



**YAMAHA**

**2021**

**SERVICE MANUAL**

**XSR125**

**MTM125**

**BFG-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>WARNING</b> | <b>A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</b>                                                                          |
| <b>NOTICE</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>                                                                                                               |

**MTM125**  
**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

3

4

5

6

| Order | Job/Parts to remove                        | Q'ty | Remarks                                                 |
|-------|--------------------------------------------|------|---------------------------------------------------------|
|       | Front side cowling assembly/Bottom cowling |      | Refer to "GENERAL CHASSIS (5)" on page 4-8.             |
|       | Engine oil                                 |      | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-26. |
|       | Coolant                                    |      | Drain. Refer to "CHANGING THE COOLANT" on page 3-29.    |
| 1     | Water pump breather hose                   | 1    | Disconnect.                                             |
| 2     | Clutch cable                               | 1    | Disconnect.                                             |
| 3     | Pull lever                                 | 1    |                                                         |
| 4     | Pull lever spring                          | 1    |                                                         |
| 5     | Clutch cover                               | 1    |                                                         |
| 6     | Clutch cover gasket                        | 1    |                                                         |
| 7     | Dowel pin                                  | 2    |                                                         |

5-46

CLUTCH

**REMOVING THE CLUTCH**

1. Remove:

- Oil strainer  
Refer to "OIL PUMP" on page 5-59.
- Water pump  
Refer to "WATER PUMP" on page 6-12.
- Friction plates
- Clutch plates

**TIP**

Be sure to mark the friction plates and clutch plates or note the position of each part so that they are installed in their original positions.

2. Straighten the clutch boss nut rib "a".

3. Loosen:

- Clutch boss nut "1"

**TIP**

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

4. Remove:

- Spacer "1"
- Bearing
- Clutch housing "2"
- Oil pump drive chain

**TIP**

Remove the spacer and bearing from the main axle, then remove the oil pump drive chain from the oil pump driven sprocket, and then remove the clutch housing and oil pump drive chain from the main axle.

**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.

1. Check:

- Friction plate  
Damage/wear → Replace the friction plates as a set.

2. Measure:

- Friction plate thickness  
Out of specification → Replace the friction plates as a set.

**TIP**

Measure the friction plate at four places.

Friction plate thickness  
2.92–3.08 mm (0.115–0.121 in)  
Wear limit  
2.80 mm (0.110 in)

**CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

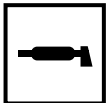
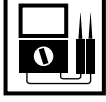
5-50

## 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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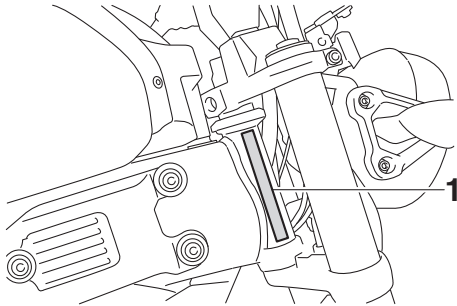
EAS20007

## IDENTIFICATION

EAS30002

### VEHICLE IDENTIFICATION NUMBER

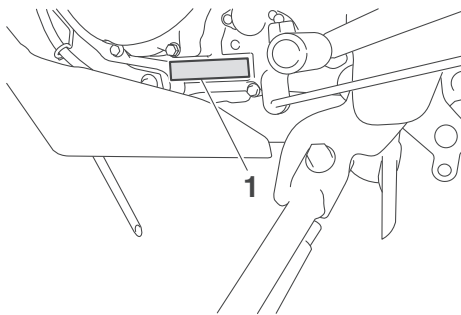
The vehicle identification number “1” is stamped into the steering head pipe.



EAS30004

### ENGINE SERIAL NUMBER

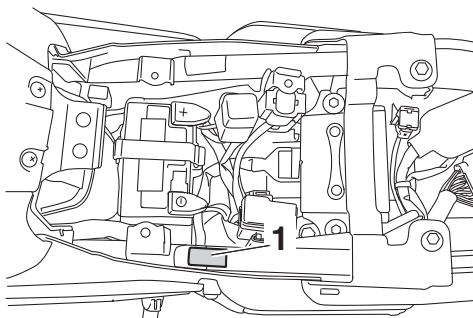
The engine serial number “1” is stamped into the crankcase.



EAS30003

### MODEL LABEL

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

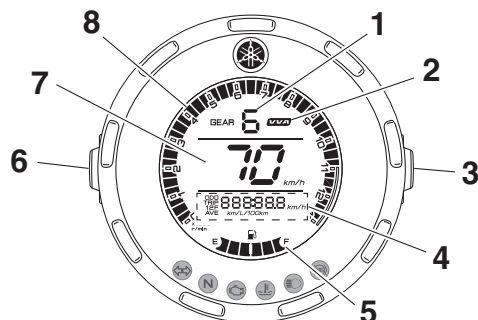


EAS20008

## FEATURES

EAS30982

### MULTI-FUNCTION METER UNIT



1. Transmission gear display
2. VVA (variable valve actuation) indicator
3. "RESET" button
4. Multi-function display
5. Fuel meter
6. "SELECT" button
7. Speedometer
8. Tachometer

The multi-function meter unit is also equipped with a backlight setting mode.

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.**

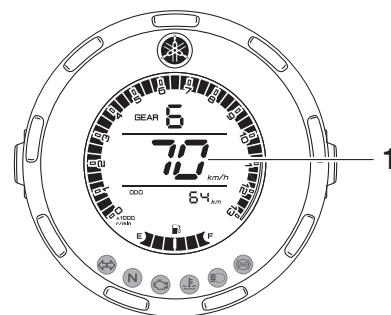
### Switching the display units

The display units can be switched between kilometers and miles.

#### To switch the display units

1. Turn the vehicle off.
2. While pushing the "SELECT" button, turn the vehicle on.
3. Continue to push the "SELECT" button for at least 5 seconds.

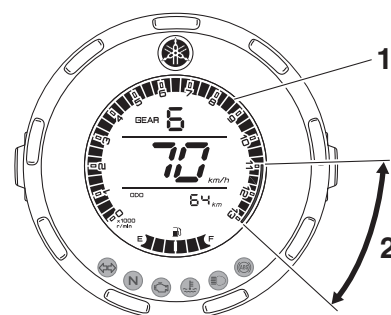
### Speedometer



1. Speedometer

The speedometer shows the vehicle's traveling speed.

### Tachometer



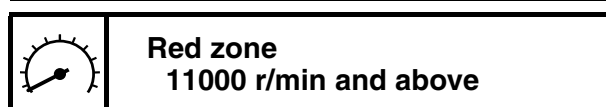
1. Tachometer
2. Red zone

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

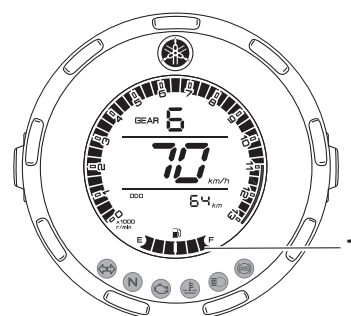
ECA19660

### **NOTICE**

**Do not operate the engine in the tachometer red zone.**



### Fuel meter



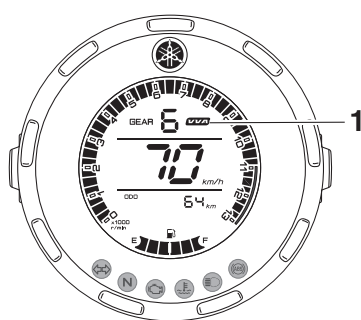
1. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear from “F” (full) towards “E” (empty) as the fuel level decreases. When approximately 3.0 L (0.79 US gal, 0.66 Imp.gal) of fuel remains, the last segment starts flashing. Refuel as soon as possible.

## TIP

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

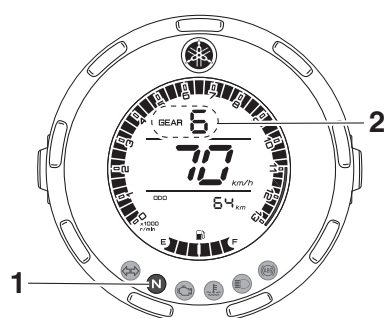
## VVA indicator



1. VVA (variable valve actuation) indicator

This model is equipped with variable valve actuation (VVA) for good fuel economy and acceleration in both the low-speed and high-speed ranges. The VVA indicator comes on when the variable valve actuation system has switched to the high-speed range.

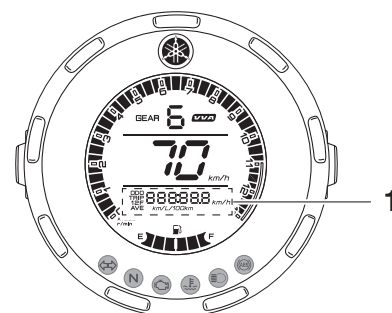
## Transmission gear display



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

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

## Multi-function display



1. Multi-function display

The multi-function display is equipped with the following:

- an odometer (ODO)
- two tripmeters (TRIP 1 and TRIP 2)
- a fuel reserve tripmeter (TRIP F)
- a clock
- an instantaneous fuel consumption display (km/L or L/100 km)
- an average fuel consumption display (AVE\_ \_ \_ km/L or AVE\_ \_ \_ L/100 km)
- an average speed display (AVE\_ \_ \_ km/h)
- a backlight display (bL-01, bL-02 or bL-03)

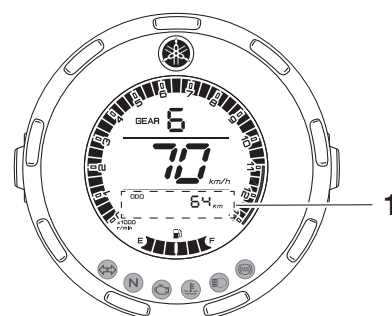
Push the “SELECT” button to change the display in the following order:

ODO → TRIP 1 → TRIP 2 → TRIP F → clock → km/L or L/100 km → AVE\_ \_ \_ km/L or AVE\_ \_ \_ L/100 km → AVE\_ \_ \_ km/h → backlight (bL-01, bL-02 or bL-03) → ODO

## TIP

- The fuel reserve tripmeter appears only when you are low on fuel.
- Push the “RESET” button to change the display in the reverse order.

## Odometer



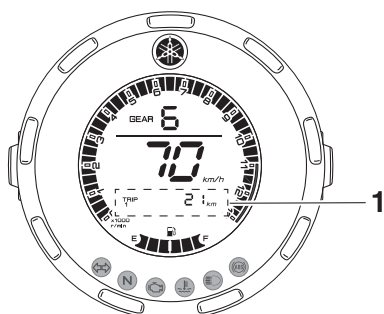
1. Odometer

The odometer shows the total distance traveled by the vehicle.

## TIP

The odometer will lock at 999999 and cannot be reset.

## Tripmeters



1. Tripmeter

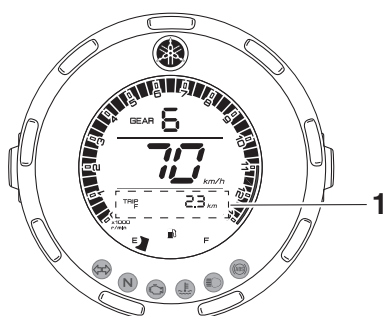
The tripmeters show the distance traveled since they were last reset.

To reset a tripmeter, change the display to the tripmeter you want to reset, and then push the “RESET” button until it is reset.

## TIP

The tripmeters will reset and continue counting after 9999.9 is reached.

## Fuel reserve tripmeter



1. Fuel reserve tripmeter

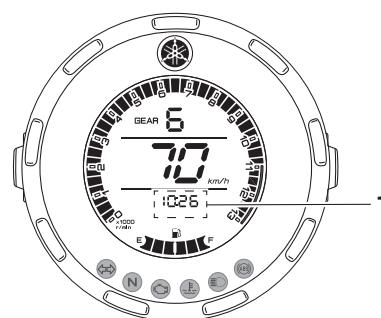
If the last segment of the fuel meter starts flashing, the display automatically changes to the fuel reserve tripmeter “TRIP F” and starts counting the distance traveled from that point.

To reset the fuel reserve tripmeter, push the “RESET” button until it is reset.

## TIP

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).

## Clock



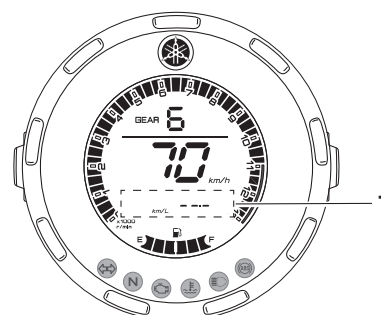
1. Clock

The clock uses a 12-hour time system.

### To set the clock

1. Push the “SELECT” button to change the display to the clock.
2. Push the “SELECT” button until the hour digits start flashing.
3. Use the “RESET” button to set the hours.
4. Push the “SELECT” button and the minute digits start flashing.
5. Use the “RESET” button to set the minutes.
6. Push the “SELECT” button to confirm the settings.

## Instantaneous fuel consumption display



1. Instantaneous fuel consumption display

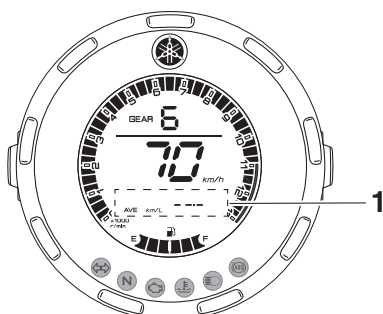
This display shows the fuel consumption under the current riding conditions. It can be set to either “km/L” or “L/100 km”, or “MPG” when using miles. To switch the fuel consumption measurement units, push the “SELECT” button until the measurement units change.

- “km/L”: the distance that can be traveled on 1.0 L of fuel.
- “L/100 km”: the amount of fuel necessary to travel 100 km.
- “MPG”: the distance that can be traveled on 1.0 Imp.gal of fuel.

## TIP

When traveling under 10 km/h (6 mi/h), “\_ \_ . \_” is displayed.

## Average fuel consumption display



### 1. Average fuel consumption display

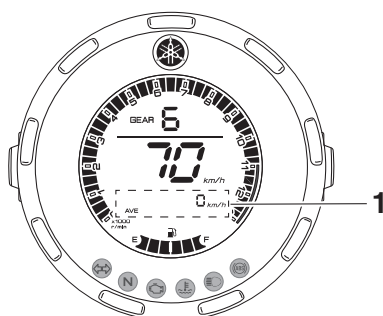
This display shows the average fuel consumption since it was last reset. The average fuel consumption display can be set to either “AVE\_ \_ . \_ km/L” or “AVE\_ \_ . \_ L/100 km”, or “AVE\_ \_ . \_ MPG” when using miles. To switch the fuel consumption measurement units, push the “SELECT” button until the measurement units change.

- “AVE\_ \_ . \_ km/L”: the average distance that can be traveled on 1.0 L of fuel.
- “AVE\_ \_ . \_ L/100 km”: the average amount of fuel necessary to travel 100 km.
- “AVE\_ \_ . \_ MPG”: the average distance that can be traveled on 1.0 Imp.gal of fuel.

## TIP

- To reset the display, push the “RESET” button until it resets.
- After resetting, “\_ \_ . \_” is shown until the vehicle has traveled some distance.

## Average speed display

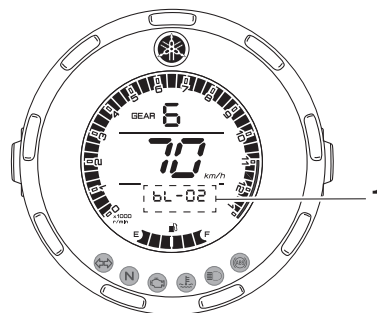


### 1. Average speed display

This display shows the vehicle’s average traveling speed since it was last reset.

To reset the average speed display, push the “RESET” button until it is reset.

## Backlight setting mode



### 1. Backlight setting mode

This mode allows you to change the backlight setting.

### To enter the backlight setting mode

1. Stop the vehicle.
2. Push the “SELECT” button to change the multi-function display to show the current backlight setting “bL-01”, “bL-02”, or “bL-03”.
3. Push the “SELECT” button until the multi-function display enters the backlight setting mode.
4. Push the “RESET” button to select the desired backlight setting.
5. Push the “SELECT” button until the multi-function display exits the backlight setting mode.

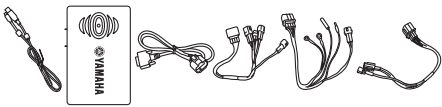
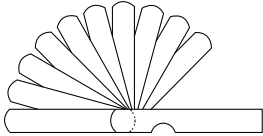
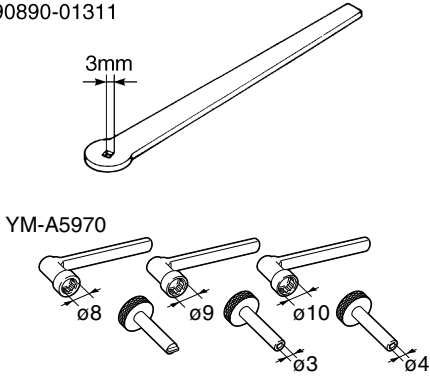
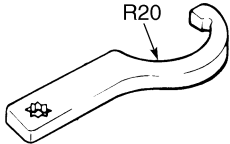
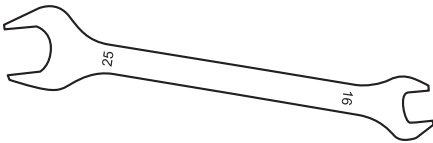
EAS20012

## SPECIAL TOOLS

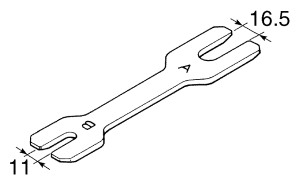
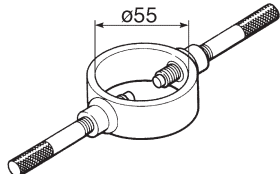
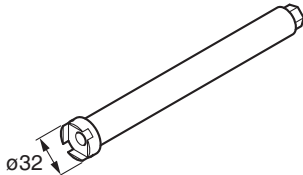
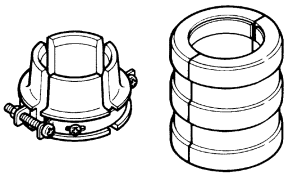
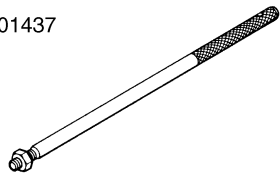
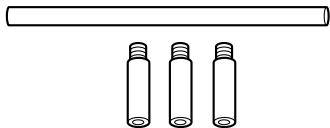
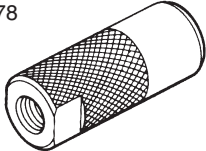
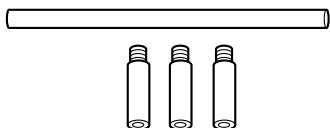
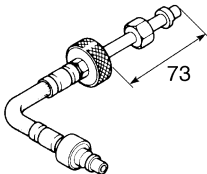
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

### TIP

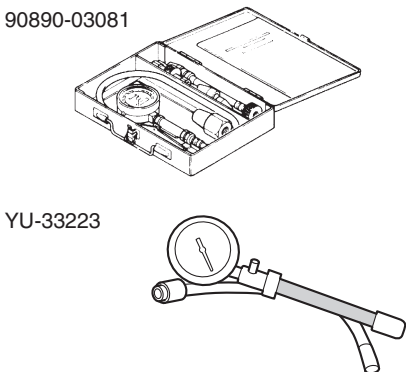
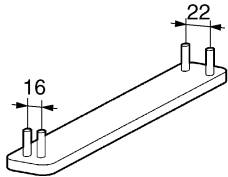
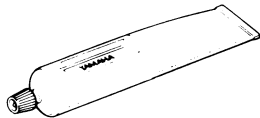
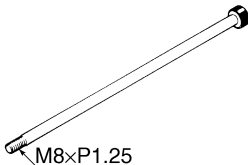
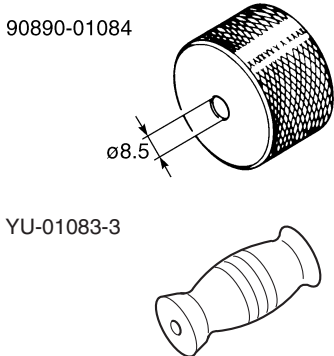
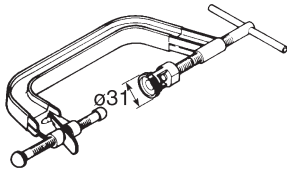
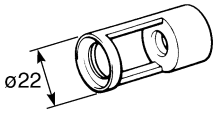
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

| Tool name/Tool No.                                                                                  | Illustration                                                                         | Reference pages                              |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------|
| Yamaha diagnostic tool USB<br>90890-03267                                                           |    | 3-4, 4-45, 4-46, 7-10, 8-34, 9-2, 9-20, 9-21 |
| Yamaha diagnostic tool (A/I)<br>90890-03264                                                         |    | 3-4, 4-45, 4-46, 7-10, 8-34, 9-2, 9-20, 9-21 |
| Thickness gauge<br>90890-03268<br>Feeler gauge set<br>YU-26900-9                                    |  | 3-6, 3-7, 4-13, 4-19, 5-51                   |
| Tappet adjusting tool<br>90890-01311<br>Six piece tappet set<br>YM-A5970                            |  | 3-7                                          |
| Steering nut wrench<br>90890-01403<br>Exhaust flange nut wrench<br>YU-A9472                         |  | 3-15, 4-67                                   |
| Double open-end wrench (25mm-16mm)<br>90890-01593<br>Double open-end wrench (25mm-16mm)<br>YM-01593 |  | 4-56, 4-57, 4-60, 4-64                       |

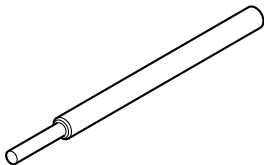
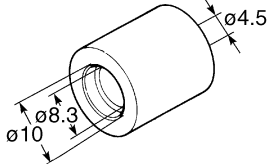
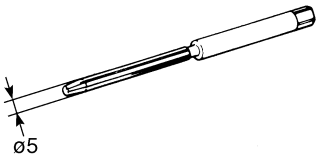
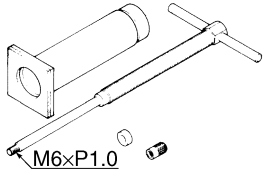
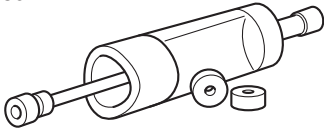
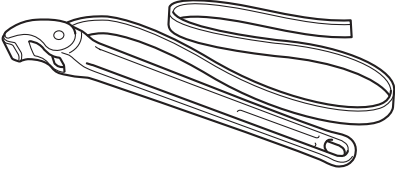
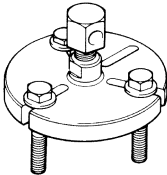
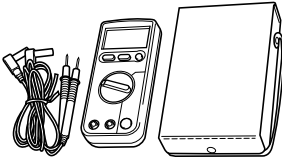
## SPECIAL TOOLS

| Tool name/Tool No.                                                                                     | Illustration                                                                                                                                                                                                | Reference pages                       |
|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Rod holder<br>90890-01434<br>Damper rod holder double ended<br>YM-01434                                |                                                                                                                           | 4-57, 4-63                            |
| Fork spring compressor<br>90890-01441<br>Fork spring compressor<br>YM-01441                            |                                                                                                                           | 4-57, 4-63                            |
| Damper rod holder (32mm)<br>90890-01591<br>Damper rod holder (32mm)<br>YM-01591                        |                                                                                                                           | 4-57, 4-62                            |
| Fork seal driver<br>90890-01442<br>Adjustable fork seal driver (36–46 mm)<br>YM-01442                  |                                                                                                                          | 4-59, 4-59, 4-60,<br>4-61, 4-61, 4-62 |
| Rod puller<br>90890-01437<br>Universal damping rod bleeding tool set<br>YM-A8703                       | 90890-01437<br><br><br>YM-A8703<br> | 4-63                                  |
| Rod puller attachment (M10 long)<br>90890-01578<br>Universal damping rod bleeding tool set<br>YM-A8703 | 90890-01578<br><br><br>YM-A8703<br> | 4-63                                  |
| Compression gauge extension 73mm<br>90890-04082<br>Compression gauge extension 73mm<br>YM-04082        |                                                                                                                         | 5-5                                   |

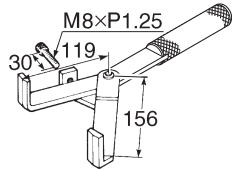
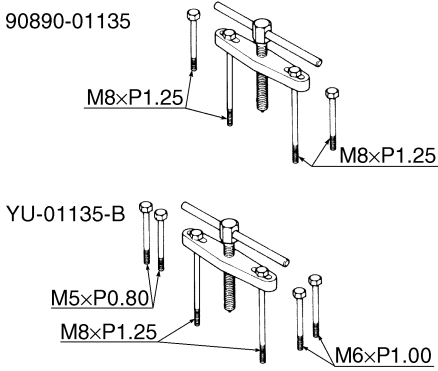
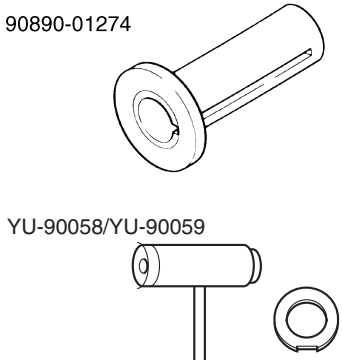
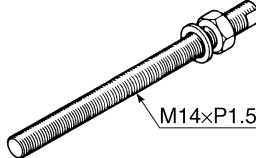
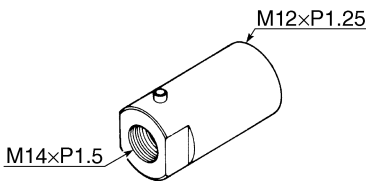
## SPECIAL TOOLS

| Tool name/Tool No.                                                                                     | Illustration                                                                                                              | Reference pages  |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------|
| Compression gauge<br>90890-03081<br>Engine compression tester<br>YU-33223                              |  <p>90890-03081</p> <p>YU-33223</p>     | 5-5              |
| Camshaft wrench<br>90890-04162<br>Camshaft wrench<br>YM-04162                                          |                                         | 5-16, 5-20       |
| Yamaha bond No. 1215<br>90890-85505<br>Three bond No. 1215®                                            |                                        | 5-19, 5-43, 5-69 |
| Slide hammer bolt (M8)<br>90890-01085<br>Slide hammer bolt 8 mm<br>YU-01083-2                          |                                       | 5-23             |
| Weight<br>90890-01084<br>Weight<br>YU-01083-3                                                          |  <p>90890-01084</p> <p>YU-01083-3</p> | 5-23             |
| Valve spring compressor<br>90890-04200<br>Valve spring compressor<br>YM-04019                          |                                       | 5-27, 5-31       |
| Valve spring compressor attachment<br>90890-04108<br>Valve spring compressor adapter 22 mm<br>YM-04108 |                                       | 5-27, 5-31       |

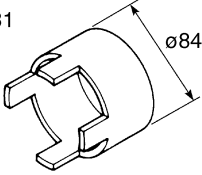
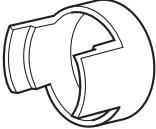
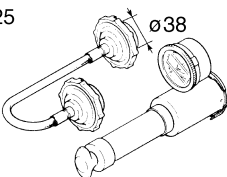
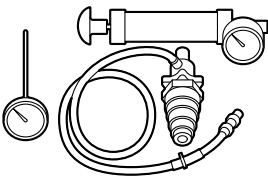
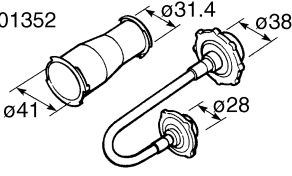
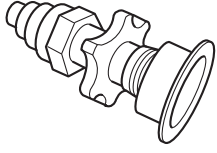
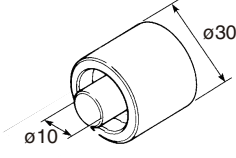
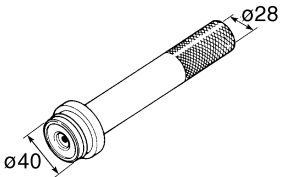
## SPECIAL TOOLS

| Tool name/Tool No.                                                                               | Illustration                                                                                                                                                                                                               | Reference pages                                                                                                                    |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Valve guide remover (ø4.5)<br>90890-04116<br>Valve guide remover (4.5 mm)<br>YM-04116            |                                                                                                                                          | 5-28                                                                                                                               |
| Valve guide installer (ø4.5)<br>90890-04117<br>Valve guide installer (4.5 mm)<br>YM-04117        |                                                                                                                                          | 5-28                                                                                                                               |
| Valve guide reamer (ø5)<br>90890-04099<br>Valve guide reamer (5.0 mm)<br>YM-04099                |                                                                                                                                          | 5-28                                                                                                                               |
| Piston pin puller set<br>90890-01304<br>Piston pin puller<br>YU-01304                            | <p>90890-01304</p>  <p>M6xP1.0</p> <p>YU-01304</p>  | 5-34                                                                                                                               |
| Rotor holding tool<br>90890-04166<br>Rotor holding tool<br>YM-04166                              |                                                                                                                                        | 5-41, 5-41, 5-42,<br>5-42                                                                                                          |
| Flywheel puller<br>90890-01362<br>Heavy duty puller<br>YU-33270-B                                |                                                                                                                                        | 5-41                                                                                                                               |
| Digital circuit tester (CD732)<br>90890-03243<br>Model 88 Multimeter with tachometer<br>YU-A1927 |                                                                                                                                        | 5-46, 8-34, 8-35,<br>8-36, 8-36, 8-36,<br>8-37, 8-37, 8-37,<br>8-38, 8-39, 8-39,<br>8-40, 8-40, 8-41,<br>8-41, 8-42, 8-42,<br>8-43 |

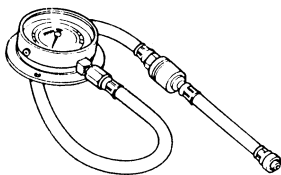
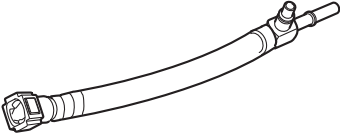
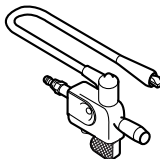
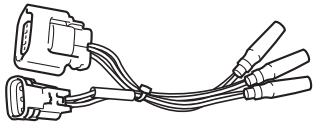
# SPECIAL TOOLS

| Tool name/Tool No.                                                            | Illustration                                                                         | Reference pages |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|
| Clutch holder<br>90890-04199<br>Universal clutch holder<br>YM-91042           |    | 5-51, 5-53      |
| Crankcase separating tool<br>90890-01135<br>Crankcase separator<br>YU-01135-B |    | 5-72            |
| Crankshaft installer pot<br>90890-01274<br>Installing pot<br>YU-90058         |   | 5-73            |
| Crankshaft installer bolt<br>90890-01275<br>Bolt<br>YU-90060                  |  | 5-73            |
| Adapter (M12)<br>90890-01278<br>Adapter #3<br>YU-90063                        |  | 5-73            |

## SPECIAL TOOLS

| Tool name/Tool No.                                                                                         | Illustration                                                                                                                                                                                                                                                                     | Reference pages |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Spacer (crankshaft installer)<br>90890-04081<br>Pot spacer<br>YM-91044                                     | <div>90890-04081</div>  <div>YM-91044</div>          | 5-73            |
| Radiator cap tester<br>90890-01325<br>Mityvac cooling system tester kit<br>YU-24460-A                      | <div>90890-01325</div>  <div>YU-24460-A</div>       | 6-4             |
| Radiator cap tester adapter<br>90890-01352<br>Pressure tester adapter<br>YU-33984                          | <div>90890-01352</div>  <div>YU-33984</div>  | 6-4             |
| Mechanical seal installer<br>90890-04145                                                                   |                                                                                                                                                                                              | 6-8             |
| Middle driven shaft bearing driver<br>90890-04058<br>Middle drive bearing installer 40 & 50 mm<br>YM-04058 |                                                                                                                                                                                              | 6-8             |

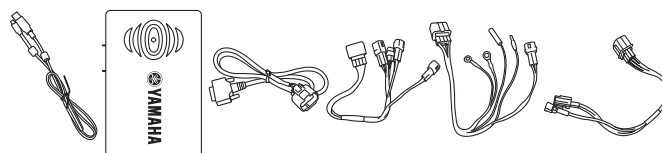
## SPECIAL TOOLS

| Tool name/Tool No.                                                                                                | Illustration                                                                        | Reference pages |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------|
| Pressure gauge<br>90890-03153<br>Pressure gauge<br>YU-03153                                                       |   | 7-6             |
| Fuel pressure adapter 6.3mm<br>90890-03227                                                                        |   | 7-6             |
| Ignition checker<br>90890-06754<br>Oppama pet-4000 spark checker<br>YM-34487                                      |   | 8-38            |
| Test harness – lean angle sensor 1PA (3P)<br>90890-03237<br>Test harness – lean angle sensor 1PA (3P)<br>YU-03237 |  | 8-39            |

### TIP

#### Yamaha diagnostic tool (A/I) 90890-03264

This special tool includes the YDT sub harness (6P) (90890-03266).

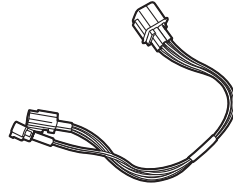


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**TIP****YDT sub harness (6P) 90890-03266**

If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

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## SPECIFICATIONS

|                                  |      |
|----------------------------------|------|
| GENERAL SPECIFICATIONS .....     | 2-1  |
| ENGINE SPECIFICATIONS .....      | 2-2  |
| CHASSIS SPECIFICATIONS .....     | 2-6  |
| ELECTRICAL SPECIFICATIONS .....  | 2-8  |
| TIGHTENING TORQUES .....         | 2-10 |
| ENGINE TIGHTENING TORQUES .....  | 2-10 |
| CHASSIS TIGHTENING TORQUES ..... | 2-11 |
| CABLE ROUTING .....              | 2-13 |

# GENERAL SPECIFICATIONS

EAS20013

## GENERAL SPECIFICATIONS

|                        |                   |
|------------------------|-------------------|
| <b>Model</b>           |                   |
| Model                  | BFG1              |
| <b>Dimensions</b>      |                   |
| Overall length         | 2005 mm (78.9 in) |
| Overall width          | 805 mm (31.7 in)  |
| Overall height         | 1090 mm (42.9 in) |
| Wheelbase              | 1330 mm (52.4 in) |
| Ground clearance       | 145 mm (5.71 in)  |
| Minimum turning radius | 2.3 m (7.55 ft)   |
| <b>Weight</b>          |                   |
| Curb weight            | 139 kg (307 lb)   |
| <b>Loading</b>         |                   |
| Maximum load           | 190 kg (420 lb)   |
| Riding capacity        | 2 person          |

# ENGINE SPECIFICATIONS

EAS20014

## ENGINE SPECIFICATIONS

### Engine

|                      |                                                                            |
|----------------------|----------------------------------------------------------------------------|
| Combustion cycle     | 4-stroke                                                                   |
| Cooling system       | Liquid cooled                                                              |
| Valve train          | SOHC                                                                       |
| Displacement         | 124 cm <sup>3</sup>                                                        |
| Number of cylinders  | Single cylinder                                                            |
| Bore × stroke        | 52.0 × 58.6 mm (2.05 × 2.31 in)                                            |
| Compression ratio    | 11.2 : 1                                                                   |
| Compression pressure | 600 kPa-550 r/min (6.0 kgf/cm <sup>2</sup> –550 r/min, 85.3 psi-550 r/min) |

### Fuel

|                     |                                            |
|---------------------|--------------------------------------------|
| Recommended fuel    | Regular unleaded gasoline (E10 acceptable) |
| Fuel tank capacity  | 10 L (2.6 US gal, 2.2 Imp.gal)             |
| Fuel reserve amount | 3.0 L (0.79 US gal, 0.66 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          |                                                 |
| Oil change                   | 0.85 L (0.90 US qt, 0.75 Imp.qt)                |
| With oil filter removal      | 0.95 L (1.00 US qt, 0.84 Imp.qt)                |
| Quantity (disassembled)      | 1.05 L (1.11 US qt, 0.92 Imp.qt)                |

### Oil filter

|                 |       |
|-----------------|-------|
| Oil filter type | Paper |
|-----------------|-------|

### Cooling system

|                                                  |                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------|
| Coolant quantity                                 |                                                                 |
| Radiator (including all routes)                  | 0.49 L (0.52 US qt, 0.43 Imp.qt)                                |
| Coolant reservoir (up to the maximum level mark) | 0.15 L (0.16 US qt, 0.13 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                        | 74.0–78.0 °C (165.20–172.40 °F)                                 |
| Valve full open temperature                      | 90.0 °C (194.00 °F)                                             |

### Spark plug(s)

|                    |                             |
|--------------------|-----------------------------|
| Manufacturer/model | NGK/MR8E9                   |
| Spark plug gap     | 0.8–0.9 mm (0.031–0.035 in) |

### Cylinder head

|               |                     |
|---------------|---------------------|
| Warpage limit | 0.05 mm (0.0020 in) |
|---------------|---------------------|

# ENGINE SPECIFICATIONS

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## Camshaft

|                                       |                       |
|---------------------------------------|-----------------------|
| Camshaft lobe dimensions              |                       |
| Lobe height limit (Intake)            | 32.268 mm (1.2704 in) |
| Lobe height limit (Intake high speed) | 32.332 mm (1.2729 in) |
| Lobe height limit (Exhaust)           | 29.516 mm (1.1620 in) |
| Camshaft runout limit                 | 0.030 mm (0.0012 in)  |

---

## Rocker arm/rocker arm shaft

|                                         |                       |
|-----------------------------------------|-----------------------|
| Rocker arm inside diameter limit        | 14.015 mm (0.5518 in) |
| Rocker arm shaft outside diameter limit | 13.935 mm (0.5486 in) |

---

## Valve, valve seat, valve guide

|                                                     |                                   |
|-----------------------------------------------------|-----------------------------------|
| Valve clearance (cold)                              |                                   |
| Intake                                              | 0.10–0.14 mm (0.0039–0.0055 in)   |
| Exhaust                                             | 0.21–0.25 mm (0.0083–0.0098 in)   |
| Valve dimensions                                    |                                   |
| Valve seat contact width limit (intake)             | 1.3 mm (0.05 in)                  |
| Valve seat contact width limit (exhaust)            | 1.7 mm (0.07 in)                  |
| Valve stem diameter limit (intake)                  | 4.945 mm (0.1947 in)              |
| Valve stem diameter limit (exhaust)                 | 4.930 mm (0.1941 in)              |
| Valve guide inside diameter (intake)                | 5.000–5.012 mm (0.1969–0.1973 in) |
| Valve guide inside diameter (exhaust)               | 5.000–5.012 mm (0.1969–0.1973 in) |
| Valve-stem-to-valve-guide clearance limit (intake)  | 0.080 mm (0.0032 in)              |
| Valve-stem-to-valve-guide clearance limit (exhaust) | 0.100 mm (0.0039 in)              |
| Valve stem runout                                   | 0.010 mm (0.0004 in)              |

---

## Valve spring

|                             |                    |
|-----------------------------|--------------------|
| Free length limit (intake)  | 32.12 mm (1.26 in) |
| Free length limit (exhaust) | 32.12 mm (1.26 in) |

---

## Cylinder

|            |                                     |
|------------|-------------------------------------|
| Bore       | 52.000–52.010 mm (2.0472–2.0476 in) |
| Wear limit | 52.060 mm (2.0496 in)               |

---

## Piston

|                                            |                                     |
|--------------------------------------------|-------------------------------------|
| Diameter                                   | 51.962–51.985 mm (2.0457–2.0466 in) |
| Measuring point (from piston skirt bottom) | 6.0 mm (0.24 in)                    |
| Piston-to-cylinder clearance               | 0.015–0.048 mm (0.0006–0.0019 in)   |
| Piston pin bore inside diameter limit      | 14.043 mm (0.5529 in)               |
| Piston pin outside diameter limit          | 13.975 mm (0.5502 in)               |

---

## Piston ring

|                      |                      |
|----------------------|----------------------|
| Top ring             |                      |
| End gap limit        | 0.42 mm (0.0165 in)  |
| Side clearance limit | 0.115 mm (0.0045 in) |
| 2nd ring             |                      |
| End gap limit        | 0.85 mm (0.0335 in)  |
| Side clearance limit | 0.115 mm (0.0045 in) |

# ENGINE SPECIFICATIONS

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## Crankshaft

|                      |                                 |
|----------------------|---------------------------------|
| Crank assembly width | 47.95–48.00 mm (1.888–1.890 in) |
| Runout limit         | 0.050 mm (0.0020 in)            |

---

## Clutch

|                                 |                               |
|---------------------------------|-------------------------------|
| Clutch type                     | Wet, multiple-disc            |
| Clutch lever free play          | 10.0–15.0 mm (0.39–0.59 in)   |
| Assembly width                  | 13.0–14.0 mm (0.51–0.55 in)   |
| Friction plate 1 thickness      | 2.92–3.08 mm (0.115–0.121 in) |
| Plate quantity                  | 1 pcs                         |
| Wear limit                      | 2.82 mm (0.111 in)            |
| Friction plate 2 thickness      | 2.92–3.08 mm (0.115–0.121 in) |
| Plate quantity                  | 1 pcs                         |
| Wear limit                      | 2.82 mm (0.111 in)            |
| Friction plate 3 thickness      | 2.92–3.08 mm (0.115–0.121 in) |
| Plate quantity                  | 1 pcs                         |
| Wear limit                      | 2.82 mm (0.1110 in)           |
| Clutch plate 1 thickness        | 2.18–2.42 mm (0.086–0.095 in) |
| Plate quantity                  | 1 pcs                         |
| Warpage limit                   | 0.10 mm (0.004 in)            |
| Clutch plate 2 thickness        | 2.20–2.40 mm (0.087–0.094 in) |
| Plate quantity                  | 1 pcs                         |
| Warpage limit                   | 0.10 mm (0.004 in)            |
| Clutch spring free length limit | 39.51 mm (1.56 in)            |
| Push rod bending limit          | 0.50 mm (0.020 in)            |

---

## Drivetrain

|                           |                                 |
|---------------------------|---------------------------------|
| Primary reduction ratio   | 3.042 (73/24)                   |
| Transmission type         | Constant mesh 6-speed           |
| Gear ratio                |                                 |
| 1st                       | 2.833 (34/12)                   |
| 2nd                       | 1.875 (30/16)                   |
| 3rd                       | 1.364 (30/22)                   |
| 4th                       | 1.143 (24/21)                   |
| 5th                       | 0.957 (22/23)                   |
| 6th                       | 0.840 (21/25)                   |
| Main axle runout limit    | 0.08 mm (0.0032 in)             |
| Drive axle runout limit   | 0.08 mm (0.0032 in)             |
| Main axle assembly width  | 106.85–107.05 mm (4.21–4.21 in) |
| Secondary reduction ratio | 3.71 (52/14)                    |

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## Air filter

|                    |             |
|--------------------|-------------|
| Air filter element | Wet element |
|--------------------|-------------|

---

## Fuel injector

|            |               |
|------------|---------------|
| Resistance | 12.2 $\Omega$ |
|------------|---------------|

---

## Idling condition

|                        |                       |
|------------------------|-----------------------|
| Engine idling speed    | 1250–1550 r/min       |
| Coolant temperature    | 70–90 °C (158–194 °F) |
| Engine oil temperature | 50 °C (122 °F)        |
| CO%                    | 0.2–2.5 %             |

## ENGINE SPECIFICATIONS

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Fuel line pressure (at idle)

245–255 kPa (2.5–2.6 kgf/cm<sup>2</sup>, 35.5–37.0 psi)

Throttle grip free play

3.0–5.0 mm (0.12–0.20 in)

# CHASSIS SPECIFICATIONS

EAS20015

## CHASSIS SPECIFICATIONS

### Chassis

|              |                |
|--------------|----------------|
| Caster angle | 26.0 °         |
| Trail        | 95 mm (3.7 in) |

### Front wheel

|                            |                   |
|----------------------------|-------------------|
| Wheel type                 | Cast wheel        |
| Rim size                   | 17M/C × MT2.75    |
| Radial wheel runout limit  | 1.0 mm (0.04 in)  |
| Lateral wheel runout limit | 0.5 mm (0.02 in)  |
| Wheel axle bending limit   | 0.25 mm (0.01 in) |

### Rear wheel

|                            |                   |
|----------------------------|-------------------|
| Wheel type                 | Cast wheel        |
| Rim size                   | 17M/C × MT4.00    |
| Radial wheel runout limit  | 1.0 mm (0.04 in)  |
| Lateral wheel runout limit | 0.5 mm (0.02 in)  |
| Wheel axle bending limit   | 0.25 mm (0.01 in) |

### Front tire

|                    |                          |
|--------------------|--------------------------|
| Type               | Tubeless                 |
| Size               | 110/70–17 M/C 54S        |
| Manufacturer/model | IRC/TRAIL WINNER GP-211F |

### Rear tire

|                    |                          |
|--------------------|--------------------------|
| Type               | Tubeless                 |
| Size               | 140/70–17 M/C 66S        |
| Manufacturer/model | IRC/TRAIL WINNER GP-211R |

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

|           |                                             |
|-----------|---------------------------------------------|
| 1 person  |                                             |
| Front     | 180 kPa (1.80 kgf/cm <sup>2</sup> , 26 psi) |
| Rear      | 200 kPa (2.00 kgf/cm <sup>2</sup> , 29 psi) |
| 2 persons |                                             |
| Front     | 180 kPa (1.80 kgf/cm <sup>2</sup> , 26 psi) |
| Rear      | 225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi) |

### Front brake

|                                                |                            |
|------------------------------------------------|----------------------------|
| Front brake lever free play                    | 2.0–5.0 mm (0.08–0.20 in)  |
| Front disc brake                               |                            |
| Brake disc thickness limit                     | 3.5 mm (0.14 in)           |
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in)        |
| Brake pad lining thickness limit               | 0.8 mm (0.03 in)           |
| Master cylinder inside diameter                | 12.70 mm (0.50 in)         |
| Caliper cylinder inside diameter               | 25.40 mm × 2 (1.00 in × 2) |
| Specified brake fluid                          | DOT 4                      |

### Rear brake

|                            |                            |
|----------------------------|----------------------------|
| Brake pedal free play      | 7.0–13.0 mm (0.28–0.51 in) |
| Rear disc brake            |                            |
| Brake disc thickness limit | 4.0 mm (0.16 in)           |

## CHASSIS SPECIFICATIONS

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|                                                |                     |
|------------------------------------------------|---------------------|
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in) |
| Brake pad lining thickness limit               | 1.5 mm (0.06 in)    |
| Master cylinder inside diameter                | 12.7 mm (0.50 in)   |
| Caliper cylinder inside diameter               | 30.20 mm (1.19 in)  |
| Specified brake fluid                          | DOT 4               |

---

### Front suspension

|                               |                                                   |
|-------------------------------|---------------------------------------------------|
| Shock absorber                | Hydraulic damper                                  |
| Fork spring free length limit | 299.4 mm (11.79 in)                               |
| Inner tube bending limit      | 0.1 mm (0.00 in)                                  |
| Recommended oil               | Yamaha Suspension Oil 01                          |
| Quantity (left)               | 314.0 cm <sup>3</sup> (10.62 US oz, 11.07 Imp.oz) |
| Quantity (right)              | 356.0 cm <sup>3</sup> (12.04 US oz, 12.56 Imp.oz) |
| Level (left)                  | 93 mm (3.7 in)                                    |

---

### Rear suspension

|                |                  |
|----------------|------------------|
| Shock absorber | Hydraulic damper |
|----------------|------------------|

---

### Drive chain

|                               |                             |
|-------------------------------|-----------------------------|
| Size                          | DID428VIX2                  |
| Chain type                    | Sealed type                 |
| Number of links               | 130                         |
| Drive chain slack (Sidestand) | 30.0–40.0 mm (1.18–1.57 in) |
| 15-link length limit          | 191.5 mm (7.54 in)          |

# ELECTRICAL SPECIFICATIONS

EAS20016

## ELECTRICAL SPECIFICATIONS

### Voltage

|                |      |
|----------------|------|
| System voltage | 12 V |
|----------------|------|

### Ignition system

|                            |                  |
|----------------------------|------------------|
| Ignition timing (B.T.D.C.) | 2.0 °/1400 r/min |
|----------------------------|------------------|

### Engine control unit

|       |      |
|-------|------|
| Model | B5G1 |
|-------|------|

### Ignition coil

|                           |                       |
|---------------------------|-----------------------|
| Primary coil resistance   | 2.16–2.64 $\Omega$    |
| Secondary coil resistance | 8.64–12.96 k $\Omega$ |

### Spark plug cap

|            |                      |
|------------|----------------------|
| Resistance | 3.75–6.25 k $\Omega$ |
|------------|----------------------|

### Lean angle sensor

|                                      |           |
|--------------------------------------|-----------|
| Operating angle                      | 50 °      |
| Output voltage up to operating angle | 0.4–1.4 V |
| Output voltage over operating angle  | 3.7–4.4 V |

### Charging system

|                        |                             |
|------------------------|-----------------------------|
| Charging system        | AC magneto                  |
| Standard output        | 14.0 V, 150 W at 5000 r/min |
| Stator coil resistance | 0.360–0.540 $\Omega$        |

### Rectifier/regulator

|                        |             |
|------------------------|-------------|
| Regulated voltage (DC) | 14.0–14.8 V |
|------------------------|-------------|

### Battery

|                   |                      |
|-------------------|----------------------|
| Model             | GTZ4V                |
| Voltage, capacity | 12 V, 3.0 Ah (10 HR) |

### Bulb wattage

|                         |        |
|-------------------------|--------|
| Headlight               | LED    |
| Brake/tail light        | LED    |
| Front turn signal light | 10.0 W |
| Rear turn signal light  | 10.0 W |
| Auxiliary light         | LED    |
| License plate light     | 5.0 W  |
| Meter lighting          | LED    |

### Indicator light

|                                   |     |
|-----------------------------------|-----|
| Neutral indicator light           | LED |
| High beam indicator light         | LED |
| Turn signal indicator light       | LED |
| Coolant temperature warning light | LED |
| Malfunction indicator light       | LED |
| ABS warning light                 | LED |

## ELECTRICAL SPECIFICATIONS

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### **Starter motor**

|                            |                   |
|----------------------------|-------------------|
| Brush overall length limit | 3.5 mm (0.14 in)  |
| Mica undercut (depth)      | 1.35 mm (0.05 in) |

---

### **Fuel sender unit**

|                                |                      |
|--------------------------------|----------------------|
| Sender unit resistance (full)  | 10.0–14.0 $\Omega$   |
| Sender unit resistance (empty) | 267.0–273.0 $\Omega$ |

---

### **Fuel injection sensor**

|                                          |                                                           |
|------------------------------------------|-----------------------------------------------------------|
| Crankshaft position sensor resistance    | 228–342 $\Omega$                                          |
| Intake air temperature sensor resistance | 5700–6300 $\Omega$ at 0 °C (5700–6300 $\Omega$ at 32 °F)  |
| Coolant temperature sensor resistance    | 2513–2777 $\Omega$ at 20 °C (2513–2777 $\Omega$ at 68 °F) |
| Coolant temperature sensor resistance    | 210–221 $\Omega$ at 100 °C (210–221 $\Omega$ at 212 °F)   |

---

### **Fuse(s)**

|                       |        |
|-----------------------|--------|
| Main fuse             | 15.0 A |
| Headlight fuse        | 7.5 A  |
| ABS control unit fuse | 2.0 A  |
| ABS motor fuse        | 30.0 A |
| ABS solenoid fuse     | 15.0 A |

# TIGHTENING TORQUES

EAS20017

## TIGHTENING TORQUES

EAS30016

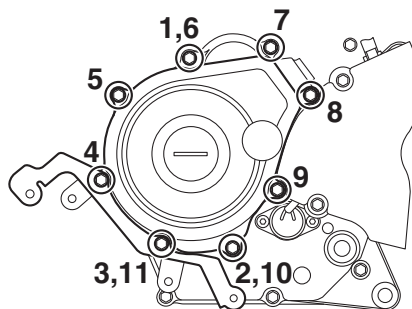
### ENGINE TIGHTENING TORQUES

| Item                               | Thread size | Q'ty | Tightening torque             | Remarks                                                                              |
|------------------------------------|-------------|------|-------------------------------|--------------------------------------------------------------------------------------|
| Oil filter element cover bolt      | M6          | 3    | 10 N·m (1.0 kgf·m, 7.4 lb·ft) |                                                                                      |
| Clutch cable locknut               | M8          | 1    | 7 N·m (0.7 kgf·m, 5.2 lb·ft)  |                                                                                      |
| Spark plug                         | M10         | 1    | 13 N·m (1.3 kgf·m, 9.6 lb·ft) |                                                                                      |
| Exhaust pipe nut                   | M8          | 2    | 15 N·m (1.5 kgf·m, 11 lb·ft)  |                                                                                      |
| Air bleed bolt (coolant)           | M6          | 1    | 10 N·m (1.0 kgf·m, 7.4 lb·ft) |                                                                                      |
| Exhaust assembly bolt              | M8          | 1    | 20 N·m (2.0 kgf·m, 15 lb·ft)  |                                                                                      |
| Coolant drain bolt (cylinder side) | M6          | 1    | 10 N·m (1.0 kgf·m, 7.4 lb·ft) |                                                                                      |
| Clutch spring bolt                 | M6          | 3    | 12 N·m (1.2 kgf·m, 8.9 lb·ft) |                                                                                      |
| Clutch boss nut                    | M14         | 1    | 70 N·m (7.0 kgf·m, 52 lb·ft)  |   |
| Generator rotor nut                | M12         | 1    | 70 N·m (7.0 kgf·m, 52 lb·ft)  |                                                                                      |
| Cylinder head cover bolt           | M6          | 4    | 10 N·m (1.0 kgf·m, 7.4 lb·ft) |                                                                                      |
| Muffler protector bolt             | M6          | 3    | 8 N·m (0.8 kgf·m, 5.9 lb·ft)  |   |
| Muffler cap bolt                   | M6          | 3    | 8 N·m (0.8 kgf·m, 5.9 lb·ft)  |  |
| Generator cover bolt               | M6          | 8    | See TIP.                      |                                                                                      |
| Clutch cover bolt                  | M6          | 10   | See TIP.                      |                                                                                      |
| Engine oil drain plug              | M35         | 1    | 32 N·m (3.2 kgf·m, 24 lb·ft)  |                                                                                      |

#### TIP

##### Generator cover bolt

Tighten the bolts to 10 N·m (1.0 kgf·m, 7.4 lb·ft) in the proper tightening sequence as shown.

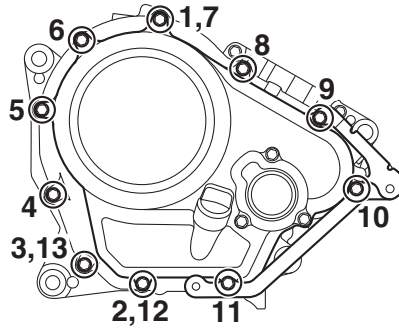


## TIGHTENING TORQUES

### TIP

#### Clutch cover bolt

Tighten the bolts to 10 N·m (1.0 kgf·m, 7.4 lb·ft) in the proper tightening sequence as shown.



EAS30017

### CHASSIS TIGHTENING TORQUES

| Item                            | Thread size | Q'ty | Tightening torque             | Remarks |
|---------------------------------|-------------|------|-------------------------------|---------|
| Upper bracket pinch bolt        | M8          | 2    | 23 N·m (2.3 kgf·m, 17 lb·ft)  |         |
| Lower bracket pinch bolt        | M10         | 2    | 30 N·m (3.0 kgf·m, 22 lb·ft)  |         |
| Steering stem nut               | M22         | 1    | 110 N·m (11 kgf·m, 81 lb·ft)  |         |
| Front wheel axle nut            | M14         | 1    | 38 N·m (3.8 kgf·m, 28 lb·ft)  |         |
| Front brake caliper bleed screw | M7          | 1    | 6 N·m (0.6 kgf·m, 4.4 lb·ft)  |         |
| Front brake caliper bolt        | M10         | 2    | 40 N·m (4.0 kgf·m, 30 lb·ft)  |         |
| Rear wheel axle nut             | M14         | 1    | 85 N·m (8.5 kgf·m, 63 lb·ft)  |         |
| Rear brake caliper bleed screw  | M7          | 1    | 5 N·m (0.5 kgf·m, 3.7 lb·ft)  |         |
| Upper handlebar holder bolt     | M8          | 4    | 23 N·m (2.3 kgf·m, 17 lb·ft)  |         |
| Lower handlebar holder nut      | M10         | 2    | 40 N·m (4.0 kgf·m, 30 lb·ft)  |         |
| Drive sprocket retainer bolt    | M6          | 1    | 10 N·m (1.0 kgf·m, 7.4 lb·ft) |         |
| Rear wheel sprocket nut         | M8          | 6    | 39 N·m (3.9 kgf·m, 29 lb·ft)  |         |

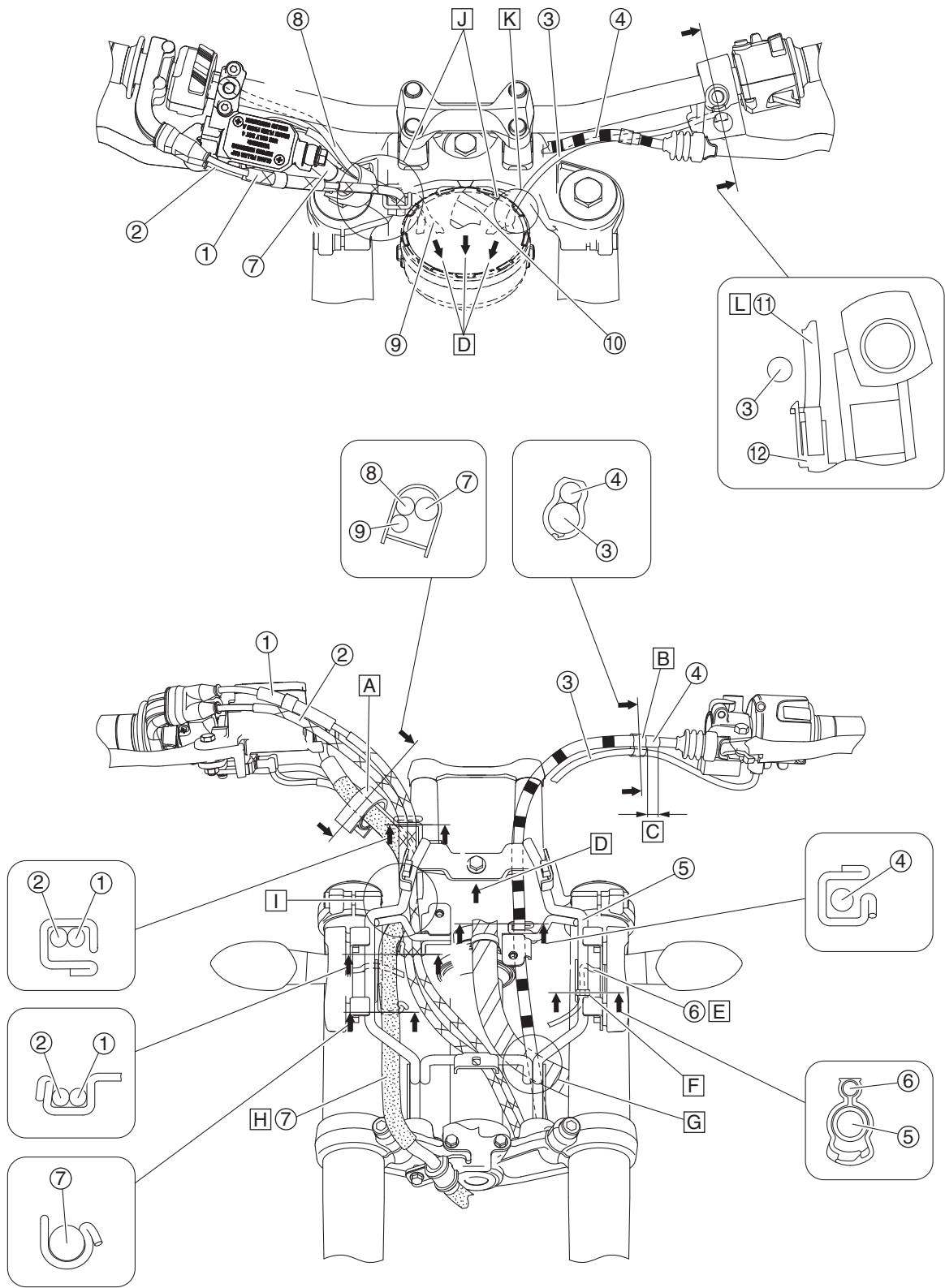
## TIGHTENING TORQUES

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EAS20021

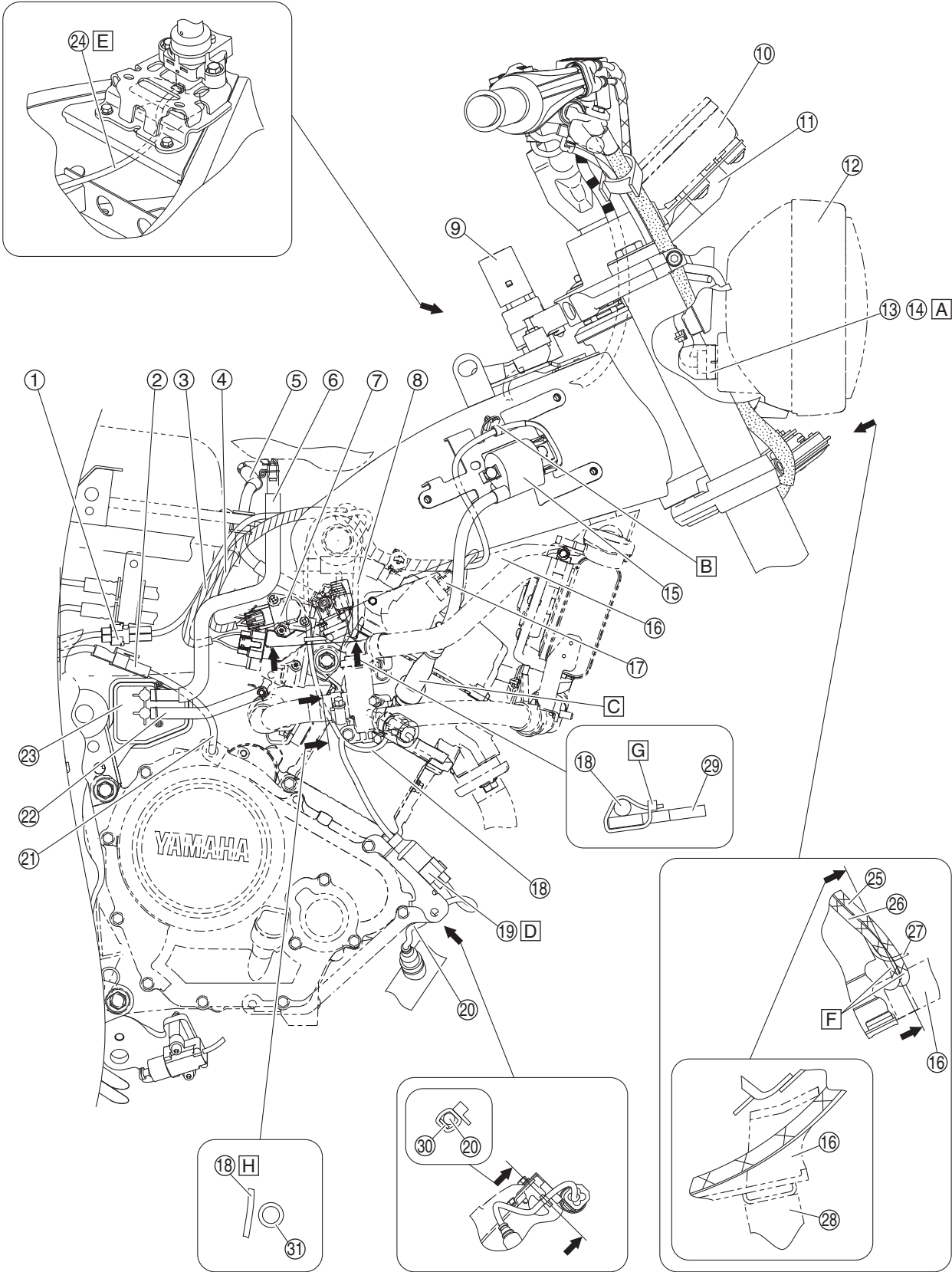
CABLE ROUTING

Handlebar



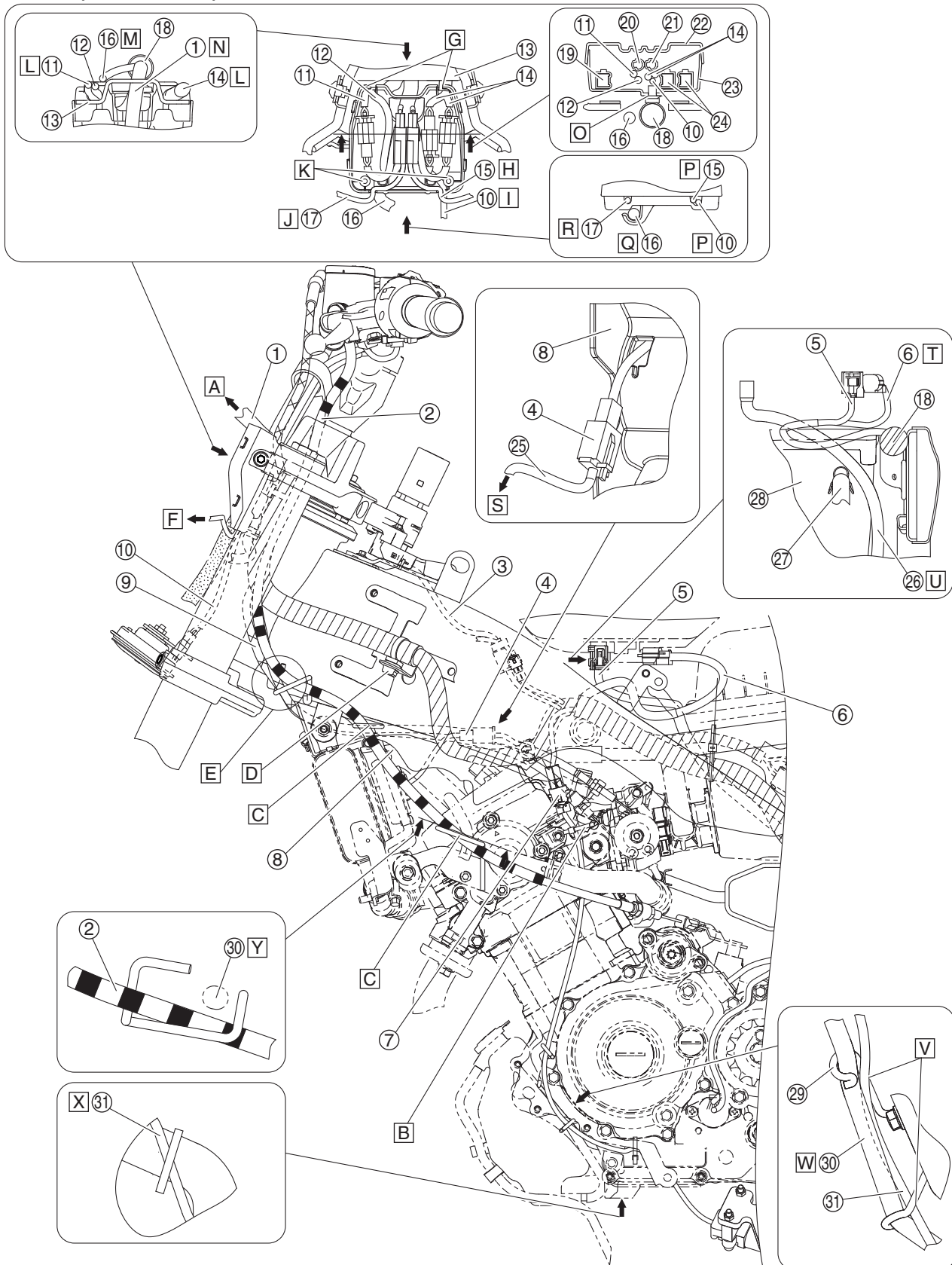
1. Throttle cable (accelerator cable)
2. Throttle cable (decelerator cable)
3. Handlebar switch lead (left)
4. Clutch cable
5. Headlight stay
6. Front turn signal light lead
7. Front brake hose (front brake master cylinder to hydraulic unit)
8. Handlebar switch lead (right)
9. Front brake light switch lead
10. Wire harness
11. Clutch switch lead
12. Clutch switch coupler
- A. Fasten the front brake hose (front brake master cylinder to hydraulic unit) at the white paint with the holder.
- B. Fasten the handlebar switch lead (left) to the clutch cable with the holder. Position the holder of the clutch cable in this range from the end of the protector.
- C. 0–5 mm (0.0–0.2 in)
- D. To inside coupler cover.
- E. Route the front turn signal light lead through into hole at the headlight stay, and then fasten the front turn signal lead and the headlight stay with the clamp.
- F. Align the clamp with the edge of the headlight stay bracket as illustration.
- G. Route the clutch cable under the wire harness.
- H. Route the front brake hose (front brake master cylinder to hydraulic unit) to the rear of the headlight stay.
- I. Route the front brake hose (front brake master cylinder to hydraulic unit) and throttle cables to the rear of the headlight stay.
- J. Route the throttle cables, clutch cable and handlebar switch leads to the rear of the meter assembly.
- K. Route the handlebar switch lead (left) to the front of the clutch cable.
- L. Route the clutch switch lead over the handlebar switch lead (left).

Chassis (front right view)



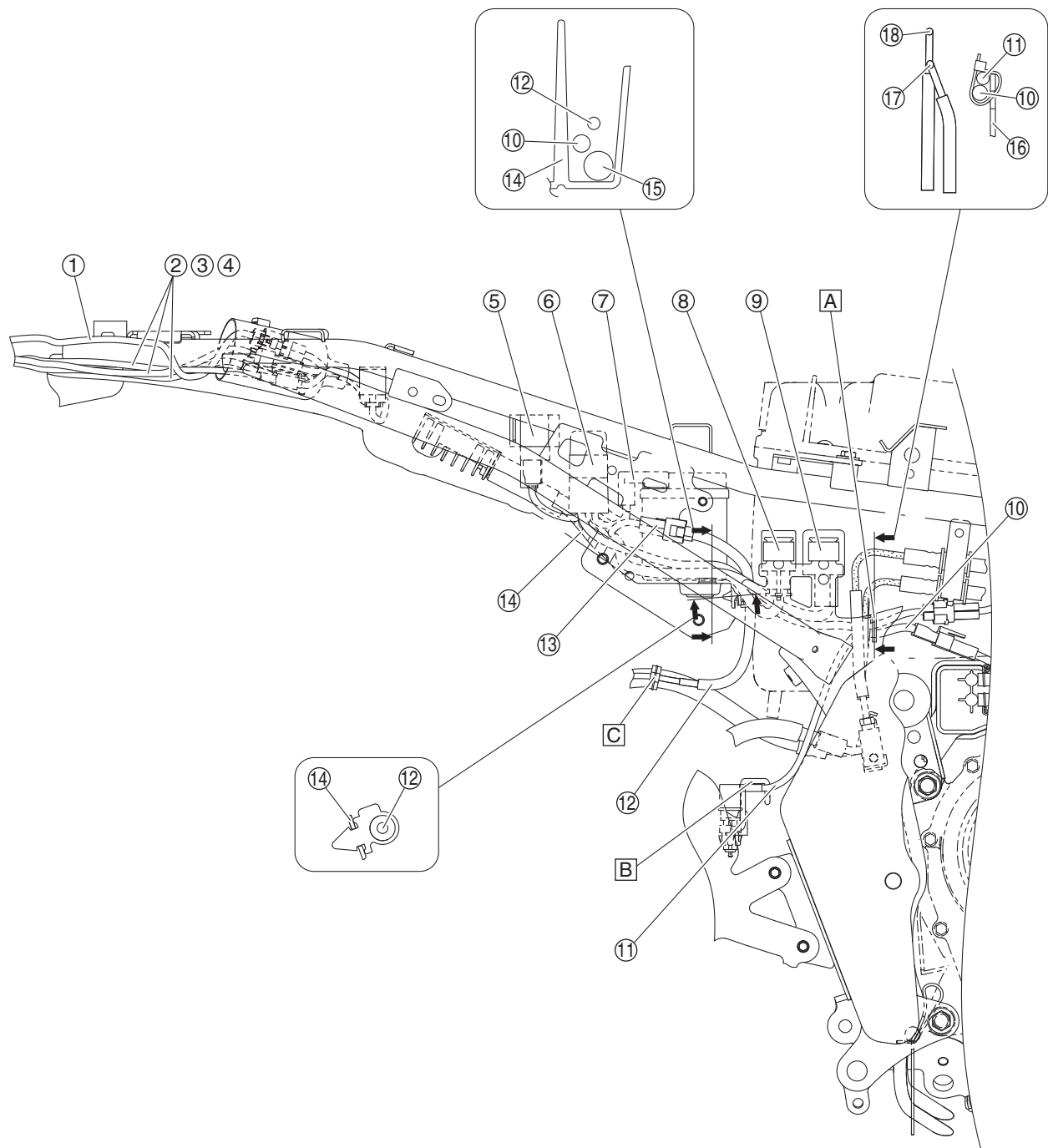
1. Rear brake light switch coupler
2. Starter relay coupler
3. Throttle body sensor assembly lead
4. FID (Fast Idle Device) lead
5. Fuel hose
6. Fuel tank breather hose (fuel tank to canister)
7. Throttle body
8. Fuel injector
9. Main switch
10. Meter assembly
11. Meter assembly coupler
12. Headlight assembly
13. Headlight coupler
14. Coupler cover
15. Ignition coil
16. Radiator cover
17. VVA (variable valve actuator) solenoid coupler
18. Coolant temperature sensor lead
19. O<sub>2</sub> sensor coupler
20. O<sub>2</sub> sensor lead
21. Starter motor lead
22. Canister purge hose (throttle body assembly to canister)
23. Canister
24. Main switch lead
25. Throttle cable (accelerator cable)
26. Throttle cable (decelerator cable)
27. Cable guide
28. Radiator
29. Frame
30. O<sub>2</sub> sensor coupler bracket
31. Radiator inlet hose
- A. Connect the headlight coupler to back side of headlight and then place the coupler in the coupler cover.
- B. Insert the projection on the wire harness holder into the hole in the frame.
- C. Install the spark plug lead completely onto the plug cap.
- D. Insert the O<sub>2</sub> sensor coupler into the hole in the O<sub>2</sub> sensor coupler bracket.
- E. Route the main switch lead through the hole in the frame and main switch bracket.
- F. Route the throttle cables through the hole in the radiator cover.
- G. Fasten the coolant temperature sensor lead at the white tape to the frame with the plastic locking tie.
- H. Route the coolant temperature sensor lead to the inside of the radiator inlet hose.

## Chassis (front left view)



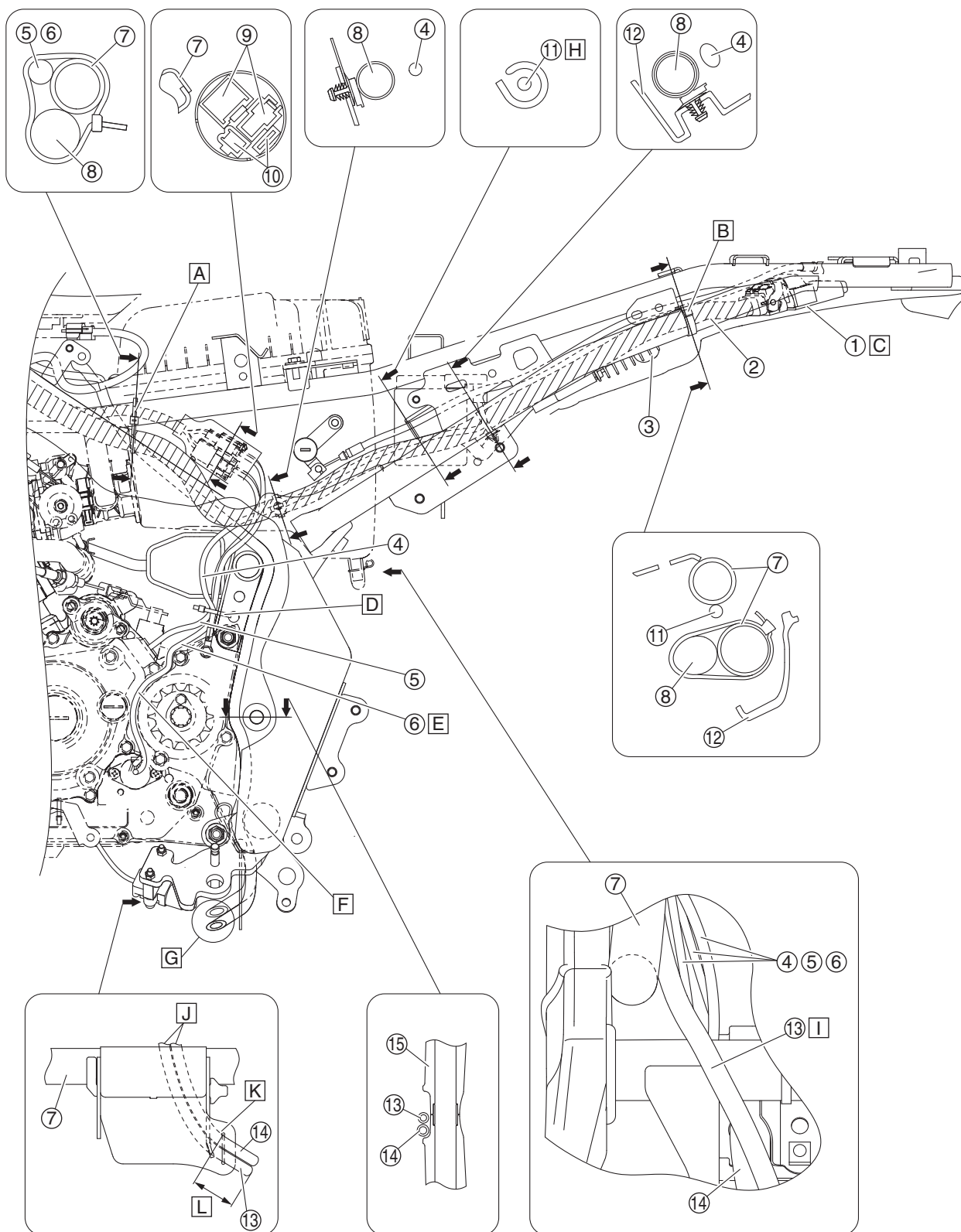
1. Meter assembly lead
2. Clutch cable
3. Main switch lead
4. Radiator fan motor coupler
5. Fuel sender lead
6. Fuel pump lead
7. Sidestand switch coupler
8. Radiator cover
9. Throttle cable (accelerator/decelerator)
10. Horn lead
11. Handlebar switch lead (right)
12. Front brake light switch lead
13. Headlight stay
14. Handlebar switch lead (left)
15. Front turn signal light lead (left)
16. Headlight lead
17. Front turn signal light lead (right)
18. Wire harness
19. Handlebar switch coupler (right)
20. Front turn signal light coupler (right)
21. Front turn signal light coupler (left)
22. Connector cover (front)
23. Connector cover (rear)
24. Handlebar switch coupler (left)
25. Radiator fan motor lead
26. Fuel tank overflow hose
27. Cylinder head breather hose
28. Air filter case
29. Bottom cowling bracket (left)
30. Coolant reservoir hose
31. Sidestand switch lead
  - A. To meter assembly
  - B. Pass the plastic locking tie through the hole in the engine mount bracket, and then fasten the sidestand switch lead with the plastic locking tie. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
  - C. Route the clutch cable through the guide.
  - D. Insert the projection on the wire harness holder into the hole in the frame.
  - E. Route the throttle cables under the clutch cable. Route the throttle cables through the guide and then into the radiator cover.
  - F. To headlight unit
  - G. Route the front brake light switch and handlebar switch (left and right) through the hole in the connector cover (rear).
  - H. Fit the front turn signal light (left) lead into the groove in the connector cover (rear).
  - I. Route the horn lead under the front turn signal light lead (left).
  - J. Fit the front turn signal light (right) lead into the groove in the connector cover (rear).
  - K. Route the wire harness to the outside rib of connector cover (rear).
  - L. Route the handlebar switch lead (right) to the rear of the headlight stay, and to inside connector cover (rear).
  - M. Route the headlight lead to the rear of the connector cover (rear).
  - N. Route the meter assembly lead to the outside of the connector cover (rear).
  - O. Insert the projection on the wire harness holder into the hole in the connector cover (rear).
  - P. Route the front turn signal light (left) lead and horn lead through the cutout in the connector cover (rear).
  - Q. Route the headlight lead wire through the guide on the connector cover (rear).
  - R. Route the front turn signal light (right) lead through the hole in the connector cover (rear).
  - S. To wire harness
  - T. Route the fuel pump lead and fuel sender lead to the inward of the vehicle and to the front of the fuel tank overflow hose.
  - U. Route the fuel tank overflow hose above the cylinder head breather hose.
  - V. Route the sidestand switch lead as shown in the illustration.
  - W. Route the coolant reservoir hose to the outside of the sidestand switch lead.
  - X. Fasten the sidestand switch lead and bottom cowling bracket (left) with a plastic band. Cut off the excess end of the plastic band to 5 mm (0.20 in) or less.
  - Y. Route the coolant reservoir hose to the inside of the clutch cable.

Chassis (rear right view)



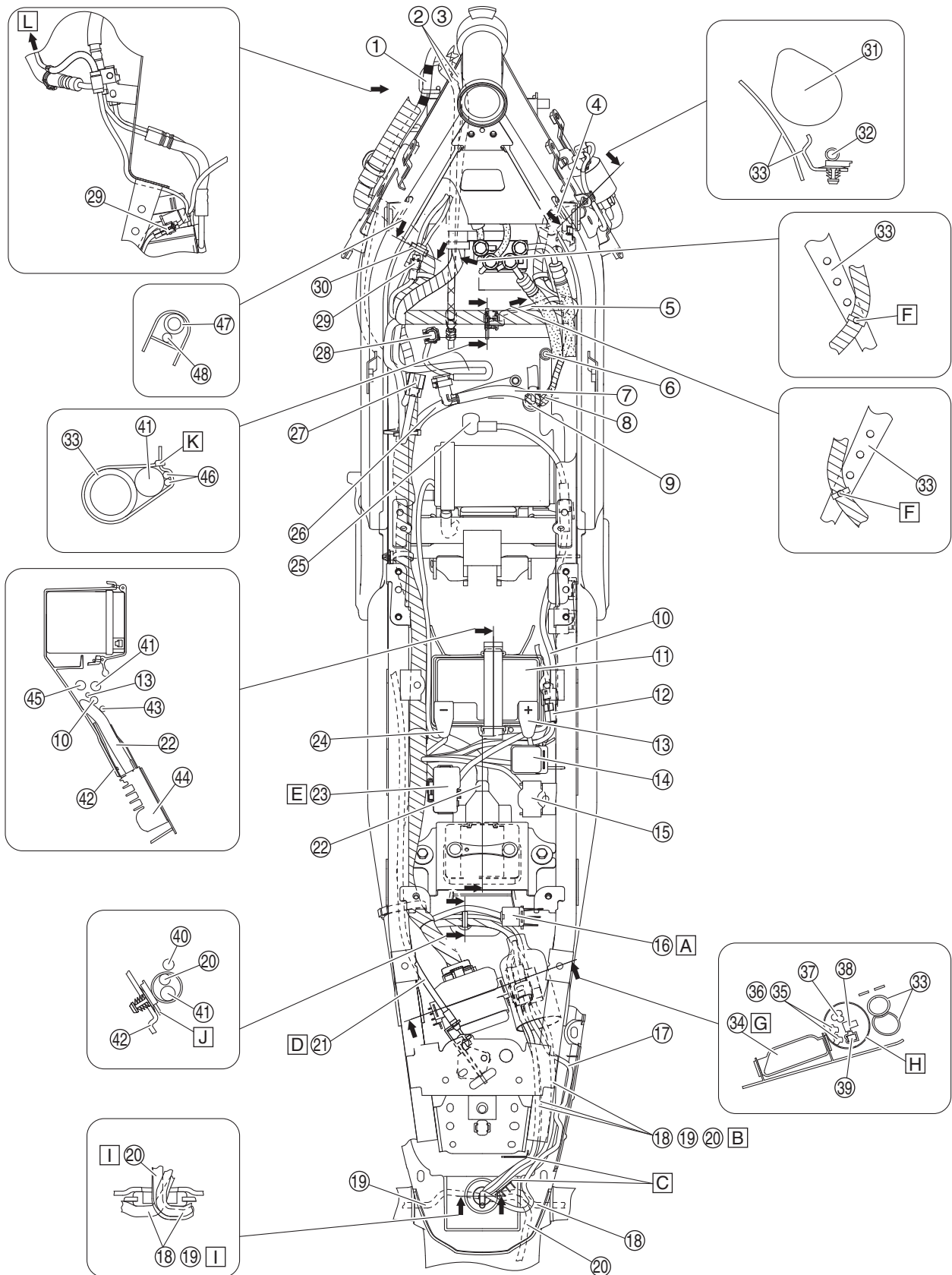
1. Tail/brake light assembly lead
2. Rear turn signal lead (right)
3. Rear turn signal lead (left)
4. License plate light lead
5. Lean angle sensor
6. Starter relay
7. Positive battery lead
8. Radiator fan motor relay
9. Turn signal relay
10. Starter relay lead
11. Rear brake light switch lead
12. Rear wheel sensor lead
13. Rear wheel sensor coupler
14. Rear fender
15. Wire harness
16. Frame
17. Rear brake hose (hydraulic unit to rear brake caliper)
18. Rear brake hose (rear brake master cylinder to hydraulic unit)
  - A. Fasten the starter relay lead at the white tape and rear brake light switch lead to the frame with the holder.
  - B. Route the rear brake light switch lead thorough the wire guide of rear brake light switch stay.
  - C. Fasten the rear wheel sensor lead and brake hose (hydraulic unit to rear brake caliper) with the holder.

## Chassis (rear left view)



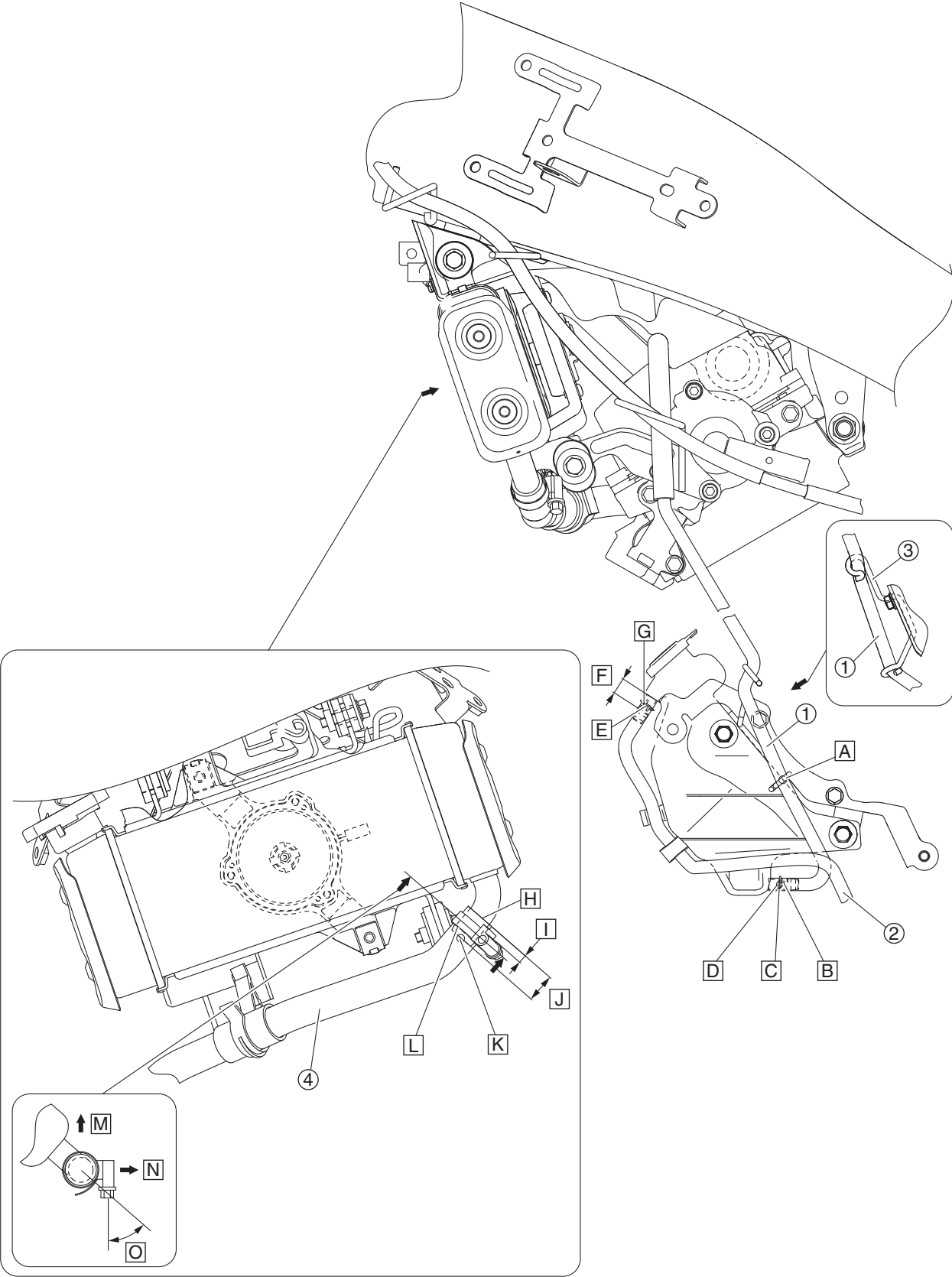
1. ECU (Engine Control Unit)
2. Wire harness (engine control unit)
3. Reflector/Regulator
4. Engine ground lead
5. AC magneto lead
6. Gear position switch lead
7. Frame
8. Wire harness
9. Gear position switch coupler
10. AC magneto lead coupler
11. Seat lock cable
12. Rear fender
13. Fuel tank overflow hose
14. Canister breather hose
15. Swingarm
- A. Fasten the AC magneto lead, gear position sensor lead and wire harness on the protector portion to the frame with the plastic locking tie.
- B. Position the plastic locking tie to the end of the frame bracket.
- C. Install the ECU (engine control unit) completely onto the tab on the rear fender.
- D. Fasten the AC magneto lead, gear position switch lead and engine ground lead with the plastic locking tie on the frame. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- E. Route the gear position switch lead under the AC magneto lead and do not pass inside the drive chain cover.
- F. Route the gear position switch lead along the drive chain cover.
- G. Route the fuel tank overflow hose and canister breather hose as shown in the illustration. Face the end of the hoses outward.
- H. Route the seat lock cable through the guide on the frame.
- I. Route the fuel tank overflow hose between wire harness and AC magneto lead, gear position switch lead or engine ground lead.
- J. Route the fuel tank overflow hose and canister breather hose to the inside of the bracket.
- K. Route the hoses through the slit of mudguard.
- L. 40 mm (1.57 in) or more

## Chassis (top view)



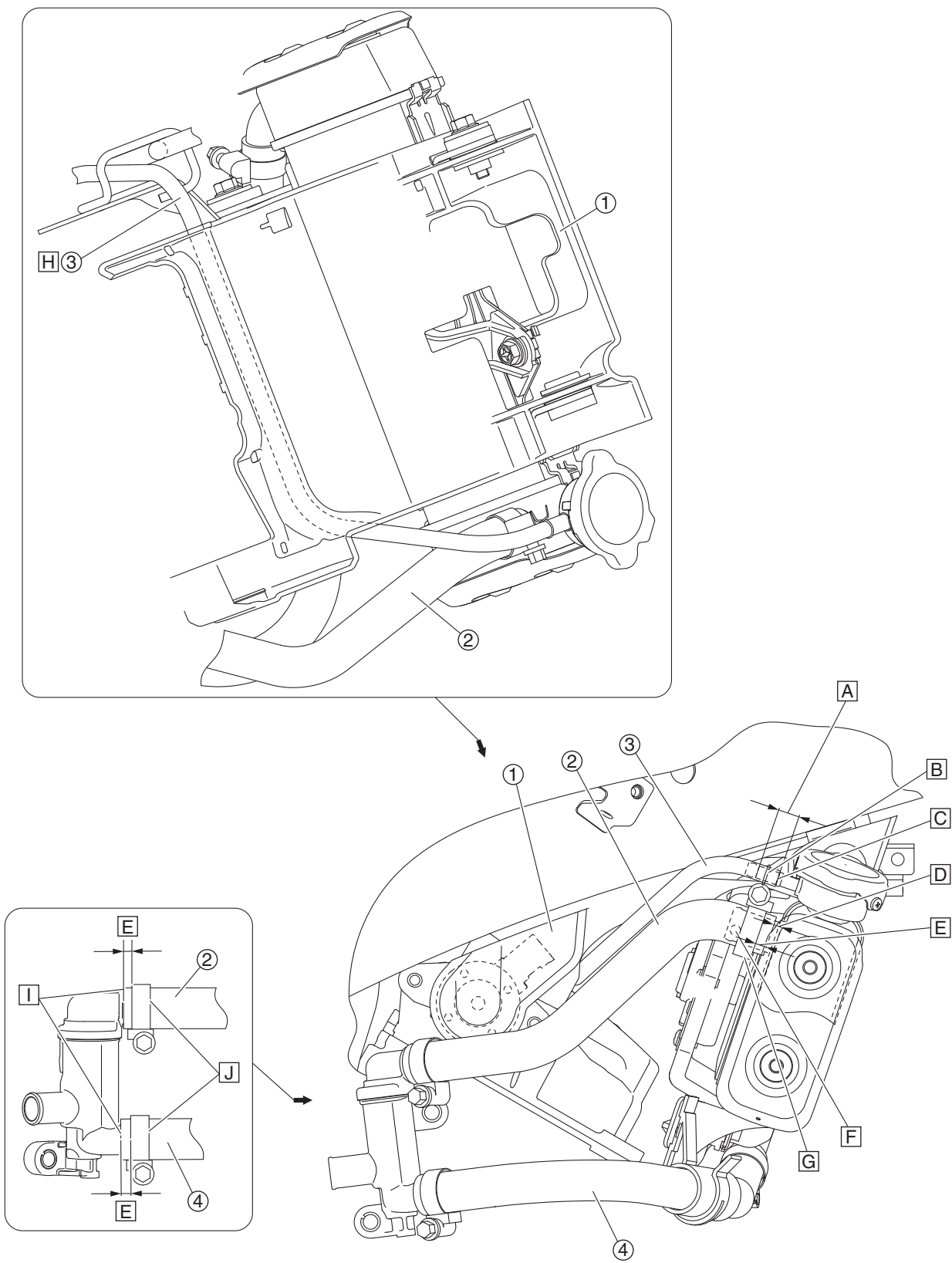
1. Clutch cable
2. Throttle cable (accelerator cable)
3. Throttle cable (decelerator cable)
4. VVA (variable valve actuator) solenoid coupler
5. Fuel injector coupler
6. Fuel tank breather hose
7. Fuel hose
8. FID (Fast Idle Device) lead
9. Throttle body sensor assembly lead
10. Starter relay lead
11. Battery
12. Rear wheel sensor coupler
13. Positive battery lead
14. Starter relay
15. Lean angle sensor
16. YDT coupler
17. Tail/brake light lead
18. Rear turn signal light lead (left)
19. Rear turn signal light lead (right)
20. License plate light lead
21. Seat lock cable
22. Wire harness (rectifier/regulator)
23. Fuse box
24. Negative battery lead
25. Starter motor lead
26. Fuel tank overflow hose
27. Fuel pump coupler
28. Fuel sender coupler
29. Front wheel sensor coupler
30. Main switch coupler
31. Ignition coil
32. Ignition coil lead
33. Frame
34. ECU (Engine Control Unit)
35. Rear turn signal light coupler (left)
36. Rear turn signal light coupler (right)
37. Tail/brake light coupler
38. Diode
39. License plate light coupler
40. Wire harness (YDT)
41. Wire harness
42. Rear fender
43. Wire harness (lean angle sensor lead)
44. Rectifier/regulator
45. Rear wheel sensor lead
46. Joint connector
47. Main switch lead
48. Front wheel sensor lead
- A. Install the Yamaha Diagnostic tool coupler completely onto the tab on the rear fender.
- B. Route the rear turn signal light lead (left), rear turn signal light lead (right) and license plate light lead under the frame. The leads may be routed in any order.
- C. Route the rear turn signal leads and license plate light lead to the outside rib of rear fender.
- D. Route the seat lock cable under the frame.
- E. Install the fuse box to the holder on the rear fender.
- F. Insert the projection on the wire harness holder into the fourth hole in the frame as shown in the illustration.
- G. Install the ECU (engine control unit) completely onto the tab on the rear fender.
- H. Route the tail/brake light coupler, rear turn signal light (left) coupler, rear turn signal light (right) coupler, diode and license plate light coupler to the inside of the coupler cover.
- I. Route the rear turn signal light lead (left), rear turn signal light lead (right) and license plate light lead through the hole in the grommet.
- J. Face the end of the plastic band rearward.
- K. Face the end of the plastic locking tie forward.
- L. To front wheel sensor

Radiator (front and left side view)



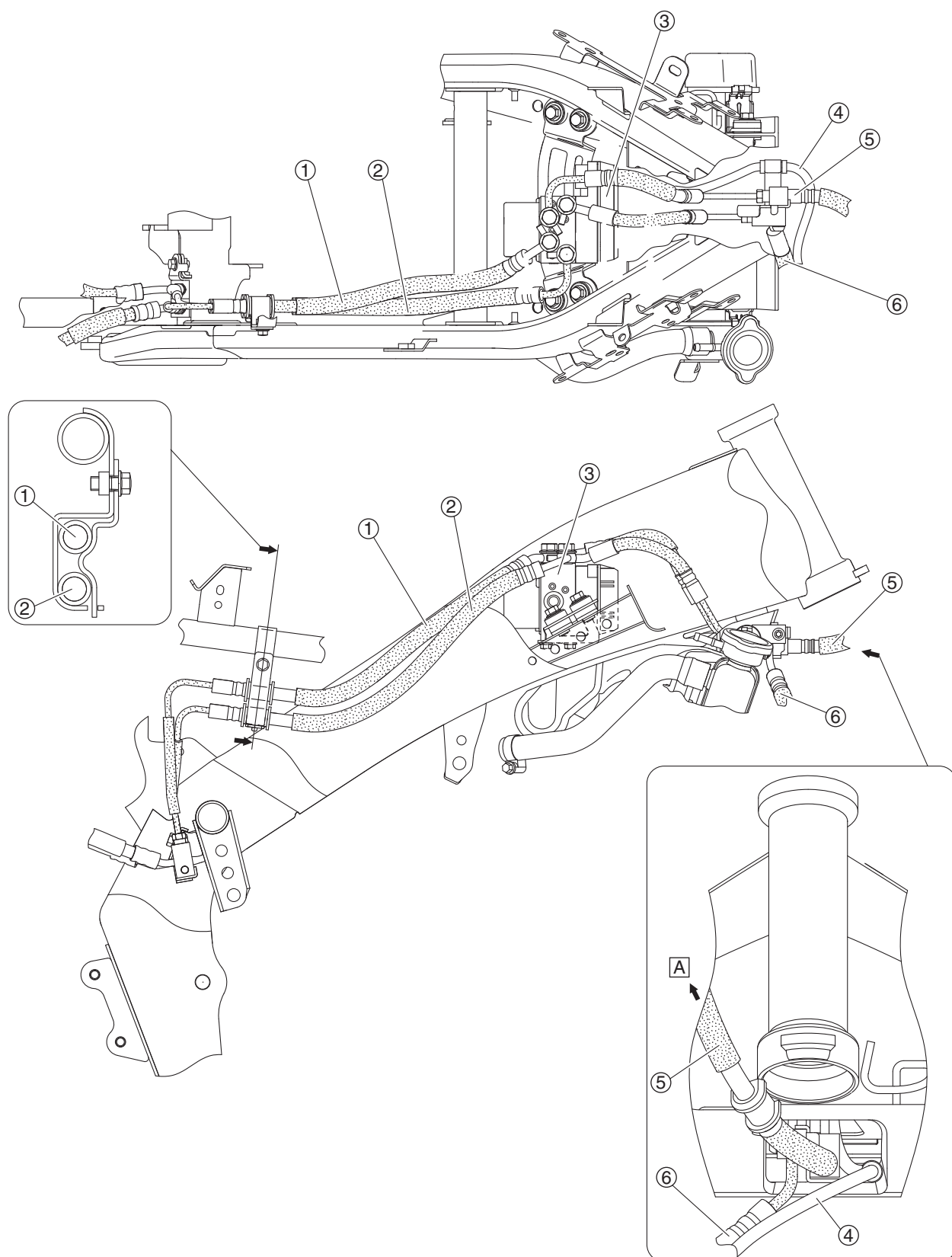
1. Coolant reservoir hose
2. Coolant reservoir breather hose
3. Bottom cowling bracket (left)
4. Radiator outlet hose
- A. Align the paint mark on the coolant reservoir hose with the hose guide.
- B. Align the hose clamp to the paint mark and face the end of hose clamp outward.
- C. Face the paint mark on the coolant reservoir hose outward.
- D. Install the coolant reservoir hose completely to the hose fitting.
- E. Point the ends of the hose clamp outward.
- F. 10.5 mm (0.41 in)
- G. Install the coolant reservoir breather hose completely to the hose fitting.
- H. Install the radiator outlet hose up to the bend in the hose fitting on the radiator.
- I. 3–5 mm (0.12–0.20 in)
- J. 18 mm (0.71 in)
- K. Face the paint mark on the radiator outlet hose forward.
- L. Make sure not to install the hose clamp on the raised portion of the hose fitting.
- M. Forward
- N. Downward
- O. 48.9°

Radiator (right side view)



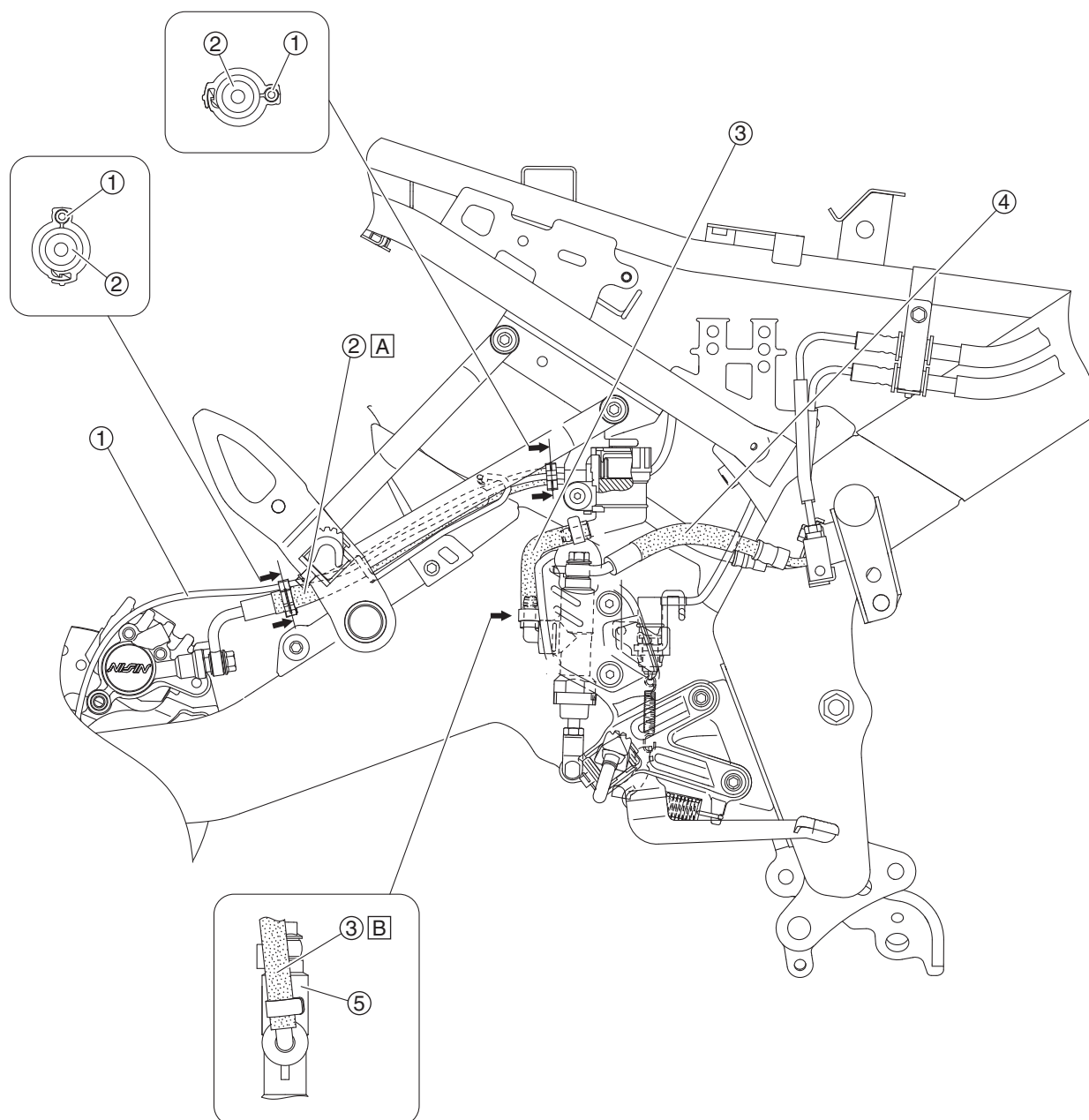
1. Radiator cover
2. Radiator inlet hose
3. Coolant reservoir hose
4. Radiator outlet hose
- A. 10.5 mm (0.41 in)
- B. Install the hose clamp in the area as shown. Point the ends of the hose clamp inward.
- C. Install the coolant reservoir hose completely onto the hose fitting of the spool.
- D. 0–3 mm (0.00–0.12 in)
- E. 3–5 mm (0.12–0.20 in)
- F. White paint mark
- G. Face the paint mark on the radiator inlet hose outward. Make sure not to install the hose clamp on the raised portion of the hose fitting.
- H. Route the coolant reservoir hose as shown in the illustration.
- I. Install the hose completely to the hose fitting.
- J. Make sure not to install the hose clamp on the raised portion of the hose fitting.

## Hydraulic unit



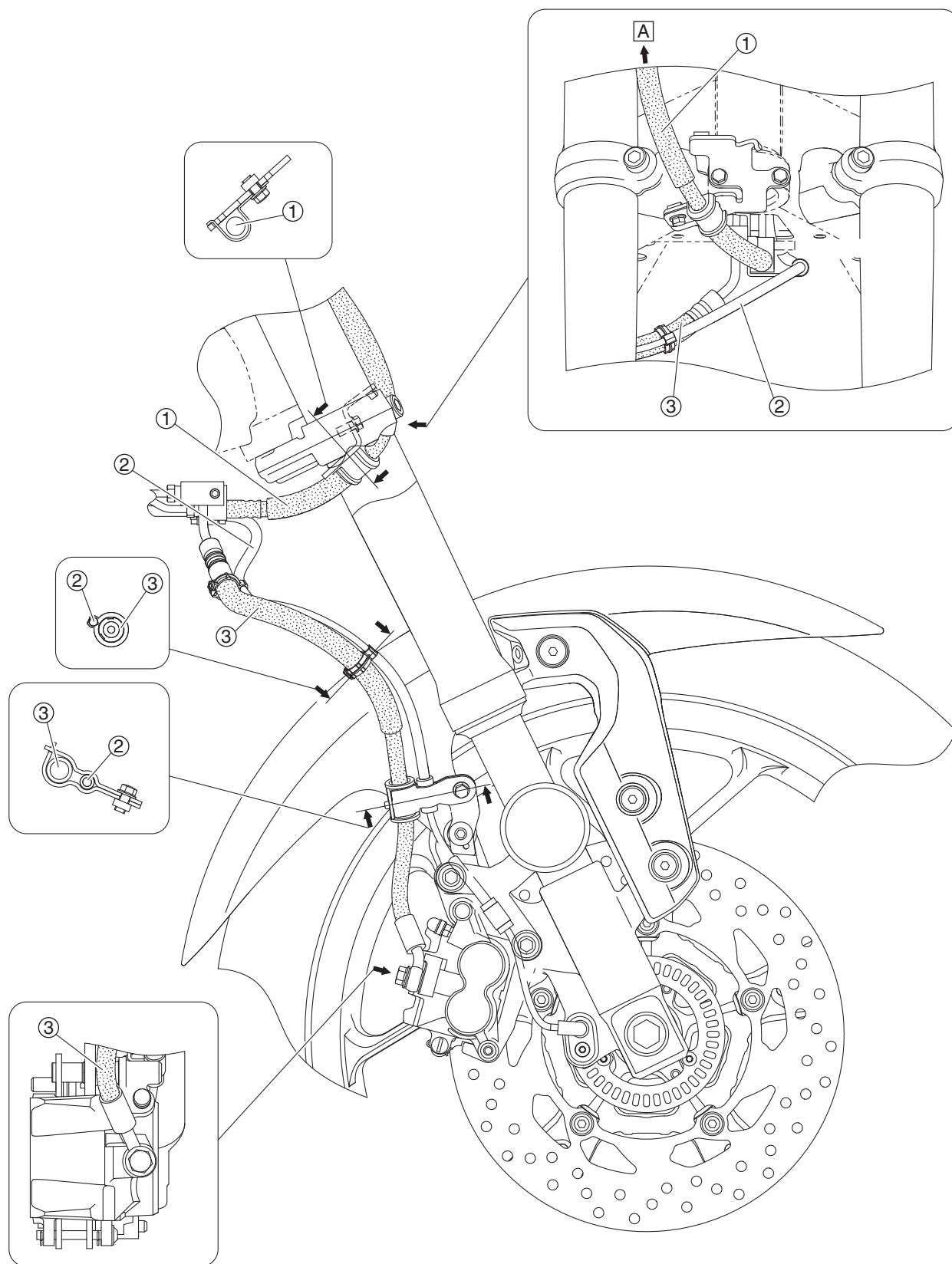
1. Rear brake hose (rear brake master cylinder to hydraulic unit)
2. Rear brake hose (hydraulic unit to rear brake caliper)
3. Hydraulic unit
4. Front wheel sensor lead
5. Front brake hose (front brake master cylinder to hydraulic unit)
6. Front brake hose (hydraulic unit to front brake caliper)
- A. To front brake master cylinder

## Rear brake (right side view)



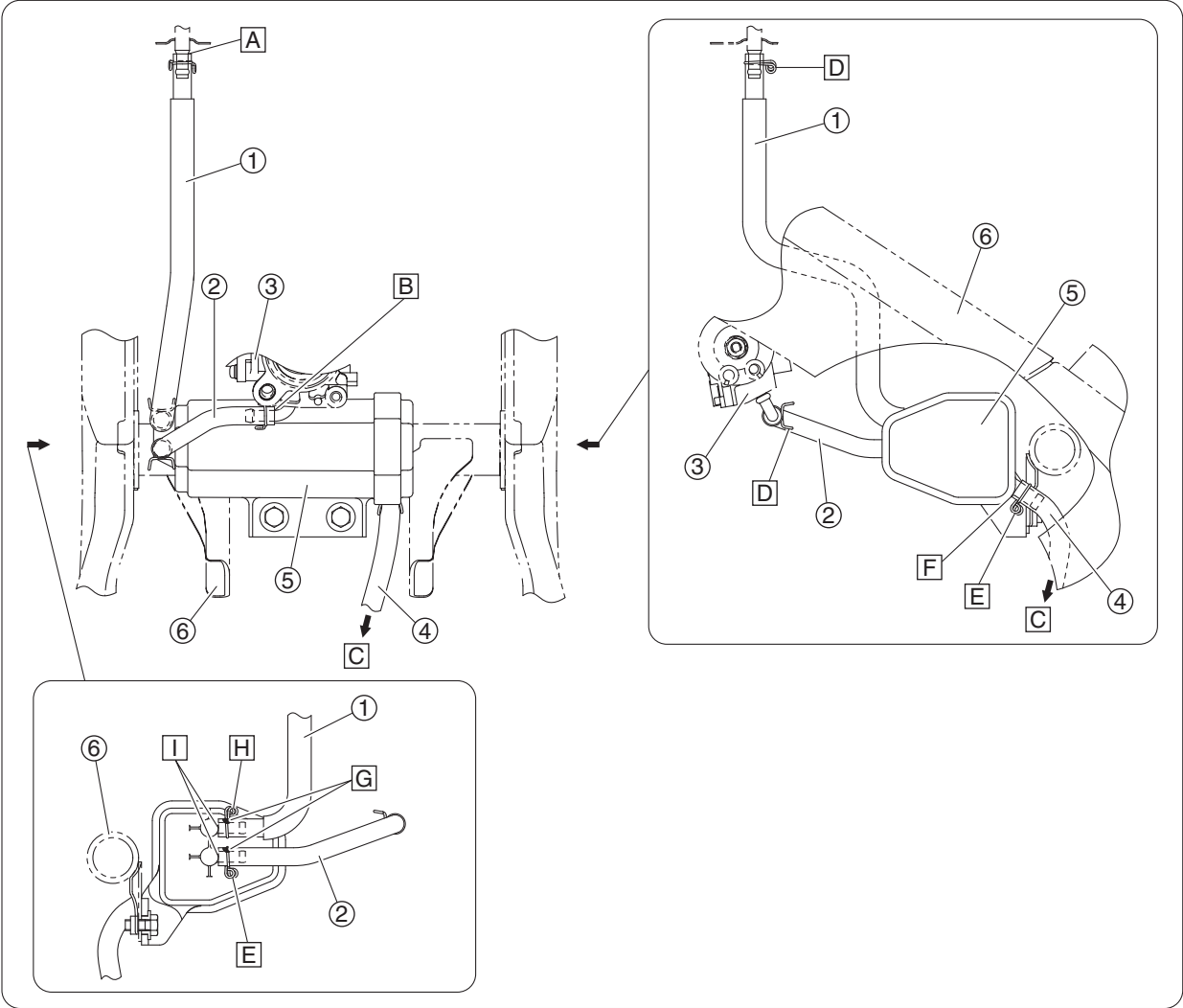
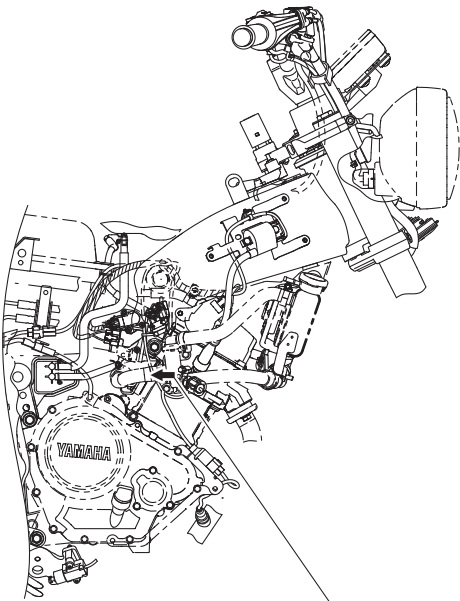
1. Rear wheel sensor lead
2. Rear brake hose (hydraulic unit to rear brake caliper)
3. Brake fluid reservoir hose
4. Rear brake hose (rear brake master cylinder to hydraulic unit)
5. Rear brake master cylinder
  - A. Route the rear wheel sensor lead between the rear brake hose holder and the rear brake hose (hydraulic unit to rear brake caliper).
  - B. Making sure that the brake fluid reservoir hose is facing upward as shown in the illustration.

## Front brake (right side view)



1. Front brake hose (front brake master cylinder to hydraulic unit)
2. Front wheel sensor lead
3. Front brake hose (hydraulic unit to front brake caliper)
  - A. To front brake master cylinder

Canister



1. Fuel tank breather hose (fuel tank to canister)
2. Canister purge hose (throttle body assembly to canister)
3. Throttle body assembly
4. Canister breather hose
5. Canister
6. Frame
- A. Install the fuel tank breather hose up to the wide portion of the hose fitting.
- B. Install the canister purge hose up to the bend in the hose fitting on the canister.
- C. To mudguard
- D. Point the ends of the hose clamp rearward.
- E. Point the ends of the hose clamp downward.
- F. Install the canister breather hose completely onto the hose fittings of the canister.
- G. Face the paint marks on the fuel tank breather hose and canister purge hose upward.
- H. Point the ends of the hose clamp upward.
- I. Install the fuel tank breather hose and canister purge hose completely onto the hose fittings of the canister.



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## PERIODIC CHECKS AND ADJUSTMENTS

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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

- The annual checks must be performed every year, except if a distance-based maintenance is performed instead.
- From 30000 km (17500 mi), repeat the maintenance intervals starting from 6000 km (3500 mi).
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

| NO. | ITEM                                  | CHECK OR MAINTENANCE JOB                                                                                                                        | ODOMETER READING |                   |                    |                     |                     | ANNUAL CHECK |
|-----|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------|---------------------|---------------------|--------------|
|     |                                       |                                                                                                                                                 | 1000 km (600 mi) | 6000 km (3500 mi) | 12000 km (7000 mi) | 18000 km (10500 mi) | 24000 km (14000 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 plug                          | <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>                                                                           |                  | ✓                 | ✓                  | ✓                   | ✓                   |              |
| 4   | * Fuel injection                      | <ul style="list-style-type: none"> <li>• Check and adjust engine idle speed.</li> </ul>                                                         | ✓                | ✓                 | ✓                  | ✓                   | ✓                   | ✓            |
| 5   | * Exhaust system                      | <ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Tighten if necessary.</li> <li>• Replace gasket 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

- The annual checks must be performed every year, except if a distance-based maintenance is performed instead.
- From 30000 km (17500 mi), repeat the maintenance intervals starting from 6000 km (3500 mi).
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

| NO. | ITEM                       | CHECK OR MAINTENANCE JOB                                                                                                               | ODOMETER READING |                   |                    |                     |                     | ANNUAL CHECK |
|-----|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------|---------------------|---------------------|--------------|
|     |                            |                                                                                                                                        | 1000 km (600 mi) | 6000 km (3500 mi) | 12000 km (7000 mi) | 18000 km (10500 mi) | 24000 km (14000 mi) |              |
| 1   | * Diagnostic system check  | <ul style="list-style-type: none"> <li>• Perform dynamic inspection using Yamaha diagnostic tool.</li> <li>• Check the DTC.</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)                                                                                   | 6000 km (3500 mi) | 12000 km (7000 mi) | 18000 km (10500 mi) | 24000 km (14000 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> <li>Replace.</li> </ul>                                                                                     |                                                                                                    | √                 | √                  | √                   | √                   | √            |
| 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 and for damage.</li> <li>Replace 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> <li>Lubricate with lithium-soap-based grease.</li> </ul>                                        |                                                                                                    | √                 | √                  | √                   | √                   |              |
| 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> <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> <li>Lubricate with lithium-soap-based grease.</li> </ul>                                                               |                                                                                                    | √                 | √                  | √                   | √                   |              |

## PERIODIC MAINTENANCE

| NO. | ITEM                              | CHECK OR MAINTENANCE JOB                                                                                                                                                                            | ODOMETER READING                                                |                      |                       |                        |                        | ANNUAL CHECK |
|-----|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------|-----------------------|------------------------|------------------------|--------------|
|     |                                   |                                                                                                                                                                                                     | 1000 km<br>(600 mi)                                             | 6000 km<br>(3500 mi) | 12000 km<br>(7000 mi) | 18000 km<br>(10500 mi) | 24000 km<br>(14000 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>                                                       | At the initial interval and every 3000 km (1800 mi) thereafter. |                      |                       |                        |                        | √            |
| 26  | Engine oil filter element         | <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> <li>Change.</li> </ul>                                                                             |                                                                 | √                    | √                     | √                      | √                      | √            |
| 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

- The air filter needs more frequent service if you are 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 calipers, and change the brake fluid.
  - Replace the brake hoses every four years and if cracked or damaged.

EAS32024

## CHECKING THE VEHICLE USING THE YAMAHA DIAGNOSTIC TOOL

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

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



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03264**

### TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to “YDT” on page 9-2.

3. Check:
  - DTC (Diagnostic Trouble Code)

### TIP

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

DTC number is displayed → Check and repair the probable cause of the malfunction. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-22.

4. Perform:
  - Dynamic inspection

### TIP

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

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

EAS30619

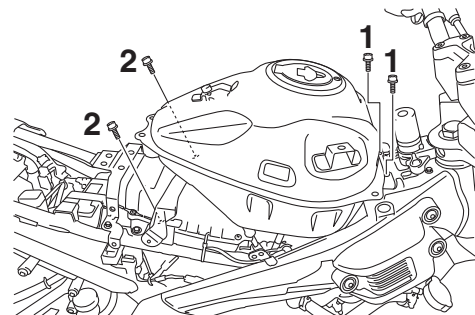
## CHECKING THE FUEL LINE

1. Remove:
  - Seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.
  - Upper side covers  
Refer to “GENERAL CHASSIS (2)” on page 4-2.
  - Lower side covers/Fuel tank covers/Main switch cover  
Refer to “GENERAL CHASSIS (3)” on page 4-3.
2. Remove:
  - Fuel tank fitting bracket bolts “1”
  - Fuel tank bracket bolts (rear) “2”

ECA20070

### NOTICE

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

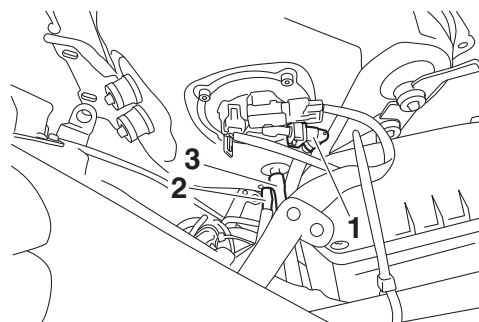


3. Check:
  - Fuel hose “1”
  - Fuel tank breather hose “2”
  - Fuel tank overflow hose “3”  
Cracks/damage → Replace.  
Loose connection → Connect properly.

ECA16950

### NOTICE

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



4. Install:
  - Fuel tank fitting bracket bolts

## PERIODIC MAINTENANCE

- Fuel tank bracket bolts (rear)



**Rear fuel tank bracket bolt (frame)**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**  
**Front fuel tank bracket bolt (frame)**  
**23 N·m (2.3 kgf·m, 17 lb·ft)**

### 5. Install:

- Lower side covers/Fuel tank covers/Main switch cover  
Refer to "GENERAL CHASSIS (3)" on page 4-3.
- Upper side covers  
Refer to "GENERAL CHASSIS (2)" on page 4-2.
- Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30620

### CHECKING THE SPARK PLUG

1. Disconnect:
  - Spark plug cap
2. Remove:
  - Spark plug

ECA13330

#### NOTICE

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

### 3. Check:

- Spark plug type  
Incorrect → Change.



**Manufacturer/model**  
**NGK/MR8E9**

### 4. Check:

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

### 5. Clean:

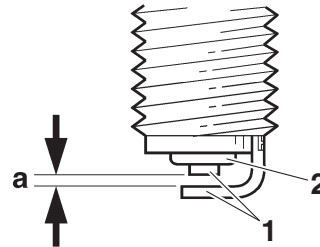
- Spark plug  
(with a spark plug cleaner or wire brush)

### 6. Measure:

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

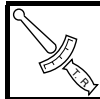


**Spark plug gap**  
**0.8–0.9 mm (0.031–0.035 in)**



### 7. Install:

- Spark plug



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

#### TIP

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

### 8. Connect:

- Spark plug cap

EAS30622

### ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

#### TIP

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

### 1. Remove:

- Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Bottom cowlings  
Refer to "GENERAL CHASSIS (3)" on page 4-3.

### 2. Drain:

- Coolant  
Refer to "CHANGING THE COOLANT" on page 3-19.

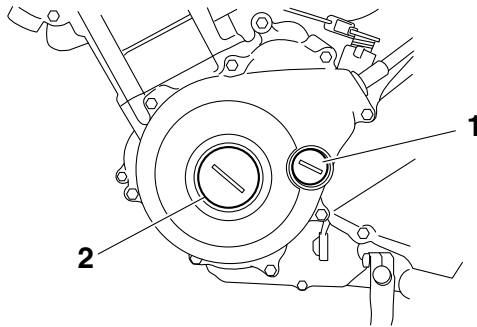
### 3. Remove:

- Radiator  
Refer to "RADIATOR AND THERMOSTAT" on page 6-2.

### 4. Disconnect:

- Spark plug cap

5. Remove:
  - Spark plug
6. Remove:
  - Cylinder head cover
  - Cylinder head cover gasket
 Refer to "CYLINDER HEAD" on page 5-12.
7. Remove:
  - Timing mark accessing screw "1"
  - Crankshaft end cover "2"



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



## Valve clearance (cold)

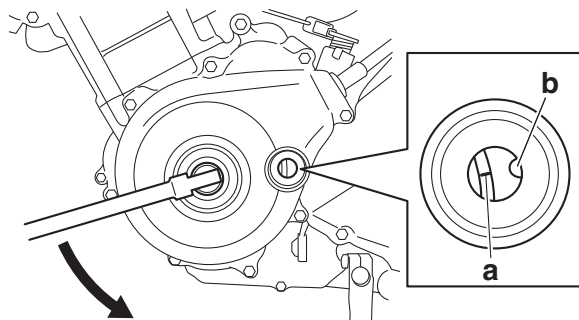
### Intake

0.10–0.14 mm (0.0039–0.0055 in)

### Exhaust

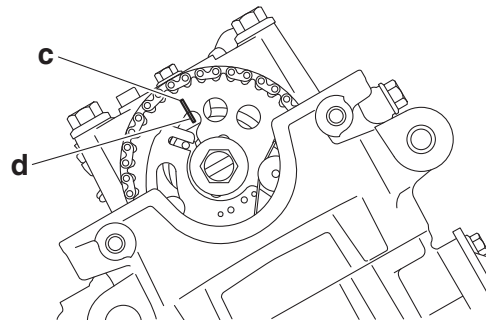
0.21–0.25 mm (0.0083–0.0098 in)

- a. Turn the crankshaft counterclockwise.
- b. Align the TDC mark "a" on the generator rotor with the stationary pointer "b" on the generator cover.

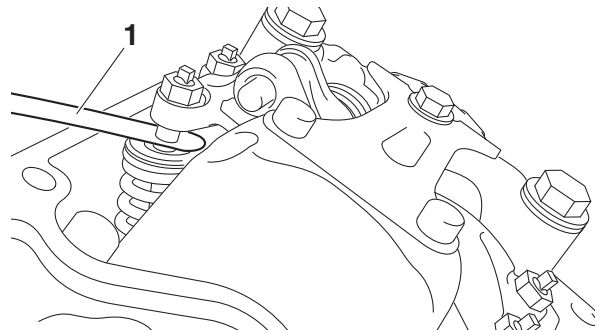


## TIP

When the piston is at TDC on the compression stroke, align the "I" mark "c" on the camshaft sprocket with the match mark "d" on the stopper plate.



- c. Measure the valve clearance with the thickness gauge "1".  
Out of specification → Adjust.



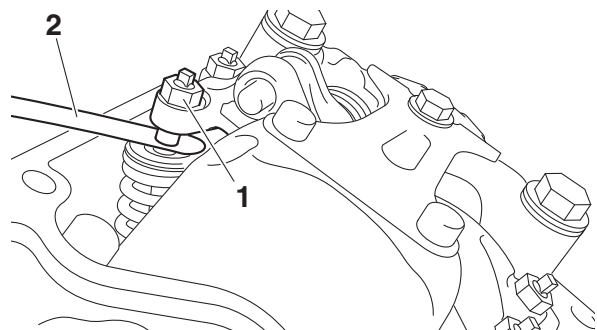
## Thickness gauge

90890-03268

## Feeler gauge set

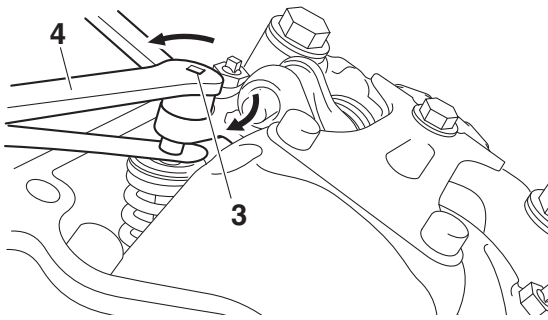
YU-26900-9

9. Adjust:
  - Valve clearance
    - a. Loosen the locknut "1".
    - b. Insert the thickness gauge "2" between the end of the adjusting screw and the valve tip.



- c. Turn the adjusting screw "3" with the tap-pet adjusting tool "4" until the specified valve clearance is obtained.

## PERIODIC MAINTENANCE



**Thickness gauge**  
90890-03268  
**Feeler gauge set**  
YU-26900-9  
**Tappet adjusting tool**  
90890-01311  
**Six piece tappet set**  
YM-A5970

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



**Valve adjusting screw locknut**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

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

10. Install:

- All removed parts

### TIP

For installation, reverse the removal procedure.

EAS30031

### ADJUSTING THE ENGINE IDLING SPEED

#### TIP

Prior to adjusting the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

- Start the engine and let it warm up for several minutes.
- Check:
  - Engine idling speed
 Out of specification → Adjust.

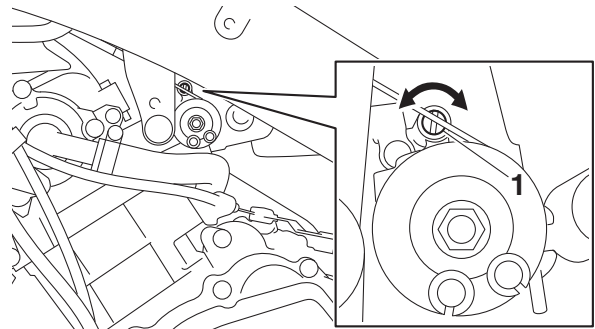


**Engine idling speed**  
1250–1550 r/min

3. Adjust:

- Engine idling speed

- Turn the idling speed adjusting screw “1” until the specified engine idling speed is obtained.



EAS30625

### CHECKING THE EXHAUST SYSTEM

1. Check:

- Exhaust assembly “1”  
Cracks/damage → Replace.
- Gasket “2”  
Exhaust gas leaks → Replace.

2. Check:

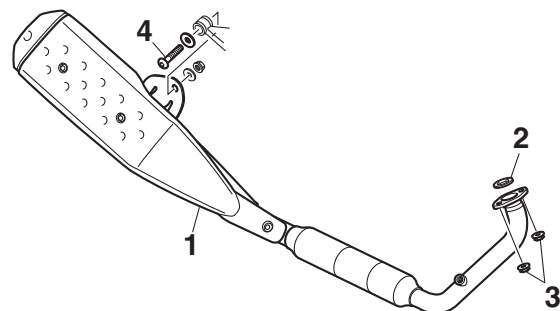
- Tightening torque.
- Exhaust pipe nuts “3”
- Exhaust assembly bolt “4”

#### TIP

If the exhaust assembly is removed, be sure to install and tighten the nuts and bolt in the proper order. Refer to “INSTALLING THE EXHAUST ASSEMBLY” on page 5-10.



**Exhaust pipe nut**  
15 N·m (1.5 kgf·m, 11 lb·ft)  
**Exhaust assembly bolt**  
20 N·m (2.0 kgf·m, 15 lb·ft)



EAS30626

### CHECKING THE CANISTER

1. Remove:

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

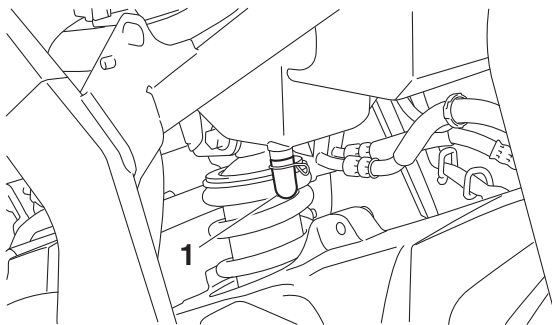
- Upper side covers  
Refer to “GENERAL CHASSIS (2)” on page 4-2.
  - Lower side covers/Fuel tank covers/Main switch cover  
Refer to “GENERAL CHASSIS (3)” on page 4-3.
2. Check:
- Canister
  - Canister purge hose
  - Fuel tank breather hose
  - Fuel tank overflow hose
  - Canister breather hose  
Cracks/damage → Replace.
3. Install:
- Lower side covers/Fuel tank covers/Main switch cover  
Refer to “GENERAL CHASSIS (3)” on page 4-3.
  - Upper side covers  
Refer to “GENERAL CHASSIS (2)” on page 4-2.
  - Seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS31130

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

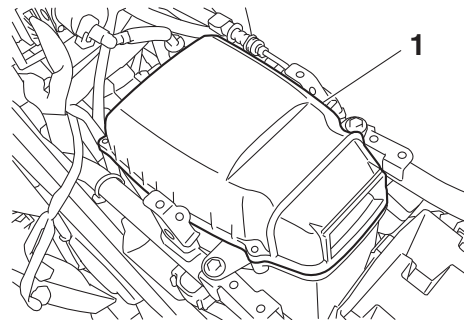
#### TIP

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



1. Remove:
- Seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.
  - Upper side covers  
Refer to “GENERAL CHASSIS (2)” on page 4-2.

- Lower side covers/Fuel tank covers/Main switch cover  
Refer to “GENERAL CHASSIS (3)” on page 4-3.
  - Fuel tank  
Refer to “FUEL TANK” on page 7-1.
2. Remove:
- Seat bracket
  - Air filter case cover “1”
  - Air filter element  
Refer to “GENERAL CHASSIS (5)” on page 4-6.



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

#### TIP

- Replace the air filter element every 12000 km (7000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

4. Install:
- Air filter element
  - Air filter case cover (along with the gaskets)
  - Seat bracket  
Refer to “GENERAL CHASSIS (5)” on page 4-6.

ECA20480

#### NOTICE

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

#### TIP

Make sure the air filter element is properly installed in the air filter case.

## PERIODIC MAINTENANCE

### 5. Install:

- Fuel tank  
Refer to "FUEL TANK" on page 7-1.
- Lower side covers/Fuel tank covers/Main switch cover  
Refer to "GENERAL CHASSIS (3)" on page 4-3.
- Upper side covers  
Refer to "GENERAL CHASSIS (2)" on page 4-2.
- Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30629

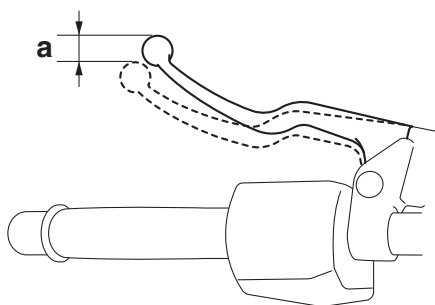
### ADJUSTING THE CLUTCH LEVER FREE PLAY

#### 1. Check:

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



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



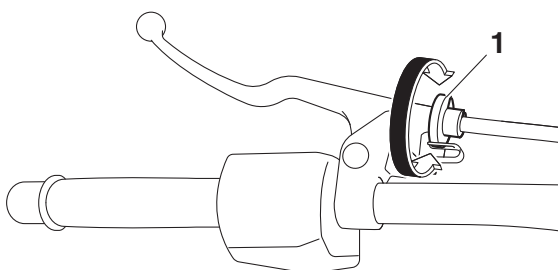
G088887

#### 2. Adjust:

- Clutch lever free play

#### Handlebar side

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



G088888

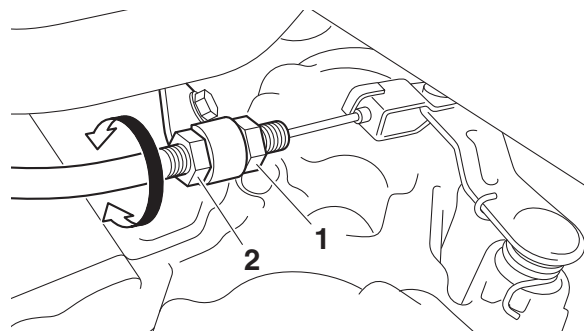
- Tighten the locknut.

#### TIP

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

#### Engine side

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



- Tighten the locknut.



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

EAS30801

### CHECKING THE BRAKE OPERATION

#### 1. Check:

- Brake operation  
Brake not working properly → Check the brake system.  
Refer to "FRONT BRAKE" on page 4-20 and "REAR BRAKE" on page 4-30.

#### TIP

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

EAS30074

### CHECKING THE BRAKE FLUID LEVEL

#### 1. Stand the vehicle on a level surface.

#### TIP

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

#### 2. Check:

- Brake fluid level  
Below the minimum level mark → 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**

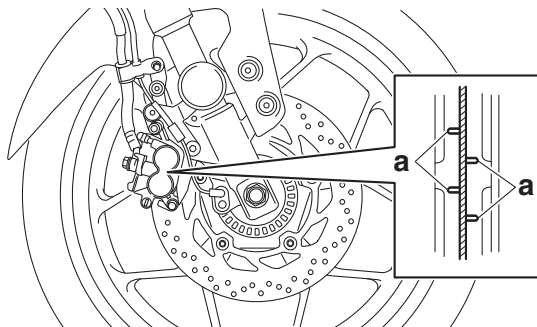
In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

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 4-20.



EAS30634

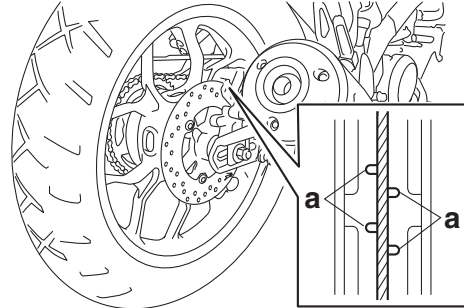
## **CHECKING THE REAR BRAKE PADS**

The following procedure applies to all of the brake pads.

1. Operate the brake.

2. Check:

- Rear brake pad  
Wear indicator groove "a" has almost disappeared → Replace the brake pads as a set. Refer to "REAR BRAKE" on page 4-30.



EAS30635

## **CHECKING THE FRONT BRAKE HOSES**

1. Check:
  - Brake hoses  
Cracks/damage/wear → Replace.
2. Check:
  - Front brake hose/lead holder  
Loose connection → Tighten the holder bolt.
3. Hold the vehicle upright and apply the front brake several times.
4. Check:
  - Brake hoses  
Brake fluid leakage → Replace the damaged hose.  
Refer to "FRONT BRAKE" on page 4-20 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS30636

## **CHECKING THE REAR BRAKE HOSES**

1. Check:
  - Brake hoses  
Cracks/damage/wear → Replace.
2. Check:
  - Rear brake hose guide  
Loose connection → Tighten the guide bolt.
3. Hold the vehicle upright and apply the front brake several times.
4. Check:
  - Brake hoses  
Brake fluid leakage → Replace the damaged hose.  
Refer to "REAR BRAKE" on page 4-30 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS30893

## BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

### **WARNING**

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

ECA22780

### **NOTICE**

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

EWA16530

### **WARNING**

Bleed the ABS whenever:

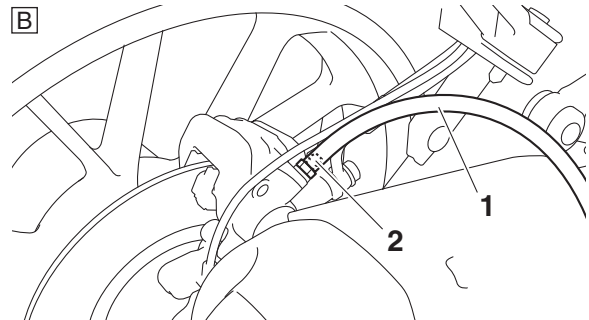
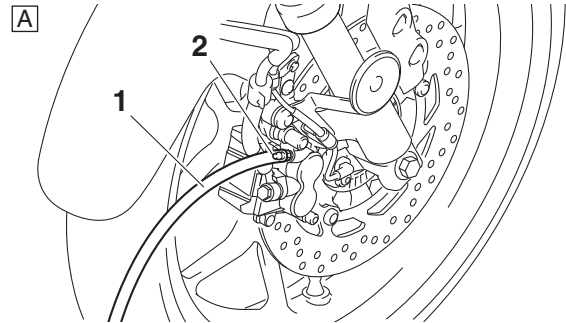
- the system is disassembled.
- a brake hose is loosened, disconnected or replaced.
- the brake fluid level is very low.
- brake operation is faulty.

### **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 or brake fluid reservoir to the proper level with the specified brake fluid.
  - b. Install the diaphragm (brake master cylinder or brake fluid reservoir).
  - c. Connect a clear plastic hose "1" tightly to the bleed screw "2".



A. Front brake caliper

B. Rear brake caliper

- d. 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 4-44.

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



**Front brake caliper bleed screw**  
6 N·m (0.6 kgf·m, 4.4 lb·ft)  
**Rear brake caliper bleed screw**  
5 N·m (0.5 kgf·m, 3.7 lb·ft)

- m. Fill the brake master cylinder or brake fluid reservoir to the proper level with the specified brake fluid.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-9.

EWA13110



**WARNING**

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

EAS30638

## CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260



**WARNING**

**Never attempt to make any repairs to the wheel.**

## TIP

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

EAS30640

## CHECKING THE TIRES

The following procedure applies to both of the tires.

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

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  
180 kPa (1.80 kgf/cm<sup>2</sup>, 26 psi)  
Rear  
200 kPa (2.00 kgf/cm<sup>2</sup>, 29 psi)  
**2 persons**  
Front  
180 kPa (1.80 kgf/cm<sup>2</sup>, 26 psi)  
Rear  
225 kPa (2.25 kgf/cm<sup>2</sup>, 33 psi)  
Maximum load  
190 kg (420 lb)

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

EWA13190



**WARNING**

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

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



**Wear limit**  
1.6 mm (0.06 in)

EWA18550



**WARNING**

**After extensive tests, the tires listed below have been approved by MBK industrie 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 MBK industrie is used on this vehicle.**



**Front tire**  
**Size**  
110/70-17 M/C 54S  
**Manufacturer/model**  
IRC/TRAIL WINNER GP-211F



**Rear tire**  
**Size**  
140/70-17 M/C 66S  
**Manufacturer/model**  
IRC/TRAIL WINNER GP-211R

# PERIODIC MAINTENANCE

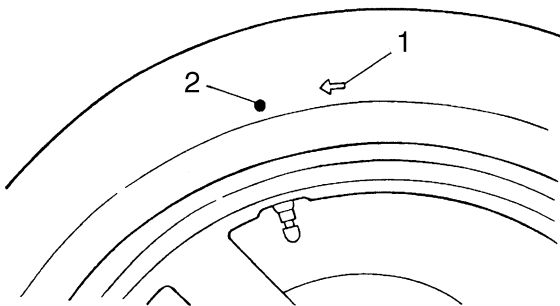
EWA13210

## **WARNING**

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

## **TIP**

- For tires with a direction of rotation mark "1":
- Install the tire with the mark pointing in the direction of wheel rotation.
  - Align the mark "2" with the valve installation point.



EAS30641

## **CHECKING THE WHEEL BEARINGS**

The following procedure applies to all of the wheel bearings.

1. Check:
  - Wheel bearingsRefer to "CHECKING THE FRONT WHEEL" on page 4-10 and "CHECKING THE REAR WHEEL" on page 4-16.

EAS30802

## **CHECKING THE SWINGARM OPERATION**

1. Check:
  - Swingarm operationSwingarm not working properly → Check the swingarm.  
Refer to "SWINGARM" on page 4-72.
2. Check:
  - Swingarm excessive playRefer to "SWINGARM" on page 4-72.

EAS30643

## **LUBRICATING THE SWINGARM PIVOT**

1. Lubricate:
  - Bearings
  - Pivot shaft
  - Dust covers
  - Spacers



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

Refer to "INSTALLING THE SWINGARM" on page 4-73.

EAS31923

## **DRIVE CHAIN SLACK**

### **Checking 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.

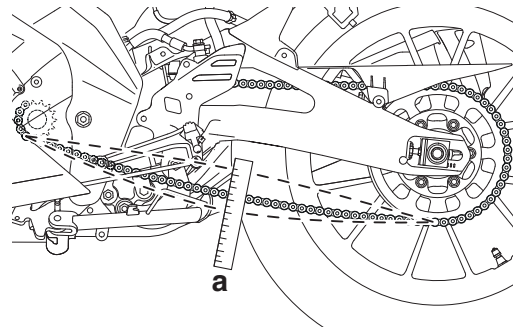
1. Place the vehicle on the sidestand.

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 "a"Out of specification → Adjust.



**Drive chain slack (Sidestand)**  
30.0–40.0 mm (1.18–1.57 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.

## Adjusting the drive chain slack

EWA13120

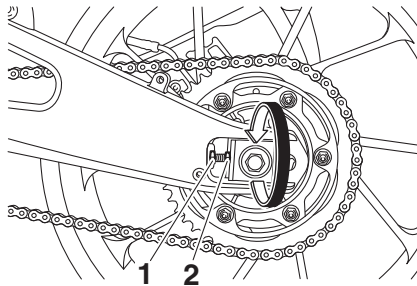


**WARNING**

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

### 1. Adjust:

- Drive chain slack
  - a. Loosen the wheel axle nut.
  - b. Loosen both locknuts "1".
  - c. Turn both adjusting bolts "2" until the specified drive chain slack is obtained.



### TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
  - Push the rear wheel forward to make sure there is no clearance between the drive chain pullers and the ends of the adjusting bolts.
- d. Tighten the wheel axle nut to specification.



**Wheel axle nut**  
**85 N·m (8.5 kgf·m, 63 lb·ft)**

### e. Tighten the locknuts to specification.



**Drive chain adjusting locknut**  
**15 N·m (1.5 kgf·m, 11 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**  
**Engine oil or chain lubricant**  
**suitable for O-ring chains**

EAS30645

## CHECKING AND ADJUSTING THE STEERING HEAD

### 1. Stand the vehicle on a level surface.

EWA13120



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

### TIP

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

### 2. Check:

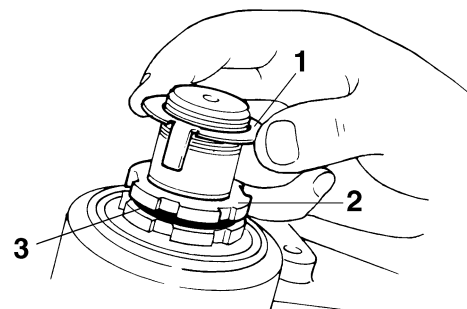
- Steering head  
Grasp the bottom of the front fork legs and gently rock the front fork.  
Binding/looseness → Adjust the steering head.

### 3. Remove:

- Front wheel  
Refer to "FRONT WHEEL" on page 4-8.
- Front forks  
Refer to "FRONT FORK" on page 4-53.
- Handlebar  
Refer to "HANDLEBAR" on page 4-48.
- Upper bracket  
Refer to "STEERING HEAD" on page 4-65.

### 4. Adjust:

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

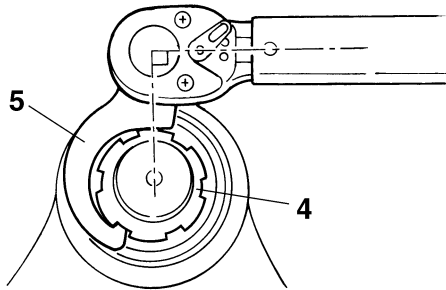


- b. Tighten the lower ring nut "4" with a steering nut wrench "5".

## PERIODIC MAINTENANCE

### TIP

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



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



**Lower ring nut (initial tightening torque)**  
48 N·m (4.8 kgf·m, 35 lb·ft)

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

EWA13140



### WARNING

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

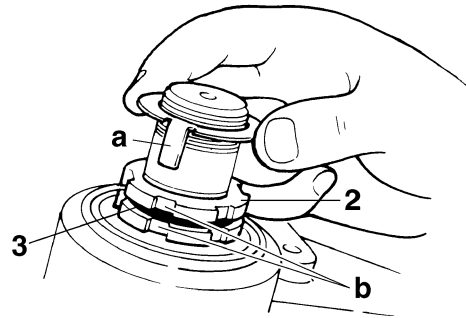


**Lower ring nut (final tightening torque)**  
19 N·m (1.9 kgf·m, 14 lb·ft)

- 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 4-65.
- e. Install the rubber washer “3”.
- f. Install the upper ring nut “2”.
- g. Finger tighten the upper ring nut “2”, and then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.

### TIP

Make sure the lock washer tabs “a” sit correctly in the ring nut slots “b”.



### 5. Install:

- Upper bracket  
Refer to “STEERING HEAD” on page 4-65.
- Handlebar  
Refer to “HANDLEBAR” on page 4-48.
- Front forks  
Refer to “FRONT FORK” on page 4-53.
- Front wheel  
Refer to “FRONT WHEEL” on page 4-8.

EAS30097

### LUBRICATING THE STEERING HEAD

#### 1. Lubricate:

- Upper bearing
- Lower bearing
- Bearing cover
- Dust seal



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

EAS31186

### 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

EAS30649

### 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.



EAS30651

## LUBRICATING THE SIDESTAND

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



EAS30650

## CHECKING THE SIDESTAND

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

EAS30652

## CHECKING THE SIDESTAND SWITCH

Refer to “ELECTRICAL COMPONENTS” on page 8-32.

EAS30653

## CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120



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

2. Check:
  - Inner tube  
Damage/scratches → Replace.
  - Oil seal  
Oil leakage → Replace.
3. Hold the vehicle upright and apply the front brake.
4. Check:
  - Front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.  
Rough movement → Repair.  
Refer to “FRONT FORK” on page 4-53.

EAS30808

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to “CHECKING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-70.

EAS32816

## CHECKING THE CONNECTING ARMS AND RELAY ARM

Refer to “CHECKING THE CONNECTING ARMS AND RELAY ARM” on page 4-70.

EAS30119

## LUBRICATING THE REAR SUSPENSION

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



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:

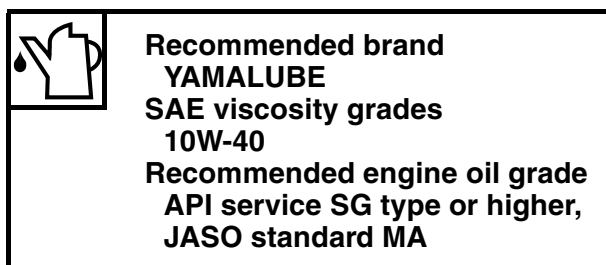
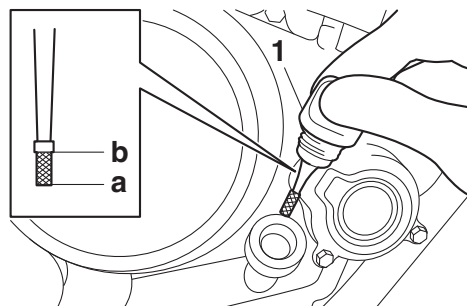
- Engine oil level

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.
- Do not screw the engine oil filler cap (dipstick) “1” in when checking the oil level.



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

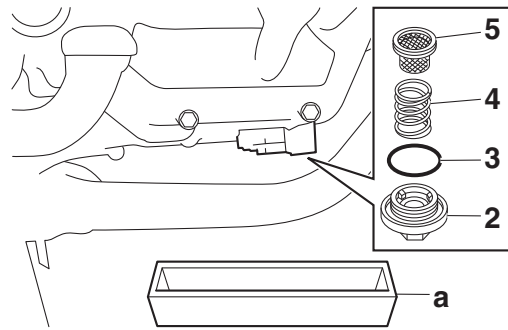
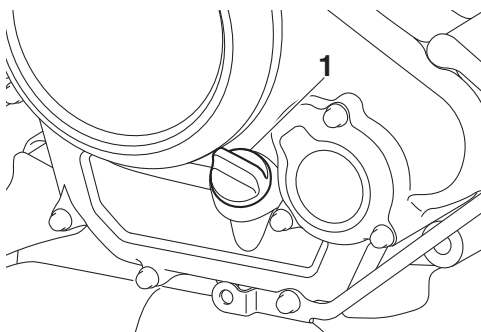
## CHANGING THE ENGINE OIL

1. Remove:
  - Bottom cowlings  
Refer to “GENERAL CHASSIS (3)” on page 4-3.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a oil pan “a” under the engine oil drain plug to collect the used oil.
4. Remove:
  - Engine oil filler cap (dipstick) “1”
  - Engine oil drain plug “2”
  - O-ring “3”
  - Spring “4”
  - Engine oil strainer “5”

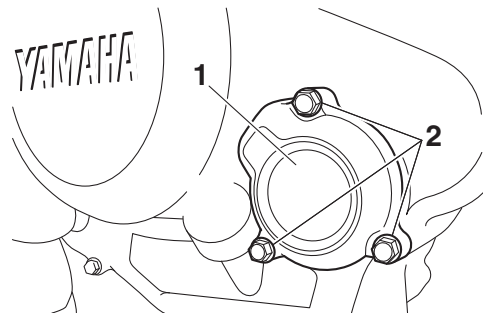
ECA26350

## NOTICE

**When removing the engine oil drain bolt, the O-ring, compression spring, and oil strainer will fall out. Take care not to lose these parts.**



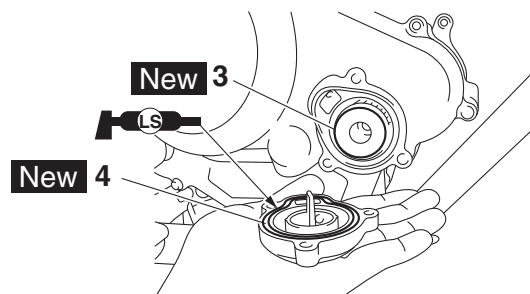
5. Drain:
  - Engine oil  
(completely from the crankcase)
6. If the oil filter element is also to be replaced, perform the following procedure.
  - a. Remove the oil filter element cover “1” by removing the bolts “2”.



- b. Remove and replace the oil filter element “3” and new O-ring “4”.

## TIP

Lubricate the O-ring with lithium-soap-based grease.



- c. Install the oil filter element cover by installing the bolts, then tightening them to the specified torque.

|  |                                                                              |
|--|------------------------------------------------------------------------------|
|  | <b>Oil filter element cover bolt</b><br><b>10 N·m (1.0 kgf·m, 7.4 lb·ft)</b> |
|--|------------------------------------------------------------------------------|

## TIP

Make sure that the O-ring is properly seated.

## PERIODIC MAINTENANCE

### 7. Check:

- Engine oil strainer  
Dirt → Clean.

### 8. Install:

- Engine oil strainer
- Spring
- O-ring **New**
- Engine oil drain plug



**Engine oil drain plug**  
32 N·m (3.2 kgf·m, 24 lb·ft)

### 9. Fill:

- Crankcase  
(with the specified amount of the recommended engine oil)



**Engine oil quantity**  
**Oil change**  
0.85 L (0.90 US qt, 0.75 Imp.qt)  
**With oil filter removal**  
0.95 L (1.00 US qt, 0.84 Imp.qt)  
**Quantity (disassembled)**  
1.05 L (1.11 US qt, 0.92 Imp.qt)

### 10. Install:

- Engine oil filler cap (dipstick)

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

### 12. Check:

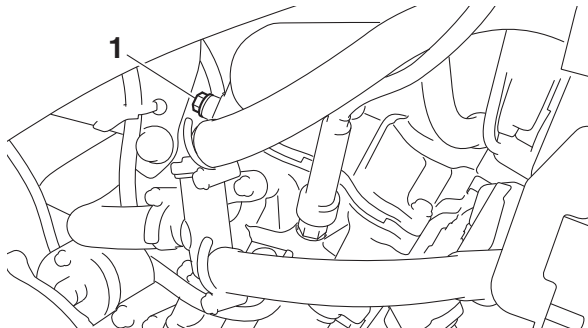
- Engine  
(for engine oil leaks)

### 13. Check:

- Engine oil level  
Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-16.

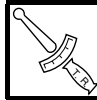
### 14. Check:

- Engine oil pressure  
a. Slightly loosen the oil check bolt "1".



- b. Start the engine and keep it idling until engine oil starts to seep from the oil check bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.

- c. Check the engine oil passages, the oil filter element and the oil pump for damage or leakage.
- d. Start the engine after solving the problem(s) and check the engine oil pressure again.
- e. Tighten the oil check bolt to specification.



**Oil check bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

### 15. Install:

- Bottom cowlings  
Refer to "GENERAL CHASSIS (3)" on page 4-3.

EAS30811

## CHECKING THE COOLANT LEVEL

### 1. Remove:

- Bottom cowlings  
Refer to "GENERAL CHASSIS (3)" on page 4-3.

### 2. Stand the vehicle on a level surface.

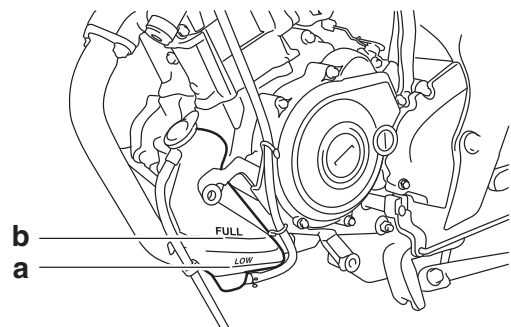
#### TIP

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

### 3. 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.**

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

## TIP

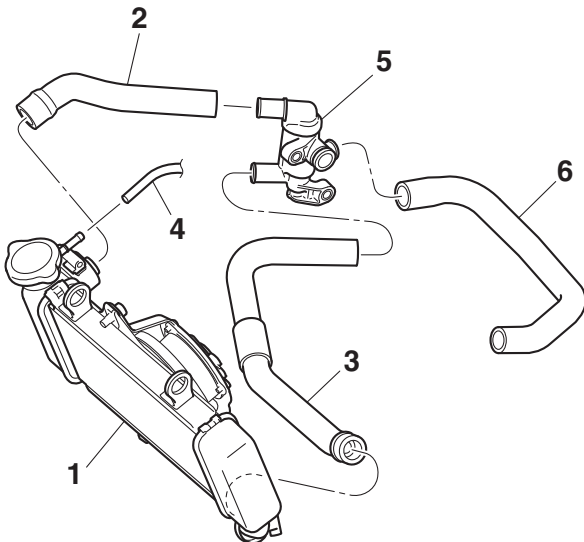
Before checking the coolant level, wait a few minutes until it settles.

6. Install:
  - Bottom cowlings
 Refer to "GENERAL CHASSIS (3)" on page 4-3.

EAS30812

## CHECKING THE COOLING SYSTEM

1. Check:
  - Radiator "1"
  - Radiator inlet hose "2"
  - Radiator outlet hose "3"
  - Coolant reservoir hose "4"
  - Thermostat "5"
  - Water pump inlet hose "6"
 Cracks/damage → Replace.  
 Refer to "RADIATOR AND THERMOSTAT" on page 6-2.



EAS30813

## CHANGING THE COOLANT

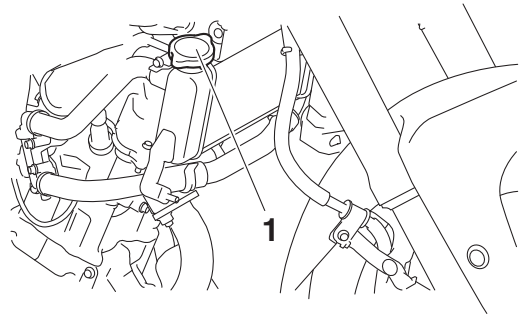
1. Remove:
  - Bottom cowlings
 Refer to "GENERAL CHASSIS (3)" on page 4-3.
2. Remove:
  - Radiator cap "1"

EWA13030

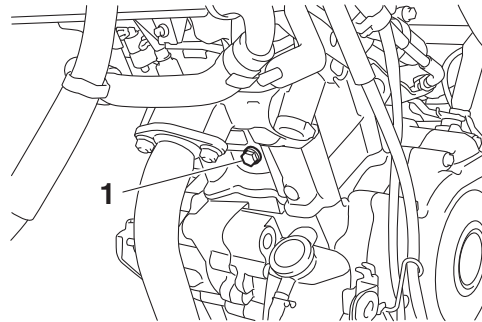
## WARNING

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

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

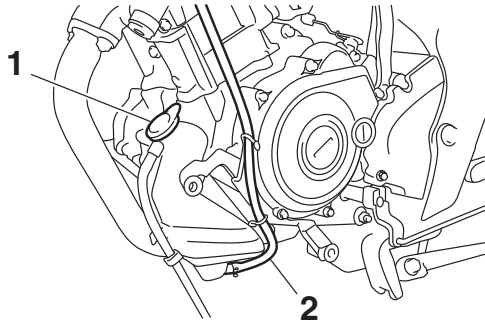


3. Remove:
  - Coolant drain bolt (cylinder side) "1" (along with the copper washer)



4. Drain:
  - Coolant (from the engine and radiator)
5. Remove:
  - Coolant reservoir cap "1"
6. Disconnect:
  - Coolant reservoir hose "2"

## PERIODIC MAINTENANCE



7. Drain:
  - Coolant  
(from the coolant reservoir)
8. Connect:
  - Coolant reservoir hose
9. Install:
  - Coolant drain bolt (cylinder side)  
(along with the copper washer **New**)



**Coolant drain bolt (cylinder side)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

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



**Coolant quantity**  
**Radiator (including all routes)**  
 0.49 L (0.52 US qt, 0.43 Imp. qt)  
**Coolant reservoir (up to the maximum level mark)**  
 0.15 L (0.16 US qt, 0.13 Imp. qt)

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

EWA13040

### **WARNING**

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

ECA13481

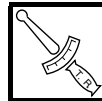
### **NOTICE**

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

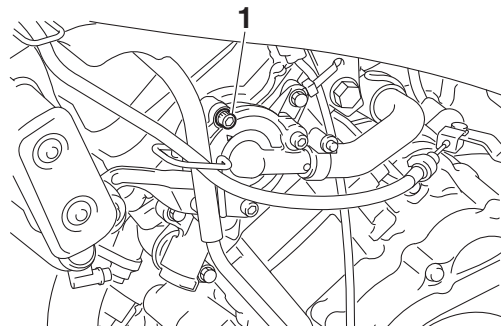
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

### **TIP**

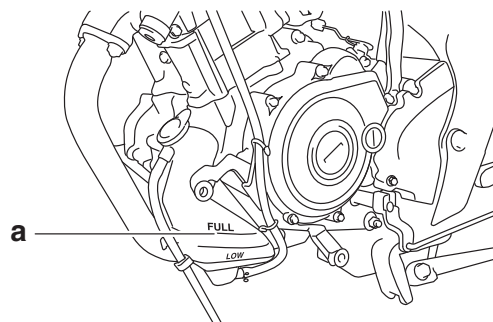
- Fill the coolant into the radiator, and then remove the air bleed bolt "1" until coolant comes out.
- Tighten the air bleed bolt to specification.



**Air bleed bolt (coolant)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)



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



13. Install:
  - Coolant reservoir cap
14. Start the engine, warm it up for several minutes, and then turn it off.
15. Check:
  - Coolant level  
Refer to "CHECKING THE COOLANT LEVEL" on page 3-18.

## TIP

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

## 16. Install:

- Bottom cowlings  
Refer to "GENERAL CHASSIS (3)" on page 4-3.

EAS30082

## CHECKING THE BRAKE LIGHT SWITCHES

### 1. Check:

- Front brake light switch operation
- Rear brake light switch operation  
When operating the brake lever and brake pedal, confirm that the brake light turns on. Faulty → Refer to "CHECKING THE SWITCHES" on page 8-33.

EAS31146

## ADJUSTING THE REAR BRAKE LIGHT SWITCH

## TIP

The rear brake light switch is operated by the movement of the brake pedal.

Adjustment is correct when the brake light comes on by depressing the brake pedal 7.0–13.0 mm (0.28–0.51 in) or more.

### 1. Check:

- Rear brake light operation timing  
Incorrect → Adjust.

### 2. Adjust:

- Rear brake light operation timing  
a. Hold the main body of the rear brake light switch so that it does not rotate and turn the adjusting nut until the rear brake light comes on at the proper time.

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.

EAS30661

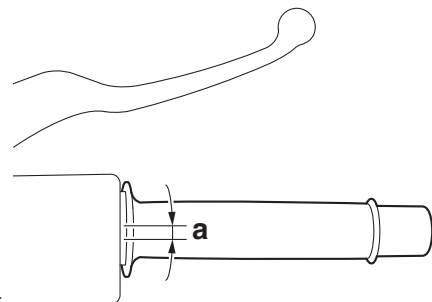
## ADJUSTING THE THROTTLE GRIP FREE PLAY

## TIP

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

### 1. Check:

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



G088895



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

### 2. Adjust:

- Throttle grip free play

### Throttle body side

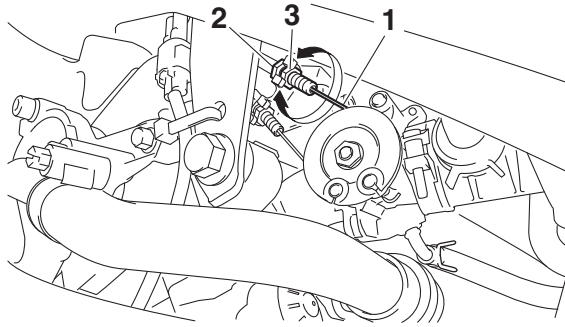
- Loosen the locknut "2" on the accelerator cable "1".
- Turn the adjusting nut "3" to take up any slack on the accelerator cable.
- Tighten the locknut.



**Throttle cable locknut**  
**4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

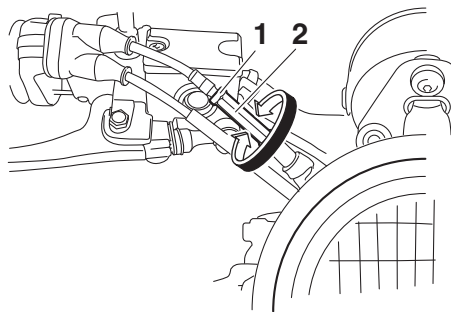
## TIP

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.

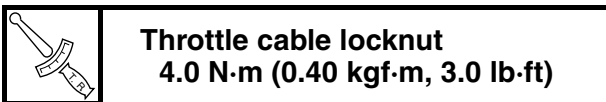


## Handlebar side

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



- Tighten the locknut.



**Throttle cable locknut**  
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

EWA18900



## WARNING

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

EAS30663

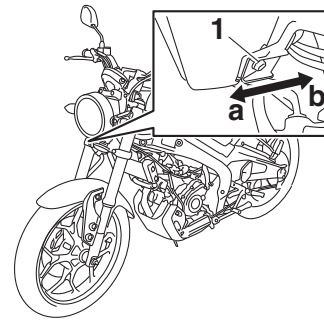
## CHECKING THE SWITCHES, LIGHTS AND SIGNALS

- Check that all switches operate and that all lights come on.  
Refer to "Instrument and control functions" in OWNER'S MANUAL.  
Faulty → Refer to "CHECKING THE SWITCHES" on page 8-33 and "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).

EAS30664

## ADJUSTING THE HEADLIGHT BEAM

- Adjust:
  - Headlight beam (vertically)
    - Loosen the bolt "1".
    - Adjust to the position "a" or "b".



- Tighten the bolt.

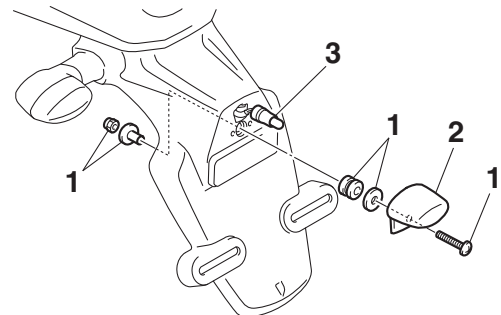


**Bolt**  
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)

EAS31831

## REPLACING THE LICENSE PLATE LIGHT BULB

- Remove:
  - License plate light unit nut/screw/washer/collar/grommet "1"
  - License plate light unit "2"
- Remove the license plate light bulb socket (together with the bulb) "3" by pulling it out.
- Remove the license plate light bulb by pulling it out.



- Install:
  - License plate light bulb **New**
- Install:
  - License plate light unit
  - License plate light unit grommet/collar/washer/screw/nut



**License plate light unit screw**  
1.0 N·m (0.10 kgf·m, 0.73 lb·ft)



---

## CHASSIS

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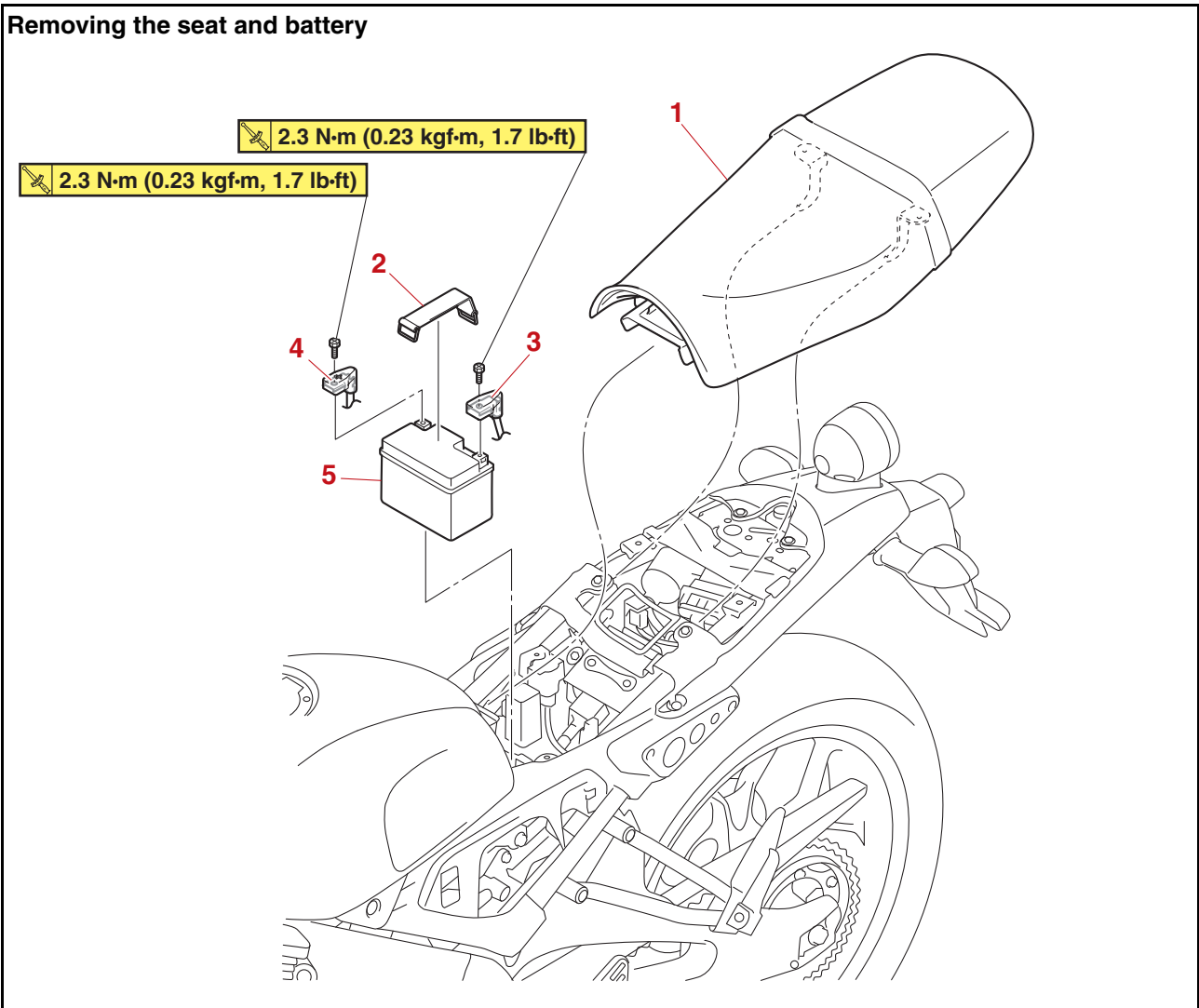
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EAS20026

GENERAL CHASSIS (1)

Removing the seat and battery

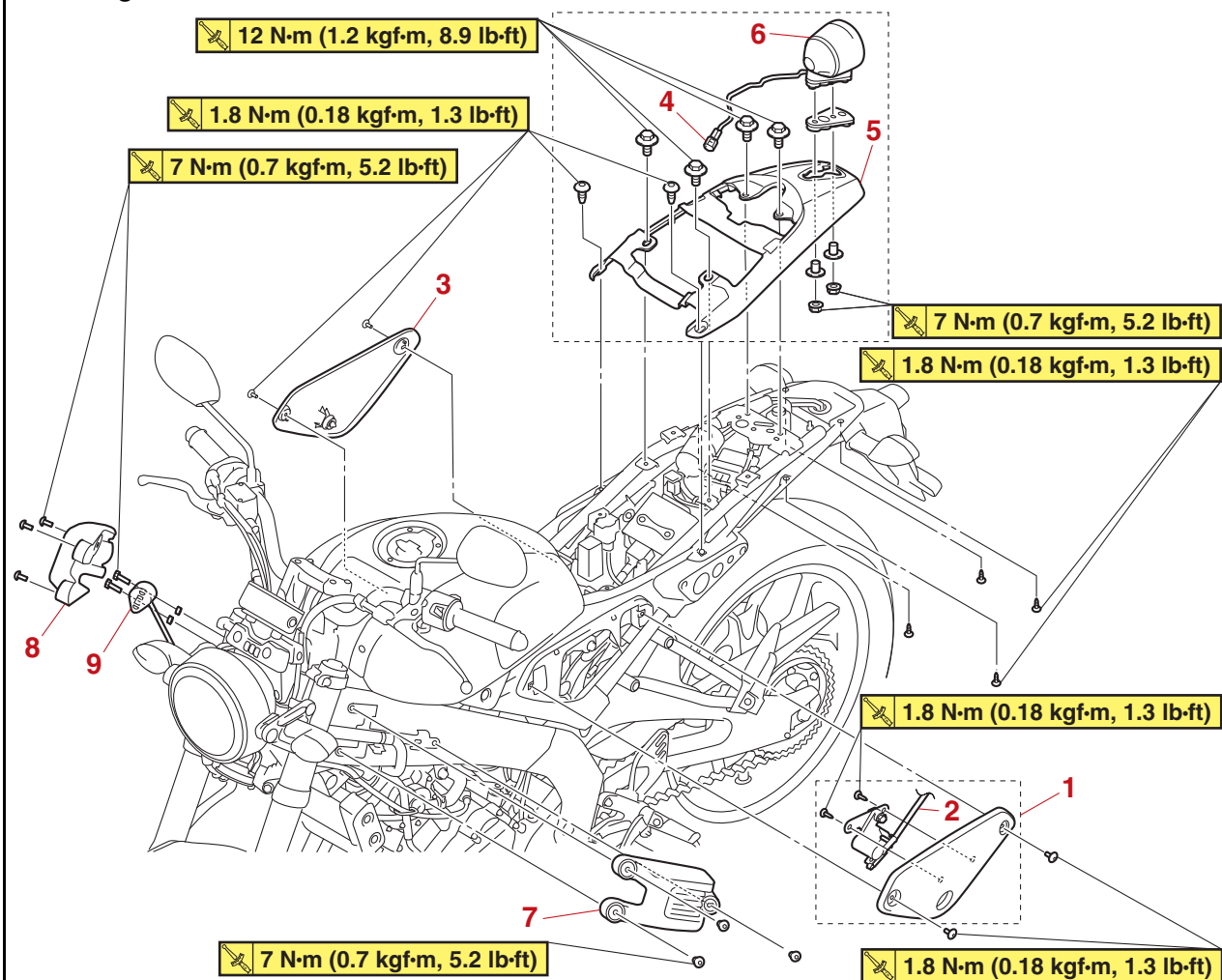


| Order | Job/Parts to remove   | Q'ty | Remarks     |
|-------|-----------------------|------|-------------|
| 1     | Seat                  | 1    |             |
| 2     | Battery band          | 1    |             |
| 3     | Negative battery lead | 1    | Disconnect. |
| 4     | Positive battery lead | 1    | Disconnect. |
| 5     | Battery               | 1    |             |

EAS20155

## GENERAL CHASSIS (2)

### Removing the side covers and rear fender cover

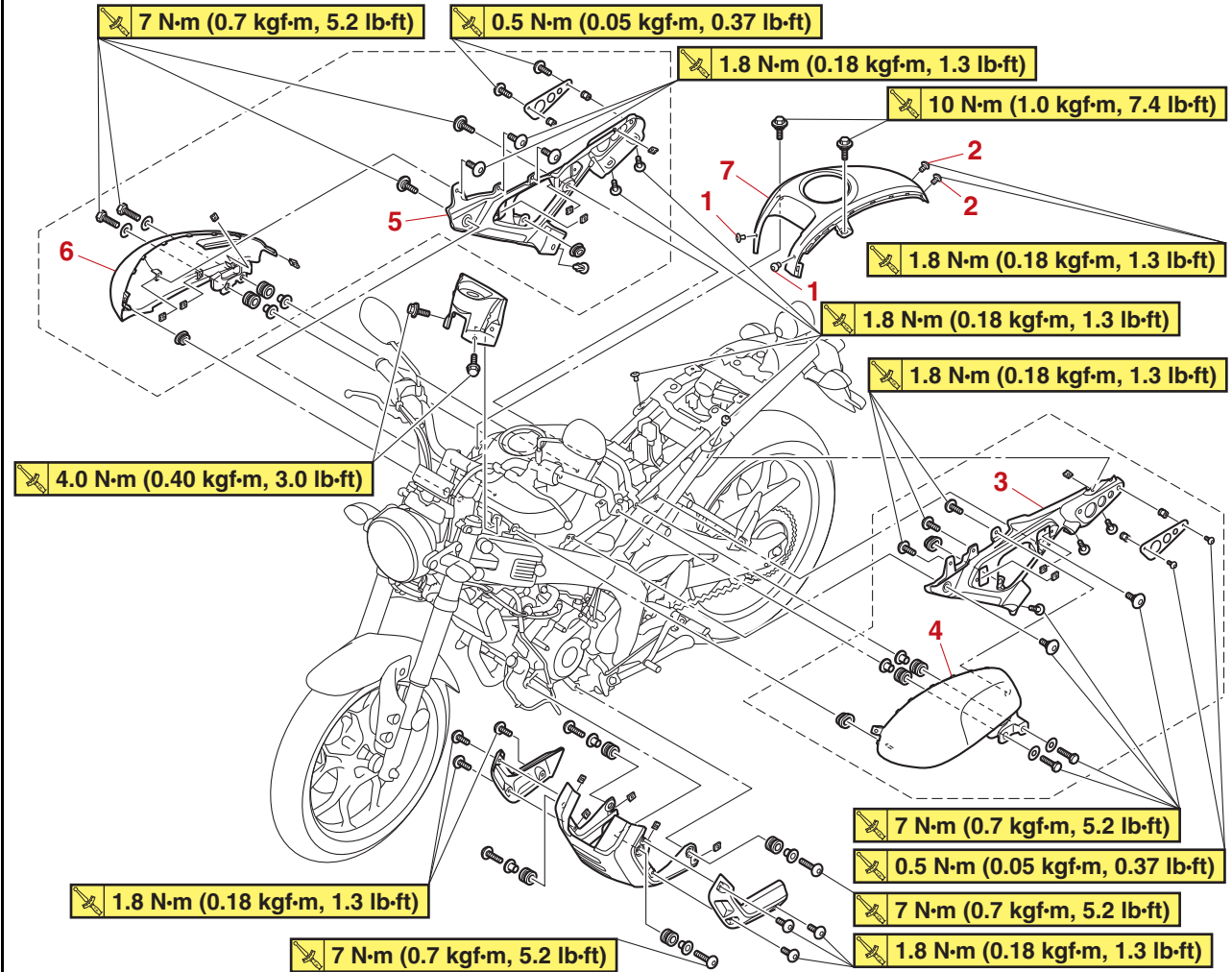


| Order | Job/Parts to remove      | Q'ty | Remarks                                                          |
|-------|--------------------------|------|------------------------------------------------------------------|
|       | Seat                     |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.                      |
| 1     | Upper side cover (left)  | 2    |                                                                  |
| 2     | Seat lock cable          | 1    | Disconnect.                                                      |
| 3     | Upper side cover (right) | 1    |                                                                  |
| 4     | Tail/brake light coupler | 1    | Disconnect.                                                      |
| 5     | Rear fender cover        | 1    | <b>TIP</b>                                                       |
| 6     | Tail/brake light         | 1    | Remove the rear fender cover together with the tail/brake light. |
| 7     | Air scoop (left)         | 1    |                                                                  |
| 8     | Air scoop (right)        | 1    |                                                                  |
| 9     | Ignition coil            | 1    |                                                                  |

EAS20156

## GENERAL CHASSIS (3)

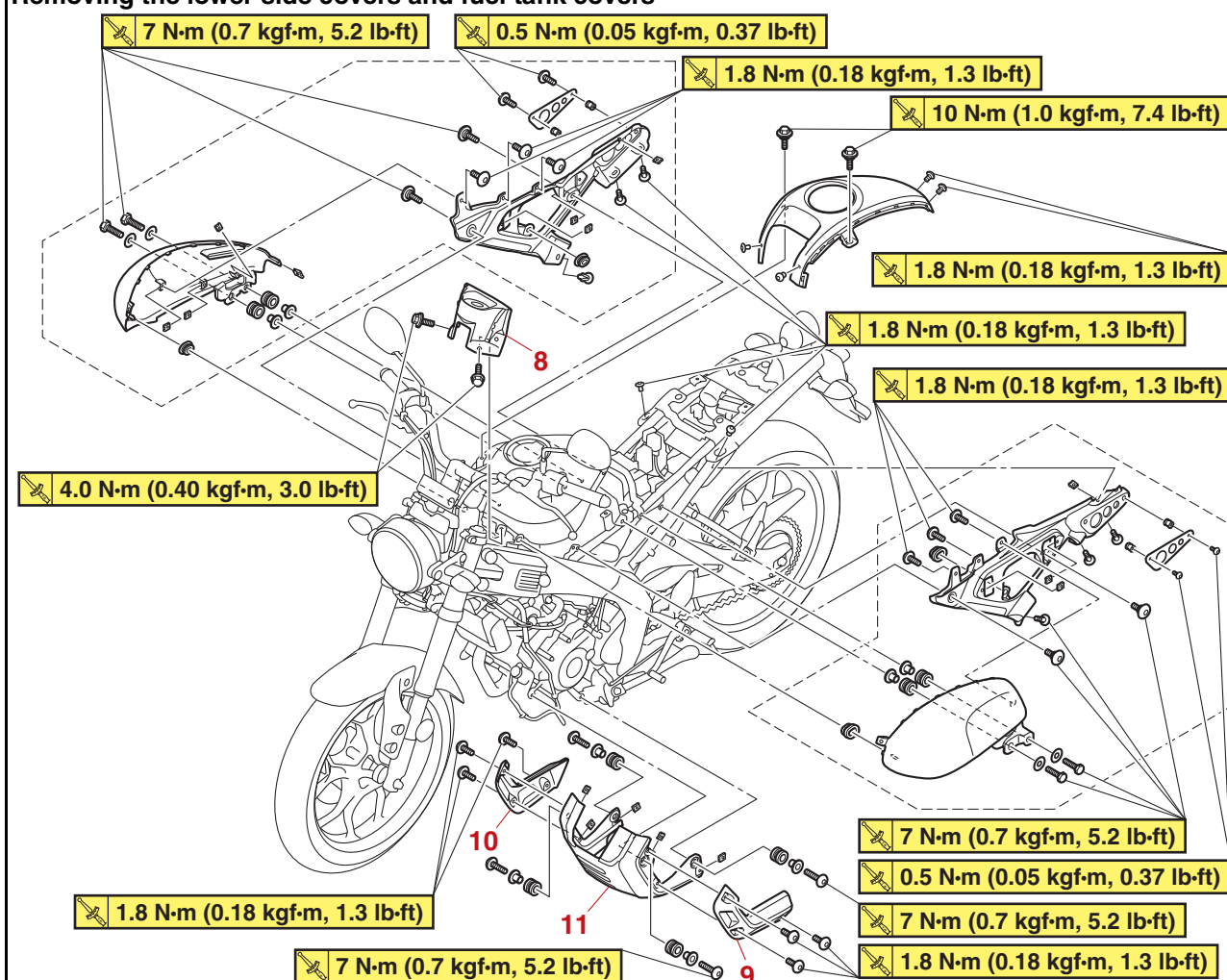
### Removing the lower side covers and fuel tank covers



| Order | Job/Parts to remove                | Q'ty | Remarks                                                                             |
|-------|------------------------------------|------|-------------------------------------------------------------------------------------|
|       | Seat                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.                                         |
|       | Upper side covers (left and right) |      | Refer to "GENERAL CHASSIS (2)" on page 4-2.                                         |
| 1     | Quick fastener                     | 2    |                                                                                     |
| 2     | Screw                              | 2    |                                                                                     |
| 3     | Lower side cover (left)            | 1    | <b>TIP</b>                                                                          |
| 4     | Fuel tank side cover (left)        | 1    | Remove the lower side cover (left) together with the fuel tank side cover (left).   |
| 5     | Lower side cover (right)           | 1    | <b>TIP</b>                                                                          |
| 6     | Fuel tank side cover (right)       | 1    | Remove the lower side cover (right) together with the fuel tank side cover (right). |
| 7     | Fuel tank center cover             | 1    |                                                                                     |

## GENERAL CHASSIS (3)

### Removing the lower side covers and fuel tank covers

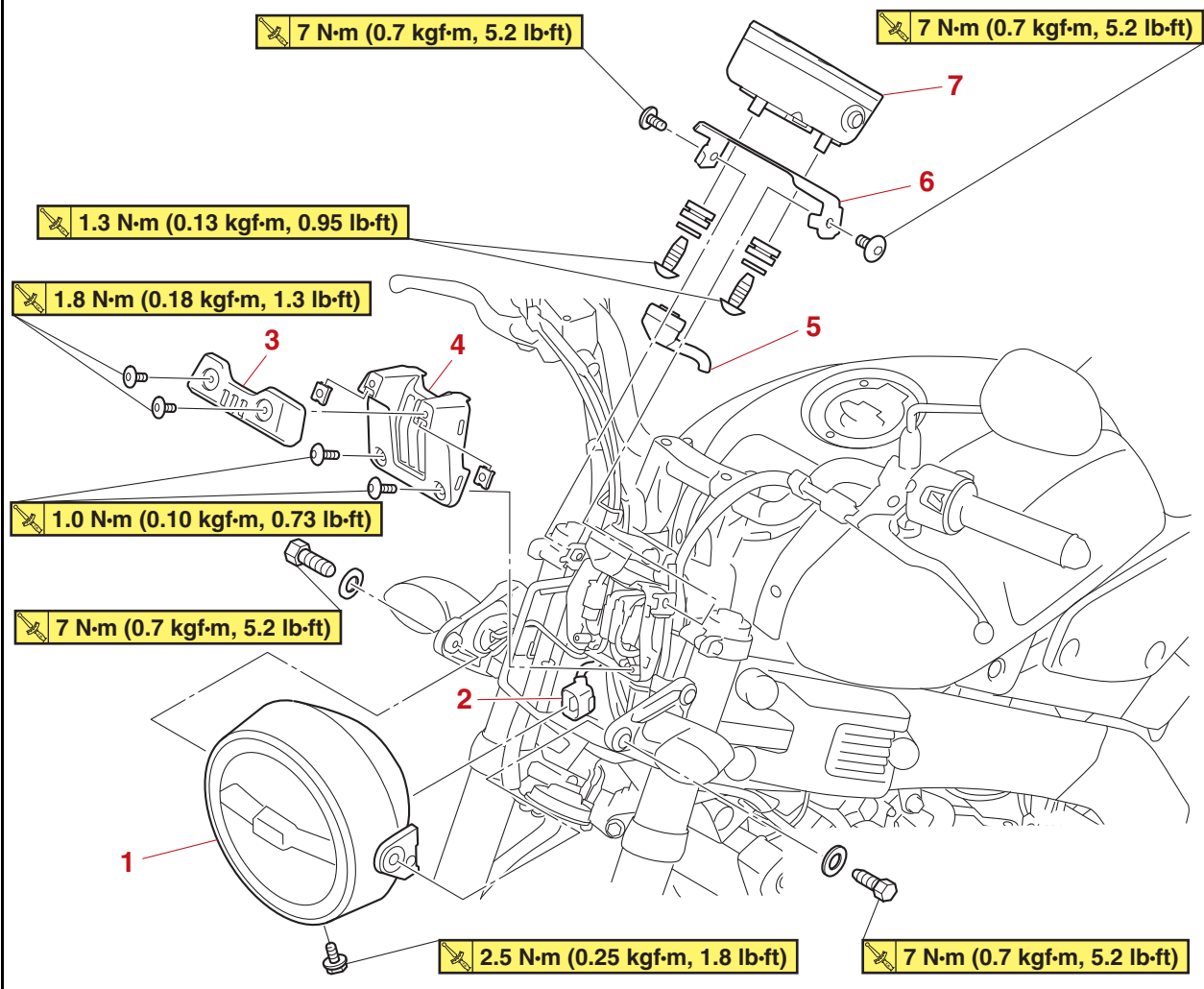


| Order | Job/Parts to remove     | Q'ty | Remarks |
|-------|-------------------------|------|---------|
| 8     | Main switch cover       | 1    |         |
| 9     | Bottom cowling (left)   | 1    |         |
| 10    | Bottom cowling (right)  | 1    |         |
| 11    | Bottom cowling (center) | 1    |         |

EAS20157

## GENERAL CHASSIS (4)

Removing the meter assembly and headlight assembly

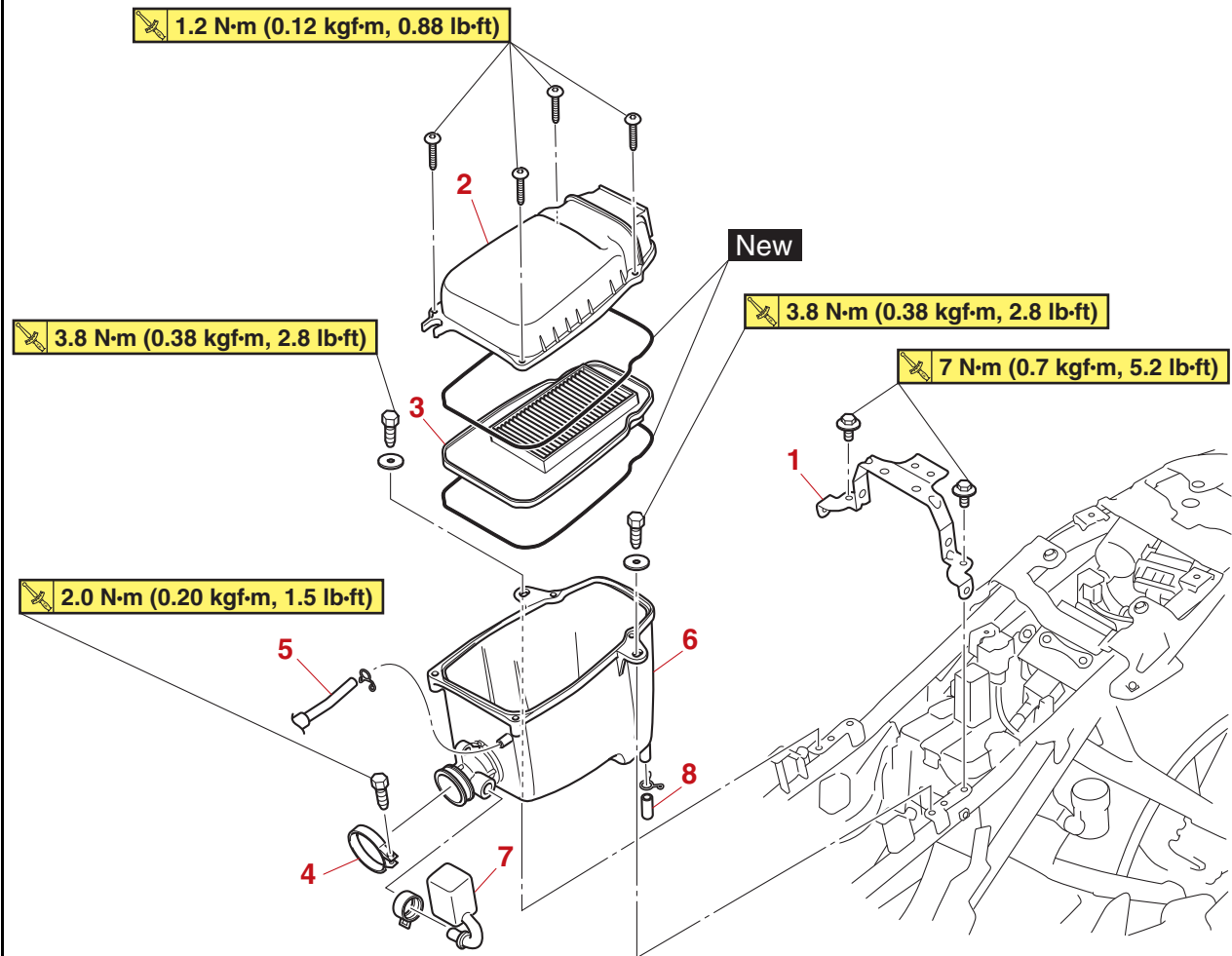


| Order | Job/Parts to remove     | Q'ty | Remarks     |
|-------|-------------------------|------|-------------|
| 1     | Headlight assembly      | 1    |             |
| 2     | Headlight coupler       | 1    | Disconnect. |
| 3     | Meter assembly cover    | 1    |             |
| 4     | Connector cover (front) | 1    |             |
| 5     | Meter assembly coupler  | 1    | Disconnect. |
| 6     | Meter assembly bracket  | 1    |             |
| 7     | Meter assembly          | 1    |             |

EAS20158

## GENERAL CHASSIS (5)

### Removing the air filter case



| Order | Job/Parts to remove                                | Q'ty | Remarks                                     |
|-------|----------------------------------------------------|------|---------------------------------------------|
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3. |
|       | Fuel tank                                          |      | Refer to "FUEL TANK" on page 7-1.           |
| 1     | Seat bracket                                       | 1    |                                             |
| 2     | Air filter case cover                              | 1    |                                             |
| 3     | Air filter                                         | 1    |                                             |
| 4     | Air filter case joint clamp screw                  | 1    | Loosen.                                     |
| 5     | Cylinder head breather hose                        | 1    | Disconnect.                                 |
| 6     | Air filter case                                    | 1    |                                             |
| 7     | Resonator                                          | 1    |                                             |
| 8     | Air filter check hose                              | 1    |                                             |

EAS30968

### INSTALLING THE AIR FILTER CASE

1. Install:

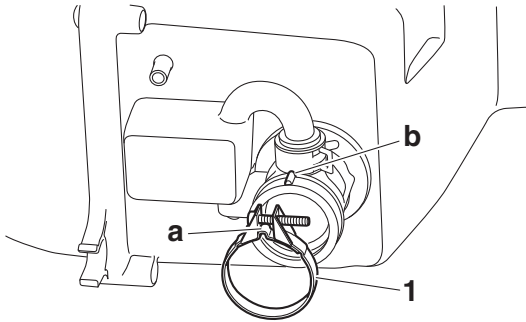
- Air filter case joint clamp “1”



**Air filter case joint clamp screw**  
**2.0 N·m (0.20 kgf·m, 1.5 lb·ft)**

#### TIP

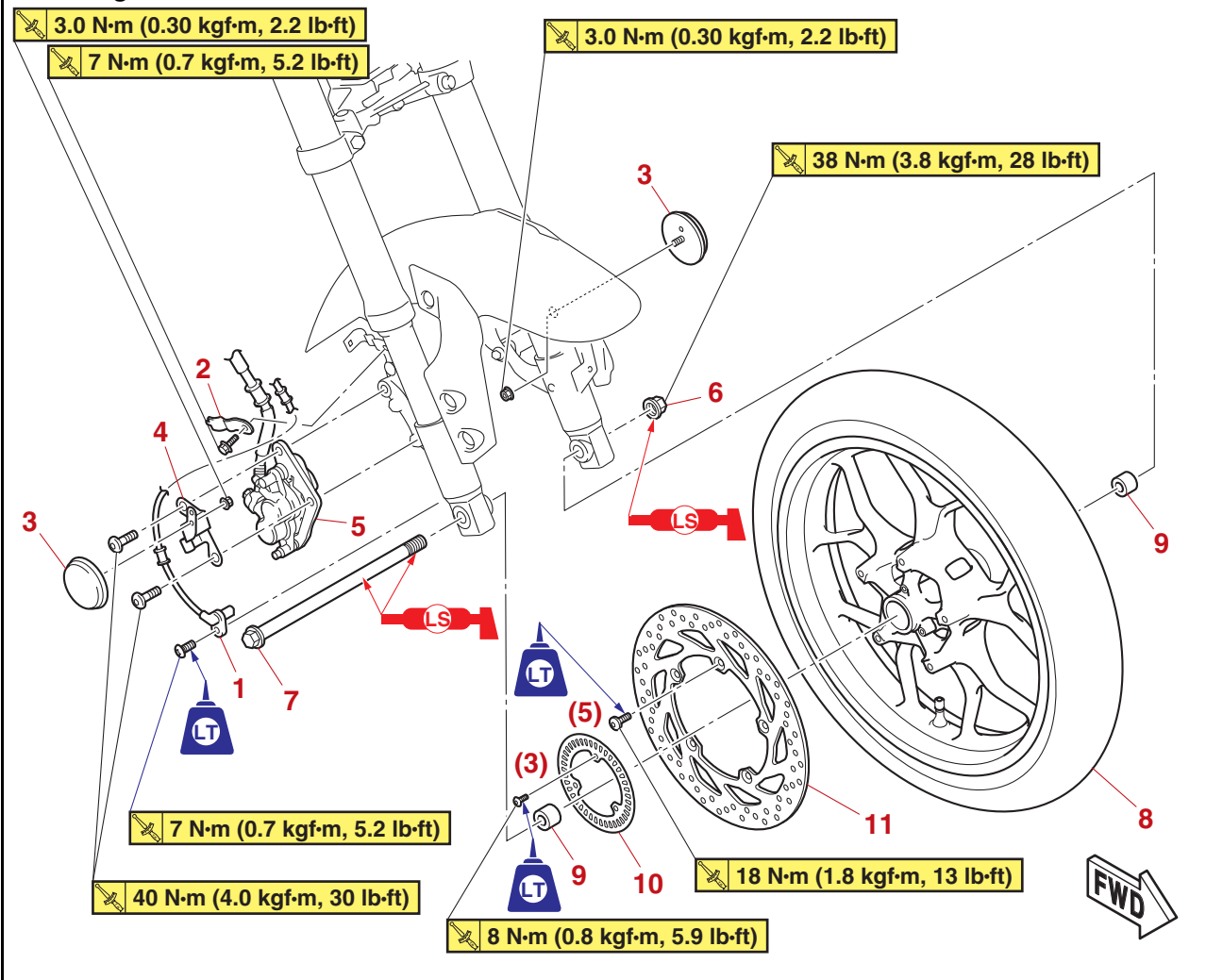
Align the slot “a” in the air filter case joint clamp with the projection “b” on the air filter case.



EAS20028

## FRONT WHEEL

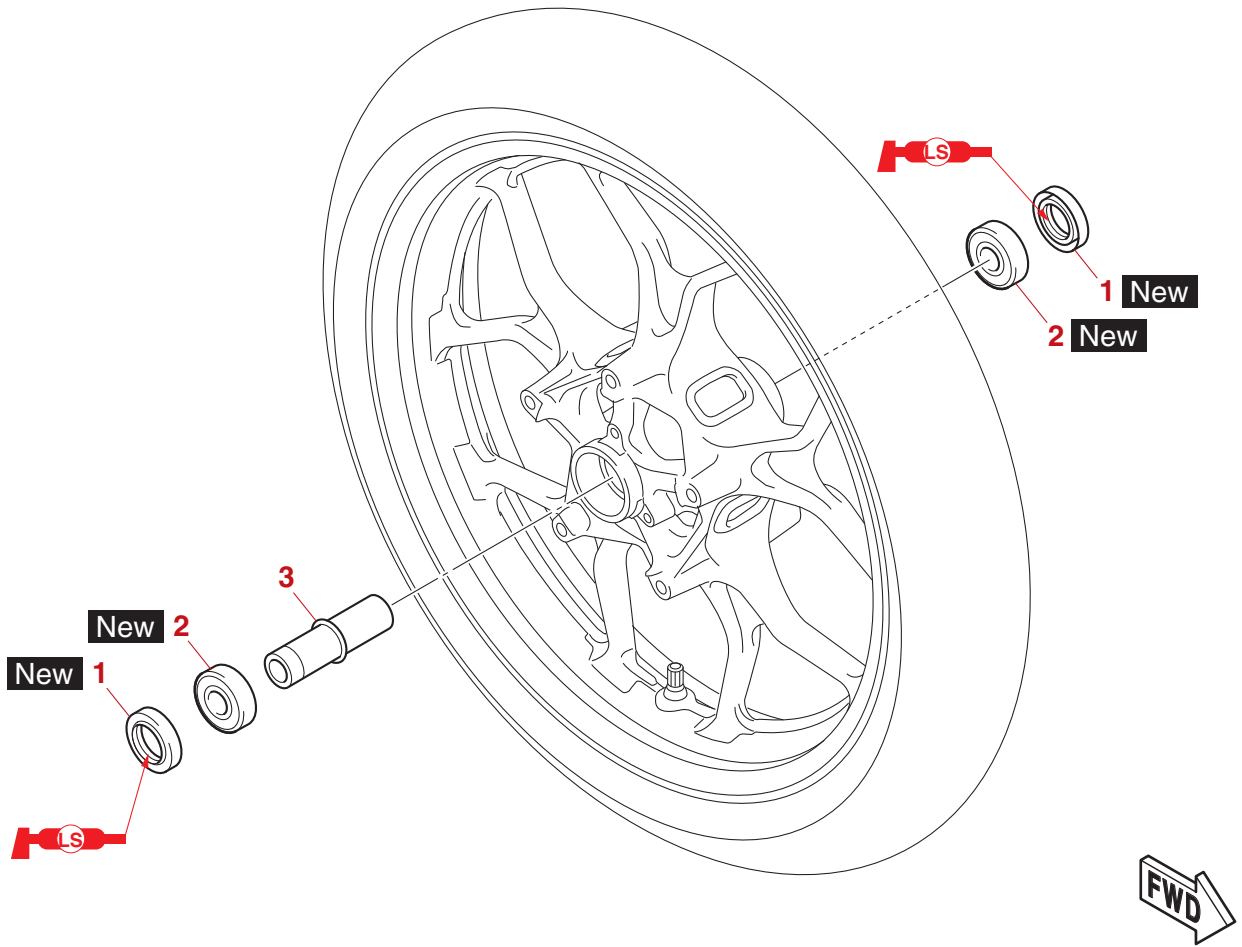
### Removing the front wheel and brake disc



| Order | Job/Parts to remove              | Q'ty | Remarks                                                                                  |
|-------|----------------------------------|------|------------------------------------------------------------------------------------------|
|       |                                  |      | <b>TIP</b><br>Place the vehicle on a suitable stand so that the front wheel is elevated. |
| 1     | Front wheel sensor               | 1    |                                                                                          |
| 2     | Front brake hose holder 1        | 1    |                                                                                          |
| 3     | Front reflector (left and right) | 2    |                                                                                          |
| 4     | Front reflector bracket (right)  | 1    |                                                                                          |
| 5     | Front brake caliper              | 1    |                                                                                          |
| 6     | Front wheel axle nut             | 1    |                                                                                          |
| 7     | Front wheel axle                 | 1    |                                                                                          |
| 8     | Front wheel                      | 1    |                                                                                          |
| 9     | Collar                           | 2    |                                                                                          |
| 10    | Front wheel sensor rotor         | 1    |                                                                                          |
| 11    | Front brake disc                 | 1    |                                                                                          |

# FRONT WHEEL

## Disassembling the front wheel



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

EAS30145

## REMOVING THE FRONT WHEEL (DISC)

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 wheel sensor
  - Front brake hose holder
  - Front brake caliper

ECA26620

### NOTICE

- Do not apply the brake lever when removing the brake caliper.
- Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the inner tube.

3. Elevate:
  - Front wheel

### TIP

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

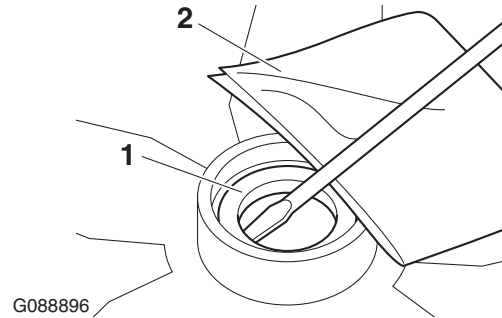
EAS30146

## 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

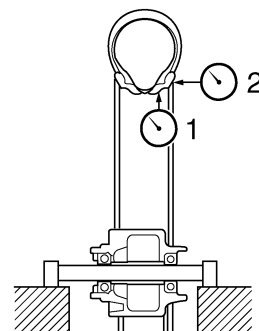
### WARNING

Do not attempt to straighten a bent wheel axle.

2. Check:
  - Tire
  - Front wheel
    - Damage/wear → Replace.
    - Refer to "CHECKING THE TIRES" on page 3-12 and "CHECKING THE WHEELS" on page 3-12.
3. Measure:
  - Radial wheel runout "1"
  - Lateral wheel runout "2"
  - Over the specified limits → Replace.



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



4. Check:
  - Wheel bearings
    - Front wheel turns roughly or is loose → Replace the wheel bearings.

- Oil seals  
Damage/wear → Replace.

EAS30155

## MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

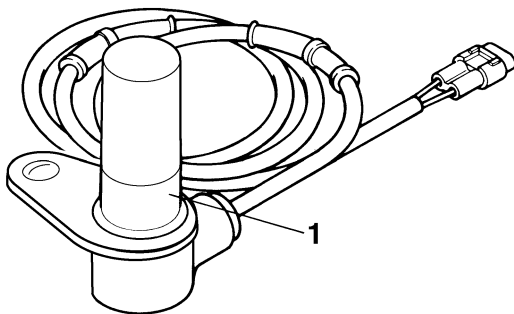
ECA21070

### 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 "1"  
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.

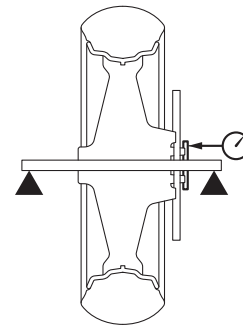


**Wheel sensor rotor deflection limit**  
**0.25 mm (0.0098 in)**

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

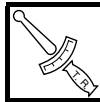
#### TIP

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



G088901

- 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

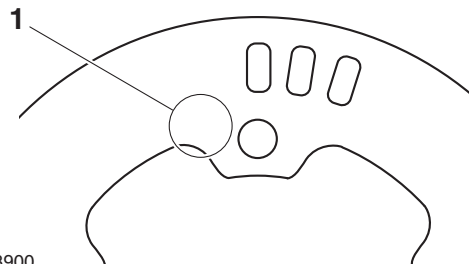
### NOTICE

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

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

#### TIP

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



G088900

EAS30151

## ASSEMBLING THE FRONT WHEEL

ECA21340

### NOTICE

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

#### 1. Install:

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

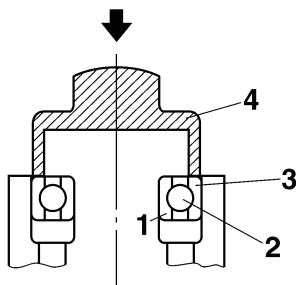
ECA18110

### NOTICE

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

#### TIP

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

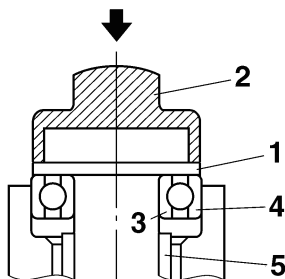


G088898

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

#### TIP

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



G088899

- d. Install the new oil seals.

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:

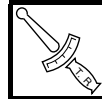
- Front wheel static balance

EAS30932

## INSTALLING THE FRONT WHEEL

#### 1. Install:

- Front brake disc
- Front wheel sensor rotor



**Front brake disc bolt**  
18 N·m (1.8 kgf·m, 13 lb·ft)

**LOCTITE®**

**Front wheel sensor rotor bolt**  
8 N·m (0.8 kgf·m, 5.9 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 facing outward.
- Tighten the brake disc bolts in stages and in a crisscross pattern.

#### 2. Check:

- Front brake disc  
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-25.

#### 3. Lubricate:

- Front wheel axle
- Front wheel axle nut
- Oil seal lip

# FRONT WHEEL

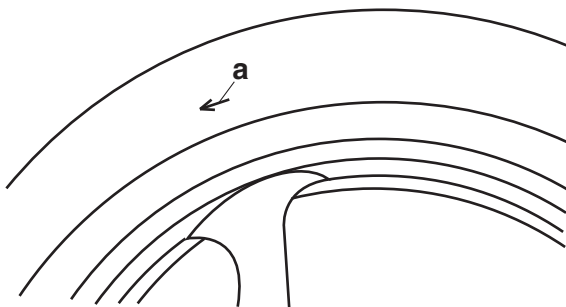


**Recommended lubricant**  
**Lithium-soap-based grease**

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

## TIP

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



5. Tighten:
- Front wheel axle nut



**Front wheel axle nut**  
**38 N·m (3.8 kgf·m, 28 lb·ft)**

6. Install:
- Front wheel sensor



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

ECA21020

## NOTICE

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

## TIP

- When installing the front wheel sensor, check the wheel sensor lead for twists.
- To route the front wheel sensor lead, refer to “CABLE ROUTING” on page 2-13.

7. 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.



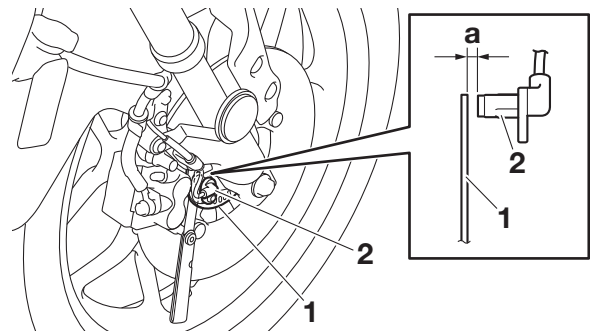
**Distance “a” (between the front wheel sensor rotor and front wheel sensor)**  
**0.6–1.7 mm (0.02–0.07 in)**

## 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**



8. Install:
- Front brake caliper
  - Front wheel sensor lead holder
  - Front brake hose holder “1”



**Front brake caliper bolt**  
**40 N·m (4.0 kgf·m, 30 lb·ft)**  
**Front brake hose holder bolt**  
**7 N·m (0.7 kgf·m, 5.2 lb·ft)**

EWA13500

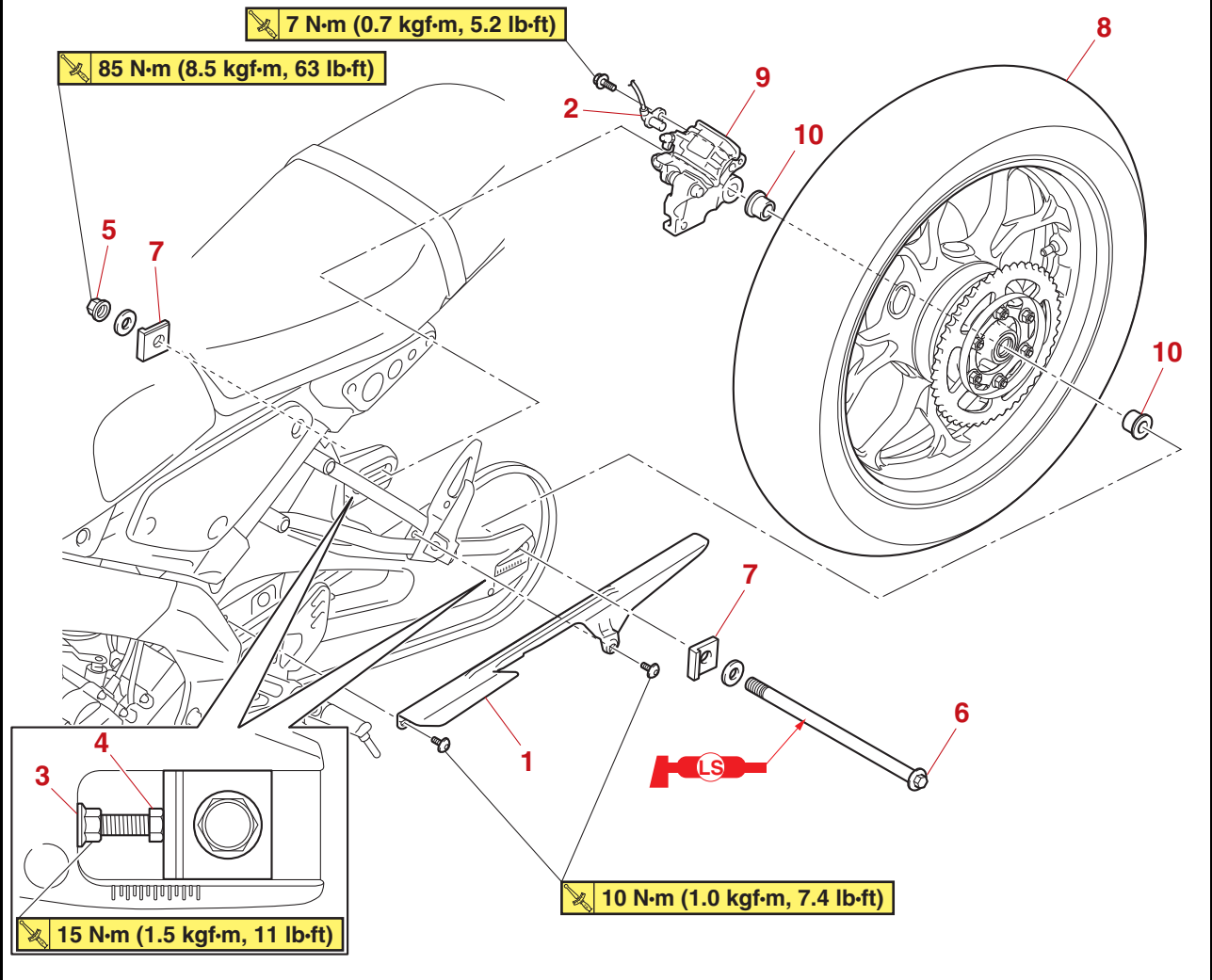
## WARNING

**Make sure the brake hose is routed properly.**

EAS20029

REAR WHEEL

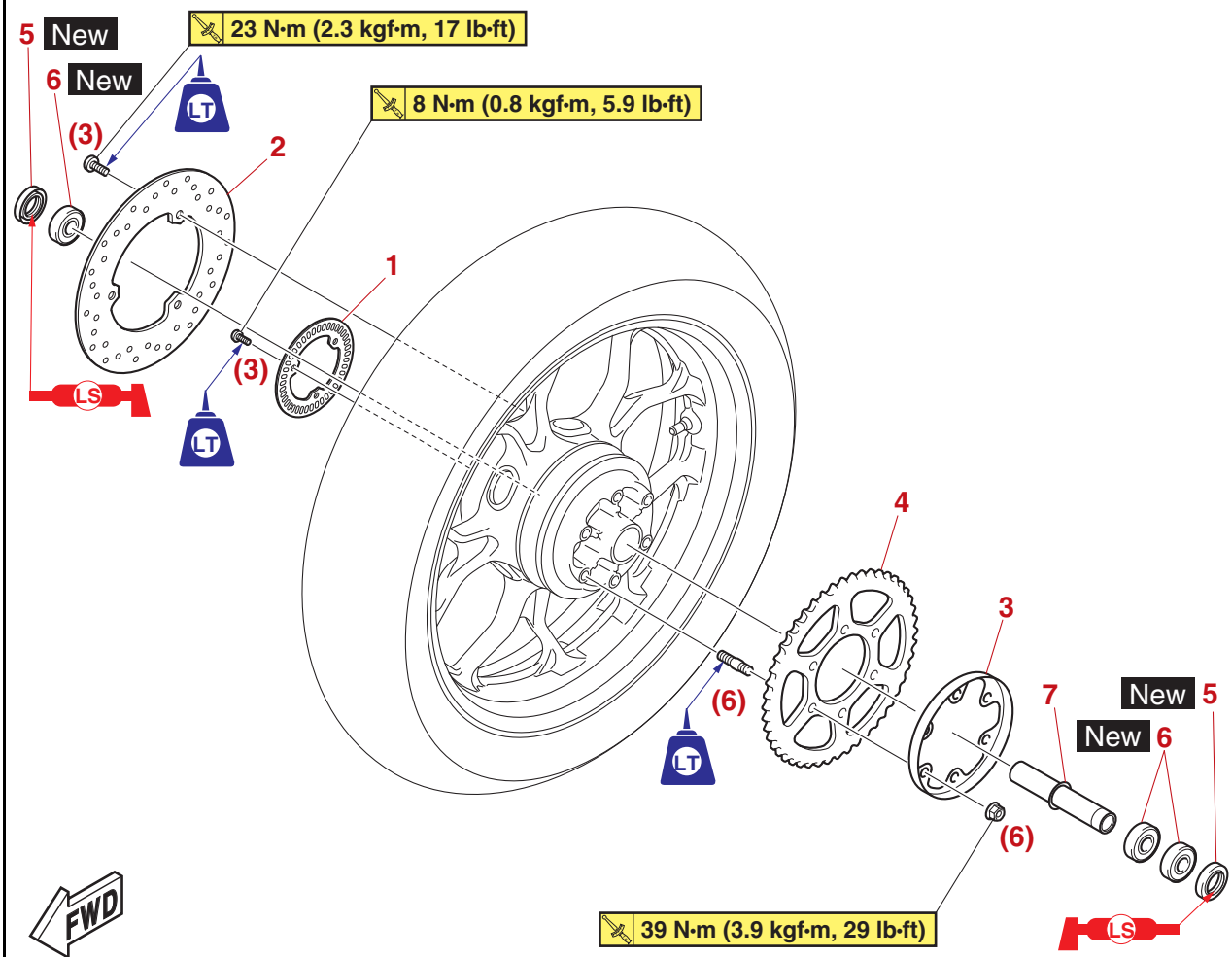
Removing the rear wheel



| Order | Job/Parts to remove                           | Q'ty | Remarks                                                                                       |
|-------|-----------------------------------------------|------|-----------------------------------------------------------------------------------------------|
|       |                                               | 1    | <b>TIP</b> _____<br>Place the vehicle on a suitable stand so that the rear wheel is elevated. |
| 1     | Drive chain guard                             | 1    |                                                                                               |
| 2     | Rear wheel sensor                             | 1    |                                                                                               |
| 3     | Drive chain adjusting locknut                 | 2    | Loosen.                                                                                       |
| 4     | Drive chain adjusting bolt                    | 2    | Loosen.                                                                                       |
| 5     | Rear wheel axle nut                           | 1    |                                                                                               |
| 6     | Rear wheel axle                               | 1    |                                                                                               |
| 7     | Drive chain puller                            | 2    |                                                                                               |
| 8     | Rear wheel                                    | 1    |                                                                                               |
| 9     | Rear brake caliper/Rear brake caliper bracket | 1    |                                                                                               |
| 10    | Collar                                        | 2    |                                                                                               |

## REAR WHEEL

## Disassembling the rear wheel



| Order | Job/Parts to remove     | Q'ty | Remarks |
|-------|-------------------------|------|---------|
| 1     | Rear wheel sensor rotor | 1    |         |
| 2     | Brake disc              | 1    |         |
| 3     | Spacer                  | 1    |         |
| 4     | Drive sprocket          | 1    |         |
| 5     | Oil seal                | 2    |         |
| 6     | Bearing                 | 3    |         |
| 7     | Collar                  | 1    |         |

EAS30156

## REMOVING THE REAR WHEEL (DISC BRAKE)

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.

### TIP

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

2. Remove:
  - Rear wheel sensor

ECA26630

### NOTICE

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:
  - Wheel axle nut
  - Washers
  - Wheel axle
  - Drive chain pullers
  - Rear wheel
  - Rear brake caliper/Rear brake caliper bracket
  - Collars

ECA21470

### NOTICE

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

### TIP

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

EAS30158

## DISASSEMBLING THE REAR WHEEL

1. Remove:

- Oil seals
- Wheel bearings
- Spacer

Refer to "DISASSEMBLING THE FRONT WHEEL" on page 4-10.

EAS30159

## CHECKING THE REAR WHEEL

1. Check:

- Rear wheel axle
- Wheel bearings
- Oil seals

Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

2. Check:

- Tire
- Rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" on page 3-12 and "CHECKING THE WHEELS" on page 3-12.

3. Measure:

- Radial wheel runout
- Lateral wheel runout

Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

EAS30161

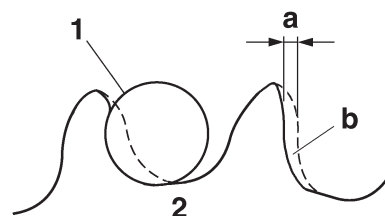
## CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:

- Rear wheel sprocket

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

Bent teeth → Replace the drive chain sprockets as a set.



- b. Correct

1. Drive chain roller
2. Rear wheel sprocket

2. Replace:

- Rear wheel sprocket

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



**Rear wheel sprocket nut**  
39 N·m (3.9 kgf·m, 29 lb·ft)

## TIP

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 4-11.

### 2. Check:

- Rear wheel sensor rotor  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

### 3. Measure:

- Wheel sensor rotor deflection  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.



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

EAS30163

## ASSEMBLING THE REAR WHEEL

### 1. Install:

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

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

EAS30164

## ADJUSTING THE REAR WHEEL STATIC BALANCE

### TIP

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

### 1. Adjust:

- Rear wheel static balance  
Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-12.

EAS30165

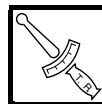
## INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

### 1. Install:

- Rear wheel sprocket
- Rear wheel sprocket spacer  
Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-16.

### 2. Install:

- Rear brake disc
- Rear wheel sensor rotor



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

**Rear wheel sensor rotor bolt**  
8 N·m (0.8 kgf·m, 5.9 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 facing outward.

## 3. Check:

- Rear brake disc  
Refer to "CHECKING THE REAR BRAKE DISC" on page 4-35.

## 4. Lubricate:

- Oil seal lips
- Wheel axle

## TIP

Do not lubricate the thread of the wheel axle.



## 5. Install:

- Collars
- Rear brake caliper/Rear brake caliper bracket
- Rear wheel
- Drive chain pullers
- Wheel axle
- Washers
- Wheel axle nut

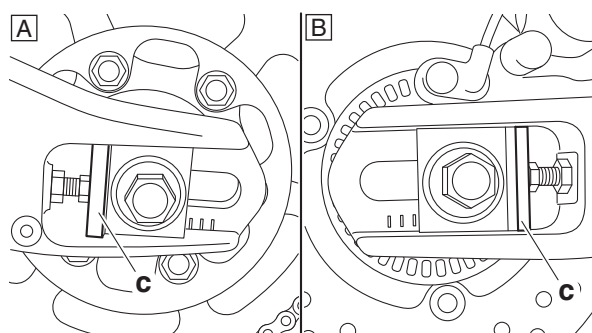
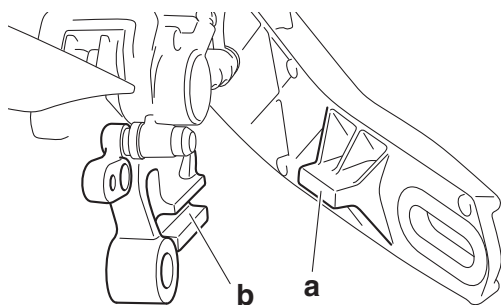
EWA13500



**Make sure the brake hose is routed properly.**

## TIP

- Align the projection "a" in the swingarm with the slot "b" of the brake caliper bracket.
- Install the drive chain puller so that projection "c" faces to the front of the vehicle.



A. Left side

## B. Right side

## 6. Adjust:

- Drive chain slack  
Refer to "Adjusting the drive chain slack" on page 3-14.



**Drive chain slack (Sidestand)**  
30.0–40.0 mm (1.18–1.57 in)

## 7. Tighten:

- Wheel axle nut



**Rear wheel axle nut**  
85 N·m (8.5 kgf·m, 63 lb·ft)

## 8. 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 2-13.

## 9. 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 (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.



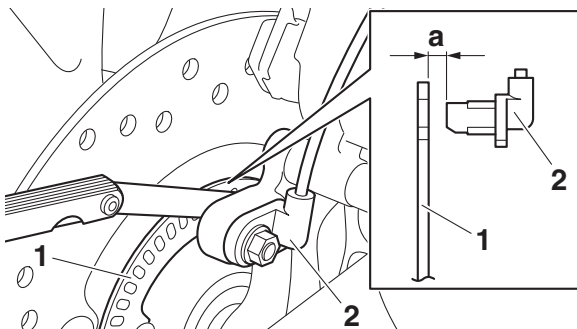
**Distance "a" (between the rear wheel sensor rotor and rear wheel sensor)**  
0.8–1.7 mm (0.03–0.07 in)

### 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.



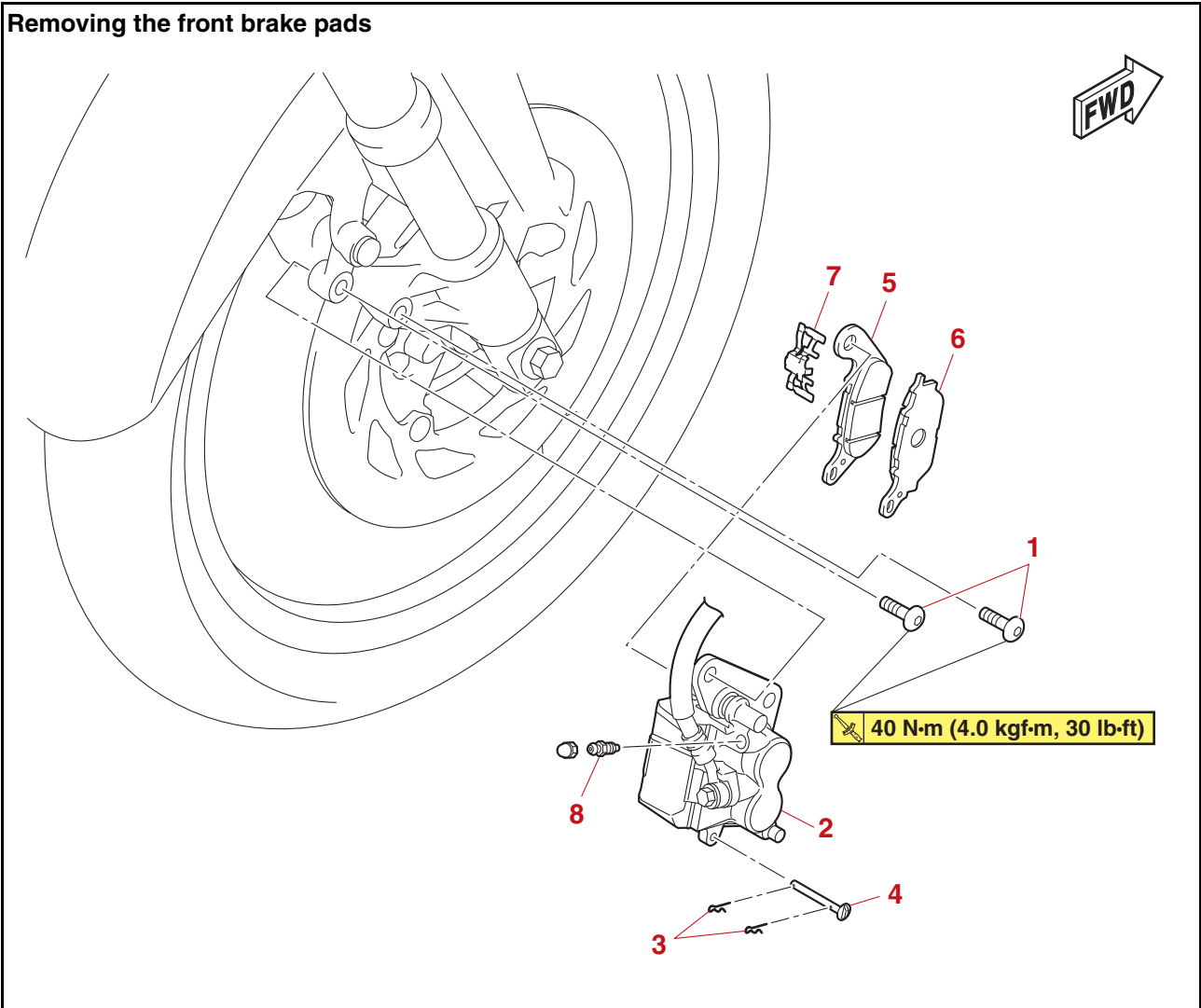
**Thickness gauge**  
**90890-03268**  
**Feeler gauge set**  
**YU-26900-9**



EAS20030

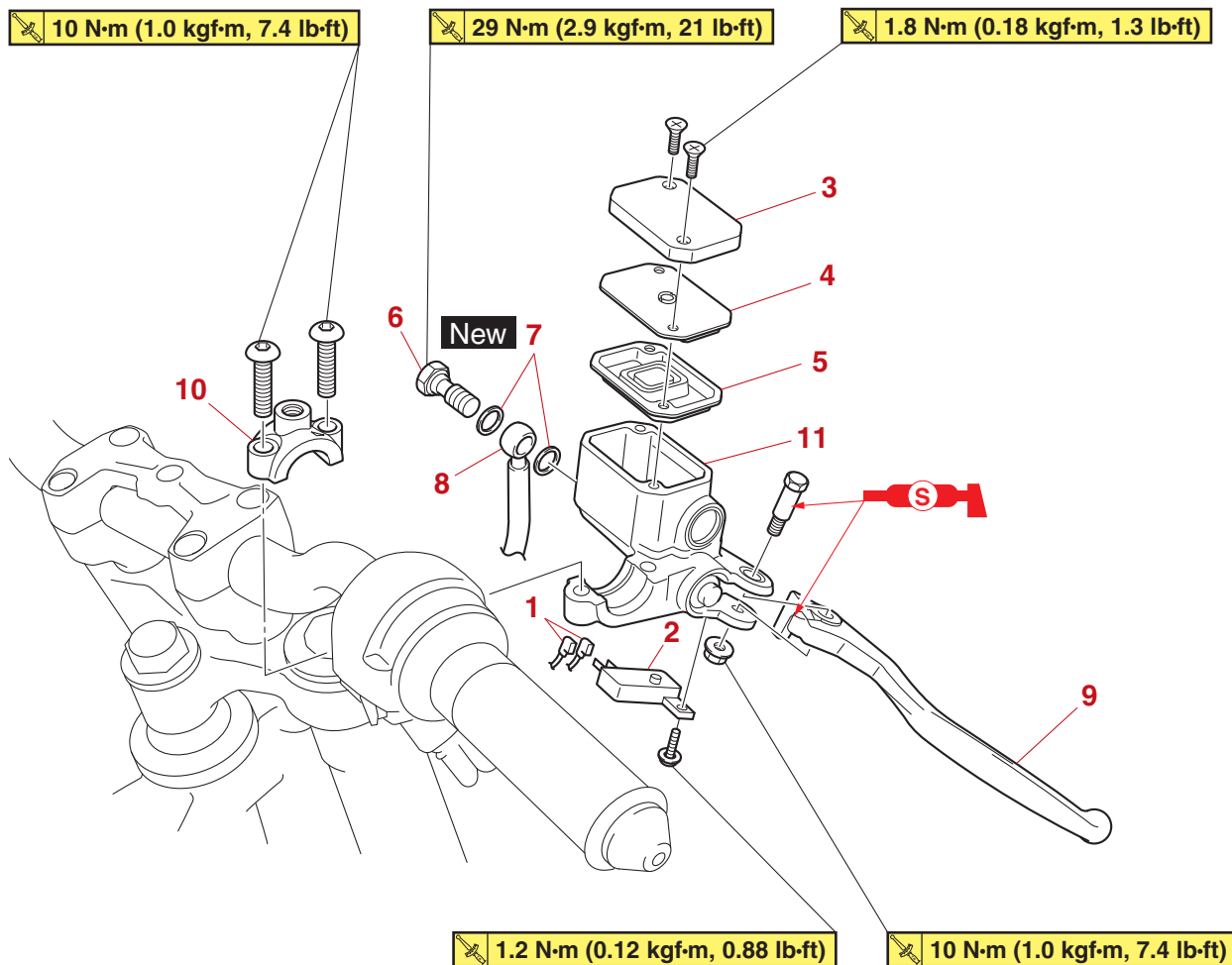
FRONT BRAKE

Removing the front brake pads



| Order | Job/Parts to remove       | Q'ty | Remarks |
|-------|---------------------------|------|---------|
| 1     | Front brake caliper bolt  | 2    |         |
| 2     | Front brake caliper       | 1    |         |
| 3     | Brake pad clip            | 2    |         |
| 4     | Brake pad pin             | 1    |         |
| 5     | Brake pad (inner)         | 1    |         |
| 6     | Brake pad (outer)         | 1    |         |
| 7     | Brake pad spring          | 1    |         |
| 8     | Brake caliper bleed screw | 1    |         |

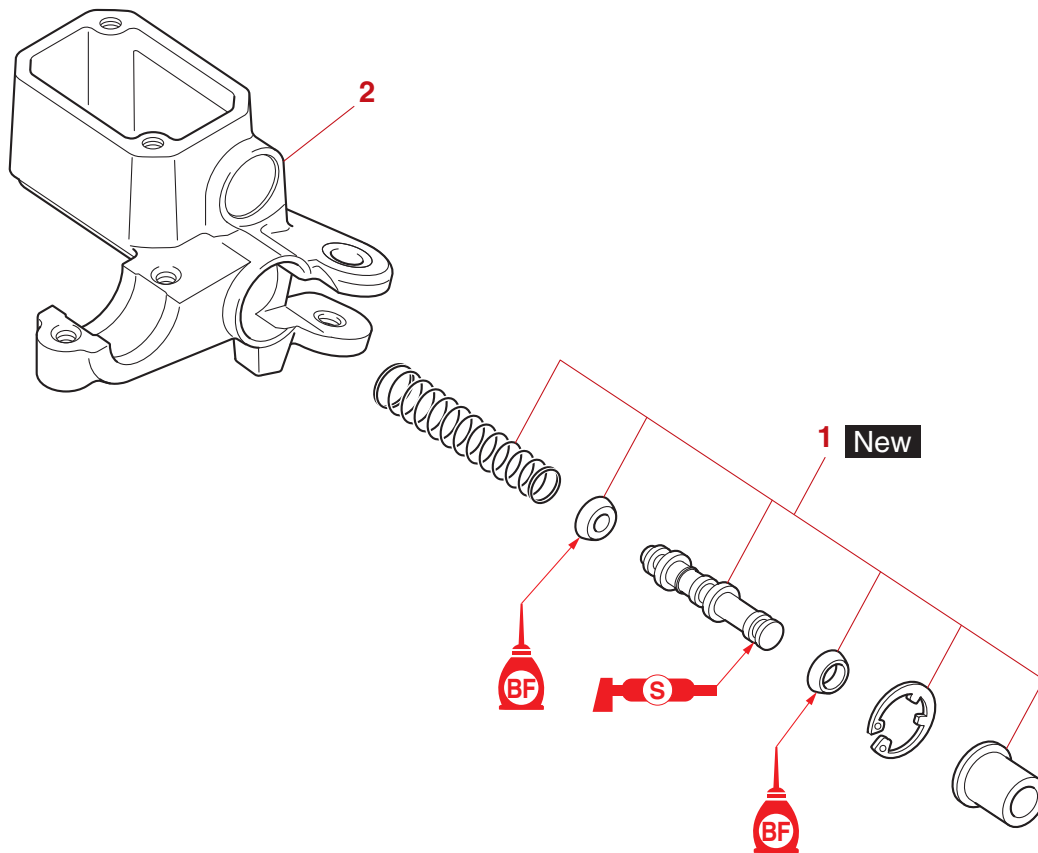
## Removing the front brake master cylinder



| Order | Job/Parts to remove                                                 | Q'ty | Remarks                                                                      |
|-------|---------------------------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Brake fluid                                                         |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
|       | Rearview mirror                                                     |      | Refer to "HANDLEBAR" on page 4-48.                                           |
| 1     | Front brake light switch connector                                  | 2    | Disconnect.                                                                  |
| 2     | Front brake light switch                                            | 1    |                                                                              |
| 3     | Brake master cylinder reservoir cap                                 | 1    |                                                                              |
| 4     | Brake master cylinder reservoir diaphragm hold-<br>er               | 1    |                                                                              |
| 5     | Brake master cylinder reservoir diaphragm                           | 1    |                                                                              |
| 6     | Brake hose union bolt                                               | 1    |                                                                              |
| 7     | Brake hose gasket                                                   | 2    |                                                                              |
| 8     | Front brake hose (front brake master cylinder to<br>hydraulic unit) | 1    | Disconnect.                                                                  |
| 9     | Brake lever                                                         | 1    |                                                                              |
| 10    | Front brake master cylinder holder                                  | 1    |                                                                              |
| 11    | Front brake master cylinder                                         | 1    |                                                                              |

## FRONT BRAKE

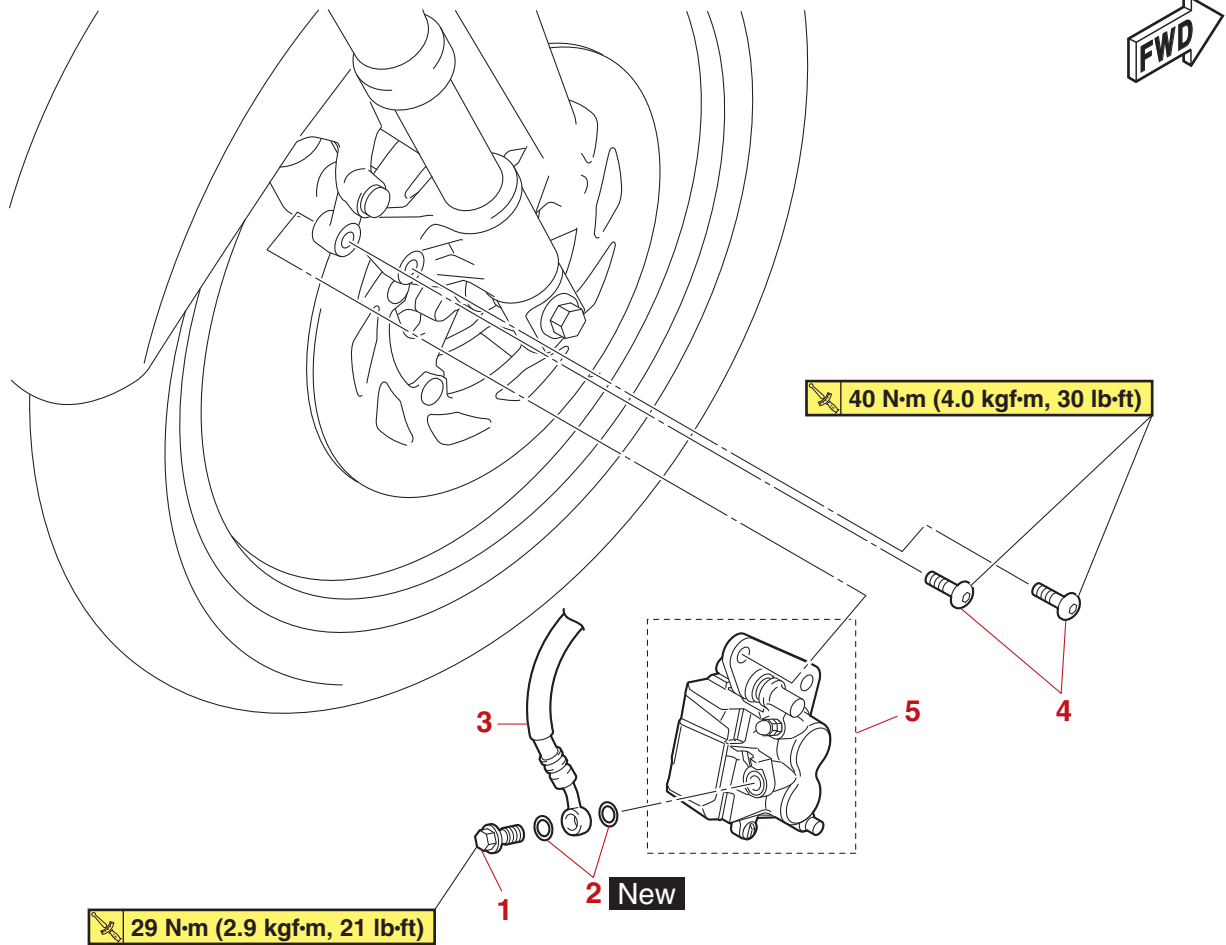
## Disassembling the front brake master cylinder



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

# FRONT BRAKE

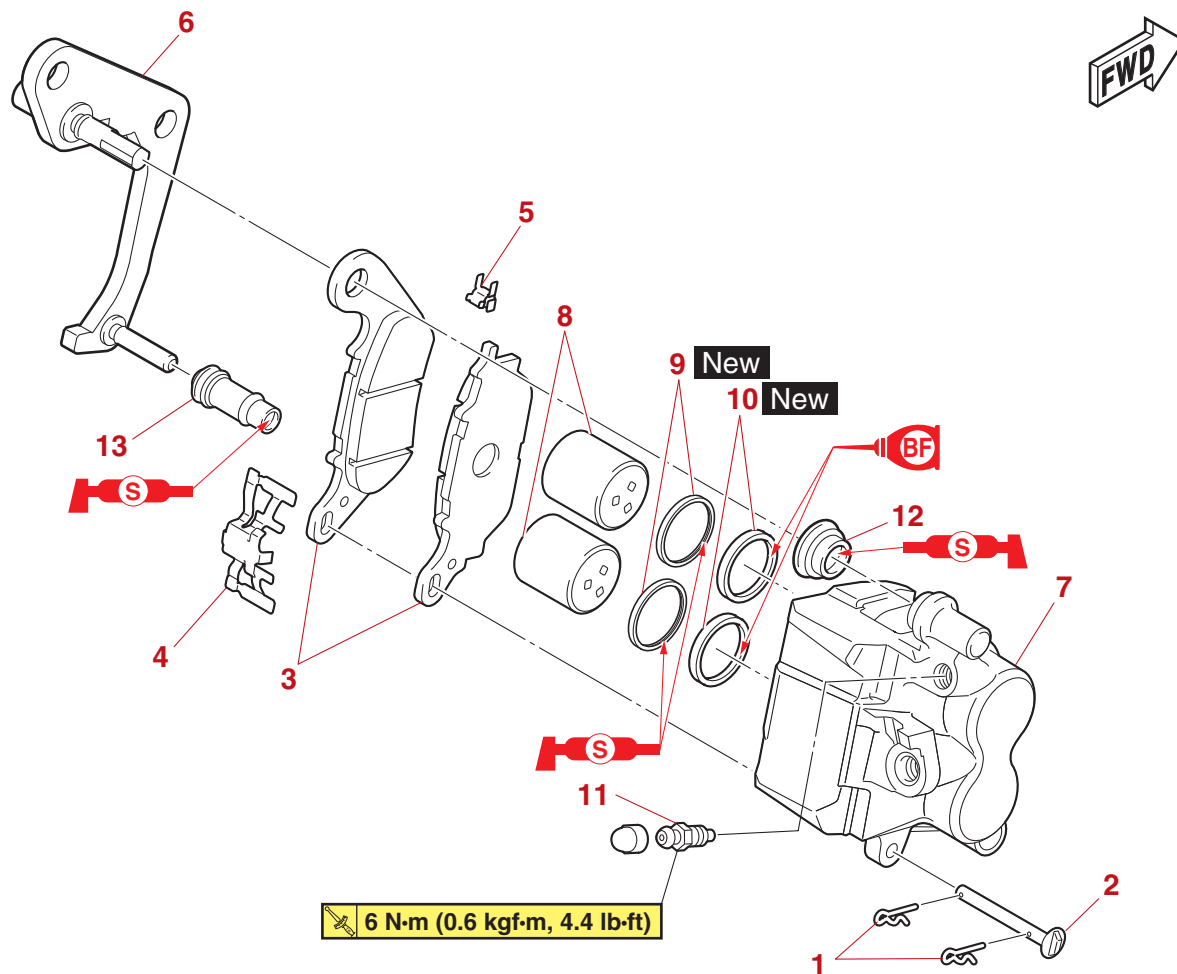
## Removing the front brake caliper



| Order | Job/Parts to remove                                      | Q'ty | Remarks                                                                      |
|-------|----------------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Brake fluid                                              |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
| 1     | Brake hose union bolt                                    | 1    |                                                                              |
| 2     | Copper washer                                            | 2    |                                                                              |
| 3     | Front brake hose (hydraulic unit to front brake caliper) | 1    |                                                                              |
| 4     | Front brake caliper bolt                                 | 2    |                                                                              |
| 5     | Front brake caliper                                      | 1    |                                                                              |

# FRONT BRAKE

## Disassembling the front brake caliper



| 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     | Brake caliper bracket          | 1    |                                                                      |
| 7     | Brake caliper body             | 1    |                                                                      |
| 8     | Brake caliper piston           | 2    |                                                                      |
| 9     | Brake caliper piston dust seal | 2    |                                                                      |
| 10    | Brake caliper piston seal      | 2    |                                                                      |
| 11    | Bleed screw                    | 1    |                                                                      |
| 12    | Pin boot                       | 1    |                                                                      |
| 13    | Sleeve boot                    | 1    |                                                                      |

EAS30168

## INTRODUCTION

EWA14101

### **WARNING**

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

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

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

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

EAS30169

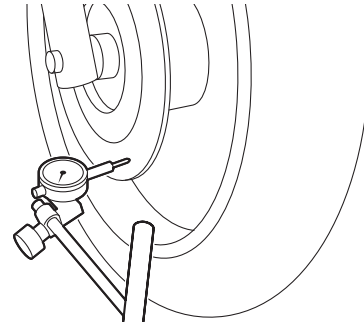
## CHECKING THE FRONT BRAKE DISC

1. Check:
  - Brake disc
    - Damage/galling → Replace.
2. Measure:
  - Brake disc deflection
    - Out of specification → 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**  
3.5 mm (0.14 in)

EAS30170

## REPLACING THE FRONT BRAKE PADS

### TIP

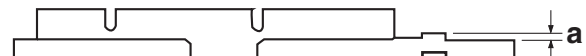
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

### 1. Measure:

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



**Brake pad lining thickness limit**  
0.8 mm (0.03 in)



### 2. Install:

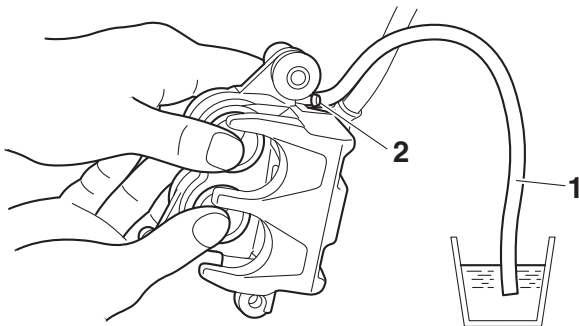
- Brake pad springs
- Brake pads

### TIP

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

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

- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your fingers.



- c. Tighten the bleed screw.



**Front brake caliper bleed screw**  
6 N·m (0.6 kgf·m, 4.4 lb·ft)

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

**3. Install:**

- Brake pad pins
- 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 3-9.

**5. Check:**

- Brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

EAS30724

## REMOVING THE FRONT BRAKE CALIPER

### TIP

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

**1. Remove:**

- Brake hose union bolt
- Brake hose gaskets
- Brake hose

### TIP

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

EAS30172

## DISASSEMBLING THE FRONT BRAKE CALIPER

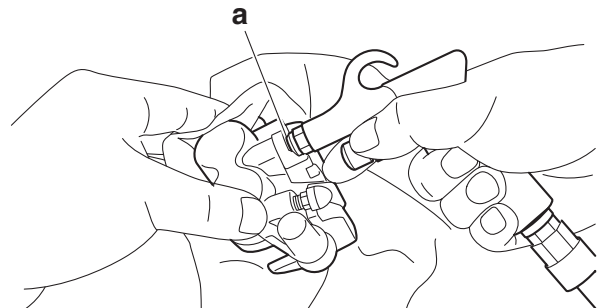
**1. Remove:**

- Brake caliper pistons
- Brake caliper piston dust seals
- Brake caliper piston seals
  - a. Blow compressed air into the brake hose joint opening “a” to force out the pistons from the brake caliper.

EWA13550

### WARNING

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



- b. Remove the brake caliper piston seals and dust seals.

EAS30173

## CHECKING THE FRONT BRAKE CALIPER

### Recommended brake component replacement schedule

|                           |                                                        |
|---------------------------|--------------------------------------------------------|
| Brake pads                | If necessary                                           |
| Brake caliper piston kits | If necessary                                           |
| Brake hose                | Every four years                                       |
| Brake fluid               | Every two years and whenever the brake is disassembled |

**1. Check:**

- Brake caliper pistons  
Rust/scratches/wear → Replace the brake caliper piston kits.
- Brake caliper cylinders  
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body  
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)

Obstruction → Blow out with compressed air.

EWA20670

## **WARNING**

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

EAS30174

## ASSEMBLING THE FRONT BRAKE CALIPER

EWA20680

## **WARNING**

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



**Specified brake fluid  
DOT 4**

EAS30934

## INSTALLING THE FRONT BRAKE CALIPER

1. Install:

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



**Brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)**

EWA13531

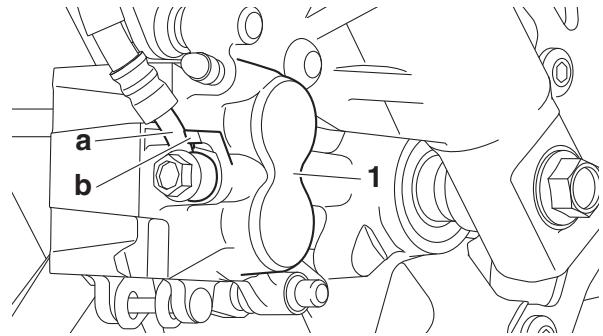
## **WARNING**

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

ECA14170

## **NOTICE**

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



2. Remove:

- Brake caliper

3. Install:

- Brake pads
- Brake pad spring
- Brake pad support
- Brake pad pins
- Brake pad clips
- Front brake caliper



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

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-25.

4. Fill:

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



**Specified brake fluid  
DOT 4**

EWA13090

## **WARNING**

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

ECA13540

## **NOTICE**

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

5. Bleed:
  - Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.
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 3-9.
7. Check:
  - Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

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:
  - Front brake light switch connectors
2. Remove:
  - Brake hose union bolt
  - Brake hose gaskets
  - Brake hose

### 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 reservoir  
Cracks/damage → Replace the brake master cylinder.
  - Brake master cylinder reservoir diaphragm  
Damage/wear → Replace.
3. Check:
  - Brake hose  
Cracks/damage/wear → Replace.

EAS30181

## ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

### WARNING

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



**Specified brake fluid  
DOT 4**

EAS30182

## INSTALLING THE FRONT BRAKE MASTER CYLINDER

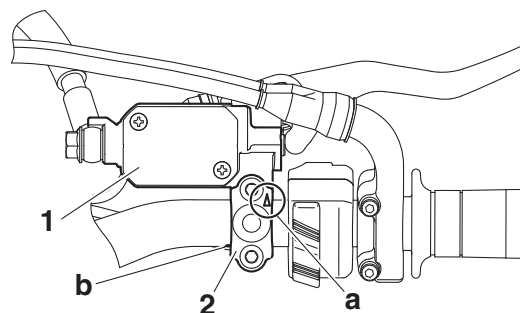
1. Install:
  - Brake master cylinder “1”
  - Brake master cylinder holder “2”



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

### TIP

- Install the brake master cylinder holder with the arrow mark “a” pointing forward.
- Align the end of the brake master cylinder holder with the punch mark “b” on the handlebar.
- First, tighten the front bolt, then the rear bolt.



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



**Brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)**

EWA13531

### WARNING

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

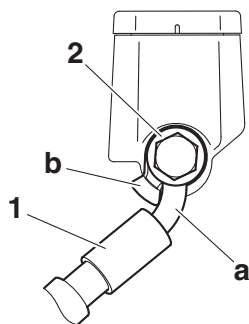
ECA19780

## NOTICE

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

## TIP

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



## 3. Install:

- Front brake light switch lead

## 4. Fill:

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



**Specified brake fluid  
DOT 4**

EWA13540

## WARNING

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

ECA13540

## NOTICE

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

## 5. Bleed:

- Brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

## 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 3-9.

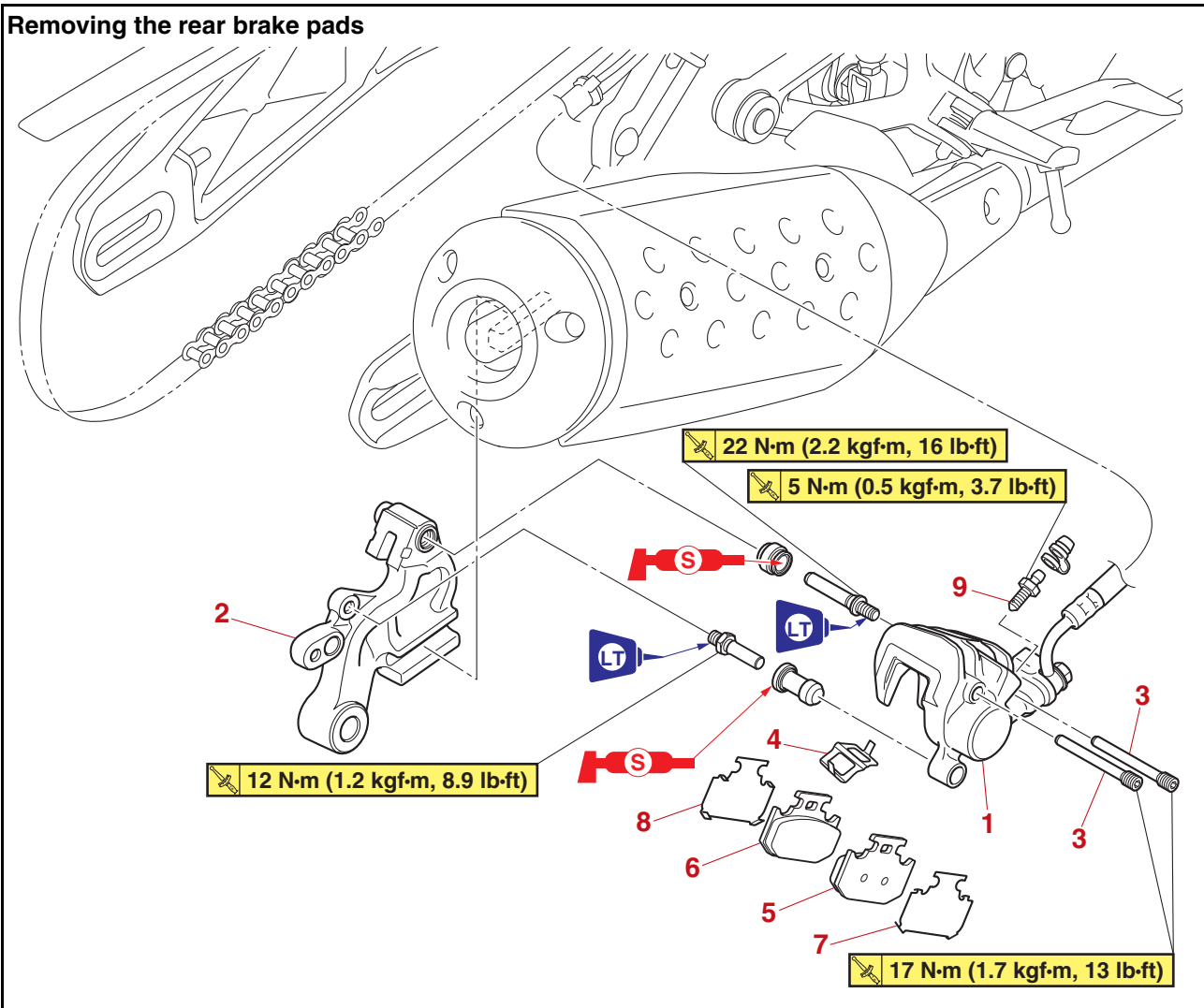
## 7. Check:

- Brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

EAS20031

## REAR BRAKE

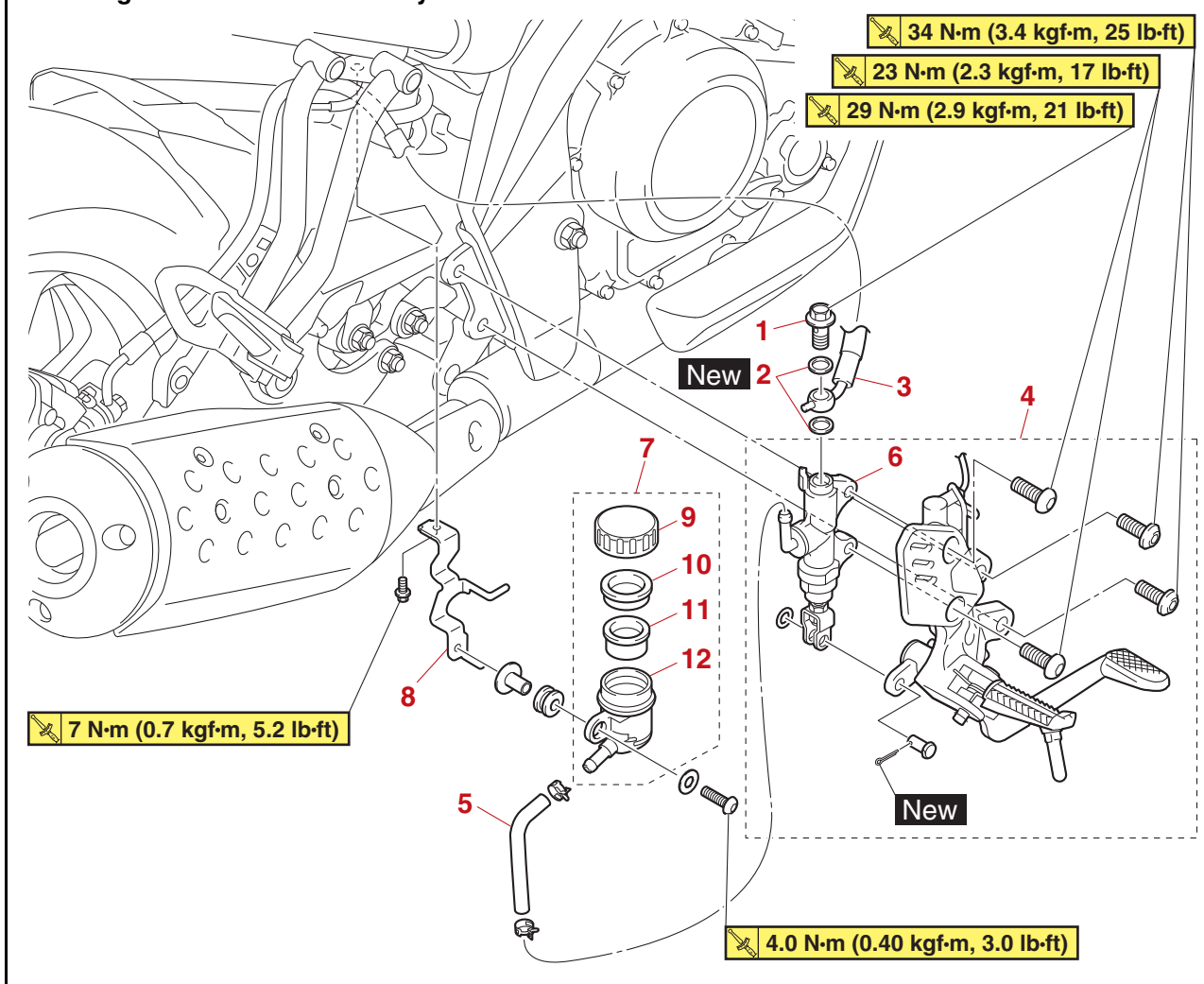
### Removing the rear brake pads



| Order | Job/Parts to remove         | Q'ty | Remarks                             |
|-------|-----------------------------|------|-------------------------------------|
|       | Rear wheel                  |      | Refer to "REAR WHEEL" on page 4-14. |
| 1     | Rear brake caliper          | 1    |                                     |
| 2     | Rear brake caliper bracket  | 1    |                                     |
| 3     | Slide pin bolt              | 2    |                                     |
| 4     | Brake pad spring            | 1    |                                     |
| 5     | Rear brake pad (outer)      | 1    |                                     |
| 6     | Rear brake pad (inner)      | 1    |                                     |
| 7     | Rear brake pad shim (outer) | 1    |                                     |
| 8     | Rear brake pad shim (inner) | 1    |                                     |
| 9     | Bleed screw                 | 1    | Loosen.                             |

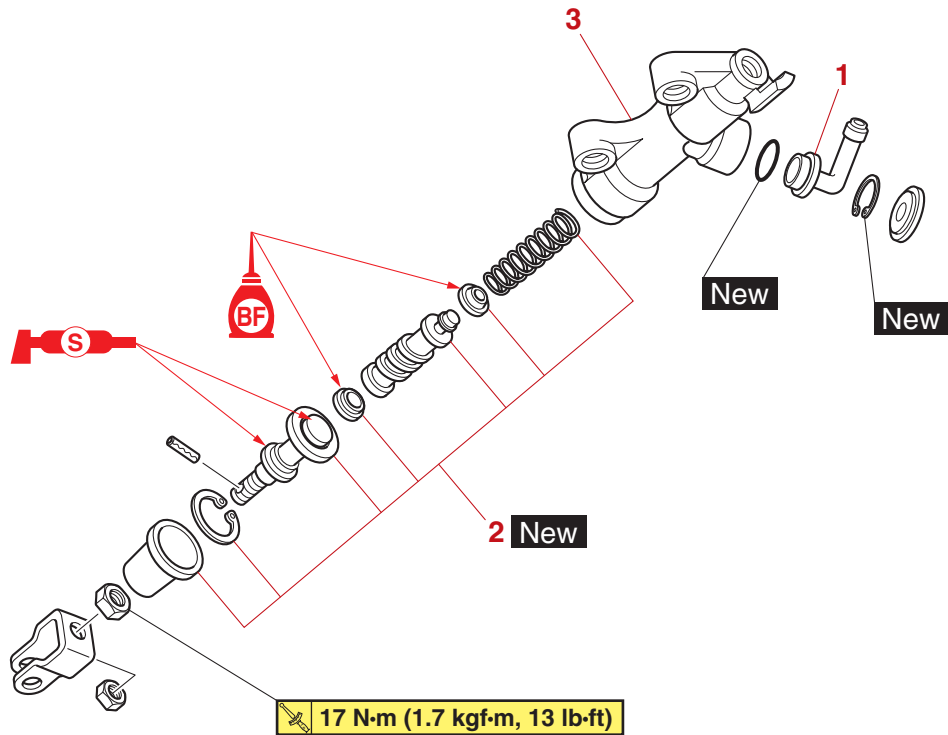
# REAR BRAKE

## Removing the rear brake master cylinder



| Order | Job/Parts to remove                                            | Q'ty | Remarks                                                                      |
|-------|----------------------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Brake fluid                                                    |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
| 1     | Brake hose union bolt                                          | 1    |                                                                              |
| 2     | Copper washer                                                  | 2    |                                                                              |
| 3     | Rear brake hose (rear brake master cylinder to hydraulic unit) | 1    |                                                                              |
| 4     | Footrest assembly                                              | 1    |                                                                              |
| 5     | Brake fluid reservoir hose                                     | 1    |                                                                              |
| 6     | Rear brake master cylinder                                     | 1    |                                                                              |
| 7     | Brake fluid reservoir                                          | 1    |                                                                              |
| 8     | Brake fluid reservoir bracket                                  | 1    |                                                                              |
| 9     | Brake fluid reservoir cap                                      | 1    |                                                                              |
| 10    | Brake fluid reservoir diaphragm holder                         | 1    |                                                                              |
| 11    | Brake fluid reservoir diaphragm                                | 1    |                                                                              |
| 12    | Brake fluid reservoir tank                                     | 1    |                                                                              |

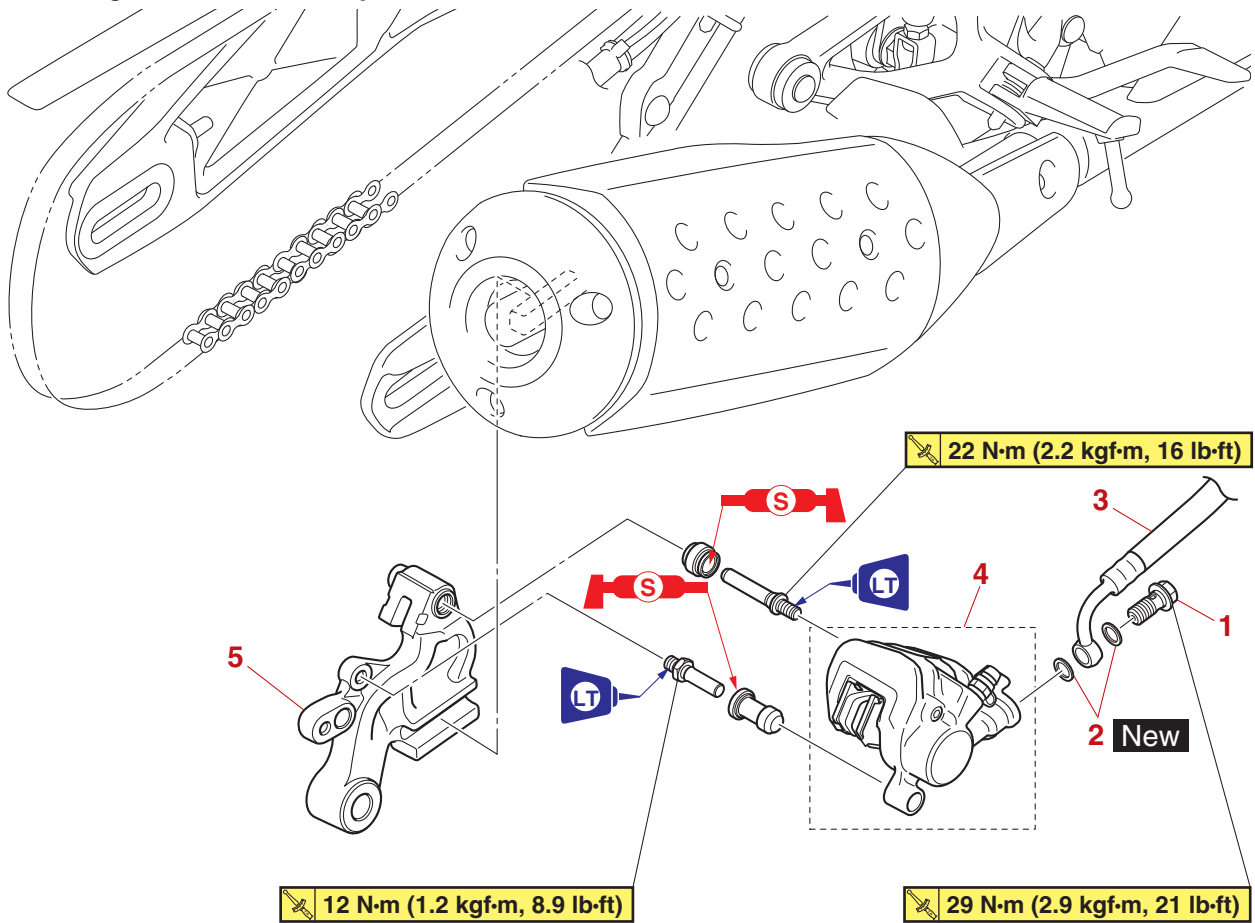
## Disassembling the rear brake master cylinder



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

# REAR BRAKE

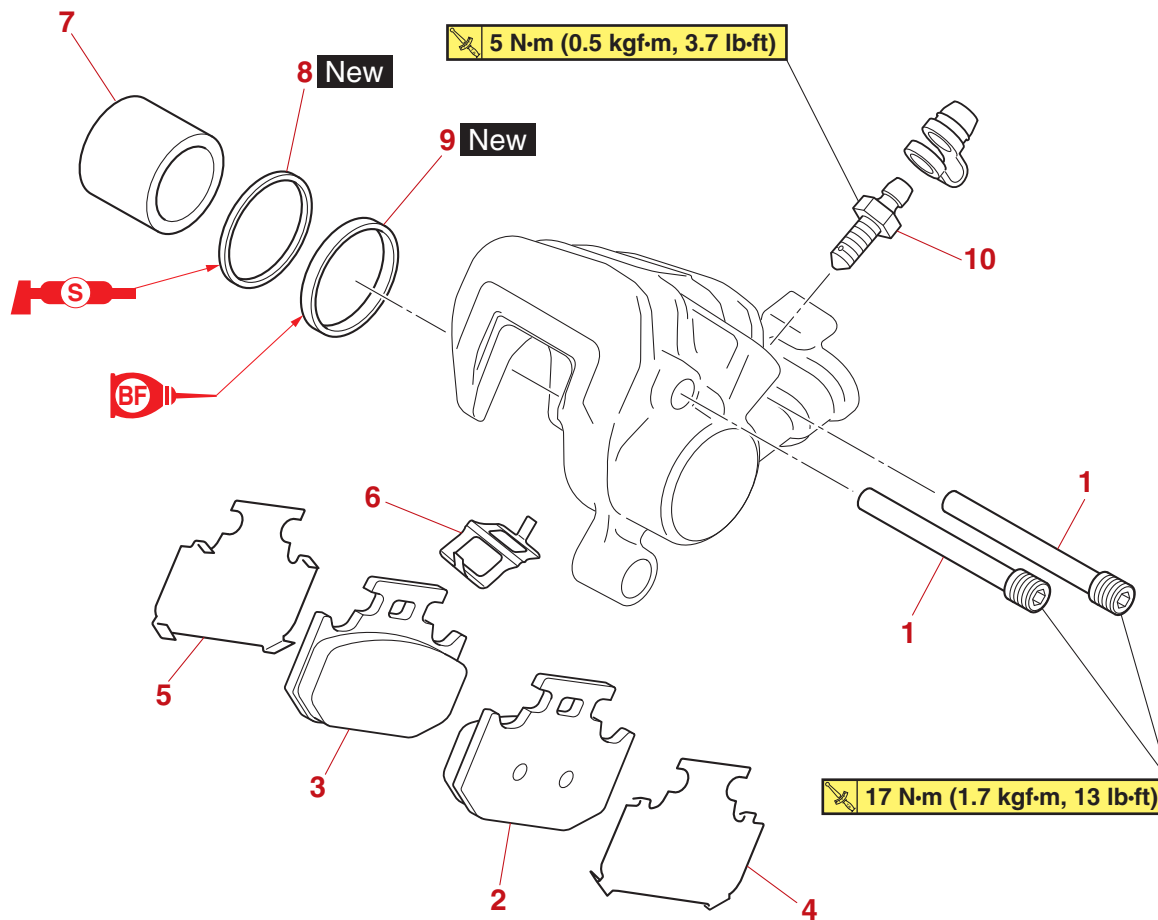
## Removing the rear brake caliper



| Order | Job/Parts to remove                                    | Q'ty | Remarks                                                                      |
|-------|--------------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Brake fluid                                            |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
|       | Rear wheel                                             |      | Refer to "REAR WHEEL" on page 4-14.                                          |
| 1     | Rear brake hose union bolt                             | 1    |                                                                              |
| 2     | Brake hose gasket                                      | 2    |                                                                              |
| 3     | Rear brake hose (hydraulic unit to rear brake caliper) | 1    | Disconnect.                                                                  |
| 4     | Rear brake caliper                                     | 1    |                                                                              |
| 5     | Rear brake caliper bracket                             | 1    |                                                                              |

# REAR BRAKE

## Disassembling the rear brake caliper



| Order | Job/Parts to remove            | Q'ty | Remarks |
|-------|--------------------------------|------|---------|
| 1     | Slide pin bolt                 | 2    |         |
| 2     | Rear brake pad (outer)         | 1    |         |
| 3     | Rear brake pad (inner)         | 1    |         |
| 4     | Rear brake pad shim (outer)    | 1    |         |
| 5     | Rear brake pad shim (inner)    | 1    |         |
| 6     | Brake pad spring               | 1    |         |
| 7     | Brake caliper piston           | 1    |         |
| 8     | Brake caliper piston dust seal | 1    |         |
| 9     | Brake caliper piston seal      | 1    |         |
| 10    | Bleed screw                    | 1    |         |

EAS30183

## INTRODUCTION

EWA14101

### WARNING

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

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

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

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

EAS30184

## CHECKING THE REAR BRAKE DISC

1. Check:
  - Brake disc
    - Damage/galling → Replace.
2. Measure:
  - Brake disc deflection
    - Out of specification → Replace the brake disc.
    - Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-25.



**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 DISC" on page 4-25.



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

EAS30185

## REPLACING THE REAR BRAKE PADS

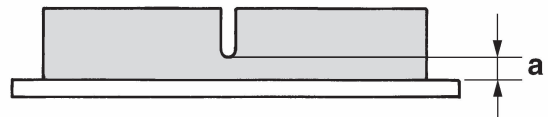
### TIP

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

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



**Brake pad lining thickness limit**  
1.5 mm (0.06 in)

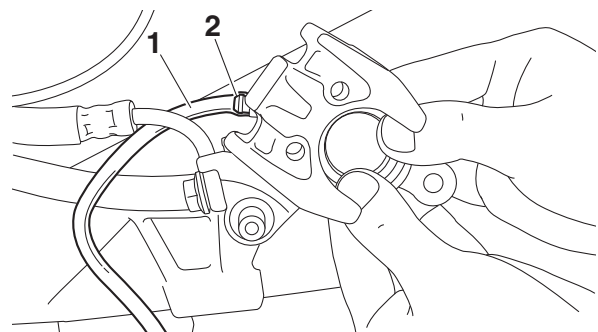


2. Install:
  - Brake pad spring
  - Brake pad shims
  - Brake pads

### TIP

Always replace the brake pads, brake pad shims, and brake pad spring as a set.

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



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



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

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

3. Install:

- Slide pin bolt



**Slide pin bolt**  
17 N·m (1.7 kgf·m, 13 lb·ft)

4. Check:

- Brake fluid level

Below the minimum level mark → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-9.

5. Check:

- Brake pedal operation

Soft or spongy feeling → Bleed the brake system.

Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

EAS30186

## REMOVING THE REAR BRAKE CALIPER

### TIP

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

1. Remove:

- Brake hose union bolt
- Brake hose gaskets
- Brake hose

### TIP

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

EAS30187

## DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:

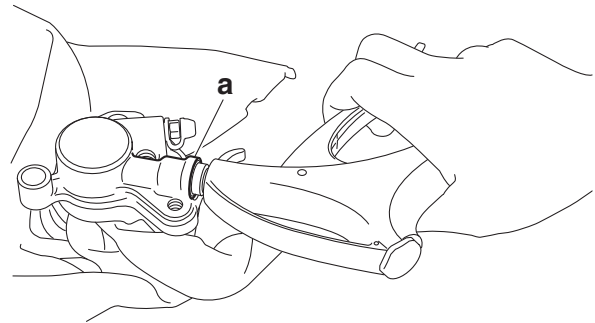
- Brake caliper piston
- Brake caliper piston dust seal
- Brake caliper piston seal
  - a. Blow compressed air into the brake hose joint opening “a” to force out the piston from the brake caliper.

EWA13550



**WARNING**

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



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

EAS30188

## CHECKING THE REAR BRAKE CALIPER

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

1. Check:

- Brake caliper piston  
Rust/scratches/wear → Replace the brake caliper piston.
- Brake caliper cylinder  
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body  
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)  
Obstruction → Blow out with compressed air.

EWA17070



**WARNING**

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

EAS32685

## CHECKING THE REAR BRAKE CALIPER BRACKET

1. Check:

- Rear brake caliper bracket  
Cracks/damage → Replace.

EAS30189

## ASSEMBLING THE REAR BRAKE CALIPER

EWA17080

### **WARNING**

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



**Specified brake fluid  
DOT 4**

EAS30190

## INSTALLING THE REAR BRAKE CALIPER

### 1. Install:

- Rear brake caliper “1” (temporarily)
- Brake hose gaskets **New**
- Brake hose (hydraulic unit to rear brake caliper) “2”
- Rear brake hose union bolt “3”



**Rear brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)**

EWA13531

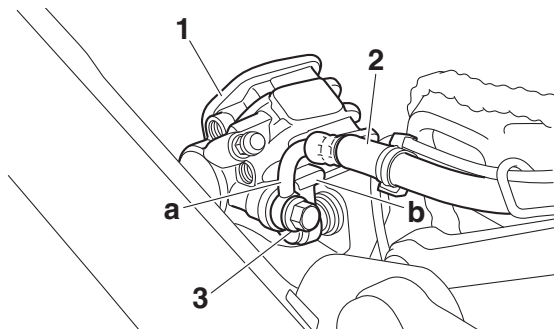
### **WARNING**

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

ECA23460

### **NOTICE**

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



### 2. Remove:

- Rear brake caliper

### 3. Install:

- Brake pad shims (onto the brake pads)
  - Brake pad spring (into the rear brake caliper)
  - Brake pads
  - Rear brake caliper
- Refer to “REPLACING THE REAR BRAKE PADS” on page 4-35.



**Slide pin bolt  
17 N·m (1.7 kgf·m, 13 lb·ft)**

### 4. Fill:

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



**Specified brake fluid  
DOT 4**

EWA13090

### **WARNING**

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

ECA13540

### **NOTICE**

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

### 5. Bleed:

- Brake system
- Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

### 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 3-9.

## 7. Check:

- Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

EAS30193

## REMOVING THE REAR BRAKE MASTER CYLINDER

### TIP

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

## 1. Remove:

- Brake hose union bolt
- Brake hose gaskets
- Brake hose

### 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 the brake master cylinder assembly.
- Brake fluid delivery passages (brake master cylinder body)  
Obstruction → Blow out with compressed air.

## 2. Check:

- Brake master cylinder kit  
Damage/scratches/wear → Replace the brake master cylinder kit.

## 3. Check:

- Brake fluid reservoir  
Cracks/damage → Replace the reservoir tank.
- Brake fluid reservoir diaphragm  
Cracks/damage → Replace the brake fluid reservoir diaphragm.

## 4. Check:

- Brake hoses  
Cracks/damage/wear → Replace the brake hose.

EAS30195

## ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

### ⚠ WARNING

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



**Specified brake fluid  
DOT 4**

EAS30196

## INSTALLING THE REAR BRAKE MASTER CYLINDER

## 1. Install:

- Brake hose “1”  
(rear brake master cylinder to hydraulic unit)
- Brake hose gaskets **New**
- Brake hose union bolt “2”



**Brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)**

EWA13531

### ⚠ WARNING

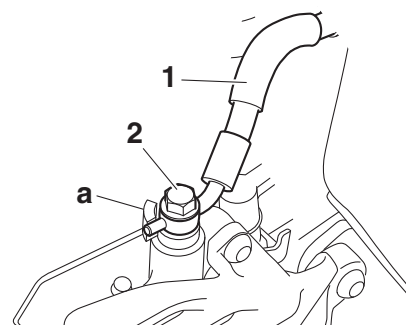
**Proper brake hose routing is essential to insure safe vehicle operation.**

Refer to “CABLE ROUTING” on page 2-13.

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 recommended 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 3-11.

#### 4. Check:

- Brake fluid level  
Below the minimum level mark → Add the recommended brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-9.

#### 5. Check:

- Brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-11.

#### 6. Adjust:

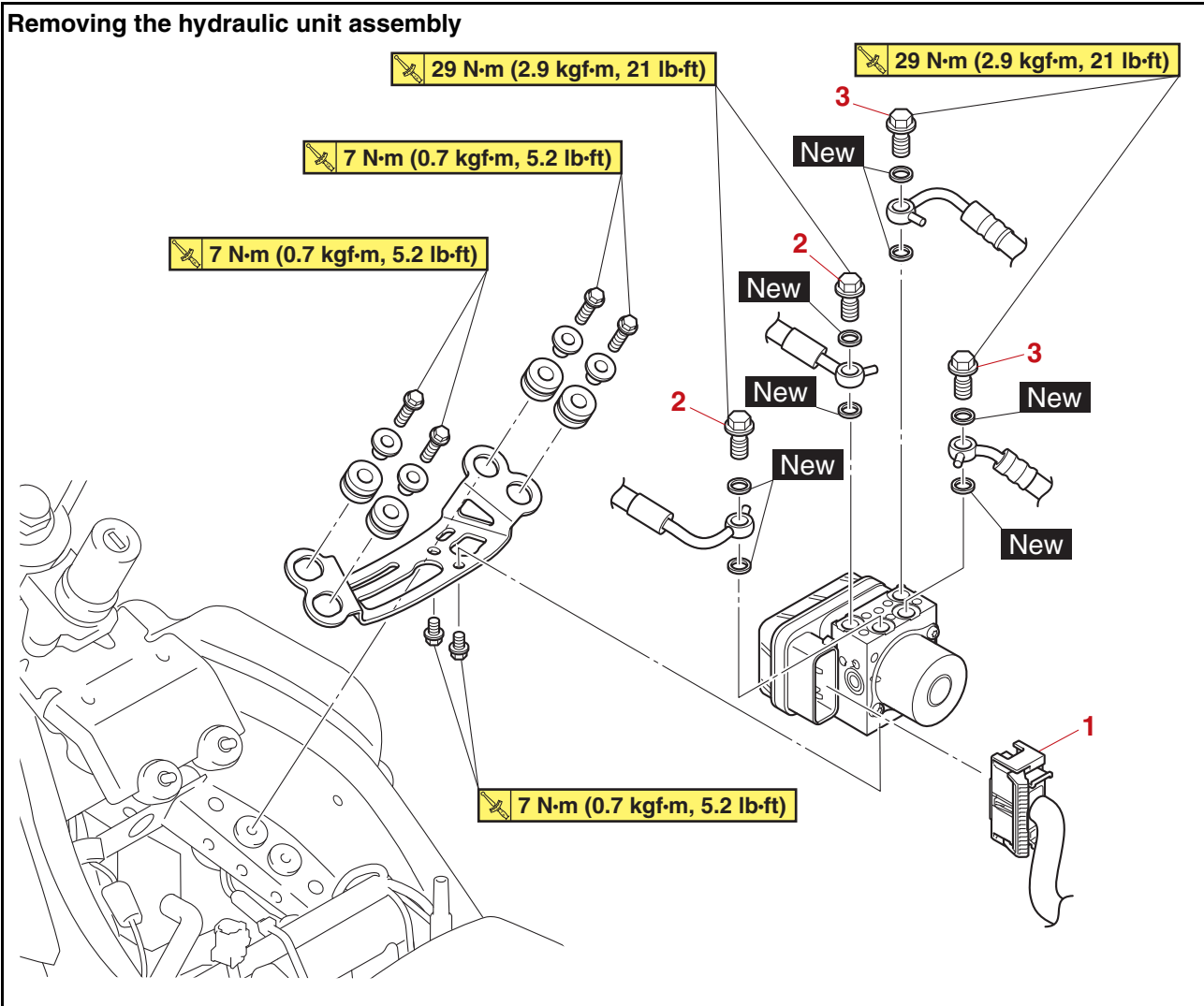
- Brake light operation timing  
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-21.

# ABS (ANTI-LOCK BRAKE SYSTEM)

EAS20032

## ABS (ANTI-LOCK BRAKE SYSTEM)

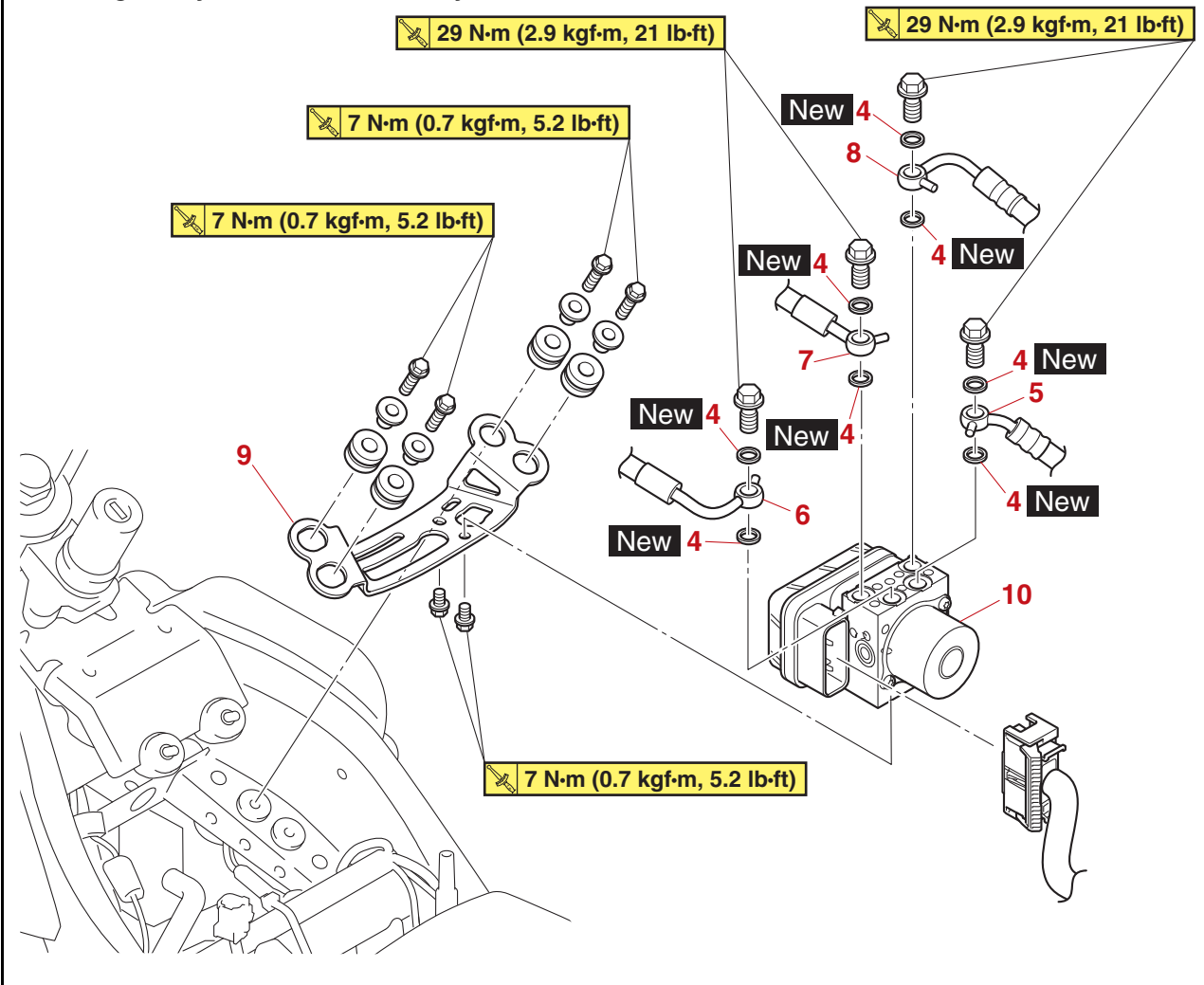
### Removing the hydraulic unit assembly



| Order | Job/Parts to remove                                | Q'ty | Remarks                                                                      |
|-------|----------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Brake fluid                                        |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.                                  |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                                  |
|       | Fuel tank                                          |      | Refer to "FUEL TANK" on page 7-1.                                            |
| 1     | ABS ECU coupler                                    | 1    | Disconnect.                                                                  |
| 2     | Front brake hose union bolt                        | 2    |                                                                              |
| 3     | Rear brake hose union bolt                         | 2    |                                                                              |

# ABS (ANTI-LOCK BRAKE SYSTEM)

## Removing the hydraulic unit assembly



| Order | Job/Parts to remove                                              | Q'ty | Remarks     |
|-------|------------------------------------------------------------------|------|-------------|
| 4     | Brake hose gasket                                                | 8    |             |
| 5     | Rear brake hose (rear brake master cylinder to hydraulic unit)   | 1    | Disconnect. |
| 6     | Front brake hose (front brake master cylinder to hydraulic unit) | 1    | Disconnect. |
| 7     | Front brake hose (hydraulic unit to front brake caliper)         | 1    | Disconnect. |
| 8     | Rear brake hose (hydraulic unit to rear brake caliper)           | 1    | Disconnect. |
| 9     | Hydraulic unit bracket                                           | 1    |             |
| 10    | 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

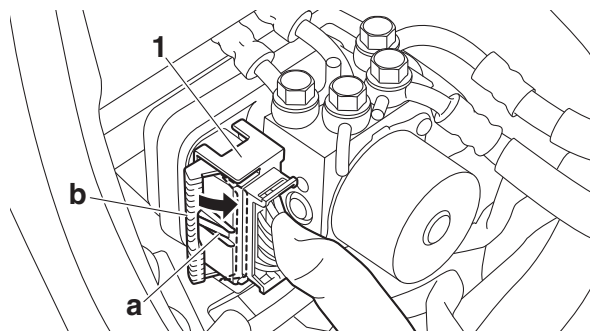
### NOTICE

- 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

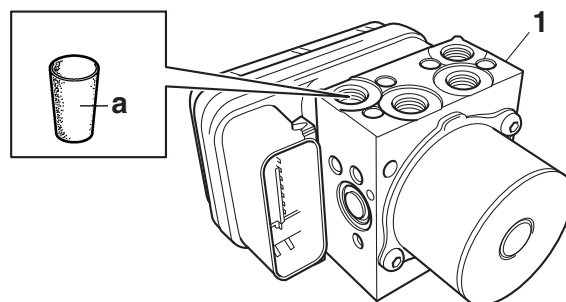
### NOTICE

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  
(to hydraulic unit bracket)
  - 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:

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



**Front brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)  
Rear brake hose union bolt  
29 N·m (2.9 kgf·m, 21 lb·ft)**

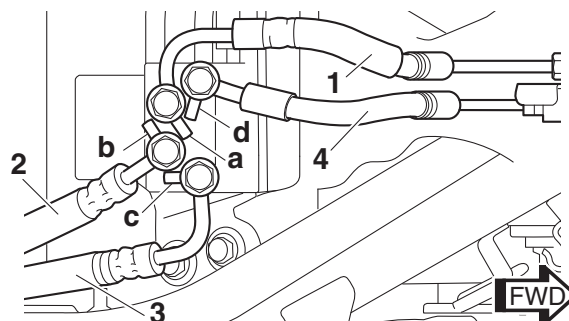
ECA21121

### 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 front brake hose (front brake master cylinder to hydraulic unit) "1" so that its projection "a" contacts the rear brake hose (rear brake master cylinder to hydraulic unit), and then temporarily tighten the union bolt for the front brake hose (front brake master cylinder to hydraulic unit).
- Position the rear brake hose (rear brake master cylinder to hydraulic unit) "2" so that its projection "b" contacts the front brake hose (front brake master cylinder to hydraulic unit) "1", and then temporarily tighten the union bolt for the rear brake hose (rear brake master cylinder to hydraulic unit).

- Position the rear brake hose (hydraulic unit to rear brake caliper) "3" so that its projection "c" contacts the rear brake hose (rear brake master cylinder to hydraulic unit) "2", and then temporarily tighten the union bolt for the rear brake hose (hydraulic unit to rear brake caliper).
- Position the front brake hose (hydraulic unit to front brake caliper) "4" so that its projection "d" contacts the front brake hose (front brake master cylinder to hydraulic unit) "1", and then temporarily tighten the union bolt for the front brake hose (hydraulic unit to front brake caliper).
- Tighten the brake hose union bolts to specification.

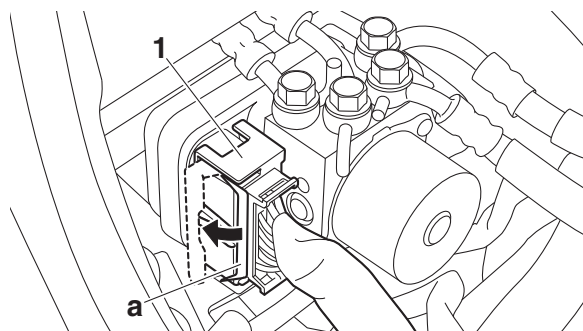


#### 4. Connect:

- ABS ECU coupler "1"

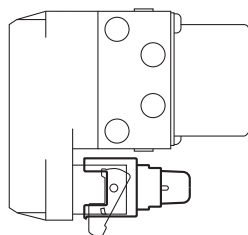
### TIP

- 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".

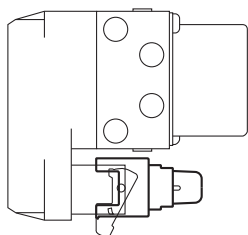


# ABS (ANTI-LOCK BRAKE SYSTEM)

A



B



- A. The ABS ECU coupler is connected correctly.  
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)



**Specified brake fluid  
DOT 4**

EWA13090

## WARNING

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

ECA13540

## NOTICE

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

## 6. Bleed:

- Brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11.

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 4-44.)

ECA14770

## NOTICE

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

8. Delete the DTC. (Refer to "[B-3] DELETING THE DTC" on page 9-21.)
9. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-47.)

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 mode 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:
  - 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)



**Battery voltage**  
**Higher than 12.8 V**

### TIP

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

5. Removing the protective cap, and then connect the Yamaha diagnostic tool to the YDT coupler.



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03264**

### TIP

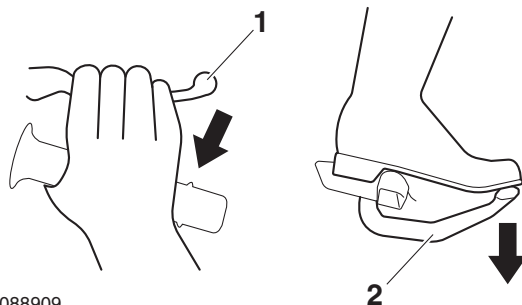
- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

6. Start the Yamaha diagnostic tool and display the diagnosis mode 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

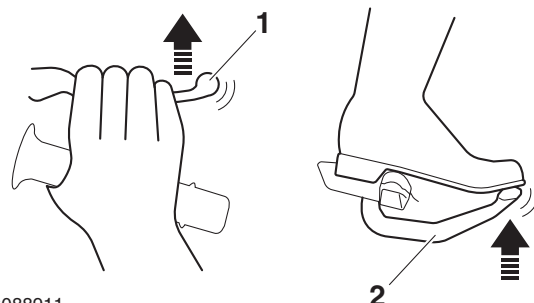
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.  
On: The hydraulic unit is operating.  
Flashing: The conditions for operating 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 DTC.

### ABS reaction-force confirmation

EWA13120



### WARNING

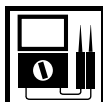
Securely support the vehicle so that there is no danger of it falling over.

# ABS (ANTI-LOCK BRAKE SYSTEM)

## TIP

- For the ABS reaction-force confirmation, use the diagnosis mode 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:
  - Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
  - Battery voltage  
Lower than 12.8 V → Charge or replace the battery.



**Battery voltage  
Higher than 12.8 V**

## TIP

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

5. Removing the protective cap, and then connect the Yamaha diagnostic tool to the YDT coupler.



**Yamaha diagnostic tool USB  
90890-03267  
Yamaha diagnostic tool (A/I)  
90890-03264**

## TIP

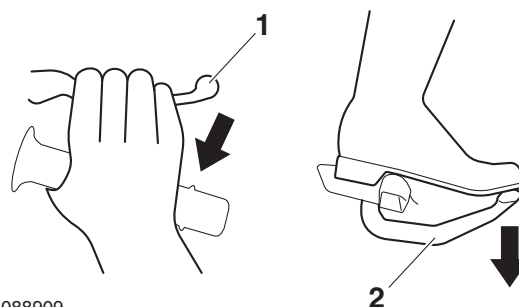
- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

6. Start the Yamaha diagnostic tool and display the diagnosis mode 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.

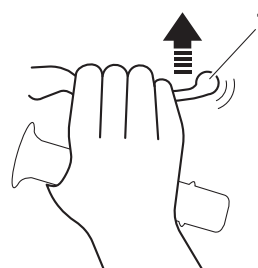


G088909

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.



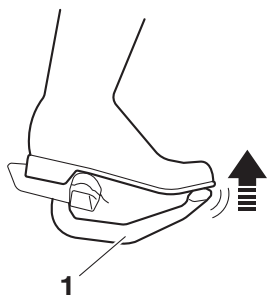
G088913

## ABS (ANTI-LOCK BRAKE SYSTEM)

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.
- "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 YDT 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 DTC.

EAS31041

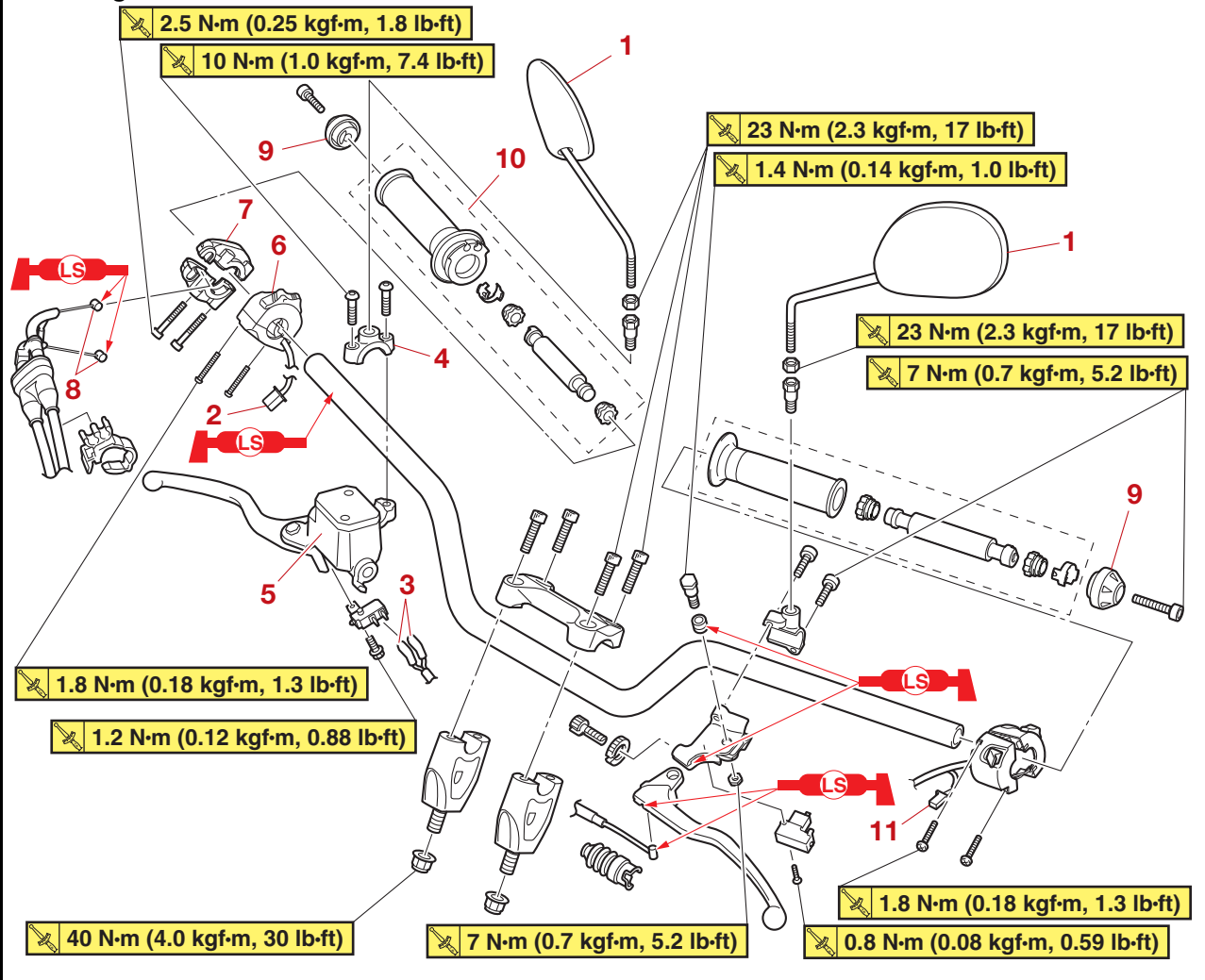
### CHECKING THE ABS WARNING LIGHT

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 (6.2 mph) or performing a trial run.

EAS20033

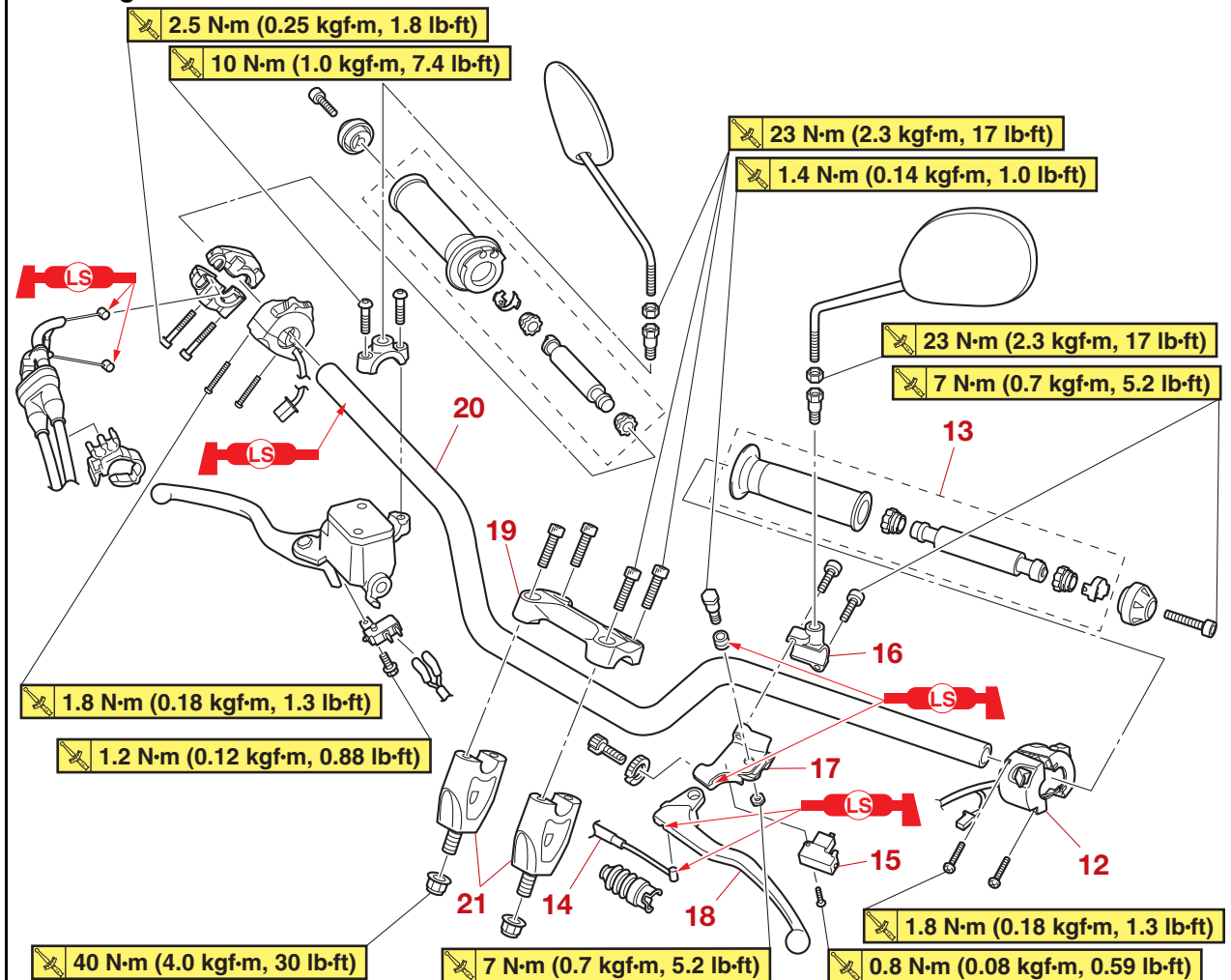
## HANDLEBAR

### Removing the handlebar



| Order | Job/Parts to remove                  | Q'ty | Remarks                                    |
|-------|--------------------------------------|------|--------------------------------------------|
| 1     | Rearview mirror                      | 2    | Rearview mirror (right): Left-hand threads |
| 2     | Handlebar switch coupler (right)     | 1    | Disconnect.                                |
| 3     | Front brake light switch connector   | 2    | Disconnect.                                |
| 4     | Front brake master cylinder holder   | 1    |                                            |
| 5     | Front brake master cylinder assembly | 1    |                                            |
| 6     | Handlebar switch (right)             | 1    |                                            |
| 7     | Throttle cable housing               | 1    |                                            |
| 8     | Throttle cable                       | 2    | Disconnect.                                |
| 9     | Grip end                             | 2    |                                            |
| 10    | Throttle grip                        | 1    |                                            |
| 11    | Clutch switch coupler                | 1    | Disconnect.                                |

## Removing the handlebar



| Order | Job/Parts to remove     | Q'ty | Remarks     |
|-------|-------------------------|------|-------------|
| 12    | Handlebar switch (left) | 1    |             |
| 13    | Handlebar grip          | 1    |             |
| 14    | Clutch cable            | 1    | Disconnect. |
| 15    | Clutch switch           | 1    |             |
| 16    | Clutch lever holder 1   | 1    |             |
| 17    | Clutch lever holder 2   | 1    |             |
| 18    | Clutch lever            | 1    |             |
| 19    | Upper handlebar holder  | 1    |             |
| 20    | Handlebar               | 1    |             |
| 21    | Lower handlebar holder  | 2    |             |

EAS30203

## REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

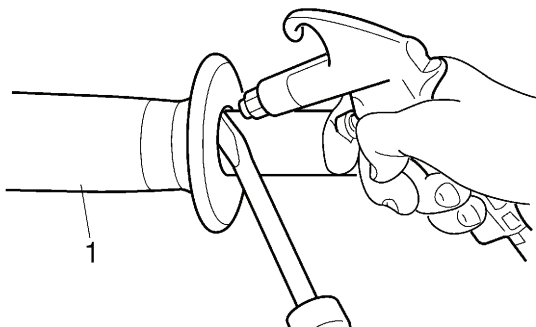
**Securely support the vehicle so that there is no danger of it falling over.**

2. Remove:

- Handlebar grip "1"

### **TIP**

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



EAS30204

## CHECKING THE 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**

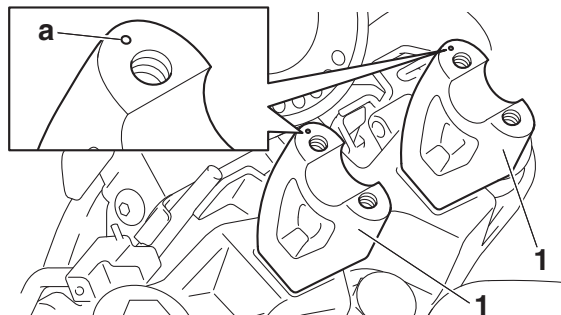
**Securely support the vehicle so that there is no danger of it falling over.**

2. Install:

- Lower handlebar holder "1"
- Lower handlebar holder nut (temporarily)

### **TIP**

Install the lower handlebar holders with the punch mark "a" pointing forward.



3. Install:

- Handlebar "1"
- Upper handlebar holder "2"



**Upper handlebar holder bolt**  
**23 N·m (2.3 kgf·m, 17 lb·ft)**

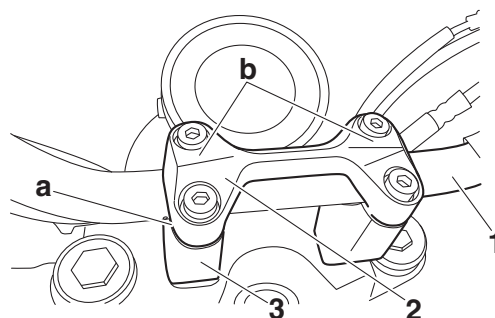
ECA18300

### **NOTICE**

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

### **TIP**

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



4. Tighten:

- Lower handlebar holder nuts



**Lower handlebar holder nut**  
**40 N·m (4.0 kgf·m, 30 lb·ft)**

5. Install:

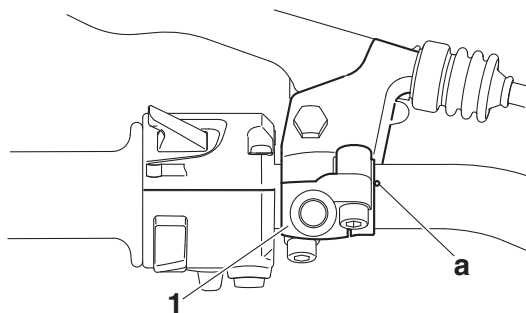
- Clutch lever holder "1"



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

### **TIP**

Align the mating surfaces of the clutch lever holder with the punch mark "a" on the handlebar.



## 6. Install:

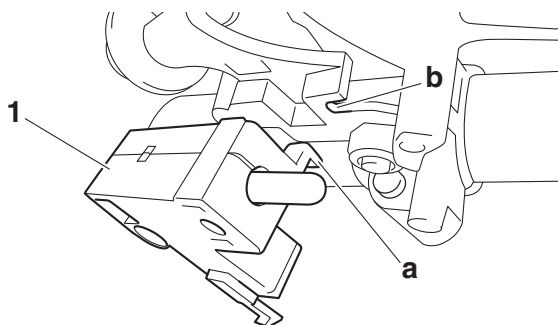
- Clutch lever
- Clutch switch "1"



**Clutch lever pivot bolt**  
1.4 N·m (0.14 kgf·m, 1.0 lb·ft)  
**Clutch lever pivot nut**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)  
**Clutch switch screw**  
0.8 N·m (0.08 kgf·m, 0.59 lb·ft)

## TIP

Align the projection "a" on the clutch switch with the slit "b" in the clutch lever holder.



## 7. Connect:

- Clutch cable

## TIP

Lubricate the end of the clutch cable with a thin coat of lithium-soap-based grease.

## 8. Install:

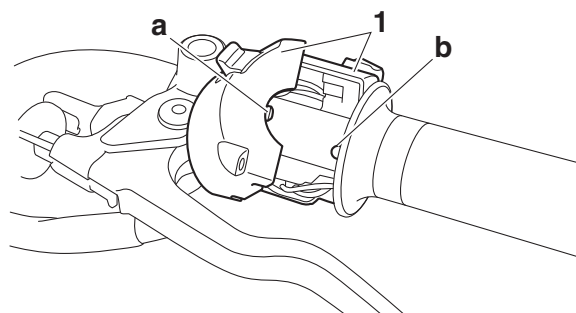
- Handlebar switch (left) "1"



**Handlebar switch screw (left)**  
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

## TIP

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



## 9. Connect:

- Clutch switch coupler

## 10. Install:

- Handlebar grip
- Grip end (left) "1"



**Grip end bolt**  
7 N·m (0.7 kgf·m, 5.2 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.

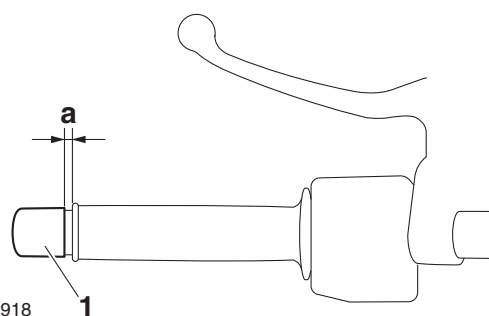
EWA13700

## WARNING

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

## TIP

There should be 0.4–4.5 mm (0.02–0.18 in) of clearance "a" between the handlebar grip and the grip end.



G088918

## 11. Install:

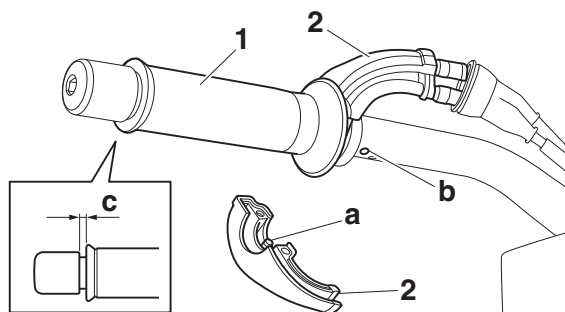
- Throttle grip "1"
- Throttle cables
- Throttle cable housing "2"
- Grip end



**Throttle cable housing bolt**  
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)  
**Grip end bolt**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)

## TIP

- Align the projection “a” on the throttle cable housing with the hole “b” in the handlebar.
- There should be 0.4–4.5 mm (0.02–0.18 in) of clearance “c” between the throttle grip and the grip end.



## 12.Install:

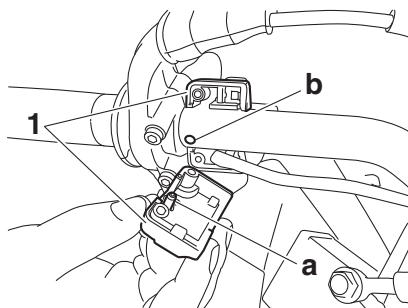
- Handlebar switch (right) “1”



**Handlebar switch screw (right)**  
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

## TIP

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



## 13.Install:

- Front brake master cylinder assembly  
Refer to “INSTALLING THE FRONT BRAKE MASTER CYLINDER” on page 4-28.

## 14.Check:

- Cable routing

## TIP

Make sure the brake hose, throttle cables, clutch cable, and handlebar switch leads are routed properly. Refer to “CABLE ROUTING” on page 2-13.

## 15.Adjust:

- Clutch lever free play  
Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-9.



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

## 16.Adjust:

- Throttle grip free play  
Refer to “ADJUSTING THE THROTTLE GRIP FREE PLAY” on page 3-21.

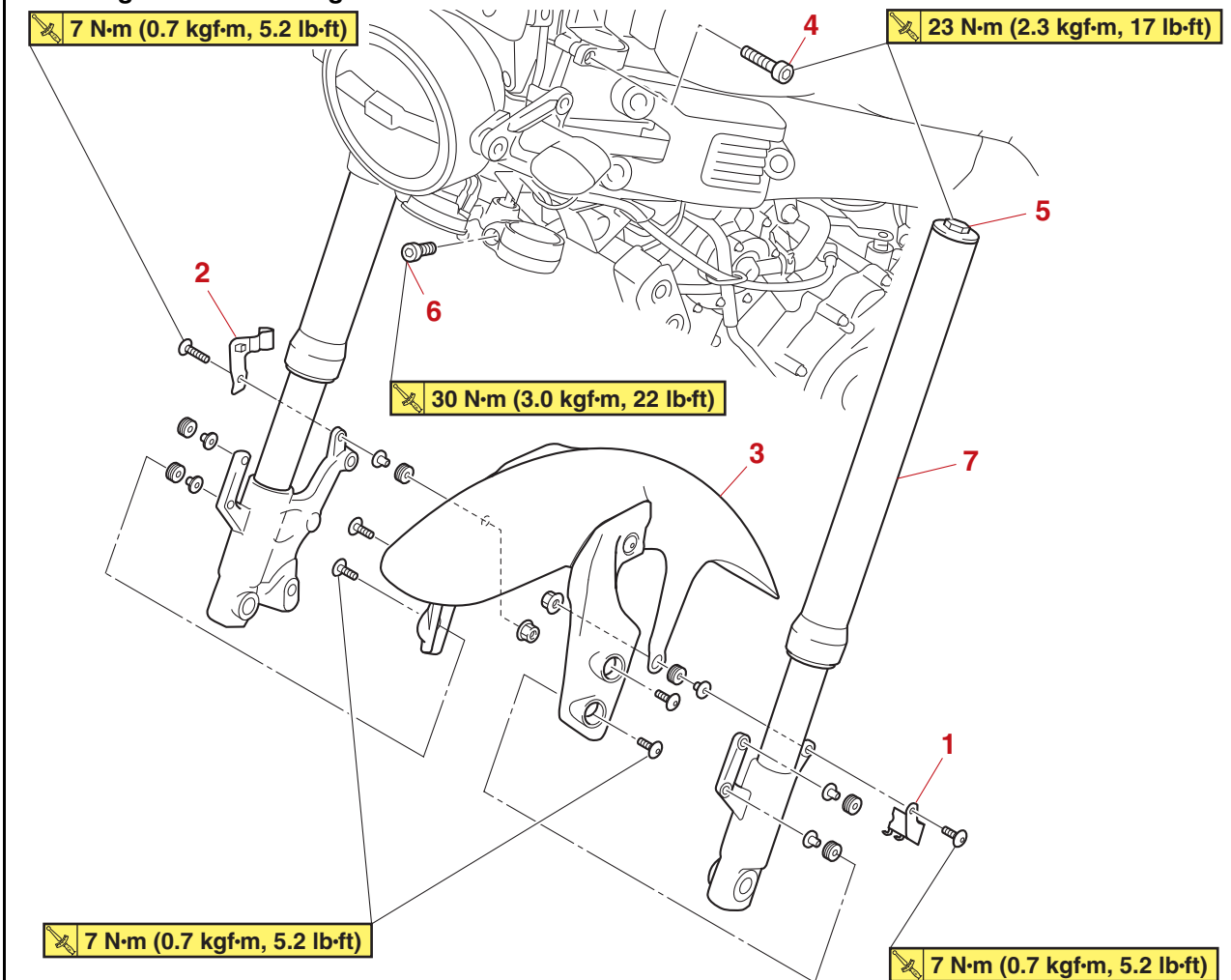


**Throttle grip free play**  
3.0–5.0 mm (0.12–0.20 in)

EAS20034

## FRONT FORK

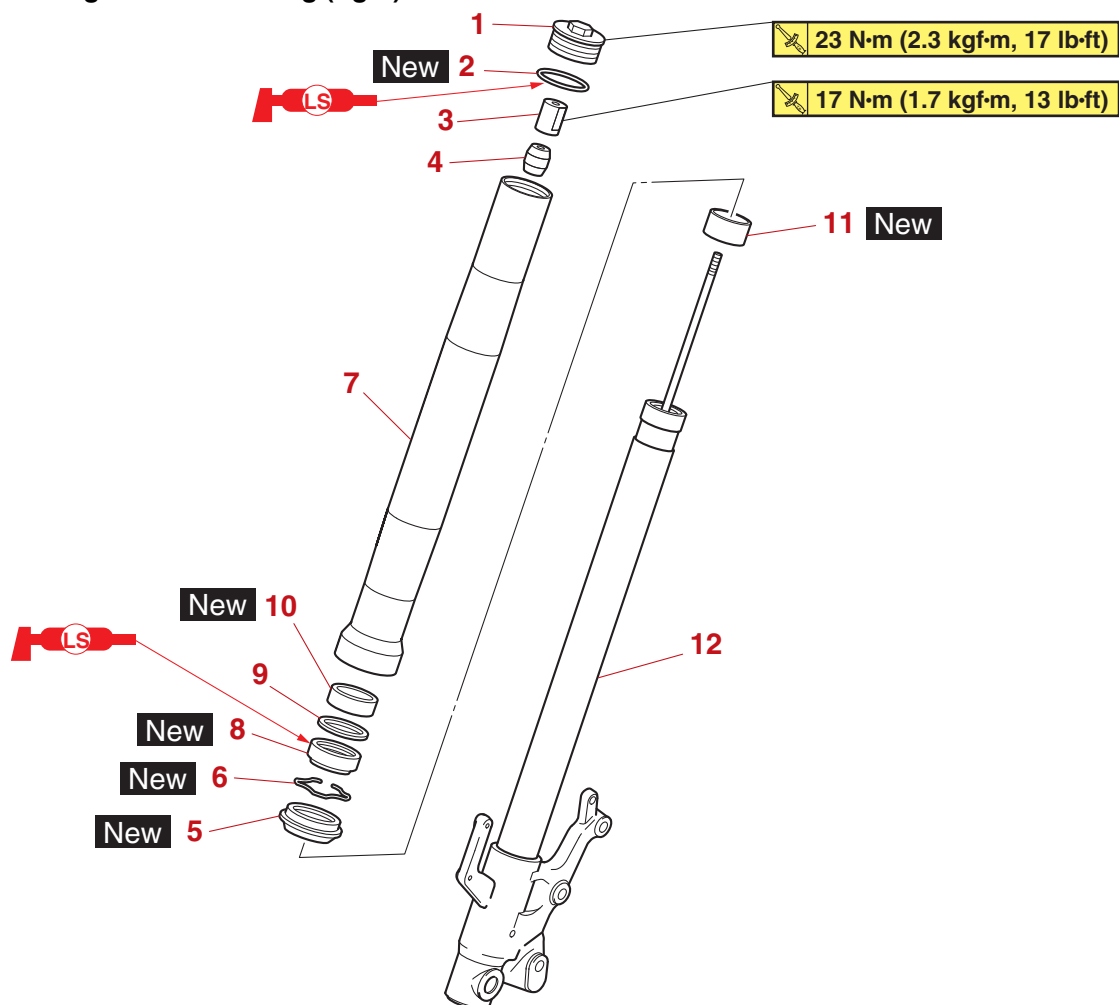
### Removing the front fork legs



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

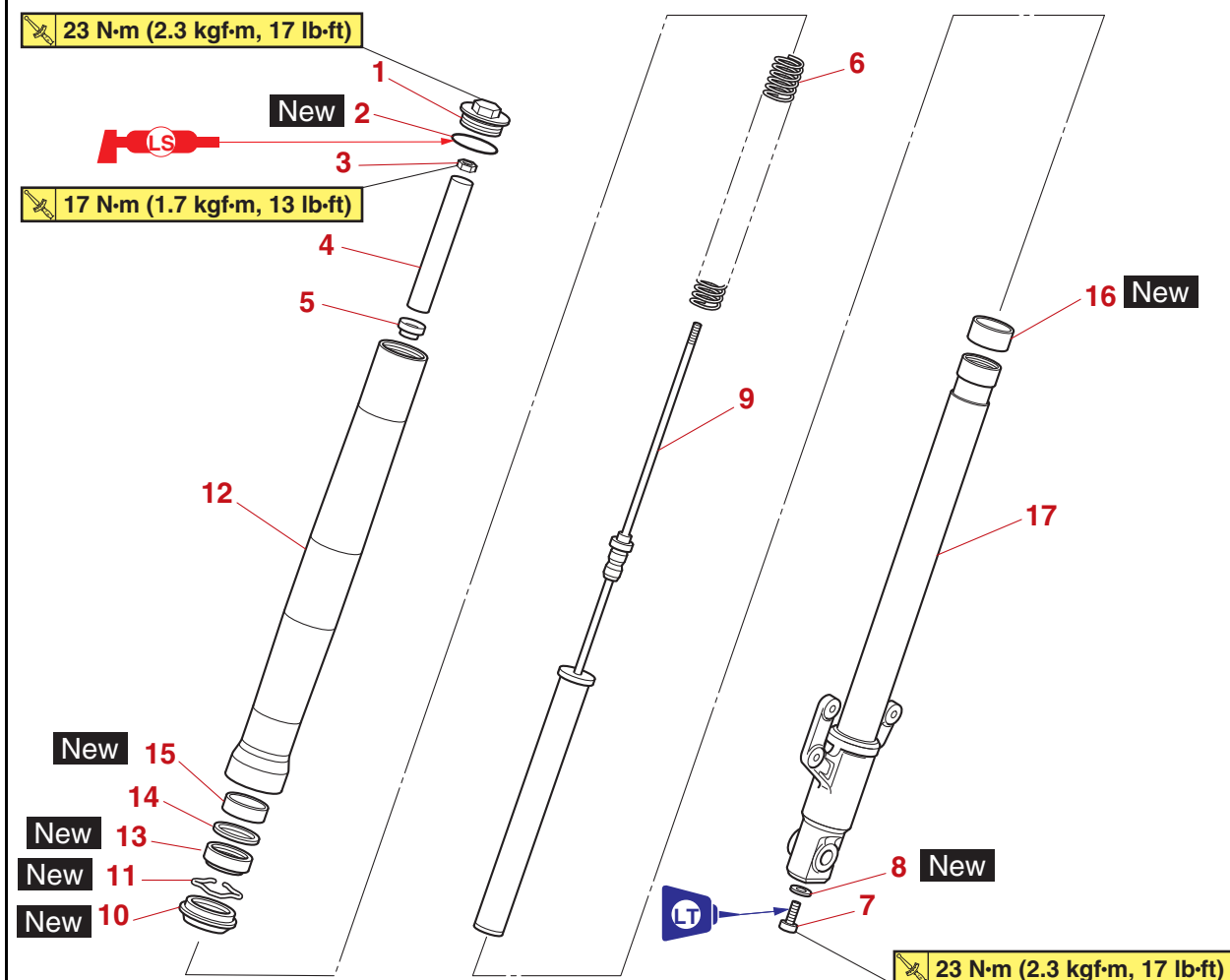
# FRONT FORK

## Disassembling the front fork leg (right)



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|---------|
| 1     | Cap bolt            | 1    |         |
| 2     | O-ring              | 1    |         |
| 3     | Locknut             | 1    |         |
| 4     | Rubber damper       | 1    |         |
| 5     | Dust seal           | 1    |         |
| 6     | Oil seal clip       | 1    |         |
| 7     | Outer tube          | 1    |         |
| 8     | Oil seal            | 1    |         |
| 9     | Washer              | 1    |         |
| 10    | Outer tube bushing  | 1    |         |
| 11    | Inner tube bushing  | 1    |         |
| 12    | Inner tube          | 1    |         |

## Disassembling the front fork leg (left)



| Order | Job/Parts to remove      | Q'ty | Remarks |
|-------|--------------------------|------|---------|
| 1     | Cap bolt                 | 1    |         |
| 2     | O-ring                   | 1    |         |
| 3     | Locknut                  | 1    |         |
| 4     | Spacer                   | 1    |         |
| 5     | Spring seat              | 1    |         |
| 6     | Fork spring              | 1    |         |
| 7     | Damper rod assembly bolt | 1    |         |
| 8     | Copper washer            | 1    |         |
| 9     | Damper rod assembly      | 1    |         |
| 10    | Dust seal                | 1    |         |
| 11    | Oil seal clip            | 1    |         |
| 12    | Outer tube               | 1    |         |
| 13    | Oil seal                 | 1    |         |
| 14    | Washer                   | 1    |         |
| 15    | Outer tube bushing       | 1    |         |
| 16    | Inner tube bushing       | 1    |         |
| 17    | Inner tube               | 1    |         |

EAS30206

## REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

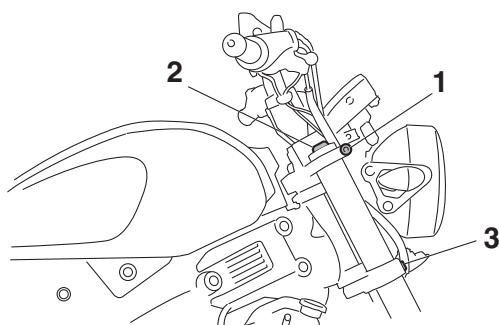
EWA13120

### **WARNING**

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

2. Loosen:

- Upper bracket pinch bolt "1"
- 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 LEG (right)

1. Loosen:

- Cap bolt "1"
- Locknut "2"
- Rubber damper "3"
  - a. Press down on the outer tube "4".
  - b. Hold the locknut "2" with the double open-end wrench "5", and remove the cap bolt "1".
  - c. Remove the locknut "2" and rubber damper "3".

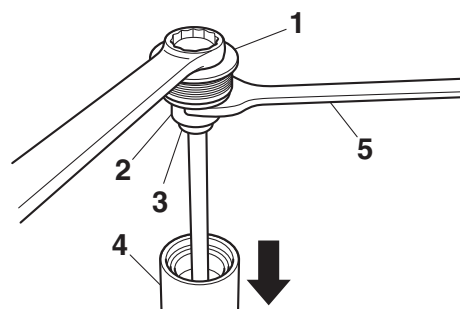


**Double open-end wrench (25mm-16mm)**

**90890-01593**

**Double open-end wrench (25mm-16mm)**

**YM-01593**

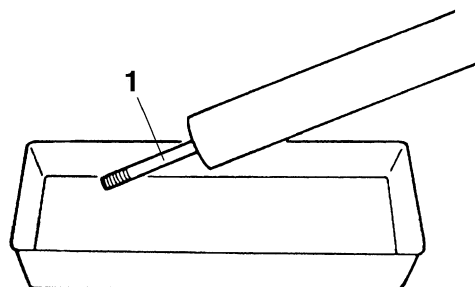


2. Drain:

- Fork oil

### **TIP**

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



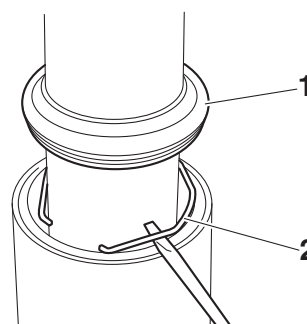
3. Remove:

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

ECA14180

### **NOTICE**

**Do not scratch the inner tube.**



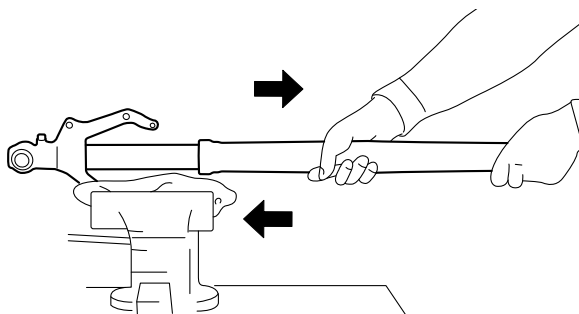
4. Remove:

- Outer tube
  - a. Hold the front fork leg horizontally.
  - b. Securely clamp the fender 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.**



EAS31649

## DISASSEMBLING THE FRONT FORK LEG (left)

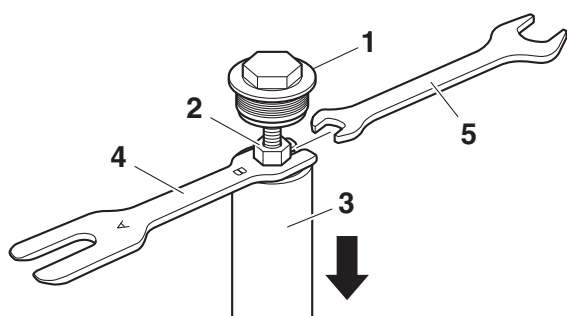
1. Remove:
  - Cap bolt "1"
  - Locknut "2"
  - a. Press down on the spacer "3" with the fork spring compressor.
  - b. Install the rod holder "4" between the locknut "2", and the spacer "3".
  - c. Loosen the locknut "2" with the double open-end wrench "5".



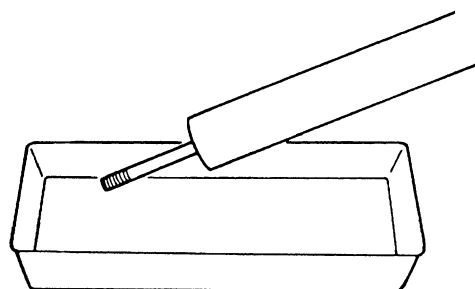
**Double open-end wrench (25mm-16mm)**  
90890-01593  
**Double open-end wrench (25mm-16mm)**  
YM-01593  
**Rod holder**  
90890-01434  
**Damper rod holder double ended**  
YM-01434  
**Fork spring compressor**  
90890-01441  
**Fork spring compressor**  
YM-01441

## TIP

Use the side of the rod holder that is mark "B".



- d. Remove the cap bolt "1" and locknut "2".
2. Remove:
  - Spacer
  - Spring seat
  - Fork spring
3. Drain:
  - Fork oil



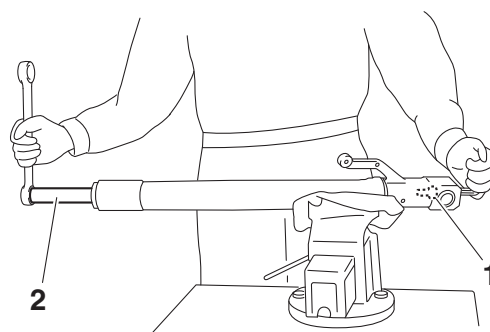
4. Remove:
  - Damper rod assembly bolt
  - Copper washer
  - Damper rod assembly

## TIP

While holding the damper rod with the damper rod holder "2", loosen the damper rod assembly bolt "1".



**Damper rod holder (32mm)**  
90890-01591  
**Damper rod holder (32mm)**  
YM-01591

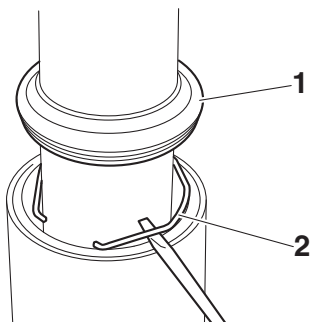


5. Remove:
  - Dust seal "1"
  - Oil seal clip "2"
  - (with a flat-head screwdriver)

ECA14180

## NOTICE

**Do not scratch the inner tube.**



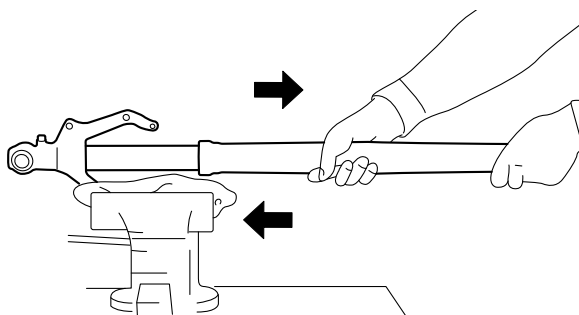
## 6. Remove:

- Outer tube
  - a. Hold the front fork leg horizontally.
  - b. Securely clamp the fender 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.**



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

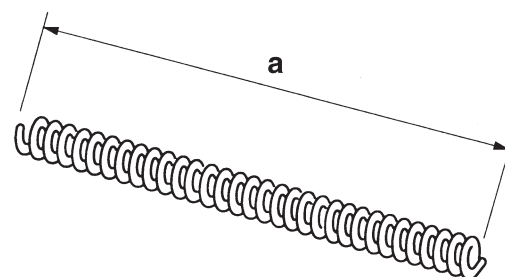
**Do not attempt to straighten a bent inner tube as this may dangerously weaken it.**

### 2. Measure:

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



**Fork spring free length limit  
299.4 mm (11.79 in)**



G088921

### 3. Check:

- Damper rod assembly
- Damage/wear → Replace.  
Obstruction → Blow out all of the oil passages with compressed air. (right front fork leg only)

ECA20550

### NOTICE

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

EAS30209

## ASSEMBLING THE FRONT FORK LEG (right)

### TIP

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

### 1. Lubricate:

- Inner tube's outer surface



**Recommended oil  
Yamaha Suspension Oil 01**

### 2. 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**

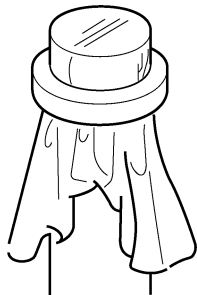
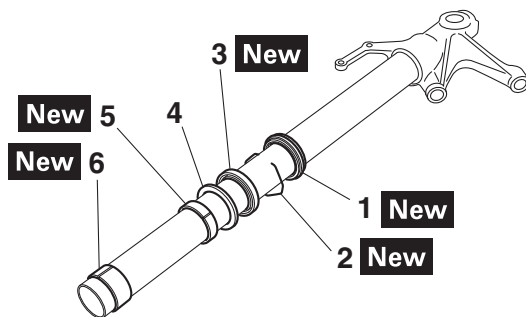
ECA19860

## NOTICE

Make sure to face the numbered side of the oil seal toward the bottom end of the inner tube.

## TIP

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



### 3. Install:

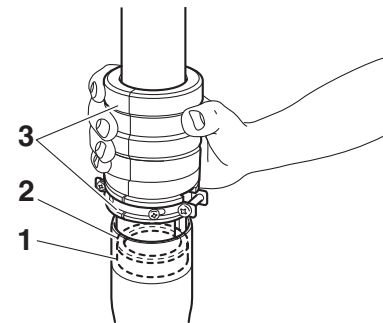
- Outer tube  
(to the inner tube)

### 4. 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**

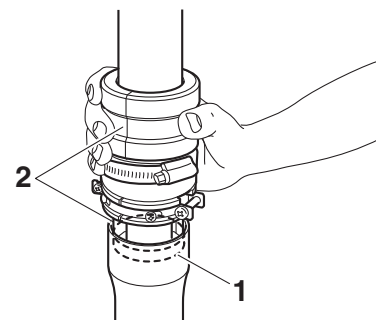


### 5. Install:

- Oil seal "1"  
(with the fork seal driver "2")



**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**

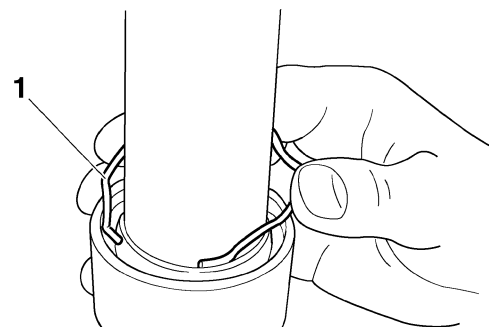


### 6. Install:

- Oil seal clip "1"

## TIP

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



### 7. Install:

- Dust seal "1"  
(with the fork seal driver "2")

# FRONT FORK



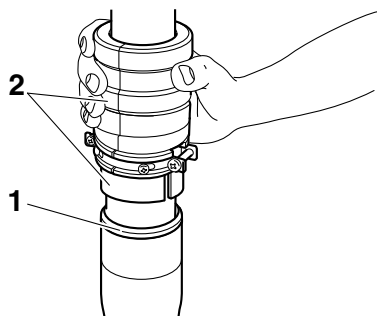
**Fork seal driver**  
90890-01442  
**Adjustable fork seal driver (36–46 mm)**  
YM-01442



**Double open-end wrench (25mm-16mm)**  
90890-01593  
**Double open-end wrench (25mm-16mm)**  
YM-01593



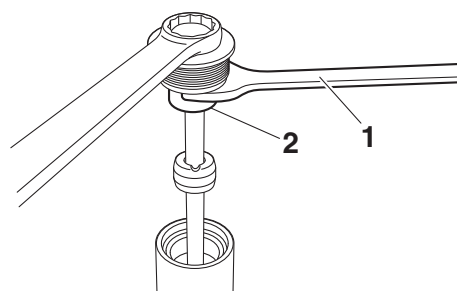
**Locknut**  
17 N·m (1.7 kgf·m, 13 lb·ft)



8. Fully compress the front fork leg.
9. Fill:
  - Front fork leg  
(with the specified amount of the recommended fork oil)



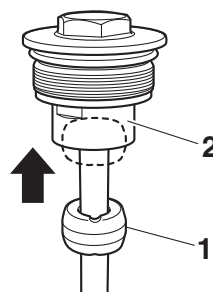
**Recommended oil**  
**Yamaha Suspension Oil 01**  
**Quantity (right)**  
356.0 cm<sup>3</sup> (12.04 US oz, 12.56 Imp.oz)



12. Install:
  - Rubber damper “1”

## TIP

Push the rubber damper into locknut “2” until it stop.



13. 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.

ECA14230

## NOTICE

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

## 10. Install:

- Rubber damper
- Locknut

## 11. Install:

- Cap bolt  
(along with the O-ring **New**)
  - a. Screw the cap bolt by hand until it touches the damper rod assembly.
  - b. Tighten the locknut “2” with the double open-end wrench “1” to the specified torque.

EAS31055

## ASSEMBLING THE FRONT FORK LEG (left)

## TIP

- When assembling the front fork leg, be sure to replace the following parts:
  - Inner tube bushing
  - Outer tube bushing

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

## 1. Lubricate:

- Inner tube's outer surface



**Recommended oil**  
**Yamaha Suspension Oil 01**

## 2. 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**

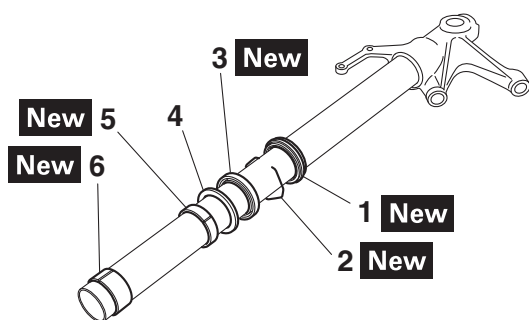
ECA19860

### NOTICE

**Make sure to face the numbered side of the oil seal toward the bottom end of the inner tube.**

### TIP

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



## 3. Install:

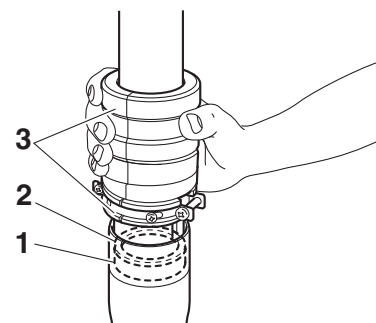
- Outer tube  
(to the inner tube)

## 4. 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**

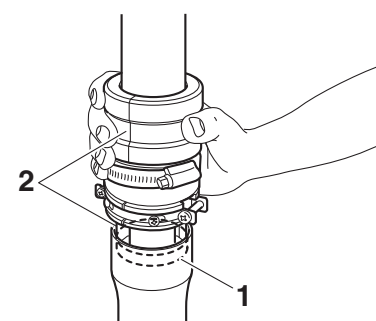


## 5. Install:

- Oil seal "1"  
(with the fork seal driver "2")



**Fork seal driver**  
**90890-01442**  
**Adjustable fork seal driver (36–46 mm)**  
**YM-01442**



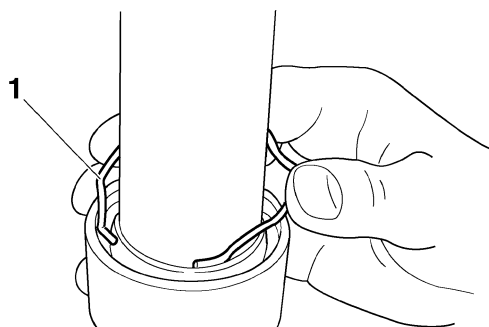
## 6. Install:

- Oil seal clip "1"

### TIP

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

# FRONT FORK

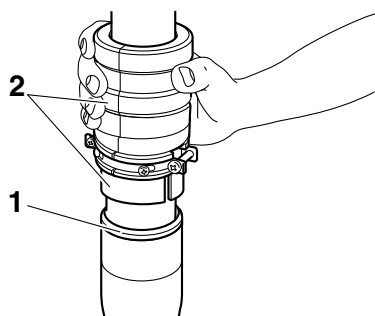


7. Install:

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



**Fork seal driver**  
90890-01442  
**Adjustable fork seal driver (36–46 mm)**  
YM-01442



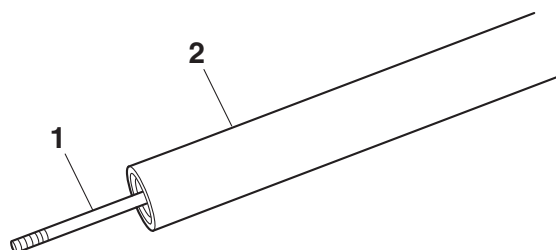
8. Install:

- Damper rod assembly “1”

ECA19120

## NOTICE

Allow the damper rod assembly to slide slowly down the inner tube “2” until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



9. Install:

- Damper rod assembly bolt “1”
- Copper washer **New**

## TIP

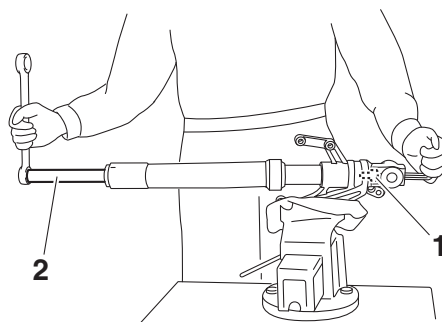
Secure the fender bracket in a vise, and then tighten the damper rod assembly bolt “1” with the damper rod holder “2” to the specified torque.



**Damper rod assembly bolt**  
23 N·m (2.3 kgf·m, 17 lb·ft)  
**LOCTITE®**



**Damper rod holder (32mm)**  
90890-01591  
**Damper rod holder (32mm)**  
YM-01591



10. Fill:

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



**Recommended oil**  
**Yamaha Suspension Oil 01**  
**Quantity (left)**  
314.0 cm<sup>3</sup> (10.62 US oz, 11.07 Imp.oz)

ECA14230

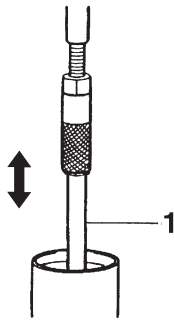
## NOTICE

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

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.



G088929

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

## TIP

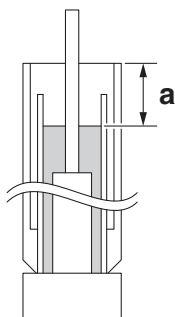
Be sure to bleed the front fork leg of any residual air.

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.



**Level (left)**  
**93 mm (3.7 in)**



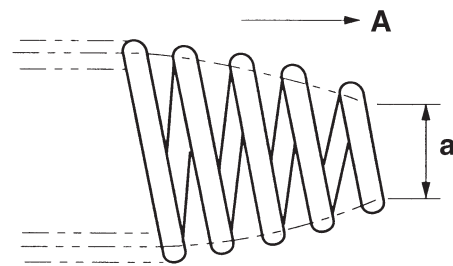
G088930

14. Install:

- Fork spring
  - Spring seat
  - Spacer
  - Locknut
  - Cap bolt  
(along with the O-ring **New**)
- a. Install the fork spring.

## TIP

Install the fork spring with the smaller diameter "a" face up "A".



G088931

- Install the locknut all the way onto the damper rod assembly.
- Install the rod puller and rod puller attachment.
- Install the spring seat and spacer.
- Install the fork spring compressor.
- Press down on the spacer with the fork spring compressor.
- Pull up the rod puller and install the rod holder between the locknut and the spacer.



**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**

**Rod holder**  
**90890-01434**

**Damper rod holder double ended**  
**YM-01434**

**Fork spring compressor**  
**90890-01441**

**Fork spring compressor**  
**YM-01441**

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

EWA13670



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

- Hold the cap bolt and tighten the locknut with the double open-end wrench.

# FRONT FORK

|                                                                                   |                                                                                                                                |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Double open-end wrench (25mm-16mm)</b><br/>90890-01593</p> <p><b>Double open-end wrench (25mm-16mm)</b><br/>YM-01593</p> |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|

|                                                                                   |                                                        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|
|  | <p><b>Locknut</b><br/>17 N·m (1.7 kgf·m, 13 lb·ft)</p> |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|

k. Remove the rod holder and fork spring compressor.

15. 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.

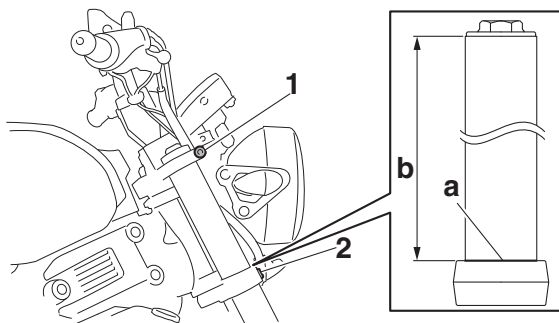
1. Install:

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

|                                                                                     |                                                                                                |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|  | <p><b>Installed length (lower bracket to end of outer tube) “b”</b><br/>211.0 mm (8.27 in)</p> |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

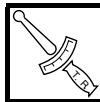
## TIP

Put the mark “a” to specification length, and then install the front fork legs to align the mark “a” with top of lower bracket “2”.

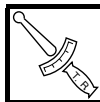


2. Tighten:

- Lower bracket pinch bolt

|                                                                                   |                                                                         |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|  | <p><b>Lower bracket pinch bolt</b><br/>30 N·m (3.0 kgf·m, 22 lb·ft)</p> |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|

- Cap bolt

|                                                                                   |                                                         |
|-----------------------------------------------------------------------------------|---------------------------------------------------------|
|  | <p><b>Cap bolt</b><br/>23 N·m (2.3 kgf·m, 17 lb·ft)</p> |
|-----------------------------------------------------------------------------------|---------------------------------------------------------|

- Upper bracket pinch bolt

|                                                                                   |                                                                         |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|  | <p><b>Upper bracket pinch bolt</b><br/>23 N·m (2.3 kgf·m, 17 lb·ft)</p> |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|

EWA20690

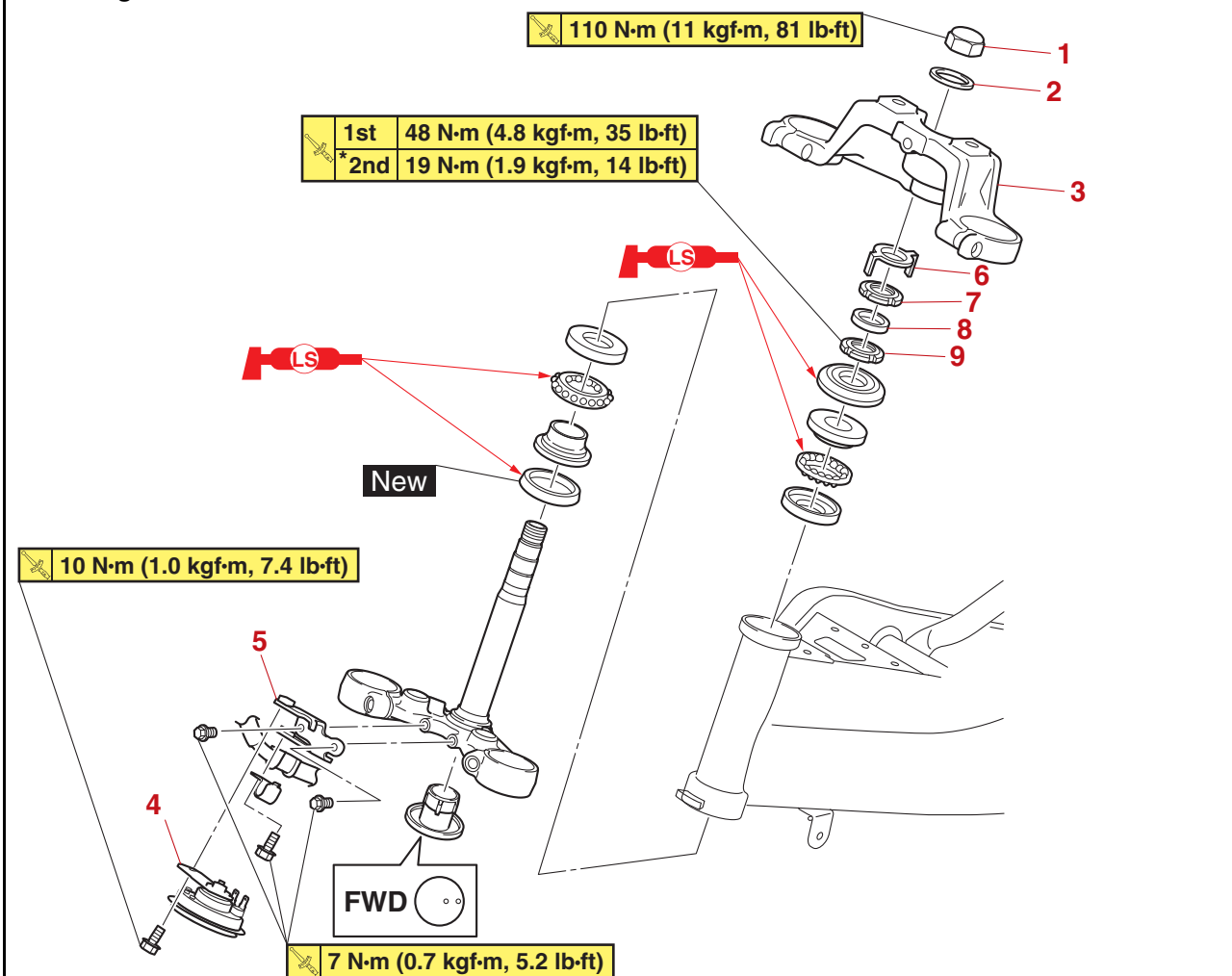
## WARNING

**Make sure the brake hose, clutch cable, and leads are routed properly.**

EAS20035

## STEERING HEAD

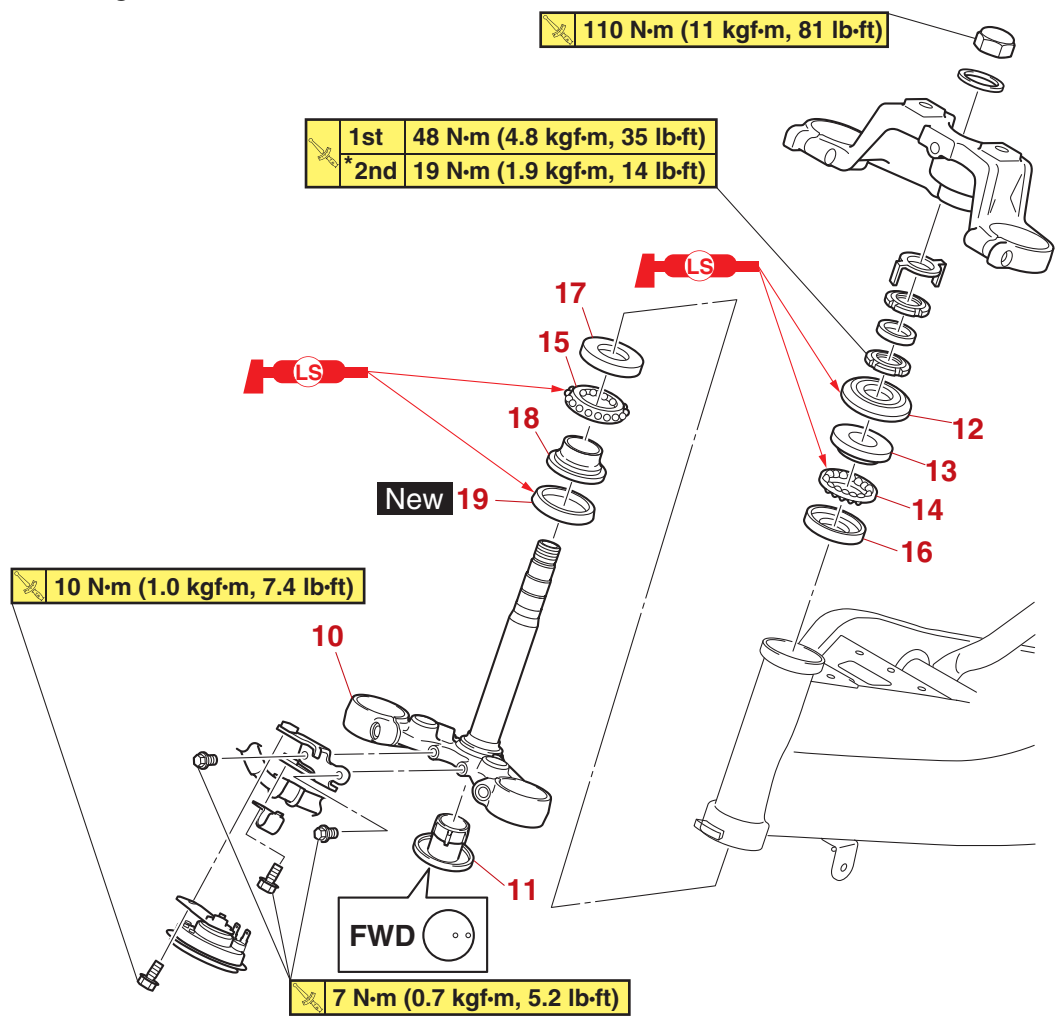
### Removing the lower bracket



\*Loosen the lower ring nut completely and then tighten it to specification.

| Order | Job/Parts to remove               | Q'ty | Remarks                                     |
|-------|-----------------------------------|------|---------------------------------------------|
|       | Fuel tank                         |      | Refer to "FUEL TANK" on page 7-1.           |
|       | Headlight assembly/Meter assembly |      | Refer to "GENERAL CHASSIS (4)" on page 4-5. |
|       | Handlebar                         |      | Refer to "HANDLEBAR" on page 4-48.          |
|       | Front fork leg                    |      | Refer to "FRONT FORK" on page 4-53.         |
| 1     | Steering stem nut                 | 1    |                                             |
| 2     | Washer                            | 1    |                                             |
| 3     | Upper bracket                     | 1    |                                             |
| 4     | Horn                              | 1    |                                             |
| 5     | Front brake hose holder           | 1    |                                             |
| 6     | Lock washer                       | 1    |                                             |
| 7     | Upper ring nut                    | 1    |                                             |
| 8     | Rubber washer                     | 1    |                                             |
| 9     | Lower ring nut                    | 1    |                                             |

Removing the lower bracket



\*Loosen the lower ring nut completely and then tighten it to specification.

| Order | Job/Parts to remove      | Q'ty | Remarks |
|-------|--------------------------|------|---------|
| 10    | Lower bracket            | 1    |         |
| 11    | Cap                      | 1    |         |
| 12    | Bearing cover            | 1    |         |
| 13    | Upper bearing inner race | 1    |         |
| 14    | Upper bearing            | 1    |         |
| 15    | Lower bearing            | 1    |         |
| 16    | Upper bearing outer race | 1    |         |
| 17    | Lower bearing outer race | 1    |         |
| 18    | Lower bearing inner race | 1    |         |
| 19    | Dust seal                | 1    |         |

# STEERING HEAD

EAS30213

## REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

2. Remove:

- Upper ring nut
- Rubber washer
- Lower ring nut "1"
- Lower bracket

### **TIP**

Remove the lower ring nut with the steering nut wrench "2".



**Steering nut wrench**

**90890-01403**

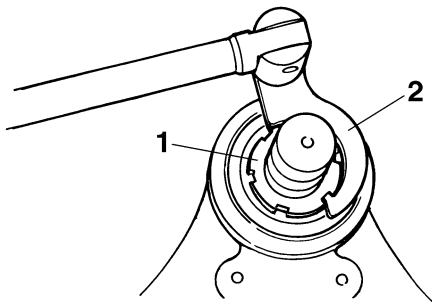
**Exhaust flange nut wrench**

**YU-A9472**

EWA13730

### **WARNING**

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



EAS30214

## CHECKING THE STEERING HEAD

1. Wash:

- Bearings
- Bearing races



**Recommended cleaning solvent**  
**Kerosene**

2. Check:

- Bearings
  - Bearing races
- Damage/pitting → Replace.

3. Replace:

- Bearings
- Bearing races

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

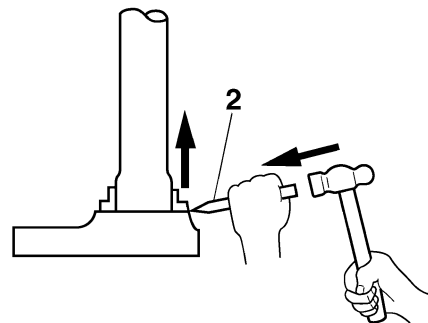
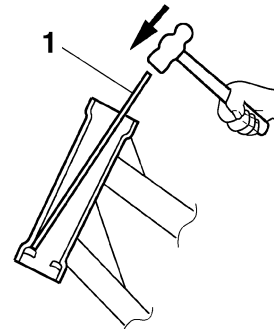
ECA14270

### **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.



4. Check:

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

EAS30216

## INSTALLING THE STEERING HEAD

1. Lubricate:

- Upper bearing
- Lower bearing
- Bearing races



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

2. Install:

- Lower ring nut
- Rubber washer
- Upper ring nut
- Lock washer

Refer to "CHECKING AND ADJUSTING  
THE STEERING HEAD" on page 3-14.

3. Install:

- Upper bracket
- Steering stem nut

**TIP**

Temporarily tighten the steering stem nut.

4. Install:

- Front fork legs

Refer to "FRONT FORK" on page 4-53.

**TIP**

Temporarily tighten the upper and lower bracket  
pinch bolts.

5. Tighten:

- Steering stem nut



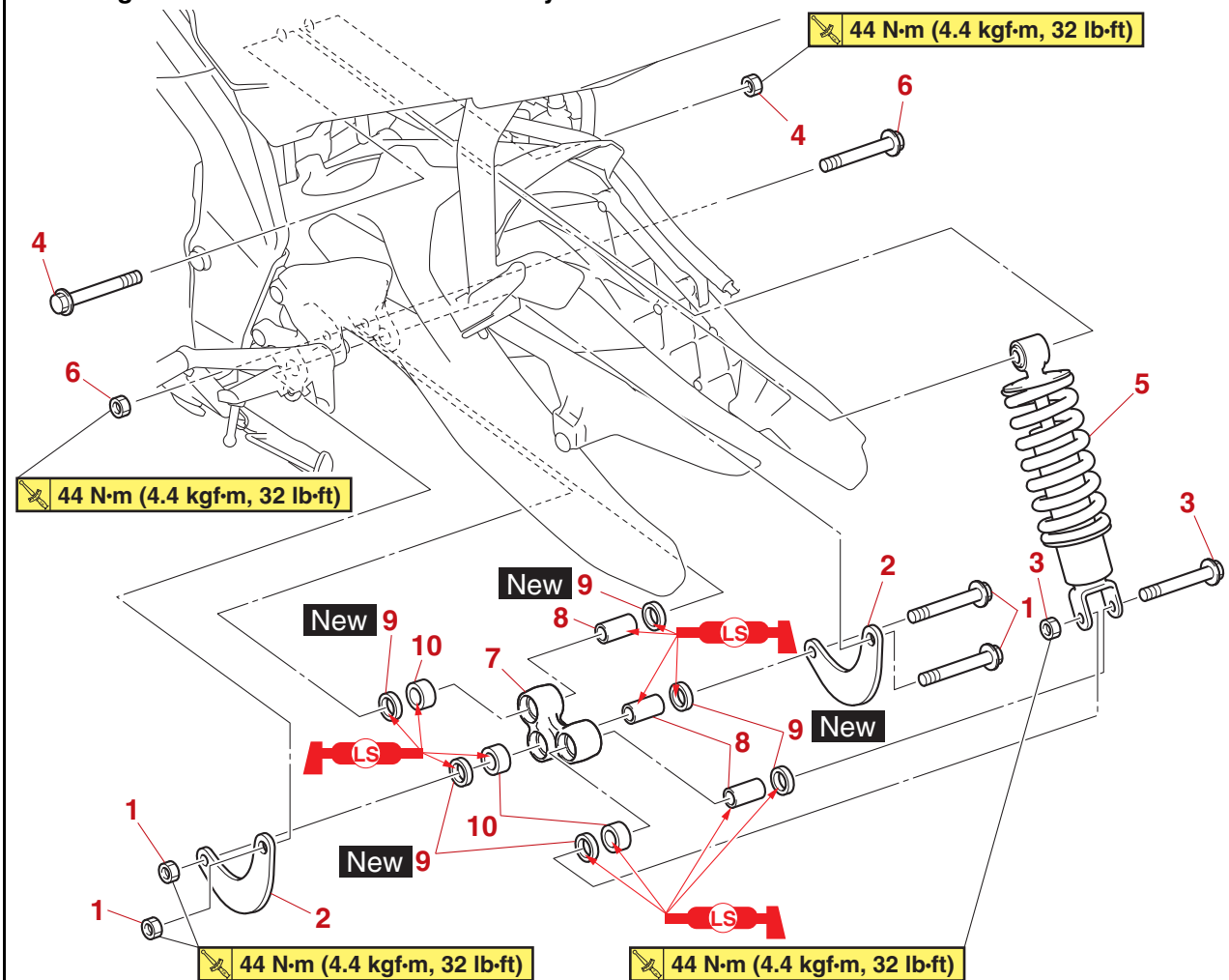
**Steering stem nut**  
**110 N·m (11 kgf·m, 81 lb·ft)**

## REAR SHOCK ABSORBER ASSEMBLY

EAS20036

## REAR SHOCK ABSORBER ASSEMBLY

## Removing the rear shock absorber assembly



| Order | Job/Parts to remove                         | Q'ty | Remarks                             |
|-------|---------------------------------------------|------|-------------------------------------|
|       | Rear wheel                                  |      | Refer to "REAR WHEEL" on page 4-14. |
| 1     | Connecting arm nut/bolt                     | 2/2  |                                     |
| 2     | Connecting arm                              | 2    |                                     |
| 3     | Rear shock absorber assembly lower nut/bolt | 1/1  |                                     |
| 4     | Rear shock absorber assembly upper nut/bolt | 1/1  |                                     |
| 5     | Rear shock absorber assembly                | 1    |                                     |
| 6     | Relay arm nut/bolt                          | 1/1  |                                     |
| 7     | Relay arm                                   | 1    |                                     |
| 8     | Spacer                                      | 3    |                                     |
| 9     | Oil seal                                    | 6    |                                     |
| 10    | Bearing                                     | 3    |                                     |

# REAR SHOCK ABSORBER ASSEMBLY

EAS31304

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120



### WARNING

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

### TIP

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

EAS31305

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
  - Rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.
  - Rear shock absorber  
Oil leaks → Replace the rear shock absorber assembly.
  - Spring  
Damage/wear → Replace the rear shock absorber assembly.
  - Bushing  
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/pitting → Replace.
3. Check:
  - Spacers  
Damage/scratches → Replace.

EAS30212

## INSTALLING THE RELAY ARM

1. Lubricate:
  - Bearings
  - Oil seals
  - Spacers



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

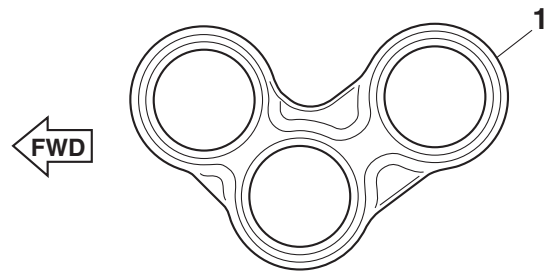
EAS31366

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
  - Relay arm “1”
  - Rear shock absorber assembly

### TIP

Install the relay arm as shown in the illustration.



2. Tighten:
  - Rear shock absorber assembly upper bolt



**Rear shock absorber assembly upper nut**  
44 N·m (4.4 kgf·m, 32 lb·ft)

- Relay arm nut



**Relay arm nut**  
44 N·m (4.4 kgf·m, 32 lb·ft)

- Rear shock absorber assembly lower nut



**Rear shock absorber assembly lower nut**  
44 N·m (4.4 kgf·m, 32 lb·ft)

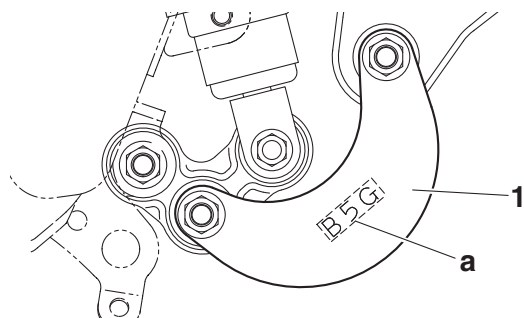
3. Install:
  - Connecting arms “1”

### TIP

- When installing the connecting arms, lift up the swingarm.
- Install the connecting arms with the stamped mark “a” facing to the left.

## REAR SHOCK ABSORBER ASSEMBLY

---



### 4. Tighten:

- Connecting arm nuts

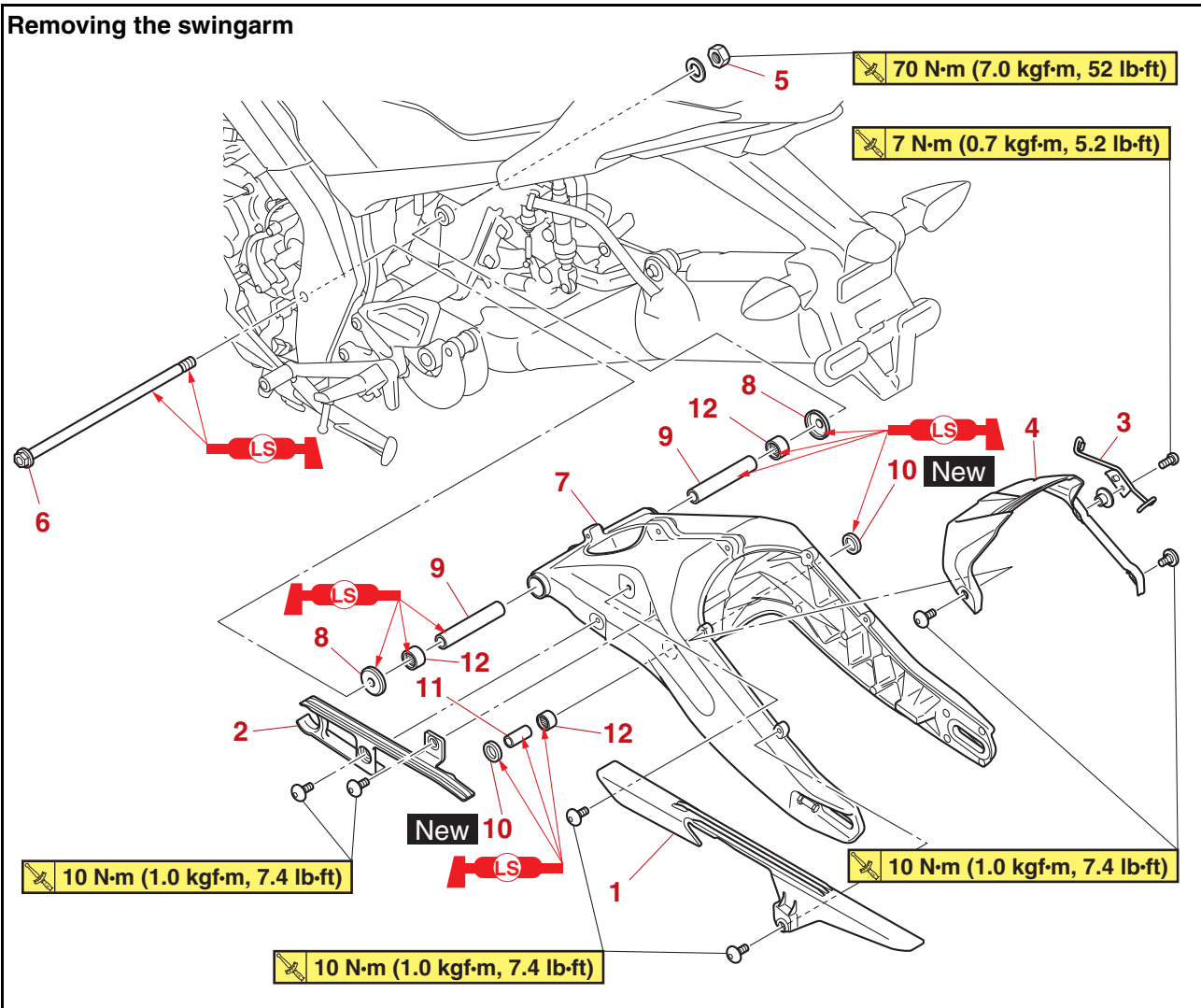


**Connecting arm nut**  
**44 N·m (4.4 kgf·m, 32 lb·ft)**

EAS20037

## SWINGARM

### Removing the swingarm



| Order | Job/Parts to remove          | Q'ty | Remarks                                               |
|-------|------------------------------|------|-------------------------------------------------------|
|       | Rear wheel                   |      | Refer to "REAR WHEEL" on page 4-14.                   |
|       | Rear shock absorber assembly |      | Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-69. |
|       | Drive chain                  |      | Refer to "CHAIN DRIVE" on page 4-75.                  |
| 1     | Drive chain guard            | 1    |                                                       |
| 2     | Drive chain guide            | 1    |                                                       |
| 3     | Rear brake hose guide        | 1    |                                                       |
| 4     | Mudguard                     | 1    |                                                       |
| 5     | Pivot shaft nut              | 1    |                                                       |
| 6     | Pivot shaft                  | 1    |                                                       |
| 7     | Swingarm                     | 1    |                                                       |
| 8     | Dust cover                   | 2    |                                                       |
| 9     | Spacer                       | 2    |                                                       |
| 10    | Oil seal                     | 2    |                                                       |
| 11    | Spacer                       | 1    |                                                       |
| 12    | Bearing                      | 3    |                                                       |

EAS30226

## REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

### **WARNING**

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

### **TIP**

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

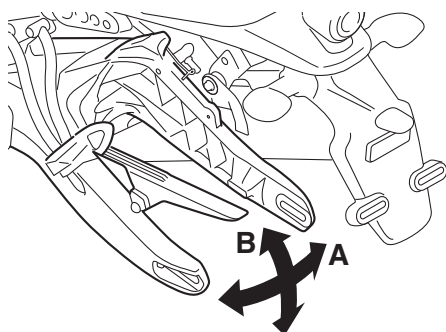
2. Measure:

- Swingarm side play
- Swingarm vertical movement
  - a. Measure the tightening torque of the pivot shaft nut.



**Pivot shaft nut**  
**70 N·m (7.0 kgf·m, 52 lb·ft)**

- b. Check the swingarm side play “A” by moving the swingarm from side to side. If the swingarm has side-to-side play, check the spacers, bearings, and dust covers.
- c. Check the swingarm vertical movement “B” by moving the swingarm up and down. If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, spacers, bearings, and dust covers.



3. Remove:

- Swingarm

EAS30227

## CHECKING THE SWINGARM

1. Check:

- Swingarm  
Bends/cracks/damage → Replace.

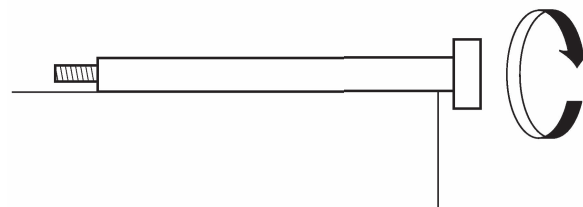
2. Check:

- Pivot shaft  
Roll the pivot shaft on a flat surface.  
Bends → Replace.

EWA13770

### **WARNING**

**Do not attempt to straighten a bent pivot shaft.**



3. Wash:

- Pivot shaft
- Dust covers
- Spacers



**Recommended cleaning solvent**  
**Kerosene**

4. Check:

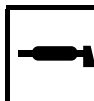
- Dust covers
- Spacers  
Damage/wear → Replace.
- Bearings  
Damage/pitting → Replace.

EAS30228

## INSTALLING THE SWINGARM

1. Lubricate:

- Bearings
- Spacers
- Dust covers
- Pivot shaft



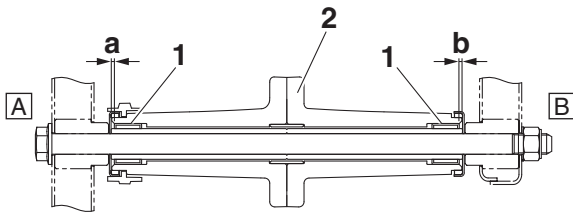
**Recommended lubricant**  
**Lithium-soap-based grease**

2. Install:

- Bearings “1”



**Bearing installed depth “a”**  
**1.0–2.0 mm (0.04–0.08 in)**  
**Bearing installed depth “b”**  
**1.5 mm (0.06 in)**



## 2. Swingarm

A. Left side

B. Right side

## 3. Install:

- Rear shock absorber assembly
- Rear wheel

Refer to “REAR SHOCK ABSORBER ASSEMBLY” on page 4-69.

## 4. Adjust:

- Drive chain slack

Refer to “Adjusting the drive chain slack” on page 3-14.

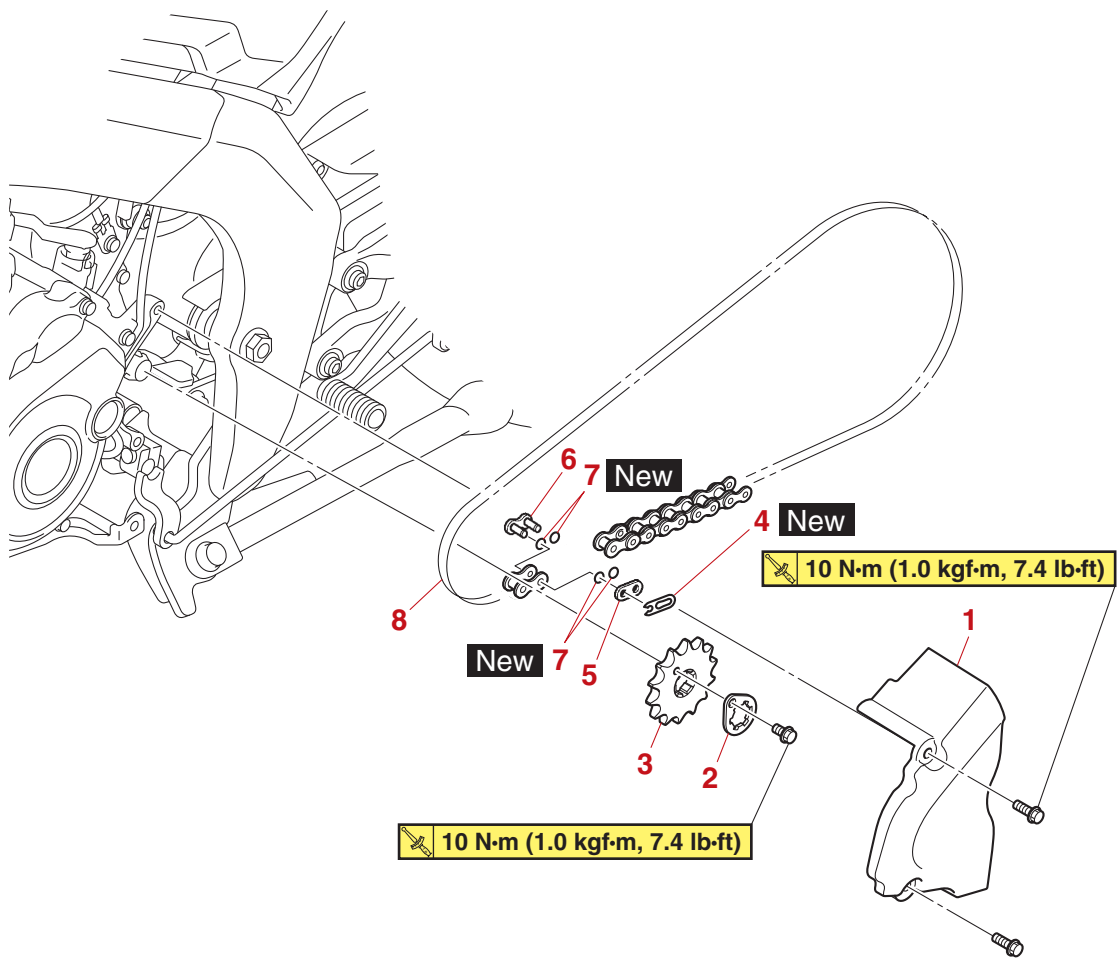


**Drive chain slack (Sidestand)**  
**30.0–40.0 mm (1.18–1.57 in)**

EAS20038

CHAIN DRIVE

Removing the drive chain



| Order | Job/Parts to remove     | Q'ty | Remarks                                                                                 |
|-------|-------------------------|------|-----------------------------------------------------------------------------------------|
|       |                         |      | Loosen the drive chain adjusting locknut and wheel axle nut and push the wheel forward. |
| 1     | Drive sprocket cover    | 1    |                                                                                         |
| 2     | Drive sprocket retainer | 1    |                                                                                         |
| 3     | Drive sprocket          | 1    |                                                                                         |
| 4     | Chain joint clip        | 1    |                                                                                         |
| 5     | Drive chain side plate  | 1    |                                                                                         |
| 6     | Chain joint             | 1    |                                                                                         |
| 7     | O-ring                  | 4    |                                                                                         |
| 8     | Drive chain             | 1    |                                                                                         |

EAS30229

## REMOVING THE DRIVE CHAIN

1. Stand the vehicle on a level surface.

EWA13120

### WARNING

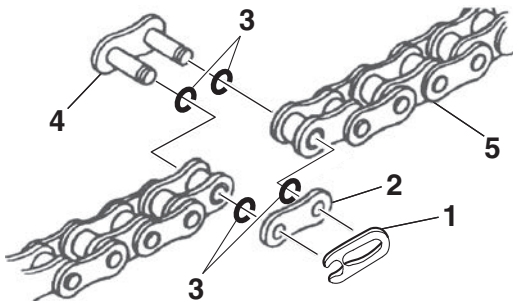
**Securely support the vehicle so that there is no danger of it falling over.**

### TIP

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

2. Remove:

- Chain joint clip “1”
- Drive chain side plate “2”
- O-ring “3”
- Chain joint “4”
- Drive chain “5”



EAS30230

## CHECKING THE DRIVE CHAIN

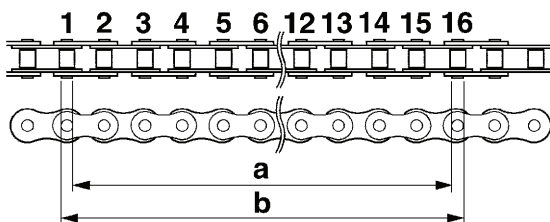
1. Measure:

- 15-link section “a” of the drive chain  
Out of specification → Replace the drive chain.



**15-link length limit  
191.5 mm (7.54 in)**

- a. Measure the length “a” between the inner sides of the pins and the length “b” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.

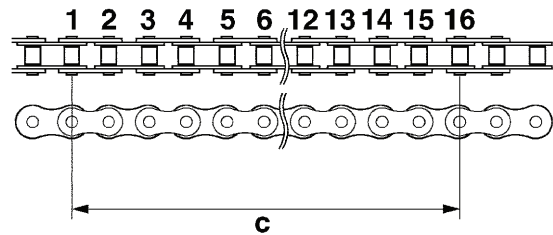


- b. Calculate the length “c” of the 15-link section of the drive chain using the following formula.

Drive chain 15-link section length “c” =  
(length “a” between pin inner sides +  
length “b” between pin outer sides)/2

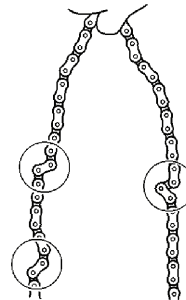
### TIP

- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.



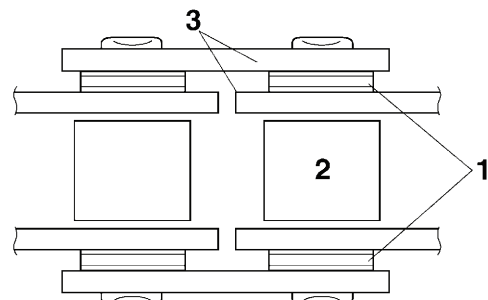
2. Check:

- Drive chain  
Stiffness → Clean and lubricate or replace.



3. Check:

- O-rings “1”  
Damage → Replace the drive chain.
- Drive chain rollers “2”  
Damage/wear → Replace the drive chain.
- Drive chain side plates “3”  
Damage/wear → Replace the drive chain.  
Cracks → Replace the drive chain.

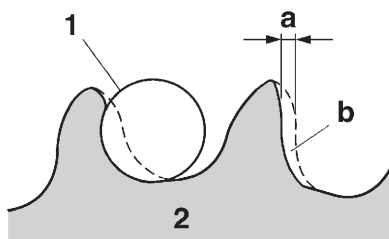


EAS30231

## CHECKING THE DRIVE SPROCKET

### 1. Check:

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



- b. Correct
1. Drive chain roller
  2. Drive chain sprocket

EAS30232

## CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-16.

EAS30234

## INSTALLING THE DRIVE CHAIN

### 1. Lubricate:

- Drive chain
- Chain joint
- O-ring



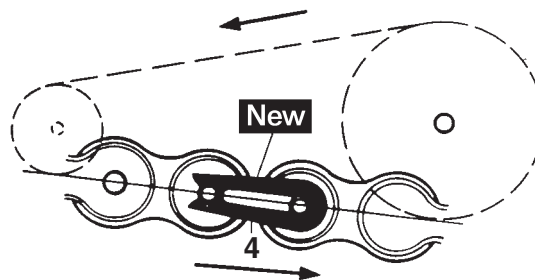
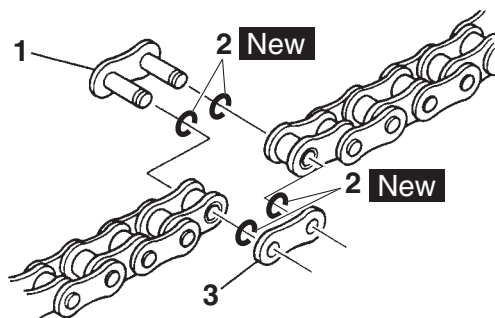
### 2. Install:

- Drive chain
- Chain joint "1"
- O-ring "2" **New**
- Drive chain side plate "3"
- Chain joint clip "4" **New**

ECA24040

### NOTICE

Be sure to install the chain joint clip to the direction as shown.



### 3. Install:

- Drive sprocket cover

### TIP

Be sure not to pinch the gear position switch lead when installing the drive sprocket cover.

### 4. Adjust:

- Drive chain slack  
Refer to "Adjusting the drive chain slack" on page 3-14.



**Drive chain slack (Sidestand)**  
30.0–40.0 mm (1.18–1.57 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.

---

# ENGINE

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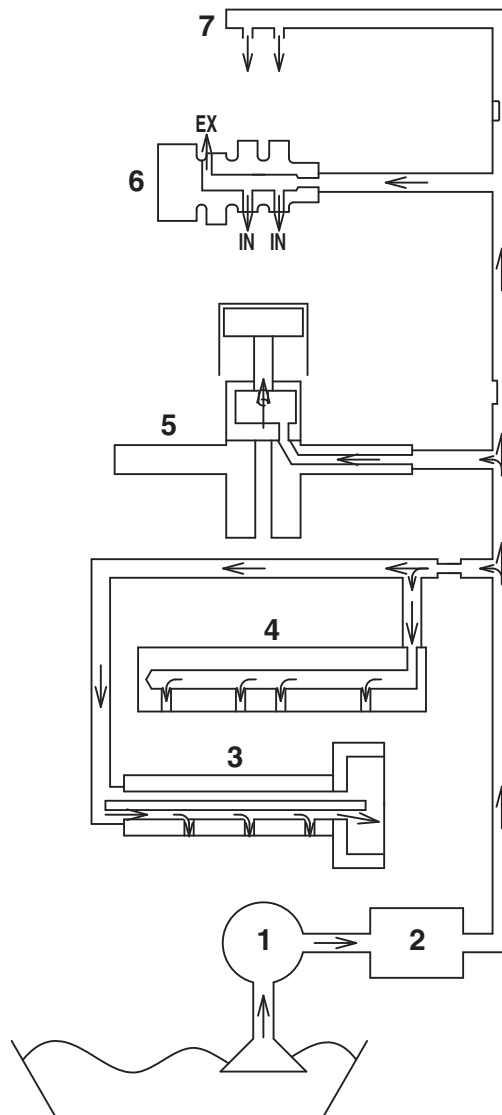
# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20298

## LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32362

### ENGINE OIL LUBRICATION CHART

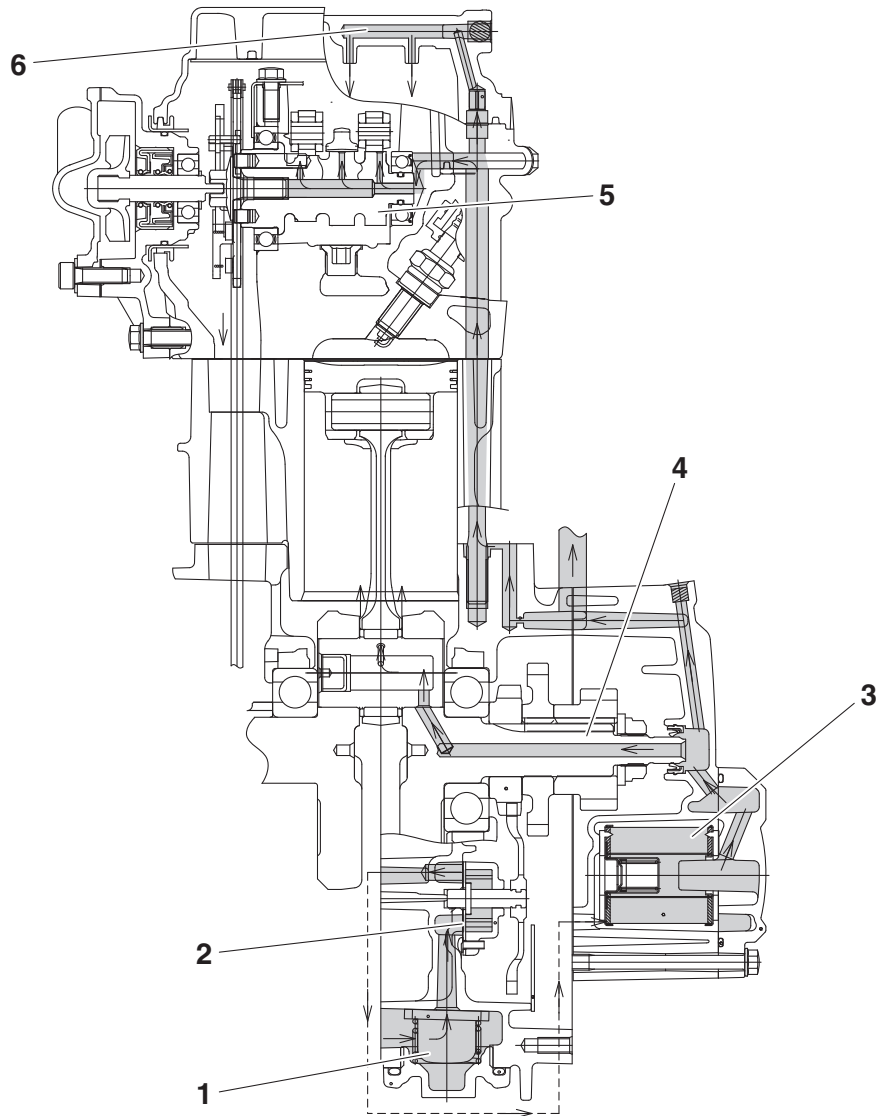


1. Oil pump
2. Oil filter
3. Main axle
4. Drive axle
5. Crankshaft
6. Camshaft
7. Cylinder head cover

# LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32363

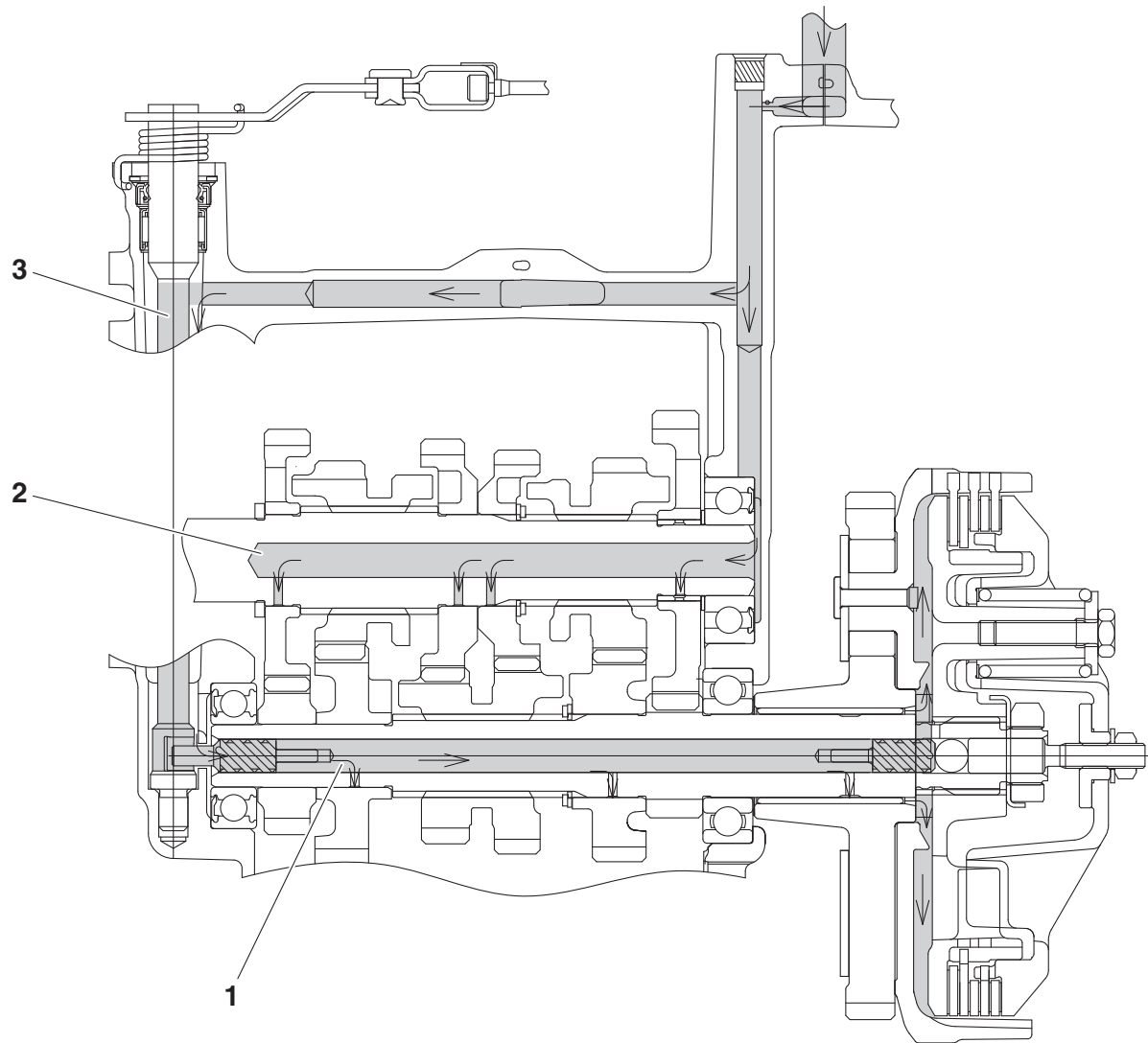
## LUBRICATION DIAGRAMS



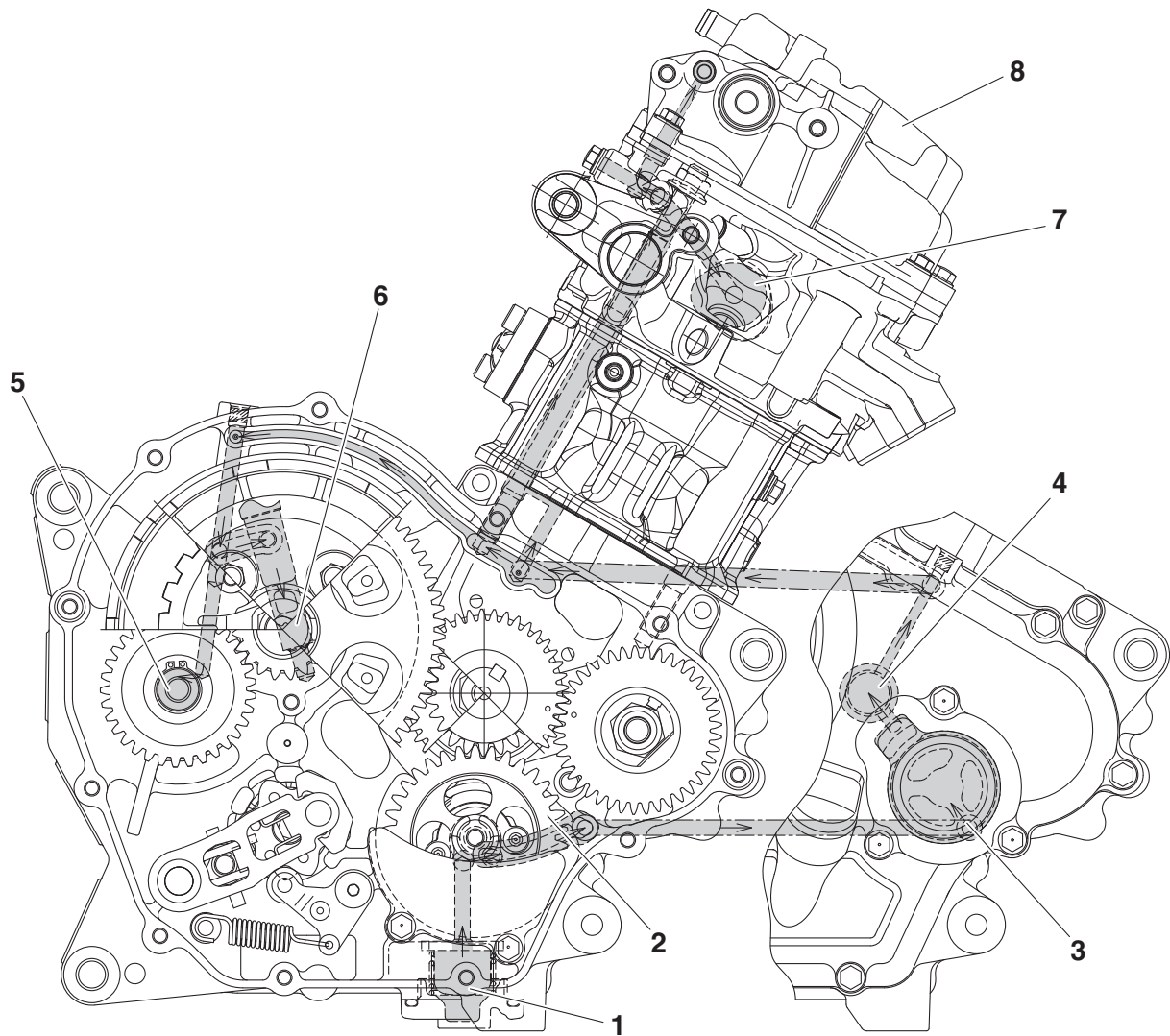
1. Oil strainer
2. Oil pump
3. Oil filter
4. Crankshaft
5. Camshaft
6. Cylinder head cover

# LUBRICATION SYSTEM CHART AND DIAGRAMS

---



- 1. Main axle
- 2. Drive axle
- 3. Clutch push lever



1. Oil strainer
2. Oil pump
3. Oil filter
4. Crankshaft
5. Drive axle
6. Main axle
7. Camshaft
8. Cylinder head cover

EAS20041

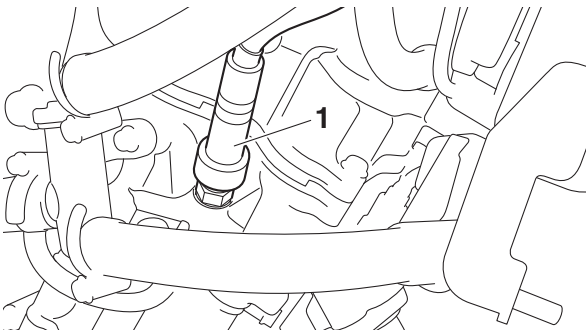
ENGINE INSPECTION

EAS30249

MEASURE THE COMPRESSION PRESSURE  
TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
  - Valve clearance  
Out of specification → Adjust.  
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Disconnect:
  - Spark plug cap “1”



4. Remove:
  - Spark plug

ECA13350

NOTICE

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

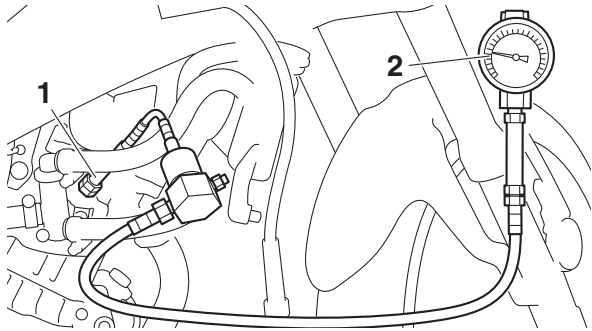
5. Install:
  - Extension “1”
  - Compression gauge “2”

**Compression gauge extension**  
73mm  
90890-04082

**Compression gauge extension**  
73mm  
YM-04082

**Compression gauge**  
90890-03081

**Engine compression tester**  
YU-33223



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

**Compression pressure**  
600 kPa-550 r/min (6.0 kgf/cm<sup>2</sup>-  
550 r/min, 85.3 psi-550 r/min)

- a. Set the main switch to “ON”.
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.
- 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                                       | Piston, valves, cylinder head gasket or piston possibly defective → Repair. |

7. Remove:
  - Extension
  - Compression gauge
8. Install:
  - Spark plug

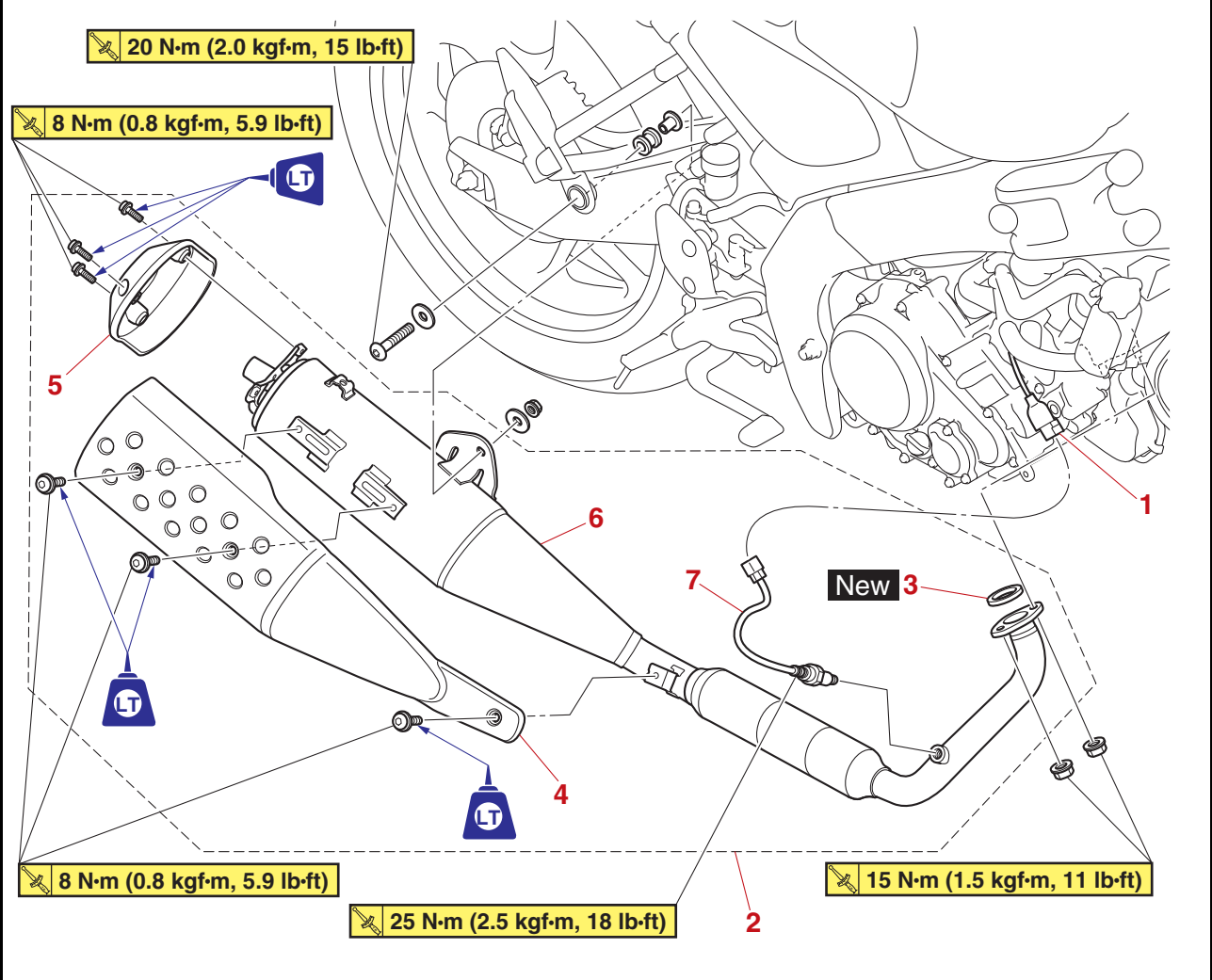
**Spark plug**  
13 N·m (1.3 kgf·m, 9.6 lb·ft)

9. Connect:
  - Spark plug cap

EAS20042

ENGINE REMOVAL

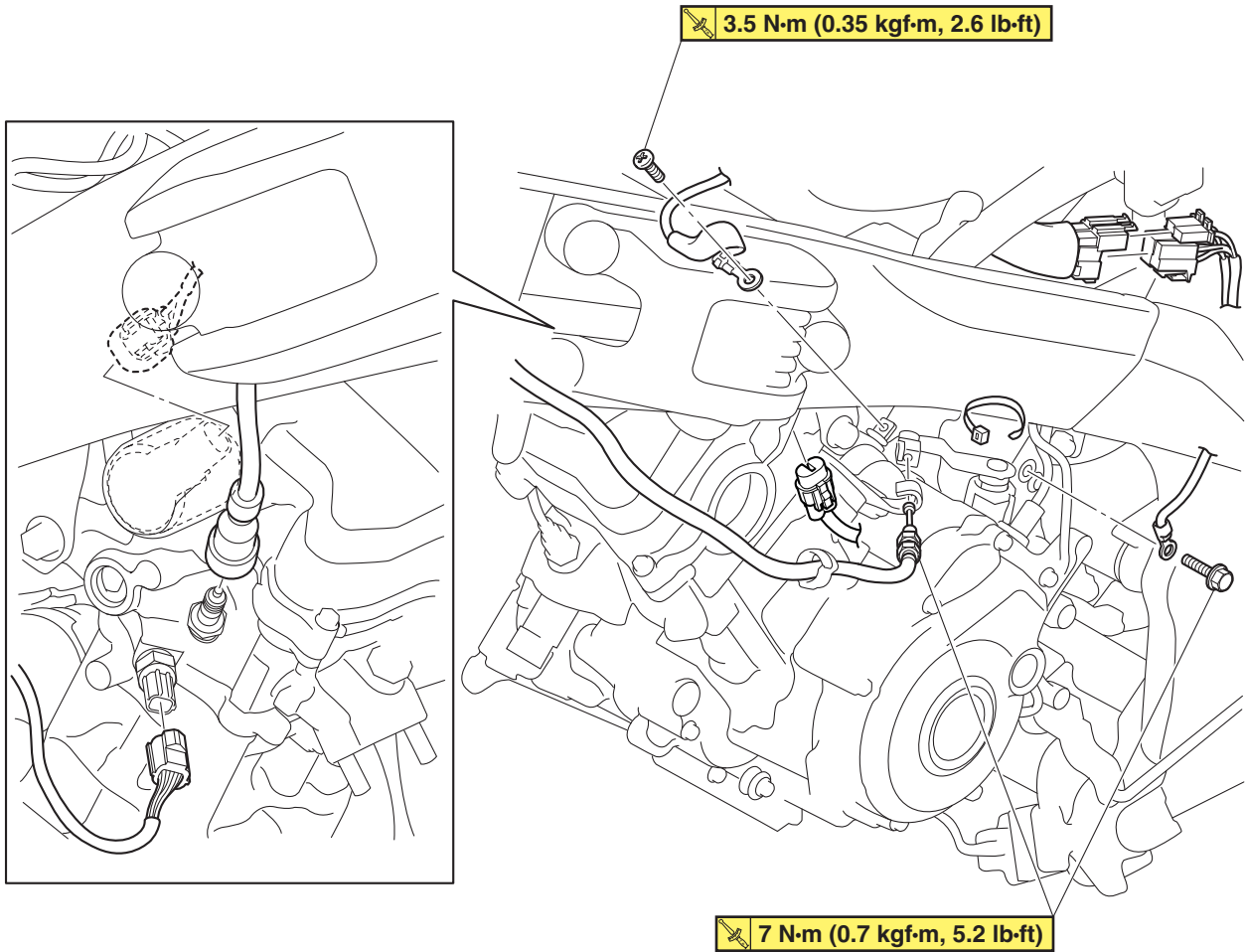
Removing the exhaust assembly



| Order | Job/Parts to remove           | Q'ty | Remarks                                                                   |
|-------|-------------------------------|------|---------------------------------------------------------------------------|
|       | Bottom cowl                   |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                               |
| 1     | O <sub>2</sub> sensor coupler | 1    | Disconnect.                                                               |
| 2     | Exhaust assembly              | 1    |                                                                           |
| 3     | Gasket                        | 1    |                                                                           |
| 4     | Muffler protector             | 1    |                                                                           |
| 5     | Muffler cap                   | 1    |                                                                           |
| 6     | Muffler                       | 1    |                                                                           |
| 7     | O <sub>2</sub> sensor         | 1    | <b>TIP</b> _____<br>Remove the O <sub>2</sub> sensor only when necessary. |

# ENGINE REMOVAL

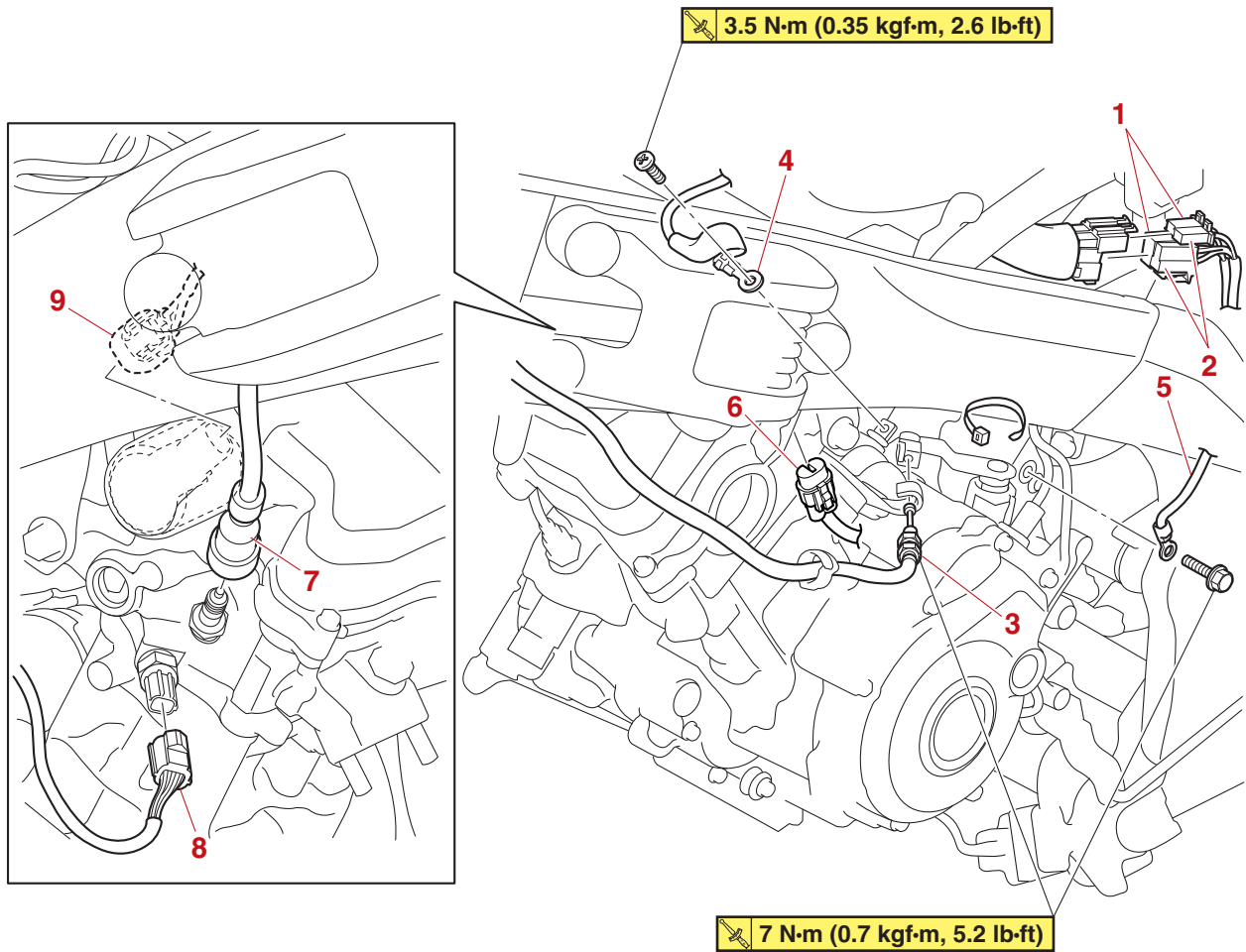
## Disconnecting the leads and couplers



| Order | Job/Parts to remove                                | Q'ty | Remarks                                               |
|-------|----------------------------------------------------|------|-------------------------------------------------------|
|       | Engine oil                                         |      | Refer to "CHANGING THE ENGINE OIL" on page 3-17.      |
|       | Coolant                                            |      | Refer to "CHANGING THE COOLANT" on page 3-19.         |
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.           |
|       | Upper side cover                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-2.           |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.           |
|       | Fuel tank                                          |      | Refer to "FUEL TANK" on page 7-1.                     |
|       | Air filter case                                    |      | Refer to "GENERAL CHASSIS (5)" on page 4-6.           |
|       | Drive chain/Drive sprocket                         |      | Refer to "CHAIN DRIVE" on page 4-75.                  |
|       | Bottom cowling bracket (left)                      |      | Refer to "GENERATOR AND STARTER CLUTCH" on page 5-38. |
|       | Bottom cowling bracket (right)                     |      | Refer to "CLUTCH" on page 5-47.                       |

# ENGINE REMOVAL

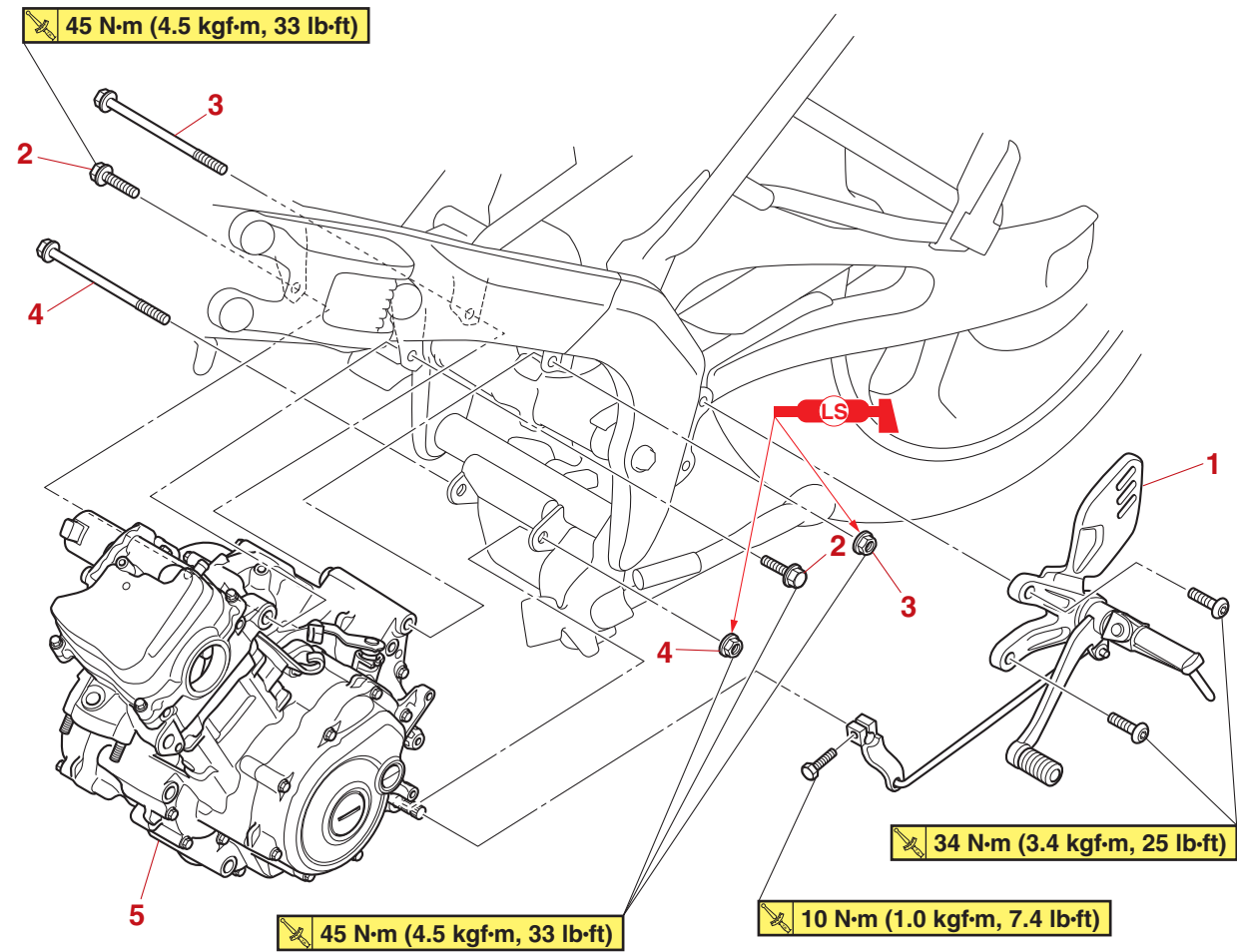
## Disconnecting the leads and couplers



| Order | Job/Parts to remove                            | Q'ty | Remarks                                         |
|-------|------------------------------------------------|------|-------------------------------------------------|
|       | Coolant reservoir/Radiator/Thermostat          |      | Refer to "RADIATOR AND THERMOSTAT" on page 6-2. |
|       | Water pump assembly                            |      | Refer to "WATER PUMP" on page 6-6.              |
|       | Throttle body/Intake manifold                  |      | Refer to "THROTTLE BODY" on page 7-7.           |
| 1     | Gear position switch coupler                   | 2    | Disconnect.                                     |
| 2     | AC magneto/crankshaft position sensor coupler  | 2    | Disconnect.                                     |
| 3     | Clutch cable                                   | 1    | Disconnect.                                     |
| 4     | Starter motor lead                             | 1    | Disconnect.                                     |
| 5     | Engine ground lead                             | 1    | Disconnect.                                     |
| 6     | Sidestand switch                               | 1    | Disconnect.                                     |
| 7     | Spark plug cap                                 | 1    | Disconnect.                                     |
| 8     | Coolant temperature sensor coupler             | 1    | Disconnect.                                     |
| 9     | VVA (variable valve actuator) solenoid coupler | 1    | Disconnect.                                     |

ENGINE REMOVAL

Removing the engine



| Order | Job/Parts to remove                        | Q'ty | Remarks                                                      |
|-------|--------------------------------------------|------|--------------------------------------------------------------|
|       |                                            |      | <b>TIP</b> _____<br>Place a suitable stand under the engine. |
| 1     | Footrest assembly (left)                   | 1    |                                                              |
| 2     | Engine mounting bolt (front side)          | 2    |                                                              |
| 3     | Engine mounting bolt/nut (rear upper side) | 1/1  |                                                              |
| 4     | Engine mounting bolt/nut (rear lower side) | 1/1  |                                                              |
| 5     | Engine                                     | 1    |                                                              |

# ENGINE REMOVAL

EAS30251

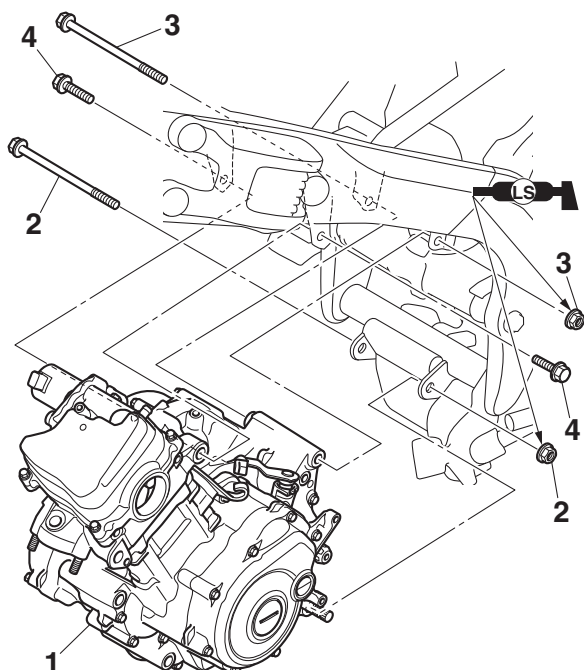
## INSTALLING THE ENGINE

### 1. Install:

- Engine "1"
- Engine mounting bolt/nut (rear lower side) "2"
- Engine mounting bolt/nut (rear upper side) "3"
- Engine mounting bolts (front side) "4"

### TIP

- Lubricate the engine mounting nut (rear lower side) and engine mounting nut (rear upper side) with lithium-soap-based grease.
- Do not fully tighten the bolts and nuts.



### 2. Tighten:

- Engine mounting nut (rear lower side)
- Engine mounting nut (rear upper side)
- Engine mounting bolts (front side)



**Engine mounting nut (rear lower side)**  
45 N·m (4.5 kgf·m, 33 lb·ft)  
**Engine mounting nut (rear upper side)**  
45 N·m (4.5 kgf·m, 33 lb·ft)  
**Engine mounting bolt (front side)**  
45 N·m (4.5 kgf·m, 33 lb·ft)

EAS32800

## INSTALLING THE FOOTREST ASSEMBLY

### 1. Install:

- Footrest assembly (left)

### TIP

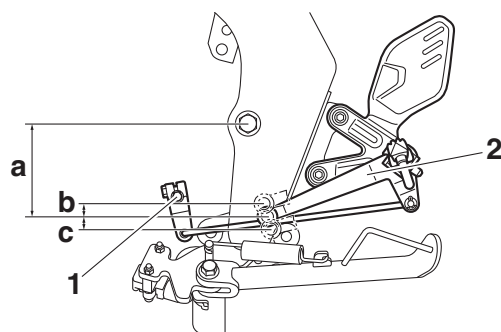
Install the footrest assembly to the shift shaft "1" so that the shift pedal "2" distance "a", "b", and "c" are within specification.



**Shift pedal distance "a"**  
94.6 mm (3.72 in)  
**Shift pedal distance "b"**  
12.8 mm (0.50 in) or less  
**Shift pedal distance "c"**  
12.5 mm (0.49 in) or less



**Shift arm bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
**Footrest assembly bolt**  
34 N·m (3.4 kgf·m, 25 lb·ft)



EAS32676

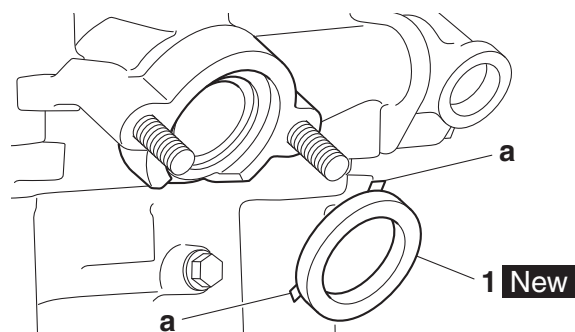
## INSTALLING THE EXHAUST ASSEMBLY

### 1. Install:

- Gasket "1" **New**  
(to the cylinder head)

### TIP

Install the gasket with its projections "a" facing toward the cylinder head.



### 2. Install:

- Exhaust assembly "1"
- Exhaust pipe nuts "2", "3"
- Exhaust assembly bolt "4"
- Exhaust assembly nut "5"

**TIP**

Do not fully tighten the nuts and bolts.

**3. Tighten:**

- Exhaust pipe nuts

**TIP**

Tighten the exhaust pipe nut “2”, exhaust pipe nut “3”, and exhaust pipe nut “2” to specified torque in this order.



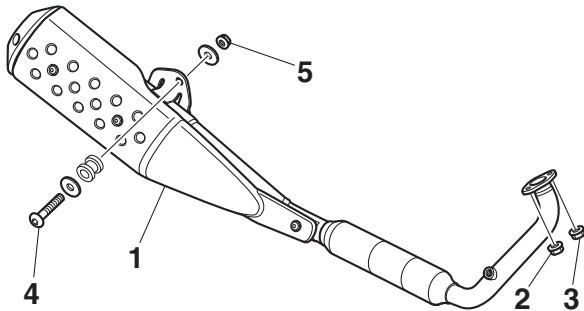
**Exhaust pipe nut**  
**15 N·m (1.5 kgf·m, 11 lb·ft)**

**4. Tighten:**

- Exhaust assembly bolt



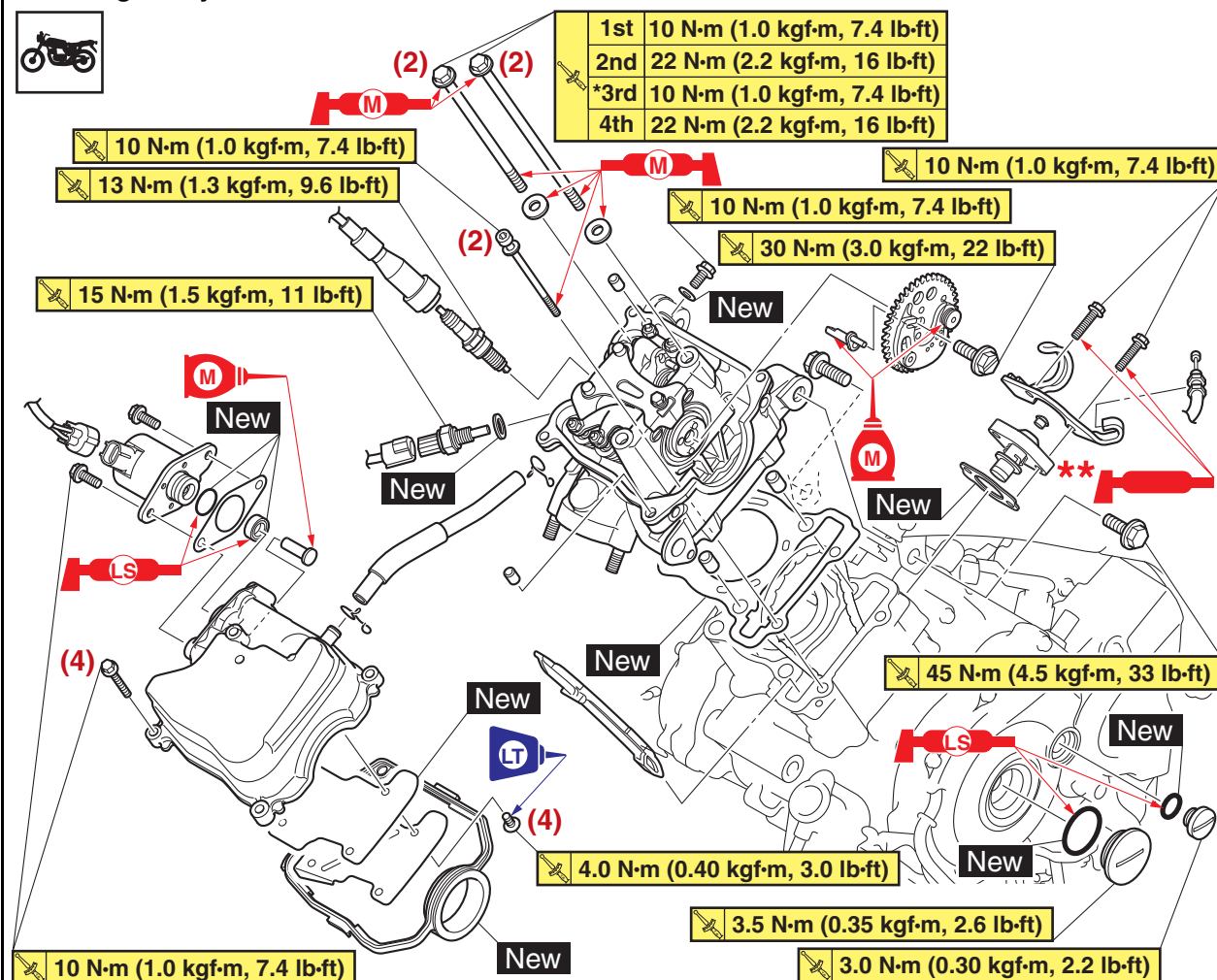
**Exhaust assembly bolt**  
**20 N·m (2.0 kgf·m, 15 lb·ft)**



EAS20044

## CYLINDER HEAD

## Removing the cylinder head



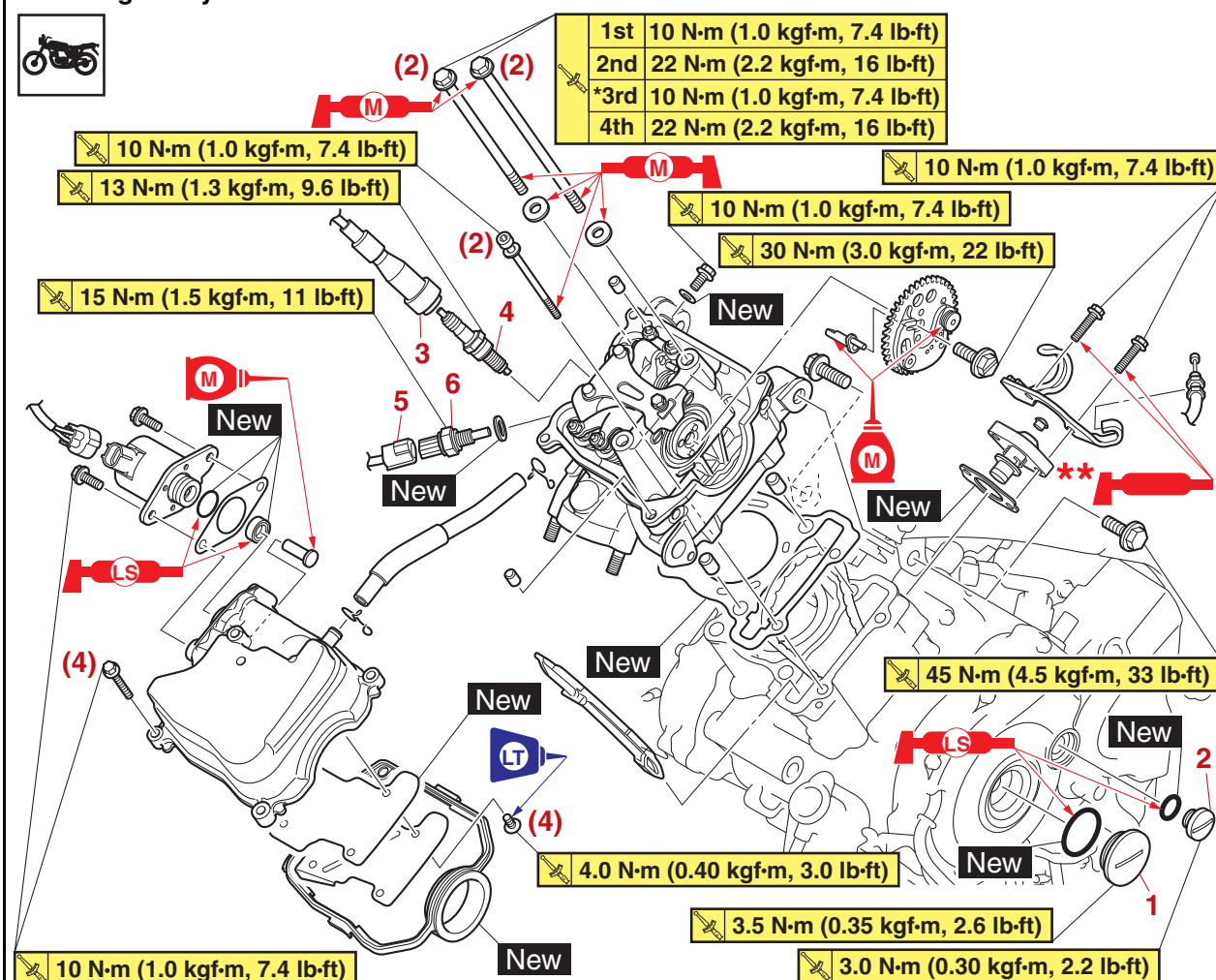
\*Loosen all of the bolts, and then retighten them to the specified torque.

\*\*Apply Yamaha bond No.1215 (90890-85505).

| Order | Job/Parts to remove                                            | Q'ty | Remarks                                                                      |
|-------|----------------------------------------------------------------|------|------------------------------------------------------------------------------|
|       | Seat                                                           |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.                                  |
|       | Upper side cover                                               |      | Refer to "GENERAL CHASSIS (2)" on page 4-2.                                  |
|       | Lower side cover/Fuel tank cover/Main switch cover/Bottom cowl |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                                  |
|       | Coolant                                                        |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-19.                      |
|       | Brake fluid                                                    |      | Drain.<br>Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-11. |
|       | Fuel tank                                                      |      | Refer to "FUEL TANK" on page 7-1.                                            |
|       | Air filter case                                                |      | Refer to "GENERAL CHASSIS (5)" on page 4-6.                                  |
|       | Hydraulic unit assembly                                        |      | Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.                        |

# CYLINDER HEAD

## Removing the cylinder head



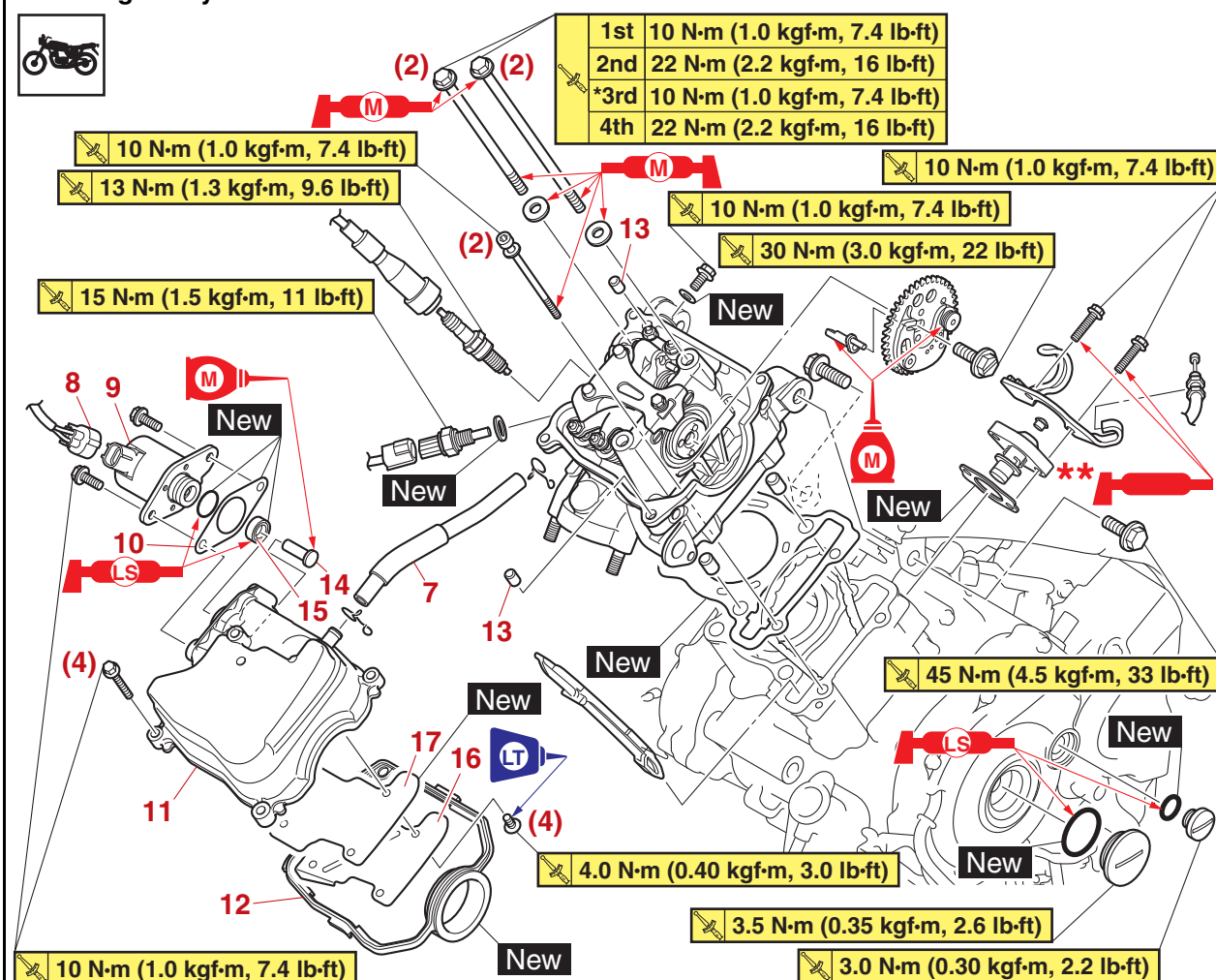
\*Loosen all of the bolts, and then retighten them to the specified torque.

\*\*Apply Yamaha bond No.1215 (90890-85505).

| Order | Job/Parts to remove                | Q'ty | Remarks                                         |
|-------|------------------------------------|------|-------------------------------------------------|
|       | Exhaust assembly                   |      | Refer to "ENGINE REMOVAL" on page 5-6.          |
|       | Radiator                           |      | Refer to "RADIATOR AND THERMOSTAT" on page 6-2. |
|       | Water pump                         |      | Refer to "WATER PUMP" on page 6-6.              |
|       | Throttle body/Intake manifold      |      | Refer to "THROTTLE BODY" on page 7-7.           |
| 1     | Crankshaft end cover               | 1    |                                                 |
| 2     | Timing mark accessing bolt         | 1    |                                                 |
| 3     | Spark plug cap                     | 1    | Disconnect.                                     |
| 4     | Spark plug                         | 1    |                                                 |
| 5     | Coolant temperature sensor coupler | 1    | Disconnect.                                     |
| 6     | Coolant temperature sensor         | 1    |                                                 |

# CYLINDER HEAD

## Removing the cylinder head



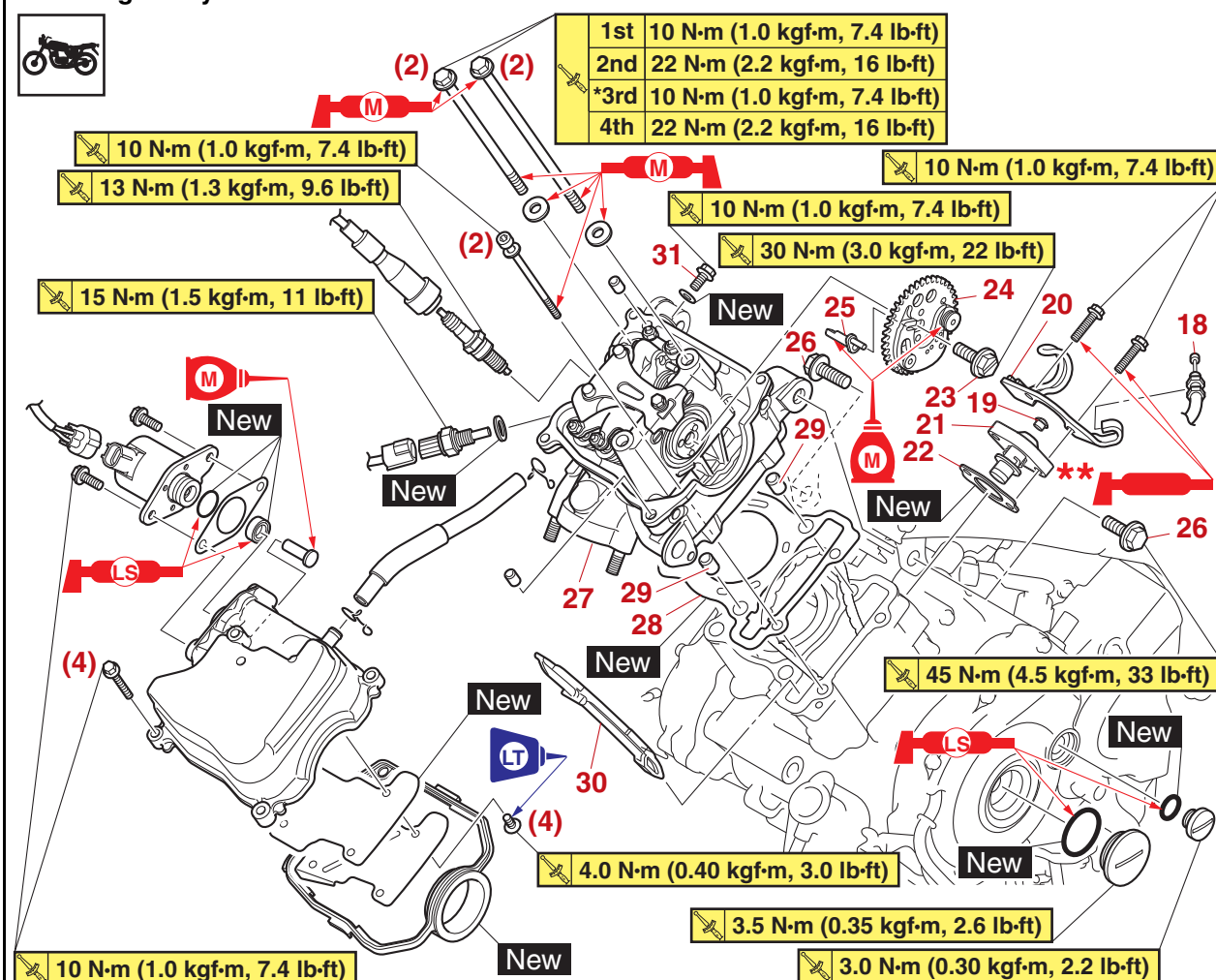
\*Loosen all of the bolts, and then retighten them to the specified torque.

\*\*Apply Yamaha bond No.1215 (90890-85505).

| Order | Job/Parts to remove                            | Q'ty | Remarks     |
|-------|------------------------------------------------|------|-------------|
| 7     | Cylinder head breather hose                    | 1    |             |
| 8     | VVA (variable valve actuator) solenoid coupler | 1    | Disconnect. |
| 9     | VVA (variable valve actuator) solenoid         | 1    |             |
| 10    | VVA (variable valve actuator) solenoid gasket  | 1    |             |
| 11    | Cylinder head cover                            | 1    |             |
| 12    | Cylinder head cover gasket                     | 1    |             |
| 13    | Dowel pin                                      | 2    |             |
| 14    | VVA (variable valve actuator) solenoid rod     | 1    |             |
| 15    | Oil seal                                       | 1    |             |
| 16    | Cylinder head cover breather plate             | 1    |             |
| 17    | Cylinder head cover breather plate gasket      | 1    |             |

# CYLINDER HEAD

## Removing the cylinder head



\*Loosen all of the bolts, and then retighten them to the specified torque.

\*\*Apply Yamaha bond No.1215 (90890-85505).

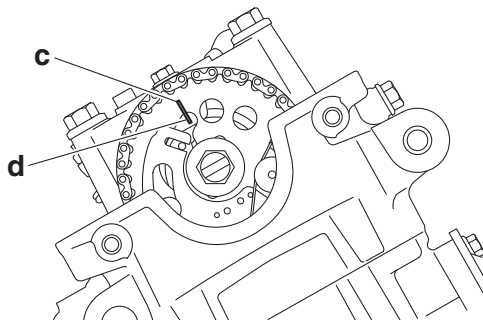
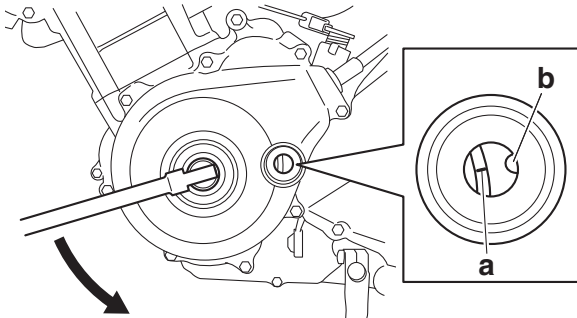
| Order | Job/Parts to remove               | Q'ty | Remarks     |
|-------|-----------------------------------|------|-------------|
| 18    | Clutch cable                      | 1    | Disconnect. |
| 19    | Timing chain tensioner plug       | 1    |             |
| 20    | Clutch cable holder               | 1    |             |
| 21    | Timing chain tensioner            | 1    |             |
| 22    | Timing chain tensioner gasket     | 1    |             |
| 23    | Camshaft sprocket bolt            | 1    |             |
| 24    | Camshaft sprocket                 | 1    |             |
| 25    | Decompression cam                 | 1    |             |
| 26    | Engine mounting bolt (front side) | 2    |             |
| 27    | Cylinder head                     | 1    |             |
| 28    | Cylinder head gasket              | 1    |             |
| 29    | Dowel pin                         | 2    |             |
| 30    | Timing chain guide (exhaust side) | 1    |             |
| 31    | Oil check bolt                    | 1    |             |

EAS30276

## REMOVING THE CYLINDER HEAD

### 1. Align:

- "I" mark "a" on the generator rotor (with the stationary pointer "b" on the generator cover)
  - Turn the crankshaft counterclockwise.
  - When the piston is at TDC on the compression stroke, align the "I" mark "c" on the camshaft sprocket with the match mark "d" on the camshaft stopper plate.



### 2. Loosen:

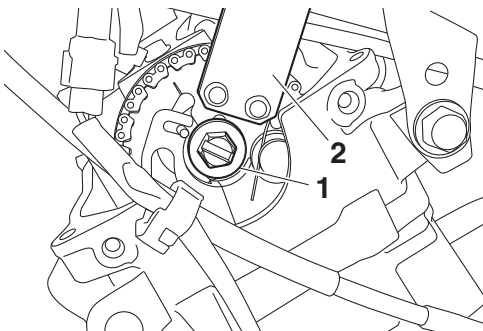
- Camshaft sprocket bolt "1"

### TIP

Use the camshaft wrench "2" and loosen the camshaft sprocket bolt.



**Camshaft wrench**  
90890-04162  
**Camshaft wrench**  
YM-04162

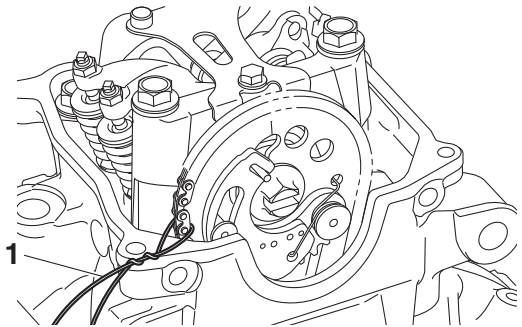


### 3. Remove:

- Camshaft sprocket

### TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire "1".

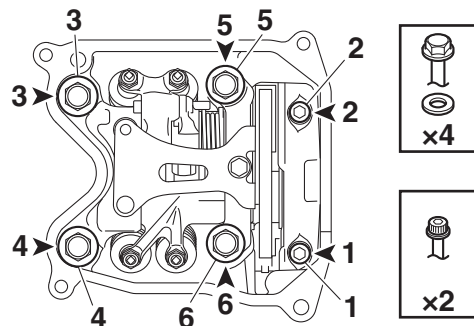


### 4. Remove:

- Cylinder head

### 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 bolts 1, 2, 4, and 6, and then remove the cylinder head with bolts 3 and 5 installed in the bolt holes.



EAS30277

## CHECKING THE CYLINDER HEAD

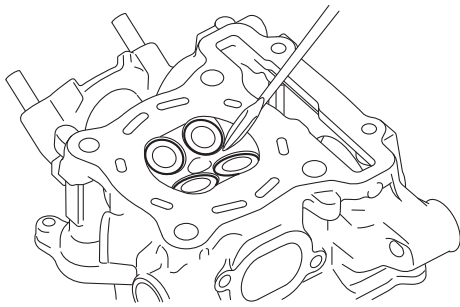
### 1. Eliminate:

- 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.

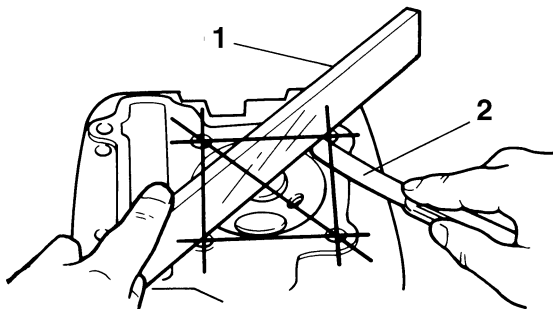
## 3. Measure:

- Cylinder head warpage  
Out of specification → Resurface the cylinder head.



**Warpage limit**  
**0.05 mm (0.0020 in)**

- Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.
- Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

## TIP

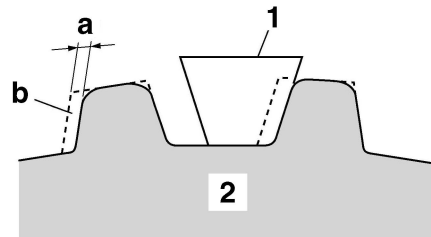
To ensure an even surface, rotate the cylinder head several times.

EAS32677

## CHECKING THE CAMSHAFT SPROCKET AND TIMING CHAIN GUIDE

### 1. Check:

- Camshaft sprocket  
More than 1/4 tooth wear "a" → Replace the camshaft sprocket, timing chain and crankshaft as a set.



- 1/4 tooth
  - Correct
- Timing chain roller
  - Camshaft sprocket

### 2. Check:

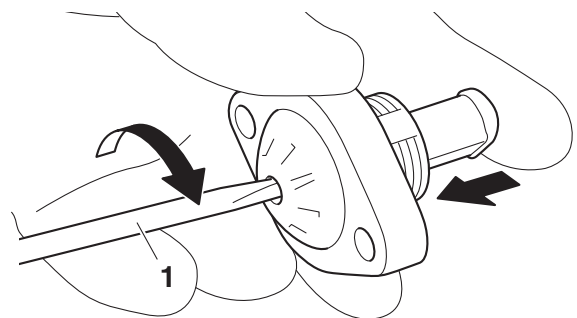
- Timing chain guide (exhaust side)  
Damage/wear → Replace.

EAS30266

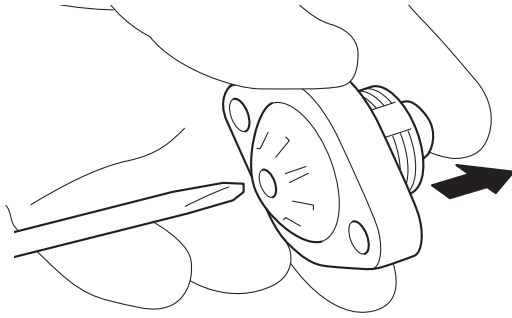
## CHECKING THE TIMING CHAIN TENSIONER

### 1. Check:

- Timing chain tensioner  
Cracks/damage → Replace.
- a. Remove the timing chain tensioner plug.
- b. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".



- While holding the timing chain tensioner rod in place with your hand, turn the screwdriver counterclockwise, remove the screwdriver, and slowly release the timing chain tensioner rod.



- d. Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.
- e. Install the timing chain tensioner plug.

EAS30267

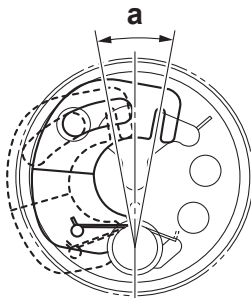
## CHECKING THE DECOMPRESSION SYSTEM

### 1. Check:

- Decompression system

### TIP

- Check that the decompression lever moves smoothly.
- Check that the operating range "a" of the decompression lever is the same as the range shown in the illustration.



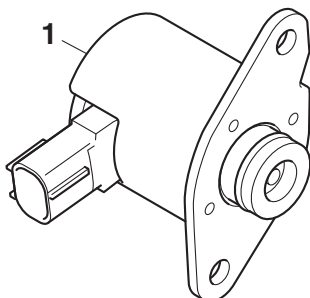
a. 20.88°

EAS31624

## CHECKING THE VVA SOLENOID

### 1. Check:

- VVA (variable valve actuator) solenoid "1"
- Cracks/damage → Replace.



EAS30282

## INSTALLING THE CYLINDER HEAD

### 1. Install:

- Cylinder head

### TIP

Pass the timing chain through the timing chain cavity.

### 2. Tighten:

- Cylinder head bolts (M8 × 193) "1"
- Cylinder head bolts (M8 × 155) "2"



### Cylinder head bolt

- 1st: 10 N·m (1.0 kgf·m, 7.4 lb·ft)
- 2nd: 22 N·m (2.2 kgf·m, 16 lb·ft)
- 3rd\*: 10 N·m (1.0 kgf·m, 7.4 lb·ft)
- 4th: 22 N·m (2.2 kgf·m, 16 lb·ft)

\*Loosen all of the bolts, and then retighten them to the specified torque.

### TIP

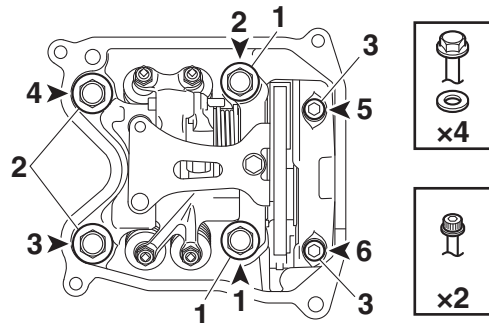
Lubricate the cylinder head bolts and washers with molybdenum disulfide grease.

- Cylinder head bolts "3"



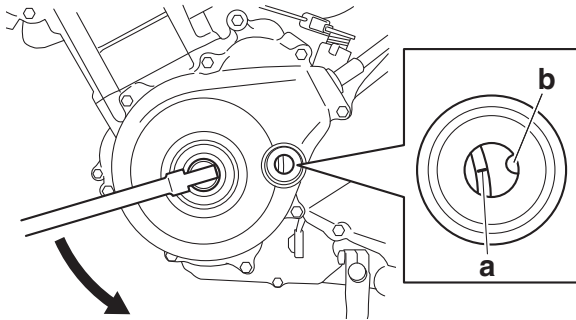
### Cylinder head bolt

- 10 N·m (1.0 kgf·m, 7.4 lb·ft)



### 3. Install:

- Decompression cam "1"
- Camshaft sprocket "2"
- Timing chain
- Camshaft sprocket bolt
  - a. Turn the crankshaft counterclockwise.
  - b. Align the "I" mark "a" on the generator rotor with the stationary pointer "b" on the generator cover.



c. Install the decompression cam.

## TIP

Lubricate the decompression cam with molybdenum disulfide oil.

d. Install the timing chain onto the camshaft sprocket, then the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolt.

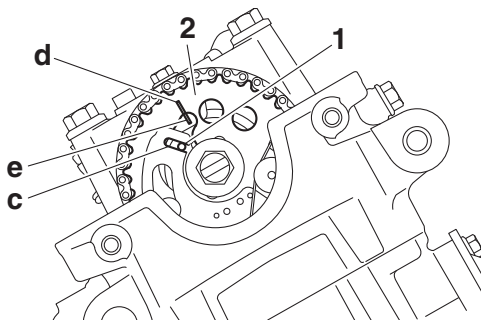
ECA20600

## NOTICE

**Do not turn the crankshaft when installing the camshaft sprocket to avoid damage or improper valve timing.**

## TIP

- Fit the pin on the decompression cam 1 into the slot "c" in the decompression lever on the camshaft sprocket 2.
- Align the "I" mark "d" on the camshaft sprocket with the match mark "e" on the camshaft stopper plate.



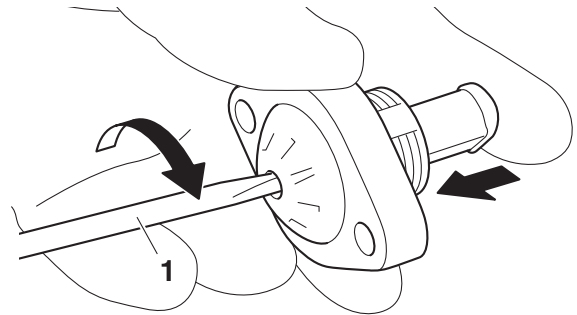
e. While holding the camshaft, temporarily tighten the camshaft sprocket bolt.

4. Install:

- Timing chain tensioner gasket **New**
- Timing chain tensioner
- Clutch cable holder
  - a. Remove the timing chain tensioner plug.
  - b. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".

## TIP

Make sure that the tensioner rod has been fully turned clockwise.



c. Install the gasket and the timing chain tensioner "2" onto the cylinder.

EWA17620

## WARNING

**Always use a new gasket.**

## TIP

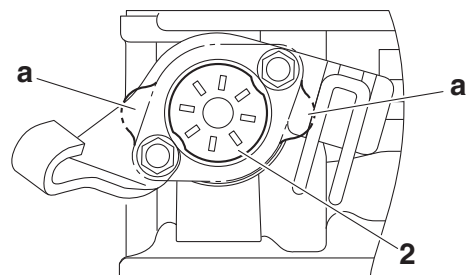
- Install the timing chain tensioner gasket so that the tabs "a" on the gasket are protruding in the directions shown in the illustration.
- Apply Yamaha bond No. 1215 to the threads of the timing chain tensioner bolts.



**Yamaha bond No. 1215**  
**90890-85505**  
**Three bond No. 1215®**

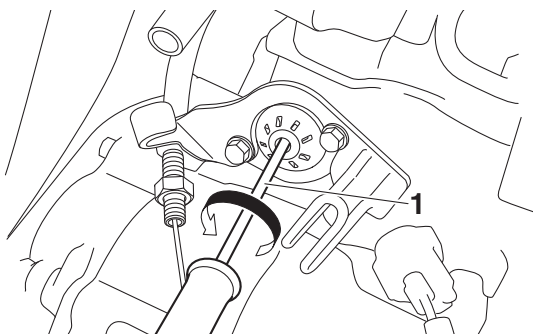


**Timing chain tensioner bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**



d. Turn the timing chain tensioner rod counterclockwise with a thin screwdriver "1", make sure it releases, and then install the timing chain tensioner plug.

# CYLINDER HEAD

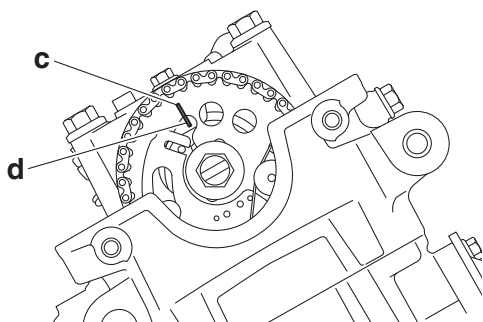
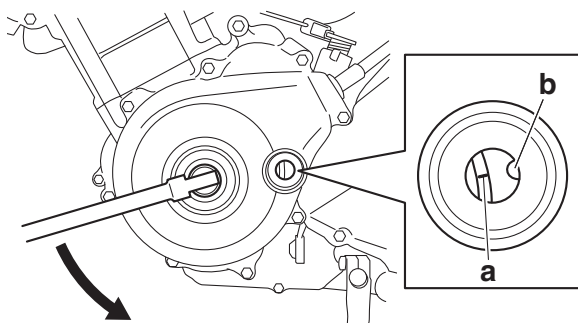


5. Turn:
  - Crankshaft  
(several turns counterclockwise)
6. Check:
  - "I" mark "a"

Make sure the "I" mark "a" on the generator rotor is aligned with the stationary pointer "b" on the generator cover.

  - "I" mark "c"

Make sure the "I" mark "c" on the camshaft sprocket is aligned with the match mark "d" on the camshaft stopper plate.  
Out of alignment → Correct.  
Refer to the installation steps above.



7. Tighten:
  - Camshaft sprocket bolt "1"



**Camshaft sprocket bolt**  
30 N·m (3.0 kgf·m, 22 lb·ft)



**Camshaft wrench**  
90890-04162  
**Camshaft wrench**  
YM-04162

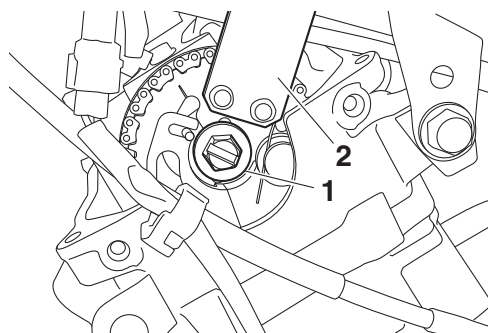
ECA20610

## NOTICE

Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolt coming loose and damaging the engine.

## TIP

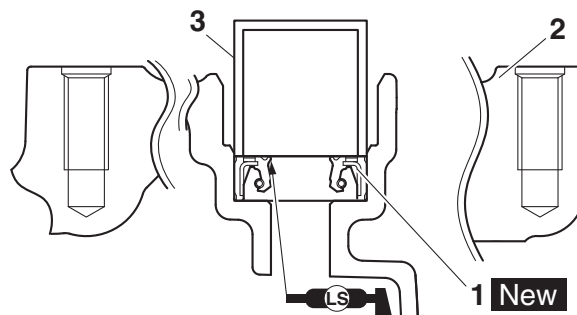
Tighten the camshaft sprocket bolt with the camshaft wrench "2".



8. Measure:
  - Valve clearance  
Out of specification → Adjust.  
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
9. Install:
  - Oil seal "1" **New**  
(into the cylinder head cover "2")

## TIP

- Lubricate the oil seal with lithium-soap-based grease.
- Install the oil seal so that it is facing in the direction shown in the illustration. Press the oil seal into the cylinder head cover using a suitable diameter socket "3".



10.Install:

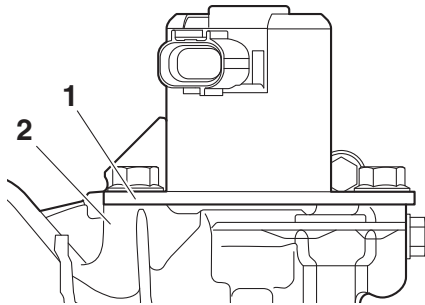
- VVA (variable valve actuator) solenoid “1”



**VVA (variable valve actuator) solenoid bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

**TIP**

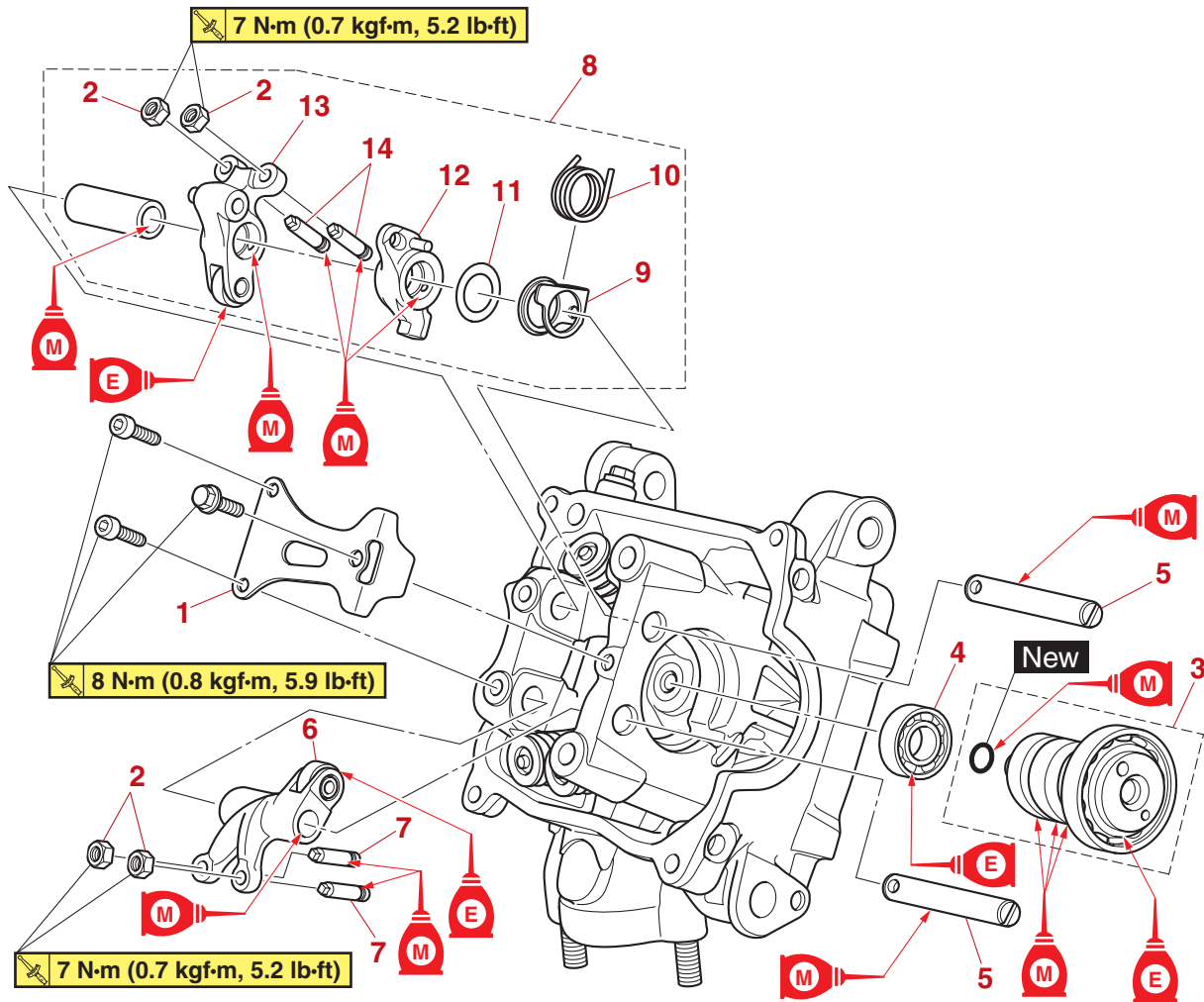
While holding the VVA (variable valve actuator) solenoid so that it is contacting the cylinder head cover “2”, tighten the bolts to specification.



EAS20043

CAMSHAFT

Removing the rocker arms and camshaft



| Order | Job/Parts to remove            | Q'ty | Remarks                                |
|-------|--------------------------------|------|----------------------------------------|
|       | Cylinder head                  |      | Refer to "CYLINDER HEAD" on page 5-12. |
| 1     | Camshaft stopper plate         | 1    |                                        |
| 2     | Locknut                        | 4    |                                        |
| 3     | Camshaft assembly              | 1    |                                        |
| 4     | Bearing                        | 1    |                                        |
| 5     | Rocker arm shaft               | 2    |                                        |
| 6     | Exhaust rocker arm             | 1    |                                        |
| 7     | Adjusting screw (exhaust side) | 2    |                                        |
| 8     | Intake rocker arm assembly     | 1    |                                        |
| 9     | Plate                          | 1    |                                        |
| 10    | Spring                         | 1    |                                        |
| 11    | Washer                         | 1    |                                        |
| 12    | Intake rocker arm 1            | 1    |                                        |
| 13    | Intake rocker arm 2            | 1    |                                        |
| 14    | Adjusting screw (intake side)  | 2    |                                        |

EAS30256

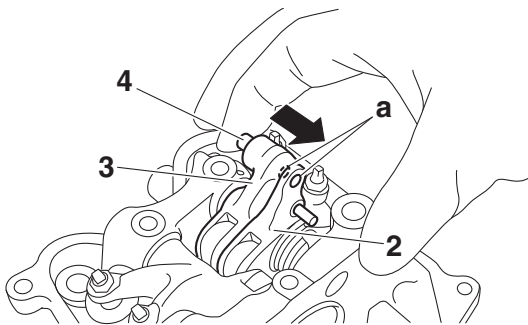
## REMOVING THE CAMSHAFT

1. Loosen:
  - Adjusting screws (intake/exhaust)
2. Remove:
  - Camshaft assembly "1"

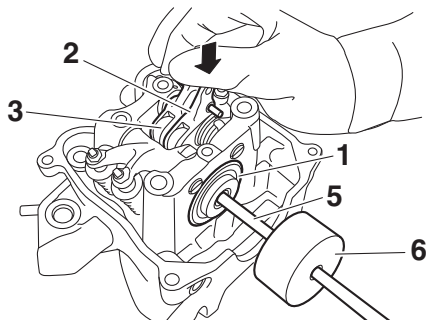


**Slide hammer bolt (M8)**  
**90890-01085**  
**Slide hammer bolt 8 mm**  
**YU-01083-2**  
**Weight**  
**90890-01084**  
**Weight**  
**YU-01083-3**

- a. Align the holes "a" in intake rocker arm 1 "2" and intake rocker arm 2 "3", and then push the intake rocker arm stopper pin "4" in the direction of the arrow shown in the illustration.



- b. While pushing intake rocker arm 1 "2" and intake rocker arm 2 "3" in the direction of the arrow shown in the illustration, remove the camshaft assembly using a slide hammer bolt "5" and weight "6".



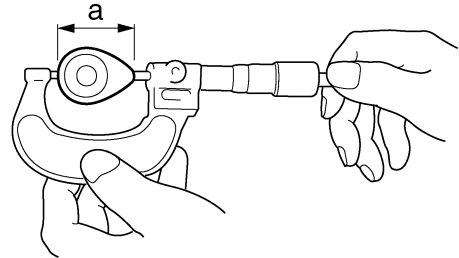
EAS30257

## CHECKING THE CAMSHAFT

1. Check:
  - Camshaft lobes  
Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
  - Camshaft lobe dimensions "a"  
Out of specification → Replace the camshaft.



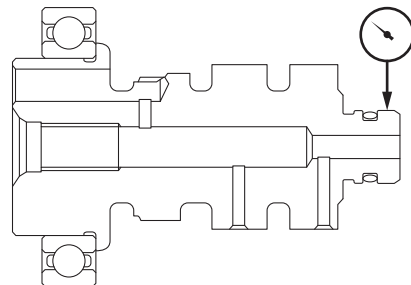
**Camshaft lobe dimensions**  
**Lobe height limit (Intake)**  
**32.268 mm (1.2704 in)**  
**Lobe height limit (Intake high speed)**  
**32.332 mm (1.2729 in)**  
**Lobe height limit (Exhaust)**  
**29.516 mm (1.1620 in)**



3. Measure:
  - Camshaft runout  
Out of specification → Replace the camshaft.



**Camshaft runout limit**  
**0.030 mm (0.0012 in)**



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

EAS30259

## CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

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

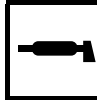
1. Check:
  - Rocker arm
  - Rocker arm roller "1"  
Damage/wear → Replace.

EAS30270

## INSTALLING THE CAMSHAFT AND ROCKER ARMS

### 1. Lubricate:

- Camshaft assembly



**Recommended lubricant**  
**Camshaft**  
**Molybdenum disulfide oil**  
**Camshaft bearing**  
**Engine oil**

### 2. Lubricate:

- Rocker arms
- Rocker arm shafts
- Intake rocker arm stopper pin



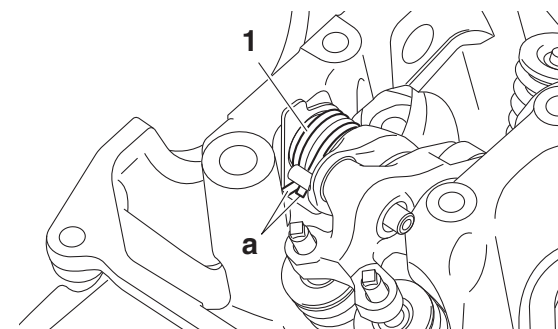
**Recommended lubricant**  
**Rocker arm**  
**Rocker arm shaft**  
**Intake rocker arm stopper pin**  
**Molybdenum disulfide oil**  
**Rocker arm roller**  
**Engine oil**

### 3. Install:

- Spring "1"

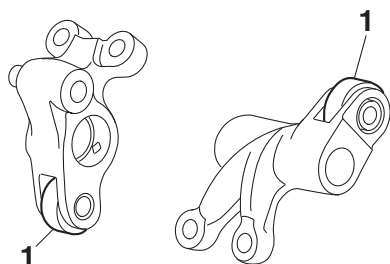
### TIP

Install the spring so that the ends "a" of the spring are positioned at the locations shown in the illustration.



### 4. Install:

- Camshaft assembly
  - a. Align the holes "a" in intake rocker arm 1 "1" and intake rocker arm 2 "2", and then push the intake rocker arm stopper pin "3" in the direction of the arrow shown in the illustration.



### 2. Check:

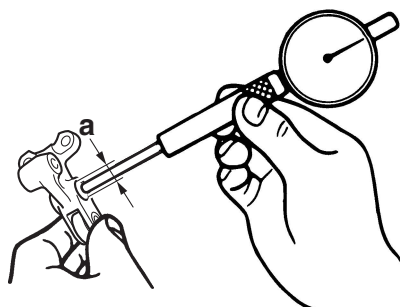
- Rocker arm shaft  
 Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.

### 3. Measure:

- Rocker arm inside diameter "a"  
 Out of specification → Replace.



**Rocker arm inside diameter limit**  
**14.015 mm (0.5518 in)**

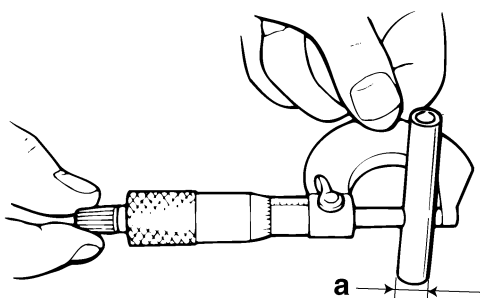


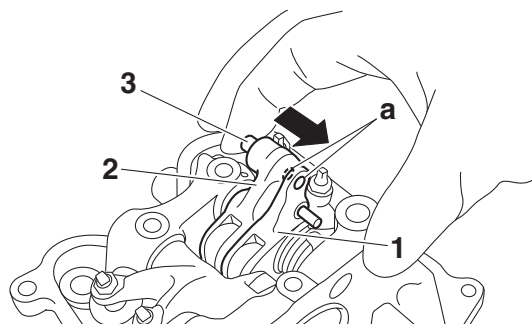
### 4. Measure:

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



**Rocker arm shaft outside diameter limit**  
**13.935 mm (0.5486 in)**

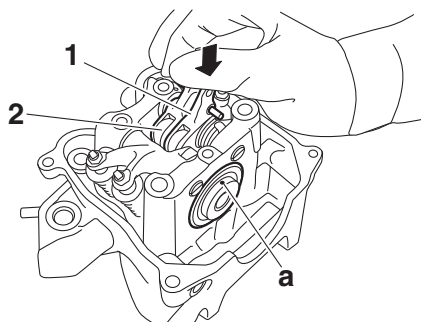
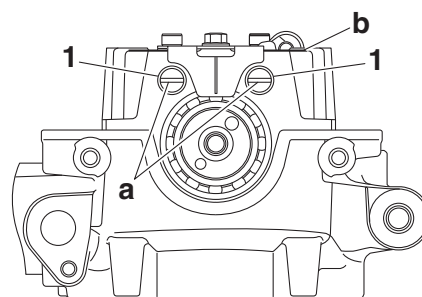




- b. While pushing intake rocker arm 1 "1" and intake rocker arm 2 "2" in the direction of the arrow shown in the illustration, install the camshaft assembly.

## TIP

Install the camshaft with the punch mark "a" facing upward.



## 5. Install:

- Camshaft stopper plate



**Camshaft stopper plate bolt (M5  
× 16)**

**8 N·m (0.8 kgf·m, 5.9 lb·ft)**

**Camshaft stopper plate bolt (M6  
× 14)**

**8 N·m (0.8 kgf·m, 5.9 lb·ft)**

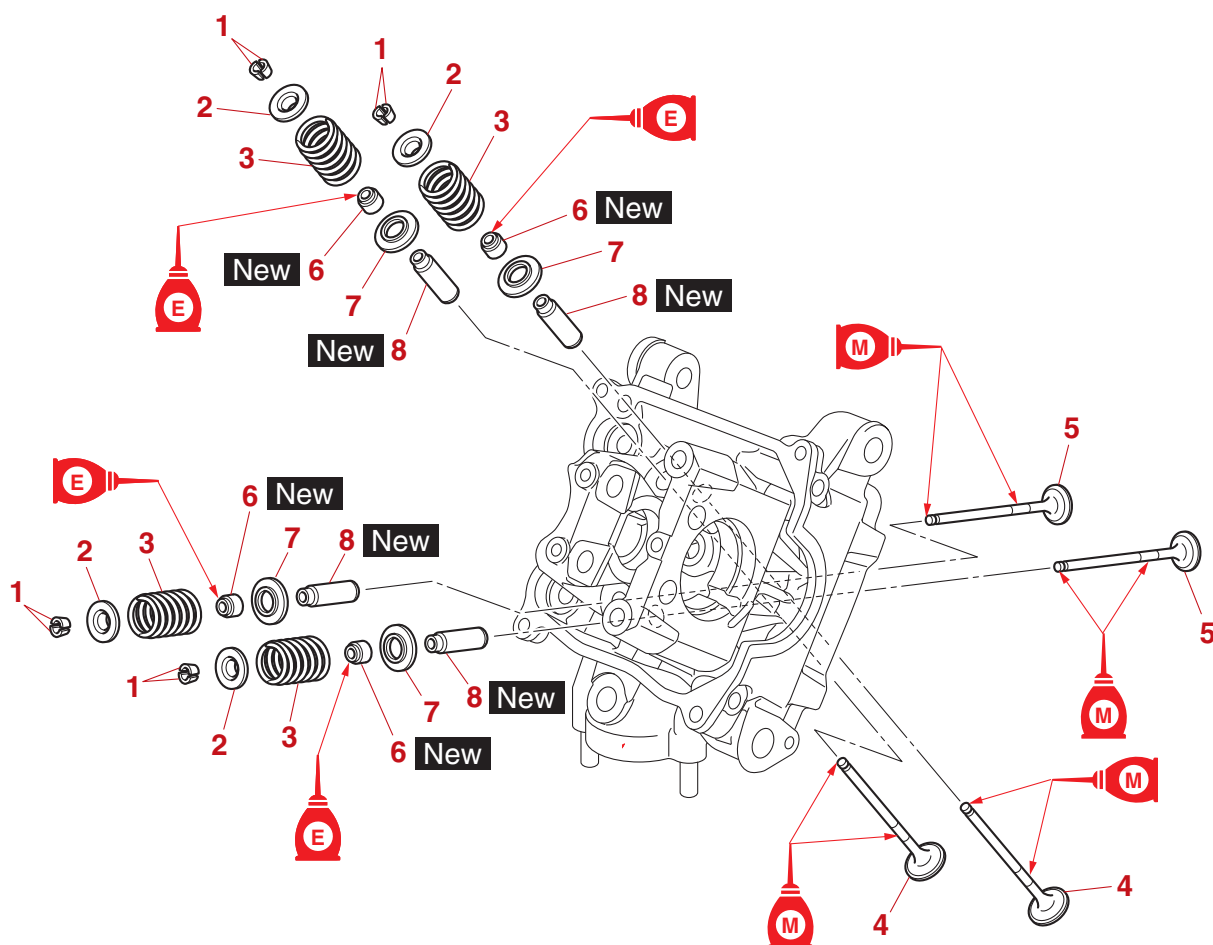
## TIP

Before installing the camshaft stopper plate, make sure that the slots "a" in the rocker arm shafts "1" are parallel with the edge "b" of the cylinder head and that the camshaft stopper plate bolt holes in the cylinder head and rocker arm shafts are aligned.

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 5-12. |
|       | Rocker arms/Camshaft |      | Refer to "CAMSHAFT" on page 5-22.      |
| 1     | Valve cotter         | 8    |                                        |
| 2     | Upper spring seat    | 4    |                                        |
| 3     | Valve spring         | 4    |                                        |
| 4     | Intake valve         | 2    |                                        |
| 5     | Exhaust valve        | 2    |                                        |
| 6     | Valve stem seal      | 4    |                                        |
| 7     | Lower spring seat    | 4    |                                        |
| 8     | Valve guide          | 4    |                                        |

# VALVES AND VALVE SPRINGS

EAS30283

## REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

### TIP

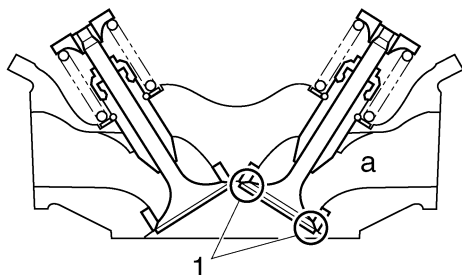
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

#### 1. 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 5-29.
  - 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”.



#### 2. Remove:

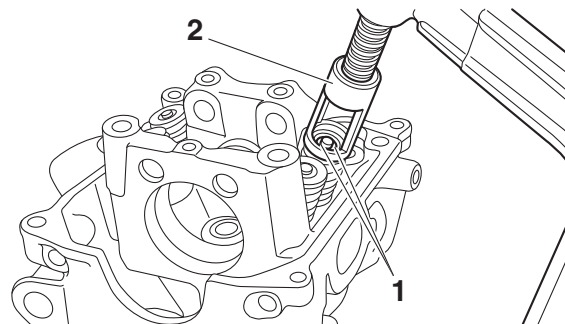
- Valve cotters “1”

### TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment “2”.



**Valve spring compressor**  
90890-04200  
**Valve spring compressor**  
YM-04019  
**Valve spring compressor attach-**  
**ment**  
90890-04108  
**Valve spring compressor adapt-**  
**er 22 mm**  
YM-04108

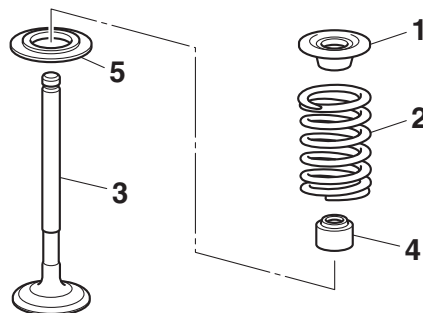


#### 3. Remove:

- Upper spring seat “1”
- Valve spring “2”
- Valve “3”
- Valve stem seal “4”
- Lower spring seat “5”

### TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



EAS30284

## CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

#### 1. Measure:

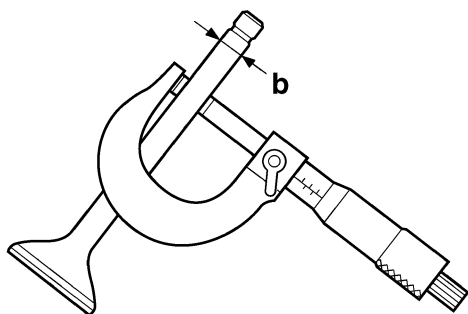
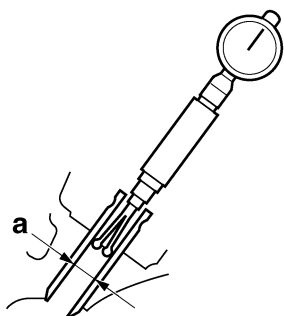
- Valve-stem-to-valve-guide clearance  
Out of specification → Replace the valve guide.

- Valve-stem-to-valve-guide clearance =  
Valve guide inside diameter “a” -  
Valve stem diameter “b”



**Valve-stem-to-valve-guide clear-**  
**ance limit (intake)**  
0.080 mm (0.0032 in)  
**Valve-stem-to-valve-guide clear-**  
**ance limit (exhaust)**  
0.100 mm (0.0039 in)

# VALVES AND VALVE SPRINGS

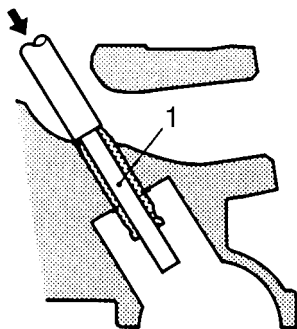


2. Replace:
- Valve guide

## TIP

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

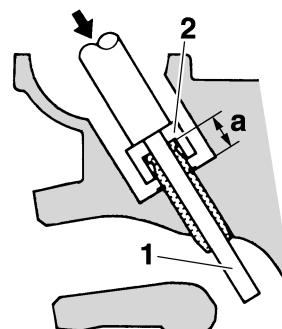
- a. Remove the valve guide with the valve guide remover "1".



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

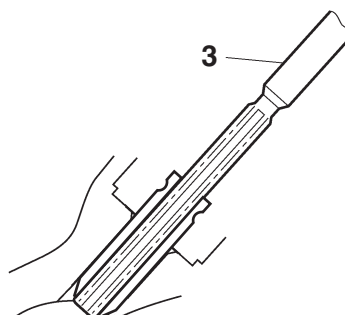


**Valve guide position**  
9.9–10.3 mm (0.39–0.41 in)



- a. Valve guide position

- c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



## TIP

After replacing the valve guide, reface the valve seat.



**Valve guide remover (ø4.5)**  
90890-04116

**Valve guide remover (4.5 mm)**  
YM-04116

**Valve guide installer (ø4.5)**  
90890-04117

**Valve guide installer (4.5 mm)**  
YM-04117

**Valve guide reamer (ø5)**  
90890-04099

**Valve guide reamer (5.0 mm)**  
YM-04099

3. Eliminate:

- Carbon deposits  
(from the valve face and valve seat)

4. Check:

- Valve face  
Pitting/wear → Grind the valve face.
- Valve stem end  
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

# VALVES AND VALVE SPRINGS

## 5. Measure:

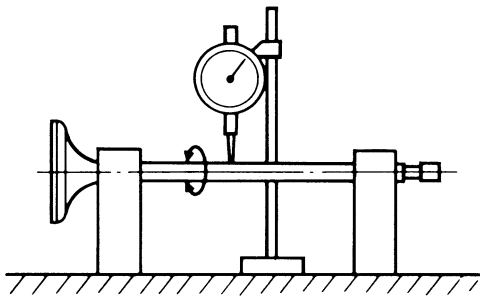
- Valve stem runout  
Out of specification → Replace the valve.

### TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



**Valve stem runout**  
**0.010 mm (0.0004 in)**



EAS30285

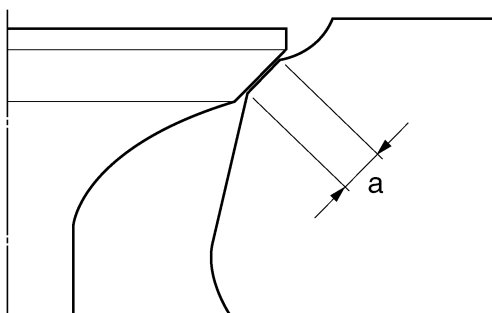
## CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

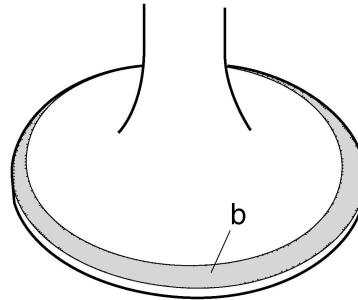
1. Eliminate:
  - Carbon deposits  
(from the valve face and valve seat)
2. Check:
  - Valve seat  
Pitting/wear → Replace the cylinder head.
3. Measure:
  - Valve seat contact width "a"  
Out of specification → Replace the cylinder head.



**Valve seat contact width limit (in-  
take)**  
**1.3 mm (0.05 in)**  
**Valve seat contact width limit (ex-  
haust)**  
**1.7 mm (0.07 in)**



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



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

### TIP

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

## 4. Lap:

- Valve face
- Valve seat

### TIP

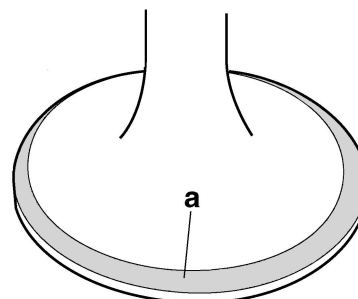
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

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

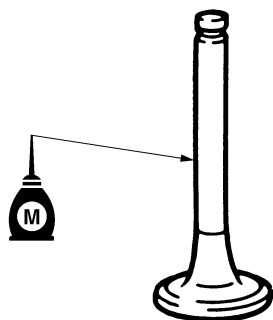
ECA13790

### NOTICE

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



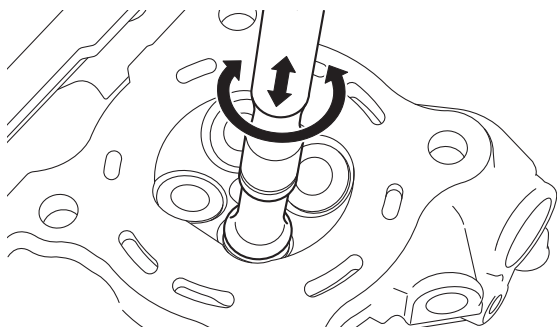
- b. Apply molybdenum disulfide oil onto the valve stem.



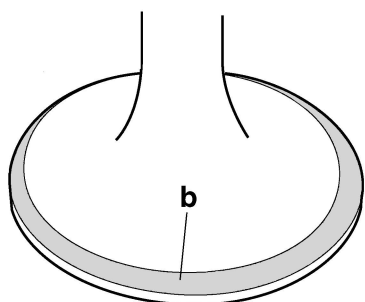
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

## TIP

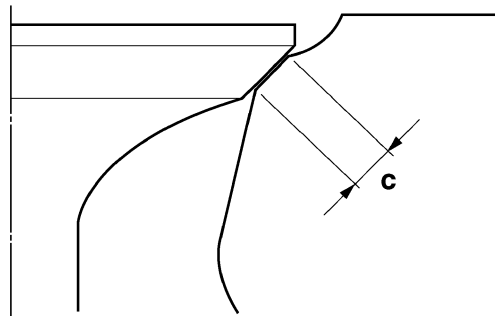
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid "b" onto the valve face.



- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



EAS30286

## CHECKING THE VALVE SPRINGS

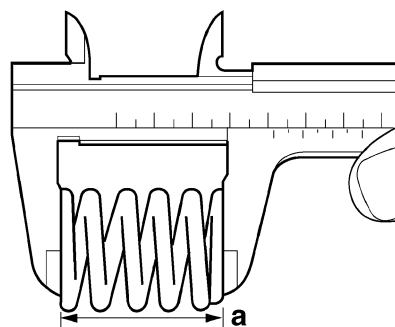
The following procedure applies to all of the valve springs.

1. Measure:

- Valve spring free length "a"
- Out of specification → Replace the valve spring.



**Free length limit (intake)**  
32.12 mm (1.26 in)  
**Free length limit (exhaust)**  
32.12 mm (1.26 in)



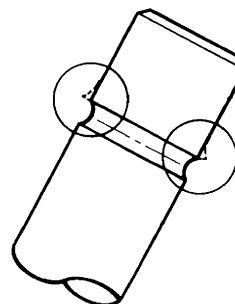
EAS30288

## INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:

- Valve stem end  
(with an oil stone)



2. Lubricate:

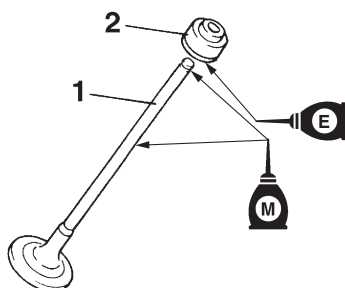
- Valve stem "1"  
(with the recommended lubricant)

# VALVES AND VALVE SPRINGS

|                                                                                   |                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|
|  | <b>Recommended lubricant</b><br><b>Molybdenum disulfide oil</b> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|

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

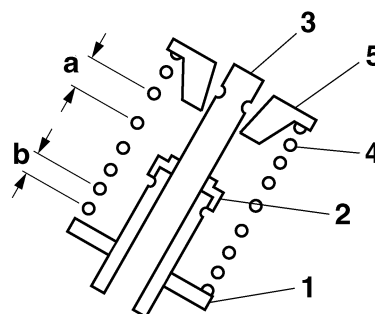
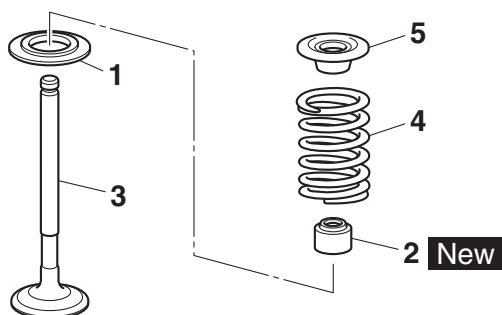
|                                                                                   |                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------|
|  | <b>Recommended lubricant</b><br><b>Engine oil</b> |
|-----------------------------------------------------------------------------------|---------------------------------------------------|



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

## TIP

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



b. Smaller pitch

4. Install:

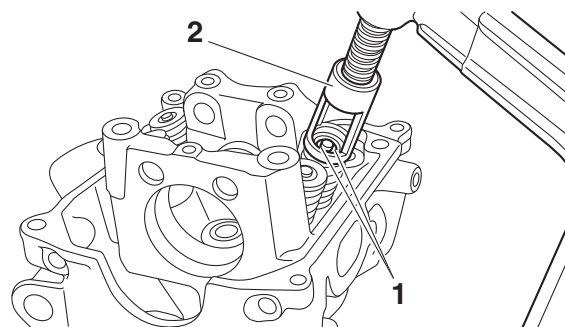
- Valve cotters “1”

## TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment “2”.



**Valve spring compressor**  
**90890-04200**  
**Valve spring compressor**  
**YM-04019**  
**Valve spring compressor attach-**  
**ment**  
**90890-04108**  
**Valve spring compressor adapt-**  
**er 22 mm**  
**YM-04108**



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

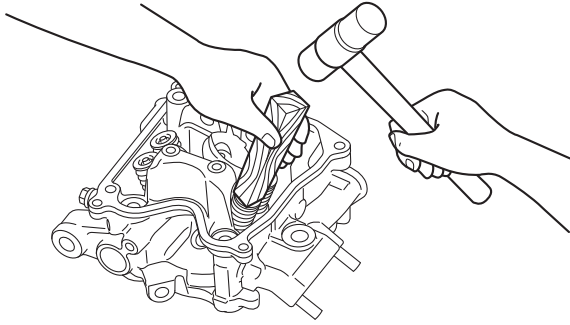
ECA13800

## NOTICE

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

## VALVES AND VALVE SPRINGS

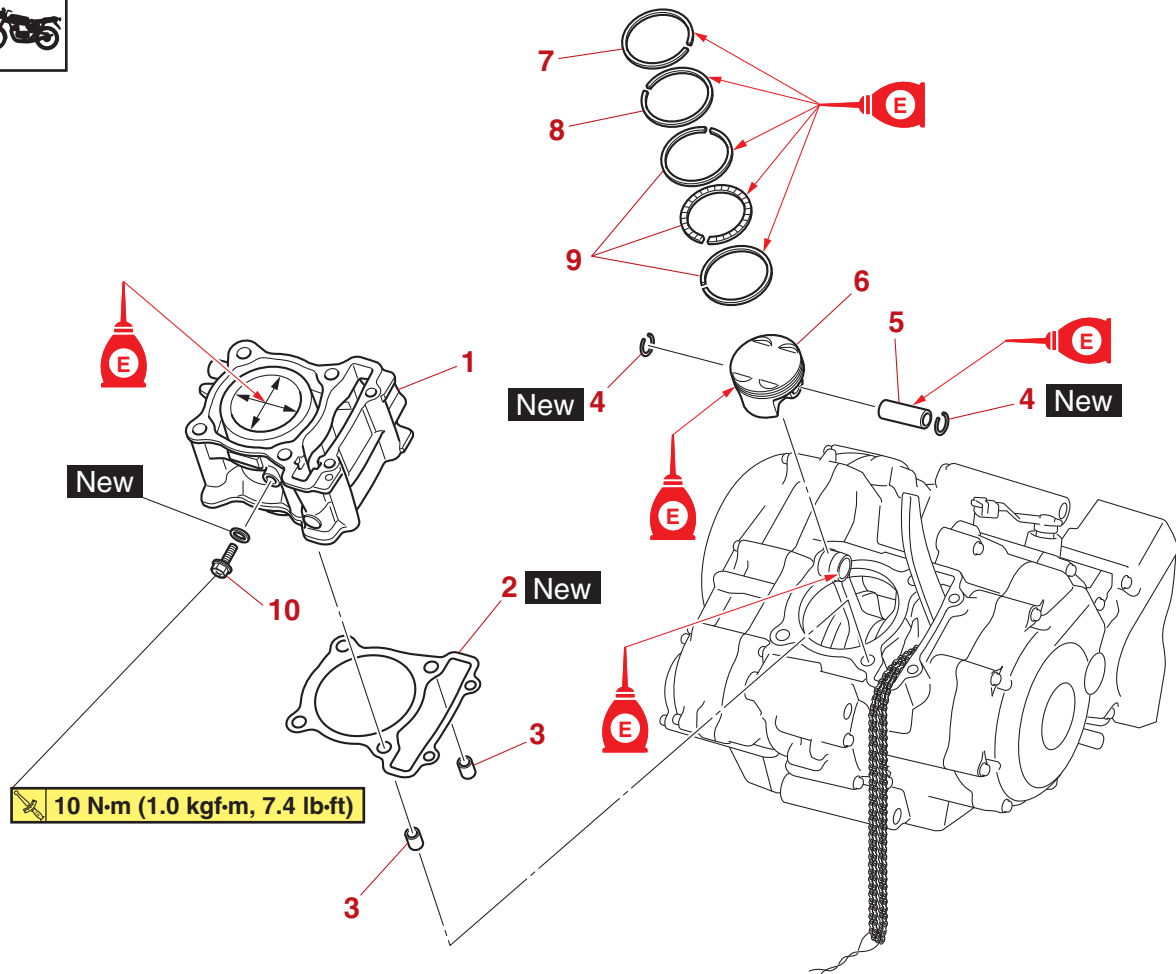
---



EAS20046

## CYLINDER AND PISTON

### Removing the cylinder and piston



| Order | Job/Parts to remove                | Q'ty | Remarks                                |
|-------|------------------------------------|------|----------------------------------------|
|       | Cylinder head                      |      | Refer to "CYLINDER HEAD" on page 5-12. |
| 1     | Cylinder                           | 1    |                                        |
| 2     | Cylinder gasket                    | 1    |                                        |
| 3     | Dowel pin                          | 2    |                                        |
| 4     | Piston pin clip                    | 2    |                                        |
| 5     | Piston pin                         | 1    |                                        |
| 6     | Piston                             | 1    |                                        |
| 7     | Top ring                           | 1    |                                        |
| 8     | 2nd ring                           | 1    |                                        |
| 9     | Oil ring                           | 1    |                                        |
| 10    | Coolant drain bolt (cylinder side) | 1    |                                        |

# CYLINDER AND PISTON

EAS30289

## REMOVING THE PISTON

### 1. Remove:

- Piston pin clips "1"
- Piston pin "2"
- Piston "3"

ECA13810

### NOTICE

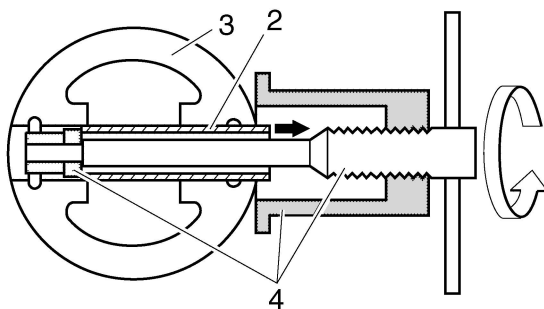
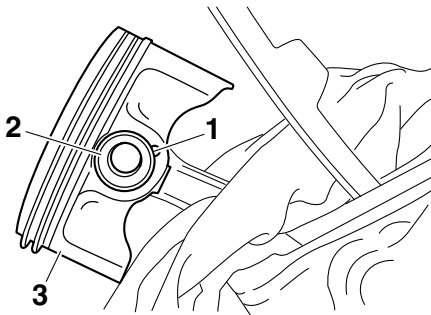
**Do not use a hammer to drive the piston pin out.**

### TIP

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



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

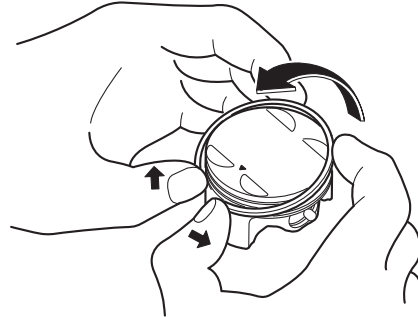


### 2. Remove:

- Top ring
- 2nd ring
- Oil ring

### 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.



EAS30291

## CHECKING THE CYLINDER AND PISTON

### 1. Check:

- Piston wall
- Cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

### 2. Measure:

- Piston-to-cylinder clearance
  - a. Measure cylinder bore "C" with the cylinder bore gauge.

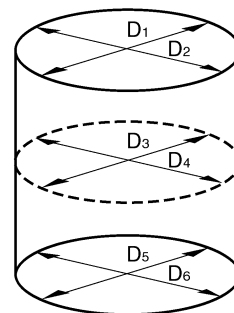
### TIP

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



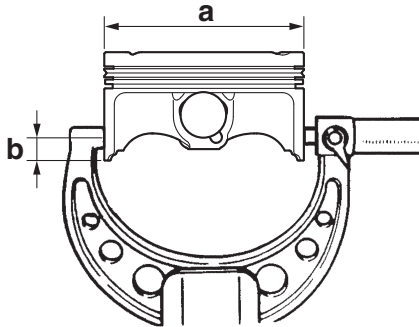
**Bore**  
**52.000–52.010 mm (2.0472–2.0476 in)**  
**Wear limit**  
**52.060 mm (2.0496 in)**

"C" = maximum of D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub>, D<sub>4</sub>, D<sub>5</sub>, D<sub>6</sub>



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

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



- b. 6.0 mm (0.24 in) from the bottom edge of the piston



## Piston

### Diameter

51.962–51.985 mm (2.0457–  
2.0466 in)

- d. If out of specification, replace the piston and piston rings as a set.  
e. Calculate the piston-to-cylinder clearance with the following formula.

- Piston-to-cylinder clearance =  
Cylinder bore - Piston skirt diameter



## Piston-to-cylinder clearance

0.015–0.048 mm (0.0006–0.0019  
in)

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

EAS30292

## 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.



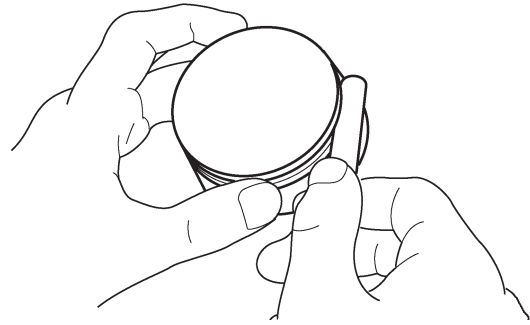
## Piston ring

### Top ring

Side clearance limit  
0.115 mm (0.0045 in)

### 2nd ring

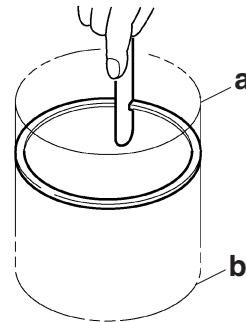
Side clearance limit  
0.115 mm (0.0045 in)



2. Install:
- Piston ring  
(into the cylinder)

### TIP

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



- b. Top of cylinder

3. Measure:

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

### TIP

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



## Piston ring

### Top ring

End gap limit  
0.42 mm (0.0165 in)

### 2nd ring

End gap limit  
0.85 mm (0.0335 in)

EAS30293

## CHECKING THE PISTON PIN

1. Check:

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

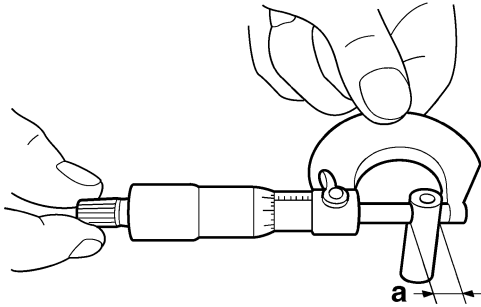
# CYLINDER AND PISTON

## 2. Measure:

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



**Piston pin outside diameter limit**  
13.975 mm (0.5502 in)

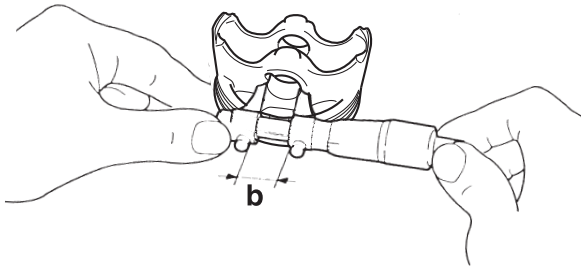


## 3. Measure:

- Piston pin bore inside diameter “b”
- Out of specification → Replace the piston.



**Piston pin bore inside diameter limit**  
14.043 mm (0.5529 in)



EAS30294

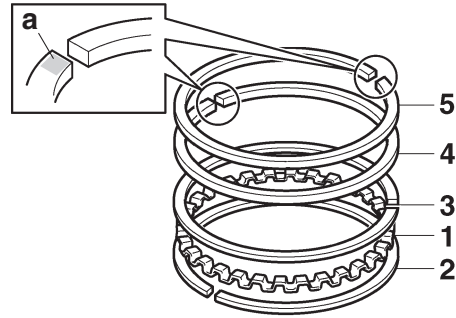
## INSTALLING THE PISTON AND CYLINDER

### 1. Install:

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

### TIP

Be sure to install the piston rings so that the manufacturer marks “a” face up.

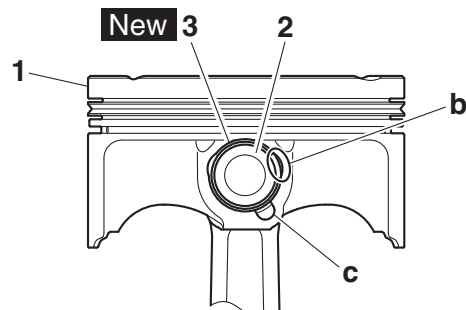
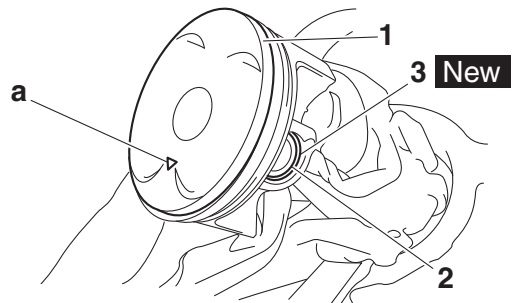


### 2. Install:

- Piston “1”
- Piston pin “2”
- Piston pin clips “3” **New**

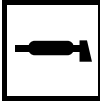
### TIP

- Apply engine oil to the piston pin and connecting rod.
- Make sure the arrow mark “a” on the piston points towards the exhaust side of the cylinder.
- Before installing the piston pin clips, cover the crankcase opening with a clean rag to prevent the clips from falling into the crankcase.
- When installing a piston pin clip, make sure that the clip ends “b” are positioned away from the cutout “c” in the piston as shown in the illustration.



### 3. Lubricate:

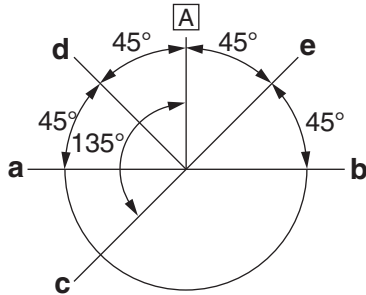
- Piston
- Piston rings
- Cylinder (with the recommended lubricant)



## Recommended lubricant Engine oil

### 4. Offset:

- Piston ring end gaps



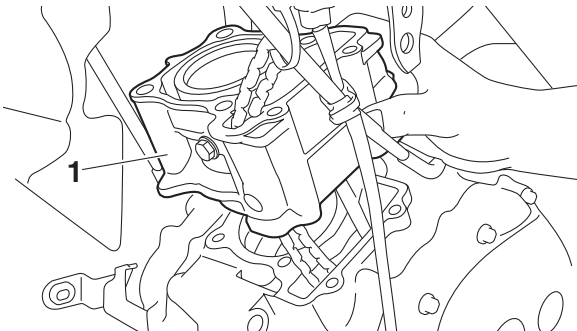
- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail
- A. Exhaust side

### 5. Install:

- Dowel pins
- Cylinder gasket **New**
- Cylinder "1"

### TIP

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

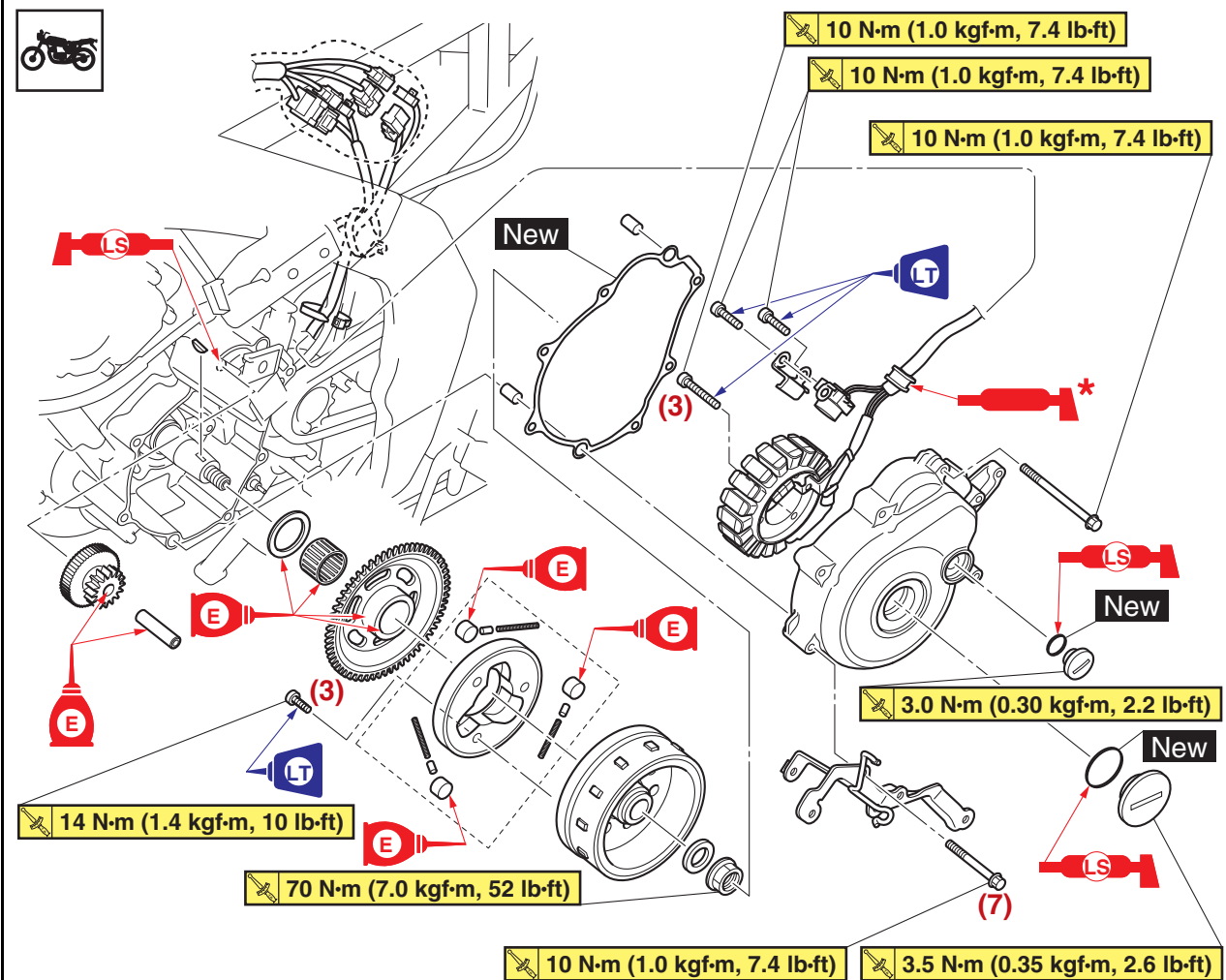


# GENERATOR AND STARTER CLUTCH

EAS20140

## GENERATOR AND STARTER CLUTCH

### Removing the generator and starter clutch

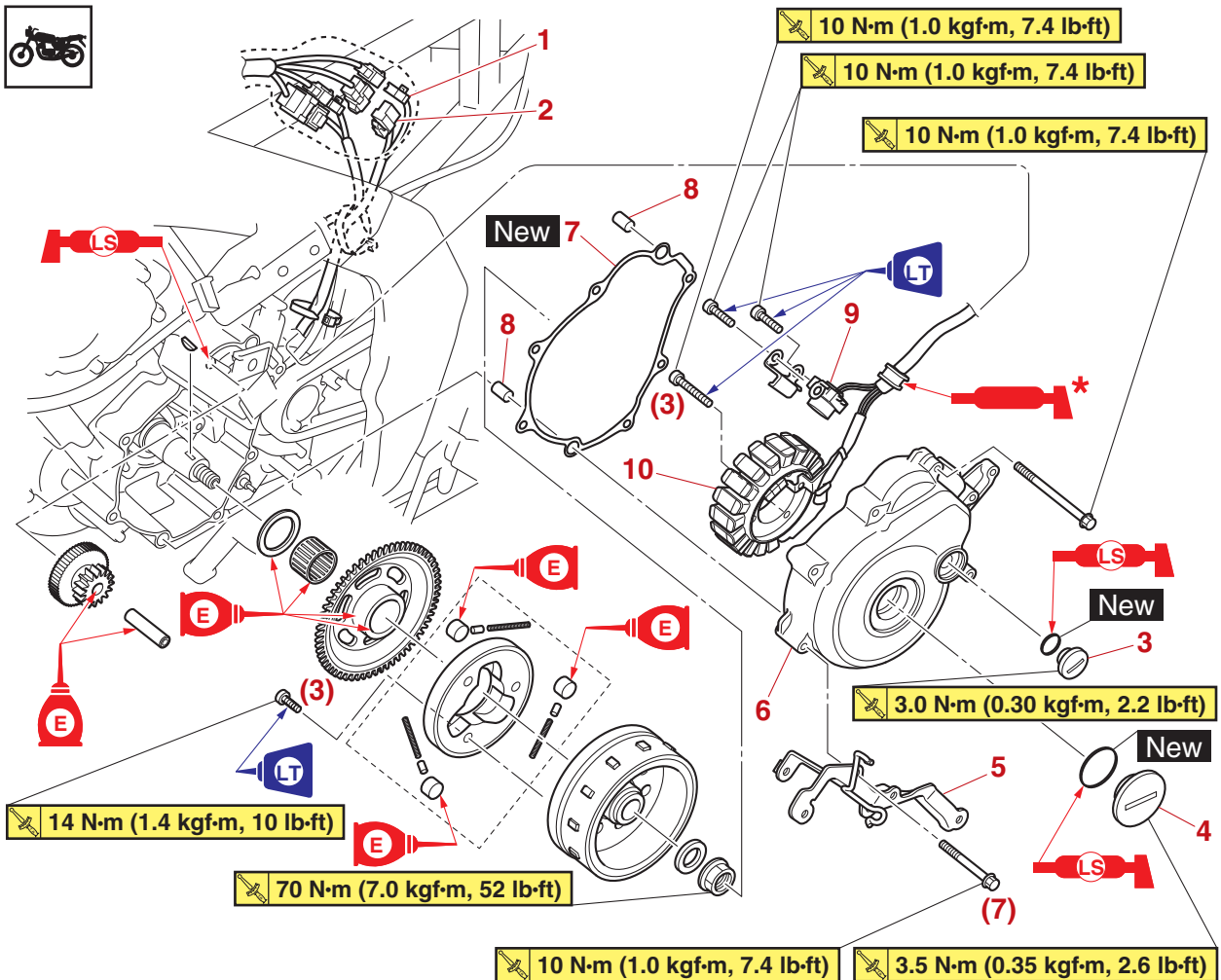


\*Apply Yamaha bond No.1215 (90890-85505).

| Order | Job/Parts to remove                                             | Q'ty | Remarks                                                    |
|-------|-----------------------------------------------------------------|------|------------------------------------------------------------|
|       | Seat                                                            |      | Refer to "GENERAL CHASSIS (1)" on page 4-1.                |
|       | Upper side cover (left)                                         |      | Refer to "GENERAL CHASSIS (2)" on page 4-2.                |
|       | Lower side cover (left)/Fuel tank side cover (left)/Bottom cowl |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                |
|       | Engine oil                                                      |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-17. |
|       | Coolant                                                         |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-19.    |
|       | Drive sprocket cover                                            |      | Refer to "CHAIN DRIVE" on page 4-75.                       |
|       | Coolant reservoir                                               |      | Refer to "RADIATOR AND THERMOSTAT" on page 6-2.            |

## GENERATOR AND STARTER CLUTCH

## Removing the generator and starter clutch

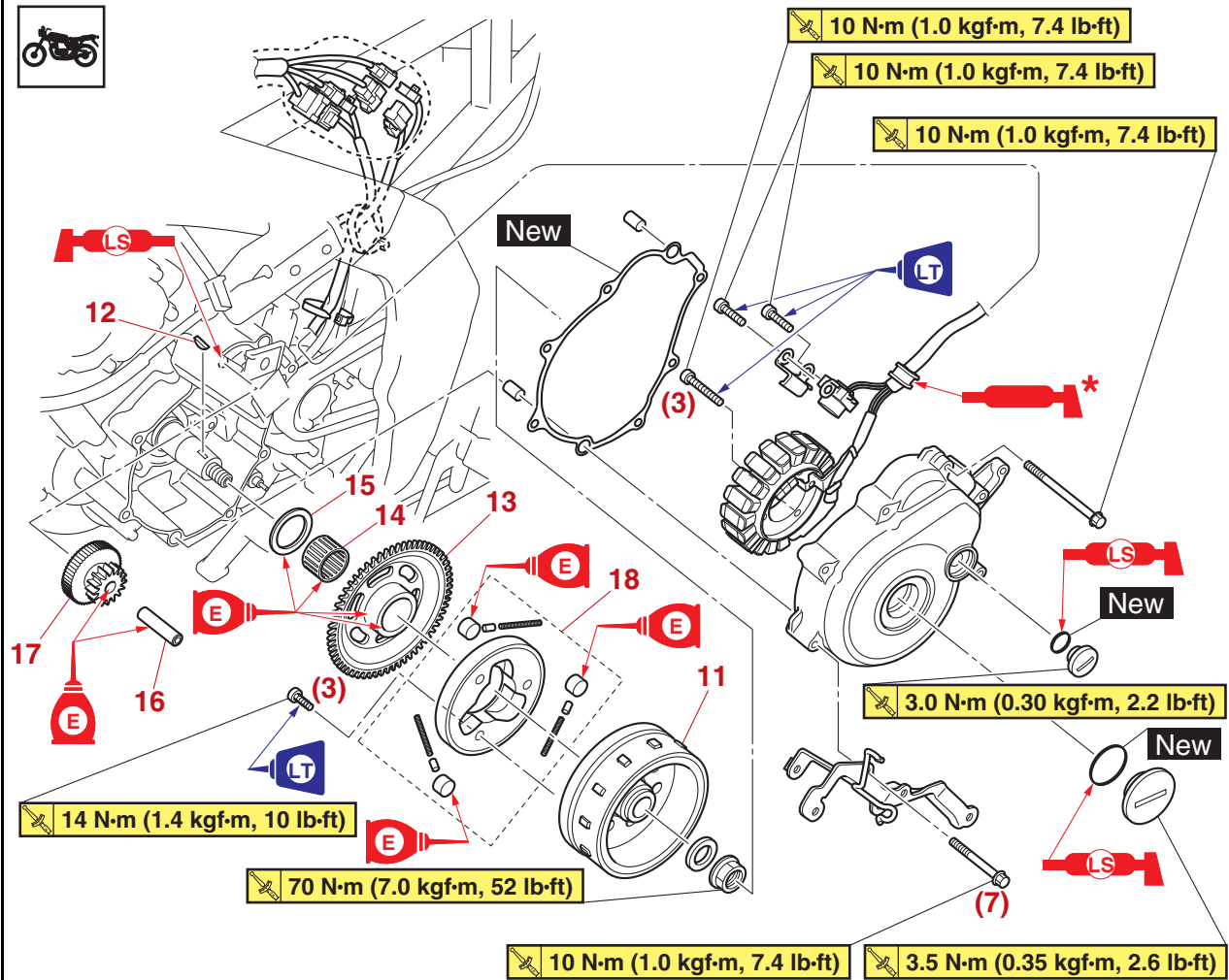


**\*Apply Yamaha bond No.1215 (90890-85505).**

| Order | Job/Parts to remove                | Q'ty | Remarks     |
|-------|------------------------------------|------|-------------|
| 1     | Crankshaft position sensor coupler | 1    | Disconnect. |
| 2     | Stator coil coupler                | 1    | Disconnect. |
| 3     | Timing mark accessing bolt         | 1    |             |
| 4     | Crankshaft end cover               | 1    |             |
| 5     | Bottom cowling bracket (left)      | 1    |             |
| 6     | Generator cover                    | 1    |             |
| 7     | Generator cover gasket             | 1    |             |
| 8     | Dowel pin                          | 2    |             |
| 9     | Crankshaft position sensor         | 1    |             |
| 10    | Stator coil                        | 1    |             |

# GENERATOR AND STARTER CLUTCH

## Removing the generator and starter clutch



\*Apply Yamaha bond No.1215 (90890-85505).

| Order | Job/Parts to remove            | Q'ty | Remarks |
|-------|--------------------------------|------|---------|
| 11    | Generator rotor                | 1    |         |
| 12    | Woodruff key                   | 1    |         |
| 13    | Starter clutch gear            | 1    |         |
| 14    | Bearing                        | 1    |         |
| 15    | Washer                         | 1    |         |
| 16    | Starter clutch idle gear shaft | 1    |         |
| 17    | Starter clutch idle gear       | 1    |         |
| 18    | Starter clutch assembly        | 1    |         |

# GENERATOR AND STARTER CLUTCH

EAS30867

## REMOVING THE GENERATOR

### 1. Remove:

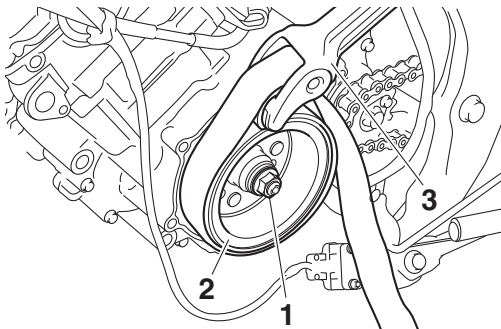
- Generator rotor nut "1"
- Washer

### TIP

While holding the generator rotor "2" with the rotor holding tool "3", loosen the generator rotor nut.



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**



### 2. Remove:

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

ECA13880

### NOTICE

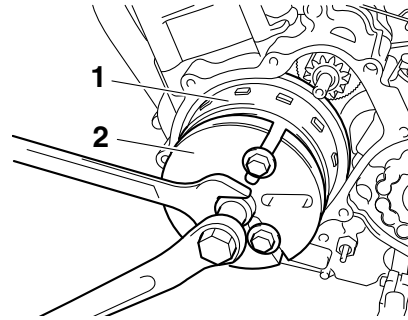
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

### TIP

Make sure the flywheel puller is centered over the generator rotor.



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



EAS30868

## REMOVING THE STARTER CLUTCH

### 1. Remove:

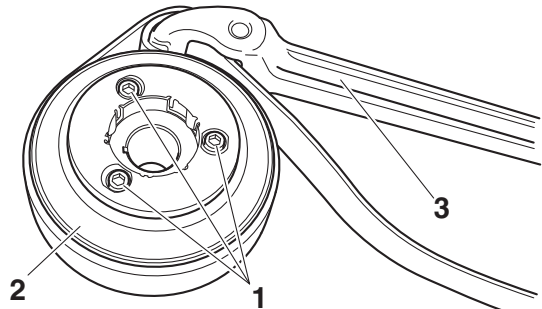
- Starter clutch bolts "1"

### TIP

While holding the generator rotor "2" with the rotor holding tool "3", remove the starter clutch bolts.



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**



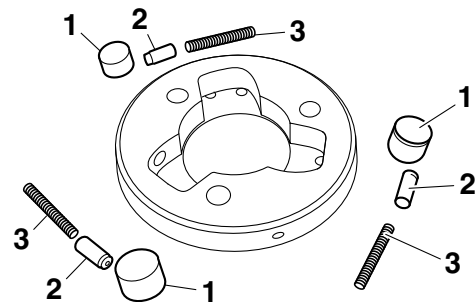
EAS30869

## CHECKING THE STARTER CLUTCH

### 1. Check:

- Starter clutch rollers "1"
- Starter clutch caps "2"
- Starter clutch springs "3"

Damage/wear → Replace the starter clutch assembly.



# GENERATOR AND STARTER CLUTCH

## 2. Check:

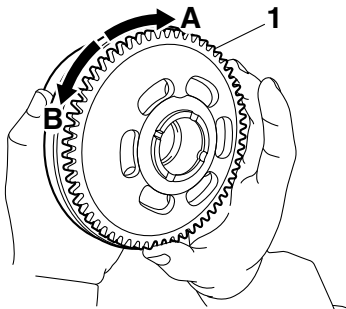
- Starter clutch idle gear
- Starter clutch gear  
Burrs/chips/roughness/wear → Replace the defective part(s).

## 3. Check:

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

## 4. Check:

- Starter clutch operation
  - a. Install the starter clutch gear “1” and starter clutch assembly onto the generator rotor and hold the generator rotor. Refer to “INSTALLING THE STARTER CLUTCH” on page 5-42.
  - b. When turning the starter clutch gear clockwise “A”, the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
  - c. When turning the starter clutch gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



EAS30871

## INSTALLING THE STARTER CLUTCH

### 1. Install:

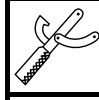
- Starter clutch assembly
- Starter clutch bolts “1”



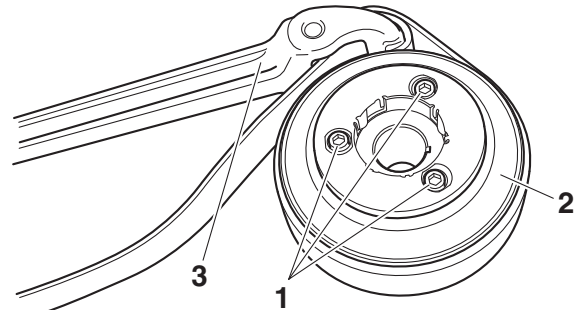
**Starter clutch bolt**  
**14 N·m (1.4 kgf·m, 10 lb·ft)**  
**LOCTITE®**

### TIP

While holding the generator rotor “2” with the rotor holding tool “3”, tighten the starter clutch bolts.



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**



EAS30872

## INSTALLING THE GENERATOR

### 1. Install:

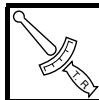
- Woodruff key
- Generator rotor
- Washer
- Generator rotor nut

### 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 sealed in the keyway of the crankshaft.

### 2. Tighten:

- Generator rotor nut “1”



**Generator rotor nut**  
**70 N·m (7.0 kgf·m, 52 lb·ft)**

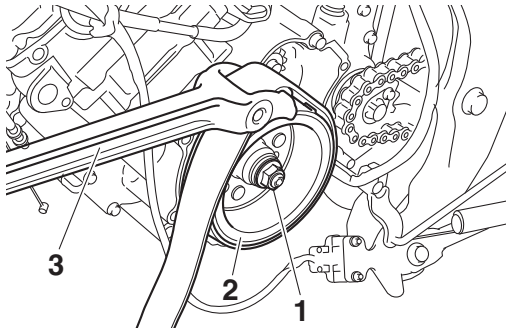
### TIP

While holding the generator rotor “2” with the rotor holding tool “3”, tighten the generator rotor nut.



**Rotor holding tool**  
**90890-04166**  
**Rotor holding tool**  
**YM-04166**

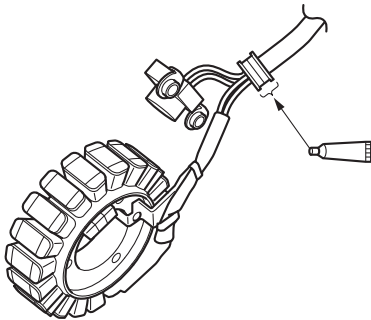
## GENERATOR AND STARTER CLUTCH



3. Apply:
- Sealant  
(onto the crankshaft position sensor/stator assembly lead grommet)



**Yamaha bond No. 1215**  
**90890-85505**  
**Three bond No. 1215®**



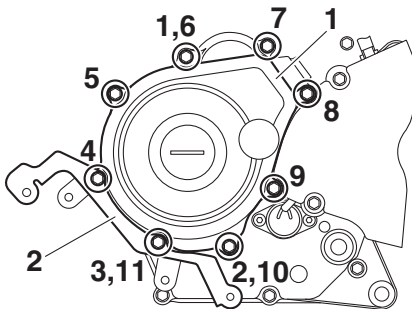
4. Install:
- Generator cover “1”
  - Bottom cowling bracket (left) “2”



**Generator cover bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

### TIP

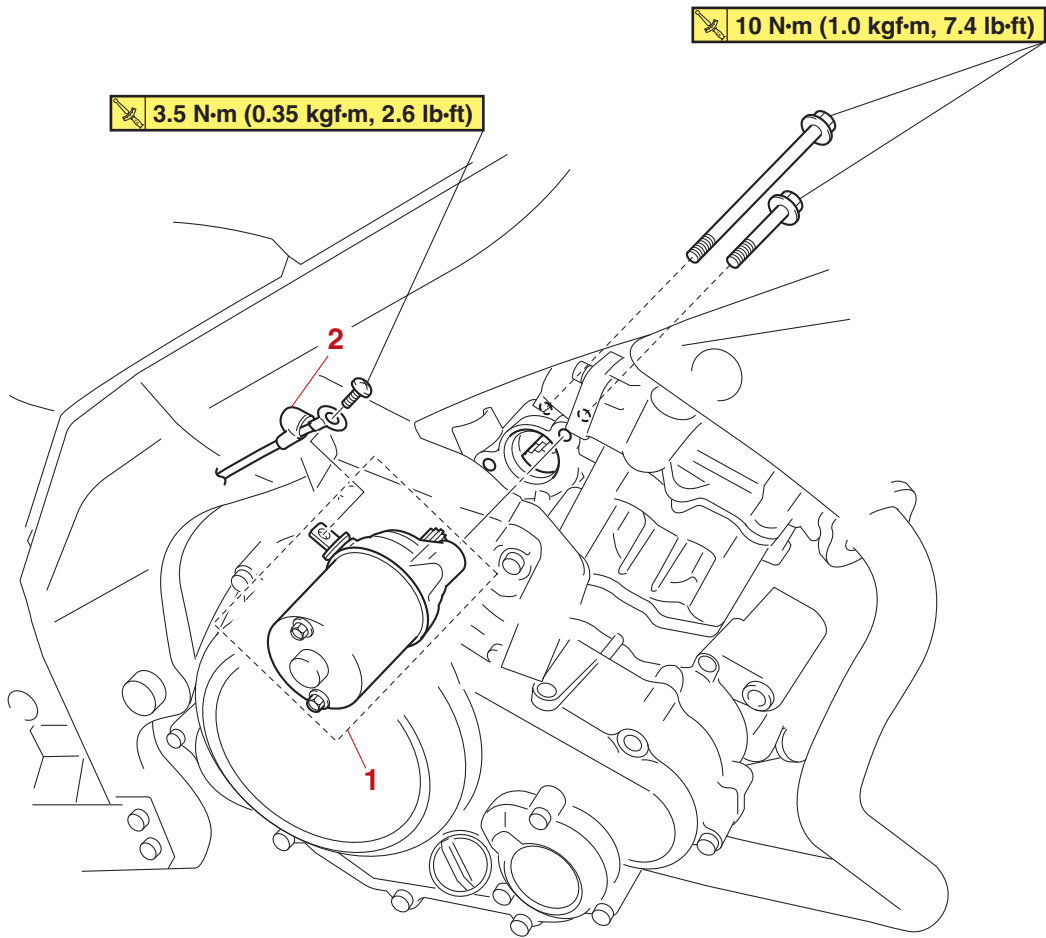
Tighten the generator cover bolts in the proper tightening sequence as shown.



EAS20052

ELECTRIC STARTER

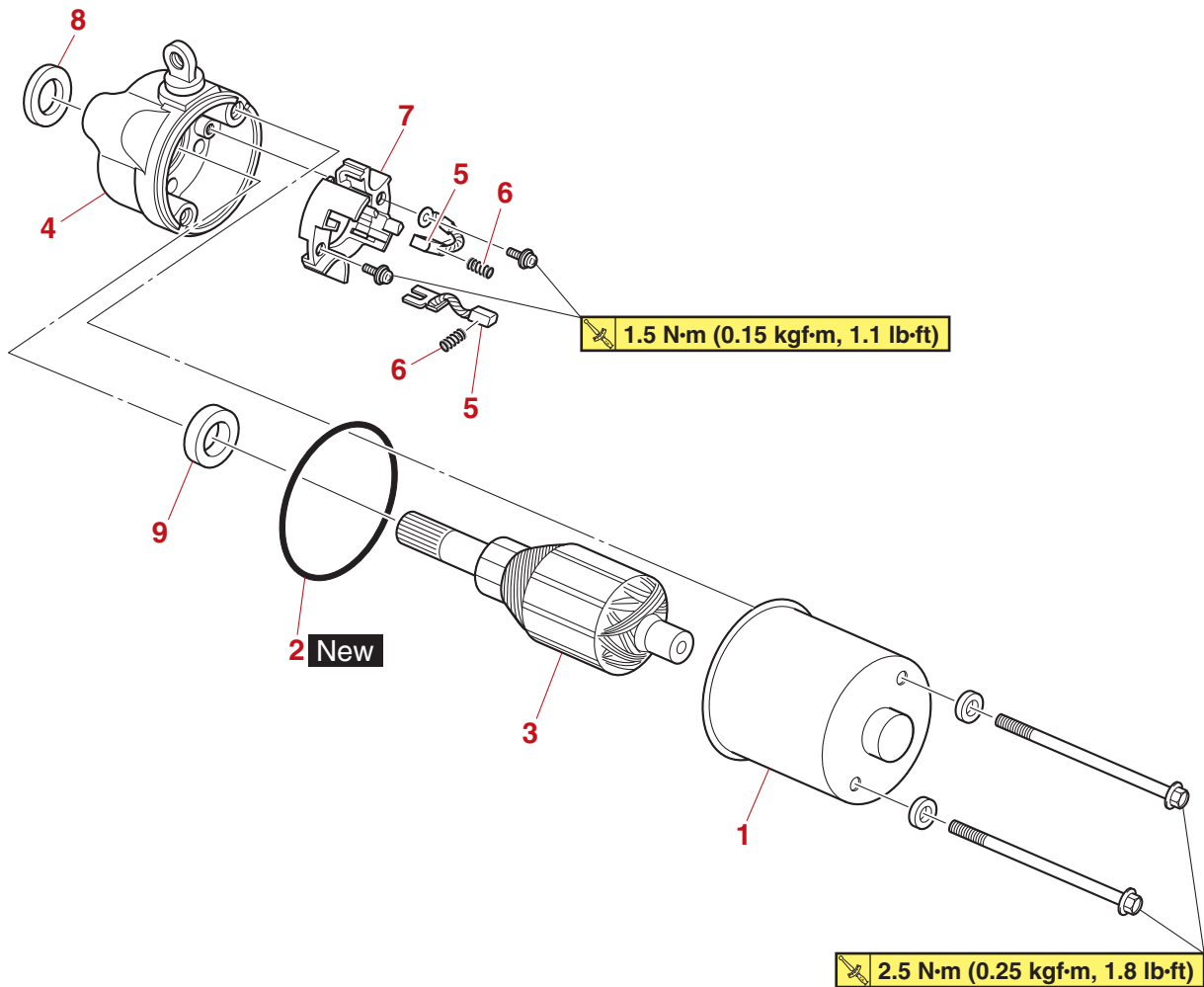
Removing the starter motor



| Order | Job/Parts to remove | Q'ty | Remarks     |
|-------|---------------------|------|-------------|
| 1     | Starter motor       | 1    |             |
| 2     | Starter motor lead  | 1    | Disconnect. |

# ELECTRIC STARTER

## Disassembling the starter motor



| Order | Job/Parts to remove       | Q'ty | Remarks |
|-------|---------------------------|------|---------|
| 1     | Starter motor rear cover  | 1    |         |
| 2     | Gasket                    | 1    |         |
| 3     | Commutator                | 1    |         |
| 4     | Starter motor front cover | 1    |         |
| 5     | Brush                     | 2    |         |
| 6     | Brush spring              | 2    |         |
| 7     | Brush holder              | 1    |         |
| 8     | Oil seal                  | 1    |         |
| 9     | Bearing                   | 1    |         |

EAS30325

## CHECKING THE STARTER MOTOR

### 1. Check:

- Commutator  
Dirt → Clean with 600 grit sandpaper.

### 2. Measure:

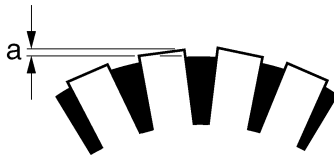
- Mica undercut "a"  
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



**Mica undercut (depth)**  
**1.35 mm (0.05 in)**

### TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



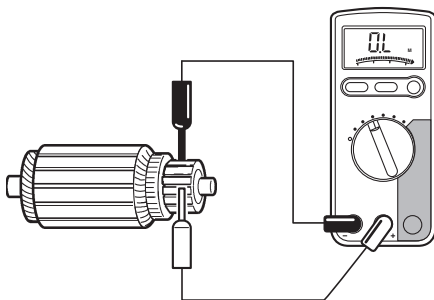
### 3. Check:

- 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.

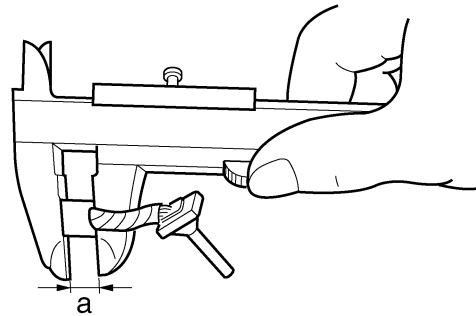


### 4. Measure:

- Brush length "a"  
Out of specification → Replace the starter motor front cover/brush holder set.



**Brush overall length limit**  
**3.5 mm (0.14 in)**



### 5. Check:

- Gear teeth  
Damage/wear → Replace the starter motor.

### 6. Check:

- Bearing
- Oil seal  
Damage/wear → Replace the starter motor.

EAS30326

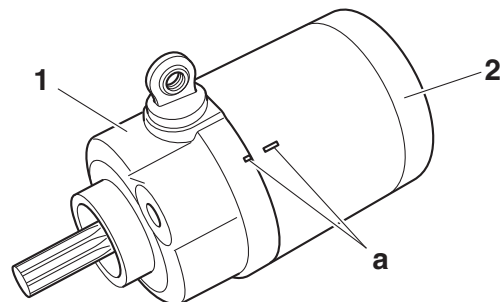
## ASSEMBLING THE STARTER MOTOR

### 1. Assemble:

- Starter motor front cover "1"
- Starter motor rear cover "2"

### TIP

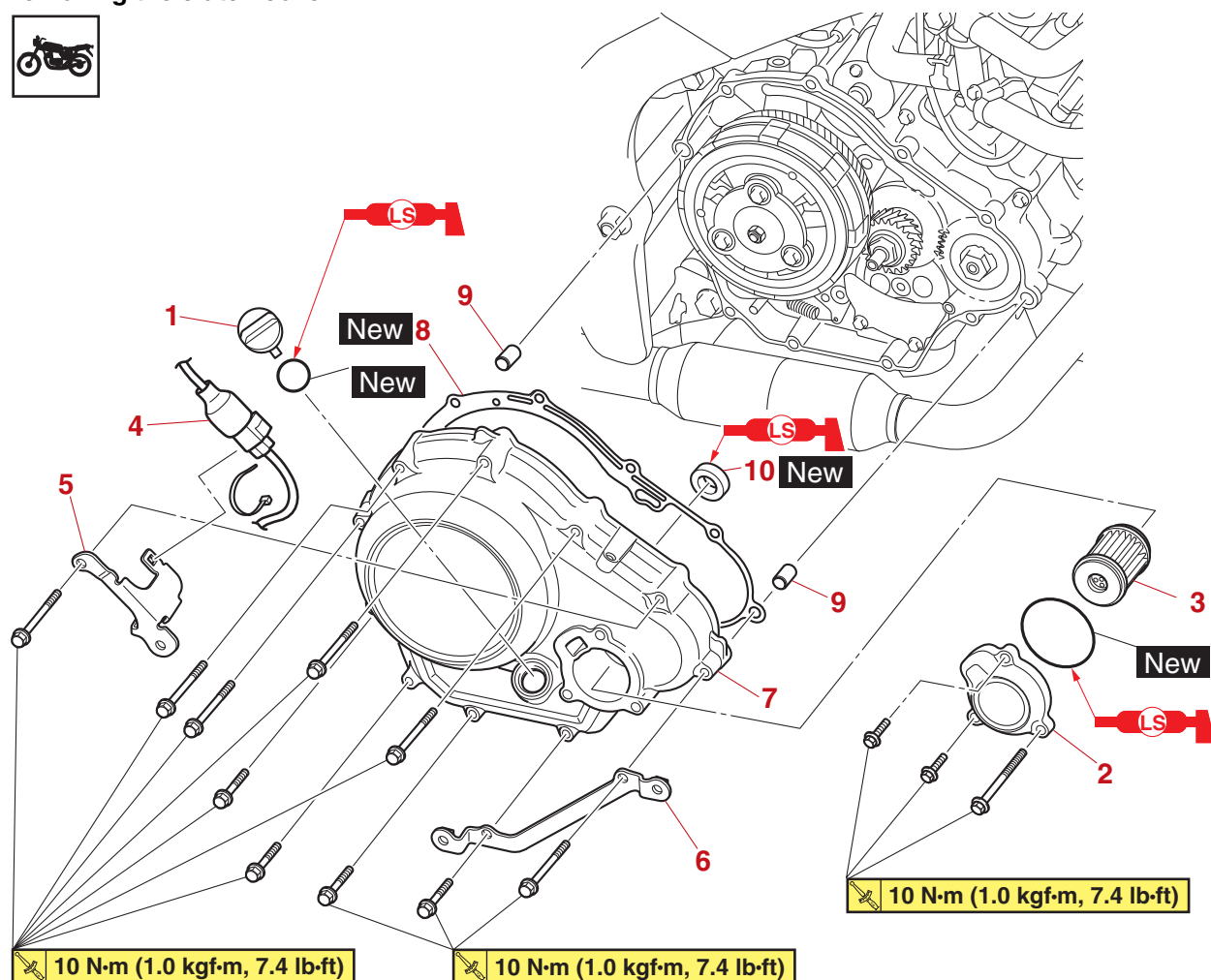
Align the marks "a" on the starter motor rear cover and starter motor front cover.



EAS20055

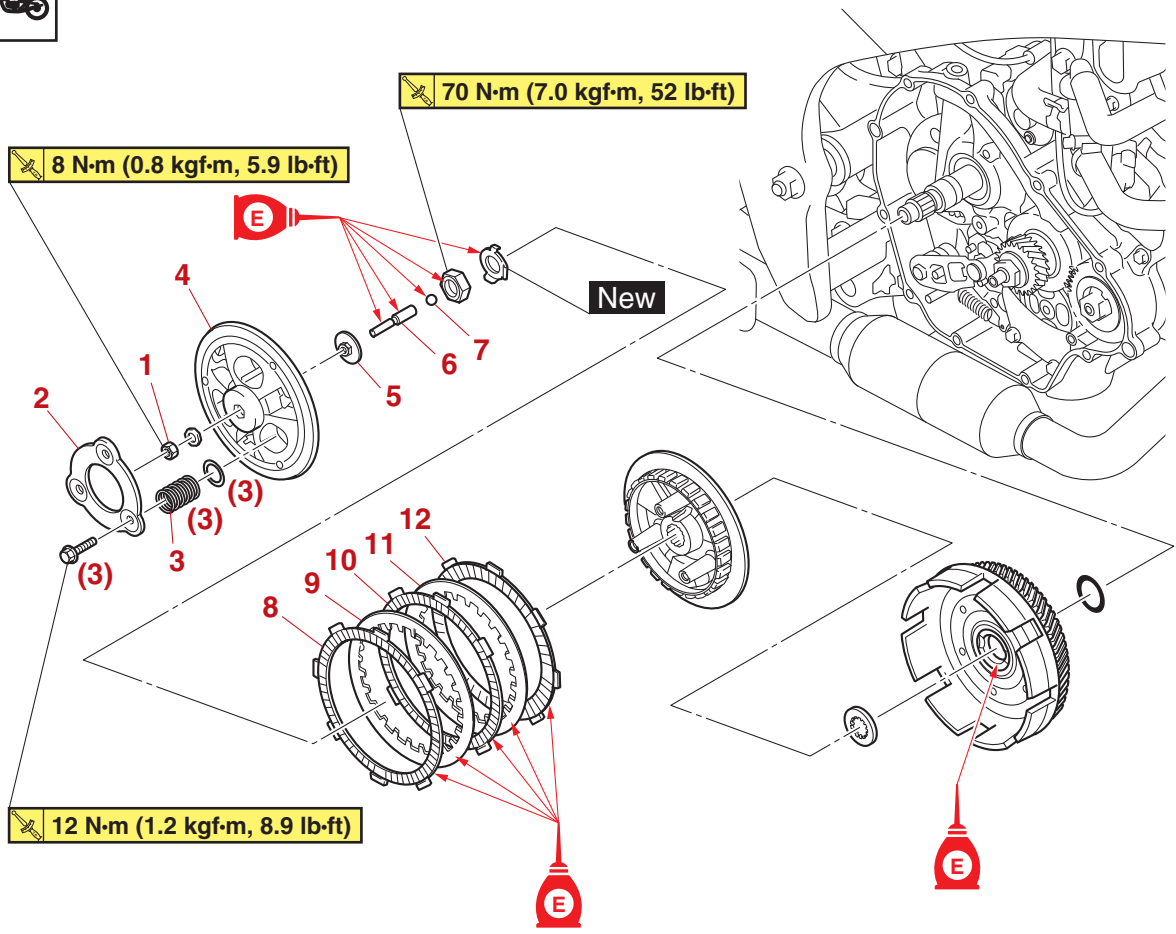
## CLUTCH

## Removing the clutch cover



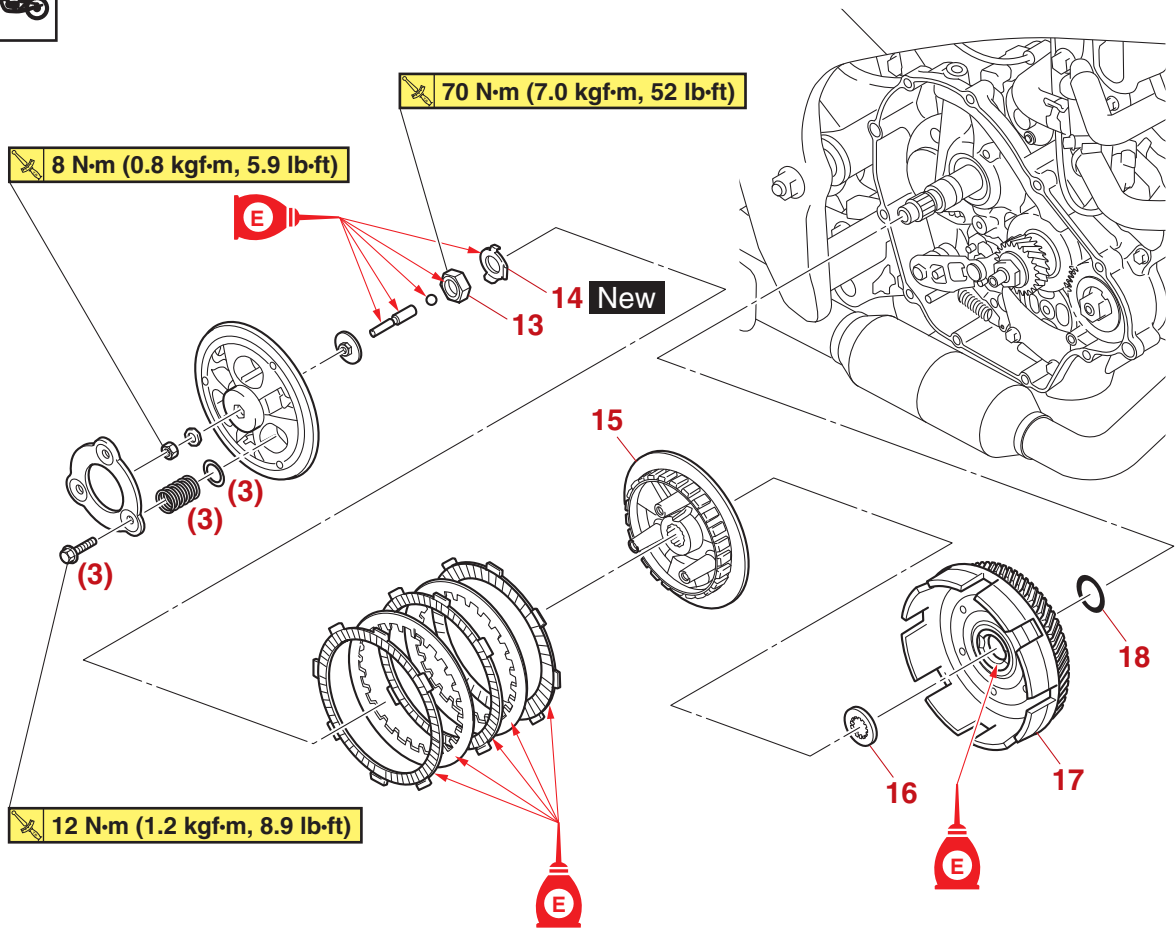
| Order | Job/Parts to remove                   | Q'ty | Remarks                                                    |
|-------|---------------------------------------|------|------------------------------------------------------------|
|       | Bottom cowling                        |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                |
|       | Engine oil                            |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-17. |
| 1     | Oil filler cap                        | 1    |                                                            |
| 2     | Oil filter element cover              | 1    |                                                            |
| 3     | Oil filter element                    | 1    |                                                            |
| 4     | O <sub>2</sub> sensor coupler         | 1    |                                                            |
| 5     | O <sub>2</sub> sensor coupler bracket | 1    |                                                            |
| 6     | Bottom cowling bracket (right)        | 1    |                                                            |
| 7     | Clutch cover                          | 1    |                                                            |
| 8     | Clutch cover gasket                   | 1    |                                                            |
| 9     | Dowel pin                             | 2    |                                                            |
| 10    | Oil seal                              | 1    |                                                            |

## Removing the clutch



| Order | Job/Parts to remove    | Q'ty | Remarks |
|-------|------------------------|------|---------|
| 1     | Locknut                | 1    |         |
| 2     | Pressure plate 1       | 1    |         |
| 3     | Clutch spring          | 3    |         |
| 4     | Pressure plate 2       | 1    |         |
| 5     | Clutch push rod holder | 1    |         |
| 6     | Short clutch push rod  | 1    |         |
| 7     | Ball                   | 1    |         |
| 8     | Friction plate 1       | 1    |         |
| 9     | Clutch plate 1         | 1    |         |
| 10    | Friction plate 2       | 1    |         |
| 11    | Clutch plate 2         | 1    |         |
| 12    | Friction plate 3       | 1    |         |

Removing the clutch

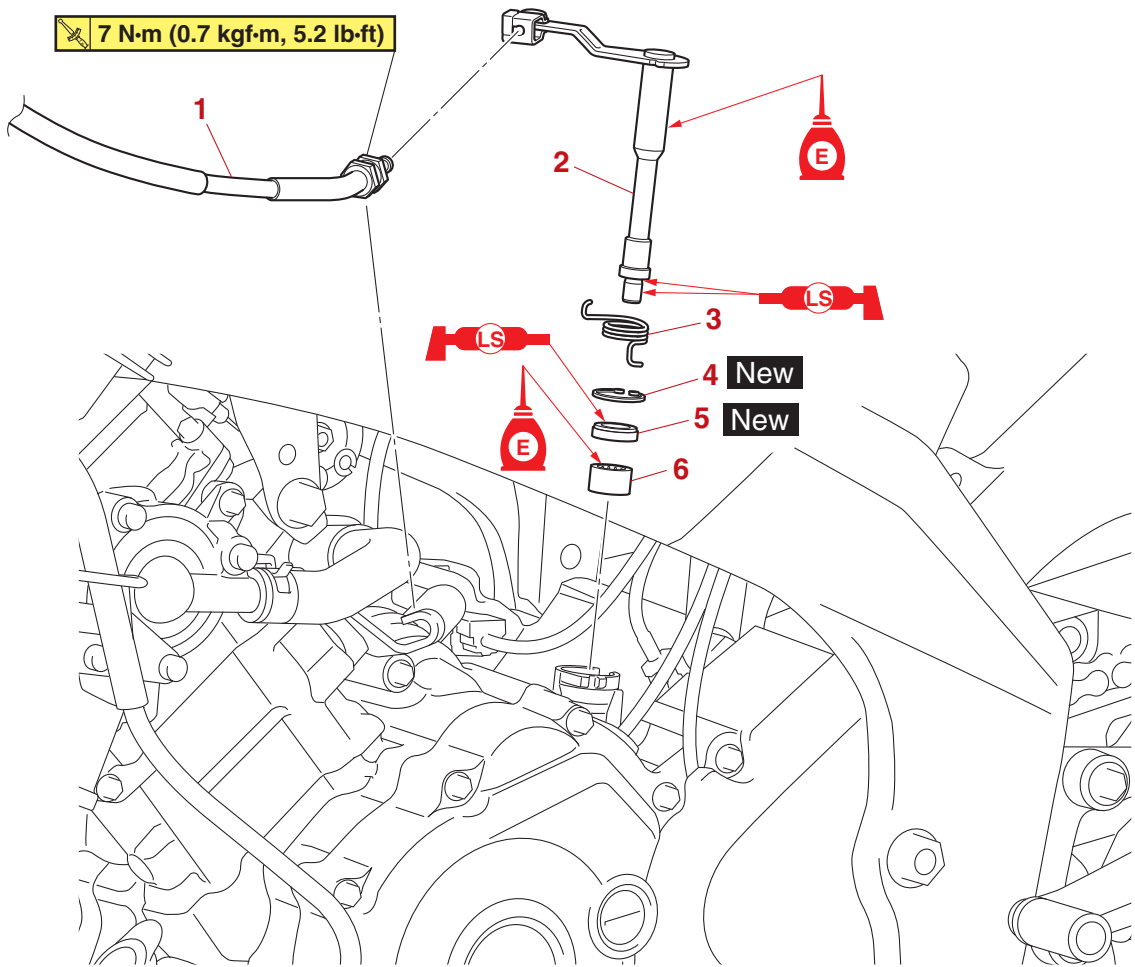


| Order | Job/Parts to remove   | Q'ty | Remarks |
|-------|-----------------------|------|---------|
| 13    | Clutch boss nut       | 1    |         |
| 14    | Lock washer           | 1    |         |
| 15    | Clutch boss           | 1    |         |
| 16    | Thrust washer         | 1    |         |
| 17    | Clutch housing        | 1    |         |
| 18    | Conical spring washer | 1    |         |

Removing the push lever



7 N·m (0.7 kgf·m, 5.2 lb·ft)



| Order | Job/Parts to remove      | Q'ty | Remarks     |
|-------|--------------------------|------|-------------|
| 1     | Clutch cable             | 1    | Disconnect. |
| 2     | Clutch push lever        | 1    |             |
| 3     | Clutch push lever spring | 1    |             |
| 4     | Circlip                  | 1    |             |
| 5     | Oil seal                 | 1    |             |
| 6     | Bearing                  | 1    |             |

EAS30346

## REMOVING THE CLUTCH

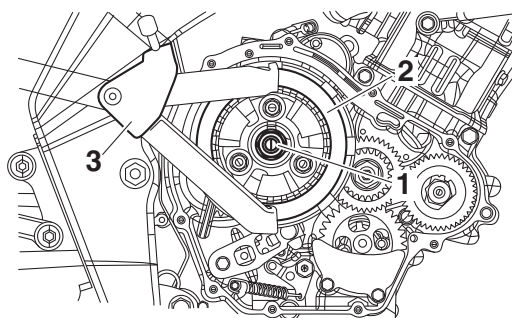
1. Straighten the lock washer tab.
2. Loosen:
  - Clutch boss nut "1"

### TIP

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



**Clutch holder**  
90890-04199  
**Universal clutch holder**  
YM-91042



EAS30348

## CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

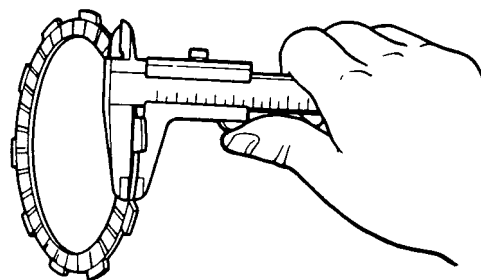
1. Check:
  - Friction plate
 Damage/wear → Replace the friction plates as a set.
2. Measure:
  - Friction plate thickness
 Out of specification → Replace the friction plates as a set.

### TIP

Measure the friction plate at four places.



**Friction plate 1 thickness**  
2.92–3.08 mm (0.115–0.121 in)  
**Wear limit**  
2.82 mm (0.111 in)  
**Friction plate 2 thickness**  
2.92–3.08 mm (0.115–0.121 in)  
**Wear limit**  
2.82 mm (0.111 in)  
**Friction plate 3 thickness**  
2.92–3.08 mm (0.115–0.121 in)  
**Wear limit**  
2.82 mm (0.1110 in)



EAS30349

## CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

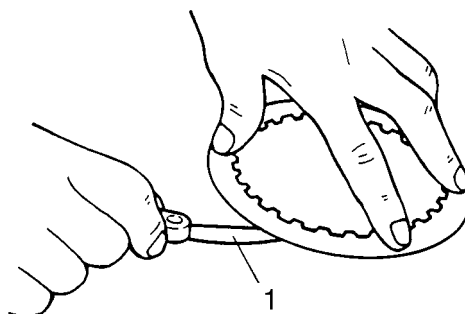
1. Check:
  - Clutch plate
 Damage → Replace the clutch plates as a set.
2. Measure:
  - Clutch plate warpage
 (with a surface plate and thickness gauge "1")  
 Out of specification → Replace the clutch plates as a set.



**Thickness gauge**  
90890-03268  
**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.

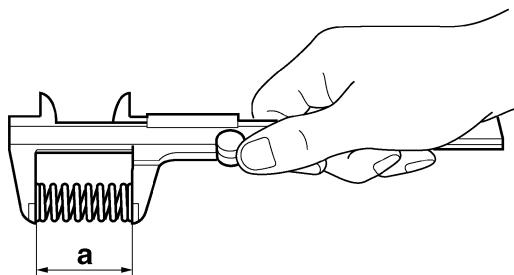
1. Check:
  - Clutch spring
 Damage → Replace the clutch springs as a set.

## 2. Measure:

- Clutch spring free length “a”  
Out of specification → Replace the clutch springs as a set.



**Clutch spring free length limit  
39.51 mm (1.56 in)**



EAS30352

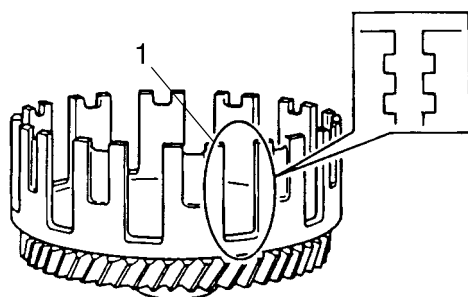
## CHECKING THE CLUTCH HOUSING

### 1. Check:

- Clutch housing dogs “1”  
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

### TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.



### 2. Check:

- Bearing  
Damage/wear → Replace the clutch housing.

EAS30353

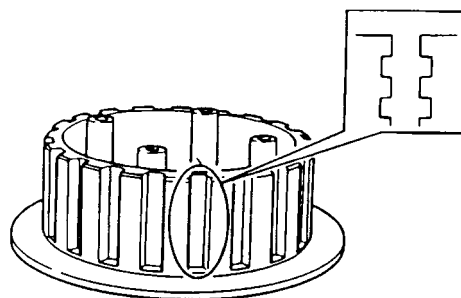
## CHECKING THE CLUTCH BOSS

### 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.

EAS30974

## CHECKING THE CLUTCH PUSH LEVER AND SHORT CLUTCH PUSH ROD

### 1. Check:

- Clutch push lever
- Ball
- Short clutch push rod  
Damage/wear → Replace the defective part(s).

EAS30356

## CHECKING THE PRIMARY DRIVE GEAR

### 1. Remove:

- Primary drive gear  
Refer to “BALANCER GEAR” on page 5-61.

### 2. Check:

- Primary drive gear  
Damage/wear → Replace the primary drive gear and clutch housing as a set.  
Excessive noise during operation → Replace the primary drive gear and clutch housing as a set.

### 3. Install:

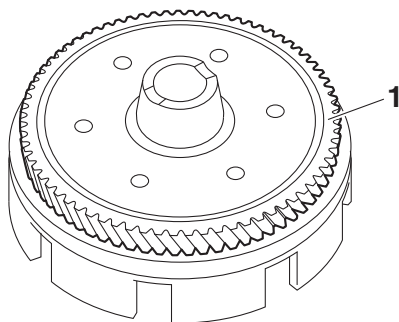
- Primary drive gear  
Refer to “BALANCER GEAR” on page 5-61.

EAS30357

## CHECKING THE PRIMARY DRIVEN GEAR

### 1. Check:

- Primary driven gear “1”  
Damage/wear → Replace the primary drive gear and clutch housing as a set.  
Excessive noise during operation → Replace the primary drive gear and clutch housing as a set.



EAS30363

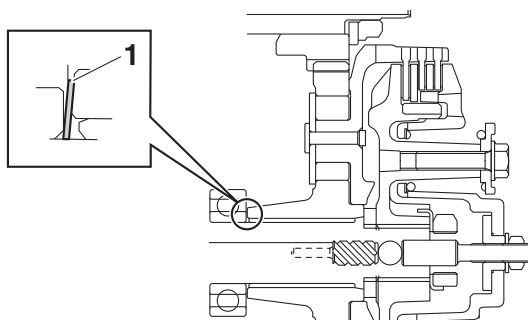
## INSTALLING THE CLUTCH

### 1. Install:

- Conical spring washer "1"

### TIP

Make sure that the white paint mark on the conical spring washers is facing outward as shown in the illustration.

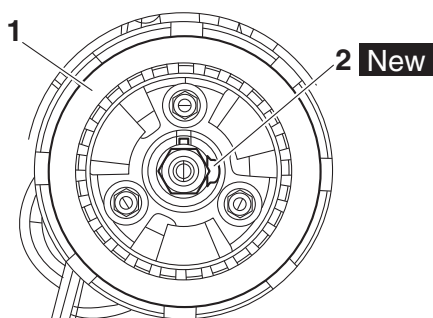


### 2. Install:

- Clutch housing
- Thrust washer
- Clutch boss "1"
- Lock washer "2" **New**
- Clutch boss nut

### TIP

- Install the thrust washer with round-edged corner facing out.
- Lubricate the clutch boss nut threads and lock washer mating surfaces with engine oil.



### 3. Tighten:

- Clutch boss nut "1"



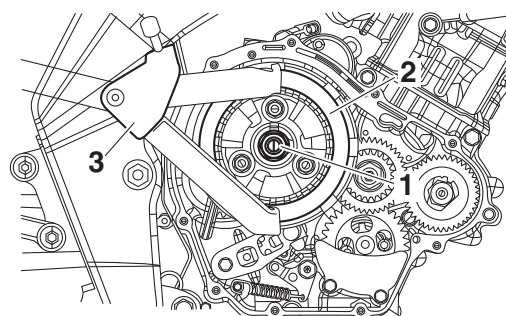
**Clutch boss nut**  
70 N·m (7.0 kgf·m, 52 lb·ft)

### TIP

While holding the clutch boss "2" with the universal clutch holder "3", tighten the clutch boss nut.



**Clutch holder**  
90890-04199  
**Universal clutch holder**  
YM-91042



4. Bend the lock washer tab along a flat side of the nut.

### 5. Lubricate:

- Friction plates
- Clutch plates
- (with the recommended lubricant)



**Recommended lubricant**  
Engine oil

### 6. Install:

- Friction plates
- Clutch plates

### TIP

First, install a friction plate and then alternate between a clutch plate and a friction plate.

### 7. Install:

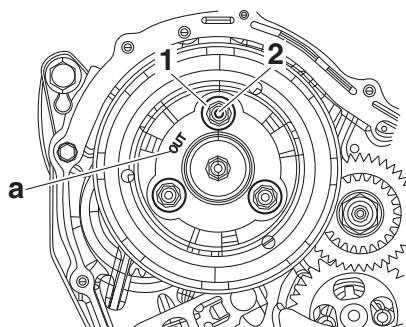
- Clutch springs "1"
- Pressure plate
- Clutch spring bolts "2"

### TIP

Face the mark "a" on the pressure plate outward of the vehicle.



**Clutch spring bolt**  
12 N·m (1.2 kgf·m, 8.9 lb·ft)



## 8. Install:

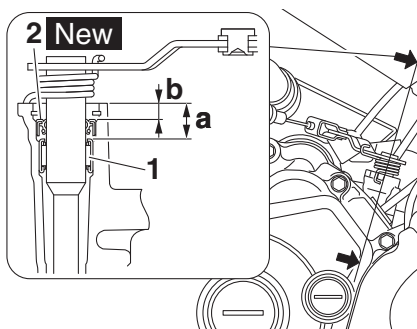
- Bearing "1"
- Oil seal "2" **New**  
(to the crankcase)
- Circlip **New**
- Clutch push lever spring
- Clutch push lever

## TIP

- Lubricate the bearing with engine oil and lubricate the oil seal with lithium-soap-based grease.
- When installing the bearing to the crankcase, face the stamp on the bearing outside.

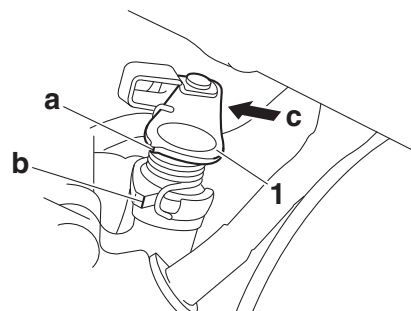


**Install depth of bearing "a"**  
10.5–11.3 mm (0.41–0.44 in)  
**Install depth of oil seal "b"**  
4.5–5.0 mm (0.18–0.19 in)



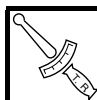
## 9. Adjust:

- Clutch mechanism free play
  - a. Check that projection "a" on the clutch push lever "1" aligns with mark "b" shown on the crankcase in the illustration by pushing the clutch push lever manually in direction "c" until it stops.

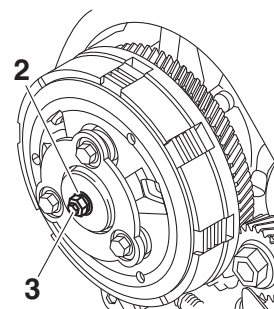


- b. If projection "a" is not aligned with mark "b", align them as follows:

- Loosen the locknut "2".
- With the clutch push lever fully pushed in direction "c", turn the short clutch push rod "3" in or out until projection "a" aligns with mark "b".
- Hold the short clutch push rod to prevent it from moving and then tighten the locknut to specification.



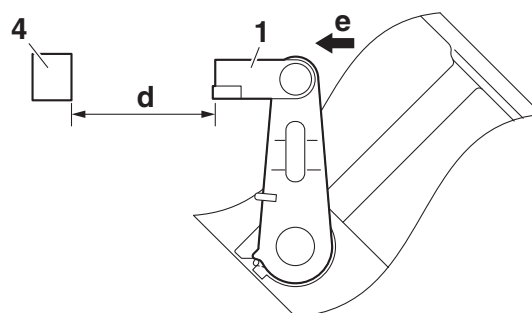
**Locknut (short clutch push rod)**  
8 N·m (0.8 kgf·m, 5.9 lb·ft)



- c. Check the length "d" between the clutch cable holder "4" and the clutch push lever by pushing the lever manually in direction "e" until it stops.



**Length "d"**  
43.0–47.0 mm (1.69–1.85 in)



## 10.Install:

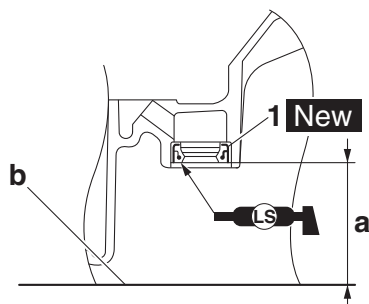
- Oil seal “1” **New**  
(to the clutch cover)



**Installed depth of oil seal “a”**  
**35.9–36.4 mm (1.41–1.43 in)**

### TIP

Lubricate the oil seal with lithium-soap-based grease.



b. Mating surface of the clutch cover

## 11.Install:

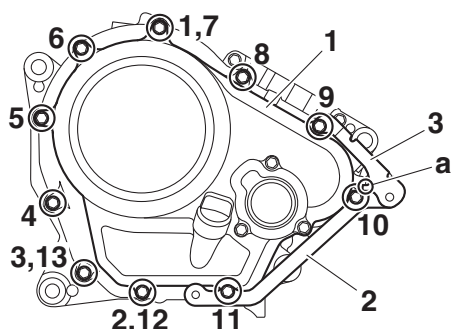
- Clutch cover “1”
- Bottom cowling bracket (right) “2”
- O<sub>2</sub> sensor coupler bracket “3”



**Clutch cover bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

### TIP

- Contact the bended part “a” of the O<sub>2</sub> sensor coupler bracket to the bottom cowling bracket (right).
- Tighten the clutch cover bolts in the proper tightening sequence as shown.



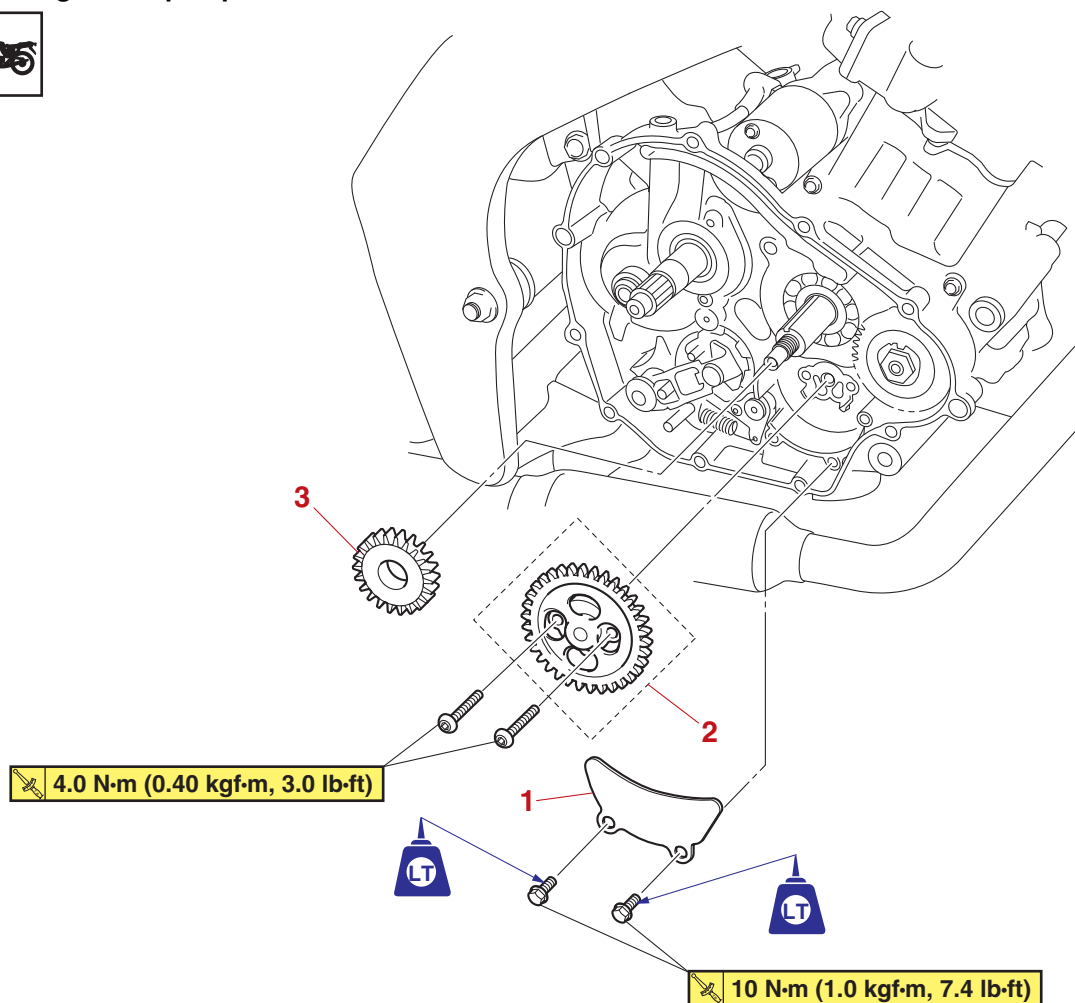
## 12.Adjust:

- Clutch cable free play  
Refer to “ADJUSTING THE CLUTCH LEVER  
FREE PLAY” on page 3-9.

EAS20054

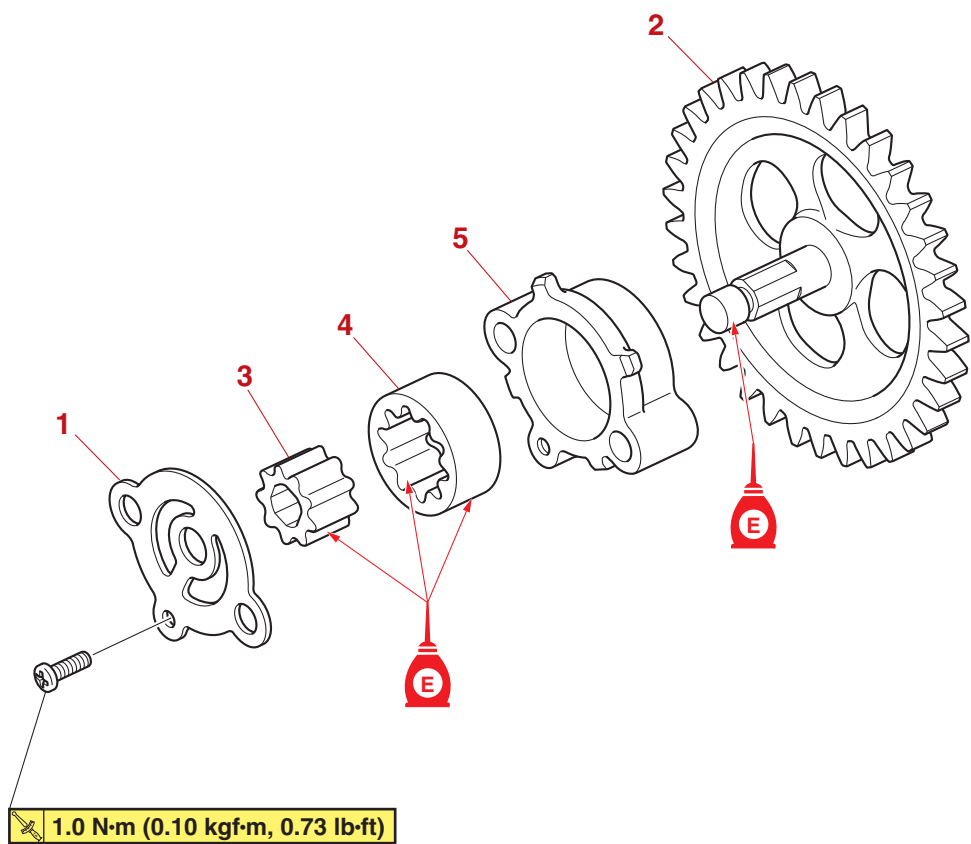
## OIL PUMP

## Removing the oil pump



| Order | Job/Parts to remove              | Q'ty | Remarks                                                    |
|-------|----------------------------------|------|------------------------------------------------------------|
|       | Bottom cowling                   |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                |
|       | Engine oil                       |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-17. |
|       | Clutch housing                   |      | Refer to "CLUTCH" on page 5-47.                            |
|       | Balancer drive gear/Straight key |      | Refer to "BALANCER GEAR" on page 5-61.                     |
| 1     | Oil baffle plate                 | 1    |                                                            |
| 2     | Oil pump assembly                | 1    |                                                            |
| 3     | Oil pump drive gear              | 1    |                                                            |

Disassembling the oil pump

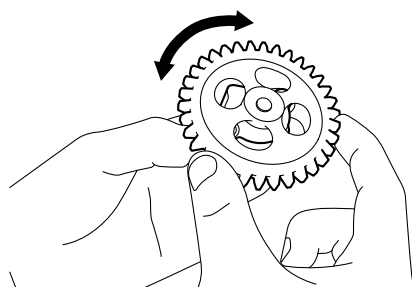


| Order | Job/Parts to remove    | Q'ty | Remarks |
|-------|------------------------|------|---------|
| 1     | Oil pump housing cover | 1    |         |
| 2     | Oil pump driven gear   | 1    |         |
| 3     | Oil pump inner rotor   | 1    |         |
| 4     | Oil pump outer rotor   | 1    |         |
| 5     | Oil pump housing       | 1    |         |

EAS30337

## CHECKING THE OIL PUMP

1. Check:
  - Oil pump drive gear
  - Oil pump driven gear
  - Oil pump housing
  - Oil pump housing cover
 Cracks/damage/wear → Replace the oil pump assembly.
2. Check:
  - Oil pump operation
 Rough movement → Repeat steps (1) and (2) or replace the oil pump assembly.



EAS30342

## ASSEMBLING THE OIL PUMP

1. Lubricate:
  - Oil pump inner rotor
  - Oil pump outer rotor
  - Oil pump driven gear
 (with the recommended lubricant)



2. Install:
  - Oil pump outer rotor
  - Oil pump inner rotor
  - Oil pump driven gear
  - Oil pump housing cover

### TIP

- Face the punch mark on the oil pump outer rotor inward and the punch mark on the inner rotor outward.
- Install the oil pump housing cover with its chamfered side facing towards the oil pump housing.

3. Check:
  - Oil pump operation
 Refer to “CHECKING THE OIL PUMP” on page 5-58.

EAS30343

## INSTALLING THE OIL PUMP

1. Install:
  - Oil pump assembly



**Oil pump assembly screw**  
**4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

ECA20620

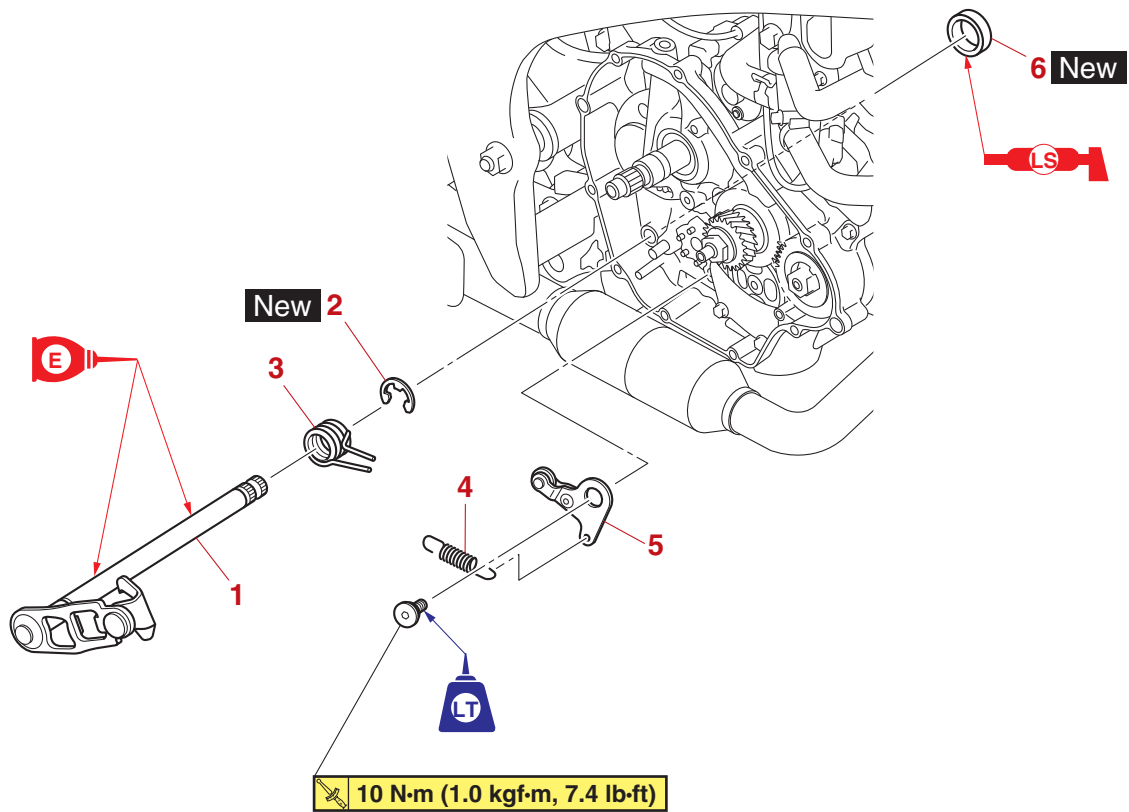
### NOTICE

**After tightening the screws, make sure the oil pump turns smoothly.**

EAS20057

SHIFT SHAFT

Removing the shift shaft and stopper lever



| Order | Job/Parts to remove      | Q'ty | Remarks                                                    |
|-------|--------------------------|------|------------------------------------------------------------|
|       | Bottom cowling           |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                |
|       | Engine oil               |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-17. |
|       | Clutch housing           |      | Refer to "CLUTCH" on page 5-47.                            |
|       | Footrest assembly (left) |      | Refer to "ENGINE REMOVAL" on page 5-6.                     |
| 1     | Shift shaft              | 1    |                                                            |
| 2     | Circlip                  | 1    |                                                            |
| 3     | Shift shaft spring       | 1    |                                                            |
| 4     | Stopper lever spring     | 1    |                                                            |
| 5     | Stopper lever            | 1    |                                                            |
| 6     | Oil seal                 | 1    |                                                            |

EAS30377

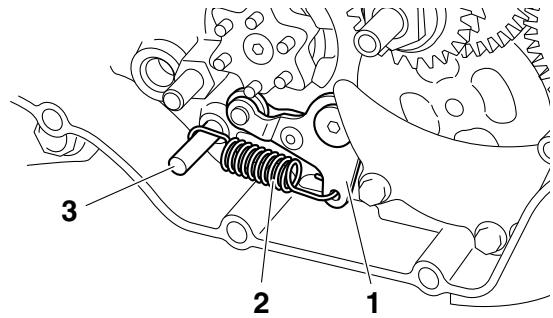
## CHECKING THE SHIFT SHAFT

1. Check:
  - Shift shaft
    - Bends/damage/wear → Replace.
  - Shift shaft spring
    - Damage/wear → Replace.

EAS30378

## CHECKING THE STOPPER LEVER

1. Check:
  - Stopper lever
    - Bends/damage → Replace.
    - Roller turns roughly → Replace the stopper lever.
  - Stopper lever spring
    - Damage/wear → Replace.



3. Install:
  - Shift shaft "1"

### TIP

Hook the end of the shift shaft spring onto the dowel pin "2".

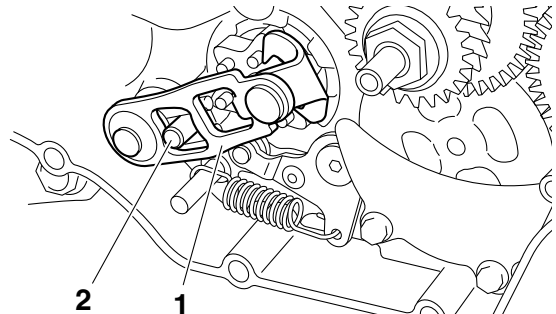
EAS30381

## INSTALLING THE SHIFT SHAFT

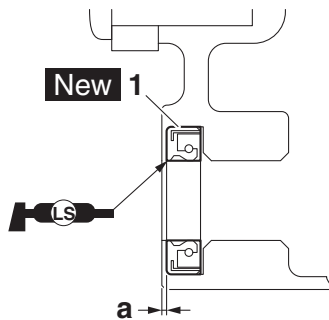
1. Install:
  - Oil seal "1" **New**  
(to the crankcase)

### TIP

Lubricate the oil seal with lithium-soap-based grease.



Installed depth "a"  
0.0–0.5 mm (0.00–0.02 in)



2. Install:
  - Stopper lever "1"
  - Stopper lever spring "2"

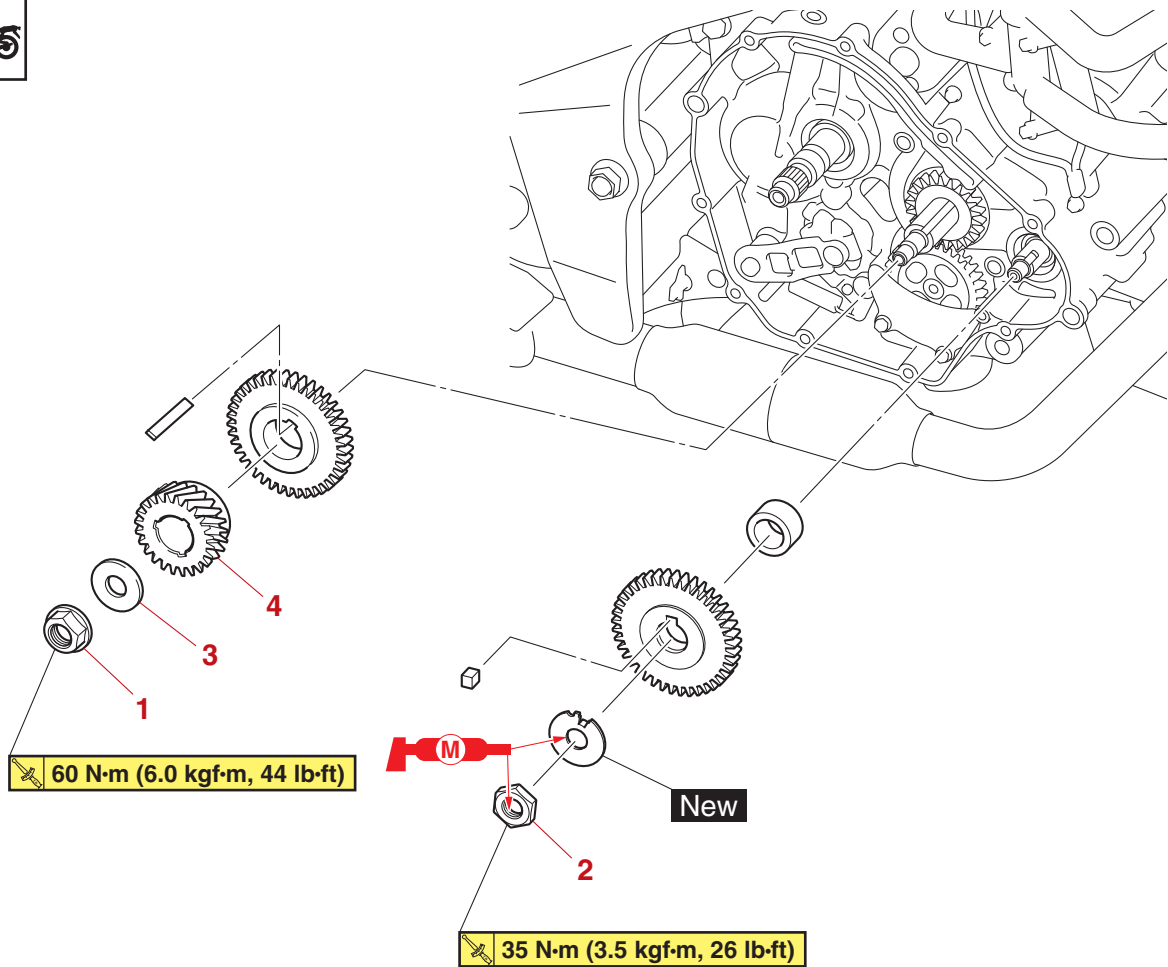
### TIP

- Install the stopper lever spring as shown in the illustration.
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss "3".
- Mesh the stopper lever with the shift drum segment.

EAS20219

## BALANCER GEAR

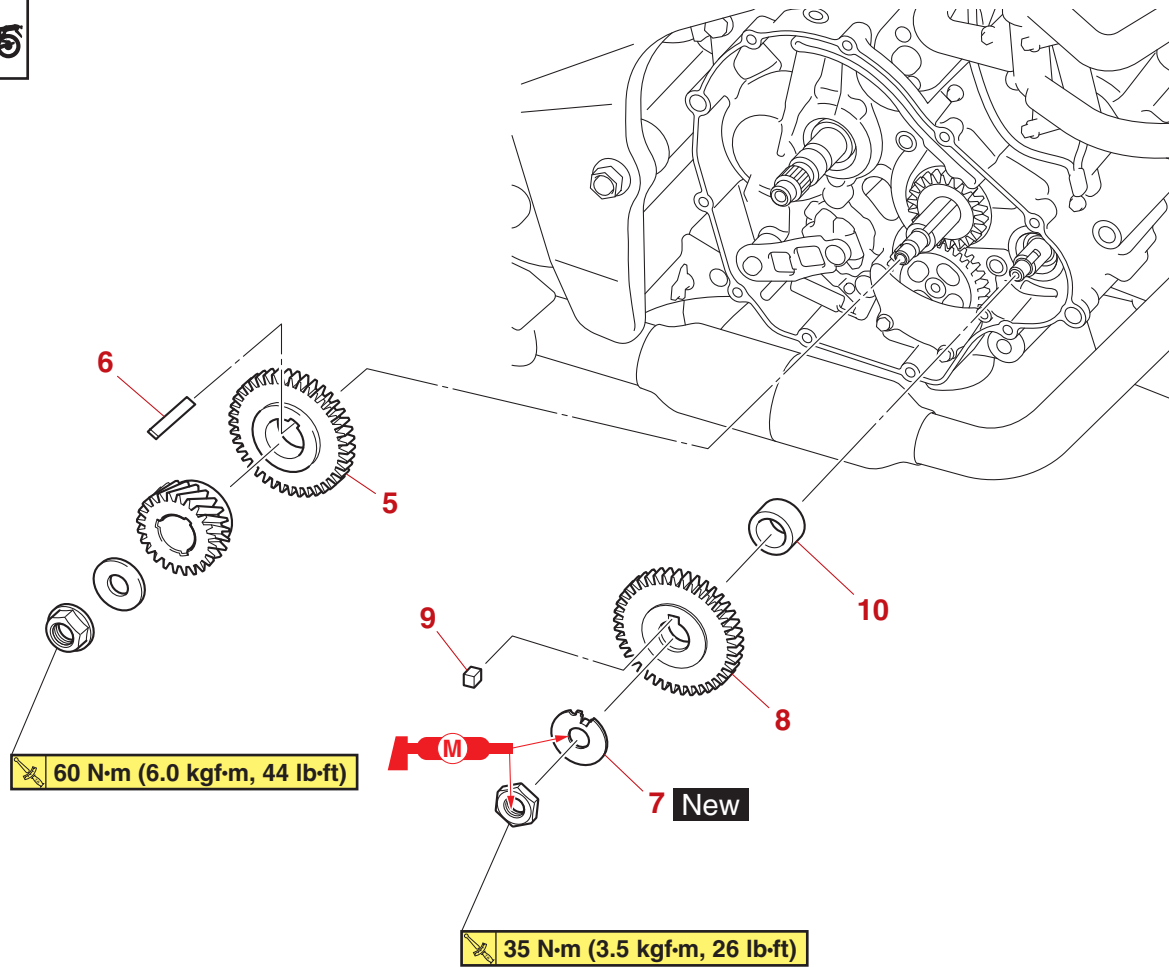
### Removing the primary drive gear and balancer gears



| Order | Job/Parts to remove      | Q'ty | Remarks                                                    |
|-------|--------------------------|------|------------------------------------------------------------|
|       | Bottom cowling           |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.                |
|       | Engine oil               |      | Drain.<br>Refer to "CHANGING THE ENGINE OIL" on page 3-17. |
|       | Clutch housing           |      | Refer to "CLUTCH" on page 5-47.                            |
| 1     | Primary drive gear nut   | 1    |                                                            |
| 2     | Balancer driven gear nut | 1    |                                                            |
| 3     | Washer                   | 1    |                                                            |
| 4     | Primary drive gear       | 1    |                                                            |

## BALANCER GEAR

## Removing the primary drive gear and balancer gears



| Order | Job/Parts to remove  | Q'ty | Remarks |
|-------|----------------------|------|---------|
| 5     | Balancer drive gear  | 1    |         |
| 6     | Straight key         | 1    |         |
| 7     | Lock washer          | 1    |         |
| 8     | Balancer driven gear | 1    |         |
| 9     | Straight key         | 1    |         |
| 10    | Spacer               | 1    |         |

EAS32459

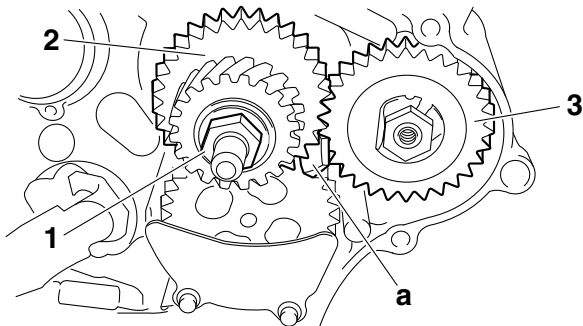
## REMOVING THE PRIMARY DRIVE GEAR AND BALANCER GEARS

### 1. Loosen:

- Primary drive gear nut "1"

### TIP

Place the aluminum plate "a" between the balancer drive gear "2" and the balancer driven gear "3", and then loosen the primary drive gear nut.



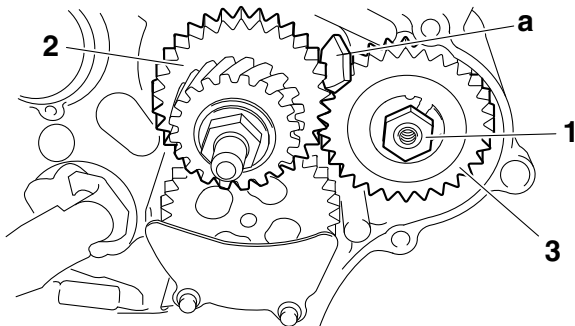
### 2. Straighten the lock washer tab.

### 3. Loosen:

- Balancer driven gear nut "1"

### TIP

Place the aluminum plate "a" between the balancer drive gear "2" and the balancer driven gear "3", and then loosen the balancer driven gear nut.



EAS32460

## CHECKING THE BALANCER GEARS AND PRIMARY DRIVE GEAR

### 1. Check:

- Balancer drive gear
- Balancer driven gear
- Cracks/damage/wear → Replace.

### 2. Check:

- Primary drive gear
- Refer to "CHECKING THE PRIMARY DRIVE GEAR" on page 5-52.

EAS32461

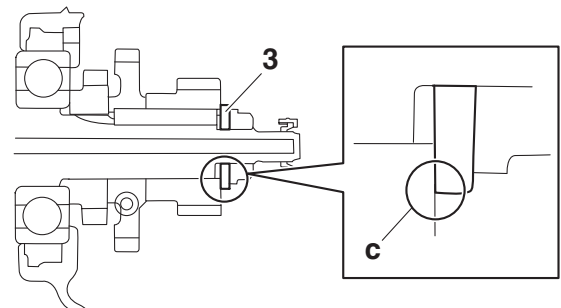
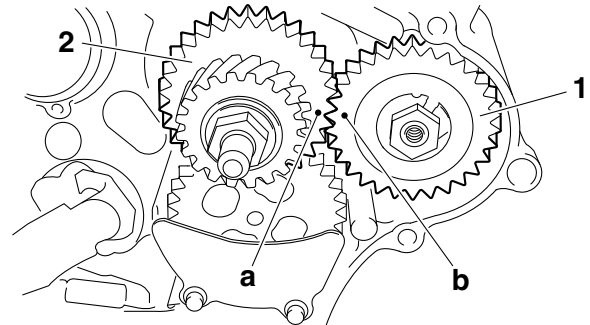
## INSTALLING THE PRIMARY DRIVE GEAR AND BALANCER GEARS

### 1. Install:

- Balancer driven gear "1"
- Lock washer **New**
- Straight key
- Balancer drive gear "2"
- Primary drive gear
- Washer "3"
- Balancer driven gear nut
- Primary drive gear nut

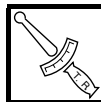
### TIP

- Align the punch mark "a" in the balancer drive gear with the punch mark "b" in the balancer driven gear.
- Be sure to install the washer so that its sharp edge "c" is facing the primary drive gear.



### 2. Tighten:

- Balancer driven gear nut "1"
- Primary drive gear nut "2"

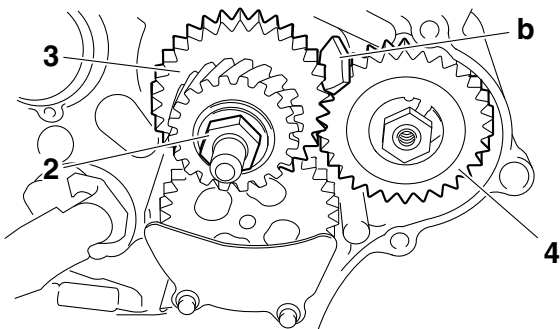
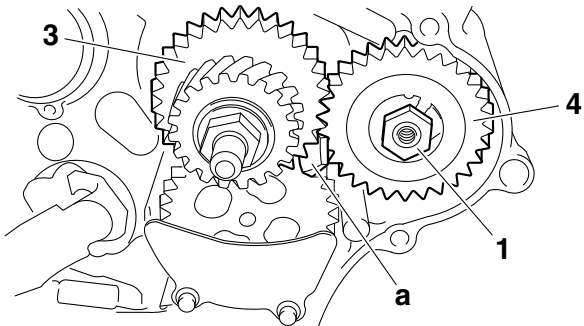


**Balancer driven gear nut**  
**35 N·m (3.5 kgf·m, 26 lb·ft)**  
**Primary drive gear nut**  
**60 N·m (6.0 kgf·m, 44 lb·ft)**

### TIP

- Place the aluminum plate "a" between the balancer drive gear "3" and the balancer driven gear "4", and then tighten the balancer driven gear nut.

- Place the aluminum plate “b” between the balancer drive gear “3” and the balancer driven gear “4”, and then tighten the primary drive gear nut.

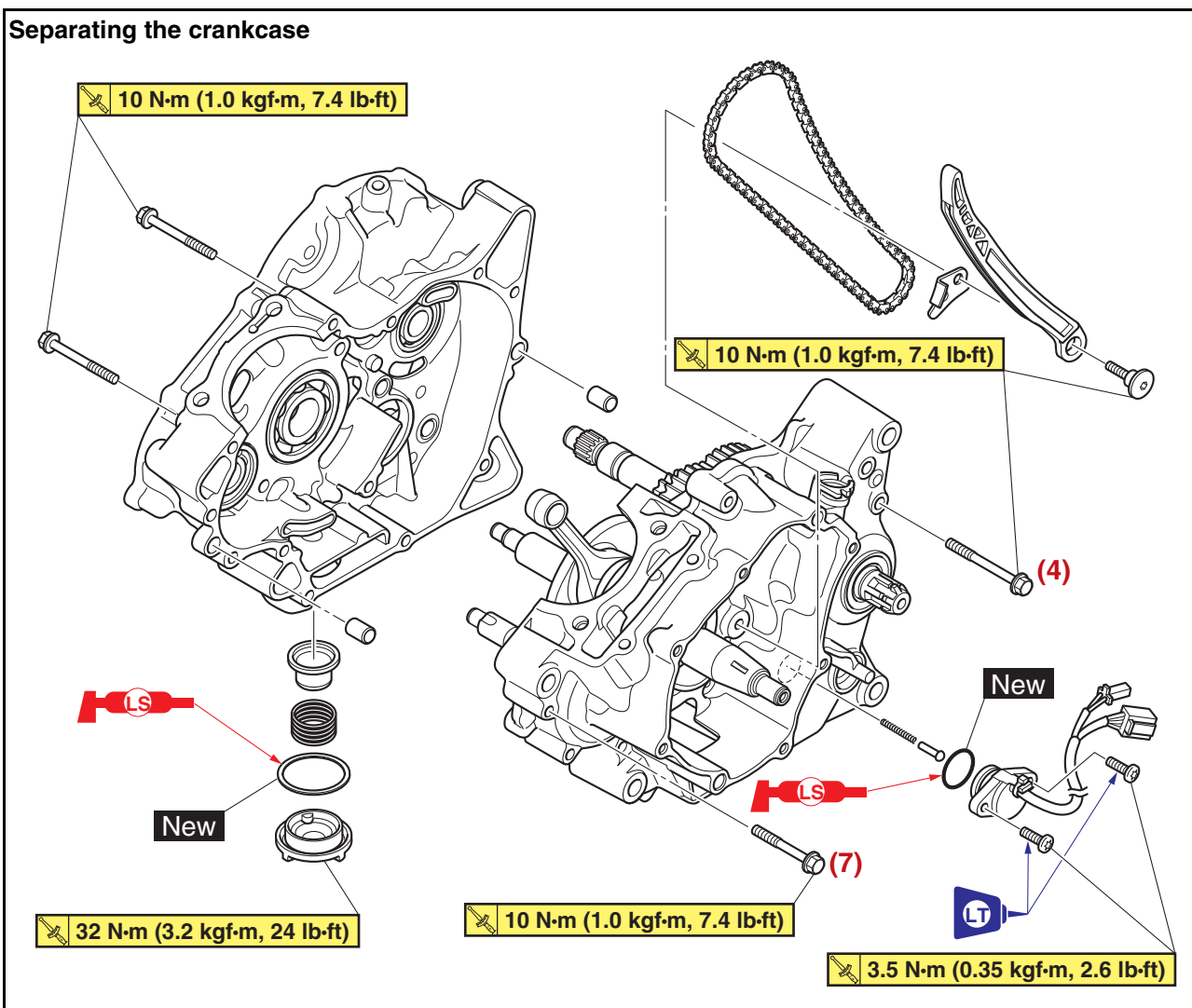


3. Bend the lock washer tab along a flat side of the nut.

EAS20059

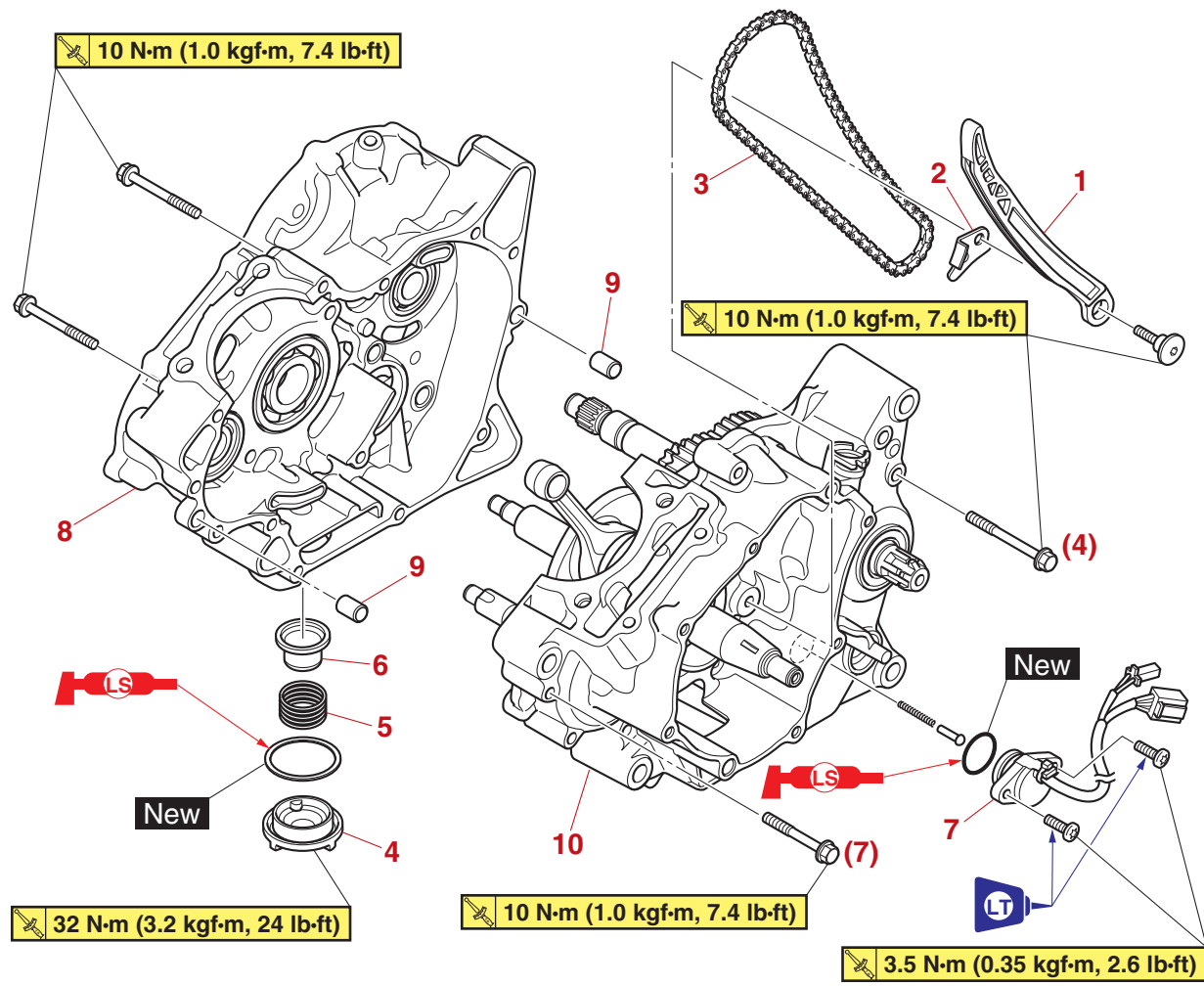
## CRANKCASE

### Separating the crankcase



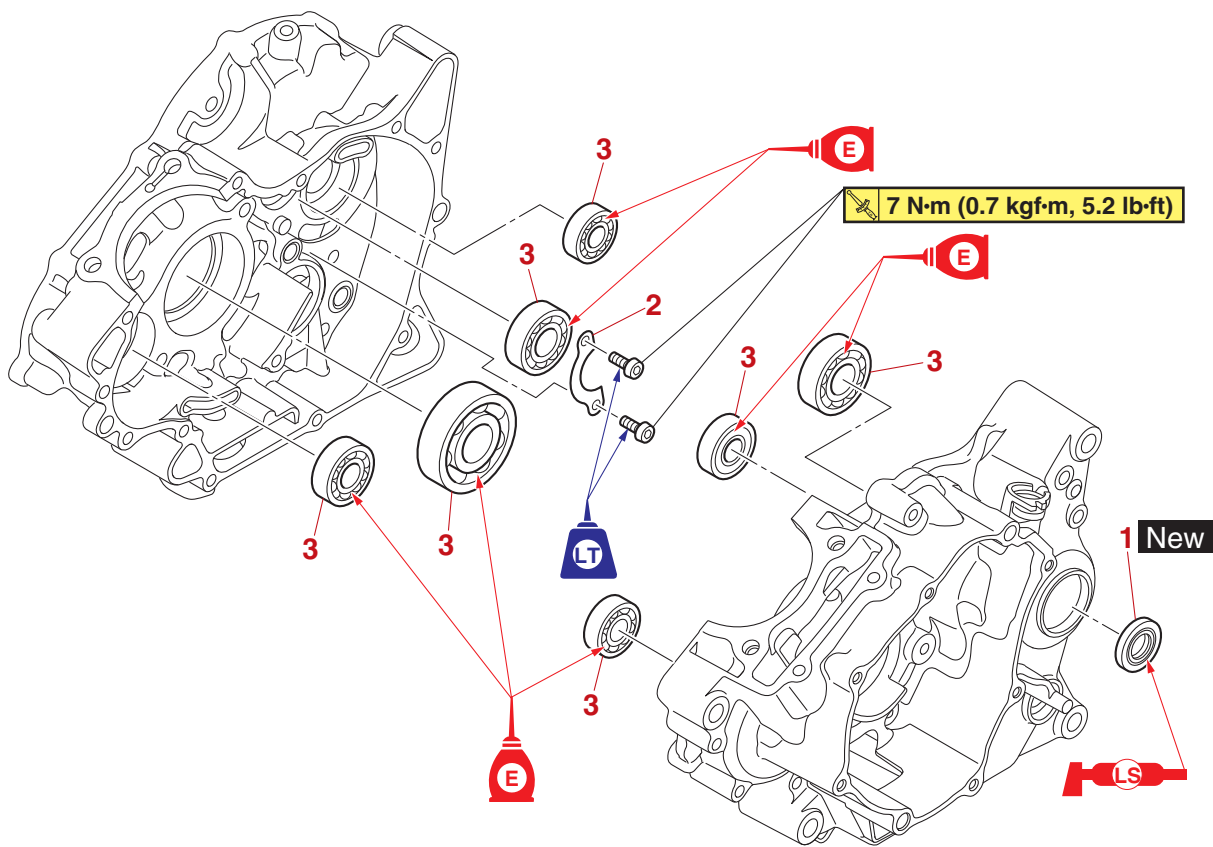
| Order | Job/Parts to remove                     | Q'ty | Remarks                                               |
|-------|-----------------------------------------|------|-------------------------------------------------------|
|       | Engine                                  |      | Refer to "ENGINE REMOVAL" on page 5-6.                |
|       | Cylinder head                           |      | Refer to "CYLINDER HEAD" on page 5-12.                |
|       | Cylinder/Piston                         |      | Refer to "CYLINDER AND PISTON" on page 5-33.          |
|       | Generator rotor/Starter clutch assembly |      | Refer to "GENERATOR AND STARTER CLUTCH" on page 5-38. |
|       | Starter motor                           |      | Refer to "ELECTRIC STARTER" on page 5-44.             |
|       | Clutch housing                          |      | Refer to "CLUTCH" on page 5-47.                       |
|       | Shift shaft                             |      | Refer to "SHIFT SHAFT" on page 5-59.                  |
|       | Balancer gears                          |      | Refer to "BALANCER GEAR" on page 5-61.                |
|       | Oil pump assembly                       |      | Refer to "OIL PUMP" on page 5-56.                     |

Separating the crankcase



| Order | Job/Parts to remove              | Q'ty | Remarks |
|-------|----------------------------------|------|---------|
| 1     | Timing chain guide (intake side) | 1    |         |
| 2     | Chain cover                      | 1    |         |
| 3     | Timing chain                     | 1    |         |
| 4     | Engine oil drain plug            | 1    |         |
| 5     | Spring                           | 1    |         |
| 6     | Engine oil strainer              | 1    |         |
| 7     | Gear position switch             | 1    |         |
| 8     | Crankcase (right)                | 1    |         |
| 9     | Dowel pin                        | 2    |         |
| 10    | Crankcase (left)                 | 1    |         |

Removing the oil seal and bearings



| Order | Job/Parts to remove | Q'ty | Remarks                               |
|-------|---------------------|------|---------------------------------------|
|       | Crankshaft/Balancer |      | Refer to "CRANKSHAFT" on page 5-71.   |
|       | Transmission        |      | Refer to "TRANSMISSION" on page 5-74. |
| 1     | Oil seal            | 1    |                                       |
| 2     | Bearing retainer    | 1    |                                       |
| 3     | Bearing             | 7    |                                       |

EAS32673

## SEPARATING THE CRANKCASE

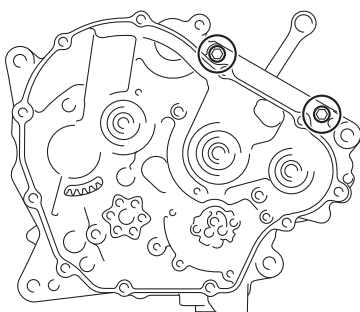
### 1. Remove:

- Crankcase bolts

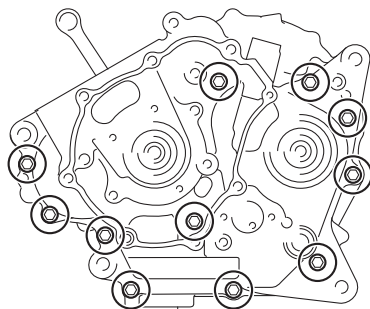
### TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

A



B



A. Crankcase (right)

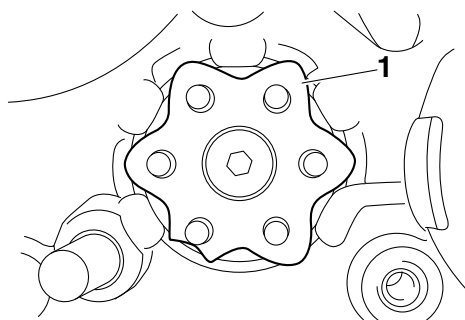
B. Crankcase (left)

### 2. Turn:

- Shift drum segment

### TIP

Turn the shift drum segment "1" to the position shown in the illustration. In this position, the shift drum segment teeth will not contact the crankcase during crankcase separation.



### 3. Remove:

- Crankcase (right)

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

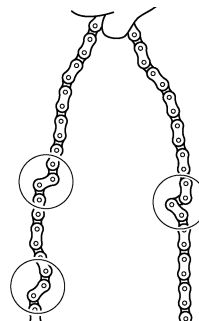
## CHECKING THE CRANKCASE

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.

EAS30391

## CHECKING THE TIMING CHAIN AND TIMING CHAIN GUIDE

1. Check:
  - Timing chain  
Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.



2. Check:
  - Timing chain guide (intake side)  
Damage/wear → Replace.

EAS31069

## CHECKING THE OIL STRAINER

1. Check:
  - Oil strainer  
Damage → Replace.  
Contaminants → Clean with solvent.

EAS31766

## CHECKING THE BEARINGS AND OIL SEAL

1. Check:
  - Bearings  
Clean and lubricate the bearings, and then rotate the inner race with your finger.  
Rough movement → Replace.

- Oil seal  
Damage/wear → Replace.

EAS32799

## INSTALLING THE BEARING RETAINER AND OIL SEAL

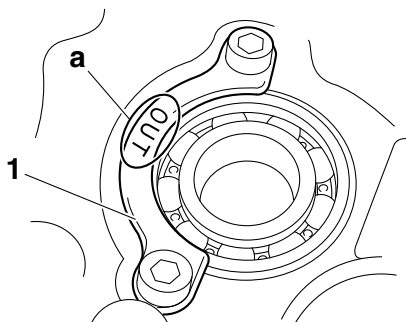
1. Install:
  - Bearing retainer “1”

### TIP

- Install the bearing retainer “1” with its “OUT” mark “a” facing outward.
- Apply locking agent (LOCTITE®) to the threads of the bearing retainer bolt.



**Bearing retainer bolt**  
7 N·m (0.7 kgf·m, 5.2 lb·ft)  
LOCTITE®



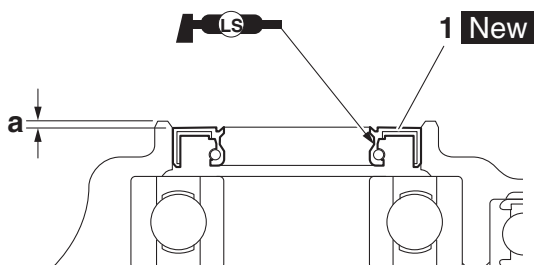
2. Install:
  - Oil seal “1” **New**



**Install depth of oil seal “a”**  
1.0–1.5 mm (0.039–0.059 in)

### TIP

Lubricate the oil seal with lithium-soap-based grease.



EAS30397

## ASSEMBLING THE CRANKCASE

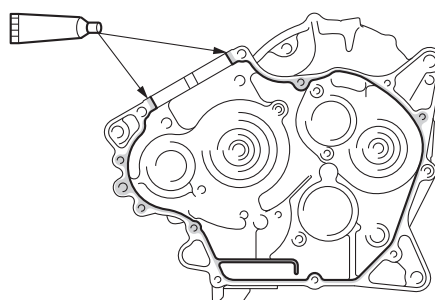
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
  - Sealant  
(onto the crankcase mating surfaces)



**Yamaha bond No. 1215**  
90890-85505  
Three bond No. 1215®

### TIP

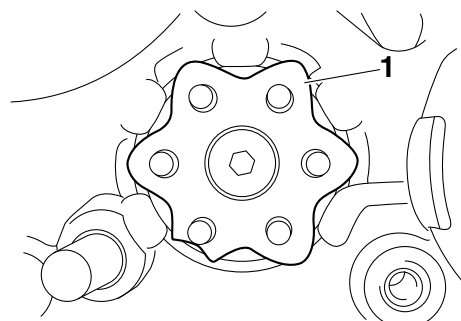
Do not allow any sealant to come into contact with the oil gallery.



3. Install:
  - Crankcase (right)

### TIP

Turn the shift drum segment “1” to the position shown in the illustration. In this position, the shift drum segment teeth will not contact the crankcase during crankcase installation.



4. Install:
  - Crankcase bolts



**Crankcase bolt**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)

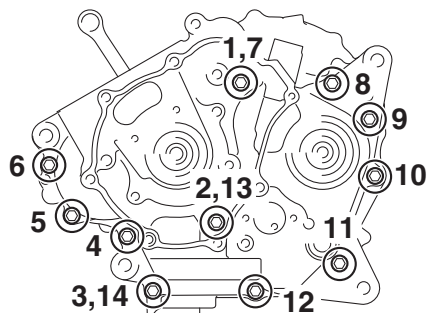
### TIP

Tighten each bolt 1/4 of a turn at a time, in stages and in the proper sequence as shown.

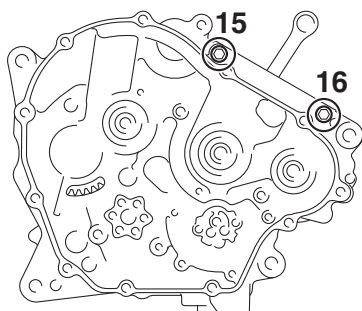
- M6 × 70 mm : “8–10”, “12”

- M6 × 55 mm : “15”, “16”
- M6 × 45 mm : “1-6”, “11”

A



B



- A. Crankcase (left)  
B. Crankcase (right)

## 5. Install:

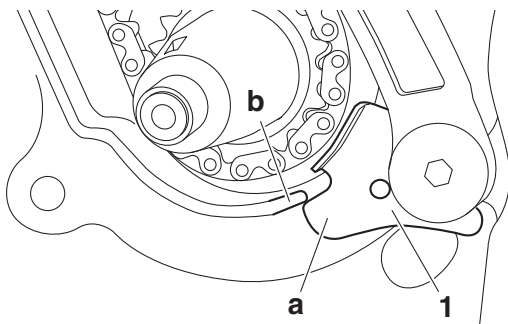
- Chain cover “1”
- Timing chain guide (intake side)



**Timing chain guide bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

## TIP

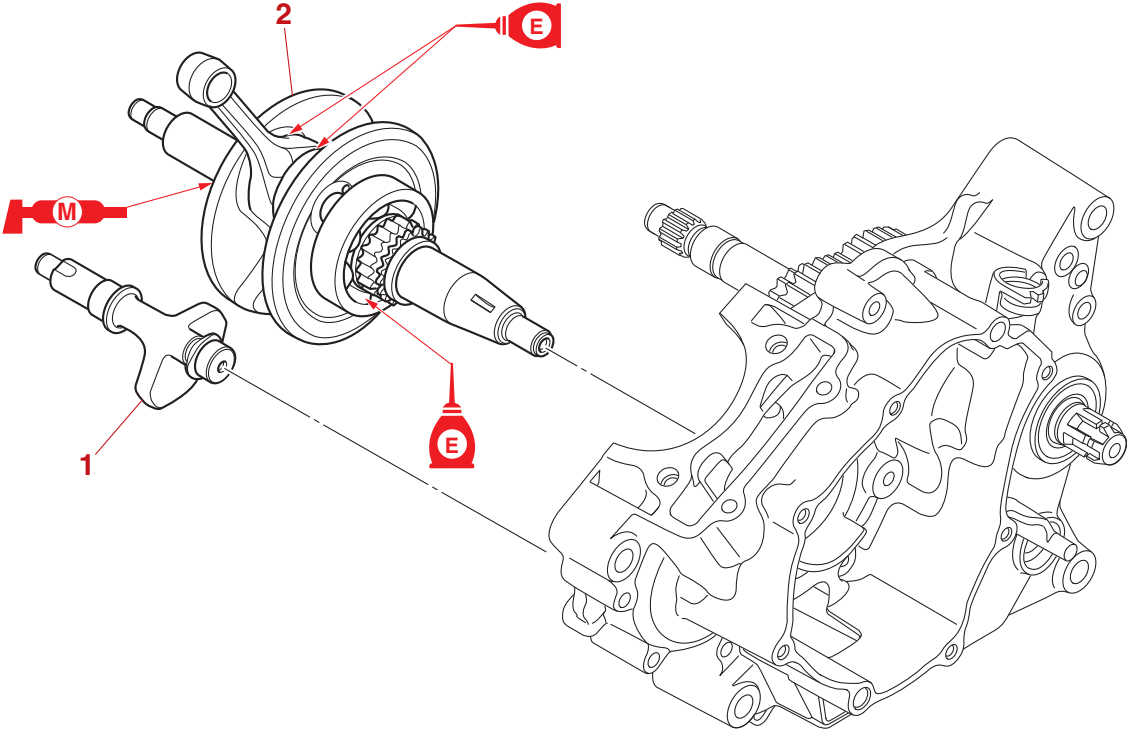
Fit the portion “a” on the chain cover to the portion “b” on the crankcase.



EAS20061

CRANKSHAFT

Removing the crankshaft and balancer



| Order | Job/Parts to remove | Q'ty | Remarks                                         |
|-------|---------------------|------|-------------------------------------------------|
|       | Crankcase           |      | Separate.<br>Refer to "CRANKCASE" on page 5-65. |
| 1     | Balancer            | 1    |                                                 |
| 2     | Crankshaft          | 1    |                                                 |

EAS30416

## REMOVING THE CRANKSHAFT

### 1. Remove:

- Crankshaft “1”

### TIP

- Remove the crankshaft with the crankcase separating tool “2”.
- Make sure the crankcase separating tool is centered over the crankshaft.

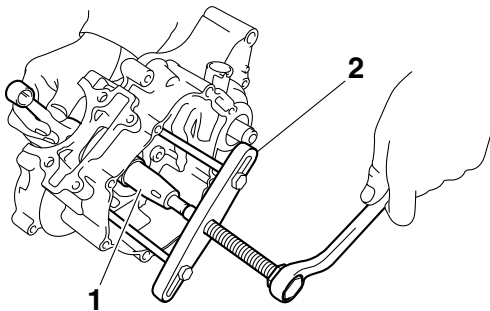
ECA20630

### NOTICE

- To protect the end of the crankshaft, place an appropriate sized socket between the crankcase separating tool bolt and the crankshaft.
- Do not tap on the crankshaft.



**Crankcase separating tool**  
90890-01135  
**Crankcase separator**  
YU-01135-B



EAS31075

## CHECKING THE CRANKSHAFT

### 1. Measure:

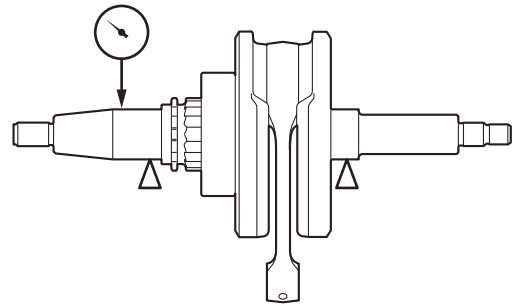
- Crankshaft runout  
Out of specification → Replace the crankshaft, bearing or both.

### TIP

Turn the crankshaft slowly.



**Runout limit**  
0.050 mm (0.0020 in)

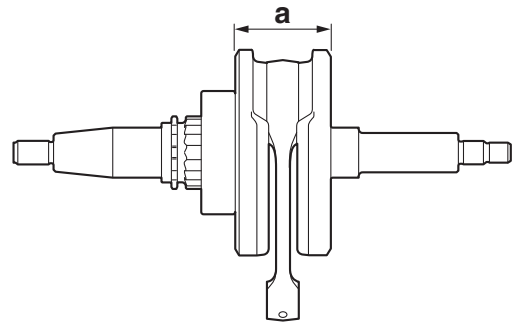


### 2. Measure:

- Crankshaft width “a”  
Out of specification → Replace the crankshaft.



**Crank assembly width**  
47.95–48.00 mm (1.888–1.890 in)



### 3. Check:

- Crankshaft sprocket  
Damage/wear → Replace the crankshaft.
- Bearing  
Cracks/damage/wear → Replace the crankshaft.

EAS30425

## CHECKING THE BALANCER

### 1. Check:

- Balancer  
Scratches/wear/damage → Replace the balancer.

EAS31077

## INSTALLING THE CRANKSHAFT

### 1. Install:

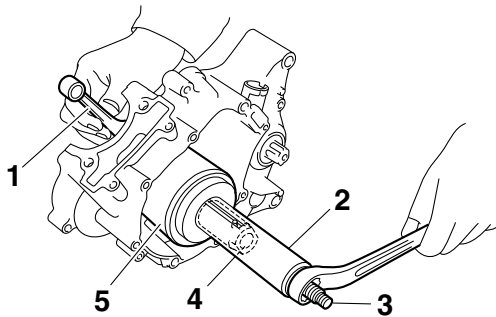
- Crankshaft “1”

### TIP

Install the crankshaft with the crankshaft installer pot “2”, crankshaft installer bolt “3”, adapter (M12) “4” and spacer (crankshaft installer) “5”.



**Crankshaft installer pot**  
90890-01274  
**Installing pot**  
YU-90058  
**Crankshaft installer bolt**  
90890-01275  
**Bolt**  
YU-90060  
**Adapter (M12)**  
90890-01278  
**Adapter #3**  
YU-90063  
**Spacer (crankshaft installer)**  
90890-04081  
**Pot spacer**  
YM-91044



ECA22650

## **NOTICE**

**To avoid scratching the crankshaft and to ease the installation procedure, lubricate each bearing with engine oil.**

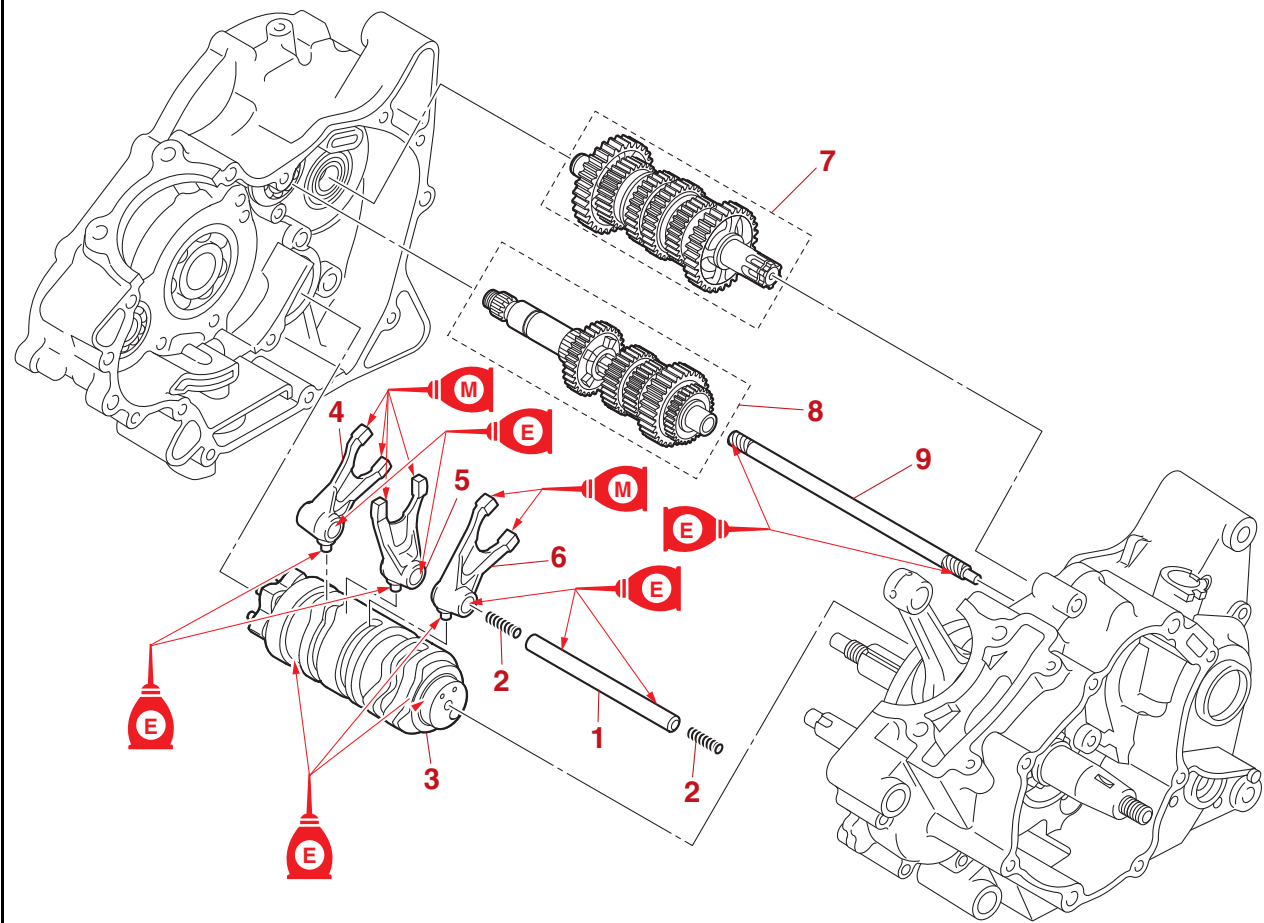
## **TIP**

Hold the connecting rod at top dead center (TDC) with one hand while turning the nut of the crankshaft installer bolt with the other. Turn the crankshaft installer bolt until the crankshaft bottoms against the bearing.

EAS20062

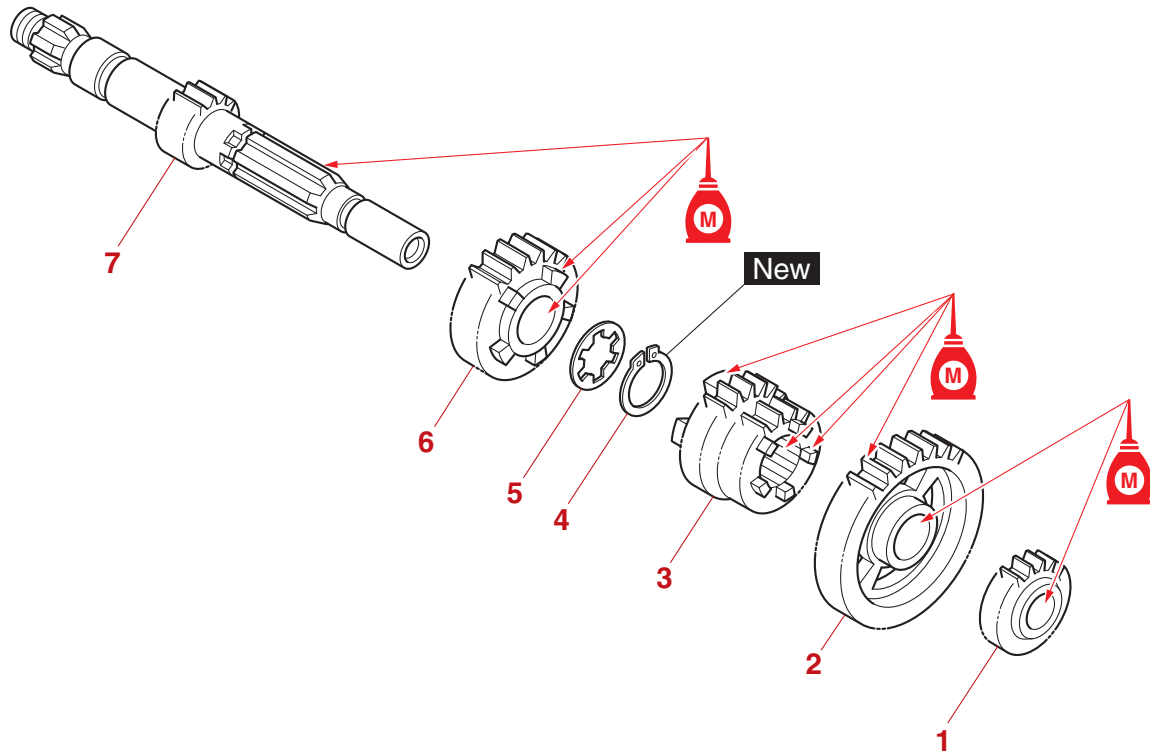
## TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



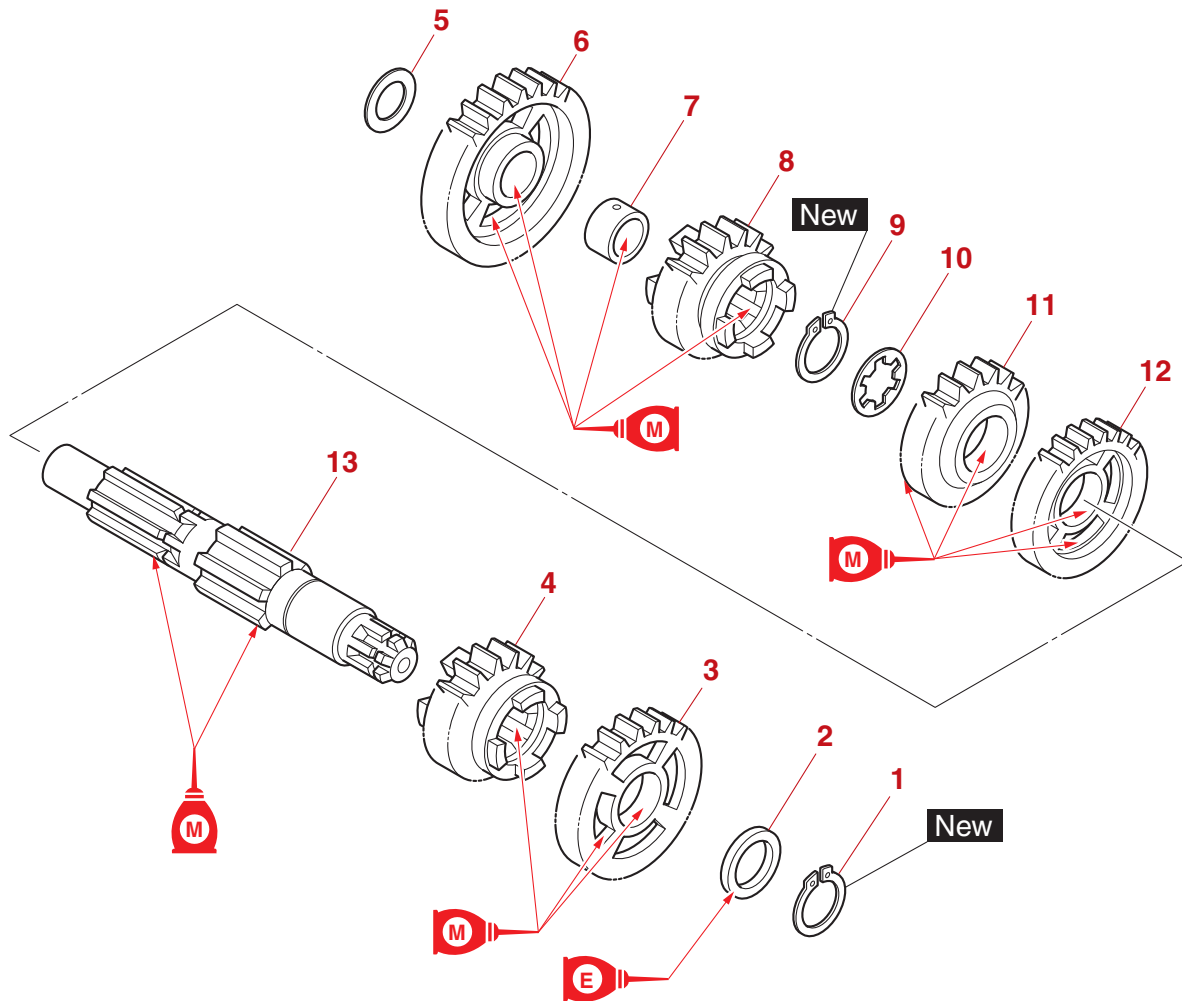
| Order | Job/Parts to remove  | Q'ty | Remarks                                         |
|-------|----------------------|------|-------------------------------------------------|
|       | Crankcase            |      | Separate.<br>Refer to "CRANKCASE" on page 5-65. |
| 1     | Shift fork guide bar | 1    |                                                 |
| 2     | Spring               | 2    |                                                 |
| 3     | Shift drum assembly  | 1    |                                                 |
| 4     | Shift fork-R         | 1    |                                                 |
| 5     | Shift fork-C         | 1    |                                                 |
| 6     | Shift fork-L         | 1    |                                                 |
| 7     | Drive axle assembly  | 1    |                                                 |
| 8     | Main axle assembly   | 1    |                                                 |
| 9     | Long clutch push rod | 1    |                                                 |

## Disassembling the main axle



| Order | Job/Parts to remove       | Q'ty | Remarks |
|-------|---------------------------|------|---------|
| 1     | 2nd pinion gear           | 1    |         |
| 2     | 6th pinion gear           | 1    |         |
| 3     | 3rd/4th pinion gear       | 1    |         |
| 4     | Circlip                   | 1    |         |
| 5     | Toothed washer            | 1    |         |
| 6     | 5th pinion gear           | 1    |         |
| 7     | Main axle/1st pinion gear | 1    |         |

## Disassembling the drive axle



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|---------|
| 1     | Circlip             | 1    |         |
| 2     | Washer              | 1    |         |
| 3     | 2nd wheel gear      | 1    |         |
| 4     | 6th wheel gear      | 1    |         |
| 5     | Washer              | 1    |         |
| 6     | 1st wheel gear      | 1    |         |
| 7     | Spacer              | 1    |         |
| 8     | 5th wheel gear      | 1    |         |
| 9     | Circlip             | 1    |         |
| 10    | Toothed washer      | 1    |         |
| 11    | 4th wheel gear      | 1    |         |
| 12    | 3rd wheel gear      | 1    |         |
| 13    | Drive axle          | 1    |         |

EAS30431

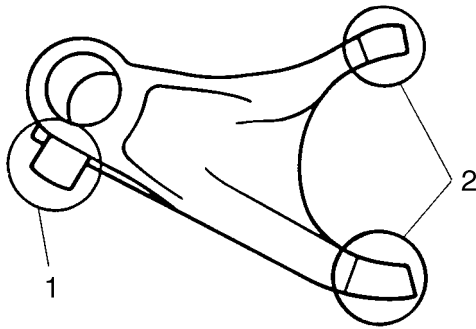
## CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

### 1. Check:

- Shift fork cam follower "1"
- Shift fork pawl "2"

Bends/damage/scoring/wear → Replace the shift fork.



### 2. Check:

- Shift fork guide bar

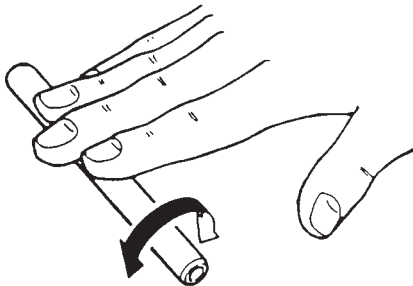
Roll the shift fork guide bar on a flat surface.  
Bends → Replace.

EWA12840



**WARNING**

**Do not attempt to straighten a bent shift fork guide bar.**

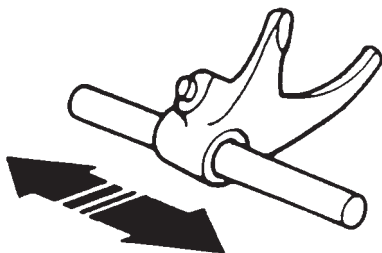


319-010

### 3. Check:

- Shift fork movement (along the shift fork guide bar)

Rough movement → Replace the shift forks and shift fork guide bar as a set.



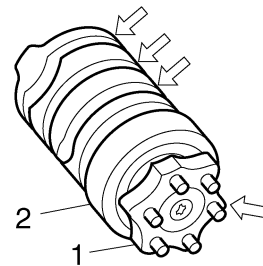
319-011

EAS30432

## CHECKING THE SHIFT DRUM ASSEMBLY

### 1. Check:

- Shift drum groove  
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "1"  
Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2"  
Damage/pitting → Replace the shift drum assembly.



EAS30433

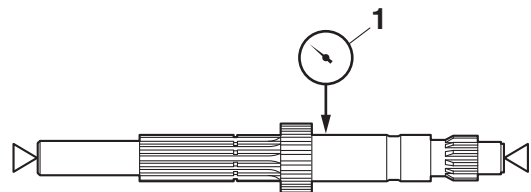
## CHECKING THE TRANSMISSION

### 1. Measure:

- Main axle runout (with a centering device and dial gauge "1")  
Out of specification → Replace the main axle.



**Main axle runout limit  
0.08 mm (0.0032 in)**

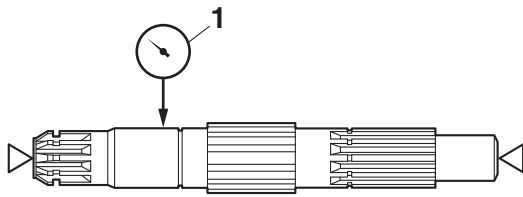


### 2. Measure:

- Drive axle runout (with a centering device and dial gauge "1")  
Out of specification → Replace the drive axle.

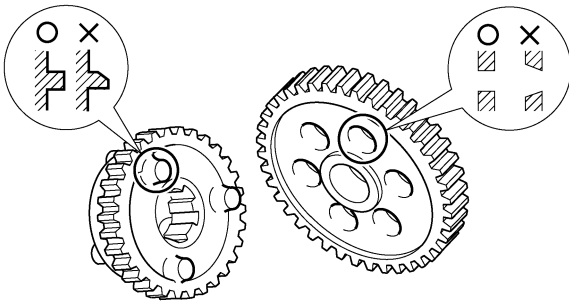


**Drive axle runout limit  
0.08 mm (0.0032 in)**



### 3. Check:

- Transmission gears  
Blue discoloration/pitting/wear → Replace the defective gear(s).
- Transmission gear dogs  
Cracks/damage/rounded edges → Replace the defective gear(s).



### 4. Check:

- Transmission gear engagement  
(each pinion gear to its respective wheel gear)  
Incorrect → Reassemble the transmission axle assemblies.

### 5. Check:

- Transmission gear movement  
Rough movement → Replace the defective part(s).

EAS32680

## CHECKING THE CLUTCH PUSH ROD

### 1. Check:

- Long clutch push rod  
Cracks/damage/wear → Replace the long clutch push rod.

### 2. Measure:

- Push rod bending limit  
Out of specification → Replace the long clutch push rod.



**Push rod bending limit**  
**0.50 mm (0.020 in)**

EAS30435

## ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

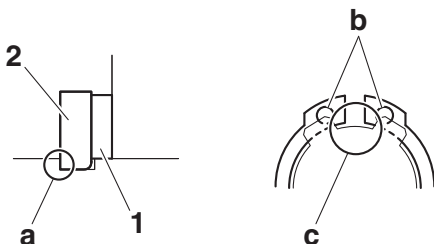
### 1. Install:

- Toothed washer "1"
- Circlip "2" **New**

### TIP

- Be sure to install the circlip so that its sharp edge "a" is facing away from the toothed washer and gear.
- Be sure the circlip ends "b" are positioned at the axle spline groove "c".

**New** 2



### 2. Install:

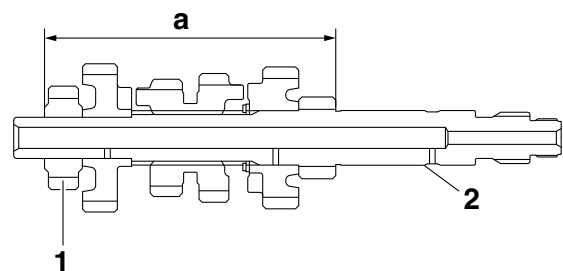
- 2nd pinion gear "1"

### TIP

Press the 2nd pinion gear into the main axle "2", as shown in the illustration.



**Installed depth "a"**  
**106.85–107.05 mm (4.207–4.215 in)**



EAS30437

## INSTALLING THE SHIFT FORKS AND SHIFT DRUM ASSEMBLY

### 1. Install:

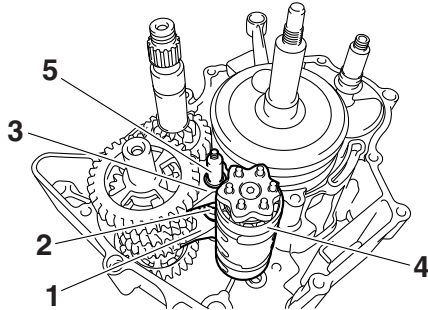
- Shift fork-L "1"
- Shift fork-C "2"
- Shift fork-R "3"
- Shift drum assembly "4"
- Springs
- Shift fork guide bar "5"

---

**TIP**

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.

---



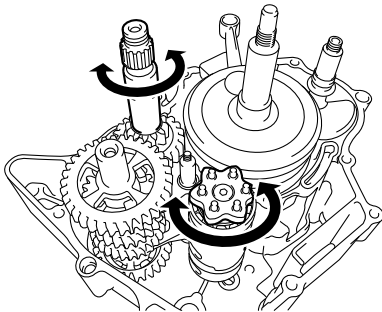
2. Check:

- Transmission  
Rough movement → Repair.

---

**TIP**

- Apply engine oil to each gear and bearing thoroughly.
  - Before assembling the crankcase, make sure that the transmission is in neutral and that the gears turn freely.
- 



---

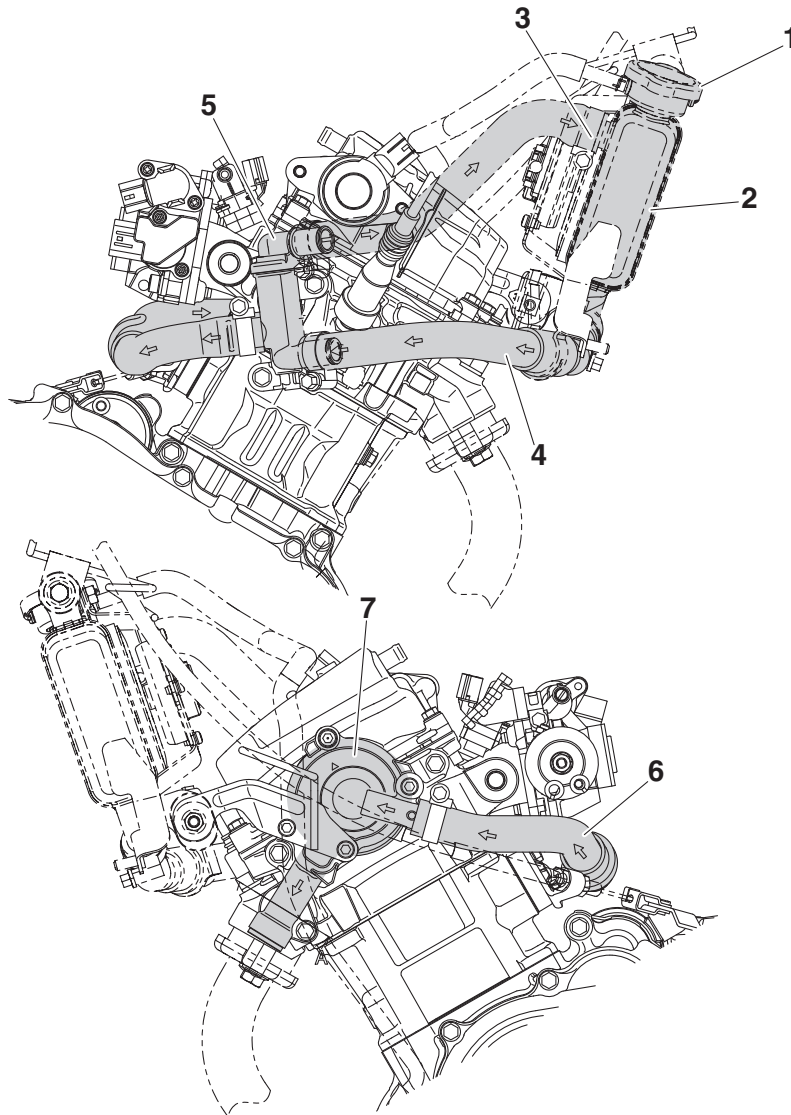
## COOLING SYSTEM

|                                          |            |
|------------------------------------------|------------|
| <b>COOLING SYSTEM DIAGRAMS .....</b>     | <b>6-1</b> |
| <b>RADIATOR AND THERMOSTAT .....</b>     | <b>6-2</b> |
| CHECKING THE RADIATOR.....               | 6-4        |
| INSTALLING THE RADIATOR.....             | 6-4        |
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# COOLING SYSTEM DIAGRAMS

EAS20299

## COOLING SYSTEM DIAGRAMS



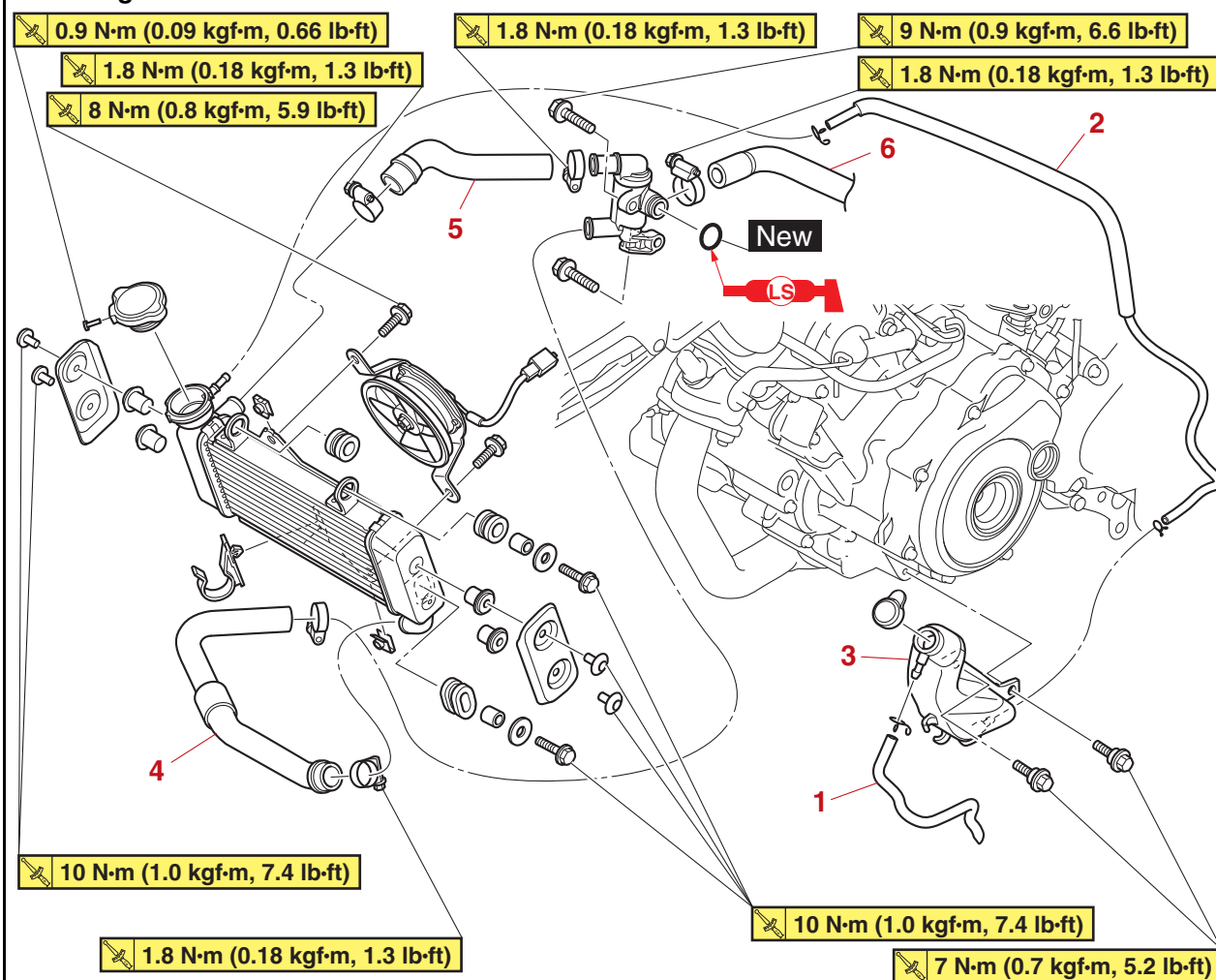
1. Radiator cap
2. Radiator
3. Radiator inlet hose
4. Radiator outlet hose
5. Thermostat
6. Water pump inlet hose
7. Water pump assembly

# RADIATOR AND THERMOSTAT

EAS20380

## RADIATOR AND THERMOSTAT

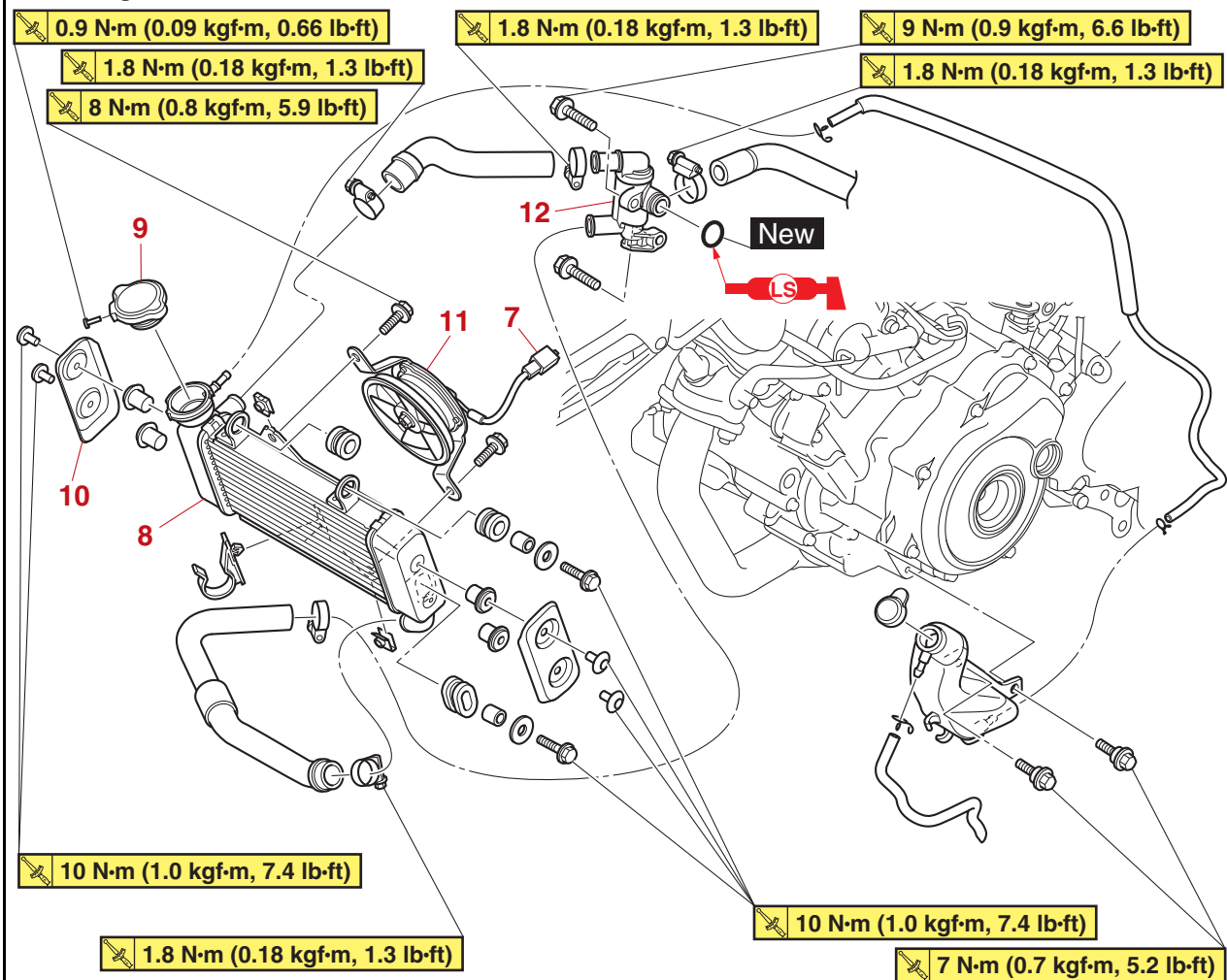
### Removing the radiator



| Order | Job/Parts to remove             | Q'ty | Remarks                                                 |
|-------|---------------------------------|------|---------------------------------------------------------|
|       | Bottom cowling                  |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.             |
|       | Coolant                         |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-19. |
| 1     | Coolant reservoir breather hose | 1    |                                                         |
| 2     | Coolant reservoir hose          | 1    |                                                         |
| 3     | Coolant reservoir               | 1    |                                                         |
| 4     | Radiator outlet hose            | 1    |                                                         |
| 5     | Radiator inlet hose             | 1    |                                                         |
| 6     | Water pump inlet hose           | 1    | Disconnect.                                             |

# RADIATOR AND THERMOSTAT

## Removing the radiator



| Order | Job/Parts to remove        | Q'ty | Remarks     |
|-------|----------------------------|------|-------------|
| 7     | Radiator fan motor coupler | 1    | Disconnect. |
| 8     | Radiator                   | 1    |             |
| 9     | Radiator cap               | 1    |             |
| 10    | Radiator cover             | 2    |             |
| 11    | Radiator fan motor         | 1    |             |
| 12    | Thermostat                 | 1    |             |

# RADIATOR AND THERMOSTAT

EAS30439

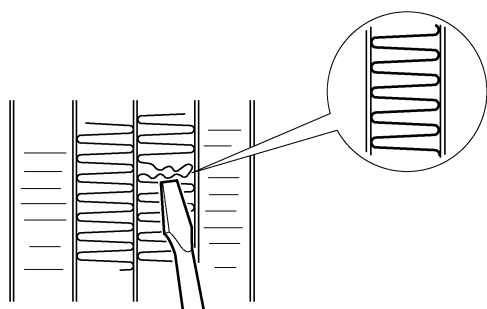
## CHECKING THE RADIATOR

### 1. Check:

- Radiator fins  
Obstruction → Clean.  
Apply compressed air to the rear of the radiator.
- Damage → Repair or replace.

### TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



### 2. Check:

- Radiator hoses  
Cracks/damage → Replace.

### 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)

- a. Install the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator cap “3”.



### Radiator cap tester

90890-01325

### Mityvac cooling system tester kit

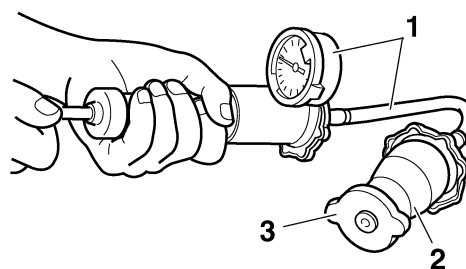
YU-24460-A

### Radiator cap tester adapter

90890-01352

### Pressure tester adapter

YU-33984



- b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

### 4. Check:

- Radiator fan  
Damage → Replace.  
Malfunction → Check and repair.  
Refer to “COOLING SYSTEM” on page 8-25.

EAS30440

## INSTALLING THE RADIATOR

### 1. Fill:

- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to “CHANGING THE COOLANT” on page 3-19.

### 2. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.

### 3. Measure:

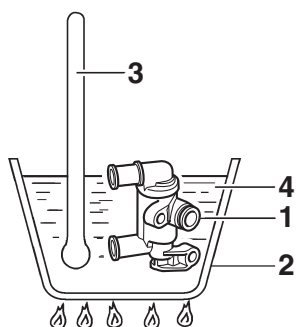
- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to “CHECKING THE RADIATOR” on page 6-4.

EAS31248

## CHECKING THE THERMOSTAT ASSEMBLY

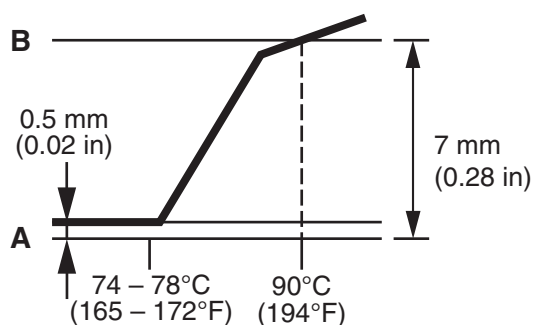
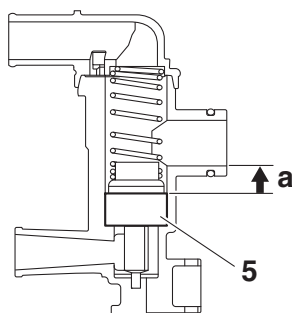
### 1. Check:

- Thermostat “1”  
Does not open at 74–78°C (165–172°F) → Replace.
  - a. Suspend the thermostat “1” in a container “2” filled with water.
  - b. Slowly heat the water.
  - c. Place a thermometer “3” in the water.
  - d. While stirring the water “4”, observe the thermostat and thermometer’s indicated temperature.



e. Check the thermostat element position "5".

Same level for the thermostat element upper end and the hole lower line "a" at 90 °C (194 °F)



A. Fully closed

B. Fully open

## TIP

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

EAS30445

## INSTALLING THE THERMOSTAT ASSEMBLY

1. Fill:

- Cooling system (with the specified amount of the recommended coolant)  
Refer to "CHANGING THE COOLANT" on page 3-19.

2. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.  
Refer to "INSTALLING THE RADIATOR" on page 6-4.

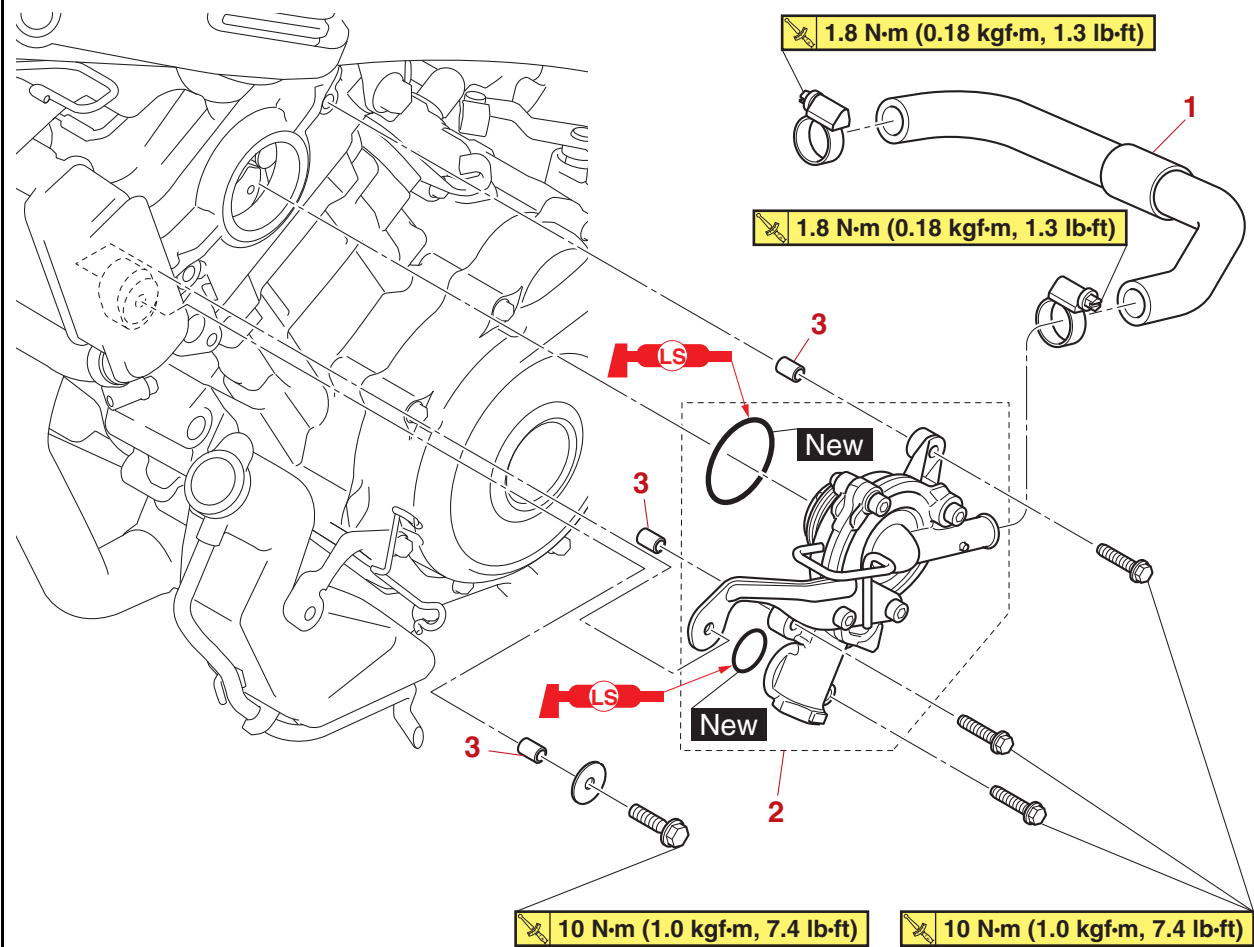
3. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS20066

WATER PUMP

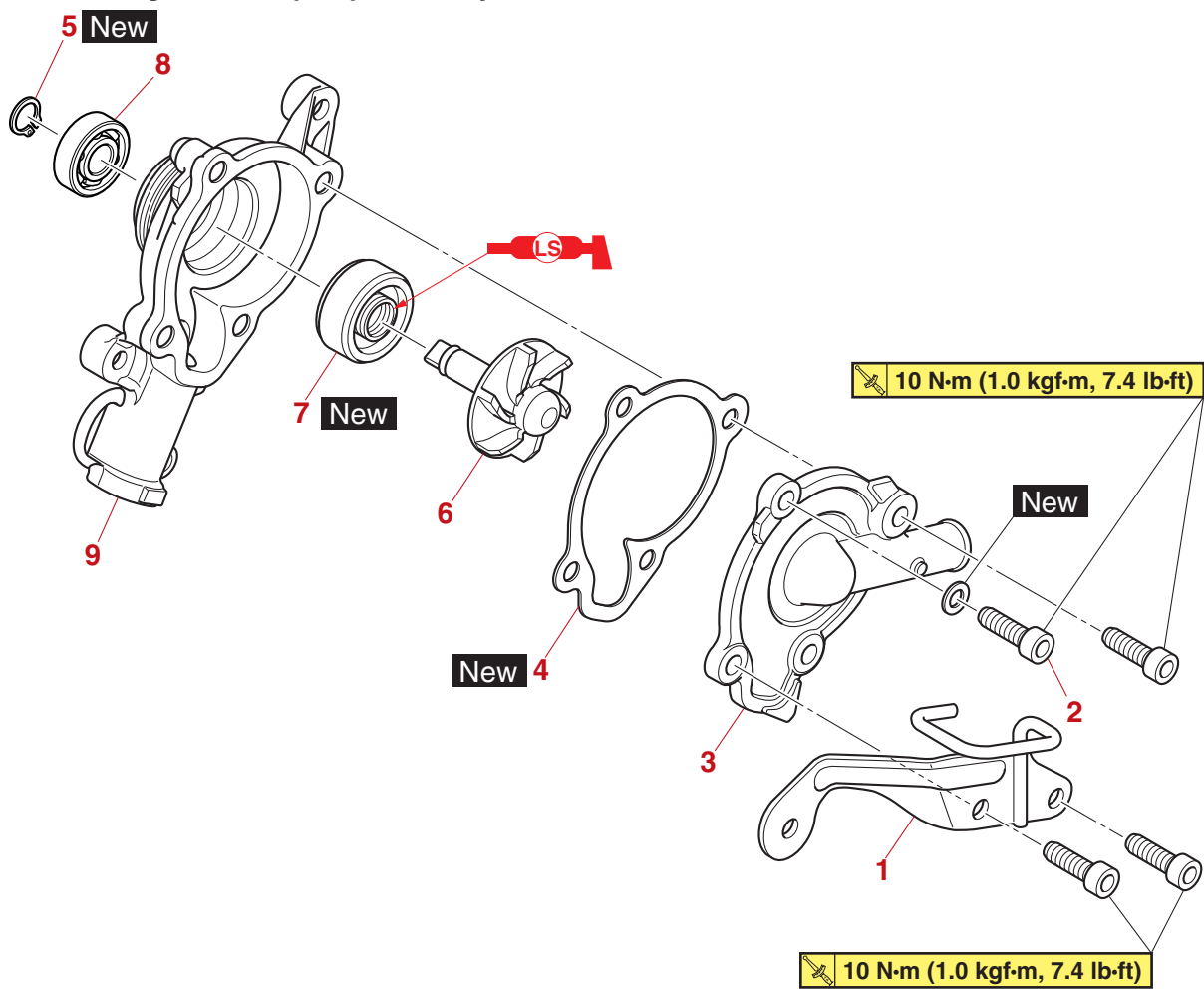
Removing the water pump assembly



| Order | Job/Parts to remove   | Q'ty | Remarks                                                 |
|-------|-----------------------|------|---------------------------------------------------------|
|       | Bottom cowling        |      | Refer to "GENERAL CHASSIS (3)" on page 4-3.             |
|       | Coolant               |      | Drain.<br>Refer to "CHANGING THE COOLANT" on page 3-19. |
| 1     | Water pump inlet hose | 1    |                                                         |
| 2     | Water pump assembly   | 1    |                                                         |
| 3     | Dowel pin             | 3    |                                                         |

WATER PUMP

Disassembling the water pump assembly



| Order | Job/Parts to remove             | Q'ty | Remarks |
|-------|---------------------------------|------|---------|
| 1     | Radiator bracket                | 1    |         |
| 2     | Air bleed bolt (coolant)        | 1    |         |
| 3     | Water pump housing cover        | 1    |         |
| 4     | Water pump housing cover gasket | 1    |         |
| 5     | Circlip                         | 1    |         |
| 6     | Impeller shaft                  | 1    |         |
| 7     | Water pump seal                 | 1    |         |
| 8     | Bearing                         | 1    |         |
| 9     | Water pump housing              | 1    |         |

EAS30446

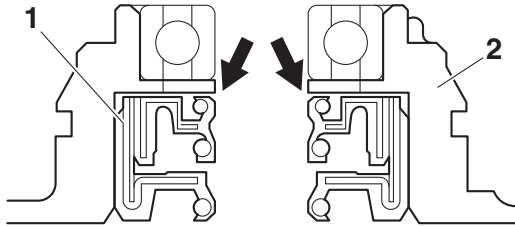
## DISASSEMBLING THE WATER PUMP

### 1. Remove:

- Water pump seal “1”

### TIP

Remove the water pump seal from the inside of the water pump housing “2”.



EAS30447

## CHECKING THE WATER PUMP

### 1. Check:

- Water pump housing cover
- Water pump housing  
Cracks/damage → Replace.
- Impeller shaft  
Cracks/damage/wear → Replace.

EAS30448

## ASSEMBLING THE WATER PUMP

### 1. Install:

- Water pump seal “1” **New**  
(into the water pump housing “2”)

### TIP

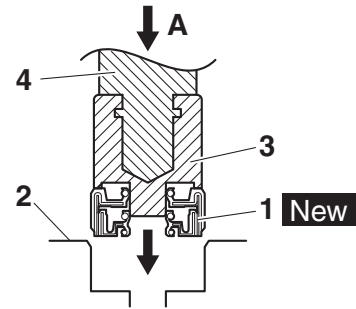
Install the water pump seal with the special tools to the specified depth as shown in the illustration.



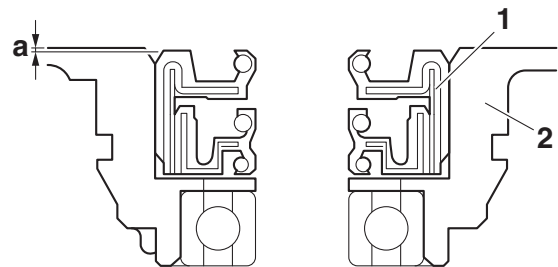
**Installed depth of water pump seal**  
0–0.5 mm (0–0.02 in)



**Mechanical seal installer**  
90890-04145  
**Middle driven shaft bearing driver**  
90890-04058  
**Middle drive bearing installer 40 & 50 mm**  
YM-04058



- A. Push down  
3. Mechanical seal installer  
4. Middle driven shaft bearing driver



- a. Installed depth of water pump seal

### 2. Lubricate:

- Water pump seal

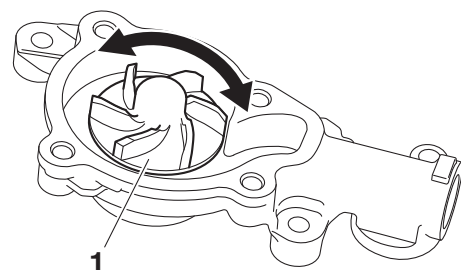


### 3. Install:

- Impeller shaft “1”
- Circlip **New**

### TIP

After installation, check that the impeller shaft rotates smoothly.



EAS30449

## INSTALLING THE WATER PUMP

### 1. Install:

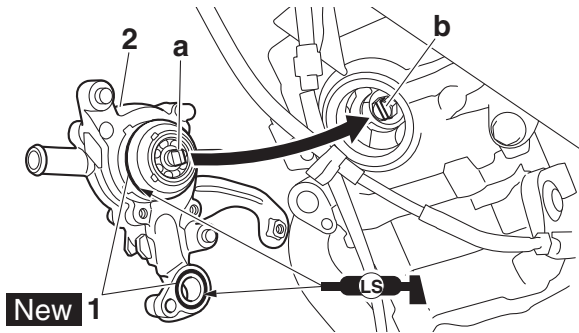
- O-rings “1” **New**
- Water pump assembly “2”



**Water pump assembly bolt**  
**10 N·m (1.0 kgf·m, 7.4 lb·ft)**

## TIP

- Lubricate the O-ring with a thin coat of lithium-soap-based grease.
- Align the projection “a” on the impeller shaft with the slit “b” on the camshaft sprocket bolt.



## 2. Fill:

- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to “CHANGING THE COOLANT” on page 3-19.

## 3. Check:

- Cooling system  
Leaks → Repair or replace any faulty part.  
Refer to “INSTALLING THE RADIATOR” on page 6-4.

## 4. Measure:

- Radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.  
Refer to “CHECKING THE RADIATOR” on page 6-4.

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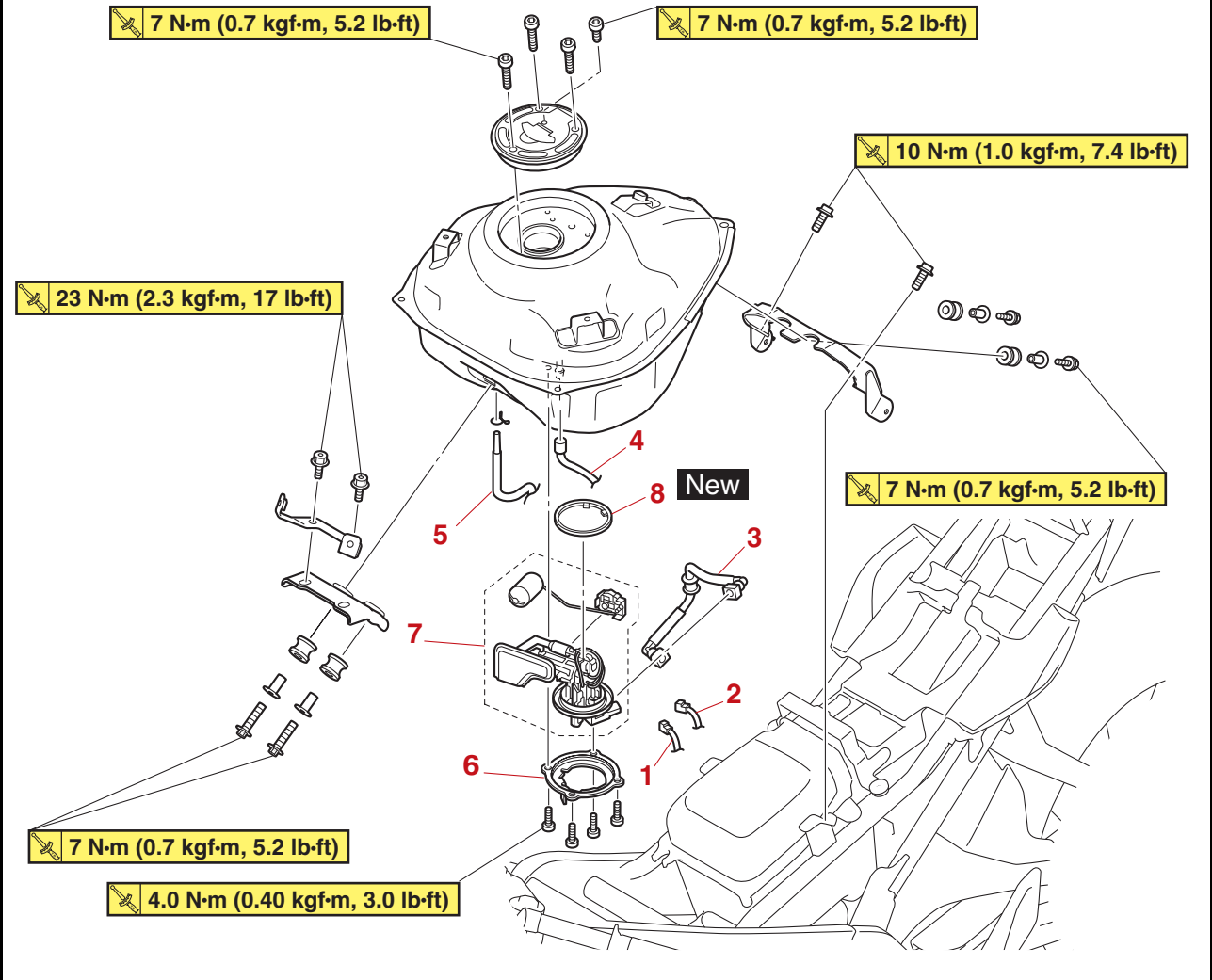
## FUEL SYSTEM

|                                   |      |
|-----------------------------------|------|
| <b>FUEL TANK</b> .....            | 7-1  |
| REMOVING THE FUEL TANK.....       | 7-4  |
| REMOVING THE FUEL PUMP.....       | 7-4  |
| REMOVING THE FUEL FILTER.....     | 7-4  |
| CHECKING THE FUEL PUMP BODY.....  | 7-4  |
| CHECKING THE FUEL FILTER.....     | 7-4  |
| INSTALLING THE FUEL FILTER.....   | 7-4  |
| INSTALLING THE FUEL PUMP.....     | 7-5  |
| INSTALLING THE FUEL TANK.....     | 7-5  |
| CHECKING THE FUEL PRESSURE.....   | 7-5  |
| <br><b>THROTTLE BODY</b> .....    | 7-7  |
| REMOVING THE THROTTLE BODY.....   | 7-9  |
| CHECKING THE FUEL INJECTOR.....   | 7-9  |
| CHECKING THE THROTTLE BODY.....   | 7-9  |
| INSTALLING THE FUEL INJECTOR..... | 7-9  |
| INSTALLING THE THROTTLE BODY..... | 7-9  |
| REPLACING THE THROTTLE BODY.....  | 7-10 |

EAS20067

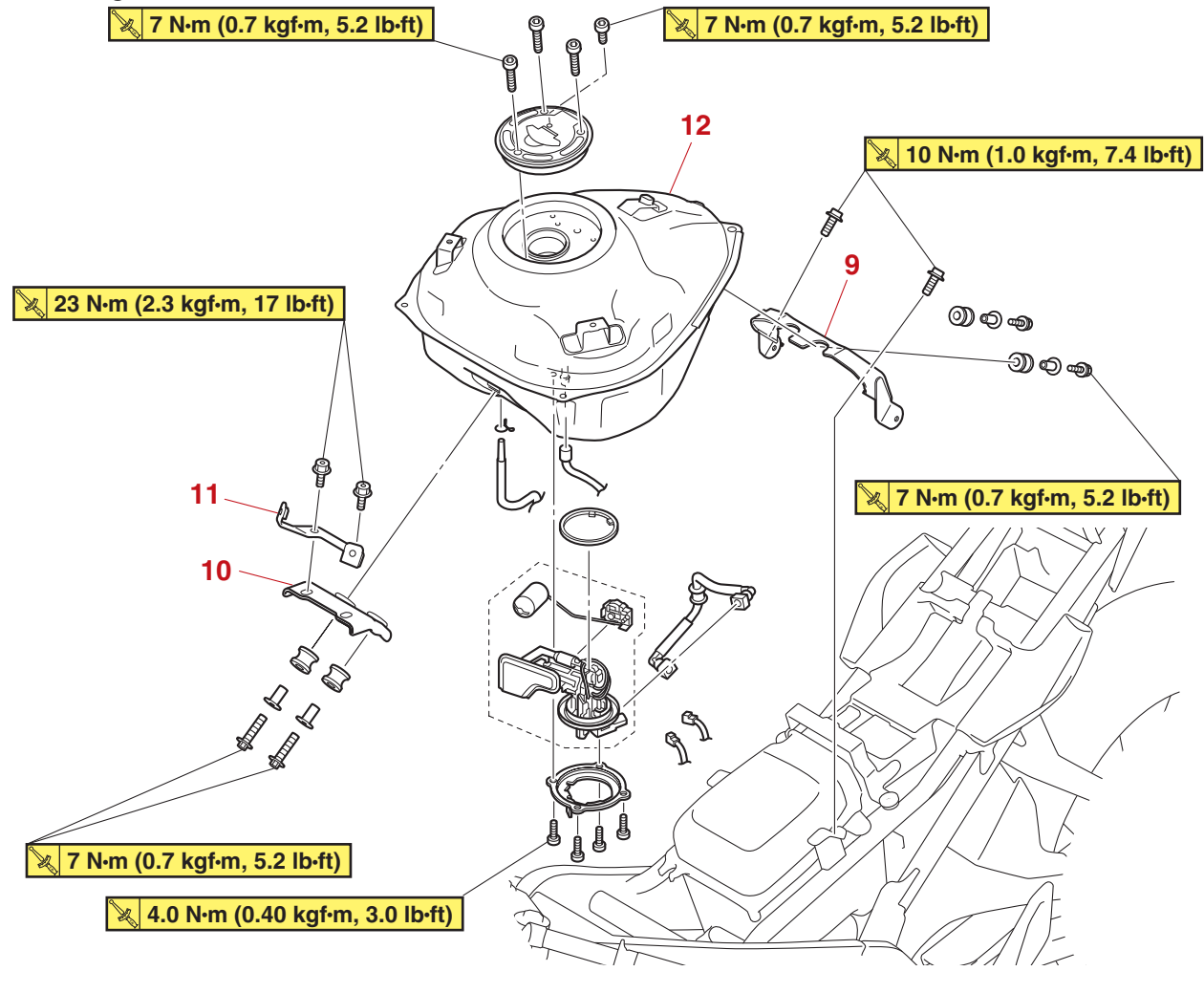
FUEL TANK

Removing the fuel tank



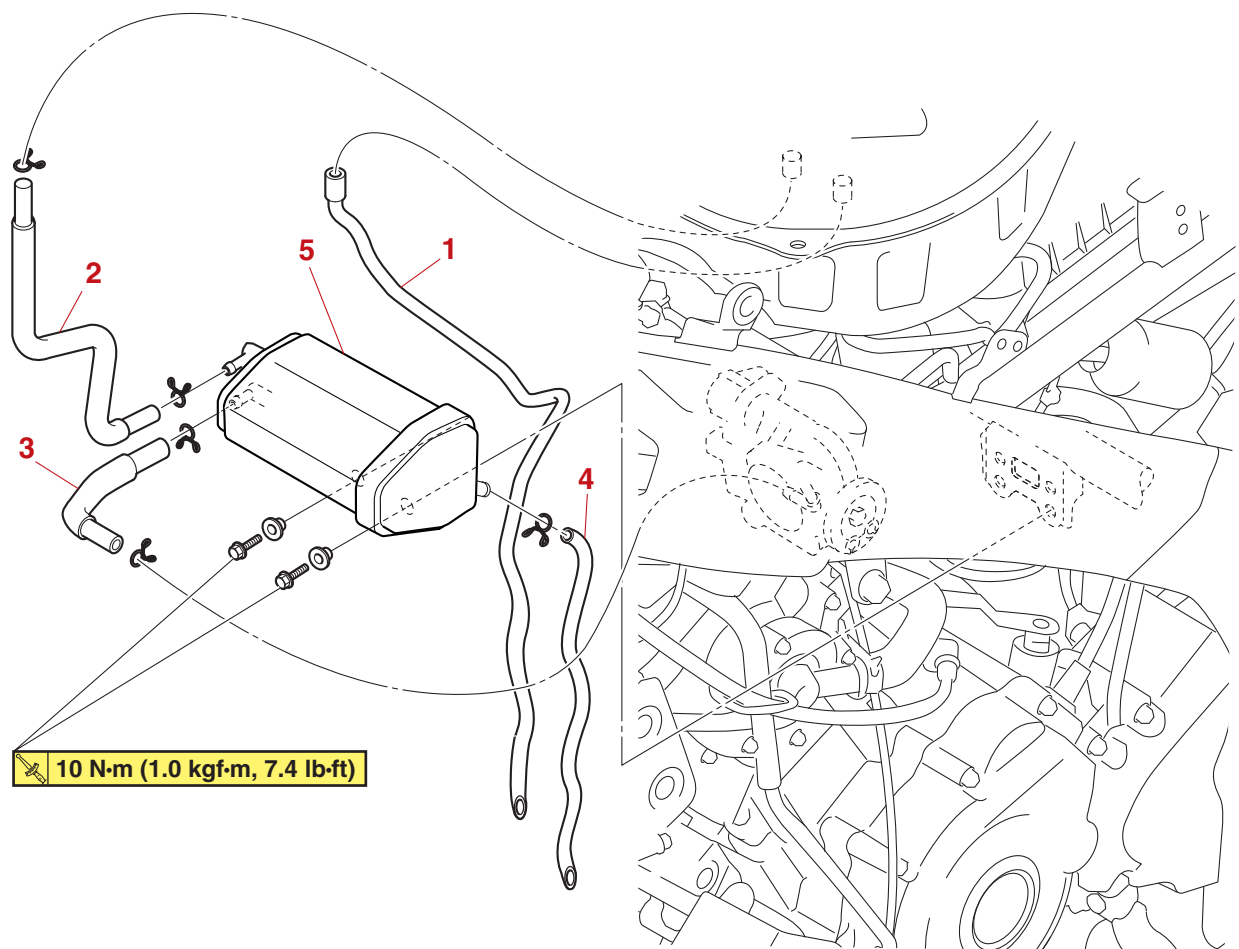
| Order | Job/Parts to remove                                | Q'ty | Remarks                                     |
|-------|----------------------------------------------------|------|---------------------------------------------|
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Upper side cover                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3. |
| 1     | Fuel pump coupler                                  | 1    | Disconnect.                                 |
| 2     | Fuel sender coupler                                | 1    | Disconnect.                                 |
| 3     | Fuel hose                                          | 1    | Disconnect.                                 |
| 4     | Fuel tank overflow hose                            | 1    | Disconnect.                                 |
| 5     | Fuel tank breather hose (fuel tank to canister)    | 1    | Disconnect.                                 |
| 6     | Fuel pump bracket                                  | 1    |                                             |
| 7     | Fuel pump assembly                                 | 1    |                                             |
| 8     | Fuel pump gasket                                   | 1    |                                             |

Removing the fuel tank



| Order | Job/Parts to remove       | Q'ty | Remarks |
|-------|---------------------------|------|---------|
| 9     | Fuel tank bracket (rear)  | 1    |         |
| 10    | Fuel tank bracket (front) | 1    |         |
| 11    | Fuel tank fitting bracket | 1    |         |
| 12    | Fuel tank                 | 1    |         |

Removing the canister



| Order | Job/Parts to remove                                | Q'ty | Remarks                                     |
|-------|----------------------------------------------------|------|---------------------------------------------|
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Upper side cover                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3. |
| 1     | Fuel tank overflow hose                            | 1    |                                             |
| 2     | Fuel tank breather hose (fuel tank to canister)    | 1    |                                             |
| 3     | Canister purge hose (throttle body to canister)    | 1    |                                             |
| 4     | Canister breather hose                             | 1    |                                             |
| 5     | Canister                                           | 1    |                                             |

EAS30450

## REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Disconnect:
  - Fuel sender coupler
  - Fuel pump coupler
  - Fuel hose
  - Fuel tank overflow hose
  - Fuel tank breather hose

EWA18020

### **WARNING**

Cover the fuel hose connection with a cloth when disconnecting it. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

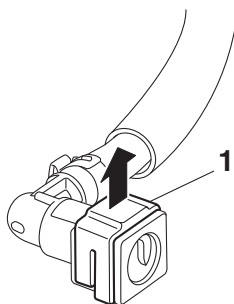
ECA20020

### **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 pump, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.



3. Remove:
  - Fuel tank

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.

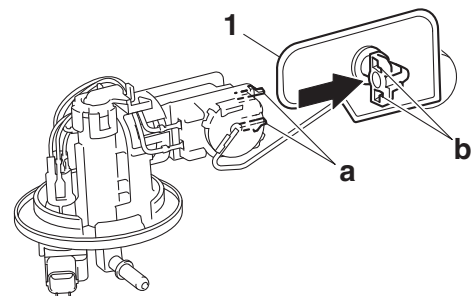
EAS31376

## REMOVING THE FUEL FILTER

1. Remove:
  - Fuel filter "1"

### **TIP**

Remove the projections "a" on the fuel pump from the holes "b" in the fuel filter and slide the fuel filter in the direction of the arrow shown to remove it.



EAS30454

## CHECKING THE FUEL PUMP BODY

1. Check:
  - Fuel pump body
    - Obstruction → Clean.
    - Cracks/damage → Replace the fuel pump assembly.

EAS31249

## CHECKING THE FUEL FILTER

1. Check:
  - Fuel filter
    - Damage → Replace.
    - Contaminants → Clean with solvent.

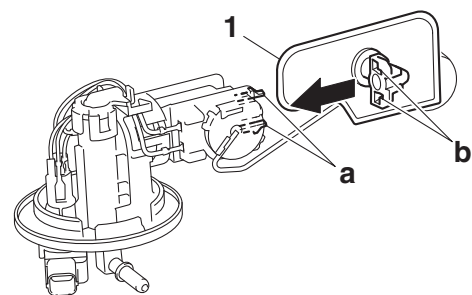
EAS31377

## INSTALLING THE FUEL FILTER

1. Install:
  - Fuel filter "1"

### **TIP**

Fit the projections "a" on the fuel pump into the holes "b" in the fuel filter and slide the fuel filter in the direction of the arrow shown to install it.



EAS30456

## INSTALLING THE FUEL PUMP

### 1. Install:

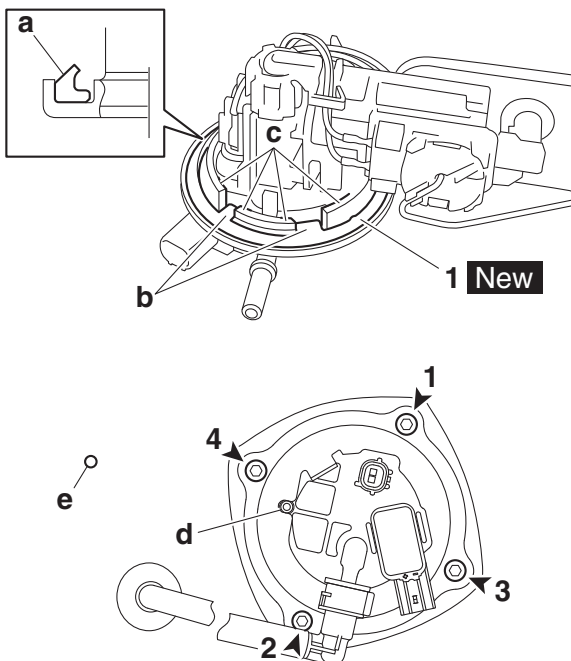
- Fuel pump gasket "1" **New**
- Fuel pump
- Fuel pump bracket



**Fuel pump bracket bolt**  
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

### TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- The gasket lip "a" shall face toward the fuel tank.
- Align the projections "b" (two locations) on the fuel pump gasket with the slots "c" in the fuel pump.
- Align the projection "d" on the fuel pump with the slot in the fuel pump bracket.
- Align the projection "d" on the fuel pump with the punch mark "e" on the fuel tank.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



EAS30457

## INSTALLING THE FUEL TANK

### 1. Install:

- Fuel hose

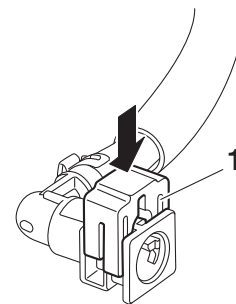
ECA17500

### NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

### TIP

- Install the fuel hose securely onto the 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.



EAS30703

## CHECKING THE FUEL PRESSURE

### 1. Remove:

- Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.
  - Upper side covers  
Refer to "GENERAL CHASSIS (2)" on page 4-2.
  - Lower side covers/Fuel tank covers/Main switch cover  
Refer to "GENERAL CHASSIS (3)" on page 4-3.
2. Remove the fuel tank bracket bolts (rear) and fuel tank fitting bracket bolts, and then hold up the fuel tank.

ECA26670

### NOTICE

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

### 3. Check:

- Pressure regulator operation
  - a. Disconnect the fuel hose from the fuel pump.

EWA18020

## **WARNING**

Cover the fuel hose connection with a cloth when disconnecting it. 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.

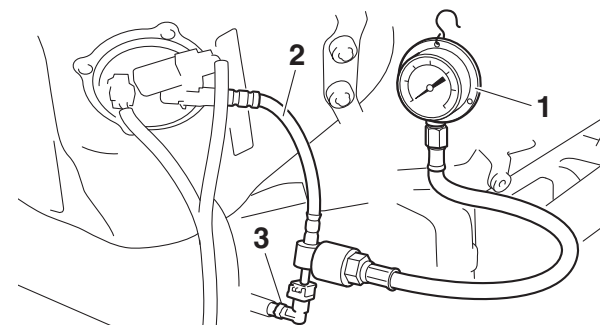
## **TIP**

Before removing the hose, place a few rags in the area under where it will be removed.

- b. Connect the pressure gauge "1" and fuel pressure adapter "2" to the fuel hose "3".



**Pressure gauge**  
90890-03153  
**Pressure gauge**  
YU-03153  
**Fuel pressure adapter 6.3mm**  
90890-03227



- c. Start the engine.
- d. Measure the fuel pressure.



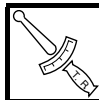
**Fuel line pressure (at idle)**  
245–255 kPa (2.5–2.6 kgf/cm<sup>2</sup>,  
35.5–37.0 psi)

Faulty → Replace the fuel pump.

- e. Connect the fuel hose.  
Refer to "INSTALLING THE FUEL TANK" on page 7-5.

## 4. Install:

- Fuel tank bracket bolts (rear)/Fuel tank fitting bracket bolts  
Refer to "FUEL TANK" on page 7-1.



**Fuel tank bracket bolt (rear)**  
10 N·m (1.0 kgf·m, 7.4 lb·ft)  
**Fuel tank fitting bracket bolt**  
23 N·m (2.3 kgf·m, 17 lb·ft)

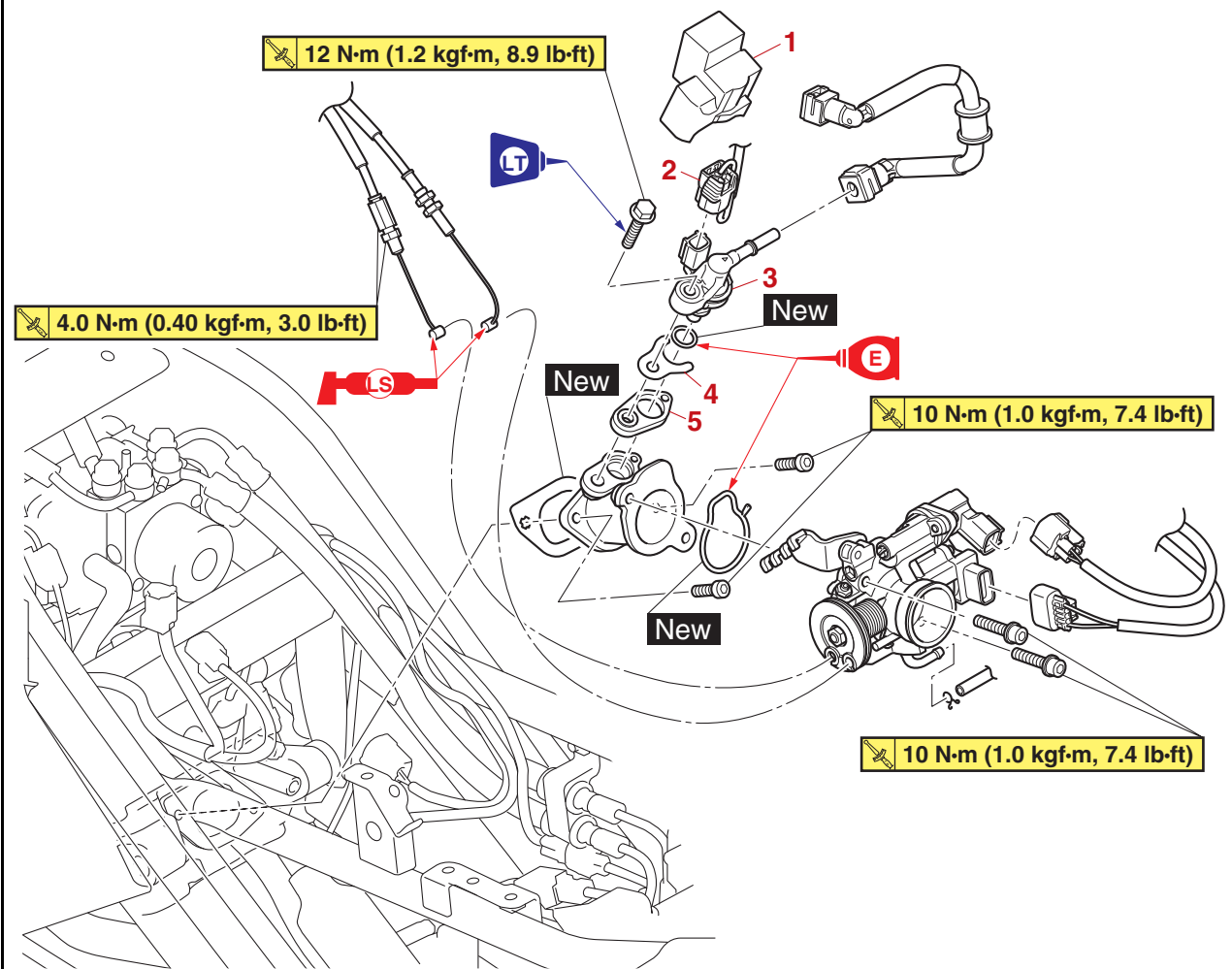
## 5. Install:

- Lower side covers/Fuel tank covers/Main switch cover  
Refer to "GENERAL CHASSIS (3)" on page 4-3.
- Upper side covers  
Refer to "GENERAL CHASSIS (2)" on page 4-2.
- Seat  
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS20070

## THROTTLE BODY

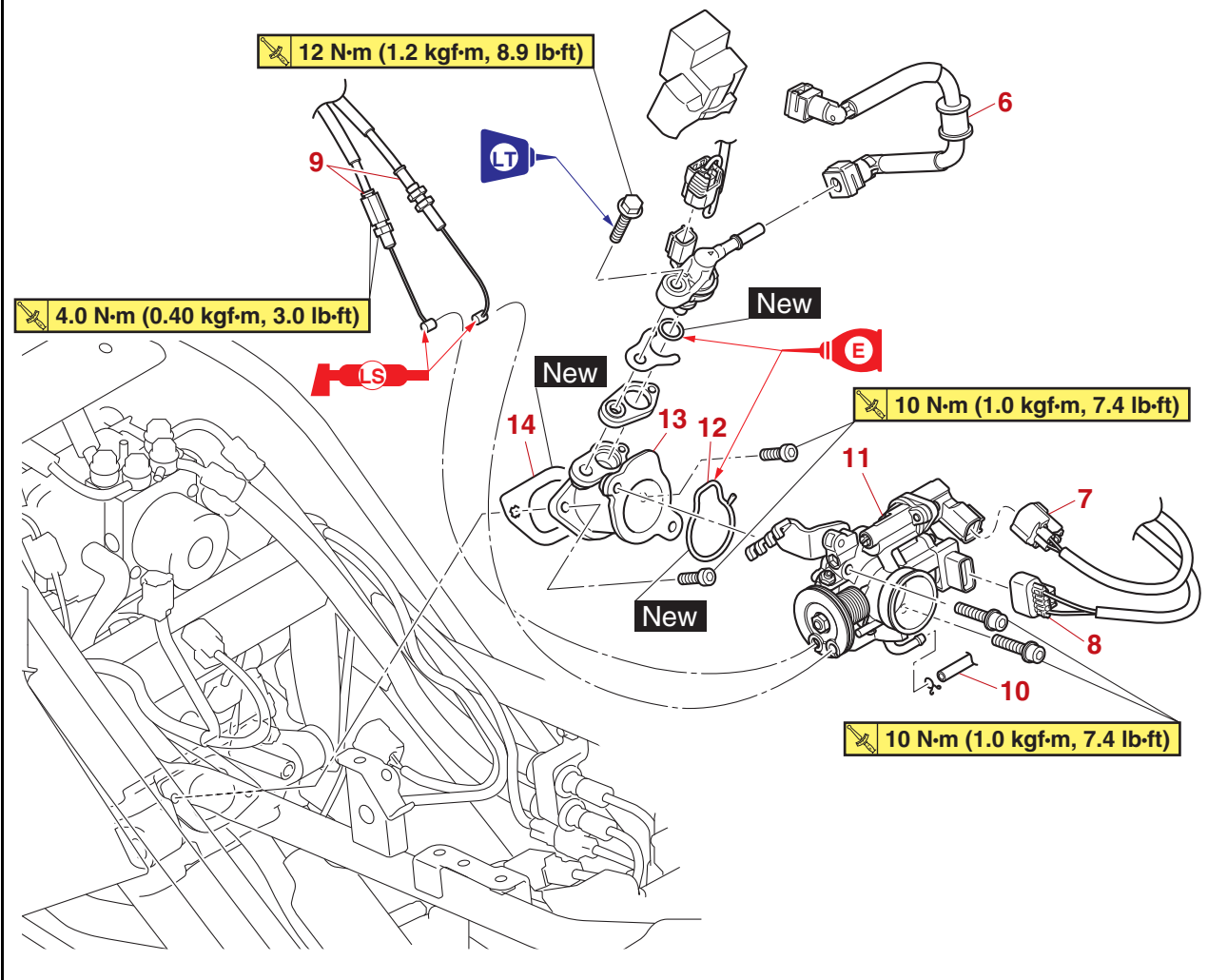
### Removing the throttle body



| Order | Job/Parts to remove                                | Q'ty | Remarks                                     |
|-------|----------------------------------------------------|------|---------------------------------------------|
|       | Seat                                               |      | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
|       | Upper side cover                                   |      | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
|       | Lower side cover/Fuel tank cover/Main switch cover |      | Refer to "GENERAL CHASSIS (3)" on page 4-3. |
|       | Fuel tank                                          |      | Refer to "FUEL TANK" on page 7-1.           |
|       | Air filter case                                    |      | Refer to "GENERAL CHASSIS (5)" on page 4-6. |
| 1     | Fuel injector cover                                | 1    |                                             |
| 2     | Fuel injector coupler                              | 1    | Disconnect.                                 |
| 3     | Fuel injector                                      | 1    |                                             |
| 4     | Gasket                                             | 1    |                                             |
| 5     | Fuel injector adaptor                              | 1    |                                             |

# THROTTLE BODY

## Removing the throttle body



| Order | Job/Parts to remove                             | Q'ty | Remarks                                                                                         |
|-------|-------------------------------------------------|------|-------------------------------------------------------------------------------------------------|
| 6     | Fuel hose                                       | 1    |                                                                                                 |
| 7     | FID (Fast Idle Device) coupler                  | 1    | Disconnect.                                                                                     |
| 8     | Throttle body sensor assembly coupler           | 1    | Disconnect.                                                                                     |
| 9     | Throttle cable                                  | 2    | Disconnect.                                                                                     |
| 10    | Canister purge hose (throttle body to canister) | 1    | Disconnect.                                                                                     |
| 11    | Throttle body                                   | 1    | <p>ECA22690</p> <p><b>NOTICE</b> _____</p> <p>The throttle body should not be disassembled.</p> |
| 12    | Gasket                                          | 1    |                                                                                                 |
| 13    | Intake manifold                                 | 1    |                                                                                                 |
| 14    | Gasket                                          | 1    |                                                                                                 |

EAS30979

## REMOVING THE THROTTLE BODY

### 1. Disconnect:

- Fuel hose

EWA17610



**WARNING**

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

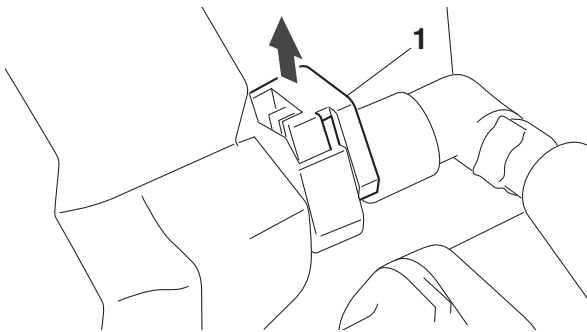
ECA20020

### 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 disconnect the fuel hose from the fuel pump, slide the cover "1" in the direction of the arrow, and then disconnect the fuel hose.
- Before removing the hose, place a few rags in the area under where it will be removed.



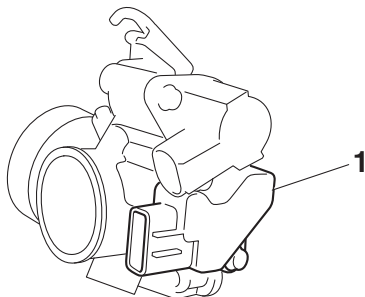
### 2. Remove:

- Throttle body

ECA20590

### NOTICE

Do not remove the throttle body sensor assembly "1" from the throttle body.



EAS31251

## CHECKING THE FUEL INJECTOR

### 1. Check:

- Fuel injector
- Damage → Replace.

EAS30479

## CHECKING THE THROTTLE BODY

### 1. Check:

- Throttle body
- Cracks/damage → Replace the throttle body.

EAS31617

## INSTALLING THE FUEL INJECTOR

### 1. Install:

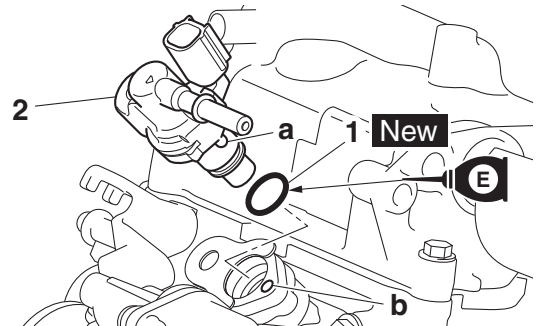
- O-ring "1" **New**  
(to the fuel injector)
- Fuel injector "2"



**Fuel injector bolt**  
**12 N·m (1.2 kgf·m, 8.9 lb·ft)**  
**LOCTITE®**

### TIP

- Lubricate the O-ring with engine oil.
- Align the projection "a" on the fuel injector with the hole "b" in the fuel injector adapter.



EAS30980

## INSTALLING THE THROTTLE BODY

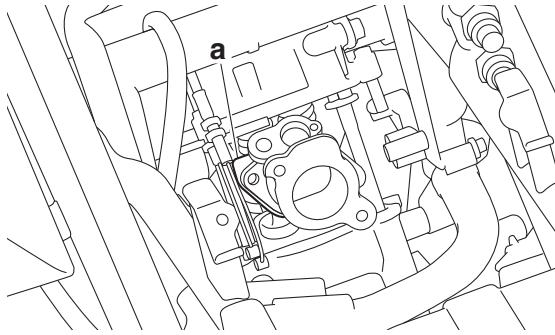
### 1. Install:

- Intake manifold gasket **New**

### TIP

Install the intake manifold gasket so that the tab "a" on the gasket is protruding in the direction shown in the illustration.

# THROTTLE BODY



2. Connect:
- Fuel hose

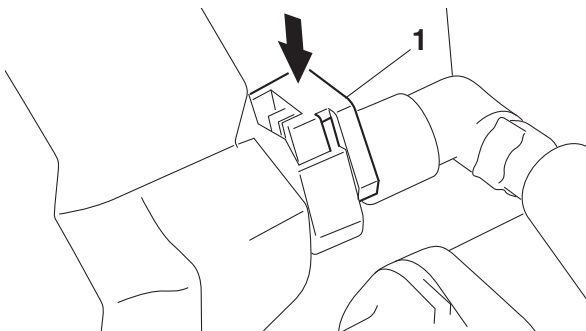
ECA17500

## NOTICE

**When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.**

## TIP

To install the fuel hose onto the fuel injector, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown.



EAS31160

## REPLACING THE THROTTLE BODY

1. Remove the throttle body from the vehicle.
2. Install a new throttle body to the vehicle.
3. Reset:
  - A/F control learning values  
Use the diagnostic code number “87”.  
Refer to “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-39.



**Yamaha diagnostic tool USB  
90890-03267  
Yamaha diagnostic tool (A/I)  
90890-03264**

## TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).

- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

## 4. Check:

- Engine idling speed  
Start the engine, warm it up, and then measure the engine idling speed.



**Engine idling speed  
1250–1550 r/min**



---

## ELECTRICAL SYSTEM

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|                                               |             |
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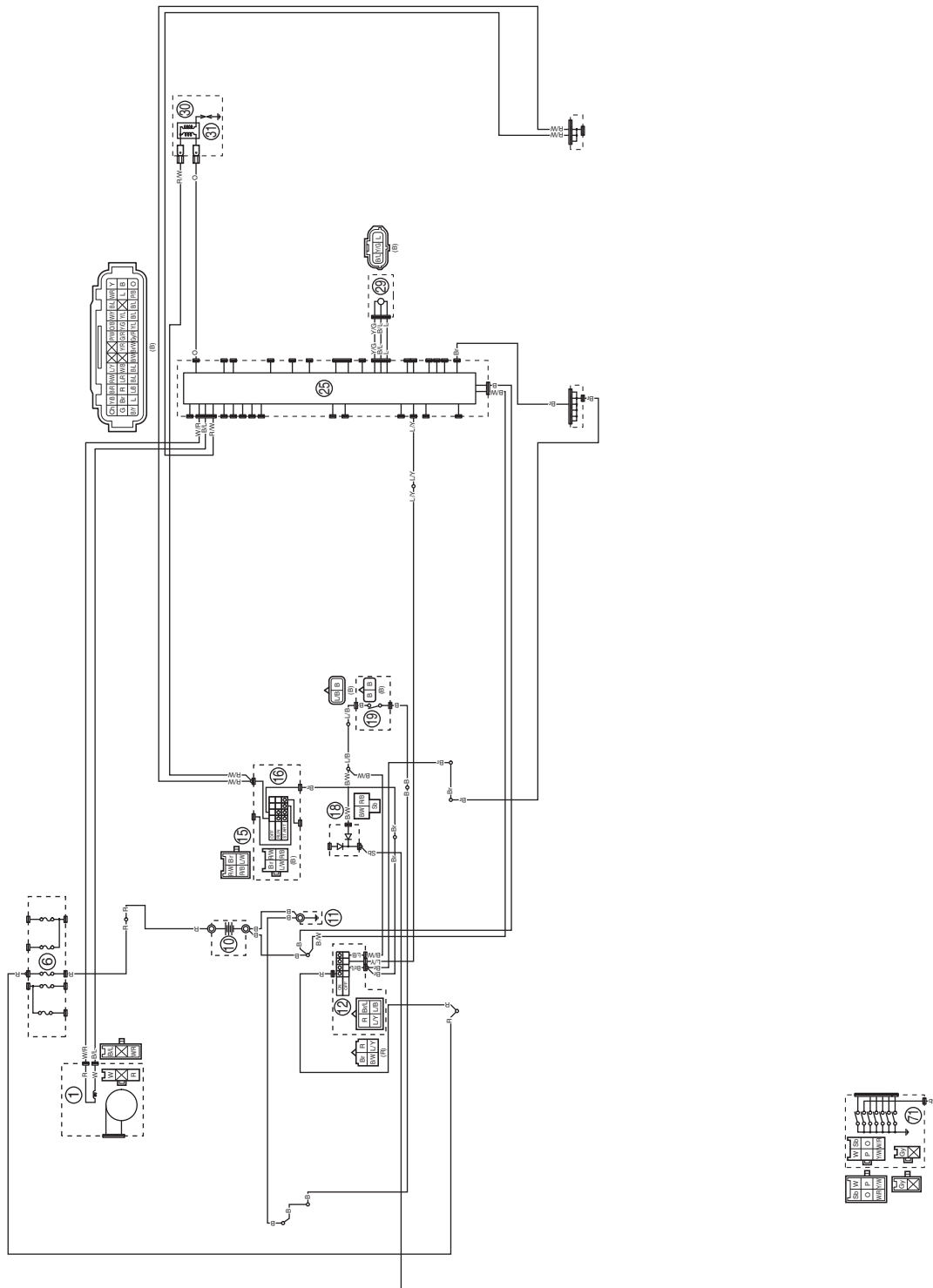
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EAS20072

## IGNITION SYSTEM

EAS30490

## CIRCUIT DIAGRAM



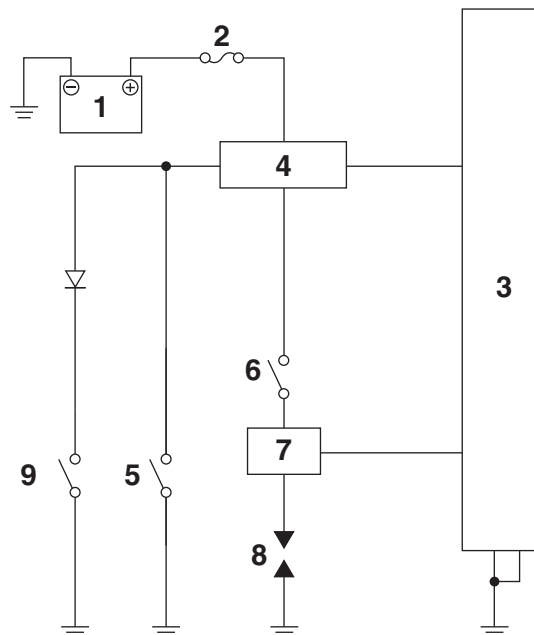
- 1. Crankshaft position sensor
- 6. Main fuse
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 18. Diode
- 19. Sidestand switch
- 25. ECU (Engine Control Unit)
- 29. Lean angle sensor
- 30. Ignition coil
- 31. Spark plug
- 71. Gear position switch

EAS30491

## ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ECU does not flow to the ignition coil or fuel injector 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. ECU (Engine Control Unit)
4. Main switch
5. Sidestand switch
6. Start/engine stop switch
7. Ignition coil
8. Spark plug
9. 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. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)
7. Air scoop (right)

|                                                                                                              |      |                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1. Check the fuse (main).<br>Refer to "CHECKING THE FUSES" on page 8-34.                                     | NG → | Replace the fuse.                                                                                                            |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.                          | 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 spark plug.<br>Refer to "CHECKING THE SPARK PLUG" on page 3-5.                                  | NG → | Re-gap or replace the spark plug.                                                                                            |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 4. Check the ignition spark gap.<br>Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-38.                 | OK → | Ignition system is OK.                                                                                                       |
| NG ↓                                                                                                         |      |                                                                                                                              |
| 5. Check the ignition coil.<br>Refer to "CHECKING THE IGNITION COIL" on page 8-37.                           | NG → | Replace the ignition coil.                                                                                                   |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 6. Check the crankshaft position sensor.<br>Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-38. | NG → | Replace the crankshaft position sensor/stator assembly.                                                                      |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 7. Check the main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                  | NG → | Replace the main switch.                                                                                                     |
| OK ↓                                                                                                         |      |                                                                                                                              |

## IGNITION SYSTEM

|                                                                                                  |      |                                                 |
|--------------------------------------------------------------------------------------------------|------|-------------------------------------------------|
| 8. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.         | NG → | Replace the handlebar switch (right).           |
| OK ↓                                                                                             |      |                                                 |
| 9. Check the gear position switch.<br>Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-42. | NG → | Replace the gear position switch.               |
| OK ↓                                                                                             |      |                                                 |
| 10. Check the sidestand switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                | NG → | Replace the sidestand switch.                   |
| OK ↓                                                                                             |      |                                                 |
| 11. Check the lean angle sensor.<br>Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-38.      | NG → | Replace the lean angle sensor.                  |
| OK ↓                                                                                             |      |                                                 |
| 12. Check the entire ignition system wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-1.          | NG → | Properly connect or replace the wiring harness. |
| OK ↓                                                                                             |      |                                                 |
| Replace the ECU.                                                                                 |      |                                                 |



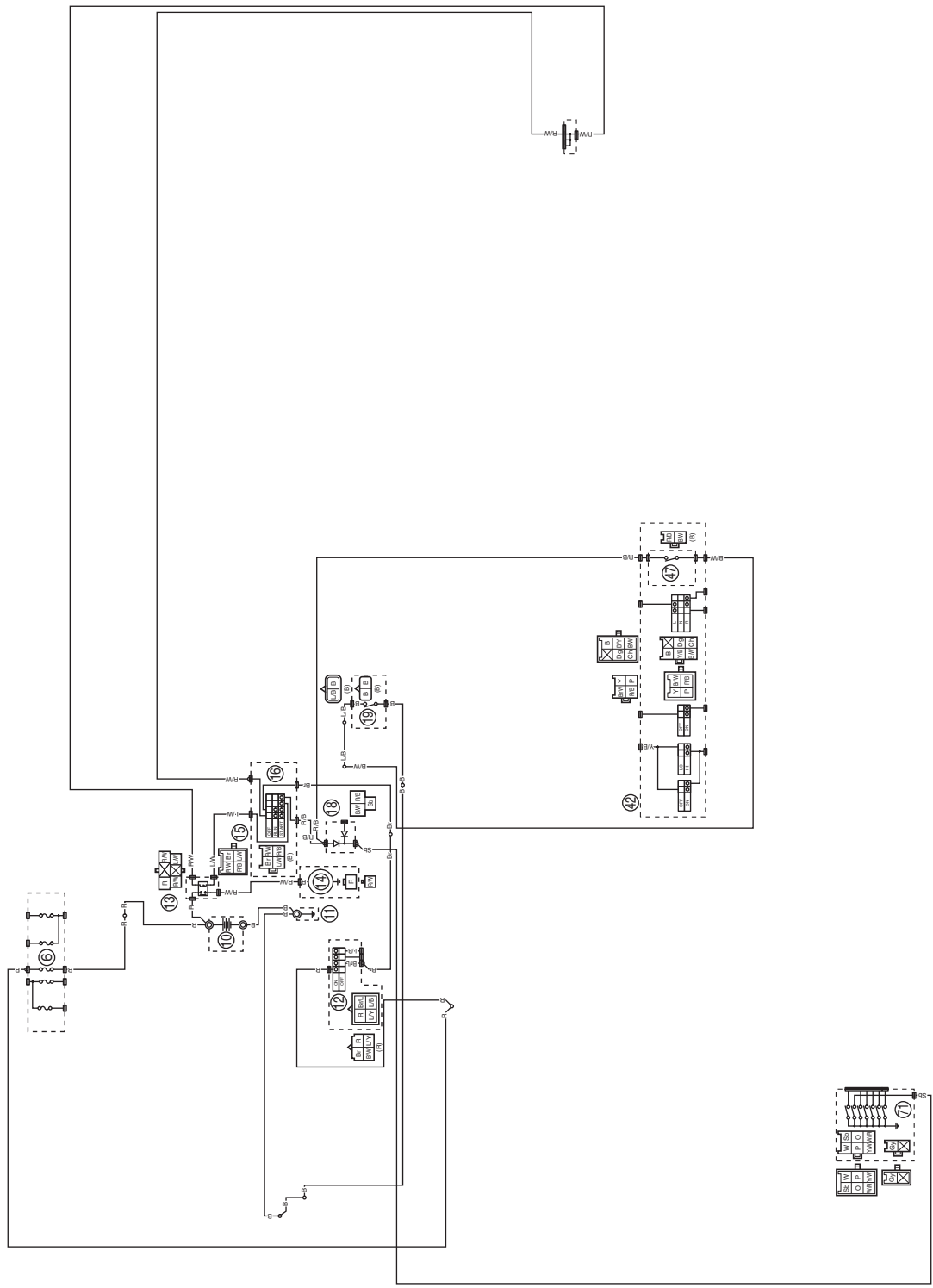
# ELECTRIC STARTING SYSTEM

EAS20073

## ELECTRIC STARTING SYSTEM

EAS30493

### CIRCUIT DIAGRAM



## ELECTRIC STARTING SYSTEM

---

- 6. Main fuse
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 13. Starter relay
- 14. Starter motor
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 18. Diode
- 19. Sidestand switch
- 42. Handlebar switch (left)
- 47. Clutch switch
- 71. Gear position switch

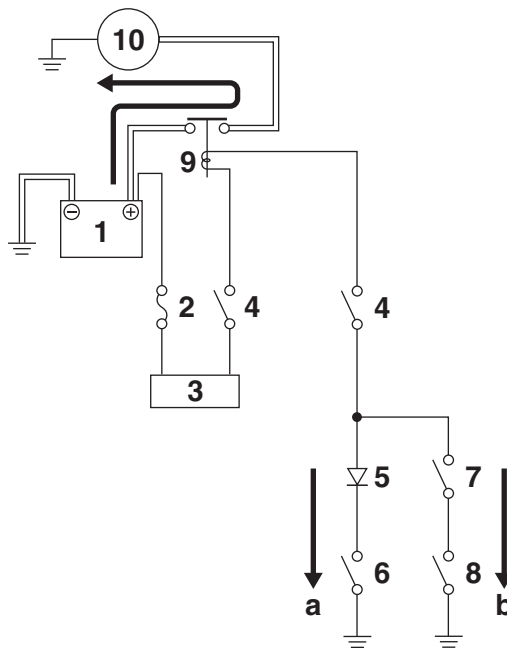
# ELECTRIC STARTING SYSTEM

EAS30494

## STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is set to “ON” and the “” side of the start/engine stop switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).



- WHEN THE TRANSMISSION IS IN NEUTRAL
- WHEN THE SIDE STAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

10. Starter motor

- Battery
- Main fuse
- Main switch
- Start/engine stop switch
- Diode
- Gear position switch
- Clutch switch
- Sidestand switch
- Starter relay

# ELECTRIC STARTING SYSTEM

EAS30495

## TROUBLESHOOTING

The starter motor fails to turn.

### TIP

- Before troubleshooting, remove the following part(s):

1. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)

1. Check the fuse (main).  
Refer to "CHECKING THE FUSES" on page 8-34.

NG →

Replace the fuse.

OK ↓

2. Check the battery.  
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

OK ↓

3. Check the starter motor operation.  
Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-39.

OK →

Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.

NG ↓

4. Check the starter motor.  
Refer to "CHECKING THE STARTER MOTOR" on page 5-46.

NG →

Repair or replace the starter motor.

OK ↓

5. Check the diode.  
Refer to "CHECKING THE DIODES" on page 8-36.

NG →

Replace the diode.

OK ↓

6. Check the starter relay.  
Refer to "CHECKING THE RELAYS" on page 8-35.

NG →

Replace the starter relay.

OK ↓

7. Check the main switch.  
Refer to "CHECKING THE SWITCHES" on page 8-33.

NG →

Replace the main switch.

OK ↓

## ELECTRIC STARTING SYSTEM

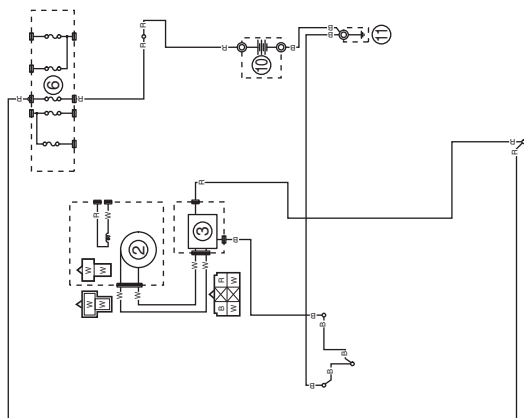
|                                                                                                  |      |                                                 |
|--------------------------------------------------------------------------------------------------|------|-------------------------------------------------|
| 8. Check the gear position switch.<br>Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-42. | NG → | Replace the gear position switch.               |
| OK ↓                                                                                             |      |                                                 |
| 9. Check the sidestand switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                 | NG → | Replace the sidestand switch.                   |
| OK ↓                                                                                             |      |                                                 |
| 10. Check the clutch switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                   | NG → | Replace the clutch switch.                      |
| OK ↓                                                                                             |      |                                                 |
| 11. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.        | NG → | Replace the handlebar switch (right).           |
| OK ↓                                                                                             |      |                                                 |
| 12. Check the entire starting system wiring.<br>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



- 2. AC magneto
- 3. Rectifier/regulator
- 6. Main fuse
- 10. Battery
- 11. Engine ground

EAS30497

TROUBLESHOOTING

The battery is not being charged.

TIP

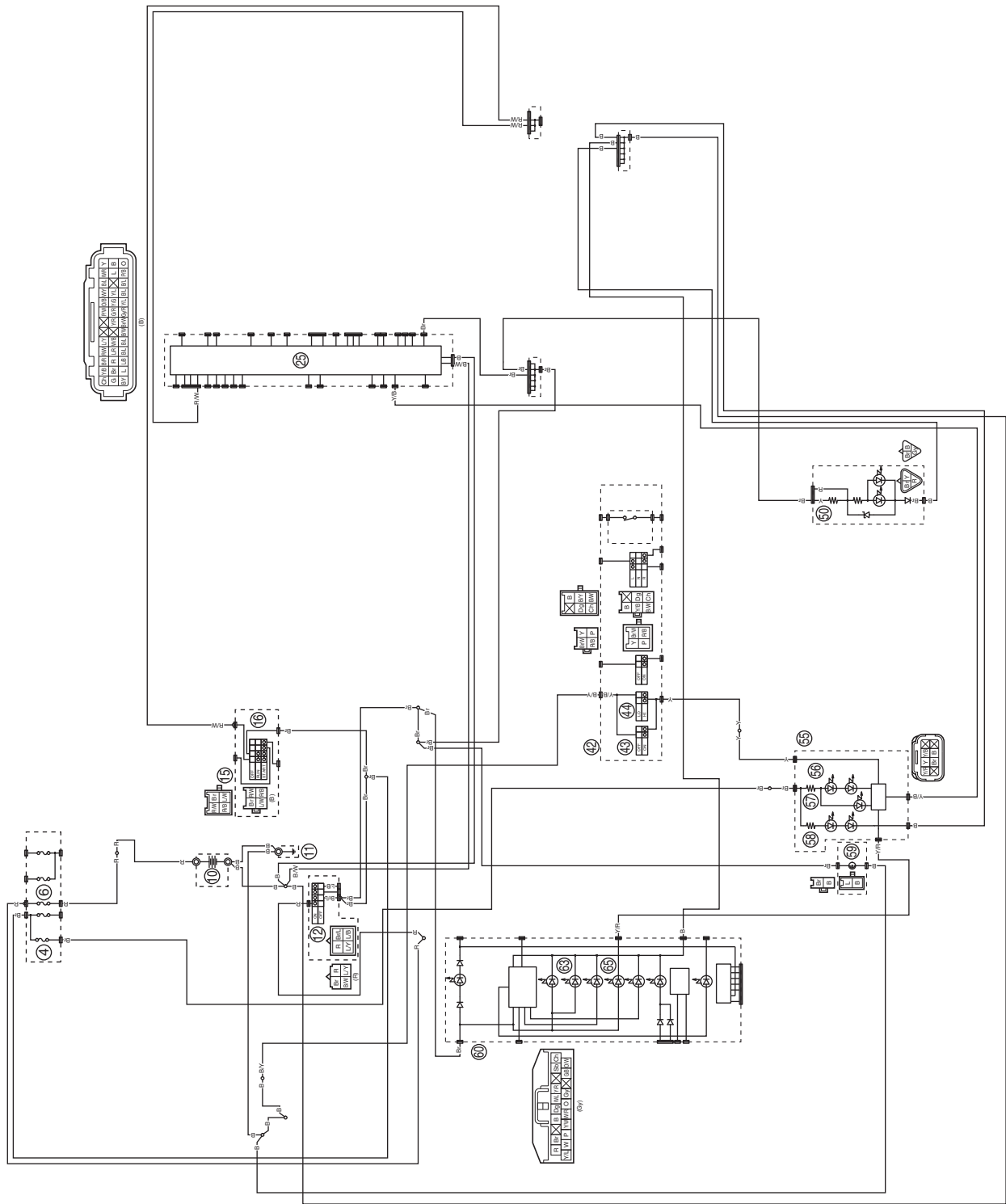
- Before troubleshooting, remove the following part(s):
  1. Seat
  2. Upper side covers
  3. Lower side covers (left)
  4. Fuel tank covers
  5. Rear fender cover

|                                                                                                |      |                                                                                                                           |
|------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------|
| 1. Check the fuse (main).<br>Refer to "CHECKING THE FUSES" on page 8-34.                       | NG → | Replace the fuse.                                                                                                         |
| OK ↓                                                                                           |      |                                                                                                                           |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.            | 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.<br>Refer to "CHECKING THE STATOR COIL" on page 8-39.                 | NG → | Replace the crankshaft position sensor/<br>stator assembly.                                                               |
| OK ↓                                                                                           |      |                                                                                                                           |
| 4. Check the rectifier/regulator.<br>Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-40. | NG → | Replace the rectifier/regulator.                                                                                          |
| OK ↓                                                                                           |      |                                                                                                                           |
| 5. Check the entire charging system wiring.<br>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



- 4. Headlight fuse
- 6. Main fuse
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 25. ECU (Engine Control Unit)
- 42. Handlebar switch (left)
- 43. Pass switch
- 44. Dimmer switch
- 50. Tail/brake light
- 55. Headlight unit
- 56. Headlight (high beam)
- 57. Headlight (low beam)
- 58. Auxiliary light
- 59. License plate light
- 60. Meter assembly
- 63. Meter light
- 65. High beam indicator light

EAS30499

## TROUBLESHOOTING

Any of the following fail to light: headlight, auxiliary light, high beam indicator light, tail light, license plate light or meter light.

### TIP

• Before troubleshooting, remove the following part(s):

1. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)

|                                                                                                                                                    |      |                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1. Check the license plate light bulb and bulb socket condition.<br>Refer to "CHECKING THE BULB SOCKETS" in "BASIC INFORMATION" (separate volume). | NG → | Replace the bulb and bulb socket.                                                                                            |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 2. Check the fuse (main and headlight).<br>Refer to "CHECKING THE FUSES" on page 8-34.                                                             | NG → | Replace the fuse(s).                                                                                                         |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 3. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.                                                                | NG → | <ul style="list-style-type: none"> <li>• Clean the battery terminals.</li> <li>• Recharge or replace the battery.</li> </ul> |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 4. Check the main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                                                        | NG → | Replace the main switch.                                                                                                     |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 5. Check the dimmer switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                                                      | NG → | Replace the handlebar switch (left).                                                                                         |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 6. Check the pass switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                                                        | NG → | Replace the handlebar switch (left).                                                                                         |
| OK ↓                                                                                                                                               |      |                                                                                                                              |
| 7. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                                           | NG → | Replace the handlebar switch (right).                                                                                        |
| OK ↓                                                                                                                                               |      |                                                                                                                              |

## LIGHTING SYSTEM

8. Check the entire lighting system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-15.

NG →

Properly connect or replace the wiring harness.

OK ↓

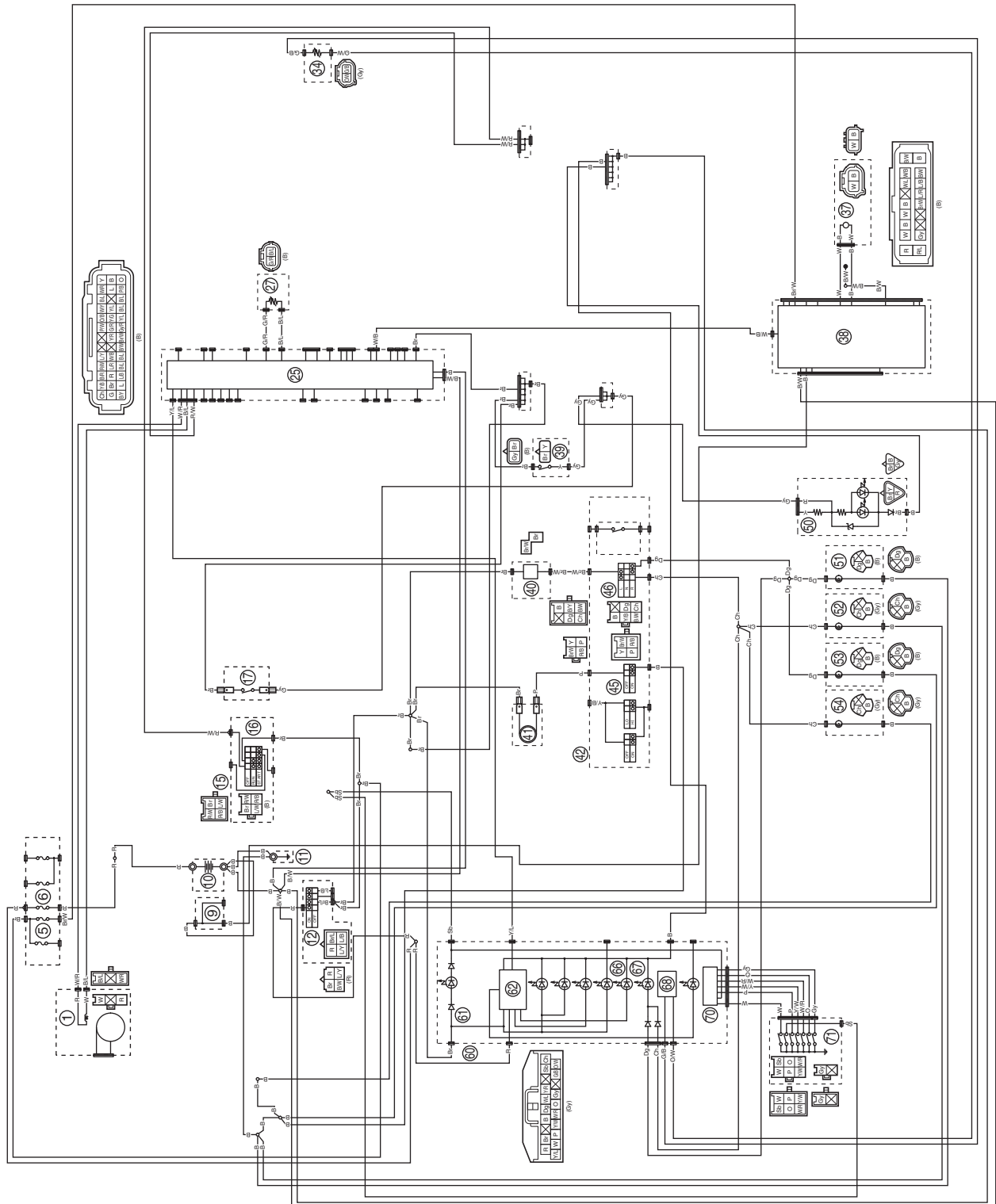
Replace the ECU, headlight unit, auxiliary light, meter assembly, or tail/brake light.

EAS20076

## SIGNALING SYSTEM

EAS30500

## CIRCUIT DIAGRAM



1. Crankshaft position sensor
5. ABS control unit fuse
6. Main fuse
9. Engine ground lead terminal
10. Battery
11. Engine ground
12. Main switch
15. Handlebar switch (right)
16. Start/engine stop switch
17. Front brake light switch
25. ECU (Engine Control Unit)
27. Coolant temperature sensor
34. Fuel sender
37. Rear wheel sensor
38. ABS ECU
39. Rear brake light switch
40. Turn signal relay
41. Horn
42. Handlebar switch (left)
45. Horn switch
46. Turn signal switch
50. Tail/brake light
51. Rear turn signal light (right)
52. Rear turn signal light (left)
53. Front turn signal light (right)
54. Front turn signal light (left)
60. Meter assembly
61. Neutral indicator light
62. Multi-function meter
66. Coolant temperature warning light
67. Turn signal indicator light
68. Fuel meter
70. Transmission gear display
71. Gear position switch

EAS30501

## TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.
- The tachometer fails to operate.
- The coolant temperature meter fails to operate.

## TIP

- Before troubleshooting, remove the following part(s):

1. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)

|                                                                                                                      |      |                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1. Check the fuses.<br>(ABS control unit and main)<br>Refer to "CHECKING THE FUSES" on page 8-34.                    | NG → | Replace the fuse(s).                                                                                                         |
| OK ↓                                                                                                                 |      |                                                                                                                              |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.                                  | 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 main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                          | NG → | Replace the main switch.                                                                                                     |
| OK ↓                                                                                                                 |      |                                                                                                                              |
| 4. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                             | NG → | Replace the handlebar switch (right).                                                                                        |
| OK ↓                                                                                                                 |      |                                                                                                                              |
| 5. Check the entire signaling system wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-19.                             | NG → | Properly connect or replace the wiring harness.                                                                              |
| OK ↓                                                                                                                 |      |                                                                                                                              |
| Check the condition of each of the signaling system circuits. Refer to "Checking the signaling system" on page 8-22. |      |                                                                                                                              |

## Checking the signaling system

The horn fails to sound.

1. Check the horn switch.  
Refer to "CHECKING THE SWITCHES" on page 8-33.

NG →

- The horn switch is faulty.
- Replace the left handlebar switch.

OK ↓

2. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the horn.

The brake light fails to come on.

1. Check the front brake light switch.  
Refer to "CHECKING THE SWITCHES" on page 8-33.

NG →

Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch.  
Refer to "CHECKING THE SWITCHES" on page 8-33.

NG →

Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the tail/brake light.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal light bulbs and sockets.  
Refer to "CHECKING THE BULB SOCKETS" in "BASIC INFORMATION" (separate volume).

NG →

Replace the turn signal light bulb, socket or both.

OK ↓

2. Check the turn signal switch.  
Refer to "CHECKING THE SWITCHES" on page 8-33.

NG →

- The turn signal switch is faulty.
- Replace the left handlebar switch.

OK ↓

## SIGNALING SYSTEM

3. Check the turn signal relay.  
Refer to "CHECKING THE RELAYS" on page 8-35.

NG →

Replace the turn signal relay.

OK ↓

4. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

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 8-42.

NG →

Replace the gear position switch.

OK ↓

2. Check the entire signaling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly.

The fuel meter fail to come on.

1. Check the fuel sender.  
Refer to "CHECKING THE FUEL SENDER" on page 8-40.

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 8-41.

NG →

Replace the coolant temperature sensor.

OK ↓

## SIGNALING SYSTEM

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.

The speedometer fails to operate.

1. Check the rear wheel sensor.  
Execute the diagnostic mode.  
(Code "07")  
Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-39.

NG →

Replace the rear wheel sensor.

OK ↓

2. Check the entire rear wheel sensor wiring.  
Refer to TIP.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the ECU, ABS ECU, or meter assembly.

### TIP

Replace the wire harness if there is an open or short circuit.

- Between rear wheel sensor coupler and ABS ECU coupler.  
(white–white)  
(black–black)
- Between ABS ECU coupler and ECU coupler.  
(white/black–white/black)
- Between ECU coupler and meter coupler.  
(yellow/blue–yellow/blue)

The tachometer fails to operate.

1. Check the crankshaft position sensor.  
Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-38.

NG →

Replace the crankshaft position sensor/stator 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 meter assembly or ECU.

## EAS30502

This is a detailed schematic diagram of a vehicle's electrical system. The diagram shows the following components and their connections:

- Battery:** A 12V battery is shown at the bottom left, connected to the main power lines.
- Alternator:** An alternator is shown at the bottom right, connected to the battery and the engine.
- Engine:** The engine is shown at the top right, connected to the alternator and the main power lines.
- Fuse Block:** A fuse block is located in the center, containing fuses for various circuits (e.g., 10A, 15A, 20A).
- Lighting:** Various lighting components are shown, including headlights, taillights, and interior lights, connected to the main power lines.
- Horn:** A horn is shown at the bottom right, connected to the main power lines.
- Wiring:** The diagram shows a complex network of wires connecting all components, with labels for wire colors and gauges.

- 6. Main fuse
- 9. Engine ground lead terminal
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 25. ECU (Engine Control Unit)
- 27. Coolant temperature sensor
- 48. Radiator fan motor relay
- 49. Radiator fan motor

EAS30503

## TROUBLESHOOTING

The radiator fan motor fails to turn.

### TIP

- Before troubleshooting, remove the following part(s):

1. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)

|                                                                                                              |      |                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1. Check the fuse (main).<br>Refer to "CHECKING THE FUSES" on page 8-34.                                     | NG → | Replace the fuse.                                                                                                            |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.                          | 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 main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                                  | NG → | Replace the main switch.                                                                                                     |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 4. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.                     | NG → | Replace the handlebar switch (right).                                                                                        |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 5. Check the radiator fan motor.<br>Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-41.                 | NG → | Replace the radiator fan motor.                                                                                              |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 6. Check the radiator fan motor relay.<br>Refer to "CHECKING THE RELAYS" on page 8-35.                       | NG → | Replace the radiator fan motor relay.                                                                                        |
| OK ↓                                                                                                         |      |                                                                                                                              |
| 7. Check the coolant temperature sensor.<br>Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-41. | NG → | Replace the coolant temperature sensor.                                                                                      |
| OK ↓                                                                                                         |      |                                                                                                                              |

## COOLING SYSTEM

8. Check the entire cooling system wiring.  
Refer to "CIRCUIT DIAGRAM" on page 8-25.

OK ↓

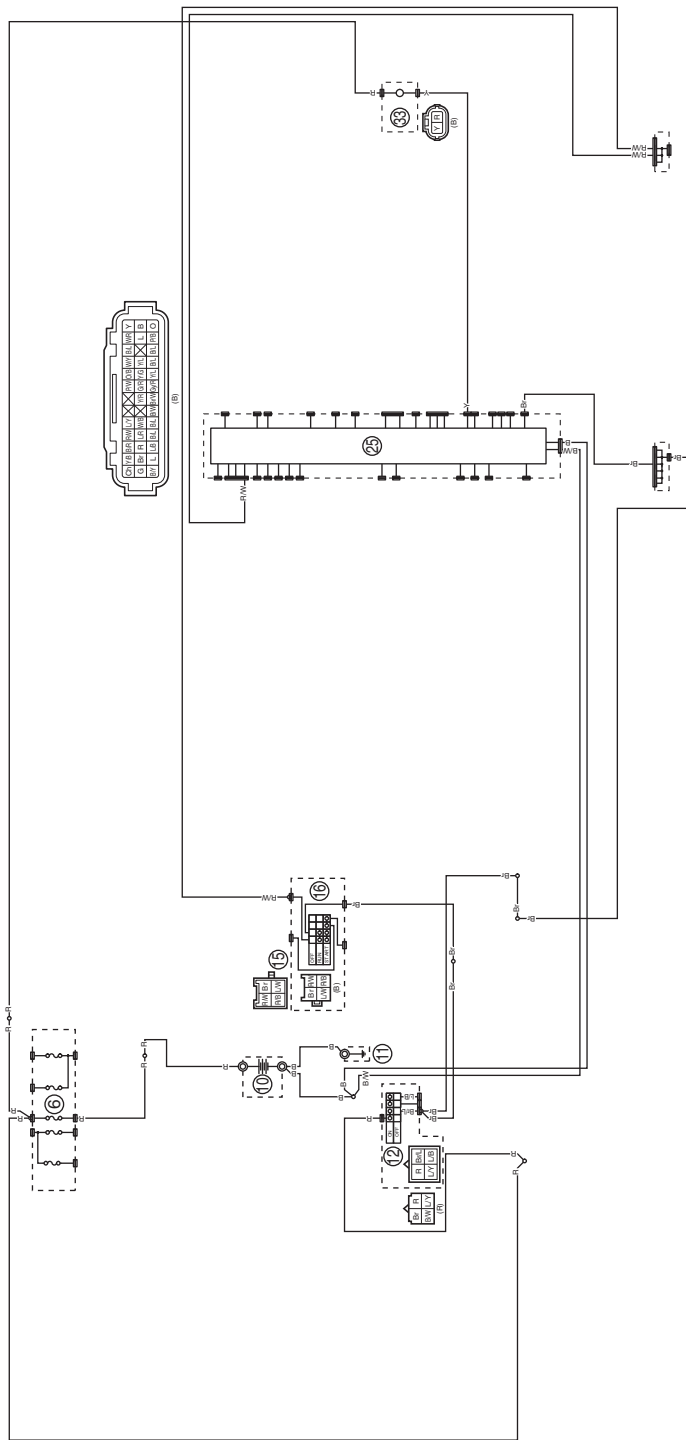
Replace the ECU.

NG →

Properly connect or replace the wiring harness.

EAS20081  
FUEL PUMP SYSTEM

EAS30513  
CIRCUIT DIAGRAM



- 6. Main fuse
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 25. ECU (Engine Control Unit)
- 33. Fuel pump

EAS30514

## TROUBLESHOOTING

If the fuel pump fails to operate.

### TIP

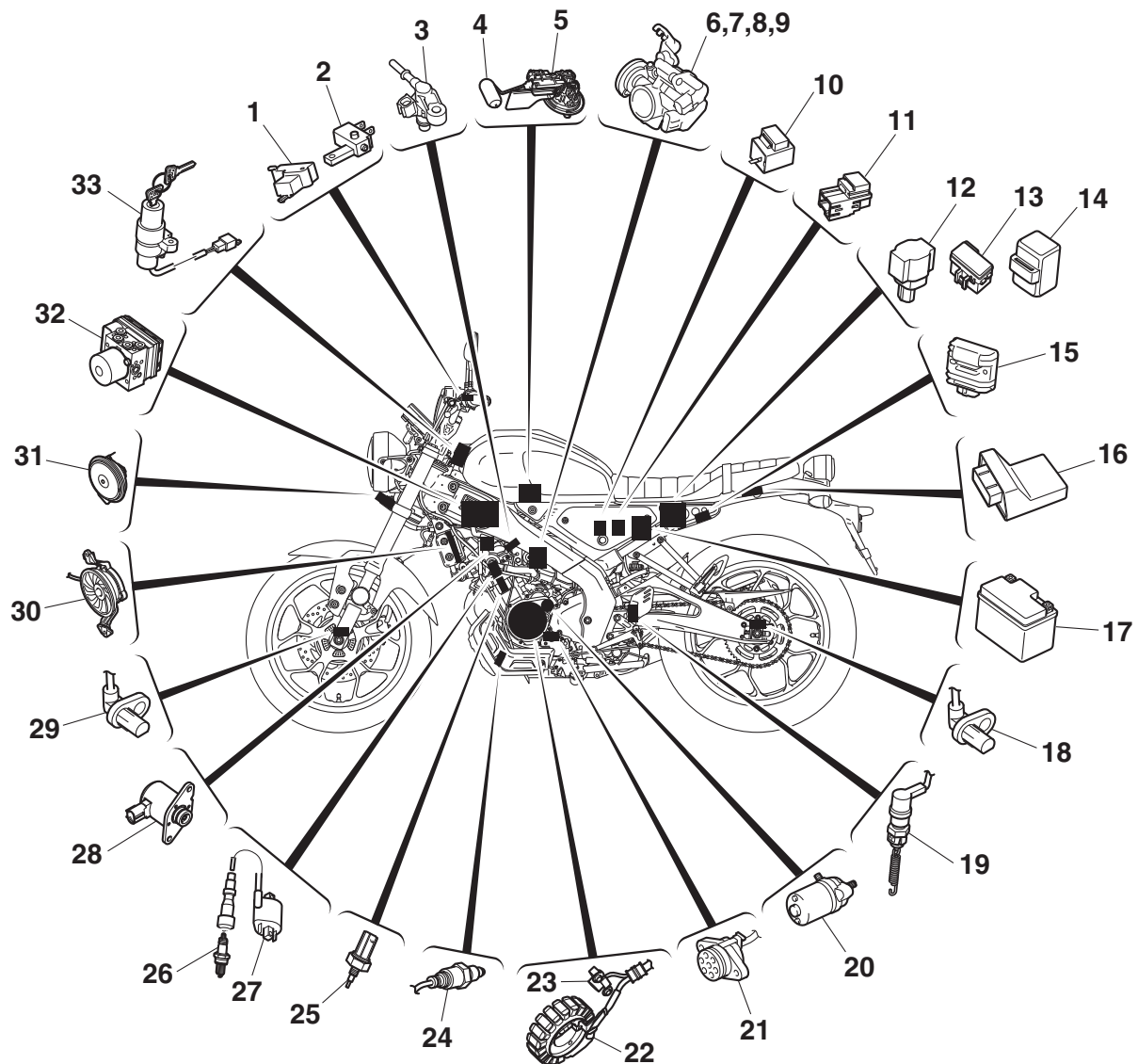
- Before troubleshooting, remove the following part(s):

1. Seat
2. Upper side covers
3. Lower side covers
4. Fuel tank covers
5. Fuel tank
6. Connector cover (front)

|                                                                                          |      |                                                                                                                              |
|------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1. Check the fuse (main).<br>Refer to "CHECKING THE FUSES" on page 8-34.                 | NG → | Replace the fuse.                                                                                                            |
| OK ↓                                                                                     |      |                                                                                                                              |
| 2. Check the battery.<br>Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.      | 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 main switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33.              | NG → | Replace the main switch.                                                                                                     |
| OK ↓                                                                                     |      |                                                                                                                              |
| 4. Check the start/engine stop switch.<br>Refer to "CHECKING THE SWITCHES" on page 8-33. | NG → | Replace the handlebar switch (right).                                                                                        |
| OK ↓                                                                                     |      |                                                                                                                              |
| 5. Check the fuel pump.<br>Refer to "CHECKING THE FUEL PUMP BODY" on page 7-4.           | NG → | Replace the fuel pump assembly.                                                                                              |
| OK ↓                                                                                     |      |                                                                                                                              |
| 6. Check the entire fuel pump system wiring.<br>Refer to "CIRCUIT DIAGRAM" on page 8-29. | NG → | Properly connect or replace the wiring harness.                                                                              |
| OK ↓                                                                                     |      |                                                                                                                              |
| Replace the ECU.                                                                         |      |                                                                                                                              |

EAS20089

## ELECTRICAL COMPONENTS

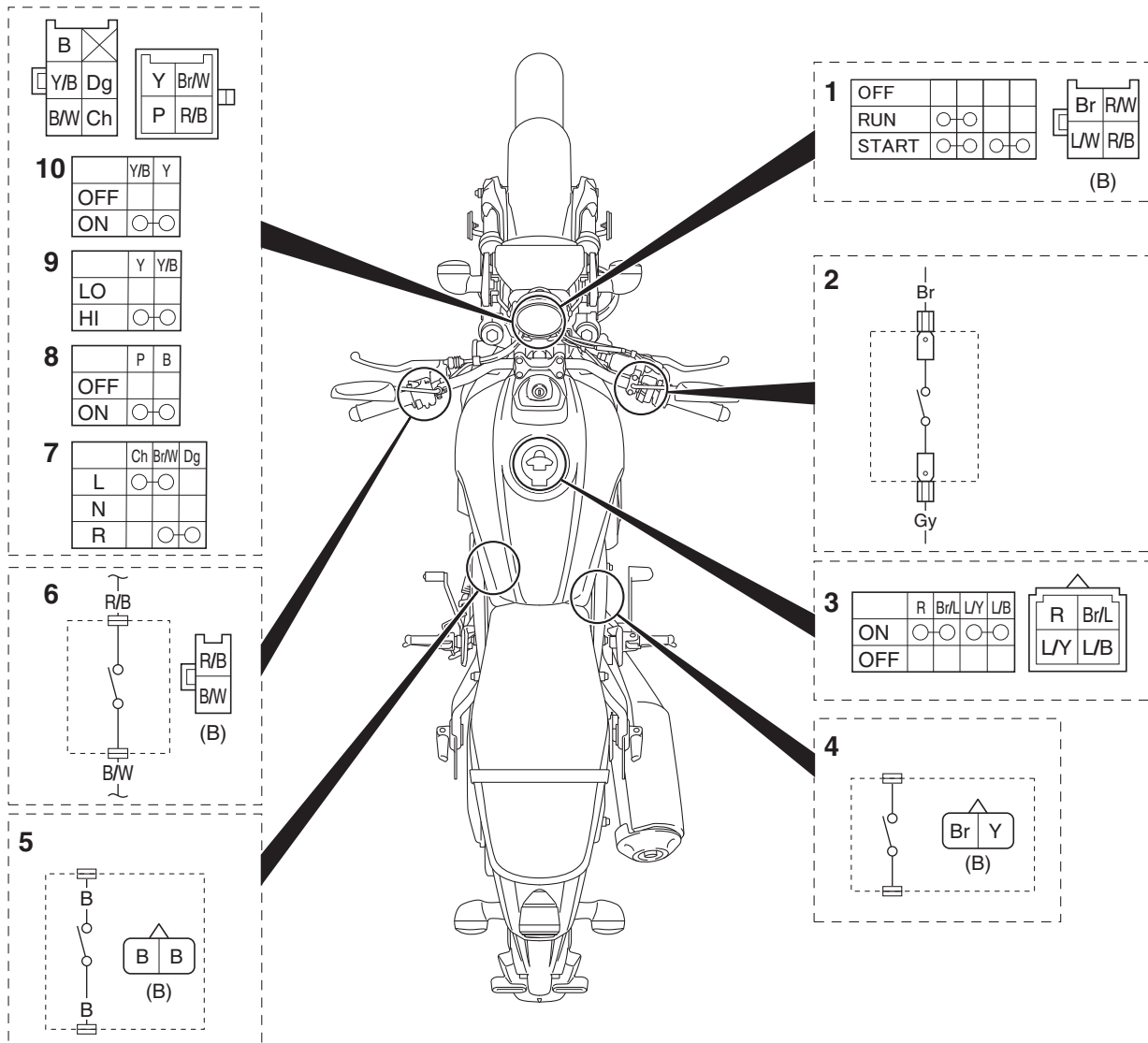


- |                                  |                                            |
|----------------------------------|--------------------------------------------|
| 1. Clutch switch                 | 19. Rear brake light switch                |
| 2. Front brake light switch      | 20. Starter motor                          |
| 3. Fuel injector                 | 21. Gear position switch                   |
| 4. Fuel sender                   | 22. AC magneto                             |
| 5. Fuel pump                     | 23. Crankshaft position sensor             |
| 6. FID (Fast Idle Device)        | 24. O <sub>2</sub> sensor                  |
| 7. Intake air pressure sensor    | 25. Coolant temperature sensor             |
| 8. Intake air temperature sensor | 26. Spark plug                             |
| 9. Throttle position sensor      | 27. Ignition coil                          |
| 10. Turn signal relay            | 28. VVA (variable valve actuator) solenoid |
| 11. Radiator fan motor relay     | 29. Front wheel sensor                     |
| 12. Lean angle sensor            | 30. Radiator fan motor                     |
| 13. Fuse box                     | 31. Horn                                   |
| 14. Starter relay                | 32. Hydraulic unit assembly                |
| 15. Rectifier/regulator          | 33. Main switch                            |
| 16. ECU (Engine Control Unit)    |                                            |
| 17. Battery                      |                                            |
| 18. Rear wheel sensor            |                                            |

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. Start/engine stop switch
2. Front brake light switch
3. Main switch
4. Rear brake light switch
5. Sidestand switch
6. Clutch switch
7. Turn signal switch
8. Horn switch
9. Dimmer switch
10. Pass switch

EAS30551

## CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA20520

### NOTICE

**To avoid a short circuit, always turn the main switch to “OFF” when checking or replacing a fuse.**

1. Remove:
  - 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 tachometer  
YU-A1927**

- b. If there is no continuity, replace the fuse.
3. Replace:
  - Blown fuse
    - a. Set the main switch to “OFF”.
    - b. Install a new fuse of the correct amperage rating.
    - c. Set on the switches to verify if the electrical circuit is operational.
    - d. If the fuse immediately blows again, check the electrical circuit.

| Item             | Amperage rating | Q'ty |
|------------------|-----------------|------|
| Main             | 15 A            | 1    |
| ABS control unit | 2 A             | 1    |
| ABS solenoid     | 15 A            | 1    |
| ABS motor        | 30 A            | 1    |
| Headlight        | 7.5 A           | 1    |
| Spare            | 30 A            | 1    |
| Spare            | 15 A            | 1    |
| Spare            | 7.5 A           | 1    |
| Spare            | 2 A             | 1    |

EWA13310

### WARNING

**Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

**cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

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

EAS31006

## REPLACING THE ECU (Engine Control Unit)

1. Turn the main switch to “OFF”.
2. Replace the ECU (Engine Control Unit).
3. Reset:
  - A/F control learning value  
Use the diagnostic code number “87”.  
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-22.



**Yamaha diagnostic tool USB  
90890-03267  
Yamaha diagnostic tool (A/I)  
90890-03264**

### TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to “YDT” on page 9-2.

4. Check:
  - Engine idling speed  
Start the engine, warm it up, and then measure the engine idling speed.



**Engine idling speed  
1250–1550 r/min**

EAS30552

## CHECKING AND CHARGING THE BATTERY

### TIP

Refer to “CHECKING AND CHARGING THE BATTERY” in “BASIC INFORMATION” (separate volume).

1. Remove:
  - Seat  
Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Disconnect:
  - Battery leads  
(from the battery terminals)

ECA13700

## NOTICE

**First, disconnect the negative battery lead, and then the positive battery lead.**

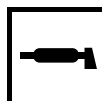
3. Remove:
  - Battery band
  - Battery
 Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
  - Battery charge
5. Charge:
  - Battery
6. Install:
  - Battery
  - Battery band
 Refer to "GENERAL CHASSIS (1)" on page 4-1.
7. Connect:
  - Battery leads  
(to the battery terminals)

ECA26980

## NOTICE

**First, connect the positive battery lead, and then the negative battery lead.**

8. Check:
  - Battery terminals  
Dirt → Clean with a wire brush.  
Loose connection → Connect properly.
9. Lubricate:
  - Battery terminals



**Recommended lubricant**  
**Dielectric grease**

10. Install:
  - Seat
 Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30553

## CHECKING THE RELAYS

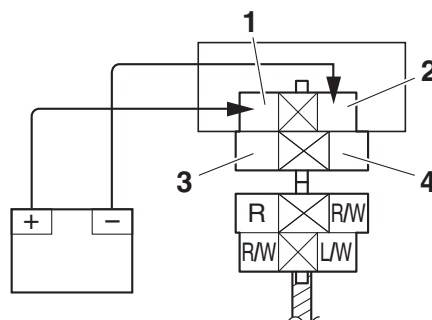
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



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

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown.  
Check the relay operation.  
Out of specification → Replace.

### Starter relay

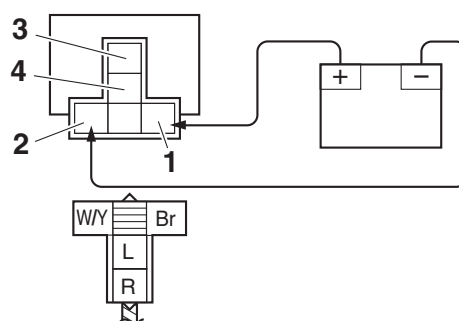


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity**  
**(between "3" and "4")**

### Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



**Result**  
**Continuity**  
**(between "3" and "4")**

EAS30554

## CHECKING THE TURN SIGNAL RELAY

1. Check:
  - Turn signal relay input voltage  
Out of specification → The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.



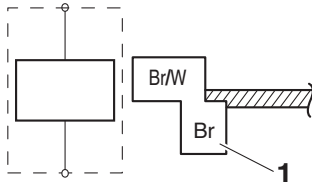
## Turn signal relay input voltage DC 12 V

- Connect the digital circuit tester to the turn signal relay terminal as shown.

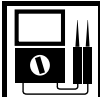


**Digital circuit tester (CD732)**  
90890-03243  
**Model 88 Multimeter with ta-**  
**chometer**  
YU-A1927

- Positive tester probe → brown "1"
- Negative tester probe → ground



- Turn the main switch to "ON".
  - Measure the turn signal relay input voltage.
- Check:
    - Turn signal relay output voltage
 Out of specification → Replace.



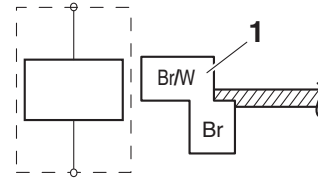
## Turn signal relay output voltage DC 12 V

- Connect the digital circuit tester to the turn signal relay terminal as shown.



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

- Positive tester probe → brown/white "1"
- Negative tester probe → ground



- Set the main switch to "ON".
- Measure the turn signal relay output voltage.

EAS30555

## CHECKING THE DIODES

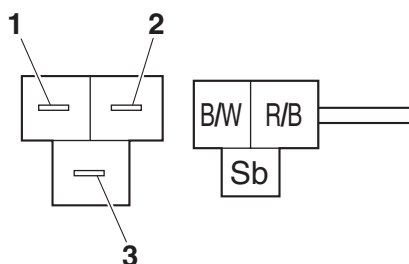
- Check:
  - Diode
 Out of specification → Replace.



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



**Continuity**  
Positive tester probe → red/black "1"  
Negative tester probe → sky blue "3"  
**No continuity**  
Positive tester probe → sky blue "3"  
Negative tester probe → red/black "1"  
**Continuity**  
Positive tester probe → black/white "2"  
Negative tester probe → sky blue "3"  
**No continuity**  
Positive tester probe → sky blue "3"  
Negative tester probe → black/white "2"



- Disconnect the diode from the wire harness.
- Connect the digital circuit tester to the diode terminals as shown.
- Check the diode for continuity.
- Check the diode for no continuity.

EAS30557

## CHECKING THE SPARK PLUG CAP

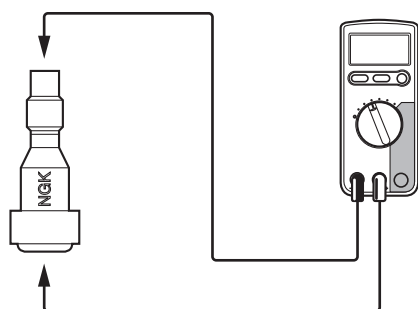
### 1. Check:

- Spark plug cap resistance  
Out of specification → Replace.

**Resistance**  
**3.75–6.25 kΩ**

- Remove the spark plug cap from the spark plug lead.
- Connect the digital circuit tester to the spark plug cap as shown.

**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**



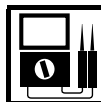
- Measure the spark plug cap resistance.

EAS30558

## CHECKING THE IGNITION COIL

### 1. Check:

- Primary coil resistance  
Out of specification → Replace.



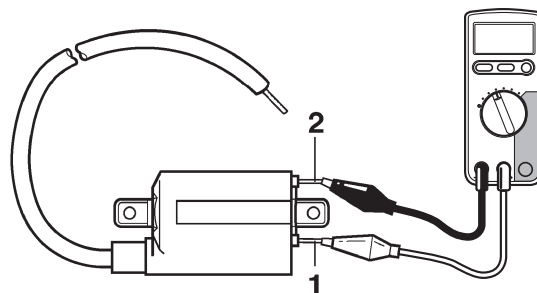
**Primary coil resistance**  
**2.16–2.64 Ω**

- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the digital circuit tester (Ω) to the ignition coil as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → red/white “1” (wire harness color)
- Negative tester probe → orange “2” (wire harness color)



- Measure the primary coil resistance.
- Check:
    - Secondary coil resistance  
Out of specification → Replace.



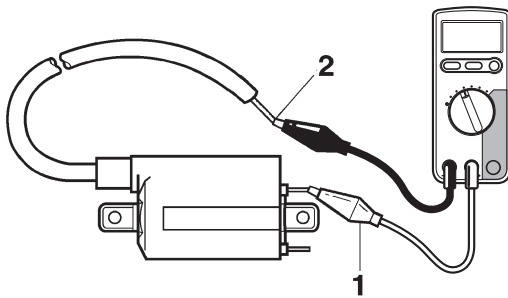
**Secondary coil resistance**  
**8.64–12.96 kΩ**

- Connect the digital circuit tester (Ω) to the ignition coil as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → orange “1” (wire harness color)
- Negative tester probe → spark plug lead “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**  
**6.0 mm (0.24 in)**

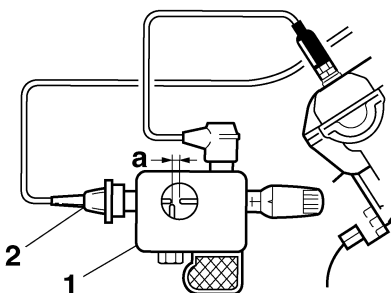
### TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker “1” as shown.



**Ignition checker**  
**90890-06754**  
**Oppama pet-4000 spark checker**  
**YM-34487**



2. Spark plug cap

- Turn the main switch to “ON” and the start/engine stop switch to “○”.
- Measure the ignition spark gap “a”.

- Crank the engine by pushing the start/engine stop switch “⊗” and gradually increase the spark gap until a misfire occurs.

EAS30560

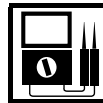
## CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:

- Crankshaft position sensor coupler (from the wire harness)

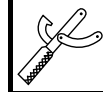
2. Check:

- Crankshaft position sensor resistance  
Out of specification → Replace the crankshaft position sensor/stator assembly.



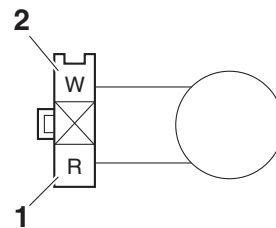
**Crankshaft position sensor resistance**  
**228–342 Ω**

- Connect the digital circuit tester to the crankshaft position sensor coupler as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → red “1”
- Negative tester probe → white “2”



- Measure the crankshaft position sensor resistance.

EAS30561

## CHECKING THE LEAN ANGLE SENSOR

1. Remove:

- Lean angle sensor

2. Check:

- Lean angle sensor output voltage  
Out of specification → Replace.



## Lean angle sensor

**Operating angle**

50 °

**Output voltage up to operating angle**

0.4–1.4 V

**Output voltage over operating angle**

3.7–4.4 V

- Connect the test harness “1” to the lean angle sensor and wire harness as shown.
- Connect the digital circuit tester to the test harness.



## Test harness – lean angle sensor

1PA (3P)

90890-03237

## Test harness – lean angle sensor

1PA (3P)

YU-03237

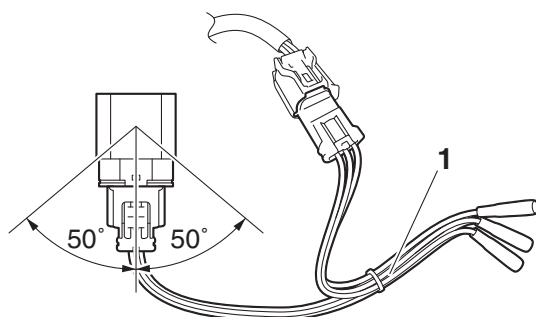
## Digital circuit tester (CD732)

90890-03243

## Model 88 Multimeter with tachometer

YU-A1927

- Positive tester probe → green (test harness color)
- Negative tester probe → black (test harness color)



- Turn the main switch to “ON”.
- Tilt the lean angle sensor to 50°.
- Measure the lean angle sensor output voltage.

EAS30562

## CHECKING THE STARTER MOTOR OPERATION

- Check:
  - Starter motor operation  
Does not operate → Perform the electric starting system troubleshooting, starting with step 4.

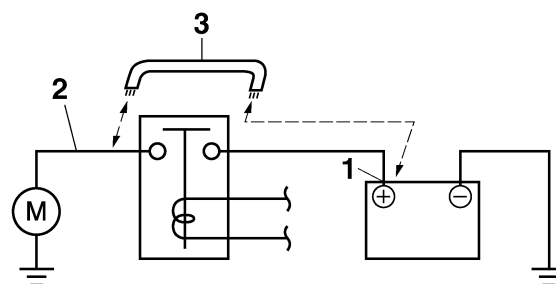
Refer to “TROUBLESHOOTING” on page 8-10.

- 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.



- Check the starter motor operation.

EAS30566

## CHECKING THE STATOR COIL

- Disconnect:
  - Stator coil coupler (from the wire harness)
- Check:
  - Stator coil resistance  
Out of specification → Replace the crankshaft position sensor/stator assembly.



## Stator coil resistance

0.360–0.540 Ω

- Connect the digital circuit tester to the stator coil coupler as shown.



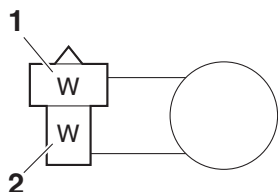
## Digital circuit tester (CD732)

90890-03243

## Model 88 Multimeter with tachometer

YU-A1927

- Positive tester probe → white “1”
- Negative tester probe → white “2”



b. Measure the stator coil resistance.

EAS30680

## CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Rectifier/regulator output voltage  
Out of specification → Replace the rectifier/regulator.



**Rectifier/regulator output voltage**  
**14 V at 5000 r/min**

a. Connect the digital circuit tester to the battery terminals.



**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

b. Start the engine and let it run at approximately 5000 r/min.

c. Measure the charging voltage.

EAS30573

## CHECKING THE FUEL SENDER

1. Remove:

- Fuel pump  
(from the fuel tank)

2. Check:

- Fuel sender resistance  
Out of specification → Replace the fuel sender.



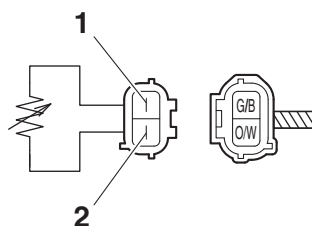
**Sender unit resistance (full)**  
**10.0–14.0 Ω**  
**Sender unit resistance (empty)**  
**267.0–273.0 Ω**

a. Connect the digital circuit tester to the fuel sender coupler as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe → terminal “1”
- Negative tester probe → terminal “2”



b. Move the fuel sender float to the minimum and maximum level positions.

c. Measure the fuel sender resistance.

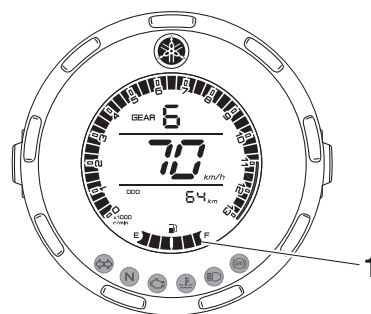
EAS31372

## CHECKING THE FUEL METER

This model is equipped with a self-diagnosis device for the fuel level detection circuit.

1. Check:

- Fuel meter “1”  
(Turn the main switch to “ON”).  
Fuel meter comes on for a few seconds, then goes off → Fuel meter is OK.  
Fuel meter does not come on → Replace the meter assembly.  
Fuel meter flashes eight times, then goes off for 3 seconds in a repeated cycle (malfunction detected in fuel sender) → Replace the fuel pump assembly.



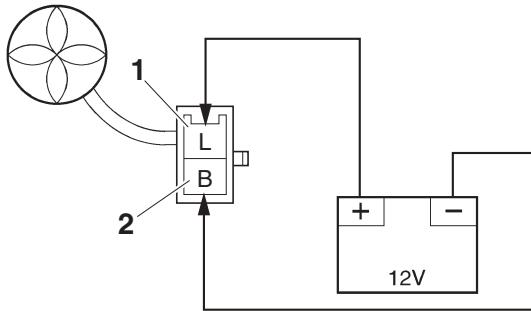
EAS30577

## 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

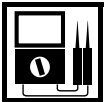
EWA14130

### ⚠ 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**

2513–2777  $\Omega$  at 20 °C (2513–2777  $\Omega$  at 68 °F)

**Coolant temperature sensor resistance**

210–221  $\Omega$  at 100 °C (210–221  $\Omega$  at 212 °F)

a. Connect the digital circuit tester to the coolant temperature sensor terminals as shown.



**Digital circuit tester (CD732)**

90890-03243

**Model 88 Multimeter with tachometer**

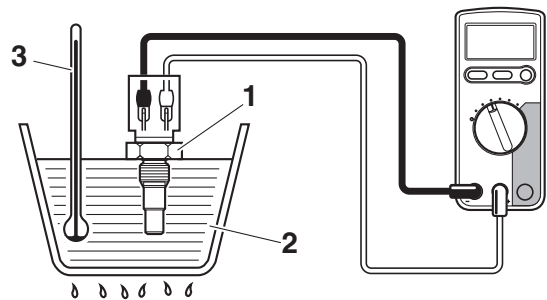
YU-A1927

- b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

### TIP

Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer "3" in the coolant.



- d. Slowly heat the coolant, and then let it cool down to the specified temperature.
- e. Check the coolant temperature sensor resistance.

### 3. Install:

- Coolant temperature sensor



**Coolant temperature sensor**

15 N·m (1.5 kgf·m, 11 lb·ft)

EAS31085

## CHECKING THE FID (FAST IDLE DEVICE)

### 1. Disconnect:

- FID (Fast Idle Device) coupler

### 2. Check:

- FID (Fast Idle Device) resistance
- a. Connect the digital circuit tester to the terminals of the FID (Fast Idle Device).

- Positive tester probe → terminal "1"
- Negative tester probe → terminal "2"



**Digital circuit tester (CD732)**

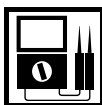
90890-03243

**Model 88 Multimeter with tachometer**

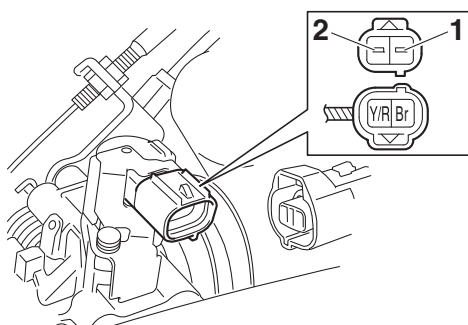
YU-A1927

- b. Measure the FID (Fast Idle Device) resistance.

Out of specification → Replace the throttle body assembly.



**FID (Fast Idle Device) resistance**  
**31.5–38.5  $\Omega$  at 20–30 °C (31.5–38.5  $\Omega$  at 68–86 °F)**

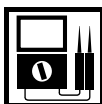


EAS31612

## CHECKING THE VVA SOLENOID

1. Check:

- VVA solenoid resistance  
 Out of specification → Replace.



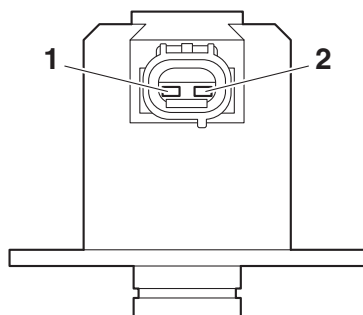
**Resistance**  
**1.8–2.2  $\Omega$  at 20 °C (1.8–2.2  $\Omega$  at 68 °F)**

- Disconnect the VVA solenoid coupler from the VVA solenoid.
- Connect the digital circuit tester to the VVA solenoid terminal as shown.



**Digital circuit tester (CD732)**  
**90890-03243**  
**Model 88 Multimeter with tachometer**  
**YU-A1927**

- Positive tester probe  
 Solenoid terminal “1”
- Negative tester probe  
 Solenoid terminal “2”



c. Measure the VVA solenoid resistance.

EAS31088

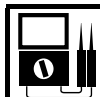
## CHECKING THE GEAR POSITION SWITCH

1. 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**

**Switch terminal “a”**

**Negative tester probe**

**sky blue “1”**

**1st position**

**Continuity**

**Positive tester probe**

**Switch terminal “b”**

**Negative tester probe**

**white “2”**

**2nd position**

**Continuity**

**Positive tester probe**

**Switch terminal “c”**

**Negative tester probe**

**pink “3”**

**3rd position**

**Continuity**

**Positive tester probe**

**Switch terminal “d”**

**Negative tester probe**

**yellow/white “4”**

**4th position**

**Continuity**

**Positive tester probe**

**Switch terminal “e”**

**Negative tester probe**

**white/red “5”**

**5th position**

**Continuity**

**Positive tester probe**

**Switch terminal “f”**

**Negative tester probe**

**orange “6”**

**6th position**

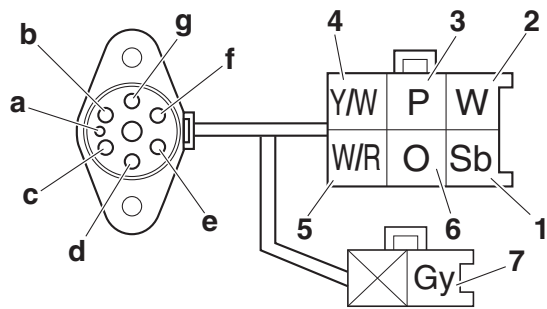
**Continuity**

**Positive tester probe**

**Switch terminal “g”**

**Negative tester probe**

**gray “7”**



EAS30681

## CHECKING THE FUEL INJECTOR

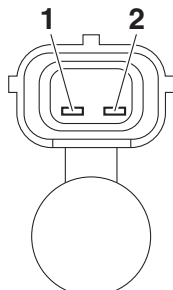
1. Remove:
  - Fuel injector
 Refer to “THROTTLE BODY” on page 7-7.
2. Check:
  - Fuel injector resistance
 Out of specification → Replace the fuel injector.

|                                                                                   |                                    |
|-----------------------------------------------------------------------------------|------------------------------------|
|  | <b>Resistance</b><br><b>12.2 Ω</b> |
|-----------------------------------------------------------------------------------|------------------------------------|

- a. Disconnect the fuel injector coupler from the fuel injector.
- b. Connect the digital circuit tester to the fuel injector coupler as shown.

|                                                                                     |                                                                                                                              |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Digital circuit tester (CD732)</b><br><b>90890-03243</b><br><b>Model 88 Multimeter with tachometer</b><br><b>YU-A1927</b> |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|

- Positive tester probe  
Fuel injector terminal “1”
- Negative tester probe  
Fuel injector terminal “2”



- c. Measure the fuel injector resistance.

---

## SELF DIAGNOSTIC

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| <b>56_ABS</b> .....     | 9-174 |
| TROUBLESHOOTING .....   | 9-174 |
| <b>63_ABS</b> .....     | 9-175 |
| TROUBLESHOOTING .....   | 9-175 |
| <b>64_ABS</b> .....     | 9-177 |
| TROUBLESHOOTING .....   | 9-177 |

EAS20437

## SELF-DIAGNOSTIC FUNCTION

EAS33142

### GLOSSARY

| Word                                             | Description                                                                                                                                                                                   |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MIL<br>(Malfunction indicator light)             | MIL is an indicator light that comes on when a control unit determines a malfunction.                                                                                                         |
| DTC<br>(Diagnostic trouble code)                 | DTC is a code that is saved within a control unit's memory when the control unit determines a malfunction.                                                                                    |
| Pending DTC<br>(Pending diagnostic trouble code) | Pending DTC is a code that is saved within a control unit's memory when the control unit detects an abnormal condition. If the abnormal condition continues, a malfunction may be determined. |
| Driving cycle                                    | Driving cycle is the duration from the main switch being turned on, OBD requirements are met, and until the main switch is turned off.                                                        |
| FFD<br>(Freeze frame data)                       | FFD is the data of all signal sensors saved at the moment a malfunction is determined.                                                                                                        |
| Current malfunction                              | A DTC for an unrecovered, current malfunction.                                                                                                                                                |
| Recovered malfunction                            | A DTC for a previously determined but now recovered malfunction.                                                                                                                              |
| Pending abnormality                              | Abnormal condition that is detected but not yet determined to be a malfunction.                                                                                                               |
| Threshold                                        | Threshold is a point set to detect if the output from sensors are abnormal or not.                                                                                                            |
| OBD<br>(On-board diagnostics)                    | Self-diagnostic system is equipped in a control unit for the emission control system.                                                                                                         |
| GST<br>(Generic scan tool)                       | Generic diagnostic tool that complies with OBD standards.                                                                                                                                     |
| YDT<br>(Yamaha diagnostic tool)                  | Diagnostic tool developed especially for Yamaha vehicles.                                                                                                                                     |

EAS32858

### OUTLINE

The control unit is equipped with a self-diagnostic function in order to ensure that the system is operating normally. If this function detects a malfunction in the system, it immediately operates the system under substitute characteristics and illuminates the warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a DTC is stored in the memory of the control unit.

EAS32859

### CHECKING THE WARNING LIGHT

The warning light comes on after the main switch has been set to "ON". Refer to the following table for lighting up time.

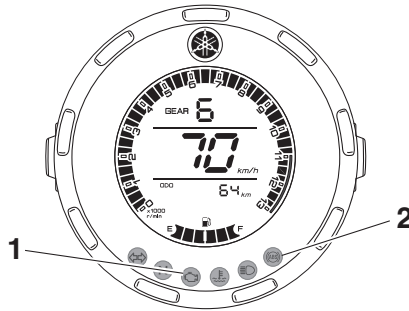
If the warning light still comes on, refer to a check item of a troubleshooting of each system, check and repair it. If the warning light does not come on, the warning light (LED) may be defective.

#### TIP

- This engine equips self-diagnostic function. It's controlled delicately for detecting defective and malfunction of the exhaust emission control system. Therefore, the vehicle modifying, poor maintenance, and improper using of the vehicle may also become the cause of the MIL come on. These events may cause the occurrence of the warning light coming on without malfunction.
- Reprogramming of the ECU software.
- Using the electrical accessory which may affect the ECU.

## SELF-DIAGNOSTIC FUNCTION

- Using the incorrect specification of spark plug and fuel injector. Using the third party accessories such as exhaust system.
- Change of specifications of drive chain, sprocket, wheel and tire.
- Removing or modifying the O<sub>2</sub> sensor, the exhaust system part (catalyst, etc.).
- Poor maintenance of the drive chain and tire air pressure.
- Incorrect brake pedal height, rear brake dragging.
- Excessive opening and closing of the throttle grip, frequently used of burnout, wheelie and half clutch.
- Air mixture by fuel supply badness.



| System                       | Lighting up warning light | Lighting time |
|------------------------------|---------------------------|---------------|
| FUEL INJECTION SYSTEM        | MIL "1"                   | 2.0 seconds*1 |
| ABS (Anti-lock Brake System) | ABS warning light "2"     | *2            |

### TIP

\*1: If the MIL flashed, refer to "COPE WITH THE MIL FLASHING" on page 9-3.

\*2: The ABS warning light goes off when the vehicle is judged to normal with running.

EAS32806

### YDT

This model uses the YDT to identify malfunctions.

For information about using the YDT, refer to the operation manual that is included with the tool.



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03264**

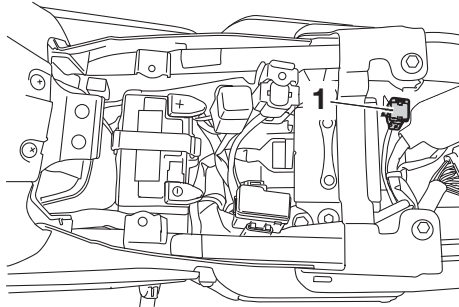
### TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.
- A GST can also be used to identify malfunctions.

# SELF-DIAGNOSTIC FUNCTION

## Connecting the YDT

Remove the protective cap, and then connect the YDT to the coupler “1”.



EAS32864

## 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
- AC magneto
- Fuel injector
- Fuel pump
- Ignition coil
- VVA (variable valve actuator) solenoid
- Coolant temperature sensor
- Throttle body sensor assembly
- O<sub>2</sub> sensor
- ABS ECU
- Sidestand switch
- Headlight
- Meter assembly
- Rectifier/regulator
- Lean angle sensor
- Radiator fan motor relay
- FID (Fast Idle Device)

EAS32918

## PARTS CONNECTED TO THE ABS ECU

The following parts are connected to the hydraulic unit assembly (ABS ECU).

When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Meter assembly
- ECU (Engine Control Unit)
- Front wheel sensor
- Rear wheel sensor
- Front brake light switch
- Rear brake light switch
- Tail/brake light

EAS33137

## PRECAUTIONS FOR ROAD TEST

EWA20860



**When test riding the vehicle, always comply with local traffic regulations.**

EAS33283

## COPE WITH THE MIL FLASHING

With the vehicle is running, the MIL flashes by the process of the misfire (P0301) detection procedure but no DTC is sometimes stored. In this case, question the customer about the conditions when the problem occurred, and do the troubleshooting.

Refer to “P0301” on page 9-90.

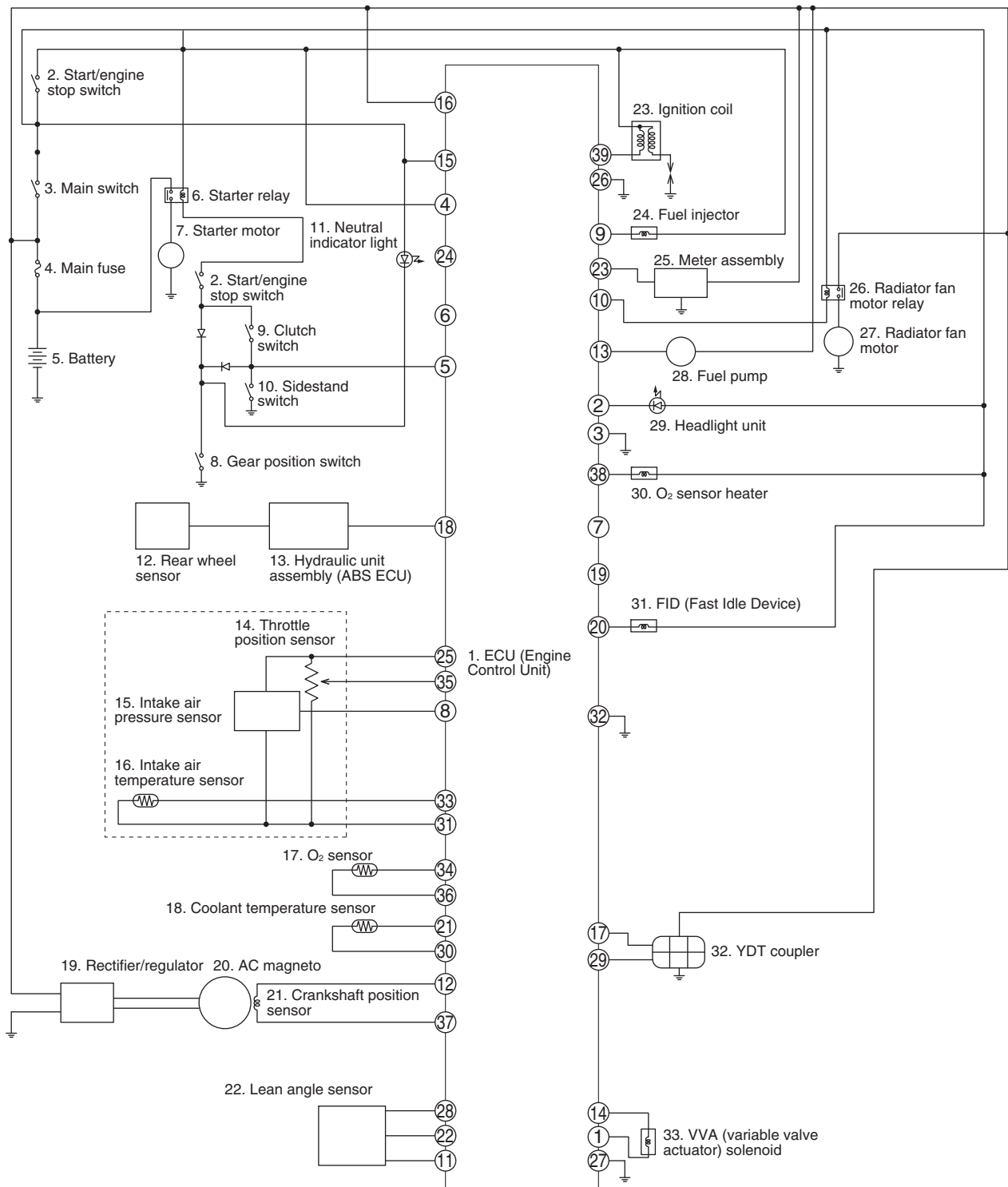


EAS20387

## SYSTEM DIAGRAM

EAS32920

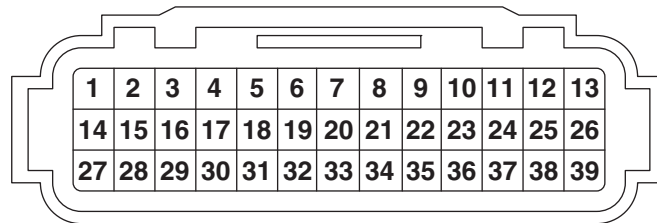
## ECU CIRCUIT DIAGRAM



1. ECU (Engine Control Unit)
2. Start/engine stop switch
3. Main switch
4. Main fuse
5. Battery
6. Starter relay
7. Starter motor
8. Gear position switch
9. Clutch switch
10. Sidestand switch
11. Neutral indicator light
12. Rear wheel sensor
13. Hydraulic unit assembly (ABS ECU)
14. Throttle position sensor
15. Intake air pressure sensor
16. Intake air temperature sensor
17. O<sub>2</sub> sensor
18. Coolant temperature sensor
19. Rectifier/regulator
20. AC magneto
21. Crankshaft position sensor
22. Lean angle sensor
23. Ignition coil
24. Fuel injector
25. Meter assembly
26. Radiator fan motor relay
27. Radiator fan motor
28. Fuel pump
29. Headlight unit
30. O<sub>2</sub> sensor heater
31. FID (Fast Idle Device)
32. YDT coupler
33. VVA (variable valve actuator) solenoid

EAS33369

## ECU COUPLER LAYOUT



| No. | Connected parts                                              | Wire harness color |
|-----|--------------------------------------------------------------|--------------------|
| 1   | VVA (variable valve actuator) solenoid                       | Ch                 |
| 2   | Headlight                                                    | Y/B                |
| 3   | Ground                                                       | B/R                |
| 4   | Handlebar switch (right), ignition coil, fuel injector       | R/W                |
| 5   | Sidestand switch, clutch switch, diode, gear position switch | L/Y                |
| 6   | —                                                            | —                  |
| 7   | —                                                            | —                  |
| 8   | Intake air pressure sensor                                   | P/W                |
| 9   | Fuel injector                                                | O/B                |
| 10  | Radiator fan motor relay                                     | W/Y                |
| 11  | Lean angle sensor                                            | B/L                |
| 12  | Crankshaft position sensor                                   | W/R                |
| 13  | Fuel pump                                                    | Y                  |
| 14  | VVA (variable valve actuator) solenoid                       | G                  |
| 15  | Main switch                                                  | Br                 |
| 16  | Main fuse                                                    | R                  |
| 17  | CAN communication circuit                                    | L/R                |
| 18  | Hydraulic unit assembly (ABS ECU)                            | W/B                |
| 19  | —                                                            | —                  |
| 20  | FID (Fast Idle Device)                                       | Y/R                |
| 21  | Coolant temperature sensor                                   | G/R                |
| 22  | Lean angle sensor                                            | Y/G                |
| 23  | Meter assembly                                               | Y/L                |
| 24  | —                                                            | —                  |

| No. | Connected parts               | Wire harness color |
|-----|-------------------------------|--------------------|
| 25  | Throttle body sensor assembly | L                  |
| 26  | Ground                        | B                  |
| 27  | Ground                        | B/Y                |
| 28  | Lean angle sensor             | L                  |
| 29  | CAN communication circuit     | L/B                |
| 30  | Coolant temperature sensor    | B/L                |
| 31  | Throttle body sensor assembly | B/L                |
| 32  | Ground                        | B/W                |
| 33  | Intake air temperature sensor | Br/W               |
| 34  | O <sub>2</sub> sensor         | Gy/R               |
| 35  | Throttle position sensor      | Y/L                |
| 36  | O <sub>2</sub> sensor         | B/L                |
| 37  | Crankshaft position sensor    | B/L                |
| 38  | O <sub>2</sub> sensor         | P/B                |
| 39  | Ignition coil                 | O                  |



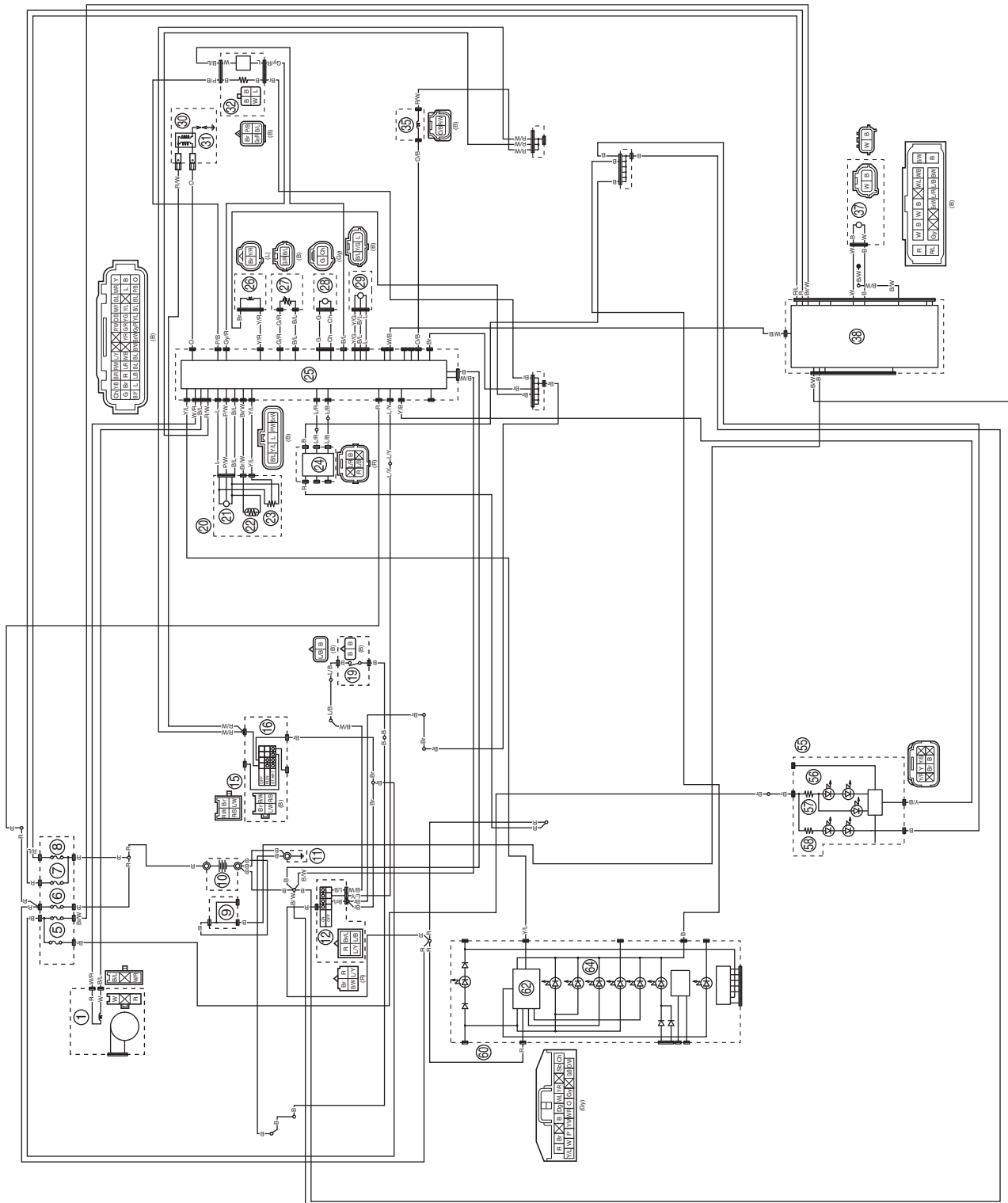
## FUEL INJECTION SYSTEM

EAS20440

## FUEL INJECTION SYSTEM

EAS32871

## CIRCUIT DIAGRAM



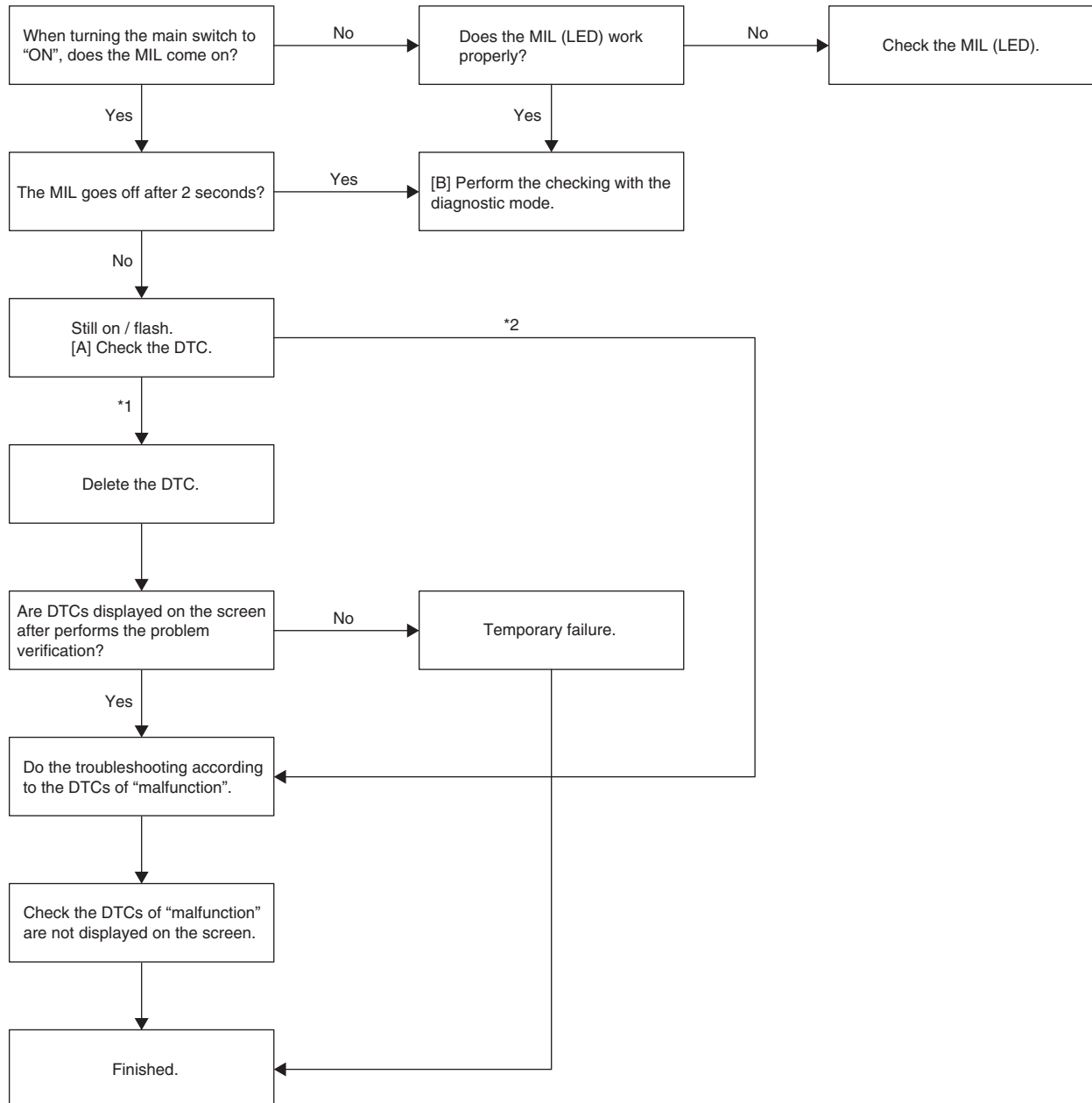
1. Crankshaft position sensor
5. ABS control unit fuse
6. Main fuse
7. ABS solenoid fuse
8. ABS motor fuse
9. Engine ground lead terminal
10. Battery
11. Engine ground
12. Main switch
15. Handlebar switch (right)
16. Start/engine stop switch
19. Sidestand switch
20. Throttle body sensor assembly
21. Intake air pressure sensor
22. Intake air temperature sensor
23. Throttle position sensor
24. YDT coupler
25. ECU (Engine Control Unit)
26. FID (Fast Idle Device)
27. Coolant temperature sensor
28. VVA (variable valve actuator) solenoid
29. Lean angle sensor
30. Ignition coil
31. Spark plug
32. O<sub>2</sub> sensor
35. Fuel injector
37. Rear wheel sensor
38. ABS ECU
55. Headlight unit
56. Headlight (high beam)
57. Headlight (low beam)
58. Auxiliary light
60. Meter assembly
62. Multi-function meter
64. Malfunction indicator light

EAS32917

## BASIC PROCESS FOR TROUBLESHOOTING

This section describes the basic process about fuel injection system troubleshooting.

But because a work procedure varies depending to symptom and DTC, check and repair it according to applicable troubleshooting.



\*1. For P0133, P0301

\*2. For except P0133, P0301

# FUEL INJECTION SYSTEM

EAS33147

## **[A] THE MIL COMES ON/FLASHES AND ENGINE OPERATION IS NOT NORMAL**

1. Check the DTC of “malfunction” using the YDT.
2. Check and repair the malfunction according to applicable DTC troubleshooting.
3. Turn the main switch from “OFF” to “ON”, and then check the DTC of “malfunction” is not displayed.

### **TIP**

- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
- Turning the main switch to “OFF” will not erase the malfunction history.

EAS33148

## **[B] THE MIL DOES NOT COME ON, BUT THE ENGINE OPERATION IS NOT NORMAL**

1. Monitor the operation of these sensors and actuators by using the YDT in the diagnostic mode.  
Refer to “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-39 and “DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE” on page 9-40.

|                                                      |
|------------------------------------------------------|
| 01: Throttle position sensor signal (throttle angle) |
| 30: Ignition coil                                    |
| 36: Fuel injector                                    |

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

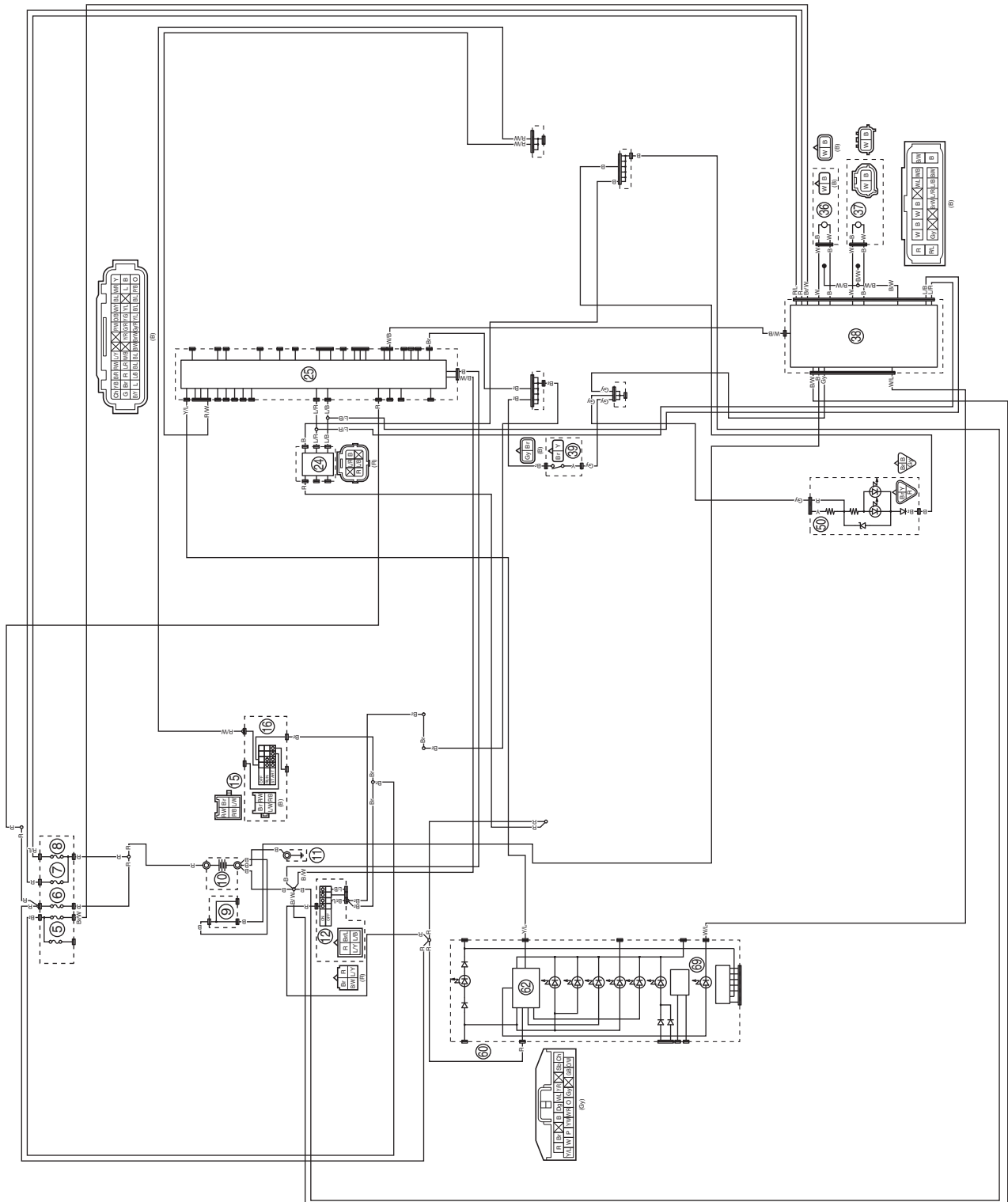
# ABS (Anti-lock Brake System)

EAS20443

## ABS (Anti-lock Brake System)

EAS32890

### CIRCUIT DIAGRAM



## ABS (Anti-lock Brake System)

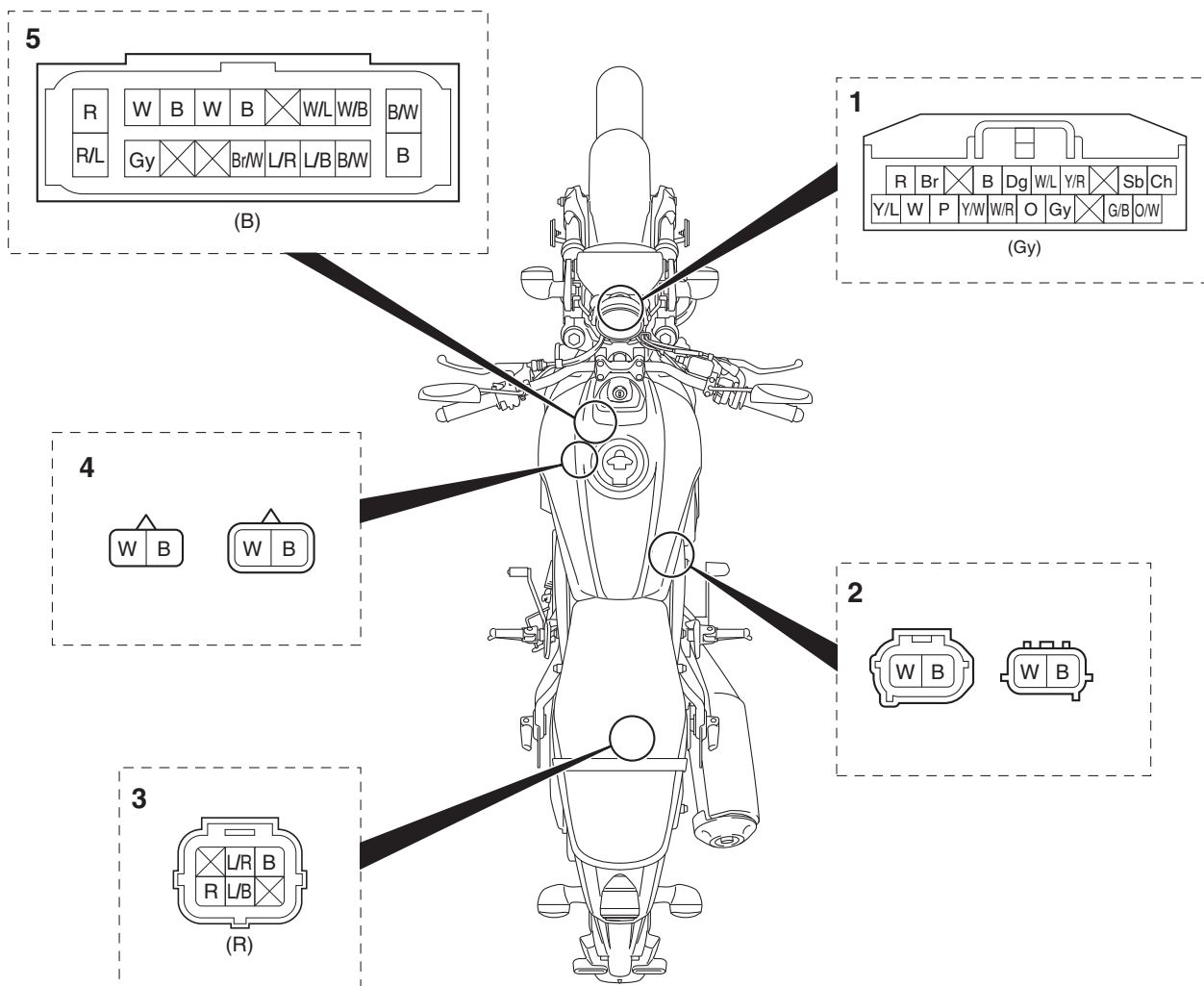
---

- 5. ABS control unit fuse
- 6. Main fuse
- 7. ABS solenoid fuse
- 8. ABS motor fuse
- 9. Engine ground lead terminal
- 10. Battery
- 11. Engine ground
- 12. Main switch
- 15. Handlebar switch (right)
- 16. Start/engine stop switch
- 24. YDT coupler
- 25. ECU (Engine Control Unit)
- 36. Front wheel sensor
- 37. Rear wheel sensor
- 38. ABS ECU
- 39. Rear brake light switch
- 50. Tail/brake light
- 60. Meter assembly
- 62. Multi-function meter
- 69. ABS warning light

# ABS (Anti-lock Brake System)

EAS32892

## ABS COUPLER LOCATION CHART



1. Meter assembly coupler
2. Rear wheel sensor coupler
3. YDT coupler
4. Front wheel sensor coupler
5. ABS ECU coupler

EAS32893

## MAINTENANCE OF THE ABS ECU

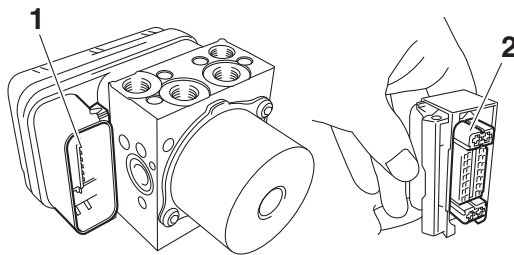
### Checking the ABS ECU

#### 1. Check:

- Terminals “1” of the hydraulic unit assembly (ABS ECU)  
Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.
- Terminals “2” of the ABS ECU coupler  
Connection defective, contaminated, come-off → Correct or clean.

#### TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS33284

## ABS TROUBLESHOOTING OUTLINE

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 9-21.

### 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 9-17.

### Self-diagnosis with 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 YDT when the ABS ECU has entered the self-diagnosis mode.

# ABS (Anti-lock Brake System)

---

## 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 under the fuel tank, 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.

---

## Special precautions for handling and servicing a vehicle equipped with ABS

ECA17620

### NOTICE

**Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.**

---

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
  - The malfunction history is stored in the memory of the ABS ECU. Delete the DTC when the service is finished. (This is because the past DTC will be displayed again if another malfunction occurs.)
- 

EAS32895

## BASIC INSTRUCTIONS FOR TROUBLESHOOTING

1. Check the DTC of "malfunction" using the YDT.
2. Check and repair the malfunction according to applicable DTC troubleshooting.
3. Turn the main switch from "OFF" to "ON", and then check the DTC of "malfunction" is not displayed.

## TIP

- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
  - Turning the main switch to "OFF" will not erase the malfunction history.
- 

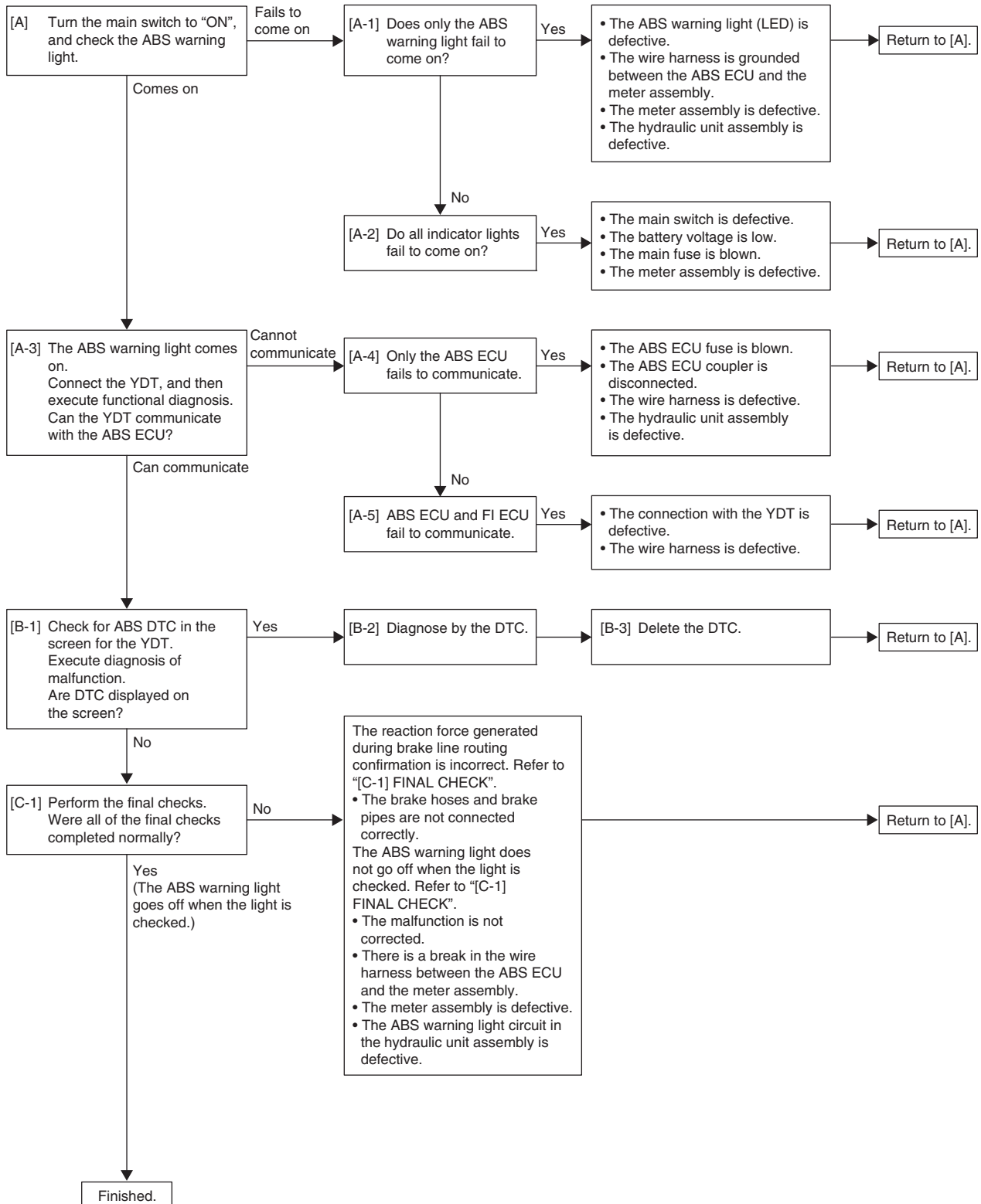
4. Do the final check.

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.**
-

# ABS (Anti-lock Brake System)



# ABS (Anti-lock Brake System)

---

EAS32897

## **[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]

EAS32898

## **[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON**

1. Check for a short circuit to the ground between the white/blue terminal of the ABS ECU coupler and white/blue terminal of the meter assembly.
  - If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
  - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
  - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS32899

## **[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 8-33.
  - 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 8-34.
  - 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 8-34.
  - If the main fuse is blown, replace the fuse.
4. Circuit
  - Check the meter assembly circuit.  
Refer to "CIRCUIT DIAGRAM" on page 9-13.
  - If the meter assembly circuit is open, replace the wire harness.

EAS32900

## **[A-3] THE ABS WARNING LIGHT COMES ON**

Connect the YDT to the YDT 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.)

EAS32901

## **[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 8-34.
  - If the ABS control unit fuse is blown, replace the fuse.

# ABS (Anti-lock Brake System)

## 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 4-42.

## 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 terminal of the main switch coupler and brown/white terminal of the ABS ECU coupler.

Check for continuity between black/white terminal of the ABS ECU coupler and the ground.

If there is no continuity, the wire harness is defective. Replace the wire harness.

- Open circuit in the wire harness between the ABS ECU coupler and the YDT coupler. Check for continuity between blue/red terminal of the ABS ECU coupler and blue/red terminal of the YDT coupler. (CANH)  
Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the YDT coupler. (CANL)

## 4. ABS ECU malfunction

Replace the hydraulic unit assembly.

EAS32902

### [A-5] ABS ECU AND FI ECU FAIL TO COMMUNICATE

#### 1. YDT

Check that the YDT is properly connected.

#### 2. Wire harness

- Open circuit in the wire harness between the ABS ECU coupler and the YDT coupler. Check for continuity between blue/red terminal of the ABS ECU coupler and blue/red terminal of the YDT coupler. (CANH)  
Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the YDT coupler. (CANL)

EAS32903

### [B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the YDT is connected to the YDT coupler, the DTC will be displayed on the computer screen.

- A DTC is displayed. [B-2]
- A DTC is not displayed. [C-1]

EAS32904

### [B-2] DIAGNOSIS USING THE DTC

This model uses the YDT to identify malfunctions.

For information about using the YDT, refer to the operation manual that is included with the tool.



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03264**

#### TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Details about the displayed DTCs are shown in the following chart. Refer to this chart and check the vehicle.

Once all the work is complete, delete the DTCs. [B-3]

#### TIP

Do the final check after terminating the connection with the YDT and turning the main switch off. [C-1]

# ABS (Anti-lock Brake System)

EAS33339

## [B-3] DELETING THE DTC

To delete the DTCs, use the YDT. For information about deleting the DTCs, refer to the operation manual of the YDT.

Check that all the displayed DTCs are deleted.



**Yamaha diagnostic tool USB**  
**90890-03267**  
**Yamaha diagnostic tool (A/I)**  
**90890-03264**

### TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

EAS32905

## [C-1] FINAL CHECK

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.**

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 front brake master cylinder reservoir and the rear brake master cylinder reservoir.  
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-9.
2. Check the wheel sensors for proper installation.  
Refer to "INSTALLING THE FRONT WHEEL" on page 4-12 and "INSTALLING THE REAR WHEEL (REAR BRAKE DISC)" on page 4-17.
3. Perform brake line routing confirmation.  
Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-44.  
If it does not have reaction-force properly, the brake hose is not properly routed or connected.
4. Delete the DTC.  
Refer to "[B-3] DELETING THE DTC" on page 9-21.
5. Checking the ABS warning light.  
Confirm the ABS warning light go off.  
If the ABS warning light does not come on or does not go off, refer to "[A] CHECKING THE ABS WARNING LIGHT" on page 9-19.  
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 white/blue terminal of the ABS ECU coupler and white/blue terminal of the meter assembly coupler.
  - Malfunction in the meter assembly circuit.
  - Malfunction in the ABS warning light circuit in the hydraulic unit assembly.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS20551

## SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33149

### DTC TABLE

| DTC          | Symptom                                                                                                                                                               | Fail-safe system    |                     | Diagnostic code |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|
|              |                                                                                                                                                                       | Starting the engine | Driving the vehicle |                 |
| "11, 25_ABS" | Front wheel sensor (intermittent pulses or no pulses)                                                                                                                 | —                   | —                   | —               |
| "12_ABS"     | Rear wheel sensor (intermittent pulses or no pulses)                                                                                                                  | —                   | —                   | —               |
| "13, 26_ABS" | Front wheel sensor (abnormal pulse period)                                                                                                                            | —                   | —                   | —               |
| "14, 27_ABS" | Rear wheel sensor (abnormal pulse period)                                                                                                                             | —                   | —                   | —               |
| "15_ABS"     | Front wheel sensor (open or short circuit)                                                                                                                            | —                   | —                   | —               |
| "16_ABS"     | Rear wheel sensor (open or short circuit)                                                                                                                             | —                   | —                   | —               |
| "17, 45_ABS" | Front wheel sensor (missing pulses)                                                                                                                                   | —                   | —                   | —               |
| "18, 46_ABS" | Rear wheel sensor (missing pulses)                                                                                                                                    | —                   | —                   | —               |
| "21_ABS"     | Hydraulic unit assembly (defective solenoid drive circuit)                                                                                                            | —                   | —                   | —               |
| "24_ABS"     | Brake light switch or tail/brake light                                                                                                                                | —                   | —                   | —               |
| "31_ABS"     | Hydraulic unit assembly (defective ABS solenoid power circuit)                                                                                                        | —                   | —                   | —               |
| "32_ABS"     | Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)                                                                                          | —                   | —                   | —               |
| "33_ABS"     | Hydraulic unit assembly (abnormal ABS motor power supply)                                                                                                             | —                   | —                   | —               |
| "34_ABS"     | Hydraulic unit assembly (short circuit in ABS motor power supply circuit)                                                                                             | —                   | —                   | —               |
| "41_ABS"     | Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)                                                                                       | —                   | —                   | —               |
| "42, 47_ABS" | Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)                                                                                        | —                   | —                   | —               |
| "43_ABS"     | Front wheel sensor (missing pulses)                                                                                                                                   | —                   | —                   | —               |
| "44_ABS"     | Rear wheel sensor (missing pulses)                                                                                                                                    | —                   | —                   | —               |
| "51, 52_ABS" | [51_ABS] Vehicle system power supply (voltage of ABS ECU power supply is high)<br>[52_ABS] Vehicle system power supply (voltage of wheel sensor power supply is high) | —                   | —                   | —               |
| "53_ABS"     | Vehicle system power supply (voltage of ABS ECU power supply is low)                                                                                                  | —                   | —                   | —               |
| "54_ABS"     | Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)                                                                                  | —                   | —                   | —               |
| "55_ABS"     | Hydraulic unit assembly (defective ABS ECU)                                                                                                                           | —                   | —                   | —               |
| "56_ABS"     | Hydraulic unit assembly (abnormal internal power supply)                                                                                                              | —                   | —                   | —               |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Symptom                                                                                                                                               | Fail-safe system    |                     | Diagnostic code |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|
|                |                                                                                                                                                       | Starting the engine | Driving the vehicle |                 |
| "63_ABS"       | Front wheel sensor power supply (voltage of power supply is low)                                                                                      | —                   | —                   | —               |
| "64_ABS"       | Rear wheel sensor power supply (voltage of power supply is low)                                                                                       | —                   | —                   | —               |
| "P0030"        | O <sub>2</sub> sensor heater: defective heater controller detected.                                                                                   | Able                | Able                | —               |
| "P00D1, P2195" | [P00D1] O <sub>2</sub> sensor: heater performance deterioration.<br>[P2195] O <sub>2</sub> sensor: open circuit detected.                             | Able                | Able                | —               |
| "P0105"        | Intake air pressure sensor: signal out of range                                                                                                       | Able                | Able                | 03              |
| "P0106"        | Intake air pressure sensor: clogging of hose or sensor disconnection                                                                                  | Able                | Able                | 03              |
| "P0107, P0108" | [P0107] Intake air pressure sensor: open or ground short circuit detected.<br>[P0108] Intake air pressure sensor: power short circuit detected.       | Able                | Able                | 03              |
| "P0110"        | Intake air temperature sensor: signal stuck                                                                                                           | Able                | Able                | —               |
| "P0111"        | Intake air temperature sensor: signal out of range                                                                                                    | Able                | Able                | 05              |
| "P0112, P0113" | [P0112] Intake air temperature sensor: ground short circuit detected.<br>[P0113] Intake air temperature sensor: open or power short circuit detected. | Able                | Able                | 05              |
| "P0115"        | Coolant temperature sensor: signal stuck                                                                                                              | Able                | Able                | —               |
| "P0116"        | Coolant temperature sensor: signal out of range                                                                                                       | Able                | Able                | 06              |
| "P0117, P0118" | [P0117] Coolant temperature sensor: ground short circuit detected.<br>[P0118] Coolant temperature sensor: open or power short circuit detected.       | Able                | Able                | 06              |
| "P0122, P0123" | [P0122] Throttle position sensor: open or ground short circuit detected.<br>[P0123] Throttle position sensor: power short circuit detected.           | Able                | Able                | 01              |
| "P0132"        | O <sub>2</sub> sensor: short circuit detected (power short circuit).                                                                                  | Able                | Able                | —               |
| "P0133"        | O <sub>2</sub> sensor: deterioration detected                                                                                                         | Able                | Able                | —               |
| "P0134"        | O <sub>2</sub> sensor: signal stuck                                                                                                                   | Able                | Able                | —               |
| "P0201"        | Fuel injector: malfunction in fuel injector.                                                                                                          | Unable              | Unable              | 36              |
| "P0301"        | Misfire in cylinder #1                                                                                                                                | Able/Unable         | Able/Unable         | —               |
| "P0335"        | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.                                                       | Unable              | Unable              | —               |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Symptom                                                                                                                                           | Fail-safe system    |                     | Diagnostic code |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|
|                |                                                                                                                                                   | Starting the engine | Driving the vehicle |                 |
| "P0351"        | Ignition coil: open or short circuit detected in the primary lead of the ignition coil.                                                           | Unable              | Unable              | 30              |
| "P0480"        | Radiator fan motor relay: open circuit detected.                                                                                                  | Able                | Able                | —               |
| "P0500"        | Rear wheel sensor: no normal signals are received from the rear wheel sensor                                                                      | Able                | Able                | 07              |
| "P0507"        | FID solenoid: performance deterioration                                                                                                           | Able                | Able                | —               |
| "P0511"        | FID solenoid: open or short circuit detected.                                                                                                     | Able                | Able                | 54              |
| "P0560, P0563" | [P0560] Charging voltage is abnormal.<br>[P0563] Vehicle system power voltage out of range.                                                       | Able                | Able                | —               |
| "P0601"        | Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)                        | Unable              | Unable              | —               |
| "P062F"        | EEPROM DTC: an error is detected while reading or writing on EEPROM.                                                                              | Able                | Able                | 60              |
| "P0657"        | Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.                                                               | Able                | Able                | 09              |
| "P1601"        | Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.                                                           | Unable              | Unable              | 20              |
| "P1602"        | Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).                                                                  | Able                | Able                | —               |
| "P1604, P1605" | [P1604] Lean angle sensor: ground short circuit detected.<br>[P1605] Lean angle sensor: open or power short circuit detected.                     | Unable              | Unable              | 08              |
| "P2645"        | VVA (variable valve actuator) solenoid: performance deterioration                                                                                 | Able                | Able                | 45              |
| "Er-1"         | ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter. | Able/Unable         | Able/Unable         | —               |
| "Er-2"         | ECU (engine control unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.         | Able                | Able                | —               |
| "Er-3"         | ECU (engine control unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.                             | Able                | Able                | —               |
| "Er-4"         | ECU (engine control unit) internal malfunction (input signal error): non-registered data has been received from the meter.                        | Able                | Able                | —               |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33028

## SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

### TIP

For details of the DTC, refer to “BASIC PROCESS FOR TROUBLESHOOTING” on page 9-11.

| DTC   | 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 (Malfunction in ECU).</li> <li>Broken or disconnected lead in O<sub>2</sub> sensor heater.</li> <li>Malfunction in ECU.</li> </ul> | (When the O <sub>2</sub> sensor does not operate because the exhaust temperature is low) Increased exhaust emissions.                                                          | Display only (If the O <sub>2</sub> sensor does not operate, O <sub>2</sub> feedback is not carried out.)                                                                                                            |
| P00D1 | O <sub>2</sub> sensor: heater performance deterioration              | <ul style="list-style-type: none"> <li>Disconnected coupler.</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 heater.</li> <li>Malfunction in ECU.</li> </ul>                                                                 | Increased exhaust emissions.                                                                                                                                                   | O <sub>2</sub> feedback is not carried out.                                                                                                                                                                          |
| P0105 | Intake air pressure sensor: signal out of range                      | <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.<br>Engine idling speed is unstable.<br>Engine response is poor.<br>Loss of engine power.<br>Increased exhaust emissions.                          | Intake air pressure is fixed to 101.3 [kPa].<br>Intake air pressure difference is fixed to 0 [kPa].<br>Fuel is not cut off due to the intake air pressure difference.<br>O <sub>2</sub> feedback is not carried out. |
| P0106 | Intake air pressure sensor: clogging of hose or sensor disconnection | <ul style="list-style-type: none"> <li>Intake air pressure sensor hole is clogged, or intake air pressure sensor is not installed correctly.</li> <li>Throttle body assembly is not installed correctly.</li> </ul>                                                                                       | Engine idling speed is high.<br>Engine idling speed is unstable.<br>Engine response is poor.<br>Loss of engine power.<br>Deceleration is poor.<br>Increased exhaust emissions. | Intake air pressure is fixed to 101.3 [kPa].<br>Intake air pressure difference is fixed to 0 [kPa].<br>Fuel is not cut off due to the intake air pressure difference.<br>O <sub>2</sub> feedback is not carried out. |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Item                                                                                                                                            | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                  | Vehicle symptom                                                                                                                                       | Fail-safe system operation                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0107<br>P0108 | [P0107] Intake air pressure sensor: open or ground short circuit detected.<br>[P0108] Intake air pressure sensor: power short circuit detected. | [P0107] Low voltage of the intake air pressure sensor circuit (0.2 V or less)<br>[P0108] High voltage of the intake air pressure sensor circuit (4.9 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.<br>Engine idling speed is unstable.<br>Engine response is poor.<br>Loss of engine power.<br>Increased exhaust emissions. | Intake air pressure difference is fixed to 0 [kPa].<br>Fuel is not cut off due to the intake air pressure difference.<br>Intake air pressure is fixed to 101.3 [kPa].<br>O <sub>2</sub> feedback is not carried out. |
| P0110          | Intake air temperature sensor: signal stuck                                                                                                     | <ul style="list-style-type: none"> <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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable.                                                     | The intake air temperature is fixed to 20 [°C].<br>O <sub>2</sub> feedback is not carried out.                                                                                                                       |
| P0111          | Intake air temperature sensor: signal out of range                                                                                              | <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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable.                                                     | The intake air temperature is fixed to 20 [°C].<br>O <sub>2</sub> feedback is not carried out.                                                                                                                       |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Item                                                                                                                                                  | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Vehicle symptom                                                                                   | Fail-safe system operation                                                                     |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| P0112<br>P0113 | [P0112] Intake air temperature sensor: ground short circuit detected.<br>[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)<br>[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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable. | The intake air temperature is fixed to 20 [°C].<br>O <sub>2</sub> feedback is not carried out. |
| P0115          | Coolant temperature sensor: signal stuck                                                                                                              | <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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable. | O <sub>2</sub> feedback is not carried out.<br>The coolant temperature is fixed to 30 [°C].    |
| P0116          | Coolant temperature sensor: signal out of range                                                                                                       | <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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable. | O <sub>2</sub> feedback is not carried out.<br>The coolant temperature is fixed to 30 [°C].    |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Item                                                                                                                                            | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Vehicle symptom                                                                                                                                                                | Fail-safe system operation                                                                                                                                                                                                                                              |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0117<br>P0118 | [P0117] Coolant temperature sensor: ground short circuit detected.<br>[P0118] Coolant temperature sensor: open or power short circuit detected. | [P0117] Low voltage of the coolant temperature sensor circuit (0.2 V or less)<br>[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.<br>Increased exhaust emissions.<br>Engine idling speed is unstable.                                                                              | O <sub>2</sub> feedback is not carried out.<br>The coolant temperature is fixed to 30 [°C].                                                                                                                                                                             |
| P0122<br>P0123 | [P0122] Throttle position sensor: open or ground short circuit detected.<br>[P0123] Throttle position sensor: power short circuit detected.     | [P0122] Low voltage of the throttle position sensor circuit (0.2 V or less)<br>[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.<br>Engine idling speed is unstable.<br>Engine response is poor.<br>Loss of engine power.<br>Deceleration is poor.<br>Increased exhaust emissions. | Change in the throttle opening is 0 (transient control is not carried out).<br>Throttle opening is fixed to 15 [°].<br>Atmospheric pressure is fixed to 101.3 [kPa].<br>O <sub>2</sub> feedback is not carried out.<br>Fuel is not cut off due to the throttle opening. |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC   | Item                                                                 | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                | Vehicle symptom                                                                                                                                                          | Fail-safe system operation                              |
|-------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 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>• 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.             |
| P0133 | O <sub>2</sub> sensor: response delay                                | <ul style="list-style-type: none"> <li>• Defective O<sub>2</sub> sensor.</li> <li>• Malfunction in fuel system.</li> <li>• Malfunction in exhaust system.</li> </ul>                                                                                                                                                                                                                                         | Increased exhaust emissions.                                                                                                                                             | —                                                       |
| P0134 | O <sub>2</sub> sensor: signal stuck                                  | <ul style="list-style-type: none"> <li>• Defective engine condition.</li> <li>• Improperly installed O<sub>2</sub> sensor.</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 learning is not carried out.    |
| P0201 | Fuel injector: malfunction in fuel injector.                         | <ul style="list-style-type: none"> <li>• Defective coupler between fuel injector and ECU.</li> <li>• Open or short circuit in wire harness between fuel injector and ECU.</li> <li>• Defective fuel injector.</li> <li>• Malfunction in ECU.</li> <li>• Improperly installed fuel injector.</li> </ul>                                                                                                       | Loss of engine power.<br>Engine is difficult to start.<br>Engine cannot be started.<br>Engine stops.<br>Engine idling speed is unstable.<br>Increased exhaust emissions. | Engine forcefully stopped.<br>Engine cannot be started. |
| P0301 | Cylinder misfire detection                                           | <ul style="list-style-type: none"> <li>• Ignition system malfunction/abnormal</li> <li>• Fuel system malfunction/abnormal</li> </ul>                                                                                                                                                                                                                                                                         | Engine is difficult to start.<br>Loss of engine power.<br>Engine idling speed is unstable.<br>Engine response is poor.<br>Increased exhaust emissions.                   | —                                                       |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC   | 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.                                       |
| P0351 | Ignition coil: open or short circuit detected in the primary lead of the ignition coil.         | <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>                                                                                              | Engine stops.<br>Loss of engine power.<br>Engine is difficult to start.<br>Engine cannot be started.                                                                                                          | Engine forcefully stopped.<br>Engine cannot be started. |
| P0480 | Radiator fan motor relay: open or short circuit detected.                                       | <ul style="list-style-type: none"> <li>Open circuit in wire harness.</li> <li>Disconnected coupler.</li> <li>Defective driver.</li> <li>Defective radiator fan motor relay.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                       | Engine is difficult to start.<br>Loss of engine power.<br>Engine overheats.<br>Increased exhaust emissions.                                                                                                   | —                                                       |
| P0500 | Rear wheel sensor (no normal signals are received from the rear wheel sensor)                   | <ul style="list-style-type: none"> <li>Open or short circuit in wire harness between rear wheel sensor and ABS unit.</li> <li>Open or short circuit in wire harness between ABS unit and ECU.</li> <li>Defective rear wheel sensor.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                               | Vehicle speed is not displayed on the meter.<br>Engine stalls when the vehicle is decelerating to a stop.<br>Engine idling speed is high.<br>Engine idling speed is unstable.<br>Increased exhaust emissions. | O <sub>2</sub> feedback is not carried out.             |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC   | Item                                                                                                                       | Probable cause of malfunction                                                                                                                                                                                                                                                | Vehicle symptom                                                                                                                                            | Fail-safe system operation                                                                                                                                                                                                        |
|-------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0507 | FID solenoid (performance deterioration)                                                                                   | <ul style="list-style-type: none"> <li>Defective coupler between FID solenoid and ECU.</li> <li>Open or short circuit in wire harness between FID solenoid and ECU.</li> <li>Defective FID solenoid (FID solenoid stuck fully open).</li> <li>Malfunction in ECU.</li> </ul> | Engine idling speed is high.                                                                                                                               | —                                                                                                                                                                                                                                 |
| P0511 | FID solenoid (open or short circuit detected)                                                                              | <ul style="list-style-type: none"> <li>Defective coupler between FID solenoid and ECU.</li> <li>Open or short circuit in wire harness between FID solenoid and ECU.</li> <li>Defective FID solenoid (FID solenoid stuck fully open).</li> <li>Malfunction in ECU.</li> </ul> | Engine is difficult to start.<br>Engine idling speed is unstable.<br>Engine idling speed is high.                                                          | Power is not supplied to the FID solenoid.                                                                                                                                                                                        |
| P0560 | Charging voltage is abnormal.                                                                                              | <ul style="list-style-type: none"> <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.<br>Increased exhaust emissions.<br>Battery performance has deteriorated or battery is defective.                             | O <sub>2</sub> feedback learning is not carried out.                                                                                                                                                                              |
| P0563 | Vehicle system power voltage out of range                                                                                  | <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> </ul>                                                                     | Engine is difficult to start.<br>Increased exhaust emissions.<br>Battery performance has deteriorated or battery is defective.                             | O <sub>2</sub> feedback learning is not carried out.                                                                                                                                                                              |
| P0601 | Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.) | <ul style="list-style-type: none"> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                                        | Engine cannot be started.                                                                                                                                  | Engine cannot be started.<br>Ignition and injection are not carried out.<br>Judgment for other DTC is not carried out.<br>Writing to EEPROM is not carried out.                                                                   |
| P062F | EEPROM DTC: 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>O<sub>2</sub> feedback learning value is not properly written.</li> <li>OBD memory value is not properly written.</li> <li>Malfunction in ECU.</li> </ul>                       | Increased exhaust emissions.<br>Engine cannot be started or is difficult to start.<br>Engine idling speed is unstable.<br>OBD memory value is not correct. | CO adjustment value for the faulty cylinder = 0 (default value)<br>OBD memory value is initialized.<br>Initialization of O <sub>2</sub> feedback learning value.<br>Throttle fully closed position learning valve is initialized. |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC            | Item                                                                                                                          | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                                                                                           | Vehicle symptom                                                                                                                   | Fail-safe system operation                                              |
|----------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 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 main switch and ECU.</li> <li>• Open circuit in red/white lead of the ECU.</li> <li>• Malfunction in ECU.</li> </ul>                                                                                                                                                                                                                                                             | Engine is difficult to start.<br>Increased exhaust emissions.                                                                     | Monitor voltage = 12 [V]<br>O <sub>2</sub> feedback is not carried out. |
| P1601          | Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.                                       | <ul style="list-style-type: none"> <li>• Defective coupler between sidestand switch and ECU.</li> <li>• Open or short circuit in wire harness between sidestand switch and ECU.</li> <li>• Defective sidestand switch.</li> <li>• Malfunction in ECU.</li> </ul>                                                                                                                                                                                                        | Engine cannot be started.                                                                                                         | Engine is forcefully stopped.                                           |
| 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>• Disconnected battery terminal.</li> <li>• Defective connection of the ECU coupler.</li> <li>• Malfunction in ECU.</li> </ul>                                                                                                                                                                                                                         | Engine idling speed is unstable.<br>Engine idling speed is high.<br>Increased exhaust emissions.<br>Engine is difficult to start. | —                                                                       |
| P1604<br>P1605 | [P1604] Lean angle sensor (ground short circuit detected)<br>[P1605] Lean angle sensor (open or power short circuit detected) | [P1604] Low voltage of the lean angle sensor circuit (0.2 V or less)<br>[P1605] High voltage of the lean angle sensor circuit (4.8 V or more) <ul style="list-style-type: none"> <li>• Defective connection of the lean angle sensor coupler.</li> <li>• Defective connection of the ECU coupler.</li> <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.<br>Engine stops.                                                                                        | Engine cannot be started.<br>Engine is forcefully stopped.              |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC   | Item                                                                                                                                              | Probable cause of malfunction                                                                                                                                                                                                                                                                                                                                                                             | Vehicle symptom                                       | Fail-safe system operation                                                               |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------|
| P2195 | O <sub>2</sub> sensor: open circuit detected.                                                                                                     | <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> </ul> VVA (variable valve actuator) solenoid: <ul style="list-style-type: none"> <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.                                              |
| P2645 | Performance deterioration.                                                                                                                        | <ul style="list-style-type: none"> <li>Defective coupler between VVA solenoid and ECU.</li> <li>Open or short circuit in wire harness between VVA solenoid and ECU.</li> <li>Open circuit in VVA solenoid.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                        | Decreased engine torque in the high-revolution range. | Fixed to the low-speed cam position. Upper limit for the engine revolution is decreased. |
| Er-1  | ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the Multi-function meter. | <ul style="list-style-type: none"> <li>Defective coupler between meter and ECU.</li> <li>Open or short circuit in wire harness between meter and ECU.</li> <li>Defective meter.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                   | Meter is not operated.                                | Normal operation expect for meter.                                                       |
| Er-2  | ECU (engine control unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.         | <ul style="list-style-type: none"> <li>Defective coupler between meter and ECU.</li> <li>Open or short circuit in wire harness between meter and ECU.</li> <li>Defective meter.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                   | Meter is not operated.                                | Normal operation expect for meter.                                                       |
| Er-3  | ECU (engine control unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.                             | <ul style="list-style-type: none"> <li>Defective coupler between meter and ECU.</li> <li>Open or short circuit in wire harness between meter and ECU.</li> <li>Defective meter.</li> <li>Malfunction in ECU.</li> </ul>                                                                                                                                                                                   | Meter is not operated.                                | Normal operation expect for meter.                                                       |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC  | Item                                                                                                                       | Probable cause of malfunction                                                                                                                                                                                           | Vehicle symptom        | Fail-safe system operation         |
|------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|
| Er-4 | ECU (engine control unit) internal malfunction (input signal error): non-registered data has been received from the meter. | <ul style="list-style-type: none"> <li>Defective coupler between meter and ECU.</li> <li>Open or short circuit in wire harness between meter and ECU.</li> <li>Defective meter.</li> <li>Malfunction in ECU.</li> </ul> | Meter is not operated. | Normal operation expect for meter. |

EAS33286

## SELF-DIAGNOSTIC FUNCTION TABLE (FOR ABS (Anti-lock Brake System))

### TIP

For details of the DTC, refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 9-17.

| DTC        | Item                                                  | Symptom                                                                                                                                      | Check point                                                                                                                                                                                                                                                                                                      |
|------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11*<br>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*<br>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> |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC        | Item                                                       | Symptom                                                                                                                         | Check point                                                                                                                                                                                                                                                                                                           |
|------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14*<br>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*<br>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*<br>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>                                                                                                                                                                                                                                   |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | 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 (defective ABS solenoid power circuit)                  | 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>                                                                                                                                                                                                                                 |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC      | Item                                                                                                                                                                                                                                          | Symptom                                                                                                                                                                                                                                                                                                                  | Check point                                                                                                                                                                                                                                                                                                      |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 42<br>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 DTC 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 DTC 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<br>52 | <ul style="list-style-type: none"> <li>Vehicle system power supply (voltage of ABS ECU power supply is high) (for DTC No. 51)</li> <li>Vehicle system power supply (voltage of wheel sensor power supply is high) (for DTC 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 DTC No. 51)</li> <li>Power voltage supplied to the wheel sensor is too high. (for DTC 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>                     |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | 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> |
| 55  | Hydraulic unit assembly (defective ABS ECU)                                          | Abnormal data is detected in the hydraulic unit assembly.                                             | <ul style="list-style-type: none"> <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 hydraulic unit assembly</li> <li>• Defective front wheel sensor</li> <li>• Defective hydraulic unit assembly</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>                                                                                                           |

\* The DTC number varies according to the vehicle conditions.

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33031

## 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> | 12–22<br>94–110                                                                                                                                                    | Check with throttle valves fully closed.<br>Check with throttle valves fully open.                                                                                                                            |
| 03                  | Intake air pressure                                                                                                                  | Displays the intake air pressure.                                                                                                                                  | Operate the throttle while pushing the start/engine stop switch “  ”. (If the display value changes, the performance is OK.) |
| 05                  | Intake air temperature                                                                                                               | When engine is cold: Displays temperature closer to air temperature. When engine is hot: Air temperature + approx. 20 °C (68 °F).                                  | 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                  | Rear wheel vehicle speed pulses                                                                                                      | Rear wheel speed pulse 0–999                                                                                                                                       | Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.                                                                   |
| 08                  | Lean angle sensor <ul style="list-style-type: none"> <li>Upright</li> <li>Overturned</li> </ul>                                      | Lean angle sensor output voltage<br>0.4–1.4<br>3.7–4.4                                                                                                             | Remove the lean angle sensor and incline it more than 50 degrees.                                                                                                                                             |
| 09                  | Fuel system voltage (battery voltage)                                                                                                | Fuel system voltage<br>Approximately 12.0                                                                                                                          | 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>Sidestand retracted</li> <li>Sidestand extended</li> </ul>                   | ON<br>OFF                                                                                                                                                          | Extend and retract the sidestand (with the transmission in gear).                                                                                                                                             |
| 60                  | EEPROM DTC display <ul style="list-style-type: none"> <li>No history</li> <li>History exists</li> </ul>                              | 00<br>• No malfunctions detected (If the DTC P062F is indicated, the ECU is defective.)<br>01 (CO adjustment value)<br>12 (O <sub>2</sub> feedback learning value) | —                                                                                                                                                                                                             |

# SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| Diagnostic code No. | Item                               | Tool display                                                                                                                           | Procedure                                                                                                |
|---------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 70                  | Control number                     | 0-254 [-]                                                                                                                              | —                                                                                                        |
| 87                  | A/F control learning value erasure | 00<br>A/F control learning value learning data has been erased.<br>01<br>A/F control learning value learning data has not been erased. | To erase the A/F control learning value learning data, push the “Operation” button 3 times in 5 seconds. |

EAS33032

## DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

| Diagnostic code No. | Item                                   | Actuation                                                                                                                                                                  | Procedure                                                                                                                                              |
|---------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30                  | Ignition coil                          | Actuates the ignition coil five times at one-second intervals.<br>The “check” indicator on the YDT screen come on each time the ignition coil is actuated.                 | Check that a spark is generated five times.<br>• Connect an ignition checker.                                                                          |
| 36                  | Fuel injector                          | Actuates the fuel injector five times at one-second intervals.<br>The “check” indicator on the YDT screen come on each time the fuel injector is actuated.                 | Disconnect the fuel pump coupler before doing this procedure.<br>Check that fuel injector is actuated five times by listening for the operating sound. |
| 45                  | VVA (variable valve actuator) solenoid | Actuates the VVA solenoid five times at five-second intervals.<br>The check indicator on the Yamaha diagnostic tool screen come on each time the VVA solenoid is actuated. | Check that the VVA solenoid is actuated five times.                                                                                                    |
| 51                  | Radiator fan motor relay               | Actuates the radiator fan motor relay five times at five-seconds intervals.<br>The “check” indicator on the YDT screen come on each time the relay is actuated.            | Check that the radiator fan motor relay is actuated five times by listening for the operating sound.                                                   |
| 52                  | Headlight                              | Actuates the headlight five times at five-seconds intervals.<br>The “check” indicator on the YDT screen come on each time the headlight is actuated.                       | Check that the headlight is on five times.                                                                                                             |
| 54                  | FID solenoid                           | Actuates the FID solenoid five times at one-second intervals.<br>The “check” indicator on the Yamaha diagnostic tool screen come on.                                       | Check that FID solenoid is actuated five times by listening for the operating sound.                                                                   |

# EVENT CODE TABLE

EAS20707

## EVENT CODE TABLE

### TIP

The event code numbers listed below cannot be displayed on the meter. To display the event code numbers, use the YDT.

| No. | Item                                                            | Symptom                                                                         | Possible causes                                                                                                                                                                                                                                                                                         | Note                                                                                                                                                                               |
|-----|-----------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 192 | Intake air pressure sensor                                      | Brief abnormality detected in the intake air pressure sensor                    | Same as for DTC number P0107 and P0108                                                                                                                                                                                                                                                                  | Perform the inspection items listed for DTC number P0107 and P0108.                                                                                                                |
| 193 | Throttle position sensor                                        | Brief abnormality detected in the throttle position sensor                      | Same as for DTC number P0122 and P0123                                                                                                                                                                                                                                                                  | Perform the inspection items listed for DTC number P0122 and P0123.                                                                                                                |
| 196 | Coolant temperature sensor                                      | Brief abnormality detected in the coolant temperature sensor                    | Same as for DTC number P0117 and P0118                                                                                                                                                                                                                                                                  | Perform the inspection items listed for DTC number P0117 and P0118.                                                                                                                |
| 197 | Intake air temperature sensor                                   | Brief abnormality detected in the intake air temperature sensor                 | Same as for DTC number P0112 and P0113                                                                                                                                                                                                                                                                  | Perform the inspection items listed for DTC number P0112 and P0113.                                                                                                                |
| 203 | Lean angle sensor                                               | Brief abnormality detected in lean angle sensor                                 | Same as for DTC number P1604 and P1605                                                                                                                                                                                                                                                                  | Perform the inspection items listed for DTC number P1604 and P1605.                                                                                                                |
| 218 | Crankshaft position sensor                                      | Brief abnormality detected in crankshaft position sensor                        | Same as for DTC number P0335                                                                                                                                                                                                                                                                            | Perform the checks and maintenance jobs for DTC number P0335.                                                                                                                      |
| 240 | O <sub>2</sub> sensor (Stuck at the upper limit for adjustment) | During O <sub>2</sub> feedback, the adjustment is maintained at the upper limit | <ul style="list-style-type: none"> <li>• Open or short circuit in the wire harness between the sensor and ECU</li> <li>• Drop in fuel pressure</li> <li>• Clogged fuel injector</li> <li>• Fault in sensor</li> <li>• Malfunction in ECU</li> <li>• Malfunction in the fuel injection system</li> </ul> | <ul style="list-style-type: none"> <li>• If a DTC is occurring, respond to that first.</li> <li>* Rarely, Code 240 occurs even when the system is functioning properly.</li> </ul> |
| 241 | O <sub>2</sub> sensor (Stuck at the lower limit for adjustment) | During O <sub>2</sub> feedback, the adjustment is maintained at the lower limit | <ul style="list-style-type: none"> <li>• Open or short circuit in the wire harness between the sensor and ECU</li> <li>• Drop in fuel pressure</li> <li>• Clogged fuel injector</li> <li>• Fault in sensor</li> <li>• Malfunction in ECU</li> <li>• Malfunction in the fuel injection system</li> </ul> | <ul style="list-style-type: none"> <li>• If a DTC is occurring, respond to that first.</li> <li>* Rarely, Code 241 occurs even when the system is functioning properly.</li> </ul> |
| 244 | Difficult/unable to start engine                                | Engine starting difficult/unable condition detected                             | <ul style="list-style-type: none"> <li>• No gasoline</li> <li>• Malfunction in the fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Malfunction in the battery</li> <li>• Malfunction in ECU</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>• If a DTC is occurring, respond to that first.</li> <li>* Rarely, Code 244 occurs even when the system is functioning properly.</li> </ul> |

## EVENT CODE TABLE

| No. | Item         | Symptom               | Possible causes                                                                                                                                                                                                                                                                                               | Note                                                                                                                                                                               |
|-----|--------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 245 | Engine stall | Engine stall detected | <ul style="list-style-type: none"> <li>• No gasoline</li> <li>• Poorly adjusted throttle cable</li> <li>• Poorly adjusted clutch cable</li> <li>• Malfunction in the fuel injection system</li> <li>• Dirty or worn spark plug</li> <li>• Malfunction in the battery</li> <li>• Malfunction in ECU</li> </ul> | <ul style="list-style-type: none"> <li>• If a DTC is occurring, respond to that first.</li> <li>* Rarely, Code 245 occurs even when the system is functioning properly.</li> </ul> |

EAS20397

**P0030**

EAS33134

**TROUBLESHOOTING****Item**

O<sub>2</sub> sensor heater: defective heater controller detected.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. 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).

**Is the coupler condition normal?**

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 2.

**TIP**

For this check, also set the start/engine stop switch to "○".

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).

**Is the coupler condition normal?**

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 3.

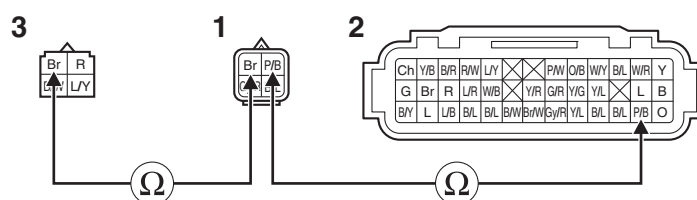
**TIP**

For this check, also set the start/engine stop switch to “○”.

**3. Wire harness continuity.**

- Disconnect the O<sub>2</sub> sensor coupler “1”, ECU coupler “2”, and main switch coupler “3”.
- Open circuit check

|                                                               |                       |
|---------------------------------------------------------------|-----------------------|
| Between O <sub>2</sub> sensor coupler and ECU coupler         | pink/black–pink/black |
| Between O <sub>2</sub> sensor coupler and main switch coupler | brown–brown           |



**Is resistance 0 Ω?**

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

**TIP**

For this check, also set the start/engine stop switch to “○”.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

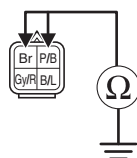
|                                                      |                                   |
|------------------------------------------------------|-----------------------------------|
| Between O <sub>2</sub> sensor coupler “1” and ground | brown–ground<br>pink/black–ground |
|------------------------------------------------------|-----------------------------------|

Lines short circuit check “B”

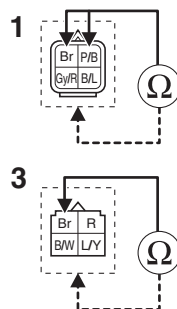
|                                   |                                                                           |
|-----------------------------------|---------------------------------------------------------------------------|
| O <sub>2</sub> sensor coupler “1” | brown–any other coupler terminal<br>pink/black–any other coupler terminal |
| ECU coupler “2”                   | pink/black–any other coupler terminal                                     |
| Main switch coupler “3”           | brown–any other coupler terminal                                          |

**A**

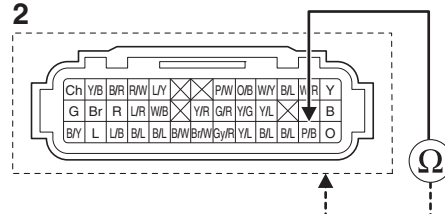
1



**B**



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

**TIP**

For this check, also set the start/engine stop switch to “○”.

4. Defective O<sub>2</sub> sensor.

- Replace the O<sub>2</sub> sensor.

Refer to “ENGINE REMOVAL” on page 5-6.

- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

---

**TIP**

For this check, also set the start/engine stop switch to “○”.

---

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20660

## P00D1, P2195

EAS33115

### TROUBLESHOOTING

#### Item

- [P00D1] O<sub>2</sub> sensor: heater performance deterioration.
- [P2195] O<sub>2</sub> sensor: open circuit detected.

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

1. Installed condition of O<sub>2</sub> sensor.
  - Check for looseness or pinching.

##### Is check result OK?

###### YES

→ Go to step 2.

###### NO

- a. Reinstall or replace the O<sub>2</sub> sensor.  
Refer to "ENGINE REMOVAL" on page 5-6.
- b. Start the engine and let it idle for approximately 1 minute, and then race it.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

###### YES

→ Go to step 8, and complete the service.

###### NO

→ Go to step 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).

##### Is the coupler condition normal?

###### YES

→ Go to step 3.

###### NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 1 minute, and then race it.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

###### YES

→ Go to step 8, and complete the service.

###### NO

→ Go to step 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).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 1 minute, and then race it.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 8, and complete the service.

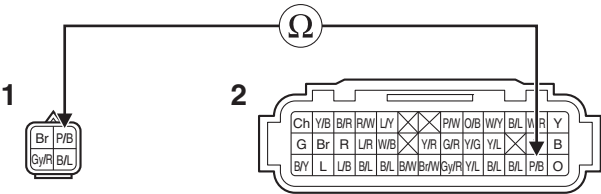
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the O<sub>2</sub> sensor coupler “1” and ECU coupler “2”.
- Open circuit check

|                                                       |                       |
|-------------------------------------------------------|-----------------------|
| Between O <sub>2</sub> sensor coupler and ECU coupler | pink/black–pink/black |
|-------------------------------------------------------|-----------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Start the engine and let it idle for approximately 1 minute, and then race it.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

|                                                      |                   |
|------------------------------------------------------|-------------------|
| Between O <sub>2</sub> sensor coupler “1” and ground | pink/black–ground |
|------------------------------------------------------|-------------------|

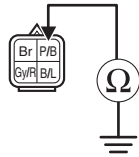
Lines short circuit check “B”

|                               |                                       |
|-------------------------------|---------------------------------------|
| O <sub>2</sub> sensor coupler | pink/black–any other coupler terminal |
|-------------------------------|---------------------------------------|

|                 |                                       |
|-----------------|---------------------------------------|
| ECU coupler "2" | pink/black—any other coupler terminal |
|-----------------|---------------------------------------|

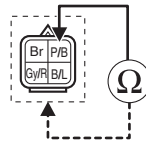
**A**

**1**

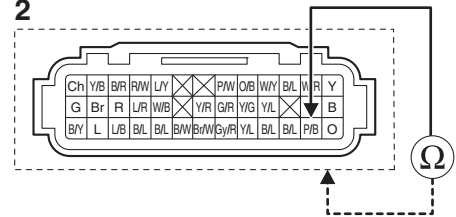


**B**

**1**



**2**



**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 5.

**NO**

- Replace the wire harness.
- Start the engine and let it idle for approximately 1 minute, and then race it.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 5.

5. Check fuel pressure.

- Check the fuel pressure.

Refer to "CHECKING THE FUEL PRESSURE" on page 7-5.

**Is check result OK?**

**YES**

→ Go to step 6.

**NO**

- Replace the fuel pump.  
Refer to "FUEL TANK" on page 7-1.
- Start the engine and let it idle for approximately 1 minute, and then race it.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 6.

6. Defective O<sub>2</sub> sensor.

- Replace the O<sub>2</sub> sensor.

Refer to "ENGINE REMOVAL" on page 5-6.

- Start the engine and let it idle for approximately 1 minute, and then race it.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 7.

7. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

8. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20420

## P0105

EAS32838

### TROUBLESHOOTING

#### Item

Intake air pressure sensor: signal out of range

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0107, P0108

1. Connection of throttle body sensor 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).

**Is the coupler condition normal?**

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 2.

2. Defective intake air pressure sensor.

- Replace the throttle body assembly.

Refer to "THROTTLE BODY" on page 7-7.

- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 3.

3. Defective wire harness.

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

---

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 4.

4. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

5. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20421

**P0106**

EAS32840

**TROUBLESHOOTING****Item**

Intake air pressure sensor: clogging of hose or sensor disconnection

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

ECA20500

**NOTICE****Do not remove the throttle body sensor assembly from the throttle body.****TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0107, P0108

1. Installed condition of intake air pressure sensor.

- Check for looseness or pinching.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

- Start the engine and let it idle for approximately 5 seconds with the throttle fully closed, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 3, and complete the service.

**NO**

→ Go to step 2.

2. Defective intake air pressure sensor.

- Execute the diagnostic mode. (Code “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.

**Is check result OK?****YES**

→ Go to step 3, and complete the service.

**NO**

- 
- a. Replace the throttle body assembly.  
Refer to "THROTTLE BODY" on page 7-7.
  - b. Start the engine and let it idle for approximately 5 seconds with the throttle fully closed, and then check the condition of the DTC using the malfunction mode of the YDT.
  - c. Confirm the "Recovered" condition, then go to step 3.
3. Delete the DTC and check that the MIL goes off.
    - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20567

## P0107, P0108

EAS33047

### TROUBLESHOOTING

#### Item

- [P0107] Intake air pressure sensor: open or ground short circuit detected.
- [P0108] Intake air pressure sensor: power short circuit detected.

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0107, P0108

#### 1. Connection of throttle body sensor 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

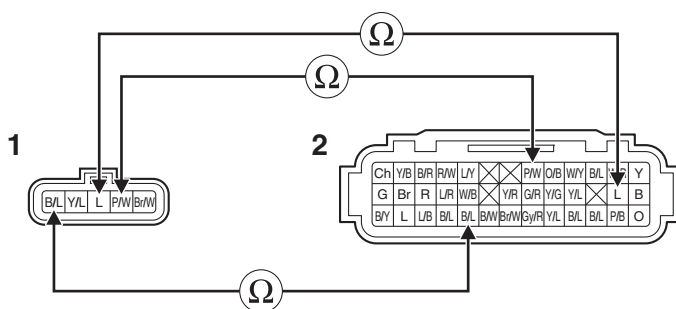
**NO**

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the throttle body sensor assembly coupler “1” and ECU coupler “2”.
- Open circuit check

|                                                               |                                                             |
|---------------------------------------------------------------|-------------------------------------------------------------|
| Between throttle body sensor assembly coupler and ECU coupler | blue–blue<br>pink/white–pink/white<br>black/blue–black/blue |
|---------------------------------------------------------------|-------------------------------------------------------------|



**Is resistance 0  $\Omega$ ?**

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

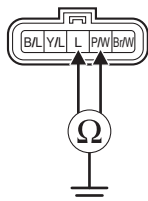
|                                                              |                                  |
|--------------------------------------------------------------|----------------------------------|
| Between throttle body sensor assembly coupler “1” and ground | blue–ground<br>pink/white–ground |
|--------------------------------------------------------------|----------------------------------|

Lines short circuit check “B”

|                                       |                                                                                                                   |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Throttle body sensor assembly coupler | blue–any other coupler terminal<br>pink/white–any other coupler terminal<br>black/blue–any other coupler terminal |
| ECU coupler “2”                       | blue–any other coupler terminal<br>pink/white–any other coupler terminal<br>black/blue–any other coupler terminal |

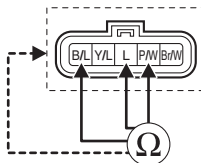
A

1

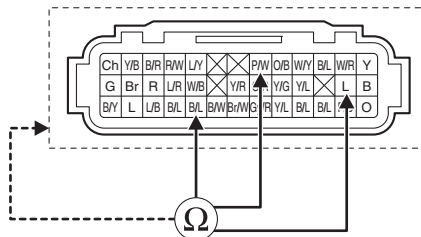


B

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Installed condition of intake air pressure sensor.

- Check for looseness or pinching.

Is check result OK?

**YES**

→ Go to step 5.

**NO**

- a. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective intake air pressure sensor.

- Execute the diagnostic mode. (Code “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), approx. 3.64 V |
| 1000 m (3300 ft) above sea level | Approx. 90 kPa (675.1 mmHg, 26.6 inHg), approx. 3.30 V  |
| 2000 m (6700 ft) above sea level | Approx. 80 kPa (600.0 mmHg, 23.6 inHg), approx. 3.00 V  |
| 3000 m (9800 ft) above sea level | Approx. 70 kPa (525.0 mmHg, 20.7 inHg), approx. 2.70 V  |

- When engine is cranking: Make sure that the indication value changes.

**Is check result OK?**

**YES**

→ Go to step 6.

**NO**

- a. Replace the throttle body assembly.  
Refer to "THROTTLE BODY" on page 7-7.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

**6. Malfunction in ECU.**

- Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

**7. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20426

## P0110

EAS32845

### TROUBLESHOOTING

#### Item

Intake air temperature sensor: signal stuck

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### TIP

- Perform this procedure when the engine is cold.
- If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P0112, P0113

1. Installed condition of intake air temperature sensor.

- Check for looseness or pinching.
- Check the dirt around the intake air temperature sensor.

#### Is check result OK?

##### YES

→ Go to step 2.

##### NO

- a. Clean around the intake air temperature sensor.
- b. Turn the main switch to "ON", then heat the intake air temperature sensor using warm water or hot air.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

#### Is it in the "Recovered" condition?

##### YES

→ Go to step 4, and complete the service.

##### NO

→ Go to step 2.

2. Defective intake air temperature sensor.

- Measure and note the intake air temperature sensor resistance at ambient temperature.
- Heat the intake air temperature sensor using warm water or hot air, and measure the intake air temperature sensor resistance, then compare the noted resistance at ambient temperature.

#### Is the resistance change?

##### YES

→ Go to step 3.

##### NO

- a. Replace the throttle body assembly.  
Refer to "THROTTLE BODY" on page 7-7.
- b. Turn the main switch to "ON", then heat the intake air temperature sensor using warm water or hot air.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

#### Is it in the "Recovered" condition?

**YES**

→ Go to step 4, and complete the service.

**NO**

→ Go to step 3.

3. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

4. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20425

## P0111

EAS32844

### TROUBLESHOOTING

#### Item

Intake air temperature sensor: signal out of range

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### TIP

- Perform this procedure when the engine is cold.
- If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P0112, P0113

#### 1. Connection of throttle body sensor 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).

##### Is the coupler condition normal?

###### YES

→ Go to step 2.

###### NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "05")
  - When engine is cold: Displayed temperature is close to the ambient temperature.

##### Is check result OK?

###### YES

→ Go to step 7, and complete the service.

###### NO

→ Go to step 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).

##### Is the coupler condition normal?

###### YES

→ Go to step 3.

###### NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "05")
  - When engine is cold: Displayed temperature is close to the ambient temperature.

##### Is check result OK?

###### YES

→ Go to step 7, and complete the service.

**NO**

→ Go to step 3.

3. Installed condition of intake air temperature sensor.

- Check for looseness or pinching.

**Is check result OK?**

**YES**

→ Go to step 4.

**NO**

a. Execute the diagnostic mode. (Code "05")

- When engine is cold: Displayed temperature is close to the ambient temperature.

**Is check result OK?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Defective intake air temperature sensor.

- Check the intake air temperature sensor resistance.



**Intake air temperature sensor resistance**

**5700–6300  $\Omega$  at 0 °C (5700–6300  $\Omega$  at 32 °F)**

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

a. Replace the throttle body assembly.

Refer to "THROTTLE BODY" on page 7-7.

b. Execute the diagnostic mode. (Code "05")

c. Submerge the intake air temperature sensor in a container filled with water at 0 °C (32 °F).

- The displayed temperature is close to the 0 °C (32 °F)

**Is check result OK?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective wire harness.

- Replace the wire harness.
- Execute the diagnostic mode. (Code "05")
- Submerge the intake air temperature sensor in a container of 0 °C (32 °F) water.
- The displayed temperature is close to the 0 °C (32 °F)

**Is check result OK?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

---

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20568

## P0112, P0113

EAS33048

### TROUBLESHOOTING

#### Item

- [P0112] Intake air temperature sensor: ground short circuit detected.
- [P0113] Intake air temperature sensor: open or power short circuit detected.

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### TIP

Perform this procedure when the engine is cold.

#### 1. Connection of throttle body sensor 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

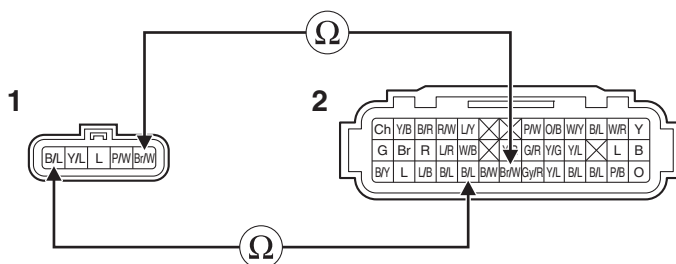
**NO**

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the throttle body sensor assembly coupler “1” and ECU coupler “2”.
- Open circuit check

|                                                               |                                                  |
|---------------------------------------------------------------|--------------------------------------------------|
| Between throttle body sensor assembly coupler and ECU coupler | brown/white–brown/white<br>black/blue–black/blue |
|---------------------------------------------------------------|--------------------------------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

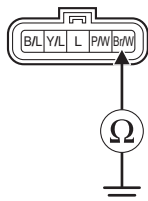
|                                                              |                    |
|--------------------------------------------------------------|--------------------|
| Between throttle body sensor assembly coupler “1” and ground | brown/white–ground |
|--------------------------------------------------------------|--------------------|

Lines short circuit check “B”

|                                       |                                                                                 |
|---------------------------------------|---------------------------------------------------------------------------------|
| Throttle body sensor assembly coupler | brown/white–any other coupler terminal<br>black/blue–any other coupler terminal |
| ECU coupler “2”                       | brown/white–any other coupler terminal<br>black/blue–any other coupler terminal |

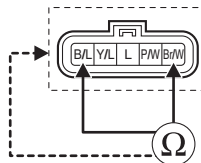
A

1

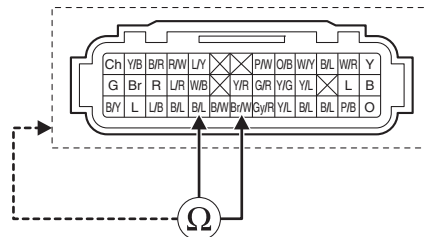


B

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Installed condition of intake air temperature sensor.

- Check for looseness or pinching.

Is check result OK?

**YES**

→ Go to step 5.

**NO**

- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective intake air temperature sensor.

- Execute the diagnostic mode. (Code “05”)
- When engine is cold: Displayed temperature is close to the ambient temperature.

Is check result OK?

**YES**

→ Go to step 6.

**NO**

- Replace the throttle body assembly.  
Refer to “THROTTLE BODY” on page 7-7.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20424

## P0115

EAS32843

### TROUBLESHOOTING

#### Item

Coolant temperature sensor: signal stuck

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

##### TIP

- Perform this procedure when the engine is cold.
- If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P0116, P0117, P0118, P0122, P0123, P0335, P0500

#### 1. Defective coolant temperature sensor.

- Measure and note the coolant temperature sensor resistance at ambient temperature.  
Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-41.



#### Coolant temperature sensor resistance

2513–2777  $\Omega$  at 20 °C (2513–2777  $\Omega$  at 68 °F)

#### Coolant temperature sensor resistance

210–221  $\Omega$  at 100 °C (210–221  $\Omega$  at 212 °F)

- Start the engine and warm-up the vehicle.
- Measure the coolant temperature sensor resistance at engine warmed-up, then compare the noted resistance at ambient temperature.

#### Is the resistance change?

##### YES

→ Go to step 2.

##### NO

- Cool down the engine to ambient temperature, then replace the coolant temperature sensor.  
Refer to "CYLINDER HEAD" on page 5-12.
- Turn the main switch to "ON", then start the engine and warm-up the vehicle.
- Check the condition of the DTC using the malfunction mode of the YDT.

#### Is it in the "Recovered" condition?

##### YES

→ Go to step 3, and complete the service.

##### NO

→ Go to step 2.

#### 2. Malfunction in ECU.

- Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

#### 3. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20423

**P0116**

EAS32842

**TROUBLESHOOTING****Item**

Coolant temperature sensor: signal out of range

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure****TIP**

- Perform this procedure when the engine is cold.
- If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P0117, P0118

**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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "06")
  - When engine is cold: Displayed temperature is close to the ambient temperature.

**Is check result OK?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "06")
  - When engine is cold: Displayed temperature is close to the ambient temperature.

**Is check result OK?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 3.

3. Installed condition of coolant temperature sensor.

- Check for looseness or pinching.  
Refer to "CYLINDER HEAD" on page 5-12.

**Is check result OK?**

**YES**

→ Go to step 4.

**NO**

- Reinstall the sensor.
- Execute the diagnostic mode. (Code "06")
  - When engine is cold: Displayed temperature is close to the ambient temperature.

**Is check result OK?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Defective coolant temperature sensor.

- Check the coolant temperature sensor resistance.  
Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-41.

|                                                                                    |                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Coolant temperature sensor resistance</b><br/>           2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F)</p> <p><b>Coolant temperature sensor resistance</b><br/>           210–221 Ω at 100 °C (210–221 Ω at 212 °F)</p> |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

- Replace the coolant temperature sensor.  
Refer to "CYLINDER HEAD" on page 5-12.
- Execute the diagnostic mode. (Code "06")
  - When engine is cold: Displayed temperature is close to the ambient temperature.
- Submerge the coolant temperature sensor in a container filled with water at 20 °C (68 °F) and 100 °C (212 °F).
  - Displayed temperature is close to the 20 °C (68 °F) and 100 °C (212 °F).

**Is check result OK?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective wire harness.

- Replace the wire harness.
- Execute the diagnostic mode. (Code "06")
- When engine is cold: Displayed temperature is close to the ambient temperature.
- Submerge the coolant temperature sensor in a container filled with water at 20 °C (68 °F) and 100 °C (212 °F).

- 
- Displayed temperature is close to the 20 °C (68 °F) and 100 °C (212 °F).

**Is check result OK?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

**6. Malfunction in ECU.**

- Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

**7. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20569

## P0117, P0118

EAS33049

### TROUBLESHOOTING

#### Item

- [P0117] Coolant temperature sensor: ground short circuit detected.
- [P0118] Coolant temperature sensor: open or power short circuit detected.

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

##### TIP

Perform this procedure when the engine is cold.

#### 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

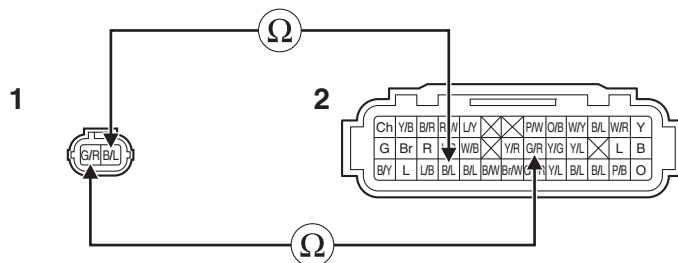
→ Go to step 3.

#### 3. Wire harness continuity.

- Disconnect the coolant temperature sensor coupler "1" and ECU coupler "2".

• Open circuit check

|                                                            |                                              |
|------------------------------------------------------------|----------------------------------------------|
| Between coolant temperature sensor coupler and ECU coupler | green/red–green/red<br>black/blue–black/blue |
|------------------------------------------------------------|----------------------------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

a. Replace the wire harness.

b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

• Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.

Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

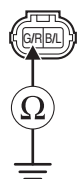
|                                                           |                  |
|-----------------------------------------------------------|------------------|
| Between coolant temperature sensor coupler “1” and ground | green/red–ground |
|-----------------------------------------------------------|------------------|

Lines short circuit check “B”

|                                    |                                                                               |
|------------------------------------|-------------------------------------------------------------------------------|
| Coolant temperature sensor coupler | green/red–black/blue                                                          |
| ECU coupler “2”                    | green/red–any other coupler terminal<br>black/blue–any other coupler terminal |

**A**

1

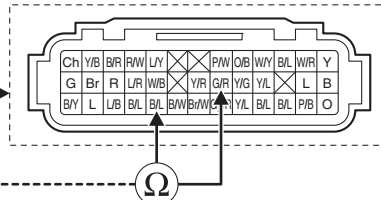


**B**

1



2



**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Installed condition of coolant temperature sensor.

- Check for looseness or pinching.

Refer to "CYLINDER HEAD" on page 5-12.

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

- a. Reinstall the sensor.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective coolant temperature sensor.

- Execute the diagnostic mode. (Code "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.

Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-41.

**Is check result OK?**

**YES**

→ Go to step 6.

**NO**

- a. Replace the coolant temperature sensor.  
Refer to "CYLINDER HEAD" on page 5-12.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

6. Malfunction in ECU.
  - Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.
7. Delete the DTC and check that the MIL goes off.
  - Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20757

## P0122, P0123

EAS33050

### TROUBLESHOOTING

#### Item

- [P0122] Throttle position sensor: open or ground short circuit detected.
- [P0123] Throttle position sensor: power short circuit detected.

#### Fail-safe system

- Able to start engine
- Able to drive vehicle

#### Procedure

ECA20500

#### NOTICE

**Do not remove the throttle body sensor assembly from the throttle body.**

#### 1. Connection of throttle body sensor 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

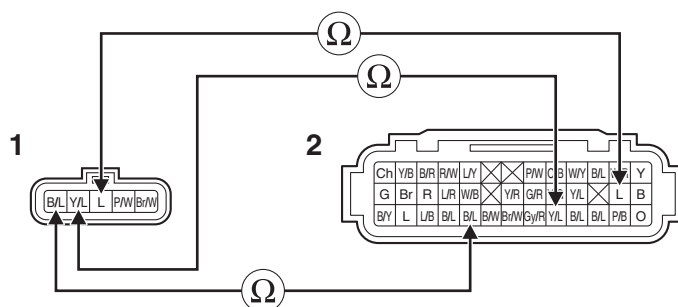
**NO**

→ Go to step 3.

## 3. Wire harness continuity.

- Disconnect the throttle body sensor assembly coupler “1” and ECU coupler “2”.
- Open circuit check

|                                                               |                                                               |
|---------------------------------------------------------------|---------------------------------------------------------------|
| Between throttle body sensor assembly coupler and ECU coupler | black/blue–black/blue<br>yellow/blue–yellow/blue<br>blue–blue |
|---------------------------------------------------------------|---------------------------------------------------------------|



### Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

### Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

### TIP

Disconnect the ECU related connectors before checking.

Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

### Ground short circuit check “A”

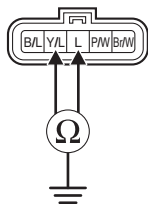
|                                                         |                                   |
|---------------------------------------------------------|-----------------------------------|
| Between throttle position sensor coupler “1” and ground | yellow/blue–ground<br>blue–ground |
|---------------------------------------------------------|-----------------------------------|

### Lines short circuit check “B”

|                                  |                                                                                                                    |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Throttle position sensor coupler | black/blue–any other coupler terminal<br>yellow/blue–any other coupler terminal<br>blue–any other coupler terminal |
| ECU coupler “2”                  | black/blue–any other coupler terminal<br>yellow/blue–any other coupler terminal<br>blue–any other coupler terminal |

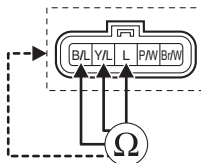
A

1

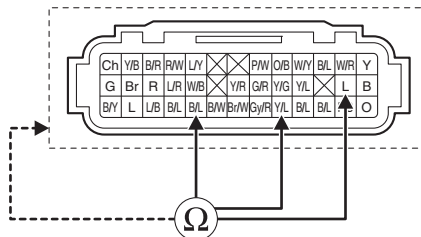


B

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

4. Installed condition of throttle position sensor.

- Check for looseness or pinching.

Is check result OK?

**YES**

→ Go to step 5.

**NO**

- a. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective throttle position sensor.

- Check throttle position sensor signal.
- Execute the diagnostic mode. (Code “01”)

|                                           |        |
|-------------------------------------------|--------|
| When the throttle valves are fully closed | 13–21  |
| When throttle valves are fully open       | 92–102 |

Is check result OK?

**YES**

→ Go to step 6.

**NO**

- a. Replace the throttle body assembly.  
Refer to "THROTTLE BODY" on page 7-7.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

6. Malfunction in ECU.
  - Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.
7. Delete the DTC and check that the MIL goes off.
  - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20571

**P0132**

EAS33051

**TROUBLESHOOTING****Item**

O<sub>2</sub> sensor: short circuit detected (power short circuit).

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Installed condition of O<sub>2</sub> sensor.

- Check for looseness or pinching.

Refer to "ENGINE REMOVAL" on page 5-6.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

- Reinstall or replace the sensor.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?**

**YES**

→ Go to step 4.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

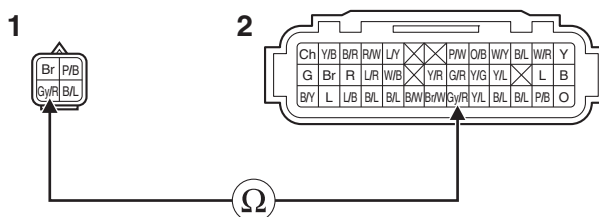
**NO**

→ Go to step 4.

**4. Wire harness continuity.**

- Disconnect the O<sub>2</sub> sensor coupler "1" and ECU coupler "2".
- Open circuit check

|                                                       |                   |
|-------------------------------------------------------|-------------------|
| Between O <sub>2</sub> sensor coupler and ECU coupler | gray/red–gray/red |
|-------------------------------------------------------|-------------------|

**Is resistance 0 Ω?****YES**

→ Go to "Short circuit check".

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

**Ground short circuit check "A"**

|                                                      |                 |
|------------------------------------------------------|-----------------|
| Between O <sub>2</sub> sensor coupler "1" and ground | gray/red–ground |
|------------------------------------------------------|-----------------|

**Lines short circuit check "B"**

|                               |                                     |
|-------------------------------|-------------------------------------|
| O <sub>2</sub> sensor coupler | gray/red–any other coupler terminal |
| ECU coupler "2"               | gray/red–any other coupler terminal |

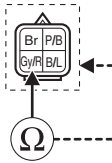
A

1

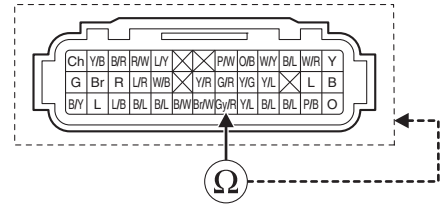


B

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 5.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

5. Defective O<sub>2</sub> sensor.

- Replace the O<sub>2</sub> sensor.

Refer to “ENGINE REMOVAL” on page 5-6.

- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

7. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20767

**P0133**O<sub>2</sub> sensor: deterioration detected

EAS33291

**OUTLINE****Explanation of detection method**

The O<sub>2</sub> sensor detects the oxygen concentration in the exhaust gas, converts it into an electrical signal, and sends it to the ECU. The ECU determines whether there is any deterioration by comparing the output value from the O<sub>2</sub> sensor with a predetermined threshold value such as response time. When the ECU determines that there is an O<sub>2</sub> sensor deterioration, the DTC is stored in ECU and MIL comes on.

|                                  |                                                                                                                       |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Frequency of detection           | Once per driving cycle                                                                                                |
| Malfunction determination method | If an abnormality is detected in three consecutive driving cycles, the malfunction is confirmed and the MIL comes on. |
| Driving condition                | Flat road, no overloading, and no acceleration or deceleration                                                        |
| Type of detection result         | Complete, Incomplete                                                                                                  |

**Requirement for detection**

|                         |                                                                          |
|-------------------------|--------------------------------------------------------------------------|
| Duration                | 400 seconds or more                                                      |
| O <sub>2</sub> feedback | Carried out                                                              |
| Vehicle speed           | 40–60 km/h (25–37 mph)                                                   |
| Gear position           | No condition specified                                                   |
| Engine speed            | No condition specified                                                   |
| Fuel correction value   | The O <sub>2</sub> feedback correction amount is within a certain range. |

**Related sensor for detection**

O<sub>2</sub> sensor, intake air pressure sensor, coolant temperature sensor, front wheel sensor, crankshaft position sensor, and throttle position sensor

**Storing DTC**

Once an abnormality has been detected, a pending DTC is stored in the memory of the ECU. Then, if the abnormality is detected in the next two driving cycles, the MIL comes on and the DTC and FFD are stored. If the vehicle is judged to be operating normally for three consecutive driving cycles, the MIL goes off. However, the DTC, pending DTC, and FFD will not be deleted even if a battery terminal is disconnected.

**Reproduction test**

Perform the test using the driving pattern according to the operating conditions of the vehicle air induction system.

EWA20860

**WARNING**

**When test riding the vehicle, always comply with local traffic regulations.**

EAS33153

**FAIL-SAFE SYSTEM**

- Able to start engine
- Able to drive vehicle

EAS32813

## TROUBLESHOOTING

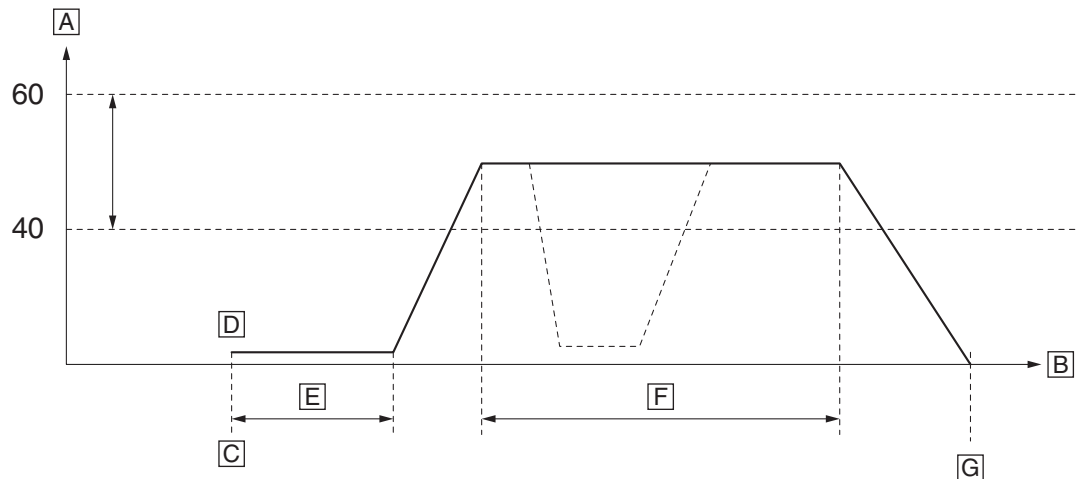
### TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- DTCs except P0133

1. Connect the YDT to check and delete the DTC stored in the ECU.
2. Perform the reproduction test under the following conditions, then go to step 3.

#### Reproduction test conditions



- A. Speed [km/h]
- B. Time [min]
- C. Start the engine
- D. Idle (warm up)

- E. 5 min.
- F. Total: 15 min.
- G. Stop the engine

3. Connect the YDT and check if the pending DTC is displayed.

#### Is pending DTC displayed?

##### Yes

→ Delete the pending DTC, then go to step 4.

##### No

→ Check the readiness status.

##### Readiness status is "Complete".

→ Check the coupler between the ECU and O<sub>2</sub> sensor for any abnormality. If there is no abnormality, temporary connection failure is considered to be the cause, so finish the troubleshooting.

##### Readiness status is "Incomplete"

→ Reproduction test is required again because the reproduction is not completed.  
Go to step 2.

4. Replace the O<sub>2</sub> sensor, then go to step 5.
5. Perform reproduction test and connect the YDT.  
Check that the pending DTC is not detected and readiness status is "Complete". Then complete the troubleshooting.

EAS20414

**P0134**

EAS32834

**TROUBLESHOOTING****Item**

O<sub>2</sub> sensor: signal stuck

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure****TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

1. P0030
2. P00D1, P2195
3. P0105, P0106, P0107, P0108, P0110, P0111, P0112, P0113, P0115, P0116, P0117, P0118, P0122, P0123, P0132, P0201, P0335, P0351, P0480, P0500, P0560, P0563, P062F, P0657
4. P0301

1. Engine condition.

- Check the idling condition and check the engine sound while racing the engine.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

- a. Check the ignition spark gap.  
Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-38.
- b. Test ride the vehicle according to the test-ride conditions for the O<sub>2</sub> deterioration diagnosis.  
Refer to step 2 in "TROUBLESHOOTING" on page 9-84.  
At this time, do not check the malfunction diagnosis status (readiness).
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 2.

2. Installed condition of O<sub>2</sub> sensor.

- Check for looseness or pinching.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

- a. Reinstall the O<sub>2</sub> sensor.
- b. Test ride the vehicle according to the test-ride conditions for the O<sub>2</sub> deterioration diagnosis.  
Refer to step 2 in "TROUBLESHOOTING" on page 9-84.  
At this time, do not check the malfunction diagnosis status (readiness).
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

---

→ Go to step 6, and complete the service.

**NO**

→ Go to step 3.

3. Check fuel pressure.

- Check the fuel pressure.

Refer to “CHECKING THE FUEL PRESSURE” on page 7-5.

**Is check result OK?**

**YES**

→ Go to step 4.

**NO**

- Replace the fuel pump.  
Refer to “REMOVING THE FUEL PUMP” on page 7-4.
- Test ride the vehicle according to the test-ride conditions for the O<sub>2</sub> deterioration diagnosis.  
Refer to step 2 in “TROUBLESHOOTING” on page 9-84.  
At this time, do not check the malfunction diagnosis status (readiness).
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

4. Defective O<sub>2</sub> sensor.

- Replace the O<sub>2</sub> sensor.

Refer to “ENGINE REMOVAL” on page 5-6.

- Test ride the vehicle according to the test-ride conditions for the O<sub>2</sub> deterioration diagnosis.  
Refer to step 2 in “TROUBLESHOOTING” on page 9-84.  
At this time, do not check the malfunction diagnosis status (readiness).
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20574

**P0201**

EAS33054

**TROUBLESHOOTING****Item**

Fuel injector: malfunction in fuel injector.

**Fail-safe system**

- Unable to start engine
- Unable to drive vehicle

**Procedure**

1. Connection of fuel injector coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "36")

**Is there an operating sound?****YES**

→ Go to step 6.

**NO**

→ Go to step 2.

2. Defective fuel injector.

- Measure the fuel injector resistance.

Refer to "CHECKING THE FUEL INJECTOR" on page 8-43.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

- a. Replace the fuel injector.  
Refer to "THROTTLE BODY" on page 7-7.
- b. Execute the diagnostic mode. (Code "36")

**Is there an operating sound?****YES**

→ Go to step 6.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 4.

**NO**

- Connect the coupler securely or replace the wire harness.
- Execute the diagnostic mode. (Code "36")

**Is there an operating sound?**

**YES**

→ Go to step 6.

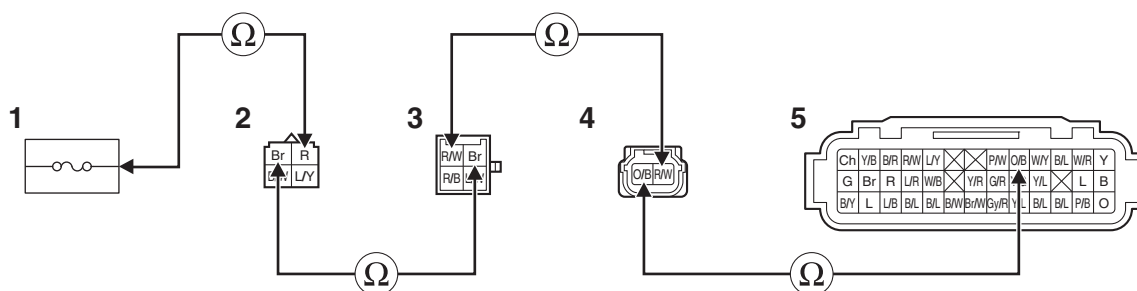
**NO**

→ Go to step 4.

**4. Wire harness continuity.**

- Disconnect the main fuse "1", main switch coupler "2", handlebar switch (right) coupler "3", fuel injector coupler "4" and ECU coupler "5".
- Open circuit check

|                                                                    |                           |
|--------------------------------------------------------------------|---------------------------|
| Between main fuse and main switch coupler                          | red-red                   |
| Between main switch coupler and handlebar switch (right) coupler   | brown-brown               |
| Between handlebar switch (right) coupler and fuel injector coupler | red/white-red/white       |
| Between fuel injector coupler and ECU coupler                      | orange/black-orange/black |



**Is resistance 0 Ω?**

**YES**

→ Go to "Short circuit check".

**NO**

- Replace the wire harness.
- Execute the diagnostic mode. (Code "36")

**Is there an operating sound?**

**YES**

→ Go to step 6.

**NO**

→ Go to step 5.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

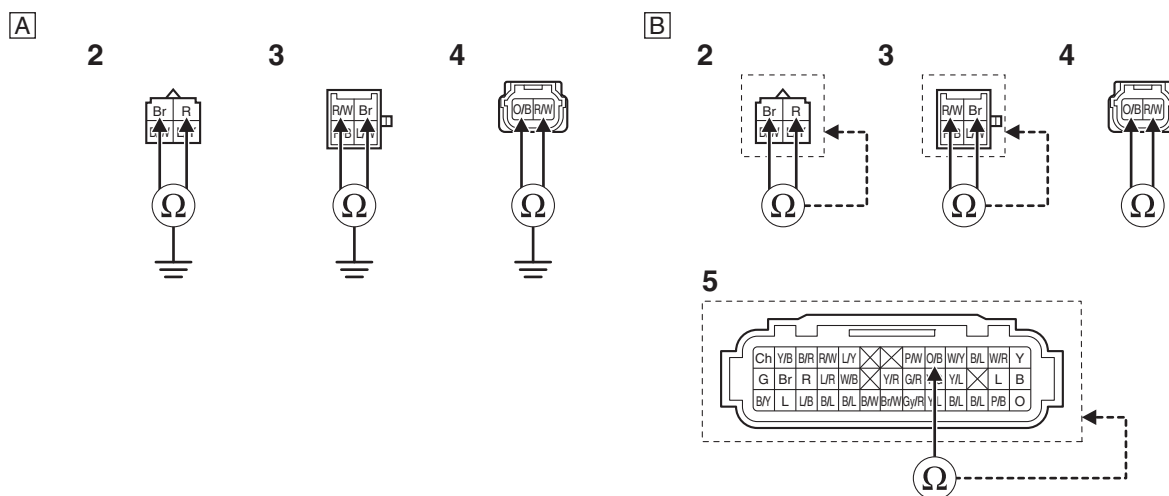
**Ground short circuit check "A"**

|                                            |                            |
|--------------------------------------------|----------------------------|
| Between main switch coupler "2" and ground | brown-ground<br>red-ground |
|--------------------------------------------|----------------------------|

|                                                         |                                         |
|---------------------------------------------------------|-----------------------------------------|
| Between handlebar switch (right) coupler “3” and ground | red/white–ground<br>brown–ground        |
| Between fuel injector coupler “4” and ground            | orange/black–ground<br>red/white–ground |

Lines short circuit check “B”

|                                  |                                                                          |
|----------------------------------|--------------------------------------------------------------------------|
| Main switch coupler              | red–any other coupler terminal<br>brown–any other coupler terminal       |
| Handlebar switch (right) coupler | brown–any other coupler terminal<br>red/white–any other coupler terminal |
| Fuel injector coupler            | orange/black–red/white                                                   |
| ECU coupler “5”                  | orange/black–any other coupler terminal                                  |



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 5.

**NO**

- Replace the wire harness.
- Execute the diagnostic mode. (Code “36”)

Is there an operating sound?

**YES**

→ Go to step 6.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Start the engine and let it idle for approximately 5 seconds.
- Confirm that the DTC has a condition of “Recovered” using the malfunction mode of the YDT, and then delete the DTC.

EAS20792

**P0301**

EAS33318

**OUTLINE****Explanation of detection method**

The ECU monitors the consistency of the crankshaft rotation by crankshaft position sensor, and if the angular velocity fluctuates irregularly, the ECU determines that there is a misfire. Two kinds of misfire judgment are performed according to the number of misfire occurrences and the threshold value.

## \* Catalyst damage

- The number of misfires per 200 revolutions of the crankshaft exceeds the threshold value, and it is detected that the exhaust gas damages the catalyst, the DTC is stored in the ECU and the MIL starts flashing.

## \* Exhaust gas deterioration

- The number of misfires per 1000 revolutions of the crankshaft exceeds the threshold value, and it is detected that the exhaust gas does not damage the catalyst but affect the exhaust gas emission level, the DTC is stored in the ECU and the MIL comes on.

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency of detection           | Always                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Time required for detection      | Always                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Malfunction determination method | <ul style="list-style-type: none"> <li>• Catalyst damage<br/>When an abnormality is detected three times in one driving cycle, it is determined to be a pending abnormality and the MIL starts flashing. If this cycle occurs in three consecutive driving cycles, the malfunction is determined and the MIL comes on.</li> <li>• Exhaust gas deterioration<br/>If an abnormality is detected four times within one driving cycle, it is determined to be a pending abnormality. The MIL does not flash at this time. If this cycle occurs in three consecutive driving cycles, the malfunction is determined and the MIL comes on.</li> </ul> |
| Driving condition                | No excessive acceleration or deceleration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Type of detection result         | Complete, Incomplete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Requirement for detection**

|                         |                                                       |
|-------------------------|-------------------------------------------------------|
| Duration                | Refer to the conversion table of steady driving time. |
| Engine starting time    | No condition specified                                |
| O <sub>2</sub> feedback | No condition specified                                |
| Vehicle speed           | No condition specified                                |
| Gear position           | No condition specified                                |
| Engine speed            | 2400–9000 r/min                                       |

**Related sensors for detection**

Intake air pressure sensor, coolant temperature sensor, front wheel sensor, crankshaft position sensor, and throttle position sensor

**Storing DTC**

Once an abnormality has been detected, a pending DTC is stored in the memory of the ECU. Then, if the abnormality is detected in the next two driving cycles, the MIL comes on and the DTC and FFD are stored. If the vehicle is judged to be operating normally for three consecutive driving cycles, the MIL goes off. However, the DTC, pending DTC, and FFD will not be deleted even if a battery terminal is disconnected.

---

### Reproduction test

Operate the vehicle according to the engine speed, vehicle speed, and gear position in the FFD. Confirm the operating time in the conversion table of steady driving time according to the engine speed in the FFD. Do not accelerate or decelerate excessively during the reproduction test. Continue to operate the vehicle even if the vehicle cannot be operated at a constant speed due to the operating environment.

EWA20860



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**When test riding the vehicle, always comply with local traffic regulations.**

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EAS33154

### FAIL-SAFE SYSTEM

- Able/Unable to start engine
- Able/Unable to drive vehicle

EAS32820

### TROUBLESHOOTING

#### TIP

---

If more than one DTC is detected at the same time, perform troubleshooting of DTCs listed below first  
–DTCs except P0301

---

1. Connect the YDT and check the DTC stored in the ECU.

#### DTC is displayed

- Check the engine speed, vehicle speed and gear position of FFD.
- Delete DTC, then go to step 2.

#### Pending DTC is displayed

- Confirm the engine speed, vehicle speed and gear position to the customer when the customer feels an abnormality.
- Delete pending DTC, then go to step 2.

#### DTC and pending DTC are not displayed.

- Confirm the engine speed, vehicle speed and gear position to the customer when the customer feels an abnormality.
- Go to step 2.

2. Perform the reproduction test under the following conditions, then go to step 3.

ECA26950

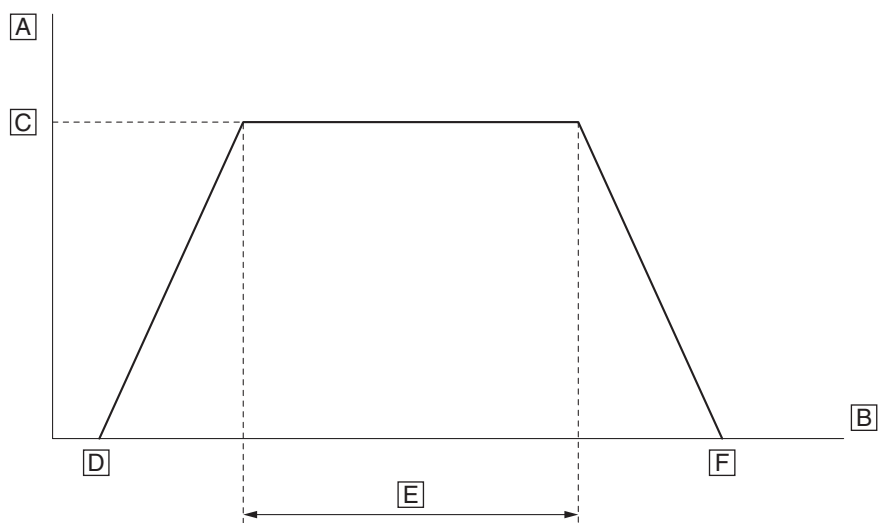
#### NOTICE

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**If the MIL flashes during the reproduction test, immediately decelerate or reduce the engine speed. Otherwise, the catalyst could be damaged.**

---

### Reproduction test condition



- A. Speed [km/h]
- B. Time [min]
- C. Vehicle speed of FFD
- D. Start the engine

- E. Steady driving time
- F. Stop the engine

| Conversion table of steady driving time |             |
|-----------------------------------------|-------------|
| Engine speed (r/min)                    | Time (sec.) |
| 2000                                    | 240         |
| 3000                                    | 160         |
| 4000                                    | 120         |
| 5000                                    | 96          |
| 6000                                    | 80          |
| 7000                                    | 70          |
| 8000                                    | 60          |
| 9000                                    | 54          |
| 10000                                   | 48          |

3. Connect the YDT and check if the pending DTC is displayed.

#### Is the pending DTC displayed?

##### Yes

→ Delete the pending DTC, then go to step 4.

##### No

→ Confirm the engine speed, vehicle speed and gear position to the customer when the customer feels an abnormality.

Go to step 2.

If the pending DTC is not displayed after several reproduction test, go to step 4.

4. Check the ignition system

---

**Is the inspection result OK?****Yes**

→ Go to step 5.

**No**

→ Repair or replace the defective part, then go to step 6.

5. Check the following parts. If defective, replace the parts and go to step 6.

- Intake air pressure sensor
- Coolant temperature sensor (or Engine temperature sensor)
- Front wheel sensor
- Crankshaft position sensor
- Throttle position sensor

6. Perform a reproduction test and connect the YDT.

Check that the pending DTC is not detected, then complete the troubleshooting.

EAS20578

**P0335**

EAS33058

**TROUBLESHOOTING****Item**

Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.

**Fail-safe system**

- Unable to start engine
- Unable to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 2.

2. Connection of wire harness ECU coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

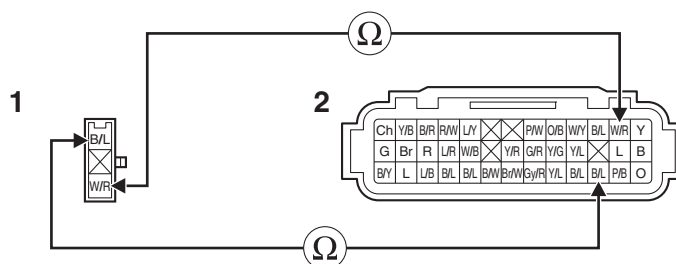
→ Go to step 7, and complete the service.

**NO**

→ Go to step 3.

3. Wire harness continuity.
  - Disconnect the crankshaft position sensor coupler “1” and ECU coupler “2”.
  - Open circuit check

|                                                            |                                              |
|------------------------------------------------------------|----------------------------------------------|
| Between crankshaft position sensor coupler and ECU coupler | black/blue–black/blue<br>white/red–white/red |
|------------------------------------------------------------|----------------------------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

|                                                           |                  |
|-----------------------------------------------------------|------------------|
| Between crankshaft position sensor coupler “1” and ground | white/red–ground |
|-----------------------------------------------------------|------------------|

Lines short circuit check “B”

|                                    |                                                                               |
|------------------------------------|-------------------------------------------------------------------------------|
| Crankshaft position sensor coupler | black/blue–white/red                                                          |
| ECU coupler “2”                    | black/blue–any other coupler terminal<br>white/red–any other coupler terminal |

**A**

1

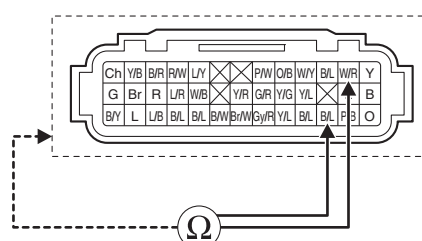


**B**

1



2



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

**4. Installed condition of crankshaft position sensor.**

- Check for looseness or pinching.

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

- a. Reinstall or replace the sensor.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

**5. Defective crankshaft position sensor.**

- Check the crankshaft position sensor.

Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-38.

**Is check result OK?**

**YES**

→ Go to step 6.

**NO**

- a. Replace the crankshaft position sensor.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

**6. Malfunction in ECU.**

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

**7. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20580

**P0351**

EAS33060

**TROUBLESHOOTING****Item**

Ignition coil: open or short circuit detected in the primary lead of the ignition coil.

**Fail-safe system**

- Unable to start engine
- Unable to drive vehicle

**Procedure**

1. Connection of the ignition coil connector.

**Is the connector condition normal?****YES**

→ Go to step 2.

**NO**

- Connect the connector securely or replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- 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 DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 7, and complete the service.

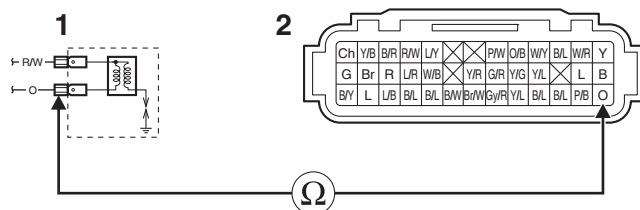
**NO**

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the ignition coil connector “1” and ECU coupler “2”.
- Open circuit check

|                                                 |               |
|-------------------------------------------------|---------------|
| Between ignition coil connector and ECU coupler | orange—orange |
|-------------------------------------------------|---------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

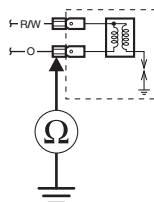
|                                                |               |
|------------------------------------------------|---------------|
| Between ignition coil connector “1” and ground | orange–ground |
|------------------------------------------------|---------------|

Lines short circuit check “B”

|                         |                                   |
|-------------------------|-----------------------------------|
| Ignition coil connector | orange–red/white                  |
| ECU coupler “2”         | orange–any other coupler terminal |

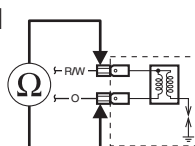
**A**

1

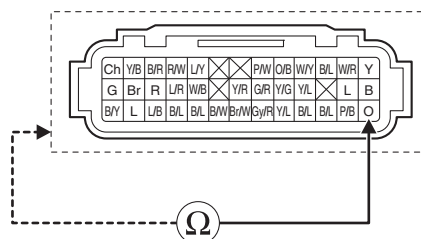


**B**

1



2



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 4.

**4. Installed condition of the ignition coil.**

- Check for looseness or pinching.

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

- a. Reinstall or replace the ignition coil.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

**5. Defective ignition coil.**

- Measure the primary coil resistance of the ignition coil.  
Refer to “CHECKING THE IGNITION COIL” on page 8-37.

**Is check result OK?**

**YES**

→ Go to step 6.

**NO**

- a. Replace the ignition coil.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

**6. Malfunction in ECU.**

- Execute the diagnostic mode. (Code “30”)
- Confirm that spark plug does not sparking.
- Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

**7. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20585

**P0480**

EAS33065

**TROUBLESHOOTING****Item**

Radiator fan motor relay: open or short circuit detected.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Connection of radiator fan motor relay coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?**

**YES**

→ Go to step 2.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?**

**YES**

→ Go to step 3.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

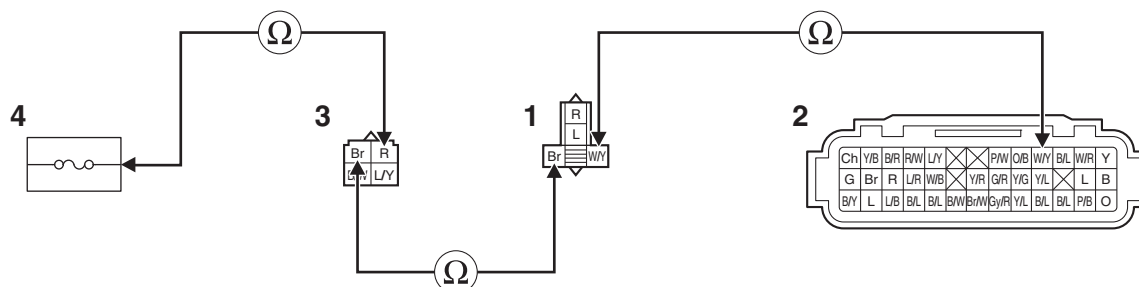
→ Go to step 3.

3. Wire harness continuity.

- Disconnect the radiator fan motor relay coupler "1", ECU coupler "2", main switch coupler "3", and main fuse "4".
- Open circuit check

|                                                  |         |
|--------------------------------------------------|---------|
| Between main fuse holder and main switch coupler | red-red |
|--------------------------------------------------|---------|

|                                                                  |                           |
|------------------------------------------------------------------|---------------------------|
| Between main switch coupler and radiator fan motor relay coupler | brown–brown               |
| Between radiator fan motor relay coupler and ECU coupler         | white/yellow–white/yellow |



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

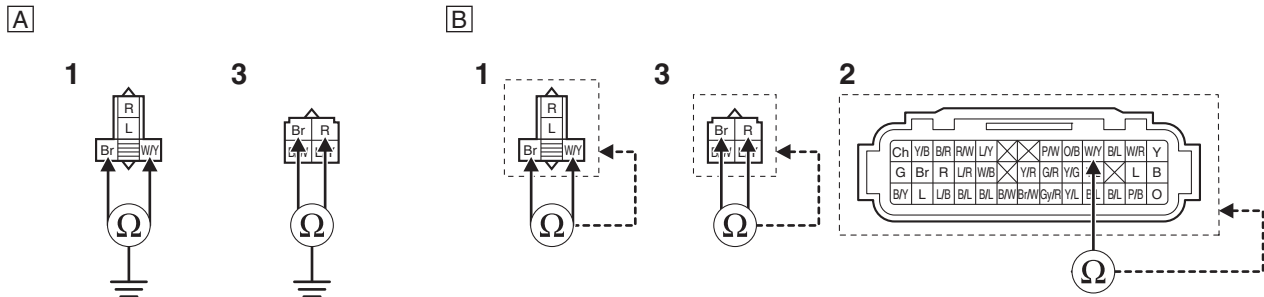
Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

|                                                         |                                     |
|---------------------------------------------------------|-------------------------------------|
| Between radiator fan motor relay coupler “1” and ground | brown–ground<br>white/yellow–ground |
| Main switch coupler “3” and ground                      | red–ground<br>brown–ground          |

Lines short circuit check “B”

|                                  |                                                                             |
|----------------------------------|-----------------------------------------------------------------------------|
| Radiator fan motor relay coupler | brown–any other coupler terminal<br>white/yellow–any other coupler terminal |
| Main switch coupler              | red–any other coupler terminal<br>brown–any other coupler terminal          |
| ECU coupler “2”                  | white/yellow–any other coupler terminal                                     |



**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 4.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

4. Defective radiator fan motor relay.

- Replace the radiator fan motor relay.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20769

**P0500**

EAS33113

**TROUBLESHOOTING****Item**

Rear wheel sensor: no normal signals are received from the rear wheel sensor.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Connection of rear wheel sensor coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code "07")
- c. Rotate the rear wheel by hand and check that the indicated value increases.

**Is that value increased?****YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 2.

2. Connection of ABS ECU coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Refer to "REMOVING THE HYDRAULIC UNIT ASSEMBLY" on page 4-42.

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.  
Refer to "INSTALLING THE HYDRAULIC UNIT ASSEMBLY" on page 4-42.
- b. Execute the diagnostic mode. (Code "07")
- c. Rotate the rear wheel by hand and check that the indicated value increases.

**Is that value increased?****YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?**

**YES**

→ Go to step 4.

**NO**

- Connect the coupler securely or replace the wire harness.
- Execute the diagnostic mode. (Code "07")
- Rotate the rear wheel by hand and check that the indicated value increases.

**Is that value increased?**

**YES**

→ Go to step 8, and complete the service.

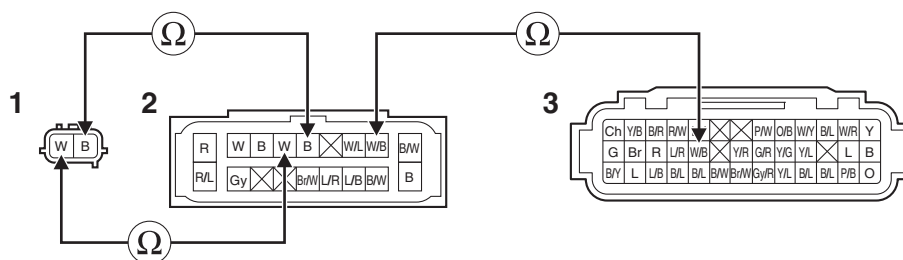
**NO**

→ Go to step 4.

**4. Wire harness continuity.**

- Disconnect the rear wheel sensor coupler "1", ABS ECU coupler "2" and ECU coupler "3".
- Open circuit check

|                                                       |                            |
|-------------------------------------------------------|----------------------------|
| Between rear wheel sensor coupler and ABS ECU coupler | black-black<br>white-white |
| Between ABS ECU coupler and ECU coupler               | white/black-white/black    |



**Is resistance 0 Ω?**

**YES**

→ Go to "Short circuit check".

**NO**

- Replace the wire harness.
- Execute the diagnostic mode. (Code "07")
- Rotate the rear wheel by hand and check that the indicated value increases.

**Is that value increased?**

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 5.

- Short circuit check

**TIP**

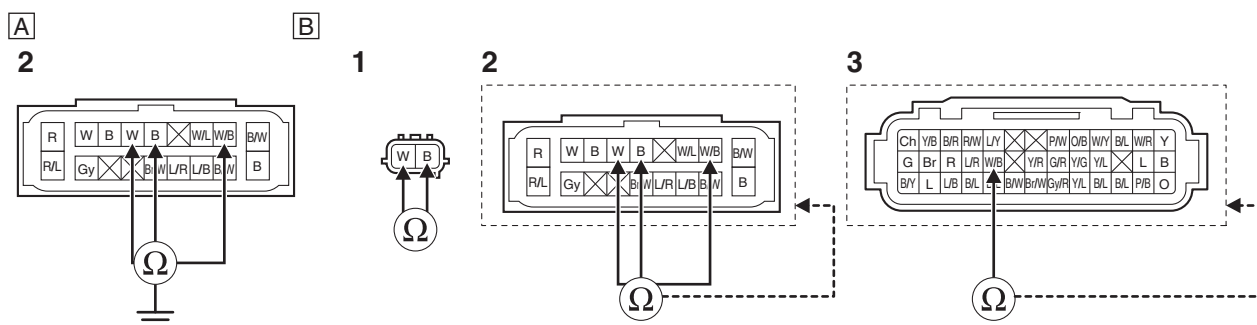
Disconnect the ECU and ABS ECU related connectors before checking.  
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3 and "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

Ground short circuit check "A"

|                                        |                                                    |
|----------------------------------------|----------------------------------------------------|
| Between ABS ECU coupler "2" and ground | black-ground<br>white-ground<br>white/black-ground |
|----------------------------------------|----------------------------------------------------|

Lines short circuit check "B"

|                               |                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|
| Rear wheel sensor coupler "1" | white-black                                                                                                    |
| ABS ECU coupler               | black-any other coupler terminal<br>white-any other coupler terminal<br>white/black-any other coupler terminal |
| ECU coupler "3"               | white/black-any other coupler terminal                                                                         |



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 5.

**NO**

- Replace the wire harness.
- Execute the diagnostic mode. (Code "07")
- Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 5.

5. Defective rear wheel sensor.

- Reinstall or replace the rear wheel sensor.  
Refer to "REAR WHEEL" on page 4-14.
- Execute the diagnostic mode. (Code "07")
- Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 6.

6. Malfunction in ECU.

- Replace the ECU.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.
- Execute the diagnostic mode. (Code "07")
- Rotate the rear wheel by hand and check that the indicated value increases.

---

**Is that value increased?**

**YES**

→ Go to step 8, and complete the service.

**NO**

→ Go to step 7.

7. Malfunction in ABS ECU.

- Replace the ABS ECU.

Refer to "REMOVING THE HYDRAULIC UNIT ASSEMBLY" on page 4-42.

- Go to step 8, and complete the service.

8. Delete the DTC and check that the MIL goes off.

- Turn the main switch to "ON", and then rotate the rear wheel by hand.
- Confirm that the DTC has a condition of "Recovered" using the malfunction mode of the YDT, and then delete the DTC.
- Delete this DTC even if it has a condition of "Detected".

EAS20589

**P0507**

EAS33069

**TROUBLESHOOTING****Item**

FID (Fast Idle Device) solenoid: stuck fully open.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure****1. Connection of FID (Fast Idle Device) 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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?****YES**

→ Go to step 6, and complete the service.

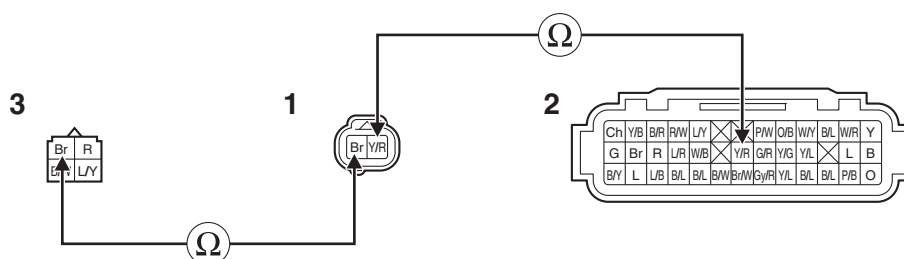
**NO**

→ Go to step 3.

**3. Wire harness continuity.**

- Disconnect the FID (Fast Idle Device) coupler “1”, ECU coupler “2”, and main switch coupler “3”.
- Open circuit check

|                                                                |                       |
|----------------------------------------------------------------|-----------------------|
| Between FID (Fast Idle Device) coupler and ECU coupler         | yellow/red–yellow/red |
| Between FID (Fast Idle Device) coupler and main switch coupler | brown–brown           |

**Is resistance 0 Ω?****YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

**Ground short circuit check “A”**

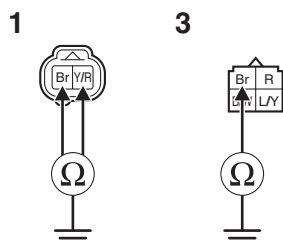
|                                                       |                                   |
|-------------------------------------------------------|-----------------------------------|
| Between FID (Fast Idle Device) coupler “1” and ground | brown–ground<br>yellow/red–ground |
|-------------------------------------------------------|-----------------------------------|

|                                            |              |
|--------------------------------------------|--------------|
| Between main switch coupler "3" and ground | brown-ground |
|--------------------------------------------|--------------|

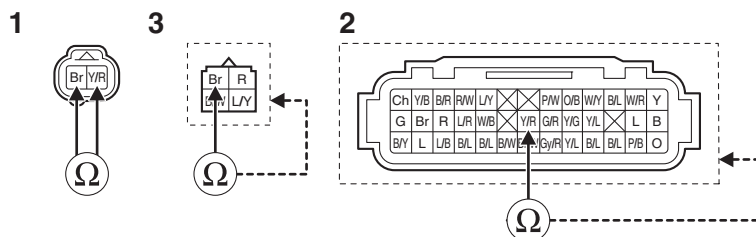
Lines short circuit check "B"

|                                |                                       |
|--------------------------------|---------------------------------------|
| FID (Fast Idle Device) coupler | brown-yellow/red                      |
| Main switch coupler            | brown-any other coupler terminal      |
| ECU coupler "2"                | yellow/red-any other coupler terminal |

A



B



Is resistance 0 Ω?

**YES**

→ Go to step 4.

**NO**

- Replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Start the engine, and then check the condition of the DTC.

Is it in the "Recovered" condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

#### 4. Defective FID (Fast Idle Device).

- Check the FID (Fast Idle Device).

Refer to "CHECKING THE FID (FAST IDLE DEVICE)" on page 8-41.

Is check result OK?

**YES**

→ Go to step 5.

**NO**

- Replace the throttle body assembly.  
Refer to "THROTTLE BODY" on page 7-7.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

Start the engine, and then check the condition of the DTC.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20590

**P0511**

EAS33070

**TROUBLESHOOTING****Item**

FID (Fast Idle Device) solenoid: FID solenoid does not operate.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

## 1. Connection of FID (Fast Idle Device) 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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- Connect the coupler securely or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 3.

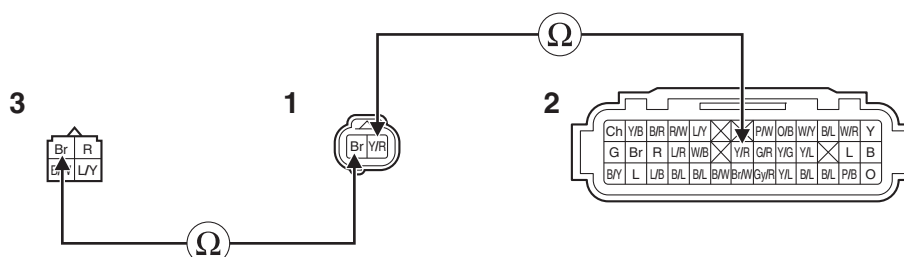
## 3. Wire harness continuity.

- Disconnect the FID (Fast Idle Device) coupler "1", ECU coupler "2", and main switch coupler "3".
- Open circuit check

|                                                        |                       |
|--------------------------------------------------------|-----------------------|
| Between FID (Fast Idle Device) coupler and ECU coupler | yellow/red–yellow/red |
|--------------------------------------------------------|-----------------------|

Between FID (Fast Idle Device) coupler and main switch coupler

brown–brown



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

#### TIP

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

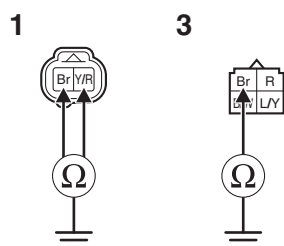
#### Ground short circuit check “A”

|                                                       |                                   |
|-------------------------------------------------------|-----------------------------------|
| Between FID (Fast Idle Device) coupler “1” and ground | brown–ground<br>yellow/red–ground |
| Between main switch coupler “3” and ground            | brown–ground                      |

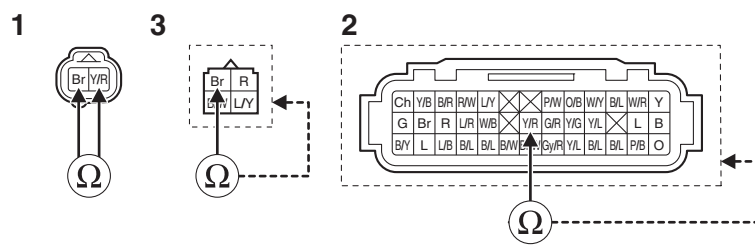
#### Lines short circuit check “B”

|                                |                                       |
|--------------------------------|---------------------------------------|
| FID (Fast Idle Device) coupler | brown–yellow/red                      |
| Main switch coupler            | brown–any other coupler terminal      |
| ECU coupler “2”                | yellow/red–any other coupler terminal |

**A**



**B**



---

**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

4. Faulty FID (Fast Idle Device) solenoid operation.

- Execute the diagnostic mode. (Code “54”)

**Is there an operating sound?**

**YES**

→ Go to step 5.

**NO**

- a. Replace the throttle body assembly.  
Refer to “THROTTLE BODY” on page 7-7.
- b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.  
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20434

**P0560, P0563**

EAS33304

**TROUBLESHOOTING****Item**

- [P0560] Charging voltage is abnormal.
- [P0563] Vehicle system power voltage out of range.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure****1. Malfunction in charging system.**

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

**Is check result OK?****YES**

- a. Start the engine and let it idle for approximately 5 seconds.
- b. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 2, and complete the service.

**NO**

→ Repeat step 1.

**NO**

- a. Defective rectifier/regulator or AC magneto → Replace.
- b. Defective connection in the charging system circuit → Properly connect or replace the wire harness.
- c. Start the engine and let it idle for approximately 5 seconds.
- d. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 2, and complete the service.

**NO**

→ Repeat step 1.

**2. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

---

EAS20676

**P0601**

EAS33305

**TROUBLESHOOTING**

**Item**

Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)

**Fail-safe system**

- Unable to start engine
- Unable to drive vehicle

**Procedure**

1. Malfunction in ECU.

- Replace the ECU.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

- Turn the main switch to “ON”.
- Check that the MIL does not come on.

EAS20598

**P062F**

EAS33078

**TROUBLESHOOTING****Item**

EEPROM DTC: an error is detected while reading or writing on EEPROM.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Locate the malfunction.
  - Execute the diagnostic mode (Code "60")
    - 00**  
Go to step 4.
    - 01**  
Go to step 2.
    - 12**  
Go to step 3.
2. "01" is indicated in diagnostic mode (Code "60"). EEPROM data error for adjustment of CO concentration.
  - 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.
  - Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**  
→ Go to step 5, and complete the service.

**NO**

  - a. Repeat step 1.
  - b. If the same number is indicated, go to item 4.
3. "12" is indicated in diagnostic mode (Code "60"). EEPROM data error for O<sub>2</sub> feedback learning values.
  - Turn the main switch to "OFF".
  - Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**  
→ Go to step 5, and complete the service.

**NO**

  - a. Repeat step 1.
  - b. If the same number is indicated, go to item 4.
4. Malfunction in ECU.
  - Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.
5. Delete the DTC and check that the MIL goes off.
  - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20601

**P0657**

EAS33081

**TROUBLESHOOTING****Item**

Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. 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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Start the engine and let it idle for approximately 5 seconds.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 4, and complete the service.

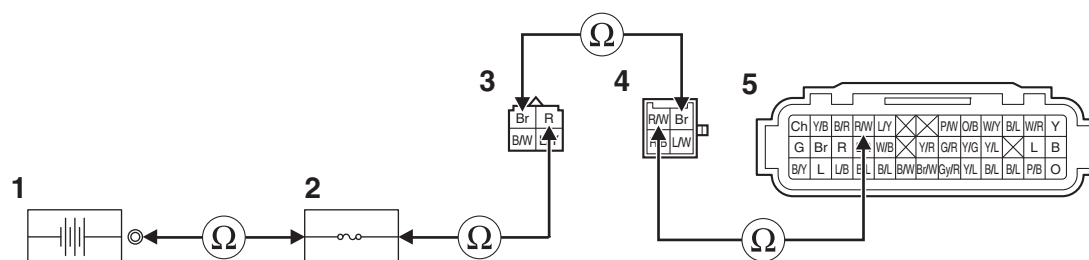
**NO**

→ Go to step 2.

2. Wire harness and/or sub-wire harness continuity.

- Disconnect the battery terminal “1”, main fuse holder “2”, main switch coupler “3”, handlebar switch (right) coupler “4”, and ECU coupler “5”.
- Open circuit check

|                                                                  |                     |
|------------------------------------------------------------------|---------------------|
| Between battery terminal and main fuse holder                    | red–red             |
| Between main fuse holder and main switch coupler                 | red–red             |
| Between main switch coupler and start/engine stop switch coupler | brown–brown         |
| Between handlebar switch (right) coupler and ECU coupler         | red/white–red/white |



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 4, and complete the service.

**NO**

→ Go to step 3.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

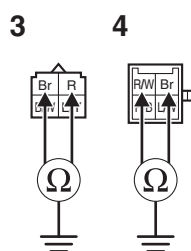
**Ground short circuit check “A”**

|                                                         |                                  |
|---------------------------------------------------------|----------------------------------|
| Between main switch coupler “3” and ground              | red–ground<br>brown–ground       |
| Between handlebar switch (right) coupler “4” and ground | red/white–ground<br>brown–ground |

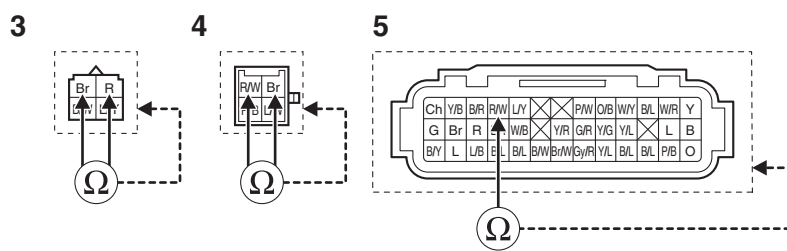
**Lines short circuit check “B”**

|                                  |                                                                          |
|----------------------------------|--------------------------------------------------------------------------|
| Main switch coupler              | red–any other coupler terminal<br>brown–any other coupler terminal       |
| Handlebar switch (right) coupler | red/white–any other coupler terminal<br>brown–any other coupler terminal |
| ECU coupler “5”                  | red/white–any other coupler terminal                                     |

**A**



**B**



**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 3.

**NO**

- Replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 4, and complete the service.

**NO**

→ Go to step 3.

---

3. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

4. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20614

**P1601**

EAS33094

**TROUBLESHOOTING****Item**

Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.

**Fail-safe system**

- Unable to start engine
- Unable to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then extend and retract the sidestand.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then extend and retract the sidestand.
- c. Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 3.

3. Connection of main switch coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?****YES**

→ Go to step 4.

**NO**

- 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 DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 7, and complete the service.

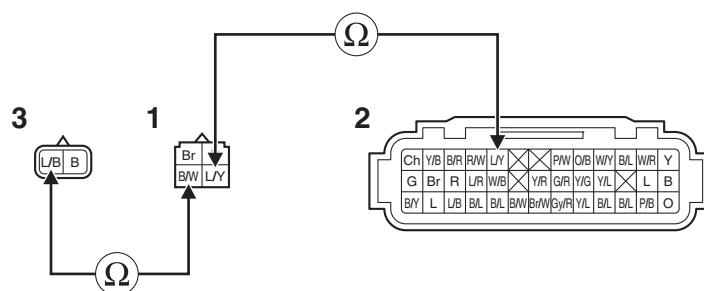
**NO**

→ Go to step 4.

**4. Wire harness continuity.**

- Disconnect the main switch coupler “1”, ECU coupler “2” and sidestand switch coupler “3”.
- Open circuit check

|                                                          |                         |
|----------------------------------------------------------|-------------------------|
| Between main switch coupler and ECU coupler              | blue/yellow–blue/yellow |
| Between main switch coupler and sidestand switch coupler | black/white–blue/black  |

**Is resistance 0 Ω?****YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?****YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

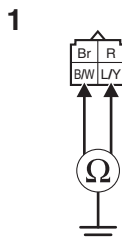
**Ground short circuit check “A”**

|                                            |                                          |
|--------------------------------------------|------------------------------------------|
| Between main switch coupler “1” and ground | black/white–ground<br>blue/yellow–ground |
|--------------------------------------------|------------------------------------------|

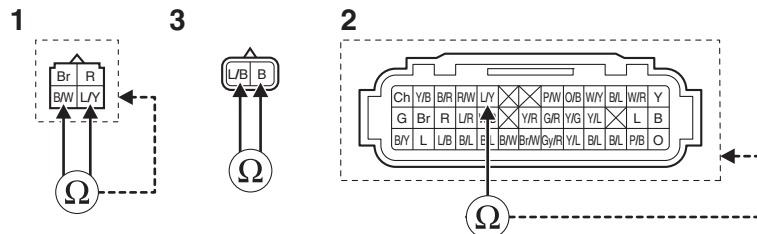
## Lines short circuit check "B"

|                              |                                                                                  |
|------------------------------|----------------------------------------------------------------------------------|
| Main switch coupler          | black/white—any other coupler terminal<br>blue/yellow—any other coupler terminal |
| Sidestand switch coupler "3" | blue/black—black                                                                 |
| ECU coupler "2"              | blue/yellow—any other coupler terminal                                           |

A



B

Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 5.

**NO**

- Replace the wire harness.
- Turn the main switch to "ON", and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 5.

## 5. Defective sidestand switch.

- Execute the diagnostic mode. (Code "20")

|                     |     |
|---------------------|-----|
| Sidestand retracted | ON  |
| Sidestand extended  | OFF |

Is check result OK?

**YES**

→ Go to step 6.

**NO**

- Replace the sidestand switch.
- Turn the main switch to "ON", and then extend and retract the sidestand.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

**YES**

→ Go to step 7, and complete the service.

**NO**

→ Go to step 6.

## 6. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

- 
7. Delete the DTC and check that the MIL goes off.
- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20615

**P1602**

EAS33095

**TROUBLESHOOTING****Item**

Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Installed condition of battery leads.

- Check the installed condition of the battery and battery leads (loose bolts).

**Is check result OK?****YES**

→ Go to step 2.

**NO**

- Reinstall or replace the wire harness.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 2.

2. Check the main fuse.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

- Replace the fuse.
- Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?****YES**

→ Go to step 5, and complete the service.

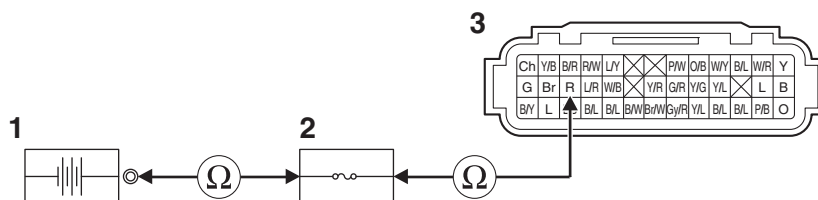
**NO**

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the battery terminal "1", main fuse holder "2", and ECU coupler "3".
- Open circuit check

|                                               |         |
|-----------------------------------------------|---------|
| Between battery terminal and main fuse holder | red-red |
| Between main fuse holder and ECU coupler      | red-red |



Is resistance 0  $\Omega$ ?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

#### TIP

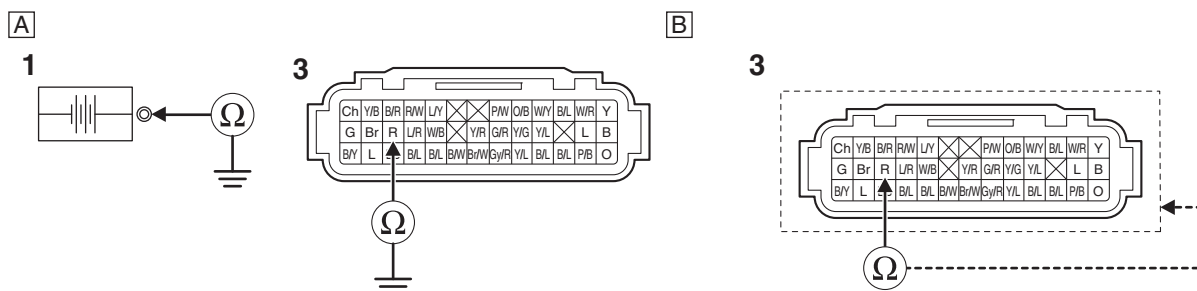
Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

#### Ground short circuit check “A”

|                                         |            |
|-----------------------------------------|------------|
| Between battery terminal “1” and ground | red–ground |
| Between ECU coupler “3” and ground      | red–ground |

#### Lines short circuit check “B”

|                 |                                |
|-----------------|--------------------------------|
| ECU coupler “3” | red–any other coupler terminal |
|-----------------|--------------------------------|



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 5, and complete the service.

**NO**

→ Go to step 4.

4. Malfunction in ECU.
  - Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.
5. Delete the DTC and check that the MIL goes off.
  - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20617

## P1604, P1605

EAS33097

### TROUBLESHOOTING

#### Item

- [P1604] Lean angle sensor: ground short circuit detected.
- [P1605] Lean angle sensor: open or short circuit detected.

#### Fail-safe system

- Unable to start engine
- Unable to drive vehicle

#### Procedure

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).

##### Is the coupler condition normal?

**YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 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).

##### Is the coupler condition normal?

**YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then to "OFF", and back to "ON".
- c. Check the condition of the DTC using the malfunction mode of the YDT.

##### Is it in the "Recovered" condition?

**YES**

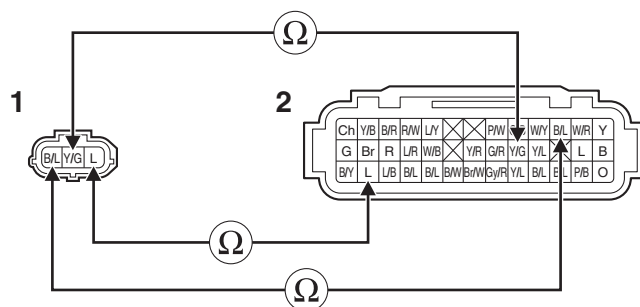
→ Go to step 6, and complete the service.

**NO**

→ Go to step 3.

3. Wire harness continuity.
  - Disconnect the lean angle sensor coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                   |                                                                 |
|---------------------------------------------------|-----------------------------------------------------------------|
| Between ECU coupler and lean angle sensor coupler | blue–blue<br>yellow/green–yellow/green<br>black/blue–black/blue |
|---------------------------------------------------|-----------------------------------------------------------------|



**Is resistance 0 Ω?**

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, then to “OFF”, and back to “ON”.
- Check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the “Recovered” condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

**Ground short circuit check “A”**

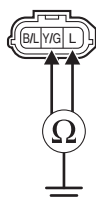
|                                                  |                                    |
|--------------------------------------------------|------------------------------------|
| Between lean angle sensor coupler “1” and ground | blue–ground<br>yellow/green–ground |
|--------------------------------------------------|------------------------------------|

**Lines short circuit check “B”**

|                           |                                                                                                                     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|
| Lean angle sensor coupler | blue–any other coupler terminal<br>yellow/green–any other coupler terminal<br>black/blue–any other coupler terminal |
| ECU coupler “2”           | blue–any other coupler terminal<br>yellow/green–any other coupler terminal<br>black/blue–any other coupler terminal |

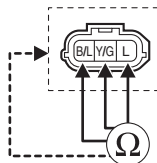
A

1

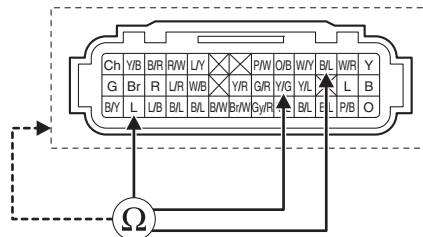


B

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, then to “OFF”, and back to “ON”.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

4. Defective lean angle sensor.

- Execute the diagnostic mode. (Code “08”)

Upright: 0.4–1.4 V

Overtured: 3.7–4.4 V

Is check result OK?

**YES**

→ Go to step 5.

**NO**

- Replace the lean angle sensor.
- Turn the main switch to “ON”, then to “OFF”, and back to “ON”.
- Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

6. Delete the DTC and check that the MIL goes off.

- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20642

**P2645**

EAS33122

**TROUBLESHOOTING****Item**

VVA (variable valve actuator) solenoid: malfunction in VVA (variable valve actuator) solenoid.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

1. Connection of VVA (variable valve actuator) solenoid coupler.
  - Check the locking condition of the coupler.
  - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then start the engine and rev up to 7400 r/min.
- c. Execute the diagnostic mode. (Code "45")

**Is it in the "Recovered" condition?****YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", then start the engine and rev up to 7400 r/min.
- c. Execute the diagnostic mode. (Code "45")

**Is it in the "Recovered" condition?****YES**

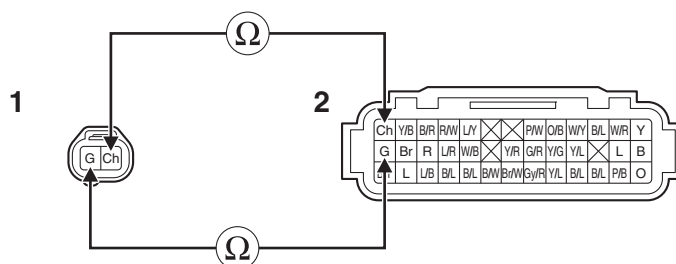
→ Go to step 6, and complete the service.

**NO**

→ Go to step 3.

3. Wire harness continuity.
  - Disconnect the VVA (variable valve actuator) solenoid coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                                         |                                    |
|-------------------------------------------------------------------------|------------------------------------|
| Between VVA (variable valve actuator) solenoid coupler and ECU coupler. | green–green<br>chocolate–chocolate |
|-------------------------------------------------------------------------|------------------------------------|



Is resistance 0  $\Omega$ ?

**YES**

→ Go to “Short circuit check”.

**NO**

- Replace the wire harness.
- Turn the main switch to “ON”, then start the engine and rev up to 7400 r/min.
- Execute the diagnostic mode. (Code “45”)

Is it in the “Recovered” condition?

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

- Short circuit check

#### TIP

Disconnect the ECU related connectors before checking.

Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

#### Ground short circuit check “A”

|                                                                       |                                  |
|-----------------------------------------------------------------------|----------------------------------|
| Between VVA (variable valve actuator) solenoid coupler “1” and ground | green–ground<br>chocolate–ground |
|-----------------------------------------------------------------------|----------------------------------|

#### Lines short circuit check “B”

|                                                |                                                                          |
|------------------------------------------------|--------------------------------------------------------------------------|
| VVA (variable valve actuator) solenoid coupler | green–chocolate                                                          |
| ECU coupler “2”                                | green–any other coupler terminal<br>chocolate–any other coupler terminal |

**A**

1

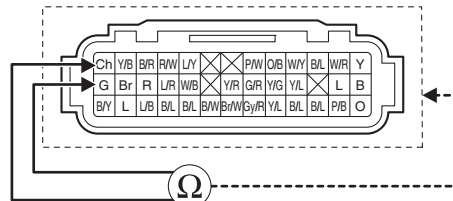


**B**

1



2



Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to "ON", then start the engine and rev up to 7400 r/min.
- c. Execute the diagnostic mode. (Code "45")

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 4.

**4. Defective VVA (variable valve actuator) solenoid**

- Check the VVA (variable valve actuator) solenoid.

Refer to "CHECKING THE VVA SOLENOID" on page 8-42.

**Is check result OK?**

**YES**

→ Go to step 5.

**NO**

- a. Replace the VVA (variable valve actuator) solenoid.
- b. Crank the engine, and then check the condition of the DTC using the malfunction mode of the YDT.

**Is it in the "Recovered" condition?**

**YES**

→ Go to step 6, and complete the service.

**NO**

→ Go to step 5.

**5. Malfunction in ECU.**

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

**6. Delete the DTC and check that the MIL goes off.**

- Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20776

**Er-1**

EAS33508

**TROUBLESHOOTING****Item**

ECU (engine control unit) internal malfunction (output signal error): signals cannot be transmitted between the ECU and the multi-function meter.

**Fail-safe system**

- Able/Unable to start engine
- Able/Unable to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 2.

**NO**

→ Service is completed.

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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

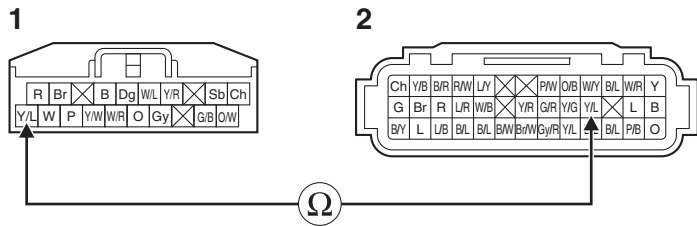
→ Go to step 3.

**NO**

→ Service is completed.

3. Wire harness continuity.
  - Disconnect the meter assembly coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                |                         |
|------------------------------------------------|-------------------------|
| Between meter assembly coupler and ECU coupler | yellow/blue–yellow/blue |
|------------------------------------------------|-------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

Is DTC displayed?

**YES**

→ Go to step 4.

**NO**

→ Service is completed.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

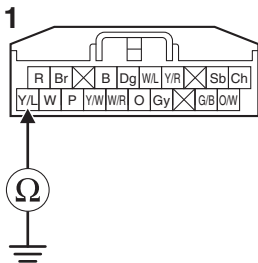
Ground short circuit check “A”

|                                               |                    |
|-----------------------------------------------|--------------------|
| Between meter assembly coupler “1” and ground | yellow/blue–ground |
|-----------------------------------------------|--------------------|

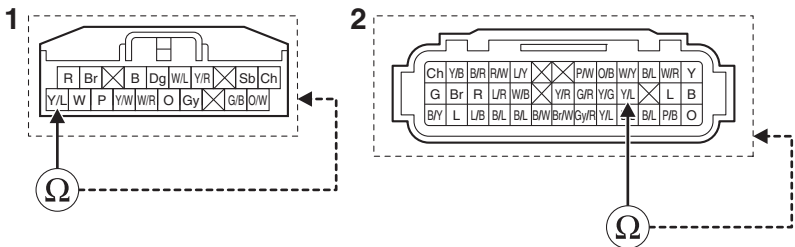
Lines short circuit check “B”

|                        |                                        |
|------------------------|----------------------------------------|
| Meter assembly coupler | yellow/blue–any other coupler terminal |
| ECU coupler “2”        | yellow/blue–any other coupler terminal |

**A**



**B**



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 4.

**NO**

→ Service is completed.

**4. Defective meter assembly**

- Replace the meter assembly.  
Refer to "GENERAL CHASSIS (4)" on page 4-5.
- Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 5.

**NO**

→ Service is completed.

**5. Malfunction in ECU.**

- Replace the ECU, and complete the service.  
Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

EAS20777

**Er-2**

EAS33509

**TROUBLESHOOTING****Item**

ECU (engine control unit) internal malfunction (output signal error): no signals are received from the ECU within the specified duration.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 2.

**NO**

→ Service is completed.

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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

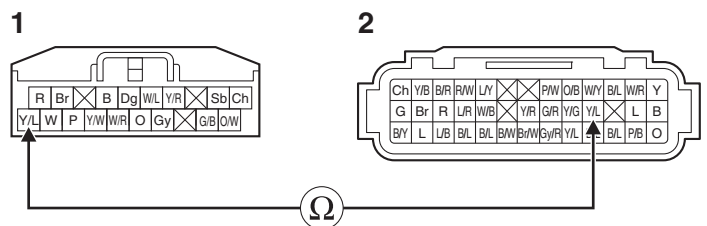
→ Go to step 3.

**NO**

→ Service is completed.

3. Wire harness continuity.
  - Disconnect the meter assembly coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                |                         |
|------------------------------------------------|-------------------------|
| Between meter assembly coupler and ECU coupler | yellow/blue–yellow/blue |
|------------------------------------------------|-------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

Is DTC displayed?

**YES**

→ Go to step 4.

**NO**

→ Service is completed.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

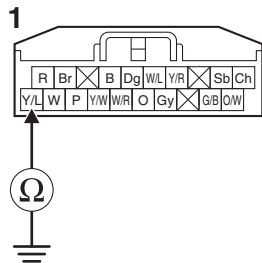
Ground short circuit check “A”

|                                               |                    |
|-----------------------------------------------|--------------------|
| Between meter assembly coupler “1” and ground | yellow/blue–ground |
|-----------------------------------------------|--------------------|

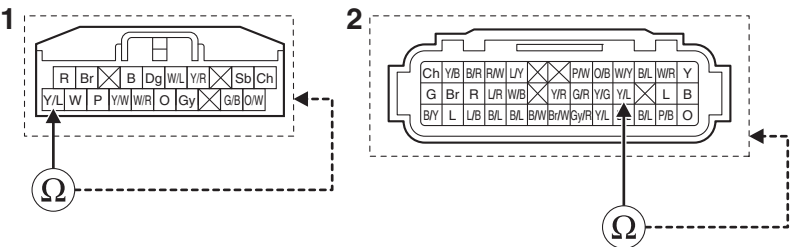
Lines short circuit check “B”

|                        |                                        |
|------------------------|----------------------------------------|
| Meter assembly coupler | yellow/blue–any other coupler terminal |
| ECU coupler “2”        | yellow/blue–any other coupler terminal |

[A]



[B]



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 4.

**NO**

→ Service is completed.

**4. Defective meter assembly**

- Replace the meter assembly.

Refer to "GENERAL CHASSIS (4)" on page 4-5.

- Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 5.

**NO**

→ Service is completed.

**5. Malfunction in ECU.**

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

EAS20778

**Er-3**

EAS33510

**TROUBLESHOOTING****Item**

ECU (engine control unit) internal malfunction (output signal error): data from the ECU cannot be received correctly.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 2.

**NO**

→ Service is completed.

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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

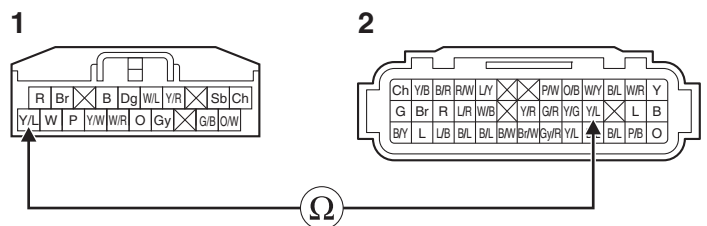
→ Go to step 3.

**NO**

→ Service is completed.

3. Wire harness continuity.
  - Disconnect the meter assembly coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                |                         |
|------------------------------------------------|-------------------------|
| Between meter assembly coupler and ECU coupler | yellow/blue–yellow/blue |
|------------------------------------------------|-------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

Is DTC displayed?

**YES**

→ Go to step 4.

**NO**

→ Service is completed.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

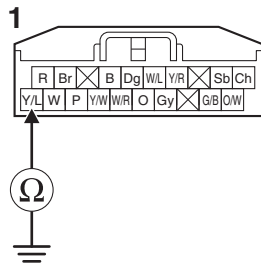
Ground short circuit check “A”

|                                               |                    |
|-----------------------------------------------|--------------------|
| Between meter assembly coupler “1” and ground | yellow/blue–ground |
|-----------------------------------------------|--------------------|

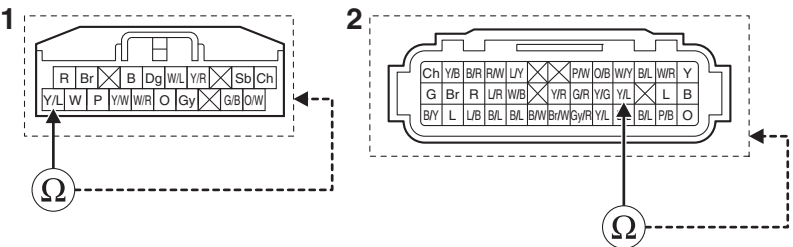
Lines short circuit check “B”

|                        |                                        |
|------------------------|----------------------------------------|
| Meter assembly coupler | yellow/blue–any other coupler terminal |
| ECU coupler “2”        | yellow/blue–any other coupler terminal |

[A]



[B]



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 4.

**NO**

→ Service is completed.

**4. Defective meter assembly**

- Replace the meter assembly.

Refer to “GENERAL CHASSIS (4)” on page 4-5.

- Turn the main switch to “ON”, and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 5.

**NO**

→ Service is completed.

**5. Malfunction in ECU.**

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-34.

EAS20779

**Er-4**

EAS33511

**TROUBLESHOOTING****Item**

ECU (engine control unit) internal malfunction (input signal error): non-registered data has been received from the meter.

**Fail-safe system**

- Able to start engine
- Able to drive vehicle

**Procedure**

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).

**Is the coupler condition normal?****YES**

→ Go to step 2.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 2.

**NO**

→ Service is completed.

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).

**Is the coupler condition normal?****YES**

→ Go to step 3.

**NO**

- a. Connect the coupler securely or replace the wire harness.
- b. Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

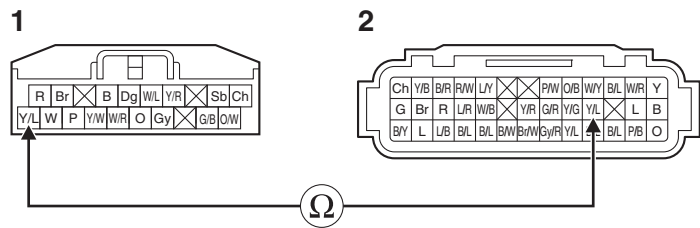
→ Go to step 3.

**NO**

→ Service is completed.

3. Wire harness continuity.
  - Disconnect the meter assembly coupler "1" and ECU coupler "2".
  - Open circuit check

|                                                |                         |
|------------------------------------------------|-------------------------|
| Between meter assembly coupler and ECU coupler | yellow/blue–yellow/blue |
|------------------------------------------------|-------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

Is DTC displayed?

**YES**

→ Go to step 4.

**NO**

→ Service is completed.

- Short circuit check

**TIP**

Disconnect the ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

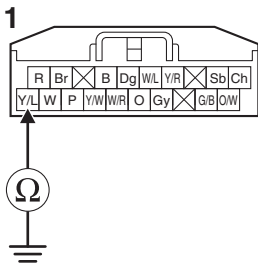
Ground short circuit check “A”

|                                               |                    |
|-----------------------------------------------|--------------------|
| Between meter assembly coupler “1” and ground | yellow/blue–ground |
|-----------------------------------------------|--------------------|

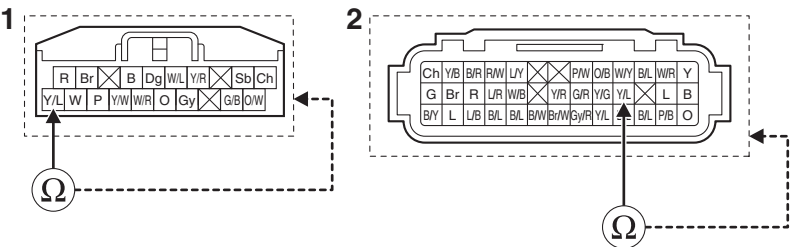
Lines short circuit check “B”

|                        |                                        |
|------------------------|----------------------------------------|
| Meter assembly coupler | yellow/blue–any other coupler terminal |
| ECU coupler “2”        | yellow/blue–any other coupler terminal |

**A**



**B**



Is resistance ∞ Ω?

**YES**

→ Go to step 4.

**NO**

- a. Replace the wire harness.
- b. Turn the main switch to “ON”, and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 4.

**NO**

→ Service is completed.

**4. Defective meter assembly**

- Replace the meter assembly.

Refer to "GENERAL CHASSIS (4)" on page 4-5.

- Turn the main switch to "ON", and then check the condition of the DTC.

**Is DTC displayed?****YES**

→ Go to step 5.

**NO**

→ Service is completed.

**5. Malfunction in ECU.**

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-34.

EAS20765

**11, 25\_ABS**

EAS33314

**TROUBLESHOOTING****Item**

Front wheel sensor (intermittent pulses or no pulses)

**Procedure****TIP**

With the front wheel stopped, the rear wheel was rotated for longer than about 20 seconds (DTC No. 11) or for longer than about 2 seconds (DTC No. 25).

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.
  - Check the components for looseness, distortion, and bends.  
Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.
  - Check the surface of the sensor rotor for damage.  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.
  - Check the wheel sensor for damage and the installed condition of the sensor.  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20686

**12\_ABS**

EAS33315

**TROUBLESHOOTING****Item**

Rear wheel sensor (intermittent pulses or no pulses)

**Procedure**

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.

**Is check result OK?**

**YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-16.

**Is check result OK?**

**YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?**

**YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?**

**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20687

**13, 26\_ABS**

EAS33316

**TROUBLESHOOTING****Item**

Front wheel sensor (abnormal pulse period)

**Procedure****TIP**

- If the front brake ABS operates continuously for 20 seconds or more, DTC No. 26 will be recorded. If the front brake ABS operates continuously for 36 seconds or more, DTC No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.  
Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.  
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20688

**14, 27\_ABS**

EAS33317

**TROUBLESHOOTING****Item**

Rear wheel sensor (abnormal pulse period)

**Procedure****TIP**

- If the rear brake ABS operates continuously for 20 seconds or more, DTC No. 27 will be recorded. If the rear brake ABS operates continuously for 36 seconds or more, DTC No. 14 will be recorded.
- Vehicle possibly ridden on uneven roads.

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-16.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20662

15\_ABS

EAS33040

TROUBLESHOOTING

Item

Front wheel sensor (open or short circuit)

Procedure

1. Defective coupler between the front wheel sensor and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

→ Go to step 2.

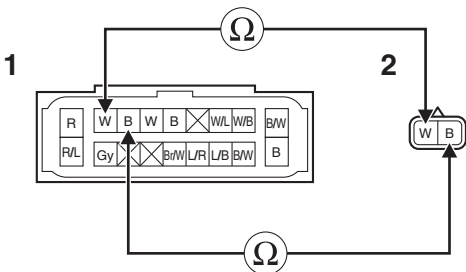
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ABS ECU coupler “1” and front wheel sensor coupler “2”.
- Open circuit check

|                                                        |                            |
|--------------------------------------------------------|----------------------------|
| Between ABS ECU coupler and front wheel sensor coupler | white–white<br>black–black |
|--------------------------------------------------------|----------------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

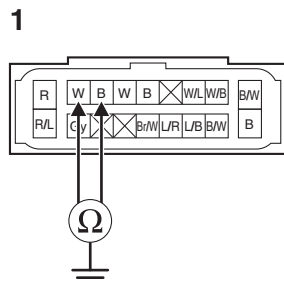
Ground short circuit check “A”

|                                        |                              |
|----------------------------------------|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground<br>black–ground |
|----------------------------------------|------------------------------|

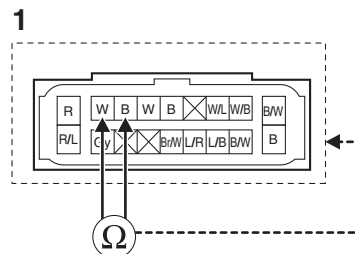
## Lines short circuit check "B"

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| ABS ECU coupler | white—any other coupler terminal<br>black—any other coupler terminal |
|-----------------|----------------------------------------------------------------------|

A



B

Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 3.

**NO**

→ Replace the wire harness.

## 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 4-8 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS20663

16\_ABS

EAS33285

TROUBLESHOOTING

Item

Rear wheel sensor (open or short circuit)

Procedure

1. Defective coupler between the rear wheel sensor and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

→ Go to step 2.

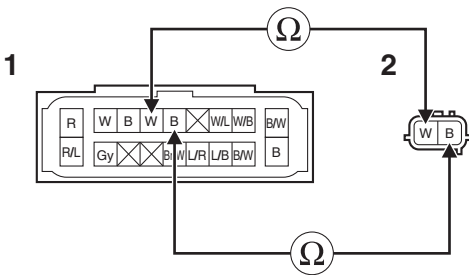
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ABS ECU coupler “1” and rear wheel sensor coupler “2”.
- Open circuit check

|                                                       |                            |
|-------------------------------------------------------|----------------------------|
| Between ABS ECU coupler and rear wheel sensor coupler | white–white<br>black–black |
|-------------------------------------------------------|----------------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

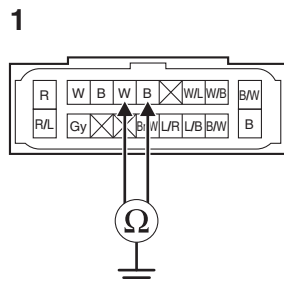
Ground short circuit check “A”

|                                        |                              |
|----------------------------------------|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground<br>black–ground |
|----------------------------------------|------------------------------|

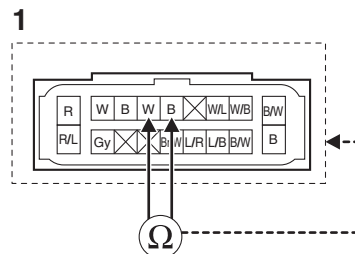
## Lines short circuit check "B"

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| ABS ECU coupler | white—any other coupler terminal<br>black—any other coupler terminal |
|-----------------|----------------------------------------------------------------------|

A



B

Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 3.

**NO**

→ Replace the wire harness.

## 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 4-14 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS20708

**17, 45\_ABS**

EAS33330

**TROUBLESHOOTING****Item**

Front wheel sensor (missing pulses)

**Procedure****TIP**

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, DTC No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, DTC No. 45 will be recorded first and DTC No. 17 will be recorded if the condition continues.

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20709

**18, 46\_ABS**

EAS33325

**TROUBLESHOOTING****Item**

Rear wheel sensor (missing pulses)

**Procedure****TIP**

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, DTC No. 18 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, DTC No. 46 will be recorded first and DTC No. 18 will be recorded if the condition continues.

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-16.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

---

EAS20690

## 21\_ABS

EAS33320

### TROUBLESHOOTING

#### Item

Hydraulic unit assembly (defective solenoid drive circuit)

#### Procedure

1. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20710

24\_ABS

EAS33374

TROUBLESHOOTING

Item

Brake light switch or tail/brake light

Procedure

1. Defective signaling system. (tail/brake light or brake light switch)
  - Check the brake light switches.  
Refer to “CHECKING THE SWITCHES” on page 8-33.

Is check result OK?

YES

→ Go to step 2.

NO

→ Repair or replace the defective part.

2. Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

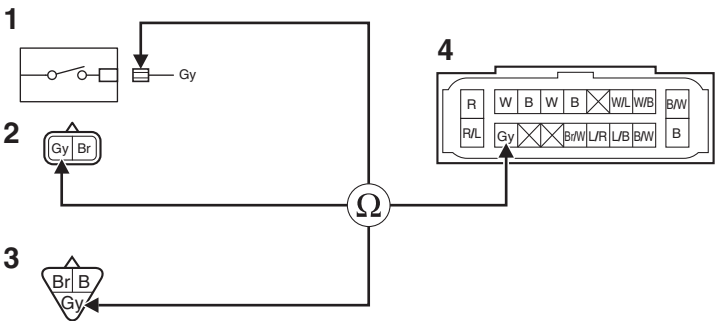
→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.
  - Disconnect the front brake light switch connector “1”, rear brake light switch coupler “2”, tail/brake light assembly coupler “3”, and ABS ECU coupler “4”.
  - Open circuit check

|                                                                |           |
|----------------------------------------------------------------|-----------|
| Between front brake light switch connector and ABS ECU coupler | gray–gray |
| Between rear brake light switch coupler and ABS ECU coupler    | gray–gray |
| Between tail/brake light assembly coupler and ABS ECU coupler  | gray–gray |



Is resistance  $0\ \Omega$ ?

**YES**

→ Go to “Short circuit check”.

**NO**

→ Replace the wire harness.

- Short circuit check

**TIP**

Disconnect the ABS ECU related connectors before checking.

Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

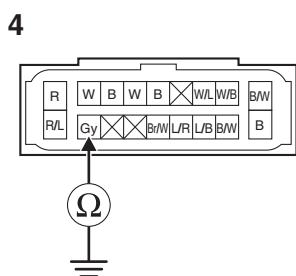
Ground short circuit check “A”

|                                        |             |
|----------------------------------------|-------------|
| Between ABS ECU coupler “4” and ground | gray–ground |
|----------------------------------------|-------------|

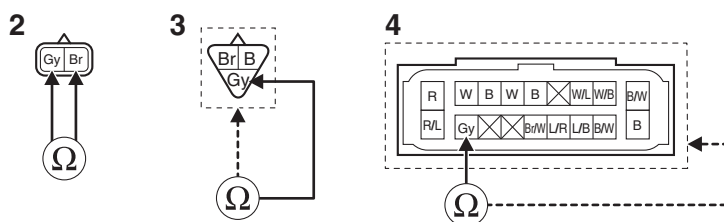
Lines short circuit check “B”

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Rear brake light switch coupler “2”   | gray–brown                      |
| Tail/brake light assembly coupler “3” | gray–any other coupler terminal |
| ABS ECU coupler                       | gray–any other coupler terminal |

**A**



**B**



Is resistance  $\infty\ \Omega$ ?

**YES**

→ Go to step 4.

**NO**

→ Replace the wire harness.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20691

**31\_ABS**

EAS33321

**TROUBLESHOOTING**

Hydraulic unit assembly (defective ABS solenoid power circuit)

**Procedure**

1. Blown ABS solenoid fuse.
  - Check the ABS solenoid fuse.
 Refer to “CHECKING THE FUSES” on page 8-34.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Replace the fuse and check the wire harness.

2. Defective coupler between the battery and the hydraulic unit assembly.

- Check the coupler for any pins that may be pulled out.
- Check the locking condition of the coupler.

**TIP**

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

**Is check result OK?****YES**

→ Go to step 3.

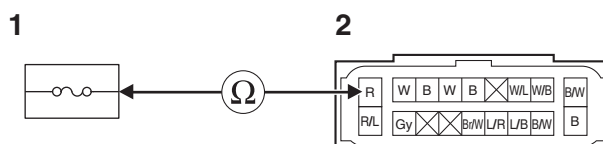
**NO**

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.

- Disconnect the ABS solenoid fuse holder “1” and ABS ECU coupler “2”.
- Open circuit check

|                                                      |         |
|------------------------------------------------------|---------|
| Between ABS solenoid fuse holder and ABS ECU coupler | red-red |
|------------------------------------------------------|---------|

**Is resistance 0  $\Omega$ ?****YES**

→ Go to “Short circuit check”.

**NO**

→ Replace the wire harness.

- Short circuit check

**TIP**

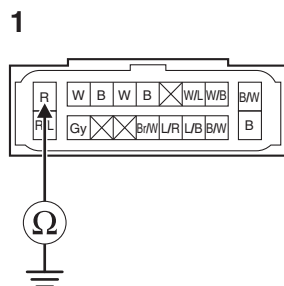
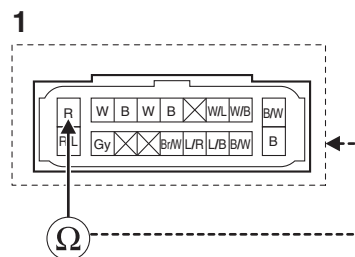
Disconnect the ABS ECU related connectors before checking.  
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

## Ground short circuit check "A"

|                                        |            |
|----------------------------------------|------------|
| Between ABS ECU coupler "1" and ground | red-ground |
|----------------------------------------|------------|

## Lines short circuit check "B"

|                 |                                |
|-----------------|--------------------------------|
| ABS ECU coupler | red-any other coupler terminal |
|-----------------|--------------------------------|

**A****B**

Is resistance  $\infty \Omega$ ?

**YES**

→ Go to step 4.

**NO**

→ Replace the wire harness.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

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EAS20712

### 32\_ABS

EAS33376

#### TROUBLESHOOTING

##### Item

Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)

##### Procedure

1. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20692

33\_ABS

EAS33322

TROUBLESHOOTING

Item

Hydraulic unit assembly (abnormal ABS motor power supply)

Procedure

1. Blown ABS motor fuse.
  - Check the ABS motor fuse.  
Refer to “CHECKING THE FUSES” on page 8-34.

Is check result OK?

YES

→ Go to step 2.

NO

→ Replace the fuse and check the wire harness.

2. Defective coupler between the battery and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

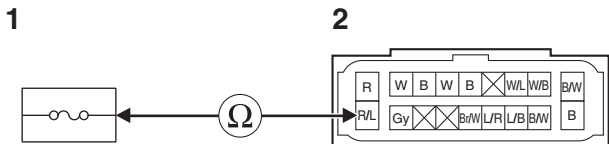
→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.
  - Disconnect the ABS motor fuse holder “1” and ABS ECU coupler “2”.
  - Open circuit check

|                                                   |                   |
|---------------------------------------------------|-------------------|
| Between ABS motor fuse holder and ABS ECU coupler | red/blue–red/blue |
|---------------------------------------------------|-------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

**TIP**

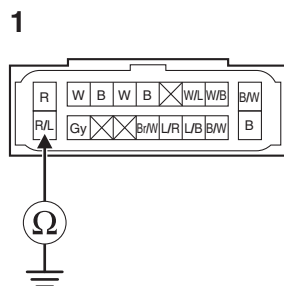
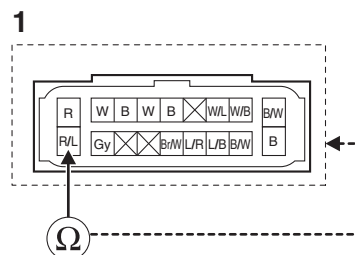
Disconnect the ABS ECU related connectors before checking.  
Refer to "PARTS CONNECTED TO THE ABS ECU" on page 9-3.

## Ground short circuit check "A"

|                                        |                 |
|----------------------------------------|-----------------|
| Between ABS ECU coupler "1" and ground | red/blue-ground |
|----------------------------------------|-----------------|

## Lines short circuit check "B"

|                 |                                     |
|-----------------|-------------------------------------|
| ABS ECU coupler | red/blue-any other coupler terminal |
|-----------------|-------------------------------------|

**A****B**Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 4.

**NO**

→ Replace the wire harness.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

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EAS20693

### 34\_ABS

EAS33323

#### TROUBLESHOOTING

##### Item

Hydraulic unit assembly (short circuit in ABS motor power supply circuit)

##### Procedure

1. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20694

**41\_ABS**

EAS33331

**TROUBLESHOOTING****Item**

Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)

**Procedure**

1. Incorrect installation of the front wheel sensor.

- Check the components for looseness, distortion, and bends.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?**

**YES**

→ Go to step 2.

**NO**

→ Repair or replace the defective part.

2. Incorrect rotation of the front wheel.

- Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly.

Refer to "CHECKING THE FRONT WHEEL" on page 4-10 and "CHECKING THE FRONT BRAKE DISC" on page 4-25.

**Is check result OK?**

**YES**

→ Go to step 3.

**NO**

→ Repair or replace the defective part.

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 DISC" on page 4-25.

**Is check result OK?**

**YES**

→ Go to step 4.

**NO**

→ Repair or replace the defective part.

4. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS20746

**42, 47\_ABS**

EAS33324

**TROUBLESHOOTING****Item**

Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)

**Procedure**

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, DTC No. 42 and 47 may be indicated.
2. Incorrect installation of the rear wheel sensor (DTC No. 42).
  - Check the components for looseness, distortion, and bends.  
Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Repair or replace the defective part.

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 4-16 and "CHECKING THE REAR BRAKE DISC" on page 4-35.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Repair or replace the defective part.

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 4-35.

**Is check result OK?****YES**

→ Go to step 5.

**NO**

→ Repair or replace the defective part.

5. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

EAS20768

**43\_ABS**

EAS33484

**TROUBLESHOOTING****Item**

Front wheel sensor (missing pulses)

**Procedure**

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the front wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE FRONT WHEEL" on page 4-10.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, front wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective front wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-11.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20747

**44\_ABS**

EAS33452

**TROUBLESHOOTING****Item**

Rear wheel sensor (missing pulses)

**Procedure**

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.

**Is check result OK?****YES**

→ Go to step 2.

**NO**

→ Clean the sensor rotor and wheel sensor.

2. Incorrect installation of the rear wheel.

- Check the components for looseness, distortion, and bends.

Refer to "CHECKING THE REAR WHEEL" on page 4-16.

**Is check result OK?****YES**

→ Go to step 3.

**NO**

→ Replace the wheel axle, tire, rear wheel, wheel bearings or oil seals.

3. Defective sensor rotor or incorrect installation of the rotor.

- Check the surface of the sensor rotor for damage.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Go to step 4.

**NO**

→ Replace the sensor rotor.

4. Defective rear wheel sensor or incorrect installation of the sensor.

- Check the wheel sensor for damage and the installed condition of the sensor.

Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-17.

**Is check result OK?****YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Replace the wheel sensor.

EAS20766

## 51, 52\_ABS

EAS33326

### TROUBLESHOOTING

#### Item

- Vehicle system power supply (voltage of ABS ECU power supply is high) (for DTC No. 51)
- Vehicle system power supply (voltage of wheel sensor power supply is high) (for DTC No. 52)

#### Procedure

1. Defective battery.
  - Recharge or replace the battery, and check again.  
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-34.
2. Disconnected battery terminal.
  - Check the connection.

#### Is check result OK?

##### YES

→ Go to step 3.

##### NO

→ Replace or reconnect the terminal.

3. Defective charging system.
  - Check the charging system.  
Refer to "CHARGING SYSTEM" on page 8-12.

#### Is check result OK?

##### YES

→ Replace the hydraulic unit assembly (ABS ECU).

##### NO

→ Confirm the cause of the problem and repair it, and check again.

EAS20699

53\_ABS

EAS33327

TROUBLESHOOTING

Item

Vehicle system power supply (voltage of ABS ECU power supply is low)

Procedure

1. Defective battery.
  - Recharge or replace the battery, and check again.  
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-34.
2. Defective coupler between the battery and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

**YES**

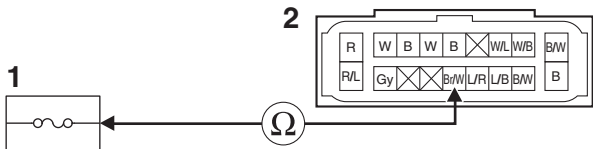
→ Go to step 3.

**NO**

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.
  - Disconnect the ABS control unit fuse holder “1” and ABS ECU coupler “2”.
  - Open circuit check

|                                                          |                         |
|----------------------------------------------------------|-------------------------|
| Between ABS control unit fuse holder and ABS ECU coupler | brown/white–brown/white |
|----------------------------------------------------------|-------------------------|



Is resistance 0 Ω?

**YES**

→ Go to “Short circuit check”.

**NO**

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

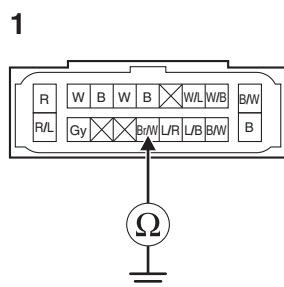
Ground short circuit check “A”

|                                        |                    |
|----------------------------------------|--------------------|
| Between ABS ECU coupler “1” and ground | brown/white–ground |
|----------------------------------------|--------------------|

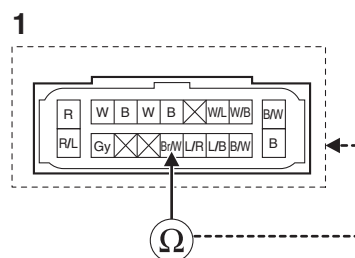
## Lines short circuit check "B"

|                 |                                        |
|-----------------|----------------------------------------|
| ABS ECU coupler | brown/white—any other coupler terminal |
|-----------------|----------------------------------------|

[A]



[B]

Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 4.

**NO**

→ Replace the wire harness.

## 4. Defective charging system.

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?

**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Confirm the cause of the problem and repair it, and check again.

EAS20711

54\_ABS

EAS33375

TROUBLESHOOTING

Item

Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)

Procedure

1. Defective battery.
  - Recharge or replace the battery, and check again.  
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-34.
2. Defective coupler between the battery and the hydraulic unit assembly.
  - Check the coupler for any pins that may be pulled out.
  - Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

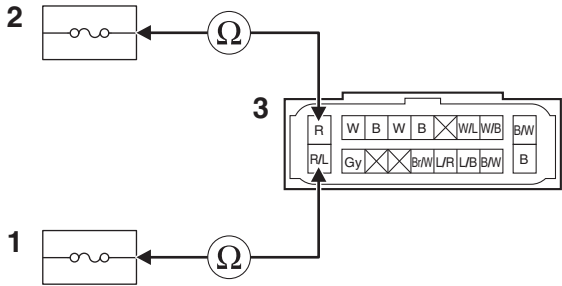
→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

3. Wire harness continuity.
  - Disconnect the ABS motor fuse holder “1”, ABS solenoid fuse holder “2” and ABS ECU coupler “3”.
  - Open circuit check

|                                                      |                   |
|------------------------------------------------------|-------------------|
| Between ABS motor fuse holder and ABS ECU coupler    | red/blue–red/blue |
| Between ABS solenoid fuse holder and ABS ECU coupler | red–red           |



Is resistance 0  $\Omega$ ?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

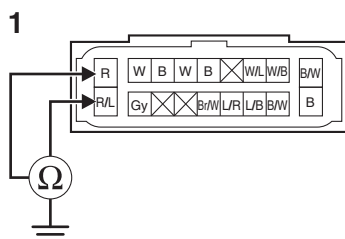
## Ground short circuit check "A"

|                                        |                               |
|----------------------------------------|-------------------------------|
| Between ABS ECU coupler "1" and ground | red/blue-ground<br>red-ground |
|----------------------------------------|-------------------------------|

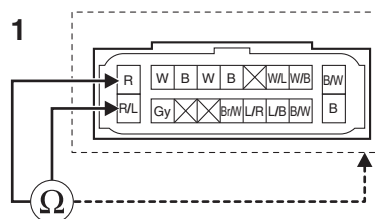
## Lines short circuit check "B"

|                 |                                                                       |
|-----------------|-----------------------------------------------------------------------|
| ABS ECU coupler | red/blue-any other coupler terminal<br>red-any other coupler terminal |
|-----------------|-----------------------------------------------------------------------|

A



B

Is resistance  $\infty \Omega$ ?**YES**

→ Go to step 4.

**NO**

→ Replace the wire harness.

## 4. Defective charging system.

- Check the charging system.

Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?

**YES**

→ Replace the hydraulic unit assembly (ABS ECU).

**NO**

→ Confirm the cause of the problem and repair it, and check again.

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EAS20700

### 55\_ABS

EAS33328

#### TROUBLESHOOTING

##### Item

Hydraulic unit assembly (defective ABS ECU)

##### Procedure

1. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

---

EAS20701

### 56\_ABS

EAS33329

#### TROUBLESHOOTING

##### Item

Hydraulic unit assembly (abnormal internal power supply)

##### Procedure

1. Defective hydraulic unit assembly.
  - Replace the hydraulic unit assembly.  
Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20703

63\_ABS

EAS33334

TROUBLESHOOTING

Item

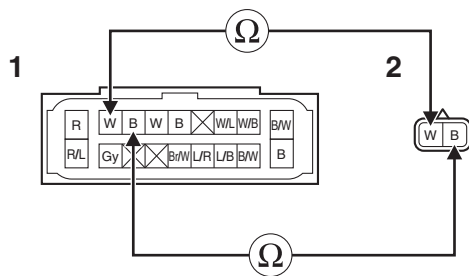
Front wheel sensor power supply (voltage of power supply is low)

Procedure

1. Wire harness continuity.

- Disconnect the ABS ECU coupler “1” and front wheel sensor coupler “2”.
- Open circuit check

|                                                        |                            |
|--------------------------------------------------------|----------------------------|
| Between front wheel sensor coupler and ABS ECU coupler | white–white<br>black–black |
|--------------------------------------------------------|----------------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

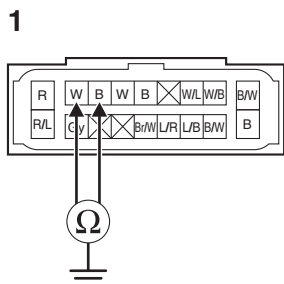
Ground short circuit check “A”

|                                        |                              |
|----------------------------------------|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground<br>black–ground |
|----------------------------------------|------------------------------|

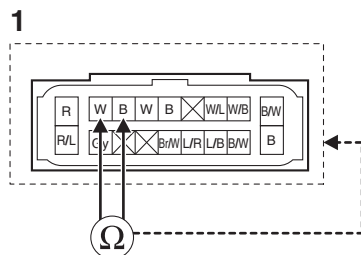
Lines short circuit check “B”

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| ABS ECU coupler | white–any other coupler terminal<br>black–any other coupler terminal |
|-----------------|----------------------------------------------------------------------|

A



B



---

**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 2.

**NO**

→ Replace the wire harness.

2. Defective front wheel sensor.

- Replace the front wheel sensor.

Refer to “FRONT WHEEL” on page 4-8.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-40.

EAS20704

64\_ABS

EAS33335

TROUBLESHOOTING

Item

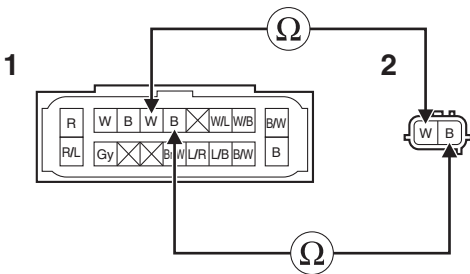
Rear wheel sensor power supply (voltage of power supply is low)

Procedure

1. Wire harness continuity.

- Disconnect the ABS ECU coupler “1” and rear wheel sensor coupler “2”.
- Open circuit check

|                                                       |                            |
|-------------------------------------------------------|----------------------------|
| Between rear wheel sensor coupler and ABS ECU coupler | white–white<br>black–black |
|-------------------------------------------------------|----------------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

Disconnect the ABS ECU related connectors before checking.  
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

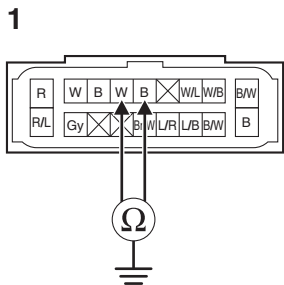
Ground short circuit check “A”

|                                        |                              |
|----------------------------------------|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground<br>black–ground |
|----------------------------------------|------------------------------|

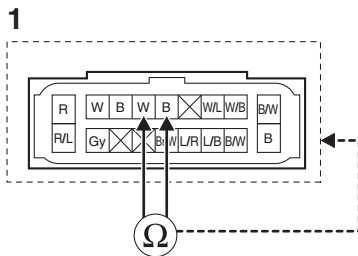
Lines short circuit check “B”

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| ABS ECU coupler | white–any other coupler terminal<br>black–any other coupler terminal |
|-----------------|----------------------------------------------------------------------|

A



B



**Is resistance  $\infty \Omega$ ?**

**YES**

→ Go to step 2.

**NO**

→ Replace the wire harness.

2. Defective rear wheel sensor.

- Replace the rear wheel sensor.

Refer to "REAR WHEEL" on page 4-14.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-40.

**WIRING DIAGRAM****MTM125 2021**

1. Crankshaft position sensor
2. AC magneto
3. Rectifier/regulator
4. Headlight fuse
5. ABS control unit fuse
6. Main fuse
7. ABS solenoid fuse
8. ABS motor fuse
9. Engine ground lead terminal
10. Battery
11. Engine ground
12. Main switch
13. Starter relay
14. Starter motor
15. Handlebar switch (right)
16. Start/engine stop switch
17. Front brake light switch
18. Diode
19. Sidestand switch
20. Throttle body sensor assembly
21. Intake air pressure sensor
22. Intake air temperature sensor
23. Throttle position sensor
24. YDT coupler
25. ECU (Engine Control Unit)
26. FID (Fast Idle Device)
27. Coolant temperature sensor
28. VVA (variable valve actuator) solenoid
29. Lean angle sensor
30. Ignition coil
31. Spark plug
32. O<sub>2</sub> sensor
33. Fuel pump
34. Fuel sender
35. Fuel injector
36. Front wheel sensor
37. Rear wheel sensor
38. ABS ECU
39. Rear brake light switch
40. Turn signal relay
41. Horn
42. Handlebar switch (left)
43. Pass switch
44. Dimmer switch
45. Horn switch
46. Turn signal switch
47. Clutch switch
48. Radiator fan motor relay
49. Radiator fan motor
50. Tail/brake light
51. Rear turn signal light (right)
52. Rear turn signal light (left)
53. Front turn signal light (right)
54. Front turn signal light (left)
55. Headlight unit
56. Headlight (high beam)

57. Headlight (low beam)
58. Auxiliary light
59. License plate light
60. Meter assembly
61. Neutral indicator light
62. Multi-function meter
63. Meter light
64. Malfunction indicator light
65. High beam indicator light
66. Coolant temperature warning light
67. Turn signal indicator light
68. Fuel meter
69. ABS warning light
70. Transmission gear display
71. Gear position switch

**COLOR CODE**

|      |              |
|------|--------------|
| B    | Black        |
| B/L  | Black/Blue   |
| B/R  | Black/Red    |
| B/W  | Black/White  |
| B/Y  | Black/Yellow |
| Br   | Brown        |
| Br/L | Brown/Blue   |
| Br/W | Brown/White  |
| Ch   | Chocolate    |
| Dg   | Dark green   |
| G    | Green        |
| G/B  | Green/Black  |
| G/R  | Green/Red    |
| Gy   | Gray         |
| Gy/R | Gray/Red     |
| L    | Blue         |
| L/B  | Blue/Black   |
| L/R  | Blue/Red     |
| L/W  | Blue/White   |
| L/Y  | Blue/Yellow  |
| O    | Orange       |
| O/B  | Orange/Black |
| O/W  | Orange/White |
| P    | Pink         |
| P/B  | Pink/Black   |
| P/W  | Pink/White   |
| R    | Red          |
| R/B  | Red/Black    |
| R/L  | Red/Blue     |
| R/W  | Red/White    |
| Sb   | Sky blue     |
| W    | White        |
| W/B  | White/Black  |
| W/L  | White/Blue   |
| W/R  | White/Red    |
| W/Y  | White/Yellow |
| Y    | Yellow       |
| Y/B  | Yellow/Black |
| Y/G  | Yellow/Green |
| Y/L  | Yellow/Blue  |
| Y/R  | Yellow/Red   |
| 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



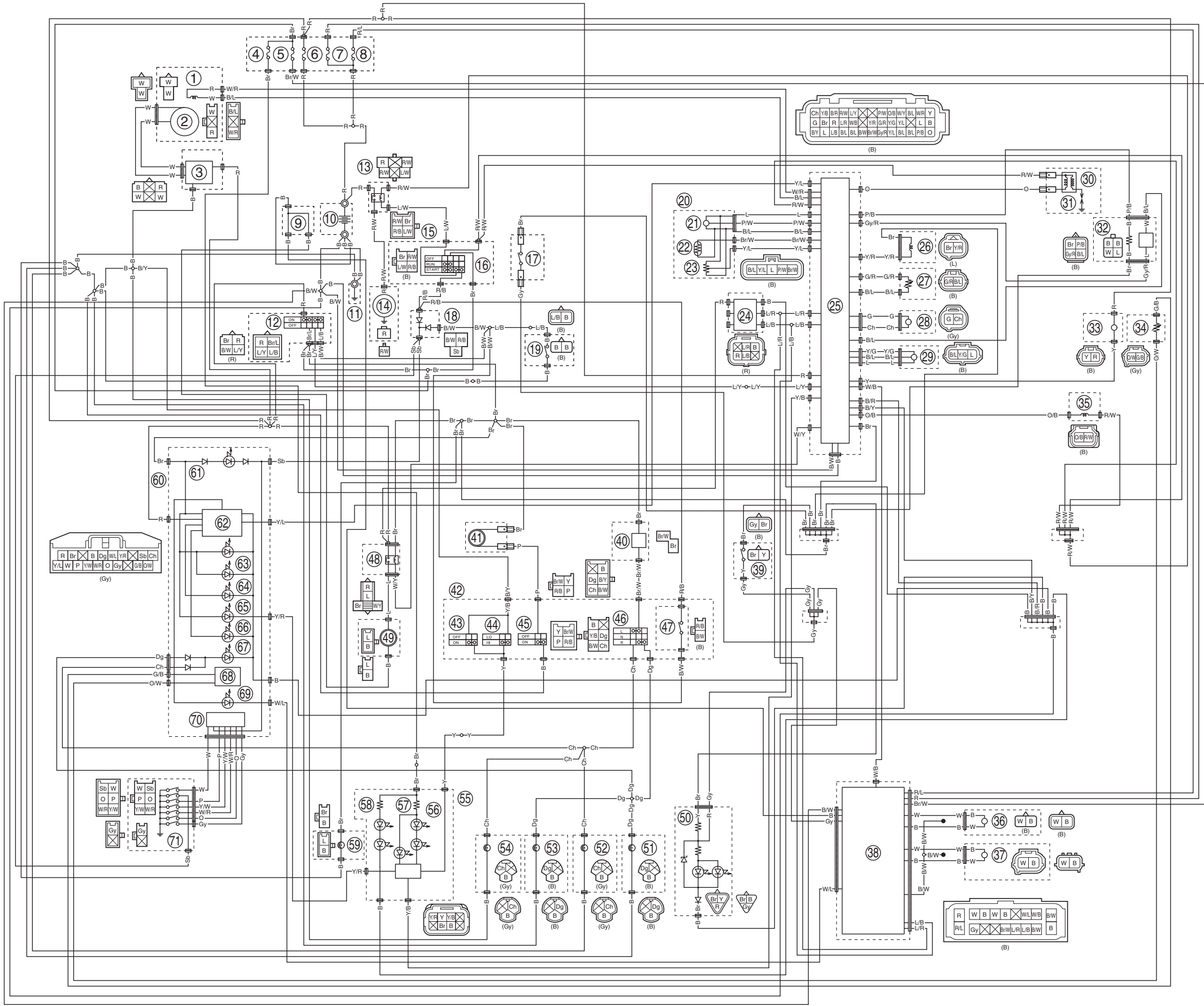
MTM125 2021  
WIRING DIAGRAM

MTM125 2021  
SCHÉMA DE CÂBLAGE

MTM125 2021  
SCHALTPLAN

MTM125 2021  
SCHEMA ELETTRICO

MTM125 2021  
DIAGRAMA ELÉCTRICO



MTM125 2021  
WIRING DIAGRAM

MTM125 2021  
SCHÉMA DE CÂBLAGE

MTM125 2021  
SCHALTPLAN

MTM125 2021  
SCHEMA ELETTRICO

MTM125 2021  
DIAGRAMA ELÉCTRICO

