



YAMAHA

2023

SERVICE MANUAL

TENERE 700

**XTZ690D
XTZ690DP**

BAG-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.

| | |
|--|---|
|  | This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death. |
|  WARNING | A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
| NOTICE | A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property. |
| TIP | A TIP provides key information to make procedures easier or clearer. |

XTZ690D/XTZ690DP
SERVICE MANUAL
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HOW TO USE THIS MANUAL

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

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

↓ 1

CLUTCH

CLUTCH

Removing the clutch cover

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

TIP

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

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

3. Loosen:

- Clutch boss nut "1"

TIP

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

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

4. Remove:

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

TIP

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

4-50004 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)

4-50004 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.





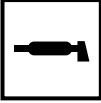









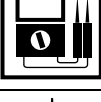



| SYMBOL | DEFINITION | SYMBOL | DEFINITION |
|---|---------------------------------|---|----------------------------------|
|  | Serviceable with engine mounted |  | Gear oil |
|  | Filling fluid |  | Molybdenum disulfide oil |
|  | Lubricant |  | Brake fluid |
|  | Special tool |  | Wheel bearing grease |
|  | 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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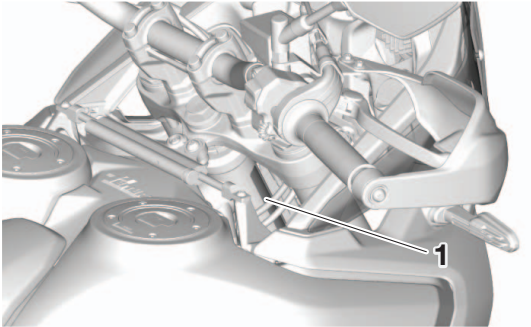
EAS20007

IDENTIFICATION

EAS30002

VEHICLE IDENTIFICATION NUMBER

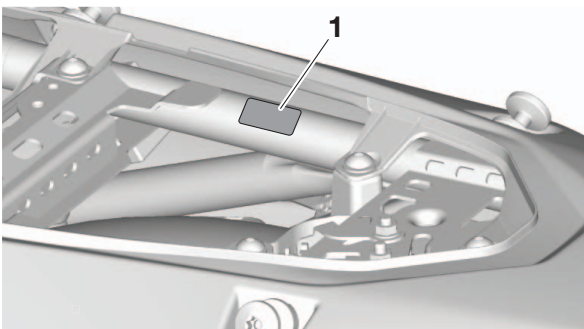
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS30003

MODEL LABEL

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



EAS20008

FEATURES

EAS31707

DISPLAY

The main screen of the display has three different themes; Explorer, Street, and Raid. Some functions are not available in all themes.

EWA18210

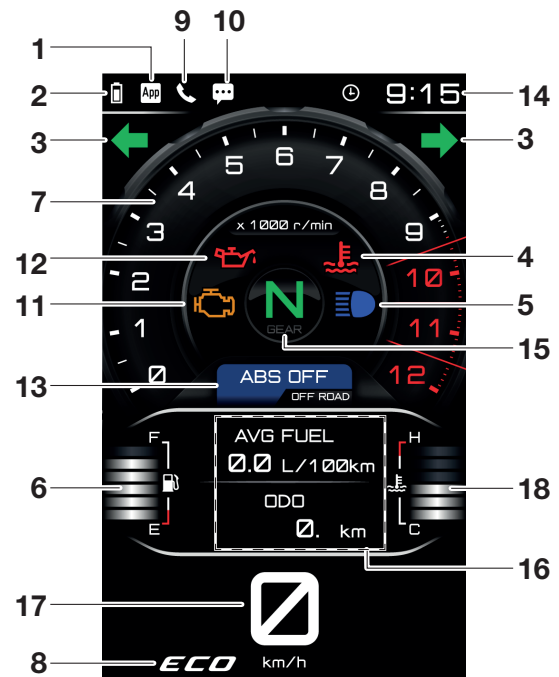
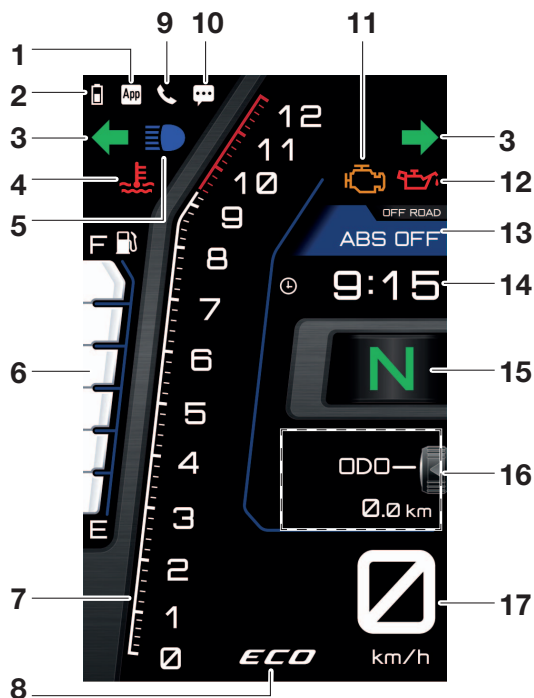
WARNING

Stop the vehicle before making any setting changes. Changing settings while riding can distract the operator and increase the risk of an accident.

TIP

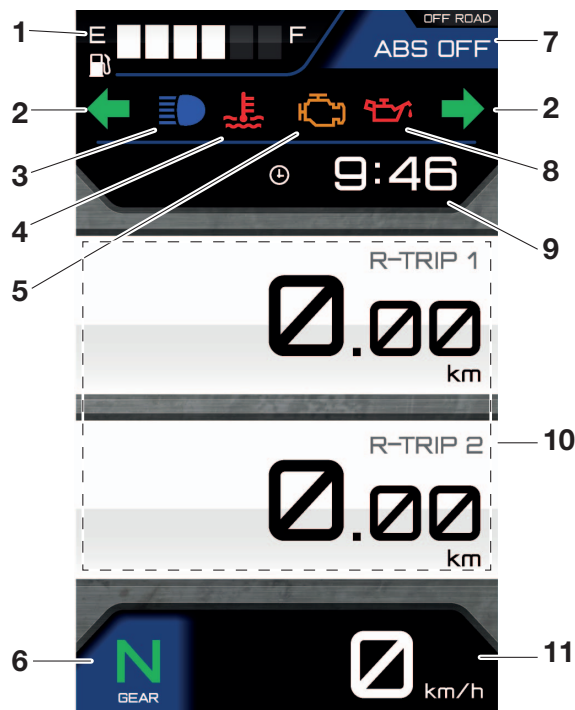
- This model uses a thin-film-transistor liquid-crystal display (TFT LCD) for good contrast and readability in various lighting conditions. However, due to the nature of this technology, it is normal for a small number of pixels to be inactive.
- The display units can be switched between kilometers/miles and celsius/fahrenheit.

Explorer theme/Street theme



1. Smartphone connectivity indicator “App”
2. Smartphone battery level indicator “”
3. Turn signal indicators “←”/“→”
4. Coolant temperature warning indicator “”
5. High beam indicator “”
6. Fuel meter
7. Tachometer
8. Eco indicator
9. Missed call indicator “”
10. Unread message indicator “”
11. Malfunction indicator (MIL) “”
12. Oil pressure warning indicator “”
13. ABS mode indicator
14. Clock
15. Transmission gear display
16. Information display
17. Speedometer
18. Coolant temperature meter

Raid theme



1. Fuel meter
2. Turn signal indicators “←”/“→”
3. High beam indicator “☰”
4. Coolant temperature warning indicator “🌡️”
5. Malfunction indicator (MIL) “🔧”
6. Transmission gear display
7. ABS mode indicator
8. Oil pressure warning indicator “🛢️”
9. Clock
10. Raid tripmeters
11. Speedometer

Speedometer

The speedometer shows the vehicle’s traveling speed.

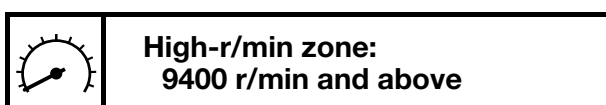
Tachometer

The tachometer shows the engine speed, as measured by the rotational velocity of the crankshaft, in revolutions per minute (r/min).

ECA26220

NOTICE

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



Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the meter disappear from “F” (full) towards “E” (empty) as the fuel level decreases.

When the last segment starts flashing, refuel as soon as possible.

TIP

If all the fuel meter display segments flash repeatedly, check the fuel meter. Refer to “CHECKING THE FUEL METER” on page 8-45.

Coolant temperature meter

The coolant temperature meter indicates the radiator coolant temperature.

When the coolant is too hot, the top segment will flash.

TIP

- The coolant temperature meter is only available in the Street theme.
- If all the coolant temperature meter display segments flash repeatedly, check the cooling system.

Clock “🕒”

The clock uses a 12-hour time system.

TIP

In Raid theme, the clock function is part of the information display.

Transmission gear display

This shows which gear the transmission is in. This model has 6 gears and a neutral position. The neutral position is indicated by “N”.

TIP

If a malfunction occurs, “-” will be shown.

Coolant temperature warning indicator “🌡️”

This indicator is shown when the coolant temperature is too high. Stop the vehicle and turn off the engine. Allow the engine to cool.

ECA10022

NOTICE

Do not continue to operate the engine if it is overheating.

Oil pressure warning indicator “🛢️”

This indicator is shown when the engine oil pressure is low. When the vehicle power is first turned on, engine oil pressure has yet to build up, therefore this indicator will show until the engine has been started.

TIP

If a malfunction is detected, the oil pressure warning icon will flash repeatedly.

ECA26410

NOTICE

Do not continue to operate the engine if the oil pressure is low.

Malfunction indicator (MIL) “”

The MIL comes on or flashes if a problem is detected in the engine or other vehicle control system. If this occurs, check the fuel injection system. Refer to “BASIC PROCESS FOR TROUBLESHOOTING” on page 9-11.

ECA26820

NOTICE

If the MIL starts flashing, reduce engine speed to prevent exhaust system damage.

TIP

The engine is sensitively monitored by the on-board diagnostic system to detect deterioration or malfunction of the emission control system. Therefore the MIL may come on or flash due to vehicle modifications, lack of maintenance, or excessive/improper use of the vehicle. To prevent this, observe these precautions.

- Do not attempt to modify the software of the engine control unit.
- Do not add any electrical accessories that interfere with engine control.
- Do not use aftermarket accessories or parts such as suspension, spark plugs, injectors, exhaust system, etc.
- Do not change the drivetrain specifications (chain, sprockets, wheels, tires, etc.).
- Do not remove or alter the O₂ sensor, air induction system, or exhaust parts (catalysts or EXUP, etc.).
- Maintain the drive chain properly.
- Maintain correct tire pressure.
- Maintain proper brake pedal height to prevent rear brake from dragging.
- Do not operate the vehicle in an extreme manner. For example, repeated or excessive opening and closing of the throttle, racing, burnouts, wheelies, extended half-clutch use, etc.

High beam indicator “”

This indicator is shown when the high beam of the headlight is on.

Turn signal indicators “”/“”

Each indicator flashes when its corresponding turn signal lights are flashing.

ABS mode indicator

This indicator shows the currently selected ABS mode. There are 3 ABS modes which can be changed within the menu system.

| ABS status | Indicated on display |
|-----------------------|-------------------------------|
| ABS is on | The indicator is off |
| Rear wheel ABS is off | “REAR ABS OFF” and “OFF ROAD” |
| ABS is off | “ABS OFF” and “OFF ROAD” |

Eco indicator

This indicator is shown when the vehicle is being operated in an environmentally friendly, fuel-efficient manner. The indicator is not shown when idling.


TIP

Consider the following tips to reduce fuel consumption:

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

Smartphone battery level indicator “”

This indicator displays the connected smartphone’s current battery level.

- Icon off: No smartphone connected.
- “” : The center bar moves up and down to indicate the battery level.

When the battery level is below 11%, the indicator will turn red and flash continuously.

TIP

This indicator will flash 3 times when the vehicle power is turned on. If it does not flash when the vehicle power is turned on, check the CCU and the electrical circuit.

Smartphone connectivity indicator “”

This indicator comes on when a smartphone is successfully connected to the CCU.

TIP

This indicator will flash 3 times when the vehicle power is turned on. If it does not flash when the vehicle power is turned on, check the CCU and the electrical circuit.

Incoming call indicator





1. Incoming call indicator



1. Incoming call indicator

The incoming call indicator pops up when the connected smartphone receives a call. It will remain on for 30 seconds.

TIP

- In Explorer theme, this indicator cannot be displayed at the same time as any of the following:
 - right turn signal indicator “→”
 - oil pressure warning indicator “”
 - malfunction indicator (MIL) “”
 If the above indicators go off, the incoming call indicator will be displayed for the remaining time.
- This indicator is not available in Raid theme.

Missed call indicator “”

The missed call indicator comes on when the connected smartphone misses a call. It will remain on until the vehicle power is turned off or until “Cancel Notification” is selected in the “Telephone” section of the menu system.

TIP

This indicator is not available in Raid theme.

Incoming message indicator





1. Incoming message indicator



1. Incoming message indicator

The incoming message indicator pops up when the connected smartphone receives an SMS, E-mail or other notification. It will remain on for 10 seconds.

TIP

- In Explorer theme, this indicator cannot be displayed at the same time as any of the following:
 - right turn signal indicator “→”
 - oil pressure warning indicator “”
 - malfunction indicator (MIL) “”
 If the above indicators go off, the incoming message indicator will be displayed for the remaining time.
- Notifications must be setup for each application on the connected smartphone in advance.
- This indicator is not available in Raid theme.

Unread message indicator “”

The unread message indicator comes on when the connected smartphone receives a message. It will remain on until the vehicle power is turned off or until “Cancel Notification” is selected in the “Message” section of the menu system.

TIP

This indicator is not available in Raid theme.

Raid tripmeters (Raid theme only)

“R-TRIP 1” and “R-TRIP 2” show the distance traveled since they were last set to zero. Short press the “RESET” switch to cycle between “R-TRIP 1” and “R-TRIP 2”. Use the L-UP/ L-DOWN switches to increment the tripmeter value up/down manually.

TIP

- Holding the L-UP/ L-DOWN switches will increase the increment speed.
- “R-TRIP 1” and “R-TRIP 2” will reset to 0 and begin counting again after 999.9 has been reached.
- “R-TRIP 1” and “R-TRIP 2” will reset to 0 and begin counting again when the Raid theme is selected or when the “All Reset” function is used.

Information display

The information display is a section of the main screen which contains various functions and information to aid the operator of the vehicle.

The information display items are:

“ODO”: odometer

“COOLANT”: coolant temperature

“AIR”: air temperature

“TRIP 1”: tripmeter 1

“TRIP 2”: tripmeter 2

“TRIP CD”: countdown tripmeter


“TRIP F”: fuel reserve tripmeter

“INST FUEL”: current fuel consumption

“AVG FUEL”: average fuel consumption

“⊕”: clock (Raid theme only)


“⌚”: chronometer (Raid theme only)


Rotate the “” wheel switch to cycle the items.

TIP

- The “TRIP 1”, “TRIP 2”, “TRIP CD”, “TRIP F”, and “AVG FUEL” items can be individually reset. The “TRIP CD” item can also be adjusted.
- In Street theme, 2 items are displayed at once.
- In Explorer theme, the information display is replaced by the speedometer when the pop-up menu is open.
- In Raid theme, only the odometer, clock, and chronometer can be displayed.

To reset information display items:

If a displayed item can be reset, short pressing the “” wheel switch will highlight the item.

Once highlighted, long press “” wheel switch and the item will reset.

Odometer “ODO”:

The odometer shows the total distance traveled by the vehicle.

TIP

The odometer will lock at 999999 km (621370 mile) and cannot be reset.

Coolant temperature “COOLANT”:

The coolant temperature is displayed from 39 °C (103 °F) to 117 °C (243 °F) in 1 °C (1 °F) increments.

TIP

- If the vehicle coolant temperature is below 39 °C (103 °F) the coolant temperature display will read “Low Temp”
- If the vehicle coolant temperature is above 117 °C (243 °F) the coolant temperature display will read “High Temp”

Air temperature “AIR”:

The air temperature is displayed from –9 °C (16 °F) to 50 °C (122 °F) in 1 °C (1 °F) increments.

The temperature displayed may vary from the actual ambient temperature.

TIP

“---” will be displayed if the detected temperature is higher or lower than the display range.



Tripmeters “TRIP 1” / “TRIP 2”:

“TRIP 1” and “TRIP 2” show the distance traveled since they were last set to zero.

TIP

“TRIP 1” and “TRIP 2” will reset to 0 and begin counting again after 9999.9 has been reached.

Countdown tripmeter “TRIP CD”:

Counts down from a set distance. Reset the countdown tripmeter and the first digit will flash. Rotate the “” wheel switch to adjust the flashing digit, short press the “” wheel switch to confirm and the next digit will flash. Repeat this until the third digit is confirmed and the tripmeter is set.

When the set mileage has been traveled, “0.0” will flash 10 times and then remain. If another information display item is being displayed, the countdown tripmeter will supersede it, flash 10 times, and then return to the previously displayed item.

TIP

The maximum set value is 900.0 km (600.0 miles)

Fuel reserve tripmeter “TRIP F”:

When the fuel tank reserve level has been reached, "TRIP F" appears automatically and begins recording distance traveled from that point.

After refueling and traveling some distance, "TRIP F" will disappear.

Current fuel consumption "INST FUEL":

The current fuel consumption display can be set to "km/L", "L/100km" or "MPG" in the menu system.

TIP

If traveling at speeds under 10 km/h, "--.-" will be displayed.

Average fuel consumption "AVG FUEL":

The average fuel consumption display can be to "km/L", "L/100km" or "MPG" in the menu system.

TIP

After resetting the average fuel consumption display, "--.-" will be shown until the vehicle has traveled 1 km.

Chronometer "⌚" (Raid theme only):

Timer function. After using the "All reset" function in the Raid theme menu system, the timer will begin counting after the vehicle has traveled 3 meters. Short press the "MENU" wheel switch to pause and resume the timer.

TIP

Starting from "00:00:00" (hours:minutes:seconds), the timer will reset and continue at "99:59:59".

Menu system

TIP

- The menu system in Raid theme is different than in Explorer and Street themes.
- The menu system cannot be operated while the vehicle is in motion. If vehicle motion is detected while the menu is open, the display will return to the main screen.
- If the "MENU" wheel switch is not operated for 10 seconds the menu system will close and the display will return to the main screen.

Menu system general operation:

The menu system for this vehicle is controlled with the "MENU" wheel switch on the right handlebar:

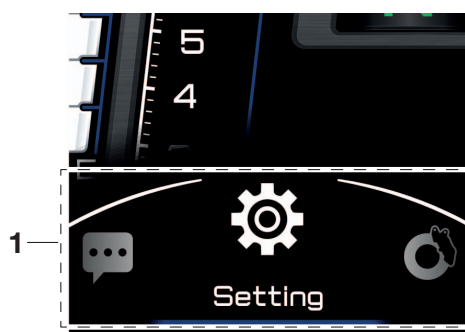
- While the main screen is displayed, long press the "MENU" wheel switch to open the menu system.

- Rotate the "MENU" wheel switch to cycle/select different items or adjust flashing item values.
- Short press the "MENU" wheel switch to highlight/de-highlight a selected item.
- While an item is highlighted, long press the "MENU" wheel switch to set an item or confirm a setting.

TIP

If no menu item is highlighted, long press of the "MENU" wheel switch will close the pop-up menu.

Explorer/Street theme menu system



1. Menu mode display

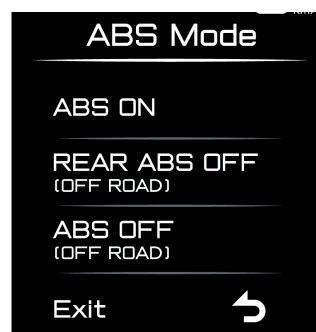
The pop-up menu is divided into the following main modules:

| | |
|-----------|--|
| Setting | Adjust settings related to the multi-function meter's operation. |
| ABS Mode | Turn ABS on/off. |
| Themes | Change between display themes. |
| Telephone | Telephone notification settings. |
| Message | Message notification settings. |

TIP

While open, the pop-up menu replaces the information display in Street theme.

ABS Mode



This menu allows you to turn the anti-lock braking system on/off or rear wheel only off. The currently selected ABS mode is indicated by the ABS mode indicator on the main screen. Select a menu item and short press the “MENU” wheel switch to highlight it. Long press the “MENU” wheel switch to change the ABS to that setting.

TIP

- When one of the ABS items is set, the display will return to the main screen instead of the previous menu screen.
- The ABS will remain disabled until:
 - The main switch is turned off.
 - The engine start/stop switch is turned to off “⊗” while the engine is running.
 - The “ABS ON” button is pressed while the vehicle is not moving.
 - The ABS is reactivated via the menu system while the vehicle is not moving.

EWA21100

WARNING

Always ride on paved roads with the ABS turned on. Turn the ABS off only when riding on non-paved surfaces.

Themes

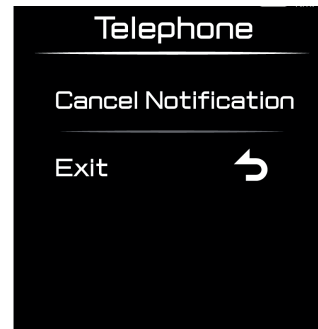


This module allows you to switch between display themes. Select a theme and the display will return to the main screen in that theme.

TIP

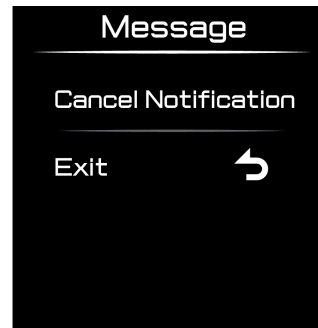
Changing to/from the Raid theme will change the contents of the menu system.

Telephone



This module allows you to clear all stored call notifications. When “Cancel Notification” is selected, the incoming/missed call icon will disappear from the main screen.

Message



This module allows you to clear all stored message notifications. When “Cancel Notification” is selected, the message icon will disappear from the main screen.

Setting menu

The Setting menu is divided into the following modules:

| | |
|-------------|-----------------------------|
| Maintenance | Set maintenance tripmeters. |
| Unit | Change measurement units. |
| Brightness | Adjust display brightness. |
| Clock | Set clock. |
| All Reset | Reset system settings. |

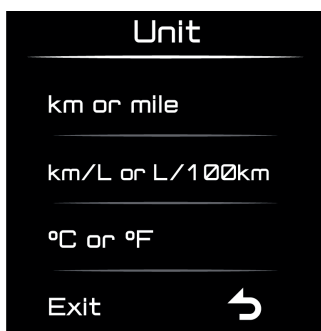
Maintenance



This module allows you to record distance traveled between engine oil changes “Oil”, and two other maintenance intervals of your choice “Interval 1”/ “Interval 2”.

After maintenance to one of the items has been completed, short press the “MENU” wheel switch to select it and then long press the “MENU” wheel switch to reset it.

Unit



This module allows you to change the measurement units. Each of the three items contain a sub-menu where the desired unit is selected.

TIP

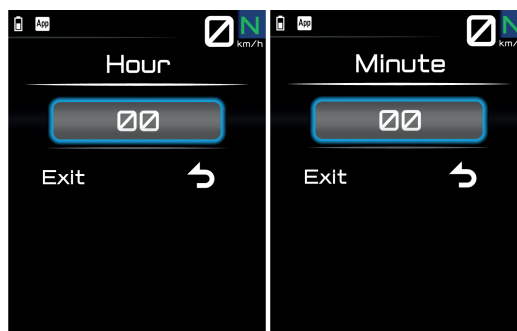
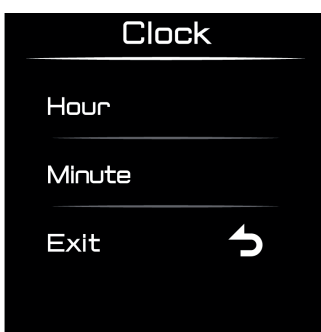
If “mile” is selected as a speed unit, “MPG” will be automatically set as the fuel economy unit and the menu item will be grayed out.

Brightness



This module allows you to adjust the screen brightness between 3 different levels.

Clock



This module allows you to set the 12-hour clock. The hours and minutes are set individually.

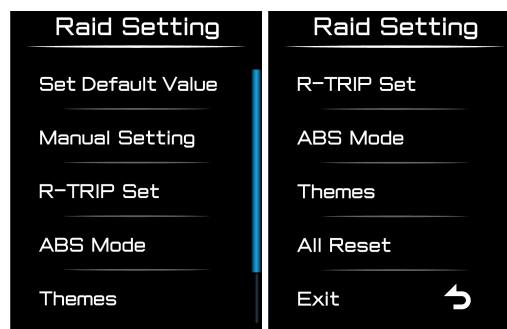
All Reset

This module allows you to reset all of the following at once: tripmeters (not including maintenance tripmeters), all measurement units, the chronometer (Raid theme), and the raid tripmeters.

TIP

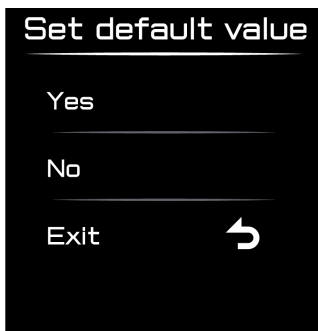
The items which are reset depend on which theme is currently selected.

Raid theme menu system



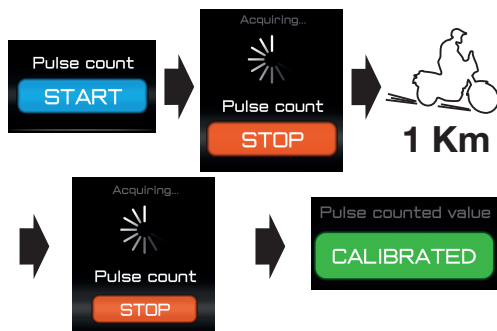
| | |
|-------------------|--|
| Set Default Value | Reset R-TRIP detection parameter to factory default. |
| Manual Setting | Calibrate R-TRIP detection parameter. |
| R-TRIP Set | Set R-TRIP display decimals. |
| ABS Mode | Turn ABS on/off. |
| Themes | Change between display themes. |

Set Default Value



This function resets the number of sensor pulses used to measure 1 km (for R-TRIP 1 and R-TRIP 2) back to its default value (for OEM wheel dimensions).

Manual Setting



This function sets the value for the number of sensor pulses used to measure 1 km (for R-TRIP 1 and R-TRIP 2) when wheels of non-standard dimensions are used.

1. Short press the “MENU” wheel switch to highlight the “START” item. When highlighted, the “START” item shrinks in size.
2. Long press the “MENU” wheel switch to start the calibration.
3. Drive the vehicle for 1 km (measured independently from the vehicle multi-function meter). When 1 km has been traveled, highlight the “STOP” item and long press the “MENU” wheel switch to stop the calibration.

TIP

- This menu screen will not automatically exit when the vehicle moves.
- Even if the measurement units are set to MPH, pulse calibration must be measured using 1 km.

R-TRIP Set



This module allows selection of how many decimals R-TRIP 1 and R-TRIP 2 display.


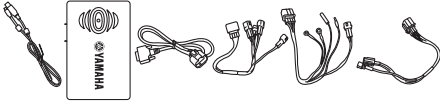
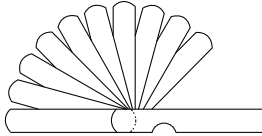
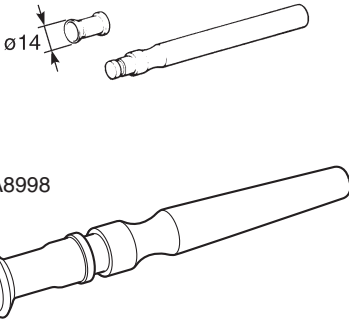
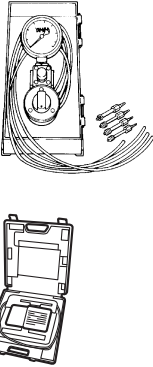
EAS20012

SPECIAL TOOLS

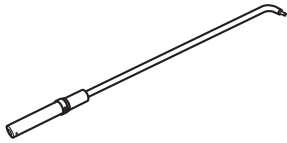
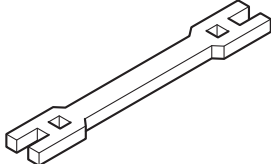
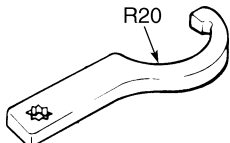
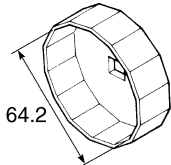
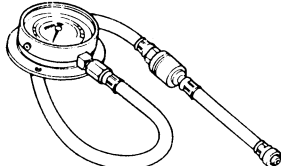
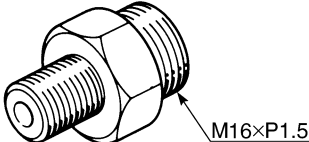
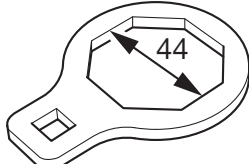
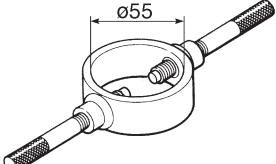
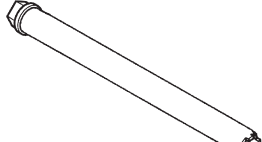
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

TIP

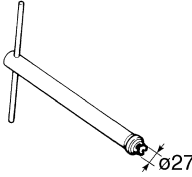
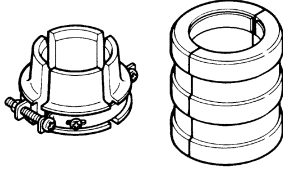
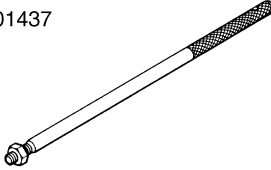
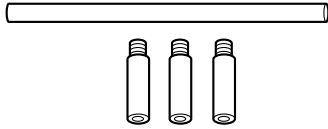
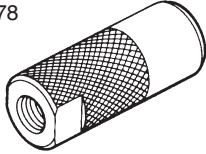
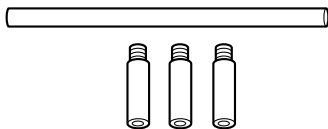
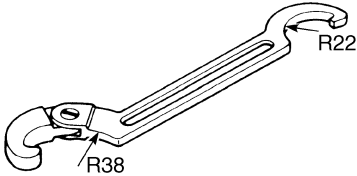
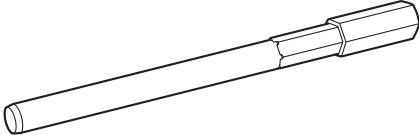
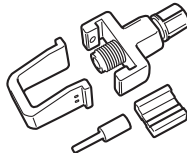
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

| Tool name/Tool No. | Illustration | Reference pages |
|---|--|---|
| Yamaha diagnostic tool USB 90890-03274 |  | 3-4, 3-9, 3-12, 4-59, 4-60, 9-2, 9-28, 9-29 |
| Yamaha diagnostic tool (A/I) 90890-03273 |  | 3-4, 3-9, 3-12, 4-59, 4-60, 9-2, 9-28, 9-29 |
| Thickness gauge 90890-03268 Feeler gauge set YU-26900-9 |  | 3-7, 4-22, 4-30, 5-59 |
| Valve lapper (ø14) 90890-04101 Valve lapper (ø14) YM-A8998 |  <p>90890-04101</p> <p>ø14</p> <p>YM-A8998</p> | 3-7 |
| Vacuum gauge 90890-03094 Vacuummate YU-44456 |  <p>90890-03094</p> <p>YU-44456</p> | 3-9 |

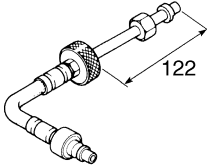
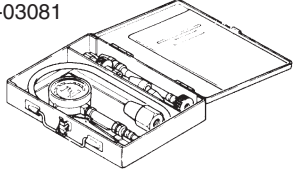
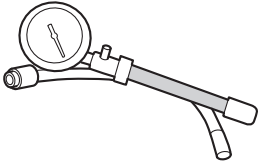
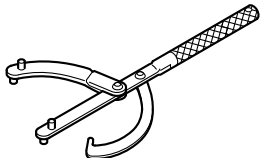
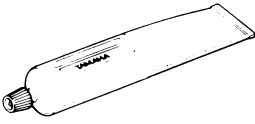
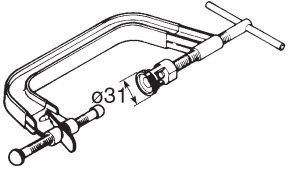
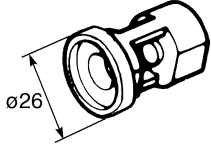
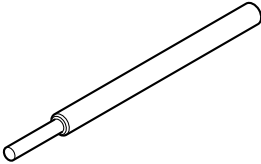
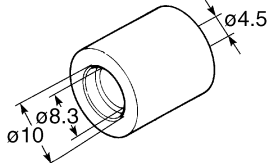
SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|---|--|------------------|
| Carburetor angle driver 2 90890-03173 |  | 3-10 |
| Spoke nipple wrench (6-7) 90890-01521 Spoke nipple wrench (6-7) YM-01521 |  | 3-17 |
| Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472 |  | 3-20, 4-82 |
| Oil filter wrench 90890-01426 Oil filter wrench YU-38411 |  | 3-26 |
| Pressure gauge 90890-03153 Pressure gauge YU-03153 |  | 3-27, 7-15, 7-16 |
| Oil pressure adapter H 90890-03139 |  | 3-27 |
| Front fork octagonal cap bolt wrench 44 mm 90890-01910 |  | 4-71, 4-77, 4-77 |
| Fork spring compressor 90890-01441 Fork spring compressor YM-01441 |  | 4-71, 4-76 |
| Damper rod holder (ø27) 90890-01582 Damper rod holder YM-01582 |  | 4-72 |

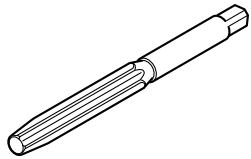
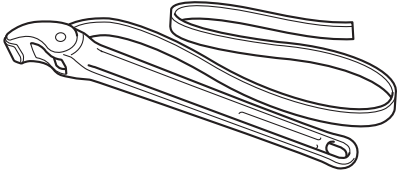
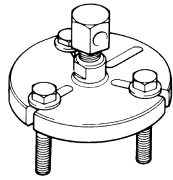
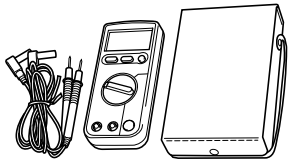
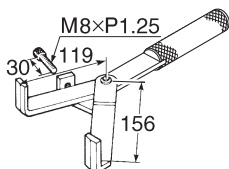
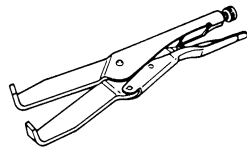
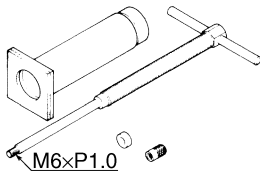
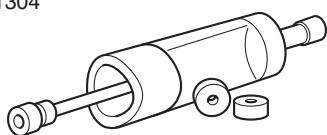
SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|--|---|------------------|
| Damper rod holder (ø27) 90890-01423 Damping rod holder YM-01423 |  | 4-73 |
| Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442 |  | 4-74, 4-74, 4-74 |
| Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703 | 90890-01437  YM-A8703  | 4-75 |
| Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703 | 90890-01578  YM-A8703  | 4-75 |
| Ring nut wrench 90890-01268 Spanner wrench YU-01268 |  | 4-82 |
| Engine alignment tool 90890-11097 Engine alignment tool YM-11097 |  | 4-89, 4-90 |
| Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550 |  | 4-96 |

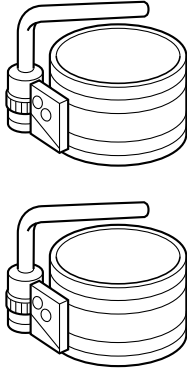
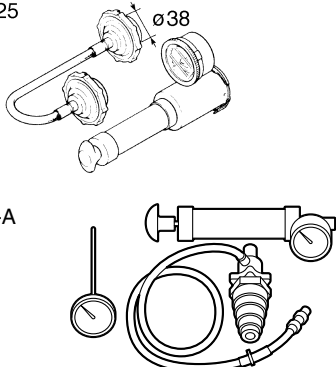
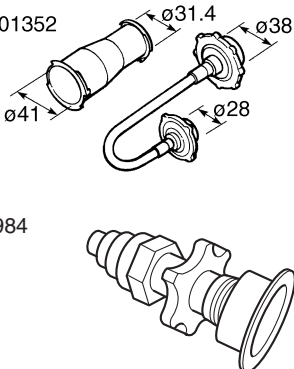
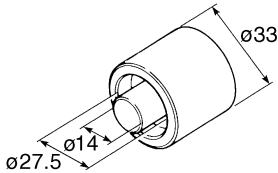
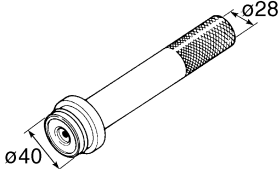
SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|---|---|------------------------|
| Compression gauge extension 122mm 90890-04136 Compression gauge extension 122mm YM-04136 |  | 5-8 |
| Compression gauge 90890-03081 Engine compression tester YU-33223 | 90890-03081  YU-33223  | 5-8 |
| Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235 |  | 5-26, 5-29 |
| Yamaha bond No. 1215 90890-85505 Three bond No. 1215® |  | 5-32, 5-49, 5-75, 5-77 |
| Valve spring compressor 90890-04200 Valve spring compressor YM-04019 |  | 5-40, 5-44 |
| Valve spring compressor attachment (ø26) 90890-01243 Valve spring compressor attachment (ø26) YM-01253-1 |  | 5-40, 5-44 |
| Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116 |  | 5-41 |
| Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117 |  | 5-41 |

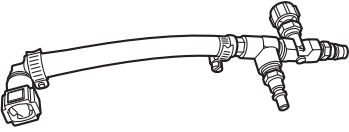
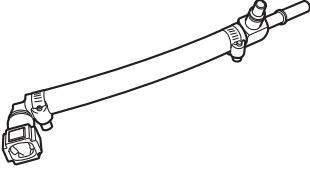
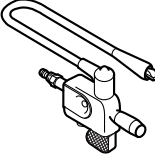
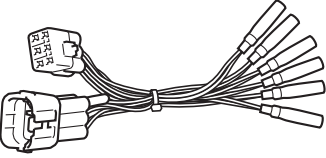
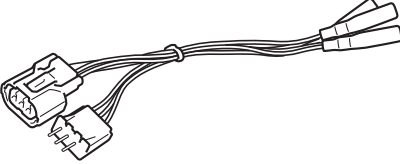
SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|--|--|--|
| Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118 |  | 5-41 |
| Rotor holding tool 90890-04166 Rotor holding tool YM-04166 |  | 5-47, 5-47, 5-48, 5-48 |
| Flywheel puller 90890-01362 Heavy duty puller YU-33270-B |  | 5-47 |
| Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927 |  | 5-52, 8-38, 8-39, 8-40, 8-41, 8-42, 8-42, 8-43, 8-43, 8-44, 8-45, 8-45, 8-46, 8-46, 8-47, 8-47, 8-48, 8-49, 8-49, 8-49 |
| Clutch holder 90890-04199 Universal clutch holder YM-91042 |  <p style="text-align: center;">YM-91042</p>  | 5-58, 5-60 |
| Piston pin puller set 90890-01304 Piston pin puller YU-01304 | 90890-01304  <p style="text-align: center;">YU-01304</p>  | 5-80 |

SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|--|--|-----------------|
| Piston ring compressor 90890-05158 Piston ring compressor YM-08037 |  | 5-87 |
| Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A |  | 6-4 |
| Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984 |  | 6-4 |
| Mechanical seal installer (ø33) 90890-04132 Water pump seal installer (ø33) YM-33221-A |  | 6-14 |
| Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058 |  | 6-14 |

SPECIAL TOOLS

| Tool name/Tool No. | Illustration | Reference pages |
|---|--|-----------------|
| Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210 |  | 7-15 |
| Fuel pressure adapter 90890-03186 Fuel pressure adapter YM-03186 |  | 7-16 |
| Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487 |  | 8-42 |
| Test harness- lean angle sensor (6P) 90890-03209 Test harness- lean angle sensor (6P) YU-03209 |  | 8-43 |
| Test harness S- pressure sensor (3P) 90890-03207 Test harness S- pressure sensor (3P) YU-03207 |  | 8-47 |

SPECIFICATIONS

| | |
|--|------|
| GENERAL SPECIFICATIONS | 2-1 |
| ENGINE SPECIFICATIONS | 2-2 |
| CHASSIS SPECIFICATIONS | 2-6 |
| ELECTRICAL SPECIFICATIONS | 2-9 |
| TIGHTENING TORQUES | 2-11 |
| ENGINE TIGHTENING TORQUES..... | 2-11 |
| CHASSIS TIGHTENING TORQUES..... | 2-12 |
| CABLE ROUTING | 2-15 |

GENERAL SPECIFICATIONS

EAS20013

GENERAL SPECIFICATIONS

Model

| | |
|-------|-----------------------------------|
| Model | BAG1 (XTZ690D) BAG2 (XTZ690DP) |
|-------|-----------------------------------|

Dimensions

| | |
|------------------------|-------------------|
| Overall length | 2370 mm (93.3 in) |
| Overall width | 905 mm (35.6 in) |
| Overall height | 1490 mm (58.7 in) |
| Wheelbase | 1595 mm (62.8 in) |
| Ground clearance | 255 mm (10.04 in) |
| Minimum turning radius | 2.8 m (9.47 ft) |

Weight

| | |
|-------------|-----------------|
| Curb weight | 220 kg (485 lb) |
|-------------|-----------------|

Loading

| | |
|-----------------|-----------------|
| Maximum load | 174 kg (384 lb) |
| Riding capacity | 2 person |

ENGINE SPECIFICATIONS

EAS20014

ENGINE SPECIFICATIONS

Engine

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

Fuel

| | |
|---------------------|------------------------------------|
| Recommended fuel | Unleaded gasoline (E10 acceptable) |
| Fuel tank capacity | 23 L (6.1 US gal, 5.1 Imp.gal) |
| Fuel reserve amount | 5.0 L (1.32 US gal, 1.10 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 | |
| Quantity (disassembled) | 3.00 L (3.17 US qt, 2.64 Imp.qt) |
| Without oil filter cartridge replacement | 2.30 L (2.43 US qt, 2.02 Imp.qt) |
| With oil filter cartridge replacement | 2.60 L (2.75 US qt, 2.29 Imp.qt) |

Oil filter

| | |
|-----------------|-----------|
| Oil filter type | Cartridge |
|-----------------|-----------|

Oil pump

| | |
|--------------|--|
| Oil pressure | 280.0 kPa/5000 r/min (2.80 kgf/cm ² /5000 r/min, 40.6 psi/5000 r/min) |
|--------------|--|

Cooling system

| | |
|--|---|
| Coolant quantity | |
| Radiator (including all routes) | 1.60 L (1.69 US qt, 1.41 Imp.qt) |
| Coolant reservoir (up to the maximum level mark) | 0.25 L (0.26 US qt, 0.22 Imp.qt) |
| Radiator cap valve opening pressure | 107.9–137.3 kPa (1.08–1.37 kgf/cm ² , 15.6–19.9 psi) |
| Thermostat | |
| Valve opening temperature | 80.0–84.0 °C (176.00–183.20 °F) |
| Valve full open temperature | 95.0 °C (203.00 °F) |
| Water pump | |
| Impeller shaft tilt limit | 0.15 mm (0.006 in) |

ENGINE SPECIFICATIONS

Spark plug(s)

| | |
|--------------------|-----------------------------|
| Manufacturer/model | NGK/LMAR8A-9 |
| Spark plug gap | 0.8–0.9 mm (0.031–0.035 in) |

Cylinder head

| | |
|---------------|---------------------|
| Warpage limit | 0.10 mm (0.0039 in) |
|---------------|---------------------|

Camshaft

| | |
|--|-------------------------------------|
| Camshaft cap inside diameter | 22.000–22.021 mm (0.8661–0.8670 in) |
| Camshaft journal diameter | 21.959–21.972 mm (0.8645–0.8650 in) |
| Camshaft-journal-to-camshaft-cap clearance limit | 0.080 mm (0.0032 in) |
| Camshaft lobe dimensions | |
| Lobe height limit (Intake) | 35.510 mm (1.3980 in) |
| Lobe height limit (Exhaust) | 35.610 mm (1.4020 in) |
| Camshaft runout limit | 0.030 mm (0.0012 in) |

Valve, valve seat, valve guide

| | |
|---|-----------------------------------|
| Valve clearance (cold) | |
| Intake | 0.11–0.20 mm (0.0043–0.0079 in) |
| Exhaust | 0.24–0.30 mm (0.0094–0.0118 in) |
| Valve dimensions | |
| Valve seat contact width limit (intake) | 1.6 mm (0.06 in) |
| Valve seat contact width limit (exhaust) | 1.6 mm (0.06 in) |
| Valve stem diameter limit (intake) | 4.445 mm (0.1750 in) |
| Valve stem diameter limit (exhaust) | 4.430 mm (0.1744 in) |
| Valve guide inside diameter (intake) | 4.500–4.512 mm (0.1772–0.1776 in) |
| Valve guide inside diameter (exhaust) | 4.500–4.512 mm (0.1772–0.1776 in) |
| Valve-stem-to-valve-guide clearance 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 | 0.020 mm (0.0008 in) |

Valve spring

| | |
|-----------------------------|--------------------|
| Free length limit (intake) | 38.29 mm (1.51 in) |
| Free length limit (exhaust) | 39.32 mm (1.55 in) |

Cylinder

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

Piston

| | |
|--|-------------------------------------|
| Diameter | 79.970–79.985 mm (3.1484–3.1490 in) |
| Measuring point (from piston skirt bottom) | 8.0 mm (0.31 in) |
| Piston-to-cylinder clearance | 0.015–0.040 mm (0.0006–0.0016 in) |
| Piston pin bore inside diameter limit | 18.045 mm (0.7104 in) |
| Piston pin outside diameter limit | 17.970 mm (0.7075 in) |

Piston ring

| | |
|---------------|---------------------|
| Top ring | |
| End gap limit | 0.50 mm (0.0197 in) |

ENGINE SPECIFICATIONS

| | |
|----------------------------------|----------------------|
| Side clearance limit 2nd ring | 0.115 mm (0.0045 in) |
| End gap limit | 0.80 mm (0.0315 in) |
| Side clearance limit | 0.115 mm (0.0045 in) |

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

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

| | |
|--|-----------------------------------|
| Balancer | |
| Balancer shaft runout limit | 0.030 mm (0.0012 in) |
| Bearing color code | |
| Code 1 | Blue |
| Code 2 | Black |
| Code 3 | Brown |
| Code 4 | Green |
| Code 5 | Yellow |
| Balancer shaft journal to balancer shaft bearing clearance | 0.020–0.054 mm (0.0008–0.0021 in) |

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

| | |
|-------------------------|-----------------------|
| Drivetrain | |
| Primary reduction ratio | 1.925 (77/40) |
| Transmission type | Constant mesh 6-speed |

ENGINE SPECIFICATIONS

| | |
|---------------------------|---------------------|
| Gear ratio | |
| 1st | 2.846 (37/13) |
| 2nd | 2.125 (34/16) |
| 3rd | 1.632 (31/19) |
| 4th | 1.300 (26/20) |
| 5th | 1.091 (24/22) |
| 6th | 0.964 (27/28) |
| Main axle runout limit | 0.08 mm (0.0032 in) |
| Drive axle runout limit | 0.08 mm (0.0032 in) |
| Secondary reduction ratio | 3.067 (46/15) |

Shifting mechanism

| | |
|----------------------------|---------------------------------|
| Installed shift rod length | 273.0–275.0 mm (10.75–10.83 in) |
|----------------------------|---------------------------------|

Air filter

| | |
|--------------------|--------------------------|
| Air filter element | Oil-coated paper element |
|--------------------|--------------------------|

Fuel injector

| | |
|------------|---|
| Resistance | 12.0 Ω at 20 °C (12.0 Ω at 68 °F) |
|------------|---|

Idling condition

| | |
|---|---|
| Engine idling speed | 1250–1450 r/min |
| O ₂ feedback control | Active |
| Coolant temperature | 85–105 °C (185–221 °F) |
| Engine oil temperature | 60–80 °C (140–176 °F) |
| Intake vacuum | 39.3–41.9 kPa (295–314 mmHg, 11.6–12.4 inHg) |
| Difference in vacuum pressure between the cylinders | 0 kPa–1.3 kPa (0 mmHg–10 mmHg, 0 inHg–0.4 inHg) |
| CO% | 0.0–2.0 % |
| Fuel line pressure (at idle) | 300–390 kPa (3.0–3.9 kgf/cm ² , 43.5–56.6 psi) |
| Throttle grip free play | 3.0–5.0 mm (0.12–0.20 in) |

CHASSIS SPECIFICATIONS

EAS20015

CHASSIS SPECIFICATIONS

Chassis

| | |
|--------------|-----------------|
| Caster angle | 27.0 ° |
| Trail | 105 mm (4.1 in) |

Front wheel

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

Rear wheel

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

Front tire

| | |
|--------------------|----------------------------|
| Type | With tube |
| Size | 90/90 – 21 M/C 54V M+S A |
| Speed rating | 240 km/h (149 mph) |
| Manufacturer/model | PIRELLI/SCORPION RALLY STR |
| Optional tire | |
| Type | With tube |
| Size | 90/90–21 M/C 54R M+S |
| Speed rating | 170 km/h (105 mph) |
| Manufacturer/model | MICHELIN/ANAKEE WILD |

Rear tire

| | |
|--------------------|----------------------------|
| Type | With tube |
| Size | 150/70 R18 M/C 70V M+S |
| Speed rating | 240 km/h (149 mph) |
| Manufacturer/model | PIRELLI/SCORPION RALLY STR |
| Optional tire | |
| Type | With tube |
| Size | 150/70 R18 M/C 70R M+S |
| Speed rating | 170 km/h (105 mph) |
| Manufacturer/model | MICHELIN/ANAKEE WILD |

Tire air pressure (measured on cold tires)

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

CHASSIS SPECIFICATIONS

Front brake

| | |
|--|---------------------------------------|
| Front disc brake | |
| Brake disc thickness limit | 4.0 mm (0.16 in) |
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in) |
| Brake pad lining thickness limit | 4.0 mm (0.16 in) |
| Master cylinder inside diameter | 16.00 mm (0.63 in) |
| Caliper cylinder inside diameter (Left) | 28.00 mm, 28.00 mm (1.10 in, 1.10 in) |
| Caliper cylinder inside diameter (Right) | 28.00 mm, 28.00 mm (1.10 in, 1.10 in) |
| Specified brake fluid | DOT 4 |

Rear brake

| | |
|--|---------------------|
| Rear disc brake | |
| Brake disc thickness limit | 4.5 mm (0.18 in) |
| Brake disc runout limit (as measured on wheel) | 0.15 mm (0.0059 in) |
| Brake pad lining thickness limit | 3.9 mm (0.15 in) |
| Master cylinder inside diameter | 12.7 mm (0.50 in) |
| Caliper cylinder inside diameter | 34.00 mm (1.34 in) |
| Specified brake fluid | DOT 4 |

Front suspension

| | |
|---|---|
| Shock absorber | Hydraulic damper |
| Fork spring free length limit | 458.5 mm (18.05 in) |
| Inner tube bending limit | 0.2 mm (0.01 in) |
| Recommended oil | Yamaha Suspension Oil 01 |
| Quantity (left) | 574.0 cm ³ (19.41 US oz, 20.24 Imp.oz) |
| Quantity (right) | 574.0 cm ³ (19.41 US oz, 20.24 Imp.oz) |
| Level | 122.0 mm (4.80 in) |
| Spring preload | |
| Adjustment value (Soft) | 19.0 mm (0.75 in) |
| Adjustment value (STD) | 19.0 mm (0.75 in) |
| Adjustment value (Hard) | 4.0 mm (0.16 in) |
| Rebound damping | |
| Unit for adjustment | Click |
| Adjustment value from the start position (Soft) | 33 |
| Adjustment value from the start position (STD) | 16 |
| Adjustment value from the start position (Hard) | 0 |
| Compression damping | |
| Unit for compression damping adjustment | Click |
| Adjustment value from the start position (Soft) | 22 |
| Adjustment value from the start position (STD) | 8 |
| Adjustment value from the start position (Hard) | 0 |

Rear suspension

| | |
|---|----------------------|
| Shock absorber | Gas-hydraulic damper |
| Spring preload | |
| Unit for adjustment | Click |
| Adjustment value (Soft) | 0 |
| Adjustment value (STD) | 10 |
| Adjustment value (Hard) | 24 |
| Rebound damping | |
| Unit for adjustment | Click |
| Adjustment value from the start position (Soft) | 23 |

CHASSIS SPECIFICATIONS

| | |
|---|-------|
| Adjustment value from the start position (STD) | 11 |
| Adjustment value from the start position (Hard) | 0 |
| Compression damping | |
| Unit for adjustment | Click |
| Adjustment value from the start position (Soft) | 18 |
| Adjustment value from the start position (STD) | 14 |
| Adjustment value from the start position (Hard) | 0 |

Drive chain

| | |
|-------------------------------|-----------------------------|
| Size | 525VZ2 |
| Chain type | Sealed type |
| Number of links | 122 |
| Drive chain slack (Sidestand) | 40.0–45.0 mm (1.57–1.77 in) |
| Drive chain slack limit | 55.0 mm (2.17 in) |
| 15-link length limit | 239.3 mm (9.42 in) |

ELECTRICAL SPECIFICATIONS

EAS20016

ELECTRICAL SPECIFICATIONS

Voltage

System voltage 12 V

Ignition system

Ignition timing (B.T.D.C.) 8.0–12.0 °/1350 r/min

Engine control unit

Model TBDF5D (XTZ690D)
TBDF8J (XTZ690DP)

Ignition coil

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

Lean angle sensor

Operating angle 65 °
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, 29.3 A at 5000 r/min
Stator coil resistance 0.128–0.192 Ω

Rectifier/regulator

Regulated voltage (DC) 14.3–14.7 V

Battery

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

Bulb wattage

Headlight LED
Tail/brake light LED
Front turn signal light LED
Rear turn signal light LED
Auxiliary light LED
License plate light 5.0 W × 1
Meter lighting LED

Indicator light

Neutral indicator light TFT LCD
Oil pressure warning light TFT LCD
High beam indicator light TFT LCD
Turn signal indicator light TFT LCD
Coolant temperature warning light TFT LCD
Malfunction indicator light TFT LCD
ABS warning light LED
ABS OFF indicator light LED
Immobilizer system indicator light LED

ELECTRICAL SPECIFICATIONS

Starter motor

| | |
|----------------------------|-------------------|
| Brush overall length limit | 6.5 mm (0.26 in) |
| Mica undercut (depth) | 0.70 mm (0.03 in) |

Fuel sender unit

| | |
|--------------------------------|----------------------|
| Sender unit resistance (full) | 8.0–12.0 Ω |
| Sender unit resistance (empty) | 267.0–273.0 Ω |

Fuel injection sensor

| | |
|---|--|
| Crankshaft position sensor resistance | 228–342 Ω |
| Intake air temperature sensor resistance | 5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F) |
| Intake air temperature sensor resistance | 290–390 Ω at 80 °C (290–390 Ω at 176 °F) |
| Intake air pressure sensor output voltage | 3.59–3.67 V at 101.3 kPa (3.59–3.67 V at 1.01 kgf/cm ² , 3.59–3.67 V at 14.7 psi) |
| Coolant temperature sensor resistance | 2513–2777 Ω at 20 °C (2513–2777 Ω at 68 °F) |
| Coolant temperature sensor resistance | 210–221 Ω at 100 °C (210–221 Ω at 212 °F) |

Fuse(s)

| | |
|----------------------------|--------|
| Main fuse | 30.0 A |
| Headlight fuse | 10.0 A |
| Signaling system fuse | 7.5 A |
| Ignition fuse | 10.0 A |
| Radiator fan motor fuse | 10.0 A |
| Fuel injection system fuse | 10.0 A |
| ABS control unit fuse | 7.5 A |
| ABS motor fuse | 30.0 A |
| ABS solenoid fuse | 20.0 A |
| Accessory fuse | 10.0 A |
| Auxiliary fuse | 2.0 A |
| Backup fuse | 7.5 A |





TIGHTENING TORQUES

EAS20017

TIGHTENING TORQUES

EAS30016

ENGINE TIGHTENING TORQUES

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

TIGHTENING TORQUES

EAS30017

CHASSIS TIGHTENING TORQUES

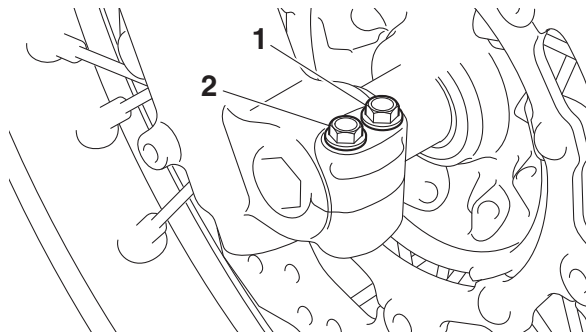
| Item | Thread size | Q'ty | Tightening torque | Remarks |
|-----------------------------|-------------|------|--------------------------------|----------|
| Steering stem nut | M22 | 1 | 150 N·m (15 kgf·m, 111 lb·ft) | |
| Front wheel axle | M18 | 1 | 72 N·m (7.2 kgf·m, 53 lb·ft) | |
| Front wheel axle pinch bolt | M8 | 2 | 21 N·m (2.1 kgf·m, 15 lb·ft) | See TIP. |
| Rear wheel sprocket nut | M10 | 6 | 80 N·m (8.0 kgf·m, 59 lb·ft) | |
| Rear wheel axle nut | M18 | 1 | 105 N·m (10.5 kgf·m, 77 lb·ft) | |
| Brake caliper bleed screw | M8 | 3 | 10 N·m (1.0 kgf·m, 7.4 lb·ft) | |
| Front brake caliper bolt | M10 | 4 | 40 N·m (4.0 kgf·m, 30 lb·ft) | |
| Upper handlebar holder bolt | M8 | 4 | 28 N·m (2.8 kgf·m, 21 lb·ft) | See TIP. |
| Lower handlebar holder nut | M10 | 2 | 32 N·m (3.2 kgf·m, 24 lb·ft) | |
| Clutch cable locknut | M8 | 1 | 7 N·m (0.7 kgf·m, 5.2 lb·ft) | |
| Lower bracket pinch bolt | M8 | 4 | 20 N·m (2.0 kgf·m, 15 lb·ft) | See TIP. |
| Upper bracket pinch bolt | M8 | 4 | 23 N·m (2.3 kgf·m, 17 lb·ft) | |
| Drive sprocket nut | M22 | 1 | 110 N·m (11 kgf·m, 81 lb·ft) | |

TIP

Front wheel axle pinch bolt

Tighten the pinch bolt to specification in order

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



TIP

Upper handlebar holder bolt

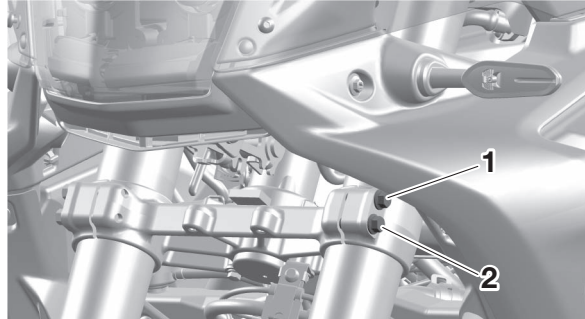
1. Tighten the upper handlebar holder bolts less than 20 N·m (2.0 kgf·m, 15 lb·ft) temporarily.
2. Tighten the upper handlebar holder bolt on the front side, and then on the rear side to specified torque.

TIP

Lower bracket pinch bolt

Tighten the pinch bolt to specification in order

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

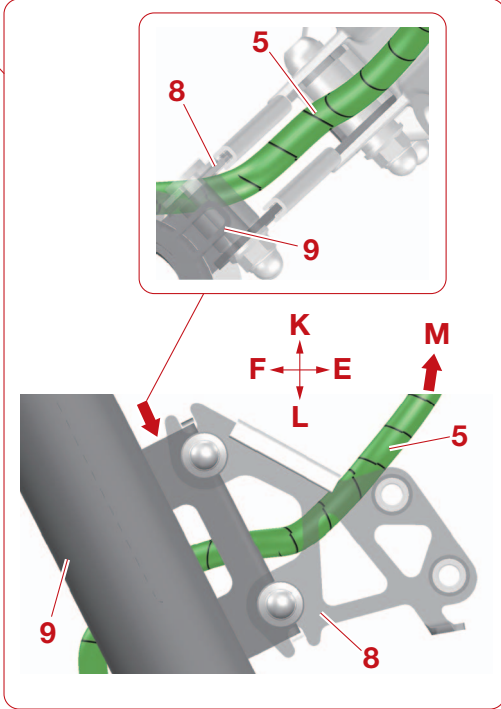
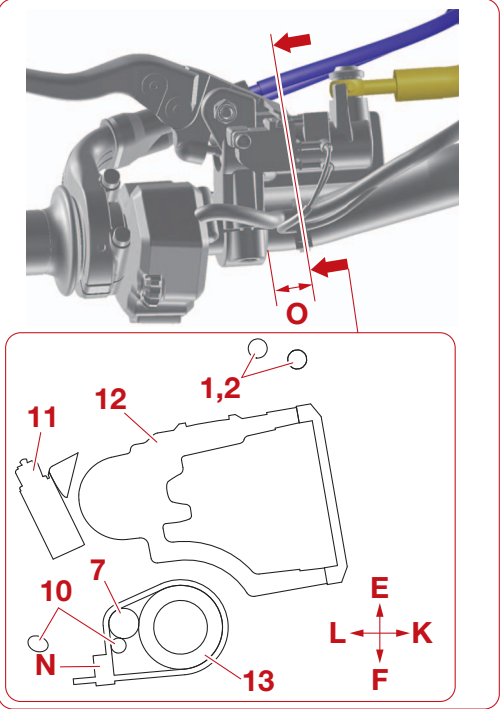
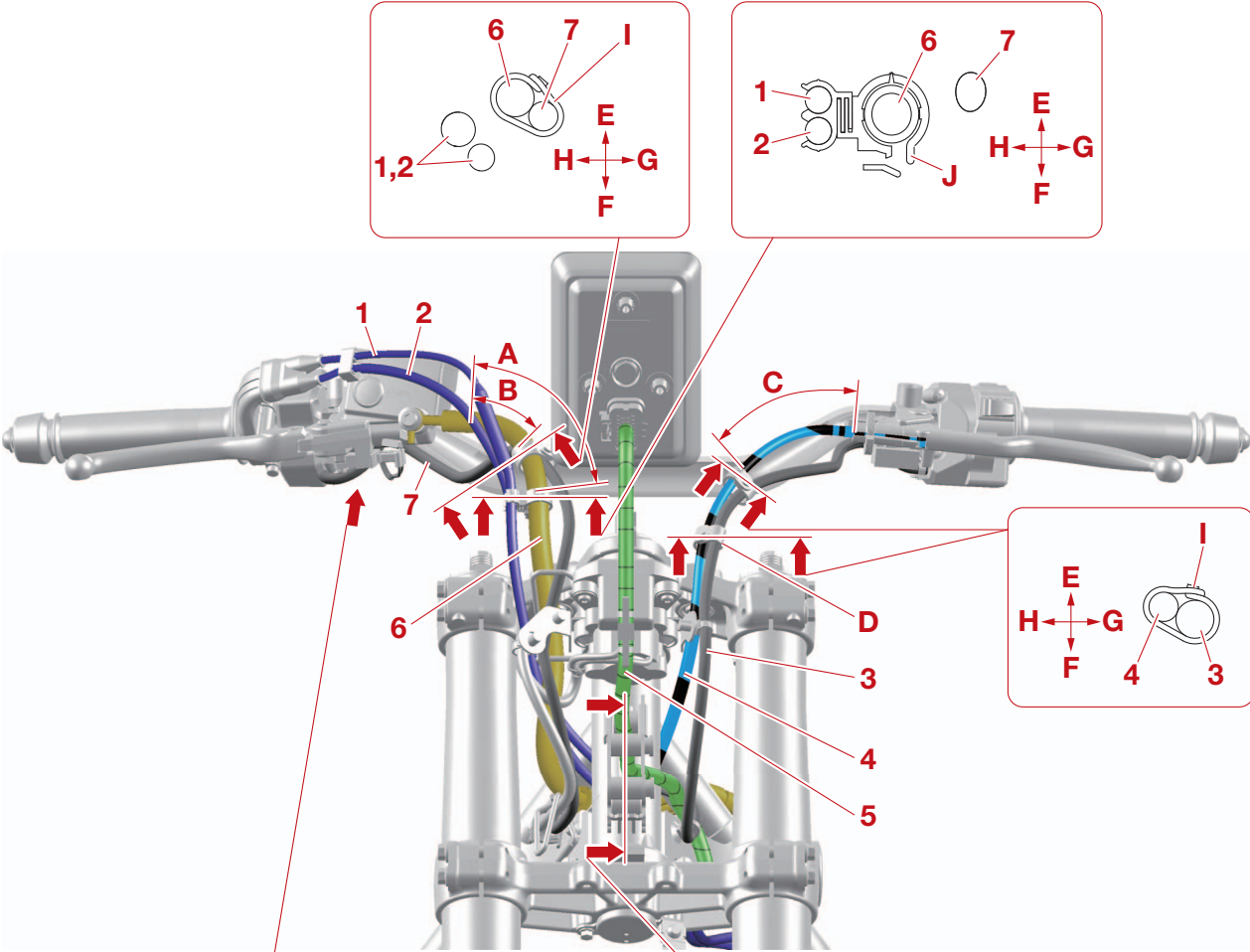


TIGHTENING TORQUES

EAS20021

CABLE ROUTING

Steering (front view)

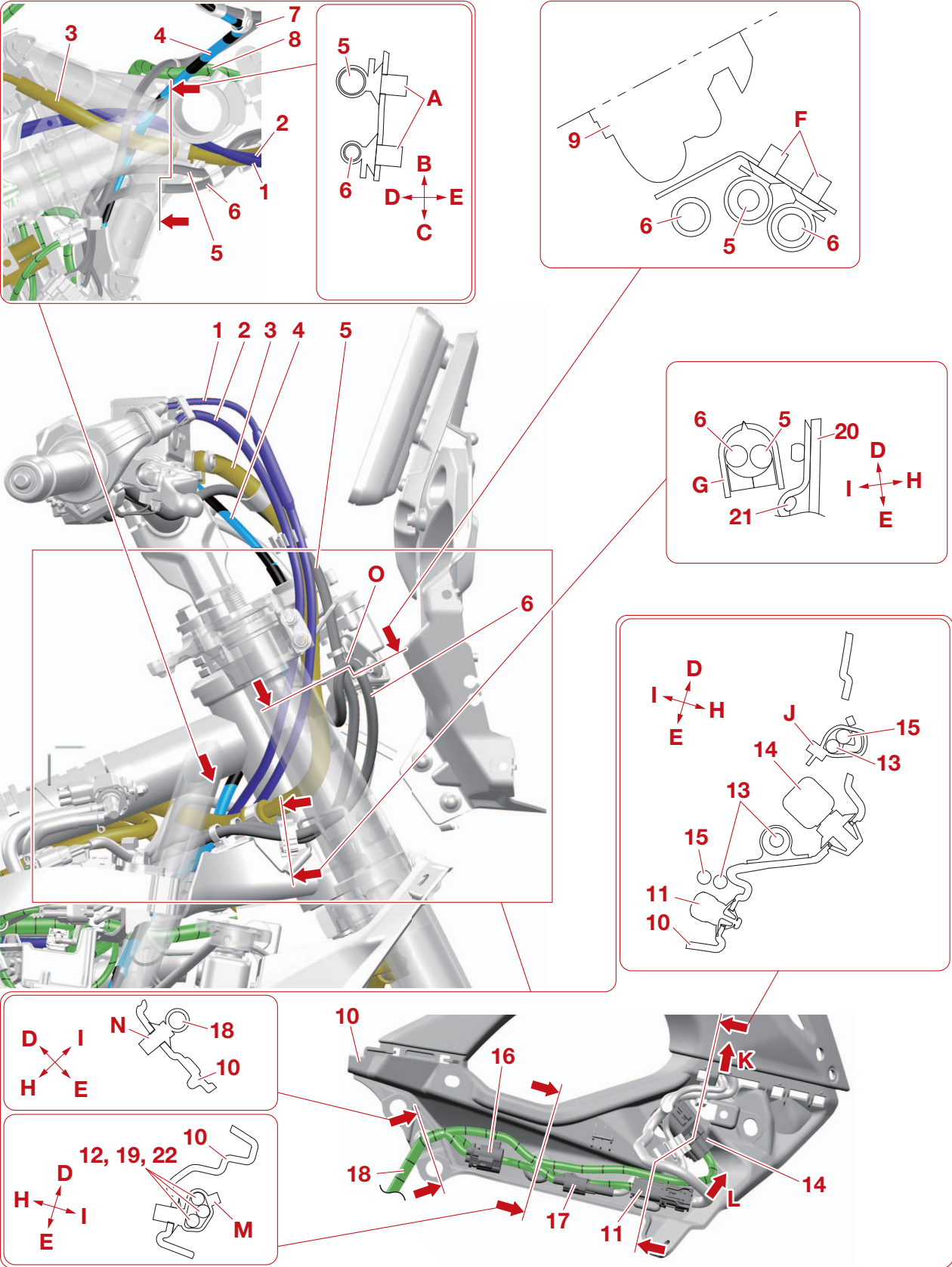


CABLE ROUTING

1. Throttle cable (accelerator cable)
2. Throttle cable (decelerator cable)
3. Handlebar switch lead (left)
4. Clutch cable
5. Wire harness (to meter assembly)
6. Brake hose (front brake master cylinder to hydraulic unit)
7. Handlebar switch lead (right)
8. Headlight stay
9. Frame
10. Front brake light switch lead
11. Front brake light switch
12. Front brake master cylinder assembly
13. Handlebar
 - A. 90–100 mm (3.54–3.93 in)
 - B. 25–35 mm (0.98–1.37 in)
 - C. 65–75 mm (2.55–2.95 in)
 - D. Fasten the left handlebar switch lead and clutch cable with the holder. Position the holder to the upper edge of the clutch cable protector.
 - E. Forward
 - F. Rearward
 - G. Left side
 - H. Right side
 - I. Point the button portion of the holder forward.
 - J. Face the catch of the holder rearward, and then engage the holder.
 - K. Upward
 - L. Downward
 - M. To meter assembly
 - N. Face the buckle of the plastic locking tie downward with the end pointing downward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - O. 15–25 mm (0.59–0.98 in)

CABLE ROUTING

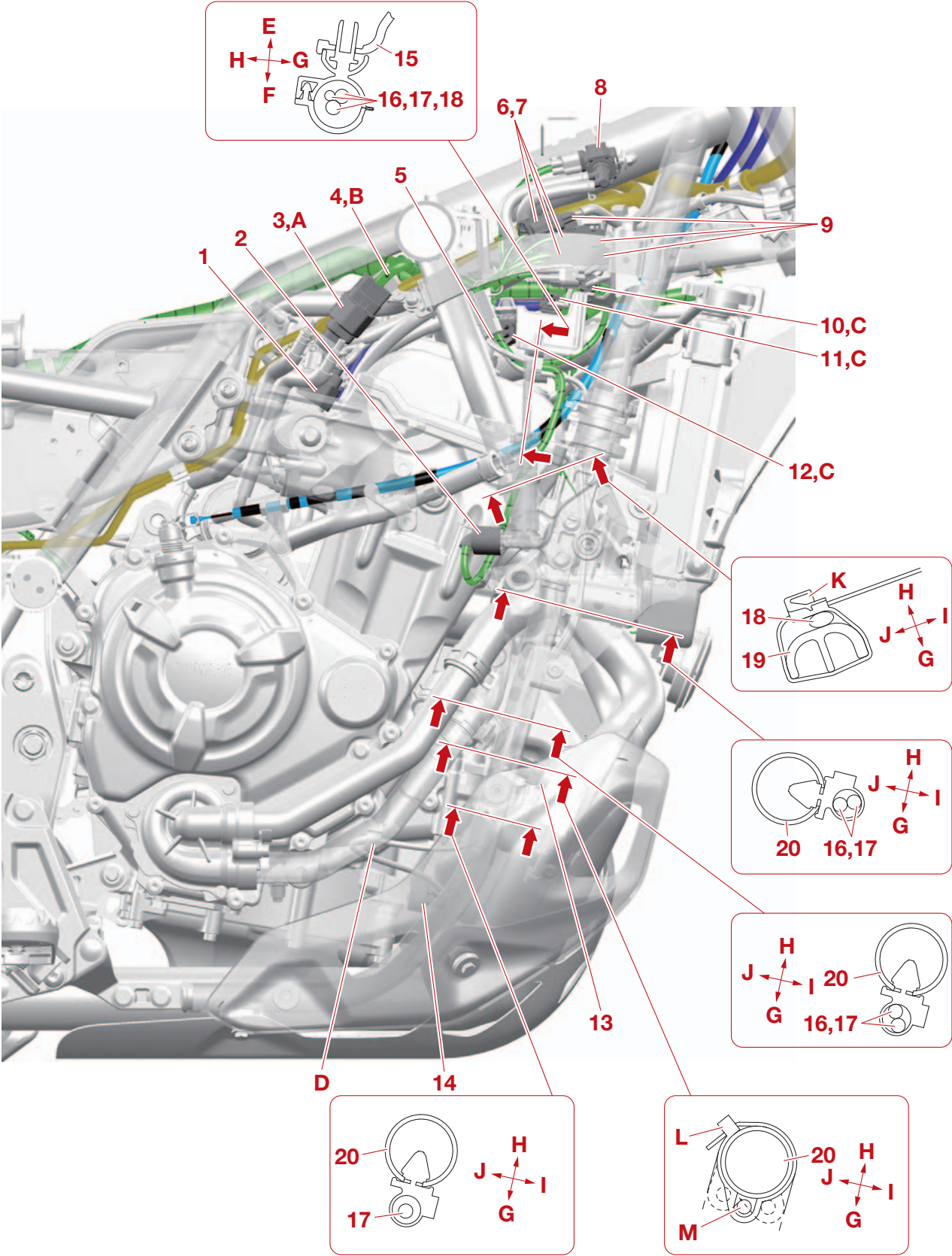
Steering (right side view)



1. Throttle cable (accelerator cable)
2. Throttle cable (decelerator cable)
3. Brake hose (front brake master cylinder to hydraulic unit)
4. Clutch cable
5. Handlebar switch lead (right)
6. Main switch lead
7. Handlebar switch lead (left)
8. Wire harness (to meter assembly)
9. Main switch
10. Windshield inner panel (right)
11. Front turn signal light coupler (right)
12. Wire harness (to headlight assembly)
13. USB port lead
14. Headlight coupler
15. Headlight lead
16. Accessory coupler #2
17. USB port coupler
18. Wire harness (to accessory coupler, headlight coupler, and front turn signal light coupler)
19. Wire harness (to front turn signal light coupler)
20. Frame
21. Cable guide
22. Wire harness (to USB port)
 - A. Insert the projection on the holder into the hole in the frame.
 - B. Forward
 - C. Rearward
 - D. Upward
 - E. Downward
 - F. Insert the projection on the holder into the hole in the bracket.
 - G. Face the catch of the holder downward, and then engage the holder at least three notches.
 - H. Inward
 - I. Outward
 - J. Face the buckle of the plastic locking tie outward with the end pointing downward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - K. To headlight assembly and USB port
 - L. To front turn signal light
 - M. Face the buckle of the plastic locking tie upward with the end pointing upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - N. Insert the projection on the holder into the hole in the windshield inner panel (right).
 - O. Route the main switch lead outward of the wire portion of the bracket.

CABLE ROUTING

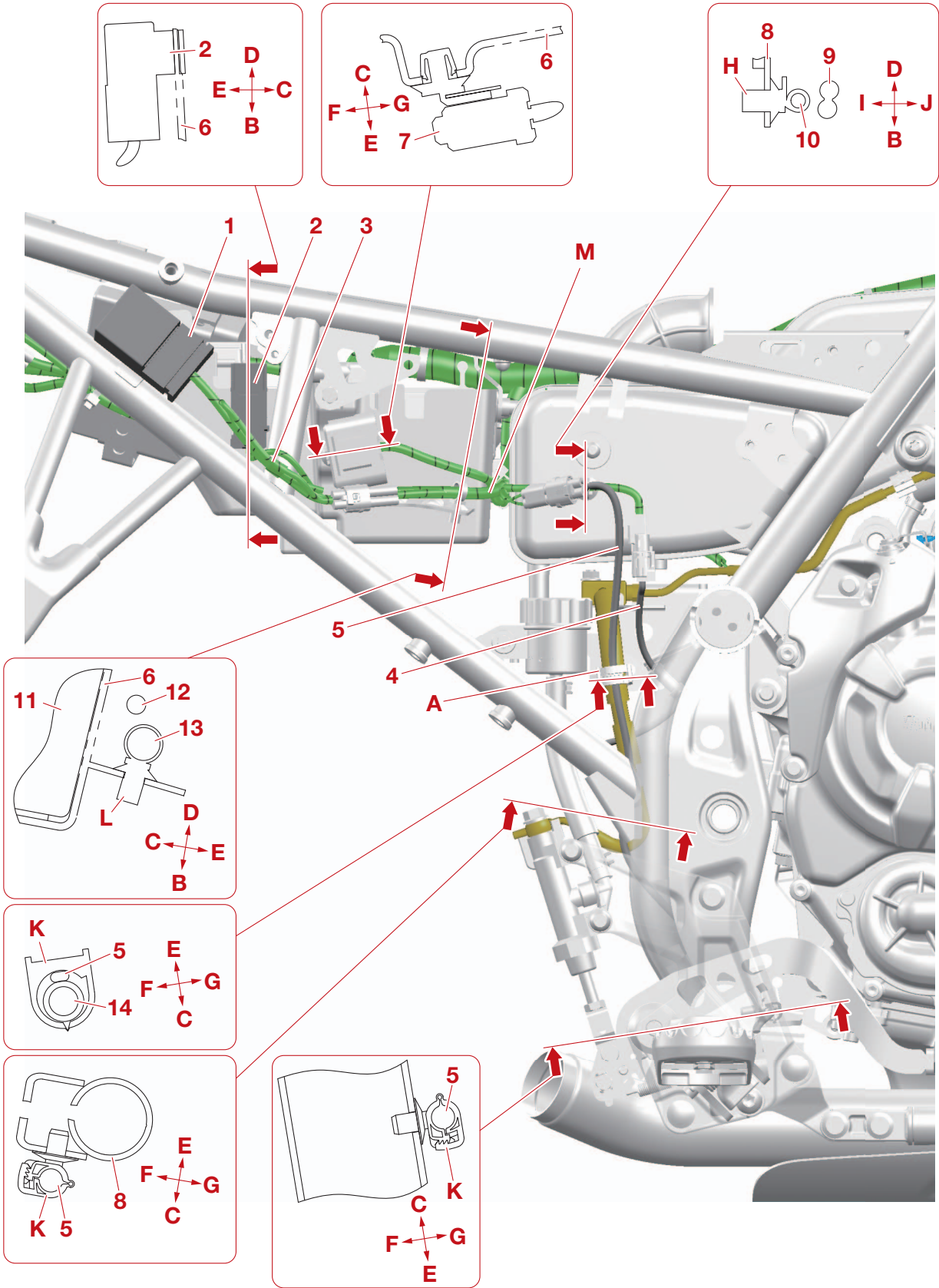
Engine (right side view)



1. Throttle position sensor coupler
2. Fuel cut solenoid valve coupler
3. Sub-wire harness coupler
4. Wire harness (to sub-wire harness)
5. Oil pressure switch connector
6. Handlebar switch coupler (left)
7. Handlebar switch coupler (right)
8. Purge cut valve solenoid
9. Main switch/immobilizer unit coupler
10. Radiator fan motor coupler
11. Front wheel sensor coupler
12. O₂ sensor coupler
13. O₂ sensor
14. Oil pressure switch
15. Coupler holder
16. O₂ sensor lead
17. Oil pressure switch lead
18. Wire harness (to fuel cut solenoid valve)
19. Frame
20. Down tube (right)
 - A. Install the sub-wire harness coupler onto the bracket.
 - B. Route the wire harness (to sub-wire harness) above the brake pipes and below the frame.
 - C. Insert the projection on the coupler into the hole in the coupler holder.
 - D. Fasten the oil pressure switch lead with the holder on the engine.
 - E. Upward
 - F. Downward
 - G. Inward
 - H. Outward
 - I. Forward
 - J. Rearward
 - K. Face the buckle of the plastic locking tie outward with the end pointing forward.
 - L. Fasten the oil pressure switch lead and down tube at the position of the O₂ sensor with the plastic locking tie. Face the buckle of the plastic locking tie outward rearward with the end pointing rearward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - M. Route the oil pressure switch lead as shown in the illustration.

CABLE ROUTING

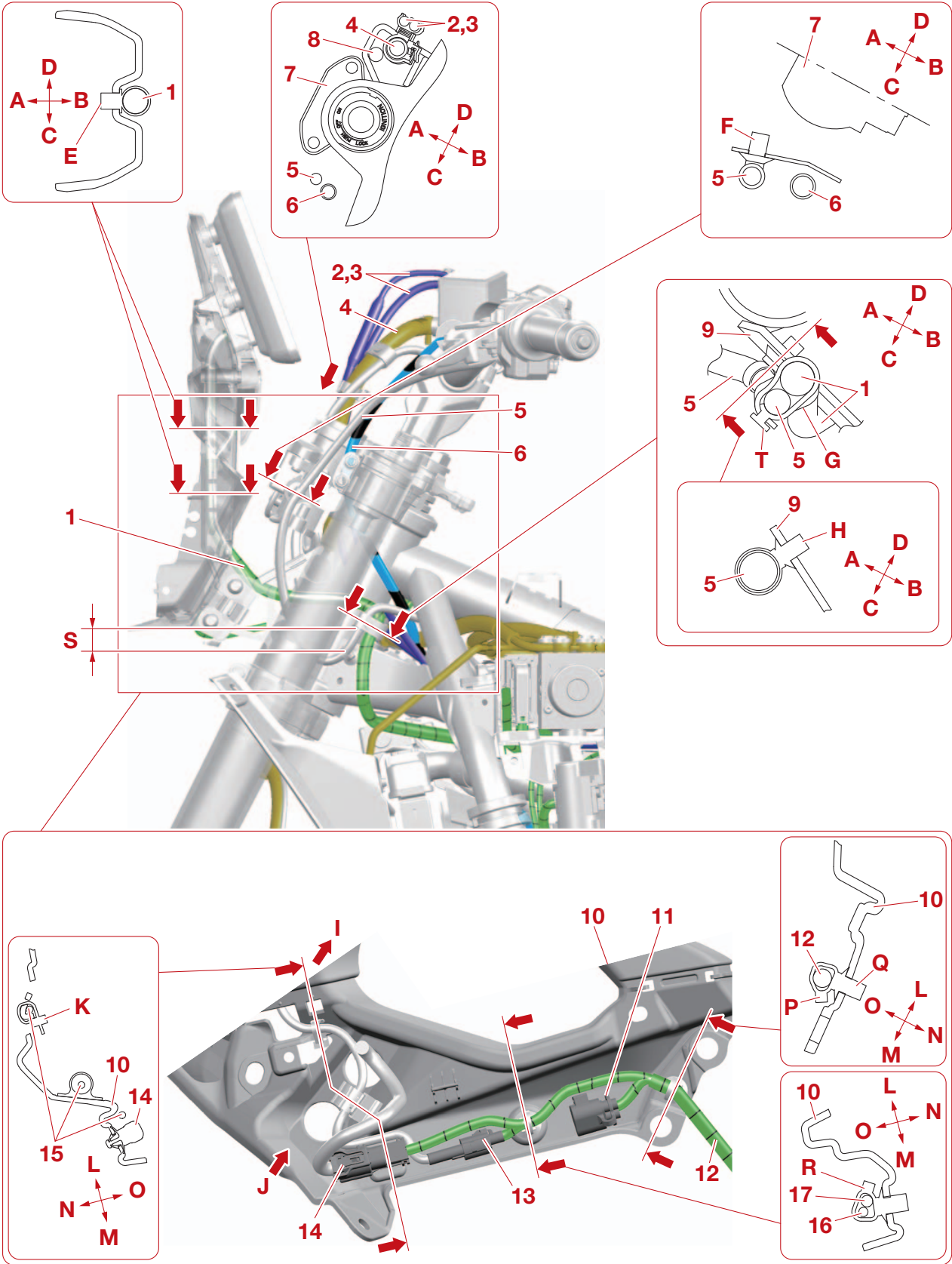
Rear frame (right side view)



1. Relay unit
 2. Radiator fan motor relay
 3. Resistor (along with wire harness)
 4. Rear wheel sensor lead
 5. Rear brake light switch lead
 6. Battery box
 7. Joint coupler
 8. Frame
 9. Rear brake light switch coupler
 10. Wire harness (to rear wheel sensor)
 11. Battery
 12. Wire harness (to joint coupler)
 13. Wire harness (to relay unit)
 14. Brake hose (rear brake master cylinder to hydraulic unit)
- A. Align the position of the rear brake light switch lead clamp with the rear brake hose metal starting portion.
 - B. Downward
 - C. Inward
 - D. Upward
 - E. Outward
 - F. Rearward
 - G. Forward
 - H. Insert the projection on the wire harness clamp into the hole in the bracket on frame.
 - I. Left side
 - J. Right side
 - K. Engage the clamp by at least three notches.
 - L. Insert the projection on the wire harness clamp into the hole in the battery box.
 - M. Route the wire harness so that the leads are routed downward of the center of the air filter case bolt.

CABLE ROUTING

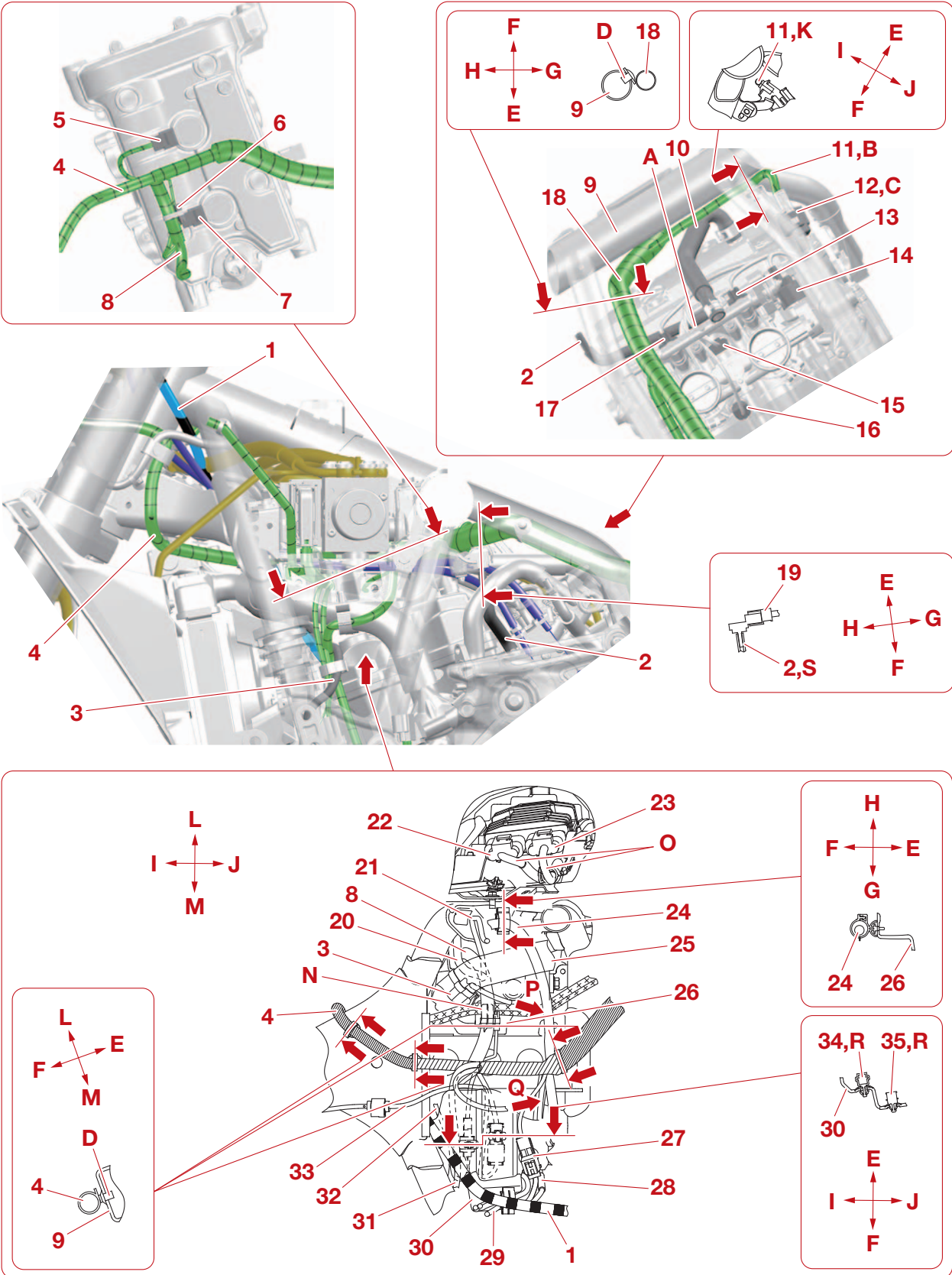
Steering (left side view)



1. Wire harness (to meter assembly)
2. Throttle cable (accelerator cable)
3. Throttle cable (decelerator cable)
4. Brake hose (front brake master cylinder to hydraulic unit)
5. Handlebar switch lead (left)
6. Clutch cable
7. Main switch
8. Handlebar switch lead (right)
9. Frame
10. Windshield inner panel (left)
11. Accessory coupler #1
12. Wire harness (to accessory coupler, "ABS ON" button, and front turn signal light)
13. "ABS ON" button coupler
14. Front turn signal light coupler (left)
15. "ABS ON" button lead
16. Wire harness (to "ABS ON" button)
17. Wire harness (to front turn signal light)
 - A. Forward
 - B. Rearward
 - C. Left side
 - D. Right side
 - E. Insert the projection on the wire harness holder into the hole in the headlight inner cover.
 - F. Insert the projection on the holder into the hole in the bracket.
 - G. Route the wire harness between the frame and the left handlebar switch lead.
 - H. Insert the projection on the holder into the hole in the frame.
 - I. To "ABS ON" button
 - J. To front turn signal light
 - K. Face the buckle of the plastic locking tie outward with the end pointing downward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - L. Upward
 - M. Downward
 - N. Inward
 - O. Outward
 - P. Face the buckle of the plastic locking tie downward with the end pointing downward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - Q. Insert the projection on the holder into the hole in the windshield inner panel (left).
 - R. Face the buckle of the plastic locking tie upward with the end pointing upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - S. 15–25 mm (0.59–0.98 in)
 - T. Face the button of the band outward.

CABLE ROUTING

Engine (left side view)

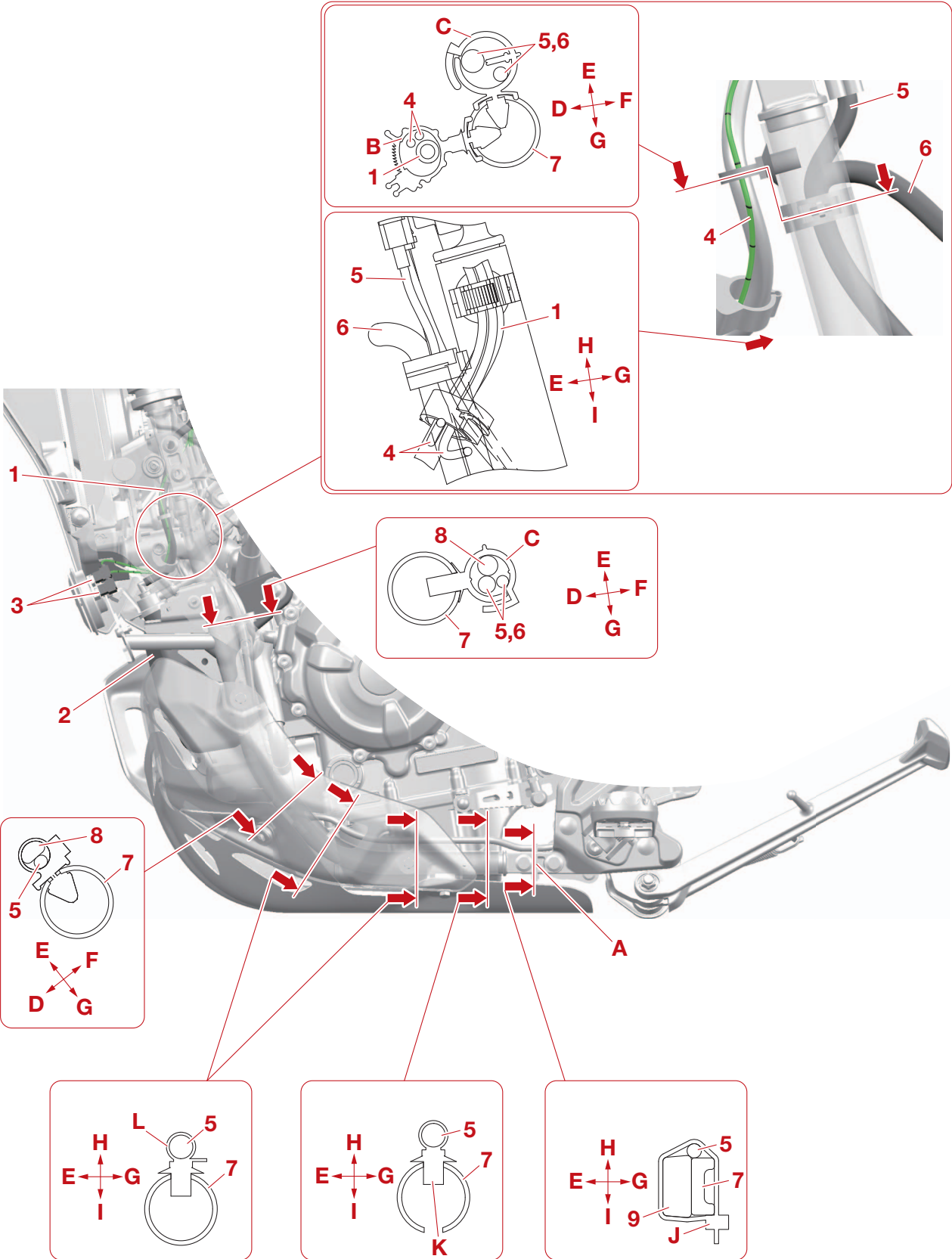


CABLE ROUTING

1. Clutch cable
 2. Intake air pressure sensor hose
 3. Coolant reservoir hose
 4. Wire harness (to meter assembly)
 5. Ignition coil #2 coupler
 6. Joint coupler
 7. Ignition coil #1 coupler
 8. Wire harness (to hydraulic unit)
 9. Frame
 10. Cylinder head breather hose
 11. Wire harness (to sub-wire harness)
 12. Sub-wire harness coupler
 13. Fuel injector #2 coupler
 14. Throttle position sensor coupler
 15. ISC (Idle Speed Control) unit coupler
 16. Coolant temperature sensor coupler
 17. Fuel injector #1 coupler
 18. Wire harness
 19. Intake air temperature sensor coupler
 20. Wire harness (to accessory coupler, "ABS ON" button, and front turn signal light)
 21. Wire harness (to sidestand switch)
 22. Stator coil coupler (gray)
 23. Rectifier/regulator coupler (black)
 24. Wire harness (to rectifier/regulator, fuel pump, and fuel sender)
 25. Radiator inlet hose
 26. Hydraulic unit bracket
 27. O₂ sensor coupler
 28. Oil pressure switch connector
 29. Wire harness (to fuel cut solenoid valve)
 30. Coupler holder
 31. Wire harness (to accessory coupler, headlight, and front turn signal light)
 32. Wire harness (to radiator fan motor)
 33. Front wheel sensor lead
 34. Radiator fan motor coupler
 35. Front wheel sensor coupler
- A. Route the ISC (Idle Speed Control) unit lead and coolant temperature sensor lead under the fuel rail.
 - B. Route the wire harness (to sub-wire harness) above the cylinder head breather hose.
 - C. Install the sub-wire harness coupler onto the bracket.
 - D. Insert the projection on the wire harness holder into the hole in the frame.
 - E. Upward
 - F. Downward
 - G. Inward
 - H. Outward
 - I. Forward
 - J. Rearward
 - K. Insert the projection on the wire harness holder into the hole in the bracket.
 - L. Left side
 - M. Right side
 - N. Route the throttle cables through the guide on the hydraulic unit bracket.
 - O. Route the stator coil lead and rectifier/regulator lead to the inside of the side cover inner panel.
 - P. To ignition coil #1
 - Q. To ignition coil #2
 - R. Insert the projection on the coupler into the hole in the coupler holder.
 - S. Install the intake air pressure sensor hose until it bottoms out the intake air pressure sensor.

CABLE ROUTING

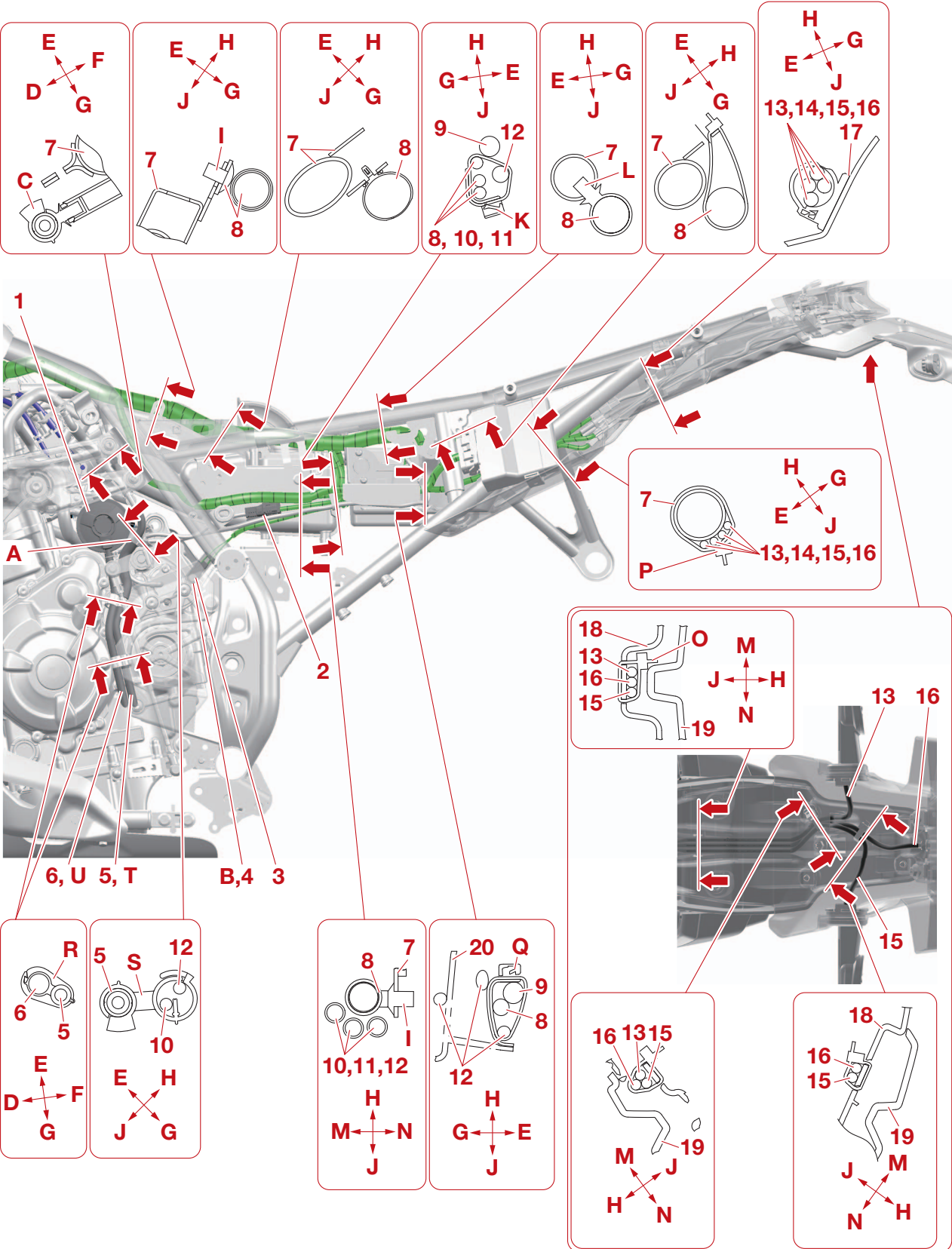
Down tube (left side view)



1. Coolant reservoir hose
2. Coolant reservoir
3. Horn connector
4. Horn lead
5. Sidestand switch lead
6. Stator coil lead
7. Down tube
8. Coolant reservoir breather hose
9. Footrest bracket (left)
- A. Fit the plastic band between the two bolts.
- B. Engage the clamp by all notches.
- C. Engage the clamp by at least three notches.
- D. Forward
- E. Inward
- F. Rearward
- G. Outward
- H. Upward
- I. Downward
- J. Face the buckle of the plastic band downward with the end pointing downward.
- K. Insert the projection on the holder into the hole in the down tube.
- L. Insert the projection on the holder into the hole in the down tube. Point the end of the band portion of the holder outward. Cut off the excess end of the band to 5 mm (0.20 in) or less.

CABLE ROUTING

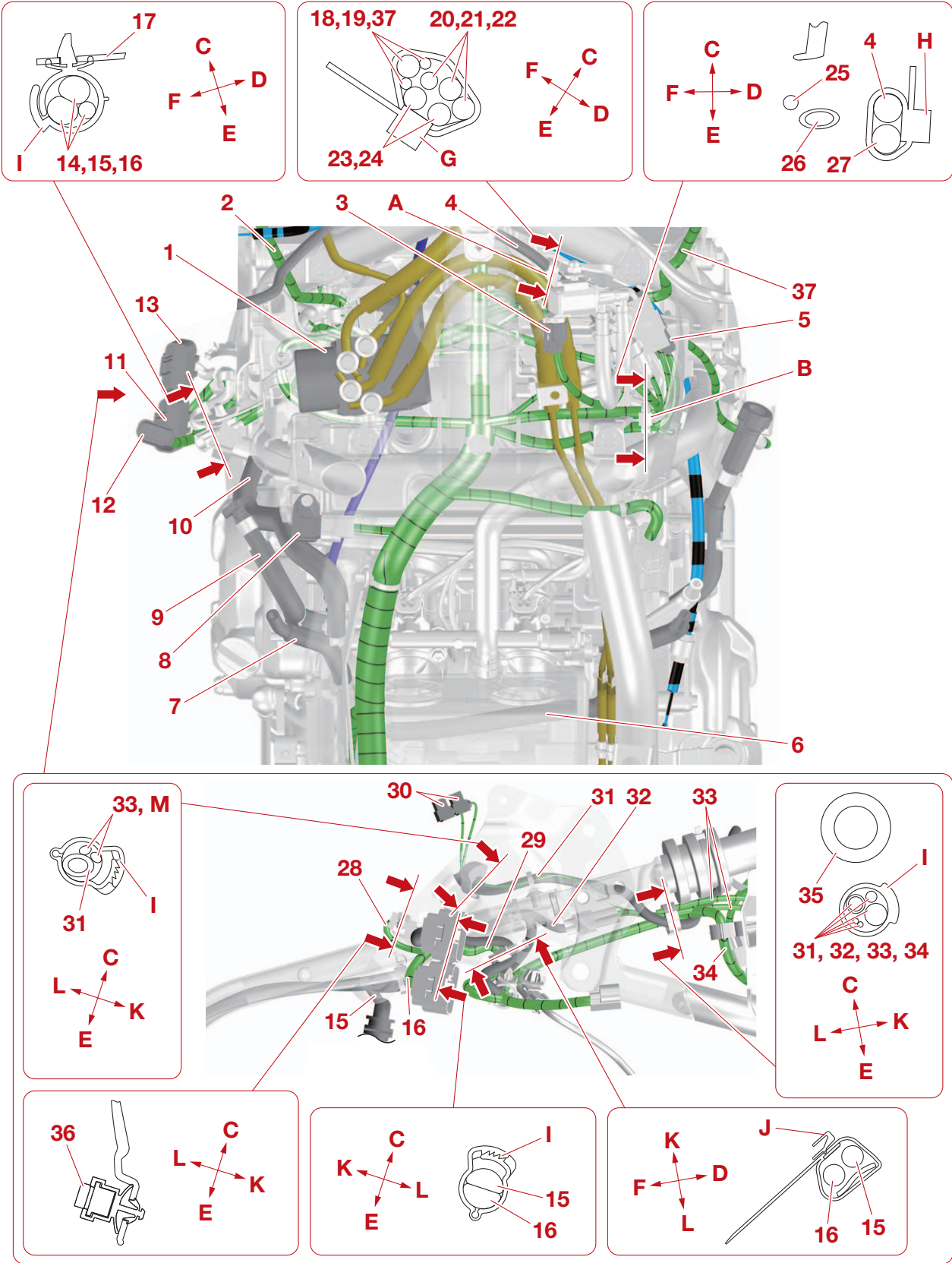
Rear frame (left side view)



1. Canister
2. Gear position switch coupler
3. Engine ground terminal
4. Engine ground terminal cover
5. Fuel tank overflow hose
6. Canister breather hose
7. Frame
8. Wire harness
9. ECU (Engine Control Unit) lead
10. Gear position switch lead
11. Engine ground lead
12. Starter motor lead
13. Rear turn signal light lead (left)
14. Tail/brake light lead
15. Rear turn signal light lead (right)
16. License plate light lead
17. Mudguard
18. License plate bracket
19. Rear fender stay
20. Battery box
- A. Position the clamp between protector end and yellow paint mark alignment with the axle clamp.
- B. Fasten the engine ground terminal with the terminal cover.
- C. Engage the clamp by at least three notches.
- D. Forward
- E. Outward
- F. Rearward
- G. Inward
- H. Upward
- I. Insert the projection on the wire harness holder into the hole in bracket on the frame.
- J. Downward
- K. Face the buckle of the plastic band downward with the end pointing inward.
- L. Insert the projection on the wire harness holder into the hole in the frame.
- M. Left side
- N. Right side
- O. Point the end of plastic locking tie inward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
- P. Face the buckle of the plastic band downward with the end pointing downward.
- Q. Face the buckle of the plastic band upward with the end pointing inward.
- R. Align the clamp with the white mark on the hose.
- S. Engage the clamp (leads side) by at least three notches. Face the buckle of the clamp (hose side) rearward. Align the clamp between the end of hose protector and yellow mark on the fuel tank overflow hose.
- T. Yellow mark
- U. White mark

CABLE ROUTING

Engine (top view)

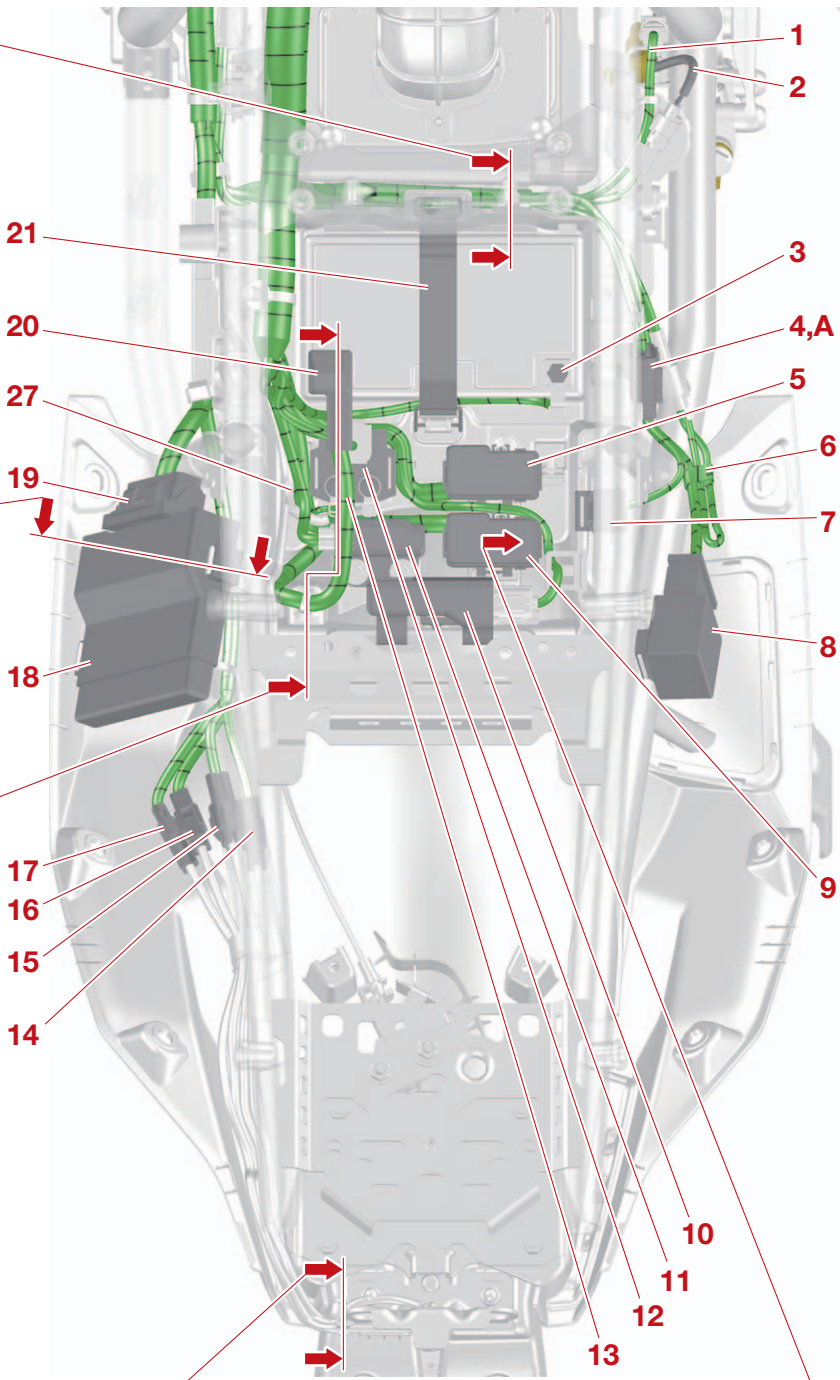
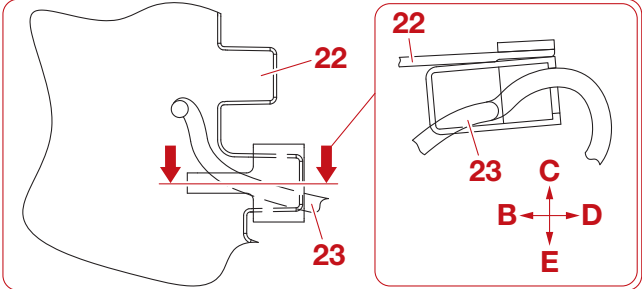
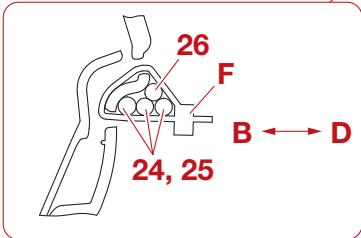
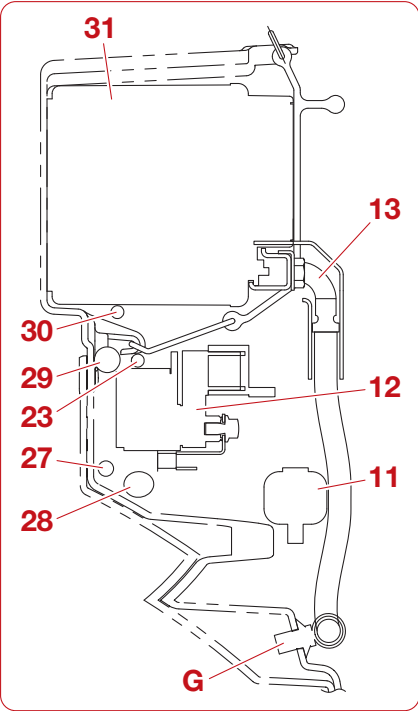
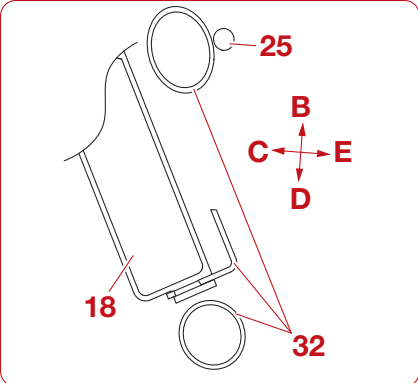
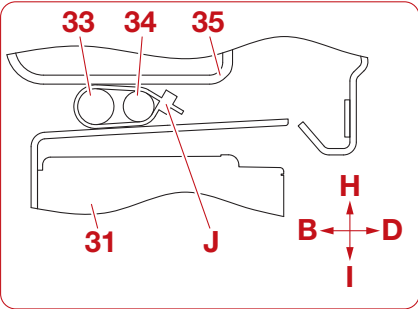


CABLE ROUTING

1. Hydraulic unit
2. Wire harness (to accessory coupler, front turn signal light, and "ABS ON" button)
3. Purge cut valve solenoid coupler
4. Handlebar switch lead (right/left)
5. Main switch/immobilizer unit coupler
6. Fuel tank overflow hose (right fuel tank to hose joint)
7. Fuel tank overflow hose (left fuel tank to hose joint)
8. Intake air pressure sensor
9. Fuel hose (right fuel tank to left fuel tank)
10. Fuel hose (fuel pump to fuel rail)
11. Rectifier/regulator coupler (black)
12. Fuel pump coupler
13. Stator coil coupler (gray)
14. Fuel pump lead
15. Stator coil lead
16. Rectifier/regulator lead
17. Radiator bracket
18. Front wheel sensor lead
19. Radiator fan motor lead
20. Immobilizer unit lead
21. Main switch lead
22. Purge cut valve solenoid lead
23. Handlebar switch lead (right)
24. Handlebar switch lead (left)
25. O₂ sensor lead
26. Oil pressure switch lead
27. Wire harness (to main switch/immobilizer unit and purge cut valve solenoid)
28. Wire harness (to crankshaft position sensor)
29. Wire harness (to rectifier/regulator and crankshaft position sensor)
30. Horn connector
31. Coolant reservoir hose
32. Sidestand switch lead
33. Horn lead
34. Wire harness (to rectifier/regulator, fuel pump, and fuel sender)
35. Frame
36. Crankshaft position sensor coupler
37. Wire harness (to headlight, USB port, front turn signal light, and accessory coupler)
 - A. Fasten the leads with the plastic band at the ends of lead protectors before the gray tape. Do not fasten the leads with the plastic band at the naked portion of the leads.
 - B. Fasten the leads with the plastic band at the ends of lead protectors.
 - C. Forward
 - D. Upward
 - E. Rearward
 - F. Downward
 - G. Face the buckle of the plastic band rearward with the end pointing downward.
 - H. Face the buckle of the plastic band upward with the end pointing forward.
 - I. Engage the clamp by at least three notches.
- J. Face the buckle of the plastic band outward with the end pointing downward.
- K. Outward
- L. Inward
- M. White tape

CABLE ROUTING

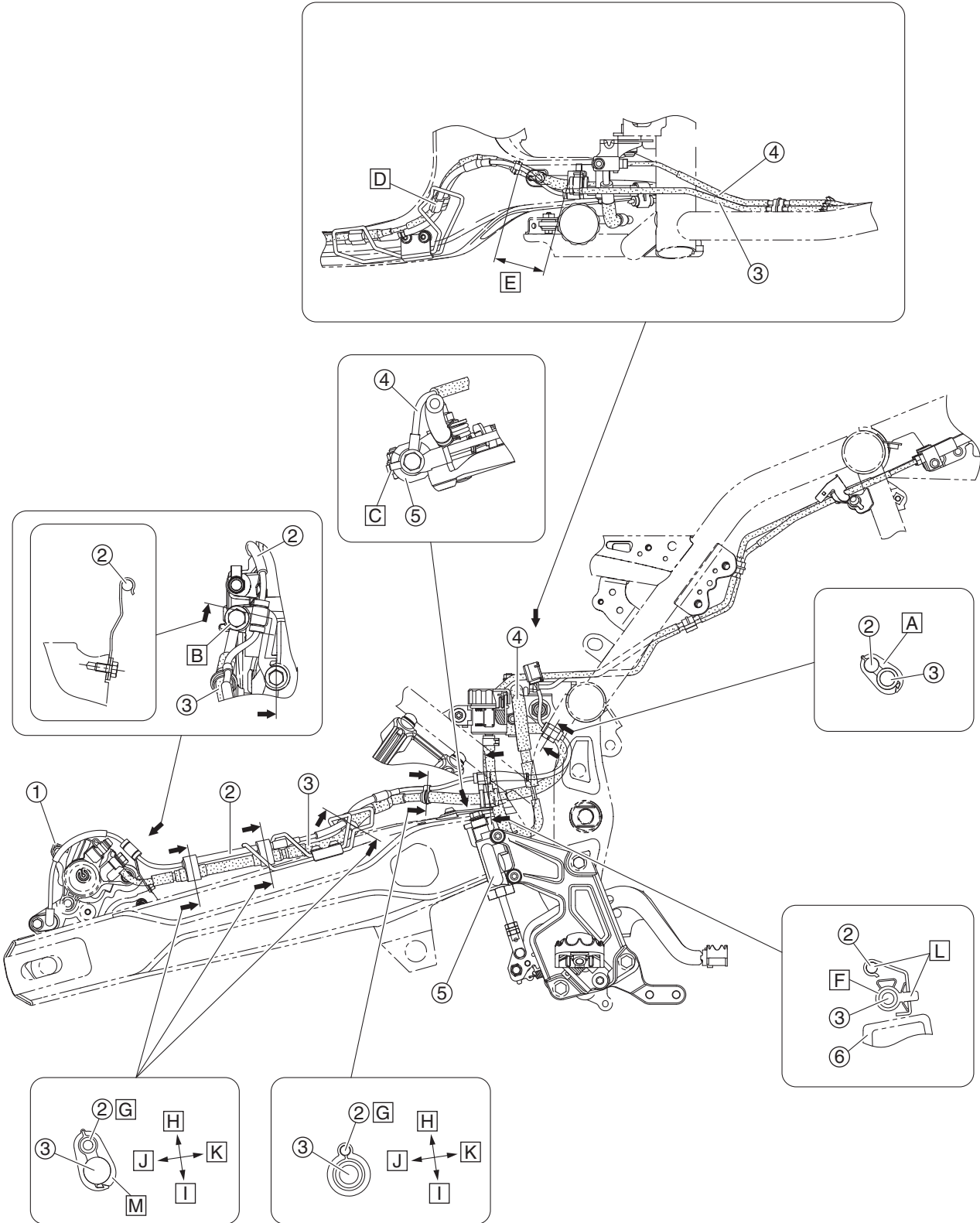
Rear frame (top view)



1. Rear wheel sensor lead
2. Rear brake light switch lead
3. Negative battery terminal
4. Joint coupler
5. Fuse box 1 (white mark)
6. Resistor (along with wire harness)
7. Radiator fan motor relay
8. Relay unit
9. Fuse box 2
10. CCU (Communication Control Unit)
11. Lean angle sensor
12. Starter relay
13. Positive battery lead
14. Rear turn signal light coupler (right)
15. Tail/brake light coupler
16. Rear turn signal light coupler (left)
17. License plate light coupler
18. ECU (Engine Control Unit)
19. ECU (engine control unit) coupler
20. Positive battery terminal
21. Battery band
22. Battery box
23. Wire harness (to CCU)
24. Rear turn signal light lead (left/right)
25. Tail/brake light lead
26. License plate light lead
27. Starter motor lead
28. Fuse box 2 lead
29. Fuse box 1 lead
30. Negative battery lead
31. Battery
32. Frame
33. Wire harness (to joint coupler)
34. Wire harness (to relay unit, radiator fan motor relay, rear brake light switch, and rear wheel sensor)
35. Air filter case
 - A. Insert the projection on the joint coupler holder into the hole in the battery box.
 - B. Downward
 - C. Outward
 - D. Upward
 - E. Inward
 - F. Face the buckle of the plastic locking tie upward. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.
 - G. Insert the projection on the lead holder into the hole in the battery box.
 - H. Forward
 - I. Rearward
 - J. Face the buckle of the plastic locking tie upward. Fasten the wire harnesses at the white marks with the plastic locking tie. Cut off the excess end of the plastic locking tie to 5 mm (0.20 in) or less.

CABLE ROUTING

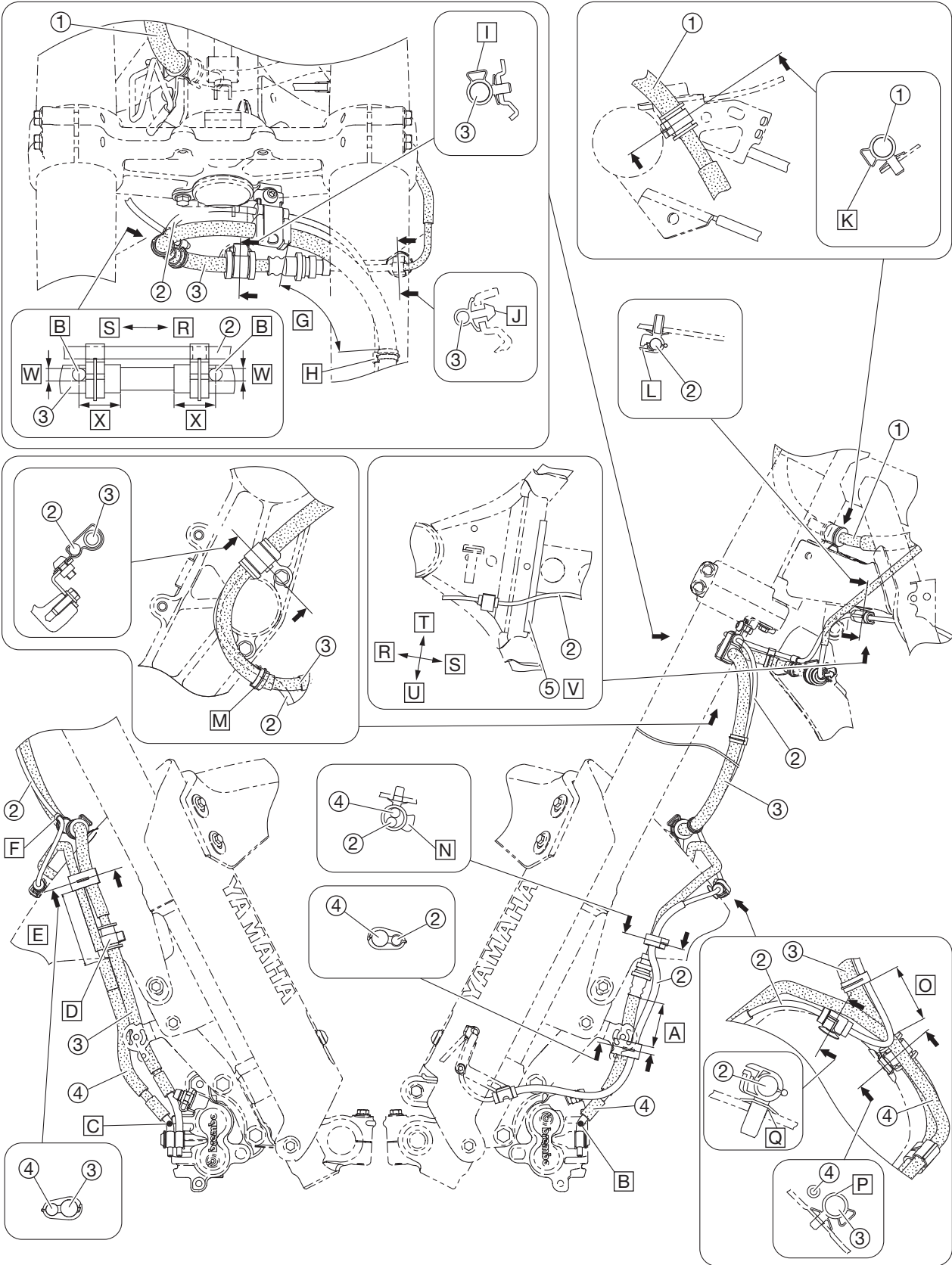
Rear brake hose (right side view)



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

CABLE ROUTING

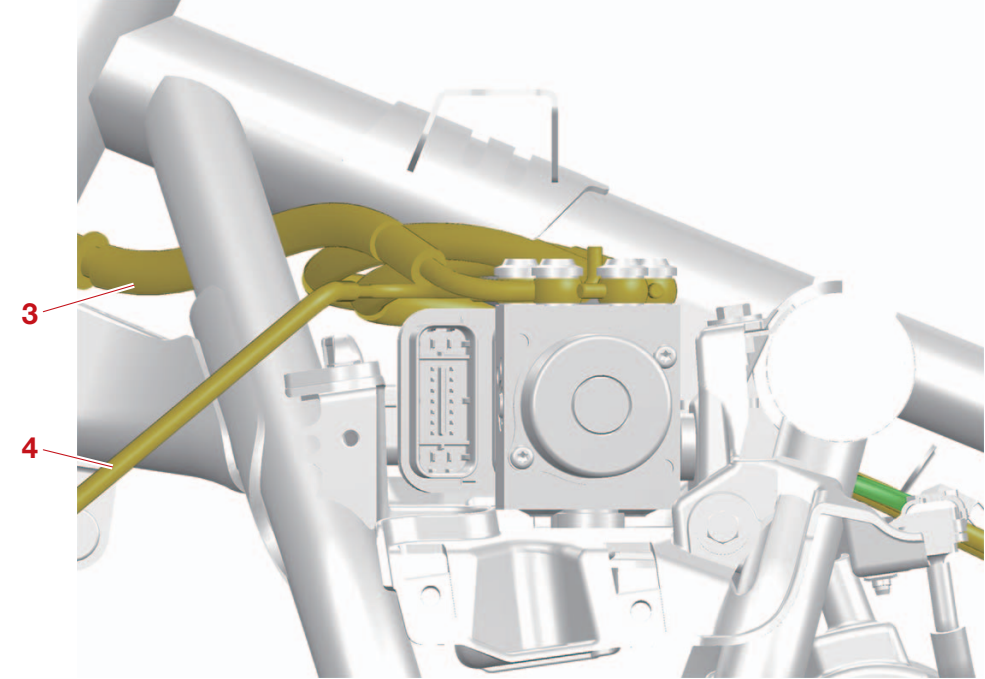
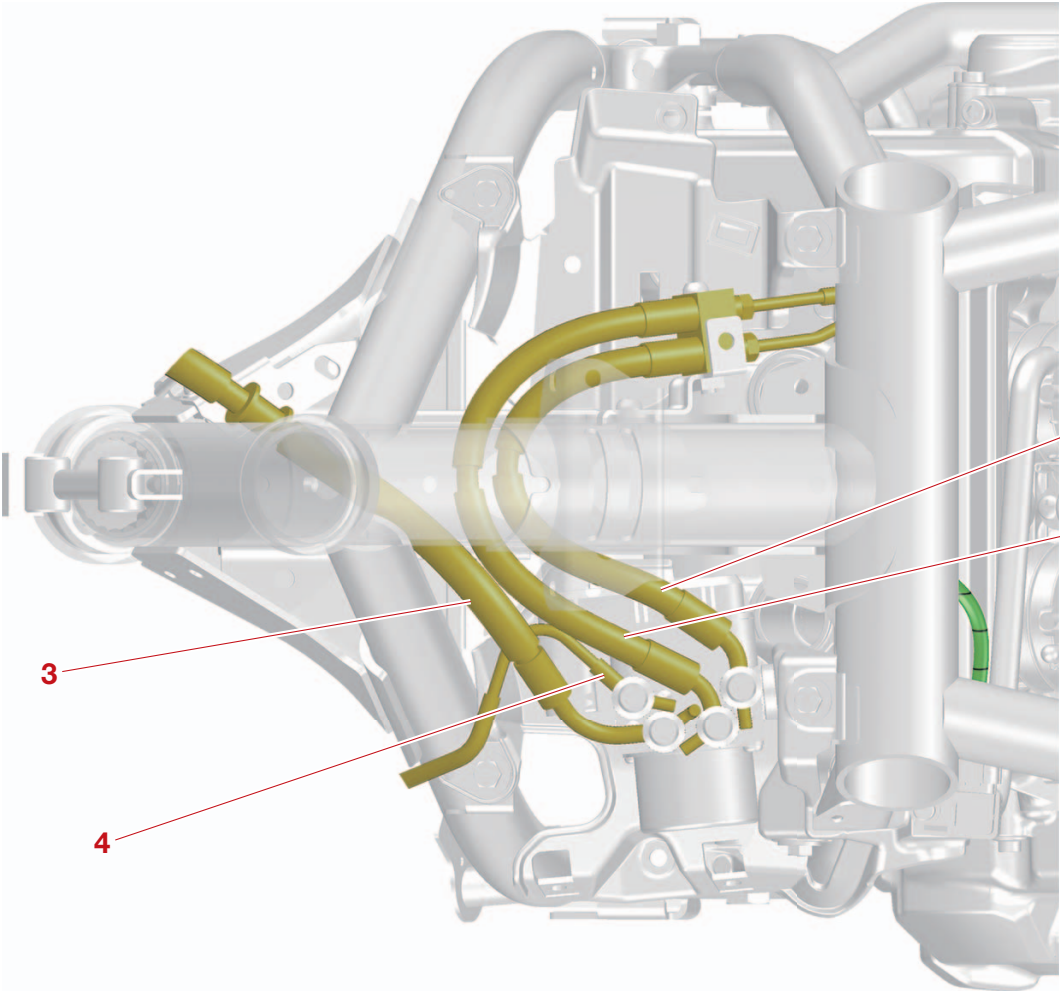
Front brake hose (left and right side view)



1. Brake hose (front brake master cylinder to hydraulic unit)
2. Front wheel sensor lead
3. Brake hose (hydraulic unit to right front brake caliper)
4. Brake hose (right front brake caliper to left front brake caliper)
5. Protector
 - A. 39–49 mm (1.54–1.93 in)
 - B. White paint mark
 - C. Yellow paint mark
 - D. Insert the holder into the hole in the fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
 - E. 69–79 mm (2.72–3.11 in)
 - F. Route the front wheel sensor lead to the upward of the brake hose.
 - G. 105–115 mm (4.13–4.53 in)
 - H. Route the front wheel sensor lead to the rearward of the brake hose and center of vehicle.
 - I. Insert the holder into the hole in the radiator cover. Face the catch of the holder upward, and then close the holder until three clicks or more are heard.
 - J. Insert the holder into the hole in the radiator cover.
 - K. Insert the holder into the hole in the frame. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
 - L. Insert the holder into the hole in the frame. Face the catch of the holder outward, and then close the holder until three clicks or more are heard.
 - M. Route the front wheel sensor lead over the brake hose.
 - N. Insert the holder into the hole in the front fender. Face the catch of the holder rearward, and then close the holder until three clicks or more are heard.
 - O. 36–46 mm (1.42–1.81 in)
 - P. Insert the holder into the hole in the front fender. Face the catch of the holder forward, and then close the holder until three clicks or more are heard.
 - Q. Insert the holder into the hole in the front fender.
 - R. Forward
 - S. Rearward
 - T. Left side
 - U. Right side
 - V. Install the protector at the right side of the frame as shown in the illustration.
 - W. Position the clamp protrusion in the range of white paint.
 - X. Position the clamp within the center of white paint and protector end.

CABLE ROUTING

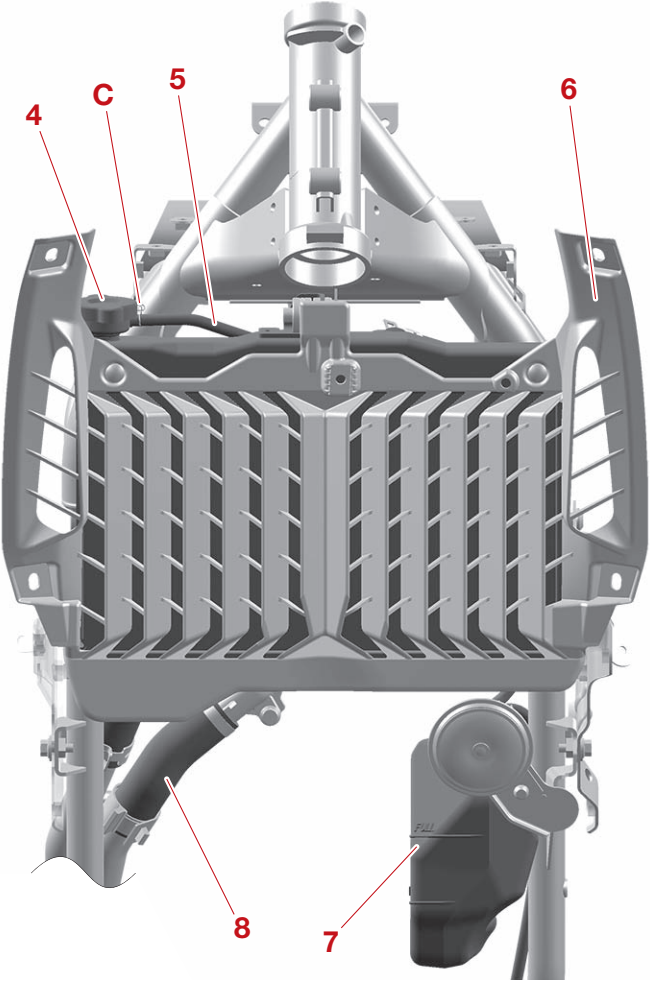
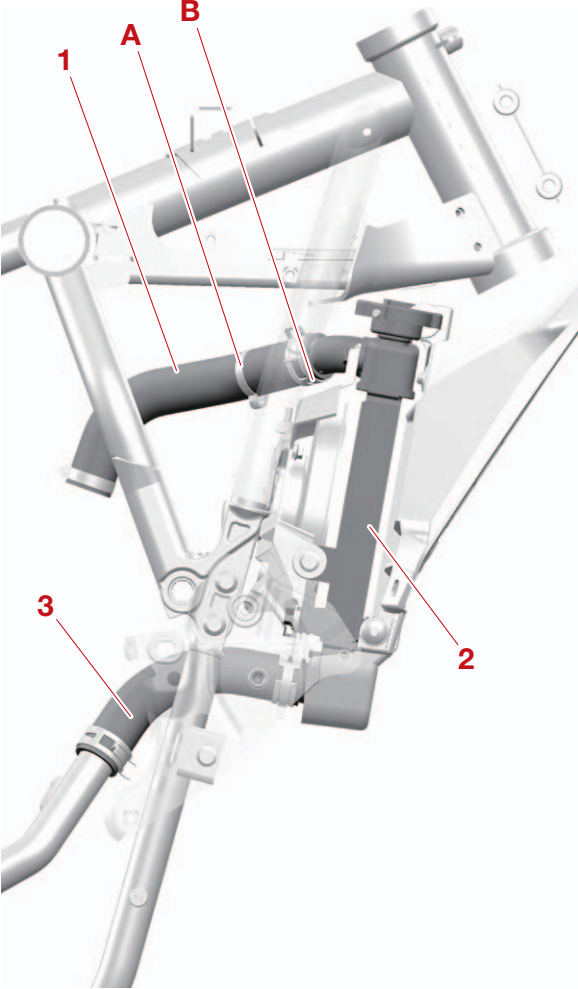
Hydraulic unit assembly (top and left side view)



CABLE ROUTING

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

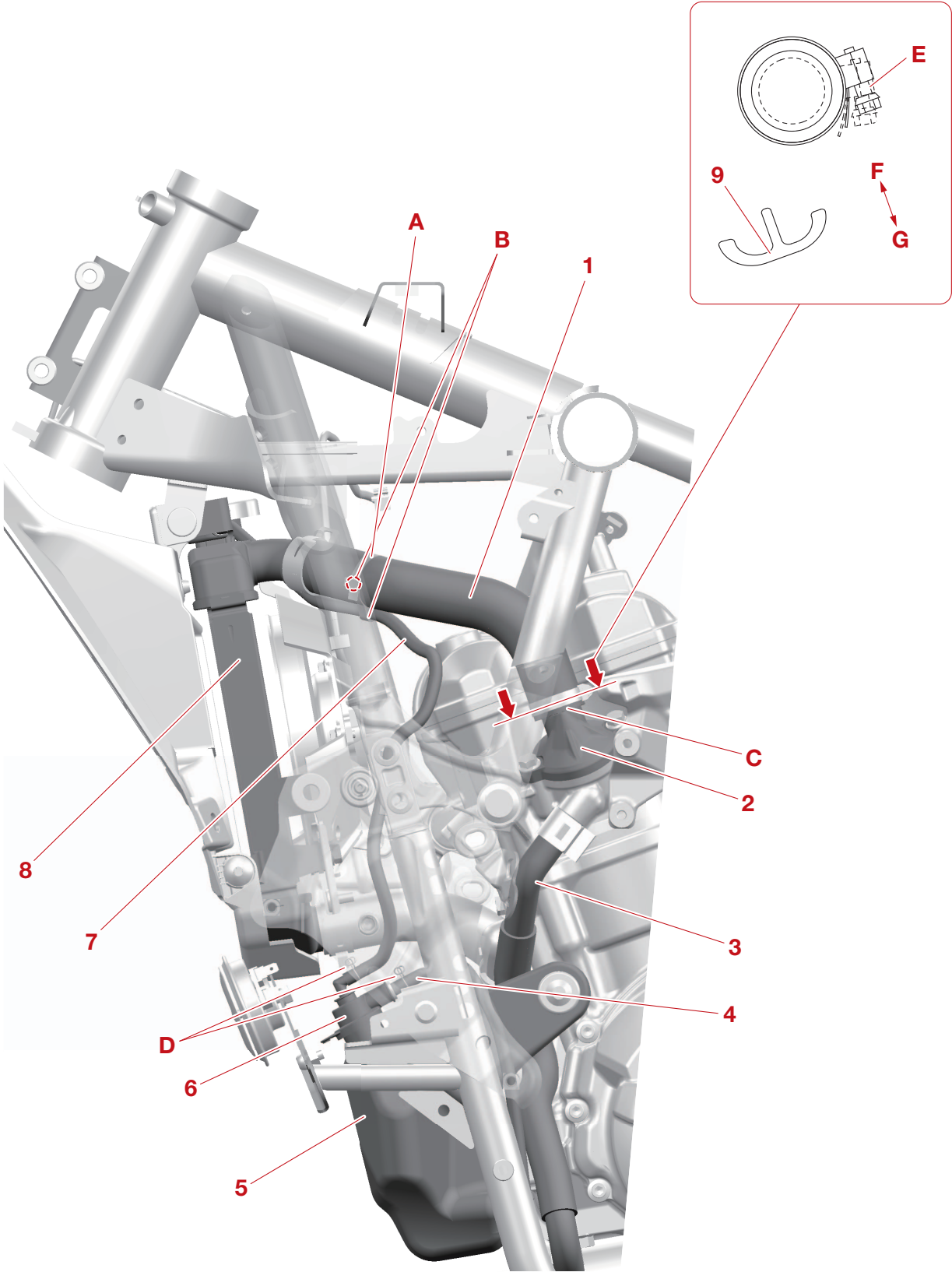
Radiator (front and right side view)



1. Radiator inlet hose
2. Radiator
3. Radiator outlet hose
4. Radiator cap
5. Coolant reservoir hose
6. Radiator cover
7. Coolant reservoir
8. Water jacket joint inlet hose
- A. Fasten the coolant reservoir hose and radiator inlet hose with clamp. Position of coolant reservoir hose is under the radiator inlet hose.
- B. Point the ends of the hose clamp inward. Make sure that the ends of the hose clamp do not contact the coolant reservoir hose. Position the hose clamp 3 mm (0.12 in) or more away from the end of the radiator inlet hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.
- C. Point the ends of the hose clamp rearward. Position the hose clamp 3 mm (0.12 in) or more away from the end of the coolant reservoir hose. Make sure not to install the hose clamp on the raised portion of the hose fitting.

CABLE ROUTING

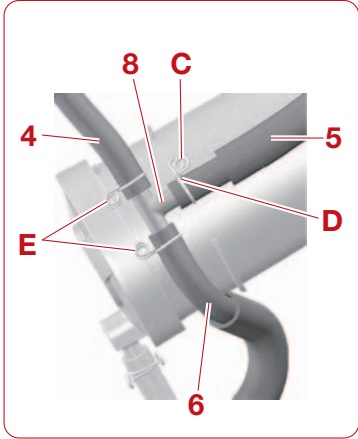
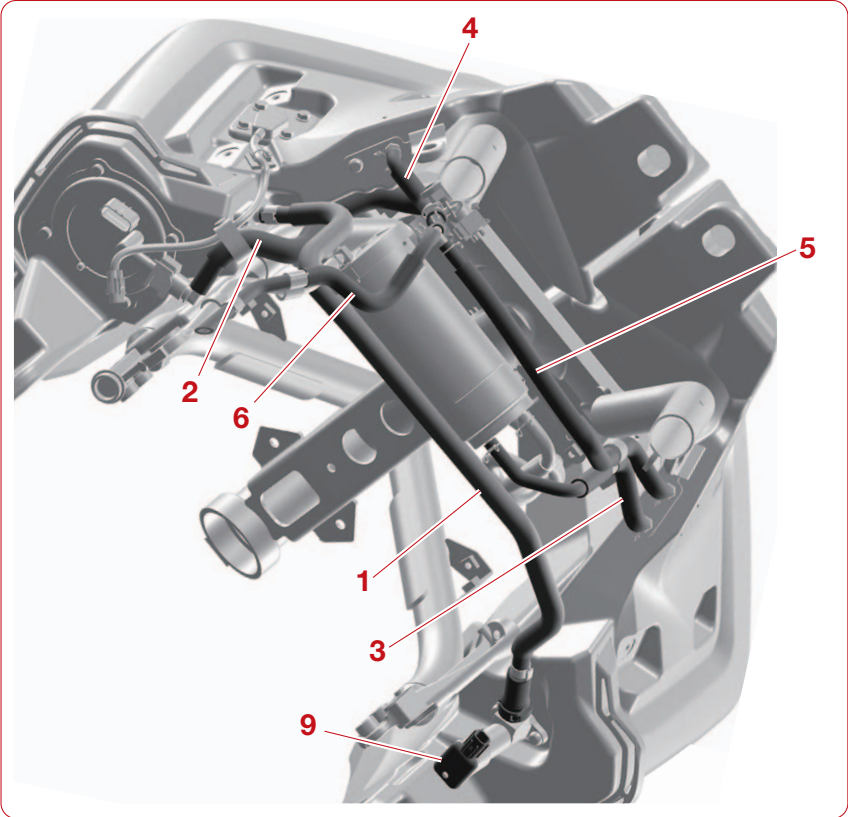
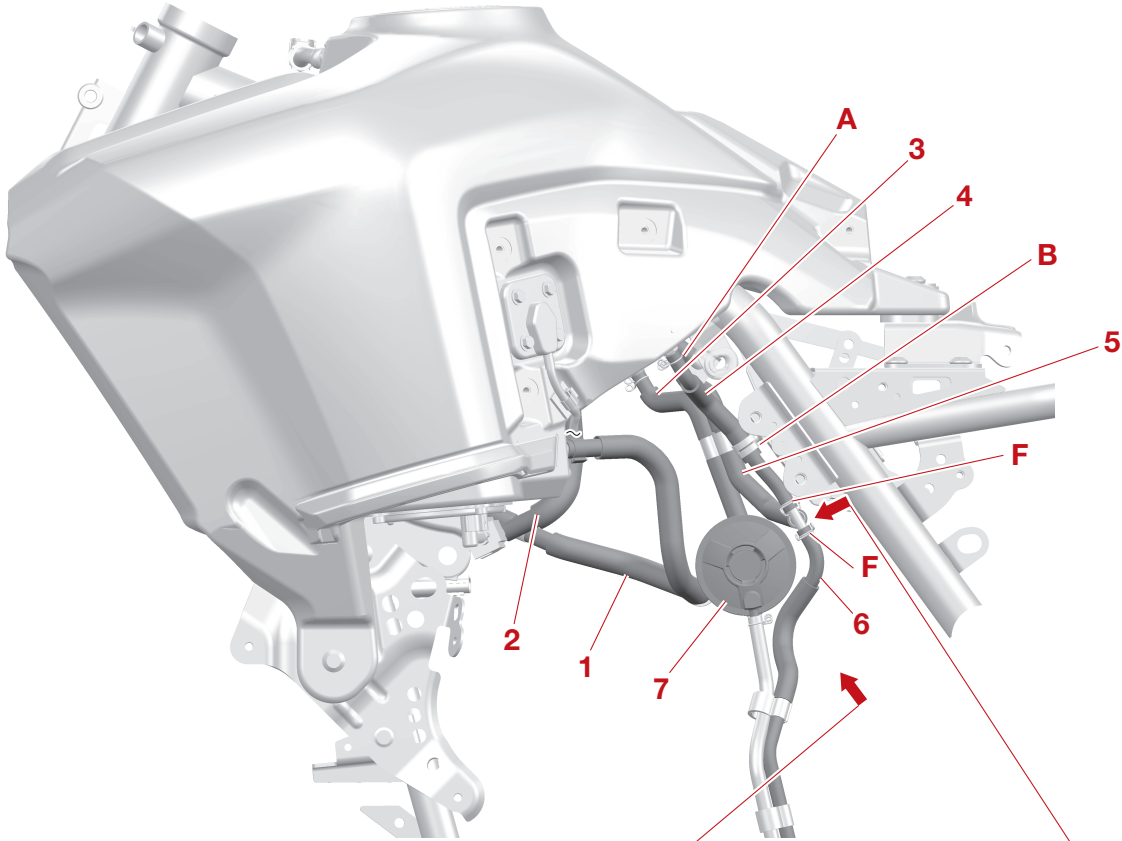
Radiator (left side view)



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

CABLE ROUTING

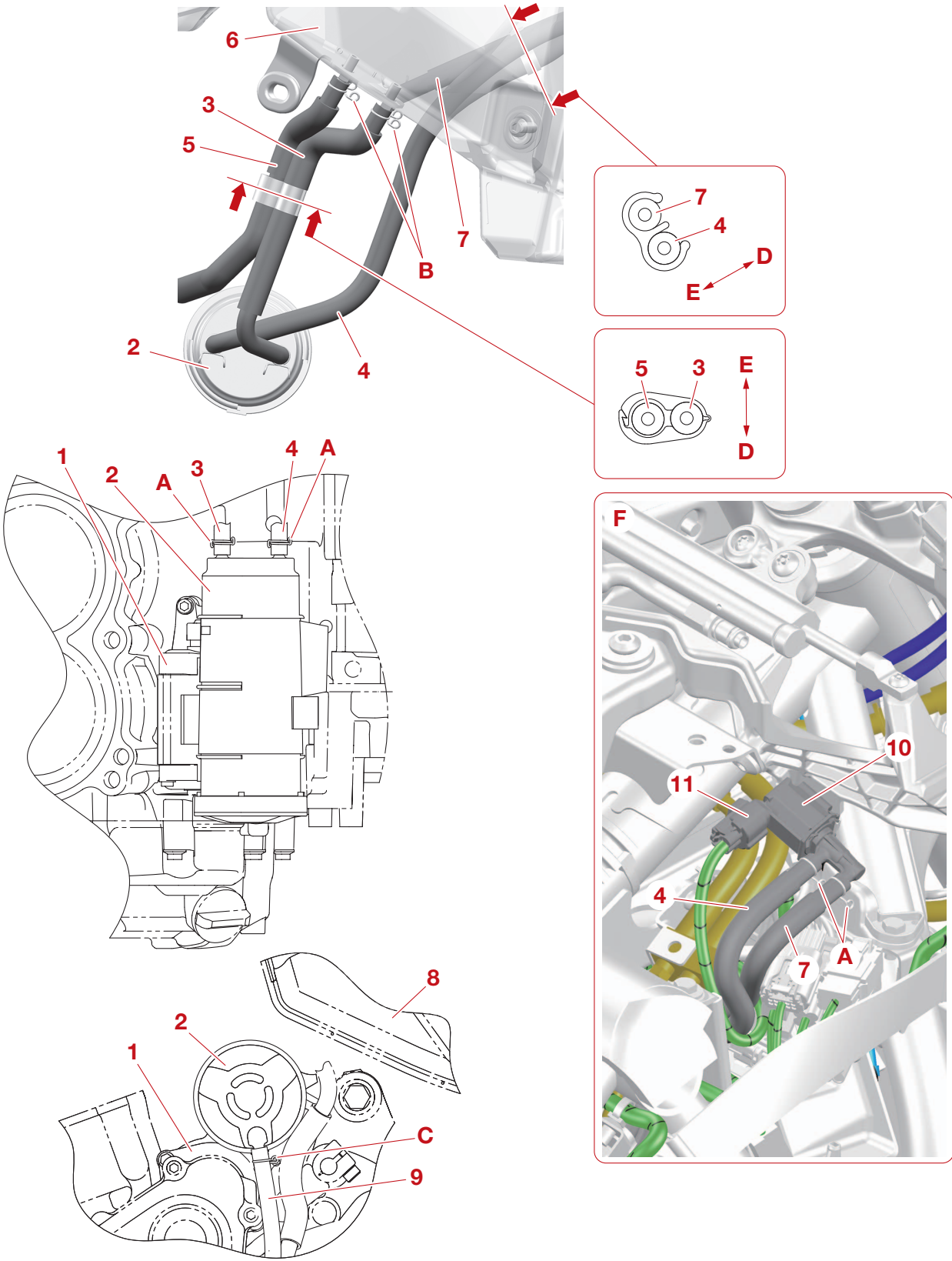
Fuel tank (left side view)



CABLE ROUTING

1. Fuel hose (right fuel tank to left fuel tank)
2. Fuel hose (fuel pump to fuel rail)
3. Fuel tank breather hose (right fuel tank to canister)
4. Fuel tank overflow hose (left fuel tank to hose joint)
5. Fuel tank overflow hose (right fuel tank to hose joint)
6. Fuel tank overflow hose
7. Canister
8. 3-way joint
9. Fuel cut solenoid valve
- A. Face the white paint mark on the hose outward.
- B. Engage the clamp by at least three notches.
- C. Point the end of the hose clip upward.
- D. Face the yellow paint mark on the hose upward.
- E. Point the end of the hose clip outward.
- F. Face the yellow paint mark on the hose outward.

Canister and purge cut valve solenoid

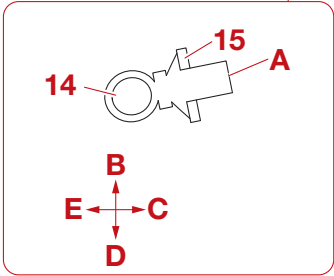
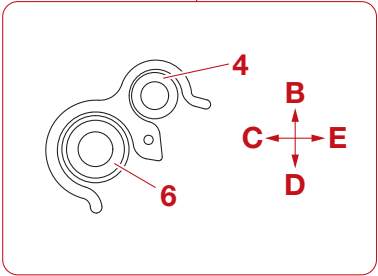
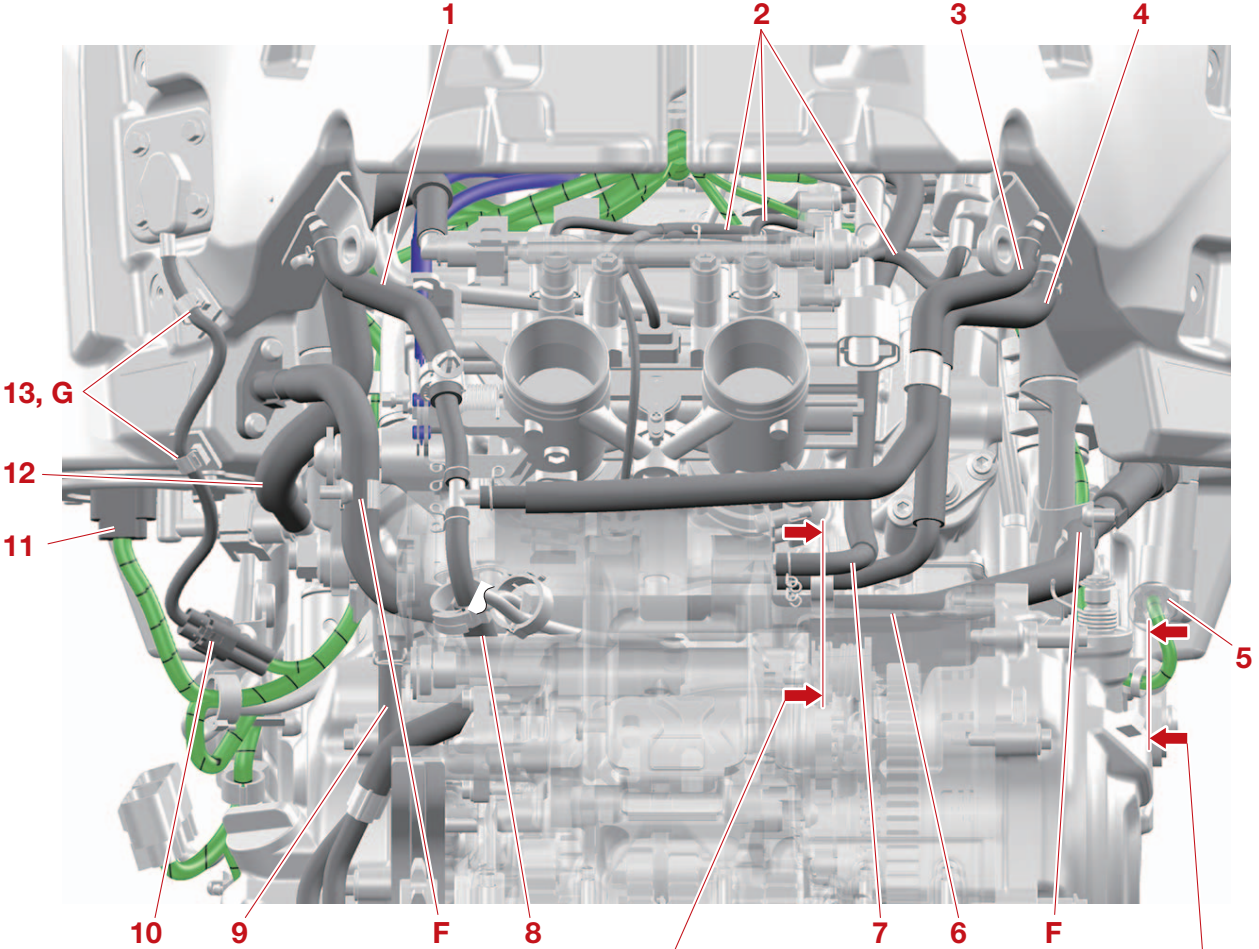


CABLE ROUTING

1. Starter motor
2. Canister
3. Fuel tank breather hose (right fuel tank to canister)
4. Canister purge hose (canister to purge cut valve solenoid)
5. Fuel tank overflow hose (right fuel tank to hose joint)
6. Fuel tank (right)
7. Canister purge hose (purge cut valve solenoid to throttle body)
8. Air filter case
9. Canister breather hose
10. Purge cut valve solenoid
11. Purge cut valve solenoid coupler
 - A. Point the end of the hose clip downward.
 - B. Point the end of the hose clip forward.
 - C. Point the end of the hose clip rearward.
 - D. Inward
 - E. Outward
 - F. Detail of the purge cut valve solenoid side

CABLE ROUTING

Throttle body and fuel hoses (rear view)



CABLE ROUTING

1. Fuel tank overflow hose (left fuel tank to hose joint)
2. Sub-wire harness
3. Fuel tank overflow hose (right fuel tank to hose joint)
4. Fuel tank breather hose (right fuel tank to canister)
5. Fuel cut solenoid valve coupler
6. Fuel hose (right fuel tank to left fuel tank)
7. Canister purge hose (purge cut valve solenoid to canister)
8. Fuel tank overflow hose
9. Canister breather hose
10. Fuel sender coupler
11. Fuel pump coupler
12. Fuel hose (fuel pump to fuel rail)
13. Fuel sender lead
14. Wire harness (to fuel cut solenoid valve)
15. Radiator bracket
 - A. Insert the projection on the holder into the hole in the radiator bracket.
 - B. Upward
 - C. Forward
 - D. Downward
 - E. Rearward
 - F. Fasten the fuel hose with the fuel hose holder on the engine bracket.
 - G. Fasten the fuel sender lead with the holder on the fuel tank.

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

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

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

EAS30615

GENERAL MAINTENANCE AND LUBRICATION CHART

TIP

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

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

PERIODIC MAINTENANCE

| NO. | ITEM | CHECK OR MAINTENANCE JOB | ODOMETER READING | | | | | ANNUAL CHECK |
|------|----------------------------|---|--|--------------------|---------------------|---------------------|---------------------|--------------|
| | | | 1000 km (600 mi) | 10000 km (6000 mi) | 20000 km (12000 mi) | 30000 km (18000 mi) | 40000 km (24000 mi) | |
| 3 | Air filter case check hose | <ul style="list-style-type: none"> Clean. | √ | √ | √ | √ | √ | |
| 4 | Clutch | <ul style="list-style-type: none"> Check operation. Adjust. | √ | √ | √ | √ | √ | |
| 5 * | Front brake | <ul style="list-style-type: none"> Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary. | √ | √ | √ | √ | √ | √ |
| 6 * | Rear brake | <ul style="list-style-type: none"> Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary. | √ | √ | √ | √ | √ | √ |
| 7 * | Brake hoses | <ul style="list-style-type: none"> Check for cracks or damage. Replace. | | √ | √ | √ | √ | √ |
| 8 * | Brake fluid | <ul style="list-style-type: none"> Change. | Every 2 years | | | | | |
| 9 * | Wheels | <ul style="list-style-type: none"> Check runout, spoke tightness and for damage. Tighten spokes if necessary. | √ | √ | √ | √ | √ | |
| 10 * | Tires | <ul style="list-style-type: none"> Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary. | | √ | √ | √ | √ | √ |
| 11 * | Wheel bearings | <ul style="list-style-type: none"> Check bearing for looseness or damage. | | √ | √ | √ | √ | |
| 12 * | Swingarm pivot bearings | <ul style="list-style-type: none"> Check operation and for excessive play. Lubricate with lithium-soap-based grease. | | √ | √ | √ | √ | |
| 13 | Drive chain | <ul style="list-style-type: none"> Check chain slack, alignment and condition. Adjust and lubricate chain with a special O-ring chain lubricant thoroughly. | 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"> Check bearing assemblies for looseness. Moderately repack with lithium-soap-based grease. | √ | √ | | √ | | |
| 15 * | Steering damper | <ul style="list-style-type: none"> Check operation and for oil leakage. | | √ | √ | √ | √ | |
| 16 * | Chassis fasteners | <ul style="list-style-type: none"> Make sure that all nuts, bolts and screws are properly tightened. | | √ | √ | √ | √ | √ |
| 17 | Brake lever pivot shaft | <ul style="list-style-type: none"> Lubricate with silicone grease. | | √ | √ | √ | √ | √ |
| 18 | Brake pedal pivot shaft | <ul style="list-style-type: none"> Lubricate with lithium-soap-based grease. | | √ | √ | √ | √ | √ |
| 19 | Clutch lever pivot shaft | <ul style="list-style-type: none"> Lubricate with lithium-soap-based grease. | | √ | √ | √ | √ | √ |
| 20 | Shift pedal pivot shaft | <ul style="list-style-type: none"> Lubricate with lithium-soap-based grease. | | √ | √ | √ | √ | √ |
| 21 | Sidestand | <ul style="list-style-type: none"> Check operation. Lubricate with molybdenum disulfide grease. | | √ | √ | √ | √ | √ |
| 22 * | Sidestand switch | <ul style="list-style-type: none"> Check operation and replace if necessary. | √ | √ | √ | √ | √ | √ |
| 23 * | Front fork | <ul style="list-style-type: none"> Check operation and for oil leakage. Replace if necessary. | | √ | √ | √ | √ | |
| 24 * | Shock absorber assembly | <ul style="list-style-type: none"> Check operation and for oil leakage. Replace if necessary. | | √ | √ | √ | √ | |

PERIODIC MAINTENANCE

| NO. | ITEM | CHECK OR MAINTENANCE JOB | ODOMETER READING | | | | | ANNUAL CHECK |
|------|--|---|------------------|--------------------|---------------------|---------------------|---------------------|--------------|
| | | | 1000 km (600 mi) | 10000 km (6000 mi) | 20000 km (12000 mi) | 30000 km (18000 mi) | 40000 km (24000 mi) | |
| 25 * | Rear suspension relay arm and connecting arm pivoting points | • Check operation. | | √ | √ | √ | √ | |
| 26 * | Engine oil | • Change (warm engine before draining). • Check oil level and vehicle for oil leakage. | √ | √ | √ | √ | √ | √ |
| 27 * | Engine oil filter cartridge | • Replace. | √ | | √ | | √ | |
| 28 * | Cooling system | • Check coolant level and vehicle for coolant leakage. | | √ | √ | √ | √ | √ |
| | | • Change. | Every 3 years | | | | | |
| 29 * | Front and rear brake switches | • Check operation. | √ | √ | √ | √ | √ | √ |
| 30 * | Moving parts and cables | • Lubricate. | | √ | √ | √ | √ | √ |
| 31 * | Throttle grip housing and cable | • Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable. | | √ | √ | √ | √ | √ |
| 32 * | Lights, signals and switches | • Check operation. • Adjust headlight beam. | √ | √ | √ | √ | √ | √ |

TIP

- Air filter
 - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
 - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
 - 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:
 - Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Disconnect the coupler from the CCU, and then connect the Yamaha diagnostic tool to the coupler.



Yamaha diagnostic tool USB
90890-03274
Yamaha diagnostic tool (A/I)
90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) 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 9-30.

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:

- YDT coupler (to CCU)
- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30619

CHECKING THE FUEL LINE

1. Remove:

- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
- Front side cover (left/right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Side cover inner panel (left/right)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
- Fuel tank center cover
- Fuel tank side cover (left/right)
Refer to “FUEL TANK” on page 7-1.

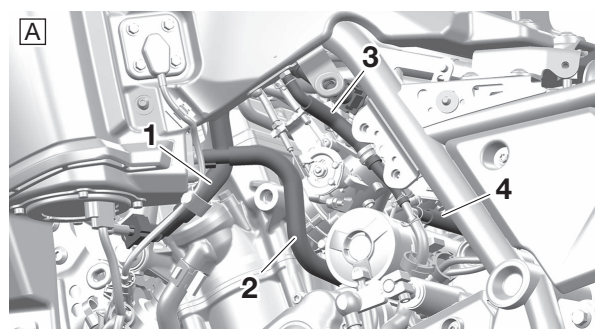
2. Check:

- Fuel hose (fuel pump to fuel rail) “1”
- Fuel hose (right fuel tank to left fuel tank) “2”
- Fuel tank overflow hose (left fuel tank to hose joint) “3”
- Fuel tank overflow hose (right fuel tank to hose joint) “4”
- Fuel tank breather hose (right fuel tank to canister) “5”
- Fuel tank breather hose (left fuel tank to right fuel tank) “6”
- Fuel tank breather hose (right fuel tank to left fuel tank) “7”
Cracks/damage → Replace.
Loose connection → Connect properly.

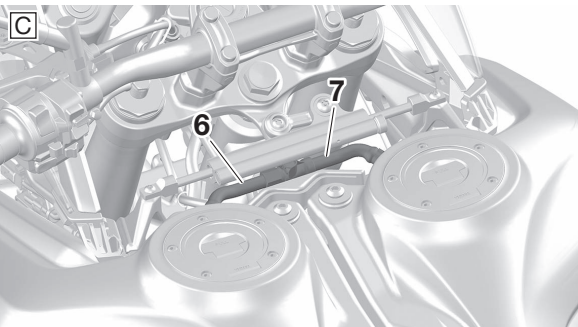
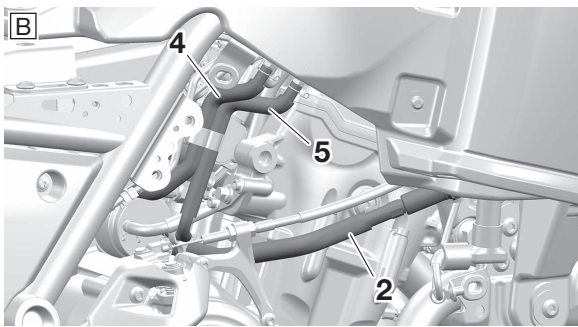
ECA16950

NOTICE

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



PERIODIC MAINTENANCE



A. Left view
B. Right view
C. Top view

3. Install:

- Fuel tank center cover
- Fuel tank side cover (left/right)
Refer to “FUEL TANK” on page 7-1.
- Side cover inner panel (left/right)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
- Front side cover (left/right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30620

CHECKING THE SPARK PLUGS

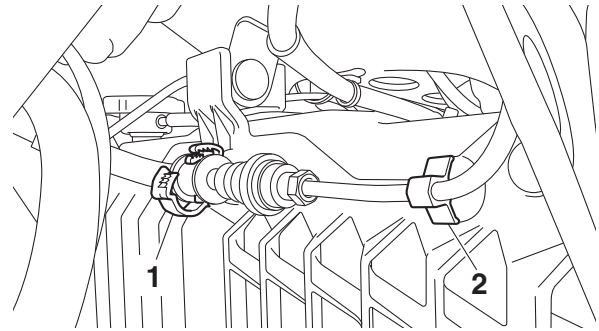
1. Remove:

- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
- Front side cover (left/right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Side cover inner panel (left/right)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
- Coupler holder
Refer to “GENERAL CHASSIS (7)” on page 4-14.

- Engine bracket (left/right)
Refer to “ENGINE REMOVAL” on page 5-10.
- Fuel tank (left/right)
Refer to “FUEL TANK” on page 7-1.

2. Remove:

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

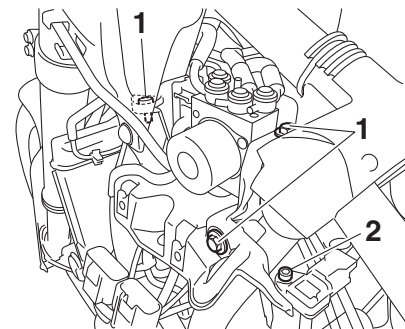


3. Remove:

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

TIP

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



4. Remove:

- Ignition coils
- Spark plugs

ECA13320

NOTICE

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

5. Check:

- Spark plug type
Incorrect → Change.



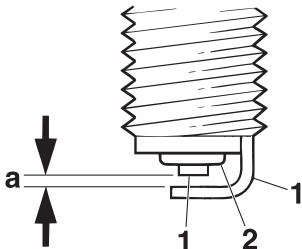
Manufacturer/model
NGK/LMAR8A-9

PERIODIC MAINTENANCE

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



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



G088879

9. Install:
 - Spark plugs
 - Ignition coils



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

TIP

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

10. Install:
 - Intake air pressure sensor bolt
 - Hydraulic unit bracket bolts



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

11. Install:
 - Holder
(to the radiator cover)
 - Brake hose
(to the holder)

12. Install:
 - Fuel tank (left/right)
Refer to "FUEL TANK" on page 7-1.
 - Engine bracket (left/right)
Refer to "ENGINE REMOVAL" on page 5-10.
 - Coupler holder
Refer to "GENERAL CHASSIS (7)" on page 4-14.
 - Side cover inner panel (left/right)
Refer to "GENERAL CHASSIS (4)" on page 4-7.
 - Front side cover (left/right)
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30622

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.


TIP

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

1. Drain:
 - Coolant
Refer to "CHANGING THE COOLANT" on page 3-28.
2. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
 - Front side cover (left/right)
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Side cover inner panel (left/right)
Refer to "GENERAL CHASSIS (4)" on page 4-7.
 - Coupler holder
Refer to "GENERAL CHASSIS (7)" on page 4-14.
 - Engine bracket (left/right)
Refer to "ENGINE REMOVAL" on page 5-10.
 - Fuel tank (left/right)
Refer to "FUEL TANK" on page 7-1.
 - Radiator
Refer to "RADIATOR" on page 6-2.

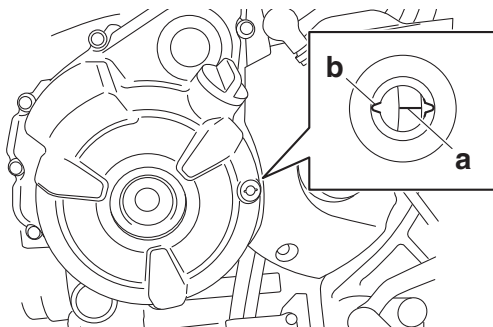
PERIODIC MAINTENANCE

3. Remove:
 - Cylinder head cover
Refer to "CAMSHAFTS" on page 5-23.
4. Remove:
 - Timing mark accessing bolt
 - Crankshaft end cover
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-45.
5. Measure:
 - Valve clearance
Out of specification → Adjust.



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

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



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

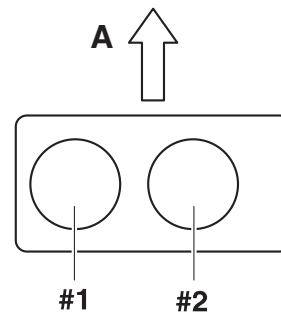


Thickness gauge
 90890-03268
Feeler gauge set
 YU-26900-9

TIP _____

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

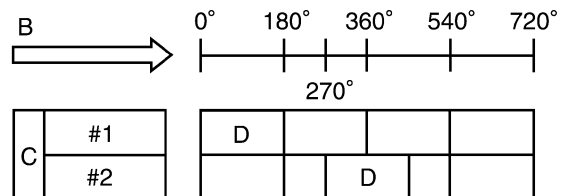
Valve clearance measuring sequence
Cylinder #1 → #2



G088881

A. Front

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



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


6. Remove:
 - Camshaft

TIP _____

- Refer to "CAMSHAFTS" on page 5-23.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

7. Adjust:

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



Valve lapper (ø14)
 90890-04101
Valve lapper (ø14)
 YM-A8998

TIP _____

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.

PERIODIC MAINTENANCE

- Make a note of the position of each valve lifter and valve pad so that they can be installed in the correct place.

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

Example:

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

Measured valve clearance = 0.25 mm (0.0098 in)

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

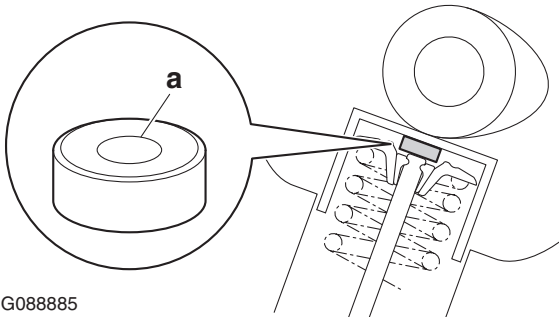
- Check the thickness of the current valve pad.

TIP

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

Example:

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



G088885

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

Example:

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

The valve pad number is 163.

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

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

TIP

Refer to the following table for the available valve pads.

| | |
|----------------------|--|
| Valve pad range | No. 150–240 |
| Valve pad thickness | 1.50–2.40 mm (0.0590–0.0944 in) |
| Available valve pads | 19 thicknesses in 0.05 mm (0.0020 in) increments |

Example:

Valve pad number = 163

Rounded value = 165

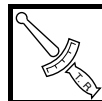
New valve pad number = 165

- Install the new valve pad and the valve lifter.

TIP

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

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



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

TIP

- Refer to “CAMSHAFTS” on page 5-23.
- Lubricate the camshaft lobes and camshaft journals with molybdenum disulfide oil.
- First, install the exhaust camshaft.
- Align the camshafts sprocket marks with the cylinder head edge.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

- 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.

- Install:

- All removed parts

TIP

For installation, reverse the removal procedure.

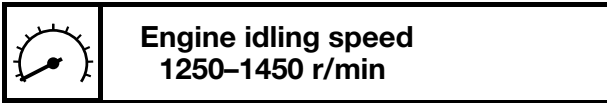
EAS31017

CHECKING THE ENGINE IDLING SPEED

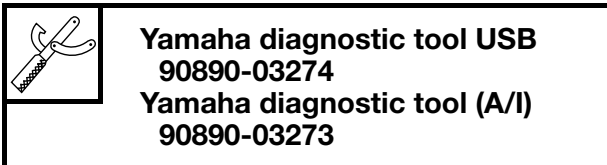
TIP

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

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



3. Check:
 - ISC (idle speed control) learning value
 “00” or “01” → Check the intake system.
 “02” → Clean the ISC (idle speed control) valve.
 Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-11.
 - a. Connect the Yamaha diagnostic tool. Use the diagnostic code number “67”. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-30.



TIP

- Yamaha diagnostic tool (A/I) (90890-03273) 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.

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

EAS30797

SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element

- Throttle body joints
- Fuel hoses
- Exhaust system
- Cylinder head breather hose
- Vacuum hoses

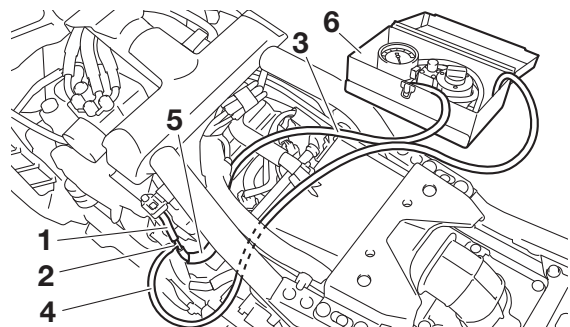
Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

TIP

Place the vehicle on a suitable stand.

2. Remove:
 - Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
 - Front side cover (left/right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
 - Side cover inner panel (left/right)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
 - Engine bracket (left/right)
Refer to “ENGINE REMOVAL” on page 5-10.
 - Fuel tank (left/right)
Refer to “FUEL TANK” on page 7-1.
3. Disconnect:
 - Intake air pressure sensor hose
 - Cap
Refer to “THROTTLE BODIES” on page 7-8.
4. Install:
 - Hose “1” (Parts No.: 5JW-24311-00)
 - 3-way joint “2” (Parts No.: 90413-05014)
 - Vacuum gauge hose #1 “3” (to throttle body #1)
 - Vacuum gauge hose #2 “4” (to 3-way joint)
 - Intake air pressure sensor hose “5”
 - Vacuum gauge “6”



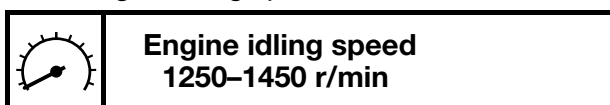
PERIODIC MAINTENANCE

5. Install:

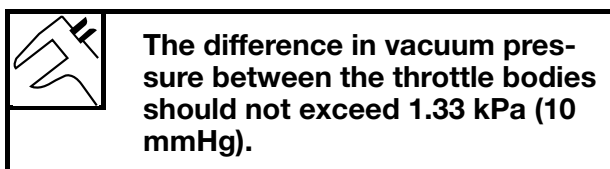
- Fuel tank (left)
 - Fuel hose (fuel pump to fuel rail)
 - Fuel pump coupler
 - Fuel sender coupler
- Refer to "FUEL TANK" on page 7-1.
- Rectifier/regulator
- Refer to "GENERAL CHASSIS (4)" on page 4-7.

6. Check:

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



- b. Check the vacuum pressure.

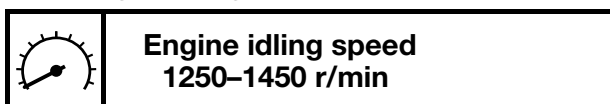


If out of specification → Adjust the throttle body synchronization.

Adjusting the throttle body synchronization

1. Adjust:

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

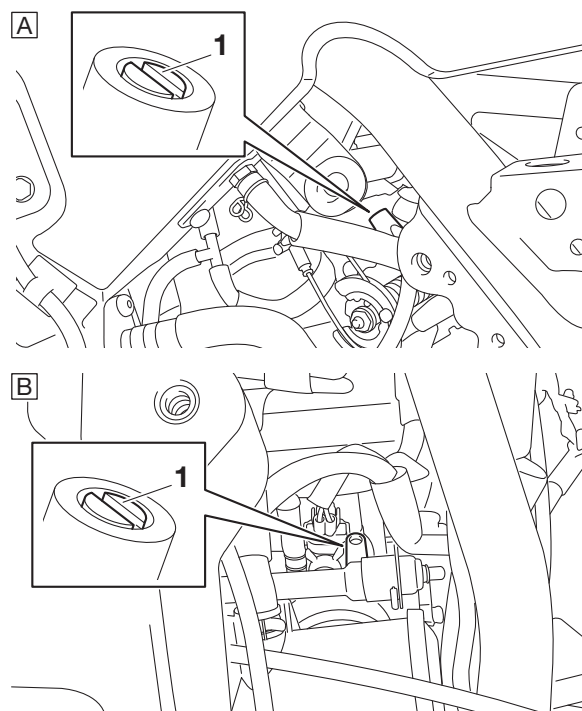


- b. With throttle body #1 as standard, adjust throttle body #2 using the air screw "1".

TIP

- Turn the bypass air screw using the carburetor angle driver.
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a bypass air screw was removed, turn the screw in fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not be adjusted using the bypass air screw, clean or replace the throttle bodies.

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



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

2. Stop the engine and remove the measuring equipment.
3. Connect:
 - Intake air pressure sensor hose
 - CapRefer to "THROTTLE BODIES" on page 7-8.
4. Install:
 - Fuel tank (left/right)
Refer to "FUEL TANK" on page 7-1.
 - Engine bracket (left/right)
Refer to "ENGINE REMOVAL" on page 5-10.
 - Side cover inner panel (left/right)
Refer to "GENERAL CHASSIS (4)" on page 4-7.
 - Front side cover (left/right)
Refer to "GENERAL CHASSIS (3)" on page 4-5.
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.

5. Adjust:

- Throttle grip free play
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-31.



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

EAS30062

CHECKING THE EXHAUST SYSTEM

1. Check:

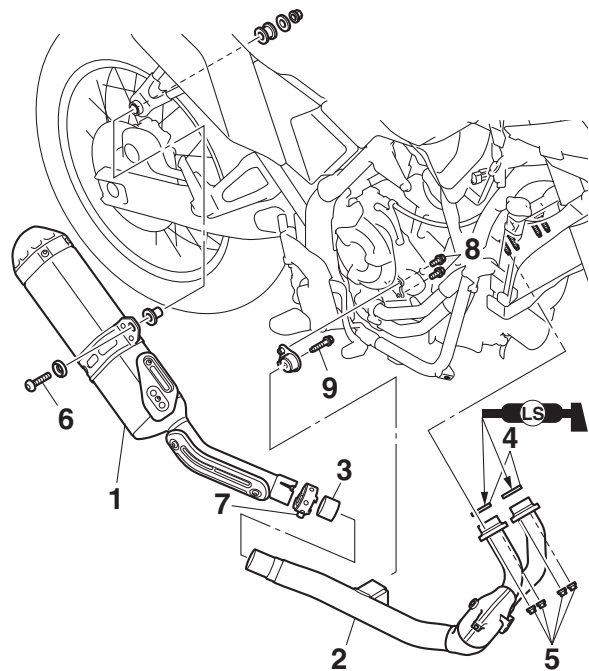
- Muffler assembly "1"
- Exhaust pipe "2"
Cracks/damage → Replace.
- Gaskets "3", "4"
Exhaust gas leaks → Replace.

2. Check:

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



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



EAS30626

CHECKING THE CANISTER

1. Remove:

- Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Front side cover (right)
Refer to "GENERAL CHASSIS (3)" on page 4-5.
- Side cover inner panel (right)
Refer to "GENERAL CHASSIS (4)" on page 4-7.
- Engine bracket (right)
Refer to "ENGINE REMOVAL" on page 5-10.
- Fuel tank (right)
Refer to "FUEL TANK" on page 7-1.

2. Check:

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

3. Install:

- Fuel tank (right)
Refer to "FUEL TANK" on page 7-1.
- Engine bracket (right)
Refer to "ENGINE REMOVAL" on page 5-10.
- Side cover inner panel (right)
Refer to "GENERAL CHASSIS (4)" on page 4-7.

PERIODIC MAINTENANCE

- Front side cover (right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30799

ADJUSTING THE EXHAUST GAS VOLUME

TIP

- Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.
- To adjust the exhaust gas volume, use the CO adjustment mode of the YDT. For more information, refer to the operation manual of the YDT.

1. Connect the YDT to the coupler. For information about connecting the YDT, refer to “YDT” on page 9-2.



Yamaha diagnostic tool USB
90890-03274
Yamaha diagnostic tool (A/I)
90890-03273

TIP

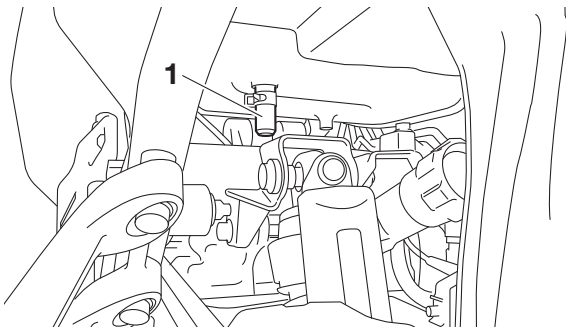
- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

EAS31130

REPLACING THE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

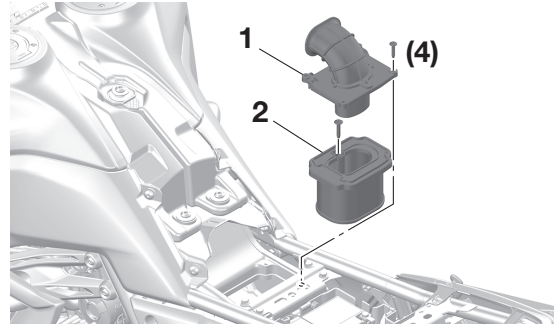
TIP

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



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

2. Remove:
 - Air filter case cover “1”
 - Air filter element “2”



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

TIP

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

4. Install:
 - Air filter element
 - Air filter case cover



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

ECA14401

NOTICE

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

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

EAS30629

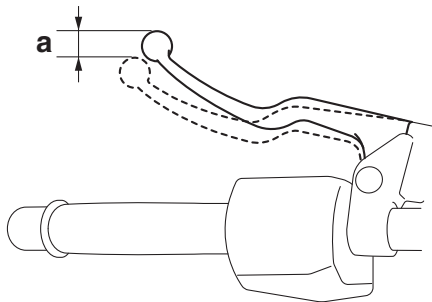
ADJUSTING THE CLUTCH LEVER FREE PLAY

1. Check:

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



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



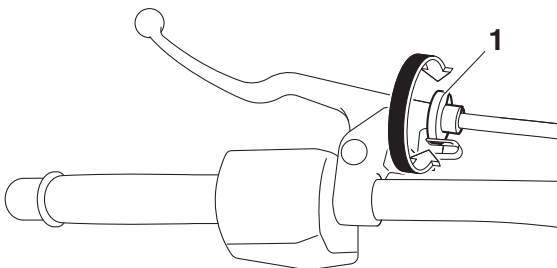
G088887

2. Adjust:

- Clutch lever free play

Handlebar side

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



G088888

TIP

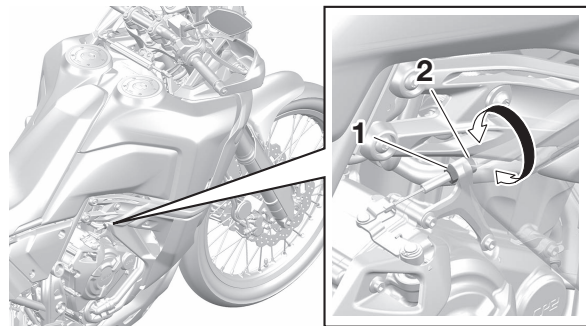
If the specified clutch lever free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.

Engine side

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



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 4-31 and “REAR BRAKE” on page 4-42.

TIP

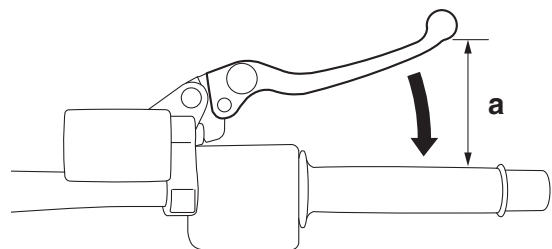
Drive on the dry road, operate the front and rear brakes separately and check to see if the brakes are operating properly.

EAS30630

ADJUSTING THE FRONT DISC BRAKE

1. Adjust:

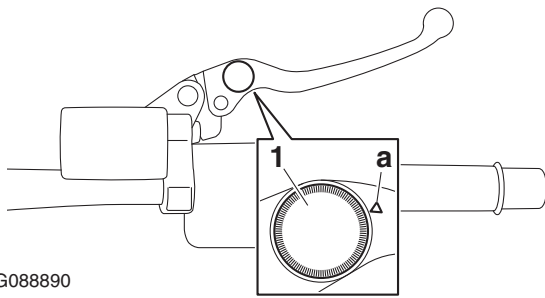
- Brake lever position
(distance “a” from the throttle grip to the brake lever)



G088889

TIP

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



G088890

EWA13050

WARNING

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

ECA13490

NOTICE

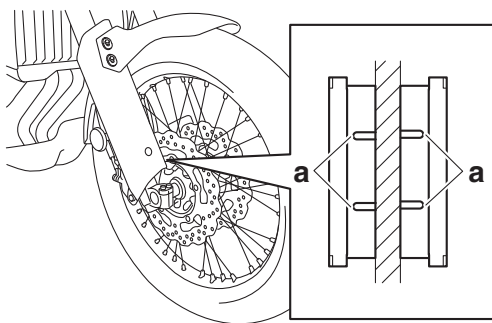
After adjusting the brake lever position, make sure there is no brake drag.

EAS30633

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Front brake pad
Wear indicator groove "a" has almost disappeared → Replace the brake pads as a set. Refer to "FRONT BRAKE" on page 4-31.



EAS30631

ADJUSTING THE REAR DISC BRAKE

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

EWA18830

WARNING

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

- c. Tighten the locknut "1" to specification.



Rear brake pedal adjusting locknut
18 N·m (1.8 kgf·m, 13 lb·ft)

EWA17030

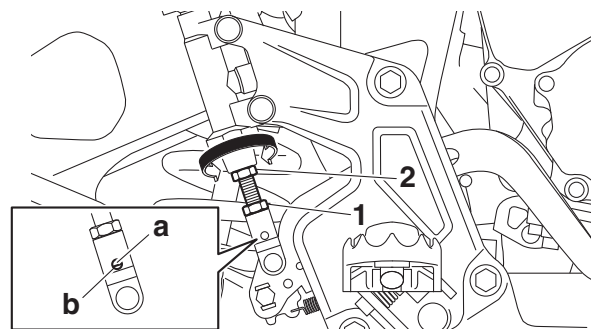
WARNING

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

ECA13510

NOTICE

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



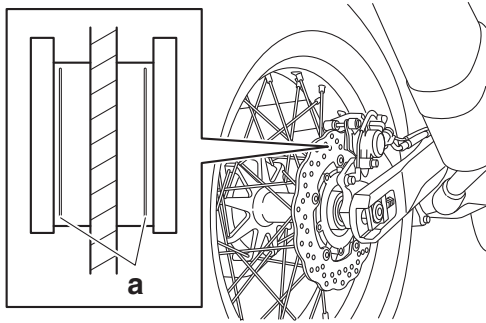
2. Adjust:
 - Rear brake light switch
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-30.

EAS30634

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
 - Rear brake pad
Worn almost to the wear indicator "a" → Replace the brake pads as a set. Refer to "REAR BRAKE" on page 4-42.



EAS30894

CHECKING THE BRAKE HOSES

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

1. Check:
 - Brake hoses
Cracks/damage/wear → Replace.
2. Check:
 - Brake hose holders
Loose → Tighten the holder bolts.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
 - Brake hose
Brake fluid leakage → Replace the damaged hose.
Refer to “FRONT BRAKE” on page 4-31, “REAR BRAKE” on page 4-42 and “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-54.

EAS30893

BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

⚠ WARNING

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

ECA18050

NOTICE

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

EWA16530

⚠ WARNING

Bleed the ABS whenever:

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

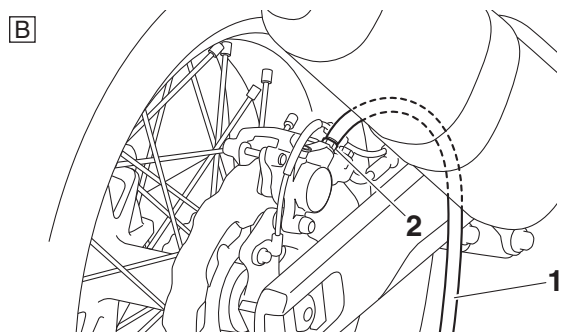
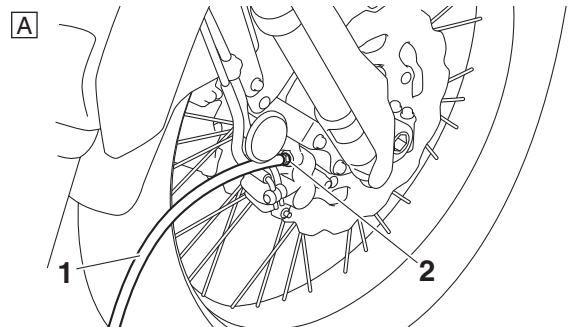
TIP

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the ABS, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
- Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:

• ABS

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



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 4-58.

ECA18060

NOTICE

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

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



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

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

EWA13110

WARNING

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

EAS30632

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a suitable stand.
 - Make sure the vehicle is upright.
2. Check:
 - Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level.



**Specified brake fluid
DOT 4**

EWA13090

WARNING

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

ECA13540

NOTICE

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

TIP

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

EAS30638

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260

WARNING

Never attempt to make any repairs to the wheel.

TIP

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

EAS30109

CHECKING AND TIGHTENING THE SPOKES

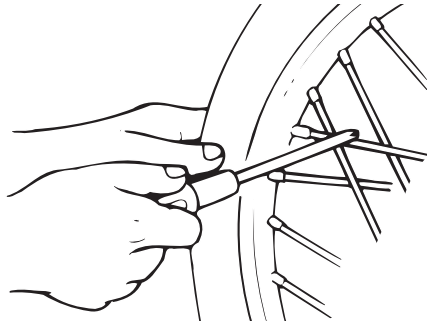
The following procedure applies to all of the spokes.

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

TIP

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

PERIODIC MAINTENANCE





2. Tighten:

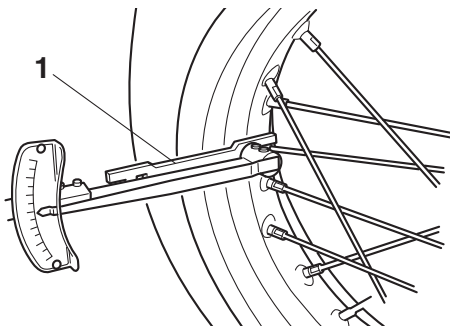
- Spoke
(with a spoke nipple wrench “1”)

TIP

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

| | |
|---|---|
|  | Spoke nipple wrench (6–7) 90890-01521 Spoke nipple wrench (6–7) YM-01521 |
|---|---|

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



EAS30640

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:

- Tire pressure
Out of specification → Regulate.

EWA13181

⚠ WARNING

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

- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded vehicle could cause tire damage, an accident or an injury. **NEVER OVERLOAD THE VEHICLE.**



Tire air pressure (measured on cold tires)

1 person

Front

220 kPa (2.20 kgf/cm², 32 psi)

Rear

250 kPa (2.50 kgf/cm², 36 psi)

2 persons

Front

220 kPa (2.20 kgf/cm², 32 psi)

Rear

250 kPa (2.50 kgf/cm², 36 psi)

Off-road riding

Front

200 kPa (2.00 kgf/cm², 29 psi)

Rear

200 kPa (2.00 kgf/cm², 29 psi)

Maximum load

174 kg (384 lb)

* Total weight of rider, passenger, cargo and accessories

2. Check:

- Tire surfaces
Damage/wear → Replace the tire.

EWA13190

⚠ WARNING

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



Wear limit (front)

1.6 mm (0.06 in)

(XTZ690D)

1.5 mm (0.06 in)

(XTZ690DP)

Wear limit (rear)

1.6 mm (0.06 in)

(XTZ690D)

1.5 mm (0.06 in)

(XTZ690DP)

EWA14090

WARNING

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



Front tire

Size

90/90 – 21 M/C 54V M+S A

Manufacturer/model

PIRELLI/SCORPION RALLY STR

Optional tire

Size

90/90–21 M/C 54R M+S

Manufacturer/model

MICHELIN/ANAKEE WILD



Rear tire

Size

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

Manufacturer/model

PIRELLI/SCORPION RALLY STR

Optional tire

Size

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

Manufacturer/model

MICHELIN/ANAKEE WILD

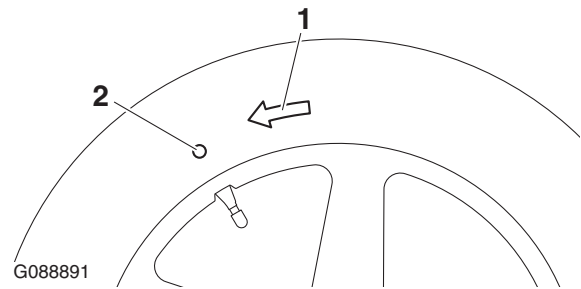
EWA13210

WARNING

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

TIP

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



EAS30641

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
 - Wheel bearings
Refer to “CHECKING THE FRONT WHEEL” on page 4-18 and “CHECKING THE REAR WHEEL” on page 4-26.

EAS30802

CHECKING THE SWINGARM OPERATION

1. Check:
 - Swingarm operation
Swingarm not working properly → Check the swingarm.
Refer to “SWINGARM” on page 4-87.
2. Check:
 - Swingarm excessive play
Refer to “SWINGARM” on page 4-87.

EAS30643

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
 - Oil seals
 - Pivot shaft



Recommended lubricant
Lithium-soap-based grease

Refer to “INSTALLING THE SWINGARM” on page 4-90.

EAS30644

ADJUSTING THE DRIVE CHAIN SLACK

ECA13550

NOTICE

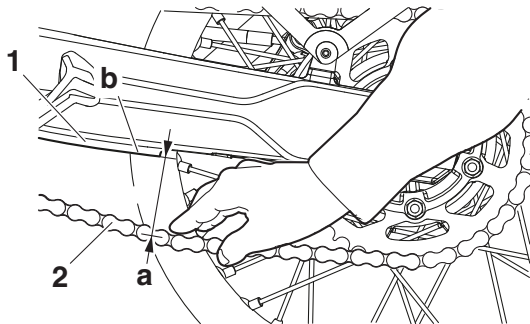
A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

PERIODIC MAINTENANCE

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

TIP

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



Drive chain slack (Sidestand)
40.0–45.0 mm (1.57–1.77 in)
Drive chain slack limit
55.0 mm (2.17 in)

ECA20870

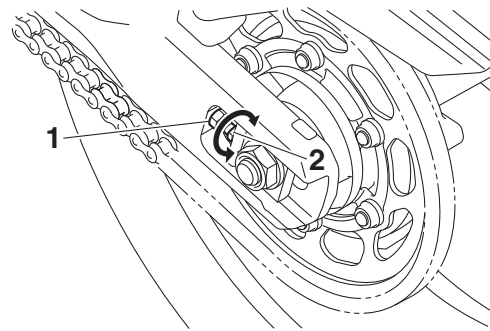
NOTICE

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

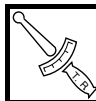
4. Loosen:
 - Wheel axle nut
Refer to “REAR WHEEL” on page 4-23.
5. Adjust:
 - Drive chain slack
 - a. Loosen both of the drive chain puller locknuts “1”.
 - b. Turn both of the drive chain puller adjusting bolts “2” until the specified drive chain slack is obtained.

TIP

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

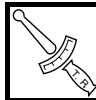


- c. Tighten the wheel axle nut to specification.



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

- d. Tighten the drive chain puller locknuts to specification.



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

EAS30803

LUBRICATING THE DRIVE CHAIN

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

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



Recommended lubricant
Chain lubricant suitable for O-ring chains

EAS30645

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

PERIODIC MAINTENANCE

TIP

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

2. Check:

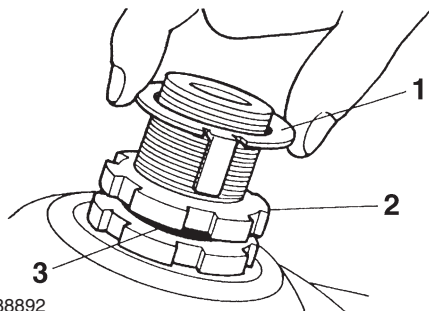
- Steering head
Grasp the bottom of the front fork legs and gently rock the front fork.
Blinding/looseness → Adjust the steering head.

3. Remove:

- Upper bracket
Refer to “STEERING HEAD” on page 4-79.

4. Adjust:

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

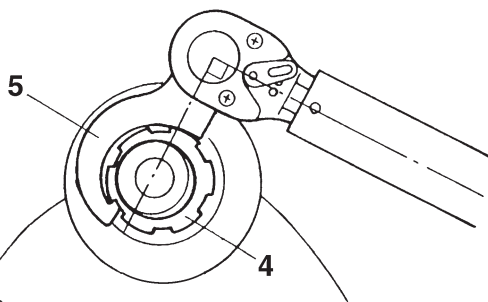


G088892

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

TIP

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



G088893



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



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

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

EWA13140

WARNING

Do not overtighten the lower ring nut.

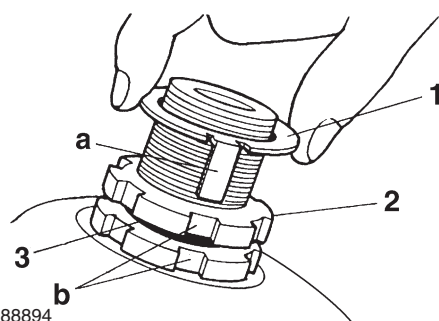


Lower ring nut (final tightening torque)
7 N·m (0.7 kgf·m, 5.2 lb·ft)

- 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 4-79.
- Install the rubber washer “3”.
- Install the upper ring nut “2”.
- Finger tighten the upper ring nut “2”, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- Install the lock washer “1”.

TIP

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



G088894

5. Install:

- Upper bracket
Refer to “STEERING HEAD” on page 4-79.

EAS30646

LUBRICATING THE STEERING HEAD

1. Lubricate:

- Upper bearing
- Lower bearing
- Upper bearing cover
- Lower bearing dust seal



EAS30098

CHECKING THE STEERING DAMPER

Refer to “CHECKING THE STEERING DAMPER” on page 4-82.

EAS30110

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.



EAS30649

LUBRICATING THE PEDALS

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



EAS30805

LUBRICATING THE CLUTCH LEVER

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



EAS30650

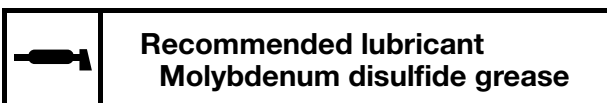
CHECKING THE SIDESTAND

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

EAS30651

LUBRICATING THE SIDESTAND

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



EAS30652

CHECKING THE SIDESTAND SWITCH

Refer to “CHECKING THE SWITCHES” on page 8-37.

EAS30653

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Check:
 - Inner tube
Damage/scratches → Replace.
 - Front fork leg
Oil leaks between inner tube and outer tube → Replace the oil seal.
3. Hold the vehicle upright and apply the front brake.
4. Check:
 - Front fork operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
Rough movement → Repair.
Refer to “FRONT FORK” on page 4-68.

EAS30806

ADJUSTING THE FRONT FORK LEGS

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

EWA13120

WARNING

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

EWA17040

WARNING

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

Spring preload

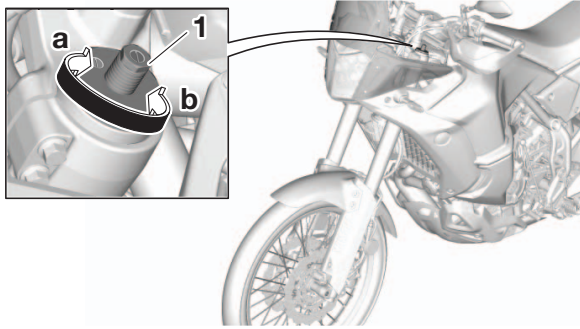
ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

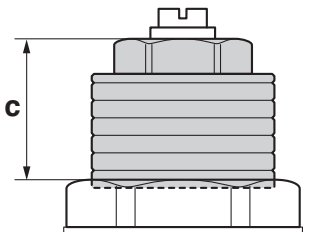
1. Adjust:
 - Spring preload
 - a. Turn the adjusting bolt “1” in direction “a” or “b”.

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



TIP

The spring preload setting is determined by measuring the distance “c” shown in the illustration. The shorter distance “c” is, the higher the spring preload; the longer distance “c” is, the lower the spring preload.



Spring preload
Adjustment value (Soft)
 19.0 mm (0.75 in)
Adjustment value (STD)
 19.0 mm (0.75 in)
Adjustment value (Hard)
 4.0 mm (0.16 in)

Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

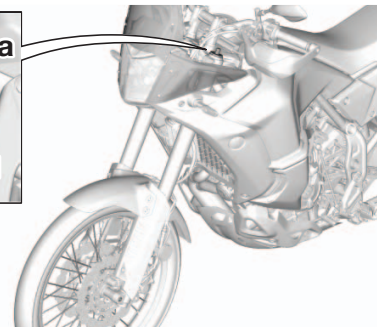
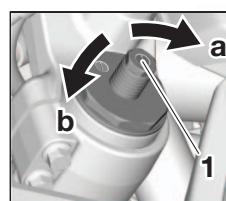


Rebound damping
Unit for adjustment
 Click
Adjustment value from the start position (Soft)
 33
Adjustment value from the start position (STD)
 16
Adjustment value from the start position (Hard)
 0

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

TIP

- When turning the damping force adjuster in direction “a”, the 0 click position and the 1 click position may be the same.
- When turning the damping force adjuster in direction “b”, it may click beyond the stated specifications, however such adjustments are ineffective and may damage the suspension.



Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

TIP

Before adjusting the compression damping, remove the rubber cap.

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

PERIODIC MAINTENANCE

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

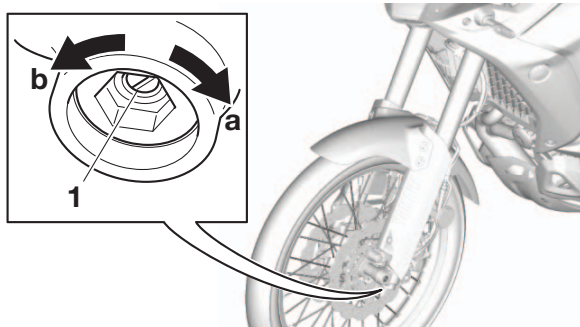


Compression damping
Unit for compression damping adjustment
Click
Adjustment value from the start position (Soft)
22
Adjustment value from the start position (STD)
8
Adjustment value from the start position (Hard)
0

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

TIP

- When turning the damping force adjuster in direction “a”, the 0 click position and the 1 click position may be the same.
- When turning the damping force adjuster in direction “b”, it may click beyond the stated specifications, however such adjustments are ineffective and may damage the suspension.



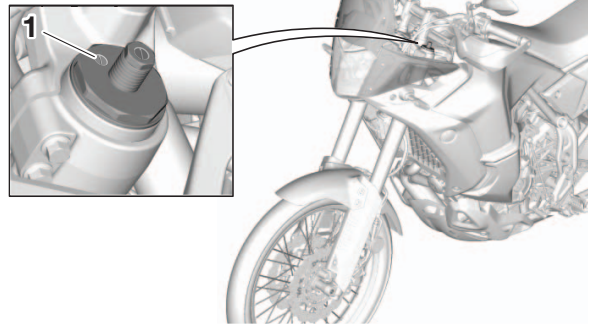
Bleeding the front fork

1. Place the motorcycle on a suitable stand.
2. Make sure the front wheel is off the ground and the area near the bleed screws is clean.

TIP

When bleeding the front fork, do not apply any pressure or weight on the front end of the vehicle.

3. Remove:
 - Bleed screw “1”



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



Front fork bleed screw
1.3 N·m (0.13 kgf·m, 0.95 lb·ft)

EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to “CHECKING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-85.

EAS30655

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120



WARNING

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

Spring preload

ECA13590



NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

PERIODIC MAINTENANCE

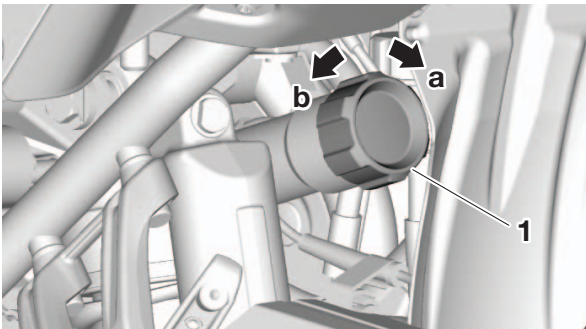


Spring preload
Unit for adjustment
Click
Adjustment value (Soft)
0
Adjustment value (STD)
10
Adjustment value (Hard)
24

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

TIP

- When turning the spring preload adjuster in direction "b", the 0 click position and the 1 click position may be the same.
- When turning the spring preload adjuster in direction "a", it may click beyond the stated specifications, however such adjustments are ineffective and may damage the suspension.



Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

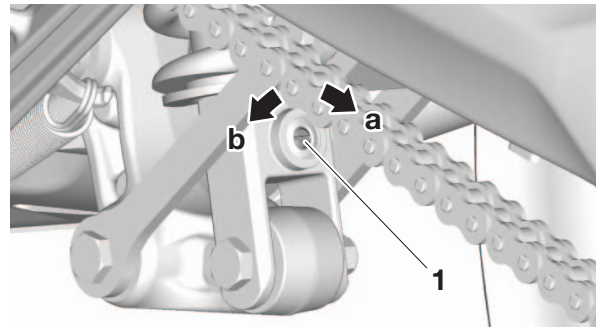


Rebound damping
Unit for adjustment
Click
Adjustment value from the start position (Soft)
23
Adjustment value from the start position (STD)
11
Adjustment value from the start position (Hard)
0

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

TIP

- When turning the damping force adjuster in direction "a", the 0 click position and the 1 click position may be the same.
- When turning the damping force adjuster in direction "b", it may click beyond the stated specifications, however such adjustments are ineffective and may damage the suspension.



Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

PERIODIC MAINTENANCE



Compression damping Unit for adjustment

Click

Adjustment value from the start
position (Soft)

18

Adjustment value from the start
position (STD)

14

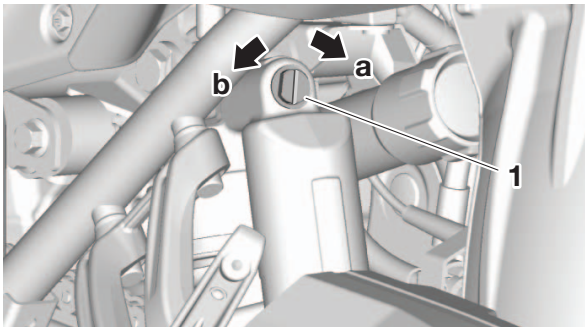
Adjustment value from the start
position (Hard)

0

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

TIP

- When turning the damping force adjuster in direction “a”, the 0 click position and the 1 click position may be the same.
- When turning the damping force adjuster in direction “b”, it may click beyond the stated specifications, however such adjustments are ineffective and may damage the suspension.



EAS32816

CHECKING THE CONNECTING ARMS AND RELAY ARM

Refer to “CHECKING THE CONNECTING
ARMS AND RELAY ARM” on page 4-85.

EAS30656

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

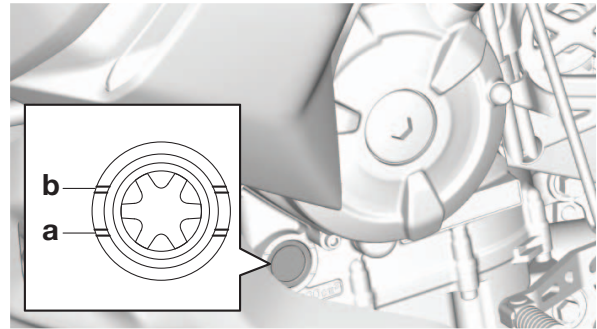
TIP

- Place the vehicle on a suitable stand.
 - Make sure the vehicle is upright.
2. Start the engine, warm it up for several minutes, and then turn it off.
 3. Check:
 - Engine oil level
The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.

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

TIP

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



Recommended brand

YAMALUBE

SAE viscosity grades

10W-40

Recommended engine oil grade

API service SG type or higher,

JASO standard MA

ECA13361

NOTICE

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

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

TIP

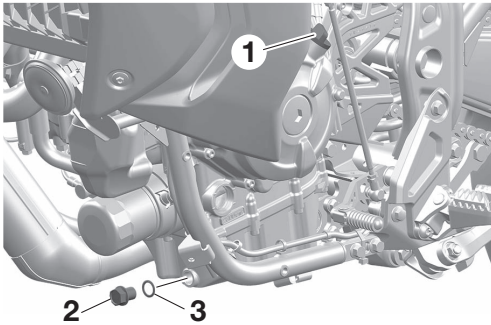
Before checking the engine oil level, wait a few
minutes until the oil has settled.

EAS30657

CHANGING THE ENGINE OIL

1. Remove:
 - Engine guard (center)
Refer to “ENGINE REMOVAL” on page 5-10.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the engine oil drain bolt.
4. Remove:
 - Engine oil filler cap “1”

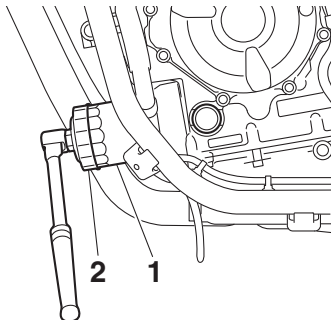
- Engine oil drain bolt “2”
(along with the gasket “3”)



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



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



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

ECA25890

NOTICE

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

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



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

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



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

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



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

9. Install:
 - Engine oil filler cap
(along with the O-ring **New**)
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
 - Engine
(for engine oil leaks)
12. Check:
 - Engine oil level
Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-25.
13. Install:
 - Engine guard (center)
Refer to “ENGINE REMOVAL” on page 5-10.

EAS30810

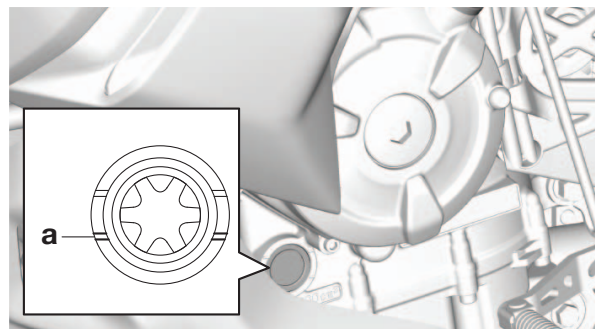
MEASURING THE ENGINE OIL PRESSURE

1. Stand the vehicle on a level surface.

TIP

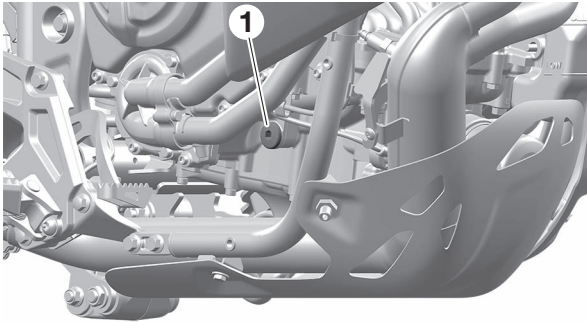
- Place the vehicle on a suitable stand.
- Make sure that the vehicle is upright.

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




PERIODIC MAINTENANCE

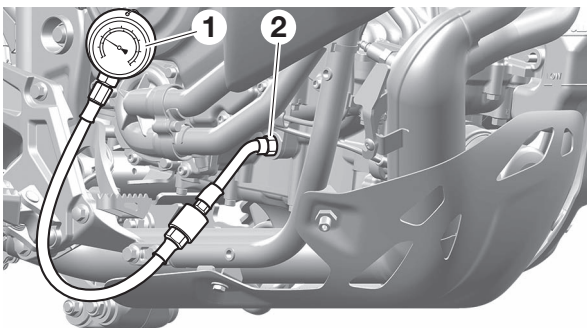
3. Remove:
 - Engine guard (right)
Refer to “ENGINE REMOVAL” on page 5-10.
4. Tilt the vehicle to the left so that oil does not flow out of the main gallery.
5. Remove:
 - Main gallery bolt “1”



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



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



7. Stand the vehicle on a level surface.
TIP _____
 - Place the vehicle on the suitable stand.
 - Make sure that the vehicle is upright.
8. Start the engine, warm it up for several minutes.

ECA13410

NOTICE

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

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



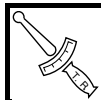
Oil pressure
280.0 kPa/5000 r/min (2.80 kgf/cm²/5000 r/min, 40.6 psi/5000 r/min)

Out of specification → Check.

| Engine oil pressure | Possible causes |
|---------------------|--|
| Below specification | <ul style="list-style-type: none"> • Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal |
| Above specification | <ul style="list-style-type: none"> • Leaking oil passage • Faulty oil filter • Oil viscosity too high |

10. Remove:
 - Oil pressure gauge
 - Adapter

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



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

EWA12980

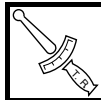
WARNING

The engine, muffler and engine oil are extremely hot.

TIP

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

12. Install:
 - Engine guard (right)
Refer to “ENGINE REMOVAL” on page 5-10.



Engine guard bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

EAS30811

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

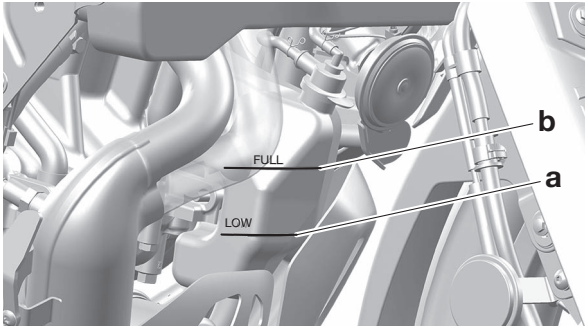
- Place the vehicle on a suitable stand.
- Make sure the vehicle is upright.

2. Check:

- Coolant level

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

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



ECA13470

NOTICE

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.

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

4. Check:

- Coolant level

TIP

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

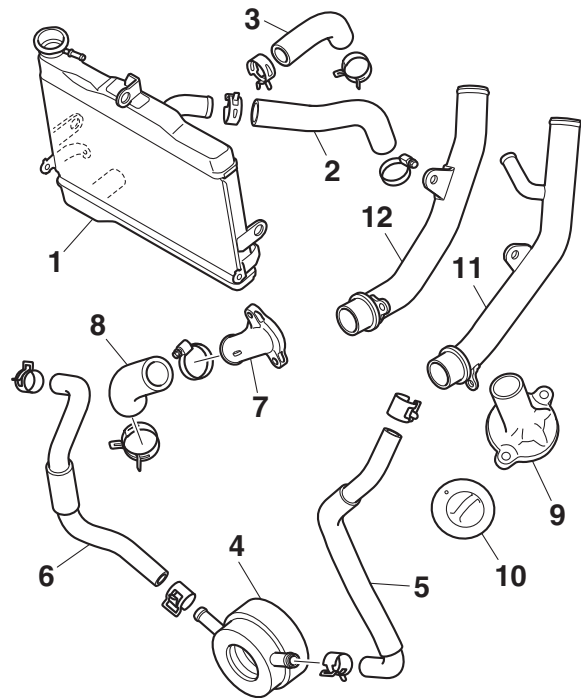
EAS30812

CHECKING THE COOLING SYSTEM

1. Check:

- Radiator “1”
 - Radiator inlet hose “2”
 - Radiator outlet hose “3”
 - Oil cooler “4”
 - Oil cooler inlet hose “5”
 - Oil cooler outlet hose “6”
 - Water jacket joint “7”
 - Water jacket joint inlet hose “8”
 - Thermostat cover “9”
 - Thermostat “10”
 - Water pump inlet pipe “11”
 - Water pump outlet pipe “12”
- Cracks/damage → Replace.

Refer to “RADIATOR” on page 6-2, “OIL COOLER” on page 6-5, “THERMOSTAT” on page 6-8 and “WATER PUMP” on page 6-10.



EAS30813

CHANGING THE COOLANT

1. Remove:

- Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
- Front side cover (left/right)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
- Side cover inner panel (left/right)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
- Engine guard (left/right)
Refer to “ENGINE REMOVAL” on page 5-10.
- Engine bracket (right)
Refer to “ENGINE REMOVAL” on page 5-10.
- Fuel tank (right)
Refer to “FUEL TANK” on page 7-1.

2. Remove:

- Radiator cap bolt “1”
- Radiator cap “2”

EWA13030

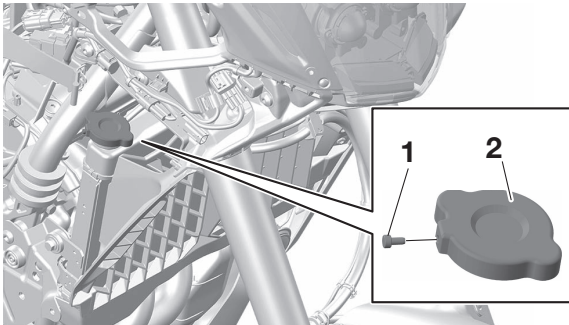
WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may

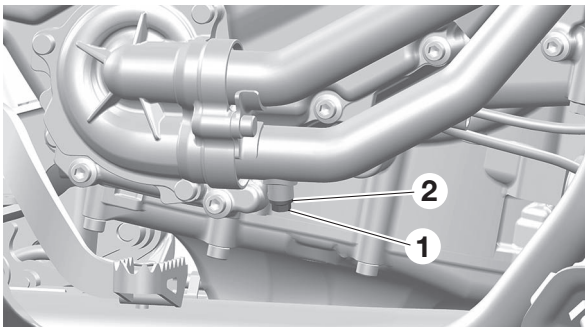
PERIODIC MAINTENANCE

be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

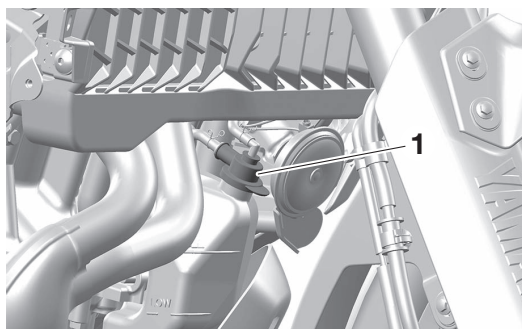
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.



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

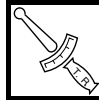


4. Drain:
- Coolant
(from the engine and radiator)
5. Remove:
- Coolant reservoir cap “1”



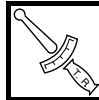
6. Remove:
- Coolant reservoir
Refer to “RADIATOR” on page 6-2.

7. Drain:
- Coolant
(from the coolant reservoir)
8. Install:
- Coolant reservoir



Coolant reservoir bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

9. Install:
- Coolant drain bolt
 - Copper washer **New**



Coolant drain bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

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



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

Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

EWA13040

WARNING

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

ECA13481

NOTICE

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

PERIODIC MAINTENANCE

- 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.

11. Install:

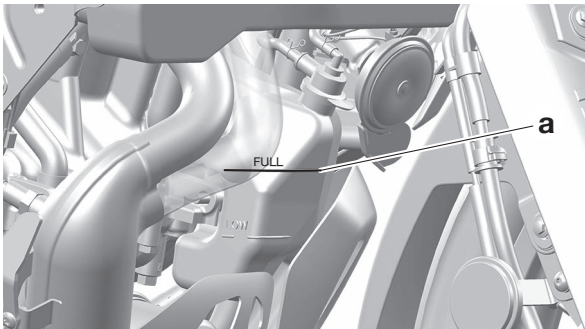
- Radiator cap
- Radiator cap bolt



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

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 3-27.

TIP

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

16. Install:

- All removed parts

TIP

For installation, reverse the removal procedure.

EAS30814

CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-37.

EAS30659

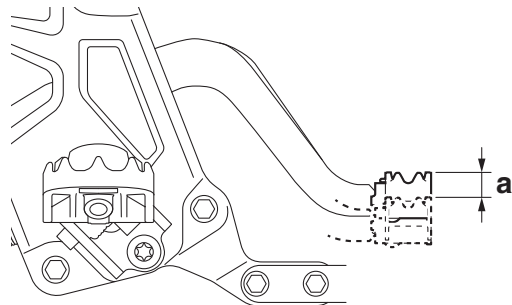
ADJUSTING THE REAR BRAKE LIGHT SWITCH

1. Check:

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



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

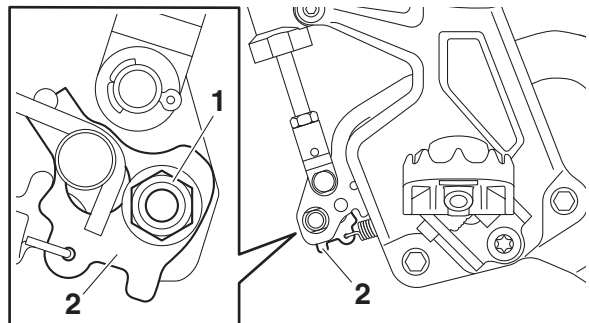


2. Adjust:

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



Nut
7 N·m (0.7 kgf·m, 5.2 lb-ft)



EAS30660

CHECKING AND LUBRICATING THE CABLES

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

EWA13270



WARNING

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

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

| | |
|---|---|
|  | Recommended lubricant Engine oil or a suitable cable lu- bricant |
|---|---|

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


EAS30861
CHECKING THE THROTTLE GRIP OPERATION

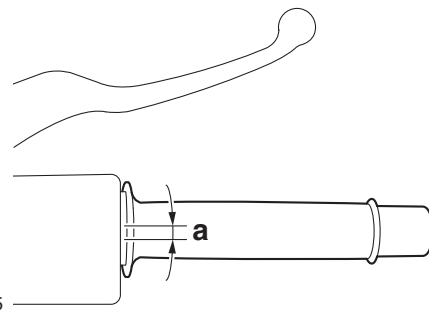
1. Check:
 - Throttle cables
Damage/deterioration → Replace.
 - Throttle cable installation
Incorrect → Reinstall the throttle cables.
Refer to “CABLE ROUTING” on page 2-15 and “HANDLEBAR” on page 4-62.
2. Check:
 - Throttle grip movement
Rough movement → Lubricate or replace the defective part(s).

| | |
|---|---|
|  | Recommended lubricant Suitable cable lubricant |
|---|---|

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

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

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




G088895

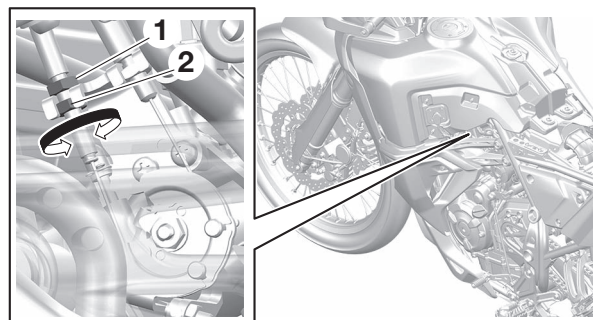
4. Adjust:
 - Throttle grip free play

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

Throttle body side

- a. Remove the fuel tank side cover (left).
Refer to “FUEL TANK” on page 7-1.
- b. Loosen the locknut “1” on the accelerator cable.
- c. Turn the adjusting nut “2” until the specified throttle grip free play is obtained.
- d. Tighten the locknut.

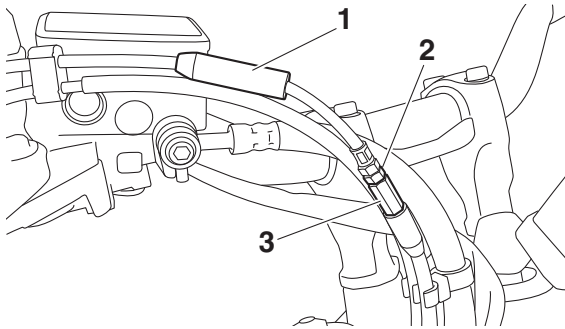
| | |
|---|--|
|  | Throttle cable locknut (throttle body side) 4.5 N·m (0.45 kgf·m, 3.3 lb·ft) |
|---|--|



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

Handlebar side

- a. Slide back the rubber cover “1”.
- b. Loosen the locknut “2”.
- c. Turn the adjusting nut “3” until the specified throttle grip free play is obtained.



d. Tighten the locknut.



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

e. Slide the rubber cover to its original position.

TIP

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

EAS30816

CHECKING AND CHARGING THE BATTERY

Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-38.

EAS30662

CHECKING THE FUSES

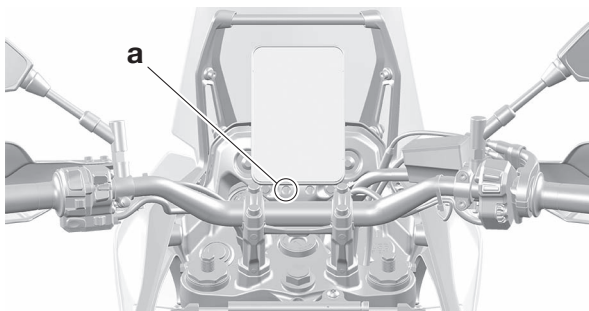
Refer to “CHECKING THE FUSES” on page 8-38.

EAS30124

ADJUSTING THE HEADLIGHT BEAMS

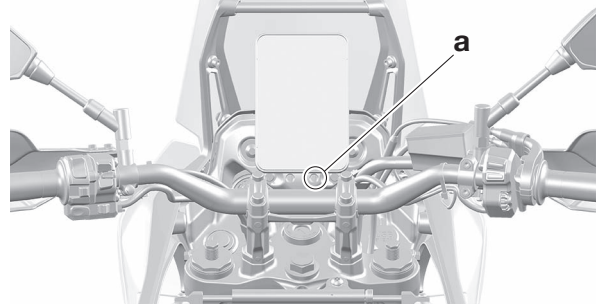
1. Adjust:

- Headlight beams (vertically–left side)
 - a. Insert a 4 mm hexagon wrench into the hole “a” and turn the adjusting bolt.



2. Adjust:

- Headlight beams (vertically–right side)
 - a. Insert a 4 mm hexagon wrench into the hole “a” and turn the adjusting bolt.

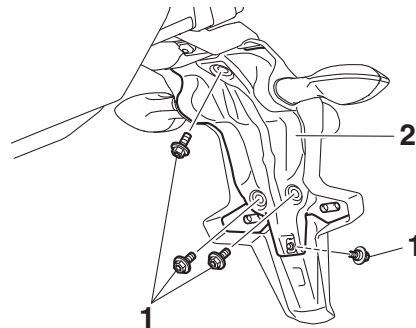


EAS31831

REPLACING THE LICENSE PLATE LIGHT BULB

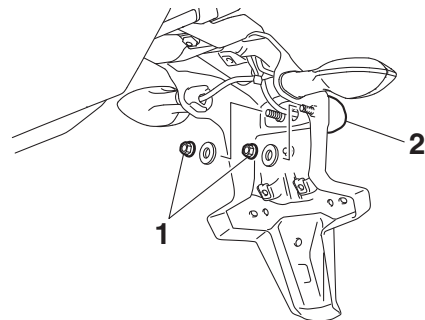
1. Remove:

- Lower fender cover bolts “1”
- Lower fender cover “2”



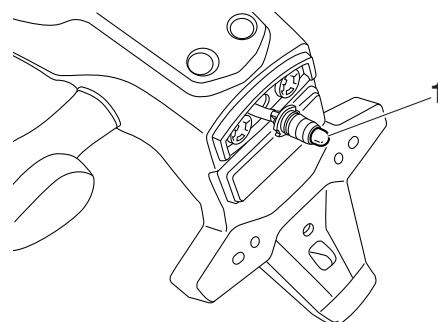
2. Remove:

- License plate light unit nuts “1”
- License plate light cover “2”



3. Remove:

- License plate light bulb “1”

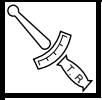


4. Install:

- License plate light bulb **New**

5. Install:

- License plate light cover
- License plate light unit
- Lower fender cover



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

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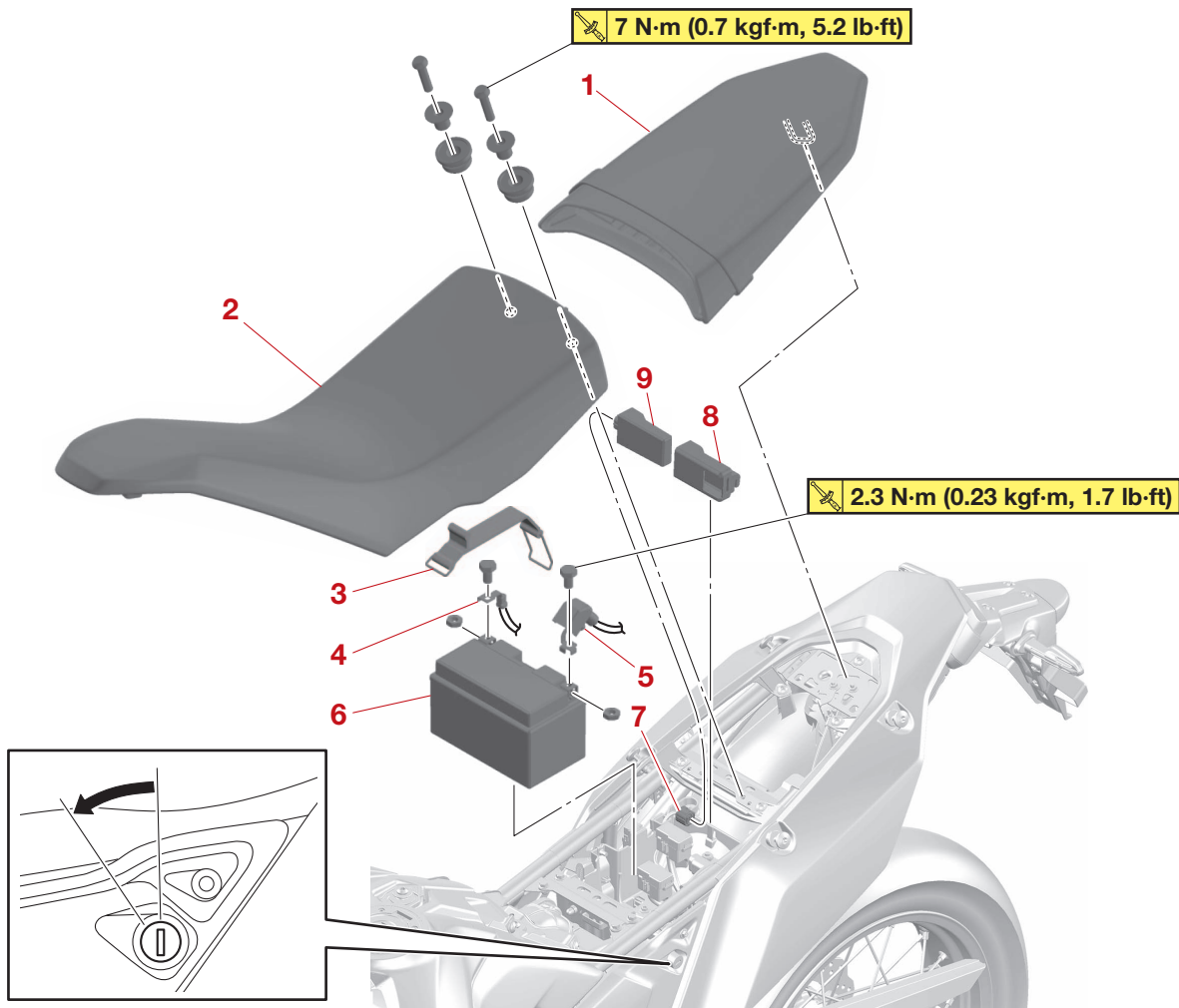
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EAS20026

GENERAL CHASSIS (1)

Removing the seats and battery

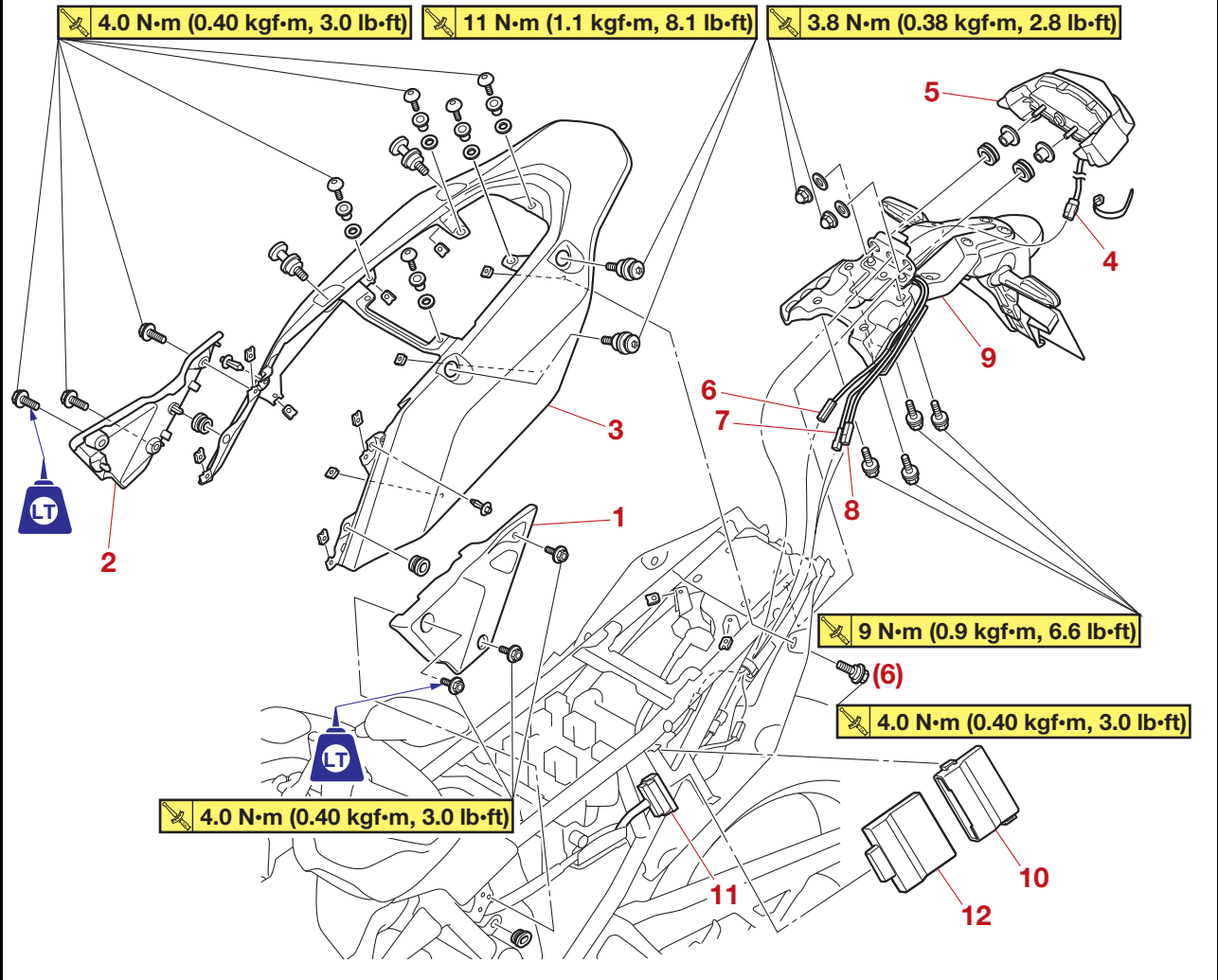


| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------------------|------|-------------|
| 1 | Passenger seat | 1 | |
| 2 | Rider seat | 1 | |
| 3 | Battery band | 1 | |
| 4 | Negative battery lead | 1 | Disconnect. |
| 5 | Positive battery lead | 1 | Disconnect. |
| 6 | Battery | 1 | |
| 7 | YDT coupler | 1 | Disconnect. |
| 8 | CCU cover | 1 | |
| 9 | CCU (Communication Control Unit) | 1 | |

EAS20155

GENERAL CHASSIS (2)

Removing the tail/brake light assembly



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

EAS31264

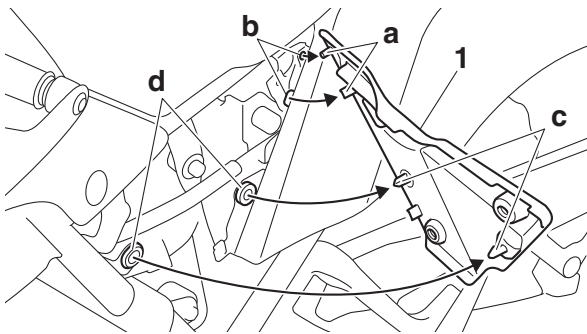
REMOVING THE SIDE COVERS

The following procedure applies to both of the side covers.

- Remove:
 - Side cover "1"

TIP

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



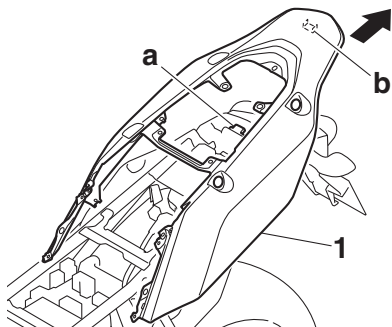
EAS33139

REMOVING THE TAIL COVER

- Remove:
 - Tail cover "1"

TIP

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



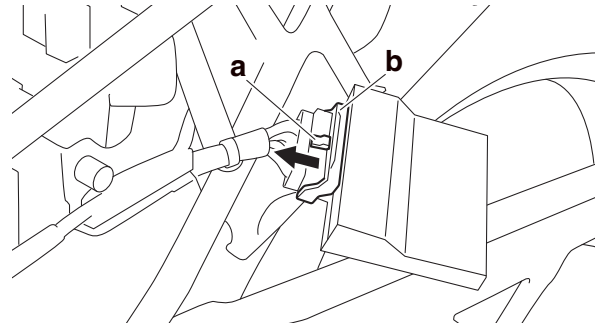
EAS31641

REMOVING THE ECU (engine control unit)

- Disconnect:
 - ECU coupler

TIP

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



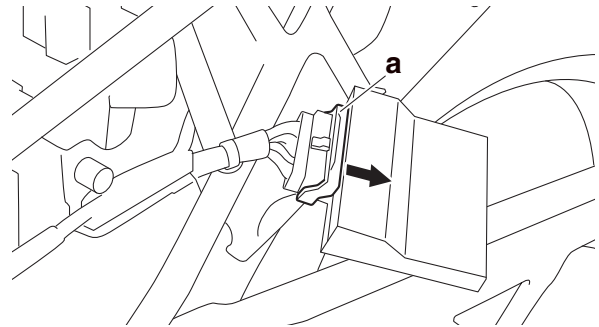
EAS31642

INSTALLING THE ECU (engine control unit)

- Connect:
 - ECU coupler

TIP

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



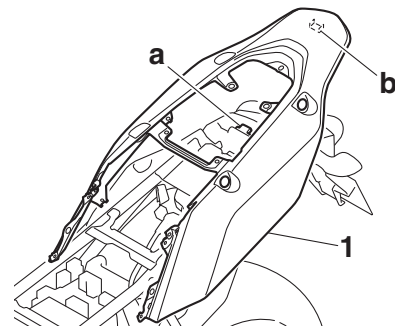
EAS33140

INSTALLING THE TAIL COVER

- Install:
 - Tail cover "1"

TIP

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



EAS31265

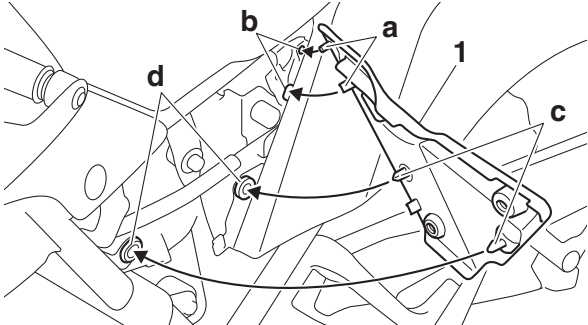
INSTALLING THE SIDE COVERS

The following procedure applies to both of the side covers.

- Install:
 - Side cover "1"

TIP

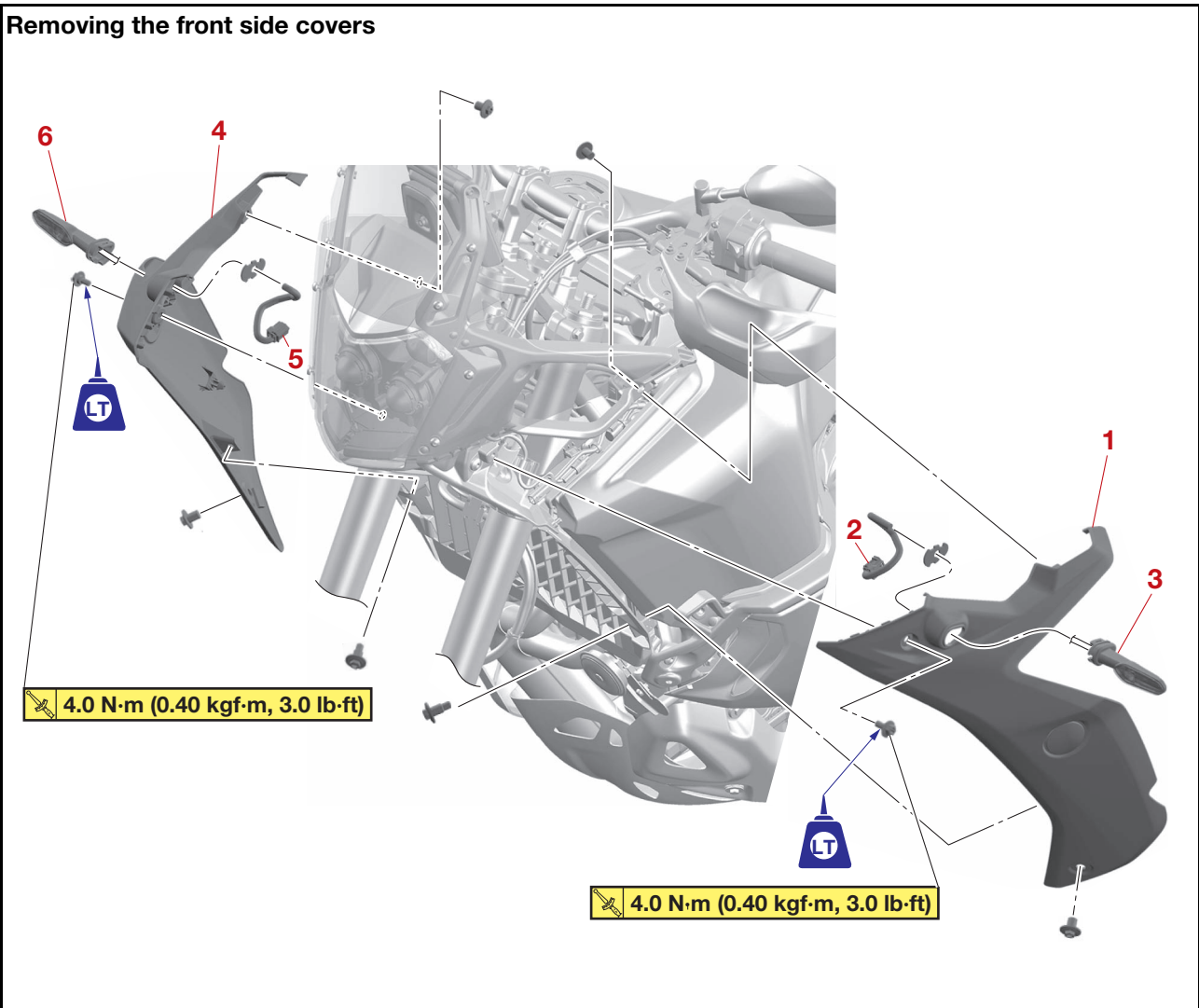
Fit the projections "a" on the side cover to the holes "b" in the tail cover, and then fit the projections "c" to the grommets "d".



EAS20156

GENERAL CHASSIS (3)

Removing the front side covers



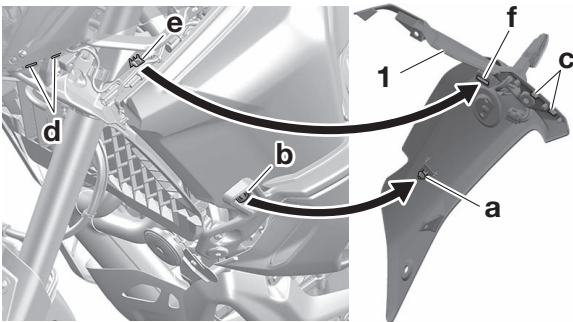
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|-------------|
| 1 | Front side cover (left) | 1 | |
| 2 | Front turn signal light coupler (left) | 1 | Disconnect. |
| 3 | Front turn signal light (left) | 1 | |
| 4 | Front side cover (right) | 1 | |
| 5 | Front turn signal light coupler (right) | 1 | Disconnect. |
| 6 | Front turn signal light (right) | 1 | |

EAS31683

REMOVING THE FRONT SIDE COVERS

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

1. Remove:
 - Front side cover “1”
 - a. Remove the front side cover bolt and quick fasteners.
 - b. Pull the front side cover outward, and then remove the projection “a” from the grommet “b”.
 - c. Unhook the projections “c” on the front side cover from the holes “d”.
 - d. Remove the projection “e” from the hole “f” on the front side cover.

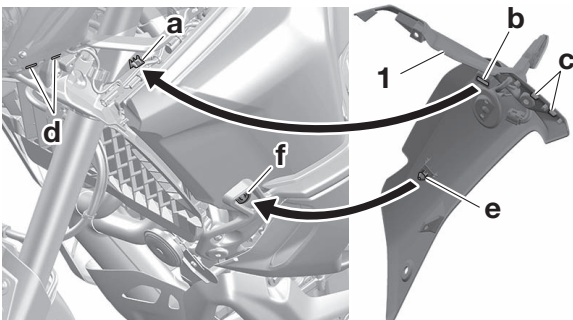


EAS31684

INSTALLING THE FRONT SIDE COVERS

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

1. Install:
 - Front side cover “1”
 - a. Insert the projection “a” into the hole “b” on the front side cover.
 - b. Hook the projections “c” on the front side cover into the hole “d”.
 - c. Insert the projection “e” on the front side cover into the grommet “f”.



- d. Install the quick fasteners and front side cover bolts, and then tighten the bolts to specification.

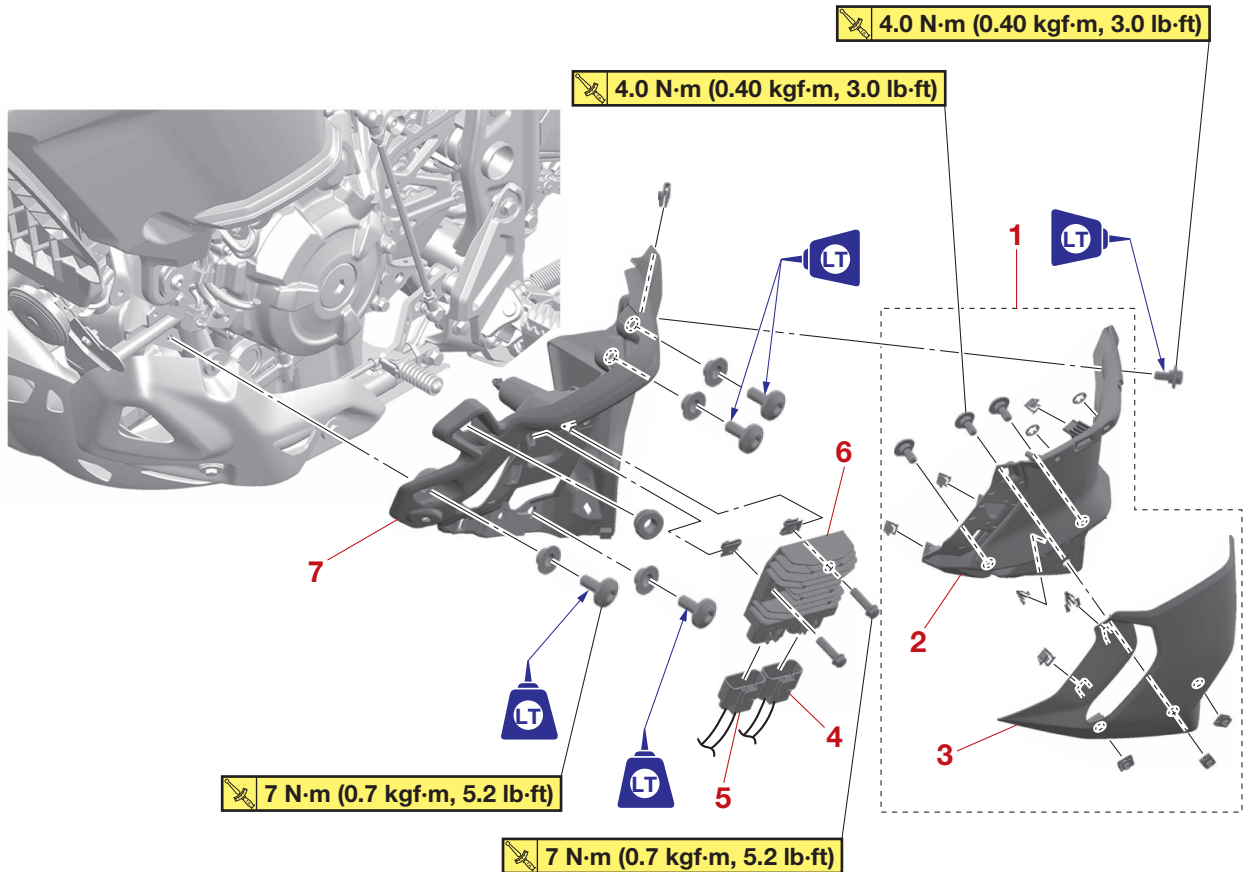


Front side cover bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)
LOCTITE®

EAS20157

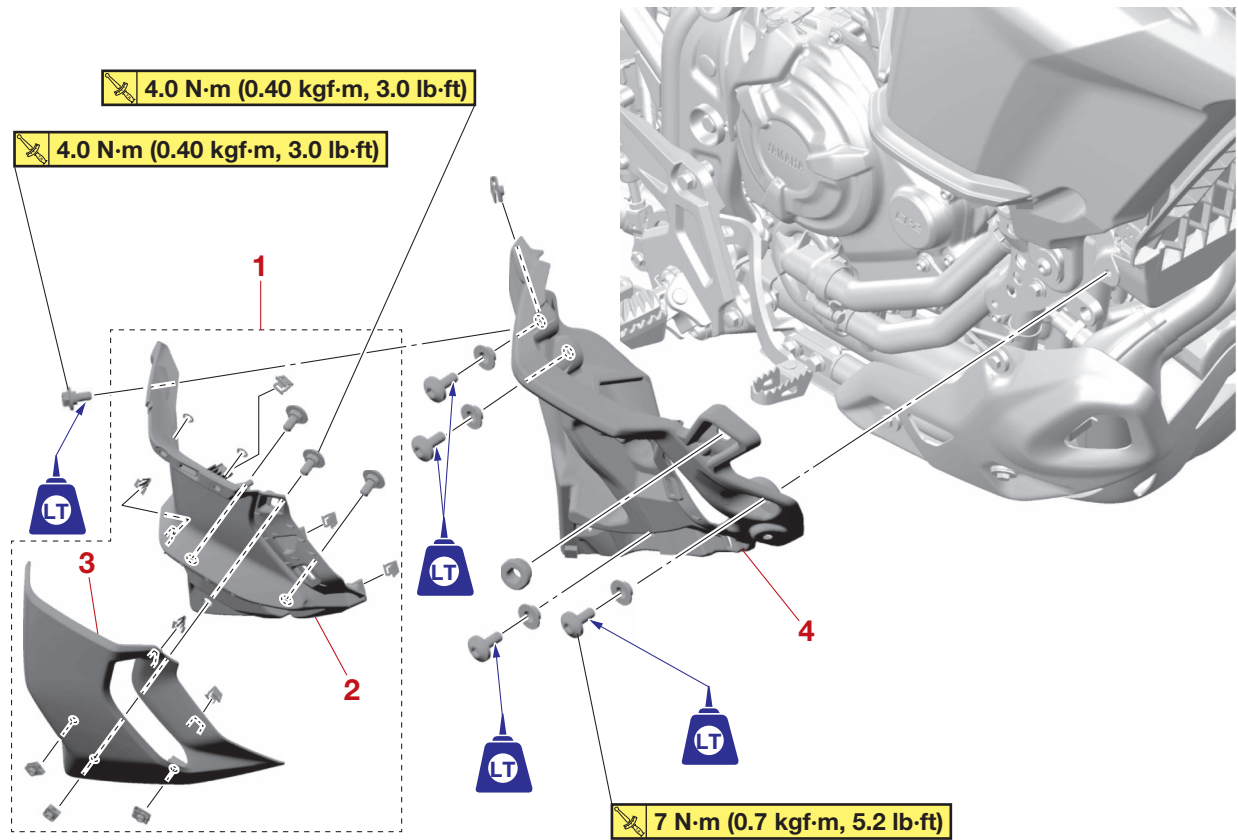
GENERAL CHASSIS (4)

Removing the lower side cover (left)



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------------------|------|---|
| | Front side cover (left) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| 1 | Lower side cover assembly (left) | 1 | |
| 2 | Lower side cover 1 (left) | 1 | |
| 3 | Lower side cover 2 (left) | 1 | |
| 4 | Rectifier/regulator coupler | 1 | Disconnect. |
| 5 | Stator coil coupler | 1 | Disconnect. |
| 6 | Rectifier/regulator | 1 | |
| 7 | Side cover inner panel (left) | 1 | |

Removing the lower side cover (right)



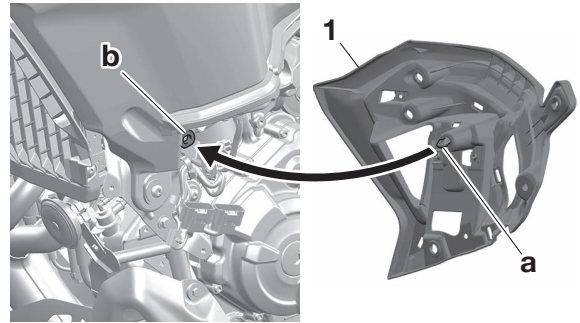
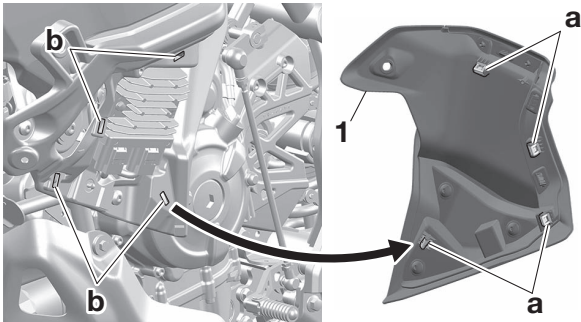
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------------------|------|---|
| | Front side cover (right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| 1 | Lower side cover assembly (right) | 1 | |
| 2 | Lower side cover 1 (right) | 1 | |
| 3 | Lower side cover 2 (right) | 1 | |
| 4 | Side cover inner panel (right) | 1 | |

EAS33812

REMOVING THE LOWER SIDE COVER ASSEMBLIES

The following procedure applies to both of the lower side cover assemblies.

1. Remove:
 - Lower side cover assembly “1”
 - a. Remove the lower side cover assembly bolt.
 - b. Remove the projections “a” on the lower side cover assembly from the holes “b”.



- b. Install the side cover inner panel bolts, and then tighten the bolts to specification.



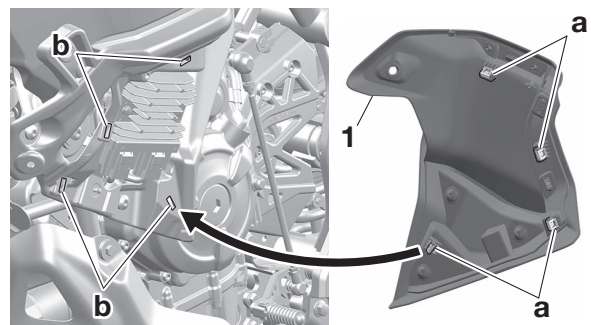
Side cover inner panel bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)
LOCTITE®

EAS33815

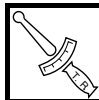
INSTALLING THE LOWER SIDE COVER ASSEMBLIES

The following procedure applies to both of the lower side cover assemblies.

1. Install:
 - Lower side cover assembly “1”
 - a. Insert the projections “a” on the lower side cover assembly into the holes “b”.



- b. Install the lower side cover assembly bolt, and then tighten the bolt to specification.



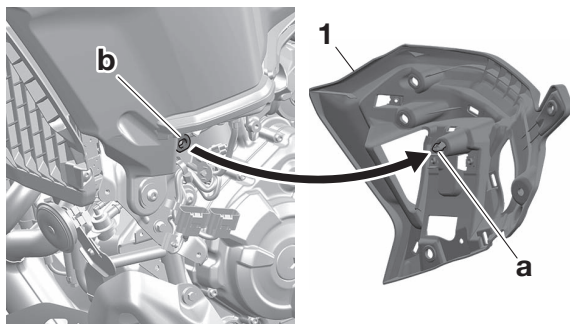
Lower side cover assembly bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)
LOCTITE®

EAS33813

REMOVING THE SIDE COVER INNER PANELS

The following procedure applies to both of the side cover inner panels.

1. Remove:
 - Side cover inner panel “1”
 - a. Remove the side cover inner panel bolts.
 - b. Remove the projection “a” on the side cover inner panel from the grommet “b”.



EAS33814

INSTALLING THE SIDE COVER INNER PANELS

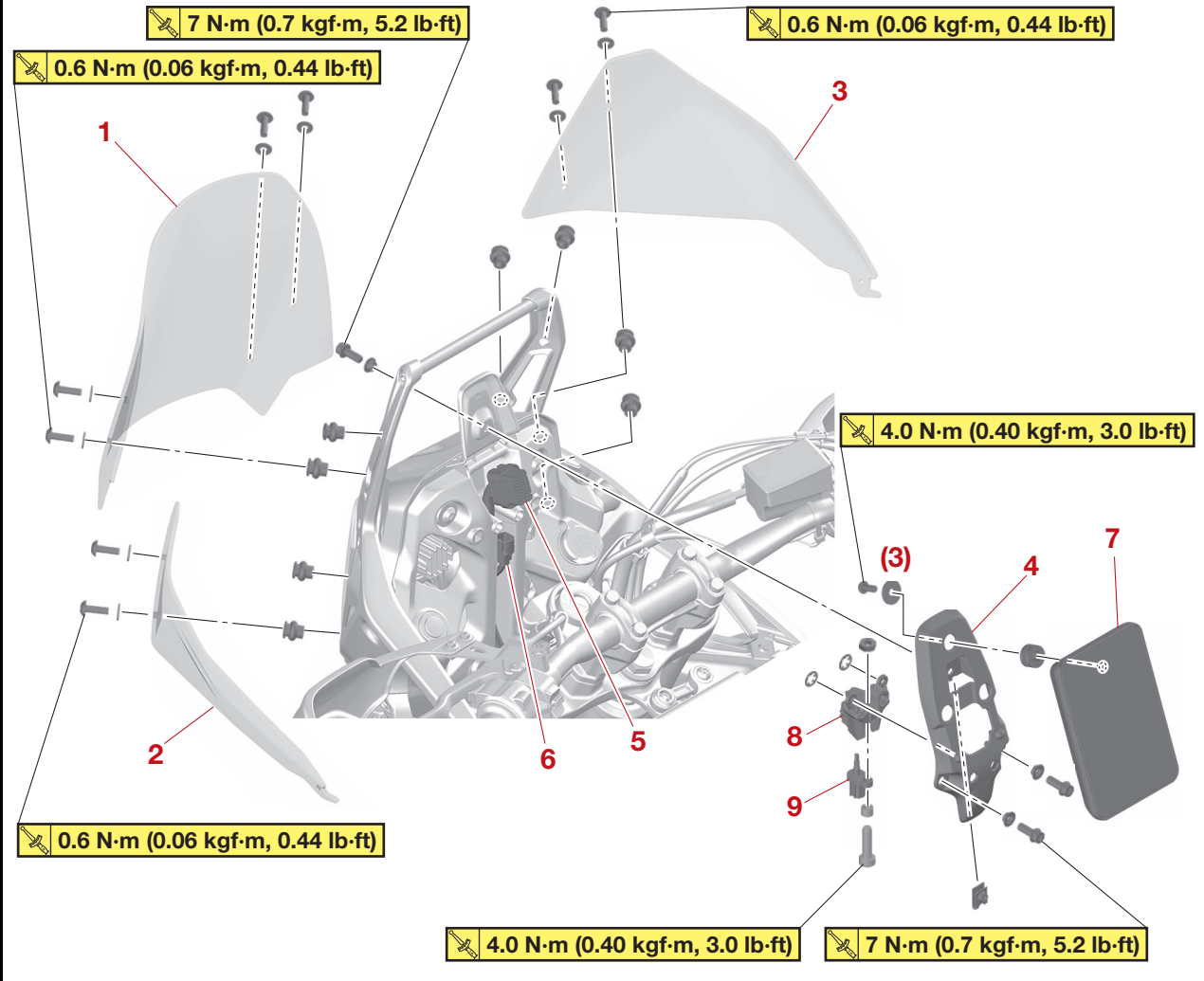
The following procedure applies to both of the side cover inner panels.

1. Install:
 - Side cover inner panel “1”
 - a. Fit the projection “a” on the side cover inner panel into the grommet “b”.

EAS20158

GENERAL CHASSIS (5)

Removing the windshields and meter assembly

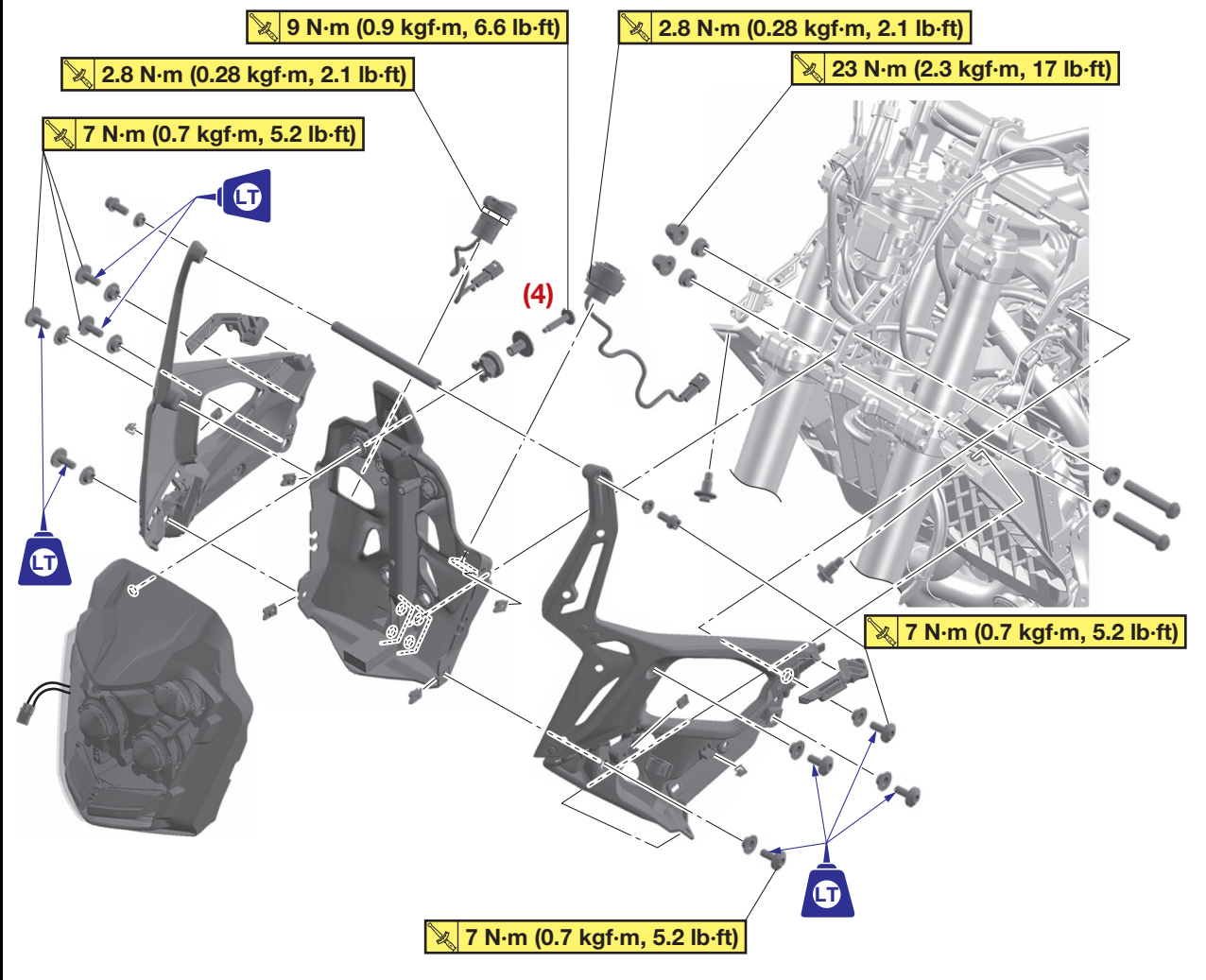


| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------------------|------|-------------|
| 1 | Windshield (center) | 1 | |
| 2 | Windshield (left) | 1 | |
| 3 | Windshield (right) | 1 | |
| 4 | Meter assembly bracket | 1 | |
| 5 | Meter assembly coupler | 1 | Disconnect. |
| 6 | Intake air temperature sensor coupler | 1 | Disconnect. |
| 7 | Meter assembly | 1 | |
| 8 | Intake air temperature sensor bracket | 1 | |
| 9 | Intake air temperature sensor | 1 | |

EAS20159

GENERAL CHASSIS (6)

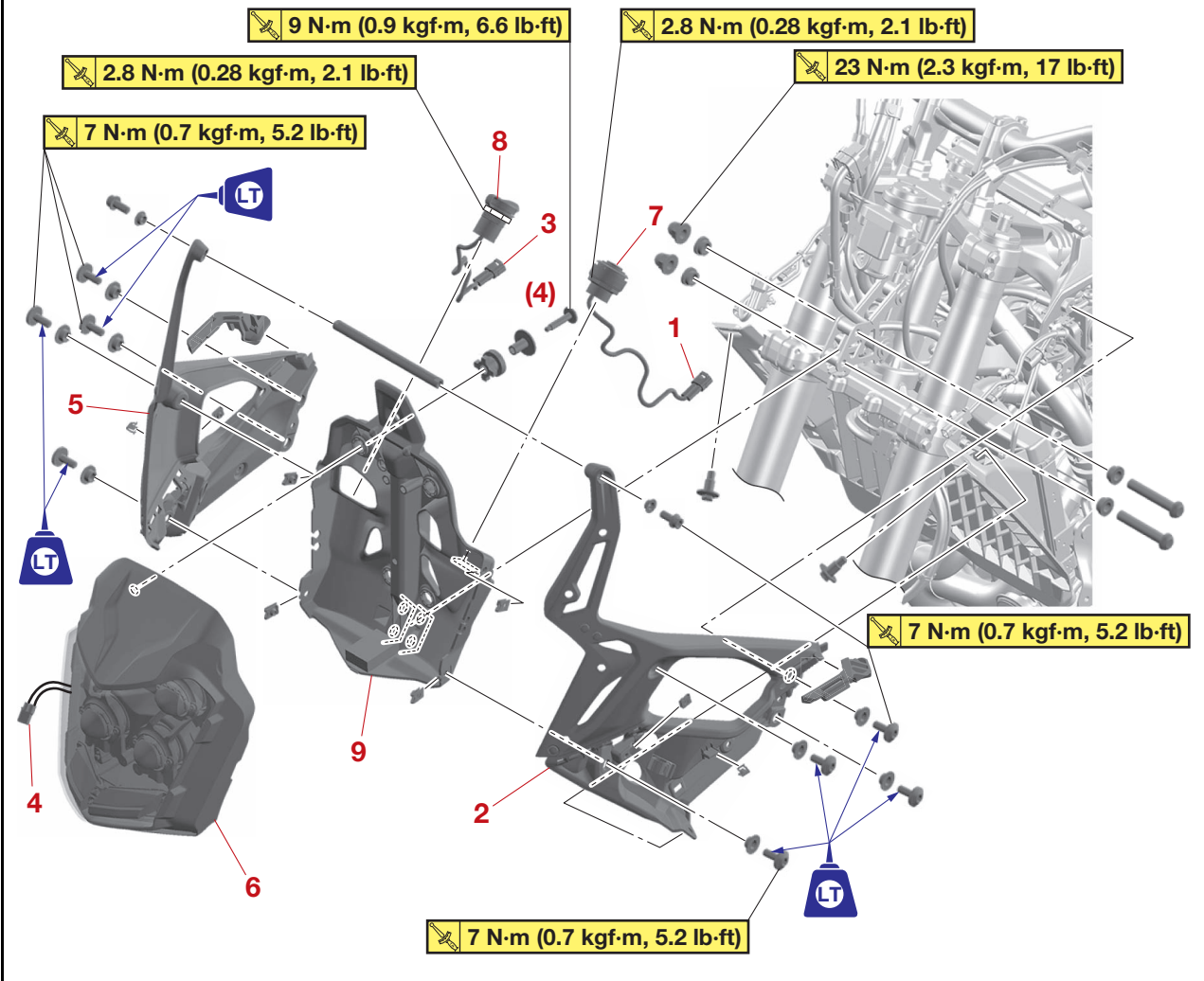
Removing the headlight assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Windshield (center/left/right)/Meter assembly | | Refer to "GENERAL CHASSIS (5)" on page 4-10. |
| | Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |

GENERAL CHASSIS (6)

Removing the headlight assembly



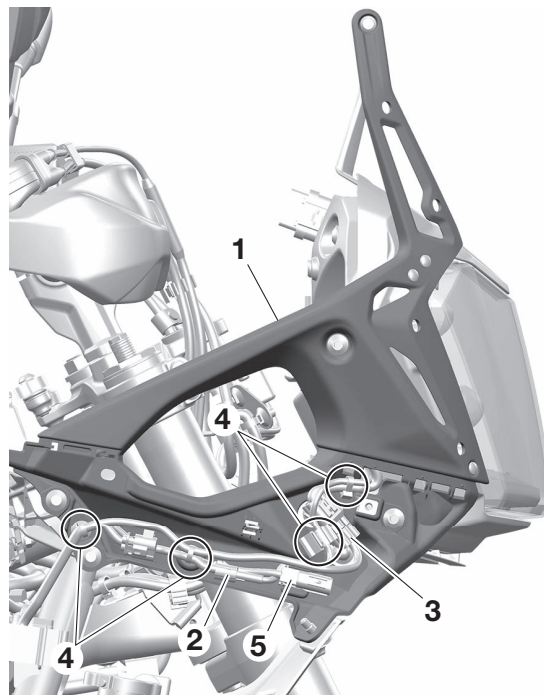
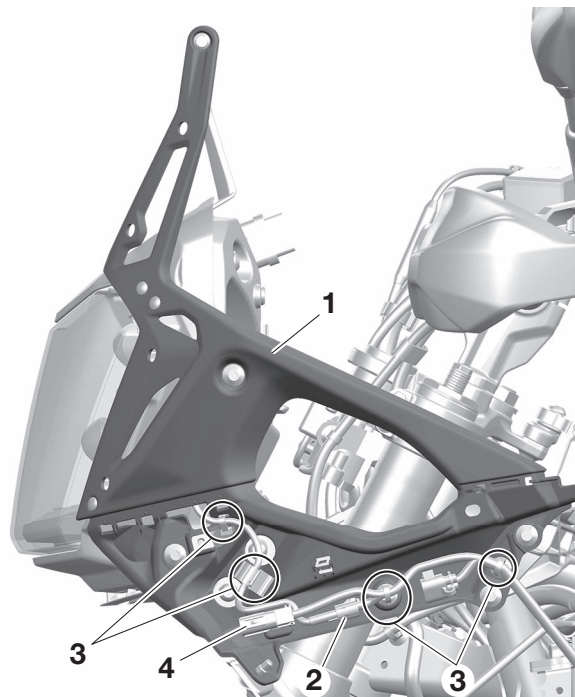
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------|------|-------------|
| 1 | "ABS ON" button coupler | 1 | Disconnect. |
| 2 | Windshield inner panel (left) | 1 | |
| 3 | USB port coupler | 1 | Disconnect. |
| 4 | Headlight coupler | 1 | Disconnect. |
| 5 | Windshield inner panel (right) | 1 | |
| 6 | Headlight assembly | 1 | |
| 7 | "ABS ON" button | 1 | |
| 8 | USB port | 1 | |
| 9 | Headlight inner cover | 1 | |

EAS31400

REMOVING THE WINDSHIELD INNER PANEL (LEFT)

1. Remove:

- Windshield inner panel (left) “1”
 - a. Disconnect the “ABS ON” button coupler “2”.
 - b. Remove the holders “3” and turn signal light coupler “4” from the windshield inner panel.
 - c. Remove the windshield inner panel.



EAS33843

REMOVING THE WINDSHIELD INNER PANEL (RIGHT)

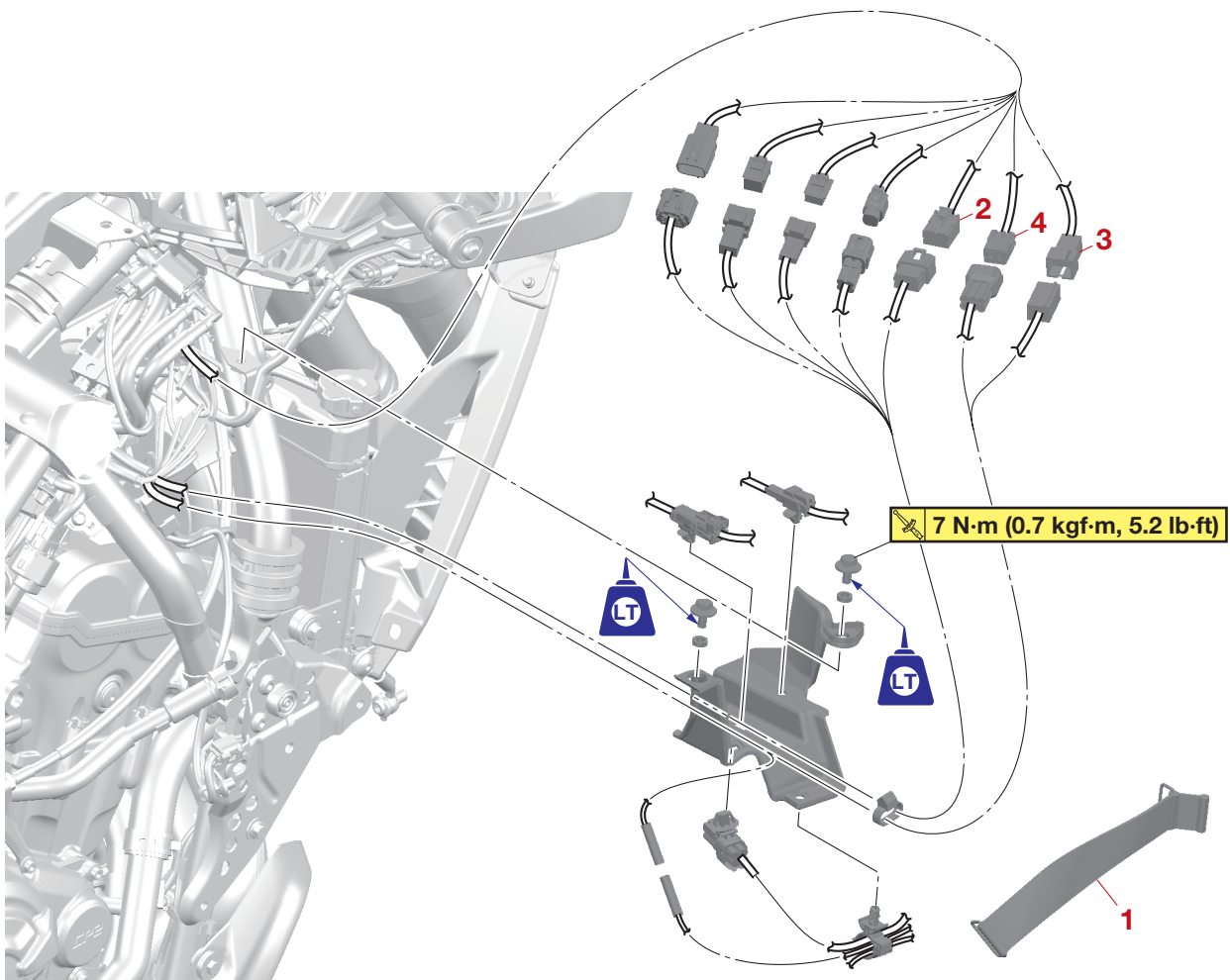
1. Remove:

- Windshield inner panel (right) “1”
 - a. Disconnect the USB port coupler “2” and headlight coupler “3”.
 - b. Remove the holders “4”, headlight coupler “3”, and turn signal light coupler “5” from the windshield inner panel.
 - c. Remove the windshield inner panel.

EAS20193

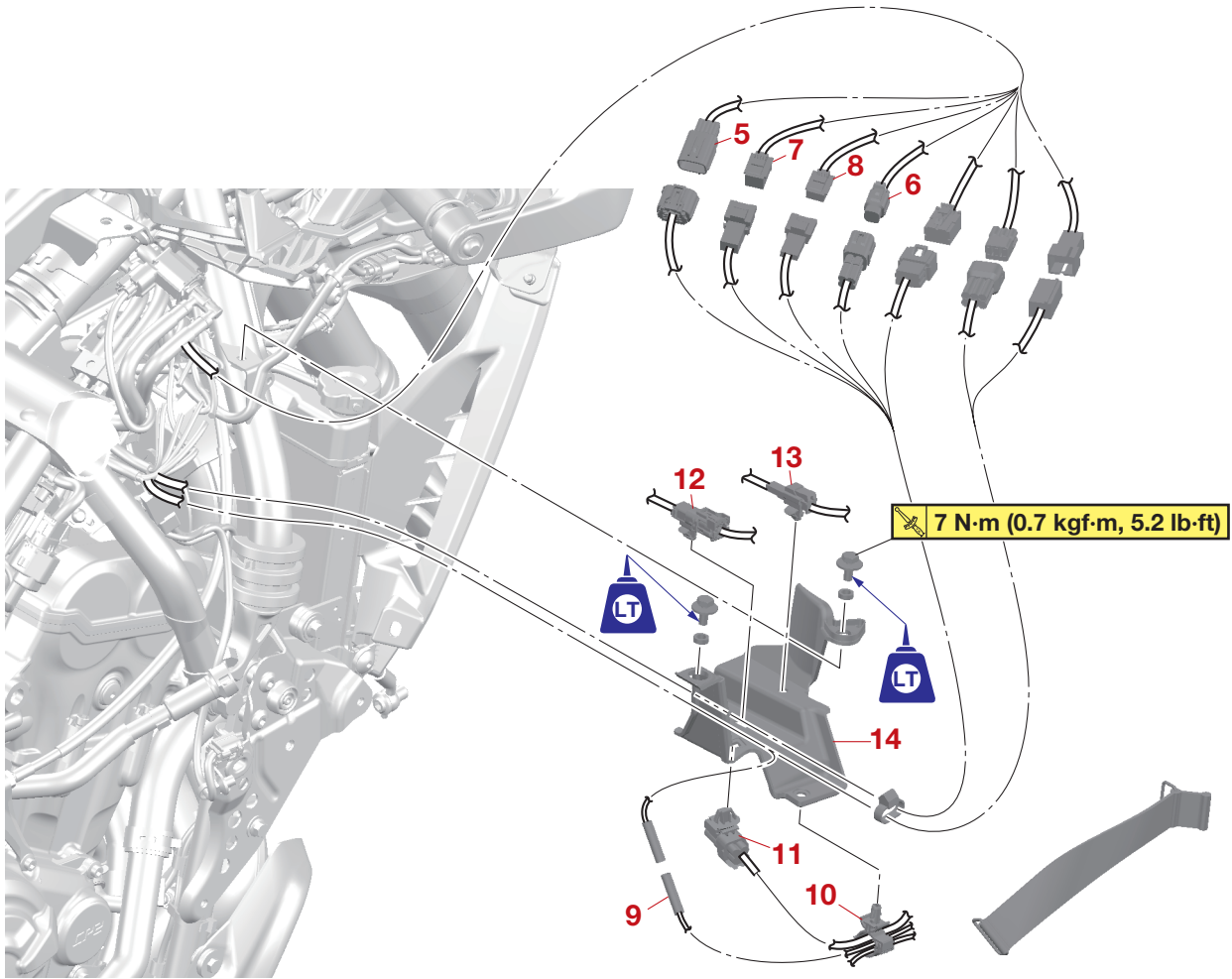
GENERAL CHASSIS (7)

Removing the coupler holder



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------------|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| 1 | Band | 1 | |
| 2 | Handlebar switch coupler 1 (right) | 1 | Disconnect. |
| 3 | Main switch coupler | 1 | Disconnect. |
| 4 | Immobilizer unit coupler | 1 | Disconnect. |

Removing the coupler holder



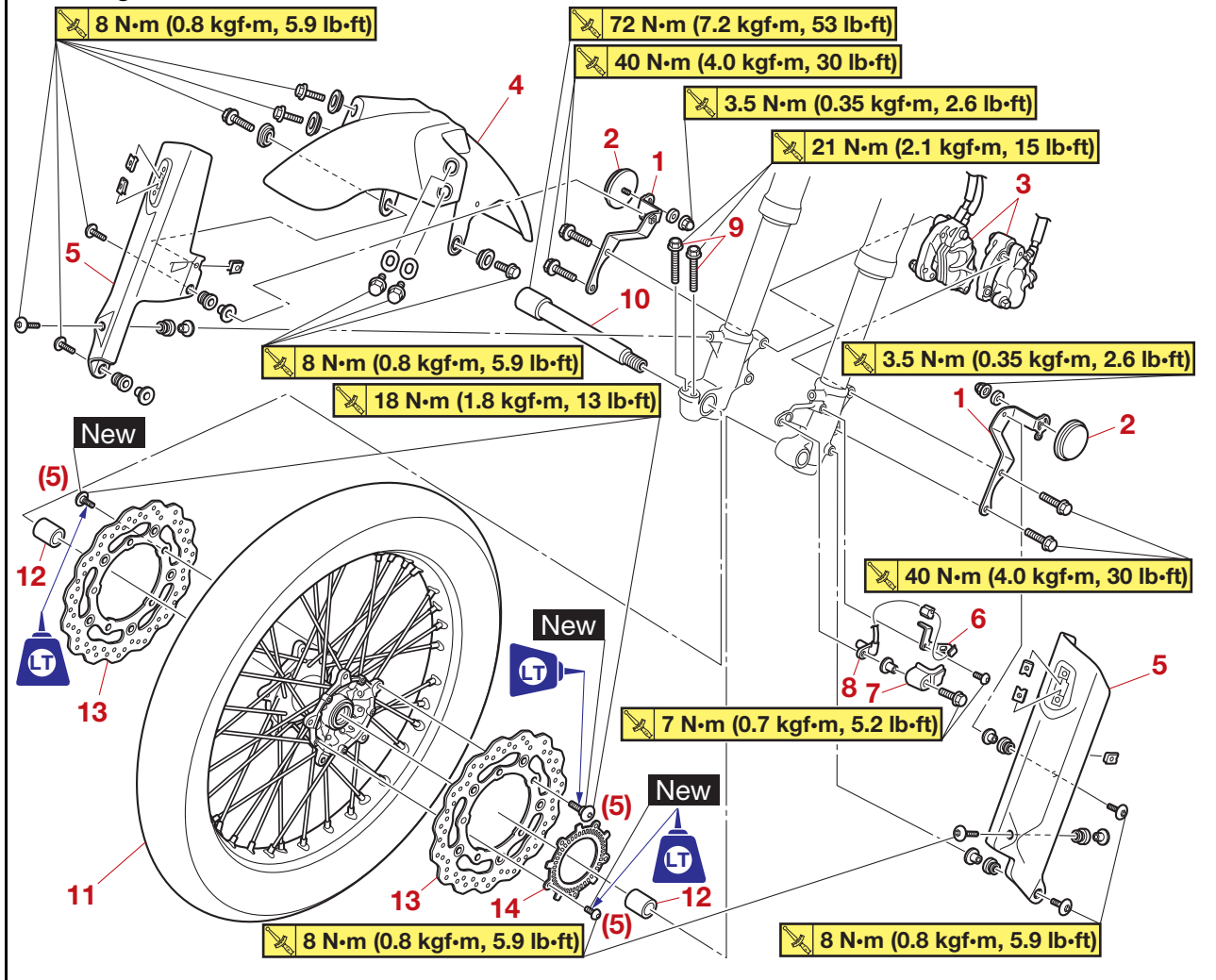
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------------|------|-------------|
| 5 | Handlebar switch coupler 1 (left) | 1 | Disconnect. |
| 6 | Handlebar switch coupler 2 (right) | 1 | Disconnect. |
| 7 | Handlebar switch coupler 2 (left) | 1 | Disconnect. |
| 8 | Handlebar switch coupler 3 (right) | 1 | Disconnect. |
| 9 | Oil pressure switch connector | 1 | Disconnect. |
| 10 | Wire harness holder | 1 | |
| 11 | O ₂ sensor coupler | 1 | |
| 12 | Front wheel sensor coupler | 1 | |
| 13 | Radiator fan motor coupler | 1 | |
| 14 | Coupler holder | 1 | |

FRONT WHEEL

EAS20028

FRONT WHEEL

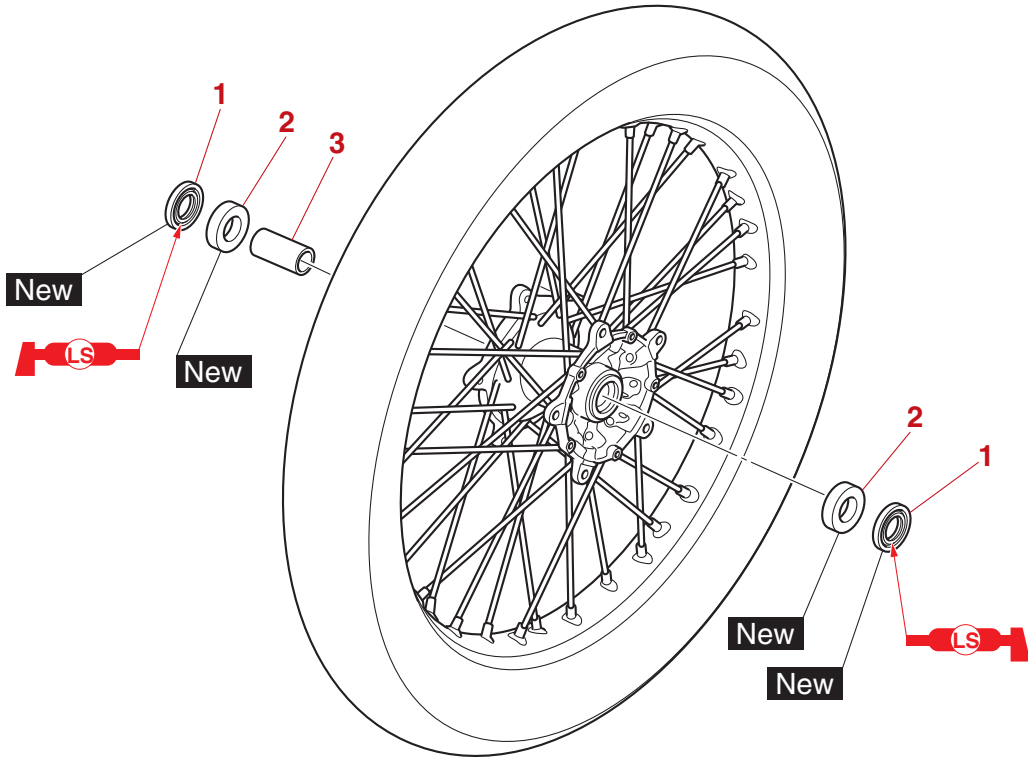
Removing the front wheel and brake discs



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

FRONT WHEEL

Disassembling the front wheel



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

EAS30145

REMOVING THE FRONT WHEEL

ECA20981

NOTICE

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

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Remove:

- Front brake calipers
- Front wheel sensor

ECA20990

NOTICE

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

3. Elevate:

- Front wheel

TIP

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

EAS30146

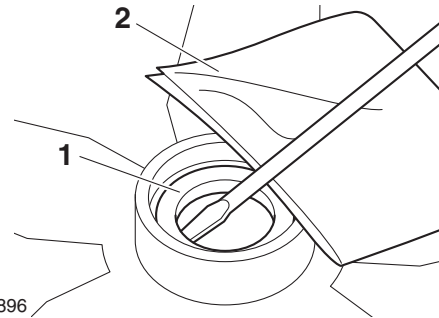
DISASSEMBLING THE FRONT WHEEL

1. Remove:

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

TIP

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



- c. Remove the wheel bearings with a general bearing puller.

EAS30147

CHECKING THE FRONT WHEEL

1. Check:

- Front wheel axle
 - Roll the wheel axle on a flat surface.
 - Bends → Replace.

EWA13460

WARNING

Do not attempt to straighten a bent wheel axle.

2. Check:

- Tire
- Front wheel
 - Damage/wear → Replace.
 - Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-16.

3. Check:

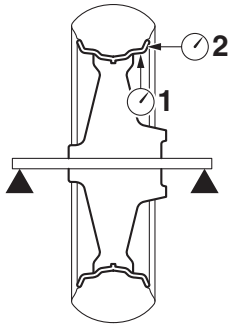
- Spokes
 - Bends/damage → Replace.
 - Loose → Tighten.
 - Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-16.

4. Measure:

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



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



G088897

5. Check:

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

EAS30155

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA21070

NOTICE

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

1. Check:

- Front wheel sensor
Cracks/bends/distortion → Replace.
Iron powder/dust → Clean.

2. Check:

- Front wheel sensor rotor
Cracks/damage/scratches → Replace the front wheel sensor rotor.
Iron powder/dust/solvent → Clean.

TIP

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

3. Measure:

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

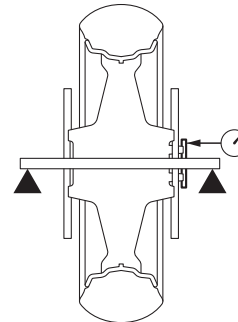


Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

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

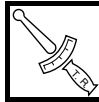
TIP

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



G088902

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



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

ECA18100

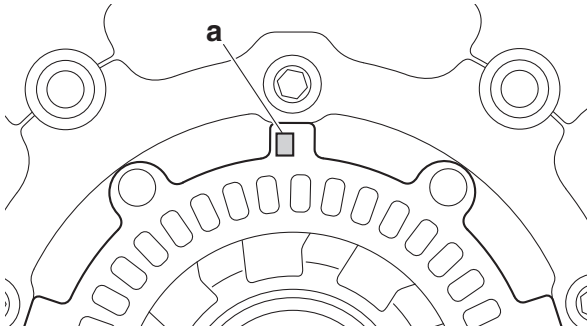
NOTICE

Replace the wheel sensor rotor bolts with new ones.

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

TIP

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



EAS30151

ASSEMBLING THE FRONT WHEEL

1. Install:

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

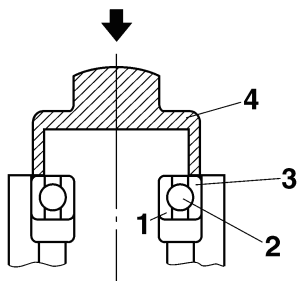
ECA18110

NOTICE

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

TIP

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

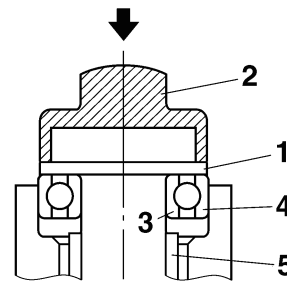


G088898

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

TIP

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



G088899

EAS30152

ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP

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

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

EAS32231

INSTALLING THE FRONT WHEEL

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



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

ECA21011

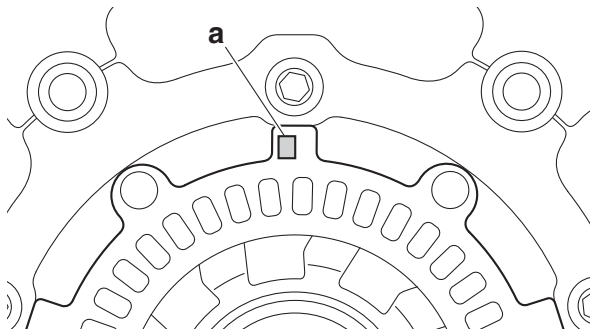
NOTICE

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

TIP

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

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



2. Lubricate:
- Oil seal lips

| | |
|--|--|
| | Recommended lubricant Lithium-soap-based grease |
|--|--|

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

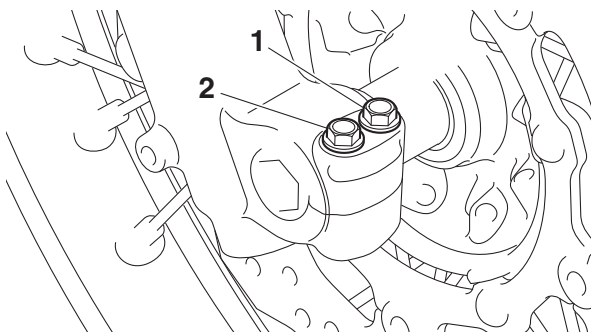
| | |
|--|---|
| | Front wheel axle 72 N·m (7.2 kgf·m, 53 lb·ft) Front wheel axle pinch bolt 21 N·m (2.1 kgf·m, 15 lb·ft) |
|--|---|

ECA14140

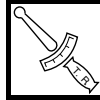
NOTICE

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

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



4. Check:
- Front brake discs
Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-36.
5. Install:
- Front wheel sensor
 - Front wheel sensor protector
 - Front wheel sensor lead holder "1"



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

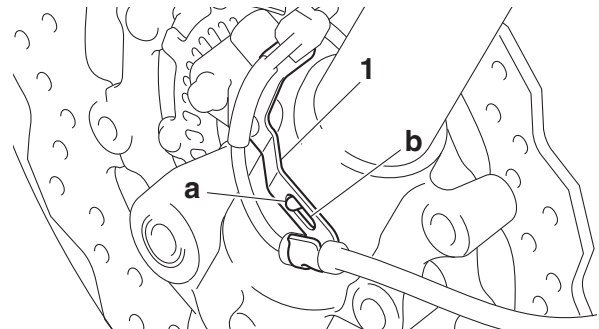
ECA21020

NOTICE

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

TIP

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



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



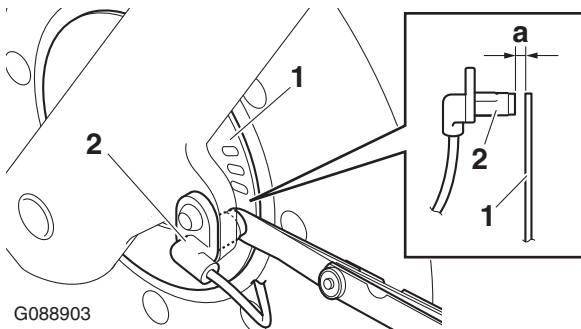
Distance “a” (between the front wheel sensor rotor and front wheel sensor)
0.7–1.6 mm (0.03–0.06 in)

TIP

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



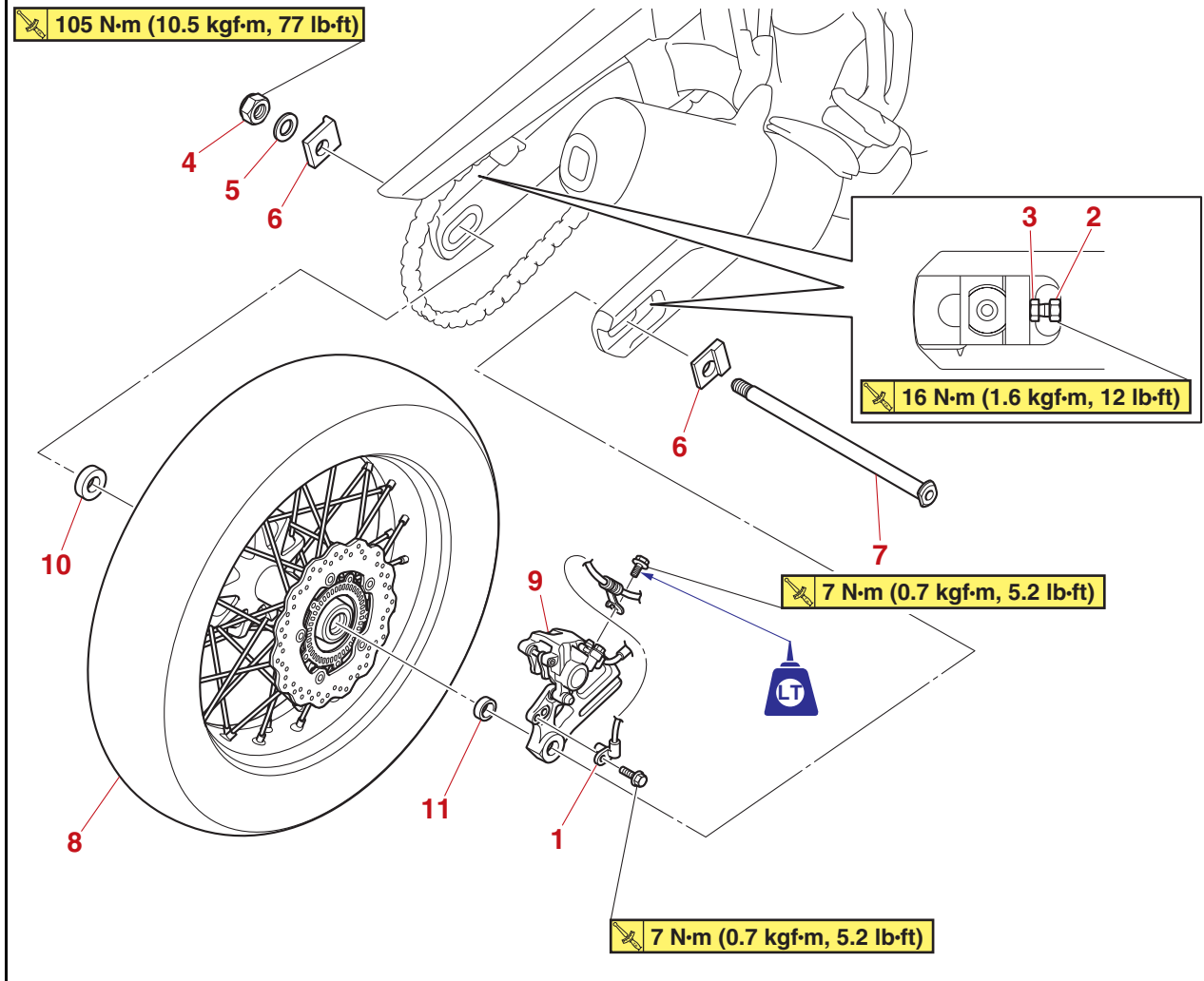
Thickness gauge
90890-03268
Feeler gauge set
YU-26900-9



EAS20029

REAR WHEEL

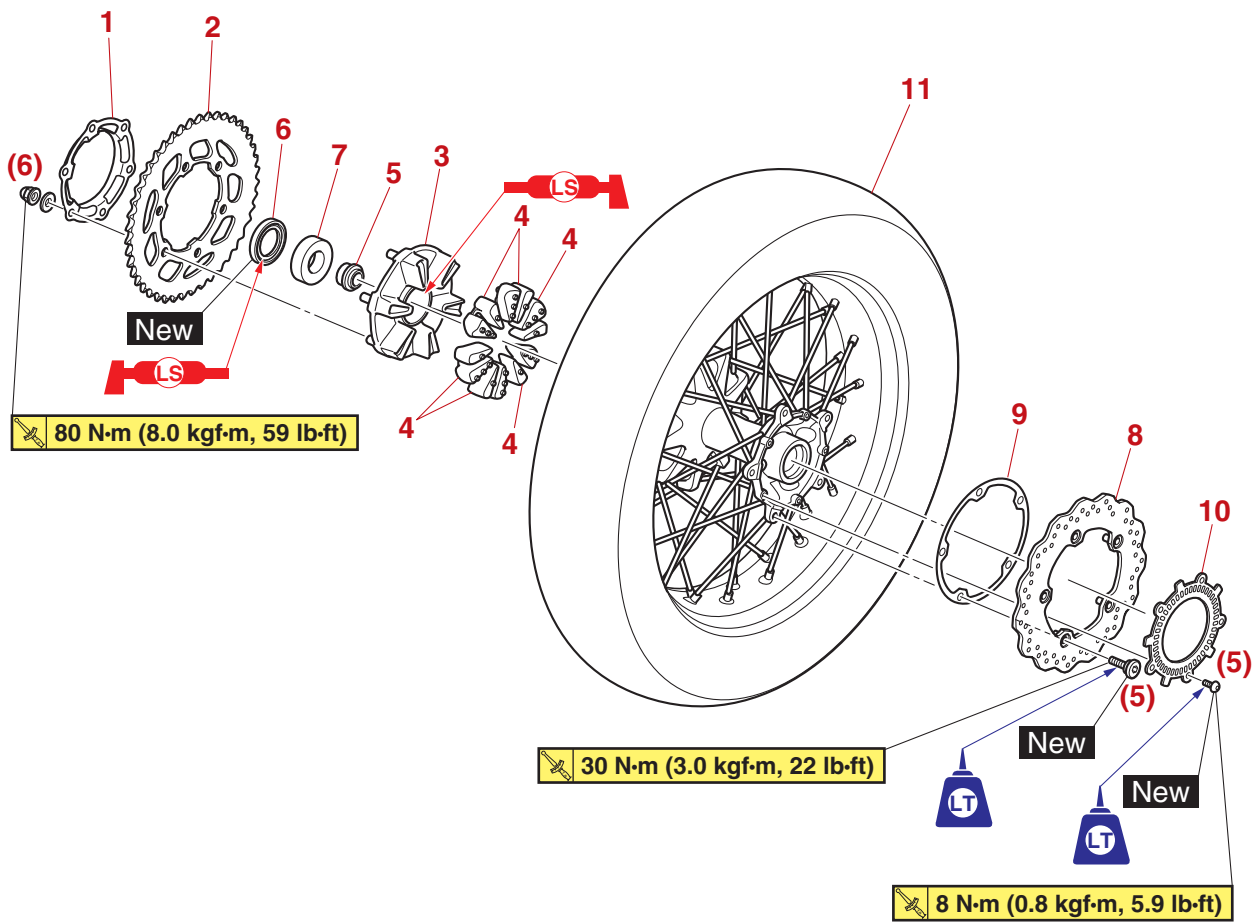
Removing the rear wheel



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

REAR WHEEL

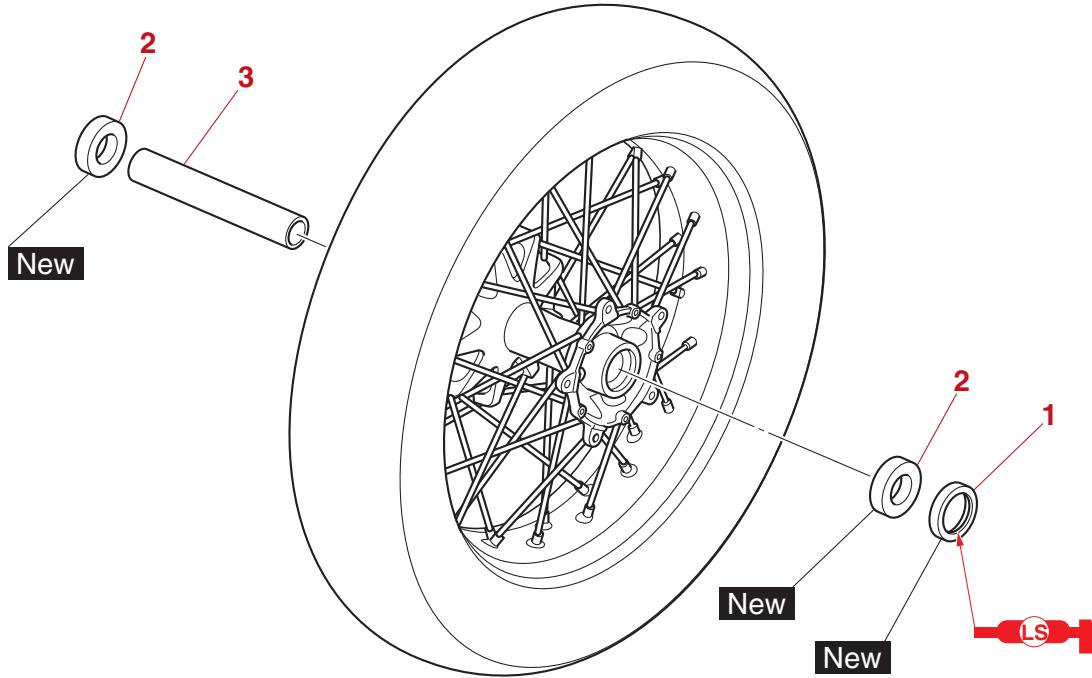
Removing the rear brake disc and rear wheel sprocket



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

REAR WHEEL

Disassembling the rear wheel



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

EAS30910

REMOVING THE REAR WHEEL

ECA21030

NOTICE

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

1. Stand the vehicle on a level surface.

EWA13120



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

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

ECA21040

NOTICE

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

3. Loosen:
 - Locknuts
 - Adjusting bolts

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

TIP

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

EAS30158

DISASSEMBLING THE REAR WHEEL

1. Remove:
 - Oil seal
 - Wheel bearingsRefer to "DISASSEMBLING THE FRONT WHEEL" on page 4-18.

EAS30159

CHECKING THE REAR WHEEL

1. Check:
 - Rear wheel axle
 - Wheel bearings
 - Oil sealRefer to "CHECKING THE FRONT WHEEL" on page 4-18.
2. Check:
 - Tire
 - Rear wheelDamage/wear → Replace.
Refer to "CHECKING THE TIRES" on page 3-17 and "CHECKING THE WHEELS" on page 3-16.
3. Check:
 - SpokesBends/damage → Replace.
Loose → Tighten.
Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-16.
4. Measure:
 - Radial wheel runout
 - Lateral wheel runoutRefer to "CHECKING THE FRONT WHEEL" on page 4-18.

EAS30160

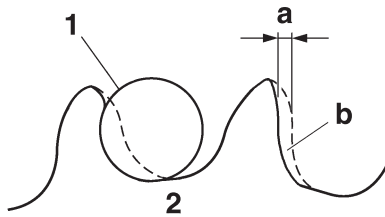
CHECKING THE REAR WHEEL DRIVE HUB

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

EAS30161

CHECKING AND REPLACING THE REAR WHEEL SPROCKET

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



G088904

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

2. Replace:

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



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

TIP

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

EAS30167

MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA21060

NOTICE

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

1. Check:

- Rear wheel sensor
Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.

2. Check:

- Rear wheel sensor rotor
Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.

3. Measure:

- Wheel sensor rotor deflection
Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.



Wheel sensor rotor deflection limit
0.25 mm (0.0098 in)

EAS30163

ASSEMBLING THE REAR WHEEL

1. Install:

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

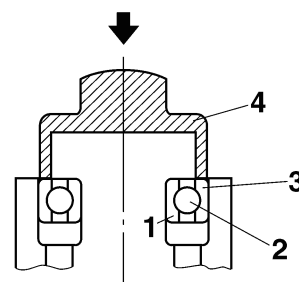
ECA18110

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.

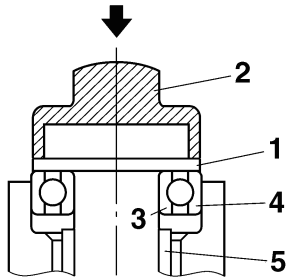


G088898

- 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

EAS30164

ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

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

1. Adjust:

- Rear wheel static balance
Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-20.

EAS32053

INSTALLING THE REAR WHEEL

1. Install:

- Rear wheel sensor rotor
- Rear brake disc



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

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

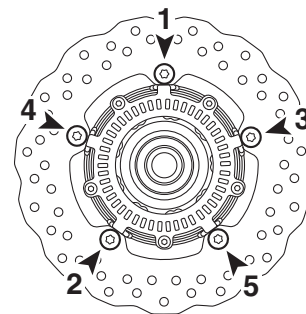
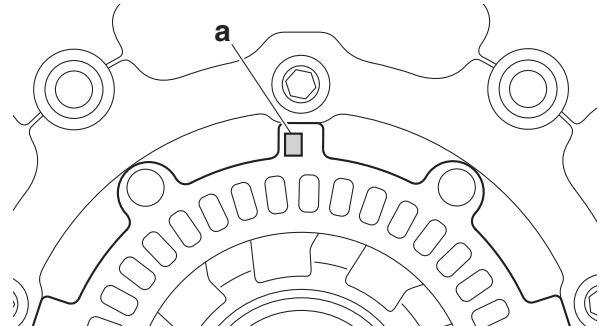
ECA21011

NOTICE

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

TIP

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



2. Install:

- Rear wheel sprocket
Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-26.

3. Check:

- Rear brake disc
Refer to “CHECKING THE REAR BRAKE DISC” on page 4-49.

4. Lubricate:

- Oil seal lips



Recommended lubricant
Lithium-soap-based grease

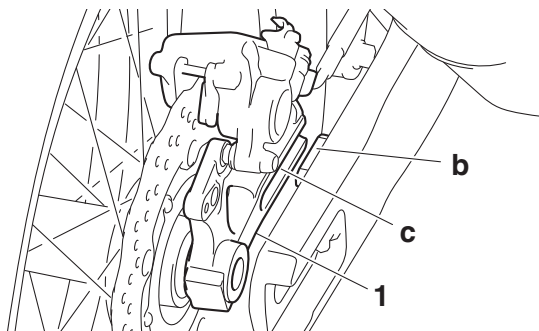
5. Install:

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

REAR WHEEL

TIP

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



6. Install:

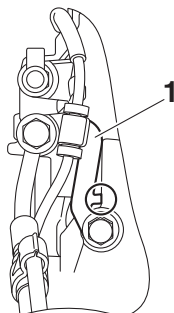
- Rear wheel sensor lead holder “1”

TIP

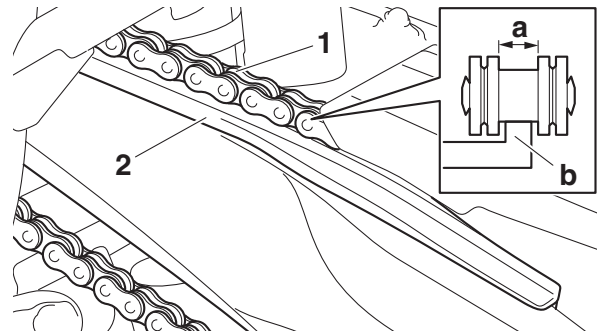
Contact the rear wheel sensor lead holder to the caliper bracket.



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



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



8. Adjust:

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



Drive chain slack (Sidestand)
40.0–45.0 mm (1.57–1.77 in)

9. Install:

- Rear wheel sensor



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

ECA21080

NOTICE

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

TIP

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

10. Measure:

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



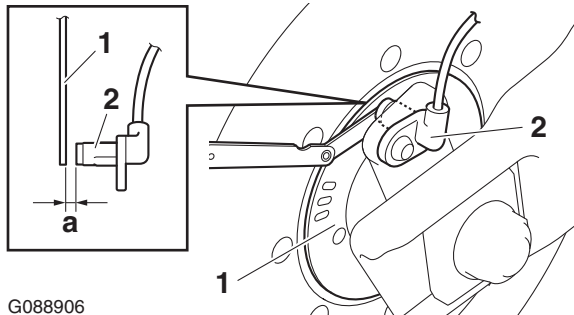
Distance “a” (between the rear wheel sensor rotor and rear wheel sensor)
0.8–1.6 mm (0.03–0.06 in)

TIP

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



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

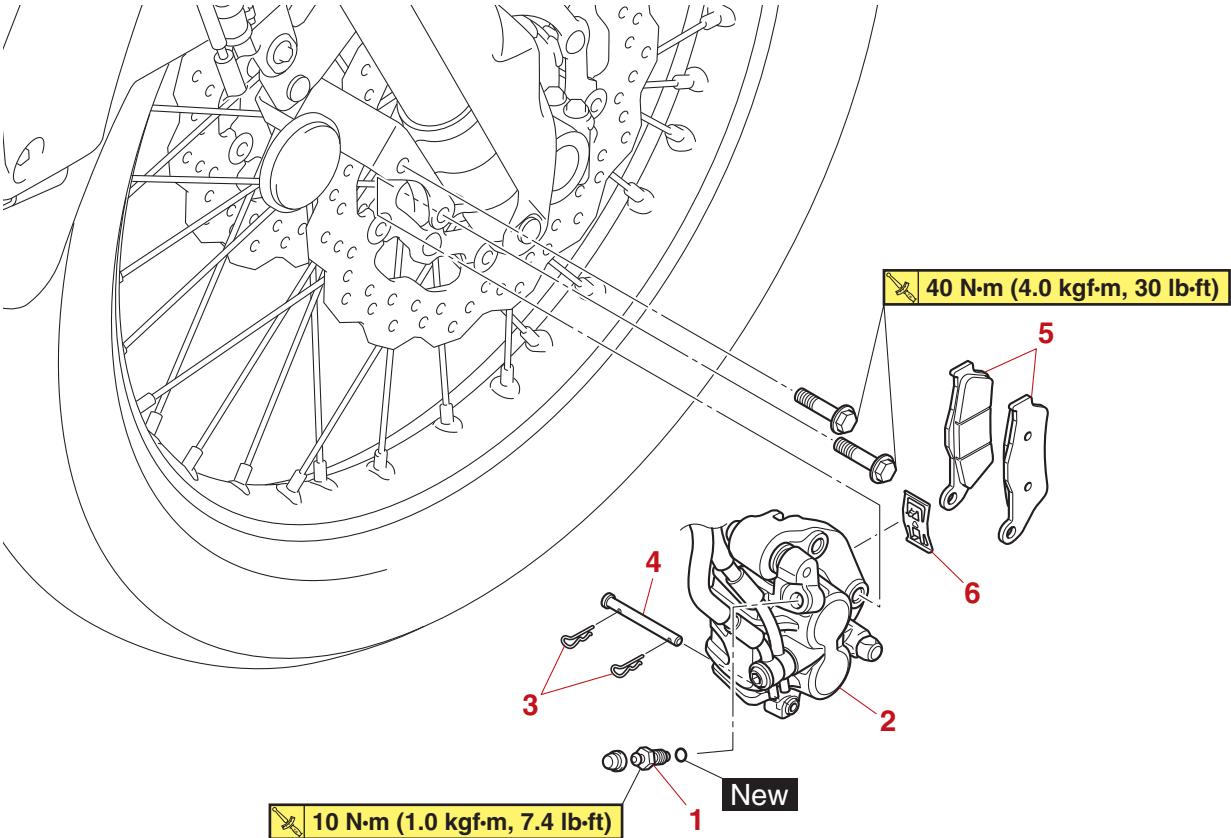


G088906

EAS20030

FRONT BRAKE

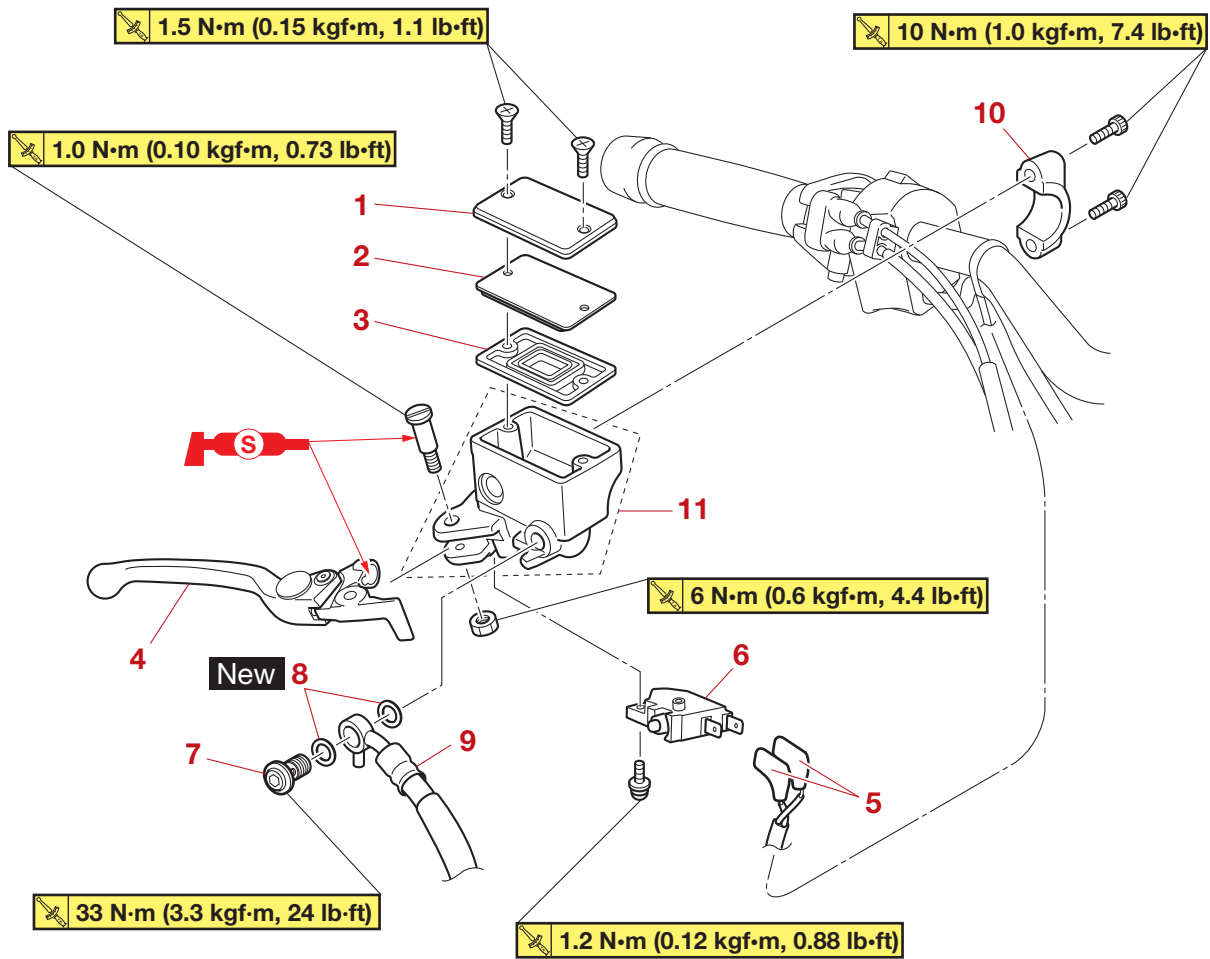
Removing the front brake pads



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

FRONT BRAKE

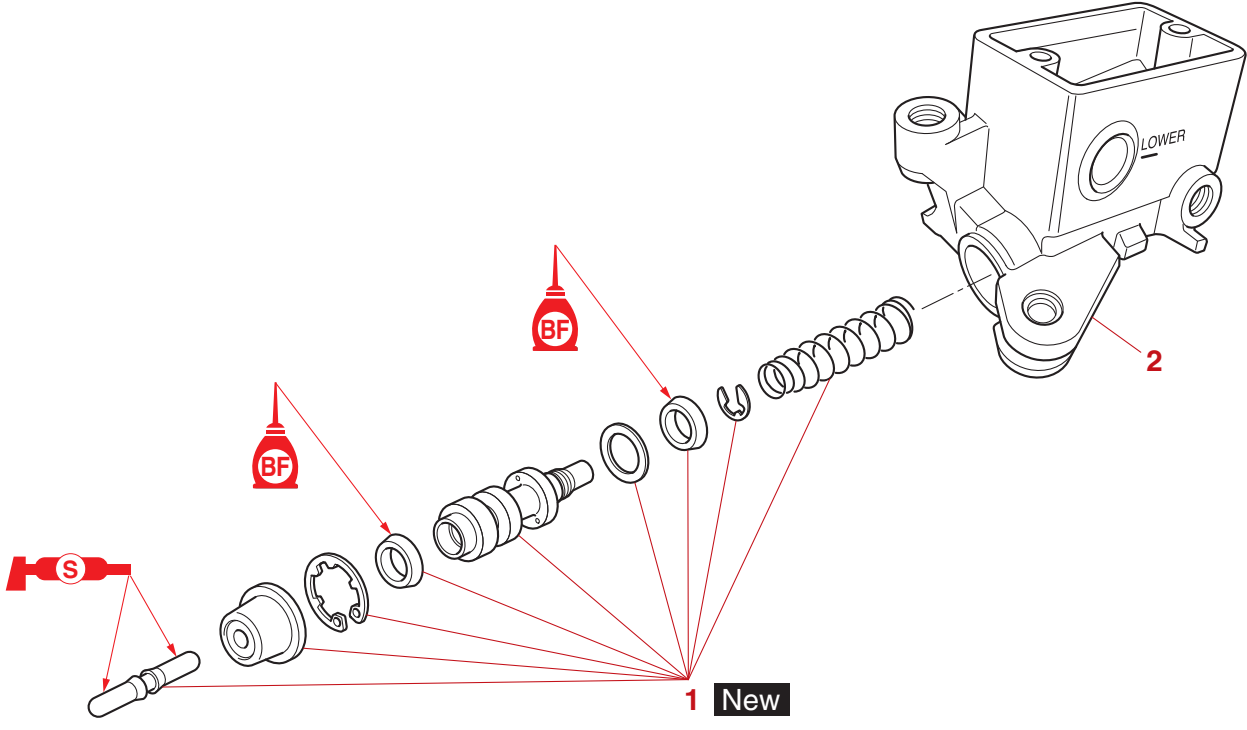
Removing the front brake master cylinder



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Brake fluid | | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15. |
| | Rearview mirror (right) | | Refer to "HANDLEBAR" on page 4-62. |
| 1 | Brake master cylinder reservoir cap | 1 | |
| 2 | Brake master cylinder reservoir diaphragm holder | 1 | |
| 3 | Brake master cylinder reservoir diaphragm | 1 | |
| 4 | Brake lever | 1 | |
| 5 | Front brake light switch connector | 2 | Disconnect. |
| 6 | Front brake light switch | 1 | |
| 7 | Front brake hose union bolt | 1 | |
| 8 | Brake hose gasket | 2 | |
| 9 | Brake hose (front brake master cylinder to hydraulic unit) | 1 | |
| 10 | Front brake master cylinder holder | 1 | |
| 11 | Front brake master cylinder assembly | 1 | |

FRONT BRAKE

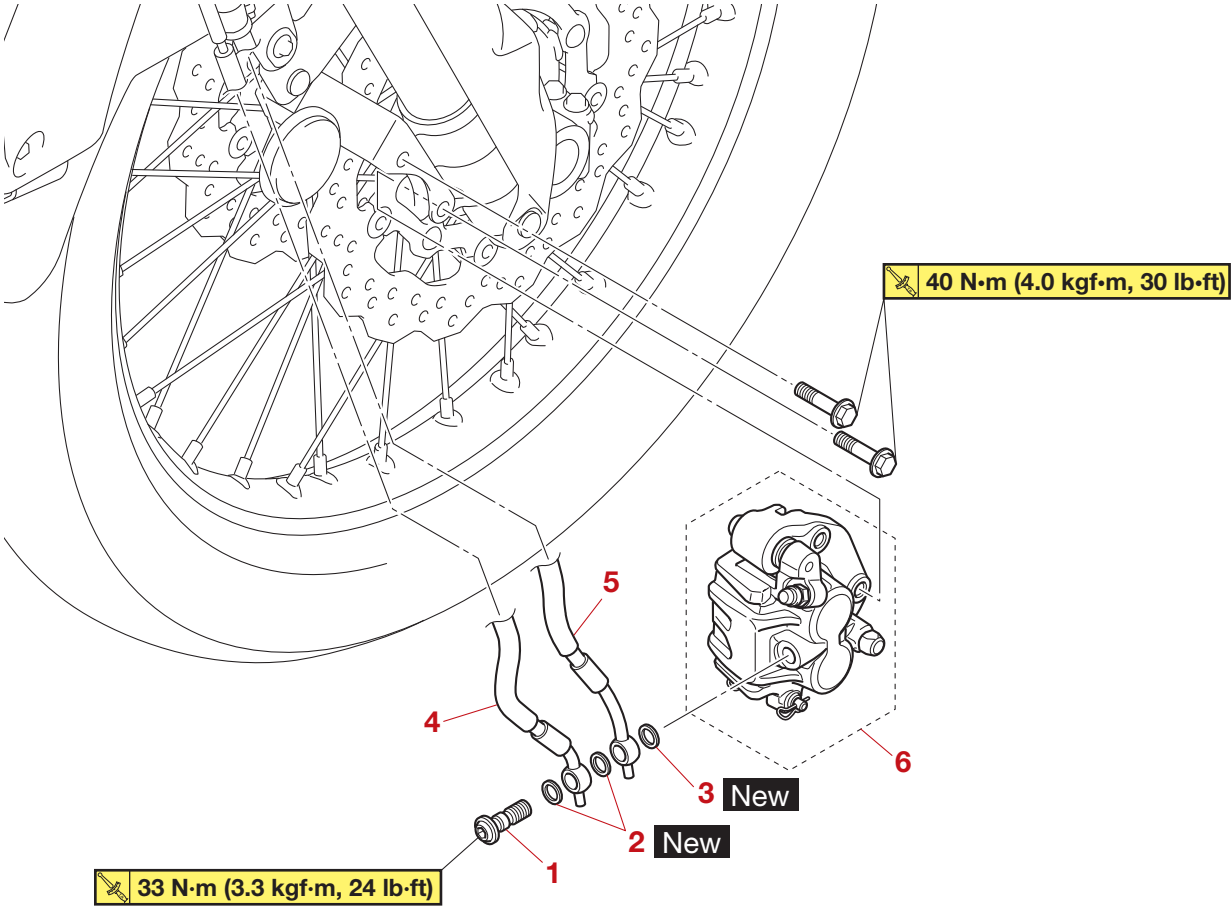
Disassembling the front brake master cylinder



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

FRONT BRAKE

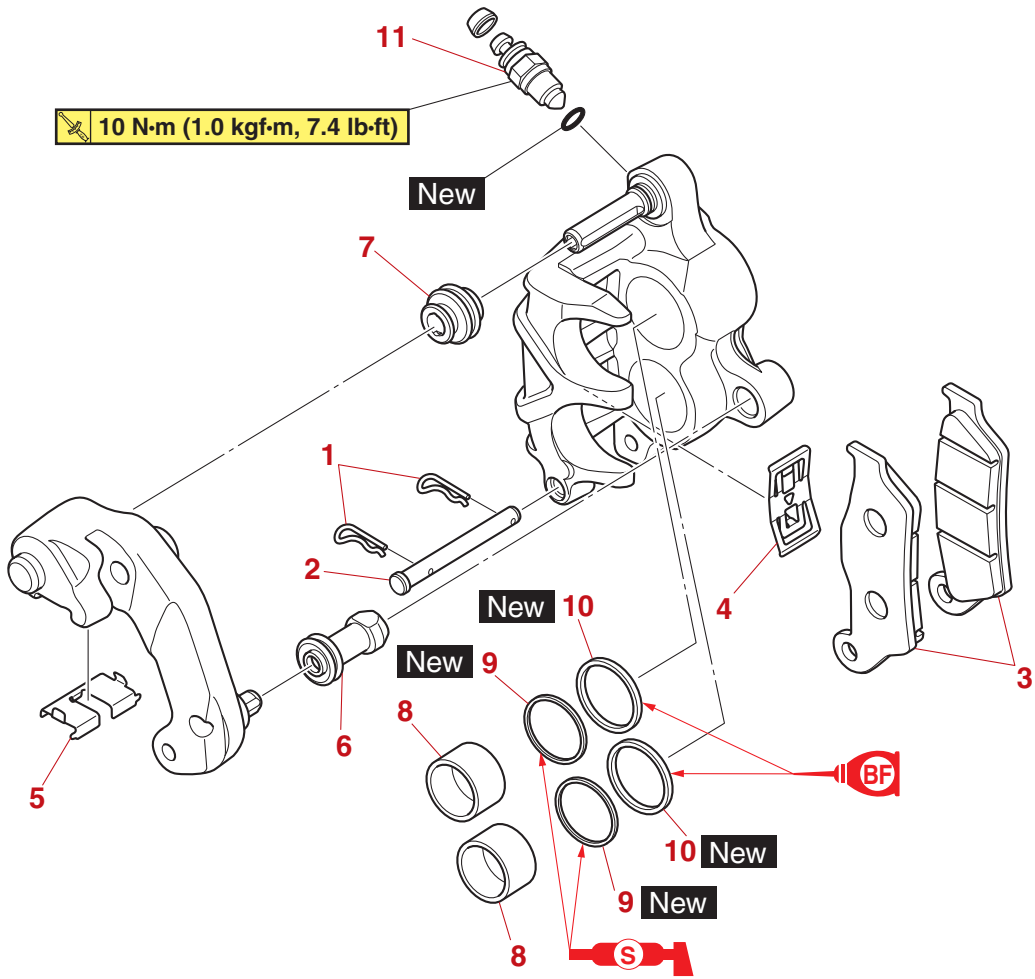
Removing the front brake calipers



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | | | The following procedure applies to both of the front brake calipers. |
| | Brake fluid | | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15. |
| 1 | Front brake hose union bolt | 1 | |
| 2 | Brake hose gasket | 2 | |
| 3 | Brake hose gasket | 1 | Right side only. |
| 4 | Brake hose (right front brake caliper to left front brake caliper) | 1 | |
| 5 | Brake hose (hydraulic unit to right front brake caliper) | 1 | Right side only. |
| 6 | Front brake caliper | 1 | |

FRONT BRAKE

Disassembling the front brake calipers



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------|------|--|
| | | | The following procedure applies to both of the front brake calipers. |
| 1 | Brake pad clip | 2 | |
| 2 | Brake pad pin | 1 | |
| 3 | Brake pad | 2 | |
| 4 | Brake pad spring | 1 | |
| 5 | Brake pad support | 1 | |
| 6 | Boot | 1 | |
| 7 | Boot | 1 | |
| 8 | Brake caliper piston | 2 | |
| 9 | Brake caliper piston dust seal | 2 | |
| 10 | Brake caliper piston seal | 2 | |
| 11 | Brake caliper bleed screw | 1 | |

EAS30168

INTRODUCTION

EWA14101

WARNING

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

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

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

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

EAS30169

CHECKING THE FRONT BRAKE DISCS

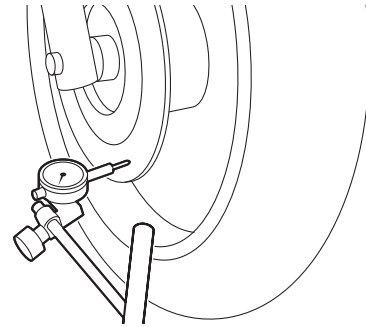
The following procedure applies to both brake discs.

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



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

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



G098641

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



Brake disc thickness limit
4.0 mm (0.16 in)

4. Replace:
 - Front brake disc
Refer to “INSTALLING THE FRONT WHEEL” on page 4-20.

EAS30170

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

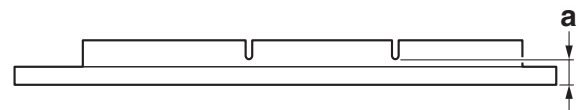
TIP

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

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



Brake pad lining thickness limit
4.0 mm (0.16 in)

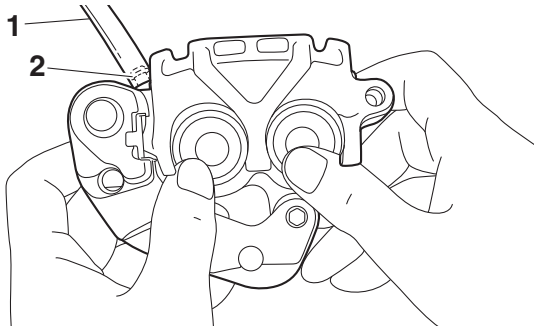


2. Install:
 - Brake pad spring
 - Brake pads

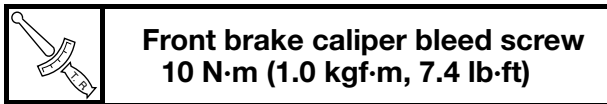
TIP

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

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



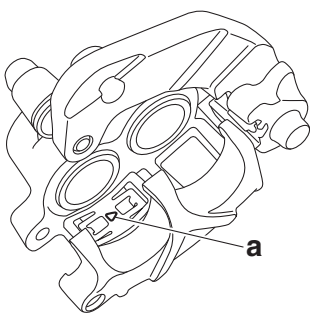
- c. Tighten the bleed screw.



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

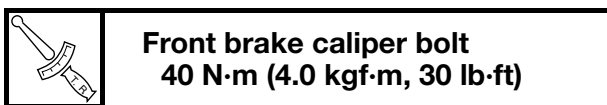
TIP

- The arrow mark "a" on the brake pad spring must point in the direction of disc rotation.
- Install the brake pad spring in the brake caliper in the recessed portion that is near the brake pad pin.



3. Install:

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



4. Check:

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

5. Check:

- Brake lever operation
 Soft or spongy feeling → Bleed the brake system. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30724

REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

TIP

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

1. Remove:

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

TIP

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

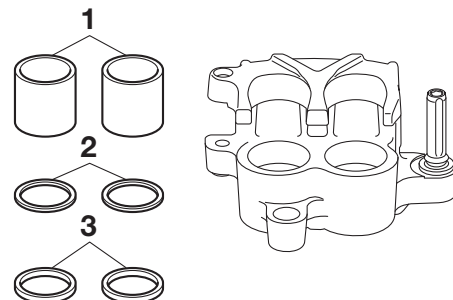
EAS30172

DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Remove:

- Brake caliper pistons "1"
- Brake caliper piston dust seals "2"
- Brake caliper piston seals "3"



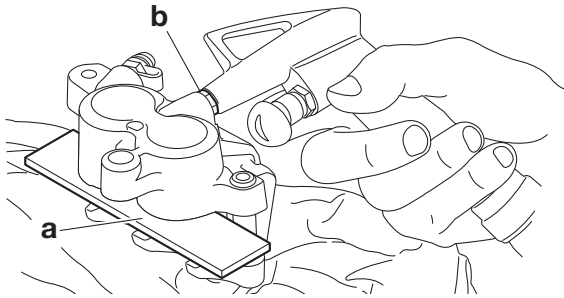
- a. Secure the right side brake caliper pistons with a piece of wood "a".

- b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWAM1070

⚠ WARNING

Never try to pry out the brake caliper pistons.



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

EAS30173

CHECKING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

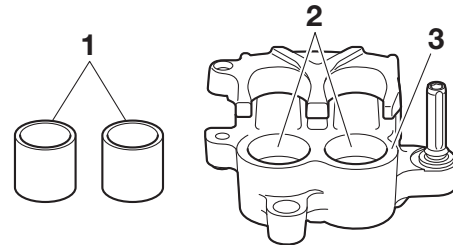
| Recommended brake component replacement schedule | |
|--|--|
| Brake pads | If necessary |
| Piston seals | Every two years |
| Piston dust seals | Every two years |
| Brake hoses | Every four years |
| Brake fluid | Every two years and whenever the brake is disassembled |

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

EWA13611

⚠ WARNING

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



EAS30174

ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13621

⚠ WARNING

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



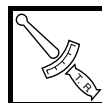
**Specified brake fluid
DOT 4**

EAS30175

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

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



**Front brake hose union bolt
33 N·m (3.3 kgf·m, 24 lb·ft)**

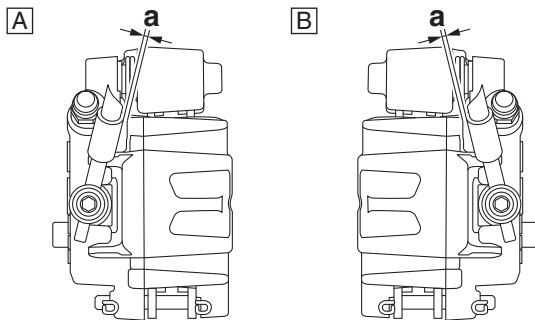
EWA13531

WARNING

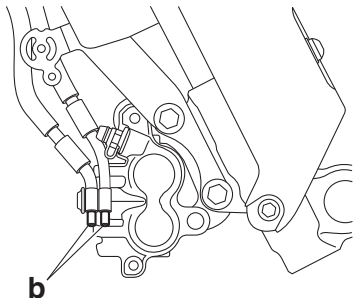
Proper brake hose routing is essential to insure safe vehicle operation.

TIP

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



- A. Left side
 B. Right side
 a. 1.5–2.5 mm (0.059–0.098 in)



2. Remove:
 - Front brake caliper
3. Install:
 - Brake pad spring
 - Brake pads
 - Brake pad pin
 - Brake pad clips

Refer to “REPLACING THE FRONT BRAKE PADS” on page 4-36.
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 3-15.
6. Check:
 - Brake fluid level

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

Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

EAS30179

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

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

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

TIP

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

EAS30725

CHECKING THE FRONT BRAKE MASTER CYLINDER

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

EAS30181

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

WARNING

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



**Specified brake fluid
DOT 4**

EAS30182

INSTALLING THE FRONT BRAKE MASTER CYLINDER

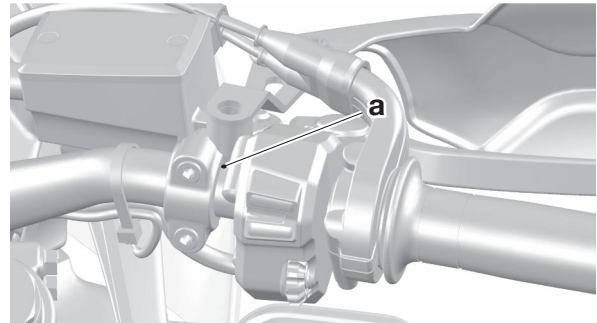
1. Install:
 - Front brake master cylinder assembly
 - Front brake master cylinder holder



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

TIP

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



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



**Front brake hose union bolt
33 N·m (3.3 kgf·m, 24 lb·ft)**

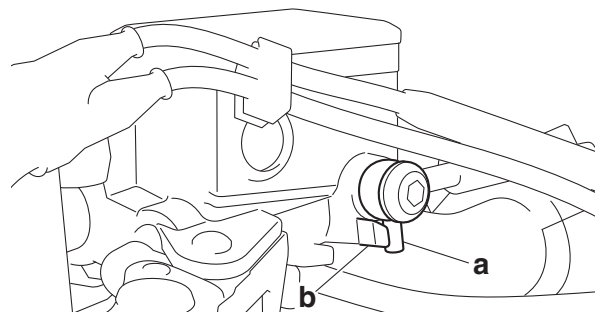
EWA13531

WARNING

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

TIP

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



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



**Specified brake fluid
DOT 4**

EWA13540

! WARNING

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

ECA13540

NOTICE

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

4. Bleed:

- Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

5. Check:

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

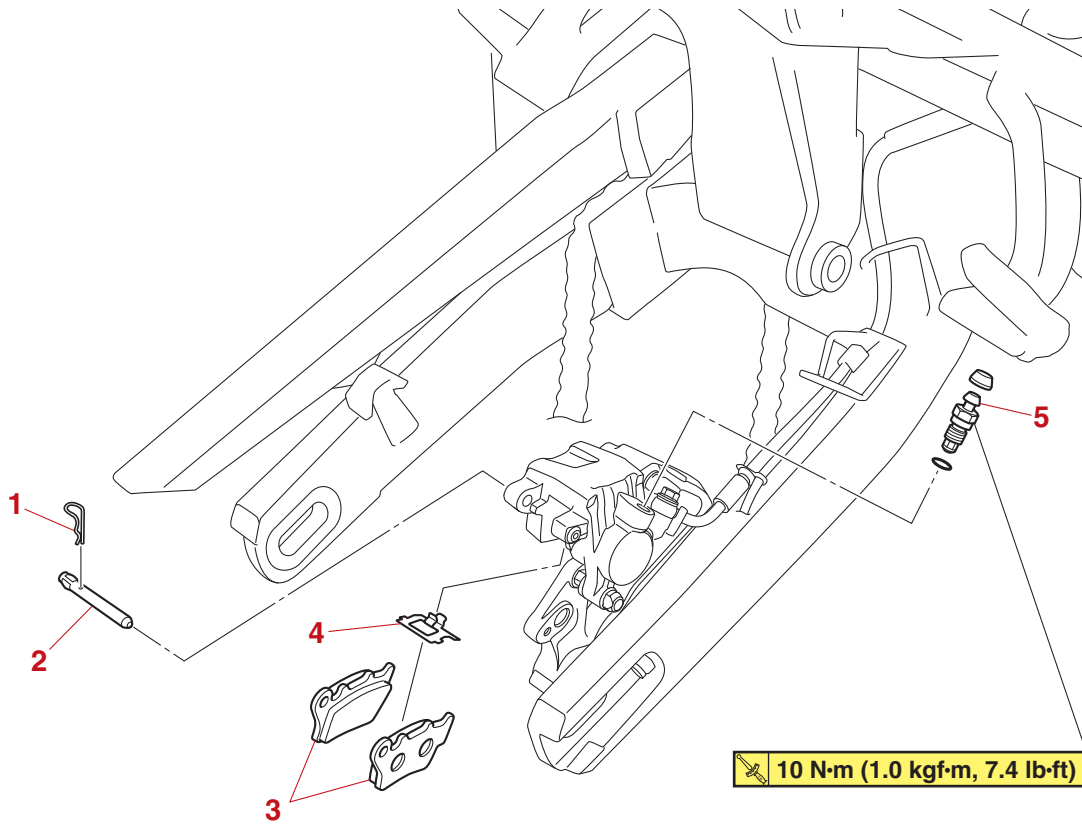
6. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

EAS20031

REAR BRAKE

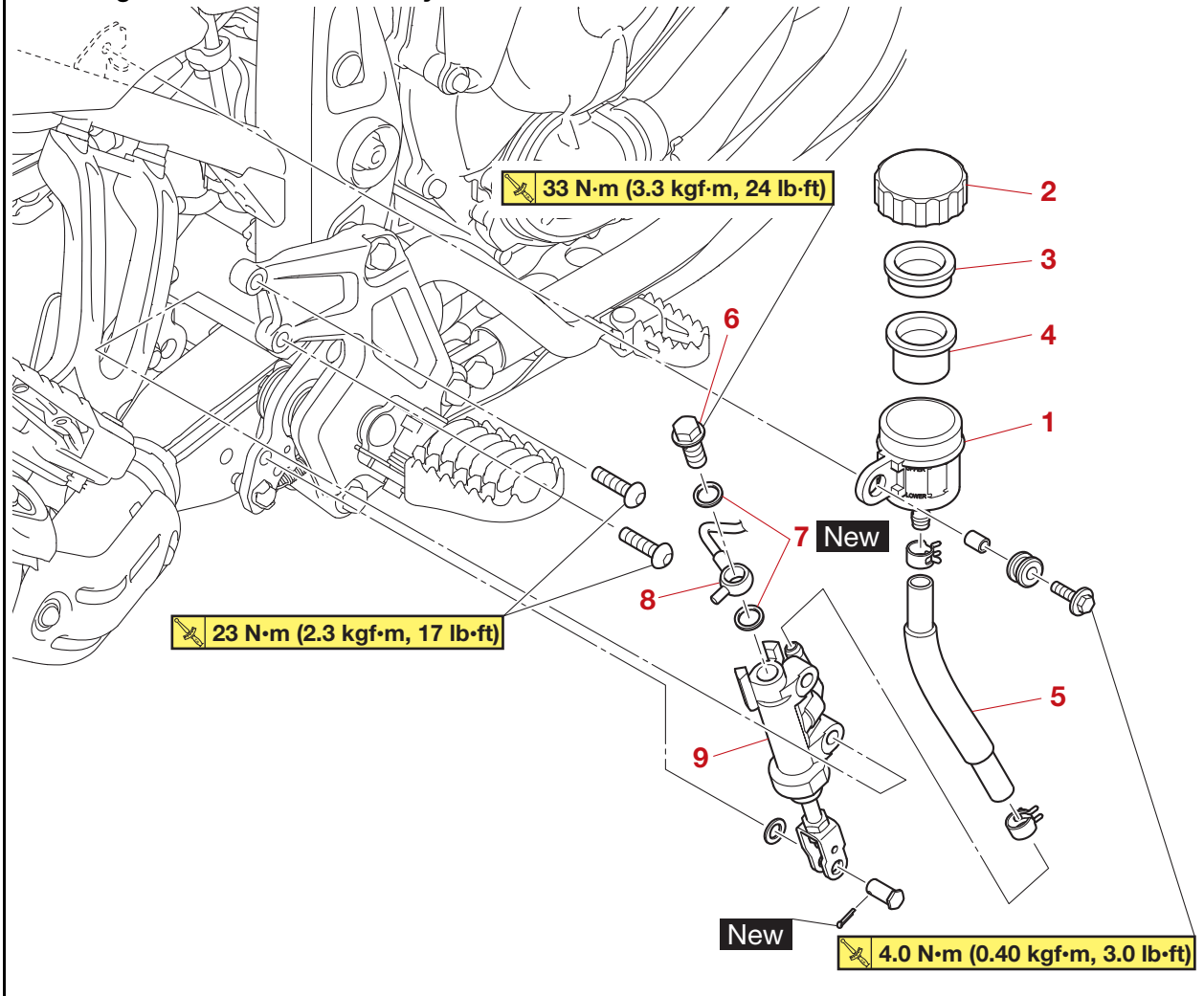
Removing the rear brake pads



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------|------|-------------------------------------|
| | Rear wheel | | Refer to "REAR WHEEL" on page 4-23. |
| 1 | Brake pad clip | 1 | |
| 2 | Brake pad pin | 1 | |
| 3 | Brake pad | 2 | |
| 4 | Brake pad spring | 1 | |
| 5 | Brake caliper bleed screw | 1 | Loosen. |

REAR BRAKE

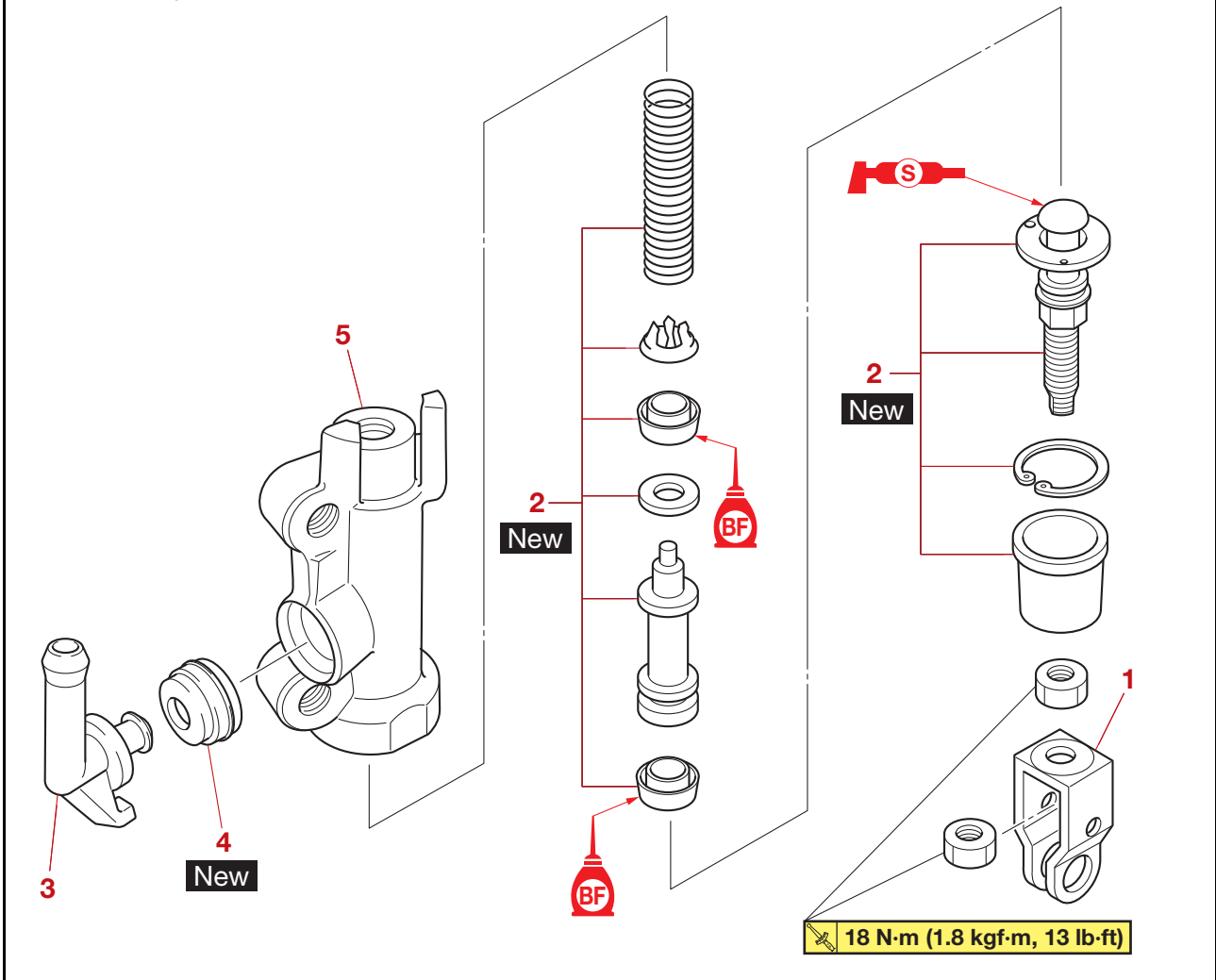
Removing the rear brake master cylinder



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|--|
| | Brake fluid | | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15. |
| 1 | Brake fluid reservoir | 1 | |
| 2 | Brake fluid reservoir cap | 1 | |
| 3 | Brake fluid reservoir diaphragm holder | 1 | |
| 4 | Brake fluid reservoir diaphragm | 1 | |
| 5 | Brake fluid reservoir hose | 1 | |
| 6 | Rear brake hose union bolt | 1 | |
| 7 | Brake hose gasket | 2 | |
| 8 | Brake hose (rear brake master cylinder to hydraulic unit) | 1 | |
| 9 | Rear brake master cylinder | 1 | |

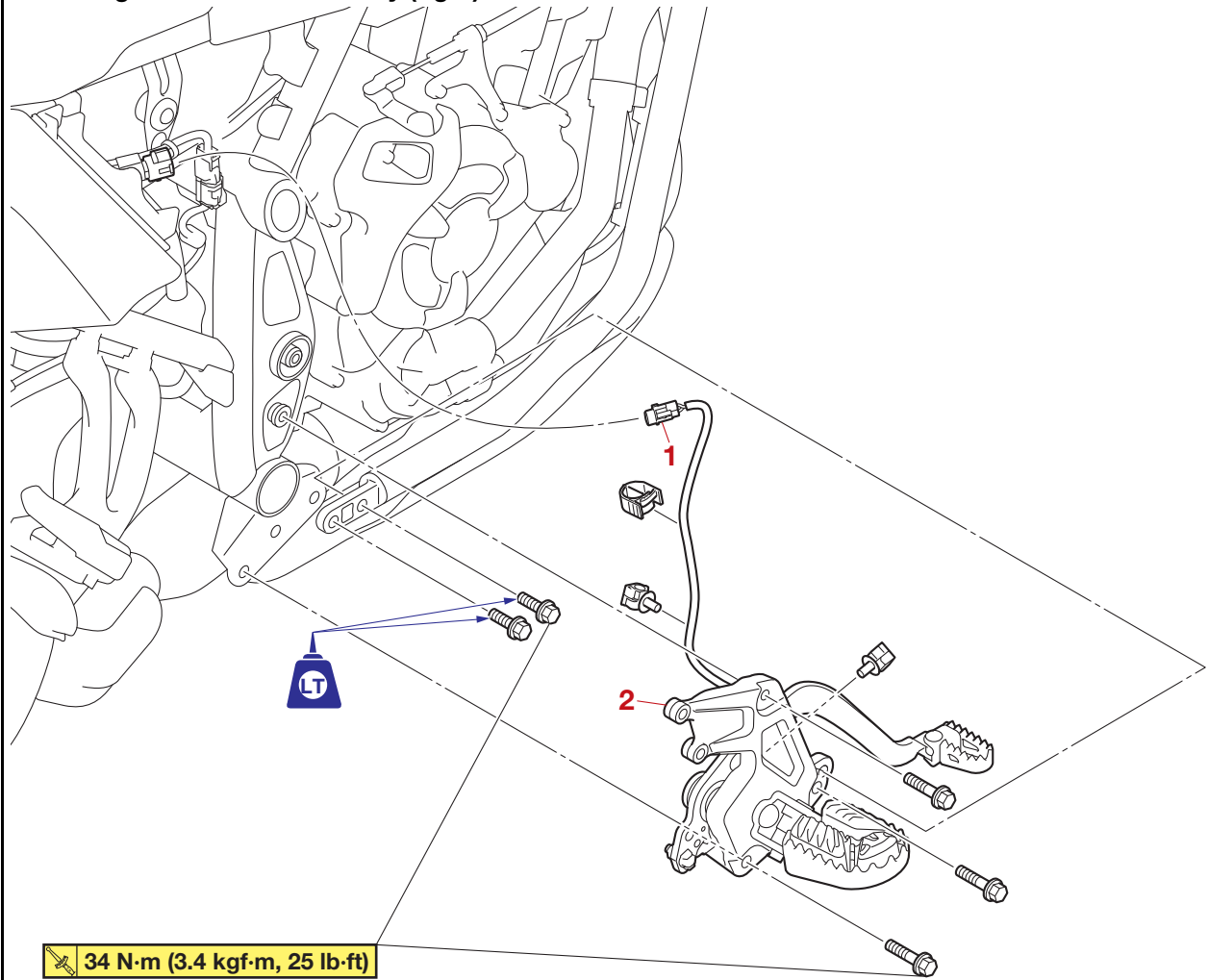
REAR BRAKE

Disassembling the rear brake master cylinder



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

Removing the footrest assembly (right)

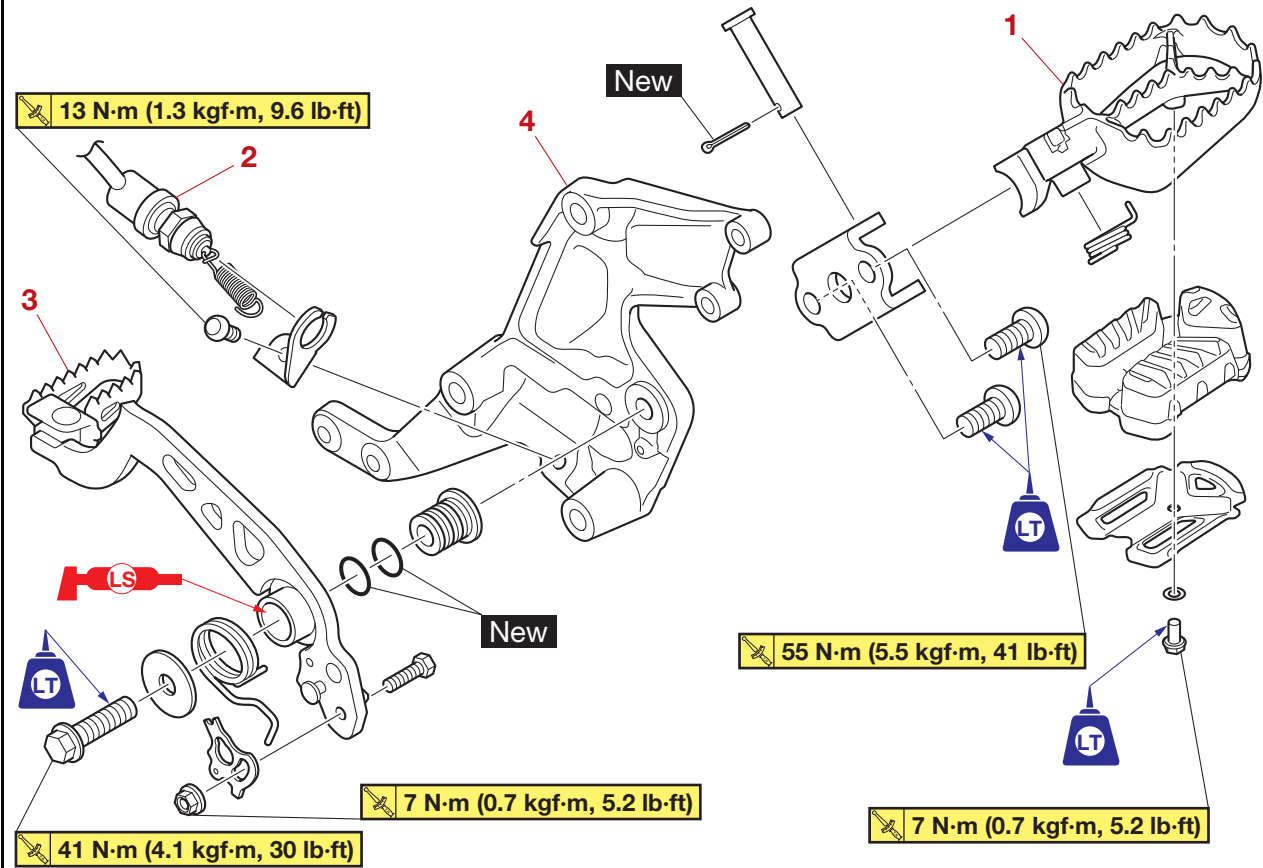


 34 N·m (3.4 kgf·m, 25 lb·ft)

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------------|------|---|
| | Side cover (right) | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| 1 | Rear brake light switch coupler | 1 | Disconnect. |
| 2 | Footrest assembly (right) | 1 | |

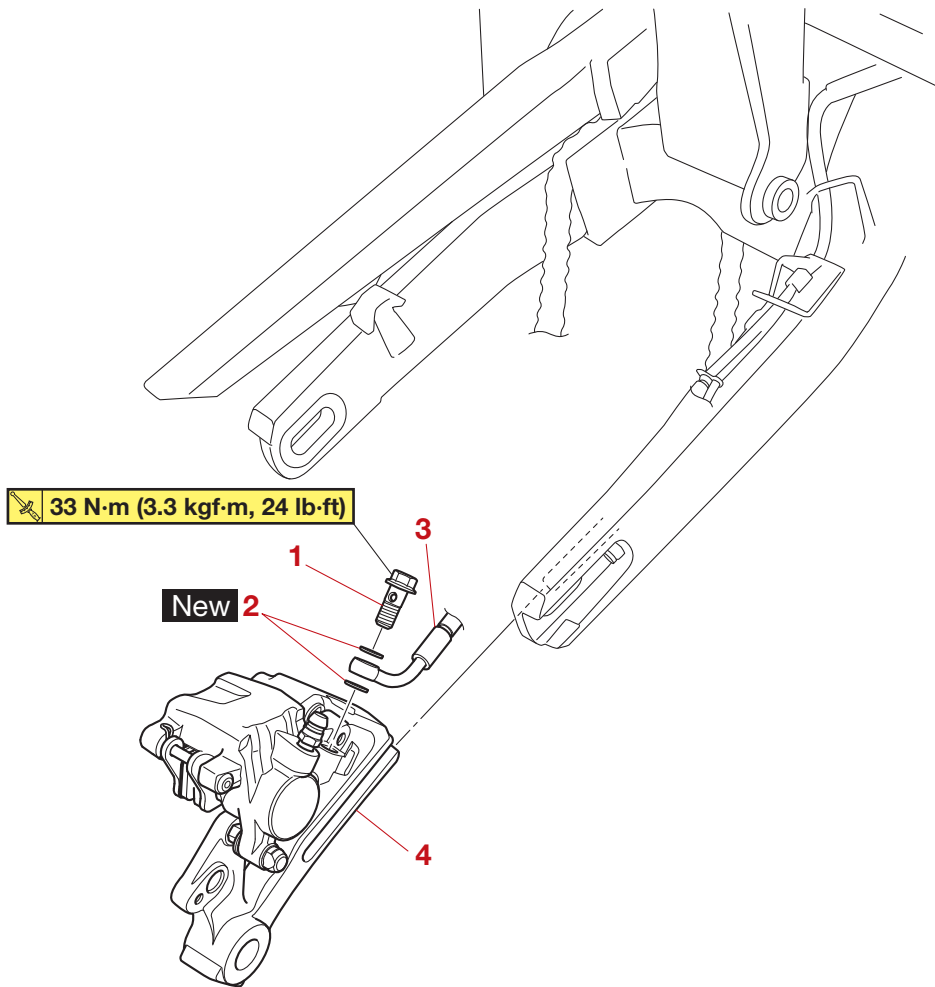
REAR BRAKE

Disassembling the footrest assembly (right)



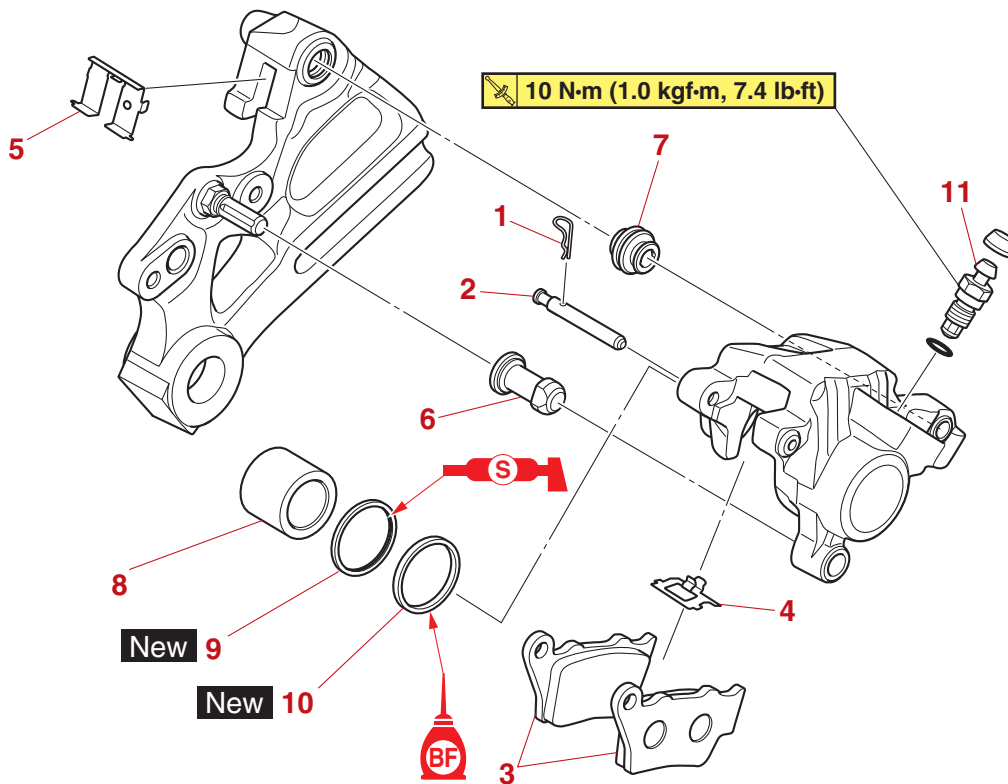
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------|------|---------|
| 1 | Footrest (right) | 1 | |
| 2 | Rear brake light switch | 1 | |
| 3 | Rear brake pedal | 1 | |
| 4 | Footrest bracket (right) | 1 | |

Removing the rear brake caliper



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|--|
| | Brake fluid | | Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15. |
| | Rear wheel | | Refer to "REAR WHEEL" on page 4-23. |
| 1 | Rear brake hose union bolt | 1 | |
| 2 | Brake hose gasket | 2 | |
| 3 | Brake hose (hydraulic unit to rear brake caliper) | 1 | |
| 4 | Rear brake caliper | 1 | |

Disassembling the rear brake caliper



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------|------|---------|
| 1 | Brake pad clip | 1 | |
| 2 | Brake pad pin | 1 | |
| 3 | Brake pad | 2 | |
| 4 | Brake pad spring | 1 | |
| 5 | Brake pad support | 1 | |
| 6 | Boot | 1 | |
| 7 | Boot | 1 | |
| 8 | Brake caliper piston | 1 | |
| 9 | Brake caliper piston dust seal | 1 | |
| 10 | Brake caliper piston seal | 1 | |
| 11 | Brake caliper bleed screw | 1 | |

EAS30183

INTRODUCTION

EWA14101

WARNING

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

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

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

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

EAS30184

CHECKING THE REAR BRAKE DISC

1. Check:
 - Rear brake disc
Damage/galling → Replace.
2. Measure:
 - Brake disc deflection
Out of specification → Replace the brake disc.
Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-36.



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

3. Measure:
 - Brake disc thickness
Measure the brake disc thickness at a few different locations.
Out of specification → Replace.
Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-36.



Brake disc thickness limit
4.5 mm (0.18 in)

4. Replace:
 - Rear brake disc
Refer to “INSTALLING THE REAR WHEEL” on page 4-28.

EAS30185

REPLACING THE REAR BRAKE PADS

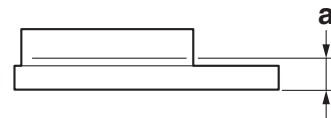
TIP

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

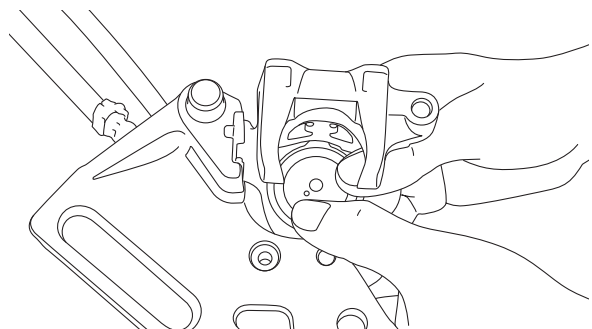
1. Remove:
 - Rear wheel
Refer to “REMOVING THE REAR WHEEL” on page 4-26.
2. Measure:
 - Brake pad wear limit “a”
Out of specification → Replace the brake pads as a set.



Brake pad lining thickness limit
3.9 mm (0.15 in)



3. Install:
 - Brake pad spring
(into the rear brake caliper)
 - Brake pads
 - a. Connect a clear plastic hose tightly to the bleed screw. Put the other end of the hose into an open container.
 - b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.



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

d. Install the brake pads and brake pad spring.

4. Install:

- Brake pad pin
- Brake pad clip
- Rear brake caliper

5. Install:

- Rear wheel
Refer to “INSTALLING THE REAR WHEEL” on page 4-28.

6. Check:

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

7. Check:

- Brake pedal operation
Soft or spongy feeling → Bleed the brake system. Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

EAS30186

REMOVING THE REAR BRAKE CALIPER

TIP

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

1. Remove:

- Rear brake hose union bolt
- Brake hose gaskets
- Brake hose (hydraulic unit to rear brake caliper)

TIP

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

2. Remove:

- Rear wheel
- Rear brake caliper
Refer to “REMOVING THE REAR WHEEL” on page 4-26.

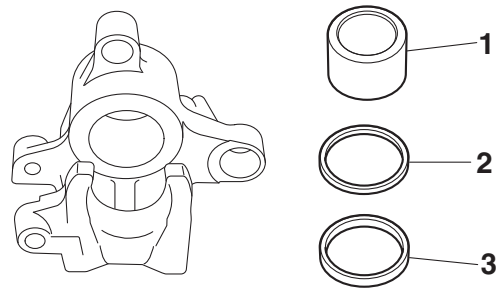
EAS30187

DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:

- Brake caliper piston “1”
- Brake caliper piston dust seal “2”

• Brake caliper piston seal “3”

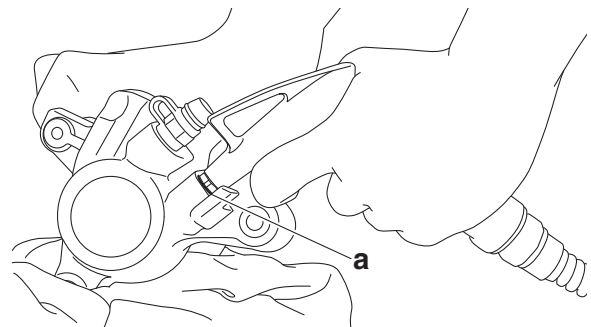


a. Blow compressed air into the brake hose joint opening “a” to force out the piston from the brake caliper.

EWA13550

WARNING

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



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

EAS30188

CHECKING THE REAR BRAKE CALIPER

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

1. Check:

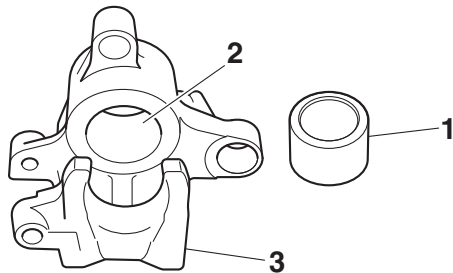
- Brake caliper piston “1”
Rust/scratches/wear → Replace the brake caliper piston.
- Brake caliper cylinder “2”
Scratches/wear → Replace the brake caliper assembly.

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

EWA17070

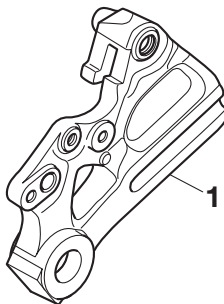
⚠ WARNING

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



2. Check:

- Rear brake caliper bracket “1”
Cracks/damage → Replace.
Refer to “REAR WHEEL” on page 4-23.



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
- Rear wheel
Refer to “INSTALLING THE REAR WHEEL” on page 4-28.

2. Install:

- Brake hose gaskets **New**
- Brake hose (hydraulic unit to rear brake caliper)
- Rear brake hose union bolt



Rear brake hose union bolt
33 N·m (3.3 kgf·m, 24 lb·ft)

EWA13531

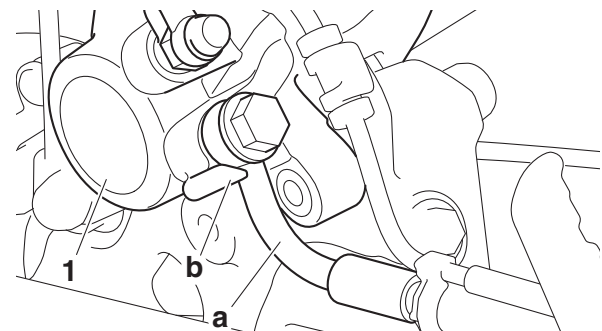
⚠ WARNING

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

ECA14170

NOTICE

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



3. Fill:

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



Specified brake fluid
DOT 4

EWA13090

⚠ WARNING

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

- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

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

4. Bleed:
 - Brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.
5. Check:
 - Brake fluid level
Below the minimum level mark → Add the specified brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-16.
6. Check:
 - Brake pedal operation
Soft or spongy feeling → Bleed the brake system.
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

EAS30193

REMOVING THE REAR BRAKE MASTER CYLINDER

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

TIP

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

EAS30194

CHECKING THE REAR BRAKE MASTER CYLINDER

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

3. Check:
 - Brake fluid reservoir
 - Brake fluid reservoir diaphragm holder
Cracks/damage → Replace.
 - Brake fluid reservoir diaphragm
Damage/wear → Replace.
4. Check:
 - Brake hose (rear brake master cylinder to hydraulic unit)
 - Brake fluid reservoir hose
Cracks/damage → Replace.

EAS30195

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

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

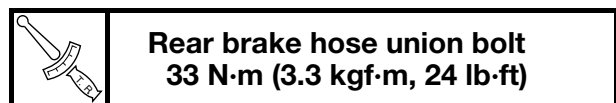


1. Install:
 - Brake master cylinder kit **New**

EAS30196

INSTALLING THE REAR BRAKE MASTER CYLINDER

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



EWA13531

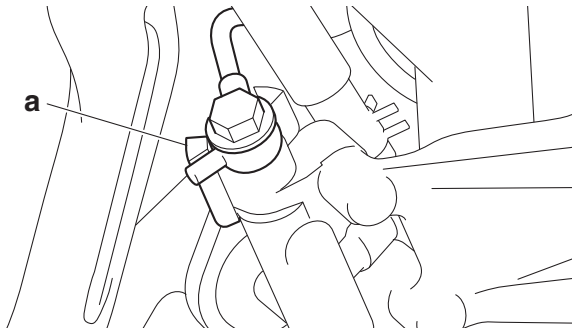
⚠ WARNING

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

ECA14160

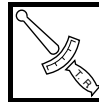
NOTICE

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

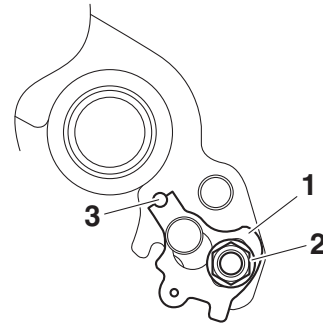


TIP

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



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



2. Fill:

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



Specified brake fluid
DOT 4

EWA13090

⚠ WARNING

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

ECA13540

NOTICE

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

3. Bleed:

- Brake system
 Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-15.

4. Check:

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

EAS33281

ASSEMBLING THE BRAKE PEDAL

1. Install:

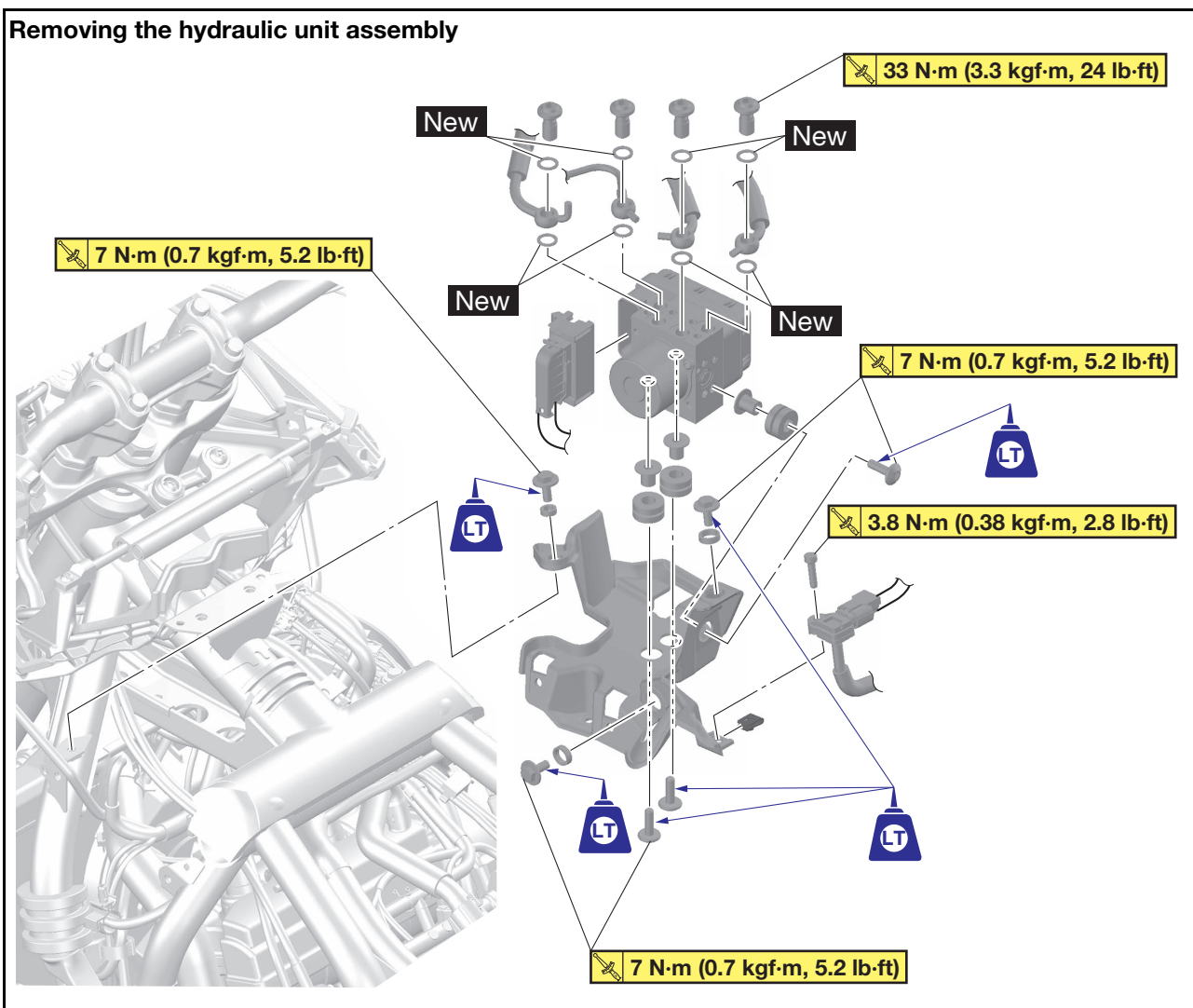
- Brake pedal plate “1”

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS20032

ABS (ANTI-LOCK BRAKE SYSTEM)

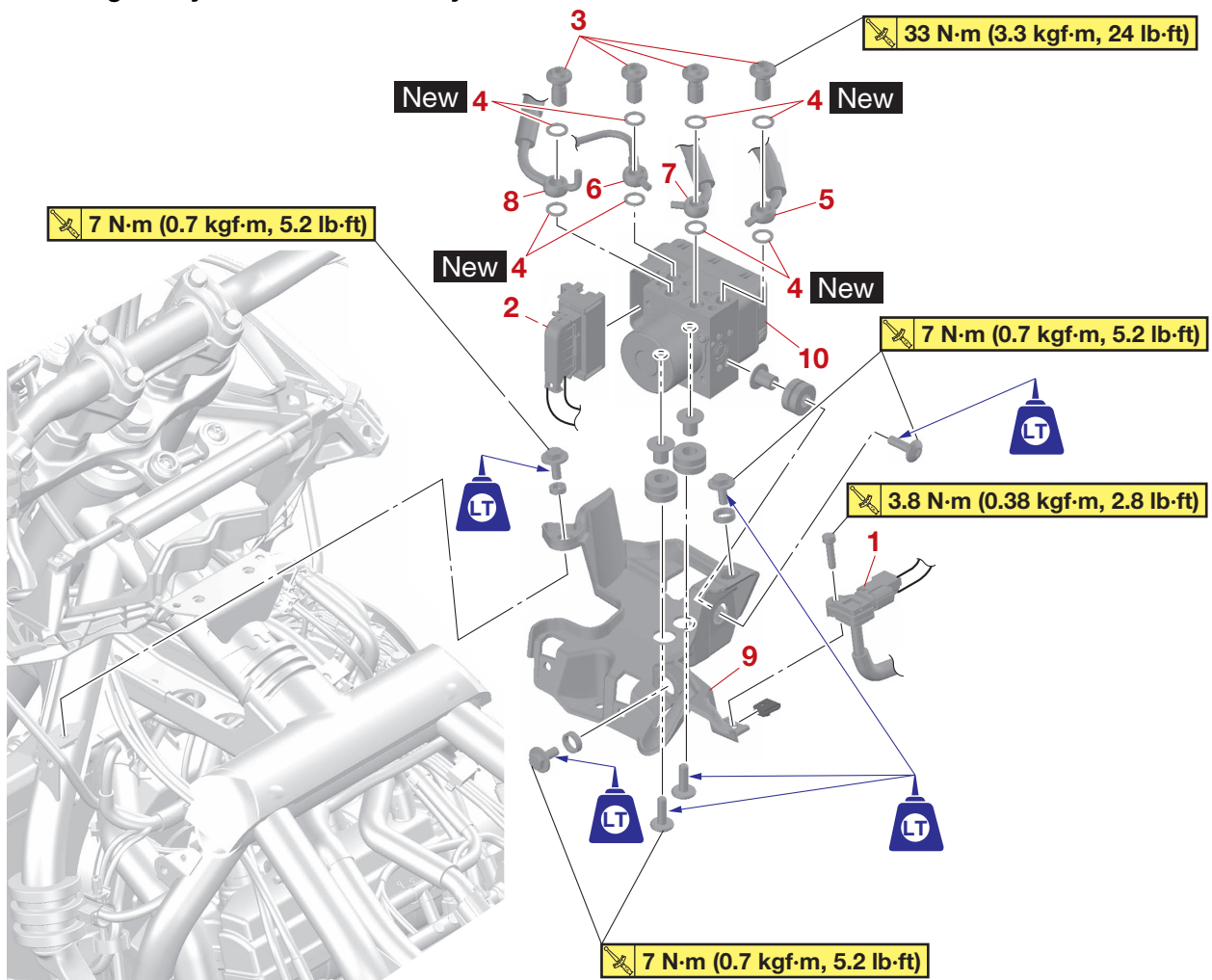
Removing the hydraulic unit assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------------------|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |

ABS (ANTI-LOCK BRAKE SYSTEM)

Removing the hydraulic unit assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|-------------|
| 1 | Intake air pressure sensor | 1 | |
| 2 | ABS ECU coupler | 1 | Disconnect. |
| 3 | Brake hose union bolt | 4 | |
| 4 | Gasket | 8 | |
| 5 | Brake hose (hydraulic unit to rear brake caliper) | 1 | Disconnect. |
| 6 | Brake hose (hydraulic unit to right front brake caliper) | 1 | Disconnect. |
| 7 | Brake hose (rear brake master cylinder to hydraulic unit) | 1 | Disconnect. |
| 8 | Brake hose (front brake master cylinder to hydraulic unit) | 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

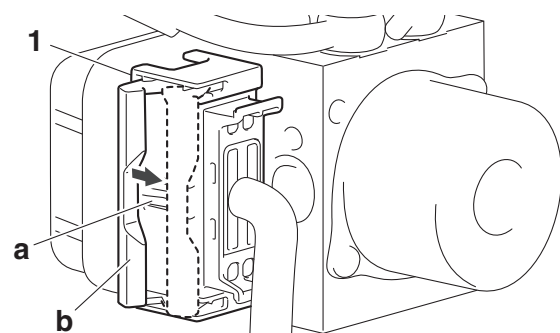
NOTICE

- 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 spilt brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.

1. Disconnect:
 - ABS ECU coupler “1”

TIP

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



2. Remove:
 - Brake hoses

TIP

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

ECA14530

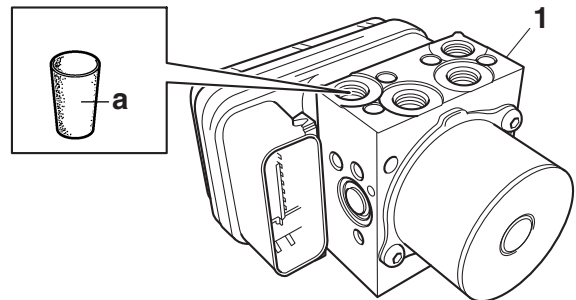
NOTICE

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

3. Remove:
 - Hydraulic unit assembly “1”

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug “a” or a bolt (M10 × 1.25) into each brake hose union bolt hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake hose union bolt seating surface could be deformed.



EAS31037

CHECKING THE HYDRAULIC UNIT ASSEMBLY

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

EAS31039

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

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

ABS (ANTI-LOCK BRAKE SYSTEM)



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

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

TIP

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

ECA21110

NOTICE

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

2. Remove:

- Rubber plugs or bolts (M10 × 1.25)

3. Install:

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



Brake hose union bolt
33 N·m (3.3 kgf·m, 24 lb·ft)

ECA21121

NOTICE

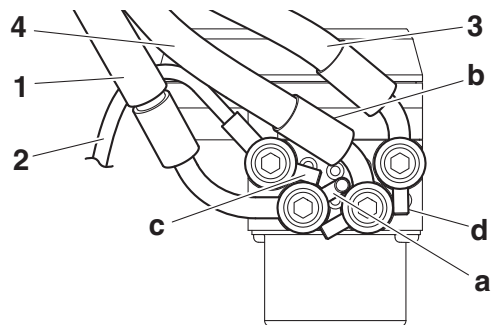
If the brake hose union bolt does not turn easily, replace the hydraulic unit assembly, brake hoses, and related parts as a set.

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

TIP

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

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

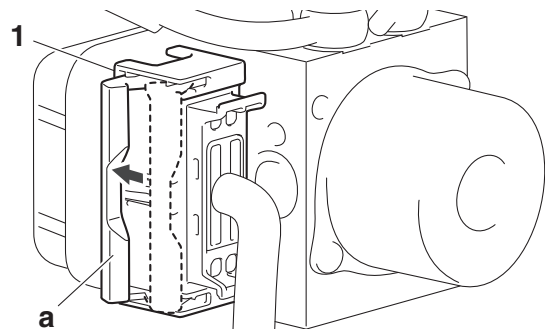


4. Connect:

- ABS ECU coupler "1"

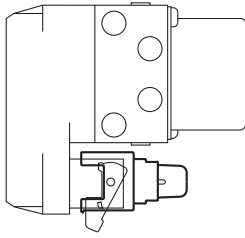
TIP

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

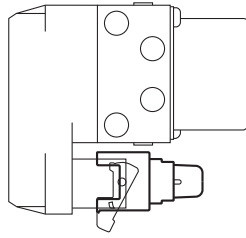


ABS (ANTI-LOCK BRAKE SYSTEM)

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 3-15.

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 4-58.)

ECA14770

NOTICE

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

8. Delete all of the DTC. (Refer to “[B-3] DELETING THE DTC” on page 9-29.)
9. Perform a trial run. (Refer to “CHECKING THE ABS WARNING LIGHT” on page 4-61.)

EAS31040

HYDRAULIC UNIT OPERATION TESTS

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

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

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

Brake line routing confirmation

EWA13120

WARNING

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

TIP

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

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

ABS (ANTI-LOCK BRAKE SYSTEM)



**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
90890-03274
Yamaha diagnostic tool (A/I)
90890-03273**

TIP

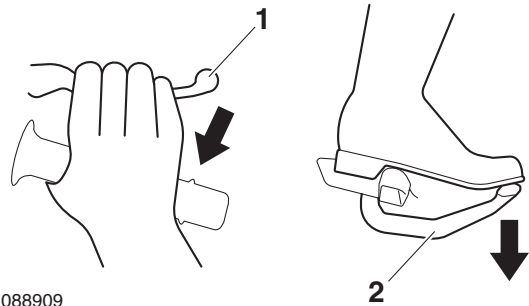
- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to “YDT” on page 9-2.

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

TIP

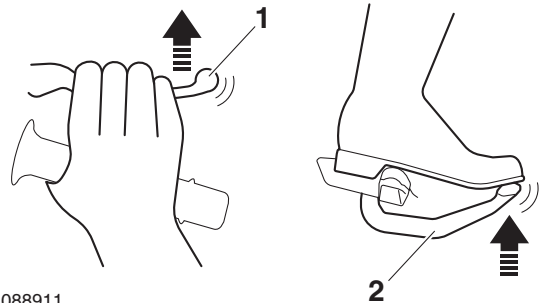
- The hydraulic unit operates 1 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 5 seconds.
- The operation of the hydraulic unit can be confirmed using the indicator.
On: The hydraulic unit is operating.
Flashing: The conditions for operating the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



G088909

9. Check:

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



G088911

TIP

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

ECA18280

NOTICE

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

10. If the operation of the hydraulic unit is normal, delete all of the 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 of function of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

1. Place the vehicle on a suitable stand.
2. Turn the main switch to "OFF".
3. Remove:
 - Rider seat
Refer to "GENERAL CHASSIS (1)" on page 4-1.
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
90890-03274
Yamaha diagnostic tool (A/I)
90890-03273**

TIP

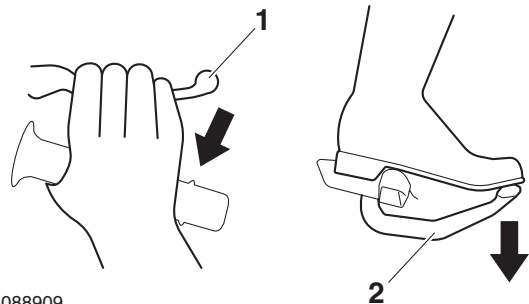
- Yamaha diagnostic tool (A/I) (90890-03273) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-2.

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

TIP

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

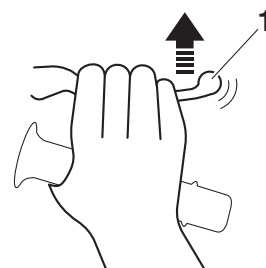


G088909

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

TIP

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



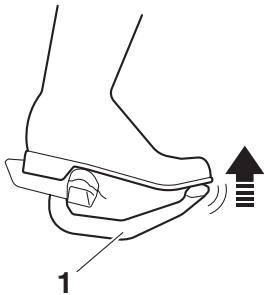
G088913

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 Yamaha diagnostic tool coupler, and then install the protective cap.

14. Turn the main switch to "ON".

15. Set the start/engine stop switch to "O".

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

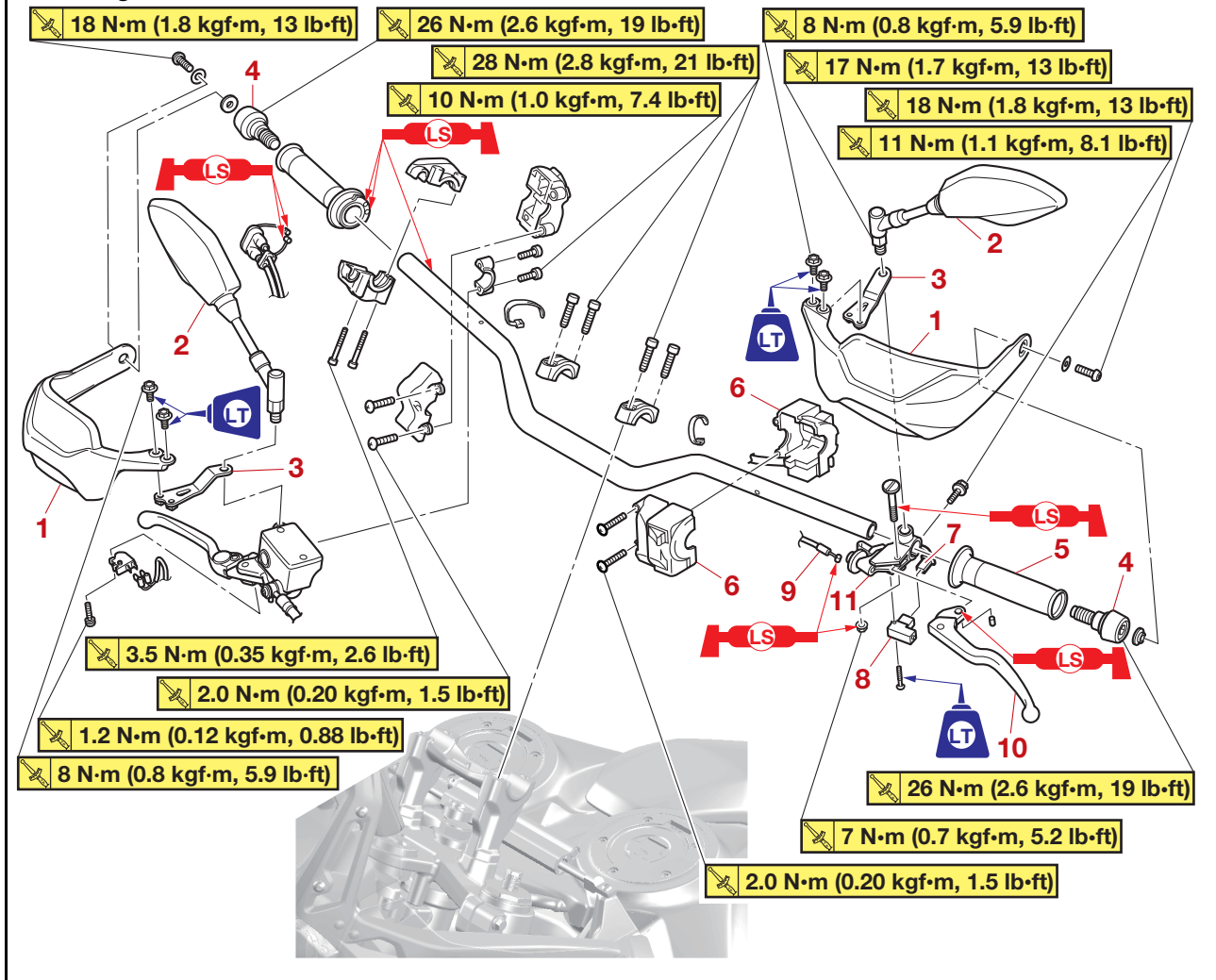
CHECKING THE ABS WARNING LIGHT

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 mph) or performing a trial run.

EAS20033

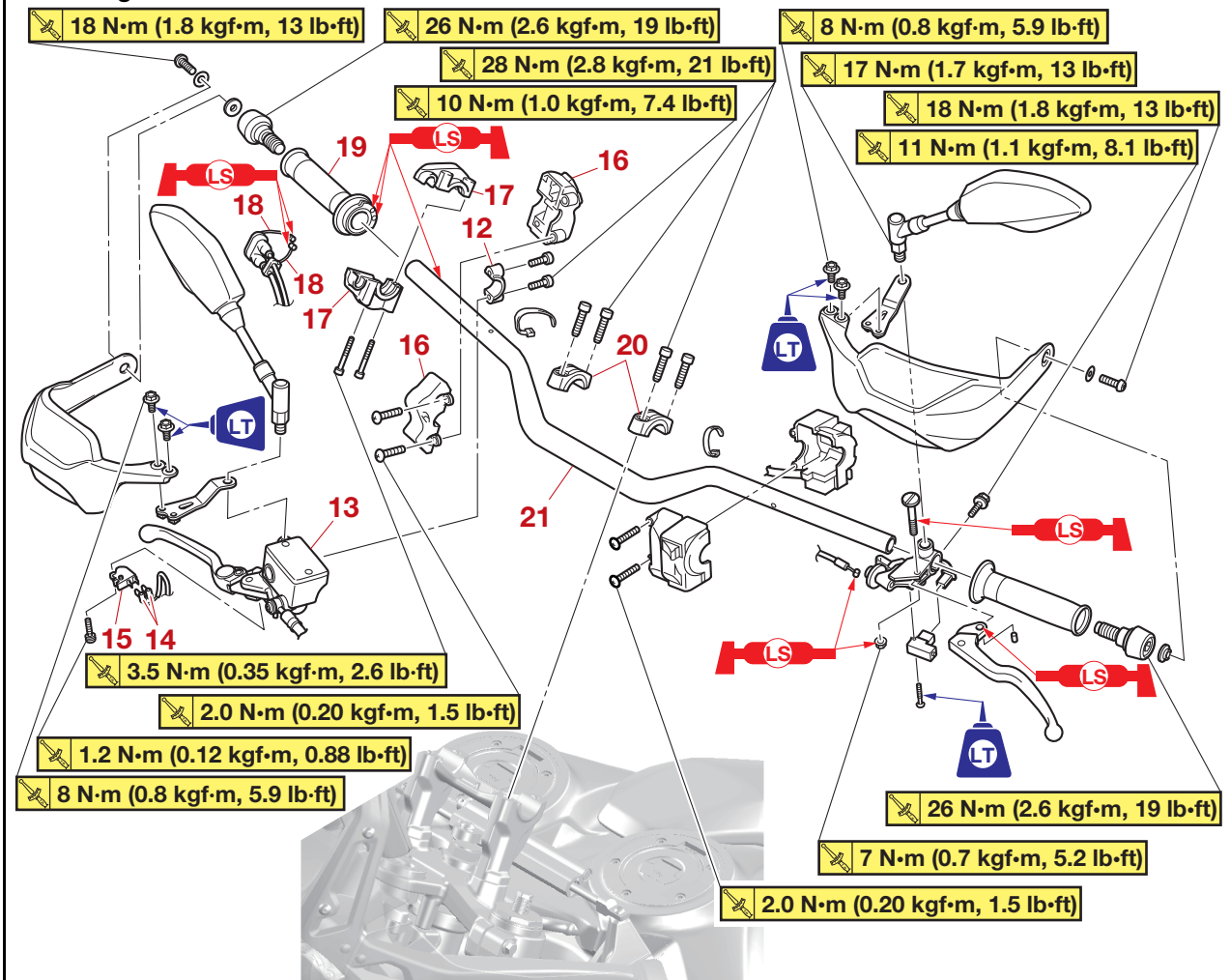
HANDLEBAR

Removing the handlebar



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

Removing the handlebar



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

EAS30203

REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

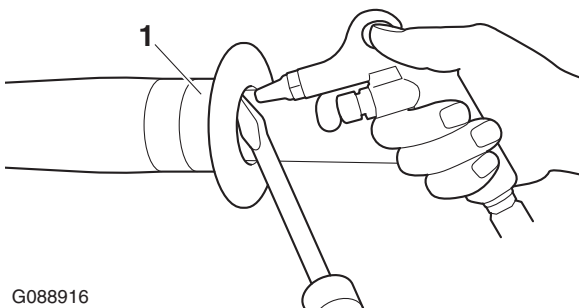
WARNING

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

2. Remove:
 - Handlebar grip "1"

TIP

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

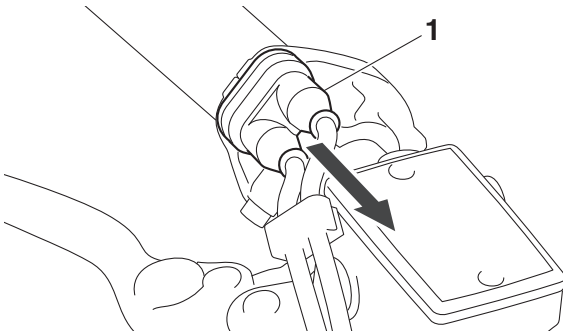


G088916

3. Remove:
 - Throttle cable housings

TIP

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



EAS30204

CHECKING THE HANDLEBAR

1. Check:
 - Handlebar

Bends/cracks/damage → Replace.

EWA13690

WARNING

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

EAS30205

INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

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



Upper handlebar holder bolt
28 N·m (2.8 kgf·m, 21 lb·ft)

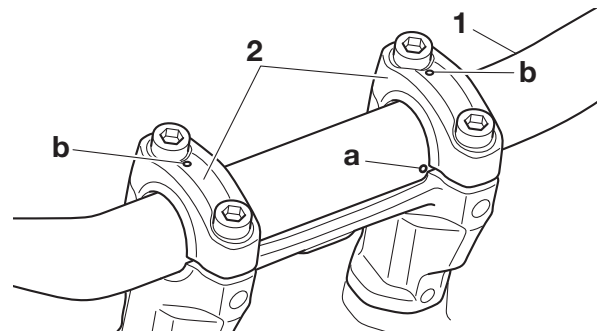
ECA19130

NOTICE

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

TIP

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



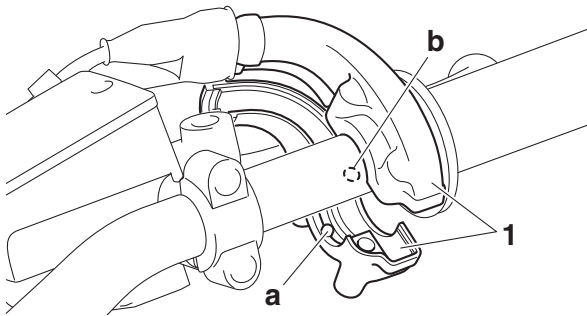
3. Install:
 - Throttle grip
 - Throttle cables
 - Throttle cable housing "1"



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

TIP

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



4. Install:

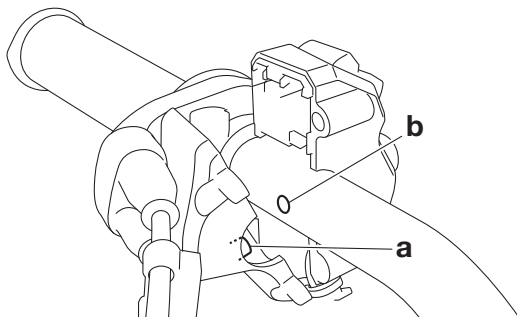
- Handlebar switch (right)



Handlebar switch screw (right)
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

TIP

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

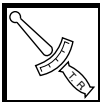


5. Install:

- Front brake master cylinder
Refer to “INSTALLING THE FRONT BRAKE MASTER CYLINDER” on page 4-40.

6. Install:

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

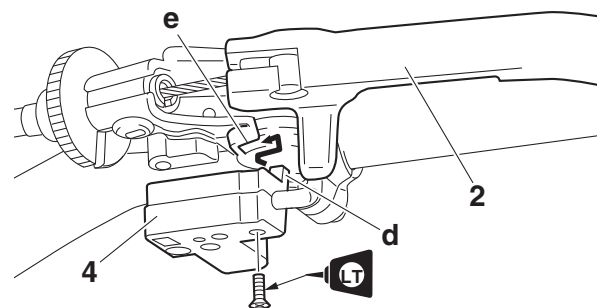
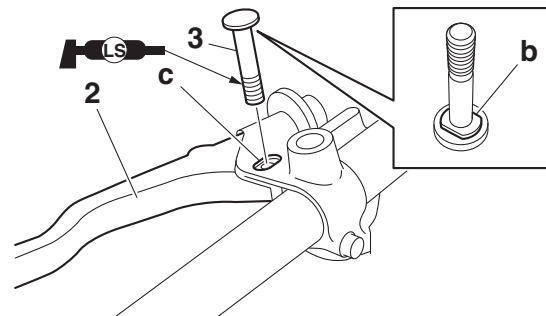
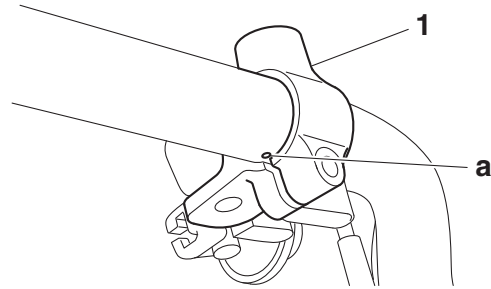


Clutch lever holder pinch bolt
11 N·m (1.1 kgf·m, 8.1 lb·ft)
Clutch lever pivot nut
7 N·m (0.7 kgf·m, 5.2 lb·ft)

TIP

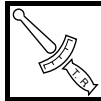
- Align the center of slit on the clutch lever holder with the punch mark “a” on the handlebar as shown in the illustration.
- Lubricate the clutch lever pivot bolt and nut with the lithium-soap-based grease.

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



7. Install:

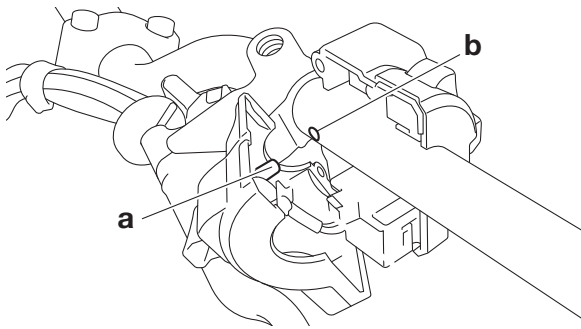
- Handlebar switch (left)



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

TIP

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



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



Grip end
26 N·m (2.6 kgf·m, 19 lb·ft)

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

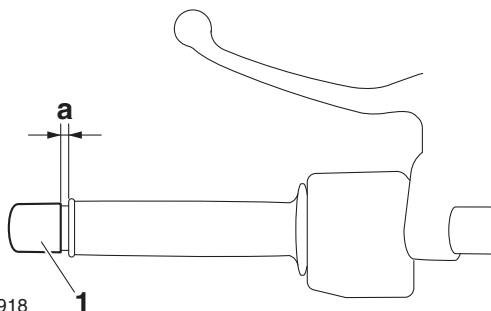
EWA13700

WARNING

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

TIP

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



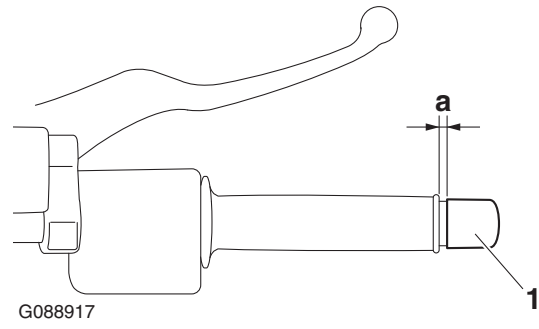
9. Install:
- Grip end (right) "1"



Grip end
26 N·m (2.6 kgf·m, 19 lb·ft)

TIP

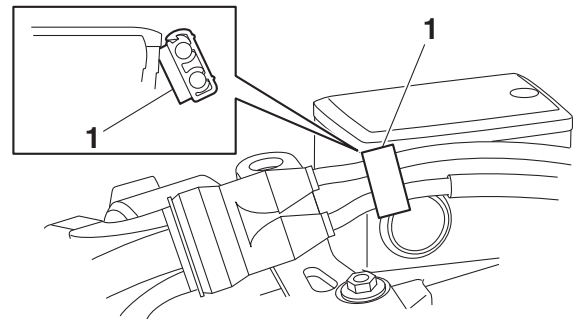
There should be 1–6 mm (0.04–0.24 in) of clearance "a" between the throttle grip and the grip end.



10. Install:
- Throttle cable holder "1"

TIP

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



11. Adjust:
- Throttle grip free play
- Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-31.



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

12. Adjust:
- Clutch lever free play
- Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.



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

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



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

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

Left-hand threads

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

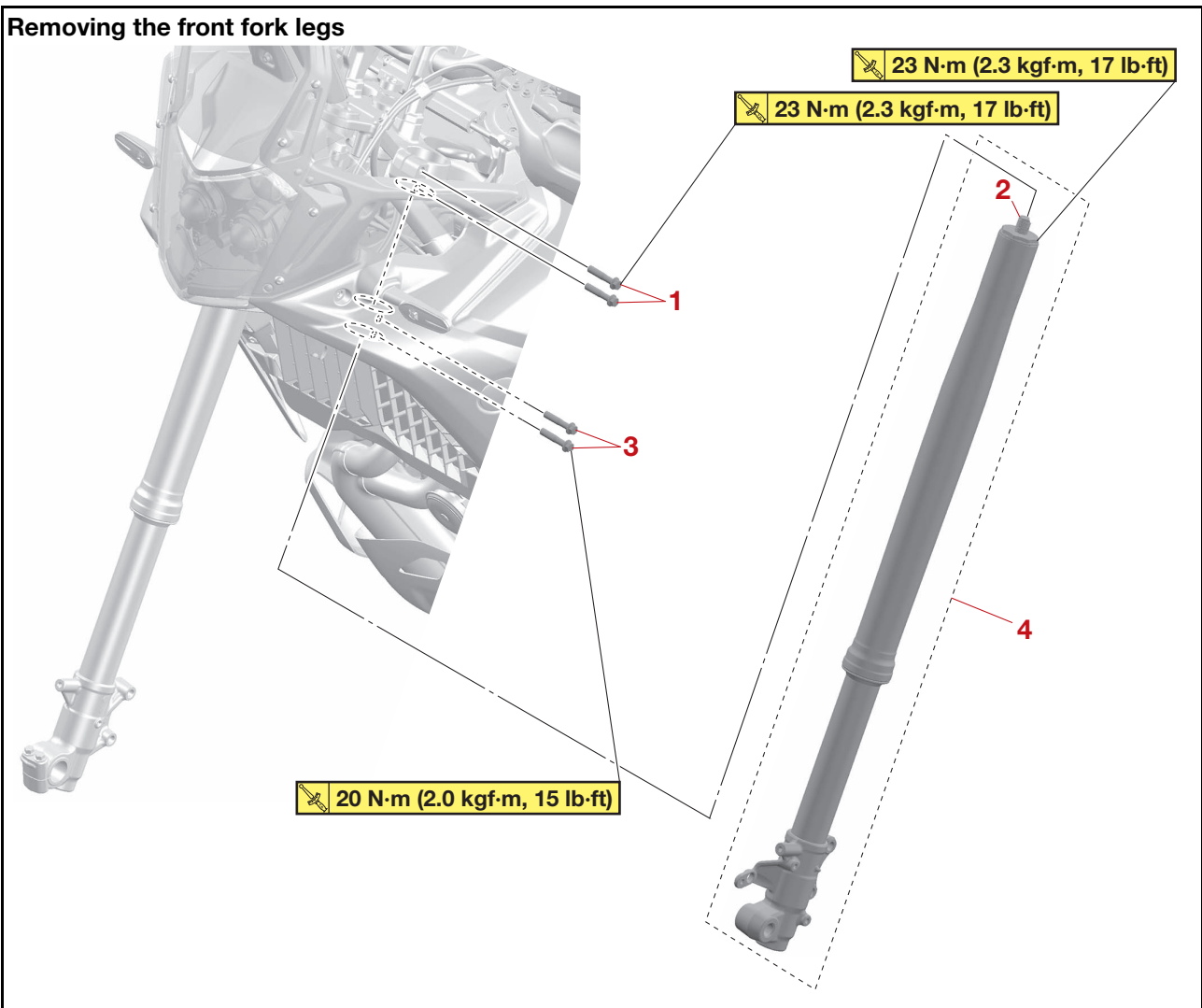
Handguard bolt (rearview mirror)
8 N·m (0.8 kgf·m, 5.9 lb·ft)

LOCTITE®

EAS20034

FRONT FORK

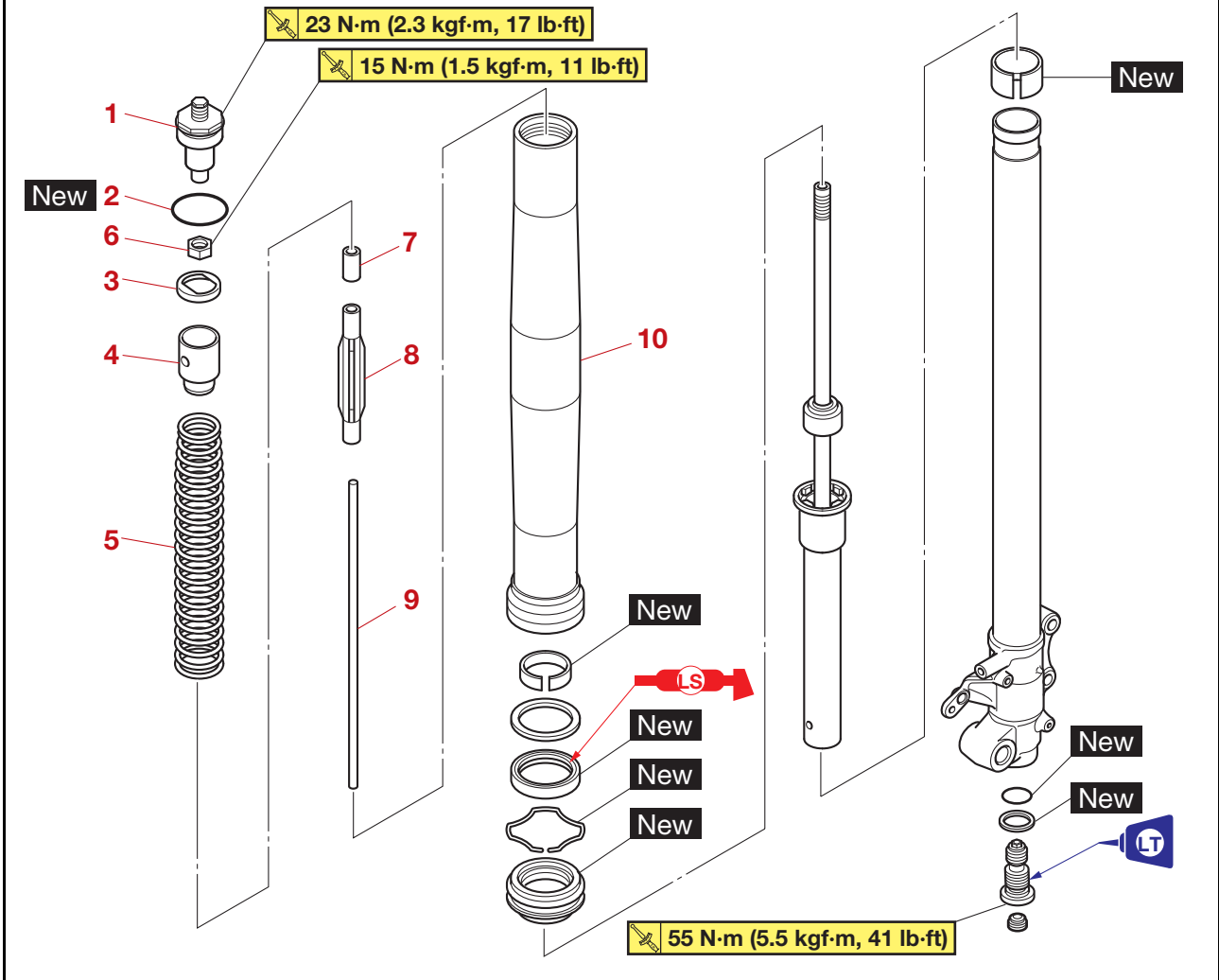
Removing the front fork legs



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | | | The following procedure applies to both of the front fork legs. |
| | Front brake calipers/Front fender/Front wheel | | Refer to "FRONT WHEEL" on page 4-16. |
| 1 | Upper bracket pinch bolt | 2 | Loosen. |
| 2 | Front fork cap bolt | 1 | Loosen. |
| 3 | Lower bracket pinch bolt | 2 | Loosen. |
| 4 | Front fork leg | 1 | |

FRONT FORK

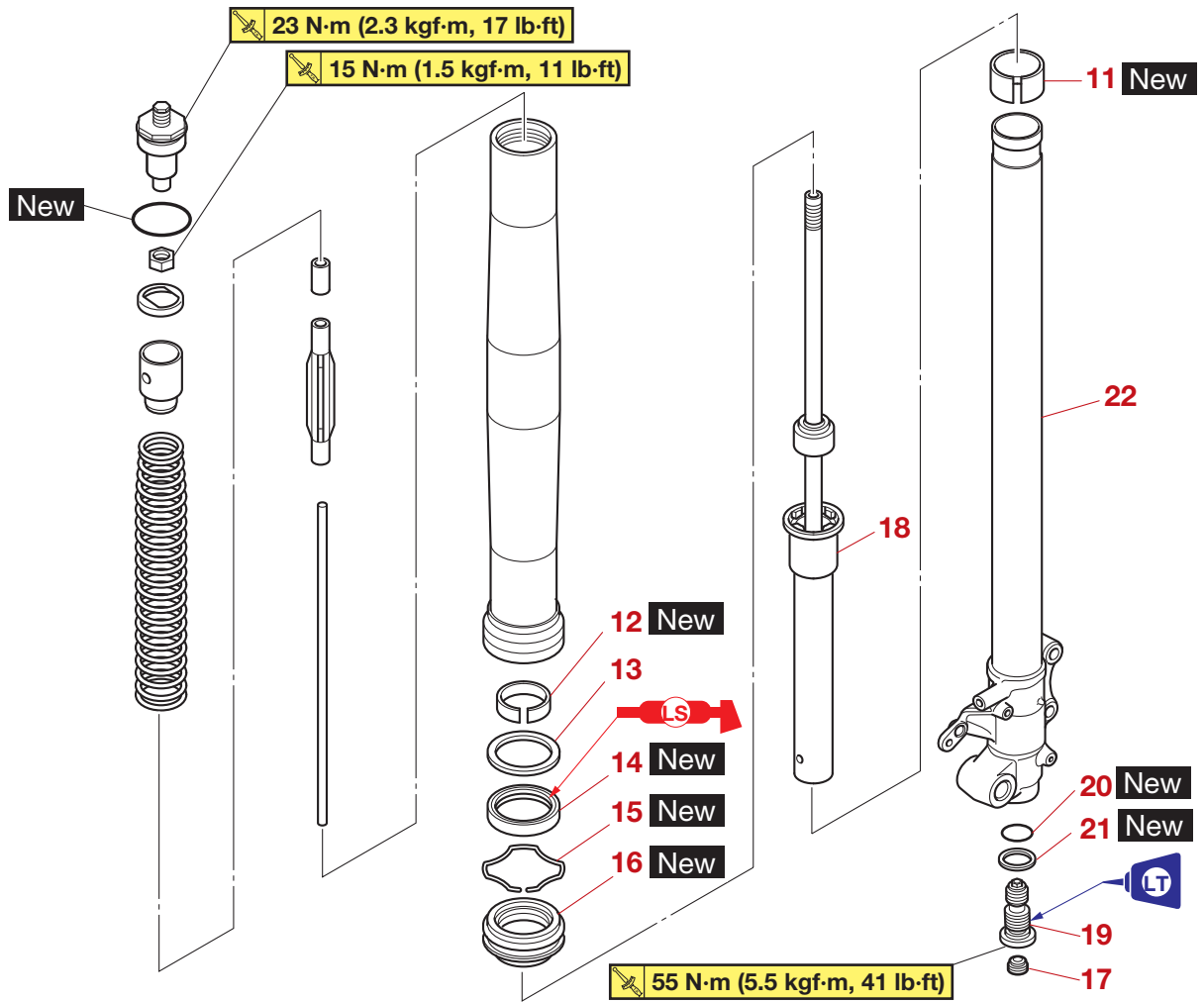
Disassembling the front fork legs



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------|------|---|
| | | | The following procedure applies to both of the front fork legs. |
| 1 | Cap bolt | 1 | |
| 2 | O-ring | 1 | |
| 3 | Fork spring seat | 1 | |
| 4 | Spacer | 1 | |
| 5 | Fork spring | 1 | |
| 6 | Damper rod locknut | 1 | |
| 7 | Collar | 1 | |
| 8 | Fork spring guide | 1 | |
| 9 | Damper adjusting rod | 1 | |
| 10 | Outer tube | 1 | |

FRONT FORK

Disassembling the front fork legs



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------|------|---------|
| 11 | Inner tube bushing | 1 | |
| 12 | Outer tube bushing | 1 | |
| 13 | Washer | 1 | |
| 14 | Oil seal | 1 | |
| 15 | Oil seal clip | 1 | |
| 16 | Dust seal | 1 | |
| 17 | Cap | 1 | |
| 18 | Damper rod assembly | 1 | |
| 19 | Damper rod assembly bolt | 1 | |
| 20 | O-ring | 1 | |
| 21 | Copper washer | 1 | |
| 22 | Inner tube | 1 | |

EAS31648

REMOVING THE FRONT FORK LEGS

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

1. Stand the vehicle on a level surface.

EWA13120

WARNING

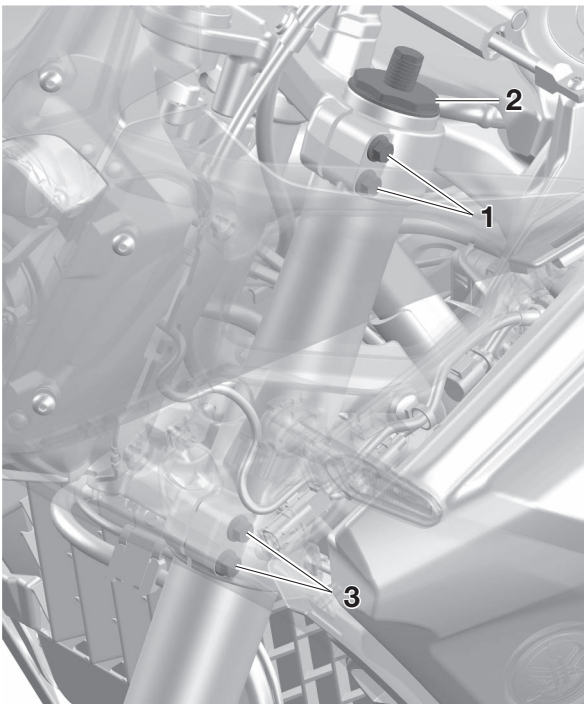
Securely support the vehicle so that there is no danger of it falling over.

TIP

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

2. Loosen:

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



EWA13640

WARNING

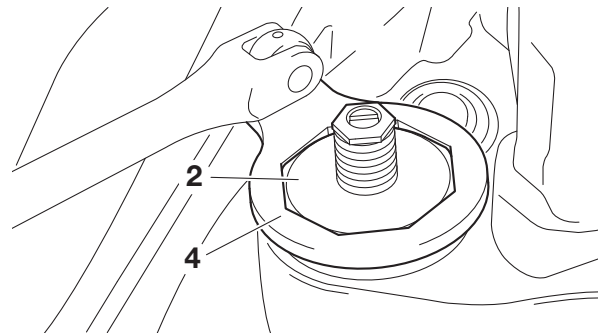
Before loosening the upper and lower bracket pinch bolts, support the front fork leg.

TIP

Use the cap bolt wrench "4" to loosen the front fork cap bolt "2".



Front fork octagonal cap bolt wrench 44 mm
90890-01910



3. Remove:
 - Front fork leg

EAS30207

DISASSEMBLING THE FRONT FORK LEGS

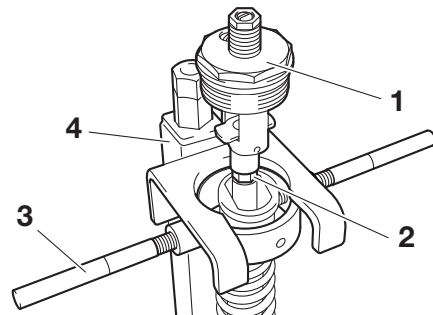
The following procedure applies to both of the front fork legs.

1. Remove:

- Cap bolt "1" (from the damper rod assembly)
 - Fork spring seat
 - Spacer
 - Fork spring
 - Locknut "2"
- a. Press down on the spacer with the fork spring compressor "3" and a general fork spring compressor "4".



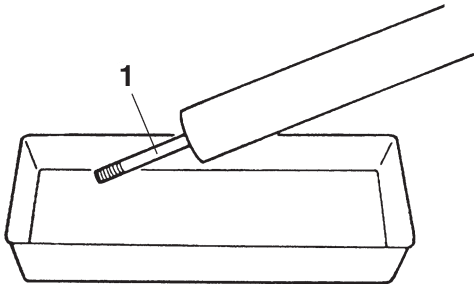
Fork spring compressor
90890-01441
Fork spring compressor
YM-01441



- b. Hold the locknut and remove the cap bolt.
 - c. Remove a general fork spring compressor and the fork spring compressor.
 - d. Remove the fork spring seat and spacer.
 - e. Remove the fork spring and locknut.
2. Remove:
 - Collar
 - Fork spring guide
 - Damper adjusting rod
 3. Drain:
 - Fork oil

TIP

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



G088919

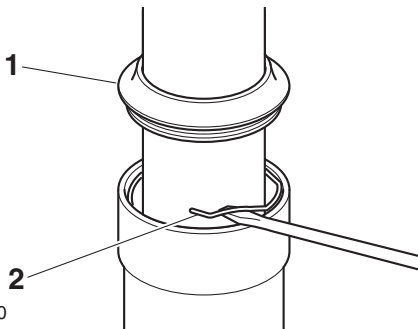
4. Remove:

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

ECA14180

NOTICE

Do not scratch the inner tube.



G088920

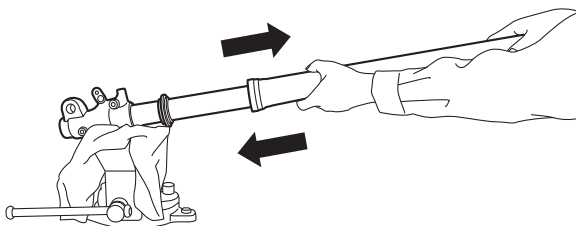
5. Remove:

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

ECA19880

NOTICE

Excessive force will damage the bushings. Damaged bushings must be replaced.



6. Remove:

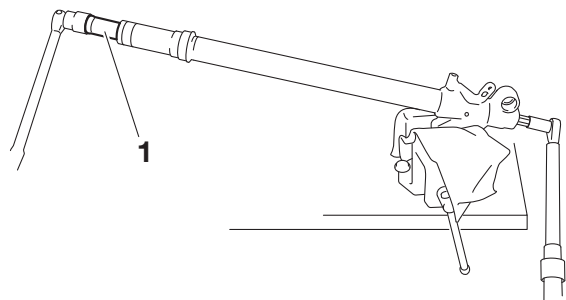
- Damper rod assembly bolt
- Damper rod assembly

TIP

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



Damper rod holder (ø27)
90890-01582
Damper rod holder
YM-01582



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

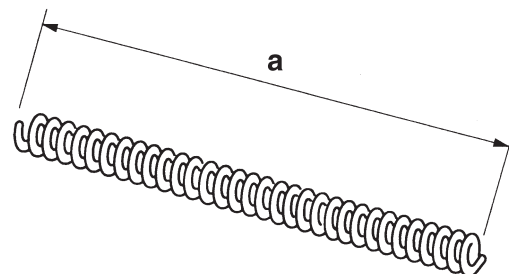
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:

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



Fork spring free length limit
458.5 mm (18.05 in)



G088921

3. Check:

- Damper rod assembly
Damage/wear → Replace.
Obstruction → Blow out all of the oil passages with compressed air.

ECA19110

NOTICE

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

EAS30209

ASSEMBLING THE FRONT FORK LEGS

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

EWA18360

WARNING

If both front fork legs are not filled with the specified amount of the fork oil, it may cause poor handling and a loss of stability.

TIP

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

1. Install:

- Damper rod assembly

ECA22560

NOTICE

Allow the damper rod assembly to slide slowly down the inner tube. Be careful not to damage the inner tube.

2. Tighten:

- Damper rod assembly bolt
(along with the O-ring **New** and the copper washer **New**)



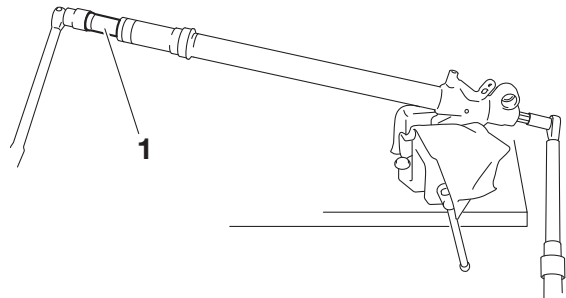
Front fork damper rod assembly bolt
55 N·m (5.5 kgf·m, 41 lb·ft)
LOCTITE®

TIP

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



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



3. Lubricate:

- Inner tube's outer surface



Recommended oil
Yamaha Suspension Oil 01

4. Install:

- Dust seal "1" **New**
- Oil seal clip "2" **New**
- Oil seal "3" **New**
- Washer "4"
- Outer tube bushing "5" **New**
- Inner tube bushing "6" **New**
(to the inner tube)

ECA19170

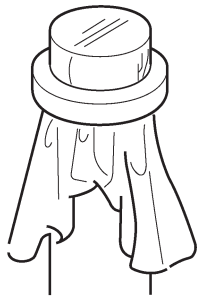
NOTICE

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

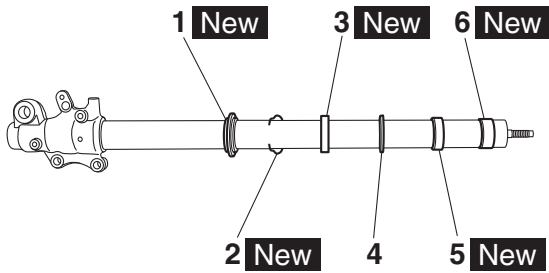
TIP

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

FRONT FORK



G088922



5. Install:

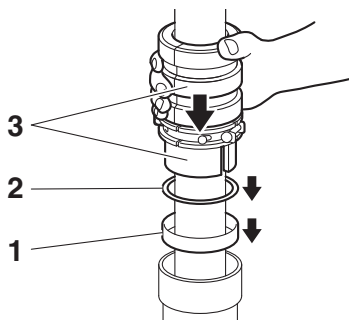
- Outer tube
(to the inner tube)

6. Install:

- Outer tube bushing "1"
- Washer "2"
(with the fork seal driver "3")



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



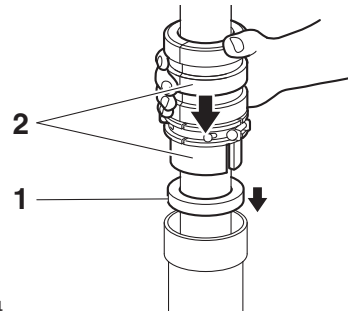
G088923

7. Install:

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



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



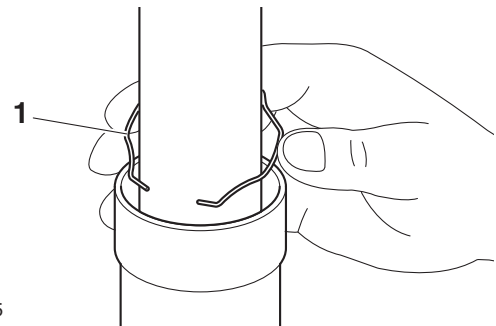
G088924

8. Install:

- Oil seal clip "1"

TIP

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



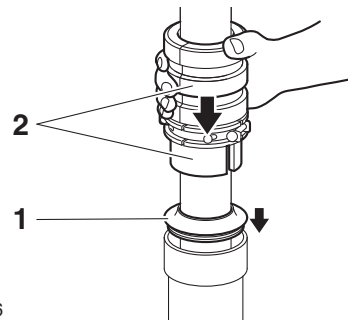
G088925

9. Install:

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



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



G088926

10. Fill:

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



Recommended oil
Yamaha Suspension Oil 01
Quantity (left)
 574.0 cm³ (19.41 US oz, 20.24 Imp.oz)
Quantity (right)
 574.0 cm³ (19.41 US oz, 20.24 Imp.oz)

ECA14230

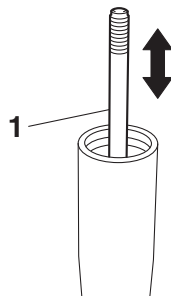
NOTICE

- 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.



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

TIP

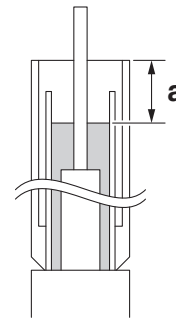
Be sure to bleed the front fork leg of any residual air.

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
 122.0 mm (4.80 in)



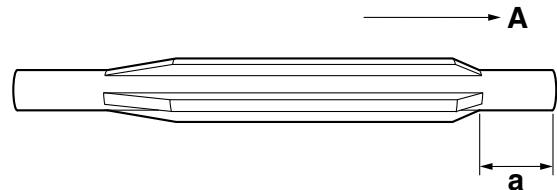
G088930

14. Install:

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

TIP

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



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

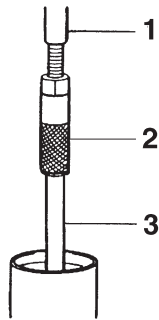
15. Install:

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



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

FRONT FORK



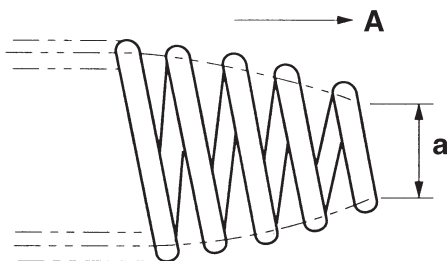
G088927

16. Install:

- Fork spring
- Spacer
- Fork spring seat
- a. Install the fork spring.

TIP

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

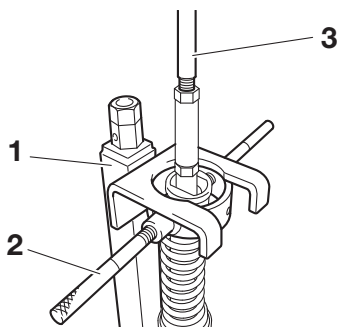


G088931

- b. Install the spacer and fork spring seat.
- c. Press down on the spacer with a general fork spring compressor "1" and the fork spring compressor "2".
- d. Pull up the rod puller "3" and hold the damper rod assembly.



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



- e. Remove the rod puller and rod puller attachment.
- f. Position the locknut "4" as distance "b".

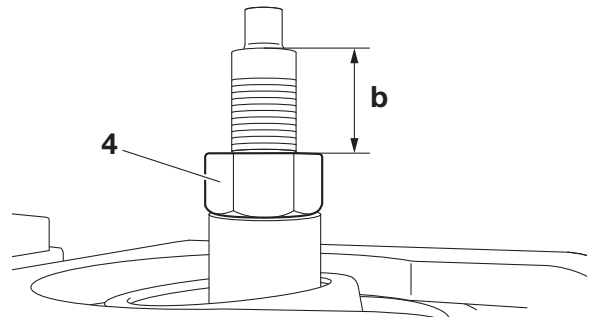
EWA17040

⚠ WARNING

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



Distance "b"
At least 14 mm (0.55 in)



- g. Turn the adjusting screw "5" on the cap bolt and set the distance "c" to specification.

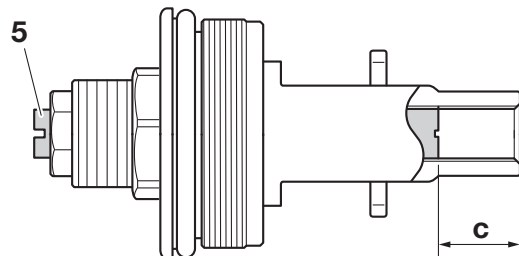
EWA17040

⚠ WARNING

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



Distance "c"
At least 14.5 mm (0.57 in)



- h. Install the cap bolt onto the damper rod, and then finger tighten the cap bolt.

TIP

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

EWA13670

⚠ WARNING

Always use a new cap bolt O-ring.

- i. Hold the cap bolt with cap bolt wrench "6", and tighten the locknut "7" to specification.

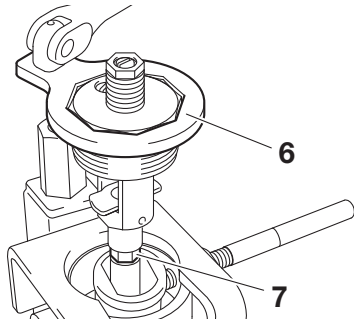
FRONT FORK



**Front fork octagonal cap bolt
wrench 44 mm
90890-01910**



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



17. Install:

- Cap bolt
(to the outer tube)

TIP

- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS30210

INSTALLING THE FRONT FORK LEGS

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

1. Install:

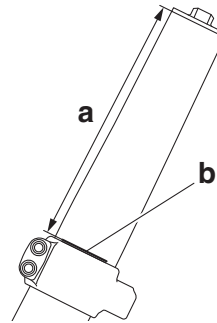
- Front fork leg
Temporarily tighten the lower bracket pinch bolts.



**Installed length (from the top of
the outer tube) "a"
214.5–215.5 mm (8.44–8.48 in)**

TIP

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



2. Tighten:

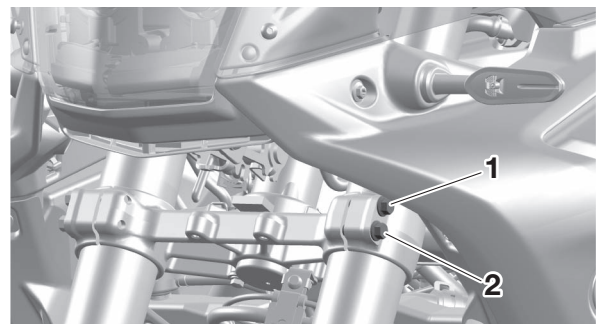
- Lower bracket pinch bolts



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

TIP

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



3. Tighten:

- Front fork cap bolt "1"
- Upper bracket pinch bolt



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

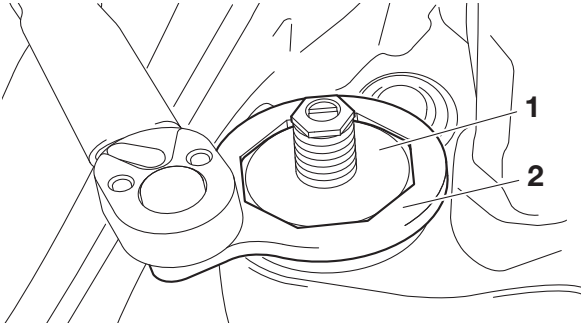
TIP

Use the cap bolt wrench "2" to tighten the front fork cap bolt "1".



**Front fork octagonal cap bolt
wrench 44 mm
90890-01910**

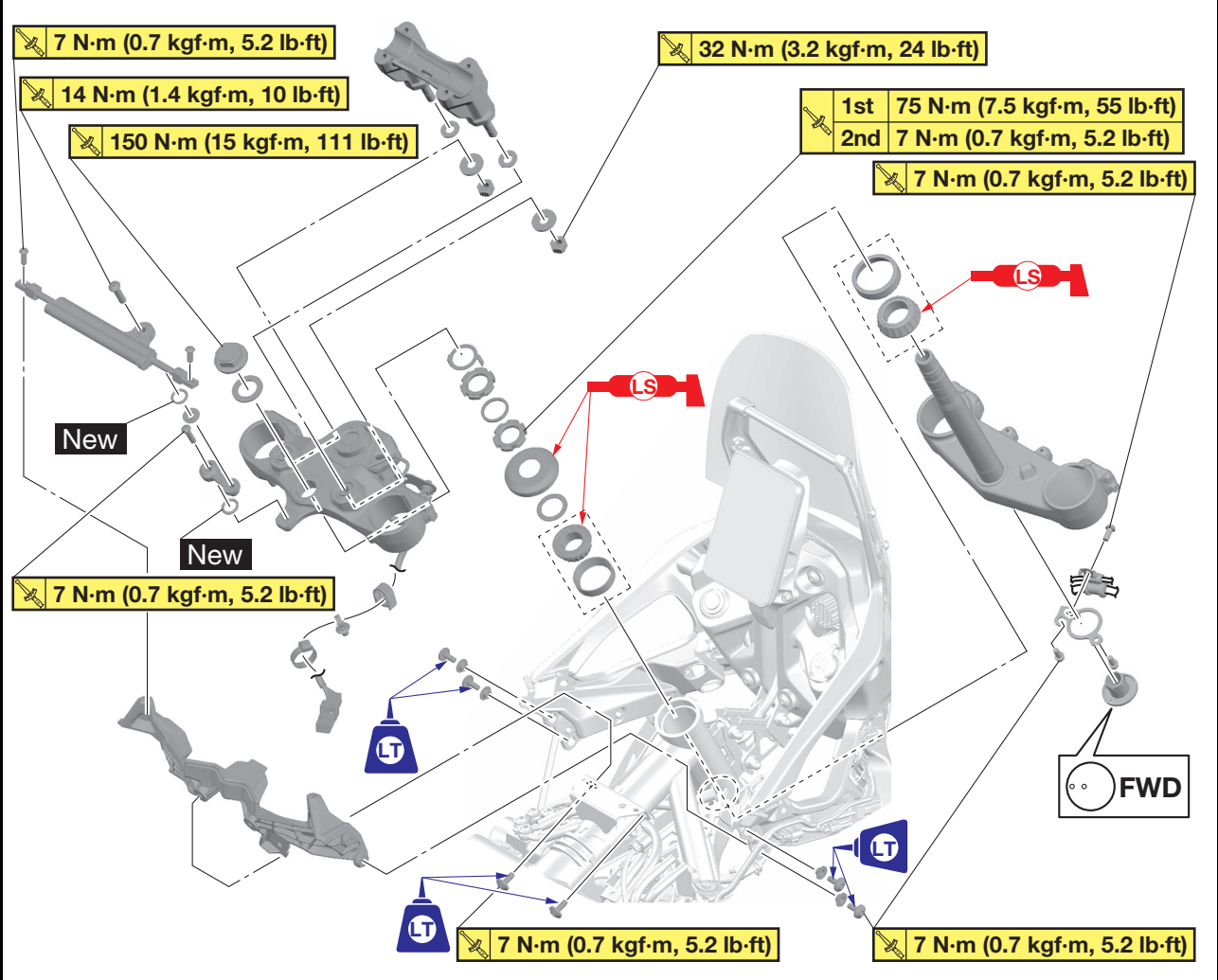
FRONT FORK



EAS20035

STEERING HEAD

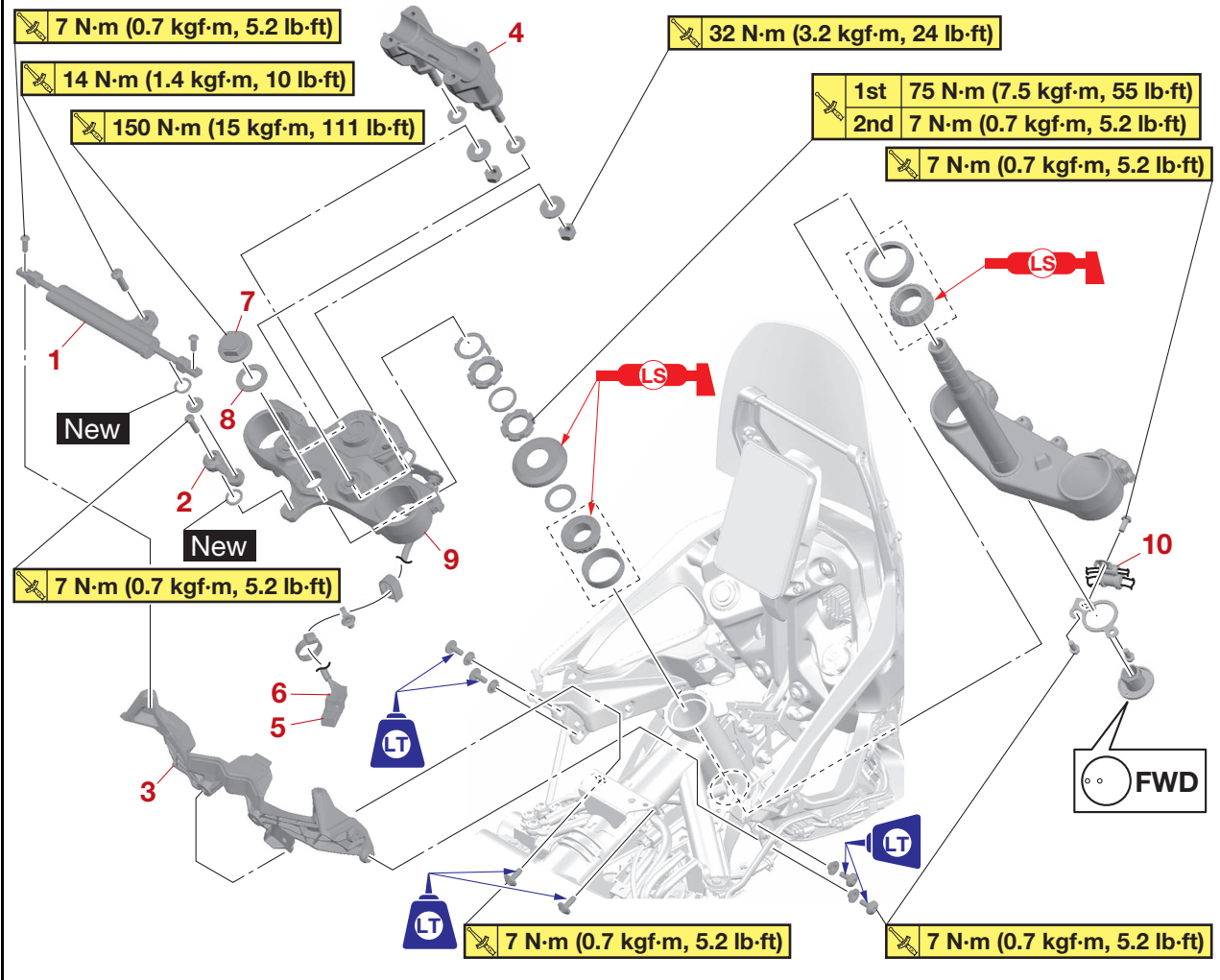
Removing the lower bracket and steering damper



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right)/Purge cut valve solenoid | | Refer to "FUEL TANK" on page 7-1. |
| | Front brake calipers/Front fender/Front wheel | | Refer to "FRONT WHEEL" on page 4-16. |
| | Front fork legs | | Refer to "FRONT FORK" on page 4-68. |
| | Handlebar | | Refer to "HANDLEBAR" on page 4-62. |

STEERING HEAD

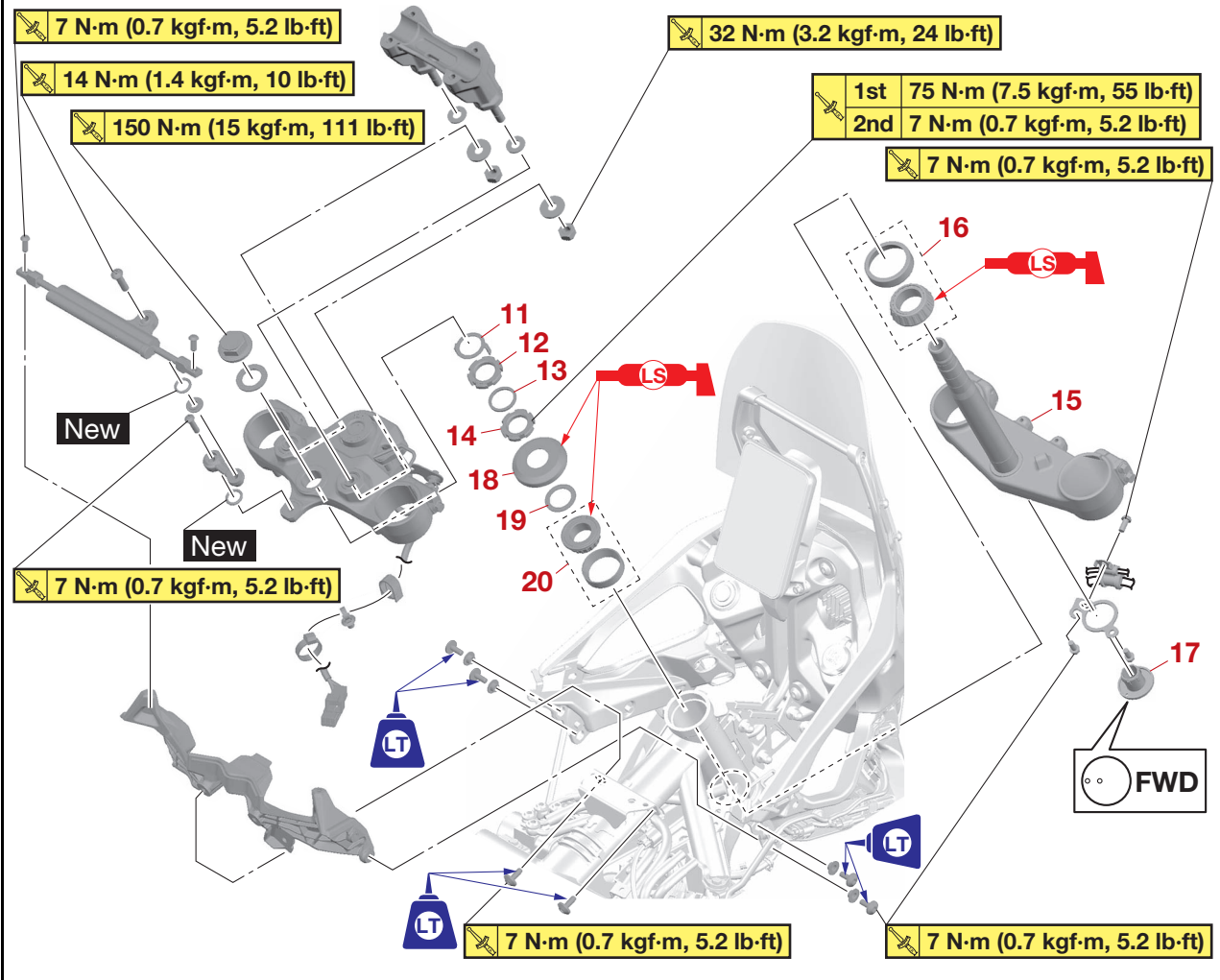
Removing the lower bracket and steering damper



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|-------------|
| 1 | Steering damper | 1 | |
| 2 | Steering damper rod | 1 | |
| 3 | Steering damper stay | 1 | |
| 4 | Lower handlebar holder | 1 | |
| 5 | Main switch coupler | 1 | Disconnect. |
| 6 | Immobilizer unit coupler | 1 | Disconnect. |
| 7 | Steering stem nut | 1 | |
| 8 | Washer | 1 | |
| 9 | Upper bracket | 1 | |
| 10 | Front brake hose/wheel sensor lead holder | 1 | |

STEERING HEAD

Removing the lower bracket and steering damper



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|---------|
| 11 | Lock washer | 1 | |
| 12 | Upper ring nut | 1 | |
| 13 | Rubber washer | 1 | |
| 14 | Lower ring nut | 1 | |
| 15 | Lower bracket | 1 | |
| 16 | Lower bearing | 1 | |
| 17 | Lower bracket cap | 1 | |
| 18 | Upper bearing cover | 1 | |
| 19 | Washer | 1 | |
| 20 | Upper bearing | 1 | |

EAS30213

REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

2. Remove:

- Upper ring nut “1”
- Rubber washer
- Lower ring nut “2”
- Lower bracket

EWA13730

WARNING

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

TIP

- Hold the lower ring nut with ring nut wrench “3”, and then remove the upper ring nut with the steering nut wrench “4”.
- Remove the lower ring nut with the steering nut wrench.



Ring nut wrench

90890-01268

Spanner wrench

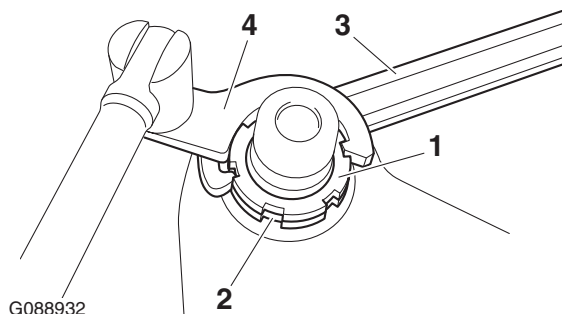
YU-01268

Steering nut wrench

90890-01403

Exhaust flange nut wrench

YU-A9472



G088932

EAS30215

CHECKING THE STEERING DAMPER

1. Check:

- Steering damper body
Damage/oil leaks → Replace the steering damper assembly.
- Steering damper rod
Bends/scratch → Replace the steering damper assembly.

- Bearing

Damage/pitting → Replace the steering damper assembly.

EAS30214

CHECKING THE STEERING HEAD

1. Wash:

- Bearings
- Bearing races



Recommended cleaning solvent
Kerosene

2. Check:

- Bearings
- Bearing races

Damage/pitting → Replace the bearings and bearing races as a set.

3. Replace:

- Bearings
- Bearing races

a. Remove the bearing races from the steering head pipe “1” with a long rod “2” and hammer.

b. Remove the bearing race “3” from the lower bracket with a floor chisel “4” and hammer.

c. Install a new dust seal and new bearing races.

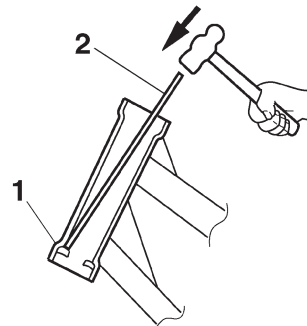
ECA14270

NOTICE

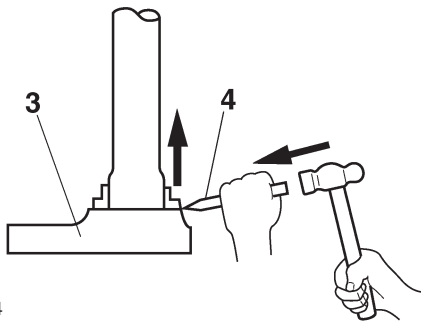
If the bearing race is not installed properly, the steering head pipe could be damaged.

TIP

- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.



G088933



G088934

4. Check:

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

EAS30216

INSTALLING THE STEERING HEAD

1. Lubricate:

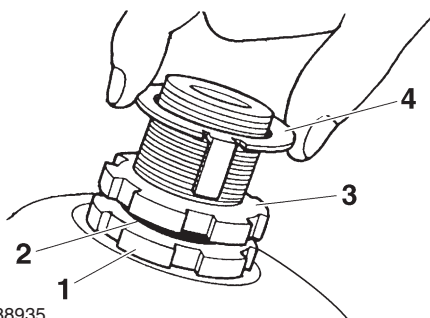
- Upper bearing
- Lower bearing



2. Install:

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

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-19.



G088935

3. Install:

- Upper bracket
- Washer
- Steering stem nut

TIP

Temporarily tighten the steering stem nut.

4. Install:

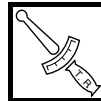
- Front fork legs
Refer to "INSTALLING THE FRONT FORK LEGS" on page 4-77.

TIP

Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:

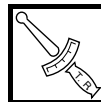
- Steering stem nut



Steering stem nut
150 N·m (15 kgf·m, 111 lb·ft)

6. Tighten:

- Upper and lower bracket pinch bolts

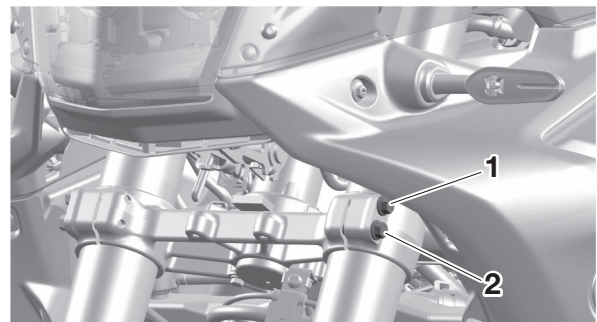


Upper bracket pinch bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
Lower bracket pinch bolts
20 N·m (2.0 kgf·m, 15 lb·ft)

TIP

Tighten each lower bracket pinch bolt to specification in the order.

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

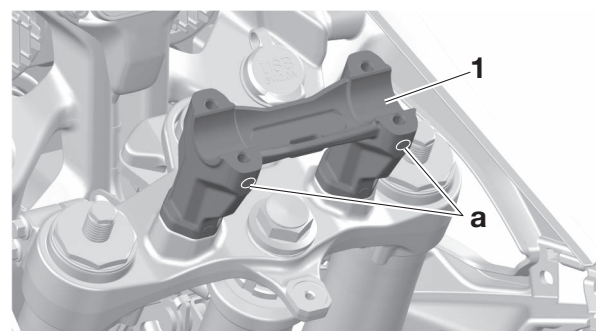


7. Install:

- Lower handlebar holder "1"

TIP

The lower handlebar holder should be installed with the projections "a" facing rearward.

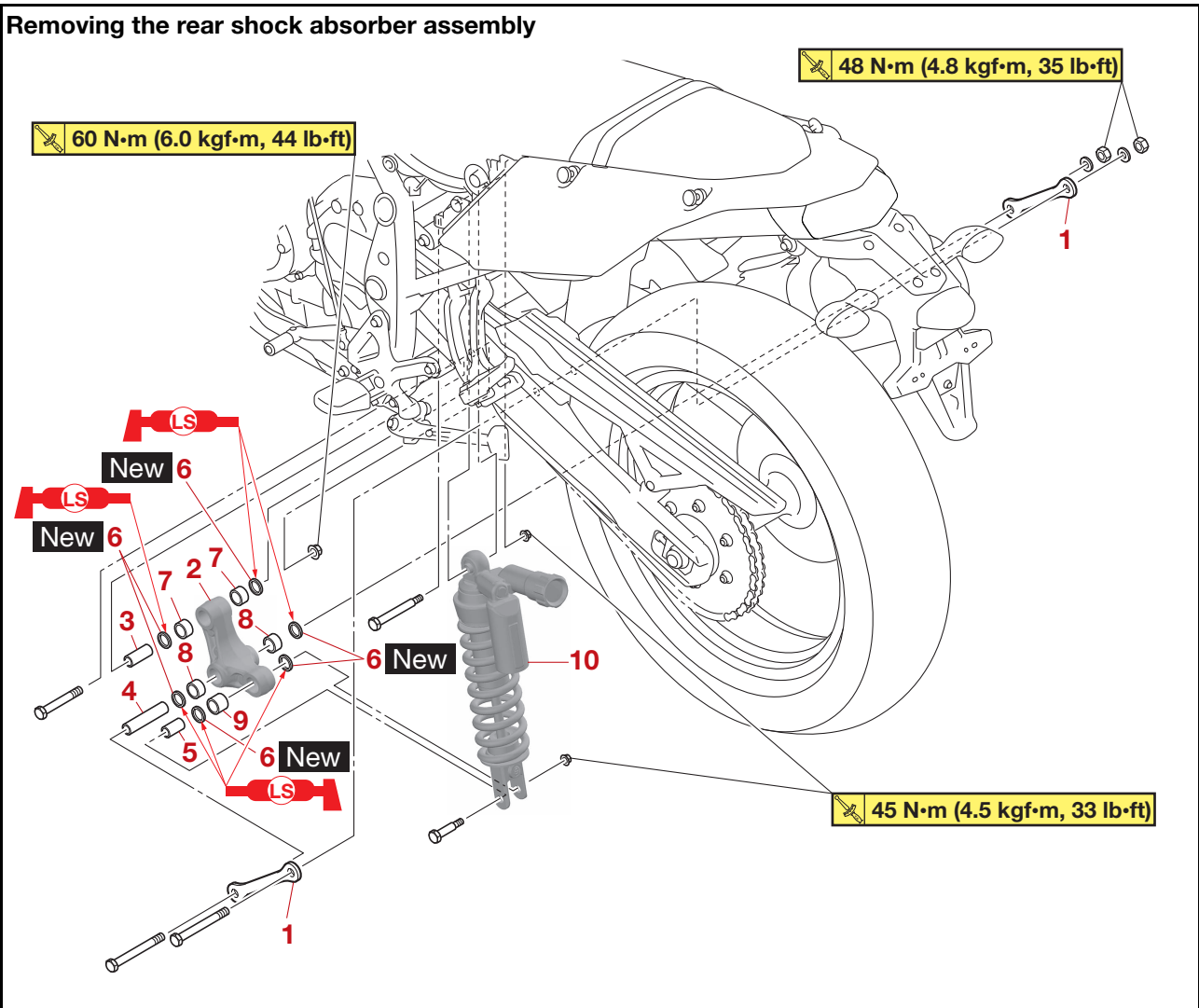


REAR SHOCK ABSORBER ASSEMBLY

EAS20036

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|---|
| | Side covers | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| | Exhaust pipe | | Refer to "ENGINE REMOVAL" on page 5-10. |
| 1 | Connecting arm | 2 | |
| 2 | Relay arm | 1 | |
| 3 | Collar | 1 | |
| 4 | Collar | 1 | |
| 5 | Collar | 1 | |
| 6 | Oil seal | 6 | |
| 7 | Bearing | 2 | |
| 8 | Bearing | 2 | |
| 9 | Bearing | 1 | |
| 10 | Rear shock absorber assembly | 1 | |

REAR SHOCK ABSORBER ASSEMBLY

EAS30826

HANDLING THE REAR SHOCK ABSORBER

EWA13740

WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.

EAS30729

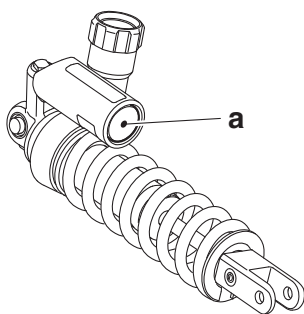
DISPOSING OF A REAR SHOCK ABSORBER

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

EWA13760

WARNING

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



EAS30219

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

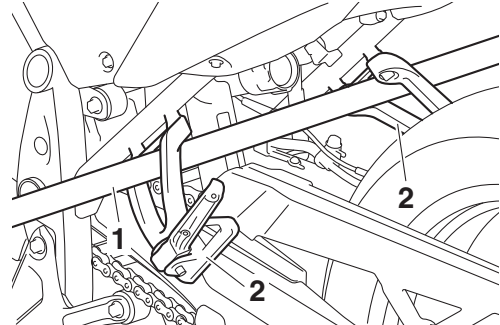
EWA13120

WARNING

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

TIP

Pass a suitable rod “1” through the holes in the brackets of the passenger footrests “2” and secure the rod to support the vehicle.



EAS30220

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
 - Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
 - Rear shock absorber assembly
Gas leaks → Replace the rear shock absorber assembly.
 - Spring
Damage/wear → Replace the rear shock absorber assembly.
 - Bolts
Bends/damage/wear → Replace.

EAS32678

CHECKING THE CONNECTING ARMS AND RELAY ARM

1. Check:
 - Connecting arms
 - Relay arm
Damage/wear → Replace.
2. Check:
 - Bearings
 - Oil seals
Damage → Replace.
3. Check:
 - Collars
Damage/scratches → Replace.

EAS30225

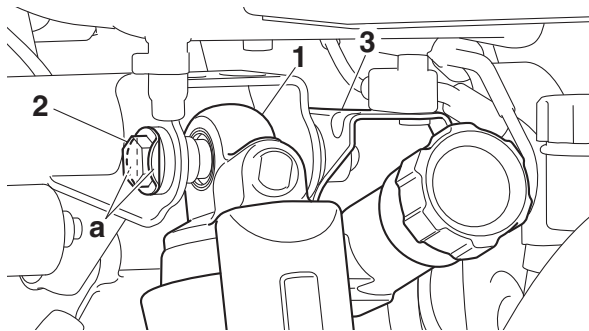
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

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

REAR SHOCK ABSORBER ASSEMBLY

TIP

- Install both the rear shock absorber assembly and brake hose bracket “3” using the rear shock absorber assembly bolt.
- Install the rear shock absorber assembly bolt “2” so that the bolt head fits between the projections “a” on the frame as shown in the illustration.



2. Tighten:

- Rear shock absorber assembly nut (upper side)



Rear shock absorber assembly nut (upper side)
45 N·m (4.5 kgf·m, 33 lb-ft)

EAS30222

INSTALLING THE RELAY ARM

1. Install:

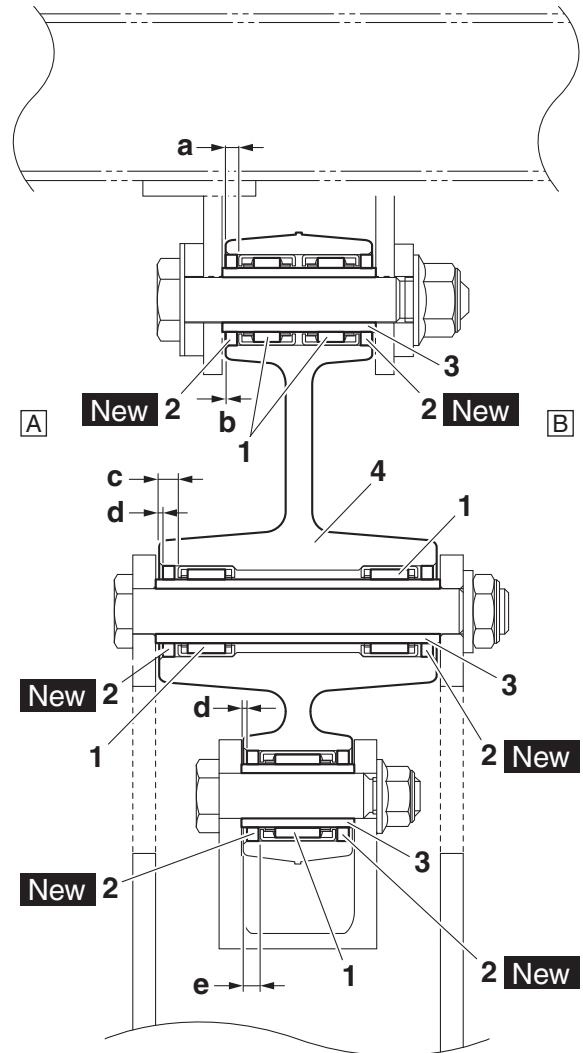
- Bearings “1”
- Oil seals “2” **New**
- Collars “3”
(to the relay arm “4”)



Installed depth “a” (bearing)
3.5–4.5 mm (0.14–0.18 in)
Installed depth “b” (oil seal)
0.0 mm (0.00 in)
Installed depth “c” (bearing)
4.5–5.5 mm (0.18–0.22 in)
Installed depth “d” (oil seal)
1.0 mm (0.04 in)
Installed depth “e” (bearing)
4.0–5.0 mm (0.16–0.20 in)

TIP

When installing the oil seals to the relay arm, face the character stamps of the oil seals outward.



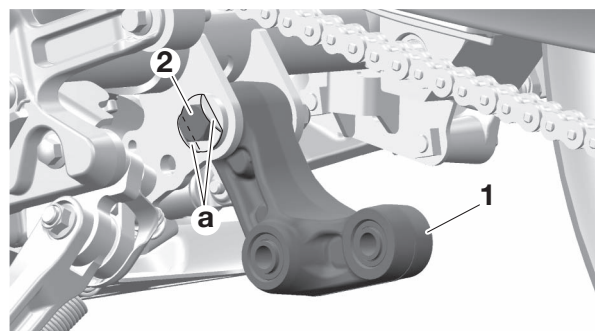
- A. Left side
B. Right side

2. Install:

- Relay arm “1”

TIP

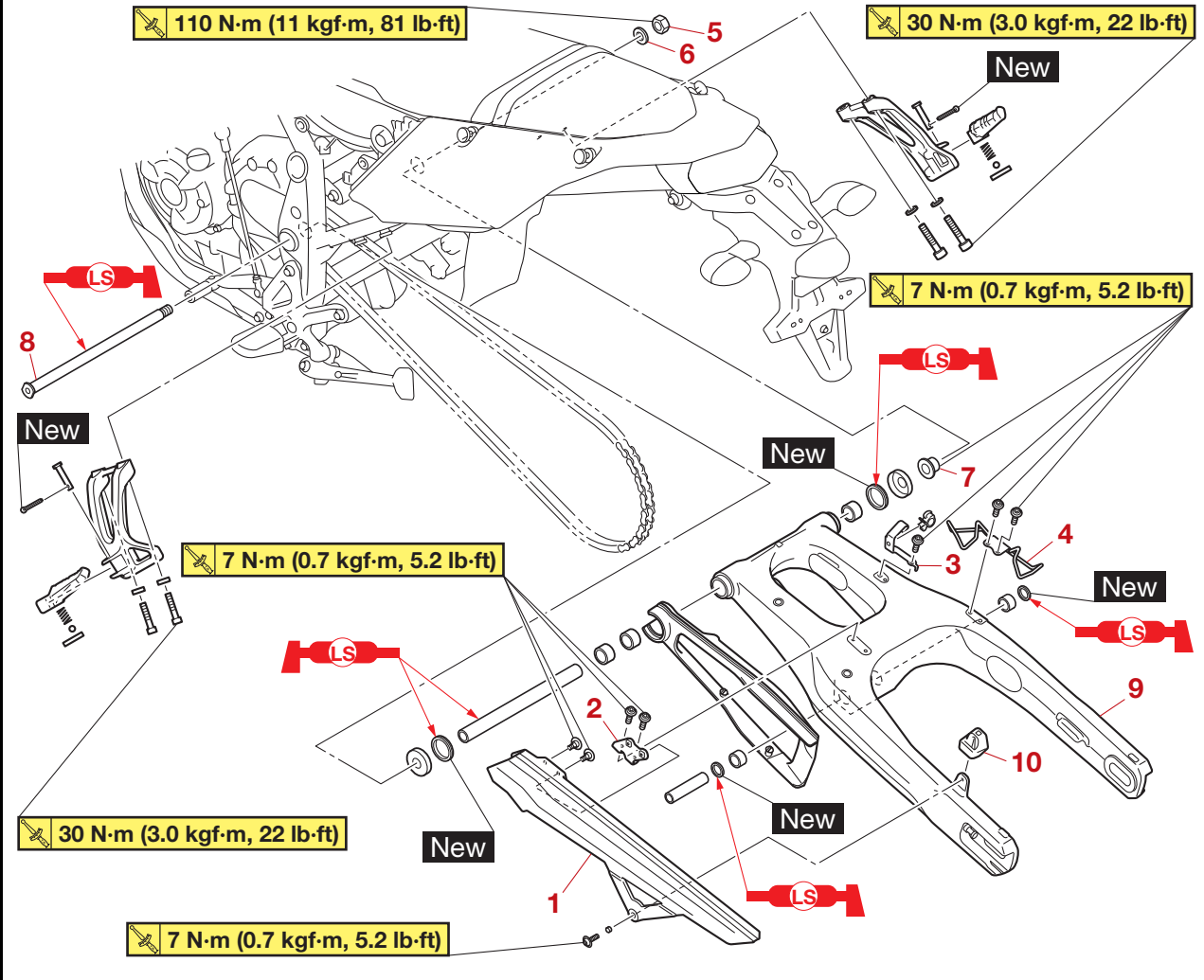
Install the relay arm bolt “2” so that the bolt head fits between the projections “a” on the frame as shown in the illustration.



EAS20037

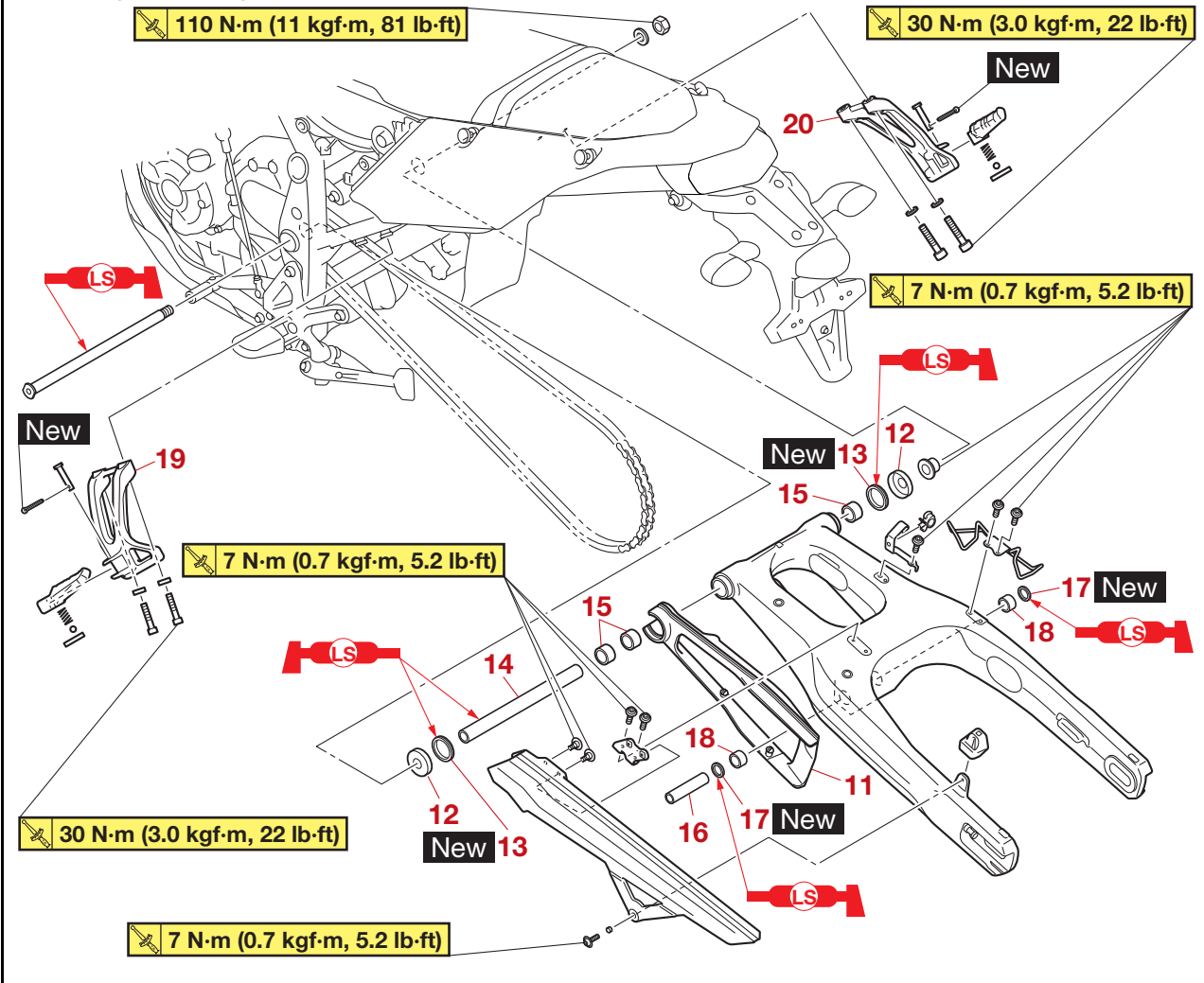
SWINGARM

Removing the swingarm



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|---|
| | Side covers | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| | Rear wheel | | Refer to "REAR WHEEL" on page 4-23. |
| | Rear shock absorber assembly | | Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-84. |
| 1 | Drive chain case | 1 | |
| 2 | Stay | 1 | |
| 3 | Rear brake hose/lead holder | 1 | |
| 4 | Rear brake hose/lead guide | 1 | |
| 5 | Pivot shaft nut | 1 | |
| 6 | Washer | 1 | |
| 7 | Adjusting bolt | 1 | Loosen. |
| 8 | Pivot shaft | 1 | |
| 9 | Swingarm | 1 | |
| 10 | Damper | 1 | |

Removing the swingarm



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------------|------|---------|
| 11 | Drive chain guide | 1 | |
| 12 | Dust cover | 2 | |
| 13 | Oil seal | 2 | |
| 14 | Collar | 1 | |
| 15 | Bearing | 3 | |
| 16 | Collar | 1 | |
| 17 | Oil seal | 2 | |
| 18 | Bearing | 2 | |
| 19 | Passenger footrest bracket (left) | 1 | |
| 20 | Passenger footrest bracket (right) | 1 | |

EAS30226

REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

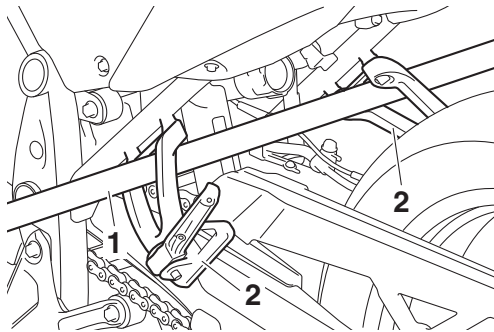
EWA13120

WARNING

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

TIP

Pass a suitable rod "1" through the holes in the brackets of the passenger footrests "2" and secure the rod to support the vehicle.



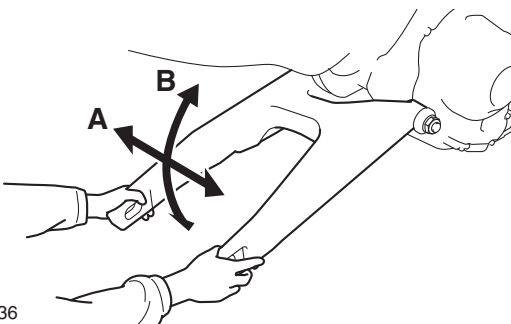
2. Measure:

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



Pivot shaft nut
110 N·m (11 kgf·m, 81 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 collars, bearings, dust covers, and adjusting bolt.
- c. Check the swingarm vertical movement "B" by moving the swingarm up and down. If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, collars, bearings, dust covers, and adjusting bolt.



G088936

3. Loosen:

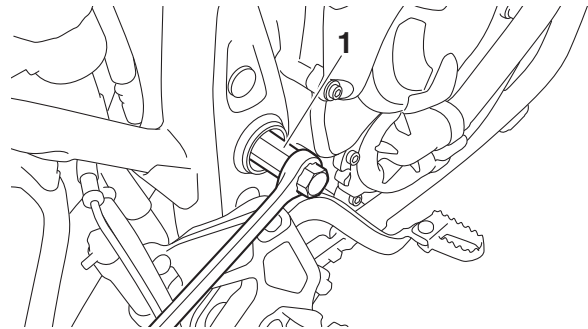
- Adjusting bolt

TIP

Loosen the adjusting bolt with the engine alignment tool "1".



Engine alignment tool
90890-11097
Engine alignment tool
YM-11097



4. Remove:

- Pivot shaft
- Swingarm

EAS30227

CHECKING THE SWINGARM

1. Check:

- Swingarm
Bends/cracks/damage → Replace.

2. Check:

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

EWA13770

WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:

- Pivot shaft
- Dust covers
- Collars
- Bearings
- Washer



Recommended cleaning solvent
Kerosene

4. Check:

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

- Collars
Damage/scratches → Replace.

EAS30228

INSTALLING THE SWINGARM


1. Lubricate:

- Oil seals
- Pivot shaft

| | |
|---|--|
|  | Recommended lubricant Lithium-soap-based grease |
|---|--|

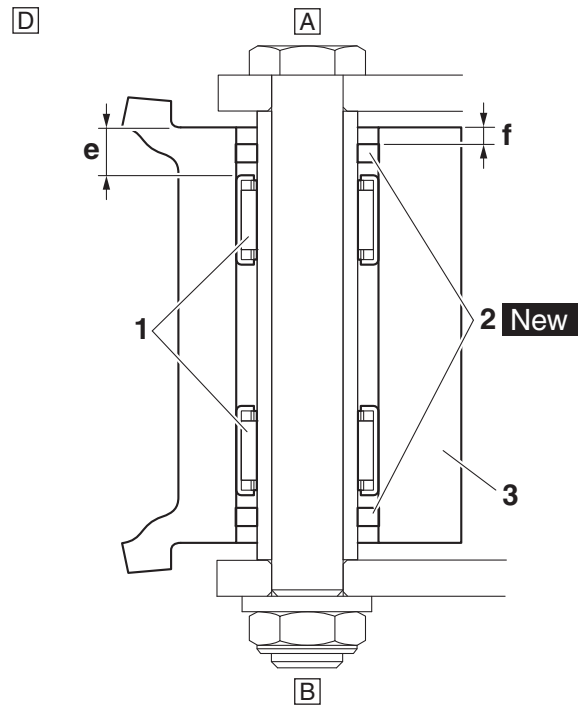
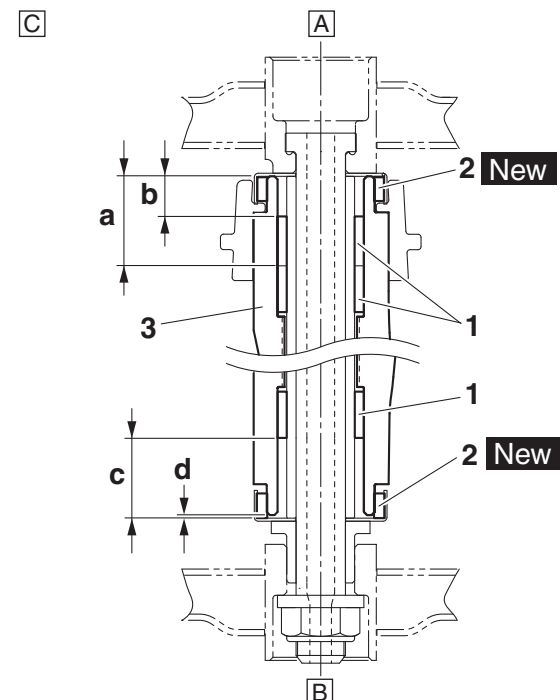
2. Install:

- Bearings "1"
- Oil seals "2" **New**
(to the swingarm "3")

| | |
|---|---|
|  | <p>Installed depth "a" 28.3–29.7 mm (1.11–1.17 in)</p> <p>Installed depth "b" 11.5–13.0 mm (0.45–0.51 in)</p> <p>Installed depth "c" 24.3–25.7 mm (0.96–1.01 in)</p> <p>Installed depth "d" 1.0 mm (0.04 in)</p> <p>Installed depth "e" 7.5–8.5 mm (0.30–0.33 in)</p> <p>Installed depth "f" 3.0 mm (0.12 in)</p> |
|---|---|

TIP

Install the bearings to the swingarm so that the marks are facing outward.



- A. Left side
- B. Right side
- C. Pivot shaft side
- D. Connecting rod bolt side

3. Install:

- Adjusting bolt
(to the frame)

TIP

Temporarily tighten the adjusting bolt until its flange contacts the frame.

4. Install:


- Swingarm
- Pivot shaft


5. Tighten:

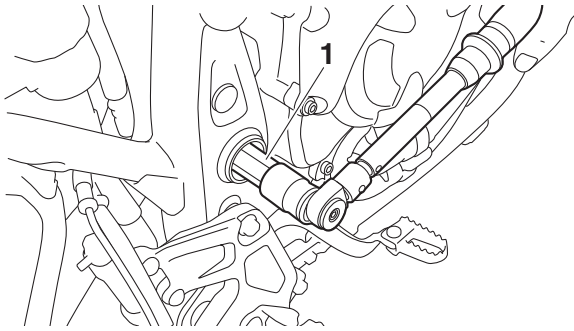
- Adjusting bolt

TIP

- Tighten the adjusting bolt to specification with the engine alignment tool "1".
- Make sure that the flange on the adjusting bolt contacts the dust cover on the swingarm.

| | |
|---|--|
|  | <p>Engine alignment tool 90890-11097</p> <p>Engine alignment tool YM-11097</p> |
|---|--|

| | |
|---|---|
|  | <p>Adjusting bolt 7 N·m (0.7 kgf·m, 5.2 lb·ft)</p> |
|---|---|



6. Install:
- Washer
 - Pivot shaft nut



Pivot shaft nut
110 N·m (11 kgf·m, 81 lb·ft)

7. Install:
- Rear wheel
Refer to “REAR WHEEL” on page 4-23.
8. Adjust:
- Drive chain slack
Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.

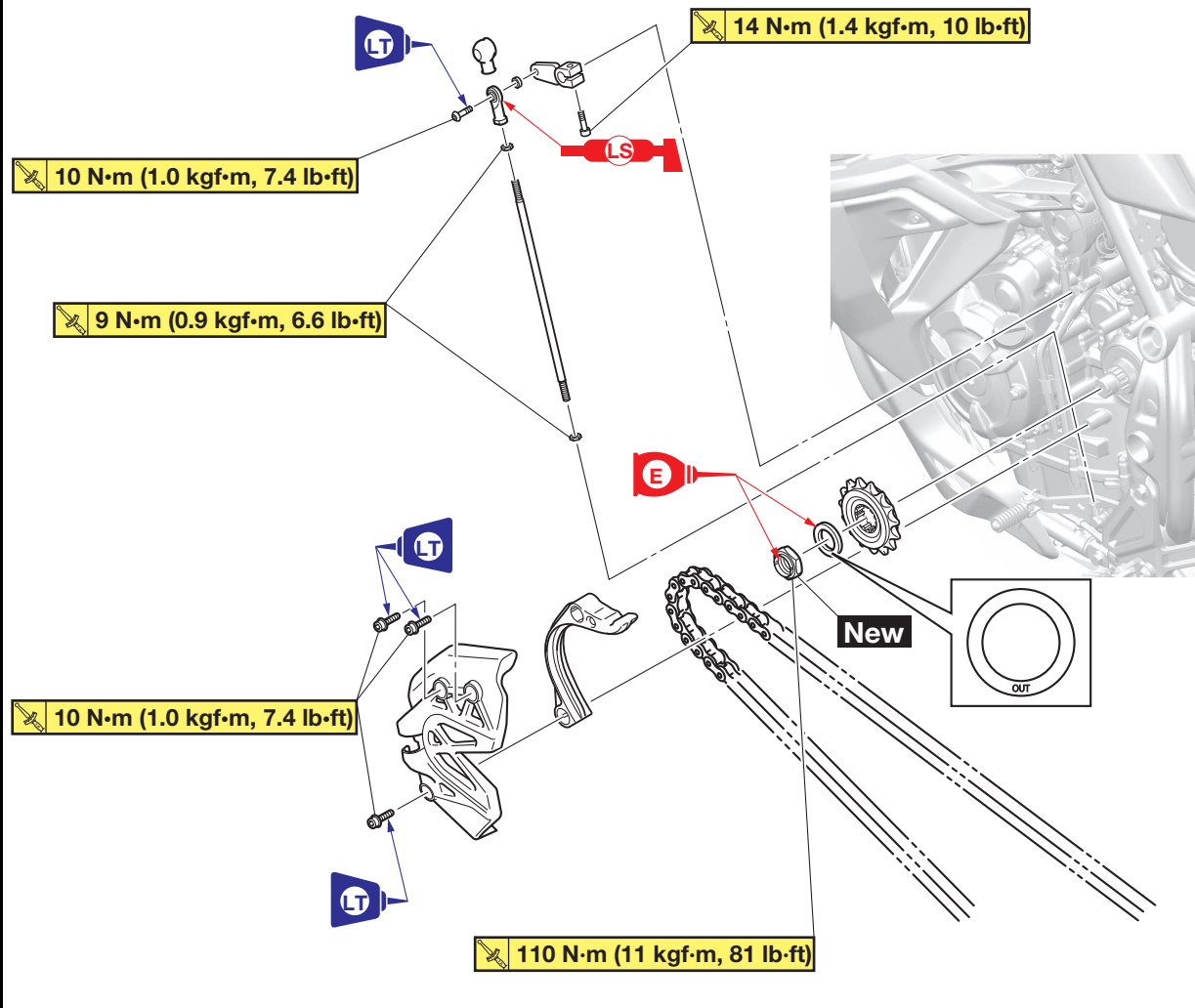


Drive chain slack (Sidestand)
40.0–45.0 mm (1.57–1.77 in)

EAS20038

CHAIN DRIVE

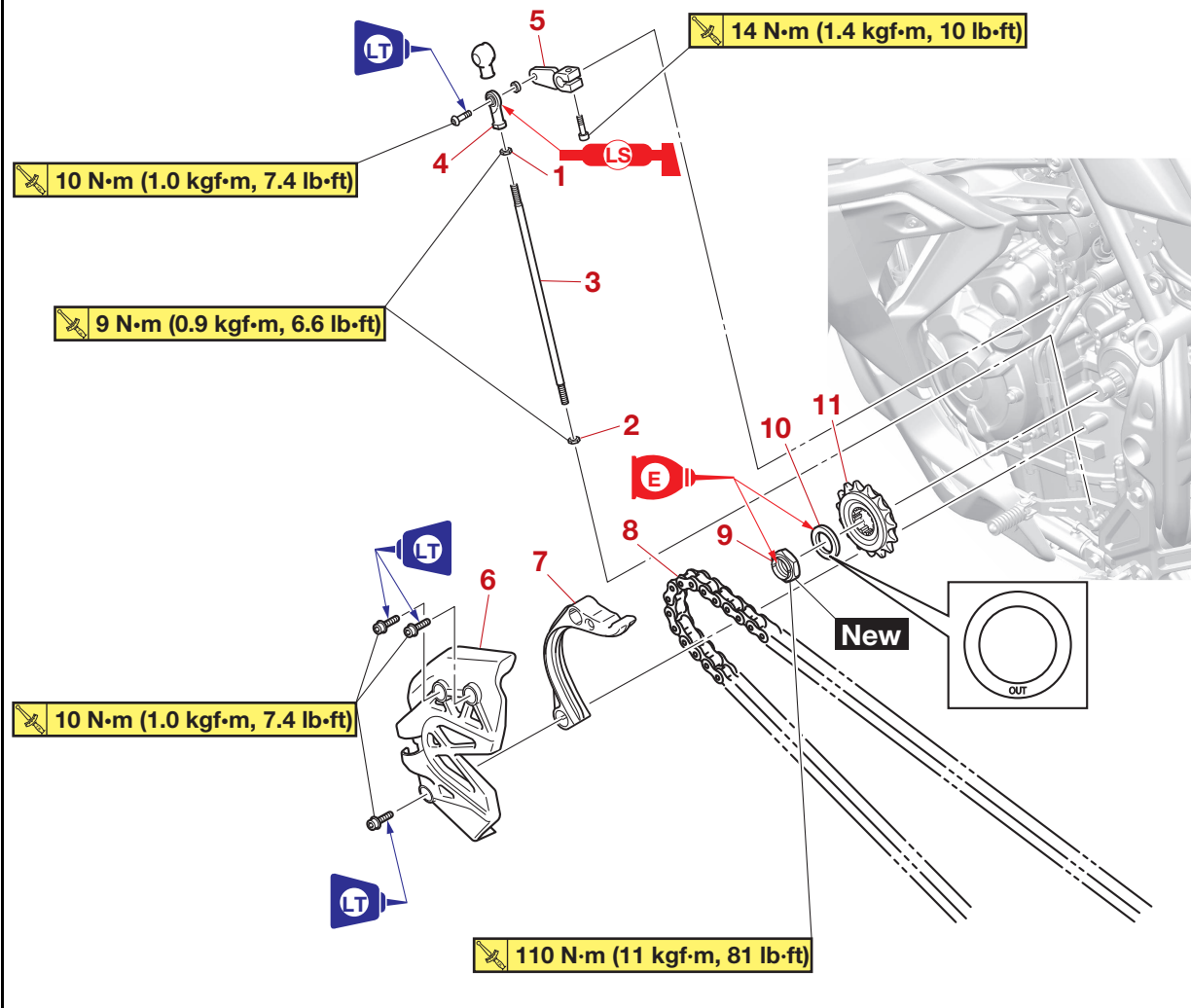
Removing the drive chain



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|--|
| | Side covers | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| | Rear wheel | | TIP Loosen the drive sprocket nut before removing the rear wheel. Refer to "REAR WHEEL" on page 4-23. |
| | Rear shock absorber assembly | | Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-84. |
| | Swingarm | | Refer to "SWINGARM" on page 4-87. |

CHAIN DRIVE

Removing the drive chain



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------------|------|------------------------------|
| 1 | Shift rod locknut (shift arm side) | 1 | Loosen. |
| 2 | Shift rod locknut (shift pedal side) | 1 | Loosen. Left-hand threads |
| 3 | Shift rod | 1 | |
| 4 | Shift rod joint | 1 | |
| 5 | Shift arm | 1 | |
| 6 | Drive sprocket cover | 1 | |
| 7 | Drive chain guide | 1 | |
| 8 | Drive chain | 1 | |
| 9 | Drive sprocket nut | 1 | |
| 10 | Washer | 1 | |
| 11 | Drive sprocket | 1 | |

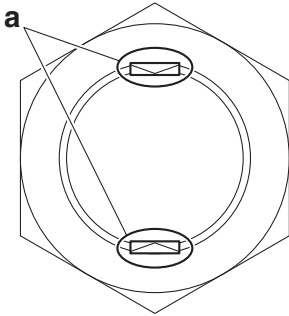
EAS31115

REMOVING THE DRIVE SPROCKET

TIP

Loosen the drive sprocket nut before removing the rear wheel.

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



2. Loosen:

- Drive sprocket nut

TIP

Loosen the drive sprocket nut while pressing the brake pedal.

EAS30230

CHECKING THE DRIVE CHAIN

1. Measure:

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

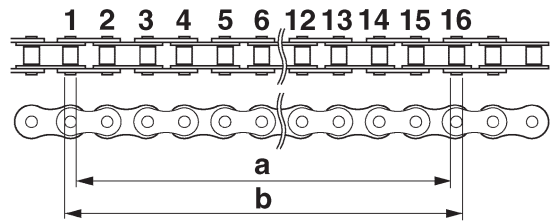


15-link length limit
239.3 mm (9.42 in)

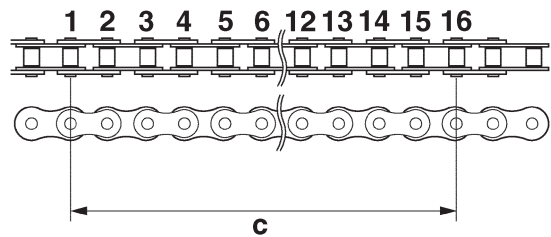
- a. Measure the length "b" between the inner sides of the pins and the length "c" between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
- b. Calculate the length "a" of the 15-link section of the drive chain using the following formula.
Drive chain 15-link section length "a" = (length "b" between pin inner sides + length "c" between pin outer sides)/2

TIP

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



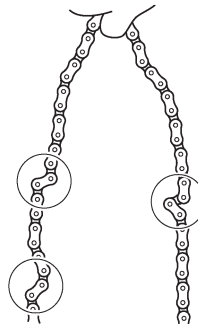
G088937



G088938

2. Check:

- Drive chain
Stiffness → Clean and lubricate or replace.



G088939

3. Clean:

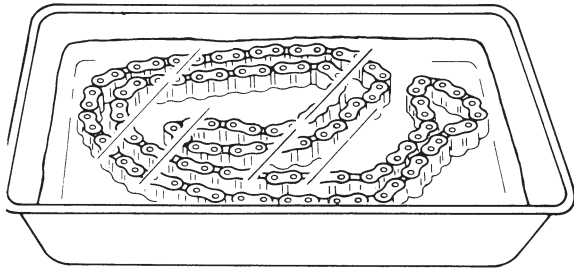
- Drive chain
 - a. Wipe the drive chain with a clean cloth.
 - b. Put the drive chain in kerosene and remove any remaining dirt.
 - c. Remove the drive chain from the kerosene and completely dry it.

ECA14290

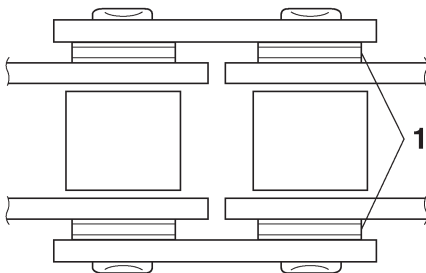
NOTICE

- This motorcycle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.

- Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.

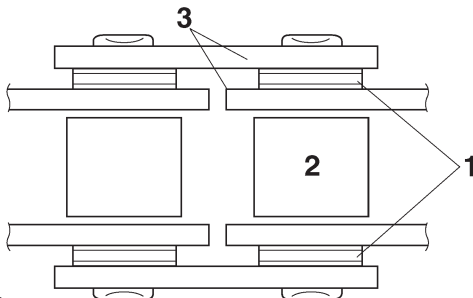


G088940



G088941

4. Check:
 - O-rings "1"
Damage → Replace the drive chain.
 - Drive chain rollers "2"
Damage/wear → Replace the drive chain.
 - Drive chain side plates "3"
Damage/wear/cracks → Replace the drive chain.



G088943

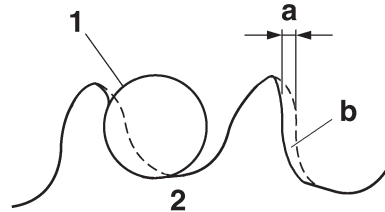
5. Lubricate:
 - Drive chain



EAS30231

CHECKING THE DRIVE SPROCKET

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



G088904

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

EAS30232

CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-26.

EAS30233

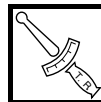
CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-26.

EAS31116

INSTALLING THE DRIVE SPROCKET

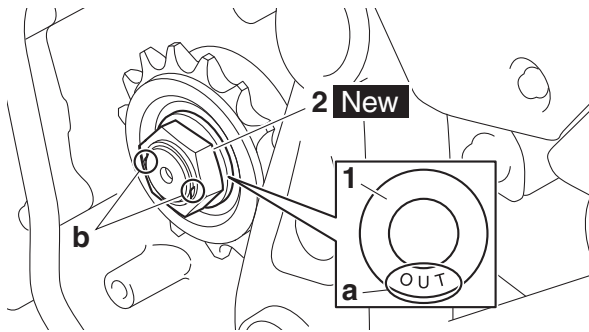
1. Install:
 - Drive sprocket
 - Washer "1"
 - Drive sprocket nut "2" **New**



Drive sprocket nut
110 N·m (11 kgf·m, 81 lb·ft)

TIP

- While applying the rear brake, tighten the drive sprocket nut.
- Install washer with the "OUT" mark "a" facing out.
- Stake the drive sprocket nut "2" at cutouts "b" in the drive axle.
- Make sure that there is no crack in the caulking of the nut.



EAS30234

INSTALLING THE DRIVE CHAIN

1. Install:

- Drive chain

TIP

Install the drive chain joint with the drive chain cut & rivet tool.

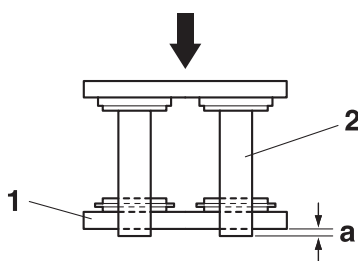


Drive chain cut & rivet tool
90890-01550
Drive chain cut & rivet tool
YM-01550

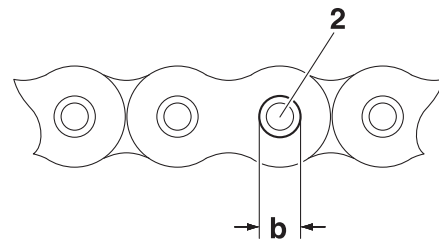
- a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).

TIP

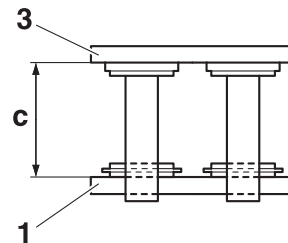
Apply lithium soap-based grease onto the connecting pin "2".



- b. After riveting, make sure the diameter between the edges "b" of the connecting pin "2" is 5.7–6.0 mm (0.22–0.24 in).



- c. After riveting, make sure the space "c", which is inside of the connecting link "3" and inside of the connecting plate "1", is 14.6–14.8 mm (0.57–0.58 in).



2. Lubricate:

- Drive chain



Recommended lubricant
Chain lubricant suitable for O-
ring chains

3. Install:

- Shift arm "1"
- Shift rod joint
- Shift rod
- Shift rod locknuts

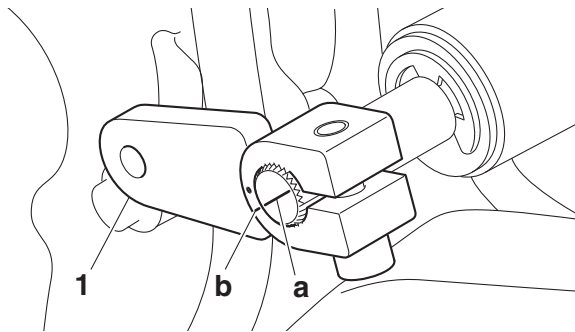
TIP

Before installing, make sure to align the mark "a" of the shift shaft with the mark "b" of the shift arm.





Shift arm pinch bolt
14 N·m (1.4 kgf·m, 10 lb·ft)

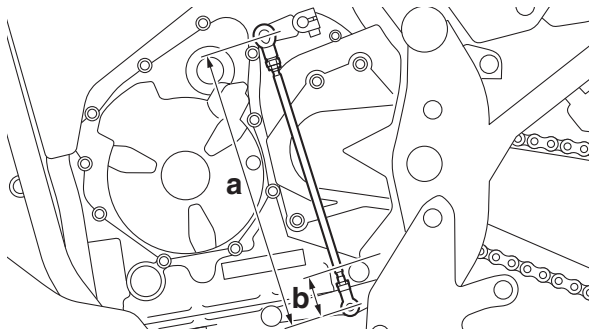
CHAIN DRIVE



4. Measure:

- Installed shift rod length "a" and "b"
Incorrect → Adjust.

| | |
|---|----------------------------------|
|  | Installed length "a" |
| | 273–275 mm (10.7–10.8 in) |
|  | Installed length "b" |
| | 35–36 mm (1.38–1.42 in) |



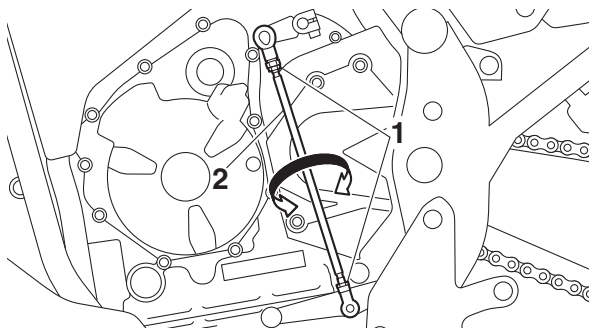
5. Adjust:

- Installed shift rod length
 - Loosen both locknuts "1".

TIP

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

- Turn the shift rod "2" to obtain the correct shift pedal position.

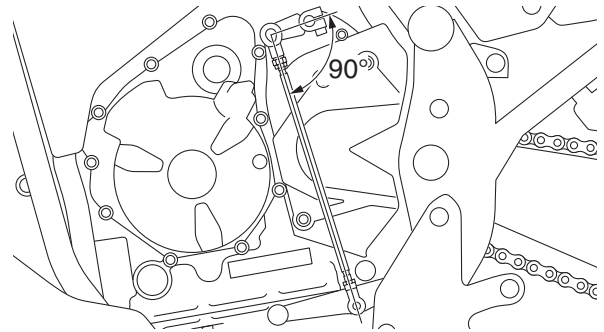


- Tighten both locknuts.



Shift rod locknut (shift arm side)
9 N·m (0.9 kgf·m, 6.6 lb·ft)
Shift rod locknut (shift pedal side)
9 N·m (0.9 kgf·m, 6.6 lb·ft)
Left-hand threads

- Make sure that the angle between the shift arm and the shift rod is about 90°.



6. Adjust:

- Drive chain slack
Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-18.



Drive chain slack (Sidestand)
40.0–45.0 mm (1.57–1.77 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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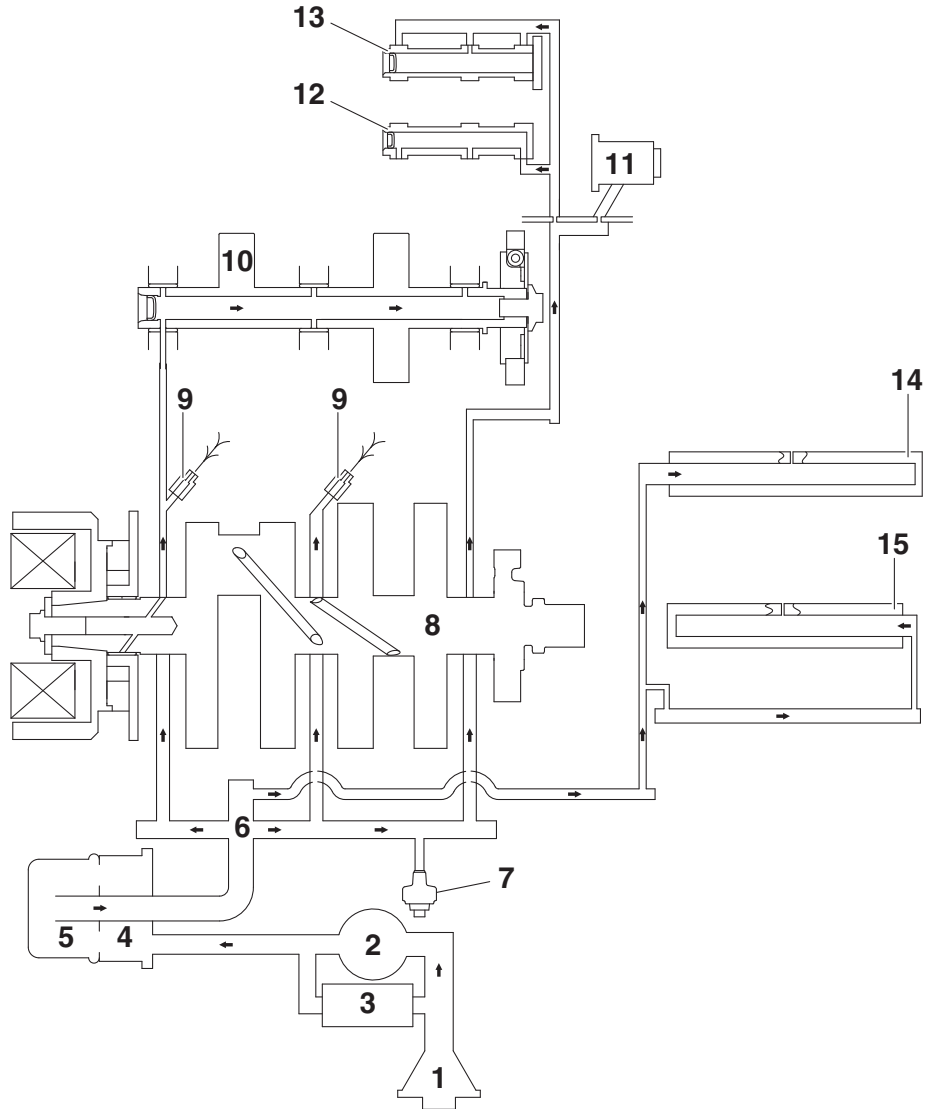
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20298

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32362

ENGINE OIL LUBRICATION CHART



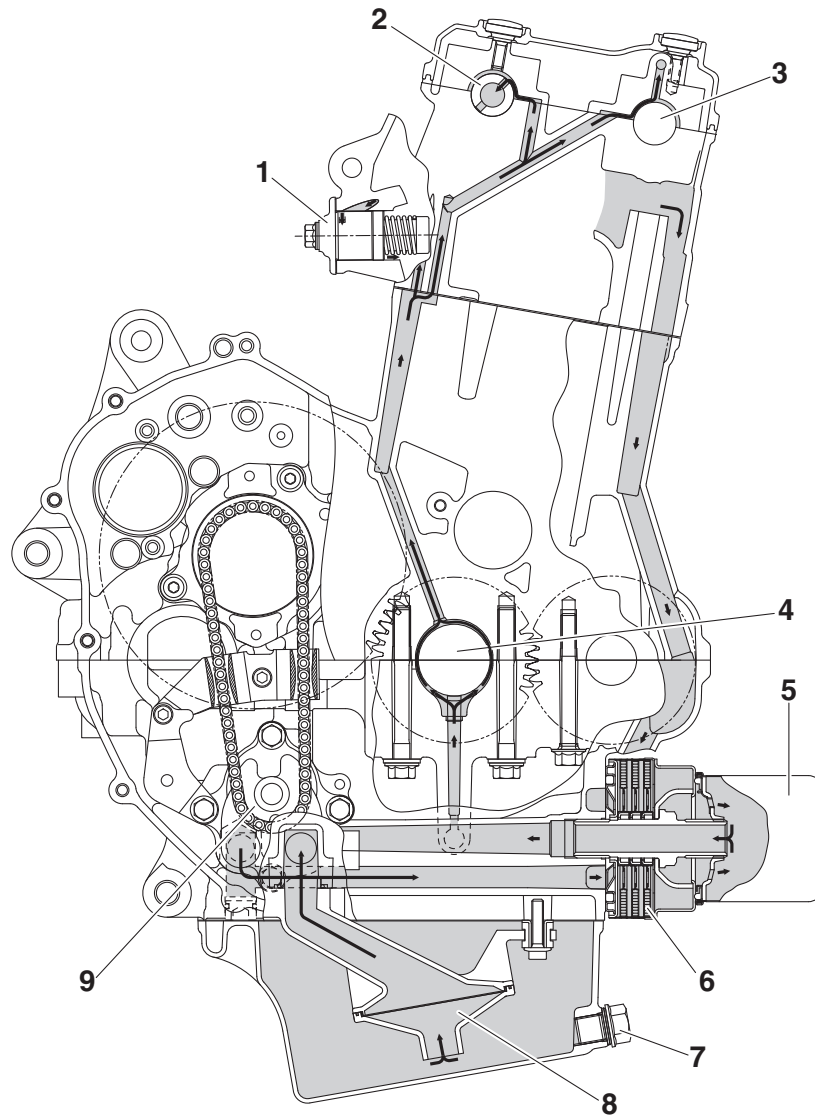
1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter cartridge
6. Main gallery
7. Oil pressure switch
8. Crankshaft
9. Oil nozzle
10. Balancer shaft assembly
11. Timing chain tensioner
12. Intake camshaft
13. Exhaust camshaft
14. Main axle
15. Drive axle

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32363

LUBRICATION DIAGRAMS

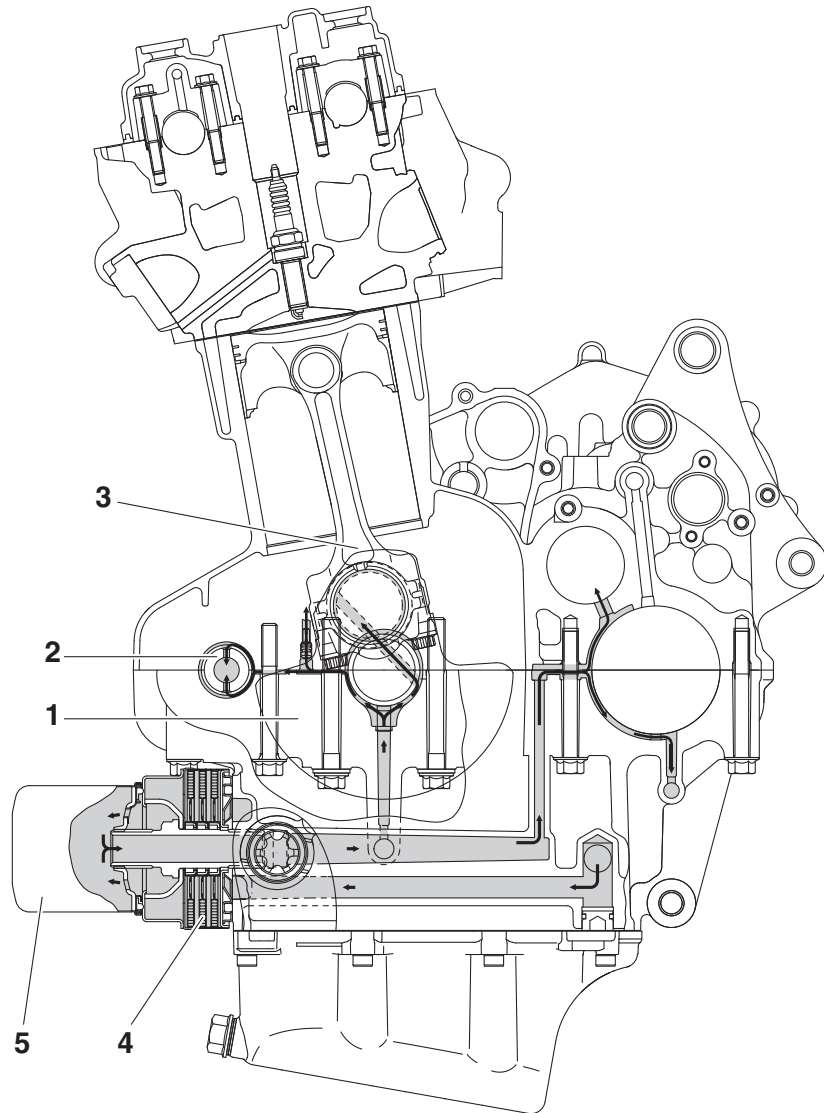
Crankcase, cylinder, and cylinder head (right side view)



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

LUBRICATION SYSTEM CHART AND DIAGRAMS

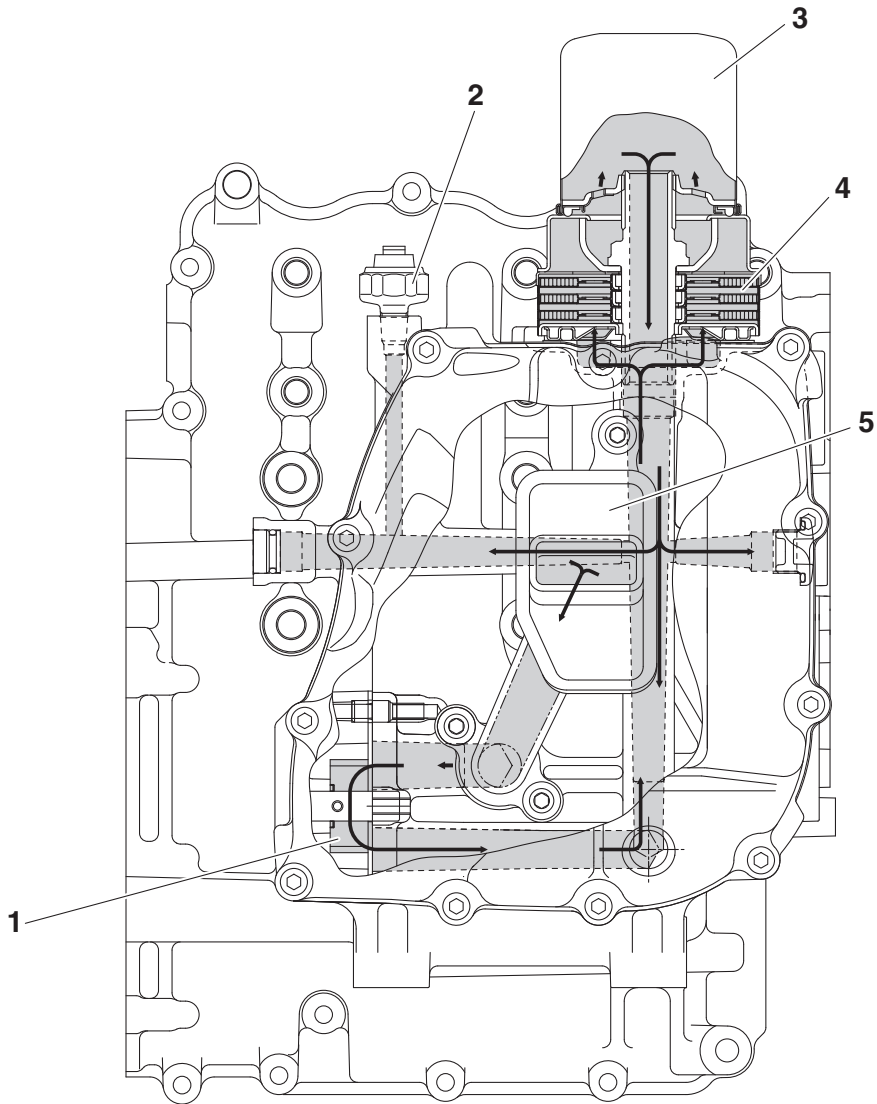
Crankcase and cylinder (left side view)



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

LUBRICATION SYSTEM CHART AND DIAGRAMS

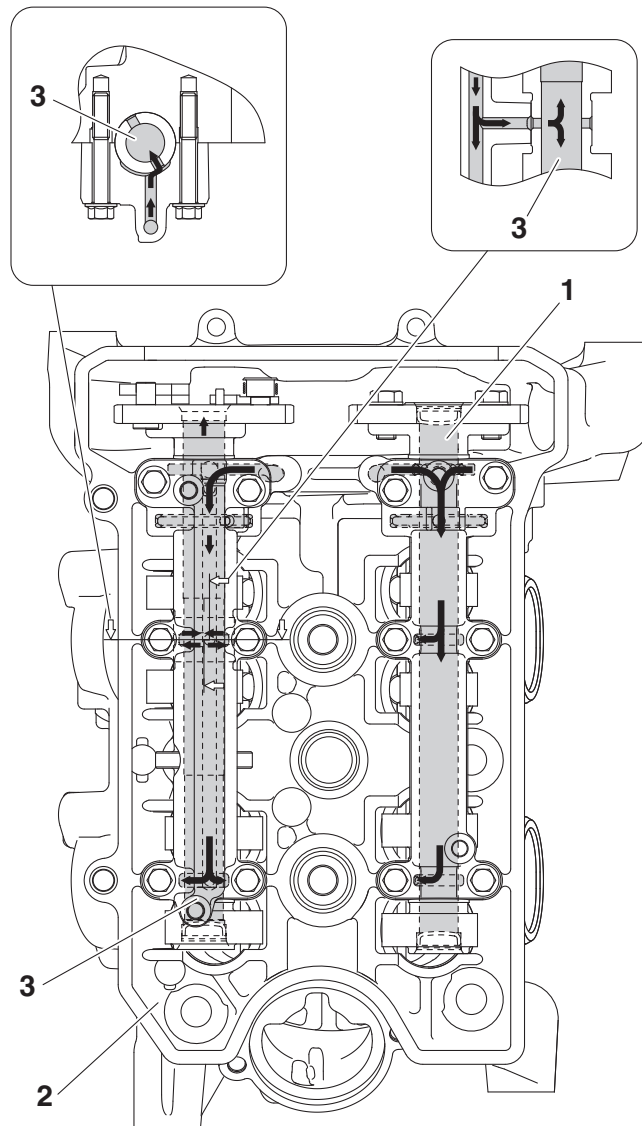
Oil pump (bottom view)



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

LUBRICATION SYSTEM CHART AND DIAGRAMS

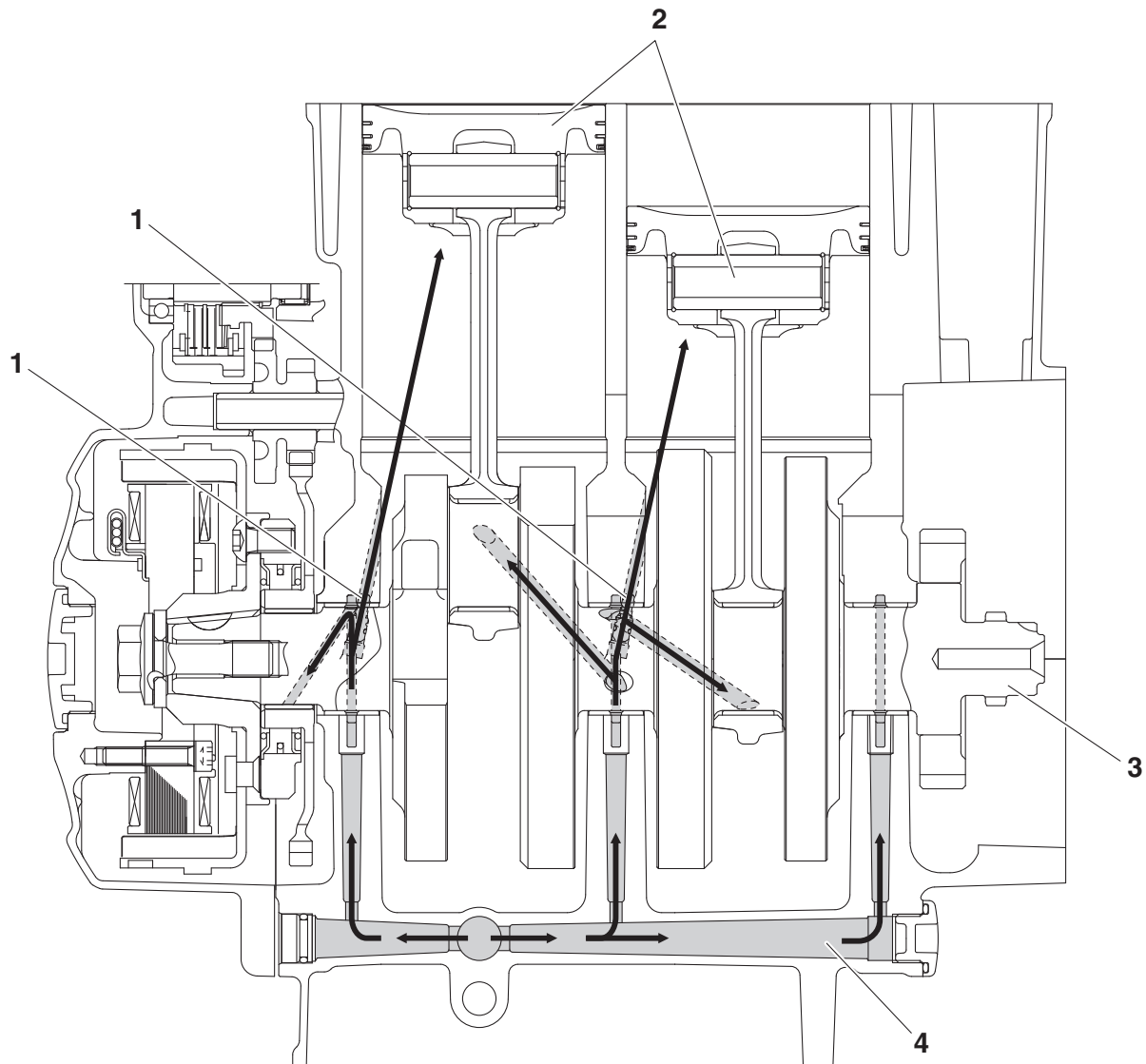
Camshaft (top view)



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

LUBRICATION SYSTEM CHART AND DIAGRAMS

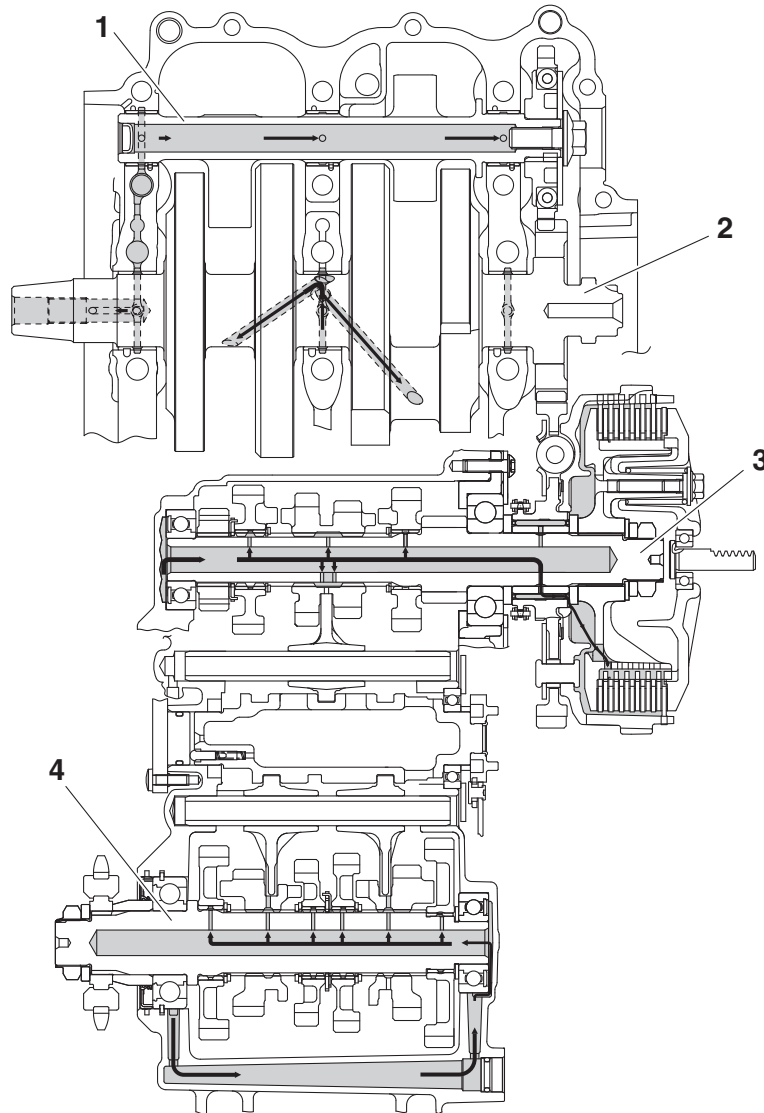
Crankshaft (front view)



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

LUBRICATION SYSTEM CHART AND DIAGRAMS

Crankshaft and transmission (top view)



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

EAS20041

ENGINE INSPECTION

EAS30249

MEASURE THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
 - Valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-6.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
 - Ignition coils
Refer to “CHECKING THE SPARK PLUGS” on page 3-5.
4. Remove:
 - Spark plugs

ECA13340

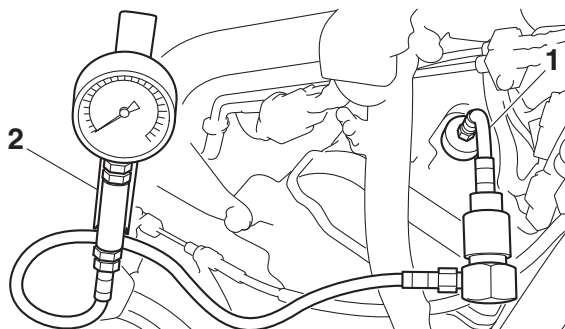
NOTICE

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

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



**Compression gauge extension
122mm
90890-04136**
**Compression gauge extension
122mm
YM-04136**
**Compression gauge
90890-03081**
**Engine compression tester
YU-33223**



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

TIP

Due to the engine characteristics, the compression pressure is different for cylinder #1 and cylinder #2.



Compression pressure (#1 cylinder)

770–990 kPa/355 r/min (7.7–9.9 kgf/cm²/355 r/min, 109.5–140.8 psi/355 r/min)

Compression pressure (#2 cylinder)

690–880 kPa/355 r/min (6.9–8.8 kgf/cm²/355 r/min, 98.1–125.2 psi/355 r/min)

- a. Turn the main switch to “ON”.
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12940

WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

- c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
Carbon deposits → Eliminate.
- d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
Refer to the following table.

| Compression pressure (with oil applied into the cylinder) | |
|---|--|
| Reading | Diagnosis |
| Higher than without oil | Piston ring(s) wear or damage → Repair. |
| Same as without oil | Pistons, valves, cylinder head gasket or piston ring(s) possibly defective → Repair. |

7. Install:

- Spark plugs
- Ignition coils

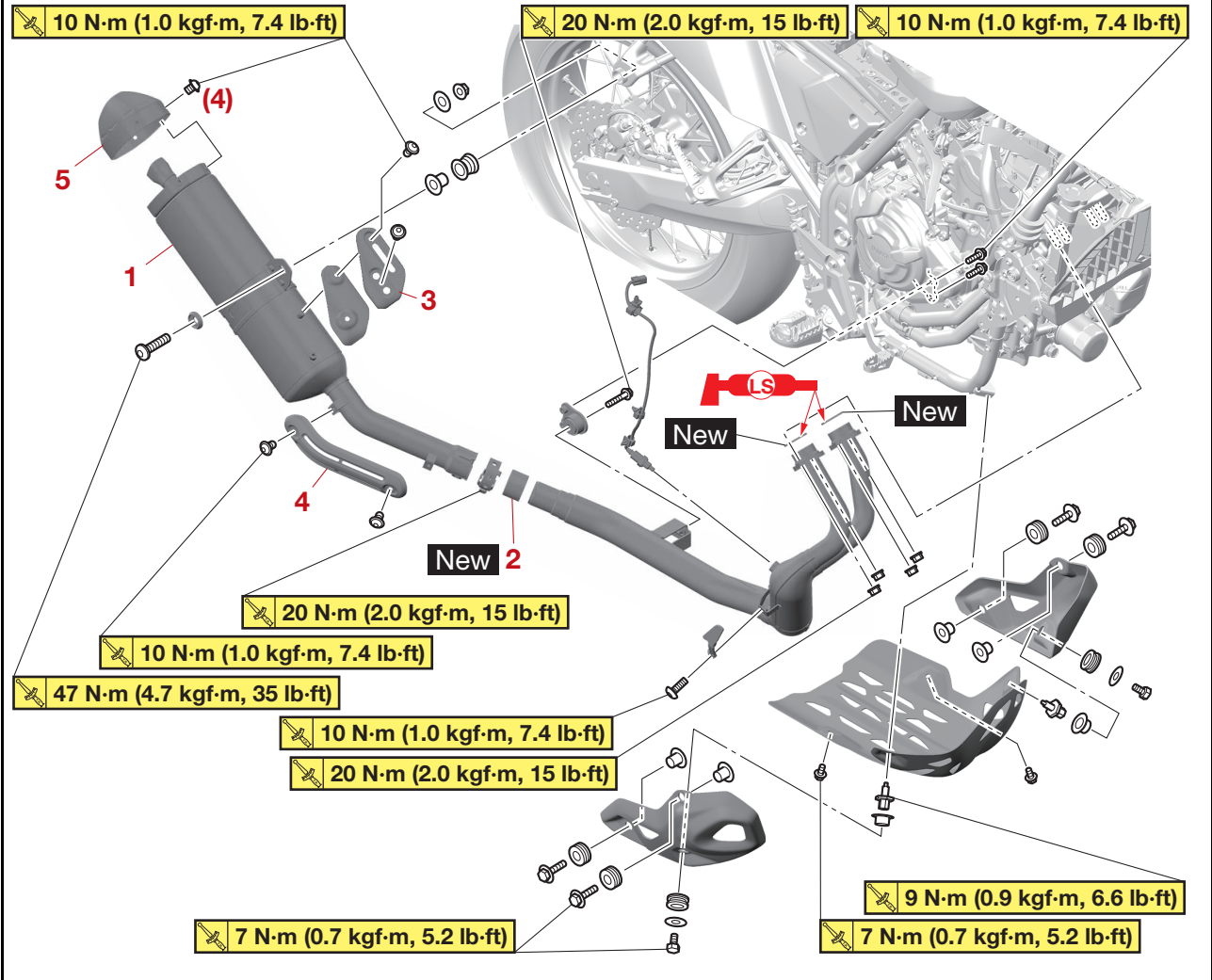


Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

EAS20042

ENGINE REMOVAL

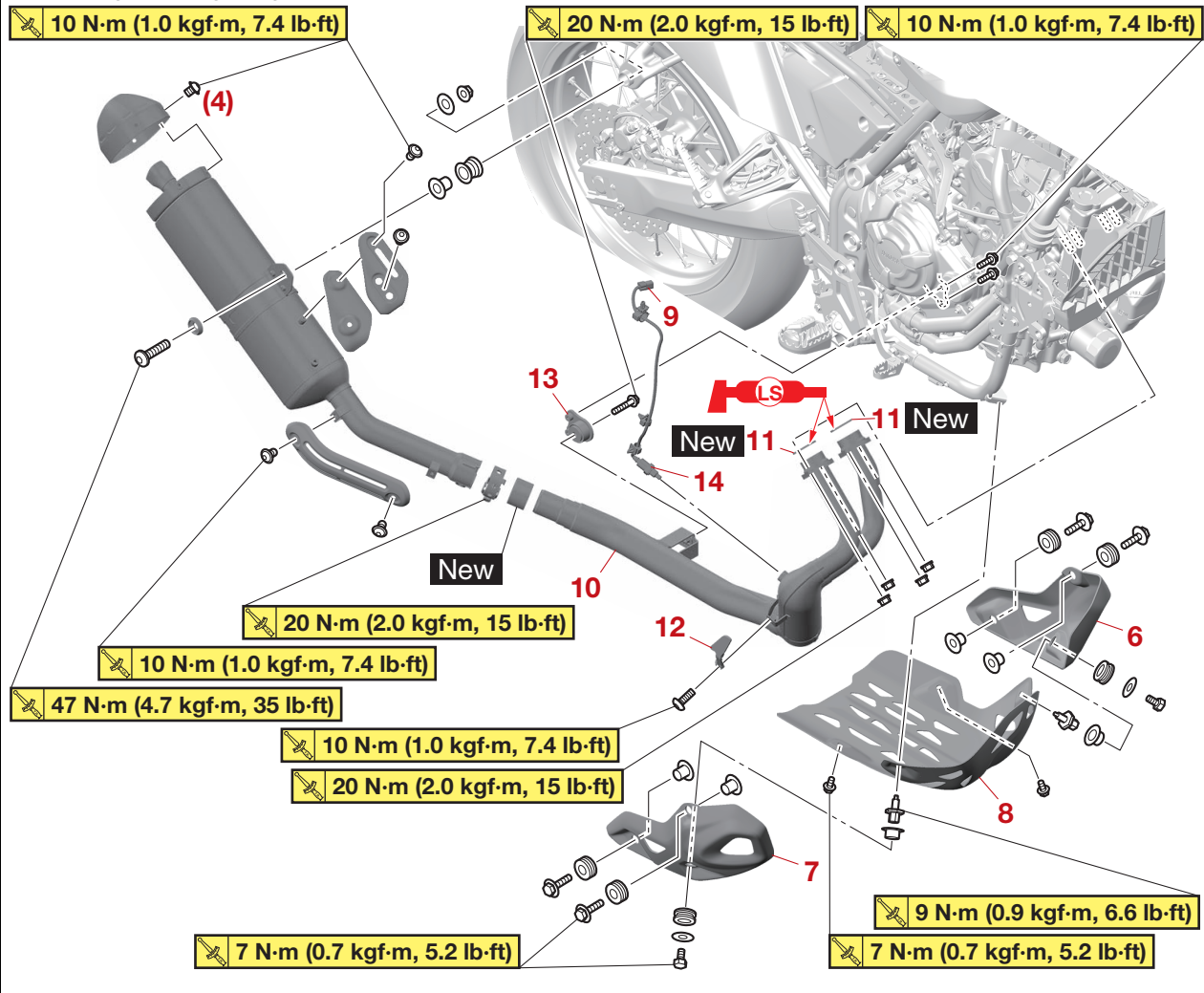
Removing the engine guards and exhaust pipe



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| 1 | Muffler | 1 | |
| 2 | Gasket | 1 | |
| 3 | Muffler protector 1 | 1 | |
| 4 | Muffler protector 2 | 1 | |
| 5 | Muffler cap | 1 | |

ENGINE REMOVAL

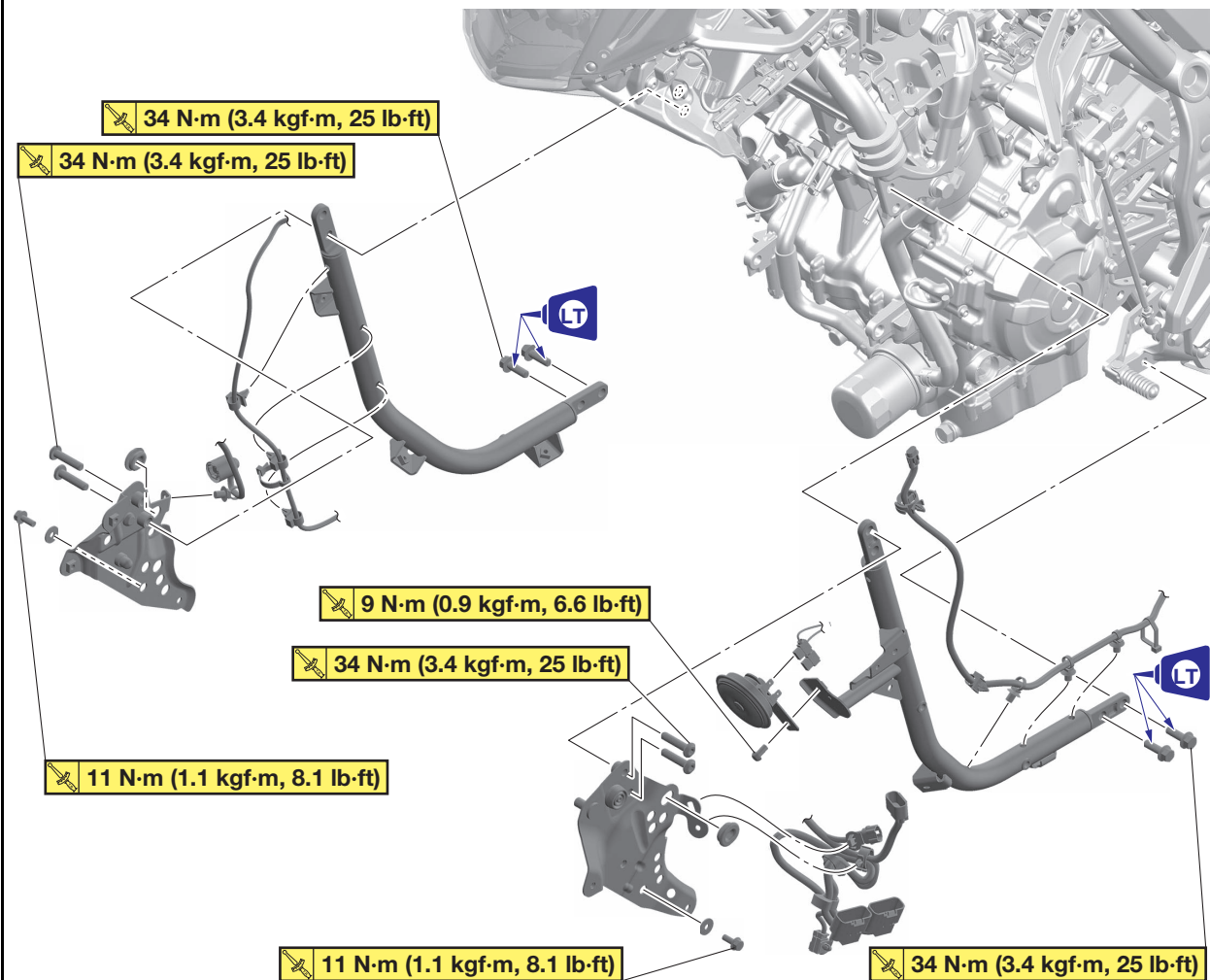
Removing the engine guards and exhaust pipe



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------------|------|---|
| 6 | Engine guard (left) | 1 | |
| 7 | Engine guard (right) | 1 | |
| 8 | Engine guard (center) | 1 | |
| 9 | O ₂ sensor coupler | 1 | Disconnect. |
| 10 | Exhaust pipe | 1 | |
| 11 | Gasket | 2 | |
| 12 | Damper | 1 | |
| 13 | Exhaust pipe bracket | 1 | |
| 14 | O ₂ sensor | 1 | Remove the O ₂ sensor only when necessary. |

ENGINE REMOVAL

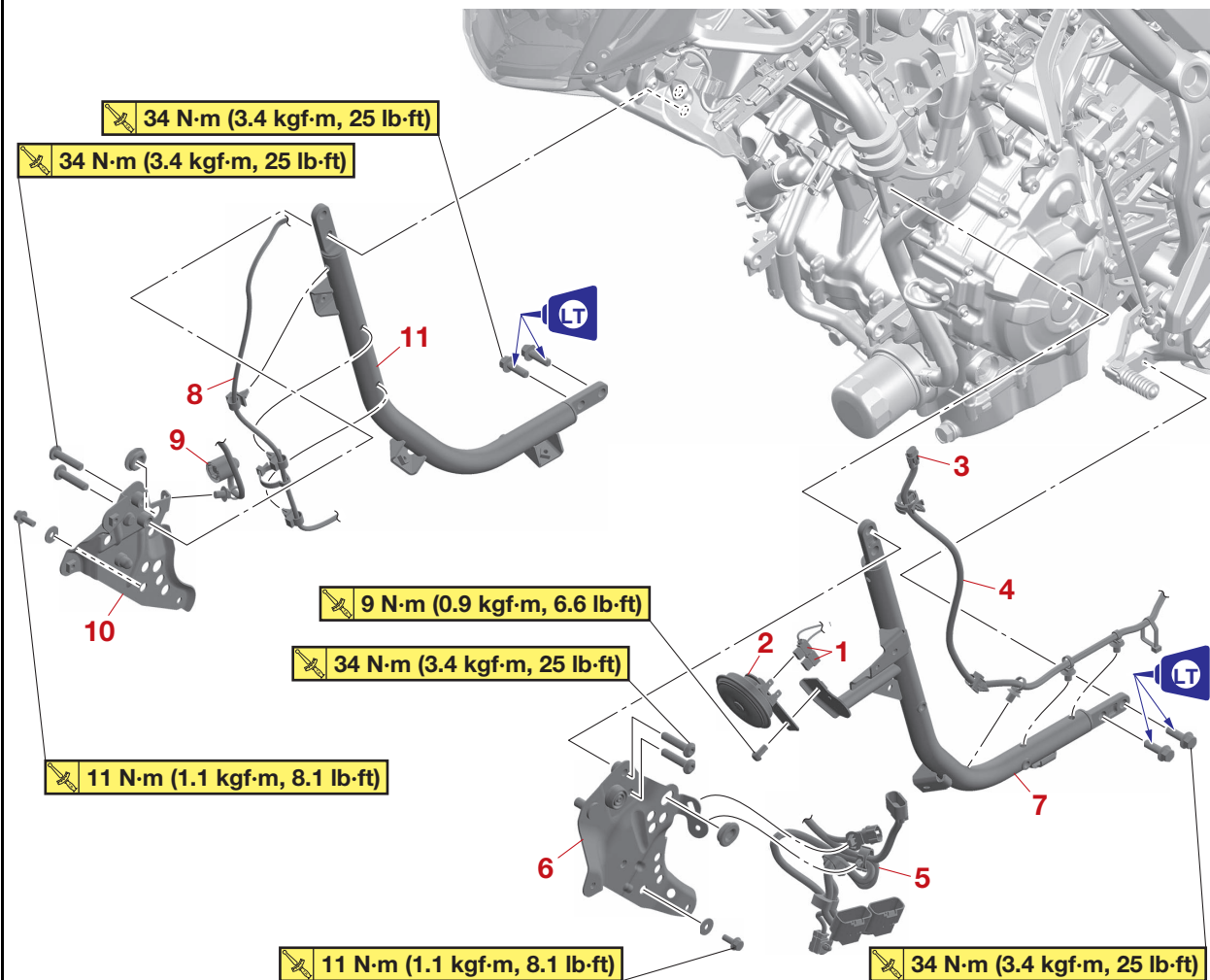
Removing the down tubes



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------------|------|---|
| | Front side cover (left) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (left) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Radiator | | Refer to "RADIATOR" on page 6-2. |

ENGINE REMOVAL

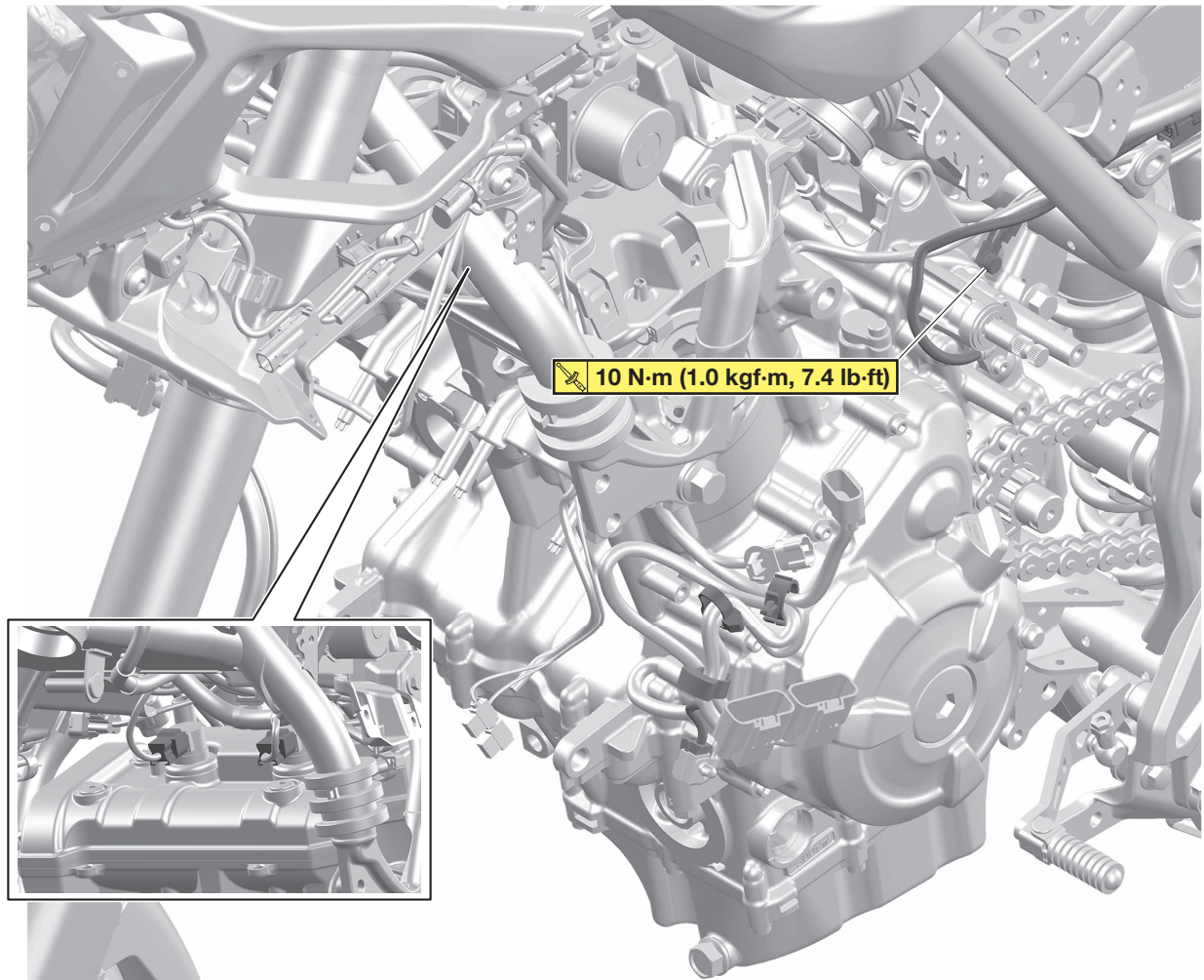
Removing the down tubes



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|-------------|
| 1 | Horn connector | 2 | Disconnect. |
| 2 | Horn | 1 | |
| 3 | Sidestand switch coupler | 1 | Disconnect. |
| 4 | Sidestand switch lead | 1 | |
| 5 | Wire harness | 1 | |
| 6 | Radiator bracket (left) | 1 | |
| 7 | Down tube (left) | 1 | |
| 8 | Oil pressure switch lead | 1 | |
| 9 | Fuel cut solenoid valve lead | 1 | |
| 10 | Radiator bracket (right) | 1 | |
| 11 | Down tube (right) | 1 | |

ENGINE REMOVAL

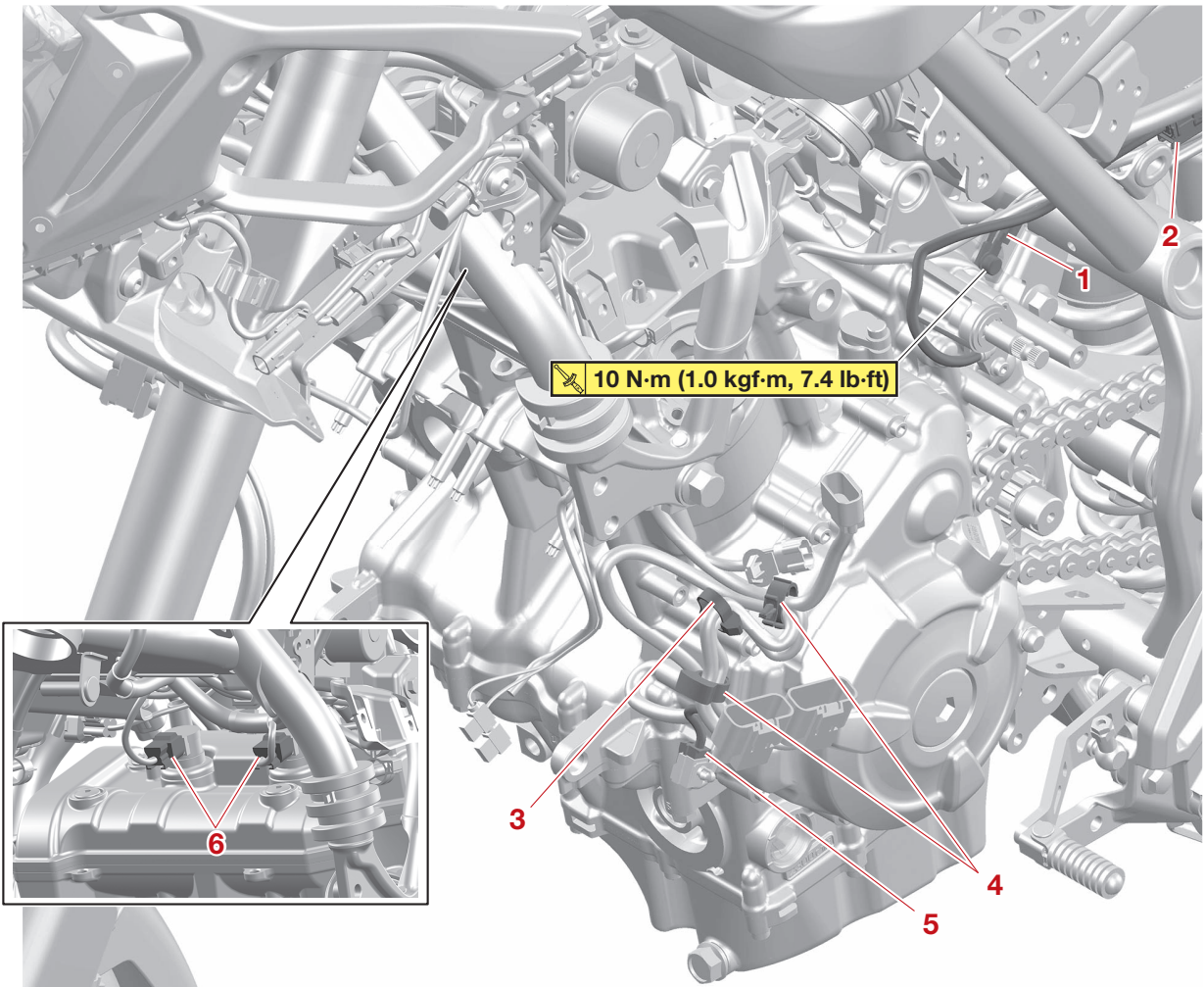
Disconnecting the leads and couplers



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Engine oil | | Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| | Tail cover | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| | Canister | | Refer to "FUEL TANK" on page 7-1. |
| | Drive chain | | Refer to "CHAIN DRIVE" on page 4-92. |
| | Cylinder head breather hose | | Refer to "CYLINDER HEAD" on page 5-34. |
| | Clutch cable | | Disconnect. Refer to "CLUTCH" on page 5-54. |
| | Starter motor lead | | Disconnect. Refer to "ELECTRIC STARTER" on page 5-50. |
| | Oil pressure switch | | Refer to "CRANKCASE" on page 5-73. |
| | Water jacket joint/Oil cooler | | Refer to "OIL COOLER" on page 6-5. |
| | Thermostat | | Refer to "THERMOSTAT" on page 6-8. |
| | Water pump inlet pipe/Water pump outlet pipe | | Refer to "WATER PUMP" on page 6-10. |
| | Sub-wire harness/Throttle bodies | | Refer to "THROTTLE BODIES" on page 7-8. |

ENGINE REMOVAL

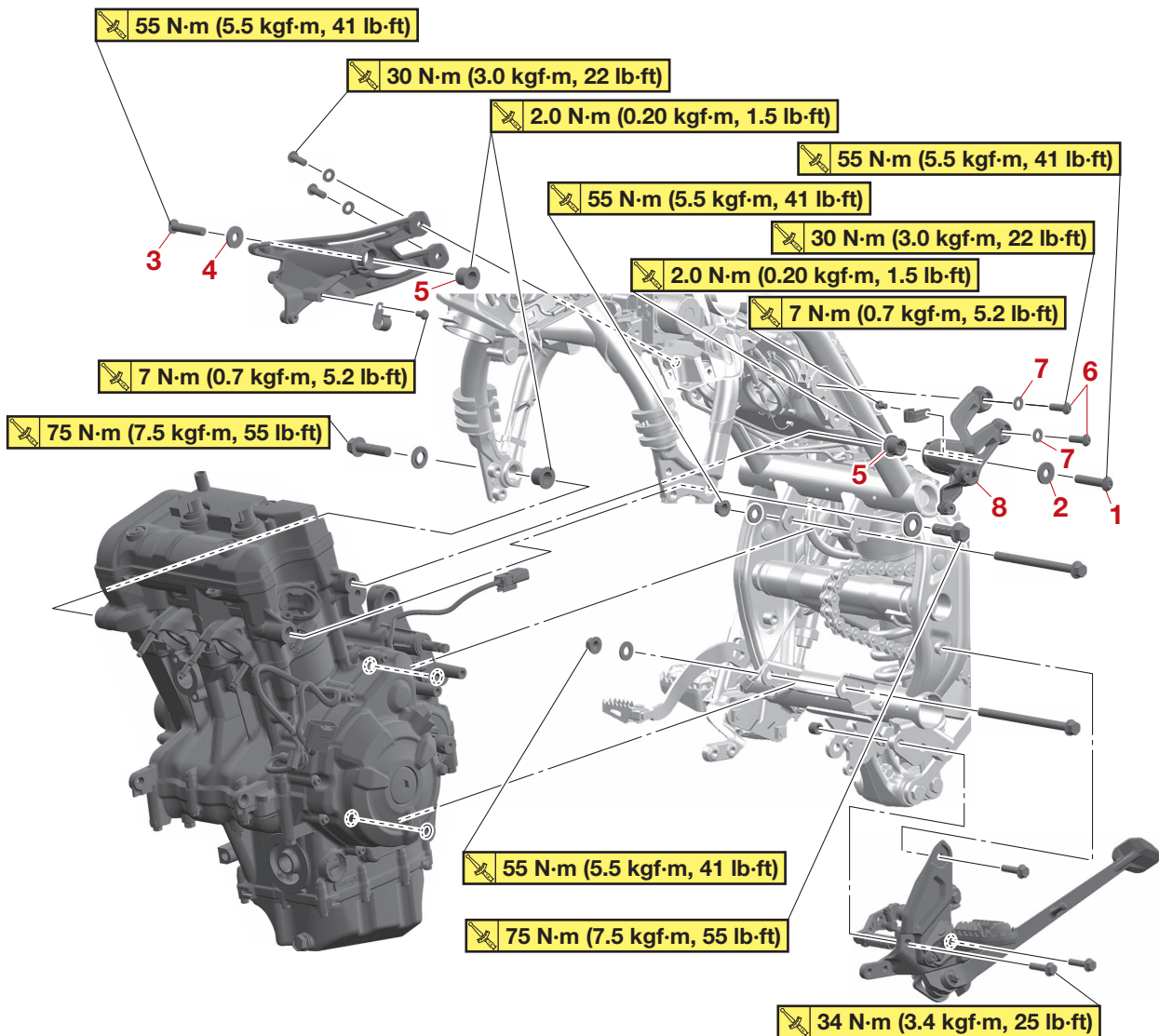
Disconnecting the leads and couplers



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------------|------|-------------|
| 1 | Engine ground lead | 1 | Disconnect. |
| 2 | Gear position sensor coupler | 1 | Disconnect. |
| 3 | Plastic band | 1 | |
| 4 | Lead holder | 2 | |
| 5 | Crankshaft position sensor coupler | 1 | Disconnect. |
| 6 | Ignition coil coupler | 2 | Disconnect. |

ENGINE REMOVAL

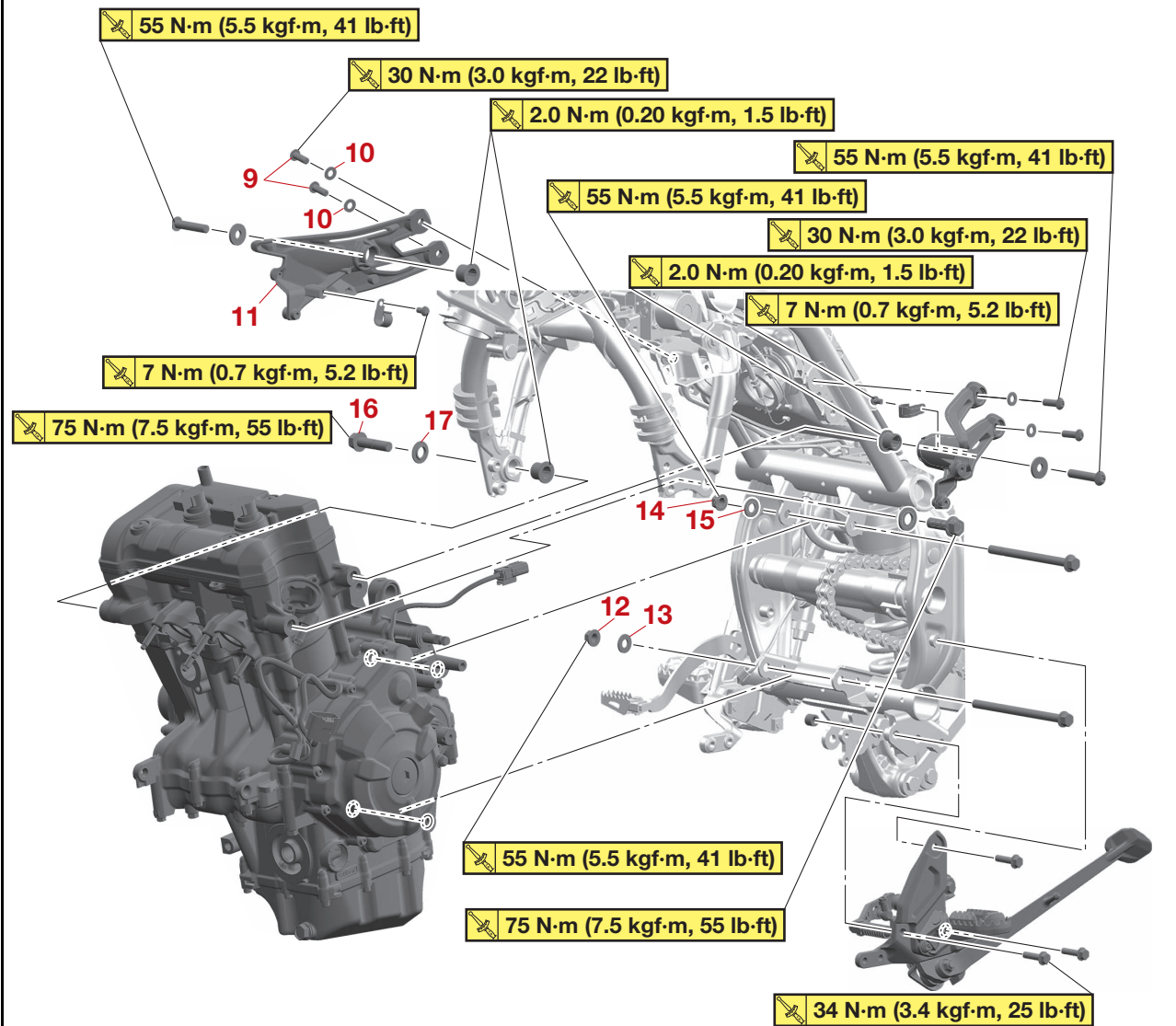
Removing the engine



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|--|
| 1 | Engine mounting bolt (left upper side) | 1 | |
| 2 | Washer | 1 | |
| 3 | Engine mounting bolt (right upper side) | 1 | |
| 4 | Washer | 1 | |
| 5 | Engine mounting adjust bolt (rear) | 2 | Loosen. TIP _____ Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket. |
| 6 | Engine bracket bolt (left) | 2 | |
| 7 | Washer | 2 | |
| 8 | Engine bracket (left) | 1 | For installation, install all parts that will be installed inward of fuel tanks before installing the engine bracket. Fuel tanks cannot be installed with the engine bracket installed. |

ENGINE REMOVAL

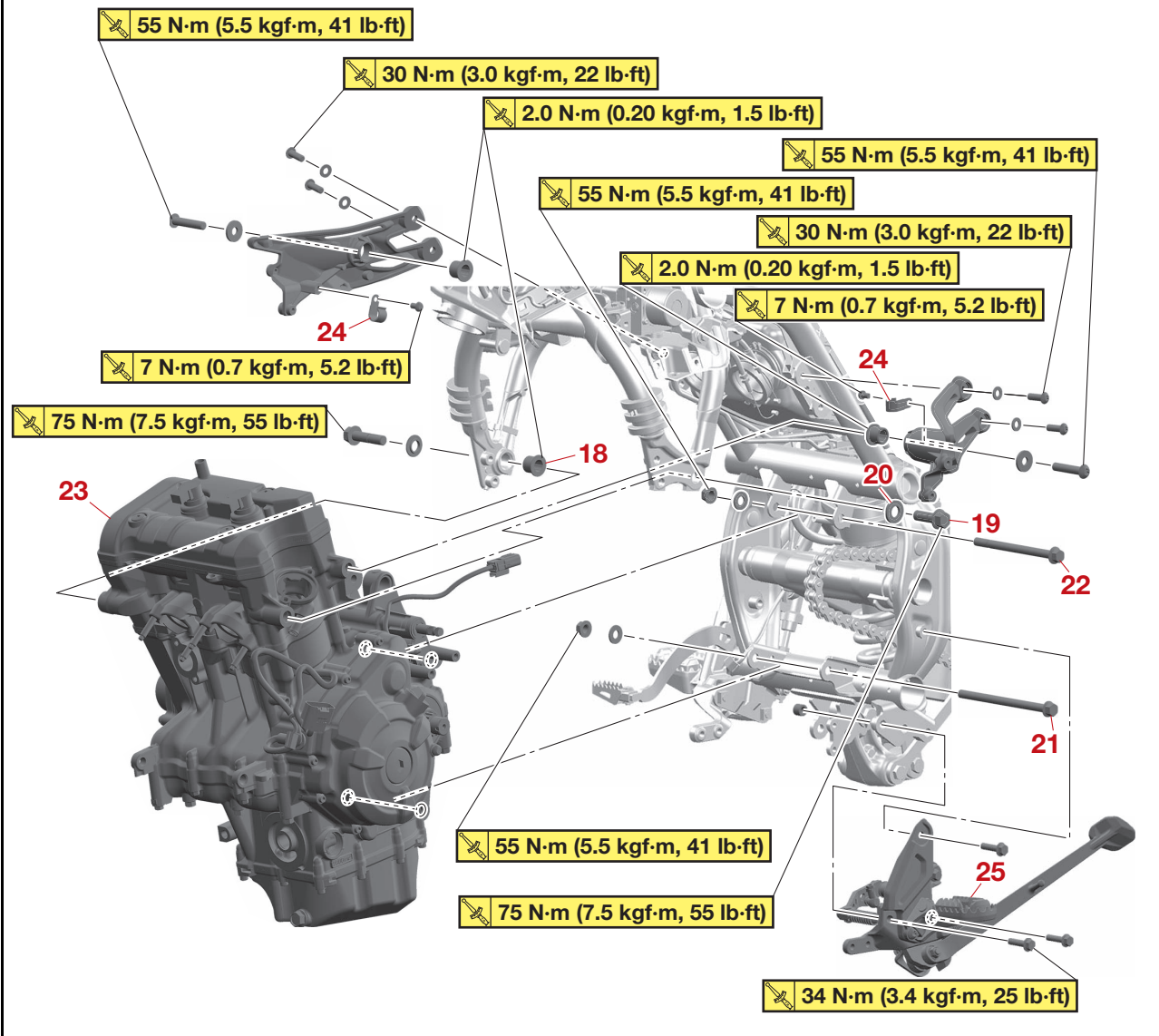
Removing the engine



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|--|
| 9 | Engine bracket bolt (right) | 2 | |
| 10 | Washer | 2 | |
| 11 | Engine bracket (right) | 1 | For installation, install all parts that will be installed inward of fuel tanks before installing the engine bracket. Fuel tanks cannot be installed with the engine bracket installed. |
| 12 | Engine mounting nut (rear lower side) | 1 | |
| 13 | Washer | 1 | |
| 14 | Engine mounting nut (rear upper side) | 1 | |
| 15 | Washer | 1 | |
| 16 | Engine mounting bolt (front right side) | 1 | |
| 17 | Collar | 1 | |

ENGINE REMOVAL

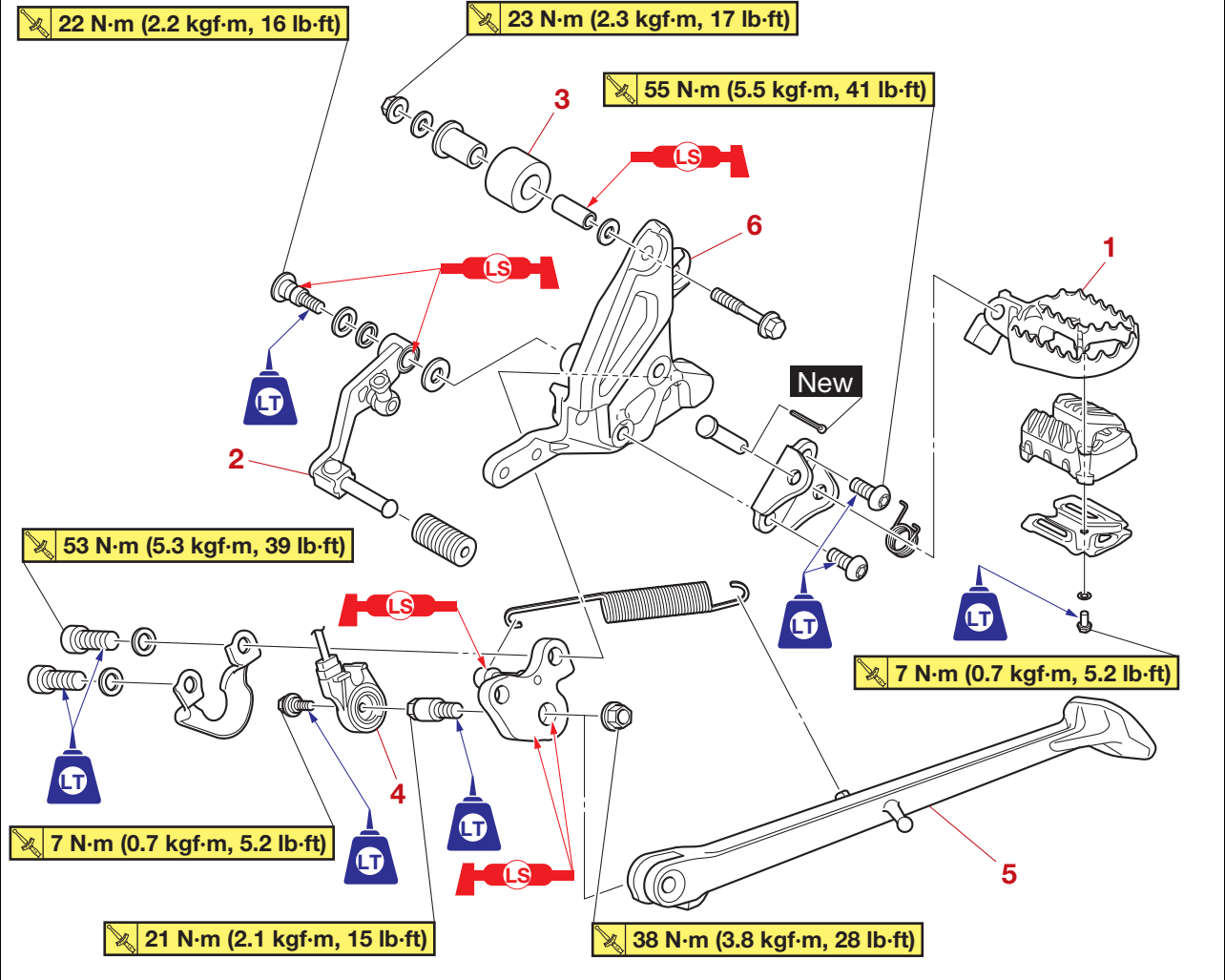
Removing the engine



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| 18 | Engine mounting adjust bolt (front) | 1 | Loosen. TIP _____ Turn the bolt counterclockwise using a 1/2 inch hexagon bit socket. |
| 19 | Engine mounting bolt (front left side) | 1 | |
| 20 | Washer | 1 | |
| 21 | Engine mounting bolt (rear lower side) | 1 | |
| 22 | Engine mounting bolt (rear upper side) | 1 | |
| 23 | Engine | 1 | |
| 24 | Fuel hose holder | 2 | |
| 25 | Footrest assembly (left) | 1 | |

ENGINE REMOVAL

Disassembling the footrest assembly (left)



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------|------|---------|
| 1 | Footrest (left) | 1 | |
| 2 | Shift pedal | 1 | |
| 3 | Drive chain tensioner | 1 | |
| 4 | Sidestand switch | 1 | |
| 5 | Sidestand | 1 | |
| 6 | Footrest bracket (left) | 1 | |

ENGINE REMOVAL

EAS30250

REMOVING THE ENGINE

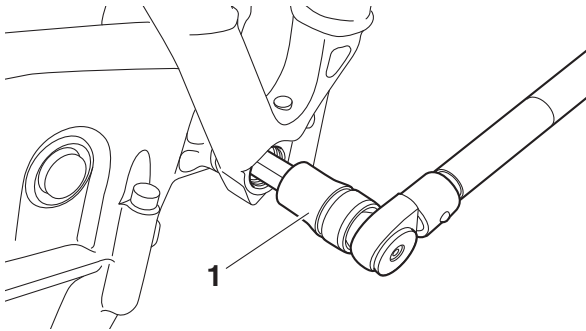
The following procedure applies to all of the engine mounting adjust bolts.

1. Loosen:

- Engine mounting adjust bolt

TIP

Loosen the engine mounting adjust bolt using a 1/2 inch hexagon bit socket "1"



EAS30251

INSTALLING THE ENGINE

1. Install:

- Engine mounting adjust bolt (front) "1"
(Temporarily, onto the frame)

TIP

Temporarily tighten the engine mounting adjust bolt until the flange of the bolt contacts the frame.

2. Install:

- Engine mounting adjust bolts (rear) "2"
(Temporarily, onto the engine bracket "3" and "4")

TIP

Temporarily tighten the engine mounting adjust bolts until the flange of the bolt contacts the engine bracket.

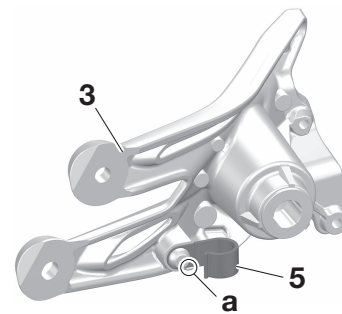
3. Install:

- Fuel hose holders "5"

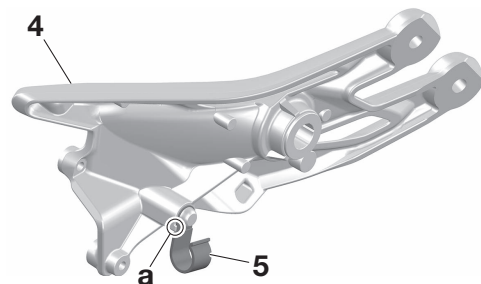
TIP

Install the fuel hose holder so that the projection "a" on the engine bracket touches the fuel hose holder.

A



B



A. Engine bracket (left)

B. Engine bracket (right)



Fuel hose holder bolt
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

4. Install:

- Engine "6"
- Engine mounting bolt (rear upper side) "7"
- Engine mounting bolt (rear lower side) "8"
- Washer "9"
- Engine mounting bolt (front left side) "10"
(Temporarily)

5. Tighten:

- Engine mounting adjust bolt (front) "1"

TIP

- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the bolt contacts the engine.



Engine mounting adjust bolt
2.0 N·m (0.20 kgf·m, 1.5 lb·ft)

6. Install:

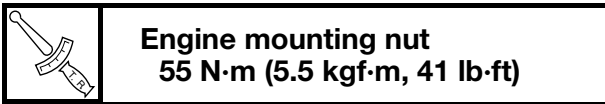
- Collar "11"
- Engine mounting bolt (front right side) "12"
(Temporarily)

7. Install:

- Washers "13"
- Engine mounting nut (rear upper side) "14"

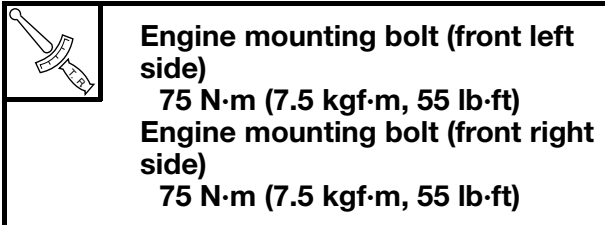
ENGINE REMOVAL

- Engine mounting nut (rear lower side) “15”



8. Tighten:

- Engine mounting bolt (front left side) “10”
- Engine mounting bolt (front right side) “12”



9. Install:

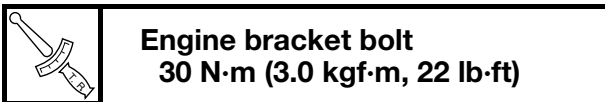
- Engine bracket (left) “3”
- Engine bracket (right) “4”
- Washers “16”
- Engine bracket bolts “17”
- Washers “18”
- Engine mounting bolt (left upper side) “19”
- Engine mounting bolt (right upper side) “20” (Temporarily)

TIP

Before installing the engine bracket, install all parts that will be installed inward of fuel tanks. Fuel tanks cannot be installed with the engine bracket installed.

10. Tighten:

- Engine bracket bolts “17”



11. Tighten:

- Engine mounting adjust bolts (rear) “2”
 - Temporarily remove the engine mounting bolt “19”, “20” and washers “18”.
 - Tighten the engine mounting adjust bolts “2”.

TIP

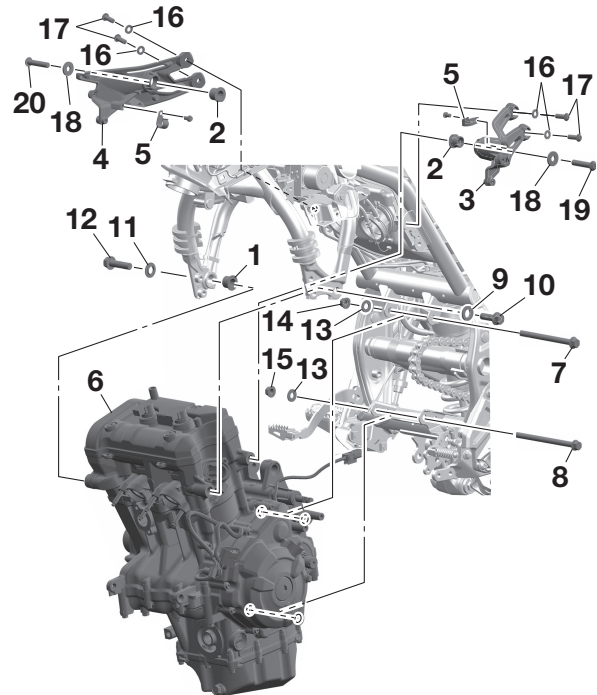
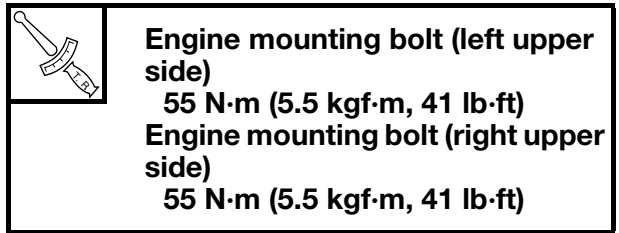
- Tighten the engine mounting adjust bolt to specification with a 1/2 inch hexagon bit socket.
- Make sure that the flange of the bolt contacts the engine.



- Install the washers “18”, engine mounting bolt “19” and “20” again.

12. Tighten:

- Engine mounting bolt (left upper side) “19”
- Engine mounting bolt (right upper side) “20”



EAS30252

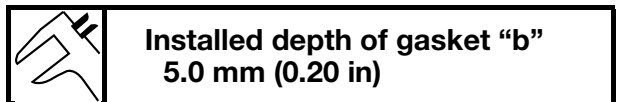
INSTALLING THE EXHAUST PIPE AND MUFFLER

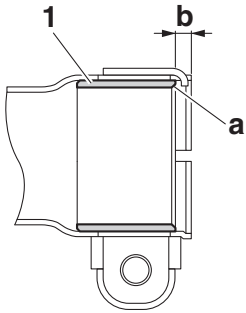
1. Install:

- Gasket “1” **New** (to the muffler)

TIP

Install the gasket with the chamfer “a”, located on an inner rim of the gasket, as shown in the illustration.

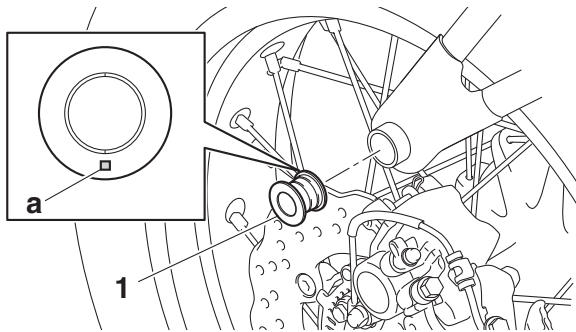




2. Install:
- Damper "1"
(to the frame)

TIP _____

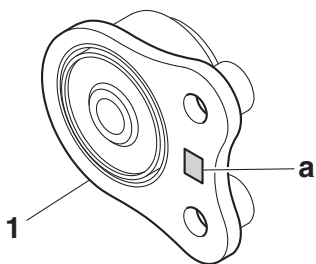
Install the damper with the mark "a" facing rear wheel side.



3. Install:
- Exhaust pipe bracket "1"
(to the frame)

TIP _____

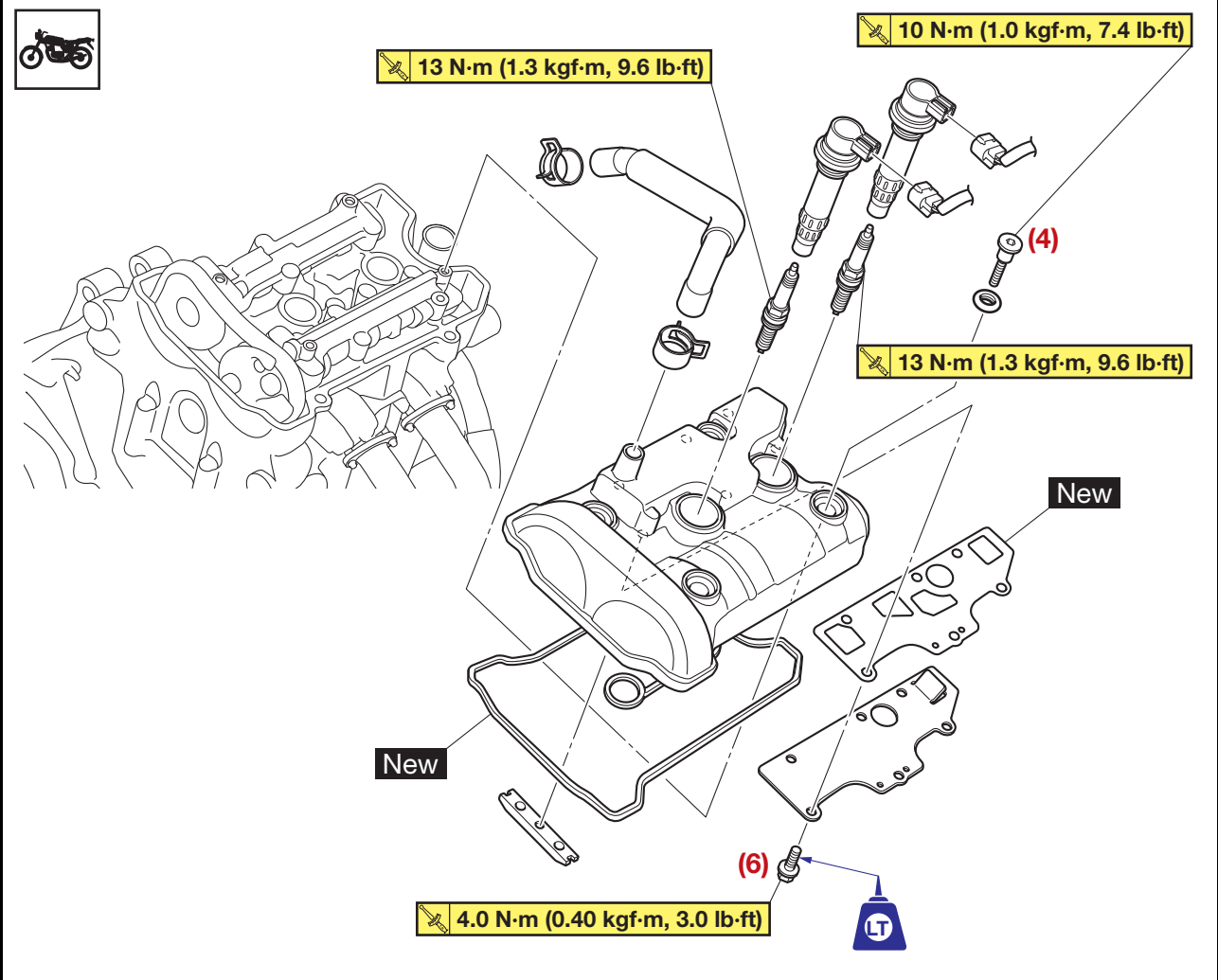
Install the exhaust pipe bracket with the mark "a" facing the left side of the vehicle.



EAS20043

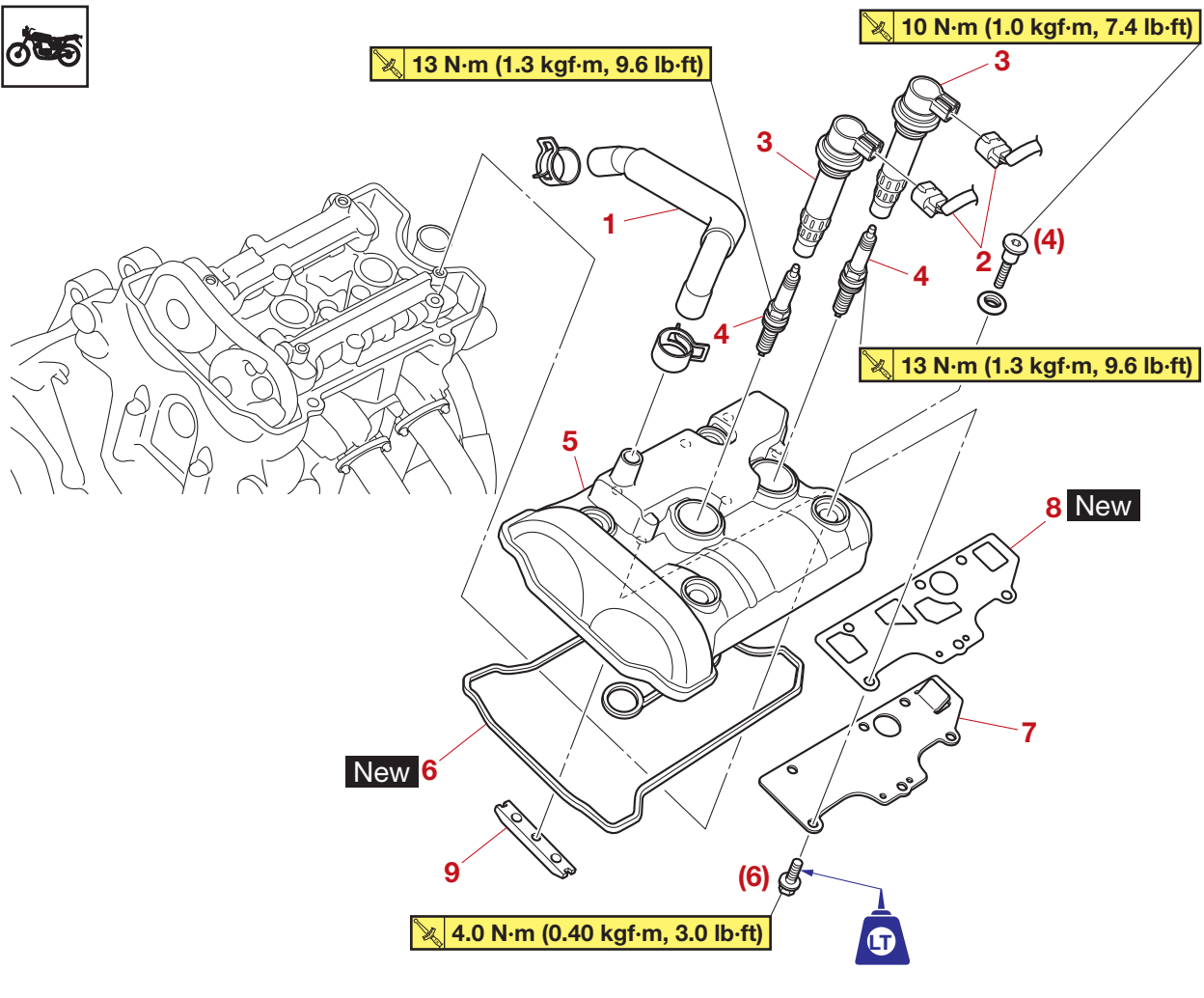
CAMSHAFTS

Removing the cylinder head cover



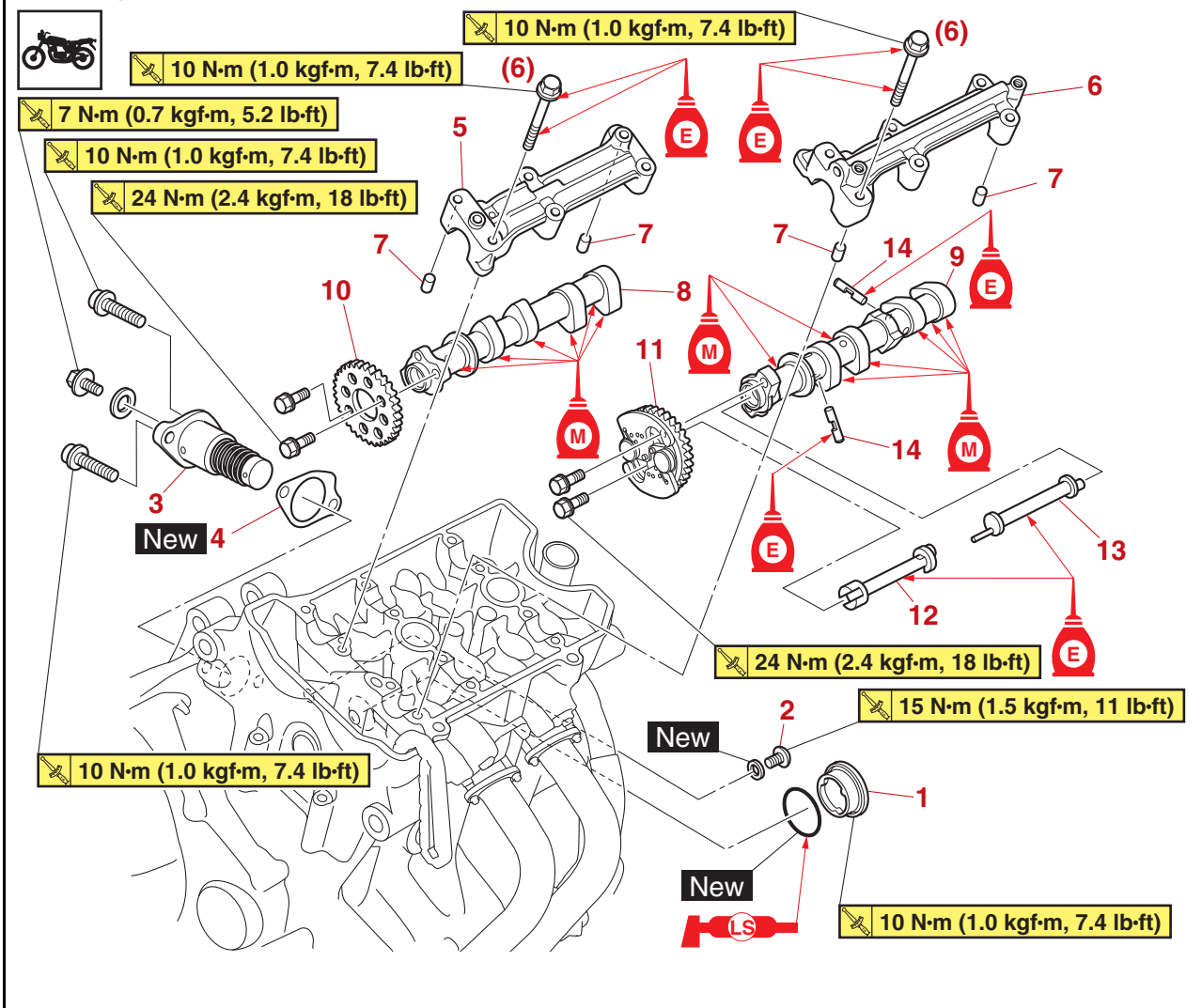
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Coupler holder | | Refer to "GENERAL CHASSIS (7)" on page 4-14. |
| | Engine guard (left/right)/Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Radiator | | Refer to "RADIATOR" on page 6-2. |

Removing the cylinder head cover



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------------|------|-------------|
| 1 | Cylinder head breather hose | 1 | |
| 2 | Ignition coil coupler | 2 | Disconnect. |
| 3 | Ignition coil | 2 | |
| 4 | Spark plug | 2 | |
| 5 | Cylinder head cover | 1 | |
| 6 | Cylinder head cover gasket | 1 | |
| 7 | Breather plate | 1 | |
| 8 | Breather plate gasket | 1 | |
| 9 | Timing chain guide (upper side) | 1 | |

Removing the camshafts



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------------|------|---------|
| 1 | Crankshaft end cover | 1 | |
| 2 | Timing mark accessing bolt | 1 | |
| 3 | Timing chain tensioner | 1 | |
| 4 | Timing chain tensioner gasket | 1 | |
| 5 | Intake camshaft cap | 1 | |
| 6 | Exhaust camshaft cap | 1 | |
| 7 | Dowel pin | 4 | |
| 8 | Intake camshaft | 1 | |
| 9 | Exhaust camshaft | 1 | |
| 10 | Intake camshaft sprocket | 1 | |
| 11 | Exhaust camshaft sprocket | 1 | |
| 12 | Decompressor lever #2 | 1 | |
| 13 | Decompressor lever #1 | 1 | |
| 14 | Decompressor lever pin | 2 | |

EAS33146

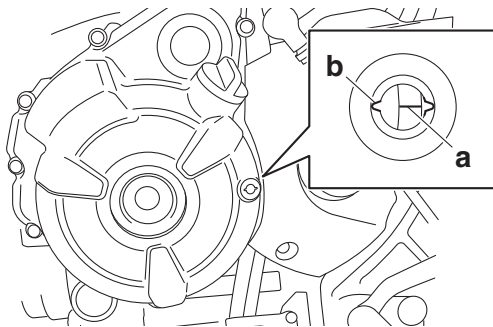
REMOVING THE IGNITION COILS

- Remove:
 - Ignition coil
Refer to "CHECKING THE SPARK PLUGS" on page 3-5.

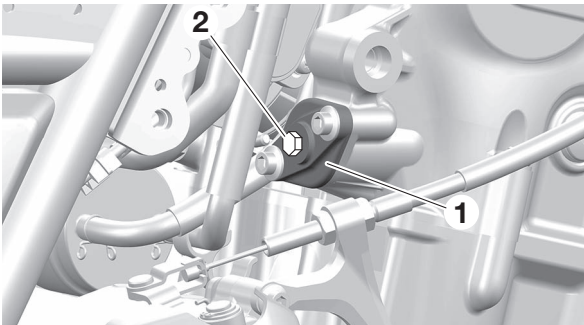
EAS30256

REMOVING THE CAMSHAFTS

- Remove:
 - Crankshaft end cover
 - Timing mark accessing bolt
Refer to "GENERATOR AND STARTER CLUTCH" on page 5-45.
- Align:
 - Mark "a" on the generator rotor (with the slot "b" in the generator rotor cover)
 - Turn the crankshaft counterclockwise.
 - When piston #1 is at TDC on the exhaust stroke, align the TDC mark "a" on the generator rotor with the slot "b" in the generator rotor cover.



- Remove:
 - Timing chain tensioner "1"
 - Timing chain tensioner gasket
 - Insert the hexagon wrench "2" (part No.: 1WS-12228-00) into the timing chain tensioner.
 - Remove the timing chain tensioner.



- Remove:
 - Intake camshaft cap
 - Exhaust camshaft cap

ECA13720

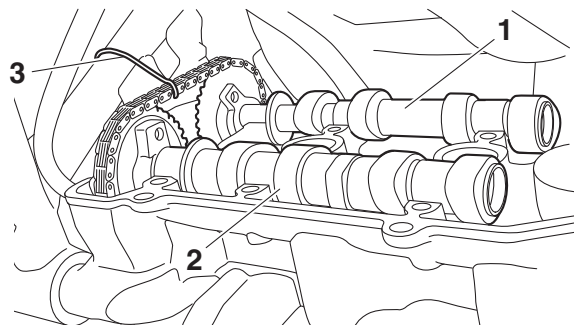
NOTICE

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

- Remove:
 - Intake camshaft "1"
 - Exhaust camshaft "2"

TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".



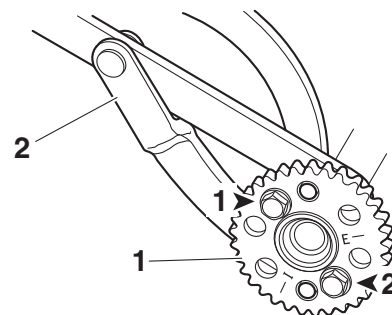
- Remove:
 - Intake camshaft sprocket "1"

TIP

While holding the intake camshaft sprocket with the rotor holding tool "2", loosen the intake camshaft sprocket bolts.



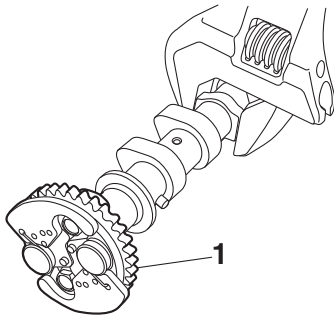
Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



- Remove:
 - Exhaust camshaft sprocket "1"

TIP

While holding the exhaust camshaft with a suitable tool, loosen the exhaust camshaft sprocket bolts.



EAS31133

CHECKING THE CYLINDER HEAD BREATHER HOSE

1. Check:
 - Cylinder head breather hose
Cracks/damage → Replace.
Loosen connection → Connect properly.

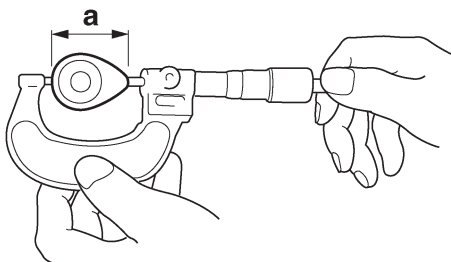
EAS30257

CHECKING THE CAMSHAFTS

1. Check:
 - Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
 - Camshaft lobe dimension “a”
Out of specification → Replace the camshaft.



Camshaft lobe dimensions
Lobe height limit (Intake)
 35.510 mm (1.3980 in)
Lobe height limit (Exhaust)
 35.610 mm (1.4020 in)

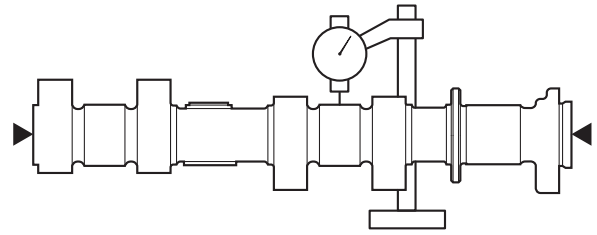


G088946

3. Measure:
 - Camshaft runout
Out of specification → Replace.



Camshaft runout limit
 0.030 mm (0.0012 in)

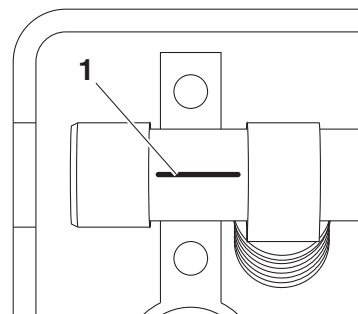


4. Measure:
 - Camshaft-journal-to-camshaft-cap clearance
Out of specification → Measure the camshaft journal diameter.



Camshaft-journal-to-camshaft-cap clearance limit
 0.080 mm (0.0032 in)

- a. Install the camshafts into the cylinder head (without the camshaft caps).
- b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.



G088947

- c. Install the dowel pins and camshaft caps.

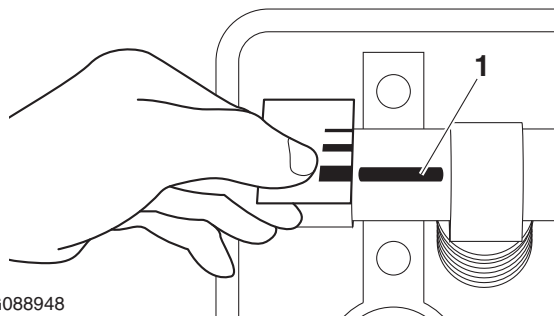
TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.



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

- d. Remove the camshaft caps, and then measure the width of the Plastigauge® “1”.



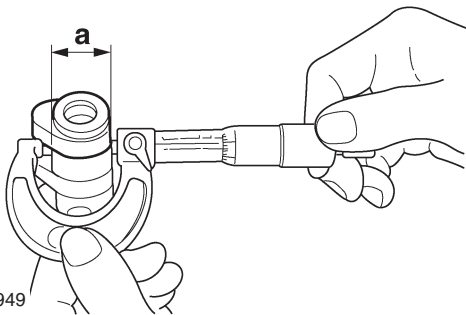
G088948

5. Measure:

- Camshaft journal diameter “a”
Out of specification → Replace the camshaft.
Within specification → Replace the cylinder head and camshaft caps as a set.



Camshaft journal diameter
21.959–21.972 mm (0.8645–0.8650 in)



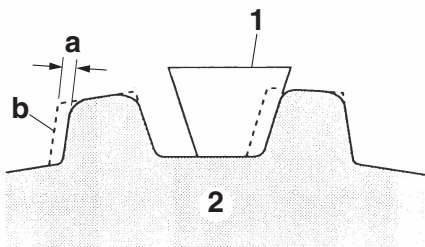
G088949

EAS30936

CHECKING THE CAMSHAFT SPROCKETS

1. Check:

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



G088950

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

EAS30266

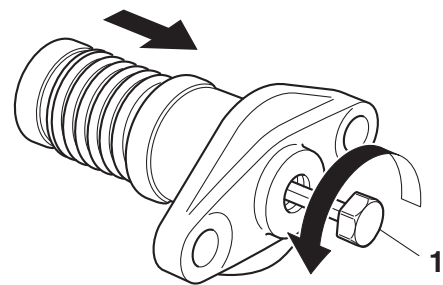
CHECKING THE TIMING CHAIN TENSIONER

1. Check:

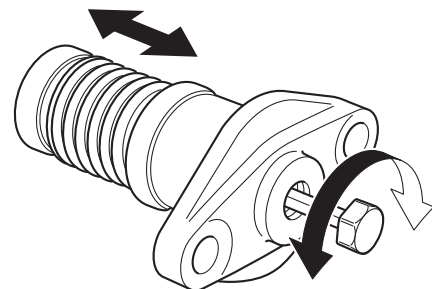
- Timing chain tensioner
Cracks/damage/rough movement → Replace.
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it counterclockwise with a hexagon wrench “1” (Parts No.: 1WS-12228-00) until it stops.



- b. Make sure that the timing chain tensioner rod moves in and out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



EAS30267

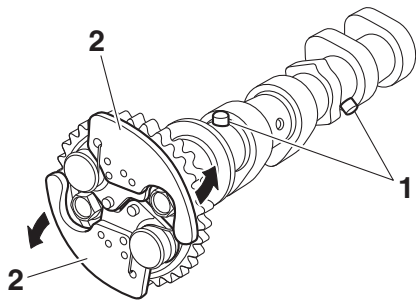
CHECKING THE DECOMPRESSION SYSTEM

1. Check:

- Decompression system

TIP

- Check that the decompressor lever pins “1” projects from the camshaft.
- Check that the decompressor cams “2” and decompressor lever pins “1” moves smoothly.



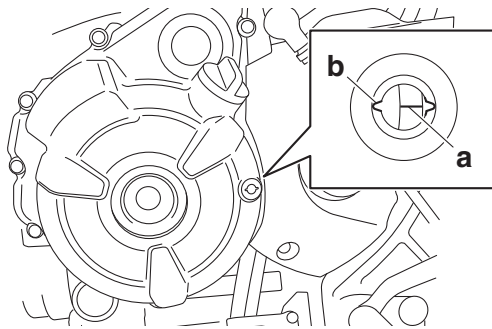
Rotor holding tool
90890-01235
Universal magneto and rotor
holder
YU-01235

EAS30269

INSTALLING THE CAMSHAFTS

1. Align:

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



2. Install:

- Intake camshaft sprocket "1"



Intake camshaft sprocket bolt
24 N·m (2.4 kgf·m, 18 lb·ft)

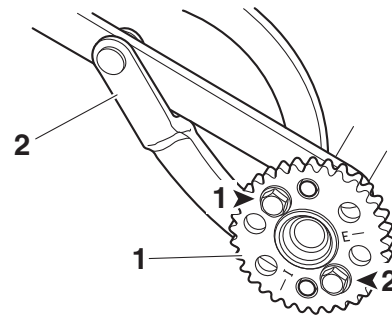
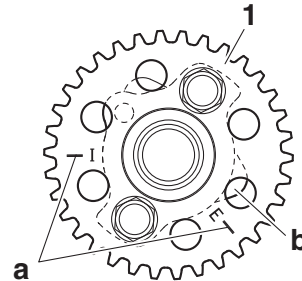
ECA19980

NOTICE

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

TIP

- Make sure that the marks "a" on the intake camshaft sprocket are aligned with cam lobe #1 "b" as shown in the illustration.
- While holding the intake camshaft sprocket with the rotor holding tool "2", tighten the intake camshaft sprocket bolts in the proper tightening sequence as shown.

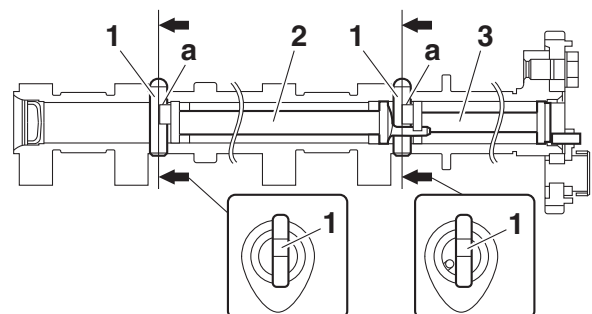


3. Install:

- Decompressor lever pins "1"
- Decompressor lever #1 "2"
- Decompressor lever #2 "3"

TIP

- Face the cutout "a" in each decompressor lever pin toward the exhaust camshaft sprocket.
- Install the decompressor lever pins, decompressor lever #1, and decompressor lever #2 into the exhaust camshaft as shown in the illustration.



4. Install:

- Exhaust camshaft sprocket "1"



Exhaust camshaft sprocket bolt
24 N·m (2.4 kgf·m, 18 lb·ft)

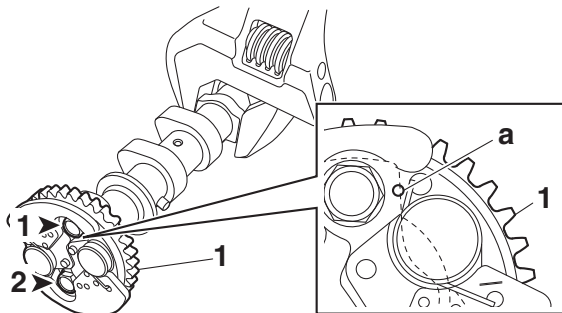
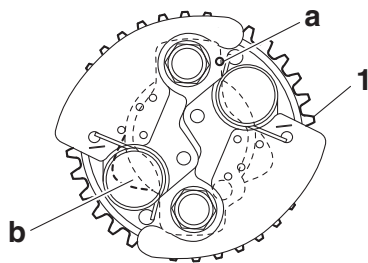
ECA19980

NOTICE

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

TIP

- Make sure that the mark “a” on the exhaust camshaft sprocket is aligned with cam lobe #1 “b” as shown in the illustration.
- While holding the exhaust camshaft with a suitable tool, tighten the exhaust camshaft sprocket bolts.
- Tighten the camshaft sprocket bolts in the tightening sequence as shown.



5. Install:

- Timing chain “1”
(onto the exhaust camshaft sprocket “2”)
- Exhaust camshaft
- Exhaust camshaft cap

ECA20930

NOTICE

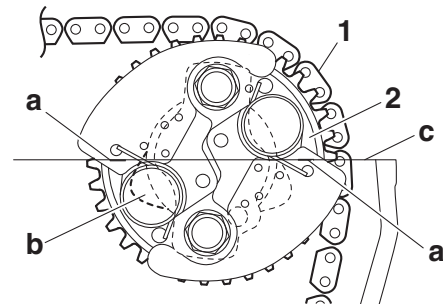
- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

TIP

- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- Make sure that the match marks “a” on the exhaust camshaft sprocket and cam lobe #1 “b” are aligned with the cylinder head edge “c” as shown in the illustration.
- Temporarily tighten the exhaust camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.



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



6. Install:

- Timing chain “1”
(onto the intake camshaft sprocket “2”)
- Intake camshaft
- Intake camshaft cap

ECA20930

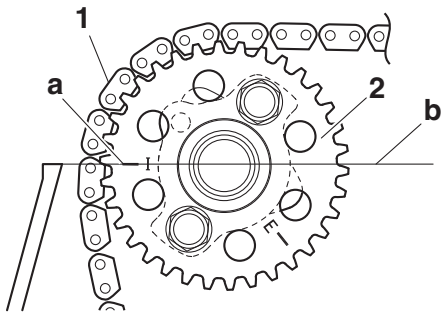
NOTICE

- **Lubricate the camshaft cap bolts with the engine oil.**
- **The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.**
- **Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

- Install the timing chain onto intake camshaft sprocket, and then install the intake camshaft onto the cylinder head.

TIP


Make sure the match mark “a” on the intake camshaft sprocket is aligned with the cylinder head edge “b”.



b. Tighten the intake camshaft cap bolts.

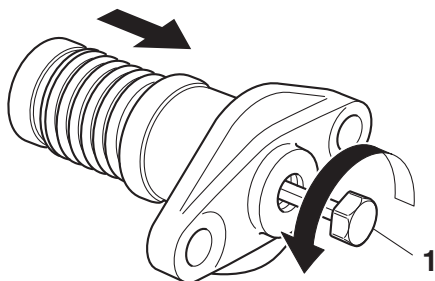
TIP

Temporarily tighten the intake camshaft cap bolts, and then tighten the bolts to specification in a crisscross pattern.

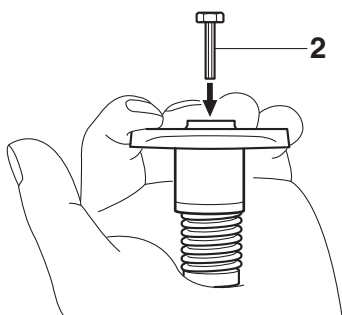
| | |
|---|--|
|  | <p>Intake camshaft cap bolt 10 N·m (1.0 kgf·m, 7.4 lb·ft)</p> |
|---|--|

7. Install:

- Timing chain tensioner
- Timing chain tensioner gasket **New**
 - a. While lightly pressing the timing chain tensioner rod by hand, turn the timing chain tensioner rod fully counterclockwise with a hexagon wrench "1".



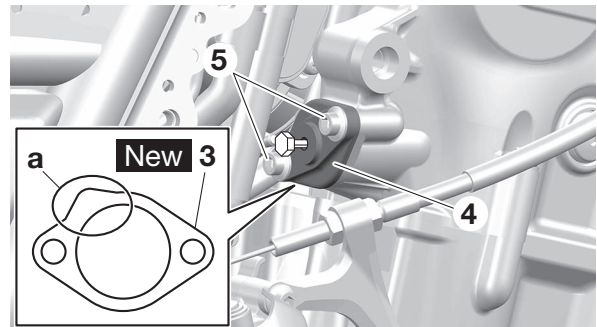
b. Keep pressing the timing chain tensioner rod by hand, remove the hexagon wrench, and then insert the hexagon wrench "2" (Parts No.: 1WS-12228-00) into the timing chain tensioner rod.




- c. Install a new timing chain tensioner gasket "3", the timing chain tensioner "4", and the timing chain tensioner bolts "5" on the cylinder block.

TIP

Be sure to install the timing chain tensioner gasket so that the portion "a" of the gasket is protruding from the upper inner side of the timing chain tensioner.



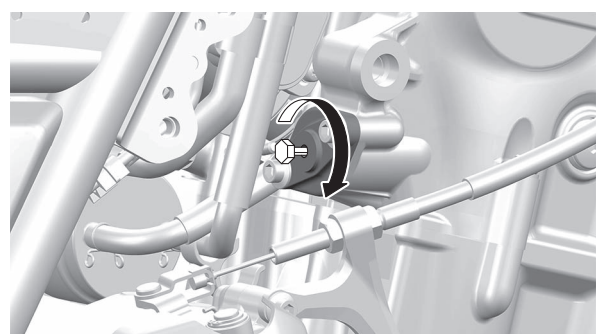
d. Tighten the timing chain tensioner bolts to specification.

| | |
|--|---|
|  | <p>Timing chain tensioner bolt 10 N·m (1.0 kgf·m, 7.4 lb·ft)</p> |
|--|---|

- e. Screw the hexagon wrench by hand until the timing chain tensioner rod touches the timing chain guide, and then tighten 1/4 turn by tool.

TIP

The timing chain tensioner rod is extended by turning the hexagon wrench clockwise.



- f. Remove the hexagon wrench.
- g. Install the timing chain tensioner cap bolt and gasket, and then tighten the timing chain tensioner cap bolt to specification.

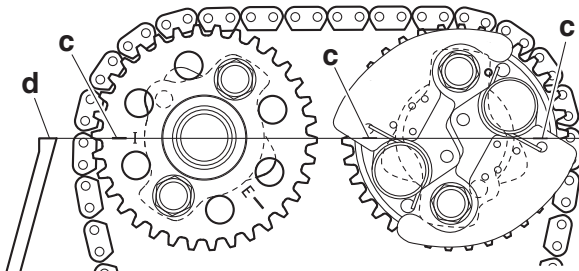
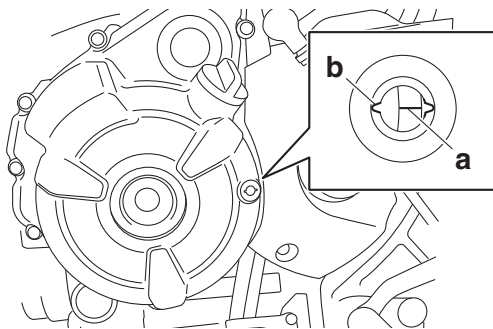
| | |
|---|--|
|  | <p>Timing chain tensioner cap bolt 7 N·m (0.7 kgf·m, 5.2 lb·ft)</p> |
|---|--|

8. Turn:

- Crankshaft
(several turns counterclockwise)

9. Check:

- Mark "a"
Make sure the mark "a" on the generator rotor is aligned with the slot "b" in the generator rotor cover.
- Camshaft sprocket match mark
Make sure the match marks "c" on the camshaft sprockets are aligned with the cylinder head mating surface "d".
Out of alignment → Adjust.
Refer to the installation steps above.

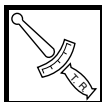


10. Measure:

- Valve clearance
Out of specification → Adjust.
Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-6.

11. Install:

- Timing mark accessing bolt "1"

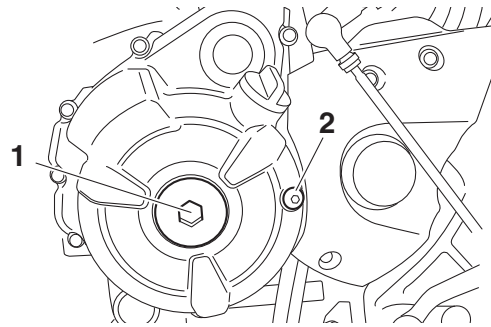


Timing mark accessing bolt
15 N·m (1.5 kgf·m, 11 lb-ft)

- Crankshaft end cover "2"



Crankshaft end cover
10 N·m (1.0 kgf·m, 7.4 lb-ft)



EAS30274

INSTALLING THE CYLINDER HEAD COVER

1. Install:

- Timing chain guide (top side)
- Cylinder head cover gasket "1" **New**
(to the cylinder head cover)
- Cylinder head cover "2"



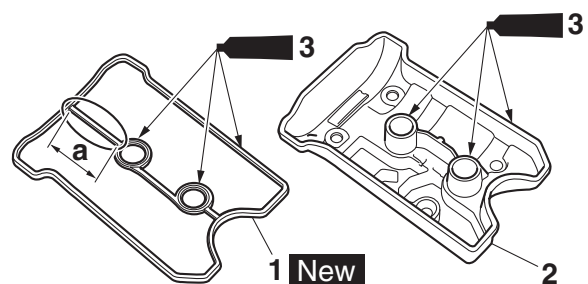
Cylinder head cover bolt
10 N·m (1.0 kgf·m, 7.4 lb-ft)

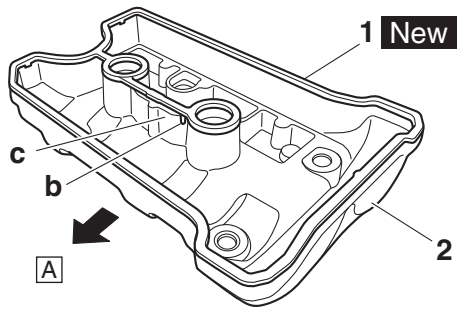
TIP

- Apply Yamaha bond No.1215 "3" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- After installing the cylinder head cover gasket "1" to the cylinder head cover, cut off the "a" section.
- Make sure that the projection "b" on the cylinder head cover gasket is positioned on the exhaust side of the rib "c" on the cylinder head cover.



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

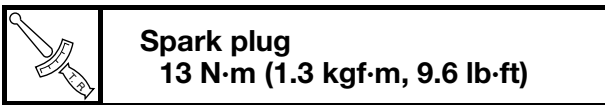




A. Exhaust side

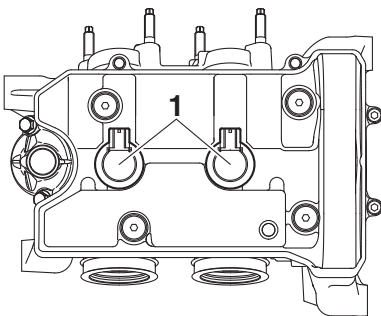
2. Install:

- Spark plugs
- Ignition coils "1"



TIP

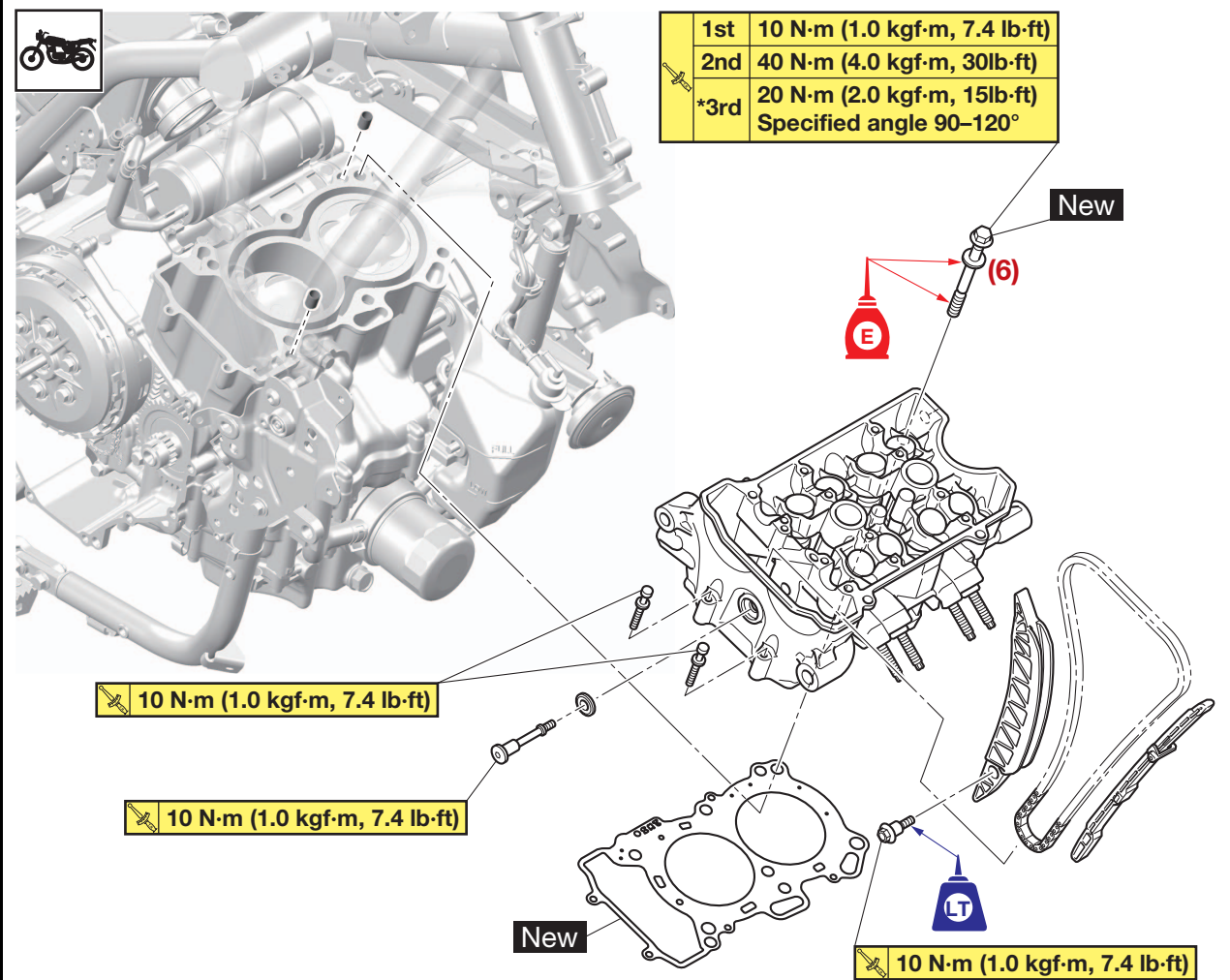
Install the ignition coils "1" in the direction shown in the illustration.



EAS20044

CYLINDER HEAD

Removing the cylinder head

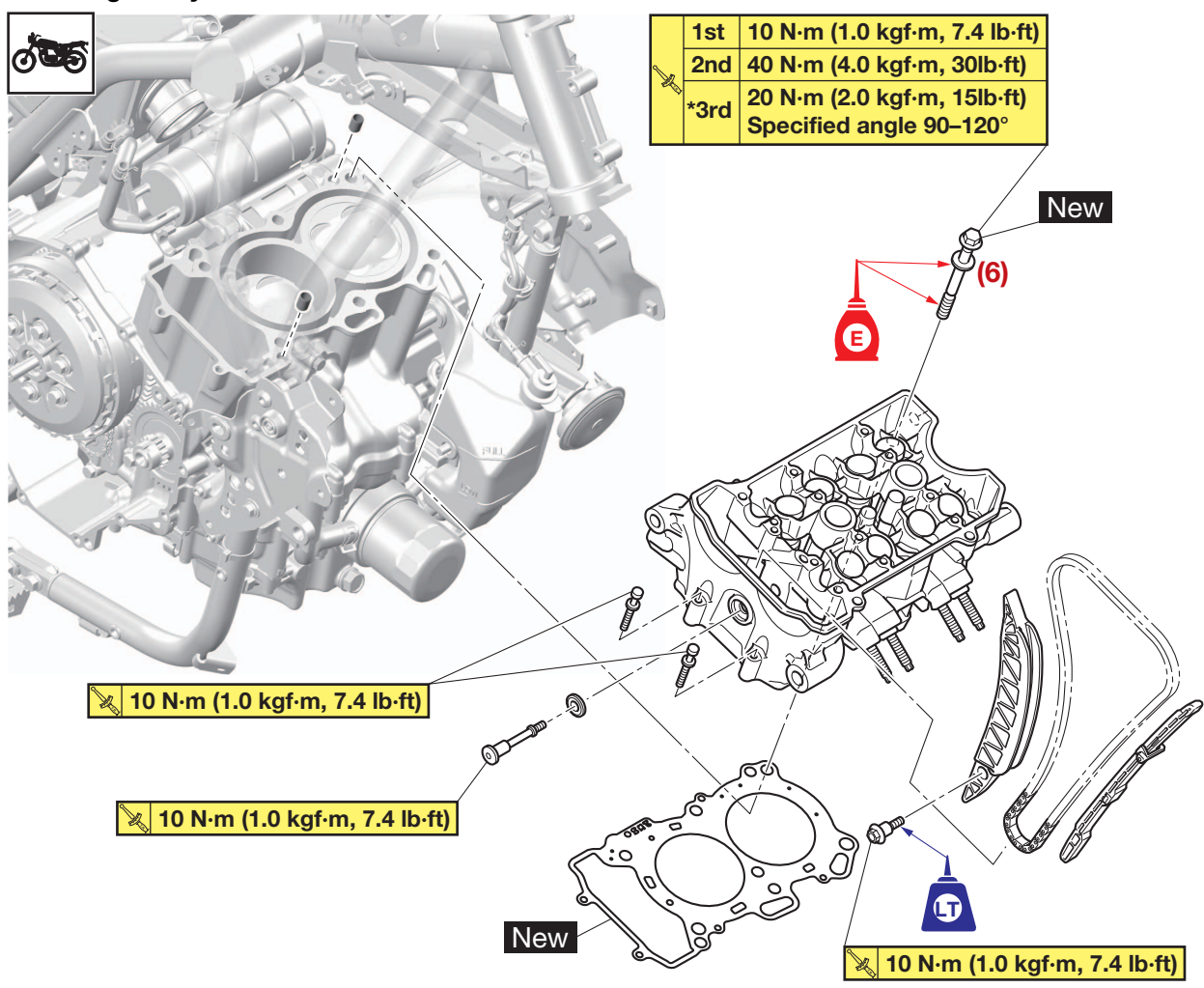


* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Exhaust pipe/Engine bracket (left/right)/Engine mounting bolt (front left side/front right side) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Engine mounting adjust bolt (front) | | Loosen. Refer to "ENGINE REMOVAL" on page 5-10. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |
| | Throttle bodies | | Refer to "THROTTLE BODIES" on page 7-8. |

CYLINDER HEAD

Removing the cylinder head

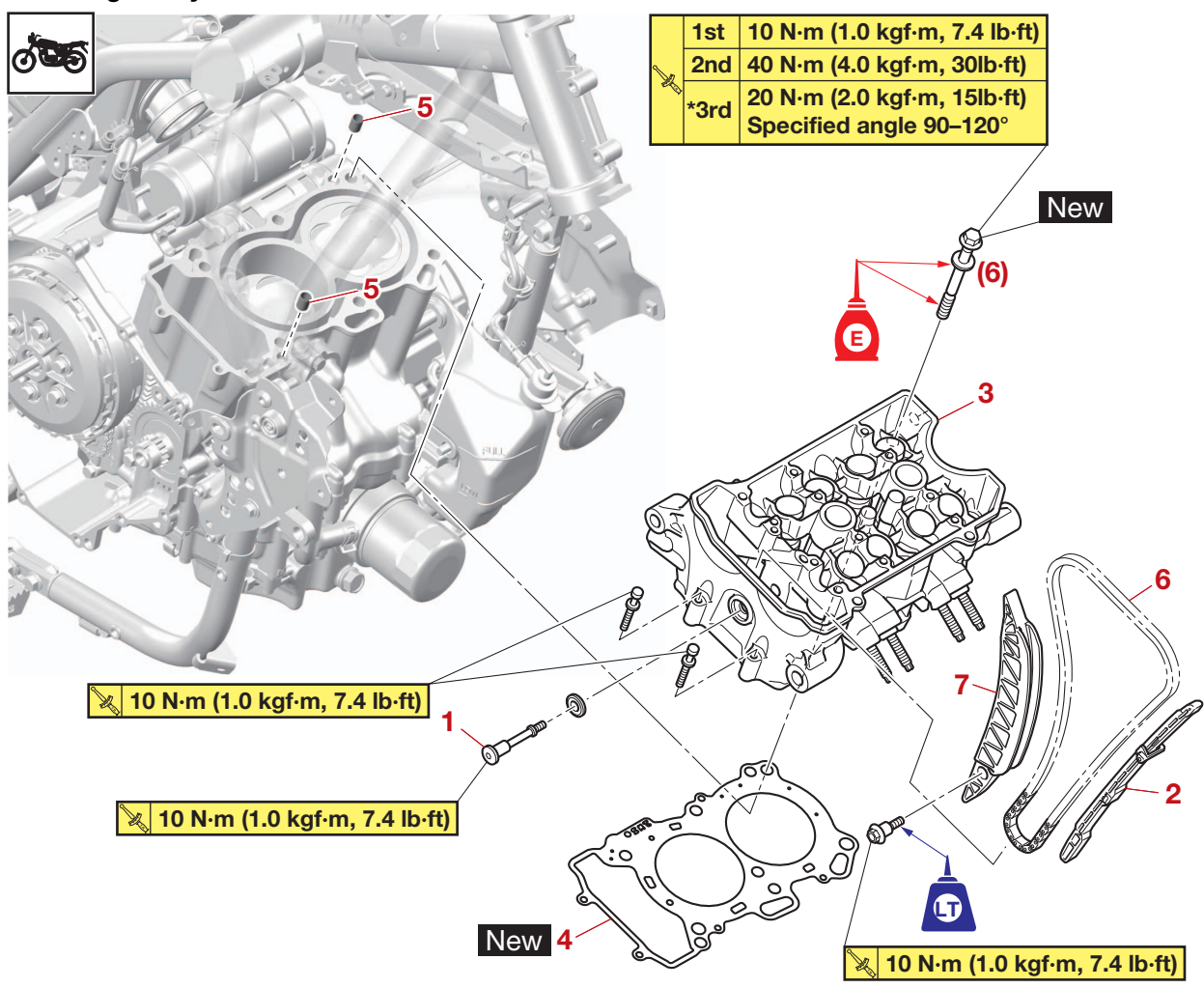


* Following the tightening order, loosen the bolt one by one, and then retighten it to specific torque.

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------------------|------|-------------------------------------|
| | Radiator | | Refer to "RADIATOR" on page 6-2. |
| | Oil cooler inlet hose | | Refer to "THERMOSTAT" on page 6-8. |
| | Intake camshaft/Exhaust camshaft | | Refer to "CAMSHAFTS" on page 5-23. |
| | Water pump housing | | Refer to "WATER PUMP" on page 6-10. |
| | Clutch cover | | Refer to "CLUTCH" on page 5-54. |

CYLINDER HEAD

Removing the cylinder head



* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---------|
| 1 | Timing chain bolt (right side of cylinder head) | 1 | |
| 2 | Timing chain guide (exhaust side) | 1 | |
| 3 | Cylinder head | 1 | |
| 4 | Cylinder head gasket | 1 | |
| 5 | Dowel pin | 2 | |
| 6 | Timing chain | 1 | |
| 7 | Timing chain guide (intake side) | 1 | |

EAS30276

REMOVING THE CYLINDER HEAD

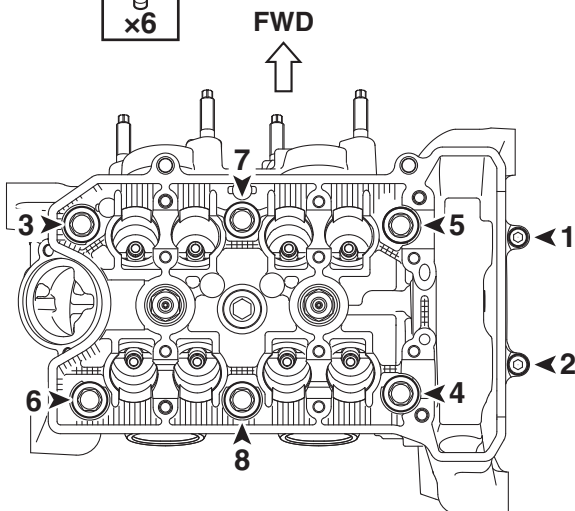
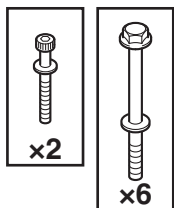
1. Remove:

- Cylinder head bolt (M6) (×2)
- Cylinder head bolt (M10) (×6)

TIP

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

- M6 × 45 mm: “1”, “2”
- M10 × 100 mm: “3”–“8”



EAS30278

CHECKING THE TIMING CHAIN GUIDES

1. Check:

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

EAS30277

CHECKING THE CYLINDER HEAD

1. Eliminate:

- Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats

2. Check:

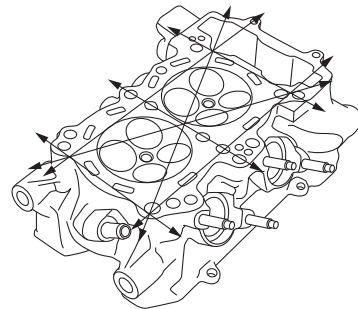
- Cylinder head
Damage/scratches → Replace.
- Cylinder head water jacket
Mineral deposits/rust → Eliminate.

3. Measure:

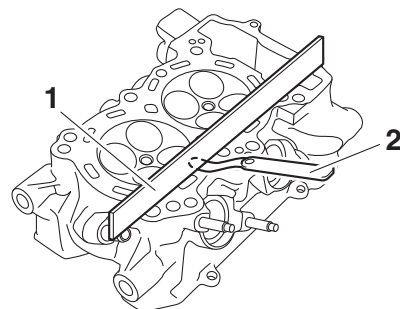
- Cylinder head warpage
Out of specification → Resurface the cylinder head.



Warpage limit
0.10 mm (0.0039 in)



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



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

TIP

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

EAS30282

INSTALLING THE CYLINDER HEAD

1. Install:

- Cylinder head
- Cylinder head bolt (M10) (×6) **New**
- Cylinder head bolt (M6) (×2)

TIP

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M10) threads and mating surface with engine oil.

2. Tighten:

- Cylinder head bolts “1”–“6”
- Cylinder head bolts “7”, “8”



Cylinder head bolt (“1”–“6”)

1st: 10 N·m (1.0 kgf·m, 7.4 lb·ft)

2nd: 40 N·m (4.0 kgf·m, 30 lb·ft)

*3rd: 20 N·m (2.0 kgf·m, 15 lb·ft)

Specified angle 90°

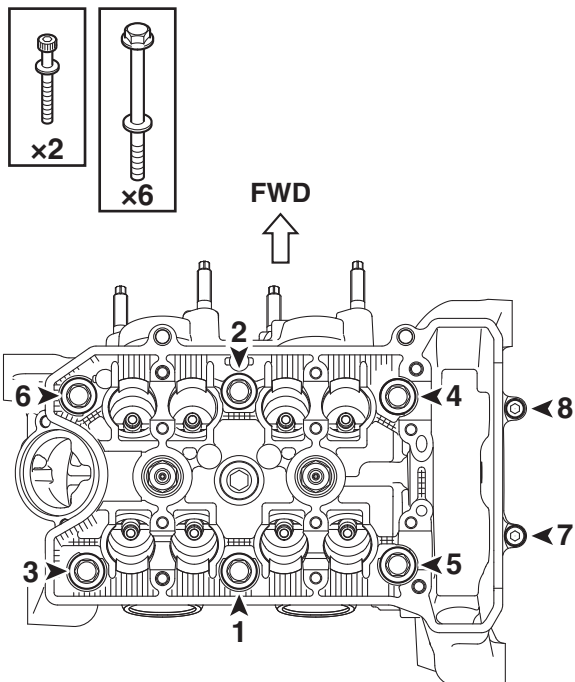
Cylinder head bolt (“7”, “8”)

10 N·m (1.0 kgf·m, 7.4 lb·ft)

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and angle.

TIP

Tighten the cylinder head bolts in the tightening sequence as shown and torque them in 3 stages.

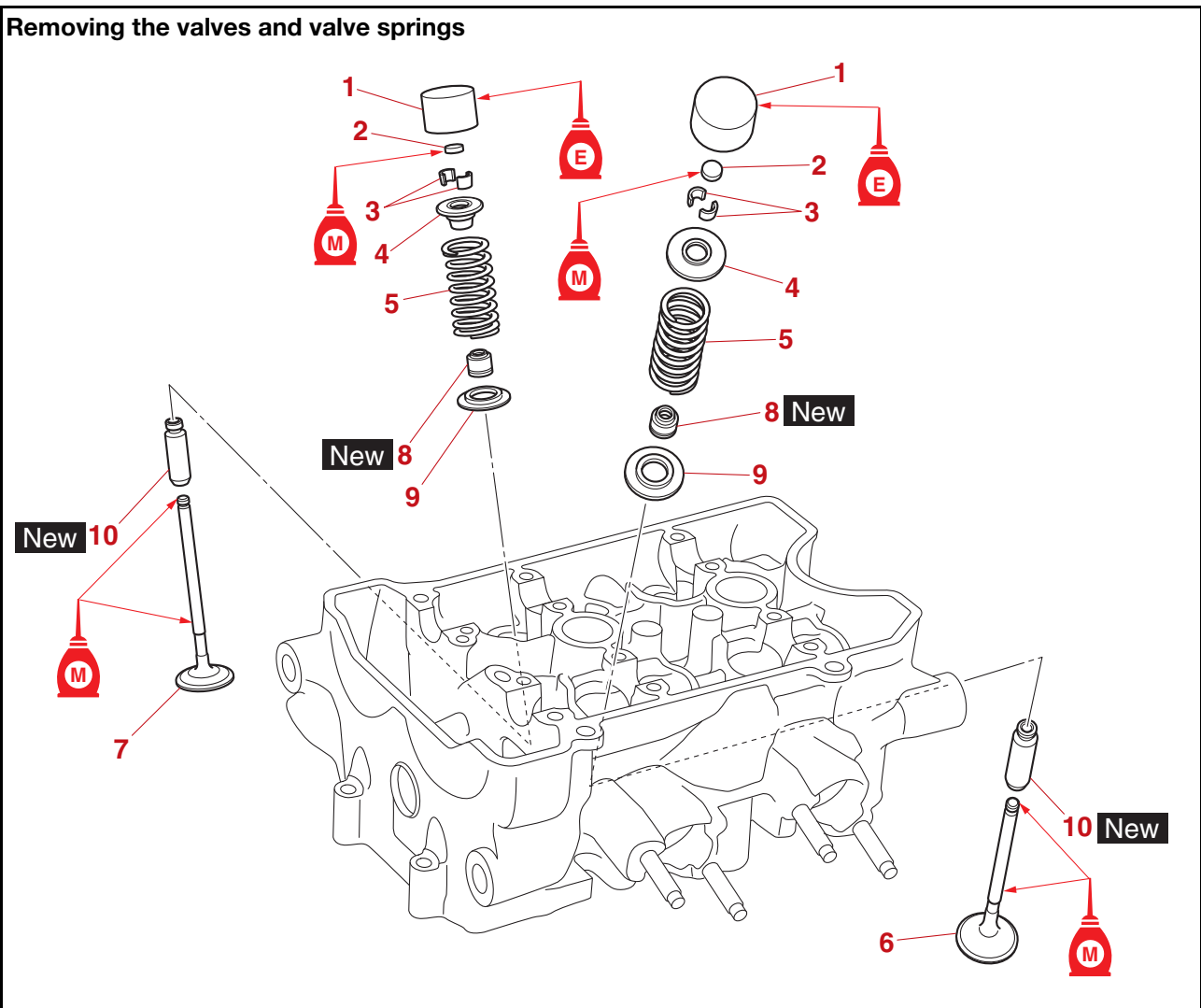


VALVES AND VALVE SPRINGS

EAS20045

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------|------|--|
| | Cylinder head | | Refer to "CYLINDER HEAD" on page 5-34. |
| 1 | Valve lifter | 8 | |
| 2 | Valve pad | 8 | |
| 3 | Valve cotter | 16 | |
| 4 | Valve spring retainer | 8 | |
| 5 | Valve spring | 8 | |
| 6 | Exhaust valve | 4 | |
| 7 | Intake valve | 4 | |
| 8 | Valve stem seal | 8 | |
| 9 | Valve spring seat | 8 | |
| 10 | Valve guide | 8 | |

VALVES AND VALVE SPRINGS

EAS30283

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
 - Valve lifter
 - Valve pad

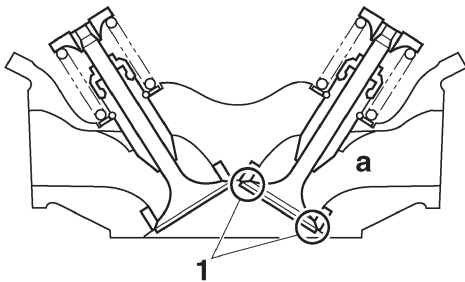
TIP

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

2. Check:
 - Valve sealing
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width. Refer to “CHECKING THE VALVE SEATS” on page 5-42.
 - a. Pour a clean solvent “a” into the intake and exhaust ports.
 - b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat “1”.



G088958

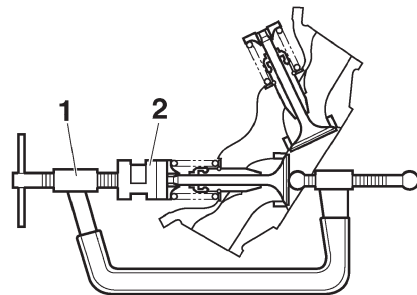
3. Remove:
 - Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.



Valve spring compressor
90890-04200
Valve spring compressor
YM-04019
Valve spring compressor attach-
ment (ø26)
90890-01243
Valve spring compressor attach-
ment (ø26)
YM-01253-1



G088959

4. Remove:
 - Valve spring retainer
 - Valve spring
 - Valve
 - Valve stem seal
 - Valve spring seat

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS30284

CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

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

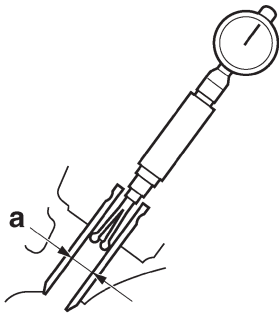
• Valve-stem-to-valve-guide clearance =
Valve guide inside diameter “a” -
Valve stem diameter “b”



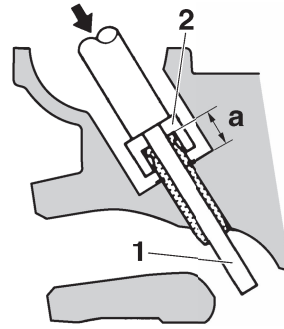
Valve-stem-to-valve-guide clear-
ance limit (intake)
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clear-
ance limit (exhaust)
0.100 mm (0.0039 in)

VALVES AND VALVE SPRINGS

G088960



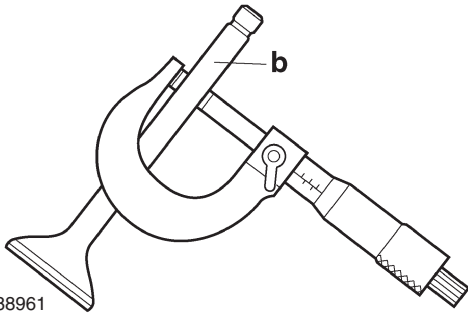
G088963



a. Valve guide position

c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.

G088961



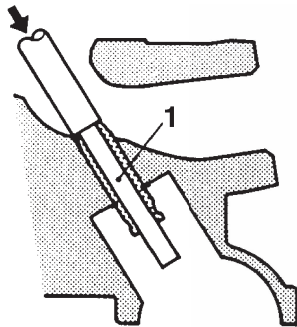
2. Replace:
• Valve guide

TIP

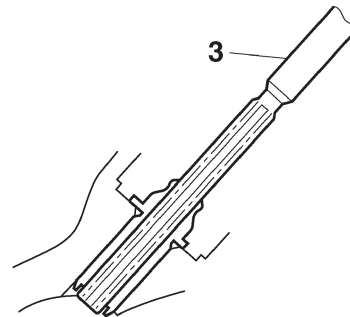
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

a. Remove the valve guide with the valve guide remover "1".

G088962



b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



G088964

TIP

After replacing the valve guide, reface the valve seat.



- Valve guide remover (ø4.5)
90890-04116
- Valve guide remover (4.5 mm)
YM-04116
- Valve guide installer (ø4.5)
90890-04117
- Valve guide installer (4.5 mm)
YM-04117
- Valve guide reamer (ø4.5)
90890-04118
- Valve guide reamer (4.5 mm)
YM-04118



Valve guide position
14.8–15.2 mm (0.58–0.60 in)

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:

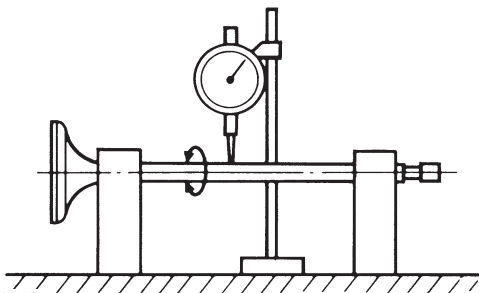
- Valve stem runout
Out of specification → Replace the valve.

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
0.020 mm (0.0008 in)




G088965

EAS30285

CHECKING THE VALVE SEATS

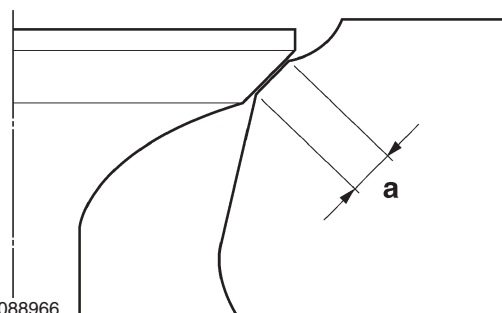
The following procedure applies to all of the valves and valve seats.

1. Eliminate:
 - Carbon deposits
(from the valve face and valve seat)
2. Check:
 - Valve seat
Pitting/wear → Replace the cylinder head.
3. Measure:
 - Valve seat width “a”
Out of specification → Replace the cylinder head.



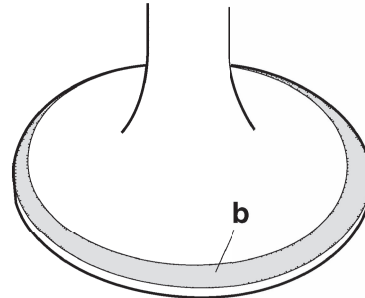
Valve seat contact width limit (in-take)
1.6 mm (0.06 in)

Valve seat contact width limit (exhaust)
1.6 mm (0.06 in)



G088966

- a. Apply blue layout fluid “b” onto the valve face.



G088967

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

TIP

Where the valve seat and valve face contacted one another, the blueing will have been removed.

4. Lap:

- Valve face
- Valve seat

TIP

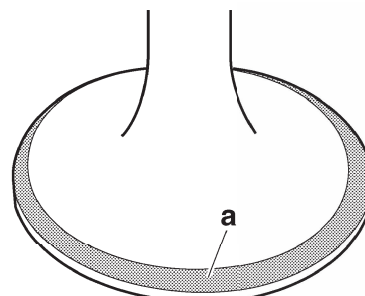
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

- a. Apply a coarse lapping compound “a” to the valve face.

ECA13790

NOTICE

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



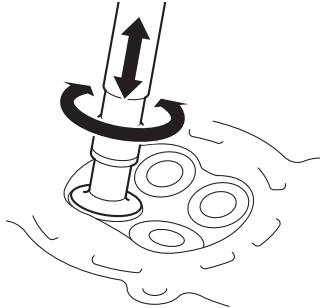
G088968

- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

VALVES AND VALVE SPRINGS

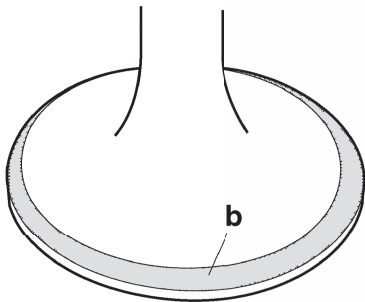
TIP

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



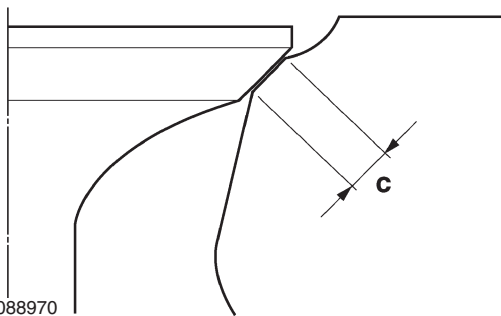
G088969

- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid “b” onto the valve face.



G088967

- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width “c” again. If the valve seat width is out of specification, reface and lap the valve seat.



G088970

EAS30286

CHECKING THE VALVE SPRINGS

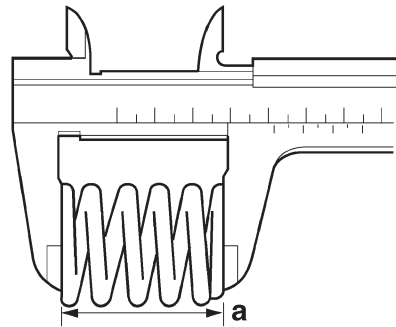
The following procedure applies to all of the valve springs.

1. Measure:

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



Free length limit (intake)
38.29 mm (1.51 in)
Free length limit (exhaust)
39.32 mm (1.55 in)



G088971

EAS30287

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:

- Valve lifter
Damage/scratches → Replace the valve lifters and cylinder head.

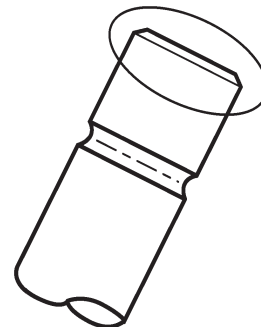
EAS30288

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:

- Valve stem end
(with an oil stone)



2. Lubricate:

- Valve stem
- Valve stem end
(with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil

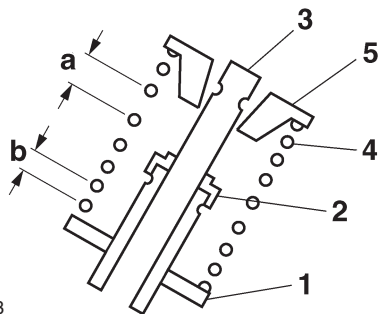
VALVES AND VALVE SPRINGS

3. Install:

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

TIP

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



G088973

b. Smaller pitch

4. Install:

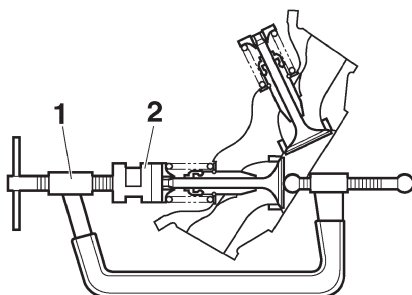
- Valve cotters

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.



- Valve spring compressor
90890-04200
- Valve spring compressor
YM-04019
- Valve spring compressor attach-
ment (ø26)
90890-01243
- Valve spring compressor attach-
ment (ø26)
YM-01253-1



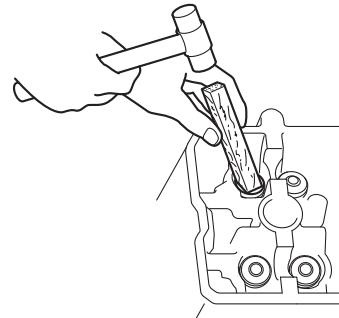
G088959

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.



G088975

6. Lubricate:

- Valve lifter
(with the recommended lubricant)

| | |
|--|---|
| | Recommended lubricant Engine oil |
|--|---|

7. Install:

- Valve pad
- Valve lifter

TIP

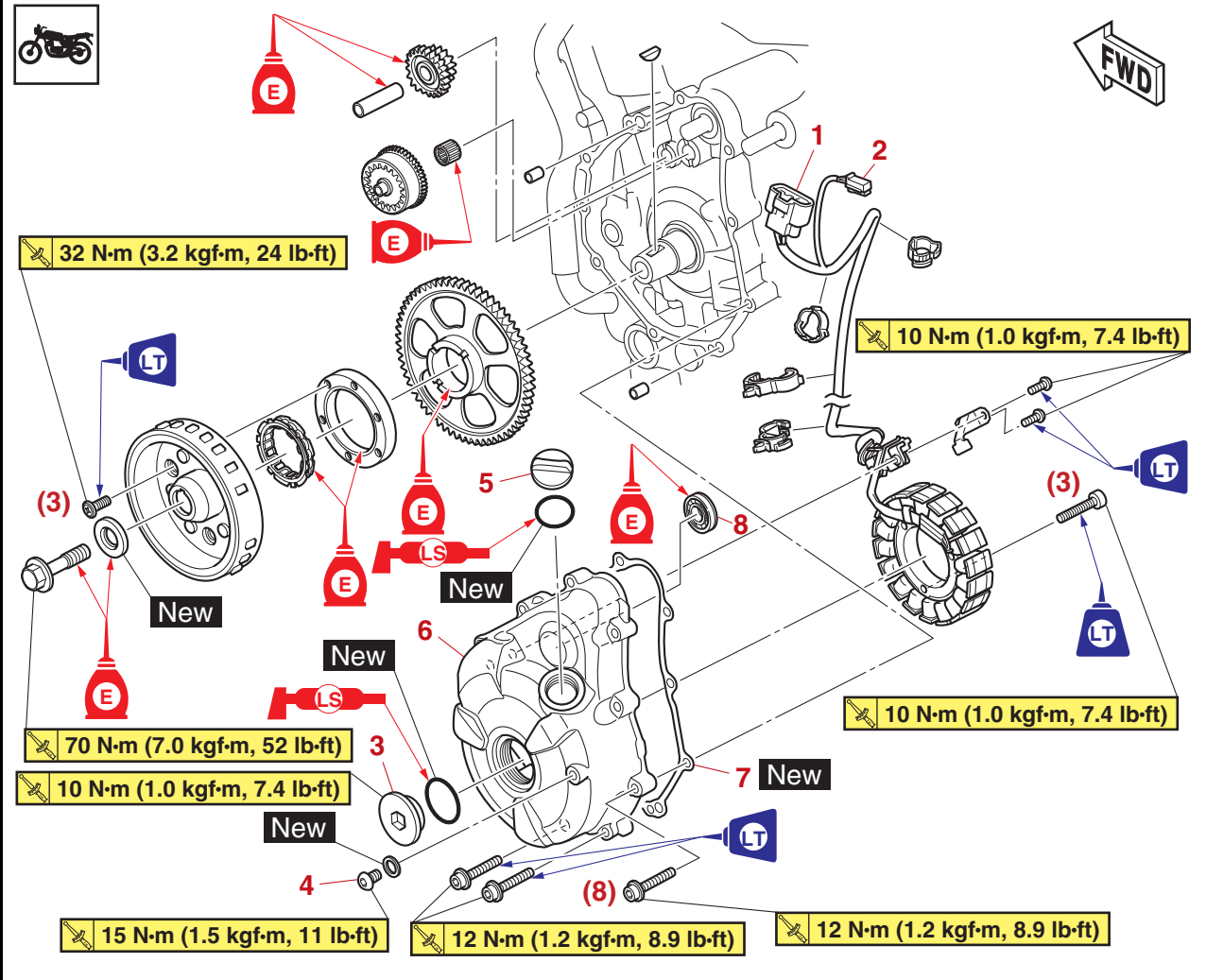
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in their original position.

GENERATOR AND STARTER CLUTCH

EAS20140

GENERATOR AND STARTER CLUTCH

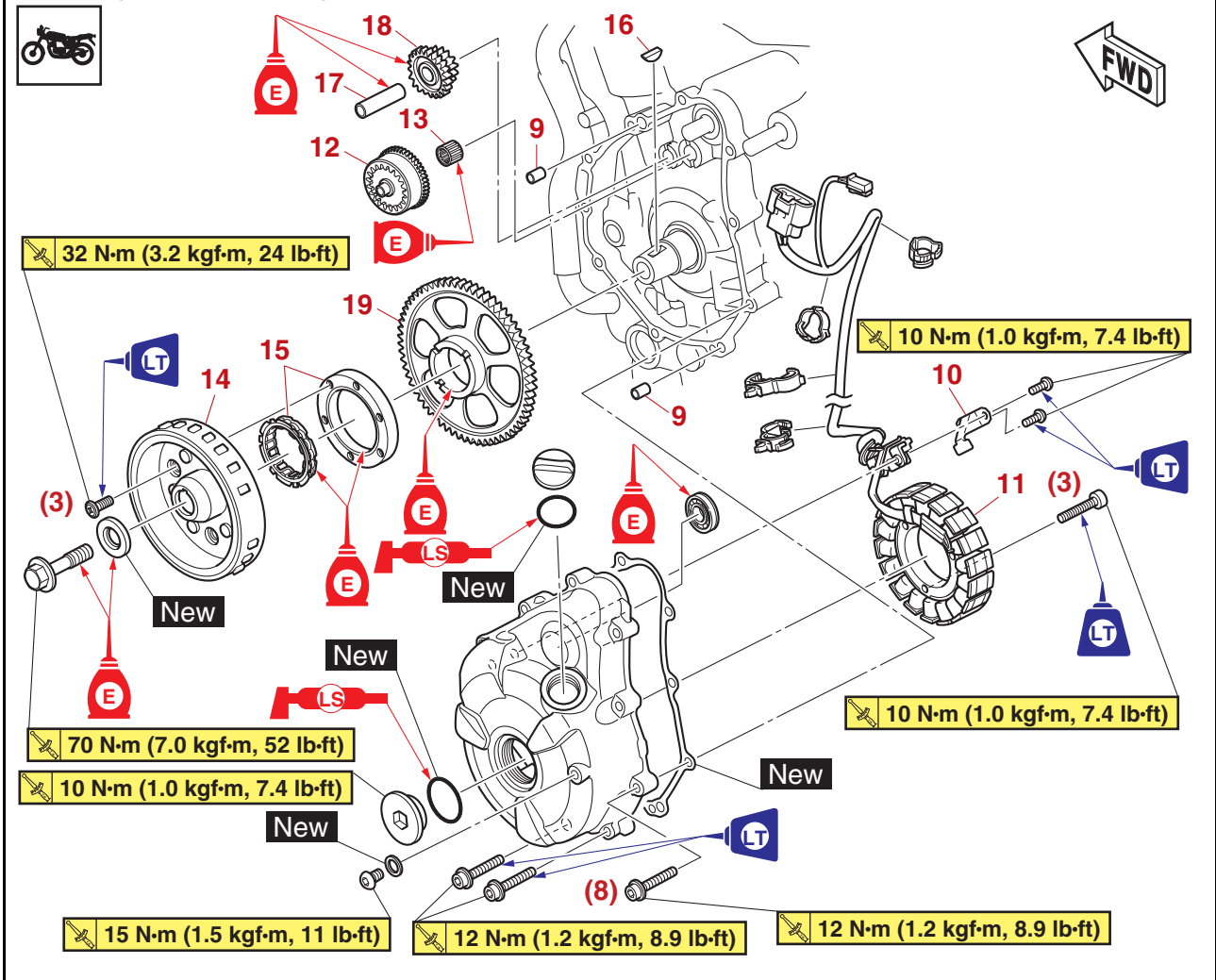
Removing the stator coil, generator rotor and starter clutch



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------------|------|--|
| | Front side cover (left) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| 1 | Stator coil coupler | 1 | Disconnect. |
| 2 | Crankshaft position sensor coupler | 1 | Disconnect. |
| 3 | Crankshaft end cover | 1 | |
| 4 | Timing mark accessing bolt | 1 | |
| 5 | Oil filler cap | 1 | |
| 6 | Generator cover | 1 | |
| 7 | Generator cover gasket | 1 | |
| 8 | Bearing | 1 | |

GENERATOR AND STARTER CLUTCH

Removing the stator coil, generator rotor and starter clutch



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---------|
| 9 | Dowel pin | 2 | |
| 10 | Stator coil lead holder | 1 | |
| 11 | Stator coil assembly (Stator coil/Crankshaft position sensor) | 1 | |
| 12 | Torque limiter | 1 | |
| 13 | Bearing | 1 | |
| 14 | Generator rotor | 1 | |
| 15 | Starter clutch | 1 | |
| 16 | Woodruff key | 1 | |
| 17 | Starter clutch idle gear shaft | 1 | |
| 18 | Starter clutch idle gear | 1 | |
| 19 | Starter clutch gear | 1 | |

GENERATOR AND STARTER CLUTCH

EAS30867

REMOVING THE GENERATOR

1. Remove:

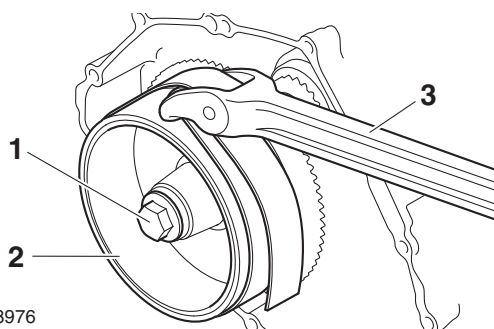
- Generator rotor bolt "1"
- Washer

TIP

While holding the generator rotor "2" with the rotor holding tool "3", loosen the generator rotor bolt.



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



G088976

2. Remove:

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

ECA13880

NOTICE

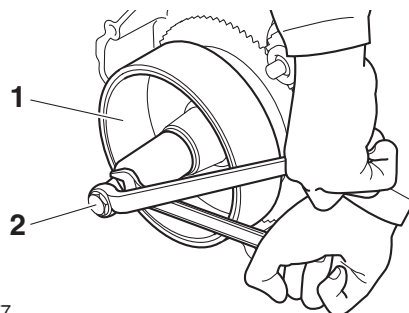
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

TIP

- Install the flywheel puller bolts to the threaded holes of the starter clutch.
- Make sure the flywheel puller is centered over the generator rotor.



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



G088977

EAS30868

REMOVING THE STARTER CLUTCH

1. Remove:

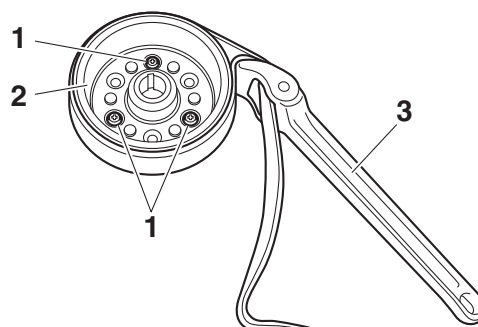
- Starter clutch bolts "1"
- Starter clutch

TIP

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



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



EAS30869

CHECKING THE STARTER CLUTCH

1. Check:

- Starter clutch rollers
Damage/wear → Replace.

2. Check:

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

3. Check:

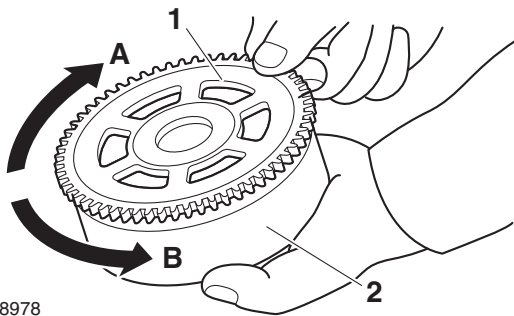
- Starter clutch gear contact surfaces
Damage/pitting/wear → Replace the starter clutch gear.

4. Check:

- Starter clutch operation

GENERATOR AND STARTER CLUTCH

- Install the starter clutch gear "1" onto the generator rotor "2" and hold the generator rotor.
- When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



G088978

EAS30870

CHECKING THE TORQUE LIMITER

1. Check:

- Torque limiter
Damage/wear → Replace.

TIP

Do not disassemble the torque limiter.

EAS30871

INSTALLING THE STARTER CLUTCH

1. Install:

- Starter clutch "1"



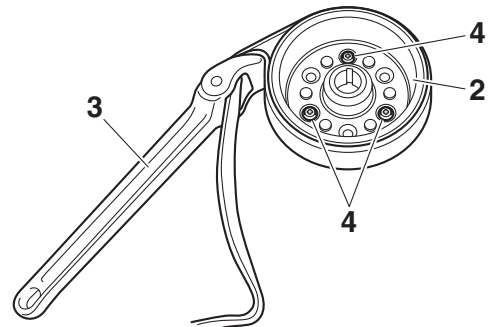
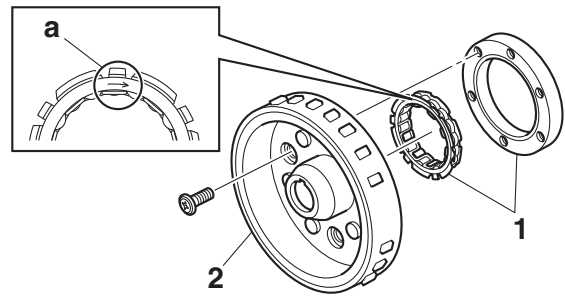
Starter clutch bolt
32 N·m (3.2 kgf·m, 24 lb·ft)
LOCTITE®

TIP

- Install the starter clutch so that the side of the starter clutch roller assembly with the arrow mark "a" is toward the generator rotor "2".
- While holding the generator rotor with the rotor holding tool "3", tighten the starter clutch bolts "4".



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166



EAS30872

INSTALLING THE GENERATOR

1. Install:

- Woodruff key
- Generator rotor
- Washer **New**
- Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

2. Tighten:

- Generator rotor bolt "1"



Generator rotor bolt
70 N·m (7.0 kgf·m, 52 lb·ft)

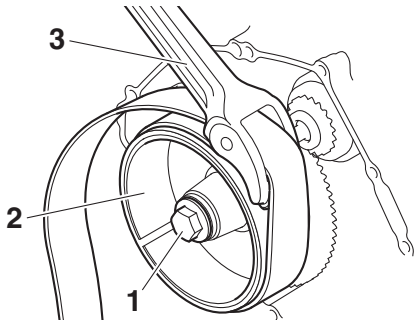
TIP

While holding the generator rotor "2" with the rotor holding tool "3", tighten the generator rotor bolt.



Rotor holding tool
90890-04166
Rotor holding tool
YM-04166

GENERATOR AND STARTER CLUTCH

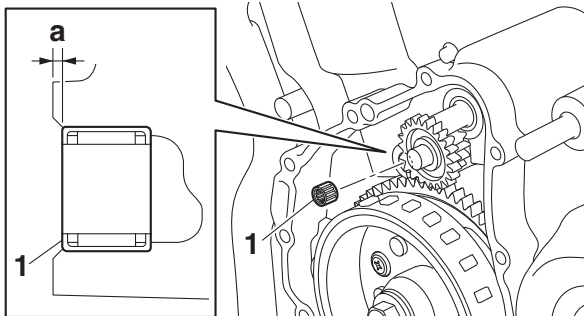


G088979

3. Install:
- Bearing "1"

TIP

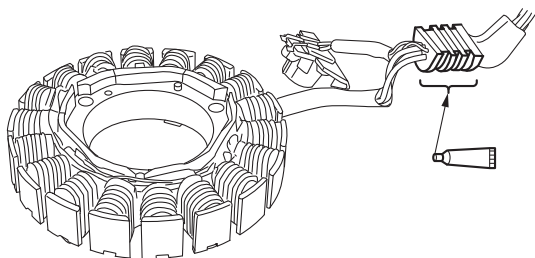
Make sure that the bearing does not protrude past the surface "a" of the cylinder.



4. Apply:
- Sealant
(onto the stator coil lead grommet)



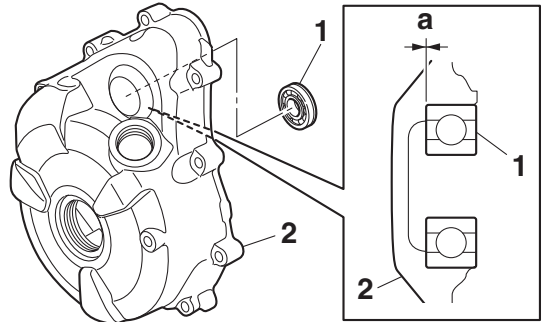
Yamaha bond No. 1215
90890-85505
Three bond No. 1215®



5. Install:
- Bearing "1"

TIP

Make sure that the bearing contacts the surface "a" of the generator cover "2".



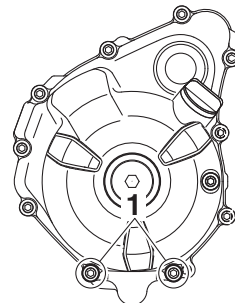
6. Install:
- Generator cover gasket **New**
 - Generator cover



Generator cover bolt
12 N·m (1.2 kgf·m, 8.9 lb-ft)
LOCTITE®
Generator cover bolt
12 N·m (1.2 kgf·m, 8.9 lb-ft)

TIP

- Tighten the generator cover bolts in stages and in a crisscross pattern.
- Apply LOCTITE® to the threads of only the generator cover bolts "1" shown in the illustration.



7. Connect:
- Stator coil coupler
 - Crankshaft position sensor coupler

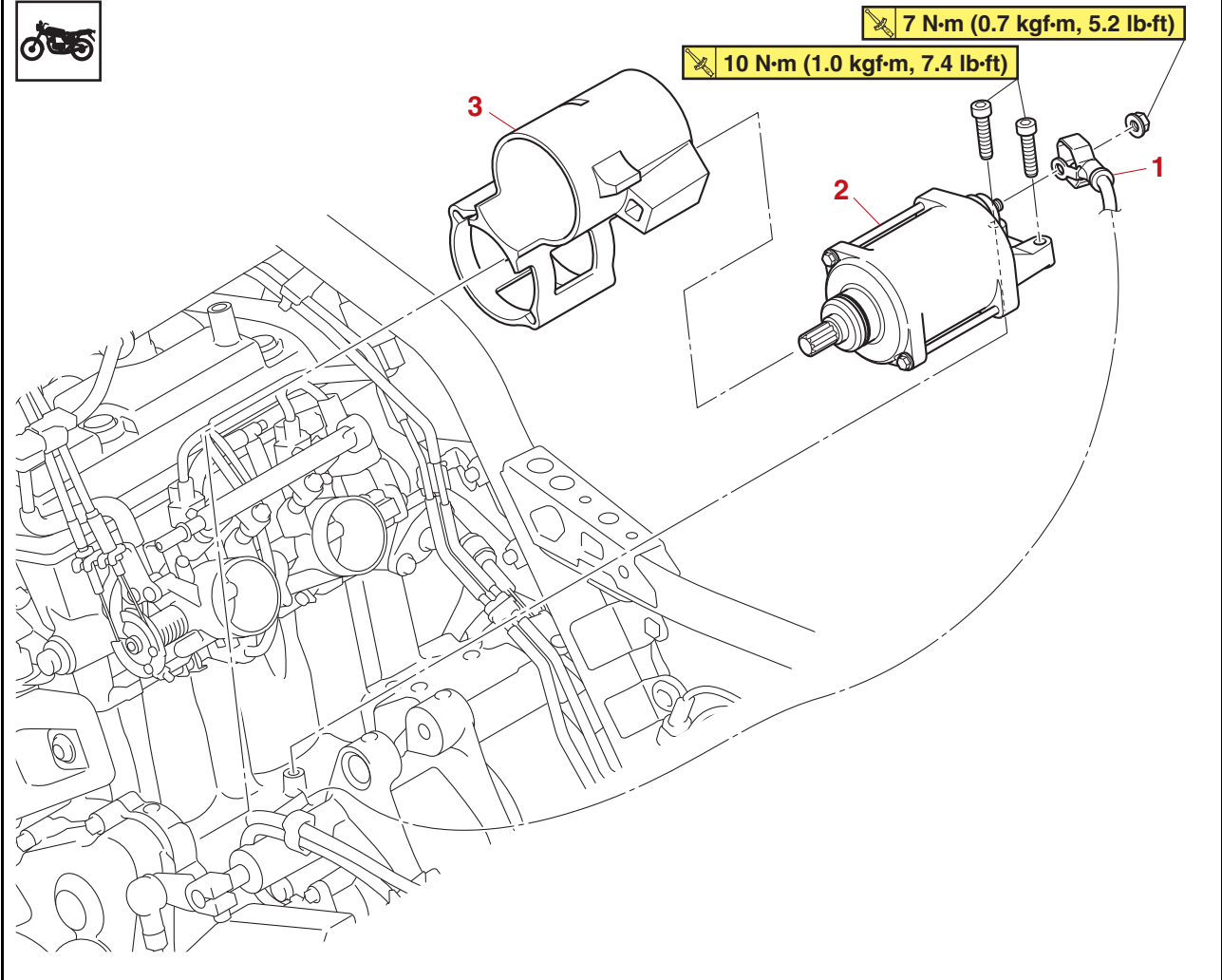
TIP

To route the stator coil lead, refer to "CABLE ROUTING" on page 2-15.

EAS20052

ELECTRIC STARTER

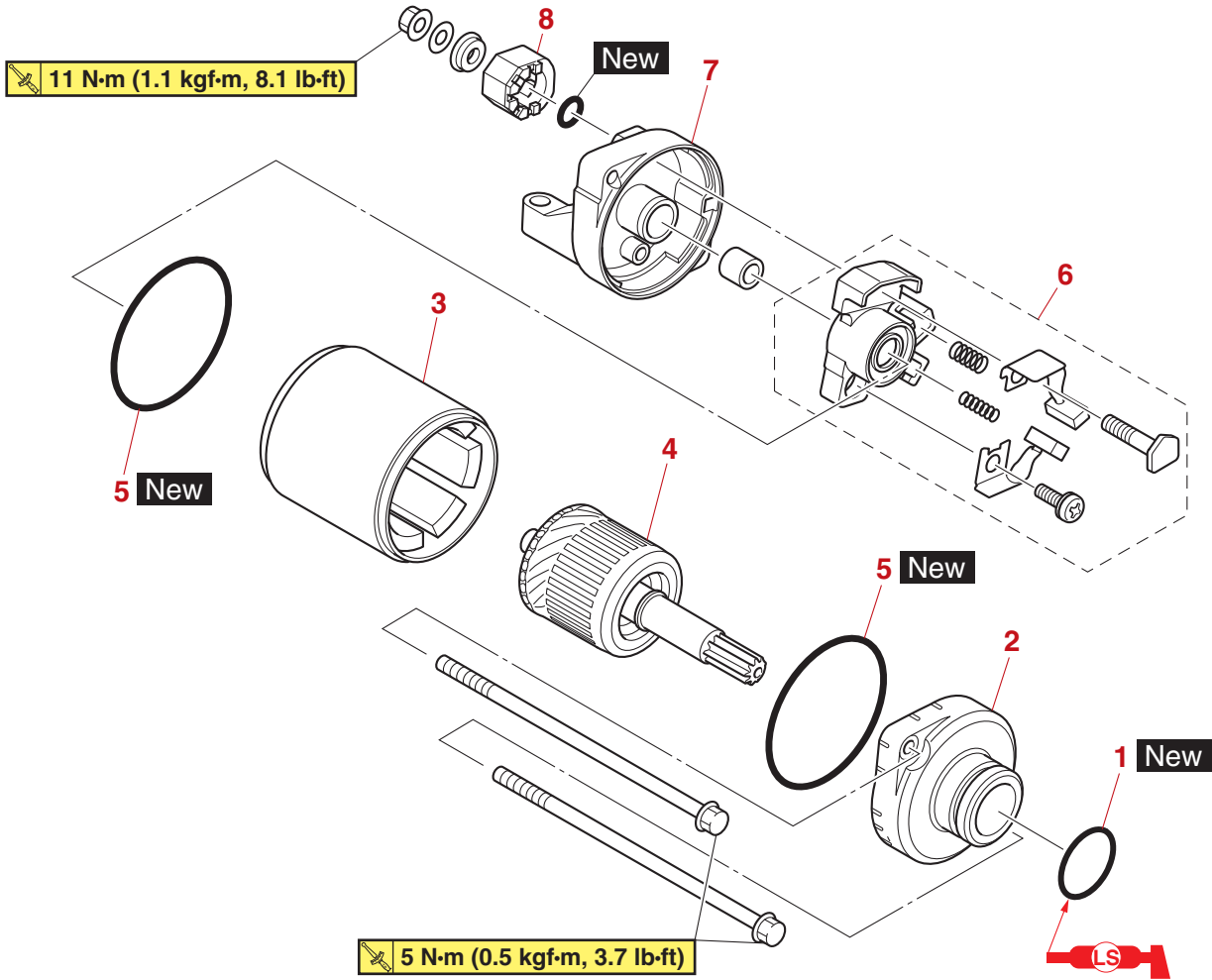
Removing the starter motor



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|-----------------------------------|
| | Canister | | Refer to "FUEL TANK" on page 7-1. |
| 1 | Starter motor lead | 1 | Disconnect. |
| 2 | Starter motor | 1 | |
| 3 | Canister holder | 1 | |

ELECTRIC STARTER

Disassembling the starter motor

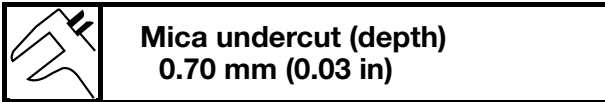


| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------|------|---------|
| 1 | O-ring | 1 | |
| 2 | Starter motor front cover | 1 | |
| 3 | Starter motor yoke | 1 | |
| 4 | Armature assembly | 1 | |
| 5 | Gasket | 2 | |
| 6 | Brush holder set | 1 | |
| 7 | Starter motor rear cover | 1 | |
| 8 | Lead guide | 1 | |

EAS30325

CHECKING THE STARTER MOTOR

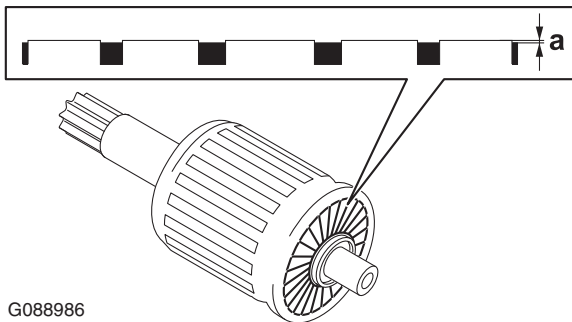
1. Check:
 - Commutator
 - Dirt → Clean with 600 grit sandpaper.
2. Measure:
 - Mica undercut "a"
 - Out of specification → Cut the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



Mica undercut (depth)
0.70 mm (0.03 in)

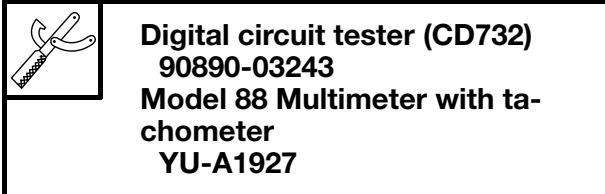
TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



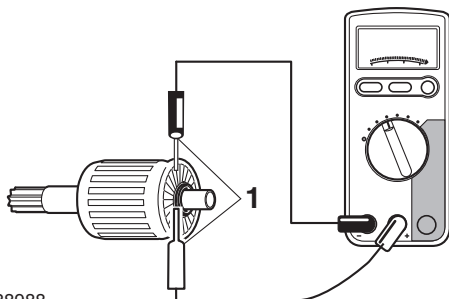
G088986

3. Check:
 - Armature assembly
 - a. Connect the digital circuit tester "1" 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 starter motor.

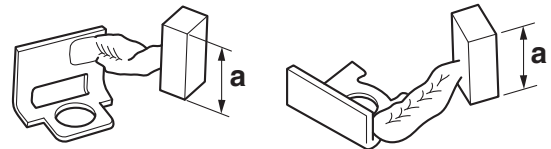


G088988

4. Measure:
 - Brush length "a"
 - Out of specification → Replace the brush holder set.



Brush overall length limit
6.5 mm (0.26 in)



5. Check:
 - Gear teeth
 - Damage/wear → Replace the starter motor.
6. Check:
 - Bearing
 - Oil seal
 - Damage/wear → Replace the starter motor front cover.

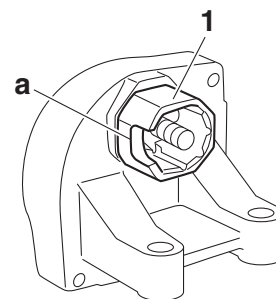
EAS30326

ASSEMBLING THE STARTER MOTOR

1. Install:
 - Lead guide "1"

TIP

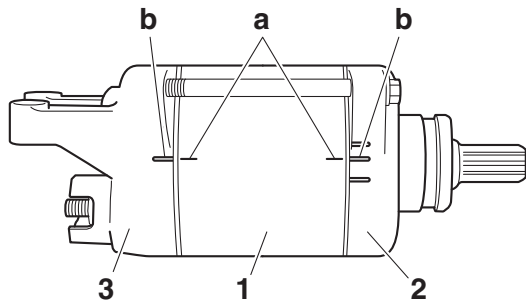
Make sure that the slot "a" in the lead guide is facing in the direction shown in the illustration.



2. Install:
 - Starter motor yoke "1"
 - Starter motor front cover "2"
 - Starter motor rear cover "3"

TIP

Align the match marks "a" on the starter motor yoke with the match marks "b" on the front cover and rear covers.



EAS30327

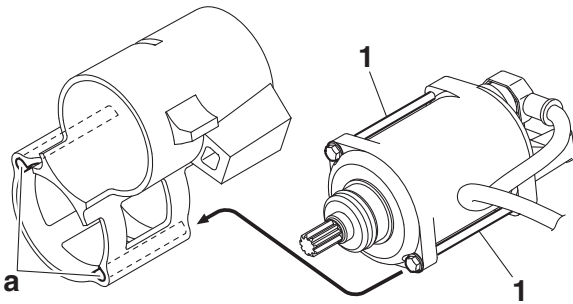
INSTALLING THE STARTER MOTOR

1. Install:

- Canister holder
- Starter motor

TIP

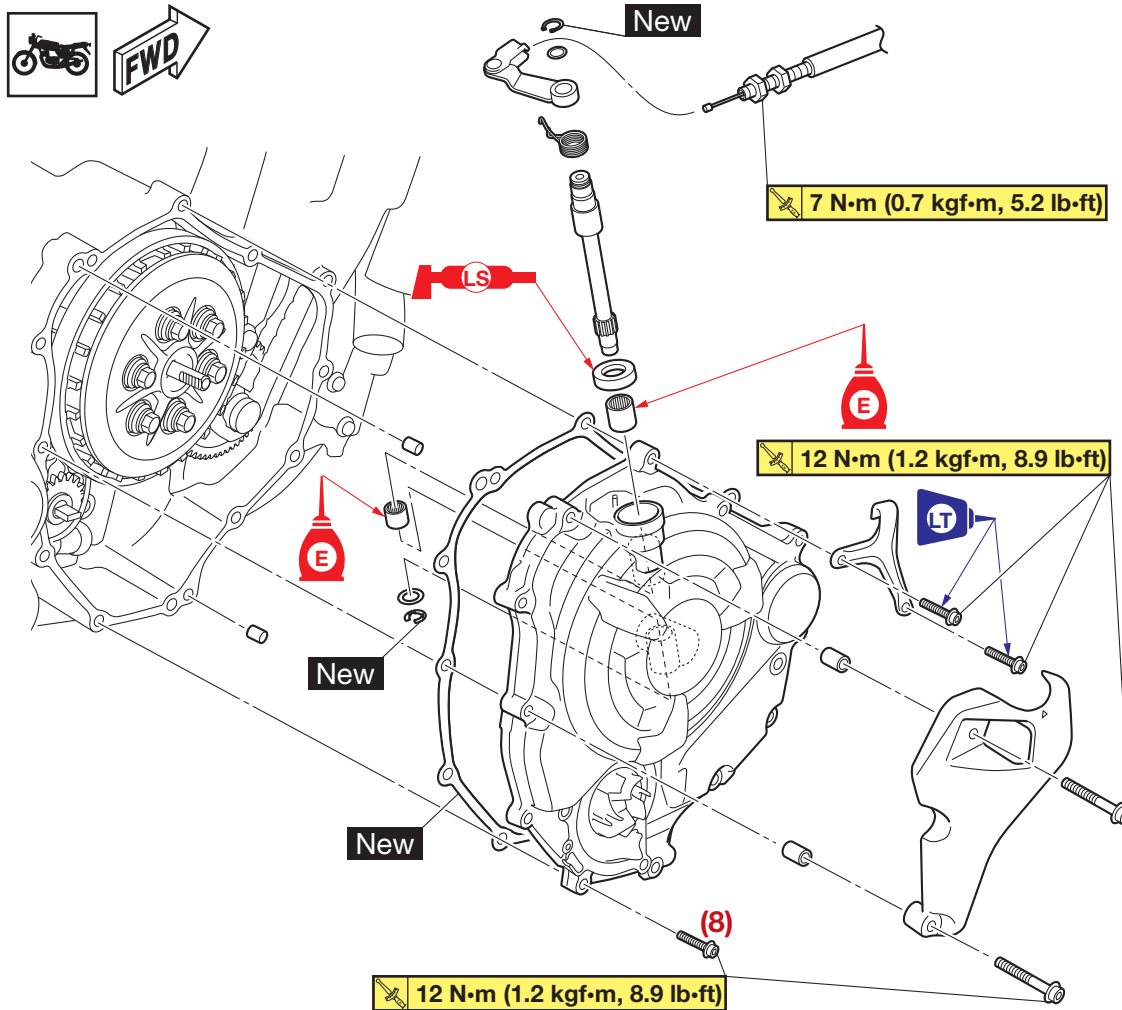
Pass the starter motor front cover bolts "1" through the slots "a" in the canister holder to secure it.



EAS20055

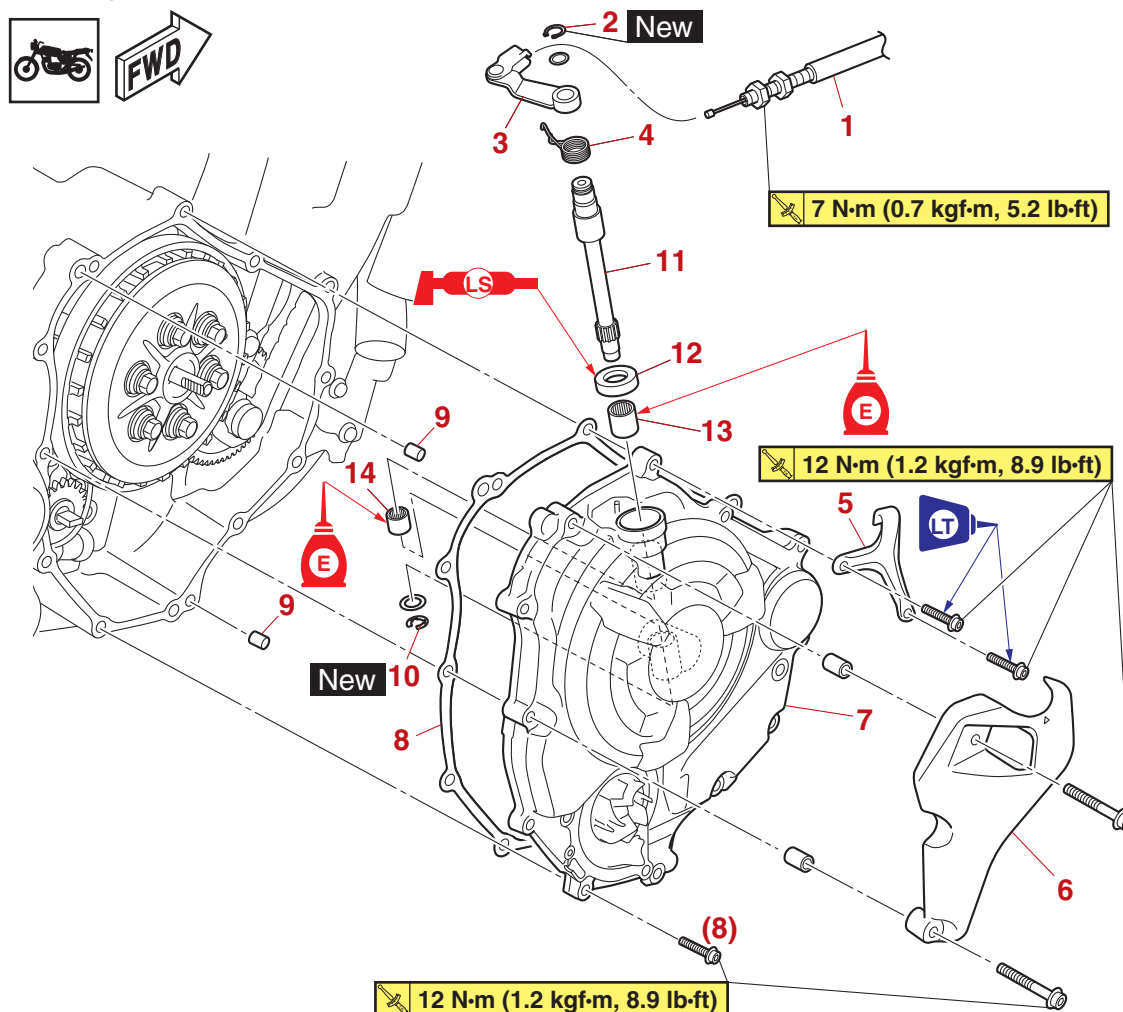
CLUTCH

Removing the clutch cover and pull lever shaft



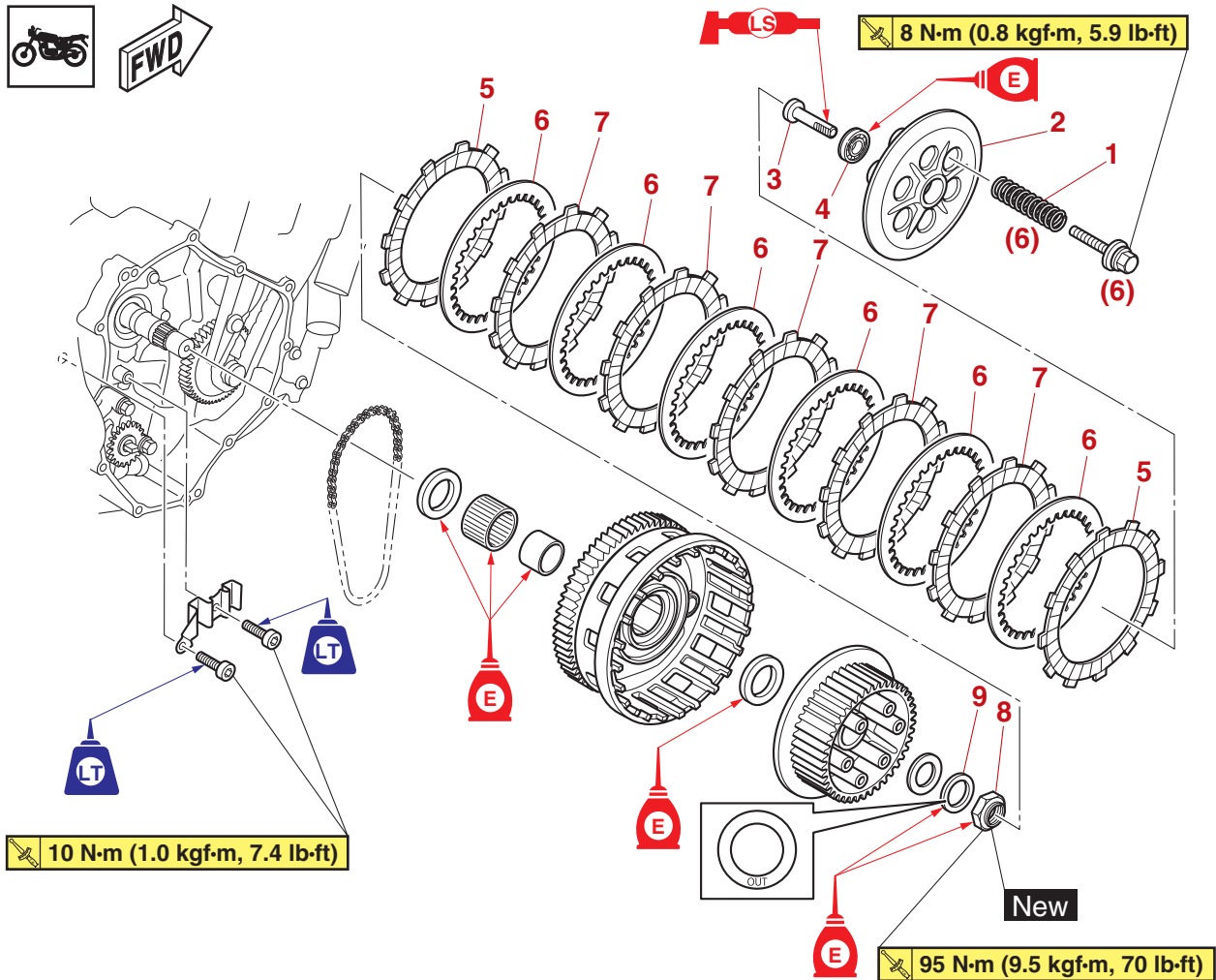
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center)/Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Water pump housing | | Refer to "WATER PUMP" on page 6-10. |

Removing the clutch cover and pull lever shaft



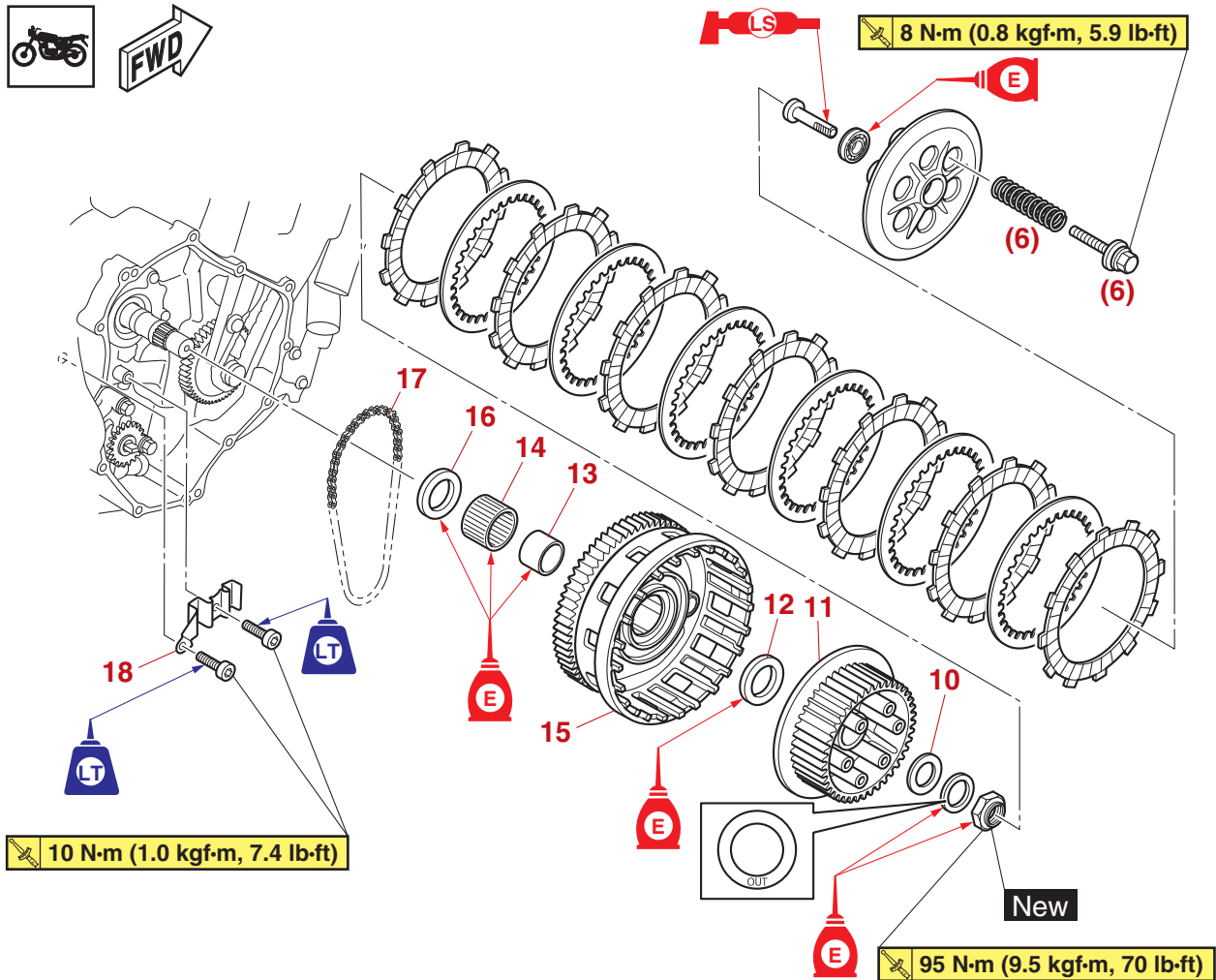
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------|------|-------------|
| 1 | Clutch cable | 1 | Disconnect. |
| 2 | Circlip | 1 | |
| 3 | Pull lever | 1 | |
| 4 | Pull lever spring | 1 | |
| 5 | Clutch cable holder | 1 | |
| 6 | Pull lever shaft cover | 1 | |
| 7 | Clutch cover | 1 | |
| 8 | Clutch cover gasket | 1 | |
| 9 | Dowel pin | 2 | |
| 10 | Circlip | 1 | |
| 11 | Pull lever shaft | 1 | |
| 12 | Oil seal | 1 | |
| 13 | Bearing | 1 | |
| 14 | Bearing | 1 | |

Removing the clutch



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------|------|---------|
| 1 | Compression spring | 6 | |
| 2 | Pressure plate | 1 | |
| 3 | Pull rod | 1 | |
| 4 | Bearing | 1 | |
| 5 | Friction plate 1 | 2 | |
| 6 | Clutch plate | 6 | |
| 7 | Friction plate 2 | 5 | |
| 8 | Clutch boss nut | 1 | |
| 9 | Conical spring washer | 1 | |

Removing the clutch



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------------|------|---------|
| 10 | Washer | 1 | |
| 11 | Clutch boss | 1 | |
| 12 | Thrust plate | 1 | |
| 13 | Spacer | 1 | |
| 14 | Bearing | 1 | |
| 15 | Clutch housing | 1 | |
| 16 | Thrust plate | 1 | |
| 17 | Oil pump drive chain | 1 | |
| 18 | Oil pump drive chain guide | 1 | |

EAS30346

REMOVING THE CLUTCH

- Remove:
 - Clutch cover
 - Gasket

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

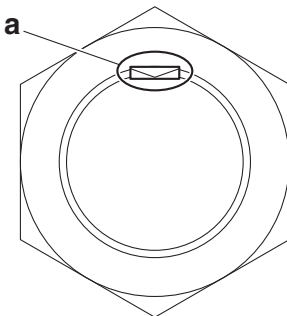
- Remove:
 - Compression spring bolts
 - Compression springs
 - Pressure plate
 - Pull rod

TIP

Loosen the compression spring bolts in stages and in a crisscross pattern.

- Remove:
 - Friction plates 1
 - Clutch plates
 - Friction plates 2

- Straighten the clutch boss nut rib "a".



G088991

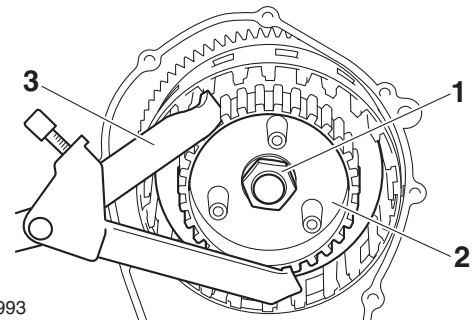
- Loosen:
 - Clutch boss nut "1"

TIP

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

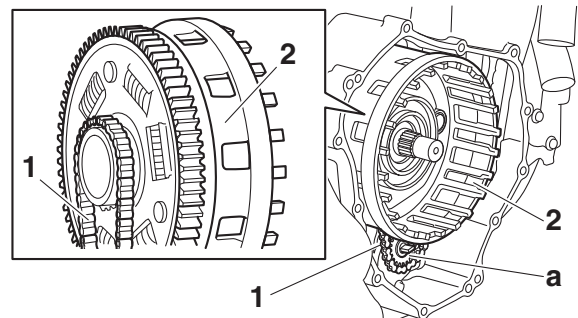


Clutch holder
90890-04199
Universal clutch holder
YM-91042



G088993

- Remove:
 - Spacer
 - Bearing
 - Clutch housing
 - Remove the spacer and bearing.
 - Remove the oil pump drive chain "1" from the oil pump driven sprocket "a", and then remove the clutch housing "2".



EAS30348

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

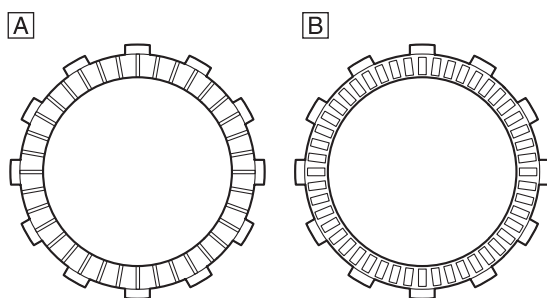
- Check:
 - Friction plate
 Damage/wear → Replace the friction plates as a set.
- Measure:
 - Friction plate thickness
 Out of specification → Replace the friction plates as a set.

TIP

Measure the friction plate at four places.



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



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

EAS30349

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:
 - Clutch plate
Damage → Replace the clutch plates as a set.
2. Measure:
 - Clutch plate warpage
(with a surface plate and thickness gauge)
Out of specification → Replace the clutch plates as a set.



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



Warpage limit
0.10 mm (0.004 in)

EAS30351

CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
 - Clutch spring
Damage → Replace the clutch springs as a set.
2. Measure:
 - Clutch spring free length
Out of specification → Replace the clutch springs as a set.



Clutch spring free length limit
47.50 mm (1.87 in)

EAS30352

CHECKING THE CLUTCH HOUSING

1. Check:
 - Clutch housing dogs
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.

2. Check:
 - Oil pump drive sprocket
Cracks/damage/wear → Replace.
3. Check:
 - Bearing
Damage/wear → Replace the bearing and clutch housing.

EAS30353

CHECKING THE CLUTCH BOSS

1. Check:
 - Clutch boss splines
Damage/pitting/wear → Replace the clutch boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.

EAS30354

CHECKING THE PRESSURE PLATE

1. Check:
 - Pressure plate
Cracks/damage → Replace.
 - Bearing
Damage/wear → Replace.

EAS30356

CHECKING THE PRIMARY DRIVE GEAR

1. Check:
 - Primary drive gear
Damage/wear → Replace the crankshaft and clutch housing as a set.
Excessive noise during operation → Replace the crankshaft and clutch housing as a set.

EAS30357

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
 - Primary driven gear
Damage/wear → Replace the clutch housing and crankshaft as a set.
Excessive noise during operation → Replace the clutch housing and crankshaft as a set.

EAS30358

CHECKING THE PULL LEVER SHAFT AND PULL ROD

- Check:
 - Pull lever shaft pinion gear teeth
 - Pull rod teeth
 Damage/wear → Replace the pull rod and pull lever shaft as a set.
- Check:
 - Pull rod bearing
 Damage/wear → Replace.

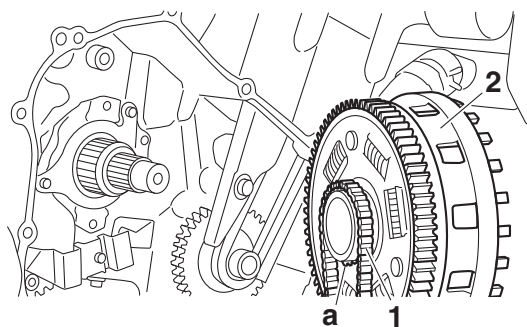
EAS30363

INSTALLING THE CLUTCH

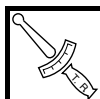
- Install:
 - Oil pump drive chain "1"
 - Thrust plate
 - Clutch housing "2"
 - Bearing
 - Spacer

TIP

Install the oil pump drive chain onto the oil pump drive sprocket "a".



- Install:
 - Thrust plate
 - Clutch boss "1"
 - Washer
 - Conical spring washer
 - Clutch boss nut "2" **New**



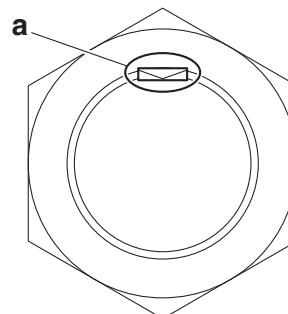
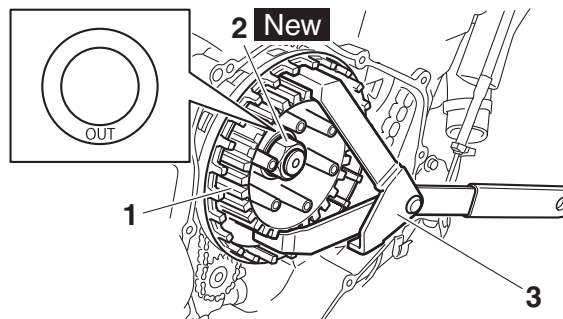
Clutch boss nut
95 N·m (9.5 kgf·m, 70 lb·ft)

TIP

- Lubricate the conical spring washer and clutch boss nut threads with engine oil.
- Install the washer on the main axle with the "OUT" mark facing away from the vehicle.
- While holding the clutch boss "1" with the universal clutch holder "3", tighten the clutch boss nut.
- Stake the clutch boss nut at a cutout "a" in the main axle.



Clutch holder
90890-04199
Universal clutch holder
YM-91042

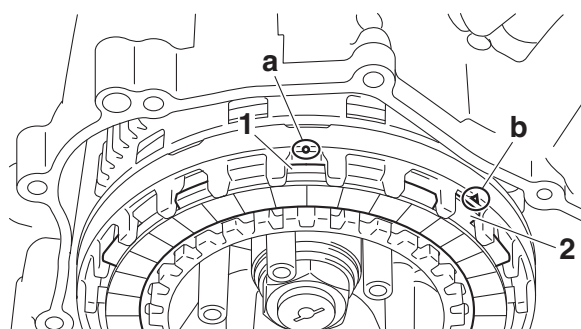


G088991

- Install:
 - Friction plates 1 "1"
 - Friction plates 2 "2"

TIP

- First, install a friction plate, and then alternate between a clutch plate and a friction plate.
- Align a projection on friction plate 1 with the punch mark "a" on the clutch housing and align a projection on friction plate 2 with the "Δ" mark "b" on the housing.



- Install:
 - Bearing
 - Pull rod
 - Pressure plate
 - Clutch springs
 - Clutch spring bolts



Clutch spring bolt
8 N·m (0.8 kgf·m, 5.9 lb·ft)

TIP

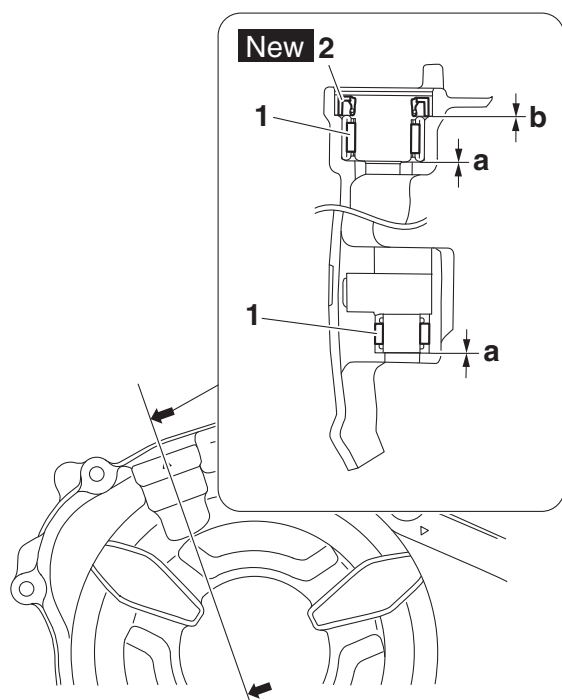
- Apply lithium-soap-based grease onto the pull rod.
- Tighten the clutch spring bolts in stages and in a crisscross pattern.

5. Install:

- Bearings "1"
- Oil seal "2" **New**
(to the clutch cover)

TIP

- Lubricate the bearings with engine oil and lubricate the oil seal with lithium-soap-based grease.
- Install the bearings until they contact the surfaces "a" and install the oil seal until it contacts the surface "b" as shown in the illustration.



6. Install:

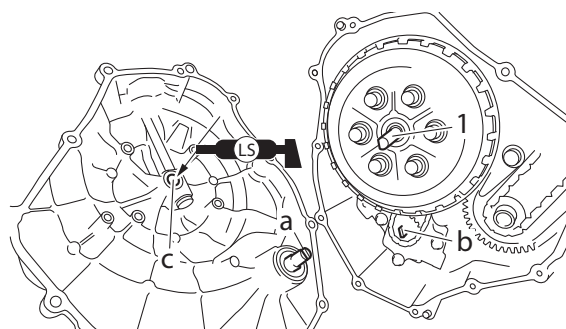
- Dowel pins
- Clutch cover gasket **New**
- Clutch cover
- Pull lever shaft cover
- Clutch cable holder



Clutch cover bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
Clutch cable holder bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "1" rearward and align the rod with the hole "c" in the clutch cover.
- Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the bolts in stages and in a crisscross pattern.

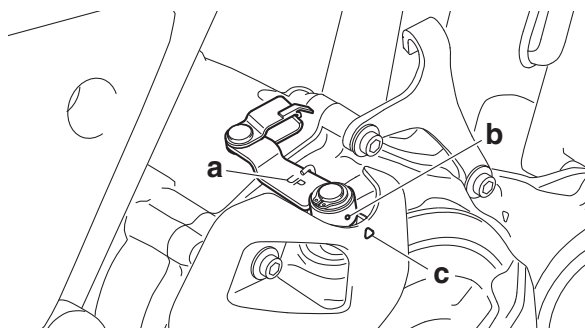


7. Install:

- Pull lever

TIP

- Install the pull lever with the "UP" mark "a" facing toward upper side.
- When installing the pull lever, push the pull lever and check that the punch mark "b" on the pull lever aligns with the mark "c" on the pull lever shaft cover.



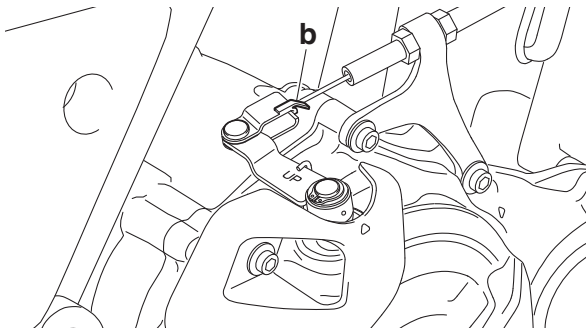
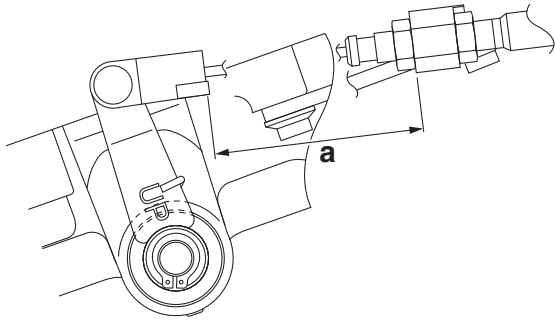
8. Connect:

- Clutch cable

TIP

- Install the clutch cable so that the clutch cable length "a" is 51.6–62.2 mm (2.03–2.45 in) as shown in the illustration.

- After installing the clutch cable, bend the projection “b” on the pull lever.



9. Adjust:

- Clutch lever free play
Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-13.

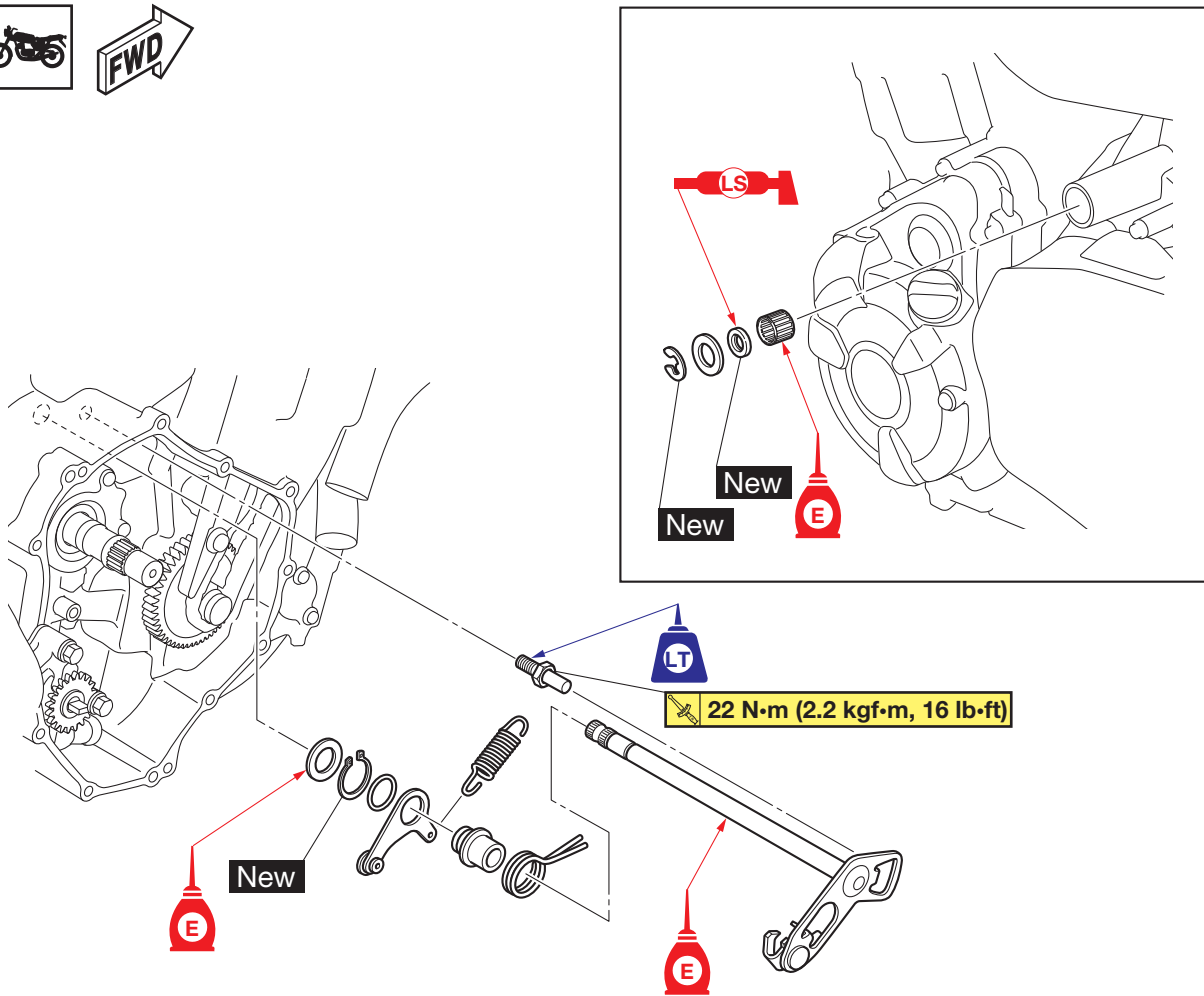


Clutch lever free play
5.0–10.0 mm (0.20–0.39 in)

EAS20057

SHIFT SHAFT

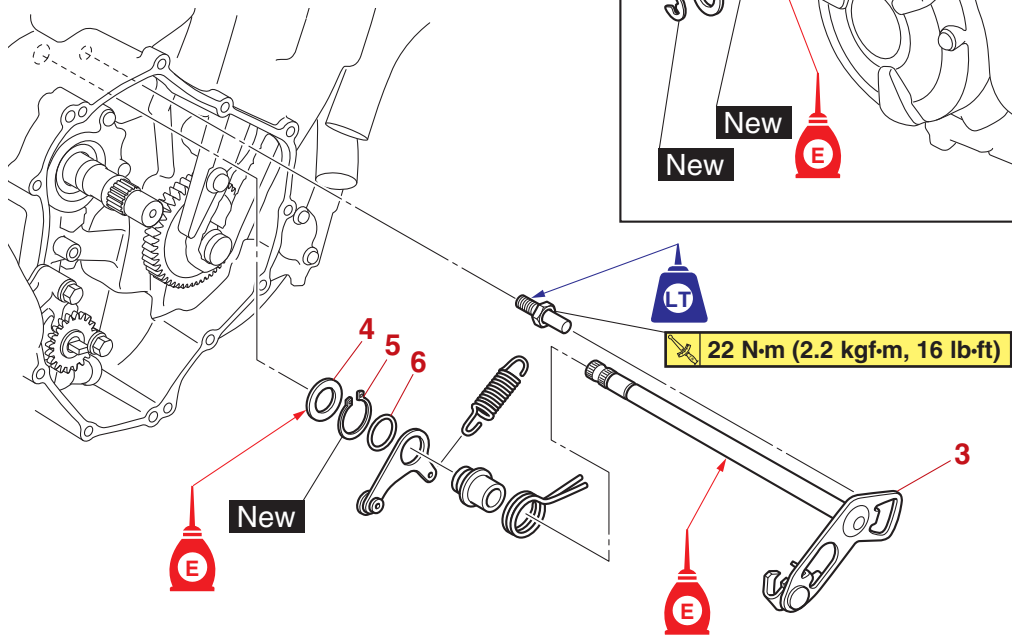
Removing the shift shaft and stopper lever



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center)/Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |

SHIFT SHAFT

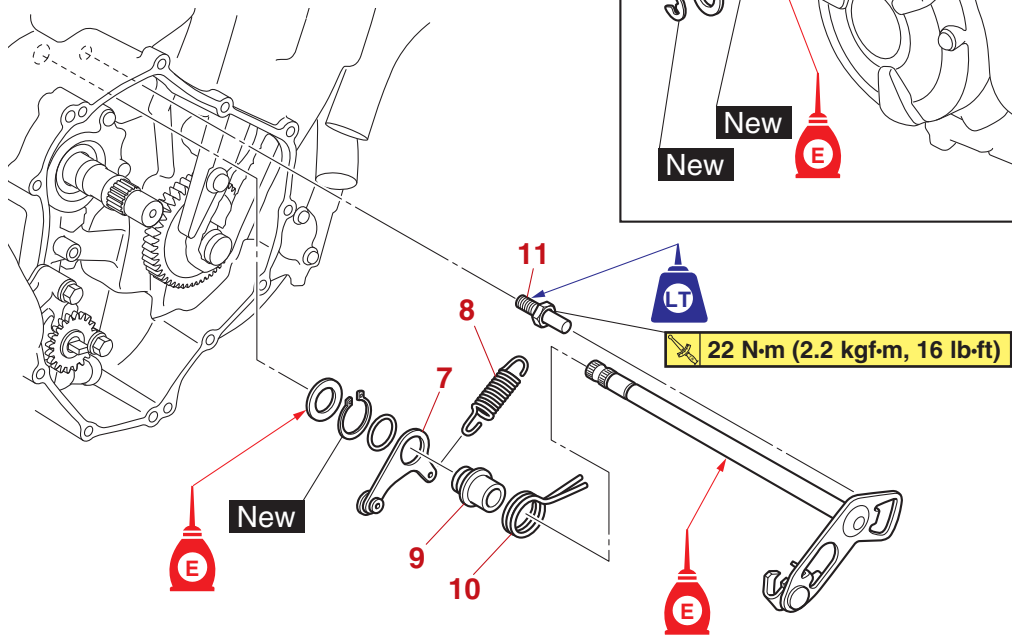
Removing the shift shaft and stopper lever



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|--------------------------------------|
| | Shift arm | | Refer to "CHAIN DRIVE" on page 4-92. |
| | Water pump housing | | Refer to "WATER PUMP" on page 6-10. |
| | Clutch housing | | Refer to "CLUTCH" on page 5-54. |
| 1 | Circlip | 1 | |
| 2 | Washer | 1 | |
| 3 | Shift shaft | 1 | |
| 4 | Washer | 1 | |
| 5 | Circlip | 1 | |
| 6 | Washer | 1 | |

SHIFT SHAFT

Removing the shift shaft and stopper lever



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------------|------|---------|
| 7 | Stopper lever | 1 | |
| 8 | Stopper lever spring | 1 | |
| 9 | Collar | 1 | |
| 10 | Shift shaft spring | 1 | |
| 11 | Shift shaft spring stopper | 1 | |
| 12 | Oil seal | 1 | |
| 13 | Bearing | 1 | |

EAS30377

CHECKING THE SHIFT SHAFT

1. Check:

- Shift shaft
Bends/damage/wear → Replace.
- Shift shaft spring
- Collar
Damage/wear → Replace.

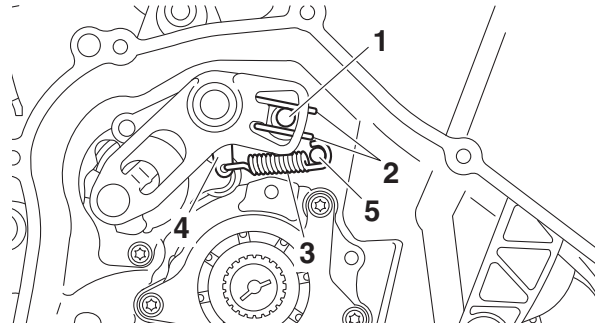
EAS30378

CHECKING THE STOPPER LEVER

1. Check:

- Stopper lever
Bends/damage → Replace.
Roller turns roughly → Replace the stopper lever.

- Hook the ends of the stopper lever spring “3” onto the stopper lever “4” and the stopper lever spring hook “5”.
- Mesh the stopper lever with the shift drum segment assembly.



EAS30381

INSTALLING THE SHIFT SHAFT

1. Install:

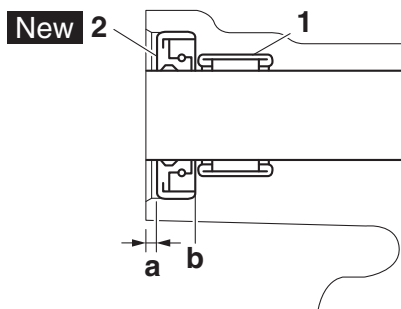
- Bearing “1”
- Oil seal “2” **New**



Install depth “a”
0.6–1.1 mm (0.02–0.04 in)

TIP

- Apply engine oil onto the bearing.
- Make sure that the bearing does not protrude past the line “b” shown in the illustration.
- Lubricate the oil seal lips with lithium-soap-based grease.



2. Install:

- Shift shaft spring stopper
- Washer
- Shift shaft assembly
- Stopper lever spring



Shift shaft spring stopper
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®

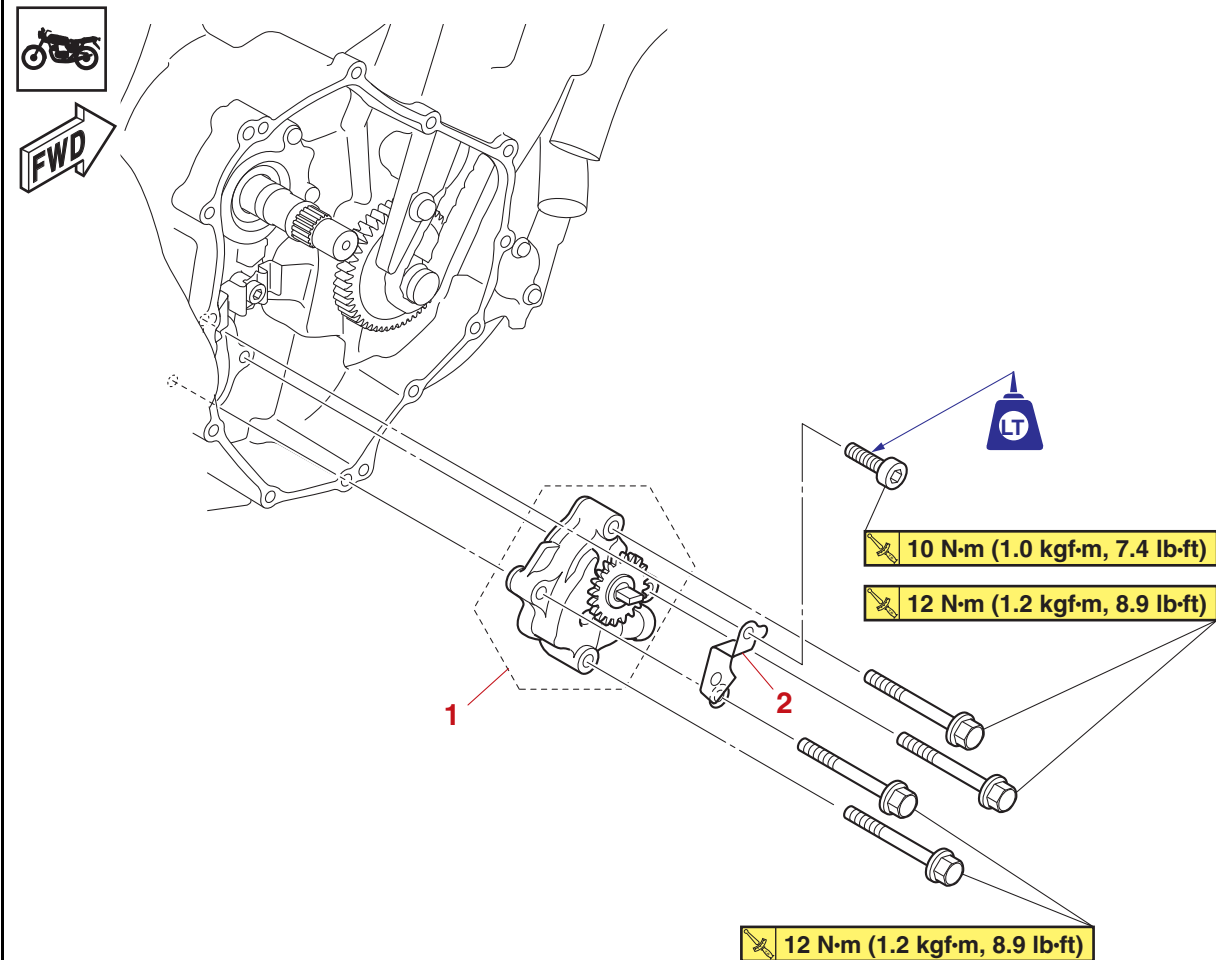
TIP

- Hook the end of the shift shaft spring “2” onto the shift shaft spring stopper “1”.

EAS20054

OIL PUMP

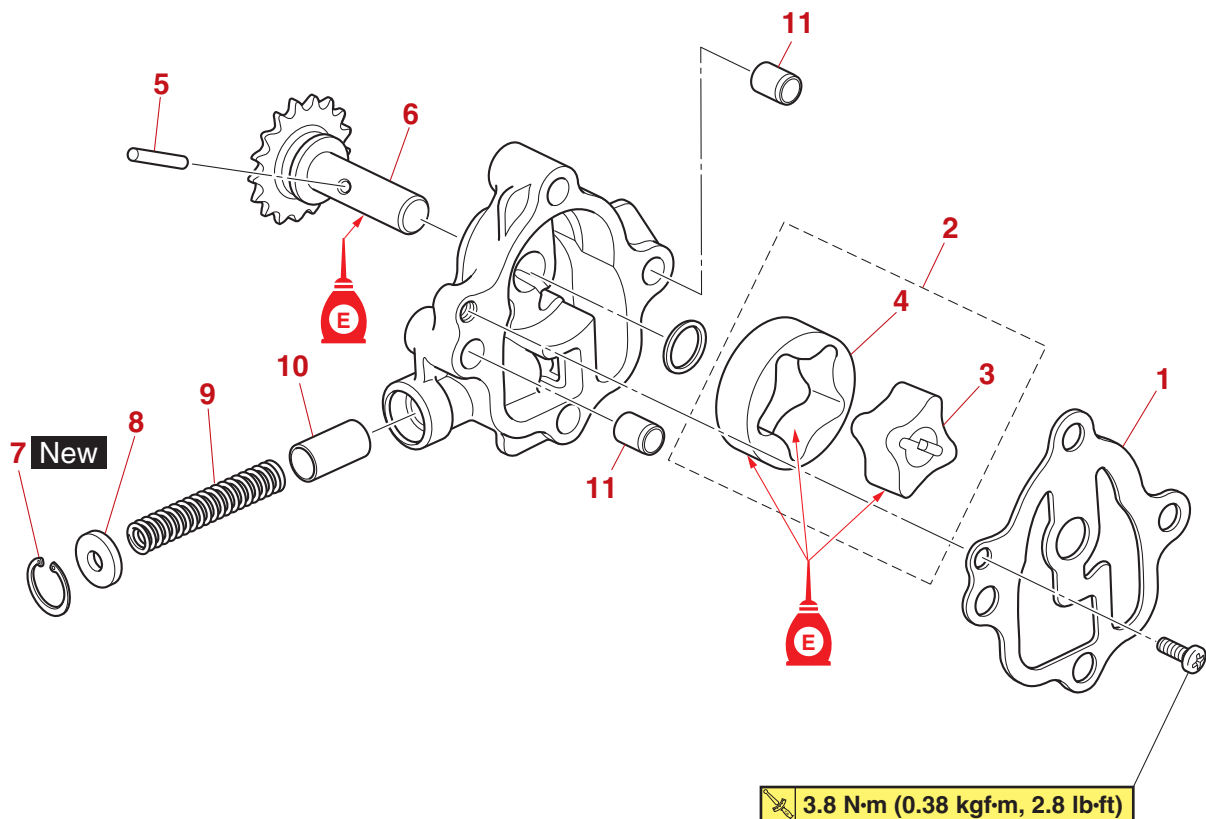
Removing the oil pump



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center)/Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| | Water pump housing | | Refer to "WATER PUMP" on page 6-10. |
| | Clutch housing | | Refer to "CLUTCH" on page 5-54. |
| 1 | Oil pump assembly | 1 | |
| 2 | Holder | 1 | |

OIL PUMP

Disassembling the oil pump



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------|------|---|
| 1 | Oil pump cover | 1 | |
| 2 | Oil pump rotor assembly | 1 | |
| 3 | Oil pump inner rotor | 1 | |
| 4 | Oil pump outer rotor | 1 | |
| 5 | Pin | 1 | |
| 6 | Oil pump driven sprocket | 1 | |
| 7 | Circlip | 1 | Hold down the washer when removing the circlip. |
| 8 | Washer | 1 | |
| 9 | Spring | 1 | |
| 10 | Relief valve | 1 | |
| 11 | Dowel pin | 2 | |

EAS30336

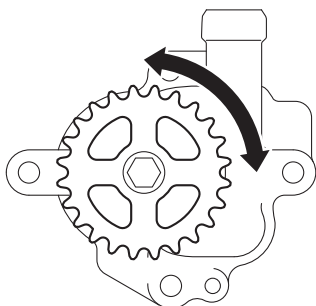
CHECKING THE SPROCKET AND CHAIN

1. Check:
 - Oil pump drive sprocket
Refer to “CHECKING THE CLUTCH HOUSING” on page 5-59.
 - Oil pump driven sprocket
Refer to “CHECKING THE OIL PUMP” on page 5-69.
2. Check:
 - Oil pump drive chain
Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket (clutch housing), and oil pump driven sprocket as a set.

EAS30337

CHECKING THE OIL PUMP

1. Check:
 - Oil pump driven sprocket
 - Oil pump housing
Cracks/damage/wear → Replace the oil pump assembly.
2. Check:
 - Oil pump operation
Rough movement → Replace the oil pump assembly.



G088997

EAS30338

CHECKING THE RELIEF VALVE

1. Check:
 - Relief valve
 - Spring
Damage/wear → Replace the oil pump assembly.

EAS30342

ASSEMBLING THE OIL PUMP

1. Lubricate:
 - Inner rotor
 - Outer rotor
(with the recommended lubricant)



Recommended lubricant
Engine oil

2. Lubricate:
 - Oil pump driven sprocket
(with the recommended lubricant)



Recommended lubricant
Engine oil

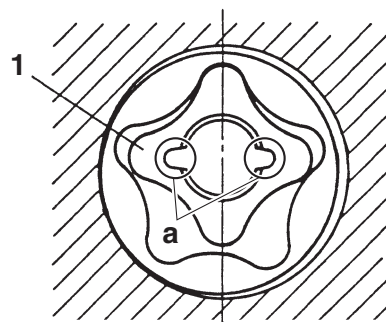
3. Install:
 - Oil pump driven sprocket
 - Pin
 - Outer rotor
 - Inner rotor
 - Oil pump cover
 - Oil pump cover screw



Oil pump cover screw
3.8 N·m (0.38 kgf·m, 2.8 lb-ft)

TIP

Align the pin in the oil pump shaft with the grooves “a” in the inner rotor “1”.



4. Check:
 - Oil pump operation
Refer to “CHECKING THE OIL PUMP” on page 5-69.

EAS30343

INSTALLING THE OIL PUMP

1. Install:
 - Oil pump “1”
 - Oil pump bolts “2”



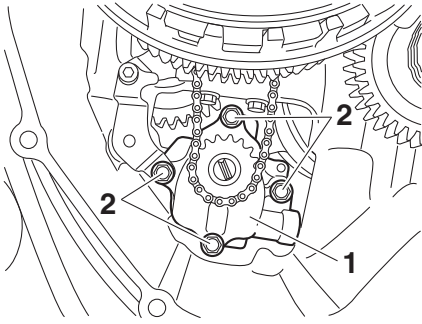
Oil pump bolt
12 N·m (1.2 kgf·m, 8.9 lb-ft)

ECA20940

NOTICE

After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.

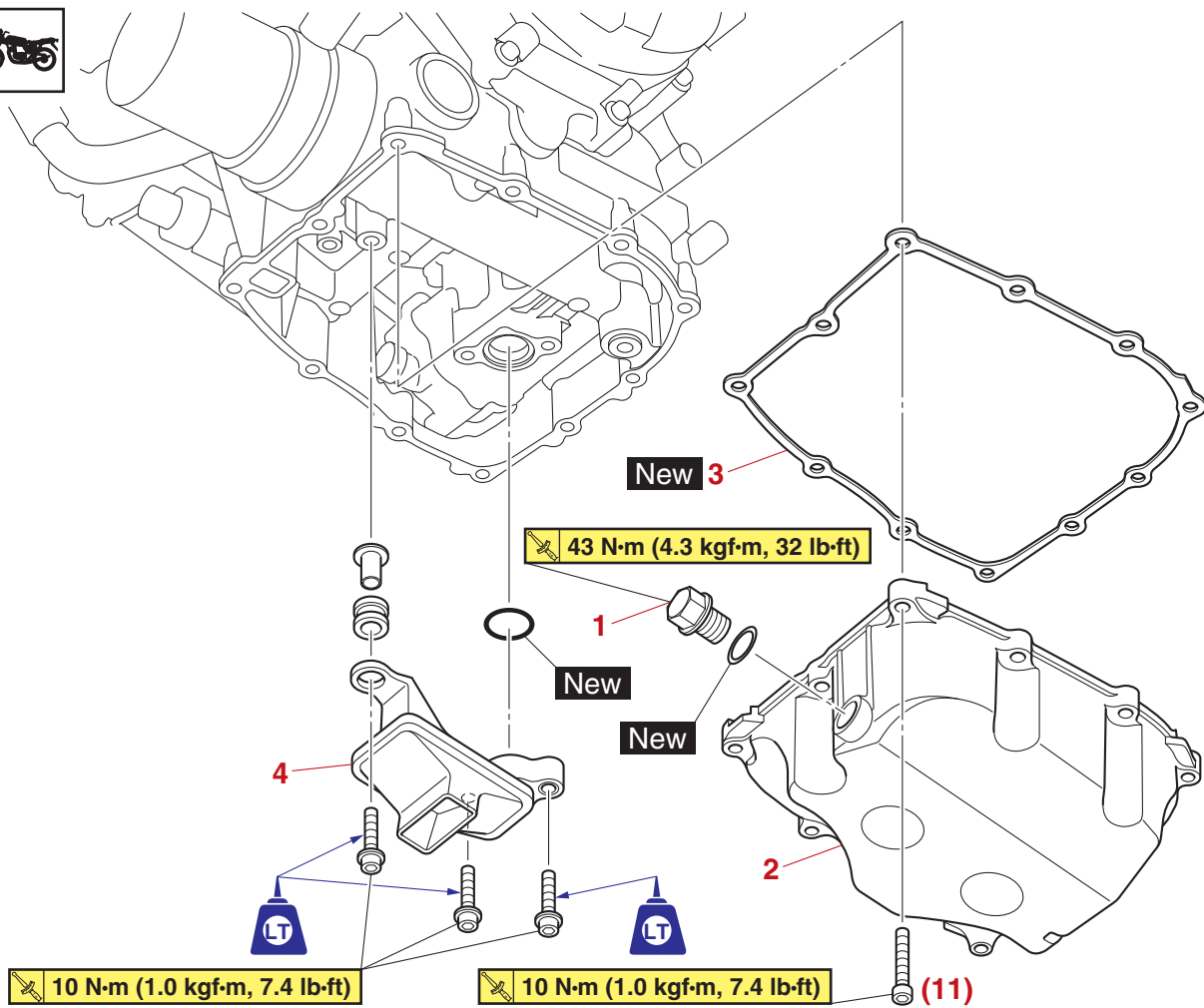
OIL PUMP



EAS20177

OIL PAN

Removing the oil pan



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------|------|---|
| | Exhaust pipe | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |
| 1 | Engine oil drain bolt | 1 | |
| 2 | Oil pan | 1 | |
| 3 | Oil pan gasket | 1 | |
| 4 | Oil strainer | 1 | |

EAS31068

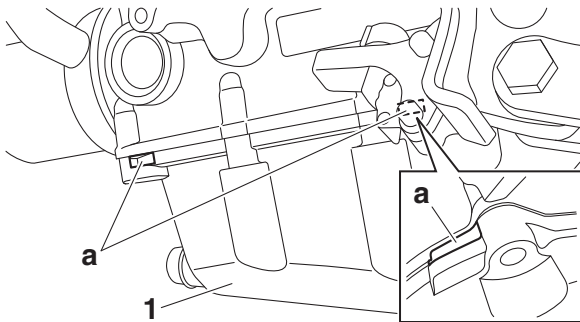
REMOVING THE OIL PAN

1. Remove:

- Oil pan "1"
- Oil pan gasket

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Insert a flat-head screwdriver into the slots "a" in the oil pan to remove the oil pan.



EAS31069

CHECKING THE OIL STRAINER

1. Check:

- Oil strainer
Damage → Replace.
Contaminants → Clean with solvent.

EAS31070

INSTALLING THE OIL PAN

1. Install:

- Oil pan gasket **New**
- Oil pan



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

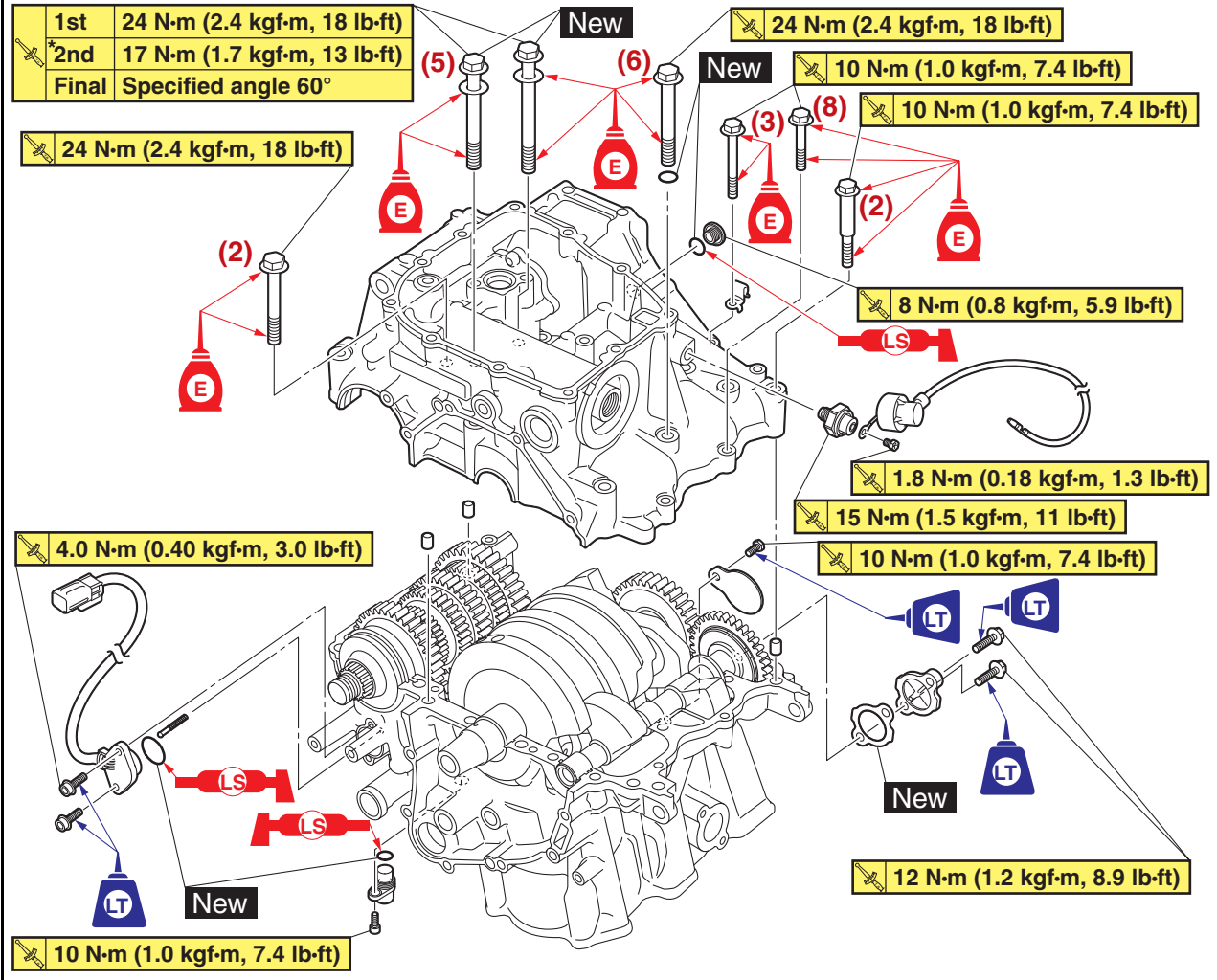
TIP

Tighten the oil pan bolts in stages and in a criss-cross pattern.

EAS20059

CRANKCASE

Separating the crankcase

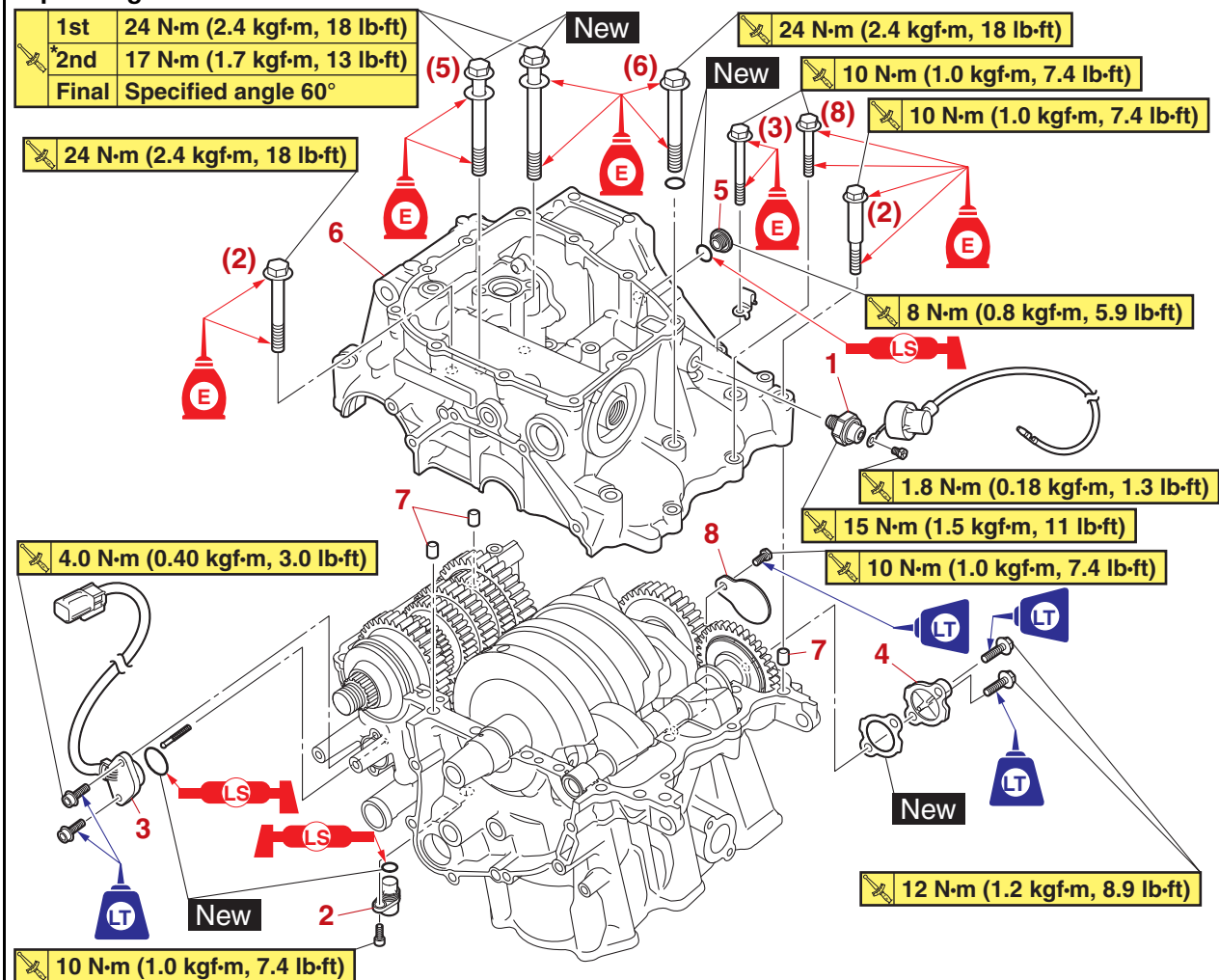


* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|---|
| | Engine | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Cylinder head cover | | Refer to "CAMSHAFTS" on page 5-23. |
| | Cylinder head | | Refer to "CYLINDER HEAD" on page 5-34. |
| | Starter clutch | | Refer to "GENERATOR AND STARTER CLUTCH" on page 5-45. |
| | Clutch housing | | Refer to "CLUTCH" on page 5-54. |
| | Oil strainer | | Refer to "OIL PAN" on page 5-71. |

CRANKCASE

Separating the crankcase



* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------------|------|---------|
| 1 | Oil pressure switch | 1 | |
| 2 | Cylinder plug | 1 | |
| 3 | Gear position switch | 1 | |
| 4 | Balancer shaft access cover | 1 | |
| 5 | Main gallery bolt | 1 | |
| 6 | Crankcase | 1 | |
| 7 | Dowel pin | 3 | |
| 8 | Blind plate | 1 | |

EAS30389

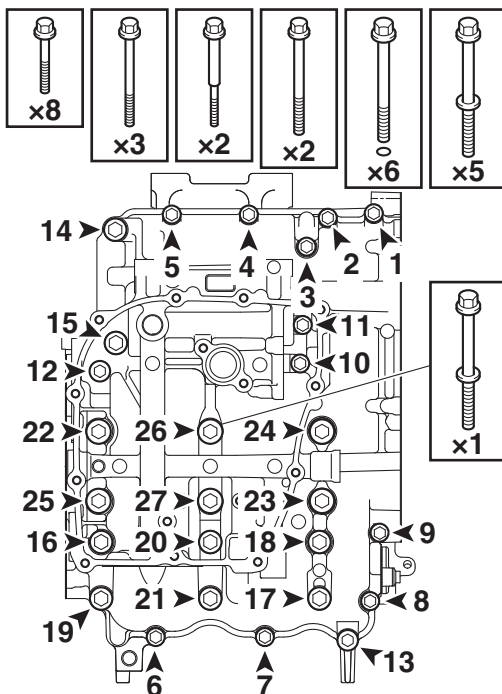
DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
 - Crankcase bolt (x27)

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts "1"–"11" in any loosening sequence.
- Loosen the bolts "12"–"27" in the proper sequence as shown.
- The numbers embossed "1"–"16" on the crankcase indicate the crankcase tightening sequence.

- M6 × 40 mm bolt (x8): "1", "2", "4"–"7", "10", "11"
- M6 × 60 mm bolt (x3): "3", "8", "9"
- M6 × 65 mm bolt (x2): "12", "13"
- M8 × 65 mm bolt (x2): "14", "15"
- M8 × 70 mm bolt (x6) (bolts with O-rings): "16"–"21"
- M9 × 80 mm bolt (x5) (bolts with washers): "22"–"25", "27"
- M9 × 90 mm bolt (x1) (bolts with washer): "26"



3. Remove:
 - Crankcase
 - Dowel pins

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

EAS30390

CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - Crankcase
Cracks/damage → Replace.
 - Oil delivery passages
Obstruction → Blow out with compressed air.

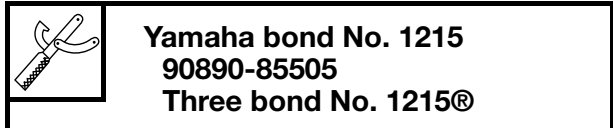
EAS30397

ASSEMBLING THE CRANKCASE

1. Lubricate:
 - Crankshaft journal bearing inner surface (with the recommended lubricant)



2. Apply:
 - Sealant (onto the crankcase mating surfaces)

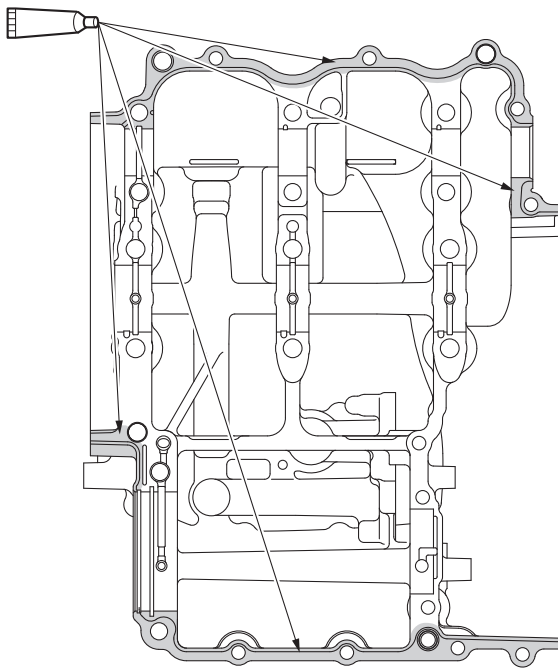


ECA20880

NOTICE

Do not allow any sealant to come into contact with the oil gallery, crankshaft journal bearings, or balancer shaft journal bearings.

CRANKCASE

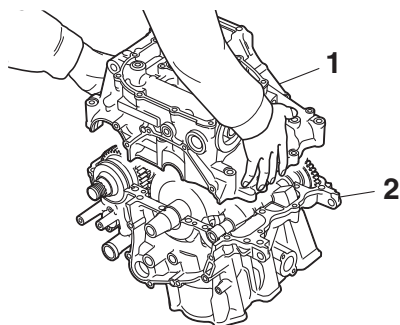


3. Install:
 - Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
 - Crankcase "1" (onto the cylinder "2")

ECA13980

NOTICE

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.



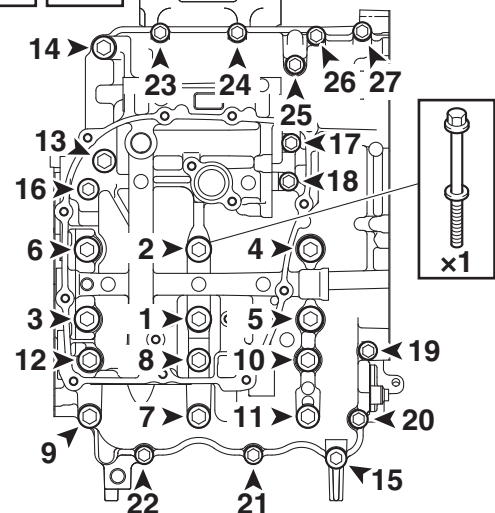
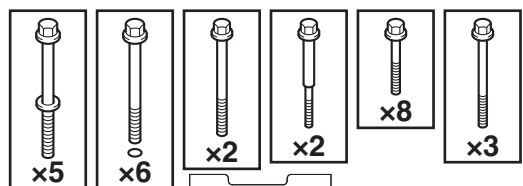
6. Install:
 - Crankcase bolt (x27)

TIP

- Tighten the bolts "1"–"16" in the order of the embossed numbers on the crankcase.
- Lubricate the bolts "1"–"6" threads, mating surfaces and washers with engine oil.
- Lubricate the bolts "7"–"12" threads, mating surfaces and O-rings with engine oil.

- Lubricate the bolts "13"–"27" threads and mating surfaces with engine oil.

- M9 × 80 mm bolt (x5) (bolts with washers): "1", "3"–"6" **New**
- M9 × 90 mm bolt (x1) (bolt with washer): "2" **New**
- M8 × 70 mm bolt (x6) (bolts with new O-rings): "7"–"12"
- M8 × 65 mm bolt (x2): "13", "14"
- M6 × 65 mm bolt (x2): "15", "16"
- M6 × 40 mm bolt (x8): "17", "18", "21"–"24", "26", "27"
- M6 × 60 mm bolt (x3): "19", "20", "25"



7. Tighten:
 - Crankcase bolts "1"–"6"



Crankcase bolts (bolts with washers) "1"–"6"

1st: 24 N·m (2.4 kgf·m, 18 lb·ft)

*2nd: 17 N·m (1.7 kgf·m, 13 lb·ft)

Final: specified angle 60°

* Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque.

EWA16610

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

CRANKCASE

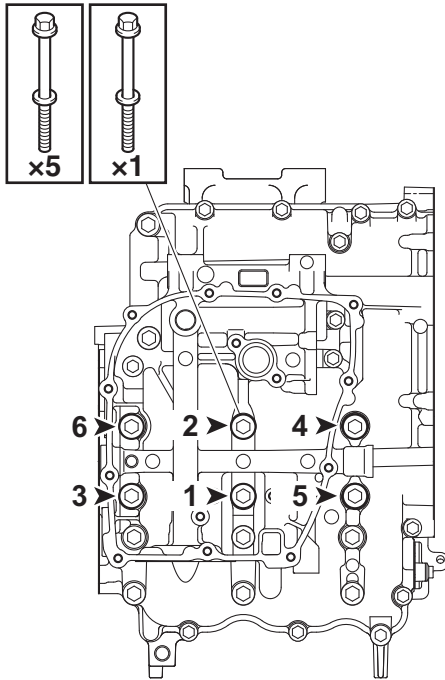
ECA20890

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.



8. Tighten:

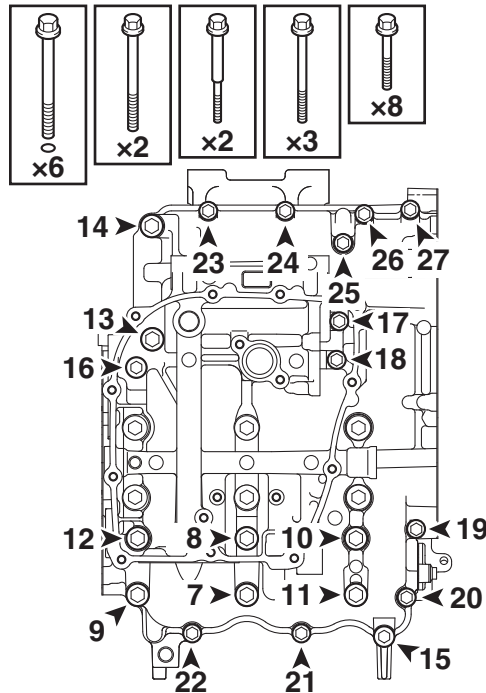
- Crankcase bolts “7”–“27”



Crankcase bolts “7”–“14”
24 N·m (2.4 kgf·m, 18 lb·ft)
Crankcase bolts “15”–“27”
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

- Tighten the bolts “7”–“16” in the tightening sequence cast on the crankcase.
- Tighten the bolts “17”–“27” in any tightening sequence using a crisscross pattern.

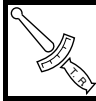


EAS31071

INSTALLING THE OIL PRESSURE SWITCH

1. Install:

- Oil pressure switch “1”
- Oil pressure switch lead “2”



Oil pressure switch
15 N·m (1.5 kgf·m, 11 lb·ft)
Oil pressure switch lead bolt
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

2. Apply:

- Sealant
 (onto the oil pressure switch threads)

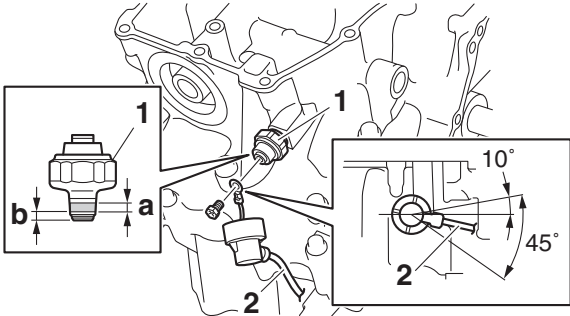


Yamaha bond No. 1215
90890-85505
Three bond No. 1215®

TIP

- Apply Three bond No.1215® to the threads “a” of the oil pressure switch. However, do not apply Three bond No.1215® to the portion “b” of the oil pressure switch.
- Install the oil pressure switch lead so that it is routed within the range shown in the illustration.

CRANKCASE




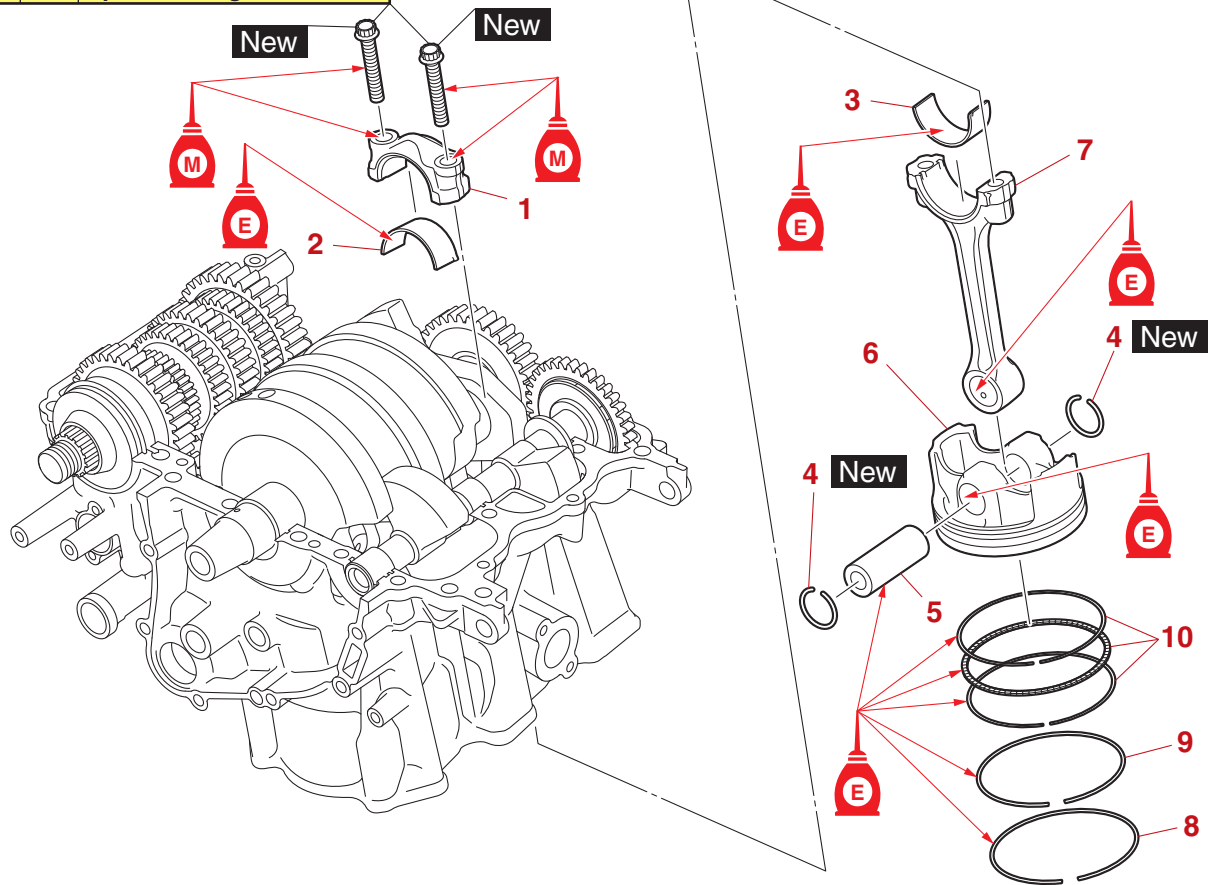
CONNECTING RODS AND PISTONS

EAS20132

CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons

| | |
|---|---|
|  | 1st 20 N·m (2.0 kgf·m, 15 lb·ft) |
| | 2nd Specified angle 180° |



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-----------------------|------|---|
| | Crankcase | | The following procedure applies to all of the connecting rods and pistons. Separate. Refer to "CRANKCASE" on page 5-73. |
| 1 | Connecting rod cap | 1 | |
| 2 | Big end lower bearing | 1 | |
| 3 | Big end upper bearing | 1 | |
| 4 | Piston pin clip | 2 | |
| 5 | Piston pin | 1 | |
| 6 | Piston | 1 | |
| 7 | Connecting rod | 1 | |
| 8 | Top ring | 1 | |
| 9 | 2nd ring | 1 | |
| 10 | Oil ring | 1 | |

CONNECTING RODS AND PISTONS

EAS30745

REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

- Remove:
 - Connecting rod cap
 - Connecting rod
 - Big end bearings

TIP

- Identify the position of each connecting rod cap so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.

- Remove:

- Piston pin clips “1”
- Piston pin “2”
- Piston
- Connecting rod

ECA13810

NOTICE

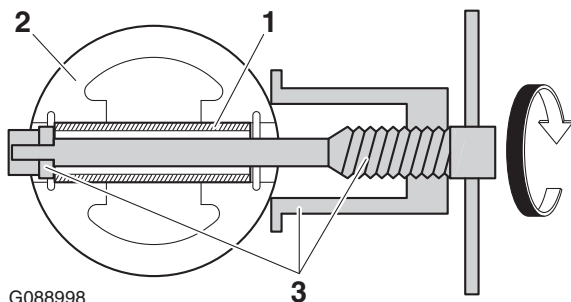
Do not use a hammer to drive the piston pin out.

TIP

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set “3”.



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



G088998

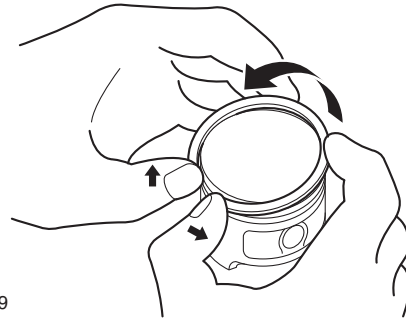
- Remove:

- Top ring

- 2nd ring
- Oil ring

TIP

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



G088999

EAS30747

CHECKING THE CYLINDER AND PISTON

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

- Check:

- Piston wall
- Cylinder wall

Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.

- Measure:

- Piston-to-cylinder clearance
 - Measure cylinder bore with the cylinder bore gauge.

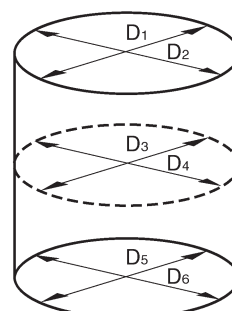
TIP

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



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


“C” = maximum of $D_1, D_2, D_3, D_4, D_5, D_6$



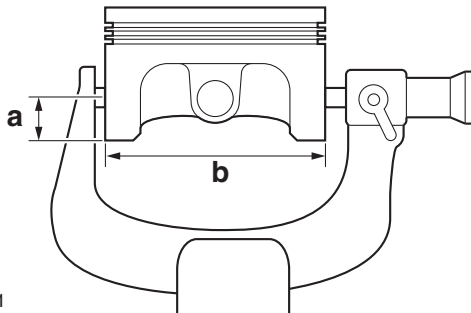
G089000

CONNECTING RODS AND PISTONS

- b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter “b” with the micrometer.



Diameter
79.970–79.985 mm (3.1484–3.1490 in)



G089001

- a. 8.0 mm (0.31 in) from the bottom edge of the piston
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
 Cylinder bore “C” – Piston skirt diameter “b”

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


EAS30748

CHECKING THE PISTON RINGS

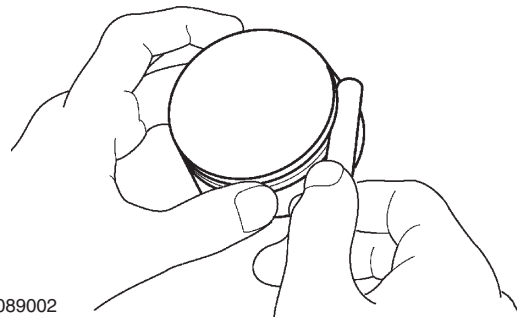
1. Measure:
 - Piston ring side clearance
 Out of specification → Replace the piston and piston rings as a set.

TIP

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



Piston ring
Top ring
Side clearance limit
0.115 mm (0.0045 in)
2nd ring
Side clearance limit
0.115 mm (0.0045 in)



G089002

2. Install:
 - Piston ring
 (into the cylinder)

TIP


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

3. Measure:

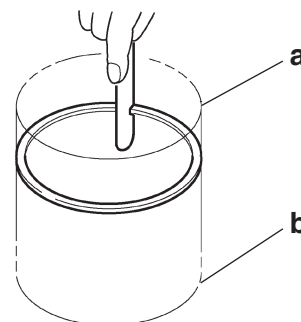
- Piston ring end gap
 Out of specification → Replace the piston ring.

TIP

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



Piston ring
Top ring
End gap limit
0.50 mm (0.0197 in)
2nd ring
End gap limit
0.80 mm (0.0315 in)



G089003

- a. Bottom of cylinder
- b. Top of cylinder

EAS30749

CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

CONNECTING RODS AND PISTONS

1. Check:

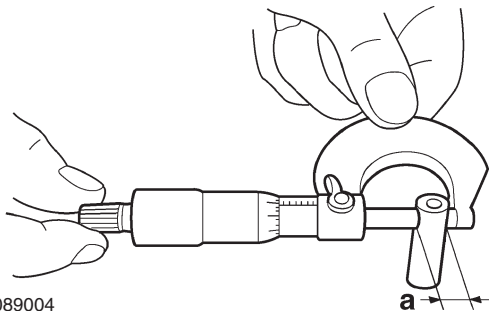
- Piston pin
Blue discoloration/grooves → Replace the piston pin, and then check the lubrication system.

2. Measure:

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



Piston pin outside diameter limit
17.970 mm (0.7075 in)



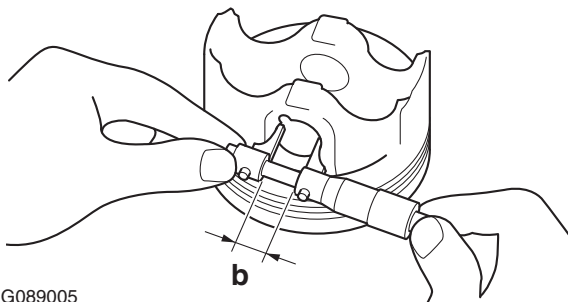
G089004

3. Measure:

- Piston pin bore inside diameter “b”
Out of specification → Replace the piston.



Piston pin bore inside diameter limit
18.045 mm (0.7104 in)



G089005

EAS30750

CHECKING THE CONNECTING RODS

1. Measure:

- Crankshaft-pin-to-big-end-bearing clearance
Out of specification → Replace the big end bearings.



Oil clearance
0.027–0.051 mm (0.0011–0.0020 in)

The following procedure applies to all of the connecting rods.

ECA13930

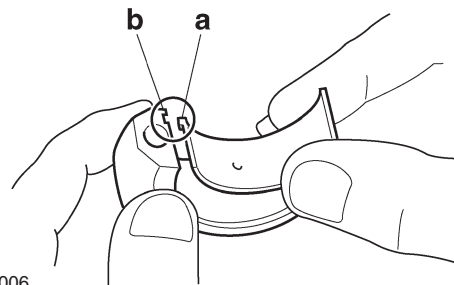
NOTICE

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

- Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

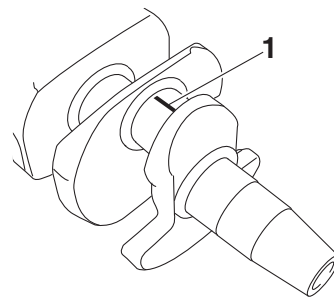
TIP

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



G089006

- Put a piece of Plastigauge® “1” on the crankshaft pin.



G089008

- Assemble the connecting rod halves.

ECA18390

NOTICE

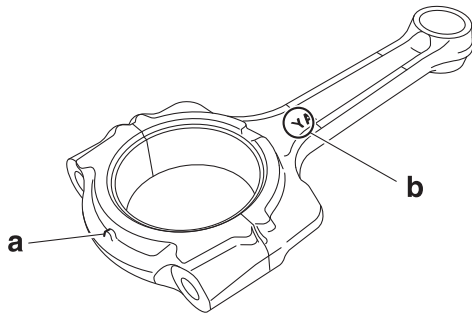
Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.

CONNECTING RODS AND PISTONS

- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

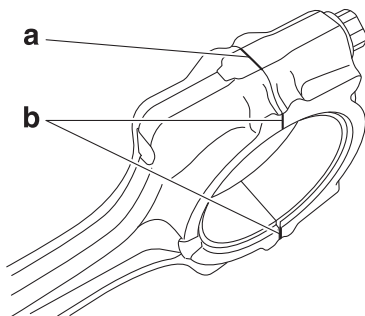
- Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



Connecting rod bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

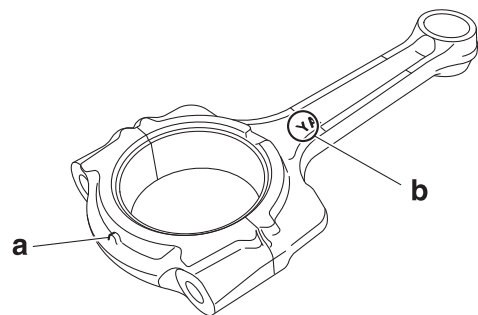


- Side machined face
- Thrusting faces

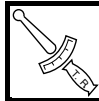
- Loosen the connecting rod bolts, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- Make sure the “Y” marks “b” on the connecting rods face towards the left side of the crankshaft.

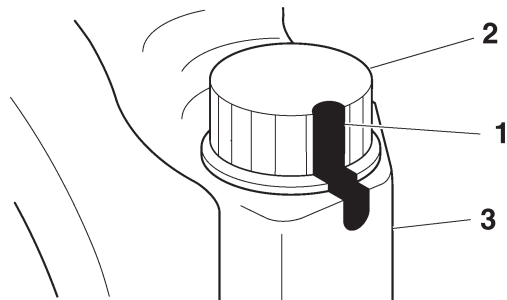


- Tighten the connecting rod bolts with a torque wrench.



Connecting rod bolt (1st)
20 N·m (2.0 kgf·m, 15 lb·ft)

- Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



- Tighten the connecting rod bolts further to reach the specified angle 175–185°.



Connecting rod bolt (final)
Specified angle 180°

EWA16610



WARNING

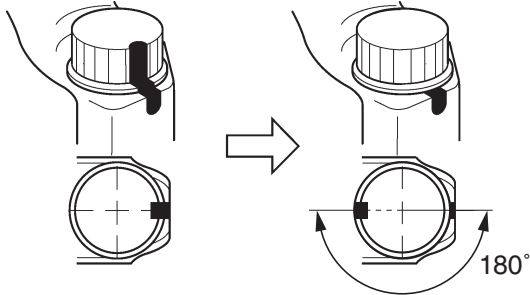
If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

CONNECTING RODS AND PISTONS

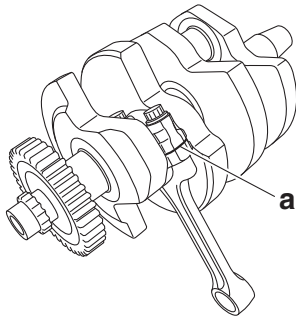
ECA20890

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.



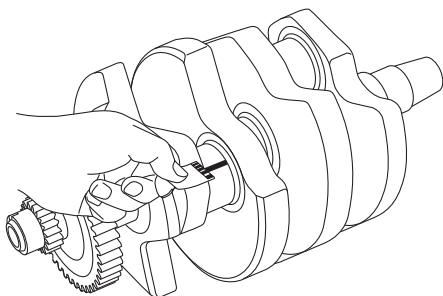
- j. After the installation, check that the section shown “a” is flush with each other by touching the surface.



- k. Remove the connecting rod and big end bearings.
 l. Measure the compressed Plastigauge® width on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



Oil clearance
0.027–0.051 mm (0.0011–0.0020 in)

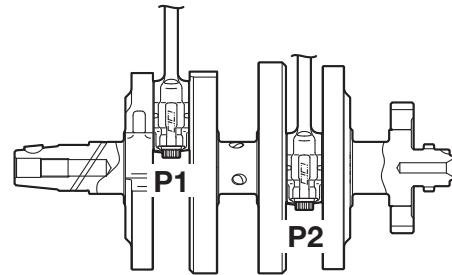


2. Select:

- Big end bearings (P_1 – P_2)

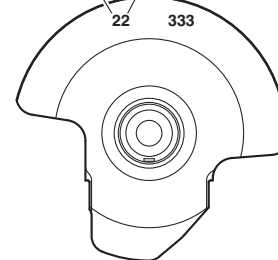
TIP

- The numbers “A” stamped into the crankshaft web and the numbers “B” on the connecting rods are used to determine the replacement big end bearings sizes.
- “ P_1 ”–“ P_2 ” refer to the bearings shown in the crankshaft illustration.

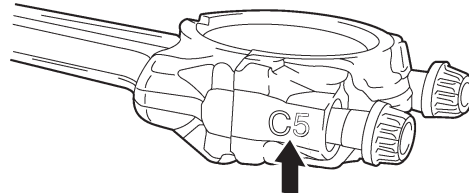


[A]

P_1 P_2



[B]



For example, if the connecting rod “ P_1 ” and the crankshaft web “ P_1 ” numbers are “5” and “2” respectively, then the bearing size for “ P_1 ” is:

“ P_1 ” (connecting rod)– “ P_1 ” (crankshaft) = 5 – 2 = 3 (brown)

CONNECTING RODS AND PISTONS



Bearing color code

Code 1

Blue

Code 2

Black

Code 3

Brown

Code 4

Green

EAS30751

INSTALLING THE CONNECTING ROD AND PISTON

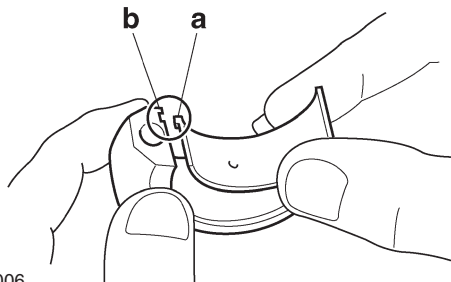
The following procedure applies to all of the connecting rods and pistons.

1. Install:

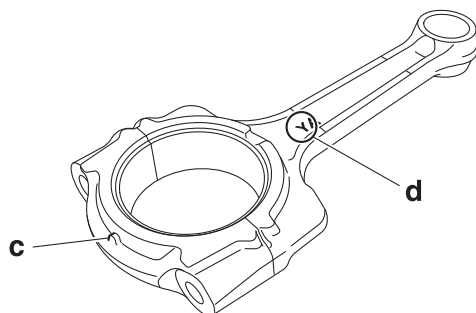
- Big end bearings
- Connecting rod cap (onto the connecting rod)

TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.



G089006



2. Tighten:

- Connecting rod bolts **New**

ECA18390

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

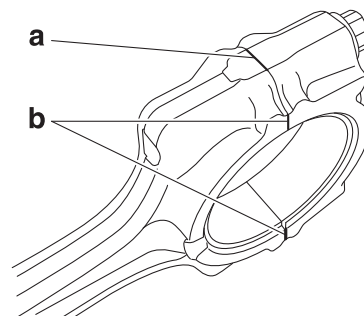
- Replace the connecting rod bolts with new ones.
- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
- Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



Connecting rod bolt
30 N·m (3.0 kgf·m, 22 lb·ft)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



- Side machined face
- Thrusting faces

- Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

3. Install:

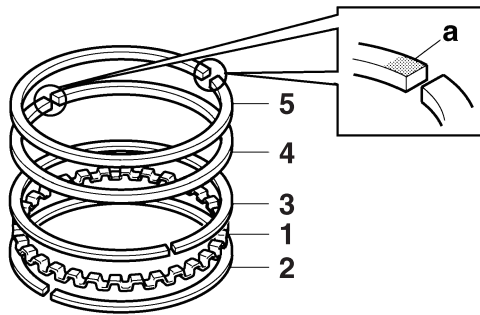
- Oil ring expander “1”
- Lower oil ring rail “2”
- Upper oil ring rail “3”

CONNECTING RODS AND PISTONS

- 2nd ring “4”
- Top ring “5”

TIP

Be sure to install the piston rings so that the manufacturer’s marks “a” face up.

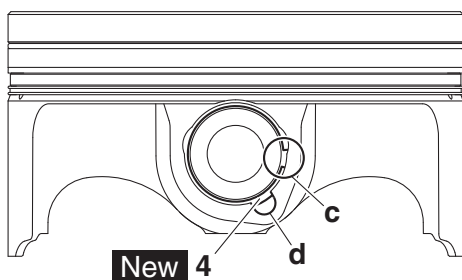
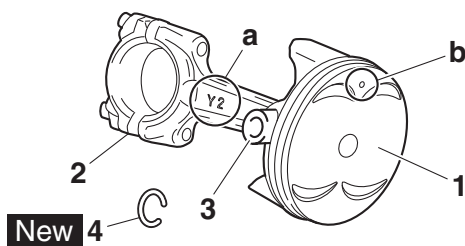


4. Install:

- Piston “1”
(onto the respective connecting rod “2”)
- Piston pin “3”
- Piston pin clips “4” **New**

TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod faces left when the punch mark “b” on the piston is pointing up as shown.
- When installing a piston pin clip, make sure that the clip ends “c” are positioned away from the cutout “d” in the piston as shown in the illustration.
- Reinstall each piston into its original cylinder.



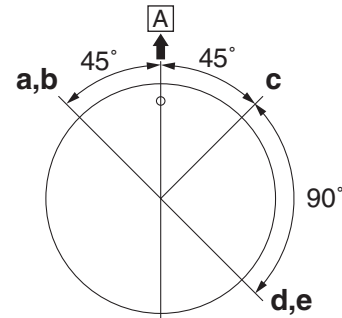
5. Lubricate:

- Piston
- Piston rings
- Cylinder
(with the recommended lubricant)

| | |
|---|---|
|  | Recommended lubricant Engine oil |
|---|---|

6. Offset:

- Piston ring end gaps



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

7. Lubricate:

- Crankshaft pin
- Connecting rod big end bearing inner surface
(with the recommended lubricant)

| | |
|---|---|
|  | Recommended lubricant Engine oil |
|---|---|

8. Install:

- Connecting rod assemblies “1”
(into the cylinder and onto the crankshaft pin)
- Connecting rod caps
(onto the connecting rod)

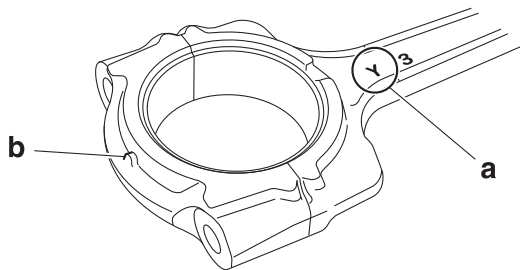
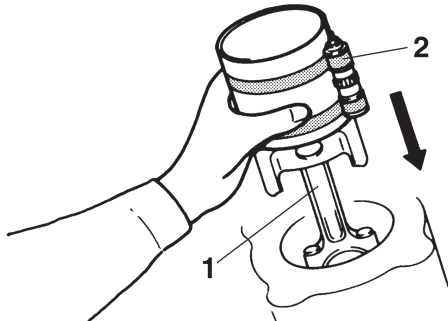
TIP

- While compressing the piston ring with piston ring compressor “2”, install the connecting rod assembly into the cylinder with the other hand.
- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection “b” on the connecting rod cap faces the same direction as the “Y” mark “a” on the connecting rod.
- Apply Molybdenum disulfide oil to the threads and seats of the connecting rod bolt.

CONNECTING RODS AND PISTONS



Piston ring compressor
90890-05158
Piston ring compressor
YM-08037



9. Tighten:

- Connecting rod bolts

TIP

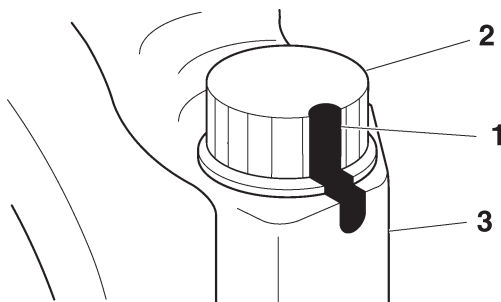
Tighten the connecting rod bolts using the following procedure.

- Tighten the connecting rod bolts with a torque wrench.



Connecting rod bolt (1st)
20 N·m (2.0 kgf·m, 15 lb-ft)

- Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



- Tighten the connecting rod bolts further to reach the specified angle 175–185°.



Connecting rod bolt (final)
Specified angle 180°

EWA16610

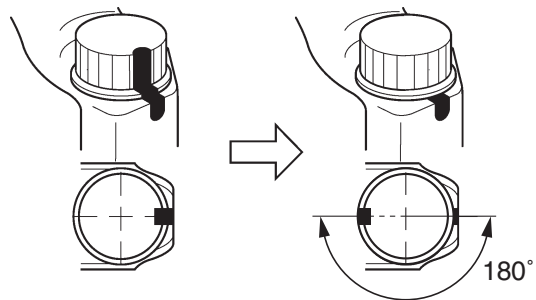
WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

ECA20890

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

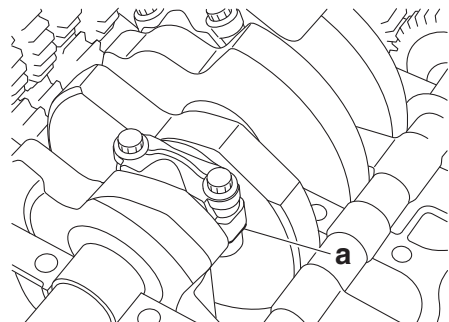


- After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA17120

WARNING

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.

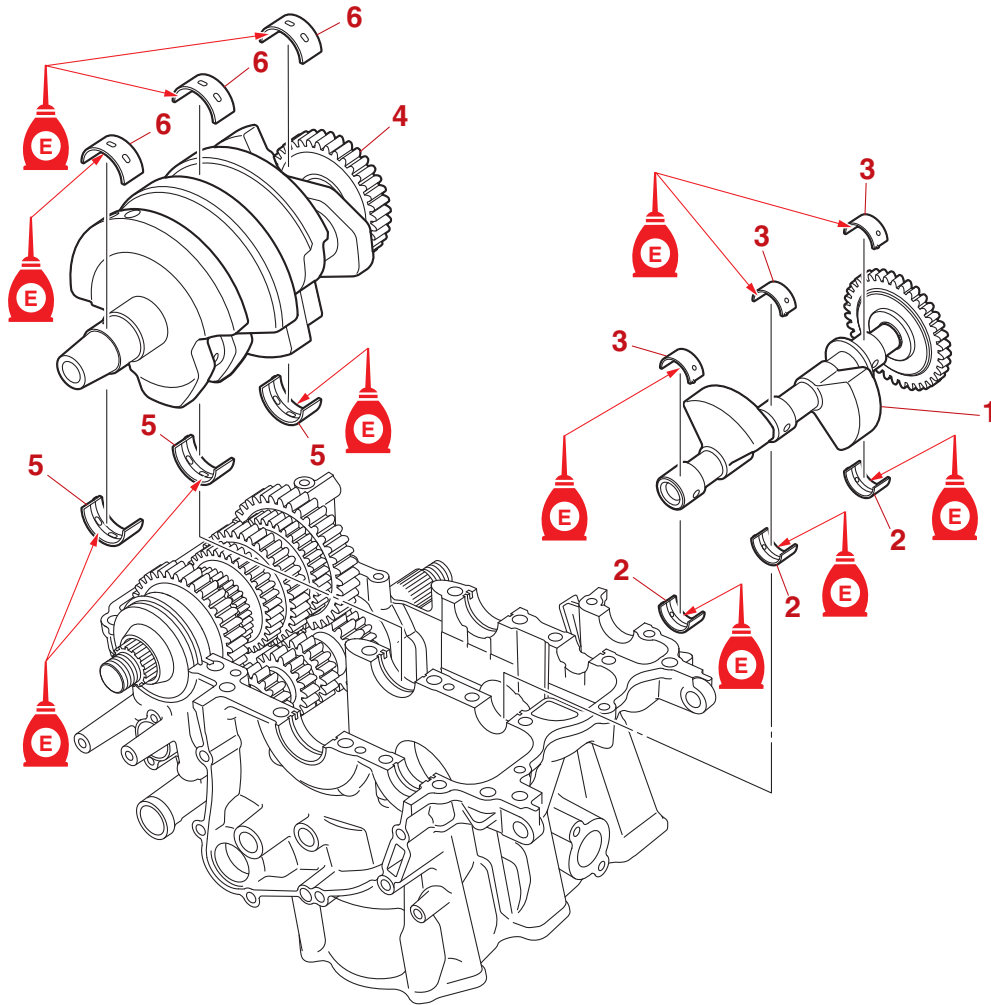


CRANKSHAFT AND BALANCER SHAFT

EAS20178

CRANKSHAFT AND BALANCER SHAFT

Removing the crankshaft and balancer shaft



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------------|------|--|
| | Crankcase | | Separate. Refer to "CRANKCASE" on page 5-73. |
| | Connecting rod | | Refer to "CONNECTING RODS AND PISTONS" on page 5-79. |
| 1 | Balancer shaft assembly | 1 | |
| 2 | Balancer shaft journal lower bearing | 3 | |
| 3 | Balancer shaft journal upper bearing | 3 | |
| 4 | Crankshaft assembly | 1 | |
| 5 | Crankshaft journal lower bearing | 3 | |
| 6 | Crankshaft journal upper bearing | 3 | |

CRANKSHAFT AND BALANCER SHAFT

EAS31072

REMOVING THE BALANCER SHAFT JOURNAL BEARINGS

1. Remove:
 - Balancer shaft journal lower bearings (from the crankcase)
 - Balancer shaft journal upper bearings (from the cylinder)

TIP

Identify the position of each balancer shaft journal bearing so that it can be reinstalled in its original place.

EAS31074

REMOVING THE CRANKSHAFT JOURNAL BEARINGS

1. Remove:
 - Crankshaft journal lower bearings (from the crankcase)
 - Crankshaft journal upper bearings (from the cylinder)

TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

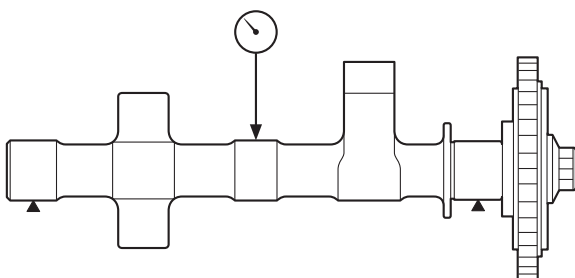
EAS31142

CHECKING THE BALANCER SHAFT ASSEMBLY

1. Check:
 - Balancer driven gear
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.
2. Measure:
 - Balancer shaft runout
Out of specification → Replace the balancer shaft assembly.



Balancer shaft runout limit
0.030 mm (0.0012 in)



3. Check:
 - Balancer shaft assembly
Cracks/damage/wear → Replace the balancer shaft assembly and journal bearings.
Dirt → Clean.
 - Bearings
Damage/wear → Replace.
4. Measure:
 - Balancer shaft-journal-to-balancer shaft-journal-bearing clearance
Out of specification → Replace the balancer shaft journal bearings.



Balancer shaft journal to balancer shaft bearing clearance
0.020–0.054 mm (0.0008–0.0021 in)
Balancer shaft journal to balancer shaft bearing clearance
0.020–0.054 mm (0.0008–0.0021 in)

ECA18400

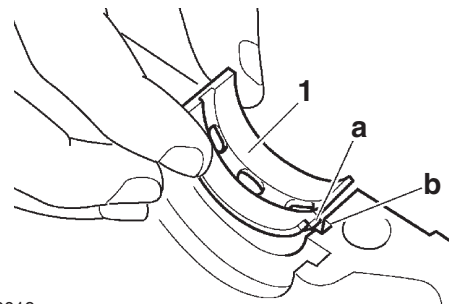
NOTICE

Do not interchange the balancer shaft journal bearings. To obtain the correct balancer shaft-journal-to-balancer shaft-journal-bearing clearance and prevent engine damage, the balancer shaft journal bearings must be installed in their original positions.

- a. Clean the balancer shaft journal bearings, balancer shaft journals, and bearing portions of the crankcase and cylinder.
- b. Install the balancer shaft journal upper bearings "1" and the balancer shaft assembly into the cylinder.

TIP

Align the projections "a" on the balancer shaft journal upper bearings with the notches "b" in the cylinder.



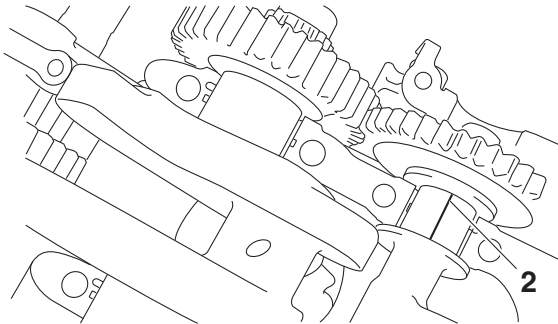
G089019

- c. Put a piece of Plastigauge® "2" on each balancer shaft journal.

CRANKSHAFT AND BALANCER SHAFT

TIP

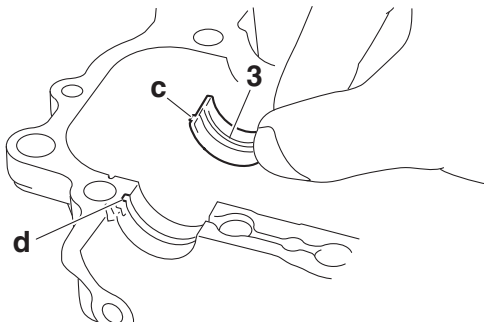
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



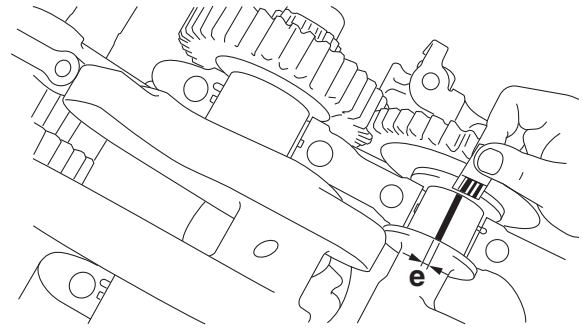
d. Install the balancer shaft journal lower bearings “3” into the crankcase and assemble the crankcase and cylinder.

TIP

- Align the projections “c” of the balancer shaft journal lower bearings with the notches “d” in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



- e. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to “CRANKCASE” on page 5-73.
- f. Remove the crankcase and the balancer shaft journal lower bearings.
- g. Measure the compressed Plastigauge® width “e” on each balancer shaft journal. If the balancer shaft-journal-to-balancer shaft-journal-bearing clearance is out of specification, select replacement balancer shaft journal bearings.

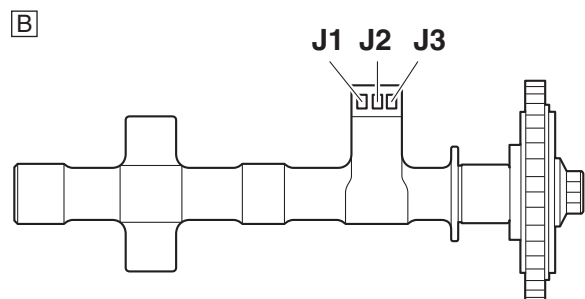
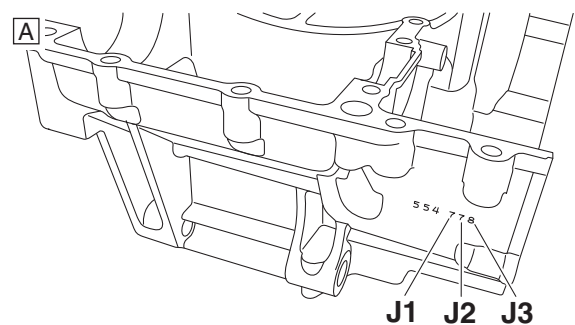
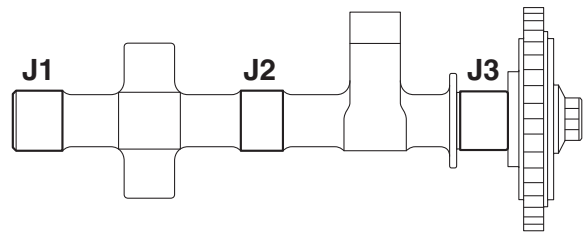


5. Select:

- Balancer shaft journal bearings (J₁-J₃)

TIP

- The numbers “A” stamped into the crankcase and the numbers “B” stamped into the balancer shaft web are used to determine the replacement balancer shaft journal bearing sizes.
- J₁-J₃ refer to the bearings shown in the crankcase and balancer shaft web illustration.
- If J₁-J₃ are the same, use the same size for all of the bearings.



CRANKSHAFT AND BALANCER SHAFT

For example, if the crankcase J_1 and balancer shaft web J_1 numbers are 6 and 5 respectively, then the bearing size for J_1 is:

$$J_1 \text{ (crankcase)} - J_1 \text{ (balancer shaft web)} \\ = 6 - 5 = \\ 1 \text{ (blue)}$$



Bearing color code

- Code 1
Blue
- Code 2
Black
- Code 3
Brown
- Code 4
Green
- Code 5
Yellow

EAS31075

CHECKING THE CRANKSHAFT

1. Check:

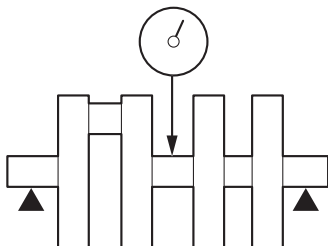
- Balancer drive gear
Damage/wear → Replace the balancer drive gear and balancer shaft assembly as a set.
Excessive noise during operation → Replace the balancer drive gear and balancer shaft assembly as a set.

2. Measure:

- Crankshaft runout
Out of specification → Replace the crankshaft.



Runout limit
0.030 mm (0.0012 in)



G089016

3. Check:

- Crankshaft journal surfaces
- Crankshaft pin surfaces
- Bearing surfaces
Scratches/wear → Replace the crankshaft.

4. Measure:

- Crankshaft-journal-to-crankshaft-journal-bearing clearance
Out of specification → Replace the crankshaft journal bearings.



Journal oil clearance
0.018–0.042 mm (0.0007–0.0017 in)

ECA13920

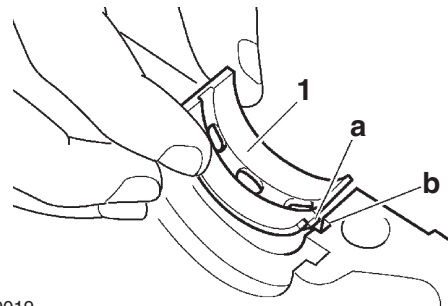
NOTICE

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the cylinder and crankcase.
- b. Install the crankshaft journal upper bearings “1” and the crankshaft into the cylinder.

TIP

Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the cylinder.



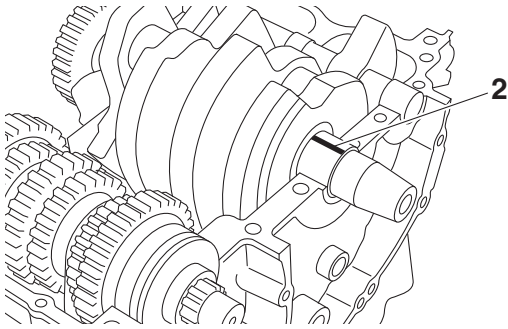
G089019

- c. Put a piece of Plastigauge® “2” on each crankshaft journal.

TIP

Do not put the Plastigauge® over the oil hole in the crankshaft journal.

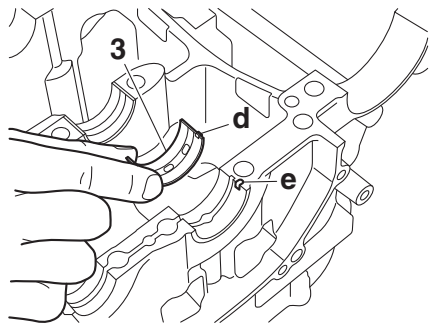
CRANKSHAFT AND BALANCER SHAFT



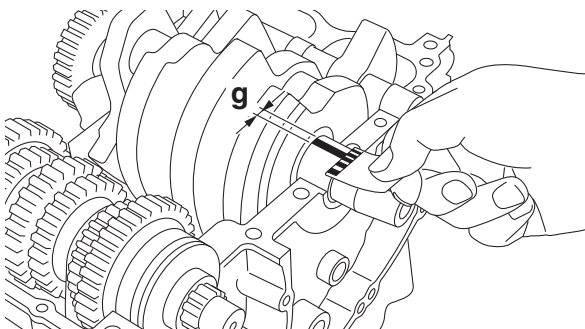
d. Install the crankshaft journal lower bearings “3” into the crankcase and assemble the crankcase and cylinder.

TIP

- Align the projections “d” of the crankshaft journal lower bearings with the notches “e” in the crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



- e. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
Refer to “CRANKCASE” on page 5-73.
- f. Remove the crankcase and the crankshaft journal lower bearings.
- g. Measure the compressed Plastigauge® width “g” on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

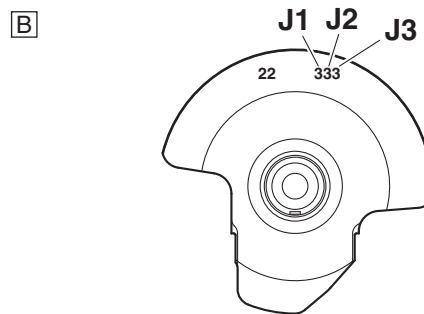
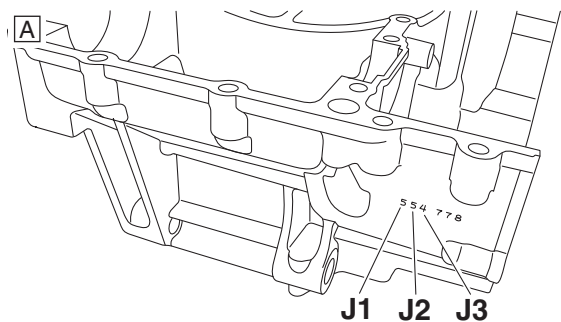
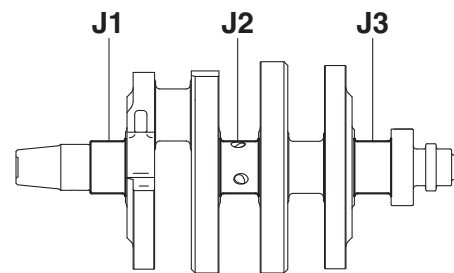


5. Select:

- Crankshaft journal bearings (J₁-J₃)

TIP

- The numbers “A” stamped into the crankcase and the numbers “B” stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J₁-J₃ refer to the bearings shown in the crankcase and crankshaft web illustration.
- If J₁-J₃ are the same, use the same size for all of the bearings.



For example, if the crankcase J₁ and crankshaft web J₁ numbers are 5 and 3 respectively, then the bearing size for J₁ is:

$$\begin{aligned} & J_1 \text{ (crankcase)} - J_1 \text{ (crankshaft web)} - 2 \\ & = 5 - 3 - 2 \\ & = 0 \text{ (white-pink)} \end{aligned}$$

CRANKSHAFT AND BALANCER SHAFT



Bearing color code
Model identification color
Pink
Code -1
Purple
Code 0
White
Code 1
Blue
Code 2
Black
Code 3
Brown

EAS31077

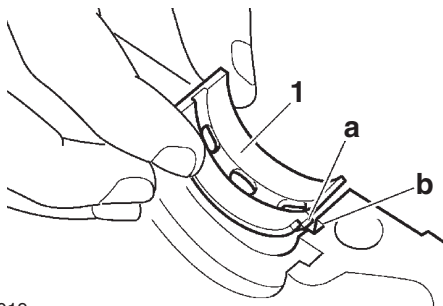
INSTALLING THE CRANKSHAFT

1. Install:

- Crankshaft journal upper bearings (into the upper crankcase)
- Crankshaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each crankshaft journal bearing in its original place.



G089019

EAS31078

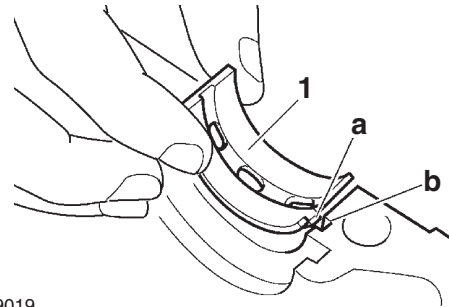
INSTALLING THE BALANCER SHAFT ASSEMBLY

1. Install:

- Balancer shaft journal upper bearings (into the upper crankcase)
- Balancer shaft journal lower bearings (into the lower crankcase)

TIP

- Align the projections “a” on the balancer shaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each balancer shaft journal bearing in its original place.



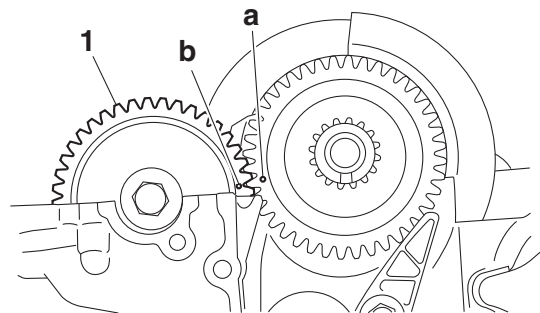
G089019

2. Install:

- Balancer shaft “1”

TIP

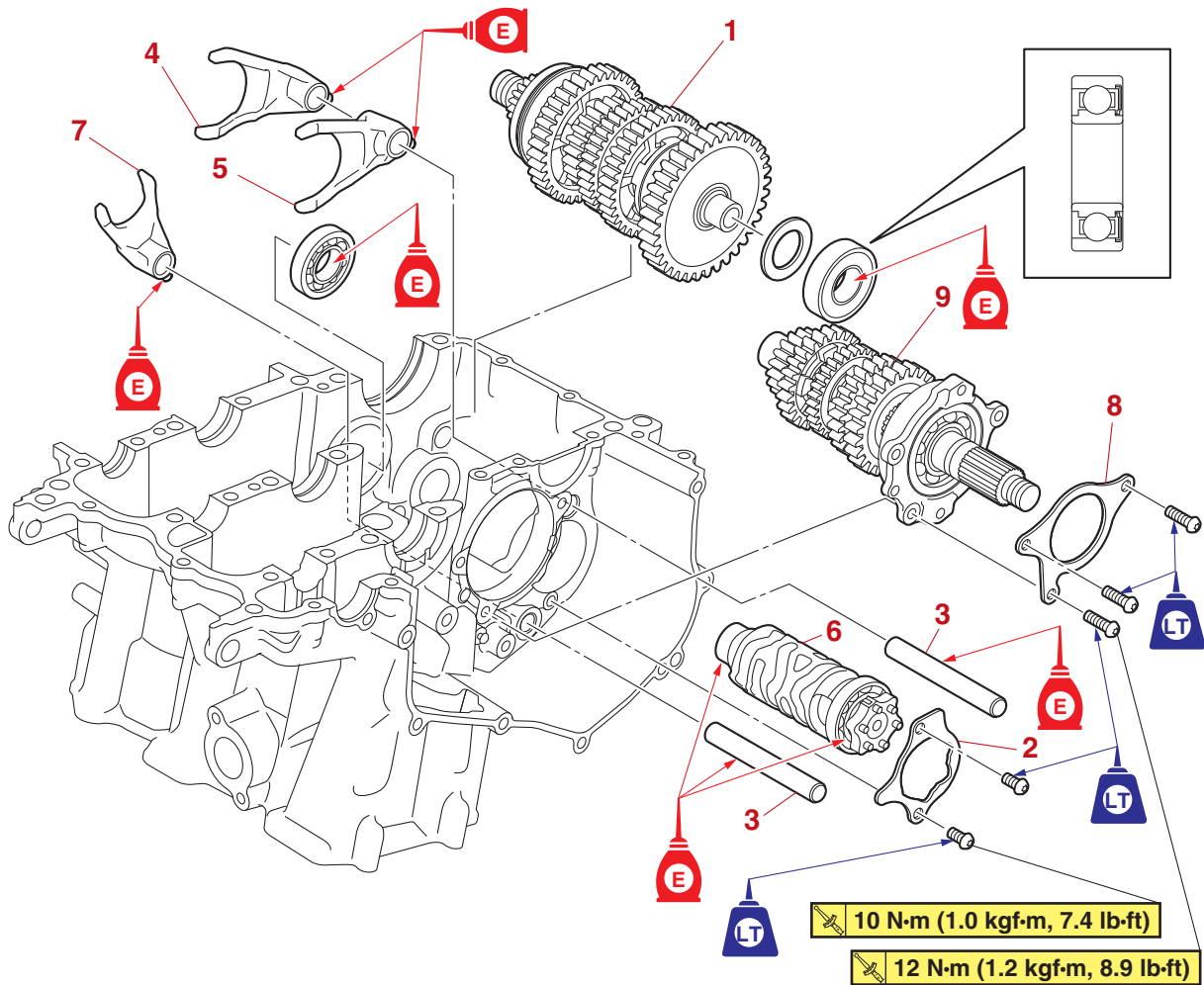
Align the punch mark “a” in the balancer drive gear with the punch mark “b” in the balancer driven gear.



EAS20062

TRANSMISSION

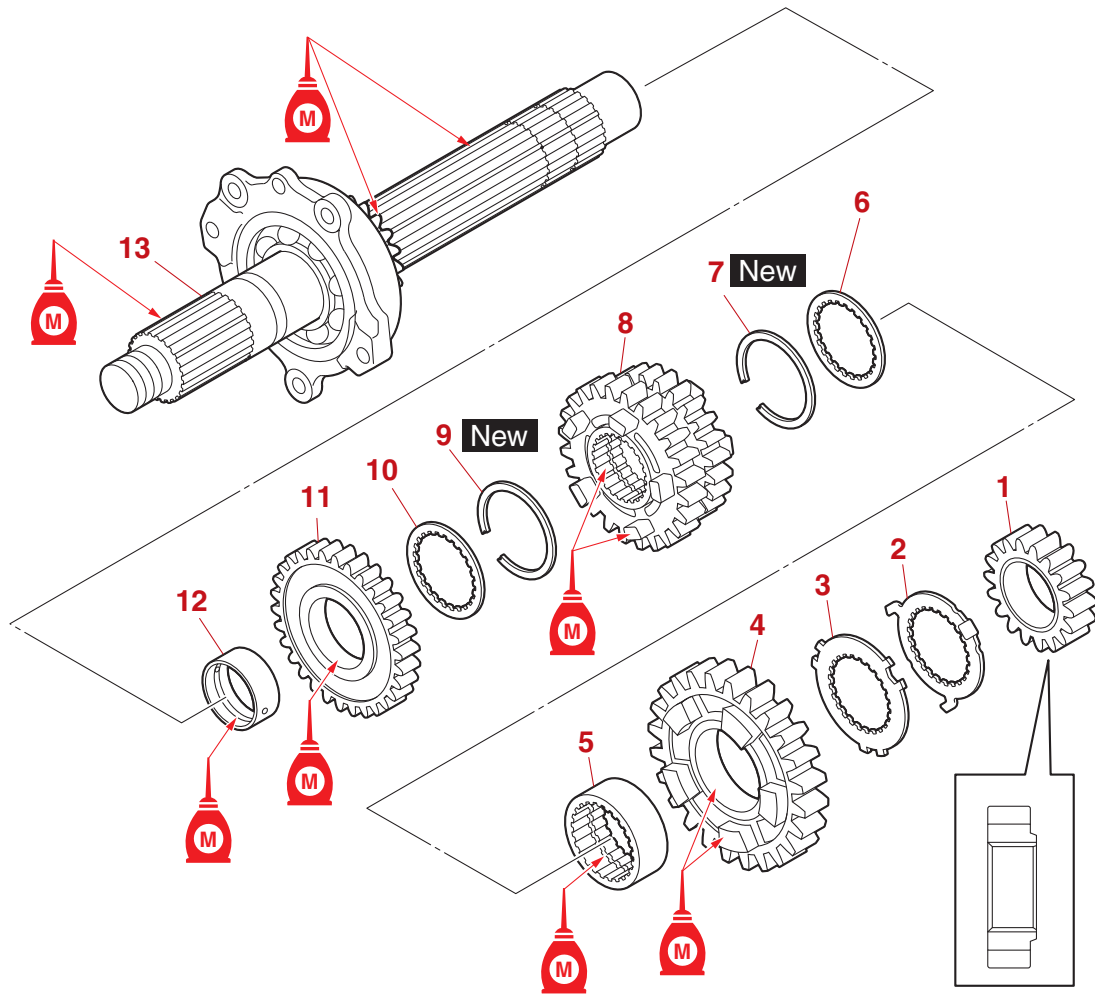
Removing the transmission, shift drum assembly, and shift forks



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|----------------------|------|---|
| | Crankcase | | Separate. Refer to "CRANKCASE" on page 5-73. |
| 1 | Drive axle assembly | 1 | |
| 2 | Shift drum retainer | 1 | |
| 3 | Shift fork guide bar | 2 | |
| 4 | Shift fork "L" | 1 | |
| 5 | Shift fork "R" | 1 | |
| 6 | Shift drum assembly | 1 | |
| 7 | Shift fork "C" | 1 | |
| 8 | Bearing retainer | 1 | |
| 9 | Main axle assembly | 1 | |

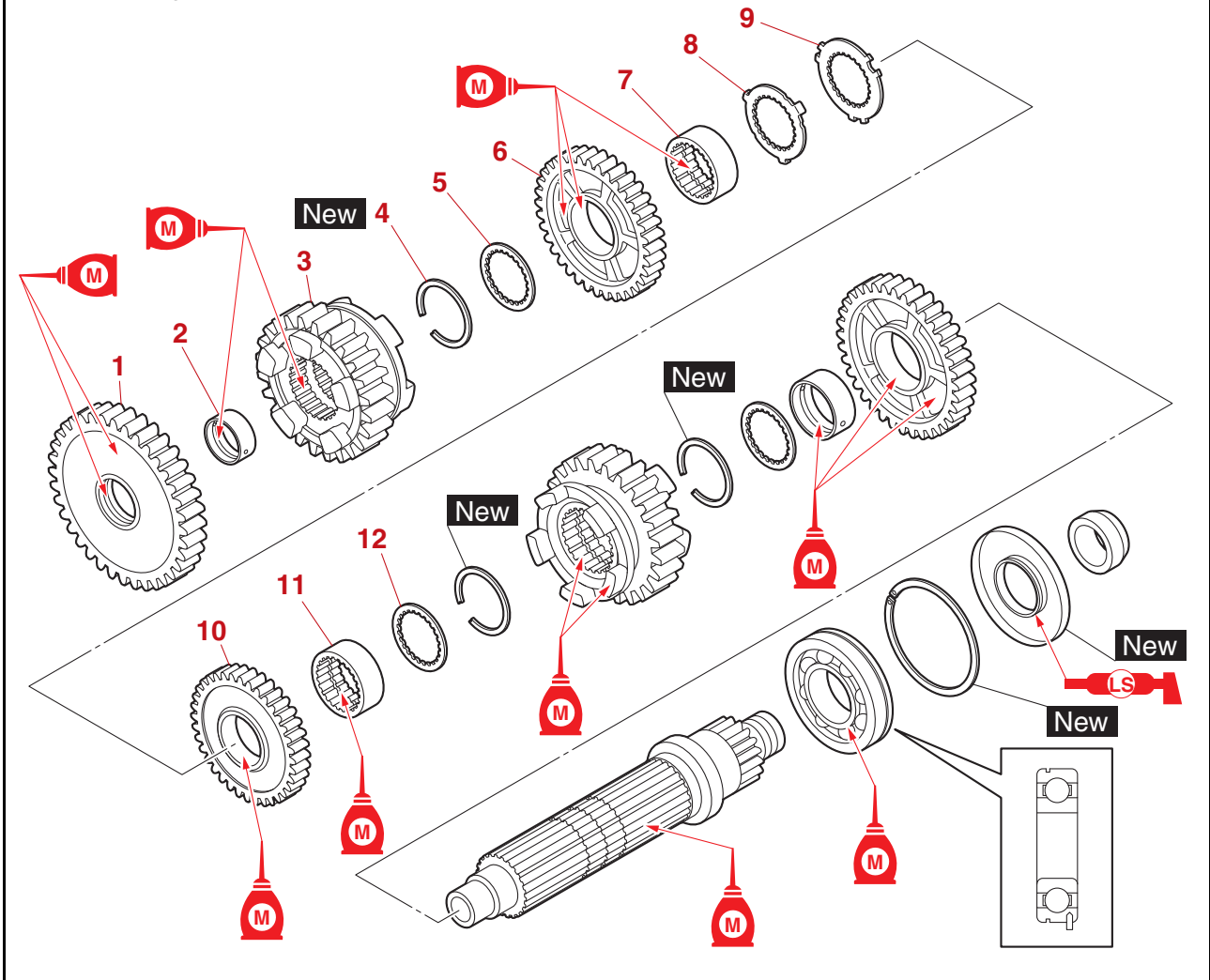
TRANSMISSION

Disassembling the main axle assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|---------|
| 1 | 2nd pinion gear | 1 | |
| 2 | Toothed lock washer | 1 | |
| 3 | Toothed lock washer retainer | 1 | |
| 4 | 6th pinion gear | 1 | |
| 5 | Collar | 1 | |
| 6 | Washer | 1 | |
| 7 | Circlip | 1 | |
| 8 | 3rd pinion gear | 1 | |
| 9 | Circlip | 1 | |
| 10 | Washer | 1 | |
| 11 | 5th pinion gear | 1 | |
| 12 | Collar | 1 | |
| 13 | Main axle | 1 | |

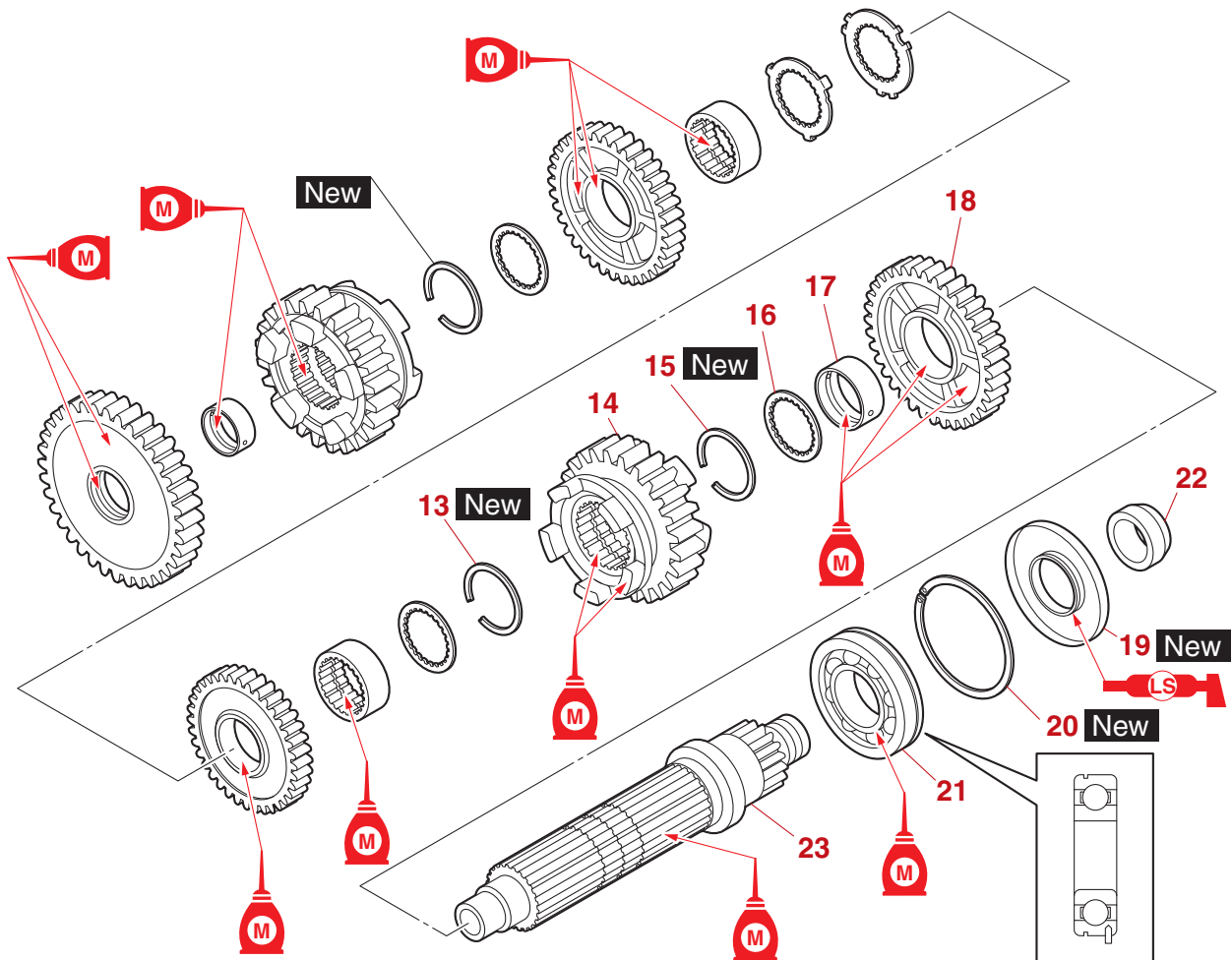
Disassembling the drive axle assembly



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------------|------|---------|
| 1 | 1st wheel gear | 1 | |
| 2 | Collar | 1 | |
| 3 | 5th wheel gear | 1 | |
| 4 | Circlip | 1 | |
| 5 | Washer | 1 | |
| 6 | 3rd wheel gear | 1 | |
| 7 | Collar | 1 | |
| 8 | Toothed lock washer | 1 | |
| 9 | Toothed lock washer retainer | 1 | |
| 10 | 4th wheel gear | 1 | |
| 11 | Collar | 1 | |
| 12 | Washer | 1 | |

TRANSMISSION

Disassembling the drive axle assembly



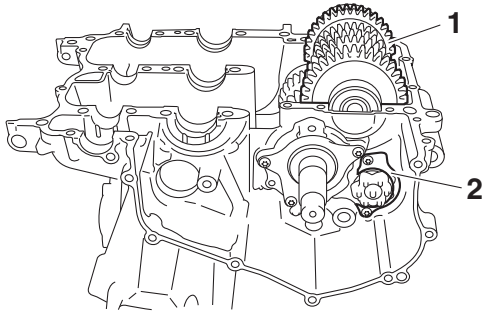
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------|------|---------|
| 13 | Circlip | 1 | |
| 14 | 6th wheel gear | 1 | |
| 15 | Circlip | 1 | |
| 16 | Washer | 1 | |
| 17 | Collar | 1 | |
| 18 | 2nd wheel gear | 1 | |
| 19 | Oil seal | 1 | |
| 20 | Circlip | 1 | |
| 21 | Bearing | 1 | |
| 22 | Collar | 1 | |
| 23 | Drive axle | 1 | |

EAS30430

REMOVING THE TRANSMISSION

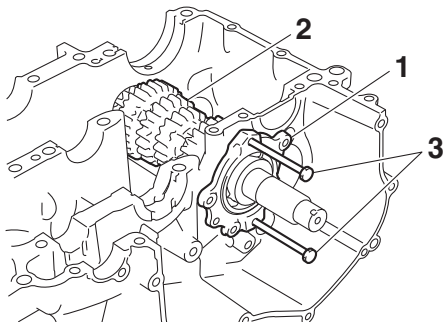
1. Remove:

- Drive axle assembly "1"
- Shift drum retainer "2"
- Shift fork guide bars
- Shift fork "L" and "R"
- Shift drum assembly
- Shift fork "C"



2. Remove:

- Bearing retainer
 - Main axle assembly bearing housing "1"
 - Main axle assembly "2"
- a. Insert two bolts "3" of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



- b. Tighten the bolts until they contact the crankcase surface.
- c. Continue tightening the bolts until the main axle assembly comes free from the cylinder.

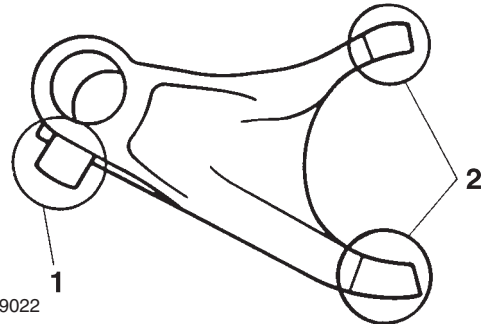
EAS30431

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:

- Shift fork cam follower "1"
 - Shift fork pawl "2"
- Bends/damage/scoring/wear → Replace the shift fork.



G089022

2. Check:

- Shift fork guide bar
- Roll the shift fork guide bar on a flat surface.
Bends → Replace.

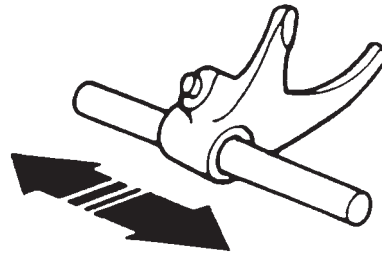
EWA12840

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.

3. Check:

- Shift fork movement (along the shift fork guide bar)
- Rough movement → Replace the shift forks and shift fork guide bar as a set.



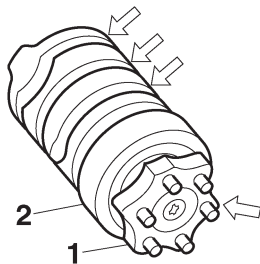
G089023

EAS30432

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- Shift drum groove
Damage/scratches/wear → Replace the shift drum assembly.
- Shift drum segment "1"
Damage/wear → Replace the shift drum assembly.
- Shift drum bearing "2"
Damage/pitting → Replace the shift drum assembly.



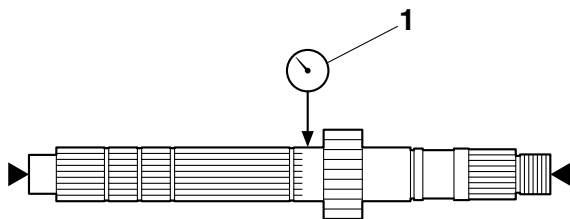
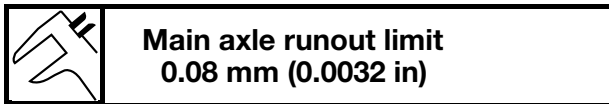
G089024

EAS30433

CHECKING THE TRANSMISSION

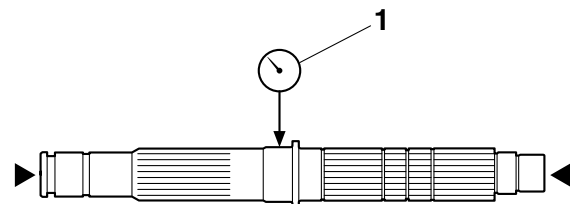
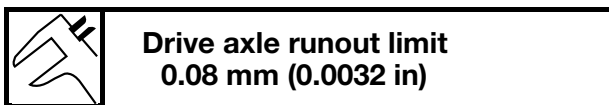
1. Measure:

- Main axle runout
(with a centering device and dial gauge "1")
Out of specification → Replace the main axle.



2. Measure:

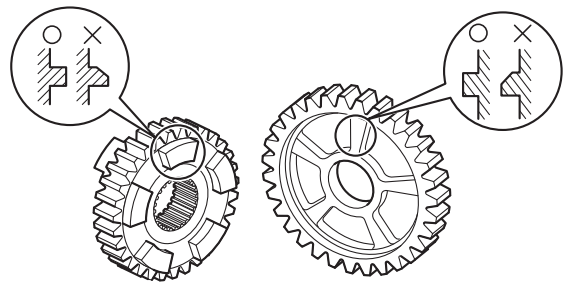
- Drive axle runout
(with a centering device and dial gauge "1")
Out of specification → Replace the drive axle.



3. Check:

- Transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(s).

- Transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(s).



G089025

4. Check:

- Transmission gear engagement
(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.

5. Check:

- Transmission gear movement
Rough movement → Replace the defective part(s).

6. Check:

- Circlips
Bends/damage/looseness → Replace.

EAS30435

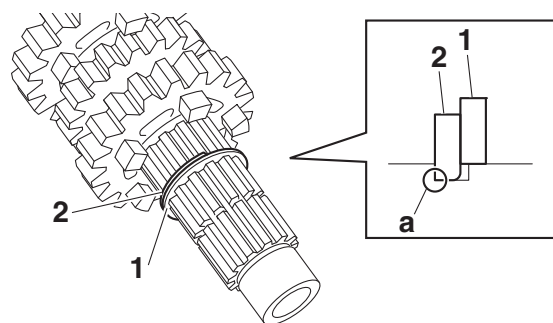
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:

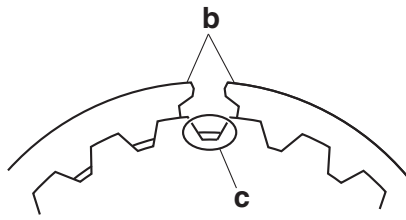
- Toothed washer "1"
- Circlip "2" **New**

TIP

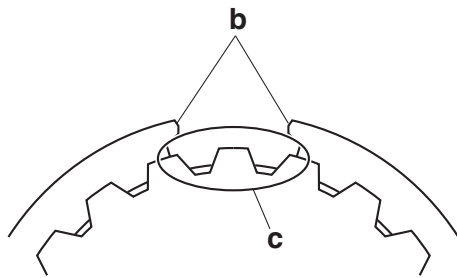
- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear.
- Align the opening between the ends "b" of the circlip with a groove "c" in the axle.



A



B



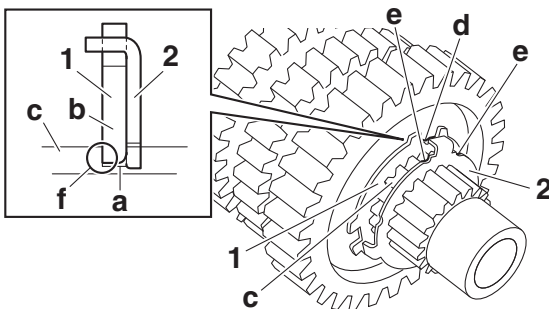
- A. Main axle
- B. Drive axle

2. Install:

- Toothed lock washer retainer "1"
- Toothed lock washer "2"

TIP

- With the toothed lock washer retainer in the groove "a" in the axle, align the projection "b" on the retainer with an axle spline "c", and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks "e" with the alignment mark "d" on the retainer.
- Be sure the toothed lock washer retainer sharp-edged corner "f" is positioned opposite side to the toothed lock washer.



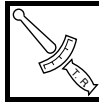
EAS30438

INSTALLING THE TRANSMISSION

1. Install:

- Main axle assembly "1"

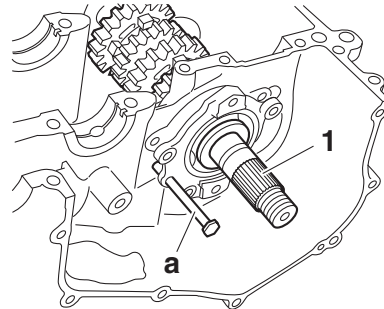
- Bearing retainer



Bearing retainer bolt
12 N·m (1.2 kgf·m, 8.9 lb·ft)
LOCTITE®

TIP

Use a suitable pin "a" to position the bearing housing, and then install the housing until it contacts the cylinder.



2. Install:

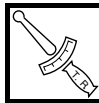
- Shift fork "C"
- Shift drum assembly
- Shift fork guide bar

TIP

- The embossed marks on the shift forks should face towards the right side of the engine.
- Install shift fork "C" into the groove in the 3rd pinion gear on the main axle.

3. Install:

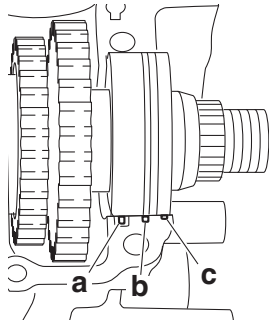
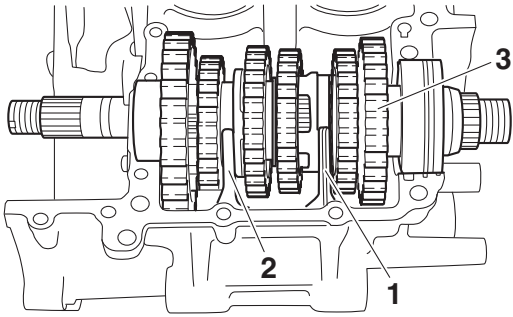
- Shift fork "L" "1"
- Shift fork "R" "2"
- Shift fork guide bar
- Shift drum retainer
- Drive axle assembly "3"



Shift drum retainer bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

TIP

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the projection "a" on the drive axle assembly is inserted into the slot in the cylinder.
- Make sure that the drive axle bearing circlip "b" and flange "c" of the oil seal are inserted into the grooves in the cylinder.



4. Check:

- Transmission

Rough movement → Repair.

TIP _____

Oil each gear, shaft, and bearing thoroughly.

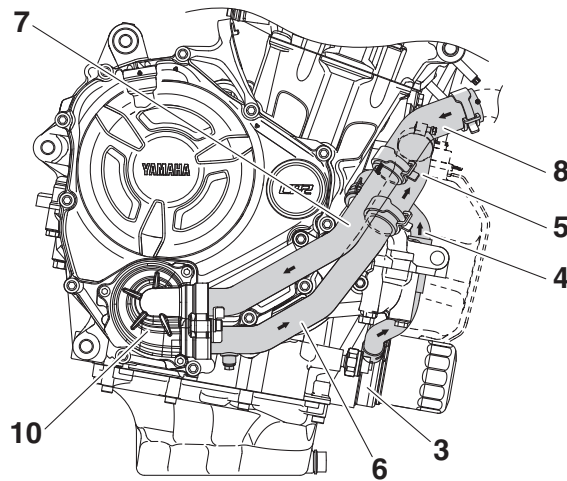
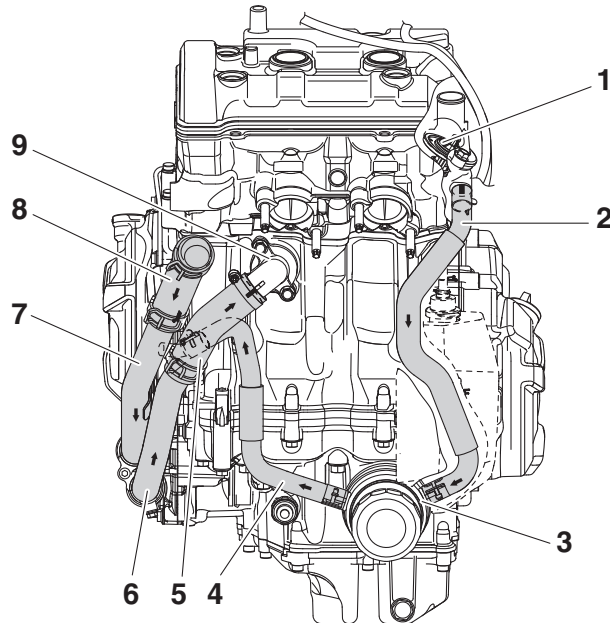
COOLING SYSTEM

| | |
|---------------------------------------|------|
| COOLING SYSTEM DIAGRAMS | 6-1 |
| RADIATOR | 6-2 |
| CHECKING THE RADIATOR | 6-4 |
| INSTALLING THE RADIATOR | 6-4 |
| OIL COOLER | 6-5 |
| CHECKING THE OIL COOLER..... | 6-7 |
| CHECKING THE WATER JACKET JOINT | 6-7 |
| INSTALLING THE OIL COOLER..... | 6-7 |
| THERMOSTAT | 6-8 |
| CHECKING THE THERMOSTAT | 6-9 |
| INSTALLING THE THERMOSTAT | 6-9 |
| WATER PUMP | 6-10 |
| DISASSEMBLING THE WATER PUMP | 6-13 |
| CHECKING THE WATER PUMP | 6-13 |
| ASSEMBLING THE WATER PUMP | 6-13 |
| INSTALLING THE CLUTCH COVER..... | 6-15 |

COOLING SYSTEM DIAGRAMS

EAS20299

COOLING SYSTEM DIAGRAMS

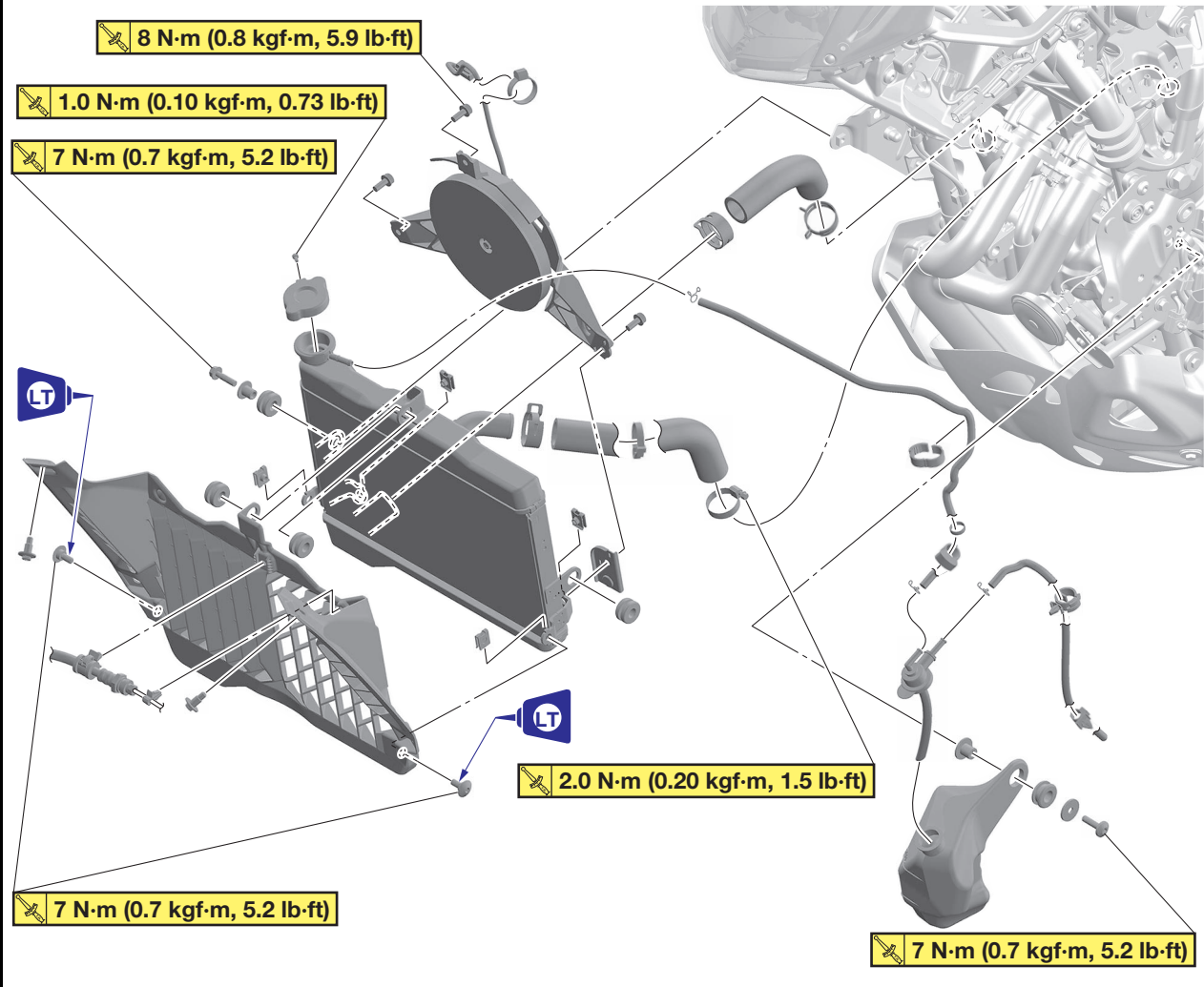


1. Thermostat
2. Oil cooler inlet hose
3. Oil cooler
4. Oil cooler outlet hose
5. Water jacket joint inlet hose
6. Water pump outlet pipe
7. Water pump inlet pipe
8. Radiator outlet hose
9. Water jacket joint
10. Water pump

EAS20063

RADIATOR

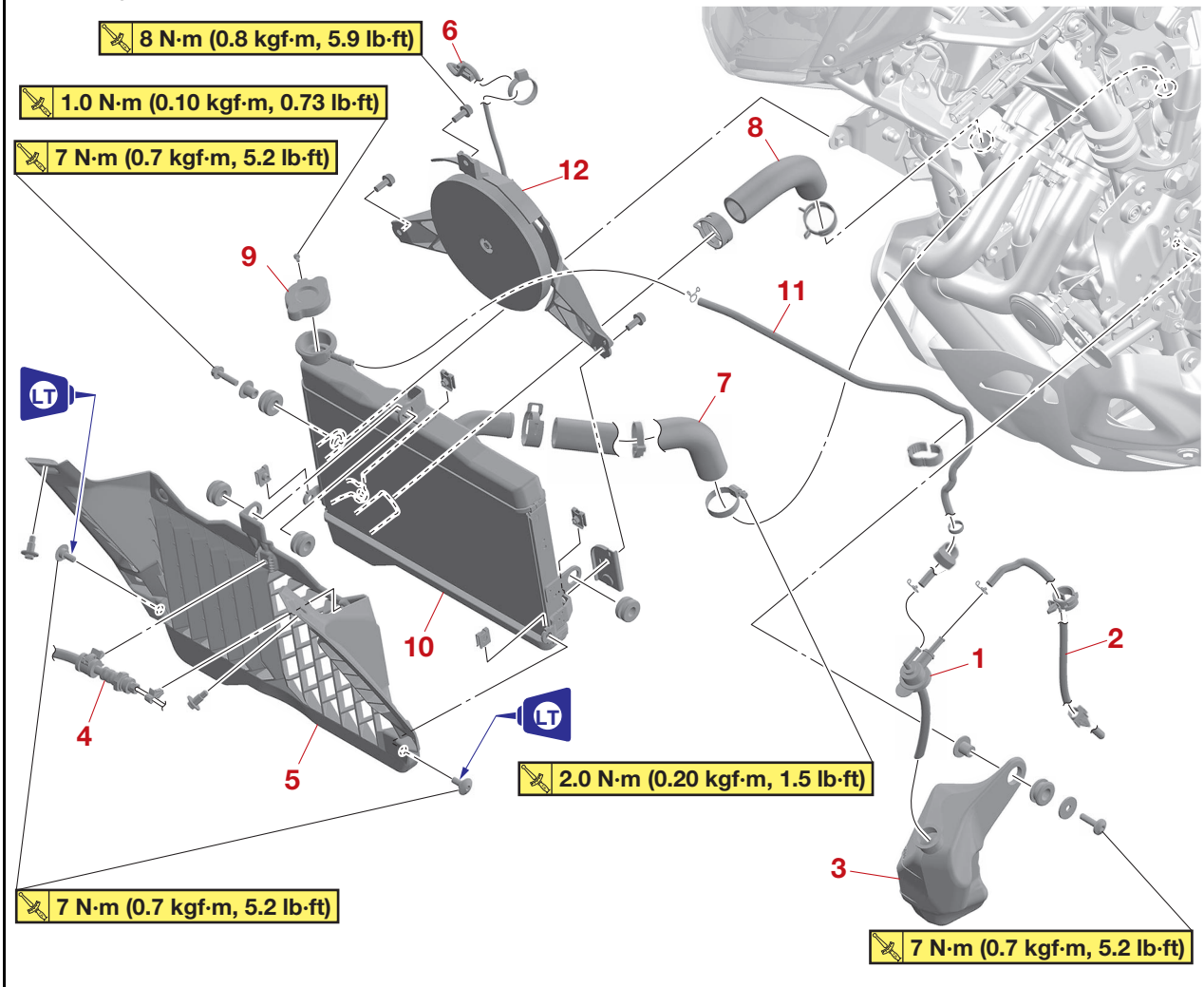
Removing the radiator



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (left/right)/Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |

RADIATOR

Removing the radiator



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|-------------|
| 1 | Coolant reservoir cap | 1 | |
| 2 | Coolant reservoir breather hose | 1 | |
| 3 | Coolant reservoir | 1 | |
| 4 | Brake hose (hydraulic unit to right front brake caliper) | 1 | |
| 5 | Radiator cover | 1 | |
| 6 | Radiator fan motor coupler | 1 | Disconnect. |
| 7 | Radiator inlet hose | 1 | |
| 8 | Radiator outlet hose | 1 | |
| 9 | Radiator cap | 1 | |
| 10 | Radiator | 1 | |
| 11 | Coolant reservoir hose | 1 | |
| 12 | Radiator fan motor | 1 | |

EAS30439

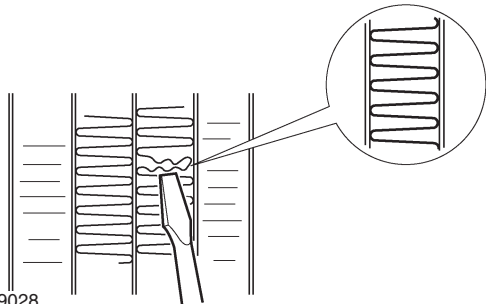
CHECKING THE RADIATOR

1. Check:

- Radiator fins
Obstruction → Clean.
Apply compressed air to the rear of the radiator.
- Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



G089028

2. Check:

- Radiator hoses
Cracks/damage → Replace.
- Radiator pipes
Cracks/damage → Replace the radiator.

3. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.

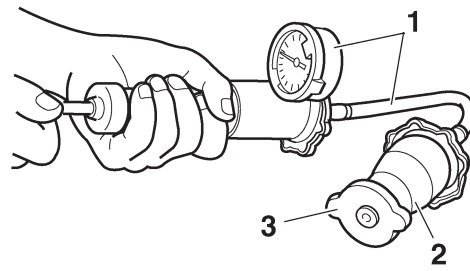


Radiator cap valve opening pressure
107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)

- a. Install the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator cap “3”.



Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
Pressure tester adapter
YU-33984



G089029

- 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 8-27.

EAS30440

INSTALLING THE RADIATOR

1. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-28.

2. Check:

- Cooling system
Leaks → Repair or replace any faulty part.

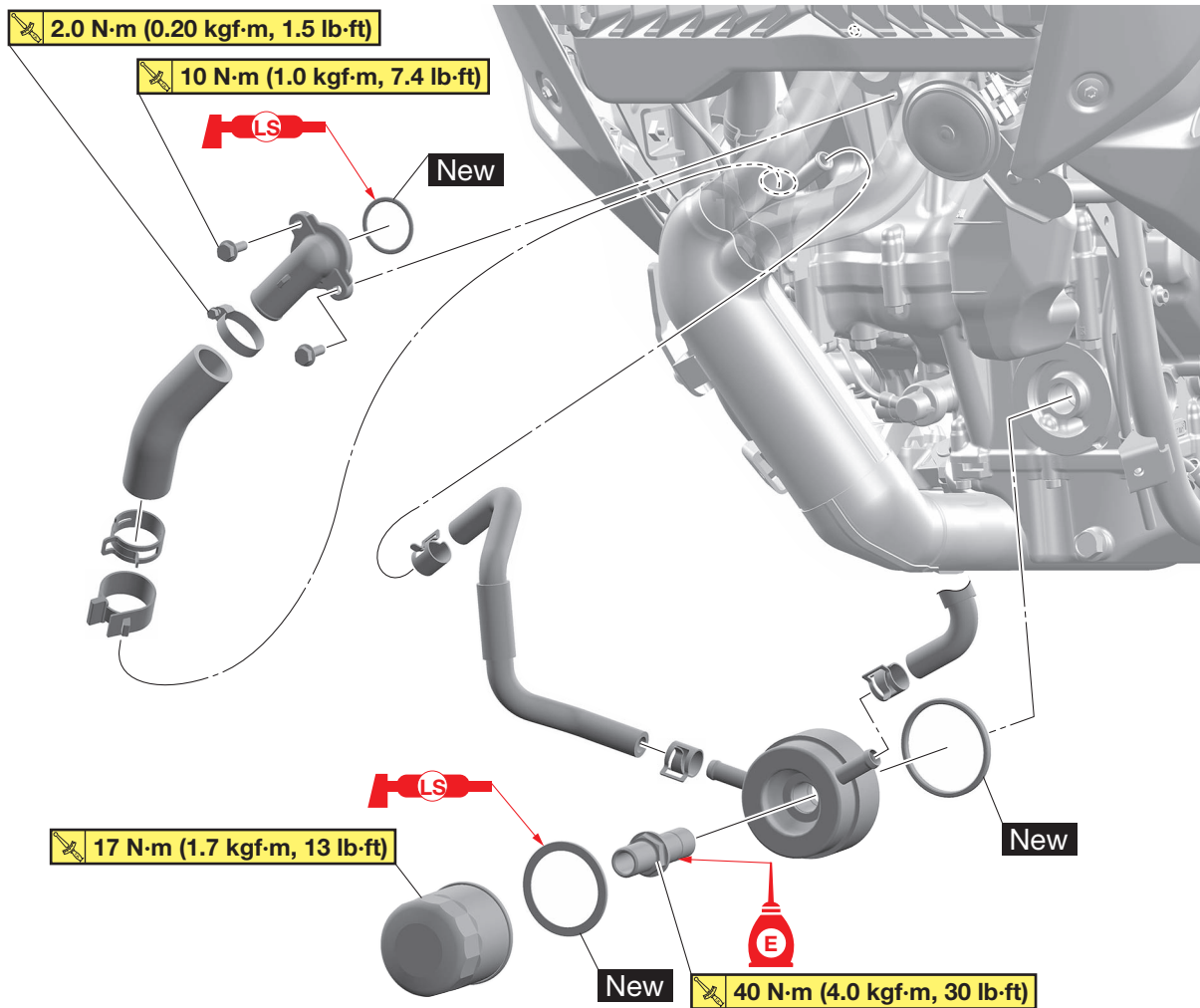
3. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-4.

EAS20064

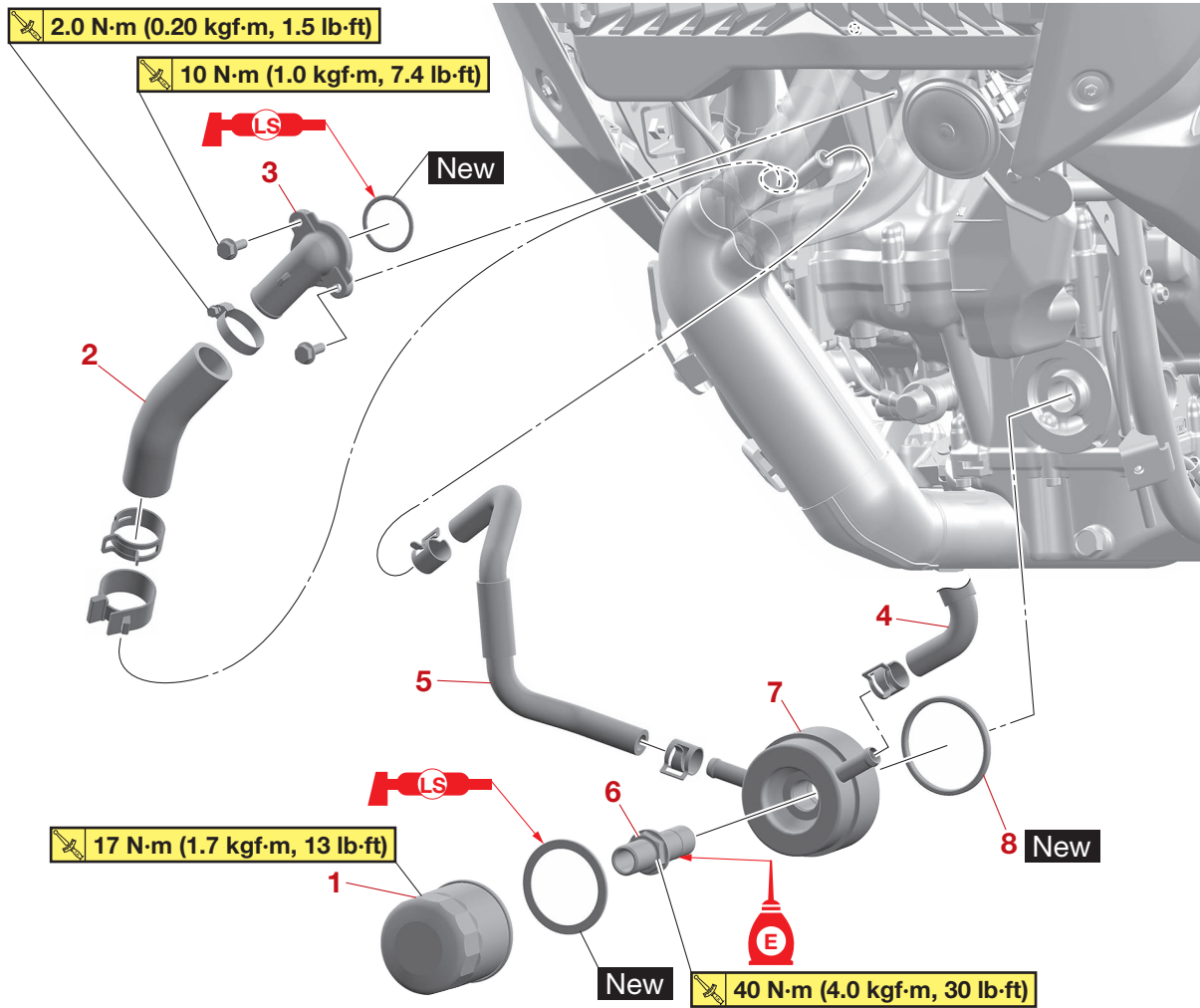
OIL COOLER

Removing the oil cooler



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center)/Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |

Removing the oil cooler



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---------------------------------|------|-------------|
| 1 | Oil filter cartridge | 1 | |
| 2 | Water jacket joint inlet hose | 1 | |
| 3 | Water jacket joint | 1 | |
| 4 | Oil cooler inlet hose | 1 | Disconnect. |
| 5 | Oil cooler outlet hose | 1 | |
| 6 | Oil filter cartridge union bolt | 1 | |
| 7 | Oil cooler | 1 | |
| 8 | Gasket | 1 | |

EAS30441

CHECKING THE OIL COOLER

1. Check:
 - Oil cooler
Cracks/damage → Replace.
2. Check:
 - Oil cooler inlet hose
 - Oil cooler outlet hose
Cracks/damage → Replace.

EAS31123

CHECKING THE WATER JACKET JOINT

1. Check:
 - Water jacket joint
Mineral deposits/rust → Eliminate.

EAS30442

INSTALLING THE OIL COOLER

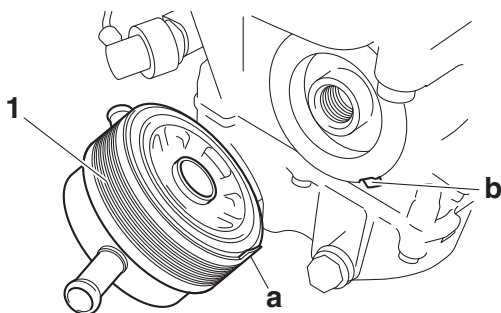
1. Clean:
 - Mating surfaces of the oil cooler and the crankcase
(with a cloth dampened with lacquer thinner)
2. Install:
 - Gasket **New**
 - Oil cooler "1"
 - Oil filter cartridge union bolt



Oil filter cartridge union bolt
40 N·m (4.0 kgf·m, 30 lb·ft)

TIP

- Before installing the oil cooler, apply engine oil lightly to the oil filter cartridge union bolt.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.



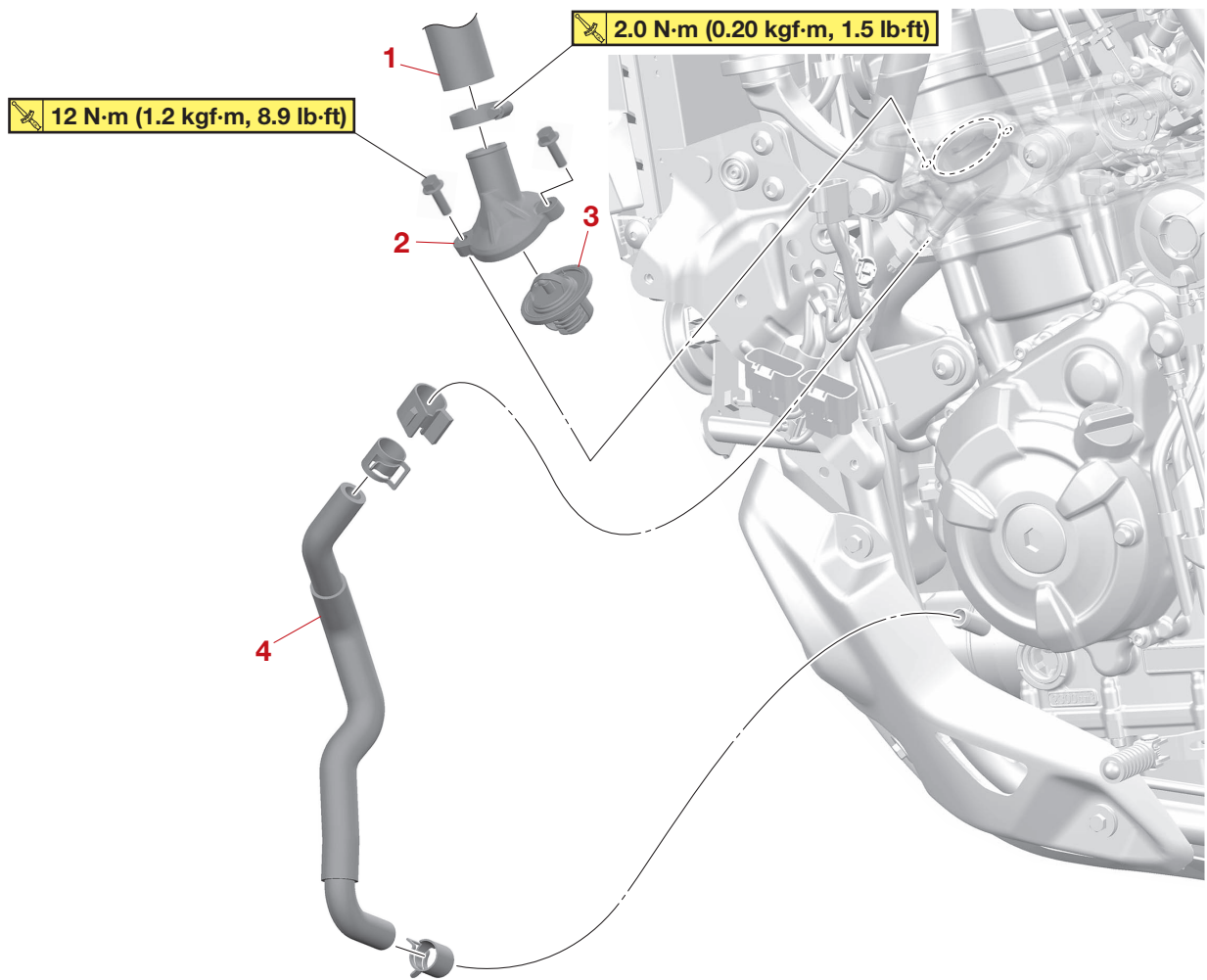
3. Fill:
 - Cooling system
(with the specified amount of the recommended coolant)
Refer to "CHANGING THE COOLANT" on page 3-28.
 - Crankcase
(with the specified amount of the recommended engine oil)

4. Check:
 - Cooling system
Leaks → Repair or replace any faulty part.
5. Measure:
 - Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR" on page 6-4.

EAS20065

THERMOSTAT

Removing the thermostat



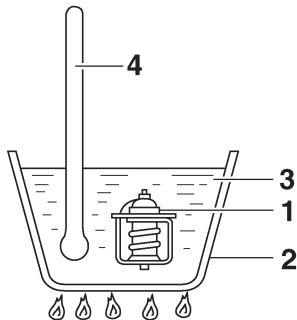
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (left/right)/Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (left/right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| 1 | Radiator inlet hose | 1 | Disconnect. |
| 2 | Thermostat cover | 1 | |
| 3 | Thermostat | 1 | |
| 4 | Oil cooler inlet hose | 1 | |

EAS30443

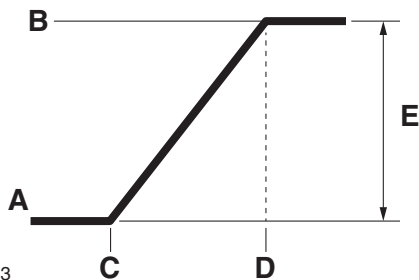
CHECKING THE THERMOSTAT

1. Check:

- Thermostat
Does not open at 80–84 °C (176–183.2 °F) → Replace.
- a. Suspend the thermostat “1” in a container “2” filled with water.
- b. Slowly heat the water “3”.
- c. Place a thermometer “4” in the water.
- d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.



G089032



G089033

- A. Fully closed
- B. Fully open
- C. 80 °C (349 °F)
- D. 95 °C (203 °F)
- E. 8 mm (0.31 in)

TIP

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:

- Thermostat cover
Cracks/damage → Replace.

EAS30939

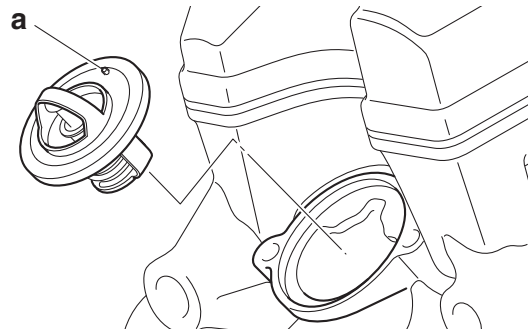
INSTALLING THE THERMOSTAT

1. Install:

- Thermostat

TIP

Install the thermostat with its breather valve “a” facing inward.



2. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-28.

3. Check:

- Cooling system
Leaks → Repair or replace any faulty part.

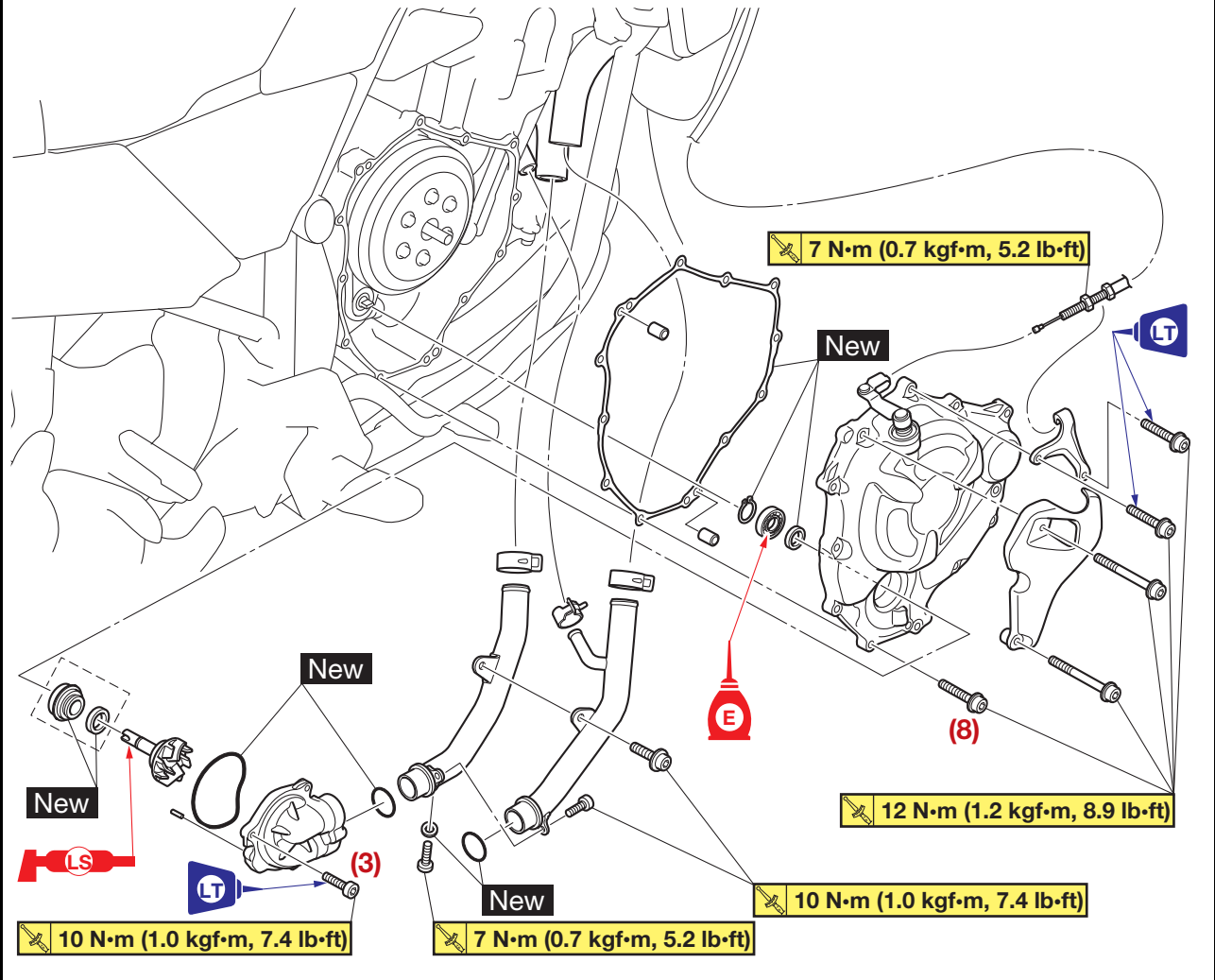
4. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-4.

EAS20066

WATER PUMP

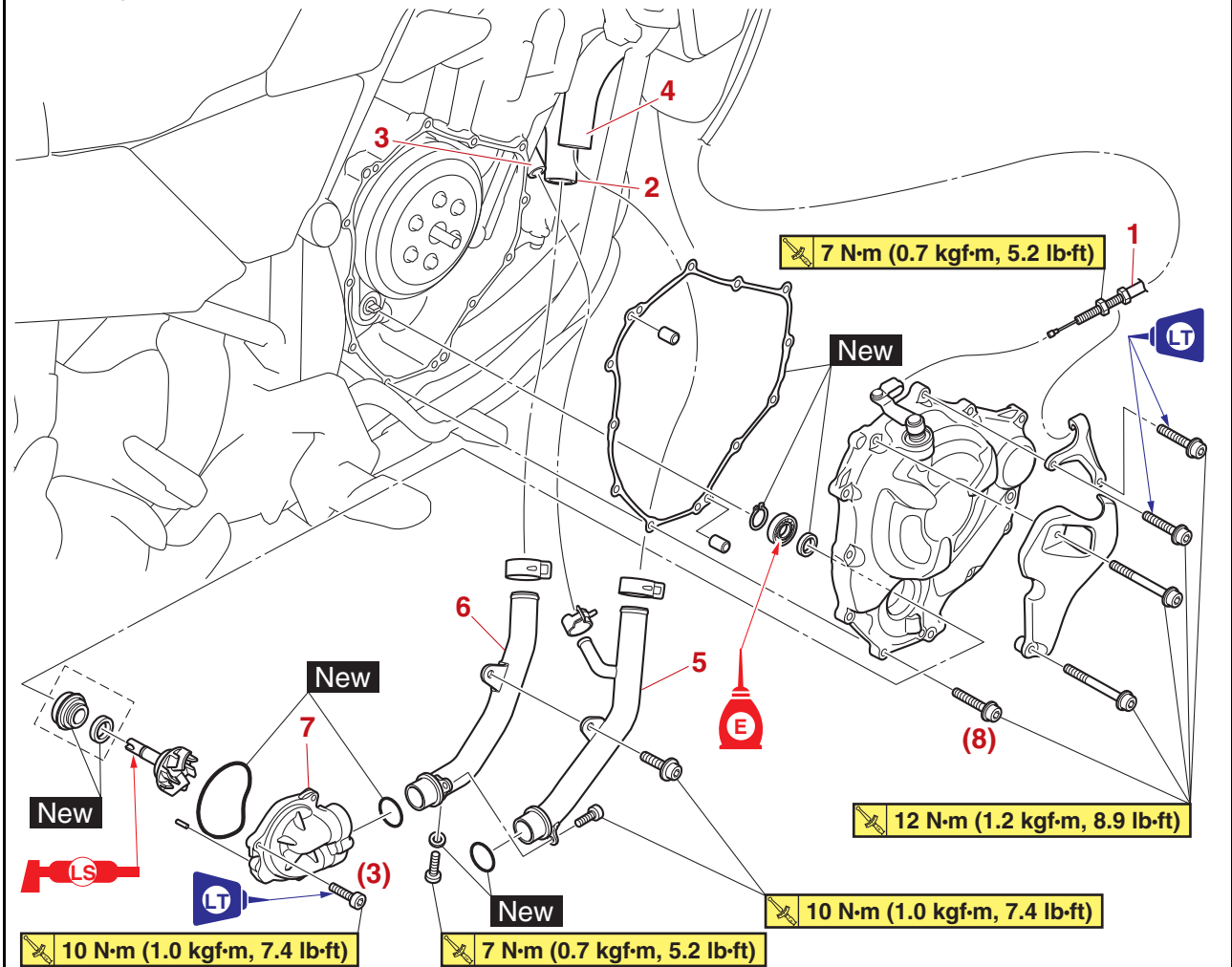
Removing the water pump



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--|------|--|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine guard (center)/Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Fuel tank (right) | | Refer to "FUEL TANK" on page 7-1. |
| | Coolant | | Drain. Refer to "CHANGING THE COOLANT" on page 3-28. |
| | Engine oil | | Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-25. |

WATER PUMP

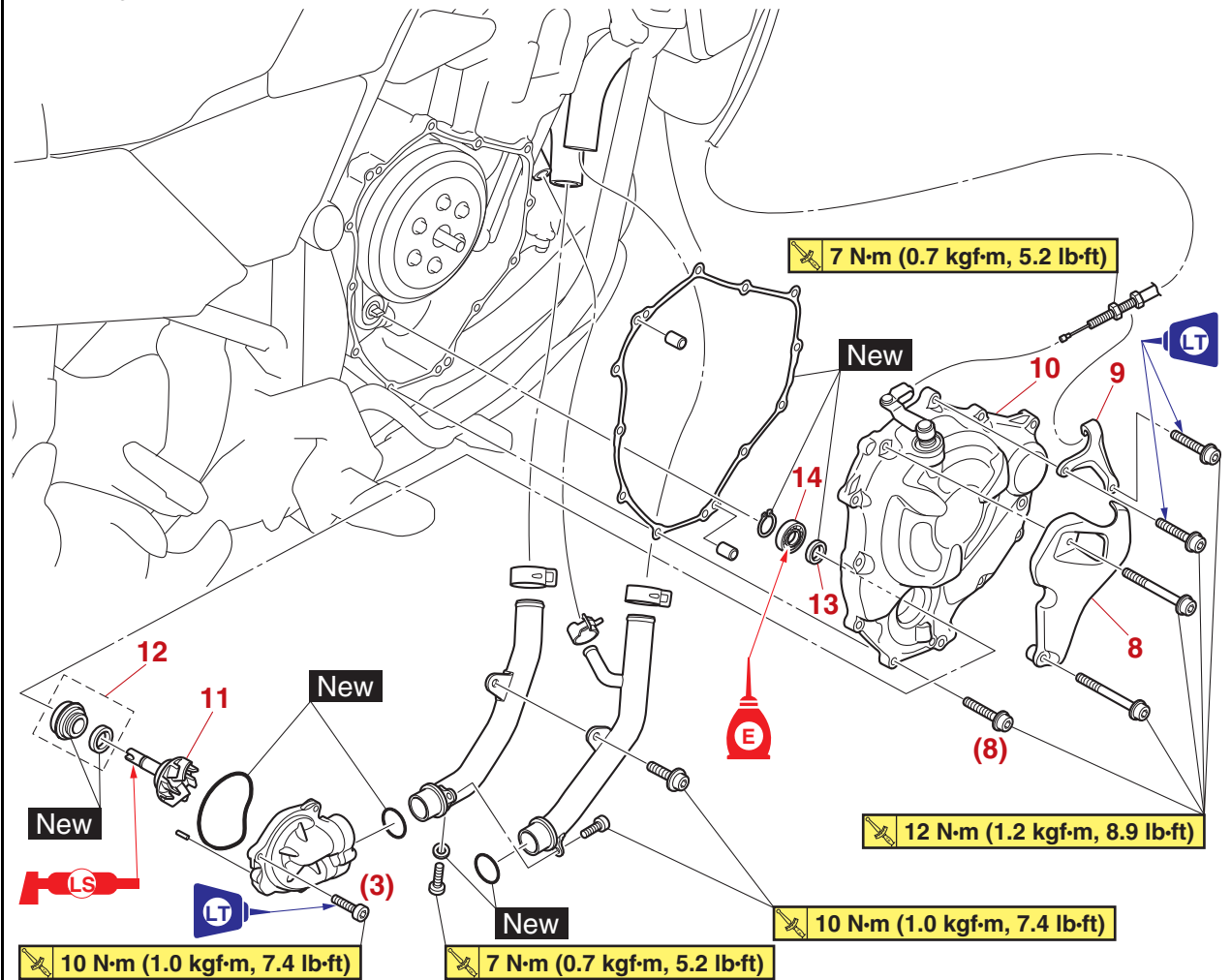
Removing the water pump



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|------------------------|------|-------------|
| 1 | Clutch cable | 1 | Disconnect. |
| 2 | Water pump outlet hose | 1 | Disconnect. |
| 3 | Oil cooler outlet hose | 1 | Disconnect. |
| 4 | Radiator outlet hose | 1 | Disconnect. |
| 5 | Water pump inlet pipe | 1 | |
| 6 | Water pump outlet pipe | 1 | |
| 7 | Water pump housing | 1 | |

WATER PUMP

Removing the water pump



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------|------|---------|
| 8 | Dust cover | 1 | |
| 9 | Clutch cable holder | 1 | |
| 10 | Clutch cover | 1 | |
| 11 | Impeller shaft | 1 | |
| 12 | Water pump seal assembly | 1 | |
| 13 | Oil seal | 1 | |
| 14 | Bearing | 1 | |

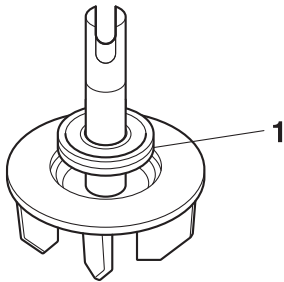
EAS30446

DISASSEMBLING THE WATER PUMP

- Remove:
 - Mechanical seal (impeller side) "1" (from the impeller, with a thin, flat-head screwdriver)

TIP

Do not scratch the impeller shaft.

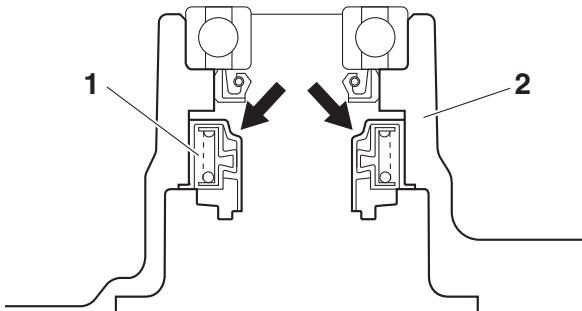


G089034

- Remove:
 - Mechanical seal (housing side) "1"

TIP

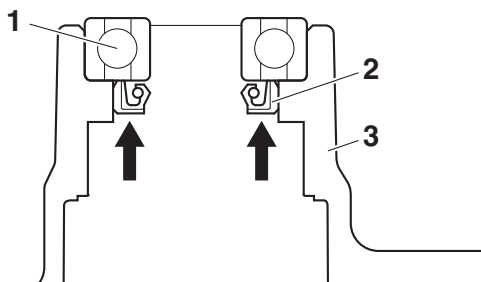
Remove the mechanical seal (housing side) from the inside of the clutch cover "2".



- Remove:
 - Bearing "1"
 - Oil seal "2"

TIP

Remove the bearing and oil seal from the outside of the clutch cover "3".



EAS30447

CHECKING THE WATER PUMP

- Check:
 - Water pump housing
 - Clutch cover
 - Impeller shaft
 Cracks/damage/wear → Replace.
- Check:
 - Bearing
 Rough movement → Replace.
- Check:
 - Water pump outlet pipe
 - Water pump inlet pipe
 Cracks/damage/wear → Replace.

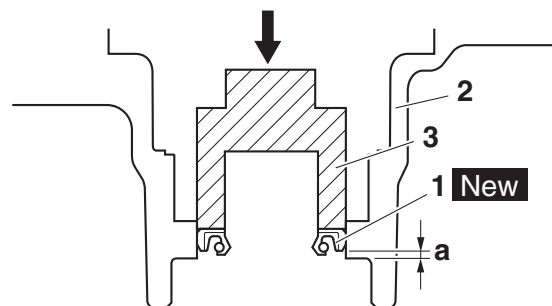
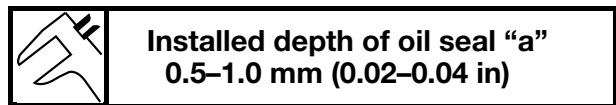
EAS30448

ASSEMBLING THE WATER PUMP

- Install:
 - Oil seal "1" **New**
 - Bearing (into the clutch cover "2")

TIP

Install the oil seal with a socket "3" that matches its outside diameter.



- Install:
 - Mechanical seal (housing side) "1" **New** (into the clutch cover "2")

ECA20330

NOTICE

Never lubricate the mechanical seal (housing side) surface with oil or grease.

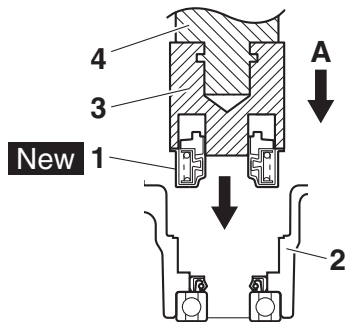
TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the clutch cover.

WATER PUMP



Mechanical seal installer (ø33)
90890-04132
Water pump seal installer (ø33)
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40
& 50 mm
YM-04058



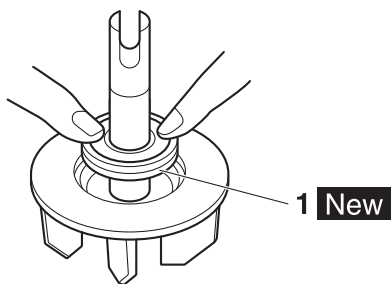
- 3. Mechanical seal installer
- 4. Middle driven shaft bearing driver
- A. Push down

3. Install:

- Mechanical seal (impeller side) "1" **New**

TIP

Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.



G089035

4. Measure:

- Mechanical seal (impeller side)
- Out of specification → Repeat steps (3) and (4).

ECA14090

NOTICE

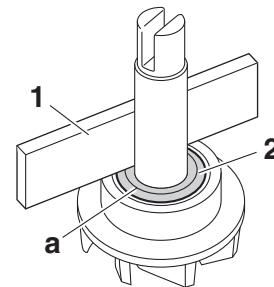
Make sure the rubber damper and rubber damper holder are flush with the impeller.

TIP

If the surface "a" of the mechanical seal (impeller side) that contacts the mechanical seal (housing side) is dirty, clean it.



Mechanical seal (impeller side)
0.15 mm (0.006 in)



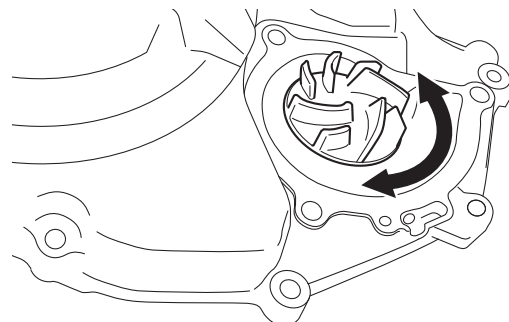
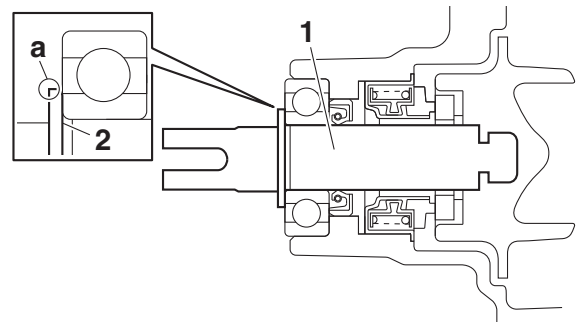
- 1. Straightedge
- 2. Impeller

5. Install:

- Impeller shaft "1"
- Circlip "2"

TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the bearing.
- After installation, check that the impeller shaft rotates smoothly.



EAS31117

INSTALLING THE CLUTCH COVER

1. Install:

- Dowel pins "1"
- Clutch cover gasket "2" **New**
- Clutch cover "3"



Clutch cover bolt
12 N·m (1.2 kgf·m, 8.9 lb-ft)
Clutch cable holder bolt
12 N·m (1.2 kgf·m, 8.9 lb-ft)
LOCTITE®

TIP

- Align the slit "a" in the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Face the serrations on the clutch pull rod "4" rearward and align the rod with the hole "c" in the clutch cover.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cable holder bolts "5".
- Tighten the bolts in stages and in a crisscross pattern.
- After installing the clutch cover, make sure that the alignment mark "d" on the clutch cover is aligned with the punch mark "e" on the pull lever "6".

Refer to "CHANGING THE COOLANT" on page 3-28.

3. Check:

- Cooling system
 Leaks → Repair or replace the faulty part.

4. Measure:

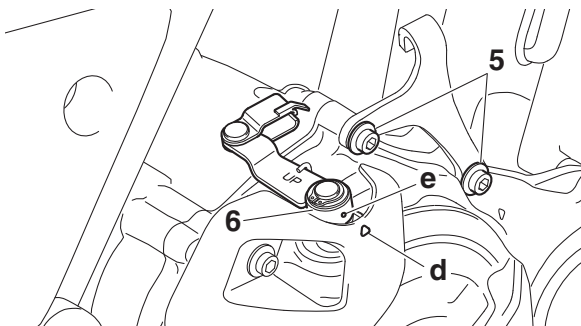
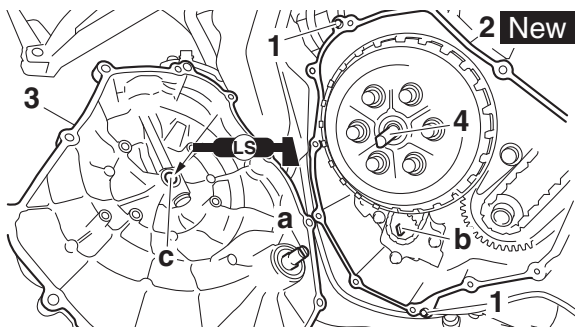
- Radiator cap opening pressure
 Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR" on page 6-4.

5. Adjust:

- Clutch lever free play

Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-13.



2. Fill:

- Cooling system
 (with the specified amount of the recommended coolant)

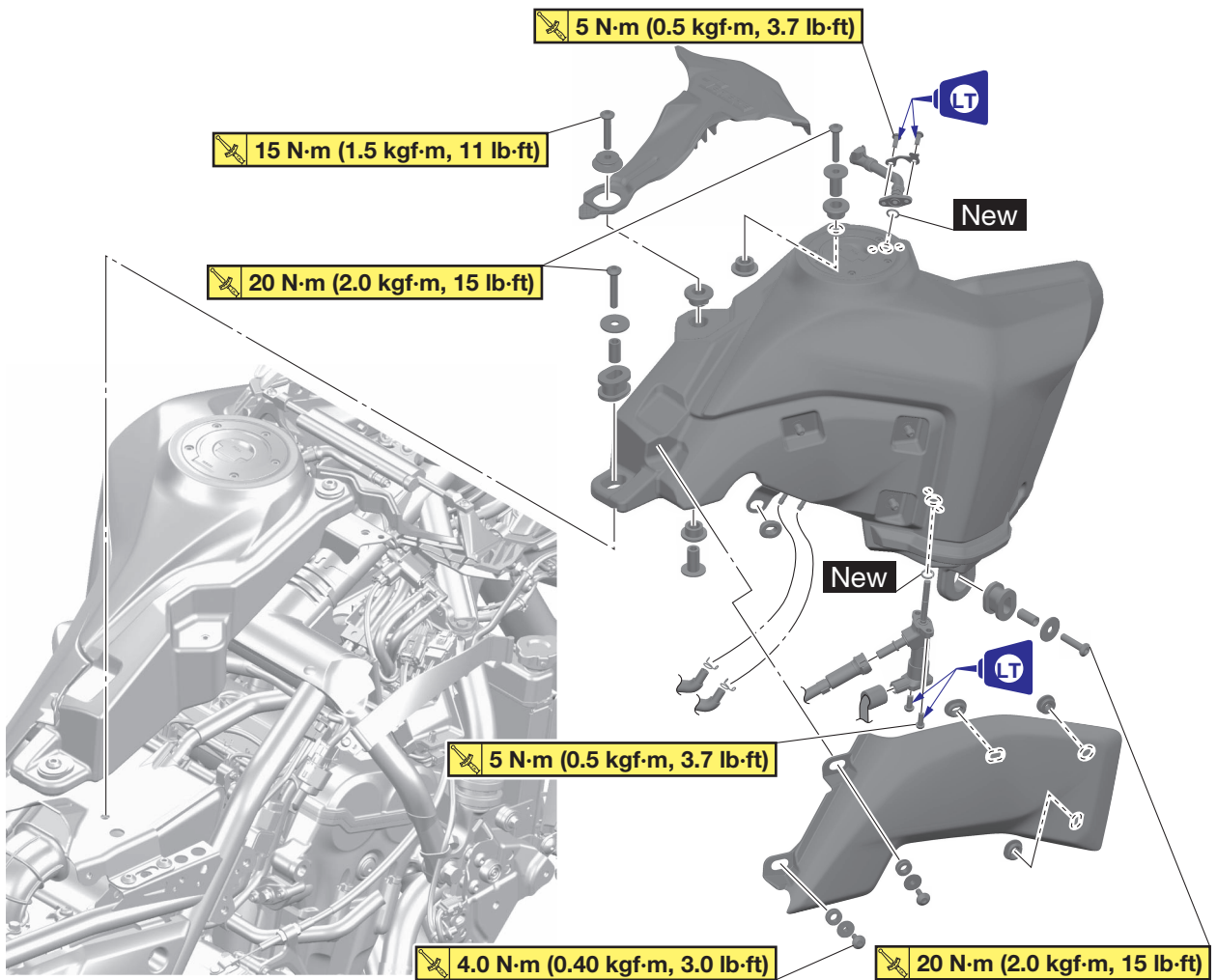
FUEL SYSTEM

| | |
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| REMOVING THE FUEL TANK (LEFT) | 7-5 |
| REMOVING THE FUEL PUMP | 7-5 |
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| CHECKING THE PURGE CUT VALVE SOLENOID..... | 7-6 |
| INSTALLING THE CANISTER..... | 7-6 |
| INSTALLING THE FUEL PUMP | 7-6 |
| INSTALLING THE FUEL TANK (LEFT)..... | 7-6 |
| INSTALLING THE FUEL TANK SIDE COVERS | 7-6 |
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| CHECKING THE INJECTORS | 7-11 |
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| REPLACING THE THROTTLE BODIES | 7-14 |
| CHECKING THE THROTTLE BODY JOINTS | 7-14 |
| ADJUSTING THE THROTTLE POSITION SENSOR | 7-14 |
| INSTALLING THE FUEL INJECTORS..... | 7-15 |
| CHECKING THE INJECTOR PRESSURE..... | 7-15 |
| CHECKING THE FUEL PRESSURE | 7-16 |
| INSTALLING THE THROTTLE BODY JOINTS | 7-16 |
| INSTALLING THE AIR FILTER CASE JOINTS..... | 7-17 |
| INSTALLING THE THROTTLE BODIES..... | 7-17 |

EAS20067

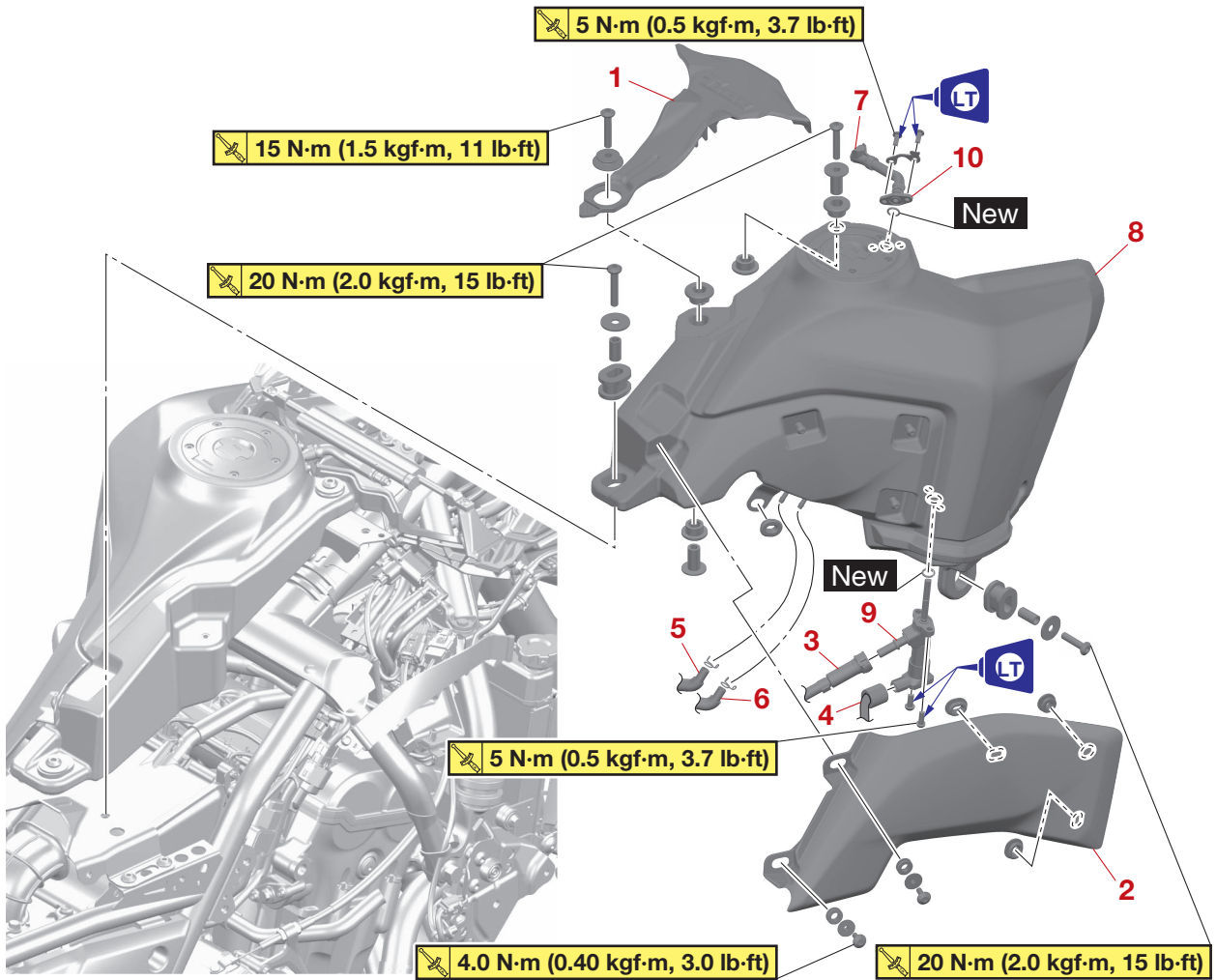
FUEL TANK

Removing the fuel tank (right)



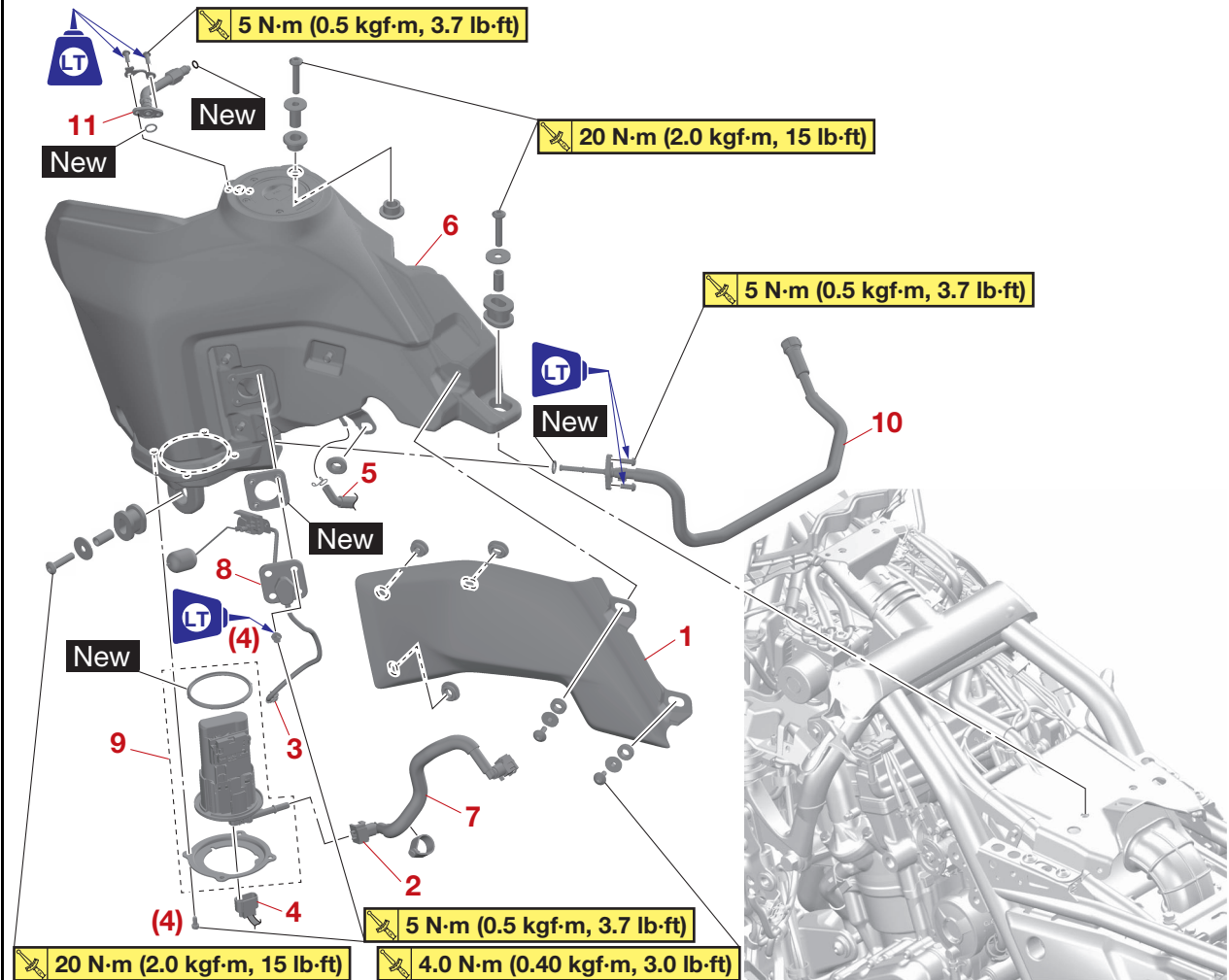
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------|------|---|
| | Rider seat | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Front side cover (right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (right) | | Refer to "ENGINE REMOVAL" on page 5-10. |

Removing the fuel tank (right)



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|-------------|
| 1 | Fuel tank center cover | 1 | |
| 2 | Fuel tank side cover (right) | 1 | |
| 3 | Fuel hose (right fuel tank to left fuel tank) | 1 | Disconnect. |
| 4 | Fuel cut solenoid valve coupler | 1 | Disconnect. |
| 5 | Fuel tank overflow hose (right fuel tank to hose joint) | 1 | Disconnect. |
| 6 | Fuel tank breather hose (right fuel tank to canister) | 1 | Disconnect. |
| 7 | Fuel tank breather hose connector (right fuel tank to left fuel tank) | 1 | Disconnect. |
| 8 | Fuel tank (right) | 1 | |
| 9 | Fuel cut solenoid valve | 1 | |
| 10 | Fuel tank breather hose (right fuel tank to left fuel tank) | 1 | |

Removing the fuel tank (left)

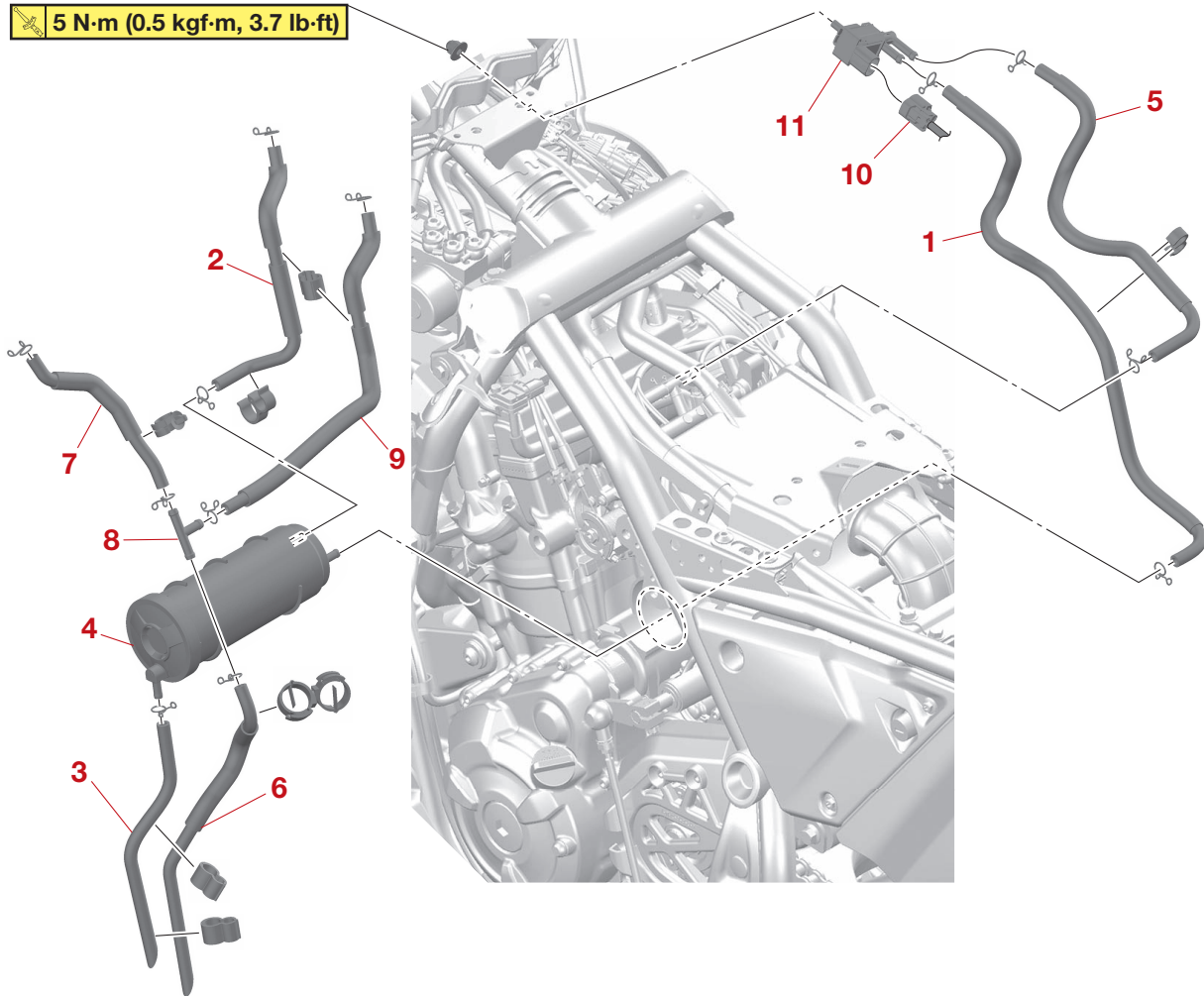


| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| | Front side cover (left) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (left) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| 1 | Fuel tank side cover (left) | 1 | |
| 2 | Fuel hose connector | 1 | Disconnect. |
| 3 | Fuel sender coupler | 1 | Disconnect. |
| 4 | Fuel pump coupler | 1 | Disconnect. |
| 5 | Fuel tank overflow hose (left fuel tank to hose joint) | 1 | Disconnect. |
| 6 | Fuel tank (left) | 1 | |
| 7 | Fuel hose (fuel pump to fuel rail) | 1 | |
| 8 | Fuel sender | 1 | |
| 9 | Fuel pump | 1 | |
| 10 | Fuel hose (right fuel tank to left fuel tank) | 1 | |
| 11 | Fuel tank breather hose (left fuel tank to right fuel tank) | 1 | |

FUEL TANK

Removing the canister

 5 N·m (0.5 kgf·m, 3.7 lb·ft)



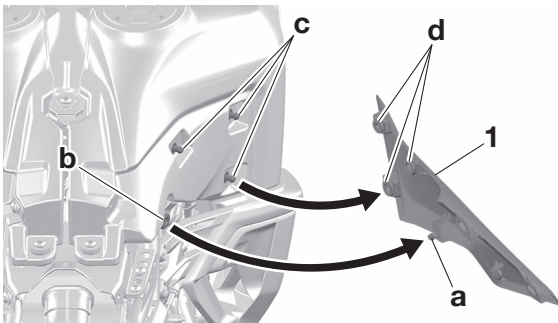
| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|-------------|
| 1 | Canister purge hose (canister to purge cut valve solenoid) | 1 | |
| 2 | Fuel tank breather hose (right fuel tank to canister) | 1 | |
| 3 | Canister breather hose | 1 | |
| 4 | Canister | 1 | |
| 5 | Canister purge hose (purge cut valve solenoid to throttle body) | 1 | |
| 6 | Fuel tank overflow hose | 1 | |
| 7 | Fuel tank overflow hose (left fuel tank to hose joint) | 1 | |
| 8 | Hose joint | 1 | |
| 9 | Fuel tank overflow hose (right fuel tank to hose joint) | 1 | |
| 10 | Purge cut valve solenoid coupler | 1 | Disconnect. |
| 11 | Purge cut valve solenoid | 1 | |

EAS31661

REMOVING THE FUEL TANK SIDE COVERS

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

1. Remove:
 - Fuel tank side cover “1”
 - a. Remove the fuel tank side cover bolts.
 - b. Pull the fuel tank side cover and remove the projection “a” from the grommet “b” on the fuel tank.
 - c. Pull the fuel tank side cover and remove the projections “c” on the fuel tank from the grommets “d”.



EAS30450

REMOVING THE FUEL TANK (RIGHT)

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Disconnect:
 - Fuel hose (right fuel tank to left fuel tank)

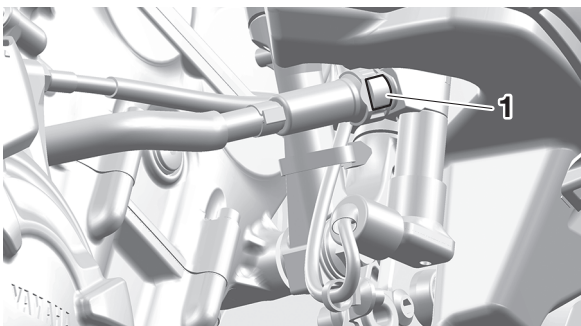
EWA17320

⚠ WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

TIP

To disconnect the fuel hose from the fuel cut valve solenoid, press the button “1” on the connector, and then pull the connector.



3. Remove:
 - Fuel tank (right)

EAS33810

REMOVING THE FUEL TANK (LEFT)

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
 - Fuel hose (fuel pump to fuel rail)
 - Fuel hose (right fuel tank to left fuel tank)

EWA17320

⚠ WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

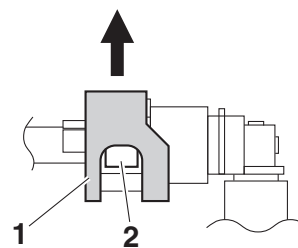
ECA20020

NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

- To remove the fuel hose (fuel pump to fuel rail) from the fuel rail and fuel pump, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



G089038

3. Remove:
 - Fuel tank (left)

TIP

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAS30451

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel pump

ECA23950

NOTICE

Do not drop the fuel pump or give it a strong shock.

EAS30454

CHECKING THE FUEL PUMP BODY

- Check:
 - Fuel pump body
Obstruction → Clean.
Cracks/damage → Replace fuel pump assembly.

EAS33542

CHECKING THE PURGE CUT VALVE SOLENOID

- Check:
 - Canister purge hose
Loose connection → Connect properly.
Cracks/damage/wear → Replace.
- Check:
 - Purge cut valve solenoid resistance
Refer to “CHECKING THE PURGE CUT VALVE SOLENOID” on page 8-49.

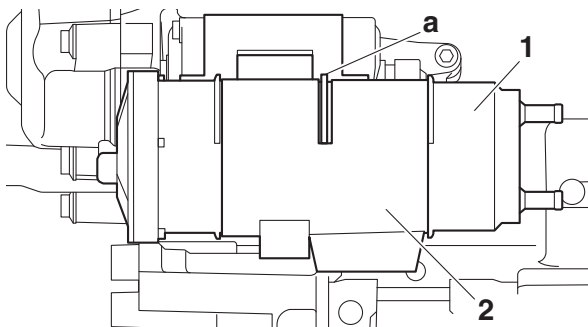
EAS31330

INSTALLING THE CANISTER

- Install:
 - Canister “1”

TIP

Fit the projection “a” on the canister into the slot in the canister holder “2”.



EAS30456

INSTALLING THE FUEL PUMP

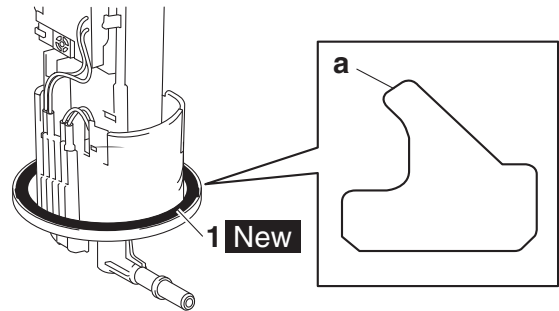
- Install:
 - Fuel pump gasket “1” **New**
 - Fuel pump
 - Fuel pump bracket



**Fuel pump bolt
5 N·m (0.5 kgf·m, 3.7 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.
- Tighten the fuel pump bolts in a crisscross pattern.



EAS30457

INSTALLING THE FUEL TANK (LEFT)

- Install:
 - Fuel hose (fuel pump to fuel rail)

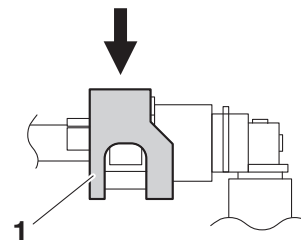
ECA18420

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position; otherwise, the fuel hose will not be properly installed.

TIP

- Install the fuel hose securely onto the fuel rail and fuel pump until a distinct “click” is heard.
- To install the fuel hose, slide the fuel hose connector cover “1” on each end of the hose in the direction of the arrow shown.



G089039

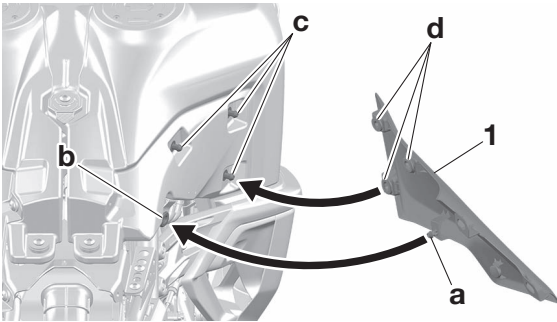
EAS31662

INSTALLING THE FUEL TANK SIDE COVERS

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

- Install:
 - Fuel tank side cover “1”

- a. Fit the projection “a” into the grommet “b” on the fuel tank.
- b. Fit the projections “c” on the fuel tank into the grommets “d”.



- c. Install the fuel tank side cover bolts.



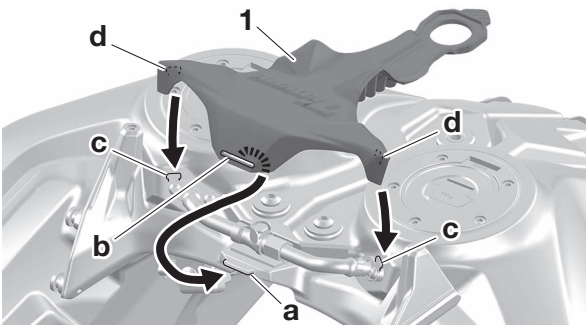
Fuel tank side cover bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

EAS33811

INSTALLING THE FUEL TANK CENTER COVER

1. Install:

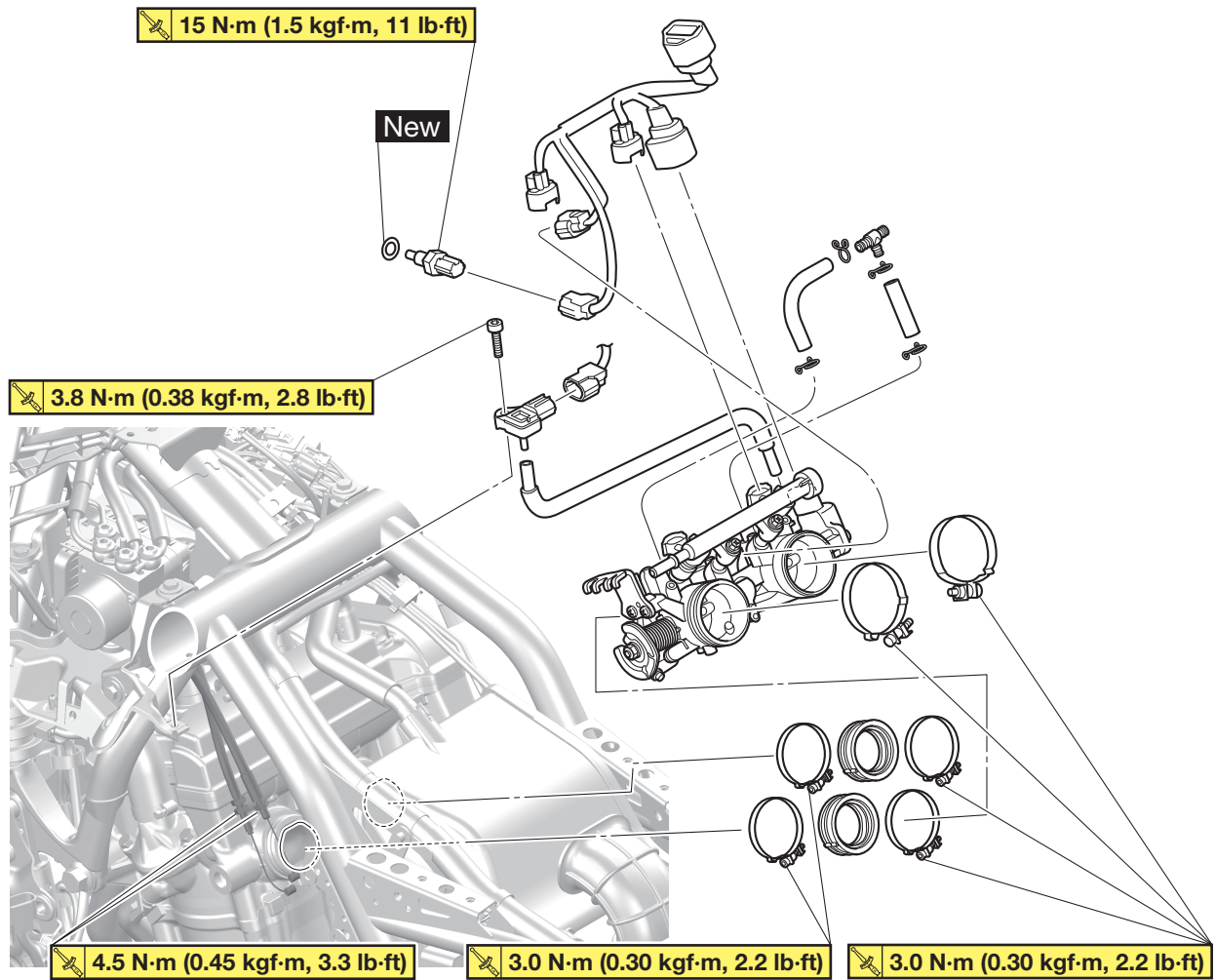
- Fuel tank center cover “1”
 - a. Fit the projection “a” on the steering damper bracket into the hole “b”.
 - b. Fit the projections “c” on the fuel tank into the grooves “d”.



EAS20070

THROTTLE BODIES

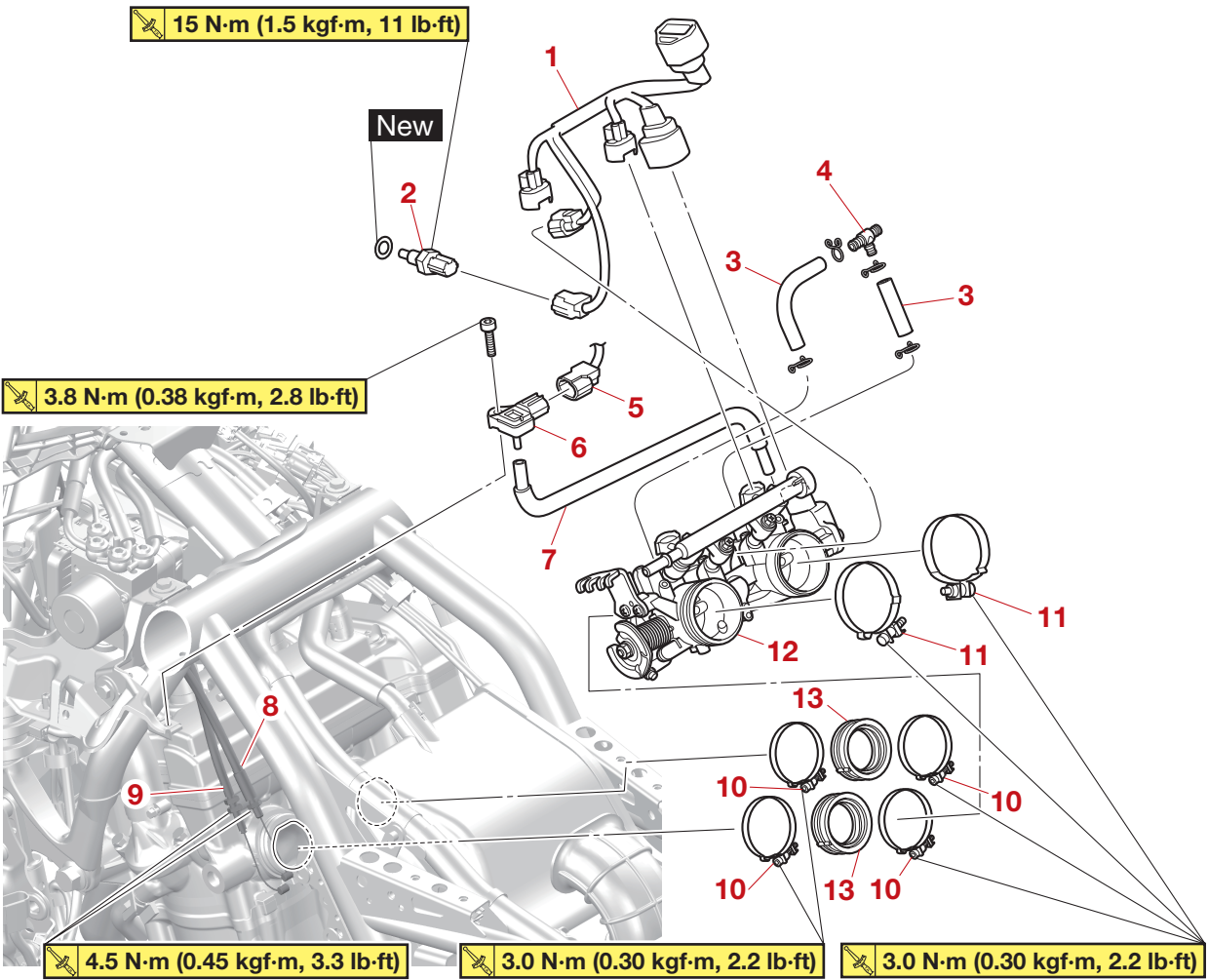
Removing the throttle bodies



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|-------------------------------------|------|---|
| | Rider seat/Battery | | Refer to "GENERAL CHASSIS (1)" on page 4-1. |
| | Tail cover | | Refer to "GENERAL CHASSIS (2)" on page 4-2. |
| | Front side cover (left/right) | | Refer to "GENERAL CHASSIS (3)" on page 4-5. |
| | Side cover inner panel (left/right) | | Refer to "GENERAL CHASSIS (4)" on page 4-7. |
| | Engine bracket (left/right) | | Refer to "ENGINE REMOVAL" on page 5-10. |
| | Cylinder head breather hose | | Refer to "CAMSHAFTS" on page 5-23. |
| | Fuel tank (left/right)/Canister | | Refer to "FUEL TANK" on page 7-1. |

THROTTLE BODIES

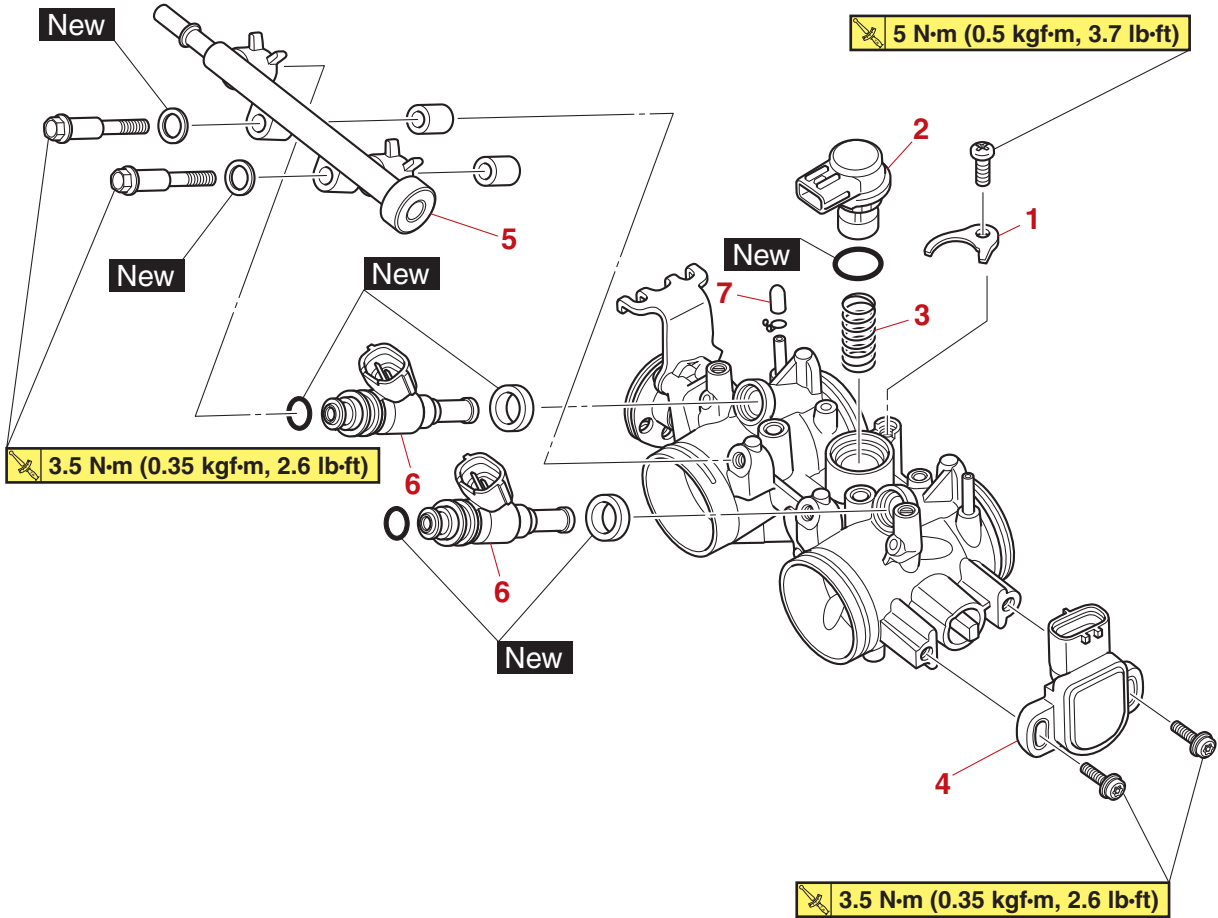
Removing the throttle bodies



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|---|------|---|
| 1 | Sub-wire harness | 1 | |
| 2 | Coolant temperature sensor | 1 | |
| 3 | Canister purge hose (hose joint to throttle bodies) | 2 | |
| 4 | Hose joint | 1 | |
| 5 | Intake air pressure sensor coupler | 1 | Disconnect. |
| 6 | Intake air pressure sensor | 1 | |
| 7 | Intake air pressure sensor hose | 1 | |
| 8 | Throttle cable (decelerator cable) | 1 | Disconnect. |
| 9 | Throttle cable (accelerator cable) | 1 | Disconnect. |
| 10 | Throttle body joint clamp screw | 4 | Loosen. |
| 11 | Air filter case joint clamp screw | 2 | Loosen. |
| 12 | Throttle bodies | 1 | Refer to "REMOVING THE THROTTLE BODIES" on page 7-11. |
| 13 | Throttle body joint | 2 | |

THROTTLE BODIES

Removing the fuel injectors



| Order | Job/Parts to remove | Q'ty | Remarks |
|-------|--------------------------------------|------|---------|
| 1 | ISC (Idle Speed Control) valve plate | 1 | |
| 2 | ISC (Idle Speed Control) valve | 1 | |
| 3 | Spring | 1 | |
| 4 | Throttle position sensor | 1 | |
| 5 | Fuel rail | 1 | |
| 6 | Fuel injector | 2 | |
| 7 | Cap | 1 | |

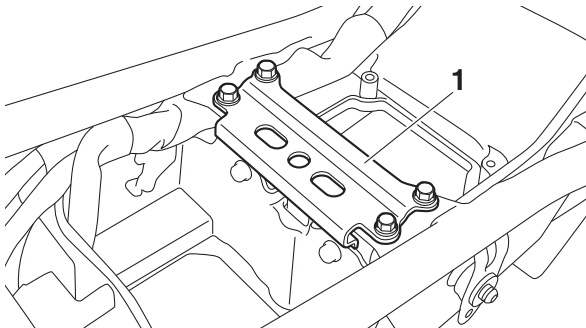
THROTTLE BODIES

EAS30979

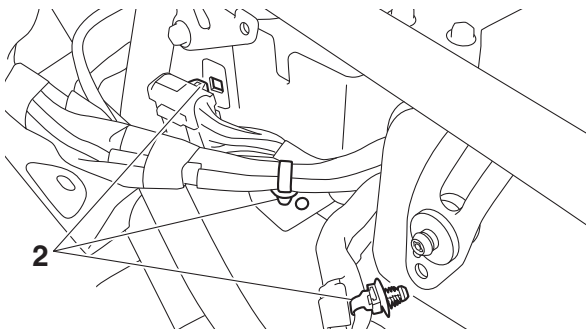
REMOVING THE THROTTLE BODIES

1. Remove:

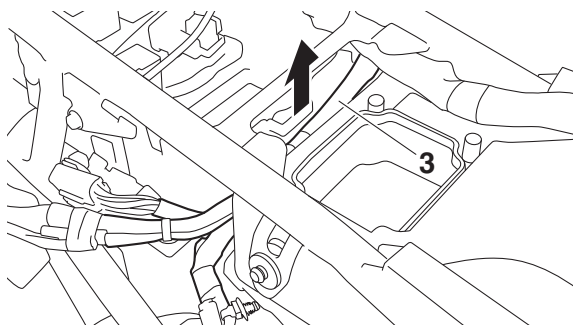
- Throttle bodies
 - a. Remove the battery box bracket "1".



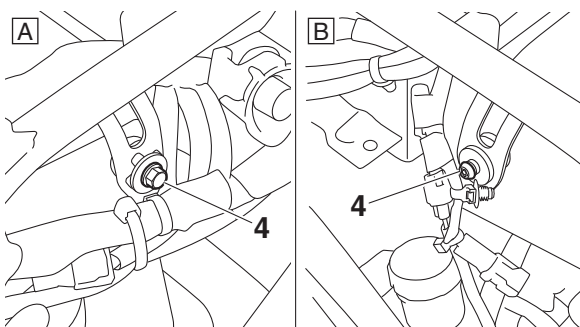
- b. Remove the holders "2" from the frame and battery box.



- c. Lift the wire harness "3" in the direction of the arrow shown.



- d. Remove the air filter case bolts (left/right) "4".



- A. Left
- B. Right

- e. Pull the air filter case rearward to remove it from the throttle bodies.
- f. Remove the throttle bodies.

EAS30475

CHECKING THE INJECTORS (BEFORE REMOVING)

1. Check:

- Injectors
 - Use the diagnostic code numbers "36" and "37".
 - Refer to "DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE" on page 9-51.

EAS30476

REMOVING THE INJECTORS

EWA17330

⚠ WARNING

- Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.
- Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.
- Turn the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before removing the injectors.

EAS30477

CHECKING THE INJECTORS

1. Check:

- Injectors
 - Obstruction → Replace and check the fuel pump/fuel supply system.
 - Deposit → Replace.
 - Damage → Replace.

2. Check:

- Injector resistance
 - Refer to "CHECKING THE FUEL INJECTORS" on page 8-49.

EAS30769

CHECKING AND CLEANING THE THROTTLE BODIES

TIP

Before checking the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints

THROTTLE BODIES

- Fuel hoses
- Exhaust system
- Cylinder head breather hose
- Canister purge hoses

EWA17850

WARNING

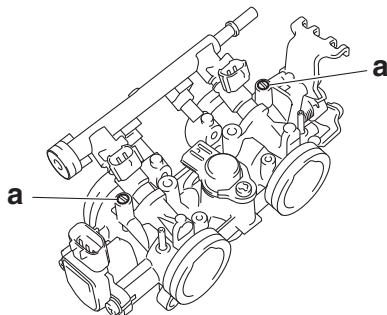
If the throttle bodies are subjected to strong shocks or dropped during checking, replace them.

1. Check:
 - Throttle bodies
 - Cracks/damage → Replace the throttle bodies.
2. Clean:
 - Throttle bodies

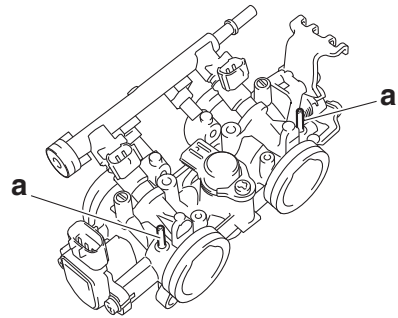
ECA20910

NOTICE

- Observe the following precautions; otherwise, the throttle bodies may not operate properly.
- Do not open the throttle valves quickly.
- Do not subject the throttle bodies to excessive force.
- Wash the throttle bodies in a petroleum-based solvent.
- Do not use any caustic carburetor cleaning solution.
- Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.
- Do not directly push the throttle valves to open them.
- Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.



- a. Place the throttle bodies on a flat surface with the air filter case side facing up.
- b. Install the caps (895-14169-00) onto the hose fittings "a".



- c. Push the lever in the direction shown in the illustration to hold the throttle valves in the open position.

EWA16680

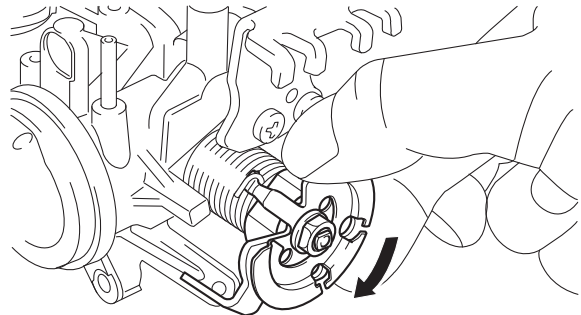
WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA21190

NOTICE

- Do not use tools to open the throttle valves or to keep them in the open position.
- Do not open the throttle valves quickly.



- d. Apply a petroleum-based solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any petroleum-based solvent to enter the opening for the injectors.
- Do not apply any petroleum-based solvent to the portions of the throttle valve shafts between the throttle bodies.

- e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

ECA18470

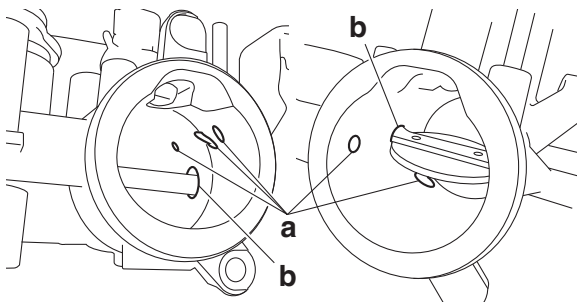
NOTICE

- Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.

THROTTLE BODIES

- Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.

- f. After removing the carbon deposits, clean the inside of the throttle bodies with a petroleum-based solvent, and then dry the throttle bodies using compressed air.
- g. Make sure that there are no carbon deposits or other foreign materials in any of the passages “a” in each throttle body or in the space “b” between the throttle valve shaft and the throttle body.



Cleaning the ISC (idle speed control) valve

1. Remove:
 - ISC (Idle Speed Control) valve plate
 - ISC (Idle Speed Control) valve
 - O-ring
2. Clean:
 - ISC (Idle Speed Control) valve “1”



ECA21230

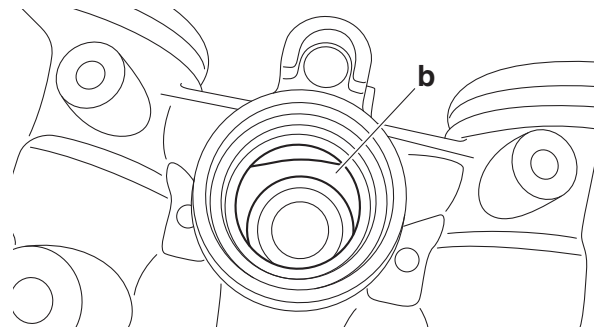
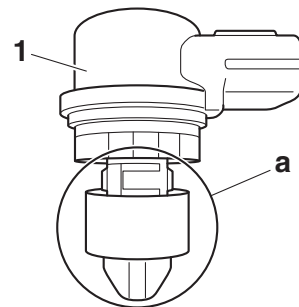
NOTICE

- Be sure to use the recommended cleaning agent.
- Do not spray the cleaning agent directly onto the ISC valve or throttle bodies and do not immerse them in the cleaning agent.
- To prevent scratching the components, do not use a brush, metal file, or other abrasive tool.
- Do not clean with compressed air.
- Do not allow the removed deposits or foreign materials to adhere to the sealing surfaces of the O-ring.

- Do not scratch or deform the ISC valve or air passage; otherwise, poor starting performance, an unstable engine idling speed, or uncontrollable engine speed could result.
- Do not clean any areas other than those indicated in the illustrations. If the cleaning agent attaches to the ISC valve or enters the throttle bodies, thoroughly wipe it off.

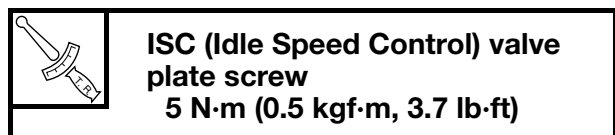
TIP

Clean the area “a” of the ISC valve and the ISC valve installation hole “b” in the throttle bodies.



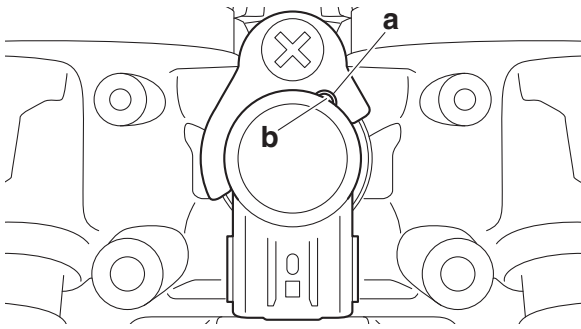
3. Install:

- O-ring **New**
- ISC (Idle Speed Control) valve
- ISC (Idle Speed Control) valve plate



TIP

Align the slot “a” in the ISC valve plate with the projection “b” on the ISC valve.



Resetting the ISC (idle speed control) learning values

1. Install:
 - Throttle bodies
2. Reset:
 - ISC (idle speed control) learning values
Use the diagnostic code number "67".
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-30.
3. Reset:
 - A/F control learning value
Use the diagnostic code number "87".
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-30.
4. Adjust:
 - Throttle bodies synchronizing
Out of specification → Replace the throttle bodies.
Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-9.

EAS31160

REPLACING THE THROTTLE BODIES

1. Remove the throttle bodies from the vehicle.
2. Install a new throttle bodies to the vehicle.
3. Reset:
 - ISC (idle speed control) learning values
Use the diagnostic code number "67".
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-30.
4. Reset:
 - A/F control learning value
Use the diagnostic code number "87".
Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-30.
5. Adjust:
 - Throttle bodies synchronizing
Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-9.

6. Place the vehicle on a suitable stand so that the rear wheel is elevated.
7. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.

| | |
|--|--|
| | Engine idling speed 1250–1450 r/min |
|--|--|

EAS30792

CHECKING THE THROTTLE BODY JOINTS

1. Check:
 - Throttle body joints
Cracks/damage → Replace.

EAS30485

ADJUSTING THE THROTTLE POSITION SENSOR

EWA16690



- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

1. Check:
 - Throttle position sensor
Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-46.
2. Adjust:
 - Throttle position sensor angle
 - a. Temporary tighten the throttle position sensor bolts.
 - b. Check that the throttle valves are fully closed.
 - c. Connect the throttle position sensor to the wire harness.
 - d. Disconnect the coupler "1" from the CCU, and then connect the Yamaha diagnostic tool to coupler.

TIP

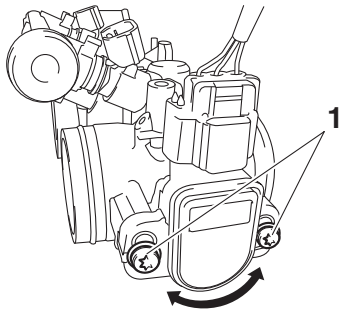
For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.

Refer to "YDT" on page 9-2.

- e. Diagnostic code number "01" is selected.
- f. Adjust the position of the throttle position sensor angle so that 11–21 can appear in the Yamaha diagnostic tool screen.
- g. After adjusting the throttle position sensor angle, tighten the throttle position sensor bolts "1".



Throttle position sensor screw
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)



EAS31124

INSTALLING THE FUEL INJECTORS

ECA20000

NOTICE

- Always use new O-rings.
- When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.
- Be careful not to twist or pinch the O-rings when installing the injectors.
- If an injector is subject to strong shocks or excessive force, replace it.
- If installing the original fuel rail and screws, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the screw seats could prevent the screws from being tightened to the specified torque.

1. Install new seals onto the end of each injector.
2. Install the fuel injectors to the fuel rail.



Fuel rail bolt
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

3. Install the fuel injector assemblies to the throttle bodies.
4. Check the injector pressure after the fuel injectors are installed to the throttle bodies. Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-15.

EAS30481

CHECKING THE INJECTOR PRESSURE

TIP

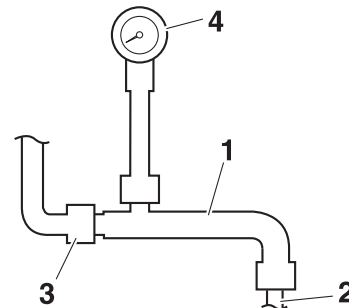
- After installing the fuel injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

1. Check:

- Injector pressure
 - a. Connect the fuel injector pressure adapter "1" to the fuel rail "2", and then connect an air compressor "3" to the adapter.
 - b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel injector pressure adapter
90890-03210
Fuel injector pressure adapter
YU-03210



G089041

- c. Close the valve on the fuel injector pressure adapter.
- d. Apply air pressure with the air compressor.
- e. Open the valve on the fuel injector pressure adapter until the specified pressure is reached.



Specific air pressure
490 kPa (4.9 kgf/cm², 69.7 psi)

ECA18440

NOTICE

Never exceed the specified air pressure or damage could occur.

- f. Close the valve on the fuel injector pressure adapter.
- g. Check that the specified air pressure is held for about one minute. Pressure drops → Check the pressure gauge and adapter. Check the seals and O-rings, and then re-install. Replace the fuel injectors.

EAS30482

CHECKING THE FUEL PRESSURE

1. Remove:
 - Front side cover (left)
Refer to “GENERAL CHASSIS (3)” on page 4-5.
 - Side cover inner panel (left)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
 - Engine bracket (left)
Refer to “ENGINE REMOVAL” on page 5-10.
2. Check:
 - Fuel pressure
 - a. Disconnect the fuel hose “1” from the fuel pump.
Refer to “REMOVING THE FUEL TANK (LEFT)” on page 7-5.

EWA16640

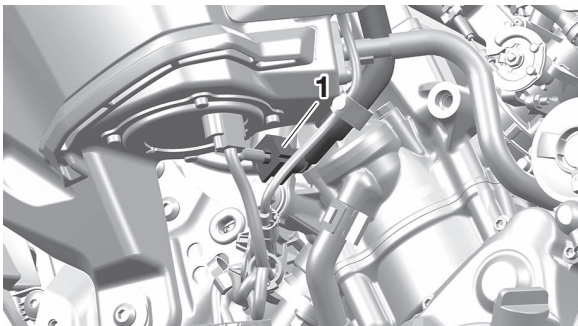
WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

ECA20010

NOTICE

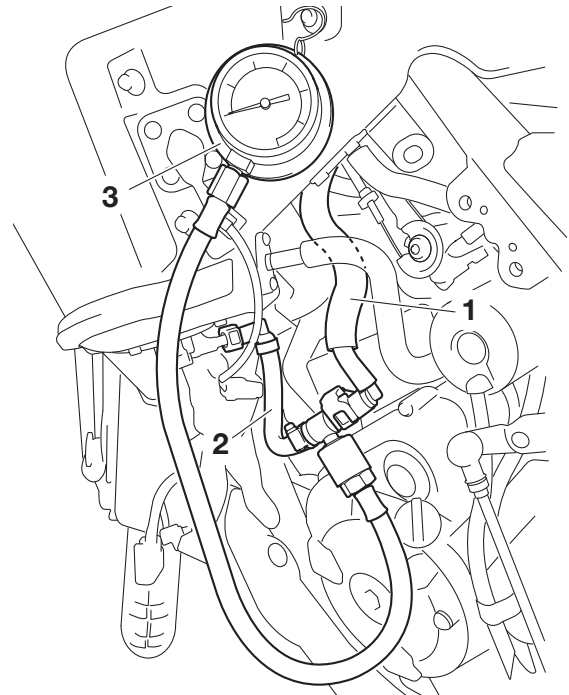
Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



- b. Connect the adapter “2” to the fuel hose “1” and fuel pump, and then connect the pressure gauge “3” to the adapter as shown in the illustration.



Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel pressure adapter
90890-03186
Fuel pressure adapter
YM-03186



- c. Start the engine.
- d. Measure the fuel pressure.



Fuel line pressure (at idle)
300–390 kPa (3.0–3.9 kgf/cm²,
43.5–56.6 psi)

Faulty → Replace the fuel pump.

3. Install:
 - Engine bracket (left)
Refer to “ENGINE REMOVAL” on page 5-10.
 - Side cover inner panel (left)
Refer to “GENERAL CHASSIS (4)” on page 4-7.
 - Front side cover (left)
Refer to “GENERAL CHASSIS (3)” on page 4-5.

EAS30937

INSTALLING THE THROTTLE BODY JOINTS

1. Install:
 - Throttle body joints “1”

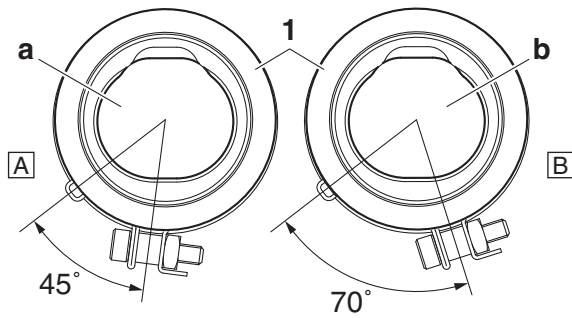


Throttle body joint clamp screw
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

TIP

Be sure to install the throttle body joints “1” as shown in the illustration.

THROTTLE BODIES



- a. #1 cylinder
- b. #2 cylinder
- A. Left
- B. Right

EAS33279

INSTALLING THE AIR FILTER CASE JOINTS

1. Install:

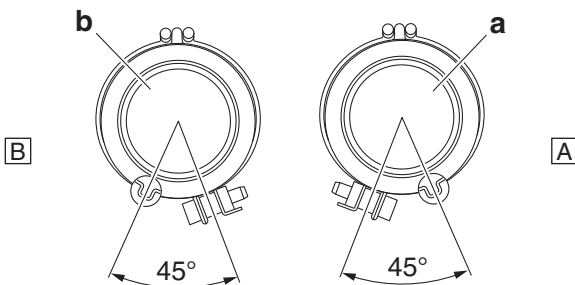
- Air filter case joint clamps "1"



Air filter case joint clamp screw
3.0 N·m (0.30 kgf·m, 2.2 lb·ft)

TIP

- Align the projection on the air filter case joint with the slot in the air filter case joint clamp.
- Face the screw head of the air filter case joint clamp outward.



- a. #1 Cylinder
- b. #2 Cylinder
- A. Left
- B. Right

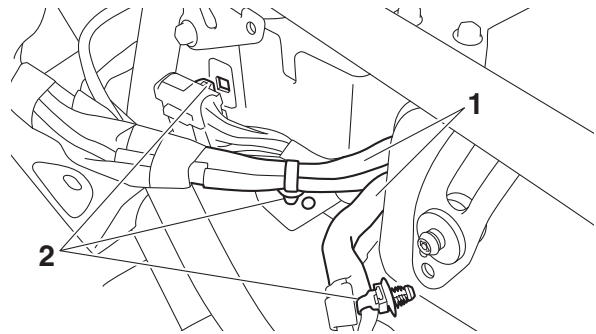
EAS30980

INSTALLING THE THROTTLE BODIES

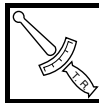
1. Install:

- Throttle bodies
 - a. Fit the throttle bodies to the throttle body joints.
 - b. Fit the air filter case joints to the throttle bodies.

- c. Place the wire harness "1" in its original position, and then insert the projections on the holders "2" into the holes in the frame and battery box.

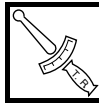


- d. Tighten the air filter case bolts (left/right).

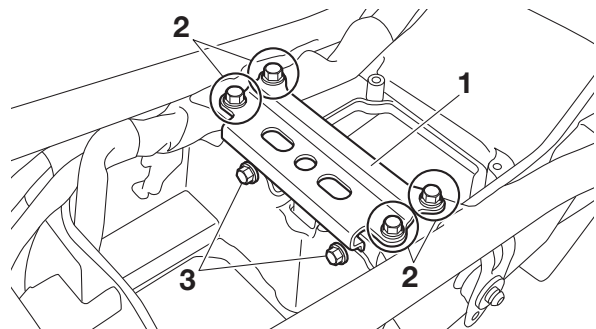


Air filter case bolt (left)
10 N·m (1.0 kgf·m, 7.4 lb·ft)
Air filter case bolt (right)
10 N·m (1.0 kgf·m, 7.4 lb·ft)

- e. Install the battery box bracket "1", and then tighten the battery box bracket bolts "2" and battery box bolts "3".



Battery box bracket bolt
9 N·m (0.9 kgf·m, 6.6 lb·ft)
Battery box bolt
9 N·m (0.9 kgf·m, 6.6 lb·ft)
LOCTITE®



ELECTRICAL SYSTEM

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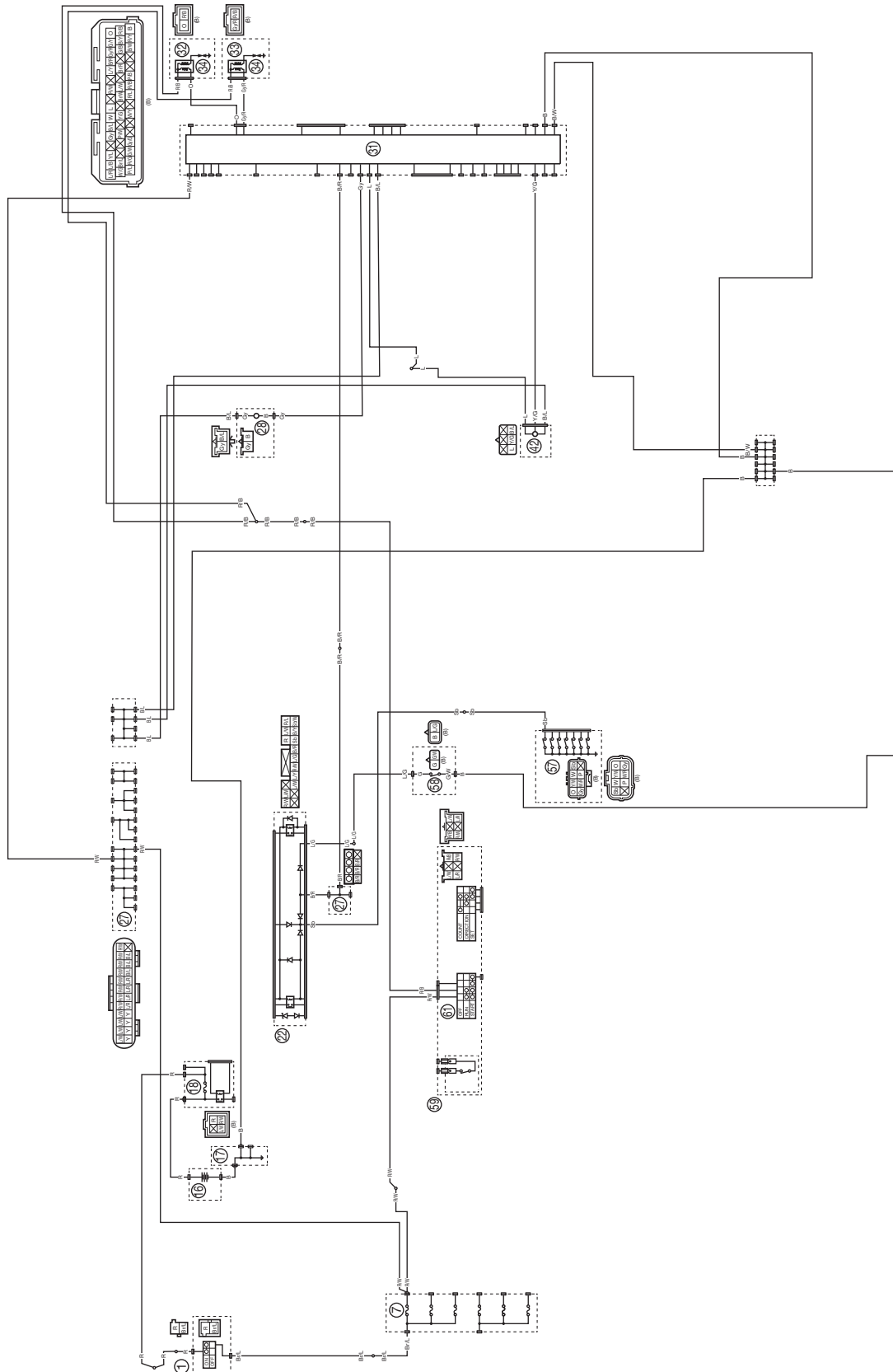
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EAS20072

IGNITION SYSTEM

EAS30490

CIRCUIT DIAGRAM



IGNITION SYSTEM

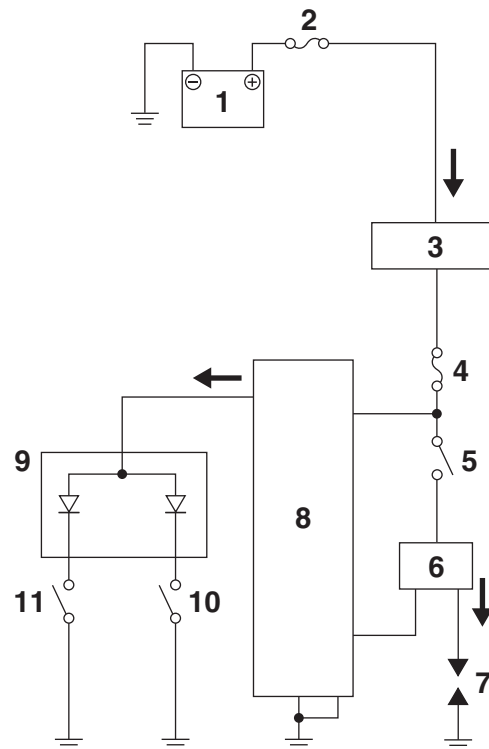
- 1. Main switch
- 7. Ignition fuse
- 16. Battery
- 17. Engine ground
- 18. Main fuse
- 22. Relay unit (diode)
- 27. Joint coupler
- 28. Crankshaft position sensor
- 31. ECU (Engine Control Unit)
- 32. Ignition coil #1
- 33. Ignition coil #2
- 34. Spark plug
- 42. Lean angle sensor
- 57. Gear position switch
- 58. Sidestand switch
- 59. Handlebar switch (right)
- 61. Engine start/stop 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 coils or fuel injectors when the gear position switch (neutral circuit) or sidestand switch is open. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine start/stop switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Relay unit (diode)
10. Sidestand switch
11. Gear position switch

IGNITION SYSTEM

EAS30492

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Front side cover (left/right)
4. Side cover inner panel (left/right)
5. Fuel tank (left/right)
6. Radiator cover
7. Drive sprocket cover

| | | |
|---|------|---|
| 1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-38. | NG → | Replace the fuse(s). |
| OK ↓ | | |
| 2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38. | NG → | <ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery. |
| OK ↓ | | |
| 3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-5. | NG → | Re-gap or replace the spark plug(s). |
| OK ↓ | | |
| 4. Check the ignition spark gap. Refer to "CHECKING THE IGNI- TION SPARK GAP" on page 8-42. | OK → | Ignition system is OK. |
| NG ↓ | | |
| 5. Check the ignition coils. Refer to "CHECKING THE IGNI- TION COILS" on page 8-42. | NG → | Replace the ignition coil(s). |
| OK ↓ | | |
| 6. Check the crankshaft position sen- sor. Refer to "CHECKING THE CRANK- SHAFT POSITION SENSOR" on page 8-43. | NG → | Replace the crankshaft position sensor. |
| OK ↓ | | |
| 7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37. | NG → | Replace the main switch/immobilizer unit. |
| OK ↓ | | |

IGNITION SYSTEM

| | | |
|--|------|---|
| <p>8. Check the engine start/stop switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | <ul style="list-style-type: none">• The engine start/stop switch is faulty.• Replace the right handlebar switch. |
| OK ↓ | | |
| <p>9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-48.</p> | NG → | Replace the gear position switch. |
| OK ↓ | | |
| <p>10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | Replace the sidestand switch. |
| OK ↓ | | |
| <p>11. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-41.</p> | NG → | Replace the relay unit. |
| OK ↓ | | |
| <p>12. Check the lean angle sensor. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-43.</p> | NG → | Replace the lean angle sensor. |
| OK ↓ | | |
| <p>13. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.</p> | NG → | Properly connect or replace the wiring harness. |
| OK ↓ | | |
| <p>Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.</p> | | |

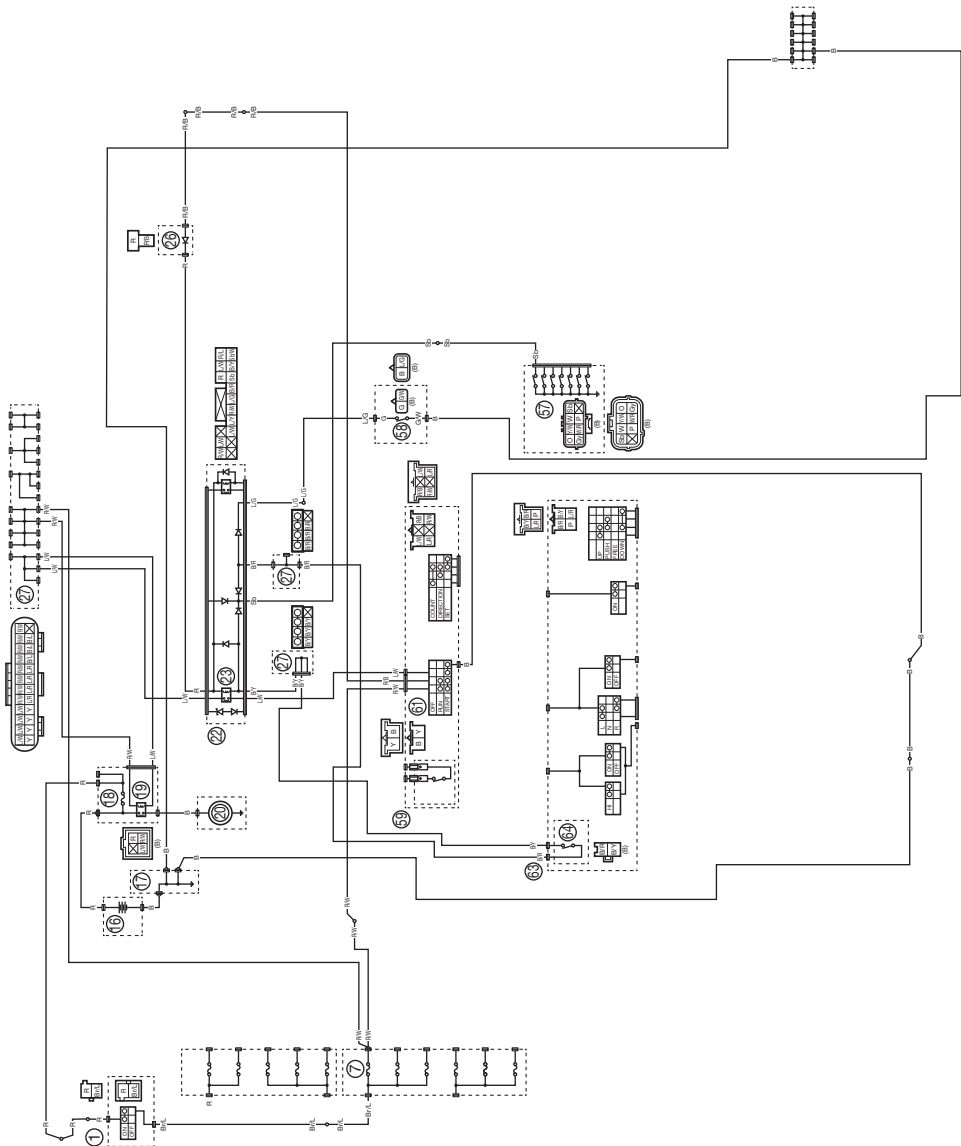
ELECTRIC STARTING SYSTEM

EAS20073

ELECTRIC STARTING SYSTEM

EAS30493

CIRCUIT DIAGRAM



ELECTRIC STARTING SYSTEM

- 1. Main switch
- 7. Ignition fuse
- 16. Battery
- 17. Engine ground
- 18. Main fuse
- 19. Starter relay
- 20. Starter motor
- 22. Relay unit (diode)
- 23. Starting circuit cut-off relay
- 26. Diode
- 27. Joint coupler
- 57. Gear position switch
- 58. Sidestand switch
- 59. Handlebar switch (right)
- 61. Engine start/stop switch
- 63. Handlebar switch (left)
- 64. Clutch switch

ELECTRIC STARTING SYSTEM

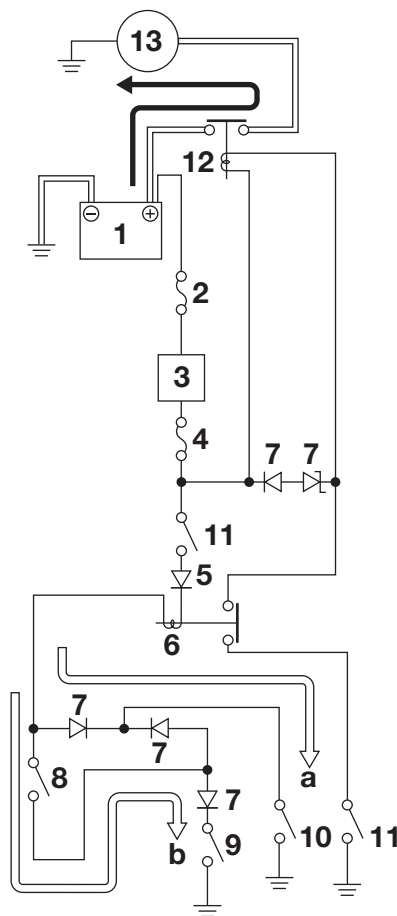
EAS30494

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON" and the "⊗" side of the engine start/stop switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pressing the "⊗" side of the engine start/stop switch.



- | | |
|---|------------------------------|
| a. WHEN THE TRANSMISSION IS IN NEUTRAL | 8. Clutch switch |
| b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR | 9. Sidestand switch |
| 1. Battery | 10. Gear position switch |
| 2. Main fuse | 11. Engine start/stop switch |
| 3. Main switch | 12. Starter relay |
| 4. Ignition fuse | 13. Starter motor |
| 5. Diode | |
| 6. Starting circuit cut-off relay | |
| 7. Relay unit (diode) | |

ELECTRIC STARTING SYSTEM

EAS30495

TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Drive chain cover

| | | |
|--|------|---|
| 1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-38. | NG → | Replace the fuse(s). |
| OK ↓ | | |
| 2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38. | NG → | <ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery. |
| OK ↓ | | |
| 3. Check the starter motor operation. Refer to "CHECKING THE START- ER MOTOR OPERATION" on page 8-44. | 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 START- ER MOTOR" on page 5-52. | NG → | Repair or replace the starter motor. |
| OK ↓ | | |
| 5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RE- LAYS" on page 8-39. | NG → | Replace the relay unit. |
| OK ↓ | | |
| 6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-41. | NG → | Replace the relay unit. |
| OK ↓ | | |
| 7. Check the starter relay. Refer to "CHECKING THE RE- LAYS" on page 8-39. | NG → | Replace the starter relay. |
| OK ↓ | | |
| 8. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37. | NG → | Replace the main switch/immobilizer unit. |
| OK ↓ | | |

ELECTRIC STARTING SYSTEM

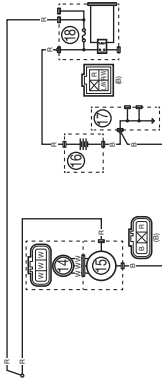
| | | |
|--|------|---|
| 9. Check the gear position switch. Refer to "CHECKING THE GEAR POSITION SWITCH" on page 8-48. | NG → | Replace the gear position switch. |
| OK ↓ | | |
| 10. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-37. | NG → | Replace the sidestand switch. |
| OK ↓ | | |
| 11. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-37. | NG → | Replace the clutch switch. |
| OK ↓ | | |
| 12. Check the engine start/stop switch. Refer to "CHECKING THE SWITCHES" on page 8-37. | NG → | <ul style="list-style-type: none">• The engine start/stop switch is faulty.• Replace the right handlebar switch. |
| OK ↓ | | |
| 13. Check the Diode. Refer to "CHECKING THE DIODE" on page 8-40. | NG → | Replace the diode. |
| OK ↓ | | |
| 14. Check the entire starting system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7. | NG → | Properly connect or replace the wiring harness. |
| OK ↓ | | |
| The starting system circuit is OK. | | |

EAS20074

CHARGING SYSTEM

EAS30496

CIRCUIT DIAGRAM



- 14.Stator coil
- 15.Rectifier/regulator
- 16.Battery
- 17.Engine ground
- 18.Main fuse

CHARGING SYSTEM

EAS30497

TROUBLESHOOTING

The battery is not being charged.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Front side cover (left)
3. Side cover inner panel (left)

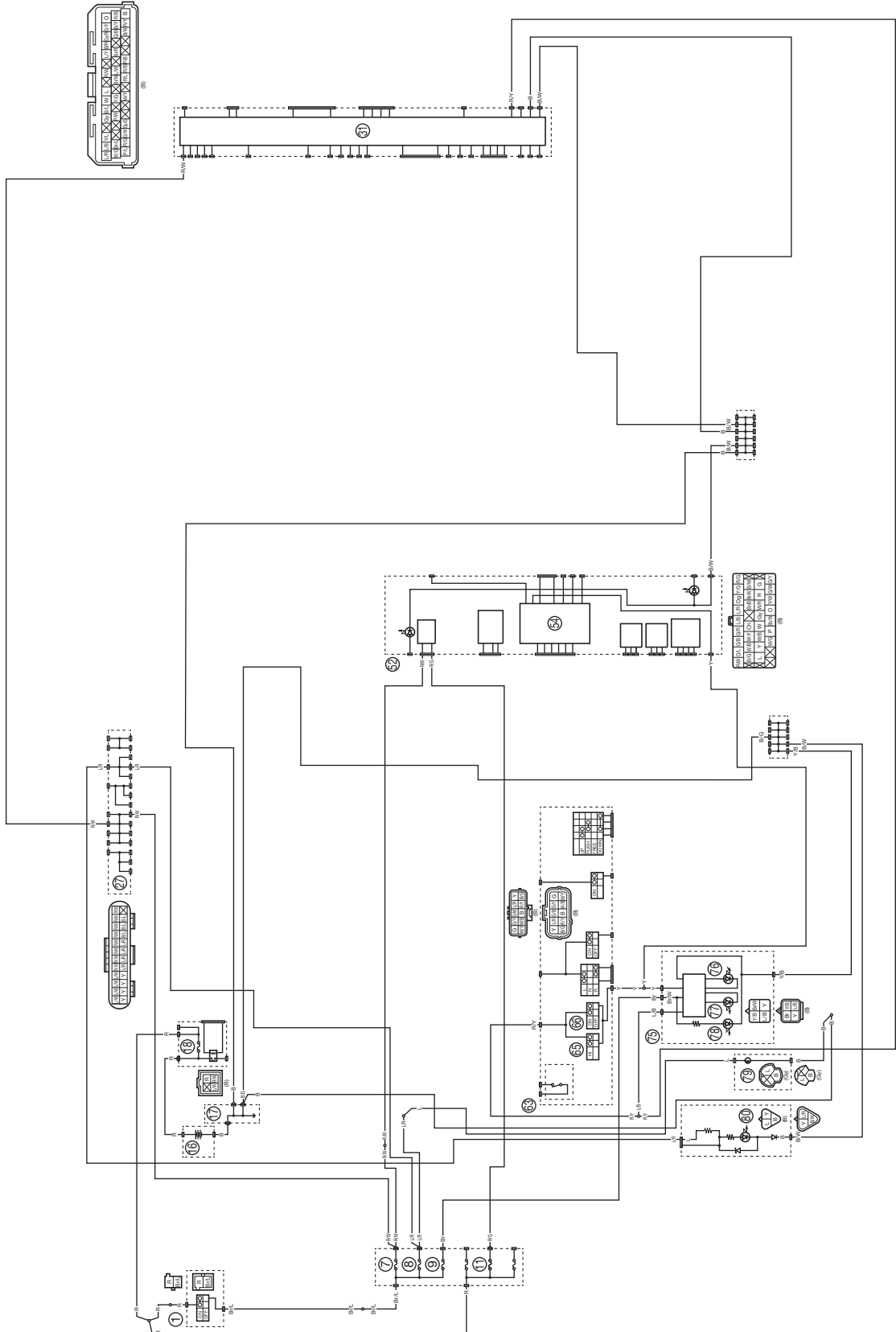
| | | |
|---|------|---|
| 1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-38. | NG → | Replace the fuse. |
| OK ↓ | | |
| 2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38. | NG → | <ul style="list-style-type: none">• Clean the battery terminals.• Recharge or replace the battery. |
| OK ↓ | | |
| 3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-44. | NG → | Replace the stator coil assembly. |
| OK ↓ | | |
| 4. Check the rectifier/regulator. Refer to "CHECKING THE RECTI- FIER/REGULATOR" on page 8-44. | NG → | Replace the rectifier/regulator. |
| OK ↓ | | |
| 5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-12. | NG → | Properly connect or replace the wiring harness. |
| OK ↓ | | |
| The charging system circuit is OK. | | |

EAS20075

LIGHTING SYSTEM

EAS30498

CIRCUIT DIAGRAM



1. Main switch
7. Ignition fuse
8. Signaling system fuse
9. Headlight fuse
- 11.Backup fuse
- 16.Battery
- 17.Engine ground
- 18.Main fuse
- 27.Joint coupler
- 31.ECU (Engine Control Unit)
- 52.Meter assembly
- 54.Multi-function meter
- 63.Handlebar switch (left)
- 65.Dimmer switch
- 66.Pass switch
- 75.Headlight assembly
- 76.Headlight (high beam)
- 77.Headlight (low beam)
- 78.Auxiliary light
- 79.License plate light
- 80.Tail/brake light

EAS30499

TROUBLESHOOTING

Any of the following fail to light: headlight (high beam), headlight (low beam), auxiliary light, license plate light, taillight, meter light or high beam indicator light.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Front side cover (right)
3. Side cover inner panel (right)
4. Fuel tank (right)

| | | |
|--|------|--|
| <p>1. Check the license plate light bulb and license plate light bulb socket condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" in "BASIC INFORMATION" (separate volume).</p> | NG → | <p>Replace the bulb and bulb socket.</p> |
| OK ↓ | | |
| <p>2. Check the fuses. (Ignition, signaling system, headlight, backup and main) Refer to "CHECKING THE FUSES" on page 8-38.</p> | NG → | <p>Replace the fuse(s).</p> |
| OK ↓ | | |
| <p>3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.</p> | NG → | <ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery. |
| OK ↓ | | |
| <p>4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | <p>Replace the main switch/immobilizer unit.</p> |
| OK ↓ | | |
| <p>5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | <ul style="list-style-type: none"> • The dimmer switch is faulty. • Replace the left handlebar switch. |
| OK ↓ | | |
| <p>6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | <ul style="list-style-type: none"> • The pass switch is faulty. • Replace the left handlebar switch. |
| OK ↓ | | |

LIGHTING SYSTEM

7. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-15.

NG →

Properly connect or replace the wiring harness.

OK ↓

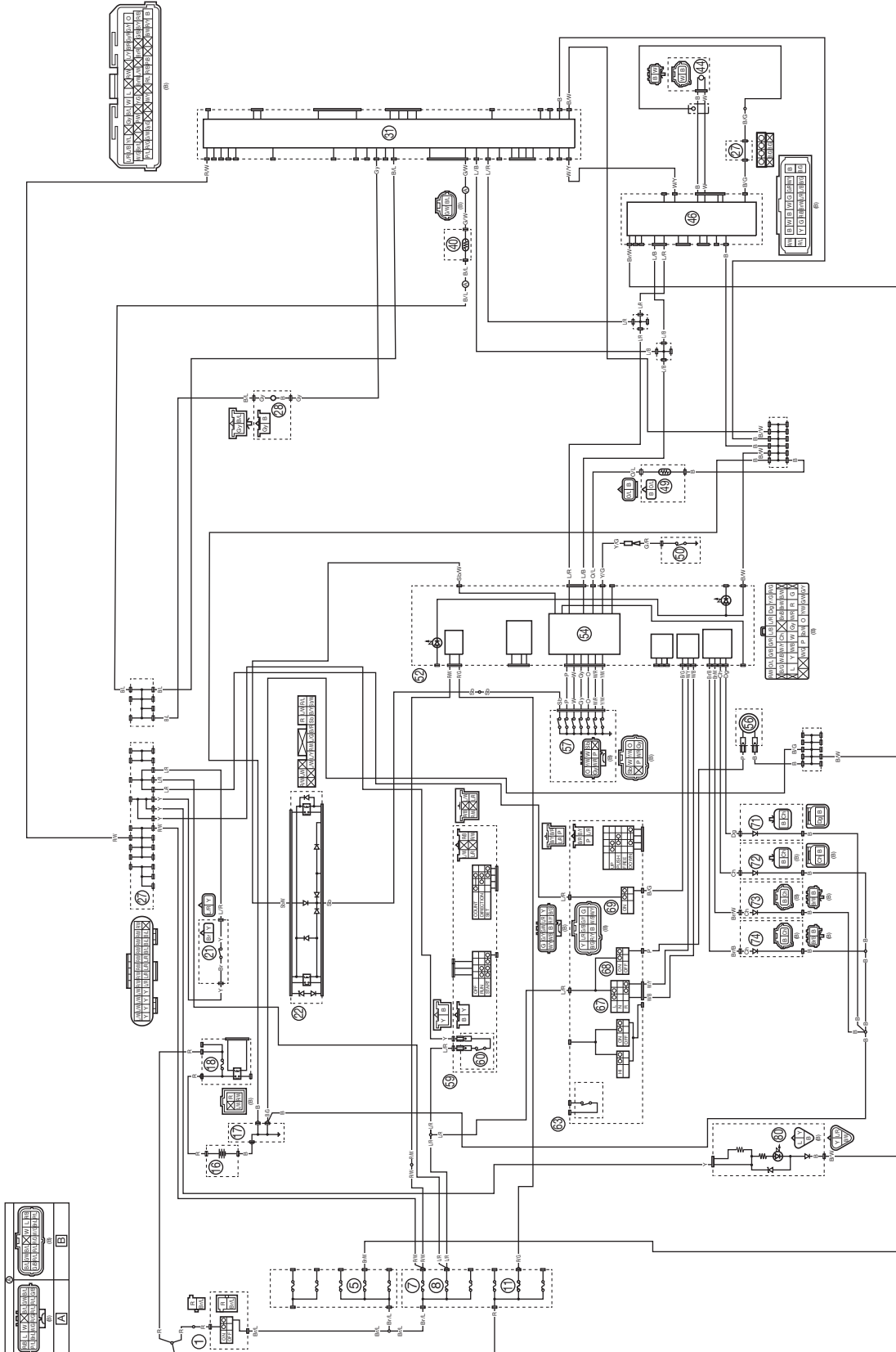
Replace the ECU, meter assembly, headlight assembly or tail/brake light.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20076

SIGNALING SYSTEM

EAS30500

CIRCUIT DIAGRAM



1. Main switch
5. ABS control unit fuse
7. Ignition fuse
8. Signaling system fuse
11. Backup fuse
16. Battery
17. Engine ground
18. Main fuse
21. Rear brake light switch
22. Relay unit (diode)
27. Joint coupler
28. Crankshaft position sensor
31. ECU (Engine Control Unit)
40. Coolant temperature sensor
44. Front wheel sensor
46. ABS ECU
49. Fuel sender
50. Oil pressure switch
52. Meter assembly
54. Multi-function meter
56. Horn
57. Gear position switch
59. Handlebar switch (right)
60. Front brake light switch
63. Handlebar switch (left)
67. Turn signal switch
68. Horn switch
69. Hazard switch
71. Rear turn signal light (right)
72. Rear turn signal light (left)
73. Front turn signal light (right)
74. Front turn signal light (left)
80. Tail/brake light
- A. Wire harness
- B. Sub-wire harness

EAS30501

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.
- The tachometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Tail cover
3. Front side cover (left/right)
4. Side cover inner panel (left/right)
5. Fuel tank (right)
6. Canister
7. Drive sprocket cover
8. Engine guard (right)

| | | |
|--|-------------|--|
| <p>1. Check the fuses. (ABS control unit, ignition, signaling system, backup and main) Refer to "CHECKING THE FUSES" on page 8-38.</p> | <p>NG →</p> | <p>Replace the fuse(s).</p> |
| <p>OK ↓</p> | | |
| <p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.</p> | <p>NG →</p> | <ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery. |
| <p>OK ↓</p> | | |
| <p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | <p>NG →</p> | <p>Replace the main switch/immobilizer unit.</p> |
| <p>OK ↓</p> | | |
| <p>4. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.</p> | <p>NG →</p> | <p>Properly connect or replace the wiring harness.</p> |
| <p>OK ↓</p> | | |
| <p>Check the condition of each of the signaling system circuits. Refer to "Checking the signaling system".</p> | | |

Checking the signaling system

The horn fails to sound.

1. Check the horn switch.
Refer to "CHECKING THE SWITCHES" on page 8-37.

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 8-37.

NG →

Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch.
Refer to "CHECKING THE SWITCHES" on page 8-37.

NG →

Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the tail/brake light.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal switch.
Refer to "CHECKING THE SWITCHES" on page 8-37.

NG →

- The turn signal switch is faulty.
- Replace the left handlebar switch.

OK ↓

2. Check the hazard switch.
Refer to "CHECKING THE SWITCHES" on page 8-37.

NG →

- The hazard switch is faulty.
- Replace the left handlebar switch.

OK ↓

SIGNALING SYSTEM

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 turn signal light or 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 8-48.

NG →

Replace the gear position switch.

OK ↓

2. Check the relay unit (diode).
Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-41.

NG →

Replace the relay unit.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the meter assembly.

The oil pressure warning light fails to come on when the main switch is set to "ON".

1. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Disconnect the oil pressure switch lead from the oil pressure switch, and then check whether the oil pressure warning light comes on when the lead is connected to the engine ground.

NG →

Replace the meter assembly.

OK ↓

Replace the oil pressure switch.

SIGNALING SYSTEM

The oil pressure warning light remains on after the engine is started.

1. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

2. Measure the engine oil pressure.
Refer to "MEASURING THE ENGINE OIL PRESSURE" on page 3-26.

NG →

Check the engine oil leakage, oil viscosity, oil seal, oil filter, or oil pump.

OK ↓

Replace the oil pressure switch.

The fuel meter fails to operate.

1. Check the fuel sender.
Refer to "CHECKING THE FUEL SENDER" on page 8-45.

NG →

Replace the fuel sender.

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 8-45.

NG →

Replace the coolant temperature sensor.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-19.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the ECU or meter assembly.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

The speedometer fails to operate.

| | | |
|---|-------------|--|
| <p>1. Check the front wheel sensor. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-19.</p> | <p>NG →</p> | <p>Replace the front wheel sensor.</p> |
| <p>OK ↓</p> | | |
| <p>2. Check the entire front wheel sensor wiring. See TIP.</p> | <p>NG →</p> | <p>Properly connect or replace the wiring harness.</p> |
| <p>OK ↓</p> | | |
| <p>Replace the ECU, ABS ECU, or meter assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.</p> | | |

TIP

Replace the wire harness if there is an open or short circuit.

- Between front wheel sensor coupler and ABS ECU coupler.
(white–white)
(black–black)
- Between ABS ECU coupler and meter assembly coupler.
(blue/black–blue/black)
(blue/red–blue/red)

The tachometer fails to operate.

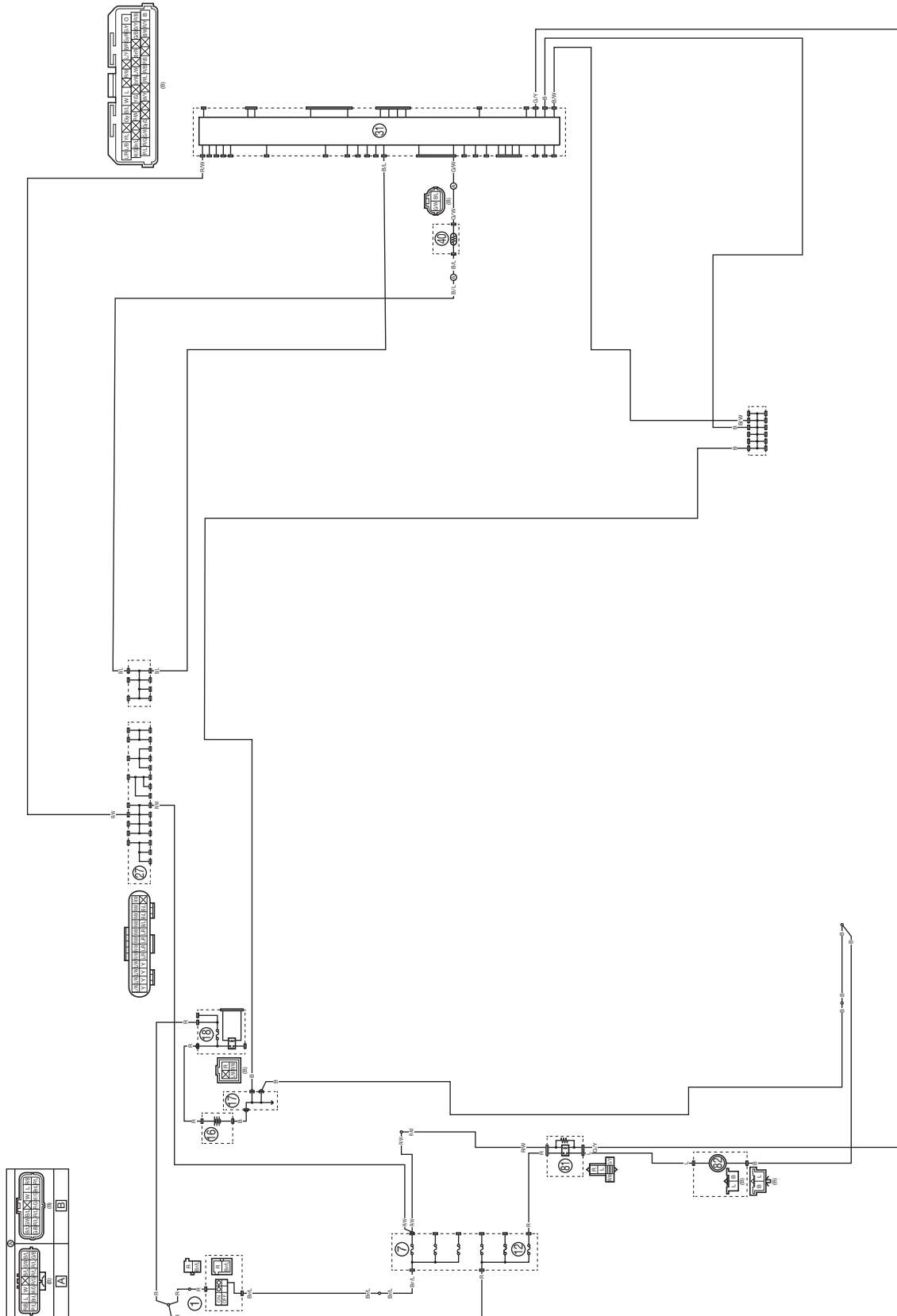
| | | |
|--|-------------|--|
| <p>1. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-43.</p> | <p>NG →</p> | <p>Replace the stator coil assembly.</p> |
| <p>OK ↓</p> | | |
| <p>2. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM" on page 8-19.</p> | <p>NG →</p> | <p>Properly connect or replace the wire harness.</p> |
| <p>OK ↓</p> | | |
| <p>Replace the ECU or meter assembly. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.</p> | | |

EAS20077

COOLING SYSTEM

EAS30502

CIRCUIT DIAGRAM



- 1. Main switch
- 7. Ignition fuse
- 12. Radiator fan motor fuse
- 16. Battery
- 17. Engine ground
- 18. Main fuse
- 27. Joint coupler
- 31. ECU (Engine Control Unit)
- 40. Coolant temperature sensor
- 81. Radiator fan motor relay
- 82. Radiator fan motor
- A. Wire harness
- B. Sub-wire harness

EAS30503

TROUBLESHOOTING

The radiator fan motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Front side cover (left/right)
3. Side cover inner panel (left/right)
4. Fuel tank (right)
5. Canister

| | | |
|---|------|--|
| <p>1. Check the fuses. (Ignition, radiator fan motor, and main) Refer to "CHECKING THE FUSES" on page 8-38.</p> | NG → | <p>Replace the fuse(s).</p> |
| OK ↓ | | |
| <p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.</p> | NG → | <ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery. |
| OK ↓ | | |
| <p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | NG → | <p>Replace the main switch/immobilizer unit.</p> |
| OK ↓ | | |
| <p>4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-45.</p> | NG → | <p>Replace the radiator fan motor.</p> |
| OK ↓ | | |
| <p>5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-39.</p> | NG → | <p>Replace the radiator fan motor relay.</p> |
| OK ↓ | | |
| <p>6. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-45.</p> | NG → | <p>Replace the coolant temperature sensor.</p> |
| OK ↓ | | |

COOLING SYSTEM

7. Check the entire cooling system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-27.

NG →

Properly connect or replace the wiring harness.

OK ↓

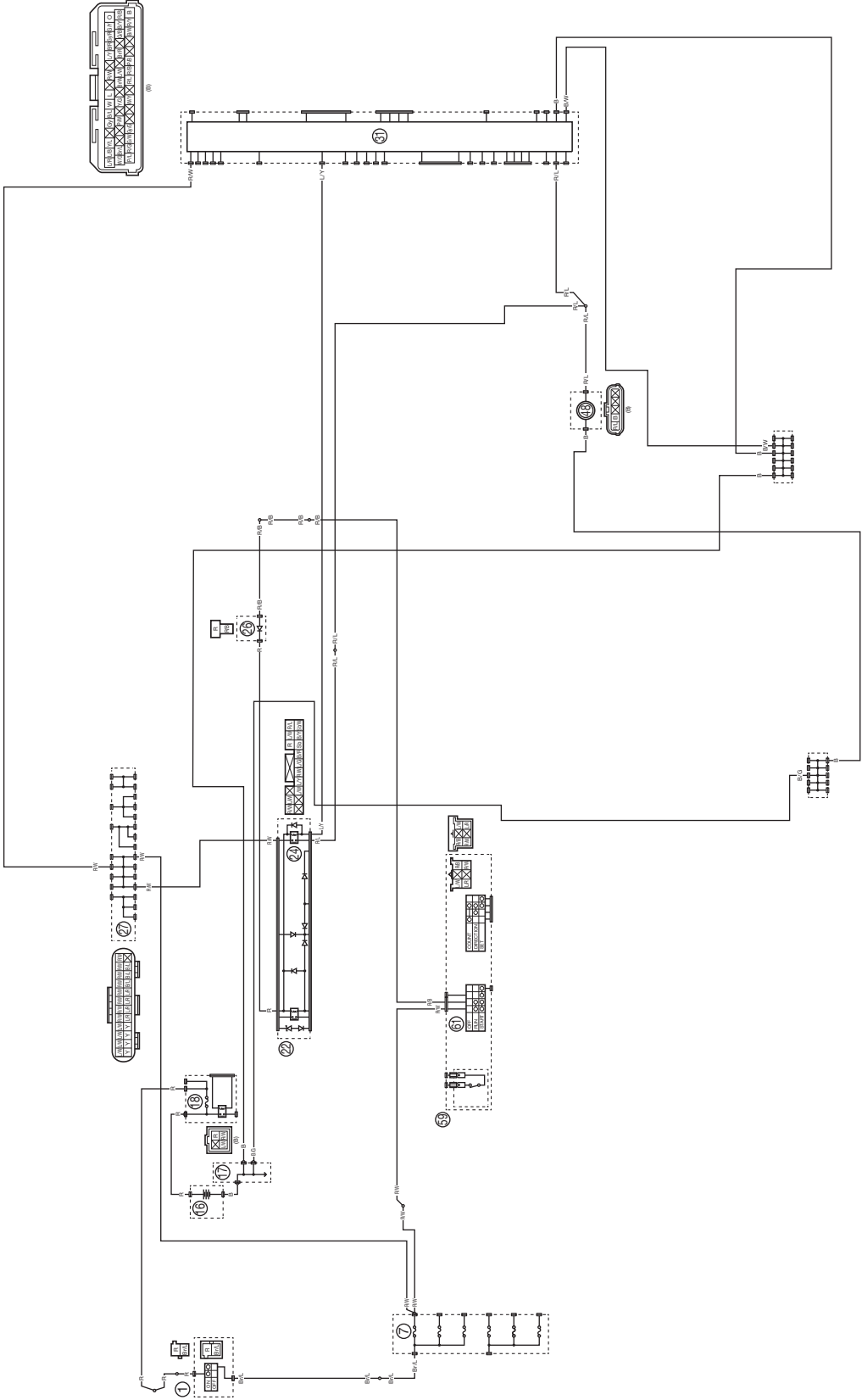
Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20081

FUEL PUMP SYSTEM

EAS30513

CIRCUIT DIAGRAM



FUEL PUMP SYSTEM

- 1. Main switch
- 7. Ignition fuse
- 16. Battery
- 17. Engine ground
- 18. Main fuse
- 22. Relay unit (diode)
- 24. Fuel pump relay
- 26. Diode
- 27. Joint coupler
- 31. ECU (Engine Control Unit)
- 48. Fuel pump
- 59. Handlebar switch (right)
- 61. Engine start/stop switch

EAS30514

TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

• Before troubleshooting, remove the following part(s):

1. Rider seat
2. Front side cover (left/right)
3. Side cover inner panel (left/right)
4. Fuel tank (right)

| | | |
|--|-------------|--|
| <p>1. Check the fuses. (Ignition and main) Refer to "CHECKING THE FUSES" on page 8-38.</p> | <p>NG →</p> | <p>Replace the fuse(s).</p> |
| OK ↓ | | |
| <p>2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.</p> | <p>NG →</p> | <ul style="list-style-type: none"> • Clean the battery terminals. • Recharge or replace the battery. |
| OK ↓ | | |
| <p>3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | <p>NG →</p> | <p>Replace the main switch/immobilizer unit.</p> |
| OK ↓ | | |
| <p>4. Check the engine start/stop switch. Refer to "CHECKING THE SWITCHES" on page 8-37.</p> | <p>NG →</p> | <ul style="list-style-type: none"> • The engine start/stop switch is faulty. • Replace the right handlebar switch. |
| OK ↓ | | |
| <p>5. Check the diode. Refer to "CHECKING THE DIODE" on page 8-40.</p> | <p>NG →</p> | <p>Replace the diode</p> |
| OK ↓ | | |
| <p>6. Check the relay unit (fuel pump re- lay). Refer to "CHECKING THE RE- LAYS" on page 8-39.</p> | <p>NG →</p> | <p>Replace the relay unit.</p> |
| OK ↓ | | |
| <p>7. Check the fuel pump. Refer to "CHECKING THE FUEL PRESSURE" on page 7-16.</p> | <p>NG →</p> | <p>Replace the fuel pump.</p> |
| OK ↓ | | |

FUEL PUMP SYSTEM

8. Check the entire fuel pump system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-31.

NG →

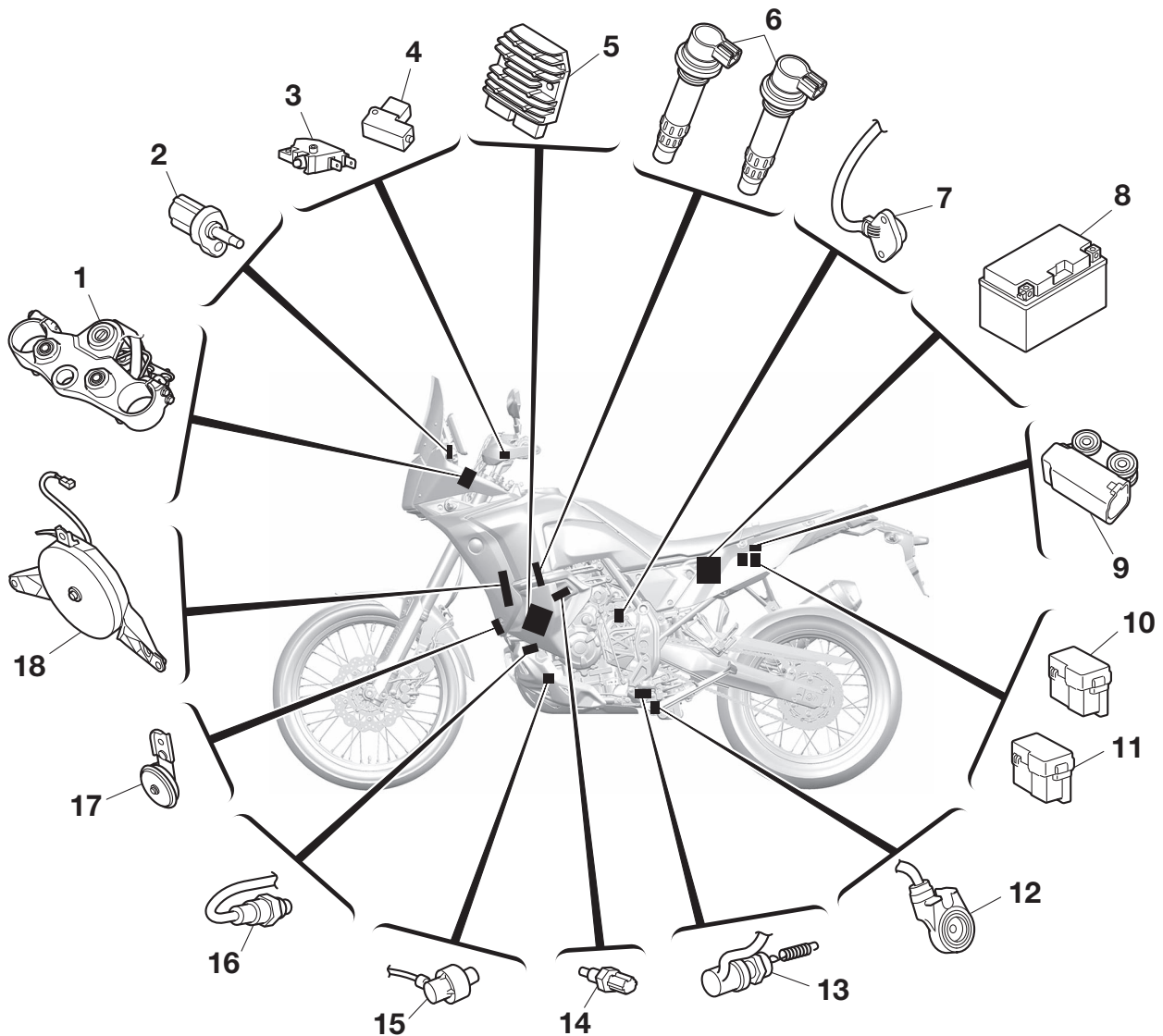
Properly connect or replace the wiring harness.

OK ↓

Replace the ECU. Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

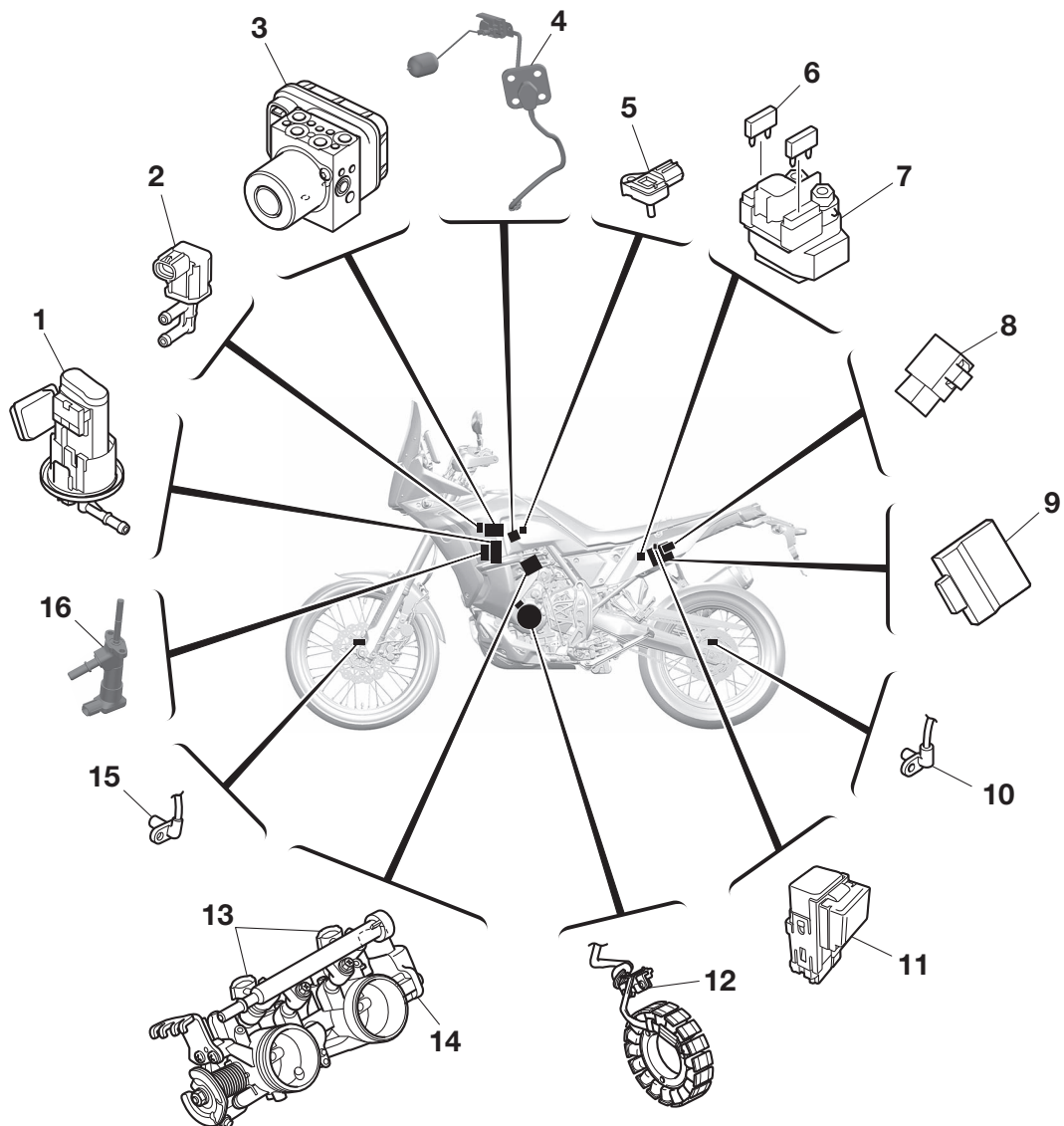
EAS20089

ELECTRICAL COMPONENTS



1. Main switch/Immobilizer unit
2. Intake air temperature sensor
3. Front brake light switch
4. Clutch switch
5. Rectifier/regulator
6. Ignition coil
7. Gear position switch
8. Battery
9. Lean angle sensor
10. Fuse box 1
11. Fuse box 2
12. Sidestand switch
13. Rear brake light switch
14. Coolant temperature sensor
15. Oil pressure switch
16. O₂ sensor
17. Horn
18. Radiator fan motor

ELECTRICAL COMPONENTS



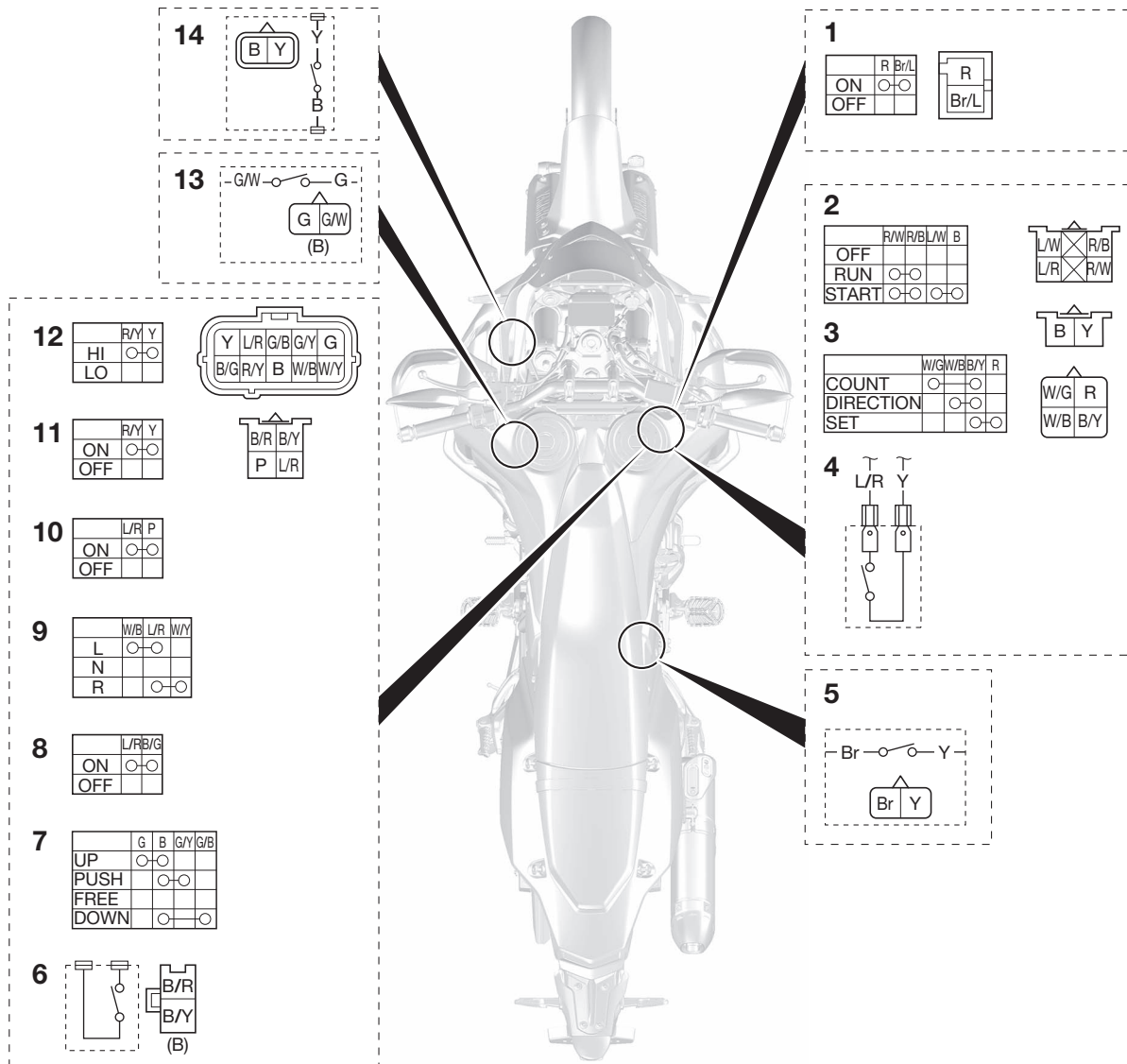
1. Fuel pump
2. Purge cut valve solenoid
3. Hydraulic unit assembly
4. Fuel sender
5. Intake air pressure sensor
6. Main fuse
7. Starter relay
8. Relay unit (diode)
9. ECU (Engine Control Unit)
10. Rear wheel sensor
11. Radiator fan motor relay
12. Crankshaft position sensor
13. Fuel injector
14. Throttle position sensor
15. Front wheel sensor
16. Fuel cut solenoid valve

ELECTRICAL COMPONENTS

EAS30549

CHECKING THE SWITCHES

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.



1. Main switch
2. Engine start/stop switch
3. Wheel switch
4. Front brake light switch
5. Rear brake light switch
6. Clutch switch
7. Select switch
8. Hazard switch
9. Turn signal switch
10. Horn switch
11. Pass switch
12. Dimmer switch
13. Sidestand switch
14. "ABS ON" button

ELECTRICAL COMPONENTS

EAS30551

CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

NOTICE

To avoid a short circuit, always set the main switch to “OFF” when checking or replacing a fuse.

1. Remove:
 - Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Check:
 - Fuse
 - a. Connect the digital circuit tester to the fuse and check the continuity.



**Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927**

- b. If there is no continuity, replace the fuse.
3. Replace:
 - Blown fuse
 - a. Set the main switch to “OFF”.
 - b. Install a new fuse of the correct amperage rating.
 - c. Set on the switches to verify if the electrical circuit is operational.
 - d. If the fuse immediately blows again, check the electrical circuit.

| Fuses | Amperage rating | Q'ty |
|-----------------------|-----------------|------|
| Main | 30 A | 1 |
| ABS motor | 30 A | 1 |
| ABS solenoid | 20 A | 1 |
| Headlight | 10 A | 1 |
| Signaling system | 7.5 A | 1 |
| Ignition | 10 A | 1 |
| Fuel injection system | 10 A | 1 |
| Radiator fan motor | 10 A | 1 |
| Accessory | 10 A | 1 |
| ABS control unit | 7.5 A | 1 |
| Backup | 7.5 A | 1 |
| Auxiliary | 2.0 A | 1 |
| Spare | 30 A | 1 |
| Spare | 20 A | 1 |

| Fuses | Amperage rating | Q'ty |
|-------|-----------------|------|
| Spare | 10 A | 2 |
| Spare | 7.5 A | 1 |
| Spare | 2.0 A | 1 |

EWA13310

WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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

EAS31006

REPLACING THE ECU (engine control unit)

1. Turn the main switch to “OFF”.
2. Replace the ECU (engine control unit).
Refer to “REMOVING THE ECU (engine control unit)” on page 4-3.
3. Clean the throttle bodies.
Refer to “Cleaning the ISC (idle speed control) valve” on page 7-13.
4. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.



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

EAS30552

CHECKING AND CHARGING THE BATTERY TIP

Refer to “CHECKING AND CHARGING THE BATTERY” in “BASIC INFORMATION” (separate volume).

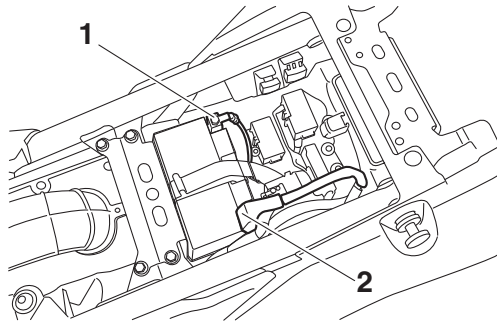
1. Remove:
 - Rider seat
Refer to “GENERAL CHASSIS (1)” on page 4-1.
2. Disconnect:
 - Battery leads
(from the battery terminals)

ELECTRICAL COMPONENTS

ECA13640

NOTICE

First, disconnect the negative battery lead "1", and then positive battery lead "2".

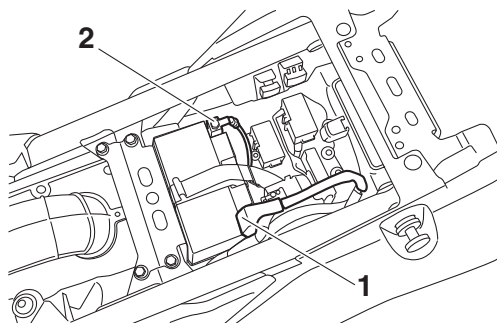


3. Remove:
 - Battery
 Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
 - Battery charge
5. Install:
 - Battery
 Refer to "GENERAL CHASSIS (1)" on page 4-1.
6. Connect:
 - Battery leads
(to the battery terminals)

ECA13630

NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



7. Check:
 - Battery terminals
Dirt → Clean with a wire brush.
Loose connection → Connect properly.
8. Lubricate:
 - Battery terminals

| | |
|--|--|
| | Recommended lubricant Dielectric grease |
|--|--|

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

EAS30553

CHECKING THE RELAYS

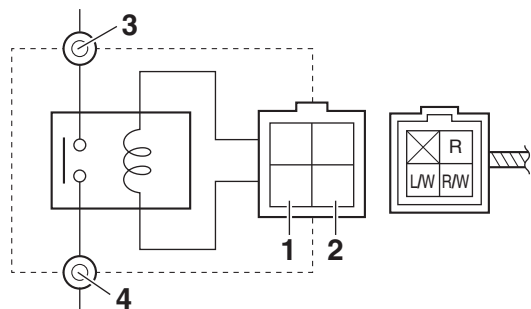
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



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



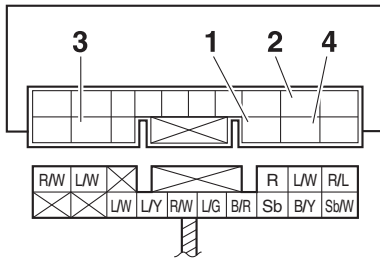
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Relay operation
Continuity
(between "3" and "4")

ELECTRICAL COMPONENTS

Starting circuit cut-off relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

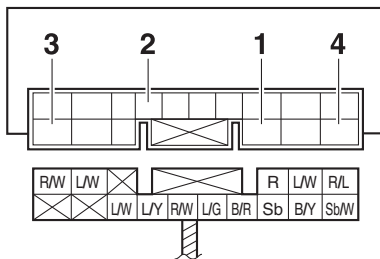
EAS30555

CHECKING THE DIODE

1. Check:
 - Diode
 Out of specification → Replace.

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

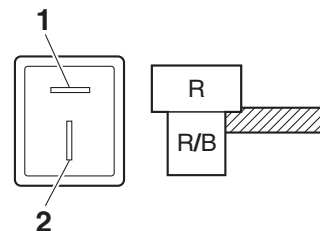
Fuel pump relay



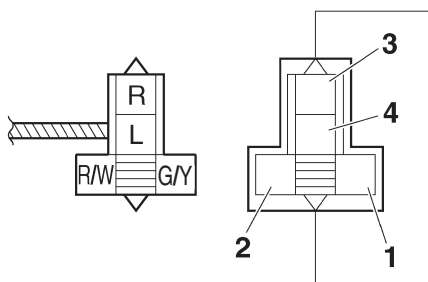
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

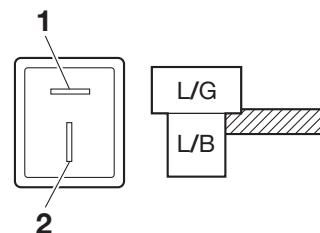
Continuity
Positive tester probe
red/black or blue/black "2"
Negative tester probe
red or blue/green "1"
No continuity
Positive tester probe
red or blue/green "1"
Negative tester probe
red/black or blue/black "2"



Radiator fan motor relay



1. Positive battery terminal



- a. Disconnect the diode from the wire harness.

- b. Connect the digital circuit tester to the diode terminals as shown.
- c. Check the diode for continuity.
- d. Check the diode for no continuity.

EAS30795

CHECKING THE RELAY UNIT (DIODE)

1. Check:

- Relay unit (diode)
Out of specification → Replace.



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



Continuity

Positive tester probe
black/yellow "1"
Negative tester probe
sky blue "2"

No continuity

Positive tester probe
sky blue "2"
Negative tester probe
black/yellow "1"

Continuity

Positive tester probe
black/red "3"
Negative tester probe
sky blue "2"

No continuity

Positive tester probe
sky blue "2"
Negative tester probe
black/red "3"

Continuity

Positive tester probe
sky blue/white "4"
Negative tester probe
sky blue "2"

No continuity

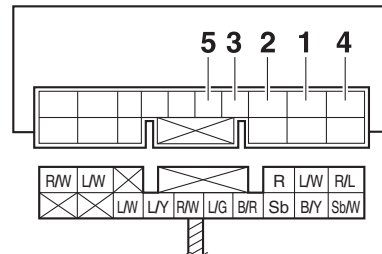
Positive tester probe
sky blue "2"
Negative tester probe
sky blue/white "4"

Continuity

Positive tester probe
black/red "3"
Negative tester probe
blue/green "5"

No continuity

Positive tester probe
blue/green "5"
Negative tester probe
black/red "3"



- a. Disconnect the relay unit coupler from the relay unit.
- b. Connect the digital circuit tester to the relay unit terminal as shown.

- c. Check the relay unit (diode) for continuity.
- d. Check the relay unit (diode) for no continuity.

EAS30558

CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

1. Check:
 - Primary coil resistance
Out of specification → Replace.



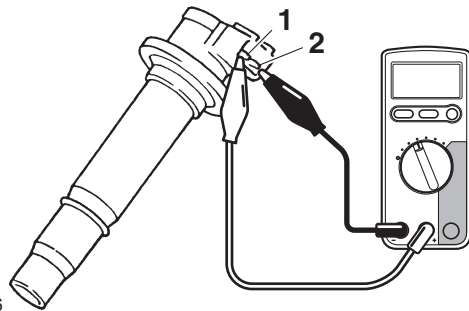
Primary coil resistance
1.19–1.61 Ω

- a. Disconnect the ignition coil coupler from the ignition coil.
- b. Connect the digital circuit tester to the ignition coil as shown.



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

- Positive tester probe
Ignition coil terminal “1”
- Negative tester probe
Ignition coil terminal “2”



- c. Measure the primary coil resistance.

2. Check:
 - Secondary coil resistance
Out of specification → Replace.



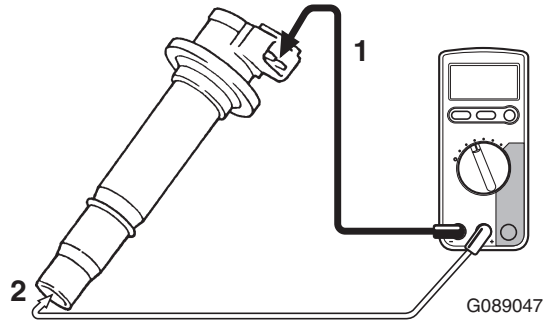
Secondary coil resistance
8.50–11.50 kΩ

- a. Connect the digital circuit tester to the ignition coil as shown.



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

- Negative tester probe
Ignition coil terminal “1”
- Positive tester probe
Spark plug terminal “2”



- b. Measure the secondary coil resistance.

EAS30556

CHECKING THE IGNITION SPARK GAP

1. Check:
 - Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to “TROUBLESHOOTING” on page 8-4.



Minimum ignition spark gap
0.6 mm (0.24 in)

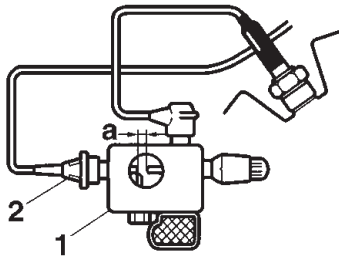
TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- a. Remove the ignition coil from the spark plug.
- b. Connect the ignition checker “1” as shown.



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



G089051

2. Ignition coil
 - c. Turn the main switch to "ON".
 - d. Measure the ignition spark gap "a".
 - e. Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

EAS30560

CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
 - Crankshaft position sensor coupler (from the wire harness)
2. Check:
 - Crankshaft position sensor resistance
Out of specification → Replace the crankshaft position sensor.



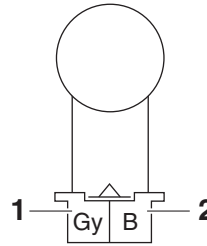
Crankshaft position sensor resistance
228–342 Ω

- a. Connect the digital circuit tester to the crankshaft position sensor coupler as shown.



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

- Positive tester probe gray "1"
- Negative tester probe black "2"

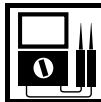


- b. Measure the crankshaft position sensor resistance.

EAS30561

CHECKING THE LEAN ANGLE SENSOR

1. Remove:
 - Lean angle sensor (from the battery box.)
2. Check:
 - Lean angle sensor output voltage
Out of specification → Replace.



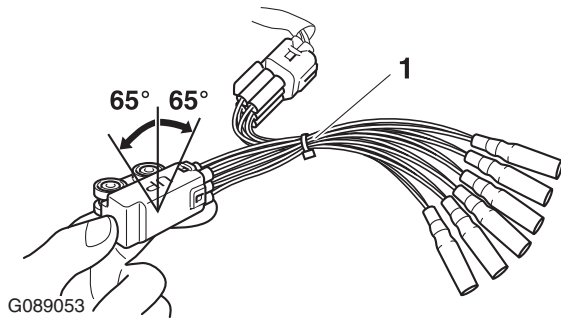
Lean angle sensor
Operating angle
65 °
Output voltage up to operating angle
0.4–1.4 V
Output voltage over operating angle
3.7–4.4 V

- a. Connect the test harness– lean angle sensor (6P) "1" to the lean angle sensor and wire harness as shown.
- b. Connect the digital circuit tester to the test harness– lean angle sensor (6P).



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
Test harness– lean angle sensor (6P)
90890-03209
Test harness– lean angle sensor (6P)
YU-03209

- Positive tester probe yellow (test harness color)
- Negative tester probe blue (test harness color)



G089053

- c. Set the main switch to "ON".
- d. Turn the lean angle sensor to 65°.
- e. Measure the lean angle sensor output voltage.

EAS30562

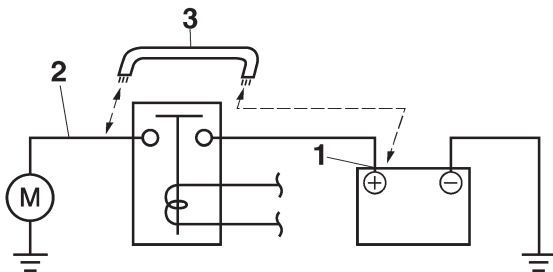
CHECKING THE STARTER MOTOR OPERATION

1. Check:
 - Starter motor operation
Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
Refer to "TROUBLESHOOTING" on page 8-10.
 - a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810

WARNING

- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



G089054

- b. Check the starter motor operation.

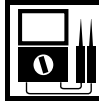
EAS30566

CHECKING THE STATOR COIL

1. Disconnect:
 - Stator coil coupler (from the rectifier/regulator)

2. Check:

- Stator coil resistance
Out of specification → Replace the stator coil.



Stator coil resistance
0.128–0.192 Ω

- a. Connect the digital circuit tester to the stator coil coupler as shown.

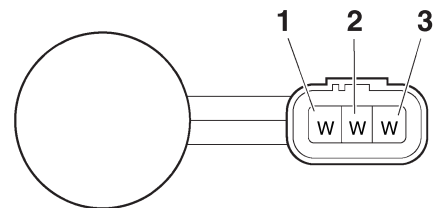


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe white "1"
- Negative tester probe white "2"

- Positive tester probe white "1"
- Negative tester probe white "3"

- Positive tester probe white "2"
- Negative tester probe white "3"



- b. Measure the stator coil resistance.

EAS30680

CHECKING THE RECTIFIER/REGULATOR

1. Check:

- Charging voltage
Out of specification → Replace the rectifier/regulator.



Charging voltage
14 V at 5000 r/min

- a. Connect the digital circuit tester to the battery terminals.

ELECTRICAL COMPONENTS



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

- Positive tester probe
Positive battery terminal
- Negative tester probe
Negative battery terminal

- Start the engine and let it run at approximately 5000 r/min.
- Measure the charging voltage.

EAS30573

CHECKING THE FUEL SENDER

- Disconnect:
 - Fuel sender coupler
- Remove:
 - Fuel sender
(from the fuel tank)
- Check:
 - Fuel sender resistance
Out of specification → Replace the fuel sender.



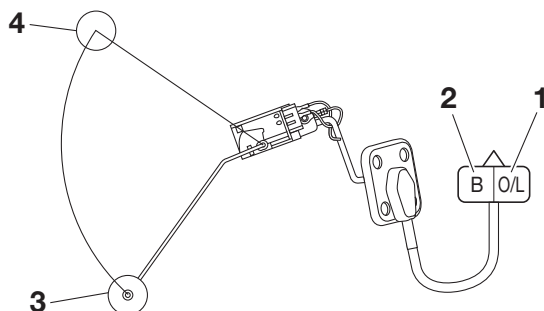
Sender unit resistance (full)
8.0–12.0 Ω
Sender unit resistance (empty)
267.0–273.0 Ω

- Connect the digital circuit tester to the fuel sender terminals as shown.



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

- Positive tester probe
orange/blue “1”
- Negative tester probe
black “2”



- Move the fuel sender float to minimum “3” and maximum “4” level position.
- 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.

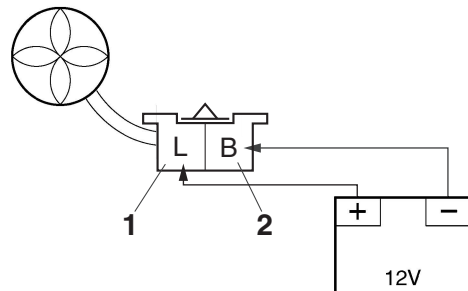
- Check:
 - Fuel meter
(Turn the main switch to “ON”.)
Fuel meter comes on for a few seconds, then goes off → Fuel meter is OK.
Fuel meter does not come on → Replace the meter assembly.
Fuel meter flashes repeatedly → Replace the fuel sender.

EAS30577

CHECKING THE RADIATOR FAN MOTOR

- Check:
 - Radiator fan motor
Faulty/rough movement → Replace.
 - Disconnect the radiator fan motor coupler from the wire harness.
 - Connect the battery (DC 12 V) as shown.

- Positive battery terminal
blue “1”
- Negative battery terminal
black “2”



- Check the radiator fan motor movement.

EAS30578

CHECKING THE COOLANT TEMPERATURE SENSOR

- Remove:
 - Coolant temperature sensor
Refer to “THROTTLE BODIES” on page 7-8.

EWA14130

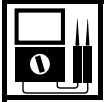


WARNING

- 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 Ω at 20 °C (2513–2777 Ω at 68 °F)
Coolant temperature sensor resistance
 210–221 Ω at 100 °C (210–221 Ω at 212 °F)

- a. Connect the digital circuit tester to the coolant temperature sensor as shown.



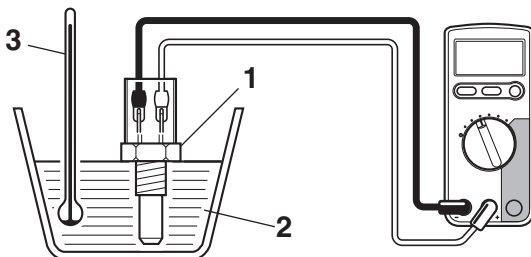
Digital circuit tester (CD732)
 90890-03243
Model 88 Multimeter with tachometer
 YU-A1927

- b. Immerse the coolant temperature sensor “1” in a container filled with coolant “2”.

TIP

Make sure the coolant temperature sensor terminals do not get wet.

- c. Place a thermometer “3” in the coolant.



G089056

- d. Heat the coolant or let it cool down to the specified temperatures.
 e. Measure the coolant temperature sensor resistance.
3. Install:
- Coolant temperature sensor (along with the gasket **New**)



Coolant temperature sensor
 15 N·m (1.5 kgf·m, 11 lb·ft)

EAS30581

CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
- Throttle position sensor (from the throttle body)

EWA16690

WARNING

- Handle the throttle position sensor with special care.
- Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.

2. Check:
- Throttle position sensor maximum resistance Out of specification → Replace the throttle position sensor.



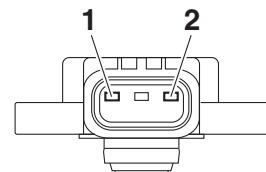
Resistance
 2.64–6.16 kΩ

- a. Connect the digital circuit tester to the throttle position sensor as shown.



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

- Positive tester probe Sensor terminal “1”
- Negative tester probe Sensor terminal “2”



- b. Check the throttle position sensor maximum resistance.
3. Install:
- Throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-14.

EAS30593

CHECKING THE INTAKE AIR PRESSURE SENSOR

- Check:
 - Intake air pressure sensor output voltage
Out of specification → Replace.



Intake air pressure sensor output voltage
4.200 V at 119.990 kPa

- Connect the test harness S- pressure sensor (3P) “1” to the intake air pressure sensor and wire harness as shown.

ECA20920

NOTICE

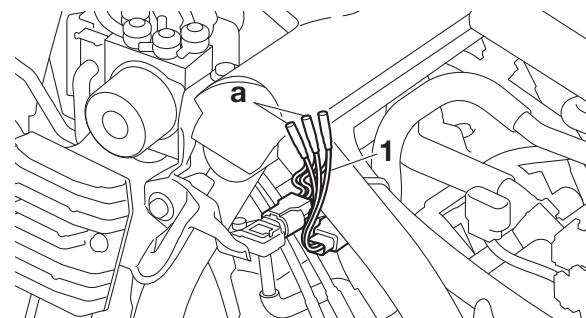
Pay attention to the installing direction of the test harness S- pressure sensor (3P) coupler.

- Connect the digital circuit tester to the test harness S- pressure sensor (3P) “a”.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927
Test harness S- pressure sensor (3P)
90890-03207
Test harness S- pressure sensor (3P)
YU-03207

- Positive tester probe pink (test harness color)
- Negative tester probe brown (test harness color)



- Set the main switch to “ON”.
- Measure the intake air pressure sensor output voltage.

EAS30594

CHECKING THE INTAKE AIR TEMPERATURE SENSOR

- Remove:
 - Intake air temperature sensor
Refer to “GENERAL CHASSIS (5)” on page 4-10.

EWA14110

WARNING

- Handle the intake air temperature sensor with special care.
- Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.

- Check:
 - Intake air temperature sensor resistance
Out of specification → Replace.



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

- Connect the digital circuit tester to the intake air temperature sensor terminal as shown.



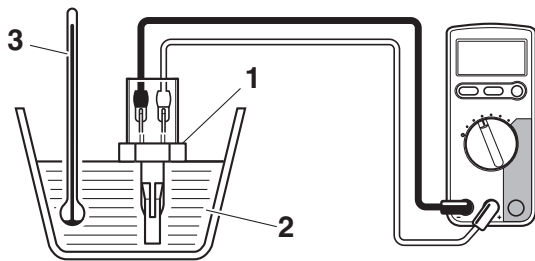
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Immerse the intake air temperature sensor “1” in a container filled with water “2”.

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

- Place a thermometer “3” in the water.

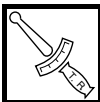


G089057

- d. Slowly heat the water, then let it cool down to the specified temperature.
- e. Measure the intake air temperature sensor resistance.

3. Install:

- Intake air temperature sensor



Intake air temperature sensor bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)

EAS31088

CHECKING THE GEAR POSITION SWITCH

1. Remove:

- Drive sprocket cover
Refer to "CHAIN DRIVE" on page 4-92.
- Gear position switch
Refer to "CRANKCASE" on page 5-73.

2. Check:

- Gear position switch
Out of specification → Replace the gear position switch.



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



Result

Neutral position

Continuity

Positive tester probe

sky blue "1"

Negative tester probe

Switch terminal "a"

1st position

Continuity

Positive tester probe

pink "2"

Negative tester probe

Switch terminal "b"

2nd position

Continuity

Positive tester probe

white "3"

Negative tester probe

Switch terminal "c"

3rd position

Continuity

Positive tester probe

gray "4"

Negative tester probe

Switch terminal "d"

4th position

Continuity

Positive tester probe

orange "5"

Negative tester probe

Switch terminal "e"

5th position

Continuity

Positive tester probe

white/red "6"

Negative tester probe

Switch terminal "f"

6th position

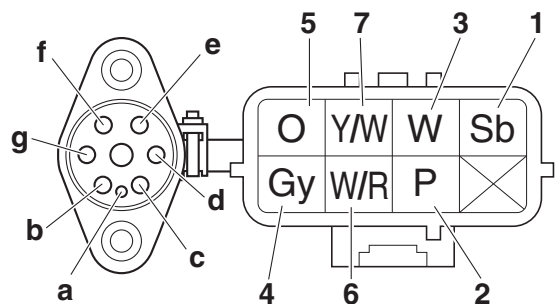
Continuity

Positive tester probe

yellow/white "7"

Negative tester probe

Switch terminal "g"



ELECTRICAL COMPONENTS

EAS30681

CHECKING THE FUEL INJECTORS

The following procedure applies to all of the fuel injectors.

1. Remove:
 - Fuel injector
 Refer to “THROTTLE BODIES” on page 7-8.
2. Check:
 - Fuel injector resistance
 Out of specification → Replace the fuel injector.



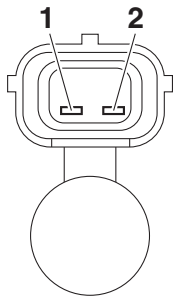
Resistance
12.0 Ω

- a. Disconnect the fuel injector coupler from the fuel injector.
- b. Connect the digital circuit tester to the fuel injector coupler as shown.



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

- Positive tester probe
Fuel injector terminal “1”
- Negative tester probe
Fuel injector terminal “2”



- c. Measure the fuel injector resistance.

EAS32604

CHECKING THE PURGE CUT VALVE SOLENOID

1. Check:
 - Purge cut valve solenoid resistance
 Out of specification → Replace.



Solenoid resistance
22–26 Ω

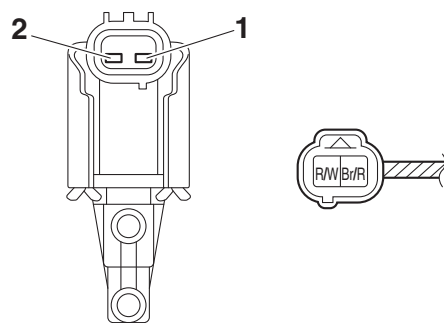
- a. Disconnect the purge cut valve solenoid coupler.

- b. Connect the digital circuit tester to the purge cut valve solenoid terminals as shown.



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

- Positive tester probe →
Purge cut valve solenoid terminal “1”
- Negative tester probe →
Purge cut valve solenoid terminal “2”



- c. Measure the purge cut valve solenoid resistance.

EAS33796

CHECKING THE FUEL CUT SOLENOID VALVE

1. Check:
 - Fuel cut solenoid valve resistance
 Out of specification → Replace.



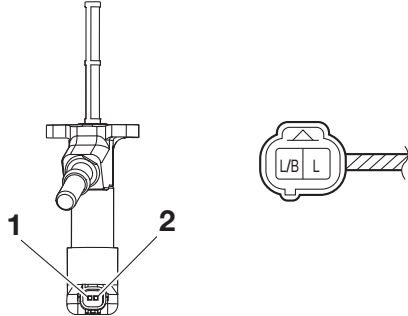
Solenoid valve resistance
26–30 Ω at 25 °C (26–30 Ω at 77 °F)

- a. Disconnect the fuel cut solenoid valve coupler.
- b. Connect the digital circuit tester to the fuel cut solenoid valve terminals as shown.
- c. Measure the fuel cut solenoid valve resistance.



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

- Positive tester probe → Fuel cut solenoid valve terminal “1”
- Negative tester probe → Fuel cut solenoid valve terminal “2”



d. Measure the fuel cut solenoid valve resistance.

SELF DIAGNOSTIC

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SELF-DIAGNOSTIC FUNCTION

EAS20437

SELF-DIAGNOSTIC FUNCTION

EAS33142

GLOSSARY

| Word | Description |
|--|---|
| MIL (Malfunction indicator light) | MIL is an indicator light that comes on when a control unit determines a malfunction. |
| DTC (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 (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 (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 (On-board diagnostics) | Self-diagnostic system is equipped in a control unit for the emission control system. |
| GST (Generic scan tool) | Generic diagnostic tool that complies with OBD standards. |
| YDT (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.

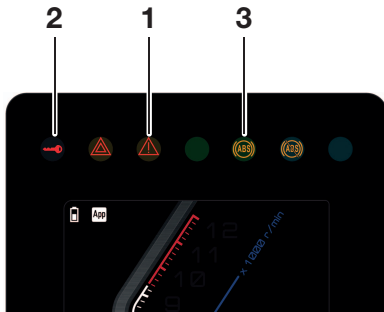
If the warning light still comes on, refer to a check item of a troubleshooting of each system, check and repair it. If the warning light does not come on, the warning light (LED) may be defective.

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 O₂ 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 |
| IMMOBILIZER SYSTEM | Immobilizer system indicator light "2" | About 0.15 seconds |
| ABS (Anti-lock Brake System) | ABS warning light "3" | *2 |

TIP

*1: If the MIL flashed, refer to "COPE WITH THE MIL FLASHING" on page 9-3.

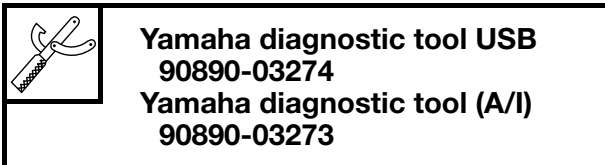
*2: The ABS warning light goes off when the vehicle is judged to normal with running.

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.



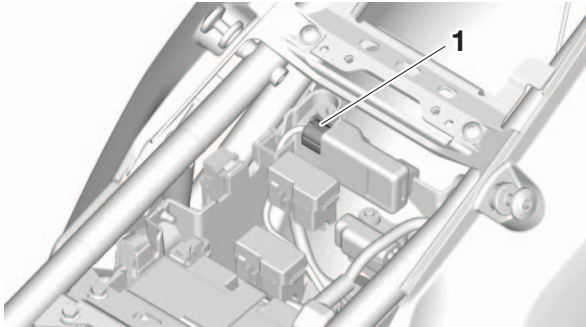
TIP

- Yamaha diagnostic tool (A/I) (90890-03273) 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

Disconnect the coupler “1” from the CCU, and then connect the YDT to the coupler.



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
- Fuel injector #1
- Fuel injector #2
- Ignition coil #1
- Ignition coil #2
- Throttle position sensor
- Intake air pressure sensor
- Coolant temperature sensor
- Lean angle sensor
- Intake air temperature sensor
- O₂ sensor
- Hydraulic unit assembly (ABS ECU)
- Relay unit (diode)
- Headlight assembly
- Radiator fan motor relay
- Meter assembly
- Immobilizer unit
- ISC (Idle Speed Control) unit
- Purge cut valve solenoid

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
- Handlebar switch (right)
- 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 (P0300/P0301/P0302) 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 “P0300, P0301, P0302” on page 9-112.

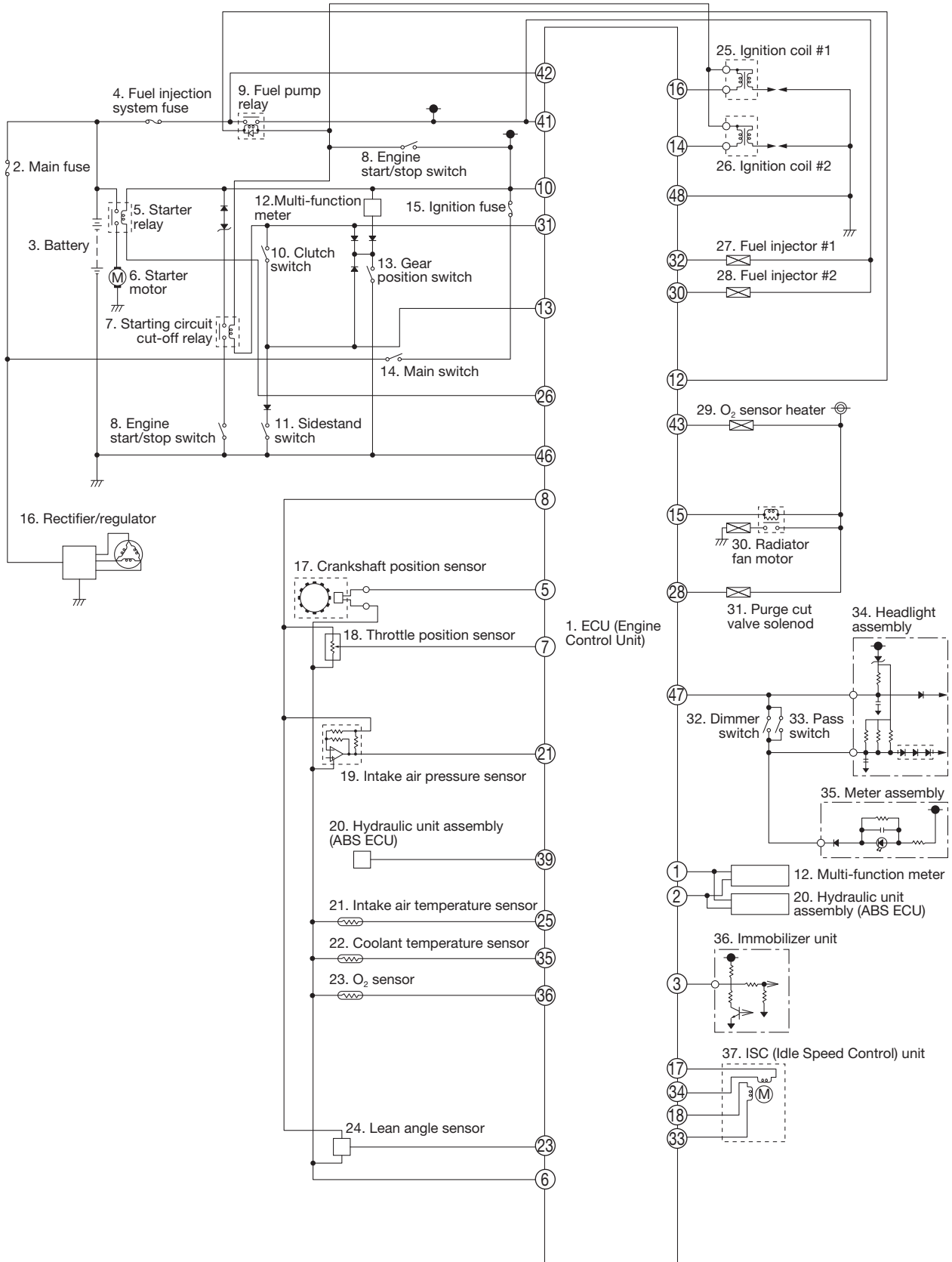
SELF-DIAGNOSTIC FUNCTION

EAS20387

SYSTEM DIAGRAM

EAS32920

ECU CIRCUIT DIAGRAM



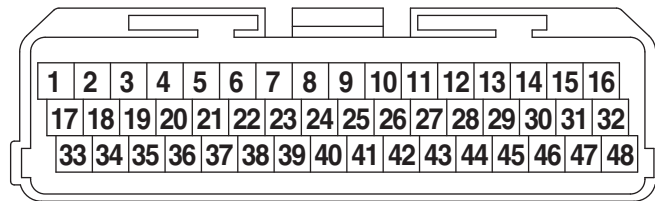
SYSTEM DIAGRAM

1. ECU (Engine Control Unit)
2. Main fuse
3. Battery
4. Fuel injection system fuse
5. Starter relay
6. Starter motor
7. Starting circuit cut-off relay
8. Engine start/stop switch
9. Fuel pump relay
10. Clutch switch
11. Sidestand switch
12. Multi-function meter
13. Gear position switch
14. Main switch
15. Ignition fuse
16. Rectifier/regulator
17. Crankshaft position sensor
18. Throttle position sensor
19. Intake air pressure sensor
20. Hydraulic unit assembly (ABS ECU)
21. Intake air temperature sensor
22. Coolant temperature sensor
23. O₂ sensor
24. Lean angle sensor
25. Ignition coil #1
26. Ignition coil #2
27. Fuel injector #1
28. Fuel injector #2
29. O₂ sensor heater
30. Radiator fan motor
31. Purge cut valve solenoid
32. Dimmer switch
33. Pass switch
34. Headlight assembly
35. Meter assembly
36. Immobilizer unit
37. ISC (Idle Speed Control) unit

SYSTEM DIAGRAM

EAS33369

ECU COUPLER LAYOUT



| No. | Connected parts | Wire harness color |
|-----|---|--------------------|
| 1 | CAN communication circuit | L/R |
| 2 | CAN communication circuit | L/B |
| 3 | Immobilizer unit | Y/L |
| 4 | — | — |
| 5 | Crankshaft position sensor | Gy |
| 6 | O ₂ sensor, throttle position sensor, intake air temperature sensor, coolant temperature sensor, intake air pressure sensor, lean angle sensor, crankshaft position sensor | B/L |
| 7 | Throttle position sensor | W |
| 8 | Throttle position sensor, intake air pressure sensor, lean angle sensor | L |
| 9 | — | — |
| 10 | Ignition fuse | R/W |
| 11 | — | — |
| 12 | Fuel pump relay | L/Y |
| 13 | Relay unit (diode), clutch switch, side-stand switch, gear position switch | B/R |
| 14 | Ignition coil #2 | Gy/R |
| 15 | Radiator fan motor relay | G/Y |
| 16 | Ignition coil #1 | O |
| 17 | ISC (Idle Speed Control) unit | W/G |
| 18 | ISC (Idle Speed Control) unit | Br/L |

| No. | Connected parts | Wire harness color |
|-----|---|--------------------|
| 19 | — | — |
| 20 | — | — |
| 21 | Intake air pressure sensor | P/W |
| 22 | — | — |
| 23 | Lean angle sensor | Y/G |
| 24 | — | — |
| 25 | Intake air temperature sensor | Br/W |
| 26 | Starter relay | L/W |
| 27 | — | — |
| 28 | Purge cut valve solenoid | Br/R |
| 29 | — | — |
| 30 | Fuel injector #2 | G/B |
| 31 | Relay unit (diode), starting circuit cut-off relay, gear position switch, clutch switch | B/Y |
| 32 | Fuel injector #1 | R/B |
| 33 | ISC (Idle Speed Control) unit | P/L |
| 34 | ISC (Idle Speed Control) unit | R/G |
| 35 | Coolant temperature sensor | G/W |
| 36 | O ₂ sensor | Gy/G |
| 37 | — | — |
| 38 | — | — |
| 39 | Hydraulic unit assembly (ABS ECU) | W/Y |
| 40 | — | — |
| 41 | Fuel injector #1, fuel injector #2, fuel pump relay | R/L |

SYSTEM DIAGRAM

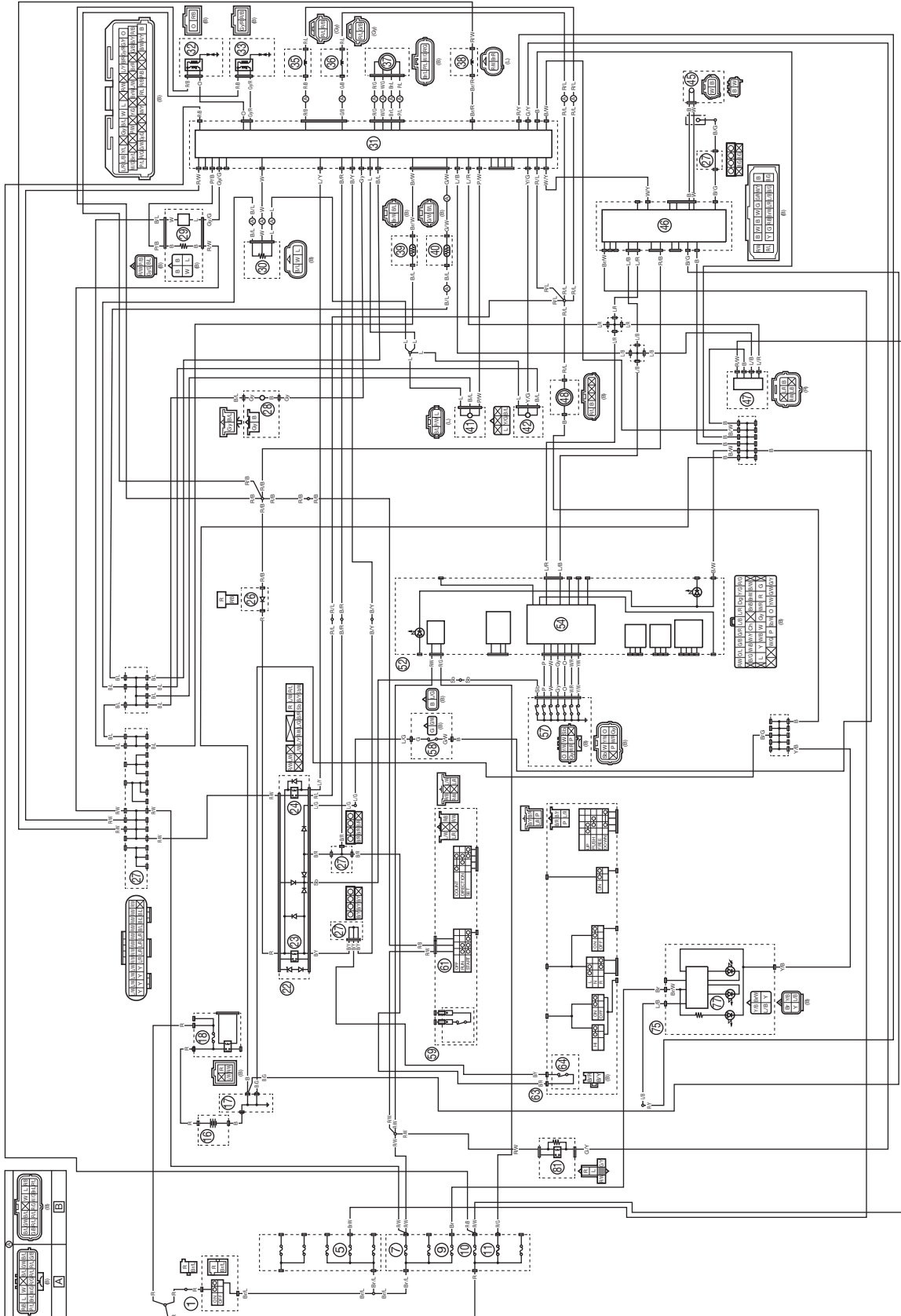
| No. | Connected parts | Wire harness color |
|-----|--|--------------------|
| 42 | Fuel injection system fuse | R/B |
| 43 | O ₂ sensor heater | P/B |
| 44 | — | — |
| 45 | — | — |
| 46 | Ground | B/W |
| 47 | Headlight assembly, dimmer switch, pass switch | R/Y |
| 48 | Ground | B |

EAS20440

FUEL INJECTION SYSTEM

EAS32871

CIRCUIT DIAGRAM



FUEL INJECTION SYSTEM

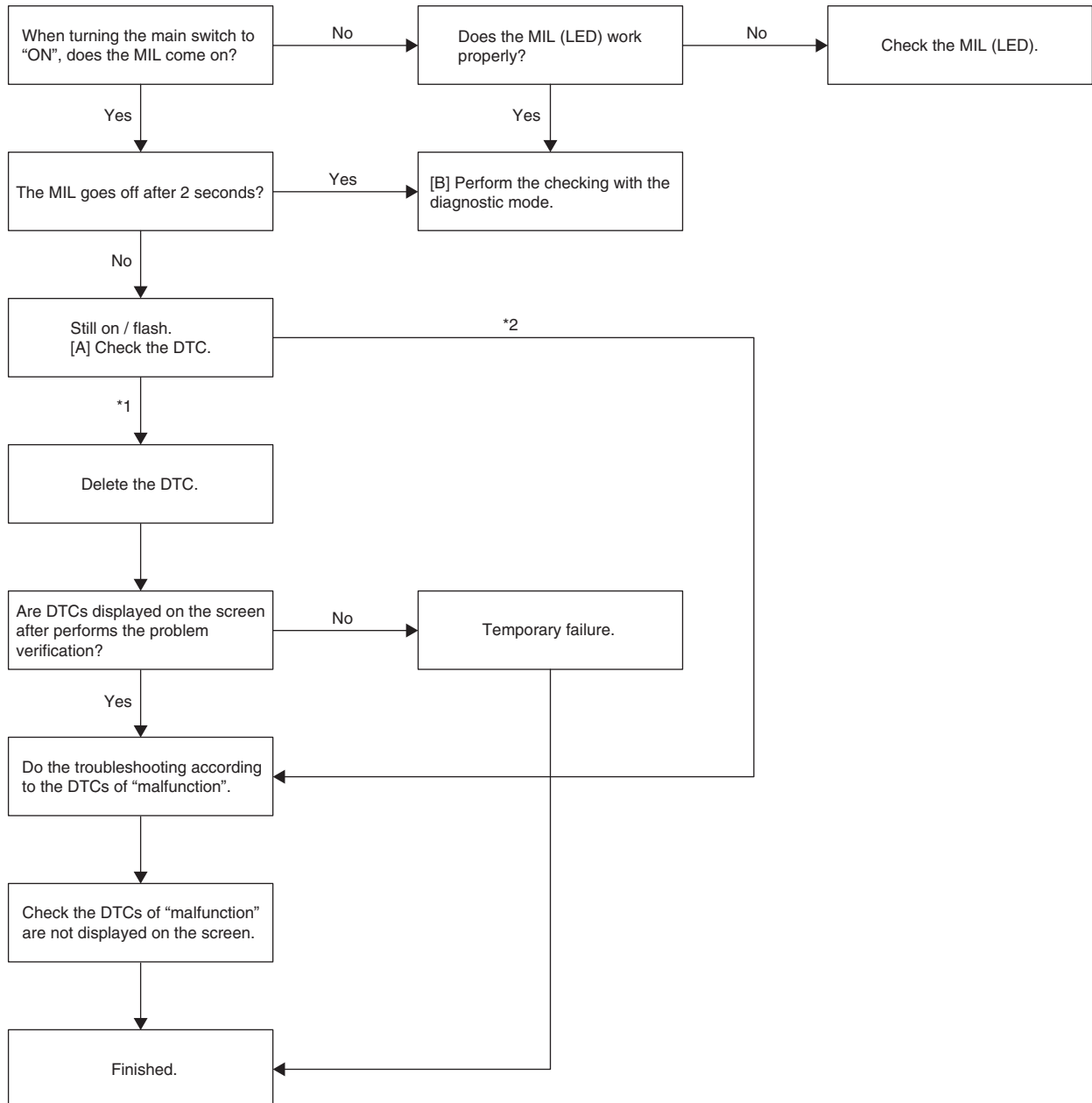
1. Main switch
5. ABS control unit fuse
7. Ignition fuse
9. Headlight fuse
10. Fuel injection system fuse
11. Backup fuse
16. Battery
17. Engine ground
18. Main fuse
22. Relay unit (diode)
23. Starting circuit cut-off relay
24. Fuel pump relay
26. Diode
27. Joint coupler
28. Crankshaft position sensor
29. O₂ sensor
30. Throttle position sensor
31. ECU (Engine Control Unit)
32. Ignition coil #1
33. Ignition coil #2
35. Fuel injector #1
36. Fuel injector #2
37. ISC (Idle Speed Control) unit
38. Purge cut valve solenoid
39. Intake air temperature sensor
40. Coolant temperature sensor
41. Intake air pressure sensor
42. Lean angle sensor
45. Rear wheel sensor
46. ABS ECU
47. YDT coupler
48. Fuel pump
52. Meter assembly
54. Multi-function meter
57. Gear position switch
58. Sidestand switch
59. Handlebar switch (right)
61. Engine start/stop switch
63. Handlebar switch (left)
64. Clutch switch
75. Headlight assembly
77. Headlight (low beam)
81. Radiator fan motor relay
- A. Wire harness
- B. Sub-wire harness

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, P0300, P0301, P0302

*2. For except P0133, P0300, P0301, P0302

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. Delete the DTC using the YDT. (Only for *1)
3. Check and repair the malfunction according to applicable DTC troubleshooting.
4. 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 (4) 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 9-49 and “DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE” on page 9-51.

| |
|--|
| 01: Throttle position sensor signal (throttle angle) |
| 30: Cylinder-#1 ignition coil |
| 31: Cylinder-#2 ignition coil |
| 36: Fuel injector #1 |
| 37: Fuel injector #2 |

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

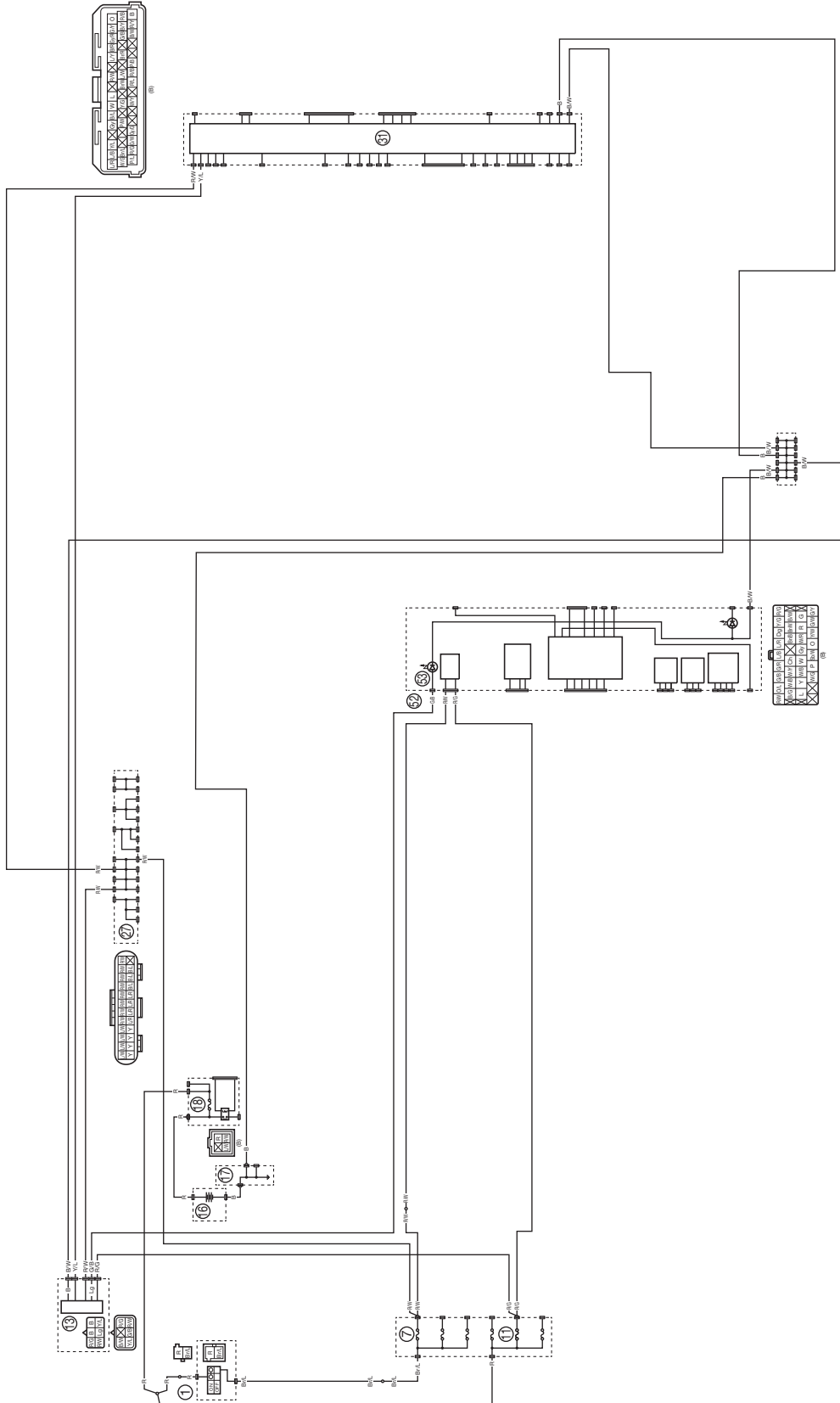
If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS20442

IMMOBILIZER SYSTEM

EAS32885

CIRCUIT DIAGRAM



IMMOBILIZER SYSTEM

- 1. Main switch
- 7. Ignition fuse
- 11.Backup fuse
- 13.Immobilizer unit
- 16.Battery
- 17.Engine ground
- 18.Main fuse
- 27.Joint coupler
- 31.ECU (Engine Control Unit)
- 52.Meter assembly
- 53.Immobilizer system indicator light

EAS32886

SYSTEM OUTLINE

This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:

- A code re-registering key (with a red bow)
- Two standard keys (with a black bow) that can be re-registered with new codes
- A transponder (installed in the red key bow)
- An immobilizer unit
- The ECU
- An immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.

Therefore, always use a standard key for driving. (See NOTICE.)

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14971

NOTICE

- **DO NOT LOSE THE CODE RE-REGISTERING KEY!** If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (e.g., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key for driving, and to keep the code re-registering key in a safe place.
 - Do not submerge the keys in water.
 - Do not expose the keys to excessively high temperatures.
 - Do not place the keys close to magnets (this includes, but is not limited to, products such as speakers, etc.).
 - Do not place heavy items on the keys.
 - Do not grind the keys or alter their shape.
 - Do not disassemble the key bows.
 - Do not put two keys of any immobilizer system on the same key ring.
 - Keep the standard keys as well as other immobilizer system keys away from the code re-registering key.
 - Keep other immobilizer system keys away from the main switch as they may cause signal interference.
-

EAS32887

PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS

In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

IMMOBILIZER SYSTEM

| | Parts to be replaced | | | | | Key registration requirement |
|---|----------------------------------|---------------------|-----------------|-----|-------------------------------|---|
| | Main switch/ immobilizer unit | | Standard key | ECU | Accessory lock* and key | |
| | Main switch | Immobilizer unit | | | | |
| Standard key is lost | | | √ | | | New standard key |
| All keys have been lost (including code re-reg- istering key) | | √ | √ | √ | √ | Code re-registering key and standard keys |
| ECU is defective | | | | √ | | Code re-registering key and standard keys |
| Immobilizer unit is de- fective | | √ | | | | Code re-registering key and standard keys |
| Main switch is defec- tive | | √ | √ | √ | √ | Code re-registering key and standard keys |

Code re-registering key registration:

When the immobilizer unit or ECU is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to “ON” with the code re-registering key.

TIP

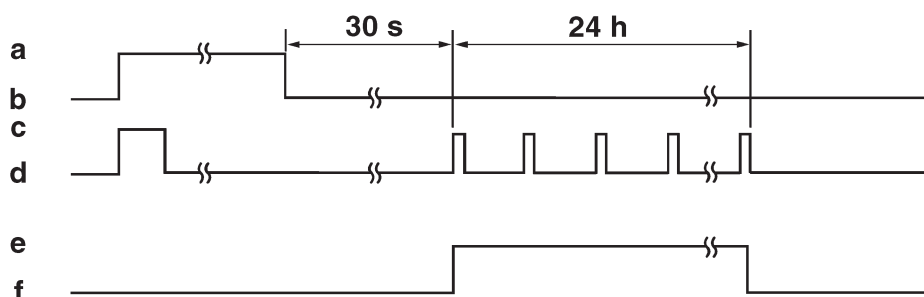
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

Standby mode:

To enable the immobilizer system, turn the ignition key to “OFF”. 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

Standby mode



- a. Main switch “ON”
- b. Main switch “OFF”
- c. LED on
- d. LED off

- e. Standby mode on
- f. Standby mode off

Standard key registration:

Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU are replaced.

TIP

Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate DTC "52". (Refer to "SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM)" on page 9-43).

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

TIP

The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

TIP

If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps (2) to (4) need to be repeated to register both standard keys.

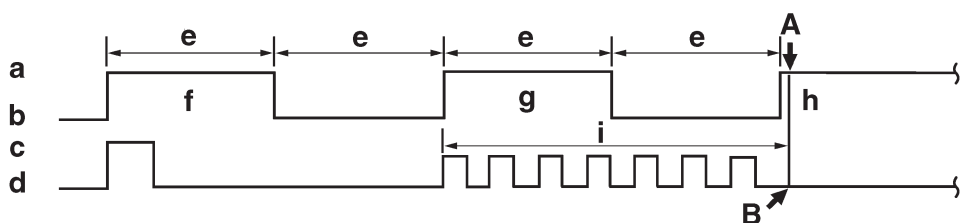
5. Turn the main switch to "ON".

TIP

When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

Standard key registration



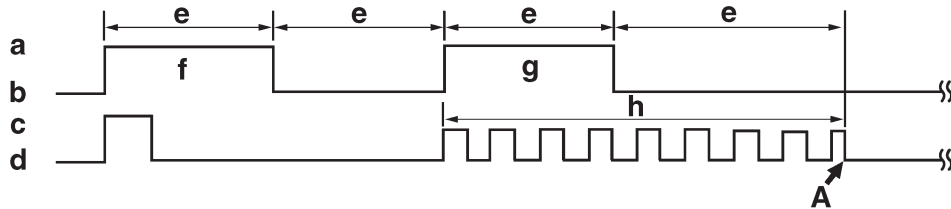
- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. First standard key
- h. Second standard key
- i. Registration mode
- A. Registration of the second standard key is complete.

- B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

Voiding the standard key code:

If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

Standard key code voiding method



- a. Main switch "ON"
- b. Main switch "OFF"
- c. LED on
- d. LED off
- e. Less than 5.0 s
- f. Code re-registering key
- g. Remaining standard key
- h. Registration mode
- A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

EAS32888

TROUBLESHOOTING

When the main switch is turned to "ON", the immobilizer system indicator light does not come on nor flashes.

1. Check the fuses.
(Main, ignition, and backup)
Refer to "CHECKING THE FUSES" on page 8-38.

OK ↓

NG →

Replace the fuse(s).

2. Check the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-38.

OK ↓

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

3. Check the main switch.
Refer to "CHECKING THE SWITCHES" on page 8-37.

OK ↓

NG →

Replace the main switch/immobilizer unit.

4. Check the entire immobilizer system wiring.
Refer to "CIRCUIT DIAGRAM" on page 9-13.

OK ↓

NG →

Properly connect or repair the immobilizer system wiring.

- Check the condition of the each immobilizer system circuits.
- Refer to "SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM)" on page 9-43.

EAS32889

HOW TO CHECK DTC

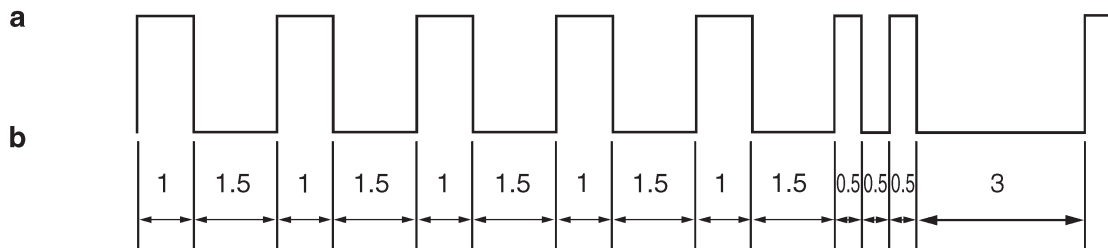
When a system malfunction occurs, the DTC is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC.

Immobilizer system indicator light DTC indication

Digit of 10: Cycles of 1 sec. ON and 1.5 sec. OFF.

Digit of 1: Cycles of 0.5 sec. ON and 0.5 sec. OFF.

Example: DTC 52



- a. Light on
- b. Light off

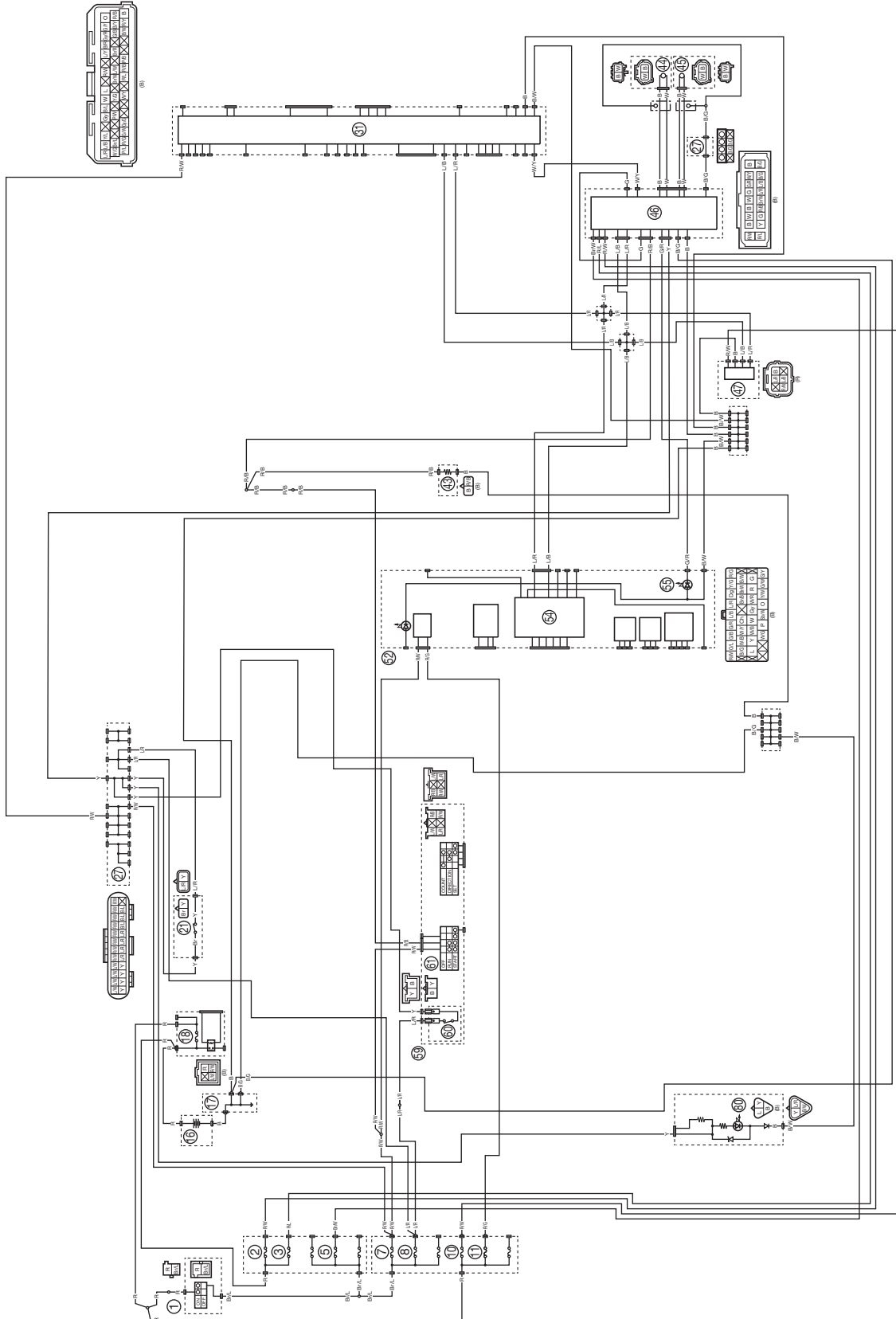
ABS (Anti-lock Brake System)

EAS20443

ABS (Anti-lock Brake System)

EAS32890

CIRCUIT DIAGRAM



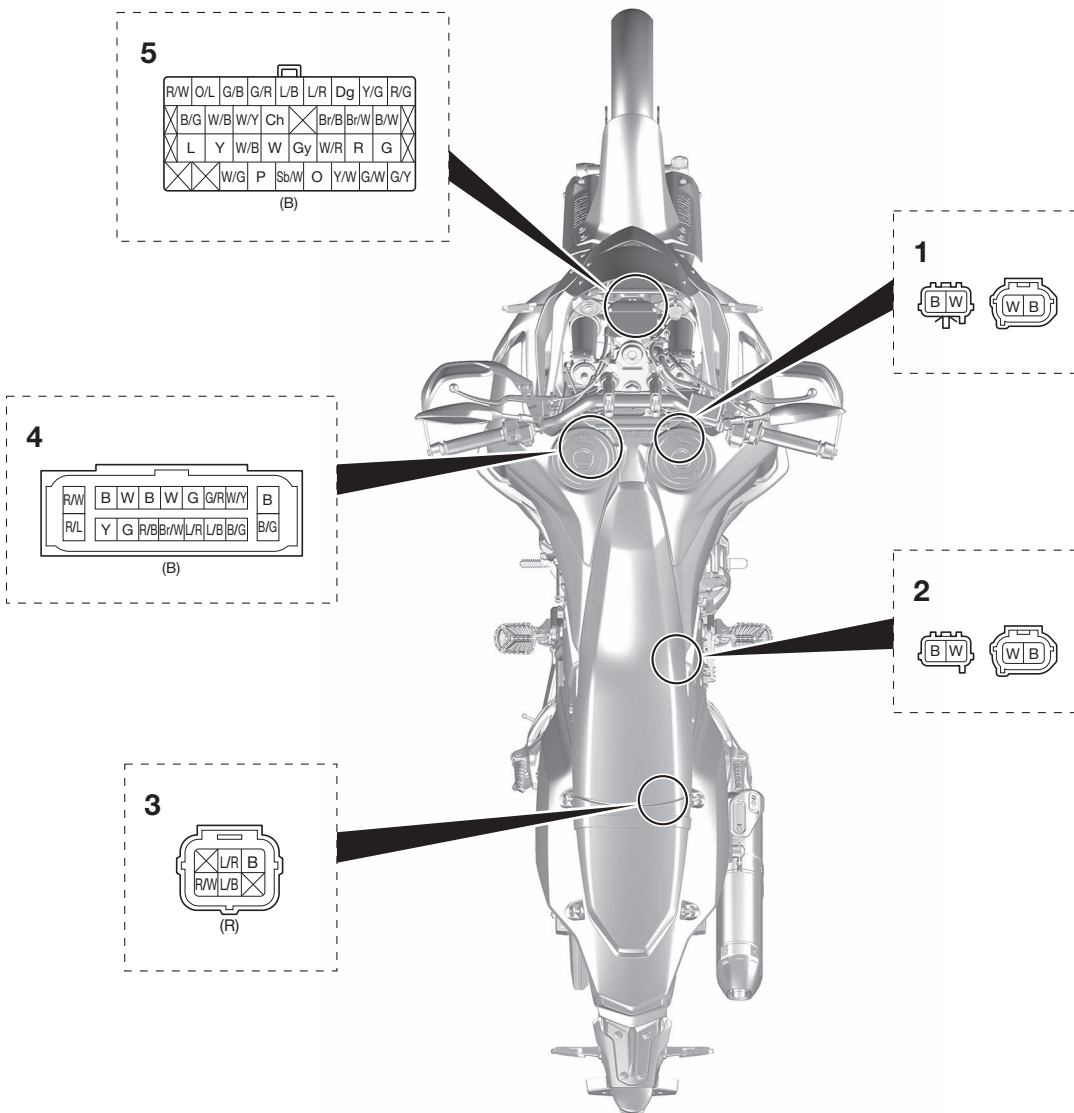
ABS (Anti-lock Brake System)

1. Main switch
2. ABS solenoid fuse
3. ABS motor fuse
5. ABS control unit fuse
7. Ignition fuse
8. Signaling system fuse
10. Fuel injection system fuse
11. Backup fuse
16. Battery
17. Engine ground
18. Main fuse
21. Rear brake light switch
27. Joint coupler
31. ECU (Engine Control Unit)
43. Resistor unit
44. Front wheel sensor
45. Rear wheel sensor
46. ABS ECU
47. YDT coupler
52. Meter assembly
54. Multi-function meter
55. ABS warning light
59. Handlebar switch (right)
60. Front brake light switch
61. Engine start/stop switch
80. Tail/brake light

ABS (Anti-lock Brake System)

EAS32892

ABS COUPLER LOCATION CHART



1. Front wheel sensor coupler
2. Rear wheel sensor coupler
3. YDT coupler
4. ABS ECU coupler
5. Meter assembly coupler

ABS (Anti-lock Brake System)

EAS32893

MAINTENANCE OF THE ABS ECU

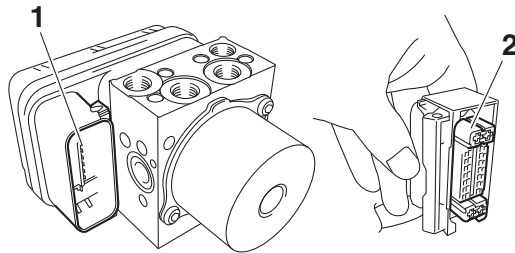
Checking the ABS ECU

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

WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to “[C-1] FINAL CHECK” on page 9-29.

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 9-25.

ABS (Anti-lock Brake System)

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.

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.
-

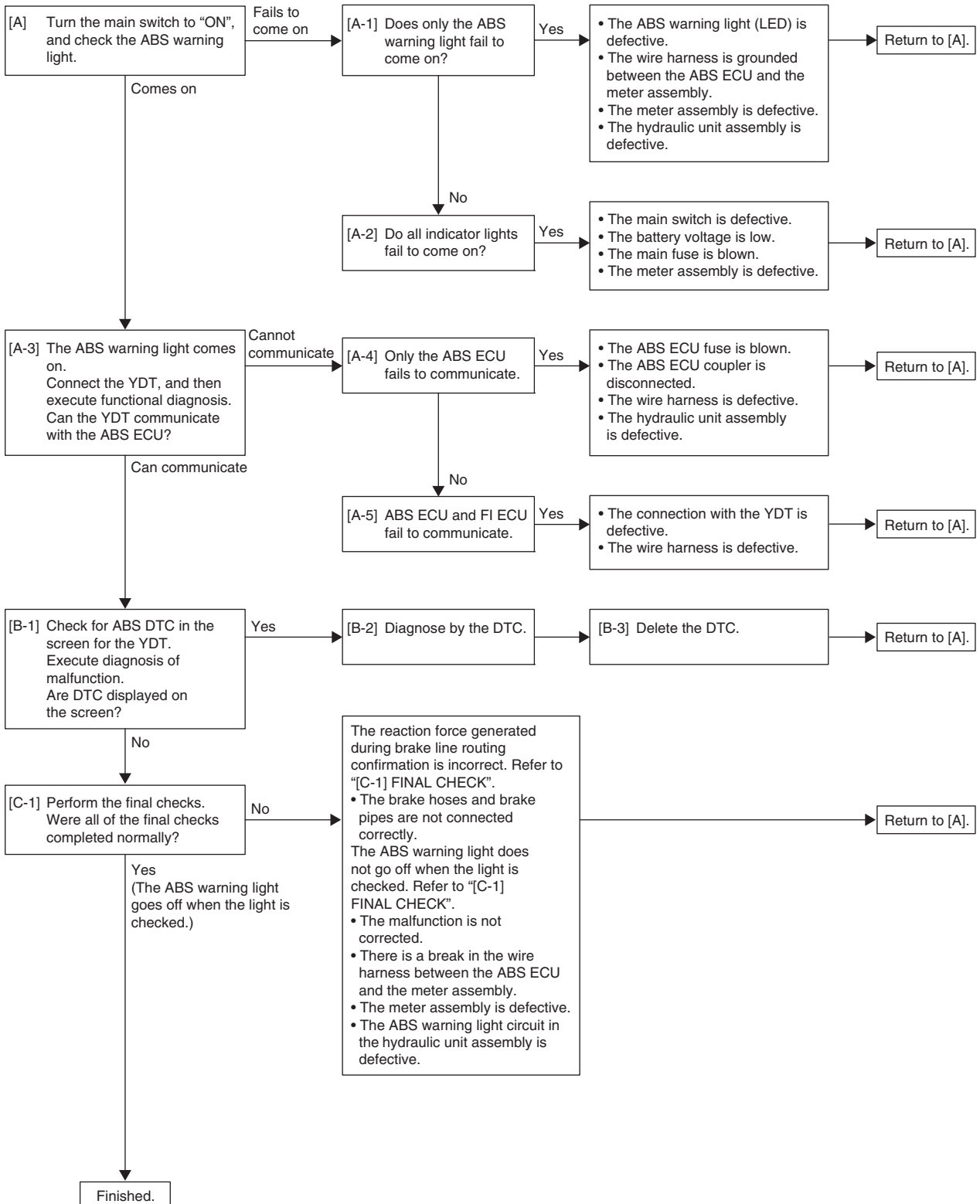
4. Do the final check.

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 green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly.
 - If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
 - If the ABS warning light does not come on, the meter assembly 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 8-37.
 - 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 8-38.
 - 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 8-38.
 - If the main fuse is blown, replace the fuse.
4. Circuit
 - Check the meter assembly circuit.
Refer to "CIRCUIT DIAGRAM" on page 9-21.
 - 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 8-38.
 - 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 4-56.

3. Wire harness

- Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground. Check for continuity between brown/blue terminal of the main switch coupler and brown/white terminal of the ABS ECU coupler.

Check for continuity between black terminal of the ABS ECU coupler and the ground.

If there is no continuity, the wire harness is defective. Replace the wire harness.

- Open circuit in the wire harness between the ABS ECU coupler and the 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.

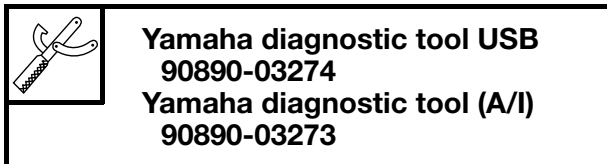
- A DTC is displayed. [B-2]
- A DTC is not displayed. [C-1]

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.



TIP

- Yamaha diagnostic tool (A/I) (90890-03273) 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
90890-03274
Yamaha diagnostic tool (A/I)
90890-03273

TIP

- Yamaha diagnostic tool (A/I) (90890-03273) 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



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 3-16.
2. Check the wheel sensors for proper installation.
Refer to "INSTALLING THE FRONT WHEEL" on page 4-20 and "INSTALLING THE REAR WHEEL" on page 4-28.
3. Perform brake line routing confirmation.
Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-58.
If it does not have reaction-force properly, the brake hose is not properly routed or connected.
4. Delete the DTCs.
Refer to "[B-3] DELETING THE DTC" on page 9-29.
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 9-27.
If the ABS warning light does not turn off, the possible causes are following:
 - The problem is not solved.
 - Open circuit between the ABS ECU and the meter assembly.
Check for continuity between green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly coupler.
 - Malfunction in the meter assembly 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 | — | — | — |
| "30_EVENT" | Latch up detected. | Unable | Unable | 08 |
| "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) [52_ABS] Vehicle system power supply (voltage of wheel sensor power supply is high) | — | — | — |
| "51_IMMO-BILIZER" | Code cannot be transmitted between the key and the immobilizer unit. | Unable | Unable | — |
| "52_IMMO-BILIZER" | Codes between the key and immobilizer unit do not match. | Unable | Unable | — |
| "53_ABS" | Vehicle system power supply (voltage of ABS ECU power supply is low) | — | — | — |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Symptom | Fail-safe system | | Diagnostic code |
|-------------------|---|---------------------|---------------------|-----------------|
| | | Starting the engine | Driving the vehicle | |
| "53_IMMO-BILIZER" | Codes cannot be transmitted between the ECU and the immobilizer unit. | Unable | Unable | — |
| "54_ABS" | Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits) | — | — | — |
| "54_IMMO-BILIZER" | Codes transmitted between the ECU and the immobilizer unit do not match. | Unable | Unable | — |
| "55_IMMO-BILIZER" | Key code registration malfunction. | Unable | Unable | — |
| "56_ABS" | Hydraulic unit assembly (abnormal internal power supply) | — | — | — |
| "56_IMMO-BILIZER" | Unidentified code is received. | Unable | Unable | — |
| "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) | — | — | — |
| "70_EVENT" | Engine forcibly stops when the vehicle is left idling for a long period. | Unable | Unable | — |
| "89_ABS" | CAN communication (between meter assembly and hydraulic unit assembly) | — | — | — |
| "90_ABS" | CAN communication (between ECU and hydraulic unit assembly) | — | — | — |
| "P0030" | O ₂ sensor heater: defective heater controller detected. | Able | Able | — |
| "P00D1, P2195" | [P00D1] O ₂ sensor: heater performance deterioration. [P2195] O ₂ sensor: open circuit detected. | Able | Able | — |
| "P0105" | Intake air pressure sensor: signal out of range | Able | Able | — |
| "P0106" | Intake air pressure sensor: clogging of hose or sensor disconnection | Able | Able | 04 |
| "P0107, P0108" | [P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected. | Able | Able | 04 |
| "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. [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 |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Symptom | Fail-safe system | | Diagnostic code |
|-----------------------|---|--|--|-----------------|
| | | Starting the engine | Driving the vehicle | |
| "P0117, P0118" | [P0117] Coolant temperature sensor: ground short circuit detected. [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. [P0123] Throttle position sensor: power short circuit detected. | Able/Unable | Able/Unable | 01 |
| "P0132" | O ₂ sensor: short circuit detected (power short circuit). | Able | Able | — |
| "P0133" | O ₂ sensor: deterioration detected | Able | Able | — |
| "P0134" | O ₂ sensor: signal stuck | Able | Able | — |
| "P0201" | Fuel injector #1: malfunction in fuel injector #1. | Able (depending on the number of faulty cylinders) | Able (depending on the number of faulty cylinders) | 36 |
| "P0202" | Fuel injector #2: malfunction in fuel injector #2. | Able (depending on the number of faulty cylinders) | Able (depending on the number of faulty cylinders) | 37 |
| "P0300, P0301, P0302" | [P0300] Misfire in multiple cylinders [P0301] Misfire in cylinder #1 [P0302] Misfire in cylinder #2 | Able/Unable | Able/Unable | — |
| "P0335" | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor. | Unable | Unable | — |
| "P0351" | Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil. | Unable | Unable | 30 |
| "P0352" | Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil. | Unable | Unable | 31 |
| "P0458" | Purge cut valve solenoid: open circuit detected. | Able | Able | 46 |
| "P0480" | Radiator fan motor relay: open or short circuit detected. | Able | Able | 51 |
| "P0507" | Engine idling speed is too high. | Able | Able | 54 |
| "P0511" | ISC (Idle Speed Control) valve: ISC valve does not operate. | Able | Able | 54 |
| "P0560, P0563" | [P0560] Charging voltage is abnormal. [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 | — |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Symptom | Fail-safe system | | Diagnostic code |
|----------------|--|---------------------|---------------------|-----------------|
| | | Starting the engine | Driving the vehicle | |
| "P062F" | EEPROM DTC: an error is detected while reading or writing on EEPROM. | Able/Unable | Able/Unable | 60 |
| "P0657" | Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump. | Able | Able | 09, 50 |
| "P1500" | Rear wheel sensor: no normal signals are received from the rear wheel sensor. Neutral switch: open or short circuit is detected. Clutch switch: open or short circuit is detected. | Able | Able | 07, 21 |
| "P1601" | Sidestand switch: open or short circuit of the black/red lead of the ECU is detected. | Unable | Unable | 20 |
| "P1602" | Malfunction in ECU internal circuit (malfunction of ECU power cut-off function). | Able/Unable | Able/Unable | — |
| "P1604, P1605" | [P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or short circuit detected. | Unable | Unable | 08 |
| "U0155 or Err" | Multi-function meter: signals cannot be transmitted between the ECU and the multifunction meter. | Able | Able | — |

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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 |
|----------|--|--|---|---|
| 30_EVENT | Latch up detected. | <ul style="list-style-type: none"> The vehicle has overturned. Installed condition of lean angle sensor. Defective lean angle sensor. Malfunction in ECU. | — | — |
| 70_EVENT | Engine forcibly stops when the vehicle is left idling for a long period. | <ul style="list-style-type: none"> Allow to idle for a long period of time. Malfunction in ECU. | — | — |
| P0030 | O ₂ sensor heater: defective heater controller detected. | <ul style="list-style-type: none"> Open or short circuit in wire harness. Disconnected coupler. Defective O₂ sensor heater controller (Malfunction in ECU). Broken or disconnected lead in O₂ sensor heater. | (When the O ₂ sensor does not operate because the exhaust temperature is low) Increased exhaust emissions. Fuel learning cannot be carried out. | Display only (If the O ₂ sensor does not operate, O ₂ feedback is not carried out.) |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|-------|--|--|---|---|
| P00D1 | O ₂ sensor: heater performance deterioration | <ul style="list-style-type: none"> • Improperly installed O₂ sensor. • Defective coupler between O₂ sensor and ECU. • Open or short circuit in wire harness between O₂ sensor and ECU. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. | Increased exhaust emissions. | O ₂ feedback is not carried out. O ₂ learning is not carried out. |
| P0105 | Intake air pressure sensor: signal out of range | <ul style="list-style-type: none"> • Defective coupler between intake air pressure sensor and ECU. • Open or short circuit in wire harness between intake air pressure sensor and ECU. • Defective intake air pressure sensor. • Malfunction in ECU. | Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions. | Intake air pressure is fixed to 101.3 [kPa]. α -N is fixed. Fuel is not cut off due to the intake air pressure difference. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0106 | Intake air pressure sensor: clogging of hose or sensor disconnection | <ul style="list-style-type: none"> • Intake air pressure sensor hose is not installed. • Intake air pressure sensor hose is not installed correctly (Detached, clogged, kinked or pinching). • Intake air pressure sensor hole is clogged, or intake air pressure sensor is not installed correctly. | Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions. | Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. α -N is fixed. Fuel is not cut off due to the intake air pressure difference. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|---|--|---|--|
| P0107 P0108 | [P0107] Intake air pressure sensor: ground short circuit detected. [P0108] Intake air pressure sensor: open or power short circuit detected. | [P0107] Low voltage of the intake air pressure sensor circuit (0.5 V or less) [P0108] High voltage of the intake air pressure sensor circuit (4.8 V or more) <ul style="list-style-type: none"> • Defective coupler between intake air pressure sensor and ECU. • Open or short circuit in wire harness between intake air pressure sensor and ECU. • Defective intake air pressure sensor. • Malfunction in ECU. | Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions. | α -N is fixed. Fuel is not cut off due to the intake air pressure difference. Intake air pressure is fixed to 101.3 [kPa]. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0110 | Intake air temperature sensor: signal stuck | <ul style="list-style-type: none"> • Defective coupler between intake air temperature sensor and ECU. • Open or short circuit in wire harness between intake air temperature sensor and ECU. • Improperly installed intake air temperature sensor. • Defective intake air temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The intake air temperature is fixed to 20 [°C]. O ₂ sensor heater driving is not carried out. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0111 | Intake air temperature sensor: signal out of range | <ul style="list-style-type: none"> • Defective coupler between intake air temperature sensor and ECU. • Open or short circuit in wire harness between intake air temperature sensor and ECU. • Improperly installed intake air temperature sensor. • Defective intake air temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The intake air temperature is fixed to 20 [°C]. O ₂ sensor heater driving is not carried out. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|---|--|---|---|
| P0112 P0113 | [P0112] Intake air temperature sensor: ground short circuit detected. [P0113] Intake air temperature sensor: open or power short circuit detected. | [P0112] Low voltage of the intake air temperature sensor circuit (0.1 V or less) [P0113] High voltage of the intake air temperature sensor circuit (4.8 V or more) <ul style="list-style-type: none"> • Defective coupler between intake air temperature sensor and ECU. • Open or short circuit in wire harness between intake air temperature sensor and ECU. • Improperly installed intake air temperature sensor. • Defective intake air temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The intake air temperature is fixed to 20 [°C]. O ₂ sensor heater driving is not carried out. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0115 | Coolant temperature sensor: signal stuck | <ul style="list-style-type: none"> • Defective coupler between coolant temperature sensor and ECU. • Open or short circuit in wire harness between coolant temperature sensor and ECU. • Improperly installed coolant temperature sensor. • Defective coolant temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C]. |
| P0116 | Coolant temperature sensor: signal out of range | <ul style="list-style-type: none"> • Defective coupler between coolant temperature sensor and ECU. • Open or short circuit in wire harness between coolant temperature sensor and ECU. • Improperly installed coolant temperature sensor. • Defective coolant temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C]. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|---|--|---|--|
| P0117 P0118 | [P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected. | [P0117] Low voltage of the coolant temperature sensor circuit (0.1 V or less) [P0118] High voltage of the coolant temperature sensor circuit (4.9 V or more) <ul style="list-style-type: none"> • Defective coupler between coolant temperature sensor and ECU. • Open or short circuit in wire harness between coolant temperature sensor and ECU. • Improperly installed coolant temperature sensor. • Defective coolant temperature sensor. • Malfunction in ECU. | Engine is difficult to start. Increased exhaust emissions. Engine idling speed is unstable. | The radiator fan motor relay is on only when the vehicle is traveling at low speeds. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. The coolant temperature is fixed to 60 [°C]. |
| P0122 P0123 | [P0122] Throttle position sensor: open or ground short circuit detected. [P0123] Throttle position sensor: power short circuit detected. | [P0122] Low voltage of the throttle position sensor circuit (0.2 V or less) [P0123] High voltage of the throttle position sensor circuit (4.8 V or more) <ul style="list-style-type: none"> • Defective coupler between throttle position sensor and ECU. • Open or short circuit in wire harness between throttle position sensor and ECU. • Improperly installed throttle position sensor. • Defective throttle position sensor. • Malfunction in ECU. | Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Deceleration is poor. Increased exhaust emissions. Vehicle cannot be driven. | Change in the throttle opening is 0 (transient control is not carried out). D-j is fixed. Throttle opening is fixed to 125 [°]. Atmospheric pressure is fixed to 101.3 [kPa]. O ₂ feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|--|--|---|---|
| P0132 | O ₂ sensor: short circuit detected (power short circuit). | <p>High voltage of the O₂ sensor circuit (4.8 V or more)</p> <ul style="list-style-type: none"> • Improperly installed O₂ sensor. • Defective coupler between O₂ sensor and ECU. • Open or short circuit in wire harness between O₂ sensor and ECU. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. | Increased exhaust emissions. | O ₂ feedback is not carried out. O ₂ feedback learning is not carried out. |
| P0133 | O ₂ sensor: response delay | <ul style="list-style-type: none"> • Defective O₂ sensor. • Malfunction in fuel system. • Malfunction in exhaust system. | Increased exhaust emissions. | – |
| P0134 | O ₂ sensor: signal stuck | <ul style="list-style-type: none"> • Defective engine condition. • Improperly installed O₂ sensor. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. | Increased exhaust emissions. | – |
| P0201 P0202 | [P0201] Fuel injector #1: malfunction in fuel injector #1. [P0202] Fuel injector #2: malfunction in fuel injector #2. | <ul style="list-style-type: none"> • Defective coupler between fuel injector and ECU. • Open or short circuit in wire harness between fuel injector and ECU. • Defective fuel injector. • Malfunction in ECU. • Improperly installed fuel injector. | <p>Loss of engine power.</p> <p>Engine is difficult to start.</p> <p>Engine cannot be started.</p> <p>Engine stops.</p> <p>Engine idling speed is unstable.</p> <p>Increased exhaust emissions.</p> | O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0300 | Multiple cylinder misfire detected. | <ul style="list-style-type: none"> • Ignition system malfunction/abnormal • Fuel system malfunction/abnormal | <p>Engine is difficult to start.</p> <p>Loss of engine power.</p> <p>Engine idling speed is unstable.</p> <p>Engine response is poor.</p> <p>Increased exhaust emissions.</p> | – |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|--|---|--|---|
| P0301 | Cylinder-#1 misfire detection | <ul style="list-style-type: none"> • Ignition system malfunction/abnormal • Fuel system malfunction/abnormal | Engine is difficult to start. Loss of engine power. Engine idling speed is unstable. Engine response is poor. Increased exhaust emissions. | - |
| P0302 | Cylinder-#2 misfire detection | <ul style="list-style-type: none"> • Ignition system malfunction/abnormal • Fuel system malfunction/abnormal | Engine is difficult to start. Loss of engine power. Engine idling speed is unstable. Engine response is poor. Increased exhaust emissions. | - |
| P0335 | Crankshaft position sensor: no normal signals are received from the crankshaft position sensor. | <ul style="list-style-type: none"> • Defective coupler between crankshaft position sensor and ECU. • Open or short circuit in wire harness between crankshaft position sensor and ECU. • Improperly installed crankshaft position sensor. • Malfunction in generator rotor. • Defective crankshaft position sensor. • Malfunction in ECU. | Engine cannot be started. | Does not operate. ISC feedback is not carried out. ISC learning is not carried out. |
| P0351 P0352 | [P0351] Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil. [P0352] Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil. | <ul style="list-style-type: none"> • Defective coupler between ignition coil and ECU. • Open or short circuit in wire harness between ignition coil and ECU. • Improperly installed ignition coil. • Defective ignition coil. • Malfunction in ECU. | Engine stops. Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine idling speed is unstable. Increased exhaust emissions. | Injection to the applicable cylinder group is cut off. O ₂ feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. |
| P0458 | Purge cut valve solenoid: open circuit detected. | <ul style="list-style-type: none"> • Open or short circuit in wire harness. • Defective purge cut valve solenoid. • Malfunction in ECU. | Vapor gas cannot be purged from canister. | Closing side on purge cut valve solenoid is fixed. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|-------|--|--|---|--|
| P0480 | Radiator fan motor relay: open or short circuit detected. | <ul style="list-style-type: none"> • Open or short circuit in wire harness. • Disconnected coupler. • Defective radiator fan motor relay. • Defective radiator fan motor relay controller (Malfunction in ECU). | <p>Engine is difficult to start.</p> <p>Loss of engine power.</p> <p>Engine overheats.</p> <p>Increased exhaust emissions.</p> | <p>Radiator fan motor relay is off all the time.</p> <p>O₂ feedback is not carried out.</p> <p>ISC feedback is not carried out.</p> <p>ISC learning is not carried out.</p> |
| P0507 | <ul style="list-style-type: none"> • Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard). • Defective ISC (idle speed control) unit (ISC operating sound is not heard). | <ul style="list-style-type: none"> • Defective speed sensor. • Defective coupler between ISC unit and ECU. • Open or short circuit in wire harness between ISC unit and ECU. • Improperly installed ISC unit. • Disconnected ISC unit hose or air leak from intake air passage. • Defective throttle valve or throttle cable. • Defective ISC unit (ISC valve stuck fully open). • Malfunction in ECU. | <p>Engine idling speed is high.</p> | <p>ISC learning is not carried out.</p> |
| P0511 | ISC unit (malfunction in ISC unit) | <ul style="list-style-type: none"> • Defective coupler between ISC unit and ECU. • Open or short circuit in wire harness between ISC unit and ECU. • Defective ISC stepping motor. • Malfunction in ECU. | <p>Engine is difficult to start.</p> <p>Engine idling speed is unstable.</p> <p>Engine idling speed is high.</p> | <p>Power is not supplied to the ISC unit.</p> <p>ISC learning is not carried out.</p> |
| P0560 | Charging voltage is abnormal. | <ul style="list-style-type: none"> • Battery over-discharging (broken or disconnected lead in charging system). • Battery over-discharging (defective rectifier/regulator). | <p>Engine is difficult to start.</p> <p>Increased exhaust emissions.</p> <p>Battery performance has deteriorated or battery is defective.</p> | <p>O₂ feedback is not carried out.</p> |
| P0563 | Vehicle system power voltage out of range | <ul style="list-style-type: none"> • Battery overcharging (defective rectifier/regulator). • Battery overcharging (broken or disconnected lead in rectifier/regulator wire harness). | <p>Engine is difficult to start.</p> <p>Increased exhaust emissions.</p> <p>Battery performance has deteriorated or battery is defective.</p> | <p>O₂ feedback is not carried out.</p> |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|-------|--|--|---|--|
| 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"> • Malfunction in ECU. | Engine cannot be started. | Engine cannot be started. |
| P062F | EEPROM DTC: an error is detected while reading or writing on EEPROM. | <ul style="list-style-type: none"> • CO adjustment value is not properly written. • ISC learning value is not properly written. • O₂ feedback learning value is not properly written. • OBD memory value is not properly written. • Malfunction in ECU. | <p>Increased exhaust emissions.</p> <p>Engine cannot be started or is difficult to start.</p> <p>Engine idling speed is unstable.</p> <p>OBD memory value is not correct.</p> | <p>CO adjustment value for the faulty cylinder = 0 (default value)</p> <p>ISC learning values = Default values.</p> <p>OBD memory value is initialized.</p> <p>Initialization of O₂ feedback learning value.</p> |
| P0657 | Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump. | <ul style="list-style-type: none"> • Open or short circuit in wire harness between relay unit and ECU. • Open circuit in wire harness between battery and ECU. • Defective relay unit. • Malfunction in ECU. | <p>Engine is difficult to start.</p> <p>Increased exhaust emissions.</p> | <p>Monitor voltage = 12 [V]</p> <p>O₂ feedback is not carried out.</p> |
| P1500 | <ul style="list-style-type: none"> • Rear wheel sensor (no normal signals are received from the rear wheel sensor) • Gear position switch (open or short circuit is detected) • Clutch switch (open or short circuit is detected) | <ul style="list-style-type: none"> • Open or short circuit in wire harness between rear wheel sensor and ECU. • Open or short circuit in wire harness between ABS unit and ECU. • Open or short circuit in wire harness between gear position switch and ECU. • Open or short circuit in wire harness between clutch switch and ECU. • Defective rear wheel sensor. • Defective gear position switch. • Defective clutch switch. • Improper adjustment of clutch lever. • Malfunction in ECU. | <p>Vehicle speed is not displayed on the meter.</p> <p>Indication of the neutral indicator light is incorrect.</p> <p>Engine idling speed is unstable.</p> | <p>Vehicle speed displayed on the meter = 0 [km/h]</p> <p>O₂ feedback is not carried out.</p> <p>Fuel cut-off control when the rear wheel sensor or gear position switch malfunctions is carried out.</p> <p>ISC feedback is not carried out.</p> <p>ISC learning is not carried out.</p> |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|----------------|---|--|---|--|
| P1601 | Sidestand switch: open or short circuit of the black/red lead of the ECU is detected. | <ul style="list-style-type: none"> • Defective coupler between relay unit and ECU. • Open or short circuit in wire harness between relay unit and ECU. • Defective coupler between sidestand switch and relay unit. • Open or short circuit in wire harness between sidestand switch and relay unit. • Defective sidestand switch. • Malfunction in ECU. | Engine cannot be started. | Engine is forcefully stopped (the injector output is stopped). |
| P1602 | Malfunction in ECU internal circuit (malfunction of ECU power cut-off function). | <ul style="list-style-type: none"> • Open or short circuit in wire harness between ECU and battery. • Open or short circuit in wire harness between ECU and main switch. • Blown fuel injection system fuse. • Malfunction in ECU. | Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start. | O ₂ feedback learning is not carried out. O ₂ feedback learning value is not written. |
| P1604 P1605 | [P1604] Lean angle sensor (ground short circuit detected) [P1605] Lean angle sensor (open or power short circuit detected) | <p>[P1604] Low voltage of the lean angle sensor circuit (0.2 V or less)</p> <p>[P1605] High voltage of the lean angle sensor circuit (4.8 V or more)</p> <ul style="list-style-type: none"> • Open or short circuit in wire harness between lean angle sensor and ECU. • Defective lean angle sensor. • Malfunction in ECU. | Engine cannot be started. | Engine cannot be started. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|-------|---|--|------------------------------|---|
| P2195 | O ₂ sensor: open circuit detected. | <ul style="list-style-type: none"> • Signal voltage is 0.18–0.49 V. • Improperly installed O₂ sensor. • Defective coupler between O₂ sensor and ECU. • Open or short circuit in wire harness between O₂ sensor and ECU. • Incorrect fuel pressure. • Defective O₂ sensor. • Malfunction in ECU. | Increased exhaust emissions. | O ₂ feedback is not carried out. O ₂ feedback learning is not carried out. |
| U0155 | CAN communication error (with the meter). | <ul style="list-style-type: none"> • Defective coupler between meter assembly and ECU. • Open or short circuit in wire harness between meter assembly and ECU. • Defective meter assembly. • Malfunction in ECU. | Defective meter display. | Grip warmer output: OFF is fixed. MAP changeover: State is fixed. Meter switch input: OFF is fixed. |

EAS33029

SELF-DIAGNOSTIC FUNCTION TABLE (FOR IMMOBILIZER SYSTEM)

TIP

For details of the DTC, refer to “HOW TO CHECK DTC” on page 9-20.

| DTC | Item |
|-----|--|
| 51 | Immobilizer unit: Code cannot be transmitted between the key and the immobilizer unit. |
| 52 | Immobilizer unit: Codes between the key and immobilizer unit do not match. |
| 53 | Immobilizer unit: Codes cannot be transmitted between the ECU and the immobilizer unit. |
| 54 | Immobilizer unit: Codes transmitted between the ECU and the immobilizer unit do not match. |
| 55 | Immobilizer unit: Key code registration malfunction. |
| 56 | ECU: Unidentified code is received. |

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 9-25.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Symptom | Check point |
|------------|---|--|---|
| 11* 25* | Front wheel sensor (intermittent pulses or no pulses) | Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor |
| 12 | Rear wheel sensor (intermittent pulses or no pulses) | Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor |
| 13* 26* | Front wheel sensor (abnormal pulse period) | Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor |
| 14* 27* | Rear wheel sensor (abnormal pulse period) | Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor |
| 15 | Front wheel sensor (open or short circuit) | Open or short circuit is detected in the front wheel sensor. | <ul style="list-style-type: none"> • Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Symptom | Check point |
|------------|--|--|--|
| 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"> • Defective coupler between the rear wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor or hydraulic unit assembly |
| 17* 45* | Front wheel sensor (missing pulses) | Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor |
| 18* 46* | Rear wheel sensor (missing pulses) | Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.) | <ul style="list-style-type: none"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor |
| 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"> • Defective hydraulic unit assembly |
| 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"> • Defective signaling system (tail/brake light or brake light switch) • Defective coupler between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Open or short circuit in the wire harness between the signaling system (tail/brake light or brake light switch) and the hydraulic unit assembly • Defective hydraulic unit assembly |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Symptom | Check point |
|----------|---|--|--|
| 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"> • Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly |
| 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"> • Defective hydraulic unit assembly |
| 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"> • Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly |
| 34 | Hydraulic unit assembly (short circuit in ABS motor power supply circuit) | Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly. | <ul style="list-style-type: none"> • Defective hydraulic unit assembly |
| 41 | Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization) | <ul style="list-style-type: none"> • Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. | <ul style="list-style-type: none"> • Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly |
| 42 47 | Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization) | <ul style="list-style-type: none"> • Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. (for DTC No. 42) • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure. | <ul style="list-style-type: none"> • Incorrect installation of the rear wheel sensor (for DTC No. 42) • Incorrect rotation of the rear wheel • Rear brake dragging • Defective hydraulic unit assembly |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Symptom | Check point |
|----------|---|--|---|
| 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"> • Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor |
| 44 | 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"> • Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor |
| 51 52 | <ul style="list-style-type: none"> • 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) | <ul style="list-style-type: none"> • Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high. (for DTC No. 51) • Power voltage supplied to the wheel sensor is too high. (for DTC No. 52) | <ul style="list-style-type: none"> • Defective battery • Disconnected battery terminal • Defective charging system |
| 53 | Vehicle system power supply (voltage of ABS ECU power supply is low) | Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low. | <ul style="list-style-type: none"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system |
| 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"> • Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system • Defective hydraulic unit assembly |
| 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"> • Defective hydraulic unit assembly |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| DTC | Item | Symptom | Check point |
|-----|--|---|---|
| 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"> • Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor • Defective hydraulic unit assembly |
| 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"> • Short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor • Defective hydraulic unit assembly |
| 89 | CAN communication (between meter assembly and ABS ECU) | Transmitted data from the meter cannot be normally received. | <ul style="list-style-type: none"> • Defective coupler between meter assembly and ABS ECU • Open or short-circuit in the wire harness between meter assembly and ABS ECU • Defective meter assembly • Defective ABS ECU |
| 90 | CAN communication (between ECU and ABS ECU) | Transmitted data from the ECU cannot be normally received. | <ul style="list-style-type: none"> • Defective coupler between ECU and ABS ECU • Open or short-circuit in the wire harness between ECU and ABS ECU • Defective ECU • Defective ABS ECU |

* The DTC number varies according to the vehicle conditions.

EAS33030

COMMUNICATION ERROR WITH THE METER

| DTC | Item | Probable cause of malfunction | Vehicle symptom | Fail-safe system operation |
|---|--|--|--------------------------|---|
| U0155 (YDT) Err (multi-function meter display) | CAN communication error (with the meter) | Communication between the ECU and the meter is not possible <ul style="list-style-type: none"> • Defective meter coupler and ECU coupler • Open or short circuit in the wire harness between the meter and the ECU • Defective meter • Defective ECU | Defective meter display. | MAP changeover: State is fixed. Meter switch input: OFF is fixed. Grip warmer (OPTION): OFF is fixed. |

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"> • Fully closed position • Fully open position | 11–21 96–106 | Check with throttle valves fully closed. Check with throttle valves fully open. |
| 04 | Intake air pressure | Displays the intake air pressure. | Operate the throttle while pushing the “⊖” side of the engine start/stop switch. (If the display value changes, the performance is OK.) |
| 05 | Intake air temperature | Displays the intake air temperature. | Compare the actually measured air temperature with the 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"> • Upright • Overturned | Lean angle sensor output voltage 0.4–1.4 3.7–4.4 | Remove the lean angle sensor and incline it more than 65 degrees. |
| 09 | Fuel system voltage (battery voltage) | Fuel system voltage Approximately 12.0 | Set the engine start/stop switch to “○”, and then compare the actually measured battery voltage with the tool display value. (If the actually measured battery voltage is low, recharge the battery.) |
| 20 | Sidestand switch <ul style="list-style-type: none"> • Sidestand retracted • Sidestand extended | ON OFF | Extend and retract the sidestand (with the transmission in gear). |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| Diagnostic code No. | Item | Tool display | Procedure |
|---------------------|--|---|--|
| 21 | Gear position switch and clutch switch <ul style="list-style-type: none"> • Transmission is in neutral • Transmission is in gear or the clutch lever released • Clutch lever is squeezed with the transmission in gear and when the side-stand is retracted • Clutch lever is squeezed with the transmission in gear and when the side-stand is extended | ON OFF ON OFF | Operate the transmission, clutch lever, and sidestand. |
| 60 | EEPROM DTC display <ul style="list-style-type: none"> • No history • History exists | 00 <ul style="list-style-type: none"> • No malfunctions detected (If the DTC P062F is indicated, the ECU is defective.) 01-02 (CO adjustment value) <ul style="list-style-type: none"> • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) Except 00-02 (EEPROM data error for corresponding learning/memory values) | — |
| 67 | ISC (Idle Speed Control) learning condition display ISC (Idle Speed Control) learning data erasure | 00 ISC (Idle Speed Control) learning data has been erased. 01 It is not necessary to erase the ISC (Idle Speed Control) learning data. 02 It is necessary to erase the ISC (Idle Speed Control) learning data. | To erase the ISC (Idle Speed Control) learning data, push the “Operation” button 3 times in 5 seconds. |
| 70 | Control number | 0-254 [-] | — |
| 87 | O ₂ feedback learning data erasure | 00 O ₂ feedback learning data has been erased. 01 O ₂ feedback learning data has not been erased. | To erase the O ₂ feedback learning data, push the “Operation” button 3 times in 5 seconds. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS33032

DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

| Diagnostic code No. | Item | Actuation | Procedure |
|---------------------|---------------------------|--|---|
| 30 | Cylinder-#1 ignition coil | Actuates the cylinder-#1 ignition coil five times at one-second intervals. The "check" indicator on the YDT screen come on each time the ignition coil is actuated. | Check that a spark is generated five times. • Connect an ignition checker. |
| 31 | Cylinder-#2 ignition coil | Actuates the cylinder-#2 ignition coil five times at one-second intervals. The "check" indicator on the YDT screen come on each time the ignition coil is actuated. | Check that a spark is generated five times. • Connect an ignition checker. |
| 36 | Fuel injector #1 | Actuates the fuel injector #1 five times at one-second intervals. 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. Check that fuel injector #1 is actuated five times by listening for the operating sound. |
| 37 | Fuel injector #2 | Actuates the fuel injector #2 five times at one-second intervals. 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. Check that fuel injector #2 is actuated five times by listening for the operating sound. |
| 46 | Purge cut valve solenoid | Actuates the purge cut valve solenoid five times at one-second intervals. The "check" indicator on the YDT screen come on each time the purge cut valve solenoid is actuated. | Check that the purge cut valve solenoid is actuated five times by listening for the operating sound. |
| 50 | Relay unit | Actuates the relay unit five times at one-second intervals. The "check" indicator on the YDT screen come on each time the relay is actuated. | Check that the relay unit is actuated five times by listening for the operating sound. |
| 51 | Radiator fan motor relay | Actuates the radiator fan motor relay five times at five-seconds intervals. 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 relay | Actuates the headlight five times at five-seconds intervals. The "check" indicator on the YDT screen come on each time the headlight is actuated. | Check that the headlight relay is actuated five times by listening for the operating sound. |

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

| Diagnostic code No. | Item | Actuation | Procedure |
|---------------------|-----------|--|---|
| 54 | ISC valve | Fully closes the ISC valve, and then opens the valve. This operation is performed 3 times and takes approximately 6 seconds each time. The "check" indicator on the YDT screen come on during the operation. | Check that the ISC unit is actuated three times by listening for the operating sound. |

EVENT CODE TABLE

EAS20707

EVENT CODE TABLE

Fuel injection system 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. |
| 195 | Sidestand switch | Brief abnormality detected in the ECU (black/red) input line | Same as for DTC number P1601 | Perform the inspection items listed for DTC number P1601. |
| 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. |
| 240 | O ₂ sensor (Stuck at the upper limit for adjustment) | During O ₂ feedback, the adjustment is maintained at the upper limit | <ul style="list-style-type: none"> • Open or short circuit in the wire harness between the sensor and ECU • Drop in fuel pressure • Clogged fuel injector • Fault in sensor • Malfunction in ECU • Malfunction in the fuel injection system | <ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 240 occurs even when the system is functioning properly. |
| 241 | O ₂ sensor (Stuck at the lower limit for adjustment) | During O ₂ feedback, the adjustment is maintained at the lower limit | <ul style="list-style-type: none"> • Open or short circuit in the wire harness between the sensor and ECU • Drop in fuel pressure • Clogged fuel injector • Fault in sensor • Malfunction in ECU • Malfunction in the fuel injection system | <ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 241 occurs even when the system is functioning properly. |

EVENT CODE TABLE

| No. | Item | Symptom | Possible causes | Note |
|-----|--|--|---|---|
| 242 | ISC (Stuck at the upper limit for adjustment) | During idling, the adjustment is maintained at the upper limit | Idling engine speed is slow <ul style="list-style-type: none"> • Clogged throttle body • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU | <ul style="list-style-type: none"> • Implement diagnosis mode D67, and check the ISC maintenance request. • If a DTC is occurring, respond to that first. * Rarely, Code 242 occurs even when the system is functioning properly. |
| 243 | ISC (Stuck at the lower limit for adjustment) | During idling, the adjustment is maintained at the lower limit | Idling engine speed is fast <ul style="list-style-type: none"> • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU | <ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 243 occurs even when the system is functioning properly. |
| 244 | Poor starting/inability to start | Poor starting/inability to start detected | <ul style="list-style-type: none"> • No gasoline • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU | <ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 244 occurs even when the system is functioning properly. |
| 245 | Engine stop | Engine stop detected | <ul style="list-style-type: none"> • No gasoline • Poorly adjusted throttle cable • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU | <ul style="list-style-type: none"> • If a DTC is occurring, respond to that first. * Rarely, Code 245 occurs even when the system is functioning properly. |

EVENT CODE TABLE

ABS system 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 | ABS condition when driving | Records ABS condition of last drive | ABS condition of last drive is recorded as FFD. This does not mean a fault condition has been detected. This event code is not deleted. ABS condition <ul style="list-style-type: none">• ABS ON• Rr ABS OFF• ABS OFF | — |

EAS20552

30_EVENT

EAS33033

TROUBLESHOOTING**Item**

Latch up detected.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. The vehicle has overturned.
 - Raise the overturned vehicle vertically and check again.
 - Turn the main switch to “ON”, then to “OFF”, and then back to “ON”.

Is the MIL on?**YES**

→ Go to step 2.

NO

→ Service is completed.

2. Installed condition of lean angle sensor.
 - Check the installed direction and condition of the sensor.

Is check result OK?**YES**

→ Go to step 3.

NO

- a. Fix the lean angle sensor installation condition.
- b. Turn the main switch to “ON”, then to “OFF”, and then back to “ON”.

Is the MIL on?**YES**

→ Go to step 3.

NO

→ Service is completed.

3. Defective lean angle sensor.
 - Execute the diagnostic mode. (Code 08)
 - Check that 0.4–1.4 V is displayed when the vehicle is vertical and that the displayed value increases as the vehicle continues to incline.

Is check result OK?**YES**

→ Go to step 4.

NO

- a. Replace the lean angle sensor.
- b. Turn the main switch to “ON”, then to “OFF”, and then back to “ON”.

Is the MIL on?**YES**

→ Go to step 4.

NO

→ Service is completed.

4. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

EAS20554

70_EVENT

EAS33034

TROUBLESHOOTING

Item

Engine forcibly stops when the vehicle is left idling for a long period.

Procedure

TIP

If another DTC is displayed at the same time, check the other DTC first and repair it.

1. Allow to idle for a long period.
 - Turn the main switch to “OFF”.
 - Check whether it is possible to start the engine.

Can the engine starting?

YES

→ Service is completed.

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 8-38.

EAS20901

192

EAS33980

TROUBLESHOOTING**Item**

Records ABS condition of last drive.

FFD check item with tool

- Rear ABS
- ABS

Procedure

1. Check ABS condition
 - Check the FFD details recorded for this event code with the tool.
 - Check “Rear ABS OFF” and “ABS OFF” in the FFD display item.
When “Rear ABS OFF” display is ON: Go to item 2.
When ABS OFF display is ON: Go to item 3.
When “Rear ABS OFF” and “ABS OFF” display are OFF: Go to item 4.
2. OFF is displayed for “Rear ABS”
 - ABS condition of last drive is rear ABS OFF
3. OFF is displayed for “ABS”
 - ABS condition of last drive is ABS OFF
4. ON is displayed for both “Rear ABS” and “ABS”
 - ABS condition of last drive is ABS ON

TIP

ABS condition of last drive is recorded. (ABS condition: ABS ON, ABS OFF, or Rear ABS OFF)
This event code does not mean an abnormality has been detected with the vehicle, but the ABS condition of the last drive is recorded as FFD (freeze frame), and is not deleted even when deleting fault codes using YDT.

EAS20397

P0030

EAS33134

TROUBLESHOOTING**Item**

O₂ sensor heater: defective heater controller detected.

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.

- P0112, P0113, P0122, P0123

1. Connection of O₂ 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 engine start/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.

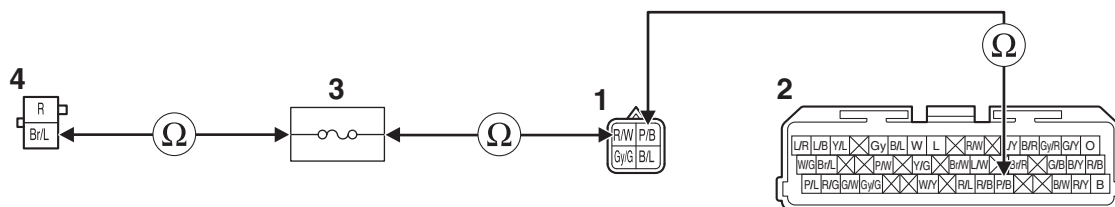
TIP

For this check, also set the engine start/stop switch to “○”.

3. Wire harness continuity.

- Disconnect the O₂ sensor coupler “1”, ECU coupler “2”, ignition fuse holder “3” and main switch coupler “4”.
- Open circuit check

| | |
|--|-----------------------|
| Between O ₂ sensor coupler and ECU coupler | pink/black–pink/black |
| Between O ₂ sensor coupler and ignition fuse holder | red/white–red/white |
| Between main switch coupler and ignition fuse holder | brown/blue–brown/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 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 engine start/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.

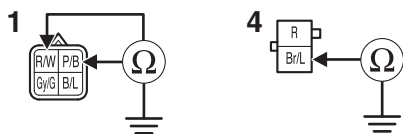
Ground short circuit check “A”

| | |
|--|---------------------------------------|
| Between O ₂ sensor coupler “1” and ground | red/white–ground pink/black–ground |
| Between main switch coupler “4” and ground | brown/blue–ground |

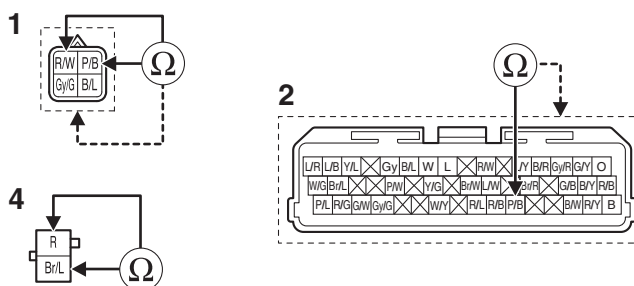
Lines short circuit check “B”

| | |
|-------------------------------|---|
| O ₂ sensor coupler | red/white–any other coupler terminal pink/black–any other coupler terminal |
| ECU coupler “2” | pink/black–any other coupler terminal |
| Main switch coupler | brown/blue–red |

A



B



Is resistance ∞ 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.

TIP

For this check, also set the engine start/stop switch to “○”.

4. Defective O₂ sensor.

- Replace the O₂ sensor.

Refer to “ENGINE REMOVAL” on page 5-10.

- 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 engine start/stop switch to “○”.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

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] O₂ sensor: heater performance deterioration.
- [P2195] O₂ sensor: open circuit detected.

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. P0657
2. P0030

1. Installed condition of O₂ sensor.
 - Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 2.

NO

- a. Reinstall or replace the O₂ sensor.
Refer to "ENGINE REMOVAL" on page 5-10.
- b. Start the engine and let it idle for approximately 1 minute.
- 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 O₂ 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.
- 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

- Connect the coupler securely or replace the wire harness.
- Start the engine and let it idle for approximately 1 minute.
- 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.

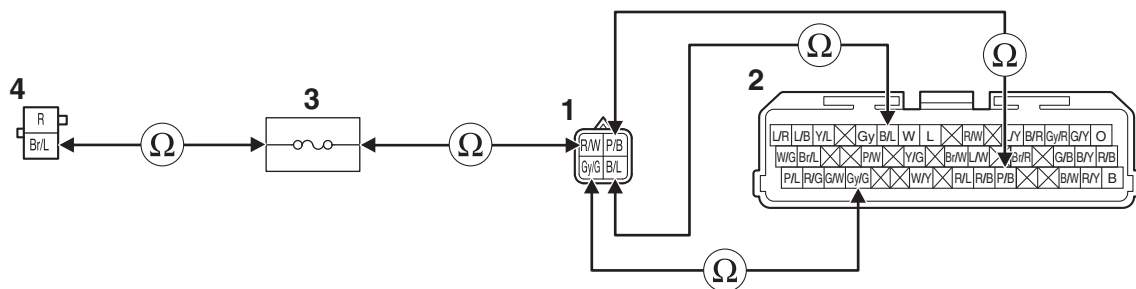
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the O₂ sensor coupler “1”, ECU coupler “2”, ignition fuse holder “3” and main switch coupler “4”.
- Open circuit check

| | |
|--|---|
| Between O ₂ sensor coupler and ECU coupler | gray/green–gray/green pink/black–pink/black black/blue–black/blue |
| Between O ₂ sensor coupler and ignition fuse holder | red/white–red/white |
| Between main switch coupler and ignition fuse holder | brown/blue–brown/blue |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- Replace the wire harness.
- Start the engine and let it idle for approximately 1 minute.
- 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

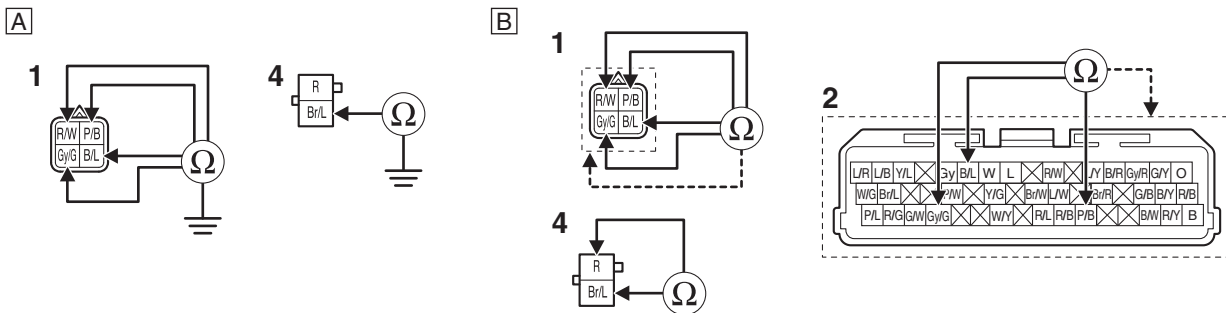
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|--|---|
| Between O ₂ sensor coupler “1” and ground | gray/green–ground pink/black–ground black/blue–ground red/white–ground |
| Between main switch coupler “4” and ground | brown/blue–ground |

Lines short circuit check “B”

| | |
|-------------------------------|---|
| O ₂ sensor coupler | gray/green–any other coupler terminal pink/black–any other coupler terminal black/blue–any other coupler terminal red/white–any other coupler terminal |
| ECU coupler “2” | gray/green–any other coupler terminal pink/black–any other coupler terminal black/blue–any other coupler terminal |
| Main switch coupler | brown/blue–red |



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.
- 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 7-16.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the fuel pump.
Refer to "FUEL TANK" on page 7-1.
- b. Start the engine and let it idle for approximately 1 minute.
- 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 6.

6. Defective O₂ sensor.

- Check the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the O₂ sensor.
Refer to "ENGINE REMOVAL" on page 5-10.
- b. Start the engine and let it idle for approximately 1 minute.
- 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 7.

7. Malfunction in ECU.

- Replace the ECU, and complete the service.

Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

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

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0107, P0108

1. Connection of intake air pressure sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 5, and complete the service.

NO

→ Go to step 2.

2. Defective intake air pressure sensor.

- Replace the intake air pressure sensor.
Refer to "THROTTLE BODIES" on page 7-8.
- 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 8-38.

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

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0105, P0107, P0108, P0122, P0123, P0335

1. Installed condition of intake air pressure sensor hose.

- Check for detached, clogged, kinked or pinching.

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

Is check result OK?

YES

→ Go to step 2.

NO

- Repair or replace the intake air pressure sensor hose.
Refer to "CABLE ROUTING" on page 2-15.
- 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 04)
- 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

- Replace the intake air pressure sensor.
Refer to "THROTTLE BODIES" on page 7-8.
- 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.
- 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: ground short circuit detected.
- [P0108] Intake air pressure sensor: open or power short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Connection of intake air pressure sensor coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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

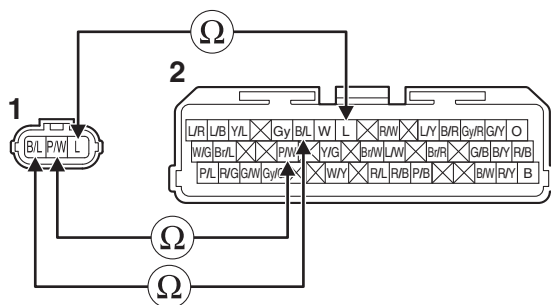
→ Go to step 3.

3. Wire harness continuity.

- Disconnect the intake air pressure sensor coupler “1” and ECU coupler “2”.
- Open circuit check

Between intake air pressure sensor coupler and ECU coupler

blue–blue
pink/white–pink/white
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 intake air pressure sensor coupler “1” and ground

blue–ground
pink/white–ground

Lines short circuit check “B”

Intake air pressure sensor coupler

blue–any other coupler terminal
pink/white–any other coupler terminal
black/blue–any other coupler terminal

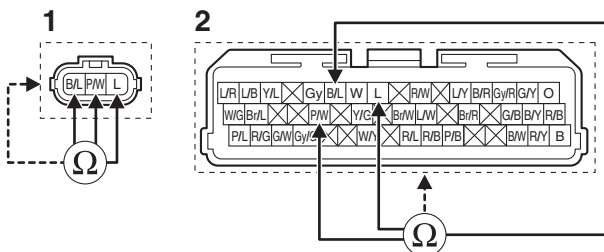
ECU coupler “2”

blue–any other coupler terminal
pink/white–any other coupler terminal
black/blue–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 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. Reinstall or replace 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 intake air pressure sensor.

- Execute the diagnostic mode. (Code 04)
- 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 intake air pressure sensor.
Refer to “THROTTLE BODIES” on page 7-8.
- 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 8-38.

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**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.
Refer to "GENERAL CHASSIS (5)" on page 4-10.
- Check the dirt around the intake air temperature sensor.

Is check result OK?**YES**

→ Go to step 2.

NO

- Clean around the intake air temperature sensor, then reinstall it.
- Turn the main switch to "ON", then heat the intake air temperature sensor using warm water or hot air.
- 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.

- Check the intake air temperature sensor.
Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-47.

**Intake air temperature sensor resistance**

5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)

Intake air temperature sensor resistance

290–390 Ω at 80 °C (290–390 Ω at 176 °F)

Is the resistance change?**YES**

→ Go to step 3.

NO

- a. Replace the intake air temperature sensor.
Refer to "GENERAL CHASSIS (5)" on page 4-10.
- 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 8-38.

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

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 intake air temperature sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- Connect the coupler securely or replace the wire harness.
- 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

- Connect the coupler securely or replace the wire harness.
- 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.

Refer to "GENERAL CHASSIS (5)" on page 4-10.

Is check result OK?**YES**

→ Go to step 4.

NO

- Reinstall the 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 7, and complete the service.

NO

→ Go to step 4.

4. Defective intake air temperature sensor.

- Check the intake air temperature sensor.

Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-47.

**Intake air temperature sensor resistance**

5400–6600 Ω at 0 °C (5400–6600 Ω at 32 °F)

Intake air temperature sensor resistance

290–390 Ω at 80 °C (290–390 Ω at 176 °F)

Is check result OK?**YES**

→ Go to step 5.

NO

- Replace the intake air temperature sensor.
Refer to "GENERAL CHASSIS (5)" on page 4-10.
- Execute the diagnostic mode. (Code 05)
- 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 8-38.

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

TIP

Perform this procedure when the engine is cold.

1. Connection of intake air temperature sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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

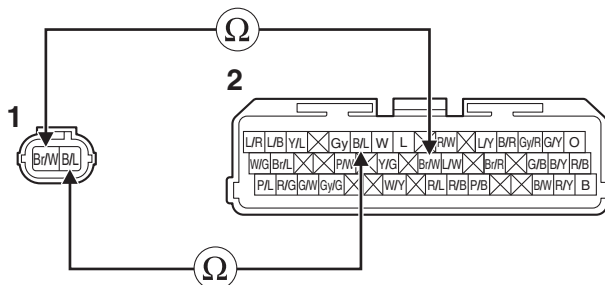
→ Go to step 3.

3. Wire harness continuity.

- Disconnect the intake air temperature sensor coupler "1" and ECU coupler "2".

• Open circuit check

| | |
|---|--|
| Between intake air temperature sensor coupler and ECU coupler | brown/white–brown/white 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.

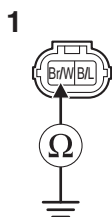
Ground short circuit check “A”

| | |
|--|--------------------|
| Between intake air temperature sensor coupler “1” and ground | brown/white–ground |
|--|--------------------|

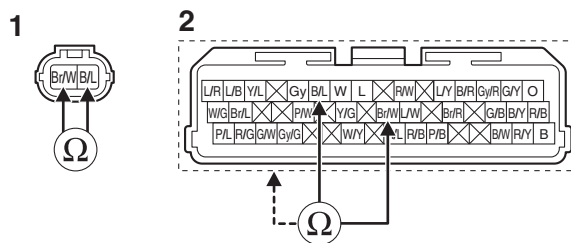
Lines short circuit check “B”

| | |
|---------------------------------------|---|
| Intake air temperature sensor coupler | brown/white–black/blue |
| ECU coupler “2” | brown/white–any other coupler terminal black/blue–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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of intake air temperature sensor.

- Check for looseness or pinching.

Refer to “GENERAL CHASSIS (5)” on page 4-10.

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 intake air temperature sensor.

- Execute the diagnostic mode. (Code 05)
- When engine is cold: Displayed temperature is close to the ambient temperature.
- The displayed temperature is not close to the ambient temperature → Check the intake air temperature sensor.

Refer to “CHECKING THE INTAKE AIR TEMPERATURE SENSOR” on page 8-47.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the intake air temperature sensor.
Refer to “GENERAL CHASSIS (5)” on page 4-10.
- 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 8-38.
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, P0335, P1500
-

1. Defective coolant temperature sensor.

- Measure and note the coolant temperature sensor resistance at ambient temperature.
- 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

- a. Allow the engine to cool to ambient temperature, then replace the coolant temperature sensor.
Refer to "THROTTLE BODIES" on page 7-8.
- b. Turn the main switch to "ON", then start the engine and warm-up the vehicle.
- c. 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 8-38.

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 sub-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 9, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-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 9, 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. 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 9, and complete the service.

NO

→ Go to step 4.

4. Installed condition of coolant temperature sensor.

- Check for looseness or pinching.
- Refer to “THROTTLE BODIES” on page 7-8.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall the sensor.
- 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 9, and complete the service.

NO

→ Go to step 5.

5. Defective coolant temperature sensor.

- Check the coolant temperature sensor resistance.
- Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-45.



**Coolant temperature sensor re-
sistance**
2513–2777 Ω at 20 °C (2513–
2777 Ω at 68 °F)

**Coolant temperature sensor re-
sistance**
210–221 Ω at 100 °C (210–221 Ω
at 212 °F)

Is check result OK?

YES

→ Go to step 6.

NO

-
- a. Replace the coolant temperature sensor.
Refer to “THROTTLE BODIES” on page 7-8.
 - b. Execute the diagnostic mode. (Code 06)
 - When engine is cold: Displayed temperature is close to the ambient temperature.
 - c. 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 9, and complete the service.

NO

→ Go to step 6.

6. Defective sub-wire harness.

- Replace the sub-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 9, and complete the service.

NO

→ Go to step 7.

7. 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 9, and complete the service.

NO

→ Go to step 8.

8. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

9. 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 sub-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 8, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-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 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.
- 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 8, and complete the service.

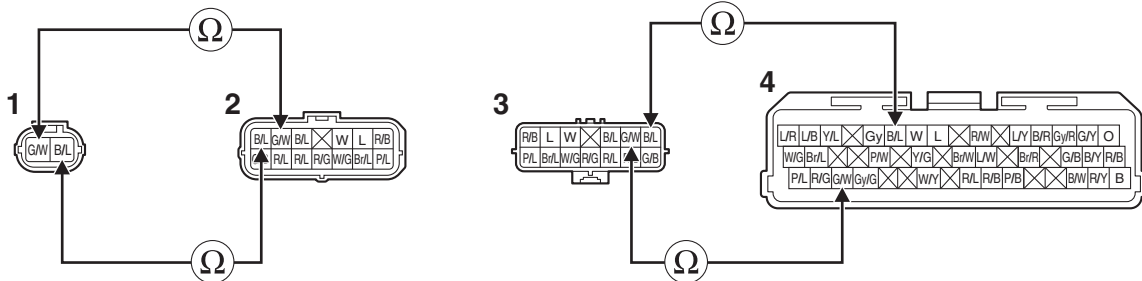
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the coolant temperature sensor coupler “1”, sub-wire harness coupler (wire harness side) “2”, wire harness coupler (sub-wire harness side) “3” and ECU coupler “4”.
- Open circuit check

| | |
|---|--|
| Between coolant temperature sensor coupler and sub-wire harness coupler (wire harness side) | green/white–green/white black/blue–black/blue |
| Between wire harness coupler (sub-wire harness side) and ECU coupler | green/white–green/white black/blue–black/blue |



Is resistance 0 Ω?

YES

→ Go to step “Short circuit check”.

NO

- Replace the wire harness and/or sub-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 8, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.

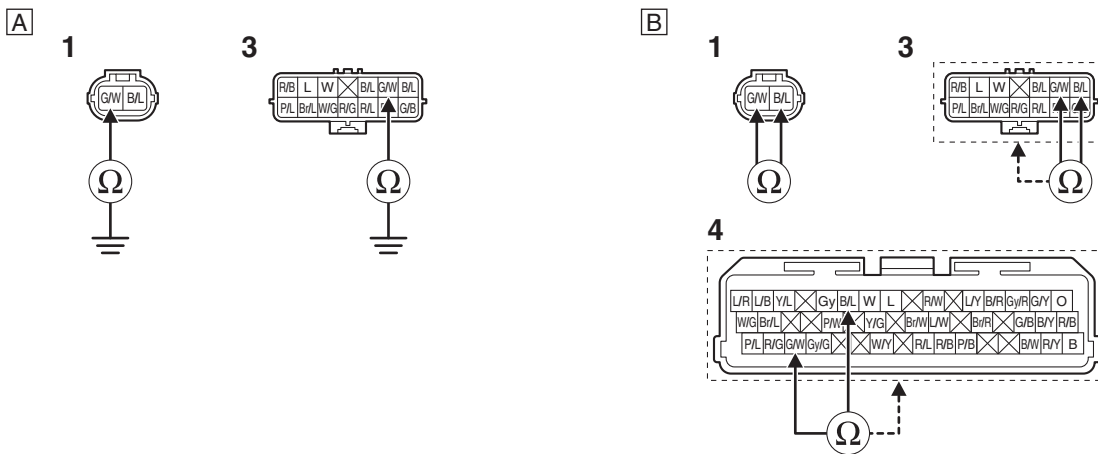
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|--------------------|
| Between coolant temperature sensor coupler “1” and ground | green/white–ground |
| Between wire harness coupler (sub-wire harness side) “3” and ground | green/white–ground |

Lines short circuit check “B”

| | |
|--|---|
| Coolant temperature sensor coupler | green/white–black/blue |
| Wire harness coupler (sub-wire harness side) | green/white–any other coupler terminal black/blue–any other coupler terminal |
| ECU coupler “4” | green/white–any other coupler terminal black/blue–any other coupler terminal |



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

- Replace the wire harness and/or sub-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 8, and complete the service.

NO

→ Go to step 5.

5. Installed condition of coolant temperature sensor.

- Check for looseness or pinching.

Refer to “THROTTLE BODIES” on page 7-8.

Is check result OK?

YES

→ Go to step 6.

NO

- Reinstall 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 8, and complete the service.

NO

→ Go to step 6.

6. 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 8-45.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the coolant temperature sensor.
Refer to “THROTTLE BODIES” on page 7-8.
- 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 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 8-38.

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.

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/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Connection of throttle position sensor coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-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 9, and complete the service.

NO

→ Go to step 2.

2. Connection of wire harness coupler and sub-wire harness coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-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 9, 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 9, and complete the service.

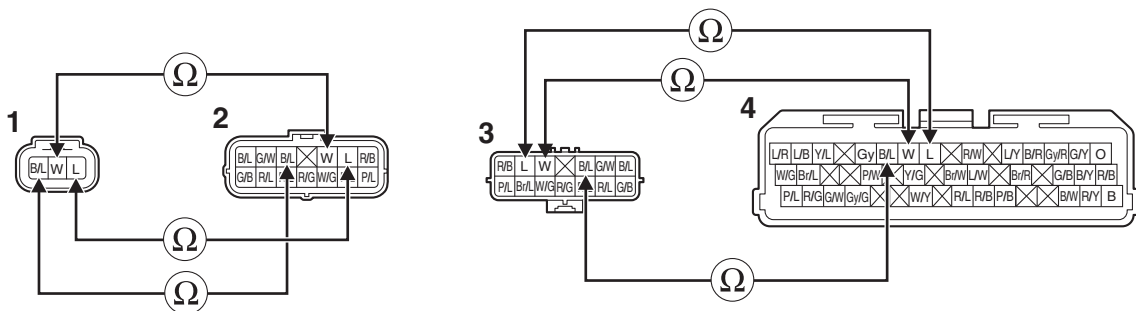
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the throttle position sensor coupler “1”, sub-wire harness coupler (wire harness side) “2”, wire harness coupler (sub-wire harness side) “3” and ECU coupler “4”.
- Open circuit check

| | |
|---|---|
| Between throttle position sensor coupler and sub-wire harness coupler (wire harness side) | black/blue–black/blue white–white blue–blue |
| Between wire harness coupler (sub-wire harness side) and ECU coupler | black/blue–black/blue white–white blue–blue |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness and/or sub-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 9, and complete the service.

NO

→ Go to step 5.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.

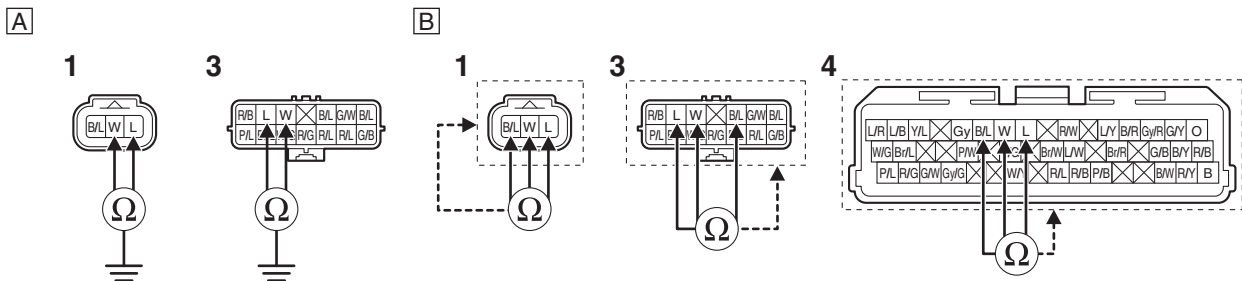
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|-----------------------------|
| Between throttle position sensor coupler “1” and ground | white-ground blue-ground |
| Between wire harness coupler (sub-wire harness side) “3” and ground | white-ground blue-ground |

Lines short circuit check “B”

| | |
|--|--|
| Throttle position sensor coupler | black/blue–any other coupler terminal white–any other coupler terminal blue–any other coupler terminal |
| Wire harness coupler (sub-wire harness side) | black/blue–any other coupler terminal white–any other coupler terminal blue–any other coupler terminal |
| ECU coupler “4” | black/blue–any other coupler terminal white–any other coupler terminal blue–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

NO

- Replace the wire harness and/or sub-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 9, and complete the service.

NO

→ Go to step 5.

5. Installed condition of throttle position sensor.

- Check for looseness or pinching.

Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-14.

Is check result OK?

YES

→ Go to step 6.

NO

- Reinstall or adjust 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 9, and complete the service.

NO

→ Go to step 6.

6. Throttle position sensor resistance.

- Measure the throttle position sensor resistance.

Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-46.

Is check result OK?

YES

→ Go to step 7.

NO

- a. Replace the throttle position sensor.
Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-14.
- 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 9, and complete the service.

NO

→ Go to step 7.

7. Defective throttle position sensor.

- Check throttle position sensor signal.
- Execute the diagnostic mode. (Code 01)

| | |
|---|--------|
| When the throttle valves are fully closed | 11-21 |
| When throttle valves are fully open | 96-106 |

Is check result OK?

YES

→ Go to step 8.

NO

- a. Replace the throttle position sensor.
Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-14.
- 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 9, and complete the service.

NO

→ Go to step 8.

8. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

9. 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**

O₂ sensor: short circuit detected (power short circuit).

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Installed condition of O₂ sensor.
 - Check for looseness or pinching.
Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?**YES**

→ Go to step 2.

NO

- a. Reinstall or replace 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 2.

2. Connection of O₂ 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. 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.

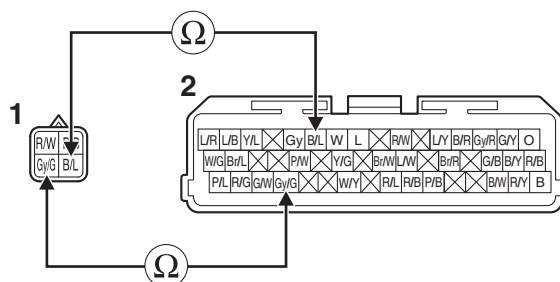
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the O₂ sensor coupler “1” and ECU coupler “2”.
- Open circuit check

| | |
|---|--|
| Between O ₂ sensor coupler and ECU coupler | black/blue–black/blue gray/green–gray/green |
|---|--|



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 ₂ sensor coupler “1” and ground | gray/green–ground |
|--|-------------------|

Lines short circuit check “B”

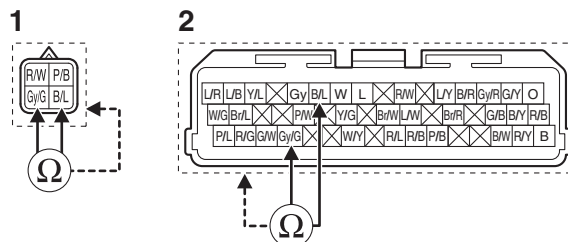
| | |
|-------------------------------|--|
| O ₂ sensor coupler | black/blue–any other coupler terminal gray/green–any other coupler terminal |
|-------------------------------|--|

| | |
|-----------------|--|
| ECU coupler "2" | black/blue—any other coupler terminal gray/green—any other coupler terminal |
|-----------------|--|

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

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.

5. Defective O₂ sensor.

- Check the O₂ sensor.

Refer to "ENGINE REMOVAL" on page 5-10.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the O₂ sensor.
Refer to "ENGINE REMOVAL" on page 5-10.
- 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 8-38.

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

O₂ sensor: deterioration detected

EAS33291

OUTLINE

Explanation of detection method

The O₂ 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 O₂ sensor with a predetermined threshold value such as response time. When the ECU determines that there is an O₂ 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 ₂ 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 ₂ feedback correction amount is within a certain range. |

Related sensor for detection

O₂ sensor, intake air pressure sensor, coolant temperature sensor (or engine temperature sensor), front wheel sensor, rear 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



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

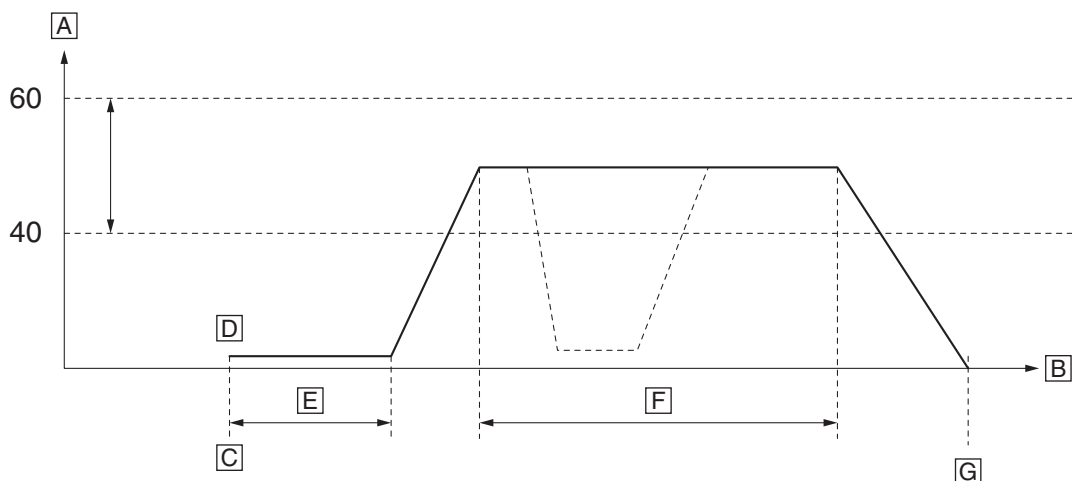
TIP

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 O₂ 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 O₂ 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

O₂ 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, P0202, P0335, P0351, P0352, P0480, P0560, P0563, P062F, P0657, P1500
 4. P0300, P0301, P0302
-

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 8-42.
- b. Test ride the vehicle according to the test-ride conditions for the O₂ deterioration diagnosis.
Refer to step 2 in "TROUBLESHOOTING" on page 9-101.
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 O₂ sensor.

- Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 3.

NO

- a. Reinstall the O₂ sensor.
- b. Test ride the vehicle according to the test-ride conditions for the O₂ deterioration diagnosis.
Refer to step 2 in "TROUBLESHOOTING" on page 9-101.
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 7-16.

Is check result OK?

YES

→ Go to step 4.

NO

- Replace the fuel pump.
Refer to “FUEL TANK” on page 7-1.
- Test ride the vehicle according to the test-ride conditions for the O₂ deterioration diagnosis.
Refer to step 2 in “TROUBLESHOOTING” on page 9-101.
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 O₂ sensor.

- Check the O₂ sensor.

Refer to “ENGINE REMOVAL” on page 5-10.

Is check result OK?

YES

→ Go to step 5.

NO

- Replace the O₂ sensor.
Refer to “ENGINE REMOVAL” on page 5-10.
- Test ride the vehicle according to the test-ride conditions for the O₂ deterioration diagnosis.
Refer to step 2 in “TROUBLESHOOTING” on page 9-101.
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 8-38.

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 #1: malfunction in fuel injector #1.

Fail-safe system

- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure

1. Connection of fuel injector #1 coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

NO

→ Go to step 2.

2. Defective fuel injector #1.

- Measure the fuel injector resistance.
Refer to "CHECKING THE FUEL INJECTORS" on page 8-49.

Is check result OK?

YES

→ Go to step 3.

NO

- a. Replace the fuel injector #1.
Refer to "THROTTLE BODIES" on page 7-8.
- b. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

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. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

NO

→ Go to step 4.

4. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 5.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

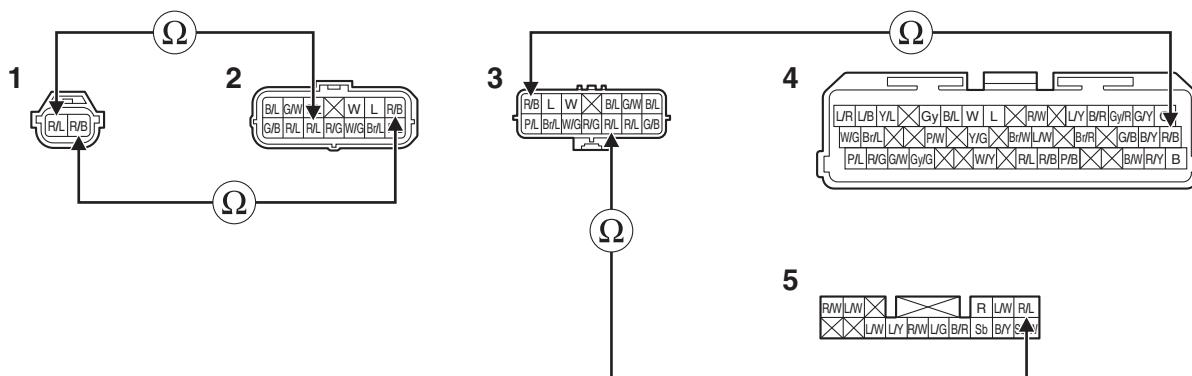
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the fuel injector #1 coupler “1”, sub-wire harness coupler (wire harness side) “2”, wire harness coupler (sub-wire harness side) “3” ECU coupler “4” and relay unit coupler “5”
- Open circuit check

| | |
|---|--|
| Between fuel injector #1 coupler and sub-wire harness coupler (wire harness side) | red/black–red/black red/blue–red/blue |
| Between wire harness coupler (sub-wire harness side) and relay unit coupler | red/blue–red/blue |
| Between wire harness coupler (sub-wire harness side) and ECU coupler | red/black–red/black |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

NO

→ Go to step 6.

- Short circuit check

TIP

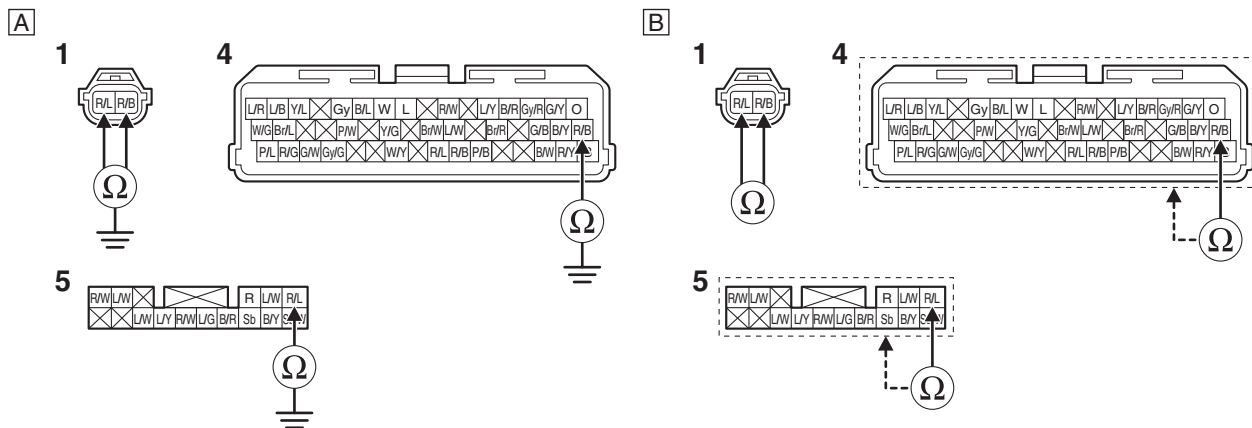
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|-------------------------------------|
| Between fuel injector #1 coupler “1” and ground | red/black–ground red/blue–ground |
| Between ECU coupler “4” and ground | red/black–ground |
| Between relay unit coupler “5” and ground | red/blue–ground |

Lines short circuit check “B”

| | |
|--------------------------|--------------------------------------|
| Fuel injector #1 coupler | red/black–red/blue |
| ECU coupler | red/black–any other coupler terminal |
| Relay unit coupler | red/blue–any other coupler terminal |



Is resistance ∞ Ω?

YES

→ Go to step 6.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 36)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

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 8-38.

7. 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.

EAS20575

P0202

EAS33055

TROUBLESHOOTING**Item**

Fuel injector #2: malfunction in fuel injector #2.

Fail-safe system

- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure

1. Connection of fuel injector #2 coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?**YES**

→ Go to step 7.

NO

→ Go to step 2.

2. Defective fuel injector #2.

- Measure the fuel injector resistance.
Refer to "CHECKING THE FUEL INJECTORS" on page 8-49.

Is check result OK?**YES**

→ Go to step 3.

NO

- a. Replace the fuel injector #2.
Refer to "THROTTLE BODIES" on page 7-8.
- b. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?**YES**

→ Go to step 7.

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. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

NO

→ Go to step 4.

4. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 5.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

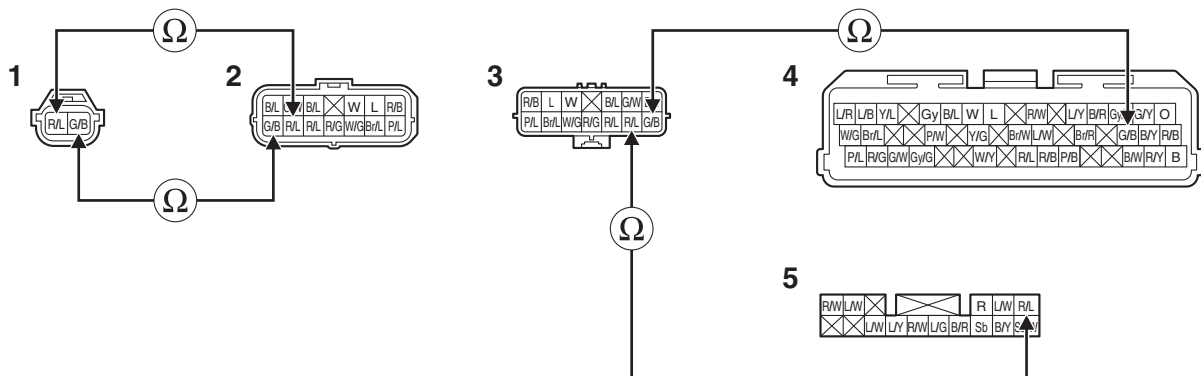
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the fuel injector #2 coupler “1”, sub-wire harness coupler (wire harness side) “2”, wire harness coupler (sub-wire harness side) “3”, ECU coupler “4” and relay unit coupler “5”
- Open circuit check

| | |
|---|--|
| Between fuel injector #2 coupler and sub-wire harness coupler (wire harness side) | green/black–green/black red/blue–red/blue |
| Between wire harness coupler (sub-wire harness side) and relay unit coupler | red/blue–red/blue |
| Between wire harness coupler (sub-wire harness side) and ECU coupler | green/black–green/black |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

NO

→ Go to step 6.

- Short circuit check

TIP

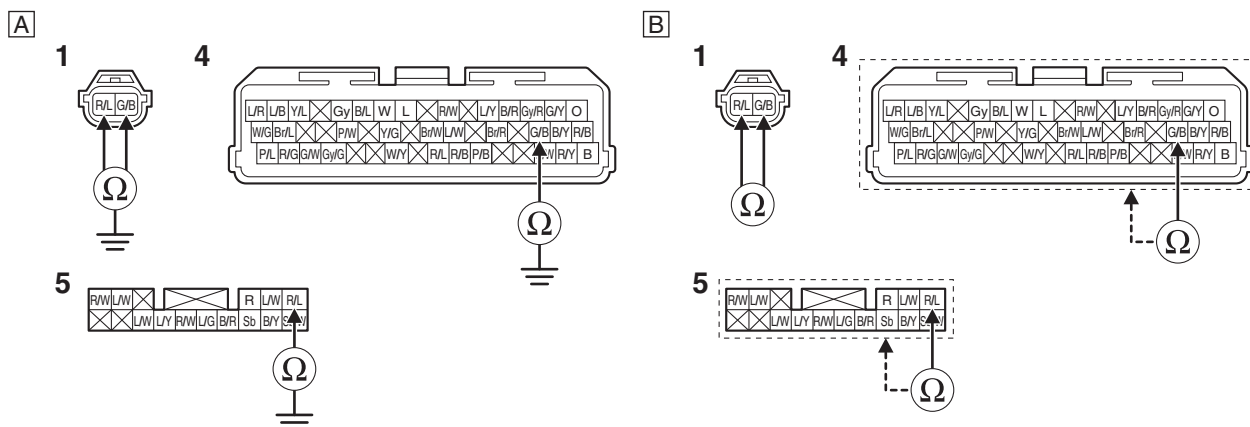
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|---------------------------------------|
| Between fuel injector #2 coupler “1” and ground | green/black–ground red/blue–ground |
| Between ECU coupler “4” and ground | green/black–ground |
| Between relay unit coupler “5” and ground | red/blue–ground |

Lines short circuit check “B”

| | |
|--------------------------|--|
| Fuel injector #2 coupler | green/black–red/blue |
| ECU coupler | green/black–any other coupler terminal |
| Relay unit coupler | red/blue–any other coupler terminal |



Is resistance ∞ Ω?

YES

→ Go to step 6.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 37)

Is the fuel injector operating sound heard?

YES

→ Go to step 7.

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 8-38.

7. 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.

EAS20713

P0300, P0301, P0302

- [P0300] Misfire in multiple cylinders
- [P0301] Misfire in cylinder #1
- [P0302] Misfire in cylinder #2

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"> • Catalyst damage 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. • Exhaust gas deterioration 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. |
| 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 ₂ feedback | No condition specified |
| Vehicle speed | No condition specified |
| Gear position | No condition specified |
| Engine speed | 2350–6900 r/min |

Related sensors for detection

Intake air pressure sensor, coolant temperature sensor, front wheel sensor, rear 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



When test riding the vehicle, always comply with local traffic regulations.

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
 - DTC except P0300, P0301, P0302
 - If more than one misfire DTC has been detected at the same time, open each FFD and check the total ECU energization time at the time of failure or event, and refer to the latest FFD.
 - How to identify the most recent FFD.
Total energization time of 00:25:30 is newer than 00:10:55 of FFD.
-

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.

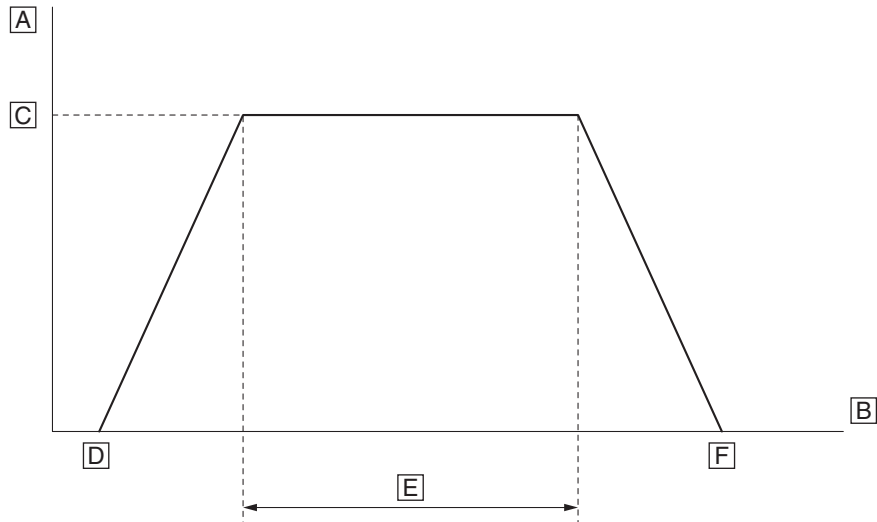
2. Perform the reproduction test under the following conditions, then go to step 3.

ECA26950

NOTICE

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
- Front wheel sensor
- Rear 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**

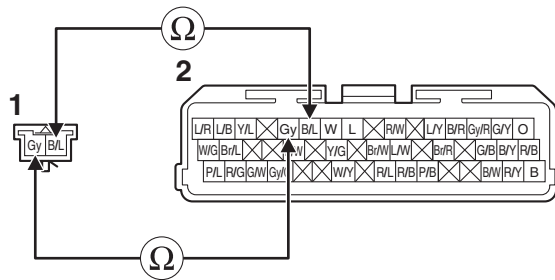
→ Go to step 7, and complete the service.

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 gray–gray |
|--|------------------------------------|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

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.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

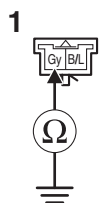
Ground short circuit check “A”

| | |
|---|-------------|
| Between crankshaft position sensor coupler “1” and ground | gray-ground |
|---|-------------|

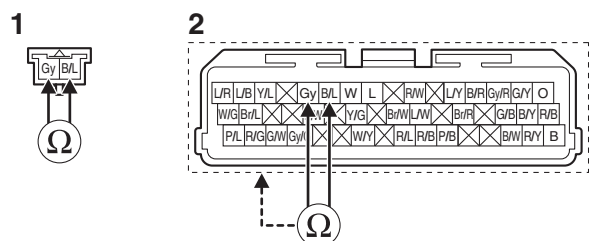
Lines short circuit check “B”

| | |
|------------------------------------|--|
| Crankshaft position sensor coupler | black/blue-gray |
| ECU coupler “2” | black/blue-any other coupler terminal gray-any other coupler terminal |

[A]



[B]



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.
- Check the gap (0.85 mm (0.03 in)) between the crankshaft position sensor and the generator rotor.

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 8-43.

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 8-38.

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**

Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. Connection of cylinder-#1 ignition coil coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 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. 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**

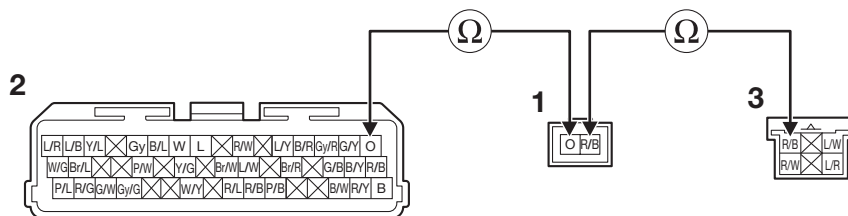
→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
 - Disconnect the cylinder-#1 ignition coil coupler "1", ECU coupler "2" and handlebar switch (right) coupler "3".
 - Open circuit check

| | |
|--|---------------------|
| Between cylinder-#1 ignition coil coupler and ECU coupler | orange–orange |
| Between cylinder-#1 ignition coil coupler and handlebar switch (right) coupler | red/black–red/black |



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.

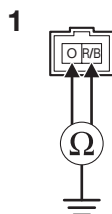
Ground short circuit check “A”

| | |
|--|-----------------------------------|
| Between cylinder-#1 ignition coil coupler “1” and ground | orange–ground red/black–ground |
|--|-----------------------------------|

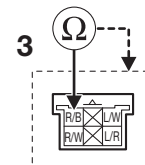
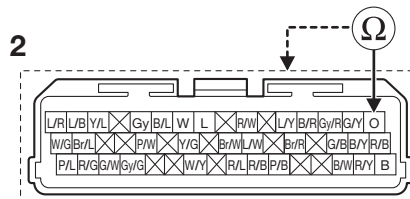
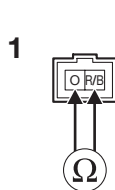
Lines short circuit check “B”

| | |
|--------------------------------------|--------------------------------------|
| Cylinder-#1 ignition coil coupler | orange–red/black |
| ECU coupler “2” | orange–any other coupler terminal |
| Handlebar switch (right) coupler “3” | red/black–any other coupler terminal |

A



B



Is resistance $\infty \Omega$?

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 cylinder-#1 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 cylinder-#1 ignition coil.

- Measure the primary coil resistance of the cylinder-#1 ignition coil.
Refer to “CHECKING THE IGNITION COILS” on page 8-42.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the cylinder-#1 ignition coil.
Refer to “CAMSHAFTS” on page 5-23.
- 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 8-38.
- 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.

EAS20581

P0352

EAS33061

TROUBLESHOOTING**Item**

Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

1. Connection of cylinder-#2 ignition coil coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 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. 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**

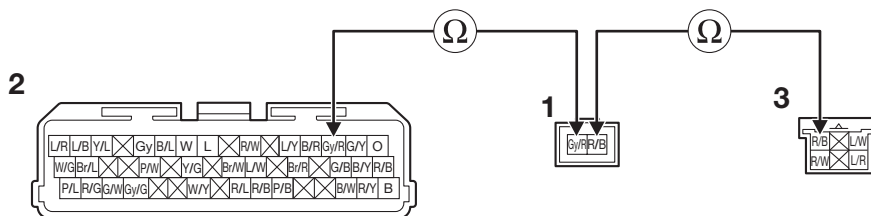
→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
 - Disconnect the cylinder-#2 ignition coil coupler "1", ECU coupler "2" and handlebar switch (right) coupler "3".
 - Open circuit check

| | |
|--|---------------------|
| Between cylinder-#2 ignition coil coupler and ECU coupler | gray/red–gray/red |
| Between cylinder-#2 ignition coil coupler and handlebar switch (right) coupler | red/black–red/black |



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.

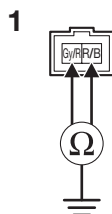
Ground short circuit check “A”

| | |
|--|-------------------------------------|
| Between cylinder-#2 ignition coil coupler “1” and ground | gray/red–ground red/black–ground |
|--|-------------------------------------|

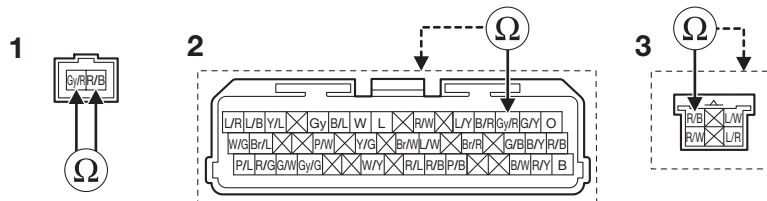
Lines short circuit check “B”

| | |
|--------------------------------------|--------------------------------------|
| Cylinder-#2 ignition coil coupler | gray/red–red/black |
| ECU coupler “2” | gray/red–any other coupler terminal |
| Handlebar switch (right) coupler “3” | red/black–any other coupler terminal |

A



B



Is resistance $\infty \Omega$?

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 cylinder-#2 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 cylinder-#2 ignition coil.

- Measure the primary coil resistance of the cylinder-#2 ignition coil.
Refer to “CHECKING THE IGNITION COILS” on page 8-42.

Is check result OK?

YES

→ Go to step 6.

NO

- a. Replace the cylinder-#2 ignition coil.
Refer to “CAMSHAFTS” on page 5-23.
- 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 31)
- Confirm that spark plug does not sparking.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.
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.

EAS20785

P0458

EAS33528

TROUBLESHOOTING**Item**

Purge cut valve solenoid: open circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Connection of purge cut valve 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", 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**

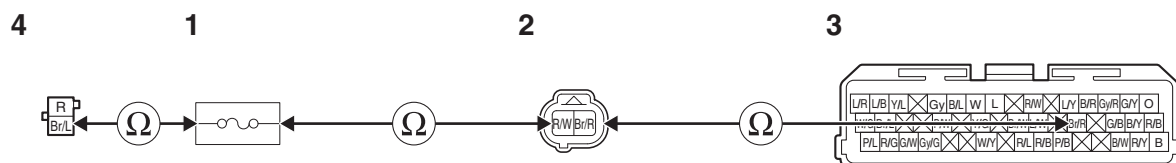
→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
 - Disconnect the ignition fuse holder "1", purge cut valve solenoid coupler "2", ECU coupler "3" and main switch coupler "4".
 - Open circuit check

| | |
|---|-----------------------|
| Between ignition fuse holder and purge cut valve solenoid coupler | red/white–red/white |
| Between purge cut valve solenoid coupler and ECU coupler | brown/red–brown/red |
| Between main switch coupler and ignition fuse holder | brown/blue–brown/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 “REPLACING THE ECU (engine control unit)” on page 8-38.

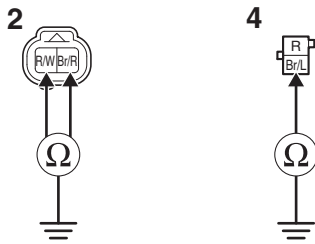
Ground short circuit check “A”

| | |
|---|--------------------------------------|
| Between purge cut valve solenoid coupler “2” and ground | red/white–ground brown/red–ground |
| Between main switch coupler “4” and ground | brown/blue–ground |

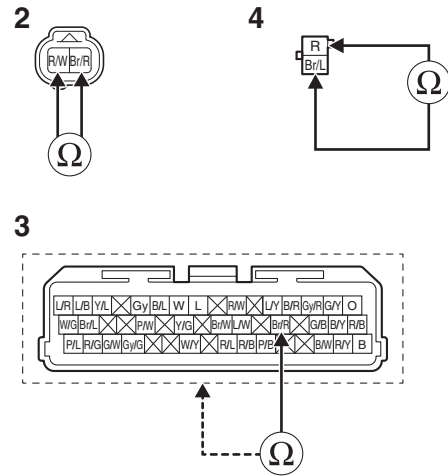
Lines short circuit check “B”

| | |
|----------------------------------|--------------------------------------|
| Purge cut valve solenoid coupler | red/white–brown/red |
| ECU coupler “3” | brown/red–any other coupler terminal |
| Main switch coupler | brown/blue–red |

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of purge cut valve solenoid.

- Check for looseness or pinching.
Refer to “FUEL TANK” on page 7-1.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Reinstall or replace the purge cut valve solenoid.
Refer to “FUEL TANK” on page 7-1.
- 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 purge cut valve solenoid.

- Execute the diagnostic mode. (Code 46)

Is the solenoid operating sound heard?

YES

→ Go to step 7, and complete the service.

NO

→ Check the purge cut valve solenoid.

Refer to “CHECKING THE PURGE CUT VALVE SOLENOID” on page 8-49.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the purge cut valve solenoid.

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 8-38.

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

- 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

→ 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 6, and complete the service.

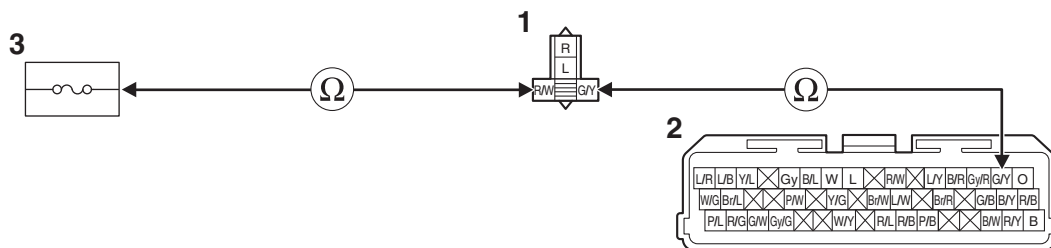
NO

→ Go to step 3.

3. Wire harness continuity.
 - Disconnect the radiator fan motor relay "1", ECU coupler "2" and ignition fuse holder "3".
 - Open circuit check

| | |
|---|---------------------|
| Between radiator fan motor relay and ignition fuse holder | red/white-red/white |
|---|---------------------|

| | |
|--|---------------------------|
| Between radiator fan motor relay and ECU coupler | green/yellow–green/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.

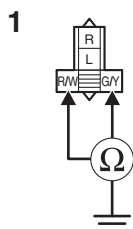
Ground short circuit check “A”

| | |
|---|---|
| Between radiator fan motor relay “1” and ground | green/yellow–ground red/white–ground |
|---|---|

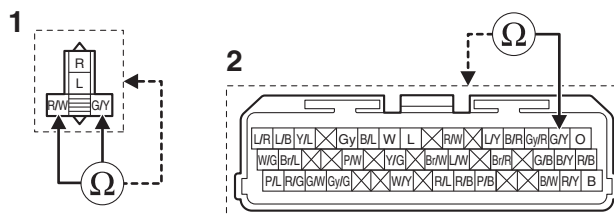
Lines short circuit check “B”

| | |
|--------------------------|---|
| Radiator fan motor relay | green/yellow–any other coupler terminal red/white–any other coupler terminal |
| ECU coupler “2” | green/yellow–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 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 8-38.

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.

EAS20589

P0507

EAS33069

TROUBLESHOOTING**Item**

Engine idling speed is too high.

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.
- P0560, P1500

1. Locate the malfunction.

- Execute the diagnostic mode. (Code 54)
- Fully closes the ISC (Idle Speed Control) valve, and then fully opens the valve. This operation takes approximately 6 seconds.

Is the ISC operating sound heard?**YES**

→ Go to step 2.

NO

→ Go to step 7.

2. Incorrect rear wheel sensor signal.

- Check the rear wheel sensor.
- Execute the diagnostic mode. (Code 07)
- Rear wheel stop: The pulse integrated value should be constant.
- Rotate the rear wheel by hand and check that the indicated value increases.

Is check result OK?**YES**

- a. Start the engine and let it idle for approximately 10 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 6, and complete the service.

NO

→ Go to step 3.

NO

→ Go to DTC No. P1500.

Refer to "P1500" on page 9-152.

3. Throttle valve does not fully close due to malfunction in throttle cables.

- Check the throttle grip free play.
Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-31.

Is check result OK?**YES**

→ Go to step 4.

NO

-
- a. Replace the cables.
 - b. Start the engine and let it idle for approximately 10 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 6, and complete the service.

NO

→ Go to step 4.

4. ISC (Idle Speed Control) valve is not moving correctly.

- Check the ISC (Idle Speed Control) valve.

Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-11.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the ISC (Idle Speed Control) valve.
- b. Start the engine and let it idle for approximately 10 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 6, and complete the service.

NO

→ Go to step 5.

5. Malfunction in ECU.

- Replace the ECU.

Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

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.

7. Connection of ISC (Idle Speed Control) unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 8.

NO

- a. Connect the coupler securely or replace the sub-wire harness.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 8.

8. Connection of wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.

- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 9.

NO

- Connect the coupler securely or replace the wire harness and/or sub-wire harness.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 9.

9. 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 10.

NO

- Connect the coupler securely or replace the wire harness.
- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

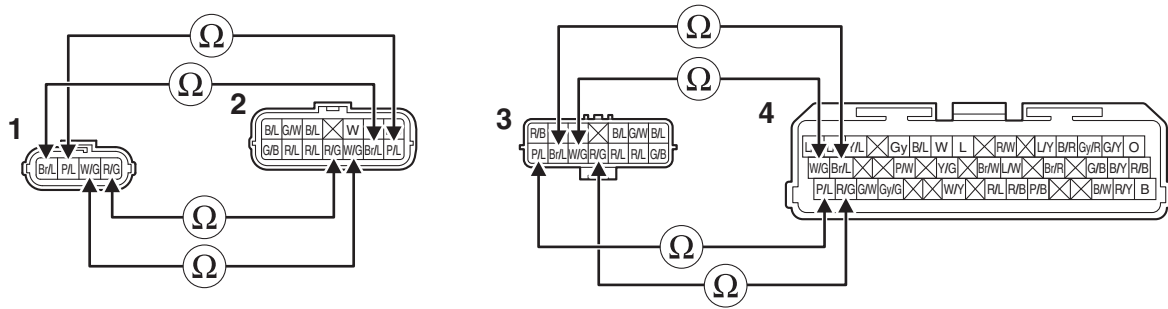
NO

→ Go to step 10.

10. Wire harness continuity.

- Disconnect the ISC (Idle Speed Control) unit coupler "1" sub-wire harness coupler (wire harness side) "2", wire harness coupler (sub-wire harness side) "3" and ECU coupler "4".
- Open circuit check

| | |
|---|--|
| Between ISC (Idle Speed Control) unit coupler and sub-wire harness coupler (wire harness side). | red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue |
| Between the wire harness coupler (sub-wire harness side) and ECU coupler. | red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 11.

- Short circuit check

TIP

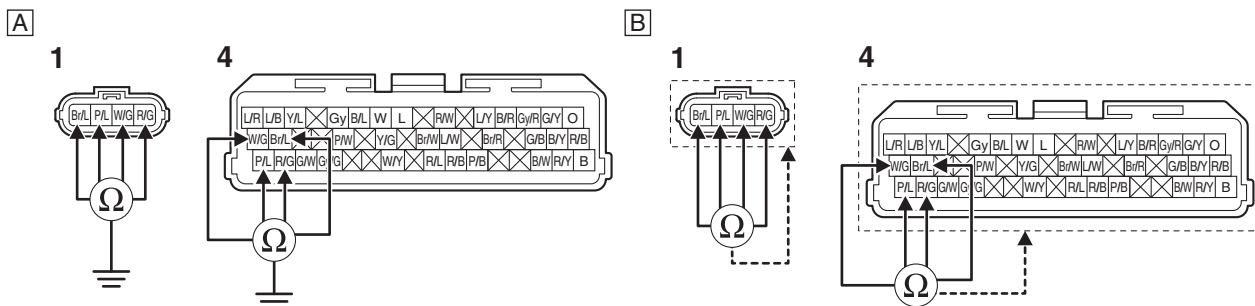
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|--|---|
| Between ISC (Idle Speed Control) unit coupler “1” and ground | red/green–ground white/green–ground brown/blue–ground pink/blue–ground |
| Between ECU coupler “4” and ground | red/green–ground white/green–ground brown/blue–ground pink/blue–ground |

Lines short circuit check “B”

| | |
|---------------------------------------|---|
| ISC (Idle Speed Control) unit coupler | red/green–any other coupler terminal white/green–any other coupler terminal brown/blue–any other coupler terminal pink/blue–any other coupler terminal |
| ECU coupler | red/green–any other coupler terminal white/green–any other coupler terminal brown/blue–any other coupler terminal pink/blue–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 11.

NO

- a. Replace the wire harness and/or sub-wire harness.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 11.

11. Installed condition of ISC (Idle Speed Control) unit.

- Improperly installed ISC (Idle Speed Control) unit.
- Check the intake air passages for air leaks.

Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-11.

Is check result OK?

YES

→ Go to step 12.

NO

- a. Reinstall or replace the ISC (Idle Speed Control) unit.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 12.

12. ISC (Idle Speed Control) valve is not moving correctly.

- Check the ISC (Idle Speed Control) valve.

Refer to “CHECKING AND CLEANING THE THROTTLE BODIES” on page 7-11.

Is check result OK?

YES

→ Go to step 13.

NO

- a. Replace the ISC (Idle Speed Control) valve.
- b. Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 14, and complete the service.

NO

→ Go to step 13.

13. Malfunction in ECU.

- Replace the ECU.

Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

14. Delete the DTC and check that the MIL goes off.

- Start the engine and let it idle for approximately 10 seconds.
- Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20590

P0511

EAS33070

TROUBLESHOOTING

Item

ISC (Idle Speed Control) valve: ISC valve does not operate.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

TIP

Do not remove the ISC valve from the throttle body.

1. Connection of ISC unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 2.

NO

- a. Connect the coupler securely or replace the sub-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 wire harness coupler and sub-wire harness coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 3.

NO

- a. Connect the coupler securely or replace the wire harness and/or sub-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 check result OK?

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

- 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.

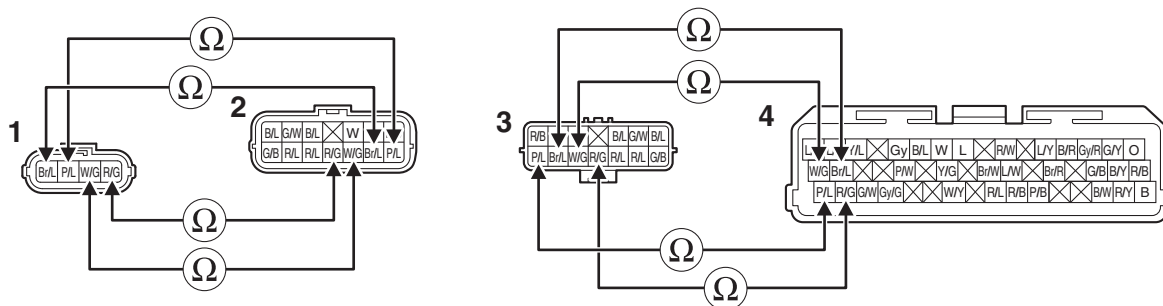
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the ISC (Idle Speed Control) unit coupler “1”, sub-wire harness coupler (wire harness side) “2”, wire harness coupler (sub-wire harness side) “3” and ECU coupler “4”.
- Open circuit check

| | |
|---|--|
| Between ISC (Idle Speed Control) unit coupler and sub-wire harness coupler (wire harness side). | red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue |
| Between the wire harness coupler (sub-wire harness side) and ECU coupler. | red/green–red/green white/green–white/green brown/blue–brown/blue pink/blue–pink/blue |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- Replace the wire harness and/or sub-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.

- Short circuit check

TIP

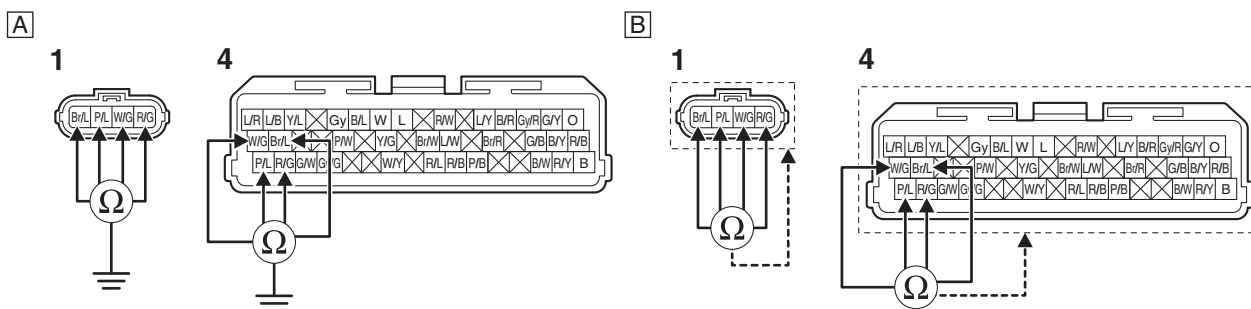
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|--|---|
| Between ISC (Idle Speed Control) unit “1” coupler and ground | red/green–ground white/green–ground brown/blue–ground pink/blue–ground |
| Between ECU coupler “4” and ground | red/green–ground white/green–ground brown/blue–ground pink/blue–ground |

Lines short circuit check “B”

| | |
|---------------------------------------|---|
| ISC (Idle Speed Control) unit coupler | red/green–any other coupler terminal white/green–any other coupler terminal brown/blue–any other coupler terminal pink/blue–any other coupler terminal |
| ECU coupler | red/green–any other coupler terminal white/green–any other coupler terminal brown/blue–any other coupler terminal pink/blue–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 5.

NO

- Replace the wire harness and/or sub-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. Faulty ISC valve operation.

- Execute the diagnostic mode. (Code 54)

Is the ISC operating sound heard?

YES

→ Go to step 6.

NO

- a. Replace the ISC valve.
Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-11.
- 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 8-38.

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.

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

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0335

1. Malfunction in charging system.

- Check the charging system.
Refer to "CHARGING SYSTEM" on page 8-12.

Is check result OK?

YES

- 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 2, and complete the service.

NO

→ Repeat step 1.

NO

- Defective rectifier/regulator or AC magneto → Replace.
- Defective connection in the charging system circuit → Properly connect or replace the wire harness.
- Start the engine and let it idle for approximately 5 seconds.
- Check the condition of the 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 8-38.
- 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/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Locate the malfunction.
 - Execute the diagnostic mode (Code 60)
 - 00**
Go to step 5.
 - 01**
Go to step 2.
 - 02**
Go to step 3.
 - Except 00–02**
Go to step 4.
2. “01” is indicated in diagnostic mode (Code 60). EEPROM data error for adjustment of CO concentration of cylinder #1.
 - Change the CO concentration of cylinder #1, and rewrite in EEPROM.
Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-12.
 - After this adjustment is made, 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 6, and complete the service.

NO

- a. Repeat step 1.
- b. If the same number is indicated, go to item 5.

3. “02” is indicated in diagnostic mode (Code 60). EEPROM data error for adjustment of CO concentration of cylinder #2.
 - Change the CO concentration of cylinder #2, and rewrite in EEPROM.
Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-12.
 - After this adjustment is made, 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 6, and complete the service.

NO

- a. Repeat step 1.
- b. If the same number is indicated, go to item 5.

4. Except “00-02” is indicated in diagnostic mode (Code 60). EEPROM data error for corresponding learning/memory 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 6, and complete the service.

NO

- a. Repeat step 1.
- b. If the same number is indicated, go to item 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

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.

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**TIP**

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.

- P0335

1. Connection of relay unit coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 2.

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 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.

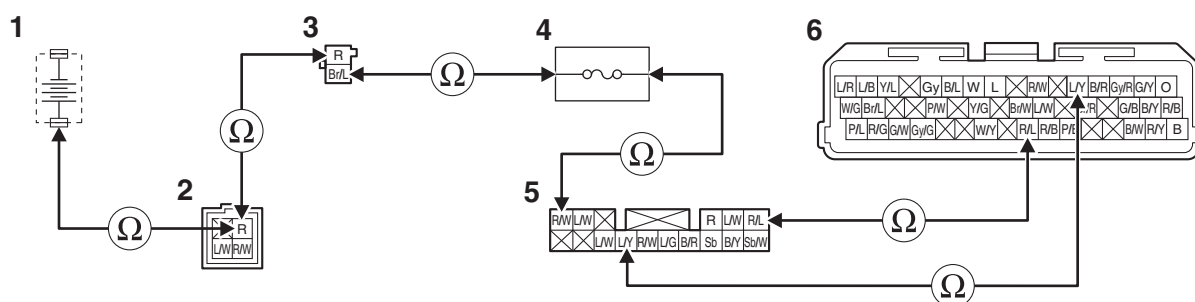
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the battery terminal “1”, main fuse coupler “2”, main switch coupler “3”, ignition fuse holder “4”, relay unit coupler “5” and ECU coupler “6”.
- Open circuit check

| | |
|--|--|
| Between battery terminal and main fuse coupler | red-red |
| Between main fuse coupler and main switch coupler | red-red |
| Between main switch coupler and ignition fuse holder | brown/blue-brown/blue |
| Between ignition fuse holder and relay unit coupler | red/white-red/white |
| Between relay unit coupler and ECU coupler | red/blue-red/blue blue/yellow-blue/yellow |



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

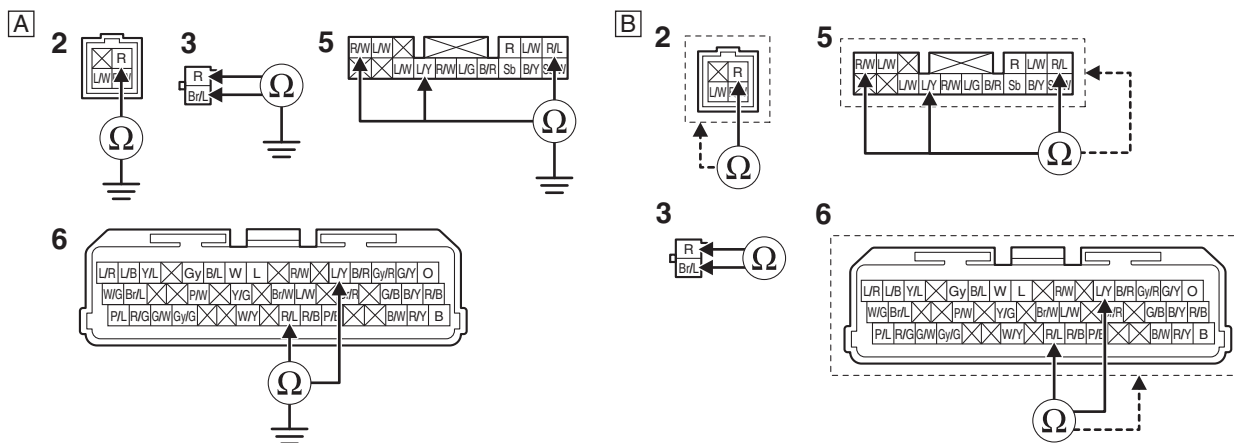
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|---|
| Between main fuse coupler “2” and ground. | red-ground |
| Between main switch coupler “3” and ground. | red-ground brown/blue-ground |
| Between relay unit coupler “5” and ground. | red/white-ground red/blue-ground blue/yellow-ground |
| Between ECU coupler “6” and ground. | red/blue-ground blue/yellow-ground |

Lines short circuit check “B”

| | |
|---------------------|---|
| Main fuse coupler | red–any other coupler terminal |
| Main switch coupler | red–brown/blue |
| Relay unit coupler | red/white–any other coupler terminal red/blue–any other coupler terminal blue/yellow–any other coupler terminal |
| ECU coupler | red/blue–any other coupler terminal blue/yellow–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 4.

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.

4. Defective relay unit.

- Execute the diagnostic mode. (Code 50)
- Check the operating sound of the relay.

Is check result OK?

YES

→ Go to step 5.

NO

- Replace the relay unit.
- 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 5.

5. Defective relay unit.

- Execute the diagnostic mode. (Code 09)

Is the fuel system voltage less than 3V?

YES

- a. Replace the relay unit.
- 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.

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 8-38.

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.

EAS20764

P1500

EAS33303

TROUBLESHOOTING

Item

- Rear wheel sensor: no normal signals are received from the rear wheel sensor.
- Neutral switch: open or short circuit is detected.
- Clutch switch: open or short circuit is detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Locate the malfunction.
 - DTC P1500 detected.
 - a. Execute the diagnostic mode. (Code 07)
 - b. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step c.

NO

→ Go to step 2.

TIP

Perform the procedure from step 2 to step 7 and step 21.

- c. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is check result OK?

YES

→ Go to step d.

NO

→ Go to step 8.

TIP

Perform the procedure from step 8 to step 14 and step 21.

- d. Execute the diagnostic mode. (Code 21)

| | |
|--|----|
| When the transmission is in gear with the clutch lever squeezed and the side-stand retracted | ON |
|--|----|

Is check result OK?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 15.

TIP

Perform the procedure from step 15 to step 21.

2. Connection of rear wheel sensor coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 3.

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 21, and complete the service.

NO

→ Go to step 3.

3. Connection of ABS ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 21, and complete the service.

NO

→ Go to step 4.

4. Connection of ECU coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?**YES**

→ Go to step 5.

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 21, and complete the service.

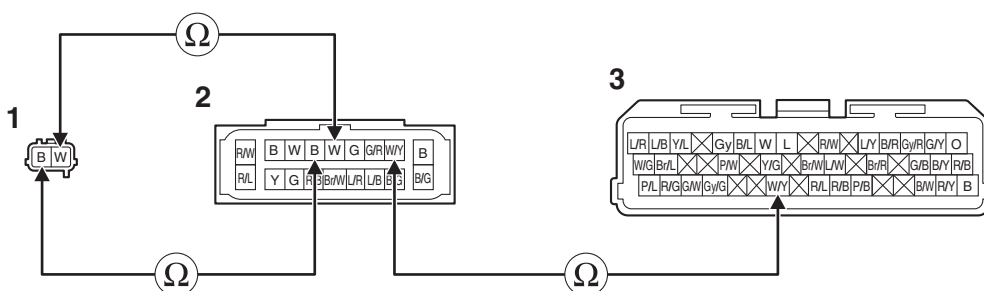
NO

→ Go to step 5.

5. 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 white–white |
| Between ABS ECU coupler and ECU coupler | white/yellow–white/yellow |



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 21, and complete the service.

NO

→ Go to step 6.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

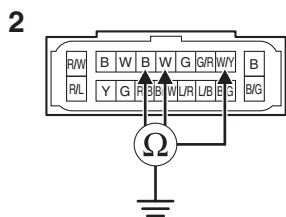
Ground short circuit check “A”

| | |
|--|---|
| Between ABS ECU coupler “2” and ground | black–ground white–ground white/yellow–ground |
|--|---|

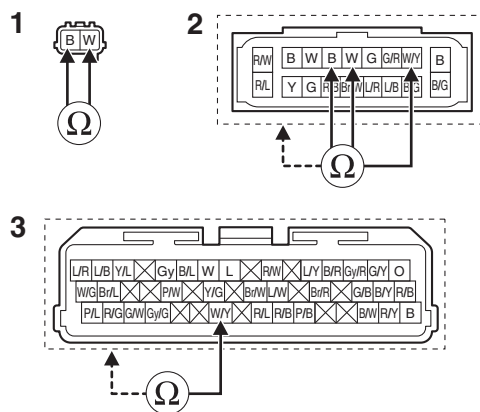
Lines short circuit check “B”

| | |
|-------------------------------|---|
| Rear wheel sensor coupler “1” | black–white |
| ABS ECU coupler | black–any other coupler terminal white–any other coupler terminal white/yellow–any other coupler terminal |
| ECU coupler “3” | white/yellow–any other coupler terminal |

A



B



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

NO

- a. 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 21, 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 8-38.
- 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 21, and complete the service.

NO

→ Go to step 7.

7. Malfunction in ABS ECU.

- Replace the ABS ECU and go to step 21, and complete the service.

8. Connection of gear position switch coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 9.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 9.

9. 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 10.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

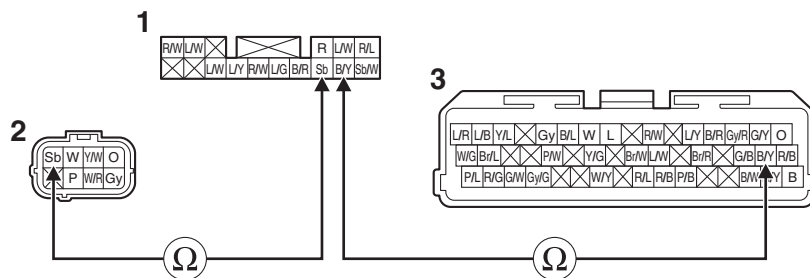
NO

→ Go to step 10.

10. Wire harness continuity.

- Disconnect the relay unit coupler “1”, gear position switch coupler “2” and ECU coupler “3”.
- Open circuit check

| | |
|---|---------------------------|
| Between relay unit coupler and ECU coupler | black/yellow–black/yellow |
| Between relay unit coupler and gear position switch coupler | sky blue–sky blue |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 11.

- Short circuit check

TIP

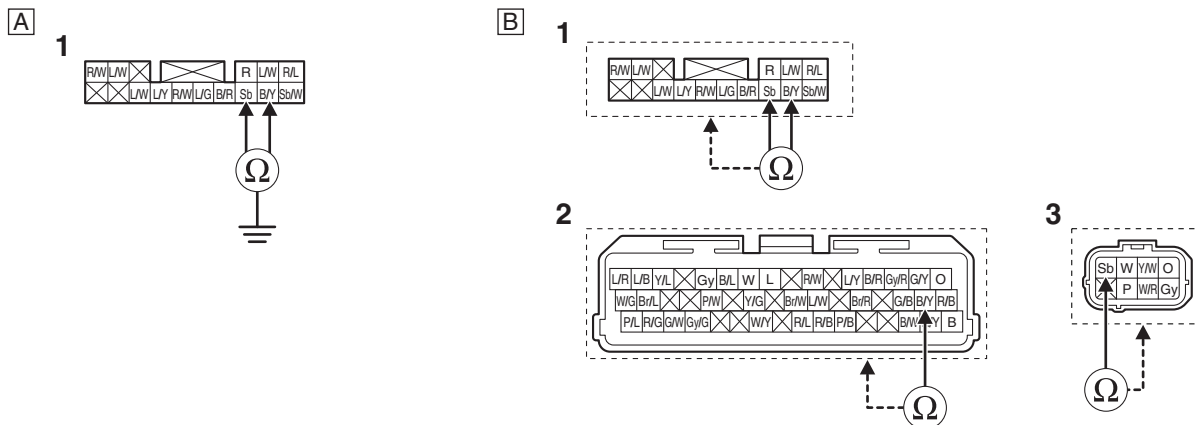
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|--|
| Between relay unit coupler “1” and ground | black/yellow–ground sky blue–ground |
|---|--|

Lines short circuit check “B”

| | |
|----------------------------------|--|
| Relay unit coupler | black/yellow–any other coupler terminal sky blue–any other coupler terminal |
| ECU coupler “2” | black/yellow–any other coupler terminal |
| Gear position switch coupler “3” | sky blue–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 11.

NO

- a. Replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 11.

11. Defective relay unit (diode).

- Check the relay unit (diode).

Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-41.

Is check result OK?

YES

→ Go to step 12.

NO

- Replace the relay unit.
- Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 12.

12. Defective gear position switch.

- Check the gear position switch.
- Refer to “CHECKING THE GEAR POSITION SWITCH” on page 8-48.

Is check result OK?

YES

→ Go to step 13.

NO

- Replace the gear position switch.
Refer to “CRANKCASE” on page 5-73.
- Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the transmission is in neutral | ON |
| When the transmission is in gear with the clutch lever released | OFF |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 13.

13. Faulty shift drum (neutral detection area).

- Check the shift drum.

Refer to “CHECKING THE SHIFT DRUM ASSEMBLY” on page 5-98.

Is check result OK?

YES

→ Go to step 14.

NO

→ Replace the shift drum and go to step 21.
Refer to “TRANSMISSION” on page 5-94.

14. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

15. Clutch lever adjustment.

- Refer to “ADJUSTING THE CLUTCH LEVER FREE PLAY” on page 3-13.
- Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 16.

16. Connection of handlebar switch (left) coupler and clutch switch coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 17.

NO

- a. Connect the coupler securely or replace the left handlebar switch.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 17.

17. 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 18.

NO

- a. Connect the coupler securely or replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

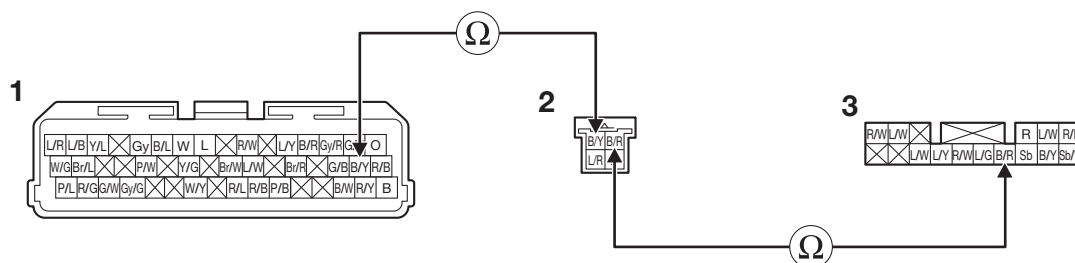
NO

→ Go to step 18.

18. Wire harness continuity.

- Disconnect the ECU coupler “1”, handlebar switch (left) coupler “2” and relay unit coupler “3”.
- Open circuit check

| | |
|--|---------------------------|
| Between ECU coupler and handlebar switch (left) coupler | black/yellow–black/yellow |
| Between handlebar switch (left) coupler and relay unit coupler | black/red–black/red |



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

- a. Replace the wire harness.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 19.

- Short circuit check

TIP

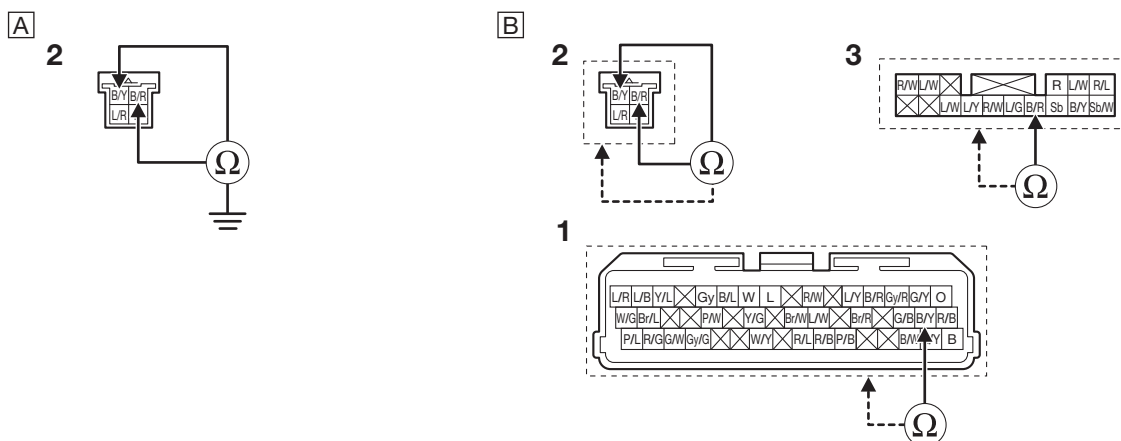
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|--|---|
| Between handlebar switch (left) coupler “2” and ground | black/yellow–ground black/red–ground |
|--|---|

Lines short circuit check “B”

| | |
|---------------------------------|---|
| Handlebar switch (left) coupler | black/yellow–any other coupler terminal black/red–any other coupler terminal |
| Relay unit coupler “3” | black/red–any other coupler terminal |
| ECU coupler “1” | black/yellow–any other coupler terminal |



Is resistance ∞ Ω?

YES

→ Go to step 19.

NO

- Replace the wire harness.
- Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 19.

19. Defective clutch switch.

- Check the clutch switch.

Refer to “CHECKING THE SWITCHES” on page 8-37.

Is check result OK?

YES

→ Go to step 20.

NO

- a. Replace the clutch switch.
Refer to "HANDLEBAR" on page 4-62.
- b. Execute the diagnostic mode. (Code 21)

| | |
|---|-----|
| When the clutch lever is released with the transmission in gear and when the sidestand is retracted | OFF |
| When the clutch lever is squeezed with the transmission in gear and when the sidestand is retracted | ON |

Is it correct indication?

YES

→ Go to step 21, and complete the service.

NO

→ Go to step 20.

20. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

21. Delete the DTC and check that the MIL goes off.

- Turn the main switch to "ON", and then rotate the rear wheel by hand.
- Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph).
- Confirm that the 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".

EAS20614

P1601

EAS33094

TROUBLESHOOTING**Item**

Sidestand switch: open or short circuit of the black/red 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 relay unit coupler.
 - Check the locking condition of the coupler.
 - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 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.

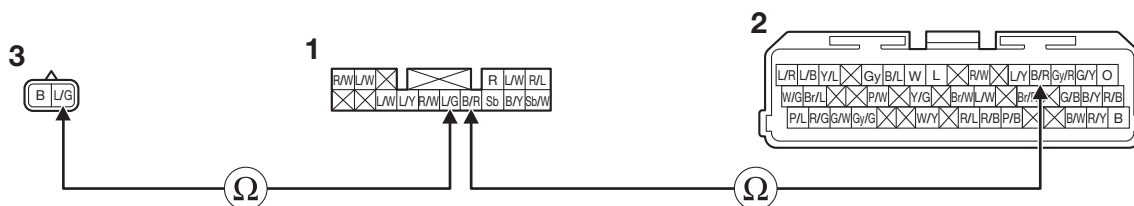
NO

→ Go to step 4.

4. Wire harness continuity.

- Disconnect the relay unit coupler “1”, ECU coupler “2” and sidestand switch coupler “3”.
- Open circuit check

| | |
|---|-----------------------|
| Between relay unit coupler and ECU coupler | black/red–black/red |
| Between relay unit coupler and sidestand switch coupler | blue/green–blue/green |



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 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 5.

- Short circuit check

TIP

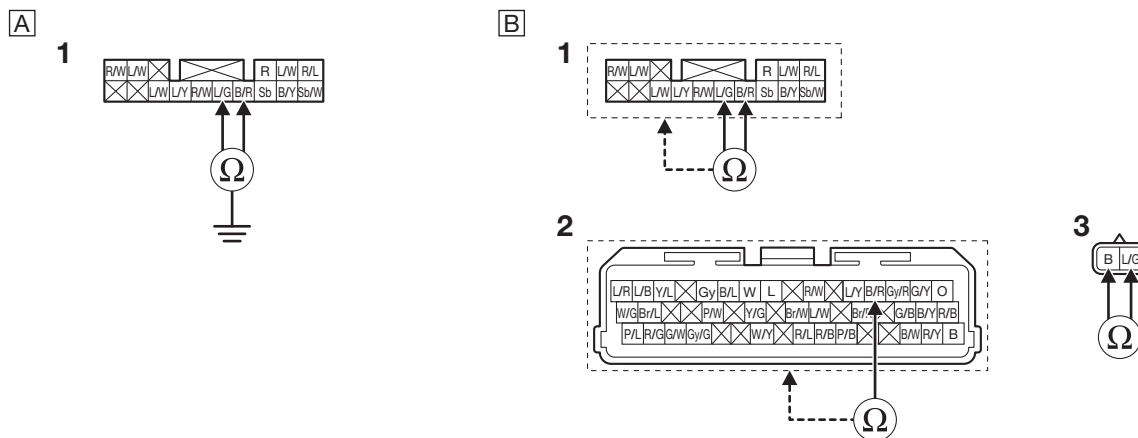
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|---------------------------------------|
| Between relay unit coupler “1” and ground | black/red–ground blue/green–ground |
|---|---------------------------------------|

Lines short circuit check "B"

| | |
|------------------------------|---|
| Relay unit coupler | black/red–any other coupler terminal blue/green–any other coupler terminal |
| ECU coupler "2" | black/red–any other coupler terminal |
| Sidestand switch coupler "3" | blue/green–black |



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)
- Shift the transmission into gear.

| | |
|---------------------|-----|
| 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 8-38.

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/Unable to start engine
- Able/Unable 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

- a. Reinstall or replace the battery leads.
- 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 starter relay coupler.

- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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. 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

- 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. Check the fuel injection system fuse.

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the fuse.
- 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.

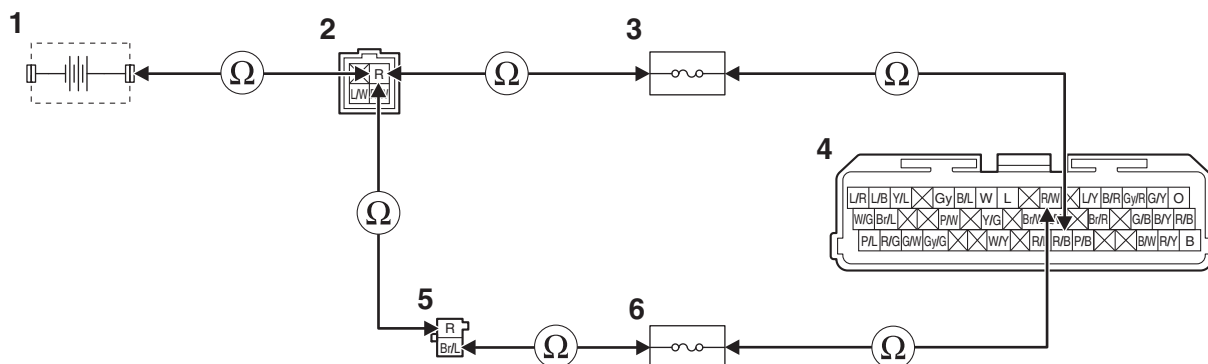
NO

→ Go to step 5.

5. Wire harness continuity.

- Disconnect the battery “1”, starter relay coupler (main fuse) “2”, fuel injection system fuse holder “3”, ECU coupler “4”, main switch coupler “5” and ignition fuse holder “6”.
- Open circuit check

| | |
|---|-----------------------|
| Between battery and starter relay coupler | red-red |
| Between starter relay coupler and fuel injection system fuse holder | red-red |
| Between starter relay coupler and main switch coupler | red-red |
| Between fuel injection system fuse holder and ECU coupler | red/black-red/black |
| Between main switch coupler and ignition fuse holder | brown/blue-brown/blue |
| Between ignition fuse holder and ECU coupler | red/white-red/white |



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 6.

- Short circuit check

TIP

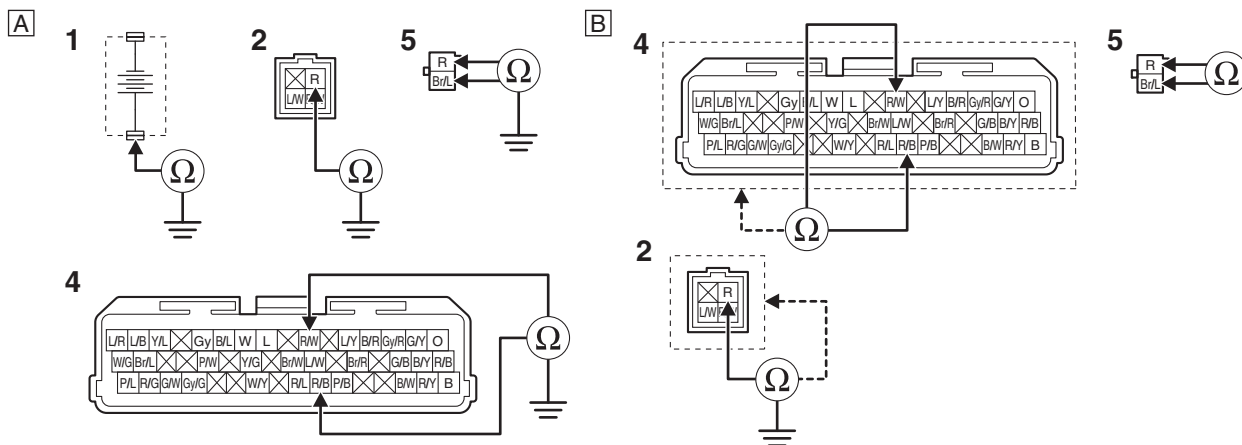
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|--|--------------------------------------|
| Between battery “1” and ground | red-ground |
| Between starter relay coupler (main fuse) “2” and ground | red-ground |
| Between ECU coupler “4” and ground | red/black-ground red/white-ground |
| Between main switch coupler “5” and ground | red-ground brown/blue-ground |

Lines short circuit check “B”

| | |
|-----------------------|--|
| ECU coupler | red/black-any other coupler terminal red/white-any other coupler terminal |
| Main switch coupler | brown/blue-red |
| Starter relay coupler | red-any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 6.

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 6.

6. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

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.

EAS20617

P1604, P1605

EAS33097

TROUBLESHOOTING

Item

- [P1604] Lean angle sensor: ground short circuit detected.
- [P1605] Lean angle sensor: open or power 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

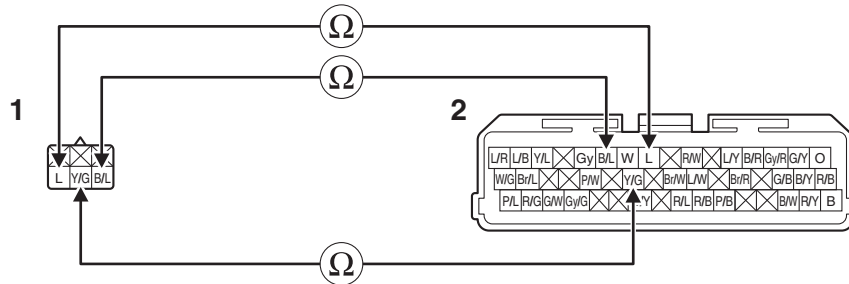
→ Go to step 6, and complete the service.

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 yellow/green–yellow/green 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.

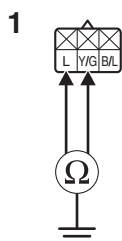
Ground short circuit check “A”

| | |
|--|------------------------------------|
| Between lean angle sensor coupler “1” and ground | blue–ground yellow/green–ground |
|--|------------------------------------|

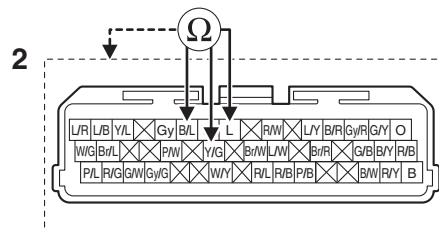
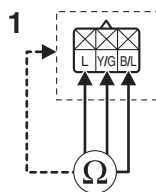
Lines short circuit check “B”

| | |
|---------------------------|---|
| Lean angle sensor coupler | blue–any other coupler terminal yellow/green–any other coupler terminal black/blue–any other coupler terminal |
| ECU coupler “2” | blue–any other coupler terminal yellow/green–any other coupler terminal black/blue–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”, 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 4.

4. Defective lean angle sensor.

- Execute the diagnostic mode. (Code 08)

| | |
|---|---|
|  | Lean angle sensor Operating angle 65 ° Output voltage up to operating angle 0.4–1.4 V Output voltage over operating angle 3.7–4.4 V |
|---|---|

Is check result OK?

YES

→ Go to step 5.

NO

- a. Replace the lean angle sensor.
- 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 5.

5. Malfunction in ECU.

- Replace the ECU, and complete the service.
Refer to “REPLACING THE ECU (engine control unit)” on page 8-38.

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.

EAS20649

U0155 or Err

EAS33129

TROUBLESHOOTING

Item

Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

TIP

“Err” is displayed on the multi-function meter, but the MIL does not come on.

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 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”, 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.

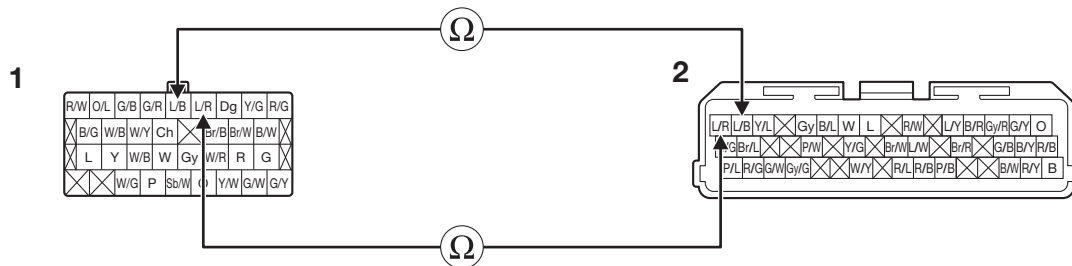
NO

→ Go to step 3.

3. Wire harness continuity.

- Disconnect the meter assembly coupler “1” and ECU coupler “2”.
- Open circuit check

| | |
|--|--|
| Between meter assembly coupler and ECU coupler | blue/red–blue/red blue/black–blue/black |
|--|--|



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 6, and complete the service.

NO

→ Go to step 4.

- Short circuit check

TIP

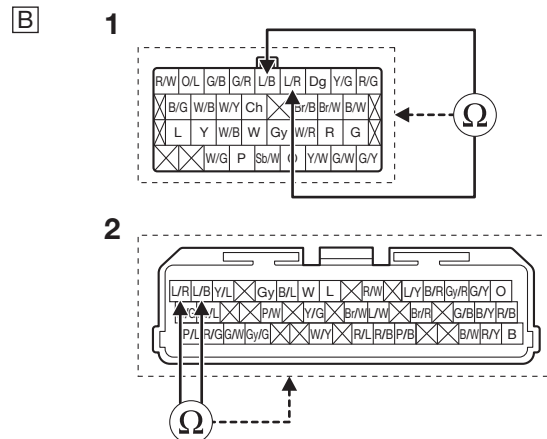
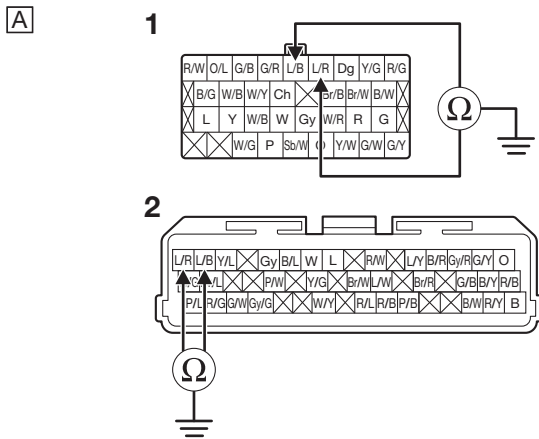
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|--------------------------------------|
| Between meter assembly coupler “1” and ground | blue/red–ground blue/black–ground |
| Between ECU coupler “2” and ground | blue/red–ground blue/black–ground |

Lines short circuit check “B”

| | |
|------------------------|--|
| Meter assembly coupler | blue/red–any other coupler terminal blue/black–any other coupler terminal |
| ECU coupler | blue/red–any other coupler terminal blue/black–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 6, and complete the service.

NO

→ Go to step 4.

4. Defective meter assembly.

- Replace the meter assembly.

Refer to “GENERAL CHASSIS (5)” on page 4-10.

- 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 8-38.

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.

EAS20680

51_IMMOBILIZER

EAS33309

TROUBLESHOOTING

Item

Code cannot be transmitted between the key and the immobilizer unit.

Cause

- Radio wave interference caused by objects around the keys and antennas.
- Immobilizer unit malfunction.
- Key malfunction.

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 2.

NO

→ Service is completed.

2. Replace the main switch/immobilizer unit.
Refer to "STEERING HEAD" on page 4-79.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 3.

NO

→ Service is completed.

3. Key malfunction.
 - Replace the key, and complete the service.

EAS20679

52_IMMobilizer

EAS33308

TROUBLESHOOTING

Item

Codes between the key and immobilizer unit do not match.

Cause

- Signal received from other transponder (failed to recognize code after ten consecutive attempts).
- Signal received from unregistered standard key.

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Place the immobilizer unit at least 50 mm away from the transponder of other vehicles.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 2.

NO

→ Service is completed.

2. Register the standard key, and complete the service.

EAS20681

53_IMMobilizer

EAS33310

TROUBLESHOOTING

Item

Codes cannot be transmitted between the ECU and the immobilizer unit.

Cause

- Noise interference or disconnected lead/cable.
- Interference due to radio wave noise.
- Disconnected communication harness.
- Immobilizer unit malfunction.
- ECU malfunction.

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Check the wire harness and connector.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 2.

NO

→ Service is completed.

2. Replace the main switch/immobilizer unit.
Refer to "STEERING HEAD" on page 4-79.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 3.

NO

→ Service is completed.

3. Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20682

54_IMMOBILIZER

EAS33311

TROUBLESHOOTING

Item

Codes transmitted between the ECU and the immobilizer unit do not match.

Cause

- Noise interference or disconnected lead/cable.
- Interference due to radio wave noise.
- Disconnected communication harness.
- Immobilizer unit malfunction.
- ECU failure. (The ECU or immobilizer unit was replaced with a used unit from another vehicle.)

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Register the code re-registering key.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 2.

NO

→ Service is completed.

2. Check the wire harness and connector.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 3.

NO

→ Service is completed.

3. Replace the main switch/immobilizer unit.
Refer to "STEERING HEAD" on page 4-79.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 4.

NO

→ Service is completed.

4. Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

EAS20683

55_IMMOBILIZER

EAS33312

TROUBLESHOOTING

Item

Key code registration malfunction.

Cause

- Same standard key was attempted to be registered two consecutive times.

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Register another standard key, and complete the service.

EAS20684

56_IMMOBILIZER

EAS33313

TROUBLESHOOTING

Item

Unidentified code is received.

Cause

- Noise interference or disconnected lead/cable.

Procedure

TIP

When a system malfunction occurs, the DTC number is indicated in the meter display and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the DTC. Refer to "HOW TO CHECK DTC" on page 9-20.

1. Check the wire harness and connector.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 2.

NO

→ Service is completed.

2. Replace the main switch/immobilizer unit.
Refer to "STEERING HEAD" on page 4-79.
 - Turn the main switch to "ON".

Is DTC displayed?

YES

→ Go to step 3.

NO

→ Service is completed.

3. Replace the ECU, and complete the service.
Refer to "REPLACING THE ECU (engine control unit)" on page 8-38.

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 4-18.

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 4-19.

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 4-19.

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 4-26.

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 4-27.

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 4-27.

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 4-18.

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 4-19.

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 4-19.

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 4-26.

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 4-27.

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 4-27.

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.

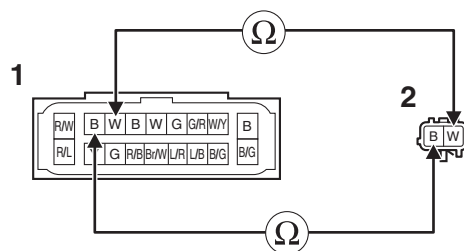
NO

→ 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 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.

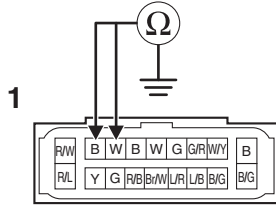
Ground short circuit check “A”

| | |
|--|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground black–ground |
|--|------------------------------|

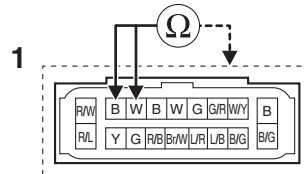
Lines short circuit check "B"

| | |
|-----------------|--|
| ABS ECU coupler | white—any other coupler terminal 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 4-16 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-54.

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.

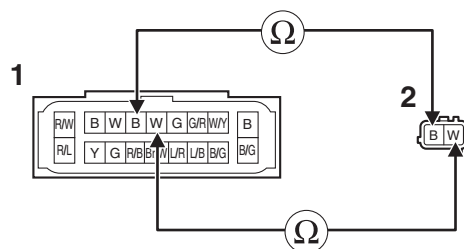
NO

→ 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 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.

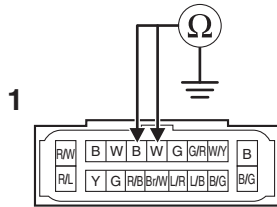
Ground short circuit check “A”

| | |
|--|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground black–ground |
|--|------------------------------|

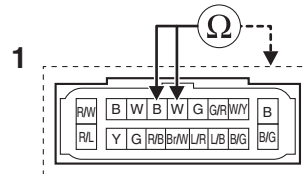
Lines short circuit check "B"

| | |
|-----------------|--|
| ABS ECU coupler | white—any other coupler terminal 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 4-23 and "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-54.

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 4-18.

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 4-19.

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 4-19.

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 4-26.

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 4-27.

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 4-27.

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 4-54.

EAS20710

24_ABS

EAS33374

TROUBLESHOOTING

Item

Brake light switch or tail/brake light

Procedure

- Defective signaling system. (tail/brake light or brake light switch)
 - Check the brake light switches.
Refer to "CHECKING THE SWITCHES" on page 8-37.

Is check result OK?

YES

→ Go to step 2.

NO

→ Repair or replace the defective part.

- 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

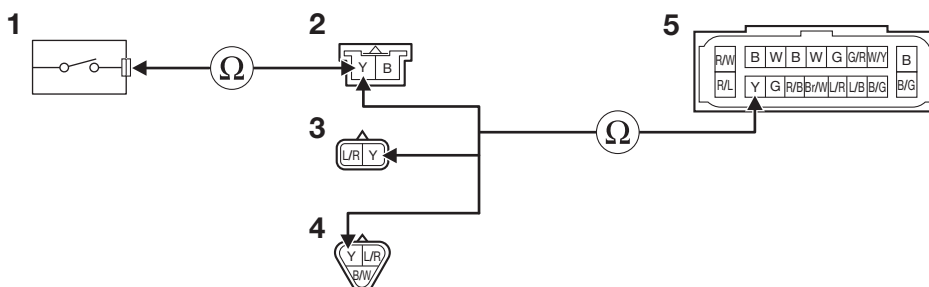
→ Go to step 3.

NO

→ Connect the coupler securely or replace the wire harness.

- Wire harness continuity.
 - Disconnect the front brake light switch connector "1" right handlebar switch coupler "2", rear brake light switch coupler "3", tail/brake light assembly coupler "4", and ABS ECU coupler "5".
 - Open circuit check

| | |
|---|---------------|
| Between front brake light switch connector and right handlebar switch coupler | yellow–yellow |
| Between right handlebar switch coupler and ABS ECU coupler | yellow–yellow |
| Between rear brake light switch coupler and ABS ECU coupler | yellow–yellow |
| Between tail/brake light assembly coupler and ABS ECU coupler | yellow–yellow |



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”

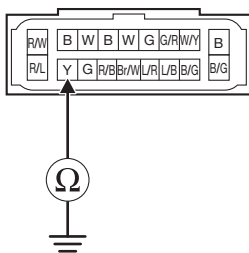
| | |
|--|---------------|
| Between ABS ECU coupler “5” and ground | yellow-ground |
|--|---------------|

Lines short circuit check “B”

| | |
|---------------------------------------|-----------------------------------|
| Right handlebar switch coupler “2” | yellow-any other coupler terminal |
| Rear brake light switch coupler “3” | yellow-blue/red |
| Tail/brake light assembly coupler “4” | yellow-any other coupler terminal |
| ABS ECU coupler | yellow-any other coupler terminal |

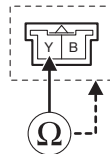
A

5



B

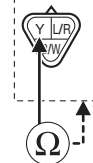
2



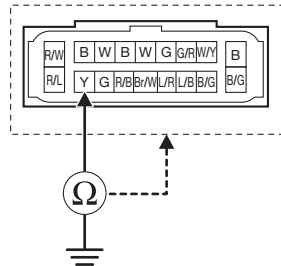
3



4



5



Is resistance ∞ Ω?

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 4-54.

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 8-38.

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

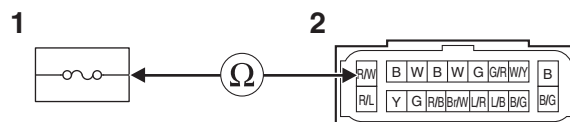
→ Go to step 3.

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/white-red/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.

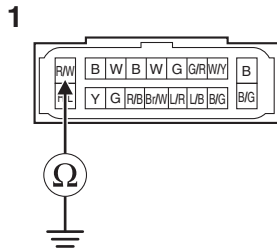
Ground short circuit check “A”

| | |
|--|------------------|
| Between ABS ECU coupler “1” and ground | red/white-ground |
|--|------------------|

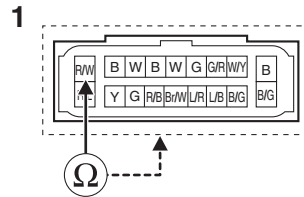
Lines short circuit check “B”

| | |
|-----------------|--------------------------------------|
| ABS ECU coupler | red/white-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 4-54.

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 4-54.

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 8-38.

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

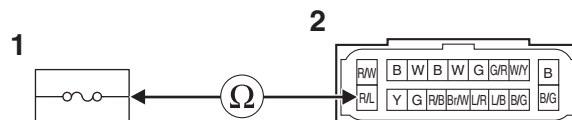
→ Go to step 3.

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.

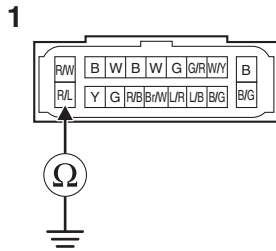
Ground short circuit check “A”

| | |
|--|-----------------|
| Between ABS ECU coupler “1” and ground | red/blue-ground |
|--|-----------------|

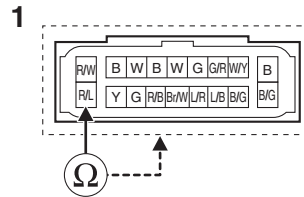
Lines short circuit check “B”

| | |
|-----------------|-------------------------------------|
| 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 4-54.

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 4-54.

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 4-19.

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 4-18 and “CHECKING THE FRONT BRAKE DISCS” on page 4-36.

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 DISCS” on page 4-36.

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 4-54.

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. ABS_42 and ABS_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 4-27.

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 4-26 and "CHECKING THE REAR BRAKE DISC" on page 4-49.

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 4-49.

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 4-54.

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 4-18.

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 4-19.

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 4-19.

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 4-26.

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 4-27.

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 4-27.

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 8-38.
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 8-38.
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.

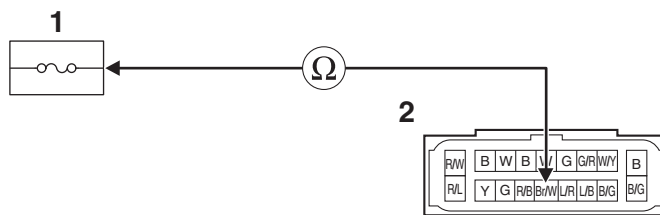
NO

→ 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.

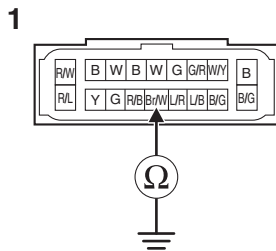
Ground short circuit check “A”

| | |
|--|--------------------|
| Between ABS ECU coupler “1” and ground | brown/white–ground |
|--|--------------------|

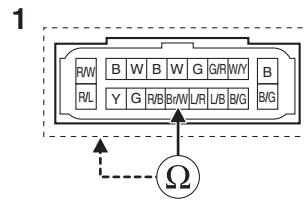
Lines short circuit check "B"

| | |
|-----------------|--|
| 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 8-38.
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.

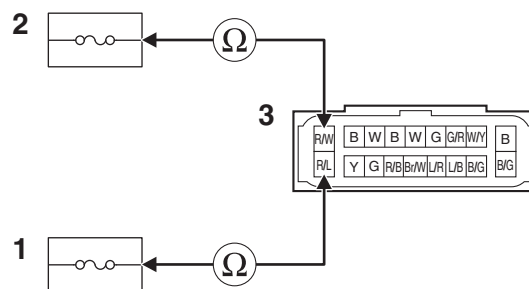
NO

→ 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/white–red/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.

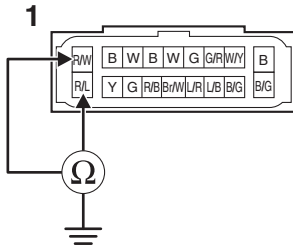
Ground short circuit check "A"

| | |
|--|-------------------------------------|
| Between ABS ECU coupler "1" and ground | red/blue-ground red/white-ground |
|--|-------------------------------------|

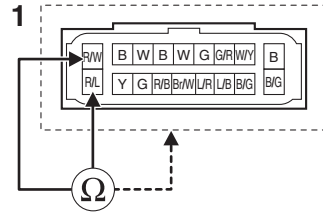
Lines short circuit check "B"

| | |
|-----------------|---|
| ABS ECU coupler | red/blue-any other coupler terminal red/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.

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 4-54.

EAS20703

63_ABS

EAS33334

TROUBLESHOOTING

Item

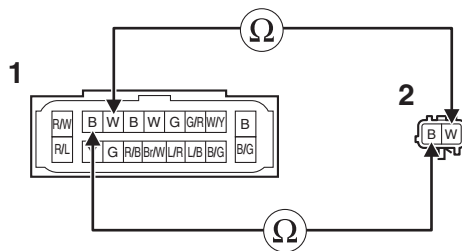
Front wheel sensor power supply (voltage of power supply is low)

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 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.

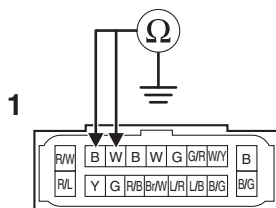
Ground short circuit check “A”

| | |
|--|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground black–ground |
|--|------------------------------|

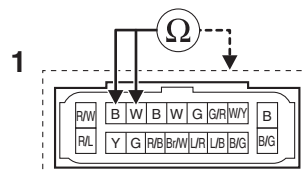
Lines short circuit check “B”

| | |
|-----------------|--|
| ABS ECU coupler | white–any other coupler terminal 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.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-54.

EAS20704

64_ABS

EAS33335

TROUBLESHOOTING

Item

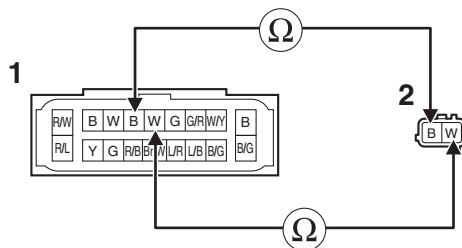
Rear wheel sensor power supply (voltage of power supply is low)

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 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.

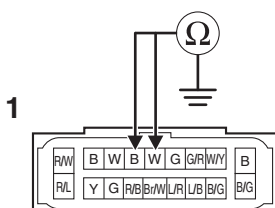
Ground short circuit check “A”

| | |
|--|------------------------------|
| Between ABS ECU coupler “1” and ground | white–ground black–ground |
|--|------------------------------|

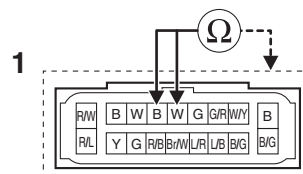
Lines short circuit check “B”

| | |
|-----------------|--|
| ABS ECU coupler | white–any other coupler terminal 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.

3. Defective hydraulic unit assembly.

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-54.

EAS20669

89_ABS

EAS33299

TROUBLESHOOTING

Item

CAN communication (between meter assembly and hydraulic unit assembly)

Procedure

1. Defective coupler between the meter assembly 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.

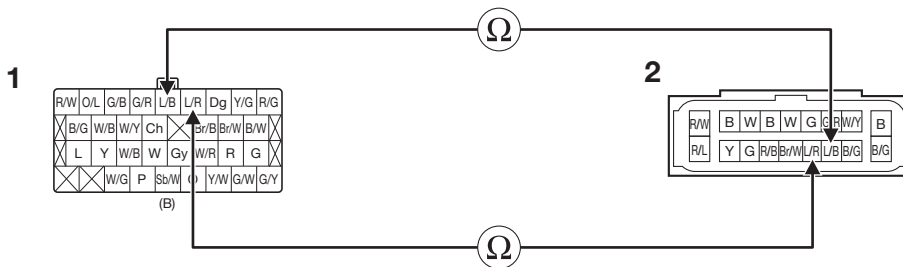
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the meter assembly coupler “1” and ABS ECU coupler “2”.
- Open circuit check

| | |
|--|--|
| Between meter assembly coupler “1” and ABS ECU coupler “2” | blue/black–blue/black blue/red–blue/red |
|--|--|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

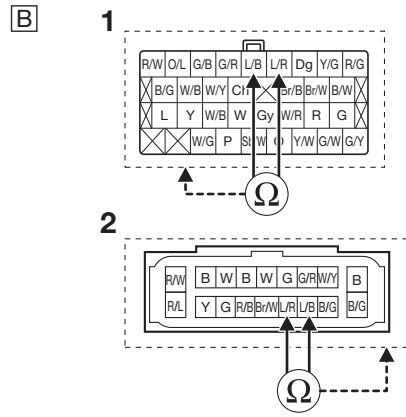
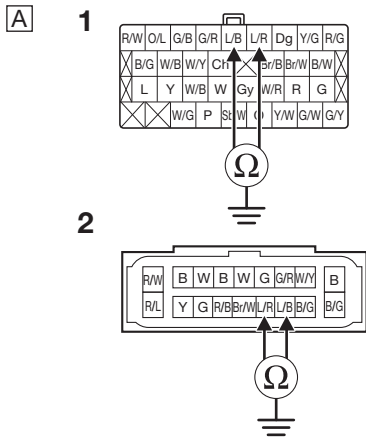
Disconnect the ABS ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ABS ECU” on page 9-3.

Ground short circuit check “A”

| | |
|---|--------------------------------------|
| Between meter assembly coupler “1” and ground | blue/red–ground blue/black–ground |
| Between ABS ECU coupler “2” and ground | blue/red–ground blue/black–ground |

Lines short circuit check "B"

| | |
|------------------------|--|
| Meter assembly coupler | blue/red–any other coupler terminal blue/black–any other coupler terminal |
| ABS ECU coupler | blue/red–any other coupler terminal blue/black–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective meter assembly

- Replace the meter assembly, and check again.

4. Defective hydraulic unit assembly

- Replace the hydraulic unit assembly.

Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-54.

EAS20670

90_ABS

EAS33300

TROUBLESHOOTING

Item

CAN communication (between ECU and hydraulic unit assembly)

Procedure

1. Defective coupler between the ECU 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.

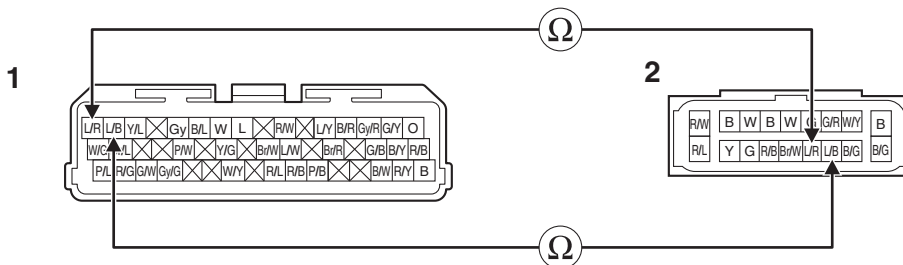
NO

→ Connect the coupler securely or replace the wire harness.

2. Wire harness continuity.

- Disconnect the ECU coupler “1” and ABS ECU coupler “2”.
- Open circuit check

| | |
|---|--|
| Between ECU coupler “1” and ABS ECU coupler “2” | blue/black–blue/black blue/red–blue/red |
|---|--|



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

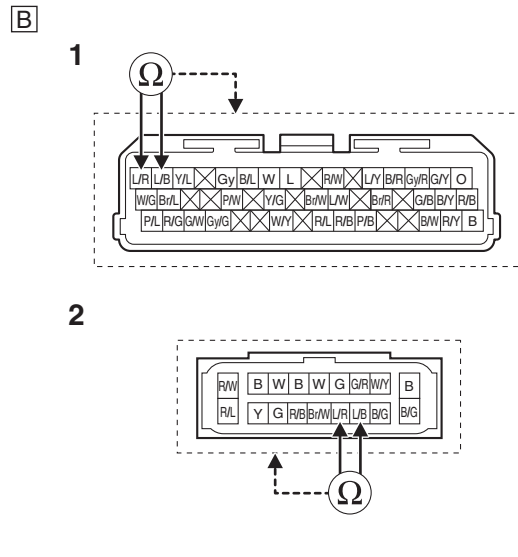
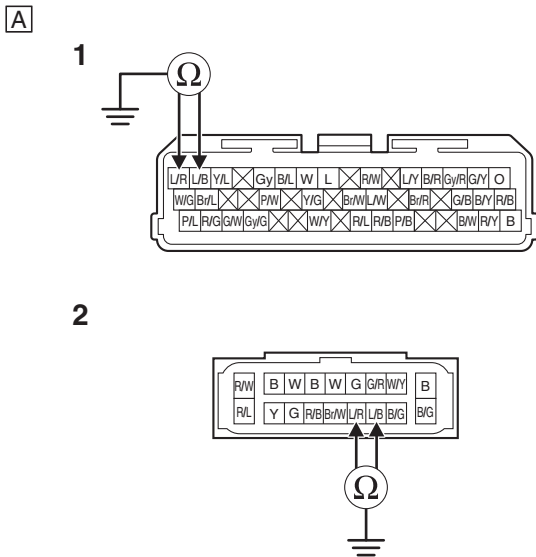
Disconnect the ECU and ABS ECU related connectors before checking.

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 ECU coupler “1” and ground | blue/red–ground blue/black–ground |
|------------------------------------|--------------------------------------|

| | |
|--|--|
| Between ABS ECU coupler “2” and ground | blue/red–ground blue/black–ground |
| Lines short circuit check “B” | |
| ECU coupler | blue/red–any other coupler terminal blue/black–any other coupler terminal |
| ABS ECU coupler | blue/red–any other coupler terminal blue/black–any other coupler terminal |



Is resistance $\infty \Omega$?

YES

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective ECU

- Replace the ECU, and check again.

4. Defective hydraulic unit assembly

- Replace the hydraulic unit assembly.

Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-54.

WIRING DIAGRAM**XTZ690D/XTZ690DP**

1. Main switch
2. ABS solenoid fuse
3. ABS motor fuse
4. Accessory fuse
5. ABS control unit fuse
6. Auxiliary fuse
7. Ignition fuse
8. Signaling system fuse
9. Headlight fuse
10. Fuel injection system fuse
11. Backup fuse
12. Radiator fan motor fuse
13. Immobilizer unit
14. Stator coil
15. Rectifier/regulator
16. Battery
17. Engine ground
18. Main fuse
19. Starter relay
20. Starter motor
21. Rear brake light switch
22. Relay unit (diode)
23. Starting circuit cut-off relay
24. Fuel pump relay
25. Fuel cut solenoid valve
26. Diode
27. Joint coupler
28. Crankshaft position sensor
29. O₂ sensor
30. Throttle position sensor
31. ECU (Engine Control Unit)
32. Ignition coil #1
33. Ignition coil #2
34. Spark plug
35. Fuel injector #1
36. Fuel injector #2
37. ISC (Idle Speed Control) unit
38. Purge cut valve solenoid
39. Intake air temperature sensor
40. Coolant temperature sensor
41. Intake air pressure sensor
42. Lean angle sensor
43. Resistor unit
44. Front wheel sensor
45. Rear wheel sensor
46. ABS ECU
47. YDT coupler
48. Fuel pump
49. Fuel sender
50. Oil pressure switch
51. "ABS ON" button
52. Meter assembly
53. Immobilizer system indicator light
54. Multi-function meter
55. ABS warning light
56. Horn

57. Gear position switch
58. Sidestand switch
59. Handlebar switch (right)
60. Front brake light switch
61. Engine start/stop switch
62. Wheel switch
63. Handlebar switch (left)
64. Clutch switch
65. Dimmer switch
66. Pass switch
67. Turn signal switch
68. Horn switch
69. Hazard switch
70. Select switch
71. Rear turn signal light (right)
72. Rear turn signal light (left)
73. Front turn signal light (right)
74. Front turn signal light (left)
75. Headlight assembly
76. Headlight (high beam)
77. Headlight (low beam)
78. Auxiliary light
79. License plate light
80. Tail/brake light
81. Radiator fan motor relay
82. Radiator fan motor
83. Grip warmer (OPTION)
84. Fog light (OPTION)
- A. Wire harness
- B. Sub-wire harness

COLOR CODE

| | |
|------|----------------|
| B | Black |
| Br | Brown |
| Ch | Chocolate |
| Dg | Dark green |
| G | Green |
| Gy | Gray |
| L | Blue |
| Lg | Light green |
| O | Orange |
| P | Pink |
| R | Red |
| Sb | Sky blue |
| W | White |
| Y | Yellow |
| B/G | Black/Green |
| B/L | Black/Blue |
| B/R | Black/Red |
| B/W | Black/White |
| B/Y | Black/Yellow |
| Br/B | Brown/Black |
| Br/L | Brown/Blue |
| Br/R | Brown/Red |
| Br/W | Brown/White |
| Br/Y | Brown/Yellow |
| G/B | Green/Black |
| G/R | Green/Red |
| G/W | Green/White |
| G/Y | Green/Yellow |
| Gy/G | Gray/Green |
| Gy/R | Gray/Red |
| L/B | Blue/Black |
| L/G | Blue/Green |
| L/R | Blue/Red |
| L/W | Blue/White |
| L/Y | Blue/Yellow |
| O/L | Orange/Blue |
| P/B | Pink/Black |
| P/L | Pink/Blue |
| P/W | Pink/White |
| R/B | Red/Black |
| R/G | Red/Green |
| R/L | Red/Blue |
| R/W | Red/White |
| R/Y | Red/Yellow |
| Sb/W | Sky blue/White |
| W/B | White/Black |
| W/G | White/Green |
| W/R | White/Red |
| W/Y | White/Yellow |
| Y/B | Yellow/Black |
| Y/G | Yellow/Green |
| Y/L | Yellow/Blue |
| Y/W | Yellow/White |

MBK Industrie
Z.I. de Rouvroy 02100 Saint Quentin
SAS au capital de 14 000 000 €
R.C St-Quentin B 329 035 422



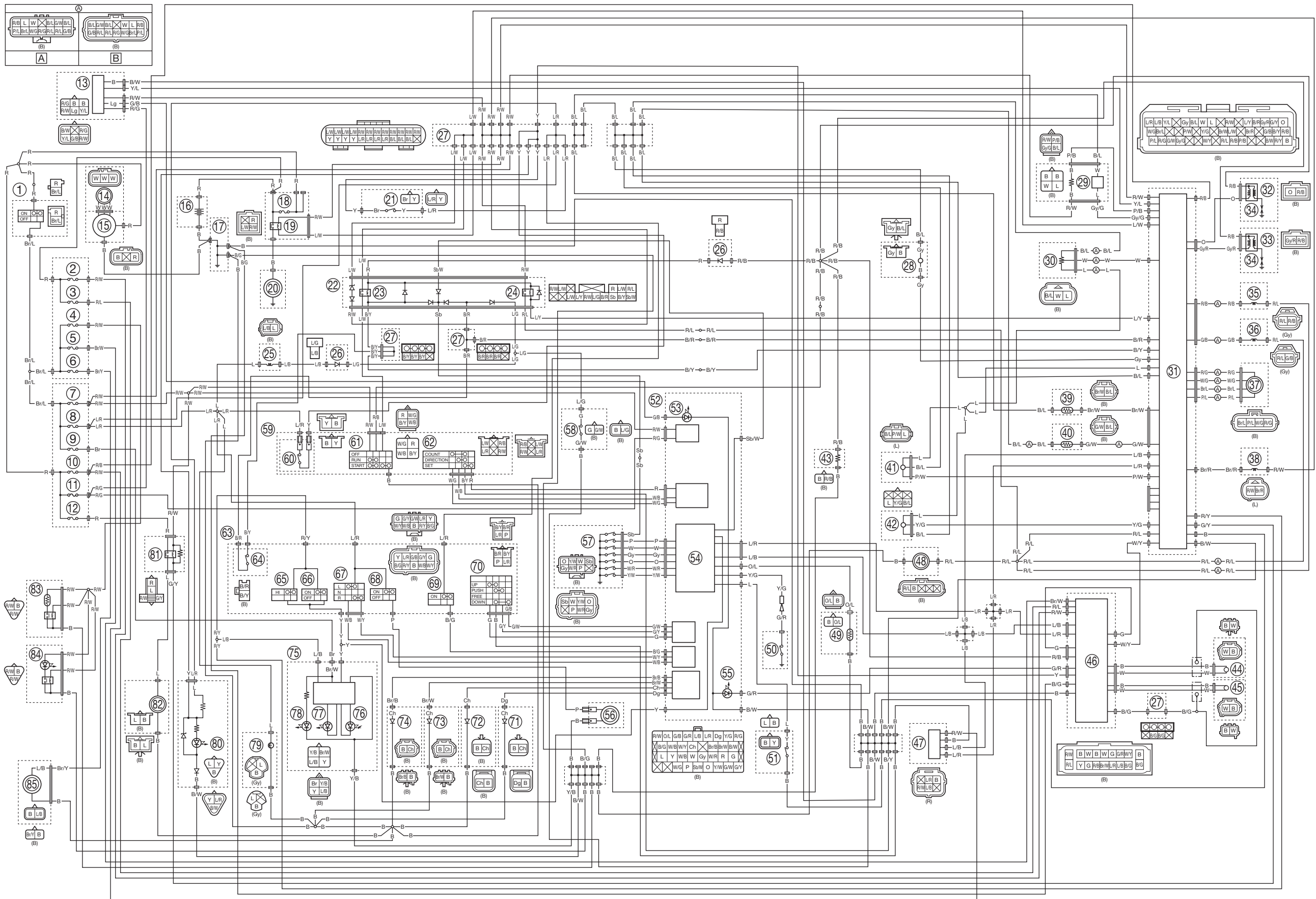
XTZ690D/XTZ690DP 2023
WIRING DIAGRAM

XTZ690D/XTZ690DP 2023
SCHÉMA DE CÂBLAGE

XTZ690D/XTZ690DP 2023
SCHALTPLAN

XTZ690D/XTZ690DP 2023
SCHEMA ELETTRICO

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DIAGRAMA ELÉCTRICO



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