLUTCH

### 1. Remove:

- Clutch cover
- Gasket

### TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

### 2. Remove:

- Compression spring bolts
- Compression springs
- Pressure plate
- Pull rod

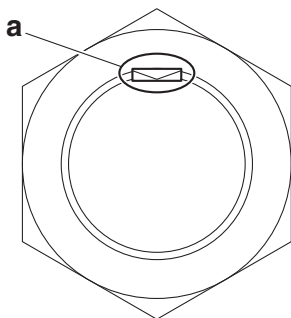
### TIP

Loosen the compression spring bolts in stages and in a crisscross pattern.

### 3. Remove:

- Friction plates 1
- Clutch plates
- Friction plates 2

### 4. Straighten the clutch boss nut rib "a".



G088991

### 5. Loosen:

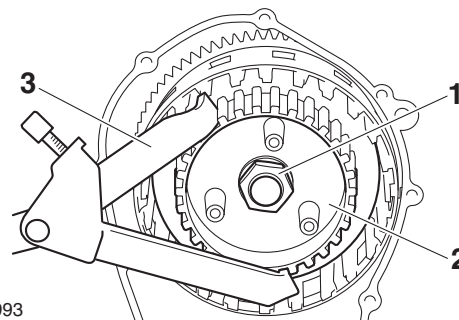
- Clutch boss nut "1"

### TIP

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



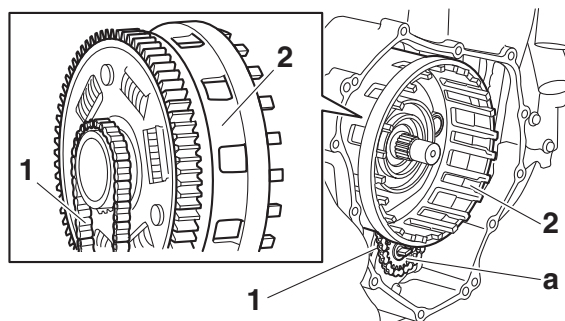
**Universal clutch holder**  
**90890-04086**  
**Universal clutch holder**  
**YM-91042**



G088993

### 6. Remove:

- Spacer
- Bearing
- Clutch housing
  - Remove the spacer and bearing.
  - Remove the oil pump drive chain "1" from the oil pump driven sprocket "a", and then remove the clutch housing "2".



EAS30348

## CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

### 1. Check:

- Friction plate  
 Damage/wear → Replace the friction plates as a set.

### 2. Measure:

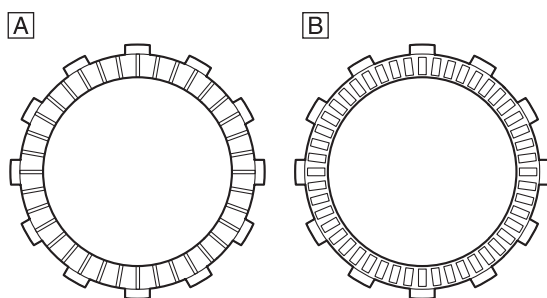
- Friction plate thickness  
 Out of specification → Replace the friction plates as a set.

### TIP

Measure the friction plate at four places.



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



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

EAS30349

## CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
  - Clutch plate  
Damage → Replace the clutch plates as a set.
2. Measure:
  - Clutch plate warpage  
(with a surface plate and thickness gauge)  
Out of specification → Replace the clutch plates as a set.



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



**Warpage limit**  
0.10 mm (0.004 in)

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  
Out of specification → Replace the clutch springs as a set.



**Clutch spring free length**  
50.00 mm (1.97 in)  
**Limit**  
47.50 mm (1.87 in)

EAS30352

## CHECKING THE CLUTCH HOUSING

1. Check:
  - Clutch housing dogs  
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

### TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.

2. Check:
  - Oil pump drive sprocket  
Cracks/damage/wear → Replace.
3. Check:
  - Bearing  
Damage/wear → Replace the bearing and clutch housing.

EAS30353

## CHECKING THE CLUTCH BOSS

1. Check:
  - Clutch boss splines  
Damage/pitting/wear → Replace the clutch boss.

### TIP

Pitting on the clutch boss splines will cause erratic clutch operation.

EAS30354

## CHECKING THE PRESSURE PLATE

1. Check:
  - Pressure plate  
Cracks/damage → Replace.
  - Bearing  
Damage/wear → Replace.

EAS30356

## CHECKING THE PRIMARY DRIVE GEAR

1. Check:
  - Primary drive gear  
Damage/wear → Replace the crankshaft and clutch housing as a set.  
Excessive noise during operation → Replace the crankshaft and clutch housing as a set.

EAS30357

## CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
  - Primary driven gear  
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

- Check:
  - Pull lever shaft pinion gear teeth
  - Pull rod teeth
 Damage/wear → Replace the pull rod and pull lever shaft as a set.
- Check:
  - Pull rod bearing
 Damage/wear → Replace.

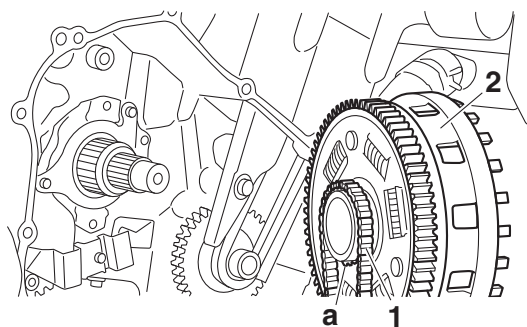
EAS30363

## INSTALLING THE CLUTCH

- Install:
  - Oil pump drive chain "1"
  - Thrust plate
  - Clutch housing "2"
  - Bearing
  - Spacer

### TIP

Install the oil pump drive chain onto the oil pump drive sprocket "a".



- Install:
  - Thrust plate
  - Clutch boss "1"
  - Washer
  - Conical spring washer
  - Clutch boss nut "2" **New**



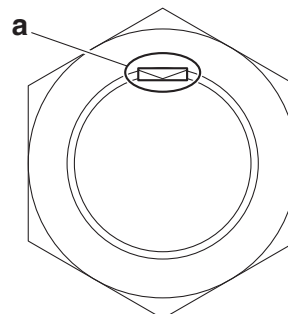
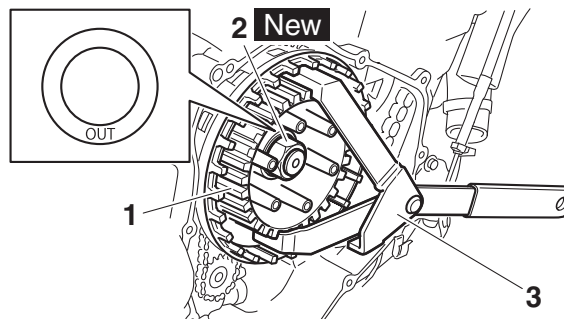
**Clutch boss nut**  
95 N·m (9.5 kgf·m, 70 lb·ft)

### TIP

- Lubricate the conical spring washer and clutch boss nut threads with engine oil.
- Install the washer on the main axle with the "OUT" mark facing away from the vehicle.
- While holding the clutch boss "1" with the universal clutch holder "3", tighten the clutch boss nut.
- Stake the clutch boss nut at a cutout "a" in the main axle.



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

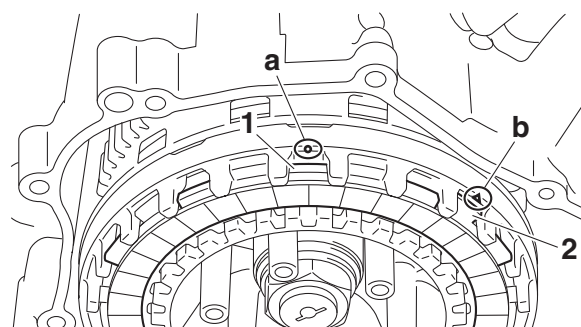


G088991

- Install:
  - Friction plates 1 "1"
  - Friction plates 2 "2"

### TIP

- First, install a friction plate, and then alternate between a clutch plate and a friction plate.
- Align a projection on friction plate 1 with the punch mark "a" on the clutch housing and align a projection on friction plate 2 with the "△" mark "b" on the housing.



- Install:
  - Bearing
  - Pull rod
  - Pressure plate
  - Clutch springs
  - Clutch spring bolts



**Clutch spring bolt**  
8 N·m (0.8 kgf·m, 5.9 lb·ft)

**TIP**

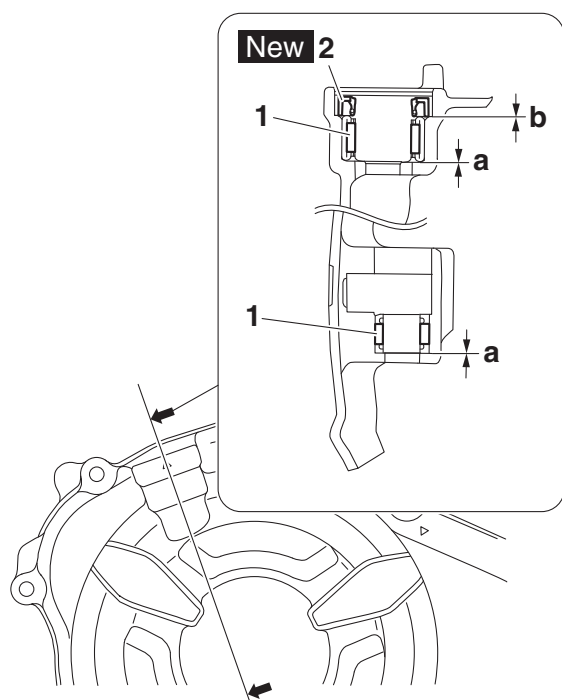
- Apply lithium-soap-based grease onto the pull rod.
- Tighten the clutch spring bolts in stages and in a crisscross pattern.

5. Install:

- Bearings "1"
- Oil seal "2" **New**  
(to the clutch cover)

**TIP**

- Lubricate the bearings with engine oil and lubricate the oil seal with lithium-soap-based grease.
- Install the bearings until they contact the surfaces "a" and install the oil seal until it contacts the surface "b" as shown in the illustration.



6. Install:

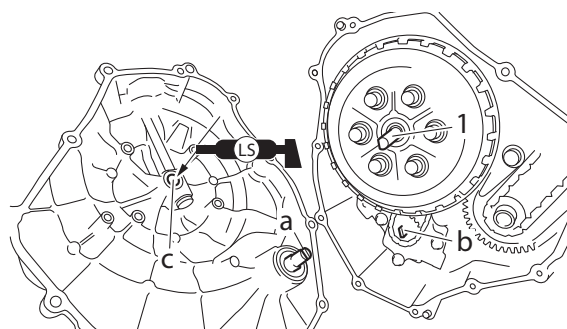
- Dowel pins
- Clutch cover gasket **New**
- Clutch cover
- Pull lever shaft cover
- Clutch cable holder



**Clutch cover bolt**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
**Clutch cable holder bolt**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)  
**LOCTITE®**

**TIP**

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "1" rearward and align the rod with the hole "c" in the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the bolts in stages and in a crisscross pattern.

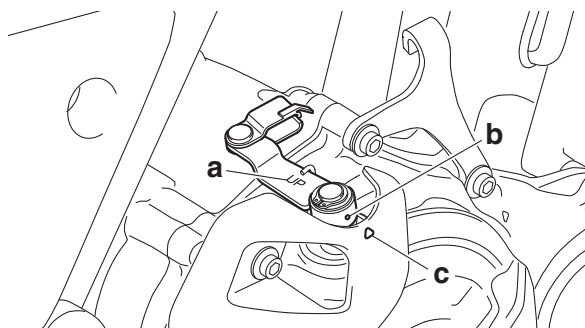


7. Install:

- Pull lever

**TIP**

- Install the pull lever with the "UP" mark "a" facing toward upper side.
- When installing the pull lever, push the pull lever and check that the punch mark "b" on the pull lever aligns with the mark "c" on the pull lever shaft cover.



8. Connect:

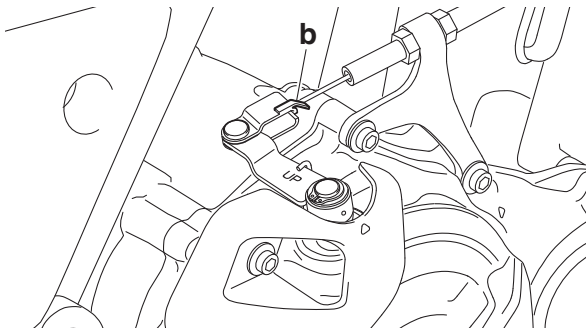
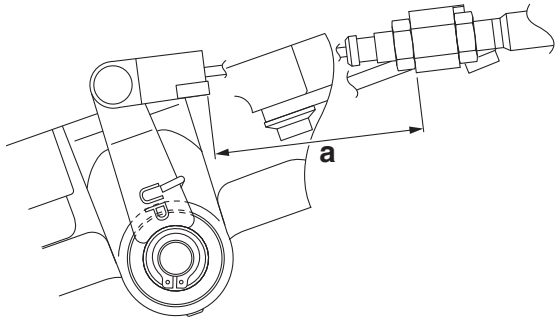
- Clutch cable

**TIP**

- Install the clutch cable so that the clutch cable length "a" is 51.6–62.2 mm (2.03–2.45 in) as shown in the illustration.



- After installing the clutch cable, bend the projection “b” on the pull lever.



9. Adjust:

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

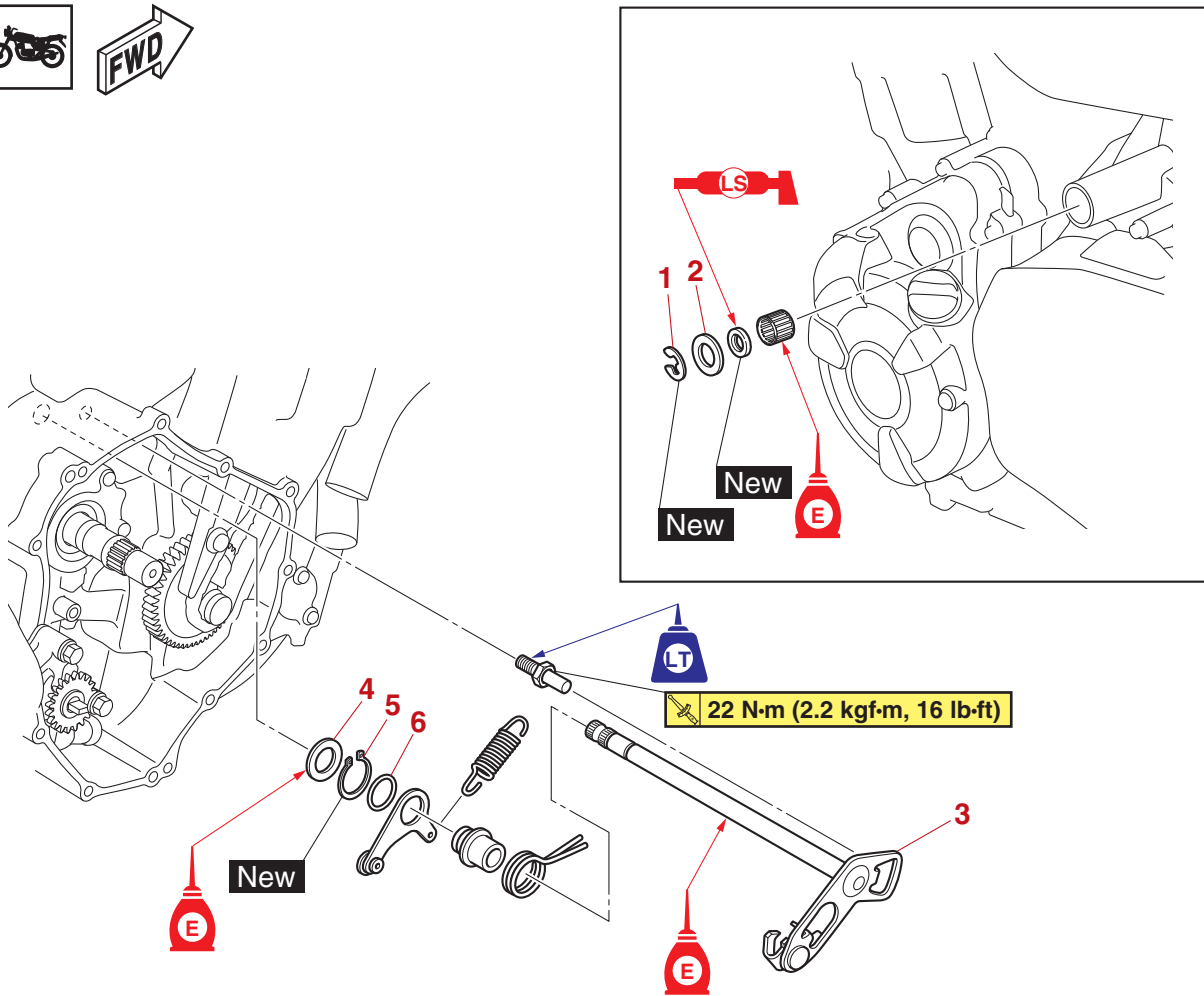


**Clutch lever free play**  
**5.0–10.0 mm (0.20–0.39 in)**

EAS20057

## SHIFT SHAFT

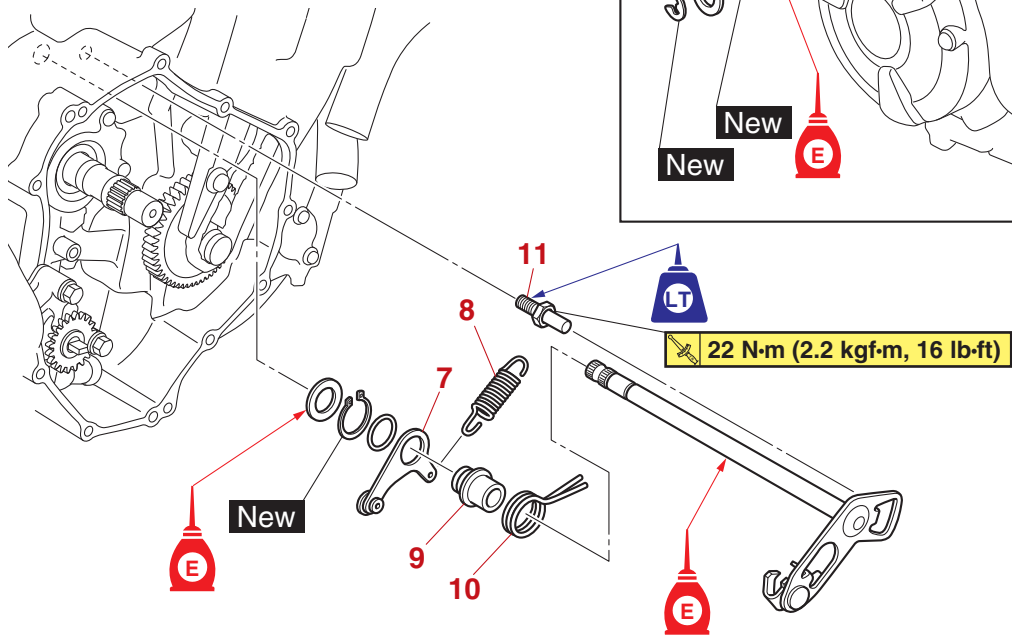
### Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Shift arm		Refer to "CHAIN DRIVE" on page 4-80.
	Water pump housing		Refer to "WATER PUMP" on page 6-10.
	Clutch housing		Refer to "CLUTCH" on page 5-42.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	

# SHIFT SHAFT

## Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
7	Stopper lever	1	
8	Stopper lever spring	1	
9	Collar	1	
10	Shift shaft spring	1	
11	Shift shaft spring stopper	1	
12	Oil seal	1	
13	Bearing	1	

EAS30377

## CHECKING THE SHIFT SHAFT

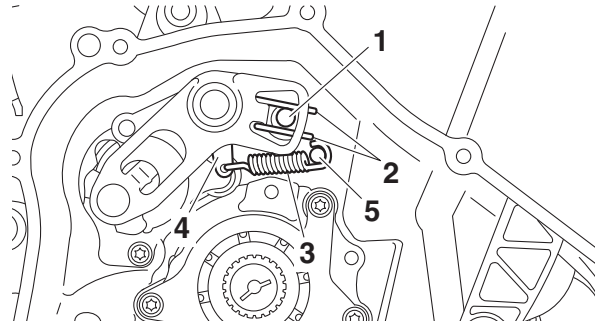
1. Check:
  - Shift shaft  
Bends/damage/wear → Replace.
  - Shift shaft spring
  - Collar  
Damage/wear → Replace.

EAS30378

## CHECKING THE STOPPER LEVER

1. Check:
  - Stopper lever  
Bends/damage → Replace.  
Roller turns roughly → Replace the stopper lever.

- Hook the ends of the stopper lever spring “3” onto the stopper lever “4” and the stopper lever spring hook “5”.
- Mesh the stopper lever with the shift drum segment assembly.



EAS30381

## INSTALLING THE SHIFT SHAFT

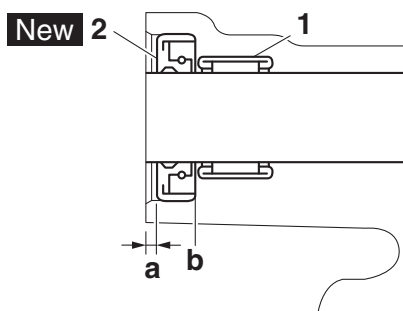
1. Install:
  - Bearing “1”
  - Oil seal “2” **New**



Install depth “a”  
0.6–1.1 mm (0.02–0.04 in)

### TIP

- Apply engine oil onto the bearing.
- Make sure that the bearing does not protrude past the line “b” shown in the illustration.
- Lubricate the oil seal lips with lithium-soap-based grease.



2. Install:
  - Shift shaft spring stopper
  - Washer
  - Shift shaft assembly
  - Stopper lever spring



Shift shaft spring stopper  
22 N·m (2.2 kgf·m, 16 lb·ft)  
LOCTITE®

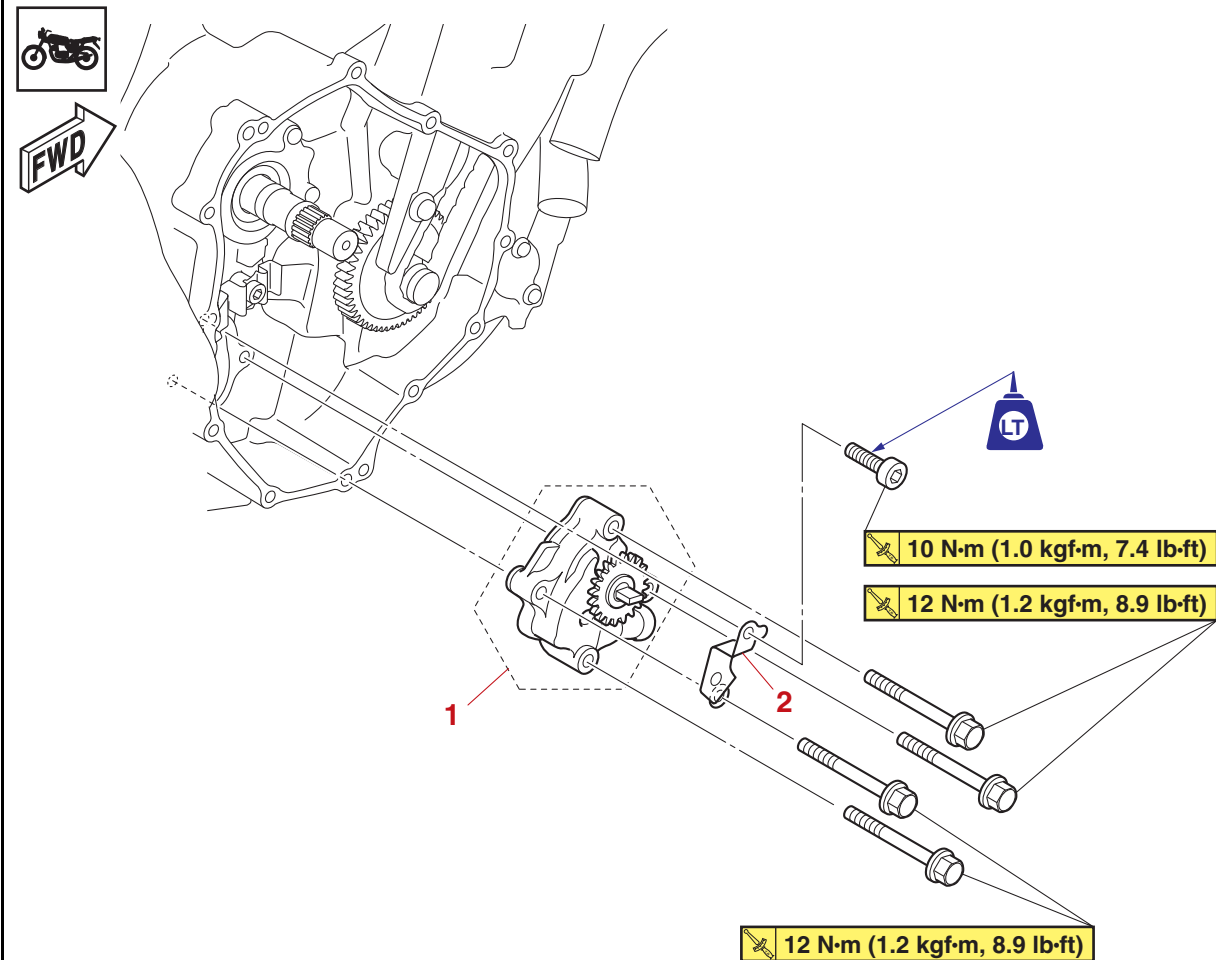
### TIP

- Hook the end of the shift shaft spring “2” onto the shift shaft spring stopper “1”.

EAS20054

## OIL PUMP

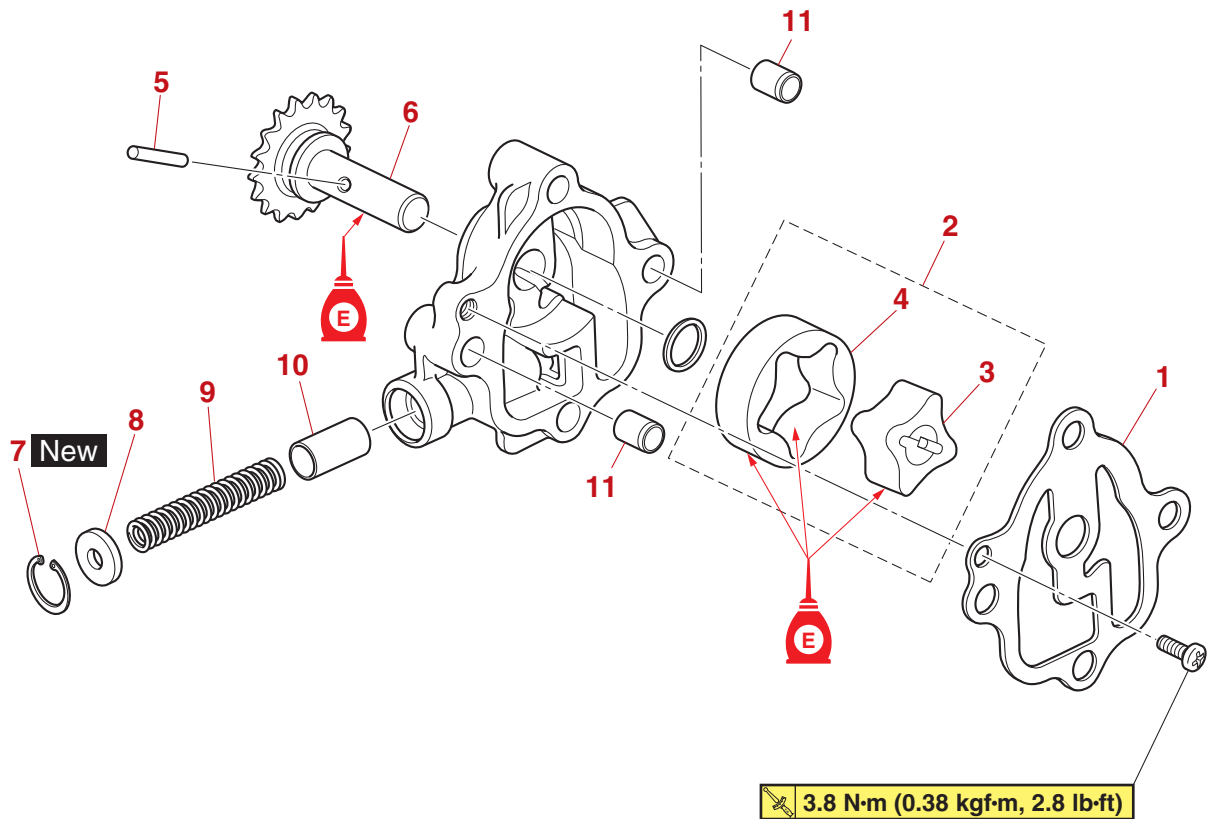
### Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Clutch housing		Refer to "CLUTCH" on page 5-42.
1	Oil pump assembly	1	
2	Holder	1	

# OIL PUMP

## Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Oil pump rotor assembly	1	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Oil pump driven sprocket	1	
7	Circlip	1	Hold down the washer when removing the circlip.
8	Washer	1	
9	Spring	1	
10	Relief valve	1	
11	Dowel pin	2	

EAS30336

## CHECKING THE SPROCKET AND CHAIN

- Check:
  - Oil pump drive sprocket  
Refer to "CHECKING THE CLUTCH HOUSING" on page 5-47.
  - Oil pump driven sprocket  
Refer to "CHECKING THE OIL PUMP" on page 5-56.
- Check:
  - Oil pump drive chain  
Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket (clutch housing), and oil pump driven sprocket as a set.

EAS30337

## CHECKING THE OIL PUMP

- Check:
  - Oil pump driven sprocket
  - Oil pump housing  
Cracks/damage/wear → Replace the oil pump assembly.
- Measure:
  - Inner-rotor-to-outer-rotor-tip clearance "a"
  - Outer-rotor-to-oil-pump-housing clearance "b"



**Inner-rotor-to-outer-rotor-tip clearance**

**0.080 mm (0.0031 in)**

**Limit**

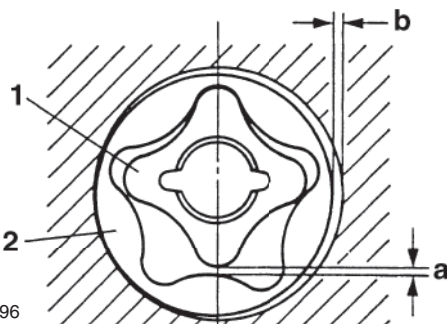
**0.120 mm (0.0047 in)**

**Outer-rotor-to-oil-pump-housing clearance**

**0.090–0.150 mm (0.0035–0.0059 in)**

**Limit**

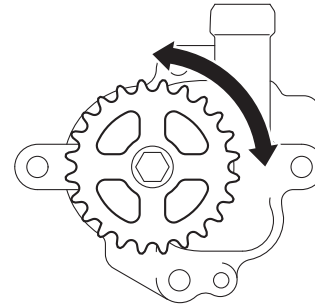
**0.220 mm (0.0087 in)**



G088996

- Inner rotor
- Outer rotor

- Check:
  - Oil pump operation  
Rough movement → Repeat steps (1) and (2) or replace the oil pump assembly.



G088997

EAS30338

## CHECKING THE RELIEF VALVE

- Check:
  - Relief valve
  - Spring  
Damage/wear → Replace the oil pump assembly.

EAS30342

## ASSEMBLING THE OIL PUMP

- Lubricate:
  - Inner rotor
  - Outer rotor  
(with the recommended lubricant)



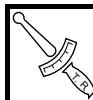
**Recommended lubricant**  
**Engine oil**

- Lubricate:
  - Oil pump driven sprocket  
(with the recommended lubricant)



**Recommended lubricant**  
**Engine oil**

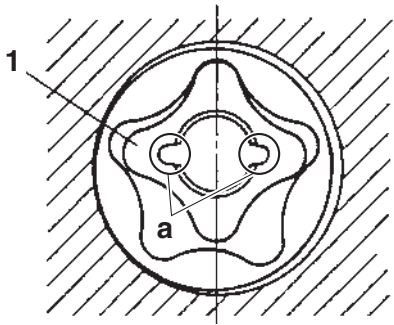
- Install:
  - Oil pump driven sprocket
  - Pin
  - Outer rotor
  - Inner rotor
  - Oil pump cover
  - Oil pump cover screw



**Oil pump cover screw**  
**3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

### TIP

Align the pin in the oil pump shaft with the grooves "a" in the inner rotor "1".



4. Check:

- Oil pump operation  
Refer to "CHECKING THE OIL PUMP" on page 5-56.

EAS30343

## INSTALLING THE OIL PUMP

1. Install:

- Oil pump "1"
- Oil pump bolts "2"

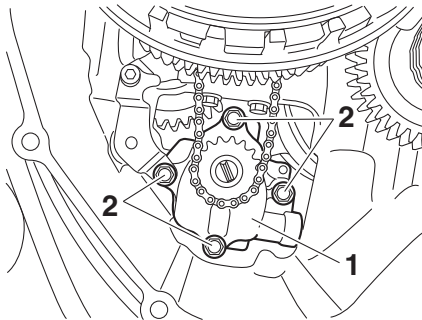


**Oil pump bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**

ECA20940

### NOTICE

**After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.**

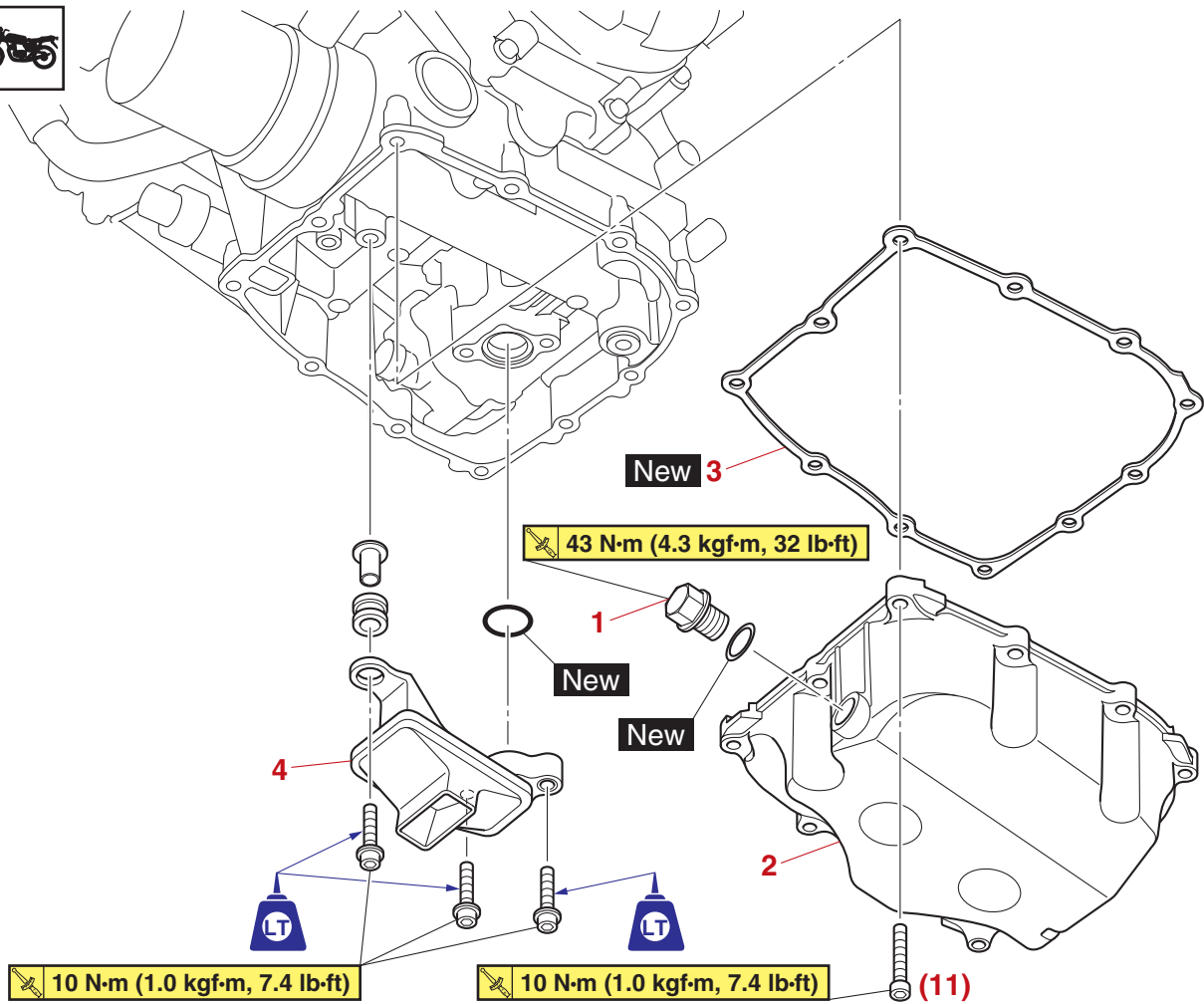




EAS20177

## OIL PAN

### Removing the oil pan



Order	Job/Parts to remove	Q'ty	Remarks
	Air scoop (right)/Air duct (right)		Refer to "GENERAL CHASSIS (2)" on page 4-2.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Exhaust pipe		Refer to "ENGINE REMOVAL" on page 5-3.
1	Engine oil drain bolt	1	
2	Oil pan	1	
3	Oil pan gasket	1	
4	Oil strainer	1	

EAS31068

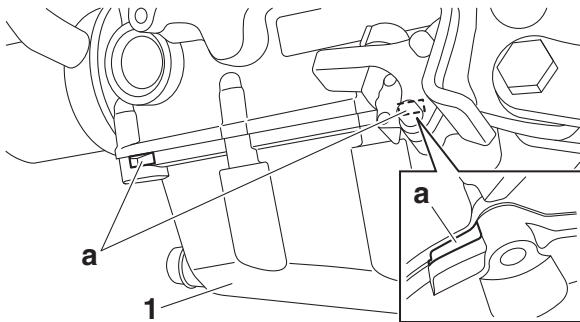
## REMOVING THE OIL PAN

1. Remove:

- Oil pan "1"
- Oil pan gasket

### TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Insert a flat-head screwdriver into the slots "a" in the oil pan to remove the oil pan.



EAS31069

## CHECKING THE OIL STRAINER

1. Check:

- Oil strainer  
Damage → Replace.  
Contaminants → Clean with solvent.

EAS31070

## INSTALLING THE OIL PAN

1. Install:

- Oil pan gasket **New**
- Oil pan



**Oil pan bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

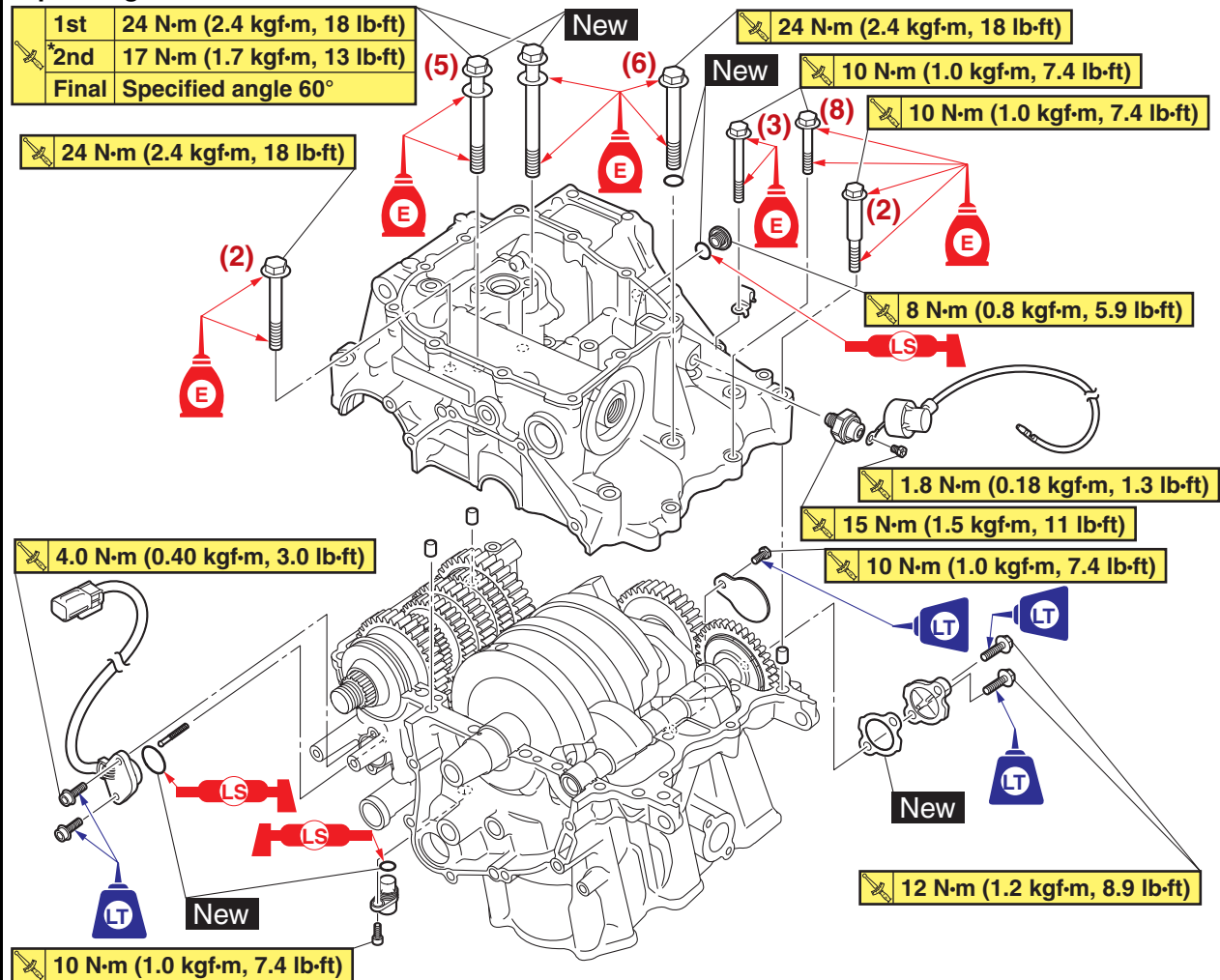
### TIP

Tighten the oil pan bolts in stages and in a crisscross pattern.

EAS20059

## CRANKCASE

### Separating the crankcase

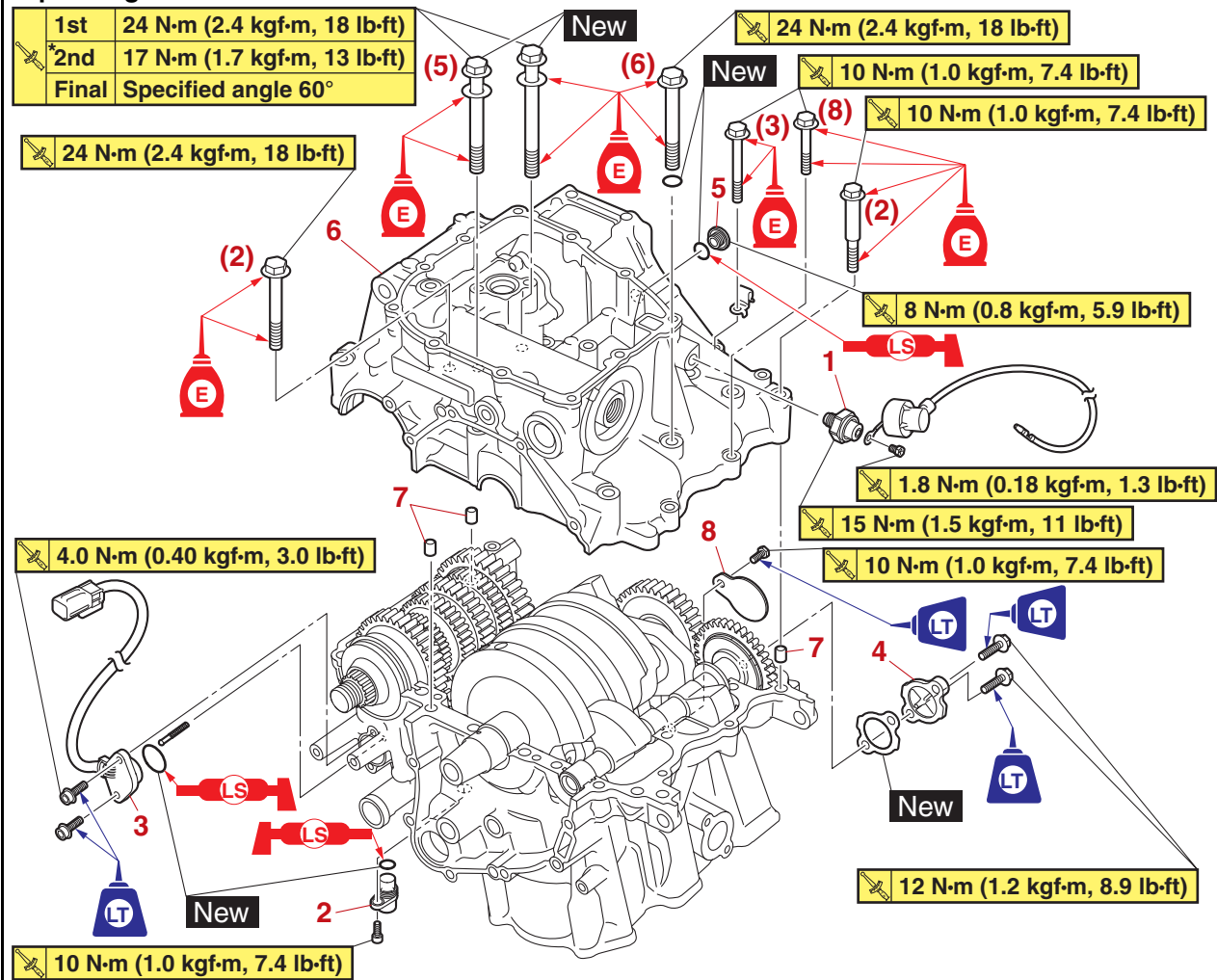


\* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Cylinder head cover		Refer to "CAMSHAFTS" on page 5-10.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-21.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.
	Clutch housing		Refer to "CLUTCH" on page 5-42.
	Oil strainer		Refer to "OIL PAN" on page 5-58.

# CRANKCASE

## Separating the crankcase



\* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pressure switch	1	
2	Cylinder plug	1	
3	Gear position switch	1	
4	Balancer shaft access cover	1	
5	Main gallery bolt	1	
6	Crankcase	1	
7	Dowel pin	3	
8	Blind plate	1	

EAS30389

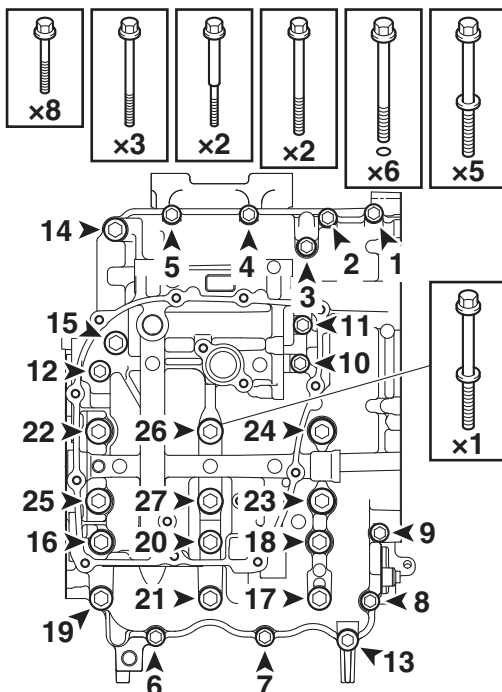
## DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
  - Crankcase bolt (×27)

### TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts “1”–“11” in any loosening sequence.
- Loosen the bolts “12”–“27” in the proper sequence as shown.
- The numbers embossed “1”–“16” on the crankcase indicate the crankcase tightening sequence.

- M6 × 40 mm bolt (×8): “1”, “2”, “4”–“7”, “10”, “11”
- M6 × 60 mm bolt (×3): “3”, “8”, “9”
- M6 × 65 mm bolt (×2): “12”, “13”
- M8 × 65 mm bolt (×2): “14”, “15”
- M8 × 70 mm bolt (×6) (bolts with O-rings): “16”–“21”
- M9 × 80 mm bolt (×5) (bolts with washers): “22”–“25”, “27”
- M9 × 90 mm bolt (×1) (bolts with washer): “26”



3. Remove:
  - Crankcase
  - Dowel pins

ECA13900

### NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

EAS30390

## CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
  - Crankcase Cracks/damage → Replace.
  - Oil delivery passages Obstruction → Blow out with compressed air.

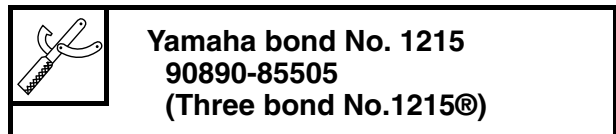
EAS30397

## ASSEMBLING THE CRANKCASE

1. Lubricate:
  - Crankshaft journal bearing inner surface (with the recommended lubricant)



2. Apply:
  - Sealant (onto the crankcase mating surfaces)

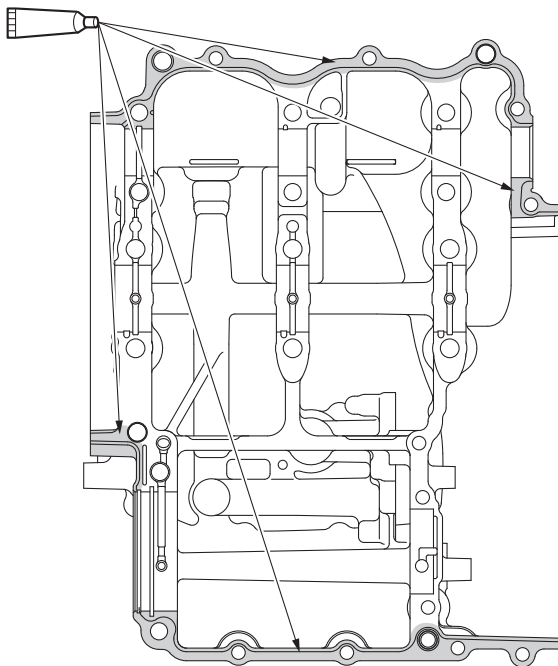


ECA20880

### NOTICE

Do not allow any sealant to come into contact with the oil gallery, crankshaft journal bearings, or balancer shaft journal bearings.

# CRANKCASE

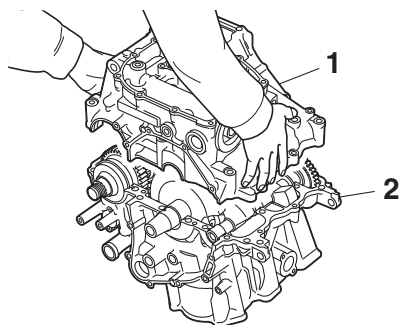


3. Install:
  - Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
  - Crankcase "1"
  - (onto the cylinder "2")

ECA13980

## NOTICE

**Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.**



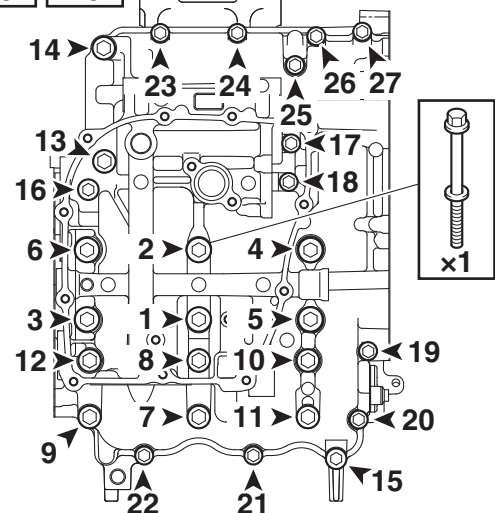
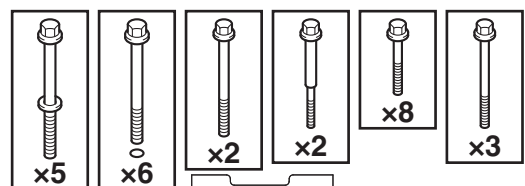
6. Install:
  - Crankcase bolt (x27)

## TIP

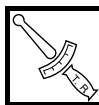
- Tighten the bolts "1"–"16" in the order of the embossed numbers on the crankcase.
- Lubricate the bolts "1"–"6" threads, mating surfaces and washers with engine oil.
- Lubricate the bolts "7"–"12" threads, mating surfaces and O-rings with engine oil.

- Lubricate the bolts "13"–"27" threads and mating surfaces with engine oil.

- M9 × 80 mm bolt (x5) (bolts with washers): "1", "3"–"6" **New**
- M9 × 90 mm bolt (x1) (bolt with washer): "2" **New**
- M8 × 70 mm bolt (x6) (bolts with new O-rings): "7"–"12"
- M8 × 65 mm bolt (x2): "13", "14"
- M6 × 65 mm bolt (x2): "15", "16"
- M6 × 40 mm bolt (x8): "17", "18", "21"–"24", "26", "27"
- M6 × 60 mm bolt (x3): "19", "20", "25"



7. Tighten:
  - Crankcase bolts "1"–"6"



### Crankcase bolts (bolts with washers) "1"–"6"

1st: 24 N·m (2.4 kgf·m, 18 lb·ft)

\*2nd: 17 N·m (1.7 kgf·m, 13 lb·ft)

Final: specified angle 60°

\* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

EWA16610

## WARNING

**If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.**

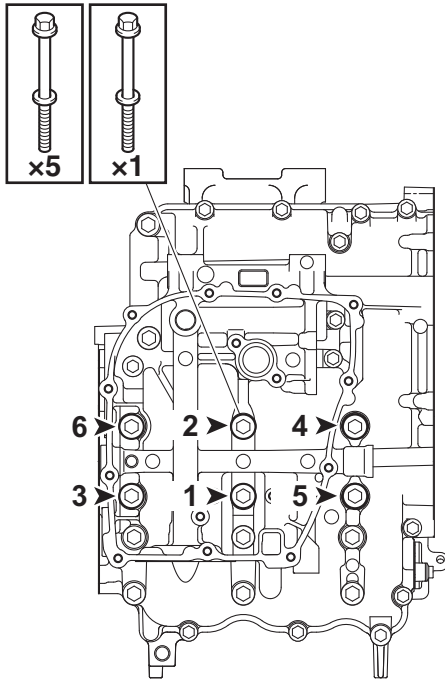
ECA20890

## NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

## TIP

Tighten the bolts in the tightening sequence cast on the crankcase.



8. Tighten:

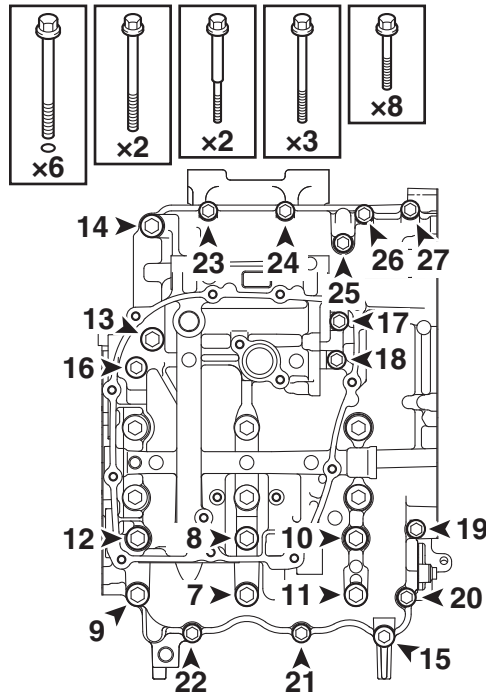
- Crankcase bolts “7”–“27”



**Crankcase bolts “7”–“14”**  
**24 N·m (2.4 kgf·m, 18 lb·ft)**  
**Crankcase bolts “15”–“27”**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

## TIP

- Tighten the bolts “7”–“16” in the tightening sequence cast on the crankcase.
- Tighten the bolts “17”–“27” in any tightening sequence using a crisscross pattern.

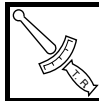


EAS31071

## INSTALLING THE OIL PRESSURE SWITCH

1. Install:

- Oil pressure switch “1”
- Oil pressure switch lead “2”



**Oil pressure switch**  
**15 N·m (1.5 kgf·m, 11 lb·ft)**  
**Oil pressure switch lead bolt**  
**1.8 N·m (0.18 kgf·m, 1.3 lb·ft)**

2. Apply:

- Sealant  
 (onto the oil pressure switch threads)



**Yamaha bond No. 1215**  
**90890-85505**  
**(Three bond No.1215®)**

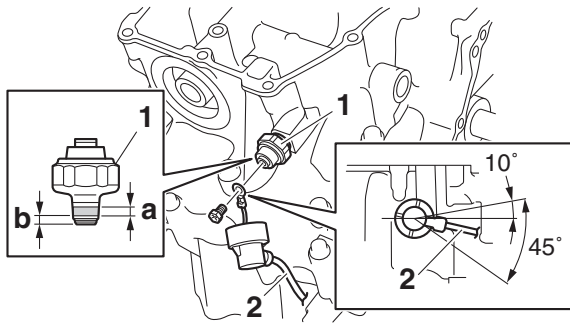
## TIP

- Apply Three bond No.1215® to the threads “a” of the oil pressure switch. However, do not apply Three bond No.1215® to the portion “b” of the oil pressure switch.
- Install the oil pressure switch lead so that it is routed within the range shown in the illustration.



# CRANKCASE

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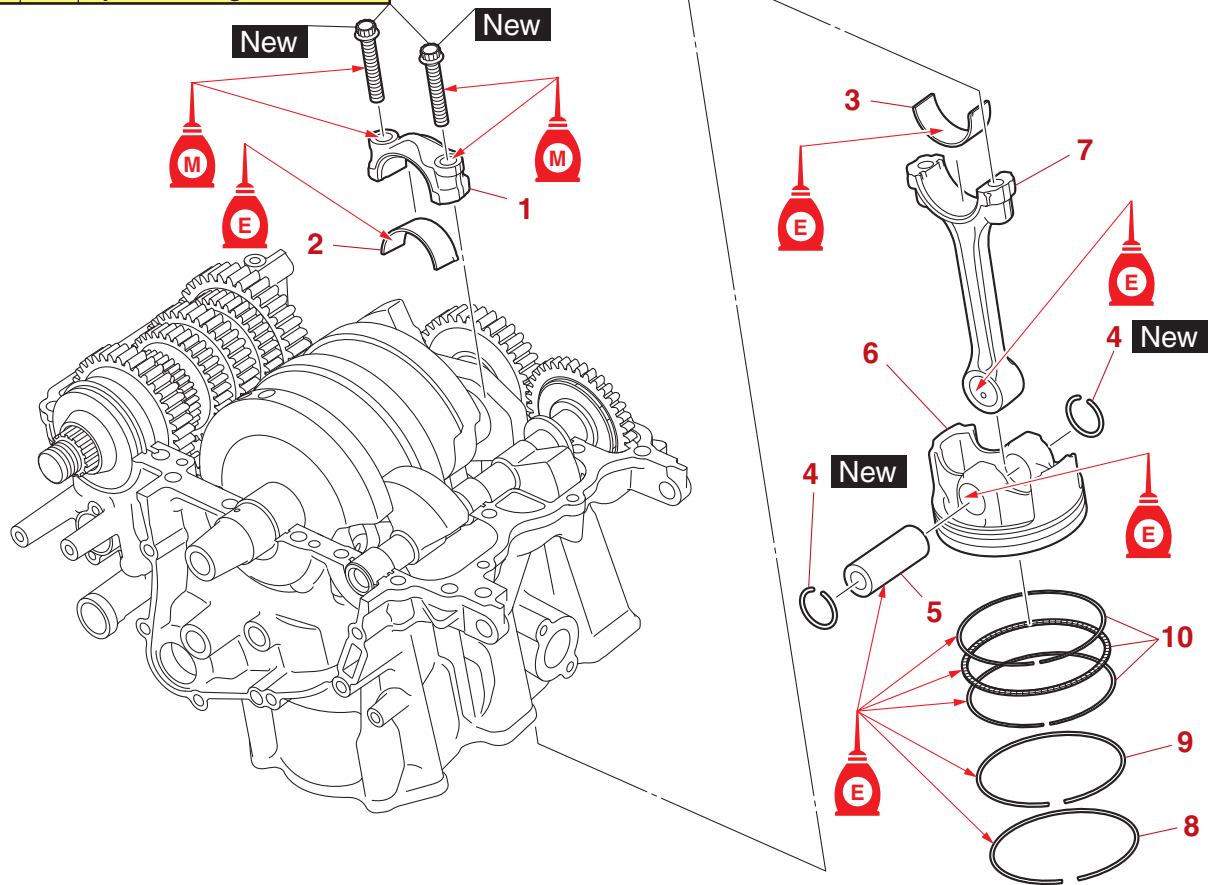
# CONNECTING RODS AND PISTONS

EAS20132

## CONNECTING RODS AND PISTONS

### Removing the connecting rods and pistons

	<b>1st</b> 20 N·m (2.0 kgf·m, 15 lb·ft)
	<b>2nd</b> Specified angle 180°



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to all of the connecting rods and pistons.
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-60.
1	Connecting rod cap	1	
2	Big end lower bearing	1	
3	Big end upper bearing	1	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Connecting rod	1	
8	Top ring	1	
9	2nd ring	1	
10	Oil ring	1	

# CONNECTING RODS AND PISTONS

EAS30745

## REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

- Remove:
  - Connecting rod cap
  - Connecting rod
  - Big end bearings

### TIP

- Identify the position of each connecting rod cap so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.

- Remove:

- Piston pin clips "1"
- Piston pin "2"
- Piston
- Connecting rod

ECA13810

### NOTICE

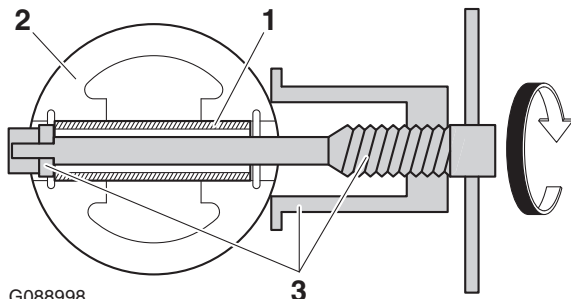
**Do not use a hammer to drive the piston pin out.**

### TIP

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set "3".



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



G088998

- 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.



G088999

EAS30747

## CHECKING THE CYLINDER AND PISTON

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

- Check:

- Piston wall
- Cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

- Measure:

- Piston-to-cylinder clearance
  - Measure cylinder bore with the cylinder bore gauge.

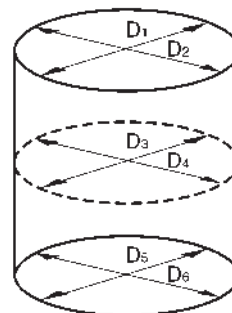
### TIP

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



**Bore  
80.000–80.010 mm (3.1496–  
3.1500 in)  
Wear limit  
80.060 mm (3.1520 in)**


"C" = maximum of  $D_1, D_2, D_3, D_4, D_5, D_6$



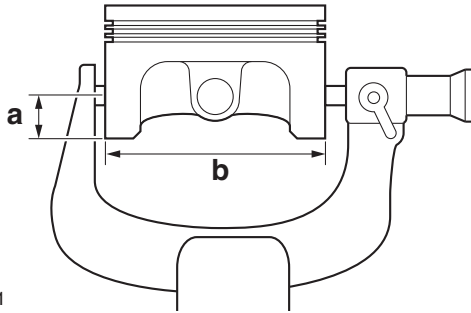
G089000

# CONNECTING RODS AND PISTONS

- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter "b" with the micrometer.



**Diameter**  
79.970–79.985 mm (3.1484–3.1490 in)



G089001

- a. 8.0 mm (0.31 in) from the bottom edge of the piston
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

$$\text{Piston-to-cylinder clearance} = \text{Cylinder bore "C"} - \text{Piston skirt diameter "b"}$$

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

EAS30748

## CHECKING THE PISTON RINGS

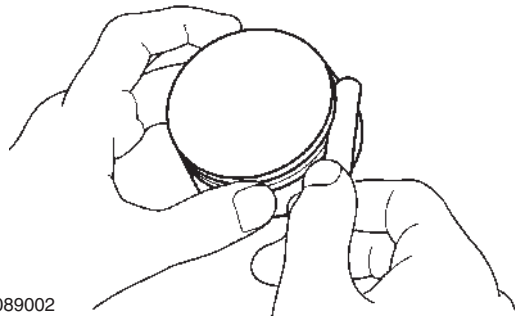
1. Measure:
  - Piston ring side clearance  
Out of specification → Replace the piston and piston rings as a set.

### TIP

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



**Piston ring**  
**Top ring**  
 Ring side clearance  
 0.030–0.065 mm (0.0012–0.0026 in)  
 Side clearance limit  
 0.115 mm (0.0045 in)  
**2nd ring**  
 Ring side clearance  
 0.020–0.055 mm (0.0008–0.0022 in)  
 Side clearance limit  
 0.115 mm (0.0045 in)



G089002

2. Install:
  - Piston ring  
(into the cylinder)

### TIP

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

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

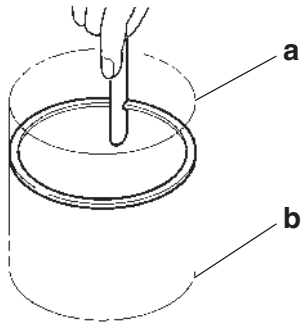
### TIP

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



**Piston ring**  
**Top ring**  
 End gap limit  
 0.50 mm (0.0197 in)  
**2nd ring**  
 End gap limit  
 0.80 mm (0.0315 in)

# CONNECTING RODS AND PISTONS



G089003

- a. Bottom of cylinder
- b. Top of cylinder

EAS30749

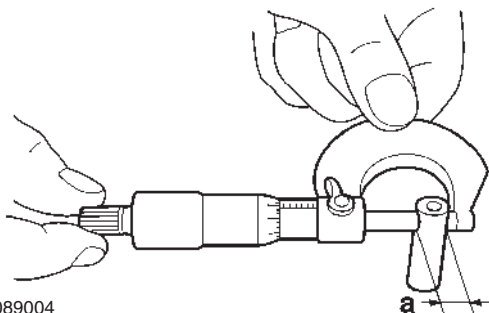
## CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

1. Check:
  - Piston pin  
Blue discoloration/grooves → Replace the piston pin, and then check the lubrication system.
2. Measure:
  - Piston pin outside diameter “a”  
Out of specification → Replace the piston pin.



**Piston pin outside diameter**  
**17.990–17.995 mm (0.7083–0.7085 in)**  
**Limit**  
**17.970 mm (0.7075 in)**

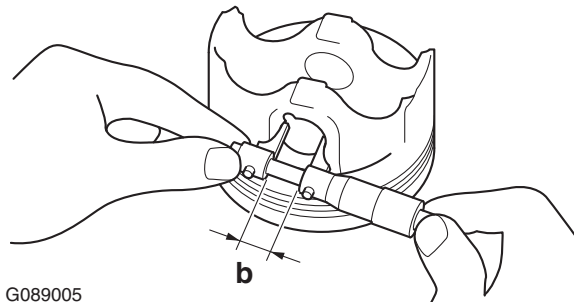


G089004

3. Measure:
  - Piston pin bore inside diameter “b”  
Out of specification → Replace the piston.



**Piston pin bore inside diameter**  
**18.004–18.015 mm (0.7088–0.7093 in)**  
**Limit**  
**18.045 mm (0.7104 in)**



G089005

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

Piston-pin-to-piston-pin-bore clearance =  
 Piston pin bore inside diameter “b” –  
 Piston pin outside diameter “a”



**Piston-pin-to-piston-pin-bore clearance**  
**0.009–0.025 mm (0.0004–0.0010 in)**

EAS30750

## CHECKING THE CONNECTING RODS

1. Measure:
  - Crankshaft-pin-to-big-end-bearing clearance  
Out of specification → Replace the big end bearings.



**Oil clearance**  
**0.027–0.051 mm (0.0011–0.0020 in)**

The following procedure applies to all of the connecting rods.

ECA13930

### NOTICE

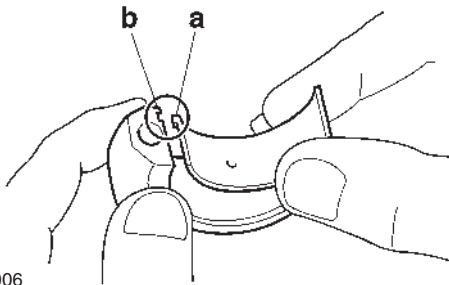
**Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.**

- 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.

# CONNECTING RODS AND PISTONS

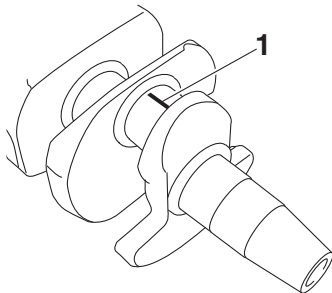
## TIP

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



G089006

- c. Put a piece of Plastigauge® “1” on the crankshaft pin.



G089008

- d. Assemble the connecting rod halves.

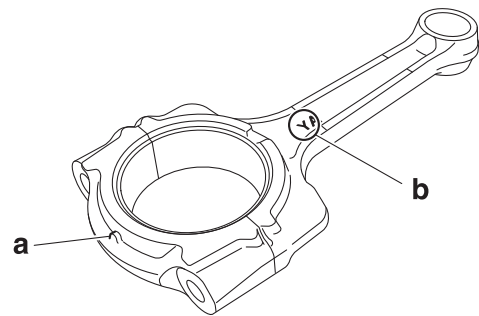
ECA18390

## NOTICE

**Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.**

## TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



## TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

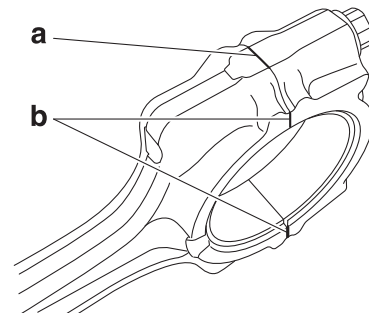
- e. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



**Connecting rod bolt  
30 N·m (3.0 kgf·m, 22 lb-ft)**

## TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- a. Side machined face  
b. Thrusting faces

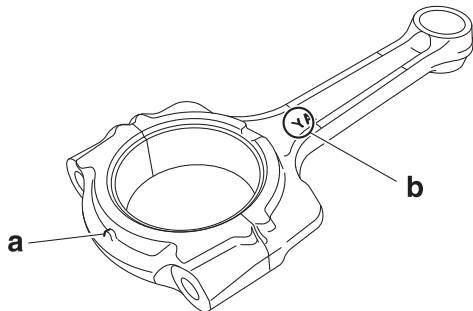
- f. Loosen the connecting rod bolts, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

## TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.

# CONNECTING RODS AND PISTONS

- Make sure the “Y” marks “b” on the connecting rods face towards the left side of the crankshaft.

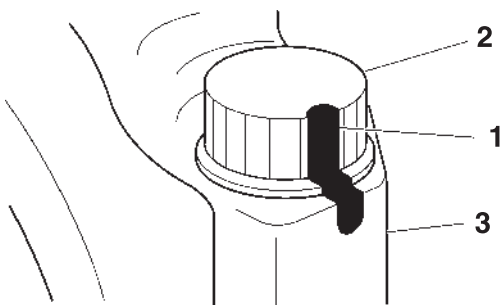


- g. Tighten the connecting rod bolts with a torque wrench.



**Connecting rod bolt (1st)**  
20 N·m (2.0 kgf·m, 15 lb-ft)

- h. Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



- i. Tighten the connecting rod bolts further to reach the specified angle 175–185°.



**Connecting rod bolt (final)**  
Specified angle 180°

EWA16610

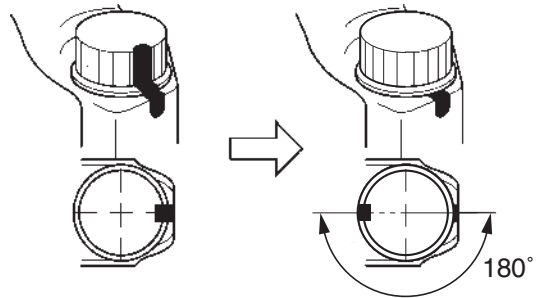
## WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then re-tighten it. Instead, replace the bolt with a new one and perform the procedure again.

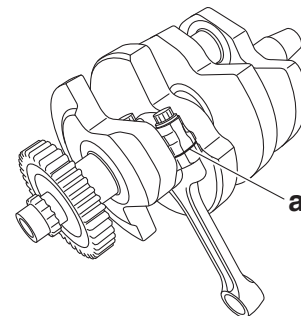
ECA20890

## NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.



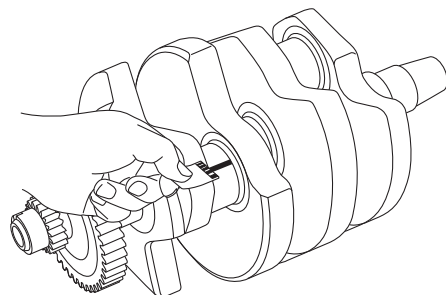
- j. After the installation, check that the section shown “a” is flush with each other by touching the surface.



- k. Remove the connecting rod and big end bearings.  
l. Measure the compressed Plastigauge® width on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



**Oil clearance**  
0.027–0.051 mm (0.0011–0.0020 in)



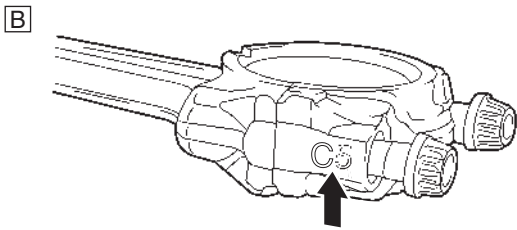
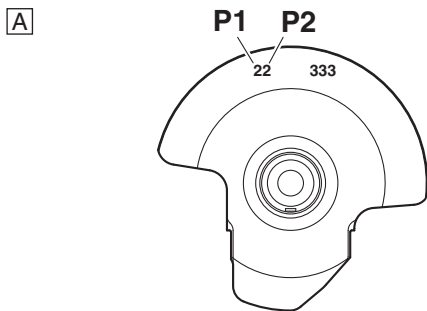
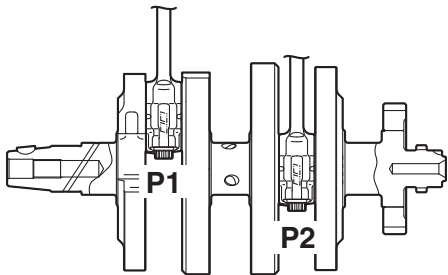
2. Select:
- Big end bearings (P<sub>1</sub>–P<sub>2</sub>)

## TIP

- The numbers “A” stamped into the crankshaft web and the numbers “B” on the connecting rods are used to determine the replacement big end bearings sizes.


# CONNECTING RODS AND PISTONS

- “P<sub>1</sub>”–“P<sub>2</sub>” refer to the bearings shown in the crankshaft illustration.



For example, if the connecting rod “P<sub>1</sub>” and the crankshaft web “P<sub>1</sub>” numbers are “5” and “2” respectively, then the bearing size for “P<sub>1</sub>” is:

$$\text{“P}_1\text{” (connecting rod) – “P}_1\text{” (crankshaft) = 5 – 2 = 3 (brown)}$$

	Bearing color code
	Code 1 Blue
	Code 2 Black
	Code 3 Brown
	Code 4 Green

EAS30751

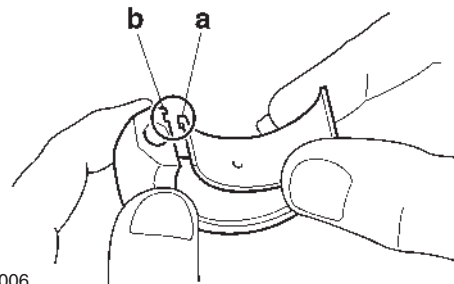
## INSTALLING THE CONNECTING ROD AND PISTON

The following procedure applies to all of the connecting rods and pistons.

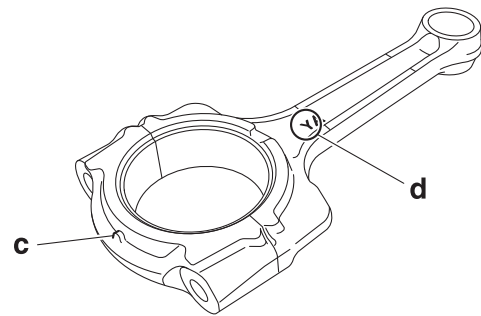
1. Install:
  - Big end bearings
  - Connecting rod cap (onto the connecting rod)

### TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.



G089006



2. Tighten:
  - Connecting rod bolts **New**

ECA18390

### NOTICE

**Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.**

### TIP


Install by carrying out the following procedures in order to assemble in the most suitable condition.

- a. Replace the connecting rod bolts with new ones.



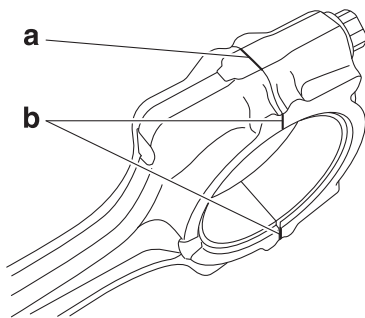
# CONNECTING RODS AND PISTONS

- b. Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- c. After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
- d. Tighten the connecting rod bolt while checking that the sections shown "a" and "b" are flush with each other by touching the surface.

	<p><b>Connecting rod bolt</b>  <b>30 N·m (3.0 kgf·m, 22 lb·ft)</b></p>
---	--

**TIP**

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- a. Side machined face
- b. Thrusting faces

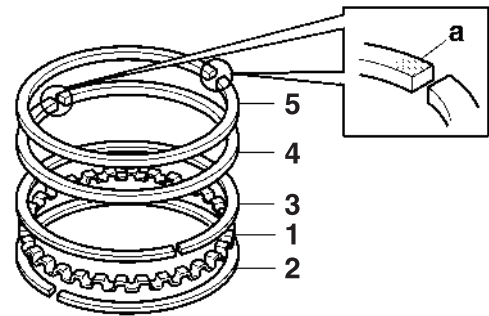
- e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

**3. Install:**

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

**TIP**

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

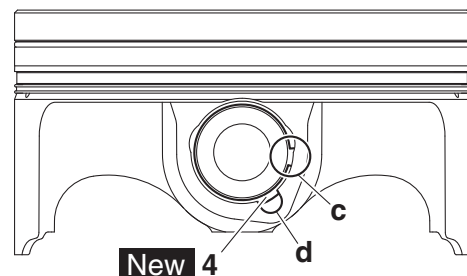
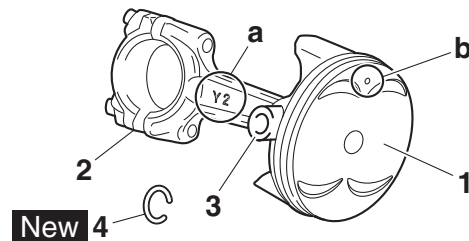


**4. Install:**

- Piston "1"  
(onto the respective connecting rod "2")
- Piston pin "3"
- Piston pin clips "4" **New**

**TIP**

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark "a" on the connecting rod faces left when the punch mark "b" on the piston is pointing up as shown.
- When installing a piston pin clip, make sure that the clip ends "c" are positioned away from the cutout "d" in the piston as shown in the illustration.
- Reinstall each piston into its original cylinder.



**5. Lubricate:**

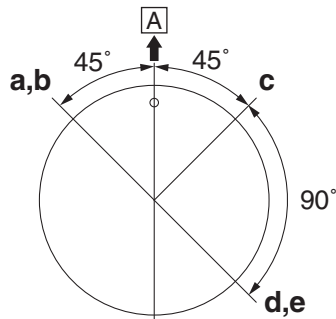
- Piston
- Piston rings
- Cylinder  
(with the recommended lubricant)



# CONNECTING RODS AND PISTONS

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---

6. Offset:
- Piston ring end gaps



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

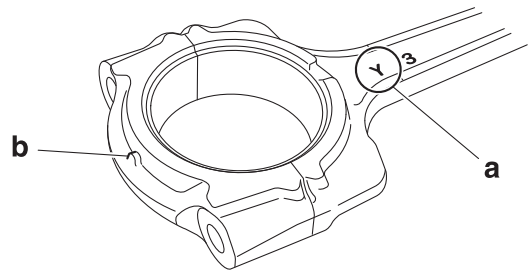
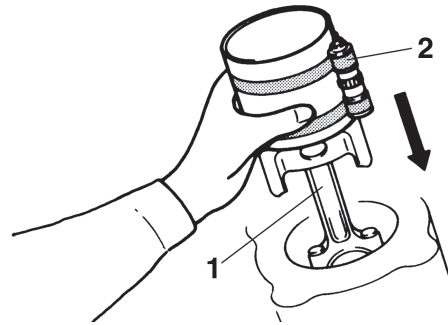
7. Lubricate:
- Crankshaft pin
  - Connecting rod big end bearing inner surface (with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---

8. Install:
- Connecting rod assemblies "1"
  - (into the cylinder and onto the crankshaft pin)
  - Connecting rod caps
  - (onto the connecting rod)

- TIP**
- While compressing the piston ring with piston ring compressor "2", install the connecting rod assembly into the cylinder with the other hand.
  - Make sure the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
  - Make sure that the projection "b" on the connecting rod cap faces the same direction as the "Y" mark "a" on the connecting rod.
  - Apply Molybdenum disulfide oil to the threads and seats of the connecting rod bolt.

	<b>Piston ring compressor</b> <b>90890-05158</b> <b>Piston ring compressor</b> <b>YM-08037</b>
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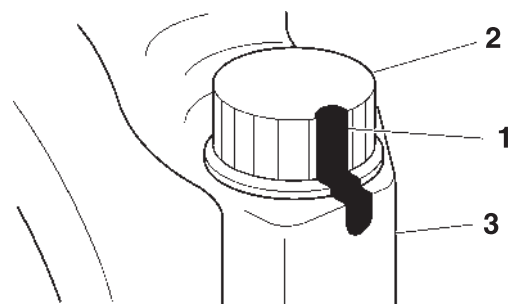
9. Tighten:
- Connecting rod bolts

**TIP**  
Tighten the connecting rod bolts using the following procedure.

- a. Tighten the connecting rod bolts with a torque wrench.

	<b>Connecting rod bolt (1st)</b> <b>20 N·m (2.0 kgf·m, 15 lb·ft)</b>
---	---

- b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



- c. Tighten the connecting rod bolts further to reach the specified angle 175–185°.

	<b>Connecting rod bolt (final)</b> <b>Specified angle 180°</b>
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# CONNECTING RODS AND PISTONS

EWA16610

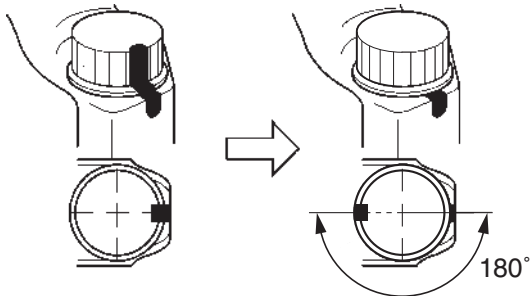
## **WARNING**

If the bolt is tightened more than the specified angle, do not loosen the bolt and then re-tighten it. Instead, replace the bolt with a new one and perform the procedure again.

ECA20890

## **NOTICE**

Do not use a torque wrench to tighten the bolt to the specified angle.

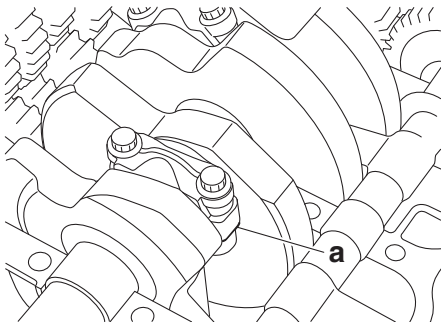


- d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA17120

## **WARNING**

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.

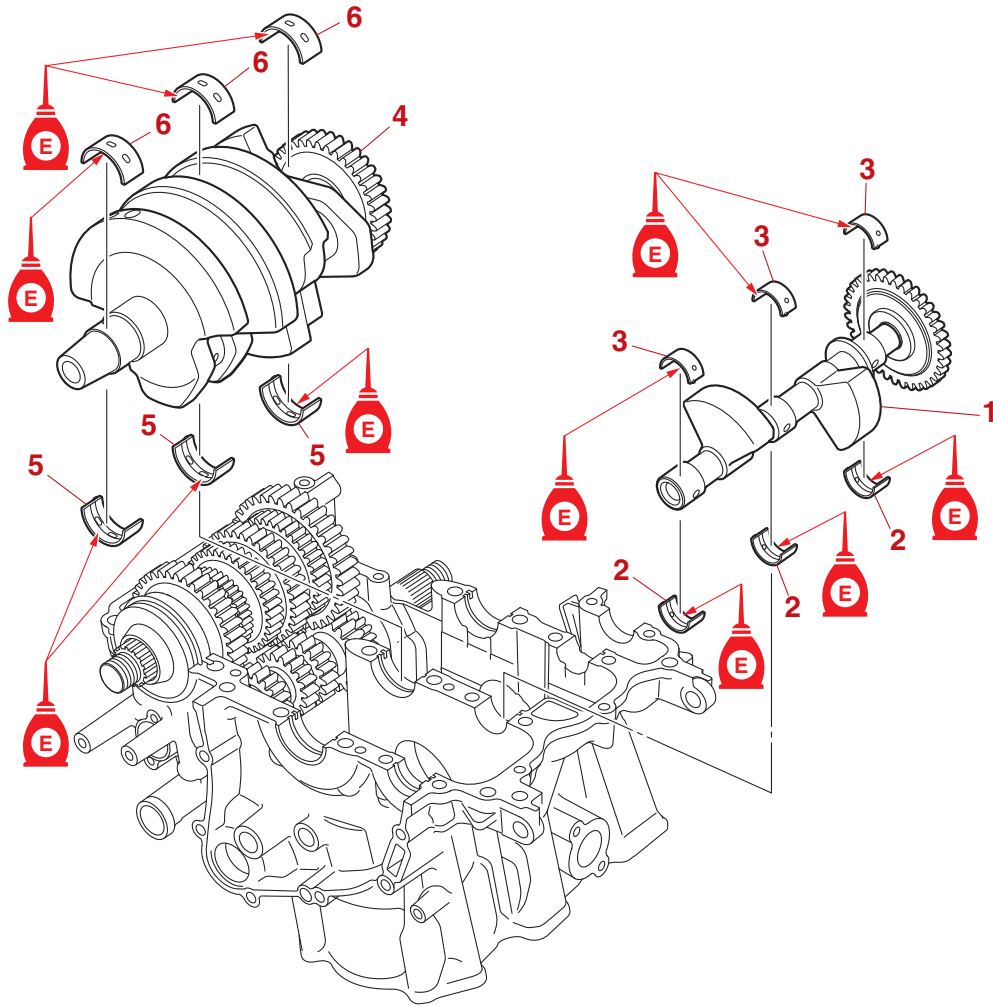


# CRANKSHAFT AND BALANCER SHAFT

EAS20178

## CRANKSHAFT AND BALANCER SHAFT

### Removing the crankshaft and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-60.
	Connecting rod		Refer to "CONNECTING RODS AND PISTONS" on page 5-66.
1	Balancer shaft assembly	1	
2	Balancer shaft journal lower bearing	3	
3	Balancer shaft journal upper bearing	3	
4	Crankshaft assembly	1	
5	Crankshaft journal lower bearing	3	
6	Crankshaft journal upper bearing	3	

# CRANKSHAFT AND BALANCER SHAFT

EAS31072

## REMOVING THE BALANCER SHAFT JOURNAL BEARINGS

1. Remove:
  - Balancer shaft journal lower bearings (from the crankcase)
  - Balancer shaft journal upper bearings (from the cylinder)

### TIP

Identify the position of each balancer shaft journal bearing so that it can be reinstalled in its original place.

EAS31074

## REMOVING THE CRANKSHAFT JOURNAL BEARINGS

1. Remove:
  - Crankshaft journal lower bearings (from the crankcase)
  - Crankshaft journal upper bearings (from the cylinder)

### TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

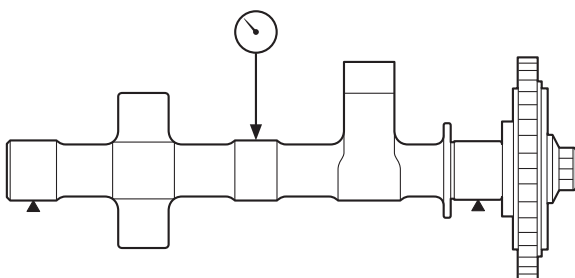
EAS31142

## CHECKING THE BALANCER SHAFT ASSEMBLY

1. Check:
  - Balancer driven gear  
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.  
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.
2. Measure:
  - Balancer shaft runout  
Out of specification → Replace the balancer shaft assembly.



**Balancer shaft runout limit**  
0.030 mm (0.0012 in)



3. Check:
  - Balancer shaft assembly  
Cracks/damage/wear → Replace the balancer shaft assembly and journal bearings.  
Dirt → Clean.
  - Bearings  
Damage/wear → Replace.
4. Measure:
  - Balancer shaft-journal-to-balancer shaft-journal-bearing clearance  
Out of specification → Replace the balancer shaft journal bearings.



**Balancer shaft journal to balancer shaft bearing clearance**  
0.020–0.054 mm (0.0008–0.0021 in)

**Balancer shaft journal to balancer shaft bearing clearance**  
0.020–0.054 mm (0.0008–0.0021 in)

ECA18400

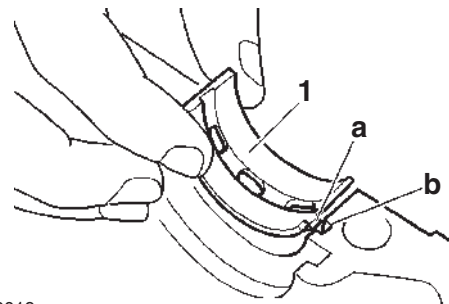
### NOTICE

**Do not interchange the balancer shaft journal bearings. To obtain the correct balancer shaft-journal-to-balancer shaft-journal-bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.**

- a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcase and cylinder.
- b. Install the balancer shaft journal upper bearings “1” and the balancer shaft assembly into the cylinder.

### TIP

Align the projections “a” on the balancer shaft journal upper bearings with the notches “b” in the cylinder.



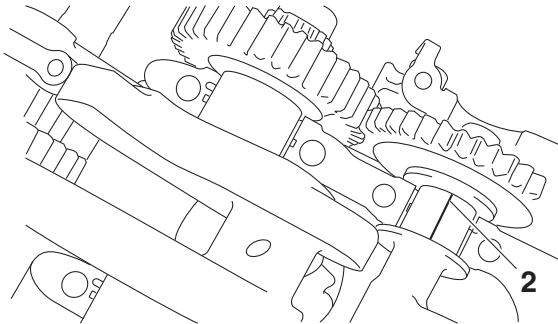
G089019

- c. Put a piece of Plastigauge® “2” on each balancer shaft journal.

# CRANKSHAFT AND BALANCER SHAFT

**TIP**

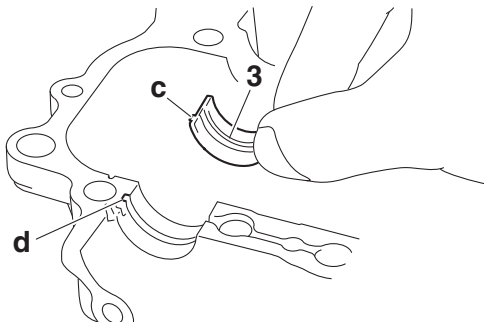
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



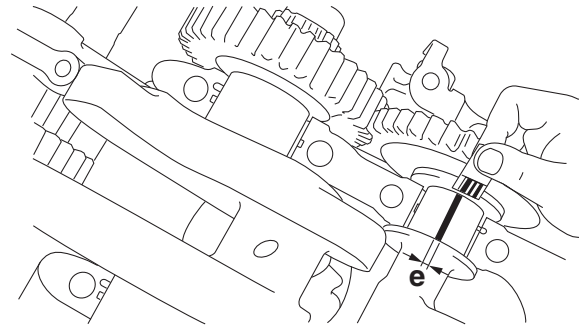
d. Install the balancer shaft journal lower bearings “3” into the crankcase and assemble the crankcase and cylinder.

**TIP**

- Align the projections “c” of the balancer shaft journal lower bearings with the notches “d” in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



- e. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to “CRANKCASE” on page 5-60.
- f. Remove the crankcase and the balancer shaft journal lower bearings.
- g. Measure the compressed Plastigauge® width “e” on each balancer shaft journal. If the balancer shaft-journal-to-balancer shaft-journal-bearing clearance is out of specification, select replacement balancer shaft journal bearings.

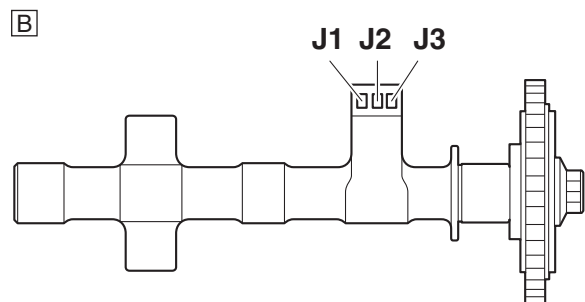
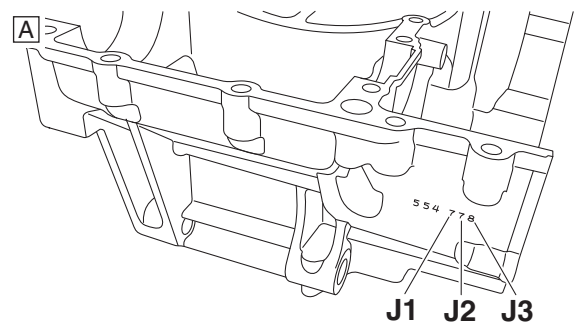
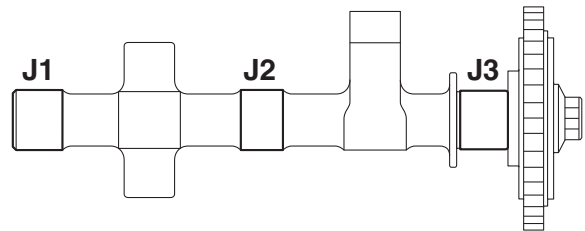


5. Select:

- Balancer shaft journal bearings (J<sub>1</sub>–J<sub>3</sub>)

**TIP**

- The numbers “A” stamped into the crankcase and the numbers “B” stamped into the balancer shaft web are used to determine the replacement balancer shaft journal bearing sizes.
- J<sub>1</sub>–J<sub>3</sub> refer to the bearings shown in the crankcase and balancer shaft web illustration.
- If J<sub>1</sub>–J<sub>3</sub> are the same, use the same size for all of the bearings.



# CRANKSHAFT AND BALANCER SHAFT

For example, if the crankcase  $J_1$  and balancer shaft web  $J_1$  numbers are 6 and 5 respectively, then the bearing size for  $J_1$  is:

$$\begin{aligned} & J_1 \text{ (crankcase)} - J_1 \text{ (balancer shaft web)} \\ & = 6 - 5 = \\ & 1 \text{ (blue)} \end{aligned}$$



## Bearing color code

- Code 1  
Blue
- Code 2  
Black
- Code 3  
Brown
- Code 4  
Green
- Code 5  
Yellow

EAS31075

## CHECKING THE CRANKSHAFT

### 1. Check:

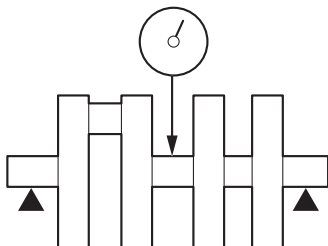
- Balancer drive gear  
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.  
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.

### 2. Measure:

- Crankshaft runout  
Out of specification → Replace the crankshaft.



**Runout limit**  
0.030 mm (0.0012 in)



G089016

### 3. Check:

- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces  
Scratches/wear → Replace the crankshaft.

### 4. Measure:

- Crankshaft-journal-to-crankshaft-journal-bearing clearance  
Out of specification → Replace the crankshaft journal bearings.



**Journal oil clearance**  
0.018–0.042 mm (0.0007–0.0017 in)

ECA13920

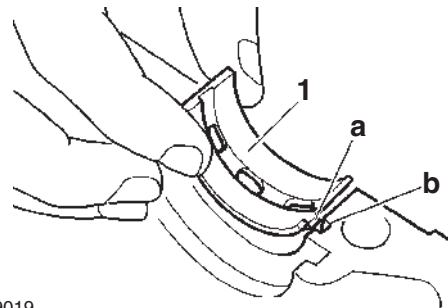
## NOTICE

**Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.**

- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the cylinder and crankcase.
- b. Install the crankshaft journal upper bearings "1" and the crankshaft into the cylinder.

## TIP

Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the cylinder.



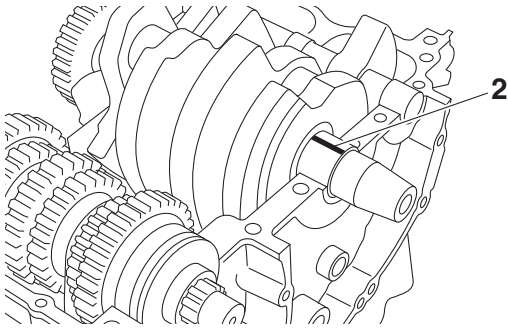
G089019

- c. Put a piece of Plastigauge® "2" on each crankshaft journal.

## TIP

Do not put the Plastigauge® over the oil hole in the crankshaft journal.

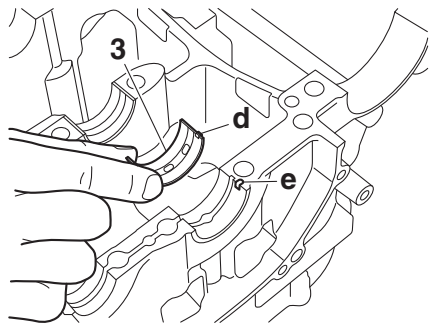
# CRANKSHAFT AND BALANCER SHAFT



d. Install the crankshaft journal lower bearings “3” into the crankcase and assemble the crankcase and cylinder.

## TIP

- Align the projections “d” of the crankshaft journal lower bearings with the notches “e” in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.

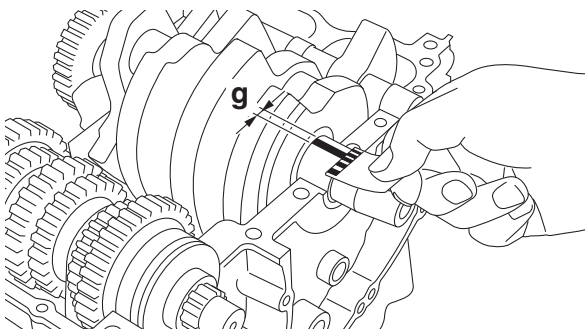


e. Tighten the bolts to specification in the tightening sequence cast on the crankcase.

Refer to “CRANKCASE” on page 5-60.

f. Remove the crankcase and the crankshaft journal lower bearings.

g. Measure the compressed Plastigauge® width “g” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

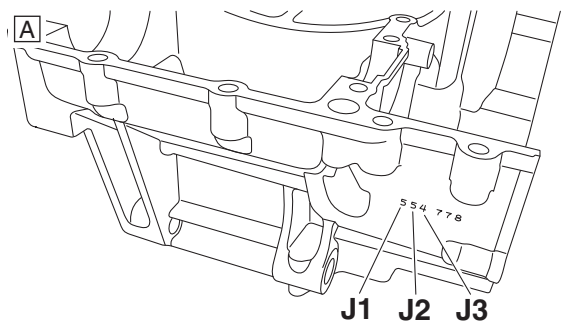
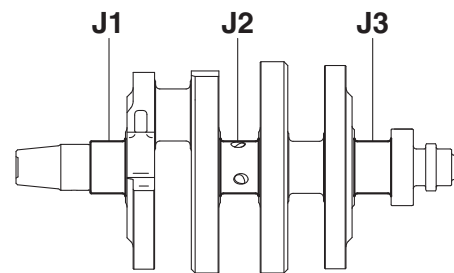


5. Select:

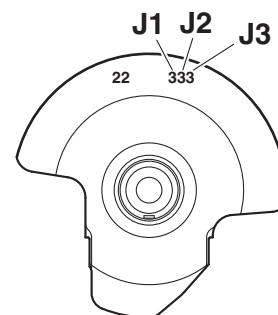
- Crankshaft journal bearings (J<sub>1</sub>–J<sub>3</sub>)

## TIP

- The numbers “A” stamped into the crankcase and the numbers “B” stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J<sub>1</sub>–J<sub>3</sub> refer to the bearings shown in the crankcase and crankshaft web illustration.
- If J<sub>1</sub>–J<sub>3</sub> are the same, use the same size for all of the bearings.



## B



For example, if the crankcase J<sub>1</sub> and crankshaft web J<sub>1</sub> numbers are 5 and 3 respectively, then the bearing size for J<sub>1</sub> is:

$$\begin{aligned} & J_1 \text{ (crankcase)} - J_1 \text{ (crankshaft web)} - 2 \\ & = 5 - 3 - 2 \\ & = 0 \text{ (white-pink)} \end{aligned}$$



# CRANKSHAFT AND BALANCER SHAFT



**Bearing color code**  
**Model identification color**  
Pink  
Code -1  
Purple  
Code 0  
White  
Code 1  
Blue  
Code 2  
Black  
Code 3  
Brown

EAS31077

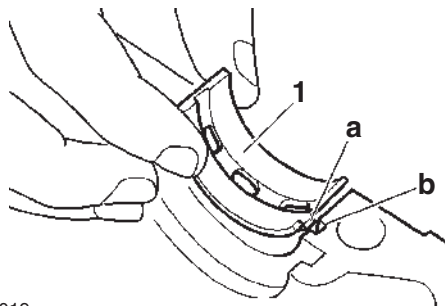
## INSTALLING THE CRANKSHAFT

### 1. Install:

- Crankshaft journal upper bearings (into the upper crankcase)
- Crankshaft journal lower bearings (into the lower crankcase)

### TIP

- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each crankshaft journal bearing in its original place.



G089019

EAS31078

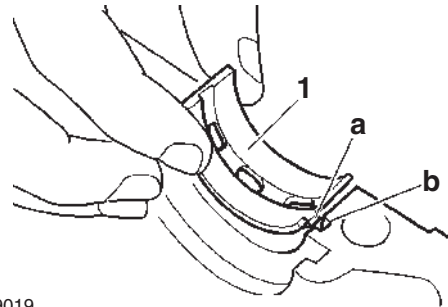
## INSTALLING THE BALANCER SHAFT ASSEMBLY

### 1. Install:

- Balancer shaft journal upper bearings (into the upper crankcase)
- Balancer shaft journal lower bearings (into the lower crankcase)

### TIP

- Align the projections “a” on the balancer shaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each balancer shaft journal bearing in its original place.



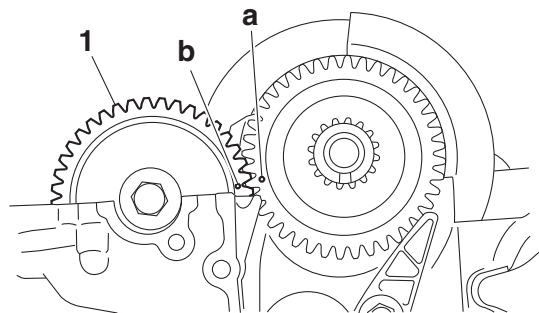
G089019

### 2. Install:

- Balancer shaft “1”

### TIP

Align the punch mark “a” in the balancer drive gear with the punch mark “b” in the balancer driven gear.

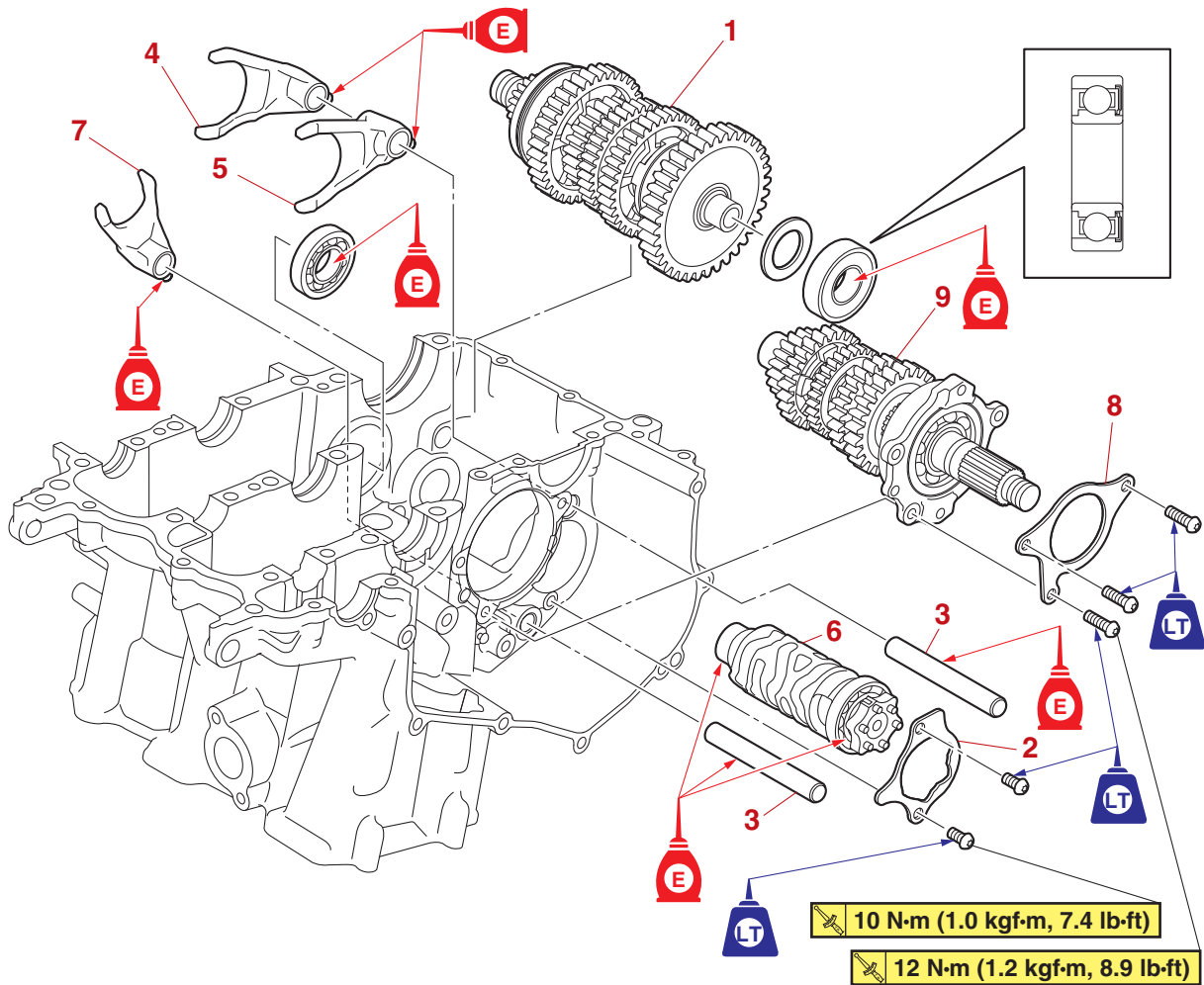




EAS20062

## TRANSMISSION

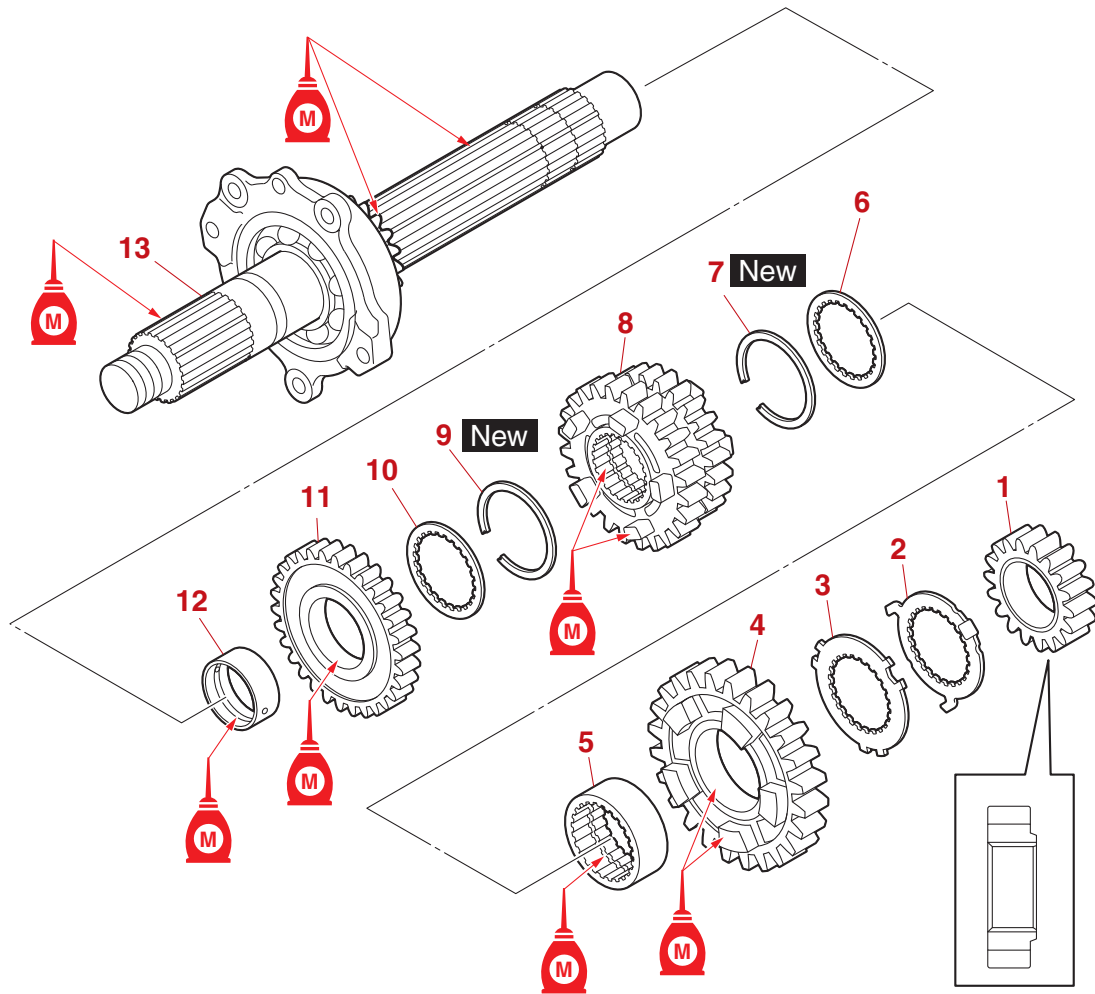
Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-60.
1	Drive axle assembly	1	
2	Shift drum retainer	1	
3	Shift fork guide bar	2	
4	Shift fork "L"	1	
5	Shift fork "R"	1	
6	Shift drum assembly	1	
7	Shift fork "C"	1	
8	Bearing retainer	1	
9	Main axle assembly	1	

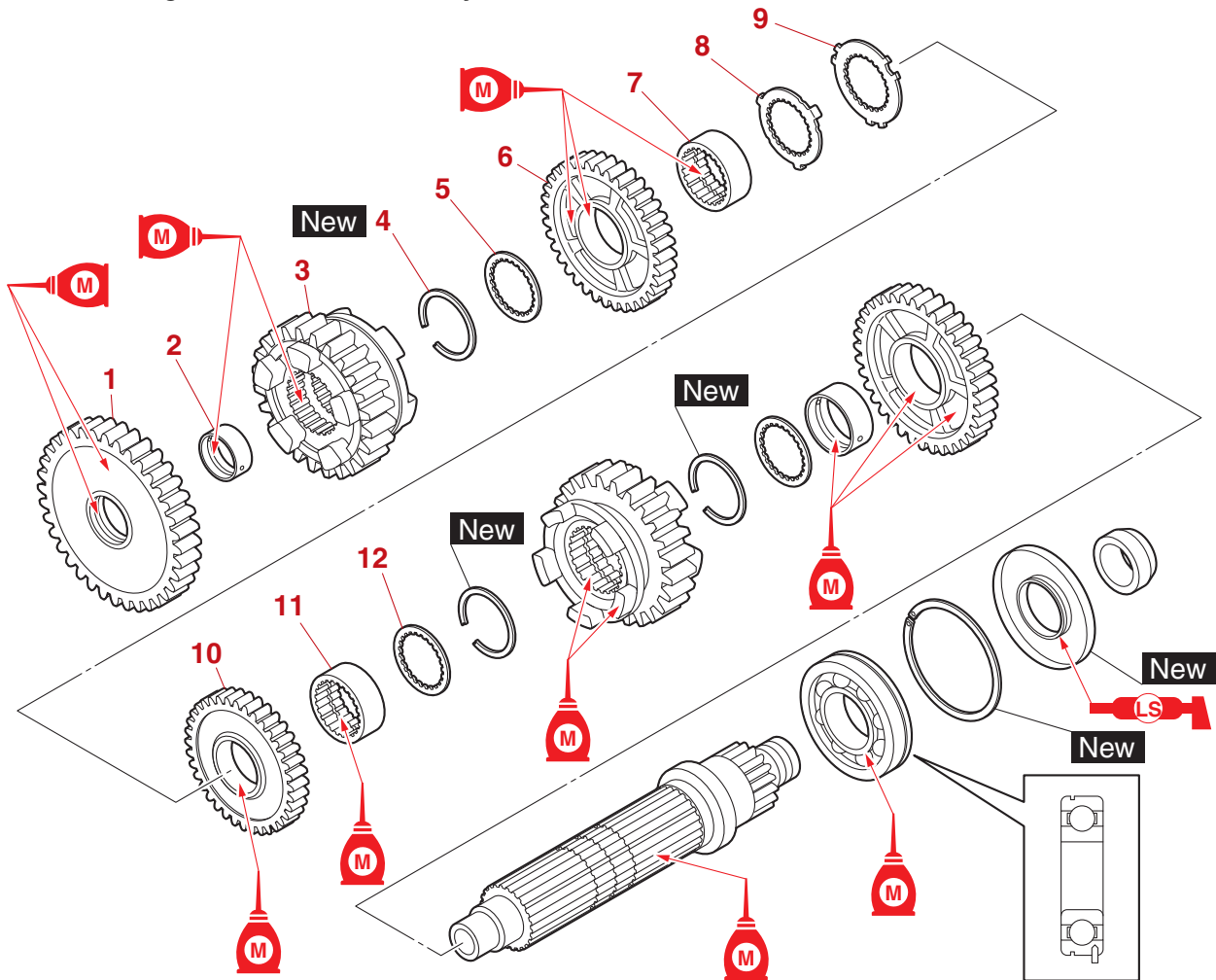
# TRANSMISSION

## Disassembling the main axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Main axle	1	

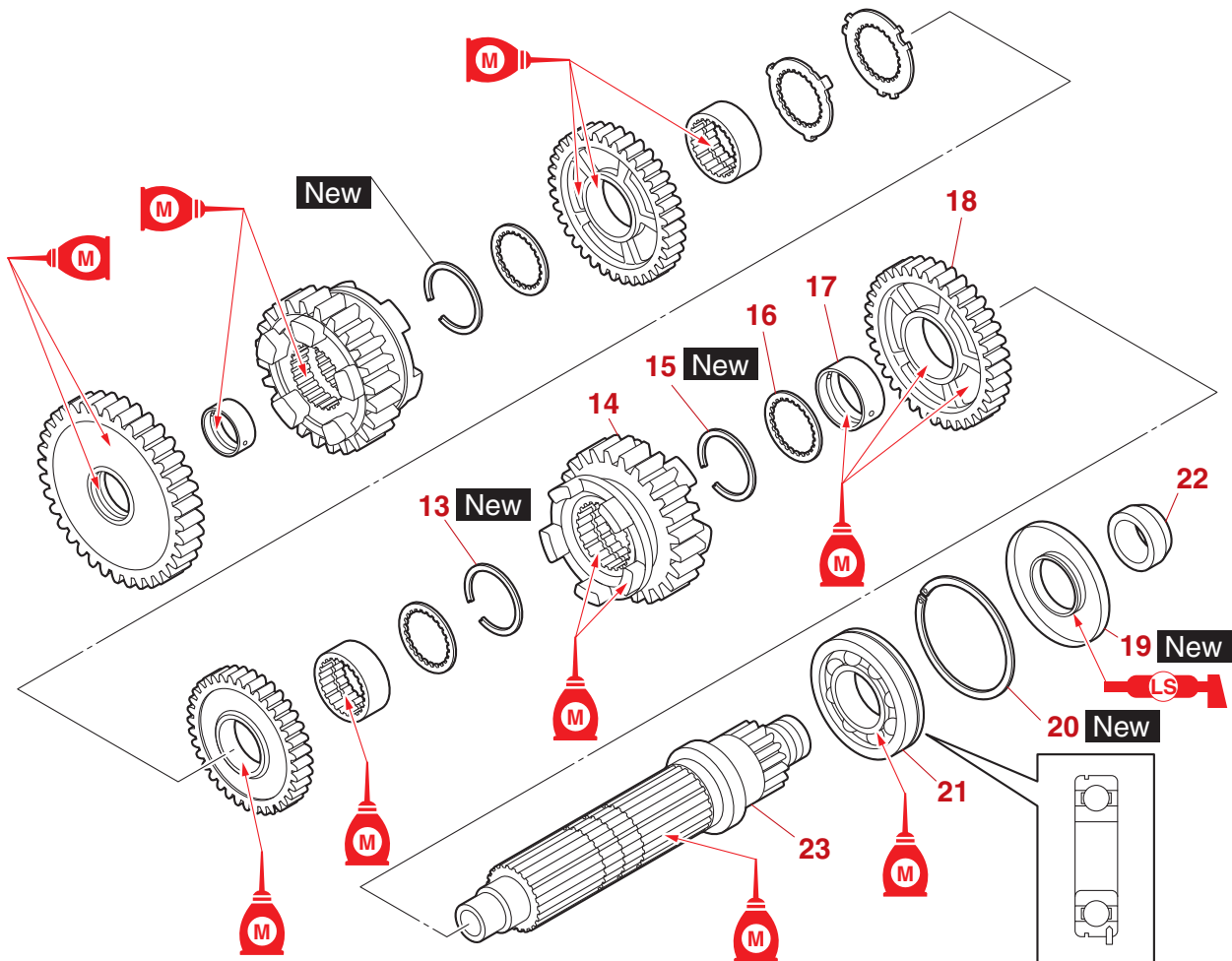
## Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	1st wheel gear	1	
2	Collar	1	
3	5th wheel gear	1	
4	Circlip	1	
5	Washer	1	
6	3rd wheel gear	1	
7	Collar	1	
8	Toothed lock washer	1	
9	Toothed lock washer retainer	1	
10	4th wheel gear	1	
11	Collar	1	
12	Washer	1	

# TRANSMISSION

## Disassembling the drive axle assembly



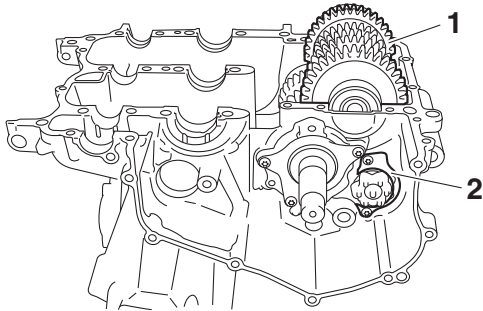
Order	Job/Parts to remove	Q'ty	Remarks
13	Circlip	1	
14	6th wheel gear	1	
15	Circlip	1	
16	Washer	1	
17	Collar	1	
18	2nd wheel gear	1	
19	Oil seal	1	
20	Circlip	1	
21	Bearing	1	
22	Collar	1	
23	Drive axle	1	

EAS30430

## REMOVING THE TRANSMISSION

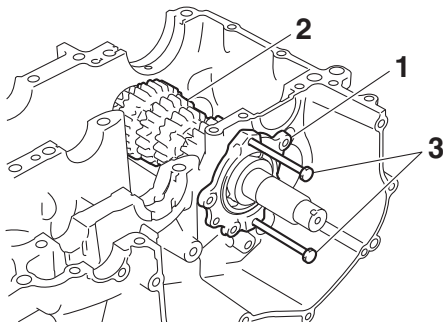
### 1. Remove:

- Drive axle assembly "1"
- Shift drum retainer "2"
- Shift fork guide bars
- Shift fork "L" and "R"
- Shift drum assembly
- Shift fork "C"



### 2. Remove:

- Bearing retainer
  - Main axle assembly bearing housing "1"
  - Main axle assembly "2"
- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the cylinder.

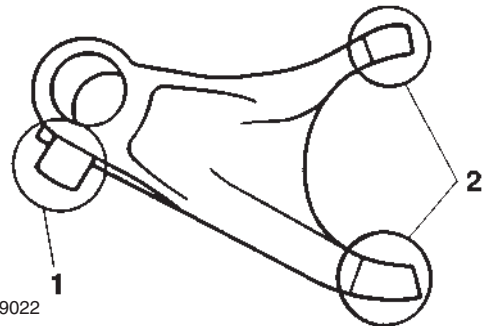
EAS30431

## 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.



G089022

### 2. Check:

- Shift fork guide bar
- Roll the shift fork guide bar on a flat surface.  
Bends → Replace.

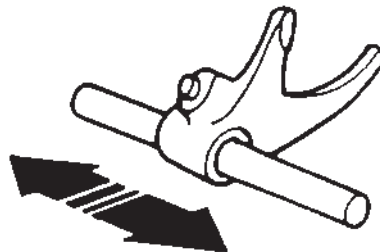
EWA12840

## ⚠ 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.



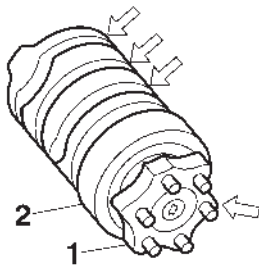
G089023

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.



G089024

EAS30433

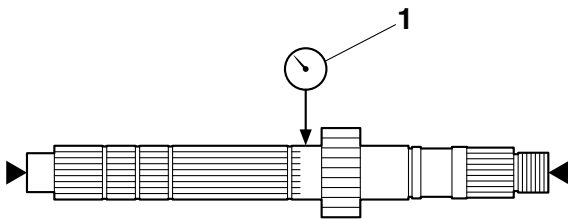
## CHECKING THE TRANSMISSION

### 1. Measure:

- Main axle runout  
(with a centering device and dial gauge "1")  
Out of specification → Replace the main axle.



**Main axle runout limit  
0.08 mm (0.0032 in)**

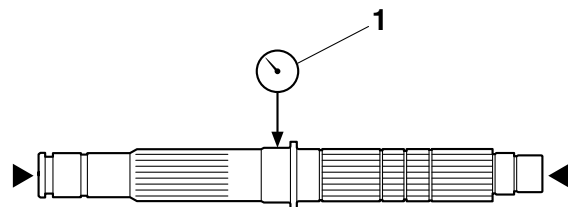


### 2. Measure:

- Drive axle runout  
(with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.



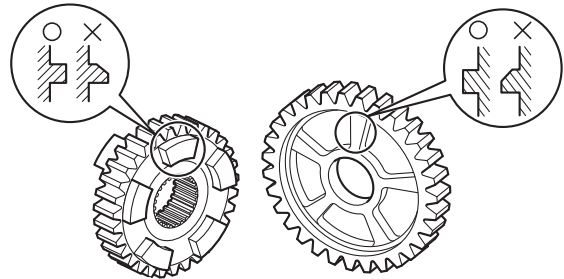
**Drive axle runout limit  
0.08 mm (0.0032 in)**



### 3. Check:

- Transmission gears  
Blue discoloration/pitting/wear → Replace the defective gear(s).

- Transmission gear dogs  
Cracks/damage/rounded edges → Replace the defective gear(s).



G089025

### 4. Check:

- Transmission gear engagement  
(each pinion gear to its respective wheel gear)  
Incorrect → Reassemble the transmission axle assemblies.

### 5. Check:

- Transmission gear movement  
Rough movement → Replace the defective part(s).

### 6. Check:

- Circlips  
Bends/damage/looseness → Replace.

EAS30435

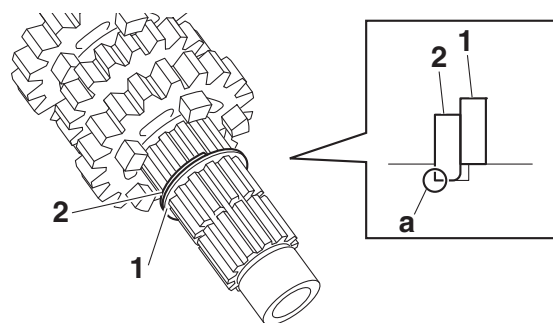
## ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

### 1. Install:

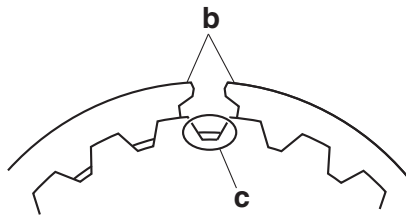
- Toothed washer "1"
- Circlip "2" **New**

### TIP

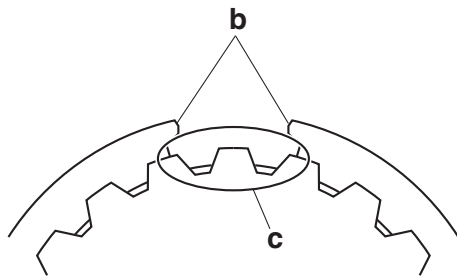
- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends "b" of the circlip with a groove "c" in the axle.



A



B



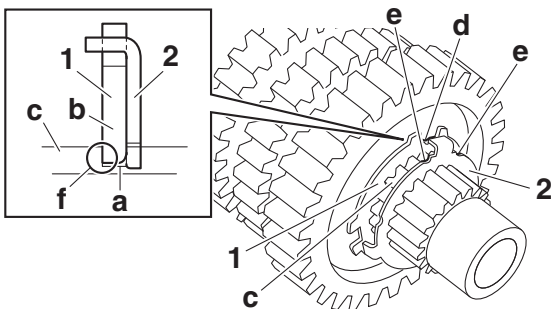
- A. Main axle
- B. Drive axle

2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

**TIP**

- With the toothed lock washer retainer in the groove "a" in the axle, align the projection "b" on the retainer with an axle spline "c", and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "e" with the alignment mark "d" on the retainer.
- Be sure the toothed lock washer retainer sharp-edged corner "f" is positioned opposite side to the toothed lock washer.



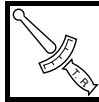
EAS30438

## INSTALLING THE TRANSMISSION

1. Install:

- Main axle assembly "1"

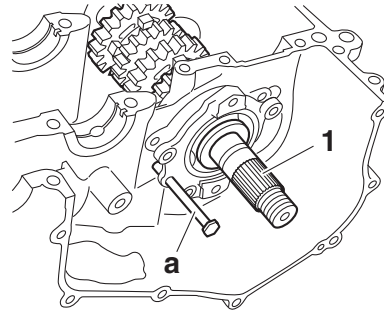
- Bearing retainer



**Bearing retainer bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**  
**LOCTITE®**

**TIP**

Use a suitable pin "a" to position the bearing housing, and then install the housing until it contacts the cylinder.



2. Install:

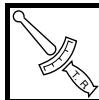
- Shift fork "C"
- Shift drum assembly
- Shift fork guide bar

**TIP**

- The embossed marks on the shift forks should face towards the right side of the engine.
- Install shift fork "C" into the groove in the 3rd pinion gear on the main axle.

3. Install:

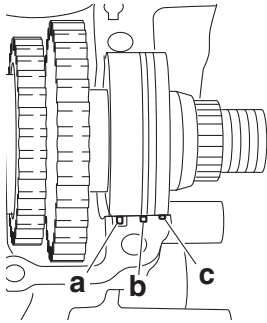
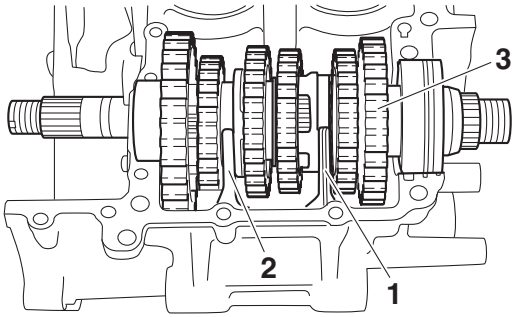
- Shift fork "L" "1"
- Shift fork "R" "2"
- Shift fork guide bar
- Shift drum retainer
- Drive axle assembly "3"



**Shift drum retainer bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**  
**LOCTITE®**

**TIP**

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the projection "a" on the drive axle assembly is inserted into the slot in the cylinder.
- Make sure that the drive axle bearing circlip "b" and flange "c" of the oil seal are inserted into the grooves in the cylinder.



4. Check:

- Transmission

Rough movement → Repair.

**TIP**

---

Oil each gear, shaft, and bearing thoroughly.

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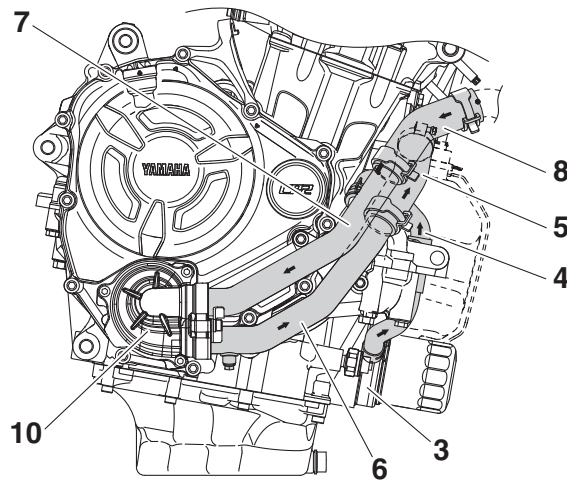
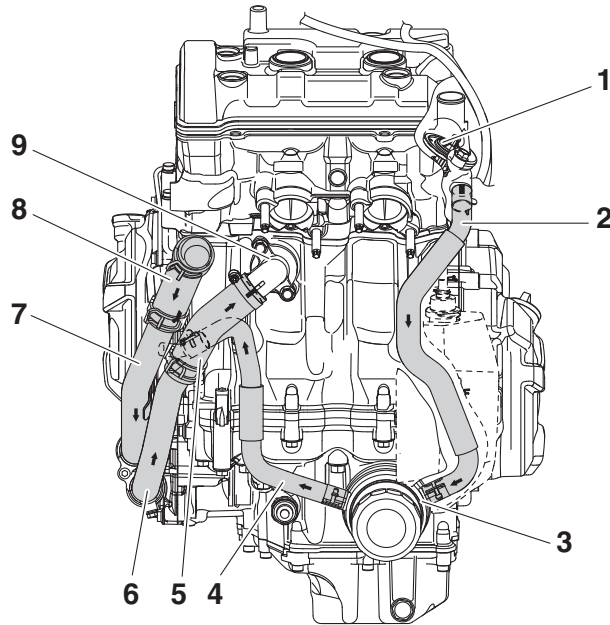
## COOLING SYSTEM

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# COOLING SYSTEM DIAGRAMS

EAS20299

## COOLING SYSTEM DIAGRAMS

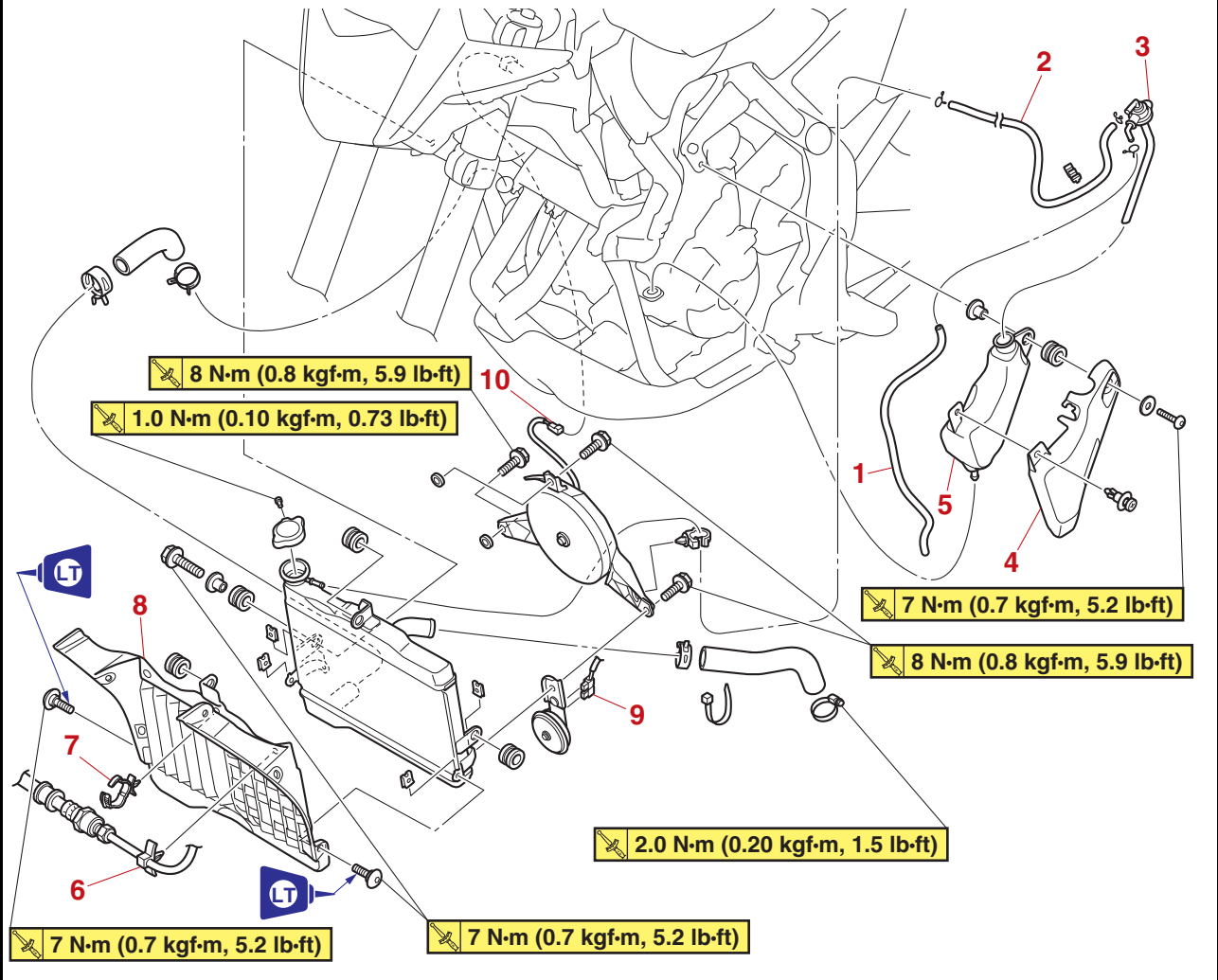


1. Thermostat
2. Oil cooler inlet hose
3. Oil cooler
4. Oil cooler outlet hose
5. Water jacket joint inlet hose
6. Water pump outlet pipe
7. Water pump inlet pipe
8. Radiator outlet hose
9. Water jacket joint
10. Water pump

EAS20063

## RADIATOR

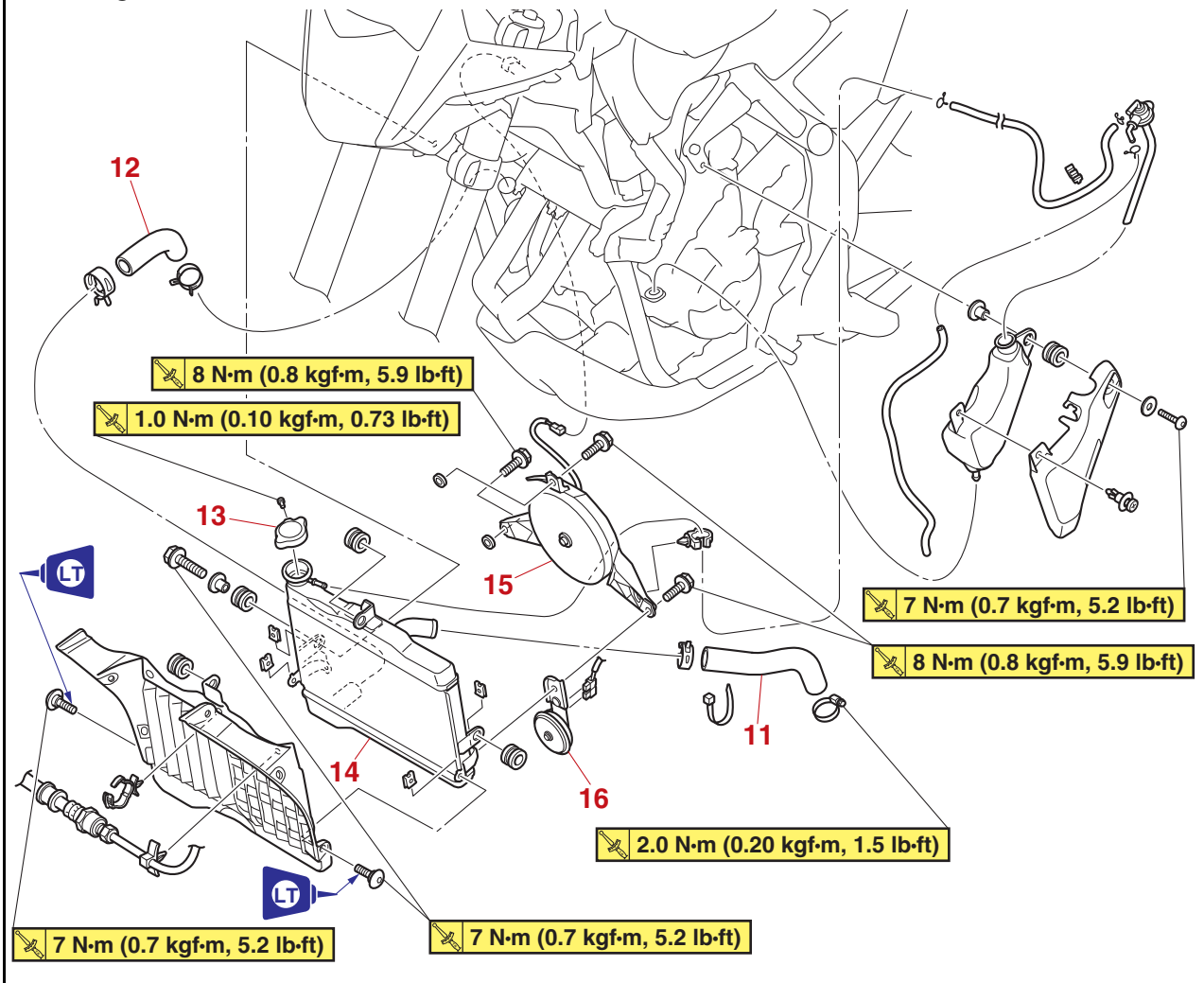
### Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Air scoops		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Coolant reservoir breather hose	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir cap	1	
4	Coolant reservoir cover	1	
5	Coolant reservoir	1	
6	Holder	1	
7	Holder	1	Open.
8	Radiator cover	1	
9	Horn connector	2	Disconnect.
10	Radiator fan motor coupler	1	Disconnect.

# RADIATOR

## Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
11	Radiator inlet hose	1	
12	Radiator outlet hose	1	
13	Radiator cap	1	
14	Radiator	1	
15	Radiator fan motor	1	
16	Horn	1	

EAS30439

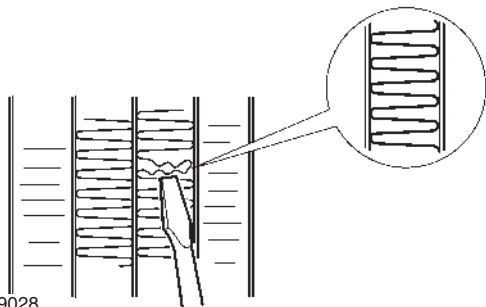
## CHECKING THE RADIATOR

### 1. Check:

- Radiator fins  
Obstruction → Clean.  
Apply compressed air to the rear of the radiator.
- Damage → Repair or replace.

### TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



G089028

### 2. Check:

- Radiator hoses  
Cracks/damage → Replace.
- Radiator pipes  
Cracks/damage → Replace the radiator.

### 3. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.

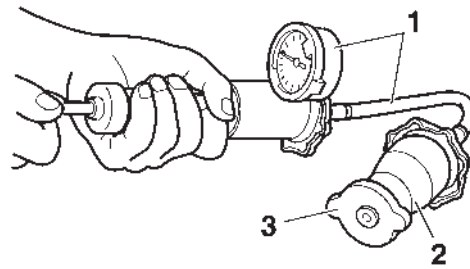


**Radiator cap valve opening pressure**  
108.0–137.4 kPa (1.08–1.37 kgf/cm<sup>2</sup>, 15.7–19.9 psi)

- 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



G089029

- 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 8-27.

EAS30440

## INSTALLING THE RADIATOR

### 1. Fill:

- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to “CHANGING THE COOLANT” on page 3-27.

### 2. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.

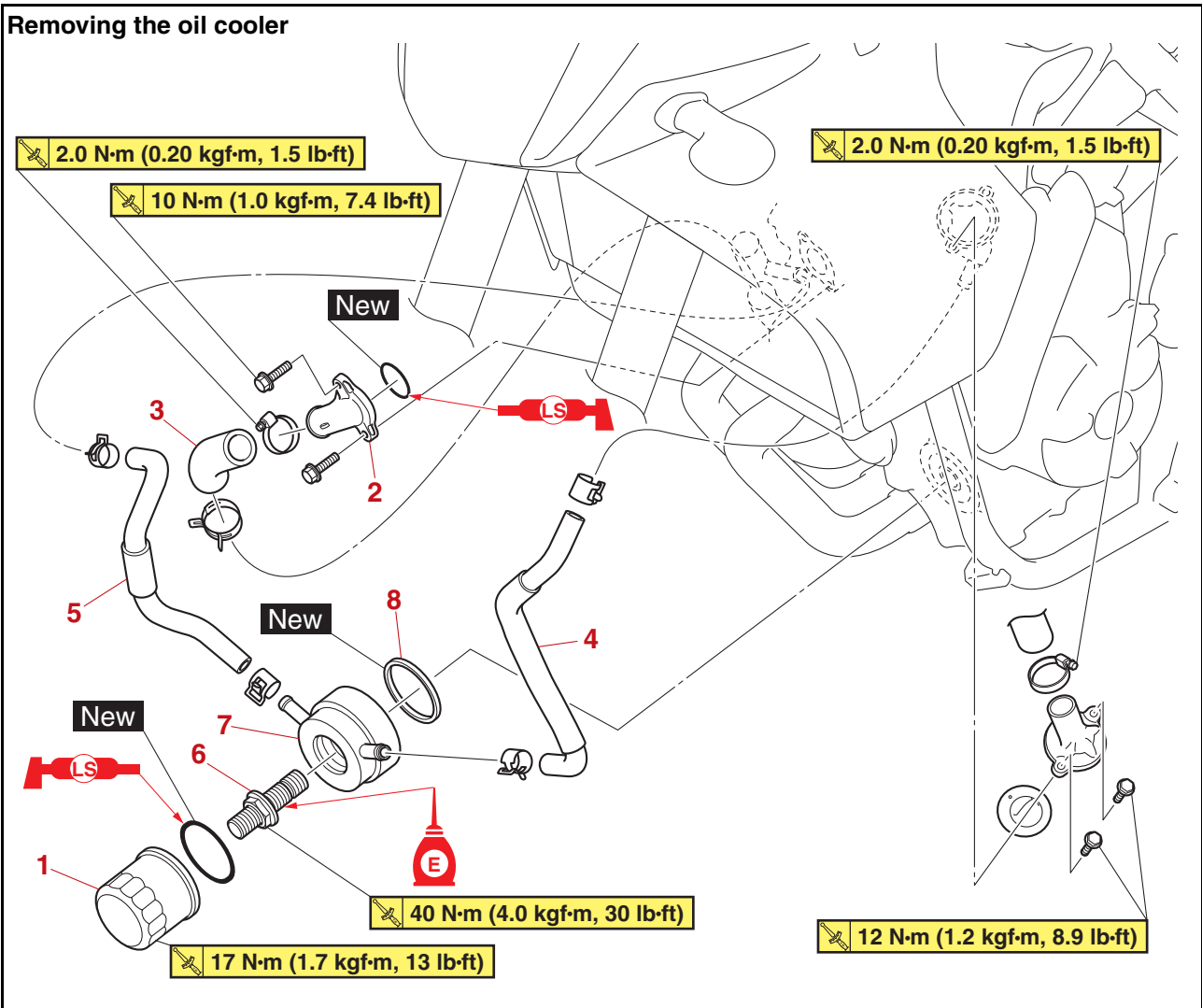
### 3. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to “CHECKING THE RADIATOR” on page 6-4.

EAS20064

## OIL COOLER

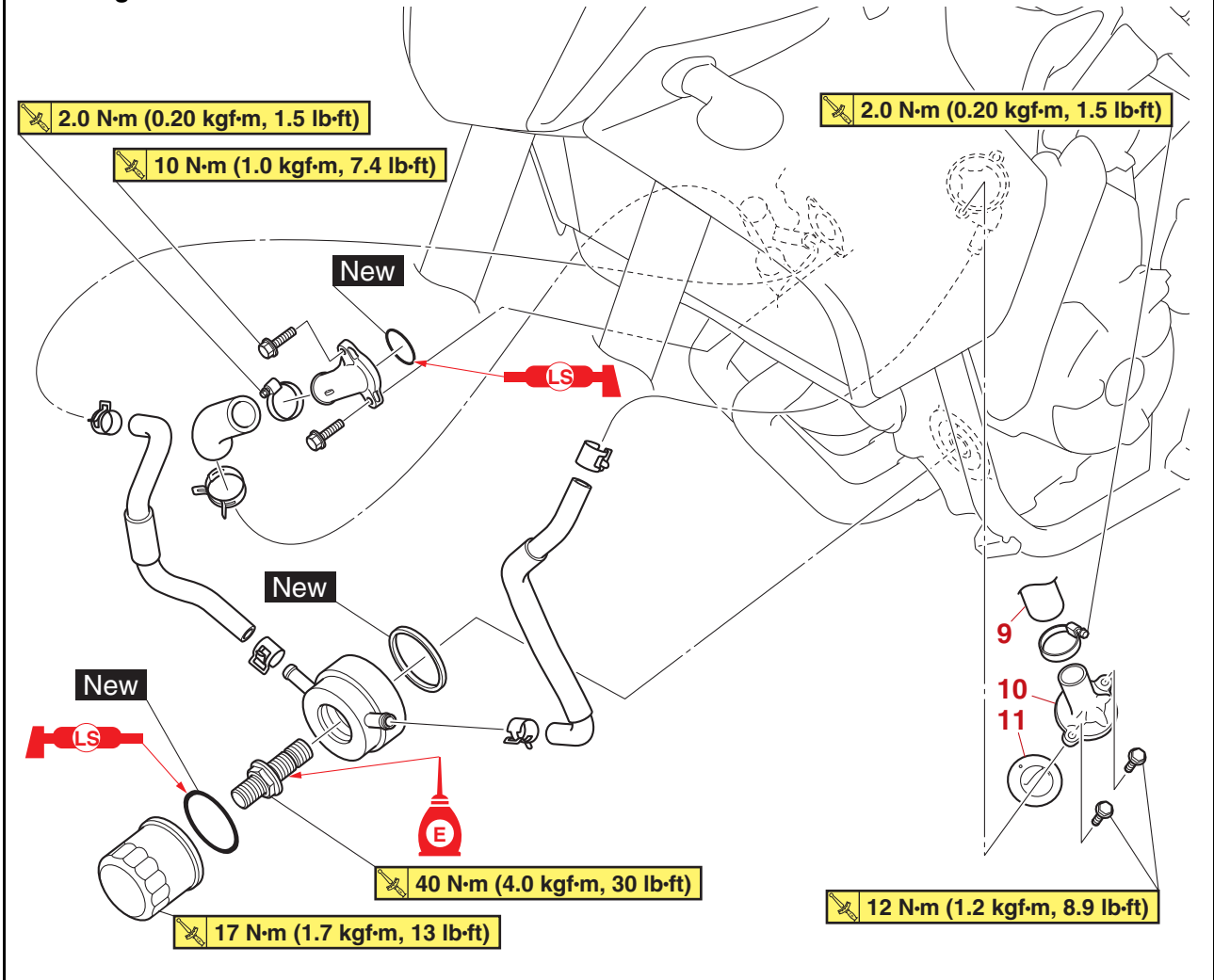
### Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Oil filter cartridge	1	
2	Water jacket joint	1	
3	Water jacket joint inlet hose	1	
4	Oil cooler inlet hose	1	
5	Oil cooler outlet hose	1	
6	Oil filter cartridge union bolt	1	
7	Oil cooler	1	
8	Gasket	1	

# OIL COOLER

## Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
9	Radiator inlet hose	1	Disconnect.
10	Thermostat cover	1	
11	Thermostat	1	

EAS30441

## CHECKING THE OIL COOLER

1. Check:
  - Oil cooler  
Cracks/damage → Replace.
2. Check:
  - Oil cooler inlet hose
  - Oil cooler outlet hose
  - Water pump outlet hose  
Cracks/damage → Replace.

EAS31123

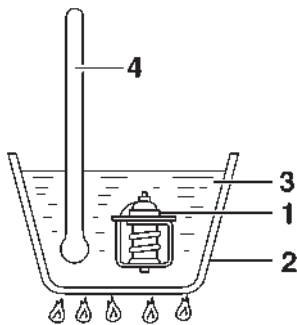
## CHECKING THE WATER JACKET JOINT

1. Check:
  - Water jacket joint  
Mineral deposits/rust → Eliminate.

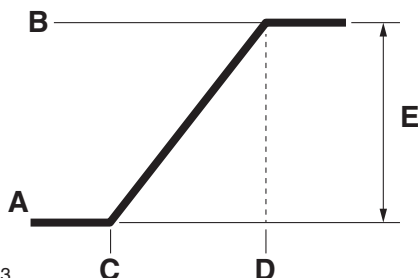
EAS30443

## CHECKING THE THERMOSTAT

1. Check:
  - Thermostat  
Does not open at 80–84 °C (176–183.2 °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.



G089032



G089033

- A. Fully closed
- B. Fully open
- C. 80 °C (349 °F)
- D. 95 °C (203 °F)
- E. 8 mm (0.31 in)

## TIP

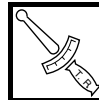
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:
  - Thermostat cover  
Cracks/damage → Replace.

EAS30442

## INSTALLING THE OIL COOLER

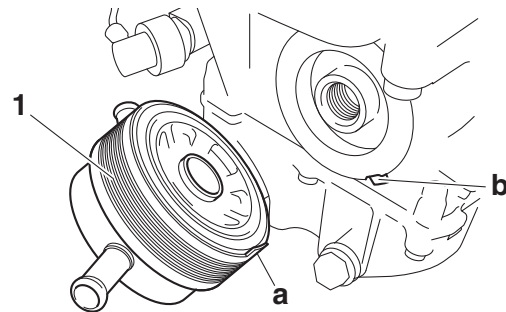
1. Clean:
  - Mating surfaces of the oil cooler and the crankcase  
(with a cloth dampened with lacquer thinner)
2. Install:
  - Gasket **New**
  - Oil cooler “1”
  - Oil filter cartridge union bolt



**Oil filter cartridge union bolt**  
40 N·m (4.0 kgf·m, 30 lb·ft)

## TIP

- Before installing the oil cooler, apply engine oil lightly to the oil filter cartridge union bolt.
- Align the projection “a” on the oil cooler with the slot “b” in the crankcase.



3. Fill:
  - Cooling system  
(with the specified amount of the recommended coolant)  
Refer to “CHANGING THE COOLANT” on page 3-27.
  - Crankcase  
(with the specified amount of the recommended engine oil)  
Refer to “CHANGING THE ENGINE OIL” on page 3-24.
4. Check:
  - Cooling system  
Leaks → Repair or replace any faulty part.



Refer to "INSTALLING THE RADIATOR" on page 6-4.

5. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS30939

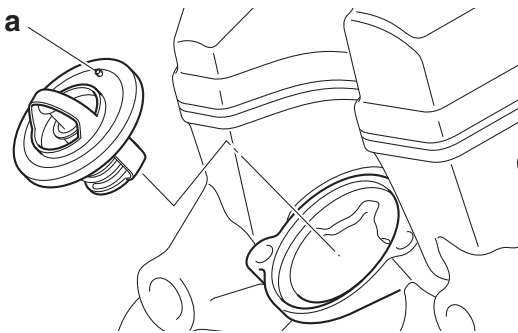
## INSTALLING THE THERMOSTAT

1. Install:

- Thermostat

**TIP**

Install the thermostat with its breather valve "a" facing inward.



2. Fill:

- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "CHANGING THE COOLANT" on page 3-27.

3. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.

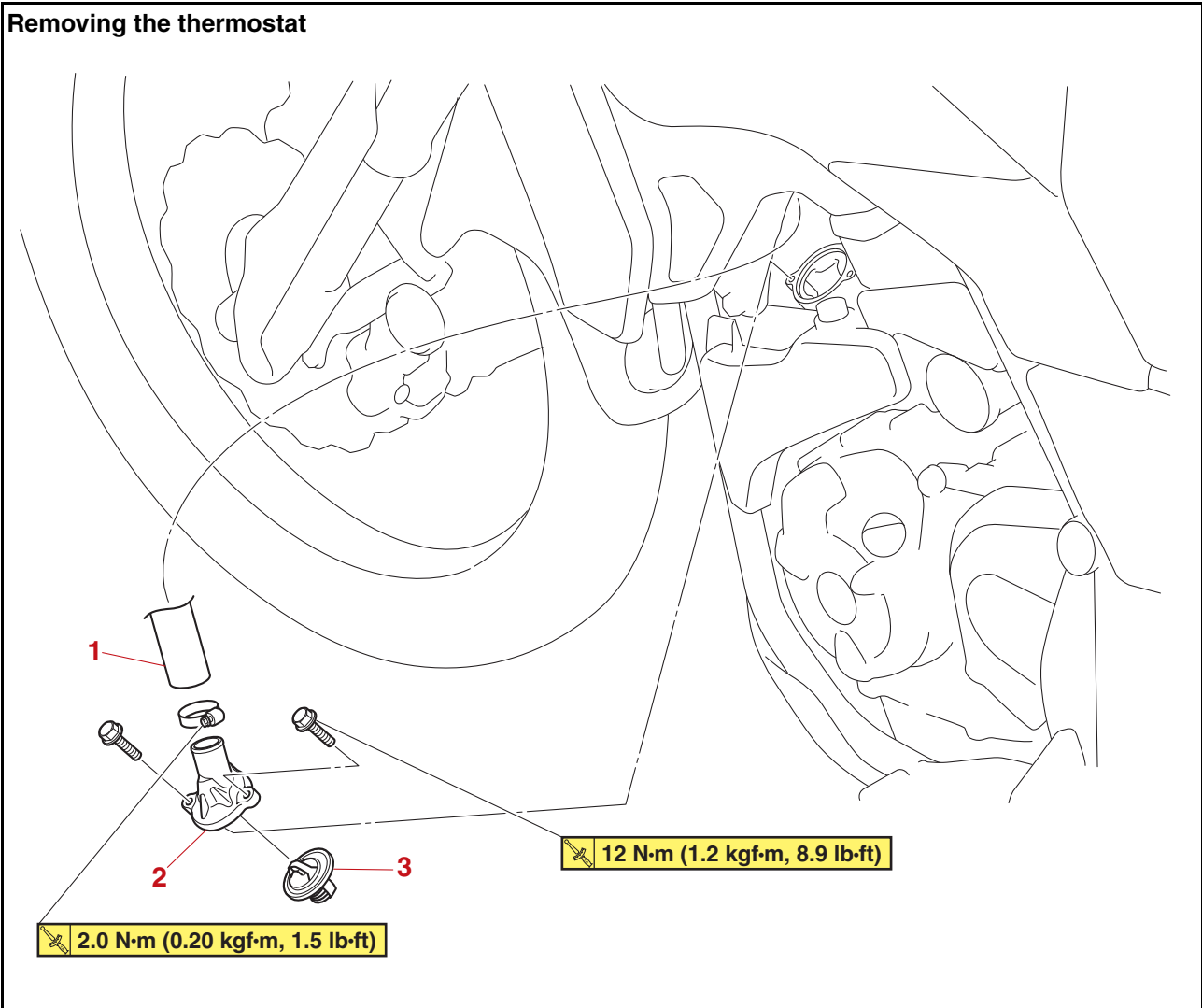
4. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS20065

## THERMOSTAT

### Removing the thermostat

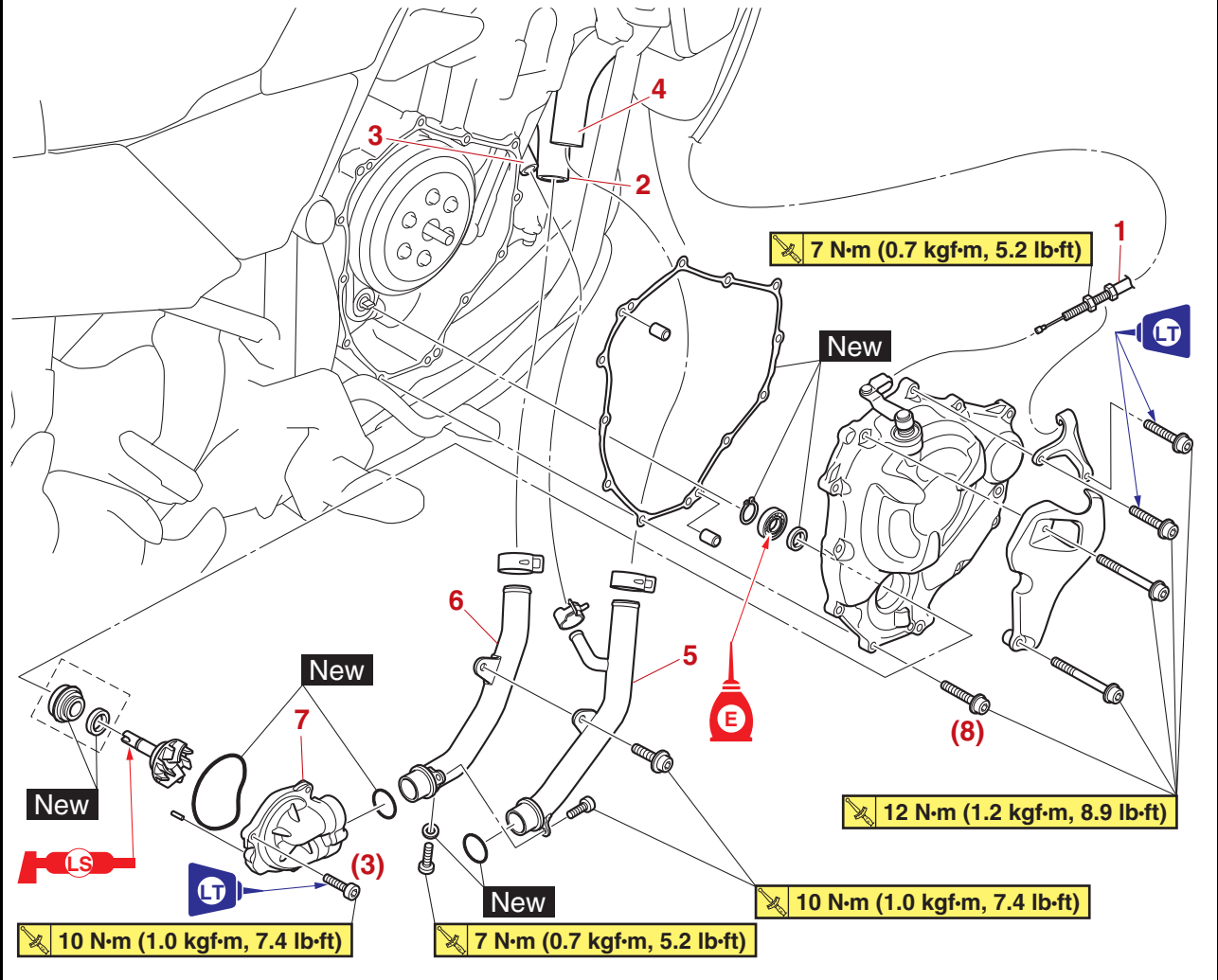


Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Radiator inlet hose	1	Disconnect.
2	Thermostat cover	1	
3	Thermostat	1	

EAS20066

## WATER PUMP

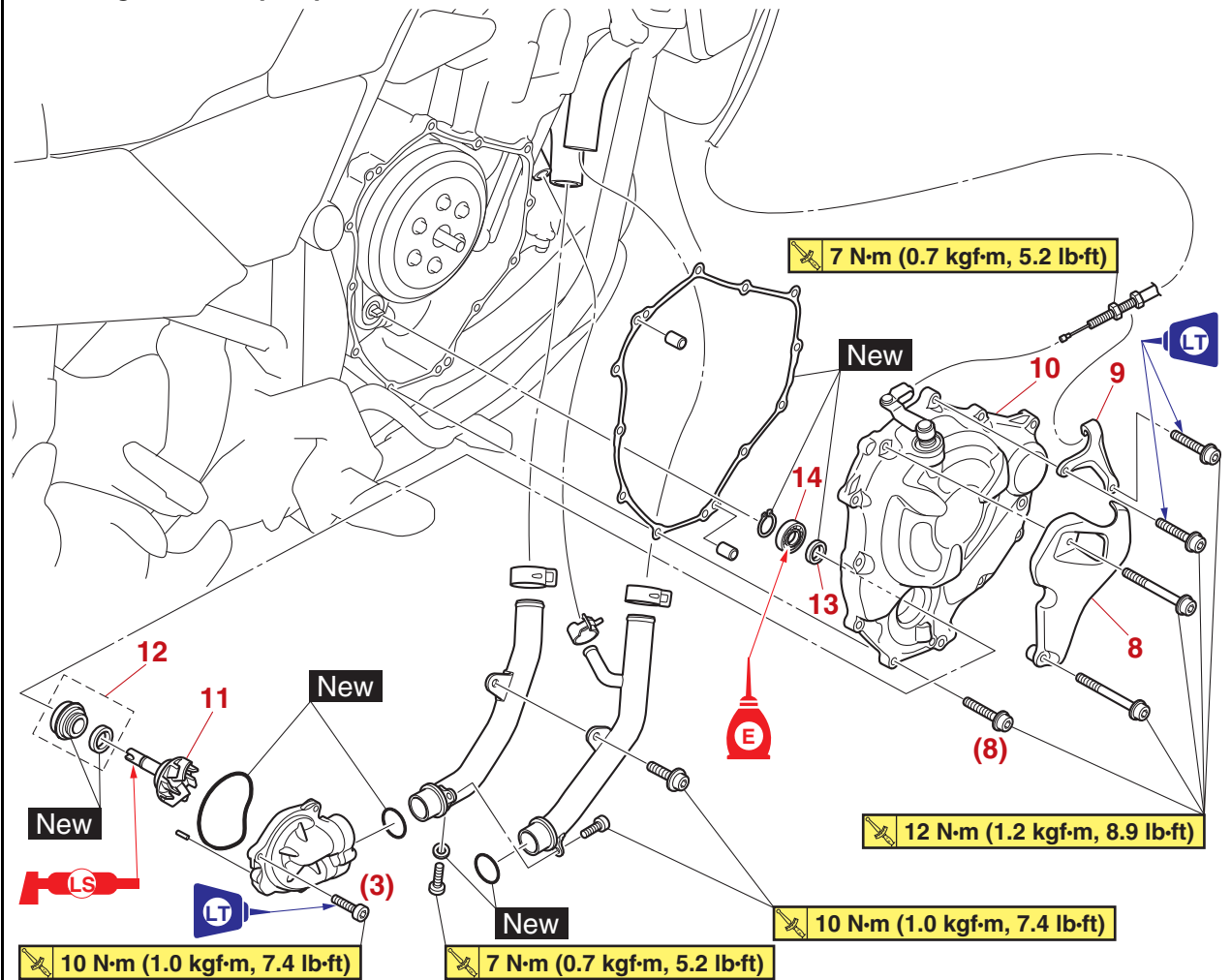
### Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Clutch cable	1	Disconnect.
2	Water pump outlet hose	1	Disconnect.
3	Oil cooler outlet hose	1	Disconnect.
4	Radiator outlet hose	1	Disconnect.
5	Water pump inlet pipe	1	
6	Water pump outlet pipe	1	
7	Water pump housing	1	

# WATER PUMP

## Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
8	Dust cover	1	
9	Clutch cable holder	1	
10	Clutch cover	1	
11	Impeller shaft	1	
12	Water pump seal assembly	1	
13	Oil seal	1	
14	Bearing	1	

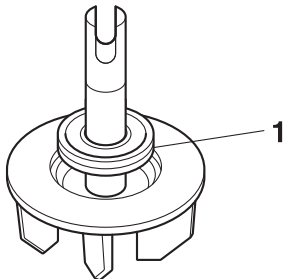
EAS30446

## DISASSEMBLING THE WATER PUMP

- Remove:
  - Mechanical seal (impeller side) "1" (from the impeller, with a thin, flat-head screwdriver)

### TIP

Do not scratch the impeller shaft.

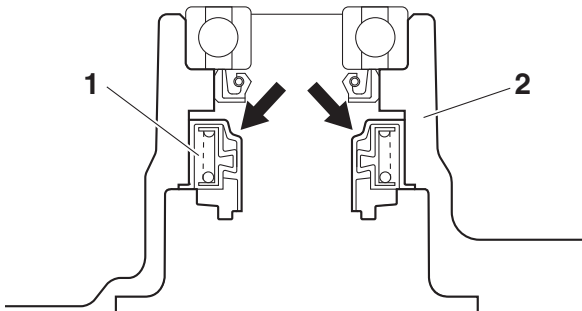


G089034

- Remove:
  - Mechanical seal (housing side) "1"

### TIP

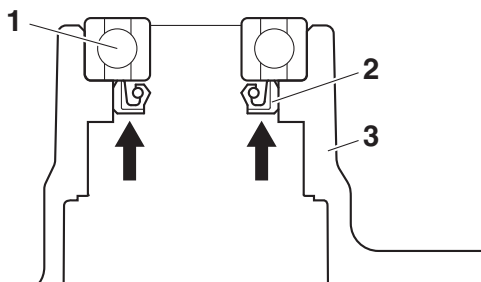
Remove the mechanical seal (housing side) from the inside of the clutch cover "2".



- Remove:
  - Bearing "1"
  - Oil seal "2"

### TIP

Remove the bearing and oil seal from the outside of the clutch cover "3".



EAS30447

## CHECKING THE WATER PUMP

- Check:
  - Water pump housing
  - Clutch cover
  - Impeller shaft
 Cracks/damage/wear → Replace.
- Check:
  - Bearing
 Rough movement → Replace.
- Check:
  - Water pump outlet pipe
  - Water pump inlet pipe
 Cracks/damage/wear → Replace.

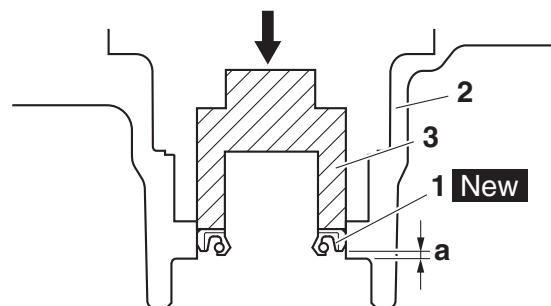
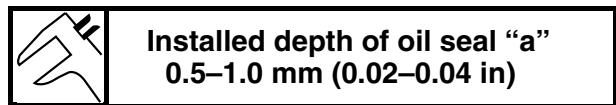
EAS30448

## ASSEMBLING THE WATER PUMP

- Install:
  - Oil seal "1" **New**
  - Bearing (into the clutch cover "2")

### TIP

Install the oil seal with a socket "3" that matches its outside diameter.



- Install:
  - Mechanical seal (housing side) "1" **New** (into the clutch cover "2")

ECA20330

### NOTICE

Never lubricate the mechanical seal (housing side) surface with oil or grease.

### TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the clutch cover.

# WATER PUMP



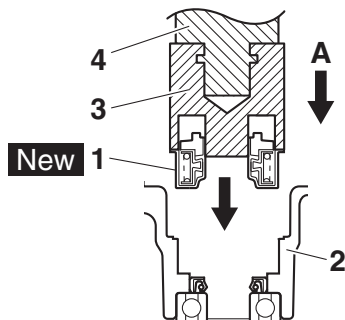
**Mechanical seal installer (ø33)**  
**90890-04132**  
**Water pump seal installer (ø33)**  
**YM-33221-A**  
**Middle driven shaft bearing driver**  
**90890-04058**  
**Middle drive bearing installer 40**  
**& 50 mm**  
**YM-04058**

## TIP

If the surface "a" of the mechanical seal (impeller side) that contacts the mechanical seal (housing side) is dirty, clean it.



**Mechanical seal (impeller side)**  
**0.15 mm (0.006 in)**



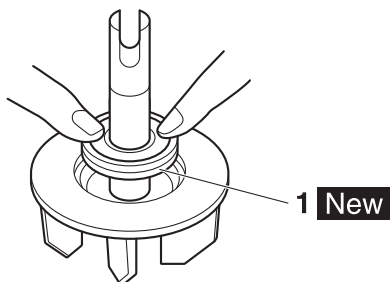
3. Mechanical seal installer
4. Middle driven shaft bearing driver
- A. Push down

## 3. Install:

- Mechanical seal (impeller side) "1" **New**

## TIP

Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.



G089035

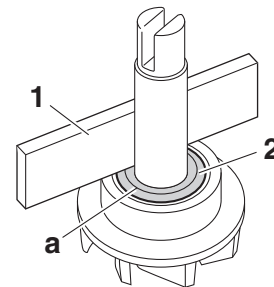
## 4. Measure:

- Mechanical seal (impeller side)  
 Out of specification → Repeat steps (3) and (4).

ECA14090

## NOTICE

**Make sure the rubber damper and rubber damper holder are flush with the impeller.**



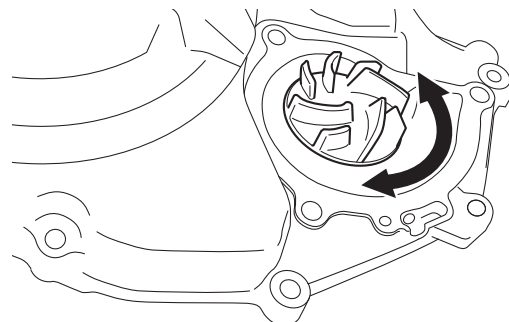
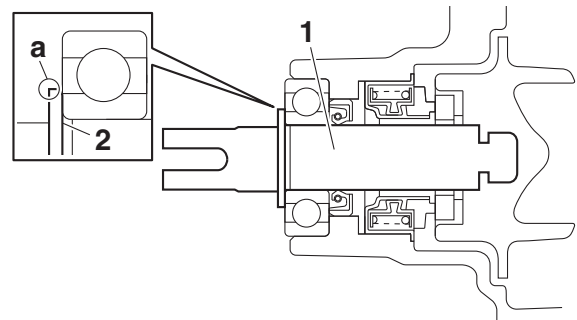
1. Straightedge
2. Impeller

## 5. Install:

- Impeller shaft "1"
- Circlip "2"

## TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the bearing.
- After installation, check that the impeller shaft rotates smoothly.



EAS31117

## INSTALLING THE CLUTCH COVER

### 1. Install:

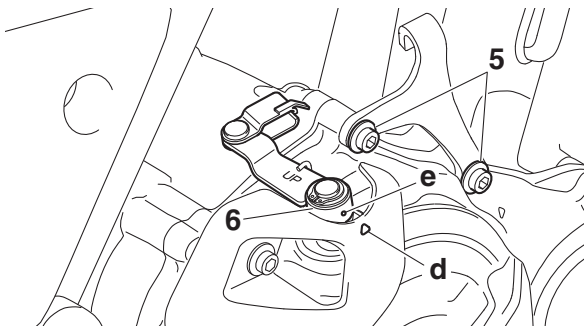
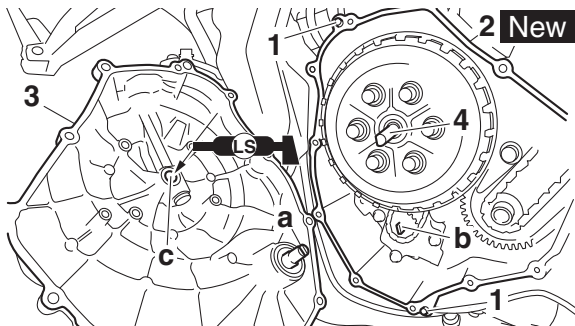
- Dowel pins "1"
- Clutch cover gasket "2" **New**
- Clutch cover "3"



**Clutch cover bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**  
**Clutch cable holder bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**  
**LOCTITE®**

### TIP

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "4" rearward and align the rod with the hole "c" in the clutch cover.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cable holder bolts "5".
- Tighten the bolts in stages and in a crisscross pattern.
- After installing the clutch cover, make sure that the alignment mark "d" on the clutch cover is aligned with the punch mark "e" on the pull lever "6".



### 2. Fill:

- Cooling system  
 (with the specified amount of the recommended coolant)  
 Refer to "CHANGING THE COOLANT" on page 3-27.

### 3. Check:

- Cooling system  
 Leaks → Repair or replace the faulty part.

### 4. Measure:

- Radiator cap opening pressure  
 Below the specified pressure → Replace the radiator cap.  
 Refer to "CHECKING THE RADIATOR" on page 6-4.

### 5. Adjust:

- Clutch lever free play  
 Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-12.





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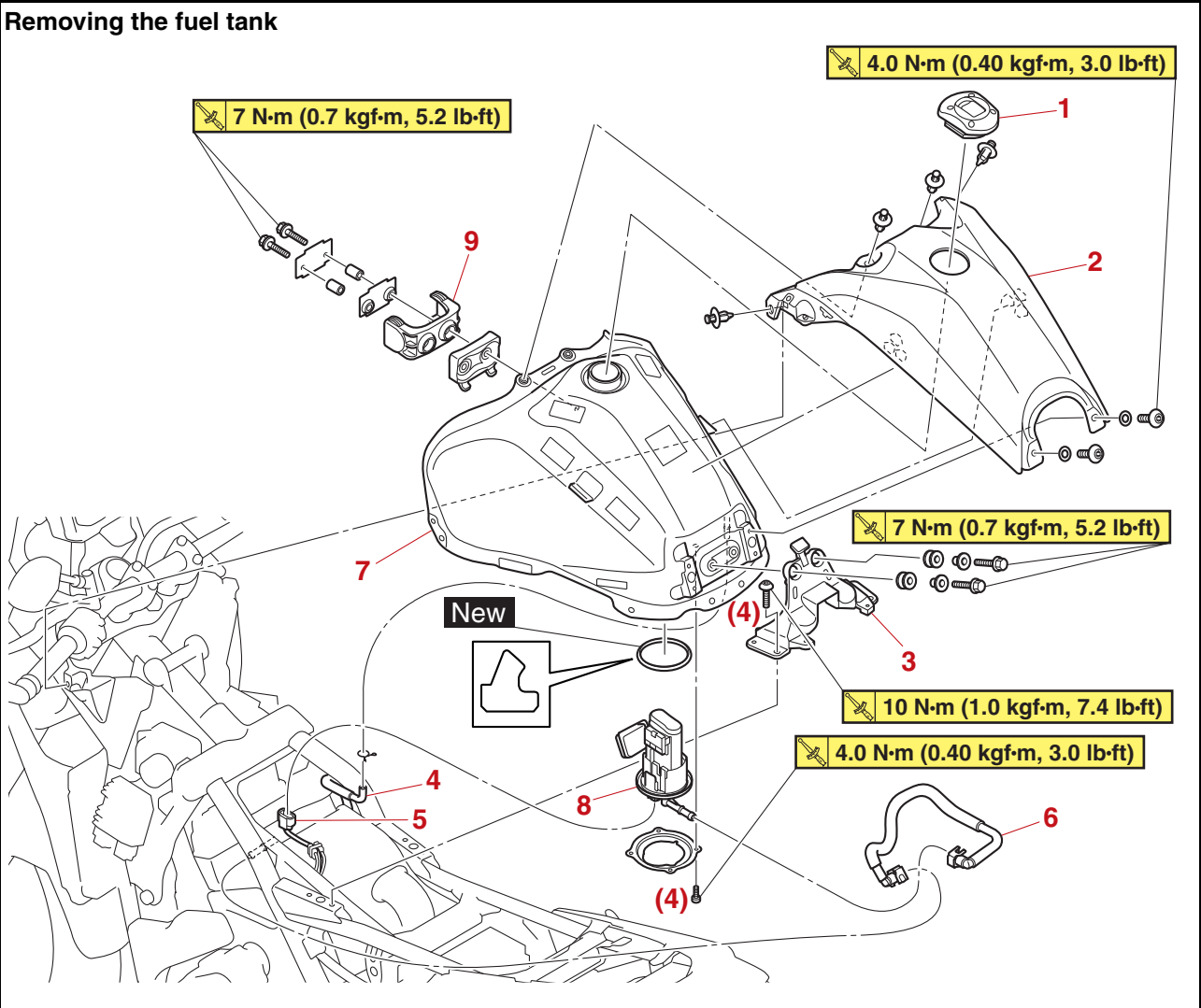
## FUEL SYSTEM

<b>FUEL TANK</b> .....	7-1
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REMOVING THE FUEL PUMP.....	7-3
CHECKING THE FUEL PUMP BODY.....	7-3
CHECKING THE CYLINDER HEAD BREATHER HOSE.....	7-3
CHECKING THE ROLLOVER VALVE.....	7-3
INSTALLING THE CANISTER.....	7-3
INSTALLING THE FUEL PUMP.....	7-4
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EAS20067

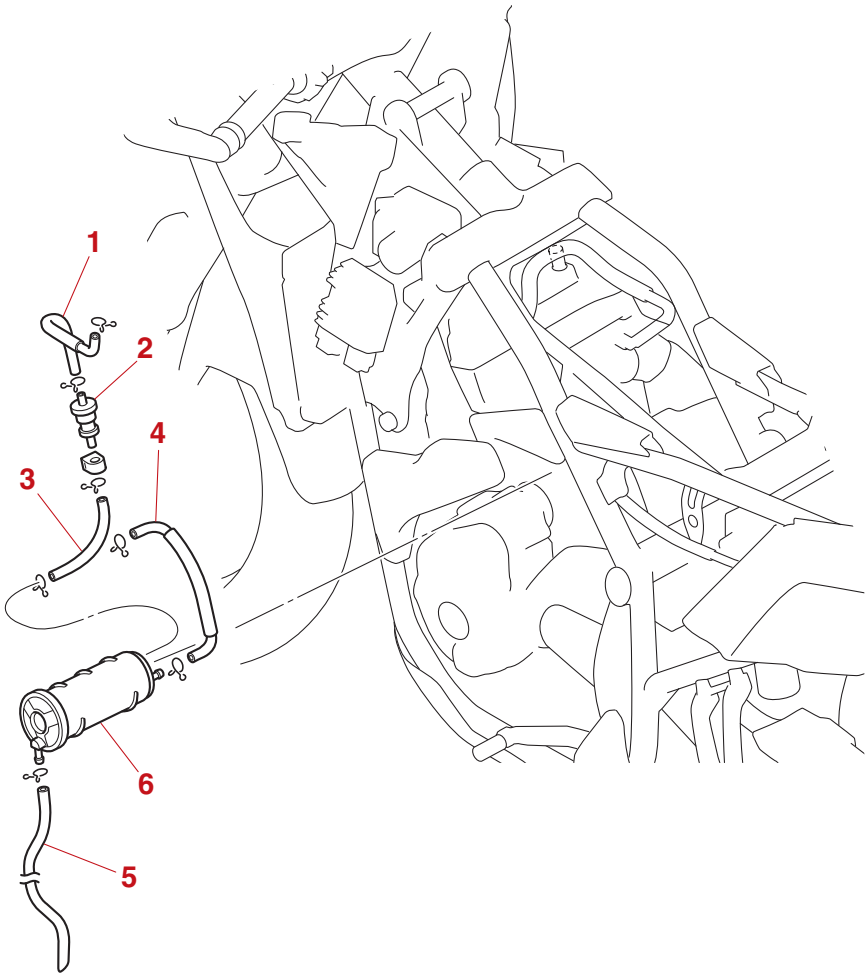
## FUEL TANK

### Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoops/Air ducts/Fuel tank side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
1	Fuel tank cap	1	
2	Fuel tank cover	1	
3	Fuel tank mounting bracket (rear side)	1	
4	Fuel tank breather/overflow hose	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel hose	1	
7	Fuel tank	1	
8	Fuel pump	1	
9	Fuel tank mounting bracket (front side)	1	

## Removing the canister



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "Removing the fuel tank" on page 7-1.
1	Fuel tank breather/overflow hose (fuel tank to rollover valve)	1	
2	Rollover valve	1	
3	Fuel tank breather/overflow hose (rollover valve to canister)	1	
4	Canister purge hose	1	
5	Canister breather hose	1	
6	Canister	1	

EAS30450

## REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
  - Fuel hose

EWA17320



**WARNING**

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

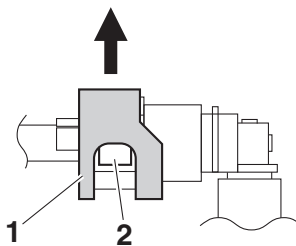
ECA20020

## NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

## TIP

- To remove the fuel hose from the fuel rail and fuel pump, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



G089038

3. Remove:
  - Fuel tank

## TIP

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAS30451

## REMOVING THE FUEL PUMP

1. Remove:
  - Fuel pump

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.

EAS33278

## CHECKING THE CYLINDER HEAD BREATHER HOSE

1. Check:
  - Cylinder head breather hose  
Cracks/damage → Replace.  
Loosen connection → Connect properly.

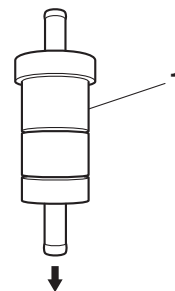
EAS30699

## CHECKING THE ROLLOVER VALVE

1. Check:
  - Rollover valve “1”  
Damage/faulty → Replace.

## TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.



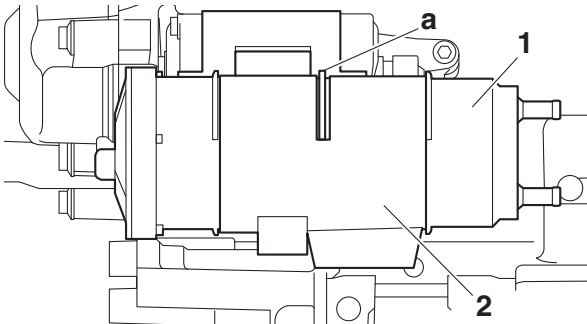
EAS31330

## INSTALLING THE CANISTER

1. Install:
  - Canister “1”

## TIP

Fit the projection “a” on the canister into the slot in the canister holder “2”.



EAS30456

## INSTALLING THE FUEL PUMP

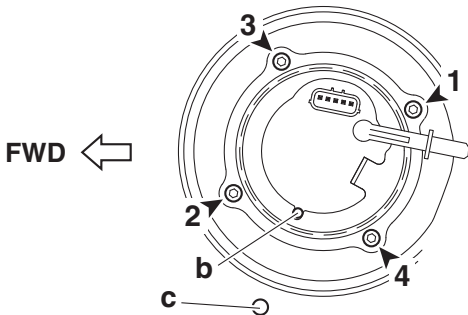
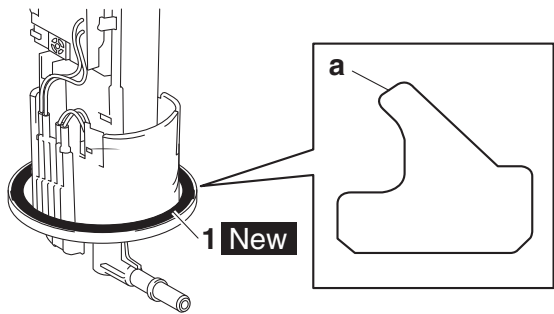
1. Install:

- Fuel pump gasket "1" **New**
- Fuel pump
- Fuel pump bracket

	<p><b>Fuel pump bolt</b> 4.0 N·m (0.40 kgf·m, 3.0 lb·ft)</p>
---	--

### TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- The gasket lip "a" shall face toward the fuel tank.
- Align the projection "b" on the fuel pump with the punch mark "c" on the fuel tank.
- Align the slot in the fuel pump bracket with the projection "b" on the fuel pump.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



EAS30457

## INSTALLING THE FUEL TANK

1. Install:

- Fuel hose

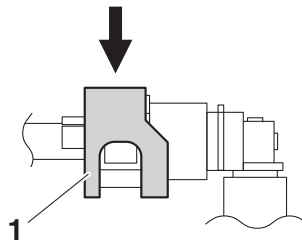
ECA18420

### NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position; otherwise, the fuel hose will not be properly installed.

### TIP

- Install the fuel hose securely onto the fuel rail and fuel pump until a distinct "click" is heard.
- To install the fuel hose, slide the fuel hose connector cover "1" on each end of the hose in the direction of the arrow shown.

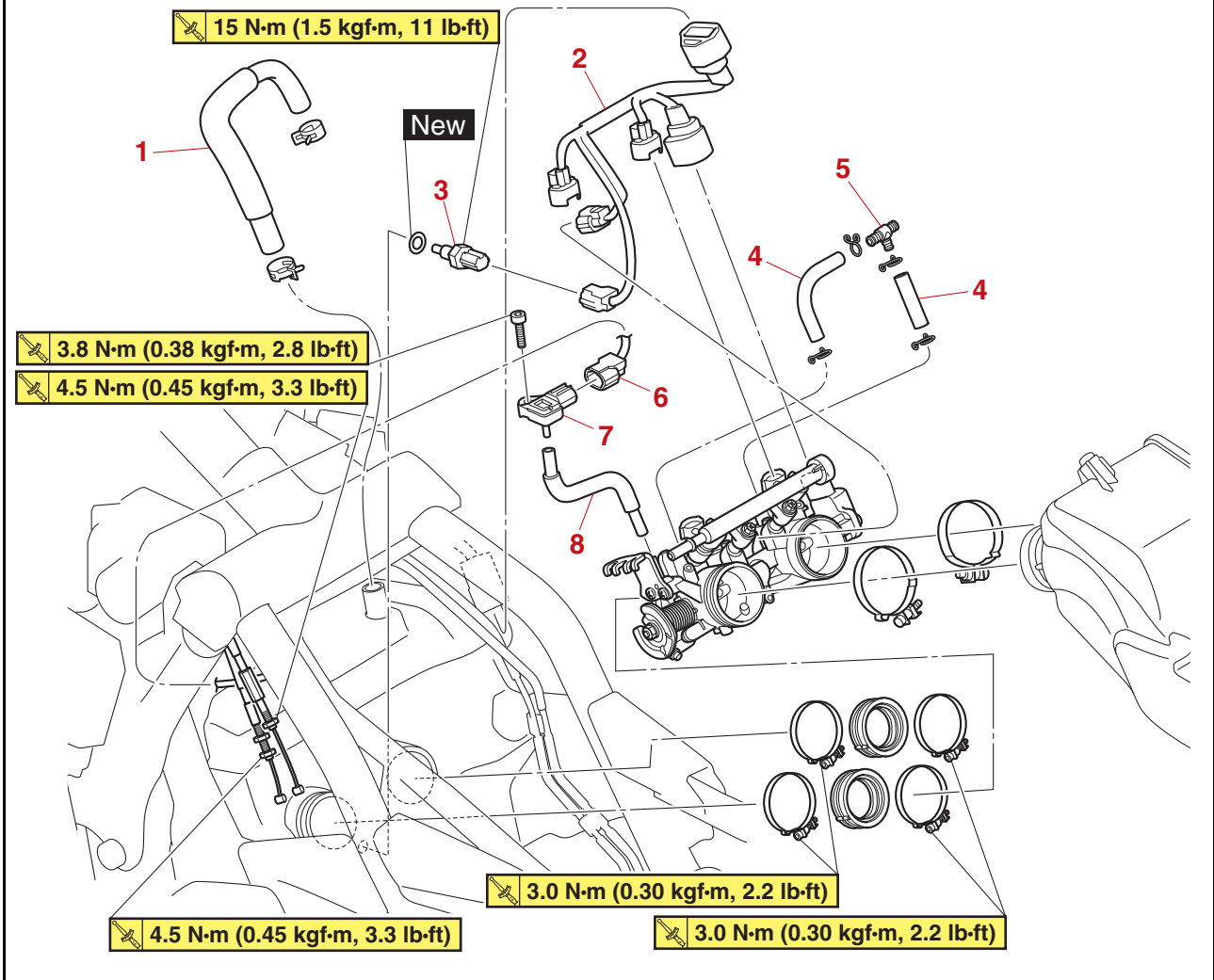


G089039

EAS20070

## THROTTLE BODIES

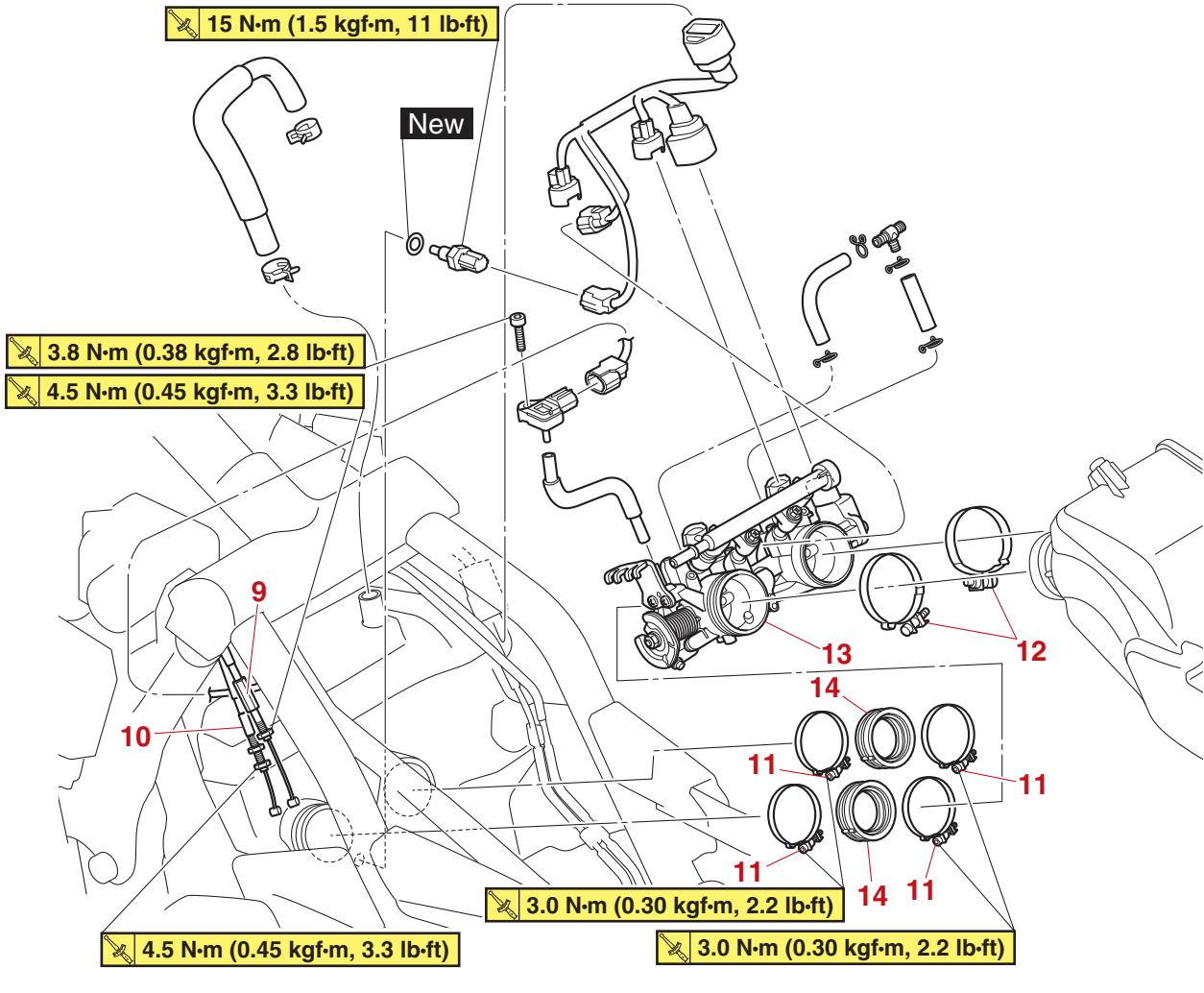
### Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Side covers		Refer to "GENERAL CHASSIS (3)" on page 4-5.
	Fuel tank/Canister		Refer to "FUEL TANK" on page 7-1.
1	Cylinder head breather hose	1	
2	Sub-wire harness	1	
3	Coolant temperature sensor	1	
4	Canister purge hose (hose joint to throttle bodies)	2	
5	Hose joint	1	
6	Intake air pressure sensor coupler	1	Disconnect.
7	Intake air pressure sensor	1	
8	Intake air pressure sensor hose	1	Disconnect.

# THROTTLE BODIES

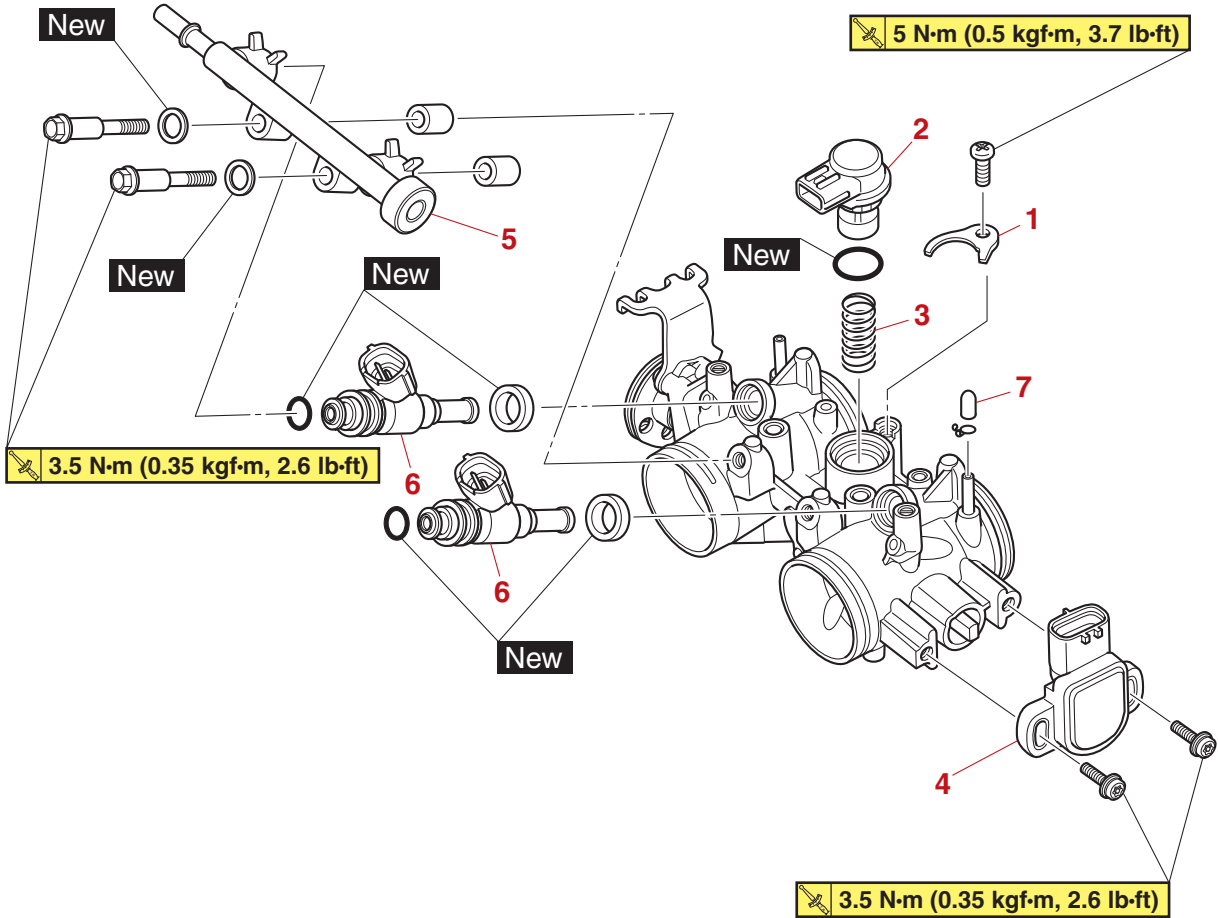
## Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
9	Throttle cable (decelerator cable)	1	Disconnect.
10	Throttle cable (accelerator cable)	1	Disconnect.
11	Throttle body joint clamp screw	4	Loosen.
12	Air filter case joint clamp screw	2	Loosen.
13	Throttle bodies	1	Refer to "REMOVING THE THROTTLE BODIES" on page 7-8.
14	Throttle body joint	2	

# THROTTLE BODIES

## Removing the fuel injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	ISC (Idle Speed Control) valve plate	1	
2	ISC (Idle Speed Control) valve	1	
3	Spring	1	
4	Throttle position sensor	1	
5	Fuel rail	1	
6	Fuel injector	2	
7	Cap	1	



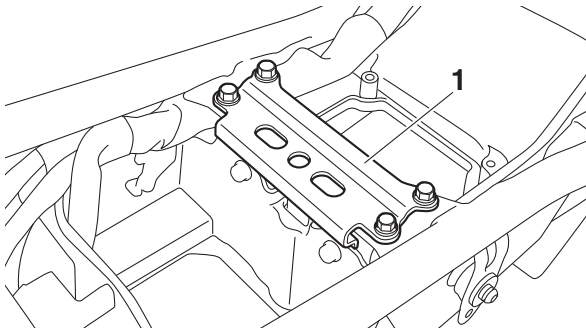
# THROTTLE BODIES

EAS30979

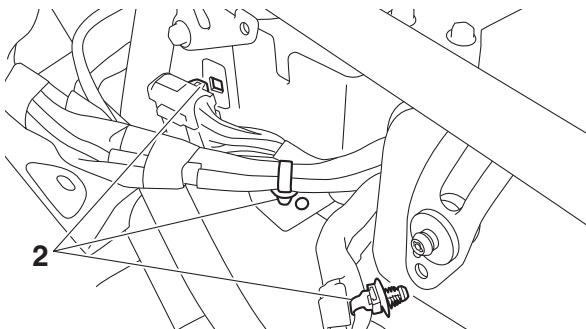
## REMOVING THE THROTTLE BODIES

### 1. Remove:

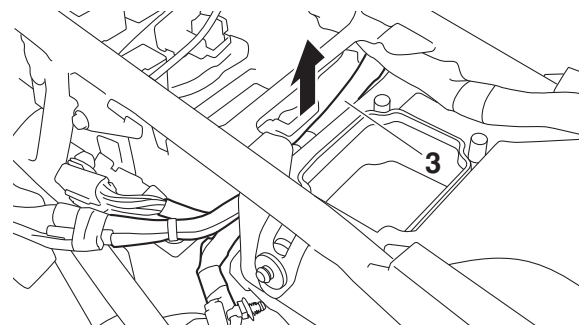
- Throttle bodies
  - a. Remove the battery box bracket "1".



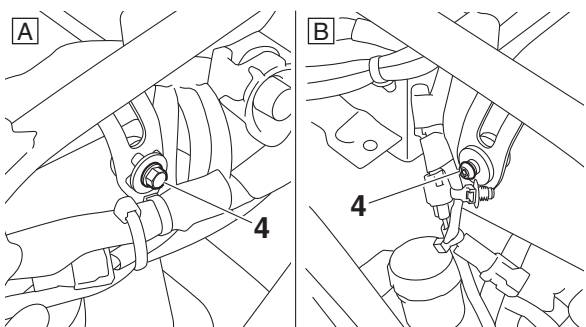
- b. Remove the holders "2" from the frame and battery box.



- c. Lift the wire harness "3" in the direction of the arrow shown.



- d. Remove the air filter case bolts (left/right) "4".



- A. Left
- B. Right

- e. Pull the air filter case rearward to remove it from the throttle bodies.
- f. Remove the throttle bodies.

EAS30475

## CHECKING THE INJECTORS (BEFORE REMOVING)

### 1. Check:

- Injectors  
Use the diagnostic code numbers "36" and "37".  
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.

EAS30476

## REMOVING THE INJECTORS

EWA17330

### ! WARNING

- Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.
- Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.
- Turn the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before removing the injectors.

### 1. Remove:

- Fuel rail

EAS30477

## CHECKING THE INJECTORS

### 1. Check:

- Injectors  
Obstruction → Replace and check the fuel pump/fuel supply system.  
Deposit → Replace.  
Damage → Replace.

### 2. Check:

- Injector resistance  
Refer to "CHECKING THE FUEL INJECTORS" on page 8-140.

EAS30769

## CHECKING AND CLEANING THE THROTTLE BODIES

### TIP

Before checking the throttle bodies, check the following items:

- Valve clearance

# THROTTLE BODIES

- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hose
- Exhaust system
- Cylinder head breather hose
- Canister purge hoses

EWA17850

## WARNING

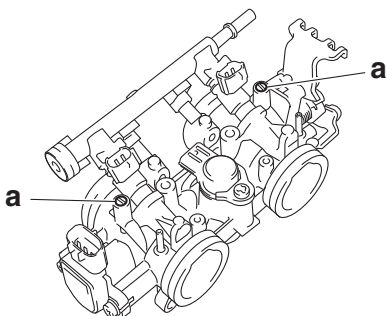
If the throttle bodies are subjected to strong shocks or dropped during checking, replace them.

1. Check:
  - Throttle bodies  
Cracks/damage → Replace the throttle bodies.
2. Clean:
  - Throttle bodies

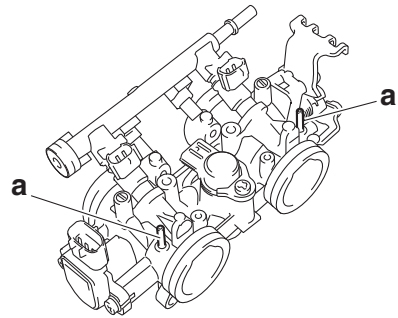
ECA20910

## NOTICE

- Observe the following precautions; otherwise, the throttle bodies may not operate properly.
- Do not open the throttle valves quickly.
- Do not subject the throttle bodies to excessive force.
- Wash the throttle bodies in a petroleum-based solvent.
- Do not use any caustic carburetor cleaning solution.
- Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.
- Do not directly push the throttle valves to open them.
- Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.



- a. Place the throttle bodies on a flat surface with the air filter case side facing up.
- b. Install the caps (895-14169-00) onto the hose fittings "a".



- c. Push the lever in the direction shown in the illustration to hold the throttle valves in the open position.

EWA16680

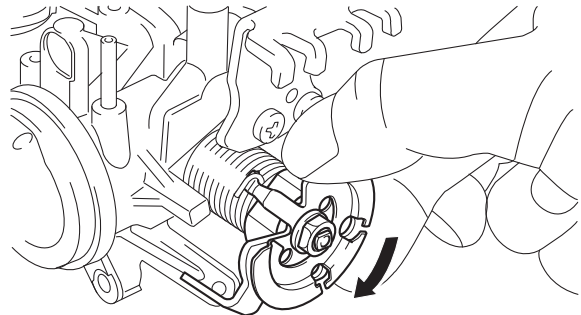
## WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA21190

## NOTICE

- Do not use tools to open the throttle valves or to keep them in the open position.
- Do not open the throttle valves quickly.



- d. Apply a petroleum-based solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

## TIP

- Do not allow any petroleum-based solvent to enter the opening for the injectors.
- Do not apply any petroleum-based solvent to the portions of the throttle valve shafts between the throttle bodies.

- e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ECA18470

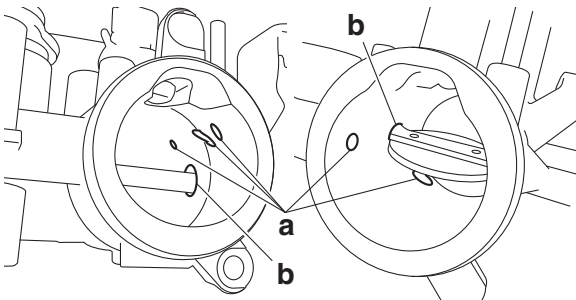
## NOTICE

- Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.

# THROTTLE BODIES

- Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.

- f. After removing the carbon deposits, clean the inside of the throttle bodies with a petroleum-based solvent, and then dry the throttle bodies using compressed air.
- g. Make sure that there are no carbon deposits or other foreign materials in any of the passages “a” in each throttle body or in the space “b” between the throttle valve shaft and the throttle body.



## Cleaning the ISC (idle speed control) valve

1. Remove:
  - ISC (Idle Speed Control) valve plate
  - ISC (Idle Speed Control) valve
  - O-ring
2. Clean:
  - ISC (Idle Speed Control) valve “1”



ECA21230

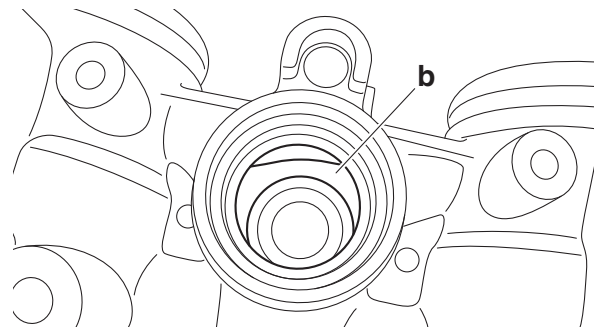
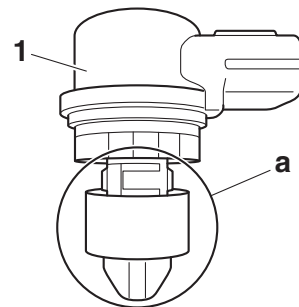
### NOTICE

- Be sure to use the recommended cleaning agent.
- Do not spray the cleaning agent directly onto the ISC valve or throttle bodies and do not immerse them in the cleaning agent.
- To prevent scratching the components, do not use a brush, metal file, or other abrasive tool.
- Do not clean with compressed air.
- Do not allow the removed deposits or foreign materials to adhere to the sealing surfaces of the O-ring.

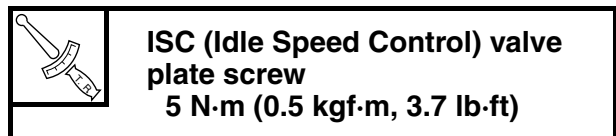
- Do not scratch or deform the ISC valve or air passage; otherwise, poor starting performance, an unstable engine idling speed, or uncontrollable engine speed could result.
- Do not clean any areas other than those indicated in the illustrations. If the cleaning agent attaches to the ISC valve or enters the throttle bodies, thoroughly wipe it off.

### TIP

Clean the area “a” of the ISC valve and the ISC valve installation hole “b” in the throttle bodies.

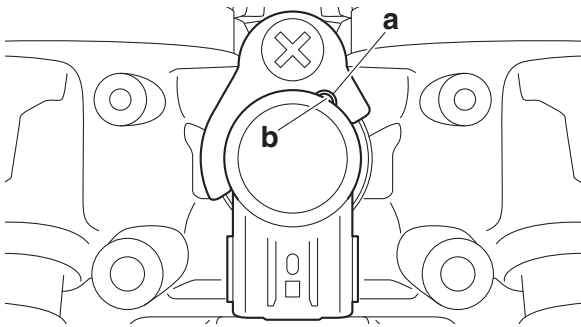


3. Install:
  - O-ring **New**
  - ISC (Idle Speed Control) valve
  - ISC (Idle Speed Control) valve plate



### TIP

Align the slot “a” in the ISC valve plate with the projection “b” on the ISC valve.



## Resetting the ISC (idle speed control) learning values

1. Install:
  - Throttle bodies
2. Reset:
  - ISC (idle speed control) learning values  
Use the diagnostic code number "67".  
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-1.
3. Adjust:
  - Throttle bodies synchronizing  
Out of specification → Replace the throttle bodies.  
Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-9.

EAS30792

## CHECKING THE THROTTLE BODY JOINTS

1. Check:
  - Throttle body joints  
Cracks/damage → Replace.

EAS30485

## ADJUSTING THE THROTTLE POSITION SENSOR

EWA16690

### **⚠ WARNING**

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

1. Check:
  - Throttle position sensor  
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-138.
2. Adjust:
  - Throttle position sensor angle
    - 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, and then connect the Yamaha diagnostic tool to coupler.

### TIP

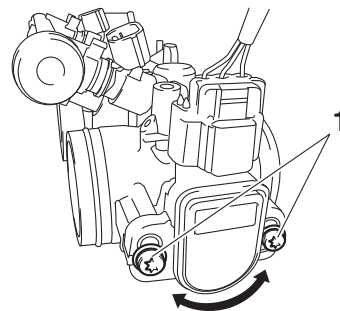
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-34.

- 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 screw**  
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)



EAS31124

## INSTALLING THE FUEL INJECTORS

ECA20000

### **NOTICE**

- Always use new O-rings.
- When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.
- Be careful not to twist or pinch the O-rings when installing the injectors.
- If an injector is subject to strong shocks or excessive force, replace it.
- If installing the original fuel rail and screws, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the screw seats could prevent the screws from being tightened to the specified torque.

# THROTTLE BODIES

1. Install new seals onto the end of each injector.
2. Install the fuel injectors to the fuel rail.



**Fuel rail bolt**  
3.5 N·m (0.35 kgf·m, 2.6 lb-ft)

3. Install the fuel injector assemblies to the throttle bodies.
4. Check the injector pressure after the fuel injectors are installed to the throttle bodies. Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-12.

EAS30481

## CHECKING THE INJECTOR PRESSURE

### TIP

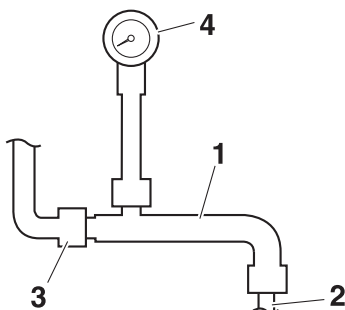
- After installing the fuel injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

### 1. Check:

- Injector pressure
  - a. Connect the fuel injector pressure adapter "1" to the fuel rail "2", and then connect an air compressor "3" to the adapter.
  - b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".



**Pressure gauge**  
90890-03153  
**Pressure gauge**  
YU-03153  
**Fuel injector pressure adapter**  
90890-03210  
**Fuel injector pressure adapter**  
YU-03210



G089041

- c. Close the valve on the fuel injector pressure adapter.
- d. Apply air pressure with the air compressor.

- e. Open the valve on the fuel injector pressure adapter until the specified pressure is reached.



**Specific air pressure**  
490 kPa (4.9 kgf/cm<sup>2</sup>, 69.7 psi)

ECA18440

### NOTICE

**Never exceed the specified air pressure or damage could occur.**

- f. Close the valve on the fuel injector pressure adapter.
- g. Check that the specified air pressure is held for about one minute. Pressure drops → Check the pressure gauge and adapter. Check the seals and O-rings, and then re-install. Replace the fuel injectors.

EAS30482

## CHECKING THE FUEL PRESSURE

### 1. Remove:

- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.

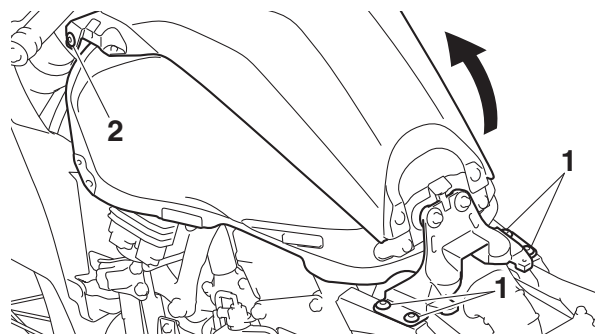
### 2. Check:

- Fuel pressure
  - a. Remove the rear fuel tank mounting bracket bolts "1" and quick fasteners "2", and then hold up the fuel tank.

ECA23360

### NOTICE

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



- b. Disconnect the fuel hose "3" from the fuel tank.



# THROTTLE BODIES

EWA16640

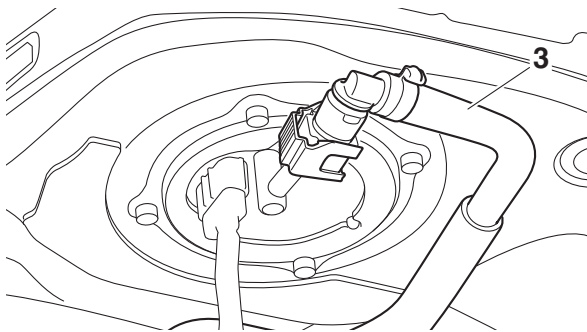
## **WARNING**

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

ECA20010

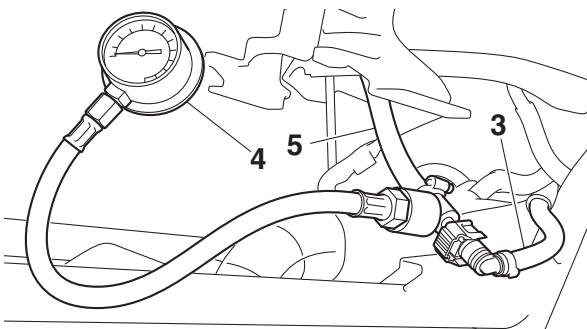
## **NOTICE**

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



c. Connect the pressure gauge "4" and adapter "5" to the fuel hose "3".

	<b>Pressure gauge</b> 90890-03153
	<b>Pressure gauge</b> YU-03153
	<b>Fuel pressure adapter</b> 90890-03176
	<b>Fuel pressure adapter</b> YM-03176



d. Start the engine.  
e. Measure the fuel pressure.

	<b>Fuel line pressure (at idle)</b> 300–390 kPa (3.0–3.9 kgf/cm <sup>2</sup> , 43.5–56.6 psi)
--	---

Faulty → Replace the fuel pump.

3. Install:

- Fuel tank



**Fuel tank mounting bracket bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

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

- Fuel tank side covers  
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30937

## **INSTALLING THE THROTTLE BODY JOINTS**

1. Install:

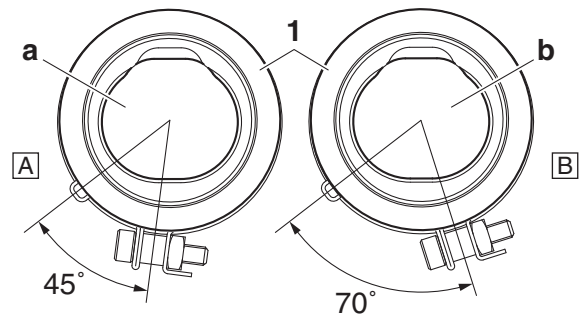
- Throttle body joints "1"



**Throttle body joint clamp screw**  
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

## **TIP**

Be sure to install the throttle body joints "1" as shown in the illustration.



- a. #1 cylinder
- b. #2 cylinder
- A. Left
- B. Right

EAS33279

## **INSTALLING THE AIR FILTER CASE JOINTS**

1. Install:

- Air filter case joint clamps "1"

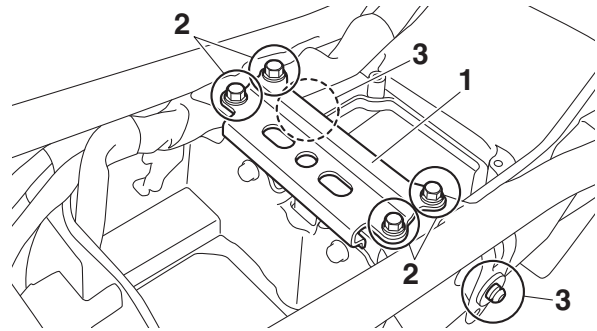
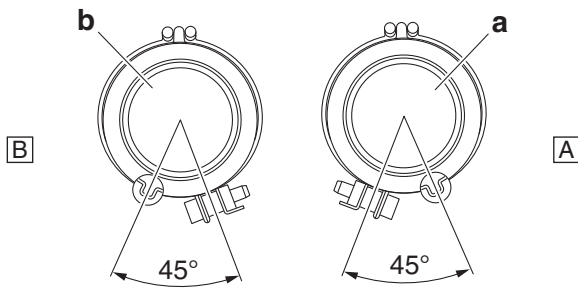


**Air filter case joint clamp screw**  
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

## **TIP**

- Align the projection on the air filter case joint with the slot in the air filter case joint clamp.
- Face the screw head of the air filter case joint clamp outward.

# THROTTLE BODIES



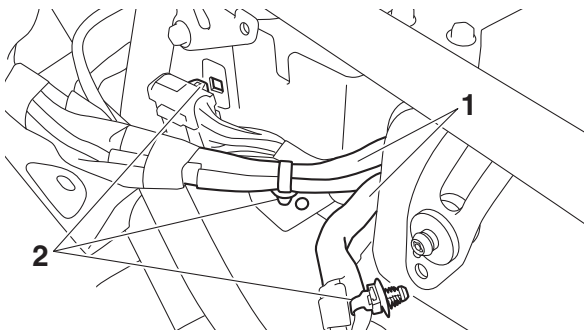
- a. #1 Cylinder
- b. #2 Cylinder
- A. Left
- B. Right

EAS30980

## INSTALLING THE THROTTLE BODIES

### 1. Install:

- Throttle bodies
  - a. Fit the throttle bodies to the throttle body joints.
  - b. Fit the air filter case joints to the throttle bodies.
  - c. Place the wire harness "1" in its original position, and then insert the projections on the holders "2" into the holes in the frame and battery box.



- d. Tighten the air filter case bolts (left/right).



**Air filter case bolt (left)**  
10 N·m (1.0 kgf·m, 7.4 lb-ft)  
**Air filter case bolt (right)**  
10 N·m (1.0 kgf·m, 7.4 lb-ft)

- e. Install the battery box bracket "1", and then tighten the battery box bracket bolts "2" and battery box bolts "3".



**Battery box bracket bolt**  
9 N·m (0.9 kgf·m, 6.6 lb-ft)  
**Battery box bolt**  
9 N·m (0.9 kgf·m, 6.6 lb-ft)  
LOCTITE®





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# IGNITION SYSTEM

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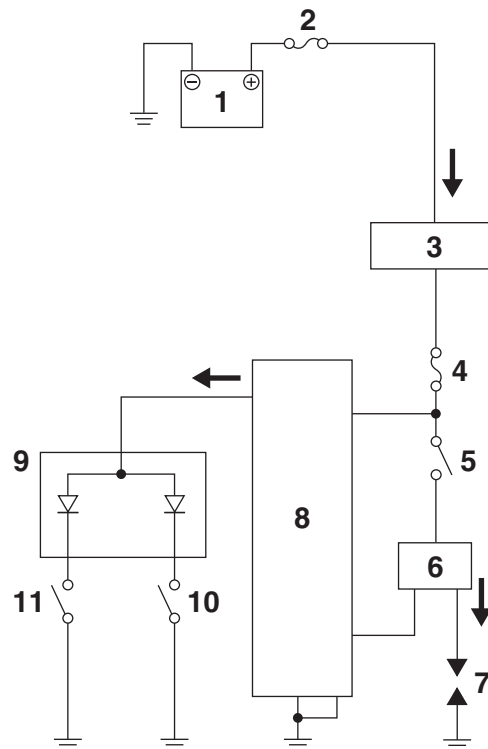
- 1. Main switch
- 8. Ignition fuse
- 17. Battery
- 18. Engine ground
- 19. Main fuse
- 23. Relay unit (diode)
- 26. Joint coupler
- 27. Sidestand switch
- 29. Crankshaft position sensor
- 32. ECU (Engine Control Unit)
- 33. Ignition coil #1
- 34. Ignition coil #2
- 35. Spark plug
- 43. Lean angle sensor
- 66. Gear position switch
- 67. Handlebar switch (right)
- 69. Engine stop switch
- C. for XTZ690
- D. for XTZ690-U

EAS30491

## ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ECU does not flow to the ignition coils or fuel injectors when the gear position switch (neutral circuit) or sidestand switch is open. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Relay unit (diode)
10. Sidestand switch
11. Gear position switch

EAS30492

## TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank side covers
4. Drive sprocket cover
5. Fuel tank

<p>1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-130.</p>	NG →	<p>Replace the fuse(s).</p>
OK ↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.</p>	NG →	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK ↓		
<p>3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-5.</p>	NG →	<p>Re-gap or replace the spark plug(s).</p>
OK ↓		
<p>4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-135.</p>	OK →	<p>Ignition system is OK.</p>
NG ↓		
<p>5. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-134.</p>	NG →	<p>Replace the ignition coil(s).</p>
OK ↓		
<p>6. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-135.</p>	NG →	<p>Replace the crankshaft position sensor.</p>
OK ↓		
<p>7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the main switch/immobilizer unit.</p>
OK ↓		

## IGNITION SYSTEM

<p>8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"><li>• The engine stop switch is faulty.</li><li>• Replace the right handlebar switch.</li></ul>
OK ↓		
<p>9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-139.</p>	NG →	Replace the gear position switch.
OK ↓		
<p>10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	Replace the sidestand switch.
OK ↓		
<p>11. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-133.</p>	NG →	Replace the relay unit.
OK ↓		
<p>12. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-136.</p>	NG →	Replace the lean angle sensor.
OK ↓		
<p>13. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.</p>	NG →	Properly connect or replace the wiring harness.
OK ↓		
<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</p>		





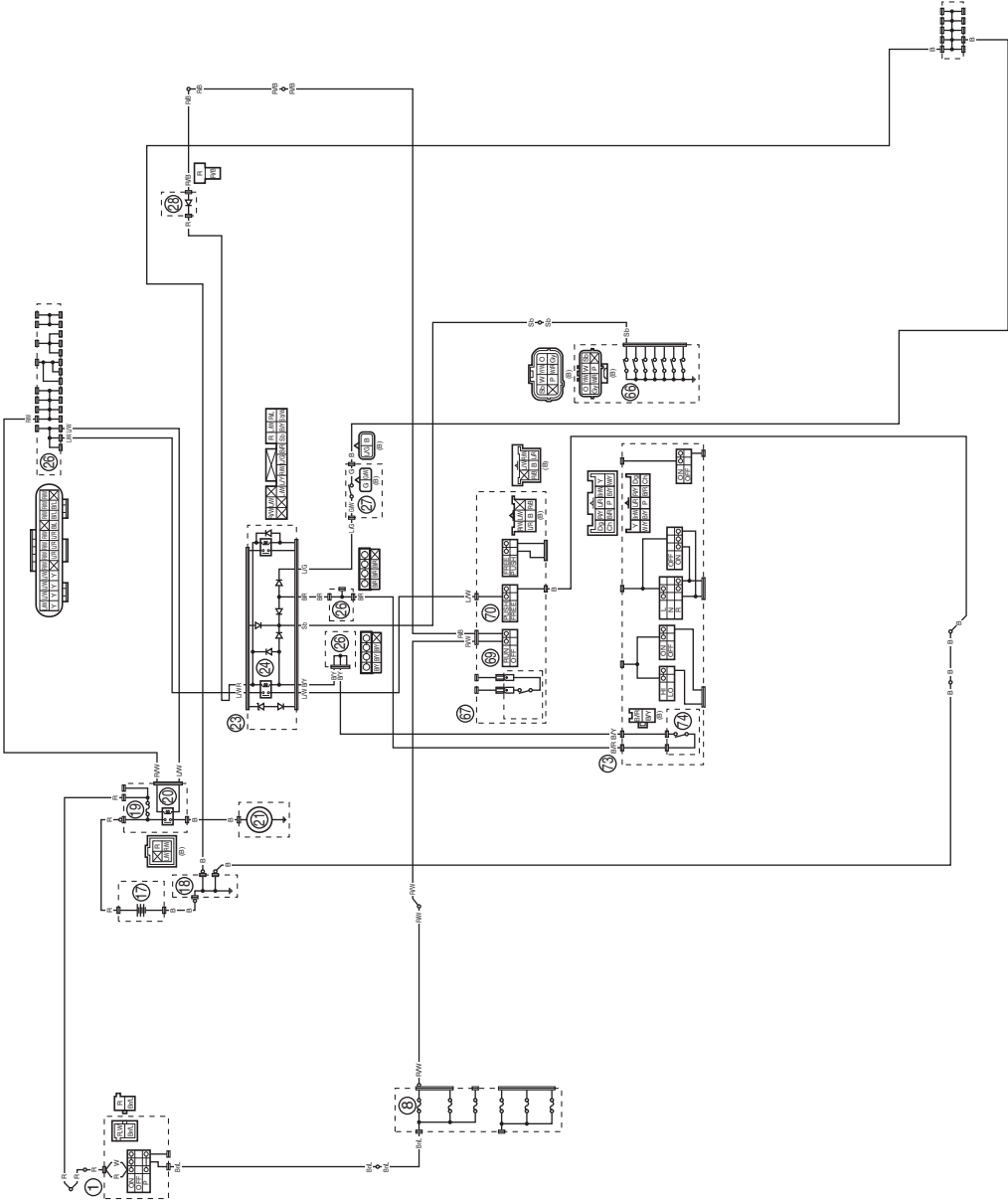
# ELECTRIC STARTING SYSTEM

EAS20073

## ELECTRIC STARTING SYSTEM

EAS30493

## CIRCUIT DIAGRAM



# ELECTRIC STARTING SYSTEM

---

- 1. Main switch
- 8. Ignition fuse
- 17. Battery
- 18. Engine ground
- 19. Main fuse
- 20. Starter relay
- 21. Starter motor
- 23. Relay unit (diode)
- 24. Starting circuit cut-off relay
- 26. Joint coupler
- 27. Sidestand switch
- 28. Diode
- 66. Gear position switch
- 67. Handlebar switch (right)
- 69. Engine stop switch
- 70. Start switch
- 73. Handlebar switch (left)
- 74. Clutch switch

# ELECTRIC STARTING SYSTEM

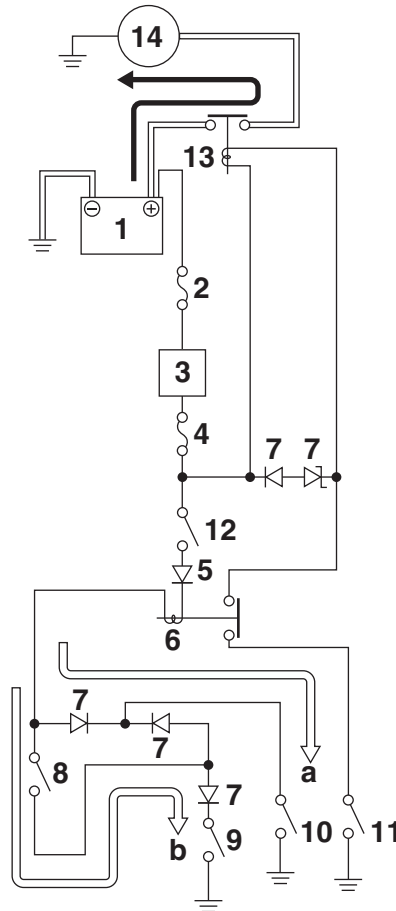
EAS30494

## STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON", the "O" side of the engine stop switch is pushed and the start switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pressing the start switch.



- |   |                          |
|---|--------------------------|
| a. WHEN THE TRANSMISSION IS IN NEUTRAL                                      | 8. Clutch switch         |
| b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR | 9. Sidestand switch      |
| 1. Battery  | 10. Gear position switch |
| 2. Main fuse  | 11. Start switch         |
| 3. Main switch  | 12. Engine stop switch   |
| 4. Ignition fuse  | 13. Starter relay        |
| 5. Diode  | 14. Starter motor        |
| 6. Starting circuit cut-off relay   |                          |
| 7. Relay unit (diode)   |                          |

# ELECTRIC STARTING SYSTEM

EAS30495

## TROUBLESHOOTING

The starter motor fails to turn.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Drive chain cover

1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-130.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.	NG →	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK ↓		
3. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-136.	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 5-40.	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 8-131.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-133.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-131.	NG →	Replace the starter relay.
OK ↓		
8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.	NG →	Replace the main switch/immobilizer unit.
OK ↓		

## ELECTRIC STARTING SYSTEM

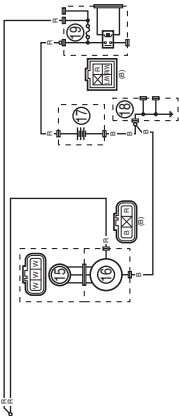
9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-139.	NG →	Replace the gear position switch.
OK ↓		
10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-129.	NG →	Replace the sidestand switch.
OK ↓		
11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-129.	NG →	Replace the clutch switch.
OK ↓		
12. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-129.	NG →	<ul style="list-style-type: none"><li>• The engine stop switch is faulty.</li><li>• Replace the right handlebar switch.</li></ul>
OK ↓		
13. Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-129.	NG →	<ul style="list-style-type: none"><li>• The start switch is faulty.</li><li>• Replace the right handlebar switch.</li></ul>
OK ↓		
14. Check the Diode. Refer to "CHECKING THE DIODE" on page 8-133.	NG →	Replace the diode.
OK ↓		
15. 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



- 15. Stator coil
- 16. Rectifier/regulator
- 17. Battery
- 18. Engine ground
- 19. Main fuse

EAS30497

## TROUBLESHOOTING

The battery is not being charged.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Air scoop (left)

1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-130.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.	NG →	<ul style="list-style-type: none"><li>• Clean the battery terminals.</li><li>• Recharge or replace the battery.</li></ul>
OK ↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-136.	NG →	Replace the stator coil assembly.
OK ↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-137.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-12.	NG →	Properly connect or replace the wiring harness.
OK ↓		
The charging system circuit is OK.		



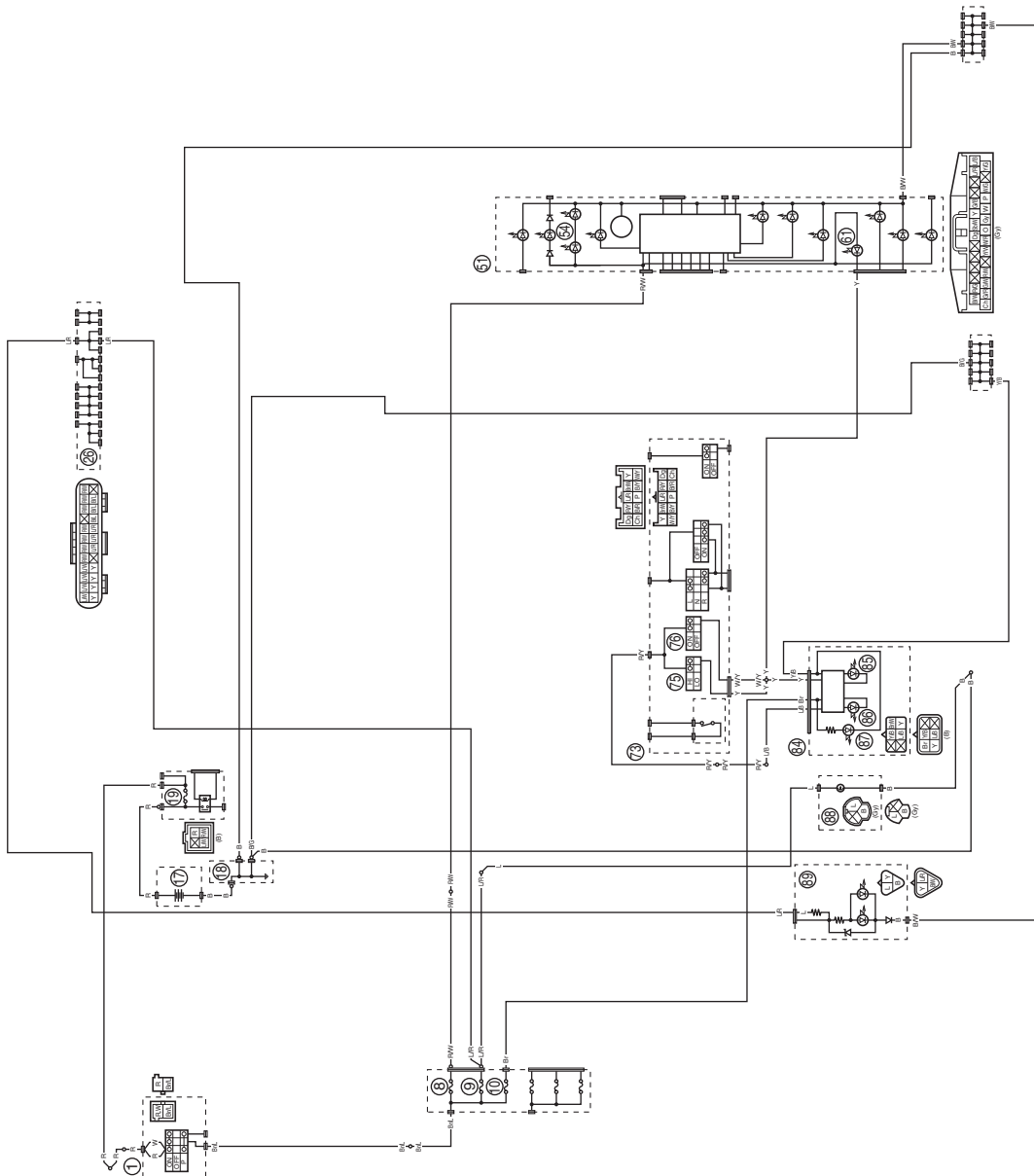


EAS20075

## LIGHTING SYSTEM

EAS30498

## CIRCUIT DIAGRAM



# LIGHTING SYSTEM

---

1. Main switch
8. Ignition fuse
9. Signaling system fuse
10. Headlight fuse
17. Battery
18. Engine ground
19. Main fuse
26. Joint coupler
51. Meter assembly
54. Meter light
61. High beam indicator light
73. Handlebar switch (left)
75. Dimmer switch
76. Pass switch
84. Headlight assembly
85. Headlight (high beam)
86. Headlight (low beam)
87. Auxiliary light
88. License plate light
89. Tail/brake light

EAS30499

## TROUBLESHOOTING

Any of the following fail to light: headlight (high beam), headlight (low beam), auxiliary light, license plate light, taillight, meter light or high beam indicator light.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover

<p>1. Check the license light bulb and license light bulb socket condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).</p>	NG →	<p>Replace the bulb and bulb socket.</p>
OK ↓		
<p>2. Check the fuses. (Ignition, signaling system, headlight and main) Refer to "CHECKING THE FUSES" on page 8-130.</p>	NG →	<p>Replace the fuse(s).</p>
OK ↓		
<p>3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.</p>	NG →	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK ↓		
<p>4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the main switch/immobilizer unit.</p>
OK ↓		
<p>5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"> <li>• The dimmer switch is faulty.</li> <li>• Replace the left handlebar switch.</li> </ul>
OK ↓		
<p>6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"> <li>• The pass switch is faulty.</li> <li>• Replace the left handlebar switch.</li> </ul>
OK ↓		
<p>7. Check the entire lighting system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-15.</p>	NG →	<p>Properly connect or replace the wiring harness.</p>
OK ↓		
<p>Replace the meter assembly, headlight assembly or tail/brake light.</p>		

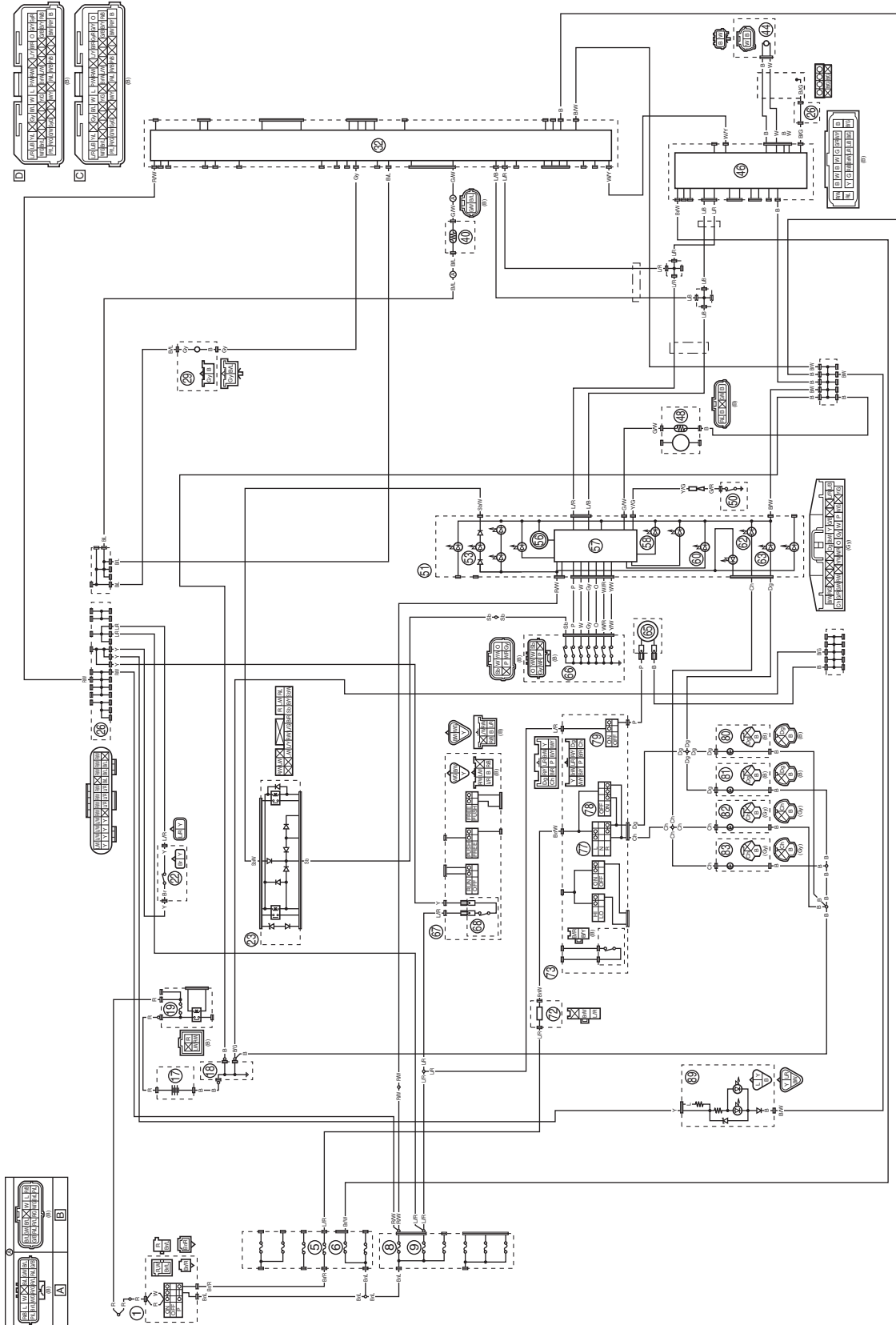


EAS20076

## SIGNALING SYSTEM

EAS30500

## CIRCUIT DIAGRAM



1. Main switch
5. Parking lighting fuse
6. ABS control unit fuse
8. Ignition fuse
9. Signaling system fuse
17. Battery
18. Engine ground
19. Main fuse
22. Rear brake light switch
23. Relay unit (diode)
26. Joint coupler
29. Crankshaft position sensor
32. ECU (Engine Control Unit)
40. Coolant temperature sensor
44. Front wheel sensor
46. ABS ECU
48. Fuel sender
50. Oil pressure switch
51. Meter assembly
53. Neutral indicator light
56. Tachometer
57. Multi-function meter
58. Oil pressure warning light
60. Coolant temperature warning light
62. Turn signal indicator light (left)
63. Turn signal indicator light (right)
65. Horn
66. Gear position switch
67. Handlebar switch (right)
68. Front brake light switch
72. Turn signal/hazard relay
73. Handlebar switch (left)
77. Turn signal switch
78. Hazard switch
79. Horn switch
80. Rear turn signal light (right)
81. Front turn signal light (right)
82. Rear turn signal light (left)
83. Front turn signal light (left)
89. Tail/brake light
- A. Wire harness
- B. Sub-wire harness (throttle position sensor, coolant temperature sensor, fuel injector, ISC unit)
- C. for XTZ690
- D. for XTZ690-U

EAS30501

## TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.
- The tachometer fails to operate.

### TIP

- Before troubleshooting, remove the following part(s):
  1. Rider seat
  2. Tail cover
  3. Drive sprocket cover
  4. Fuel tank

<p>1. Check the fuses. (Parking lighting, ABS control unit, ignition, signaling system, and main) Refer to "CHECKING THE FUSES" on page 8-130.</p>	NG →	<p>Replace the fuse(s).</p>
OK ↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.</p>	NG →	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK ↓		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the main switch/immobilizer unit.</p>
OK ↓		
<p>4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.</p>	NG →	<p>Properly connect or replace the wiring harness.</p>
OK ↓		
<p>Check the condition of each of the signaling system circuits. Refer to "Checking the signaling system".</p>		

### Checking the signaling system

The horn fails to sound.

<p>1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"> <li>• The horn switch is faulty.</li> <li>• Replace the left handlebar switch.</li> </ul>
OK ↓		



# SIGNALING SYSTEM

<p>2. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.</p>	NG →	<p>Properly connect or replace the wiring harness.</p>
OK ↓		
<p>Replace the horn.</p>		
<p><u>The brake light fails to come on.</u></p>		
<p>1. Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the front brake light switch.</p>
OK ↓		
<p>2. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the rear brake light switch.</p>
OK ↓		
<p>3. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.</p>	NG →	<p>Properly connect or replace the wiring harness.</p>
OK ↓		
<p>Replace the tail/brake light.</p>		
<p><u>The turn signal light, turn signal indicator light or both fail to blink.</u></p>		
<p>1. Check the turn signal light bulbs and sockets. Refer to "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).</p>	NG →	<p>Replace the turn signal light bulb(s), socket(s) or both.</p>
OK ↓		
<p>2. Check the turn signal switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"> <li>• The turn signal switch is faulty.</li> <li>• Replace the left handlebar switch.</li> </ul>
OK ↓		
<p>3. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<ul style="list-style-type: none"> <li>• The hazard switch is faulty.</li> <li>• Replace the left handlebar switch.</li> </ul>
OK ↓		
<p>4. Check the turn signal/hazard relay. Refer to "CHECKING THE RELAYS" on page 8-131.</p>	NG →	<p>Replace the turn signal/hazard relay.</p>
OK ↓		

# SIGNALING SYSTEM

5. 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 neutral indicator light fails to come on.

1. Check the gear position switch.  
Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-139.

NG →

Replace the gear position switch.

OK ↓

2. Check the relay unit (diode).  
Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-133.

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 pressure warning light fails to come on when the main switch is set to "ON".

1. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Disconnect the oil pressure switch lead from the oil pressure switch, and then check whether the oil pressure warning light comes on when the lead is connected to the engine ground.

NG →

Replace the meter assembly.

OK ↓

Replace the oil pressure switch.

# SIGNALING SYSTEM

The oil pressure warning light remains on after the engine is started.

1. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Measure the engine oil pressure.  
Refer to "MEASURING THE ENGINE OIL PRESSURE" on page 3-25.

NG →

Check the engine oil leakage, oil viscosity, oil seal, oil filter, or oil pump.

OK ↓

Replace the oil pressure switch.

The fuel meter fails to operate.

1. Check the fuel sender.  
Refer to "CHECKING THE FUEL SENDER" on page 8-137.

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 8-138.

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 8-130.

# SIGNALING SYSTEM

## The speedometer fails to operate.

1. Check the front wheel sensor.  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-14.

NG →

Replace the front wheel sensor.

OK ↓

2. Check the entire front wheel sensor wiring.  
See TIP.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the ECU, ABS ECU, or meter assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.

### **TIP**

Replace the wire harness if there is an open or short circuit.

- Between front wheel sensor coupler and ABS ECU coupler.  
(white–white)  
(black–black)
- Between ABS ECU coupler and meter assembly coupler.  
(blue/black–blue/black)  
(blue/red–blue/red)

## The tachometer fails to operate.

1. Check the crankshaft position sensor.  
Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-135.

NG →

Replace the starter coil assembly.

OK ↓

2. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the ECU or meter assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.

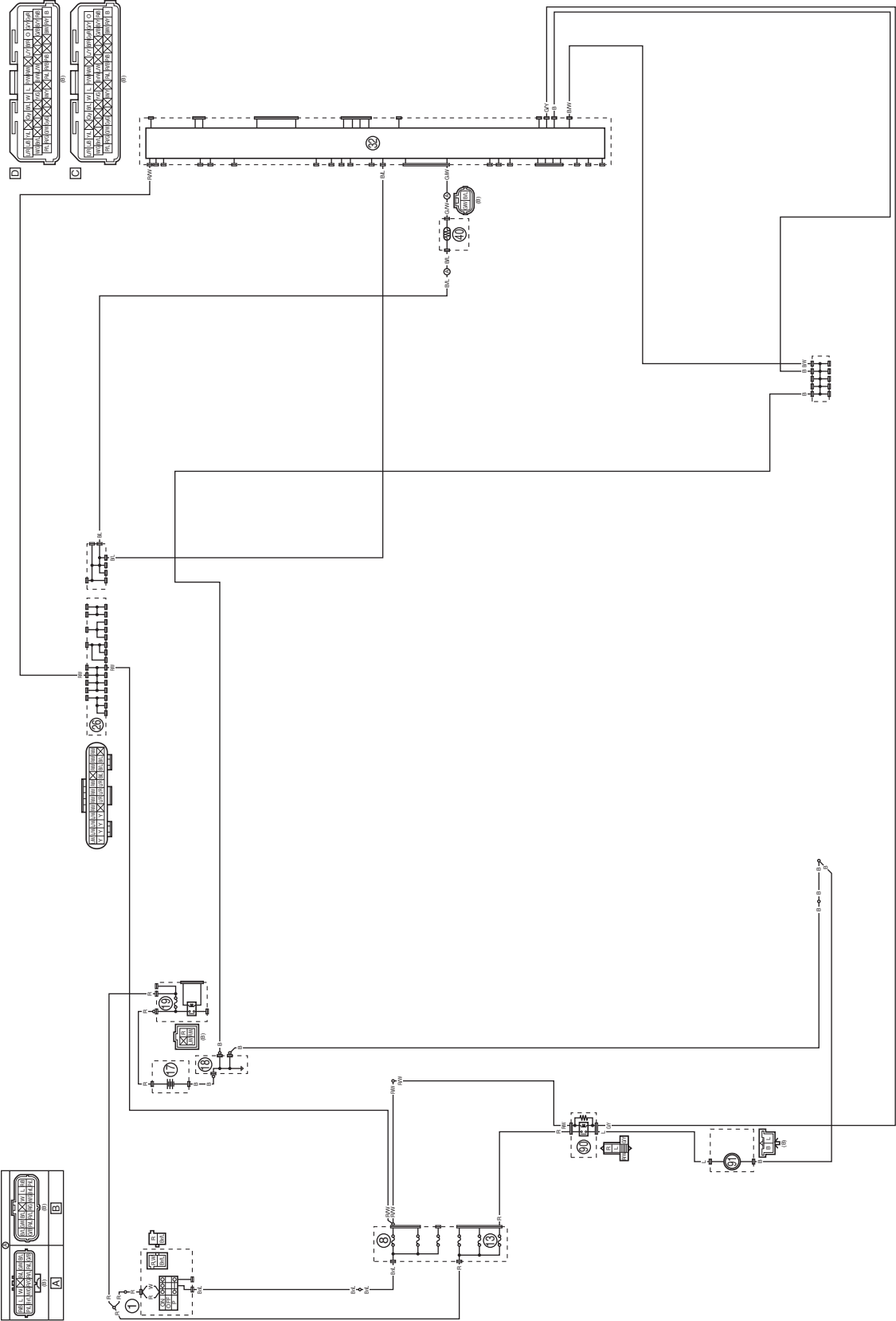


EAS20077

COOLING SYSTEM

EAS30502

CIRCUIT DIAGRAM



- 1. Main switch
- 8. Ignition fuse
- 13. Radiator fan motor fuse
- 17. Battery
- 18. Engine ground
- 19. Main fuse
- 26. Joint coupler
- 32. ECU (Engine Control Unit)
- 40. Coolant temperature sensor
- 90. Radiator fan motor relay
- 91. Radiator fan motor
- A. Wire harness
- B. Sub-wire harness (Refer to "SIGNALING SYSTEM" on page 8-19)
- C. for XTZ690
- D. for XTZ690-U

EAS30503

## TROUBLESHOOTING

The radiator fan motor fails to turn.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank

<p>1. Check the fuses. (Ignition, radiator fan motor, and main) Refer to "CHECKING THE FUSES" on page 8-130.</p>	NG →	<p>Replace the fuse(s).</p>
OK ↓		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.</p>	NG →	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
OK ↓		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	NG →	<p>Replace the main switch/immobilizer unit.</p>
OK ↓		
<p>4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-138.</p>	NG →	<p>Replace the radiator fan motor.</p>
OK ↓		
<p>5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-131.</p>	NG →	<p>Replace the radiator fan motor relay.</p>
OK ↓		
<p>6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-138.</p>	NG →	<p>Replace the coolant temperature sensor.</p>
OK ↓		



## COOLING SYSTEM

7. Check the entire cooling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-27.

NG →

Properly connect or replace the wiring harness.

OK ↓

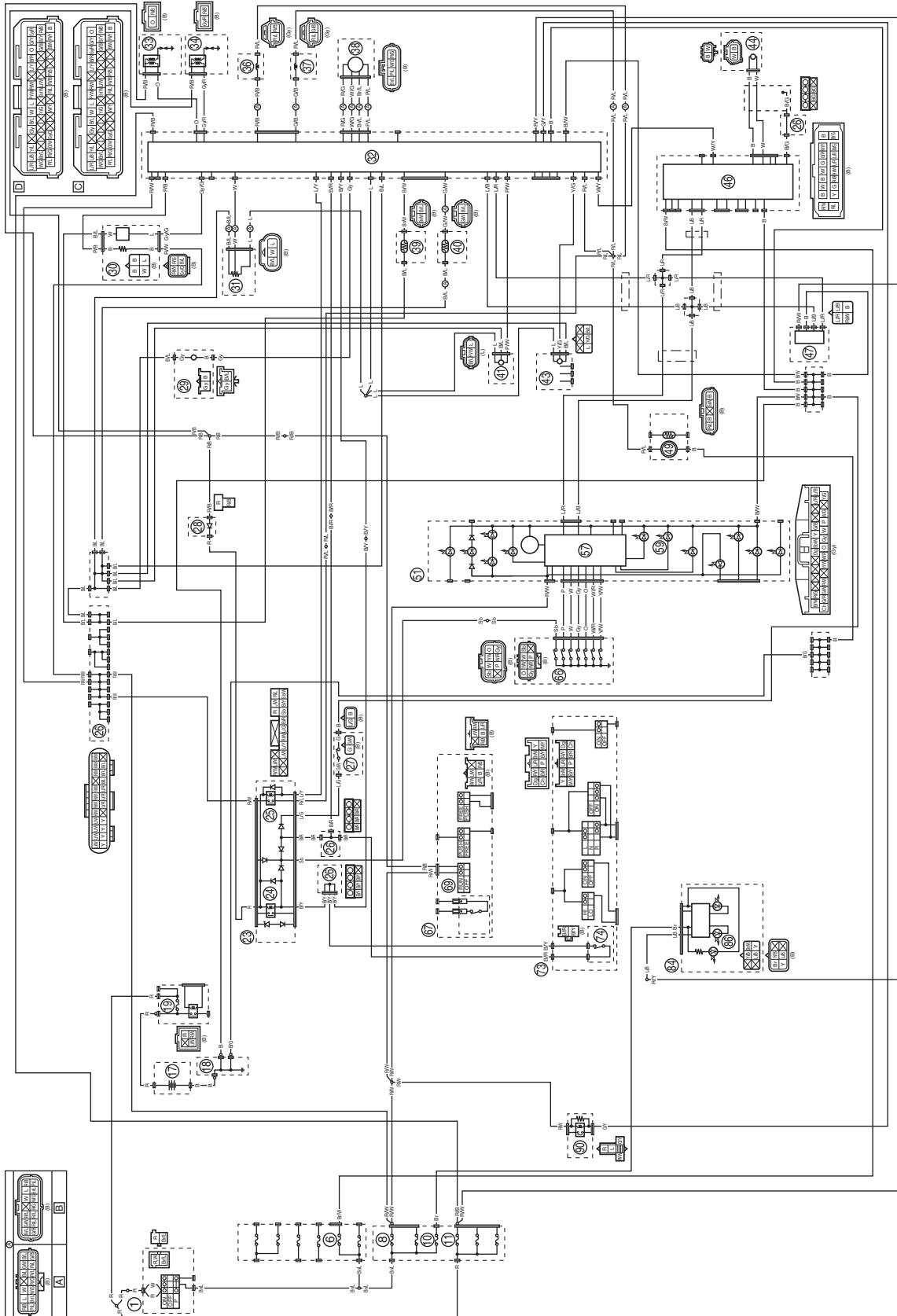
Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.

EAS20078

## FUEL INJECTION SYSTEM

EAS30504

### CIRCUIT DIAGRAM



# FUEL INJECTION SYSTEM

---

1. Main switch
6. ABS control unit fuse
8. Ignition fuse
10. Headlight fuse
11. Fuel injection system fuse
17. Battery
18. Engine ground
19. Main fuse
23. Relay unit (diode)
24. Starting circuit cut-off relay
25. Fuel pump relay
26. Joint coupler
27. Sidestand switch
28. Diode
29. Crankshaft position sensor
30. O<sub>2</sub> sensor
31. Throttle position sensor
32. ECU (Engine Control Unit)
33. Ignition coil #1
34. Ignition coil #2
36. Fuel injector #1
37. Fuel injector #2
38. ISC (Idle Speed Control) unit
39. Intake air temperature sensor
40. Coolant temperature sensor
41. Intake air pressure sensor
43. Lean angle sensor
44. Front wheel sensor
46. ABS ECU
47. Yamaha diagnostic tool coupler
49. Fuel pump
51. Meter assembly
57. Multi-function meter
59. Engine trouble warning light
66. Gear position switch
67. Handlebar switch (right)
69. Engine stop switch
73. Handlebar switch (left)
74. Clutch switch
84. Headlight assembly
86. Headlight (low beam)
90. Radiator fan motor relay
- A. Wire harness
- B. Sub-wire harness (Refer to "SIGNALING SYSTEM" on page 8-19)
- C. for XTZ690
- D. for XTZ690-U

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 8-34. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to "TROUBLESHOOTING DETAILS (FAULT CODE)" on page 8-34 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 8-34.

### 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.

# FUEL INJECTION SYSTEM

**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 9-8 and “DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE” on page 9-10.

01: Throttle position sensor signal (throttle angle)  
30: Cylinder-#1 ignition coil  
31: Cylinder-#2 ignition coil  
36: Fuel injector #1  
37: Fuel injector #2

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**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03262**

### TIP

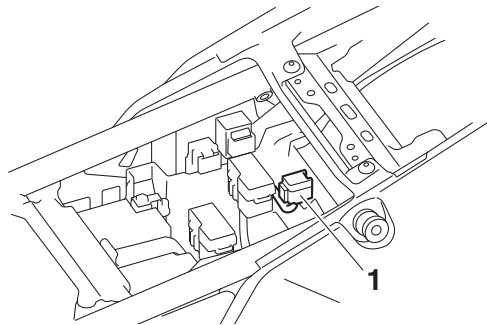
A generic scan tool can also be used to identify malfunctions.



**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.

# FUEL INJECTION SYSTEM

## Parts connected to the ECU

The following parts are connected to the ECU.

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Fuel injector #1
- Fuel injector #2
- Ignition coil #1
- Ignition coil #2
- Throttle position sensor
- Intake air pressure sensor
- Coolant temperature sensor
- Intake air temperature sensor
- O<sub>2</sub> sensor
- Lean angle sensor
- ABS ECU
- ISC (Idle Speed Control) unit
- Relay unit (diode)
- Headlight assembly
- Radiator fan motor relay
- Meter assembly
- Immobilizer unit

## 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.

<b>Fault code No.</b>	<b>P0030</b>		
<b>Item</b>	<b>O<sub>2</sub> sensor heater: defective heater controller detected.</b>		
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	—		
<b>Tool display</b>	—		
<b>Procedure</b>	—		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

# FUEL INJECTION SYSTEM

1	<p>Connection of O<sub>2</sub> 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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p> <p><b>TIP</b> _____</p> <p>For this check, also set the engine stop switch to “ON”.</p>
2	<p>Connection of wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p> <p><b>TIP</b> _____</p> <p>For this check, also set the engine stop switch to “ON”.</p>
3	<p>Wire harness continuity.</p>	<p>Open or short circuit → Properly connect or replace the wire harness. Between O<sub>2</sub> sensor coupler and ECU coupler. pink/black–pink/black Between O<sub>2</sub> sensor coupler and joint coupler. red/white–red/white Between joint coupler and ignition fuse. red/white–red/white Between ignition fuse and main switch. brown/blue–brown/blue</p>	<p>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.</p> <p><b>TIP</b> _____</p> <p>For this check, also set the engine stop switch to “ON”.</p>

# FUEL INJECTION SYSTEM

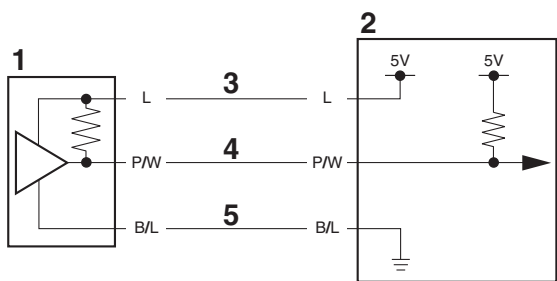
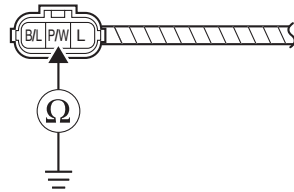
4	Defective O <sub>2</sub> sensor heater.	Replace the O <sub>2</sub> sensor.	Turn the main switch to "ON", and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is "Recover" → Go to item 6 and finish the service. Condition is "Malfunction" → 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. <b>TIP</b> For this check, also set the engine stop switch to "ON".
5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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. P0107, P0108

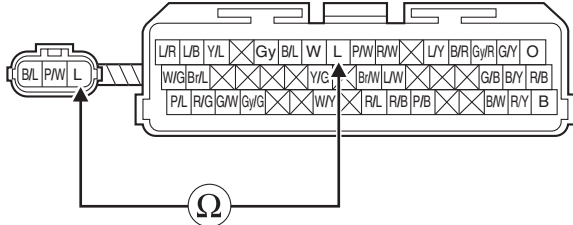
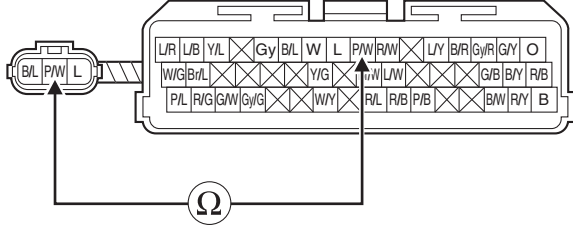
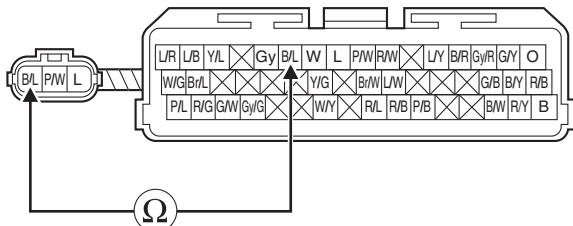
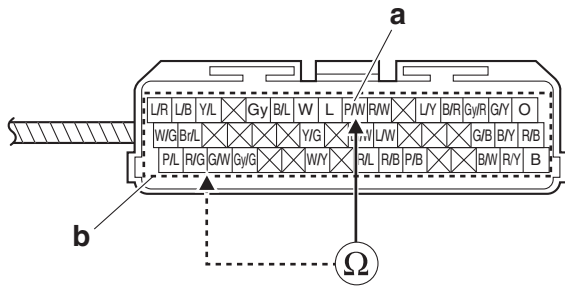
<b>Fault code No.</b>	<b>P0107, P0108</b>		
<b>Item</b>	<b>[P0107] Intake air pressure sensor: ground short circuit detected.</b> <b>[P0108] Intake air pressure sensor: open or power short circuit detected.</b>		
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	03		
<b>Tool display</b>	Displays the intake air pressure.		
<b>Procedure</b>	Operate the throttle while pushing the start switch. (If the display value changes, the performance is OK.)		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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.



# FUEL INJECTION SYSTEM

2	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p>
3	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness.</p>	<p>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.</p>
3-1	<div style="text-align: center;">  </div> <p>1. Intake air pressure sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead</p>		
3-2	<p>Disconnect the ECU coupler from the ECU. Disconnect the intake air pressure sensor coupler from the intake air pressure sensor.</p>		
3-3	<p>[For P0107] Ground short circuit Between intake air pressure sensor coupler and ground: pink/white–ground If there is continuity, replace the wire harness.</p> <div style="text-align: center;">  </div>		

# FUEL INJECTION SYSTEM

<p>3-4</p>	<p>[For P0108] Open circuit Between intake air pressure sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness.</p> 
<p>3-5</p>	<p>[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.</p> 
<p>3-6</p>	<p>[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.</p> 
<p>3-7</p>	<p>Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-35.</p>
<p>3-8</p>	<p>[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.</p> 

## FUEL INJECTION SYSTEM

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. → Check the intake air pressure sensor. 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 8-130.	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.	

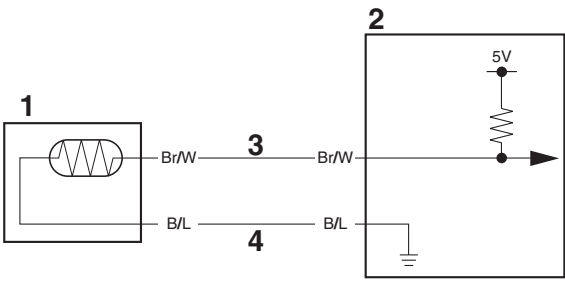
### Fault code No. P0112, P0113

#### TIP

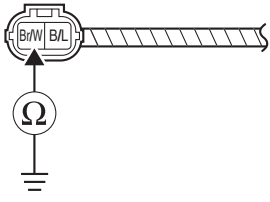
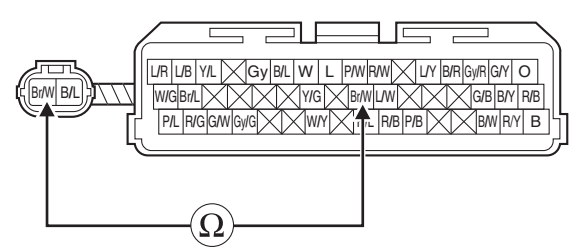
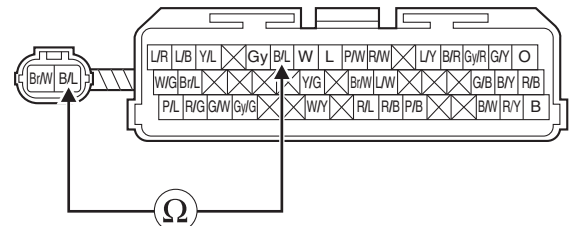
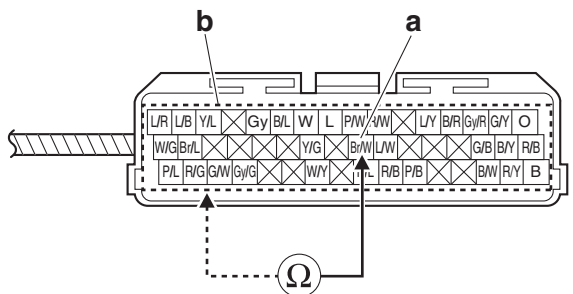
Perform this procedure when the engine is cold.

<b>Fault code No.</b>	<b>P0112, P0113</b>
<b>Item</b>	<b>[P0112] Intake air temperature sensor: ground short circuit detected.</b> <b>[P0113] Intake air temperature sensor: open or power short circuit detected.</b>
<b>Fail-safe system</b>	Able to start engine Able to drive vehicle
<b>Diagnostic code No.</b>	05
<b>Tool display</b>	Displays the air temperature.

# FUEL INJECTION SYSTEM

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.
3-1	 <p>1. Intake air temperature sensor 2. ECU 3. Sensor output lead 4. Sensor ground lead</p>		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the intake air temperature sensor coupler from the intake air temperature sensor.		

# FUEL INJECTION SYSTEM

<p>3-3</p>	<p>[For P0112] Ground short circuit Between intake air temperature sensor coupler and ground: brown/white–ground If there is continuity, replace the wire harness.</p> 
<p>3-4</p>	<p>[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.</p> 
<p>3-5</p>	<p>[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.</p> 
<p>3-6</p>	<p>Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-35.</p>
<p>3-7</p>	<p>[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.</p> 

# FUEL INJECTION SYSTEM

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. → Check the intake air temperature sensor. 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 6.
6	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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.	

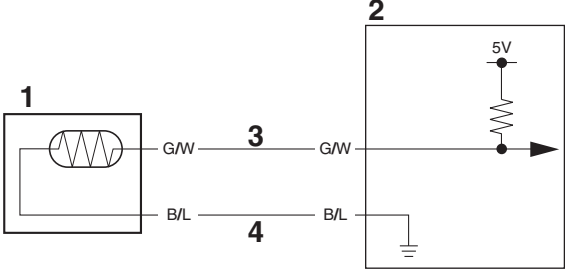
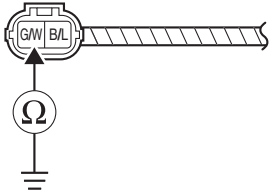
## Fault code No. P0117, P0118

### TIP

Perform this procedure when the engine is cold.

<b>Fault code No.</b>	<b>P0117, P0118</b>		
<b>Item</b>	<b>[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.</b>		
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	06		
<b>Tool display</b>	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.		
<b>Procedure</b>	Compare the actually measured coolant temperature with the tool display value.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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 8 and finish the service. Condition is "Malfunction" → Go to item 2.

# FUEL INJECTION SYSTEM

2	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p>
3	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the sub-wire harness.</p>	<p>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.</p>
4	<p>Wire harness and/or sub-wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness and/or sub-wire harness.</p>	<p>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.</p>
4-1	<div style="text-align: center;">  </div> <p>1. Coolant temperature sensor 2. ECU 3. Sensor output lead 4. Sensor ground lead</p>		
4-2	<p>Disconnect the ECU coupler from the ECU. Disconnect the coolant temperature sensor coupler from the coolant temperature sensor.</p>		
4-3	<p>[For P0117] Ground short circuit Between coolant temperature sensor coupler and ground: green/white–ground If there is continuity, replace the wire harness and/or sub-wire harness.</p> <div style="text-align: center;">  </div>		

# FUEL INJECTION SYSTEM

4-4	<p>[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 and/or sub-wire harness.</p>		
4-5	<p>[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 and/or sub-wire harness.</p>		
4-6	<p>Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-35.</p>		
4-7	<p>[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 and/or sub-wire harness.</p>		
5	<p>Installed condition of coolant temperature sensor.</p>	<p>Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.</p>	<p>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.</p>



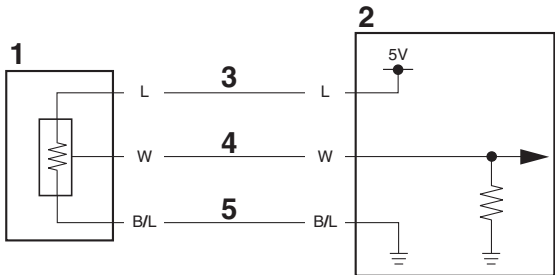
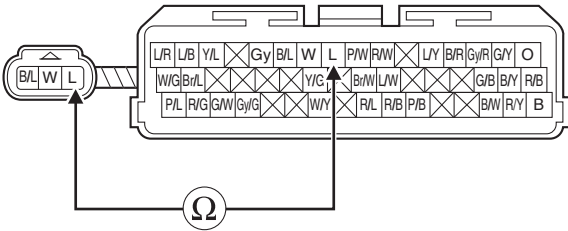
# FUEL INJECTION SYSTEM

6	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective.	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 8-130.	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.	

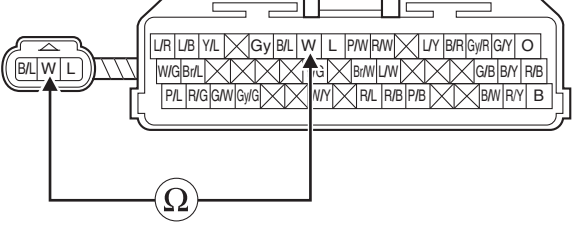
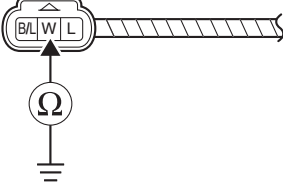
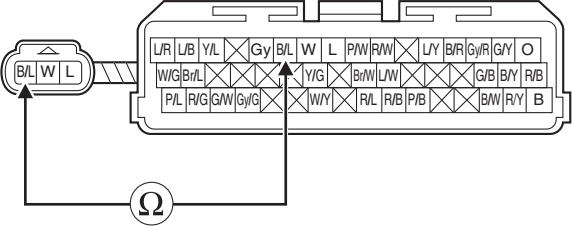
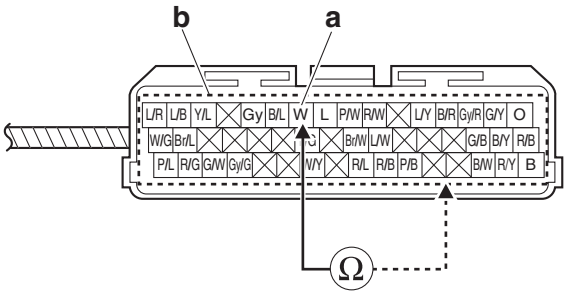
## Fault code No. P0122, P0123

<b>Fault code No.</b>		<b>P0122, P0123</b>	
<b>Item</b>		<b>[P0122] Throttle position sensor: open or ground short circuit detected.</b> <b>[P0123] Throttle position sensor: power short circuit detected.</b>	
<b>Fail-safe system</b>		Able/Unable to start engine Able/Unable to drive vehicle	
<b>Diagnostic code No.</b>		01	
<b>Tool display</b>		Throttle position sensor signal • 11–21 (fully closed position) • 96–106 (fully open position)	
<b>Procedure</b>		• Check with throttle valves fully closed. • Check with throttle valves fully open.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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 9 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 9 and finish the service. Condition is "Malfunction" → Go to item 3.

# FUEL INJECTION SYSTEM

3	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the sub-wire harness.</p>	<p>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 9 and finish the service. Condition is “Malfunction” → Go to item 4.</p>
4	<p>Wire harness and/or sub-wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness and/or sub-wire harness.</p>	<p>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 9 and finish the service. Condition is “Malfunction” → Go to item 5.</p>
4-1	<div style="text-align: center;">  </div> <p>1. Throttle position sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead</p>		
4-2	<p>Disconnect the ECU coupler from the ECU. Disconnect the throttle position sensor coupler from the throttle position sensor.</p>		
4-3	<p>[For P0122] Open circuit Between throttle position sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness and/or sub-wire harness.</p> <div style="text-align: center;">  </div>		

# FUEL INJECTION SYSTEM

<p>4-4</p>	<p>[For P0122] Open circuit Between throttle position sensor coupler and ECU coupler: white–white If there is no continuity, replace the wire harness and/or sub-wire harness.</p> 
<p>4-5</p>	<p>[For P0122] Ground short circuit Between throttle position sensor coupler and ground: white–ground If there is continuity, replace the wire harness and/or sub-wire harness.</p> 
<p>4-6</p>	<p>[For P0123] Open circuit Between throttle position sensor coupler and ECU coupler: black/blue–black/blue If there is no continuity, replace the wire harness and/or sub-wire harness.</p> 
<p>4-7</p>	<p>Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-35.</p>
<p>4-8</p>	<p>[For P0122/P0123] Short circuit Between throttle position sensor output terminal (white) “a” of ECU coupler and any other ECU coupler terminal “b”.</p> <p>If there is continuity, replace the wire harness and/or sub-wire harness.</p> 

# FUEL INJECTION SYSTEM

5	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 7-11.	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 9 and finish the service. Condition is “Malfunction” → Go to item 6.
6	Throttle position sensor resistance.	Measure the throttle position sensor resistance. black/blue–blue Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-138.	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 9 and finish the service. Condition is “Malfunction” → Go to item 7.
7	Defective throttle position sensor.	Check throttle position sensor signal. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 11–21 is indicated. When throttle valves are fully open: A value of 96–106 is indicated.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recover” → Go to item 9 and finish the service. Condition is “Malfunction” → Go to item 8.
8	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-130.	Service is finished.
9	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

<b>Fault code No.</b>	<b>P0132</b>		
<b>Item</b>	<b>O<sub>2</sub> sensor: short circuit detected (power short circuit).</b>		
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	—		
<b>Tool display</b>	—		
<b>Procedure</b>	—		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

## FUEL INJECTION SYSTEM

1	Installed condition of O <sub>2</sub> 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 <sub>2</sub> 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 wire harness ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or 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 ECU coupler and O <sub>2</sub> sensor coupler. gray/green-gray/green Between O <sub>2</sub> sensor coupler and joint coupler. black/blue-black/blue Between joint coupler and ECU coupler. black/blue-black/blue	Turn the main switch to "ON", 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 <sub>2</sub> sensor.	Check the O <sub>2</sub> sensor. Defective → Replace the O <sub>2</sub> sensor. Refer to "ENGINE REMOVAL" on page 5-3.	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 8-130.	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.	

# FUEL INJECTION SYSTEM

## Fault code No. P0201

<b>Fault code No.</b>	<b>P0201</b>		
<b>Item</b>	<b>Fuel injector #1: malfunction in fuel injector #1.</b>		
<b>Fail-safe system</b>	Able to start engine (depending on the number of faulty cylinders)		
	Able to drive vehicle (depending on the number of faulty cylinders)		
<b>Diagnostic code No.</b>	36		
<b>Actuation</b>	Actuates fuel injector #1 five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated.		
<b>Procedure</b>	Disconnect the fuel pump coupler. Check that fuel injector #1 is actuated five times by listening for the operating sound.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of fuel 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 7. No operating sound → Go to item 2.
2	Defective fuel injector #1.	Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 8-140.	Execute the diagnostic mode. (Code No. 36) 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. 36) 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. 36) Operating sound → Go to item 7. No operating sound → Go to item 5.
5	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between fuel injector #1 coupler and sub-wire harness coupler. red/black–red/black red/blue–red/blue Between sub-wire harness coupler and ECU coupler. red/black–red/black red/blue–red/blue	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 6.

# FUEL INJECTION SYSTEM

6	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Service is finished.
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. P0202

<b>Fault code No.</b>	<b>P0202</b>		
<b>Item</b>	<b>Fuel injector #2: malfunction in fuel injector #2.</b>		
<b>Fail-safe system</b>	Able to start engine (depending on the number of faulty cylinders)		
	Able to drive vehicle (depending on the number of faulty cylinders)		
<b>Diagnostic code No.</b>	37		
<b>Actuation</b>	Actuates fuel injector #2 five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated.		
<b>Procedure</b>	Disconnect the fuel pump coupler. Check that fuel injector #2 is actuated five times by listening for the operating sound.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of fuel injector #2 coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 37) Operating sound → Go to item 7. No operating sound → Go to item 2.
2	Defective fuel injector #2.	Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTORS" on page 8-140.	Execute the diagnostic mode. (Code No. 37) 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. 37) 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. 37) Operating sound → Go to item 7. No operating sound → Go to item 5.

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5	Wire harness continuity and/or sub-wire harness.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between fuel injector #2 coupler and sub-wire harness coupler. green/black–green/black red/blue–red/blue Between sub-wire harness coupler and ECU coupler. green/black–green/black red/blue–red/blue	Execute the diagnostic mode. (Code No. 37) 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 8-130.	Service is finished.
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. P0335

<b>Fault code No.</b>		<b>P0335</b>	
<b>Item</b>		<b>Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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.



# FUEL INJECTION SYSTEM

3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and ECU coupler. gray-gray Between crankshaft position sensor coupler and ECU coupler. 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. Check the gap between the crankshaft position sensor and the generator rotor.	Improperly installed sensor → Reinstall or replace the sensor. Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.	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 8-135. 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 8-130.	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. P0351

<b>Fault code No.</b>	<b>P0351</b>		
<b>Item</b>	<b>Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.</b>		
<b>Fail-safe system</b>	Able to start engine (depending on the number of faulty cylinders)		
	Able to drive vehicle (depending on the number of faulty cylinders)		
<b>Diagnostic code No.</b>	30		
<b>Actuation</b>	Actuates the cylinder-#1 ignition coil five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.		
<b>Procedure</b>	Check that a spark is generated five times. • Connect an ignition checker.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

## FUEL INJECTION SYSTEM

1	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p>
2	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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.</p>
3	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between cylinder-#1 ignition coil coupler and ECU coupler. orange–orange</p>	<p>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.</p>
4	<p>Installed condition of cylinder-#1 ignition coil.</p>	<p>Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.</p>	<p>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.</p>
5	<p>Defective cylinder-#1 ignition coil.</p>	<p>Measure the primary coil resistance of the cylinder-#1 ignition coil. Replace if out of specification. Refer to "CHECKING THE IGNITION COILS" on page 8-134.</p>	<p>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.</p>
6	<p>Malfunction in ECU.</p>	<p>Execute the diagnostic mode. (Code No. 30) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</p>	<p>Service is finished.</p>

# FUEL INJECTION SYSTEM

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.	
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## Fault code No. P0352

<b>Fault code No.</b>	<b>P0352</b>		
<b>Item</b>	<b>Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.</b>		
<b>Fail-safe system</b>	Able to start engine (depending on the number of faulty cylinders)		
	Able to drive vehicle (depending on the number of faulty cylinders)		
<b>Diagnostic code No.</b>	31		
<b>Actuation</b>	Actuates the cylinder-#2 ignition coil five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen comes on each time the ignition coil is actuated.		
<b>Procedure</b>	Check that a spark is generated five times. • Connect an ignition checker.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of cylinder-#2 ignition coil coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. 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.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between cylinder-#2 ignition coil coupler and ECU coupler. gray/red-gray/red	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.

## FUEL INJECTION SYSTEM

4	Installed condition of cylinder-#2 ignition coil.	Check for looseness or pinching. Improperly installed ignition coil → Reinstall or replace the ignition coil.	Start the engine and let it idle for approximately 5 seconds. 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 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 8-134.	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.	Execute the diagnostic mode. (Code No. 31) No spark → Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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. P0500

<b>Fault code No.</b>		<b>P0500</b>	
<b>Item</b>	<b>A</b>	<b>Front wheel sensor: no normal signals are received from the front wheel sensor.</b>	
	<b>B</b>	<b>Gear position switch: open or short circuit is detected.</b>	
	<b>C</b>	<b>Clutch switch: open or short circuit is detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		07	
<b>Tool display</b>		Front wheel speed pulse 0-999	
<b>Procedure</b>		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.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

## FUEL INJECTION SYSTEM

A-1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases.</p> <p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"</p>	<p>Value does not increase → Go to item A-2.</p> <p>Incorrect indication → Go to item B-2 for the gear position switch.</p> <p>Incorrect indication → Go to item C-2 for the clutch switch.</p>
A-2	<p>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).</p>	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front 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.</p>
A-3	<p>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).</p>	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front 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.</p>
A-4	<p>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).</p>	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front 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.</p>
A-5	Front wheel sensor lead continuity, or defective front wheel sensor.	<p>Open or short circuit, or defective sensor → Replace the front wheel sensor.</p> <p>Between front wheel sensor coupler and ABS ECU coupler. black-black white-white</p> <p>Between ABS ECU coupler and ECU coupler. white/yellow-white/yellow</p>	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front 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.</p>

# FUEL INJECTION SYSTEM

A-6	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Execute the diagnostic mode. (Code No. 07) Rotate the front 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.
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 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".	

<b>Fault code No.</b>	<b>P0500</b>	
<b>Item</b>	<b>A</b>	<b>Front wheel sensor: no normal signals are received from the front wheel sensor.</b>
	<b>B</b>	<b>Gear position switch: open or short circuit is detected.</b>
	<b>C</b>	<b>Clutch switch: open or short circuit is detected.</b>
<b>Fail-safe system</b>	Able to start engine	
	Able to drive vehicle	
<b>Diagnostic code No.</b>	21	
<b>Tool display</b>	Gear position switch • "ON" (when the transmission is in neutral) • "OFF" (when the transmission is in gear or the clutch lever released)	
<b>Procedure</b>	Operate the transmission and clutch lever.	

<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
B-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases.  Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"  When the transmission is in gear with the clutch lever squeezed and the sidestand is retracted: "ON"	Value does not increase → Go to item A-2 for the front wheel sensor.  Incorrect indication → Go to item B-2.  Incorrect indication → Go to item C-2 for the clutch switch.

## FUEL INJECTION SYSTEM

B-2	<p>Connection of gear position switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-3.</p>
B-3	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-4.</p>
B-4	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between ECU coupler and joint coupler. black/red–black/red Between joint coupler and relay unit coupler. black/red–black/red Between relay unit coupler and gear position switch coupler. sky blue–sky blue</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-5.</p>
B-5	<p>Defective relay unit (diode).</p>	<p>Check the relay unit (diode). Replace if defective. Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-133.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-6.</p>
B-6	<p>Defective gear position switch.</p>	<p>Check the gear position switch. Replace if defective. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-139.</p>	<p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-7.</p>

## FUEL INJECTION SYSTEM

B-7	Faulty shift drum (neutral detection area).	Malfunction → Replace the shift drum assembly. Refer to "TRANSMISSION" on page 5-82.	Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF" Correct indication → Go to item B-9. Incorrect indication → Go to item B-8.
B-8	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Service is finished.
B-9	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".	

<b>Fault code No.</b>	<b>P0500</b>		
<b>Item</b>	<b>A</b>	<b>Front wheel sensor: no normal signals are received from the front wheel sensor.</b>	
	<b>B</b>	<b>Gear position switch: open or short circuit is detected.</b>	
	<b>C</b>	<b>Clutch switch: open or short circuit is detected.</b>	
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	21		
<b>Tool display</b>	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)		
<b>Procedure</b>	Operate the transmission, clutch lever, and sidestand.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>



## FUEL INJECTION SYSTEM

C-1	Locate the malfunction.	<p>Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases.</p> <p>Execute the diagnostic mode. (Code No. 21) When the transmission is in neutral: "ON" When the transmission is in gear with the clutch lever released: "OFF"</p> <p>When the transmission is in gear with the clutch lever squeezed and the sidestand retracted: "ON"</p>	<p>Value does not increase → Go to item A-2 for the front wheel sensor.</p> <p>Incorrect indication → Go to item B-2 for the gear position switch.</p> <p>Incorrect indication → Go to item C-2.</p>
C-2	Clutch lever adjustment.	Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-12.	<p>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-10. Incorrect indication → Go to item C-3.</p>
C-3	<p>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).</p>	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>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-10. Incorrect indication → Go to item C-4.</p>
C-4	<p>Connection of left handlebar 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).</p>	Improperly connected → Connect the coupler securely or replace the wire harness.	<p>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-10. Incorrect indication → Go to item C-5.</p>

## FUEL INJECTION SYSTEM

C-5	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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-10.            Incorrect indication → Go to item C-6.</p>
C-6	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness and/or left handlebar switch.            Between clutch switch coupler and left handlebar switch coupler.            black/red–black/red            black/yellow–black/yellow            Between left handlebar switch coupler and joint coupler.            black/red–black/red            black/yellow–black/yellow            Between joint coupler and ECU coupler.            black/red–black/red            black/yellow–black/yellow</p>	<p>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-10.            Incorrect indication → Go to item C-7.</p>
C-7	<p>Defective clutch switch.</p>	<p>Check the clutch switch. Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	<p>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-10.            Incorrect indication → Go to item C-8.</p>
C-8	<p>Defective left handlebar switch.</p>	<p>Check the left handlebar switch. Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	<p>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-10.            Incorrect indication → Go to item C-9.</p>

# FUEL INJECTION SYSTEM

C-9	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Service is finished.
C-10	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. P0507

### TIP

- If fault code numbers "P0507" and "P0560" are both indicated, take the actions specified for fault code number "P0560" first.
- If fault code numbers "P0507" and "P0500" are both indicated, take the actions specified for fault code number "P0500" first.

<b>Fault code No.</b>		<b>P0507</b>	
<b>Item</b>	<b>A</b>	<b>Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).</b>	
	<b>B</b>	<b>Defective ISC (idle speed control) unit (ISC operating sound is not heard).</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		54	
<b>Actuation</b>		Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The indicator on the Yamaha diagnostic tool screen comes on during the operation.	
<b>Procedure</b>		Check that the ISC unit is actuated three times by listening for the operating sound.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
A-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve. This operation takes approximately 6 seconds.	ISC operating sound is heard → Go to item A-2. ISC operating sound is not heard → Go to item B-2 for the defective ISC (idle speed control) unit.

# FUEL INJECTION SYSTEM

A-2	Incorrect front wheel sensor signal.	Check the front wheel sensor. Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value does not increase → Go to the section for the defective front wheel sensor for fault code No. P0500.	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 A-6 and finish the service. Condition is "Malfunction" → Go to item A-3.
A-3	Throttle valve does not fully close.	Check the throttle body assembly. Refer to "THROTTLE BODIES" on page 7-5. Check the throttle grip free play. Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-29.	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 A-6 and finish the service. Condition is "Malfunction" → Go to item A-4.
A-4	ISC valve is not moving correctly.	Replace the ISC valve. Refer to "Cleaning the ISC (idle speed control) valve" on page 7-10.	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 A-6 and finish the service. Condition is "Malfunction" → Go to item A-5.
A-5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Service is finished.
A-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.	

<b>Fault code No.</b>		<b>P0507</b>	
<b>Item</b>	<b>A</b>	<b>Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).</b>	
	<b>B</b>	<b>Defective ISC (idle speed control) unit (ISC operating sound is not heard).</b>	
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	54		
<b>Actuation</b>	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The indicator on the Yamaha diagnostic tool screen comes on during the operation.		
<b>Procedure</b>	Check that the ISC unit is actuated three times by listening for the operating sound.		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>

## FUEL INJECTION SYSTEM

B-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then fully opens the valve. This operation takes approximately 6 seconds.	ISC operating sound is heard → Go to item A-2 for the component other than ISC (idle speed control) unit is defective. ISC operating sound is not heard → Go to item B-2.
B-2	Connection of ISC (idle speed control) unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the sub-wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-3.
B-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.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-4.
B-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. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-5.
B-5	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Replace the wire harness and/or sub-wire harness. Between ISC (idle speed control) unit coupler and sub-wire harness coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue Between sub-harness and ECU coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-6.
B-6	Installed condition of ISC (idle speed control) unit.	Check for looseness or pinching. Improperly installed ISC (idle speed control) unit → Reinstall the ISC (idle speed control) unit. Check the intake air passages for air leaks.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-7.
B-7	ISC valve is not moving correctly.	Replace the ISC valve. Refer to “Cleaning the ISC (idle speed control) valve” on page 7-10.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9. ISC operating sound is not heard → Go to item B-8.

# FUEL INJECTION SYSTEM

B-8	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Service is finished.
B-9	Delete the fault code and check that the engine trouble warning light goes off.	Start the engine and let it idle for approximately 10 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. P0511

<b>Fault code No.</b>	<b>P0511</b>		
<b>Item</b>	<b>ISC unit: malfunction in ISC unit.</b>		
<b>Fail-safe system</b>	Able to start engine		
	Able to drive vehicle		
<b>Diagnostic code No.</b>	—		
<b>Tool display</b>	—		
<b>Procedure</b>	—		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of ISC 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 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" → Go to item 2.
2	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" → 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.

# FUEL INJECTION SYSTEM

4	Wire harness and/or sub-wire harness continuity.	Open or short circuit → Properly connect or replace the wire harness and/or sub-wire harness. Between ISC (idle speed control) unit coupler and sub-wire harness coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue Between sub-harness and ECU coupler. red/green–red/green pink/blue–pink/blue white/green–white/green brown/blue–brown/blue	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	Faulty ISC valve operation.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is not heard → Replace the ISC valve. Refer to “Cleaning the ISC (idle speed control) valve” on page 7-10.	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 8-130.	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. P0560

<b>Fault code No.</b>		<b>P0560</b>	
<b>Item</b>		<b>Charging voltage is abnormal.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Malfunction in charging system.	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-12. Defective rectifier/regulator or stator coil → 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.

# FUEL INJECTION SYSTEM

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.	
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## Fault code No. P0601

<b>Fault code No.</b>		<b>P0601</b>	
<b>Item</b>		<b>Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)</b>	
<b>Fail-safe system</b>		Able/Unable to start engine	
		Able/Unable to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	Turn the main switch to "ON". Check that the engine trouble warning light does not come on.

## Fault code No. P062F

<b>Fault code No.</b>		<b>P062F</b>	
<b>Item</b>		<b>EEPROM fault code number: an error is detected while reading or writing on EEPROM.</b>	
<b>Fail-safe system</b>		Able/Unable to start engine	
		Able/Unable to drive vehicle	
<b>Diagnostic code No.</b>		60	
<b>Tool display</b>		00	
		<ul style="list-style-type: none"> <li>No malfunctions detected (If the self-diagnosis fault code P062F is indicated, the ECU is defective.)</li> </ul>	
		01–02 (CO adjustment value)	
		<ul style="list-style-type: none"> <li>(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.)</li> </ul>	
		11 (Data error for ISC (idle speed control) learning values)	
		12 (O <sub>2</sub> feedback learning value)	
		13 (OBD memory value)	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Locate the malfunction	Execute the diagnostic mode. (Code No. 60) 00: Go to item 5. 01: Go to item 2. 02: Go to item 3. 11–13: Go to item 4.	



# FUEL INJECTION SYSTEM

2	"01" is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #1.	Activate the CO volume adjustment mode using the Yamaha diagnostic tool. Click the "Step up" or "Step down" button 1 time. (Clicking the "Step up" or "Step down" button during this procedure does not change the CO volume.) Then, turn the main switch to "OFF". For more information, refer to the operation manual of the Yamaha diagnostic tool.	Set 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" → Repeat item 1. If the same number is indicated, go to item 5.
3	"02" is indicated in diagnostic mode (code No. 60). EEPROM data error for adjustment of CO concentration of cylinder #2.	Activate the CO volume adjustment mode using the Yamaha diagnostic tool. Click the "Step up" or "Step down" button 1 time. (Clicking the "Step up" or "Step down" button during this procedure does not change the CO volume.) Then, turn the main switch to "OFF". For more information, refer to the operation manual of the Yamaha diagnostic tool.	Set 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" → Repeat item 1. If the same number is indicated, go to item 5.
4	"11" is indicated in diagnostic mode (code No. 60). EEPROM data error for ISC (idle speed control) learning values. "12" is indicated in the diagnostic mode. (Code No. 60) EEPROM data error for O <sub>2</sub> feedback learning values. "13" is indicated in the diagnostic mode. (Code No. 60) EEPROM data error for OBD memory values.	Turn the main switch to "OFF".	Set 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" → Repeat item 1. If the same number is indicated, go to item 5.
5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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. P0657

<b>Fault code No.</b>	<b>P0657</b>
<b>Item</b>	<b>Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.</b>
<b>Fail-safe system</b>	Able to start engine
	Able to drive vehicle
<b>Diagnostic code No.</b>	09, 50

## FUEL INJECTION SYSTEM

09	<b>Tool display</b>	Fuel system voltage (battery voltage) Approximately 12.0	
	<b>Procedure</b>	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	<b>Actuation</b>	Actuates the relay unit five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.	
	<b>Procedure</b>	Check that the relay unit is actuated five times by listening for the operating sound.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between relay unit coupler and ECU coupler. red/blue–red/blue blue/yellow–blue/yellow Between relay unit coupler and joint coupler. red/white–red/white Between joint coupler and ignition fuse. red/white–red/white Between ignition fuse and main switch coupler. brown/blue–brown/blue Between main switch coupler and starter relay (main fuse) coupler. red–red Between starter relay (main fuse) coupler and battery terminal. red–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 7 and finish the service. Condition is "Malfunction" → Go to item 4.

# FUEL INJECTION SYSTEM

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 8-130.	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. P1601

<b>Fault code No.</b>	<b>P1601</b>		
<b>Item</b>	<b>Sidestand switch: open or short circuit of the black/red lead of the ECU is detected.</b>		
<b>Fail-safe system</b>	Unable to start engine		
	Unable to drive vehicle		
<b>Diagnostic code No.</b>	20		
<b>Tool display</b>	Sidestand switch • "ON" (sidestand retracted) • "OFF" (sidestand extended)		
<b>Procedure</b>	Extend and retract the sidestand (with the transmission in gear).		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Connection of sidestand switch coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON", and then extend and retract the sidestand. 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.

## FUEL INJECTION SYSTEM

2	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand. 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.</p>
3	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand. 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.</p>
4	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between sidestand switch coupler and relay unit coupler. blue/green–blue/green Between relay unit coupler and joint coupler. black/red–black/red Between joint coupler and ECU coupler. black/red–black/red</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand. 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.</p>
5	<p>Defective sidestand switch.</p>	<p>Execute the diagnostic mode. (Code No. 20) Shift the transmission into gear. Sidestand retracted: “ON” Sidestand extended: “OFF” Replace if defective.</p>	<p>Turn the main switch to “ON”, and then extend and retract the sidestand. 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.</p>
6	<p>Malfunction in ECU.</p>	<p>Replace the ECU. Refer to “REPLACING THE ECU (engine control unit)” on page 8-130.</p>	<p>Service is finished.</p>
7	<p>Delete the fault code and check that the engine trouble warning light goes off.</p>	<p>Confirm that the fault code has a condition of “Recover” using the Yamaha diagnostic tool, and then delete the fault code.</p>	

# FUEL INJECTION SYSTEM

## Fault code No. P1602

<b>Fault code No.</b>	<b>P1602</b>		
<b>Item</b>	<b>Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).</b>		
<b>Fail-safe system</b>	Able/Unable to start engine		
	Able/Unable to drive vehicle		
<b>Diagnostic code No.</b>	—		
<b>Tool display</b>	—		
<b>Procedure</b>	—		
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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 (main fuse) 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 fuel injection system 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 starter relay (main fuse). red-red Between starter relay (main fuse) and fuel injection system fuse. red-red Between fuel injection system fuse and ECU coupler. red/black-red/black	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.

# FUEL INJECTION SYSTEM

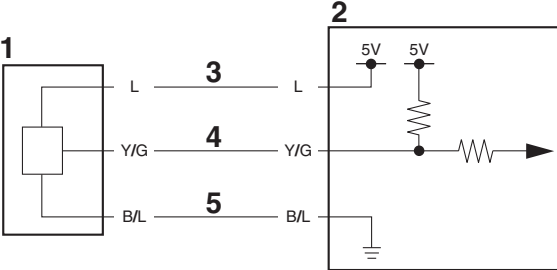
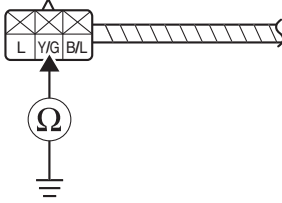
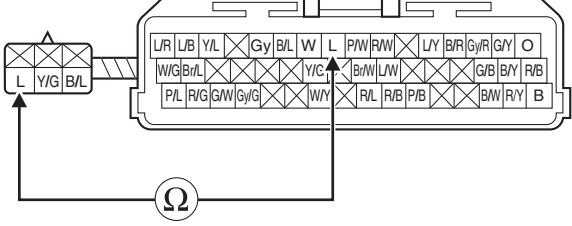
5	Wire harness continuity between main switch and ECU coupler.	Open or short circuit → Replace the wire harness. Between main switch and ignition fuse. brown/blue–brown/blue Between ignition fuse and joint coupler. red/white–red/white Between joint coupler and ECU coupler. red/white–red/white	Turn the 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 8-130.	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

<b>Fault code No.</b>	<b>P1604, P1605</b>
<b>Item</b>	<b>[P1604] Lean angle sensor: ground short circuit detected.</b> <b>[P1605] Lean angle sensor: open or power short circuit.</b>
<b>Fail-safe system</b>	Unable to start engine
	Unable to drive vehicle
<b>Diagnostic code No.</b>	08
<b>Tool display</b>	Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)
<b>Procedure</b>	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.
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.

# FUEL INJECTION SYSTEM

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	<div style="text-align: center;">  </div> <p>1. Lean angle sensor 2. ECU 3. Sensor input lead 4. Sensor output lead 5. Sensor ground lead</p>		
3-2	Disconnect the ECU coupler from the ECU. Disconnect the lean angle sensor coupler from the lean angle sensor.		
3-3	<p>[For P1604] Ground short circuit Between lean angle sensor coupler and ground: yellow/green–ground If there is continuity, replace the wire harness.</p> <div style="text-align: center;">  </div>		
3-4	<p>[For P1605] Open circuit Between lean angle sensor coupler and ECU coupler: blue–blue If there is no continuity, replace the wire harness.</p> <div style="text-align: center;">  </div>		

# FUEL INJECTION SYSTEM

<p>3-5</p>	<p>[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.</p>		
<p>3-6</p>	<p>[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.</p>		
<p>3-7</p>	<p>Disconnect the couplers from the parts that are connected to the ECU. Refer to “Parts connected to the ECU” on page 8-35.</p>		
<p>3-8</p>	<p>[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.</p>		
<p>4</p>	<p>Defective lean angle sensor.</p>	<p>Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-136.</p>	<p>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.</p>



# FUEL INJECTION SYSTEM

5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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. P2195

### TIP

If fault code numbers "P2195" and "P0030" are both indicated, take the actions specified for fault code number "P0030" first.

<b>Fault code No.</b>		<b>P2195</b>	
<b>Item</b>		<b>O<sub>2</sub> sensor: Open circuit detected.</b>	
<b>Fail-safe system</b>		Able to start engine	
		Able to drive vehicle	
<b>Diagnostic code No.</b>		—	
<b>Tool display</b>		—	
<b>Procedure</b>		—	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
1	Installed condition of O <sub>2</sub> 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 <sub>2</sub> 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".

## FUEL INJECTION SYSTEM

3	<p>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).</p>	<p>Improperly connected → Connect the coupler securely or replace the wire harness.</p>	<p>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".</p>
4	<p>Wire harness continuity.</p>	<p>Open or short circuit → Replace the wire harness. Between O<sub>2</sub> sensor coupler and ECU coupler. gray/green–gray/green pink/black–pink/black Between O<sub>2</sub> sensor coupler and joint coupler. black/blue–black/blue red/white–red/white Between joint coupler and ECU coupler. black/blue–black/blue Between joint coupler and ignition fuse. red/white–red/white</p>	<p>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".</p>
5	<p>Check fuel pressure.</p>	<p>Refer to "CHECKING THE FUEL PRESSURE" on page 7-12.</p>	<p>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".</p>
6	<p>Defective O<sub>2</sub> sensor.</p>	<p>Check the O<sub>2</sub> sensor. Replace if defective. Refer to "ENGINE REMOVAL" on page 5-3.</p>	<p>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".</p>
7	<p>Malfunction in ECU.</p>	<p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</p>	<p>Service is finished.</p>

# FUEL INJECTION SYSTEM

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.	
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EAS31790

## TROUBLESHOOTING DETAILS (EVENT CODE)

### Event 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.
- When the Yamaha diagnostic tool is used, event code No. U0155 is displayed as a fault code.

Event code No.		U0155 or "Err"	
Item		Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	
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 ECU coupler. blue/black–blue/black blue/red–blue/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 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.

# FUEL INJECTION SYSTEM

5	Malfunction in ECU.	Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.	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.	

## Event code No. 30

<b>Event code No.</b>		<b>30</b>	
<b>Item</b>		<b>Latch up detected.</b>	
<b>Fail-safe system</b>		Unable to start engine	
		Unable to drive vehicle	
<b>Diagnostic code No.</b>		08	
<b>Tool display</b>		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
<b>Procedure</b>		Remove the lean angle sensor and incline it more than 65 degrees.	
<b>Item</b>	<b>Probable cause of malfunction and check</b>	<b>Maintenance job</b>	<b>Confirmation of service completion</b>
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) Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-136.	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 8-130.	Service is finished.





# FUEL PUMP SYSTEM

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- 1. Main switch
- 8. Ignition fuse
- 17. Battery
- 18. Engine ground
- 19. Main fuse
- 23. Relay unit (diode)
- 25. Fuel pump relay
- 26. Joint coupler
- 28. Diode
- 32. ECU (Engine Control Unit)
- 49. Fuel pump
- 67. Handlebar switch (right)
- 69. Engine stop switch
- C. for XTZ690
- D. for XTZ690-U

EAS30514

## TROUBLESHOOTING

If the fuel pump fails to operate.

### TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Fuel tank

<p>1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-130.</p>	<p>NG →</p>	<p>Replace the fuse(s).</p>
<p>OK ↓</p>		
<p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.</p>	<p>NG →</p>	<ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul>
<p>OK ↓</p>		
<p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	<p>NG →</p>	<p>Replace the main switch/immobilizer unit.</p>
<p>OK ↓</p>		
<p>4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-129.</p>	<p>NG →</p>	<ul style="list-style-type: none"> <li>• The engine stop switch is faulty.</li> <li>• Replace the right handlebar switch.</li> </ul>
<p>OK ↓</p>		
<p>5. Check the diode. Refer to "CHECKING THE DIODE" on page 8-133.</p>	<p>NG →</p>	<p>Replace the diode</p>
<p>OK ↓</p>		
<p>6. Check the relay unit (fuel pump relay). Refer to "CHECKING THE RELAYS" on page 8-131.</p>	<p>NG →</p>	<p>Replace the relay unit.</p>
<p>OK ↓</p>		
<p>7. Check the fuel pump. Refer to "CHECKING THE FUEL PUMP BODY" on page 7-3.</p>	<p>NG →</p>	<p>Replace the fuel pump assembly.</p>
<p>OK ↓</p>		



## FUEL PUMP SYSTEM

8. Check the entire fuel pump system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-83.

NG →

Properly connect or replace the wiring harness.

OK ↓

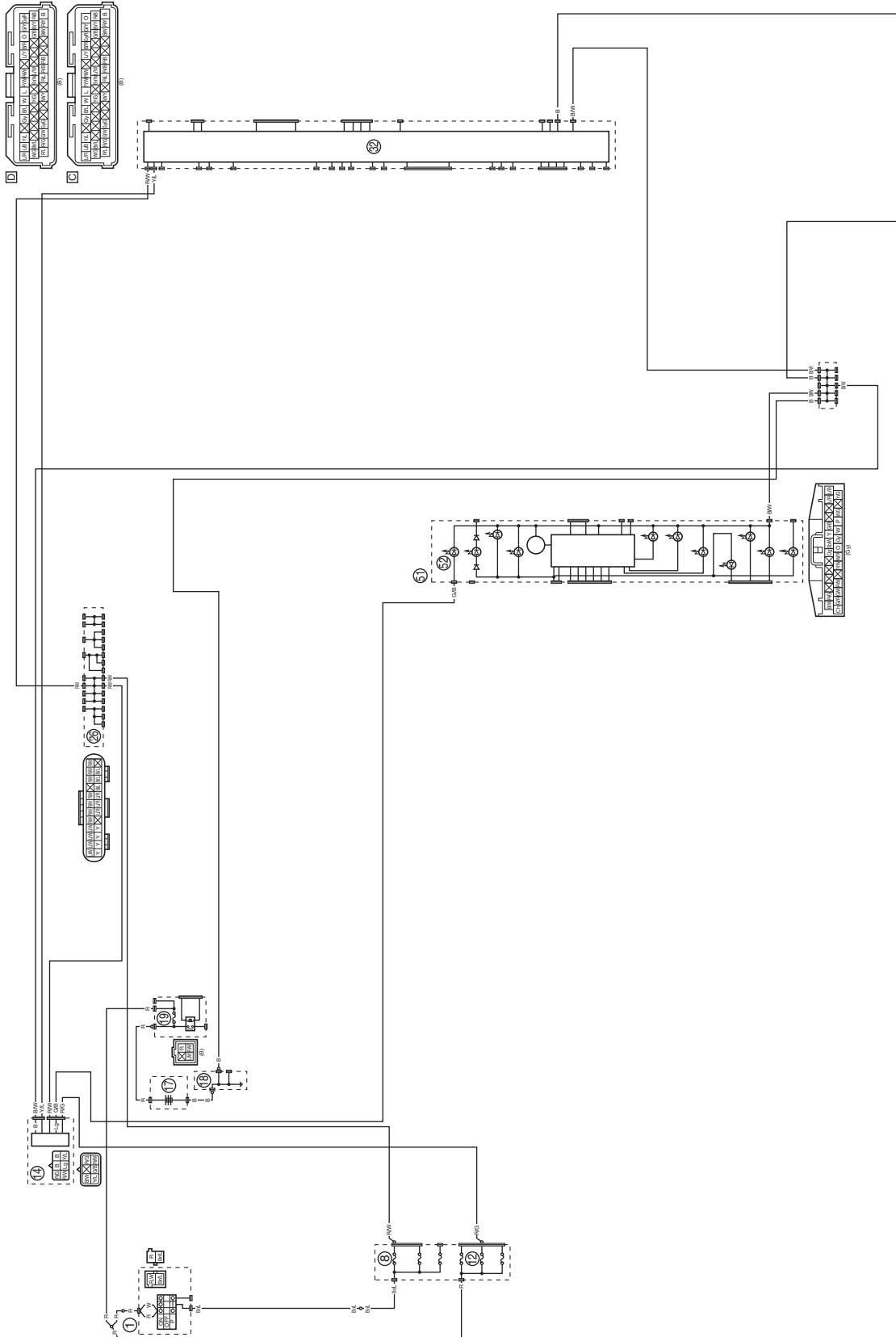
Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.

EAS20084

## IMMOBILIZER SYSTEM

EAS30519

## CIRCUIT DIAGRAM



# IMMOBILIZER SYSTEM

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- 1. Main switch
  - 8. Ignition fuse
  - 12. Backup fuse
  - 14. Immobilizer unit
  - 17. Battery
  - 18. Engine ground
  - 19. Main fuse
  - 26. Joint coupler
  - 32. ECU (Engine Control Unit)
  - 51. Meter assembly
  - 52. Immobilizer system indicator light
- C. for XTZ690  
D. for XTZ690-U

EAS30520

## GENERAL INFORMATION

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- A code re-registering key (with a red bow)
- Two standard keys (with a black bow) that can be re-registered with new codes
- A transponder (which is installed in the code re-registering key)
- An immobilizer unit
- The ECU
- An immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key is registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.

Therefore, always use a standard key for driving. (See NOTICE.)

### TIP

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Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14971

### NOTICE

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- **DO NOT LOSE THE CODE RE-REGISTERING KEY!** If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (e.g., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key for driving, and to keep the code re-registering key in a safe place.
  - Do not submerge the keys in water.
  - Do not expose the keys to excessively high temperatures.
  - Do not place the keys close to magnets (this includes, but is not limited to, products such as speakers, etc.).
  - Do not place heavy items on the keys.
  - Do not grind the keys or alter their shape.
  - Do not disassemble the key bows.
  - Do not put two keys of any immobilizer system on the same key ring.
  - Keep the standard keys as well as other immobilizer system keys away from the code re-registering key.
  - Keep other immobilizer system keys away from the main switch as they may cause signal interference.
- 

EAS30521

## PARTS REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

### TIP

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Each standard key is registered during production, therefore re-registering at purchase is not necessary.

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# IMMOBILIZER SYSTEM

	Parts to be replaced					Key registration requirement
	Main switch/immobilizer unit		Standard key	ECU	Accessory lock* and key	
	Main switch	Immobilizer unit				
Standard key is lost			√			New standard key
All keys have been lost (including code re-registering key)		√	√	√	√	Code re-registering key and standard keys
ECU is defective				√		Code re-registering key and standard keys
Immobilizer unit is defective		√				Code re-registering key and standard keys
Main switch is defective		√	√	√	√	Code re-registering key and standard keys
Accessory lock* is defective					√	Not required

\* Accessory locks mean the seat lock and fuel tank cap.

## Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to "ON" with the code re-registering key.

### TIP

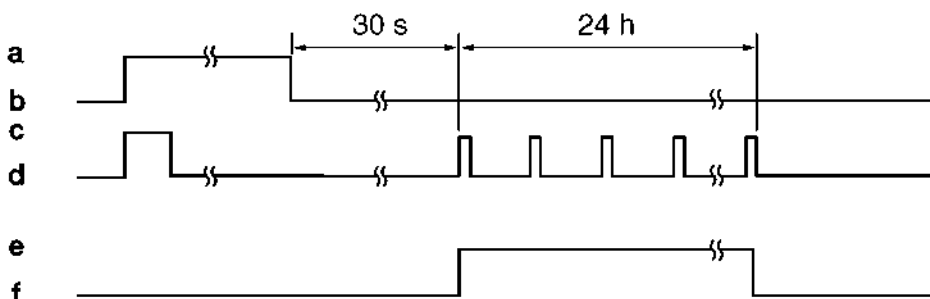
Check that the immobilizer system indicator light comes on for a few seconds, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

## Standby mode:

To enable the immobilizer system, turn the ignition key to "OFF". 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

### Standby mode



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Standby mode on

- f. Standby mode off

# IMMOBILIZER SYSTEM

## Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

### TIP

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-94).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

### TIP

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

### TIP

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

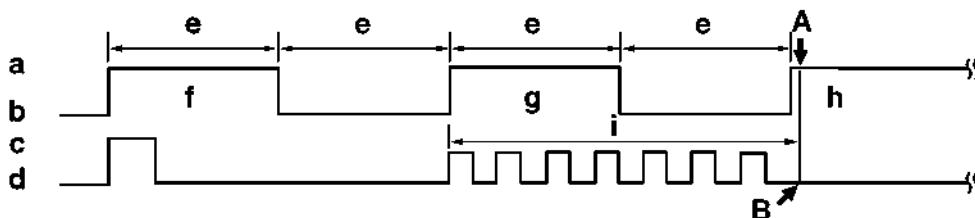
5. Turn the main switch to "ON".

### TIP

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

## Standard key registration



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode

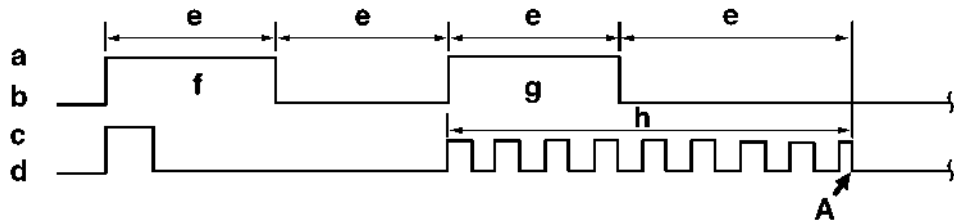
- A. Registration of the second standard key is complete.
- B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

# IMMOBILIZER SYSTEM

## Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

## Standard key code voiding method



a. Main switch "ON"

b. Main switch "OFF"

c. LED on

d. LED off

e. Less than 5.0 s

f. Code re-registering key

g. Remaining standard key

h. Registration mode

A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

EAS30522

## TROUBLESHOOTING

When the main switch is turned to "ON", the immobilizer system indicator light does not come on nor flashes.

1. Check the fuses.  
(Ignition, backup, and main)  
Refer to "CHECKING THE FUSES" on page 8-130.

OK ↓

NG →

Replace the fuse(s).

2. Check the battery.  
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.

OK ↓

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

3. Check the main switch.  
Refer to "CHECKING THE SWITCHES" on page 8-129.

OK ↓

NG →

Replace the main switch/immobilizer unit.

4. Check the entire immobilizer system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-87.

OK ↓

NG →

Properly connect or replace the wiring harness.

Check the condition each of the immobilizer system circuits. Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-94.



# IMMOBILIZER SYSTEM

EAS30523

## SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the immobilizer system indicator light flashes. The pattern of flashing also shows the fault code.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and the immobilizer unit.	<ol style="list-style-type: none"> <li>1. Radio wave interference caused by objects around the keys and antennas.</li> <li>2. Immobilizer unit malfunction.</li> <li>3. Key malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas.</li> <li>2. Replace the main switch/immobilizer unit.</li> <li>3. Replace the key.</li> </ol>
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	<ol style="list-style-type: none"> <li>1. Signal received from other transponder (failed to recognize code after ten consecutive attempts).</li> <li>2. Signal received from unregistered standard key.</li> </ol>	<ol style="list-style-type: none"> <li>1. Place the immobilizer unit at least 50 mm away from the transponder of other vehicles.</li> <li>2. Register the standard key.</li> </ol>
53	IMMOBILIZER UNIT	Codes cannot be transmitted between the ECU and the immobilizer unit.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> <li>1. Interference due to radio wave noise.</li> <li>2. Disconnected communication harness.</li> <li>3. Immobilizer unit malfunction.</li> <li>4. ECU malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the wire harness and connector.</li> <li>2. Replace the main switch/immobilizer unit.</li> <li>3. Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</li> </ol>
54	IMMOBILIZER UNIT	Codes transmitted between the ECU and the immobilizer unit do not match.	<p>Noise interference or disconnected lead/cable.</p> <ol style="list-style-type: none"> <li>1. Interference due to radio wave noise.</li> <li>2. Disconnected communication harness.</li> <li>3. Immobilizer unit malfunction.</li> <li>4. ECU failure. (The ECU or immobilizer unit was replaced with a used unit from another vehicle.)</li> </ol>	<ol style="list-style-type: none"> <li>1. Register the code re-registering key.</li> <li>2. Check the wire harness and connector.</li> <li>3. Replace the main switch/immobilizer unit.</li> <li>4. Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</li> </ol>
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.

# IMMOBILIZER SYSTEM

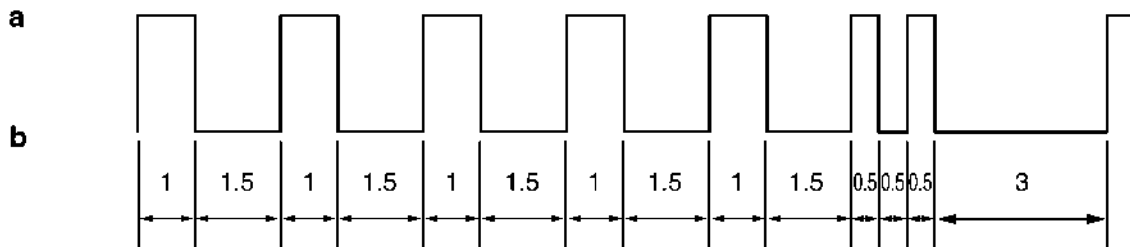
Fault code	Part	Symptom	Cause	Action
56	ECU	Unidentified code is received.	Noise interference or disconnected lead/cable.	<ol style="list-style-type: none"> <li>1. Check the wire harness and connector.</li> <li>2. Replace the main switch/immobilizer unit.</li> <li>3. Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-130.</li> </ol>

## Immobilizer system indicator light fault code indication

Units of 10: Cycles of on for 1 second and off for 1.5 seconds.

Units of 1: Cycles of on for 0.5 second and off for 0.5 second.

Example: fault code 52



a. Light on

b. Light off



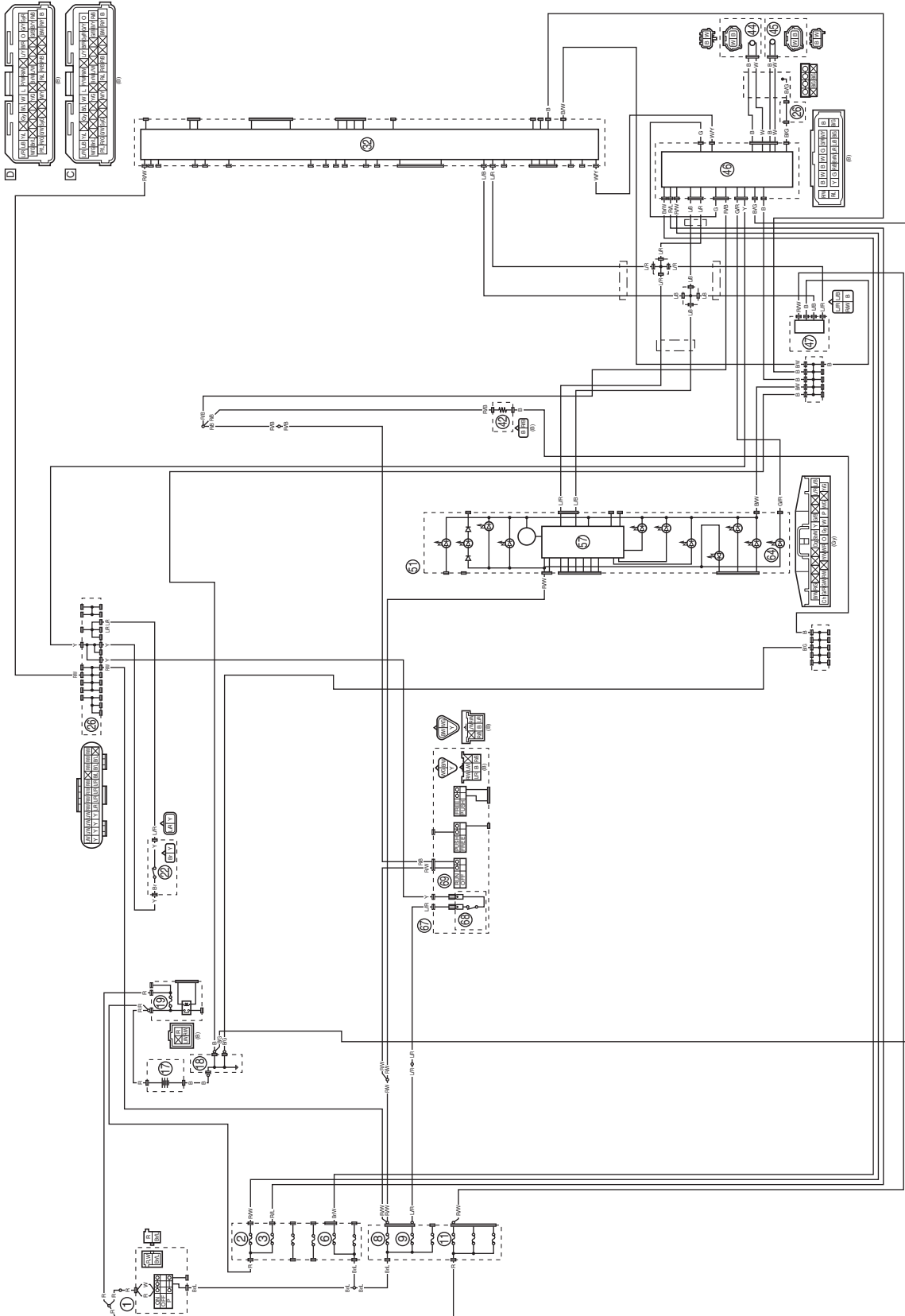
# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS20085

## ABS (ANTI-LOCK BRAKE SYSTEM)

EAS30988

### CIRCUIT DIAGRAM



# ABS (ANTI-LOCK BRAKE SYSTEM)

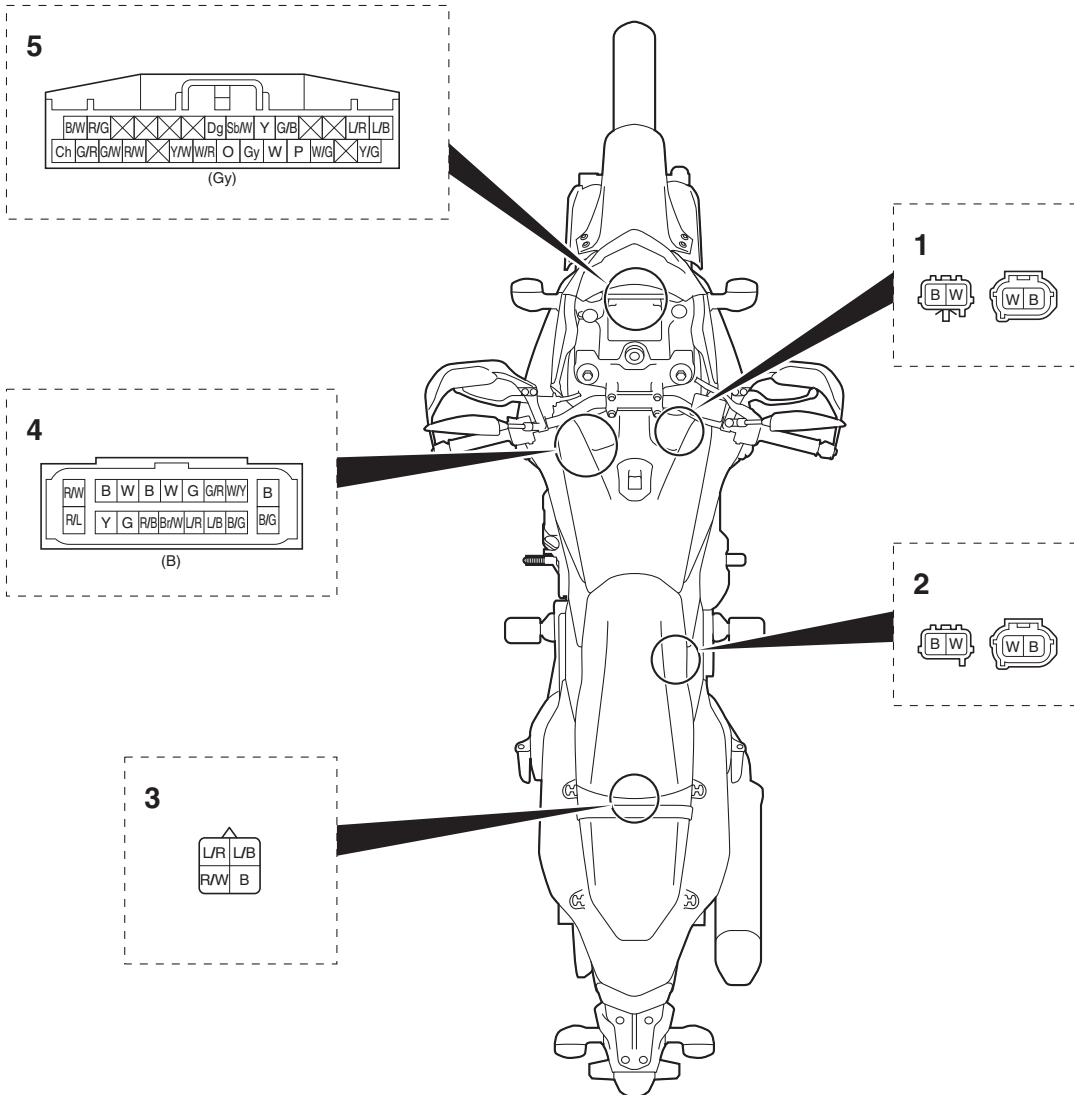
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1. Main switch
  2. ABS solenoid fuse
  3. ABS motor fuse
  6. ABS control unit fuse
  8. Ignition fuse
  9. Signaling system fuse
  11. Fuel injection system fuse
  17. Battery
  18. Engine ground
  19. Main fuse
  22. Rear brake light switch
  26. Joint coupler
  32. ECU (Engine Control Unit)
  42. Resistor unit
  44. Front wheel sensor
  45. Rear wheel sensor
  46. ABS ECU
  47. Yamaha diagnostic tool coupler
  51. Meter assembly
  57. Multi-function meter
  64. ABS warning light
  67. Handlebar switch (right)
  68. Front brake light switch
  69. Engine stop switch
- C. for XTZ690  
D. for XTZ690-U

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS30990

## ABS COUPLER LOCATION CHART



1. Front wheel sensor coupler
2. Rear wheel sensor coupler
3. Yamaha diagnostic tool coupler
4. ABS ECU coupler
5. Meter assembly coupler

# ABS (ANTI-LOCK BRAKE SYSTEM)

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EAS30991

## MAINTENANCE OF THE ABS ECU

### Checking the ABS ECU

1. Check:

- Terminals 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 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.

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EAS30992

## 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 8-104. For troubleshooting items other than the following items, follow the normal service method.

EWA16710



**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 8-125.

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### 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 10 km/h (6 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 10 km/h (6 mi/h)). → ABS operation is normal.
3. The ABS warning light flashes → ABS operation is normal.
  - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-101.

### 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 8-125. By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

# ABS (ANTI-LOCK BRAKE SYSTEM)

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## 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 hydraulic unit, 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

ECA18490

### 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.)

EAS30993

## 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

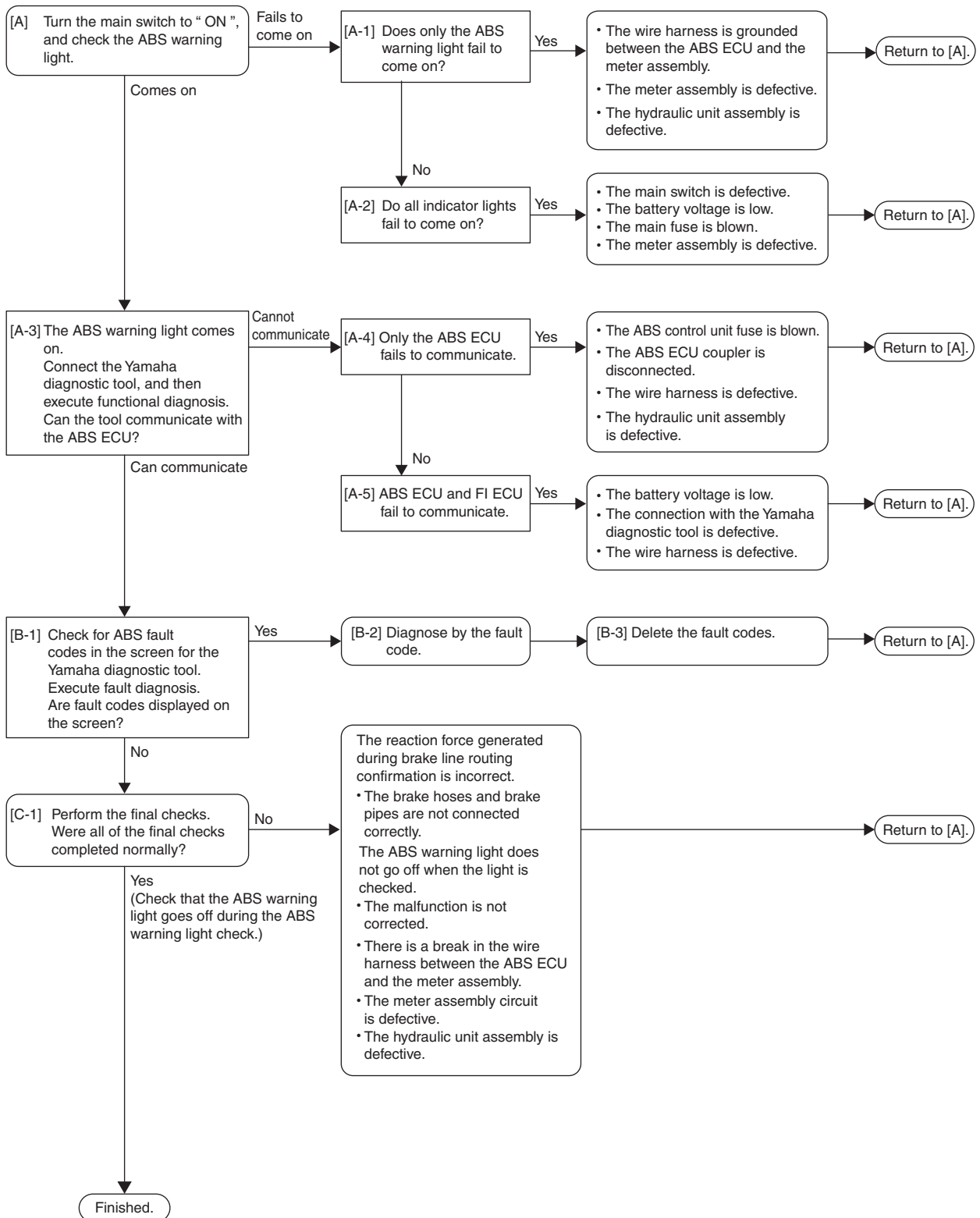
Execute the final check after disassembly and assembly.



# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS30994

## BASIC PROCESS FOR TROUBLESHOOTING



# ABS (ANTI-LOCK BRAKE SYSTEM)

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 8-125.

EAS30995

## **[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]

EAS30996

## **[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON**

1. Check for a short circuit to the ground between the green/red terminal of the ABS ECU coupler and green/red 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 is defective. Replace the meter assembly.
  - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS30997

## **[A-2] ALL INDICATOR LIGHTS FAIL TO COME ON**

1. Main switch
  - Check the main switch for continuity.  
Refer to “CHECKING THE SWITCHES” on page 8-129.
  - If there is no continuity, replace the main switch/immobilizer unit.
2. Battery
  - Check the condition of the battery.  
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-130.
  - 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 8-130.
  - If the main fuse is blown, replace the fuse.
4. Meter assembly
  - Check the meter assembly circuit.  
Refer to “CIRCUIT DIAGRAM” on page 8-97.
  - If the meter assembly circuit is open, replace the meter assembly.

EAS31134

## **[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.)

# ABS (ANTI-LOCK BRAKE SYSTEM)

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EAS31135

## **[A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE**

1. ABS control unit fuse
  - Check the ABS control unit fuse for continuity.  
Refer to “CHECKING THE FUSES” on page 8-130.
  - If the ABS control unit 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 4-46.
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 brown/white terminal of the ABS ECU coupler.  
Check for continuity between the black terminal of the ABS ECU coupler and 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 blue/red terminal of the ABS ECU coupler and blue/red terminal of the Yamaha diagnostic tool coupler. (CANH)  
Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the Yamaha diagnostic tool coupler. (CANL)
4. ABS ECU malfunction
  - Replace the hydraulic unit assembly.

EAS31136

## **[A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE**

1. Battery
  - Check the condition of the battery.  
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-130.
  - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
2. Yamaha diagnostic tool
  - Check that the Yamaha diagnostic tool is properly connected.
3. Wire harness
  - Open circuit in the wire harness between the ABS ECU coupler and the Yamaha diagnostic tool coupler.  
Check for continuity between blue/red terminal of the ABS ECU coupler and blue/red terminal of the Yamaha diagnostic tool coupler. (CANH)  
Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the Yamaha diagnostic tool coupler. (CANL)

EAS31137

## **[B-1] MALFUNCTION ARE CURRENTLY DETECTED**

When the Yamaha diagnostic tool is connected to the FI diagnostic connector, 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]

EAS31138

## **[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.

# ABS (ANTI-LOCK BRAKE SYSTEM)



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03262**

## Connecting the Yamaha diagnostic tool

Remove the rider seat. Refer to "GENERAL CHASSIS (1)" on page 4-1.

Remove the protective cap, and then connect the Yamaha diagnostic tool to the coupler. Refer to "YAMAHA DIAGNOSTIC TOOL" on page 8-34.

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* 25*	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.)	<ul style="list-style-type: none"> <li>Foreign material adhered around the front wheel sensor</li> <li>Incorrect installation of the front wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective front wheel sensor or incorrect installation of the sensor</li> </ul>
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.)	<ul style="list-style-type: none"> <li>Foreign material adhered around the rear wheel sensor</li> <li>Incorrect installation of the rear wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>
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.)	<ul style="list-style-type: none"> <li>Foreign material adhered around the front wheel sensor</li> <li>Incorrect installation of the front wheel</li> <li>Defective sensor rotor or incorrect installation of the rotor</li> <li>Defective front wheel sensor or incorrect installation of the sensor</li> </ul>

## ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	Item	Symptom	Check point
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.)	<ul style="list-style-type: none"> <li>• Foreign material adhered around the rear wheel sensor</li> <li>• Incorrect installation of the rear wheel</li> <li>• Defective sensor rotor or incorrect installation of the rotor</li> <li>• Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	<ul style="list-style-type: none"> <li>• Defective coupler between the front wheel sensor and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly</li> <li>• Defective front wheel sensor or hydraulic unit assembly</li> </ul>
16	Rear wheel sensor (open or short circuit)	Open or short circuit is detected in the rear wheel sensor.	<ul style="list-style-type: none"> <li>• Defective coupler between the rear wheel sensor and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly</li> <li>• Defective rear wheel sensor or hydraulic unit assembly</li> </ul>
17* 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.)	<ul style="list-style-type: none"> <li>• Foreign material adhered around the front wheel sensor</li> <li>• Incorrect installation of the front wheel</li> <li>• Defective sensor rotor or incorrect installation of the rotor</li> <li>• Defective front wheel sensor or incorrect installation of the sensor</li> </ul>
18* 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.)	<ul style="list-style-type: none"> <li>• Foreign material adhered around the rear wheel sensor</li> <li>• Incorrect installation of the rear wheel</li> <li>• Defective sensor rotor or incorrect installation of the rotor</li> <li>• Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	<ul style="list-style-type: none"> <li>• Defective hydraulic unit assembly</li> </ul>

## ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	Item	Symptom	Check point
24	Brake light switch or tail/brake light	Brake light signal is not received properly while the vehicle is traveling. (Brake light circuit, or front or rear brake light switch circuit)	<ul style="list-style-type: none"> <li>• Defective signaling system (tail/brake light or brake light switch)</li> <li>• Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly</li> <li>• Defective hydraulic unit assembly</li> </ul>
31	Hydraulic unit assembly (abnormal ABS solenoid power supply)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> <li>• Blown ABS solenoid fuse</li> <li>• Defective coupler between the battery and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the battery and the hydraulic unit assembly</li> <li>• Defective hydraulic unit assembly</li> </ul>
32	Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)	Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> <li>• Defective hydraulic unit assembly</li> </ul>
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> <li>• Blown ABS motor fuse</li> <li>• Defective coupler between the battery and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the battery and the hydraulic unit assembly</li> <li>• Defective hydraulic unit assembly</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Defective hydraulic unit assembly</li> </ul>
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> <li>• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling.</li> <li>• Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect installation of the front wheel sensor</li> <li>• Incorrect rotation of the front wheel</li> <li>• Front brake dragging</li> <li>• Defective hydraulic unit assembly</li> </ul>

## ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	Item	Symptom	Check point
42 47	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	<ul style="list-style-type: none"> <li>• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for fault code No. 42)</li> <li>• Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul>	<ul style="list-style-type: none"> <li>• Incorrect installation of the rear wheel sensor (for fault code No. 42)</li> <li>• Incorrect rotation of the rear wheel</li> <li>• Rear brake dragging</li> <li>• Defective hydraulic unit assembly</li> </ul>
43	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.)	<ul style="list-style-type: none"> <li>• Foreign material adhered around the front wheel sensor</li> <li>• Incorrect installation of the front wheel</li> <li>• Defective sensor rotor or incorrect installation of the rotor</li> <li>• Defective front wheel sensor or incorrect installation of the sensor</li> </ul>
44	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.)	<ul style="list-style-type: none"> <li>• Foreign material adhered around the rear wheel sensor</li> <li>• Incorrect installation of the rear wheel</li> <li>• Defective sensor rotor or incorrect installation of the rotor</li> <li>• Defective rear wheel sensor or incorrect installation of the sensor</li> </ul>
51 52	<ul style="list-style-type: none"> <li>• Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51)</li> <li>• Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52)</li> </ul>	<ul style="list-style-type: none"> <li>• Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (for fault code No. 51)</li> <li>• Power voltage supplied to the wheel sensor is too high. (for fault code No. 52)</li> </ul>	<ul style="list-style-type: none"> <li>• Defective battery</li> <li>• Disconnected battery terminal</li> <li>• Defective charging system</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Defective battery</li> <li>• Defective coupler between the battery and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the battery and the hydraulic unit assembly</li> <li>• Defective charging system</li> </ul>

## ABS (ANTI-LOCK BRAKE SYSTEM)

Fault code No.	Item	Symptom	Check point
54	Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)	Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> <li>• Defective battery</li> <li>• Defective coupler between the battery and the hydraulic unit assembly</li> <li>• Open or short circuit in the wire harness between the battery and the hydraulic unit assembly</li> <li>• Defective charging system</li> <li>• Defective hydraulic unit assembly</li> </ul>
56	Hydraulic unit assembly (abnormal internal power supply)	Abnormality is detected in the power supply circuit in the hydraulic unit assembly.	<ul style="list-style-type: none"> <li>• Defective hydraulic unit assembly</li> </ul>
63	Front wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the front wheel sensor is too low.	<ul style="list-style-type: none"> <li>• Short circuit in the wire harness between the front wheel sensor and the ABS ECU</li> <li>• Defective front wheel sensor</li> <li>• Defective ABS ECU</li> </ul>
64	Rear wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.	<ul style="list-style-type: none"> <li>• Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly</li> <li>• Defective rear wheel sensor</li> <li>• Defective hydraulic unit assembly</li> </ul>
89	CAN communication (between meter assembly and ABS ECU)	Transmitted data from the meter cannot be normally received.	<ul style="list-style-type: none"> <li>• Defective coupler between meter assembly and ABS ECU</li> <li>• Open or short-circuit in the wire harness between meter assembly and ABS ECU</li> <li>• Defective meter assembly</li> <li>• Defective ABS ECU</li> </ul>
90	CAN communication (between ECU and ABS ECU)	Transmitted data from the ECU cannot be normally received.	<ul style="list-style-type: none"> <li>• Defective coupler between ECU and ABS ECU</li> <li>• Open or short-circuit in the wire harness between ECU and ABS ECU</li> <li>• Defective ECU</li> <li>• Defective ABS ECU</li> </ul>

\* The fault code number varies according to the vehicle conditions.

### Fault code No. 11, 25

#### TIP

With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds (fault code No. 11) or for longer than about 2 seconds (fault code No. 25).



## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>11 25</b>
<b>Item</b>		<b>Front wheel sensor (intermittent pulses or no pulses)</b>
<b>Symptom</b>		<b>Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-13.
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 4-14.
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 4-14.

### Fault code No. 12

<b>Fault code No.</b>		<b>12</b>
<b>Item</b>		<b>Rear wheel sensor (intermittent pulses or no pulses)</b>
<b>Symptom</b>		<b>Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-21.
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 4-22.
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 4-22.

### 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.

## ABS (ANTI-LOCK BRAKE SYSTEM)

- Vehicle possibly ridden on uneven roads.

<b>Fault code No.</b>	13 26	
<b>Item</b>	Front wheel sensor (abnormal pulse period)	
<b>Symptom</b>	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-13.
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 4-14.
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 4-14.

### 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.

<b>Fault code No.</b>	14 27	
<b>Item</b>	Rear wheel sensor (abnormal pulse period)	
<b>Symptom</b>	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-21.
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 4-22.

# ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>14 27</b>
<b>Item</b>		<b>Rear wheel sensor (abnormal pulse period)</b>
<b>Symptom</b>		<b>Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-22.

## Fault code No. 15

### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

<b>Fault code No.</b>		<b>15</b>
<b>Item</b>		<b>Front wheel sensor (open or short circuit)</b>
<b>Symptom</b>		<b>Open or short circuit is detected in the front wheel sensor.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective coupler between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
2	Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check for continuity between the black terminal "1" and the black terminal "5" and between the white terminal "2" and the white terminal "4".</li> <li>• If there is no continuity, the wire harness is defective. Replace the wire harness.</li> <li>• Check that there is no short circuit between the black terminal "1" and the white terminal "2" and between the white terminal "4" and the black terminal "5".</li> <li>• If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>• Check that there is no short circuit between the black terminal "3" and the white terminal "4" and between the black terminal "3" and the black terminal "5".</li> <li>• If there is short circuit, the wire harness is defective. Replace the wire harness.</li> </ul>

6. ABS ECU  
7. Front wheel sensor

# ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>	<b>15</b>	
<b>Item</b>	<b>Front wheel sensor (open or short circuit)</b>	
<b>Symptom</b>	<b>Open or short circuit is detected in the front wheel sensor.</b>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-11 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

## Fault code No. 16

### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

<b>Fault code No.</b>	<b>16</b>	
<b>Item</b>	<b>Rear wheel sensor (open or short circuit)</b>	
<b>Symptom</b>	<b>Open or short circuit is detected in the rear wheel sensor.</b>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective coupler between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
2	Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check for continuity between the white terminal "1" and the white terminal "4" and between the black terminal "2" and the black terminal "5".</li> <li>• If there is no continuity, the wire harness is defective. Replace the wire harness.</li> <li>• 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".</li> <li>• If there is short circuit, the wire harness is defective. Replace the wire harness.</li> <li>• Check that there is no short circuit between the black terminal "3" and the white terminal "4" and between the black terminal "3" and the black terminal "5".</li> <li>• If there is short circuit, the wire harness is defective. Replace the wire harness.</li> </ul>

(B)

6. ABS ECU  
7. Rear wheel sensor

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>16</b>
<b>Item</b>		<b>Rear wheel sensor (open or short circuit)</b>
<b>Symptom</b>		<b>Open or short circuit is detected in the rear wheel sensor.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-18 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### Fault code No. 17, 45

#### TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, fault code No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, fault code No. 45 will be recorded first and fault code No. 17 will be recorded if the condition continues.

<b>Fault code No.</b>		<b>17 45</b>
<b>Item</b>		<b>Front wheel sensor (missing pulses)</b>
<b>Symptom</b>		<b>Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-13.
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 4-14.
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 4-14.

### Fault code No. 18, 46

#### TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, fault code No. 18 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, fault code No. 46 will be recorded first and fault code No. 18 will be recorded if the condition continues.

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>18 46</b>
<b>Item</b>		<b>Rear wheel sensor (missing pulses)</b>
<b>Symptom</b>		<b>Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-21.
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 4-22.
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 4-22.

### Fault code No. 21

<b>Fault code No.</b>		<b>21</b>
<b>Item</b>		<b>Hydraulic unit assembly (defective solenoid drive circuit)</b>
<b>Symptom</b>		<b>Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### Fault code No. 24

<b>Fault code No.</b>		<b>24</b>
<b>Item</b>		<b>Brake light switch or tail/brake light</b>
<b>Symptom</b>		<b>Brake light signal is not received properly while the vehicle is traveling (Brake light circuit, or front or rear brake light switch circuit).</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective signaling system (tail/brake light or brake light switch)	Check the brake light switches. Refer to "CHECKING THE SWITCHES" on page 8-129.
2	Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul>

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>24</b>
<b>Item</b>		<b>Brake light switch or tail/brake light</b>
<b>Symptom</b>		<b>Brake light signal is not received properly while the vehicle is traveling (Brake light circuit, or front or rear brake light switch circuit).</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
3	Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Between ABS ECU coupler and joint coupler. (yellow–yellow)</li> <li>• Between joint coupler and right handlebar switch coupler. (yellow–yellow)</li> <li>• Between right handlebar switch coupler and front brake light switch connector. (yellow–yellow)</li> <li>• Between joint coupler and rear brake light switch coupler. (yellow–yellow)</li> <li>• Between joint coupler and tail/brake light coupler. (yellow–yellow)</li> </ul>
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 4-44.

### Fault code No. 31

#### TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

<b>Fault code No.</b>		<b>31</b>
<b>Item</b>		<b>Hydraulic unit assembly (abnormal ABS solenoid power supply)</b>
<b>Symptom</b>		<b>Power is not supplied to the solenoid circuit in the hydraulic unit assembly.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 8-130.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Replace if there is an open or short circuit.</li> <li>• Between ABS ECU coupler and ABS solenoid fuse. (red/white–red/white)</li> </ul>
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 4-44.

## ABS (ANTI-LOCK BRAKE SYSTEM)

### Fault code No. 32

<b>Fault code No.</b>		<b>32</b>
<b>Item</b>		<b>Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)</b>
<b>Symptom</b>		<b>Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### Fault code No. 33

#### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

<b>Fault code No.</b>		<b>33</b>
<b>Item</b>		<b>Hydraulic unit assembly (abnormal ABS motor power supply)</b>
<b>Symptom</b>		<b>Power is not supplied to the motor circuit in the hydraulic unit assembly.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 8-130.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Replace if there is an open or short circuit.</li> <li>• Between ABS ECU coupler and ABS motor fuse. (red/blue-red/blue)</li> <li>• Between ABS ECU coupler and ground. (black/green-black)</li> </ul>
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 4-44.

### Fault code No. 34

<b>Fault code No.</b>		<b>34</b>
<b>Item</b>		<b>Hydraulic unit assembly (short circuit in ABS motor power supply circuit)</b>
<b>Symptom</b>		<b>Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.



## ABS (ANTI-LOCK BRAKE SYSTEM)

### Fault code No. 41

<b>Fault code No.</b>	41	
<b>Item</b>	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	
<b>Symptom</b>	<ul style="list-style-type: none"> <li>• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling.</li> <li>• Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Incorrect installation of the front wheel sensor	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-13.
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 4-13 and "CHECKING THE FRONT BRAKE DISCS" on page 4-30.
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 4-30.
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 4-44.

### Fault code No. 42, 47

<b>Fault code No.</b>	42 47	
<b>Item</b>	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	
<b>Symptom</b>	<ul style="list-style-type: none"> <li>• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for fault code No. 42)</li> <li>• Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Conditions when the malfunction occurred	If the rear wheel locks intermittently due to rapid down shifting or due to engine braking on a slippery road surface, fault code Nos. ABS_42 and ABS_47 may be indicated.
2	Incorrect installation of the rear wheel sensor (for fault code No. 42)	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-21.

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>	42 47	
<b>Item</b>	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	
<b>Symptom</b>	<ul style="list-style-type: none"> <li>• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for fault code No. 42)</li> <li>• Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.</li> </ul>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
3	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 4-21.
4	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 4-40.
5	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 4-44.

### Fault code No. 43

<b>Fault code No.</b>	43	
<b>Item</b>	Front wheel sensor (missing pulses)	
<b>Symptom</b>	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-13.
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 4-14.
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 4-14.

## ABS (ANTI-LOCK BRAKE SYSTEM)

### Fault code No. 44

<b>Fault code No.</b>		<b>44</b>
<b>Item</b>		<b>Rear wheel sensor (missing pulses)</b>
<b>Symptom</b>		<b>Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
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 4-21.
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 4-22.
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 4-22.

### Fault code No. 51, 52

<b>Fault code No.</b>		<b>51 52</b>
<b>Item</b>		<ul style="list-style-type: none"> <li>• Vehicle system power supply (voltage of ABS ECU power supply is high) (for fault code No. 51)</li> <li>• Vehicle system power supply (voltage of wheel sensor power supply is high) (for fault code No. 52)</li> </ul>
<b>Symptom</b>		<ul style="list-style-type: none"> <li>• Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (for fault code No. 51)</li> <li>• Power voltage supplied to the wheel sensor is too high. (for fault code No. 52)</li> </ul>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.
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 8-12.

### Fault code No. 53

#### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>	<b>53</b>	
<b>Item</b>	<b>Vehicle system power supply (voltage of ABS ECU power supply is low)</b>	
<b>Symptom</b>	<b>Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.</b>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Replace if there is an open or short circuit.</li> <li>• Between ABS ECU coupler and ABS control unit fuse. (brown/white–brown/white)</li> </ul>
4	Defective charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-12.

### Fault code No. 54

#### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

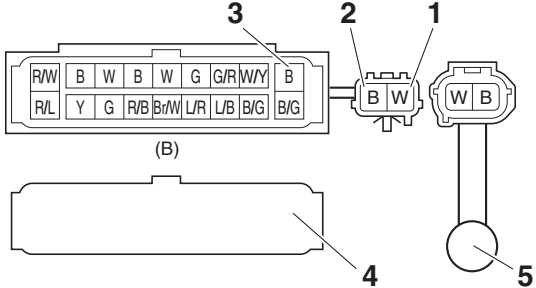
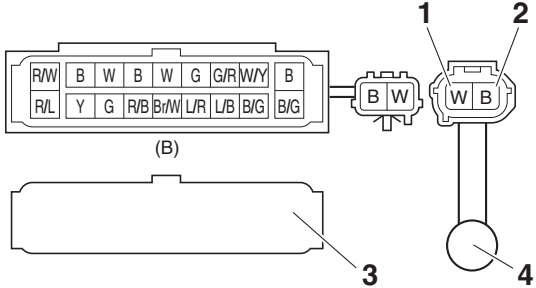
<b>Fault code No.</b>	<b>54</b>	
<b>Item</b>	<b>Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)</b>	
<b>Symptom</b>	<b>Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.</b>	
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-130.
2	Defective coupler between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely. See TIP.</li> </ul>
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Replace if there is an open or short circuit.</li> <li>• Between ABS ECU coupler and ABS motor fuse. (red/blue–red/blue)</li> <li>• Between ABS ECU coupler and ABS solenoid fuse. (red/white–red/white)</li> </ul>
4	Defective charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-12.
5	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 4-44.

# ABS (ANTI-LOCK BRAKE SYSTEM)

## Fault code No. 56

Fault code No.		56
Item		Hydraulic unit assembly (abnormal internal power supply)
Symptom		Abnormality is detected in the 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 4-44.

## Fault code No. 63

Fault code No.		63
Item		Front wheel sensor power supply (voltage of power supply is low)
Symptom		Power voltage supplied from the ABS ECU to the front wheel sensor is too low.
Order	Item/components and probable cause	Check or maintenance job
1	Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2".</li> <li>Check that there is no short circuit between the black terminal "3" and the white terminal "1".</li> <li>If there is a short circuit, the wire harness is defective. Replace the wire harness.</li> </ul>  <p>4. ABS ECU 5. Front wheel sensor</p>
2	Defective front wheel sensor	<ul style="list-style-type: none"> <li>Check that there is no short circuit between the white terminal "1" and the black terminal "2".</li> <li>If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor.</li> </ul>  <p>3. ABS ECU 4. Front wheel sensor</p>

# ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>63</b>
<b>Item</b>		<b>Front wheel sensor power supply (voltage of power supply is low)</b>
<b>Symptom</b>		<b>Power voltage supplied from the ABS ECU to the front wheel sensor is too low.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
3	Defective ABS ECU	Replace the ABS ECU. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

## Fault code No. 64

<b>Fault code No.</b>		<b>64</b>
<b>Item</b>		<b>Rear wheel sensor power supply (voltage of power supply is low)</b>
<b>Symptom</b>		<b>Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly	<ul style="list-style-type: none"> <li>• Check that there is no short circuit between the white terminal "1" and the black terminal "2".</li> <li>• Check that there is no short circuit between the black terminal "3" and the white terminal "1".</li> <li>• If there is a short circuit, the wire harness is defective. Replace the wire harness.</li> </ul> <p>4. ABS ECU 5. Rear wheel sensor</p>
2	Defective rear wheel sensor	<ul style="list-style-type: none"> <li>• Check that there is no short circuit between the gray terminal "1" and the white terminal "2".</li> <li>• If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor.</li> </ul> <p>3. ABS ECU 4. Rear wheel sensor</p>

## ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>64</b>
<b>Item</b>		<b>Rear wheel sensor power supply (voltage of power supply is low)</b>
<b>Symptom</b>		<b>Power voltage supplied from the ABS ECU to the rear wheel sensor is too low.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
3	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### Fault code No. 89

#### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

<b>Fault code No.</b>		<b>89</b>
<b>Item</b>		<b>CAN communication (between meter assembly and ABS ECU)</b>
<b>Symptom</b>		<b>Transmitted data from the meter assembly cannot be normally received.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective coupler between the meter assembly and the ABS ECU	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul> See TIP.
2	Open or short circuit in the wire harness between the meter assembly and the ABS ECU	Replace if there is an open or short circuit. <ul style="list-style-type: none"> <li>• Between meter assembly coupler and ABS ECU coupler. (blue/red–blue/red) (blue/black–blue/black)</li> </ul>
3	Defective meter assembly	Replace the meter assembly.
4	Defective ABS ECU	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-44.

### Fault code No. 90

#### TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

<b>Fault code No.</b>		<b>90</b>
<b>Item</b>		<b>CAN communication (between ECU and ABS ECU)</b>
<b>Symptom</b>		<b>Transmitted data from the ECU cannot be normally received.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
1	Defective coupler between the ECU and the ABS ECU	<ul style="list-style-type: none"> <li>• Check the coupler for any pins that may be pulled out.</li> <li>• Check the locking condition of the coupler.</li> <li>• If there is a malfunction, repair it and connect the coupler securely.</li> </ul> See TIP.

# ABS (ANTI-LOCK BRAKE SYSTEM)

<b>Fault code No.</b>		<b>90</b>
<b>Item</b>		<b>CAN communication (between ECU and ABS ECU)</b>
<b>Symptom</b>		<b>Transmitted data from the ECU cannot be normally received.</b>
<b>Order</b>	<b>Item/components and probable cause</b>	<b>Check or maintenance job</b>
2	Open or short circuit in the wire harness between the ECU and the ABS ECU	Replace if there is an open or short circuit. • Between ECU coupler and ABS ECU coupler. (blue/red–blue/red) (blue/black–blue/black)
3	Defective ECU	Replace the ECU.
4	Defective ABS ECU	Replace the ABS ECU. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-44.

EAS31139

## [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**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03262**

## Connecting the Yamaha diagnostic tool

Remove the protective cap, and then connect the Yamaha diagnostic tool to the coupler.  
Refer to “YAMAHA DIAGNOSTIC TOOL” on page 8-34.

EAS31140

## [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 3-16.
2. Check the wheel sensors for proper installation.  
Refer to “INSTALLING THE FRONT WHEEL” on page 4-15 and “INSTALLING THE REAR WHEEL” on page 4-22.
3. Perform brake line routing confirmation.  
Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-48.  
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 8-125.
5. Checking the ABS warning light.  
Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-51.  
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/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly coupler.
  - Malfunction in the meter assembly.



# ABS (ANTI-LOCK BRAKE SYSTEM)

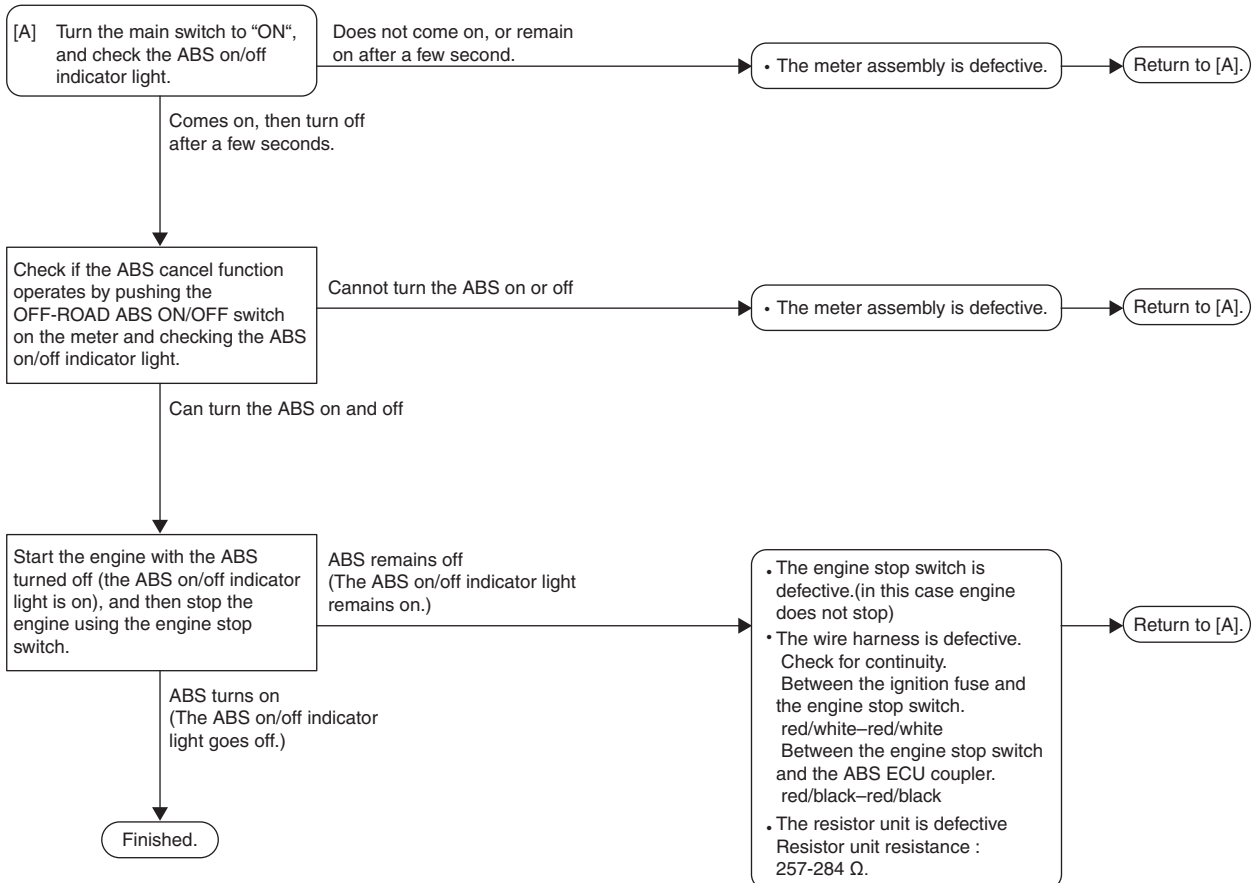
EAS33280

## TROUBLESHOOTING FOR THE ABS CANCEL FUNCTION

Perform this troubleshooting when the ABS cancel function does not operate, or to check if the ABS cancel function operates.

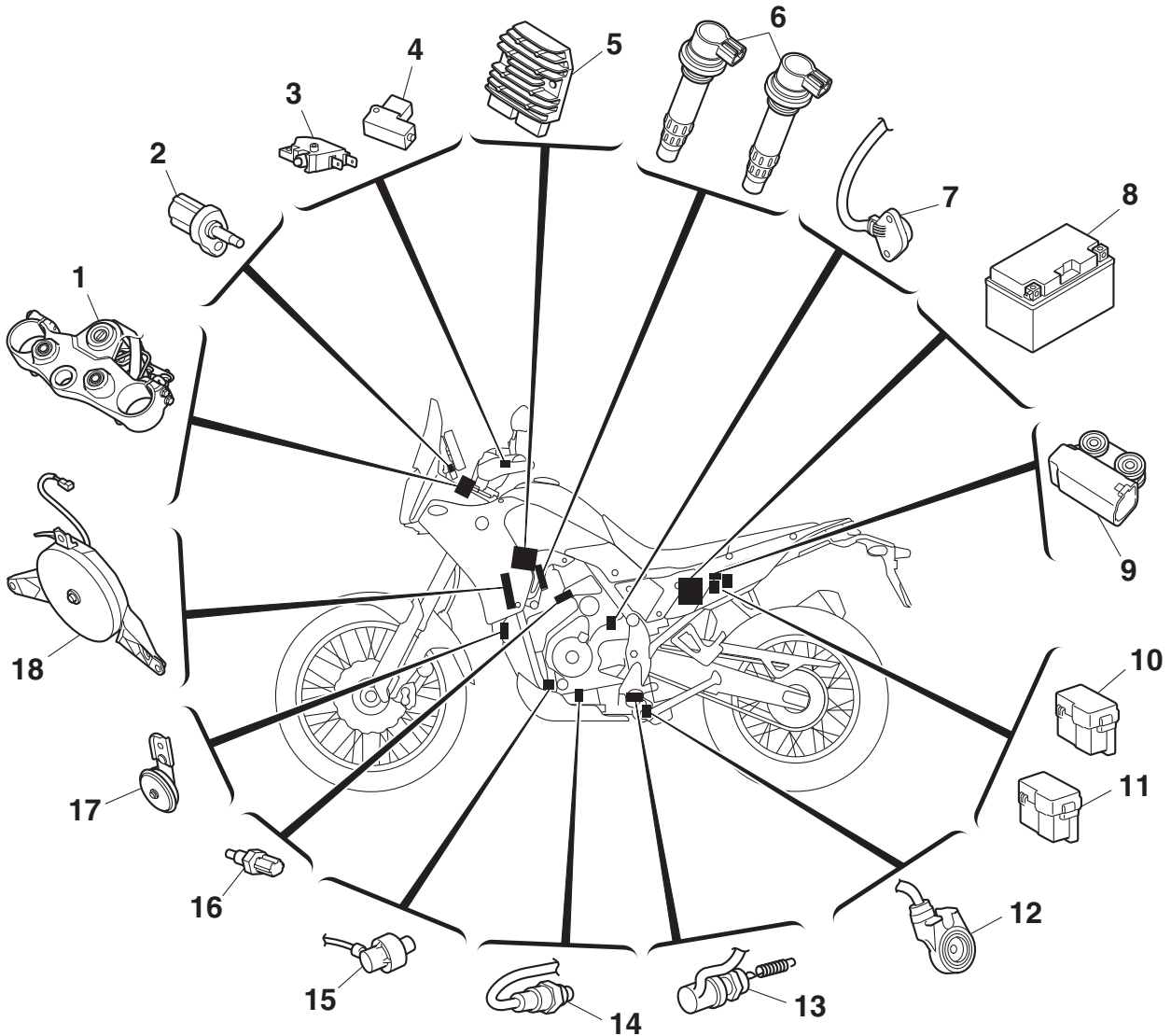
### TIP

Before performing this troubleshooting, perform the basic troubleshooting. Refer to "BASIC PROCESS FOR TROUBLESHOOTING" on page 8-102.



EAS20089

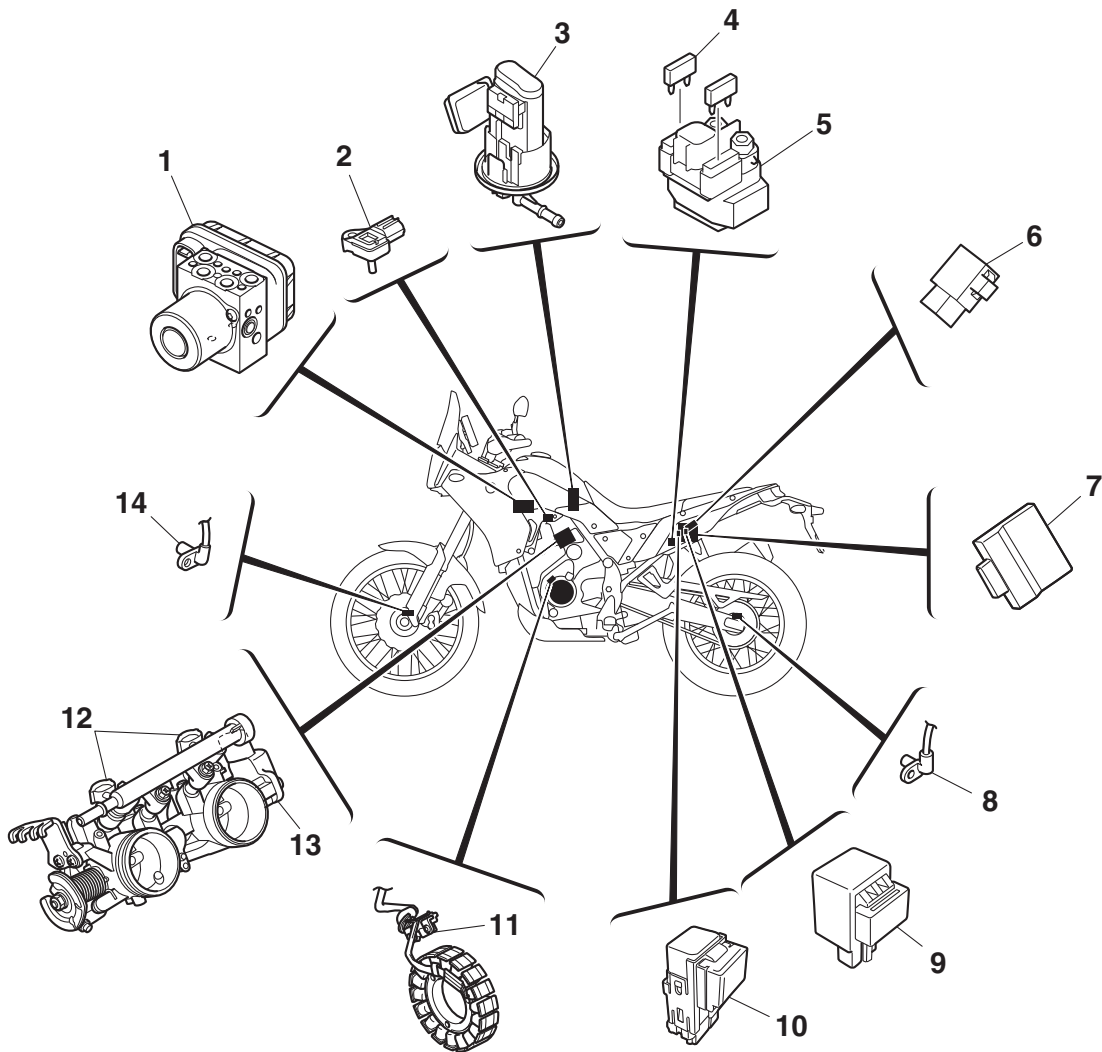
## ELECTRICAL COMPONENTS



1. Main switch/Immobilizer unit
2. Intake air temperature sensor
3. Front brake light switch
4. Clutch switch
5. Rectifier/regulator
6. Ignition coil
7. Gear position switch
8. Battery
9. Lean angle sensor
10. Fuse box 1
11. Fuse box 2
12. Sidestand switch
13. Rear brake light switch
14. O<sub>2</sub> sensor
15. Oil pressure switch
16. Coolant temperature sensor
17. Horn
18. Radiator fan motor

# ELECTRICAL COMPONENTS

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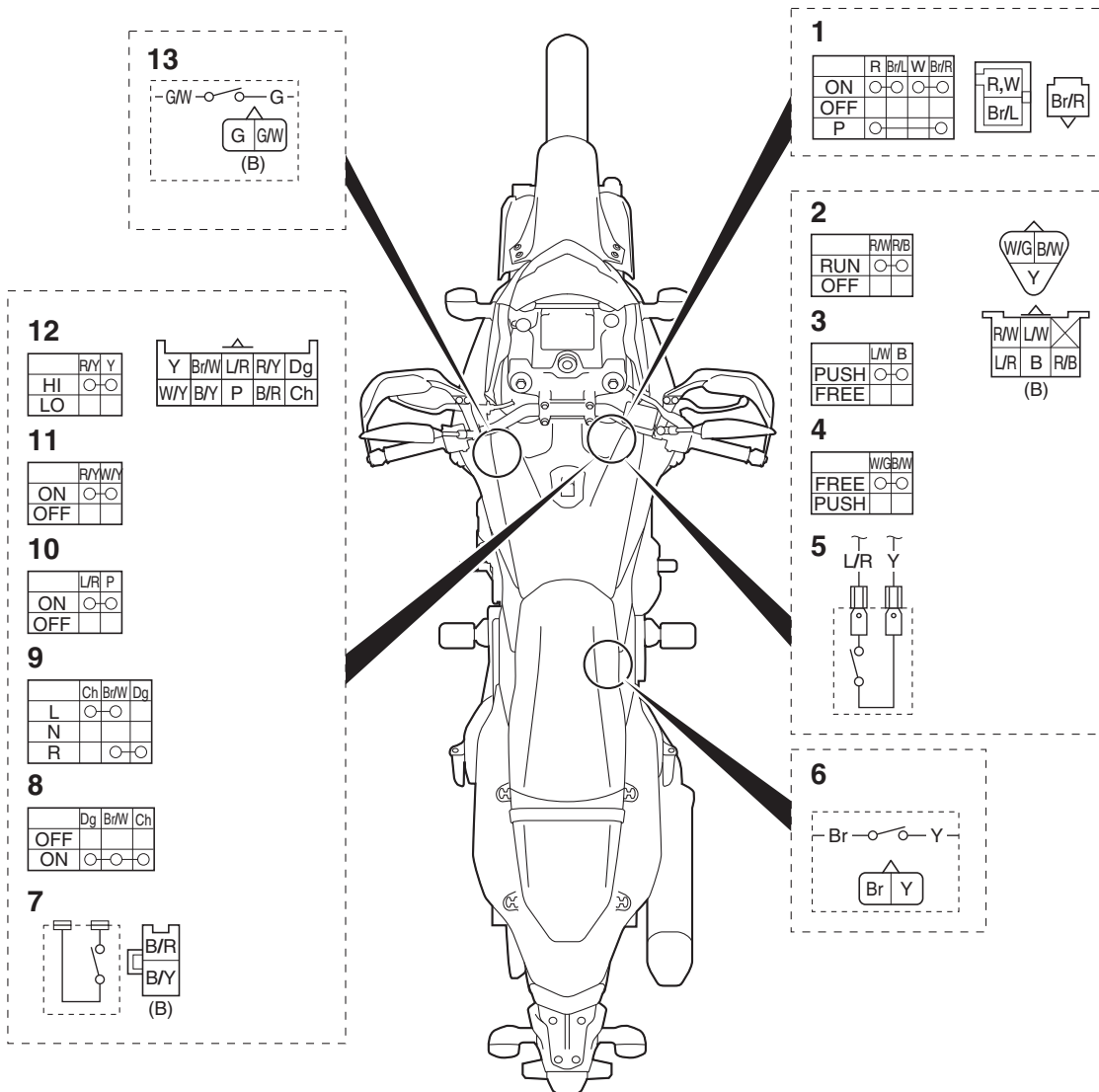
1. Hydraulic unit assembly
2. Intake air pressure sensor
3. Fuel pump
4. Main fuse
5. Starter relay
6. Relay unit (diode)
7. ECU (Engine Control Unit)
8. Rear wheel sensor
9. Turn signal/hazard relay
10. Radiator fan motor relay
11. Crankshaft position sensor
12. Fuel injector
13. Throttle position sensor
14. Front wheel sensor

# ELECTRICAL COMPONENTS

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. Main switch              | 8. Hazard switch      |
| 2. Engine stop switch       | 9. Turn signal switch |
| 3. Start switch             | 10. Horn switch       |
| 4. Select switch            | 11. Pass switch       |
| 5. Front brake light switch | 12. Dimmer switch     |
| 6. Rear brake light switch  | 13. Sidestand switch  |
| 7. Clutch switch            |                       |

# ELECTRICAL COMPONENTS

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.
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 ta-  
chometer  
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	30 A	1
ABS motor	30 A	1
ABS solenoid	20 A	1
Headlight	10 A	1
Signaling system	7.5 A	1
Ignition	10 A	1
Fuel injection system	10 A	1
Radiator fan motor	10 A	1
Accessory	10 A	1
Parking lighting	7.5 A	1
ABS control unit	7.5 A	1
Backup	7.5 A	1
Auxiliary	2.0 A	1
Spare	30 A	1

Fuses	Amperage rating	Q'ty
Spare	20 A	1
Spare	10 A	2
Spare	7.5 A	1
Spare	2.0 A	1

EWA13310

### WARNING

**Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

4. Install:
  - 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).  
Refer to “REMOVING THE ECU (engine control unit)” on page 4-3.
3. Clean the throttle bodies and reset the ISC (Idle speed control) learning value.  
Refer to “Cleaning the ISC (idle speed control) valve” on page 7-10.
4. Reset the O<sub>2</sub> feedback learning value. Use the diagnostic code number “87”.  
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-1.
5. Check:
  - Engine idling speed  
Start the engine, warm it up, and then measure the engine idling speed.



**Engine idling speed  
1250–1450 r/min**

EAS30552

## CHECKING AND CHARGING THE BATTERY TIP

Refer to “CHECKING AND CHARGING THE BATTERY” in “BASIC INFORMATION” (separate volume).

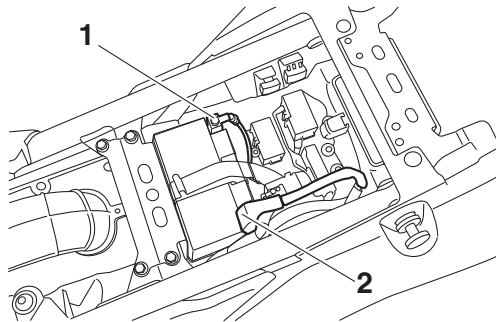
# ELECTRICAL COMPONENTS

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".**

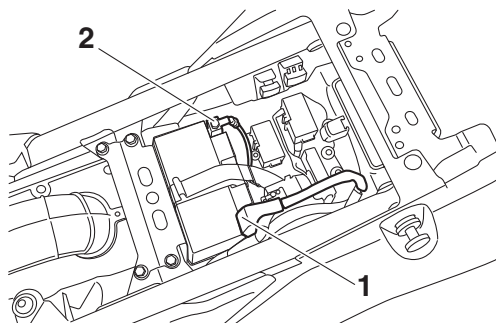


3. Remove:
  - Battery  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
  - Battery charge
5. Install:
  - Battery  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
6. Connect:
  - Battery leads  
(to the battery terminals)

ECA13630

## NOTICE

**First, connect the positive battery lead "1", and then the negative battery lead "2".**



7. Check:
  - Battery terminals  
Dirt → Clean with a wire brush.  
Loose connection → Connect properly.

8. Lubricate:
  - Battery terminals

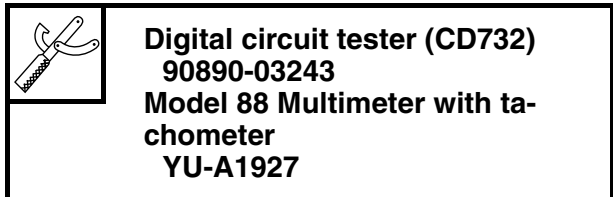


9. Install:
  - Rider seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

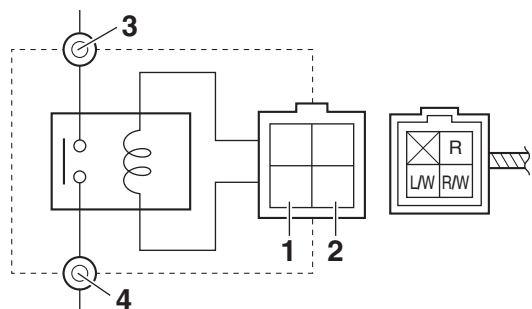
## CHECKING THE RELAYS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.

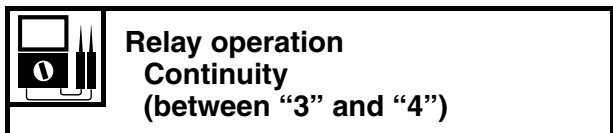


1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown. Check the relay operation. Out of specification → Replace.

## Starter relay

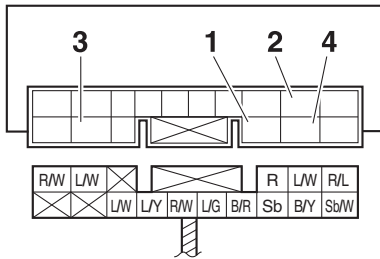


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

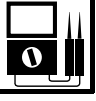


# ELECTRICAL COMPONENTS

## Starting circuit cut-off relay

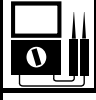


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
Continuity  
(between “3” and “4”)

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

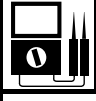


**Result**  
Continuity  
(between “3” and “4”)

EAS30794


## CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:
  - Turn signal/hazard relay input voltage  
Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and replace the wire harness.



**Turn signal/hazard relay input voltage**  
DC 12V

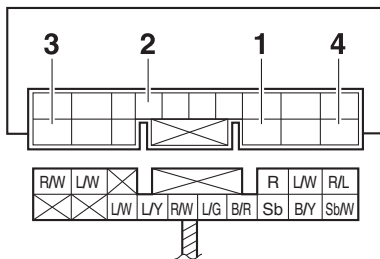
- a. Connect the digital circuit tester to the turn signal/hazard relay terminal as shown.




**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927

- Positive tester probe blue/red “1”
- Negative tester probe Ground

## Fuel pump relay

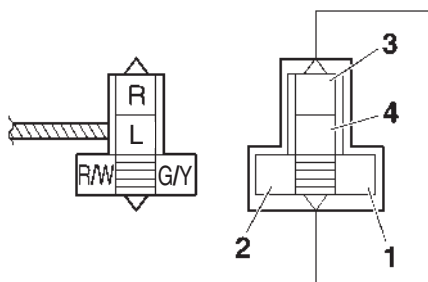


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

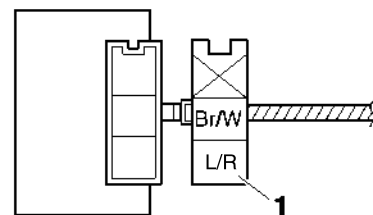


**Result**  
Continuity  
(between “3” and “4”)

## Radiator fan motor relay



1. Positive battery terminal



- b. Turn the main switch to “ON”.
- c. Measure the turn signal/hazard relay input voltage.
2. Check:
  - Turn signal/hazard relay output voltage  
Out of specification → Replace.

# ELECTRICAL COMPONENTS



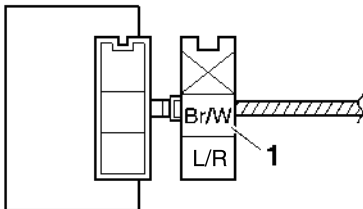
**Turn signal/hazard relay output voltage**  
DC 12V

- a. Connect the digital circuit tester to the turn signal/hazard relay terminal as shown.



**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927

- Positive tester probe brown/white "1"
- Negative tester probe Ground



- b. Turn the main switch to "ON".
- c. Measure the turn signal/hazard relay output voltage.

EAS30555

## CHECKING THE DIODE

1. Check:
  - Diode
 Out of specification → Replace.

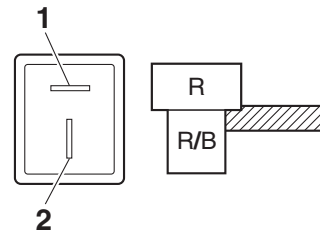


**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927



**Continuity**  
Positive tester probe red/black "2"  
Negative tester probe red "1"

**No continuity**  
Positive tester probe red "1"  
Negative tester probe red/black "2"



- a. Disconnect the diode from the wire harness.
- b. Connect the digital circuit tester to the diode terminals as shown.
- c. Check the diode for continuity.
- d. Check the diode for no continuity.

EAS30795

## CHECKING THE RELAY UNIT (DIODE)

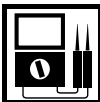
1. Check:
  - Relay unit (diode)
 Out of specification → Replace.



**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927



# ELECTRICAL COMPONENTS



## 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  
black/red "3"

Negative tester probe  
sky blue "2"

## No continuity

Positive tester probe  
sky blue "2"

Negative tester probe  
black/red "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

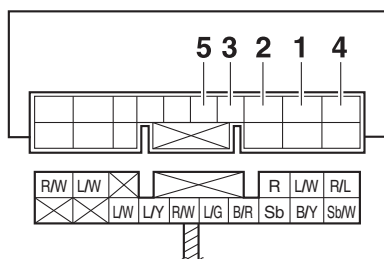
Positive tester probe  
black/red "3"

Negative tester probe  
blue/green "5"

## No continuity

Positive tester probe  
blue/green "5"

Negative tester probe  
black/red "3"



- Disconnect the relay unit coupler from the relay unit.
- Connect the digital circuit tester to the relay unit terminal as shown.

- Check the relay unit (diode) for continuity.
- Check the relay unit (diode) for no continuity.

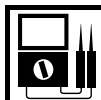
EAS30558

## CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

### 1. Check:

- Primary coil resistance  
Out of specification → Replace.



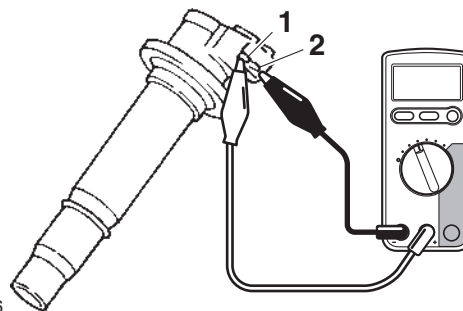
**Primary coil resistance**  
1.19–1.61 Ω

- Disconnect the ignition coil coupler from the ignition coil.
- Connect the digital circuit tester to the ignition coil as shown.



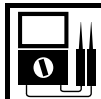
**Digital circuit tester (CD732)**  
90890-03243  
Model 88 Multimeter with tachometer  
YU-A1927

- Positive tester probe  
Ignition coil terminal "1"
- Negative tester probe  
Ignition coil terminal "2"



G089046

- Measure the primary coil resistance.
- ### 2. Check:
- Secondary coil resistance  
Out of specification → Replace.



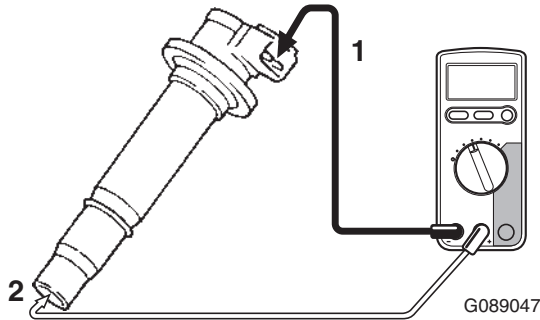
**Secondary coil resistance**  
8.50–11.50 kΩ

- Connect the digital circuit tester to the ignition coil as shown.



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

- Negative tester probe  
Ignition coil terminal "1"
- Positive tester probe  
Spark plug terminal "2"



b. Measure the secondary coil resistance.

EAS30556

## CHECKING THE IGNITION SPARK GAP

1. Check:
  - Ignition spark gap  
Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to "TROUBLESHOOTING" on page 8-4.



**Minimum ignition spark gap**  
**0.6 mm (0.24 in)**

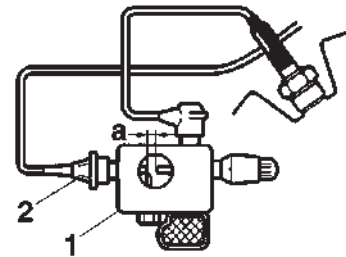
### TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- a. Remove the ignition coil from the spark plug.
- b. Connect the ignition checker "1" as shown.



**Ignition checker**  
**90890-06754**  
**Oppama pet-4000 spark checker**  
**YM-34487**



G089051

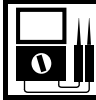
2. Ignition coil

- c. Turn the main switch to "ON".
- d. Measure the ignition spark gap "a".
- e. Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

EAS30560

## CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
  - Crankshaft position sensor coupler (from the wire harness)
2. Check:
  - Crankshaft position sensor resistance  
Out of specification → Replace the crankshaft position sensor.



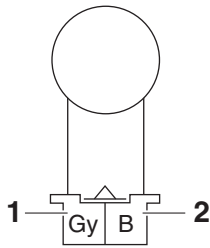
**Crankshaft position sensor resistance**  
**228–342 Ω**

- a. Connect the digital circuit tester to the crankshaft position sensor coupler as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with ta-**  
**chometer**  
**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 battery box.)
2. Check:
  - Lean angle sensor output voltage  
Out of specification → Replace.



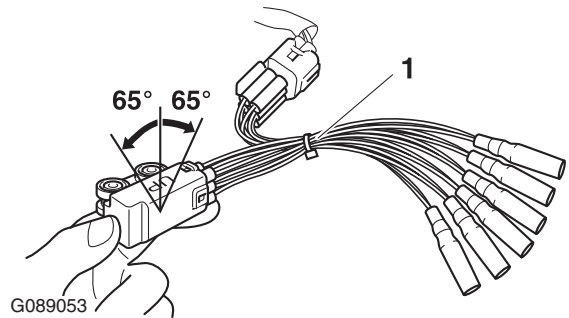
**Lean angle sensor output voltage**  
**Less than 65°: 0.4–1.4 V**  
**More than 65°: 3.7–4.4 V**

- 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 (test harness color)
- Negative tester probe blue (test harness color)



G089053

- c. Set 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

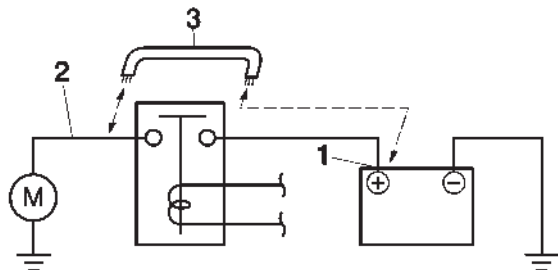
1. Check:
  - Starter motor operation  
Does not operate → Perform the electric starting system troubleshooting, starting with step 4.  
Refer to “TROUBLESHOOTING” on page 8-10.
  - a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

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.



G089054

- b. Check the starter motor operation.

EAS30566

## CHECKING THE STATOR COIL

1. Disconnect:
  - Stator coil coupler (from the rectifier/regulator)

# ELECTRICAL COMPONENTS

## 2. Check:

- Stator coil resistance  
Out of specification → Replace the stator coil.



**Stator coil resistance**  
0.128–0.192 Ω

- Connect the digital circuit tester to the stator coil coupler as shown.

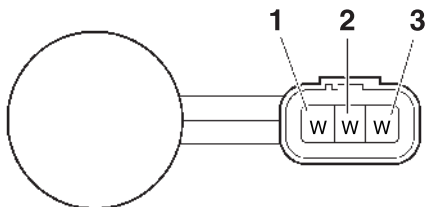


**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927

- 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"



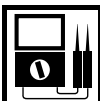
- Measure the stator coil resistance.

EAS30680

## CHECKING THE RECTIFIER/REGULATOR

### 1. Check:

- Charging voltage  
Out of specification → Replace the rectifier/regulator.



**Charging voltage**  
14 V at 5000 r/min

- 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
- Negative tester probe  
Negative battery terminal

- Start the engine and let it run at approximately 5000 r/min.
- Measure the charging voltage.

EAS30573

## CHECKING THE FUEL SENDER

### 1. Disconnect:

- Fuel pump coupler  
(from the fuel pump)

### 2. Remove:

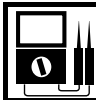
- Fuel tank

### 3. Remove:

- Fuel pump  
(from the fuel tank)

### 4. Check:

- Fuel sender resistance  
Out of specification → Replace the fuel pump assembly.



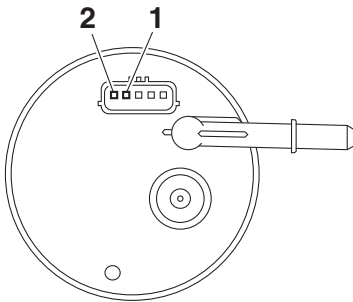
**Sender unit resistance (full)**  
12.0–14.0 Ω  
**Sender unit resistance (empty)**  
118.0–122.0 Ω

- 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 pump terminal "1"
- Negative tester probe  
Fuel pump terminal "2"



- b. Move the fuel sender float to minimum and maximum level position.
- c. Measure the fuel sender resistance.

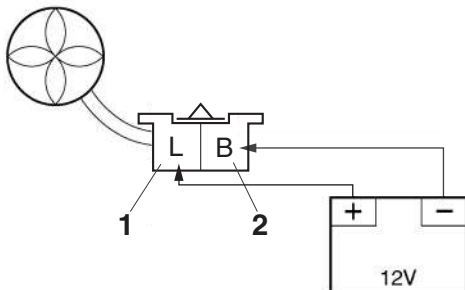
EAS30577

## CHECKING THE RADIATOR FAN MOTOR

### 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 "1"
- Negative tester probe  
black "2"



- c. Check the radiator fan motor movement.

EAS30578

## CHECKING THE COOLANT TEMPERATURE SENSOR

### 1. Remove:

- Coolant temperature sensor  
Refer to "THROTTLE BODIES" on page 7-5.

EWA14130



**WARNING**

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

### 2. Check:

- Coolant temperature sensor resistance  
Out of specification → Replace.



### Coolant temperature sensor resistance

2510–2780 Ω at 20 °C (2510–2780 Ω at 68 °F)

### Coolant temperature sensor resistance

210–221 Ω at 100 °C (210–221 Ω at 212 °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

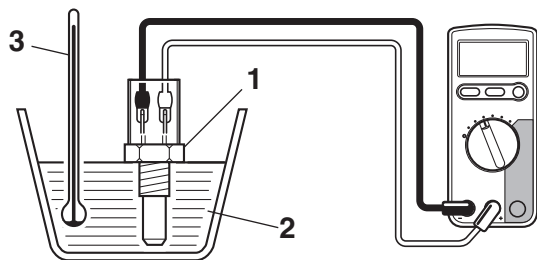
YU-A1927

- 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.



G089056

- d. Heat the coolant or let it cool down to the specified temperatures.
- e. Measure the coolant temperature sensor resistance.

### 3. Install:

- Coolant temperature sensor  
(along with the gasket **New**)



**Coolant temperature sensor**  
15 N·m (1.5 kgf·m, 11 lb·ft)

EAS30581

## CHECKING THE THROTTLE POSITION SENSOR

### 1. Remove:

- Throttle position sensor  
(from the throttle body)

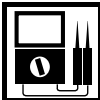
EWA16690

## **WARNING**

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

### 2. Check:

- Throttle position sensor maximum resistance  
Out of specification → Replace the throttle position sensor.



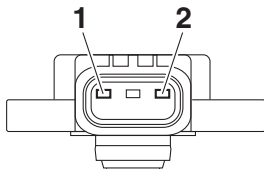
**Resistance**  
2.64–6.16 kΩ

- a. Connect the digital circuit tester to the throttle position sensor as shown.



**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927

- Positive tester probe  
Sensor terminal "1"
- Negative tester probe  
Sensor terminal "2"



- b. Check 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 7-11.

EAS31088

## **CHECKING THE GEAR POSITION SWITCH**

### 1. Remove:

- Drive sprocket cover  
Refer to "CHAIN DRIVE" on page 4-80.

- Gear position switch  
Refer to "CRANKCASE" on page 5-60.

### 2. Check:

- Gear position switch  
Out of specification → Replace the gear position switch.



**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with tachometer**  
YU-A1927



### Result

**Neutral position**

**Continuity**

**Positive tester probe**

**sky blue "1"**

**Negative tester probe**

**Switch terminal "a"**

**1st position**

**Continuity**

**Positive tester probe**

**pink "2"**

**Negative tester probe**

**Switch terminal "b"**

**2nd position**

**Continuity**

**Positive tester probe**

**white "3"**

**Negative tester probe**

**Switch terminal "c"**

**3rd position**

**Continuity**

**Positive tester probe**

**gray "4"**

**Negative tester probe**

**Switch terminal "d"**

**4th position**

**Continuity**

**Positive tester probe**

**orange "5"**

**Negative tester probe**

**Switch terminal "e"**

**5th position**

**Continuity**

**Positive tester probe**

**white/red "6"**

**Negative tester probe**

**Switch terminal "f"**

**6th position**

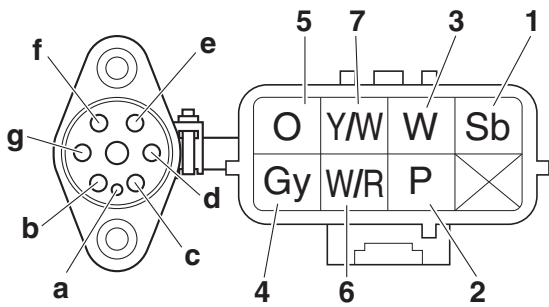
**Continuity**

**Positive tester probe**

**yellow/white "7"**

**Negative tester probe**

**Switch terminal "g"**



EAS30681

## CHECKING THE FUEL INJECTORS

The following procedure applies to all of the fuel injectors.

1. Remove:
  - Fuel injector  
Refer to “THROTTLE BODIES” on page 7-5.
2. Check:
  - Fuel injector resistance  
Out of specification → Replace the fuel injector.



### Resistance

**12.0 Ω@20 °C (12.0 Ω@68 °F)**

- a. Disconnect the fuel injector coupler from the fuel injector.
- b. Connect the digital circuit tester to the fuel injector coupler as shown.



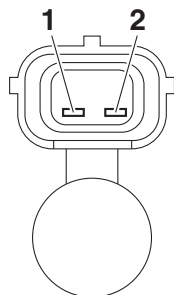
### Digital circuit tester (CD732)

**90890-03243**

**Model 88 Multimeter with tachometer**

**YU-A1927**

- Positive tester probe  
Fuel injector terminal “1”
- Negative tester probe  
Fuel injector terminal “2”



- c. Measure the fuel injector resistance.





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## APPENDIX

<b>SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE</b> .....	9-1
SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM).....	9-1
SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM).....	9-7
DIAGNOSTIC CODE: SENSOR OPERATION TABLE .....	9-8
DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE .....	9-10
 <b>EVENT CODE TABLE</b> .....	 9-12

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS20311

## SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS32705

### SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

#### TIP

For details of the fault code, refer to "TROUBLESHOOTING METHOD" on page 8-33.

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0030	O <sub>2</sub> sensor heater (defective heater controller detected)	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness.</li> <li>• Disconnected coupler.</li> <li>• Defective O<sub>2</sub> sensor heater controller.</li> <li>• Broken or disconnected lead in O<sub>2</sub> sensor heater.</li> </ul>	(When the O <sub>2</sub> sensor does not operate because the exhaust temperature is low) Increased exhaust emissions. Fuel learning cannot be carried out.	Display only (If the O <sub>2</sub> sensor does not operate, O <sub>2</sub> feedback is not carried out.)
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 (0.2 V or less) [P0108] High voltage of the intake air pressure sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Defective coupler between intake air pressure sensor and ECU.</li> <li>• Open or short circuit in wire harness between intake air pressure sensor and ECU.</li> <li>• Defective intake air pressure sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions.	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. Intake air pressure is fixed to 101.3 [kPa]. O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0112 P0113	[P0112] Intake air temperature sensor (ground short circuit detected) [P0113] Intake air temperature sensor (open or power short circuit detected)	[P0112] Low voltage of the intake air temperature sensor circuit (0.2 V or less) [P0113] High voltage of the intake air temperature sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Defective coupler between intake air temperature sensor and ECU.</li> <li>• Open or short circuit in wire harness between intake air temperature sensor and ECU.</li> <li>• Improperly installed intake air temperature sensor.</li> <li>• Defective intake air temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The intake air temperature is fixed to 20 [°C]. O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out.
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 (0.2 V or less) [P0118] High voltage of the coolant temperature sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Defective coupler between coolant temperature sensor and ECU.</li> <li>• Open or short circuit in wire harness between coolant temperature sensor and ECU.</li> <li>• Improperly installed coolant temperature sensor.</li> <li>• Defective coolant temperature sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable.	The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C].

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0122 P0123	[P0122] Throttle position sensor (open or ground short circuit detected) [P0123] Throttle position sensor (power short circuit detected)	[P0122] Low voltage of the throttle position sensor circuit (0.2 V or less) [P0123] High voltage of the throttle position sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Defective coupler between throttle position sensor and ECU.</li> <li>• Open or short circuit in wire harness between throttle position sensor and ECU.</li> <li>• Improperly installed throttle position sensor.</li> <li>• Defective throttle position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	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- $\lambda$ is fixed. Throttle opening is fixed to 125 [°]. Estimated atmospheric pressure is fixed to 101.3 [kPa]. O <sub>2</sub> feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out.
P0132	O <sub>2</sub> sensor (short circuit detected (power short circuit))	[P0132] High voltage of the O <sub>2</sub> sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Improperly installed O<sub>2</sub> sensor.</li> <li>• Defective coupler between O<sub>2</sub> sensor and ECU.</li> <li>• Open or short circuit in wire harness between O<sub>2</sub> sensor and ECU.</li> <li>• Incorrect fuel pressure.</li> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Increased exhaust emissions.	O <sub>2</sub> feedback is not carried out. O <sub>2</sub> feedback learning is not carried out.
P0201 P0202	[P0201] Fuel injector #1 (malfunction in fuel injector #1) [P0202] Fuel injector #2 (malfunction in fuel injector #2)	<ul style="list-style-type: none"> <li>• Defective coupler between injector and ECU.</li> <li>• Open or short circuit in wire harness between injector and ECU.</li> <li>• Defective injector.</li> <li>• Malfunction in ECU.</li> <li>• Improperly installed injector.</li> </ul>	Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine stops. Engine idling speed is unstable. Increased exhaust emissions.	O <sub>2</sub> feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. Injection to the applicable cylinder group is cut off.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0335	Crankshaft position sensor (no normal signals are received from the crankshaft position sensor)	<ul style="list-style-type: none"> <li>• Defective coupler between crankshaft position sensor and ECU.</li> <li>• Open or short circuit in wire harness between crankshaft position sensor and ECU.</li> <li>• Improperly installed crankshaft position sensor.</li> <li>• Malfunction in generator rotor.</li> <li>• Defective crankshaft position sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine cannot be started.	Does not operate. ISC feedback is not carried out. ISC learning is not carried out.
P0351 P0352	<p>[P0351] Cylinder-#1 ignition coil (open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.)</p> <p>[P0352] Cylinder-#2 ignition coil (open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.)</p>	<ul style="list-style-type: none"> <li>• Defective coupler between ignition coil and ECU.</li> <li>• Open or short circuit in wire harness between ignition coil and ECU.</li> <li>• Improperly installed ignition coil.</li> <li>• Defective ignition coil.</li> <li>• Malfunction in ECU.</li> </ul>	<p>Engine stops.</p> <p>Loss of engine power.</p> <p>Engine is difficult to start.</p> <p>Engine cannot be started.</p> <p>Engine idling speed is unstable.</p> <p>Increased exhaust emissions.</p>	<p>Injection to the applicable cylinder group is cut off.</p> <p>O<sub>2</sub> feedback is not carried out.</p> <p>ISC feedback is not carried out.</p> <p>ISC learning is not carried out.</p>
P0500	<ul style="list-style-type: none"> <li>• Front wheel sensor (no normal signals are received from the front wheel sensor)</li> <li>• Gear position switch (open or short circuit is detected)</li> <li>• Clutch switch (open or short circuit is detected)</li> </ul>	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness between front wheel sensor and ABS ECU.</li> <li>• Open or short circuit in wire harness between ABS ECU and ECU.</li> <li>• Open or short circuit in wire harness between gear position switch and ECU.</li> <li>• Open or short circuit in wire harness between clutch switch and ECU.</li> <li>• Defective front wheel sensor.</li> <li>• Defective gear position switch.</li> <li>• Defective clutch switch.</li> <li>• Improper adjustment of clutch lever.</li> <li>• Malfunction in ECU.</li> </ul>	<p>Vehicle speed is not displayed on the meter.</p> <p>Engine stalls when the vehicle is decelerating to a stop.</p> <p>Engine idling speed is high.</p> <p>Indication of the neutral indicator light is incorrect.</p> <p>Engine cannot be restarted when the transmission is in gear even with the clutch lever squeezed.</p> <p>Engine idling speed is unstable.</p> <p>Increased exhaust emissions.</p>	<p>Vehicle speed displayed on the meter = 0 [km/h]</p> <p>The gear ratio is fixed to the gear ratio of the top gear.</p> <p>O<sub>2</sub> feedback is not carried out.</p> <p>Fuel cut-off control when the rear wheel sensor or gear position switch malfunctions is carried out.</p> <p>ISC feedback is not carried out.</p> <p>ISC learning is not carried out.</p>

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0507	<ul style="list-style-type: none"> <li>• Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).</li> <li>• Defective ISC (idle speed control) unit (ISC operating sound is not heard).</li> </ul>	<ul style="list-style-type: none"> <li>• Defective speed sensor.</li> <li>• Defective coupler between ISC unit and ECU.</li> <li>• Open or short circuit in wire harness between ISC unit and ECU.</li> <li>• Improperly installed ISC unit.</li> <li>• Disconnected ISC unit hose or air leak from intake air passage.</li> <li>• Defective throttle valve or throttle cable.</li> <li>• Defective ISC unit (ISC valve stuck fully open).</li> <li>• Malfunction in ECU.</li> </ul>	Engine idling speed is high.	ISC learning is not carried out.
P0511	ISC unit (malfunction in ISC unit)	<ul style="list-style-type: none"> <li>• Defective coupler between ISC unit and ECU.</li> <li>• Open or short circuit in wire harness between ISC unit and ECU.</li> <li>• Defective ISC stepping motor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine is difficult to start. Engine idling speed is unstable. Engine idling speed is high.	Power is not supplied to the ISC unit. ISC learning is not carried out.
P0560	Charging voltage is abnormal.	<ul style="list-style-type: none"> <li>• Battery overcharging (defective rectifier/regulator).</li> <li>• Battery overcharging (broken or disconnected lead in rectifier/regulator wire harness).</li> <li>• Battery over-discharging (broken or disconnected lead in charging system).</li> <li>• Battery over-discharging (defective rectifier/regulator).</li> </ul>	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O <sub>2</sub> feedback is not carried out.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Fault code No.	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0601	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)	<ul style="list-style-type: none"> <li>• Malfunction in ECU.</li> </ul>	<p>Engine cannot be started.            Engine response is poor.            Loss of engine power.</p>	<p>Engine cannot be started.            Ignition and injection are not carried out.            Judgment for other fault codes is not carried out.            Writing to EEPROM is not carried out.            Load control is not carried out. (The relay unit, headlight relay, and other relays are all turned off.)            The CO adjustment mode and diagnostic mode cannot be activated.            Output is restricted.</p>
P062F	EEPROM fault code number (an error is detected while reading or writing on EEPROM)	<ul style="list-style-type: none"> <li>• CO adjustment value is not properly written.</li> <li>• ISC learning value is not properly written.</li> <li>• OBD memory value is not properly written.</li> <li>• Malfunction in ECU.</li> </ul>	<p>Increased exhaust emissions.            Engine cannot be started or is difficult to start.            Engine idling speed is unstable.            OBD memory value is not correct.</p>	<p>CO adjustment value for the faulty cylinder = 0 (default value)            ISC learning values = Default values            OBD memory value is initialized.</p>
P0657	Fuel system voltage (incorrect voltage supplied to the fuel injector and fuel pump)	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness between relay unit and ECU.</li> <li>• Open circuit in wire harness between battery and ECU.</li> <li>• Defective relay unit.</li> <li>• Malfunction in ECU.</li> </ul>	<p>Engine is difficult to start.            Increased exhaust emissions.</p>	<p>Monitor voltage = 12 [V]            O<sub>2</sub> feedback is not carried out.</p>
P1601	Sidestand switch (open or short circuit of the black/red lead of the ECU is detected)	<ul style="list-style-type: none"> <li>• Defective coupler between relay unit and ECU.</li> <li>• Open or short circuit in wire harness between relay unit and ECU.</li> <li>• Defective coupler between sidestand switch and relay unit.</li> <li>• Open or short circuit in wire harness between sidestand switch and relay unit.</li> <li>• Defective sidestand switch.</li> <li>• Malfunction in ECU.</li> </ul>	<p>Engine cannot be started.</p>	<p>Engine is forcefully stopped (the injector output is stopped).</p>

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

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)	<ul style="list-style-type: none"> <li>• Open or short circuit in wire harness between ECU and battery.</li> <li>• Open or short circuit in wire harness between ECU and main switch.</li> <li>• Blown fuel injection system fuse.</li> <li>• Malfunction in ECU.</li> </ul>	Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start.	O <sub>2</sub> feedback learning is not carried out. O <sub>2</sub> feedback learning value is not written.
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) <ul style="list-style-type: none"> <li>• Open or short circuit in wire harness between lean angle sensor and ECU.</li> <li>• Defective lean angle sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Engine cannot be started.	Engine cannot be started.
P2195	O <sub>2</sub> sensor (open circuit detected)	<ul style="list-style-type: none"> <li>• Signal voltage is 0.25–0.53 V.</li> <li>• Improperly installed O<sub>2</sub> sensor.</li> <li>• Defective coupler between O<sub>2</sub> sensor and ECU.</li> <li>• Open or short circuit in wire harness between O<sub>2</sub> sensor and ECU.</li> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Malfunction in ECU.</li> </ul>	Increased exhaust emissions.	O <sub>2</sub> feedback is not carried out. O <sub>2</sub> feedback learning is not carried out.

EAS32497

## SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM)

### TIP

For details of the fault code, refer to “SELF-DIAGNOSIS FAULT CODE INDICATION” on page 8-94.

Fault code No.	Item
51	Immobilizer unit: Code cannot be transmitted between the key and the immobilizer unit.
52	Immobilizer unit: Codes between the key and immobilizer unit do not match.
53	Immobilizer unit: Codes cannot be transmitted between the ECU and the immobilizer unit.
54	Immobilizer unit: Codes transmitted between the ECU and the immobilizer unit do not match.
55	Immobilizer unit: Key code registration malfunction.
56	ECU: Unidentified code is received.







# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS32425

## DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Tool display	Procedure
01	Throttle position sensor signal <ul style="list-style-type: none"> <li>• Fully closed position</li> <li>• Fully open position</li> </ul>	11–21  96–106	Check with throttle valves fully closed.  Check with throttle valves fully open.
03	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pushing the start switch. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the air temperature.	Compare the actually measured air temperature with the tool display value.
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the tool display value.
07	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.
08	Lean angle sensor  <ul style="list-style-type: none"> <li>• Upright</li> <li>• Overturned</li> </ul>	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.)
20	Sidestand switch  <ul style="list-style-type: none"> <li>• Stand retracted</li> <li>• Stand extended</li> </ul>	ON OFF	Extend and retract the sidestand (with the transmission in gear).

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Tool display	Procedure
21	Gear position switch and clutch switch <ul style="list-style-type: none"> <li>• Transmission is in gear or the clutch lever released</li> <li>• Clutch lever is squeezed with the transmission in gear and when the side-stand is retracted</li> <li>• Clutch lever is squeezed with the transmission in gear and when the side-stand is extended</li> </ul>	OFF  ON  OFF	Operate the transmission, clutch lever, and sidestand.
60	EEPROM fault code display <ul style="list-style-type: none"> <li>• No history</li> <li>• 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.</li> </ul>	00 <ul style="list-style-type: none"> <li>• No malfunctions detected (If the self-diagnosis fault code P062F is indicated, the ECU is defective.)</li> </ul> 01–02 (CO adjustment value) <ul style="list-style-type: none"> <li>• (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.)</li> </ul> 11 (Data error for ISC (idle speed control) learning values) 12 (O <sub>2</sub> 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	Control number	0–254 [-]	—
87	O <sub>2</sub> feedback learning data erasure	00 O <sub>2</sub> feedback learning data has been erased. 01 O <sub>2</sub> feedback learning data has not been erased.	To erase the O <sub>2</sub> feedback learning data, set the engine stop switch from “  ” to “  ” 3 times in 5 seconds.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS32426

## DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Cylinder-#1 ignition coil	Actuates cylinder-#1 ignition coil five times at one-second intervals. The 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 cylinder-#2 ignition coil five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.
36	Fuel injector #1	Actuates fuel injector #1 five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Disconnect the fuel pump coupler. Check that fuel injector #1 is actuated five times by listening for the operating sound.
37	Fuel injector #2	Actuates fuel injector #2 five times at one-second intervals. The indicator on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Disconnect the fuel pump coupler. Check that fuel injector #2 is actuated five times by listening for the operating sound.
50	Relay unit	Actuates the relay unit five times at one-second intervals. The 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 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 relay five times at five-second intervals. The indicator on the Yamaha diagnostic tool screen come on each time the relay is actuated.	Check that the headlight turns on five times.

## SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
54	ISC valve	Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The indicator on the Yamaha diagnostic tool screen come on during the operation.	Check that the ISC unit is actuated three times by listening for the operating sound.

# EVENT CODE TABLE

EAS20316

## EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
U0155	CAN communication error (with the meter)	Communication between the ECU and the meter is not possible	<ul style="list-style-type: none"> <li>Defective meter coupler and ECU coupler</li> <li>Open or short circuit in the wire harness between the sensor and the ECU</li> <li>Defective meter</li> <li>Defective ECU</li> </ul>	Perform the checks and maintenance jobs for event code number U0155 (meter display: Err).
30	Latch up detected	Latch up detected	<ul style="list-style-type: none"> <li>Vehicle has overturned</li> <li>Improperly installed sensor</li> <li>Sensor malfunction</li> <li>Defective ECU</li> </ul>	Perform the checks and maintenance jobs for event code number 30.
70	Engine idling stop	Engine has been left idling (This is not a malfunction.)	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 and P0123	Perform the checks and maintenance jobs for fault code number P0122 and P0123.
195	Sidestand switch	Brief abnormality detected in black/red input lead of ECU	Same as for fault code number P1601	Perform the checks and maintenance jobs for fault code number P1601.
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.
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.
204	Fuel system voltage (monitor voltage)	Brief abnormality detected in voltage supplied to fuel injector and fuel pump	Same as for fault code number P0657	Perform the checks and maintenance jobs for fault code number P0657.
205	Vehicle system power supply	Brief abnormality detected in charging voltage	Same as for fault code number P0560	Perform the checks and maintenance jobs for fault code number P0560.

## EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
240	O <sub>2</sub> sensor (Correction value remains at upper limit)	Correction value remains at upper limit during O <sub>2</sub> feedback	<ul style="list-style-type: none"> <li>• Open or short circuit in the wire harness between the sensor and the ECU gray/green–gray/green pink/black–pink/black black/blue–black/blue</li> <li>• Low fuel pressure</li> <li>• Clogged fuel injector</li> <li>• Sensor malfunction</li> <li>• Defective ECU</li> <li>• Defective fuel injection system</li> </ul>	<ul style="list-style-type: none"> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 240 may be indicated even if the system is normal.</li> </ul>
241	O <sub>2</sub> sensor (Correction value remains at lower limit)	Correction value remains at lower limit during O <sub>2</sub> feedback	<ul style="list-style-type: none"> <li>• Open or short circuit in the wire harness between the sensor and the ECU gray/green–gray/green pink/black–pink/black black/blue–black/blue</li> <li>• Low fuel pressure</li> <li>• Clogged fuel injector</li> <li>• Sensor malfunction</li> <li>• Defective ECU</li> <li>• Defective fuel injection system</li> </ul>	<ul style="list-style-type: none"> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 241 may be indicated even if the system is normal.</li> </ul>
242	ISC (idle speed control) (Correction value remains at upper limit)	Correction value remains at upper limit while the engine is idling	<ul style="list-style-type: none"> <li>• Low engine idling speed</li> <li>• Clogged throttle body</li> <li>• Improperly adjusted throttle cable</li> <li>• Improperly adjusted clutch cable</li> <li>• Defective fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Defective battery</li> <li>• Defective ECU</li> </ul>	<ul style="list-style-type: none"> <li>• Execute the diagnostic mode (diagnostic code number 67) and check the ISC maintenance requirements.</li> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 242 may be indicated even if the system is normal.</li> </ul>
243	ISC (idle speed control) (Correction value remains at lower limit)	Correction value remains at lower limit while the engine is idling	<ul style="list-style-type: none"> <li>• High engine idling speed</li> <li>• Improperly adjusted throttle cable</li> <li>• Improperly adjusted clutch cable</li> <li>• Defective fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Defective battery</li> <li>• Defective ECU</li> </ul>	<ul style="list-style-type: none"> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 243 may be indicated even if the system is normal.</li> </ul>

## EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
244	Difficult/unable to start engine	Engine starting difficult/unable condition detected	<ul style="list-style-type: none"> <li>• Empty fuel tank</li> <li>• Defective fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Defective battery</li> <li>• Defective ECU</li> </ul>	<ul style="list-style-type: none"> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 244 may be indicated even if the system is normal.</li> </ul>
245	Engine stall	Engine stall detected	<ul style="list-style-type: none"> <li>• Empty fuel tank</li> <li>• Improperly adjusted throttle cable</li> <li>• Improperly adjusted clutch cable</li> <li>• Defective fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Defective battery</li> <li>• Defective ECU</li> </ul>	<ul style="list-style-type: none"> <li>• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first.</li> <li>* Event code number 245 may be indicated even if the system is normal.</li> </ul>

**WIRING DIAGRAM****XTZ690/XTZ690-U 2020**

1. Main switch
2. ABS solenoid fuse
3. ABS motor fuse
4. Accessory fuse
5. Parking lighting fuse
6. ABS control unit fuse
7. Auxiliary fuse
8. Ignition fuse
9. Signaling system fuse
10. Headlight fuse
11. Fuel injection system fuse
12. Backup fuse
13. Radiator fan motor fuse
14. Immobilizer unit
15. Stator coil
16. Rectifier/regulator
17. Battery
18. Engine ground
19. Main fuse
20. Starter relay
21. Starter motor
22. Rear brake light switch
23. Relay unit (diode)
24. Starting circuit cut-off relay
25. Fuel pump relay
26. Joint coupler
27. Sidestand switch
28. Diode
29. Crankshaft position sensor
30. O<sub>2</sub> sensor
31. Throttle position sensor
32. ECU (Engine Control Unit)
33. Ignition coil #1
34. Ignition coil #2
35. Spark plug
36. Fuel injector #1
37. Fuel injector #2
38. ISC (Idle Speed Control) unit
39. Intake air temperature sensor
40. Coolant temperature sensor
41. Intake air pressure sensor
42. Resistor unit
43. Lean angle sensor
44. Front wheel sensor
45. Rear wheel sensor
46. ABS ECU
47. Yamaha diagnostic tool coupler
48. Fuel sender
49. Fuel pump
50. Oil pressure switch
51. Meter assembly
52. Immobilizer system indicator light
53. Neutral indicator light
54. Meter light
55. ABS on/off indicator light
56. Tachometer

57. Multi-function meter
58. Oil pressure warning light
59. Engine trouble warning light
60. Coolant temperature warning light
61. High beam indicator light
62. Turn signal indicator light (left)
63. Turn signal indicator light (right)
64. ABS warning light
65. Horn
66. Gear position switch
67. Handlebar switch (right)
68. Front brake light switch
69. Engine stop switch
70. Start switch
71. Select switch
72. Turn signal/hazard relay
73. Handlebar switch (left)
74. Clutch switch
75. Dimmer switch
76. Pass switch
77. Turn signal switch
78. Hazard switch
79. Horn switch
80. Rear turn signal light (right)
81. Front turn signal light (right)
82. Rear turn signal light (left)
83. Front turn signal light (left)
84. Headlight assembly
85. Headlight (high beam)
86. Headlight (low beam)
87. Auxiliary light
88. License plate light
89. Tail/brake light
90. Radiator fan motor relay
91. Radiator fan motor
92. Grip warmer (OPTION)
93. Fog light (OPTION)
94. Auxiliary DC jack #2
95. Auxiliary DC jack #1
- A. Wire harness
- B. Sub-wire harness
- C. for XTZ690
- D. for XTZ690-U

**COLOR CODE**

B	Black
Gy	Gray
L	Blue
B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/L	Brown/Blue
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
P/B	Pink/Black
P/L	Pink/Blue
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/G	White/Green
W/R	White/Red
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/W	Yellow/White





**MBK Industrie**  
**Z.I. de Rouvroy 02100 Saint Quentin**  
SAS au capital de 14 000 000 €  
R.C St-Quentin B 329 035 422





XTZ690/XTZ690-U 2020  
WIRING DIAGRAM

XTZ690/XTZ690-U 2020  
SCHEMA DE CÂBLAGE

XTZ690/XTZ690-U 2020  
SCHALTPLAN

XTZ690/XTZ690-U 2020  
SCHEMA ELETTRICO

XTZ690/XTZ690-U 2020  
DIAGRAMA ELÉCTRICO

