YAMAHA 2021

SERVICE MANUAL

MT-09
MT-09SP

MT09M
MT09MC
MT09SPM
MT09SPMC

LIT-11616-34-61

B7N-28197-10 ★

EAS20003

IMPORTANT

This manual was produced by Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Please refer to "BASIC INFORMATION" (separate volume, Y0A-28197-10*) for basic instructions that must be observed during servicing. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from their vehicle and to conform to federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

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

EAS30001

IMPORTANT MANUAL INFORMATION

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

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

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

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

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

EAS20002

MT09M/MT09MC/MT09SPM/MT09SPMC
SERVICE MANUAL

First edition, December 2020

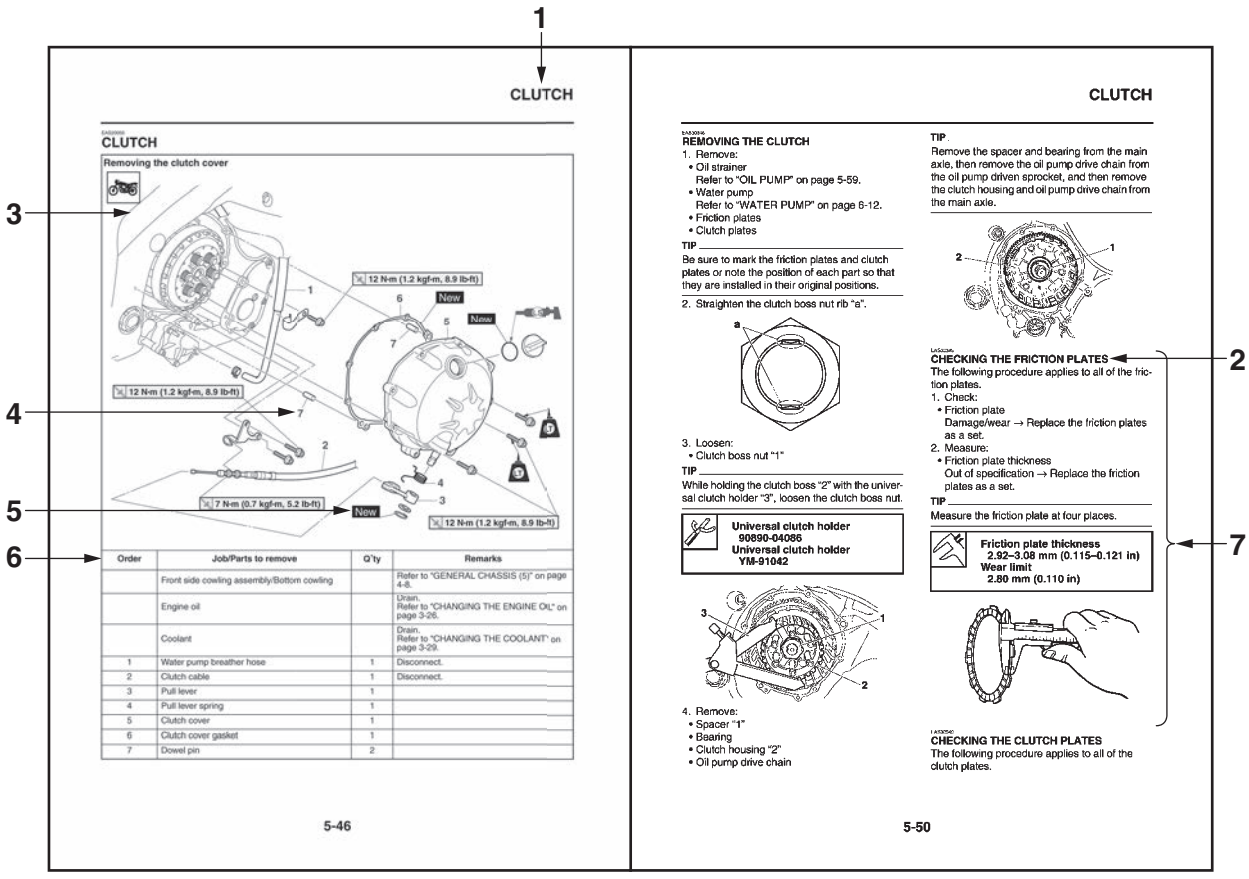
P/N LIT-11616-34-61

EAS20004

HOW TO USE THIS MANUAL

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

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



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EAS20005
SYMBOLS

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

TIP

The following symbols are not relevant to every vehicle.

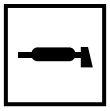
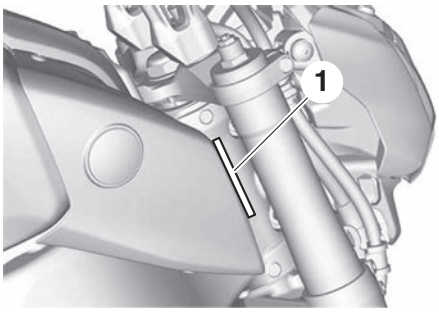
SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone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

TABLE OF CONTENTS

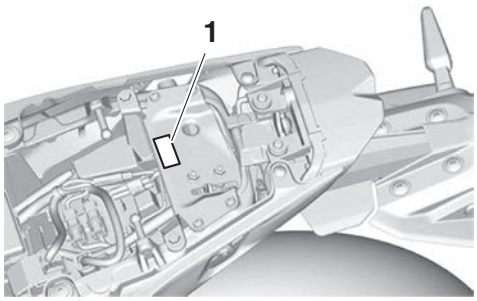
GENERAL INFORMATION

EAS20007
IDENTIFICATION

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



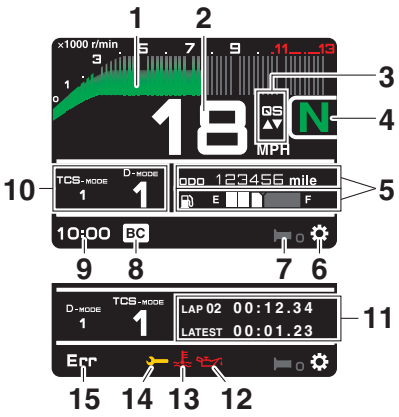
EAS30003
MODEL LABEL
The model label “1” is affixed to the frame under the seat. This information will be needed to order spare parts.



EAS20008
FEATURES

EAS31706
GLOSSARY
ABS - Anti-lock Brake System
ABS ECU - Anti-lock Brake System Electronic Control Unit
BC - Brake Control
ECU - Engine Control Unit
LIF - Lift Control System
QS - Quick Shift
SCS - Slide Control System
TCS - Traction Control System

EAS31707
DISPLAY
The following items can be found on the display:



1. Tachometer
2. Speedometer
3. Quick shift Indicator “QS”
4. Transmission gear display
5. Vehicle information displays
6. Settings MENU icon “ ”
7. Grip warmer indicator (option)
8. Brake control icon “BC”
9. Clock
10. MODE display
11. Lap timer
12. Oil pressure warning “ ”
13. Coolant temperature warning “ ”
14. Auxiliary system warning “ ”
15. Error mode warning “Err” (replaces clock when activated)

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.

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.

Speedometer
The speedometer shows the vehicle’s traveling speed.

TIP

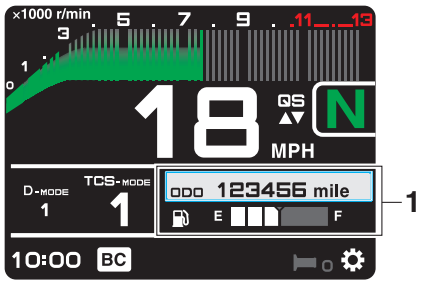
The display can be switched between kilometers and miles.

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

ECA19660
NOTICE

Do not operate the engine in the tachometer red zone.

Vehicle information displays



1. Vehicle information displays

The two vehicle information displays can be individually set to show the following items:
- ODO: odometer
- F-TRIP: fuel reserve tripmeter
- TRIP1: tripmeter
- TRIP2: tripmeter
- F.AVE: average fuel economy
- F.CRNT: instantaneous fuel economy
- A.TEMP: air temperature
- C.TEMP: coolant temperature
- Fuel meter
- FUELCON: amount of fuel consumed
- TRIPTIME: running time

Operate the vehicle information display as follows:

Rotate the wheel switch to move the cursor over a display.
Push the wheel switch inward and the selected display will highlight gray.
Rotate the wheel switch to choose a different display item.
Push the wheel switch inward to confirm the new display item.

TIP

- ODO will lock at 999999 and cannot be reset.
- TRIP1 and TRIP2 will reset to 0 and begin counting again after 9999.9 has been reached.
- When the fuel tank reserve level has been reached, F-TRIP appears automatically and begins recording distance traveled from that point.
- After refueling and traveling some distance, F-TRIP will automatically disappear.
- See "Unit" to change the fuel consumption units.
- The air temperature is displayed from –9 °C (16 °F) to 50 °C (122 °F) in 1 °C (1 °F) increments.
- The air temperature displayed may vary from the actual ambient temperature.
- In LAP TIME mode, the vehicle information display is replaced by the lap information.
- TRIP1, TRIP2, F-TRIP, F.AVE, FUELCON and TRIPTIME items can be individually reset.
- If the vehicle coolant temperature is below 40 °C (104 °F) the coolant temperature display will read "Lo"
- If the vehicle coolant temperature is above 124 °C (255 °F) the coolant temperature display will read "Hi"

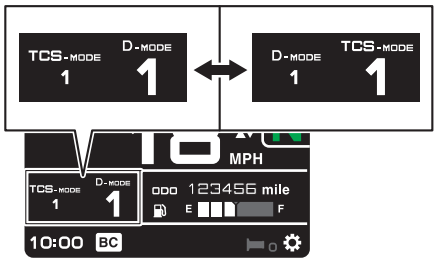
To reset information display items

1. Rotate the wheel switch to select one of the two vehicle information displays.
2. Press the wheel switch inward to highlight the information display.
3. Rotate the wheel switch to select the desired information display item.
4. Press and hold the wheel switch inward until the highlighted display item is reset.

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 the neutral indicator light "N" and by the transmission gear display "N".

MODE display



This display shows the currently selected "D-MODE" and "TCS-MODE" settings. The mode that is enlarged and displayed on the right can be adjusted using the MODE up/down switches. Use the "MODE" switch to toggle left-right between "TCS-MODE" and "D-MODE".

TIP

- When the malfunction indicator light "", the auxiliary system warning "", or the coolant temperature warning "" are on, "D-MODE" and "TCS-MODE" cannot be adjusted.
- The previously selected modes will be displayed when the vehicle power is turned on.

To turn off the traction control system, select "TCS-MODE" with the "MODE" switch, then push and hold the MODE up switch until "OFF" is displayed. To turn TCS back on, press the MODE down switch ("TCS-MODE" will return to its previous setting).

TIP

- When "TCS-MODE" has been set to "OFF", the TCS, SCS and LIF systems are all turned off together.
- The "TCS-MODE OFF" and "TCSMODE M" settings can only be selected while the vehicle is stopped.

Clock

The clock uses a 12-hour time system.

Quick shift indicator "QS"

When able to shift, the respective QS ▲ or ▼ turns green.
When unable to shift, QS △ ▽ is white.
If the QS function is turned OFF, QS △ ▽ itself is not displayed.
The QS functions can be turned on or off in the setting MENU.

TIP

The upshift and downshift functions are independent and can be activated separately.
For more information on the QS system.

Setting menu icon " ⚙ "

Choose this icon and push the wheel switch to change the settings MENU screen.

Grip warmer indicator (Option)

The grip warmers can be used when the engine is running. There are 10 temperature levels.
When activated, the indicator will display the temperature level from 1 (lowest) to 10 (highest).
To activate the grip warmer, use the wheel switch to highlight the grip warmer display with the cursor.
Press the wheel switch inward to select the grip warmer function.
Once selected, rotate the wheel switch up and down to adjust the temperature level.
Press the wheel switch inward to confirm the temperature level and exit the grip warmer function.

ECA17932

NOTICE

- **Be sure to wear gloves when using the grip warmers.**
- **Do not use the grip warmers in warm weather.**
- **If the handlebar grip or throttle grip becomes worn or damaged, stop using the grip warmers and replace the grips.**

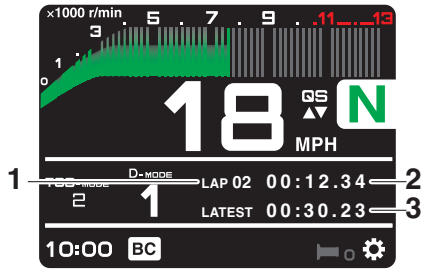
The function of the wheel switch can be locked into grip warmer mode by pressing and holding the wheel switch inward while the grip warmer indicator is highlighted by the cursor.
In this mode, the temperature levels can be instantly adjusted by rotating the wheel switch up/down.
To exit this mode and return the wheel switch to its normal functionality, press and hold the wheel switch inward.

TIP

The current grip warmer setting is saved when the vehicle is turned off.

Lap timer

This stopwatch function can be activated through the setting MENU.
Once activated, the vehicle information display is replaced with:



1. Lap count
2. Current lap time
3. Latest/Previous lap time

To start the timer, push the dimmer/pass switch down towards "PASS".
Each press of the dimmer/pass switch will increase the lap count by 1 and reset the current lap timer.
To pause the lap timer, press the wheel switch inward.
To unpause the timer, push the dimmer/pass switch down towards "PASS" and the timer will resume without counting a new lap.
To exit the lap time mode, turn it off in the settings MENU.

TIP

- The engine must be running to start the lap timer.
- The headlights will flash when the dimmer/pass switch is pressed.
- Whenever the lap timer is paused, it can be resumed using the dimmer/pass switch.

Brake control icon "BC"

This icon is replaced by the auxiliary system warning and coolant temperature warning indicators when they are activated.

Error mode warning "Err"

When an internal error occurs (e.g., communication with a system controller has been cut off), the error mode warning will appear as follows.
"Err" and " SC " indicator light indicates an ECU error.
"Err" only indicates an ABS ECU error.

TIP

Depending on the nature of the error, the display may not function properly and TCS settings may be impossible to change. Additionally, ABS may not function properly. Use extra care when braking and have a Yamaha dealer check the vehicle immediately.

Auxiliary system warning “ ”

This icon appears if a problem is detected in a non-engine-related system.

Coolant temperature warning “ ”

This icon appears if the coolant temperature reaches 116 °C (241 °F) or higher. 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 “ ”

This icon appears when the engine oil pressure is low. When the vehicle is first turned on, engine oil pressure has yet to build, so this icon will come on and stay on until the engine has been started.

TIP

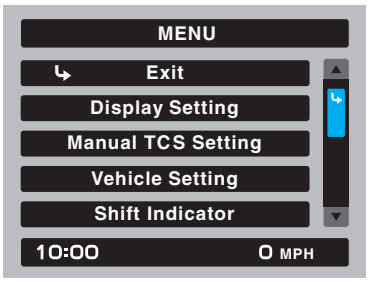
If a malfunction is detected, the oil pressure warning icon will flash repeatedly.

ECA27240

NOTICE

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

Settings MENU



The settings MENU screen contains the following settings modules. Select a module to make related settings changes.

Module	Description
“Exit”	Exit MENU and return the main display
“Display Setting”	Switch lap time mode on/off and adjust the tachometer color
“Manual TCS Setting”	Adjust TCS/SCS/LIF settings for the “TCS-MODE M”
“Vehicle Setting”	Adjust BC/QS settings
“Shift Indicator”	Turn the shift indicator on/off and adjust tachometer settings
“Maintenance”	View and reset maintenance intervals
“Unit”	Set fuel consumption and measurement units
“Brightness”	Adjust screen brightness
“Clock”	Adjust the clock
“All Reset”	Return all settings to factory default

Settings MENU access and operation

How to use the settings MENU:

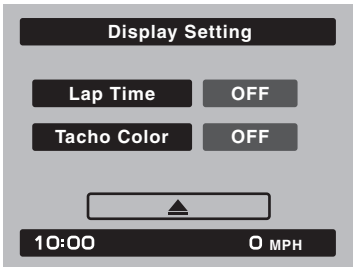
Rotate the wheel switch up or down to highlight items or increase/decrease values and briefly press the wheel switch inward to confirm the selection.

Press and hold the wheel switch until the screen returns to the main display to exit the MENU at any time.

TIP

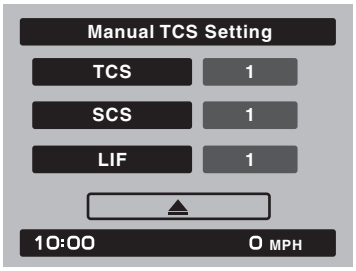
- Certain settings menu screens have an upward pointing triangle mark item. Select the triangle mark to save settings changes and exit the current screen.
- Should vehicle motion be detected, the screen will automatically exit the settings MENU and return to the main display.
- To ensure that the desired settings changes are saved, be sure to exit each menu via the triangle mark (if displayed). Exiting the settings menu by pressing and holding the wheel switch may not save settings changes.

“Display Setting”



This module allows you to switch the lap time mode and tachometer color mode ON/OFF. When the lap time mode is selected, the twin vehicle information displays on the main screen will display a lap timer and a lap counter. To exit the lap time mode, the turn lap timer OFF in the display setting module.
To change the tachometer to color mode, select ON.

“Manual TCS Setting”



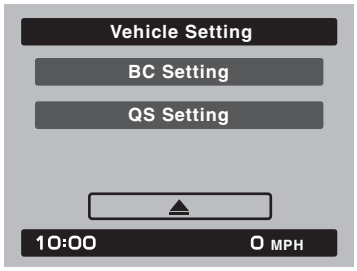
This module allows you to customize the “TCS-MODE M” which is accessible on the main display using the MODE switches.
TCS
This model uses a variable traction control system. For each setting level, the further the vehicle is leaned over, the greater the amount of traction control (system intervention) is applied. There are 3 setting levels available for the “TCS-MODE M”.
Setting level 1 applies the least amount of overall system intervention, while setting level 3 applies the greatest amount of overall traction control.

TIP

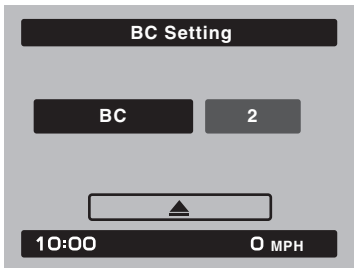
- TCS can only be turned on or off via the main screen using the MODE switches.
- SCS and LIF can be turned off independently of TCS for “TCSMODE M”.
- When “TCS-MODE” has been set to “OFF” on the main screen: TCS, SCS and LIF are all turned off together.

SCS
SCS can be set to OFF, 1, 2, and 3.
OFF turns the slide control system off, setting level 1 provides the least amount of system intervention, and setting level 3 provides the greatest amount of system intervention.
LIF
LIF can be set to OFF, 1, 2, and 3.
Setting level 1 provides the least amount of system intervention and setting 3 most strongly reduces the rate of wheel lift.
OFF turns LIF off.

“Vehicle Setting”



The vehicle setting module allows you to adjust setting for the BC and QS systems.
BC

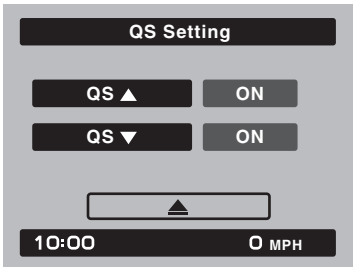


The brake control system has two settings, BC1 and BC2. Select BC1 when only standard ABS is desired. Select BC2 to have the brake control system further regulate brake pressure while cornering to suppress lateral wheel slip.

TIP

For skilled riders and when riding at the track, due to varying conditions, the BC2 brake system may engage sooner than expected relative to your desired cornering speed or intended cornering line.

QS

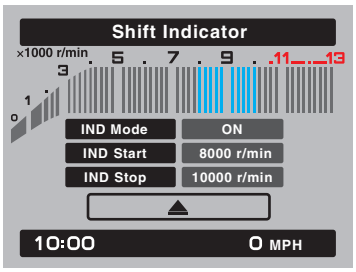


The quick shift system indicators are divided into QS△ and QS▽ sections.
QS△ and QS▽ are not linked and can be independently turned on or off.
QS can be set to ON or OFF.
OFF turns the respective upshift or downshift function off, and the clutch lever must then be used when shifting in that direction.

TIP

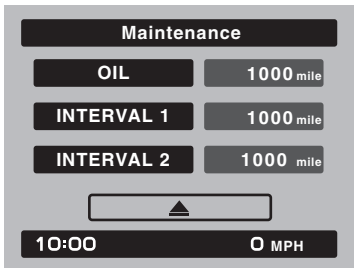
If the QSS setting cannot be changed: turn the engine off with the gear position set to neutral, then change the setting.

"Shift Indicator"



This module allows a custom shift indicator to be set. When the engine r/min (rotations per minute) are in the specified range, the gear indicator will flash.
This module has 3 options:
"IND Mode" - the shift indicator can be turned ON/OFF
"IND Start" - the r/min at which the indicator starts flashing can be chosen.
Once selected, rotate the wheel switch up/down to increase or decrease the r/min value by increments of 200 r/min.
"IND Start" is settable between 6000–12800 r/min.
"IND Stop" - the r/min at which the indicator stops flashing can be chosen.
Once selected, rotate the wheel switch up/down to increase or decrease the r/min value by increments of 200 r/min.
"IND Stop" is settable between 6200–13000 r/min.

"Maintenance"

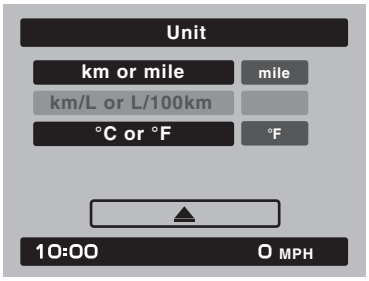


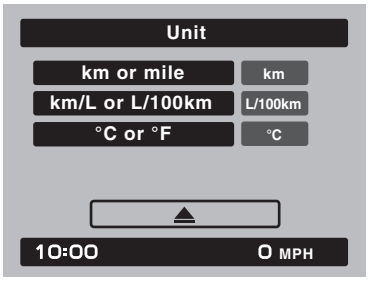
This module allows you to record the distance traveled between engine oil changes (use the OIL item), and for two other items of your choice (use INTERVAL 1 and INTERVAL 2).
To reset a maintenance trip meter, select it and then press and hold the wheel switch.

TIP

Maintenance item names cannot be changed.

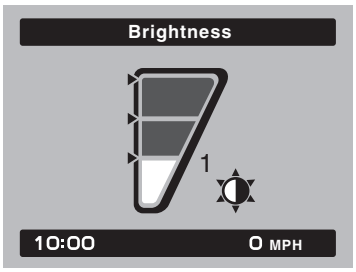
"Unit"





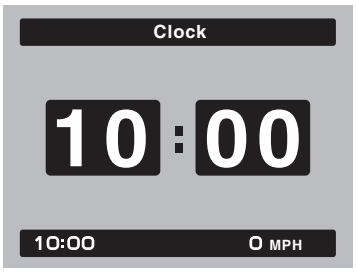
This module allows you to switch the display between metric and imperial measurement units. When using kilometers, the fuel consumption units can be changed between “km/L” or “L/100km”. When using miles, MPG will be available.
Temperature units can be switched between Celsius and Fahrenheit.

“Brightness”



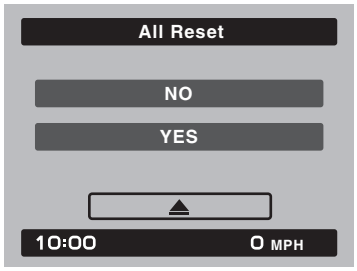
This module allows you to adjust the general brightness level of the display screen.
Select the desired brightness level by rotating the wheel switch, and then short press the wheel switch to fix the setting and return to the top MENU screen.

“Clock”



This module allows you to set the clock.
When the clock module is selected, the hours will be highlighted.
Set the hours by rotating the wheel switch. Push the switch to confirm and highlight the minutes. After confirming the minutes, you will be returned to the top MENU screen.

“All Reset”



This module resets all settings items (except the odometer and clock) to their default or factory presets.
Select YES to reset all items. After selecting YES, all items will be reset and the screen will automatically return to the top MENU screen.

EAS20010
BASIC SERVICE INFORMATION

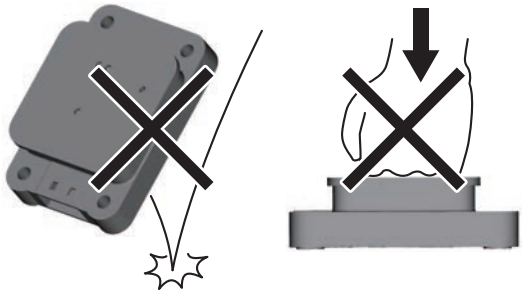
EAS30014
ELECTRICAL SYSTEM

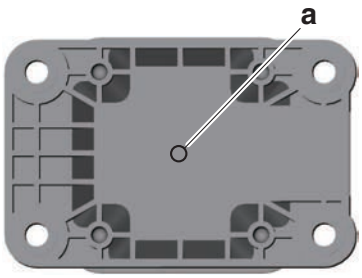
Electrical parts handling

ECA22611

NOTICE

- **Do not perform angle adjustment of the IMU and battery box by pinching the washer and related parts.**
- **When installing the IMU, apply a thin coat of silicone grease onto the washer where contacting the IMU grommet.**
- **When installing the IMU, use only a genuine bolt and washer, and tighten the bolt to the specified torque.**
- **Pay attention not to expose the IMU to strong shocks, such as striking or dropping it.**
- **Do not place any foreign objects in and around the battery box.**
- **Do not obstruct breather opening "a" of the IMU.**
- **Do not clean the breather opening and do not blow it with compressed air.**
- **When replacing the collar or grommet, replace all four collars and grommets.**



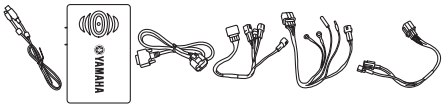
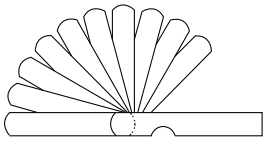
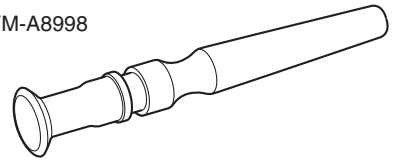
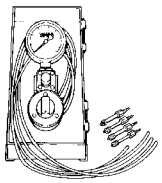


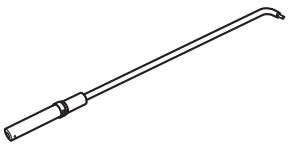
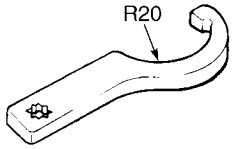
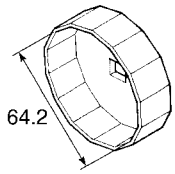
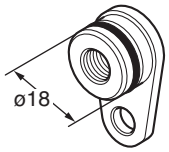
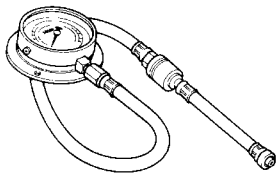
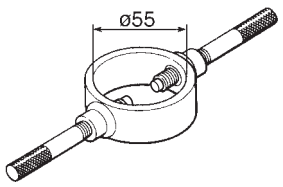
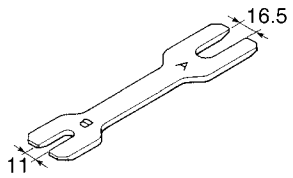
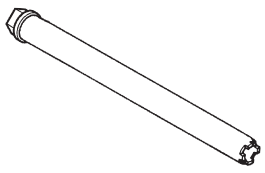
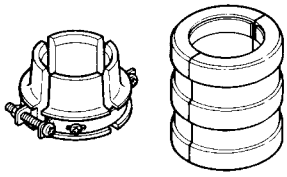
EAS20012
SPECIAL TOOLS

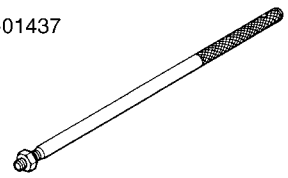
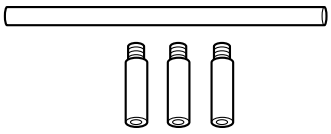
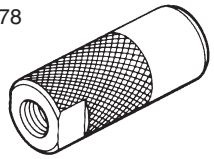
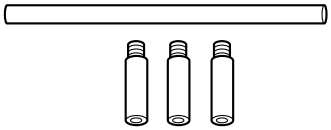
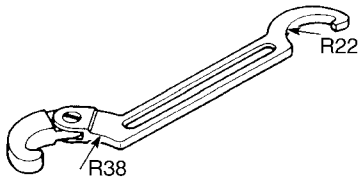
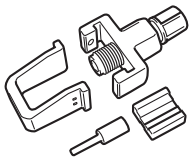
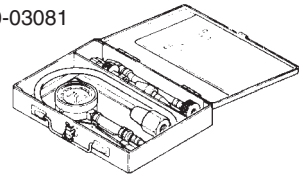
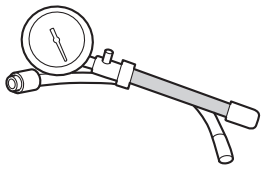
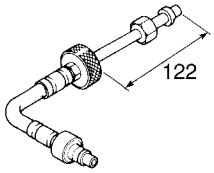
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

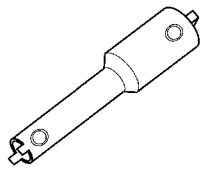
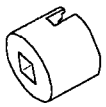
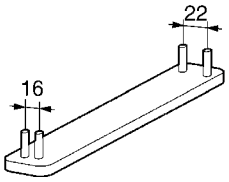
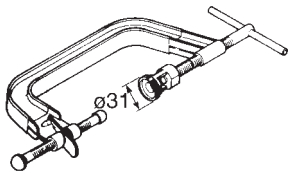
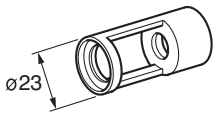
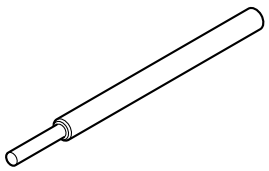
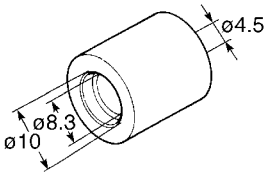
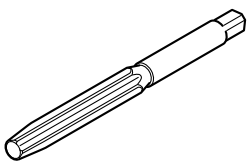
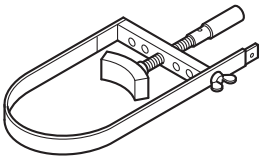
TIP

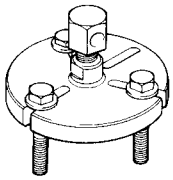
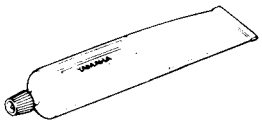
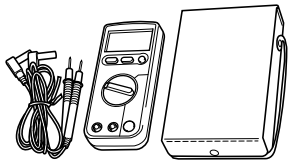
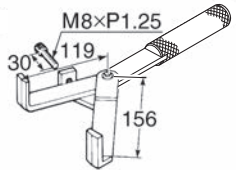
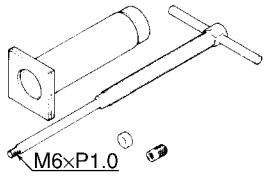
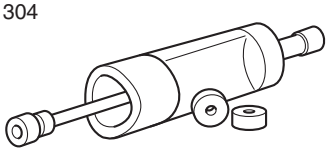
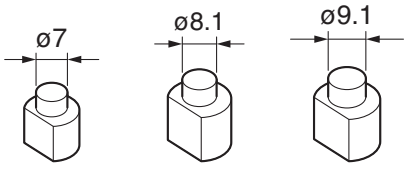
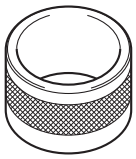
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

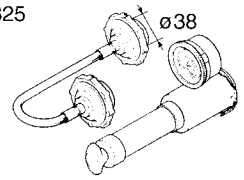
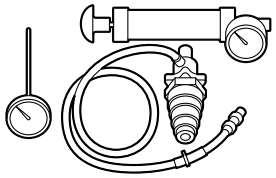
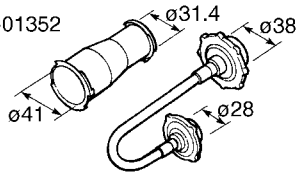
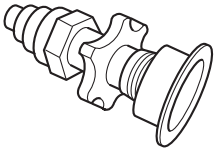
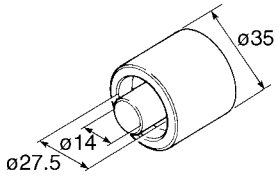
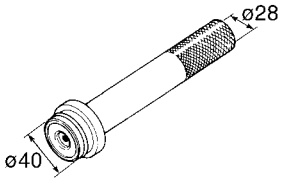
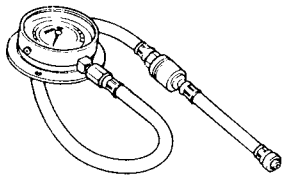
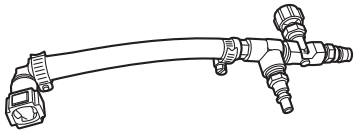
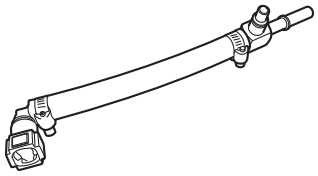
Tool name/Tool No.	Illustration	Reference pages
Yamaha diagnostic tool USB (US) 90890-03269		3-4, 4-55, 4-56, 7-11, 9-3, 9-36, 9-37
Yamaha diagnostic tool (A/I) 90890-03264		3-4, 4-55, 4-56, 7-11, 9-3, 9-36, 9-37
Thickness gauge 90890-03268 Feeler gauge set YU-26900-9		3-6, 4-17, 4-25, 5-27, 5-51
Valve lapper (ø14) 90890-04101 Valve lapper (ø14) YM-A8998	90890-04101  YM-A8998 	3-7
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094  YU-44456 	3-9

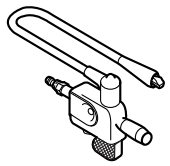
Tool name/Tool No.	Illustration	Reference pages
Carburetor angle driver 2 90890-03173		3-9
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-19, 4-77
Oil filter wrench 90890-01426 Oil filter wrench YU-38411		3-28
Oil pressure gauge joint 18 mm 90890-04176 YU-04176		3-29
Oil pressure gauge set 90890-03120		3-29
Fork spring compressor 90890-01441 Fork spring compressor YM-01441		4-67, 4-72
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-67, 4-72
Damper rod holder (ø27) 90890-01582 Damper rod holder YM-01582		4-68, 4-69
Fork seal driver 90890-01442 Adjustable fork seal driver (36–46 mm) YM-01442		4-70, 4-70, 4-71

Tool name/Tool No.	Illustration	Reference pages
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437  YM-A8703 	4-71, 4-72
Rod puller attachment (M10 long) 90890-01578 Universal damping rod bleeding tool set YM-A8703	90890-01578  YM-A8703 	4-71, 4-72
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-77
Drive chain cut & rivet tool 90890-01550 Drive chain cut & rivet tool YM-01550		4-88, 4-90
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081  YU-33223 	5-7
Compression gauge extension 122mm 90890-04136 Compression gauge extension 122mm YM-04136		5-7

Tool name/Tool No.	Illustration	Reference pages
Pivot shaft wrench 90890-01518 Frame spanner socket YM-01518		5-14, 5-14, 5-15
Pivot shaft wrench adapter 90890-01476		5-14, 5-14, 5-15
Camshaft wrench 90890-04162 Camshaft wrench YM-04162		5-19, 5-22
Valve spring compressor 90890-04200 Valve spring compressor YM-04019		5-31, 5-35
Valve spring compressor attachment (ø23) 90890-04179 Valve spring compressor adapter (ø23) YM-04179		5-31, 5-35
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-32
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-32
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-32
Sheave holder 90890-01903 Primary clutch holder YS-01880-A		5-39, 5-39, 5-40, 5-40

Tool name/Tool No.	Illustration	Reference pages
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-39
Yamaha bond No. 1215 90890-85505 Three bond No. 1215®		5-41, 5-66
Digital circuit tester (CD732) 90890-03243 Model 88 Multimeter with tachometer YU-A1927		5-44, 8-55, 8-56, 8-58, 8-59, 8-59, 8-60, 8-61, 8-61, 8-62, 8-63, 8-64, 8-64, 8-65, 8-65, 8-65
Clutch holder 90890-04199 Universal clutch holder YM-91042		5-50, 5-54
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-71
Connecting rod big end bearing installer 90890-04193 Connecting rod big end bearing installer YM-04193		5-73, 5-76
Piston installing tool 90890-04161 Piston installing tool YM-04161		5-78

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A	90890-01325  YU-24460-A 	6-5, 6-5
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984	90890-01352  YU-33984 	6-5, 6-5
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A	 	6-14
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058	 	6-14
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-10, 7-11
Fuel injector pressure adapter 90890-03210 Fuel injector pressure adapter YU-03210		7-10
Fuel pressure adapter 90890-03176 Fuel pressure adapter YM-03176		7-11

Tool name/Tool No.	Illustration	Reference pages
Ignition checker 90890-06754 Oppama pet–4000 spark checker YM-34487		8-59

SPECIFICATIONS

EAS20013
GENERAL SPECIFICATIONS

Model	
Model	B7N4 (MT09M) B7N5 (MT09MC) BAM4 (MT09SPM) BAM5 (MT09SPMC)
Dimensions	
Overall length	2090 mm (82.3 in)
Overall width	795 mm (31.3 in)
Overall height	1190 mm (46.9 in)
Wheelbase	1430 mm (56.3 in)
Ground clearance	140 mm (5.51 in)
Minimum turning radius	3.4 m (11.16 ft)
Weight	
Curb weight	189 kg (417 lb) (MT09M, MT09MC) 190 kg (419 lb) (MT09SPM, MT09SPMC)
Loading	
Maximum load	166 kg (366 lb)
Riding capacity	2 person

EAS20014
ENGINE SPECIFICATIONS

Engine	
Combustion cycle	4-stroke
Cooling system	Liquid cooled
Valve train	DOHC
Displacement	890 cm³
Cylinder arrangement	Inline
Number of cylinders	3-cylinder
Bore × stroke	78.0 × 62.1 mm (3.07 × 2.44 in)
Compression ratio	11.5 : 1
Compression pressure	1365–1758 kPa/600 r/min (13.7–17.6 kgf/cm²/600 r/min, 194.3–250.1 psi/600 r/min)
Fuel	
Recommended fuel	Premium unleaded gasoline (E10 acceptable)
Fuel tank capacity	14 L (3.7 US gal, 3.1 Imp.gal)
Fuel reserve amount	2.8 L (0.74 US gal, 0.62 Imp.gal)
Engine oil	
Recommended brand	YAMALUBE
SAE viscosity grades	10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Oil change	2.80 L (2.96 US qt, 2.46 Imp.qt)
With oil filter removal	3.20 L (3.38 US qt, 2.82 Imp.qt)
Quantity (disassembled)	3.50 L (3.70 US qt, 3.08 Imp.qt)
Oil filter	
Oil filter type	Cartridge
Oil pump	
Oil pressure	300.0 kPa/5000 r/min at 100 °C (3.00 kgf/cm²/5000 r/min at 100 °C, 43.5 psi/5000 r/min at 212 °F)
Cooling system	
Coolant quantity	
Radiator (including all routes)	1.72 L (1.82 US qt, 1.51 Imp.qt)
Coolant reservoir (up to the maximum level mark)	0.28 L (0.30 US qt, 0.25 Imp.qt)
Radiator cap valve opening pressure	107.9–137.3 kPa (1.08–1.37 kgf/cm², 15.6–19.9 psi)
Cooling system leak test pressure	137.3 kPa (1.37 kgf/cm², 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)

Spark plug(s)	
Manufacturer/model	NGK/LMAR9A-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	24.500–24.521 mm (0.9646–0.9654 in)
Camshaft journal diameter	24.459–24.472 mm (0.9630–0.9635 in)
Camshaft-journal-to-camshaft-cap clearance limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height limit (Intake)	35.590 mm (1.4012 in)
Lobe height limit (Exhaust)	35.620 mm (1.4024 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	0.28–0.32 mm (0.0110–0.0126 in)
Valve dimensions	
Valve seat contact width limit (intake)	1.6 mm (0.06 in)
Valve seat contact width limit (exhaust)	1.8 mm (0.07 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)	37.34 mm (1.47 in)
Free length limit (exhaust light green)	35.89 mm (1.41 in)
Free length limit (exhaust purple)	39.31 mm (1.55 in)
Cylinder	
Bore	78.000–78.010 mm (3.0709–3.0713 in)
Wear limit	78.060 mm (3.0732 in)
Piston	
Diameter	77.975–77.990 mm (3.0699–3.0705 in)
Measuring point (from piston skirt bottom)	9.0 mm (0.35 in)
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Piston pin bore inside diameter limit	17.043 mm (0.6710 in)
Piston pin outside diameter limit	16.970 mm (0.6681 in)

Piston ring	
Top ring	
End gap limit	0.50 mm (0.0197 in)
Side clearance limit	0.115 mm (0.0045 in)
2nd ring	
End gap limit	1.15 mm (0.0453 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	0.013–0.037 mm (0.0005–0.0015 in)
Bearing color code	
Model identification color	Two stripes of the same color
Code 0	White
Code 1	Blue
Code 2	Black
Code 3	Brown
Code 4	Green
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	0.023–0.047 mm (0.0009–0.0019 in)
Clutch	
Clutch type	Wet, multiple-disc
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in) (MT09M, MT09MC) 5.0–10.0 mm (0.20–0.39 in) (MT09SPM, MT09SPMC)
Assembly width	42.7–43.5 mm (1.68–1.71 in)
Friction plate 1 thickness	2.92–3.08 mm (0.115–0.121 in)
Plate quantity	6 pcs
Wear limit	2.82 mm (0.111 in)
Friction plate 2 thickness	2.92–3.08 mm (0.115–0.121 in)

Plate quantity	3 pcs
Wear limit	2.82 mm (0.111 in)
Clutch plate 1 thickness	2.18–2.42 mm (0.086–0.095 in)
Plate quantity	1 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch plate 2 thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	7 pcs
Warpage limit	0.10 mm (0.004 in)
Clutch spring free length limit	42.53 mm (1.67 in)
Drivetrain	
Primary reduction ratio	1.681 (79/47)
Transmission type	Constant mesh 6-speed
Gear ratio	
1st	2.571 (36/14)
2nd	1.947 (37/19)
3rd	1.619 (34/21)
4th	1.381 (29/21)
5th	1.190 (25/21)
6th	1.037 (28/27)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Secondary reduction ratio	2.813 (45/16)
Shifting mechanism	
Installed shift rod length	236.4–238.4 mm (9.31–9.39 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel injector	
Resistance	12.0 Ω
Idling condition	
Engine idling speed	1200–1400 r/min
O2 feedback control	Active
Coolant temperature	90–110 °C (194–230 °F)
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/cm², 43.5–56.6 psi)

EAS20015
CHASSIS SPECIFICATIONS

Chassis	
Caster angle	25.0 °
Trail	108 mm (4.3 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C x MT3.50
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Wheel axle bending limit	0.40 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C x MT5.50
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Wheel axle bending limit	0.40 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70ZR17M/C (58W)
Manufacturer/model	BRIDGESTONE/BATTLAX HYPERSPORT S22F
Rear tire	
Type	Tubeless
Size	180/55ZR17M/C (73W)
Manufacturer/model	BRIDGESTONE/BATTLAX HYPERSPORT S22R
Tire air pressure (measured on cold tires)	
Up to 90 kg (198 lb) load	
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
90 kg (198 lb) load - maximum load	
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
Front brake	
Type	Hydraulic dual disc brake
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc runout limit (as measured on wheel)	0.10 mm (0.0039 in)
Brake pad lining thickness limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.87 mm (0.62 in)
Caliper cylinder inside diameter (Left)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Caliper cylinder inside diameter (Right)	30.23 mm, 27.00 mm (1.19 in, 1.06 in)
Specified brake fluid	DOT 4

Rear brake	
Type	Hydraulic single 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	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.18 mm (1.50 in)
Specified brake fluid	DOT 4
Front suspension	
Shock absorber	Hydraulic damper
Fork spring free length limit	268.9 mm (10.59 in)
Inner tube bending limit	0.2 mm (0.01 in)
Recommended oil	Yamaha Suspension Oil 01
Quantity (left)	468.0 cm³ (15.82 US oz, 16.51 Imp.oz) (MT09M, MT09MC) 473.0 cm³ (15.99 US oz, 16.68 Imp.oz) (MT09SPM, MT09SPMC)
Quantity (right)	472.0 cm³ (15.96 US oz, 16.65 Imp.oz) (MT09M, MT09MC) 473.0 cm³ (15.99 US oz, 16.68 Imp.oz) (MT09SPM, MT09SPMC)
Level (left)	107 mm (4.2 in) (MT09M, MT09MC) 110 mm (4.3 in) (MT09SPM, MT09SPMC)
Level (right)	107 mm (4.2 in) (MT09M, MT09MC) 110 mm (4.3 in) (MT09SPM, MT09SPMC)
Spring preload	
Adjustment value (Soft)	19.0 mm (0.75 in)
Adjustment value (STD)	15.0 mm (0.59 in)
Adjustment value (Hard)	4.0 mm (0.16 in)
Rebound damping	
Unit for adjustment	Click
Adjustment value from the start position (Soft)	11 (MT09M, MT09MC) 26 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)	15 (MT09SPM, MT09SPMC) 6 (MT09M, MT09MC)
Adjustment value from the start position (Hard)	1
Compression damping	
Unit for compression damping adjustment	Click (MT09M, MT09MC)
Adjustment value from the start position (Soft)	11 (MT09M, MT09MC)
Adjustment value from the start position (STD)	6 (MT09M, MT09MC)
Adjustment value from the start position (Hard)	1 (MT09M, MT09MC)

Fast compression damping	
Unit for adjustment	Turn (MT09SPM, MT09SPMC)
Adjustment value from the start position (Soft)	5 1/2 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)	3 1/4 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)	0 (MT09SPM, MT09SPMC)
Slow compression damping	
Unit for adjustment	Click (MT09SPM, MT09SPMC)
Adjustment value from the start position (Soft)	18 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)	12 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)	1 (MT09SPM, MT09SPMC)

Rear suspension

Shock absorber	Gas-hydraulic damper
Spring preload	
Unit for adjustment	Cam position (MT09M, MT09MC)
Adjustment value (Soft)	1 (MT09M, MT09MC)
Adjustment value (STD)	4 (MT09M, MT09MC)
Adjustment value (Hard)	7 (MT09M, MT09MC)
Adjustment value (Soft)	154.0 mm (6.06 in) (MT09SPM, MT09SPMC)
Adjustment value (STD)	154.0 mm (6.06 in) (MT09SPM, MT09SPMC)
Adjustment value (Hard)	146.0 mm (5.75 in) (MT09SPM, MT09SPMC)
Rebound damping	
Unit for adjustment	Click (MT09SPM, MT09SPMC) Turn (MT09M, MT09MC)
Adjustment value from the start position (Soft)	2 1/2 (MT09M, MT09MC) 30 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)	1 (MT09M, MT09MC) 18 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)	0
Compression damping	
Unit for adjustment	Click (MT09SPM, MT09SPMC)
Adjustment value from the start position (Soft)	20 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)	10 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)	0 (MT09SPM, MT09SPMC)

Drive chain	
Size	525
Chain type	Sealed type
Number of links	110
Drive chain slack (Sidestand)	36.0–41.0 mm (1.42–1.61 in)
Drive chain slack (Maintenance stand)	36.0–41.0 mm (1.42–1.61 in)
Drive chain slack limit (Sidestand)	46.0 mm (1.81 in)
15-link length limit	239.3 mm (9.42 in)

EAS20016
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition timing (B.T.D.C.)	3.0–7.0 °/1300 r/min
Engine control unit	
Model	TBDF6U (MT09M) TBDF6W (MT09MC) TBDF6X (MT09SPM) TBDF6Y (MT09SPMC)
Ignition coil	
Primary coil resistance	1.19–1.61 Ω
Secondary coil resistance	8.50–11.50 kΩ
Charging system	
Charging system	AC magneto
Standard output	14.0 V, 29.6 A at 5000 r/min
Stator coil resistance	0.152–0.228 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
Brake/tail light	LED
Front turn signal/position light	LED
Rear turn signal light	LED
Auxiliary light	LED
License plate light	5.0 W
Meter lighting	LED

Indicator light	
Neutral indicator light	LED
Stability control indicator light	LED
Oil pressure and Coolant temperature warning light	LED
High beam indicator light	LED
Turn signal indicator light	LED
Fuel level warning light	LED
Engine trouble warning light	LED
Cruise control “SET” indicator light	LED (MT09SPM, MT09SPMC)
Cruise control “ON” indicator light	LED (MT09SPM, MT09SPMC)
Auxiliary system warning light	LED
ABS warning light	LED
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)	9.0–11.0 Ω
Sender unit resistance (empty)	213.0–219.0 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	289–391 Ω at 80 °C (289–391 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/cm², 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	50.0 A
Headlight fuse	7.5 A
Brake light fuse	2.0 A (MT09SPM, MT09SPMC)
Signaling system fuse	7.5 A
Ignition fuse	10.0 A
Radiator fan motor fuse	15.0 A
ABS ECU fuse	7.5 A
Fuel injection system fuse	7.5 A
ABS motor fuse	30.0 A
ABS solenoid fuse	15.0 A
Terminal fuse 1	2.0 A
Backup fuse	7.5 A
Cruise control fuse	2.0 A (MT09SPM, MT09SPMC)
Electronic throttle valve fuse	7.5 A
Ignition fuse 2	7.5 A
Backup fuse 2	15.0 A

EAS20017
TIGHTENING TORQUES

EAS30016
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe nut	M8	6	20 N·m (2.0 kgf·m, 15 lb·ft)	
Spark plug	M10	3	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	75 N·m (7.5 kgf·m, 55 lb·ft)	E
Generator cover bolt	M6	2	12 N·m (1.2 kgf·m, 8.9 lb·ft)	LT
Generator cover bolt	M6	8	12 N·m (1.2 kgf·m, 8.9 lb·ft)	
Clutch boss nut	M20	1	125 N·m (12.5 kgf·m, 92 lb·ft)	Stake. LT
Clutch spring bolt	M6	3	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Clutch cover bolt	M6	11	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	70 N·m (7.0 kgf·m, 52 lb·ft)	E
Water pump drain bolt	M6	1	10 N·m (1.0 kgf·m, 7.4 lb·ft)	
Engine oil drain bolt	M14	1	43 N·m (4.3 kgf·m, 32 lb·ft)	

EAS30017
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Front wheel axle	M18	1	72 N·m (7.2 kgf·m, 53 lb·ft)	
Front wheel axle pinch bolt	M8	1	23 N·m (2.3 kgf·m, 17 lb·ft)	
Rear wheel sprocket nut	M10	5	80 N·m (8.0 kgf·m, 59 lb·ft)	
Rear wheel axle nut	M24	1	105 N·m (10.5 kgf·m, 77 lb·ft)	LS
Rear brake caliper bolt (front)	M12	1	27 N·m (2.7 kgf·m, 20 lb·ft)	S
Rear brake caliper bolt (rear)	M8	1	22 N·m (2.2 kgf·m, 16 lb·ft)	S and LT
Brake caliper bleed screw	M8	3	5 N·m (0.5 kgf·m, 3.7 lb·ft)	
Front brake caliper bolt	M10	4	35 N·m (3.5 kgf·m, 26 lb·ft)	
Upper handlebar holder bolt	M8	4	22 N·m (2.2 kgf·m, 16 lb·ft)	
Lower handlebar holder nut	M10	2	40 N·m (4.0 kgf·m, 30 lb·ft)	
Clutch cable locknut	M8	1	7 N·m (0.7 kgf·m, 5.2 lb·ft)	
Lower bracket pinch bolt	M8	4	23 N·m (2.3 kgf·m, 17 lb·ft)	
Upper bracket pinch bolt	M8	2	26 N·m (2.6 kgf·m, 19 lb·ft)	
Lower ring nut	M30	1	See TIP.	
Drive sprocket nut	M22	1	160 N·m (16 kgf·m, 118 lb·ft)	Stake. LT

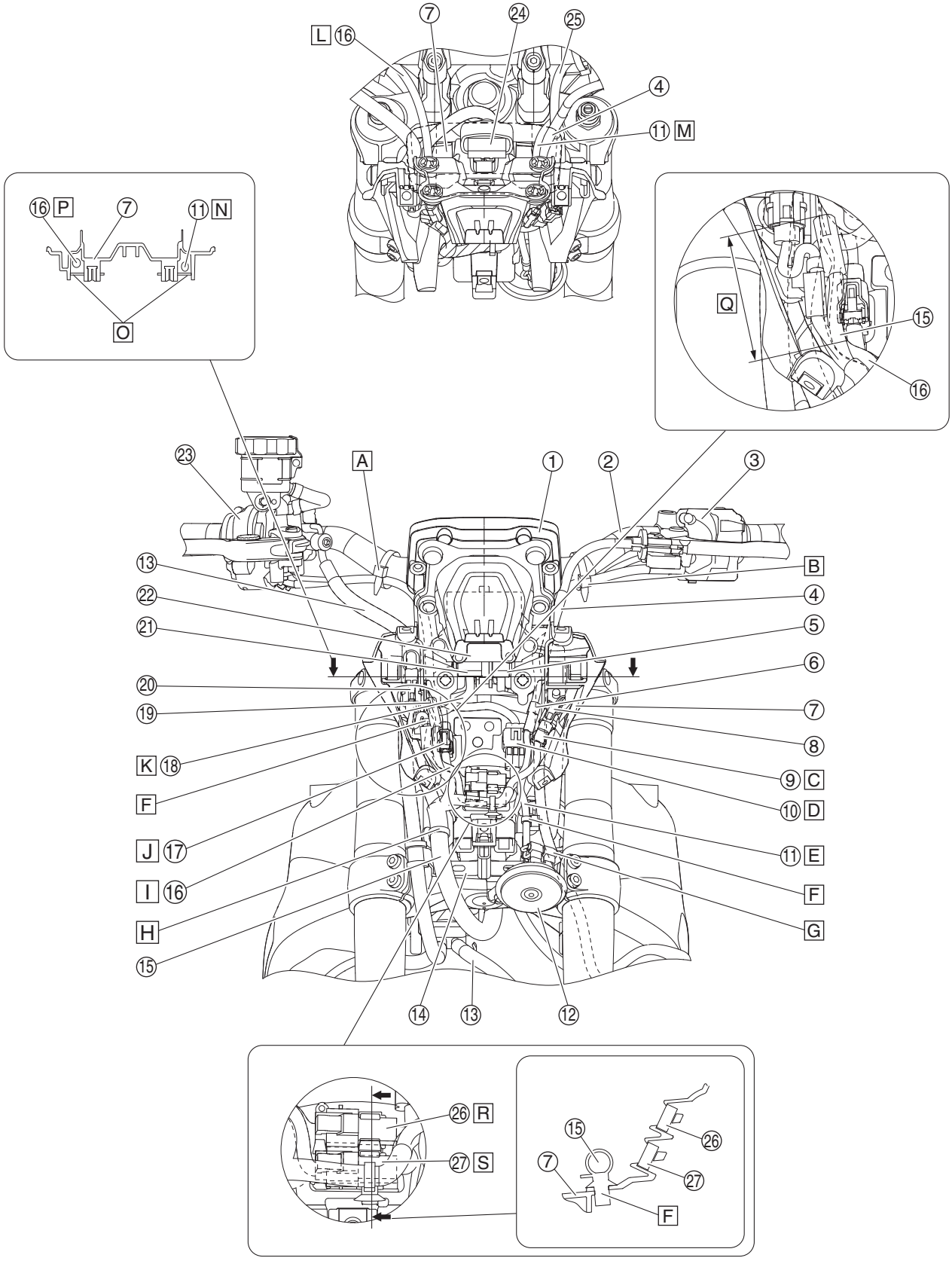
TIP

Lower ring nut

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

EAS20021
CABLE ROUTING

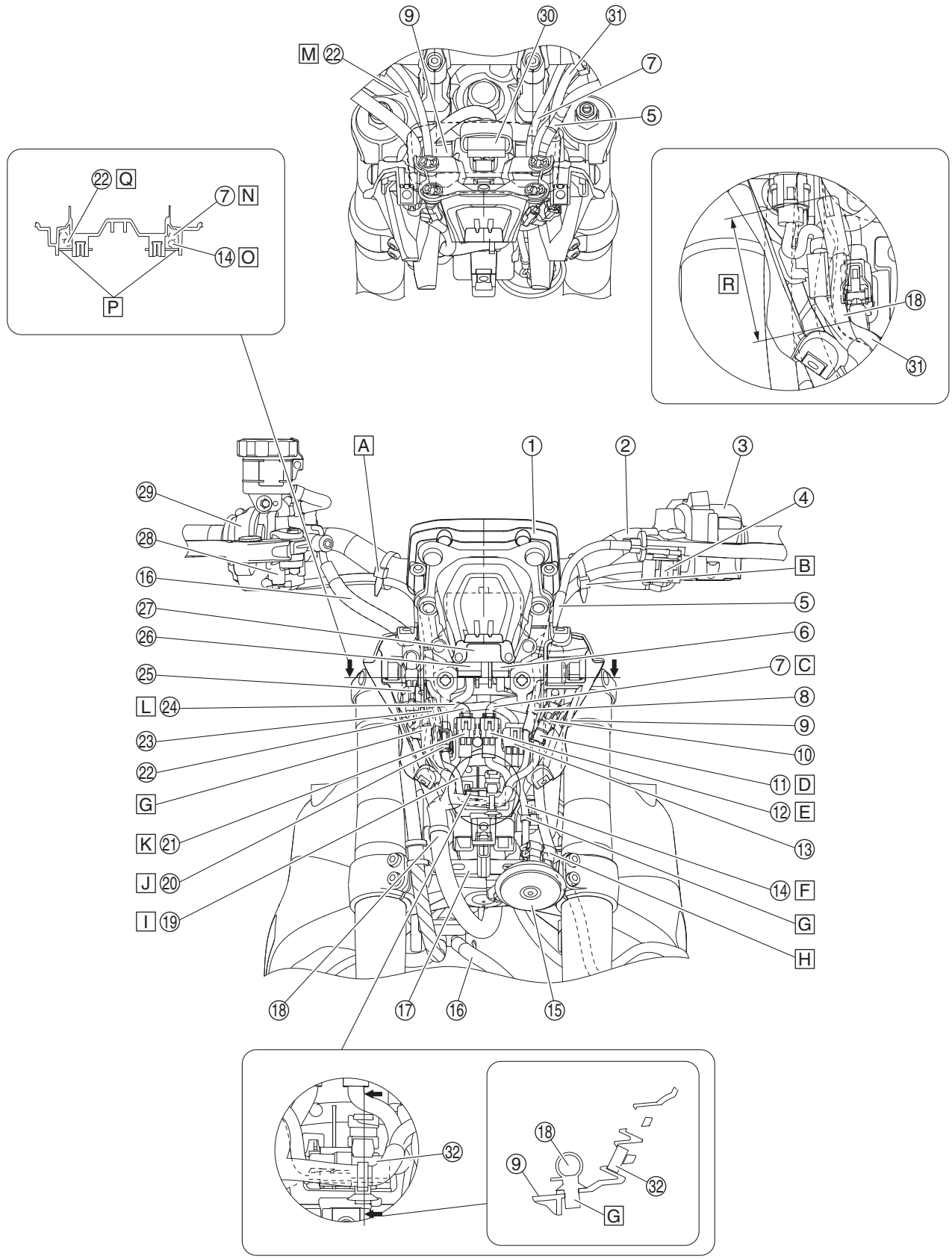
Handlebar (front view) (for MT09M/MT09MC)



1. Meter assembly
2. Handlebar
3. Handlebar switch (left)
4. Clutch cable
5. Headlight control unit coupler (headlight assembly side)
6. Grip warmer coupler (left) (OPTION)
7. Meter assembly bracket
8. Auxiliary light coupler (auxiliary light side)
9. Auxiliary light coupler (wire harness side)
10. Handlebar switch coupler (right)
11. Handlebar switch lead (left) (to horn)
12. Horn
13. Brake hose
14. Headlight bracket
15. Wire harness
16. Handlebar switch lead (right)
17. Accelerator position sensor coupler
18. Wire harness (to headlight control unit)
19. Grip warmer coupler (right) (OPTION)
20. Auxiliary DC jack coupler
21. Headlight control unit coupler (wire harness side)
22. Headlight control unit
23. Handlebar switch (right)
24. Meter assembly coupler
25. Handlebar switch lead (left)
26. Front brake light switch coupler (red)
27. Handlebar switch coupler (right) (white)

A. Clamp the handlebar switch lead (right) to the rounded part of the handlebar. Face the locking part of the plastic band forward. Face the end of the plastic band downward.
B. Clamp the handlebar switch lead (left) to the rounded part of the handlebar. Face the locking part of the plastic band forward. Face the end of the plastic band downward.
C. Insert an auxiliary light coupler into the hole of the meter assembly bracket.
D. Insert the handlebar switch coupler (right) into the hole of the meter assembly bracket.
E. Route the handlebar switch lead (left) (to horn) on the rear side of the wire harness.
F. Insert the clamp into the hole of the meter assembly bracket.
G. Face the terminal of the horn inside.
H. Insert the clamp into the hole of the headlight bracket.
I. Route the handlebar switch lead (right) on the rear side of the wire harness (to accelerator position sensor).
J. Insert an accelerator position sensor coupler into the hole of the meter assembly bracket.
K. Route the wire harness (to headlight control unit) on the front side of the handlebar switch lead (right).
L. Insert the handlebar switch lead (right) into the hole of the meter assembly bracket.
M. Route the handlebar switch lead (left) (to horn) on the rear side of the clutch cable. Insert the handlebar switch lead (left) (to horn) into the hole of the meter assembly bracket.
N. Route the handlebar switch lead (left) (to horn) on the inside of the damper.
O. Do not ride the damper over the meter assembly bracket.
P. Route the handlebar switch lead (right) on the inside of the damper.
Q. Pass the handlebar switch lead (right) behind the wire harness within the range of the figure.
R. After connecting the front brake light switch coupler (red) to the handlebar switch coupler (right), fix it into the hook part of the meter assembly bracket.
S. After connecting the handlebar switch coupler (right) (white) to the handlebar switch coupler (right), fix it into the hook part of the meter assembly bracket.

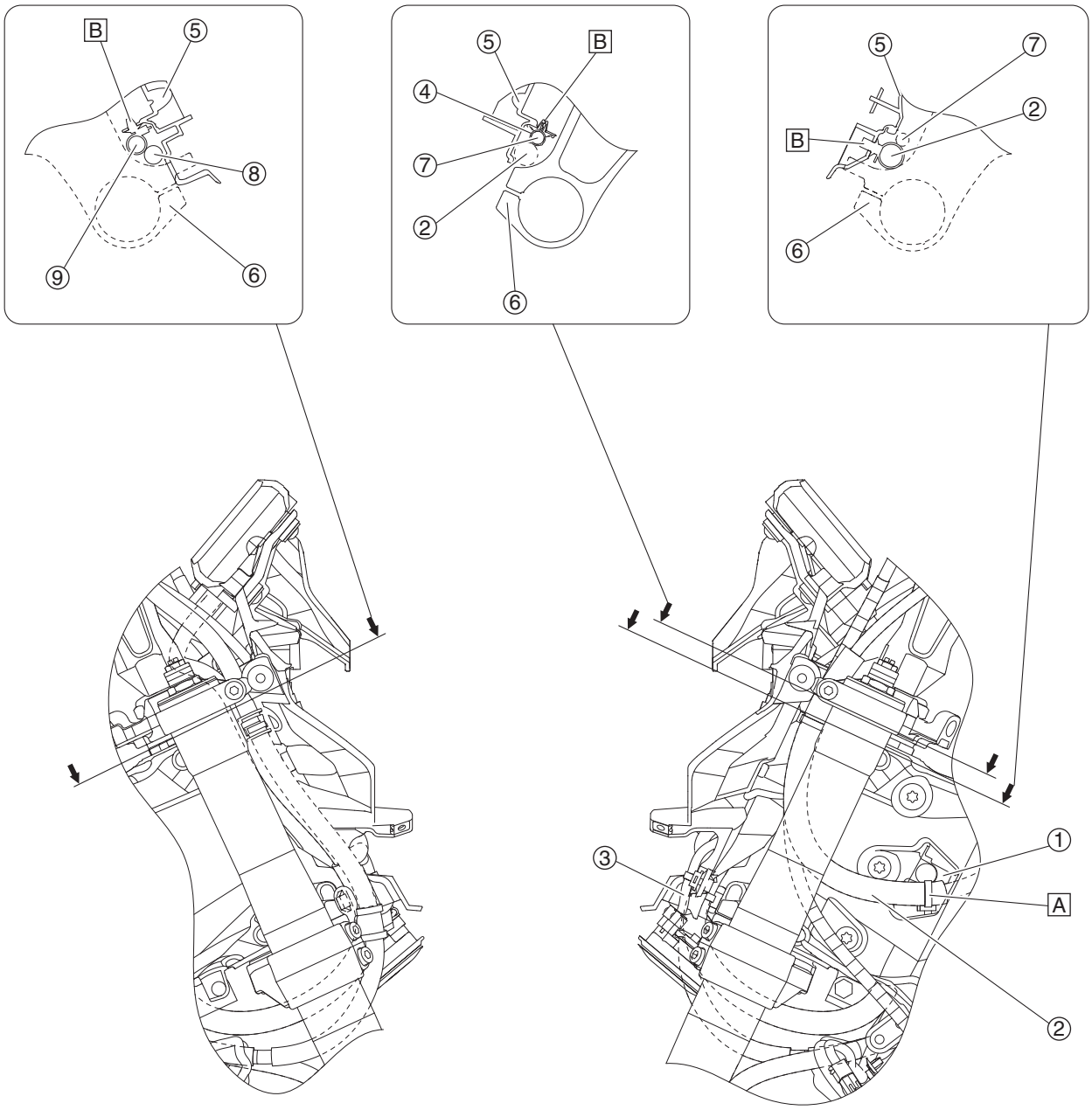
Handlebar (front view) (for MT09SPM/MT09SPMC)



1. Meter assembly
2. Handlebar
3. Handlebar switch (left)
4. Clutch switch
5. Clutch cable
6. Headlight control unit coupler (headlight assembly side)
7. Clutch switch lead
8. Grip warmer coupler (left) (OPTION)
9. Meter assembly bracket
10. Auxiliary light coupler (auxiliary light side)
11. Auxiliary light coupler (wire harness side)
12. Clutch switch coupler
13. Handlebar switch coupler (right)
14. Handlebar switch lead (left) (to horn)
15. Horn
16. Brake hose
17. Headlight bracket
18. Wire harness
19. Handlebar switch lead (right)
20. Accelerator position sensor coupler
21. Front brake light switch coupler
22. Front brake light switch lead
23. Grip warmer coupler (right) (OPTION)
24. Wire harness (to headlight control unit)
25. Auxiliary DC jack coupler
26. Headlight control unit coupler (wire harness side)
27. Headlight control unit
28. Front brake light switch
29. Handlebar switch (right)
30. Meter assembly coupler
31. Handlebar switch lead (left)
32. Handlebar switch coupler (right) (white)

A. Clamp the right lead of the handlebar switch and front brake light switch lead to the rounded part of the handlebar. Face the locking part of the plastic band forward. Face the end of the plastic band downward. No specific order for routing.
B. Clamp the left lead of the handlebar switch and clutch switch lead to the rounded part of the handlebar. Face the locking part of the plastic band forward. Face the end of the plastic band downward. No specific order for routing.
C. Route the clutch switch lead on the rear side of the wire harness (to handlebar switch coupler (right)).
D. Insert an auxiliary light coupler into the hole of the meter assembly bracket.
E. Insert the clutch switch coupler into the hole of the meter assembly bracket.
F. Route the handlebar switch lead (left) (to horn) on the rear side of the wire harness.
G. Insert the clamp into the hole of the meter assembly bracket.
H. Face the terminal of the horn inside.
I. Route the handlebar switch lead (right) on the front side of the wire harness (to front brake light switch).
J. Insert an accelerator position sensor coupler into the hole of the meter assembly bracket.
K. Insert the front brake light switch coupler into the hole of the meter assembly bracket.
L. Route the wire harness (to headlight control unit) on the front side of the front brake light switch lead.
M. Pass the front brake light switch lead into the hole of the meter assembly bracket.
N. Route the clutch switch lead on the inside of the damper.
O. Route the handlebar switch lead (left) (to horn) lead on the inside of the damper.
P. Do not ride the damper over the meter assembly bracket.
Q. Route the front brake light switch lead on the inside of the damper.
R. Pass the handlebar switch lead (right) behind the wire harness within the range of the figure.

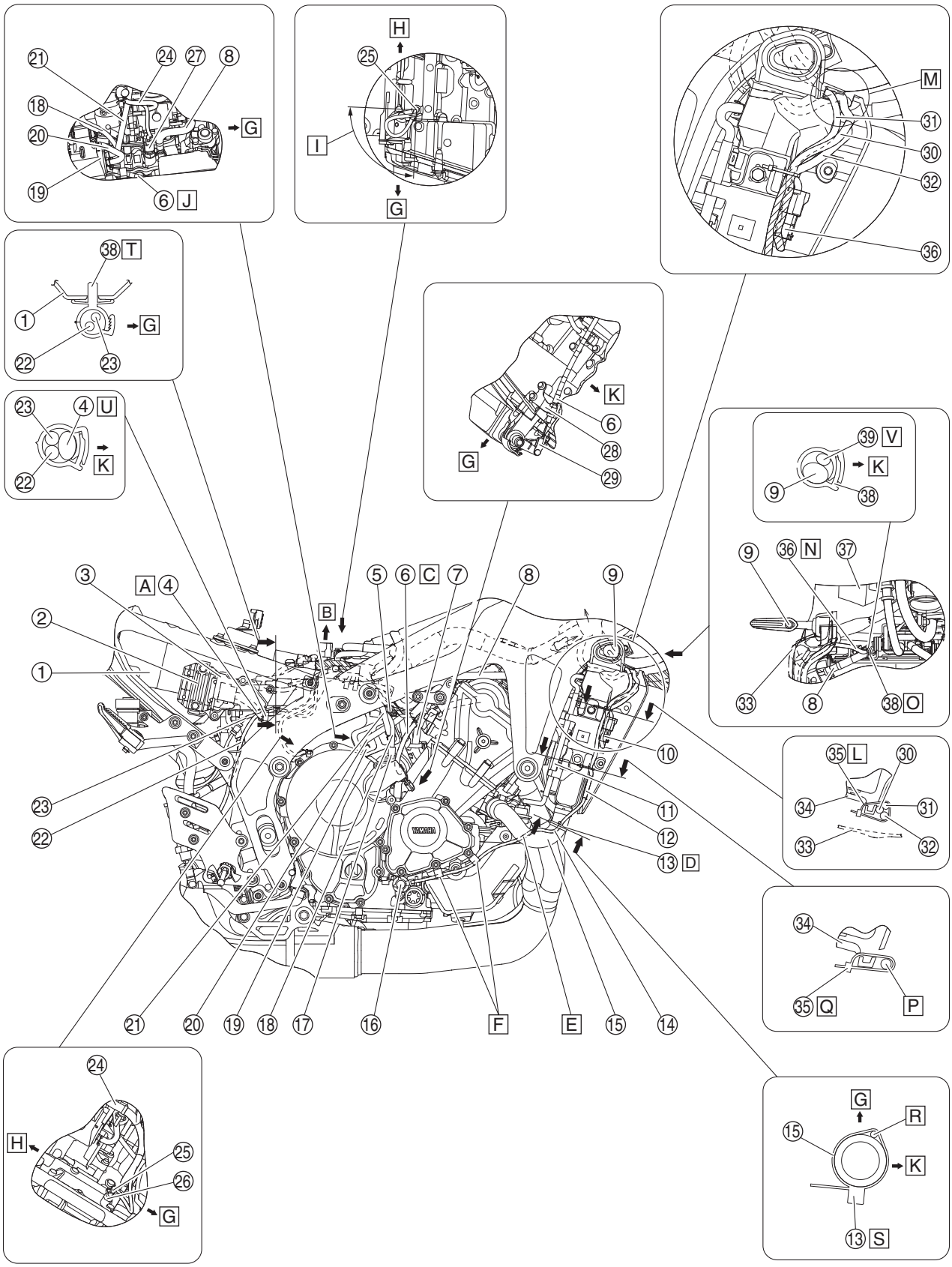
Steering head (left and right view)



1. Coupler cover
2. Handlebar switch lead (left)
3. Handlebar switch lead (left) (to horn)
4. Clamp
5. Meter assembly bracket
6. Upper bracket
7. Clutch cable
8. Brake hose
9. Wire harness (to meter)

A. Insert the clamp into the hole of the coupler cover.
B. Insert the clamp into the hole of the meter assembly bracket.

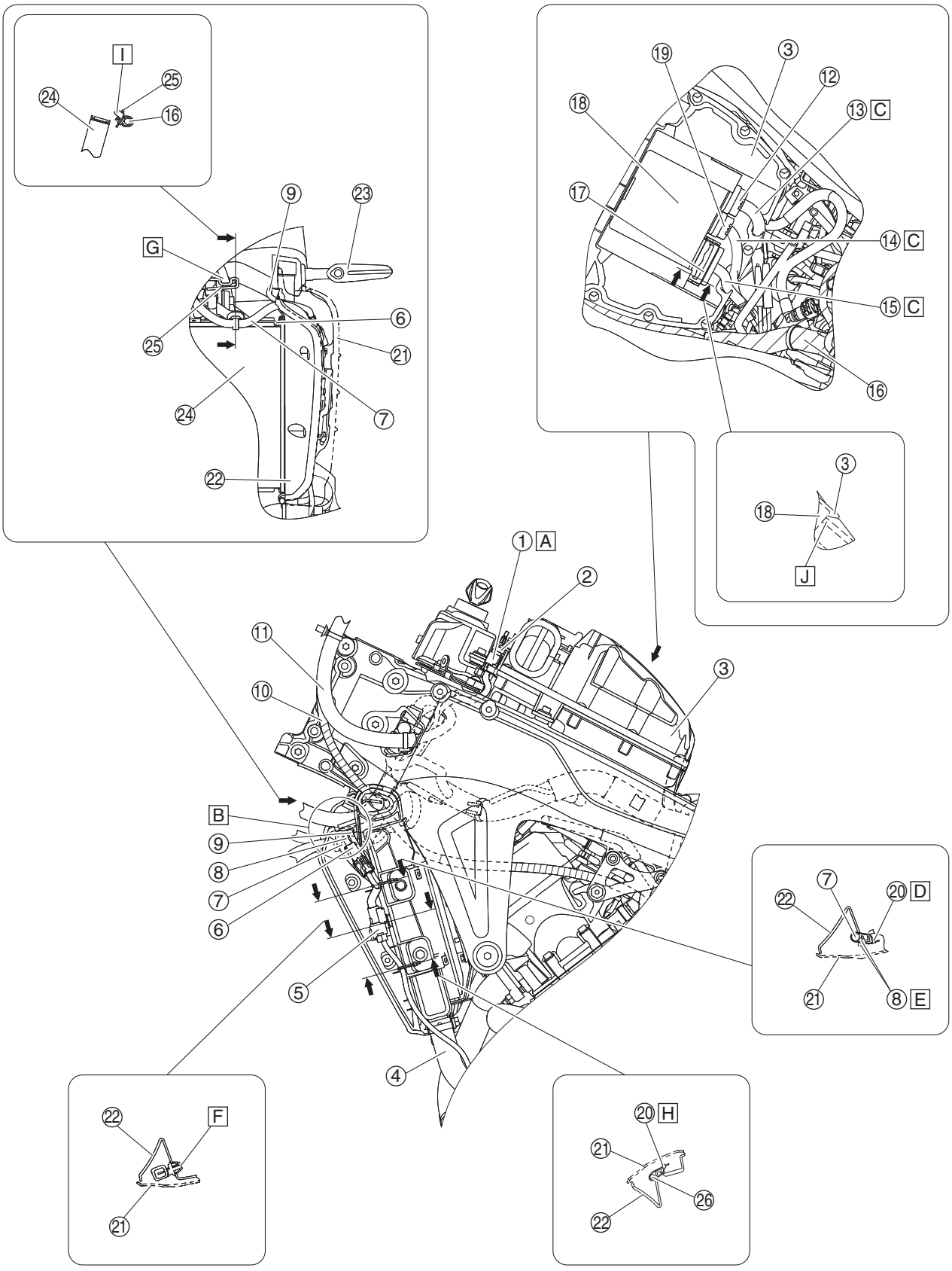
Frame (right side view)



1. Battery box
2. Rectifier/regulator
3. Rectifier/regulator cover
4. Wire harness (to rectifier/regulator)
5. Purge cut valve solenoid coupler (for MT09MC/MT09SPMC)
6. Clutch cable
7. Stator coil lead
8. Radiator hose (cylinder head to radiator)
9. Front turn signal/position light (right)
10. Front turn signal/position light coupler (right)
11. Coolant reservoir hose
12. Oil pressure switch coupler
13. Plastic band
14. Oil pressure switch lead
15. Radiator inlet hose
16. Oil pressure switch
17. Starter motor
18. Starter motor lead
19. Canister (for MT09MC/MT09SPMC)
20. Canister purge hose (purge cut valve solenoid to canister) (for MT09MC/MT09SPMC)
21. Fuel tank breather hose (fuel tank to canister) (for MT09MC/MT09SPMC)
22. Rear brake light switch lead
23. Rear wheel sensor lead
24. Wire harness
25. Neutral switch coupler
26. Neutral switch
27. Coolant temperature sensor coupler
28. Clutch cable holder
29. Pull lever
30. Wire harness (to oil pressure switch sub-lead)
31. Front turn signal/position light lead (right)
32. Wire harness (to front turn signal/position light (right))
33. Radiator cover (right)
34. Front side panel (right)
35. Plastic locking tie
36. Front turn signal/position light coupler (right)
37. Frame
38. Clamp
39. Wire harness (to front turn signal/position light (right) and oil pressure switch sub–lead)

A. When installing the rectifier/regulator cover, the rectifier/regulator lead should not bite into the cover.
B. To fuel pump
C. Route the clutch cable on the front side of the stator coil lead and canister. (for MT09MC/MT09SPMC)
D. Fix the plastic band, after aligning with the lower end of the paint mark on the radiator inlet hose.
E. Route the oil pressure switch lead on the inside of the radiator inlet hose.
F. Fasten the oil pressure switch lead with the holder.
G. Right side of the vehicle
H. Left side of the vehicle
I. Set the neutral switch coupler installation direction within the range as shown in the figure.
J. Route the clutch cable on the front side of the starter motor lead.
K. Front side of the vehicle
L. Pass each lead through the hole in the front side panel (right) and secure it with a plastic locking tie. Face the locking part of the plastic locking tie rearward. Face the end of the plastic locking tie rearward and cut off the excess.
M. Pass each lead wire through the notch on the front side panel (right) and arrange as shown in the figure.
N. Route the front turn signal/position light coupler (right) on the rear side of the wire harness (to oil pressure switch sub–lead) and frame (radiator mounting boss).
O. Fasten the gray tape portion of the front turn signal/position light lead (right) and wire harness (to oil pressure switch sub-lead) with the clamp. The opening of the clamp should face the front.
P. Fasten the gray tape portion of the wire harness (to oil pressure switch sub-lead) with the clamp.
Q. Pass the plastic locking tie through the hole in the front side panel (right) and fix the wire harness (to oil pressure switch sub-lead). Face the locking part of the plastic locking tie rearward. Face the end of the plastic locking tie rearward and cut off the excess.
R. Route the oil pressure switch lead on the outside of the radiator inlet hose.
S. Face the locking part of the plastic band inward. Face the end of the plastic locking tie rearward.
T. Insert the clamp into the hole of the battery box. The opening of the clamp should face the right.
U. Fasten the gray tape portion of the wire harness (to rectifier/regulator) with the clamp. The opening of the clamp should face the right.
V. Route the wire harness (to front turn signal/position light and oil pressure switch) on the upper side of the radiator hose (cylinder head to radiator).

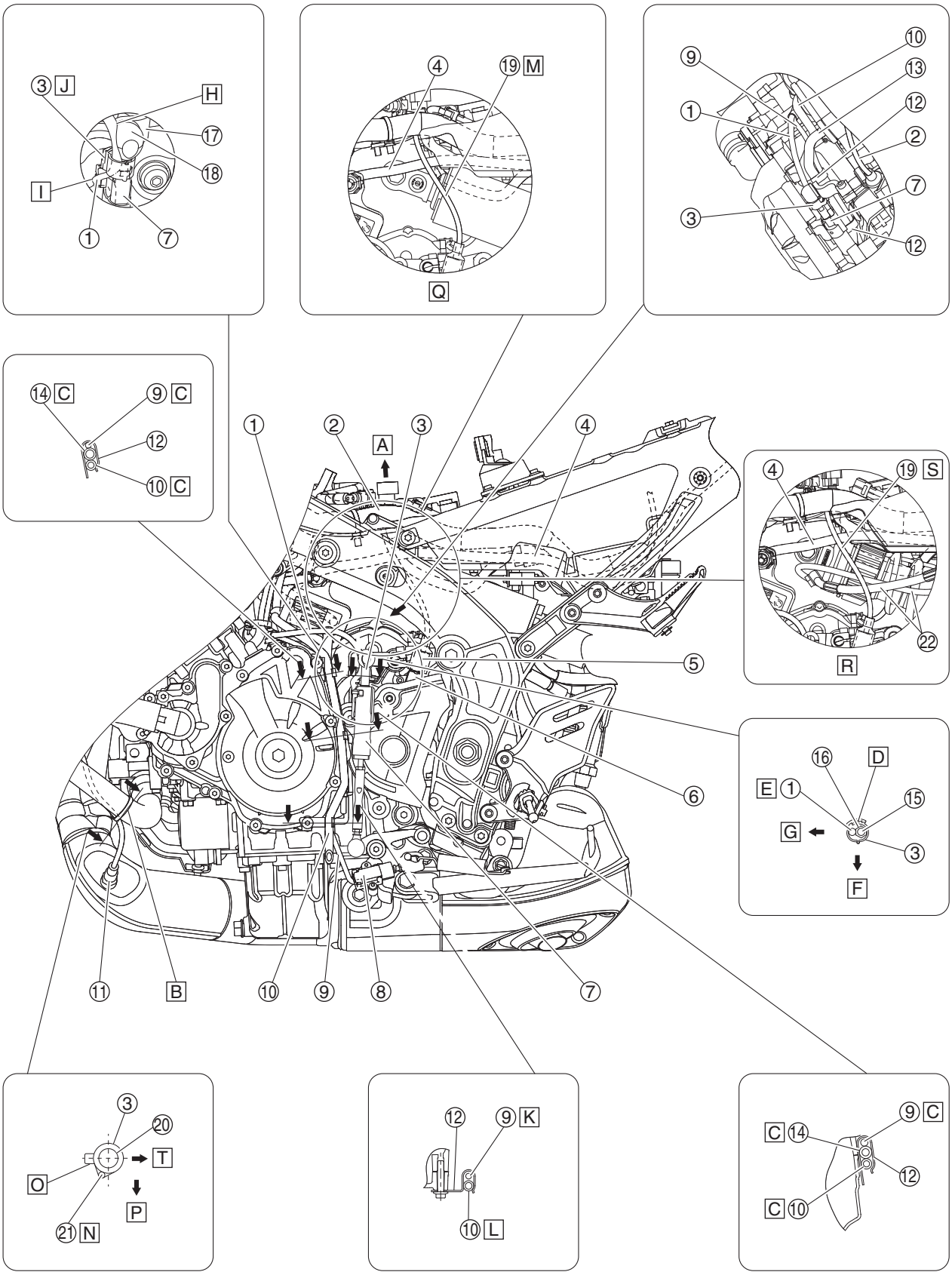
Frame (front left side view)



1. Intake air temperature sensor coupler
2. Intake air temperature sensor
3. Air filter case assembly
4. Radiator outlet hose
5. O_2 sensor coupler
6. Front turn signal/position light coupler (left)
7. Wire harness (to O_2 sensor)
8. Wire harness (to front turn signal/position light (left))
9. Front turn signal/position light lead (left)
10. Clutch cable
11. Handlebar switch lead (left)
12. ECU coupler 1
13. Wire harness (to ECU coupler 1)
14. Wire harness (to ECU coupler 2)
15. Wire harness (to ECU coupler 3)
16. Wire harness
17. ECU coupler 3
18. ECU (Engine Control Unit)
19. ECU coupler 2
20. Plastic locking tie
21. Radiator cover (left)
22. Front side panel (left)
23. Front turn signal/position light (left)
24. Radiator
25. Cable guide
26. O_2 sensor lead

A. Connect the intake air temperature sensor to its coupler and install the intake air temperature sensor to the hook of the air filter assembly. Do not ride the intake air temperature sensor lead over the bracket.
B. Route each lead through the notch section of the front side panel (left). Route each lead wire as shown in the figure.
C. Pass the wire harness (to ECU coupler) through the recess of the air filter assembly.
D. Fix the wire harness (to O_2 sensor) and wire harness (to front turn signal/position light (left)) by passing the plastic locking tie through the holes (2 places) in the front side panel (left). Face the locking part of the plastic locking tie rearward. Face the end of the plastic locking tie rearward and cut off the excess.
E. Fix the wire harness (to front turn signal/position light (left)) with the plastic locking tie and connect the front turn signal/position light coupler (left).
F. Insert the O_2 sensor coupler into the hole in the front side panel (left).
G. Pass the clutch cable through the recess of the cable guide.
H. Pass the plastic locking tie through the holes (2 places) on the front side panel (left) to fix the O_2 sensor lead. Face the locking part of the plastic locking tie rearward. Face the end of the plastic locking tie rearward and cut off the excess.
I. Insert the clamp into the hole in the cable guide.
J. Fix the ECU with the claw of air filter case assembly properly.

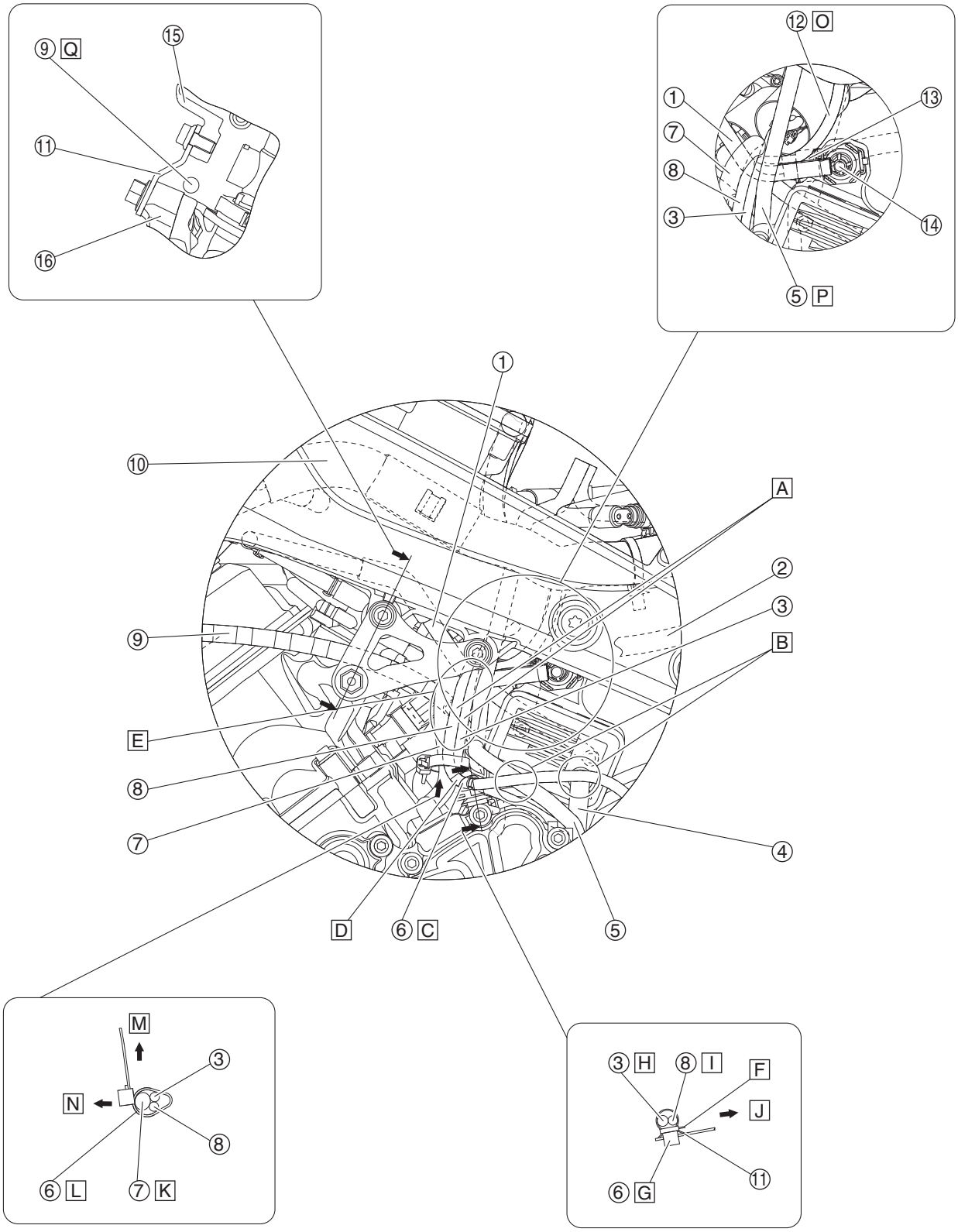
Frame (rear left side view)



1. Shift sensor lead
2. Wire harness
3. Clamp
4. Starter motor lead
5. Gear position sensor coupler
6. Gear position sensor
7. Shift sensor
8. Sidestand switch
9. Sidestand switch lead
10. Fuel tank drain hose
11. O_2 sensor
12. Holder
13. Canister breather hose (for MT09MC/MT09SPMC)
14. Fuel tank breather hose (for MT09M/MT09SPM) or canister breather hose (for MT09MC/MT09SPMC)
15. Shift rod joint
16. Locknut
17. Shift arm
18. Shift rod joint and dust cover
19. Wire harness (to gear position sensor)
20. Radiator outlet hose
21. O_2 sensor lead
22. Rear shock absorber hose

A. To fuel pump.
B. Fix the O_2 sensor lead to the rounded part on the radiator outlet hose with a plastic locking tie.
C. Arrange the sidestand switch lead, canister breather hose (for MT09MC/MT09SPMC), fuel tank breather hose (for MT09M/MT09SPM) and fuel tank drain hose from inside of the vehicle in order.
D. The opening of the clamp should face the right.
E. Arrange the shift sensor lead to the front side.
F. Left side of the vehicle
G. Front of the vehicle
H. Pass the shift sensor lead in front of the shift rod joint and shift arm.
I. Bend the shift sensor lead upward at the bottom of the sensor side.
J. Fix the shift sensor and its lead to the top part of the locknut on the shift sensor with the clamp.
K. Arrange the sidestand switch lead to the inside of the vehicle.
L. Face the paint mark on the fuel tank drain hose to the outside and pass it through the holder.
M. Route the wire harness (to gear position sensor) on the left side of the starter motor lead.
N. Route the O_2 sensor lead on the inside of the radiator outlet hose.
O. Face the locking part of the plastic locking tie inward. Face the end of the plastic locking tie downward and cut off the excess.
P. Lower side of the vehicle
Q. For MT09M/MT09MC
R. For MT09SPM/MT09SPMC
S. Route the wire harness (to gear position sensor) on the left side of the rear shock absorber hose and starter motor lead.
T. Left outside of the vehicle

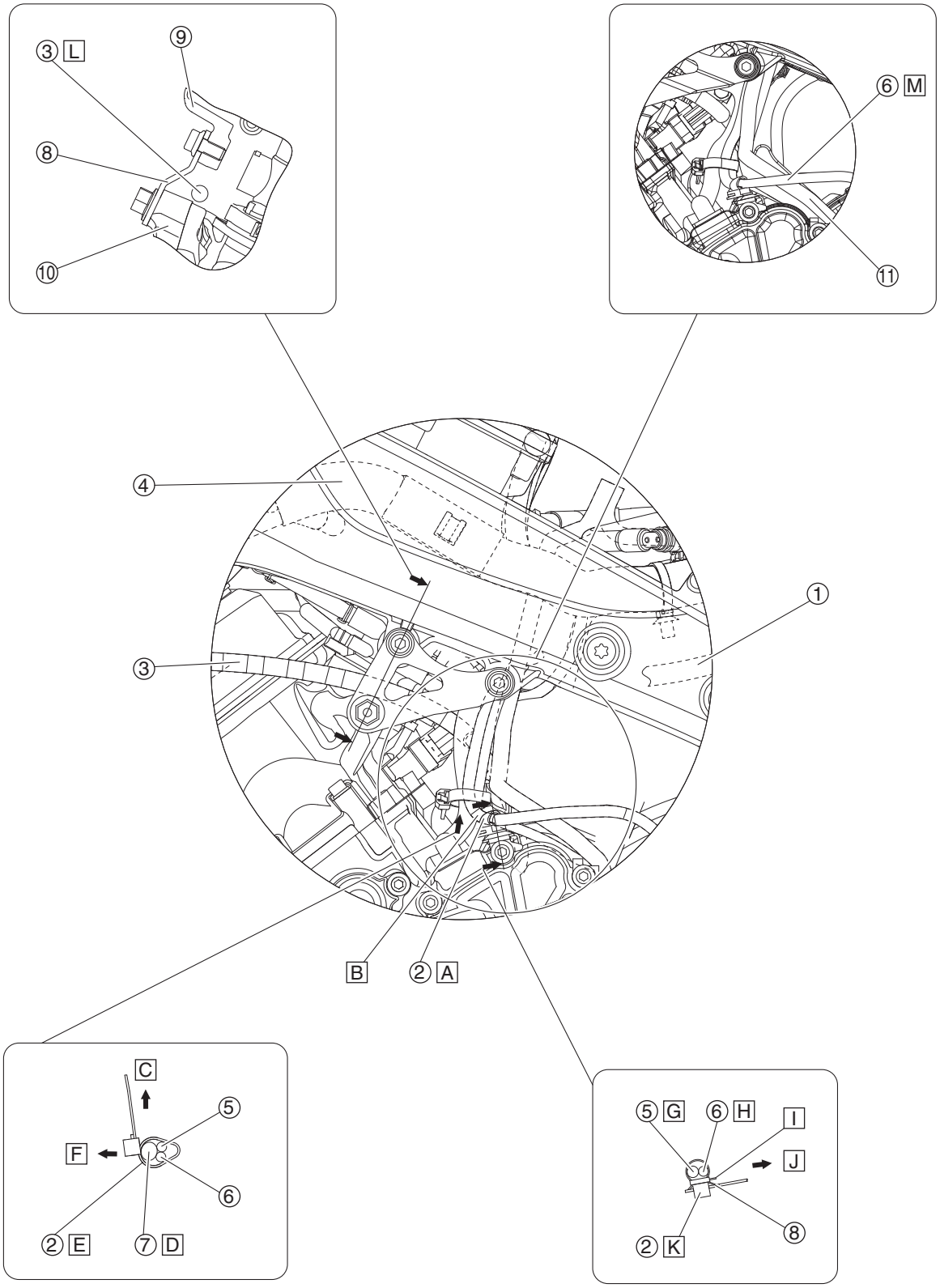
Canister (left side view) (for MT09MC/MT09SPMC)



1. Canister purge hose (purge cut valve solenoid to canister)
2. Starter motor lead
3. Sidestand switch lead
4. Canister breather hose
5. Fuel tank drain hose
6. Plastic locking tie
7. Stator coil lead
8. Shift sensor lead
9. Clutch cable
10. Wire harness
11. Bracket
12. Wire harness (to purge cut valve solenoid)
13. Purge cut valve solenoid coupler
14. Purge cut valve solenoid
15. Frame
16. Cylinder head

A. Connect each lead wire to the respective couplers of the wire harness inside the boot.
B. Route the shift sensor lead on the outside of the fuel tank drain hose and canister breather hose.
C. The plastic locking tie position is aligned with the end of the gray tape (shift sensor side and sidestand switch side).
D. Gray tape of shift sensor lead and side stand switch lead.
E. Route the stator coil lead, shift sensor lead and sidestand switch lead on the left side of the clutch cable and canister purge hose (purge cut valve solenoid to canister).
F. Face the end of the plastic locking tie leftward and cut off the excess.
G. Insert the plastic locking tie into the hole of the bracket.
H. Arrange the sidestand switch lead to the right side of the vehicle.
I. Arrange the shift sensor lead to the left side of the vehicle.
J. Left side of the vehicle
K. Route the stator coil lead to the front of the vehicle and fix the gray tape part with a plastic locking tie.
L. Fix the plastic locking tie is located 20–30 mm (0.79–1.18 in) away from the plastic locking tie “6C”. Face the locking part of the plastic locking tie forward. Face the end of the plastic locking tie rightward and do not cut off the excess.
M. Right side of the vehicle
N. Front side of the vehicle
O. Route the wire harness (to purge cut valve solenoid) on the rear side of the stator coil lead, sidestand switch lead and shift sensor lead.
P. Route the fuel tank drain hose on the rear side of the stator coil lead, sidestand switch lead and shift sensor lead. Route the fuel tank drain hose on the left side of the canister purge hose (purge cut valve solenoid to canister).
Q. Route the clutch cable between the cylinder head and the bracket.

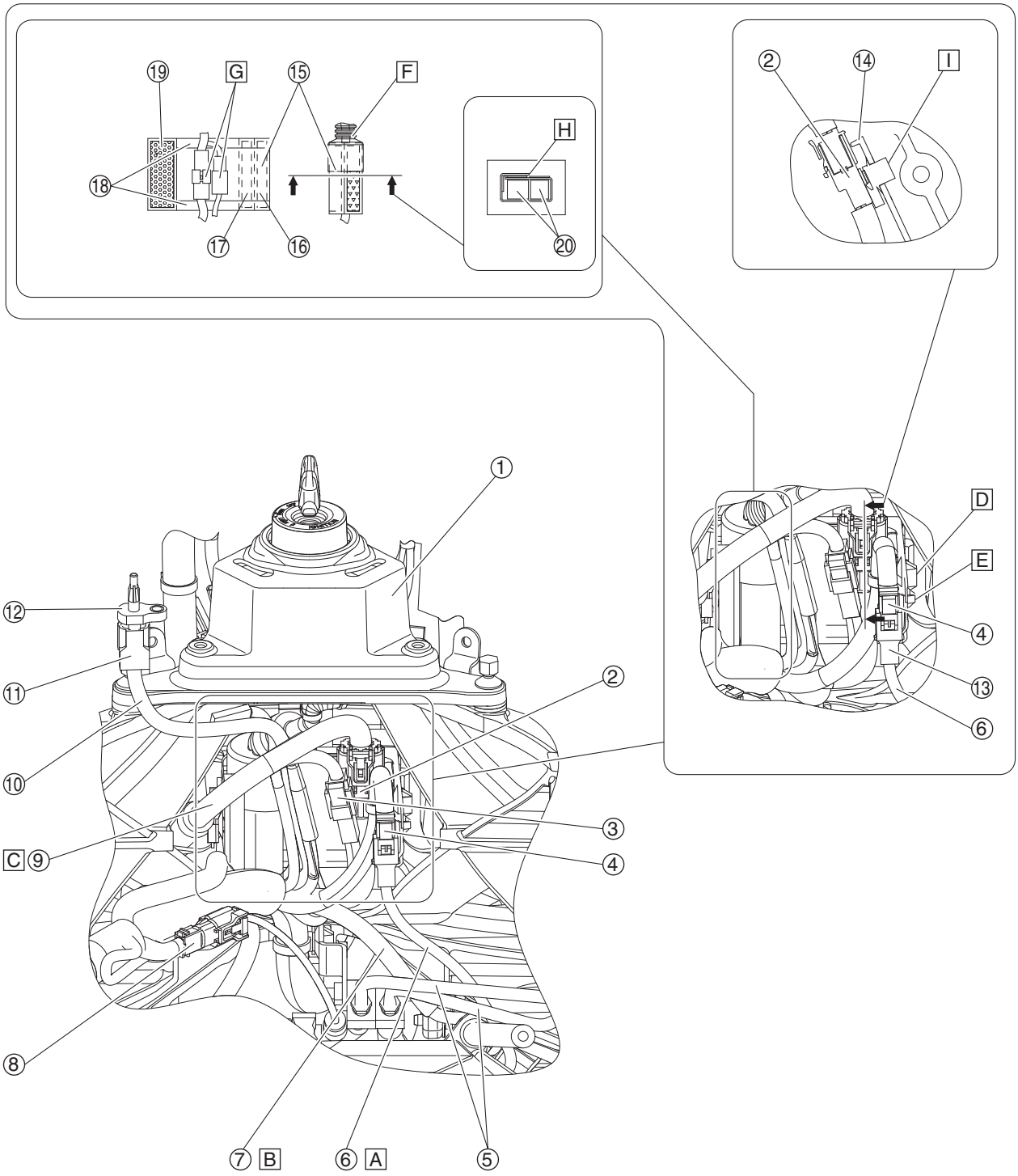
Frame (left side view) (for MT09M/MT09SPM)



1. Starter motor lead
2. Plastic locking tie
3. Clutch cable
4. Wire harness
5. Sidestand switch lead
6. Shift sensor lead
7. Stator coil lead
8. Bracket
9. Frame
10. Cylinder head
11. Fuel tank drain hose

A. The plastic locking tie position is aligned with the end of the gray tape (shift sensor side and sidestand switch side).
B. Gray tape of shift sensor lead and side stand switch lead.
C. Right side of the vehicle
D. Route the stator coil lead to the front of the vehicle and fix the gray tape part with a plastic locking tie.
E. Fix the plastic locking tie is located 20–30 mm (0.79–1.18 in) away from the plastic locking tie “6C”. Face the locking part of the plastic locking tie forward. Face the end of the plastic locking tie rightward and do not cut off the excess.
F. Front side of the vehicle
G. Arrange the sidestand switch lead to the right side of the vehicle.
H. Arrange the shift sensor lead to the left side of the vehicle.
I. Face the end of the plastic locking tie leftward and cut off the excess.
J. Left side of the vehicle
K. Insert the plastic locking tie into the hole of the bracket.
L. Route the clutch cable between the cylinder head and the bracket.
M. Route the shift sensor lead on the outside of the fuel tank drain hose.

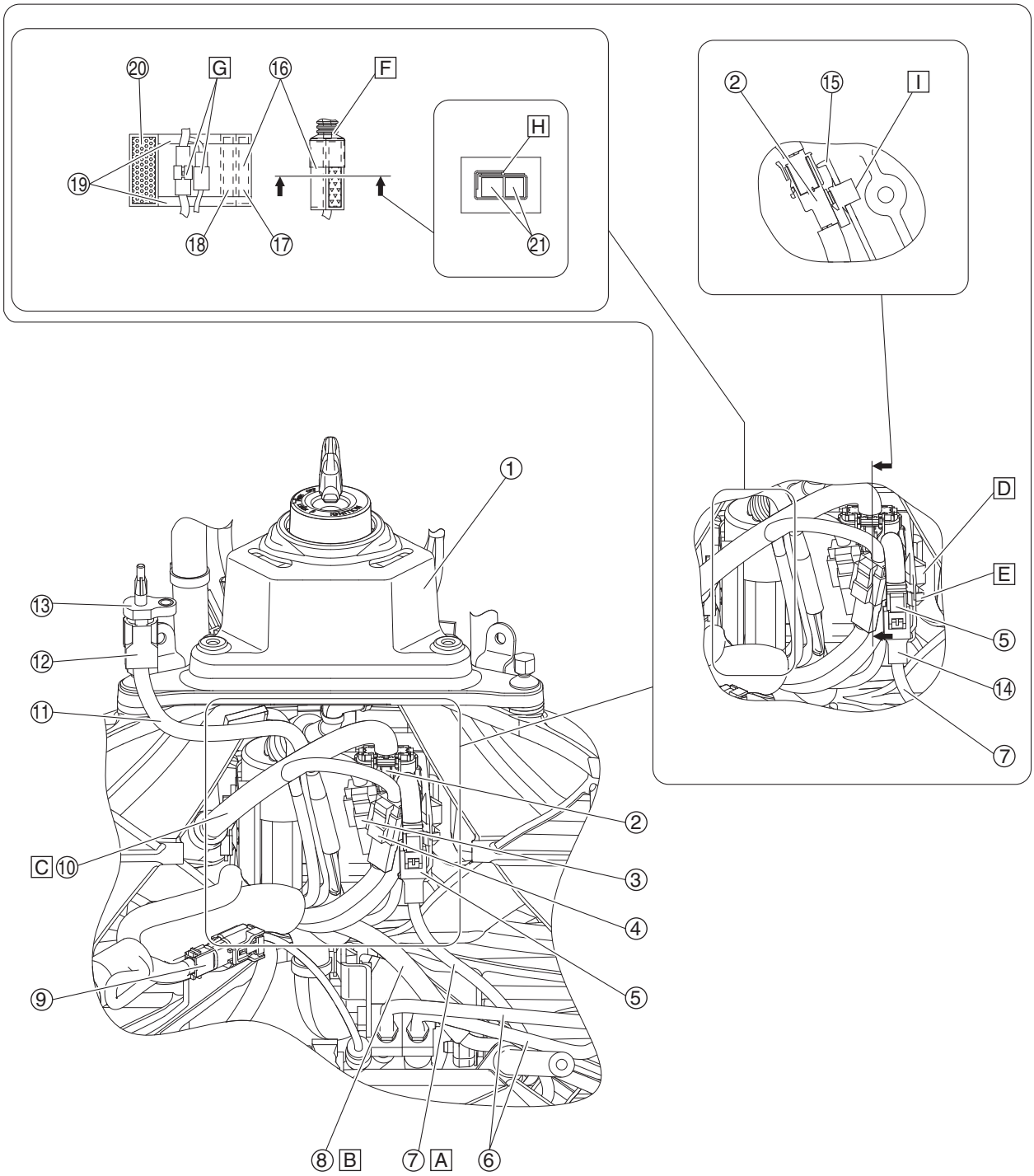
Main switch (rear view) (for MT09M/MT09MC)



1. Bracket
2. Handlebar switch coupler 2 (left)
3. Handlebar switch coupler 1 (left)
4. Radiator fan motor coupler
5. Brake hose
6. Radiator fan motor lead
7. Wire harness (to front turn signal/position light (right) and oil pressure switch)
8. Front wheel sensor coupler
9. Wire harness (to handlebar switch (left))
10. Wire harness
11. Intake air temperature sensor coupler
12. Intake air temperature sensor
13. Radiator fan motor coupler (radiator side)
14. Coupler cover
15. Protector
16. Hook-and-loop fastener (loop side) (white)
17. Hook-and-loop fastener (loop side) (black)
18. End portion of sponge protector
19. Hook-and-loop fastener (hook side) (black)
20. Main switch coupler

A. Route the radiator fan motor lead between the brake hoses and frame.
B. Route the wire harness (to front turn signal/position light (right) and oil pressure switch) between the brake hoses and frame.
C. Route the handlebar switch lead (left) on the rear side of the wire harness.
D. Insert the clamp into the hole of the coupler cover.
E. Insert the radiator fan motor coupler into the hole of the coupler cover.
F. Cover the protector with the main switch cover.
G. Make sure that the main switch couplers does not protrude from the end portion of sponge protector.
H. Align the mating surfaces on the hook-and-loop fastener end (hook side) and hook-and-loop fastener end (loop side) (white) and wrap the wire.
I. Insert the handlebar switch coupler 2 (left) into the hole of the coupler cover.

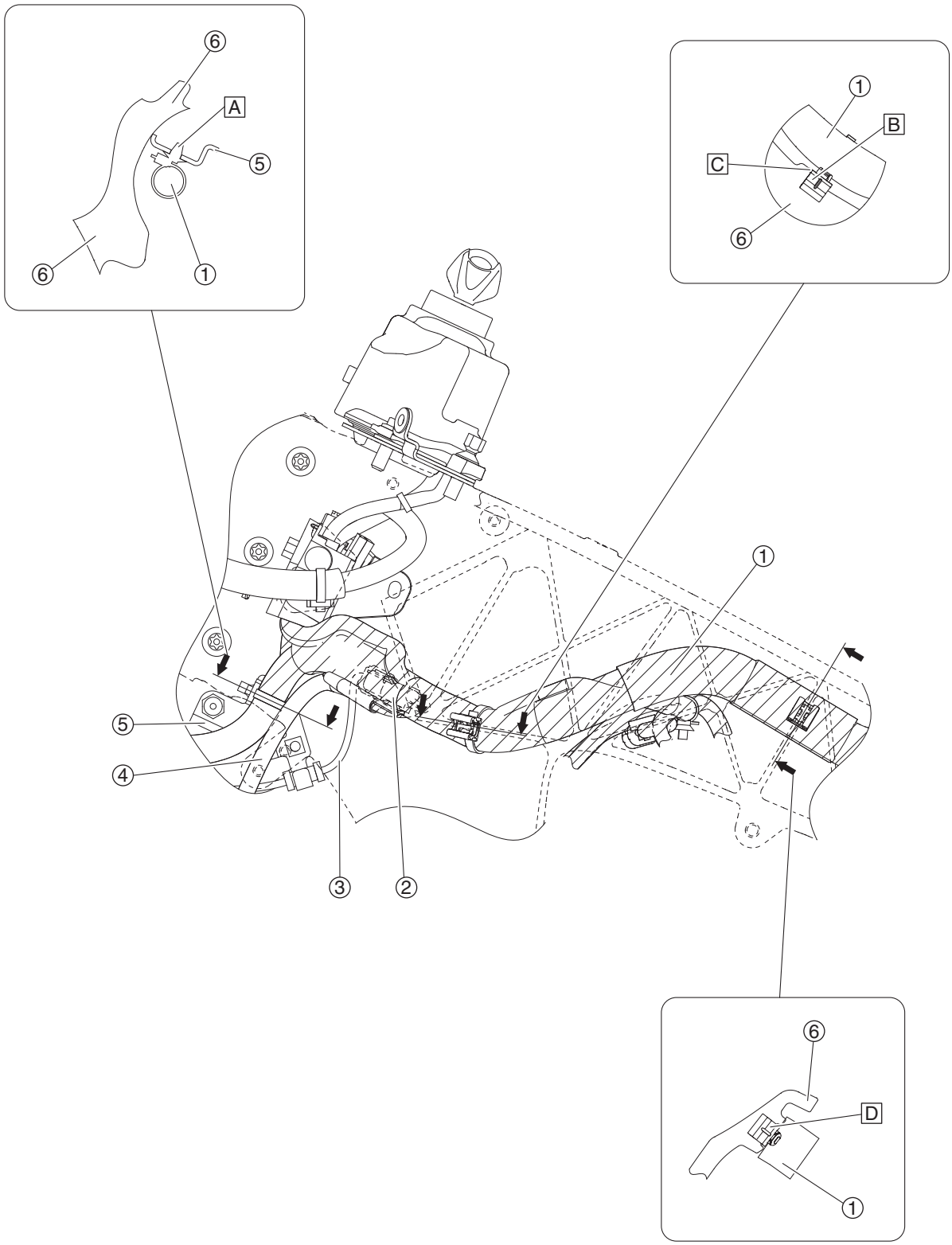
Main switch (rear view) (for MT09SPM/MT09SPMC)



1. Bracket
2. Handlebar switch coupler 2 (left)
3. Handlebar switch coupler 1 (left) (blue)
4. Handlebar switch coupler 3 (left)
5. Radiator fan motor coupler
6. Brake hose
7. Radiator fan motor lead
8. Wire harness (to front turn signal/position light (right) and oil pressure switch)
9. Front wheel sensor coupler
10. Wire harness (to handlebar switch (left))
11. Wire harness
12. Intake air temperature sensor coupler
13. Intake air temperature sensor
14. Radiator fan motor coupler (radiator side)
15. Coupler cover
16. Protector
17. Hook-and-loop fastener (loop side) (white)
18. Hook-and-loop fastener (loop side) (black)
19. End portion of sponge protector
20. Hook-and-loop fastener (hook side) (black)
21. Main switch coupler

A. Route the radiator fan motor lead between the brake hoses and frame.
B. Route the wire harness (to front turn signal/ position light (right) and oil pressure switch) between the brake hoses and frame.
C. Route the handlebar switch lead (left) on the rear side of the wire harness.
D. Insert the clamp into the hole of the coupler cover.
E. Insert the radiator fan motor coupler into the hole of the coupler cover.
F. Cover the protector with the main switch cover.
G. Make sure that the main switch couplers does not protrude from the end portion of sponge protector.
H. Align the mating surfaces on the hook-and-loop fastener end (hook side) and hook-and-loop fastener end (loop side) (white) and wrap the wire.
I. Insert the handlebar switch coupler 2 (left) into the hole of the coupler cover.

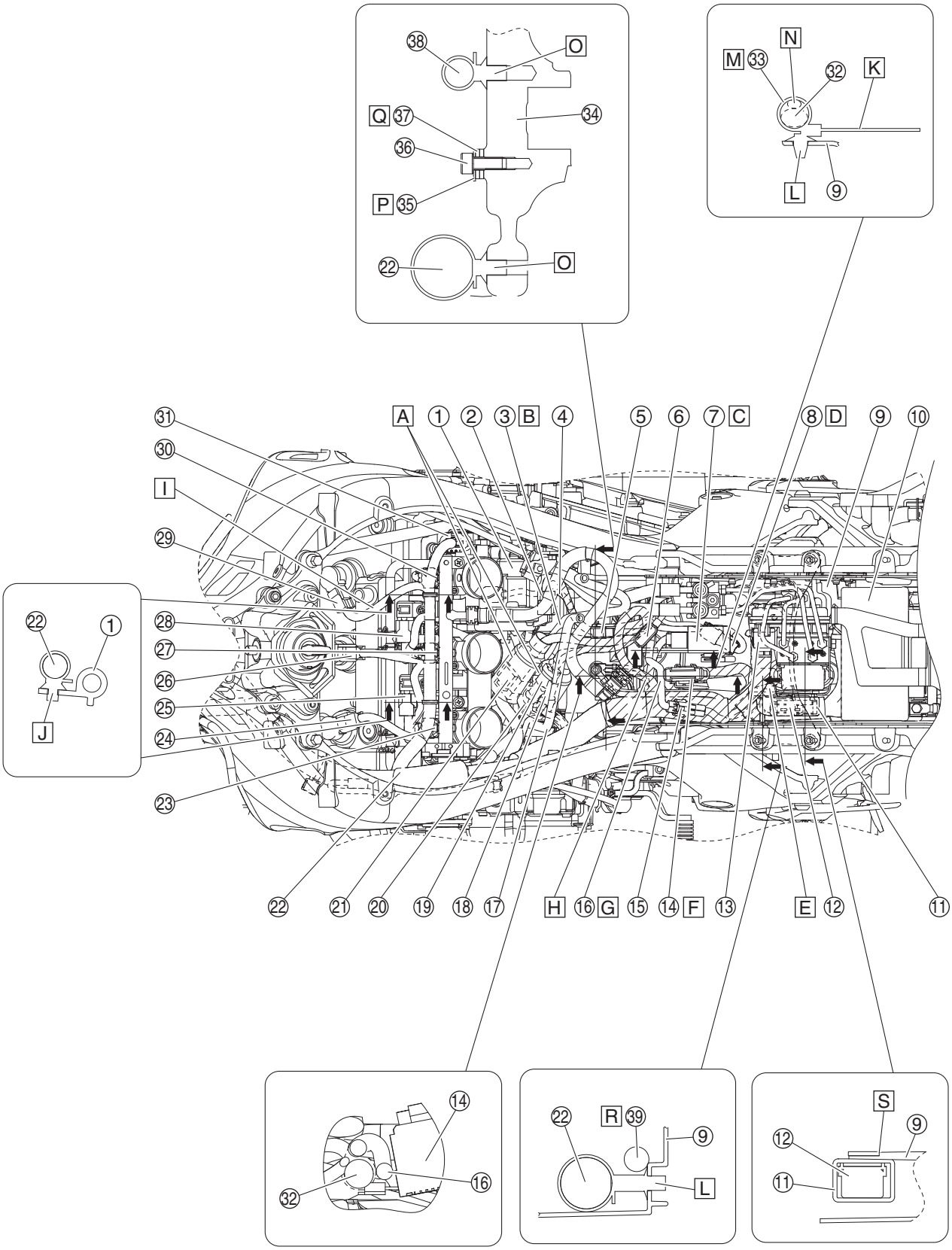
Main switch (left side view)



1. Wire harness
2. Front wheel sensor coupler
3. Front wheel sensor lead
4. Wire harness (to O_2 sensor)
5. Bracket
6. Frame

A. Insert the clamp into the hole of the bracket.
B. Insert the clamp into the rib of the frame.
C. Insert the clamp with touched the protrusion on the frame.
D. Insert the clamp between the protrusions on the frame.

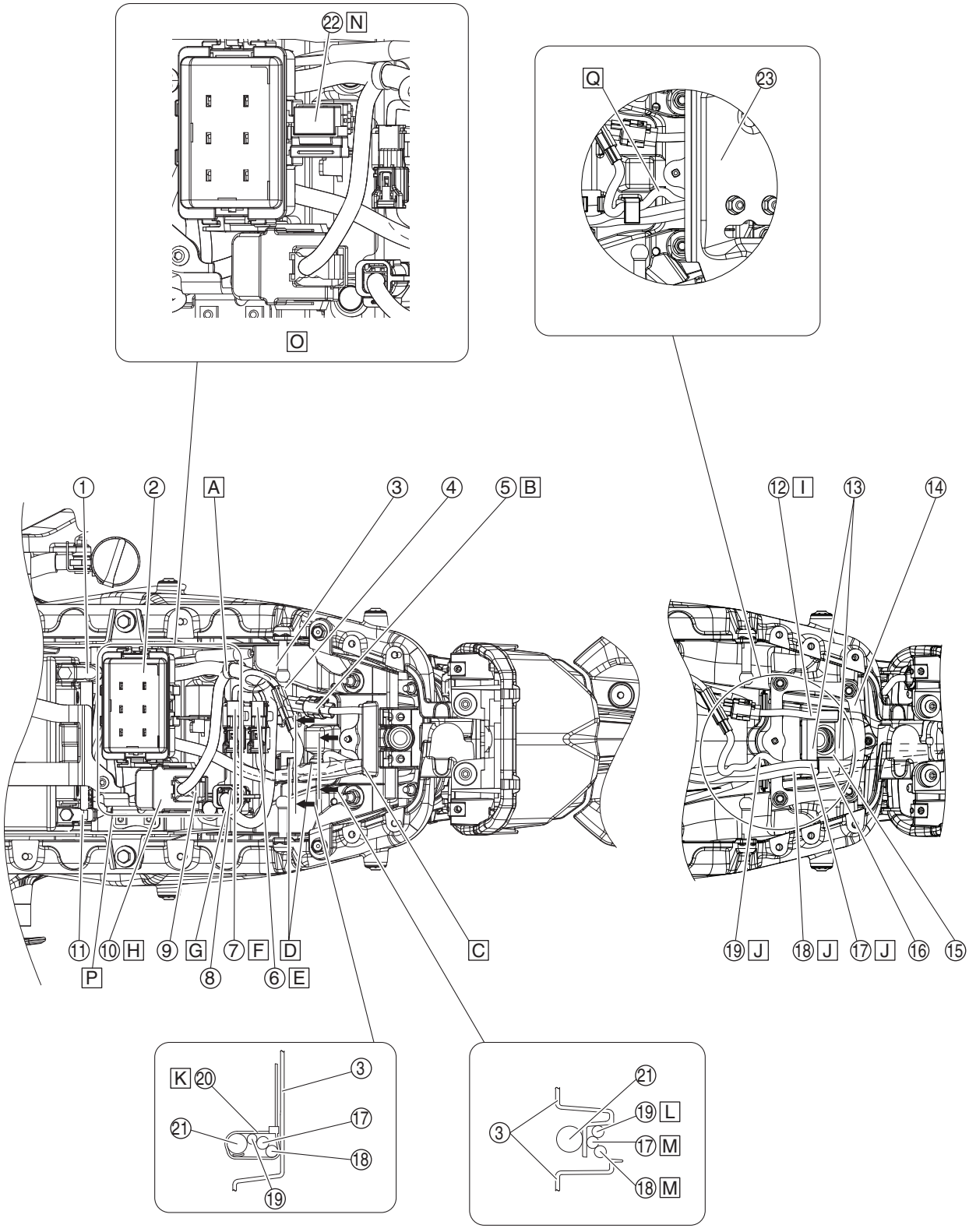
Frame (top view)



1. Throttle body
2. Throttle servo motor coupler
3. Fuel tank breather hose
4. Wire harness (to coolant temperature sensor)
5. Crankshaft position sensor coupler
6. Fuel pump coupler
7. Relay unit
8. Rear wheel sensor coupler
9. Battery box
10. Battery
11. Coupler cover
12. Radiator fan motor relay
13. ABS ECU coupler
14. Joint coupler
15. Rear brake light switch coupler
16. Rear brake light switch lead
17. Fuel tank drain hose
18. Sidestand switch coupler
19. Shift sensor coupler
20. Wire harness (to ECU)
21. Stator coil coupler
22. Wire harness
23. Injector #1 coupler
24. Ignition coil #1 coupler
25. Intake air pressure sensor 2
26. Ignition coil #2 coupler
27. Injector #2 coupler
28. Intake air pressure sensor 1
29. Ignition coil #3 coupler
30. Injector #3 coupler
31. Throttle position sensor coupler
32. Wire harness (to rectifier/regulator)
33. Clamp
34. Frame
35. Body ground 3
36. Ground bolt
37. Body ground 1, 2, 4, 5
38. Wire harness (to throttle body)
39. Starter motor lead

A. Slide the coupler cover until the coupler is covered and face the open side of the coupler cover to underside of the vehicle.
B. Route the fuel tank breather hose on the left side of the wire harness (to throttle servo motor) and wire harness (to coolant temperature sensor). Route the fuel tank breather hose on the right side of the wire harness (to stator coil), wire harness (to shift sensor), wire harness (to sidestand switch) and stator coil lead.
C. Insert the relay unit until it touches the rib on the battery box.
D. Insert the rear wheel sensor coupler into the hole of the battery box.
E. Pass the wire harness (to radiator fan motor relay) into the coupler cover and push it between the wire harness (to ABS ECU) and wire harness (main line).
F. Insert the joint coupler into the rib of the battery box.
G. Route the rear brake light switch lead between the wire harness and joint coupler. (between clamp and rear brake light switch)
H. Route the wire harness (to fuel pump) on the front side of the rear brake light switch lead.
I. Route the wire harness (to ignition coil #3) to the left side of the cylinder head breather hose.
J. Insert the clamp into the hole of the throttle body.
K. Face the end of the plastic locking tie backward.
L. Insert the clamp into the hole of the battery box.
M. Fix the plastic locking tie with the white tape part on the wire harness.
N. Fix the rear brake light switch lead with the gray tape part.
O. Insert the clamp into the hole of the frame.
P. Route the body ground 3 is located above the body grounds 1, 2, 4, and 5, and their crimped parts of the terminals do not overlap and face them upper side.
Q. Install the crimped parts of the terminals of body ground 1, 2, 4, and 5 to face the upper side.
R. Route the starter motor lead on the inside of the clamp.
S. Insert the radiator fan motor relay all the way into the bottom of the coupler cover until it stops the stopper of the rib on the battery box.

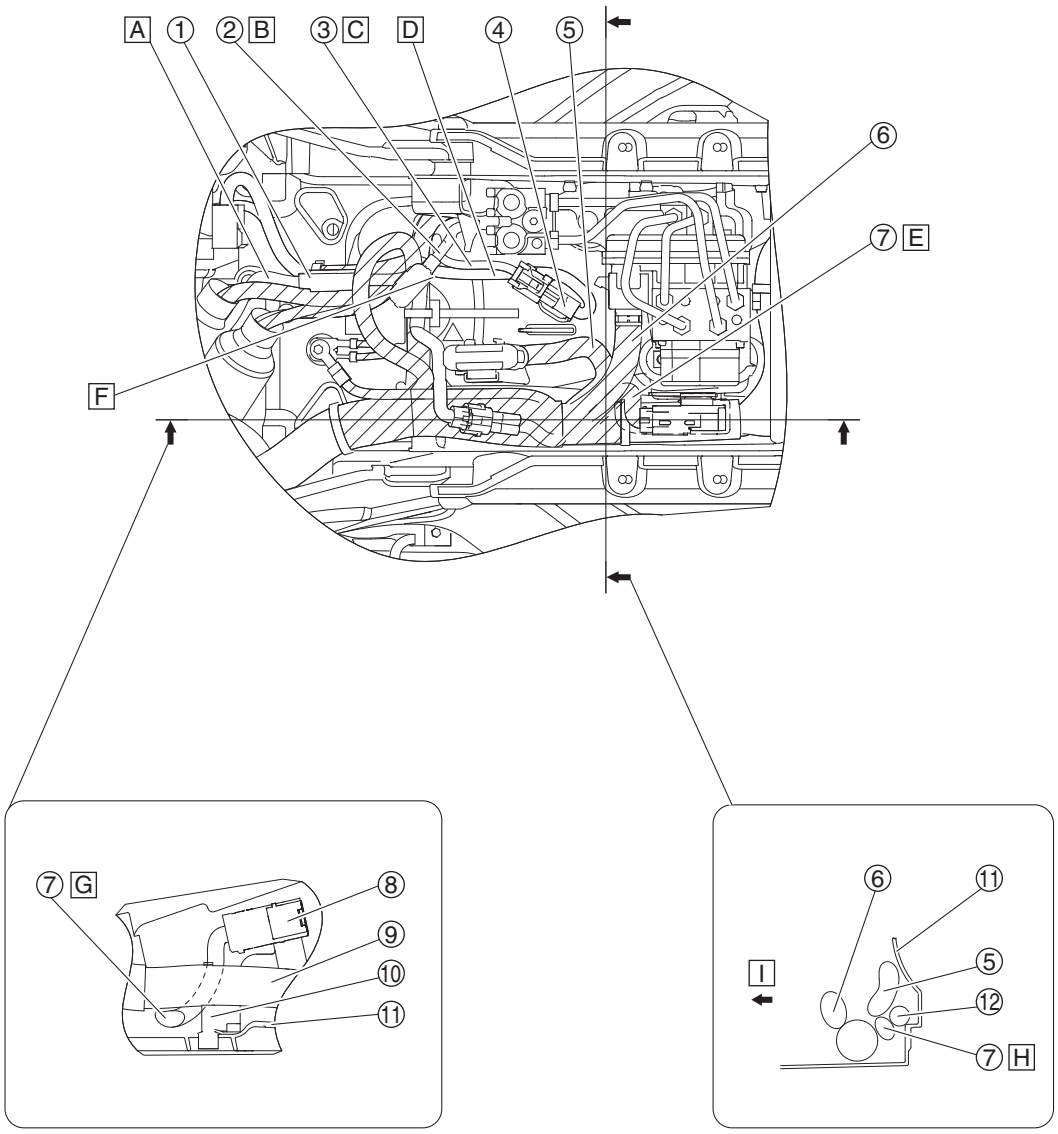
Rear fender (top view)



1. Positive battery terminal
2. Fuse box
3. Box
4. License plate light coupler
5. Tail/brake light coupler
6. Rear turn signal light (left) (black)
7. Rear turn signal light (right) (white)
8. YDT coupler
9. Starter relay coupler
10. Starter relay
11. Negative battery terminal
12. Tail/brake light lead
13. Damper
14. Rear fender bracket
15. Cover
16. Band
17. Rear turn signal light lead (right)
18. Rear turn signal light lead (left)
19. License plate light lead
20. Plastic locking tie
21. Bonder
22. Brake light relay (for MT09SPM/MT09SPMC)
23. Seat bracket

A. Insert the clamp into the hole of the box.
B. Insert the tail/brake light coupler into the hole of the box.
C. Do not ride the end of the bonder over the rib on the box.
D. The plastic locking tie is assembled between the rib and guide. Fasten the white tape portion of the license plate light lead with the plastic locking tie.
E. Insert the rear turn signal light coupler (left) into the hole of the box.
F. Insert the rear turn signal light coupler (right) into the hole of the box.
G. Insert the YDT coupler until it stops the rib stopper on the box.
H. Insert the starter relay until it stops the rib stopper on the battery box.
I. Route the tail/brake light lead to the wire guide beneath the cover.
J. Do not bite the lead with damper.
K. Face the locking part of the plastic locking tie downward. The clamp end should be faced to the right along the bottom of the box.
L. Route the license plate light lead to the inside of the rear turn signal light leads and pass it through the wire guide on the box.
M. Route the rear turn signal light lead to the wire guide on the box. The order of lead arrangement does not matter. After assembling the plastic locking tie “19”, the lead may come off the wire guide.
N. Insert the brake light relay until it stops the rib stopper on the battery box.
O. For MT09SPM/MT09SPMC
P. For MT09M/MT09MC
Q. Make a slack to the license plate light lead in front of the seat bracket.

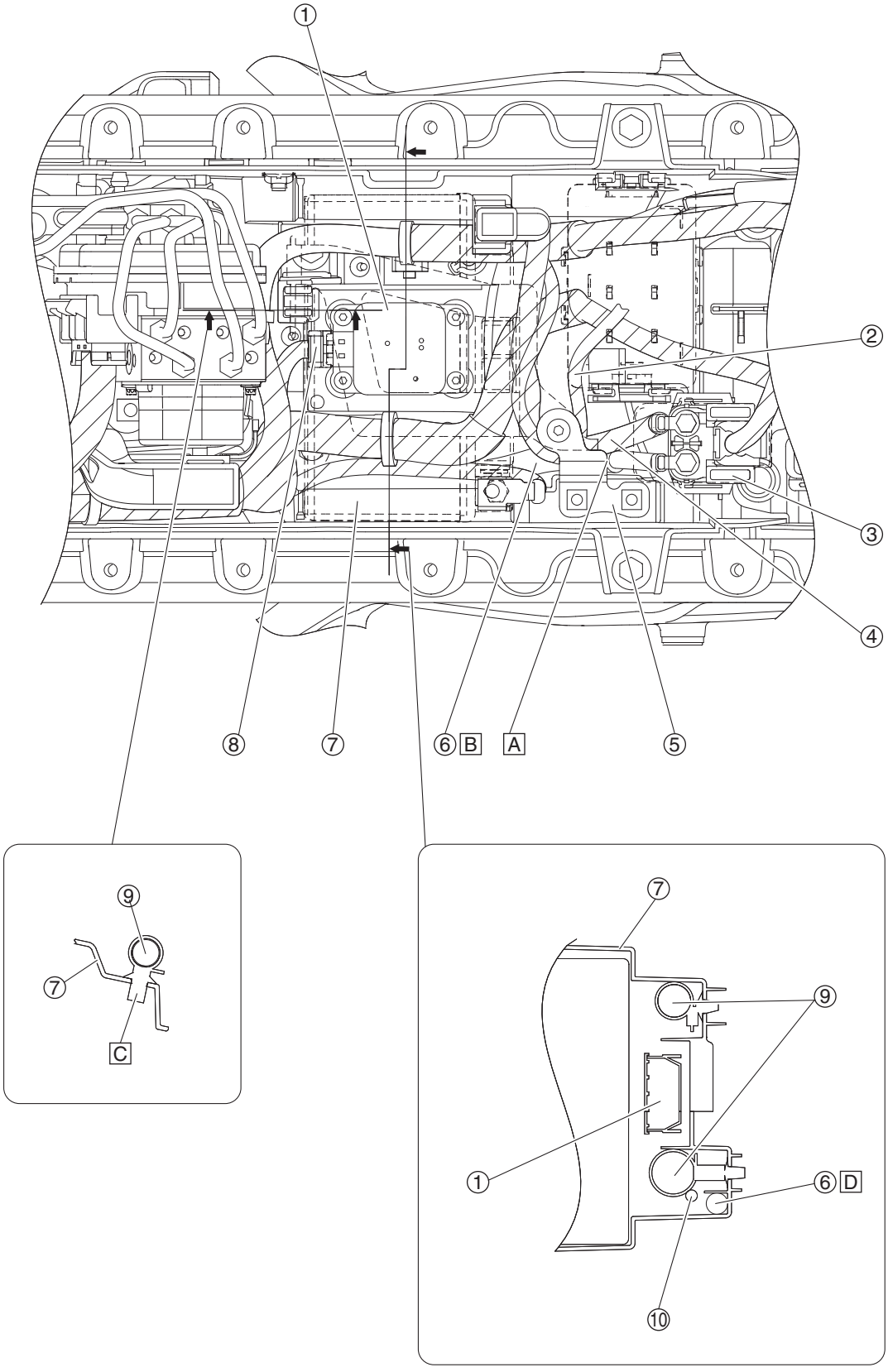
ABS ECU (top view)



1. Crankshaft position sensor coupler
2. Rear brake light switch lead
3. Rear wheel sensor lead
4. Rear wheel sensor coupler
5. Wire harness (to joint coupler)
6. Wire harness (to ABS ECU)
7. Wire harness (to radiator fan motor relay)
8. Radiator fan motor relay
9. Wire harness
10. Clamp
11. Battery box
12. Starter motor lead

A. Pass the crankshaft position sensor lead beneath the wire harness (to stator coil assembly) and connect the crankshaft position sensor coupler on the right side of the vehicle.
B. Route the rear brake light switch lead on the rear side of the wire harness (to rectifier/regulator).
C. Route the rear wheel sensor lead on the rear side of the wire harness (to rectifier/regulator).
D. Route the rear wheel sensor lead on the top side of the wire harness.
E. Route the wire harness (to radiator fan motor relay) on the rear side of the wire harness (to ABS ECU) and wire harness (to joint coupler).
F. Route the rear brake light switch lead on the top side of the wire harness.
G. Route the wire harness (to radiator fan motor relay) on the front side of the clamp.
H. Route the wire harness (to radiator fan motor relay) on the lower side of the wire harness. Route the wire harness (to radiator fan motor relay) on the top side of the starter motor lead.
I. Top of the vehicle

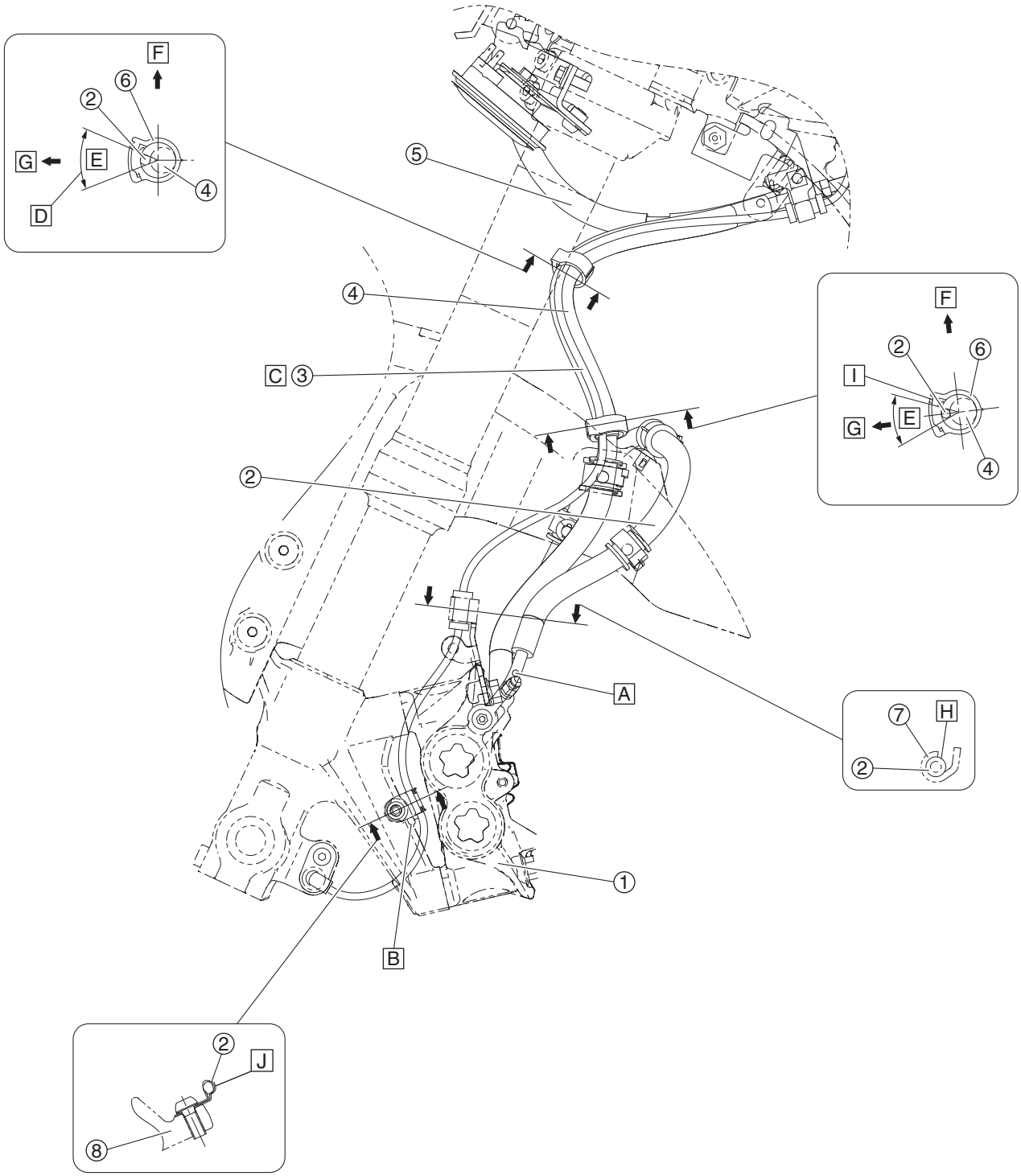
IMU (top view)



1. IMU (Inertial Measurement Unit)
2. Positive battery lead
3. Starter relay
4. Wire harness (to starter relay)
5. Bracket
6. Starter motor lead
7. Battery box
8. IMU coupler
9. Wire harness
10. Negative battery lead

A. Do not contact the starter motor lead with the bracket.
B. Route the starter motor lead on the lower side of the bracket.
C. Insert the clamp into the hole of the battery box.
D. When inserting the clamp into the battery box, pass the starter motor lead through the left side of the rib on the battery box. After inserting the clamp into the battery box, the starter motor lead may come off the rib on the battery box.

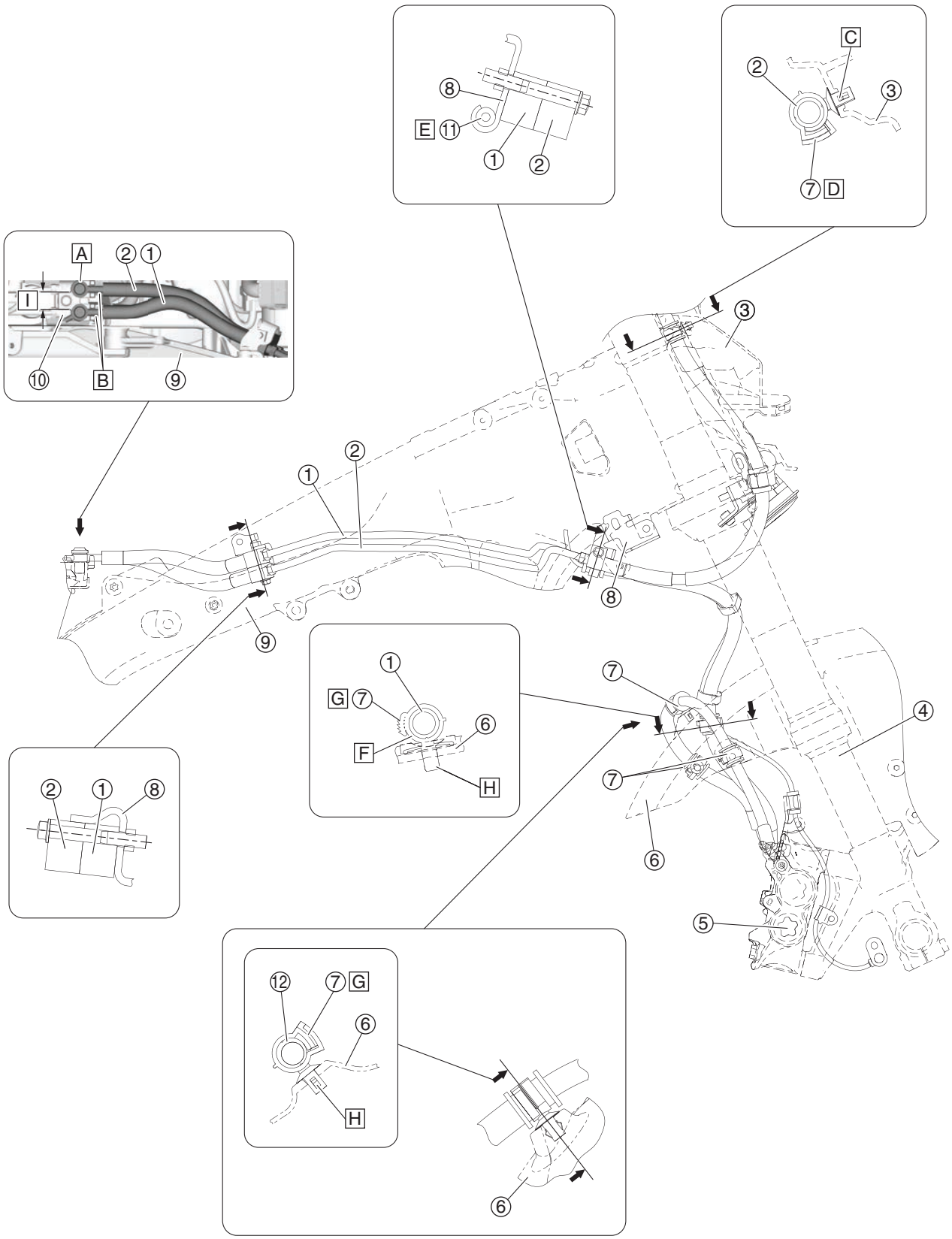
Front brake hose (left side view)



1. Front brake caliper assembly (left)
2. Brake hose (front brake caliper (left) to front brake caliper (right))
3. Front wheel sensor lead
4. Brake hose (hydraulic unit to front brake caliper (left))
5. Brake hose (front brake master cylinder to hydraulic unit)
6. Clamp
7. Reflector bracket
8. Front fork

A. Install the brake hose (front brake caliper (left) to front brake caliper (right)) with its white paint mark facing outward.
B. Install the holder with contacted the front fork leg.
C. Make the front wheel sensor lead to follow the brake hose (hydraulic unit to front brake caliper (left)) without slacking.
D. Route the front wheel sensor lead on the front side of the brake hose, and clamp the white tape portion. The opening of the clamp should face the front. Make sure the clamp is engaged by 3 or more notches.
E. 45°
F. Left side of the vehicle
G. Front side of the vehicle
H. Insert the grommet of the front wheel sensor lead.
I. Route the front wheel sensor lead on the front side of the brake hose, and clamp the white tape portion. Fasten the protector of the brake hose with the clamp. The opening of the clamp should face the front. Make sure the clamp is engaged by 3 or more notches.
J. Fasten the white tape portion of the front wheel sensor lead with the clamp.

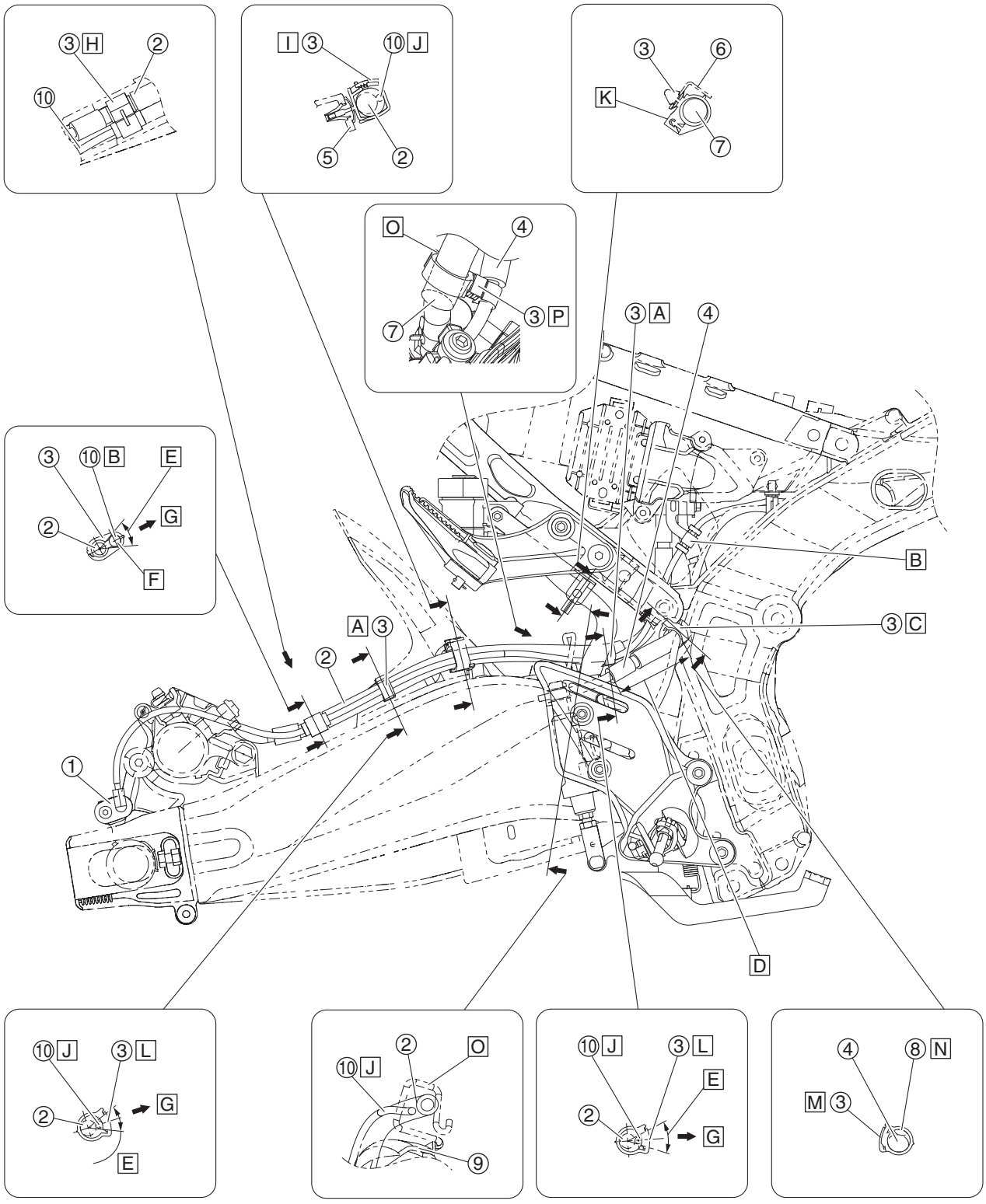
Front brake hose (right side view)



1. Brake hose (hydraulic unit to front brake caliper (left))
2. Brake hose (front brake master cylinder to hydraulic unit)
3. Meter assembly bracket
4. Front fork
5. Front brake caliper assembly (right)
6. Front fender
7. Clamp
8. Bracket
9. Frame
10. Brake hose joint
11. Front wheel sensor lead
12. Brake hose (front brake caliper (left) to front brake caliper (right))

A. Fit the metal fitting for the front brake hose to the recess of the brake hose joint.
B. Install the brake hose between the stoppers on the brake hose joint.
C. Insert the clamp into the hole of the bracket of meter assembly.
D. Make sure the clamp is engaged by 2 or more notches. Engage the claws so that they face toward the right of the vehicle.
E. Insert the grommet of the front wheel sensor lead.
F. Fit the clamp between the ribs on the front fender.
G. Make sure the clamp is engaged by 2 or more notches. Engage the claws so that they face toward the rear of the vehicle.
H. Insert the clamp into the hole of the front fender.
I. After holding the protrusion (17 mm (0.67 in) on the brake hose joint with an appropriate tool, tighten the brake hose union bolts to the specified torque.

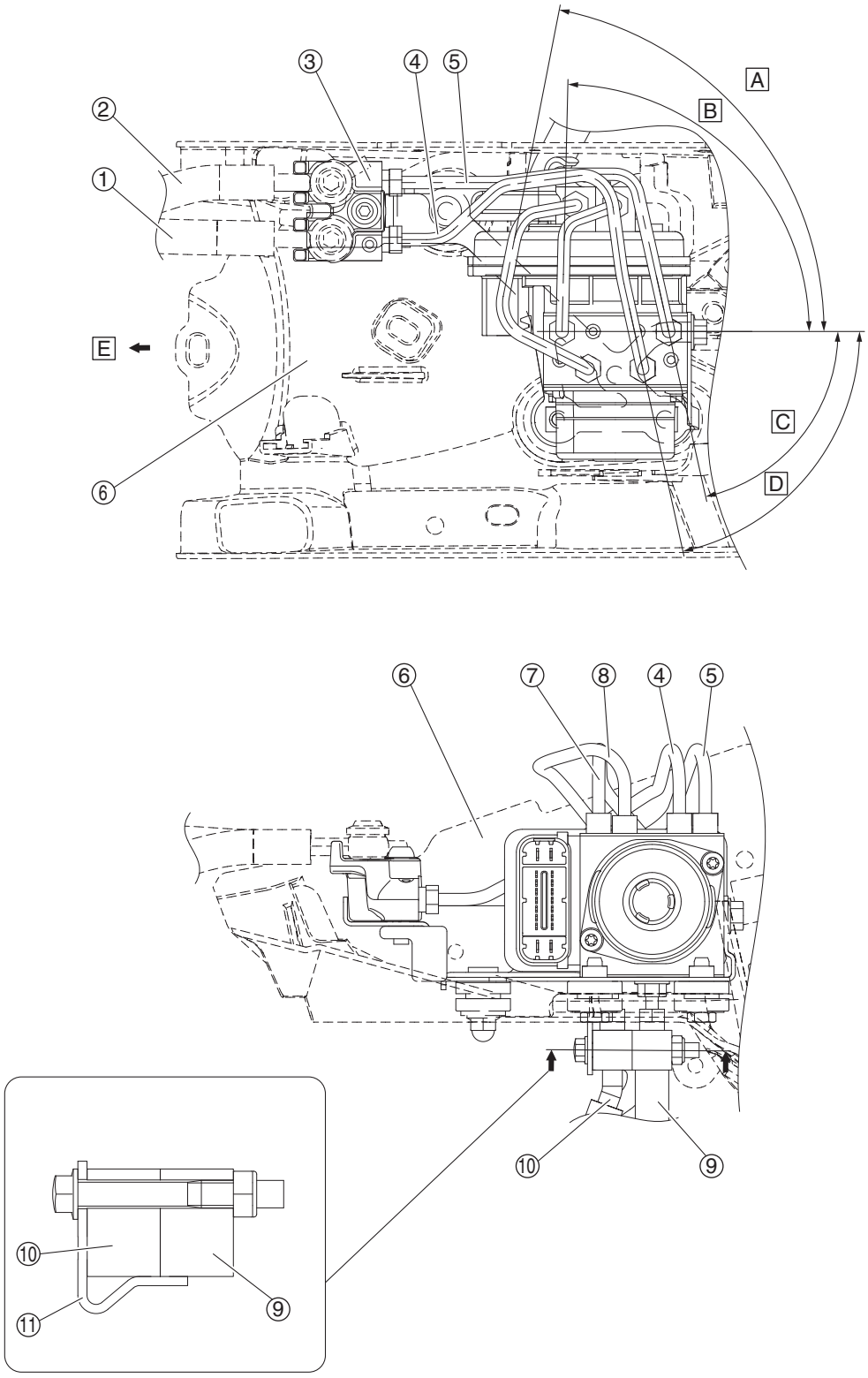
Rear brake hose (right side view)



1. Rear wheel sensor
2. Rear brake hose (hydraulic unit to rear brake caliper)
3. Clamp
4. Rear brake hose (rear brake master cylinder to hydraulic unit)
5. Rear fender
6. Frame
7. Brake fluid reservoir hose
8. Rear brake light switch lead
9. Swingarm
10. Rear wheel sensor lead

A. Fasten the white tape portion of the rear wheel sensor lead with the clamp.
B. Fasten the grommet of the rear wheel sensor lead with the clamp.
C. Fasten the gray tape portion of the rear brake light switch lead with the clamp.
D. Installing position of the rear brake hose (rear brake master cylinder to hydraulic unit). (70 mm (2.76 in))
E. 45°
F. Route the rear wheel sensor lead on the outside of the rear brake hose (hydraulic unit to rear brake caliper).
G. Outside of the vehicle
H. Fasten the protector of the rear brake hose with the clamp.
I. The opening of the clamp should face the top. Make sure the clamp is engaged by 3 or more notches.
J. Route the rear wheel sensor lead on the outside of the rear brake hose (hydraulic unit to rear brake caliper).
K. The opening of the clamp should face the down.
L. The opening of the clamp should face the outside. Make sure the clamp is engaged by 3 or more notches.
M. The opening of the clamp should face the rear. Make sure the clamp is engaged by 3 or more notches.
N. Route the rear brake light switch lead on the outside of the rear brake hose (rear brake master cylinder to hydraulic unit).
O. Fasten the protector of the brake fluid reservoir hose with clamp. The opening of the clamp should face the front.
P. Fasten the brake fluid reservoir hose and rear brake hose (rear brake master cylinder to hydraulic unit) with clamp. The opening of the clamp should face the down.

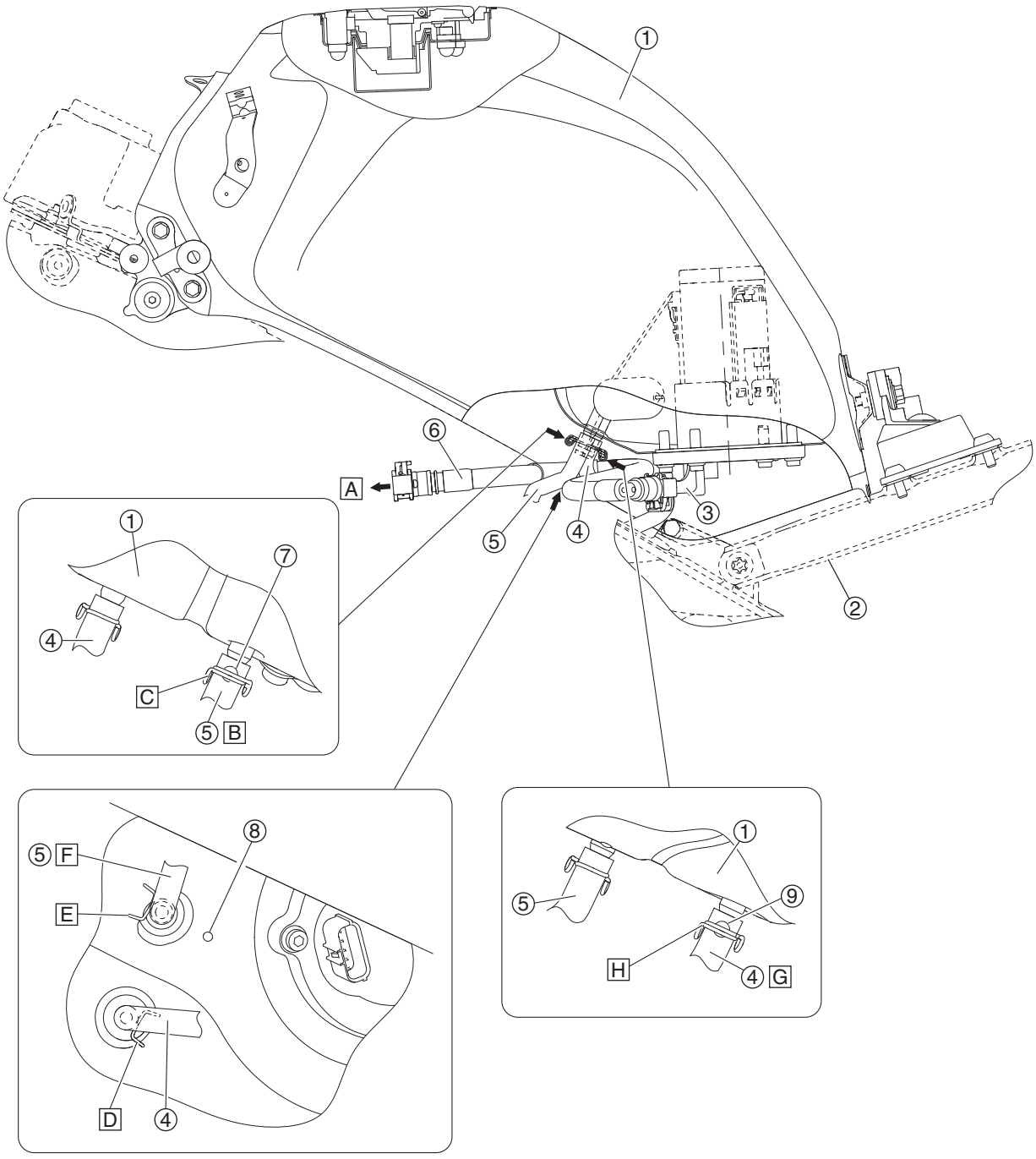
ABS ECU (Electronic Control Unit) (top and left side view)



1. Front brake hose (front brake master cylinder to hydraulic unit)
2. Front brake hose (hydraulic unit to front brake caliper (left))
3. Brake hose joint
4. Hydraulic unit brake pipe (rear brake master cylinder to hydraulic unit)
5. Hydraulic unit brake pipe (hydraulic unit to front brake calipers)
6. Battery box
7. Hydraulic unit brake pipe (hydraulic unit to rear brake caliper)
8. Hydraulic unit brake pipe (rear brake master cylinder to hydraulic unit)
9. Rear brake hose (hydraulic unit to rear brake caliper)
10. Rear brake hose (rear brake master cylinder to hydraulic unit)
11. Bracket

A. 79°
B. 89°
C. 77°
D. 78°
E. Front of the vehicle

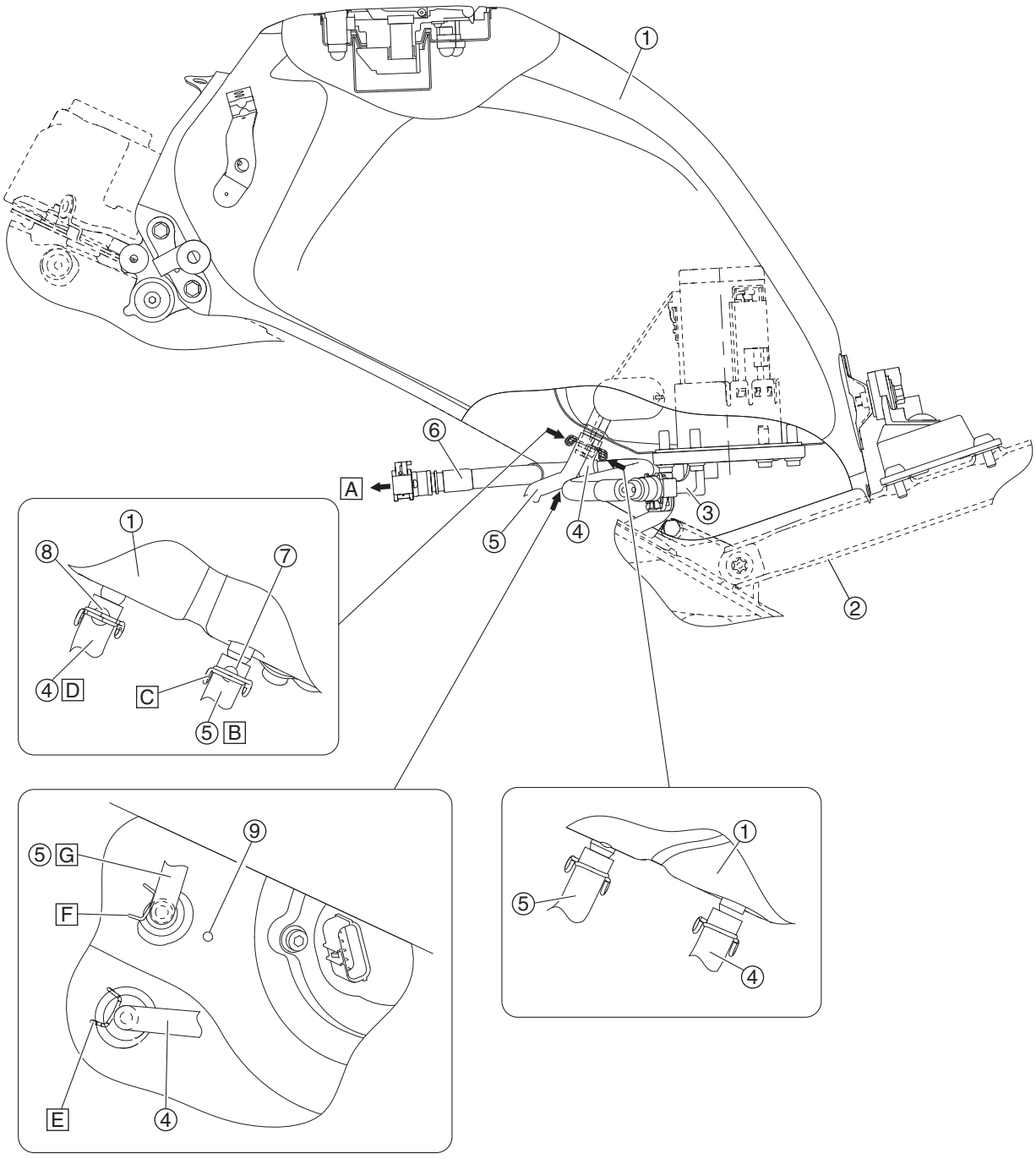
Fuel tank (left side view) (for MT09MC/MT09SPMC)



1. Fuel tank
2. Frame
3. Fuel pump
4. Fuel tank breather hose
5. Fuel tank drain hose
6. Fuel hose
7. White paint mark
8. Projection
9. Yellow paint mark

A. To engine
B. Insert the fuel tank drain hose up to the section where the fuel tank pipe increases in diameter. Install it so that the paint mark faces the front.
C. Align the clip with the paint mark on the fuel tank drain hose and install it. Make sure not to install the hose clip on the raised portion of the hose fitting.
D. Face the tip of the clip backward from the central axis of the fuel tank breather hose.
E. Face the tip of the clip forward from the central axis of the fuel tank drain hose.
F. Install the fuel tank drain hose on the projection side of the fuel tank.
G. Insert the fuel tank breather hose up to the section where the fuel tank pipe increases in diameter. Install it so that the paint mark faces the rear.
H. Align the clip with the paint mark on the fuel tank breather hose and install it. Make sure not to install the hose clip on the raised portion of the hose fitting.

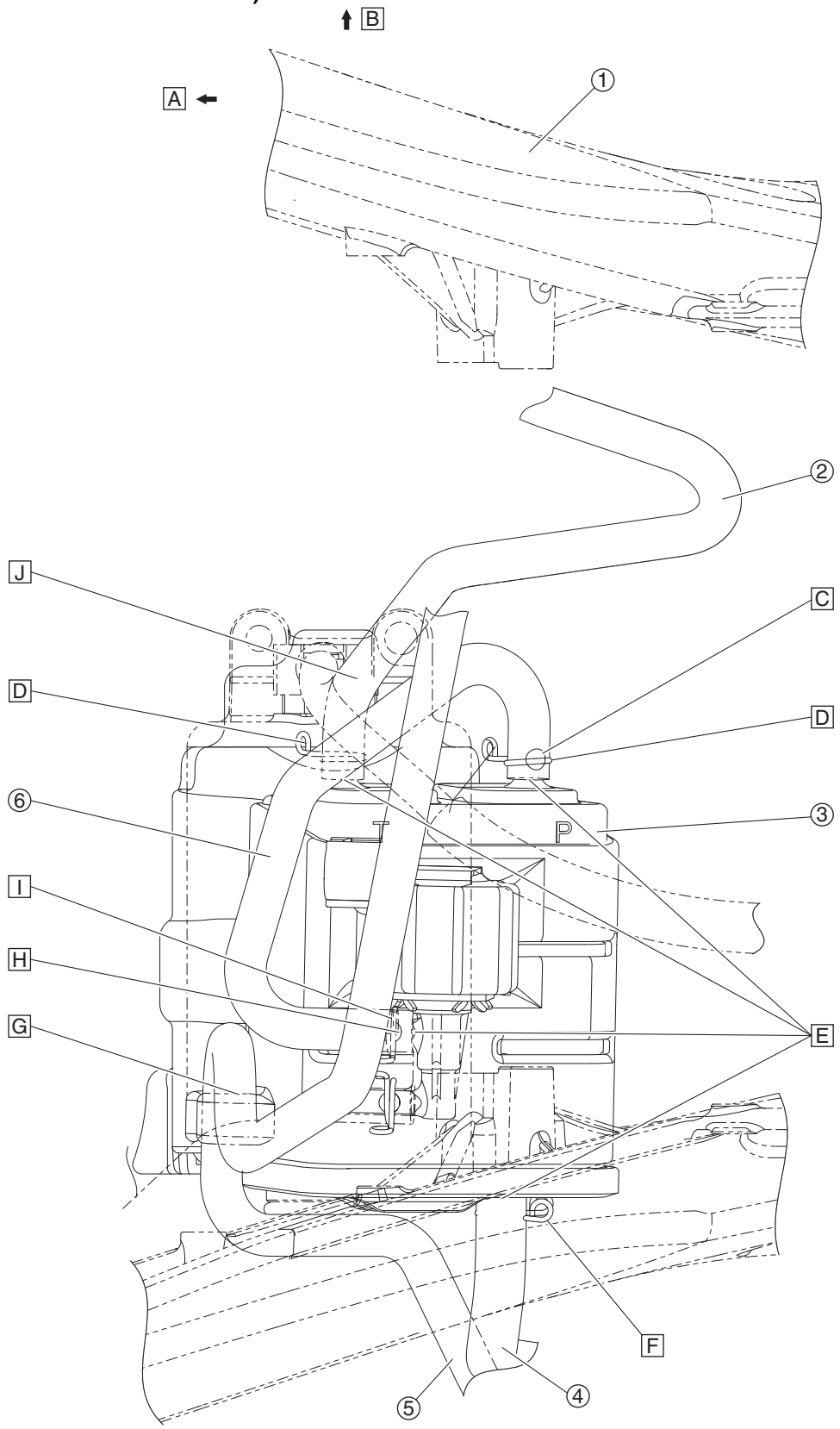
Fuel tank (left side view) (for MT09M/MT09SPM)



1. Fuel tank
2. Frame
3. Fuel pump
4. Fuel tank breather hose
5. Fuel tank drain hose
6. Fuel hose
7. White paint mark
8. Yellow paint mark
9. Projection

A. To engine
B. Insert the fuel tank drain hose up to the section where the fuel tank pipe increases in diameter. Install it so that the paint mark faces the front.
C. Align the clip with the paint mark on the fuel tank drain hose and install it. Make sure not to install the hose clip on the raised portion of the hose fitting.
D. Insert the fuel tank breather hose up to the section where the fuel tank pipe increases in diameter. Install it so that the paint mark faces the front.
E. Face the tip of the clip forward from the central axis of the fuel tank breather hose.
F. Face the tip of the clip forward from the central axis of the fuel tank drain hose.
G. Install the fuel tank drain hose on the projection side of the fuel tank.

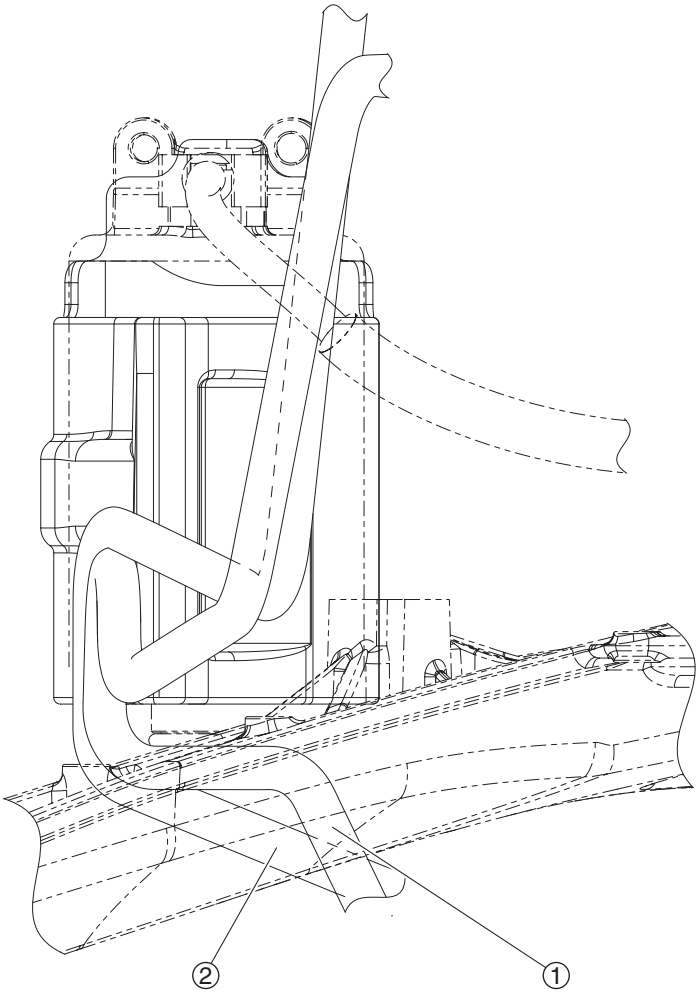
Canister (for MT09MC/MT09SPMC)



1. Frame
2. Fuel tank breather hose (fuel tank to canister)
3. Canister
4. Canister breather hose
5. Fuel tank drain hose
6. Canister purge hose (purge cut valve solenoid to canister)

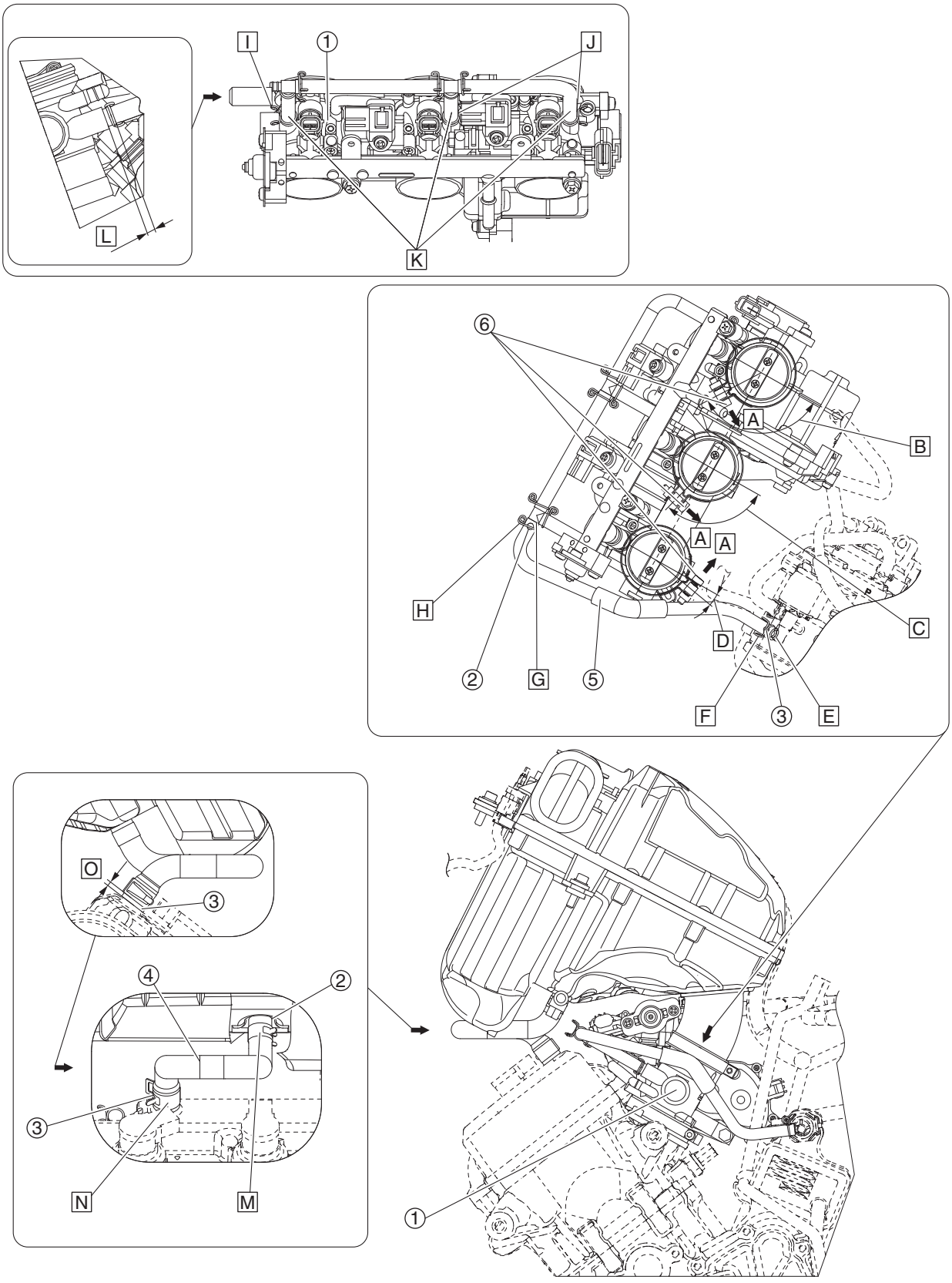
A. Front side of the vehicle
B. Right side of the vehicle
C. Face the yellow paint mark on the canister purge hose (purge cut valve solenoid to canister) upward.
D. Install the clip with its end facing the down.
E. Insert each hose until it stops each part.
F. Install the clip with its end facing the rear.
G. Fit the fuel tank drain hose into the canister holder as shown in the illustration.
H. Face the blue paint mark on the canister purge hose (purge cut valve solenoid to canister) upward.
I. Install the clip with its end facing the top.
J. Face the white paint mark on the fuel tank breather hose (fuel tank to canister) upward.

Starter motor (top view) (for MT09M/MT09SPM)



1. Fuel tank drain hose
2. Fuel tank breather hose

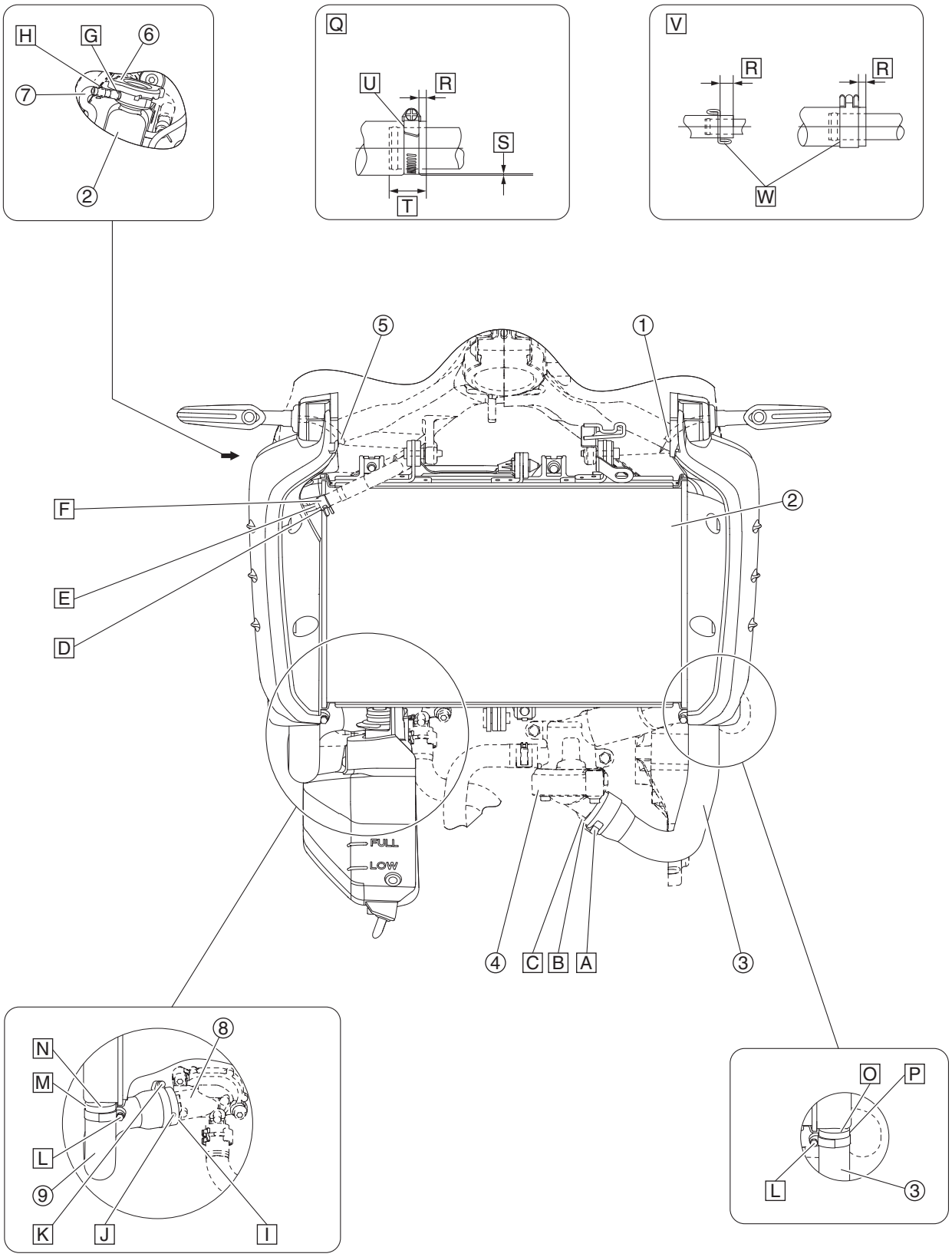
Air filter case and throttle bodies (left side view)



1. Throttle body
2. Yellow paint mark
3. White paint mark
4. Cylinder head breather hose
5. Canister purge hose (purge cut valve solenoid to hose joint) (for MT09MC/MT09SPMC)
6. Hose clamp

A. Face the bolt head to the position as shown in the figure.
B. 123°
C. 105°
D. 10°
E. Hose until it butts against the purge cut valve solenoid. (for MT09MC/MT09SPMC)
F. The end of the clip should face the upward. (for MT09MC/MT09SPMC)
G. Hose until it butts against the throttle body joint. (for MT09MC/MT09SPMC)
H. The end of the clip should face the forward. (for MT09MC/MT09SPMC)
I. The end of the clip should face the left. (for MT09MC/MT09SPMC)
J. The end of the clip should face the right. (for MT09MC/MT09SPMC)
K. Hose until it butts against the throttle body. (for MT09MC/MT09SPMC)
L. 5–7 mm (0.20–0.28 in) (3 places) (for MT09MC/MT09SPMC)
M. Insert the cylinder head breather hose until it reaches the rounded end of the pipe. Install the cylinder head breather hose with the yellow paint mark facing the left. Install the clip with its end facing the left.
N. Insert the cylinder head breather hose until it reaches the rounded end of the pipe. Install the cylinder head breather hose with the white paint mark facing the right. Install the clip with its end facing the right.
O. 1–3 mm (0.04–0.12 in)

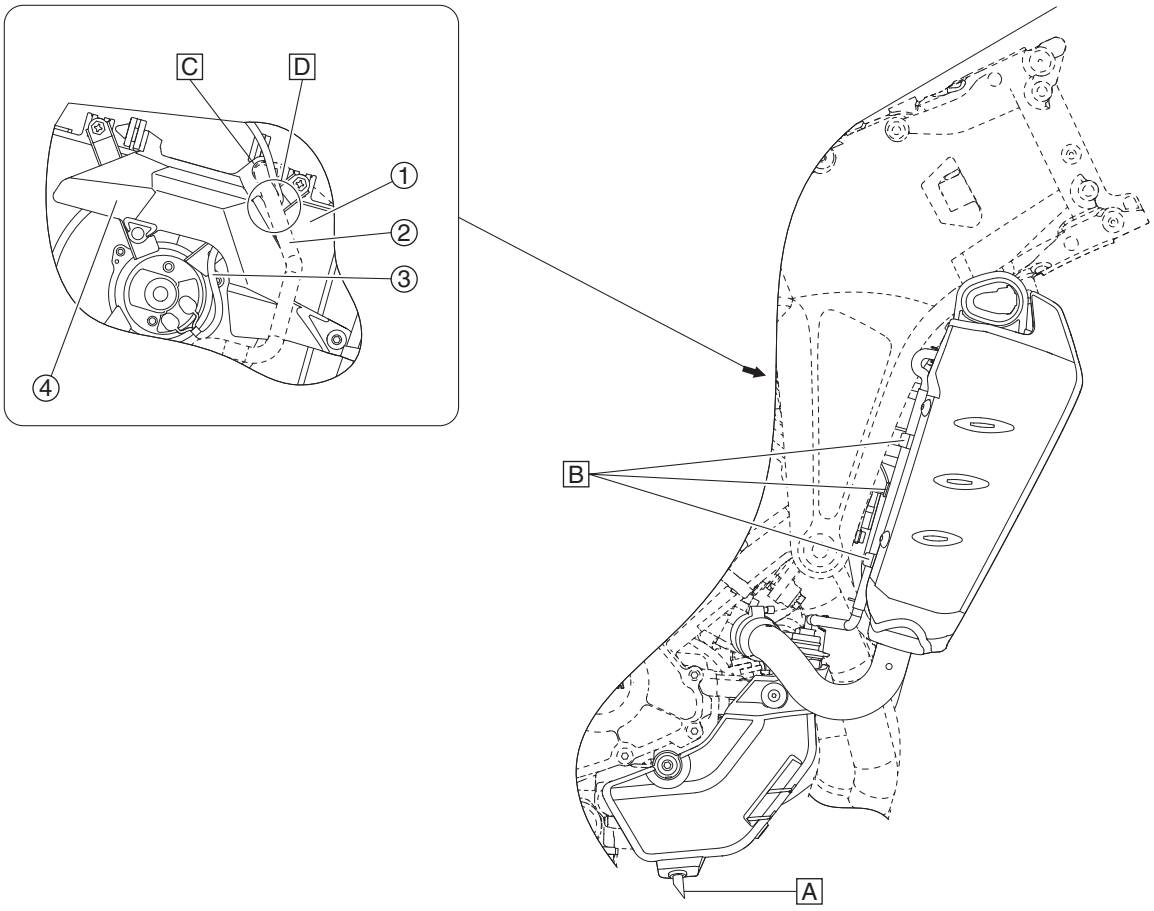
Radiator (front side view)



1. Front turn signal/position light lead (left)
2. Radiator
3. Radiator outlet hose
4. Thermostat assembly
5. Front turn signal/position light lead (right)
6. Radiator cap
7. Coolant reservoir hose
8. Water jacket joint
9. Radiator inlet hose

A. Face the tip of the clip toward the yellow paint mark on the radiator outlet hose.
B. Align the yellow paint mark on the radiator outlet hose with the rib on the thermostat assembly.
C. Insert the radiator outlet hose until it touches the rib of the thermostat assembly.
D. Install the radiator hose (cylinder head to radiator) with its white paint mark facing forward.
E. Install the radiator hose (cylinder head to radiator) up to the base of the bend in the radiator pipe.
F. Install the clip with its end facing the down.
G. Insert the coolant reservoir hose up to the section where the radiator pipe increases in diameter.
H. Fit the clip with its end facing inward. Fit the clip in the center between the spools, never ride on the spool.
I. Insert the radiator inlet hose until it touches the rib of the water jacket joint.
J. Align the yellow paint mark on the radiator inlet hose with the rib on the water jacket joint.
K. Install the hose clamp screw to face it top side.
L. Install the hose clamp with the screw head facing the inward.
M. Install the radiator inlet hose with its white paint mark facing outward.
N. Insert the radiator inlet hose up to the section where the fuel tank pipe increases in diameter.
O. Insert the radiator outlet hose up to the section where the fuel tank pipe increases in diameter.
P. Install the radiator outlet hose with its white paint mark facing outward.
Q. Hose clamp fixed position details.
R. 3 mm (0.12 in) or more
S. 0–1 mm (0–0.04 in)
T. Hose plug-in section
U. Make sure not to install the hose clamp on the raised portion of the hose fitting.
V. Hose clip fixed position details.
W. Make sure not to install the hose clip on the raised portion of the hose fitting.

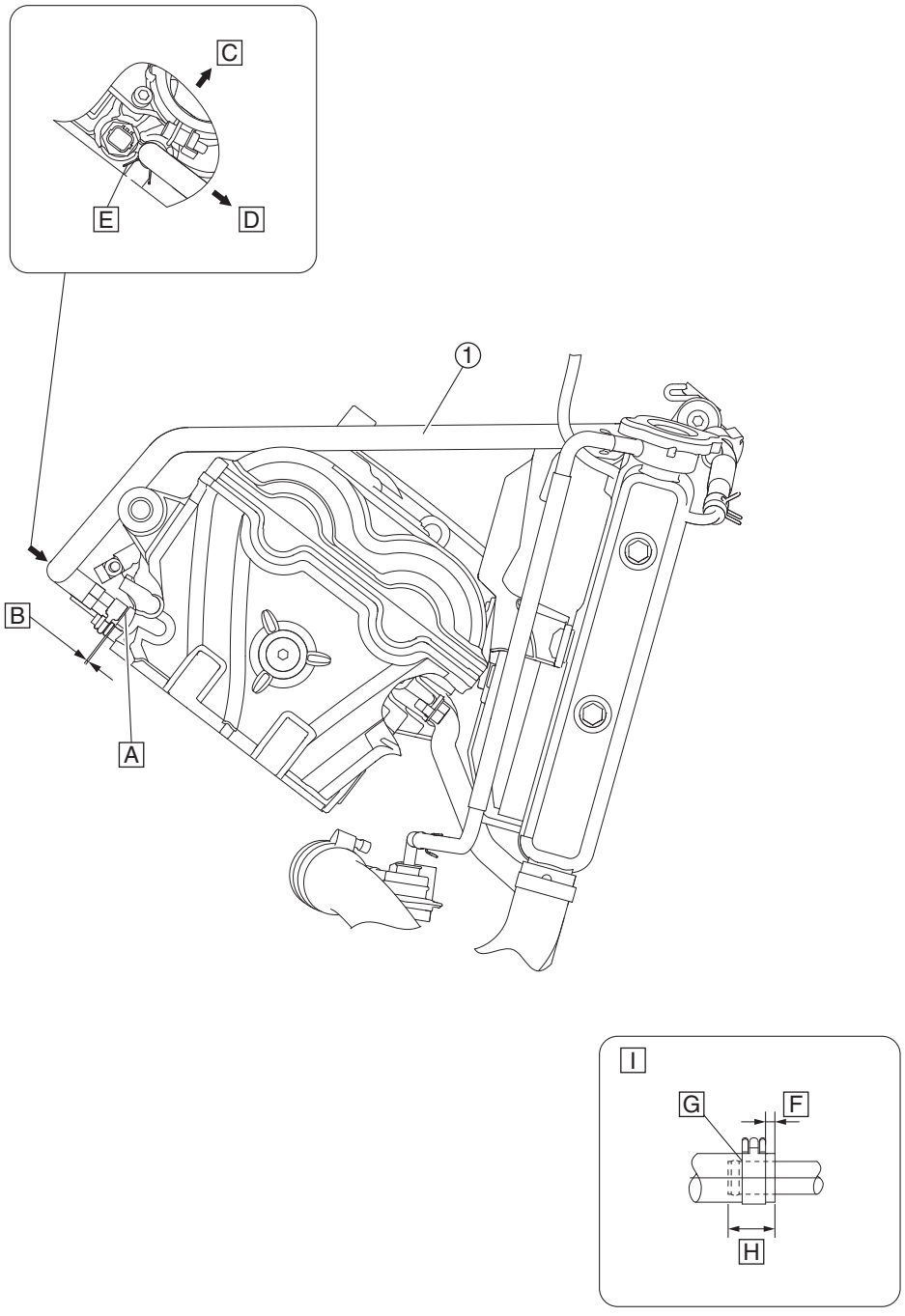
Radiator (right side view)



1. Radiator
2. Radiator hose (cylinder head to radiator)
3. Radiator fan motor lead
4. Radiator fan cover

A. Direction of the hose tip does not matter.
B. Pass the coolant reservoir hose through the front side panel (right) guide.
C. Pass the radiator hose (cylinder head to radiator) through the notch of the radiator fan cover.
D. Pass the radiator fan motor lead through the notch of the radiator fan cover.

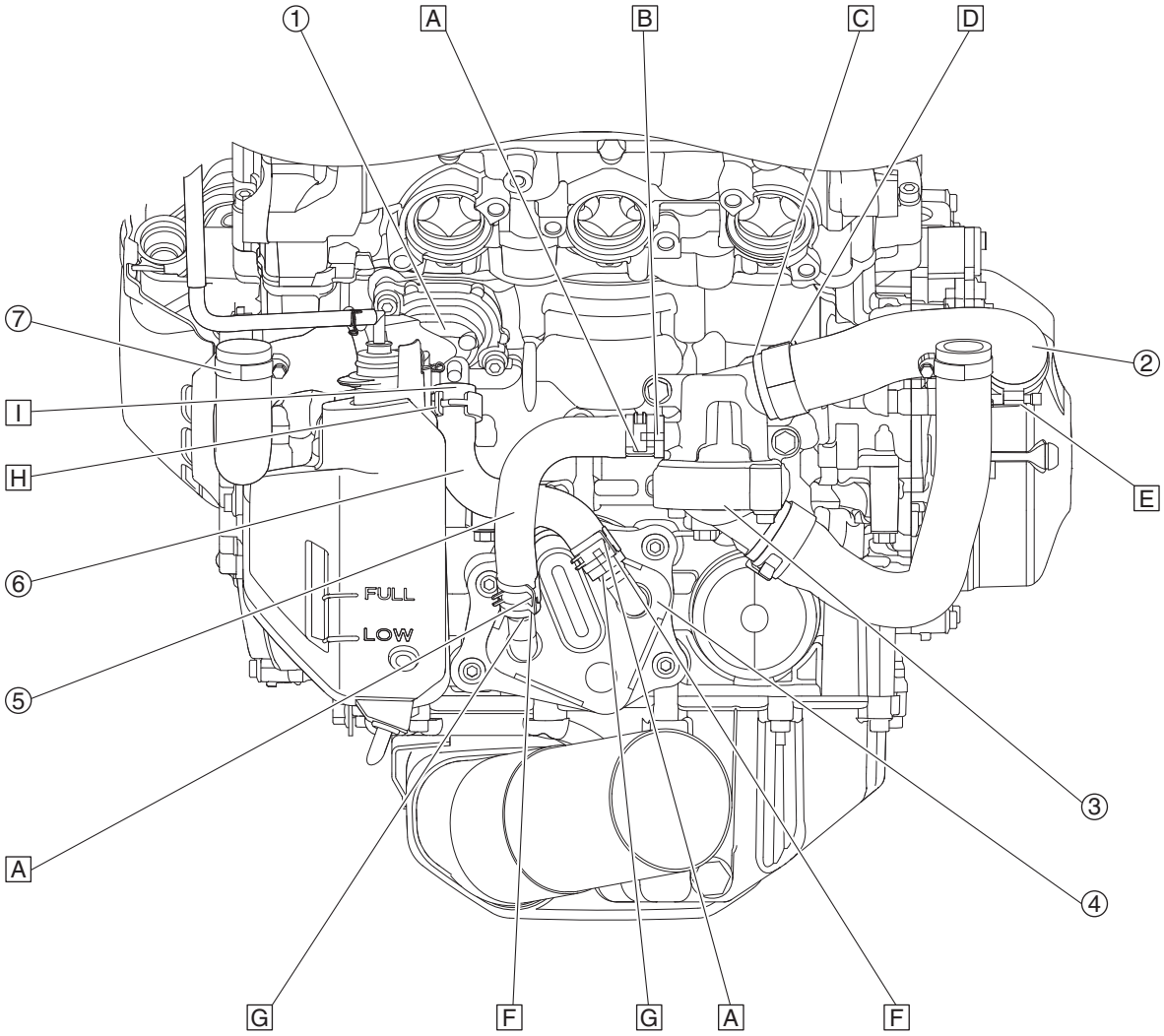
Radiator (right side view)

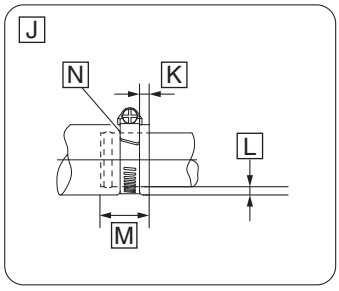


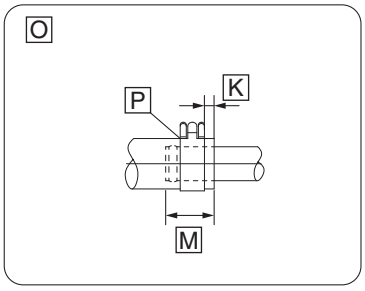
1. Radiator hose (cylinder head to radiator)

A. Insert the radiator hose (cylinder head to radiator) to the root of the radiator properly.
B. 0–2 mm (0–0.08 in)
C. Front side of the vehicle
D. Right side of the vehicle
E. Install the clip with its end facing the rear.
F. 3 mm (0.12 in) or more
G. Make sure not to install the hose clip on the raised portion of the hose fitting.
H. Hose plug-in section
I. Hose clip fixed position details.

Oil cooler and thermostat (front side view)



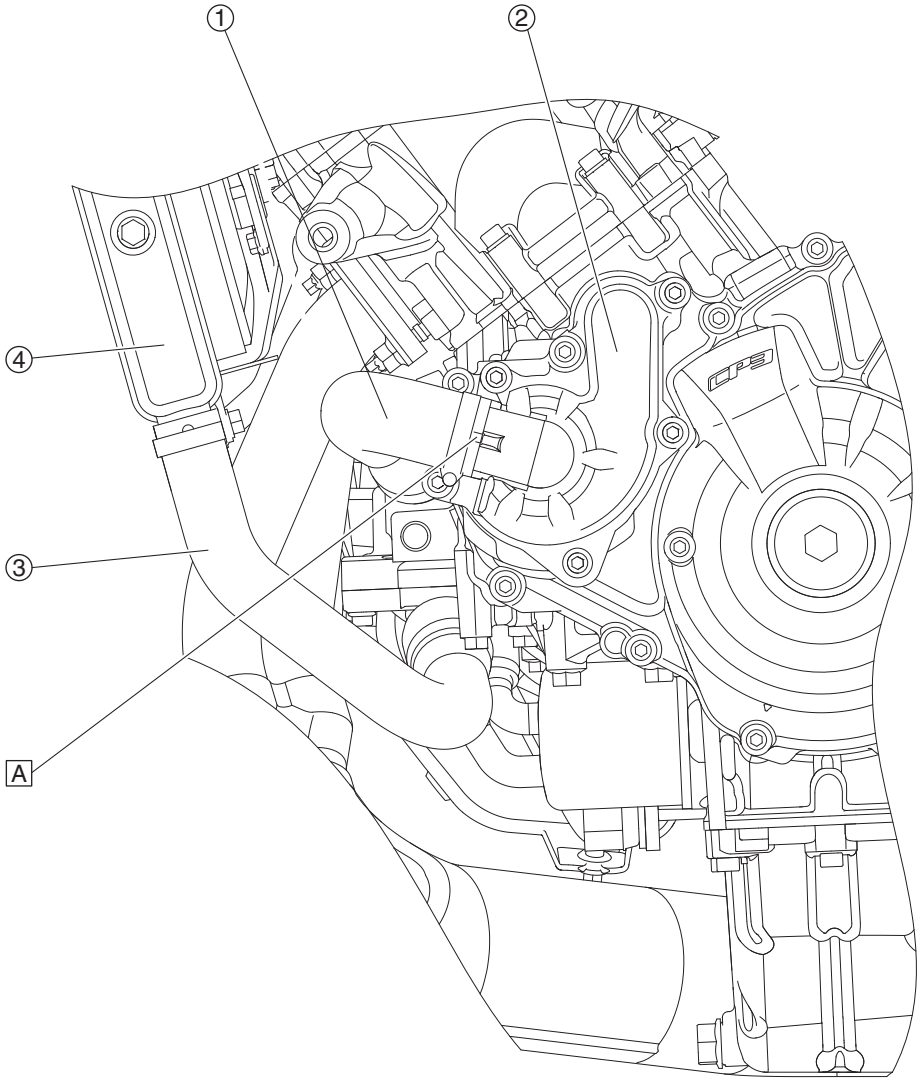


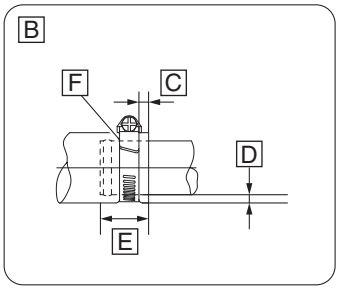


1. Water jacket joint
2. Water pump inlet hose
3. Thermostat assembly
4. Oil cooler
5. Oil cooler outlet hose
6. Oil cooler inlet hose
7. Radiator inlet hose

A. Install the clip with its end facing the front.
B. Face the white paint mark on the oil cooler outlet hose forward and insert until the hose stops.
C. Align the yellow paint mark on the water pump inlet hose with the rib on the thermostat assembly, and insert until the hose stops.
D. Install the clip with its end facing the rear.
E. Install the hose clamp with its end the screw head facing the down.
F. Fit the clip at a position more than 1 mm (0.04 in) from the end of the hose, and do not ride on the spool.
G. Face the yellow paint mark on the hoses forward, insert them up to the step where the thick part of pipe.
H. Install the clip with its end facing the right.
I. Align the white paint mark on the oil cooler inlet hose with the rib on the water jacket joint, and insert until the hose stops.
J. Hose clamp fixed position details.
K. 3 mm (0.12 in) or more
L. 0–1 mm (0–0.04 in)
M. Hose plug-in section
N. Make sure not to install the hose clamp on the raised portion of the hose fitting.
O. Hose clip fixed position details.
P. Make sure not to install the hose clip on the raised portion of the hose fitting.

Water pump (left side view)





1. Water pump inlet hose
2. Water pump assembly
3. Radiator outlet hose
4. Radiator

A. Align the white paint mark on the water pump inlet hose with the rib on the water pump and insert until the hose stops.
B. Hose clamp fixed position details.
C. 3 mm (0.12 in) or more
D. 0–1 mm (0–0.04 in)
E. Hose plug-in section
F. Make sure not to install the hose clamp on the raised portion of the hose fitting.

PERIODIC CHECKS AND ADJUSTMENTS

EAS20022
PERIODIC MAINTENANCE

EAS30022
INTRODUCTION
This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS30614
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM
TIP
- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Fuel line	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	Spark plugs	• Check condition. • Adjust gap and clean.		√	√	√	√	√
			• Replace.	Every 12000 mi (19000 km) or 18 months					
3	*	Valve clearance	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	Crankcase breather system	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	Fuel injection	• Adjust synchronization.	√	√	√	√	√	√
6	*	Exhaust system	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.	√	√	√	√	√	√
7	*	Evaporative emission control system (for California only)	• Check control system for damage. • Replace if necessary.				√		√

EAS30615
GENERAL MAINTENANCE AND LUBRICATION CHART
TIP
- From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.
- Items marked with an asterisk require special tools, data and technical skills, have a Yamaha dealer perform the service.

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	Diagnostic system check	• Perform dynamic inspection using Yamaha diagnostic tool. • Check the error codes.	√	√	√	√	√	√
2	*	Air filter element	• Replace.	Every 24000 mi (37000 km)					
3	*	Clutch	• Check operation. • Adjust or replace cable.	√	√	√	√	√	√
4	*	Front brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
5	*	Rear brake	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
6	*	Brake hoses	• Check for cracks or damage. • Check for correct routing and clamping.		√	√	√	√	√
			• Replace.	Every 4 years					
7	*	Brake fluid	• Change.	Every 2 years					
8	*	Wheels	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
9	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
10	*	Wheel bearings	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
11	*	Swingarm pivot bearings	• Check operation and for excessive play.		√	√	√	√	√
			• Moderately repack with lithium-soap-based grease.	Every 32000 mi (50000 km)					
12		Drive chain	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 600 mi (1000 km) and after washing the motorcycle, riding in the rain or riding in wet areas					
13	*	Steering bearings	• Check bearing assemblies for looseness.	√	√	√	√	√	√
			• Moderately repack with lithium-soap-based grease.	Every 12000 mi (19000 km)					
14	*	Chassis fasteners	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
15		Brake lever pivot shaft	• Apply silicone grease lightly.		√	√	√	√	√
16		Brake pedal pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
17		Clutch lever pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
18		Shift pedal pivot shaft	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
19		Sidestand pivot	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
20	*	Sidestand switch	• Check operation and replace if necessary.	√	√	√	√	√	√
21	*	Front fork	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
22	*	**Shock absorber assembly**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
23	*	**Rear suspension link pivots**	• Check operation. • Correct if necessary.			√		√	
24		**Engine oil**	• Change (warm engine before draining).	√	√	√	√	√	√
25		**Engine oil filter cartridge**	• Replace.	√		√		√	
26	*	**Cooling system**	• Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
			• Change coolant.	Every 3 years					
27	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
28	*	**Control cables**	• Apply Yamaha cable lubricant or other suitable cable lubricant thoroughly.	√	√	√	√	√	√
29	*	**Throttle grip**	• Check operation. • Lubricate throttle grip housing tube guides.		√	√	√	√	√
30	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

TIP

- Air filter
  - This model uses a disposable oil-coated paper element. This element cannot be cleaned with compressed air, doing so will only damage it.
  - Replace the air filter more frequently if you often ride in the rain or dusty conditions.
- Hydraulic brake service
  - Regularly check the brake fluid levels. Replenish as necessary.
  - 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 or sooner if cracked or damaged.

EAS32024
CHECKING THE VEHICLE USING THE YAMAHA DIAGNOSTIC TOOL

Use the YDT and check the vehicle according to the following procedure.

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
2. Remove the protective cap, and then connect the YDT to the coupler.
   Refer to "YDT" on page 9-3.

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

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

3. Check:
   - DTC

TIP

Use the "Diagnosis of malfunction" function of the YDT to check the DTC. For information about using the YDT, refer to the operation manual that is included with the tool.

   DTC No. is displayed → Check and repair the probable cause of the malfunction.
   Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-39.
4. Perform:
   - Dynamic inspection

TIP

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

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

EAS30619
CHECKING THE FUEL LINE

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

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Fuel hose "1"
   - Fuel tank breather hose "2"
   - Fuel tank drain hose "3"
     Cracks/damage → Replace.
     Loose connection → Connect properly.

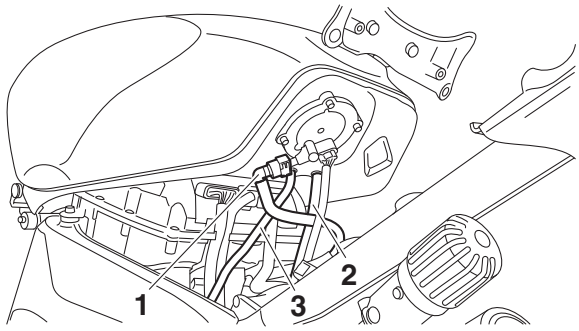
ECA14940

NOTICE

Make sure the fuel tank breather hose is routed correctly.

TIP

Before removing the fuel hoses, place a few rags in the area under where it will be removed.



3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30620
CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page 4-10.
2. Remove:
   - Ignition coil
   - Spark plug

ECA13320
NOTICE

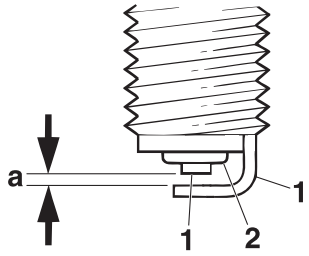
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

	**Manufacturer/model** **NGK/LMAR9A-9**

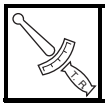
4. Check:
   - Electrode "1"
     Damage/wear → Replace the spark plug.
   - Insulator "2"
     Abnormal color → Replace the spark plug.
     Normal color is medium-to-light tan.
5. Clean:
   - Spark plug
     (with a spark plug cleaner or wire brush)
6. Measure:
   - Spark plug gap "a"
     (with a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

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



G088879

7. Install:
   - Spark plug
   - Ignition coil

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

TIP

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

8. Install:
   - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page 4-10.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - 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.

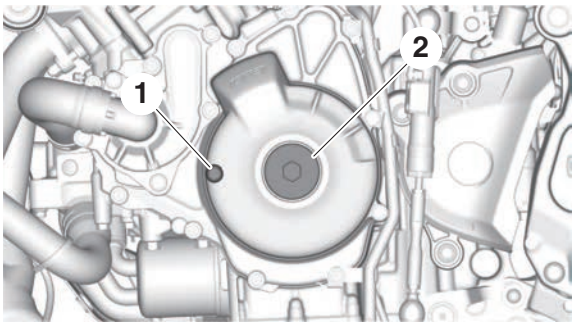
TIP

Valve clearance adjustment should be made on a cold engine, at room temperature.

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page 4-10.

- Front side panel
  Refer to "GENERAL CHASSIS (1)" on page 4-1.
- Radiator
  Refer to "RADIATOR" on page 6-3.

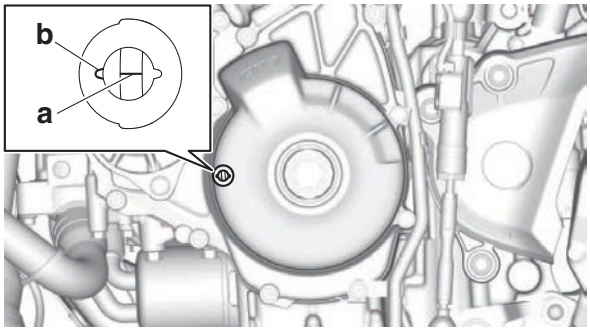
2. Remove:
   - Ignition coil
   - Spark plug
   - Cylinder head cover
   - Cylinder head cover gasket
   Refer to "CAMSHAFTS" on page 5-16.
3. Remove:
   - Timing mark accessing bolt "1"
   - Crankshaft end cover "2"



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

Valve clearance (cold)
Intake
0.11–0.20 mm (0.0043–0.0079 in)
Exhaust
0.28–0.32 mm (0.0110–0.0126 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 generator rotor cover mark "b".



TIP

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

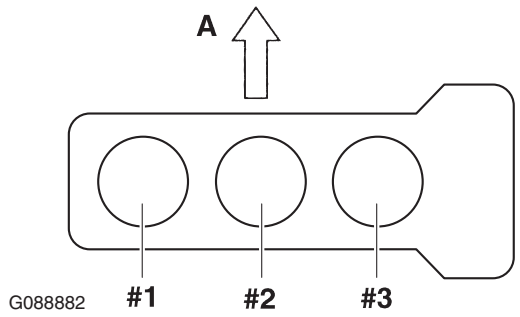
c. Measure the valve clearance with a thickness gauge.

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

TIP

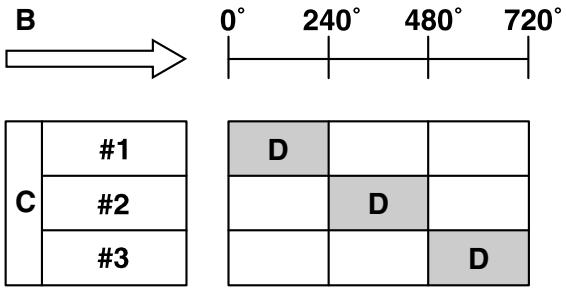
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

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



A. Front

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



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

Cylinder #2	240°
Cylinder #3	480°

5. Remove:
   • Camshaft

TIP

- Refer to "CAMSHAFTS" on page 5-16.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

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

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

TIP

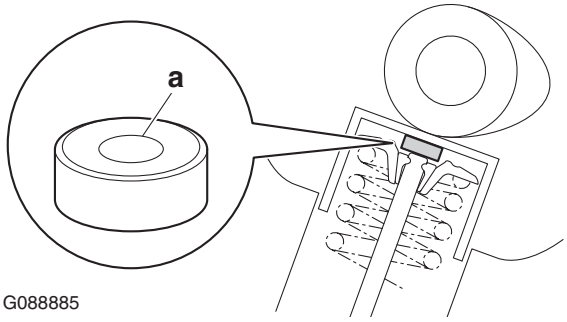
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter and valve pad so that they can be installed in the correct place.

   b. Calculate the difference between the specified valve clearance and the measured valve clearance.
      Example:
      Specified valve clearance = 0.11–0.20 mm (0.004–0.008 in)
      Measured valve clearance = 0.25 mm (0.010 in)
      0.25 mm (0.010 in) - 0.20 mm (0.008 in) = 0.05 mm (0.002 in)
   c. Check the thickness of the current valve pad.

TIP

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

Example:
If the valve pad is marked "158", the pad thickness is 1.58 mm (0.062 in).



G088885

   d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
      Example:
      1.58 mm (0.062 in) + 0.05 mm (0.002 in) = 1.63 mm (0.064 in)
      The valve pad number is 163.
   e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

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

TIP

Refer to the following table for the available valve pads.

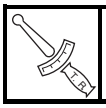
Valve pad range	Nos. 150–240
Valve pad thickness	1.50–2.40 mm (0.0590–0.0944 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

      Example:
      Valve pad number = 163
      Rounded value = 165
      New valve pad number = 165
   f. Install the new valve pad and the valve lifter.

TIP

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

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



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

TIP

- Refer to "CAMSHAFTS" on page 5-16.
- Lubricate the camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshafts marks with the camshaft cap marks.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

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

7. Install:
   - All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017

CHECKING THE ENGINE IDLING SPEED

TIP

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

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

Engine idling speed
1200–1400 r/min

3. Check:
   - ISC (idle speed control) learning value
     "00" or "01" → Check the intake system.
     "02" → Clean the throttle bodies.
     Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-7.

   a. Connect the YDT.
      Use the diagnostic code number "67".
      Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
   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 plug
- Air filter element
- Throttle body joint
- Fuel hose
- Exhaust system
- Breather hose

Checking the throttle body synchronization

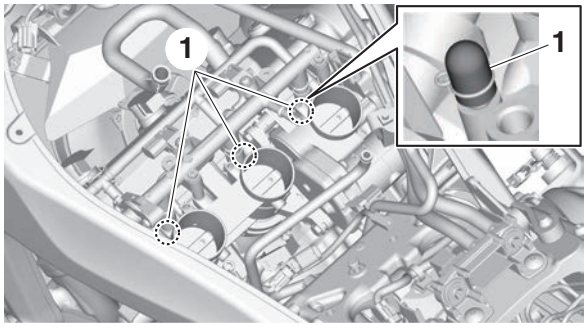
1. Stand the vehicle on a level surface.

TIP

Place the vehicle on a maintenance stand.

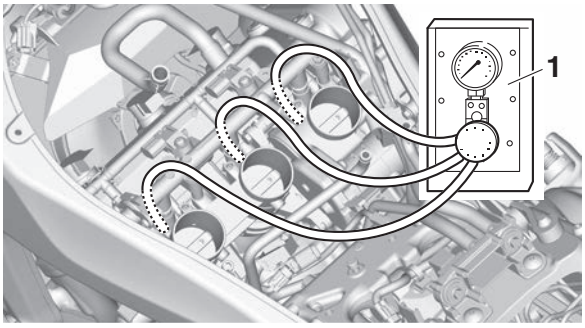
2. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page 4-10.

3. Remove:
   • Service hose cap “1”



4. Install:
   • Vacuum gauge “1”

Vacuum gauge
90890-03094
Vacuummate
YU-44456



5. Install:
   • Air filter case
   Refer to “GENERAL CHASSIS (2)” on page 4-10.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
6. Check:
   • Throttle body synchronization
   a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

Engine idling speed
1200–1400 r/min

   b. Check the vacuum pressure.

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

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.

Engine idling speed
1200–1400 r/min

   b. Using the throttle body that has the bypass air screw “1” with a white paint mark as the standard, adjust the other throttle bodies by turning its bypass air screw in or out.

ECA21300

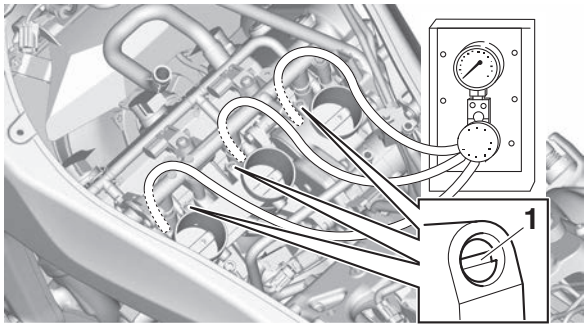
NOTICE

Do not turn the bypass air screw (white paint mark) of the throttle body that is the standard. Otherwise, the engine may run roughly at idle and the throttle bodies may not operate properly.

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 1.3 kPa (10 mmHg).

Carburetor angle driver 2
90890-03173



2. Stop the engine and remove the measuring equipment.

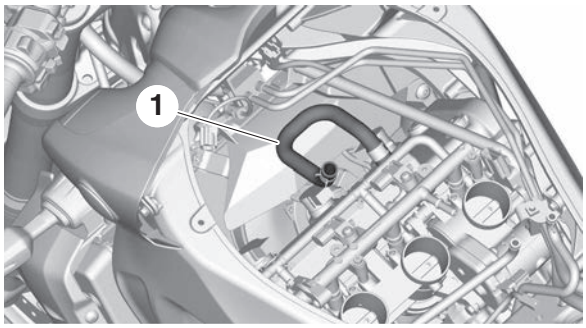
3. Install:
   • Service hose cap
4. Install:
   • Air filter case
   Refer to “GENERAL CHASSIS (2)” on page 4-10.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Fuel tank center cover
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30798
CHECKING THE THROTTLE BODY JOINTS
1. Remove:
   • Throttle body
   Refer to “THROTTLE BODIES” on page 7-5.
2. Check:
   • Throttle body joint
   Cracks/damage → Replace.
3. Install:
   • Throttle body
   Refer to “THROTTLE BODIES” on page 7-5.

EAS30623
CHECKING THE CYLINDER HEAD BREATHER HOSE
1. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Fuel tank center cover
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Air filter case
   Refer to “GENERAL CHASSIS (2)” on page 4-10.
2. Check:
   • Cylinder head breather hose “1”
   Cracks/damage → Replace.
   Loose connection → Connect properly.

ECA14920
NOTICE

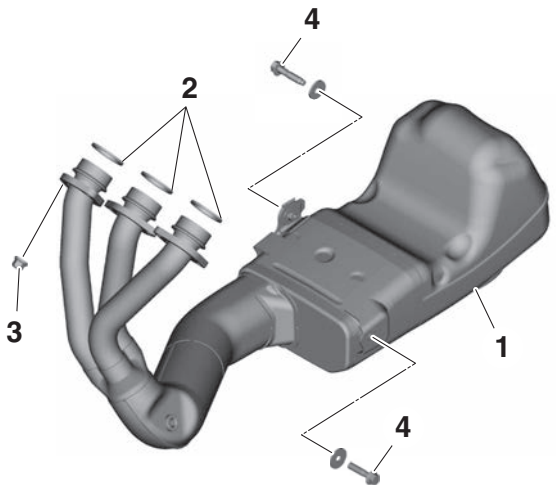
Make sure the cylinder head breather hose is routed correctly.



3. Install:
   • Air filter case
   Refer to “GENERAL CHASSIS (2)” on page 4-10.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Fuel tank center cover
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS30625
CHECKING THE EXHAUST SYSTEM
1. Check:
   • Muffler assembly “1”
   Cracks/damage → Replace.
   • Gasket “2”
   Exhaust gas leaks → Replace.
2. Check:
   Tightening torque
   • Exhaust pipe nut “3”
   • Muffler bolt “4”

Exhaust pipe nut
20 N·m (2.0 kgf·m, 15 lb·ft)
Muffler bolt
20 N·m (2.0 kgf·m, 15 lb·ft)



EAS31922
CHECKING THE CANISTER (for MT09MC/MT09SPMC)

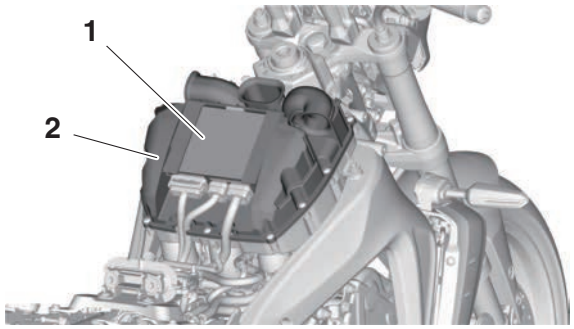
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Canister
   - Canister purge hose
   - Fuel tank breather hose
   - Canister breather hose
     Cracks/damage → Replace.
     Loose connection → Connect properly.
     Refer to "FUEL TANK" on page 7-1.
3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS33546
CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SPMC)

Refer to "CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SPMC)" on page 7-4.

EAS30628
REPLACING THE AIR FILTER ELEMENT

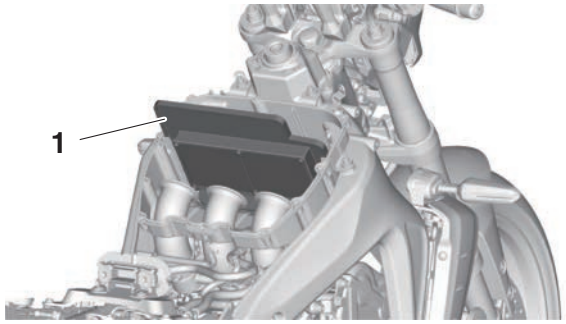
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Remove:
   - ECU (Engine Control Unit) "1"
   - Air filter case cover "2"
     Refer to "GENERAL CHASSIS (2)" on page 4-10.



3. Check:
   - Air filter element "1"
   - Air filter seal
     Damage → Replace.

TIP

- Replace the air filter element every 40000 km (24000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.



4. Install:
   - Air filter element
   - Air filter case cover
   - ECU (Engine Control Unit)
     Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-55.

ECA20710

NOTICE

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

TIP

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

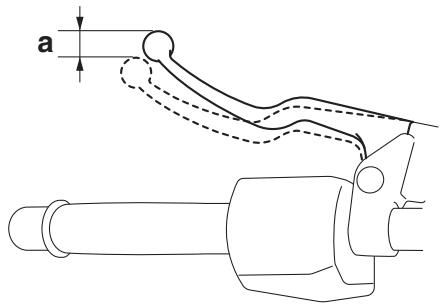
5. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.

EAS30629

ADJUSTING THE CLUTCH LEVER FREE PLAY

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

Clutch lever free play
10.0–15.0 mm (0.39–0.59 in) (MT09M, MT09MC)
5.0–10.0 mm (0.20–0.39 in) (MT09SPM, MT09SPMC)

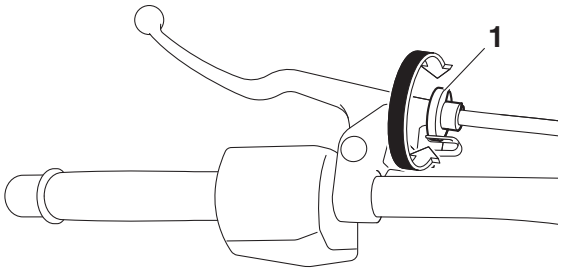


G088887

2. Adjust:
   - Clutch lever free play

Handlebar side

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



G088888

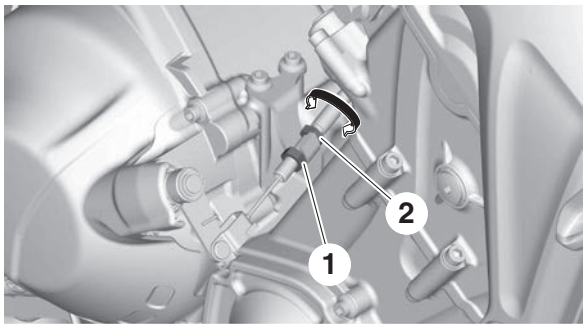
TIP

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

Engine side

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

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 4-26 and "REAR BRAKE" on page 4-38.

TIP

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

EAS30632
CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on a maintenance 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.

Front brake
Specified brake fluid
DOT 4
Rear brake
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

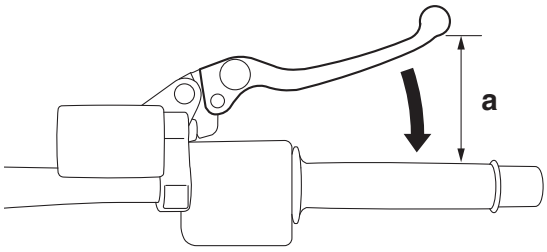
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

TIP

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

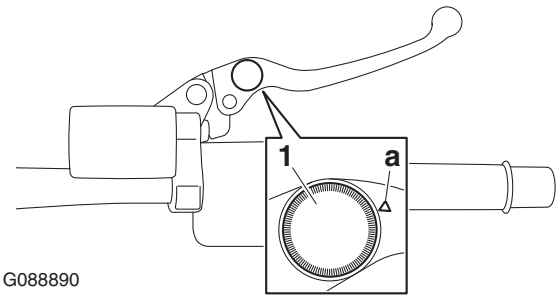
EAS30630
ADJUSTING THE FRONT DISC BRAKE

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



G088889

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



G088890

EWA17050
WARNING

- **After adjusting the brake lever position, make sure the pin on the brake lever holder is firmly inserted in the hole in the adjusting dial.**
- **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 brake performance resulting in loss of control and possibly cause an accident. Therefore, check and if necessary, bleed the brake system.**

ECA13490
NOTICE

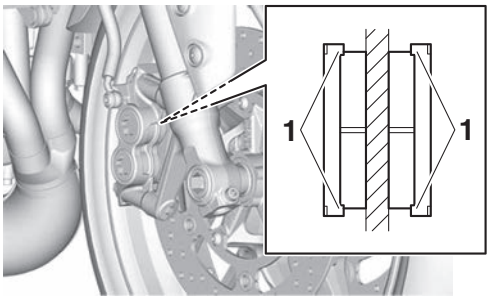
After adjusting the brake lever position, make sure there is no brake drag.

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 indicators “1” almost touch the brake disc → Replace the brake pads as a set.
   Refer to “FRONT BRAKE” on page 4-26.



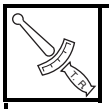
EAS30631
ADJUSTING THE REAR DISC BRAKE

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.



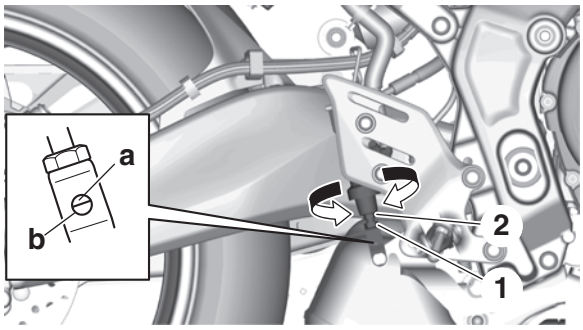
Rear brake master cylinder locknut
18 N·m (1.8 kgf·m, 13 lb·ft)

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

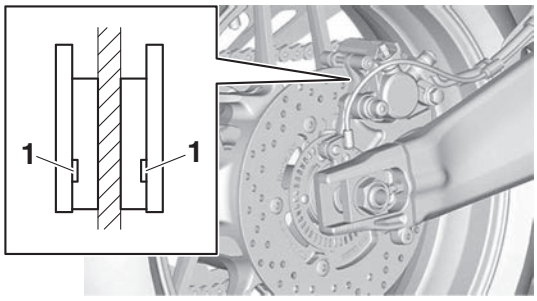
After adjusting the brake pedal position, make sure there is no brake drag.



2. Adjust:
   • Rear brake light switch
   Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-33.

EAS30634
CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.
1. Operate the brake.
2. Check:
   • Rear brake pad
   Wear indicator grooves “1” almost disappeared → Replace the brake pads as a set.
   Refer to “REAR BRAKE” on page 4-38.



EAS30635
CHECKING THE FRONT BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose holders.
1. Check:
   • Brake hose
   Cracks/damage/wear → Replace.
2. Check:
   • Brake hose holder
   Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to “FRONT BRAKE” on page 4-26.

EAS30636
CHECKING THE REAR BRAKE HOSE

1. Check:
   • Brake hose
   Cracks/damage/wear → Replace.
2. Check:
   • Brake hose holder
   Loose Connection → Tighten the holder bolt.
3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
   • Brake hose
   Brake fluid leakage → Replace the damaged hose.
   Refer to “REAR BRAKE” on page 4-38.

EAS30893
BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000
⚠ WARNING

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

ECA22640
NOTICE

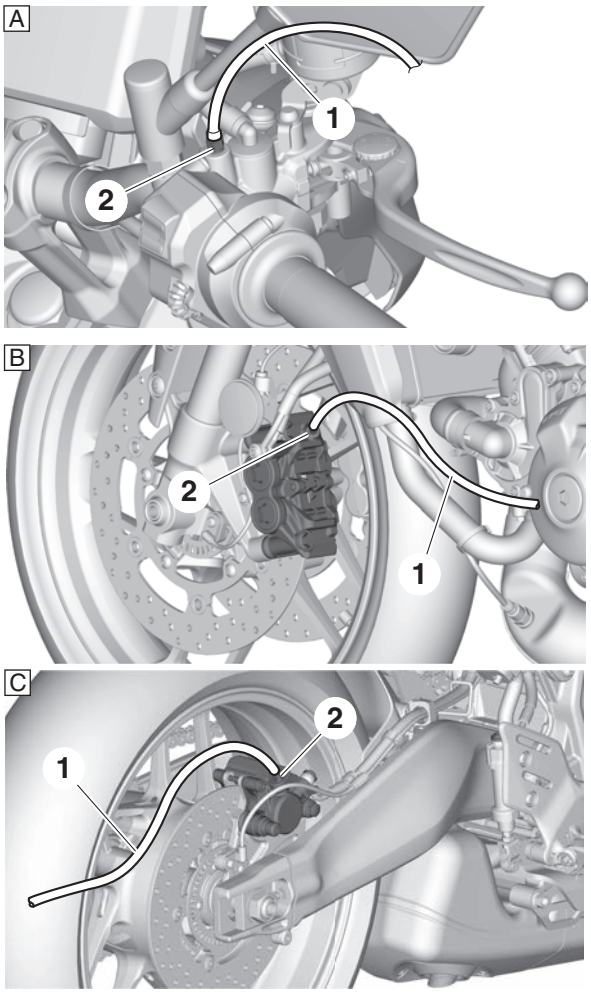
- **Bleed the brake system in the following order.**
- **1st step: Front brake master cylinder**
- **2nd step: Front brake calipers**
- **3rd step: Rear brake caliper**

EWA16530
⚠ WARNING

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

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

1. Bleed:
   • ABS
   a. Fill the brake fluid reservoir to the proper level with the specified brake fluid.
   b. Install the brake fluid reservoir diaphragm.
   c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.



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

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

TIP

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

   h. Tighten the bleed screw and then release the brake lever or brake pedal.

i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-54.

ECA17061

NOTICE

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

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

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

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

EWA13110

⚠ WARNING

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

EAS30638

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260

⚠ WARNING

Never attempt to make any repairs to the wheel.

TIP

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

EAS30640

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
   • Tire air 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)
Up to 90 kg (198 lb) load
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
90 kg (198 lb) load - maximum load
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
Maximum load
166 kg (366 lb)
*** Maximum load: 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)
1.0 mm (0.04 in)
Wear limit (rear)
1.0 mm (0.04 in)

EWA14090
⚠ WARNING

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

Front tire
Size
120/70ZR17M/C (58W)
Manufacturer/model
BRIDGESTONE/BATTLAX HYPERSPORT S22F

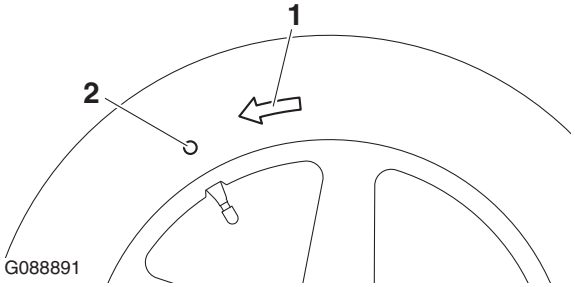
Rear tire
Size
180/55ZR17M/C (73W)
Manufacturer/model
BRIDGESTONE/BATTLAX HYPERSPORT S22R

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 bearing.
1. Check:
   - Wheel bearing
     Refer to "CHECKING THE FRONT WHEEL" on page 4-13 and "CHECKING THE REAR WHEEL" on page 4-21.

EAS30802
CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm operation
     Swingarm not working properly → Check the swingarm.
     Refer to "SWINGARM" on page 4-84.
2. Check:
   - Swingarm excessive play
     Refer to "SWINGARM" on page 4-84.

EAS30643
LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
   - Dust cover
   - Pivot shaft
   - Bearing
   - Oil seal
   - Collar

Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-85.

EAS31923
DRIVE CHAIN SLACK

Checking the drive chain slack

EWA13120
⚠ WARNING

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

ECA13550
NOTICE

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

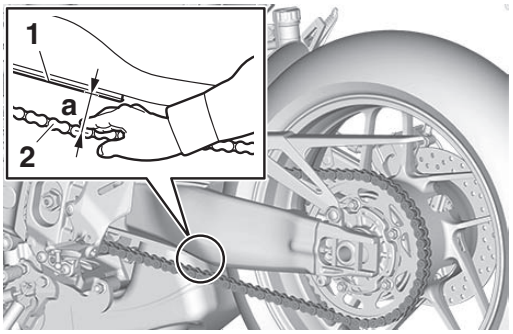
1. Shift the transmission into the neutral position.

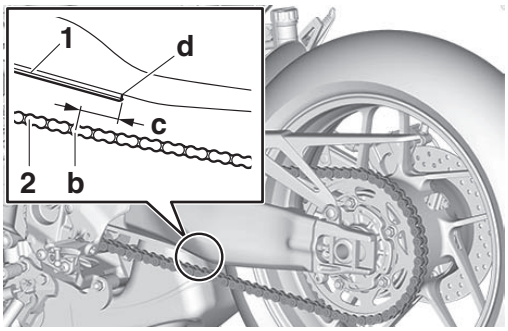
2. Check:
   • Drive chain slack
   Out of specification → Adjust.

TIP

- Measure the distance “a” between the rib end on the drive chain guide “1” and the center point of the drive chain “2”.
- The center point “b” of the drive chain is approx. 32 mm (1.26 in) “c” forward from the edge “d” of the drive chain guide.

Drive chain slack (Sidestand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack (Maintenance stand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack limit (Sidestand)
46.0 mm (1.81 in)





ECA20870

NOTICE

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

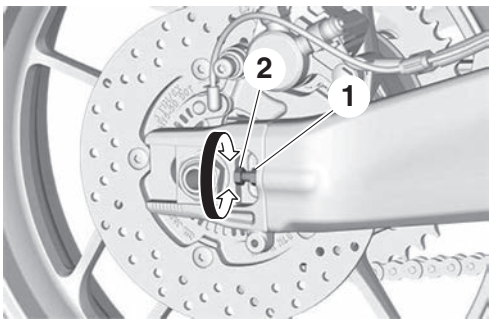
Adjusting the drive chain slack

EWA13120

WARNING

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

1. Loosen:
   • Wheel axle nut
   Refer to “REAR WHEEL” on page 4-18.
2. Adjust:
   • Drive chain slack
   a. Loosen both locknuts “1”.
   b. Turn both adjusting bolts “2” until the specified drive chain slack is obtained.



TIP

- To maintain the proper wheel alignment, adjust both sides evenly.
- There should be no clearance between the adjusting block and adjusting bolt.

   c. Tighten the wheel axle nut to specification.

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

   d. Tighten the locknuts to specification.

Chain puller adjusting bolt locknut
16 N·m (1.6 kgf·m, 12 lb·ft)

EAS30803
LUBRICATING THE DRIVE CHAIN

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

Recommended lubricant
Chain lubricant suitable for O-ring chains

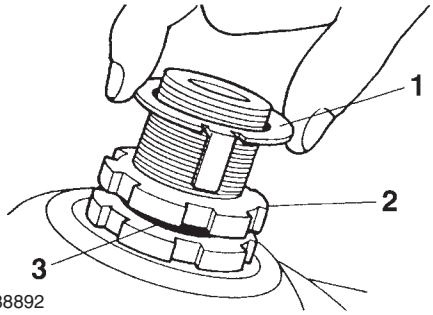
EAS30645
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING
Securely support the vehicle so that there is no danger of it falling over.

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

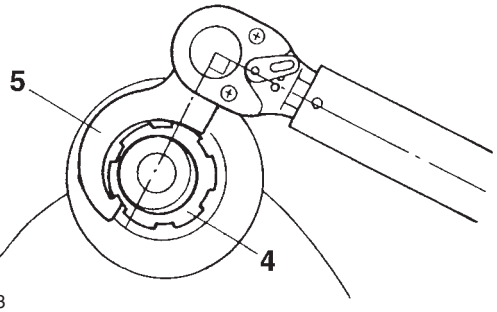
2. Check:
   - Steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Blinding/looseness → Adjust the steering head.
3. Remove:
   - Upper bracket
4. Adjust:
   - Steering head
   a. Remove the lock washer “1”, the upper ring nut “2”, and the rubber washer “3”.



G088892

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

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



G088893

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

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

   c. Loosen the lower ring nut completely, then tighten it to specification.

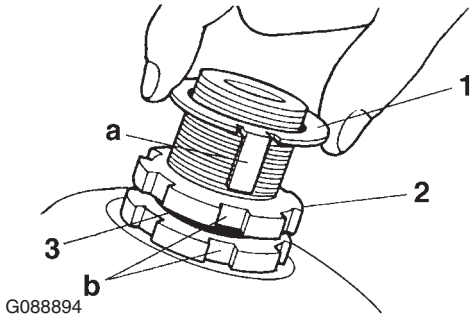
EWA13140
⚠ WARNING
Do not overtighten the lower ring nut.

Lower ring nut (final tightening torque)
14 N·m (1.4 kgf·m, 10 lb·ft)

d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-75.
e. Install the rubber washer "3".
f. Install the upper ring nut "2".
g. Finger tighten the upper ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
h. Install the lock washer "1".

TIP

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



5. Install:
   • Upper bracket
   Refer to "HANDLEBAR" on page 4-58.

EAS30646
LUBRICATING THE STEERING HEAD

1. Lubricate:
   • Upper bearing
   • Lower bearing
   • Bearing race

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

EAS31186
CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.
Refer to "CHASSIS TIGHTENING TORQUES" on page 2-12.

EAS30804
LUBRICATING THE BRAKE LEVER

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

	Recommended lubricant **Silicone grease**

EAS30805
LUBRICATING THE CLUTCH LEVER

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

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

EAS30649
LUBRICATING THE PEDAL

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

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

EAS30851
ADJUSTING THE SHIFT PEDAL

Refer to "ADJUSTING THE SHIFT PEDAL" on page 4-92.

EAS30650
CHECKING THE SIDESTAND

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

EAS30651
LUBRICATING THE SIDESTAND

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

	Recommended lubricant **Molybdenum disulfide grease**

EAS30652
CHECKING THE SIDESTAND SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-51.

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 4-64.

EAS30806
ADJUSTING THE FRONT FORK LEGS (for MT09M/MT09MC)

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

EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

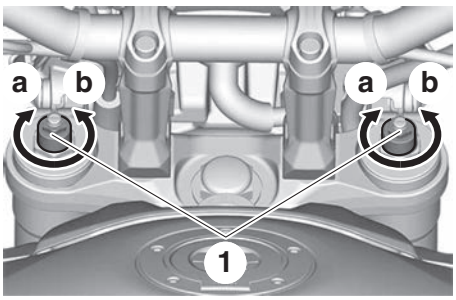
Spring preload

EWA17040
WARNING
Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.

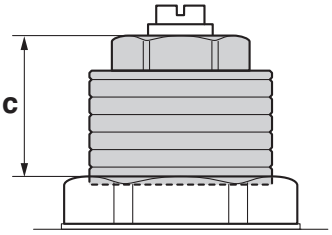
ECA13590
NOTICE
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Spring preload
   a. Turn the adjusting 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)
15.0 mm (0.59 in)
Adjustment value (Hard)
4.0 mm (0.16 in)

Rebound damping (right side only)

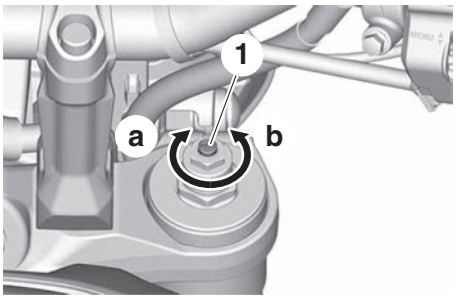
ECA13590
NOTICE
Never go beyond the maximum or minimum adjustment positions.

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

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

Rebound damping
Adjustment value from the start position (Soft)
11 (MT09M,MT09MC)
Adjustment value from the start position (STD)
6 (MT09M,MT09MC)
Adjustment value from the start position (Hard)
1
*** Start position: With the adjusting screw fully turned in direction "a"**

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



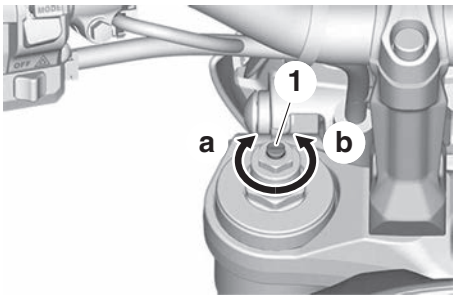
Compression damping (left side only)
ECA13590
NOTICE
Never go beyond the maximum or minimum adjustment positions.

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

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

Compression damping
Adjustment value from the start position (Soft)
11 (MT09M, MT09MC)
Adjustment value from the start position (STD)
6 (MT09M, MT09MC)
Adjustment value from the start position (Hard)
1 (MT09M, MT09MC)
*** Start position: With the adjusting screw fully turned in direction "a"**

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



EAS32009
ADJUSTING THE FRONT FORK LEGS (for MT09SPM/MT09SPMC)
The following procedure applies to both of the front fork legs.
EWA13120
⚠ WARNING
Securely support the vehicle so that there is no danger of it falling over.

Spring preload
EWA17040
⚠ WARNING
Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.

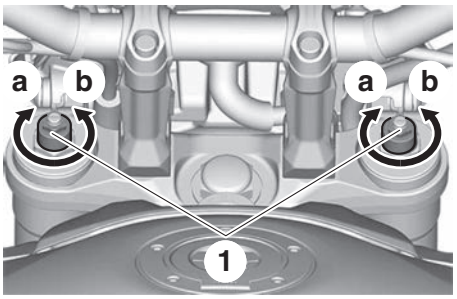
ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

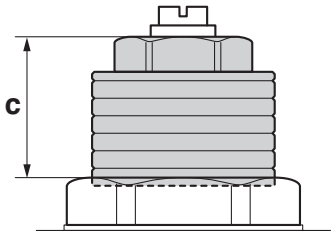
1. Adjust:
   - Spring preload
   a. Turn the adjusting bolt “1” in direction “a” or “b”.

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)
15.0 mm (0.59 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”.

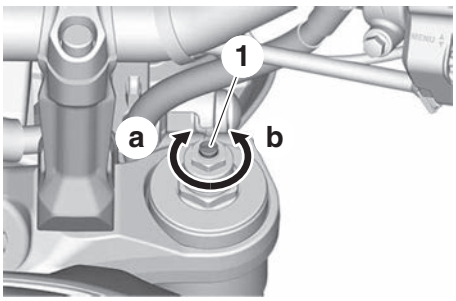
Direction “a”
Rebound damping is increased (suspension is harder).
Direction “b”
Rebound damping is decreased (suspension is softer).

Rebound damping
Adjustment value from the start position (Soft)
26 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)
15 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)
1

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

TIP

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



Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

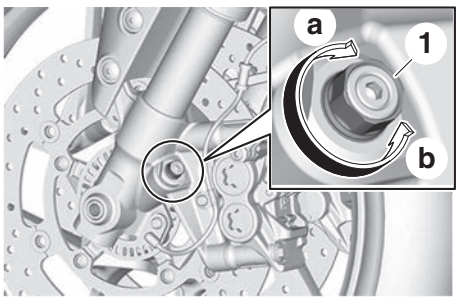
Direction "a"
Compression damping is increased (suspension is harder).
Direction "b"
Compression damping is decreased (suspension is softer).

Fast compression damping
Adjustment value from the start position (Soft)
5 1/2 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)
3 1/4 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)
0 (MT09SPM, MT09SPMC)

*** Start position: With the adjusting screw fully turned in direction "a"**

TIP

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



2. Adjust:
   - Compression damping (slow compression damping)
   a. Turn the adjusting bolt "1" in direction "a" or "b".

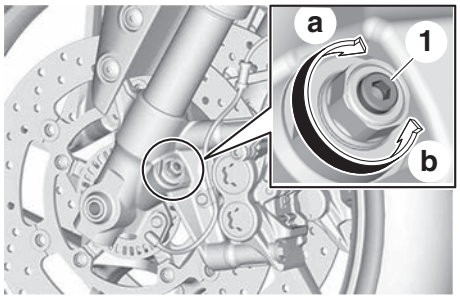
Direction "a"
Compression damping is increased (suspension is harder).
Direction "b"
Compression damping is decreased (suspension is softer).

Slow compression damping
Adjustment value from the start position (Soft)
18 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)
12 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)
1 (MT09SPM, MT09SPMC)

*** Start position: With the adjusting bolt fully turned in direction "a"**

TIP

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



EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-81.

EAS30655
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY (for MT09M/MT09MC)

EWA13120
⚠ WARNING

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

Spring preload

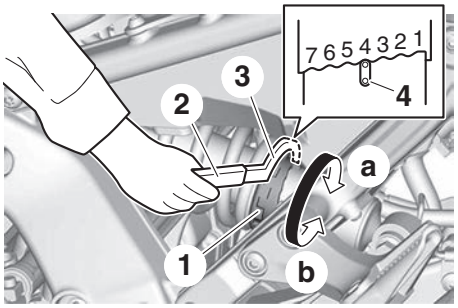
ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   • Spring preload
   a. Adjust the spring preload with the special wrench “1” and extension bar “2” included in the owner’s tool kit.
   b. Turn the adjusting ring “3” in direction “a” or “b”.
   c. Align the desired position on the adjusting ring with the stopper “4”.

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

Spring preload
Adjustment value (Soft)
1 (MT09M, MT09MC)
Adjustment value (STD)
4 (MT09M, MT09MC)
Adjustment value (Hard)
7 (MT09M, MT09MC)



Rebound damping

ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

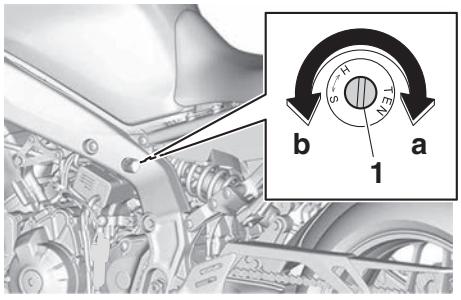
Direction “a”
Rebound damping is increased (suspension is harder).
Direction “b”
Rebound damping is decreased (suspension is softer).

Rebound damping
Adjustment value from the start position (Soft)
2 1/2 (MT09M,MT09MC)
Adjustment value from the start position (STD)
1 (MT09M,MT09MC)
Adjustment value from the start position (Hard)
0

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

TIP

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



EAS31609
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY (for MT09SPM/MT09SPMC)

EWA13120
⚠ WARNING

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

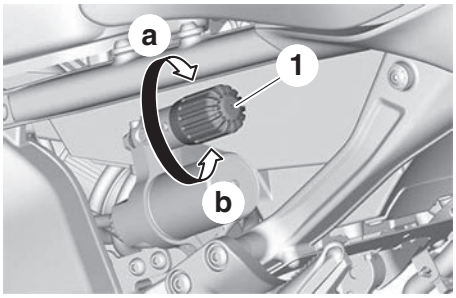
Spring preload

ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

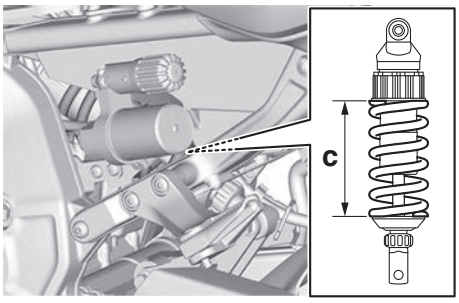
1. Adjust:
   • Spring preload
   a. Turn the adjusting knob "1" in direction "a" or "b".

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



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)
154.0 mm (6.06 in) (MT09SPM, MT09SPMC)
Adjustment value (STD)
154.0 mm (6.06 in) (MT09SPM, MT09SPMC)
Adjustment value (Hard)
146.0 mm (5.75 in) (MT09SPM, MT09SPMC)

Rebound damping

ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

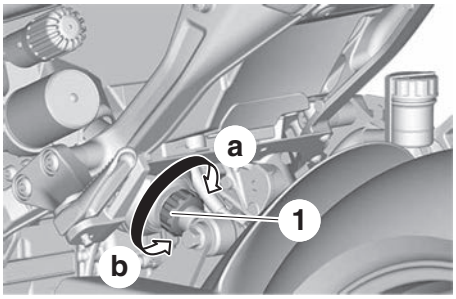
1. Adjust:
   • Rebound damping
   a. Turn the adjusting knob "1" in direction "a" or "b".

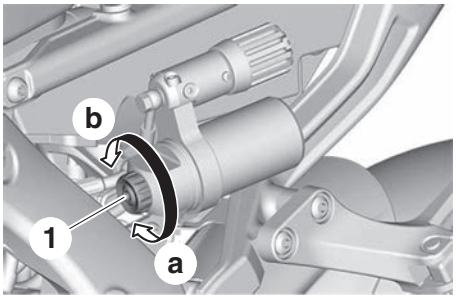
Direction "a"
Rebound damping is increased (suspension is harder).
Direction "b"
Rebound damping is decreased (suspension is softer).

Rebound damping
Adjustment value from the start position (Soft)
30 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)
18 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)
0
*** Start position: With the adjusting screw fully turned in direction "a"**

TIP

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





Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

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

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

Compression damping
Adjustment value from the start position (Soft)
20 (MT09SPM, MT09SPMC)
Adjustment value from the start position (STD)
10 (MT09SPM, MT09SPMC)
Adjustment value from the start position (Hard)
0 (MT09SPM, MT09SPMC)

*** Start position: With the adjusting knob fully turned in direction "a"**

TIP

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

EAS30809

CHECKING THE CONNECTING ARM AND RELAY ARM

Refer to "CHECKING THE CONNECTING ARM AND RELAY ARM" on page 4-82.

EAS30656

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

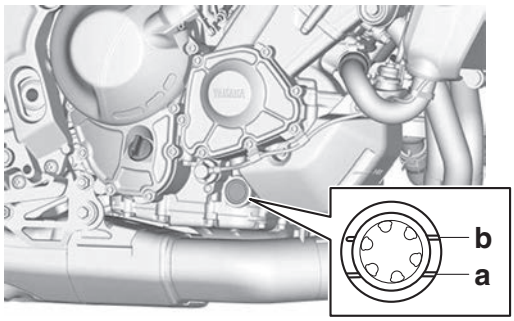
TIP

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

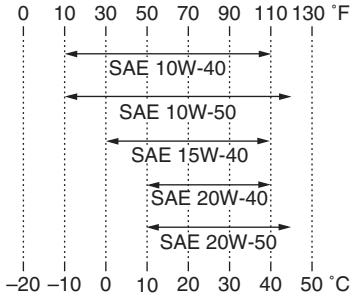
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Check:
   - Engine oil level

   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.



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



ECA13361

NOTICE

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

TIP

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

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

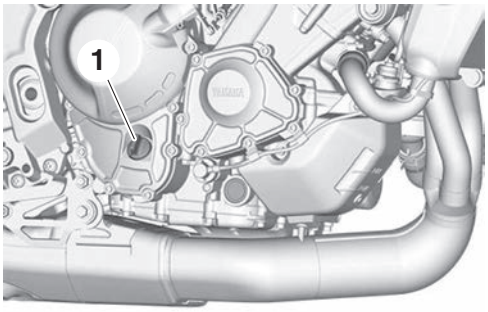
TIP

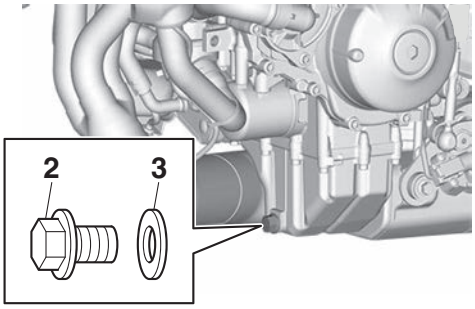
Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS30657

CHANGING THE ENGINE OIL

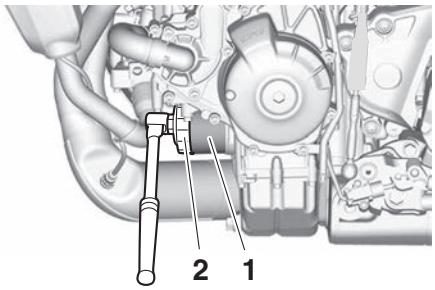
1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   - Engine oil filler cap "1"
   - Engine oil drain bolt "2"
   - Gasket "3"





4. Drain:
   - Engine oil
     (completely from the crankcase)
5. 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



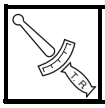
   b. Lubricate the O-ring of the new oil filter cartridge with a thin coat of engine oil.

ECA25890

NOTICE

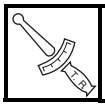
Make sure the O-ring is positioned correctly in the groove of the oil filter cartridge.

   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)

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



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

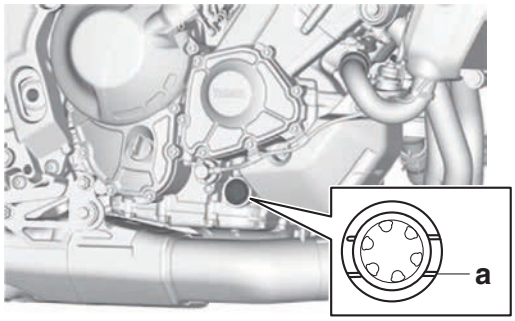
7. Fill:
   • Crankcase
   (with the specified amount of the recommended engine oil)

Engine oil quantity
Quantity (disassembled)
3.50 L (3.70 US qt, 3.08 Imp.qt)
Oil change
2.80 L (2.96 US qt, 2.46 Imp.qt)
With oil filter removal
3.20 L (3.38 US qt, 2.82 Imp.qt)

8. Install:
   • Engine oil filler cap
   (along with the O-ring New)
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
   • Engine
   (for engine oil leaks)
11. Check:
   • Engine oil level
   Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-27.

EAS30810
MEASURING THE ENGINE OIL PRESSURE

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

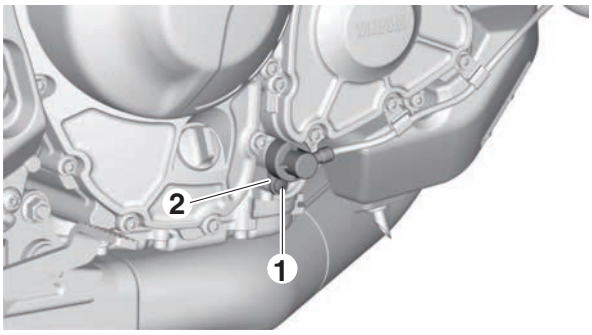


2. Start the engine, warm it up for several minutes, and then turn it off.

ECA13410
NOTICE
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:
   • Oil pressure switch joint bolt "1"
   • Oil pressure switch joint (with the oil pressure switch) "2"

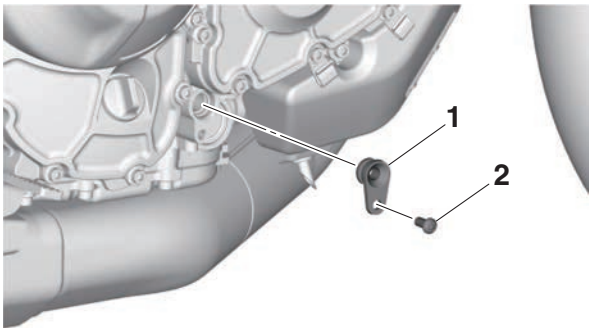
EWA12980
WARNING
The engine, muffler and engine oil are extremely hot.



4. Install:
   • Oil pressure gauge joint 18 mm "1"
   • Oil pressure switch joint bolt "2"

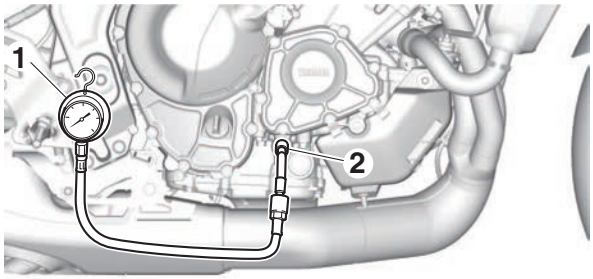
Oil pressure gauge joint 18 mm
90890-04176
YU-04176

Oil pressure switch joint bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)



5. Install:
   • Oil pressure gauge "1"
   • Adapter C "2"

Oil pressure gauge set
90890-03120



6. 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.

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

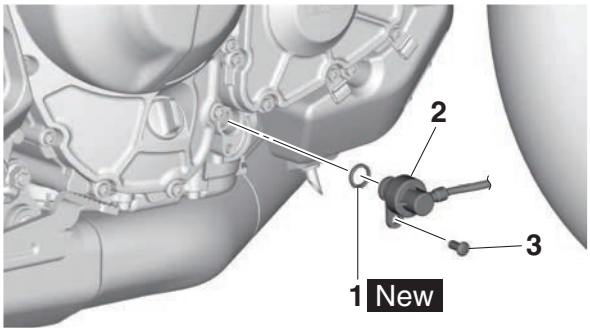
Oil pressure
300.0 kPa/5000 r/min at 100 °C
(3.00 kgf/cm²/5000 r/min at 100 °C, 43.5 psi/5000 r/min at 212 °F)

Out of specification → Check.

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

8. Remove:
   - Oil pressure gauge
   - Adapter C
   - Oil pressure switch joint bolt
   - Oil pressure switch joint (with the O-ring)
9. Install:
   - O-ring “1” New
   - Oil pressure switch joint (with the oil pressure switch) “2”
   - Oil pressure switch joint bolt “3”

Oil pressure switch joint bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)



EAS30811

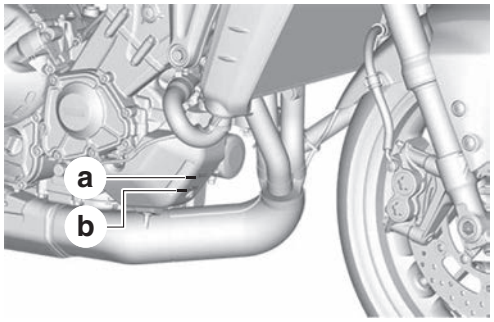
CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

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

2. Check:
   - Coolant level
     The coolant level should be between the maximum level mark “a” and minimum level mark “b”.
     Below the minimum level mark → Add the recommended coolant to the proper level.



ECA21281

NOTICE

- **Adding water instead of coolant dilutes the antifreeze concentration 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.**

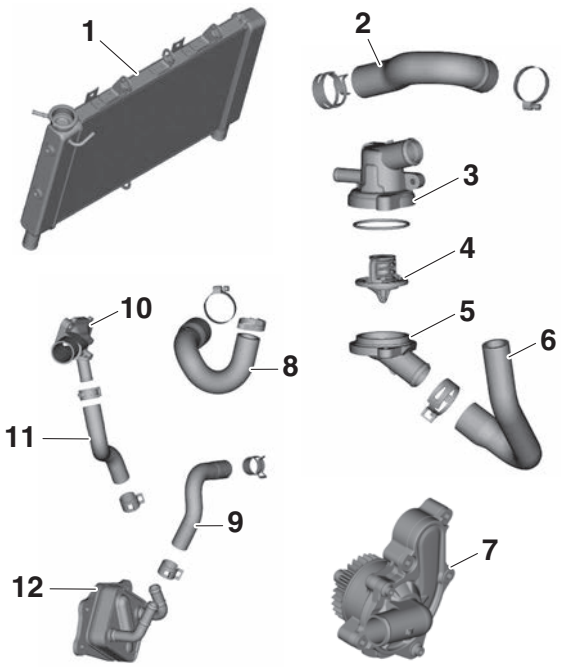
3. Start the engine, warm it up for several minutes, and then turn it off.
4. Check:
   - Coolant level

TIP

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

EAS30812
CHECKING THE COOLING SYSTEM

1. Check:
   - Radiator “1”
   - Water pump inlet hose “2”
   - Thermostat housing “3”
   - Thermostat “4”
   - Thermostat cover “5”
   - Radiator outlet hose “6”
   - Water pump “7”
   - Radiator inlet hose “8”
   - Oil cooler outlet hose “9”
   - Water jacket joint “10”
   - Oil cooler inlet hose “11”
   - Oil cooler “12”
     Cracks/damage → Replace.
     Refer to “RADIATOR” on page 6-3, “OIL COOLER” on page 6-7, “THERMOSTAT” on page 6-9, and “WATER PUMP” on page 6-11.

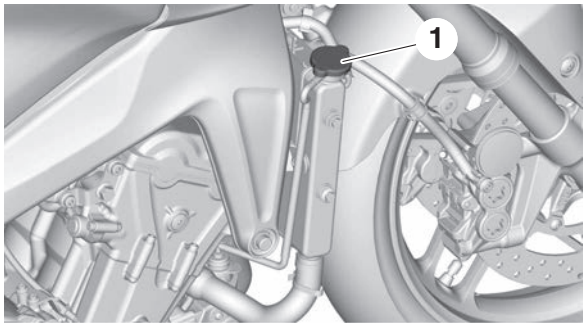


EAS30813
CHANGING THE COOLANT

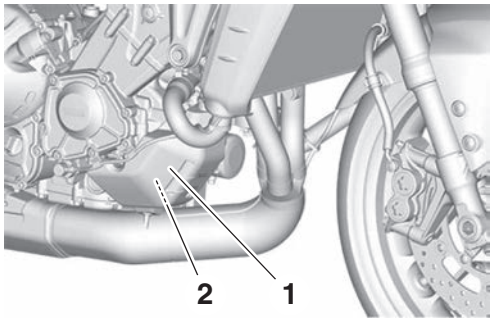
1. Remove:
   - Front side panel (right side)
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   - Radiator cap “1”

EWA13030
⚠ WARNING

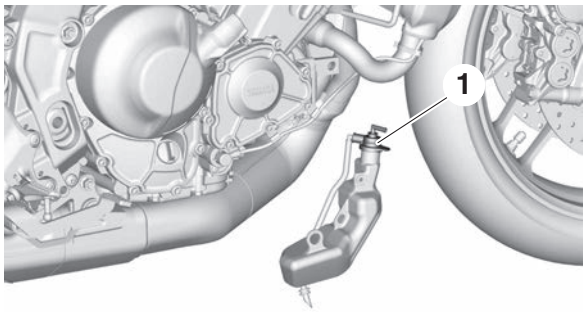
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly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



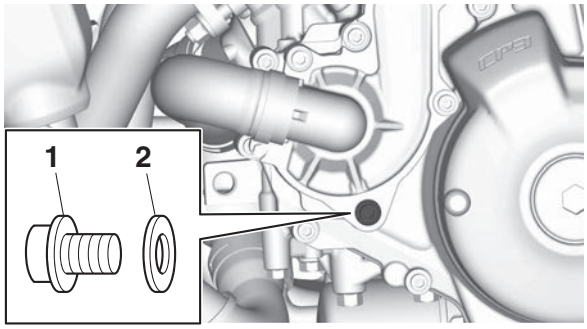
2. Remove:
   - Coolant reservoir bolt
   - Coolant reservoir cover “1”
   - Coolant reservoir “2”
   - Collar
     Refer to “RADIATOR” on page 6-3.



3. Remove:
   - Coolant reservoir cap “1”



4. Drain:
   • Coolant
   (from the coolant reservoir)
5. Remove:
   • Water pump drain bolt “1”
   • Copper washer “2”



6. Drain:
   • Coolant
   (from the engine and radiator)
7. Install:
   • Water pump drain bolt
   • Copper washer New

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

8. Install:
   • Collar
   • Coolant reservoir
   • Coolant reservoir cover
   • Coolant reservoir bolt
   Refer to “RADIATOR” on page 6-3.

Coolant reservoir bolt (M5)
0.5 N·m (0.05 kgf·m, 0.37 lb·ft)
Coolant reservoir bolt (M6)
9 N·m (0.9 kgf·m, 6.6 lb·ft)
LOCTITE®

9. 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)
Radiator (including all routes)
1.72 L (1.82 US qt, 1.51 Imp.qt)
Coolant reservoir (up to the maximum level mark)
0.28 L (0.30 US qt, 0.25 Imp.qt)

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

EWA13040

WARNING

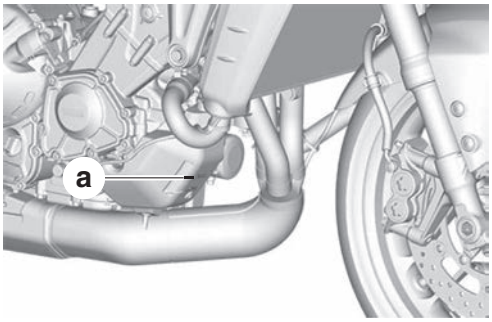
- **If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.**
- **If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.**
- **If coolant is swallowed, induce vomiting and get immediate medical attention.**

ECA21291

NOTICE

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

10. Install:
    • Radiator cap
11. Fill:
    • Coolant reservoir
    (with the recommended coolant to the maximum level mark “a”)



12. Install:
    - Coolant reservoir cap
13. Start the engine, warm it up for several minutes, and then turn it off.
14. Check:
    - Coolant level
      Refer to "CHECKING THE COOLANT LEVEL" on page 3-30.

TIP

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

EAS30814

CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-51.

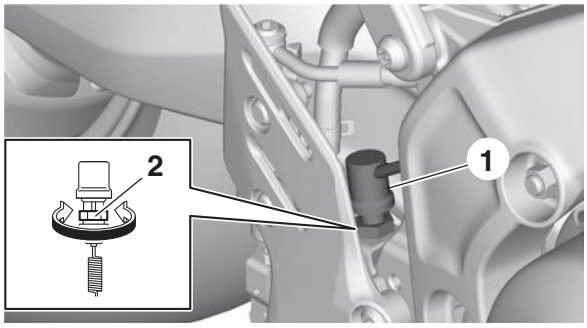
EAS30659

ADJUSTING THE REAR BRAKE LIGHT SWITCH

TIP

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:
   - Rear brake light operation timing
     Incorrect → Adjust.
2. Adjust:
   - Rear brake light operation timing
   a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" until the rear brake light comes on at the proper time.



EAS30660

CHECKING AND LUBRICATING THE CABLES

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

EWA13270

WARNING

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

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

Recommended lubricant
Engine oil or a suitable cable lubricant

TIP

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

EAS30815

CHECKING THE THROTTLE GRIP

1. 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.

EAS30816
CHECKING AND CHARGING THE BATTERY
Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.

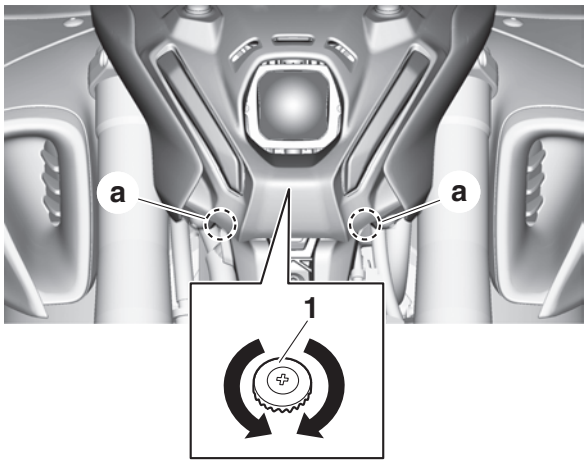
EAS30662
CHECKING THE FUSES
Refer to “CHECKING THE FUSES” on page 8-55.

EAS30664
ADJUSTING THE HEADLIGHT BEAM
1. Adjust:
   • Headlight beam (vertically)

TIP

To adjust the headlight beam (vertically), insert a phillips screwdriver into the either holes “a” on the headlight front cover and turn the adjusting screw.

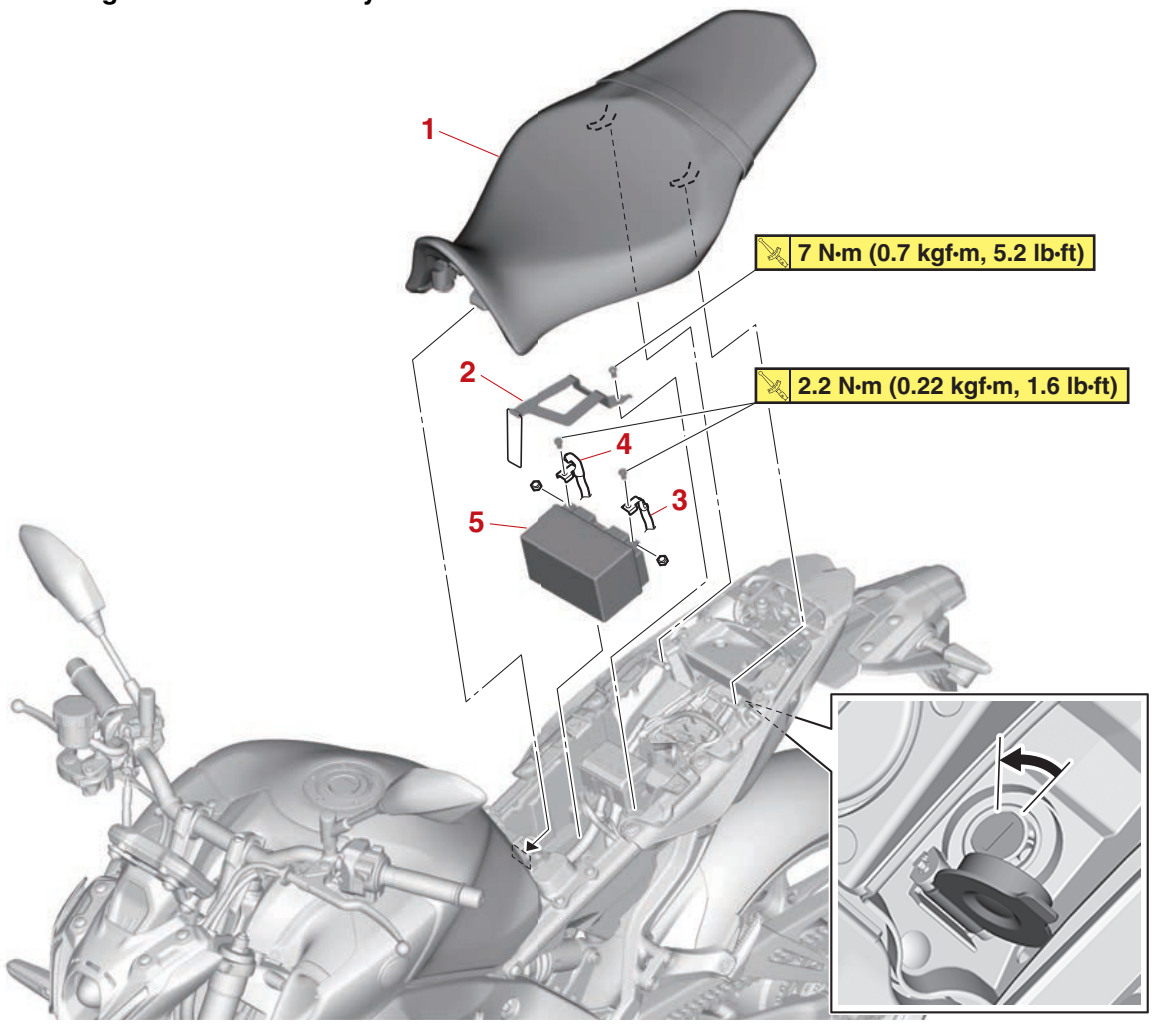
a. Turn the adjusting screw “1”.



CHASSIS

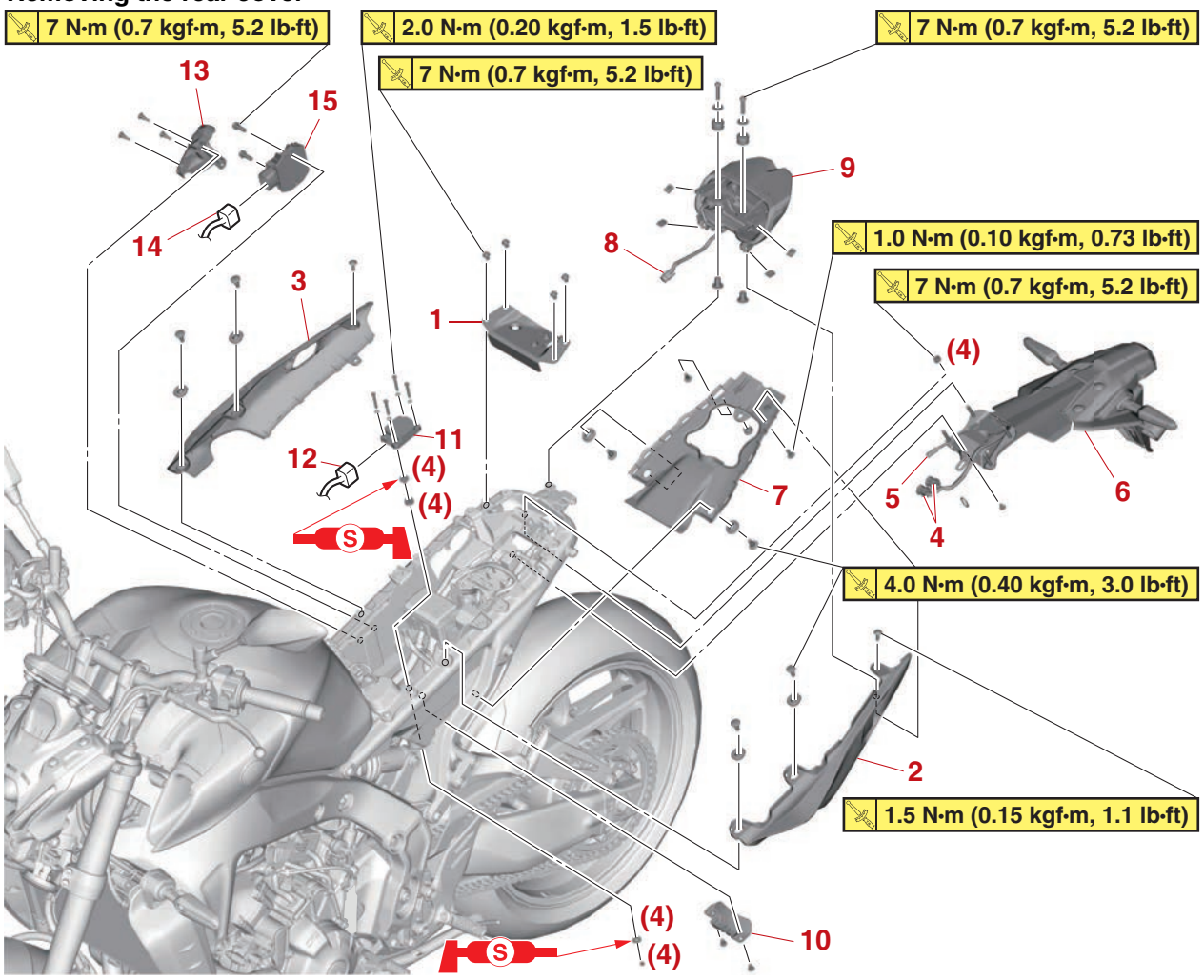
EAS20026
GENERAL CHASSIS (1)

Removing the seat and battery



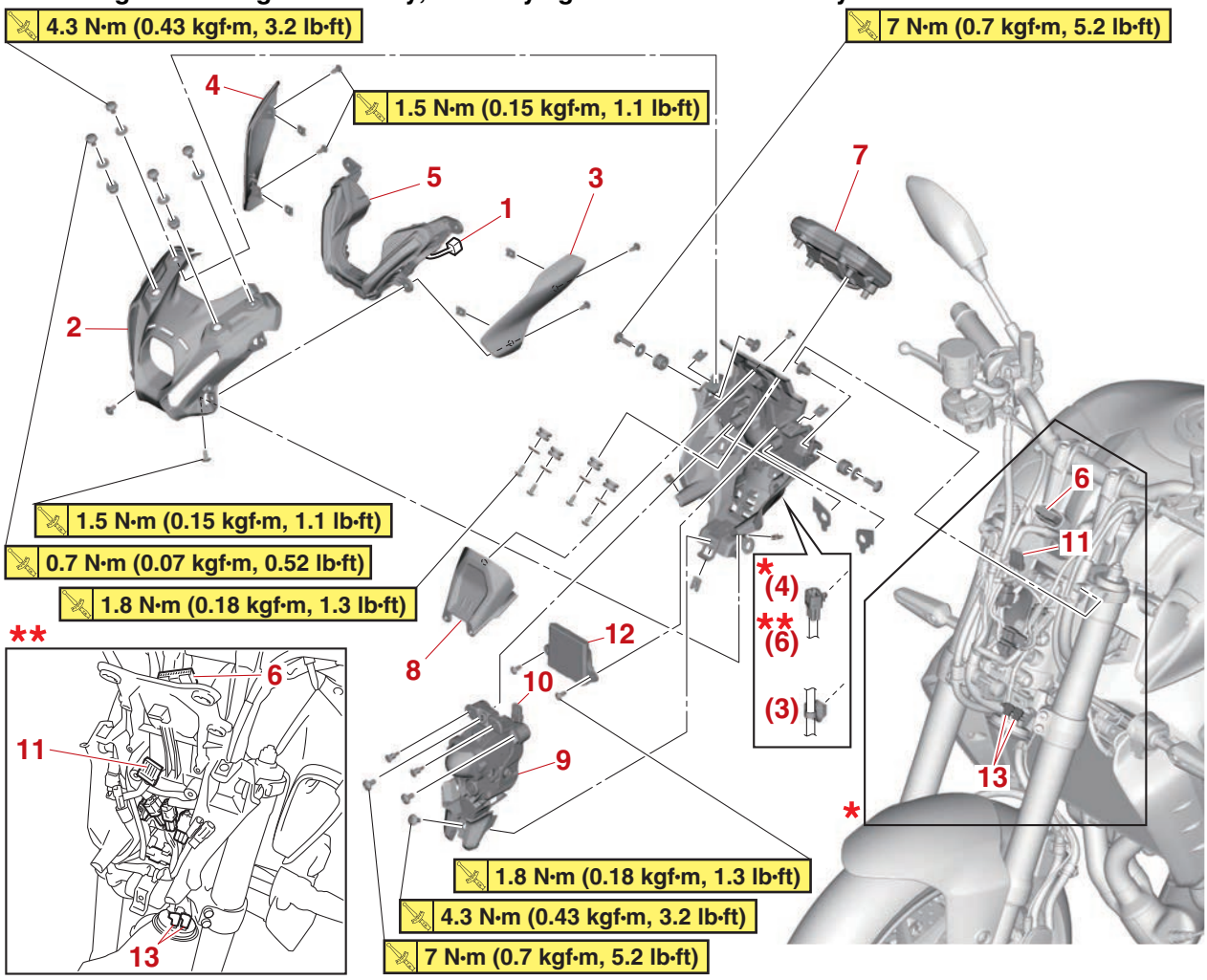
Order	Job/Parts to remove	Q'ty	Remarks
1	Rider seat	1	
2	Battery holding bracket	1	
3	Negative battery lead	1	Disconnect.
4	Positive battery lead	1	Disconnect.
5	Battery	1	

Removing the rear cover



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Seat bracket	1	
2	Rear side cover (left)	1	
3	Rear side cover (right)	1	
4	Rear turn signal light coupler	2	Disconnect.
5	License plate light coupler	1	Disconnect.
6	Mudguard assembly	1	
7	Lower fender cover	1	
8	Tail/brake light coupler	1	Disconnect.
9	Tail/brake light	1	
10	Cover	1	
11	IMU (Inertial Measurement Unit)	1	
12	IMU coupler	1	Disconnect.
13	Rectifier/regulator cover	1	
14	Rectifier/regulator coupler	1	Disconnect.
15	Rectifier/regulator	1	

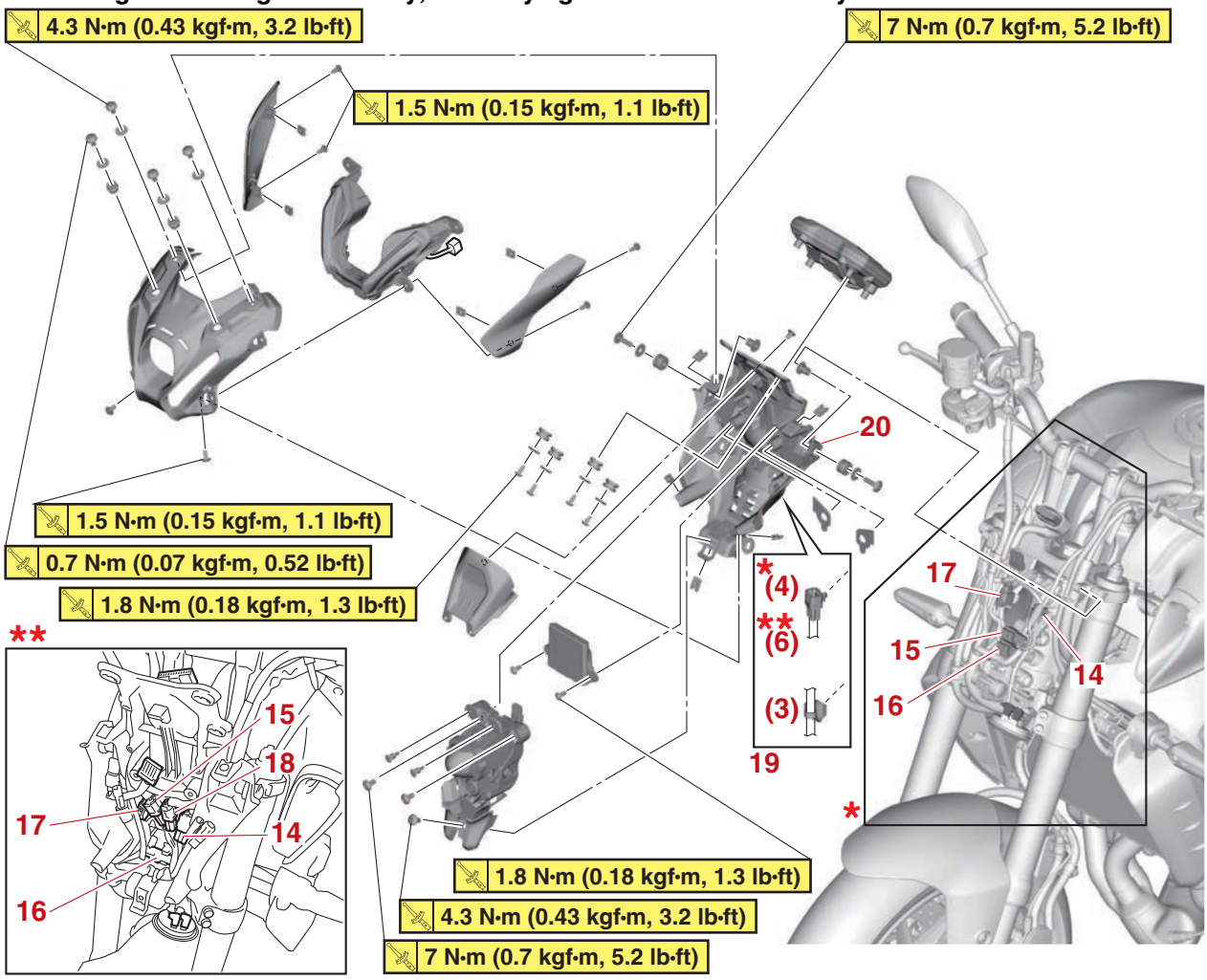
Removing the headlight assembly, auxiliary light and meter assembly



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

Order	Job/Parts to remove	Q'ty	Remarks
1	Auxiliary light coupler	1	Disconnect.
2	Headlight front cover	1	
3	Headlight side cover (left)	1	
4	Headlight side cover (right)	1	
5	Auxiliary light	1	
6	Meter assembly coupler	1	Disconnect.
7	Meter assembly	1	
8	Headlight control unit cover	1	
9	Headlight assembly	1	
10	Headlight control unit coupler (headlight assembly side)	1	Disconnect.
11	Headlight control unit coupler (wire harness side)	1	Disconnect.
12	Headlight control unit	1	
13	Horn lead connector	2	Disconnect.

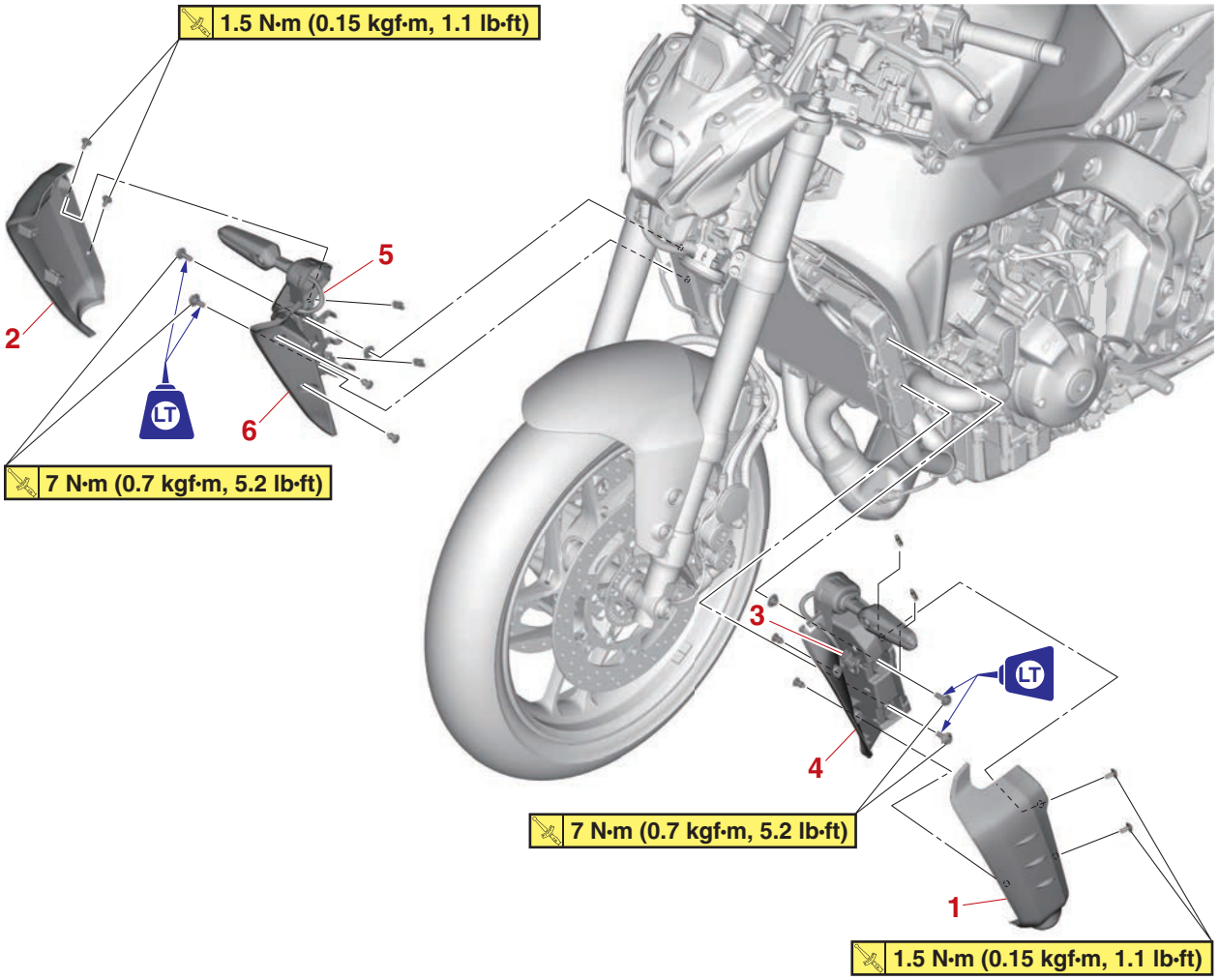
Removing the headlight assembly, auxiliary light and meter assembly



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

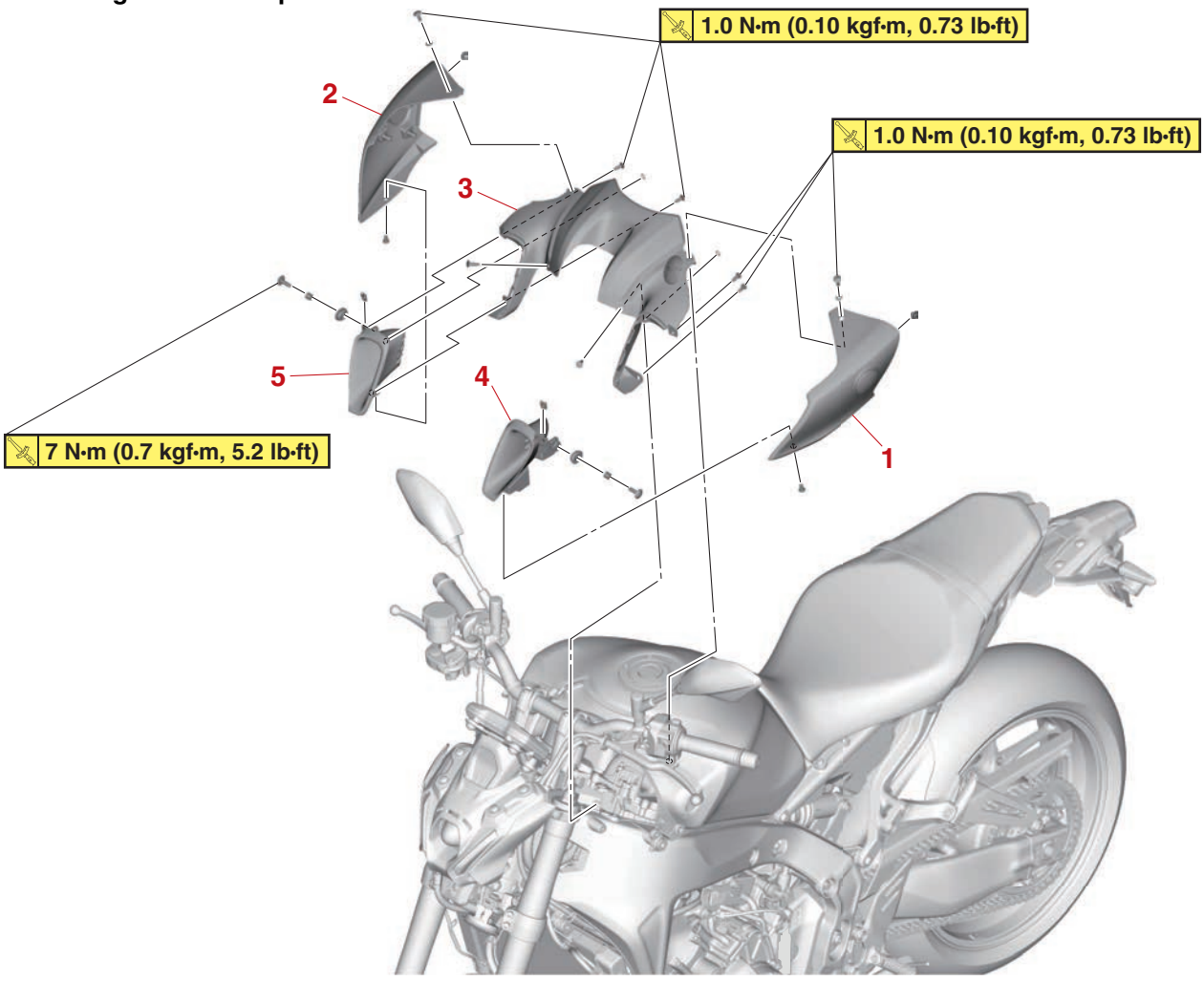
Order	Job/Parts to remove	Q'ty	Remarks
14	Handlebar switch coupler 2 (right)	1	Disconnect.
15	Front brake light switch coupler	1	Disconnect.
16	Handlebar switch coupler 1 (right)	1	Disconnect.
17	Accelerator position sensor coupler	1	Disconnect.
18	Clutch switch coupler	1	Disconnect. (for MT09SPM/MT09SPMC)
19	Harness clamp/Coupler clamp		Disconnect.
20	Meter assembly bracket	1	

Removing the front side panel



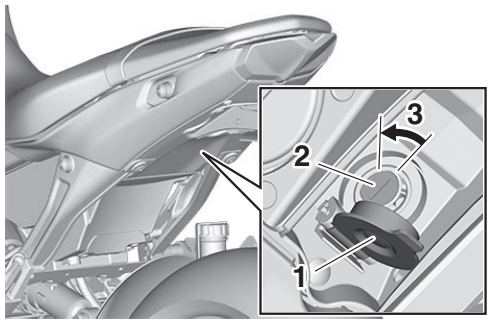
Order	Job/Parts to remove	Q'ty	Remarks
1	Radiator cover (left)	1	
2	Radiator cover (right)	1	
3	Front turn signal/position light coupler (left)	1	Disconnect.
4	Front side panel (left)	1	
5	Front turn signal/position light coupler (right)	1	Disconnect.
6	Front side panel (right)	1	

Removing the air scoop and fuel tank center cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel tank side cover (left)	1	
2	Fuel tank side cover (right)	1	
3	Fuel tank center cover	1	
4	Air scoop (left)	1	
5	Air scoop (right)	1	

EAS32229
REMOVING THE SEAT
1. Remove:
   a. Open the seat lock cover “1”, insert the key into the seat lock “2”, and then turn the key counterclockwise “3”.

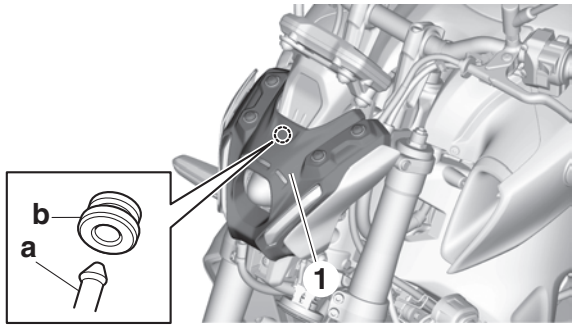


   b. While holding the key in that position, slide the seat backward and then lift the rear of the seat up, and then pull the seat off.

EAS33544
REMOVING THE HEADLIGHT FRONT COVER
1. Remove:
   • Headlight front cover “1”

TIP

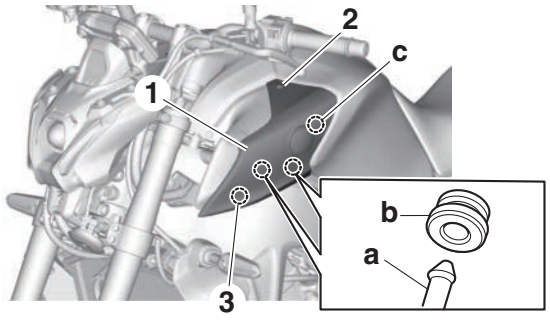
Remove the projection “a” on the headlight front cover from grommet “b”.



EAS32777
REMOVING THE FUEL TANK SIDE COVER
The following procedure applies to both of the fuel tank side cover.
1. Remove:
   • Fuel tank side cover (left) “1”
   a. Remove the fuel tank side cover bolt (left) “2” and quick fastener “3”.
   b. Remove the fuel tank side cover (left).

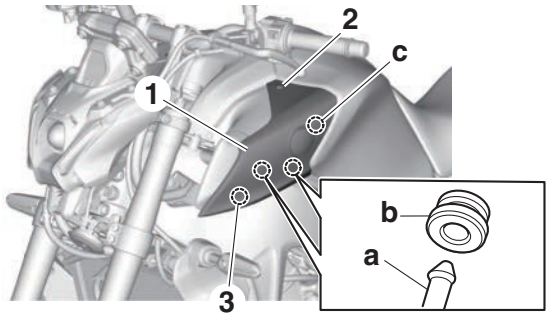
TIP

- Remove projections “a” on the fuel tank side cover from grommets “b”.
- Remove projections “c” on the fuel tank side cover from hole.



EAS32778
INSTALLING THE FUEL TANK SIDE COVER
The following procedure applies to both of the fuel tank side cover.
1. Install:
   • Fuel tank side cover (left) “1”
   a. Insert the projection “a” on the fuel tank side cover into the grommets “b” and insert the projection “c” on the fuel tank side cover into the hole.
   b. Install the fuel tank side cover bolt “2” and quick fastener “3”, and then tighten the bolts to specification.

	Fuel tank side cover bolt 1.0 N·m (0.10 kgf·m, 0.73 lb·ft)

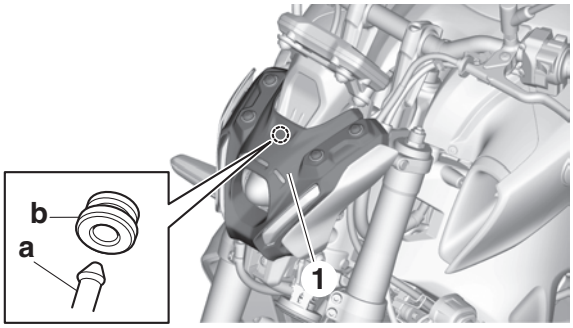


EAS33545
INSTALLING THE HEADLIGHT FRONT COVER

1. Install:
   • Headlight front cover “1”

TIP

Insert the projection “a” on the headlight front cover into the grommet “b”.

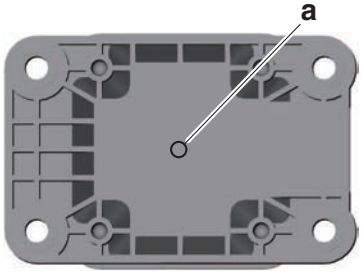


EAS31636
INSTALLING THE IMU

ECA22611

NOTICE

- **Do not perform angle adjustment of the IMU and battery box by pinching the washer and related parts.**
- **When installing the IMU, apply a thin coat of silicone grease onto the washer where contacting the IMU grommet.**
- **When installing the IMU, use only a genuine bolt and washer, and tighten the bolt to the specified torque.**
- **Pay attention not to expose the IMU to strong shocks, such as striking or dropping it.**
- **Do not place any foreign objects in and around the battery box.**
- **Do not obstruct breather opening “a” of the IMU.**
- **Do not clean the breather opening and do not blow it with compressed air.**
- **When replacing the collar or grommet, replace all four collars and grommets.**

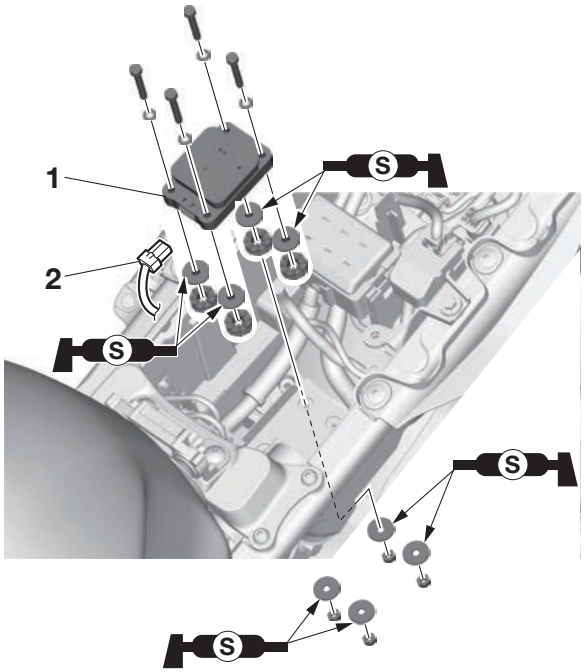


1. Install:
   • IMU (Inertial Measurement Unit) “1”
   a. Connect the IMU coupler “2” to the IMU.
   b. Install the grommets, collars, IMU “1”, washers, IMU nuts and IMU bolts, and then tighten the bolts to specification.

TIP

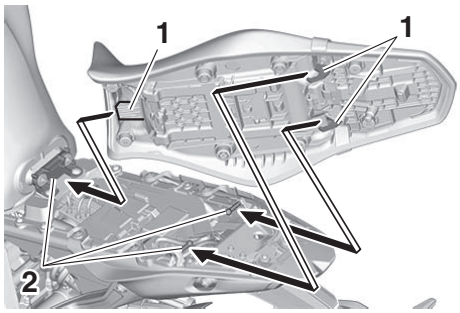
Apply a thin coat of silicone grease onto the collars and washers where contacting the grommets.

	Recommended lubricant **Silicone grease**
	IMU bolt **2.0 N·m (0.20 kgf·m, 1.5 lb·ft)**



EAS30125
INSTALLING THE SEAT

1. Install:
   • Seat
   a. Insert the projections “1” into the seat holders “2” as shown.



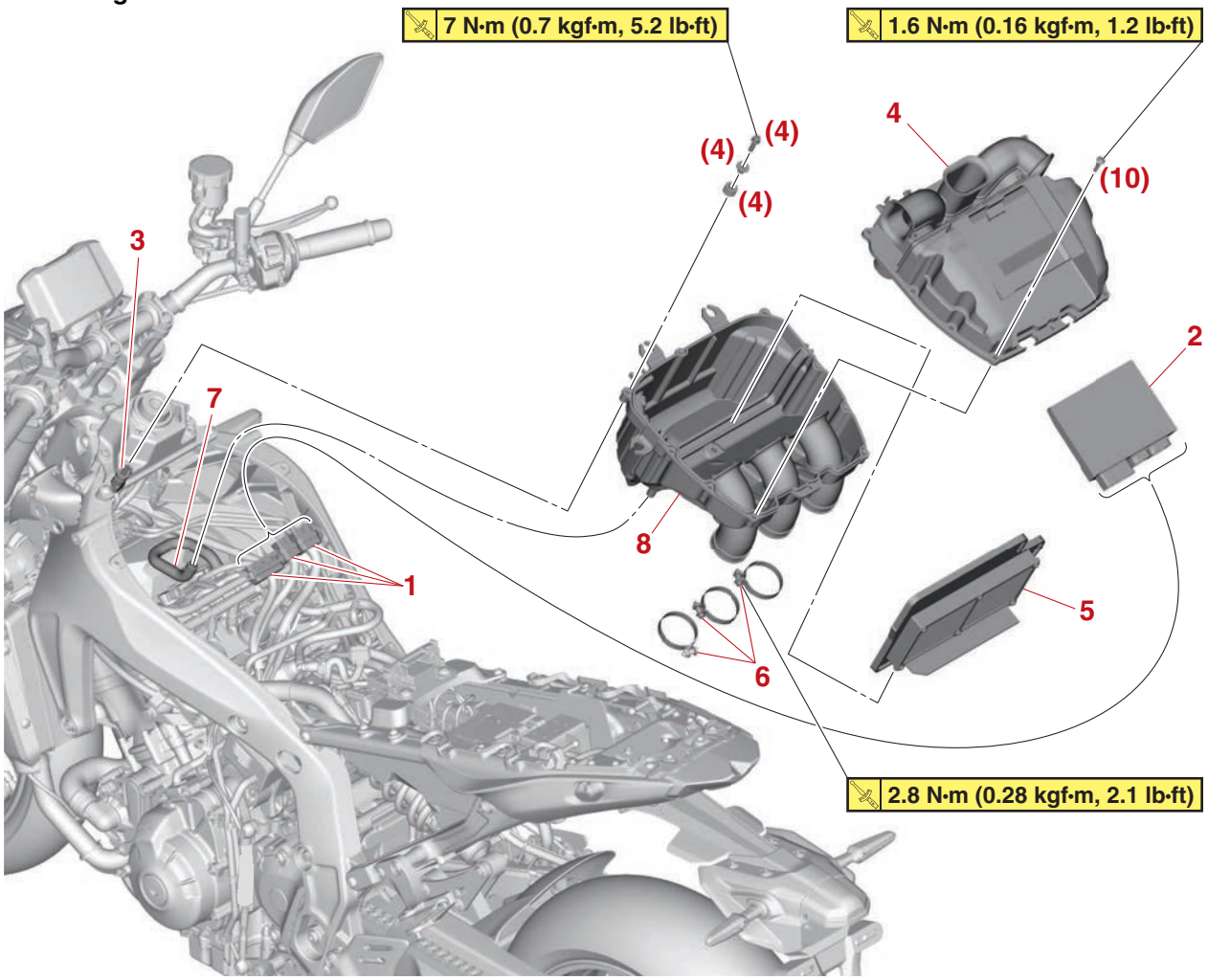
   b. Push the rear of the seat down to lock it in place.

TIP

Make sure that the seat is properly secured before riding.

EAS20155
GENERAL CHASSIS (2)

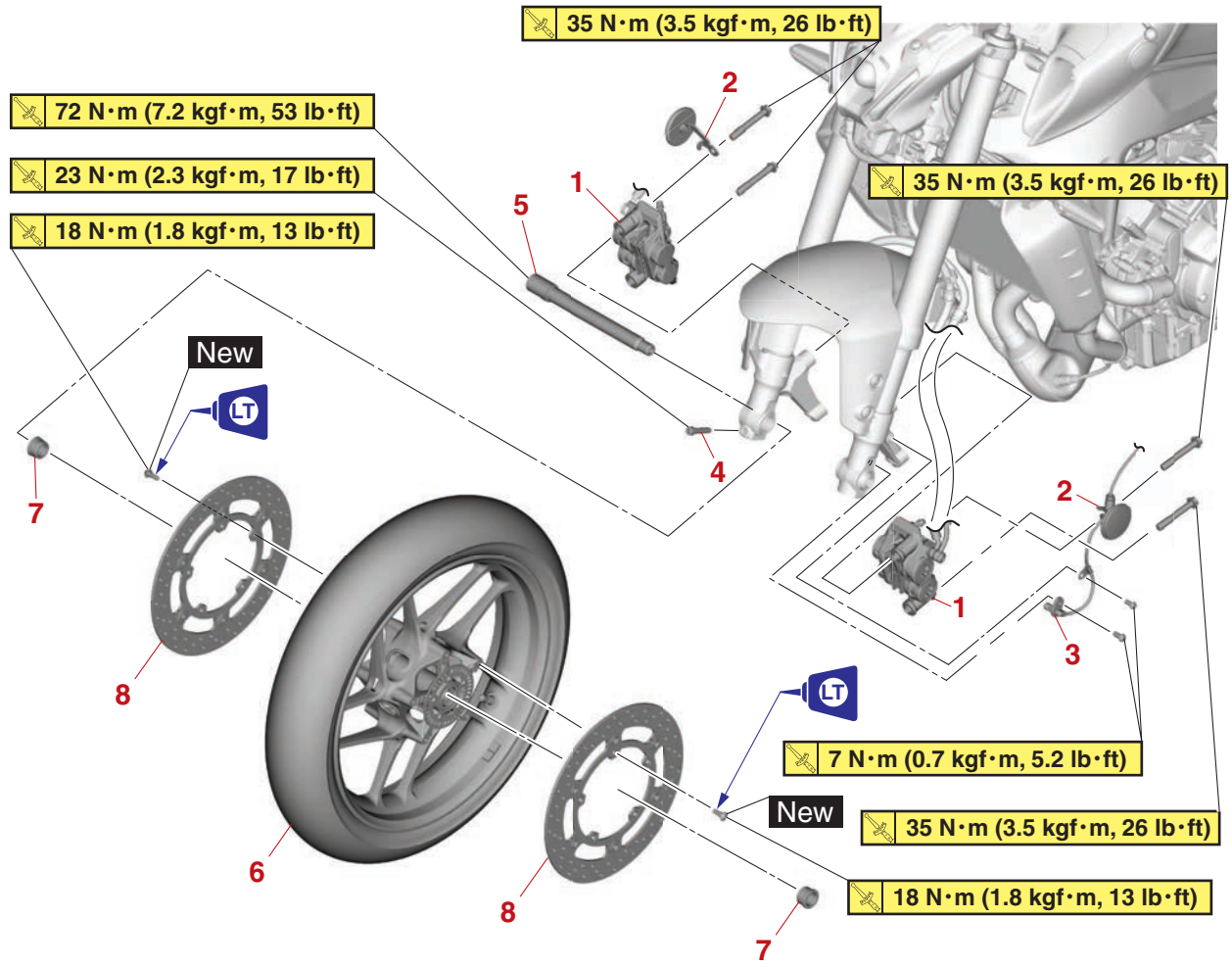
Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoop		Refer to "GENERAL CHASSIS (2)" on page 4-10.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	ECU coupler	3	Disconnect.
2	ECU (Engine Control Unit)	1	
3	Intake air temperature sensor	1	Disconnect.
4	Air filter case cover	1	
5	Air filter element	1	
6	Air filter case joint clamp screw	3	Loosen.
7	Cylinder head breather hose	1	Disconnect.
8	Air filter case	1	

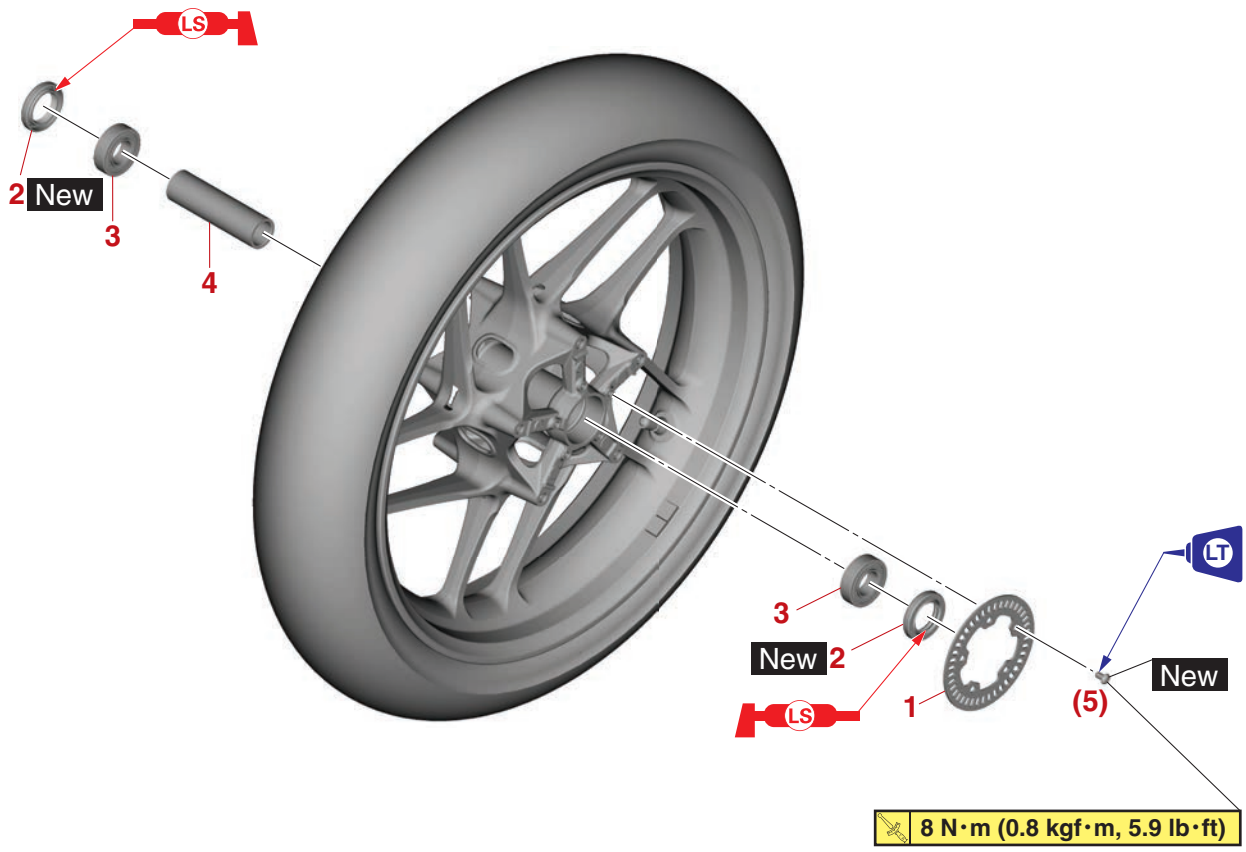
EAS20028
FRONT WHEEL

Removing the front wheel and brake discs



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

Disassembling the front wheel



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

EAS31148
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:
   - Brake caliper (left)
   - Brake caliper (right)
   - Front wheel sensor

ECA21440
NOTICE
- **Do not apply the brake lever when removing the brake calipers.**
- **Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.**

3. Elevate:
   - Front wheel

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

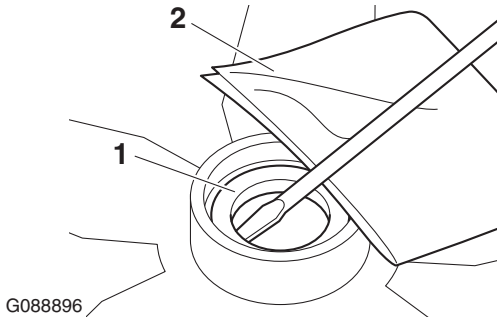
4. Loosen:
   - Wheel axle pinch bolt
5. Remove:
   - Wheel axle
   - Front wheel

EAS31149
DISASSEMBLING THE FRONT WHEEL
ECA21340
NOTICE
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Remove:
   - Oil seal
   - Wheel bearing

   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.



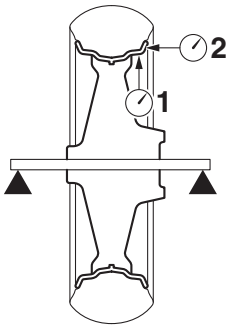
   c. Remove the wheel bearings with a general bearing puller.

EAS30147
CHECKING THE FRONT WHEEL
1. Check:
   - 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 3-16 and “CHECKING THE WHEELS” on page 3-16.
3. Measure:
   - Radial wheel runout “1”
   - Lateral wheel runout “2”
     Over the specified limits → Replace.

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



G088897

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

EAS31150
ASSEMBLING THE FRONT WHEEL

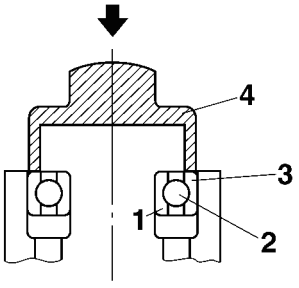
ECA21340
NOTICE
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Install:
   - Wheel bearing New
   - Oil seal 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".

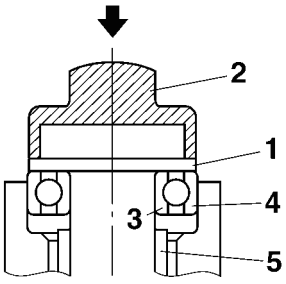
TIP
Use a socket "4" that matches the diameter of the wheel bearing outer race.



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

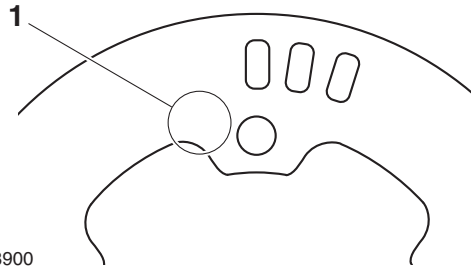
   d. Install the new oil seals.

2. Install:
   - Front wheel sensor rotor

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

ECA17200
NOTICE
Replace the wheel sensor rotor bolts with new ones.

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



G088900

3. Measure:
   - Wheel sensor rotor runout
     Out of specification → Correct the wheel sensor rotor runout or replace the wheel sensor rotor.
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-15.

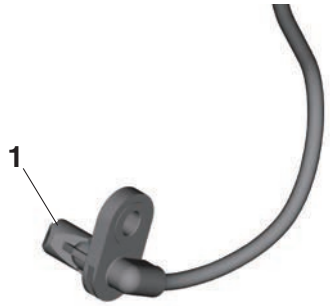
Wheel sensor rotor runout limit
0.25 mm (0.01 in)

EAS31151
MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA21070
NOTICE

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

1. Check:
   - Front wheel sensor "1"
     Cracks/bends/distortion → Replace.
     Iron powder/dust → Clean.



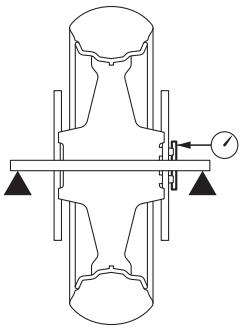
2. Check:
   - Front wheel sensor rotor
     Cracks/damage/scratches → Replace the front wheel sensor rotor.
     Iron powder/dust/solvent → Clean.

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

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

Wheel sensor rotor runout limit
0.25 mm (0.01 in)

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



G088902

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

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

ECA17200
NOTICE

Replace the wheel sensor rotor bolts with new ones.

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

EAS30152
ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP
- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.
- Refer to "ADJUSTING THE WHELL STATIC BALANCE" in "BASIC INFORMATION" (separate volume).

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

EAS31327
INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

1. Install:
   • Front brake disc

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

ECA19150
NOTICE
Replace the brake disc bolts with new ones.

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

2. Check:
   • Front brake disc
   Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-32.
3. Lubricate:
   • Oil seal lip

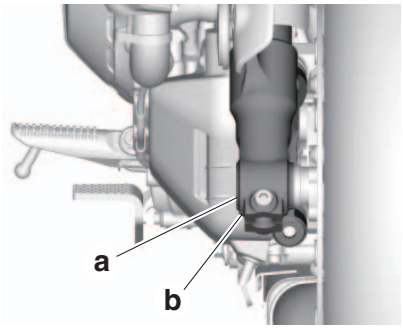
Recommended lubricant
Lithium-soap-based grease

4. Install:
   • Collar
   • Front wheel
   • Wheel axle
5. Tighten:
   • Wheel axle
   • Wheel axle pinch bolt

Front wheel axle
72 N·m (7.2 kgf·m, 53 lb·ft)
Front wheel axle pinch bolt
23 N·m (2.3 kgf·m, 17 lb·ft)

ECA19760
NOTICE
Before tightening the wheel axle, push down hard on the handlebars several times and check if the front fork rebounds smoothly.

TIP
Check that wheel axle end "a" is flush with front fork surface "b" and then tighten the wheel axle pinch bolt. If wheel axle end "a" is not flush with surface "b", align the ends manually or with a plastic hammer.



6. Install:
   • Front wheel sensor

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

ECA21020
NOTICE
Make sure there are no foreign materials in the front wheel sensor rotor and front wheel sensor. Foreign materials cause damage to the front wheel sensor rotor and front wheel sensor.

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

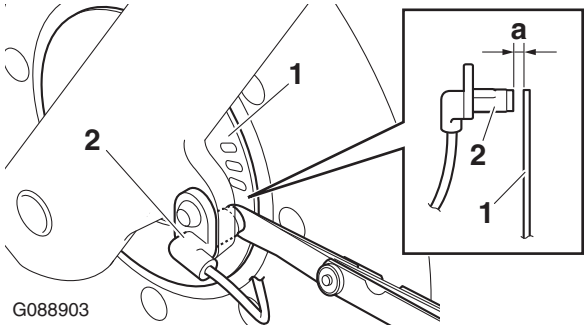
7. Measure:
   • Distance "a"
   (between the wheel sensor rotor "1" and wheel sensor "2")
   Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, 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 wheel sensor rotor and front wheel sensor)
0.6–1.8 mm (0.02–0.07 in)

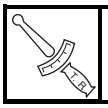
TIP

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

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



8. Install:
   • Front brake caliper



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

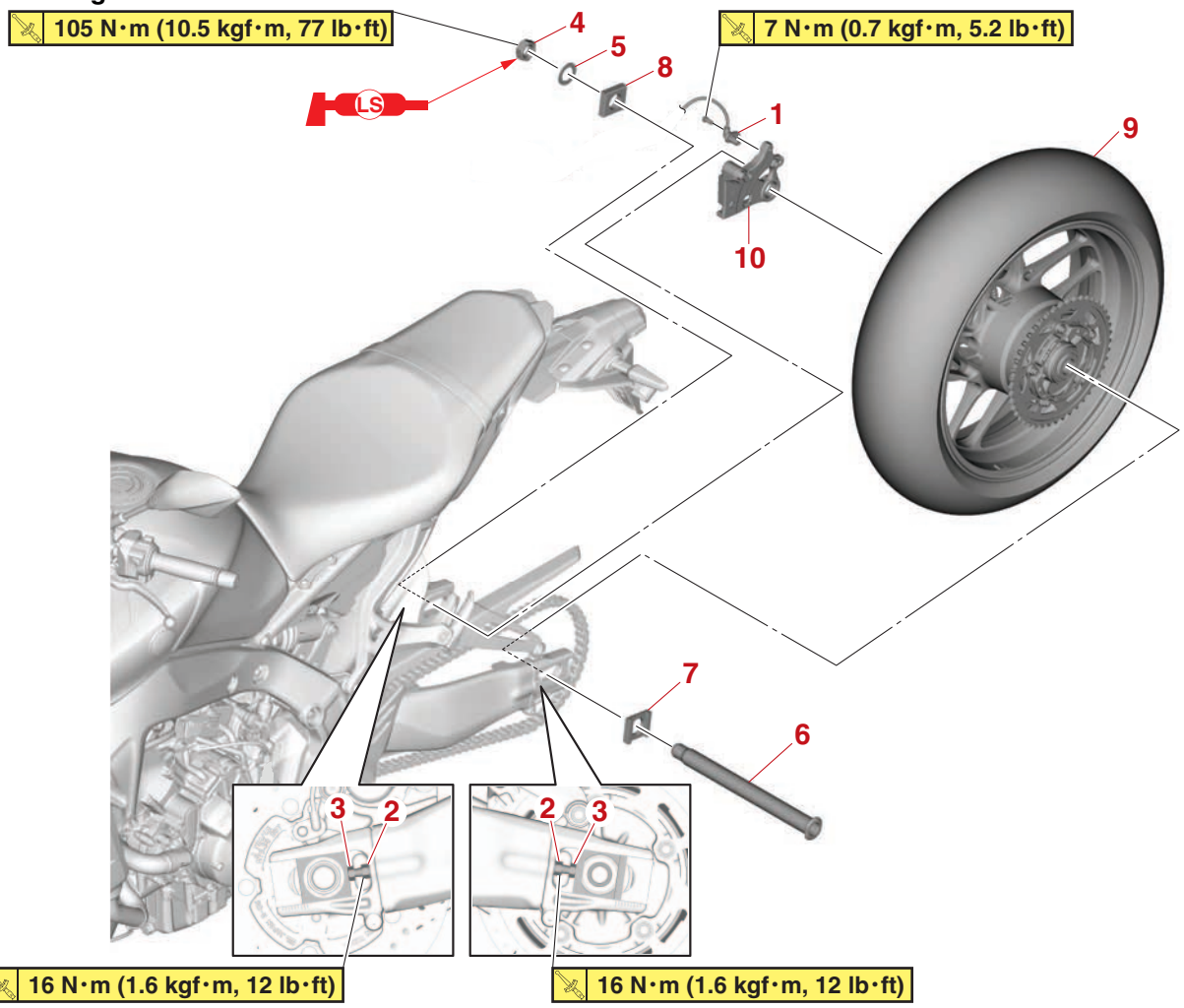
EWA13500

WARNING

Make sure the brake hose is routed properly.

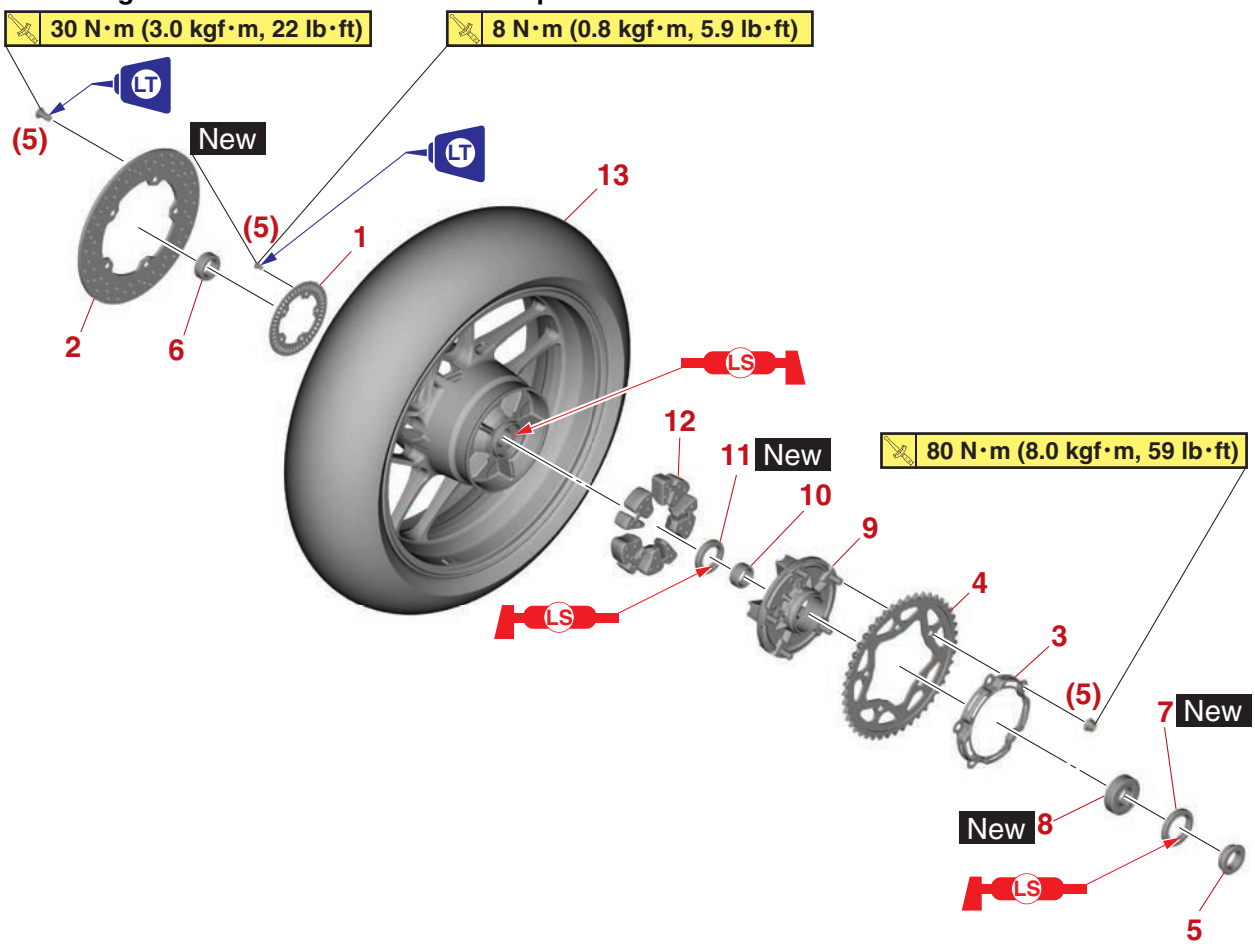
EAS20029
REAR WHEEL

Removing the rear wheel



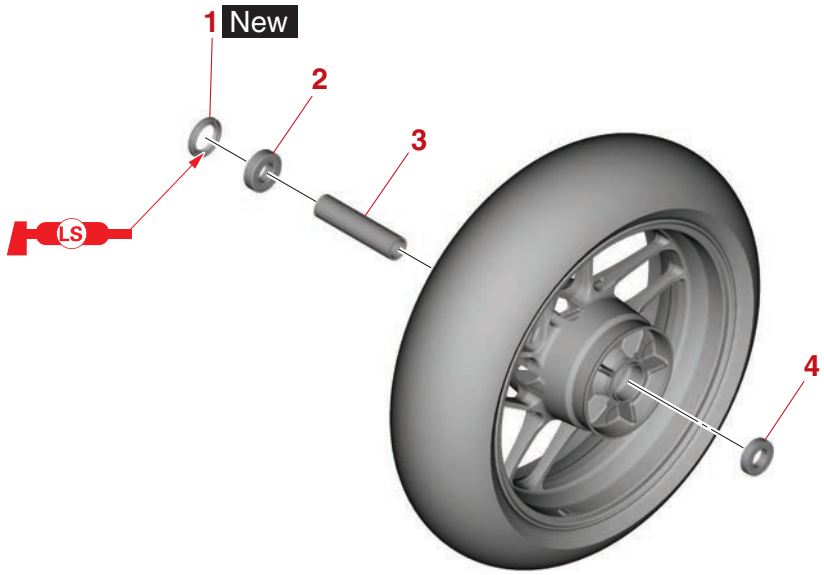
Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-38.
1	Rear wheel sensor	1	
2	Locknut	2	Loosen.
3	Adjusting bolt	2	Loosen.
4	Wheel axle nut	1	
5	Washer	1	
6	Wheel axle	1	
7	Adjusting block (left)	1	
8	Adjusting block (right)	1	
9	Rear wheel	1	
10	Brake caliper bracket assembly	1	

Removing the brake disc and rear wheel sprocket



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

Disassembling the rear wheel



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

EAS30910
REMOVING THE REAR WHEEL
ECA21030
NOTICE
- **Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel sensor or rear wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.**
- **Do not drop the rear wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the rear wheel sensor rotor, wipe it off immediately.**

1. Stand the vehicle on a level surface.

EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

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

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

ECA27270
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 assembly.**

3. Loosen:
   - Locknut
   - Adjusting bolt
4. Remove:
   - Wheel axle nut
   - Washer
   - Wheel axle
   - Rear wheel
   - Brake caliper bracket assembly

ECA27280
NOTICE
Be sure to remove the rear wheel sensor before removing the brake caliper bracket assembly, otherwise the sensor could be damaged.

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

EAS31154
DISASSEMBLING THE REAR WHEEL
ECA21340
NOTICE
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Remove:
   - Oil seal
   - Wheel bearing

   Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-13.

EAS30159
CHECKING THE REAR WHEEL
1. Check:
   - Wheel axle
   - Wheel bearing
   - Oil seal

   Refer to “CHECKING THE FRONT WHEEL” on page 4-13.
2. Check:
   - Tire
   - Rear wheel

   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” on page 3-16 and “CHECKING THE WHEELS” on page 3-16.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout

   Refer to “CHECKING THE FRONT WHEEL” on page 4-13.

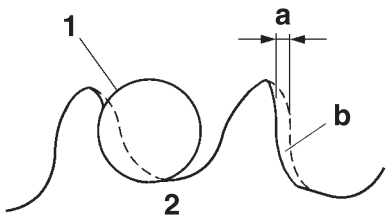
EAS30160
CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   - Rear wheel drive hub

     Cracks/damage → Replace.
   - Rear wheel drive hub damper

     Damage/wear → Replace.

EAS30161
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

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

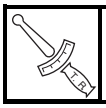


G088904

b. Correct

1. Drive chain roller
2. Rear wheel sprocket

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

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

TIP

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

EAS30163
ASSEMBLING THE REAR WHEEL

ECA21340

NOTICE

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

1. Install:
   • Wheel bearing New
   • Oil seal New
   a. Install the new wheel bearing (right side).

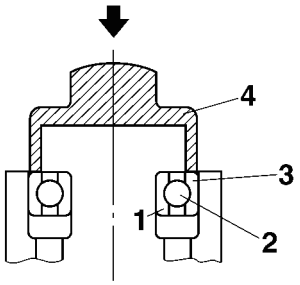
ECA18110

NOTICE

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

TIP

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

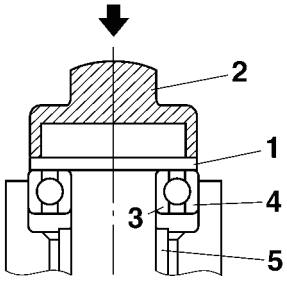


G088898

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

TIP

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



G088899

d. Install the new oil seals.

EAS31156
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 4-15.
2. Check:
   - Rear wheel sensor rotor
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-15.
3. Measure:
   - Wheel sensor rotor runout
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-15.

EAS30164
ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

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

1. Adjust:
   - Rear wheel static balance
     Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-15.

EAS31157
INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Install:
   - Rear brake disc

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

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

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

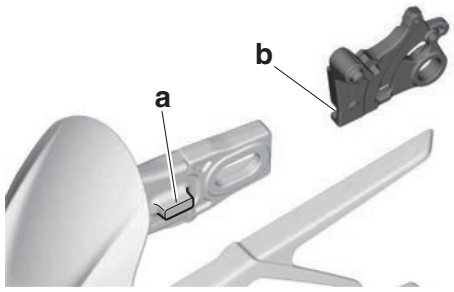
2. Check:
   - Rear brake disc
     Refer to "CHECKING THE REAR BRAKE DISC" on page 4-44.
3. Lubricate:
   - Oil seal lip

Recommended lubricant
Lithium-soap-based grease

4. Install:
   - Brake caliper bracket assembly
   - Rear wheel
   - Adjusting block
   - Wheel axle
   - Washer
   - Wheel axle nut

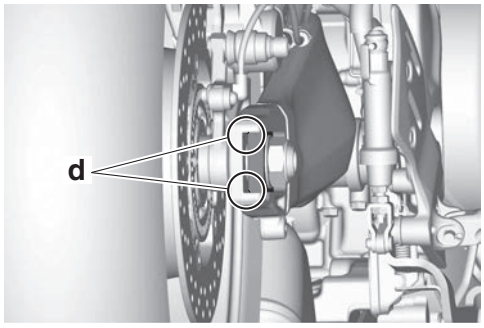
TIP

- Do not install the brake caliper.
- Align the projection "a" in the swingarm with the slot "b" of the brake caliper bracket assembly.
- Install the adjusting block (left) so that projection "c" faces to the front of the vehicle.
- Install the adjusting block (right) with the chamfered "d" facing the inside.



A

B



A. Left side
B. Right side

5. Install:
   • Rear brake caliper
   • Rear brake caliper bolt
6. Adjust:
   • Drive chain slack
   Refer to "DRIVE CHAIN SLACK" on page 3-17.

Drive chain slack (Maintenance stand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack (Sidestand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack limit (Sidestand)
46.0 mm (1.81 in)

7. Tighten:
   • Wheel axle nut
   • Rear brake caliper bolt

Rear wheel axle nut
105 N·m (10.5 kgf·m, 77 lb·ft)
Rear brake caliper bolt (front)
27 N·m (2.7 kgf·m, 20 lb·ft)
Rear brake caliper bolt (rear)
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®

EWA13500

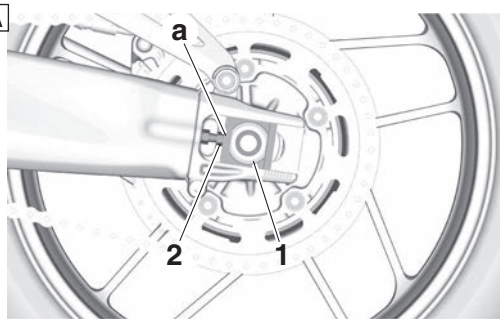
WARNING

Make sure the brake hose is routed properly.

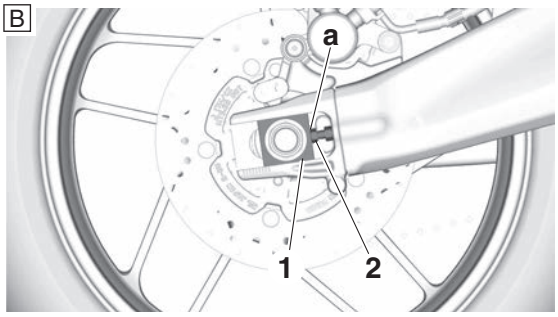
TIP

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

A



B



A. Left side
B. Right side

8. Install:
   • Rear wheel sensor

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

ECA21080

NOTICE

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

TIP

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

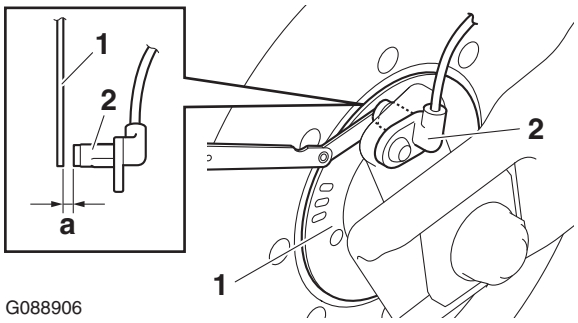
9. Measure:
   • Distance “a”
   (between the wheel sensor rotor “1” and rear wheel sensor “2”)
   Out of specification → Check the wheel bearing for looseness, and the rear wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering,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

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

TIP

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

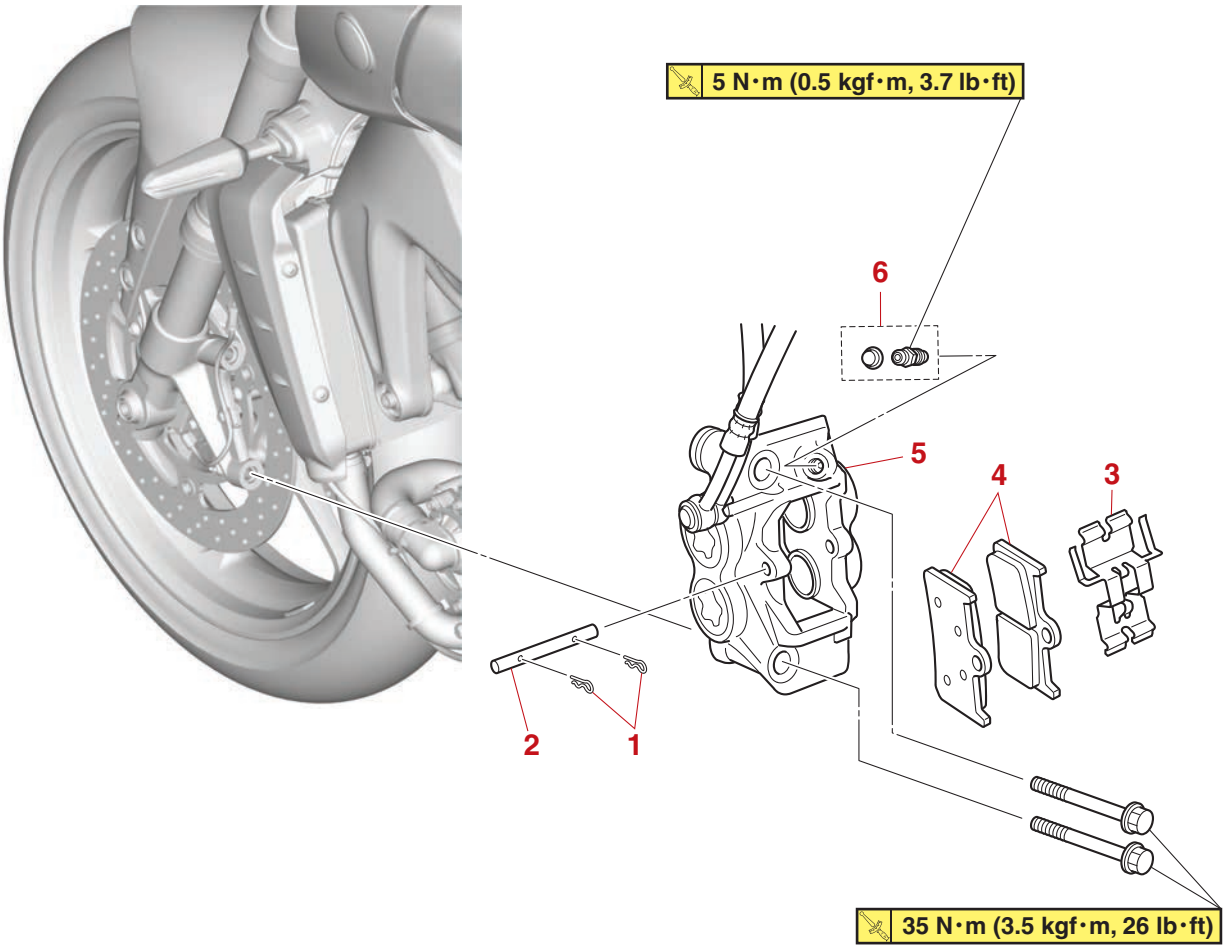
Thickness gauge
90890-03268
Feeler gauge set
YU-26900-9



G088906

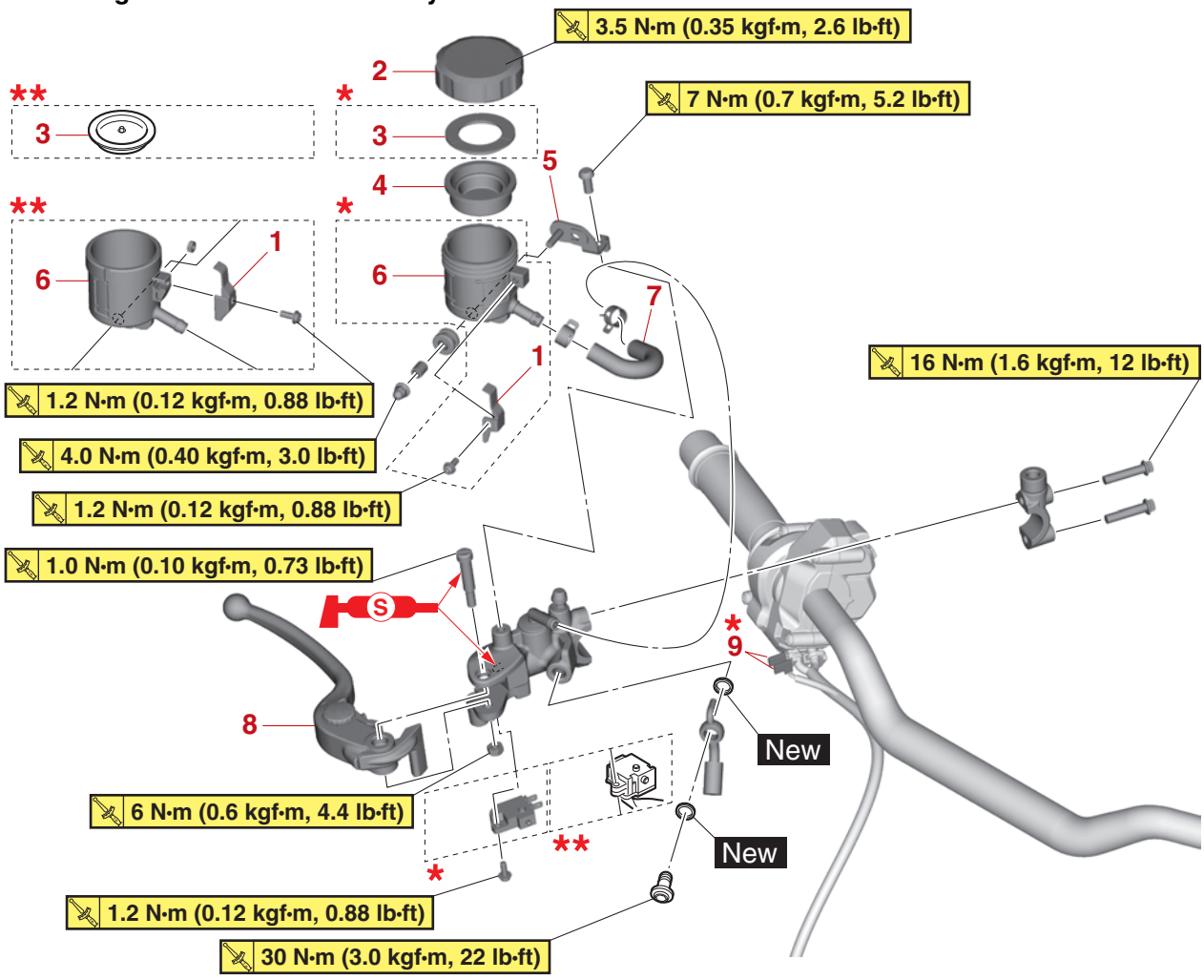
EAS20030
FRONT BRAKE

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 pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Front brake caliper	1	
6	Bleed screw	1	

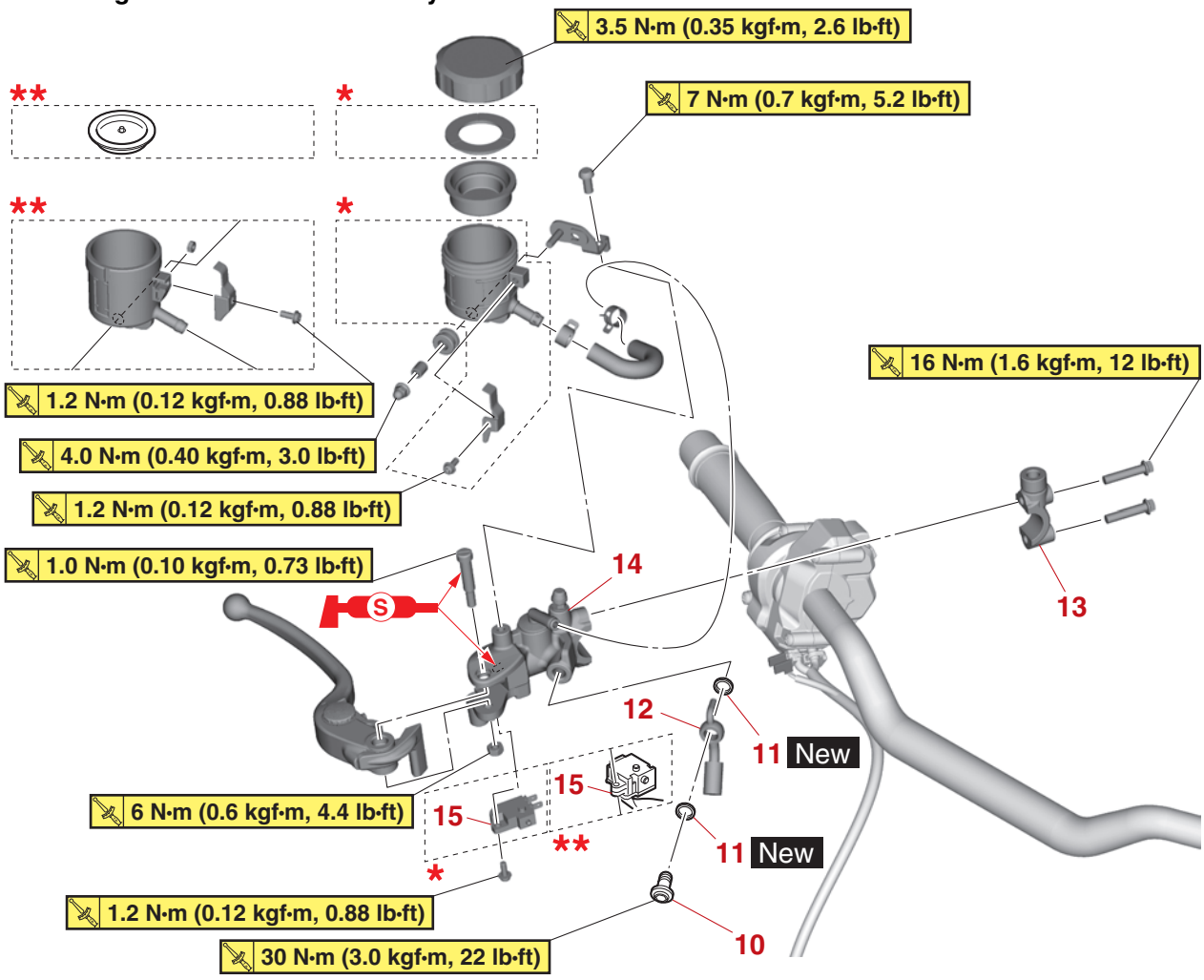
Removing the front brake master cylinder



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

Order	Job/Parts to remove	Q'ty	Remarks
	Rearview mirror (right)		Refer to "HANDLEBAR" on page 4-58.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Brake fluid reservoir cap stopper	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir bracket	1	
6	Brake fluid reservoir	1	
7	Brake fluid reservoir hose	1	
8	Brake lever	1	
9	Front brake light switch connector	2	Disconnect. (for MT09M/MT09MC)

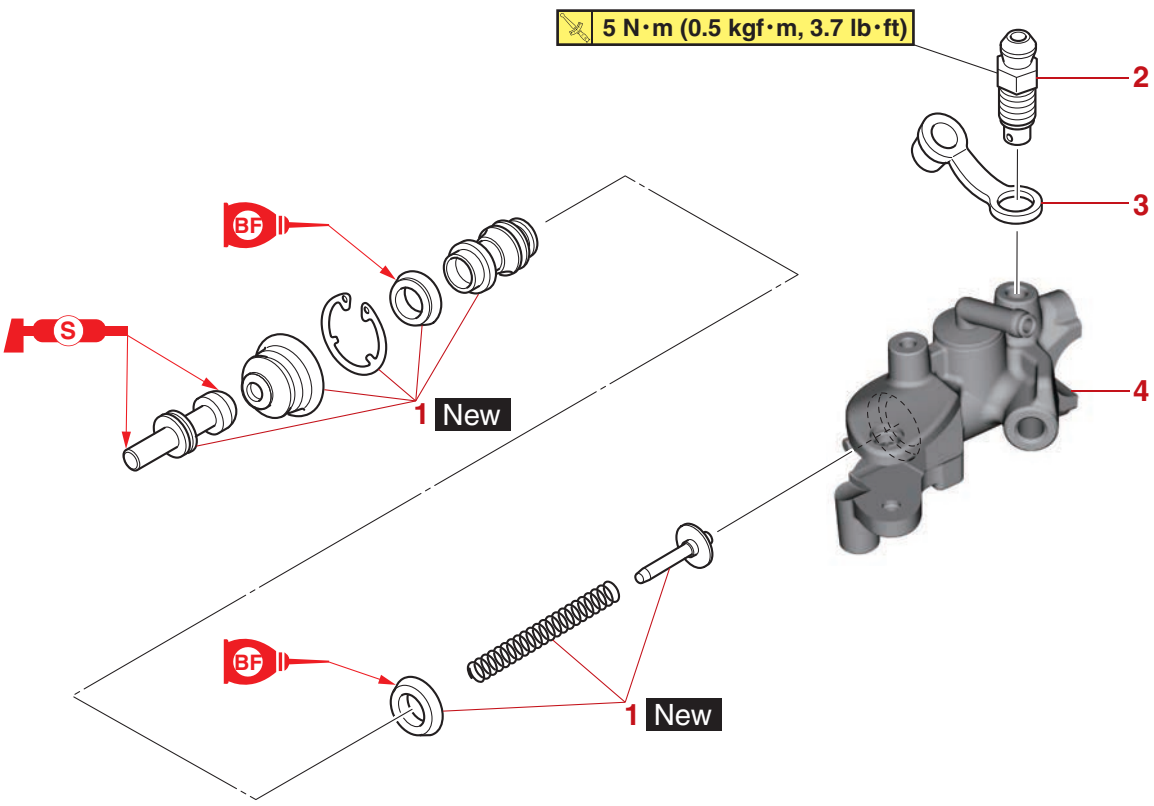
Removing the front brake master cylinder



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

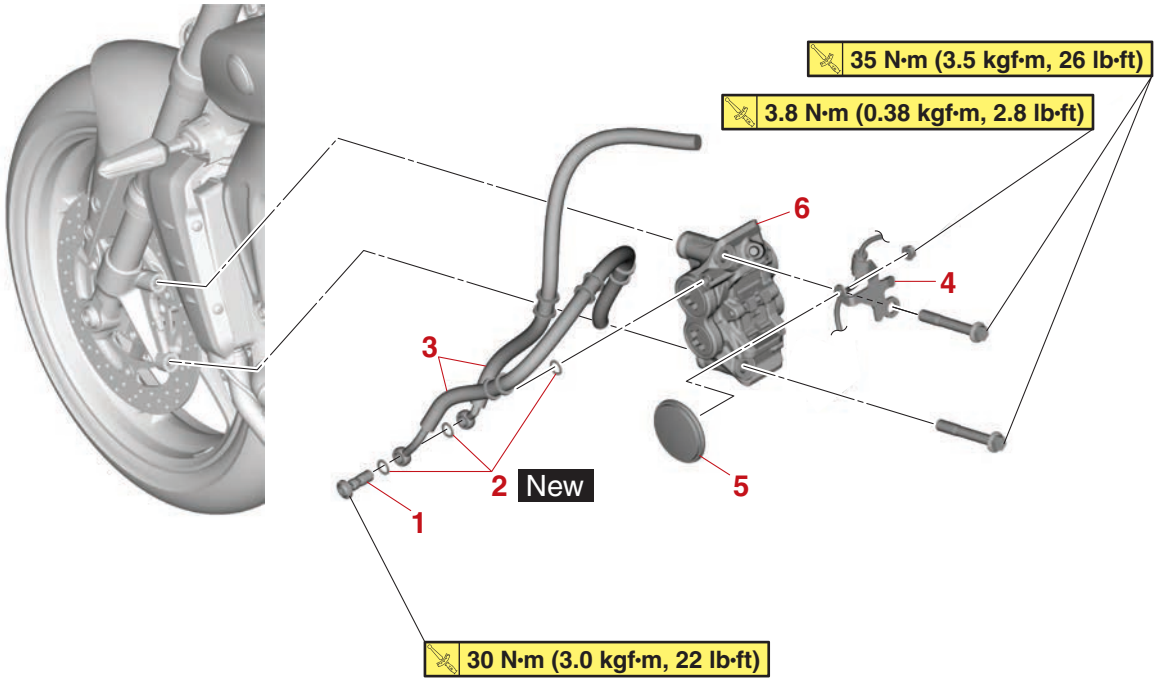
Order	Job/Parts to remove	Q'ty	Remarks
10	Brake hose union bolt	1	
11	Brake hose gasket	2	
12	Brake hose	1	
13	Front brake master cylinder holder	1	
14	Front brake master cylinder	1	
15	Front brake light switch	1	

Disassembling the front brake master cylinder



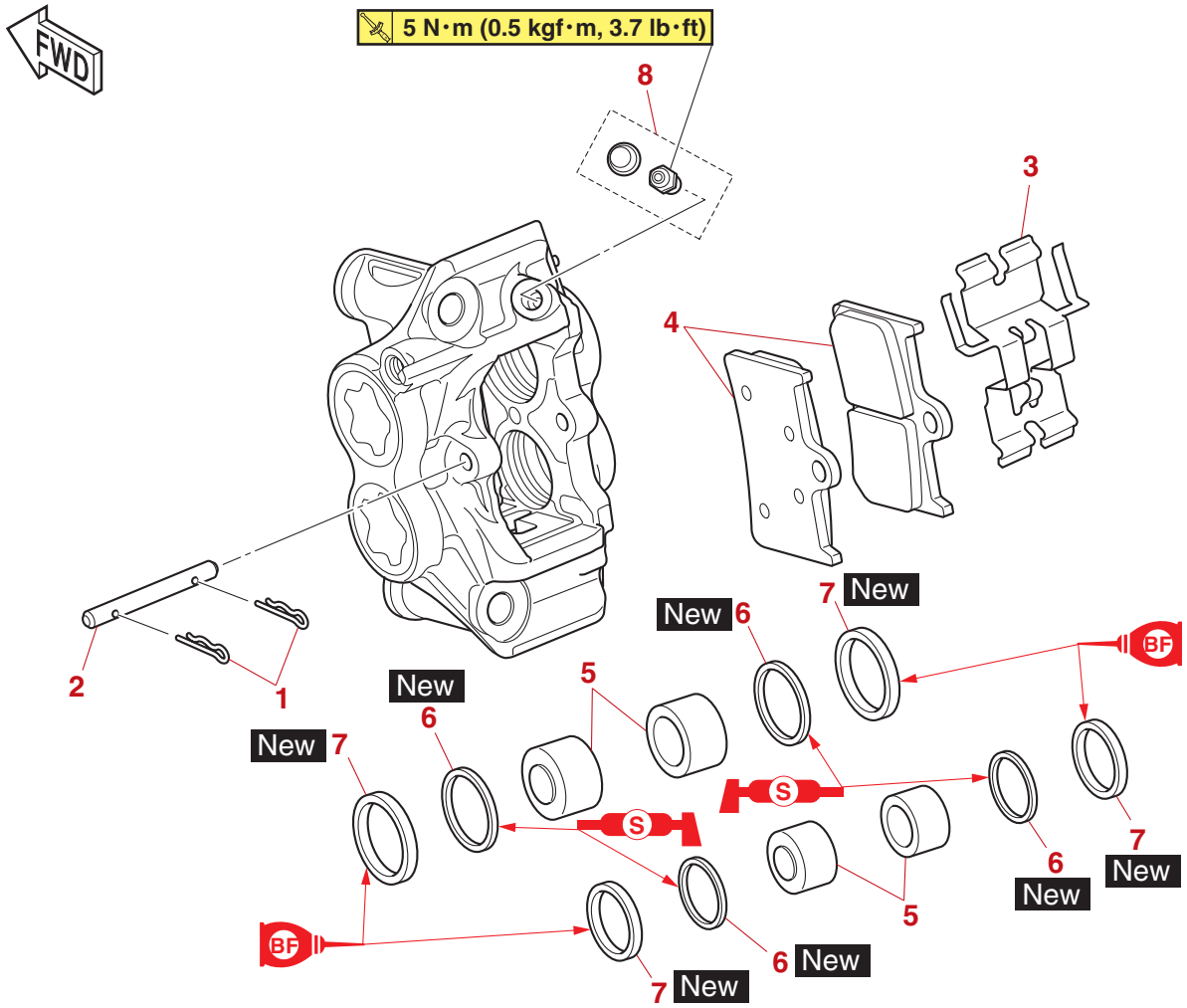
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Bleed screw	1	
3	Cap	1	
4	Brake master cylinder body	1	

Removing the front brake 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	Brake hose union bolt	1	
2	Brake hose gasket	3	
3	Brake hose	2	
4	Reflector bracket	1	
5	Reflector	1	
6	Front brake caliper	1	

Disassembling the front brake calipers



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

EAS30168
INTRODUCTION
EWA14101
⚠ WARNING

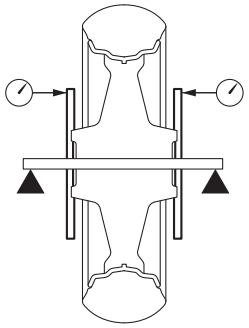
Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned,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

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

EAS30169
CHECKING THE FRONT BRAKE DISCS
The following procedure applies to both brake discs.
1. Check:
   - Front brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc runout
     Out of specification → Replace.

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

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


G088908

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:
   - Brake disc
     Refer to “FRONT WHEEL” on page 4-11.

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

ECA19150
NOTICE

Replace the brake disc bolts with new ones.

TIP

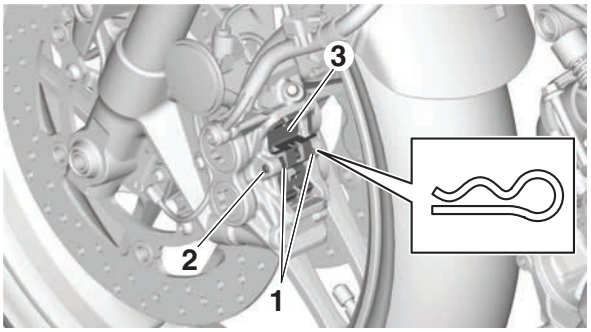
Tighten the brake disc bolts in stages and in a crisscross pattern.

EAS30170
REPLACING THE FRONT BRAKE PADS
The following procedure applies to both brake calipers.

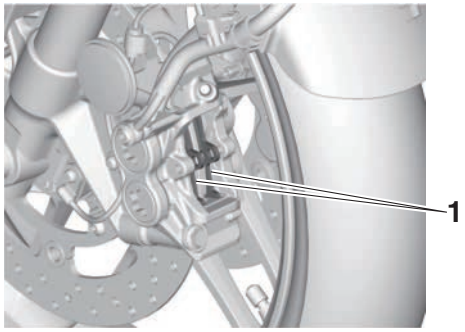
TIP

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

1. Remove:
   - Brake pad clip “1”
   - Brake pad pin “2”
   - Brake pad spring “3”

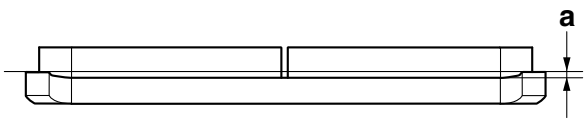


2. Remove:
   • Brake pad "1"



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

	Brake pad lining thickness limit **0.5 mm (0.02 in)**



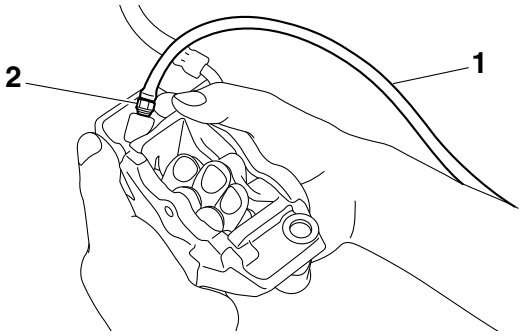
4. Remove:
   • Brake caliper bolt
5. Install:
   • Brake pad
   • Brake pad spring

TIP

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

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

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



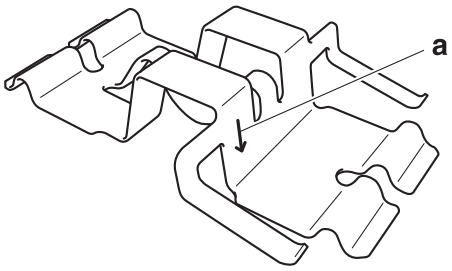
c. Tighten the bleed screw.

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

d. Install the brake pads and brake pad spring.

TIP

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



6. Install:
   • Brake pad pin
   • Brake pad clip
   • Front brake caliper

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

7. Check:
   • Brake fluid level
   Below the minimum level mark → Add the specified brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.
8. Check:
   • Brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

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 gasket
   - Brake hose

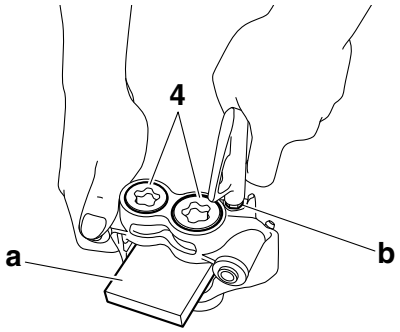
TIP
Put the end of the brake hose into a container and pump out the brake fluid carefully.

EAS30172
DISASSEMBLING THE FRONT BRAKE CALIPERS
The following procedure applies to both of the brake calipers.

1. Remove:
   - Brake caliper piston
   - Brake caliper piston dust seal
   - Brake caliper piston seal

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

EWA17060
WARNING
- **Never try to pry out the brake caliper pistons.**
- **Do not loosen the bolts “4”.**



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

EAS30173
CHECKING THE FRONT BRAKE CALIPERS
The following procedure applies to both of the brake calipers.

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

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

EWA13611
WARNING
Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.

EAS30174
ASSEMBLING THE FRONT BRAKE CALIPERS
EWA16560
WARNING
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components as they will cause the brake caliper piston dust seals and brake caliper piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.**

Specified brake fluid
DOT 4

EAS30175
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Front brake caliper "1" (temporarily)
   - Brake hose gasket New
   - Brake hose "2"
   - Brake hose union bolt "3"

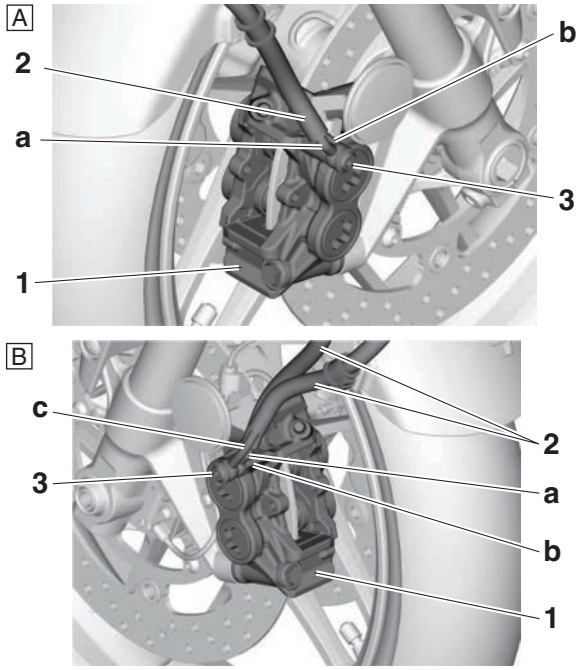
	Front brake caliper bolt 35 N·m (3.5 kgf·m, 26 lb·ft)

EWA13531
WARNING

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

ECA21410
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.**
- **Install the brake pipe "c" so that it is aligned with the brake pipe "a".**



A. Right side
B. Left side

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

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

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-32.

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 3-13.

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

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 connector (for MT09SPM/MT09SPMC)
   (from the front brake light switch)
2. Remove:
   • Brake hose union bolt
   • Brake hose gasket
   • Brake hose

TIP

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

EAS30725
CHECKING THE FRONT BRAKE MASTER CYLINDER

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

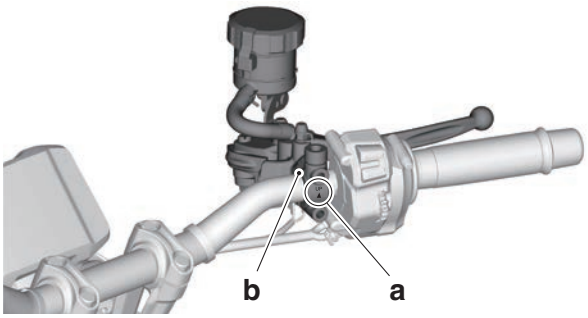
EAS30182
INSTALLING THE FRONT BRAKE MASTER CYLINDER

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

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

TIP

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

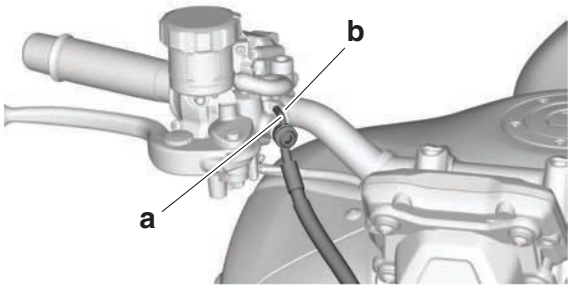


2. Install:
   • Brake hose gasket New
   • Brake hose
   • Brake hose union bolt

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

EWA13531
WARNING
Proper brake hose routing is essential to insure safe vehicle operation.

TIP
- When installing the brake hose onto the master cylinder, make sure the projection "a" on the brake hose touches the projection "b" on the master cylinder.
- 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

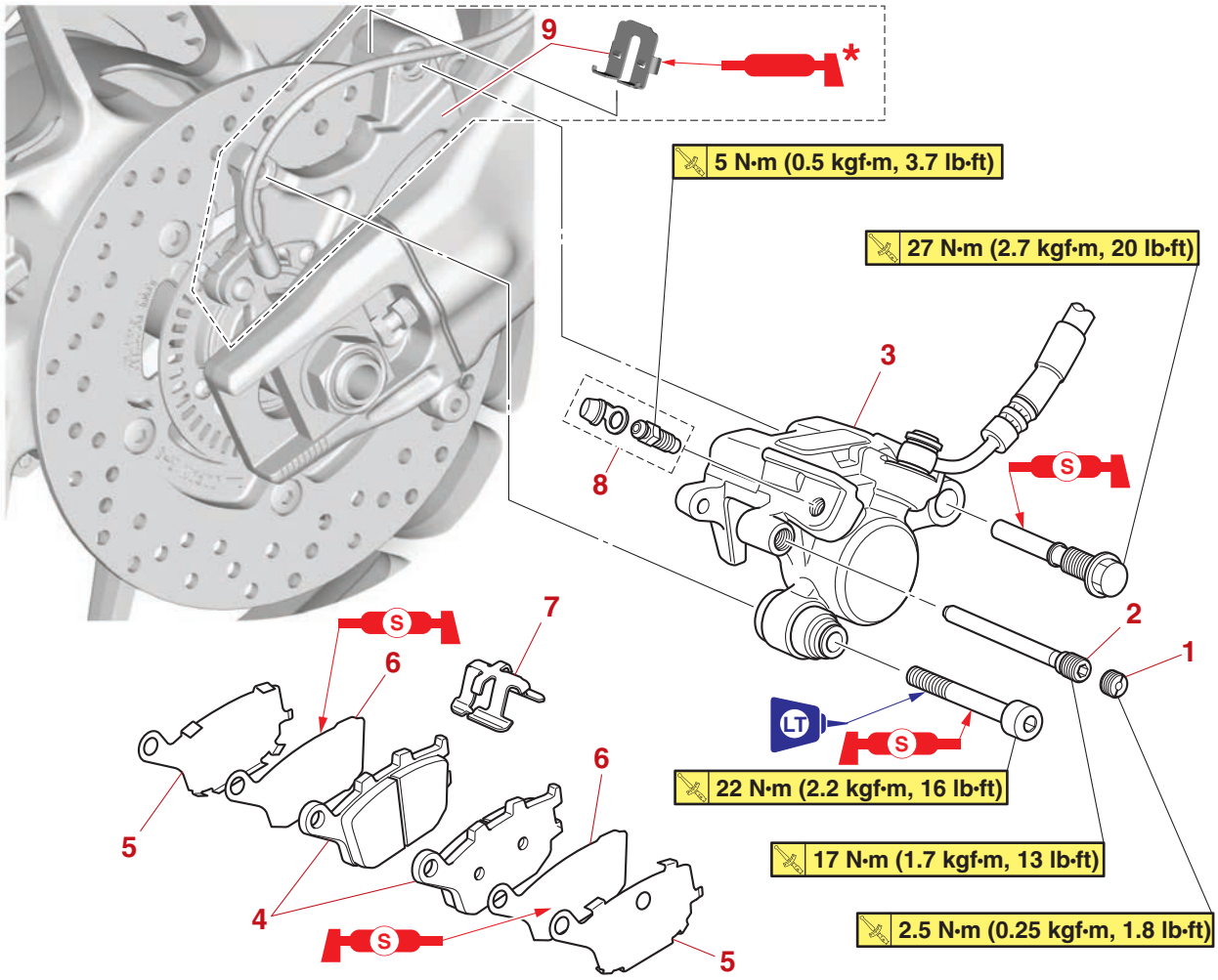
EWA13540
WARNING
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, 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 3-13.
6. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS20031
REAR BRAKE

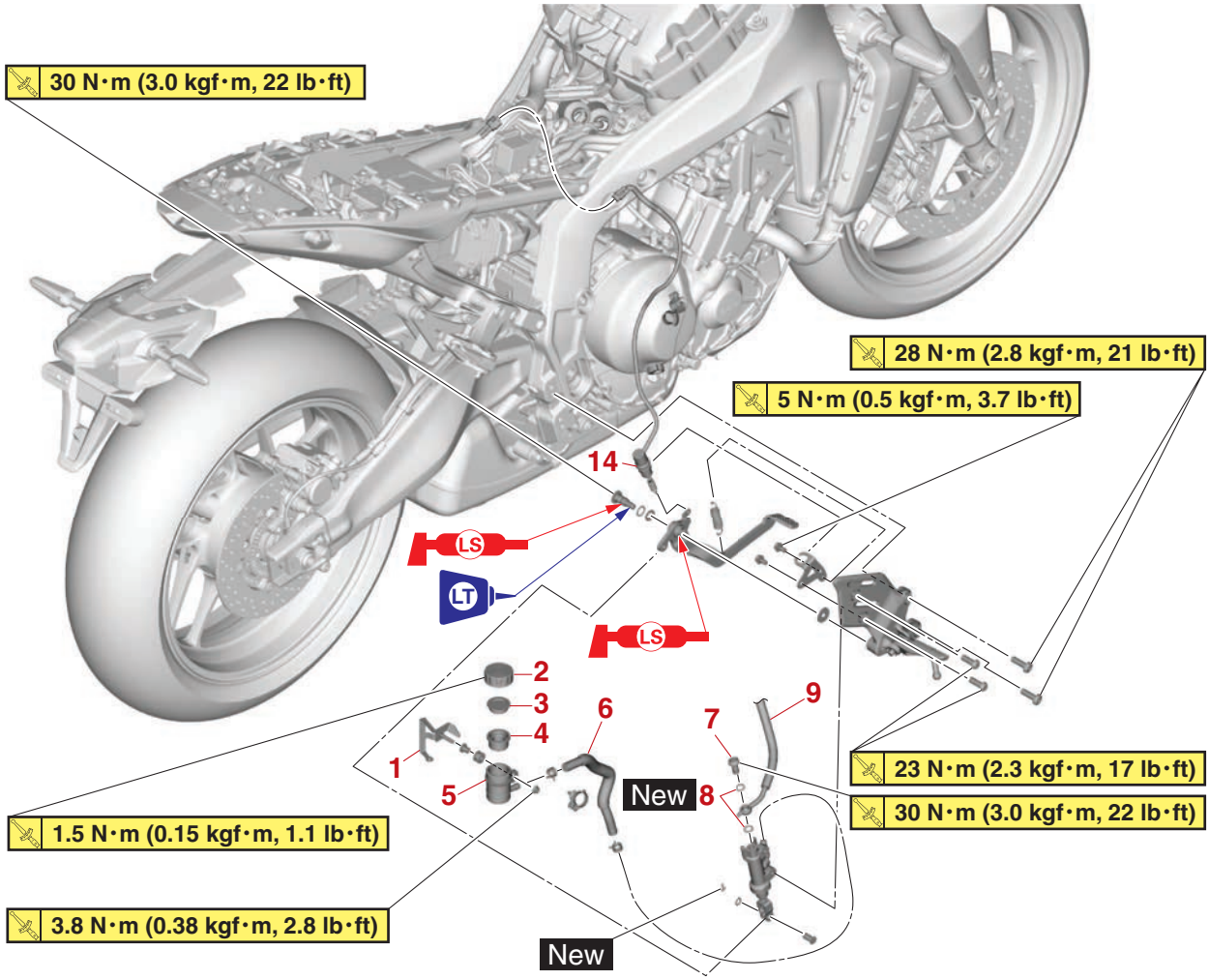
Removing the rear brake pads



*** Three Bond No. 1521.**

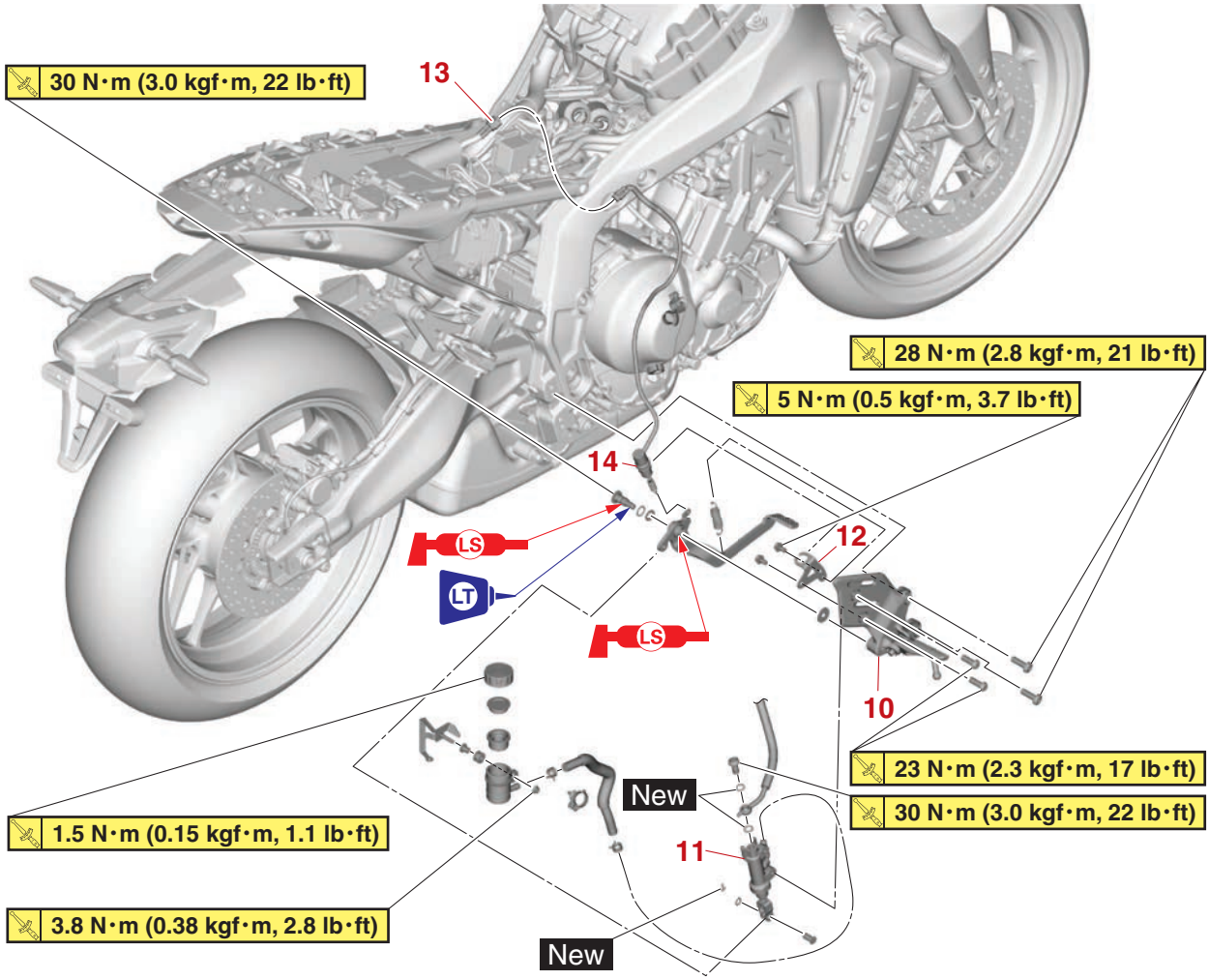
Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad retaining bolt	1	
3	Rear brake caliper	1	
4	Brake pad	2	
5	Brake pad shim	2	
6	Brake pad insulator	2	
7	Brake pad spring	1	
8	Bleed screw	1	
9	Brake caliper bracket assembly	1	

Removing the rear brake master cylinder



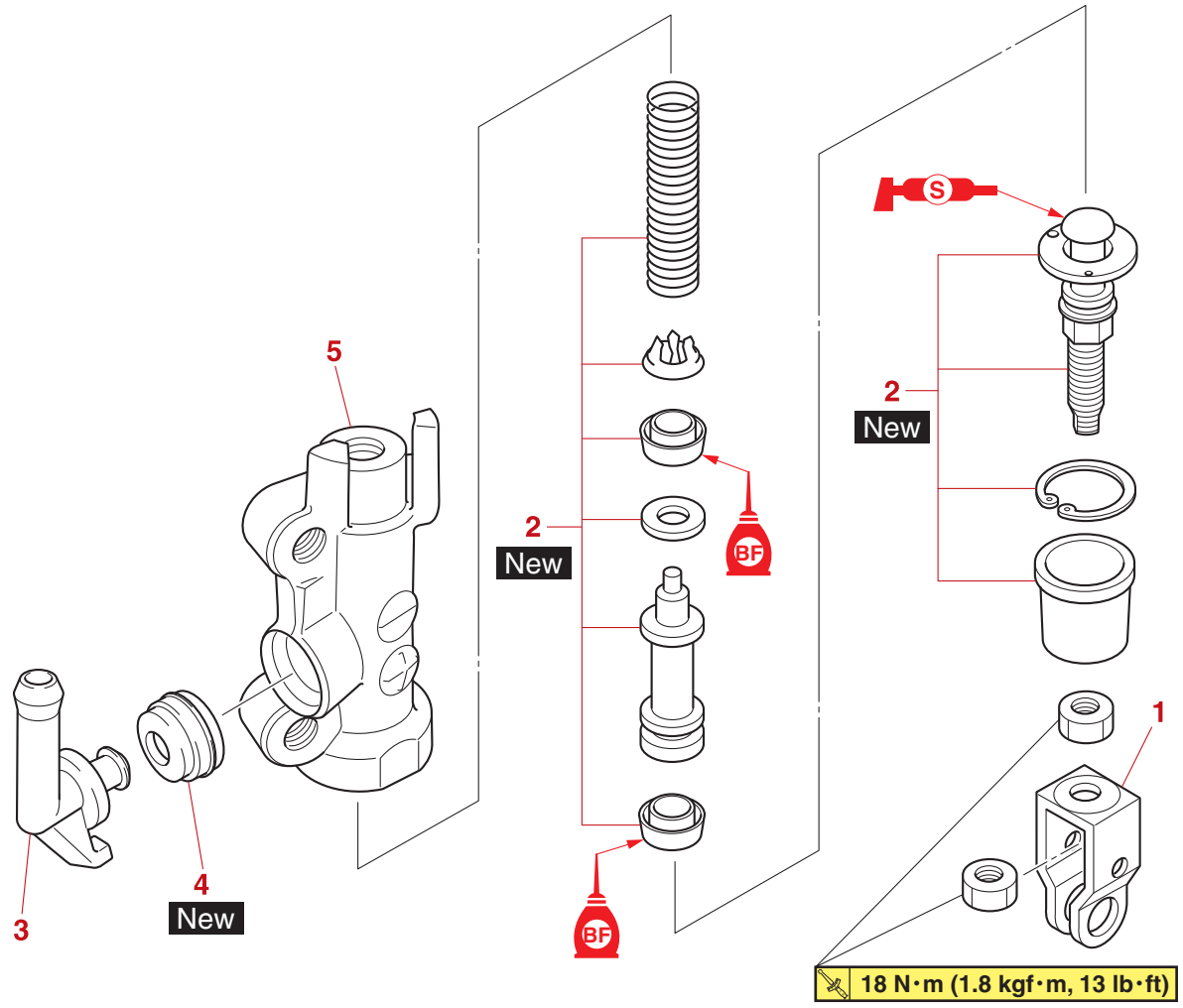
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Brake fluid		Drain. Refer to"BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Brake fluid reservoir bracket	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Brake hose union bolt	1	
8	Brake hose gasket	2	
9	Brake hose	1	

Removing the rear brake master cylinder



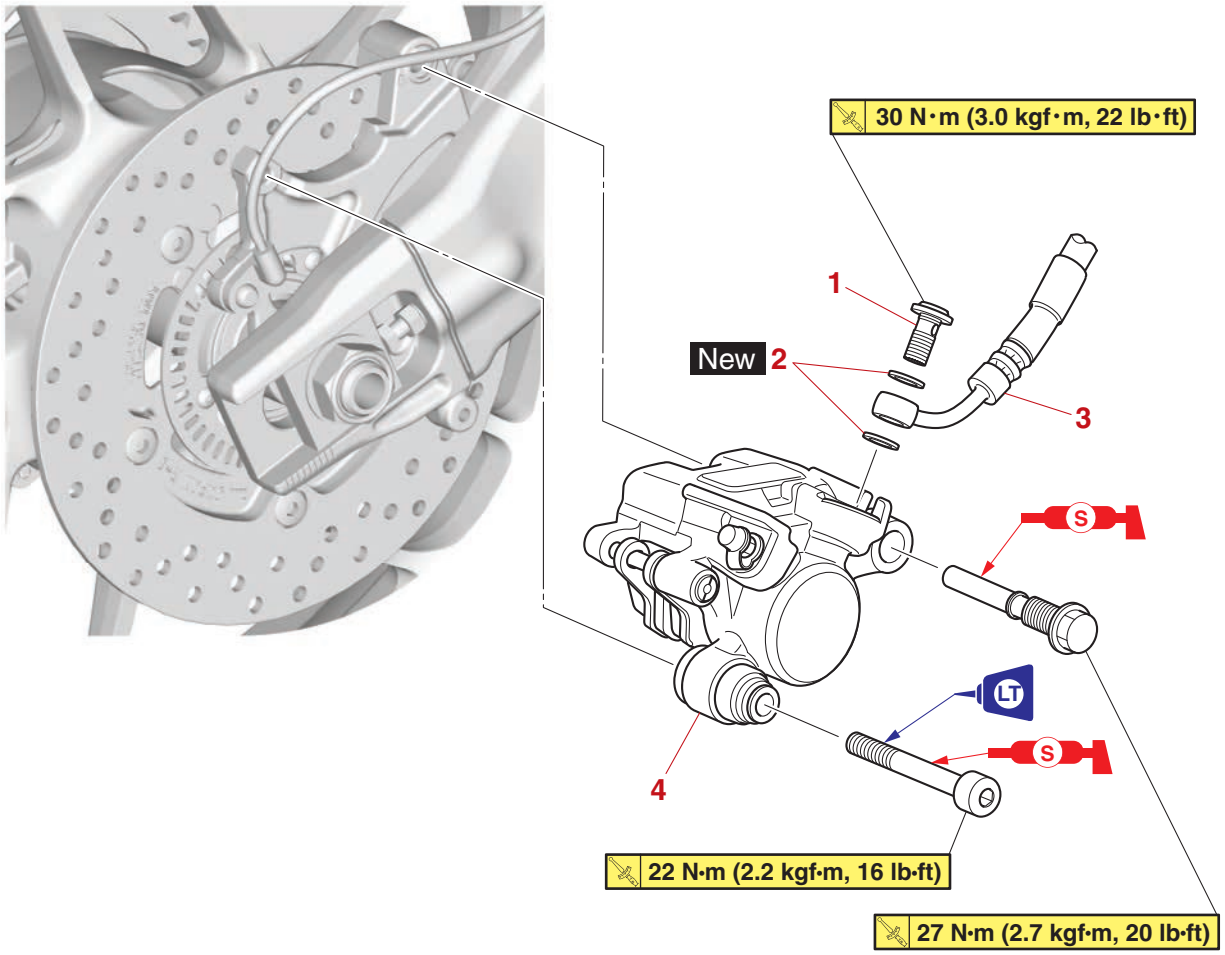
Order	Job/Parts to remove	Q'ty	Remarks
10	Footrest assembly (right)	1	
11	Rear brake master cylinder assembly	1	
12	Rear brake light switch bracket	1	
13	Rear brake light switch coupler	1	Disconnect.
14	Rear brake light switch	1	

Disassembling the rear brake master cylinder



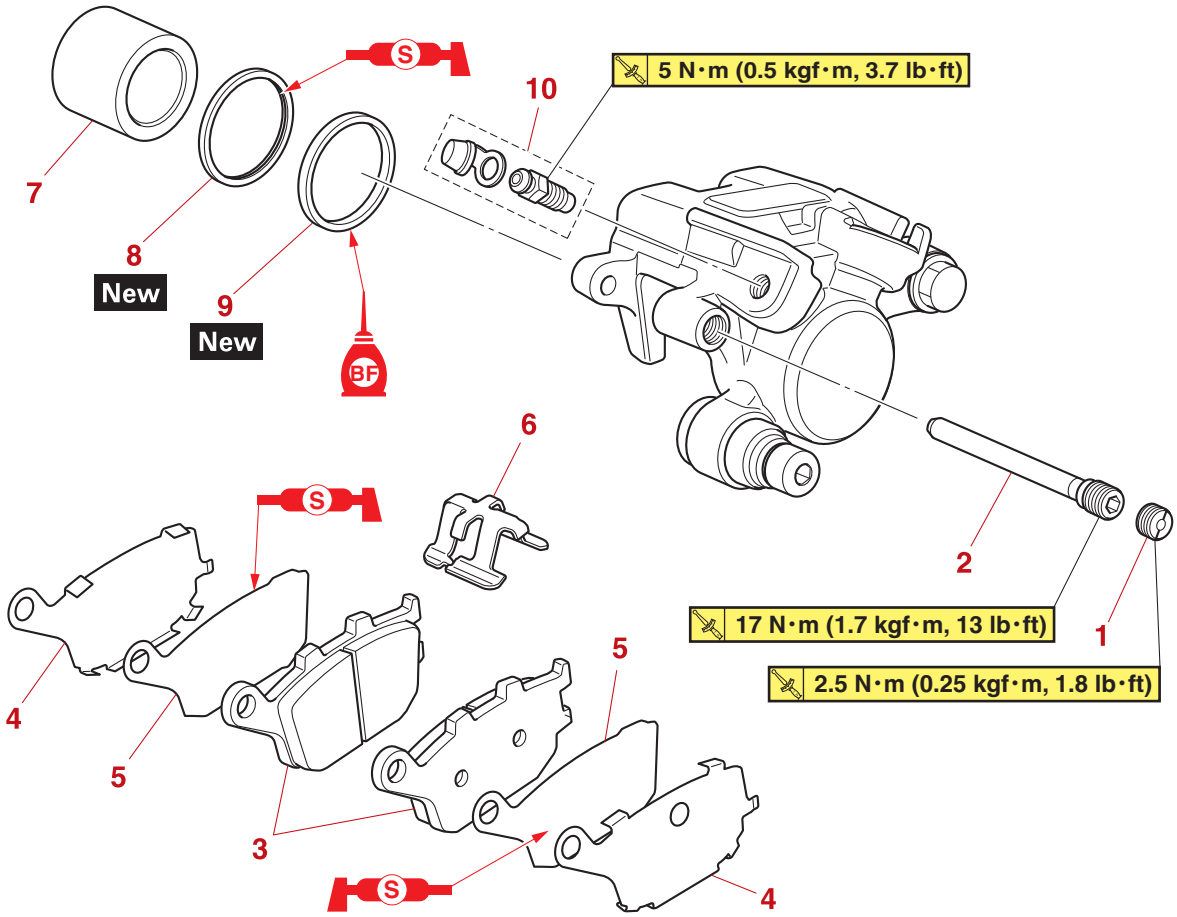
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder yoke	1	
2	Brake master cylinder kit	1	
3	Hose joint	1	
4	Bushing	1	
5	Brake master cylinder body	1	

Removing the 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.
1	Brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose	1	
4	Rear brake caliper	1	

Disassembling the rear brake caliper



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

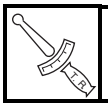
EAS33521
ADJUSTING THE FOOTREST POSITION

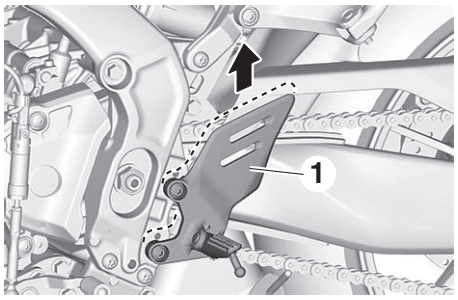
1. Check:
   • Footrest position

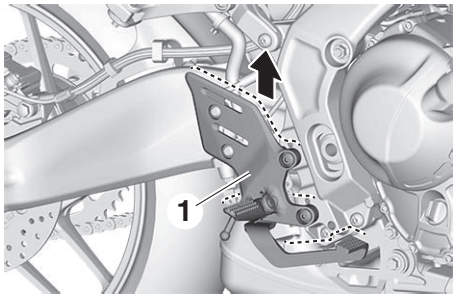
TIP

The rider footrests can be adjusted to one of two positions. From the factory, the footrests are in the low position.

2. Adjust:
   a. Remove the footrest assembly (left and right) “1”.
   b. Adjust the footrest position (low or high position).
   c. Install the footrest assembly (left and right).

	**Footrest assembly bolt** **28 N·m (2.8 kgf·m, 21 lb·ft)**

A


B


A. Left side
B. Right side

EAS30183
INTRODUCTION

EWA14101

⚠ WARNING

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

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

EAS30184
CHECKING THE REAR BRAKE DISC

1. Check:
   • Rear brake disc
   Damage/galling → Replace.
2. Measure:
   • Brake disc runout
   Out of specification → Replace.
   Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-32.

	**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 4-32.

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

4. Replace:
   • Brake disc
   Refer to "REAR WHEEL" on page 4-18.

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

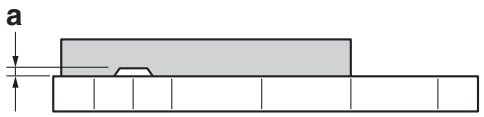
EAS30185
REPLACING THE REAR BRAKE PADS

TIP

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

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

	Brake pad lining thickness limit **1.0 mm (0.04 in)**

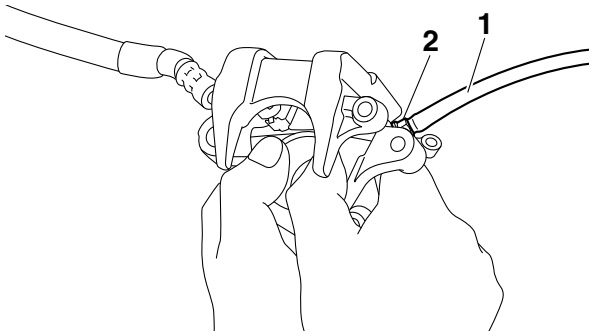


2. Install:
   • Brake pad insulator
   • Brake pad shim
   (onto the brake pad)
   • Brake pad spring
   (into the rear brake caliper)
   • Brake pad

TIP

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

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



c. Tighten the bleed screw.

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

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

TIP

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

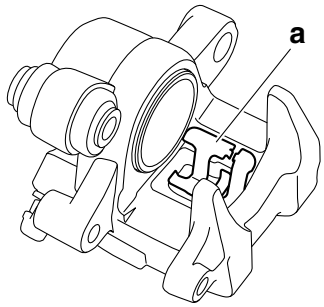
ECA14150
NOTICE

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

e. Install the brake pads and brake pad spring.

TIP

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



3. Lubricate:
   • Rear brake caliper bolt

	Recommended lubricant **Silicone grease**

ECA14150
NOTICE

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

4. Install:
   • Rear brake caliper
   • Brake pad retaining bolt
   • Screw plug

Rear brake caliper bolt (front)
27 N·m (2.7 kgf·m, 20 lb·ft)
Rear brake caliper bolt (rear)
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®
Rear brake pad retaining bolt
17 N·m (1.7 kgf·m, 13 lb·ft)
Rear brake caliper screw plug
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)

5. Check:
   • Brake fluid level
   Below the minimum level mark → Add the specified brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-13.
6. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30186
REMOVING THE REAR BRAKE CALIPER

TIP

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

1. Remove:
   • Brake hose union bolt
   • Brake hose gasket
   • Brake hose

TIP

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

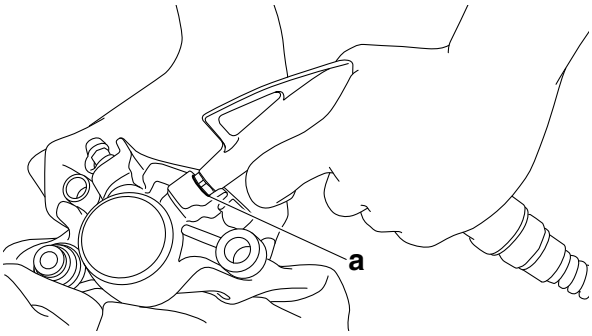
EAS30187
DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:
   • Brake caliper piston
   • Brake caliper piston dust seal
   • Brake caliper piston seal

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

EWA13550
⚠ WARNING

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



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

EWA13601
⚠ WARNING

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

2. Check:
   • Rear brake caliper bracket
   • Rear brake caliper bracket retainer
   Cracks/damage → Replace the rear brake caliper bracket assembly.
   Refer to "REAR WHEEL" on page 4-18.

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:
   • Brake caliper bracket retainer
   • Rear brake caliper
   (temporarily)
   • Brake hose gasket New
   • Brake hose
   • Brake hose union bolt

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

EWA13531
WARNING

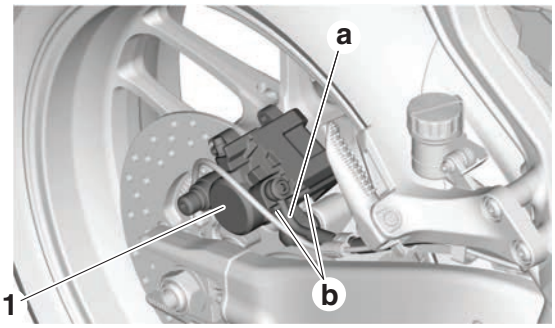
Proper brake hose routing is essential to insure safe vehicle operation.

ECA19080
NOTICE

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

TIP

Apply Three Bond No. 1521 onto the mating surfaces of the brake caliper bracket and brake caliper bracket retainer.



2. Remove:
   • Rear brake caliper
3. Install:
   • Brake pad insulator
   • Brake pad shim
   (onto the brake pad)
   • Brake pad spring
   (into the rear brake caliper)
   • Brake pad
   • Rear brake caliper
   Refer to "REPLACING THE REAR BRAKE PADS" on page 4-45.

Rear brake caliper bolt (front)
27 N·m (2.7 kgf·m, 20 lb·ft)
Rear brake caliper bolt (rear)
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®
Rear brake pad retaining bolt
17 N·m (1.7 kgf·m, 13 lb·ft)
Rear brake caliper screw plug
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)

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

Specified brake fluid
DOT 4

EWA13090
⚠ WARNING
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540
NOTICE
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
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 3-13.
7. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.

EAS30193
REMOVING THE REAR BRAKE MASTER CYLINDER
1. Remove:
   - Brake hose union bolt
   - Brake hose gasket
   - Brake hose

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

EAS30194
CHECKING THE REAR BRAKE MASTER CYLINDER
1. Check:
   - Brake master cylinder
     Damage/scratches/wear → Replace.
   - 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
   - Brake fluid reservoir hose
     Cracks/damage/wear → Replace.

EAS30195
ASSEMBLING THE REAR BRAKE MASTER CYLINDER
EWA13520
⚠ WARNING
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

Specified brake fluid
DOT 4

1. Install:
   - Brake master cylinder kit New

EAS30196
INSTALLING THE REAR BRAKE MASTER CYLINDER
1. Install:
   - Brake hose gasket New
   - Brake hose
   - Brake fluid reservoir hose
   - Brake hose union bolt

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

EWA13531

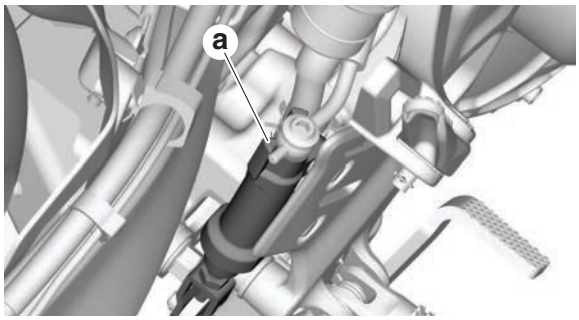
⚠ WARNING

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

ECA14160

NOTICE

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



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

Specified brake fluid
DOT 4

EWA13090

⚠ WARNING

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

ECA13540

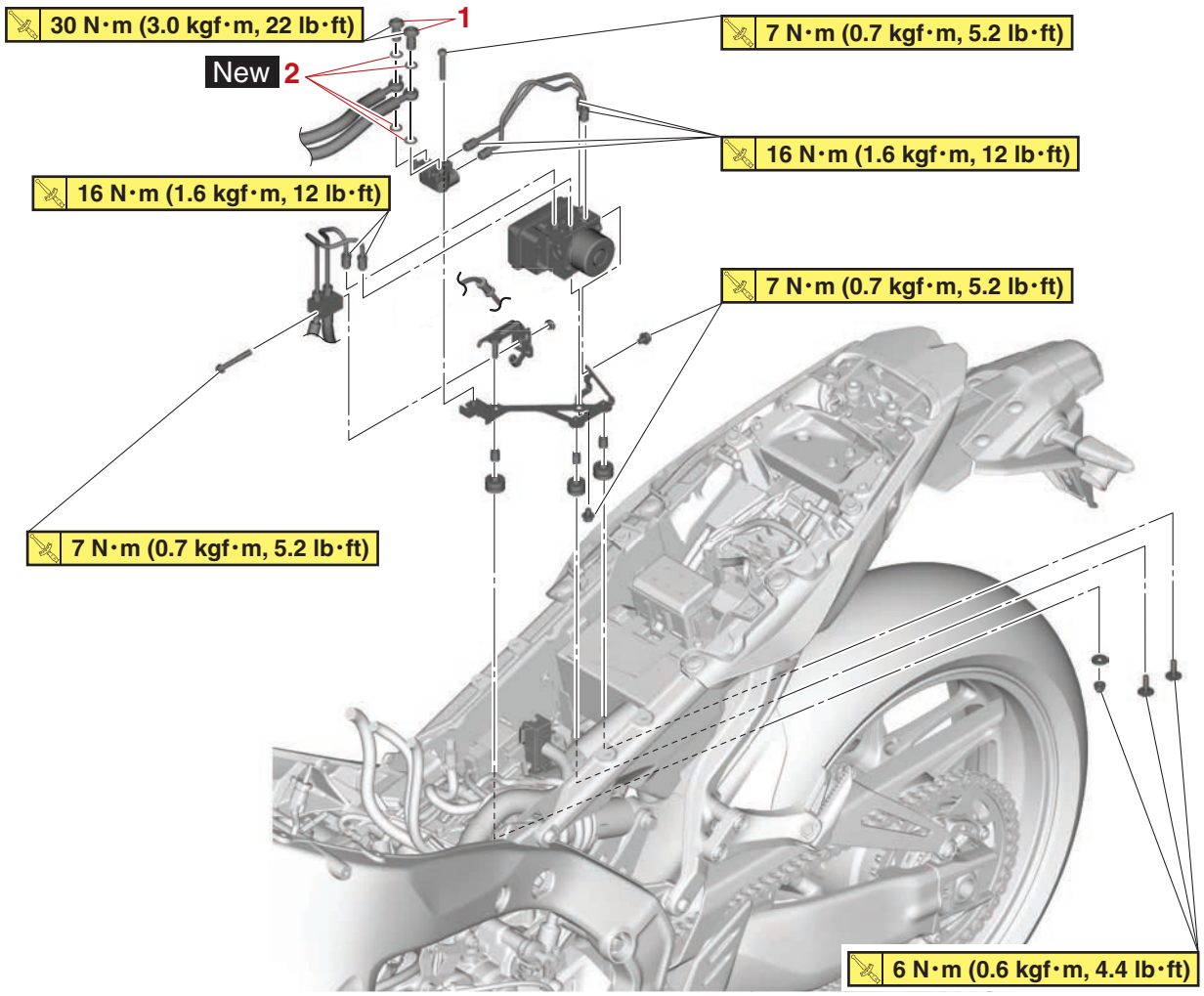
NOTICE

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

3. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
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 3-13.
5. Adjust:
   • Brake pedal position
   Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-14.
6. Adjust:
   • Rear brake light operation timing
   Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-33.

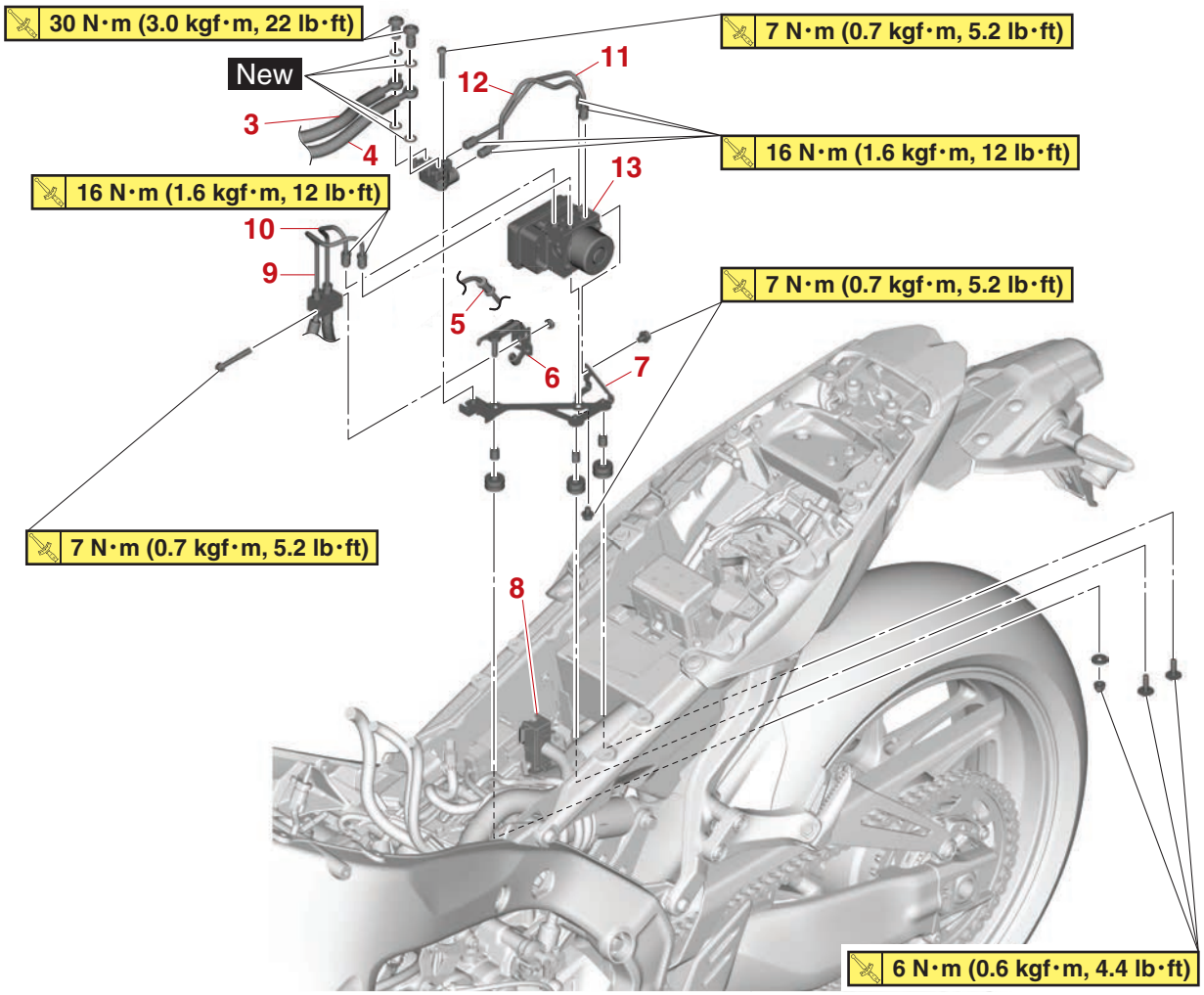
EAS20032
ABS (ANTI-LOCK BRAKE SYSTEM)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS (2)" on page 4-10.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
1	Brake hose union bolt	2	
2	Gasket	4	

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
3	Brake hose (hydraulic unit to front brake calipers)	1	Disconnect.
4	Brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
5	Rear wheel sensor lead	1	
6	Bracket	1	
7	Hydraulic unit bracket	1	
8	ABS ECU coupler	1	Disconnect.
9	Hydraulic unit brake pipe (rear brake master cylinder to hydraulic unit)	1	Disconnect.
10	Hydraulic unit brake pipe (hydraulic unit to rear brake caliper)	1	Disconnect.
11	Hydraulic unit brake pipe (hydraulic unit to front brake calipers)	1	
12	Hydraulic unit brake pipe (front brake master cylinder to hydraulic unit)	1	
13	Hydraulic unit assembly	1	

EAS30197
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.

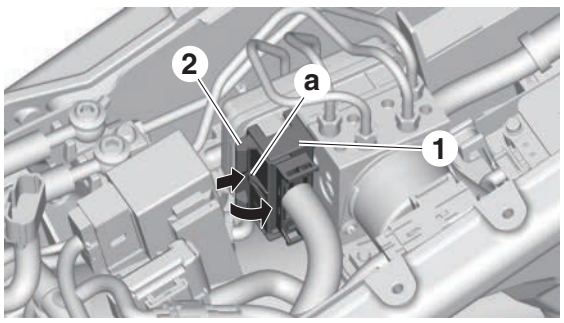
ECA18241
NOTICE

- **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, pull the lock lever "2" up to release the lock.



2. Remove:
   - Brake hose

TIP

- Do not operate the brake lever and brake pedal while removing the brake hoses.
- Do not bend the brake pipe when loosening the brake pipe flare nuts.

ECA19800
NOTICE

- **When removing the brake hoses and brake pipes, cover the area around the hydraulic unit assembly to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.**
- **Before disconnecting the brake pipes from the hydraulic unit assembly, do not lift up or move the brake pipes.**

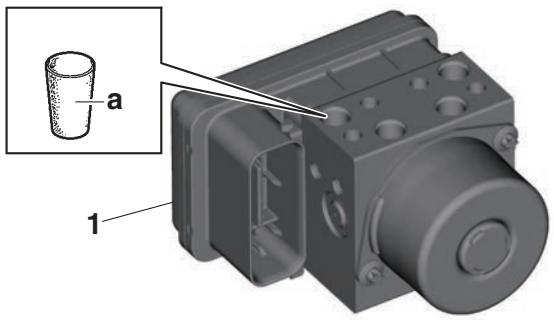
3. Remove:
   - Hydraulic unit assembly "1"

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 × 1.0) into each brake hose union bolt hole.

ECA19810
NOTICE

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



EAS30198
CHECKING THE HYDRAULIC UNIT ASSEMBLY

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

EAS30935
CHECKING THE BRAKE PIPES

The following procedure applies to all of the brake pipes.

1. Check:
   - Brake pipe end (flare nut)
     Damage → Replace the hydraulic unit assembly, brake pipes, and related parts as a set.

EAS30200
INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
   - Hydraulic unit assembly

ECA21371
NOTICE

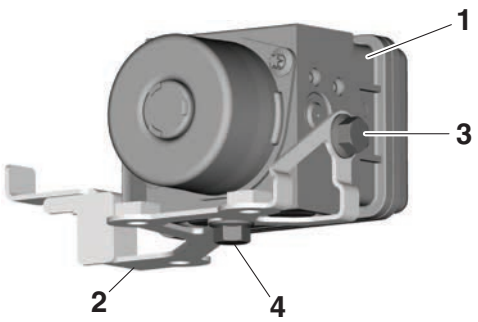
Do not remove the rubber plugs or bolts (M10 × 1.0) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.

TIP

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

a. Install the hydraulic unit assembly "1" on the hydraulic unit bracket "2".
b. Tighten the hydraulic unit assembly bolt "3", and bolt "4" to the specified torque in this order.

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



2. Remove:
   - Rubber plugs or bolt (M10 × 1.0)
3. Install:
   - Hydraulic unit brake pipe
4. Tighten:
   - Hydraulic unit brake pipe flare nut

Hydraulic unit brake pipe flare nut
16 N·m (1.6 kgf·m, 12 lb·ft)

ECA19820
NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit assembly, brake pipes, and related parts as a set.

TIP

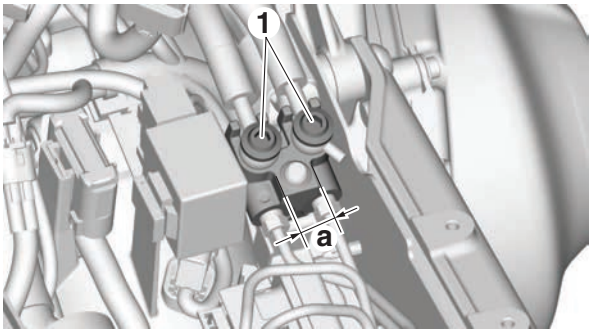
Do not bend the brake pipe when tightening the brake pipe flare nuts.

5. Install:
   - Gasket New
   - Brake hose union bolt "1"
   - Brake hose
     Refer to "CABLE ROUTING" on page 2-15.

TIP

After holding the protrusion "a" (17 mm (0.67 in)) on the brake hose joint with an appropriate tool, tighten the brake hose union bolts to the specified torque.

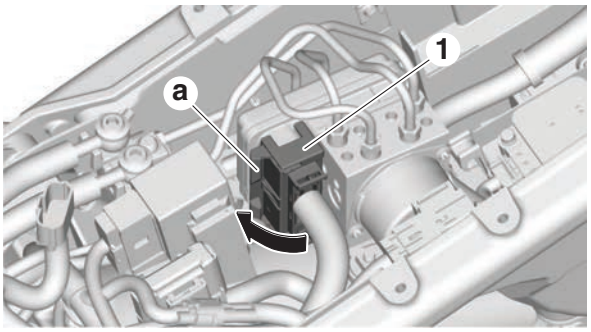
Front brake hose union bolt
30 N·m (3.0 kgf·m, 22 lb·ft)



6. 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.



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

Specified brake fluid
DOT 4

EWA17280

WARNING

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

ECA13540

NOTICE

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

8. Bleed:
   • Brake system
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-15.
9. 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 4-54.)

ECA14770

NOTICE

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

10. Delete the DTC. (Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-39.)
11. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-57.)

EAS30930

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 YDT.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

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

Battery voltage
Higher than 12.8 V

TIP

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

5. Removing the protective cap, and then connect the YDT to the YDT coupler (6P).

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

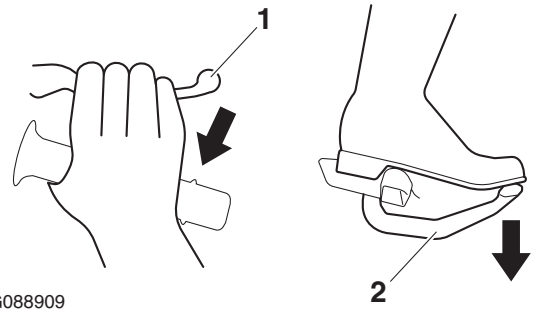
- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-3.

6. Start the YDT 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.

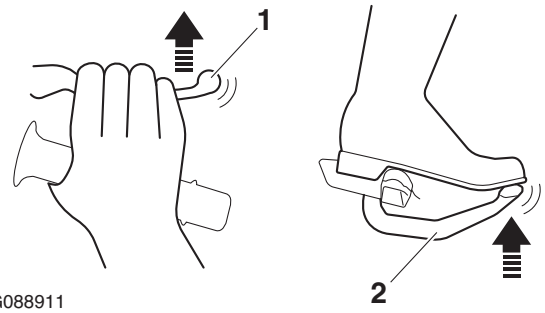
TIP

- 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.

ECA17371

NOTICE

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

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

ABS reaction-force confirmation

EWA13120

⚠ WARNING

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

TIP

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

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

4. Check:
   • Battery voltage
   Lower than 12.8 V → Charge or replace the battery.

Battery voltage
Higher than 12.8 V

TIP

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

5. Removing the protective cap, and then connect the YDT to the YDT coupler (6P).

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

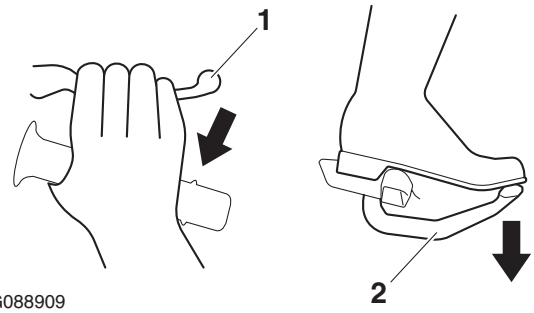
- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.

Refer to "YDT" on page 9-3.

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

TIP

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

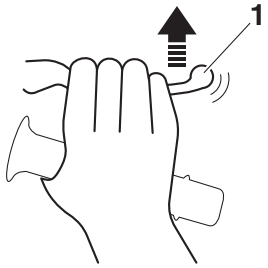


G088909

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

TIP

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

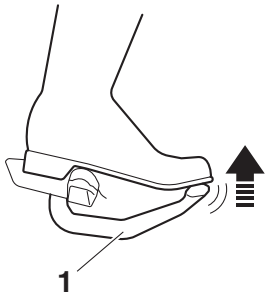


G088913

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

TIP

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



G088914

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

TIP

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

ECA17371

NOTICE

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

12. Turn the main switch to "OFF".
13. Remove the YDT from the YDT coupler, and then install the protective cap.
14. Turn the main switch to "ON".
15. Set the stop/run/start switch to "○".
16. Check for brake fluid leakage around the hydraulic unit.
    Brake fluid leakage → Replace the hydraulic unit, brake pipes, and related parts as a set.
17. If the operation of the hydraulic unit is normal, delete all of the DTC.

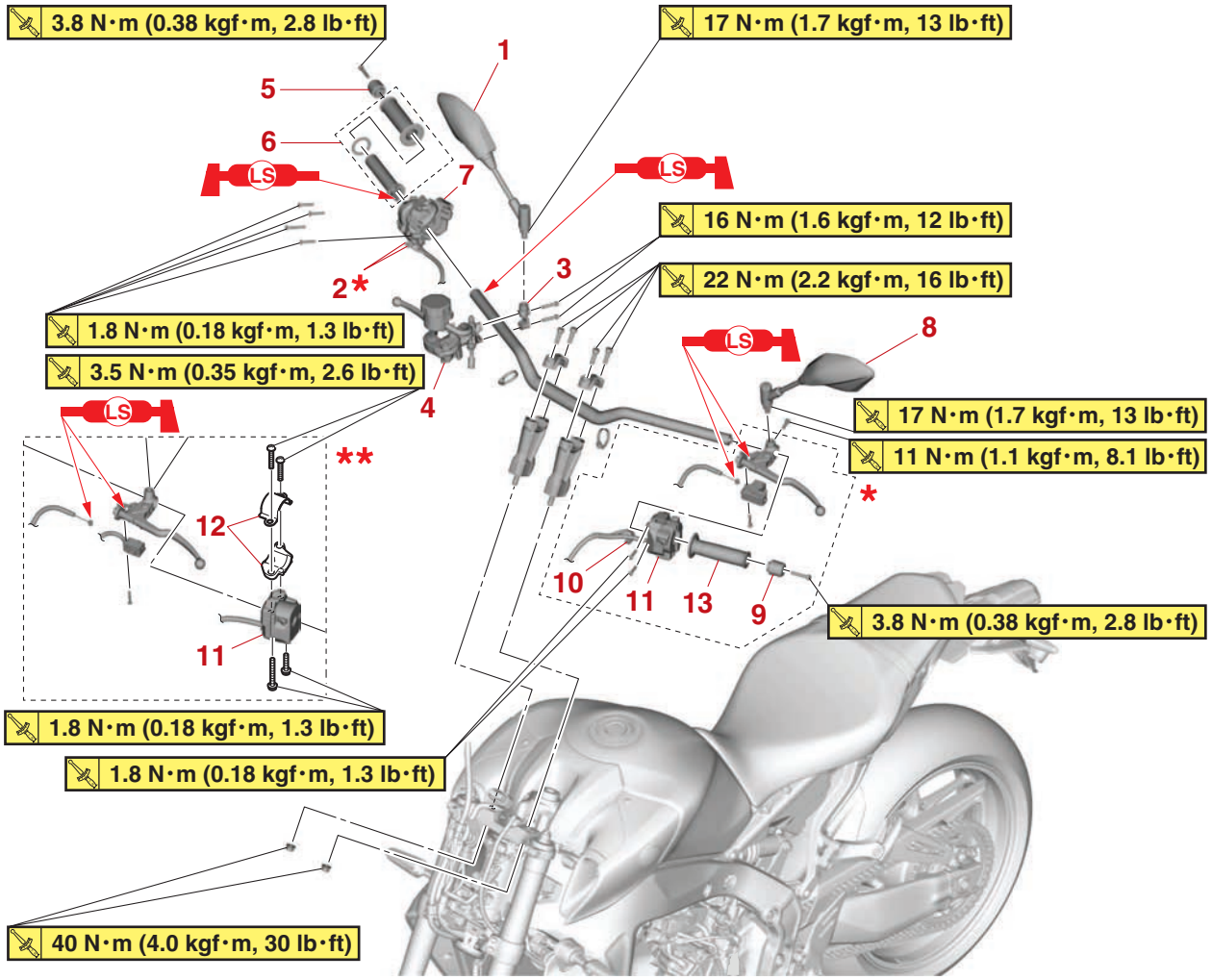
EAS30202

CHECKING THE ABS WARNING LIGHT

After all checks and servicing are completed, ensure that the ABS warning light goes off by walking the vehicle at a speed of faster than 5 km/h (3 mi/h) or performing a trial run.

EAS20033
HANDLEBAR

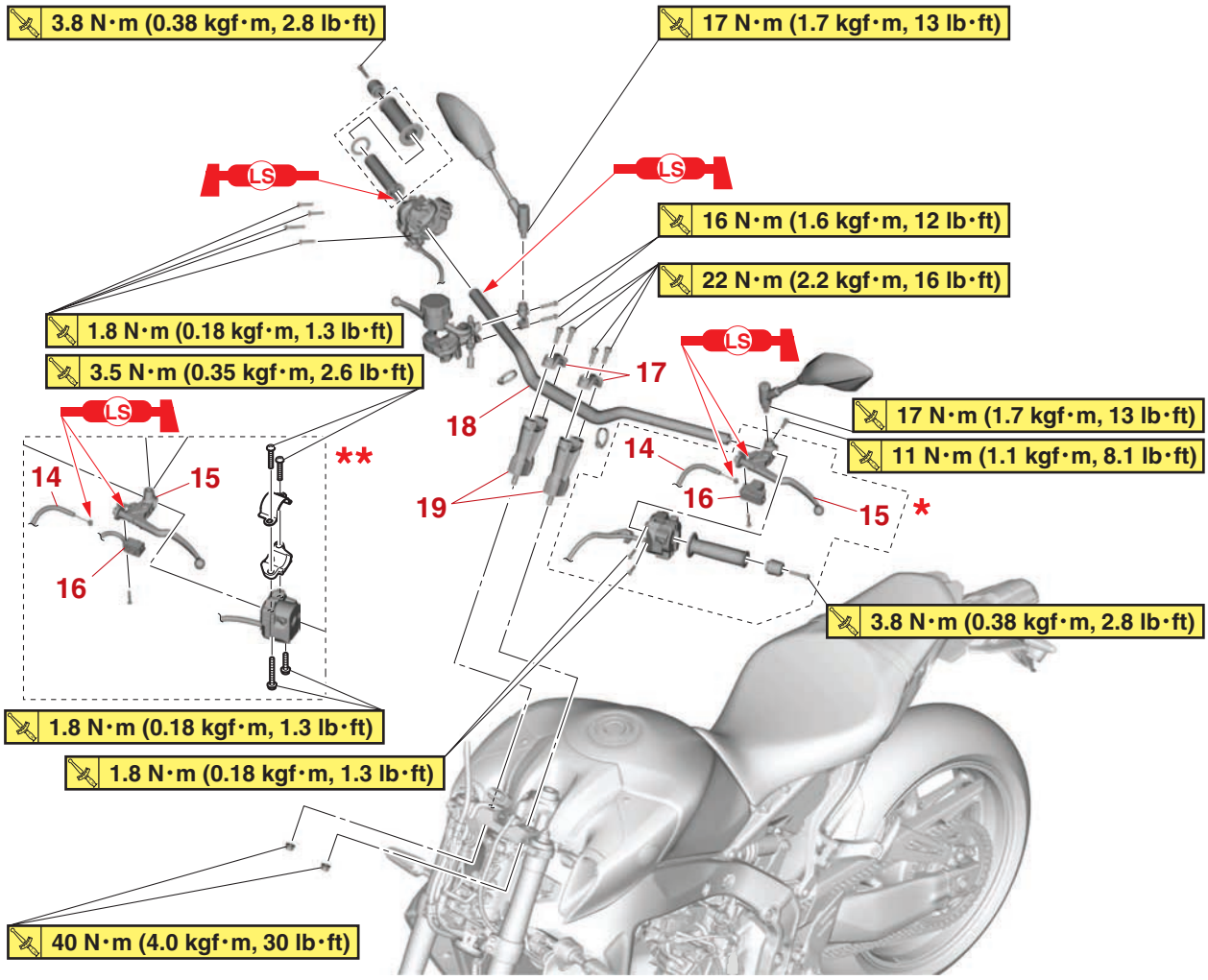
Removing the handlebar



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

Order	Job/Parts to remove	Q'ty	Remarks
	Meter assembly bracket		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Rearview mirror (right)	1	
2	Front brake light switch connector	2	Disconnect. (for MT09M/MT09MC)
3	Front brake master cylinder holder	1	
4	Front brake master cylinder assembly	1	
5	Grip end (right)	1	
6	Throttle grip	1	
7	Handlebar switch (right)	1	
8	Rearview mirror (left)	1	
9	Grip end (left)	1	
10	Clutch switch connector	2	Disconnect. (for MT09M/MT09MC)
11	Handlebar switch (left)	1	
12	Handlebar switch holder	2	For MT09SPM/MT09SPMC.
13	Handlebar grip	1	

Removing the handlebar



* For MT09M/MT09MC
** For MT09SPM/MT09SPMC

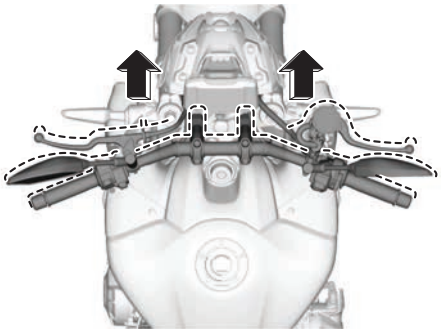
Order	Job/Parts to remove	Q'ty	Remarks
14	Clutch cable	1	Disconnect.
15	Clutch lever holder	1	
16	Clutch switch	1	
17	Upper handlebar holder	2	
18	Handlebar	1	
19	Lower handlebar holder	2	

EAS31396
ADJUSTING THE HANDLEBAR POSITION

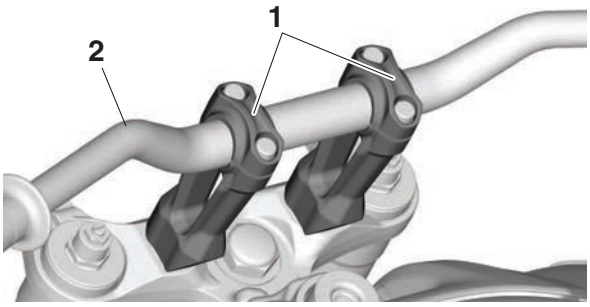
1. Check:
   • Handlebar position

TIP

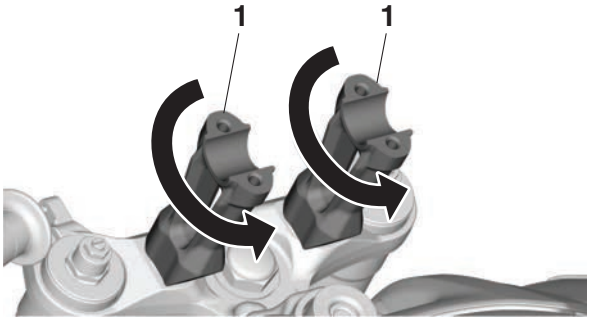
The handlebar position can be adjusted in two positions to suit the rider's preference.



2. Remove:
   • Air scoop (left and right)
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
3. Adjust:
   • Handlebar position
   a. Remove the upper handlebar holders "1" and handlebar "2".



   b. Loosen the lower handlebar holder nuts.
   c. Adjust the handlebar position by rotating both of the lower handlebar holders "1" in 180°.



   d. Install the handlebar "1" and upper handlebar holders "2".

	Upper handlebar holder bolt 22 N·m (2.2 kgf·m, 16 lb·ft)

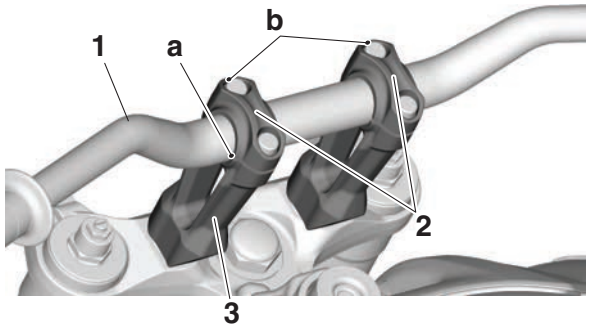
ECA18300

NOTICE

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

TIP

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



   e. Tighten the lower handlebar holder nuts.

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

EAS30203
REMOVING THE HANDLEBAR

1. Stand the vehicle on a level surface.

EWA13120

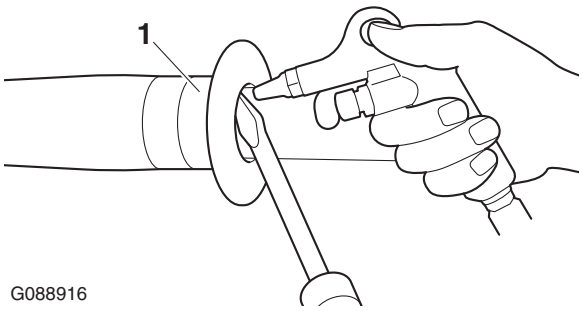
⚠ WARNING

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

2. Remove:
   • Handlebar grip "1"

TIP

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



EAS30204
CHECKING THE HANDLEBAR

1. Check:
   - Handlebar
     Bends/cracks/damage → Replace.

EWA13690
WARNING
Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS30205
INSTALLING THE HANDLEBAR

1. Stand the vehicle on a level surface.

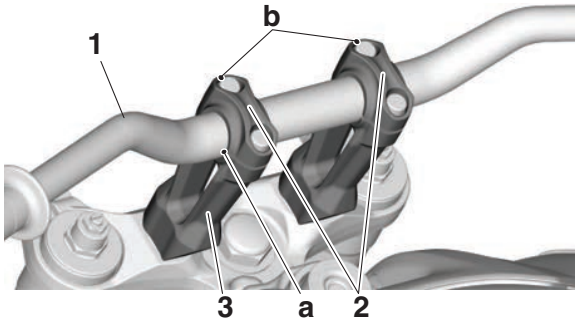
EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

2. Install:
   - Lower handlebar holder (temporarily)
   - Handlebar "1"
   - Upper handlebar holder "2"

	Upper handlebar holder bolt 22 N·m (2.2 kgf·m, 16 lb·ft)

ECA18300
NOTICE
First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.

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



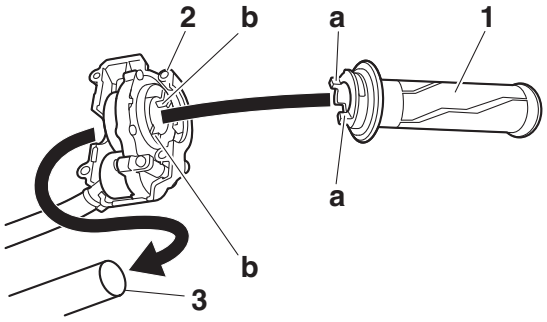
3. Tighten:
   - Lower handlebar holder nut

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

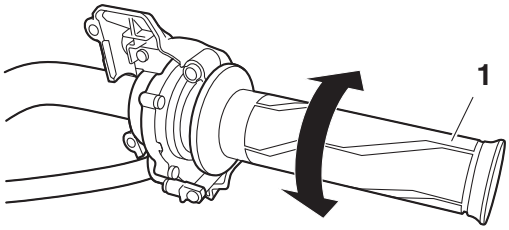
4. Install:
   - Handlebar switch (right)
   - Throttle grip
   - Grip end (right)

	Handlebar switch screw 1.8 N·m (0.18 kgf·m, 1.3 lb·ft) **Grip end bolt 3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

a. Fit the slot "a" in the throttle grip "1" into the projection "b" in the handlebar switch (right, front side) "2" and the throttle grip onto the handlebar "3".



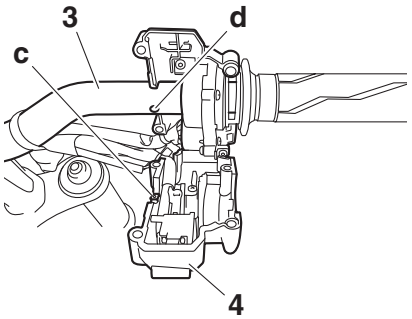
b. Make sure that the throttle grip "1" turns smoothly.



c. Install the handlebar switch (right, rear side) "4".

TIP

Align the projection "c" on the handlebar switch (right, rear side) with the hole "d" in the handlebar "3".



d. Install the grip end (right) "5".

TIP

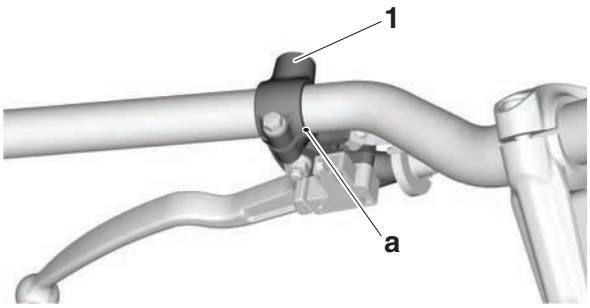
There should be 1–3 mm (0.04–0.12 in) of clearance "e" between the throttle grip and the grip end.

5. Install:
   - Front brake master cylinder assembly
     Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-36.
6. Install:
   - Clutch lever holder "1"
   - Clutch cable

	Clutch lever holder pinch bolt **11 N·m (1.1 kgf·m, 8.1 lb·ft)**

TIP

Align the center of slit on the clutch lever holder with the punch mark "a" on the handlebar.



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

	Grip end bolt **3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

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

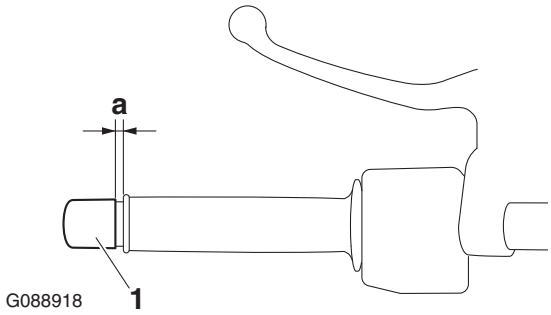
EWA13700

⚠ WARNING

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

TIP

There should be 1–3 mm (0.04–0.12 in) of clearance "a" between the handlebar grip and the grip end.



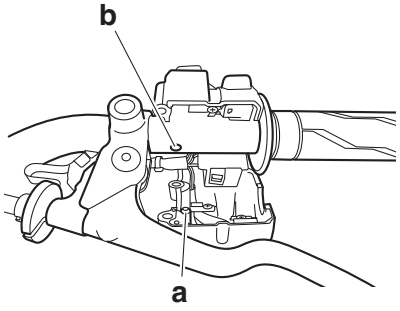
8. Install:
   - Handlebar switch holder (for MT09SPM/MT09SPMC)
   - Handlebar switch screw (left)

	Handlebar switch holder screw (for MT09SPM/MT09SPMC) **3.5 N·m (0.35 kgf·m, 2.6 lb·ft)** **Handlebar switch screw** **1.8 N·m (0.18 kgf·m, 1.3 lb·ft)**

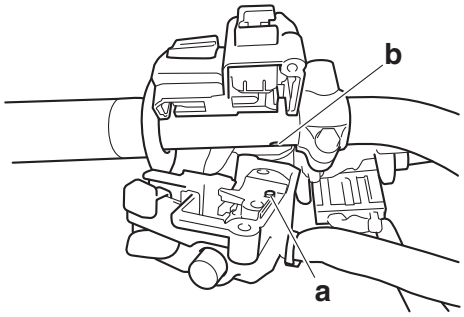
TIP

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

A



B



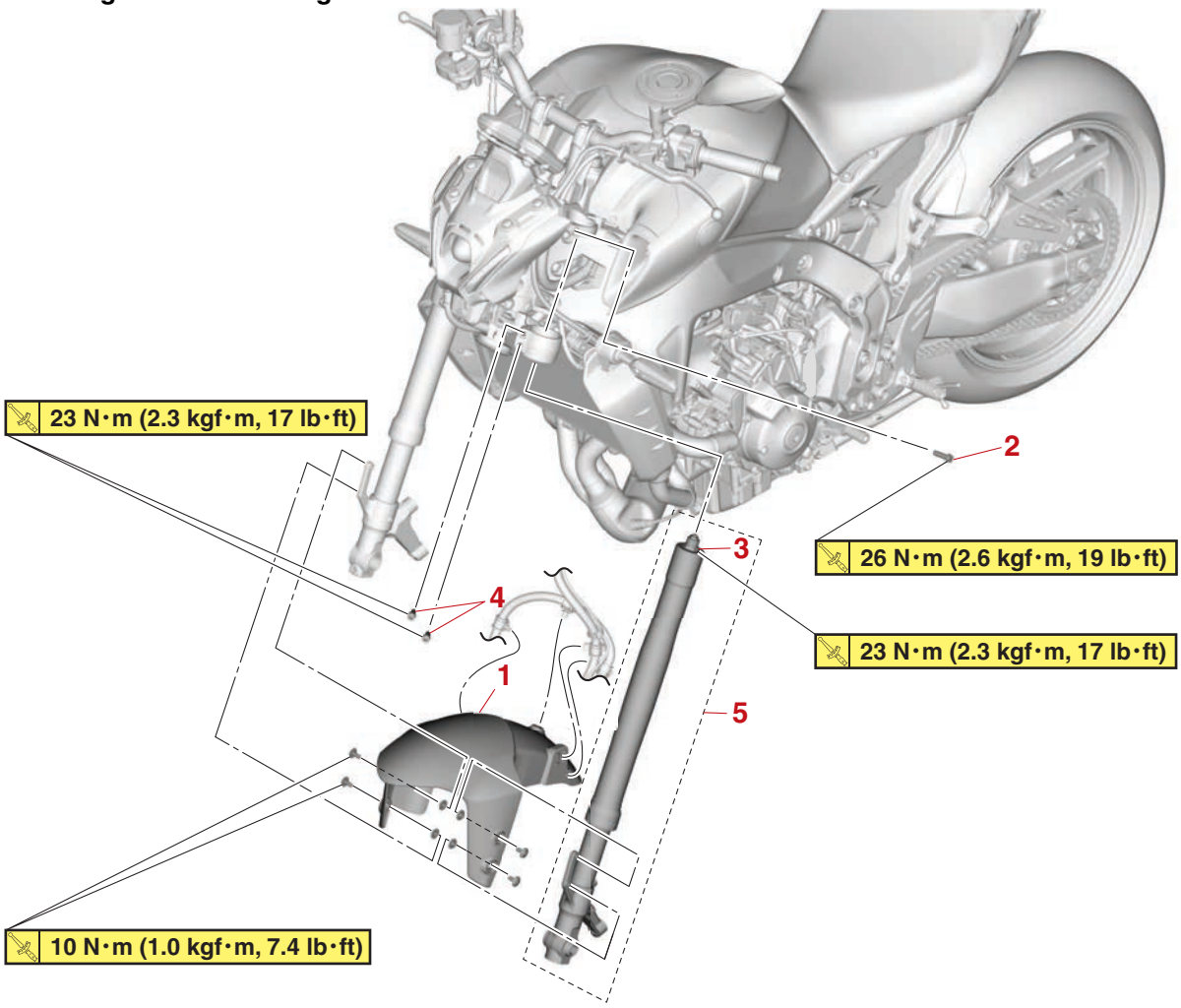
A. For MT09M/MT09MC
B. For MT09SPM/MT09SPMC

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

Clutch lever free play
10.0–15.0 mm (0.39–0.59 in)
(MT09M, MT09MC)
5.0–10.0 mm (0.20–0.39 in)
(MT09SPM, MT09SPMC)

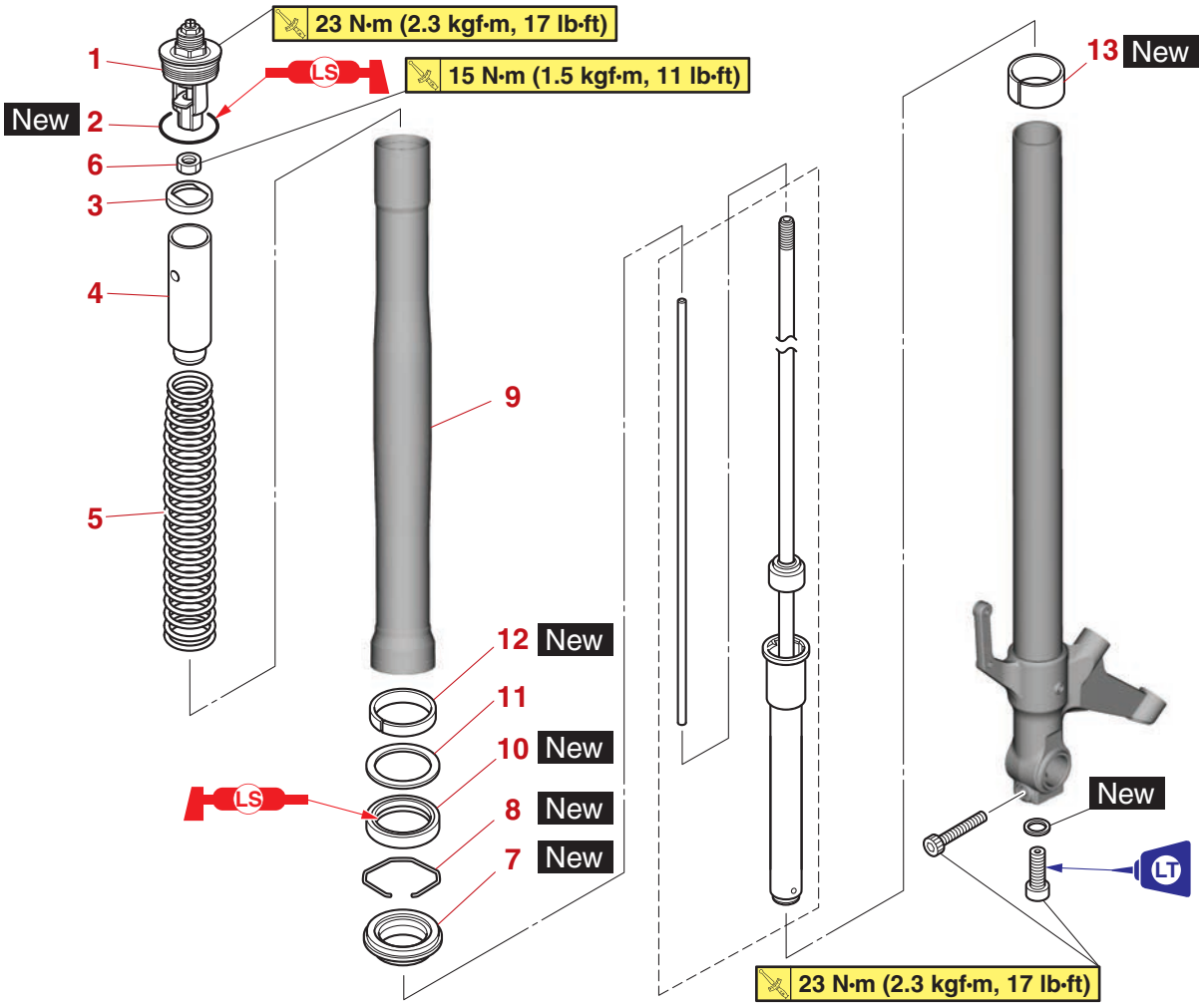
EAS20034
FRONT FORK

Removing the front fork legs



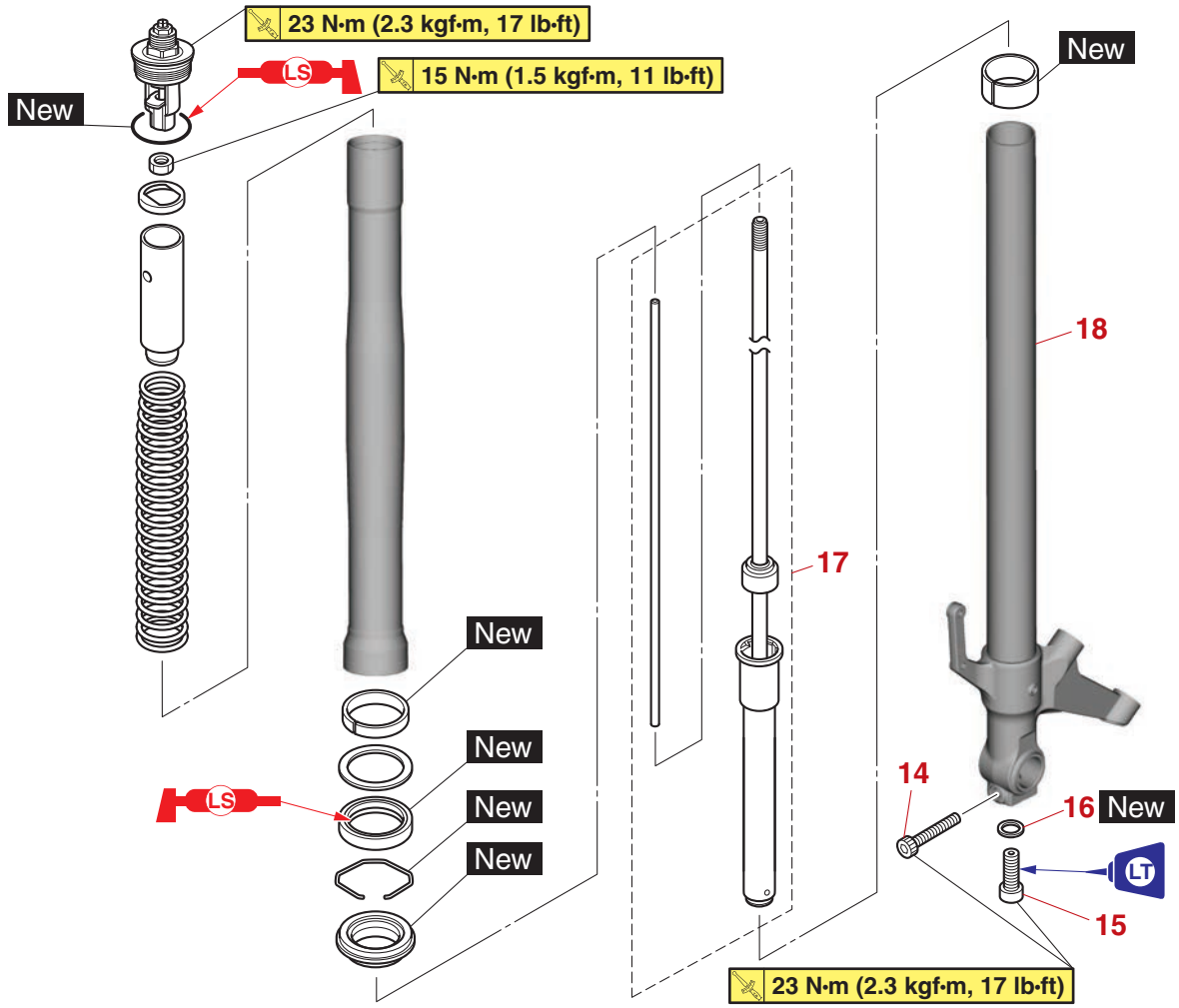
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-11.
1	Front fender	1	
2	Upper bracket pinch bolt	1	Loosen.
3	Cap bolt	1	Loosen.
4	Lower bracket pinch bolt	2	Loosen.
5	Front fork leg	1	

Disassembling the front fork leg



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	Washer	1	
4	Spacer	1	
5	Fork spring	1	
6	Locknut	1	
7	Dust seal	1	
8	Oil seal clip	1	
9	Outer tube	1	
10	Oil seal	1	
11	Washer	1	
12	Outer tube bushing	1	
13	Inner tube bushing	1	

Disassembling the front fork leg



Order	Job/Parts to remove	Q'ty	Remarks
14	Wheel axle pinch bolt	1	Right side only.
15	Damper rod assembly bolt	1	
16	Copper washer	1	
17	Damper rod assembly	1	
18	Inner tube	1	

EAS30206
REMOVING THE FRONT FORK LEGS

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

TIP

For MT09M/MT09MC:
Each front fork leg is equipped with a spring preload adjusting bolt, the fork leg (right) is equipped with a rebound damping force adjusting screw, the fork leg (left) is equipped with a compression damping force adjusting screw. Pay attention not to mistake the right and left.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

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

TIP

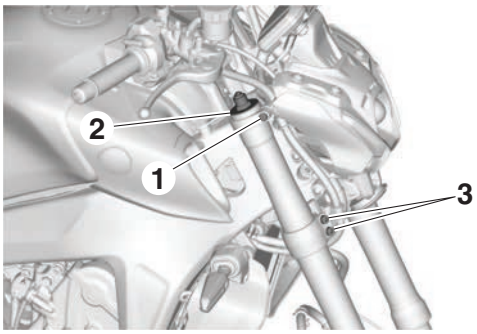
Place the vehicle on a maintenance stand so that the front wheel is elevated.

2. Remove:
   - Front brake caliper
     Refer to "FRONT BRAKE" on page 4-26.
   - Front wheel
     Refer to "FRONT WHEEL" on page 4-11.
3. Loosen:
   - Upper bracket pinch bolt "1"
   - Cap bolt "2"
   - Lower bracket pinch bolt "3"

EWA13640

WARNING

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



4. Remove:
   - Front fork leg

EAS30207
DISASSEMBLING THE FRONT FORK LEGS

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

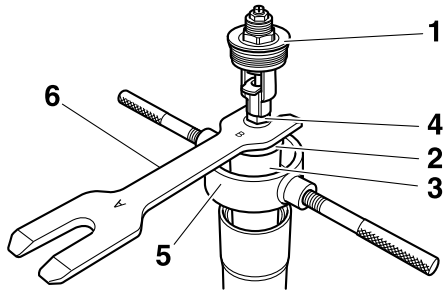
1. Remove:
   - Cap bolt "1"
     (from the damper rod assembly)
   - Washer "2"
   - Spacer "3"
   - Locknut "4"

   a. Press down on the spacer with the fork spring compressor "5".
   b. Install the rod holder "6" between the locknut "4" and the washer "2".

Fork spring compressor
90890-01441
Fork spring compressor
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

TIP

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

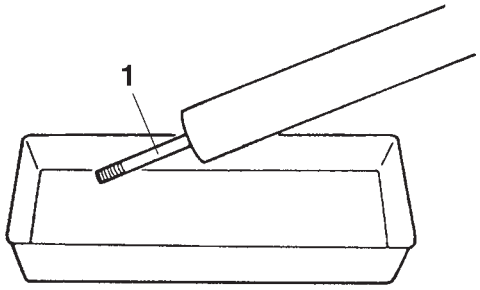


   c. Hold the cap bolt and loosen the locknut.
   d. Remove the cap bolt.
   e. Remove the rod holder and fork spring compressor.
   f. Remove the washer, spacer and locknut.

2. Drain:
   - Fork oil

TIP

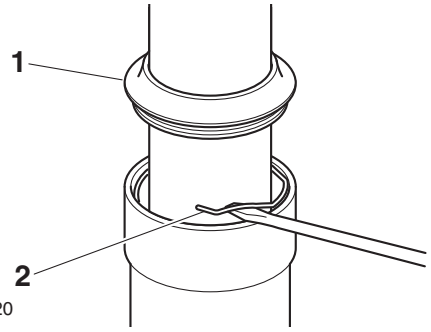
Stroke the damper rod assembly "1" several times while draining the fork oil.



G088919

3. Remove:
   • Dust seal “1”
   • Oil seal clip “2”
     (with a flat-head screwdriver)

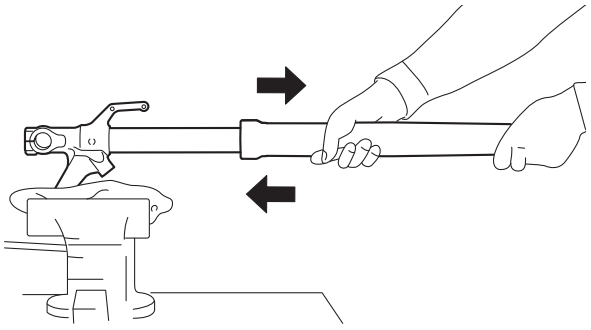
ECA19100
NOTICE
Do not scratch the outer tube.



G088920

4. Remove:
   • Outer tube
   a. Hold the front fork leg horizontally.
   b. Securely clamp the brake caliper bracket in a vise with soft jaws.
   c. Separate the outer tube from the inner tube by pulling the outer tube forcefully but carefully.

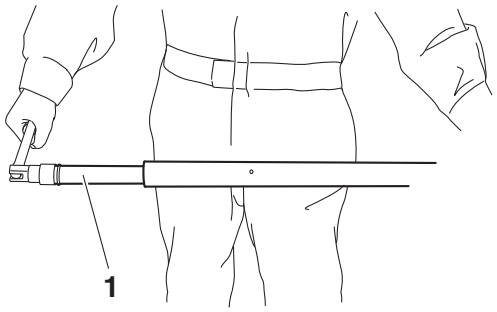
ECA19880
NOTICE
Excessive force will damage the bushings. Damaged bushings must be replaced.



5. Remove:
   • Damper rod assembly bolt
   • Damper rod assembly

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

Damper rod holder (ø27)
90890-01582
Damper rod holder
YM-01582

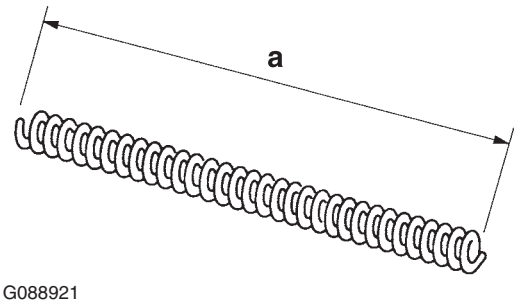


EAS30208
CHECKING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Check:
   • Inner tube
   • Outer tube
     Bends/damage/scratches → Replace.

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
268.9 mm (10.59 in)



G088921

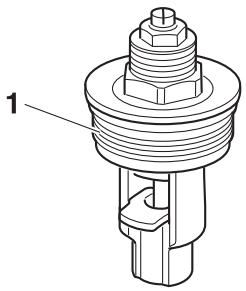
3. Check:
   • Damper rod
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.

ECA19110

NOTICE

• The front fork leg has a very sophisticated internal construction, which are particularly sensitive to foreign material.
• When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

4. Check:
   • Cap bolt "1"
   Cracks/damage → Replace.



EAS30209

ASSEMBLING THE FRONT FORK LEGS

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

For MT09M/MT09MC:

EWA17090

⚠ WARNING

• Note that the amount of the fork oil is different in the left and right front fork legs. Make sure to fill each of the left and right front fork legs with the specified amount of the fork oil.
• 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.

For MT09SPM/MT09SPMC:

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-ring
• 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.

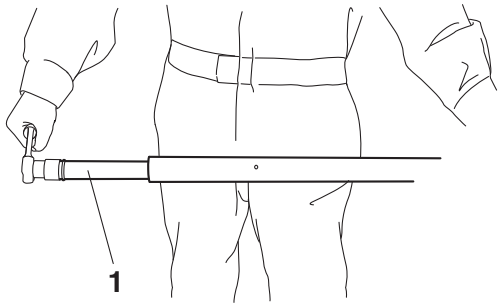
2. Tighten:
   • Damper rod assembly bolt
   (along with the copper washer New)

Front fork damper rod assembly bolt
23 N·m (2.3 kgf·m, 17 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)
90890-01582
Damper rod holder
YM-01582



3. Lubricate:
   • Inner tube's outer surface

Recommended oil
Yamaha Suspension Oil 01

4. Install:
   - Dust seal “1” New
   - Oil seal clip “2” New
   - Oil seal “3” New
   - Washer “4”
   - Outer tube bushing “5” New
   - Inner tube bushing “6” New

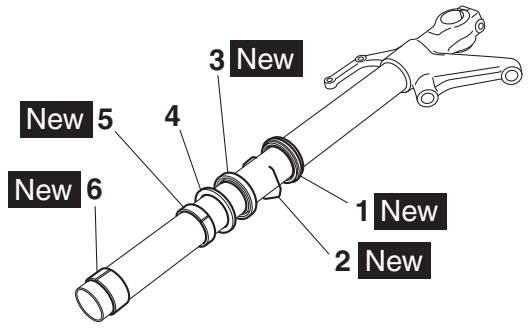
ECA19170

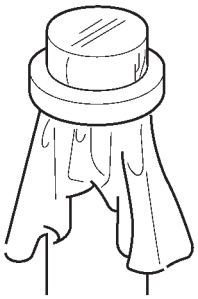
NOTICE

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

TIP

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

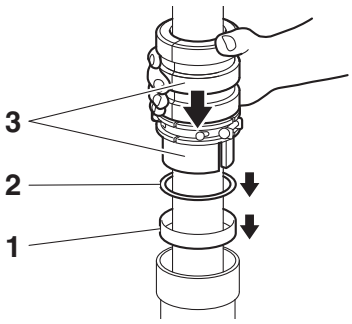




G088922

5. Install:
   - Outer tube
     (to the inner tube)
6. Install:
   - Outer tube bushing “1”
   - Washer “2”
     (with the fork seal driver “3”)

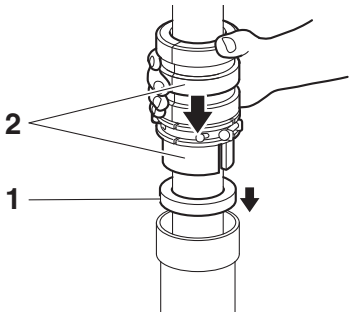
Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



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

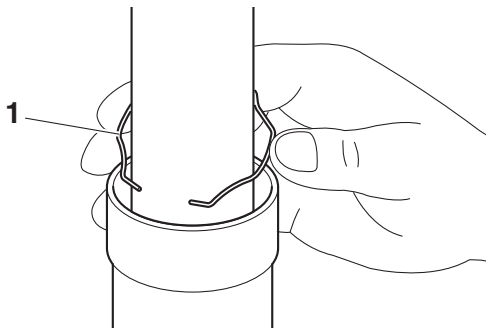


G088924

8. Install:
   - Oil seal clip “1”

TIP

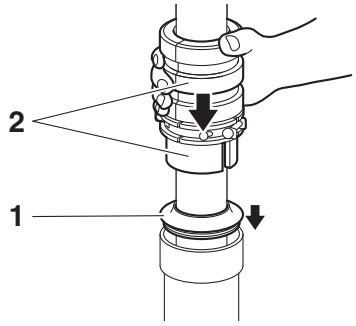
Adjust the oil seal clip so that it fits into the outer tube’s groove.



G088925

9. Install:
   • Dust seal “1”
   (with the fork seal driver “2”)

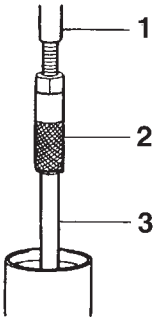
Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



G088926

10. Install:
   • Rod puller “1”
   • Rod puller attachment (M10) “2”
   (onto the damper rod “3”)

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



G088927

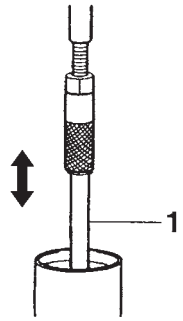
11. Fill:
   • Front fork leg
   (with the specified amount of the recommended fork oil)

Recommended oil
Yamaha Suspension Oil 01
Quantity (left)
468.0 cm³ (15.82 US oz, 16.51 Imp.oz) (MT09M, MT09MC)
473.0 cm³ (15.99 US oz, 16.68 Imp.oz) (MT09SPM, MT09SP-MC)
Quantity (right)
472.0 cm³ (15.96 US oz, 16.65 Imp.oz) (MT09M, MT09MC)
473.0 cm³ (15.99 US oz, 16.68 Imp.oz) (MT09SPM, MT09SP-MC)

ECA14230
NOTICE
- **Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

12. After filling the front fork leg, slowly stroke the damper rod “1” up and down (at least ten times) to distribute the fork oil.

TIP
Be sure to stroke the damper rod slowly because the fork oil may spurt out.



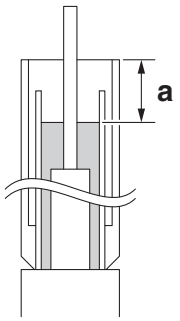
G088929

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

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

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

Level (left)
107 mm (4.2 in) (MT09M, MT09MC)
110 mm (4.3 in) (MT09SPM, MT09SPMC)
Level (right)
107 mm (4.2 in) (MT09M, MT09MC)
110 mm (4.3 in) (MT09SPM, MT09SPMC)



G088930

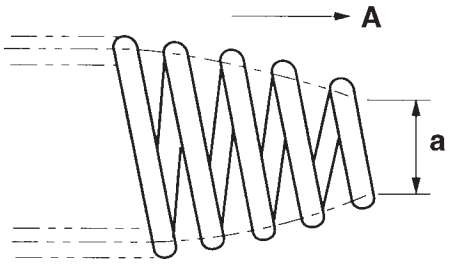
15. Install:
- Fork spring
- Spacer
- Locknut
- Damper adjusting rod (damper rod assembly)
- Washer
- Cap bolt

(along with the O-ring New)

a. Remove the rod puller and rod puller attachment.
b. Install the fork spring.

TIP

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



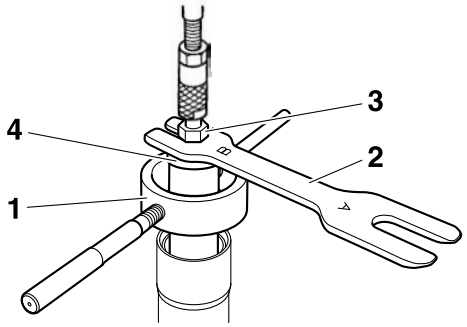
G088931

c. Install the locknut all the way onto the damper rod assembly.
d. Install the rod puller and rod puller attachment.
e. Install the spacer and washer.
f. Install the fork spring compressor.
g. Press down on the spacer with the fork spring compressor "1".
h. Pull up the rod puller and install the rod holder "2" between the locknut "3" and the washer "4".

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
Fork spring compressor
90890-01441
Fork spring compressor
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

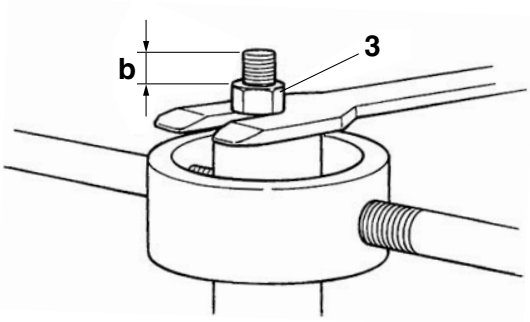
TIP

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



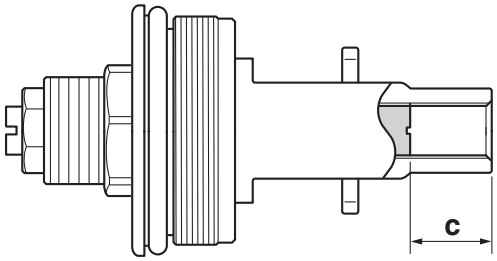
i. Remove the rod puller and rod puller attachment.
j. Position the locknut "3" as distance "b".

Distance "b"
12 mm (0.47 in)



k. Set the cap bolt distance “c” to specification.

	Distance “c” **13 mm (0.51 in)**



l. Install the damper adjusting rod and cap bolt, and then finger tighten the cap bolt.

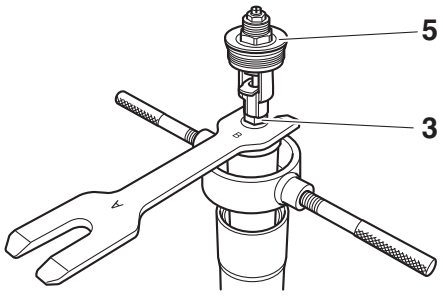
EWA13670

⚠ WARNING

Always use a new cap bolt O-ring.

m. Hold the cap bolt “5” and tighten the locknut “3” to specification.

	Front fork cap bolt locknut **15 N·m (1.5 kgf·m, 11 lb·ft)**



n. Remove the rod holder and fork spring compressor.

16. Install:
- Cap bolt
  (to the outer tube)

TIP

- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS30210

INSTALLING THE FRONT FORK LEGS

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

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

	Installed length (from the top of the outer tube) “a” **211.5 mm (8.33 in)**

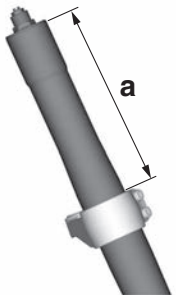
EWA13680

⚠ WARNING

Make sure the brake hoses are routed properly.

TIP

When installing the front fork, set the outer tube with the specified length “a” from the top of the outer tube to the top of the lower bracket.



2. Tighten:
- Lower bracket pinch bolt “1”

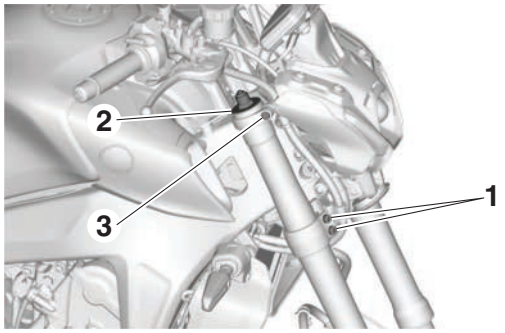
	Lower bracket pinch bolt **23 N·m (2.3 kgf·m, 17 lb·ft)**

- Cap bolt “2”

	Front fork cap bolt **23 N·m (2.3 kgf·m, 17 lb·ft)**

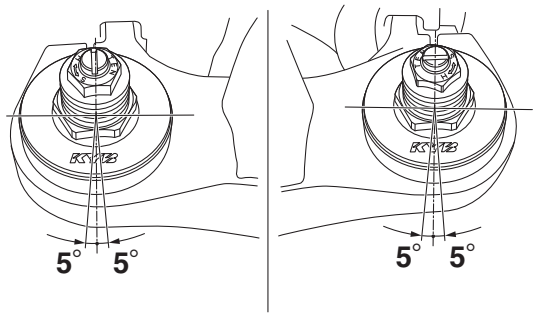
- Upper bracket pinch bolt “3”

	Upper bracket pinch bolt **26 N·m (2.6 kgf·m, 19 lb·ft)**



TIP

For MT09SPM/MT09SPMC:
When installing the front fork legs, make sure that the letters on the cap bolts are positioned within the angle range shown in the illustration.



3. Check:
   • Cable routing

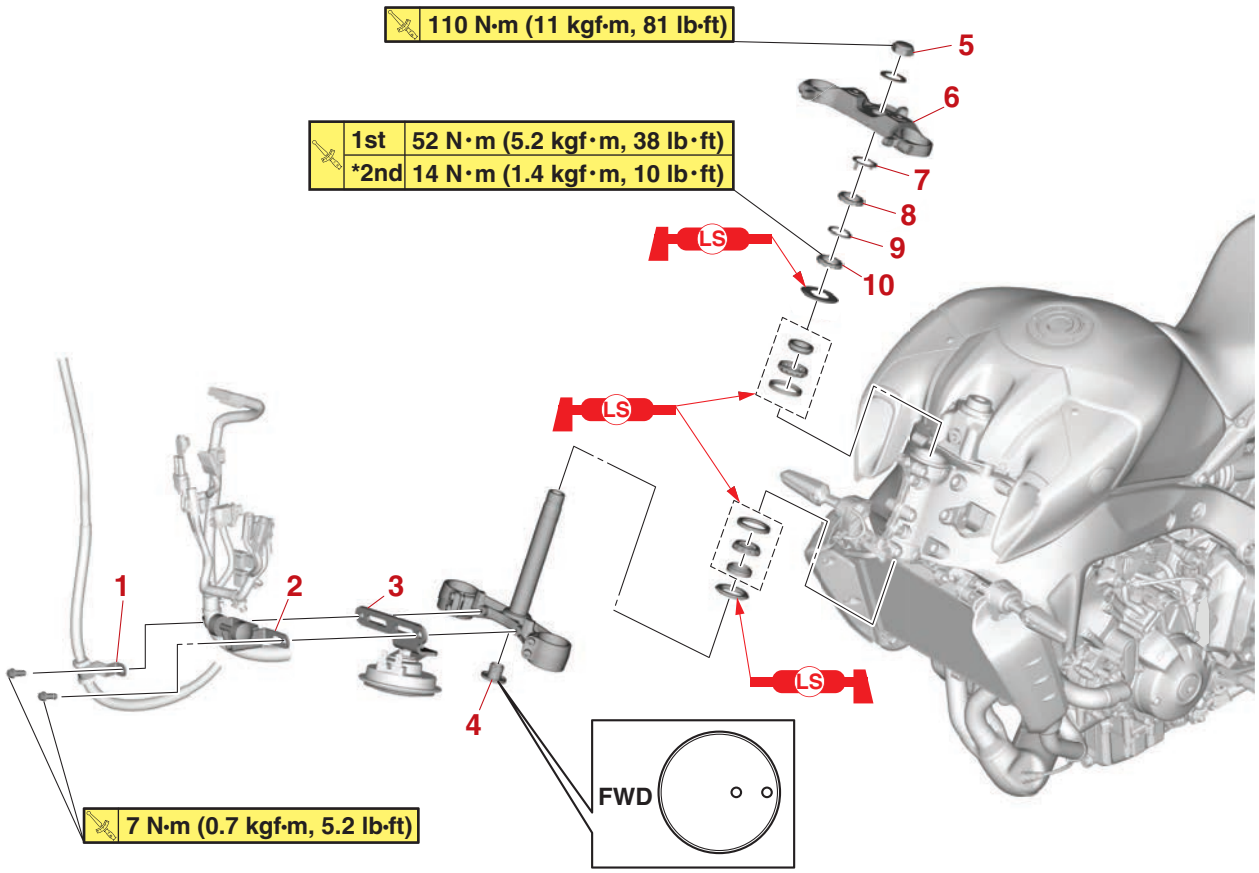
TIP

Make sure the brake hoses, clutch cable, and handlebar switch leads are routed properly. Refer to “CABLE ROUTING” on page 2-15.

4. Adjust:
   • Spring preload
   • Rebound damping
   • Compression damping
   Refer to “ADJUSTING THE FRONT FORK LEGS (for MT09M/MT09MC)” on page 3-21 and “ADJUSTING THE FRONT FORK LEGS (for MT09SPM/MT09SPMC)” on page 3-22.

EAS20035
STEERING HEAD

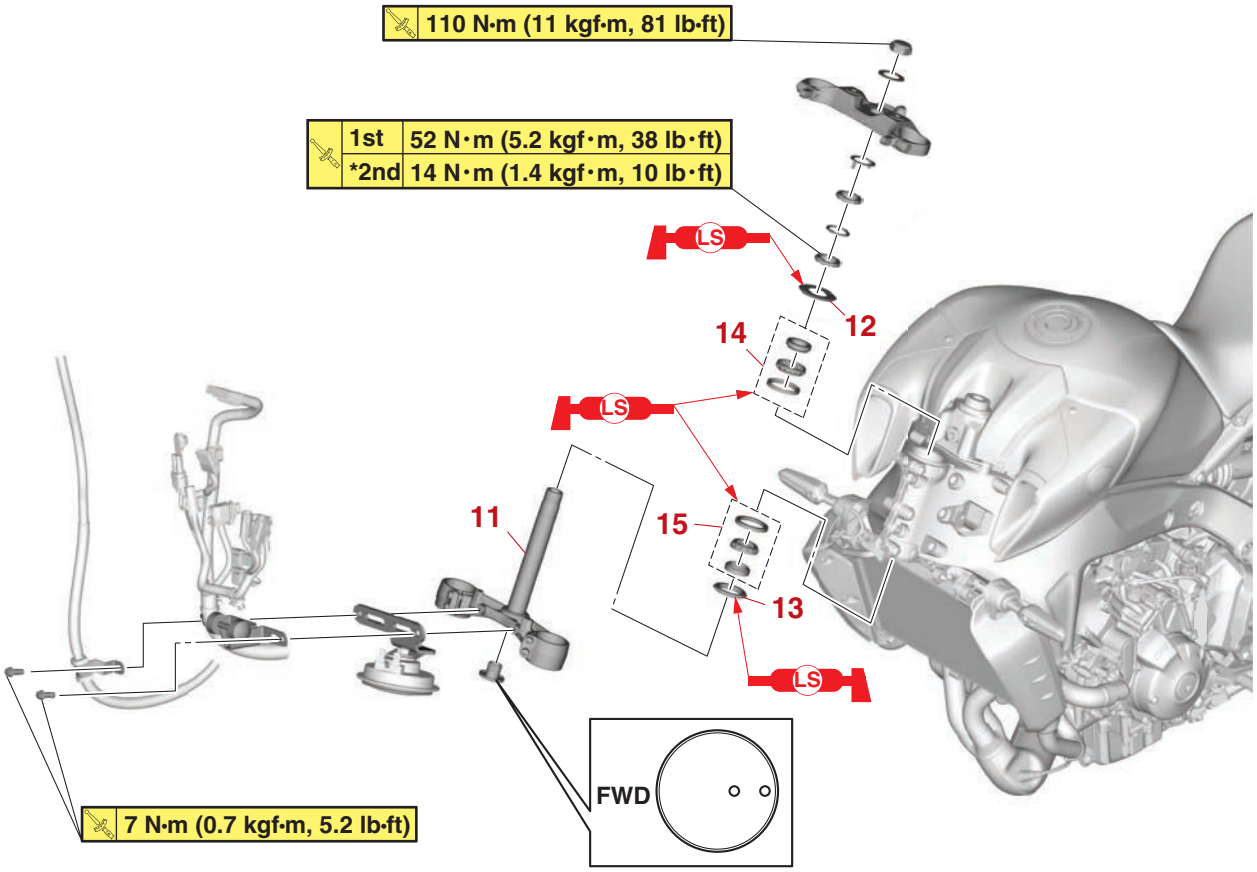
Removing the lower bracket



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

Order	Job/Parts to remove	Q'ty	Remarks
	Meter assembly bracket		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-58.
	Front fork legs		Refer to "FRONT FORK" on page 4-64.
1	Front brake hose bracket	1	
2	Headlight bracket	1	
3	Horn bracket	1	
4	Lower bracket cap	1	
5	Steering stem nut	1	
6	Upper bracket	1	
7	Lock washer	1	
8	Upper ring nut	1	
9	Rubber washer	1	
10	Lower ring nut	1	

Removing the lower bracket



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

Order	Job/Parts to remove	Q'ty	Remarks
11	Lower bracket	1	
12	Bearing cover	1	
13	Lower bearing dust seal	1	
14	Upper bearing	1	
15	Lower bearing	1	

EAS30213
REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

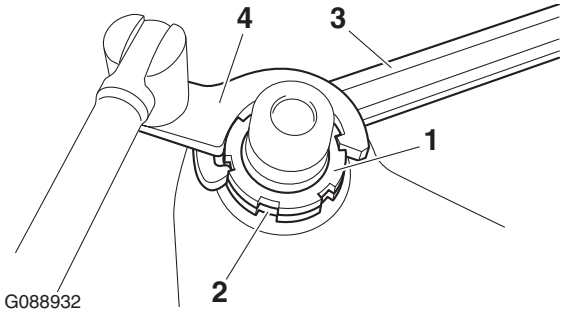
2. Remove:
   - Upper ring nut “1”
   - Rubber washer
   - Lower ring nut “2”
   - Lower bracket

EWA13730
⚠ WARNING

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

TIP
- Hold the lower ring nut with ring nut wrench “3”, and then remove the upper ring nut with the steering nut wrench “4”.
- Remove the lower ring nut with the steering nut wrench.

Ring nut wrench
90890-01268
Spanner wrench
YU-01268
Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



G088932

EAS30214
CHECKING THE STEERING HEAD

1. Wash:
   - Bearing
   - Bearing race

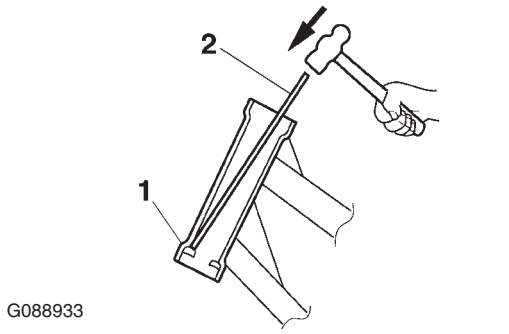
Recommended cleaning solvent
Kerosene

2. Check:
   - Bearing
   - Bearing race
   Damage/pitting → Replace the bearings and bearing races as a set.
3. Replace:
   - Bearing
   - Bearing race
   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.



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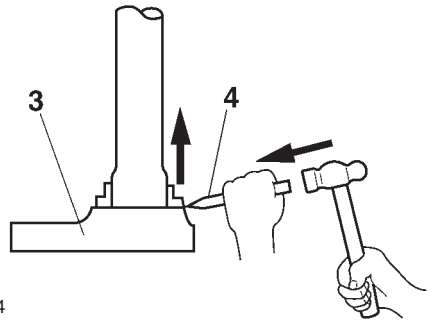


G088934

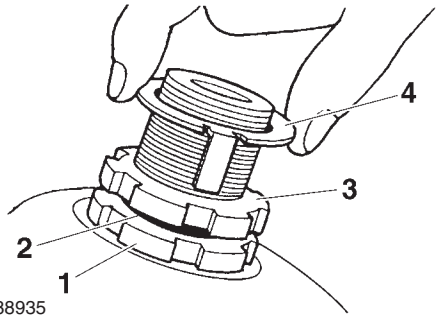
4. Check:
   - Upper bracket
   - Lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

EAS30216
INSTALLING THE STEERING HEAD

1. Lubricate:
   • Upper bearing
   • Lower bearing

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

2. Install:
   • Lower ring nut “1”
   • Rubber washer “2”
   • Upper ring nut “3”
   • Lock washer “4”
   Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-19.



G088935

3. Install:
   • Upper bracket
   • Steering stem nut

TIP
Temporarily tighten the steering stem nut.

4. Install:
   • Front fork legs
   Refer to “FRONT FORK” on page 4-64.

TIP
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
   • Steering stem nut

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

6. Tighten:
   • Lower bracket pinch bolt

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

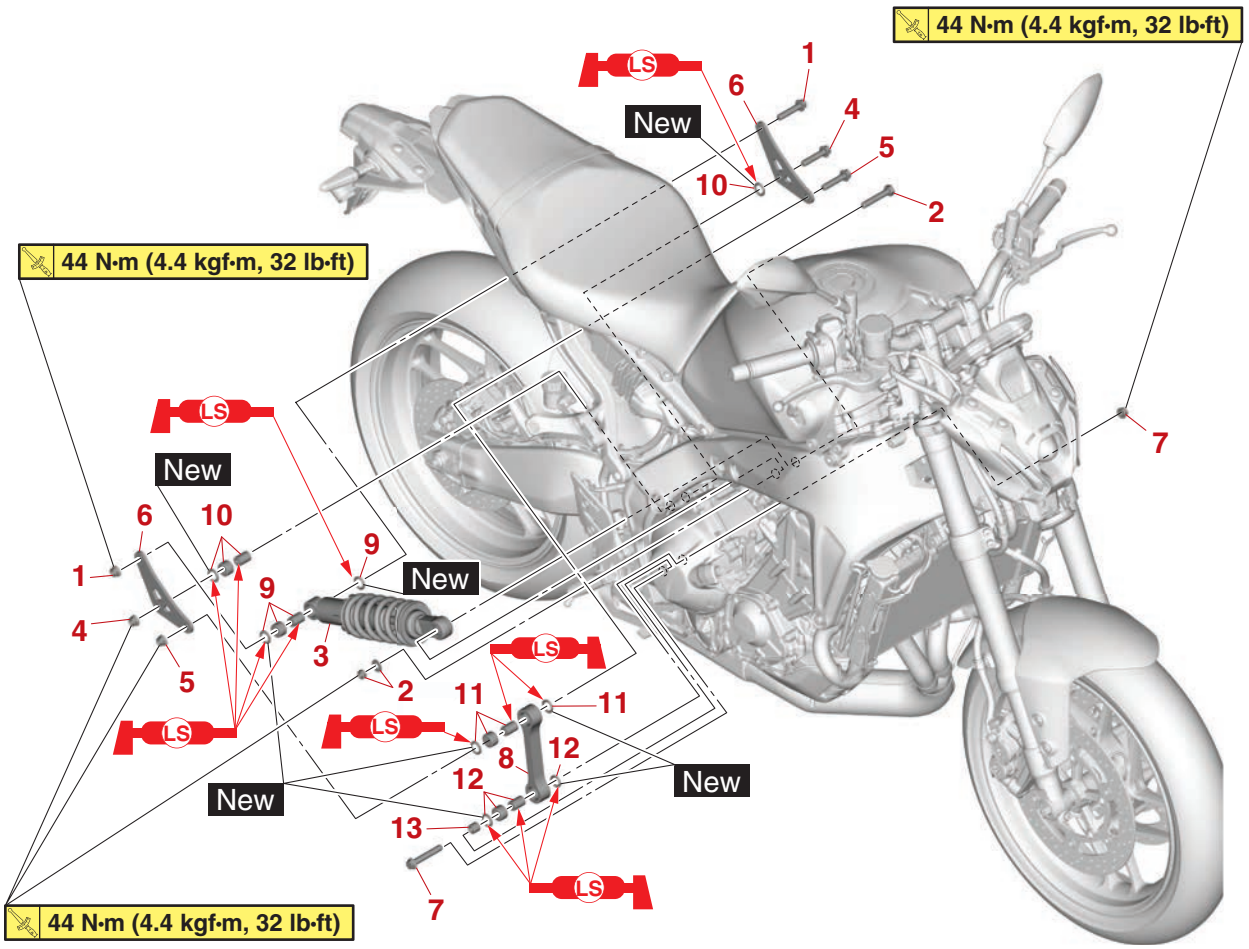
   • Upper bracket pinch bolt

	Upper bracket pinch bolt **26 N·m (2.6 kgf·m, 19 lb·ft)**

EAS20036

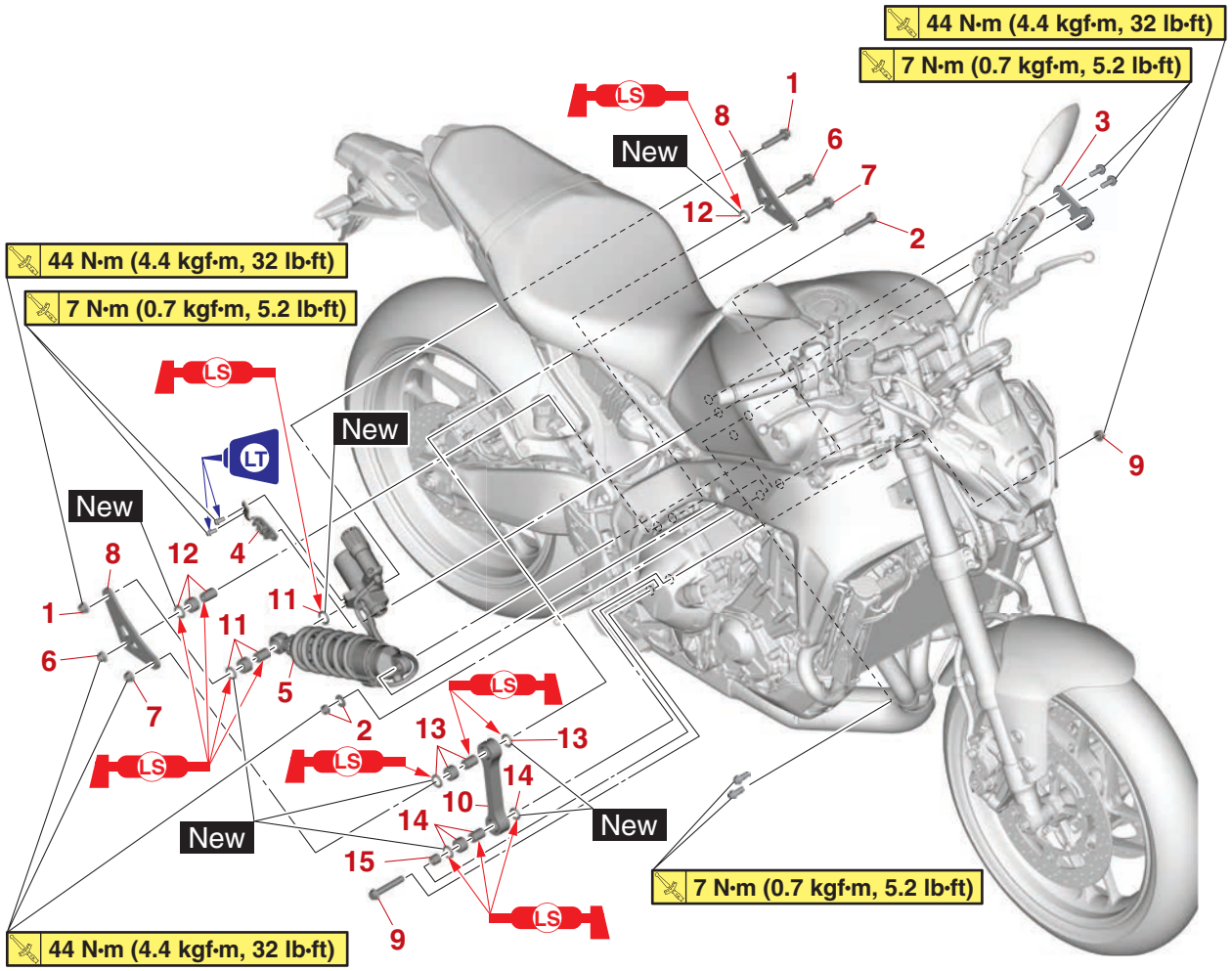
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly (for MT09M/MT09MC)



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear shock absorber assembly lower nut/Bolt	1/1	
2	Rear shock absorber assembly upper nut/ Washer/Bolt	1/1/1	
3	Rear shock absorber assembly	1	
4	Relay arm nut/Bolt	1/1	
5	Connecting arm upper nut/Bolt	1/1	
6	Relay arm	2	
7	Connecting arm lower nut/Bolt	1/1	
8	Connecting arm	1	
9	Collar/Oil seal/Bearing	1/2/1	
10	Collar/Oil seal/Bearing	1/2/1	
11	Collar/Oil seal/Bearing	1/2/1	
12	Collar/Oil seal/Bearing	1/2/1	
13	Collar	1	

Removing the rear shock absorber assembly (for MT09SPM/MT09SPMC)



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear shock absorber assembly lower nut/Bolt	1/1	
2	Rear shock absorber assembly upper nut/ Washer/Bolt	1/1/1	
3	Bracket	1	
4	Gas cylinder bracket	1	
5	Rear shock absorber assembly	1	
6	Relay arm nut/Bolt	1/1	
7	Connecting arm upper nut/Bolt	1/1	
8	Relay arm	2	
9	Connecting arm lower nut/Bolt	1/1	
10	Connecting arm	1	
11	Collar/Oil seal/Bearing	1/2/1	
12	Collar/Oil seal/Bearing	1/2/1	
13	Collar/Oil seal/Bearing	1/2/1	
14	Collar/Oil seal/Bearing	1/2/1	
15	Collar	1	

EAS30826
HANDLING THE REAR SHOCK ABSORBER

EWA13740
⚠ WARNING

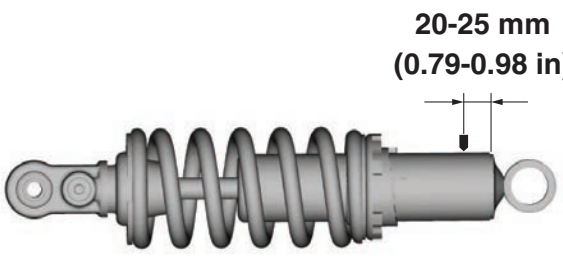
This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

EAS31034
DISPOSING OF A REAR SHOCK ABSORBER (for MT09M/MT09MC)

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 20–25 mm (0.79–0.98 in) from its end as shown.

EWA13760
⚠ WARNING

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

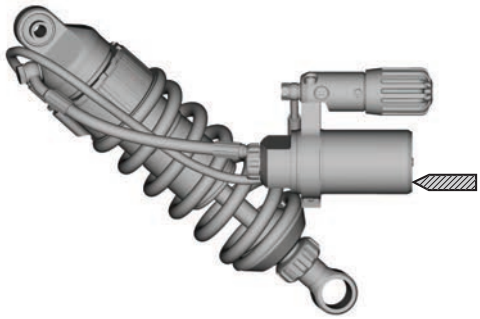


EAS30729
DISPOSING OF A REAR SHOCK ABSORBER (for MT09SPM/MT09SPMC)

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 flat portion of the gas cylinder as shown.

EWA13760
⚠ WARNING

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



EAS30219
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP
- Place the vehicle on a maintenance stand so that the rear wheel is elevated.
- When removing the bolt, hold the swingarm so that it does not drop down.

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/oil leaks → Replace the rear shock absorber assembly.
   - Spring
   - Bushing
     Damage/wear → Replace the rear shock absorber assembly.
   - Hose (for MT09SPM/MT09SPMC)
     Cracks/damage/wear → Replace the rear shock absorber assembly.
   - Bolt
     Bends/damage/wear → Replace.

EAS30221
CHECKING THE CONNECTING ARM AND RELAY ARM
1. Check:
   • Connecting arm
   • Relay arm
   Damage/wear → Replace.
2. Check:
   • Bearing
   Damage/pitting → Replace.
3. Check:
   • Collar
   Damage/scratches → Replace.

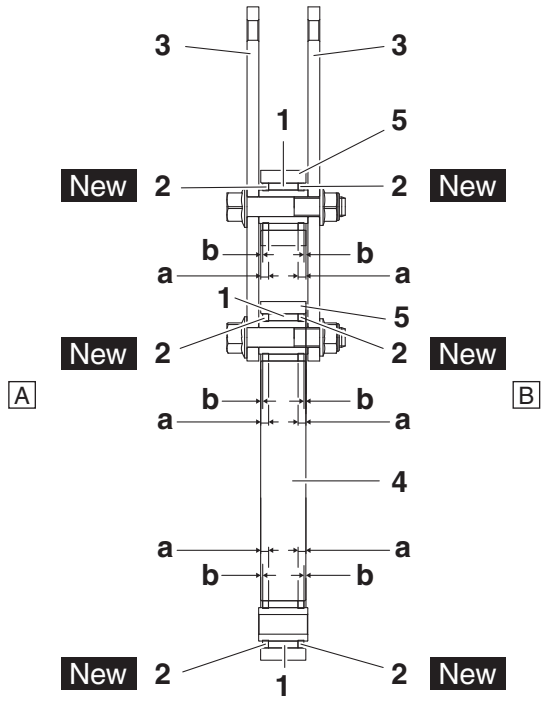
EAS30222
INSTALLING THE RELAY ARM
1. Lubricate:
   • Collar
   • Oil seal New

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

2. Install:
   • Bearing "1"
   (to the connecting arm and swingarm)
   • Oil seal "2" New
   (connecting arm and swingarm)

	Installed depth "a" **4 mm (0.16 in)** **Installed depth "b"** **0–1.0 mm (0–0.04 in)**

TIP
- When installing the oil seals "2" to the relay arm, face the character stamp of the oil seals outside.
- Install the connecting arm upper bolt and relay arm bolt from the left.



3. Relay arm
4. Connecting arm
5. Swingarm

A. Left side
B. Right side

3. Tighten:
   • Connecting arm upper nut
   • Relay arm nut

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

EAS30225
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY
1. Install:
   • Gas cylinder bracket bolt (for MT09SPM/MT09SPMC)
   • Rear shock absorber assembly
   • Bracket bolt (for MT09SPM/MT09SPMC)
   • Rear shock absorber assembly upper bolt
   • Rear shock absorber assembly upper nut
   • Rear shock absorber assembly lower bolt
   • Rear shock absorber assembly lower nut

TIP

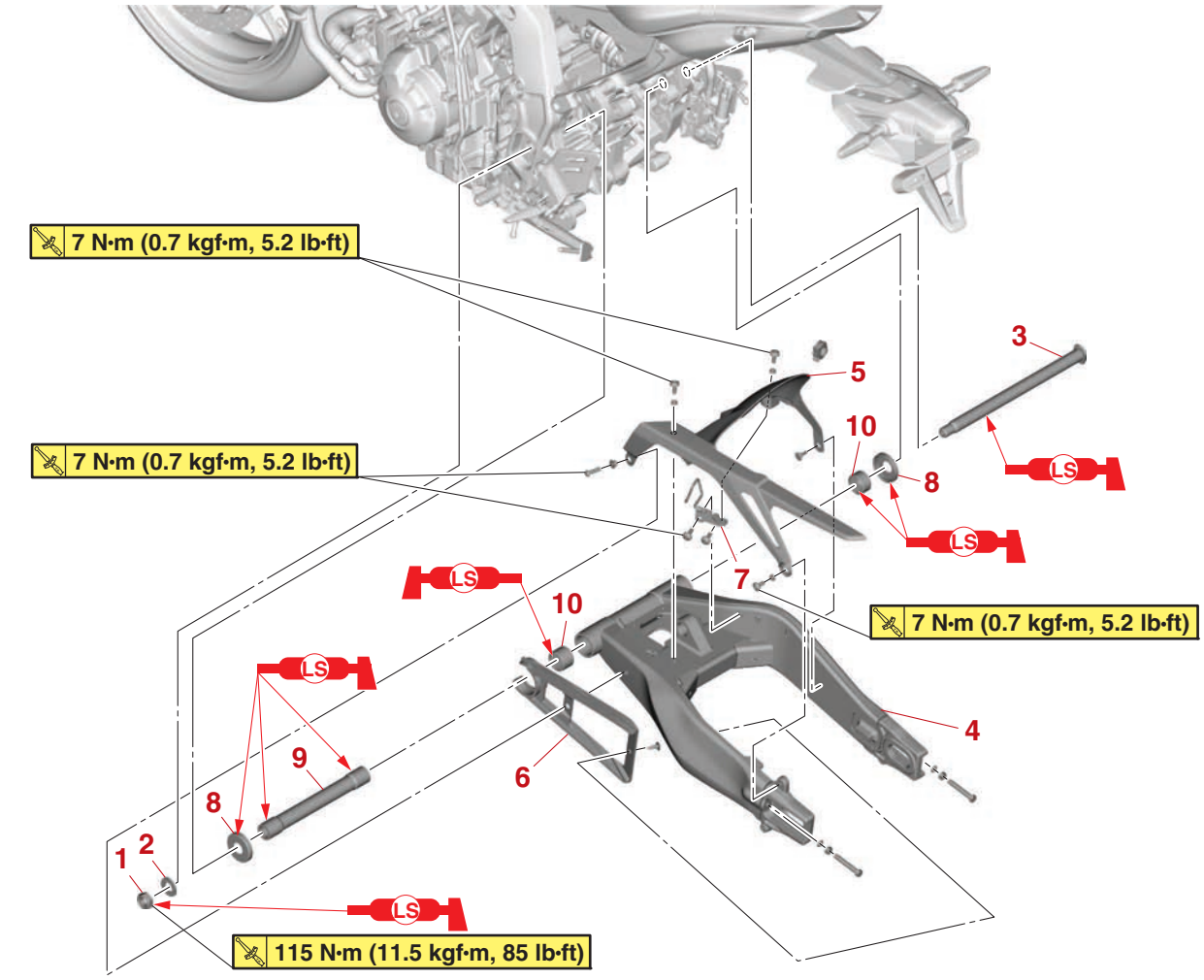
- Install the rear shock absorber assembly upper bolt and rear shock absorber assembly lower bolt from the left.
- When installing the rear shock absorber assembly, lift up the swingarm.

2. Tighten:
   - Gas cylinder bracket bolt (for MT09SPM/MT09SPMC)
   - Bracket bolt (for MT09SPM/MT09SPMC)
   - Rear shock absorber assembly upper nut
   - Rear shock absorber assembly lower nut

Gas cylinder bracket bolt (for MT09SPM/MT09SPMC)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
LOCTITE®
Bracket bolt (for MT09SPM/MT09SPMC)
7 N·m (0.7 kgf·m, 5.2 lb·ft)
Rear shock absorber assembly upper nut
44 N·m (4.4 kgf·m, 32 lb·ft)
Rear shock absorber assembly lower nut
44 N·m (4.4 kgf·m, 32 lb·ft)

EAS20037
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-38.
	Rear wheel		Refer to "REAR WHEEL" on page 4-18.
	Relay arm nut/Bolt		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-79.
1	Pivot shaft nut	1	
2	Washer	1	
3	Pivot shaft	1	
4	Swingarm	1	
5	Rear fender	1	
6	Drive chain guide	1	
7	Bracket	1	
8	Dust cover	2	
9	Collar	1	
10	Bearing	2	

EAS30226
REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

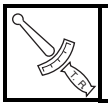
Securely support the vehicle so that there is no danger of it falling over.

TIP

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

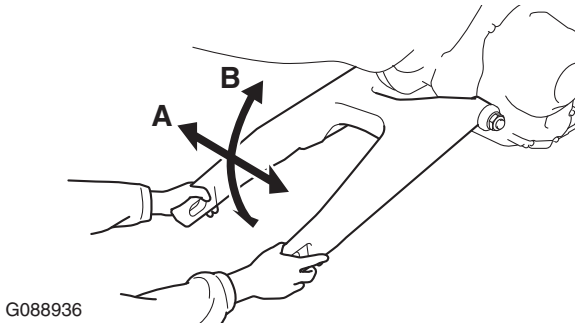
2. Measure:
   - Swingarm side play
   - Swingarm vertical movement

   a. Measure the tightening torque of the pivot shaft nut.

	**Pivot shaft nut** **115 N·m (11.5 kgf·m, 85 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, and dust covers.

   c. Check the swingarm vertical movement "B" by moving the swingarm up and down.
   If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, collar, bearings, and dust covers.



3. Remove:
   - Swingarm

EAS30227
CHECKING THE SWINGARM

1. Check:
   - Swingarm
   Bends/cracks/damage → Replace.
2. Check:
   - Pivot shaft
   Roll the pivot shaft on a flat surface.
   Bends → Replace.

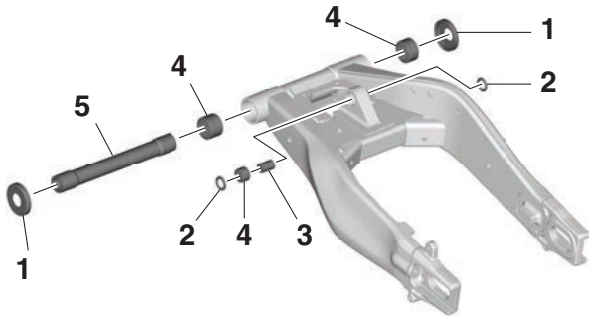
EWA13770
⚠ WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:
   - Pivot shaft
   - Dust cover
   - Collar

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

4. Check:
   - Dust cover "1"
   - Oil seal "2"
   Damage/wear → Replace.
   - Collar "3"
   Damage/scratches → Replace.
   - Bearing "4"
   Damage/pitting → Replace.
   - Collar "5"
   Damage/scratches → Replace.



EAS30228
INSTALLING THE SWINGARM

1. Lubricate:
   - Dust cover
   - Pivot shaft
   - Bearing
   - Oil seal New
   - Collar

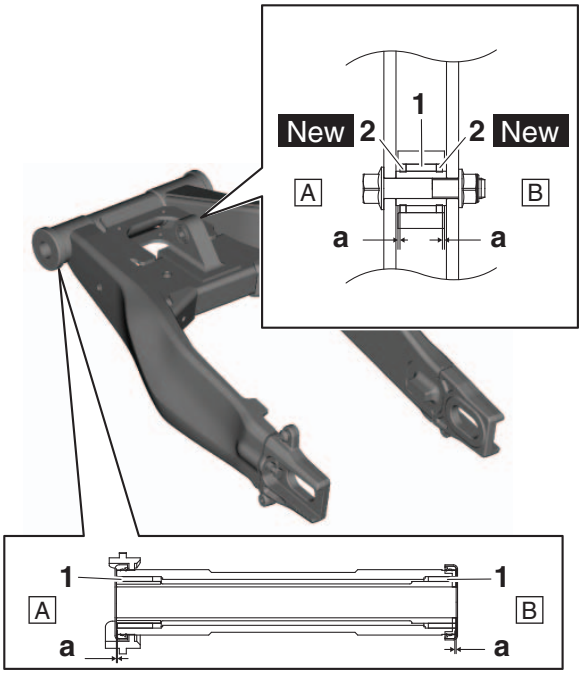
	**Recommended lubricant** **Lithium-soap-based grease**

2. Install:
   - Bearing "1"
   (to the swingarm)
   - Oil seal "2" New
   (to the swingarm)

	**Installed depth "a"** **0–1.0 mm (0–0.04 in)**

TIP

When installing the oil seals to the swingarm, face the character stamp of the oil seals outside.



A. Left side
B. Right side

3. Install:
   • Swingarm
   • Pivot shaft

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

4. Install:
   • Pivot shaft nut
   a. Lubricate the pivot shaft nut mating surface with lithium-soap-based grease, and then tighten it to specification.

	Pivot shaft nut **115 N·m (11.5 kgf·m, 85 lb·ft)**

TIP

Do not allow grease to contact the pivot shaft nut threads.

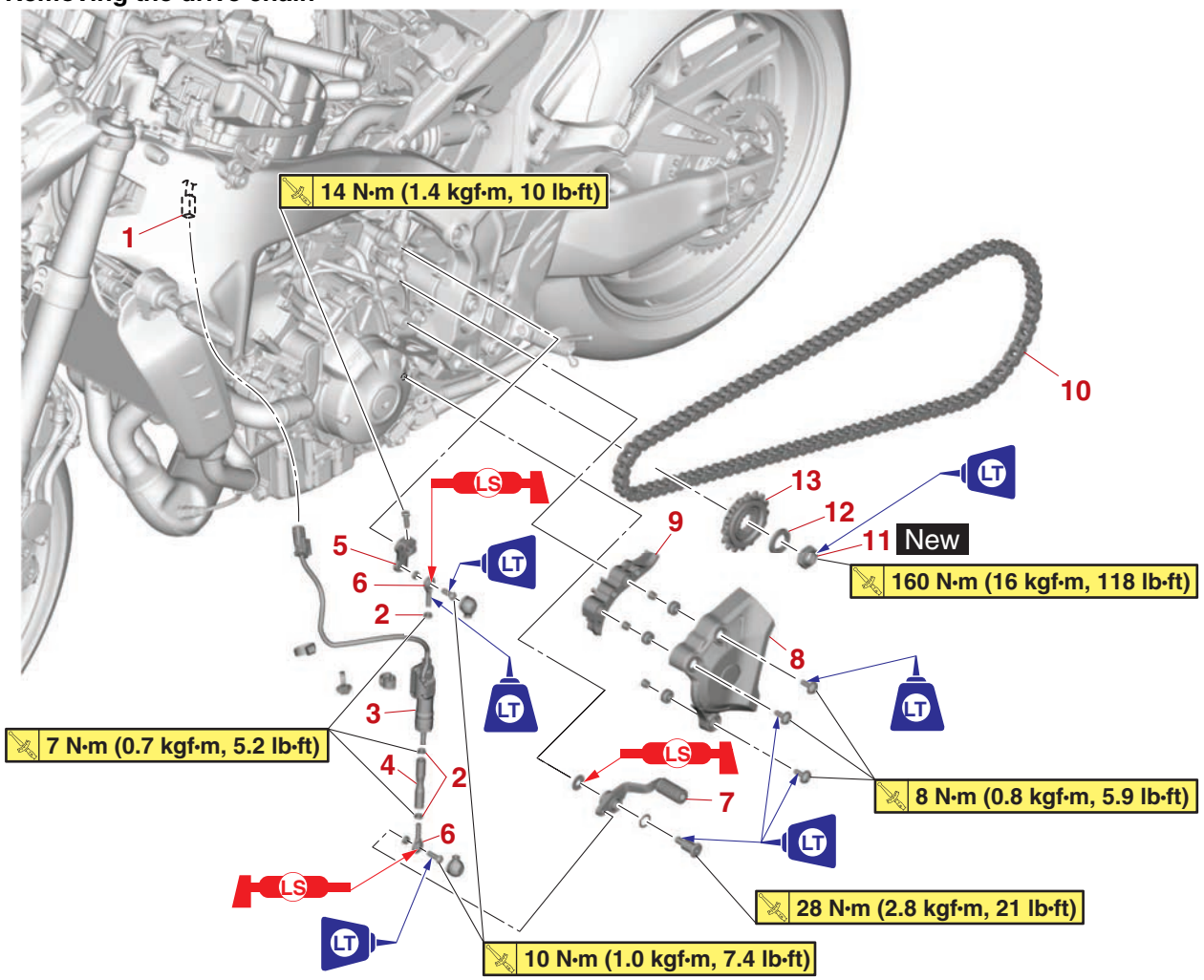
5. Install:
   • Rear wheel
   Refer to "REAR WHEEL" on page 4-18.

6. Adjust:
   • Drive chain slack
   Refer to "DRIVE CHAIN SLACK" on page 3-17.

	Drive chain slack (Sidestand) **36.0–41.0 mm (1.42–1.61 in)** **Drive chain slack (Maintenance stand)** **36.0–41.0 mm (1.42–1.61 in)** **Drive chain slack limit (Sidestand)** **46.0 mm (1.81 in)**

EAS20038
CHAIN DRIVE

Removing the drive chain



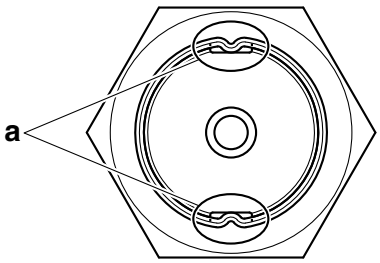
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Shift sensor coupler	1	Disconnect.
2	Locknut	3	
3	Shift sensor	1	
4	Shift rod	1	
5	Shift arm	1	
6	Shift rod joint	2	
7	Shift pedal	1	
8	Drive sprocket cover	1	
9	Drive chain guide	1	
10	Drive chain	1	
11	Drive sprocket nut	1	
12	Washer	1	
13	Drive sprocket	1	

EAS30229
REMOVING THE DRIVE CHAIN
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Straighten the drive sprocket nut ribs “a”.



3. Loosen:
   • Drive sprocket nut

TIP

Loosen the drive sprocket nut while pressing the brake pedal.

4. Remove:
   • Drive chain

ECA17410
NOTICE

Be sure to put on safety goggles when working.

TIP

Cut the drive chain with the drive chain cut & rivet tool.

Drive chain cut & rivet tool
90890-01550
Drive chain cut & rivet tool
YM-01550

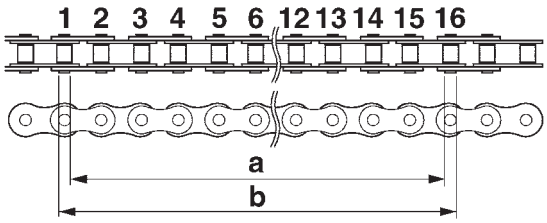
EAS30230
CHECKING THE DRIVE CHAIN
1. Measure:
   • 15-link section length “c” of the drive chain
   Out of specification → Replace the drive chain.

15-link length limit
239.3 mm (9.42 in)

a. Measure the length “a” between the inner sides of the pins and the length “b” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
b. Calculate the 15-link section length “c” of the 15-link section of the drive chain using the following formula.
   Drive chain 15-link section length “c” = (length “a” between pin inner sides + length “b” between pin outer sides)/2

TIP

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



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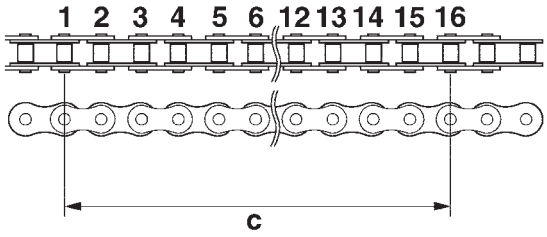
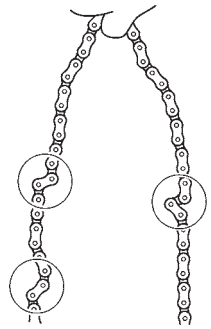


G088938

2. Check:
   • Drive chain
   Stiffness → Clean and lubricate or replace.



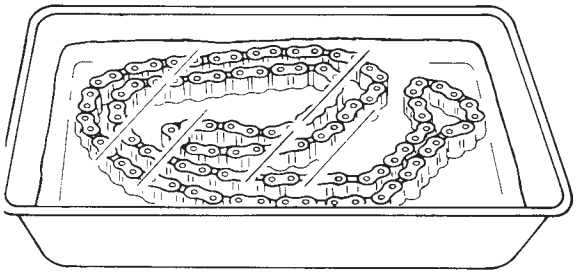
G088939

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.

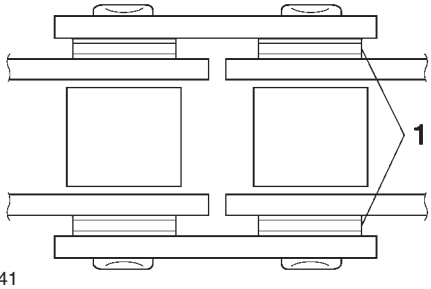
ECA19090

NOTICE

• This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.
• Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.

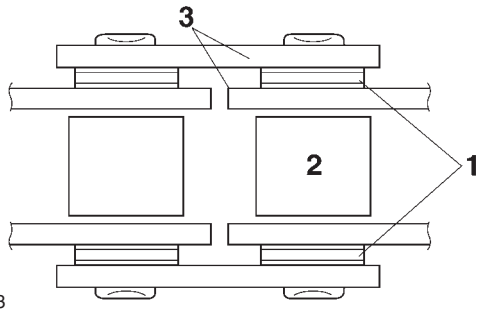


G088940



G088941

4. Check:
   • O-ring "1"
   Damage → Replace the drive chain.
   • Drive chain roller "2"
   Damage/wear → Replace the drive chain.
   • Drive chain side plate "3"
   Damage/wear/cracks → Replace the drive chain.



G088943

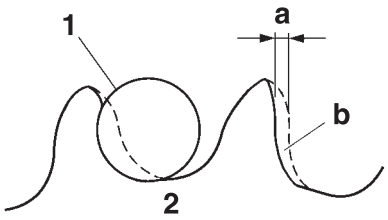
5. Lubricate:
   • Drive chain

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

EAS30231

CHECKING THE DRIVE SPROCKET

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



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 4-22.

EAS30233

CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-21.

EAS30234
INSTALLING THE DRIVE CHAIN

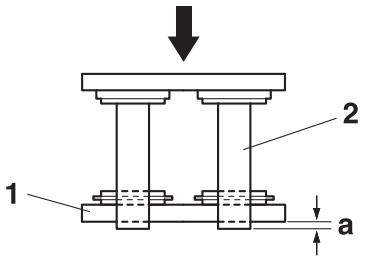
1. Install:
   • Drive chain

ECA17410
NOTICE
Be sure to put on safety goggles when working.

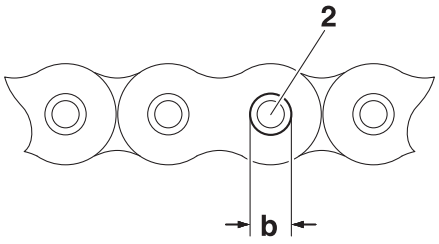
TIP
Install the drive chain joint with the drive chain cut & rivet tool.

Drive chain cut & rivet tool
90890-01550
Drive chain cut & rivet tool
YM-01550

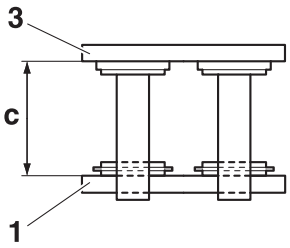
a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).



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 14.35–14.55 mm (0.565–0.573 in).



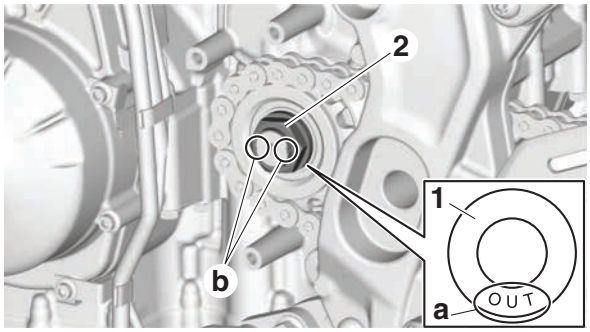
2. Lubricate:
   • Drive chain

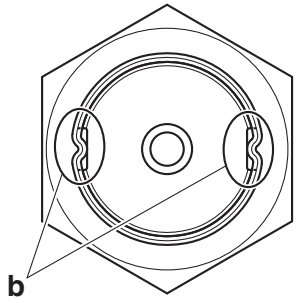
Recommended lubricant
Chain lubricant suitable for O-ring chains

3. Install:
   • Drive sprocket
   • Washer "1"
   • Drive sprocket nut "2" New

Drive sprocket nut
160 N·m (16 kgf·m, 118 lb·ft)
LOCTITE®

TIP
- Thoroughly clean all the drive sprocket nut seat and threads of drive axle.
- While applying the rear brake, tighten the drive sprocket nut.
- Install washer "1" with the "OUT" mark "a" facing out.
- Stake the drive sprocket nut "2" at cutouts "b" in the drive axle securely.



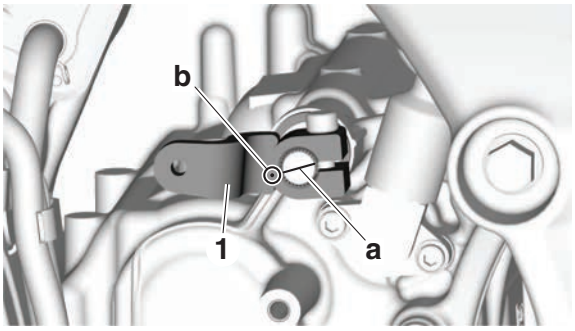


4. Install:
   • Shift arm “1”

TIP

Before installing, make sure to align the mark “a” of the shift shaft with the punch mark “b” of the shift arm.

Shift arm bolt
14 N·m (1.4 kgf·m, 10 lb·ft)

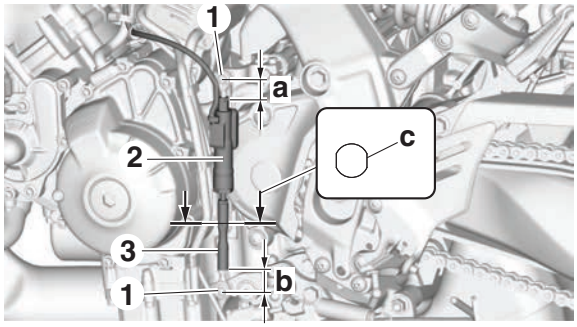


5. Install:
   • Shift rod joint “1”
   • Shift sensor “2”
   • Shift rod “3”

TIP

- Install the shift rod joint and shift sensor in the direction shown in the illustration.
- The allowable twist of the shift rod joint and shift sensor is ±5°.
- Install the shift rod so that the side “c” faces upward as shown in the illustration.

Shift rod joint bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®
Shift sensor locknut
7 N·m (0.7 kgf·m, 5.2 lb·ft)



a. 24 mm (0.94 in)
b. 24.4 mm (0.96 in)

6. Adjust:
   • Installed shift rod length
   Refer to “ADJUSTING THE SHIFT PEDAL” on page 4-92.
7. Adjust:
   • Drive chain slack
   Refer to “DRIVE CHAIN SLACK” on page 3-17.

Drive chain slack (Sidestand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack (Maintenance stand)
36.0–41.0 mm (1.42–1.61 in)
Drive chain slack limit (Sidestand)
46.0 mm (1.81 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 swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

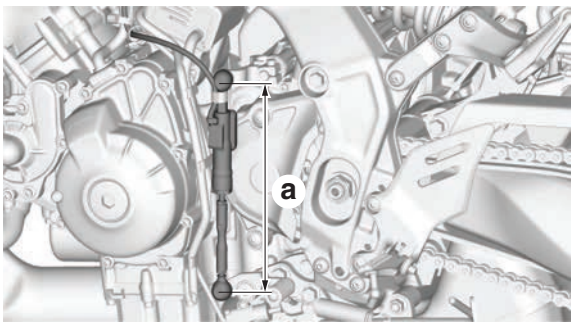
EAS31729
ADJUSTING THE SHIFT PEDAL

TIP

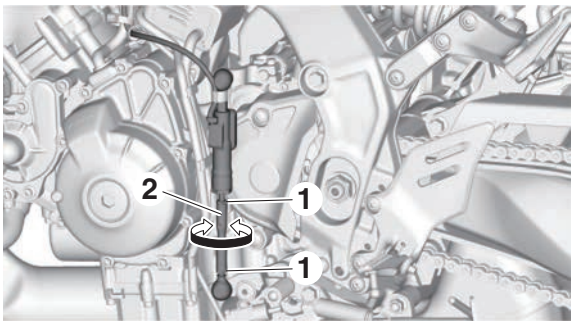
The shift pedal position is determined by the installed shift rod length.

1. Measure:
   • Installed shift rod length “a”
   Incorrect → Adjust.

	Installed shift rod length **236.4–238.4 mm (9.31–9.39 in)**



2. Adjust:
   • Installed shift rod length
   a. Loosen both locknuts “1”.
   b. Turn the shift rod “2” until the specified installed shift rod length is obtained.



   c. Tighten both locknuts.

TIP

Be sure to place the shift rod joints in parallel. The allowable twist of the shift rod joints is ±5°.

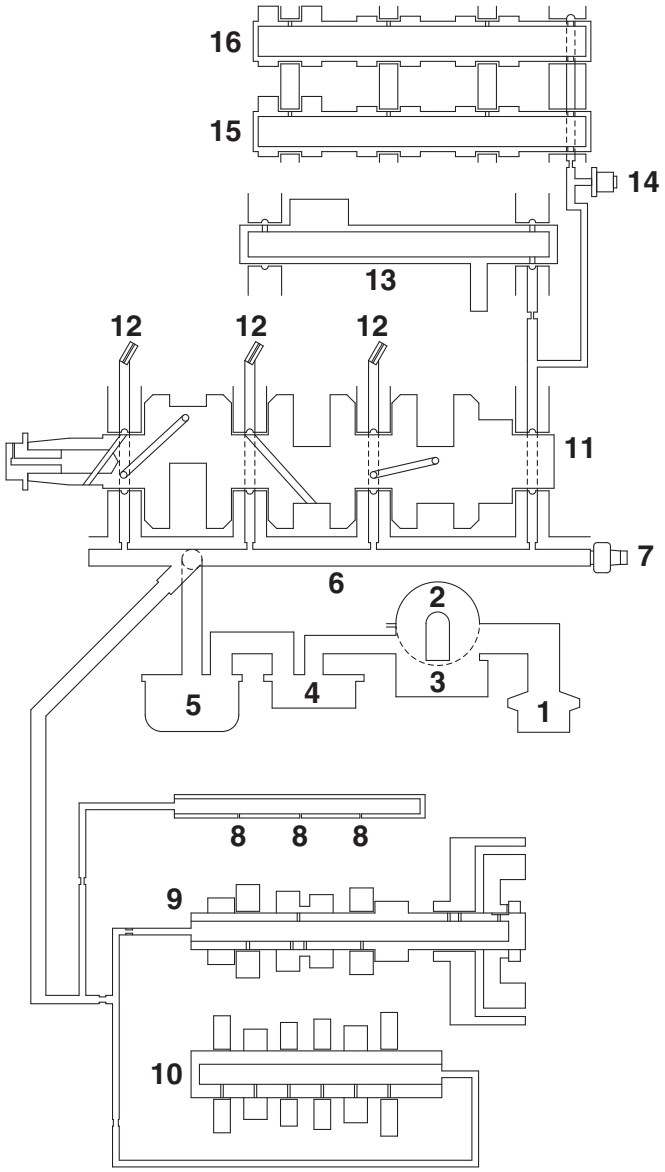
	Shift rod locknut **7 N·m (0.7 kgf·m, 5.2 lb·ft)**

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

ENGINE

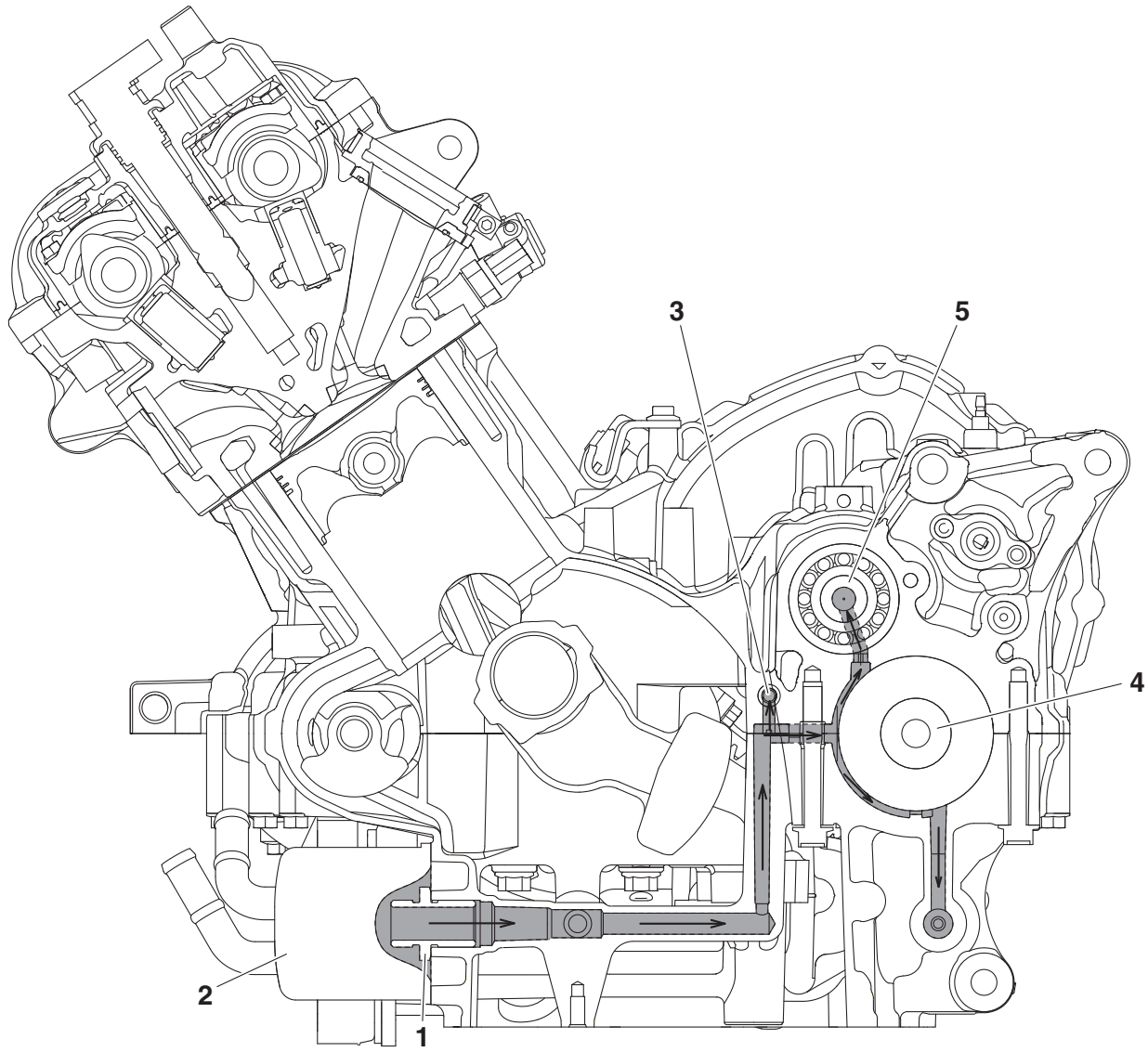
EAS20298
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS32362
ENGINE OIL LUBRICATION CHART

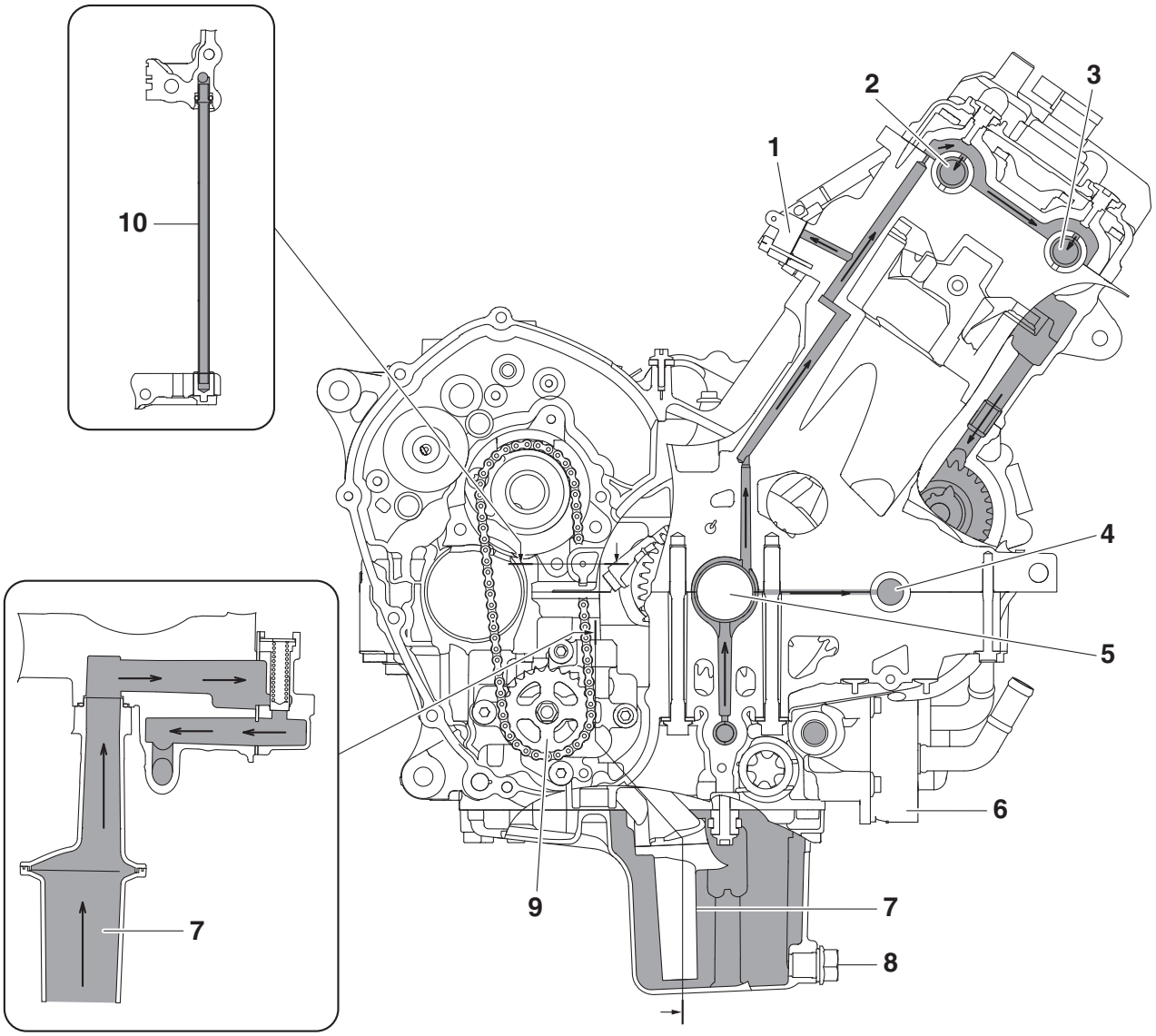


1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter cartridge
6. Main gallery
7. Oil pressure switch
8. Mission shower
9. Main axle
10. Drive axle
11. Crankshaft
12. Oil nozzle
13. Balancer shaft
14. Timing chain tensioner
15. Intake camshaft
16. Exhaust camshaft

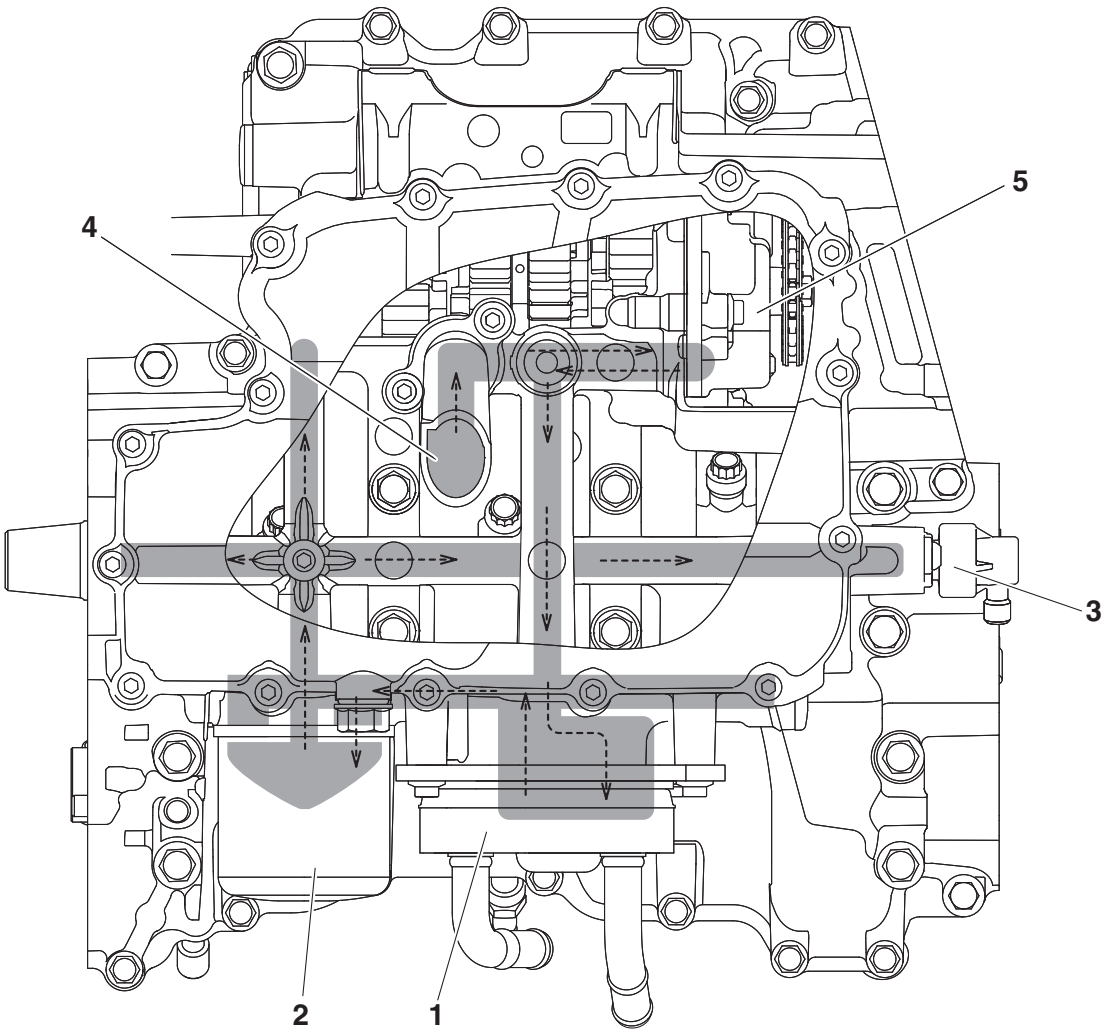
EAS32363
LUBRICATION DIAGRAMS



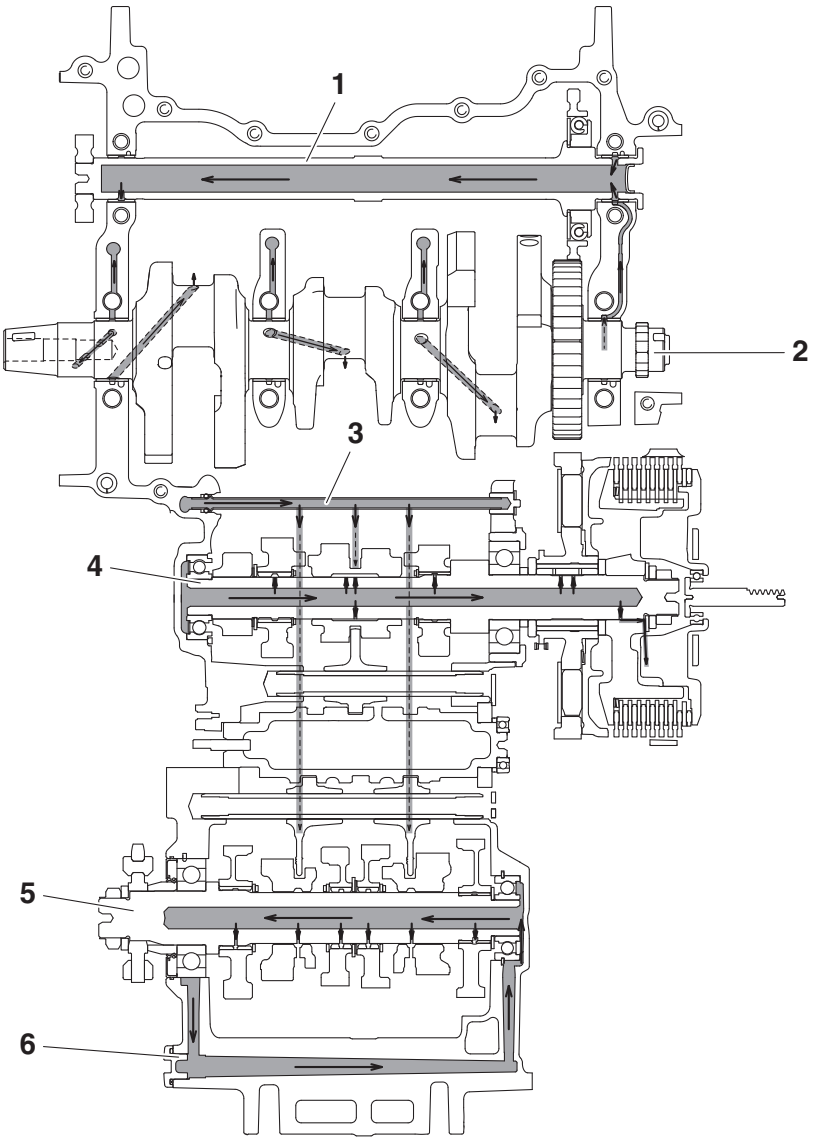
1. Oil filter cartridge union bolt
2. Oil filter cartridge
3. Oil delivery pipe
4. Drive axle
5. Main axle



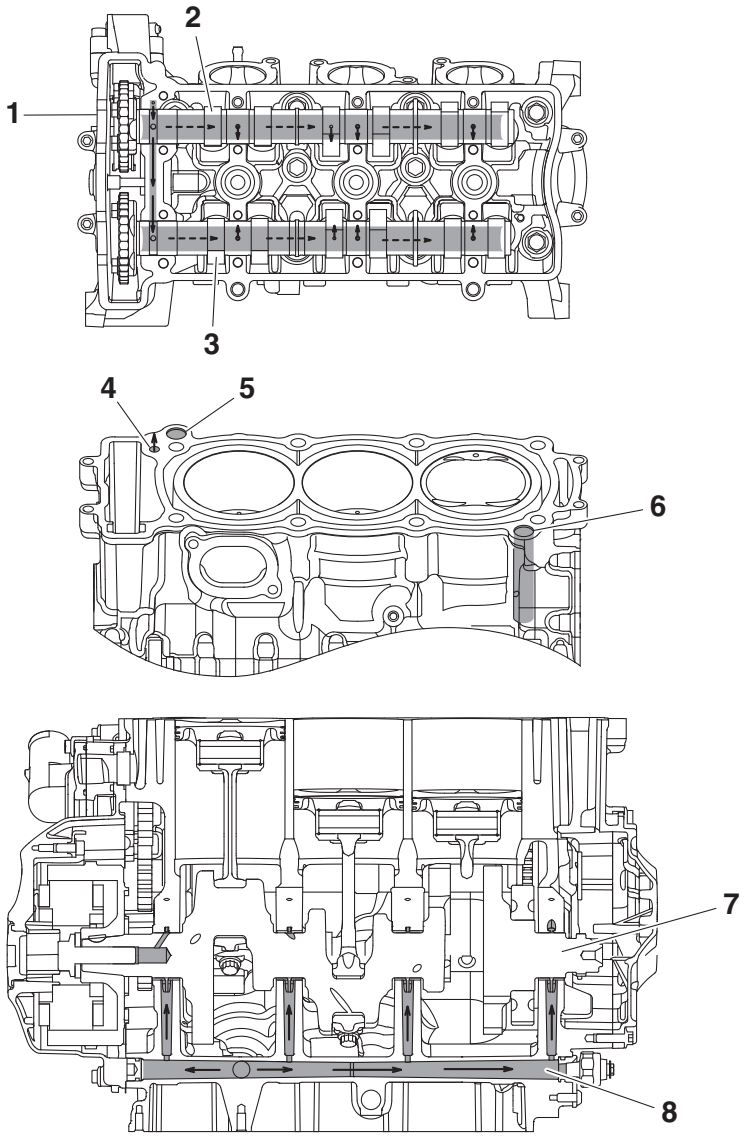
1. Timing chain tensioner
2. Intake camshaft
3. Exhaust camshaft
4. Balancer shaft
5. Crankshaft
6. Oil cooler
7. Oil strainer
8. Oil drain bolt
9. Oil pump driven sprocket
10. Oil delivery pipe



1. Oil cooler
2. Oil filter cartridge
3. Oil pressure switch
4. Oil strainer
5. Oil pump



1. Balancer shaft
2. Crankshaft
3. Oil delivery pipe
4. Main axle
5. Drive axle
6. Oil gallery bolt



1. Cylinder head
2. Intake camshaft
3. Exhaust camshaft
4. Oil passage to the cylinder head
5. Oil passage to the clutch chamber
6. Oil return passage from the cylinder head
7. Crankshaft
8. Main gallery

EAS20041
ENGINE INSPECTION

EAS30249
MEASURE THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS (2)" on page 4-10.
   - Ignition coil
   - Spark plug
     Refer to "CAMSHAFTS" on page 5-16.

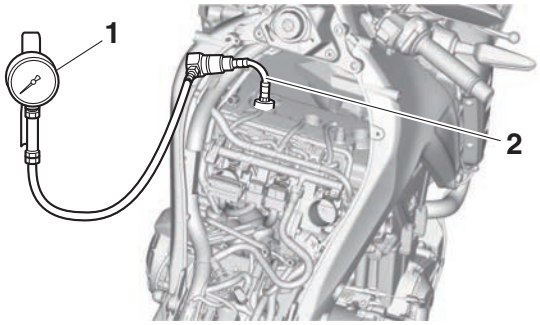
ECA13340

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.

4. Install:
   - Compression gauge "1"
   - Extension "2"

Compression gauge
90890-03081
Engine compression tester
YU-33223
Compression gauge extension 122mm
90890-04136
Compression gauge extension 122mm
YM-04136



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

Compression pressure
1365–1758 kPa/600 r/min (13.7–17.6 kgf/cm²/600 r/min, 194.3–250.1 psi/600 r/min)

   a. Set the main switch to "ON".
   b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA17100

⚠ WARNING

To prevent sparking the plug, remove all ignition coil couplers and fuel injector couplers before cranking the engine.

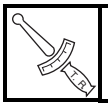
TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 15 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	Piston, valves, cylinder head gasket possibly defective → Repair.

6. Install:
   • Spark plug

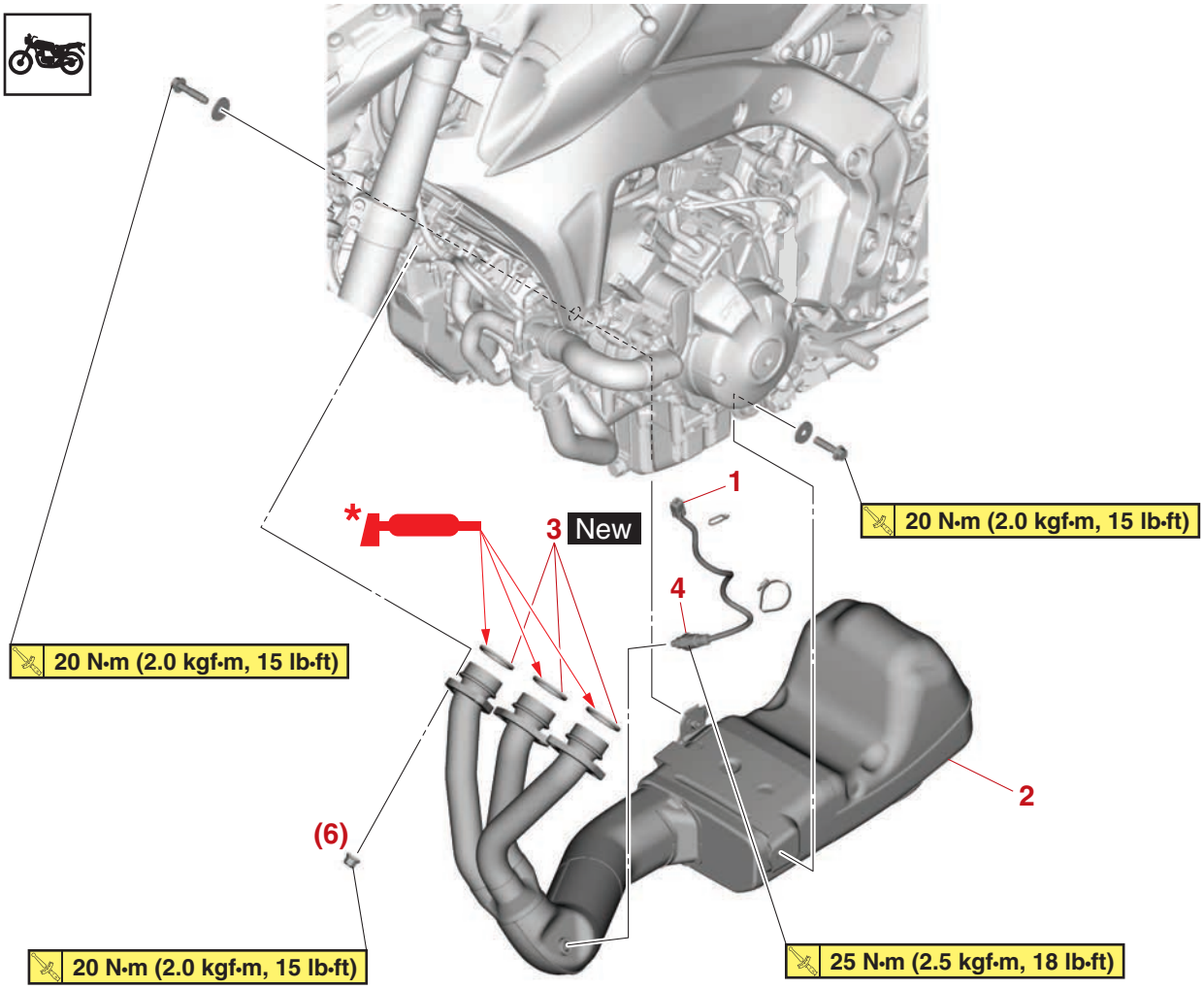


Spark plug
13 N·m (1.3 kgf·m, 9.6 lb·ft)

7. Install:
   • Ignition coil
   Refer to “CAMSHAFTS” on page 5-16.
   • Air filter case
   Refer to “GENERAL CHASSIS (2)” on page 4-10.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Fuel tank center cover
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Rider seat
   Refer to “GENERAL CHASSIS (1)” on page 4-1.

EAS20042
ENGINE REMOVAL

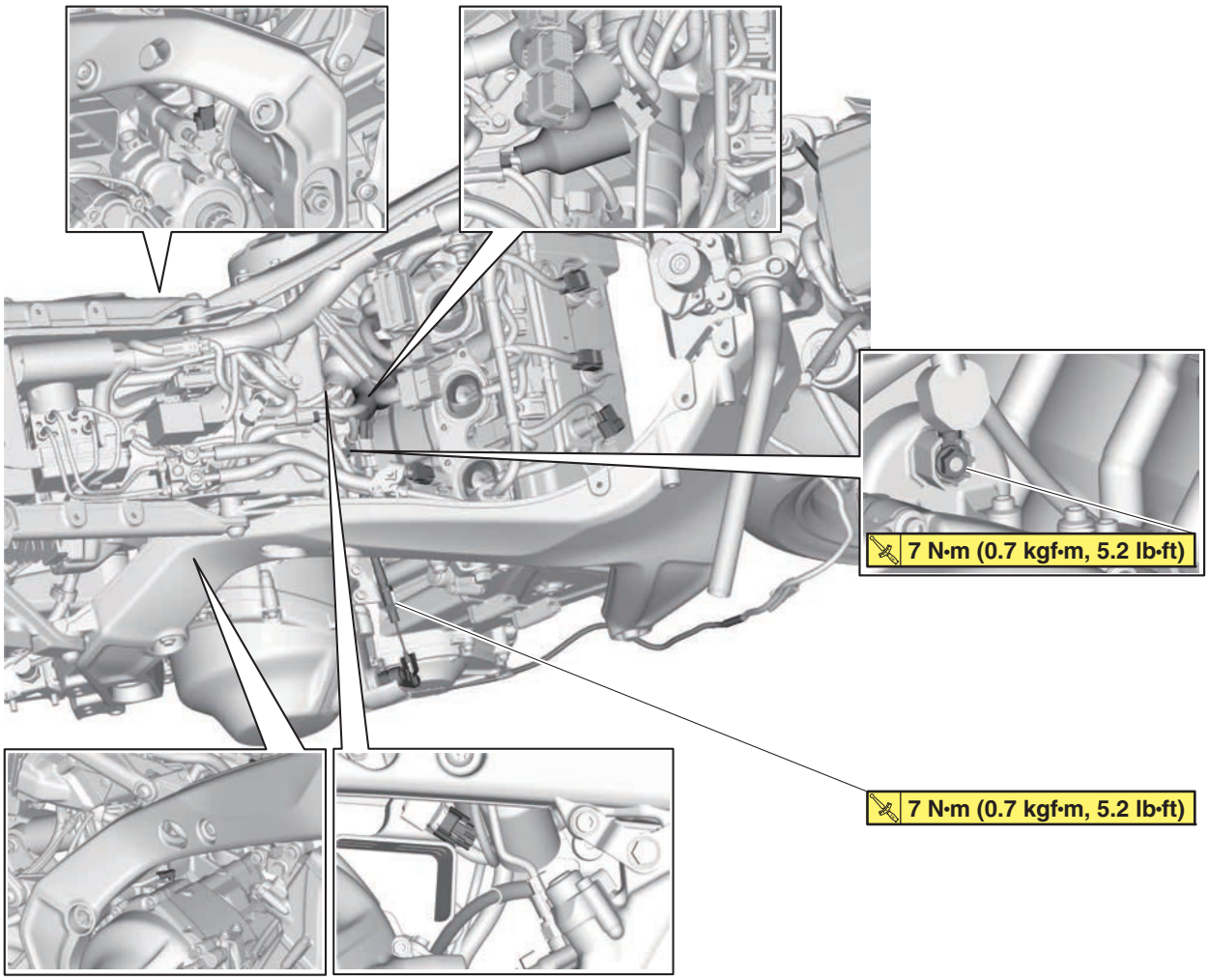
Removing the muffler and exhaust pipe



*** YAMAHA GREASE "G"**

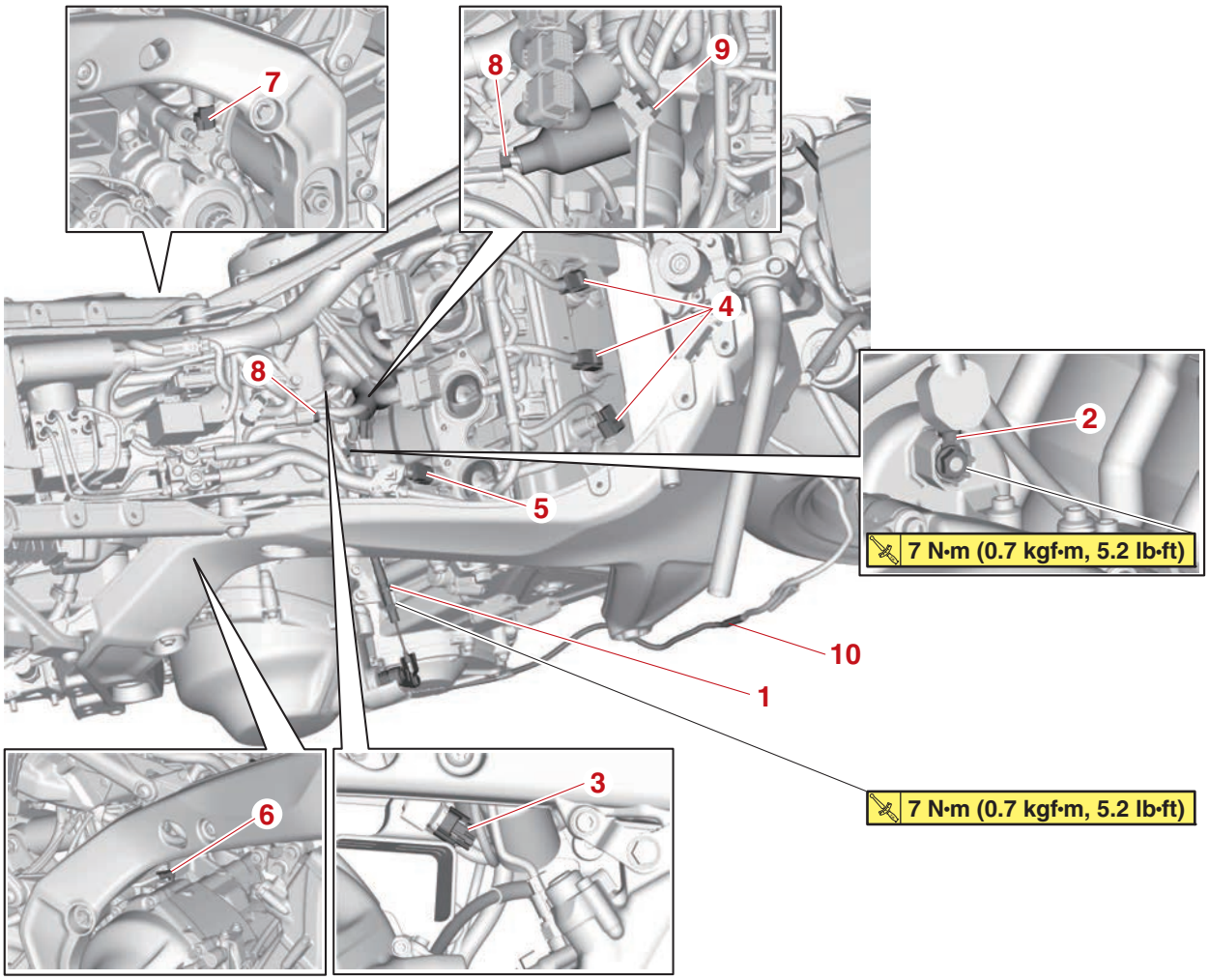
Order	Job/Parts to remove	Q'ty	Remarks
	Radiator bracket		Refer to "RADIATOR" on page 6-3.
1	O_2 sensor coupler	1	Disconnect.
2	Muffler assembly	1	
3	Exhaust gasket	3	
4	O_2 sensor	1	Remove the O_2 sensor only when necessary.

Disconnecting the leads and hoses



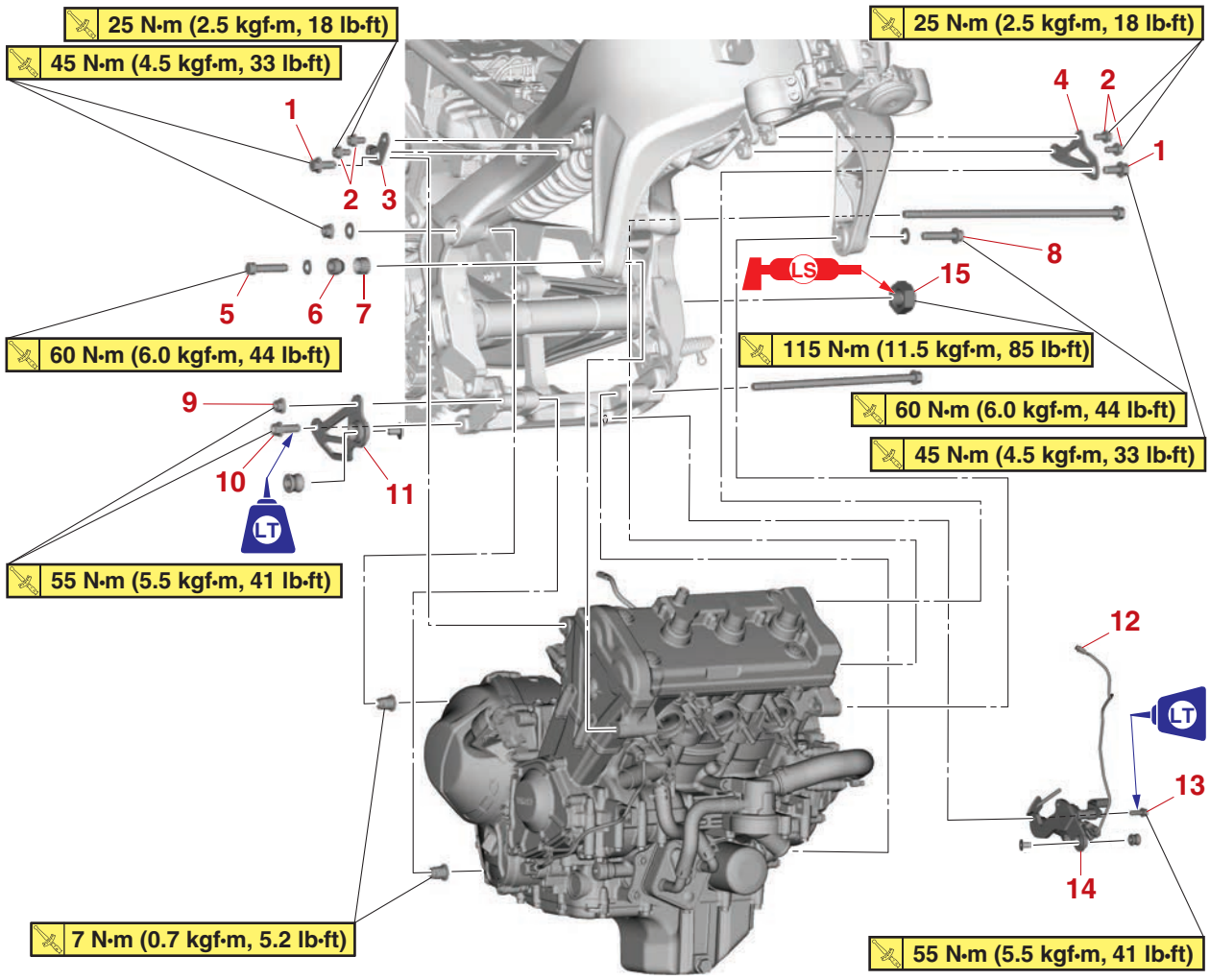
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS (2)" on page 4-10.
	Canister		Refer to "FUEL TANK" on page 7-1. For MT09MC/MT09SPMC
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Front side panel		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Radiator		Refer to "RADIATOR" on page 6-3.

Disconnecting the leads and hoses



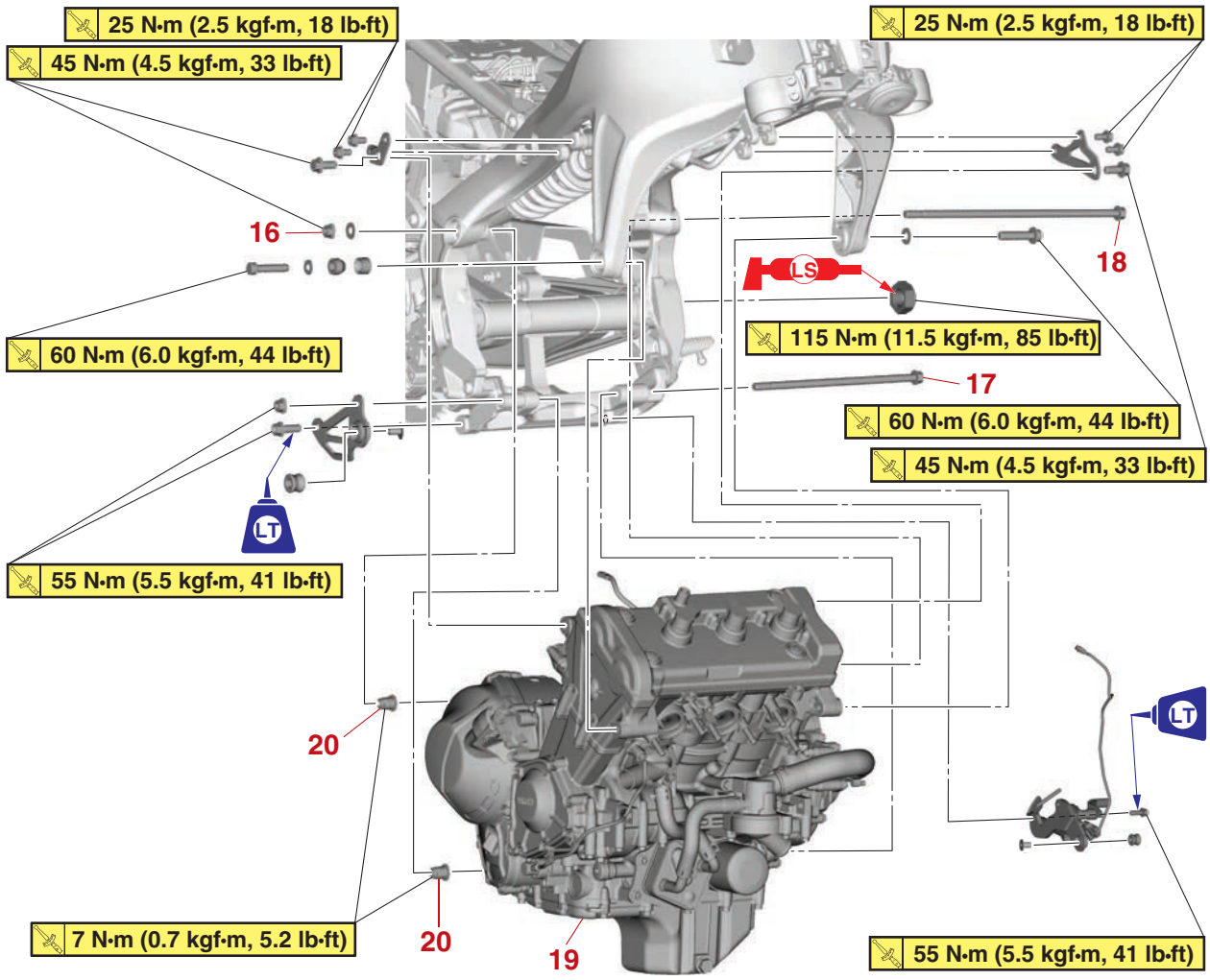
Order	Job/Parts to remove	Q'ty	Remarks
	Footrest assembly (right)		Refer to "REAR BRAKE" on page 4-38.
	Shift rod/Drive sprocket		Refer to "CHAIN DRIVE" on page 4-87.
1	Clutch cable	1	Disconnect.
2	Starter motor lead	1	Disconnect.
3	Purge cut valve solenoid coupler	1	Disconnect. For MT09MC/MT09SPMC
4	Ignition coil coupler	3	Disconnect.
5	Coolant temperature sensor coupler	1	Disconnect.
6	Neutral switch coupler	1	Disconnect.
7	Gear position sensor coupler	1	Disconnect.
8	Crankshaft position sensor coupler	1	Disconnect.
9	Stator coil coupler	1	Disconnect.
10	Oil pressure switch connector	1	Disconnect.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Engine mounting bolt (right front upper side)/ Engine mounting bolt (left front upper side)	1/1	
2	Engine bracket bolt (right)/Engine bracket bolt (left)	2/2	
3	Engine bracket (right)	1	
4	Engine bracket (left)	1	
5	Engine mounting bolt (right front lower side)	1	
6	Collar	1	
7	Collar	1	
8	Engine mounting bolt (left front lower side)	1	
9	Engine mounting nut (lower)	1	
10	Muffler bracket bolt	1	
11	Muffler bracket	1	
12	Sidestand switch coupler	1	Disconnect.
13	Muffler bracket bolt	1	
14	Muffler bracket	1	
15	Pivot shaft nut	1	Loosen.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
16	Engine mounting nut (upper)	1	
17	Engine mounting bolt (rear lower side)	1	
18	Engine mounting bolt (rear upper side)	1	
19	Engine	1	
20	Engine mounting adjust bolt	2	

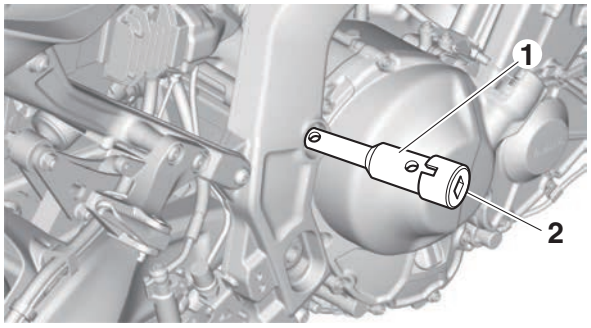
EAS30250
REMOVING THE ENGINE

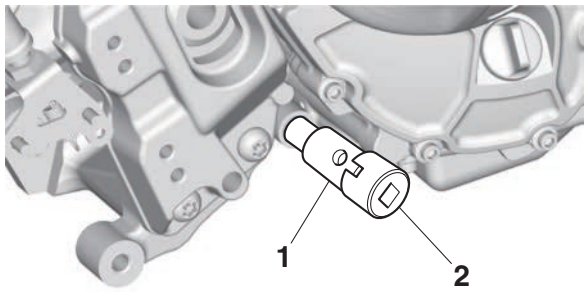
1. Loosen:
   • Engine mounting adjust bolt (rear)

TIP

Loosen the engine mounting adjust bolts with the pivot shaft wrench "1" and pivot shaft wrench adapter "2".

Pivot shaft wrench
90890-01518
Frame spanner socket
YM-01518
Pivot shaft wrench adapter
90890-01476





EAS30251
INSTALLING THE ENGINE

1. Install:
   • Engine mounting adjust bolt (lower) "1" (temporarily tighten)
   • Engine mounting adjust bolt (upper) "2" (temporarily tighten)
2. Install:
   • Muffler bracket "3"
   • Muffler bracket bolt "4" (temporarily tighten)
3. Install:
   • Engine
4. Install:
   • Engine mounting bolt (rear lower side) "5"
   • Engine mounting bolt (rear upper side) "6"
5. Install:
   • Engine mounting bolt (left front lower side) "7" (temporarily tighten)
6. Install:
   • Collar "8"
   • Collar "9"
   • Engine mounting bolt (right front lower side) "10" (temporarily tighten)
7. Tighten:
   • Engine mounting adjust bolt (lower) "1"

TIP

- Tighten the engine mounting adjust bolt to specification with the pivot shaft wrench and pivot shaft wrench adapter.
- Make sure that the flange on the engine mounting adjust bolt contacts the engine.

Engine mounting adjust bolt (lower)
7 N·m (0.7 kgf·m, 5.2 lb·ft)

Pivot shaft wrench
90890-01518
Frame spanner socket
YM-01518
Pivot shaft wrench adapter
90890-01476

8. Install:
   • Muffler bracket "11"
   • Muffler bracket bolt "12" (temporarily tighten)
9. Tighten:
   • Engine mounting nut (lower) "13"
   • Muffler bracket bolt "4", "12"

Engine mounting nut (lower)
55 N·m (5.5 kgf·m, 41 lb·ft)
Muffler bracket bolt
55 N·m (5.5 kgf·m, 41 lb·ft)
LOCTITE®

10.Tighten:
- Engine mounting bolt (left front lower side) “7”
- Engine mounting bolt (right front lower side) “10”

Engine mounting bolt (left front lower side)
60 N·m (6.0 kgf·m, 44 lb·ft)
Engine mounting bolt (right front lower side)
60 N·m (6.0 kgf·m, 44 lb·ft)

11.Tighten:
- Pivot shaft nut “14”

Pivot shaft nut
115 N·m (11.5 kgf·m, 85 lb·ft)

12.Tighten:
- Engine mounting adjust bolt (upper) “2”

TIP
- Tighten the engine mounting adjust bolt to specification with the pivot shaft wrench and pivot shaft wrench adapter.
- Make sure that the flange on the engine mounting adjust bolt contacts the engine.

Engine mounting adjust bolt (upper)
7 N·m (0.7 kgf·m, 5.2 lb·ft)

Pivot shaft wrench
90890-01518
Frame spanner socket
YM-01518
Pivot shaft wrench adapter
90890-01476

13.Tighten:
- Engine mounting nut (upper) “15”

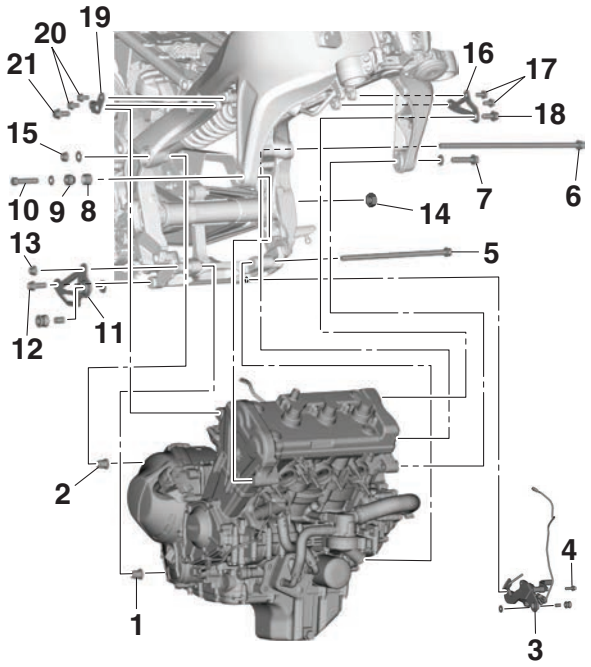
Engine mounting nut (upper)
45 N·m (4.5 kgf·m, 33 lb·ft)

14.Install:
- Engine bracket (left) “16”
- Engine bracket bolt (left) “17” (temporarily tighten)
- Engine mounting bolt (left front upper side) “18” (temporarily tighten)

15.Install:
- Engine bracket (right) “19”
- Engine bracket bolt (right) “20” (temporarily tighten)
- Engine mounting bolt (right front upper side) “21” (temporarily tighten)

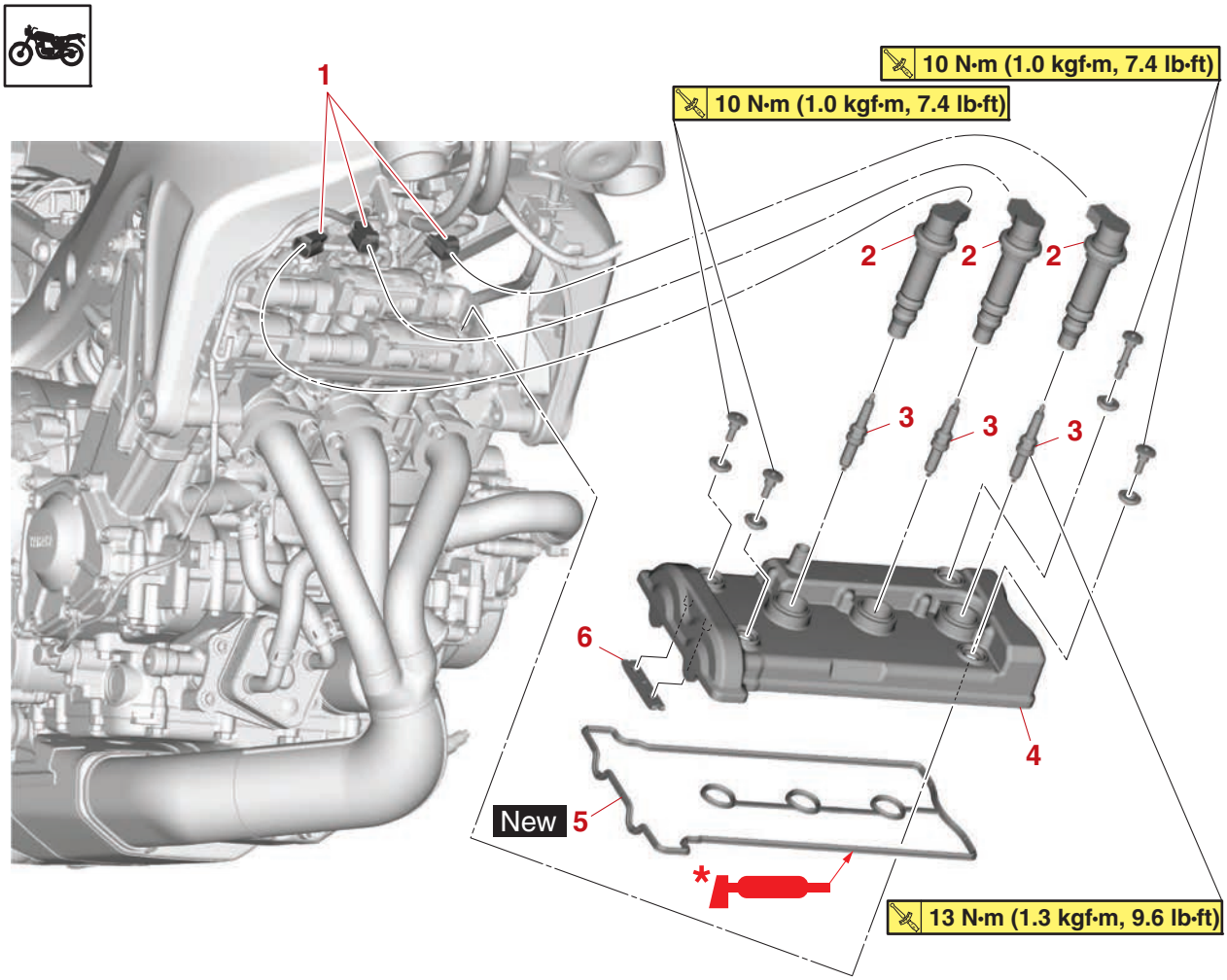
16.Tighten:
- Engine bracket bolt (left) “17”
- Engine mounting bolt (left front upper side) “18”
- Engine bracket bolt (right) “20”
- Engine mounting bolt (right front upper side) “21”

Engine bracket bolt (left)
25 N·m (2.5 kgf·m, 18 lb·ft)
Engine mounting bolt (left front upper side)
45 N·m (4.5 kgf·m, 33 lb·ft)
Engine bracket bolt (right)
25 N·m (2.5 kgf·m, 18 lb·ft)
Engine mounting bolt (right front upper side)
45 N·m (4.5 kgf·m, 33 lb·ft)



EAS20043
CAMSHAFTS

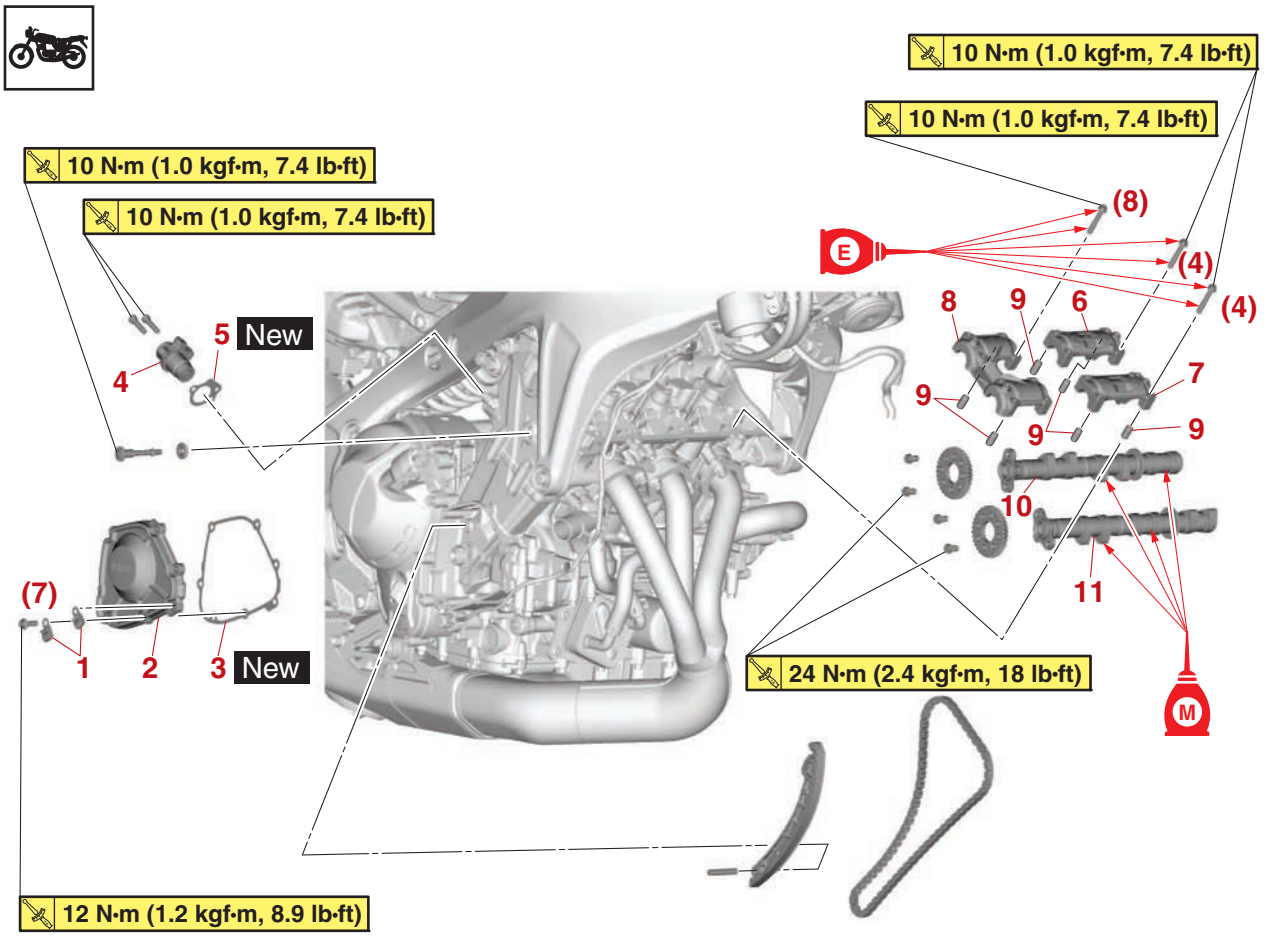
Removing the cylinder head cover



*** Three Bond No. 1541C®**

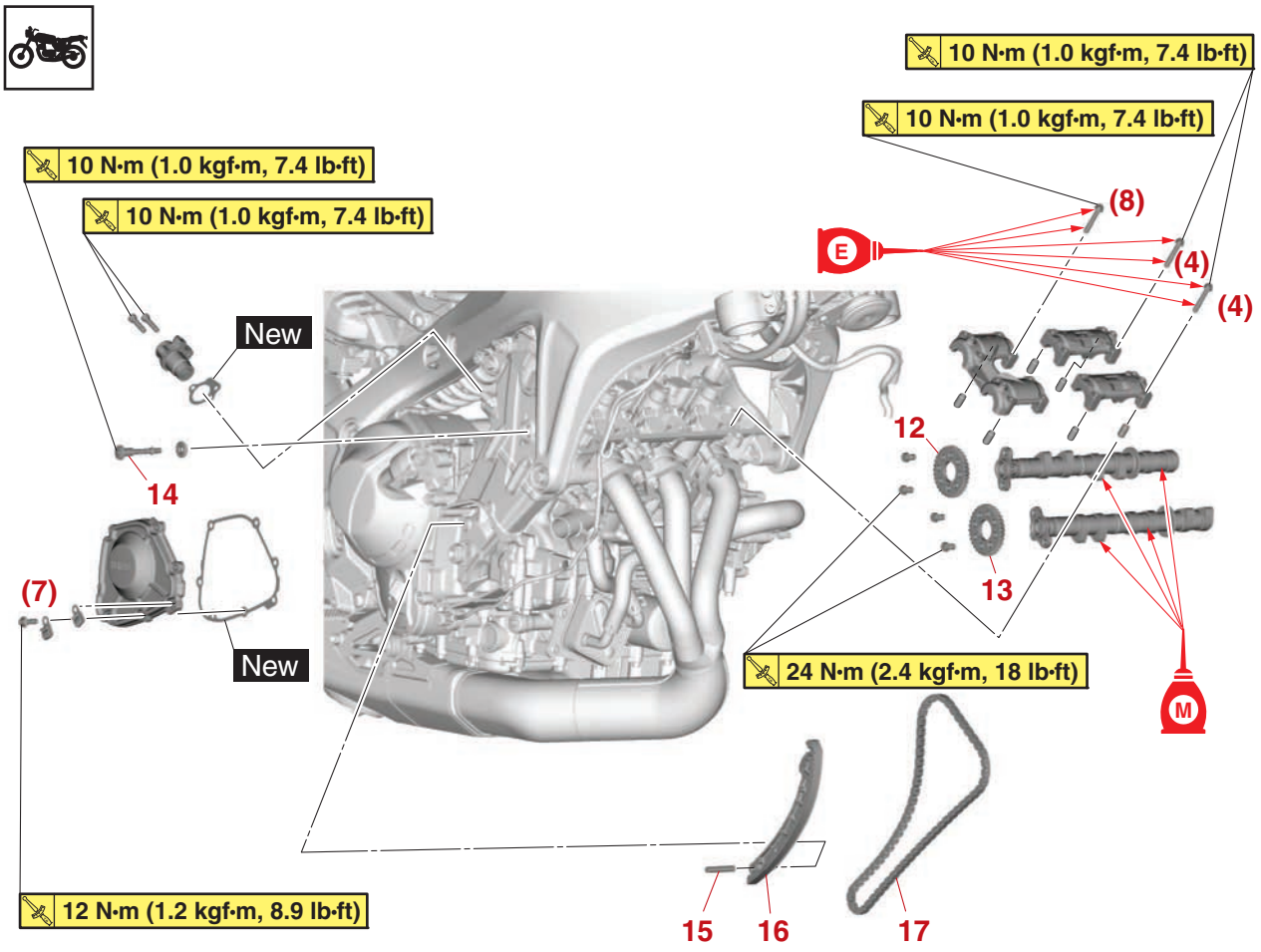
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS (2)" on page 4-10.
	Front side panel		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Radiator		Refer to "RADIATOR" on page 6-3.
1	Ignition coil coupler	3	Disconnect.
2	Ignition coil	3	
3	Spark plug	3	
4	Cylinder head cover	1	
5	Cylinder head cover gasket	1	
6	Timing chain guide (top side)	1	

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Crankshaft end cover/Timing mark accessing bolt		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-37.
1	Holder	2	
2	Timing chain cover	1	
3	Timing chain cover gasket	1	
4	Timing chain tensioner	1	
5	Timing chain tensioner gasket	1	
6	Intake camshaft cap	1	
7	Exhaust camshaft cap	1	
8	Camshaft cap	1	
9	Dowel pin	6	
10	Intake camshaft	1	
11	Exhaust camshaft	1	

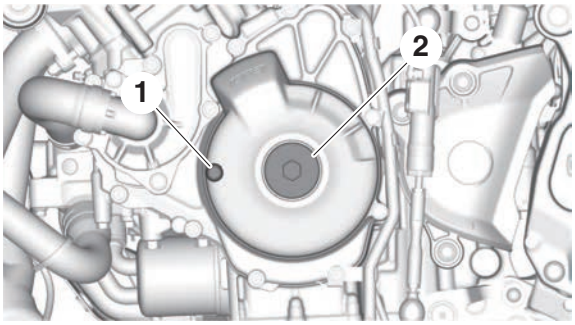
Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
12	Intake camshaft sprocket	1	
13	Exhaust camshaft sprocket	1	
14	Timing chain bolt	1	
15	Dowel pin	1	
16	Timing chain guide (intake side)	1	
17	Timing chain	1	

EAS30256
REMOVING THE CAMSHAFTS

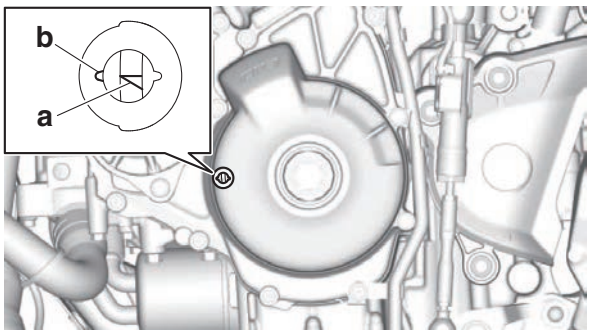
1. Remove:
   • Timing mark accessing bolt “1”
   • Crankshaft end cover “2”



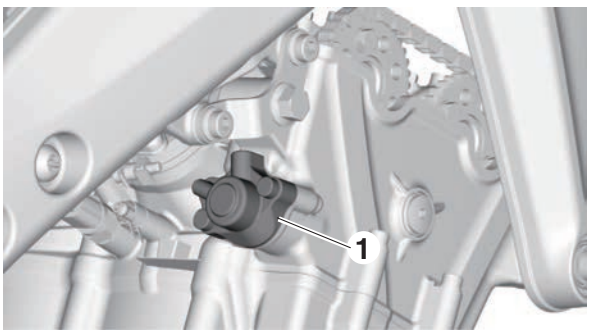
2. Align:
   • Mark “a” on the generator rotor (with the generator rotor cover mark “b”)
   a. Turn the crankshaft counterclockwise.
   b. When piston #1 is at BTDC125° on the compression stroke, align the BTDC125° mark “a” on the generator rotor with the generator rotor cover mark “b”.

TIP

BTDC125° on the compression stroke can be found when the camshaft lobes are turned away from each other.



3. Remove:
   • Timing chain tensioner “1”
   • Timing chain tensioner gasket



4. Remove:
   • Camshaft cap
   • Intake camshaft cap
   • Exhaust camshaft cap

ECA13720

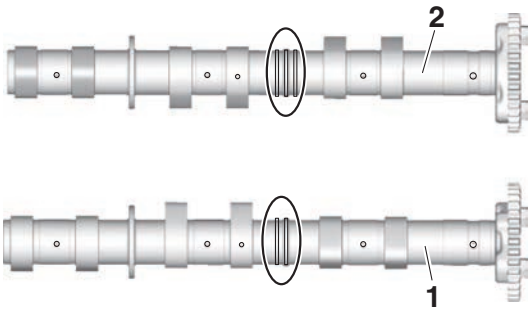
NOTICE

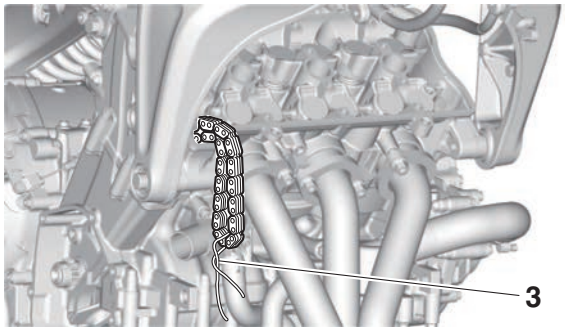
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

5. Remove:
   • Intake camshaft “1”
   • Exhaust camshaft “2”

TIP

To prevent the timing chain from falling into the crankcase, fasten it with a wire “3”.



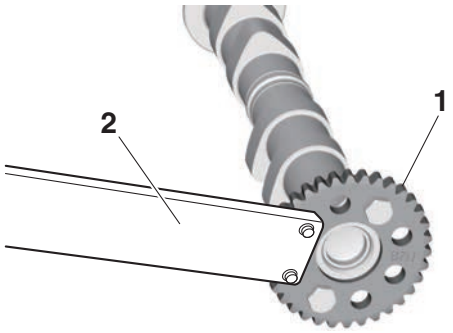


6. Remove:
   • Camshaft sprocket “1”

TIP

Use the camshaft wrench “2” and loosen the camshaft sprocket bolt.

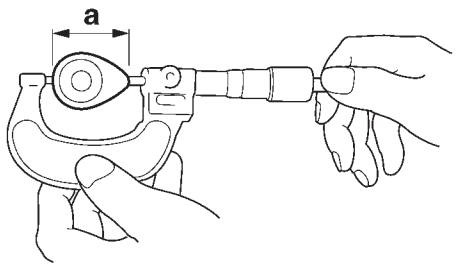
Camshaft wrench
90890-04162
Camshaft wrench
YM-04162



EAS30257
CHECKING THE CAMSHAFTS

1. Check:
   • Camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   • Camshaft lobe dimensions “a”
   Out of specification → Replace the camshaft.

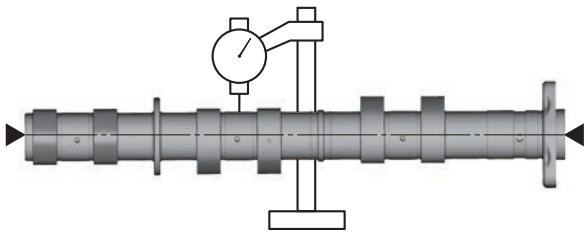
Camshaft lobe dimensions
Lobe height limit (Intake)
35.590 mm (1.4012 in)
Lobe height limit (Exhaust)
35.620 mm (1.4024 in)



G088946

3. Measure:
   • Camshaft runout
   Out of specification → Replace.

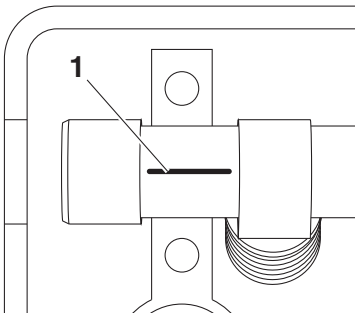
Camshaft runout limit
0.030 mm (0.0012 in)



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 camshaft into the cylinder head (without the camshaft caps).
   b. Position strip of Plastigauge® “1” onto the camshaft journal as shown.

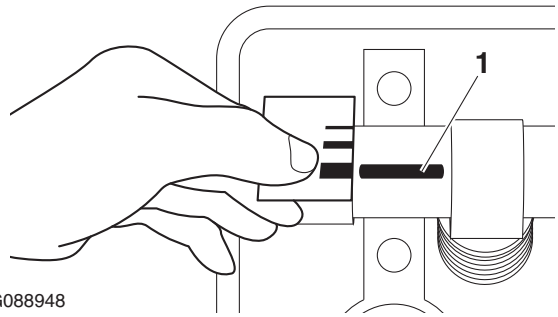


G088947

   c. Install the dowel pins and camshaft caps. Refer to “INSTALLING THE CAMSHAFTS” on page 5-22.

TIP
Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.

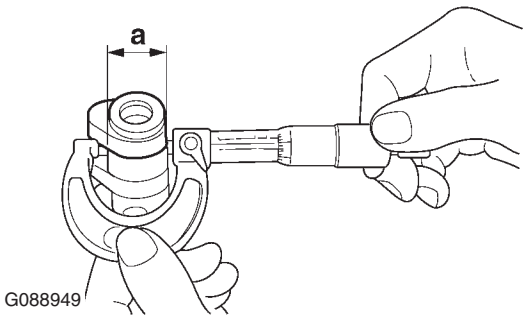
   d. Remove the camshaft caps, and then measure the width of the Plastigauge® “1”.



G088948

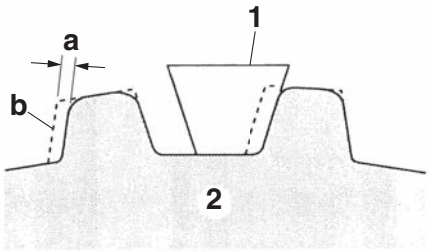
5. Measure:
   • Camshaft journal diameter “a”
   Out of specification → Replace the camshaft.
   Within specification → Replace the cylinder head and the camshaft caps as a set.

Camshaft journal diameter
24.459–24.472 mm (0.9630–0.9635 in)



EAS30258
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
   - Timing chain
     Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.
2. Check:
   - Camshaft sprocket
     More than 1/4 tooth wear "a" → Replace the camshaft sprockets and the timing chain as a set.



a. 1/4 tooth
b. Correct

1. Timing chain
2. Camshaft sprocket

EAS30265
CHECKING THE TIMING CHAIN GUIDES

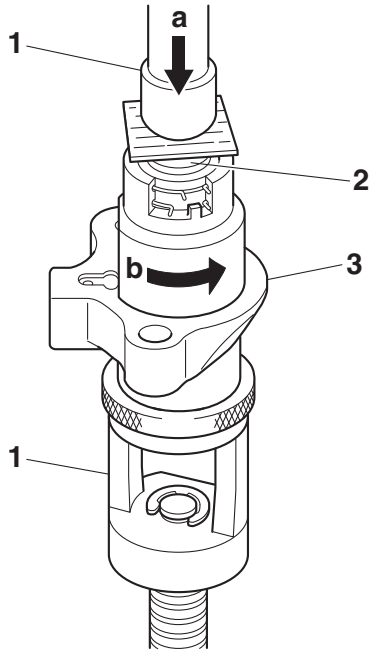
1. Check:
   - Timing chain guide (intake side)
   - Timing chain guide (top side)
     Damage/wear → Replace the defective part(s).

EAS30266
CHECKING THE TIMING CHAIN TENSIONER

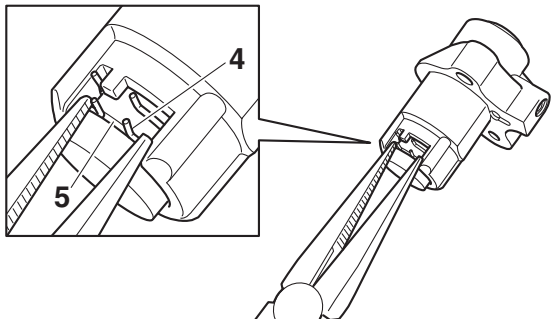
1. Check:
   - Timing chain tensioner
     Cracks/damage/rough movement → Replace.
   a. Using the valve spring compressor "1", push and insert timing chain tensioner rod "2" into the timing chain tensioner housing.

TIP

Push the timing chain tensioner rod in direction "a", and turn the timing chain tensioner body "3" in direction "b" until the circlip fits into the groove.

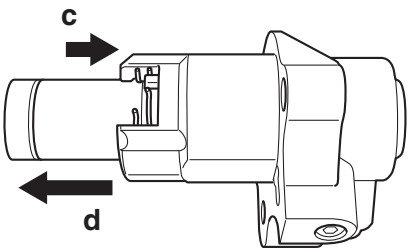


b. Lock the timing chain tensioner rod by setting the circlip "4" to groove "5" while pushing the timing chain tensioner rod.



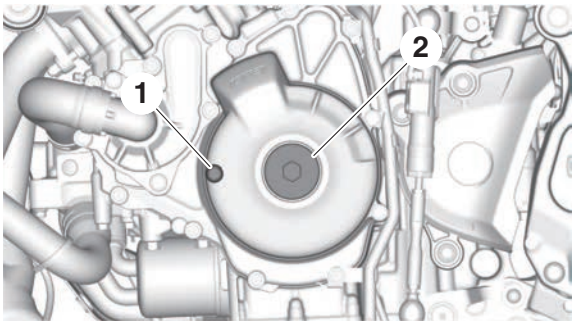
c. Push the timing chain tensioner rod "c".
d. If the circlip does not unlock even though you press the timing chain tensioner rod in the "c" direction, rotate the timing chain tensioner rod clockwise.

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



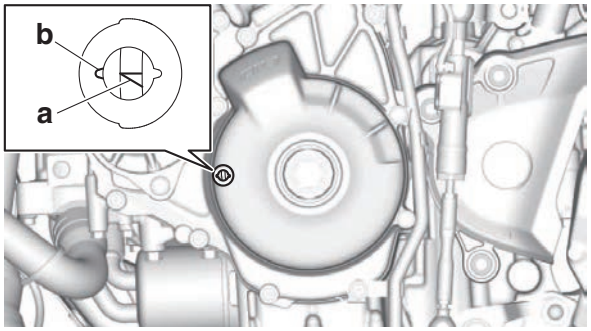
EAS30269
INSTALLING THE CAMSHAFTS

1. Remove:
   - Timing mark accessing bolt “1”
   - Crankshaft end cover “2”



2. Align:
   - Mark “a” on the generator rotor (with the generator rotor cover mark “b”)

   a. Turn the crankshaft counterclockwise.
   b. When piston #1 is at BTDC125°, align the mark “a” on the generator rotor with the generator rotor cover mark “b”.

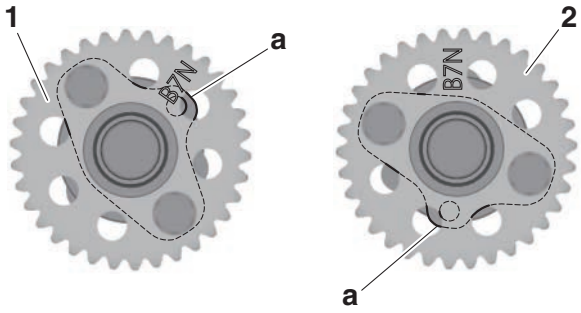


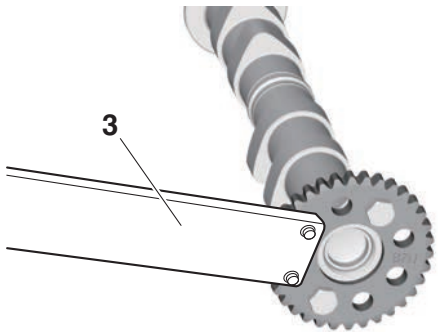
3. Install:
   - Intake camshaft sprocket “1”
   - Exhaust camshaft sprocket “2”

	Camshaft sprocket bolt **24 N·m (2.4 kgf·m, 18 lb·ft)**

TIP
- Install the camshaft projection “a” at the position shown in the illustration.
- Tighten the camshaft sprocket bolt with the camshaft wrench “3”.

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

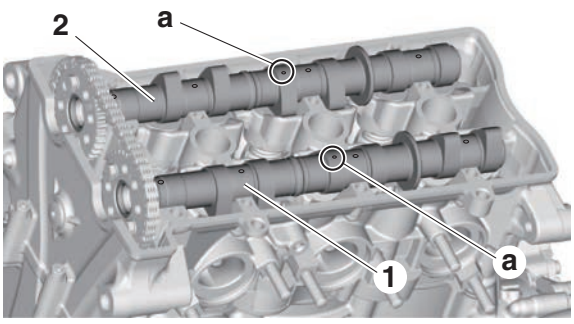




4. Install:
   - Exhaust camshaft “1”
   - Intake camshaft “2”

TIP

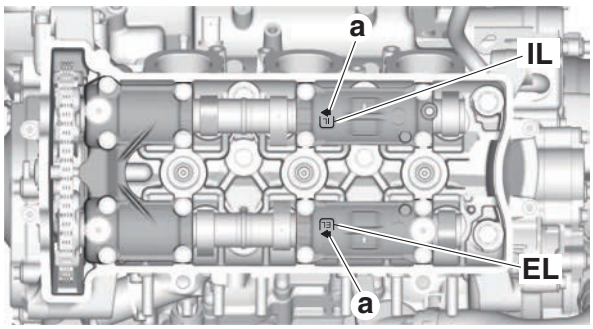
Make sure the punch mark “a” on each camshaft faces up.



5. Install:
   - Camshaft cap
   - Intake camshaft cap
   - Exhaust camshaft cap

TIP

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
  "IL": Intake left side camshaft cap mark
  "EL": Exhaust left side camshaft cap mark
- Make sure the arrow mark "a" on each camshaft points toward the right side of the engine.



6. Tighten:
   - Camshaft cap bolt "1"

	Camshaft cap bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

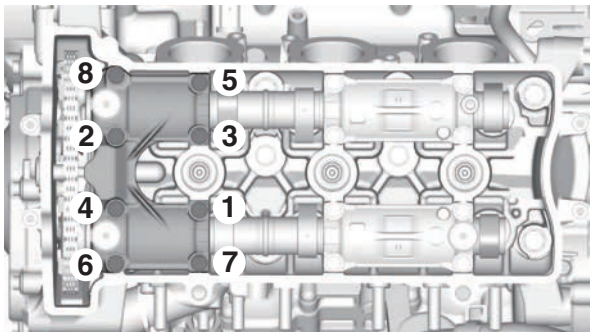
TIP

Tighten the camshaft cap bolts in the tightening sequence as shown.

ECA17430

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.**



7. Tighten:
   - Camshaft cap bolt "1"

	Camshaft cap bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

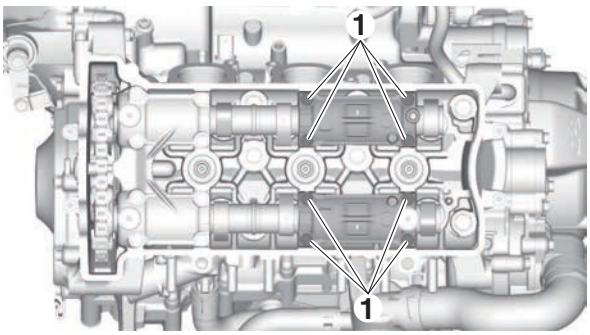
TIP

Tighten the camshaft cap bolts in stage and in a crisscross pattern, working from the inner caps out.

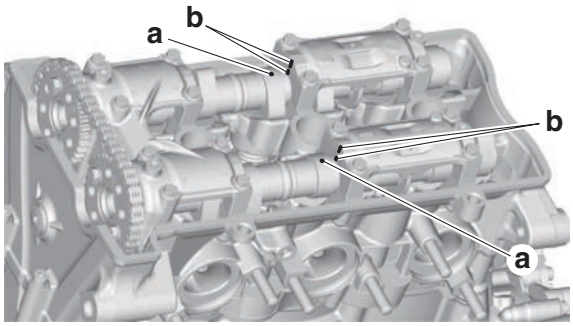
ECA17430

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.**



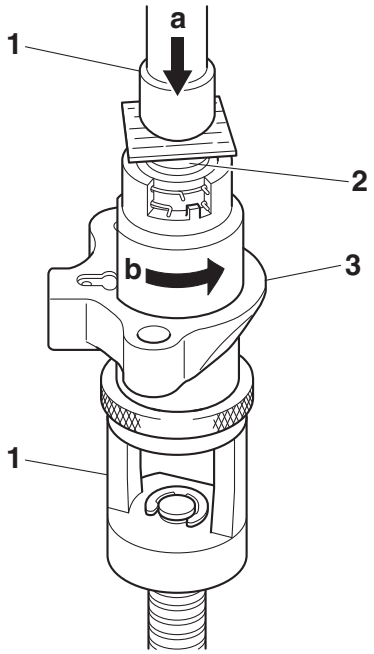
8. Check:
   - Camshaft punch mark "a"
     Make sure the camshaft punch mark "a" on the camshaft is aligned with the camshaft cap alignment mark "b".



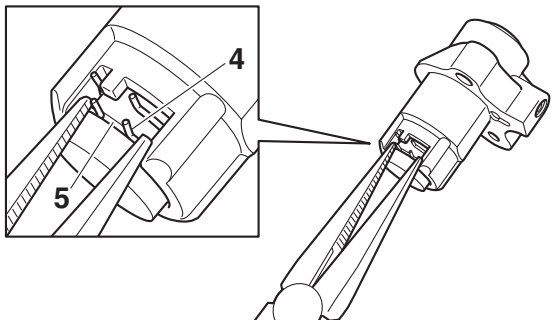
9. Install:
   - Timing chain tensioner gasket New
   - Timing chain tensioner
   a. Using the valve spring compressor "1", push and insert timing chain tensioner rod "2" into the timing chain tensioner housing.

TIP

Push the timing chain tensioner rod in direction "a", and turn the timing chain tensioner body "3" in direction "b" until the circlip fits into the groove.



b. Lock the timing chain tensioner rod by setting the circlip "4" into groove "5" while pushing the timing chain tensioner rod.



c. Install the timing chain tensioner to the cylinder block.

TIP

Always use a new gasket.

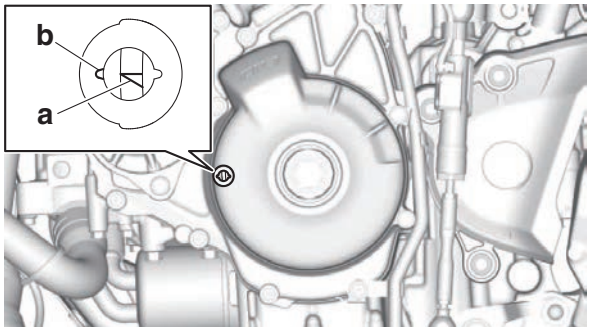
	Timing chain tensioner bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

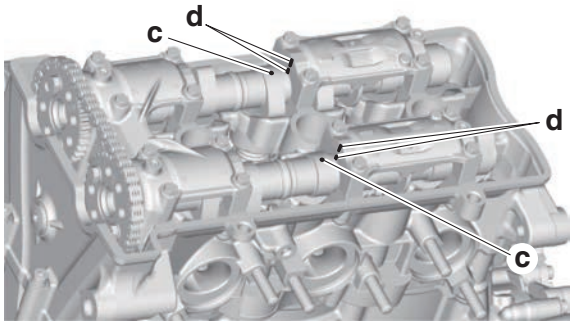
d. Turn the crankshaft clockwise several times to release the timing chain tensioner rod.

10.Turn:
- Crankshaft
  (several turns counterclockwise)

11.Confirm the timing chain tension properly.

12.Check:
- Mark "a"
  Make sure the mark "a" on the generator rotor is aligned with the generator rotor cover mark "b".
- Camshaft punch mark "c"
  Make sure the camshaft punch mark "c" on the camshaft is aligned with the camshaft cap alignment mark "d".
  Out of alignment → Adjust.
  Refer to the installation steps above.





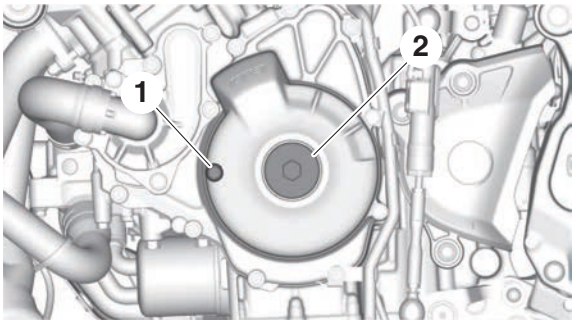
13.Measure:
- Valve clearance
  Out of specification → Adjust.
  Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.

14.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)**

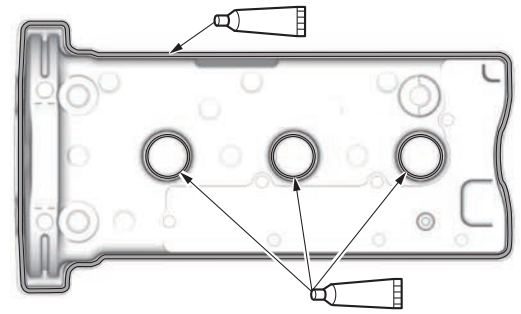


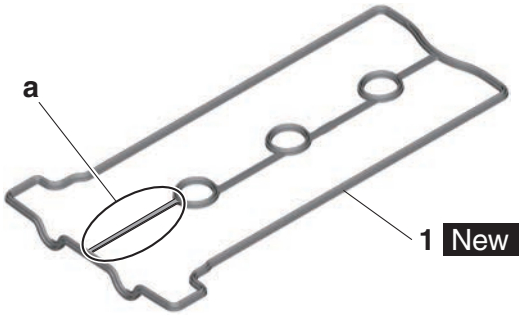
15.Install:
- Timing chain guide (top side)
- Cylinder head cover gasket "1" New
- Cylinder head cover

	Cylinder head cover bolt **10 N·m (1.0 kgf·m, 7.4 lb·ft)**

TIP

- Apply Three Bond No. 1541C® onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- After installing the cylinder head cover gasket "1" to the cylinder head cover, cut off the "a" section.



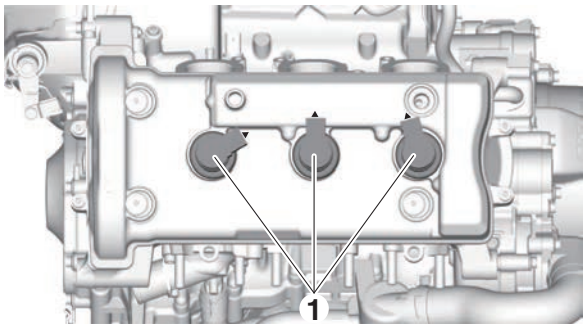


16.Install:
- Spark plug
- Ignition coil "1"

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

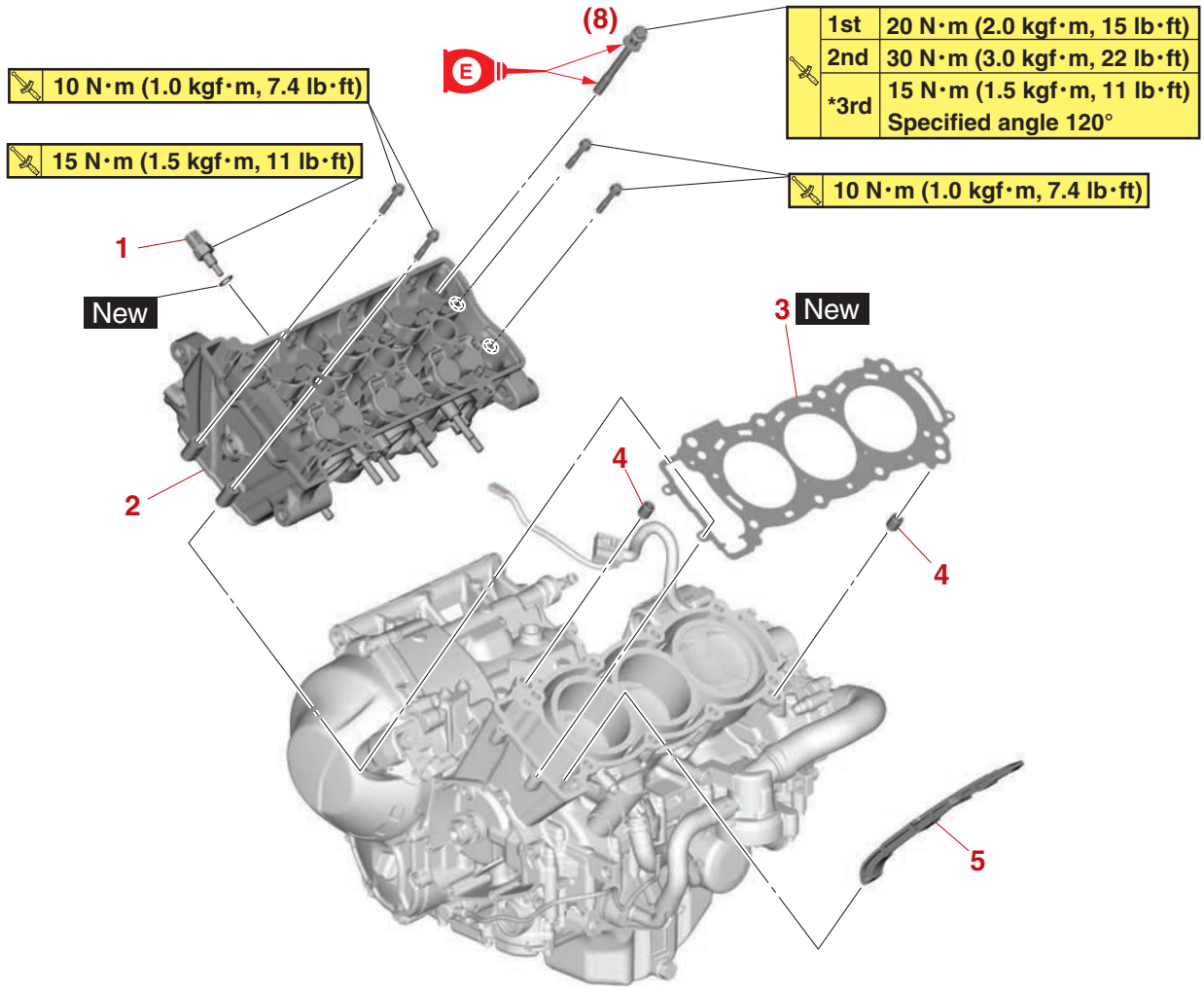
TIP

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 the specific torque and the specified angle.**

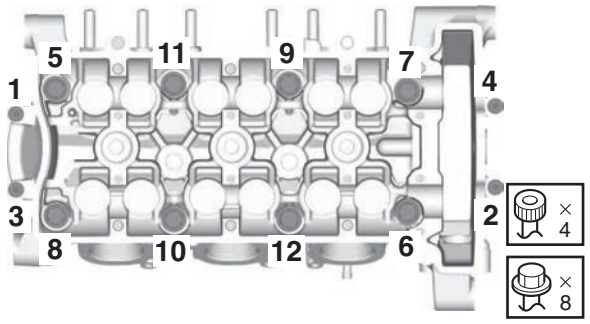
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-9.
	Intake camshaft		Refer to "CAMSHAFTS" on page 5-16.
	Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-16.
	Timing chain		Refer to "CAMSHAFTS" on page 5-16.
1	Coolant temperature sensor	1	
2	Cylinder head	1	
3	Cylinder head gasket	1	
4	Dowel pin	2	
5	Timing chain guide (exhaust side)	1	

EAS30276
REMOVING THE CYLINDER HEAD

1. Remove:
   - Intake camshaft
   - Exhaust camshaft
   Refer to "REMOVING THE CAMSHAFTS" on page 5-19.
2. Remove:
   - Cylinder head bolt (M6) (×4)
   - Cylinder head bolt (M9) (×8)

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.



EAS30278
CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

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

EAS30277
CHECKING THE CYLINDER HEAD

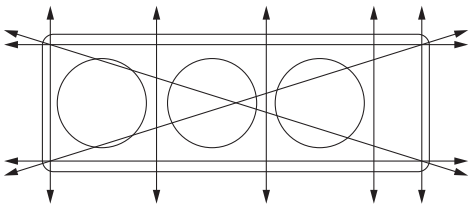
1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

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.

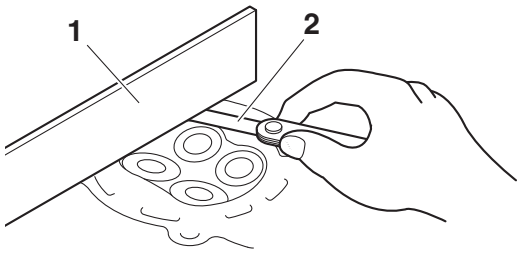
Warpage limit
0.10 mm (0.0039 in)



G088955

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

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



G088957

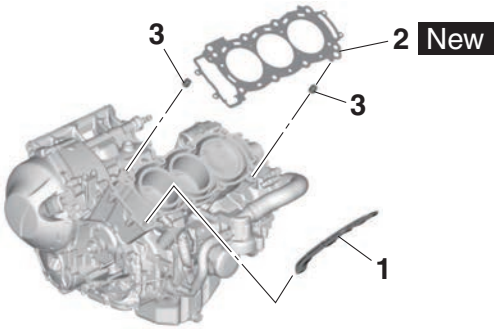
b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

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

EAS30282
INSTALLING THE CYLINDER HEAD

1. Install:
   - Timing chain guide (exhaust side) “1”
   - Cylinder head gasket “2” New
   - Dowel pin “3”



2. Install:
   - Cylinder head
   - Cylinder head bolt (M6) (×4)
   - Cylinder head bolt (M9) (×8) New

TIP

- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head bolt (M9) thread and mating surface with engine oil.

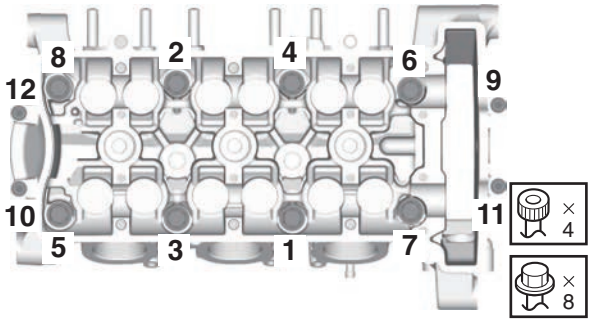
3. Tighten:
   - Cylinder head bolt “1”–“8”
   - Cylinder head bolt “9”–“12”

Cylinder head bolt “1”–“8”
1st: 20 N·m (2.0 kgf·m, 15 lb·ft)
2nd: 30 N·m (3.0 kgf·m, 22 lb·ft)
***3rd: 15 N·m (1.5 kgf·m, 11 lb·ft)**
Specified angle 120°
Cylinder head bolt “9”–“12”
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 specified torque and the specified angle.

TIP

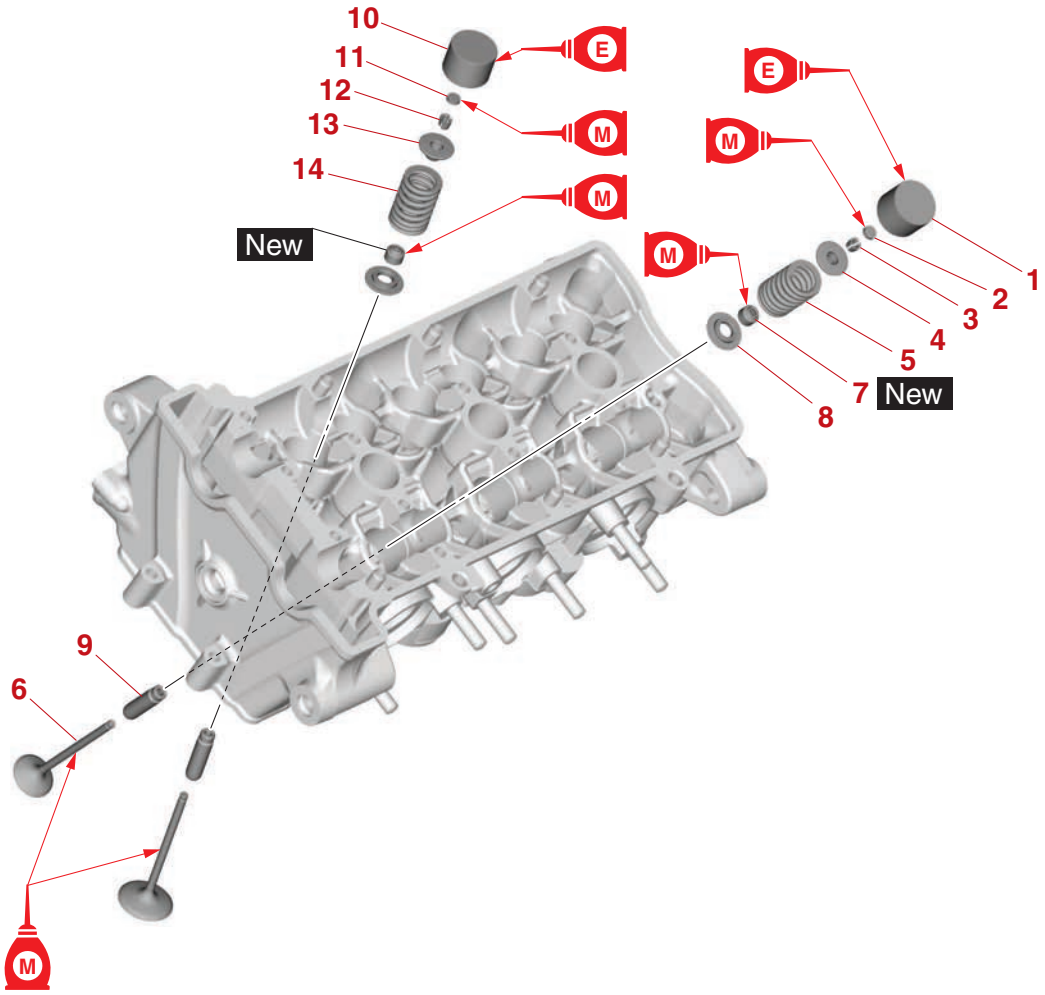
Tighten the cylinder head bolts “1”–“8” in the tightening sequence as shown and torque them in 3 stages.



4. Install:
   - Exhaust camshaft
   - Intake camshaft
   Refer to “INSTALLING THE CAMSHAFTS” on page 5-22.

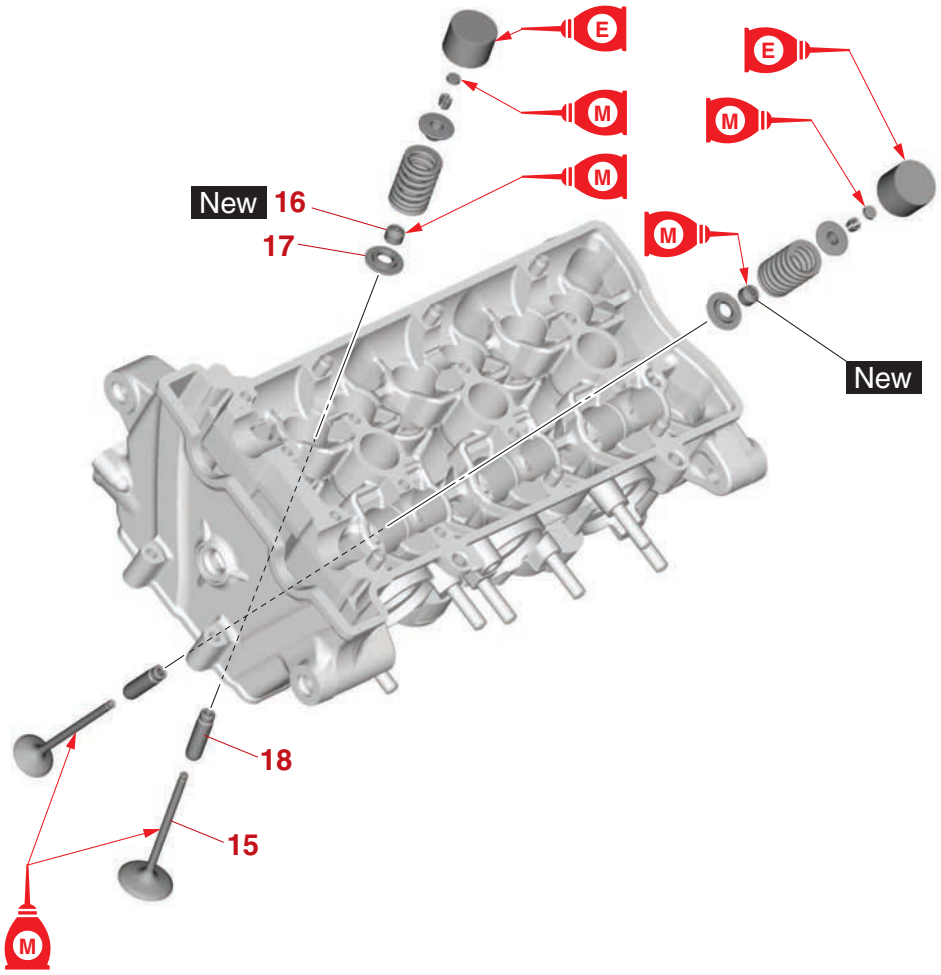
EAS20045
VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-26.
1	Intake valve lifter	6	
2	Intake valve pad	6	
3	Intake valve cotter	12	
4	Intake valve spring retainer	6	
5	Intake valve spring	6	
6	Intake valve	6	
7	Intake valve stem seal	6	
8	Intake valve spring seat	6	
9	Intake valve guide	6	
10	Exhaust valve lifter	6	
11	Exhaust valve pad	6	
12	Exhaust valve cotter	12	
13	Exhaust valve spring retainer	6	
14	Exhaust valve spring	6	

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
15	Exhaust valve	6	
16	Exhaust valve stem seal	6	
17	Exhaust valve spring seat	6	
18	Exhaust valve guide	6	

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

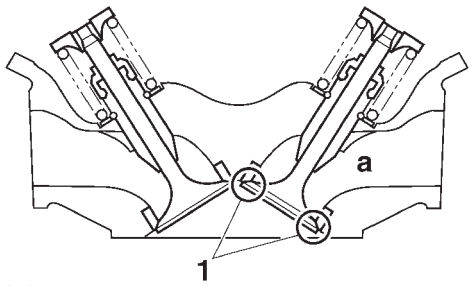
TIP

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 5-33.
   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".



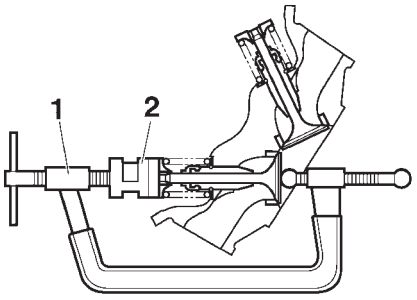
G088958

3. Remove:
   - Valve cotter

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 attachment (ø23)
90890-04179
Valve spring compressor adapter (ø23)
YM-04179



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.

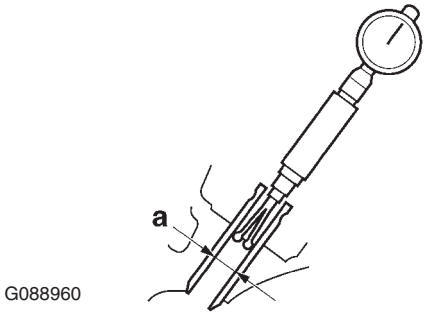
EAS30284
CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

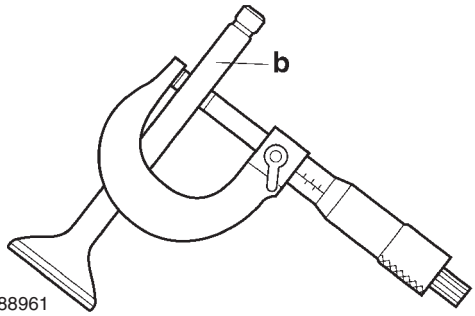
1. Measure:
   - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve guide.

- Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" - Valve stem diameter "b"

Valve-stem-to-valve-guide clearance limit (intake)
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance limit (exhaust)
0.100 mm (0.0039 in)



G088960



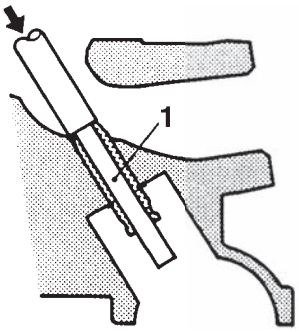
G088961

2. Replace:
   • Valve guide

TIP

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

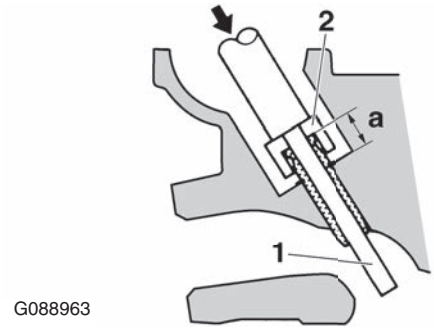
a. Remove the valve guide with the valve guide remover "1".



G088962

b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".

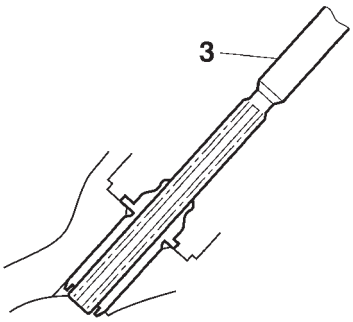
	Valve guide position **13.3–13.7 mm (0.52–0.54 in)**



G088963

a. Valve guide position

c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



G088964

TIP

After replacing the valve guide, reface the valve seat.

	Valve guide remover (ø4.5) **90890-04116** **Valve guide remover (4.5 mm)** **YM-04116** **Valve guide installer (ø4.5)** **90890-04117** **Valve guide installer (4.5 mm)** **YM-04117** **Valve guide reamer (ø4.5)** **90890-04118** **Valve guide reamer (4.5 mm)** **YM-04118**

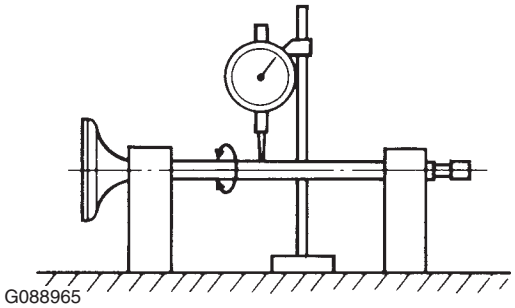
3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

5. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout
0.020 mm (0.0008 in)


G088965

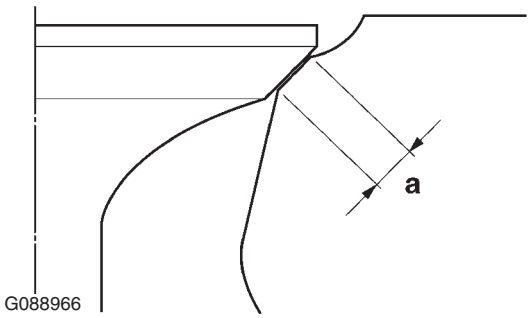
EAS30285

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

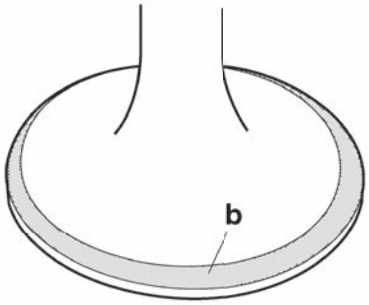
1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat contact width "a"
   Out of specification → Replace the cylinder head.

Valve seat contact width limit (intake)
1.6 mm (0.06 in)
Valve seat contact width limit (exhaust)
1.8 mm (0.07 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 contact width.

TIP

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

4. Lap:
   • Valve face
   • Valve seat

TIP

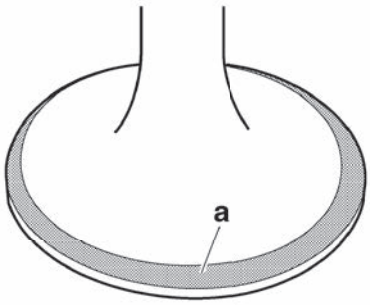
After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

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

ECA13790

NOTICE

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



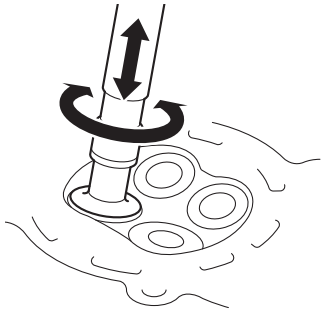
G088968

b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.

d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

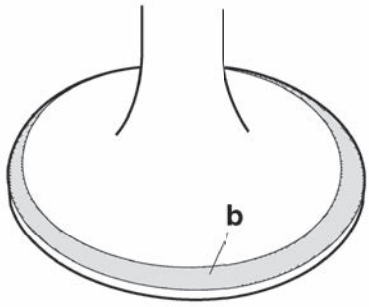
TIP

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



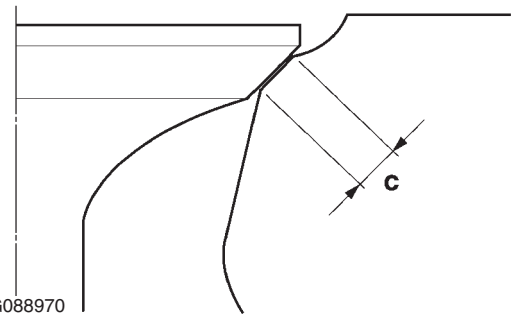
G088969

e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply blue layout fluid “b” onto the valve face.



G088967

h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat contact 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.

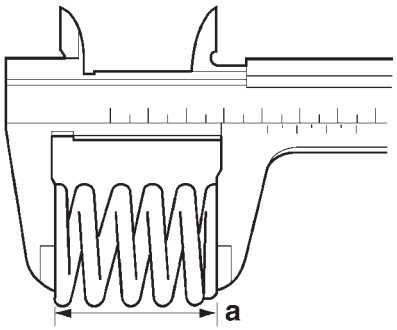
1. Measure:
   • Valve spring free length “a”
   Out of specification → Replace the valve spring.

ECA27780

NOTICE

When replacing even one light green exhaust valve spring, replace all six exhaust valve springs as a set.

Free length limit (intake)
37.34 mm (1.47 in)
Free length limit (exhaust light green)
35.89 mm (1.41 in)
Free length limit (exhaust purple)
39.31 mm (1.55 in)



G088971

EAS30287

CHECKING THE VALVE LIFTERS

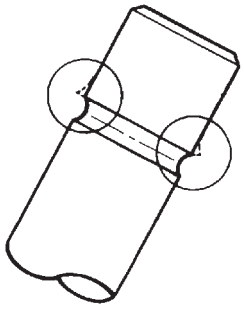
The following procedure applies to all of the valve lifters.

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)



G088972

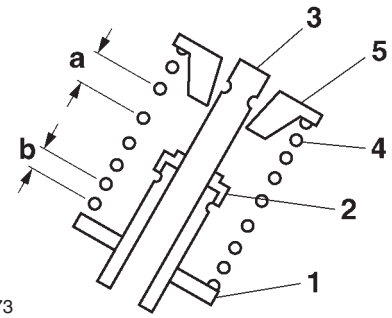
2. Lubricate:
   • Valve stem
   • Valve stem seal
   (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

3. Install:
   • Valve spring seat “1”
   • Valve stem seal “2” New
   • Valve “3”
   • Valve spring “4”
   • Valve spring retainer “5”
   (into the cylinder head)

TIP

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



G088973

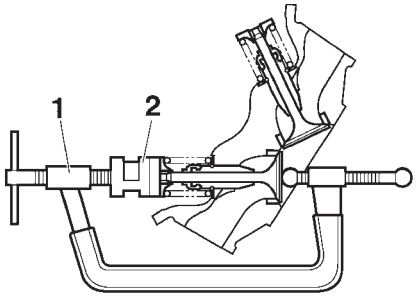
b. Smaller pitch

4. Install:
   • Valve cotter

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 attachment (ø23)** **90890-04179** **Valve spring compressor adapter (ø23)** **YM-04179**



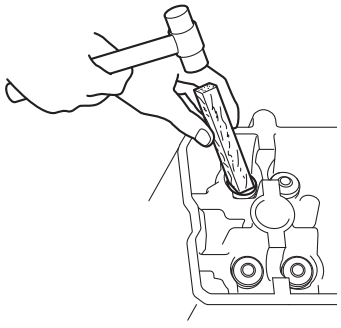
G088959

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 pad
   (with the recommended lubricant)

	**Recommended lubricant** **Molybdenum disulfide oil**

   • Valve lifter
   (with the recommended lubricant)

	**Recommended lubricant** **Engine oil**

7. Install:
   • Valve pad
   • Valve lifter

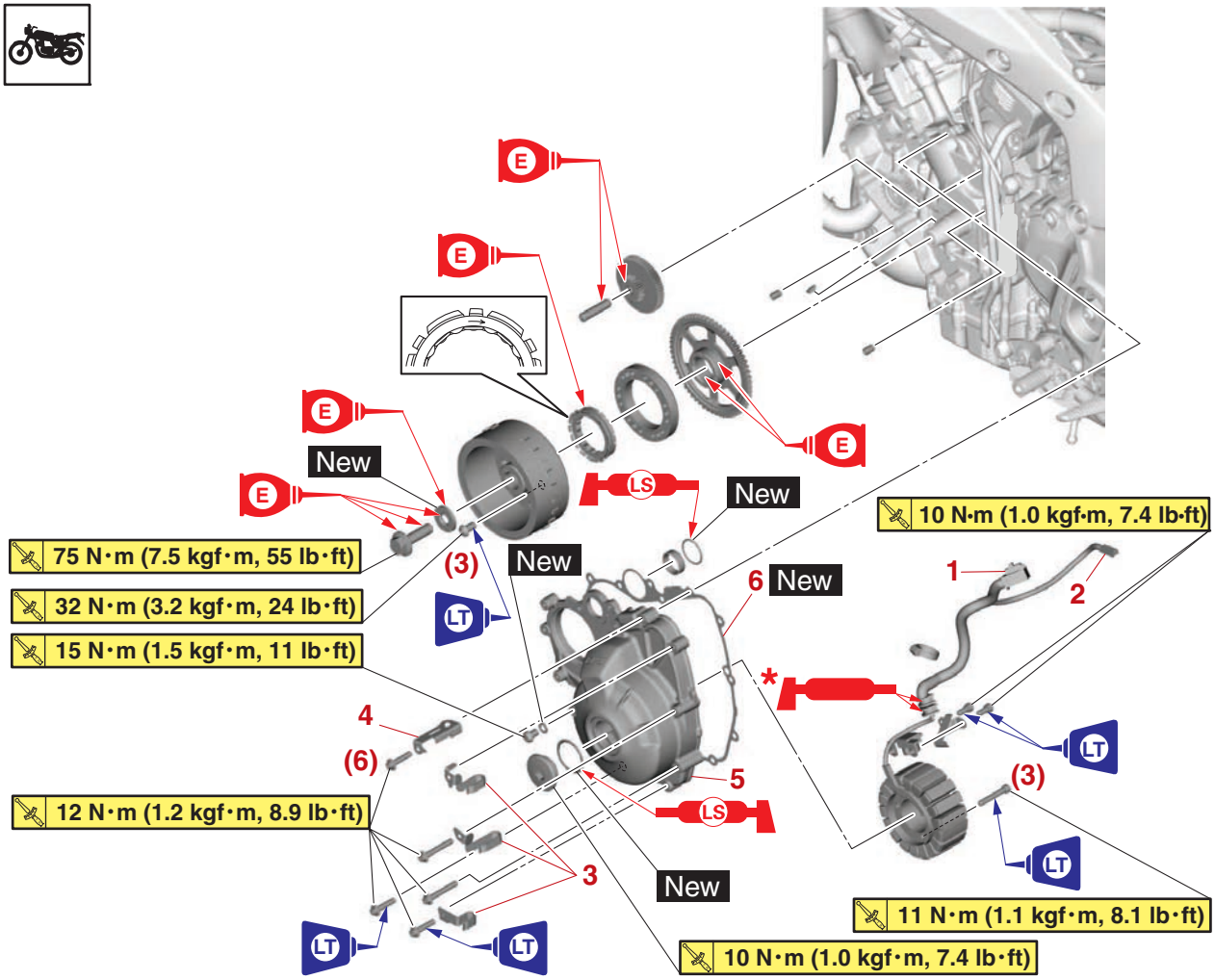
TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

EAS20140

GENERATOR AND STARTER CLUTCH

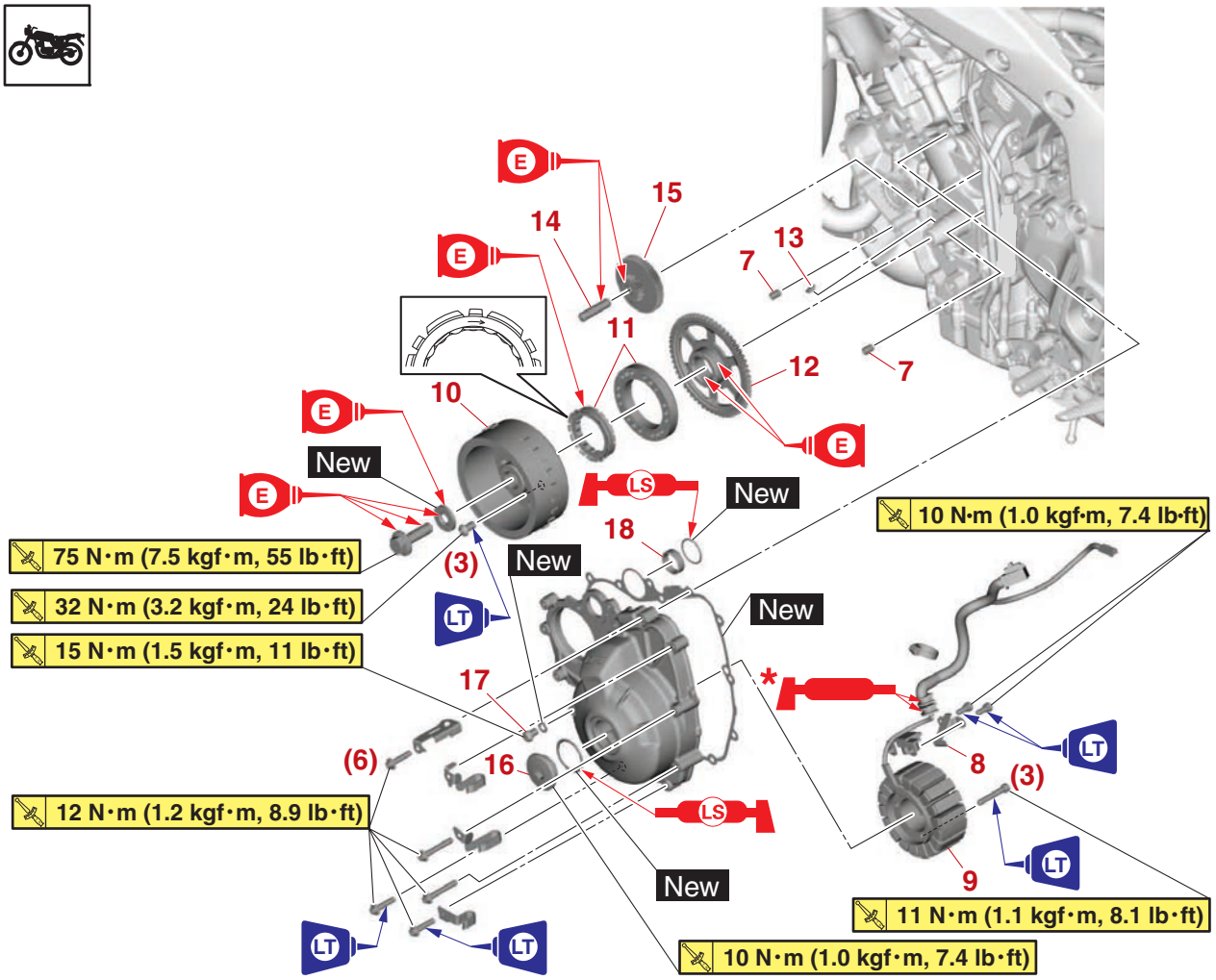
Removing the stator coil, generator rotor and starter clutch



*** YAMAHA bond No. 1215 (Three bond No. 1215®)**

Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Water pump		Refer to "WATER PUMP" on page 6-11.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-28.
1	Stator coil coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Holder (fuel tank overflow hose)	3	
4	Bracket	1	
5	Generator cover	1	
6	Generator cover gasket	1	

Removing the stator coil, generator rotor and starter clutch



*** YAMAHA bond No. 1215 (Three bond No. 1215®)**

Order	Job/Parts to remove	Q'ty	Remarks
7	Dowel pin	2	
8	Stator coil lead holder	1	
9	Stator coil assembly (stator coil/crankshaft position sensor)	1	
10	Generator rotor	1	
11	Starter clutch	1	
12	Starter clutch gear	1	
13	Woodruff key	1	
14	Starter clutch idle gear shaft	1	
15	Starter clutch idle gear	1	
16	Crankshaft end cover	1	
17	Timing mark accessing bolt	1	
18	Water pump outlet pipe	1	

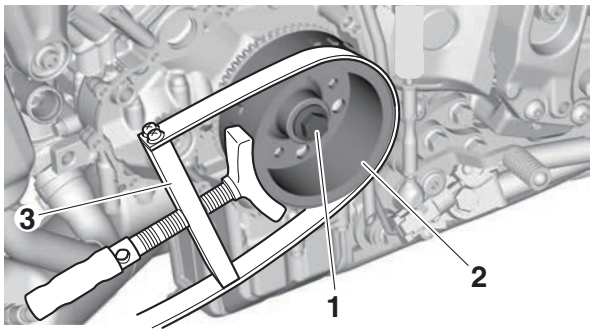
EAS30867
REMOVING THE GENERATOR

1. Remove:
   • Generator rotor bolt “1”
   • Washer

TIP

While holding the generator rotor “2” with the sheave holder “3”, loosen the generator rotor bolt.

Sheave holder
90890-01903
Primary clutch holder
YS-01880-A



2. Remove:
   • Generator rotor “1”
   (with the flywheel puller “2”)
   • Woodruff key

ECA13880

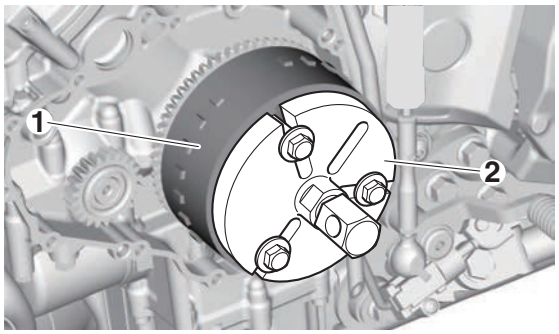
NOTICE

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

TIP

• Install the flywheel puller bolts to the threaded holes of the starter clutch.
• Make sure the flywheel puller is centered over the generator rotor.

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



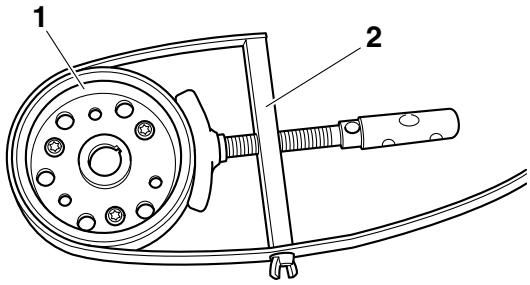
EAS30868
REMOVING THE STARTER CLUTCH

1. Remove:
   • Starter clutch bolt
   • Starter clutch

TIP

While holding the generator rotor “1” with the sheave holder “2”, loosen the starter clutch bolts.

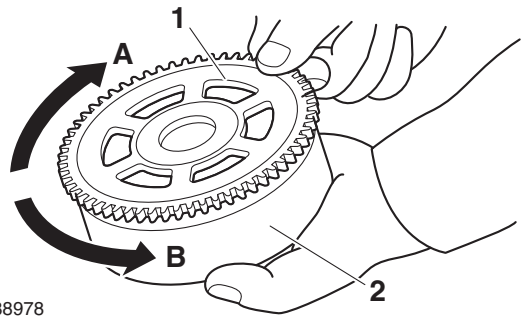
Sheave holder
90890-01903
Primary clutch holder
YS-01880-A



EAS30869
CHECKING THE STARTER CLUTCH

1. Check:
   • Starter clutch roller
   Damage/wear → Replace.
2. Check:
   • Starter clutch idle gear
   • Starter clutch gear
   Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   • Starter clutch gear contact surfaces
   Damage/pitting/wear → Replace the starter clutch gear.

4. Check:
   • Starter clutch operation
   a. Install the starter clutch gear "1" onto the generator rotor "2" and hold the generator rotor.
   b. When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
   c. When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



G088978

EAS30871
INSTALLING THE STARTER CLUTCH

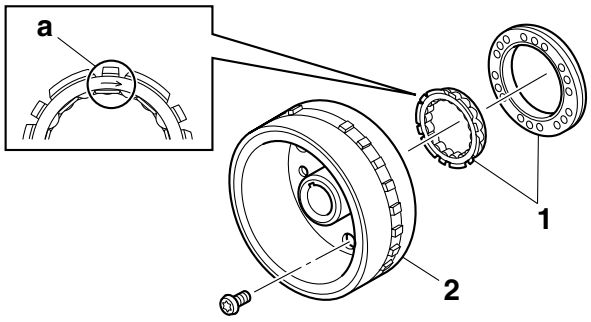
1. Install:
   • Starter clutch "1"

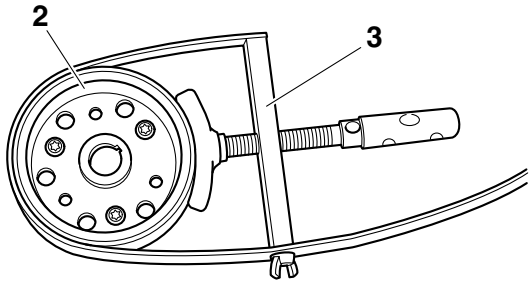
	**Starter clutch bolt** **32 N·m (3.2 kgf·m, 24 lb·ft)** **LOCTITE®**

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 sheave holder "3", tighten the starter clutch bolts.

	**Sheave holder** **90890-01903** **Primary clutch holder** **YS-01880-A**





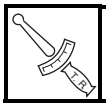
EAS30872
INSTALLING THE GENERATOR

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 washer with engine oil.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

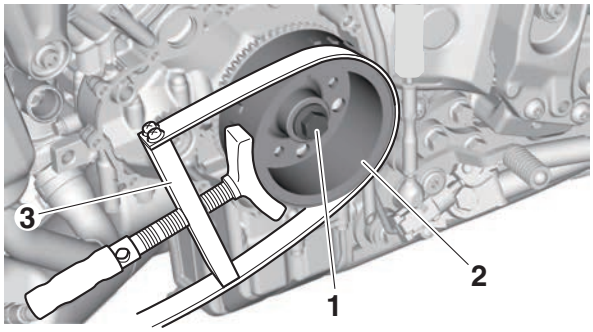
2. Tighten:
   • Generator rotor bolt "1"

	**Generator rotor bolt** **75 N·m (7.5 kgf·m, 55 lb·ft)**

TIP

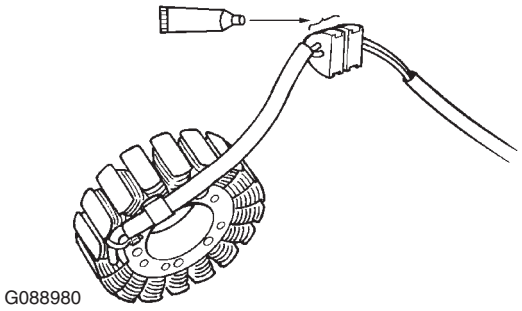
While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.

	**Sheave holder** **90890-01903** **Primary clutch holder** **YS-01880-A**



3. Apply:
   • Sealant
   (onto the stator coil assembly lead grommet)

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

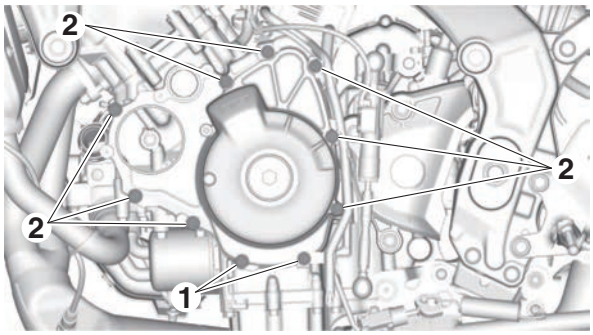


4. Install:
   • Generator cover gasket New
   • Generator cover

	Generator cover bolt "1" **12 N·m (1.2 kgf·m, 8.9 lb·ft)** **LOCTITE®** **Generator cover bolt "2"** **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

TIP

Tighten the generator cover bolts in stages and in a crisscross pattern.



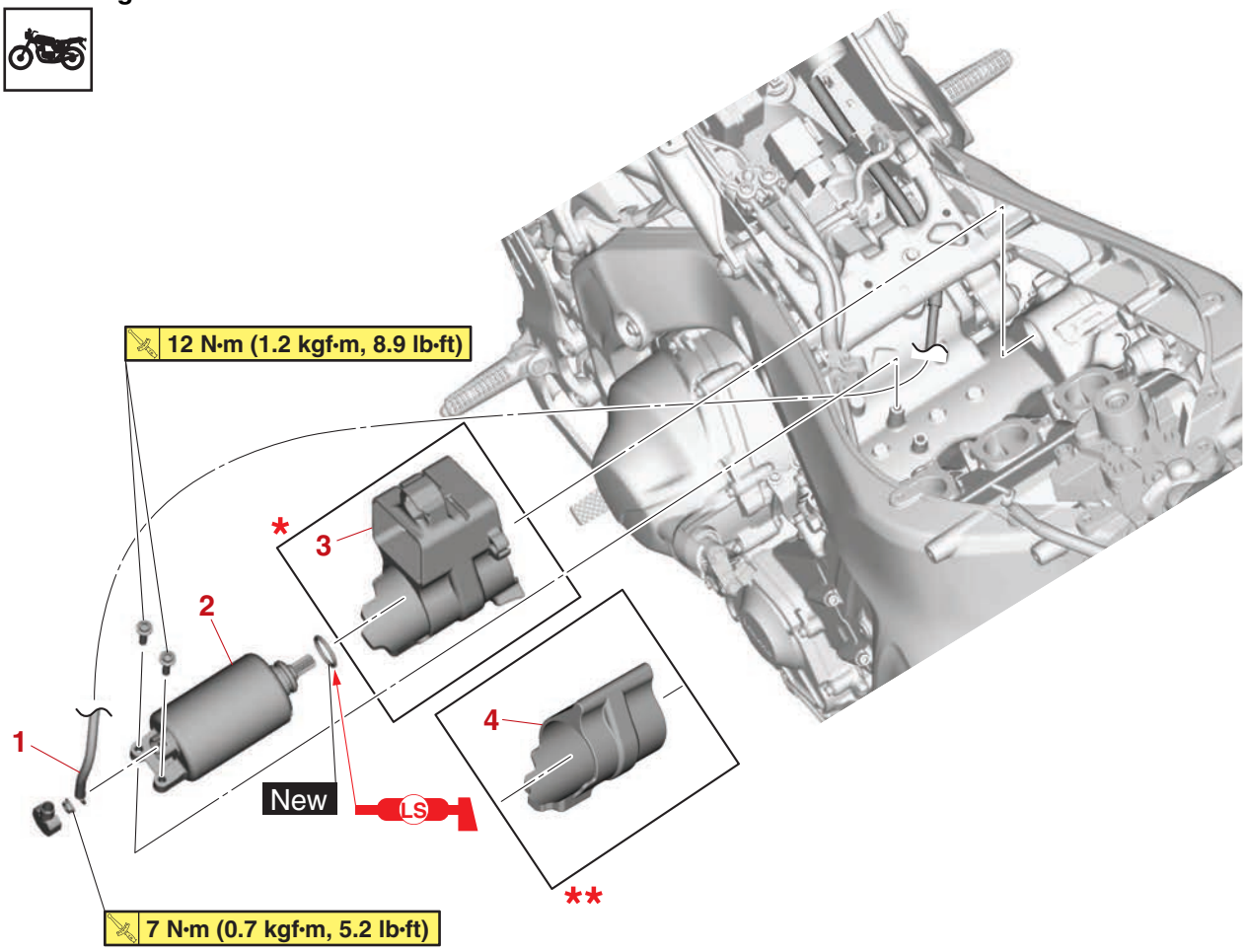
5. Connect:
   • Stator coil coupler
   • Crankshaft position sensor coupler

TIP

To route the stator coil lead, refer to "CABLE ROUTING" on page 2-15.

EAS20052
ELECTRIC STARTER

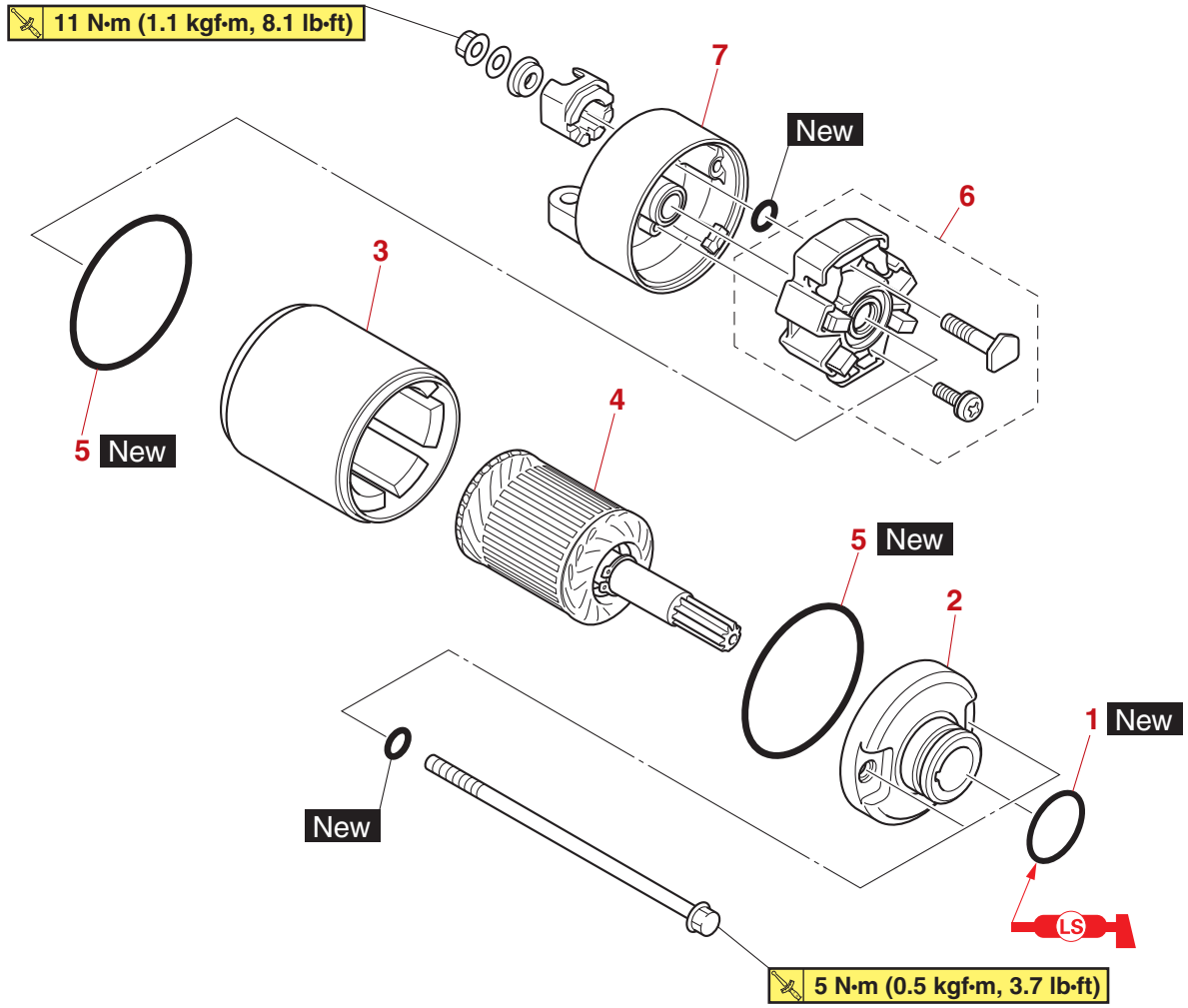
Removing the starter motor



* For MT09M/MT09SPM
** For MT09MC/MT09SPMC

Order	Job/Parts to remove	Q'ty	Remarks
	Purge cut valve solenoid		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Starter motor lead	1	Disconnect.
2	Starter motor	1	
3	Canister holder	1	For MT09MC/MT09SPMC.
4	Holder	1	For MT09M/MT09SPM.

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	

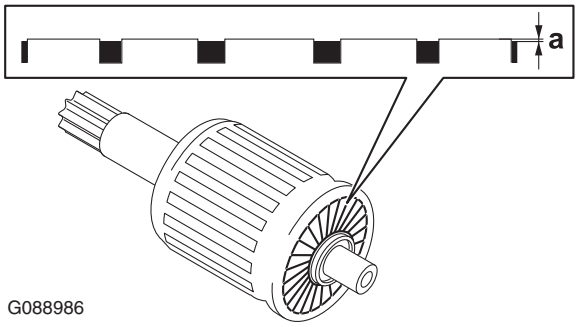
EAS30325
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600 grit sandpaper.
2. Measure:
   • Mica undercut “a”
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
0.70 mm (0.03 in)

TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.

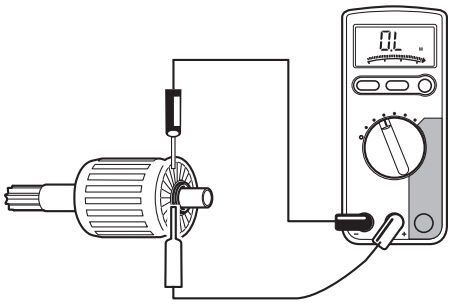


G088986

3. Check:
   • Armature assembly
   a. Connect the digital circuit tester and check the continuity.

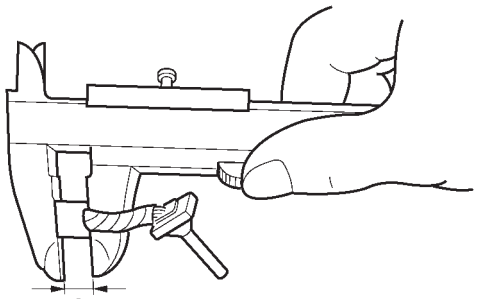
Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

   b. If there is no continuity, replace the starter motor.



4. Measure:
   • Brush length “a”
   Out of specification → Replace the brush holder set.

Brush overall length limit
6.5 mm (0.26 in)


G088989 **a**

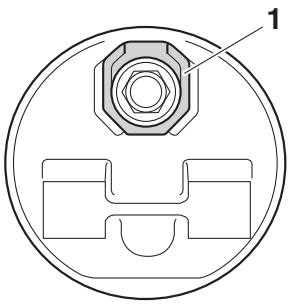
5. Check:
   • Gear teeth
   Damage/wear → Replace the starter motor assembly.
6. Check:
   • Bearing
   • Oil seal
   Damage/wear → Replace the starter motor assembly.

EAS30326
ASSEMBLING THE STARTER MOTOR

1. Install:
   • Brush holder set
   • Insulator “1”

TIP

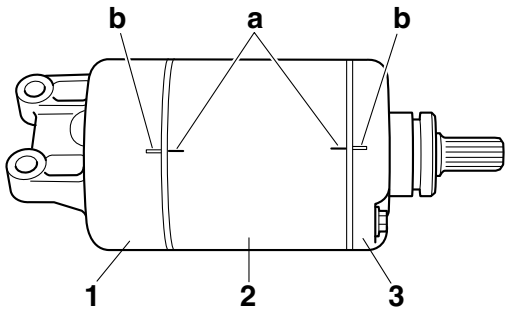
Install the insulator as shown in the illustration.



2. Install:
   • Starter motor rear cover “1”
   • Starter motor yoke “2”
   • Starter motor front cover “3”

TIP

Align the match marks “a” on the starter motor yoke with the match marks “b” on the front and rear cover.



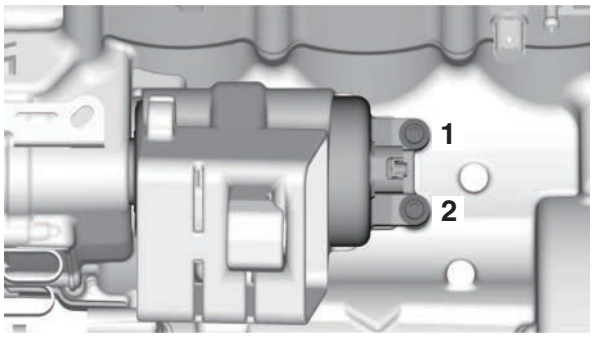
EAS30327
INSTALLING THE STARTER MOTOR

1. Install:
   - Canister holder (for MT09MC/MT09SPMC)
   - Holder (for MT09M/MT09SPM)
   - Starter motor
   - Starter motor bolt

TIP

Tighten the starter motor bolts in the tightening sequence as shown.

	Starter motor bolt **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

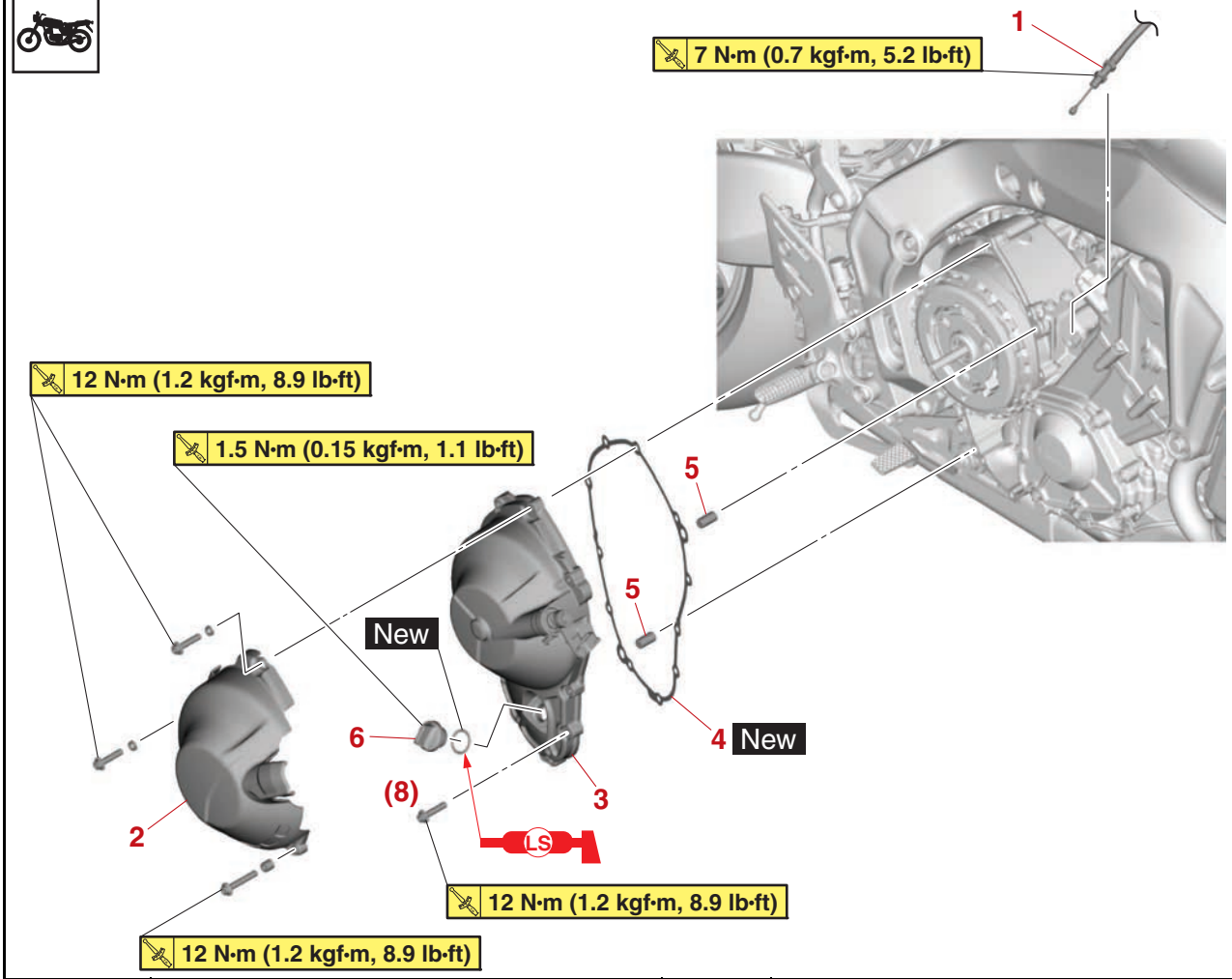


2. Connect:
   - Starter motor lead

	Starter motor lead nut **7 N·m (0.7 kgf·m, 5.2 lb·ft)**

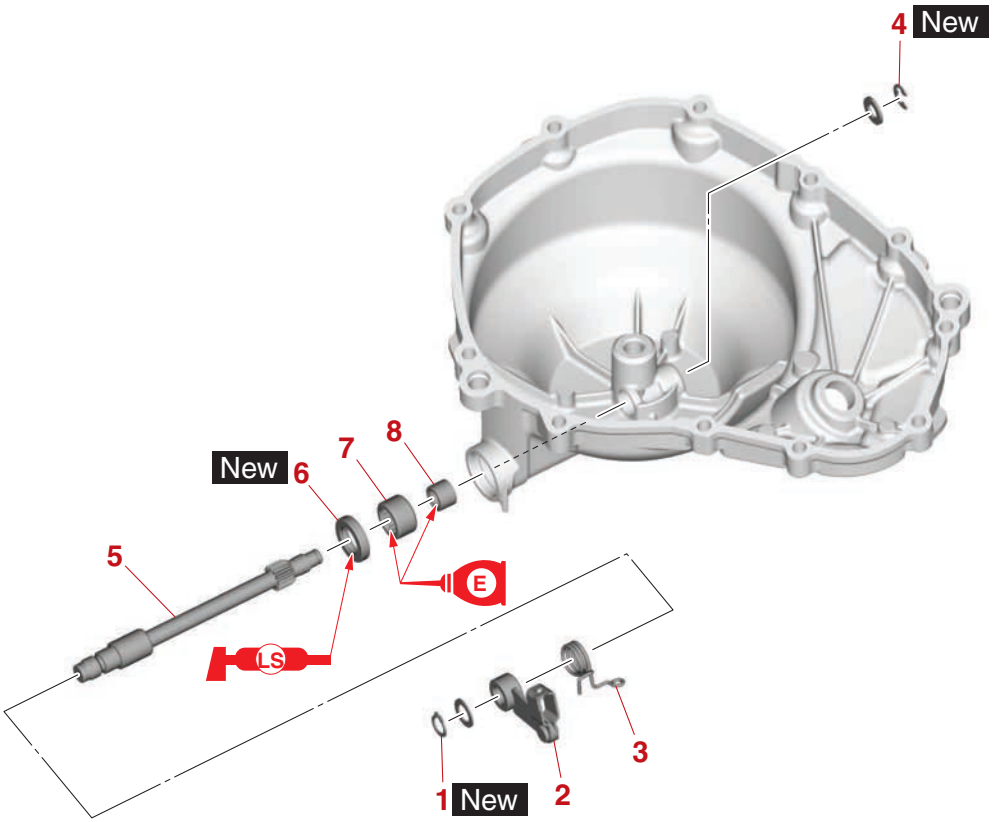
EAS20055
CLUTCH

Removing the clutch cover



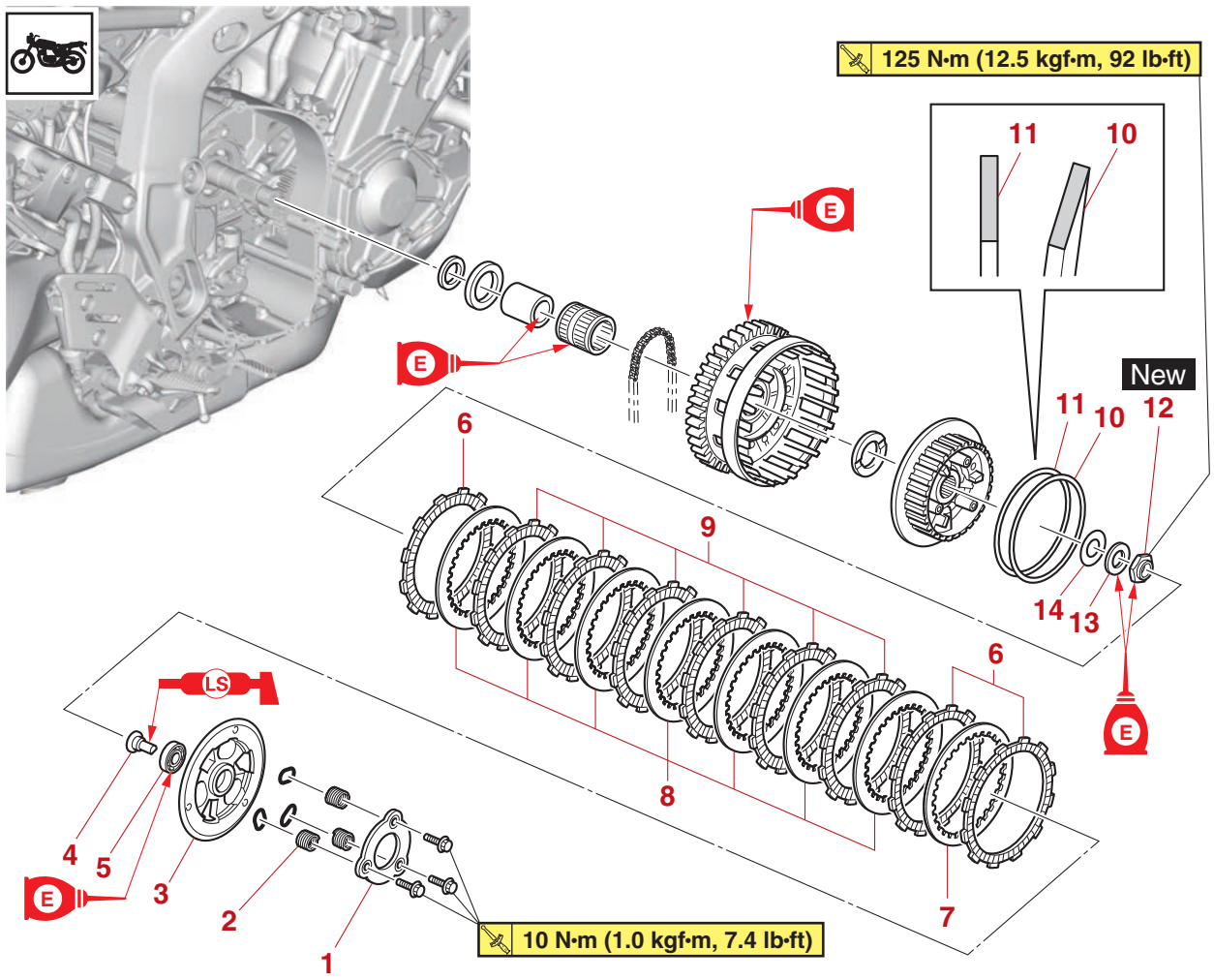
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-28.
1	Clutch cable	1	Disconnect.
2	Cover	1	
3	Clutch cover	1	
4	Clutch cover gasket	1	
5	Dowel pin	2	
6	Oil filler cap	1	

Removing the pull lever shaft



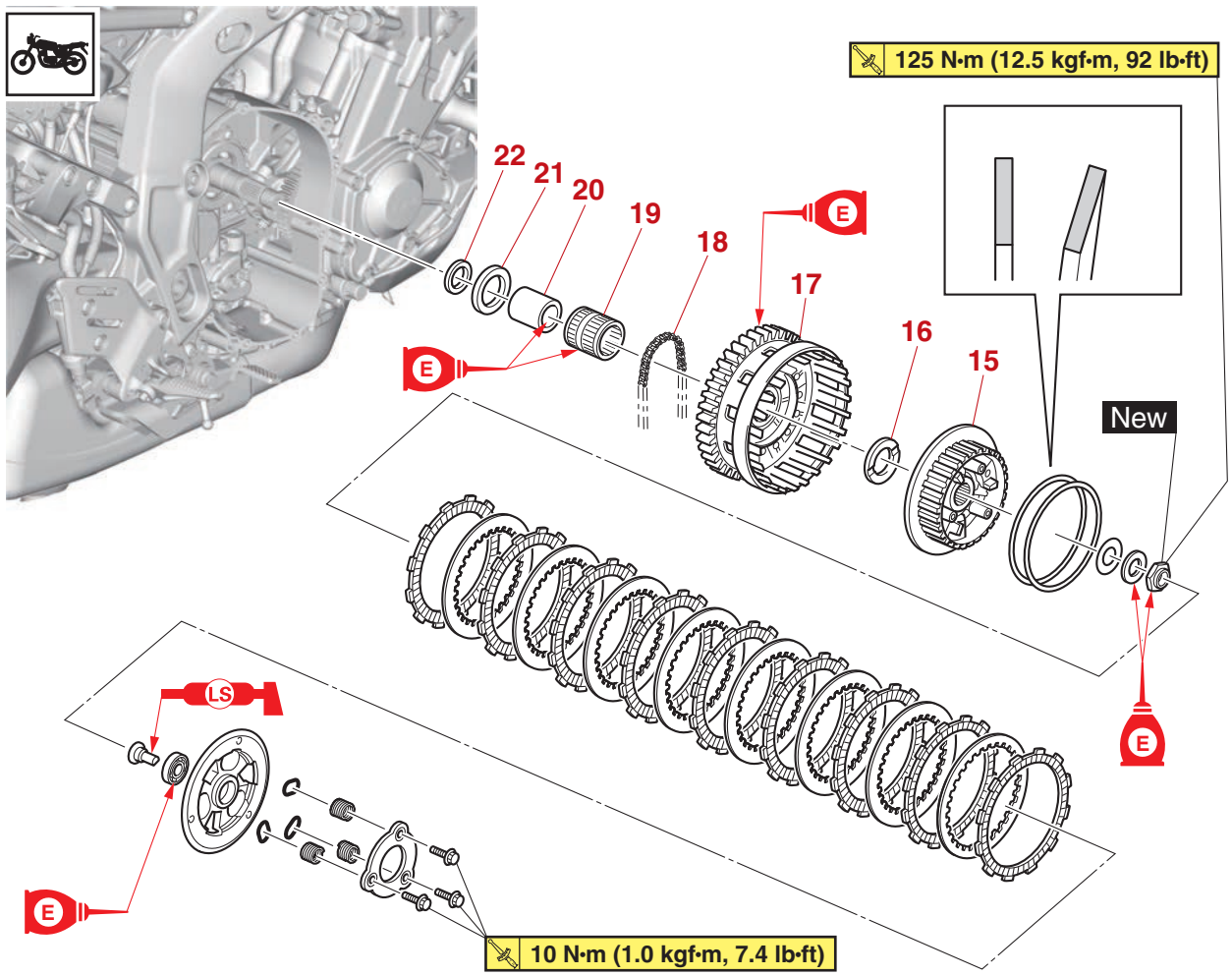
Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	1	
2	Pull lever	1	
3	Pull lever spring	1	
4	Circlip	1	
5	Pull lever shaft	1	
6	Oil seal	1	
7	Bearing	1	
8	Bearing	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Oil pump driven sprocket		Refer to "OIL PUMP" on page 5-58.
1	Pressure plate 1	1	
2	Clutch spring	3	
3	Pressure plate 2	1	
4	Pull rod	1	
5	Bearing	1	
6	Friction plate 2	3	Inside diameter: 126 mm (4.96 in)
7	Clutch plate 1	1	Inside diameter: 116 mm (4.57 in)
8	Clutch plate 2	7	Inside diameter: 105 mm (4.13 in)
9	Friction plate 1	6	Inside diameter: 119 mm (4.69 in)
10	Clutch damper spring	1	
11	Clutch damper spring seat	1	
12	Clutch boss nut	1	
13	Conical spring washer	1	
14	Washer	1	

Removing the clutch



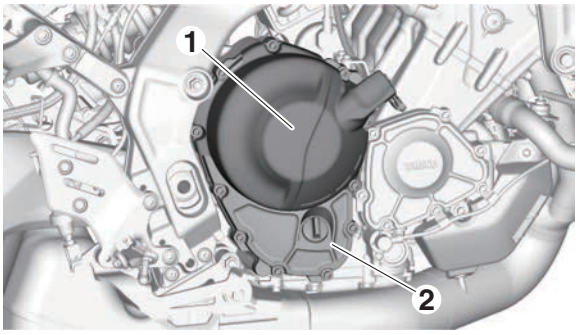
Order	Job/Parts to remove	Q'ty	Remarks
15	Clutch boss	1	
16	Thrust plate	1	
17	Clutch housing	1	
18	Oil pump drive chain	1	
19	Bearing	1	
20	Spacer	1	
21	Thrust plate	1	
22	Thrust plate	1	

EAS30346
REMOVING THE CLUTCH

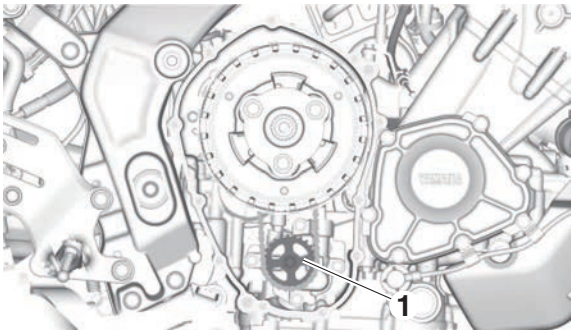
1. Remove:
   • Cover “1”
   • Clutch cover “2”
   • Gasket

TIP

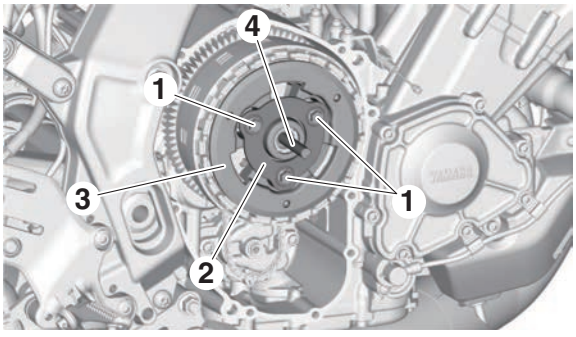
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
After all of the bolts are fully loosened, remove them.



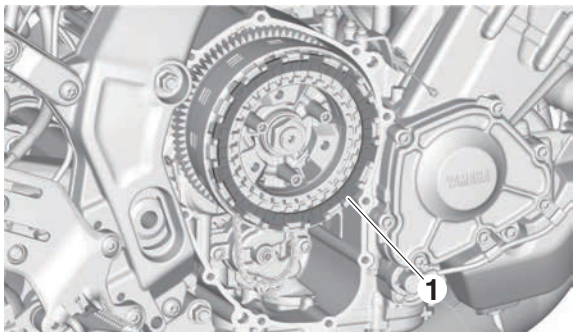
2. Remove:
   • Oil pump driven sprocket “1”
   Refer to “OIL PUMP” on page 5-58.



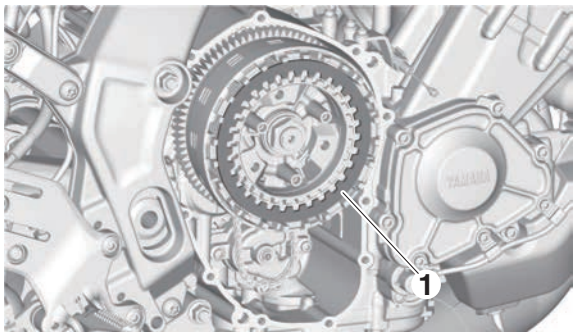
3. Remove:
   • Clutch spring bolt “1”
   • Pressure plate 1 “2”
   • Clutch spring
   • Pressure plate 2 “3”
   • Pull rod “4”



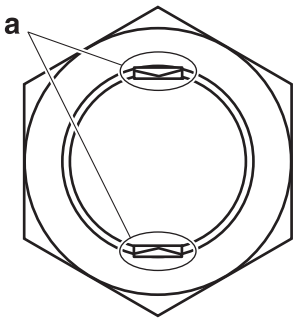
4. Remove:
   • Friction plate 2 “1”



5. Remove:
   • Clutch plate 1 “1”
   • Clutch plate 2
   • Friction plate 1
   • Clutch damper spring
   • Clutch damper spring seat



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



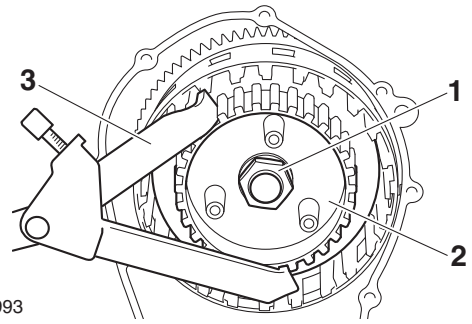
G088992

7. 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

8. Remove:
   - Clutch boss nut
   - Conical spring washer
   - Washer
   - Clutch boss
   - Thrust plate
   - Clutch housing
   - Oil pump drive chain

EAS30348
CHECKING THE FRICTION PLATES

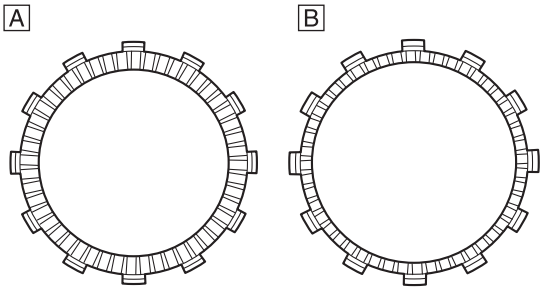
The following procedure applies to all of the friction plates.

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

TIP

Measure the friction plate at four places.

Friction plate 1 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)
Friction plate 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.111 in)



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 1, 2
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate 1, 2 thickness
     (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

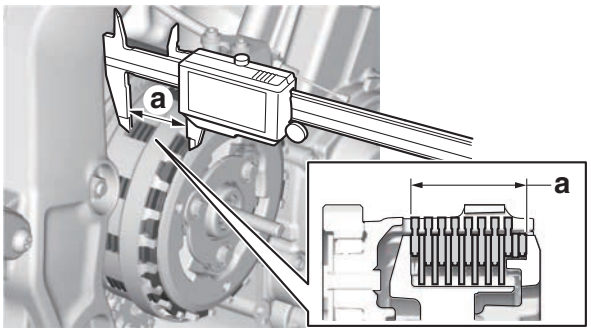
Clutch plate 1 thickness
2.18–2.42 mm (0.086–0.095 in)
Warpage limit
0.10 mm (0.004 in)
Clutch plate 2 thickness
1.90–2.10 mm (0.075–0.083 in)
Warpage limit
0.10 mm (0.004 in)

3. Measure:
   - Assembly width “a” of the friction plates and clutch plates
     Out of specification → Adjust.

Assembly width
42.7–43.5 mm (1.68–1.71 in)

TIP

- Perform the thickness measurement without applying the oil.
- This step should be performed only if the friction plates and clutch plates were replaced.
- To measure the total width of the friction plates and clutch plates, combine 9 friction plates and 8 clutch plates as shown.



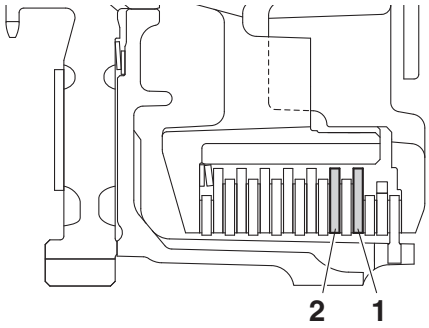
a. Assembly width adjusted by clutch plate 2 “1” and “2”.
b. Select the clutch plate 2 from the following table.

Clutch plate 2 “1”		
BR9-16324-00	1.6 mm (0.063 in)	
5VY-16325-00	2.0 mm (0.079 in)	STD
4B1-16325-00	2.3 mm (0.091 in)	

Clutch plate 2 “2”		
BR9-16324-00	1.6 mm (0.063 in)	
5VY-16325-00	2.0 mm (0.079 in)	STD
4B1-16325-00	2.3 mm (0.091 in)	

TIP

When adjusting the clutch assembly width [by replacing the clutch plate(s)], be sure to replace the clutch plate 2 “1” first.
After replacing the clutch plate 2 “1”, if specifications cannot be met, replace the clutch plate 2 “2”.



EAS30351

CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:
   - Clutch spring
     Damage → Replace the clutch springs as a set.
2. Measure:
   - Clutch spring free length
     Out of specification → Replace the clutch springs as a set.

Clutch spring free length limit
42.53 mm (1.67 in)

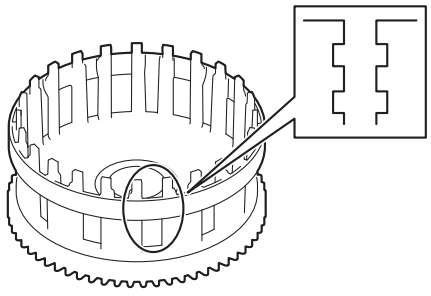
EAS30352

CHECKING THE CLUTCH HOUSING

1. Check:
   - Clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

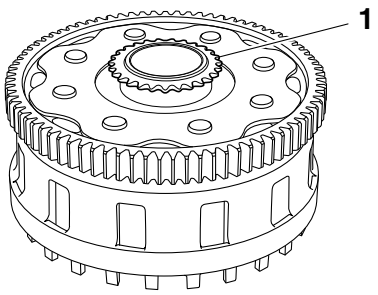
TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.



G088994

2. Check:
   - Oil pump drive sprocket “1”
     Cracks/damage/wear → Replace the oil pump drive chain and clutch housing as a set.

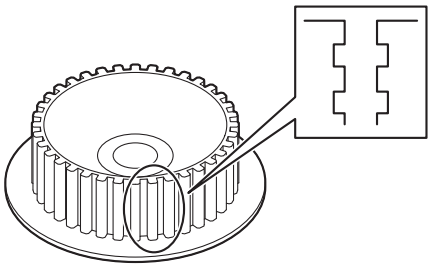


3. Check:
   • Bearing
   Damage/wear → Replace the bearing and clutch housing.

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.



G088995

EAS30354
CHECKING THE PRESSURE PLATE
1. Check:
   • Pressure plate 1
   • Pressure plate 2
   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.

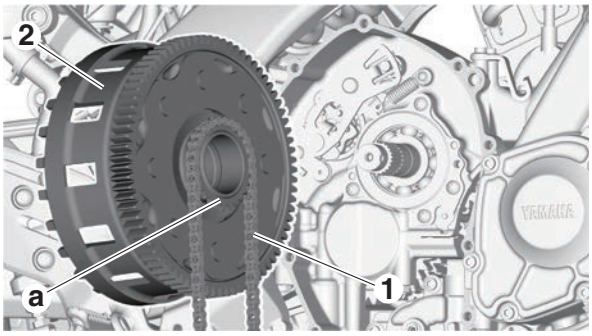
EAS30357
CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
   • Primary driven gear
   Damage/wear → Replace the clutch housing and crankshaft as a set.
   Excessive noise during operation → Replace the clutch housing and crankshaft as a set.

EAS30358
CHECKING THE PULL LEVER SHAFT AND PULL ROD
1. Check:
   • Pull lever shaft pinion gear teeth
   • Pull rod teeth
   Damage/wear → Replace the pull rod and pull lever shaft as a set.
2. Check:
   • Pull rod bearing
   Damage/wear → Replace.

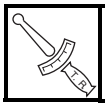
EAS30363
INSTALLING THE CLUTCH
1. Install:
   • Oil pump drive chain “1”
   • Clutch housing “2”

TIP

Install the oil pump drive chain onto the oil pump drive sprocket “a”.



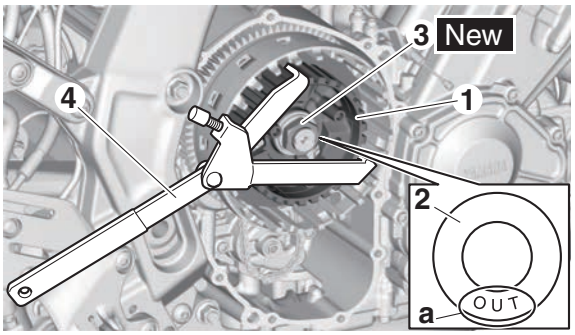
2. Install:
   • Thrust plate
   • Clutch boss “1”
   • Washer
   • Conical spring washer “2”
   • Clutch boss nut “3” New

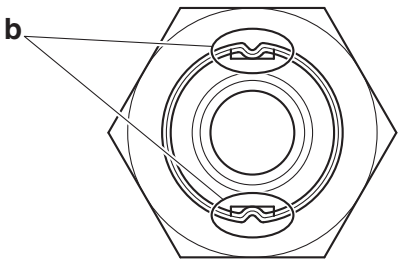
	**Clutch boss nut** **125 N·m (12.5 kgf·m, 92 lb·ft)**

TIP

- Install the conical spring washer on the main axle with the "OUT" mark "a" facing away from the vehicle.
- While holding the clutch boss "1" with the universal clutch holder "4", tighten the clutch boss nut.
- Stake the clutch boss nut at cutouts "b" in the main axle.

Clutch holder
90890-04199
Universal clutch holder
YM-91042

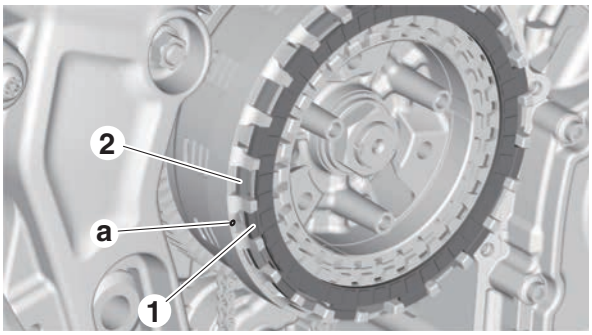




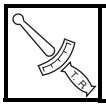
3. Install:
   - Clutch damper spring seat
   - Clutch damper spring
   - Friction plate 2
   - Clutch plate 2
   - Friction plate 1
   - Clutch plate 1

TIP

- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Install the last friction plate "1" offset from the other friction plates "2", making sure to align a projection on the friction plate with the punch mark "a" on the clutch housing.



4. Install:
   - Pull rod
   - Pressure plate 2
   - Clutch spring
   - Pressure plate 1
   - Clutch spring bolt "1"



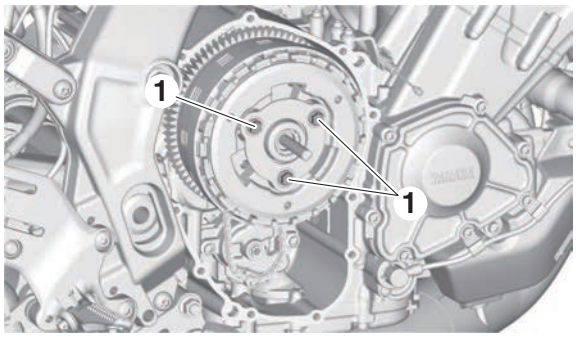
Clutch spring bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)

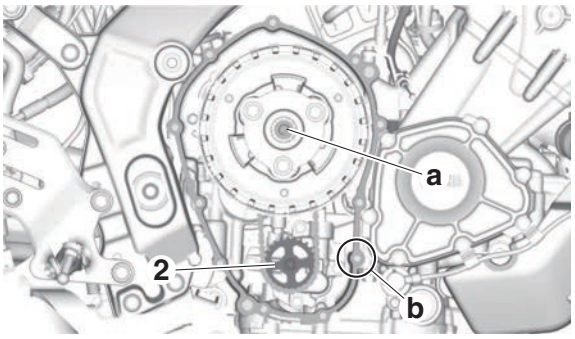
- Oil pump driven sprocket "2"

Oil pump driven sprocket bolt
15 N·m (1.5 kgf·m, 11 lb·ft)
LOCTITE®

TIP

- Tighten the clutch spring bolts in stages and in a crisscross pattern.
- Apply lithium-soap-based grease onto the pull rod.
- Position the pull rod so that the teeth "a" face towards the hole "b". Then, install the clutch cover.





5. Install:
   - Dowel pin
   - Clutch cover gasket New
   - Clutch cover
   - Cover

	Clutch cover bolt **12 N·m (1.2 kgf·m, 8.9 lb·ft)**

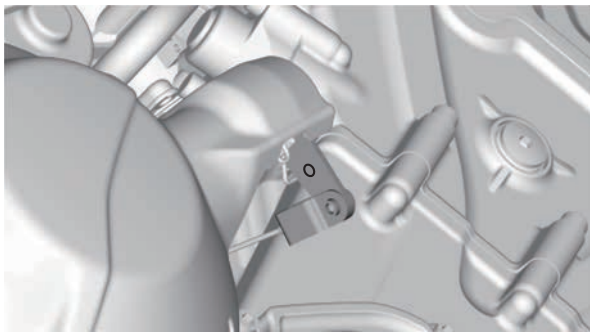
TIP

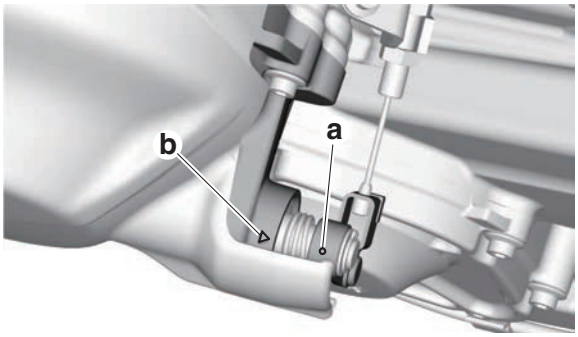
- Apply engine oil onto the bearing.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.

6. Install:
   - Pull lever

TIP

- Install the pull lever with the "O" mark facing toward lower side.
- When installing the pull lever, push the pull lever and check that the punch mark "a" on the pull lever aligns with the mark "b" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.

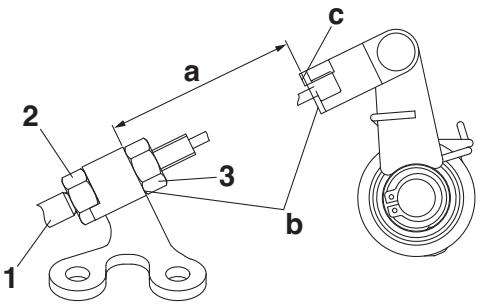




7. Connect:
   - Clutch cable "1"

TIP

- For the clutch cable "1", turn the nut "2" in fully and then adjust the length "a" by using the nut "3" so that the cable length is 47.1–54.8 mm (1.85–2.16 in).
- Measure the length while keeping the measuring surface "b" parallel.
- After installing the clutch cable, bend the projection "c" on the pull lever.

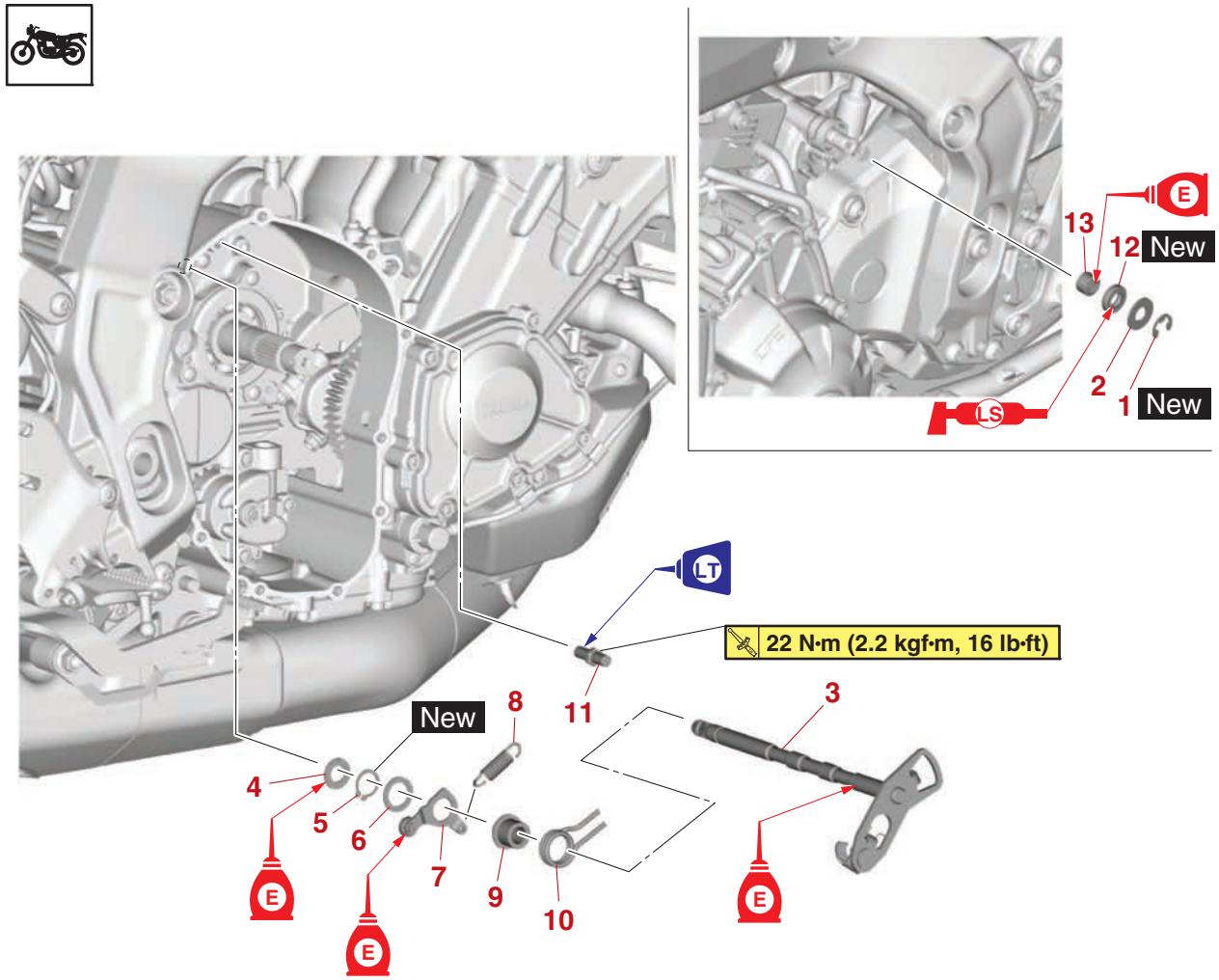


8. Adjust:
   - Clutch lever free play
     Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-12.

	Clutch lever free play **10.0–15.0 mm (0.39–0.59 in)** **(MT09M, MT09MC)** **5.0–10.0 mm (0.20–0.39 in)** **(MT09SPM, MT09SPMC)**

EAS20057
SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch assembly		Refer to "CLUTCH" on page 5-46.
	Shift arm		Refer to "CHAIN DRIVE" on page 4-87.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Circlip	1	
6	Washer	1	
7	Stopper lever	1	
8	Stopper lever spring	1	
9	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.

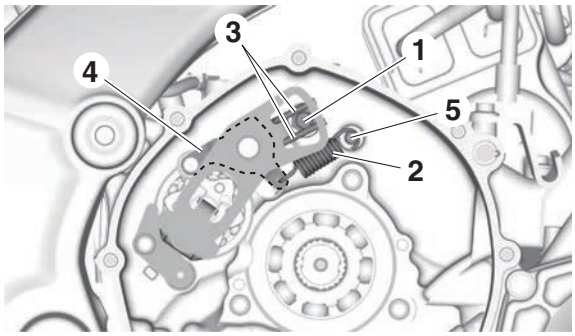
EAS30378
CHECKING THE STOPPER LEVER
1. Check:
   - Stopper lever
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.

EAS30381
INSTALLING THE SHIFT SHAFT
1. Install:
   - Shift shaft spring stopper “1”
   - Shift shaft assembly
   - Stopper lever spring “2”

Shift shaft spring stopper
22 N·m (2.2 kgf·m, 16 lb·ft)
LOCTITE®

TIP

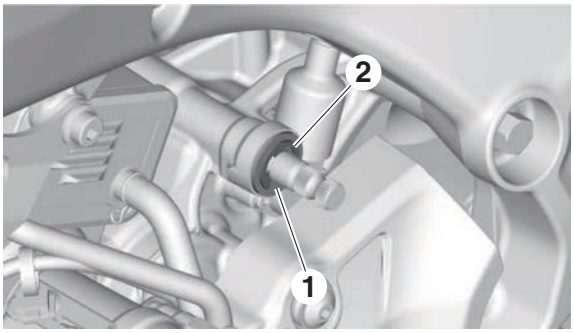
- Hook the end of the shift shaft spring “3” onto the shift shaft spring stopper “1”.
- Hook the ends of the stopper lever spring “2” onto the stopper lever “4” and the crankcase boss “5”.
- Mesh the stopper lever with the shift drum segment assembly.



2. Install:
   - Bearing
   - Oil seal New
   - Washer “1”
   - Circlip “2” New

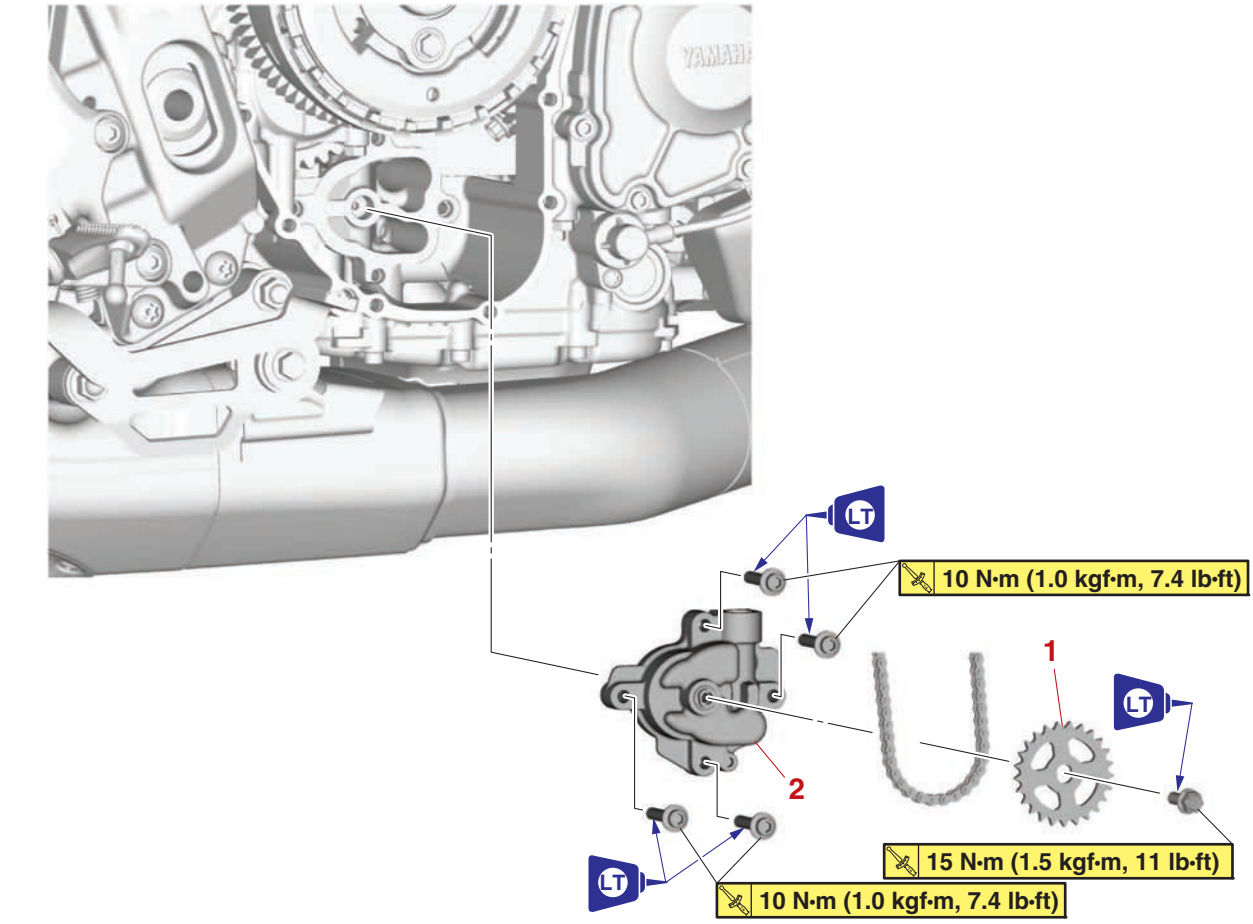
TIP

Lubricate the oil seal lips with lithium-soap-based grease.



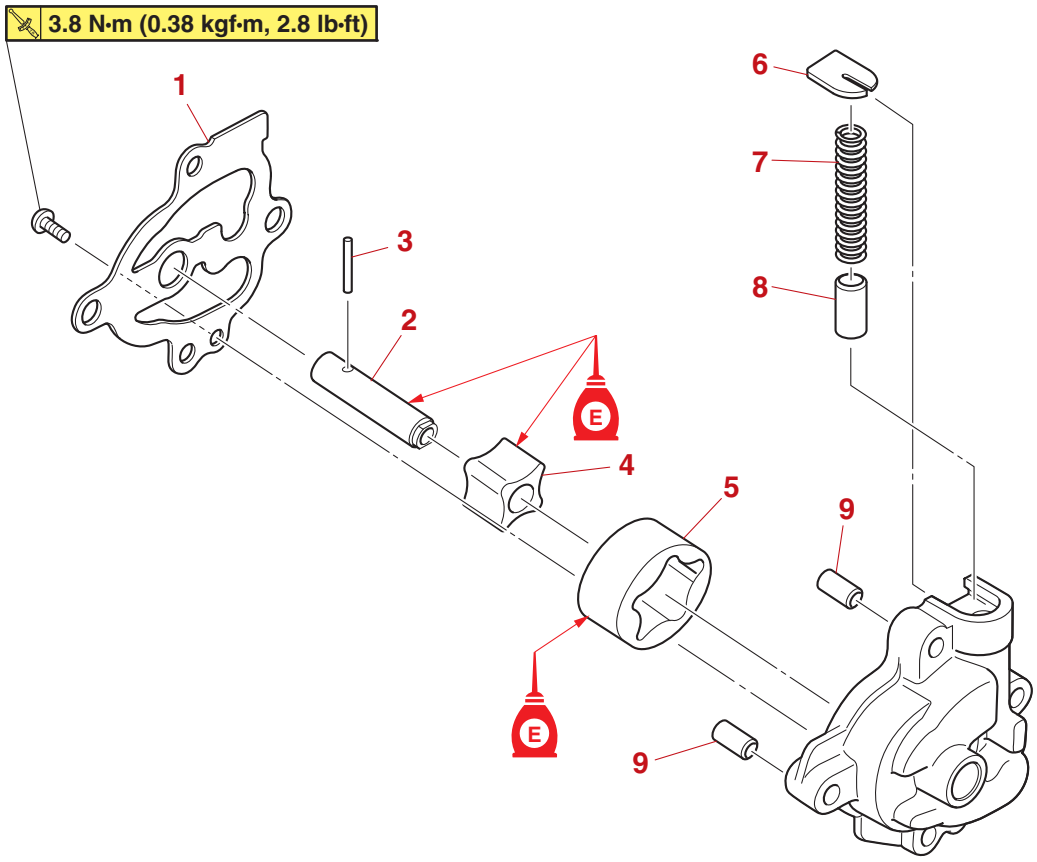
EAS20054
OIL PUMP

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch cover		Refer to "CLUTCH" on page 5-46.
1	Oil pump driven sprocket	1	
2	Oil pump assembly	1	

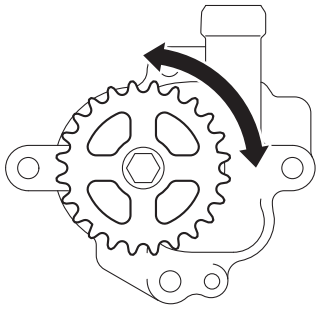
Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Oil pump shaft	1	
3	Pin	1	
4	Oil pump inner rotor	1	
5	Oil pump outer rotor	1	
6	Washer	1	
7	Spring	1	
8	Relief valve	1	
9	Dowel pin	2	

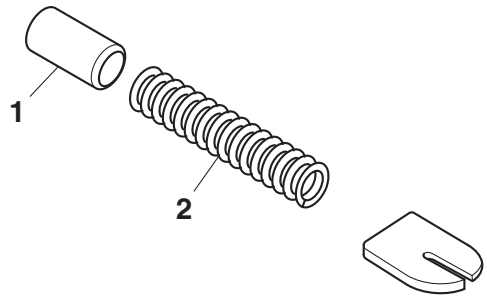
EAS30336
CHECKING THE SPROCKET AND CHAIN
1. Check:
   • Oil pump drive sprocket
   Refer to "CHECKING THE CLUTCH HOUSING" on page 5-52.
2. Check:
   • Oil pump drive chain
   Damage/stiffness → Replace the oil pump drive chain and oil pump drive sprocket (clutch housing) as a set.

EAS30337
CHECKING THE OIL PUMP
1. Check:
   • Oil pump driven sprocket
   Cracks/damage/wear → Replace the oil pump drive chain and oil pump driven sprocket as a set.
   • Oil pump housing
   • Oil pump cover
   • Oil pump shaft
   • Oil pump inner rotor
   • Oil pump outer rotor
   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 "1"
   • Spring "2"
   Damage/wear → Replace the oil pump assembly.



EAS30342
ASSEMBLING THE OIL PUMP
1. Lubricate:
   • Inner rotor
   • Outer rotor
   • Oil pump shaft

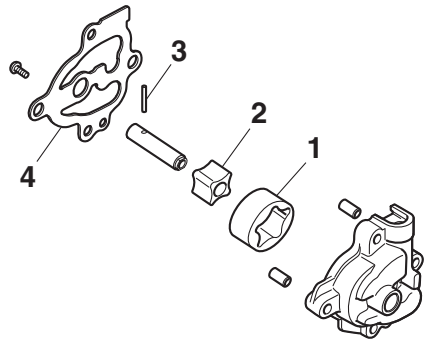
	Recommended lubricant **Engine oil**

2. Install:
   • Outer rotor "1"
   • Inner rotor "2"
   • Pin "3"
   • Oil pump cover "4"
   • Oil pump cover screw

	Oil pump cover screw **3.8 N·m (0.38 kgf·m, 2.8 lb·ft)**

TIP

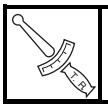
Align the pin "3" in the oil pump shaft with the groove in the inner rotor "2".



3. Check:
   • Oil pump operation
   Refer to "CHECKING THE OIL PUMP" on page 5-60.

EAS30343
INSTALLING THE OIL PUMP

1. Install:
   - Oil pump “1”
   - Oil pump bolt “2”

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

   - Oil pump driven sprocket “3”

	**Oil pump driven sprocket bolt** **15 N·m (1.5 kgf·m, 11 lb·ft)** **LOCTITE®**

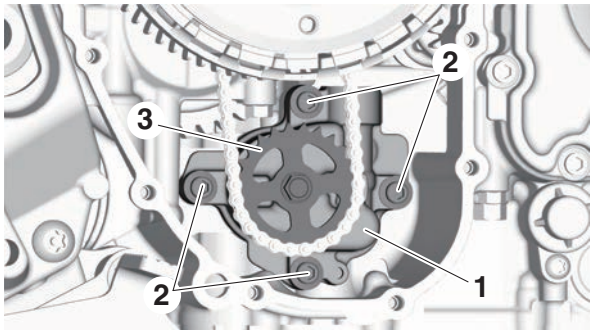
ECA20940

NOTICE

After installing the oil pump drive chain and driven sprocket, make sure the oil pump turns smoothly.

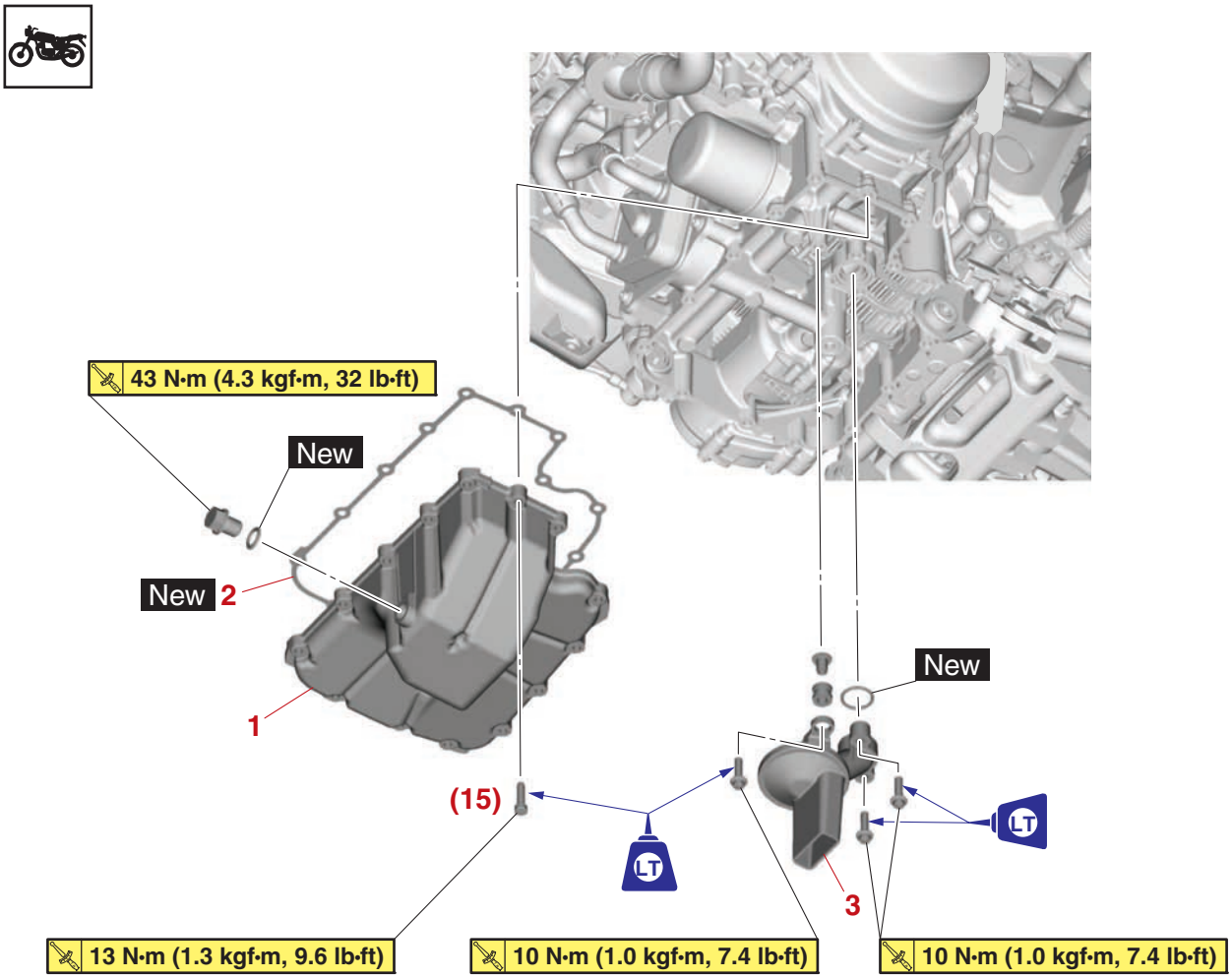
TIP

- 1RC mark of the oil pump driven sprocket is installed at oil pump side.
- Install the oil pump drive chain onto the oil pump driven sprocket.



EAS20177
OIL PAN

Removing the oil pan



Order	Job/Parts to remove	Q'ty	Remarks
	Muffler assembly		Refer to "ENGINE REMOVAL" on page 5-9.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-28.
1	Oil pan	1	
2	Oil pan gasket	1	
3	Oil strainer	1	

EAS31068
REMOVING THE OIL PAN

1. Remove:
   - Oil pan
   - Oil pan gasket

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

EAS31069
CHECKING THE OIL STRAINER

1. Check:
   - Oil strainer
     Damage → Replace.
     Contaminants → Clean with solvent.

EAS31070
INSTALLING THE OIL PAN

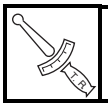
1. Install:
   - Oil pan gasket New
   - Oil pan

Oil pan bolt
13 N·m (1.3 kgf·m, 9.6 lb·ft)
LOCTITE®

TIP

Tighten the oil pan bolts in stages and in a crisscross pattern.

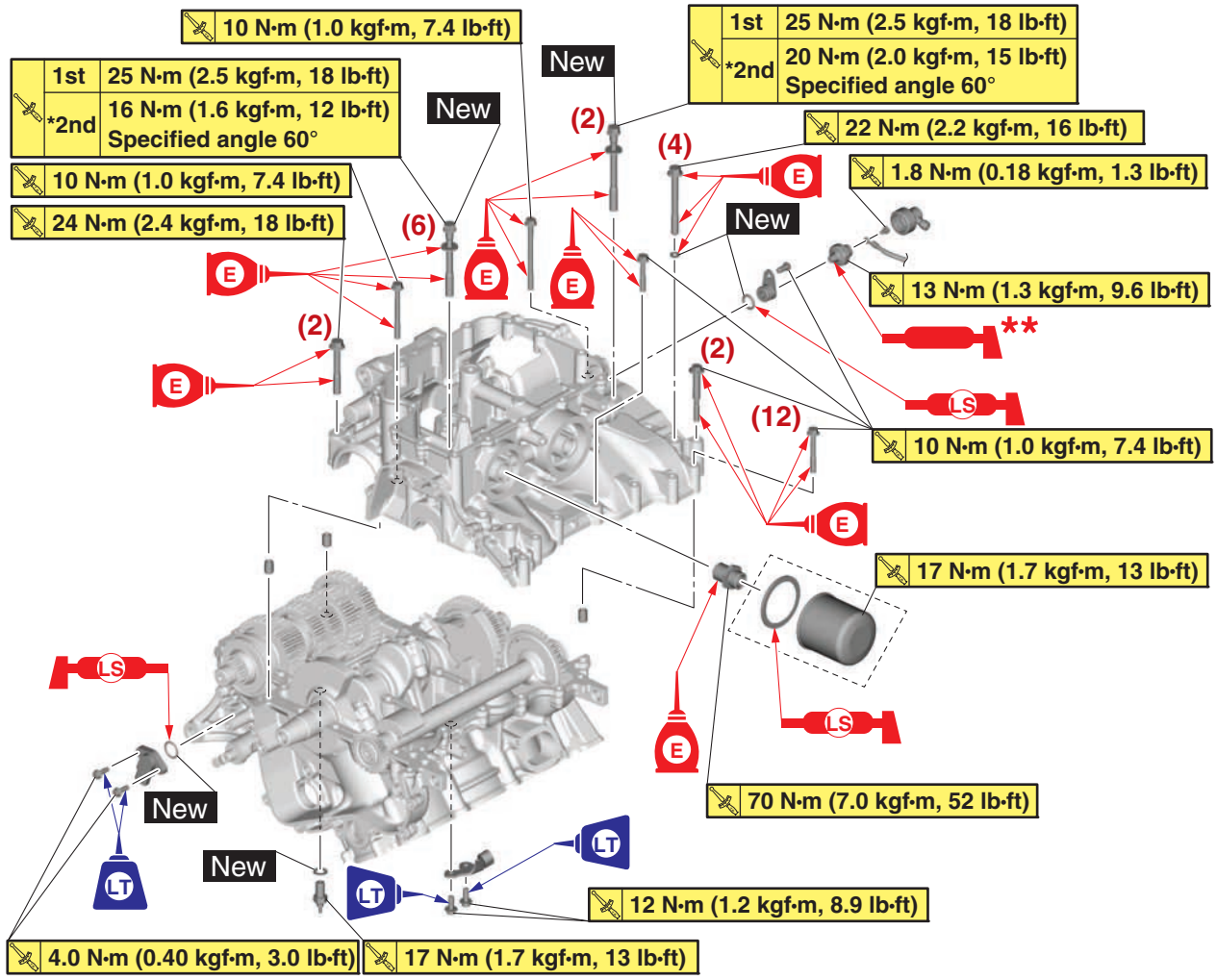
2. Install:
   - Gasket New
   - Engine oil drain bolt



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

EAS20059
CRANKCASE

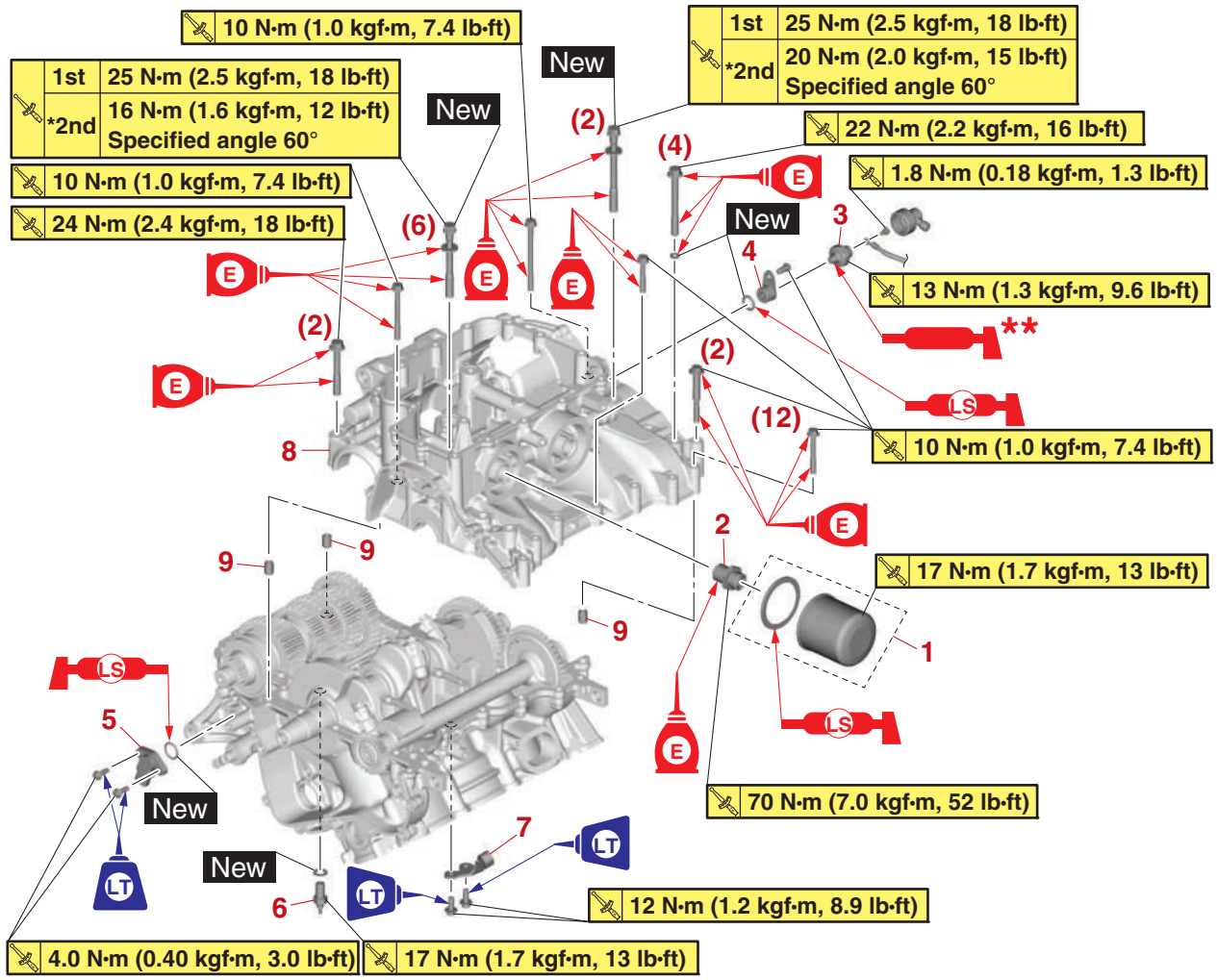
Separating the crankcase



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and the specified angle.**
**** YAMAHA Bond No. 1215B®**

Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-9.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-26.
	Water pump		Refer to "WATER PUMP" on page 6-11.
	Oil cooler		Refer to "OIL COOLER" on page 6-7.
	Water jacket joint		Refer to "OIL COOLER" on page 6-7.
	Thermostat assembly		Refer to "THERMOSTAT" on page 6-9.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-37.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-42.
	Clutch housing		Refer to "CLUTCH" on page 5-46.
	Oil strainer		Refer to "OIL PAN" on page 5-62.

Separating the crankcase



*** Following the tightening order, loosen the bolt one by one, and then retighten it to the specific torque and the specified angle.**
**** YAMAHA Bond No. 1215B®**

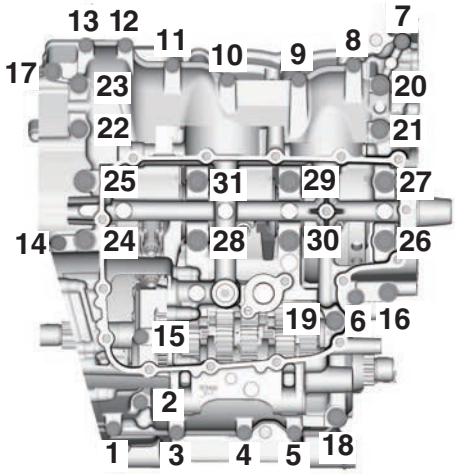
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil filter cartridge	1	
2	Oil filter cartridge union bolt	1	
3	Oil pressure switch	1	
4	Oil pressure switch joint	1	
5	Gear position sensor	1	
6	Neutral switch	1	
7	Clutch cable holder	1	
8	Lower crankcase	1	
9	Dowel pin	3	

EAS30389
DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
   • Crankcase bolt (×31)

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 in the proper sequence as shown.
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.



3. Remove:
   • Lower crankcase

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

4. Remove:
   • Dowel pin
5. Remove:
   • Crankshaft journal lower bearing
   • Balancer shaft journal bearing
   (from the lower crankcase)

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.

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)

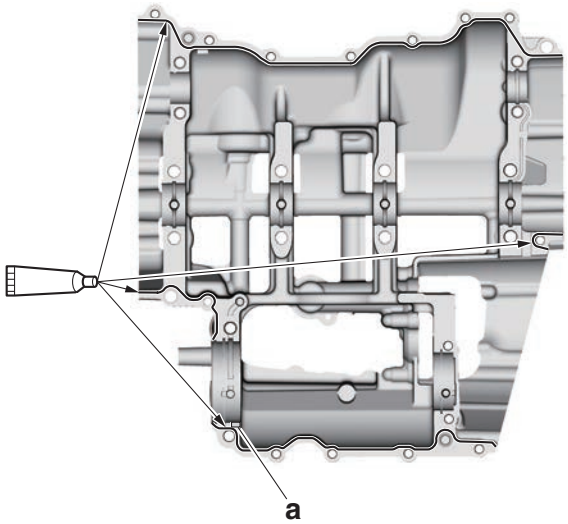
	**Recommended lubricant** **Engine oil**

2. Apply:
   • Sealant
   (onto the crankcase mating surfaces)

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

TIP

- Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings, or balancer shaft journal bearings.
- Make sure that the sealant does not get into the groove “a” in the crankcase.

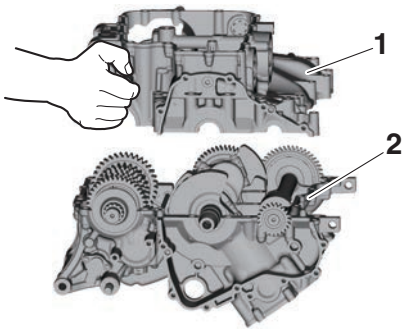


3. Install:
   • Dowel pin
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
   • Lower crankcase “1”
   (onto the upper crankcase “2”)

ECA13980

NOTICE

Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.

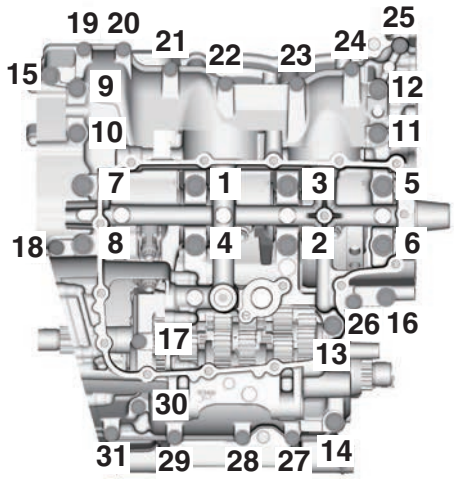


6. Install:
   • Crankcase bolt (×31)

TIP

- Lubricate the bolts “1”–“8” thread, mating surfaces and washers with engine oil.
- Lubricate the bolts “9”–“12” thread, mating surfaces and O-rings with engine oil.
- Lubricate the bolts “13”–“31” thread and mating surfaces with engine oil.

- M9 × 100 mm (3.94 in) bolt with washer: “7”, “8” New
- M9 × 85 mm (3.35 in) bolt with washer: “1”–“6” New
- M8 × 78 mm (3.07 in) bolt with new O-ring: “9”–“12”
- M8 × 60 mm (2.36 in) bolt: “13”, “14”
- M6 × 85 mm (3.35 in) bolt: “18”
- M6 × 65 mm (2.56 in) bolt: “15”, “16”
- M6 × 65 mm (2.56 in) bolt: “26”
- M6 × 50 mm (1.97 in) bolt: “17”, “19”–“21”, “23”–“25”, “27”–“31”
- M6 × 40 mm (1.57 in) bolt: “22”



7. Tighten:
   • Crankcase bolt “1”–“8”

Crankcase bolts “1”–“6”
1st: 25 N·m (2.5 kgf·m, 18 lb·ft)
***2nd: 16 N·m (1.6 kgf·m, 12 lb·ft)**
Specified angle 60°
Crankcase bolts “7”–“8”
1st: 25 N·m (2.5 kgf·m, 18 lb·ft)
***2nd: 20 N·m (2.0 kgf·m, 15 lb·ft)**
Specified angle 60°

* Following the tightening order, loosen the bolt one by one and then retighten it to the specified torque and the specified angle.

EWA16610

⚠ WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

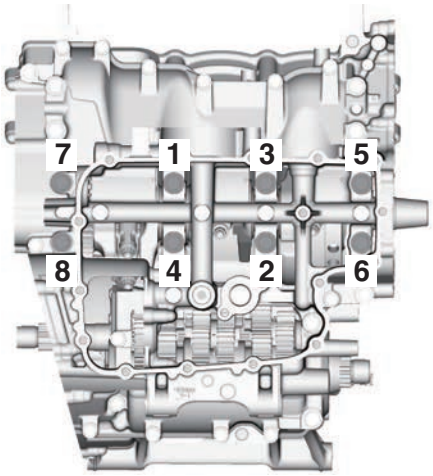
ECA20890

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.

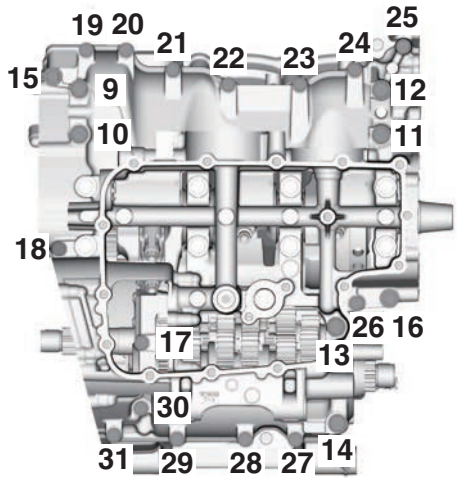


8. Tighten:
   • Crankcase bolt “9”–“31”

Crankcase bolts “9”–“12”
22 N·m (2.2 kgf·m, 16 lb·ft)
Crankcase bolts “13”–“14”
24 N·m (2.4 kgf·m, 18 lb·ft)
Crankcase bolts “15”–“31”
10 N·m (1.0 kgf·m, 7.4 lb·ft)

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.



EAS31071

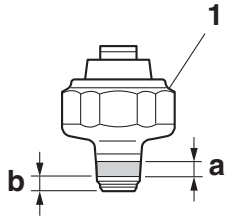
INSTALLING THE OIL PRESSURE SWITCH

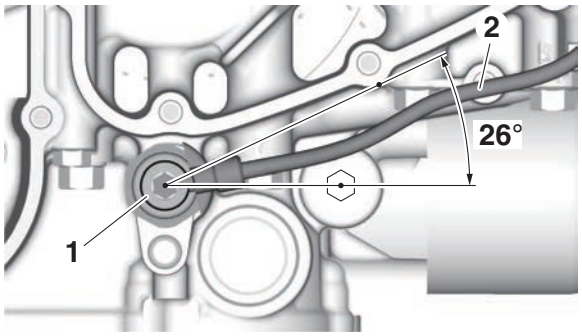
1. Install:
   • Oil pressure switch “1”
   • Oil pressure switch lead “2”

Oil pressure switch
13 N·m (1.3 kgf·m, 9.6 lb·ft)
Oil pressure switch lead bolt
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

TIP

- Apply Three Bond No. 1215B® to the threads “a” of the oil pressure switch. However, do not apply Three Bond No. 1215B® 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.





EAS31658
INSTALLING THE GEAR POSITION SENSOR

ECA22630
NOTICE

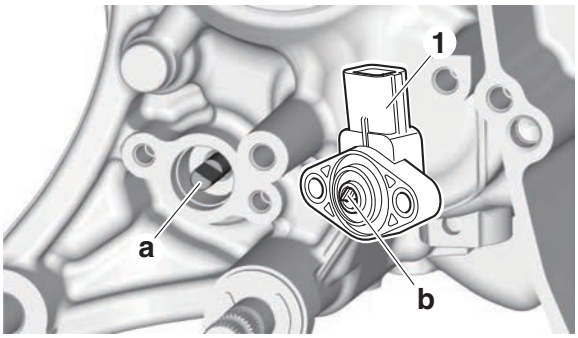
To prevent damage to the gear position sensor, keep magnets (including any pickup tool with a magnet, magnetized screwdrivers, etc.) away from the gear position sensor.

1. Install:
   - O-ring New
   - Gear position sensor “1”

Gear position sensor bolt
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)
LOCTITE®

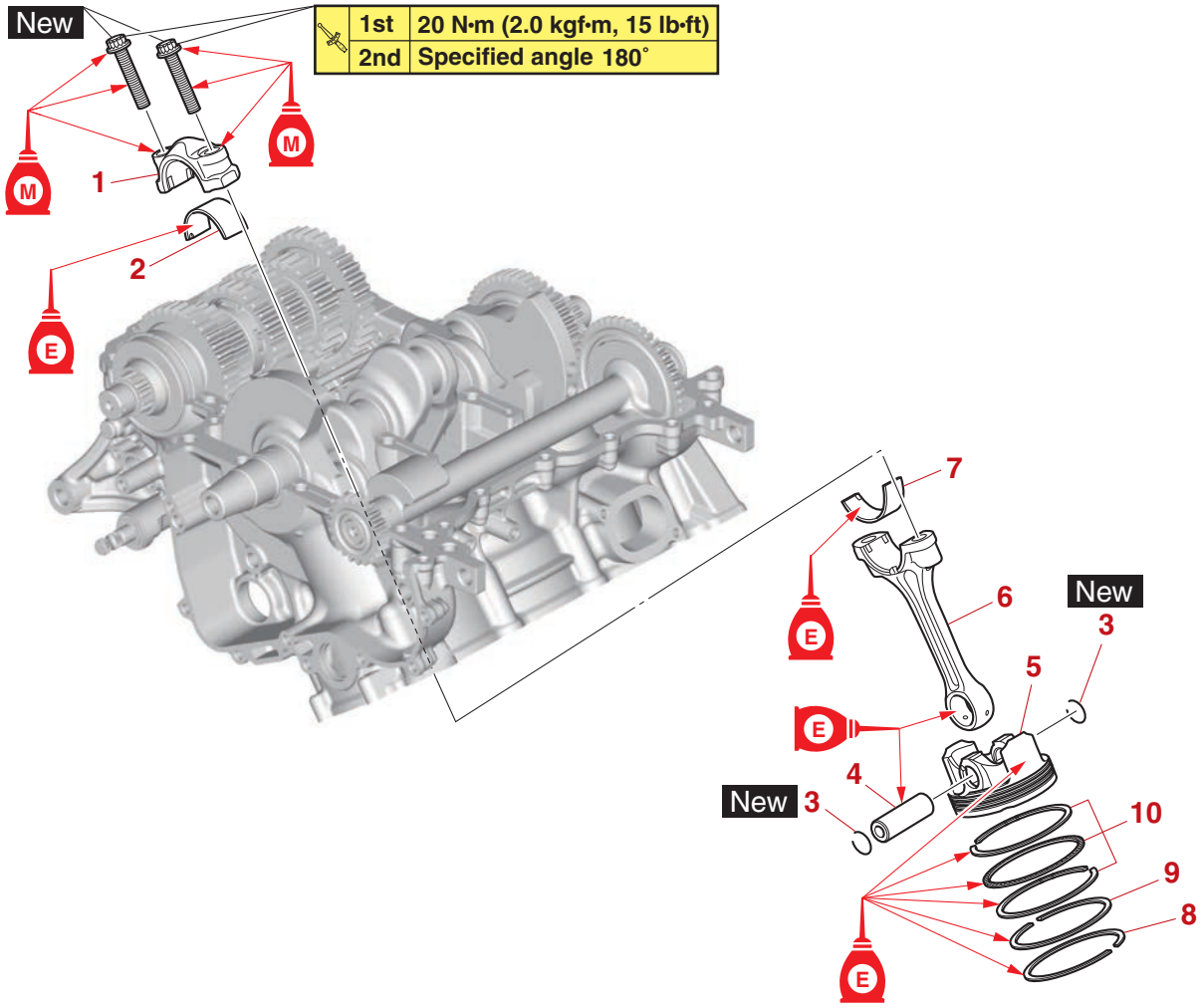
TIP

- Lubricate the O-ring with lithium-soap-based grease.
- Fit the end “a” of the shift drum assembly into the opening “b” in the gear position sensor “1”.



EAS20132
CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-64.
1	Connecting rod cap	3	
2	Big end lower bearing	3	
3	Piston pin clip	6	
4	Piston pin	3	
5	Piston	3	
6	Connecting rod	3	
7	Big end upper bearing	3	
8	Top ring	3	
9	2nd ring	3	
10	Oil ring	3	

EAS30745
REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
   - Connecting rod cap
   - Connecting rod
   - Big end bearing

TIP

- Identify the position of each big end bearing 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.

2. Remove:
   - Piston pin clip
   - Piston pin "1"
   - Piston "2"

ECA13810

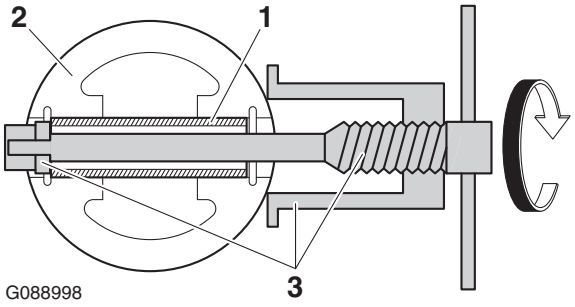
NOTICE

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 deburred 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

3. 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

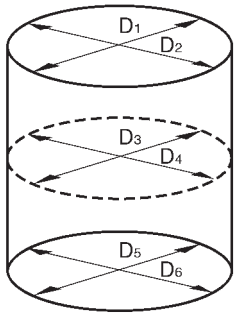
1. Check:
   - Piston wall
   - Cylinder wall
     Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance
   a. Measure cylinder bore "C" with the cylinder bore gauge.

TIP

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

Bore
78.000–78.010 mm (3.0709–3.0713 in)
Wear limit
78.060 mm (3.0732 in)

"C" = maximum of D_1, D_2, D_3, D_4, D_5, D_6

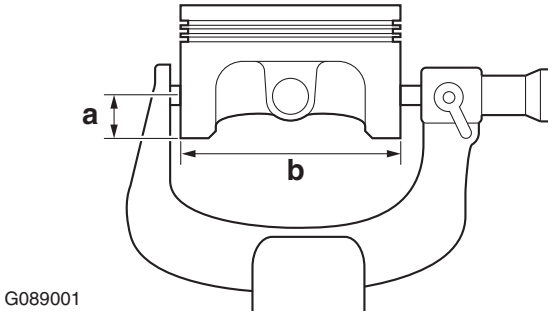


G089000

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.

Piston
Diameter
77.975–77.990 mm (3.0699–3.0705 in)



G089001

a. 9.0 mm (0.35 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”

Piston-to-cylinder clearance
0.010–0.035 mm (0.0004–0.0014 in)

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

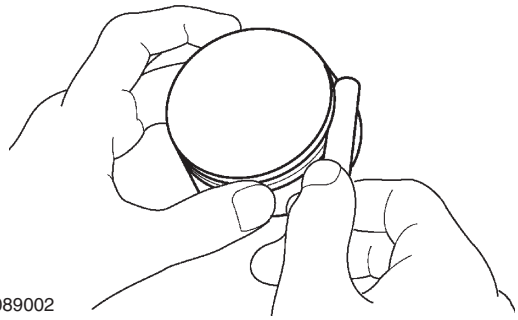
EAS30748
CHECKING THE PISTON RINGS

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.

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

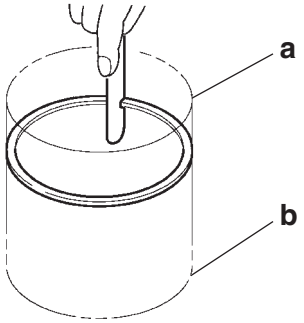
Use the piston crown to level the piston ring near bottom of cylinder, where cylinder wear is lowest.

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.

Top ring
End gap limit
0.50 mm (0.0197 in)
2nd ring
End gap limit
1.15 mm (0.0453 in)



G089003

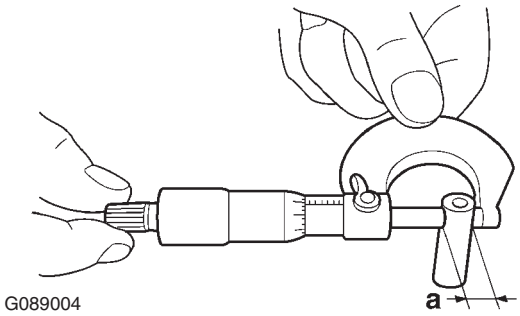
a. Bottom of cylinder
b. Upper of cylinder

EAS30749
CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

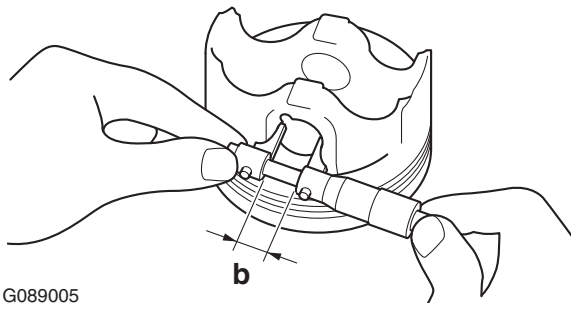
Piston pin outside diameter limit
16.970 mm (0.6681 in)



G089004

3. Measure:
   - Piston pin bore inside diameter "b"
     Out of specification → Replace the piston.

Piston pin bore inside diameter limit
17.043 mm (0.6710 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

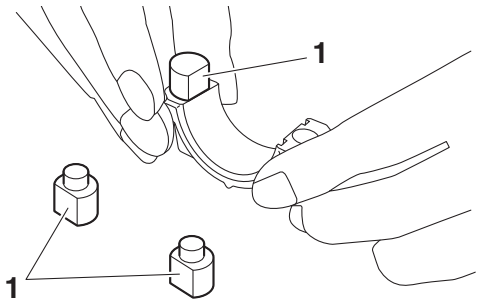
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

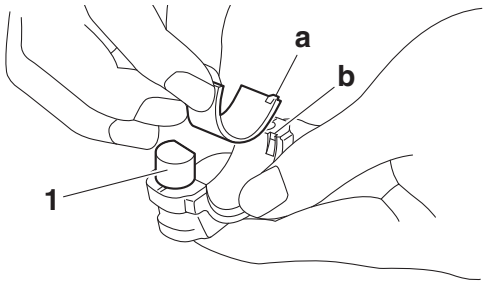
a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap with the connecting rod big end metal installer "1".

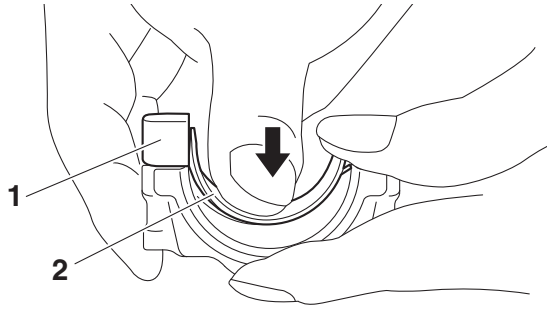
TIP

- From the 3 types, choose the connecting rod big end metal installer "1" that fits exactly, and install it to the connecting rod and connecting rod cap as shown in the illustration.
- Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.
- Push the big end bearing "2" down and install it to the connecting rod and connecting rod cap.

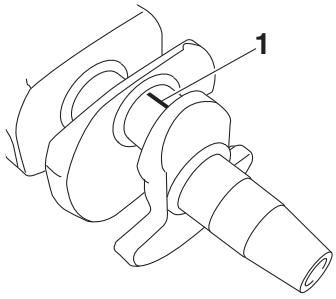
Connecting rod big end bearing installer
90890-04193
Connecting rod big end bearing installer
YM-04193







c. Put a piece of Plastigauge® “1” on the crankshaft pin.



G089008

d. Assemble the connecting rod halves.

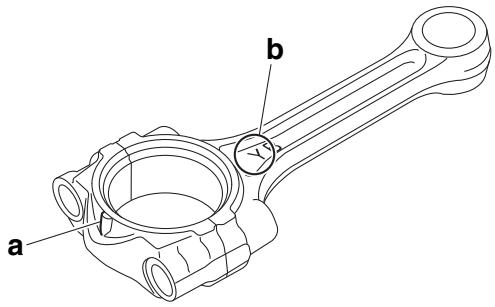
ECA18390

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

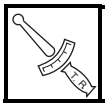
- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

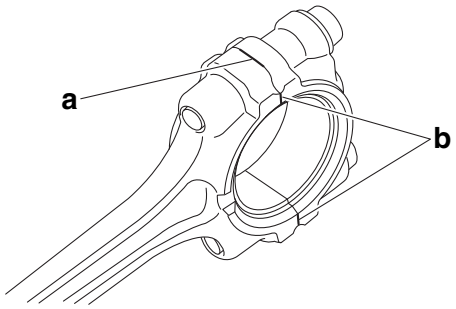
Install by carrying out the following procedures in order to assemble in the most suitable condition.

e. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.

	**Connecting rod bolt** **30 N·m (3.0 kgf·m, 22 lb·ft)**

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

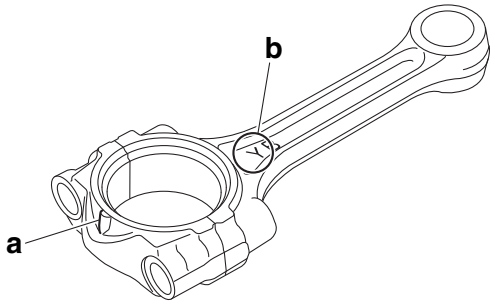


a. Side machined face
b. Thrusting faces

f. Loosen the connecting rod 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.

TIP

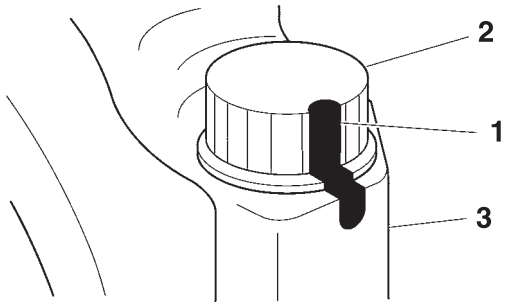
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- Make sure the “Y” marks “b” on the connecting rods face towards the left side of the crankshaft.



g. Tighten the connecting rod bolts with a torque wrench.

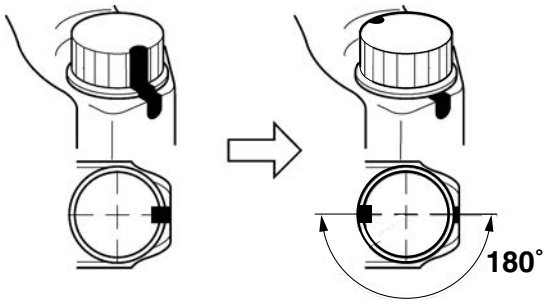
	Connecting rod bolt (1st) 20 N·m (2.0 kgf·m, 15 lb·ft)

h. Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



i. Tighten the connecting rod bolts further to reach the specified angle 180°.

	Connecting rod bolt (final) Specified angle 180°



EWA16610

⚠ WARNING

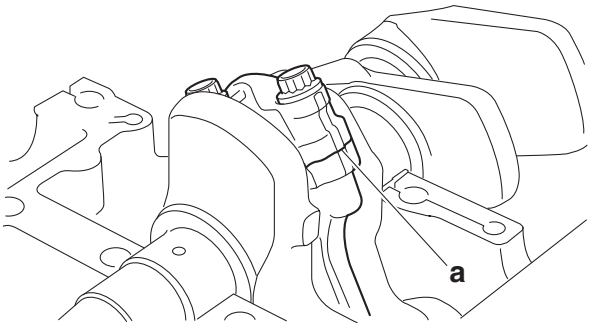
If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

ECA20890

NOTICE

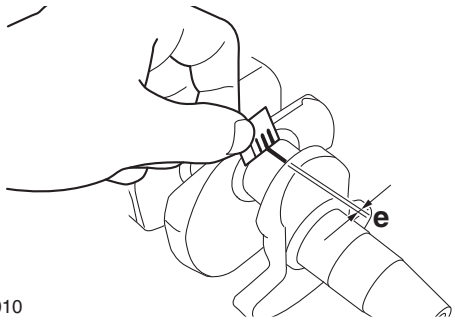
Do not use a torque wrench to tighten the bolt to the specified angle.

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 “e” on the crankshaft pin. If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



G089010

2. Select:
   • Big end bearing (P_1–P_3)

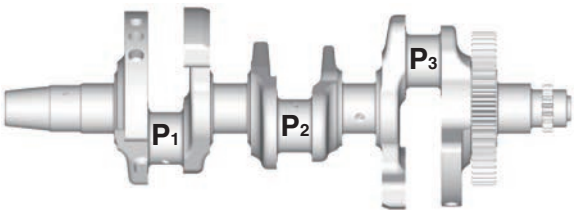
TIP

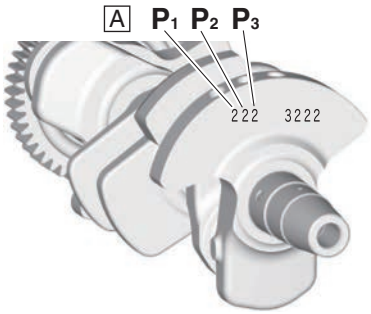
- The numbers “A” stamped into the crankshaft web and the numbers “1” on the connecting rods are used to determine the replacement big end bearings sizes.
- “P_1”–“P_3” refer to the bearings shown in the crankshaft illustration.

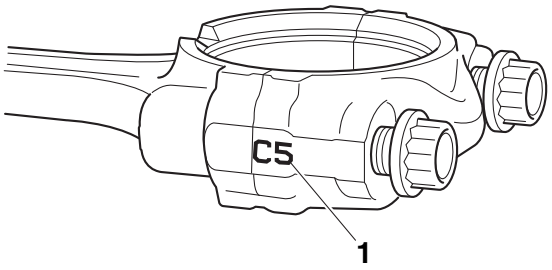
For example, if the connecting rod “P_1” and the crankshaft web “P_1” numbers are 5 and 2 respectively, then the bearing size for “P_1” is:

“P_1” (connecting rod) - “P_1” (crankshaft) = 5 - 2 = 3 (brown)

Bearing color code
Code 1
Blue
Code 2
Black
Code 3
Brown
Code 4
Green







EAS30751
INSTALLING THE CONNECTING ROD AND PISTON

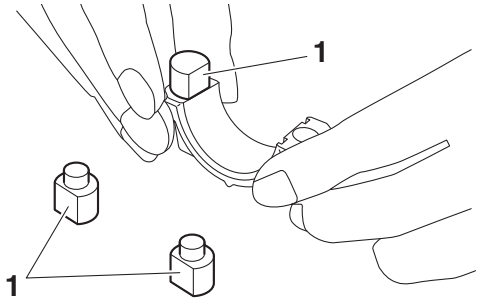
The following procedure applies to all of the connecting rods and pistons.

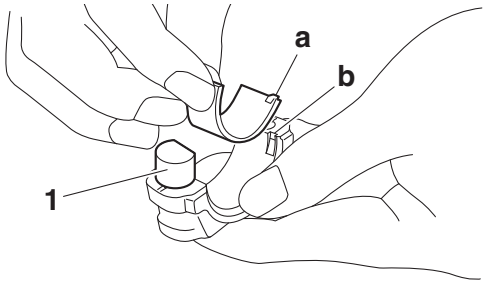
1. Install:
   • Big end bearing
   • Connecting rod cap
   (onto the connecting rod)

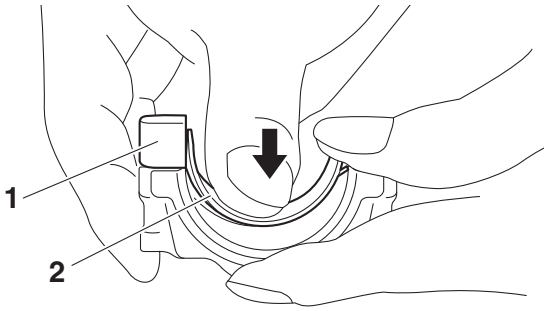
TIP

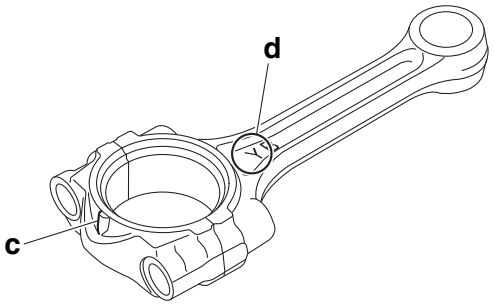
- Be sure to reinstall each big end bearing in its original place.
- From the 3 types, choose the connecting rod big end metal installer “1” that fits exactly, and install it to the connecting rod and connecting rod cap as shown in the illustration.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Push the big end bearing “2” down and install it to the connecting rod and connecting rod cap.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.

Connecting rod big end bearing installer
90890-04193
Connecting rod big end bearing installer
YM-04193









2. Tighten:
   • Connecting rod bolt New

ECA18390

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

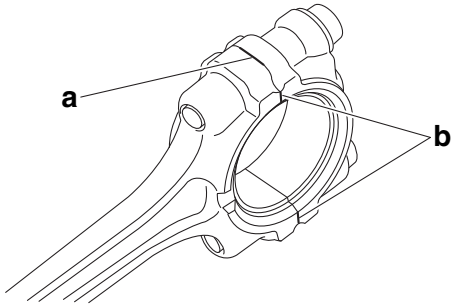
Install by carrying out the following procedures in order to assemble in the most suitable condition.

a. Replace the connecting rod bolts with new ones.
b. Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
c. After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
d. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.

	Connecting rod bolt **30 N·m (3.0 kgf·m, 22 lb·ft)**

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



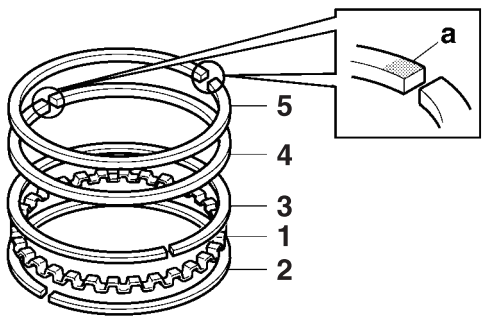
a. Side machined face
b. Thrusting faces

e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

3. Install:
   • Oil ring expander “1”
   • Lower oil ring rail “2”
   • Upper oil ring rail “3”
   • 2nd ring “4”
   • Top ring “5”
   (into the piston)

TIP

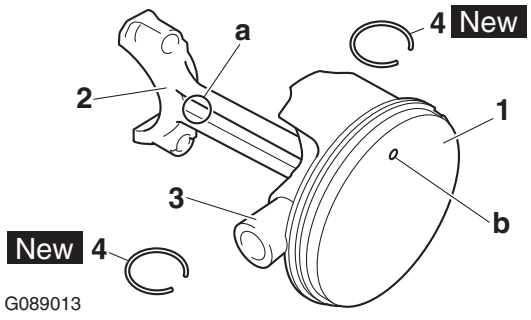
Be sure to install the piston rings so that the manufacturer’s marks or numbers “a” face up.



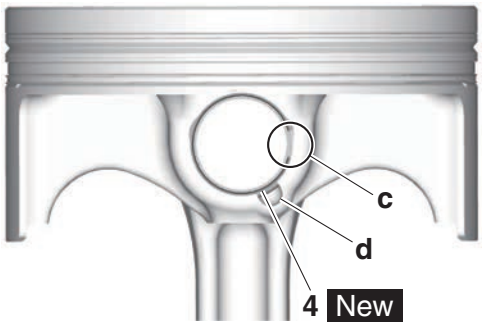
4. Install:
   • Piston “1”
   (onto the respective connecting rod “2”)
   • Piston pin “3”
   • Piston pin clip “4” New

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.
- 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.



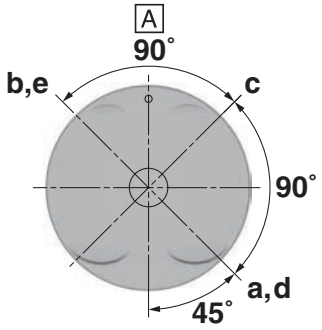
G089013



5. Lubricate:
   • Piston
   • Piston ring
   • Cylinder
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

6. Offset:
   • Piston ring end gap



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

A. Exhaust side

7. Lubricate:
   • Crankshaft pin
   • Connecting rod big end bearing inner surface
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

8. Install:
   • Piston assembly “1”
   (into the cylinder “2” and onto the crankshaft pin)

	Piston installing tool **90890-04161** **Piston installing tool** **YM-04161**

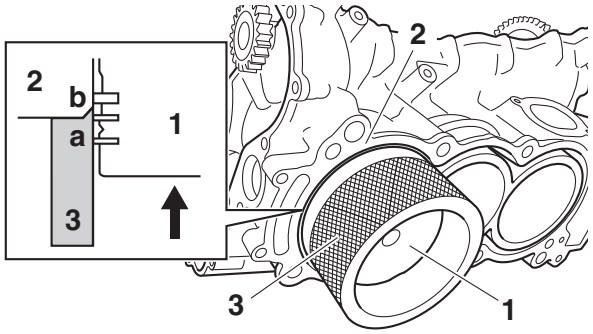
ECA21490

NOTICE

If the projection “a” of the piston installing tool damages, you cannot use it. Please handle with care.

TIP

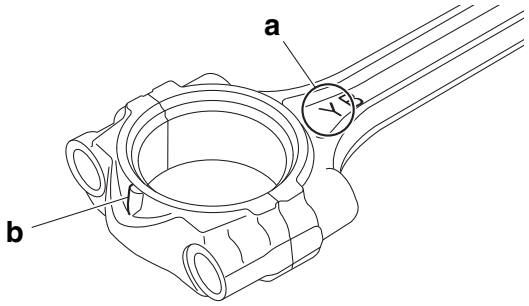
Fit the projection “a” of the piston installing tool “3” and blunt-edged part “b” of the cylinder, fix the position of the piston installing tool, and then push the piston up to the cylinder.



9. Install:
   • Connecting rod cap
   • Connecting rod bolt

TIP

- 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 bolt threads and seats.



10. Tighten:
    • Connecting rod bolt

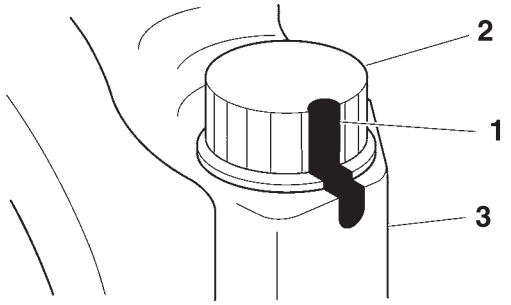
TIP

Tighten the connecting rod bolts using the following procedure.

a. Tighten the connecting rod bolts with a torque wrench.

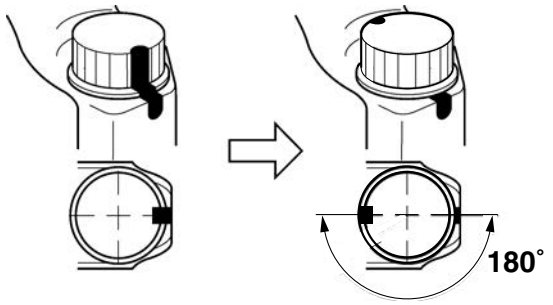
	Connecting rod bolt (1st) **20 N·m (2.0 kgf·m, 15 lb·ft)**

b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".



c. Tighten the connecting rod bolts further to reach the specified angle 180°.

	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

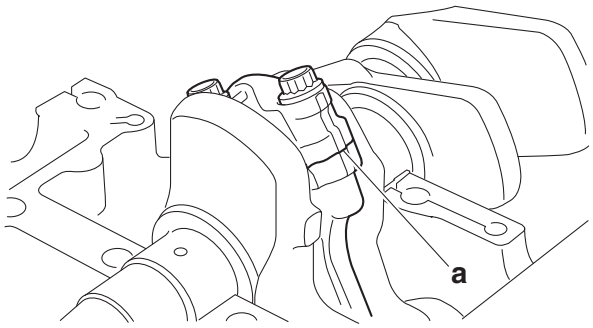
Do not use a torque wrench to tighten the bolt to the specified angle.

d. After the installation, check that the section shown "a" is flush with each other by touching the surface.

EWA17120

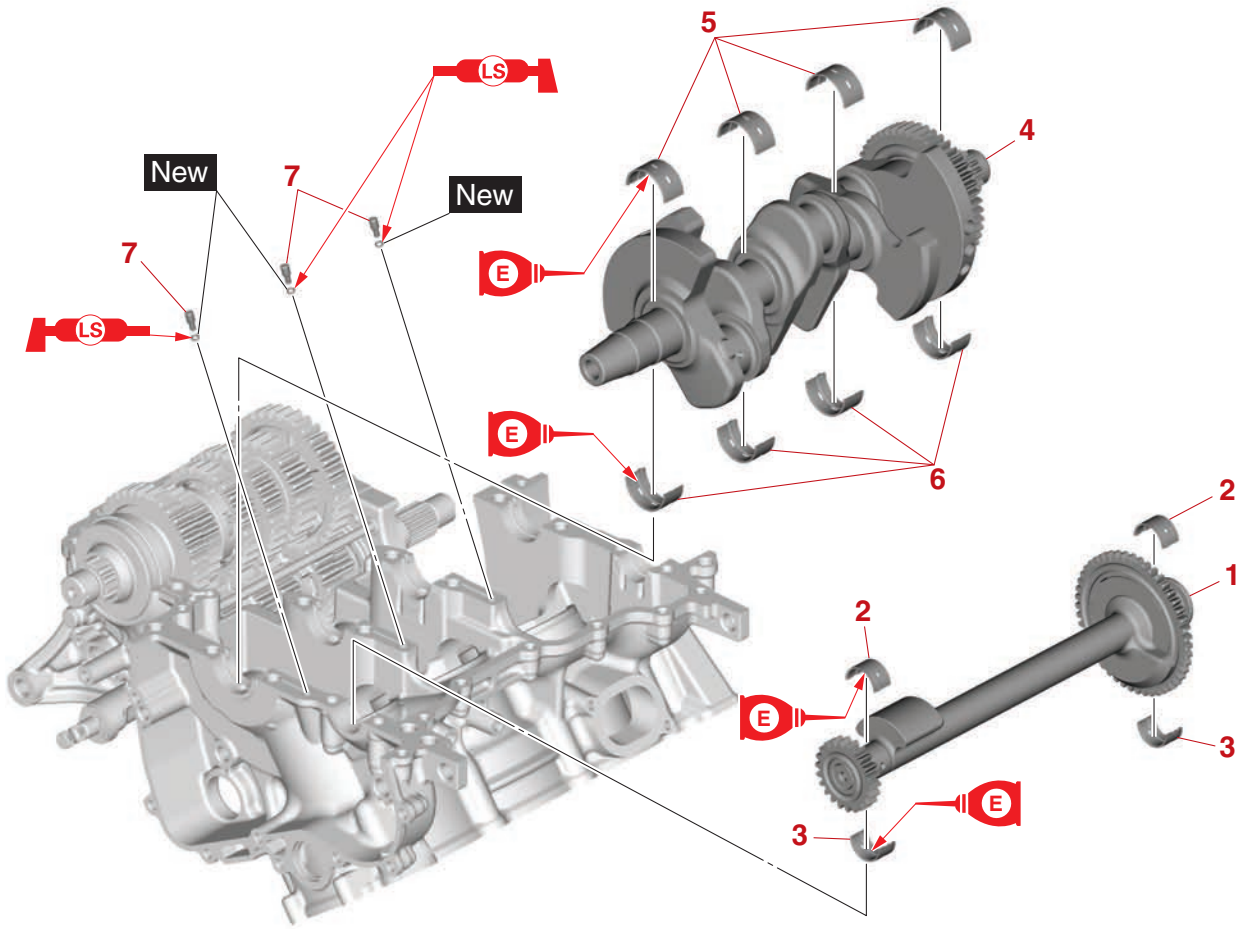
WARNING

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.


a

EAS20178
CRANKSHAFT AND BALANCER SHAFT

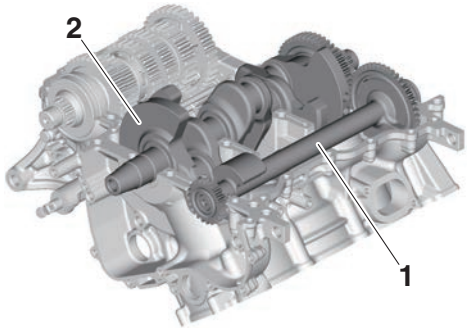
Removing the crankshaft and balancer shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-64.
	Connecting rod		Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-71.
1	Balancer shaft	1	
2	Balancer shaft journal lower bearing	2	
3	Balancer shaft journal upper bearing	2	
4	Crankshaft	1	
5	Crankshaft journal lower bearing	4	
6	Crankshaft journal upper bearing	4	
7	Oil nozzle	3	

EAS31171
REMOVING THE CRANKSHAFT AND BALANCER SHAFT
1. Remove:
   - Balancer shaft “1”
   - Balancer shaft journal bearing
   - Crankshaft assembly “2”
   - Crankshaft journal bearing

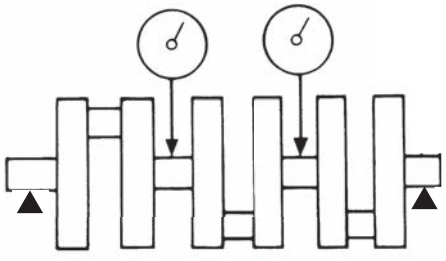
TIP
Identify the position of each balancer shaft journal bearings and crankshaft journal bearings so that it can be reinstalled in its original place.



EAS31174
CHECKING THE OIL NOZZLES
The following procedure applies to all of the oil nozzles.
1. Check:
   - Oil nozzle
     Damage/wear → Replace the oil nozzle.
   - Oil passage
     Obstruction → Blow out with compressed air.

EAS31075
CHECKING THE CRANKSHAFT
1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Runout limit
0.030 mm (0.0012 in)



G089017

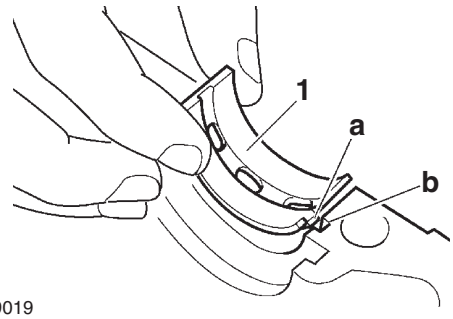
2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
3. Measure:
   - Crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance
0.013–0.037 mm (0.0005–0.0015 in)

ECA13920
NOTICE
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.
c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

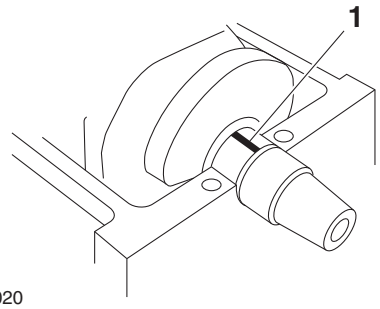
TIP
Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.



G089019

d. Put a piece of Plastigauge® “1” on each crankshaft journal.

TIP
Do not put the Plastigauge® over the oil hole in the crankshaft journal.

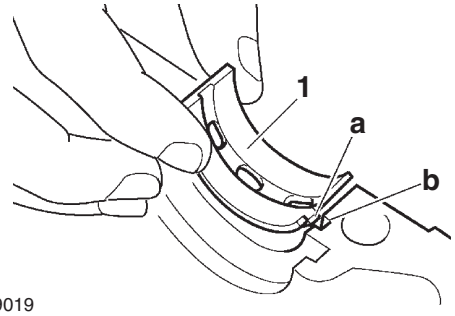


G089020

e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

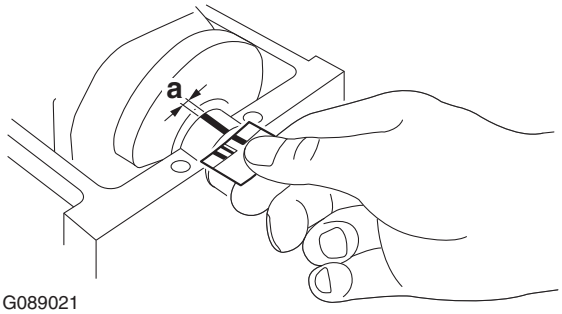
TIP

- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



G089019

f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-64.
g. Remove the lower crankcase and the crankshaft journal lower bearings.
h. Measure the compressed Plastigauge® width "a" on each crankshaft journal.
If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



G089021

4. Select:
   - Crankshaft journal bearing (J_1–J_4)

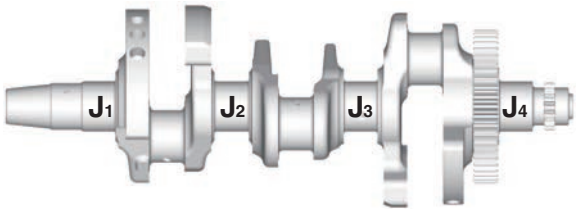
TIP

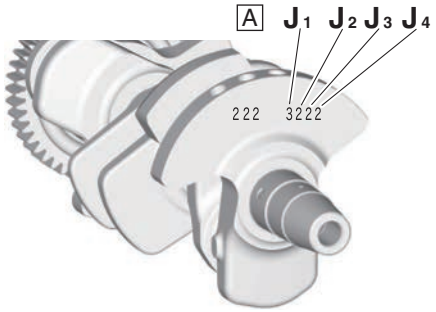
- The numbers "A" stamped into the crankshaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- "J_1"–"J_4" refer to the bearings shown in the crankshaft and lower crankcase illustration.

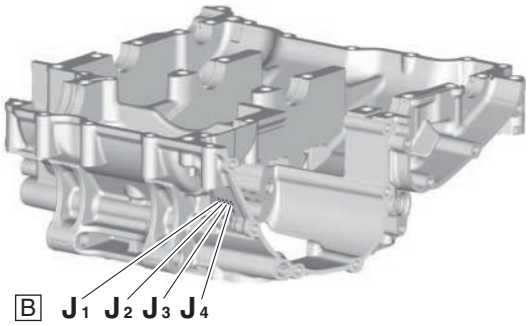
For example, if the crankcase "J_1" and crankshaft web "J_1" numbers are 7 and 2 respectively, then the bearing size for "J_1" is:

"J_1" (crankcase) - "J_1" (crankshaft web) -1 = 7 - 2 - 1 = 4 (green)

Bearing color code
Code 0
White
Code 1
Blue
Code 2
Black
Code 3
Brown
Code 4
Green



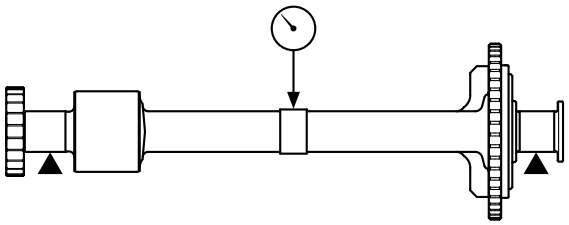




EAS31076
CHECKING THE BALANCER SHAFT

1. Measure:
   • Balancer shaft runout
   Out of specification → Replace the balancer shaft.

Balancer shaft runout limit
0.030 mm (0.0012 in)



2. Check:
   • Balancer shaft journal surfaces
   • Bearing surfaces
   Scratches/wear → Replace the balancer shaft.
3. Measure:
   • Balancer shaft journal-to-balancer shaft bearing clearance
   Out of specification → Replace the balancer shaft journal bearings.

Balancer shaft journal to balancer shaft bearing clearance
0.023–0.047 mm (0.0009–0.0019 in)

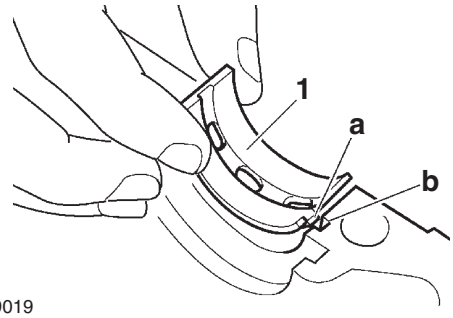
ECA18400
NOTICE

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.
b. Place the upper crankcase upside down on a bench.
c. Install the balancer shaft journal upper bearings “1” and the balancer shaft into the upper crankcase.

TIP

Align the projections “a” on the balancer shaft journal upper bearings with the notches “b” in the upper crankcase.

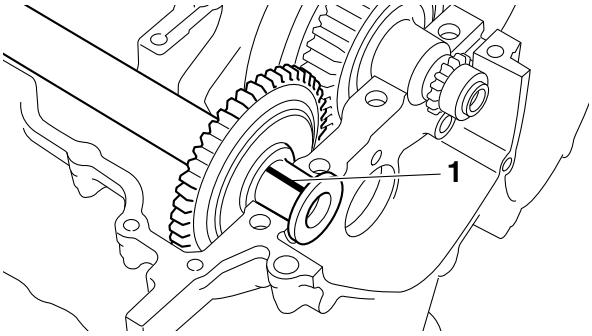


G089019

d. Put a piece of Plastigauge® “1” on each balancer shaft journal.

TIP

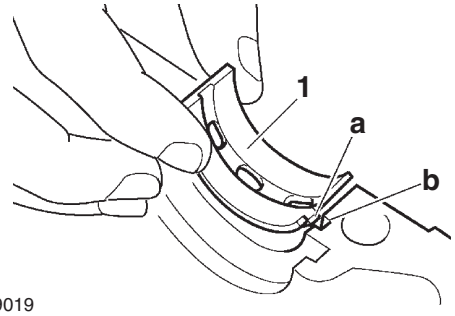
Do not put the Plastigauge® over the oil hole in the balancer shaft journal.



e. Install the balancer shaft journal lower bearings “1” into the lower crankcase and assemble the crankcase halves.

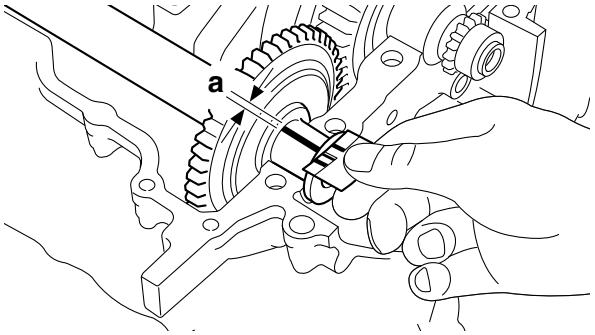
TIP

- Align the projections “a” of the balancer shaft journal lower bearings with the notches “b” in the crankcase.
- Do not move the balancer shaft until the clearance measurement has been completed.



G089019

f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-64.
g. Remove the lower crankcase and the balancer shaft journal lower bearings.
h. Measure the compressed Plastigauge® width "a" 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.



4. Select:
   • Balancer shaft journal bearing (J_1–J_2)

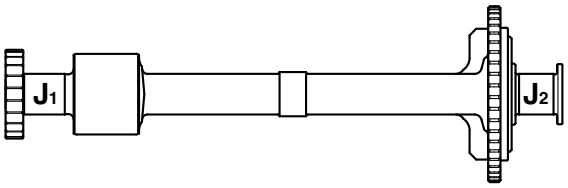
TIP

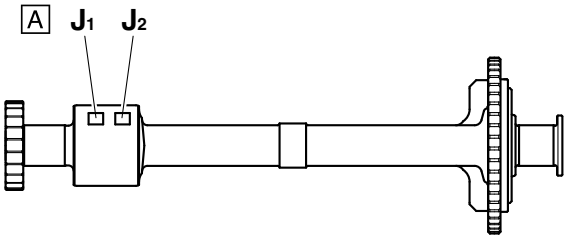
- The numbers "A" stamped into the balancer shaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement balancer shaft journal bearing sizes.
- "J_1"–"J_2" refer to the bearings shown in the balancer shaft and lower crankcase illustration.

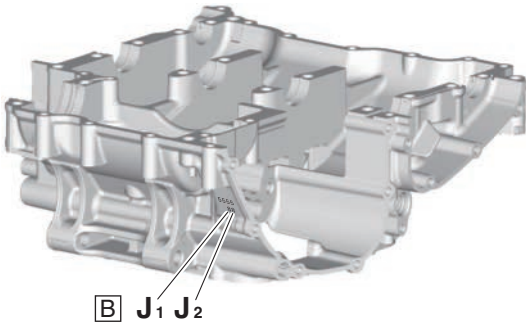
For example, if the crankcase "J_1" and balancer shaft web "J_1" numbers are 5 and 2 respectively, then the bearing size for "J_1" is:

"J_1" (crankcase) - "J_1" (balancer shaft web) = 5 - 2 = 3 (brown)

Bearing color code
Code 1
Blue
Code 2
Black
Code 3
Brown
Code 4
Green
Code 5
Yellow





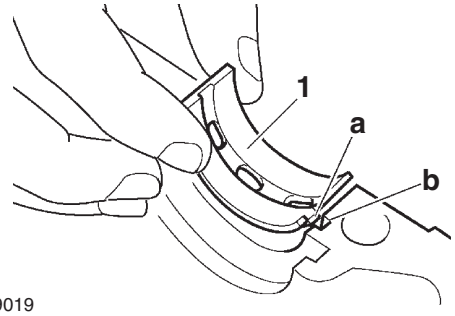


EAS31077
INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft journal upper bearing (into the upper crankcase)
   - Crankshaft journal lower bearing (into the lower crankcase)
   - Crankshaft

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 bearings in its original place.



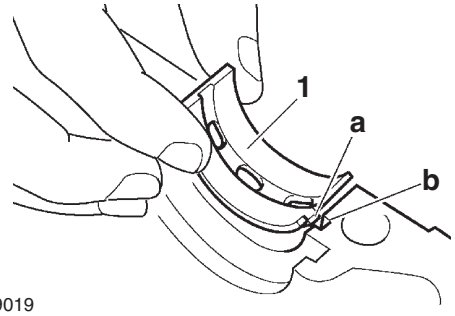
G089019

EAS31172
INSTALLING THE BALANCER ASSEMBLY

1. Install:
   - Balancer shaft journal upper bearing (into the upper crankcase)
   - Balancer shaft journal lower bearing (into the lower crankcase)

TIP

- Align the projections “a” on the balancer shaft journal bearings “1” with the notches “b” in the crankcases.
- Be sure to install each balancer shaft journal bearing in its original place.

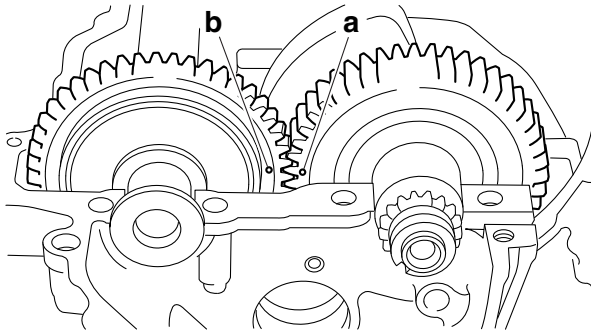


G089019

2. Install:
   - Balancer shaft

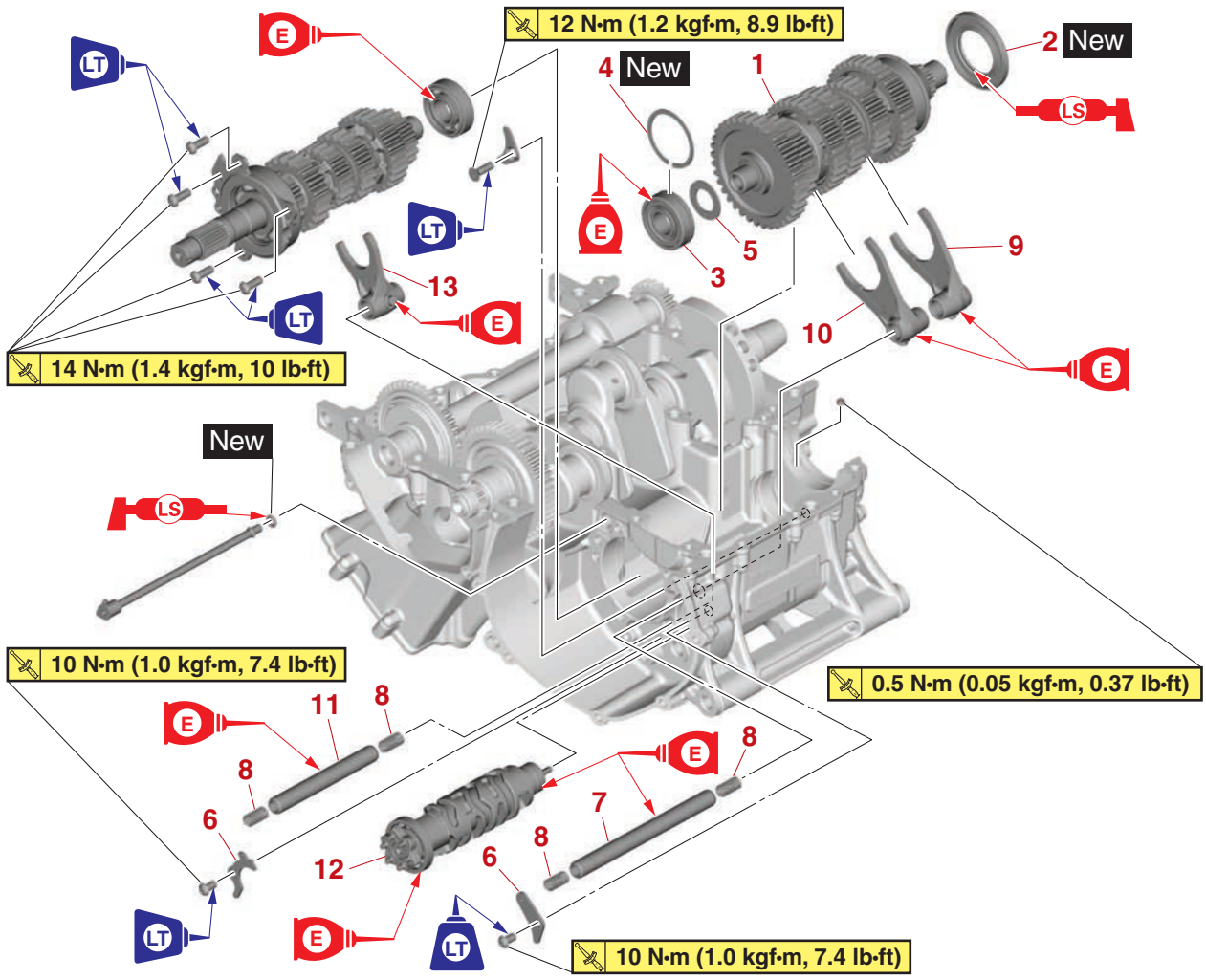
TIP

Install by aligning the crankshaft match mark “a” and the balancer shaft match mark “b”.



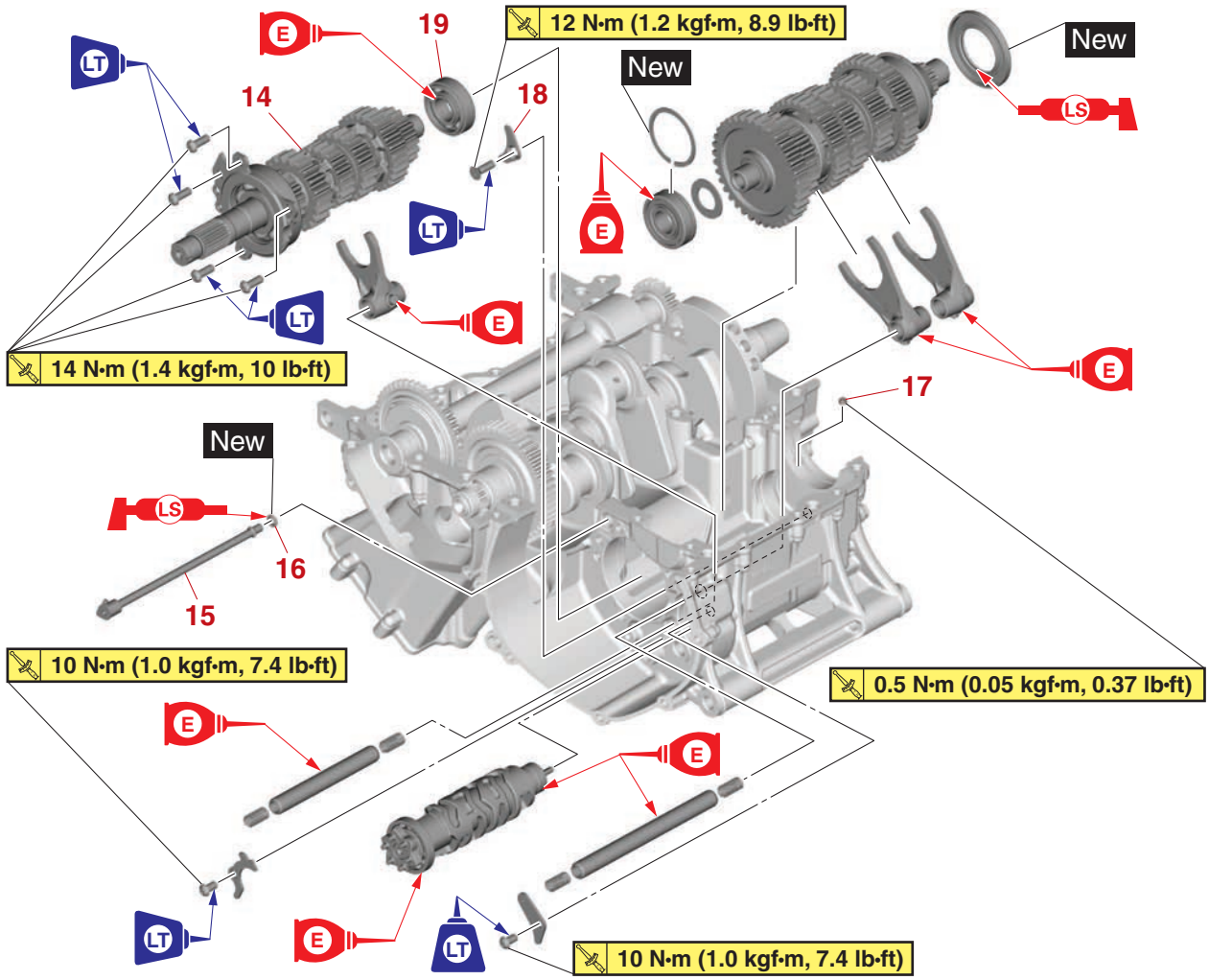
EAS20062
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



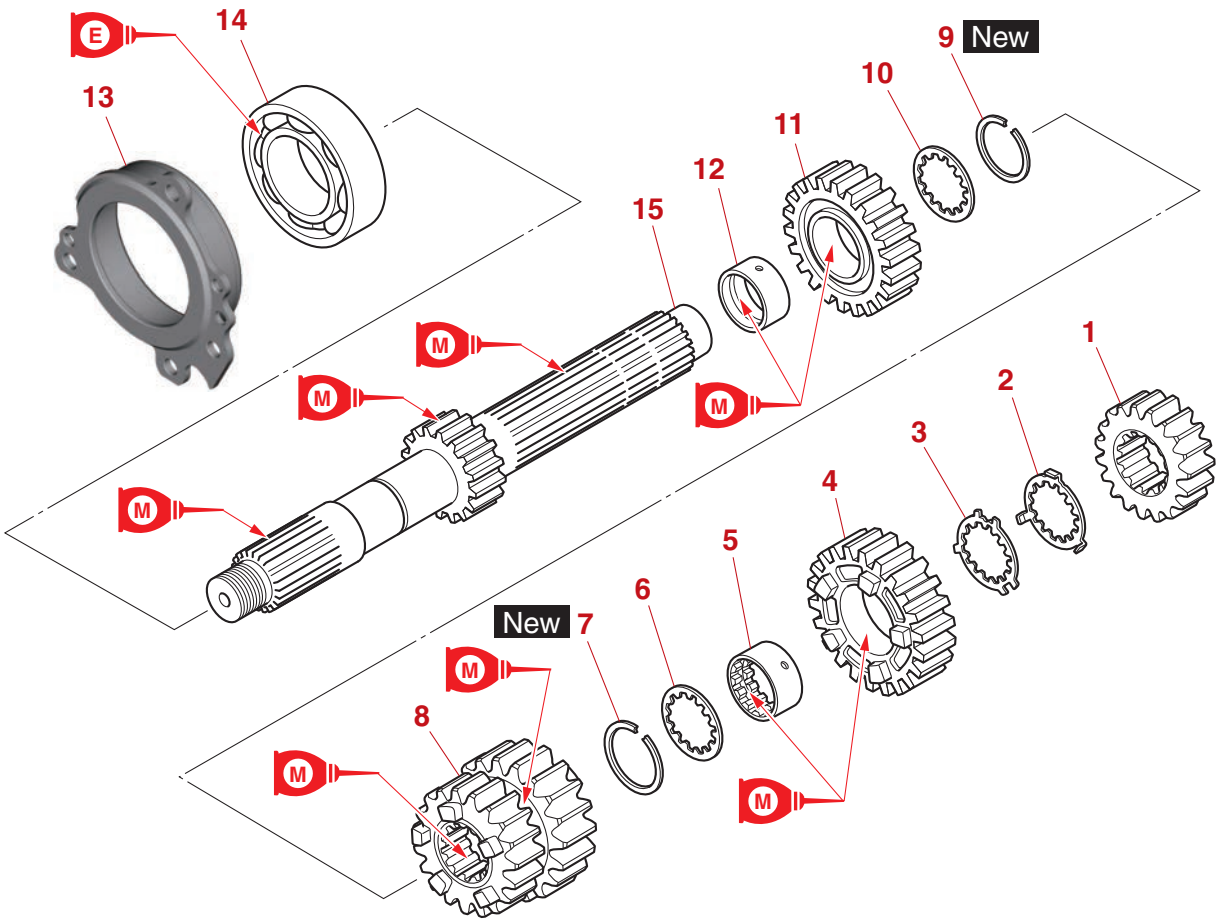
Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-64.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-56.
1	Drive axle assembly	1	
2	Oil seal	1	
3	Bearing	1	
4	Circlip	1	
5	Washer	1	
6	Shift drum retainer	2	
7	Shift fork guide bar 2	1	
8	Spring	4	
9	Shift fork-L	1	
10	Shift fork-R	1	
11	Shift fork guide bar 1	1	
12	Shift drum assembly	1	
13	Shift fork-C	1	

Removing the transmission, shift drum assembly, and shift forks



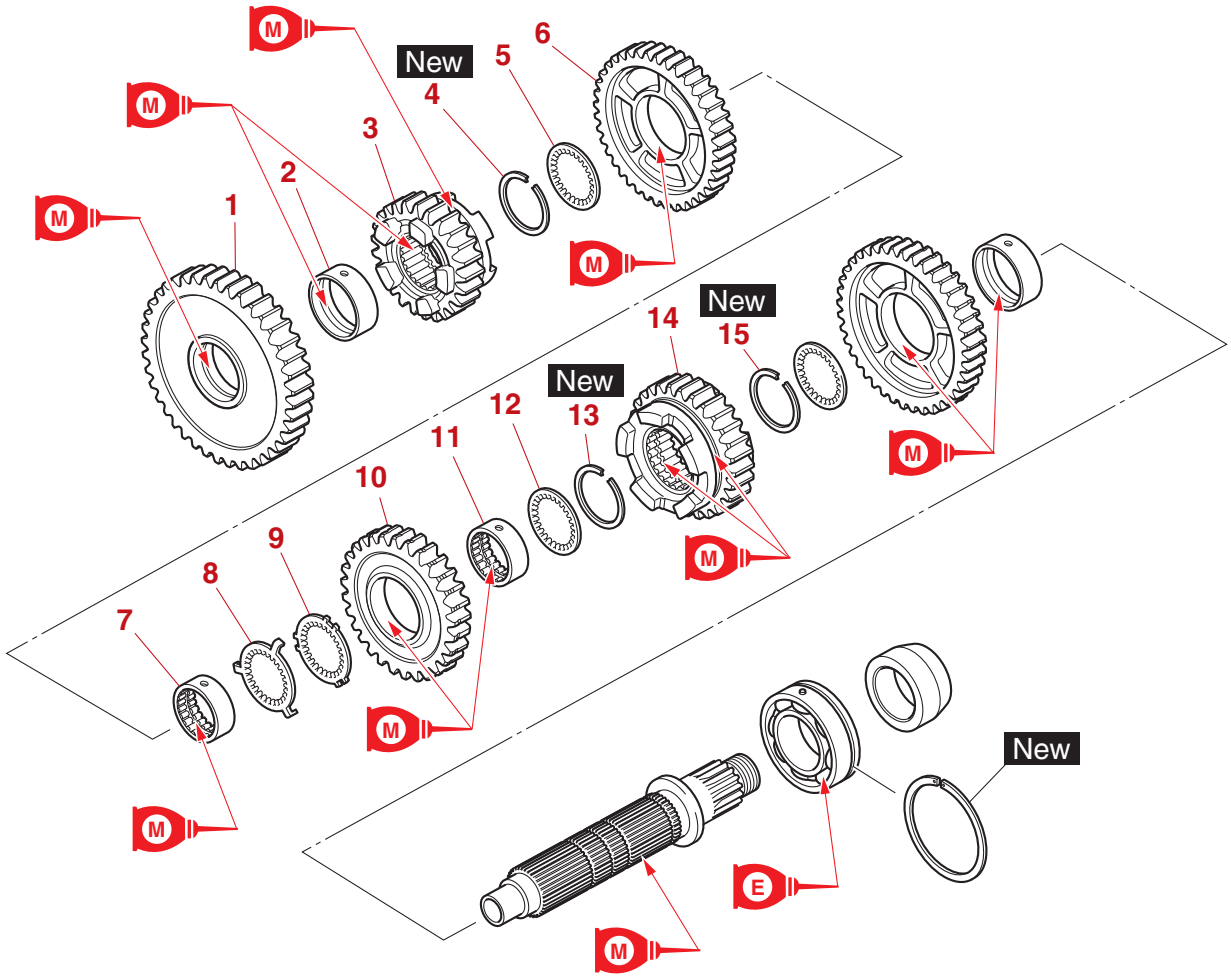
Order	Job/Parts to remove	Q'ty	Remarks
14	Main axle assembly	1	
15	Oil delivery pipe	1	
16	O-ring	1	
17	Oil nozzle	1	
18	Bearing cover plate	1	
19	Bearing	1	

Disassembling the main axle assembly



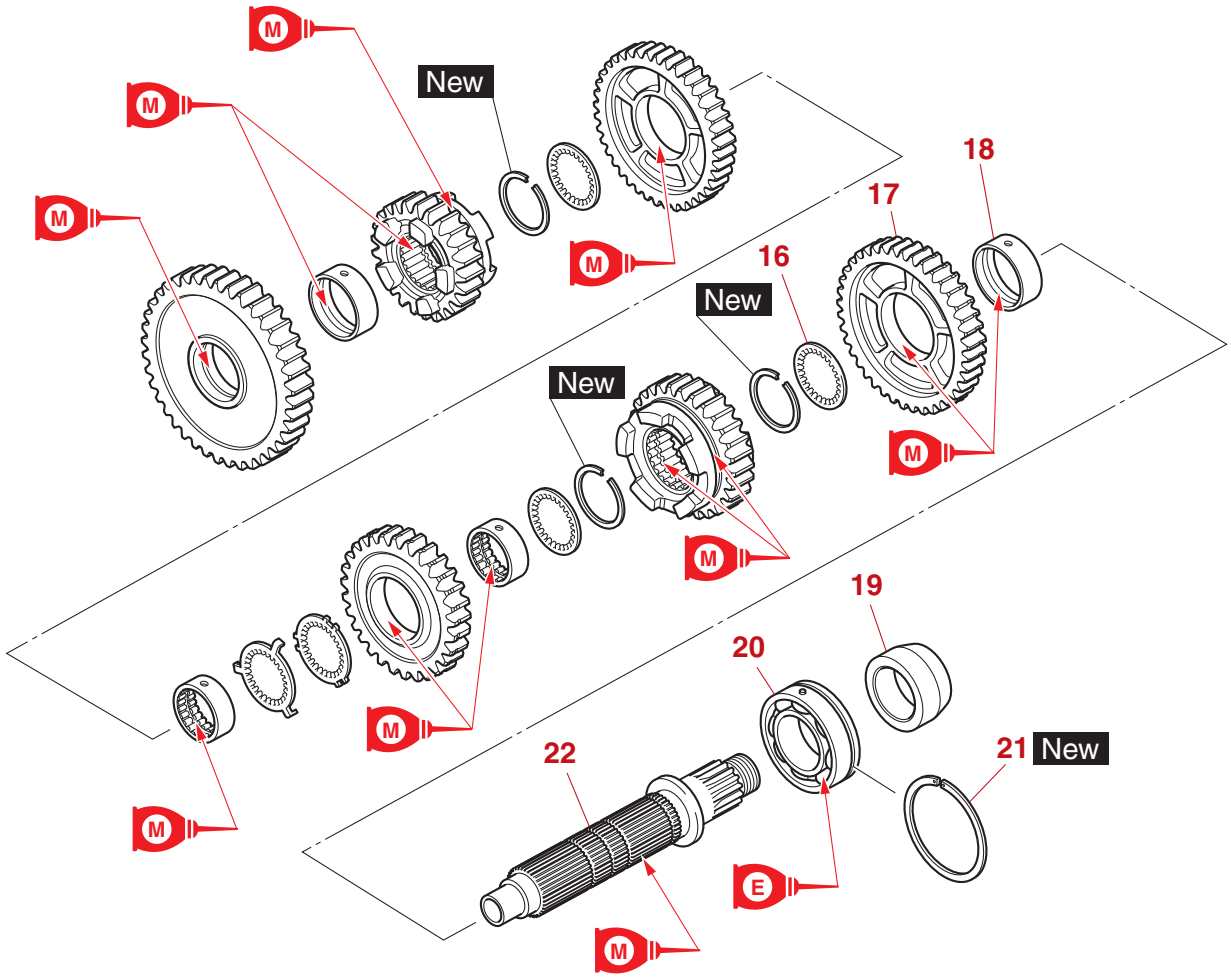
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd pinion gear	1	
9	Circlip	1	
10	Washer	1	
11	5th pinion gear	1	
12	Collar	1	
13	Bearing housing	1	
14	Bearing	1	
15	Main axle	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	
13	Circlip	1	
14	6th wheel gear	1	
15	Circlip	1	

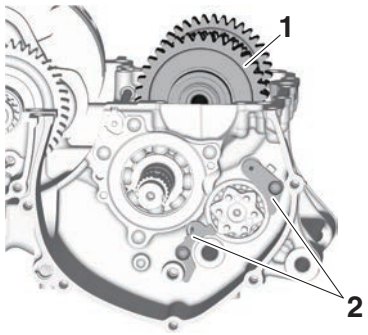
Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
16	Washer	1	
17	2nd wheel gear	1	
18	Collar	1	
19	Collar	1	
20	Bearing	1	
21	Circlip	1	
22	Drive axle	1	

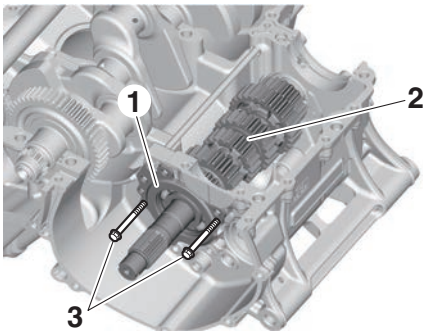
EAS30430
REMOVING THE TRANSMISSION

1. Remove:
   - Drive axle assembly “1”
   - Shift drum retainer “2”
   - Shift fork guide bar 2
   - Spring
   - Shift fork-L
   - Shift fork-R
   - Shift fork guide bar 1
   - Spring
   - Shift drum assembly
   - Shift fork-C



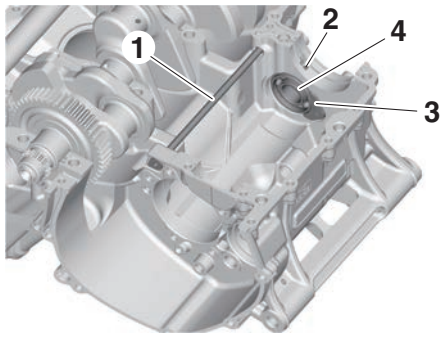
2. Remove:
   - Bearing housing “1”
   - Main axle assembly “2”

   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 upper crankcase.

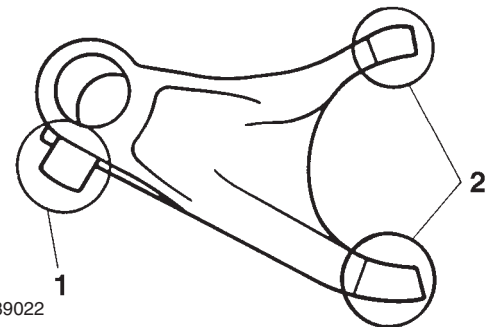
3. Remove:
   - Oil delivery pipe “1”
   - Oil nozzle “2”
   - Bearing cover plate “3”
   - Bearing “4”



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

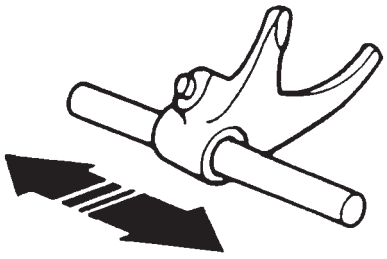
2. Check:
   - Shift fork guide bar 1
   - Shift fork guide bar 2
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA12840

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.

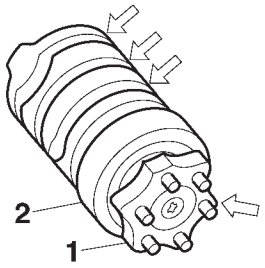
3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



G089023

EAS30432
CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment "1"
     Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing "2"
     Damage/pitting → Replace the shift drum assembly.

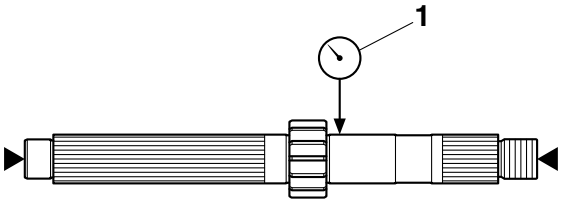


G089024

EAS30433
CHECKING THE TRANSMISSION

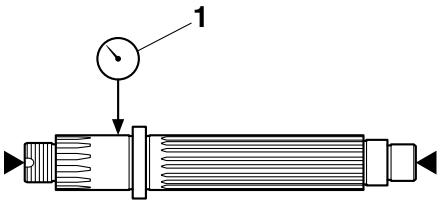
1. Measure:
   - Main axle runout
     (with a centering device and dial gauge "1")
     Out of specification → Replace the main axle.

	**Main axle runout limit** **0.08 mm (0.0032 in)**

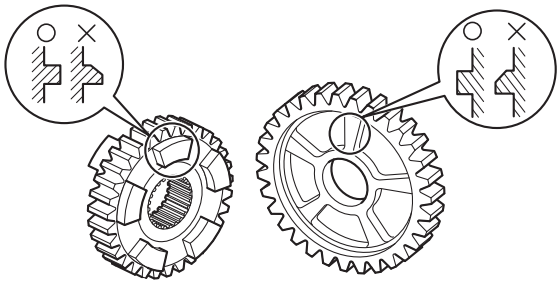


2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge "1")
     Out of specification → Replace the drive axle.

	**Drive axle runout limit** **0.08 mm (0.0032 in)**



3. Check:
   - Transmission gear
     Blue discoloration/pitting/wear → Replace the defective gear(s).
   - Transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(s).



G089025

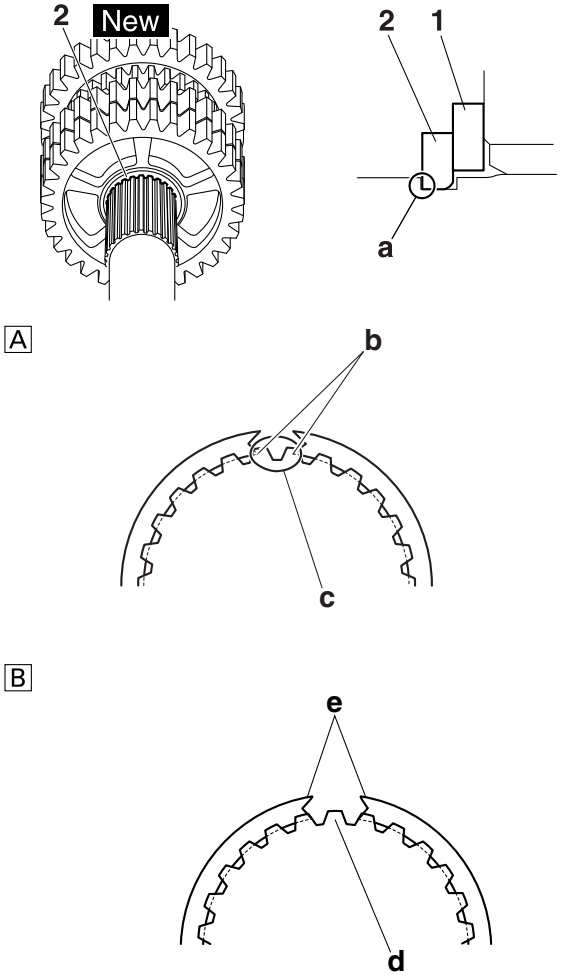
4. Check:
   - Transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - Circlip
     Bends/damage/looseness → 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.
- Install the circlip so that a spline “d” is in the center of the gap between the circlip ends “e” as shown.

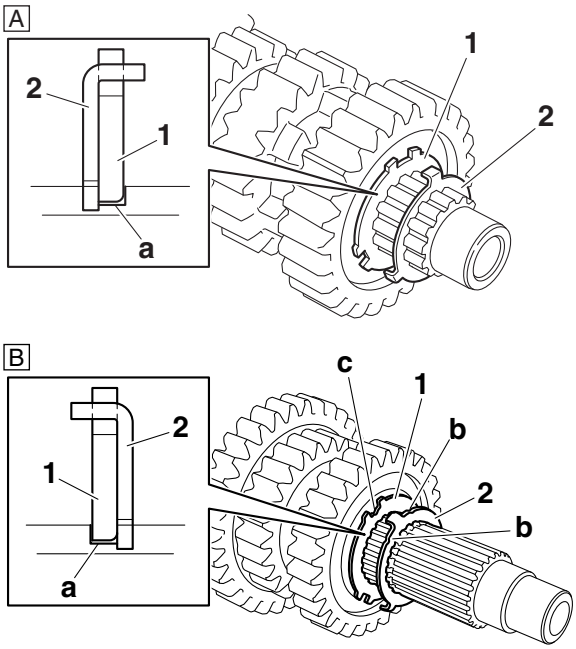


A. Main axle
B. Drive axle

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 on the retainer with an axle spline, and then install the toothed lock washer.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks “b” with the alignment mark “c” on the retainer.



A. Main axle
B. Drive axle

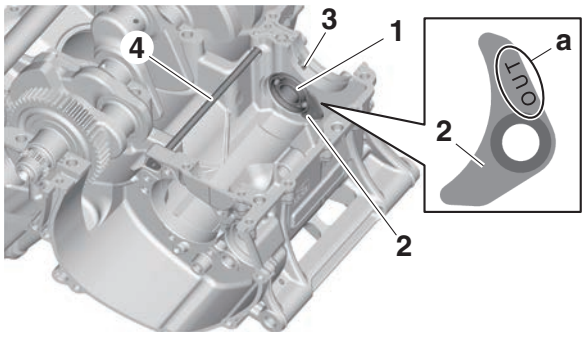
EAS30438
INSTALLING THE TRANSMISSION

1. Install:
   - Bearing “1”
   - Bearing cover plate “2”
   - Oil nozzle “3”
   - Oil delivery pipe “4”

TIP

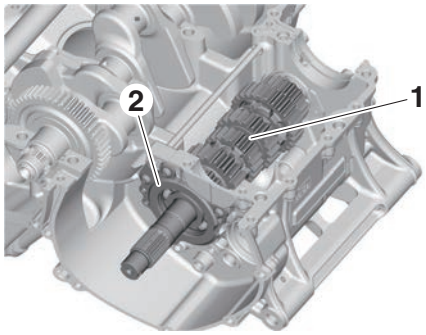
- Face the seal side of bearing to the outside.
- Install bearing cover plate “2” with the “OUT” mark “a” facing out.

	Bearing cover plate screw **12 N·m (1.2 kgf·m, 8.9 lb·ft)** **LOCTITE®** **Oil nozzle** **0.5 N·m (0.05 kgf·m, 0.37 lb·ft)**



2. Install:
   - Main axle assembly “1”
   - Bearing housing “2”

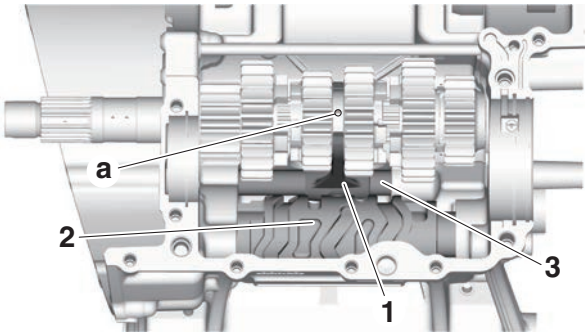
Main axle bearing housing bolt
14 N·m (1.4 kgf·m, 10 lb·ft)
LOCTITE®



3. Install:
   - Shift fork-C “1”
   - Shift drum assembly “2”
   - Spring
   - Shift fork guide bar 1 “3”

TIP

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork-C into the groove “a” in the 3rd pinion gear on the main axle.

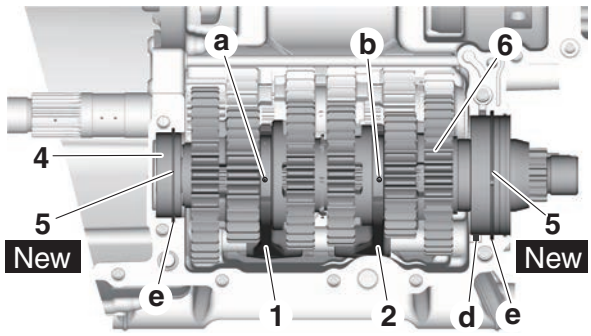


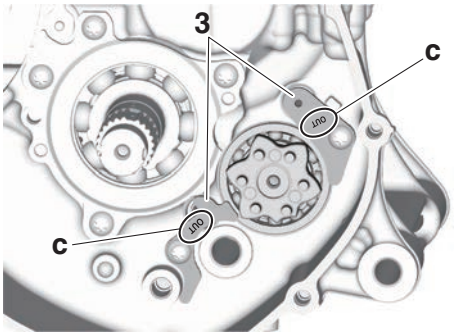
4. Install:
   - Shift fork-R “1”
   - Shift fork-L “2”
   - Spring
   - Shift fork guide bar 2
   - Shift drum retainer “3”
   - Bearing “4”
   - Circlip “5” New
   - Oil seal New
   - Drive axle assembly “6”

Shift drum retainer bolt
10 N·m (1.0 kgf·m, 7.4 lb·ft)
LOCTITE®

TIP

- Install shift fork-R into the groove “a” in the 5th wheel gear and shift fork-L into the groove “b” in the 6th wheel gear on the drive axle.
- Face the seal side of bearing “4” to the outside.
- Install the shift drum retainer with its “OUT” mark “c” facing outward.
- Make sure that the projection “d” on the drive axle assembly is inserted into the slot in the crankcase.
- Make sure that the drive axle bearing circlips “5” is inserted into the grooves “e” in the upper crankcase.





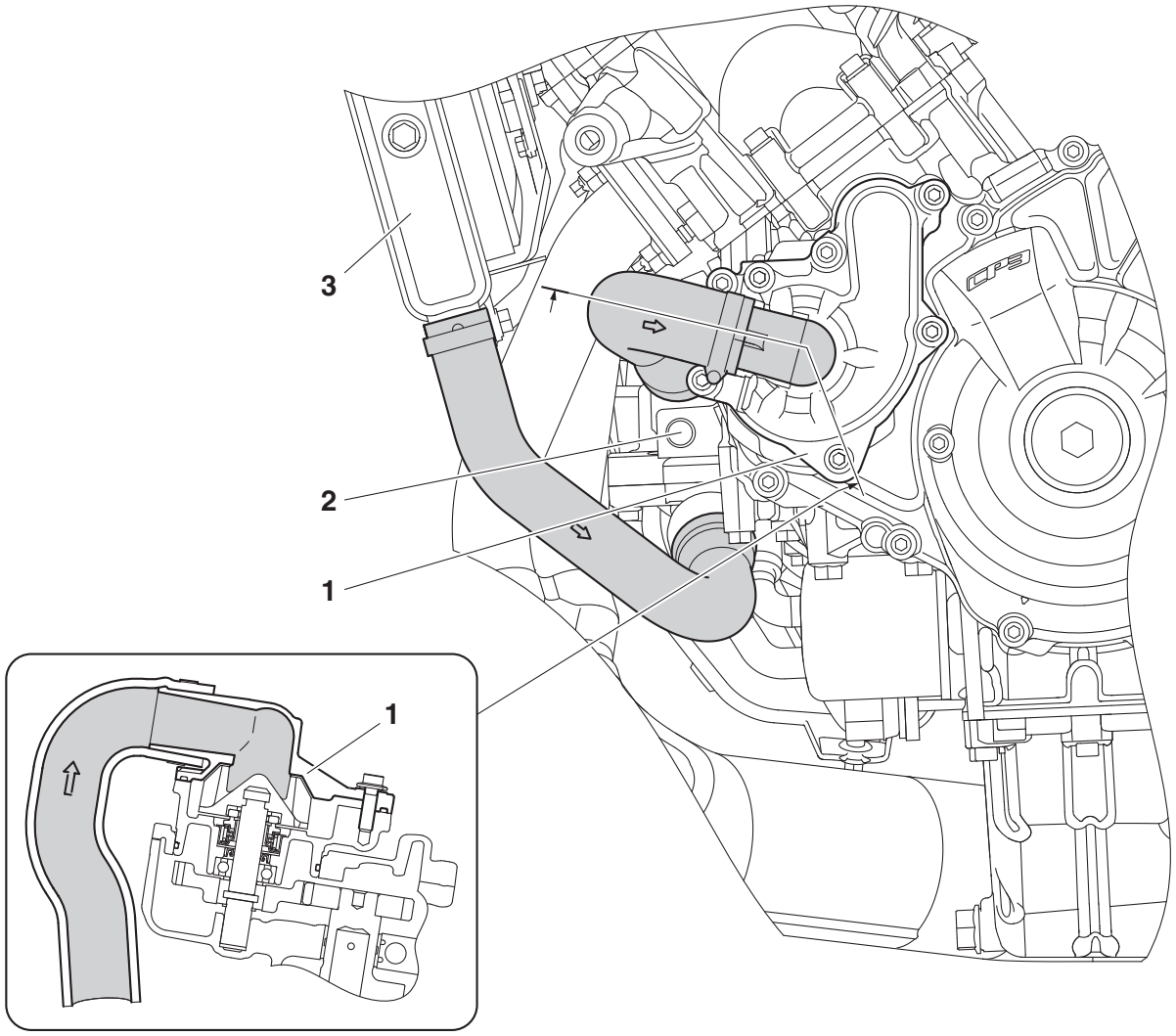
5. Check:
   • Transmission
     Rough movement → Repair.

TIP

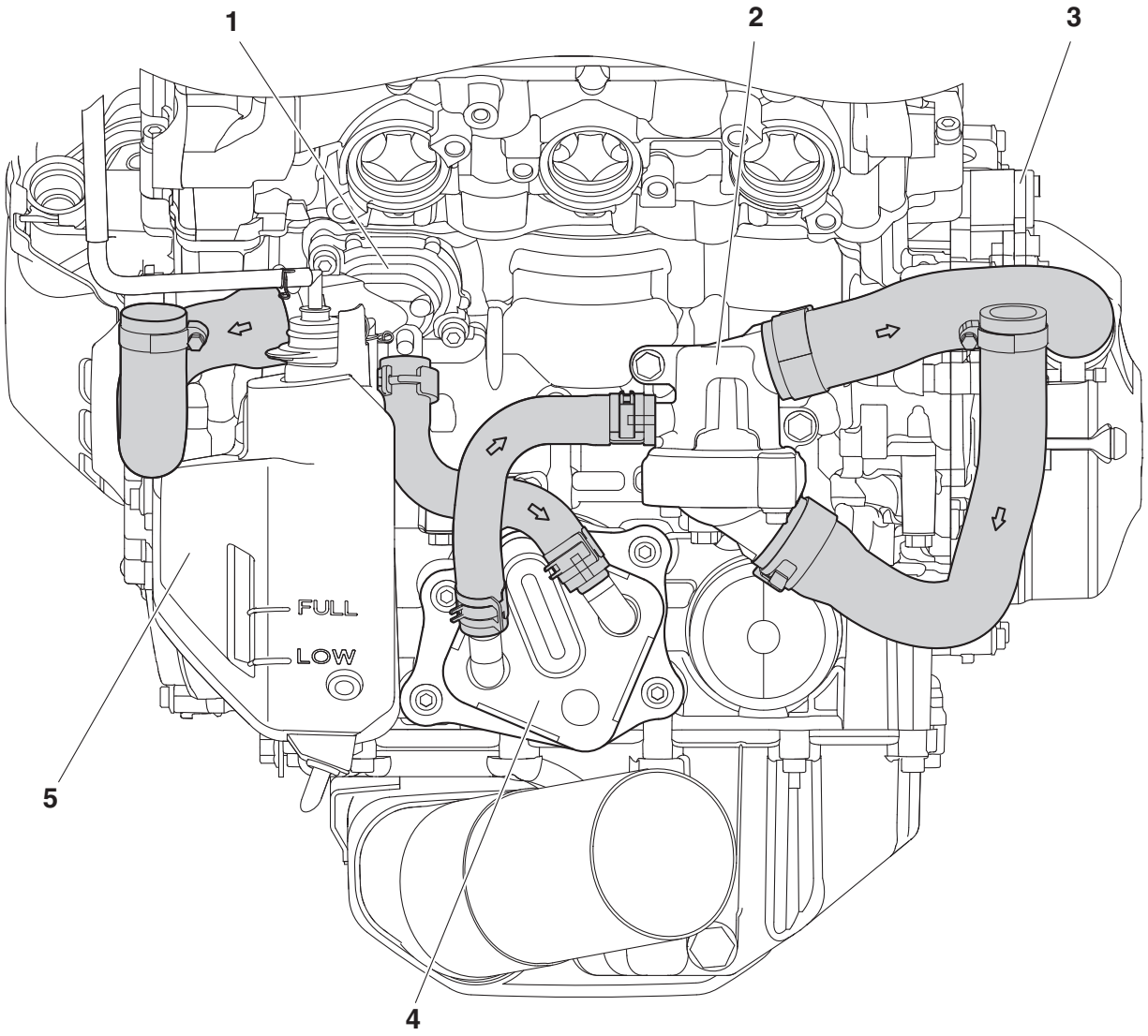
Oil each gear, shaft, and bearing thoroughly.

COOLING SYSTEM

EAS20299
COOLING SYSTEM DIAGRAMS



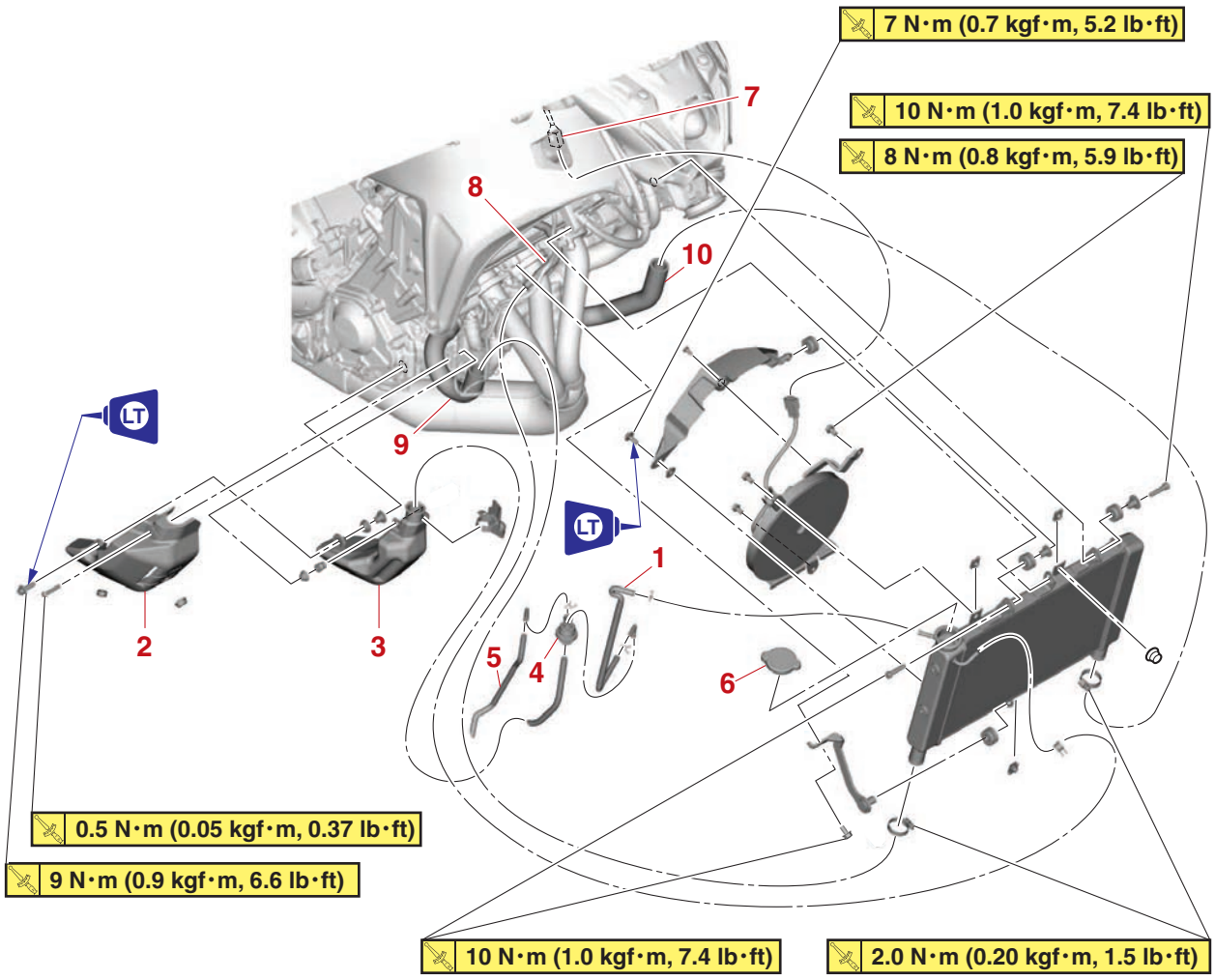
1. Water pump
2. Thermostat
3. Radiator



1. Water jacket
2. Thermostat
3. Water pump
4. Oil cooler
5. Coolant reservoir

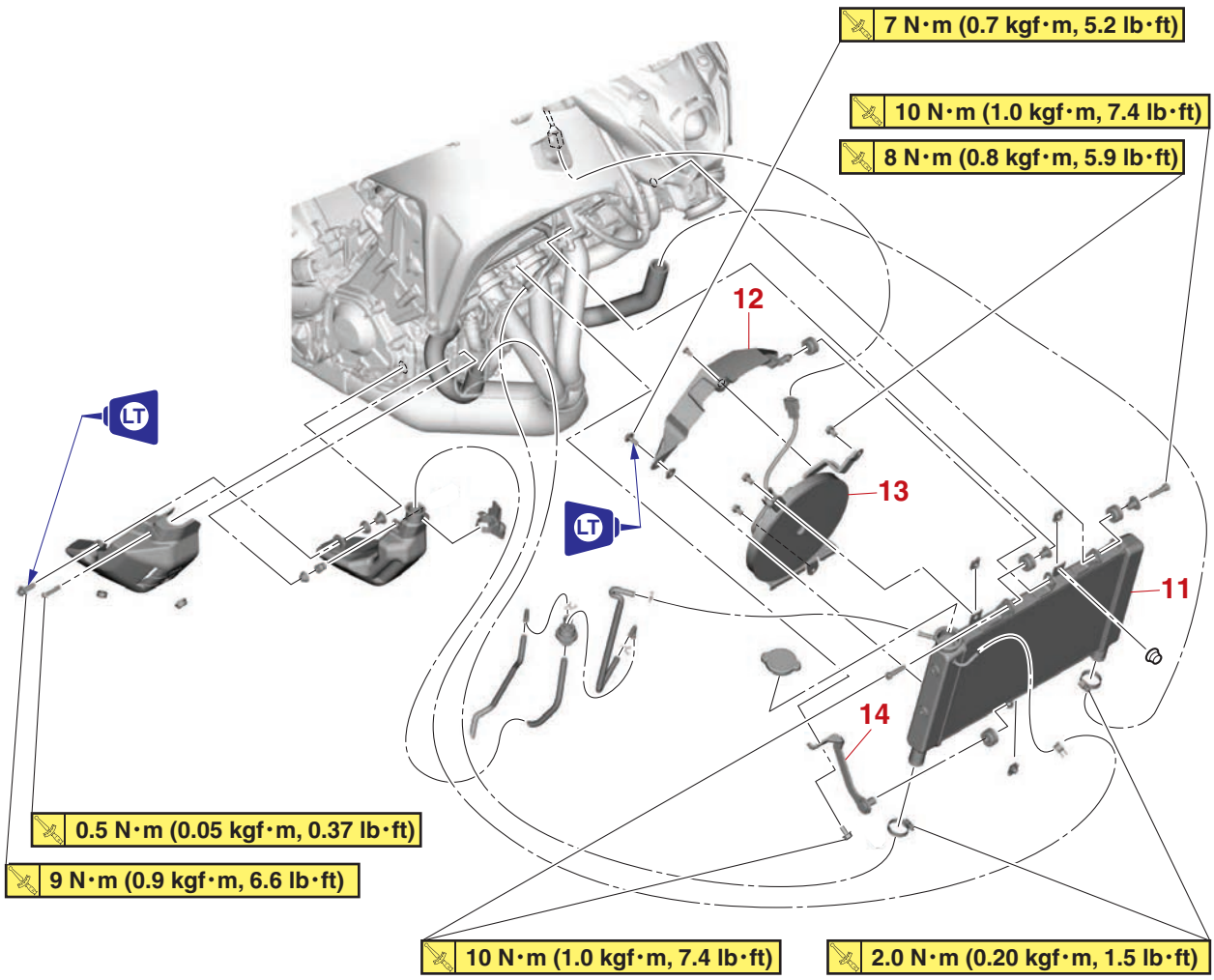
EAS20063
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (2)" on page 4-10.
	Front side panel		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-31.
1	Coolant reservoir hose	1	Disconnect.
2	Coolant reservoir cover	1	
3	Coolant reservoir	1	
4	Coolant reservoir cap	1	
5	Coolant reservoir breather hose	1	
6	Radiator cap	1	
7	Radiator fan motor coupler	1	Disconnect.
8	Radiator hose (cylinder head to radiator)	1	Disconnect.
9	Radiator inlet hose	1	Disconnect.
10	Radiator outlet hose	1	Disconnect.

Removing the radiator



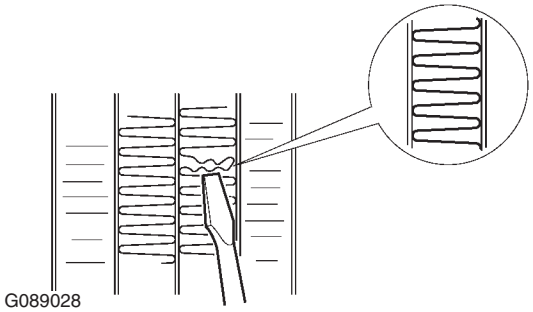
Order	Job/Parts to remove	Q'ty	Remarks
11	Radiator	1	
12	Radiator fan cover	1	
13	Radiator fan	1	
14	Radiator bracket	1	

EAS30439
CHECKING THE RADIATOR

1. Check:
   • Radiator fin
   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.



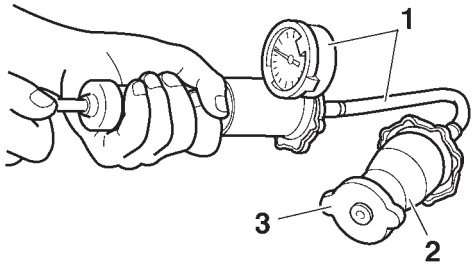
G089028

2. Check:
   • Radiator hose
   Cracks/damage → Replace.
3. Measure:
   • Radiator cap valve 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 specified pressure to the radiator cap and then, make sure to check the specified pressure for at least 10 seconds. If it is not keep the pressure, replace it.

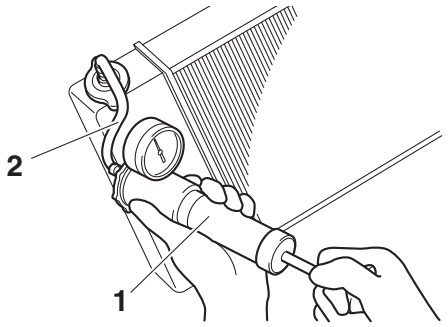
4. Check:
   • Radiator fan
   Damage → Replace.
   Malfunction → Check and repair.
   Refer to "COOLING SYSTEM" on page 8-39.

EAS30440
INSTALLING THE RADIATOR

1. Install:
   • All removed parts
2. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to "CHANGING THE COOLANT" on page 3-31.
3. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.

a. Attach the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator.

Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
Pressure tester adapter
YU-33984



G089031

b. Apply the specified pressure.

Cooling system leak test pressure
137.3 kPa (1.37 kgf/cm², 19.9 psi)

ECA24270

NOTICE

- **Do not apply such a high pressure as exceeds the test pressure.**
- **Make sure that a checkup after the cylinder head gasket is replaced is made after 3 minutes of warm-up.**
- **Make sure that coolant is filled up to the upper level beforehand.**

4. Check:
   - Pressure value
     No stay for 5 to 10 seconds at the test pressure value → Repair.
   - Radiator
   - Radiator hose connections
     Coolant leaks → Repair or replace.
   - Radiator hose
     Bulges → Replace.

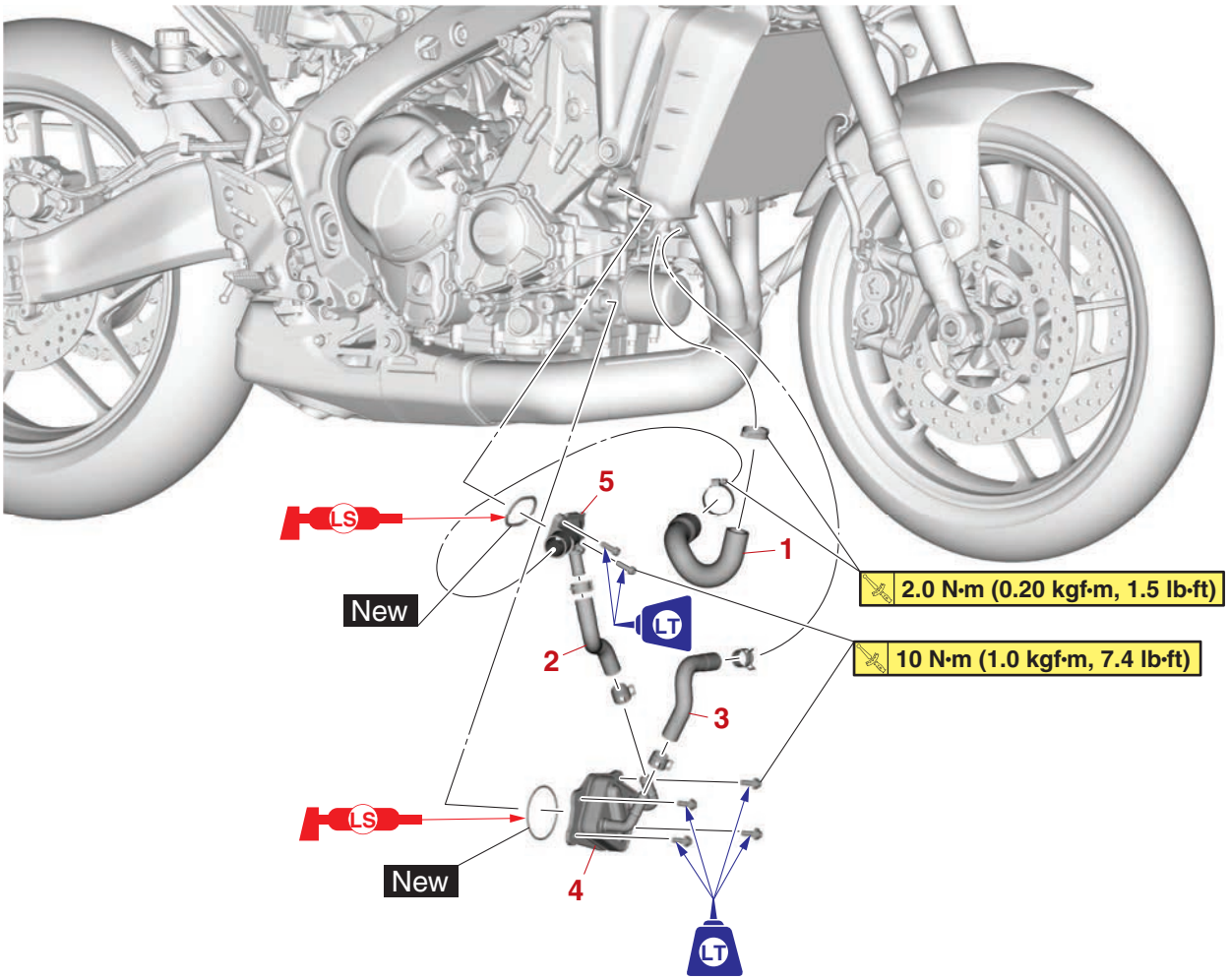
EWA19090

⚠ WARNING

When the radiator cap tester is removed, coolant will spout; therefore, cover it with a cloth beforehand.

EAS20064
OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant reservoir		Refer to "RADIATOR" on page 6-3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-31.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-28.
1	Radiator inlet hose	1	
2	Oil cooler inlet hose	1	
3	Oil cooler outlet hose	1	
4	Oil cooler	1	
5	Water jacket joint	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/wear → Replace.

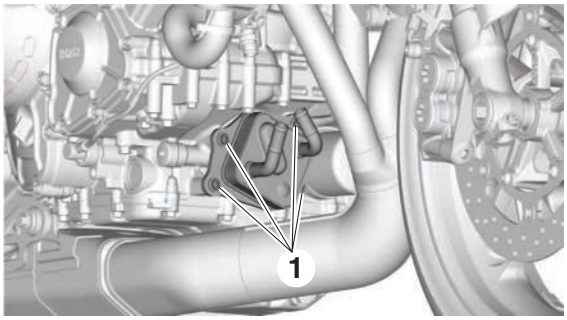
EAS30442
INSTALLING THE OIL COOLER

1. Clean:
   • Mating surfaces of the oil cooler and the crankcase
   (with a cloth dampened with lacquer thinner)
2. Install:
   • O-ring New
   • Oil cooler
   • Oil cooler bolt “1”

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

TIP

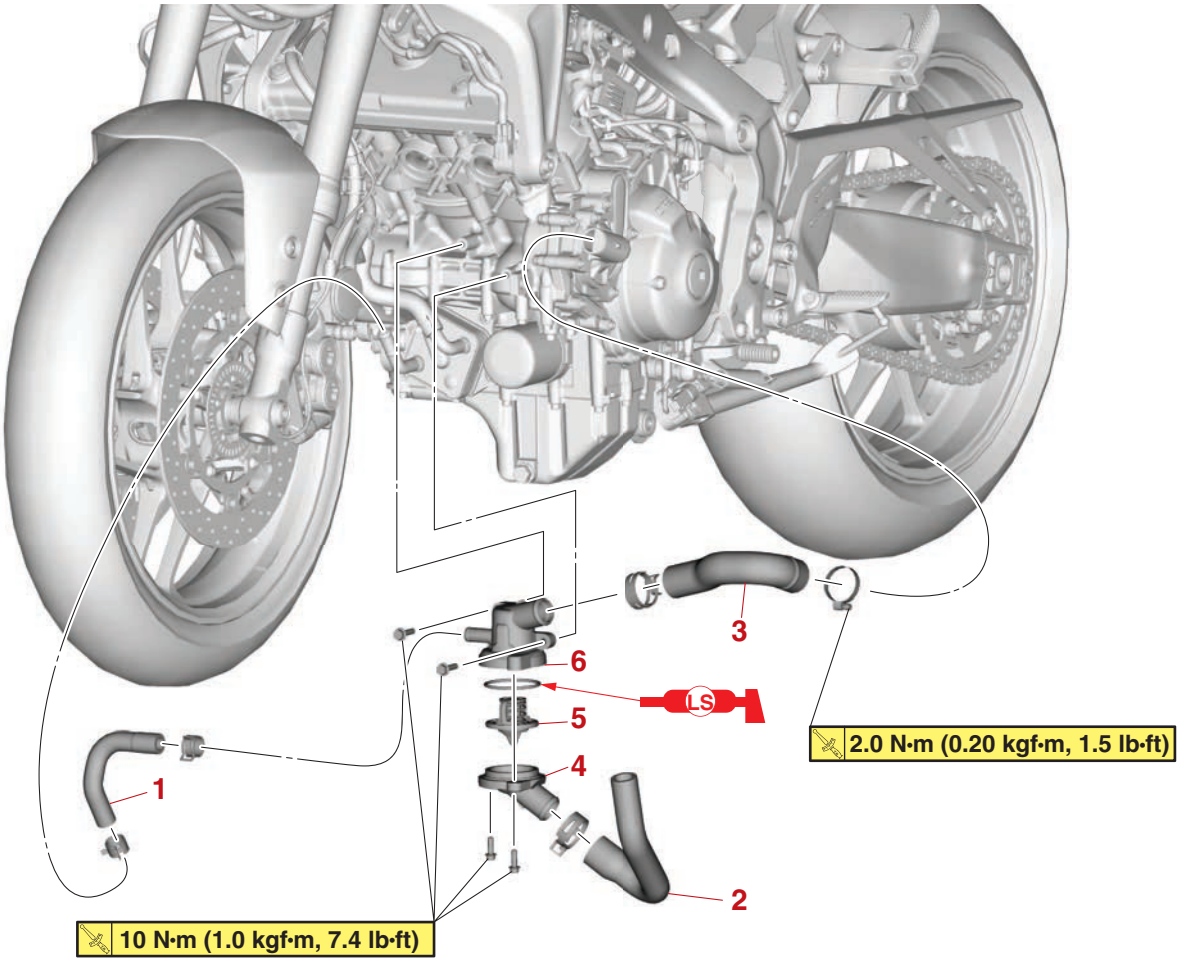
- Before installing the oil cooler, apply lithium-soap-based grease to the O-ring.
- Make sure the O-ring is positioned properly.



3. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to “CHANGING THE COOLANT” on page 3-31.
   • Crankcase
   (with the specified amount of the recommended engine oil)
   Refer to “CHANGING THE ENGINE OIL” on page 3-28.
4. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.
   Refer to “INSTALLING THE RADIATOR” on page 6-5.
5. Measure:
   • Radiator cap valve opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to “CHECKING THE RADIATOR” on page 6-5.

EAS20065
THERMOSTAT

Removing the thermostat assembly



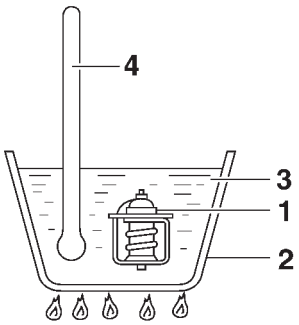
Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-31.
	Radiator		Refer to "RADIATOR" on page 6-3.
	Muffler assembly		Refer to "ENGINE REMOVAL" on page 5-9.
1	Oil cooler outlet hose	1	
2	Radiator outlet hose	1	
3	Water pump inlet hose	1	
4	Thermostat housing	1	
5	Thermostat cover	1	
6	Thermostat	1	

EAS30443
CHECKING THE THERMOSTAT

1. Check:
   • Thermostat
   When the water temperature in the specified value, the thermostat does not fully open. → Replace.

	Valve full open temperature 95.0 °C (203.00 °F)

   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

TIP
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

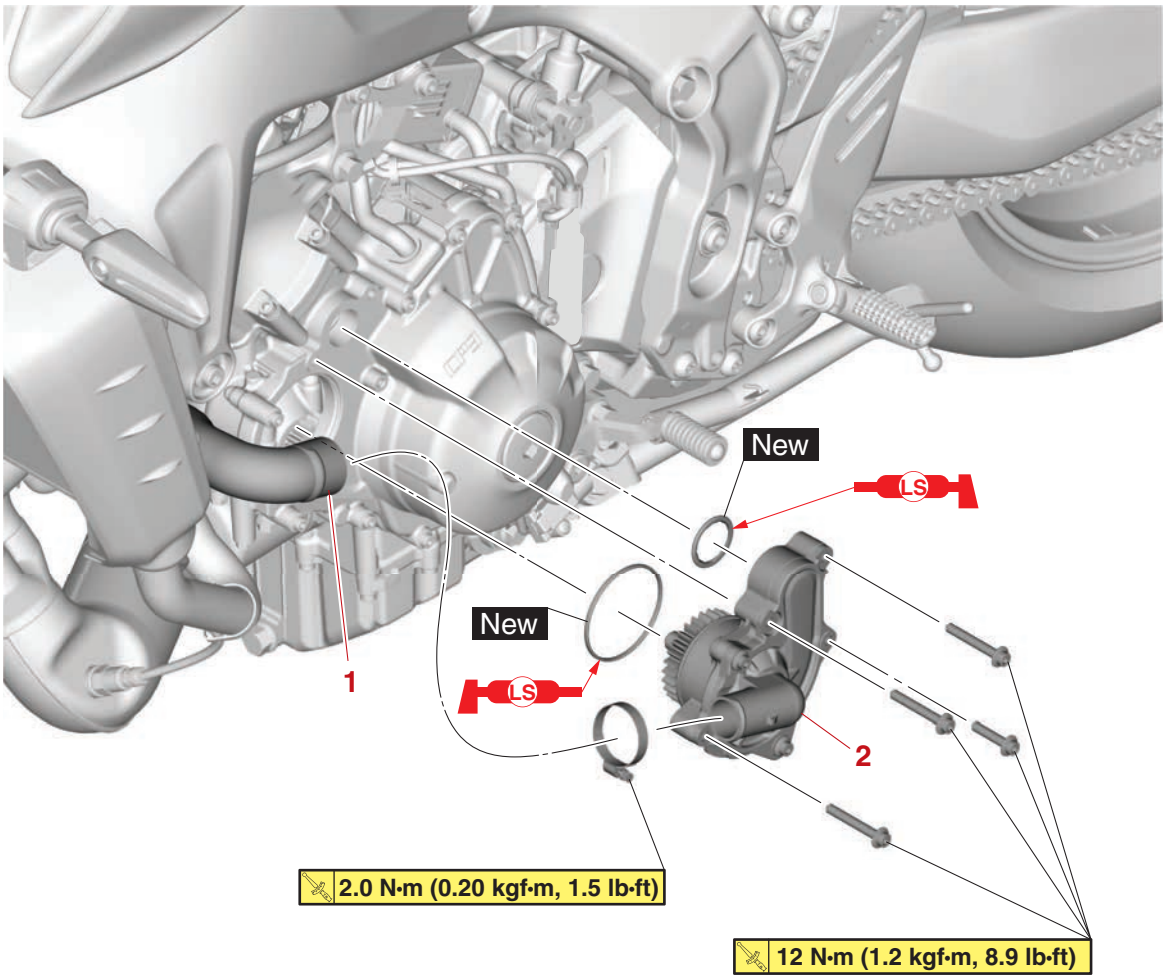
2. Check:
   • Thermostat cover
   • Thermostat housing
   Cracks/damage → Replace.

EAS30445
INSTALLING THE THERMOSTAT ASSEMBLY

1. Install:
   • Thermostat
2. Fill:
   • Cooling system
   (with the specified amount of the recommended coolant)
   Refer to "CHANGING THE COOLANT" on page 3-31.
3. Check:
   • Cooling system
   Leaks → Repair or replace any faulty part.
   Refer to "INSTALLING THE RADIATOR" on page 6-5.
4. Measure:
   • Radiator cap valve opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to "CHECKING THE RADIATOR" on page 6-5.

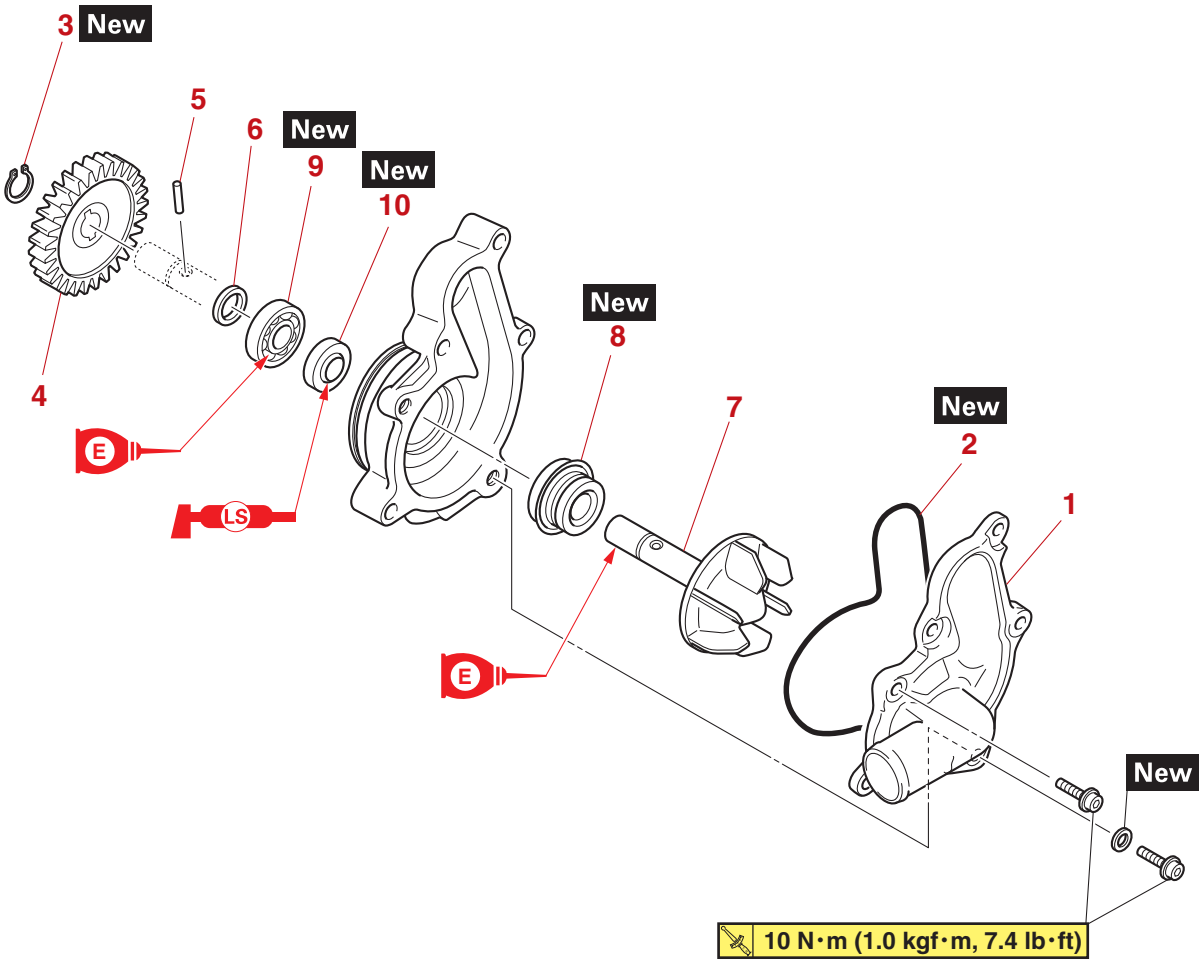
EAS20066
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-31.
1	Water pump inlet hose	1	Disconnect.
2	Water pump assembly	1	

Disassembling the water pump



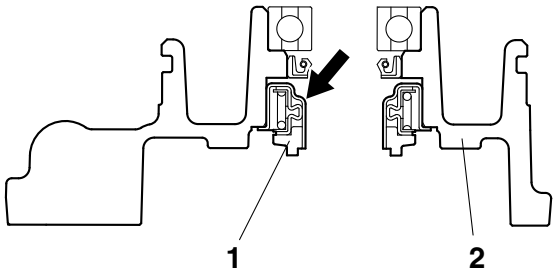
Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	O-ring	1	
3	Circlip	1	
4	Water pump driven gear	1	
5	Pin	1	
6	Washer	1	
7	Impeller shaft	1	
8	Mechanical seal	1	
9	Bearing	1	
10	Oil seal	1	

EAS30446
DISASSEMBLING THE WATER PUMP

1. Remove:
   • Mechanical seal (housing side) “1”

TIP

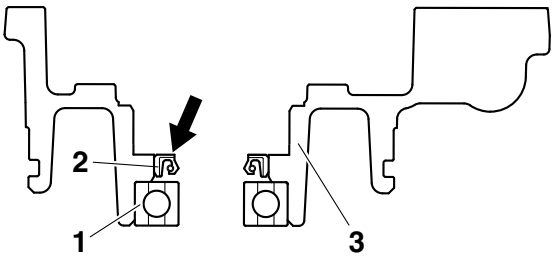
Remove the mechanical seal (housing side) from the inside of the water pump housing “2”.



2. Remove:
   • Bearing “1”
   • Oil seal “2”

TIP

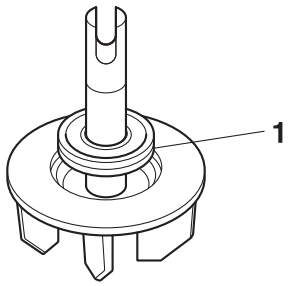
Remove the oil seal and bearing from the outside of the water pump housing “3”.



3. Remove:
   • Mechanical seal (impeller side) “1” (from the impeller, with a thin, flat-head screwdriver)

TIP

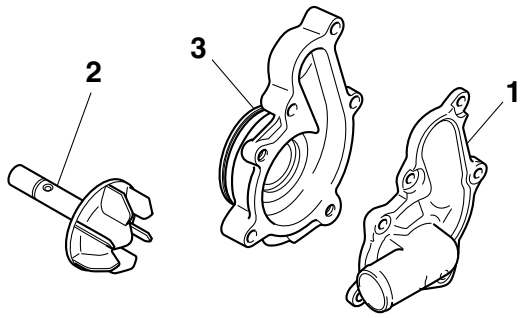
Do not scratch the impeller shaft.



G089034

EAS30447
CHECKING THE WATER PUMP

1. Check:
   • Water pump housing cover “1”
   • Impeller shaft “2”
     Cracks/damage/wear → Replace.
   • Water pump housing “3”
     Cracks/damage/wear → Replace the water pump assembly.



2. Check:
   • Bearing
     Rough movement → Replace.
3. Check:
   • Water pump inlet hose
     Cracks/damage/wear → Replace.

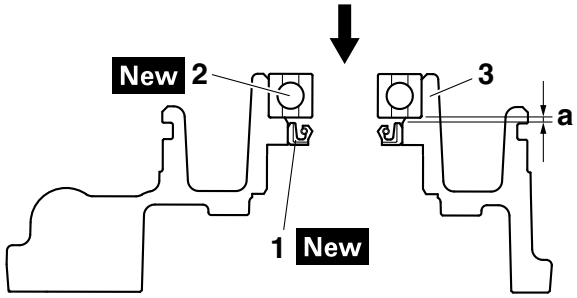
EAS30448
ASSEMBLING THE WATER PUMP

1. Install:
   • Oil seal “1” New
   • Bearing “2” New
     (into the water pump housing “3”)

	Installed depth “a” **0.5–1.0 mm (0.02–0.04 in)**

TIP

Install the oil seal with a socket that matches its outside diameter.



2. Install:
   • Mechanical seal (housing side) “1” New

ECA20330

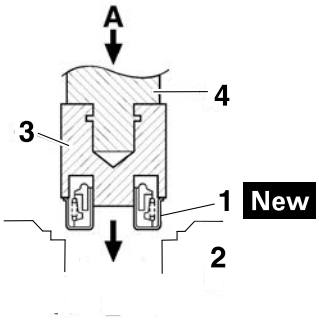
NOTICE

Never lubricate the mechanical seal (housing side) surface with oil or grease.

TIP

Use the special tools and a press to press the mechanical seal (housing side) straight in until it touches the water pump housing.

Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058



2. Water pump housing
3. Mechanical seal installer
4. Middle driven shaft bearing driver

A. Push down

3. Install:

• Mechanical seal (impeller side) “1” New

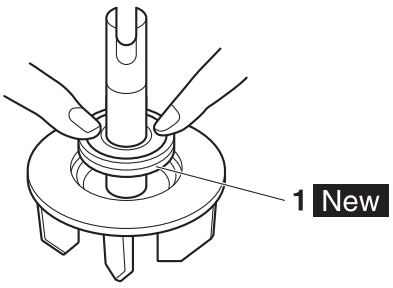
ECA20340

NOTICE

Make sure the mechanical seal (impeller side) is flush with the impeller.

TIP

- Before installing the mechanical seal (impeller side), apply tap water or coolant onto its outer surface.
- If the top of the mechanical seal is dirty, clean it.

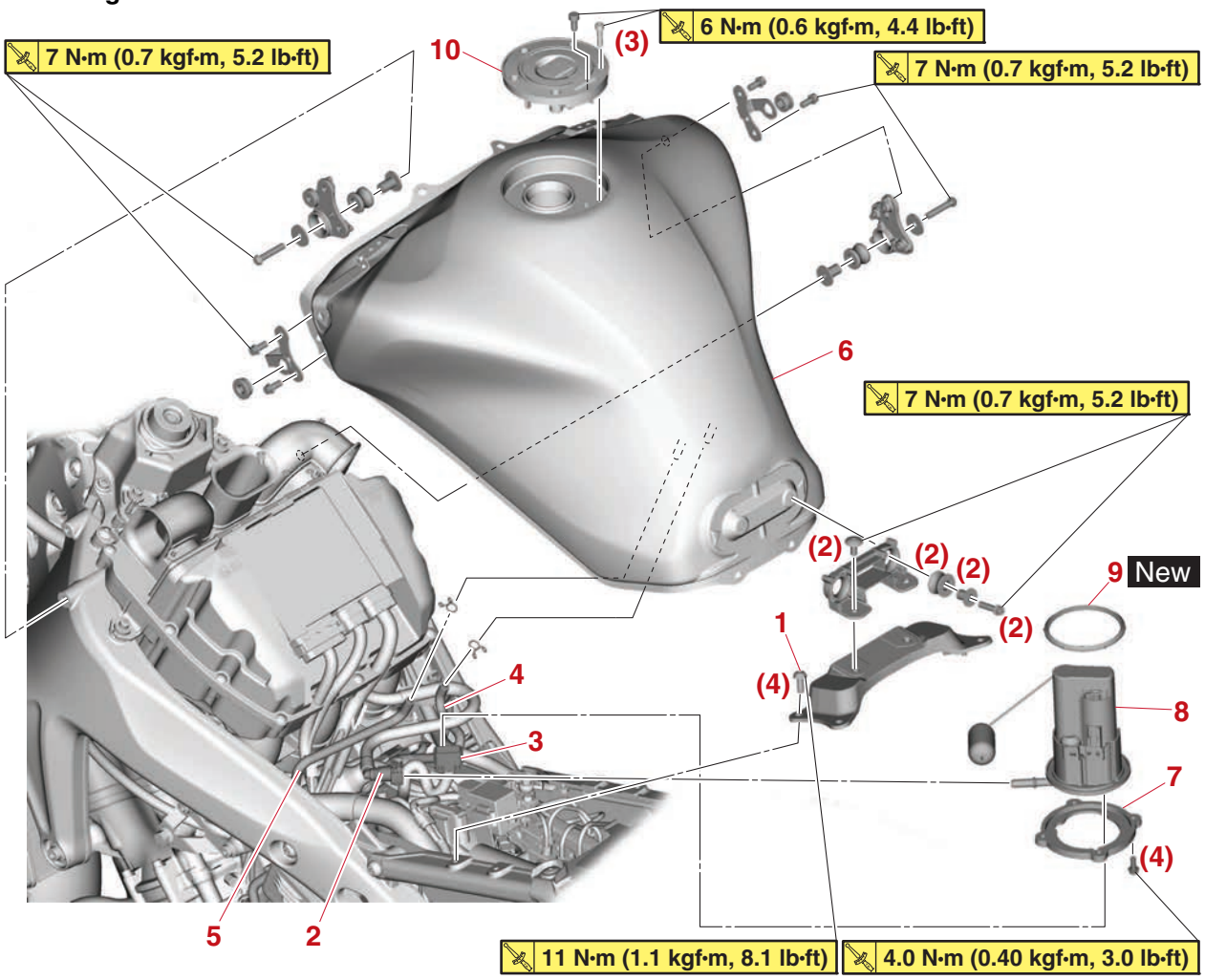


G089035

FUEL SYSTEM

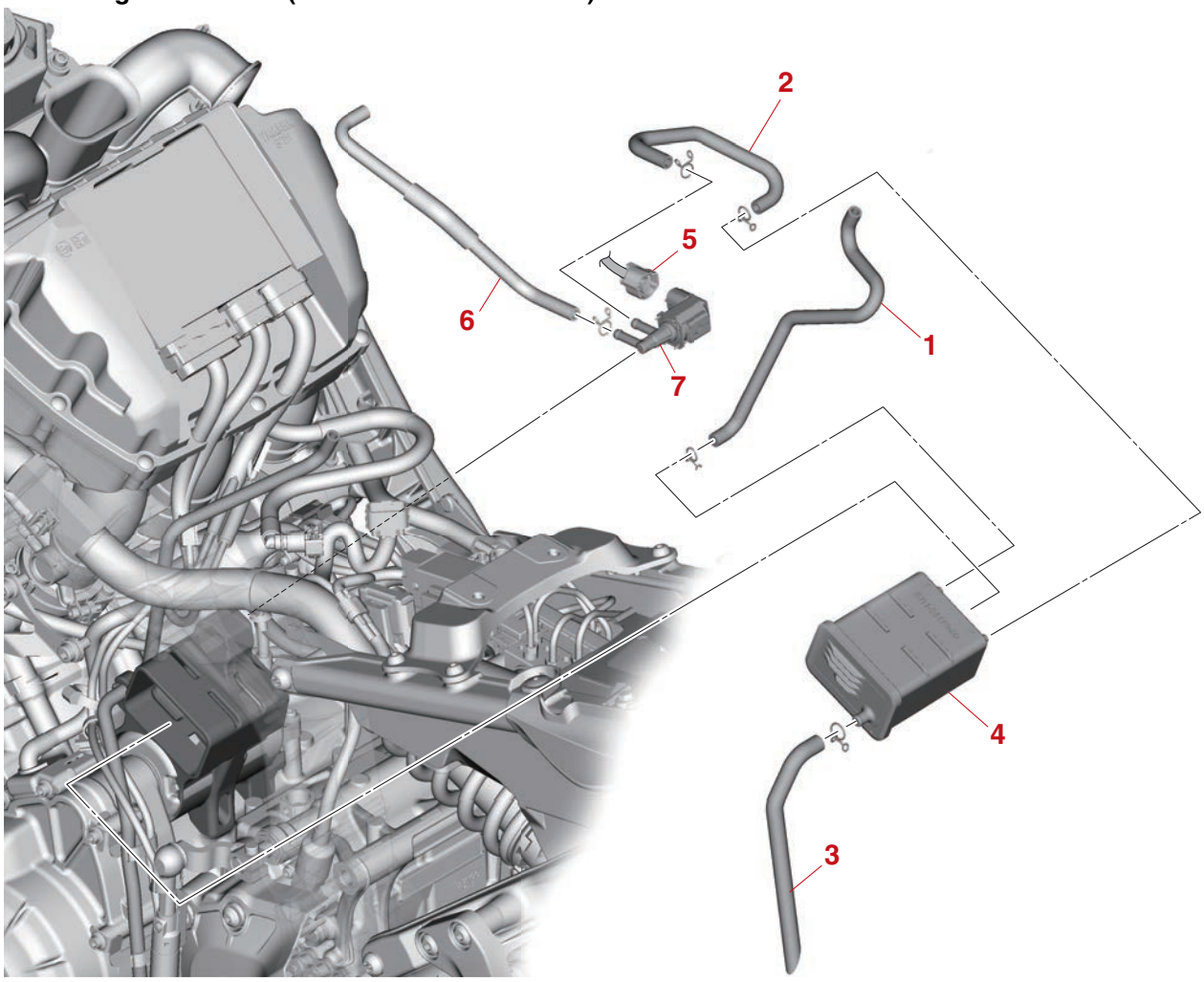
EAS20067
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Fuel tank side cover/Fuel tank center cover		Refer to "GENERAL CHASSIS (1)" on page 4-1.
1	Fuel tank bracket bolt	4	
2	Fuel hose connector	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank breather hose	1	Disconnect.
5	Fuel tank drain hose	1	Disconnect.
6	Fuel tank	1	
7	Fuel pump bracket	1	
8	Fuel pump	1	
9	Fuel pump gasket	1	
10	Fuel tank cap	1	

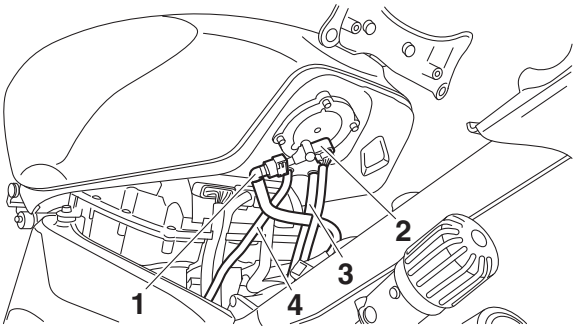
Removing the canister (for MT09MC/MT09SPMC)



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Fuel tank breather hose (fuel tank to canister)	1	
2	Canister purge hose (purge cut valve solenoid to canister)	1	
3	Canister breather hose	1	
4	Canister	1	
5	Purge cut valve solenoid coupler	1	Disconnect.
6	Canister purge hose (purge cut valve solenoid to hose joint)	1	
7	Purge cut valve solenoid	1	

EAS30450
REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Rider seat
   - Fuel tank side cover
   - Fuel tank center cover
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Bracket bolt
3. Disconnect:
   - Fuel hose (fuel tank side) "1"
   - Fuel pump coupler "2"
   - Fuel tank breather hose "3"
   - Fuel tank drain hose "4"



EWA17320
⚠ WARNING

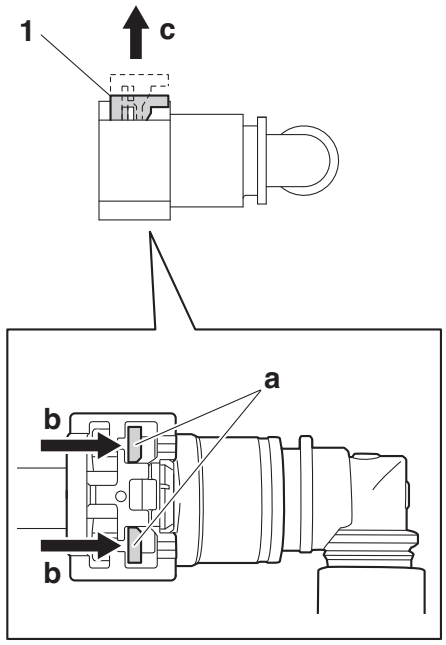
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA17490
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP

- While pushing the ends "a" of the fuel hose connector cover "1" in direction "b", slide the fuel hose connector cover in direction "c", and then remove the hose from the fuel pump.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



4. Remove:
   - Fuel tank

TIP

Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

EAS30451
REMOVING THE FUEL PUMP

1. Remove:
   - Fuel pump

ECA14721
NOTICE

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

EAS30454
CHECKING THE FUEL PUMP BODY

1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.

EAS30455
CHECKING THE FUEL PUMP OPERATION

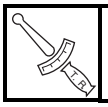
1. Check:
   - Fuel pump operation
     Refer to "CHECKING THE FUEL PRESSURE" on page 7-10.

EAS33542
CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SPMC)

1. Check:
   - Canister purge hose
     Loose connection → Connect properly.
     Cracks/damage/wear → Replace.
2. Check:
   - Purge cut valve solenoid resistance
     Refer to "CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SP-MC)" on page 8-65.

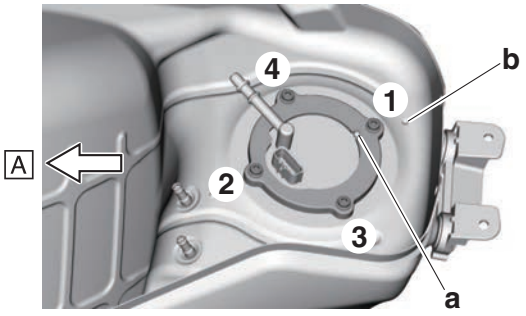
EAS30456
INSTALLING THE FUEL PUMP

1. Install:
   - Fuel pump gasket New
   - Fuel pump
   - Fuel pump bracket
   - Fuel pump bolt

	**Fuel pump bolt** **4.0 N·m (0.40 kgf·m, 3.0 lb·ft)**

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump gasket so that the lip side turns to the inside of the fuel tank.
- Install the fuel pump as shown in the illustration.
- Install the fuel pump projection "a" toward the fuel tank slot "b".
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



A. Forward

EAS30457
INSTALLING THE FUEL TANK

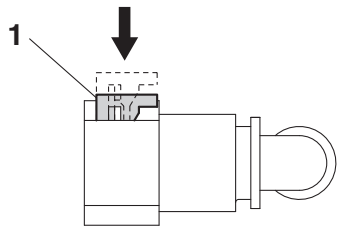
1. Connect:
   - Fuel hose (fuel tank side)

ECA17500
NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

TIP

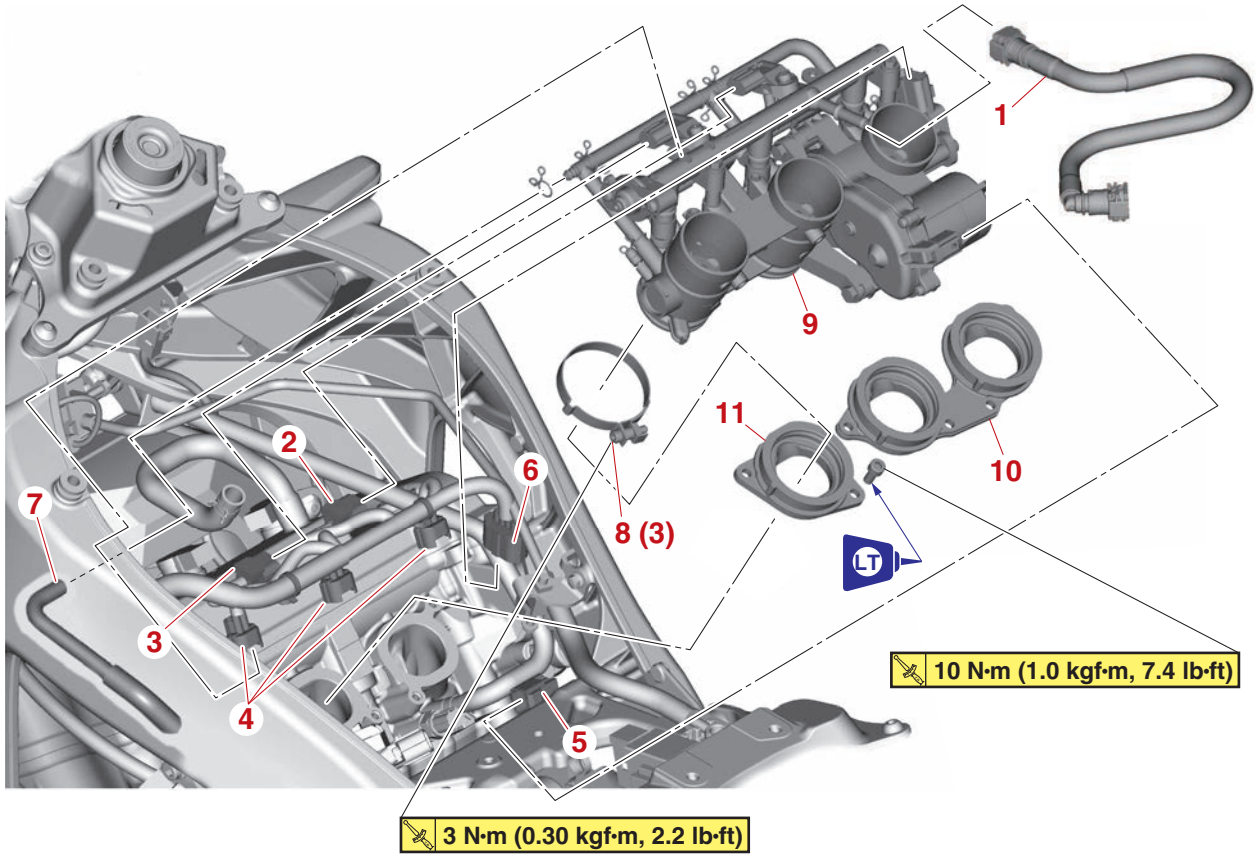
- Install the fuel hose onto the fuel pump securely, and slide the fuel hose connector cover "1" in the direction shown in the illustration.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



2. Connect:
   - Fuel tank drain hose
   - Fuel tank breather hose
   - Fuel pump coupler

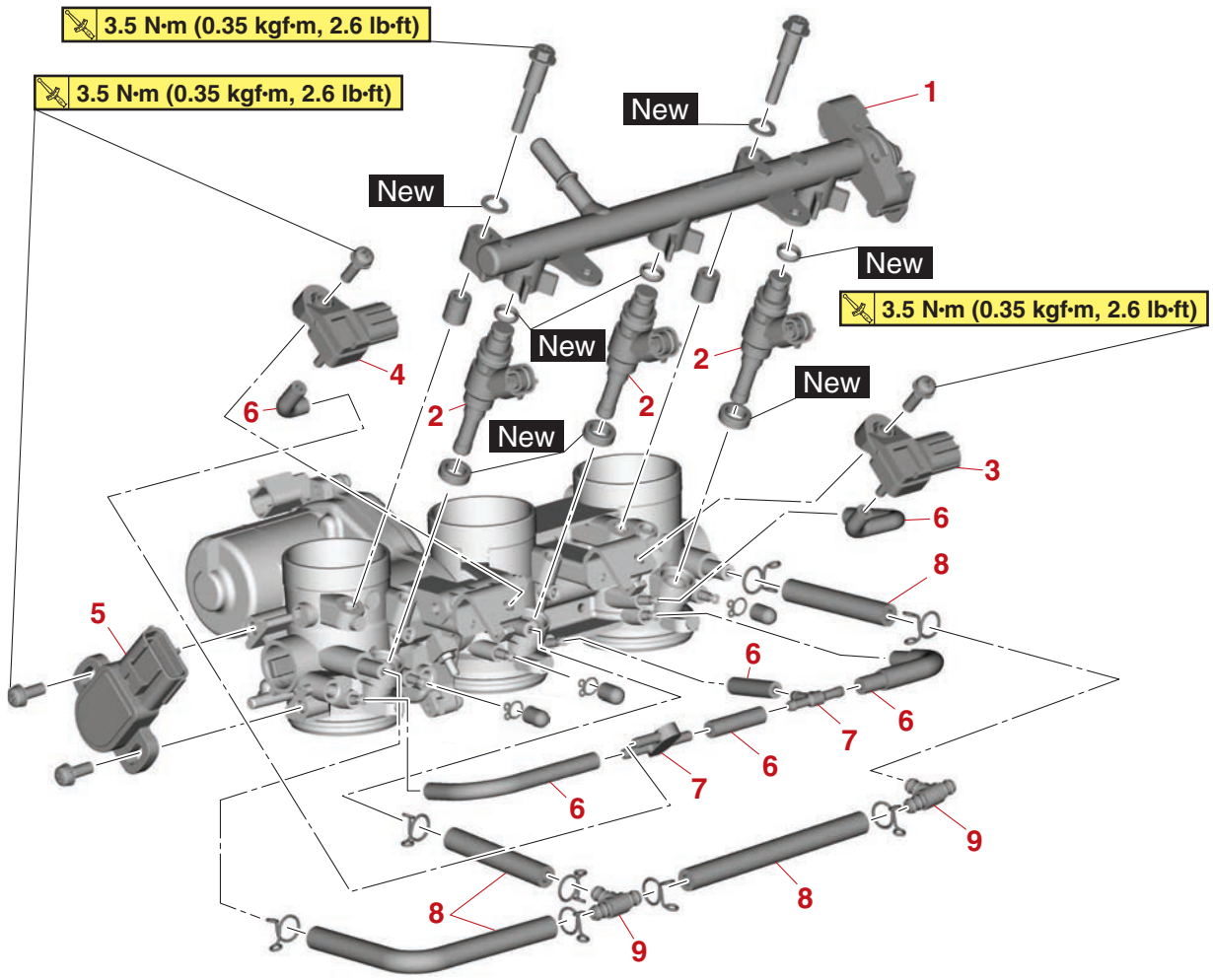
EAS20070
THROTTLE BODIES

Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS (2)" on page 4-10.
1	Fuel hose	1	
2	Intake air pressure sensor 1 coupler	1	Disconnect.
3	Intake air pressure sensor 2 coupler	1	Disconnect.
4	Injector coupler	3	Disconnect.
5	Throttle servo motor coupler	1	Disconnect.
6	Throttle position sensor coupler	1	Disconnect.
7	Canister purge hose (purge cut valve solenoid to hose joint)	1	Disconnect. For MT09MC/MT09SPMC.
8	Throttle body joint clamp screw	3	Loosen.
9	Throttle body assembly	1	
10	Throttle body joint	1	
11	Throttle body joint	1	

Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel rail	1	
2	Injector	3	
3	Intake air pressure sensor 2	1	
4	Intake air pressure sensor 1	1	
5	Throttle position sensor	1	
6	Negative pressure hose	6	
7	Hose joint	2	
8	Canister purge hose	4	For MT09MC/MT09SPMC.
9	Hose joint	2	For MT09MC/MT09SPMC.

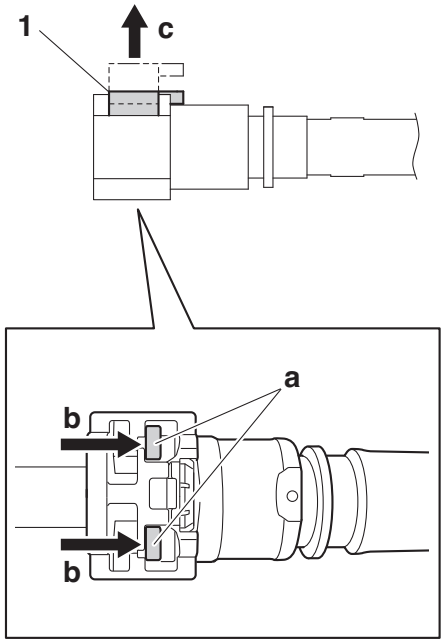
EAS30475
CHECKING THE INJECTORS (BEFORE REMOVING)
1. Check:
   • Injector
   Use the diagnostic code numbers “36”–“38”.
   Refer to “DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE” on page 9-66.

EAS31158
REMOVING THE FUEL HOSE (FUEL RAIL SIDE)
1. Remove:
   • Fuel tank
   Refer to “REMOVING THE FUEL TANK” on page 7-3.
2. Remove:
   • Fuel hose (fuel rail side)

ECA17490
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP
- While pushing the ends “a” of the fuel hose connector cover “1” in direction “b”, slide the fuel hose connector cover in direction “c”, and then remove the hose from the fuel pump.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS30476
REMOVING THE INJECTORS
EWA17330

⚠ WARNING
- **Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.**
- **Be careful when disconnecting the fuel hose. Any remaining pressure in the fuel hose may cause the fuel to spray out. Place a container or rag under the hose to catch any fuel that spills. Always clean up any spilt fuel immediately.**
- **Turn the main switch to “OFF” and disconnect the negative battery lead from the battery terminal before removing the injectors.**

1. Remove:
   • Fuel rail
   a. Remove the fuel rail bolts.

EAS30477
CHECKING THE INJECTORS
1. Check:
   • Injector
   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 8-64.

EAS30769
CHECKING AND CLEANING THE THROTTLE BODIES
TIP

Clean the throttle bodies only if they cannot be synchronized using the bypass air screws. Before cleaning the throttle bodies, check the following items:
- Valve clearance
- Spark plug
- Air filter element
- Throttle body joint
- Fuel hose
- Exhaust system
- Cylinder head breather hose

EWA17340

WARNING

If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.

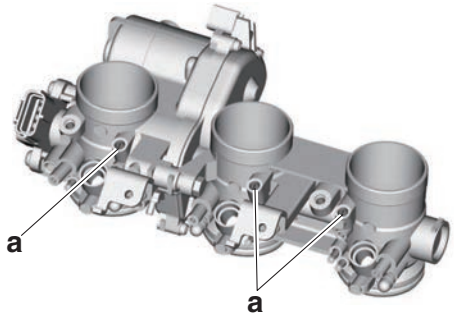
1. Check:
   - Throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
2. Clean:
   - Throttle bodies

ECA21540

NOTICE

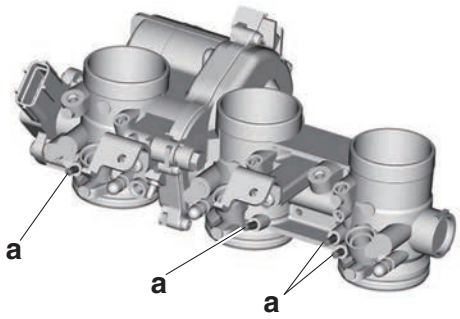
- **Observe the following precautions; otherwise, the throttle bodies may not operate properly.**
- **Do not subject the throttle bodies to excessive force.**
- **Clean the throttle bodies in the recommended cleaning solvent.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.**
- **Be careful not to remove the white paint mark that identifies the standard throttle body.**
- **Do not turn the bypass air screws "a"; otherwise, the throttle body synchronization will be affected.**

	Recommended cleaning solvent **Yamaha Oil & Brake Cleaner**

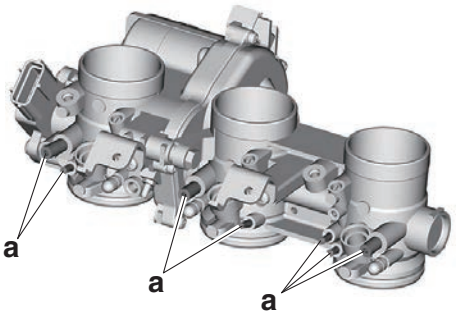


a. Place the throttle bodies on a flat surface with the air filter case side facing up.
b. Install the caps (895-14169-00) onto the hose fittings "a".

A



B



A. For MT09M/MT09SPM
B. For MT09MC/MT09SPMC

c. Hold the throttle valves in the open position.

EWA15940

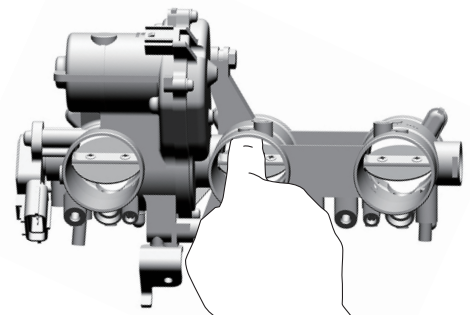
WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA20380

NOTICE

- **Do not open the throttle valves by supplying electrical power to the throttle bodies.**
- **Do not use tools to open the throttle valves or to keep them in the open position.**
- **Do not open the throttle valves quickly.**



d. Apply the recommended cleaning solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any cleaning solvent to enter the opening for the injectors.
- Do not apply any cleaning solvent to the portions of the throttle valve shafts between the throttle bodies.

e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the air filter case side of the throttle body to the engine side.

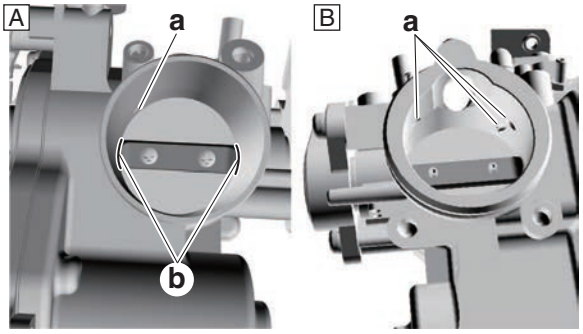
ECA17590

NOTICE

- **Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.**
- **Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.**

f. After removing the carbon deposits, clean the inside of the throttle bodies with the recommended cleaning solvent, and then dry the throttle bodies using compressed air.

g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



A. Air filter case side
B. Throttle body joint side

3. Install the throttle bodies.
4. Reset:
   - ISC (idle speed control) learning values
     Use the diagnostic code number "67".
     Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
5. Adjust:
   - Throttle bodies synchronizing
     Out of specification → Replace the throttle bodies.
     Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-8.

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 "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
   - A/F control learning value
     Use the diagnostic code number "87".
     Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
4. Adjust:
   - Throttle bodies synchronizing
     Refer to "SYNCHRONIZING THE THROTTLE BODIES" on page 3-8.
5. Place the vehicle on a maintenance stand so that the rear wheel is elevated.
6. Check:
   - Engine idling speed
     Start the engine, warm it up, and then measure the engine idling speed.

	Engine idling speed **1200–1400 r/min**

EAS30480

INSTALLING THE INJECTORS

ECA19400

NOTICE

- **Always use new O-rings.**
- **When installing the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rails, or O-rings.**
- **Be careful not to twist or pinch the O-rings when installing the injectors.**
- **When installing the injector, install it at the same position as the removed cylinder.**
- **If an injector is subject to strong shocks or excessive force, replace it.**

1. Install a new seal onto the end of each injector.
2. Install the injectors to the fuel rail, making sure to install them in the correct direction.
3. Install the injector assemblies to the throttle bodies.

Fuel rail bolt
3.5 N·m (0.35 kgf·m, 2.6 lb·ft)

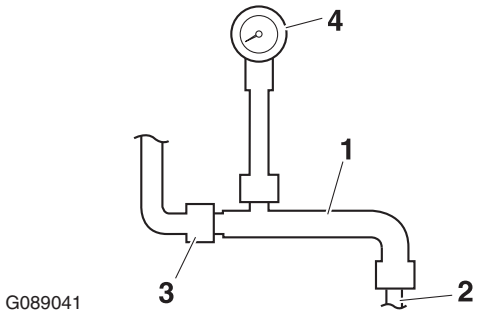
4. Check the injector pressure after the injectors are installed.
   Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-10.

EAS30481
CHECKING THE INJECTOR PRESSURE

TIP
- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

1. Check:
   - Injector pressure
   a. Connect the fuel injector pressure adapter "1" to the fuel rail joint "2", and then connect an air compressor "3" to the adapter.
   b. Connect the pressure gauge "4" to the fuel injector pressure adapter "1".

Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel injector pressure adapter
90890-03210
Fuel injector pressure adapter
YU-03210



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 air pressure is reached.

Specified air pressure
490 kPa (5.0 kgf/cm², 71.1 psi)

ECA17600
NOTICE
Never exceed the specified air pressure or damage could occur.

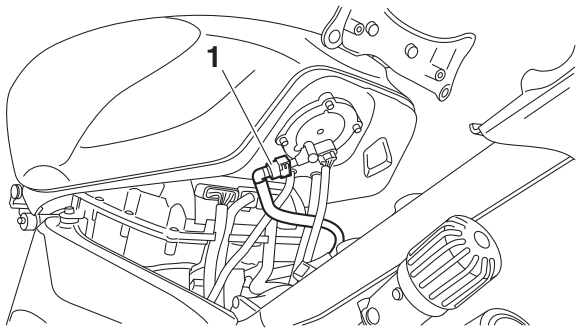
   f. Close the valve on the fuel injector pressure adapter.
   g. Check that the specified air pressure is held at least one minute.
   Pressure drops → Check the pressure gauge and adapter.
   Check the seals and O-rings and then reinstall.
   Out of specification → Replace the fuel injectors.

EAS30482
CHECKING THE FUEL PRESSURE

1. Check:
   - Fuel pressure
   a. Remove the rider seat, fuel tank side cover and fuel tank center cover.
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
   b. Remove the fuel bracket bolt and hold up the fuel tank.
   c. Disconnect the fuel hose "1" from the fuel pump.
   Refer to "REMOVING THE FUEL TANK" on page 7-3.

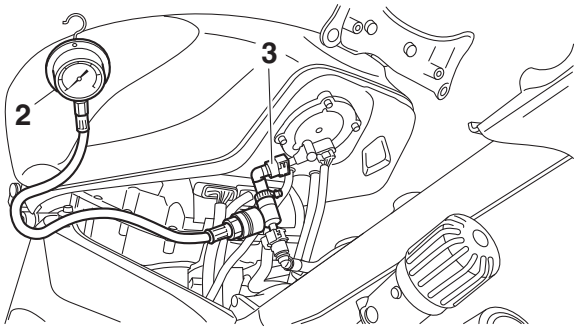
EWA17320
⚠ WARNING
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA17490
NOTICE
Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.



   d. Connect the pressure gauge "2" and fuel pressure adapter "3" to the fuel hose.

Pressure gauge
90890-03153
Pressure gauge
YU-03153
Fuel pressure adapter
90890-03176
Fuel pressure adapter
YM-03176



e. Start the engine.
f. Measure the fuel line pressure.
Faulty → Replace the fuel pump.

Fuel line pressure (at idle)
300–390 kPa (3.0–3.9 kgf/cm², 43.5–56.6 psi)

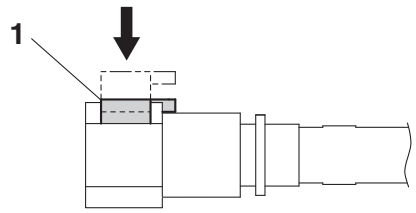
EAS31159
INSTALLING THE FUEL HOSE (FUEL RAIL SIDE)

1. Connect:
   • Fuel hose (fuel rail side)

ECA17500
NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

TIP
- Install the fuel hose onto the fuel pump securely, and slide the fuel hose connector cover "1" in the direction shown in the illustration.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS30485
ADJUSTING THE THROTTLE POSITION SENSOR

ECA17540
NOTICE

- **Handle the throttle position sensor with special care.**
- **Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.**

1. Check:
   • Throttle position sensor
   Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
2. Adjust:
   • Throttle position sensor angle

TIP

Before adjusting the throttle position sensor, the throttle bodies must be removed.

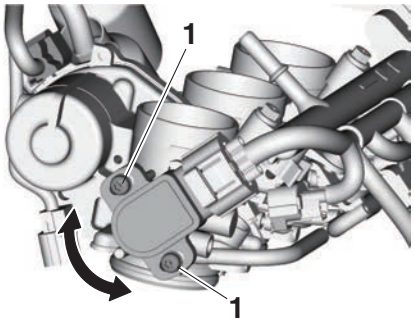
a. Temporary tighten the throttle position sensor screws "1".
b. Check that the throttle valves are fully closed.
c. Connect the throttle position sensor to the wire harness.
d. Remove the protective cap, and then connect the YDT to coupler.

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

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

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 YDT screen.
g. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

	Throttle position sensor screw **3.5 N·m (0.35 kgf·m, 2.6 lb·ft)**

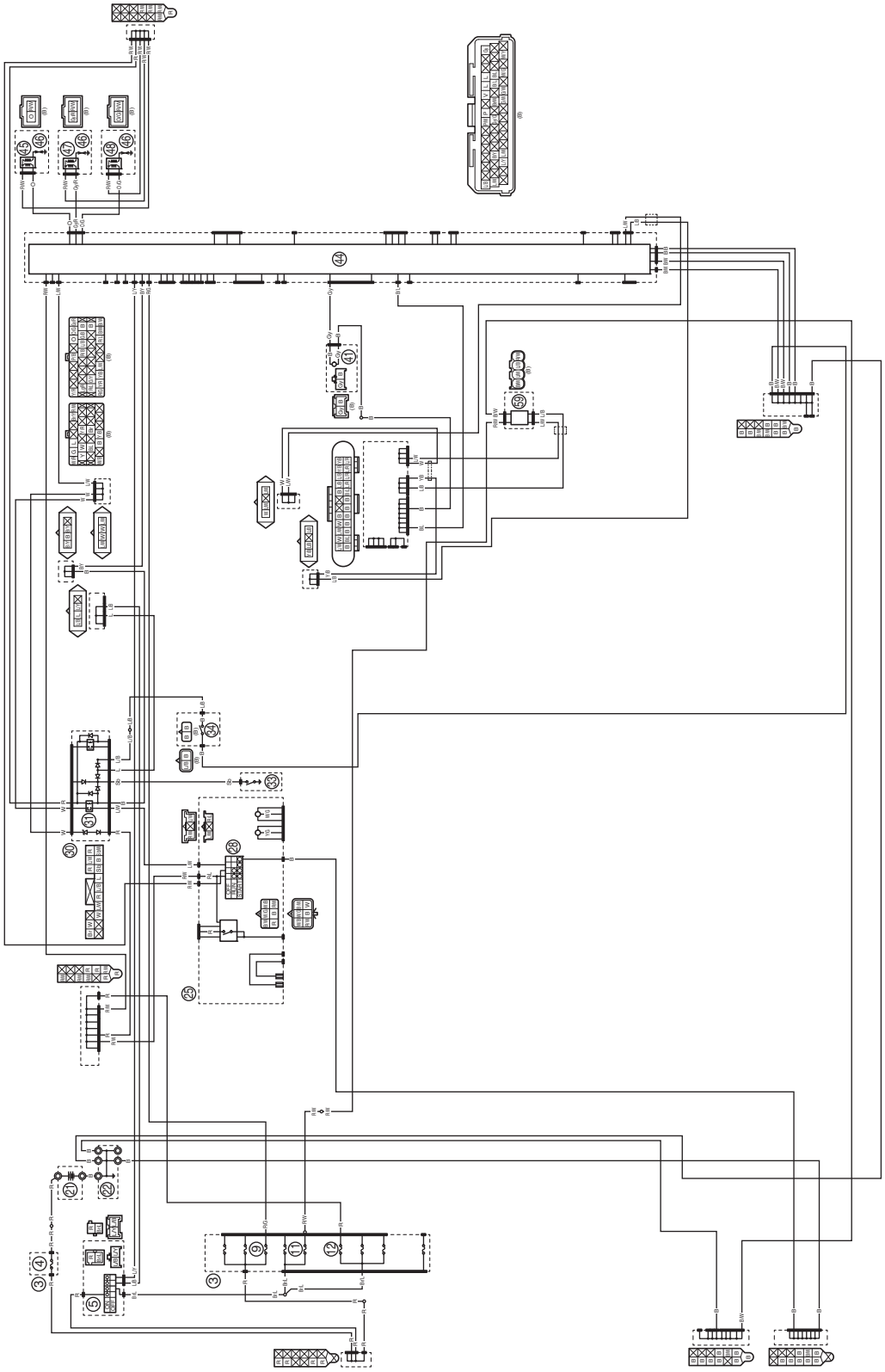


ELECTRICAL SYSTEM

EAS20072
IGNITION SYSTEM

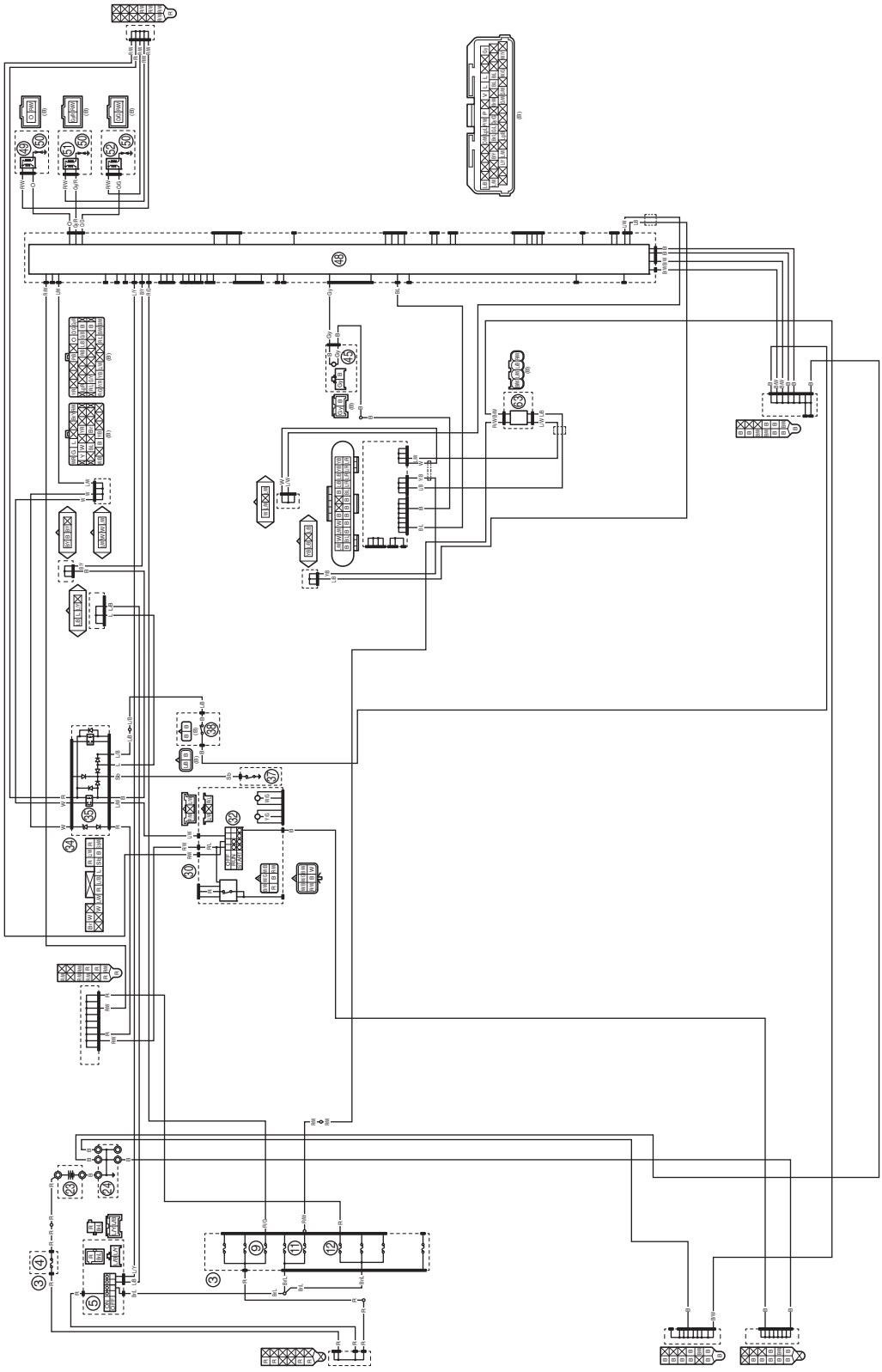
EAS30490
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
21. Battery
22. Engine ground
25. Handlebar switch (right)
28. Stop/run/start switch
30. Relay unit
31. Starting circuit cut-off relay
33. Neutral switch
34. Sidestand switch
41. Crankshaft position sensor
44. ECU (Engine Control Unit)
45. Ignition coil #1
46. Spark plug
47. Ignition coil #2
48. Ignition coil #3
59. IMU (Inertial Measurement Unit)

MT09SPM/MT09SPMC

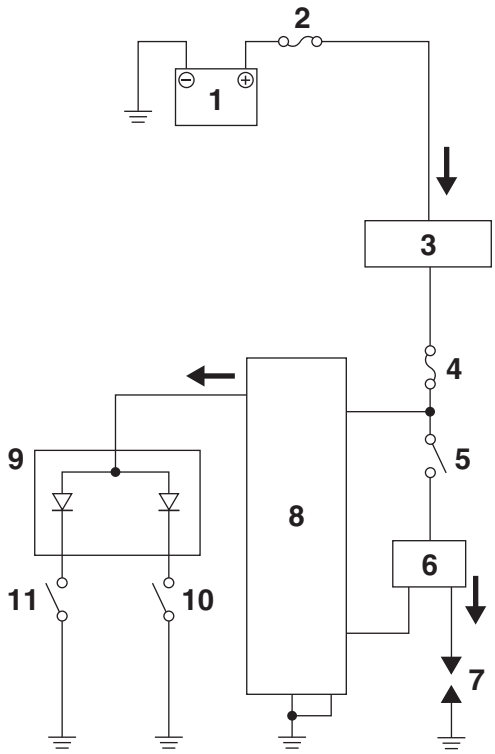


3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
23. Battery
24. Engine ground
30. Handlebar switch (right)
32. Stop/run/start switch
34. Relay unit
35. Starting circuit cut-off relay
37. Neutral switch
38. Sidestand switch
45. Crankshaft position sensor
48. ECU (Engine Control Unit)
49. Ignition coil #1
50. Spark plug
51. Ignition coil #2
52. Ignition coil #3
63. IMU (Inertial Measurement Unit)

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 neutral switch or sidestand switch is open. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral 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 1
5. Stop/run/start switch
6. Ignition coil
7. Spark plug
8. ECU (Engine Control Unit)
9. Relay unit (diode)
10. Sidestand switch
11. Neutral switch

EAS30492
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case

1. Check the fuses. (Main, backup 2, ignition 1, and ignition 2) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the spark plugs. Refer to “CHECKING THE SPARK PLUGS” on page 3-5.	NG→	Re-gap or replace the spark plugs.
OK↓		
4. Check the ignition spark gap. Refer to “CHECKING THE IGNITION SPARK GAP” on page 8-59.	OK→	Ignition system is OK.
NG↓		
5. Check the ignition coils. Refer to “CHECKING THE IGNITION COILS” on page 8-59.	NG→	Replace the ignition coils.
OK↓		
6. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-60.	NG→	Replace the crankshaft position sensor.
OK↓		
7. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the main switch.
OK↓		

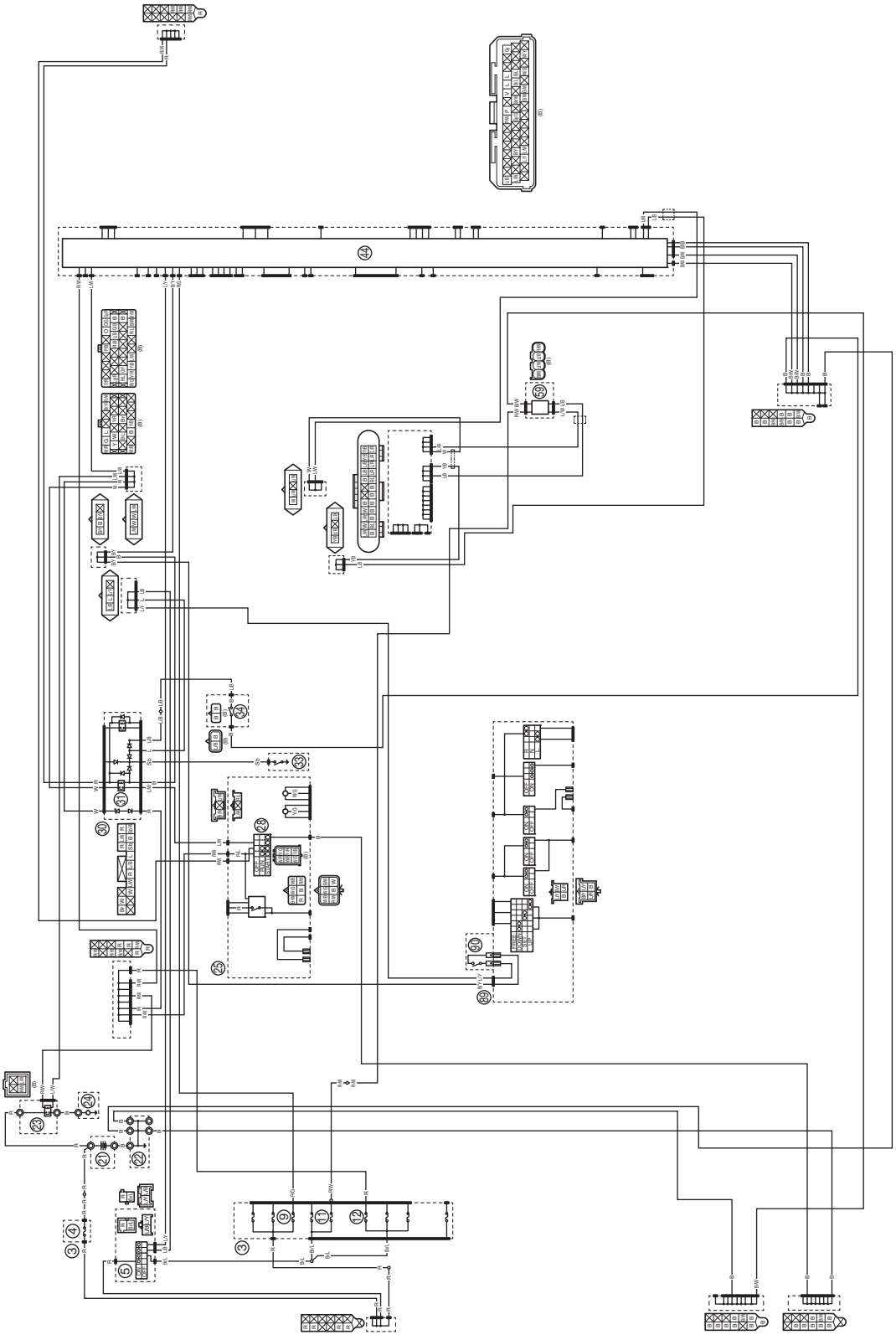
8. Check the stop/run/start switch.
   Refer to “CHECKING THE SWITCHES” on page 8-53.
   NG→ Replace the handlebar switch (right).
   OK↓
9. Check the neutral switch.
   Refer to “CHECKING THE SWITCHES” on page 8-53.
   NG→ Replace the neutral switch.
   OK↓
10. Check the sidestand switch.
    Refer to “CHECKING THE SWITCHES” on page 8-53.
    NG→ Replace the sidestand switch.
    OK↓
11. Check the relay unit (diode).
    Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-58.
    NG→ Replace the relay unit.
    OK↓
12. Check the entire ignition system’s wiring.
    Refer to “CIRCUIT DIAGRAM” on page 8-1.
    NG→ Properly connect or repair the ignition system’s wiring.
    OK↓

Replace the ECU.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

EAS20073
ELECTRIC STARTING SYSTEM

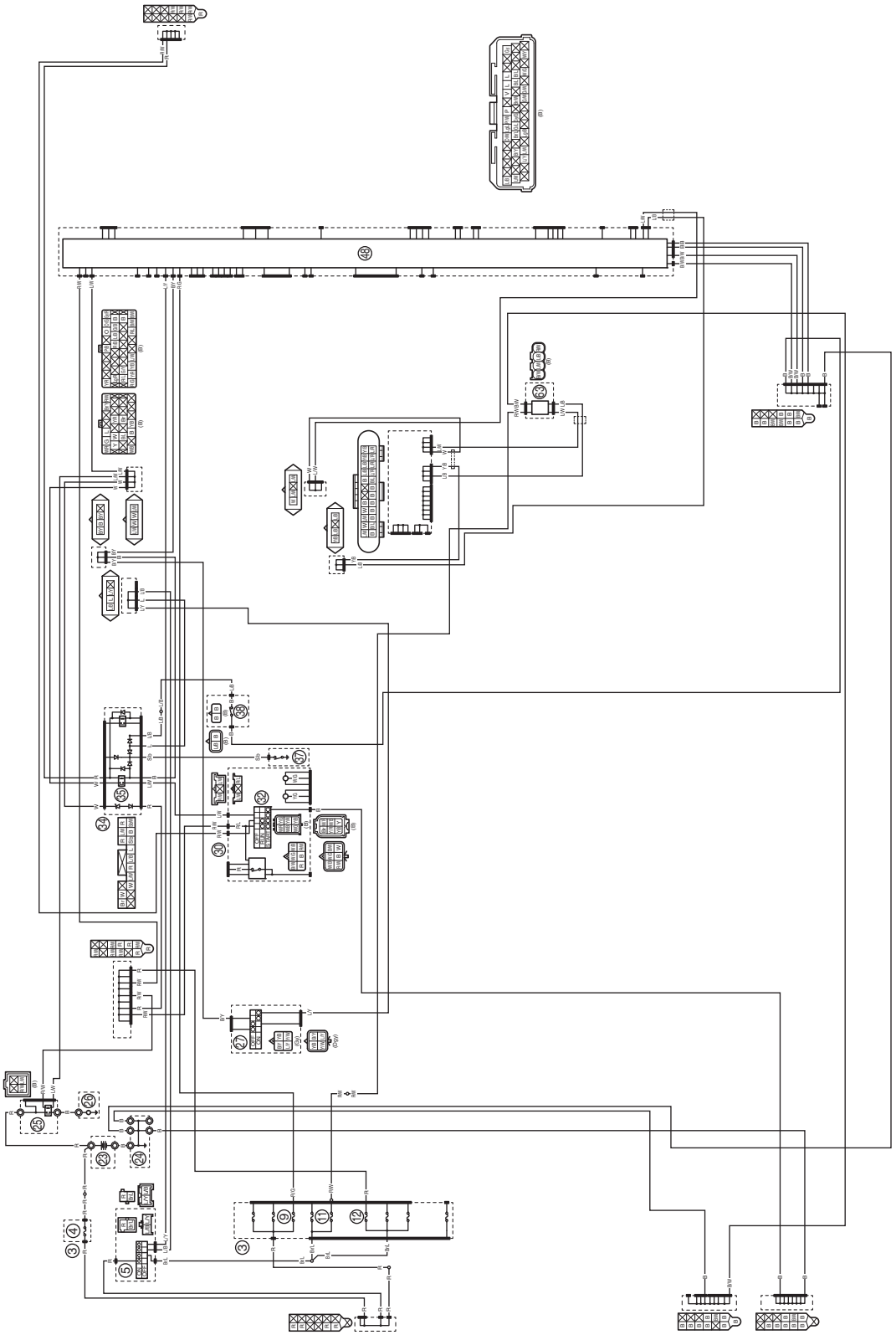
EAS30493
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
21. Battery
22. Engine ground
23. Starter relay
24. Starter motor
25. Handlebar switch (right)
28. Stop/run/start switch
30. Relay unit
31. Starting circuit cut-off relay
33. Neutral switch
34. Sidestand switch
44. ECU (Engine Control Unit)
59. IMU (Inertial Measurement Unit)
89. Handlebar switch (left)
90. Clutch switch

MT09SPM/MT09SPMC



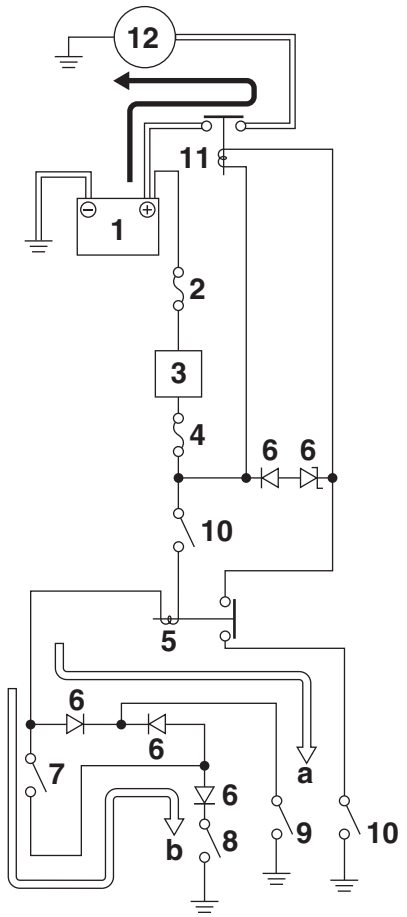
3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
23. Battery
24. Engine ground
25. Starter relay
26. Starter motor
27. Clutch switch
30. Handlebar switch (right)
32. Stop/run/start switch
34. Relay unit
35. Starting circuit cut-off relay
37. Neutral switch
38. Sidestand switch
48. ECU (Engine Control Unit)
63. IMU (Inertial Measurement Unit)

EAS30494
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to "ON" and the "" side of the stop/run/start switch is pushed, the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral 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 stop/run/start switch.



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse 1
5. Starting circuit cut-off relay
6. Relay unit (diode)
7. Clutch switch
8. Sidestand switch
9. Neutral switch
10. Stop/run/start switch
11. Starter relay
12. Starter motor

EAS30495
TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case
6. Canister (for MT09MC/MT09SPMC)

1. Check the fuses. (Main, backup 2, ignition 1, and ignition 2) Refer to "CHECKING THE FUSES" on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the starter motor operation. Refer to "CHECKING THE STARTER MOTOR OPERATION" on page 8-60.	OK→	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step (5).
NG↓		
4. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-44.	NG→	Repair or replace the starter motor.
OK↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to "CHECKING THE RELAYS" on page 8-56.	NG→	Replace the relay unit.
OK↓		
6. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-58.	NG→	Replace the relay unit.
OK↓		
7. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-56.	NG→	Replace the starter relay.
OK↓		

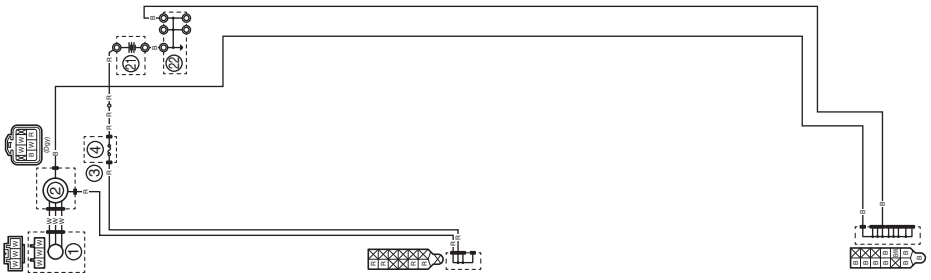
8. Check the main switch.
   Refer to “CHECKING THE SWITCHES” on page 8-53.
   NG→ Replace the main switch.
   OK↓
9. Check the neutral switch.
   Refer to “CHECKING THE SWITCHES” on page 8-53.
   NG→ Replace the neutral switch.
   OK↓
10. Check the sidestand switch.
    Refer to “CHECKING THE SWITCHES” on page 8-53.
    NG→ Replace the sidestand switch.
    OK↓
11. Check the clutch switch.
    Refer to “CHECKING THE SWITCHES” on page 8-53.
    NG→ Replace the clutch switch.
    OK↓
12. Check the stop/run/start switch.
    Refer to “CHECKING THE SWITCHES” on page 8-53.
    NG→ Replace the handlebar switch (right).
    OK↓
13. Check the entire starting system’s wiring.
    Refer to “CIRCUIT DIAGRAM” on page 8-9.
    NG→ Properly connect or repair the starting system’s wiring.
    OK↓

Replace the ECU.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

EAS20074
CHARGING SYSTEM

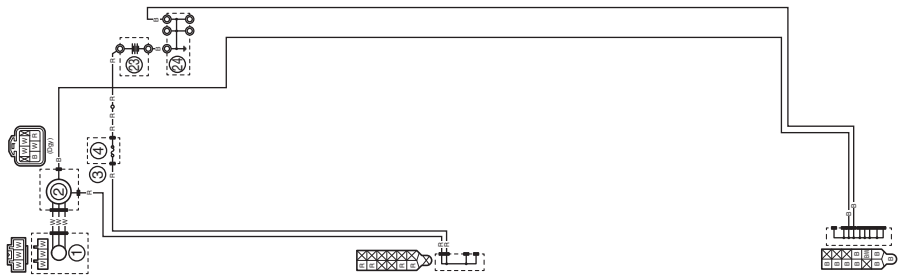
EAS30496
CIRCUIT DIAGRAM

MT09M/MT09MC



1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
21. Battery
22. Engine ground

MT09SPM/MT09SPMC



1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
23. Battery
24. Engine ground

EAS30497
TROUBLESHOOTING

The battery is not being charged.

TIP

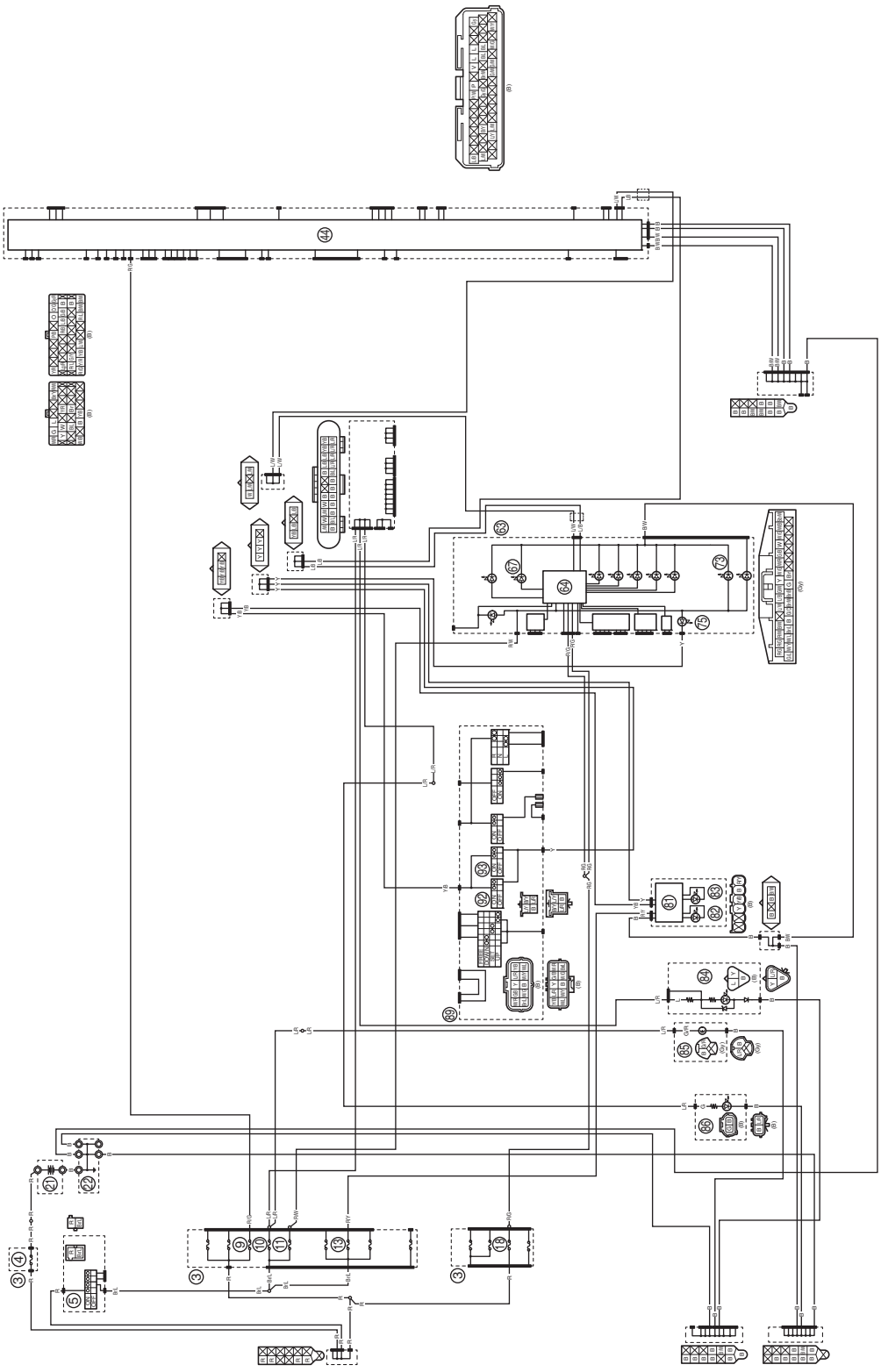
• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case

1. Check the fuse. (Main) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the stator coil. Refer to “CHECKING THE STATOR COIL” on page 8-61.	NG→	Replace the stator coil assembly.
OK↓		
4. Check the rectifier/regulator. Refer to “CHECKING THE RECTIFIER/REGULATOR” on page 8-61.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the entire charging system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-17.	NG→	Properly connect or repair the charging system’s wiring.
OK↓		
The charging system circuit is OK.		

EAS20075
LIGHTING SYSTEM

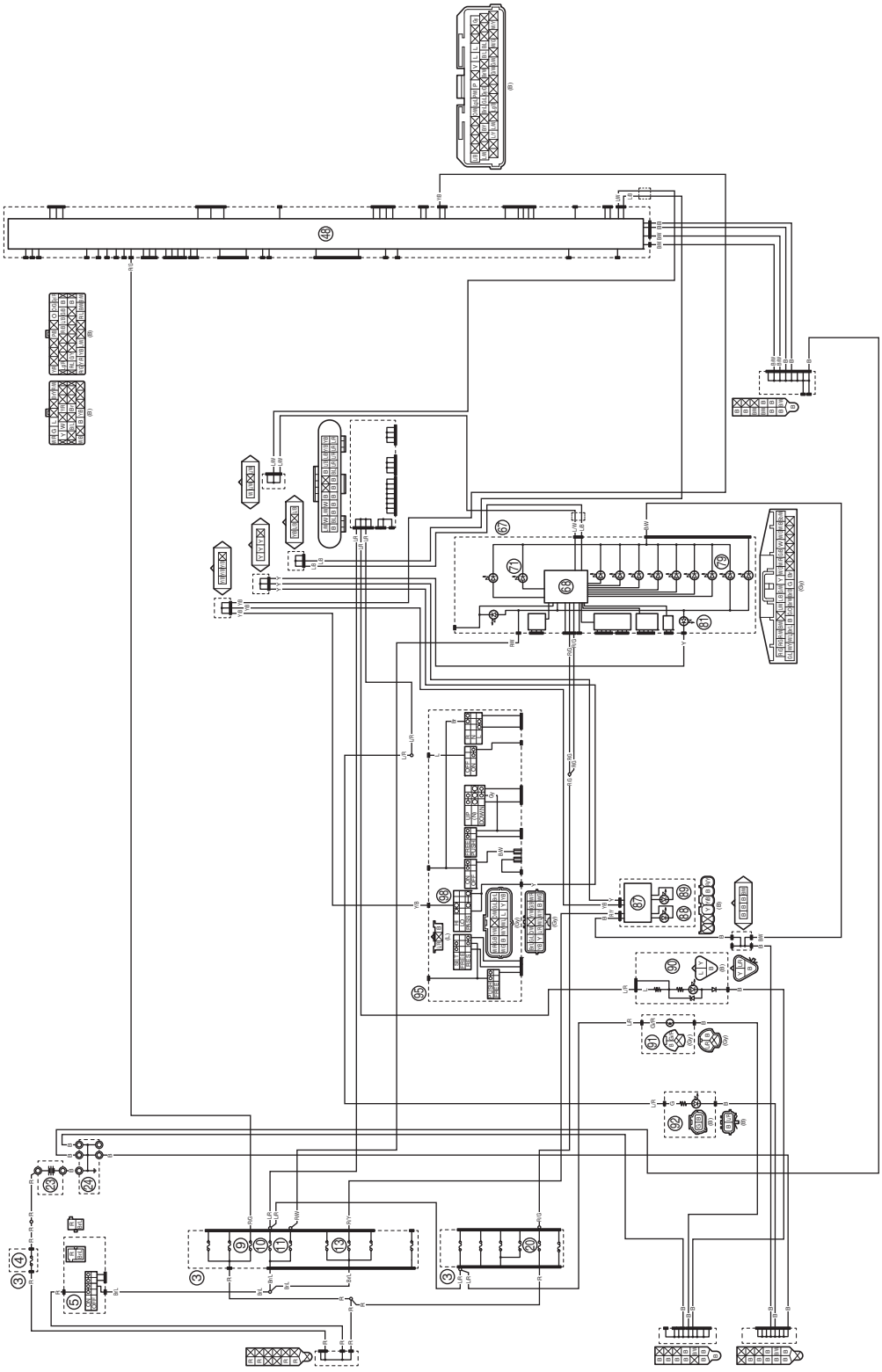
EAS30498
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
13. Headlight fuse
18. Backup fuse 1
21. Battery
22. Engine ground
44. ECU (Engine Control Unit)
63. Meter assembly
64. Multi-function meter
67. Auxiliary system warning light
73. Meter light
75. High beam indicator light
81. Headlight control unit
82. Headlight (low)
83. Headlight (high)
84. Tail/brake light
85. License plate light
86. Auxiliary light
89. Handlebar switch (left)
92. Pass switch
93. Dimmer switch

MT09SPM/MT09SPMC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
13. Headlight fuse
20. Backup fuse 1
23. Battery
24. Engine ground
48. ECU (Engine Control Unit)
67. Meter assembly
68. Multi-function meter
71. Auxiliary system warning light
79. Meter light
81. High beam indicator light
87. Headlight control unit
88. Headlight (low)
89. Headlight (high)
90. Tail/brake light
91. License plate light
92. Auxiliary light
95. Handlebar switch (left)
98. Dimmer/pass switch

EAS30499
TROUBLESHOOTING

Any of the following fail to light: headlight, auxiliary light, high beam indicator light, taillight, license light or meter light.

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case
6. Headlight assembly

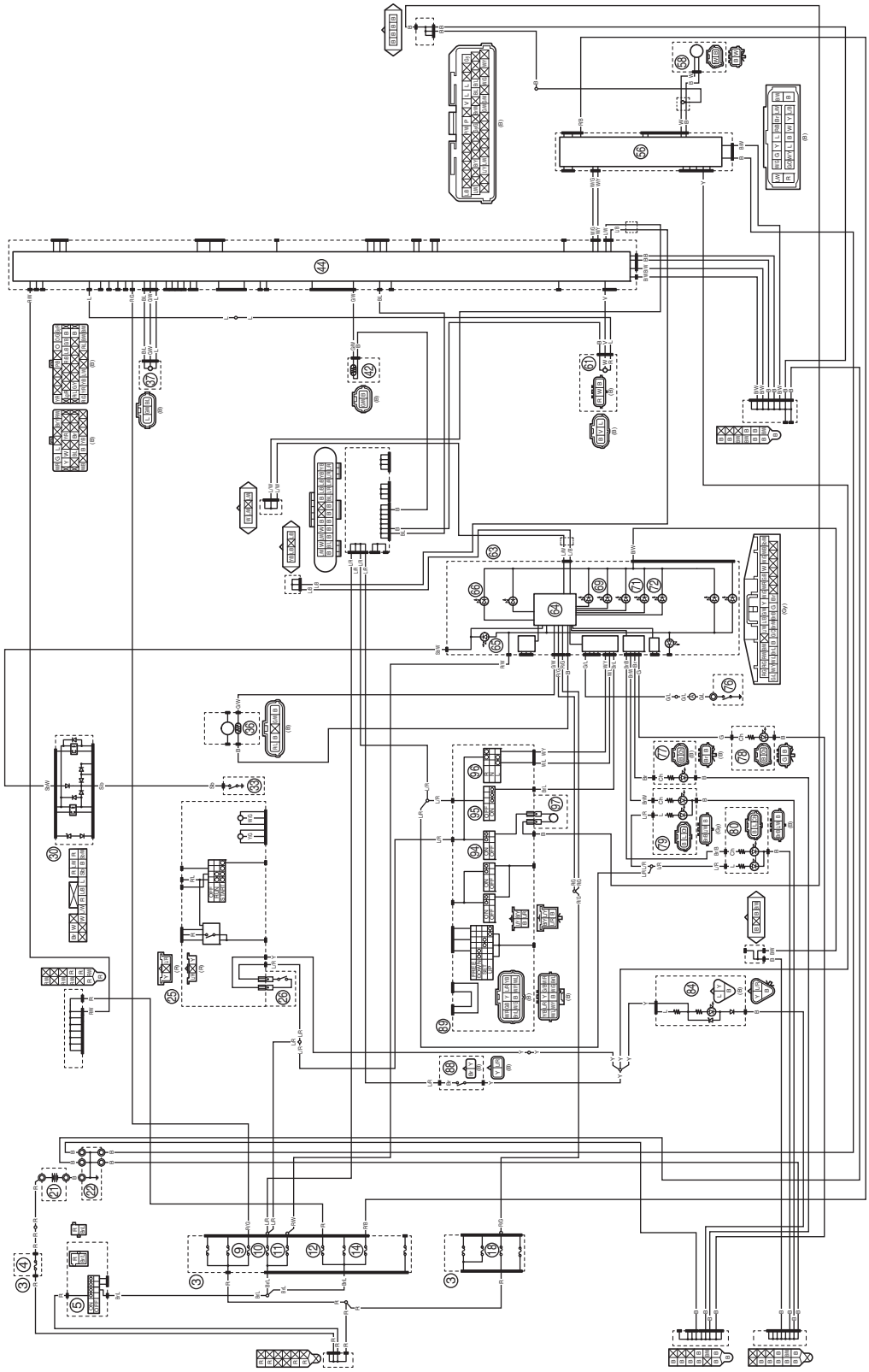
1. Check the fuses. (Main, headlight, ignition 1, ignition 2, backup 1, backup 2, and signaling system) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the main switch.
OK↓		
4. Check the dimmer switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	The dimmer switch is faulty. Replace the handlebar switch (left).
OK↓		
5. Check the pass switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	The pass switch is faulty. Replace the handlebar switch (left).
OK↓		
6. Check the entire lighting system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-23.	NG→	Properly connect or repair the lighting system’s wiring.
OK↓		

Replace the ECU, meter assembly, headlight assembly, tail/brake light, license plate light or auxiliary light. Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

EAS20076
SIGNALING SYSTEM

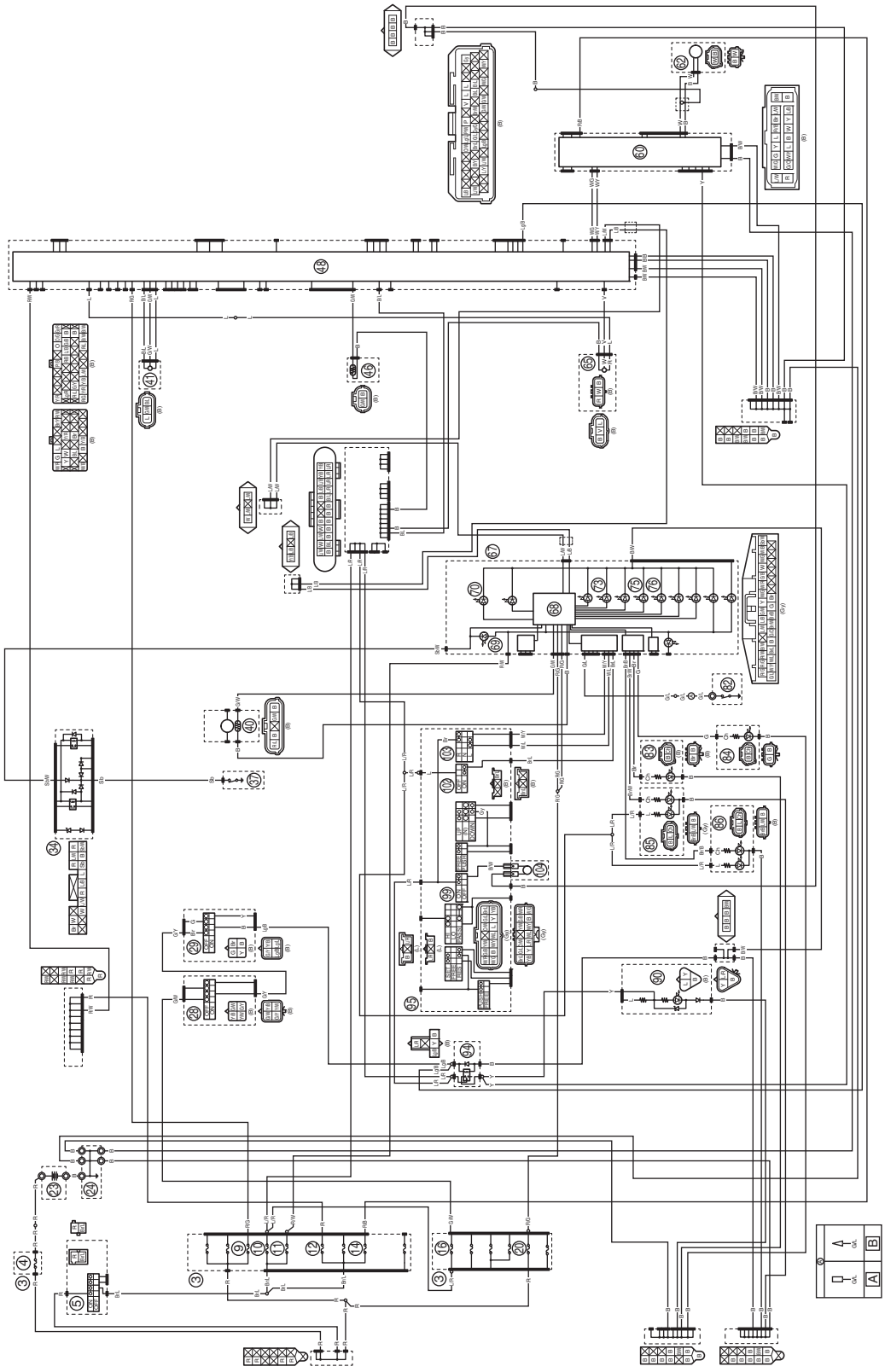
EAS30500
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
18. Backup fuse 1
21. Battery
22. Engine ground
25. Handlebar switch (right)
26. Front brake light switch
30. Relay unit
33. Neutral switch
36. Fuel sender
37. Gear position sensor
42. Coolant temperature sensor
44. ECU (Engine Control Unit)
56. ABS ECU (Electronic Control Unit)
58. Rear wheel sensor
61. Shift sensor
63. Meter assembly
64. Multi-function meter
65. Neutral indicator light
66. Oil pressure and coolant temperature warning light
69. Fuel level warning light
71. Turn signal indicator light (left)
72. Turn signal indicator light (right)
76. Oil pressure switch
77. Rear turn signal light (left)
78. Rear turn signal light (right)
79. Front turn signal/position light (right)
80. Front turn signal/position light (left)
84. Tail/brake light
88. Rear brake light switch
89. Handlebar switch (left)
94. Horn switch
95. Hazard switch
96. Turn signal switch
97. Horn

MT09SPM/MT09SPMC



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
16. Brake light fuse
20. Backup fuse 1
23. Battery
24. Engine ground
28. Front brake light switch
29. Rear brake light switch
34. Relay unit
37. Neutral switch
40. Fuel sender
41. Gear position sensor
46. Coolant temperature sensor
48. ECU (Engine Control Unit)
60. ABS ECU (Electronic Control Unit)
62. Rear wheel sensor
65. Shift sensor
67. Meter assembly
68. Multi-function meter
69. Neutral indicator light
70. Oil pressure and coolant temperature warning light
73. Fuel level warning light
75. Turn signal indicator light (left)
76. Turn signal indicator light (right)
82. Oil pressure switch
83. Rear turn signal light (left)
84. Rear turn signal light (right)
85. Front turn signal/position light (right)
86. Front turn signal/position light (left)
90. Tail/brake light
94. Brake light relay
95. Handlebar switch (left)
99. Horn switch
102. Hazard switch
103. Turn signal switch
104. Horn

EAS30501
TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case

1. Check the fuses. (Main, ignition 1, ignition 2, ABS ECU signaling system, backup 1, backup 2, and brake light.) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the main switch.
OK↓		
4. Check the entire signaling system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-29.	NG→	Properly connect or repair the signaling system’s wiring.
OK↓		
Check the condition of each of the signaling system circuits. Refer to “Checking the signaling system” on page 8-34.		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-53.	NG→	Replace the handlebar switch (left).
OK↓		
2. Check the horn. Refer to "CHECKING THE HORN" on page 8-61.	NG→	Replace the horn.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

The tail/brake light fails to come on.

1. Check the front brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-53.	NG→	Replace the front brake light switch.
OK↓		
2. Check the rear brake light switch. Refer to "CHECKING THE SWITCHES" on page 8-53.	NG→	Replace the rear brake light switch.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

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 8-53.	NG→	Replace the handlebar switch (left).
OK↓		
2. Check the hazard switch. Refer to "CHECKING THE SWITCHES" on page 8-53.	NG→	Replace the handlebar switch (left).

OK↓

3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.	NG→	Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly or turn signal light.

The neutral indicator light fails to come on.

1. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-53.	NG→	Replace the neutral switch.

OK↓

2. Check the relay unit (diode). Refer to "CHECKING THE RELAY UNIT (DIODE)" on page 8-58.	NG→	Replace the relay unit.

OK↓

3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.	NG→	Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly.

The oil pressure and coolant temperature warning light fails to come on, or the oil pressure warning icon flashes when the main switch is set to "ON".

1. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29	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 and coolant temperature warning light comes on when the lead is connected to the engine ground.	NG→	Replace the meter assembly.

OK↓

Replace the oil pressure switch.

The oil pressure and coolant temperature warning light remains on after the engine is started.

1. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-29.

NG→ Properly connect or replace the wiring harness.

OK↓

2. Measure the engine oil pressure.
   Refer to "MEASURING THE ENGINE OIL PRESSURE" on page 3-29.

NG→ Check the engine oil leakage, oil viscosity, oil seal, oil filter, or oil pump.

OK↓

Replace the oil pressure switch.

The fuel level warning light fails to come on.

1. Check the fuel sender.
   Refer to "CHECKING THE FUEL SENDER" on page 8-61.

NG→ Replace the fuel pump assembly.

OK↓

2. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-29.

NG→ Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly.

The oil pressure and coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor.
   Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-63.

NG→ Replace the coolant temperature sensor.

OK↓

2. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-29.

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 8-55.

QSS (Quick Shift System) does not operate.

1. Check that the Auxiliary system warning does not come on.	NG→	Repair the faulty parts.
OK↓		
2. Check that the QSS is working under normal QSS operating conditions.	NG→	Check the QSS operating conditions explained in the owner's manual and operate the QSS accordingly.
OK↓		
3. Make sure that the QSS is effective. (Check whether the "QS▲▼" icon is displayed at the top of the meter.)	NG→	Activate the QSS. (Set the QSS to a setting other than "OFF".)
OK↓		
4. Are you operating while the "QS▲▼" icon is lit?	NG→	Operate while the "QS▲▼" icon is lit.
OK↓		
5. Is the transmission gear display normal?	NG→	Repair the gear position sensor.
OK↓		
6. Check the connection of the coupler between the gear position sensor and the ECU.	NG→	Connect the gear position sensor coupler.
OK↓		
7. Are the clutch and neutral switches normal?	NG→	Repair the switch if it is not normal.
OK↓		
8. Check the shift sensor value in the diagnostic mode. 2.5 V when the shift pedal is not being operated. 4.5 V when the shift pedal is pressed fully in. 0.5 V when the shift pedal is pushed fully up.	NG→	Replace the shift sensor.
OK↓		
9. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-29.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		

Replace the ECU.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

The speedometer fails to operate.

1. Check the rear wheel sensor.
   Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-23.

NG→ Replace the rear wheel sensor.

OK↓

2. Check the entire wheel sensor wiring.
   Refer to TIP.

NG→ Properly connect or repair the wheel sensor wiring.

OK↓

Replace the hydraulic unit assembly, ECU, meter assembly.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

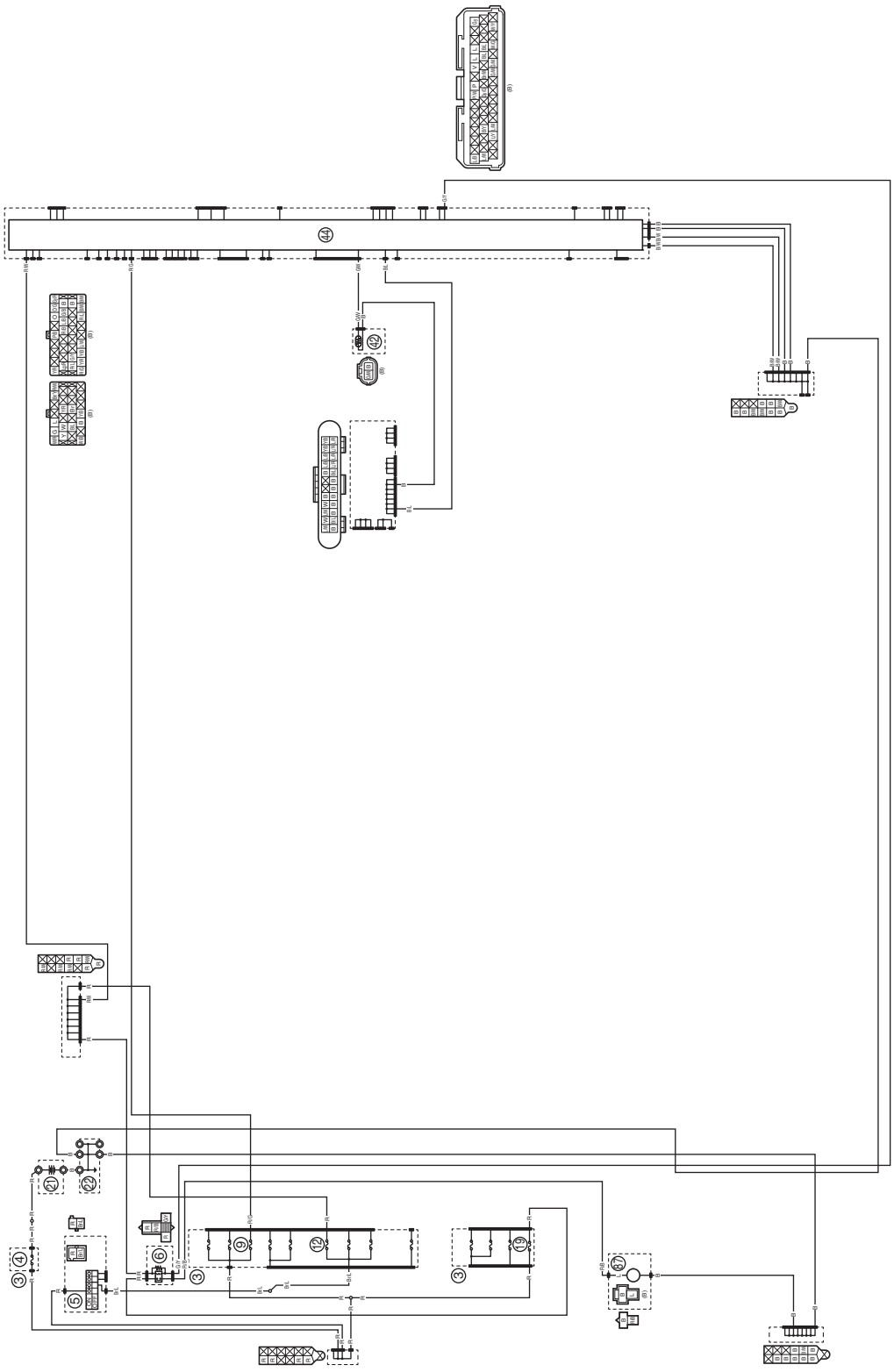
TIP

Repair or replace if there is an open or short circuit.
- Between rear wheel sensor coupler and ABS ECU coupler.
  (white–white)
  (black–black)
- Between ABS ECU coupler and ECU coupler.
  (white/green–white/green)
  (white/yellow–white/yellow)
- Between joint coupler and meter assembly coupler.
  (blue/white–blue/white)
  (blue/black–blue/black)

EAS20077
COOLING SYSTEM

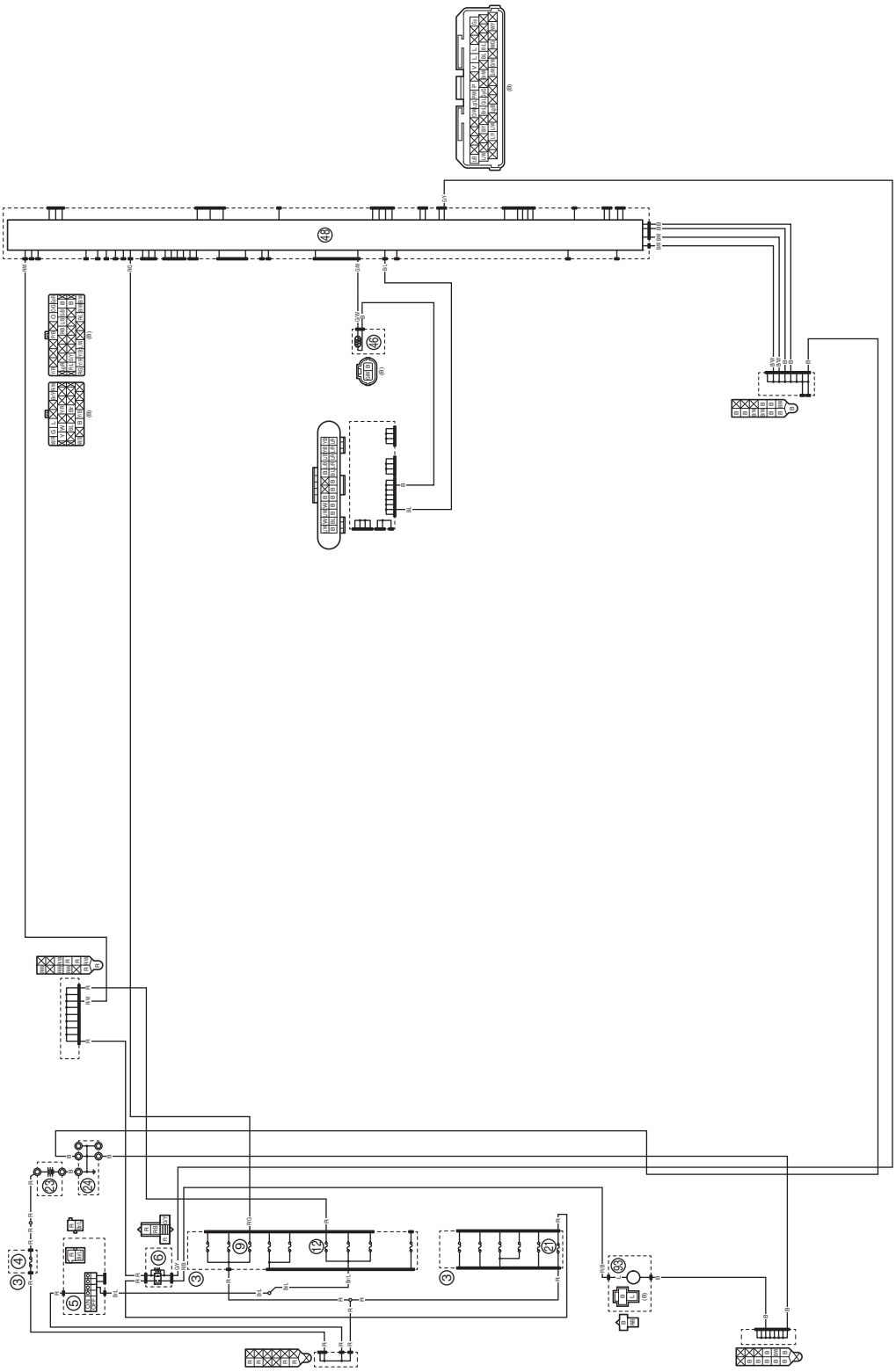
EAS30502
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
9. Backup fuse 2
12. Ignition fuse 1
19. Radiator fan motor fuse
21. Battery
22. Engine ground
42. Coolant temperature sensor
44. ECU (Engine Control Unit)
87. Radiator fan motor

MT09SPM/MT09SPMC



3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
9. Backup fuse 2
12. Ignition fuse 1
21. Radiator fan motor fuse
23. Battery
24. Engine ground
46. Coolant temperature sensor
48. ECU (Engine Control Unit)
93. Radiator fan motor

EAS30503
TROUBLESHOOTING

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank
5. Air filter case

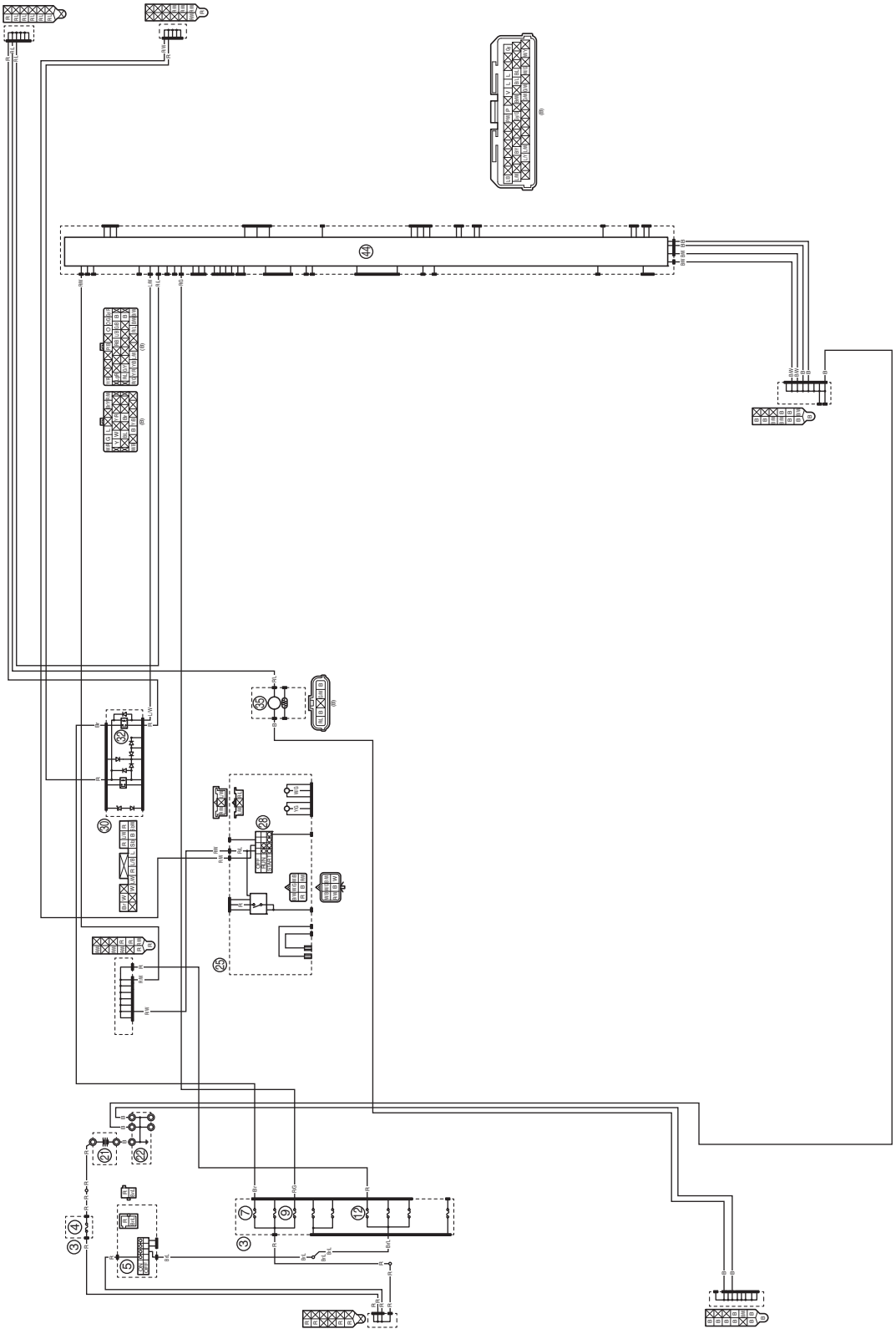
1. Check the fuses. (Main, ignition 1, backup 2, and radiator fan motor) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the main switch.
OK↓		
4. Check the radiator fan motor. Refer to “CHECKING THE RADIATOR FAN MOTOR” on page 8-62.	NG→	Replace the radiator fan motor(s).
OK↓		
5. Check the radiator fan motor relay. Refer to “CHECKING THE RELAYS” on page 8-56.	NG→	Replace the radiator fan motor relay.
OK↓		
6. Check the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-63.	NG→	Replace the coolant temperature sensor.
OK↓		
7. Check the entire cooling system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-39.	NG→	Properly connect or repair the cooling system’s wiring.
OK↓		

Replace the ECU.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

EAS20081
FUEL PUMP SYSTEM

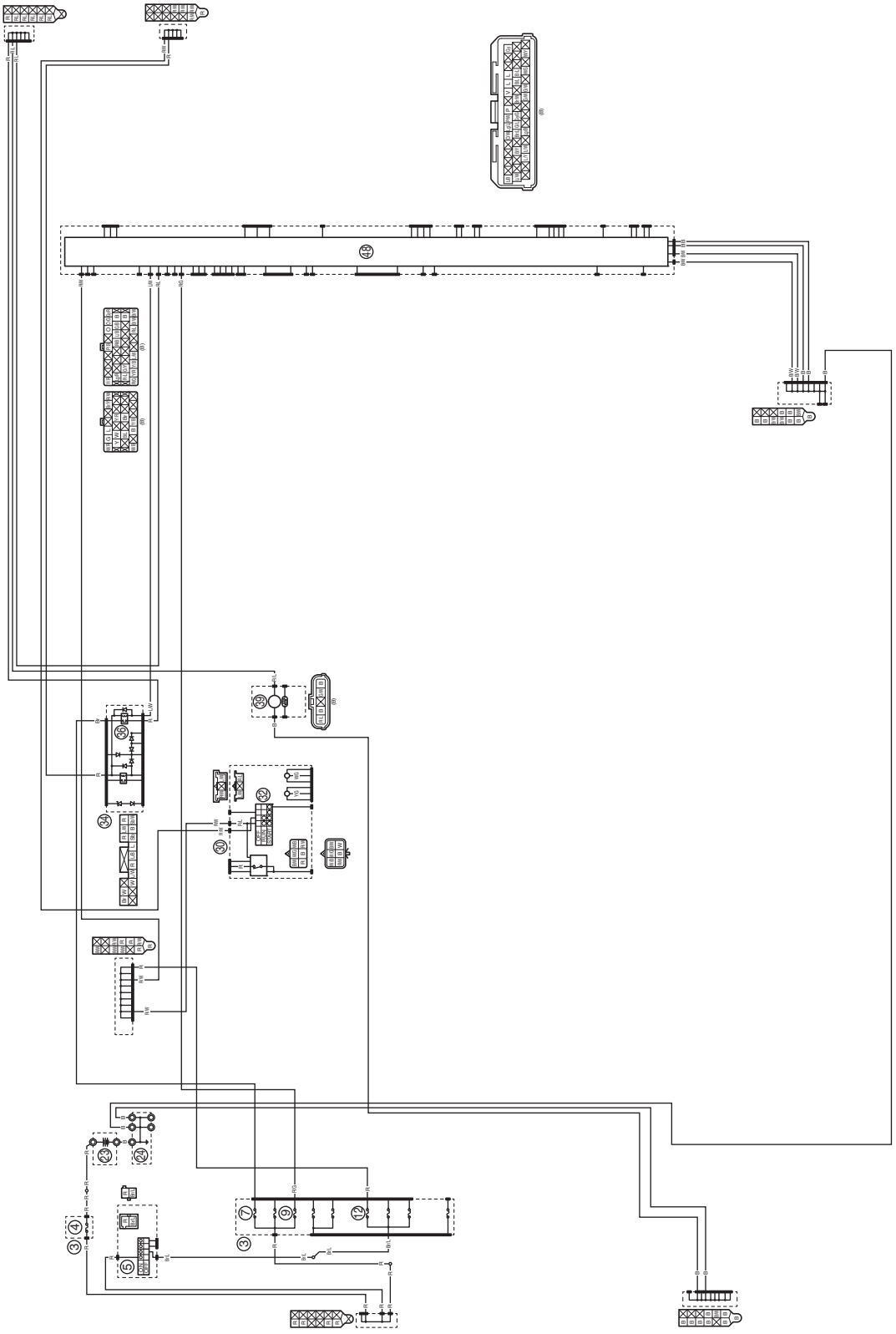
EAS30513
CIRCUIT DIAGRAM

MT09M/MT09MC



3. Fuse box
4. Main fuse
5. Main switch
7. Fuel injection system fuse
9. Backup fuse 2
12. Ignition fuse 1
21. Battery
22. Engine ground
25. Handlebar switch (right)
28. Stop/run/start switch
30. Relay unit
32. Fuel pump relay
35. Fuel pump
44. ECU (Engine Control Unit)

MT09SPM/MT09SPMC



3. Fuse box
4. Main fuse
5. Main switch
7. Fuel injection system fuse
9. Backup fuse 2
12. Ignition fuse 1
23. Battery
24. Engine ground
30. Handlebar switch (right)
32. Stop/run/start switch
34. Relay unit
36. Fuel pump relay
39. Fuel pump
48. ECU (Engine Control Unit)

EAS30514
TROUBLESHOOTING

If the fuel pump fails to operate.

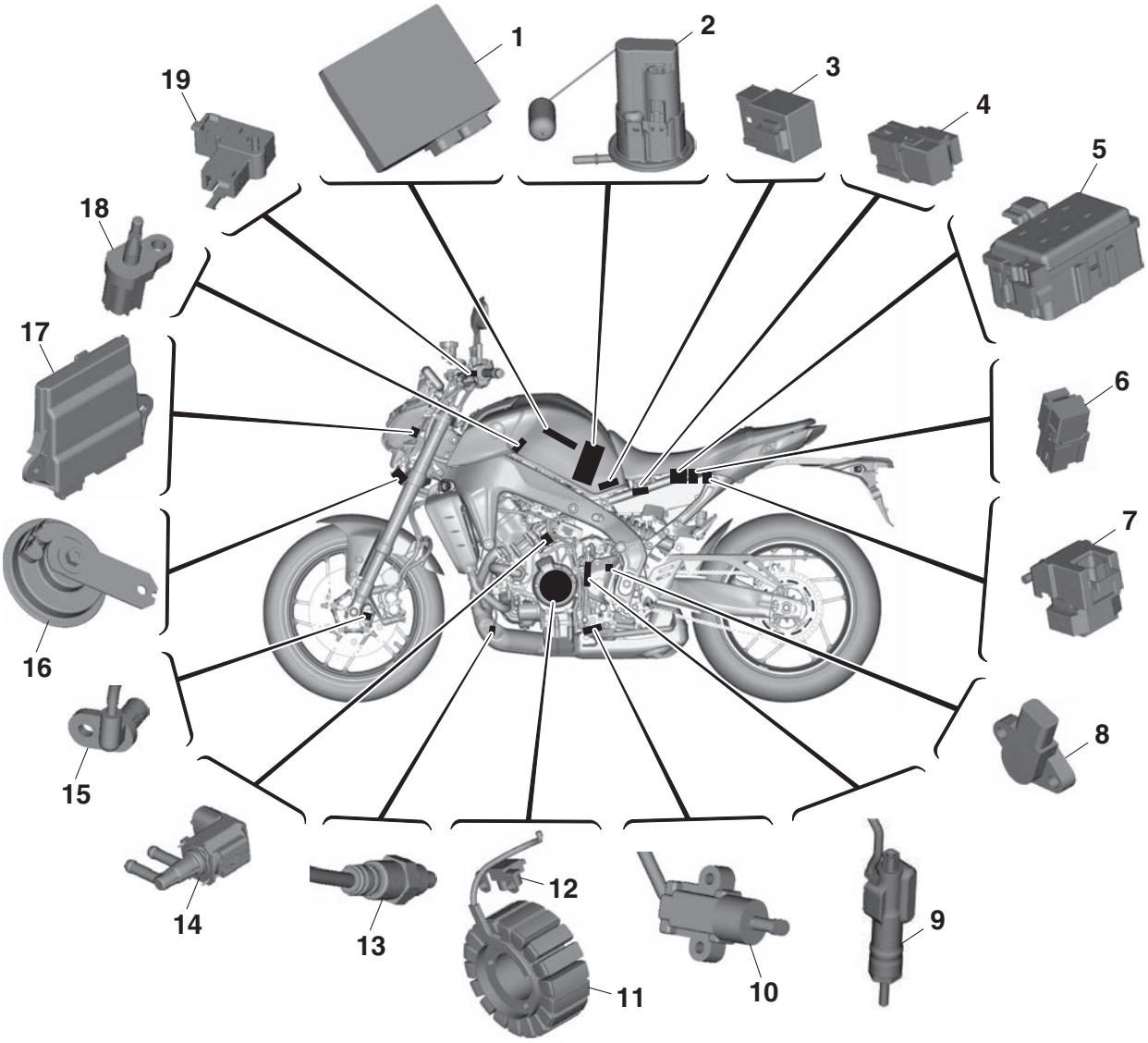
TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Fuel tank side cover
3. Fuel tank center cover
4. Fuel tank

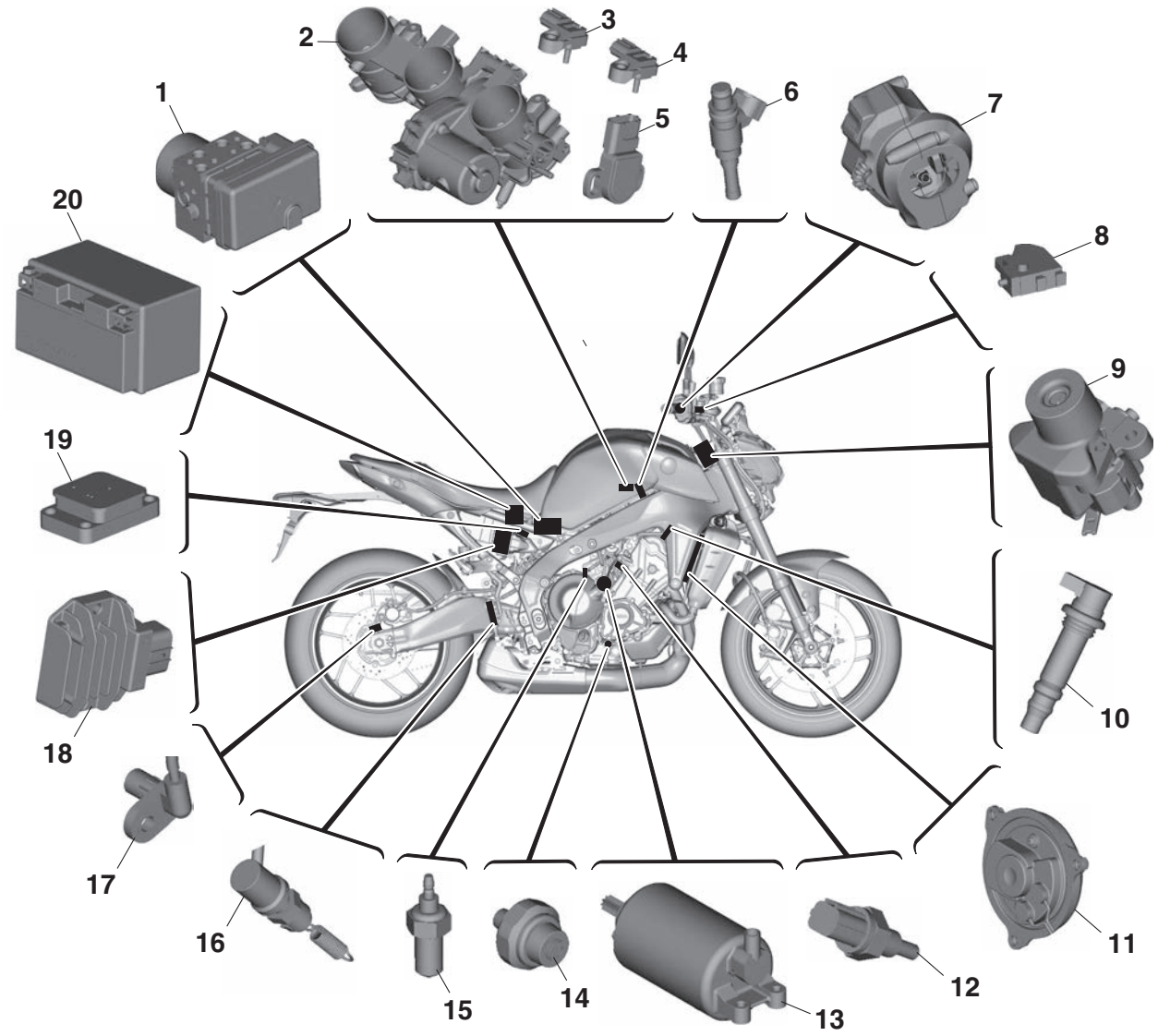
1. Check the fuses. (Main, ignition 1, backup 2, and fuel injection system) Refer to “CHECKING THE FUSES” on page 8-55.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the main switch.
OK↓		
4. Check the stop/run/start switch. Refer to “CHECKING THE SWITCHES” on page 8-53.	NG→	Replace the handlebar switch (right).
OK↓		
5. Check the relay unit (fuel pump relay). Refer to “CHECKING THE RELAYS” on page 8-56.	NG→	Replace the relay unit.
OK↓		
6. Check the fuel pump. Refer to “CHECKING THE FUEL PUMP OPERATION” on page 7-3.	NG→	Replace the fuel pump.
OK↓		
7. Check the entire fuel pump system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-45.	NG→	Properly connect or repair the fuel pump system’s wiring.
OK↓		

Replace the ECU.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

EAS20089
ELECTRICAL COMPONENTS



1. ECU (Engine Control Unit)
2. Fuel pump
3. Relay unit
4. Radiator fan motor relay
5. Fuse box
6. Brake light relay (for MT09SPM/MT09SPMC)
7. Starter relay
8. Gear position sensor
9. Shift sensor
10. Sidestand switch
11. AC magneto
12. Crankshaft position sensor
13. O_2 sensor
14. Purge cut valve solenoid (for MT09MC/ MT09SPMC)
15. Front wheel sensor
16. Horn
17. Headlight control unit
18. Intake air temperature sensor
19. Clutch switch



1. ABS ECU (Electronic Control Unit)
2. Throttle servo motor
3. Intake air pressure sensor 2
4. Intake air pressure sensor 1
5. Throttle position sensor
6. Injector
7. Accelerator position sensor
8. Front brake light switch
9. Main switch
10. Ignition coil
11. Radiator fan motor
12. Coolant temperature sensor
13. Starter motor
14. Oil pressure switch
15. Neutral switch
16. Rear brake light switch
17. Rear wheel sensor
18. Rectifier/regulator
19. IMU (Inertial Measurement Unit)
20. Battery

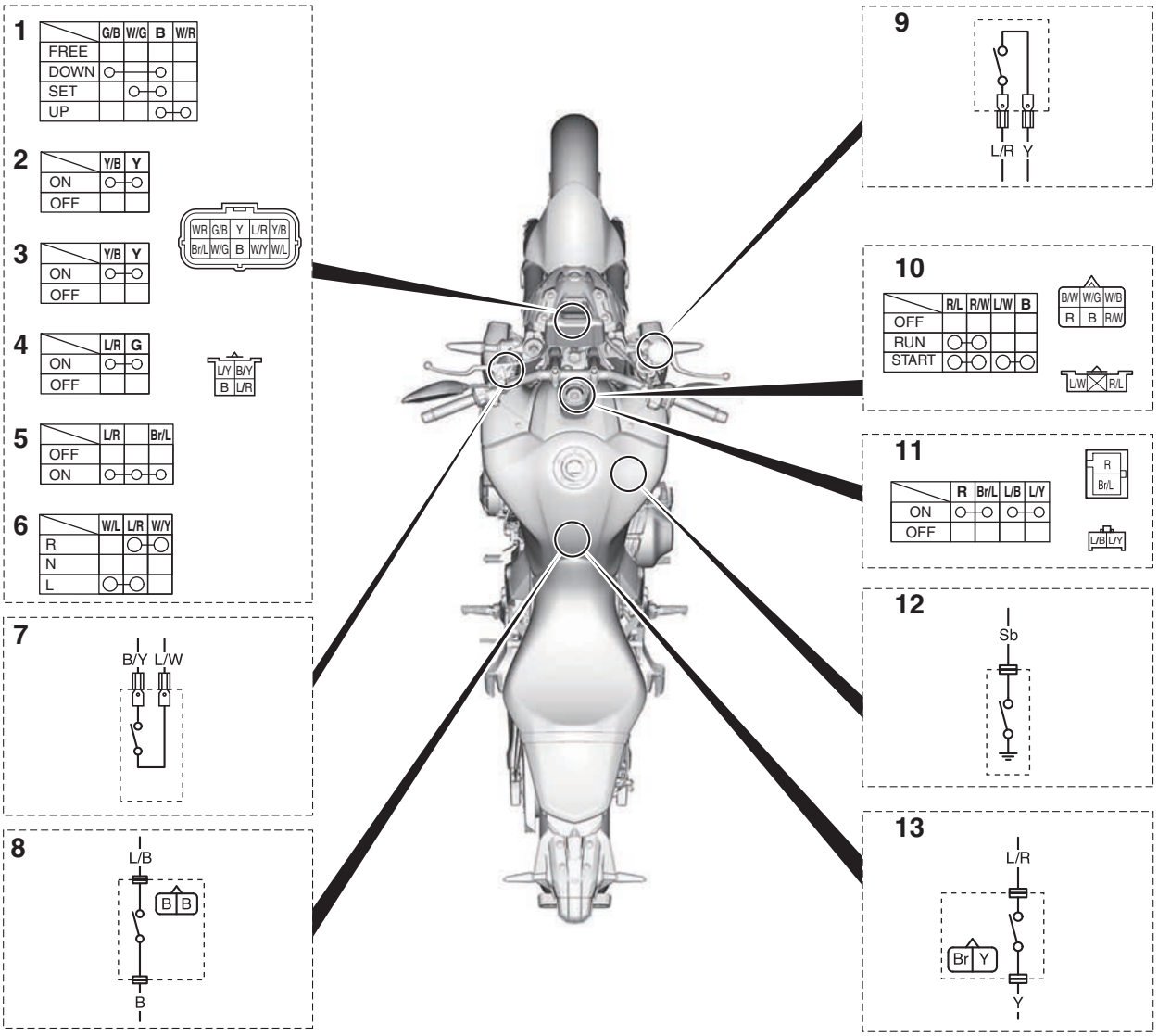
EAS30549
CHECKING THE SWITCHES

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

TIP

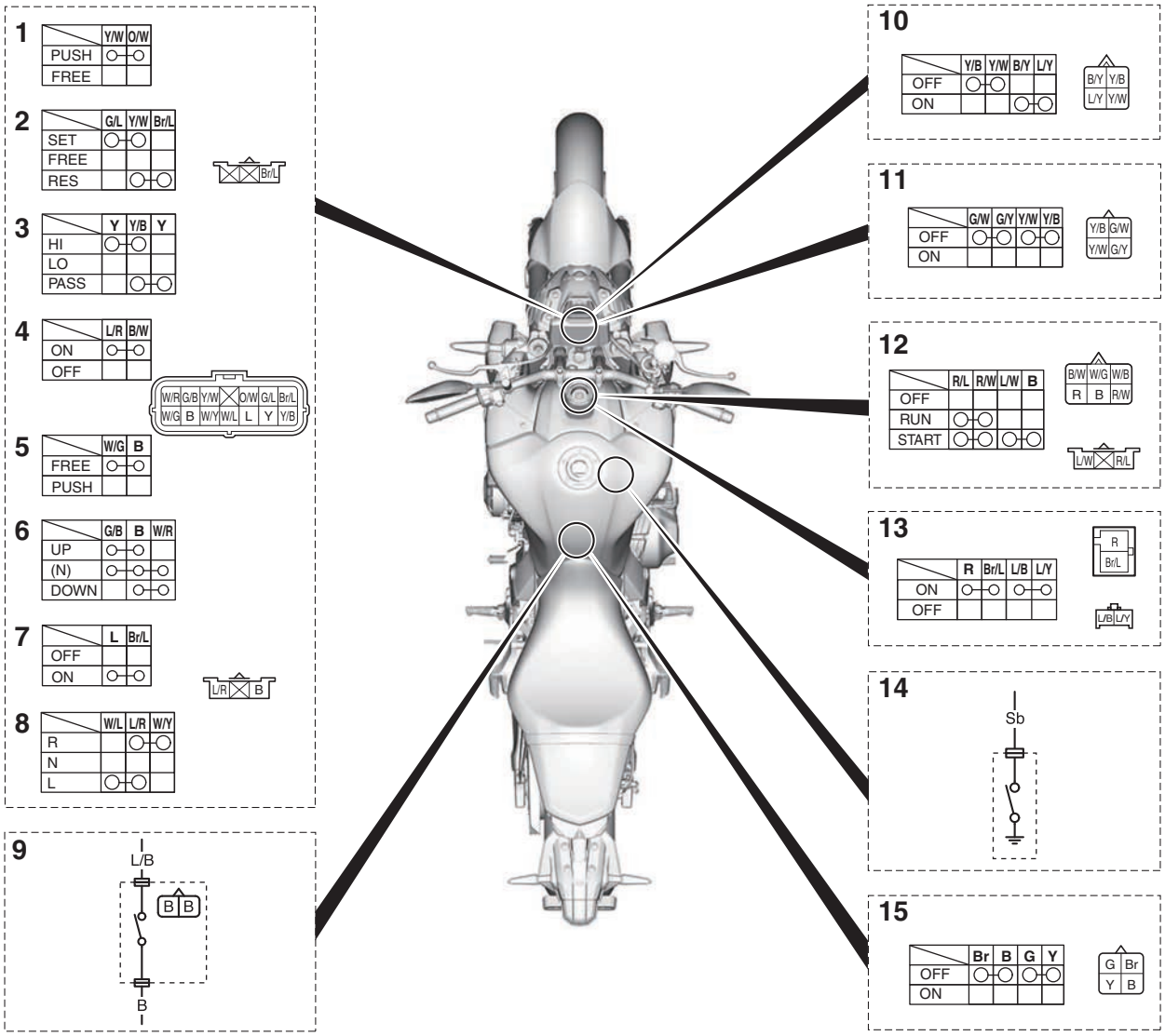
Refer to “CHECKING THE SWITCHES” in “BASIC INFORMATION” (separate volume).

MT09M/MT09MC



1. Mode switch
2. Dimmer switch
3. Pass switch
4. Horn switch
5. Hazard switch
6. Turn signal switch
7. Clutch switch
8. Sidestand switch
9. Front brake light switch
10. Stop/run/start switch
11. Main switch
12. Neutral switch
13. Rear brake light switch

MT09SPM/MT09SPMC



1. Cruise control power switch
2. Cruise control setting switch
3. Dimmer/pass switch
4. Horn switch
5. Mode switch
6. Select switch
7. Hazard switch
8. Turn signal switch
9. Sidestand switch
10. Clutch switch
11. Front brake light switch
12. Stop/run/start switch
13. Main switch
14. Neutral switch
15. Rear brake light switch

EAS30551
CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680
NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS (1)" on page 4-1.
   - Fuse box cover
2. Check:
   - Fuse
   a. Connect the digital circuit tester to the fuse and check the continuity.

TIP

Set the digital circuit tester selector to " Ω ".

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

   b. If the digital circuit tester indicates "O.L", replace the fuse.
3. Replace:
   - Blown fuse
   a. Set the main switch to "OFF".
   b. Install a new fuse of the correct amperage rating.
   c. Set on the switches to verify if the electrical circuit is operational.
   d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
Headlight	7.5 A	1
Signaling system	7.5 A	1
Ignition 1	10 A	1
Ignition 2	7.5 A	1
Radiator fan motor	15 A	1
Brake light (for MT09SPM/MT09SPMC)	2 A	1
Fuel injection system	7.5 A	1
Terminal 1	2 A	1
Backup 1	7.5 A	1
Backup 2	15 A	1
Electronic throttle valve	7.5 A	1
ABS motor	30 A	1
ABS ECU	7.5 A	1
ABS solenoid	15 A	1
Cruise control (for MT09SPM/MT09SPMC)	2 A	1
Spare fuse	30 A	1
Spare fuse	15 A	1
Spare fuse	10 A	1
Spare fuse	7.5 A	1
Spare fuse	2 A	1

EWA13310
WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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

ECA27250
NOTICE

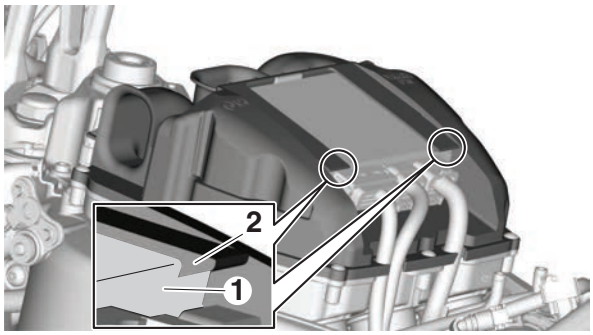
- **Be careful not to lose or damage the fuse box cover. If the fuse box cover is lost or damaged, replace it with a new one.**
- **Be sure to install the fuse box cover. Water may get inside the fuse box and cause malfunction.**

EAS31006
REPLACING THE ECU (Engine Control Unit)

1. Turn the main switch to "OFF".
2. Replace the ECU (Engine Control Unit).

TIP

Fix the ECU "1" with the claw of air filter case cover "2" properly.



3. Clean the throttle bodies and reset the ISC (idle speed control) learning value.
   Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-7.
4. Check:
   • Engine idling speed
   Start the engine, warm it up, and then measure the engine idling speed.

Engine idling speed
1200–1400 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 lead
   (from the battery terminals)

ECA13700
NOTICE

First, disconnect the negative battery lead, and then the positive battery lead.

3. Remove:
   • Battery
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
4. Check:
   • Battery charge
5. Charge:
   • Battery
6. Install:
   • Battery
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
7. Connect:
   • Battery lead
   (to the battery terminals)

ECA26980
NOTICE

First, connect the positive battery lead, and then the negative battery lead.

8. Check:
   • Battery terminal
   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
9. Lubricate:
   • Battery terminal

Recommended lubricant
Dielectric grease

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

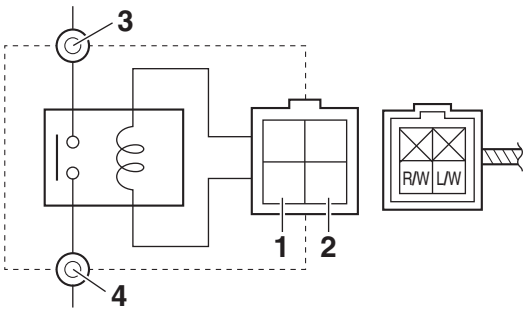
EAS30553
CHECKING THE RELAYS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.

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

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester (Ω) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

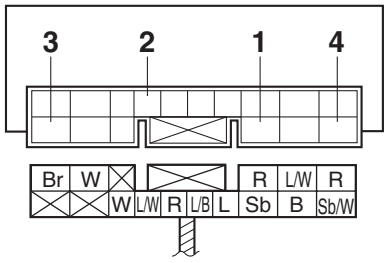
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Relay operation
Continuity
(between "3" and "4")

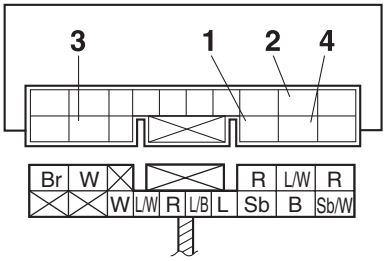
Relay unit (fuel pump relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

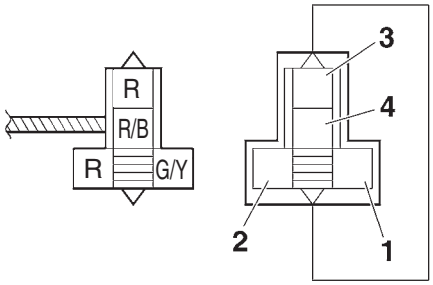
Relay unit (starting circuit cut-off relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

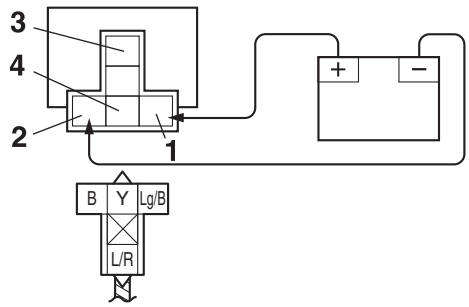
Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Brake light relay (for MT09SPM/MT09SPMC)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
No continuity
(between "3" and "4")

EAS30795
CHECKING THE RELAY UNIT (DIODE)

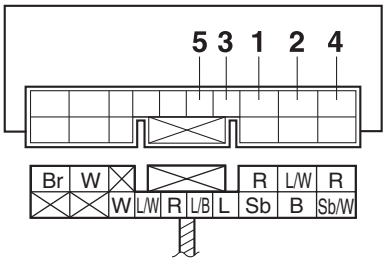
1. Check:
   • Relay unit (diode)
   Out of specification → Replace.

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

TIP

The digital circuit tester readings are shown in the following table.

No continuity
Positive tester probe
sky blue "1"
Negative tester probe
black "2"
Continuity
Positive tester probe
black "2"
Negative tester probe
sky blue "1"
No continuity
Positive tester probe
sky blue "1"
Negative tester probe
blue "3"
Continuity
Positive tester probe
blue "3"
Negative tester probe
sky blue "1"
No continuity
Positive tester probe
sky blue "1"
Negative tester probe
sky blue/white "4"
Continuity
Positive tester probe
sky blue/white "4"
Negative tester probe
sky blue "1"
No continuity
Positive tester probe
blue/black "5"
Negative tester probe
blue "3"
Continuity
Positive tester probe
blue "3"
Negative tester probe
blue/black "5"



a. Disconnect the relay unit coupler from the wire harness.
b. Connect the digital circuit tester (Ω) 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.

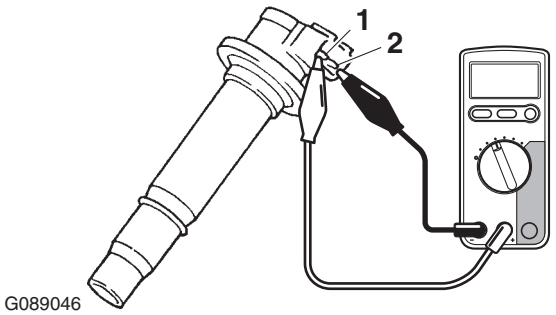
1. Check:
   • Primary coil resistance
   Out of specification → Replace.

Primary coil resistance
1.19–1.61 Ω

a. Disconnect the ignition coil coupler from the ignition coil.
b. Connect the digital circuit tester (Ω) 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.

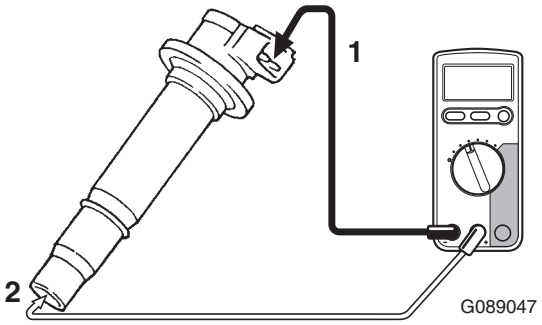
2. Check:
   • Secondary coil resistance
   Out of specification → Replace.

Secondary coil resistance
8.50–11.50 kΩ

a. Connect the digital circuit tester (Ω) 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

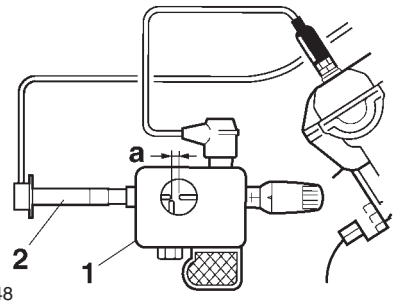
1. Check:
   • Ignition spark gap
   Out of specification → Perform the ignition system troubleshooting, starting with step (5). Refer to "TROUBLESHOOTING" on page 8-6.

Minimum ignition spark gap
6.0 mm (0.24 in)

TIP
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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



G089048

2. Ignition coil

c. Turn the main switch to "ON".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the "(≷)" side of the stop/run/start switch and gradually increase the spark gap until a misfire occurs.

EAS30560
CHECKING THE CRANKSHAFT POSITION SENSOR

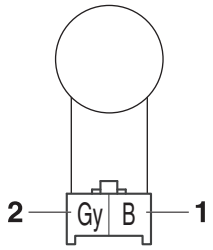
1. Disconnect:
   • Crankshaft position sensor coupler (from the wire harness)
2. Check:
   • Crankshaft position sensor resistance
   Out of specification → Replace the crankshaft position sensor.

Crankshaft position sensor resistance
228–342 Ω

a. Connect the digital circuit tester (Ω) to the crankshaft position sensor coupler as shown.

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

• Positive tester probe
black "1"
• Negative tester probe
gray "2"



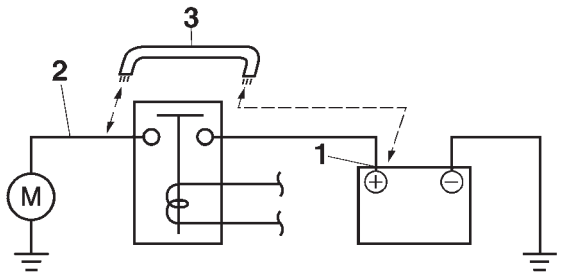
b. Measure the crankshaft position sensor resistance.

EAS30562
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   • Starter motor operation
   Does not operate → Perform the electric starting system troubleshooting, starting with step (4).
   Refer to "TROUBLESHOOTING" on page 8-14.

a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810
WARNING
• A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
• This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.



G089054

b. Check the starter motor operation.

EAS30566
CHECKING THE STATOR COIL

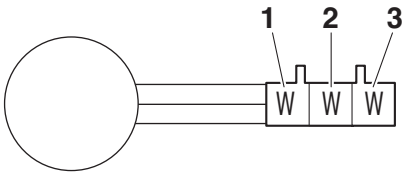
1. Disconnect:
   • Stator coil coupler
   (from the wire harness)
2. Check:
   • Stator coil resistance
   Out of specification → Replace the stator coil.

Stator coil resistance
0.152–0.228 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:
   • Battery charging voltage
   Out of specification → Check the stator coil condition. If the stator coil does not have a problem, replace the rectifier/regulator.
   Refer to “CHECKING THE STATOR COIL” on page 8-61.

Battery charging voltage
above 14 V at 5000 r/min

a. Connect the digital circuit tester to the battery terminal.

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

• Positive tester probe → Battery positive terminal • Negative tester probe → Battery negative terminal

b. Start the engine and let it run at approximately 5000 r/min.
c. Measure the battery charging voltage.

EAS30569
CHECKING THE HORN

1. Check:
   • Horn sound
   Faulty sound → Replace.

EAS30573
CHECKING THE FUEL SENDER

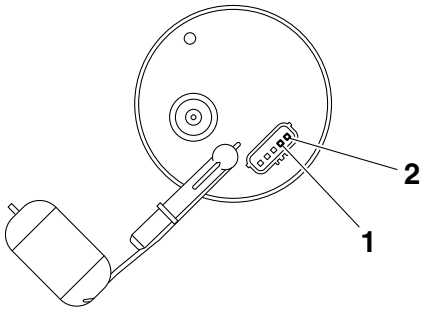
1. Disconnect:
   • Fuel pump coupler
   (from the fuel pump)
2. Remove:
   • Fuel tank
3. Remove:
   • Fuel pump
   (from the fuel tank)
4. Check:
   • Fuel sender resistance
   Out of specification → Replace the fuel pump assembly.

Sender unit resistance (full)
9.0–11.0 Ω
Sender unit resistance (empty)
213.0–219.0 Ω

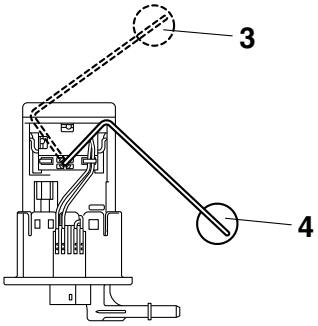
a. Connect the digital circuit tester (Ω) to the fuel sender terminals as shown.

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

- Positive tester probe → Fuel sender terminal "1"
- Negative tester probe → Fuel sender terminal "2"



b. Move the fuel sender float to maximum "3" and minimum "4" level position.



EAS30574
CHECKING THE FUEL LEVEL WARNING LIGHT

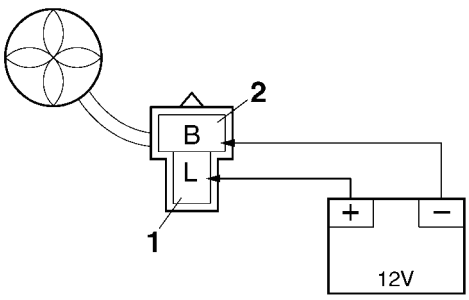
This model is equipped with a self-diagnosis device for the fuel level detection circuit.

1. Check:
   - Fuel level warning light "1"
     (Turn the main switch to "ON".)
     Warning light comes on for a few seconds, then goes off → Warning light is OK.
     Warning light does not come on → Replace the meter assembly.
     Warning light flashes eight times, then goes off for 3 seconds in a repeated cycle (malfunction detected in fuel sender) → Replace the fuel pump assembly.

EAS30577
CHECKING THE RADIATOR FAN MOTOR

1. Check:
   - Radiator fan motor
     Faulty/rough movement → Replace.
   a. Disconnect the radiator fan motor coupler from the wire harness.
   b. Connect the battery (DC 12 V) as shown.

- Positive tester probe
  blue "1"
- Negative tester probe
  black "2"



c. Measure the radiator fan motor movement.

EAS30578
CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   • Coolant temperature sensor
   Refer to "CYLINDER HEAD" on page 5-26.

EWA14130
⚠ WARNING
• Handle the coolant temperature sensor with special care.
• Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

2. Check:
   • Coolant temperature sensor resistance
   Out of specification → Replace.

Coolant temperature sensor resistance
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)

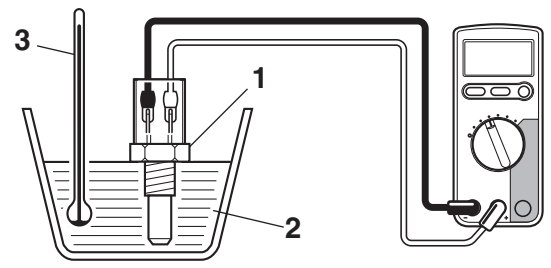
a. Connect the digital circuit tester (Ω) to the coolant temperature sensor as shown.

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

Coolant temperature sensor
15 N·m (1.5 kgf·m, 11 lb·ft)

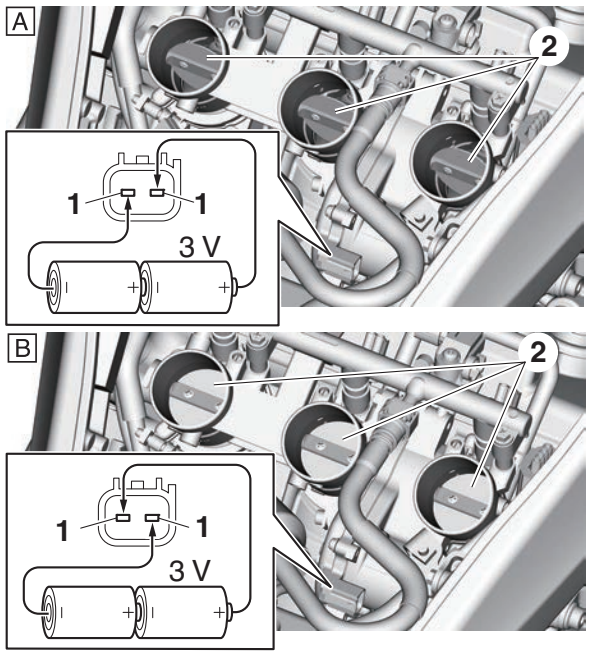
EAS30592
CHECKING THE THROTTLE SERVO MOTOR

1. Remove:
   • Air filter case
   Refer to "GENERAL CHASSIS (1)" on page 4-1.
2. Check:
   • Throttle valve operation
   Throttle valves do not fully close → Replace the throttle bodies.

a. Connect two C-size batteries to the throttle servo motor terminals "1" as shown.

ECA17660
NOTICE
Do not use a 12 V battery to operate the throttle servo motor.

TIP
Do not use old batteries to operate the throttle servo motor.



A. Check that the throttle valves "2" open.
B. Check that the throttle valves "2" fully close.

EAS30594
CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   • Intake air temperature sensor

EWA14110
WARNING
- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

2. Check:
   • Intake air temperature sensor resistance
   Out of specification → Replace.

Intake air temperature sensor resistance
5400–6600 Ω at 0 °C
(5400–6600 Ω at 32 °F)
Intake air temperature sensor resistance
289–391 Ω at 80 °C
(289–391 Ω at 176 °F)

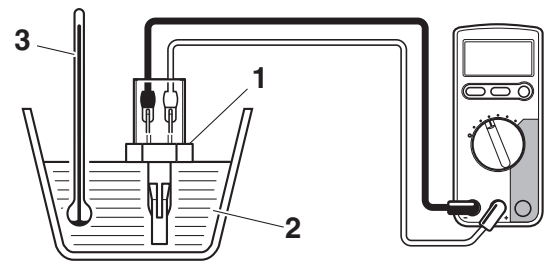
a. Connect the digital circuit tester (Ω) to the intake air temperature sensor terminal as shown.

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

b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

TIP
Make sure that the intake air temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the water.



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

EAS30681
CHECKING THE FUEL INJECTORS

The following procedure applies to all of the fuel injectors.

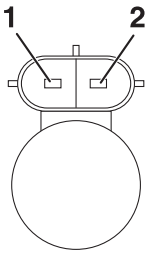
1. Remove:
   • Fuel injector
   Refer to "THROTTLE BODIES" on page 7-5.
2. Check:
   • Fuel injector resistance
   Out of specification → Replace the fuel injector.

Resistance
12.0 Ω

a. Disconnect the fuel injector coupler from the fuel injector.
b. Connect the digital circuit tester (Ω) to the fuel injector coupler as shown.

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

- Positive tester probe → Injector terminal "1"
- Negative tester probe → Injector terminal "2"



c. Measure the fuel injector resistance.

EAS32604
CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SPMC)

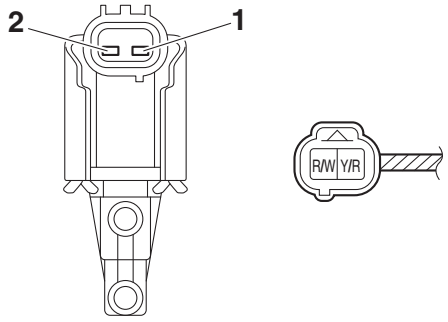
1. Check:
   • Purge cut valve solenoid resistance
   Out of specification → Replace.

Solenoid resistance
22–26 Ω

a. Disconnect the purge cut valve solenoid coupler from the wire harness.
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.

EAS31673
CHECKING THE WHEEL SWITCH

1. Check:
   • Wheel switch "1" output voltage
   Out of specification → Replace the right handlebar switch.

a. Connect the digital circuit tester (DC V) to the handlebar switch coupler (right) as shown.

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

• Positive tester probe
white/green "2"
• Negative tester probe
black/white "3"

b. Turn the main switch to "ON".
c. When turning the wheel switch in direction "a" and "b", check that the output voltage is within the specified values.

Output voltage reading cycle
More than 5 V to less than 0.5 V then back to more than 5 V to less than 0.5 V

d. Connect the digital circuit tester (DC V) to the handlebar switch coupler (right) as shown.

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

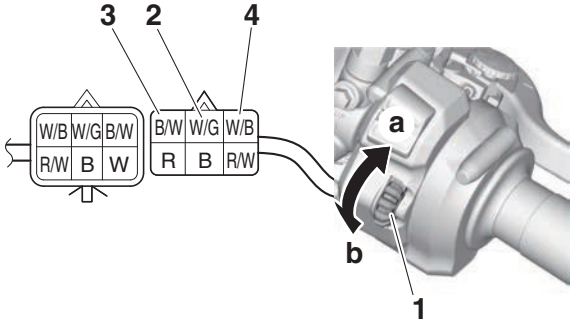
• Positive tester probe
white/black "4"
• Negative tester probe
black/white "3"

e. When turning the wheel switch in direction "a", check that the output voltage is within the specified values.

Output voltage
More than 5 V

f. When turning the wheel switch in direction "b", check that the output voltage is within the specified values.

Output voltage
Less than 0.5 V



SELF DIAGNOSTIC

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. Therefor, 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.
- Using the incorrect specification of spark plug and fuel injector. Using the third party accessories such as suspension and exhaust system.
- Change of specifications of drive chain, sprocket, wheel and tire.
- Removing or modifying the O_2 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
ABS (Anti-lock Brake System)	ABS warning light “2”	*1
CRUISE CONTROL SYSTEM (for MT09SPM/ MT09SPMC)	MIL “1”	2.0 seconds

TIP

*1: The ABS warning light goes off when the vehicle is judged to normal with running.

EAS32806
YDT

This model uses the YDT to identify malfunctions.
For information about using the YDT, refer to the operation manual that is included with the tool.

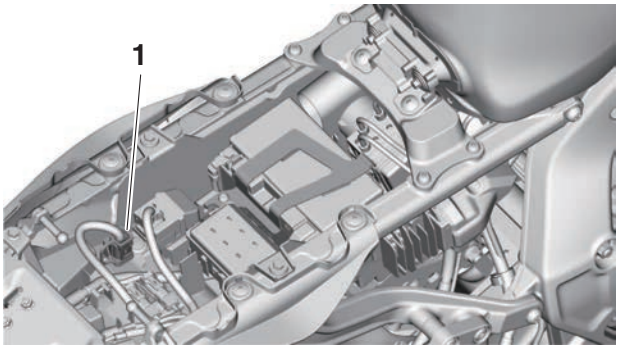
Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

- Yamaha diagnostic tool (A/I) (90890-03264) includes YDT sub harness (6P) (90890-03266).
- If you already have Yamaha diagnostic tool (A/I) (90890-03262), YDT sub harness (6P) (90890-03266) is separately required.
- A GST can also be used to identify malfunctions.

Connecting the YDT

Remove the protective cap, and then connect the YDT to the coupler “1”.



EAS32864
PARTS CONNECTED TO THE ECU

The following parts are connected to the ECU.
When checking for a power short circuit, the couplers must be disconnected from all of the following parts beforehand.

- Crankshaft position sensor
- Injector #1
- Injector #2
- Injector #3
- Clutch switch (for MT09SPM/MT09SPMC)
- Ignition coil #1
- Ignition coil #2
- Ignition coil #3
- Throttle position sensor
- Intake air pressure sensor 1
- Intake air pressure sensor 2
- Intake air temperature sensor
- Fuel pump
- O_2 sensor
- ABS ECU (Electronic Control Unit)
- Throttle servo motor
- Relay unit
- Starter relay
- Purge cut valve solenoid (for MT09MC/MT09SPMC)
- Brake light relay (for MT09SPM/MT09SPMC)
- Radiator fan motor relay
- Meter assembly

- Coolant temperature sensor
- Gear position sensor
- Shift sensor
- Headlight control unit
- Handlebar switch (left and right)
- IMU (Inertial Measurement Unit)

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
- IMU (Inertial Measurement Unit)
- ECU (Engine Control Unit)
- Front wheel sensor
- Rear wheel sensor
- Handlebar switch (left)
- Rear brake light switch (for MT09SPM/MT09SPMC)
- Tail/brake light
- Brake light relay (for MT09SPM/MT09SPMC)

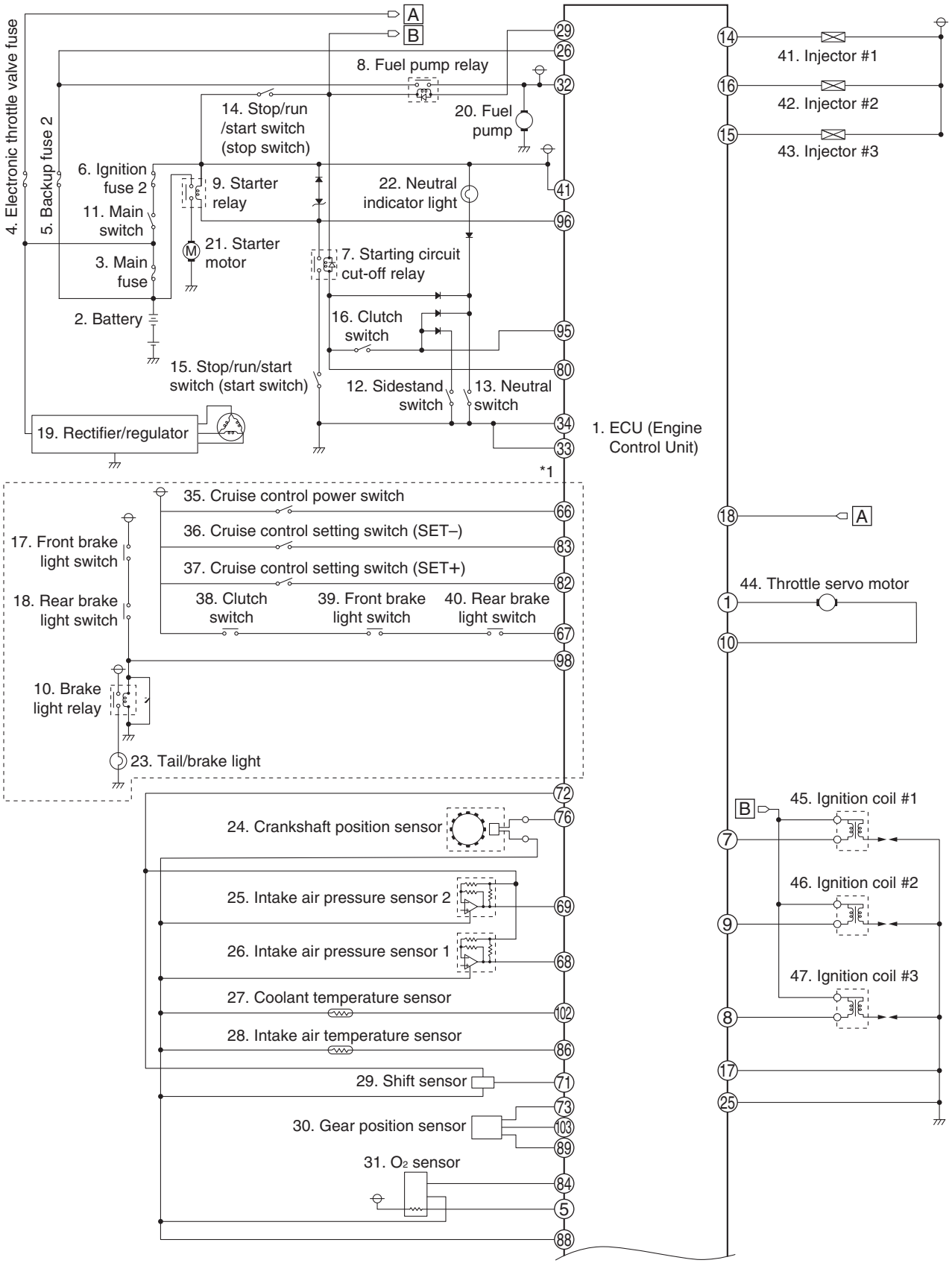
EAS33137
PRECAUTIONS FOR ROAD TEST

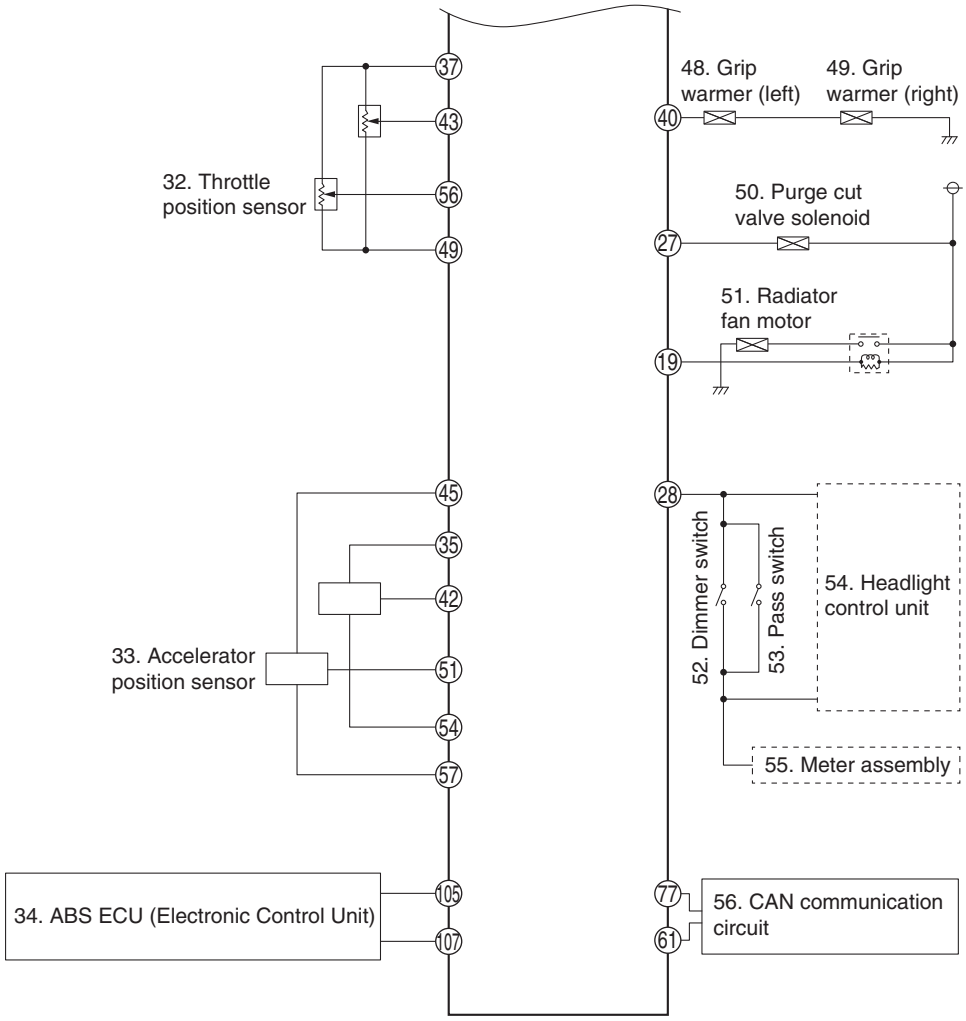
EWA20860
⚠ WARNING

When test riding the vehicle, always comply with local traffic regulations.

EAS20387
SYSTEM DIAGRAM

EAS32920
ECU CIRCUIT DIAGRAM

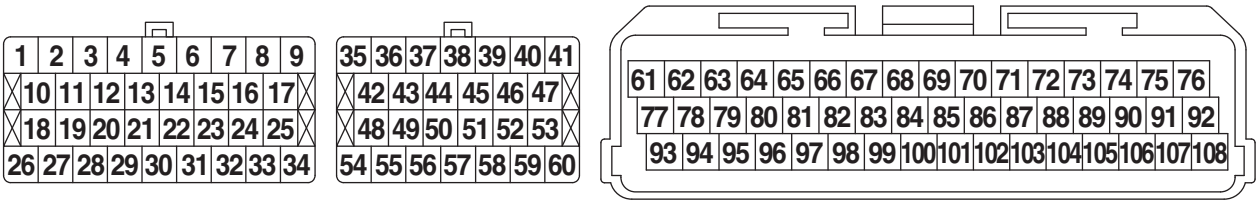



37
43
32. Throttle position sensor
56
49
48. Grip warmer (left)
49. Grip warmer (right)
40
50. Purge cut valve solenoid
27
51. Radiator fan motor
19
45
35
42
33. Accelerator position sensor
51
54
57
28
52. Dimmer switch
53. Pass switch
54. Headlight control unit
55. Meter assembly
34. ABS ECU (Electronic Control Unit)
105
107
77
61
56. CAN communication circuit

1. ECU (Engine Control Unit)
2. Battery
3. Main fuse
4. Electronic throttle valve fuse
5. Backup fuse 2
6. Ignition fuse 2
7. Starting circuit cut-off relay
8. Fuel pump relay
9. Starter relay
10. Brake light relay (for MT09SPM/MT09SPMC)
11. Main switch
12. Sidestand switch
13. Neutral switch
14. Stop/run/start switch (stop switch)
15. Stop/run/start switch (start switch)
16. Clutch switch
17. Front brake light switch (for MT09SPM/MT09SPMC)
18. Rear brake light switch (for MT09SPM/MT09SPMC)
19. Rectifier/regulator
20. Fuel pump
21. Starter motor
22. Neutral indicator light
23. Tail/brake light (for MT09SPM/MT09SPMC)
24. Crankshaft position sensor
25. Intake air pressure sensor 2
26. Intake air pressure sensor 1
27. Coolant temperature sensor
28. Intake air temperature sensor
29. Shift sensor
30. Gear position sensor
31. O_2 sensor
32. Throttle position sensor
33. Accelerator position sensor
34. ABS ECU (Electronic Control Unit)
35. Cruise control power switch (for MT09SPM/MT09SPMC)
36. Cruise control setting switch (SET–) (for MT09SPM/MT09SPMC)
37. Cruise control setting switch (RES+) (for MT09SPM/MT09SPMC)
38. Clutch switch (for MT09SPM/MT09SPMC)
39. Front brake light switch (for MT09SPM/MT09SPMC)
40. Rear brake light switch (for MT09SPM/MT09SPMC)
41. Injector #1
42. Injector #2
43. Injector #3
44. Throttle servo motor
45. Ignition coil #1
46. Ignition coil #2
47. Ignition coil #3
48. Grip warmer (left)
49. Grip warmer (right)
50. Purge cut valve solenoid (for MT09MC/MT09SPMC)
51. Radiator fan motor
52. Dimmer switch
53. Pass switch
54. Headlight control unit
55. Meter assembly
56. CAN communication circuit

*1. For MT09SPM/MT09SPMC

EAS33369
ECU COUPLER LAYOUT



No.	Connected parts	Wire harness color
1	Throttle servo motor	Y/R
2	—	—
3	—	—
4	—	—
5	O_2 sensor	P/B
6	—	—
7	Ignition coil #1	O
8	Ignition coil #3	O/G
9	Ignition coil #2	Gy/R
10	Throttle servo motor	Lg/R
11	—	—
12	—	—
13	—	—
14	Injector #1	R/B
15	Injector #3	L/B
16	Injector #2	G/B
17	Ground	B
18	Electronic throttle valve fuse	R/L
19	Radiator fan motor relay	G/Y
20	—	—
21	—	—
22	—	—
23	—	—
24	—	—
25	Ground	B
26	Backup fuse 2	R/G
27 (*2)	Purge cut valve solenoid	Y/R

No.	Connected parts	Wire harness color
28	Dimmer/pass switch, Headlight control unit	Y/B
29	Fuel pump relay	L/W
30	—	—
31	—	—
32	Fuel pump relay, Fuel pump	R/L
33	Ground	B/W
34	Ground	B/W
35	Accelerator position sensor	W/R
36	ABS ECU (Electronic Control Unit)	G
37	Throttle position sensor	L
38	—	—
39	—	—
40	Grip warmer (left), Grip warmer (right)	Br/Y
41	Ignition fuse 2	R/W
42	Accelerator position sensor	Y
43	Throttle position sensor	W
44	—	—
45	Accelerator position sensor	Y/R
46	—	—
47	—	—
48	—	—
49	Throttle position sensor	B/L

No.	Connected parts	Wire harness color
50	—	—
51	Accelerator position sensor	Br
52	—	—
53	—	—
54	Accelerator position sensor	W/B
55	—	—
56	Throttle position sensor	B
57	Accelerator position sensor	Y/B
58	—	—
59	—	—
60	—	—
61	CAN communication circuit	L/B
62	—	—
63	—	—
64	—	—
65	—	—
66 (*1)	Cruise control power switch	O/W
67 (*1)	Rear brake light switch	Lg/L
68	Intake air pressure sensor 1	P/W
69	Intake air pressure sensor 2	P
70	—	—
71	Shift sensor	V
72	Intake air pressure sensor 1, Intake air pressure sensor 2, Shift sensor	L
73	Gear position sensor	L
74	—	—
75	—	—
76	Crankshaft position sensor	Gy
77	CAN communication circuit	L/W

No.	Connected parts	Wire harness color
78	—	—
79	—	—
80	Starting circuit cut-off relay, Clutch switch	B/Y
81	—	—
82 (*1)	Cruise control setting switch (RES+)	Br/L
83 (*1)	Cruise control setting switch (SET–)	G/L
84	O_2 sensor	Gy/G
85	—	—
86	Intake air temperature sensor	Br/W
87	—	—
88	Crankshaft position sensor, Intake air pressure sensor 1, Intake air pressure sensor 2, Coolant temperature sensor, Intake air temperature sensor, Shift sensor, O_2 sensor	B/L
89	Gear position sensor	B/L
90	—	—
91	—	—
92	—	—
93	—	—
94	—	—
95	Clutch switch	L/Y
96	Starting circuit cut-off relay	L/W
97	—	—
98 (*1)	Brake light relay, Rear brake light switch	Lg/B
99	—	—
100	—	—
101	—	—
102	Coolant temperature sensor	G/W

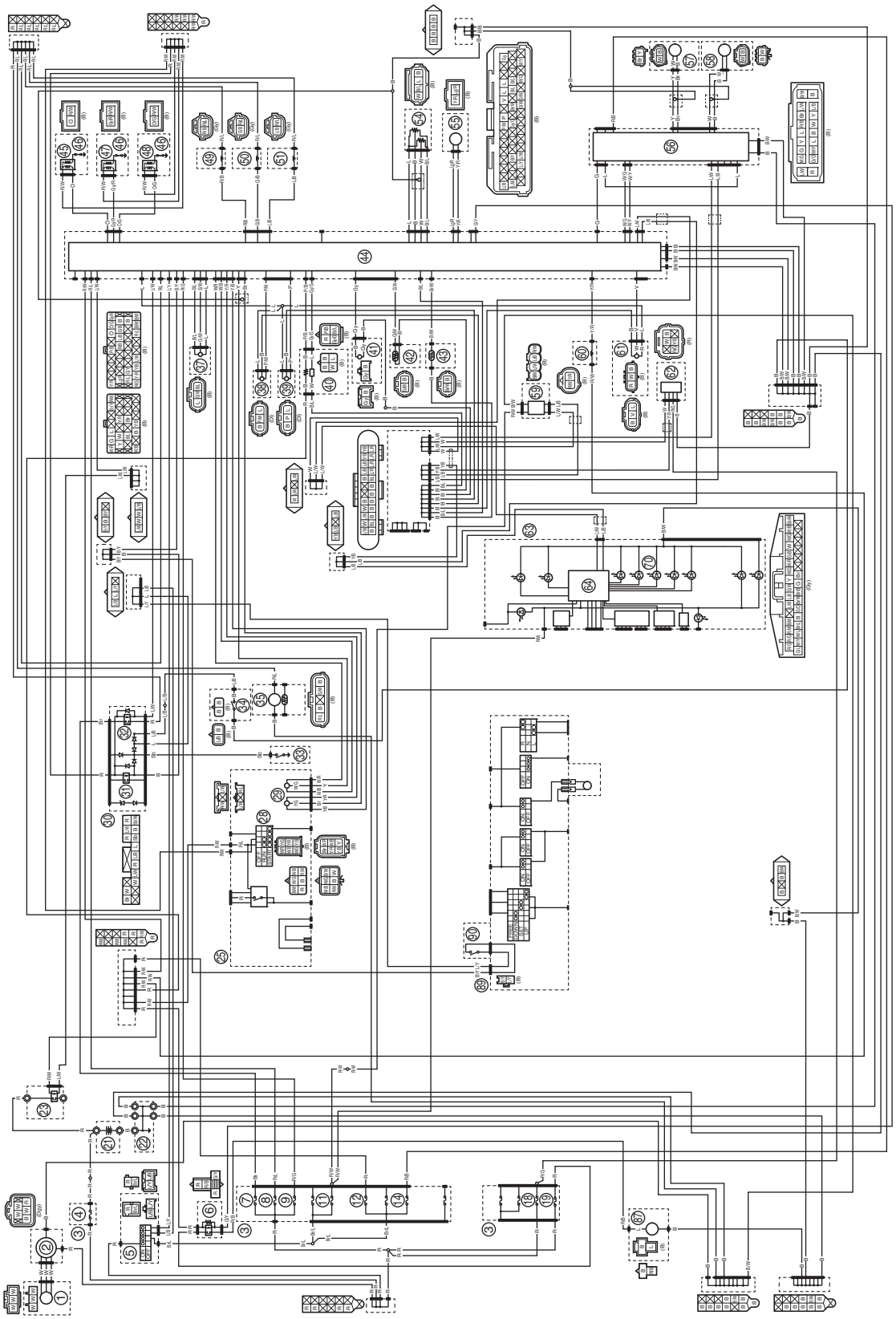
No.	Connected parts	Wire harness color
103	Gear position sensor	G/W
104	—	—
105	ABS ECU (Electronic Control Unit)	W/G
106	—	—
107	ABS ECU (Electronic Control Unit)	W/Y
108	—	—

*1. For MT09SPM/MT09SPMC
*2. For MT09MC/MT09SPMC

EAS20440
FUEL INJECTION SYSTEM

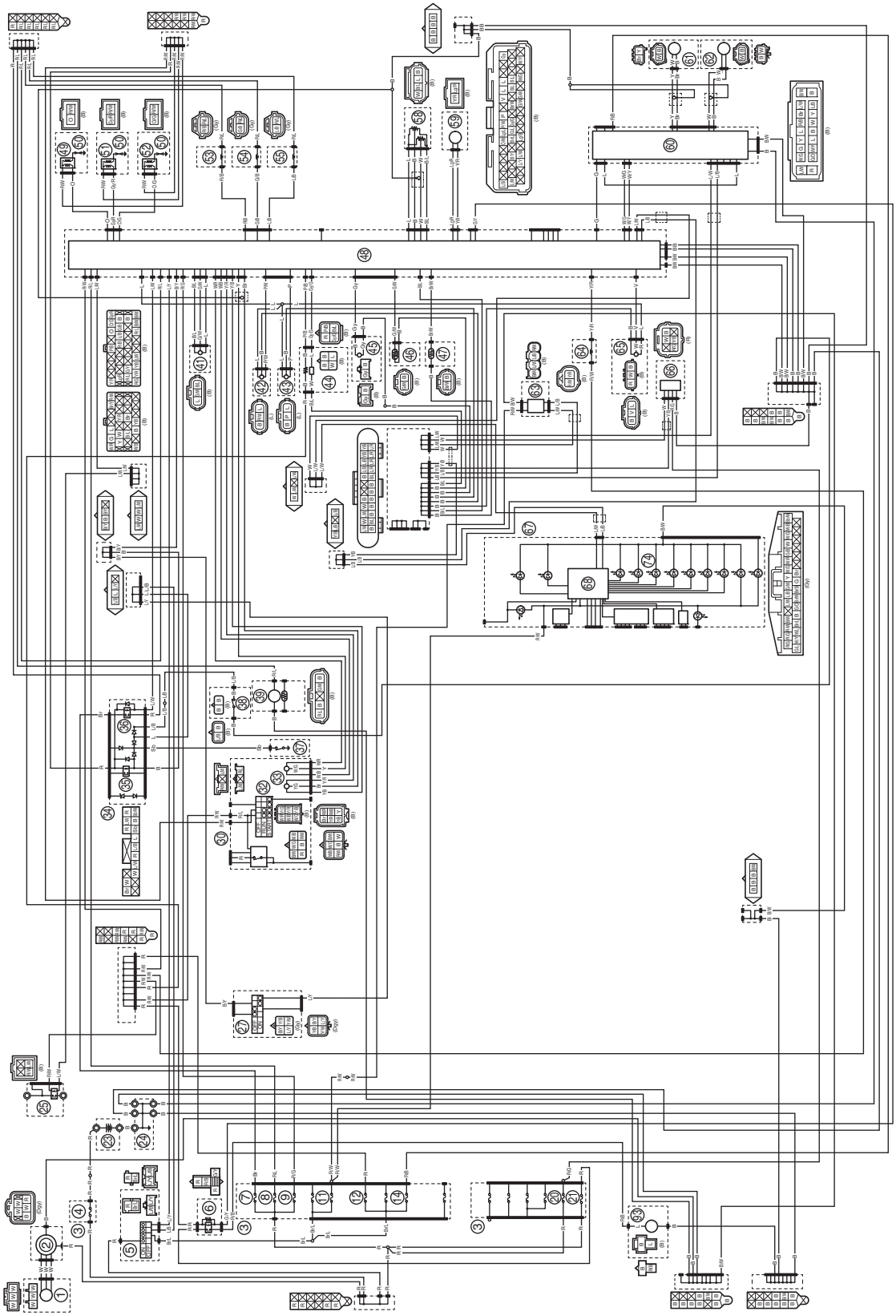
EAS32871
CIRCUIT DIAGRAM

MT09M/MT09MC



1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
7. Fuel injection system fuse
8. Electronic throttle valve fuse
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
18. Backup fuse 1
19. Radiator fan motor fuse
21. Battery
22. Engine ground
23. Starter relay
25. Handlebar switch (right)
28. Stop/run/start switch
29. Accelerator position sensor
30. Relay unit
31. Starting circuit cut-off relay
32. Fuel pump relay
33. Neutral switch
34. Sidestand switch
35. Fuel pump
37. Gear position sensor
38. Intake air pressure sensor 1
39. Intake air pressure sensor 2
40. O_2 sensor
41. Crankshaft position sensor
42. Coolant temperature sensor
43. Intake air temperature sensor
44. ECU (Engine Control Unit)
45. Ignition coil #1
46. Spark plug
47. Ignition coil #2
48. Ignition coil #3
49. Injector #1
50. Injector #2
51. Injector #3
54. Throttle position sensor
55. Throttle servo motor
56. ABS ECU (Electronic Control Unit)
57. Front wheel sensor
58. Rear wheel sensor
59. IMU (Inertial Measurement Unit)
60. Purge cut valve solenoid (for MT09MC)
61. Shift sensor
62. YDT coupler
63. Meter assembly
64. Multi-function meter
70. MIL (Malfunction indicator light)
87. Radiator fan motor
89. Handlebar switch (left)
90. Clutch switch

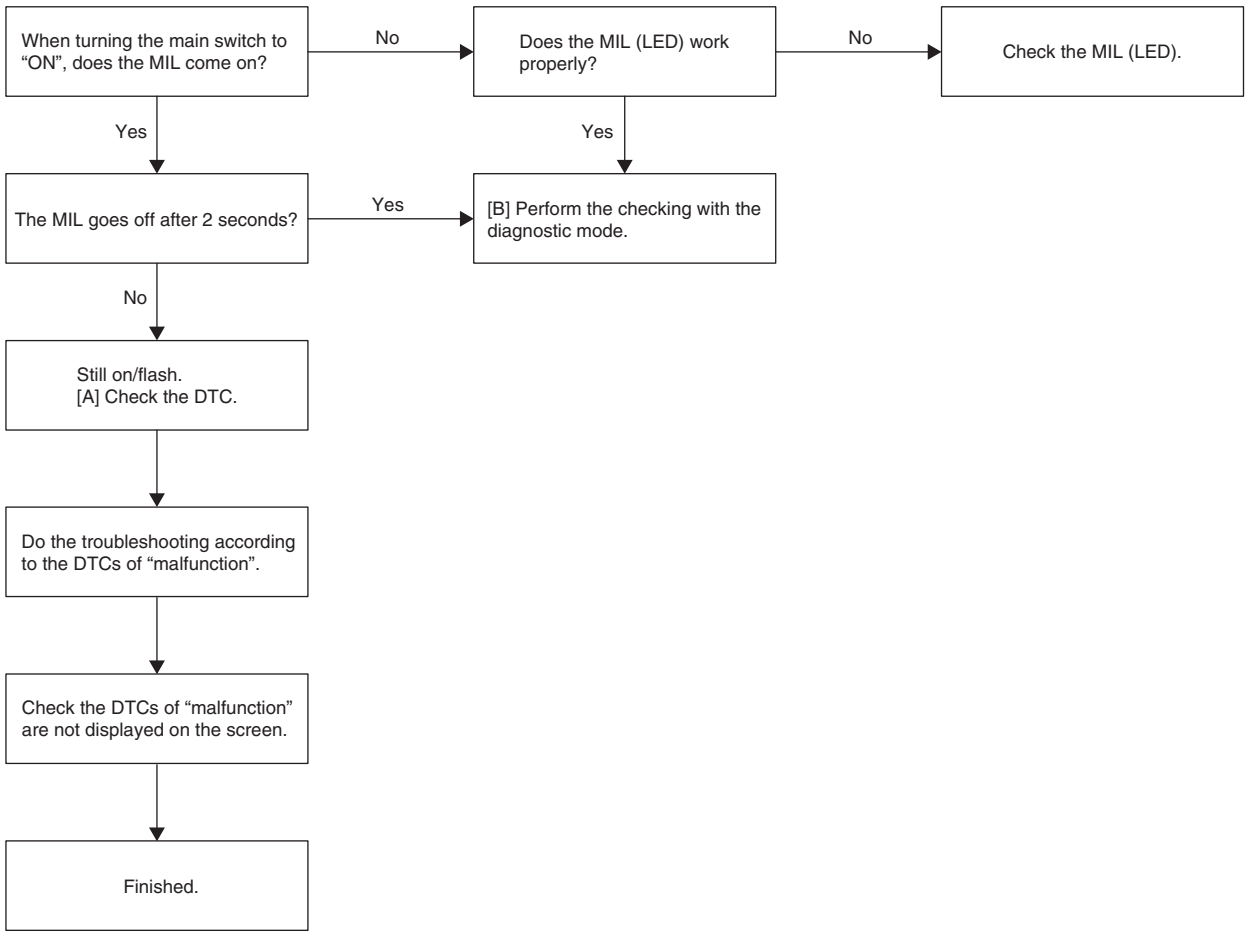
MT09SPM/MT09SPMC



1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
7. Fuel injection system fuse
8. Electronic throttle valve fuse
9. Backup fuse 2
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
20. Backup fuse 1
21. Radiator fan motor fuse
23. Battery
24. Engine ground
25. Starter relay
27. Clutch switch
30. Handlebar switch (right)
32. Stop/run/start switch
33. Accelerator position sensor
34. Relay unit
35. Starting circuit cut-off relay
36. Fuel pump relay
37. Neutral switch
38. Sidestand switch
39. Fuel pump
41. Gear position sensor
42. Intake air pressure sensor 1
43. Intake air pressure sensor 2
44. O_2 sensor
45. Crankshaft position sensor
46. Coolant temperature sensor
47. Intake air temperature sensor
48. ECU (Engine Control Unit)
49. Ignition coil #1
50. Spark plug
51. Ignition coil #2
52. Ignition coil #3
53. Injector #1
54. Injector #2
55. Injector #3
58. Throttle position sensor
59. Throttle servo motor
60. ABS ECU (Electronic Control Unit)
61. Front wheel sensor
62. Rear wheel sensor
63. IMU (Inertial Measurement Unit)
64. Purge cut valve solenoid (for MT09SPMC)
65. Shift sensor
66. YDT coupler
67. Meter assembly
68. Multi-function meter
74. MIL (Malfunction indicator light)
93. Radiator fan motor

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.



EAS33147
[A] THE MIL COMES ON/FLASHES AND ENGINE OPERATION IS NOT NORMAL

1. Check the DTC of “malfunction” using the YDT.
2. Check and repair the malfunction according to applicable DTC troubleshooting.
3. Turn the main switch from “OFF” to “ON”, and then check the DTC of “malfunction” is not displayed.

TIP

- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
- Turning the main switch to “OFF” will not erase the malfunction history.

EAS33148
[B] THE MIL DOES NOT COME ON, BUT THE ENGINE OPERATION IS NOT NORMAL

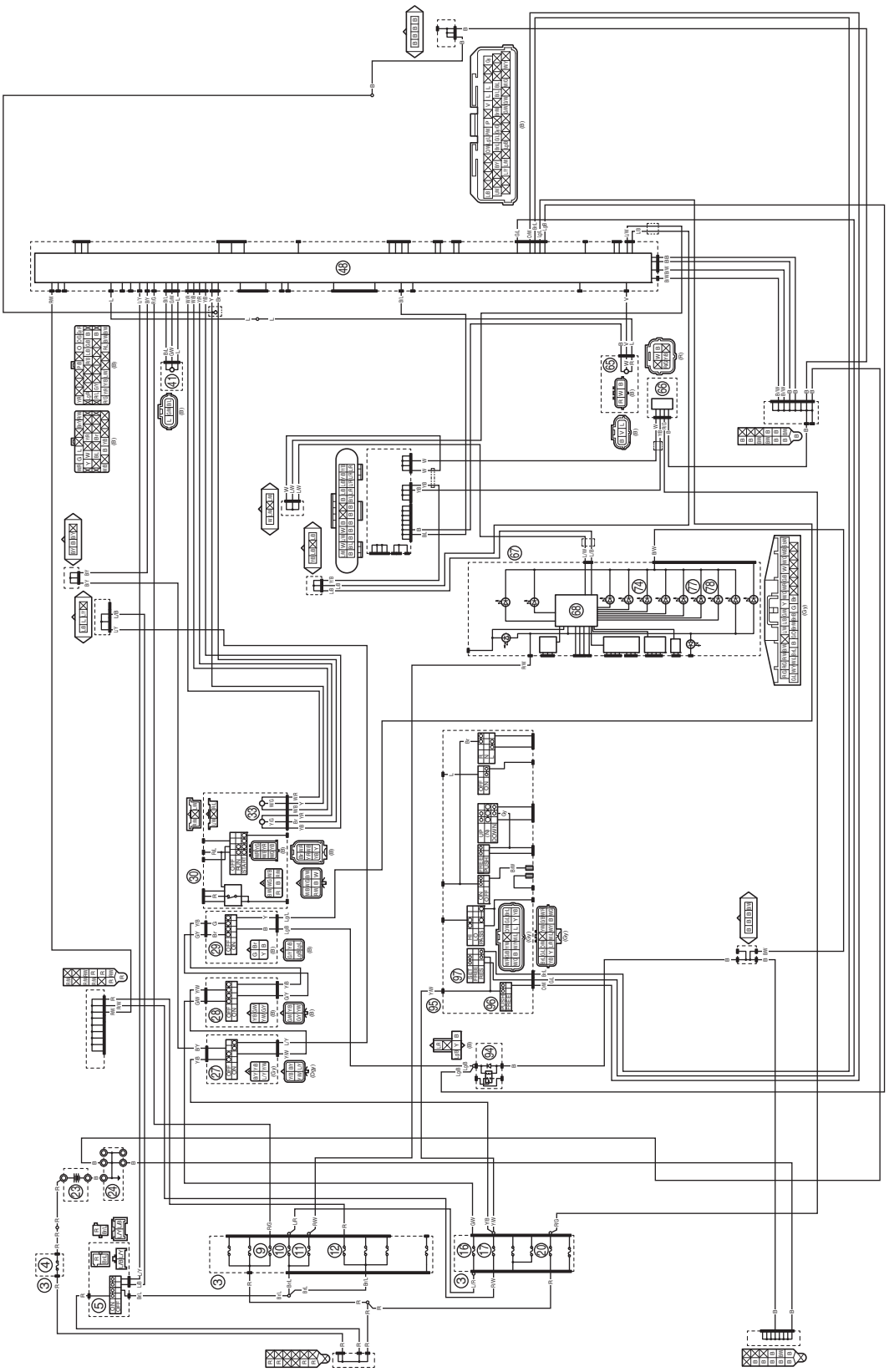
1. Monitor the operation of these sensors and actuators by using the YDT in the diagnostic mode. Refer to “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-62 and “DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE” on page 9-66.

01: Throttle position sensor signal 1 (throttle angle)
13: Throttle position sensor signal 2 (throttle angle)
14: Accelerator position sensor signal 1 (throttle angle)
15: Accelerator position sensor signal 2 (throttle angle)
30: Cylinder-#1 ignition coil
31: Cylinder-#2 ignition coil
32: Cylinder-#3 ignition coil
36: Injector #1
37: Injector #2
38: Injector #3

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.

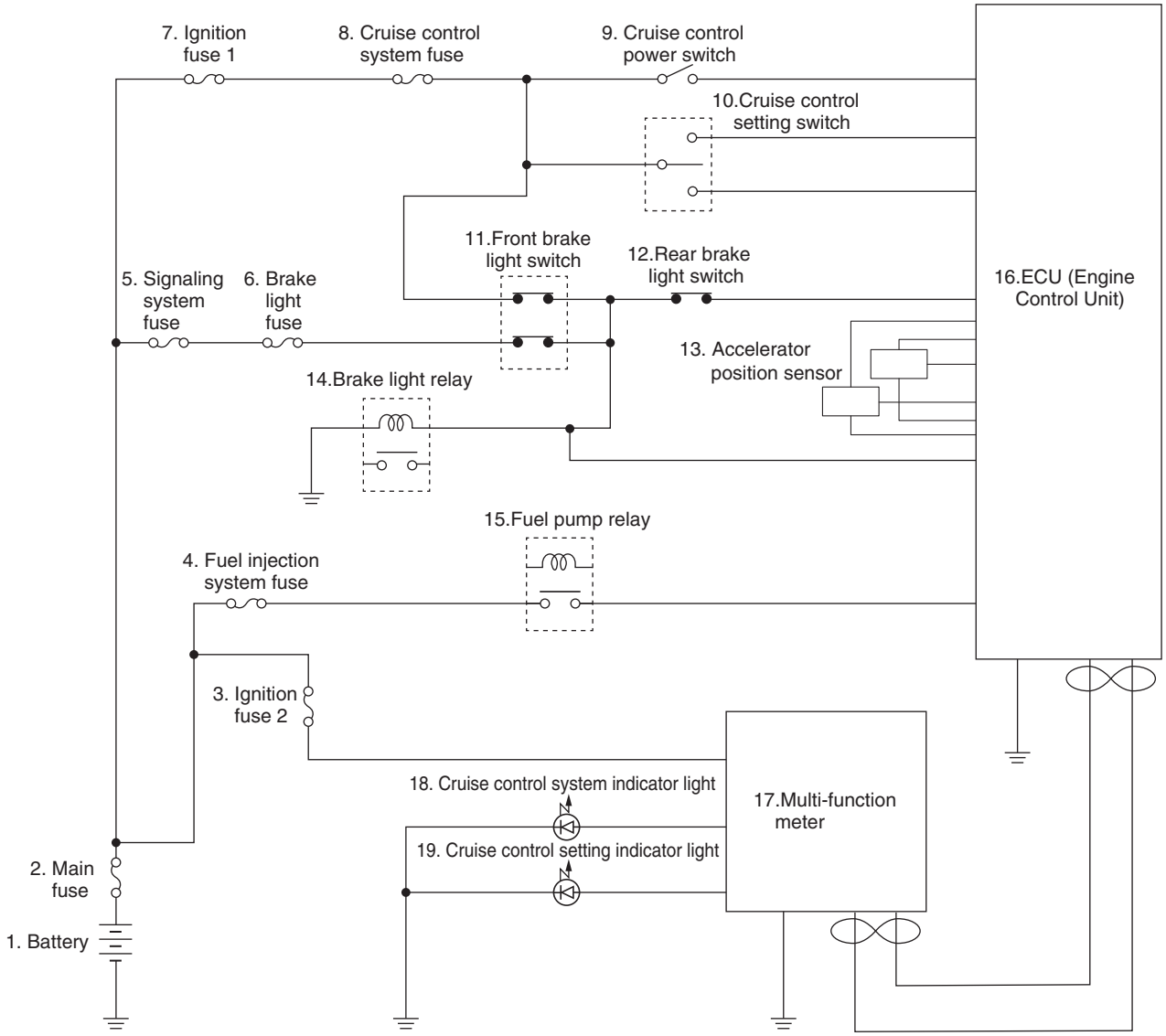
EAS20441
CRUISE CONTROL SYSTEM (for MT09SPM/MT09SPMC)

EAS32875
CIRCUIT DIAGRAM



3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
16. Brake light fuse
17. Cruise control fuse
20. Backup fuse 1
23. Battery
24. Engine ground
27. Clutch switch
28. Front brake light switch
29. Rear brake light switch
30. Handlebar switch (right)
33. Accelerator position sensor
41. Gear position sensor
48. ECU (Engine Control Unit)
65. Shift sensor
66. YDT coupler
67. Meter assembly
68. Multi-function meter
74. MIL (Malfunction indicator light)
77. Cruise control system indicator light
78. Cruise control setting indicator light
94. Brake light relay
95. Handlebar switch (left)
96. Cruise control power switch
97. Cruise control setting switch

EAS32876
CRUISE CONTROL CIRCUIT OPERATION



1. Battery
2. Main fuse
3. Ignition fuse 2
4. Fuel injection system fuse
5. Signaling system fuse
6. Brake light fuse
7. Ignition fuse 1
8. Cruise control system fuse
9. Cruise control power switch
10. Cruise control setting switch
11. Front brake light switch
12. Rear brake light switch
13. Accelerator position sensor
14. Brake light relay
15. Fuel pump relay
16. ECU (Engine Control Unit)
17. Multi-function meter
18. Cruise control system indicator light
19. Cruise control setting indicator light

EAS32877
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.

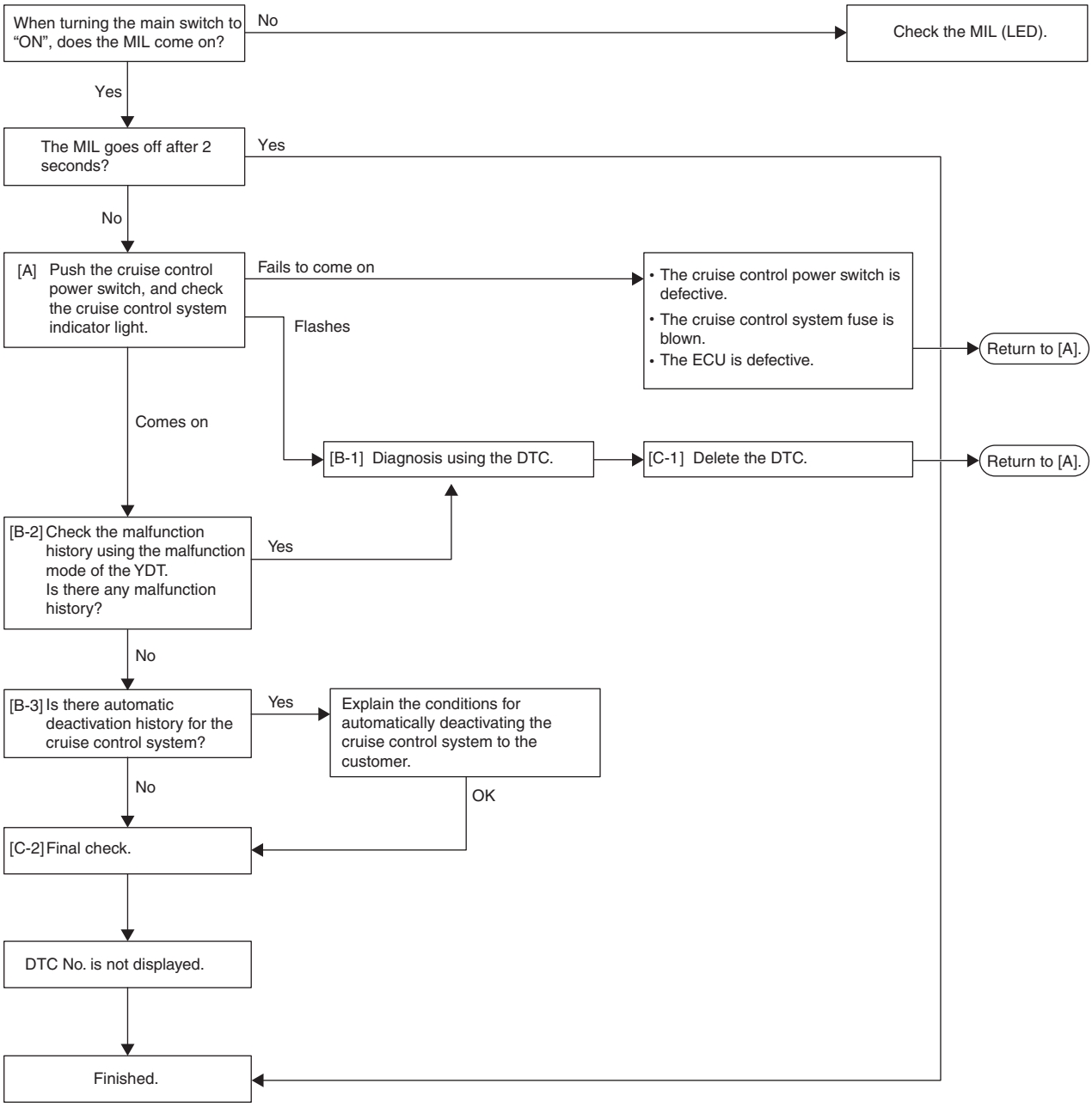
4. Do the final check.

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.**

EAS32878
BASIC PROCESS FOR TROUBLESHOOTING



EAS32879
[A] CHECKING THE CRUISE CONTROL SYSTEM INDICATOR LIGHT

Turn the main switch, and then push the cruise control power switch.

1. The cruise control system indicator light does not come on.
   - Check the control power switch for continuity. Refer to "CHECKING THE SWITCHES" on page 8-53. If there is no continuity, replace the handlebar switch (left).
   - Check the fuse for continuity. Refer to "CHECKING THE FUSES" on page 8-55. If the cruise control system fuse is blown, replace the fuse.
   - Check for continuity between the orange/white terminal of the handlebar switch coupler (left) and orange/white terminal of the ECU (engine control unit) coupler. If there is no continuity, the wire harness is defective. Replace the wire harness.
2. The cruise control system indicator light flashes. [B-1]
3. The cruise control system indicator light come on. [B-2]

EAS32880
[B-1] DIAGNOSIS USING THE DTC

1. Information for the DTCs from the cruise control system is contained in the following table. Refer to this table for troubleshooting.

DTC table

DTC No.	Symptom	Check point
P056C	No normal signals from the switch are received by the ECU.	• Wire harness (ECU coupler and front or rear brake light switch coupler) • Signaling system fuse and brake light fuses • Connection of the ECU coupler, rear brake light switch coupler, brake light relay coupler and handlebar switch coupler (right) • Accelerator position sensor • Front brake light switch • Rear brake light switch
P0564	No normal signals from the switch are received by the ECU.	• Wire harness (ECU coupler and handlebar switch coupler (left)) • Ignition fuse 1 and cruise control system fuse • Cruise control setting switch

EAS32881
[B-2] DIAGNOSIS USING THE MALFUNCTION HISTORY CODES

Check the malfunction history using the malfunction mode of the YDT.

- Malfunction history is displayed on the YDT. [B-1]
- Malfunction history is not displayed on the YDT. [B-3]

EAS32882
[B-3] MALFUNCTION HISTORY IS NOT DISPLAYED

Use the YDT to check whether automatic deactivation history for the cruise control system exists.

1. There is automatic deactivation history for the cruise control system.
   - Explain the conditions for automatically deactivating the cruise control system to the customer.
   - For information about the conditions for automatically deactivating the cruise control system. Refer to "Automatic deactivation of the cruise control system" on page 9-24.

TIP

If you do not have a YDT, the automatic deactivation history cannot be checked. Therefore, explain the automatic deactivation function of the cruise control system to the customer and explain that this is not a malfunction.

Automatic deactivation of the cruise control system

The cruise control system is electronically controlled and linked with other control systems. The cruise control system will automatically deactivate under the following conditions:

- The cruise control system is not able to maintain the set cruising speed (such as when going up a steep hill).
- Wheel slip or wheel spin is detected. (If the traction control system is on, traction control will engage.)
- Wheel slip or wheel spin is detected. (If the traction control system has not been turned off, the traction control system will work.)
- The start/engine stop switch is set to the "⊠" position.
- The engine stalls.
- The sidestand is lowered.

When traveling with a set cruising speed, if the cruise control system is deactivated under the above conditions, the "" indicator light will turn off and the "SET" indicator light will flash for 4 seconds.

When not traveling with a set cruising speed, if the start/engine stop switch is set to the "⊠" position, the engine stalls, or the sidestand is lowered, then the "" indicator light will go off (the "SET" indicator light will not flash).

If the cruise control system was automatically deactivated, please stop and confirm that your vehicle is in good operating condition before continuing on.

When traveling on roads with steep grades, the cruise control system may not be able to maintain the set cruising speed.

- When going uphill, the actual traveling speed may become lower than the set cruising speed. If this occurs, accelerate to the desired traveling speed using the throttle.
- When going downhill, the actual traveling speed may become higher than the set cruising speed. If this occurs, the setting switch cannot be used to adjust the set cruising speed. To reduce the traveling speed, apply the brakes. When the brakes are applied, the cruise control system will deactivate.

EAS32883

[C-1] ERASING THE DTC

1. Delete the DTC using the malfunction of the YDT, and check that the MIL goes off.

EAS32884

[C-2] FINAL CHECK

EWA17441

⚠ WARNING

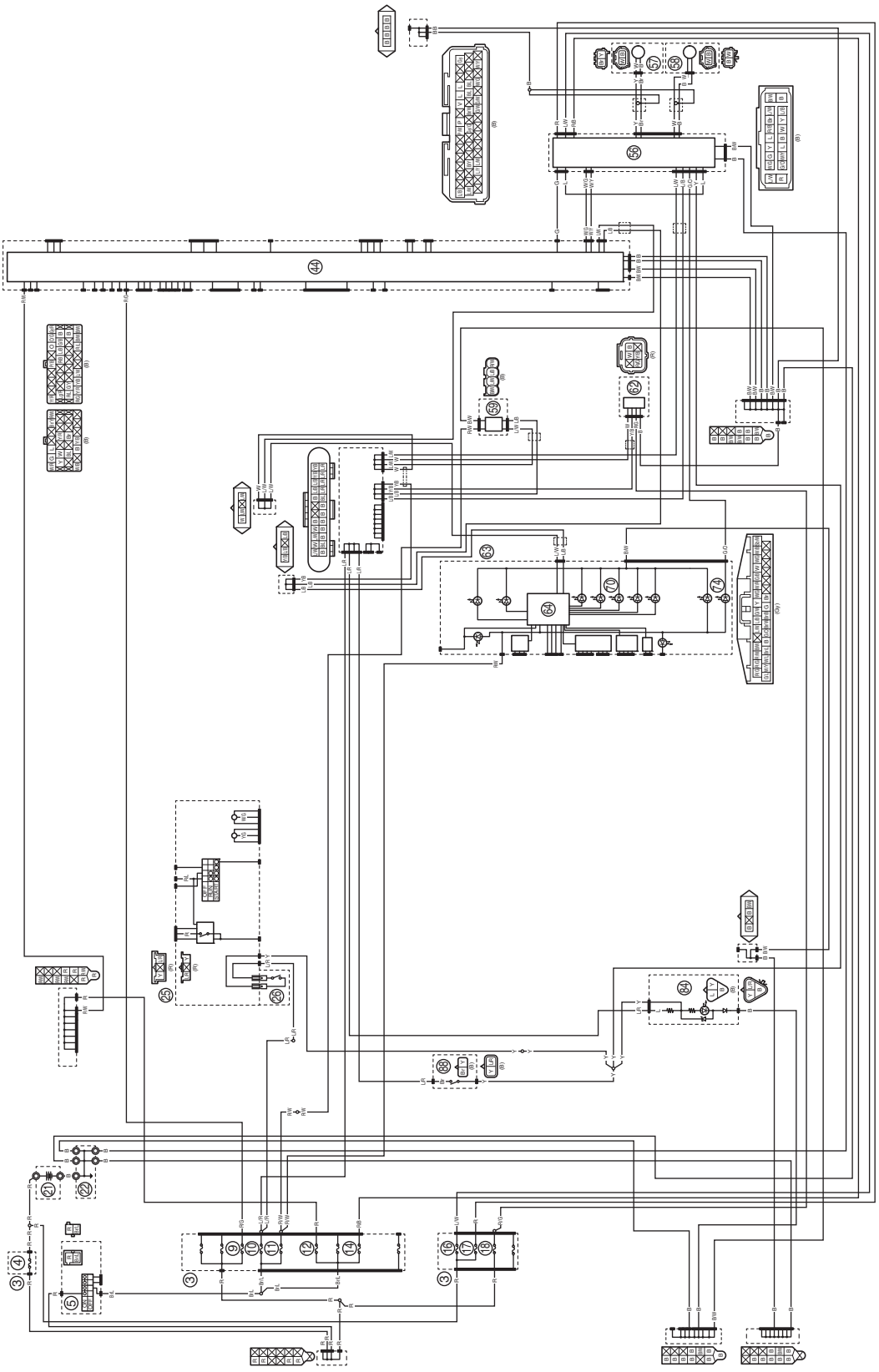
When maintenance or checks have been performed on components related to the cruise control system, be sure to perform a final check before delivering the vehicle to the customer.

1. Check the front brake lever and rear brake pedal operation.
2. Check the rear brake light switch.
   Refer to "CHECKING THE SWITCHES" on page 8-53.
3. Execute the diagnostic mode (No. 82 and 83) to check the operation of the front brake light switch, rear brake light switch, and accelerator position sensor.
   Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
4. Execute the diagnostic mode (No. 80 and 81) to check the operation of the cruise control setting switch.
   Refer to "DIAGNOSTIC CODE: SENSOR OPERATION TABLE" on page 9-62.
5. Delete the DTCs.
   Refer to "DTC TABLE" on page 9-39.
6. Check the operation of the cruise control system.
   Test ride the vehicle and confirm that the cruise control system is operating normally.

EAS20443
ABS (Anti-lock Brake System)

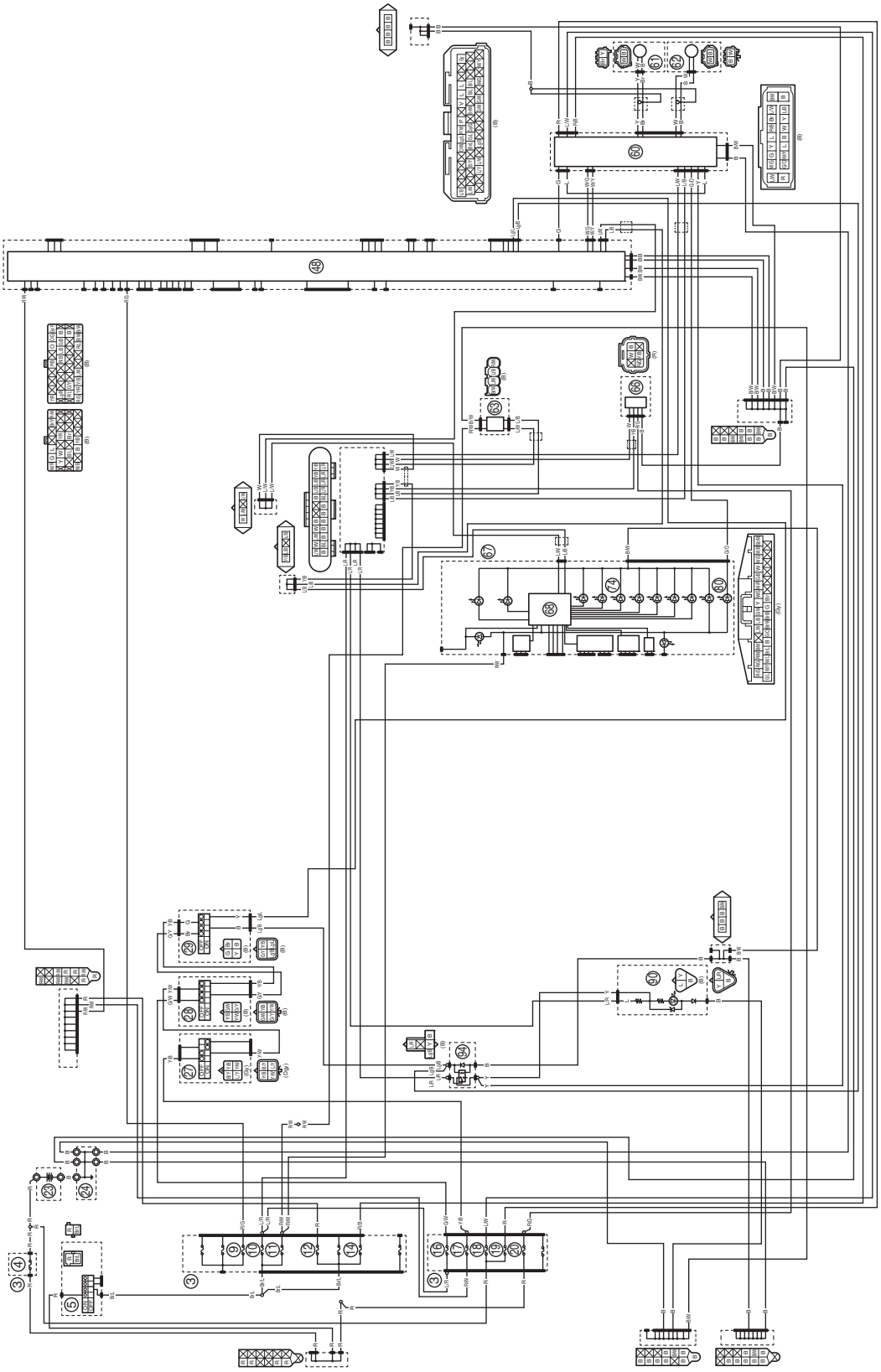
EAS32890
CIRCUIT DIAGRAM

MT09M/MT09MC



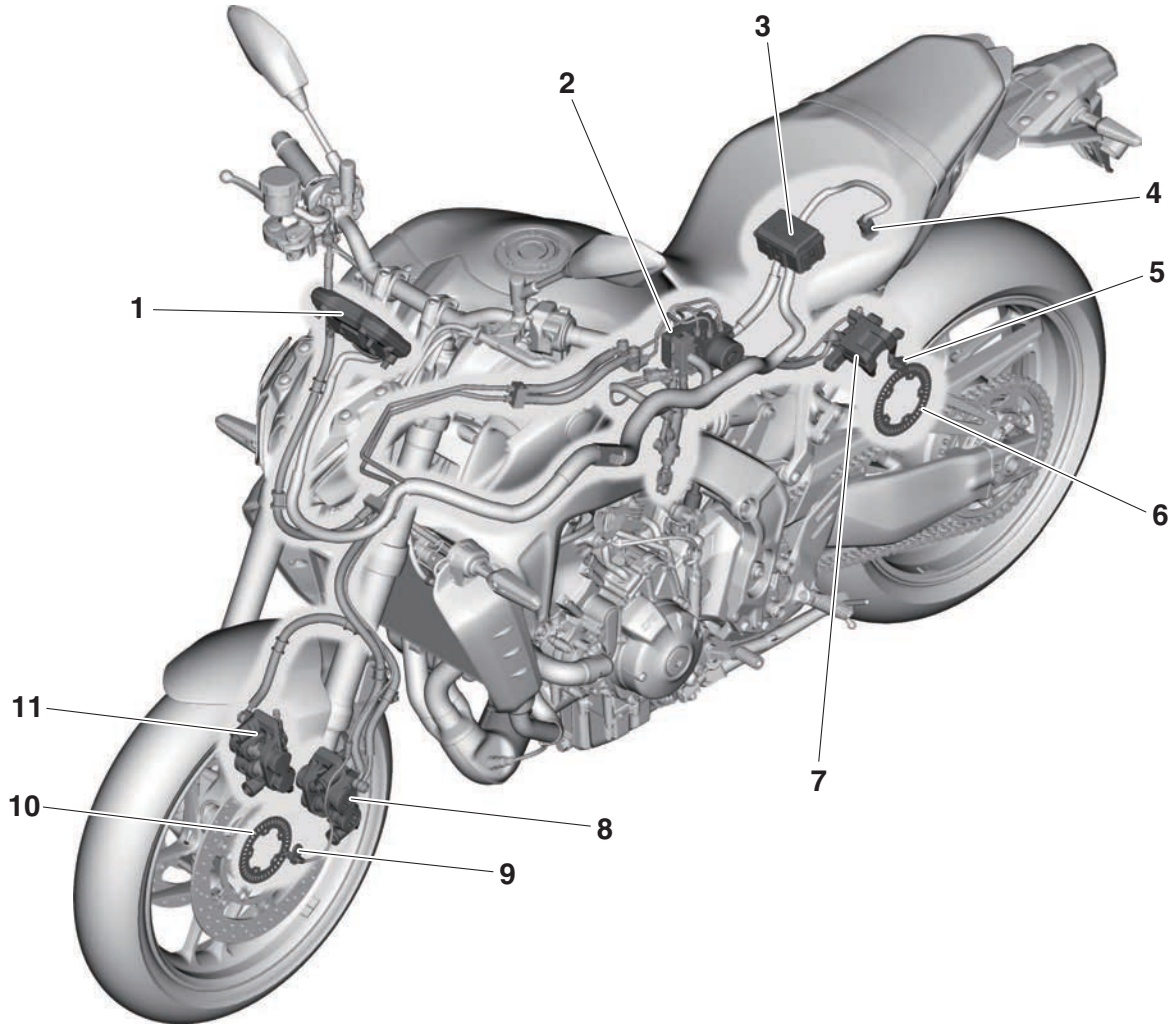
3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
16. ABS solenoid fuse
17. ABS motor fuse
18. Backup fuse 1
21. Battery
22. Engine ground
25. Handlebar switch (right)
26. Front brake light switch
44. ECU (Engine Control Unit)
56. ABS ECU (Electronic Control Unit)
57. Front wheel sensor
58. Rear wheel sensor
59. IMU (Inertial Measurement Unit)
62. YDT coupler
63. Meter assembly
64. Multi-function meter
70. MIL (Malfunction indicator light)
74. ABS warning light
84. Tail/brake light
88. Rear brake light switch

MT09SPM/MT09SPMC



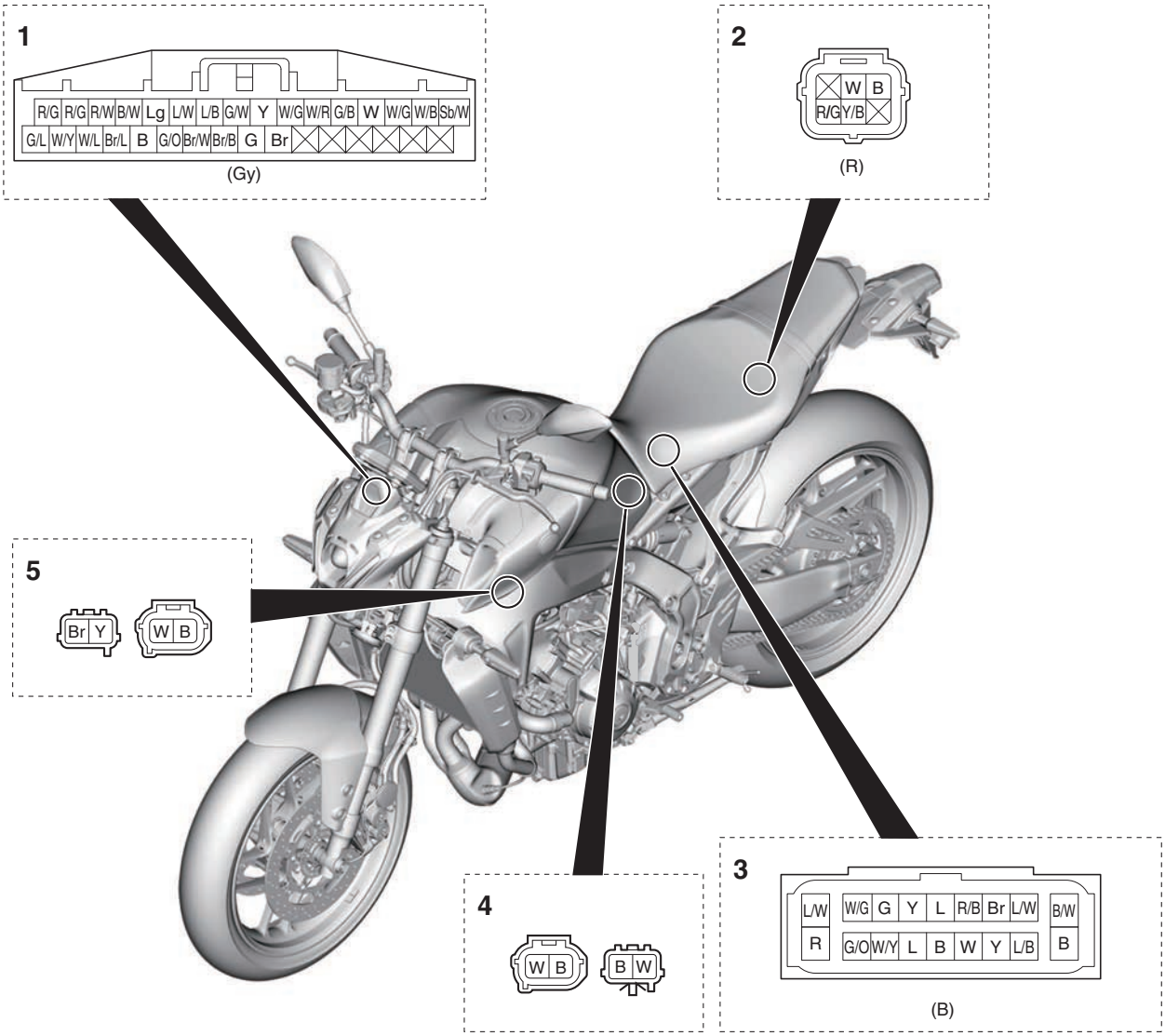
3. Fuse box
4. Main fuse
5. Main switch
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
14. ABS ECU fuse
16. Brake light fuse
17. Cruise control fuse
18. ABS solenoid fuse
19. ABS motor fuse
20. Backup fuse 1
23. Battery
24. Engine ground
27. Clutch switch
28. Front brake light switch
29. Rear brake light switch
48. ECU (Engine Control Unit)
60. ABS ECU (Electronic Control Unit)
61. Front wheel sensor
62. Rear wheel sensor
63. IMU (Inertial Measurement Unit)
66. YDT coupler
67. Meter assembly
68. Multi-function meter
74. MIL (Malfunction indicator light)
80. ABS warning light
90. Tail/brake light
94. Brake light relay

EAS32891
ABS COMPONENTS CHART



1. Meter assembly
2. Hydraulic unit assembly (ABS ECU)
3. Fuse box (ABS motor fuse, ABS ECU fuse, ABS solenoid fuse)
4. YDT coupler
5. Rear wheel sensor
6. Rear wheel sensor rotor
7. Rear brake caliper
8. Front brake caliper (left)
9. Front wheel sensor
10. Front wheel sensor rotor
11. Front brake caliper (right)

EAS32892
ABS COUPLER LOCATION CHART



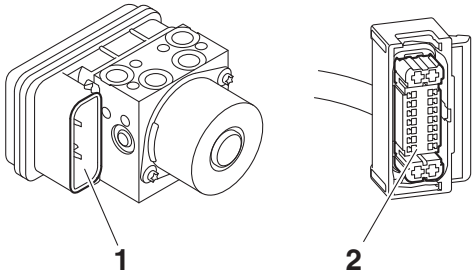
1. Meter assembly coupler
2. YDT coupler
3. ABS ECU coupler
4. Rear wheel sensor coupler
5. Front wheel sensor coupler

EAS32893
MAINTENANCE OF THE ABS ECU

Checking the ABS ECU
1. Check:
   - Terminals “1” of the hydraulic unit assembly (ABS ECU)
     Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.
   - Terminals “2” of the ABS ECU coupler
     Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS33284
ABS TROUBLESHOOTING OUTLINE

EWA16710

⚠ 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 9-37.

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 “[C-1] FINAL CHECK” on page 9-37.

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 seat, 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

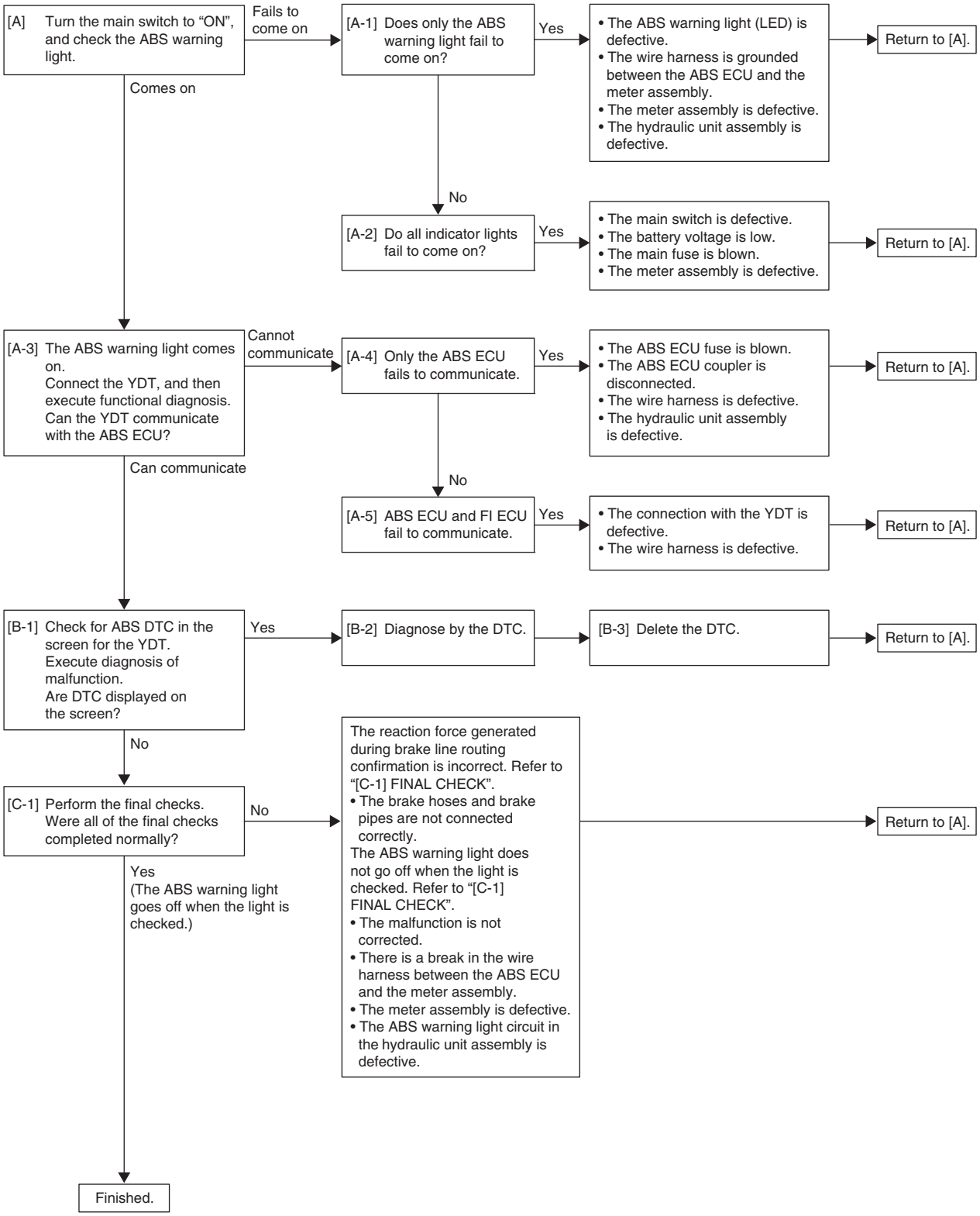
- If another DTC is displayed, repeat steps (1) to (3) until no DTC is displayed.
- Turning the main switch to “OFF” will not erase the malfunction history.

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.**


[A] Turn the main switch to "ON", and check the ABS warning light.
Fails to come on
[A-1] Does only the ABS warning light fail to come on?
Yes
• The ABS warning light (LED) is defective.
• The wire harness is grounded between the ABS ECU and the meter assembly.
• The meter assembly is defective.
• The hydraulic unit assembly is defective.
Return to [A].
No
[A-2] Do all indicator lights fail to come on?
Yes
• The main switch is defective.
• The battery voltage is low.
• The main fuse is blown.
• The meter assembly is defective.
Return to [A].
Comes on
[A-3] The ABS warning light comes on.
Connect the YDT, and then execute functional diagnosis.
Can the YDT communicate with the ABS ECU?
Cannot communicate
[A-4] Only the ABS ECU fails to communicate.
Yes
• The ABS ECU fuse is blown.
• The ABS ECU coupler is disconnected.
• The wire harness is defective.
• The hydraulic unit assembly is defective.
Return to [A].
Can communicate
No
[A-5] ABS ECU and FI ECU fail to communicate.
Yes
• The connection with the YDT is defective.
• The wire harness is defective.
Return to [A].
[B-1] Check for ABS DTC in the screen for the YDT.
Execute diagnosis of malfunction.
Are DTC displayed on the screen?
Yes
[B-2] Diagnose by the DTC.
[B-3] Delete the DTC.
Return to [A].
No
[C-1] Perform the final checks.
Were all of the final checks completed normally?
No
The reaction force generated during brake line routing confirmation is incorrect. Refer to "[C-1] FINAL CHECK".
• The brake hoses and brake pipes are not connected correctly.
The ABS warning light does not go off when the light is checked. Refer to "[C-1] FINAL CHECK".
• The malfunction is not corrected.
• There is a break in the wire harness between the ABS ECU and the meter assembly.
• The meter assembly is defective.
• The ABS warning light circuit in the hydraulic unit assembly is defective.
Return to [A].
Yes
(The ABS warning light goes off when the light is checked.)
Finished.

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/orange terminal of the ABS ECU coupler and green/orange terminal of the meter assembly.
   • If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to “ON”.
   • If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
   • If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

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 8-53.
   • If there is no continuity, replace the main switch.
2. Battery
   • Check the condition of the battery.
   Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.
   • 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 8-55.
   • If the main fuse is blown, replace the fuse.
4. Circuit
   • Check the meter assembly circuit.
   Refer to “CIRCUIT DIAGRAM” on page 9-26.
   • 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 ECU fuse
   - Check the ABS ECU fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-55.
   - If the ABS ECU fuse is blown, replace the fuse.
2. ABS ECU coupler
   - Check that the ABS ECU coupler is connected properly.
     For information about connecting the ABS ECU coupler properly, refer to “INSTALLING THE HYDRAULIC UNIT ASSEMBLY” on page 4-53.
3. Wire harness
   - Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground.
     Check for continuity between brown/blue terminal of the main switch coupler and red/black terminal of the ABS ECU coupler.
     Check for continuity between black terminal of the ABS ECU coupler and the ground.
     If there is no continuity, the wire harness is defective. Replace the wire harness.
   - Open circuit in the wire harness between the ABS ECU coupler and the YDT coupler.
     Check for continuity between blue/white terminal of the ABS ECU coupler and blue/white 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/white terminal of the ABS ECU coupler and blue/white terminal of the YDT coupler. (CANH)
     Check for continuity between blue/black terminal of the ABS ECU coupler and blue/black terminal of the YDT coupler. (CANL)

EAS32903
[B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the YDT is connected to the YDT coupler, the DTC will be displayed on the computer screen.
- A DTC is displayed. [B-2]
- A DTC is not displayed. [C-1]

EAS32904
[B-2] DIAGNOSIS USING THE DTC

This model uses the YDT to identify malfunctions.
For information about using the YDT, refer to the operation manual that is included with the tool.

Yamaha diagnostic tool USB (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

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

Details about the displayed DTCs are shown in the following chart. Refer to this chart and check the vehicle.
Once all the work is complete, delete the DTCs. [B-3]

TIP

Do the final check after terminating the connection with the YDT and turning the main switch off. [C-1]

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 (US)
90890-03269
Yamaha diagnostic tool (A/I)
90890-03264

TIP

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

EAS32905
[C-1] FINAL CHECK

EWA16710

⚠ WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

Check all the following items to complete the inspection.
If the process is not completed properly, start again from the beginning.

Checking procedures

1. Check the brake fluid level in the front brake master cylinder reservoir and the rear brake master cylinder reservoir.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-13.
2. Check the wheel sensors for proper installation.
   Refer to “INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)” on page 4-16 and “INSTALLING THE REAR WHEEL (REAR BRAKE DISC)” on page 4-23.
3. Perform brake line routing confirmation.
   Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-54.
   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 9-37.

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 9-35.
   If the ABS warning light does not turn off, the possible causes are following:
   - The problem is not solved.
   - Open circuit between the ABS ECU and the meter assembly.
     Check for continuity between green/orange terminal of the ABS ECU coupler and green/orange terminal of the meter assembly coupler.
   - Malfunction in the meter assembly circuit.
   - Malfunction in the ABS warning light circuit in the hydraulic unit assembly.

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_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)	—	—	—
“21_ABS”	Hydraulic unit assembly (defective solenoid drive circuit)	—	—	—
“30_EVENT”	Overturn detected.	Unable	Unable	17
“31_ABS”	Hydraulic unit assembly (defective ABS solenoid power 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_ABS”	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	—	—	—
“43, 45_ABS”	Front wheel sensor (missing pulses)	—	—	—
“44, 46_ABS”	Rear wheel sensor (missing pulses)	—	—	—
“51_ABS”	Vehicle system power supply (voltage of ABS ECU power supply is high)	—	—	—
“53_ABS”	Vehicle system power supply (voltage of ABS ECU power supply is low)	—	—	—
“55_ABS”	Hydraulic unit assembly (defective ABS ECU)	—	—	—
“56_ABS”	Hydraulic unit assembly (abnormal internal circuit)	—	—	—
“57_ABS”	Vehicle CAN communication line or power source of vehicle system	—	—	—

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
“62_ABS”	Power supply voltage failure in pressure sensor	—	—	—
“68_ABS”	Defective hydraulic unit assembly (defective front pressure sensor)	—	—	—
“70_EVENT”	Engine forcibly stops when the vehicle is left idling for a long period.	Able/Unable	Able/Unable	—
“89_ABS”	CAN communication (between meter assembly and hydraulic unit assembly)	—	—	—
“90_ABS”	CAN communication (between ECU and hydraulic unit assembly)	—	—	—
“91_ABS”	CAN communication (between IMU and hydraulic unit assembly)	—	—	—
“C0520”	ECU: no normal signals or malfunction signals are received from the IMU.	Able/Unable	Able/Unable	—
“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	—
“P0107, P0108”	[P0107] Intake air pressure sensor 1: ground short circuit detected. [P0108] Intake air pressure sensor 1: open or power short circuit detected.	Able	Able	03
“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
“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, P0222, P0223”	[P0122] Throttle position sensor: ground short circuit detected. [P0123] Throttle position sensor: open or power short circuit detected. [P0222] Throttle position sensor: open or ground short circuit detected. [P0223] Throttle position sensor: power short circuit detected.	Able/Unable	Able/Unable	01, 13
“P0132”	O_2 sensor: short circuit detected (power short circuit).	Able	Able	—
“P0201”	Injector #1: malfunction in injector #1.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	36

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
“P0202”	Injector #2: malfunction in injector #2.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	37
“P0203”	Injector #3: malfunction in injector #3.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	38
“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.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	30
“P0352”	Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	31
“P0353”	Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)	32
“P0458”	Purge cut valve solenoid: open circuit detected.	Able	Able	—
“P0480”	Radiator fan motor relay: open or short circuit detected.	Able	Able	51
“P0500, 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
“P0560, P0563”	[P0560] Charging voltage is abnormal. [P0563] Vehicle system power voltage out of range	Able	Able	—
“P0564”	Cruise control setting switch “RES+”: open or short circuit is detected. Cruise control setting switch “SET–”: open or short circuit is detected.	Able	Able	80, 81

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
“P056C”	Front brake light switch: open or short circuit is detected. Rear brake light switch: open or short circuit is detected.	Able	Able	82, 83
“P0601”	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	Unable	Unable	—
“P0606”	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	Able/Unable	Able/Unable	—
“P062F”	EEPROM DTC: an error is detected while reading or writing on EEPROM.	Able/Unable	Able/Unable	60
“P0638”	YCC-T drive system: malfunction detected.	Able/Unable	Able/Unable	—
“P0657”	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	Able	Able	09, 50
“P0916, P0917”	[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.	Able	Able	—
“P1004”	Intake air pressure sensor 1 and intake air pressure sensor 2: output voltage deviation error.	Able	Able	03, 04
“P1600”	Lean angle sensor: open or short circuit detected.	Unable	Unable	17
“P1601”	Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.	Unable	Unable	20
“P1602”	Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	Able/Unable	Able/Unable	—
“P1606, P1607”	[P1606] Intake air pressure sensor 2: ground short circuit detected. [P1607] Intake air pressure sensor 2: open or power short circuit detected.	Able	Able	04
“P1806, P1807”	[P1806] Shift sensor: open or ground short circuit detected. [P1807] Shift sensor: power short circuit detected.	Able	Able	95

DTC	Symptom	Fail-safe system		Diagnostic code
		Starting the engine	Driving the vehicle	
“P2122, P2123, P2127, P2128, P2138”	[P2122] Accelerator position sensor: open or ground short circuit detected. [P2123] Accelerator position sensor: power short circuit detected. [P2127] Accelerator position sensor: open or ground short circuit detected. [P2128] Accelerator position sensor: power short circuit detected. [P2138] Deviation error	Able/Unable	Able/Unable	14, 15
“P2135”	Throttle position sensor: output voltage deviation error.	Able/Unable	Able/Unable	01, 13
“P2158”	Front wheel sensor: no normal signals are received from the front wheel sensor.	Able	Able	16
“U0125”	Signals cannot be transmitted between the ECU and the IMU.	Unable	Able/Unable	—
“U0155 or Err”	Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	Able	Able	—

EAS33028
SELF-DIAGNOSTIC FUNCTION TABLE (FOR FUEL INJECTION SYSTEM)

TIP

For details of the DTC, refer to “BASIC PROCESS FOR TROUBLESHOOTING” on page 9-16.

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
30_ EVENT	Overturn detected.	• The vehicle has overturned. • Installed condition of IMU. • Defective IMU. • Malfunction in ECU.	—	—
70_ EVENT	Engine forcibly stops when the vehicle is left idling for a long period.	• Allow to idle for a long period of time. • Malfunction in ECU.	—	—

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
C0520	ECU: no normal signals or malfunction signals are received from the IMU.	• Defective IMU coupler or ECU coupler. • Open or short circuit in wire harness between IMU and ECU. • Improperly installed IMU. • Malfunction in IMU. • Malfunction in ECU.	Engine cannot be started (depending on the circumstances).	Engine cannot be started (depending on the circumstances). Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0030	O_2 sensor heater: defective heater controller detected.	• Open circuit in wire harness. • Disconnected coupler. • Defective O_2 sensor heater controller (Malfunction in ECU). • Broken or disconnected lead in O_2 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.) Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P00D1	O_2 sensor: heater performance deterioration	• Improperly installed O_2 sensor. • Defective coupler between O_2 sensor and ECU. • Open or short circuit in wire harness between O_2 sensor and ECU. • Incorrect fuel pressure. • Defective O_2 sensor. • Malfunction in ECU.	Increased exhaust emissions.	O_2 feedback is not carried out. O_2 learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0107 P0108	[P0107] Intake air pressure sensor 1: ground short circuit detected. [P0108] Intake air pressure sensor 1: open or power short circuit detected.	[P0107] Low voltage of the intake air pressure sensor 1 circuit (0.5 V or less) [P0108] High voltage of the intake air pressure sensor 1 circuit (4.8 V or more) • Defective coupler between intake air pressure sensor 1 and ECU. • Open or short circuit in wire harness between intake air pressure sensor 1 and ECU. • Defective intake air pressure sensor 1. • Malfunction in ECU.	Engine idling speed is unstable. Engine response is poor. Loss of engine power. Increased exhaust emissions.	Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. α–N is fixed. Fuel is not cut off due to the intake air pressure difference. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
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) • 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. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

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) • 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]. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0122 P0123 P0222 P0223 P2135	[P0122] Throttle position sensor: ground short circuit detected. [P0123] Throttle position sensor: open or power short circuit detected. [P0222] Throttle position sensor: open or ground short circuit detected. [P0223] Throttle position sensor: power short circuit detected. [P2135] Throttle position sensor: output voltage deviation error.	[P0122, P0222] Low voltage of the throttle position sensor circuit (0.25 V or less) [P0123, P0223] High voltage of the throttle position sensor circuit (4.75 V or more) [P2135] Difference in output voltage 1 and output voltage 2 of the throttle position sensor • Defective coupler between throttle position sensor and ECU. • Open or short circuit in wire harness between throttle position sensor and ECU. • Improperly installed throttle position sensor. • Defective throttle position sensor. • Malfunction in ECU.	Engine idling speed is high. Engine idling speed is unstable. Engine response is poor. Loss of engine power. Deceleration is poor. Increased exhaust emissions. Vehicle cannot be driven.	Change in the throttle opening is 0 (transient control is not carried out). D–j is fixed. Throttle opening is fixed to 125 [°]. O_2 feedback is not carried out. Fuel is not cut off due to the throttle opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out. O_2 sensor heater driving is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0132	O_2 sensor: deterioration detected	High voltage of the O_2 sensor circuit (4.8 V or more) • Improperly installed O_2 sensor. • Defective coupler between O_2 sensor and ECU. • Open or short circuit in wire harness between O_2 sensor and ECU. • Incorrect fuel pressure. • Defective O_2 sensor. • Malfunction in ECU.	Increased exhaust emissions.	O_2 feedback is not carried out. O_2 feedback learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0201 P0202 P0203	[P0201] Injector #1: malfunction in injector #1. [P0202] Injector #2: malfunction in injector #2. [P0203] Injector #3: malfunction in injector #3.	• Defective coupler between injector and ECU. • Open or short circuit in wire harness between injector and ECU. • Defective injector. • Malfunction in ECU. • Improperly installed injector.	Loss of engine power. Engine is difficult to start. Engine cannot be started. Engine stops. Engine idling speed is unstable. Increased exhaust emissions.	O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0335	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	• Defective coupler between crankshaft position sensor and ECU. • Open or short circuit in wire harness between crankshaft position sensor and ECU. • Improperly installed crankshaft position sensor. • 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. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0351 P0352 P0353	[P0351] Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil. [P0352] Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil. [P0353] Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.	• 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.	O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0458	Purge cut valve solenoid: open circuit detected.	• 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.
P0480	Radiator fan motor relay: open or short circuit detected.	• Open or short circuit in wire harness. • Disconnected coupler. • Defective radiator fan motor relay. • Defective radiator fan motor relay controller (Malfunction in ECU).	Engine is difficult to start. Loss of engine power. Engine overheats. Increased exhaust emissions.	Radiator fan motor relay is off all the time. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0500 P1500	[P0500] Rear wheel sensor: no normal signals are received from the rear wheel sensor. [P1500] Neutral switch: open or short circuit is detected. [P1500] Clutch switch: open or short circuit is detected.	• Open or short circuit in wire harness between rear wheel sensor and ABS unit. • Open or short circuit in wire harness between ABS unit and ECU. • [P1500] Open or short circuit in wire harness between neutral switch and ECU. • [P1500] Open or short circuit in wire harness between clutch switch and ECU. • Defective rear wheel sensor. • [P1500] Defective neutral switch. • [P1500] Defective clutch switch. • [P1500] Improper adjustment of clutch lever. • Malfunction in ECU.	Vehicle speed is not displayed on the meter. [P1500] Indication of the neutral indicator light is incorrect. Engine idling speed is unstable. Traction control does not work.	Vehicle speed displayed on the meter = 0 [km/h] O_2 feedback is not carried out. Fuel cut-off control when the rear wheel sensor or neutral switch malfunctions is carried out. ISC feedback is not carried out. ISC learning is not carried out. Traction control does not work. [P0500] QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0560	Charging voltage is abnormal.	• Battery over-discharging (broken or disconnected lead in charging system). • Battery over-discharging (defective rectifier/regulator).	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O_2 feedback is not carried out.
P0563	Vehicle system power voltage out of range	• Battery overcharging (defective rectifier/regulator). • Battery overcharging (broken or disconnected lead in rectifier/regulator wire harness).	Engine is difficult to start. Increased exhaust emissions. Battery performance has deteriorated or battery is defective.	O_2 feedback is not carried out.
P0564	Cruise control setting switch “RES+”: open or short circuit is detected. Cruise control setting switch “SET–”: open or short circuit is detected.	• Open or short circuit in wire harness. • Defective cruise control setting switch. • Malfunction in ECU.	Cruise control system cannot be operated.	Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P056C	Front brake light switch: open or short circuit is detected. Rear brake light switch: open or short circuit is detected.			
P0601	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	• Malfunction in ECU.	Engine cannot be started.	Engine cannot be started. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0606	Internal malfunction in ECU. (When this malfunction is detected in the ECU, the DTC might not appear on the tool display.)	• Malfunction in ECU.	Engine cannot be started. Engine response is poor. Loss of engine power.	Engine cannot be started. Ignition and injection are not carried out. Judgment for other DTCs is not carried out. Load control is not carried out. (The relay unit, radiator fan motor relay, and other relays are all turned off.) The CO adjustment mode and diagnostic mode cannot be activated. Output is restricted. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P062F	EEPROM DTC: an error is detected while reading or writing on EEPROM.	• CO adjustment value is not properly written. • ISC learning value is not properly written. • O_2 feedback learning value is not properly written. • OBD memory value is not properly written. • Malfunction in ECU.	Increased exhaust emissions. Engine cannot be started or is difficult to start. Engine idling speed is unstable. OBD memory value is not correct.	CO adjustment value for the faulty cylinder = 0 (default value) ISC learning values = Default values. OBD memory value is initialized. Initialization of O_2 feedback learning value. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P0638	YCC-T drive system: malfunction detected.	• Defective coupler between throttle servo motor and ECU. • Open or short circuit in wire harness between throttle servo motor and ECU. • Defective throttle servo motor. • Throttle servo motor is stuck (mechanism or motor). • Malfunction in ECU. • Blown electric throttle valve fuse.	Engine response is poor. Loss of engine power. Engine idling speed is unstable.	O_2 feedback is not carried out. YCC-T evacuation is activated. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0657	Fuel system voltage: incorrect voltage supplied to the fuel injector and fuel pump.	• Open or short circuit in wire harness between relay unit and ECU. • Open circuit in wire harness between battery and ECU. • Defective relay unit. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions.	Monitor voltage = 12 [V] O_2 feedback is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P0916 P0917	[P0916] Gear position sensor: open or ground short circuit detected. [P0917] Gear position sensor: power short circuit detected.	[P0916] Low voltage of the gear position sensor circuit (0.2 V or less) [P0917] High voltage of the gear position sensor circuit (4.8 V or more) • Defective coupler between gear position sensor and ECU. • Open or power short circuit in wire harness between gear position sensor and ECU. • Improperly installed gear position sensor. • Defective gear position sensor. • Malfunction in ECU.	Improper display for position. Engine response is poor.	Maintains the gear position value at the previous value. QSS is not carried out. Engine brake management: control mode is fixed. Engine brake management: control value is fixed. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P1004	Intake air pressure sensor 1 and intake air pressure sensor 2: output voltage deviation error.	• Intake pressure sensor 1 hose or intake pressure sensor 2 hose is detached, clogged, kinked or bent. • Defective intake air pressure sensor 1 or intake air pressure sensor 2. • Malfunction in ECU.	Engine is difficult to start. Engine idling speed is unstable. Increased exhaust emissions. Loss of engine power.	Intake air pressure is fixed to 101.3 [kPa]. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. α–N is fixed. Fuel is not cut off due to the intake air pressure difference. O_2 feedback is not carried out. ISC feedback is not carried out. ISC learning is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P1600	Lean angle sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Malfunction in IMU. • Malfunction in ECU.	Engine cannot be started.	Engine cannot be started. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P1601	Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.	• 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). Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P1602	Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	• Open or short circuit in wire harness between ECU and battery. • Open or short circuit in wire harness between ECU and main switch. • Blown backup fuse. • Malfunction in ECU.	Engine idling speed is unstable. Engine idling speed is high. Increased exhaust emissions. Engine is difficult to start.	O_2 feedback learning is not carried out. O_2 feedback learning value is not written. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P1606 P1607	[P1606] Intake air pressure sensor 2: ground short circuit detected. [P1607] Intake air pressure sensor 2: open or power short circuit detected.	• Defective coupler between intake air pressure sensor 2 and ECU. • Open or short circuit in wire harness between intake air pressure sensor 2 and ECU. • Improperly installed intake air pressure sensor 2. • Defective intake air pressure sensor 2. • Malfunction in ECU.	Engine is difficult to start. Increased exhaust emissions. Insufficient power at high altitudes. Engine idling speed is unstable.	α–N is fixed. Intake air pressure difference is fixed to 0 [kPa]. Atmospheric pressure is fixed to 101.3 [kPa]. 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. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P1806 P1807	[P1806] Shift sensor: open or ground short circuit detected. [P1807] Shift sensor: power short circuit detected.	• Defective coupler between shift sensor and ECU. • Open or power short circuit in wire harness between shift sensor and ECU. • Improperly installed shift sensor. • Defective shift sensor. • Malfunction in ECU.	Unable to carry out QSS. (If this abnormality occurs during actual shifting, the operation will be carried out until the process is completed.)	QSS is not carried out.

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P2122 P2123 P2127 P2128 P2138	[P2122] Accelerator position sensor: open or ground short circuit detected. [P2123] Accelerator position sensor: power short circuit detected. [P2127] Accelerator position sensor: open or ground short circuit detected. [P2128] Accelerator position sensor: power short circuit detected. [P2138] Deviation error	[P2122, P2127] Low voltage of the accelerator position sensor circuit (0.25 V or less) [P2123, P2128] High voltage of the accelerator position sensor circuit (4.75 V or more) [P2138] Difference in output voltage 1 and output voltage 2 of the accelerator position sensor • Defective coupler between accelerator position sensor and ECU. • Open or short circuit in wire harness between accelerator position sensor and ECU. • Improperly installed accelerator position sensor. • Defective accelerator position sensor. • Malfunction in ECU.	Engine response is poor. Loss of engine power. Engine idling speed is unstable.	No change in accelerator opening (transient control is not carried out). Accelerator opening is fixed to 0[°]. O_2 feedback is not carried out. YCC-T evacuation is activated. Fuel cut is prohibited by accelerator opening. Output is restricted. ISC feedback is not carried out. ISC learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
P2158	Front wheel sensor: no normal signals are received from the front wheel sensor.	• Open or short circuit in wire harness between front wheel sensor and ABS ECU. • Defective front wheel sensor. • Malfunction in ABS ECU. • Malfunction in ECU.	Traction control does not work. Traction control system indicator on the meter comes on. Traction control system switch is disabled. (Traction control system indicator on the meter goes OFF.)	Traction control does not work. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

DTC	Item	Probable cause of malfunction	Vehicle symptom	Fail-safe system operation
P2195	O_2 sensor: open circuit detected.	• Low voltage of the O_2 sensor circuit (0.18–0.49 V). • Improperly installed O_2 sensor. • Defective coupler between O_2 sensor and ECU. • Open or short circuit in wire harness between O_2 sensor and ECU. • Incorrect fuel pressure. • Defective O_2 sensor. • Malfunction in ECU.	Increased exhaust emissions.	O_2 feedback is not carried out. O_2 feedback learning is not carried out. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)
U0125	Signals cannot be transmitted between the ECU and the IMU.	• Defective IMU coupler or ECU coupler. • Open or short circuit in wire harness between IMU and ECU. • Malfunction in IMU. • Malfunction in ECU.	Engine cannot be started.	Engine cannot be started. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

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 9-33.

DTC	Item	Symptom	Check point
11	Front wheel sensor (intermittent pulses or no pulses)	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
12	Rear wheel sensor (intermittent pulses or no pulses)	Rear wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
13* 26*	Front wheel sensor (abnormal pulse period)	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
14* 27*	Rear wheel sensor (abnormal pulse period)	Rear wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor

DTC	Item	Symptom	Check point
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	• Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly
16	Rear wheel sensor (open or short circuit)	Open or short circuit is detected in the rear wheel sensor.	• Defective coupler between the rear wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the rear wheel sensor and the hydraulic unit assembly • Defective rear wheel sensor or hydraulic unit assembly
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	• Defective hydraulic unit assembly
31	Hydraulic unit assembly (defective ABS solenoid power circuit)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	• Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	• Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
34	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.	• Defective hydraulic unit assembly

DTC	Item	Symptom	Check point
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.	• Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly
42	Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	• Pulses from the rear wheel sensor are received intermittently while the vehicle is traveling. • Rear wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.	• Incorrect installation of the rear wheel sensor • Incorrect rotation of the rear wheel • Rear brake dragging • Defective hydraulic unit assembly
43* 45*	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
44* 46*	Rear wheel sensor (missing pulses)	Rear wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the rear wheel sensor • Incorrect installation of the rear wheel • Defective sensor rotor or incorrect installation of the rotor • Defective rear wheel sensor or incorrect installation of the sensor
51	Vehicle system power supply (voltage of ABS ECU power supply is high)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high.	• Defective battery • Disconnected battery terminal • Defective charging system

DTC	Item	Symptom	Check point
53	Vehicle system power supply (voltage of ABS ECU power supply is low)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.	• Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system
55	Hydraulic unit assembly (defective ABS ECU)	Abnormal data is detected in the hydraulic unit assembly.	• Defective hydraulic unit assembly
56	Hydraulic unit assembly (abnormal internal circuit)	Abnormality detected in of hydraulic unit assembly.	• Defective hydraulic unit assembly
57	Vehicle CAN communication line or power source of vehicle system	Short-circuit in CAN communication line or the voltage that supplies the hydraulic unit assembly is too low.	• Short-circuit in CAN communication line • Defective battery • Defective coupler between battery and hydraulic unit assembly • Wire harness between battery and hydraulic unit is interrupted or has short-circuited • Defective charging system
62	Power supply voltage failure in pressure sensor	Abnormality detected in pressure sensor power supply circuit of hydraulic unit assembly.	• Defective hydraulic unit assembly
68	Defective hydraulic unit assembly (defective front pressure sensor)	Abnormality detected in pressure sensor circuit at front caliper side of hydraulic unit assembly.	In case of electrical interlocking brake • Defective front brake line • Defective hydraulic unit assembly
89	CAN communication (between meter assembly and hydraulic unit assembly)	Transmitted data from the meter cannot be normally received.	• Defective coupler between meter assembly and hydraulic unit assembly • Harness is broken or short-circuit between meter assembly and hydraulic unit assembly • Defective meter assembly • Defective hydraulic unit assembly

DTC	Item	Symptom	Check point
90	CAN communication (between ECU and hydraulic unit assembly)	Transmitted data from the FI ECU cannot be normally received.	• Defective coupler between FI ECU and hydraulic unit assembly • Harness is broken or short-circuit between FI ECU and hydraulic unit assembly • Defective FI ECU • Defective hydraulic unit assembly
91	CAN communication (between IMU and hydraulic unit assembly)	Transmitted data from the IMU cannot be normally received.	• Defective coupler between IMU and hydraulic unit assembly • Harness is broken or short-circuit between IMU and hydraulic unit assembly • Defective IMU • Defective hydraulic unit assembly

* 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)	[U0155 (FI)] Multi-function meter: signals cannot be transmitted between the ECU and the multi-function meter.	Communication between the ECU and the meter is not possible • 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. Traction control does not work.	MAP changeover: State is fixed. Traction control does not work. Meter switch input: OFF is fixed. QSS is not carried out. Cruise control system cannot be operated. (for MT09SPM/ MT09SPMC)

EAS33031
DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Tool display	Procedure
01	Throttle position sensor signal 1		
	• Fully closed position	11–21	Check with throttle valves fully closed.
	• Fully open position	96–107	Check with throttle valves fully open.
03	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pushing the "≋" side of the stop/run/start switch. (If the display value changes, the performance is OK.)
04	Intake air pressure 2	Displays the intake air pressure.	Operate the throttle while pushing the "@" side of the stop/run/start switch. (If the display value changes, the performance is OK.)
05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured air temperature with the 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.
09	Fuel system voltage (battery voltage)	Fuel system voltage Approximately 12.0	Set the stop/run/start switch to "◯", and then compare the actually measured battery voltage with the tool display value. (If the actually measured battery voltage is low, recharge the battery.)
13	Throttle position sensor signal 2		
	• Fully closed position	9–23	Check with throttle valves fully closed.
	• Fully open position	93–109	Check with throttle valves fully open.

Diagnostic code No.	Item	Tool display	Procedure
14	Accelerator position sensor signal 1		
	• Fully closed position	14–18	Check with throttle grip fully closed position.
	• Fully open position	82–92	Check with throttle grip fully open position.
	[For MT09SPM/MT09SP-MC] Turn the throttle grip past the closed position in the deceleration direction.	7–12	
15	Accelerator position sensor signal 2		
	• Fully closed position	14–18	Check with throttle grip fully closed position.
	• Fully open position	82–92	Check with throttle grip fully open position.
	[For MT09SPM/MT09SP-MC] Turn the throttle grip past the closed position in the deceleration direction.	7–12	
16	Front wheel vehicle speed pulses	Front wheel speed pulse 0–999	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
17	Bank angle display	Displays the bank angle in increments of 5° • 0–5° (vehicle is vertical) • Less than 30° (when the sidestand is used)	Check that 0–5° is displayed when the vehicle is vertical and that the displayed value increases as the vehicle continues to incline.
20	Sidestand switch		Extend and retract the sidestand (with the transmission in gear).
	• Sidestand retracted	ON	
	• Sidestand extended	OFF	

Diagnostic code No.	Item	Tool display	Procedure
21	Neutral switch and clutch switch • Transmission is in neutral • Transmission is in gear or the clutch lever released • Clutch lever is squeezed with the transmission in gear and when the sidestand is retracted • Clutch lever is squeezed with the transmission in gear and when the sidestand is extended	 ON OFF ON OFF	Operate the transmission, clutch lever, and sidestand.
60	EEPROM DTC display • No history • History exists	 00 • No malfunctions detected (If the DTC P062F is indicated, the ECU is defective.) 01–03 (CO adjustment value) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.) Except 00–03 (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 [-]	—

Diagnostic code No.	Item	Tool display	Procedure
80	Cruise control setting switch “RES+” • Switch is pushed • Switch is released	 ON OFF	Push and release the “RES+” side of the cruise control setting switch.
81	Cruise control setting switch “SET-” • Switch is pushed • Switch is released	 ON OFF	Push and release the “SET-” side of the cruise control setting switch.
82	Cruise control cancel circuit • Clutch lever is squeezed • Clutch lever is released • Brake lever is squeezed • Brake lever is released • Brake pedal is depressed • Brake pedal is released	 ON OFF ON OFF ON OFF	Operate the clutch lever, brake lever, brake pedal, and throttle grip.
83	Front brake light switch and rear brake light switch • Brake lever is squeezed • Brake lever is released • Brake pedal is depressed • Brake pedal is released	 ON OFF ON OFF	Operate the brake lever and brake pedal.
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.
95	Shift sensor • Shift sensor output voltage display • With no shift weighting input • Shift up weighting • Shift down weighting	 0.2–4.8 [V] Approx. 2.5 [V] Changes to the low side Changes to the high side	Check the sensor condition by operating the shift pedal.

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.
32	Cylinder-#3 ignition coil	Actuates the cylinder-#3 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	Injector #1	Actuates the 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 injector #1 is actuated five times by listening for the operating sound.
37	Injector #2	Actuates the 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 injector #2 is actuated five times by listening for the operating sound.
38	Injector #3	Actuates the injector #3 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 injector #3 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 intake solenoid is actuated.	Check that the purge cut valve solenoid is actuated five times by listening for the operating sound.

Diagnostic code No.	Item	Actuation	Procedure
50	Main relay	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 comes on five times.
57	Grip warmer	Turns on the grip warmers for 2 minutes.	Check that the grip warmers become warm.

EAS20707
EVENT CODE TABLE

TIP

The event code numbers listed below cannot be displayed on the meter. To display the event code numbers, use the YDT.

No.	Item	Symptom	Possible causes	Note
192	Intake air pressure sensor	Brief abnormality detected in the intake air pressure sensor	Same as for DTC number P0107 and P0108	Perform the inspection items listed for DTC number P0107 and P0108.
193	Throttle position sensor	Brief abnormality detected in the throttle position sensor	Same as for DTC number P0122, P0123, P0222 and P0223	Perform the inspection items listed for DTC number P0122, P0123, P0222 and P0223.
195	Sidestand switch	Brief abnormality detected in the ECU (blue/yellow) input line	Same as for DTC number P1601	Perform the inspection items listed for DTC number P1601.
196	Coolant temperature sensor	Brief abnormality detected a 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.
199	Intake air pressure sensor 2	Brief abnormality detected in the intake air pressure sensor 2	Same as for DTC No. P1606 and P1607	Perform the inspection items listed for DTC No. P1606 and P1607.
207	Accelerator position sensor	Brief abnormality detected in the accelerator position sensor	Same as for DTC number P2122, P2123, P2127 and P2128	Perform the inspection items listed for DTC number P2122, P2123, P2127 and P2128.
220	Gear position sensor	Brief abnormality detected in the gear position sensor	Same as for DTC number P0916 and P0917	Perform the inspection items listed for DTC number P0916 and P0917.
240	O_2 sensor (Stuck at the upper limit for adjustment)	During O_2 feedback, the adjustment is maintained at the upper limit	• 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	• If a DTC is occurring, respond to that first. * Rarely, Code 240 occurs even when the system is functioning properly.

No.	Item	Symptom	Possible causes	Note
241	O_2 sensor (Stuck at the lower limit for adjustment)	During O_2 feedback, the adjustment is maintained at the lower limit	• 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	• If a DTC is occurring, respond to that first. * Rarely, Code 241 occurs even when the system is functioning properly.
242	ISC (Stuck at the upper limit for adjustment)	During idling, the adjustment is maintained at the upper limit	Idling engine speed is slow • Clogged throttle body • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU	• 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 • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU	• 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	• No gasoline • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU	• 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	• No gasoline • Poorly adjusted clutch cable • Malfunction in the fuel injection system • Dirty or worn spark plug • Malfunction in the battery • Malfunction in ECU	• If a DTC is occurring, respond to that first. * Rarely, Code 245 occurs even when the system is functioning properly.

No.	Item	Symptom	Possible causes	Note
246	Cruise control	Automatic turning off of the cruise control system detected	The cruise control system will automatically turn off under the following conditions: • Unable to maintain the set cruising speed when traveling up a steep slope • Wheel slip detected • Engine stalls • Sidestand is extended • Engine stop switch is set to the "⊗" position	The automatic turning off of the cruise control system does not indicate a malfunction in the system.
251	Shift sensor	Brief abnormality detected in the shift sensor	Same as for DTC number P1806 and P1807	Perform the inspection items listed for DTC number P1806 and P1807.

EAS20552
30_EVENT

EAS33033
TROUBLESHOOTING

Item

Overturn 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 IMU.
   - Check the installed direction and condition of the sensor.
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   - Check the grommet for cracks.

   Is check result OK?

   YES

   → Go to step 3.

   NO

   a. Fix the IMU 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 IMU.
   - Execute the diagnostic mode. (Code 17)
   - Check that 0°–5° 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 IMU.
      Refer to “GENERAL CHASSIS (1)” on page 4-1.
   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 8-55.

EAS20554
70_EVENT

EAS33034
TROUBLESHOOTING
Item
Engine forcibly stops when the vehicle is left idling for a long period.

Procedure
TIP

If another error code is displayed at the same time, check the other error code 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 8-55.

EAS20560
C0520

EAS33319
TROUBLESHOOTING
Item
ECU: no normal signals or malfunction signals are received from the IMU.
Fail-safe system
- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure
1. Connection of IMU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

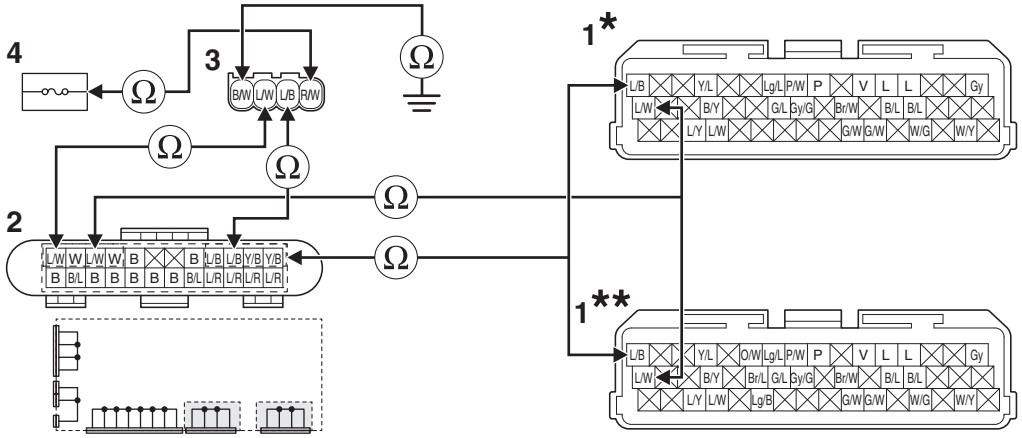
   Is the coupler condition normal?
   YES
   → Go to step 2.
   NO
   a. Connect the coupler securely or replace the wire harness.
   b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

   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 ECU coupler “1”, IMU coupler “3” and ignition fuse 2 “4”.
   - Remove the joint coupler cap “2”.
   - Open circuit check

Between ignition fuse 2 “4” coupler and IMU coupler “3”	red/white–red/white
Between IMU coupler “3” and joint coupler “2”	blue/white–blue/white blue/black–blue/black
Between IMU coupler “3” and joint coupler “2”	blue/white–blue/white blue/black–blue/black
Between IMU coupler “3” and ground	black/white–ground



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

- Short circuit check

TIP

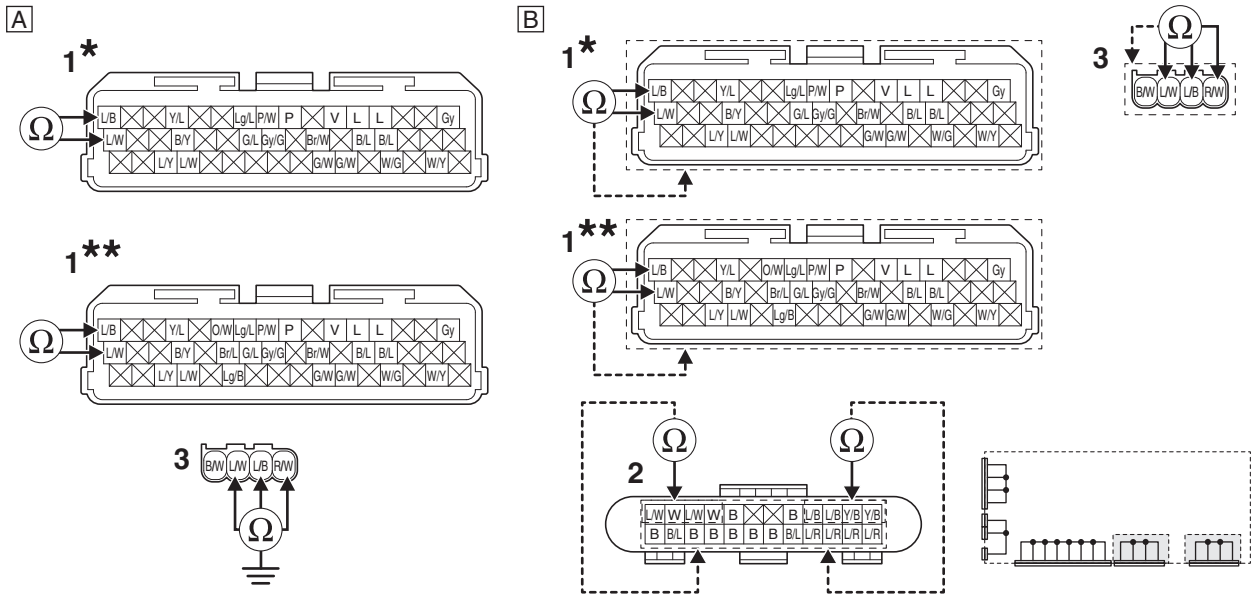
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between ECU coupler “1” and ground	blue/black–ground blue/white–ground
Between IMU coupler “3” and ground	blue/black–ground blue/white–ground red/white–ground

Lines short circuit check “B”

ECU coupler “1”	blue/black–any other coupler terminal blue/white–any other coupler terminal
IMU coupler “3”	blue/black–any other coupler terminal blue/white–any other coupler terminal red/white–any other coupler terminal
Joint coupler “2”	blue/black–any other coupler terminal blue/white–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of IMU.
   - Check the installed direction and condition of the sensor.
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   - Check the grommet for cracks.

Is check result OK?

YES

→ Go to step 5.

NO

a. Fix the IMU installation condition.
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 IMU.
   - Replace the IMU.
     Refer to “GENERAL CHASSIS (1)” on page 4-1.
   - 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 8-55.
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.

EAS20397
P0030

EAS33134
TROUBLESHOOTING

Item

O_2 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, P0222, P0223, P2135

1. Connection of O_2 sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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 stop/run/start switch to “ON”.

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

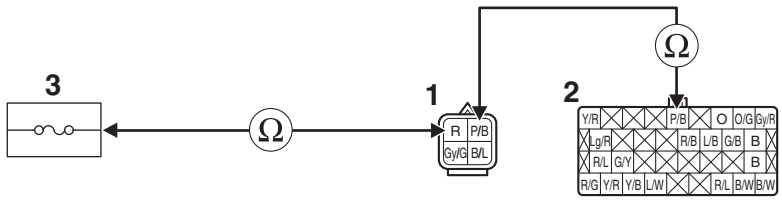
→ Go to step 3.

TIP

For this check, also set the stop/run/start switch to "ON".

3. Wire harness continuity.
   • Disconnect the O_2 sensor coupler "1", ECU coupler "2"and ignition fuse 1 "3".
   • Open circuit check

Between O_2 sensor coupler "1" and ECU coupler "2"	pink/black–pink/black
Between O_2 sensor coupler "1" and ignition fuse holder "3"	red–red



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 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 "Short circuit check".

TIP

For this check, also set the stop/run/start switch to "ON".

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

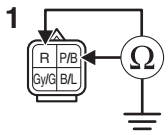
Ground short circuit check "A"

Between O_2 sensor coupler "1" and ground	red–ground pink/black–ground

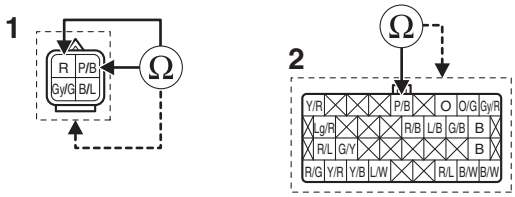
Lines short circuit check "B"

O_2 sensor coupler "1"	red–any other coupler terminal pink/black–any other coupler terminal
ECU coupler "2"	pink/black–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

→ 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 stop/run/start switch to "ON".

4. Defective O_2 sensor.
   - Replace the O_2 sensor.
     Refer to "ENGINE REMOVAL" on page 5-9.
   - Turn the main switch to "ON", and then check the condition of the 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 stop/run/start switch to "ON".

5. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-55.
6. Delete the DTC and check that the MIL goes off.
   - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20660
P00D1, P2195

EAS33115
TROUBLESHOOTING

Item

- [P00D1] O_2 sensor: heater performance deterioration
- [P2195] O_2 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.
- P0030

1. Installed condition of O_2 sensor.
   - Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 2.

NO

a. Reinstall or replace the O_2 sensor.
   Refer to “ENGINE REMOVAL” on page 5-9.
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 O_2 sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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

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

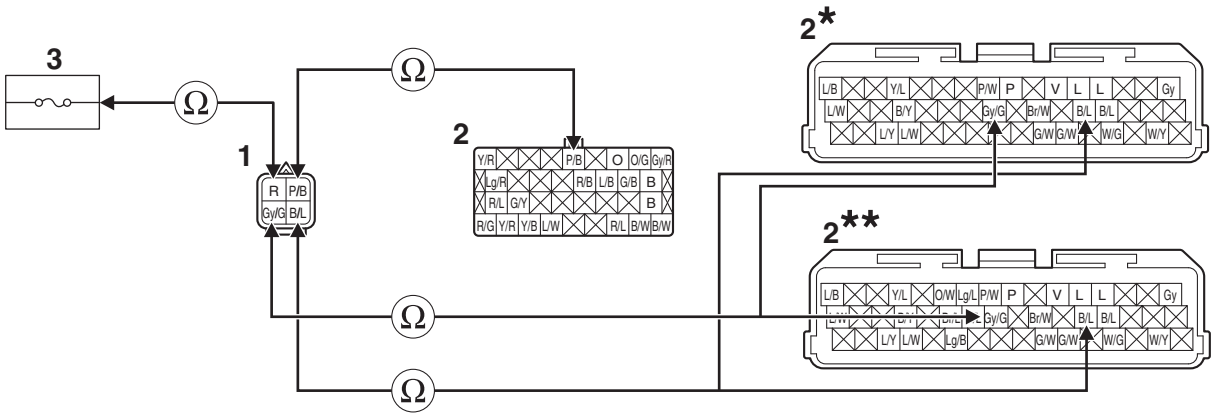
→ Go to step 8, and complete the service.

NO

→ Go to step 4.

4. Wire harness continuity.
   - Disconnect the O_2 sensor coupler "1", ECU coupler "2" and ignition fuse 1 "3".
   - Open circuit check

Between O_2 sensor coupler "1" and ECU coupler "2"	gray/green–gray/green pink/black–pink/black black/blue–black/blue
Between O_2 sensor coupler "1" and ignition fuse 1 holder "3"	red–red



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 1 minute.
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 "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

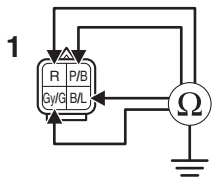
Ground short circuit check "A"

Between O_2 sensor coupler "1" and ground	gray/green–ground pink/black–ground black/blue–ground red–ground

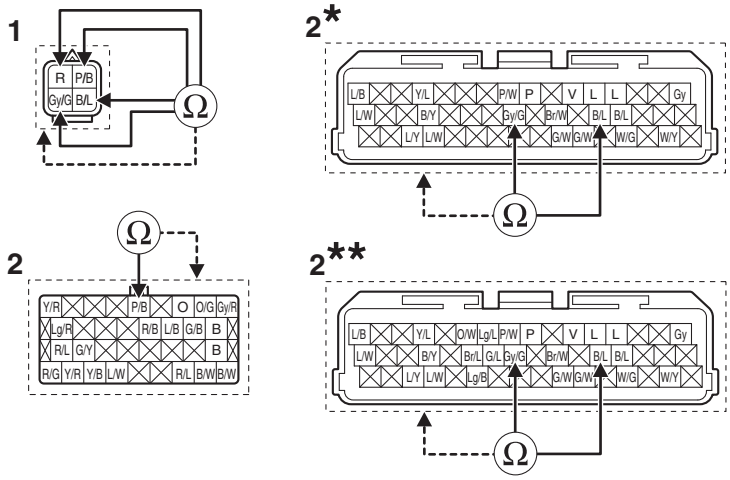
Lines short circuit check "B"

O_2 sensor coupler "1"	gray/green–any other coupler terminal pink/black–any other coupler terminal black/blue–any other coupler terminal red–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

A



B



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

a. 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 5.

5. Check fuel pressure.
   - Check the fuel pressure.
     Refer to "CHECKING THE FUEL PRESSURE" on page 7-10.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the fuel pump.
   Refer to "REMOVING THE FUEL PUMP" on page 7-3.
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 O_2 sensor.
   a. Replace the O_2 sensor.
      Refer to "ENGINE REMOVAL" on page 5-9.
   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 8-55.
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.

EAS20567
P0107, P0108

EAS33047
TROUBLESHOOTING

Item

• [P0107] Intake air pressure sensor 1: ground short circuit detected.
• [P0108] Intake air pressure sensor 1: 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 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 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.

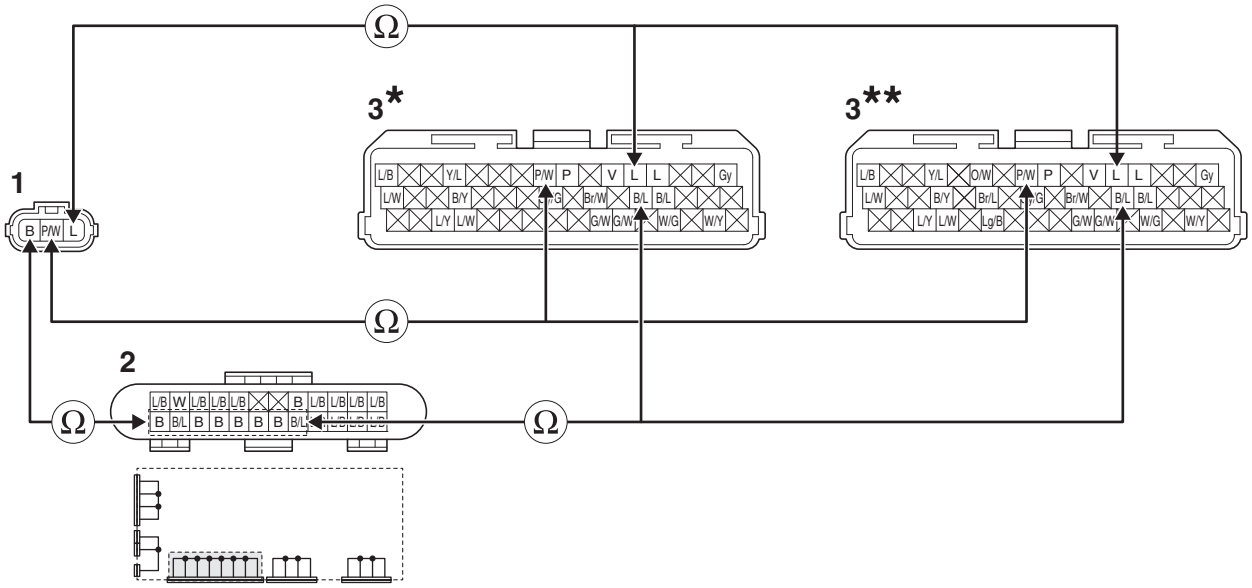
2. Connection of ECU coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 1 coupler “1” and ECU coupler “3”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between ECU coupler “3” and joint coupler cap “2”	[P0108] black/blue–black/blue
Between ECU coupler “3” and intake air pressure sensor 1 coupler “1”	[P0108] blue–blue [P0107, P0108] pink/white–pink/white
Between intake air pressure sensor 1 coupler “1” and joint coupler “2”	[P0108] black–black



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

- Short circuit check

TIP

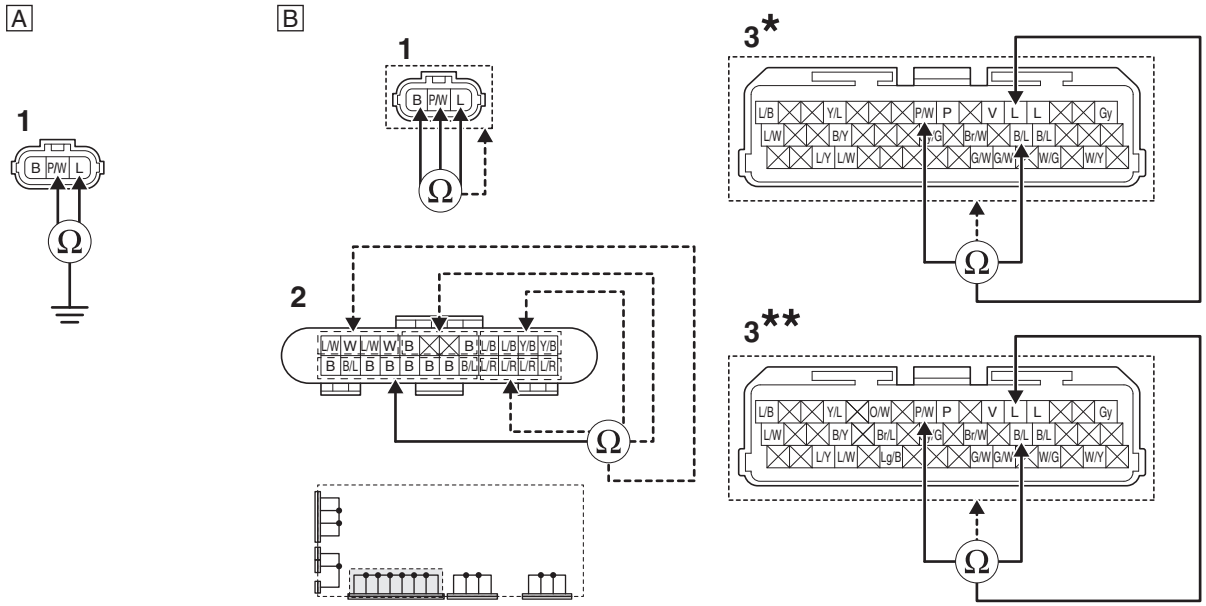
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between intake air pressure sensor 1 coupler “1” and ground	blue–ground pink/white–ground

Lines short circuit check “B”

ECU coupler “3”	[P0108] blue–any other coupler terminal [P0108] black/blue–any other coupler terminal [P0107, P0108] pink/white–any other coupler terminal
Intake air pressure sensor 1 coupler “1”	[P0108] blue–any other coupler terminal [P0108] black–any other coupler terminal [P0107, P0108] pink/white–any other coupler terminal
Joint coupler “2”	[P0108] black/blue–any other coupler terminal [P0108] black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of intake air pressure sensor 1.
• 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 1.
   - Execute the diagnostic mode. (Code 03)
   - When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated.

At sea level	Approx. 101 kPa (757.6 mmHg, 29.8 inHg), approx. 3.64 V
1000 m (3300 ft) above sea level	Approx. 90 kPa (675.1 mmHg, 26.6 inHg), approx. 3.30 V
2000 m (6700 ft) above sea level	Approx. 80 kPa (600.0 mmHg, 23.6 inHg), approx. 3.00 V
3000 m (9800 ft) above sea level	Approx. 70 kPa (525.0 mmHg, 20.7 inHg), approx. 2.70 V

   - When engine is cranking: Make sure that the indication value changes.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the intake air pressure sensor 1.
   Refer to “THROTTLE BODIES” on page 7-5.
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 8-55.
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

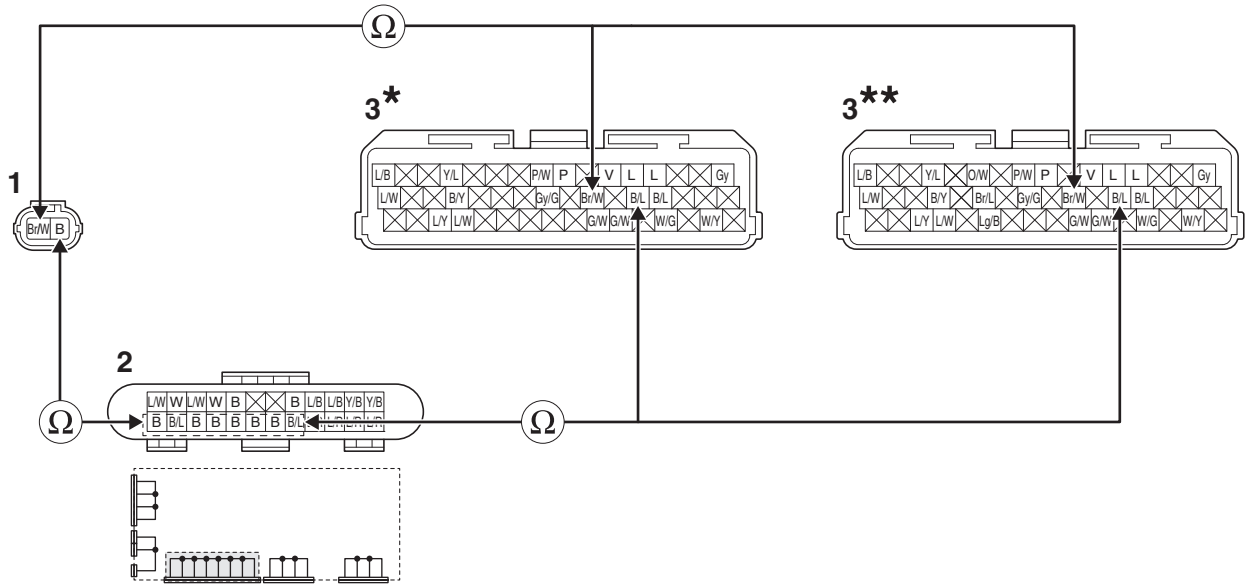
   → Go to step 7, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity.
   • Disconnect the intake air temperature sensor coupler “1” and ECU coupler “3”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between ECU coupler “3” and intake air temperature sensor coupler “1”	[P0113] brown/white–brown/white
Between ECU coupler “3” and joint coupler “2”	[P0112, P0113] black/blue–black/blue
Between intake air temperature sensor coupler “1” and joint coupler “2”	[P0113] black–black



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

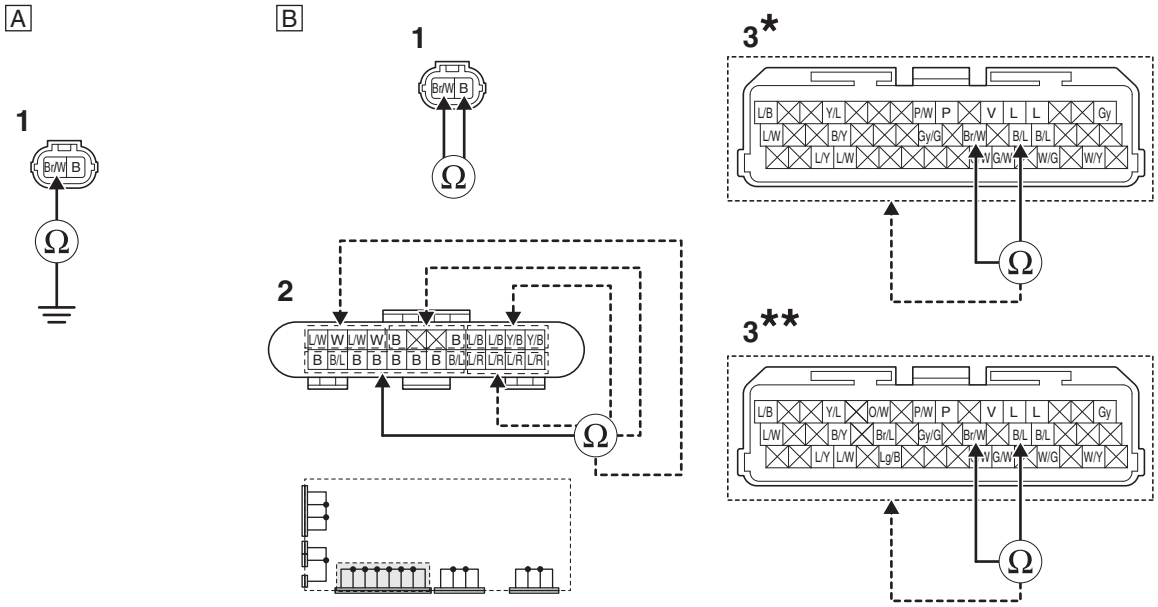
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between intake air temperature sensor coupler “1” and ground	[P0112, P0113] brown/white–ground

Lines short circuit check “B”

intake air temperature sensor coupler “1”	[P0112, P0113] brown/white–any other coupler terminal [P0113] black–any other coupler terminal
Joint coupler “2”	[P0113] black/blue–any other coupler terminal [P0113] black–any other coupler terminal
ECU coupler “3”	[P0112, P0113] brown/white–any other coupler terminal [P0113] black/blue–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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 4.

4. Installed condition of intake air temperature sensor.
   • Check for looseness or pinching.
   Refer to “GENERAL CHASSIS (2)” 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 “DIAGNOSTIC CODE: SENSOR OPERATION TABLE” on page 9-62.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the intake air temperature sensor.
   Refer to “GENERAL CHASSIS (2)” 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 8-55.
7. Delete the DTC and check that the MIL goes off.
   - Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20569
P0117, P0118

EAS33049
TROUBLESHOOTING

Item

- [P0117] Coolant temperature sensor: ground short circuit detected.
- [P0118] Coolant temperature sensor: open or power short circuit detected.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

TIP

Perform this procedure when the engine is cold.

1. Connection of coolant temperature sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Is the coupler condition normal?

   YES

   → Go to step 2.

   NO

   a. Connect the coupler securely or replace the wire harness.
   b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

      Is it in the “Recovered” condition?

      YES

      → Go to step 7, and complete the service.

      NO

      → Go to step 2.

2. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Is the coupler condition normal?

   YES

   → Go to step 3.

   NO

   a. Connect the coupler securely or replace the wire harness.
   b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

      Is it in the “Recovered” condition?

      YES

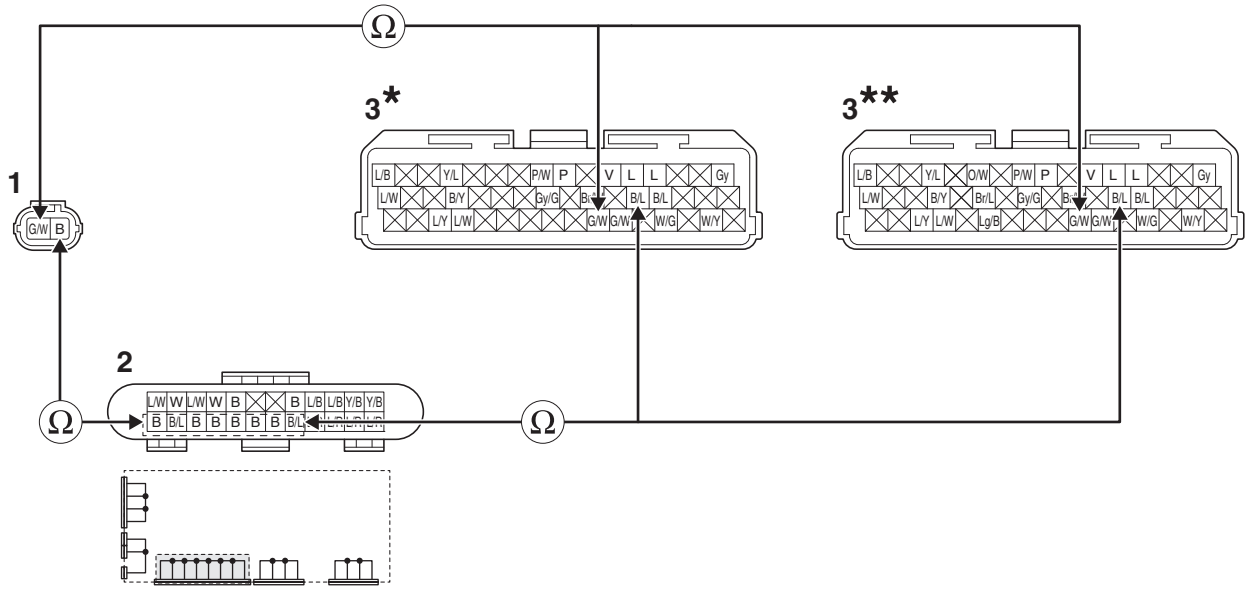
      → Go to step 7, and complete the service.

      NO

      → Go to step 3.

3. Wire harness continuity.
   • Disconnect the coolant temperature sensor coupler “1” and ECU coupler “3”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between coolant temperature sensor coupler “1” and ECU coupler “3”	[P0117, P0118] green/white–green/white
Between coolant temperature sensor coupler “1” and joint coupler “2”	[P0118] black–black
Between joint coupler “2” and ECU coupler “3”	[P0118] black/blue–black/blue



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to step “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 “Short circuit check”.

• Short circuit check

TIP

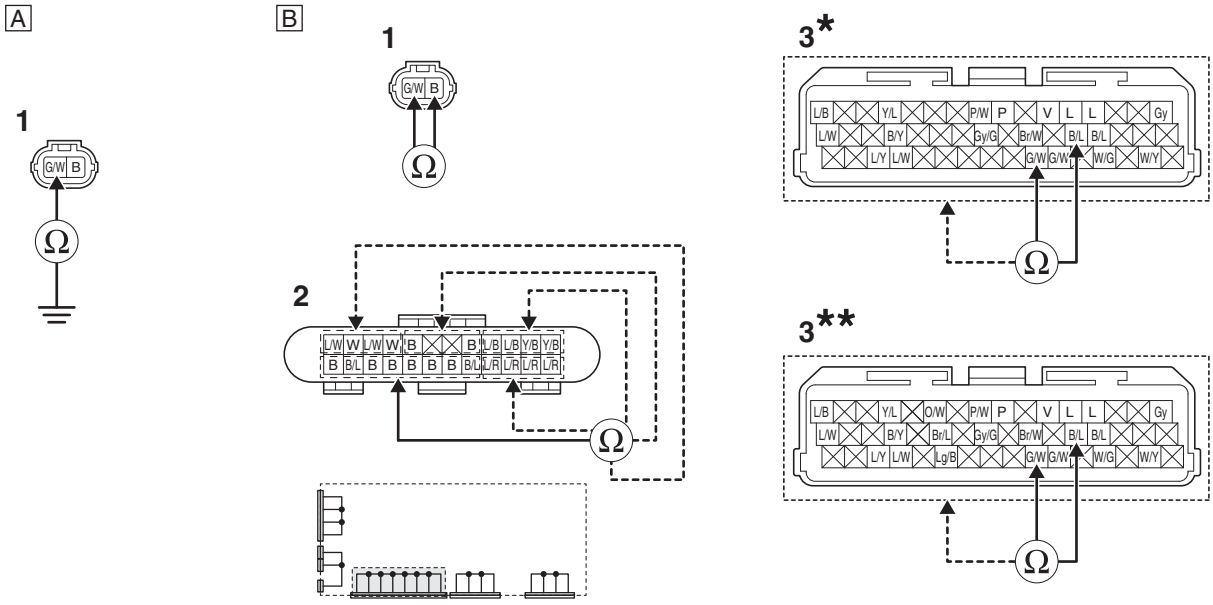
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between coolant temperature sensor coupler “1” and ground	[P0117, P0118] green/white–ground

Lines short circuit check “B”

Coolant temperature sensor coupler “1”	[P0117, P0118] green/white–any other coupler terminal [P0118] black–any other coupler terminal
Joint coupler “2”	[P0118] black/blue–any other coupler terminal [P0118] black–any other coupler terminal
ECU coupler “3”	[P0117, P0118] green/white–any other coupler terminal [P0118] black/blue–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of coolant temperature sensor.
   • Check for looseness or pinching.
   Refer to “CYLINDER HEAD” on page 5-26.

Is check result OK?

YES

→ Go to step 5.

NO

a. Reinstall the sensor.
b. Turn the main switch to “ON”, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Defective coolant temperature sensor.
   • Execute the diagnostic mode. (Code 06)
   • When engine is cold: Displayed temperature is close to the ambient temperature.
   • The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor.
   Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-63.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the coolant temperature sensor.
   Refer to “CYLINDER HEAD” on page 5-26.
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 8-55.
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.

EAS20570
P0122, P0123, P0222, P0223

EAS33050
TROUBLESHOOTING

Item

- [P0122] Throttle position sensor: ground short circuit detected.
- [P0123] Throttle position sensor: open or power short circuit detected.
- [P0222] Throttle position sensor: open or ground short circuit detected.
- [P0223] 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 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 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

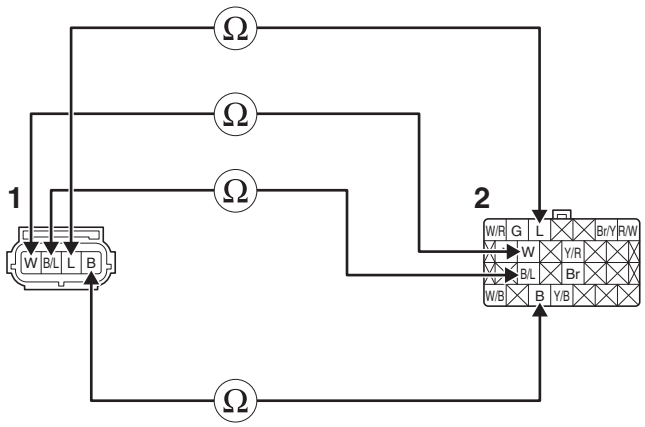
→ Go to step 8, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
   • Disconnect the throttle position sensor coupler “1” and ECU coupler “2”.
   • Open circuit check

Between throttle position sensor coupler “1” and ECU coupler “2”	[P0122, P0123, P0222, P0223] white–white [P0123, P0223] black/blue–black/blue [P0122, P0222] blue–blue [P0122, P0123, P0222, P0223] black–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 8, and complete the service.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

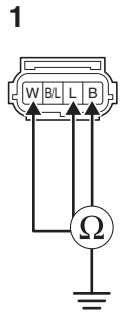
Ground short circuit check “A”

Between throttle position sensor coupler “1” and ground	[P0122, P0123, P0222, P0223] white–ground [P0122, P0222] blue–ground [P0122, P0123, P0222, P0223] black–ground

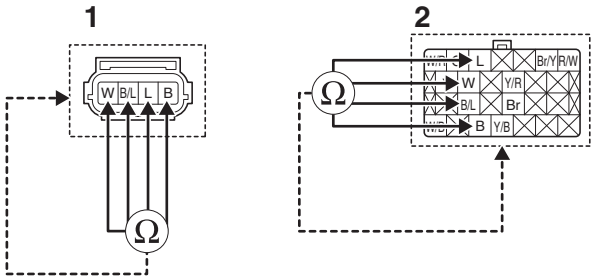
Lines short circuit check “B”

Throttle position sensor coupler “1”	[P0122, P0123, P0222, P0223] white–any other coupler terminal [P0123, P0223] black/blue–any other coupler terminal [P0122, P0222] blue–any other coupler terminal [P0122, P0123, P0222, P0223] black–any other coupler terminal
ECU coupler “2”	[P0122, P0123, P0222, P0223] white–any other coupler terminal [P0123, P0223] black/blue–any other coupler terminal [P0122, P0222] blue–any other coupler terminal [P0122, P0123, P0222, P0223] black–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 8, and complete the service.

NO

→ Go to step 4.

4. Installed condition of throttle position sensor.
   • Check for looseness or pinching.
   Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-11.

Is check result OK?

YES

→ Go to step 5.

NO

a. Reinstall or adjust 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 8, and complete the service.

NO

→ Go to step 5.

5. Defective throttle position sensor.
   • Check throttle position sensor signal 1.
   • Execute the diagnostic mode. (Code 01)

When the throttle valves are fully closed	11–21
When throttle valves are fully open	96–107

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the throttle position sensor.
   Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” 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 8, and complete the service.

NO

→ Go to step 6.

6. Defective throttle position sensor.
   • Check throttle position sensor signal 2.
   • Execute the diagnostic mode. (Code 13)

When the throttle valves are fully closed	9–23
When throttle valves are fully open	93–109

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 7-11.
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 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 8-55.
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.

EAS20571
P0132

EAS33051
TROUBLESHOOTING

Item

O_2 sensor: short circuit detected (power short circuit).

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Installed condition of O_2 sensor.
   - Check for looseness or pinching.
     Refer to “ENGINE REMOVAL” on page 5-9.

   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 O_2 sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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

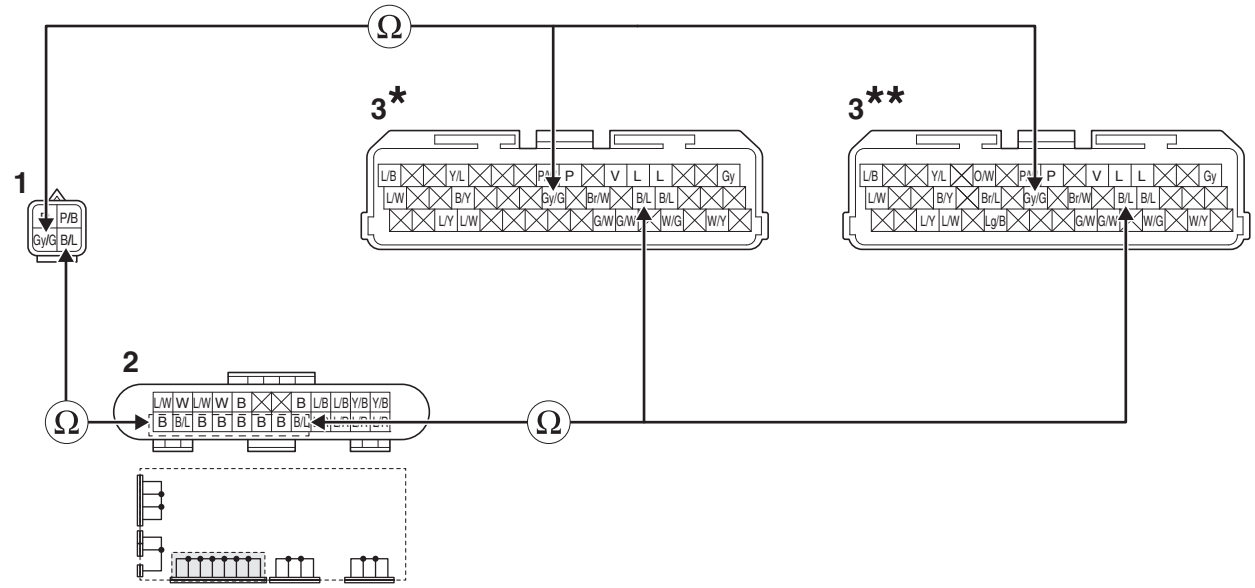
→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Wire harness continuity.
   - Disconnect the O_2 sensor coupler “1” and ECU coupler “3”.
   - Remove the joint coupler cap “2”.
   - Open circuit check

Between O_2 sensor coupler “1” and ECU coupler “3”	gray/green–gray/green
Between O_2 sensor coupler “1” and joint coupler “2”	black/blue–black/blue
Between joint coupler “2” and ECU coupler “3”	black/blue–black/blue



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

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 "Short circuit check".

- Short circuit check

TIP

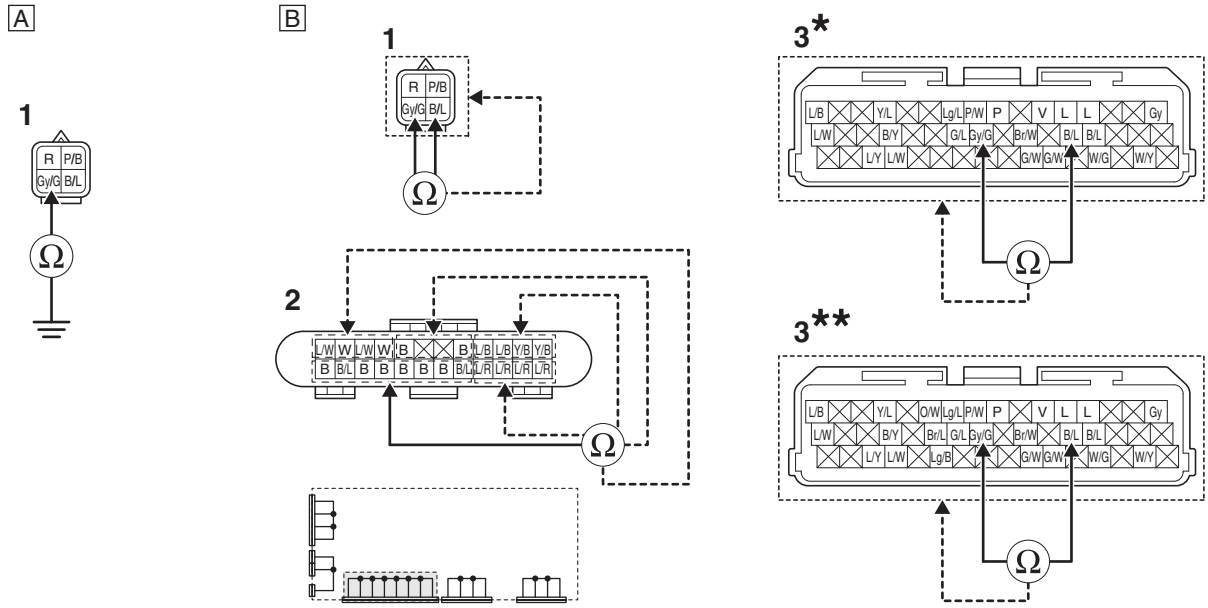
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

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 "1"	gray/green–any other coupler terminal black/blue–any other coupler terminal
Joint coupler "2"	black/blue–any other coupler terminal
ECU coupler "3"	gray/green–any other coupler terminal black/blue–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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 O_2 sensor.
   a. Replace the O_2 sensor.
      Refer to "ENGINE REMOVAL" on page 5-9.
   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 8-55.
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.

EAS20574
P0201

EAS33054
TROUBLESHOOTING
Item
Injector #1: malfunction in 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 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 wire harness.
   b. Execute the diagnostic mode. (Code 36)

      Is it hear operating sound?
      YES
      → Go to step 6.
      NO
      → Go to step 2.

2. Defective injector #1.
   - Measure the injector resistance.
     Refer to “CHECKING THE FUEL INJECTORS” on page 8-64.

   Is check result OK?
   YES
   → Go to step 3.
   NO
   a. Replace the injector #1.
      Refer to “THROTTLE BODIES” on page 7-5.
   b. Execute the diagnostic mode. (Code 36)

      Is it hear operating sound?
      YES
      → Go to step 6.
      NO
      → Go to step 3.

3. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

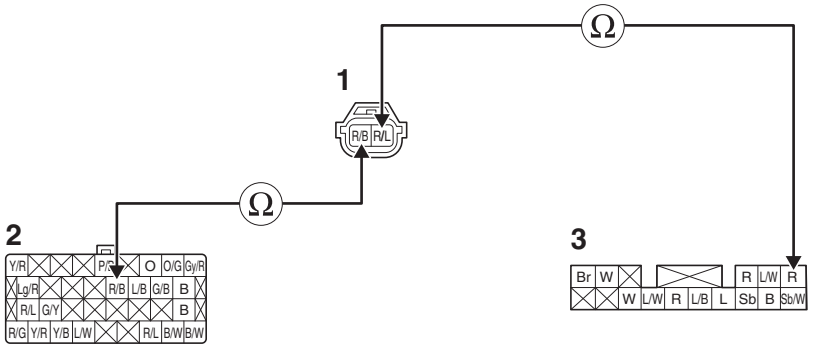
→ Go to step 6.

NO

→ Go to step 4.

4. Wire harness continuity.
   • Disconnect the injector #1 coupler “1”, ECU coupler “2” and relay unit coupler “3”.
   • Open circuit check

Between injector #1 coupler “1” and ECU coupler “2”	red/black–red/black
Between injector #1 coupler “1” and relay unit coupler “3”	red/blue–red



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

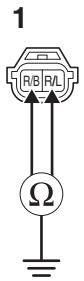
Ground short circuit check “A”

Between injector #1 coupler “1” and ground	red/black–ground red/blue–ground

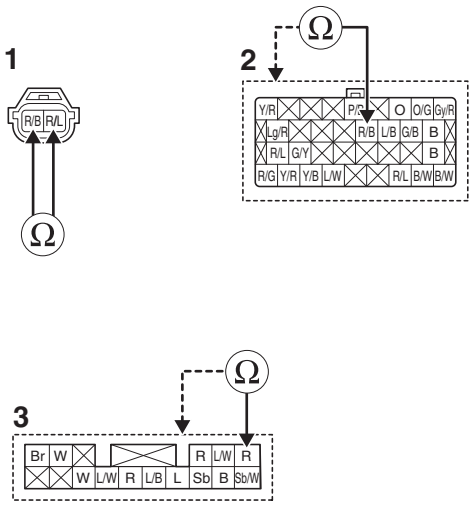
Lines short circuit check “B”

Injector #1 coupler “1”	red/black–any other coupler terminal red/blue–any other coupler terminal
ECU coupler “2”	red/black–any other coupler terminal
Relay unit coupler “3”	red–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 36)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to step 5.

5. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
6. Delete the DTC and check that the MIL goes off.
   - Start the engine and let it idle for approximately 5 seconds.
   - Confirm that the DTC has a condition of “Recovered” using the malfunction mode of the YDT, and then delete the DTC.

EAS20575
P0202

EAS33055
TROUBLESHOOTING

Item

Injector #2: malfunction in 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 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 wire harness.
   b. Execute the diagnostic mode. (Code 37)

      Is it hear operating sound?

      YES

      → Go to step 6.

      NO

      → Go to step 2.

2. Defective injector #2.
   - Measure the injector resistance.
     Refer to “CHECKING THE FUEL INJECTORS” on page 8-64.

   Is check result OK?

   YES

   → Go to step 3.

   NO

   a. Replace the injector #2.
      Refer to “THROTTLE BODIES” on page 7-5.
   b. Execute the diagnostic mode. (Code 37)

      Is it hear operating sound?

      YES

      → Go to step 6.

      NO

      → Go to step 3.

3. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

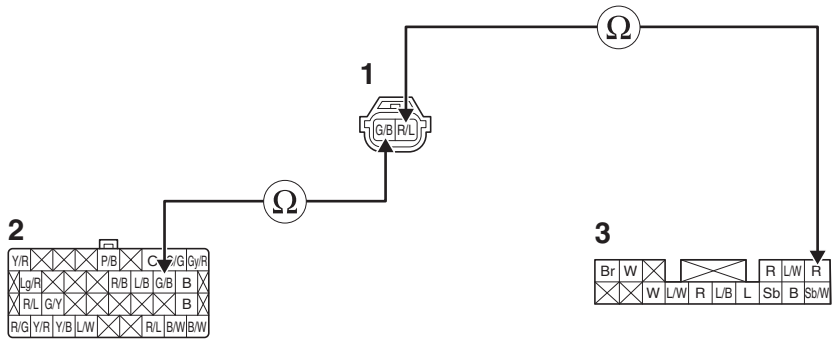
→ Go to step 6.

NO

→ Go to step 4.

4. Wire harness continuity.
   • Disconnect the injector #2 coupler “1”, ECU coupler “2” and relay unit coupler “3”.
   • Open circuit check

Between injector #2 coupler “1” and ECU coupler “2”	green/black–green/black
Between injector #2 coupler “1” and relay unit coupler “3”	red/blue–red



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

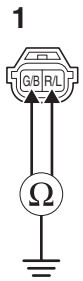
Ground short circuit check “A”

Between injector #2 coupler “1” and ground	green/black–ground red/blue–ground

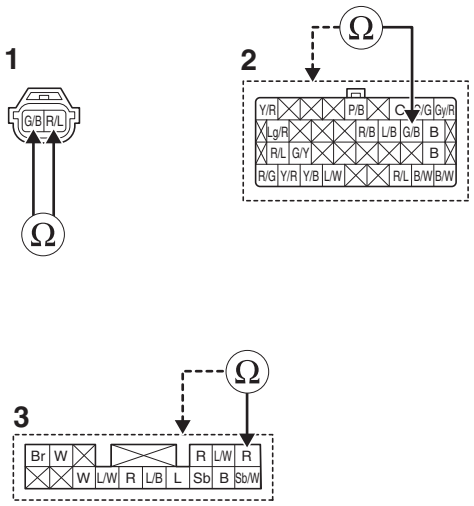
Lines short circuit check “B”

Injector #2 coupler “1”	green/black–any other coupler terminal red/blue–any other coupler terminal
ECU coupler “2”	green/black–any other coupler terminal
Relay unit coupler “3”	red–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 37)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to step 5.

5. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
6. Delete the DTC and check that the MIL goes off.
   - Start the engine and let it idle for approximately 5 seconds.
   - Confirm that the DTC has a condition of “Recovered” using the malfunction mode of the YDT, and then delete the DTC.

EAS20576
P0203

EAS33056
TROUBLESHOOTING
Item
Injector #3: malfunction in injector #3.
Fail-safe system
- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure
1. Connection of injector #3 coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Is the coupler condition normal?
   YES
   → Go to step 2.
   NO
   a. Connect the coupler securely or replace the wire harness.
   b. Execute the diagnostic mode. (Code 38)

      Is it hear operating sound?
      YES
      → Go to step 6.
      NO
      → Go to step 2.

2. Defective injector #3.
   - Measure the injector resistance.
     Refer to “CHECKING THE FUEL INJECTORS” on page 8-64.

   Is check result OK?
   YES
   → Go to step 3.
   NO
   a. Replace the injector #3.
      Refer to “THROTTLE BODIES” on page 7-5.
   b. Execute the diagnostic mode. (Code 38)

      Is it hear operating sound?
      YES
      → Go to step 6.
      NO
      → Go to step 3.

3. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 38)

Is it hear operating sound?

YES

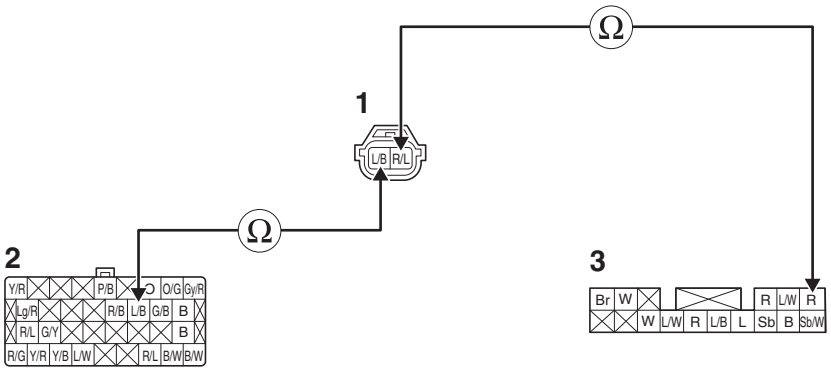
→ Go to step 6.

NO

→ Go to step 4.

4. Wire harness continuity.
   • Disconnect the injector #3 coupler “1”, ECU coupler “2” and relay unit coupler “3”
   • Open circuit check

Between injector #3 coupler “1” and ECU coupler “2”	blue/black–blue/black
Between injector #3 coupler “1” and relay unit coupler “3”	red/blue–red



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 38)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

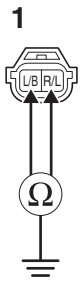
Ground short circuit check “A”

Between injector #3 coupler “1” and ground	blue/black–ground red/blue–ground

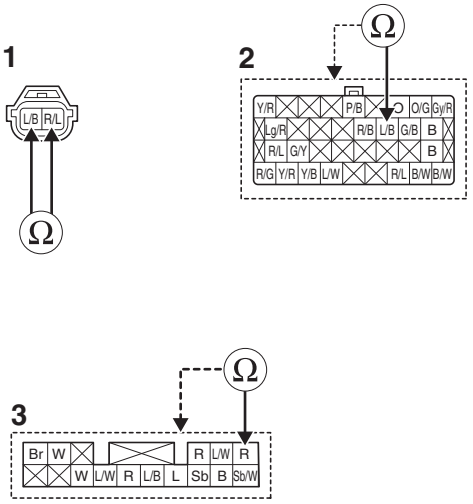
Lines short circuit check “B”

Injector #3 coupler “1”	blue/black–any other coupler terminal red/blue–any other coupler terminal
ECU coupler “2”	blue/black–any other coupler terminal
Relay unit coupler “3”	red–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 38)

Is it hear operating sound?

YES

→ Go to step 6.

NO

→ Go to step 5.

5. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
6. Delete the DTC and check that the MIL goes off.
   - Start the engine and let it idle for approximately 5 seconds.
   - Confirm that the DTC has a condition of “Recovered” using the malfunction mode of the YDT, and then delete the DTC.

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.

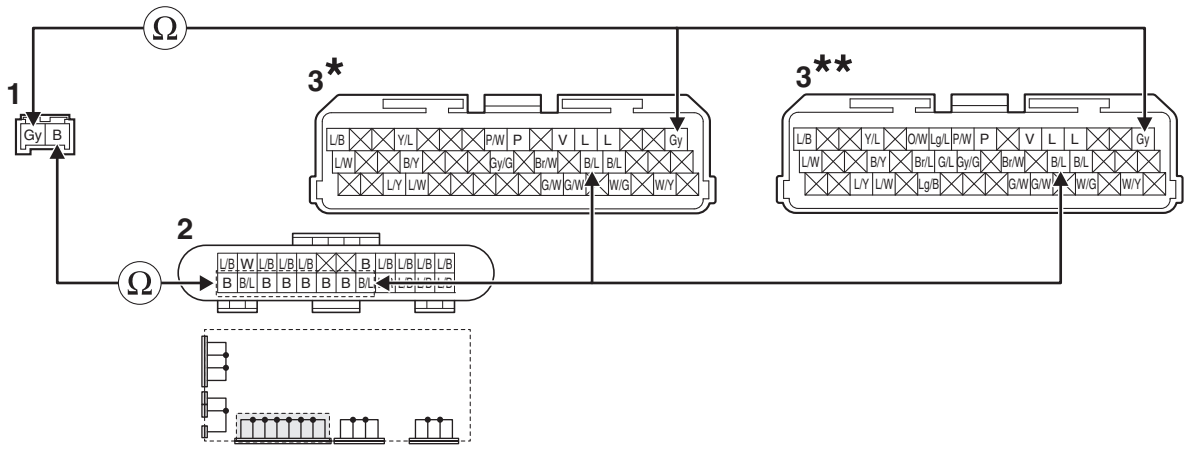
2. Connection of wire harness ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 "3".
   - Remove the joint coupler cap "2".
   - Open circuit check

Between crankshaft position sensor coupler “1” and ECU coupler “3”	gray–gray
Between crankshaft position sensor coupler “1” and joint coupler “2”	black–black
Between joint coupler “2” and ECU coupler “3”	black/blue–black/blue



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

- Short circuit check

TIP

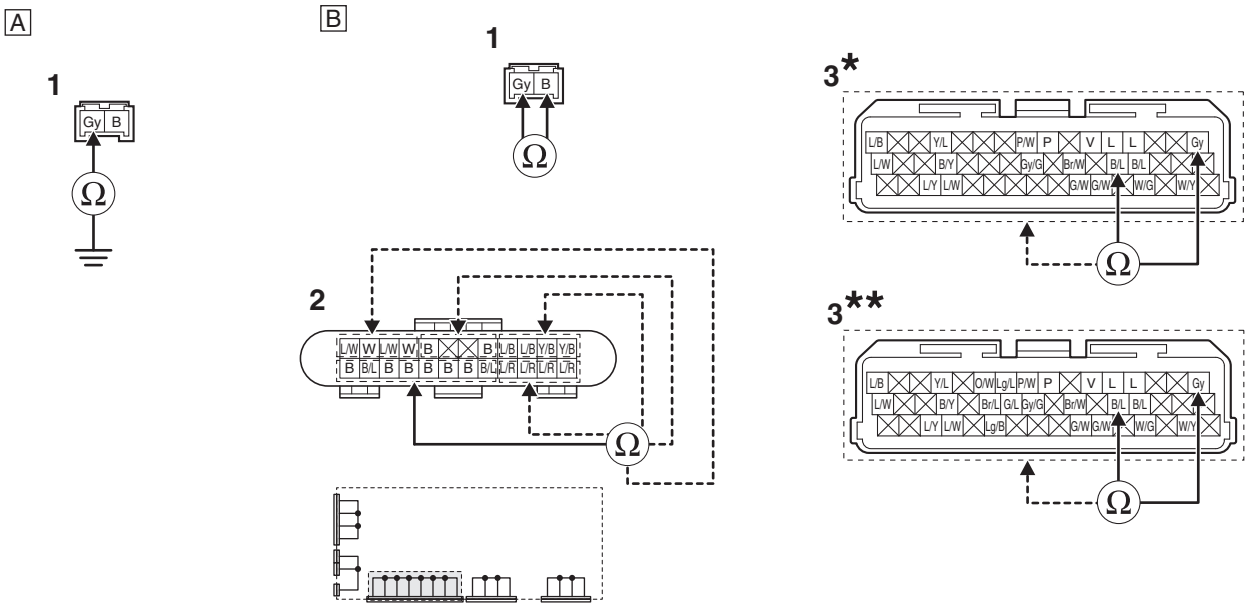
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between crankshaft position sensor coupler “1” and ground	gray–ground

Lines short circuit check “B”

Crankshaft position sensor coupler “1”	black/blue–any other coupler terminal gray–any other coupler terminal
Joint coupler “2”	black–any other coupler terminal black/blue–any other coupler terminal
ECU coupler “3”	black/blue–any other coupler terminal gray–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 8-60.

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 8-55.
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

- 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 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

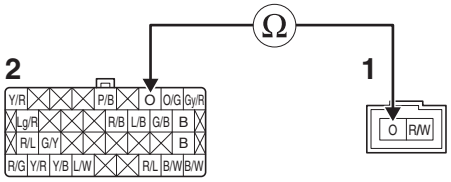
   → Go to step 7, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity.
   - Disconnect the cylinder-#1 ignition coil coupler "1" and ECU coupler "2".
   - Open circuit check

Between cylinder-#1 ignition coil coupler "1" and ECU coupler "2"	orange–orange



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 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 "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

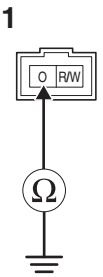
Ground short circuit check "A"

Between cylinder-#1 ignition coil coupler "1" and ground	orange–ground

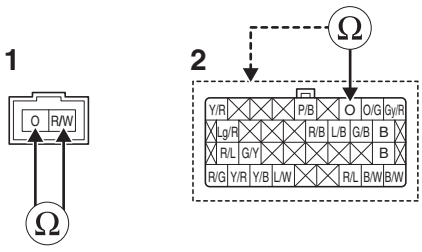
Lines short circuit check "B"

Cylinder-#1 ignition coil coupler "1"	orange–any other coupler terminal
ECU coupler "2"	orange–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 4.

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 5 seconds.
c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of 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 8-59.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the cylinder-#1 ignition coil.
   Refer to "CAMSHAFTS" on page 5-16.
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 8-55.
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

- 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 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

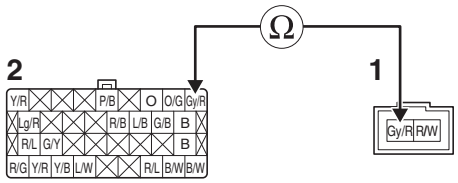
   → Go to step 7, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity.
   - Disconnect the cylinder-#2 ignition coil coupler "1" and ECU coupler "2".
   - Open circuit check

Between cylinder-#2 ignition coil coupler "1" and ECU coupler "2"	gray/red–gray/red



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 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 "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

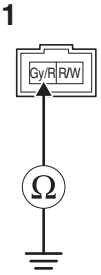
Ground short circuit check "A"

Between cylinder-#2 ignition coil coupler "1" and ground	gray/red–ground

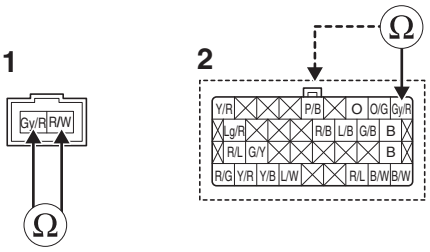
Lines short circuit check "B"

Cylinder-#2 ignition coil coupler "1"	gray/red–any other coupler terminal
ECU coupler "2"	gray/red–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 4.

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 5 seconds.
c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of 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 8-59.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the cylinder-#2 ignition coil.
   Refer to "CAMSHAFTS" on page 5-16.
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 8-55.
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.

EAS20582
P0353

EAS33062
TROUBLESHOOTING
Item
Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.
Fail-safe system
- Able to start engine (depending on the number of faulty cylinders)
- Able to drive vehicle (depending on the number of faulty cylinders)

Procedure
1. Connection of cylinder-#3 ignition coil coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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.

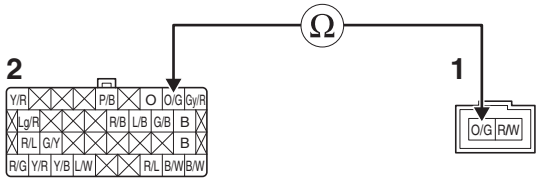
2. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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-#3 ignition coil coupler "1" and ECU coupler "2".
   - Open circuit check

Between cylinder-#3 ignition coil coupler "1" and ECU coupler "2"	orange/green–orange/green



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 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 "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

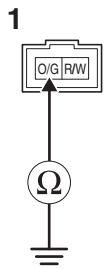
Ground short circuit check "A"

Between cylinder-#3 ignition coil coupler "1" and ground	orange/green–ground

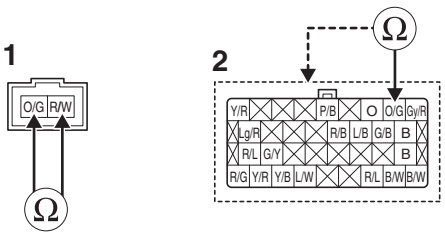
Lines short circuit check "B"

Cylinder-#3 ignition coil coupler "1"	orange/green–any other coupler terminal
ECU coupler "2"	orange/green–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 4.

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 5 seconds.
c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of cylinder-#3 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-#3 ignition coil.
   • Measure the primary coil resistance of the cylinder-#3 ignition coil.
   Refer to "CHECKING THE IGNITION COILS" on page 8-59.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the cylinder-#3 ignition coil.
   Refer to "CAMSHAFTS" on page 5-16.
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 32)
   • Confirm that spark plug does not sparking.
   • Replace the ECU, and complete the service.
   Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
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

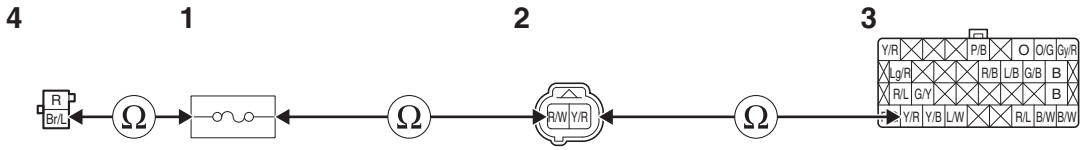
   → Go to step 7, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity.
   - Disconnect the ignition fuse 1 “1”, purge cut valve solenoid coupler “2”, ECM coupler “3” and main switch coupler “4”.
   - Open circuit check

Between ignition fuse 1 holder “1” and purge cut valve solenoid coupler “2”	red–red/white
Between purge cut valve solenoid coupler “2” and ECU coupler “3”	yellow/red–yellow/red
Between main switch coupler “4” and ignition fuse 1 holder “1”	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 “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

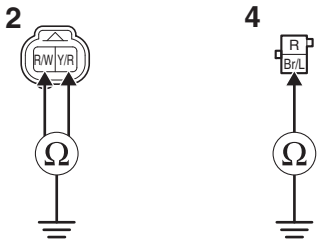
Ground short circuit check “A”

Between purge cut valve solenoid coupler “2” and ground	red/white–ground yellow/red–ground
Between main switch coupler “4” and ground	brown/blue–ground

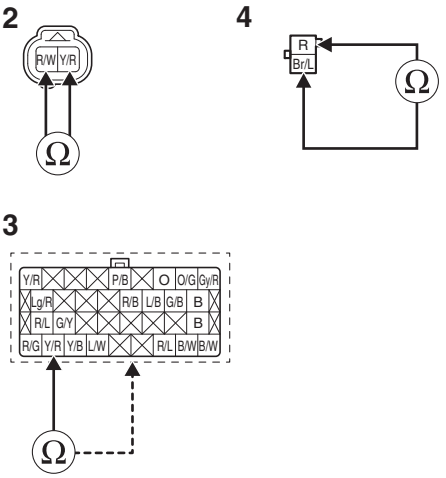
Lines short circuit check “B”

Purge cut valve solenoid coupler “2”	red/white–any other coupler terminal yellow/red–any other coupler terminal
ECU coupler “3”	yellow/red–any other coupler terminal
Main switch coupler “4”	brown/blue–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→Go to step 4.

NO

a. Replace the wire harness.
b. Turn the main switch to "ON", and then check the condition of the DTC 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. 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 it hear operationg sound?

YES

→ Go to step 7, and complete the service.

NO

→ Check the purge cut valve solenoid.
Refer to “CHECKING THE PURGE CUT VALVE SOLENOID (for MT09MC/MT09SPMC)” on page 8-65.

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 8-55.
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.

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.

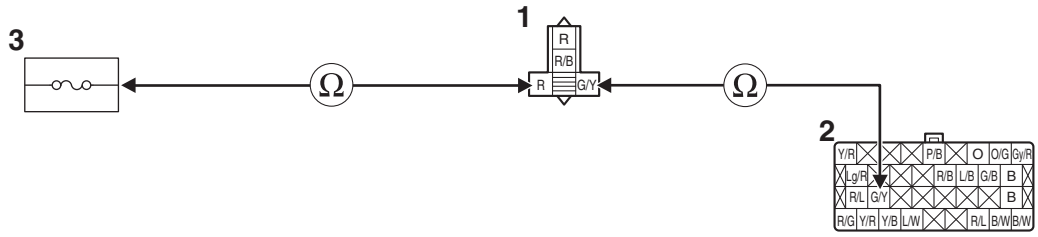
2. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 1 “3”.
   - Open circuit check

Between radiator fan motor relay “1” and ignition fuse 1 holder “3”	red–red
Between radiator fan motor relay “1” and ECU coupler “2”	green/yellow–green/yellow



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 “Short circuit check”.

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

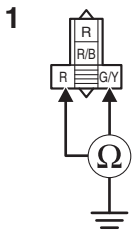
Ground short circuit check “A”

Between radiator fan motor relay “1” and ground	green/yellow–ground red–ground

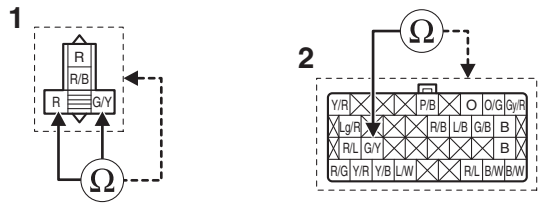
Lines short circuit check “B”

Radiator fan motor relay “1”	green/yellow–any other coupler terminal red–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 8-55.
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.

EAS20774
P0500, 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

TIP

• In case P0500 is detected, or both P0500 and P1500 are detected, proceed from step 1.
• If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
• P0335

1. Locate the malfunction.
   • DTCs P0500 or P0500 and 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 21.

NO

→ Go to step 2.

TIP

Perform the procedure from step 2 to step 7 and step 21.

• DTC P1500 detected.

a. 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 b.

NO

→ Go to step 8.

TIP

Perform the procedure from step 8 to step 14 and step 21.

b. Execute the diagnostic mode. (Code 21)

When the transmission is in gear with the clutch lever squeezed and the sidestand retracted	ON

Is check result OK?

YES

→ Go to step 21.

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

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 07)
c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21.

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

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 07)
c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 21.

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

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 07)
c. Rotate the rear wheel by hand and check that the indicated value increases.

Is that value increased?

YES

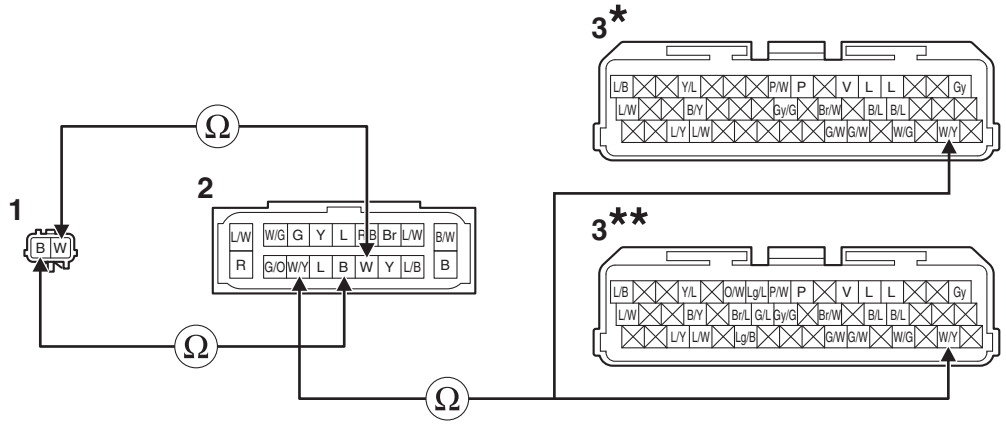
→ Go to step 21.

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 “1” and ABS ECU coupler “2”	black–black white–white
Between ABS ECU coupler “2” and ECU coupler “3”	white/yellow–white/yellow



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

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.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

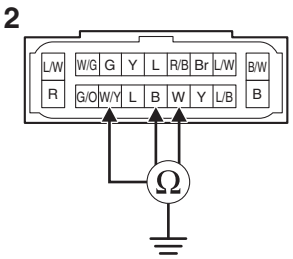
Ground short circuit check “A”

Between ABS ECU coupler “2” and ground	black–ground white–ground white/yellow–ground

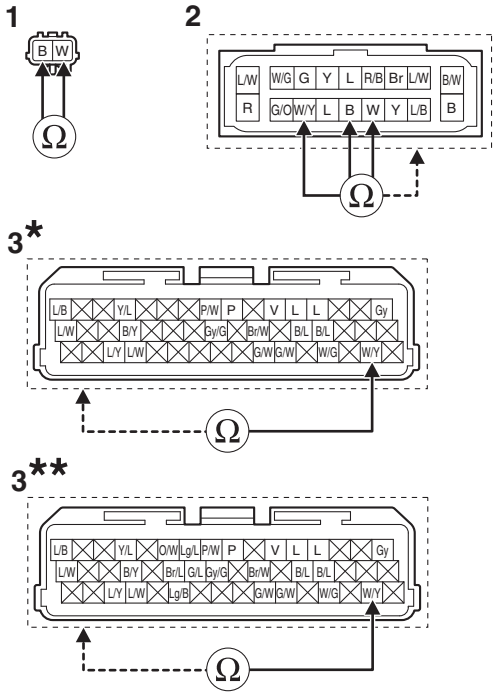
Lines short circuit check “B”

Rear wheel sensor coupler “1”	black–any other coupler terminal white–any other coupler terminal
ABS ECU coupler “2”	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



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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.
NO
→ Go to step 6.

6. Malfunction in ECU.
   • Replace the ECU.
   Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
   • 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.
NO
→ Go to step 7.

7. Malfunction in ABS ECU.
   • Replace the ABS ECU and go to step 21.
8. Connection of neutral switch coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

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.
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.

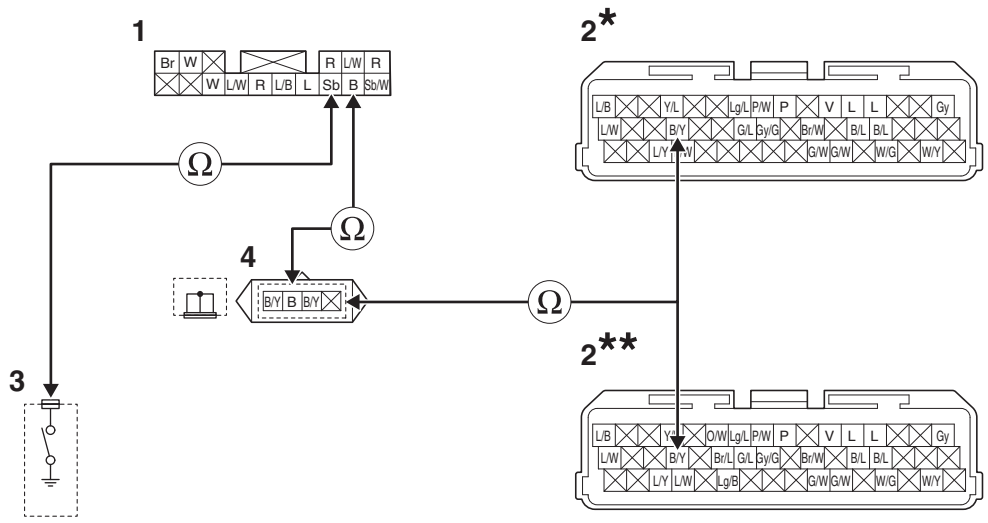
NO

→ Go to step 10.

10.Wire harness continuity.

- Disconnect the relay unit coupler “1”, ECU coupler “2” and neutral switch coupler “3”.
- Remove the joint coupler cap “4”.
- Open circuit check

Between relay unit coupler “1” and joint coupler “4”	black–black/yellow
Between joint coupler “4” and ECU coupler “2”	black/yellow–black/yellow
Between relay unit coupler “1” and neutral switch coupler “3”	sky blue–sky blue



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

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.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

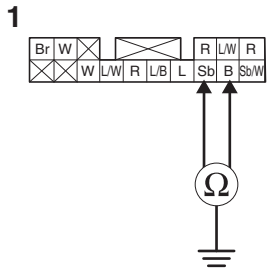
Ground short circuit check “A”

Between relay unit coupler “1” and ground	black–ground sky blue–ground

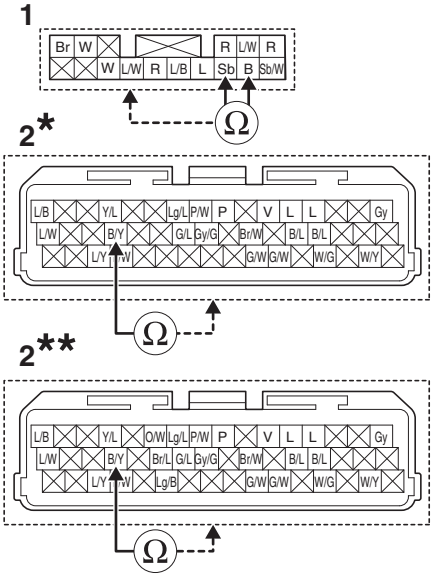
Lines short circuit check “B”

Relay unit coupler “1”	black–any other coupler terminal sky blue–any other coupler terminal
ECU coupler “2”	black/yellow–any other coupler terminal

A



B



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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.
NO
→ Go to step 11.

11.Defective relay unit.
• Check the relay unit.
Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-58.

Is check result OK?
YES
→ Go to step 12.
NO
a. Replace the relay unit.
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.
NO
→ Go to step 12.

12.Defective neutral switch.
• Check the neutral switch.
• Refer to “CHECKING THE SWITCHES” on page 8-53.

Is check result OK?
YES
→ Go to step 13.
NO
a. Replace the neutral switch.
Refer to “CRANKCASE” on page 5-64.
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.
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 5-93.

Is check result OK?

YES

→ Go to step 14.

NO

→ Replace the shift drum and go to step 21.
Refer to "TRANSMISSION" on page 5-87.

14. Malfunction in ECU.
- Replace the ECU, and complete the service.
  Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-55.

15. Clutch lever adjustment.
- Refer to "ADJUSTING THE CLUTCH LEVER FREE PLAY" on page 3-12.
- 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.

NO

→ Go to step 16.

16. Connection of clutch switch coupler.
- Check the locking condition of the coupler.
- Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 17.

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.

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

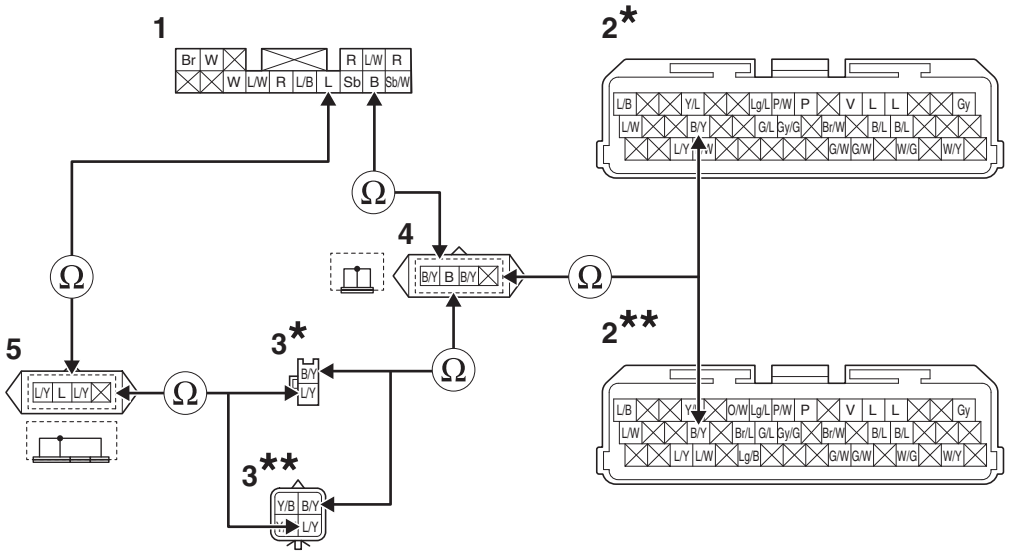
→ Go to step 21.

NO

→ Go to step 18.

18.Wire harness continuity.
- Disconnect the ECU coupler “2”, relay unit coupler “1” and clutch switch coupler “3”.
- Remove the joint coupler cap “4” and joint coupler cap “5”.
- Open circuit check

Between ECU coupler “2” and joint coupler “4”	black/yellow–black/yellow
Between relay unit coupler “1” and joint coupler “4”	black–black
Between clutch switch coupler “3” and joint coupler “4”	black/yellow–black/yellow
Between clutch switch coupler “3” and joint coupler “5”	blue/yellow–blue/yellow
Between relay unit coupler “1” and joint coupler “5”	blue–blue



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

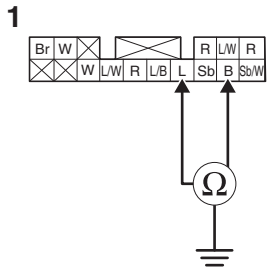
Ground short circuit check “A”

Between relay unit coupler “1” and ground	black–ground blue–ground

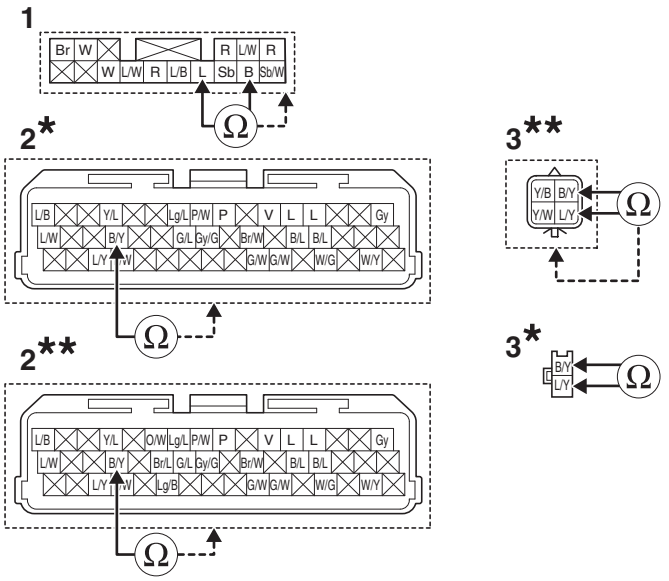
Lines short circuit check “B”

Relay unit coupler “1”	black–any other coupler terminal blue–any other coupler terminal
ECU coupler “2”	black/yellow–any other coupler terminal
Clutch switch coupler “3”	black/yellow–any other coupler terminal blue/yellow–any other coupler terminal

A



B



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?
YES
→ Go to step 19.
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.
NO
→ Go to step 19.

19. Defective clutch switch.
• Check the clutch switch.
Refer to “CHECKING THE SWITCHES” on page 8-53.

Is check result OK?

YES

→ Go to step 20.

NO

a. Replace the clutch switch.
   Refer to “HANDLEBAR” on page 4-58.
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.

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 8-55.

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”.

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 8-17.

   Is check result OK?

   YES

   → Repeat step 1.

   NO

   a. Defective rectifier/regulator or AC magneto → Replace.
   b. Defective connection in the charging system circuit → Properly connect or replace the wire harness.
   c. Start the engine and let it idle for approximately 5 seconds.
   d. Check the condition of the DTC using the malfunction mode of the YDT.

   Is it in the "Recovered" condition?

   YES

   → Go to step 2, and complete the service.

   NO

   → Repeat step 1.

2. Delete the DTC and check that the MIL goes off.
   - Confirm that the DTC has a condition of "Recovered" using the YDT, and then delete the DTC.

EAS20594
P0564

EAS33074
TROUBLESHOOTING
Item
- Cruise control setting switch “RES+”: open or short circuit is detected.
- Cruise control setting switch “SET–”: open or short circuit is detected.

Fail-safe system
- Able to start engine
- Able to drive vehicle

Procedure
1. Connection of ECU coupler, handlebar switch coupler (left) and 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 2.
NO
a. Connect the coupler securely or replace the wire harness.
b. Turn the main switch to “ON”, and then push the “RES+” side and “SET–”side of the cruise control setting switch.
c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?
YES
→Go to step 10, and complete the service.
NO
→Go to step 2.

2. Locate the malfunction.
   a. Execute the diagnostic mode. (Code 80)

When the cruise control setting switch “RES+” is pushed	ON
When the cruise control setting switch is released	OFF

Is check result OK?
YES
→Go to step b.
NO
→Go to step 3.

TIP
Perform the procedure from step 3 to step 5, and from step 9 to step 10.

   b. Execute the diagnostic mode. (Code 81)

When the cruise control setting switch “SET–” is pushed	ON
When the cruise control setting switch is released	OFF

   c. Confirm that it is defective.
   d. Go to step 6.

TIP

Perform the procedure from step 6 to step 10.

3. Check the fuse.
   • Check the ignition fuse 1 and cruise control fuse.

Is check result OK?

YES

→Go to step 4.

NO

a. Replace the fuse.
b. Turn the main switch to “ON”.
c. Push and release the “RES+” side of the cruise control setting switch, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

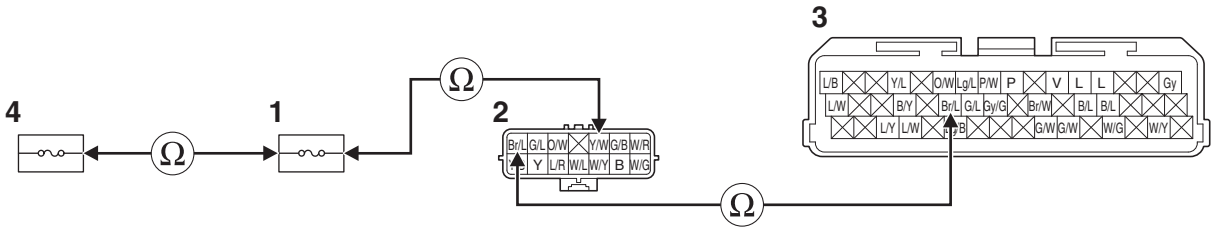
→Go to step 10, and complete the service.

NO

→Go to step 4.

4. Wire harness continuity
   • Disconnect the ignition fuse 1 “4”, cruise control fuse “1”, handlebar switch coupler (left) “2” and ECU coupler “3”.
   • Open circuit check

Between ignition fuse 1 holder “4” and cruise control fuse holder “1”	red/white–red
Between cruise control fuse holder “1” and handlebar switch coupler (left) “2”	yellow/white–yellow/white
Between handlebar switch coupler (left) “2” and ECU coupler “3”	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”.
c. Push and release the “RES+” side of the cruise control setting switch, 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 10, and complete the service.

NO

→Go to “Short circuit check”.

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

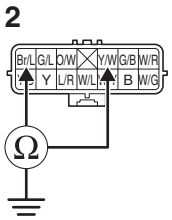
Ground short circuit check “A”

Between handlebar switch coupler (left) “2” and ground	brown/blue–ground yellow/white–ground

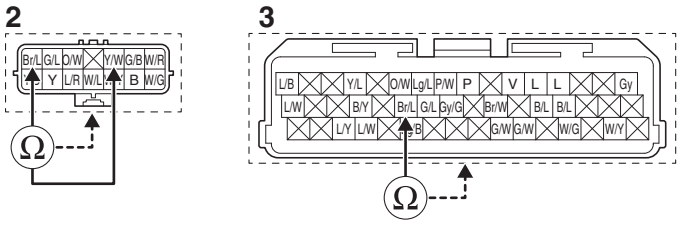
Lines short circuit check “B”

Handlebar switch coupler (left) “2”	brown/blue–any other coupler terminal yellow/white–any other coupler terminal
ECU coupler “3”	brown/blue–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→Go to step 5.

NO

a. Replace the wire harness.
b. Turn the main switch to “ON”.
c. Push and release the “RES+” side of the cruise control setting switch, 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 10, and complete the service.

NO

→Go to step 5.

5. Defective cruise control setting switch.
   • Replace the handlebar switch (left).
   • Turn the main switch to “ON”.
   • Push the “RES+” side and “SET–” side of the cruise control setting switch, 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 10, and complete the service.
NO
→Go to step 9.

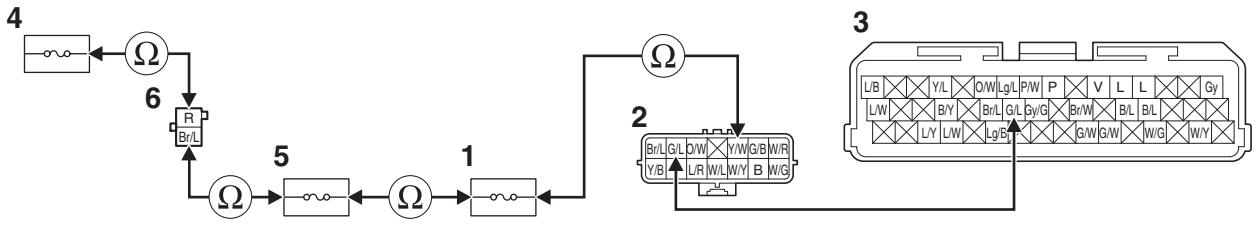
6. Check the fuse. (main fuse, cruise control fuse)

Is check result OK?
YES
→Go to step 7.
NO
a. Replace the fuse.
b. Turn the main switch to “ON”.
c. Push and release the “SET–” side of the cruise control setting switch, 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 10, and complete the service.
NO
→Go to step 7.

7. Wire harness continuity.
   • Open circuit check
   • Disconnect the main fuse “4”, ignition fuse 1 “5”, main switch coupler “6”, cruise control fuse “1”, handlebar switch coupler (left) “2” and ECU coupler “3”.

Between main fuse holder “4” and main switch coupler “6”	red–red
Between main switch coupler “6” and ignition fuse 1 holder “5”	brown/blue–brown/blue
Between ignition fuse 1 holder “5” and cruise control fuse holder “1”	red–red/white
Between cruise control fuse holder “1” and handlebar switch coupler (left) “2”	yellow/white–yellow/white
Between handlebar switch coupler (left) “2” and ECU coupler “3”	green/blue–green/blue



Is resistance 0 Ω?

YES

→Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Push and "SET–" side of the cruise control setting switch, 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 10, and complete the service.

NO

→Go to "Short circuit check".

• Short circuit check

TIP

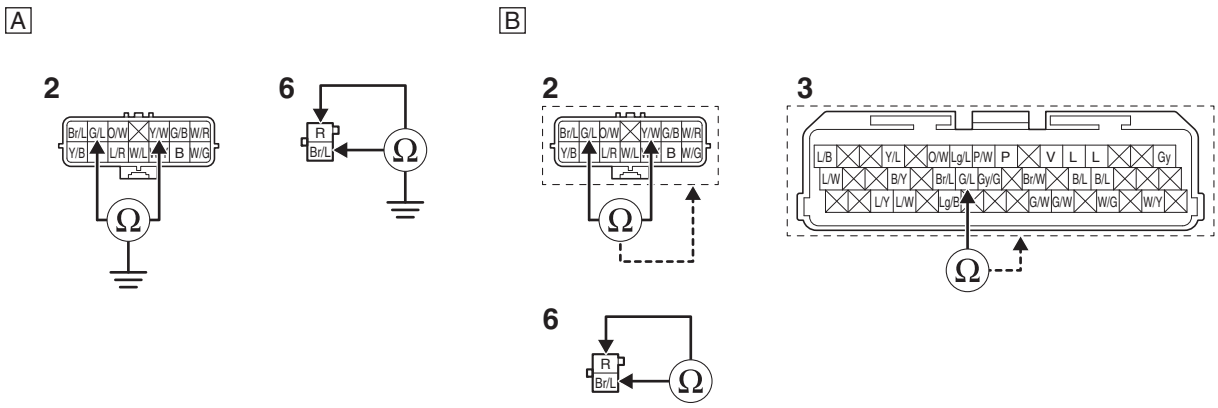
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between handlebar switch coupler (left) "2" and ground	green/blue–ground yellow/white–ground
Between main switch coupler "6" and ground	red–ground brown/blue–ground

Lines short circuit check "B"

Handlebar switch coupler (left) "2"	green/blue–any other coupler terminal yellow/white–any other coupler terminal
ECU coupler "3"	green/blue–any other coupler terminal
Main switch coupler "6"	red–any other coupler terminal brown/blue–any other coupler terminal



Is resistance ∞ Ω?

YES

→Go to step 8.

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Push and "SET–" side of the cruise control setting switch, 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 10, and complete the service.

NO

→Go to step 8.

8. Defective cruise control setting switch.
   - Replace the handlebar switch (left).
   - Turn the main switch to "ON".
   - Push the "RES+" side and "SET–" side of the cruise control setting switch, 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 10, and complete the service.

NO

→Go to step 9.

9. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-55.
10. 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.

EAS20595
P056C

EAS33075
TROUBLESHOOTING

Item

• Front brake light switch: open or short circuit is detected.
• Rear brake light switch: open or short circuit is detected.

Fail-safe system

• Able to start engine
• Able to drive vehicle

Procedure

1. Locate the malfunction.
   a. Execute the diagnostic mode. (Code 82, 83)

When the front brake is applied	ON
When the front brake is not applied	OFF

Is check result OK?

YES

→Go to step b.

NO

→Go to step 2.

TIP

Perform the procedure from step 2 to step 5, and from step 10 to step 11.

   b. Execute the diagnostic mode. (Code 82, 83)

When the rear brake is applied	ON
When the rear brake is not applied	OFF

   c. Confirm that it is defective.
   d. Go to step 6.

TIP

Perform the procedure from step 6 to step 11.

2. Connection of ECU coupler, front brake light switch coupler, brake light relay coupler and 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 3.

NO

a. Connect the coupler securely or replace the wire harness.
b. Turn the main switch to “ON”.
c. Operate the front brake lever, 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 11, and complete the service.

NO

→Go to step 3.

3. Check the fuse. (signaling system fuse and brake light fuse)

Is check result OK?

YES

→Go to step 4.

NO

a. Replace the fuse.
b. Turn the main switch to "ON".
c. Operate the front brake lever, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

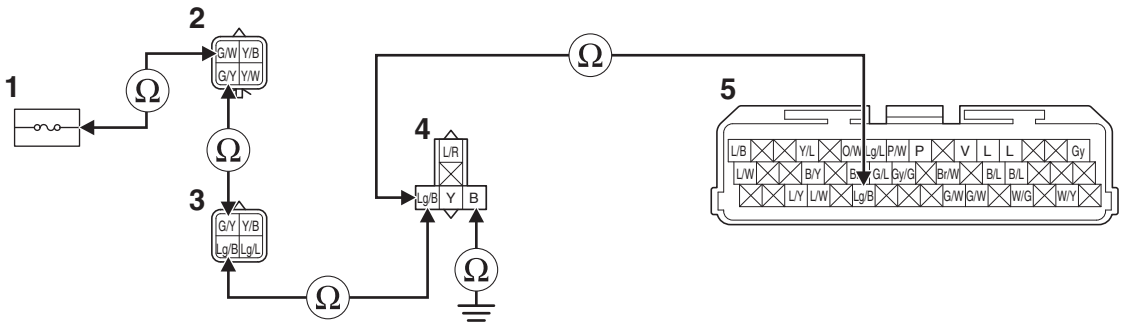
→Go to step 11, and complete the service.

NO

→Go to step 4.

4. Wire harness continuity.
   - Disconnect the brake light fuse "1", front brake light switch coupler "2", rear brake light switch coupler "3", brake light relay coupler "4" and ECU coupler "5".
   - Open circuit check

Between brake light fuse holder "1" and front brake light switch coupler "2"	green/white–green/white
Between front brake light switch coupler "2" and rear brake light switch coupler "3"	green/yellow–green/yellow
Between rear brake light switch coupler "3" and brake light relay coupler "4"	light green/black–light green/black
Between brake light relay coupler "4" and ground	black–ground
Between brake light relay coupler "4" and ECU coupler "5"	light green/black–light green/black



Is resistance 0 Ω?

YES

→Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Operate the front brake lever, 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 11, and complete the service.

NO

→Go to "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

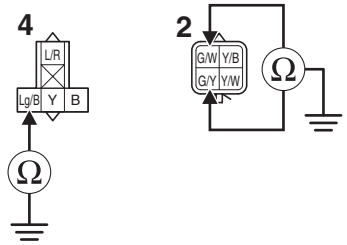
Ground short circuit check "A"

Between brake light relay coupler "4" and ground	light green/black–ground
Between front brake light switch coupler "2" and ground	green/white–ground green/yellow–ground

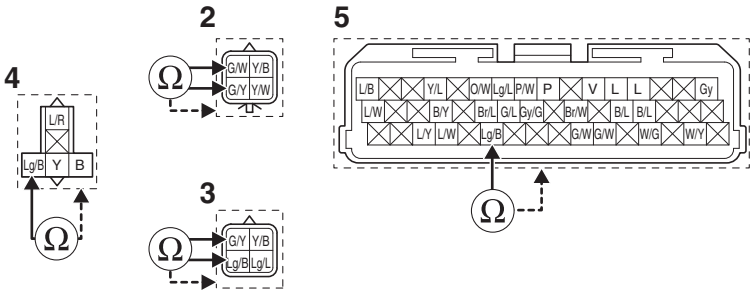
Lines short circuit check "B"

Brake light relay coupler "4"	light green/black–any other coupler terminal
Front brake light switch coupler "2"	green/white–any other coupler terminal green/yellow–any other coupler terminal
Rear brake light switch coupler "3"	green/yellow–any other coupler terminal light green/black–any other coupler terminal
ECU coupler "5"	light green/black–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→Go to step 5.

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Operate the front brake lever, 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 11, and complete the service.

NO

→Go to step 5.

5. Defective front brake light switch.
   - Replace the front brake light switch.
     Refer to "FRONT BRAKE" on page 4-26.
   - Turn the main switch to "ON".
   - Operate the front brake lever, 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 11, and complete the service.

NO

→Go to step 10.

6. Connection of wire harness ECU coupler, rear brake light switch coupler, brake light relay coupler and 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 7.

NO

a. Connect the coupler securely or replace the wire harness.
b. Turn the main switch to "ON".
c. Operate the rear brake pedal, 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 11, and complete the service.

NO

→Go to step 7.

7. Check the fuse. (signaling system fuse and brake light fuse)

Is check result OK?

YES

→Go to step 8.

NO

a. Replace the fuse.
b. Turn the main switch to “ON”.
c. Operate the rear brake pedal, and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

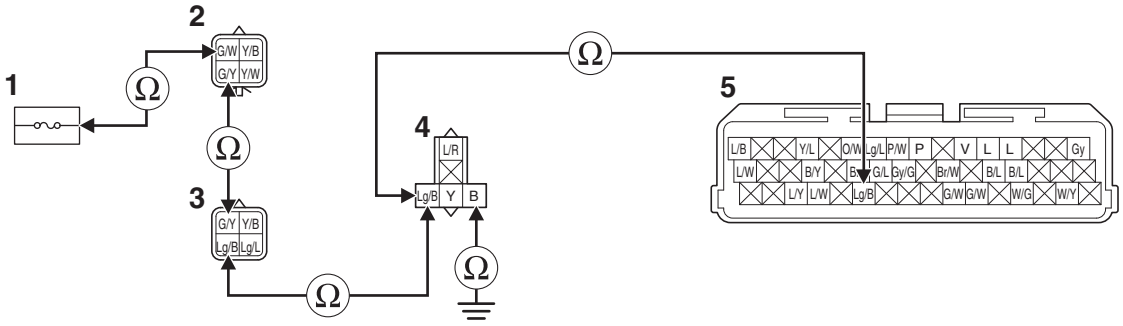
→Go to step 11, and complete the service.

NO

→Go to step 8.

8. Wire harness continuity.
   - Disconnect the brake light fuse “1”, front brake light switch coupler “2”, rear brake light switch coupler “3”, brake light relay coupler “4” and ECU coupler “5”.
   - Open circuit check

Between brake light fuse holder “1” and front brake light switch coupler “2”	green/white–green/white
Between front brake light switch coupler “2” and rear brake light switch coupler “3”	green/yellow–green/yellow
Between rear brake light switch coupler “3” and brake light relay coupler “4”	light green/black–light green/black
Between brake light relay coupler “4” and ground	black–ground
Between brake light relay coupler “4” and ECU coupler “5”	light green/black–light green/black



Is resistance 0 Ω?

YES

→Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Operate the rear brake pedal, 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 11, and complete the service.

NO

→Go to "Short circuit check".

• Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

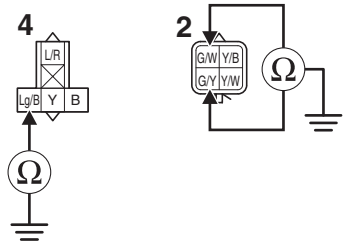
Ground short circuit check "A"

Between brake light relay coupler "4" and ground	light green/black–ground
Between front brake light switch coupler "2" and ground	green/white–ground green/yellow–ground

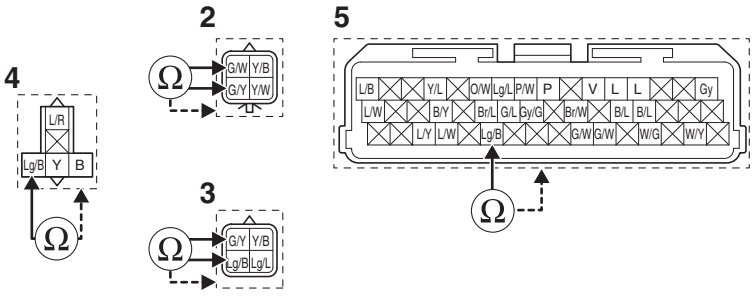
Lines short circuit check "B"

Brake light relay coupler "4"	light green/black–any other coupler terminal
Front brake light switch coupler "2"	green/white–any other coupler terminal green/yellow–any other coupler terminal
Rear brake light switch coupler "3"	green/yellow–any other coupler terminal light green/black–any other coupler terminal
ECU coupler "5"	light green/black–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→Go to step 9.

NO

a. Replace the wire harness.
b. Turn the main switch to "ON".
c. Operate the rear brake pedal, 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 11, and complete the service.

NO

→Go to step 9.

9. Defective rear brake light switch.
   • Replace the rear brake light switch.
   Refer to "REAR BRAKE" on page 4-38.

Is check result OK?

YES

→Go to step 10.

NO

a. Turn the main switch to "ON".
b. Operate the rear brake pedal, 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 11, and complete the service.

NO

→Go to step 10.

10. Malfunction in ECU.
    • Replace the ECU, and complete the service.
    Refer to "REPLACING THE ECU (Engine Control Unit)" on page 8-55.
11. 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 8-55.
   - Turn the main switch to “ON”.
   - Check that the MIL does not come on.

EAS20677
P0606

EAS33306
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

- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Check and repair for simultaneous malfunction.
   - Check the items of DTCs P0122, P0123, P0222, P0223 and P2135, if they are detected at the same time, correct the P0122, P0123, P0222, P0223 and P2135 first.
   - 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 3, and complete the service.

   NO

   → Go to step 2.
2. Malfunction in ECU.
   - Replace the ECU.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
   - Turn the main switch to “ON”.
   - Check that the MIL does not come on.
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.

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)
2. Malfunction in ECU.
   - Replace the ECU, and complete the service.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
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.

EAS20599
P0638

EAS33079
TROUBLESHOOTING

Item

YCC-T drive system: malfunction detected.

Fail-safe system

- Able/Unable to start engine
- Able/Unable to drive vehicle

Procedure

1. Connection of throttle servo motor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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. Check the electronic throttle valve fuse.

Is check result OK?

YES

→ Go to step 4.

NO

a. Replace the electronic throttle valve 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

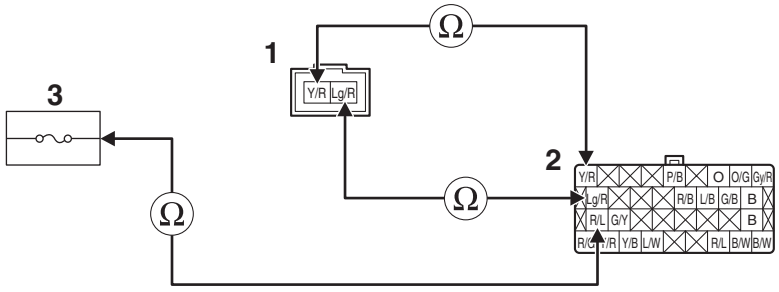
→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Wire harness continuity.
   - Disconnect the throttle servo motor coupler "1", ECU coupler "2" and electronic throttle valve fuse "3".
   - Open circuit check

Between throttle servo motor coupler "1" and ECU coupler "2"	yellow/red–yellow/red light green/red–light green/red
Between ECU coupler "2" and electronic throttle valve fuse holder "3"	red/blue–red/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 "Short circuit check".

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

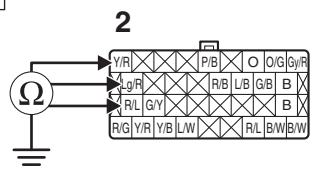
Ground short circuit check “A”

Between ECU coupler “2” and ground	yellow/red–ground light green/red–ground red/blue–ground

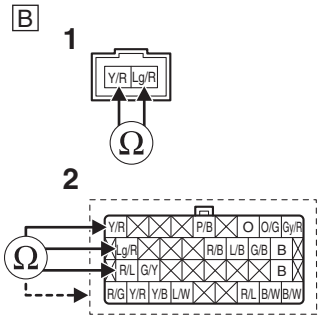
Lines short circuit check “B”

Throttle servo motor coupler “1”	yellow/red–any other coupler terminal light green/red–any other coupler terminal
ECU coupler “2”	yellow/red–any other coupler terminal light green/red–any other coupler terminal red/blue–any other coupler terminal

A



B



Is resistance ∞ Ω?

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 throttle bodies.
   • Check the throttle bodies.
   Refer to “CHECKING THE THROTTLE SERVO MOTOR” on page 8-63.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the throttle bodies.
   Refer to “REPLACING THE THROTTLE BODIES” on page 7-9.
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 8-55.
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.

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

   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 8, and complete the service.

   NO

   → Go to step 2.

2. Connection of handlebar switch coupler (right).
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Refer to "HANDLEBAR" on page 4-58.

   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 8, and complete the service.

   NO

   → Go to step 3.

3. Connection of ECU coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

a. Connect the coupler securely or replace the wire harness.
b. Start the engine and let it idle for approximately 5 seconds.
c. Check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

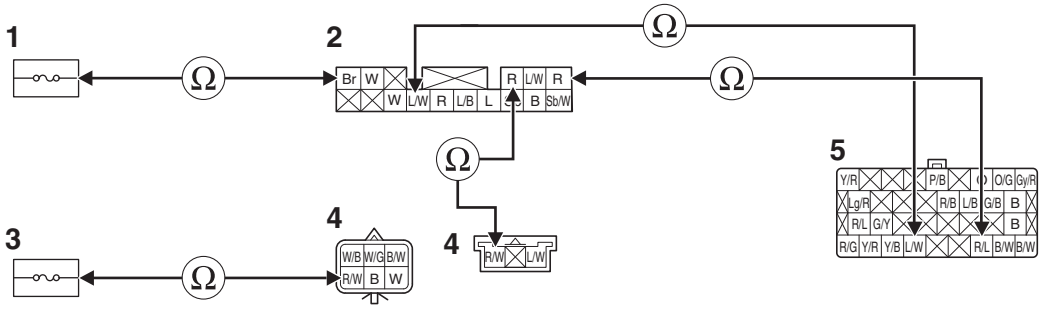
→ Go to step 8, and complete the service.

NO

→ Go to step 4.

4. Wire harness continuity.
   • Disconnect the fuel injection system fuse "1", relay unit coupler "2", ignition fuse 1 "3", handlebar switch (right) coupler "4" and ECU coupler "5".
   • Open circuit check

Between fuel injection system fuse holder "1" and relay unit coupler "2"	brown–brown
Between ignition fuse 1 holder "3" and handlebar switch (right) coupler "4"	red–red/white
Between handlebar switch (right) coupler "4" and relay unit coupler "2"	red/white–red
Between relay unit coupler "2" and ECU coupler "5"	red–red/blue blue/white–blue/white



Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

a. Replace the wire harness.
b. Start the engine and let it idle for approximately 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 8, and complete the service.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

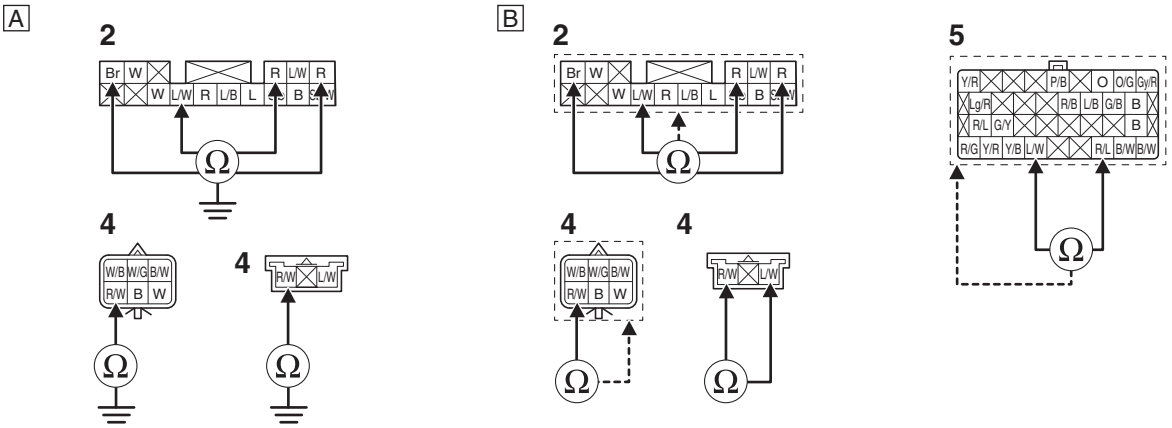
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between relay unit coupler “2” and ground	brown–ground blue/white–ground red–ground
Between handlebar switch (right) coupler “4” and ground	red/white–ground red/white–ground

Lines short circuit check “B”

Relay unit coupler “2”	brown–any other coupler terminal blue/white–any other coupler terminal red–any other coupler terminal
Handlebar switch (right) coupler “4”	red/white–any other coupler terminal red/white–any other coupler terminal
ECU coupler “5”	red/blue–any other coupler terminal blue/white–any other coupler terminal



Is resistance ∞ Ω?

YES

→ Go to step 5.

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 8, and complete the service.

NO

→ Go to step 5.

5. Defective relay unit.
   • Execute the diagnostic mode. (Code 50)
   • Check the operating sound of the relay.

Is check result OK?

YES

→ Go to step 6.

NO

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 8, and complete the service.

NO

→ Go to step 6.

6. 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 8, and complete the service.

NO

→ Go to step 7.

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 8-55.
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.

EAS20611
P0916, P0917

EAS33091
TROUBLESHOOTING

Item

• [P0916] Gear position sensor: open or ground short circuit detected.
• [P0917] Gear position sensor: power short circuit detected.

Fail-safe system

• Able to start engine
• Able to drive vehicle

Procedure

1. Connection of gear position sensor coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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.

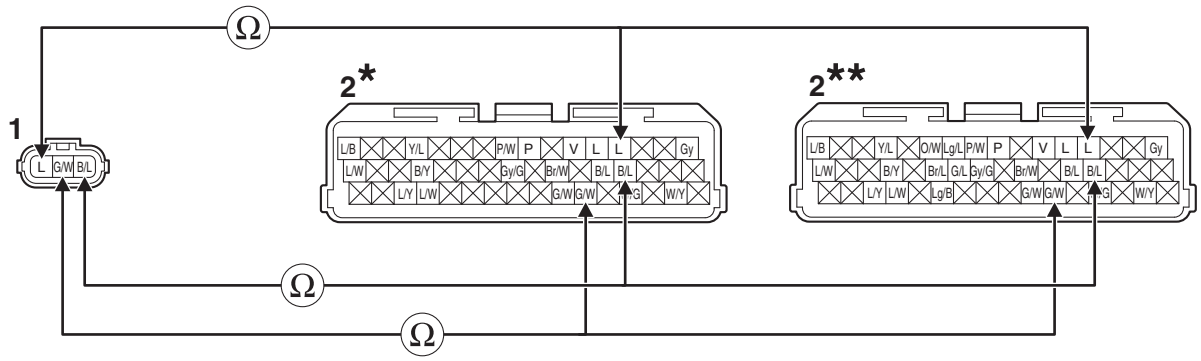
2. Connection of ECU coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 gear position sensor coupler “1” and ECU coupler “2”.
   • Open circuit check

Between gear position sensor coupler “1” and ECU coupler “2”	black/blue–black/blue green/white–green/ white blue–blue



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

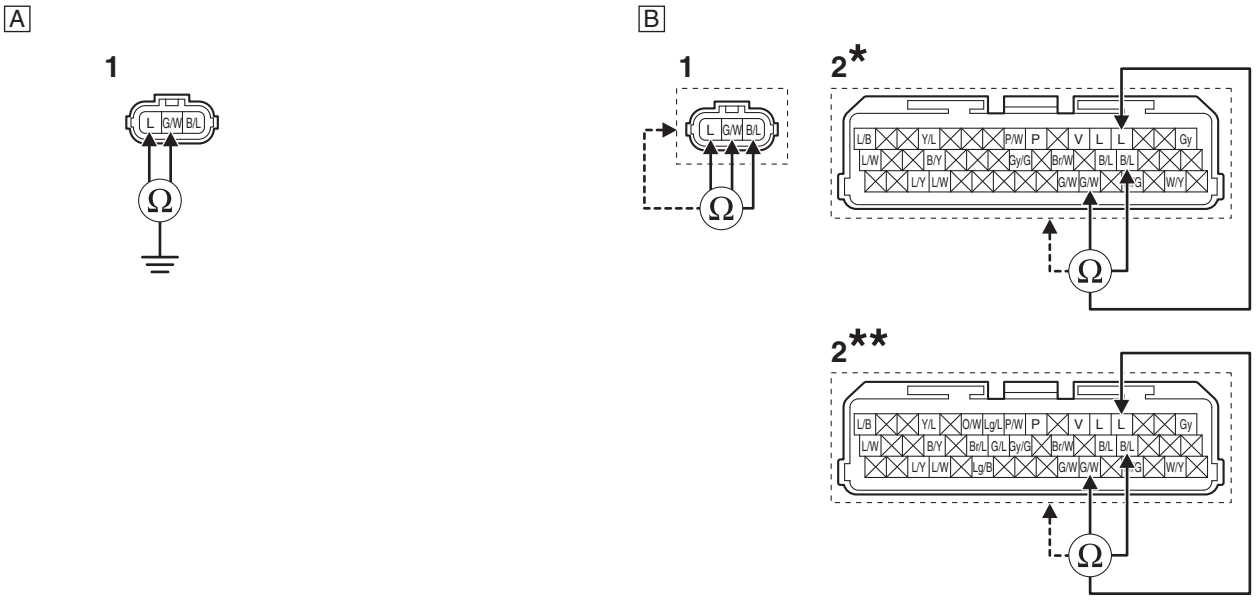
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between gear position sensor coupler “1” and ground	green/white–ground blue–ground

Lines short circuit check “B”

Gear position sensor coupler “1”	black/blue–any other coupler terminal green/white–any other coupler terminal blue–any other coupler terminal
ECU coupler “2”	black/blue–any other coupler terminal green/white–any other coupler terminal blue–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of gear position sensor.
• Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 5.

NO

a. Reinstall or replace the sensor.
Refer to “CRANKCASE” on page 5-64.
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 gear position sensor.
   • Make sure that the position of each gear is correctly displayed on the meter.

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the gear position sensor.
   Refer to “CRANKCASE” on page 5-64.
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 8-55.
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.

EAS20786
P1004

EAS33529
TROUBLESHOOTING

Item

Intake air pressure sensor 1 and intake air pressure sensor 2: output voltage deviation error.

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, P0106, P0108, P0335, P0606

1. Defective intake air pressure sensor 1.
   - Execute the diagnostic mode. (Code 03)
   - When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated.

At sea level	Approx. 101 kPa (757.6 mmHg, 29.8 inHg), approx. 3.64 V
1000 m (3300 ft) above sea level	Approx. 90 kPa (675.1 mmHg, 26.6 inHg), approx. 3.30 V
2000 m (6700 ft) above sea level	Approx. 80 kPa (600.0 mmHg, 23.6 inHg), approx. 3.00 V
3000 m (9800 ft) above sea level	Approx. 70 kPa (525.0 mmHg, 20.7 inHg), approx. 2.70 V

Is check result OK?

YES

→ Go to step 2.

NO

a. Replace the intake air pressure sensor 1.
   Refer to “THROTTLE BODIES” on page 7-5.
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 4, and complete the service.

NO

→ Go to step 2.

2. Defective intake air pressure sensor 2.
   - 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

Is check result OK?

YES

→ Go to step 3.

NO

a. Replace the intake air pressure sensor 2.
Refer to "THROTTLE BODIES" on page 7-5.
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 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 8-55.
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.

EAS20613
P1600

EAS33093
TROUBLESHOOTING

Item

Lean angle sensor: open or short circuit detected.

Fail-safe system

- Unable to start engine
- Unable to drive vehicle

Procedure

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- U0125

1. Connection of IMU coupler.
   - 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 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”, 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

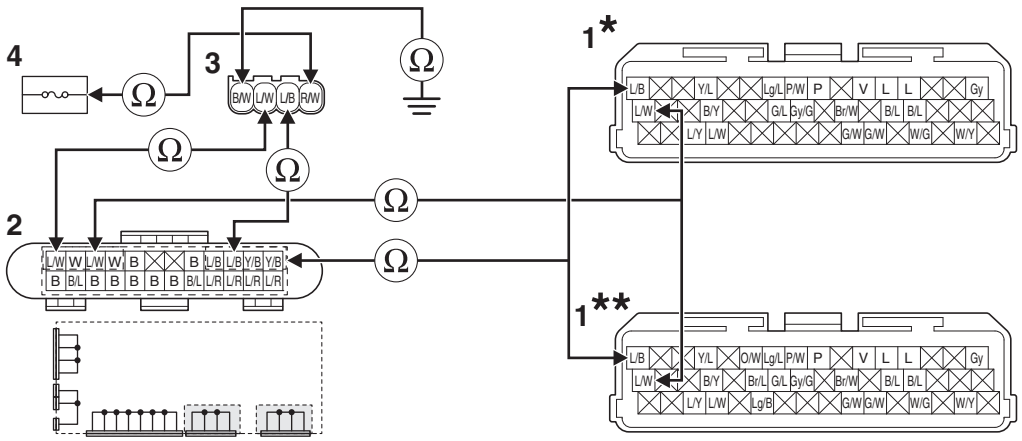
→ Go to step 7, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
   • Disconnect the ECU coupler “1”, IMU coupler “3” and ignition fuse 2 “4”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between ECU coupler “1” and joint coupler “2”	blue/white–blue/white blue/black–blue/black
Between joint coupler “2” and IMU coupler “3”	blue/white–blue/white blue/black–blue/black
Between ECU coupler “1” and ground	black/white–ground
Between ignition fuse 2 holder “4” and IMU coupler “3”	red/white–red/white



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

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 7, and complete the service.

NO

→ Go to “Short circuit check”.

• Short circuit check

TIP

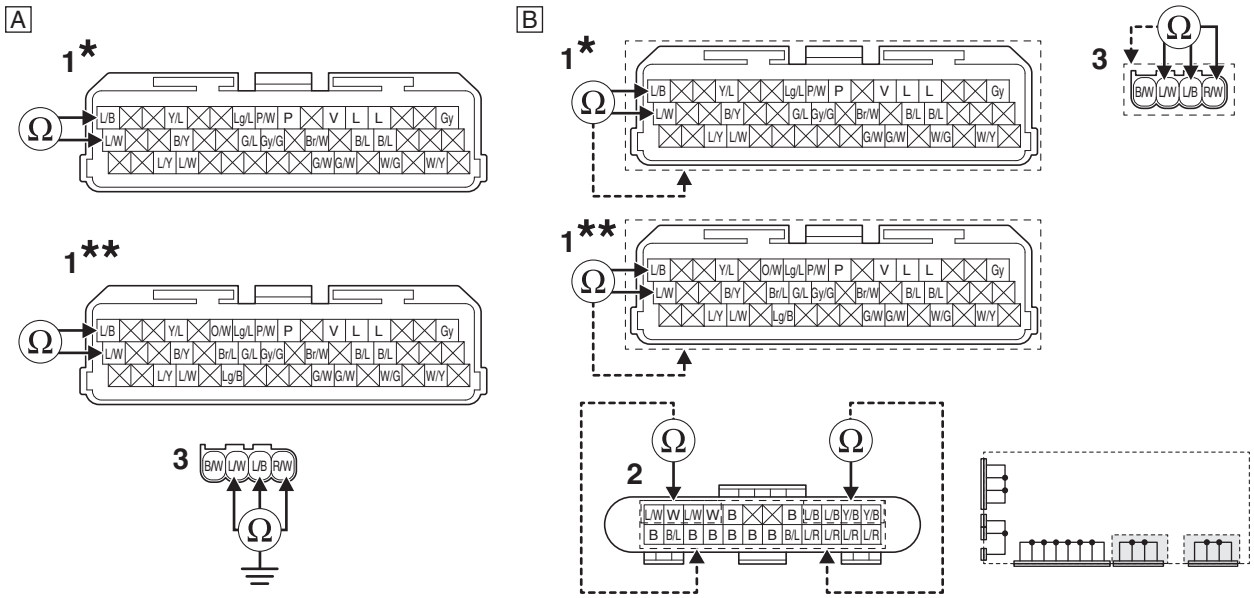
Disconnect the ECU and IMU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between ECU coupler “1” and ground	blue/white–ground blue/black–ground
Between IMU coupler “3” and ground	blue/white–ground blue/black–ground red/white–ground

Lines short circuit check “B”

ECU coupler “1”	blue/white–any other coupler terminal black/black–any other coupler terminal
Joint coupler “2”	blue/white–any other coupler terminal blue/black–any other coupler terminal
IMU coupler “3”	blue/white–any other coupler terminal blue/black–any other coupler terminal red/white–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of IMU.
   • Check the installed direction and condition of the sensor.
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • Check the grommet for cracks.

Is check result OK?

YES

→ Go to step 5.

NO

a. Fix the IMU installation condition.
b. Turn the main switch 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 7, and complete the service.

NO

→ Go to step 5.

5. Defective IMU.
   • Replace the IMU.
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • 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 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 8-55.
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.

EAS20614
P1601

EAS33094
TROUBLESHOOTING
Item
Sidestand switch: open or short circuit of the blue/yellow lead of the ECU is detected.
Fail-safe system
- Unable to start engine
- Unable to drive vehicle

Procedure
1. Connection of sidestand switch coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Is the coupler condition normal?
   YES
   → Go to step 2.
   NO
   a. Connect the coupler securely or replace the wire harness.
   b. Turn the main switch to “ON”, and then extend and retract the sidestand.
   c. Check the condition of the DTC using the malfunction mode of the YDT.

      Is it in the “Recovered” condition?
      YES
      → Go to step 7, and complete the service.
      NO
      → Go to step 2.
2. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   Is the coupler condition normal?
   YES
   → Go to step 3.
   NO
   a. Connect the coupler securely or replace the wire harness.
   b. Turn the main switch to “ON”, and then extend and retract the sidestand.
   c. Check the condition of the DTC using the malfunction mode of the YDT.

      Is it in the “Recovered” condition?
      YES
      → Go to step 7, and complete the service.
      NO
      → Go to step 3.
3. Connection of 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

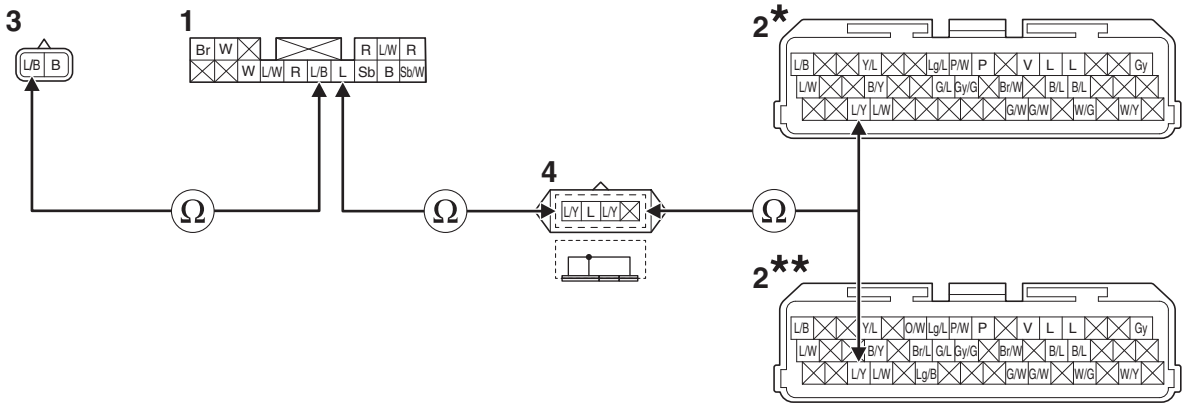
→ Go to step 7, and complete the service.

NO

→ Go to step 4.

4. Wire harness continuity.
   • Disconnect the relay unit coupler "1", ECU coupler "2" and sidestand switch coupler "3".
   • Remove the joint coupler cap "4".
   • Open circuit check

Between relay unit coupler "1" and joint coupler cap "4"	blue–blue
Between joint coupler "4" and ECU coupler "2"	blue/yellow–blue/yellow
Between relay unit coupler "1" and sidestand switch coupler "3"	blue/black–blue/black



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 "Short circuit check".

• Short circuit check

TIP

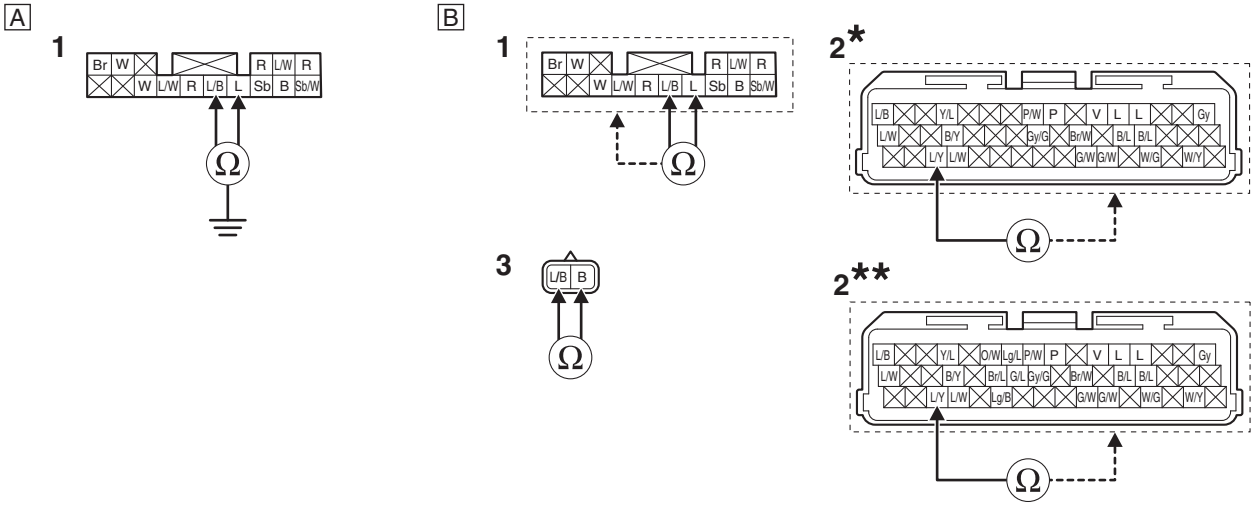
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between relay unit coupler "1" and ground	blue–ground blue/black–ground

Lines short circuit check "B"

Relay unit coupler "1"	blue–any other coupler terminal blue/black–any other coupler terminal
ECU coupler "2"	blue/yellow–any other coupler terminal
Sidestand switch coupler "3"	blue/black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

YES

→ Go to step 5.

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.

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

a. Replace the sidestand switch.
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 6.

6. Malfunction in ECU.
   • Replace the ECU, and complete the service.
   Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
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 backup 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

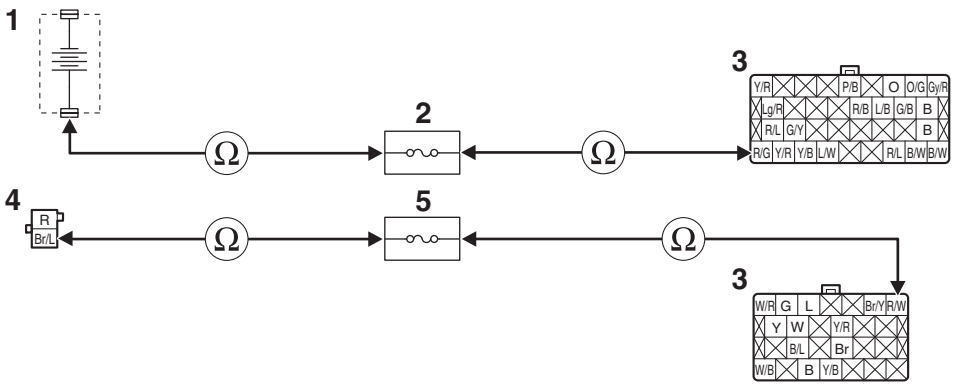
→ Go to step 7, and complete the service.

NO

→ Go to step 5.

5. Wire harness continuity.
   - Disconnect the battery “1”, backup fuse 1 “2”, ECU coupler “3”, main switch coupler “4” and ignition fuse 1 “5”.
   - Open circuit check

Between battery “1” and backup fuse 2 holder “2”	red–red
Between backup fuse 2 holder “2” and ECU coupler “3”	red/green–red/green
Between main switch coupler “4” and ignition fuse 1 holder “5”	brown/blue–brown/blue
Between ignition fuse 1 holder “5” and ECU coupler “3”	red/white–red



Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Turn the main switch to "ON", and then check the condition of the DTC using the malfunction mode of the YDT.

Is it in the "Recovered" condition?

YES

→ Go to step 7, and complete the service.

NO

→ Go to "Short circuit check".

- Short circuit check

TIP

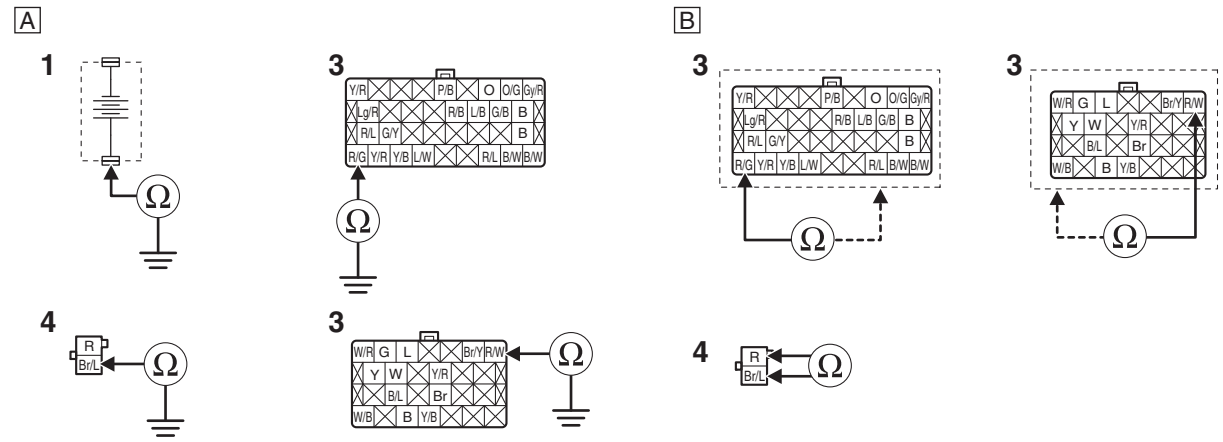
Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

Ground short circuit check "A"

Between battery "1" and ground	red–ground
Between ECU coupler "3" and ground	red/green–ground red/white–ground
Between main switch coupler "4" and ground	brown/blue–ground

Lines short circuit check "B"

ECU coupler "3"	red/green–any other coupler terminal red/white–any other coupler terminal
Main switch coupler "4"	brown/blue–any other coupler terminal



Is resistance ∞ Ω?

YES

→ Go to step 6.

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.

6. Malfunction in ECU.
   • Replace the ECU, and complete the service.
   Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
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.

EAS20787
P1606, P1607

EAS33530
TROUBLESHOOTING
Item
- [P1606] Intake air pressure sensor 2: ground short circuit detected.
- [P1607] Intake air pressure sensor 2: 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 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 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.

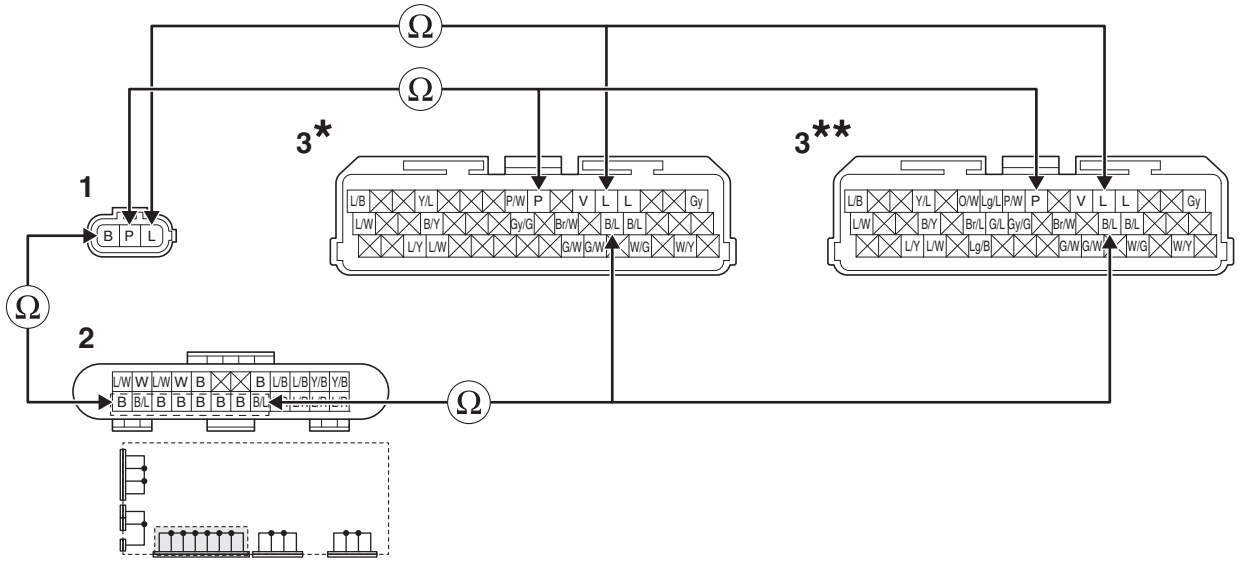
2. Connection of ECU coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 2 coupler “1” and ECU coupler “3”.
   - Remove the joint coupler cap “2”.
   - Open circuit check

Between ECU coupler “3” and joint coupler “2”	[P1607] black/blue–black/blue
Between ECU coupler “3” and intake air pressure sensor 2 coupler “1”	[P1607] blue–blue [P1606, P1607] pink–pink
Between intake air pressure sensor 2 coupler “1” and joint coupler “2”	[P1607] black–black



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

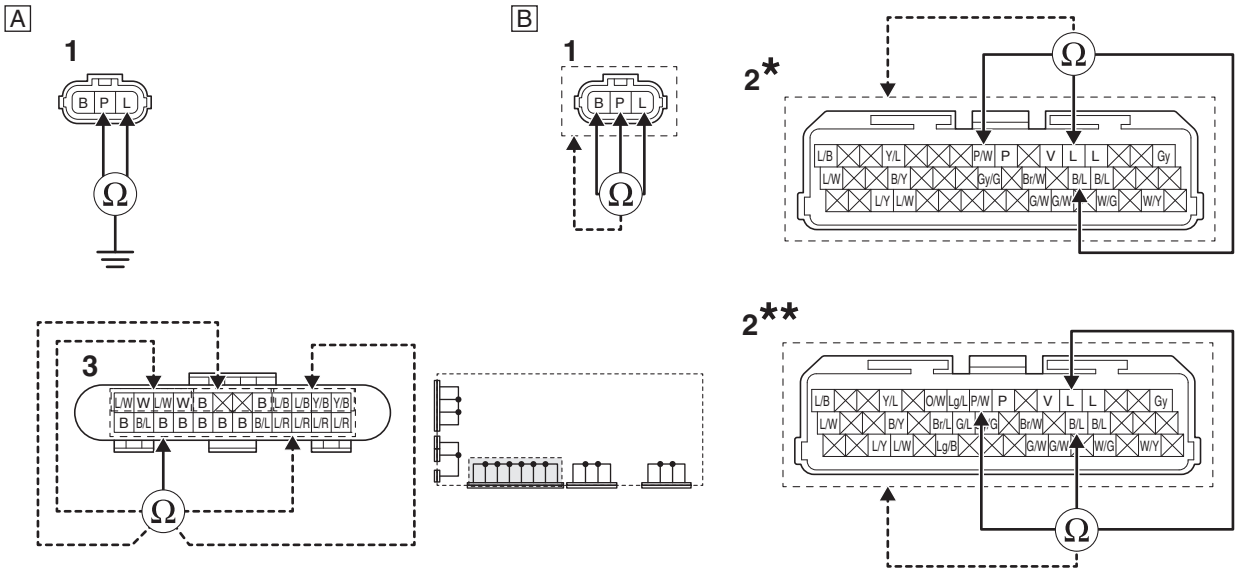
Disconnect the ECU related connectors before checking.
Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.

Ground short circuit check “A”

Between intake air pressure sensor 2 coupler “1” and ground	[P1607] blue–ground [P1606, P1607] pink–ground

Lines short circuit check “B”

ECU coupler “3”	[P1607] blue–any other coupler terminal [P1607] black/blue–any other coupler terminal [P1606, P1607] pink–any other coupler terminal
Intake air pressure sensor 2 coupler “1”	[P1607] blue–any other coupler terminal [P1607] black–any other coupler terminal [P1606, P1607] pink–any other coupler terminal
Joint coupler “2”	[P1607] black/blue–any other coupler terminal [P1607] black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of intake air pressure sensor 2.
• 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 2.
   - 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 2.
   Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
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 “THROTTLE BODIES” on page 7-5.
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.

EAS20623
P1806, P1807

EAS33103
TROUBLESHOOTING

Item

• [P1806] Shift sensor: open or ground short circuit detected.
• [P1807] Shift sensor: power short circuit detected.

Fail-safe system

• Able to start engine
• Able to drive vehicle

Procedure

1. Connection of shift 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

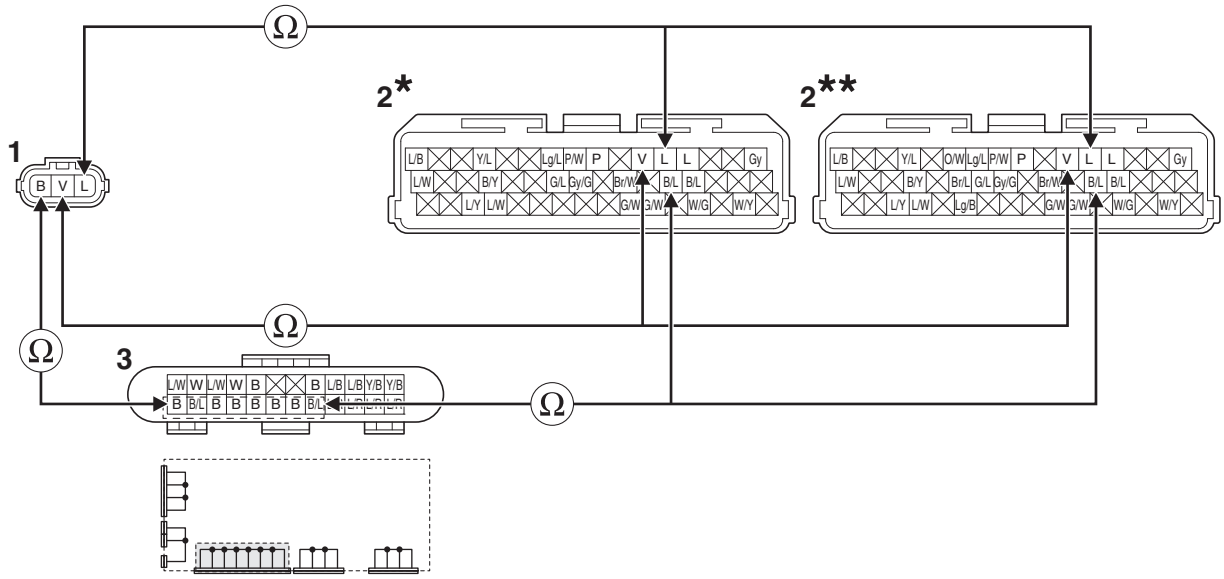
   → Go to step 7, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity
   • Disconnect the shift sensor coupler “1” and ECU coupler “2”.
   • Remove the joint coupler cap “3”.
   • Open circuit check

Between shift sensor coupler “1” and ECU coupler “2”	blue–blue violet–violet
Between shift sensor coupler “1” and joint coupler “3”	black–black
Between joint coupler “3” and ECU coupler “2”	black/blue–black/blue



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

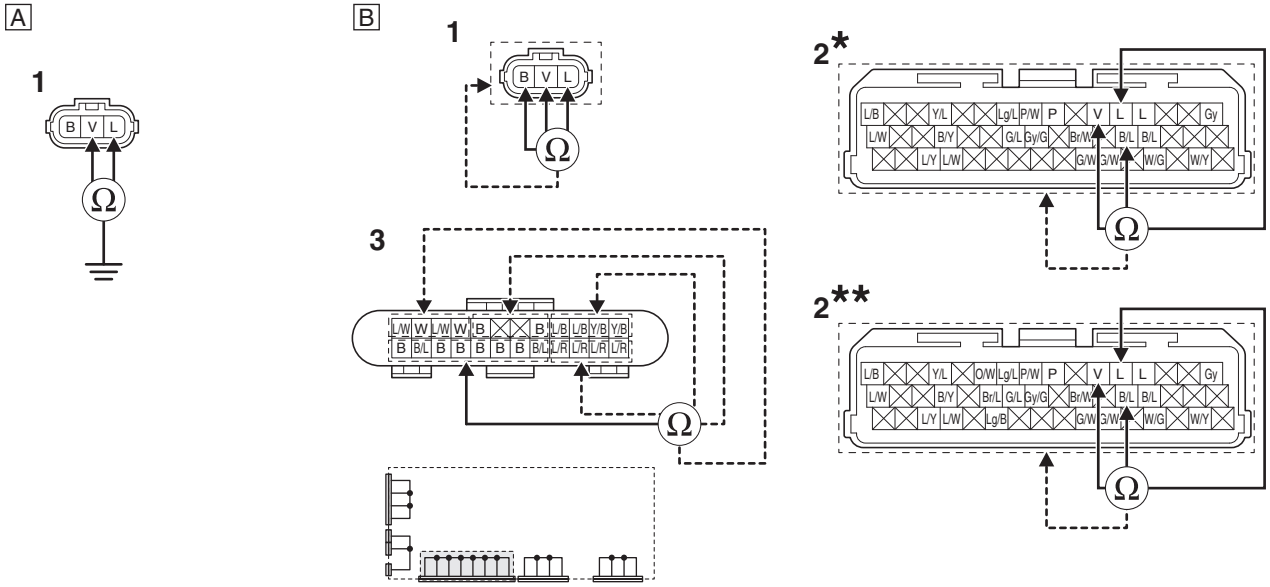
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between shift sensor coupler “1” and ground	violet–ground blue–ground

Lines short circuit check “B”

Shift sensor coupler “1”	black–any other coupler terminal violet–any other coupler terminal blue–any other coupler terminal
ECU coupler “2”	black/blue–any other coupler terminal violet–any other coupler terminal blue–any other coupler terminal
Joint coupler “3”	black/blue–any other coupler terminal black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 7, and complete the service.

NO

→ Go to step 4.

4. Installed condition of shift sensor.
• Check for looseness or pinching.

Is check result OK?

YES

→ Go to step 5.

NO

a. Reinstall or replace the sensor.
   Refer to “CHAIN DRIVE” on page 4-87.
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 shift sensor.
   • Execute the diagnostic mode. (Code D95)

Shift sensor output voltage display	0.2–4.8 [V]
With no shift weighting input	Approx. 2.5 [V]
Shift up weighting	Changes to the low side
Shift down weighting	Changes to the high side

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the shift sensor.
   Refer to “CHAIN DRIVE” on page 4-87.
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 8-55.
7. Delete the DTC and check that the Auxiliary system warning goes off.
   • Confirm that the DTC has a condition of “Recovered” using the YDT, and then delete the DTC.

EAS20632
P2122, P2123, P2127, P2128, P2138

EAS33112
TROUBLESHOOTING

Item

- [P2122] Accelerator position sensor: open or ground short circuit detected.
- [P2123] Accelerator position sensor: power short circuit detected.
- [P2127] Accelerator position sensor: open or ground short circuit detected.
- [P2128] Accelerator position sensor: power short circuit detected.
- [P2138] Deviation error

Fail-safe system

- Able/unable to start engine
- Able/unable to drive vehicle

Procedure

TIP

If a DTC other than P2138 (P2122, P2123, P2127, or P2128) is indicated, perform troubleshooting first.

1. Connection of accelerator position sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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

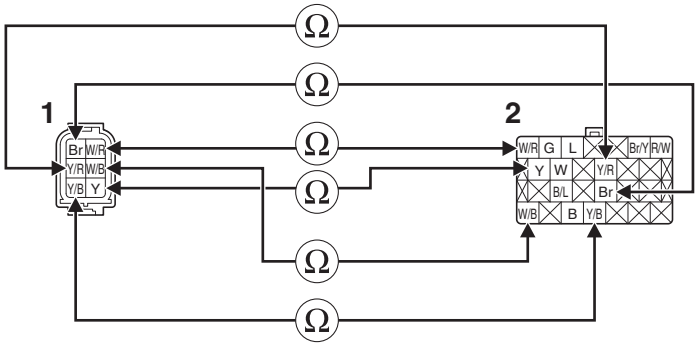
→ Go to step 6, and complete the service.

NO

→ Go to step 3.

3. Wire harness continuity.
   - Disconnect the accelerator position sensor coupler "1" and ECU coupler "2".
   - Open circuit check

Between accelerator position sensor coupler "1" and ECU coupler "2"	[P2122, P2127] yellow/red–yellow/red [P2122, P2127] white/red–white/red [P2122, P2123, P2127, P2128, P2138] yellow–yellow [P2123, P2128] white/black–white/black [P2123, P2128] yellow/black–yellow/black [P2122, P2123, P2127, P2128, P2138] brown–brown



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 "Short circuit check".

- Short circuit check

TIP

Disconnect the ECU related connectors before checking.
Refer to "PARTS CONNECTED TO THE ECU" on page 9-3.

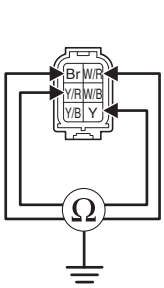
Ground short circuit check “A”

Between accelerator position sensor coupler “1” and ground	[P2122, P2123, P2127, P2128, P2138] brown–ground [P2122, P2127] white/red–ground [P2122, P2127] yellow/red–ground [P2122, P2123, P2127, P2128, P2138] yellow–ground

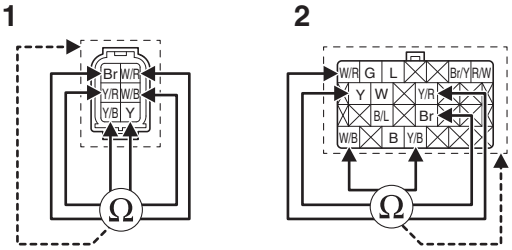
Lines short circuit check “B”

Accelerator position sensor coupler “1”	[P2122, P2123, P2127, P2128, P2138] brown–any other coupler terminal [P2122, P2127] white/red–any other coupler terminal [P2122, P2127] yellow/red–any other coupler terminal [P2122, P2123, P2127, P2128, P2138] yellow–any other coupler terminal [P2123, P2128] yellow/black–any other coupler terminal [P2123, P2128] white/black–any other coupler terminal
ECU coupler “2”	[P2122, P2123, P2127, P2128, P2138] brown–any other coupler terminal [P2122, P2127] white/red–any other coupler terminal [P2122, P2127] yellow/red–any other coupler terminal [P2122, P2123, P2127, P2128, P2138] yellow–any other coupler terminal [P2123, P2128] yellow/black–any other coupler terminal [P2123, P2128] white/black–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 accelerator position sensor.
   • Execute the diagnostic mode. (Code 14) (Accelerator position sensor signal 1.)

When the throttle valves are fully closed	14–18
When the throttle valves are fully open	82–92
*Turn the throttle grip past the closed position in the deceleration direction.	7–12

*: For MT09SPM/MT09SPMC

   • Execute the diagnostic mode. (Code 15) (Accelerator position sensor signal 2.)

When the throttle valves are fully closed	14–18
When the throttle valves are fully open	82–92
*Turn the throttle grip past the closed position in the deceleration direction.	7–12

*: For MT09SPM/MT09SPMC

Is check result OK?

YES

→ Go to step 5.

NO

→ Replace the handlebar switch (right).
Refer to "HANDLEBAR" on page 4-58.

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 8-55.
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.

EAS20812
P2135

EAS33652
TROUBLESHOOTING

Item

• Throttle position sensor: output voltage deviation error.

Fail-safe system

• Able to start engine (depending on the situation)
• Able to drive vehicle (depending on the situation)

Procedure

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
• P0122, P0123, P0222, P0223, P0638

1. Check the starting and racing the engine possibility.
   • Turn the main switch to “ON”, and then start the engine and racing the engine.

Unable to starting the engine and racing the engine.

YES

→ Go to step 2.

NO

a. Replace the throttle position sensor.
   Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-11.
b. Turn the main switch to “ON”, and then check 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 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 3.

NO

a. Connect the coupler securely or replace the wire harness.
b. Turn the main switch to “ON”, and then check the DTC using the malfunction mode of the YDT.

Is it in the “Recovered” condition?

YES

→ Go to step 8, and complete the service.

NO

→ Go to step 3.

3. Connection of ECU coupler.
   • Check the locking condition of the coupler.
   • Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

Is the coupler condition normal?

YES

→ Go to step 4.

NO

a. Connect the coupler securely or replace the wire harness.
b. Turn the main switch to "ON", and then check 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. Installed condition of throttle position sensor.
   • Check for looseness or pinching.
   Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-11.

Is check result OK?

YES

→ Go to step 5.

NO

a. Reinstall or adjust the sensor.
b. Turn the main switch to "ON", and then check 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. Defective throttle position sensor.
   • Check throttle position sensor signal 1.
   • Execute the diagnostic mode. (Code 01)

When the throttle valves are fully closed	11–21
When throttle valves are fully open	96–107

Is check result OK?

YES

→ Go to step 6.

NO

a. Replace the throttle position sensor.
   Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-11.
b. Turn the main switch to "ON", and then check 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 throttle position sensor.
   - Check throttle position sensor signal 2.
   - Execute the diagnostic mode. (Code 13)

When the throttle valves are fully closed	9–23
When throttle valves are fully open	93–109

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 7-11.
b. Turn the main switch to "ON", and then check 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 8-55.
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.

EAS20633
P2158

EAS33113
TROUBLESHOOTING

Item

Front wheel sensor: no normal signals are received from the front wheel sensor.

Fail-safe system

- Able to start engine
- Able to drive vehicle

Procedure

1. Locate the malfunction.
   - Check the ABS warning light.

   Is the ABS warning light on?

   YES

   → Refer to "BASIC INSTRUCTIONS FOR TROUBLESHOOTING" on page 9-33.

   NO

   → Go to step 2.

2. Execute the diagnostic mode.
   - Execute the diagnostic mode. (Code 16)
   - Rotate the front wheel by hand and check that the indicated value increases.

   Is that value increased?

   YES

   → Go to step 10, and complete the service.

   NO

   → Go to step 3.

3. Connection of front wheel sensor coupler.
   - Check the locking condition of the coupler.
   - Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).

   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 16)
   c. Rotate the front wheel by hand and check that the indicated value increases.

      Is that value increased?

      YES

      → Go to step 10, and complete the service.

      NO

      → Go to step 4.

4. 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 5.

NO

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 16)
c. Rotate the front wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 10, and complete the service.

NO

→ Go to step 5.

5. 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 6.

NO

a. Connect the coupler securely or replace the wire harness.
b. Execute the diagnostic mode. (Code 16)
c. Rotate the front wheel by hand and check that the indicated value increases.

Is that value increased?

YES

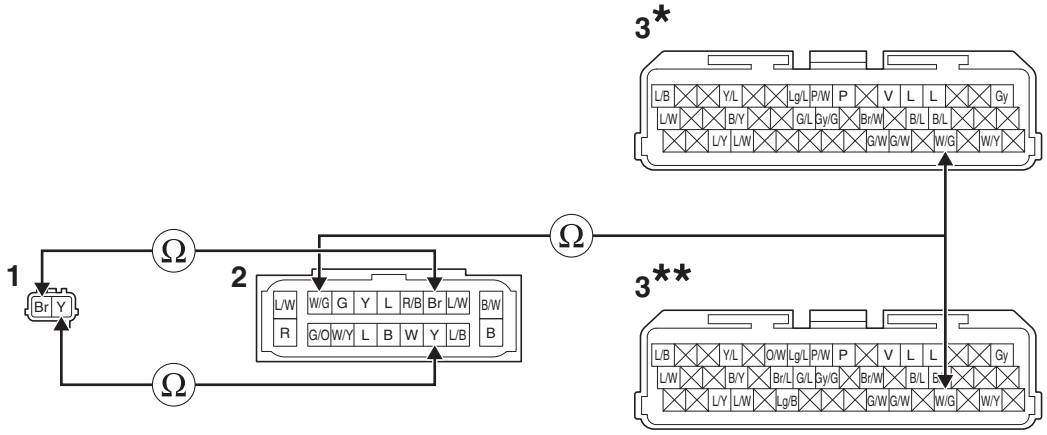
→ Go to step 10, and complete the service.

NO

→ Go to step 6.

6. Wire harness continuity.
   - Disconnect the front wheel sensor coupler “1”, ABS ECU coupler “2” and ECU coupler “3”.
   - Open circuit check

Between front wheel sensor coupler “1” and ABS ECU coupler “2”	brown–brown yellow–yellow
Between ABS ECU coupler “2” and ECU coupler “3”	white/green–white/green



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to "Short circuit check".

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 16)
c. Rotate the front wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 10, and complete the service.

NO

→ Go to "Short circuit check".

• 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 9-4.

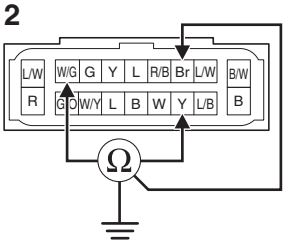
Ground short circuit check "A"

Between ABS ECU coupler "2" and ground	brown–ground yellow–ground white/green–ground

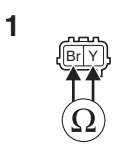
Lines short circuit check "B"

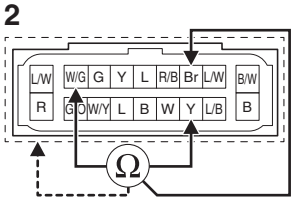
Front wheel sensor coupler "1"	brown–any other coupler terminal yellow–any other coupler terminal
ABS ECU coupler "2"	brown–any other coupler terminal yellow–any other coupler terminal white/green–any other coupler terminal
ECU coupler "3"	white/green–any other coupler terminal

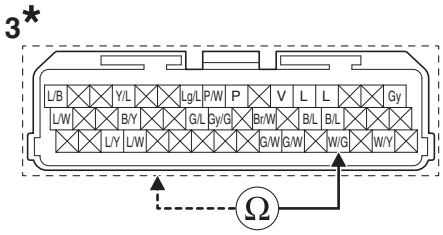
A

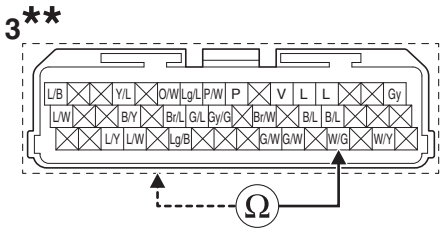


B









*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

YES

→ Go to step 7.

NO

a. Replace the wire harness.
b. Execute the diagnostic mode. (Code 16)
c. Rotate the front wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 10, and complete the service.

NO

→ Go to step 7.

7. Defective front wheel sensor.
   • Check the front wheel sensor.
   Refer to “FRONT WHEEL” on page 4-11.

Is check result OK?

YES

→ Go to step 8.

NO

a. Reinstall or replace the front wheel sensor.
   Refer to “FRONT WHEEL” on page 4-11.
b. Execute the diagnostic mode. (Code 16)
c. Rotate the front wheel by hand and check that the indicated value increases.

Is that value increased?

YES

→ Go to step 10, and complete the service.

NO

→ Go to step 8.

8. Malfunction in ECU.
   - Replace the ECU.
     Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-55.
   - Execute the diagnostic mode. (Code 16)
   - Rotate the front wheel by hand and check that the indicated value increases.

   Is that value increased?
   YES
   → Go to step 10, and complete the service.
   NO
   → Go to step 9.
9. Malfunction in ABS ECU.
   - Replace the ABS ECU.
     Refer to “REMOVING THE HYDRAULIC UNIT ASSEMBLY” on page 4-52.
   - Go to step 10, and complete the service.
10. Delete the DTC and check that the MIL goes off.
    - Turn the main switch to “ON”, and then rotate the front wheel by hand.
    - Start the engine, and input the vehicle speed signals by operating the vehicle at 20 to 30 km/h (12 to 19 mph).
    - Confirm that the 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”.

EAS20775
U0125

EAS33127
TROUBLESHOOTING

Item

Signals cannot be transmitted between the ECU and the IMU.

Fail-safe system

- Unable to start engine
- Able/Unable to drive vehicle

Procedure

TIP

If more than one DTC is detected at the same time, perform troubleshooting of DTC listed below first.
- P1600

1. Connection of IMU coupler.
   - 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

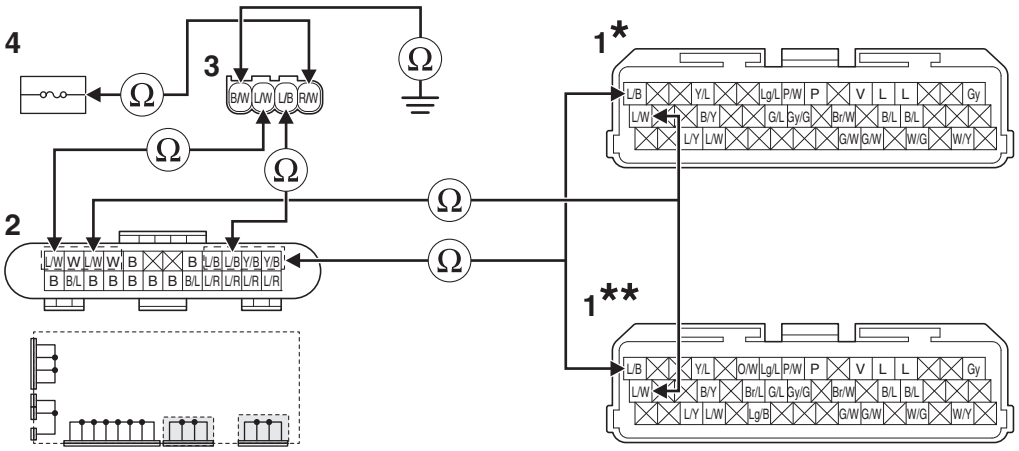
      → Go to step 6, and complete the service.

      NO

      → Go to step 3.

3. Wire harness continuity.
   • Disconnect the ECU coupler “1”, IMU coupler “3” and ignition fuse 2 “4”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between ECU coupler “1” and joint coupler “2”	blue/white–blue/white blue/black–blue/black
Between joint coupler “2” and IMU coupler “3”	blue/white–blue/white blue/black–blue/black
Between IMU coupler “3” and ignition fuse 2 holder “4”	red/white–red/white
Between IMU coupler “3” and ground	black/white–ground



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

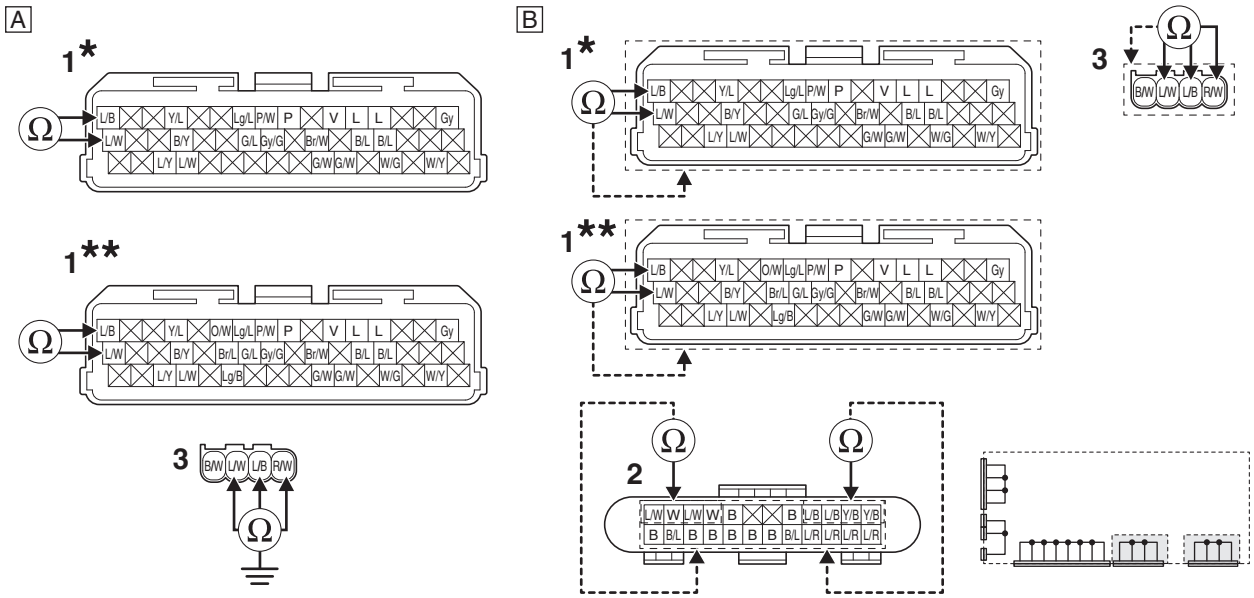
Disconnect the ECU and IMU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between ECU coupler “1” and ground	blue/white–ground blue/black–ground
Between IMU coupler “3” and ground	blue/white–ground blue/black–ground red/white–ground

Lines short circuit check “B”

ECU coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
Joint coupler “2”	blue/white–any other coupler terminal blue/black–any other coupler terminal
IMU coupler “3”	blue/white–any other coupler terminal blue/black–any other coupler terminal red/white–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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. Malfunction in IMU.
   • Replace the IMU.
   Refer to “GENERAL CHASSIS (1)” on page 4-1.
   • 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 8-55.
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 clock display of 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

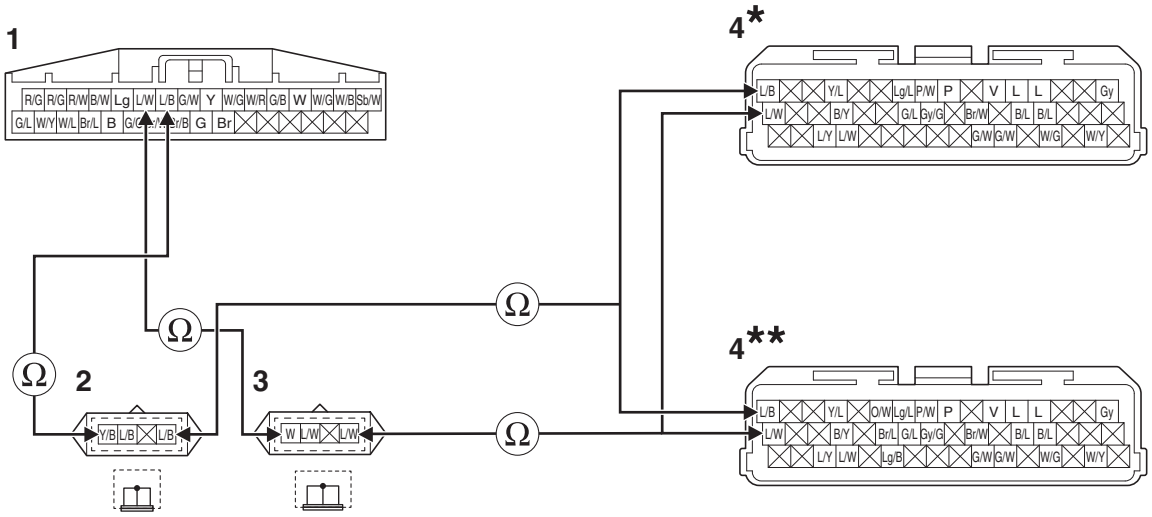
   → Go to step 6, and complete the service.

   NO

   → Go to step 3.

3. Wire harness continuity.
   • Disconnect the meter assembly coupler “1” and ECU coupler “4”.
   • Remove the joint coupler cap “2” and joint coupler cap “3”.
   • Open circuit check

Between meter assembly coupler “1” and joint coupler “2”	blue/black–blue/black
Between meter assembly coupler “1” and joint coupler “3”	blue/white–blue/white
Between joint coupler “2” and ECU coupler “4”	blue/black–blue/black
Between joint coupler “3” and ECU coupler “4”	blue/white–blue/white



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 “Short circuit check”.

• Short circuit check

TIP

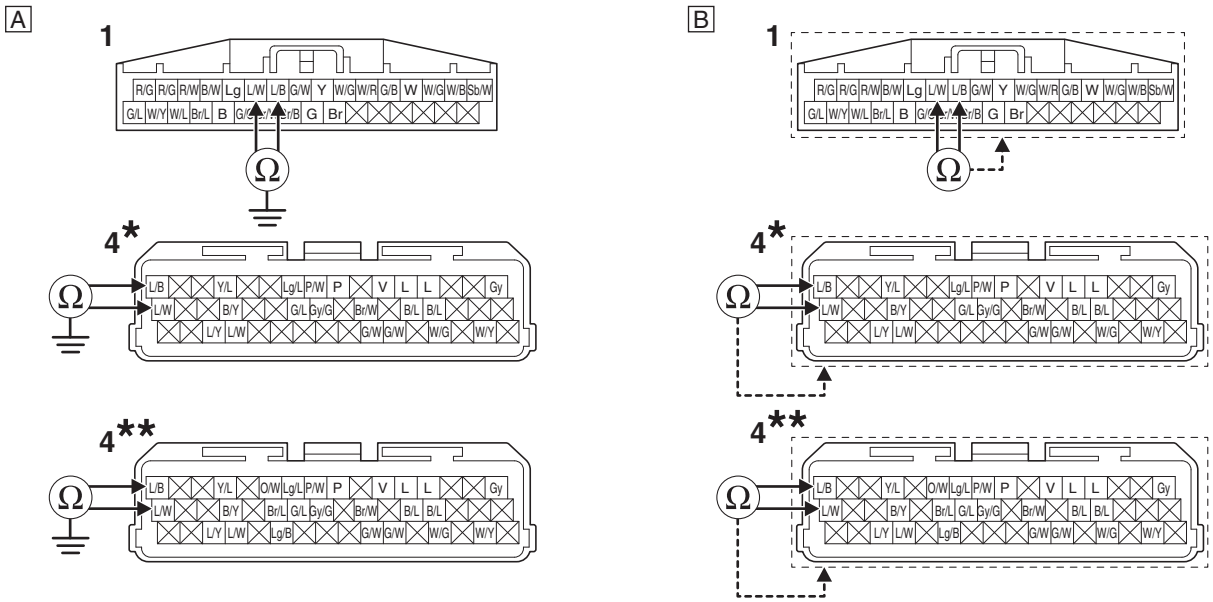
Disconnect the ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3.

Ground short circuit check “A”

Between meter assembly coupler “1” and ground	blue/white–ground blue/black–ground
Between ECU coupler “4” and ground	blue/white–ground blue/black–ground

Lines short circuit check “B”

Meter assembly coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
ECU coupler “4”	blue/white–any other coupler terminal blue/black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

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 meter assembly.
- Replace the meter assembly.
  Refer to “GENERAL CHASSIS (2)” 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 8-55.
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.

EAS20685
11_ABS

EAS33314
TROUBLESHOOTING

Item
Front wheel sensor (intermittent pulses or no pulses)

Procedure
TIP

If the rear wheel continues to turn for more than 20 seconds after the front wheel has stopped, this will be recorded.

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 4-13.

   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 4-15.

   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 4-15.

   Is check result OK?
   YES
   → Replace the hydraulic unit assembly (ABS ECU).
   NO
   → Repair or 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 4-21.

   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 4-23.

   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 4-23.

   Is check result OK?
   YES
   → Replace the hydraulic unit assembly (ABS ECU).
   NO
   → Repair or 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 4-13.

   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 FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-15.

   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 4-15.

   Is check result OK?

   YES

   → Replace the hydraulic unit assembly (ABS ECU).

   NO

   → Repair or 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 4-21.

   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 4-23.

   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 4-23.

   Is check result OK?

   YES

   → Replace the hydraulic unit assembly (ABS ECU).

   NO

   → Repair or 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

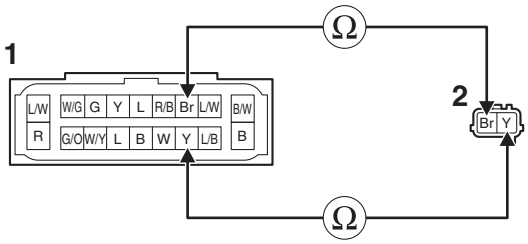
→ Go to step 2.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

2. Wire harness continuity
   • Disconnect the ABS ECU coupler “1” and front wheel sensor coupler “2”.
   • Open circuit check

Between ABS ECU coupler “1” and front wheel sensor coupler “2”	brown–brown 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 9-4.

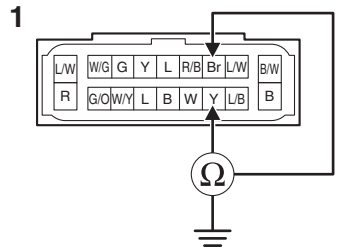
Ground short circuit check “A”

Between ABS ECU coupler “1” and ground	yellow–ground brown–ground

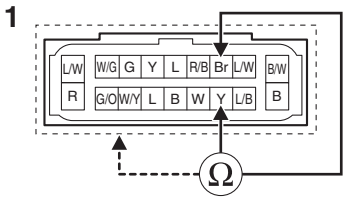
Lines short circuit check “B”

ABS ECU coupler “1”	yellow–any other coupler terminal brown–any other coupler terminal

A



B



Is resistance ∞ Ω?

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 4-11 and “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

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

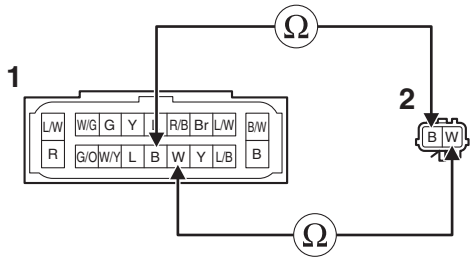
→ Go to step 2.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

2. Wire harness continuity
   • Disconnect the ABS ECU coupler “1” and rear wheel sensor coupler “2”.
   • Open circuit check

Between ABS ECU coupler “1” and rear wheel sensor coupler “2”	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 9-4.

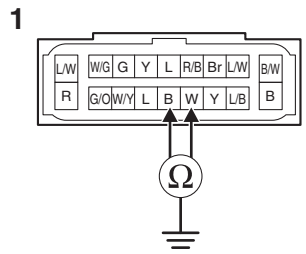
Ground short circuit check “A”

Between ABS ECU coupler “1” and ground	white–ground black–ground

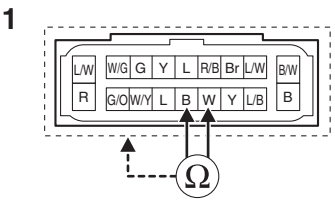
Lines short circuit check “B”

ABS ECU coupler “1”	white–any other coupler terminal black–any other coupler terminal

A



B



Is resistance ∞ Ω?

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 4-18 and “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

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 4-50.

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 8-55.

Is check result OK?
YES
→ Go to step 2.
NO
→ Replace the fuse and check the wire harness.

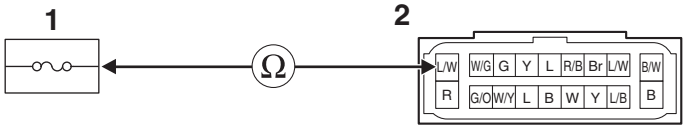
2. Defective coupler between the battery and the hydraulic unit assembly
   • Check the coupler for any pins that may be pulled out.
   • Check the locking condition of the coupler.

TIP
Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?
YES
→ Go to step 3.
NO
→ If there is a malfunction, repair it and connect the coupler securely.

3. Wire harness continuity
   • Disconnect the ABS solenoid fuse “1” and ABS ECU coupler “2”.
   • Open circuit check

Between ABS solenoid fuse holder “1” and ABS ECU coupler “2”	blue/white–blue/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 9-4.

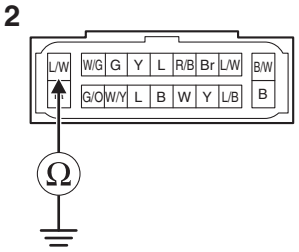
Ground short circuit check “A”

Between ABS ECU coupler “2” and ground	blue/white–ground

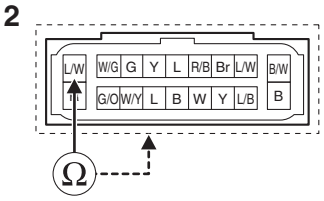
Lines short circuit check “B”

ABS ECU coupler “2”	blue/white–any other coupler terminal

A



B



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 4-50.

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 8-55.

Is check result OK?
YES
→ Go to step 2.
NO
→ Replace the fuse and check the wire harness.

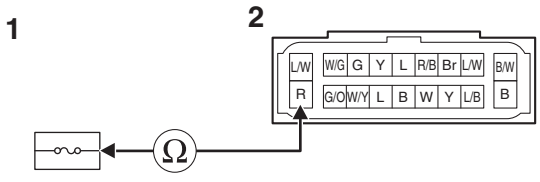
2. Defective coupler between the battery and the hydraulic unit assembly
   • Check the coupler for any pins that may be pulled out.
   • Check the locking condition of the coupler.

TIP
Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?
YES
→ Go to step 3.
NO
→ If there is a malfunction, repair it and connect the coupler securely.

3. Wire harness continuity
   • Disconnect the ABS motor fuse “1” and ABS ECU coupler “2”.
   • Open circuit check

Between ABS motor fuse “1” and ABS ECU coupler “2”	red–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 9-4.

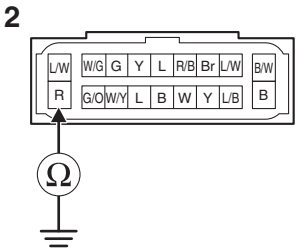
Ground short circuit check “A”

Between ABS ECU coupler “2” and ground	red–ground

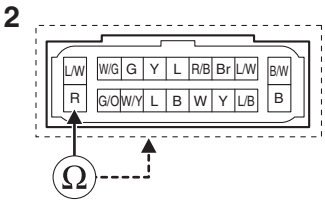
Lines short circuit check “B”

ABS ECU coupler “2”	red–any other coupler terminal

A



B



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 4-50.

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 4-50.

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 4-15.

   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 4-13 and “CHECKING THE FRONT BRAKE DISCS” on page 4-32.

   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 4-32.

   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 4-50.

EAS20695
42_ABS

EAS33324
TROUBLESHOOTING

Item
Rear wheel ABS (intermittent wheel speed pulses or incorrect depressurization)

Procedure
1. Incorrect installation of the rear wheel sensor
   • Check the components for looseness, distortion, and bends.
   Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-23.

   Is check result OK?
   YES
   → Go to step 2.
   NO
   → Repair or replace the defective part.

2. Incorrect rotation of the rear wheel
   • Check that there is no brake disc drag on the wheel and make sure that it rotates smoothly.
   Refer to “CHECKING THE REAR WHEEL” on page 4-21 and “CHECKING THE REAR BRAKE DISC” on page 4-44.

   Is check result OK?
   YES
   → Go to step 3.
   NO
   → Repair or replace the defective part.

3. Rear brake dragging
   • Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released.
   Refer to “CHECKING THE REAR BRAKE DISC” on page 4-44.

   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 4-50.

EAS20696
43, 45_ABS

EAS33330
TROUBLESHOOTING

Item

Front wheel sensor (missing pulses)

Procedure

TIP

After the DTC 45 is recorded, DTC 43 will be recorded if a certain speed and time are exceeded.

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 4-13.

   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 4-15.

   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 4-15.

   Is check result OK?
   YES
   → Replace the hydraulic unit assembly (ABS ECU).
   NO
   → Repair or replace the wheel sensor.

EAS20697
44, 46_ABS

EAS33325
TROUBLESHOOTING
Item
Rear wheel sensor (missing pulses)

Procedure
TIP

After the DTC 46 is recorded, DTC 44 will be recorded if a certain speed and time are exceeded.

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 4-21.

   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 4-23.

   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 4-23.

   Is check result OK?
   YES
   → Replace the hydraulic unit assembly (ABS ECU).
   NO
   → Repair or replace the wheel sensor.

EAS20698
51_ABS

EAS33326
TROUBLESHOOTING
Item
Vehicle system power supply (voltage of ABS ECU power supply is high)

Procedure
1. Defective battery
   • Recharge or replace the battery, and check again.
   Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.
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 8-17.

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 8-56.
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

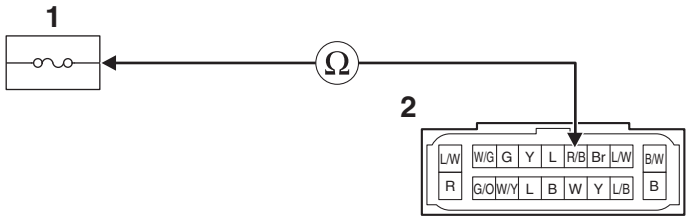
→ Go to step 3.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

3. Wire harness continuity
   • Disconnect the ABS ECU fuse “1” and ABS ECU coupler “2”.
   • Open circuit check

Between ABS ECU fuse holder “1” and ABS ECU coupler “2”	red/black–red/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 9-4.

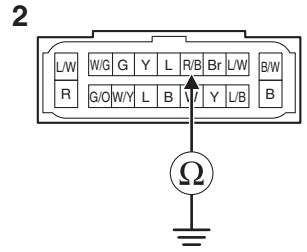
Ground short circuit check “A”

Between ABS ECU coupler “2” and ground	red/black–ground

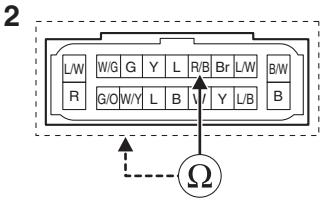
Lines short circuit check “B”

ABS ECU coupler “2”	red/black–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 4.

NO

→ Replace the wire harness.

4. Defective charging system
   - Check the charging system.
     Refer to “CHARGING SYSTEM” on page 8-17.

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.

EAS20700
55_ABS

EAS33328
TROUBLESHOOTING
Item
Hydraulic unit assembly (defective ABS ECU)

Procedure
1. Defective hydraulic unit assembly
   • Replace the hydraulic unit assembly.
   Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

EAS20701
56_ABS

EAS33329
TROUBLESHOOTING
Item
Hydraulic unit assembly (abnormal internal circuit)

Procedure
1. Defective hydraulic unit assembly
   • Replace the hydraulic unit assembly.
   Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

EAS20666
57_ABS

EAS33292
TROUBLESHOOTING

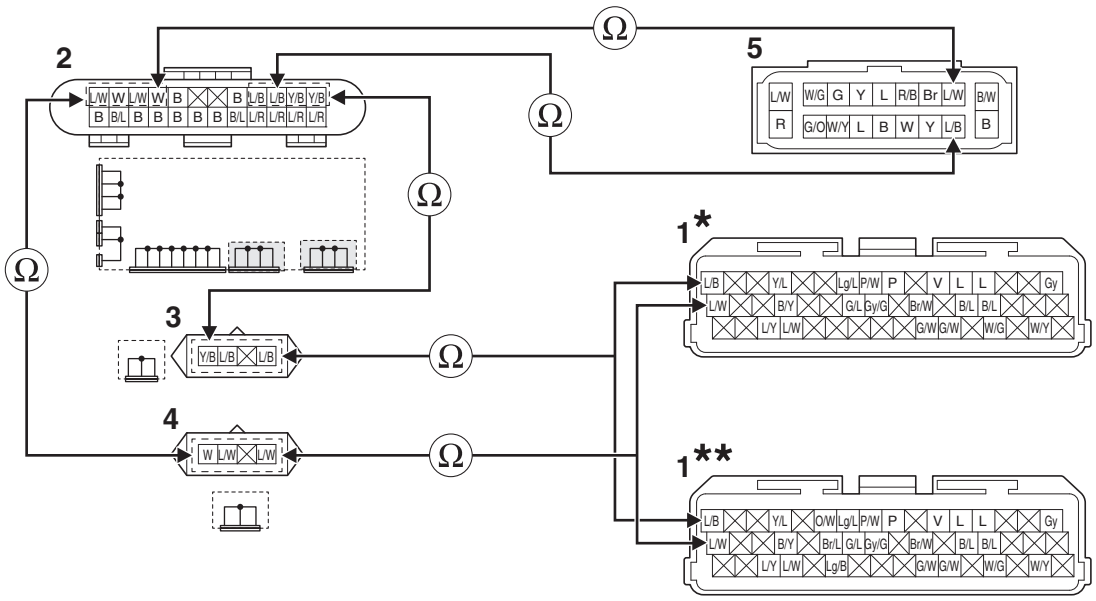
Item

Vehicle CAN communication line or power source of vehicle system

Procedure

1. Wire harness continuity.
   - Disconnect the ECU coupler “1” and ABS ECU coupler “5”.
   - Remove the joint coupler cap “2”, joint coupler cap “3” and joint coupler cap “4”.
   - Open circuit check

Between ECM coupler “1” and joint coupler “3”	blue/black–blue/black
Between ECM coupler “1” and joint coupler “4”	blue/white–blue/white
Between joint coupler “2” and joint coupler “3”	yellow/black–yellow/black
Between joint coupler “2” and joint coupler “4”	white–white
Between joint coupler “2” and ABS ECU coupler “5”	blue/black–blue/black blue/white–blue/white



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to “Short circuit check”

NO

→ Replace the wire harness.

- Short circuit check

TIP

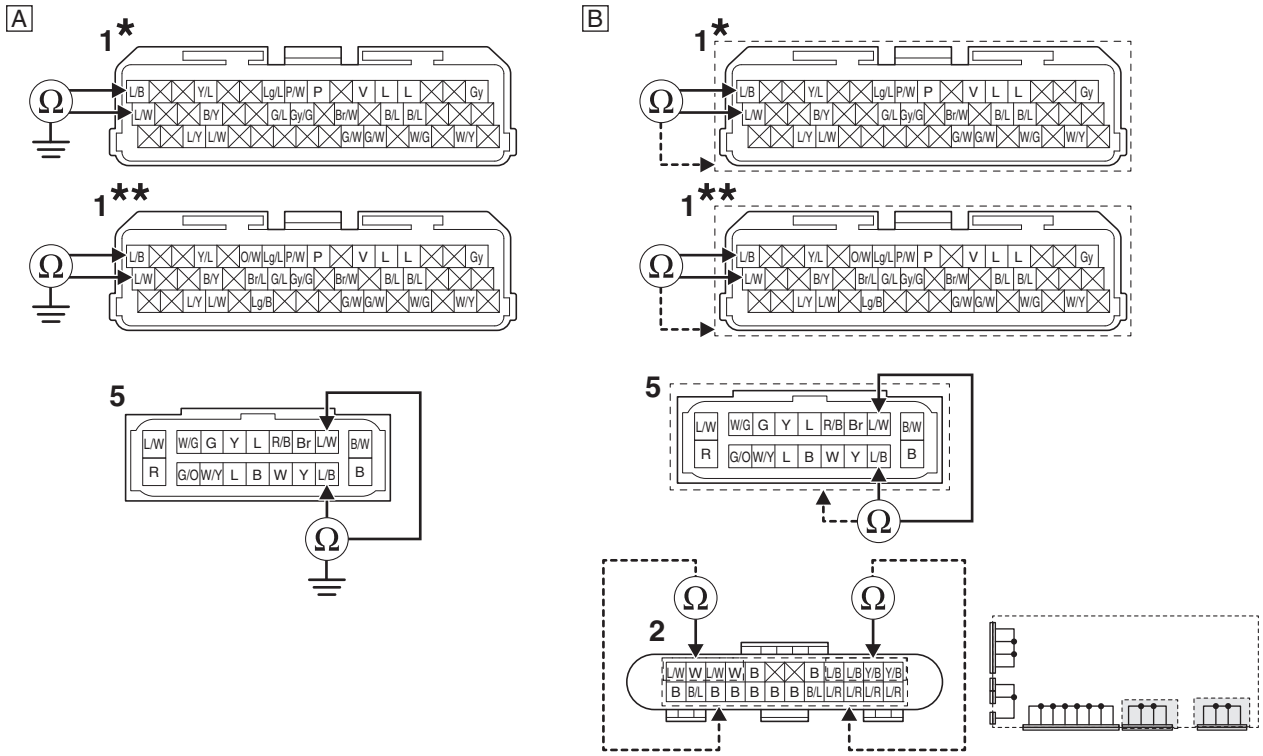
Disconnect the ECU and ABS ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3 and “PARTS CONNECTED TO THE ABS ECU” on page 9-4.

Ground short circuit check “A”

Between ECU coupler “1” and ground	blue/white–ground blue/black–ground
Between ABS ECU coupler “5” and ground	blue/white–ground blue/black–ground

Lines short circuit check “B”

ECU coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
Joint coupler “2”	yellow/black–any other coupler terminal white–any other coupler terminal
ABS ECU coupler “5”	blue/white–any other coupler terminal blue/black–any other coupler terminal



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?
YES
→ Go to step 2.
NO
→ Replace the wire harness.

2. Defective battery
   • Recharge or replace the battery, and check again.
   Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-56.
3. Defective coupler between the battery and the hydraulic unit assembly
   • Check the coupler for any pins that may be pulled out.
   • Check the locking condition of the coupler.

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Is check result OK?

YES

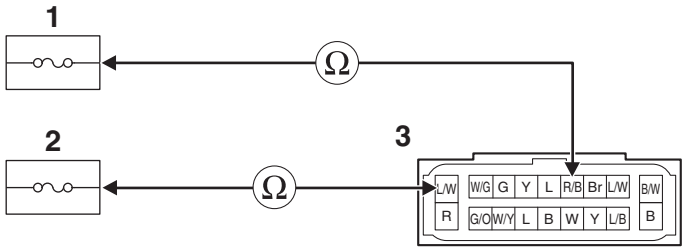
→ Go to step 4.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

4. Wire harness continuity
   - Disconnect the ABS ECU fuse “1”, ABS solenoid fuse “2” and ABS ECU coupler “3”.
   - Open circuit check

Between ABS ECU fuse holder “1” and ABS ECU coupler “3”	red/black–red/black
Between ABS solenoid fuse holder “2” and ABS ECU coupler “3”	blue/white–blue/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 9-4.

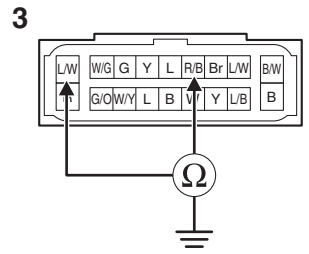
Ground short circuit check “A”

Between ABS ECU coupler “3” and ground	red/black–ground blue/white–ground

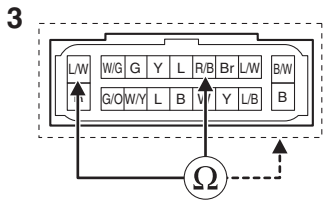
Lines short circuit check “B”

ABS ECU coupler “3”	red/black–any other coupler terminal blue/white–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 5.

NO

→ Replace the wire harness.

5. Defective charging system
   - Check the charging system.
     Refer to “CHARGING SYSTEM” on page 8-17.

Is resistance ∞ Ω?

YES

→ Replace the hydraulic unit assembly (ABS ECU).

NO

→ Confirm the cause of the problem and repair it, and check again.

EAS20702
62_ABS

EAS33333
TROUBLESHOOTING
Item
Power supply voltage failure in pressure sensor

Procedure
1. Defective hydraulic unit assembly
   • Replace the hydraulic unit assembly.
   Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

EAS20705
68_ABS

EAS33336
TROUBLESHOOTING
Item
Defective hydraulic unit assembly (defective front pressure sensor)

Procedure
1. Defective front brake line
   • Check the front brake line.

   Is check result OK?
   YES
   → Go to step 2.
   NO
   → If there is bending or blocking, replace the front brake line.

2. Defective hydraulic unit assembly
   • Replace the hydraulic unit assembly.
   Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-50.

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

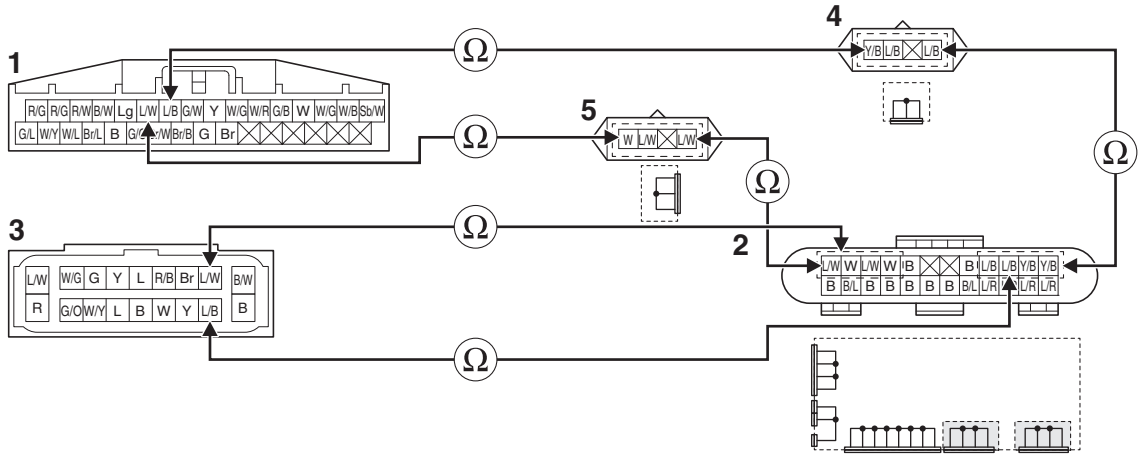
→ Go to step 2.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

2. Wire harness continuity.
   • Disconnect the meter assembly coupler “1” and ABS ECU coupler “3”.
   • Remove the joint coupler cap “2”, joint coupler cap “4” and joint coupler cap “5”.
   • Open circuit check

Between meter assembly coupler “1” and joint coupler “4”	blue/black–blue/black
Between meter assembly coupler “1” and joint coupler “5”	blue/white–blue/white
Between joint coupler “2” and joint coupler “4”	yellow/black–yellow/black
Between joint coupler “2” and joint coupler “5”	white–white
Between joint coupler “2” and ABS ECU coupler “3”	blue/black–blue/black blue/white–blue/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 9-4.

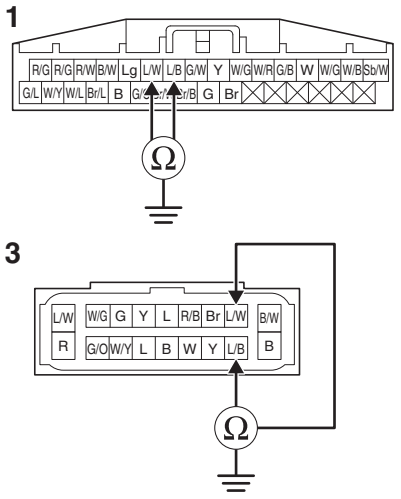
Ground short circuit check “A”

Between meter assembly coupler “1” and ground	blue/white–ground blue/black–ground
Between ABS ECU coupler “3” and ground	blue/white–ground blue/black–ground

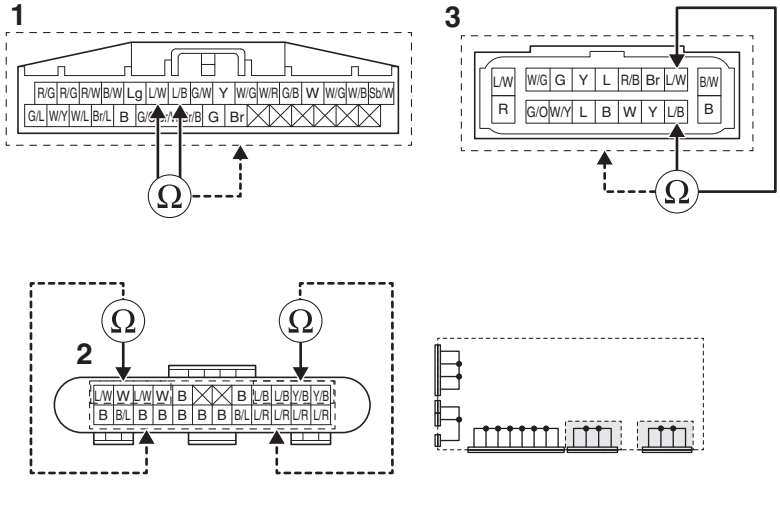
Lines short circuit check “B”

Meter assembly coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
Joint coupler “2”	blue/white–any other coupler terminal blue/black–any other coupler terminal
ABS ECU coupler “3”	blue/white–any other coupler terminal blue/black–any other coupler terminal

A



B



Is resistance ∞ Ω?

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.

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

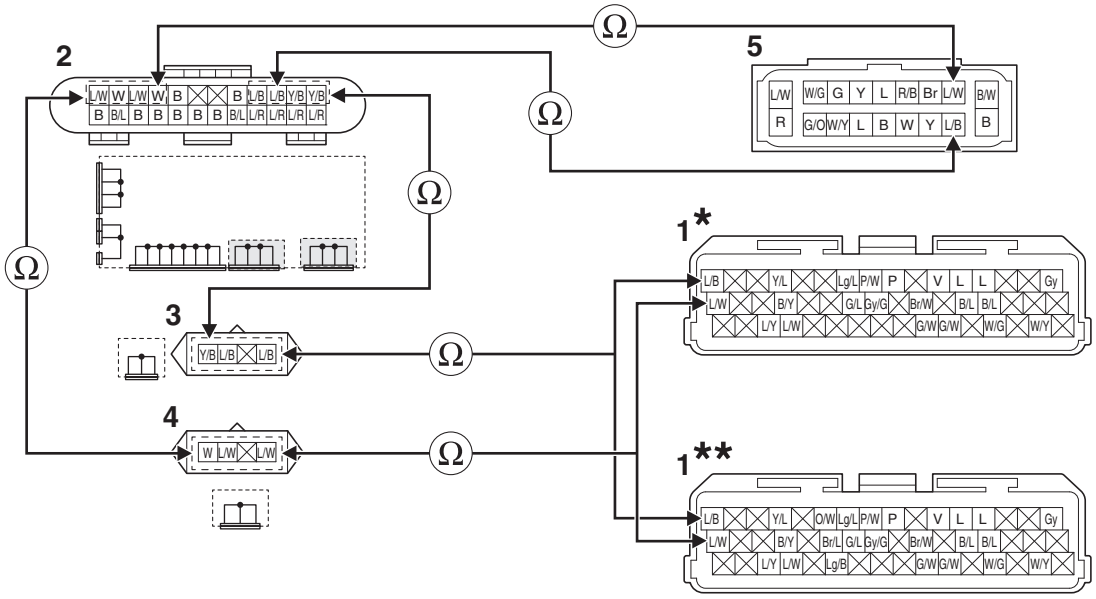
→ Go to step 2.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

2. Wire harness continuity.
   • Disconnect the ECU coupler “1” and ABS ECU coupler “5”.
   • Remove the joint coupler cap “2”, joint coupler cap “3” and joint coupler cap “4”.
   • Open circuit check

Between ECM coupler “1” and joint coupler “3”	blue/black–blue/black
Between ECM coupler “1” and joint coupler “4”	blue/white–blue/white
Between joint coupler “2” and joint coupler “3”	yellow/black–yellow/black
Between joint coupler “2” and joint coupler “4”	white–white
Between joint coupler “2” and ABS ECU coupler “5”	blue/black–blue/black blue/white–blue/white



*. MT09M/MT09MC
**. MT09SPM/MT09SPMC

Is resistance 0 Ω?

YES

→ Go to “Short circuit check”.

NO

→ Replace the wire harness.

- Short circuit check

TIP

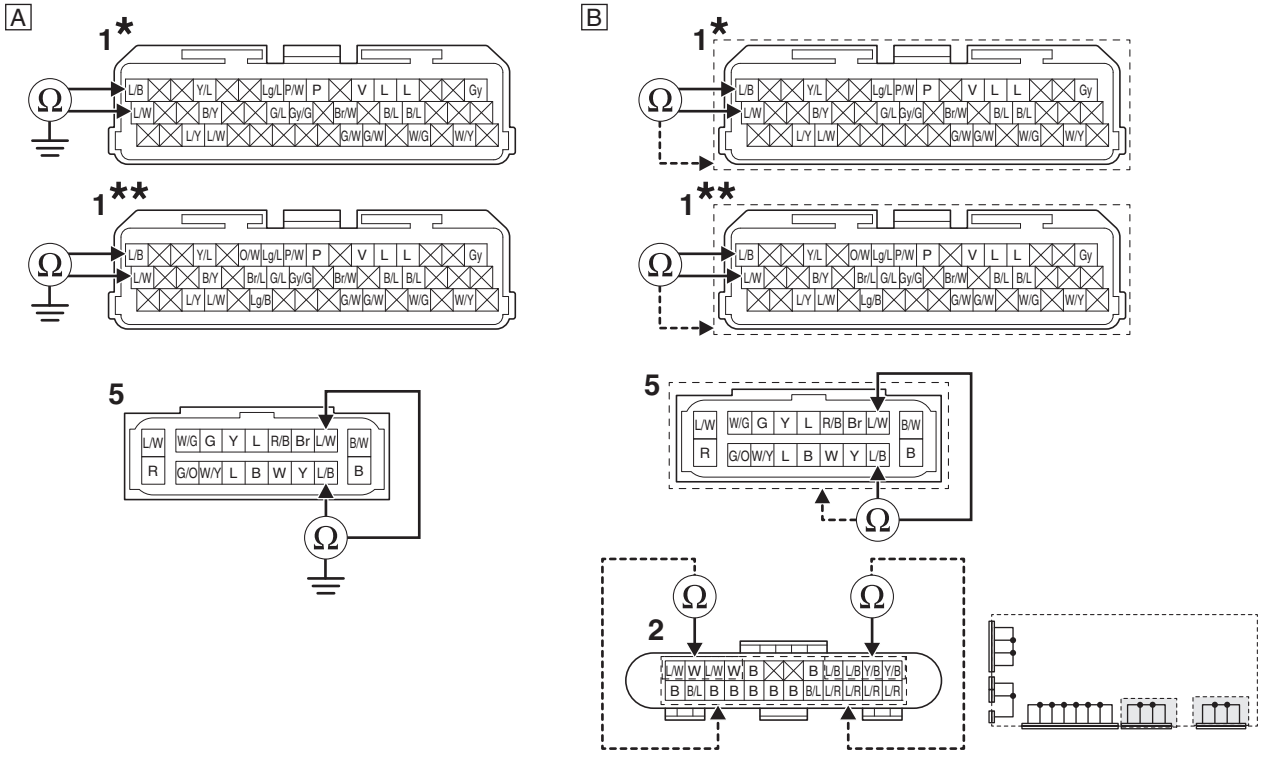
Disconnect the ECU and ABS ECU related connectors before checking.
Refer to “PARTS CONNECTED TO THE ECU” on page 9-3 and “PARTS CONNECTED TO THE ABS ECU” on page 9-4.

Ground short circuit check “A”

Between ECU coupler “1” and ground	blue/white–ground blue/black–ground
Between ABS ECU coupler “5” and ground	blue/white–ground blue/black–ground

Lines short circuit check “B”

ECU coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
Joint coupler “2”	yellow/black–any other coupler terminal white–any other coupler terminal
ABS ECU coupler “5”	blue/white–any other coupler terminal blue/black–any other coupler terminal



*. MT09M/MT09MC

**. MT09SPM/MT09SPMC

Is resistance ∞ Ω?

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.

EAS20671
91_ABS

EAS33301
TROUBLESHOOTING
Item
CAN communication (between IMU and hydraulic unit assembly)

Procedure
1. Defective coupler between the IMU 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

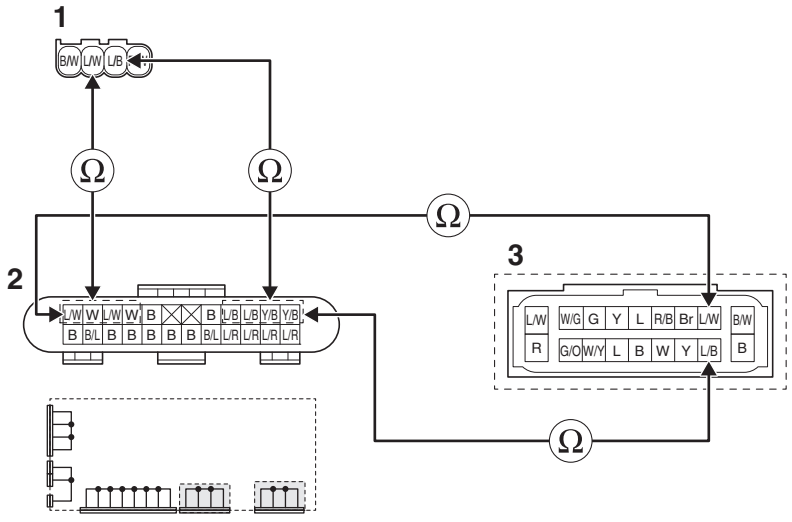
→ Go to step 2.

NO

→ If there is a malfunction, repair it and connect the coupler securely.

2. Wire harness continuity.
   • Disconnect the IMU coupler “1” and ABS ECU coupler “3”.
   • Remove the joint coupler cap “2”.
   • Open circuit check

Between IMU coupler “1” and joint coupler “2”	blue/white–blue/white blue/black–blue/black
Between joint coupler “2” and ABS ECU coupler “3”	blue/white–blue/white blue/black–blue/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 9-4.

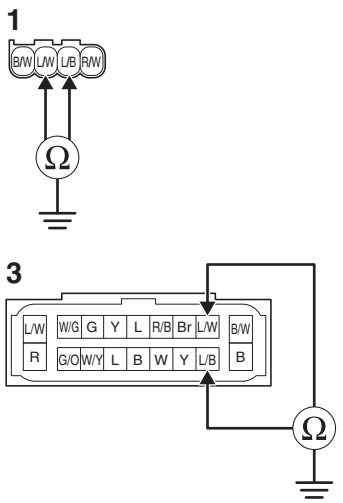
Ground short circuit check “A”

Between IMU coupler “1” and ground	blue/white–ground blue/black–ground
Between ABS ECU coupler “3” and ground	blue/white–ground blue/black–ground

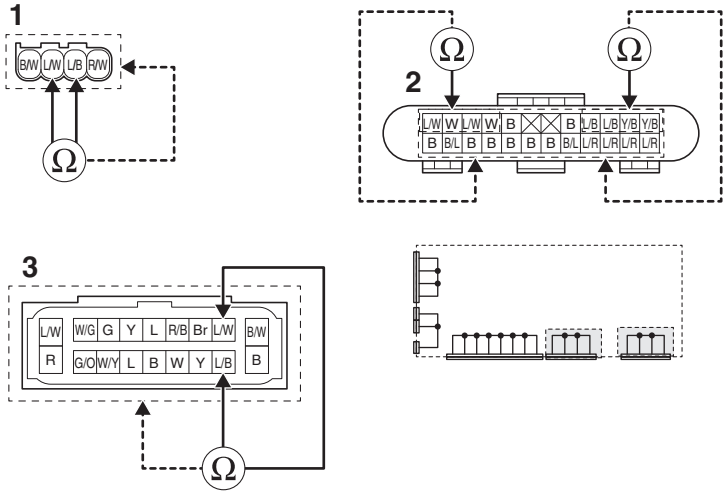
Lines short circuit check “B”

IMU coupler “1”	blue/white–any other coupler terminal blue/black–any other coupler terminal
Joint coupler “2”	blue/white–any other coupler terminal blue/black–any other coupler terminal
ABS ECU coupler “3”	blue/white–any other coupler terminal blue/black–any other coupler terminal

A



B



Is resistance ∞ Ω?

YES

→ Go to step 3.

NO

→ Replace the wire harness.

3. Defective IMU
   • Replace the IMU, and check again.

4. Defective hydraulic unit assembly
   • Replace the hydraulic unit assembly.

EAS20091

WIRING DIAGRAM

MT09M/MT09MC 2021

1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
7. Fuel injection system fuse
8. Electronic throttle valve fuse
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
13. Headlight fuse
14. ABS ECU fuse
15. Terminal fuse 1
16. ABS solenoid fuse
17. ABS motor fuse
18. Backup fuse 1
19. Radiator fan motor fuse
20. Auxiliary DC jack
21. Battery
22. Engine ground
23. Starter relay
24. Starter motor
25. Handlebar switch (right)
26. Front brake light switch
27. Wheel switch
28. Stop/run/start switch
29. Accelerator position sensor
30. Relay unit
31. Starting circuit cut-off relay
32. Fuel pump relay
33. Neutral switch
34. Sidestand switch
35. Fuel pump
36. Fuel sender
37. Gear position sensor
38. Intake air pressure sensor 1
39. Intake air pressure sensor 2
40. O_2 sensor
41. Crankshaft position sensor
42. Coolant temperature sensor
43. Intake air temperature sensor
44. ECU (Engine Control Unit)
45. Ignition coil #1
46. Spark plug
47. Ignition coil #2
48. Ignition coil #3
49. Injector #1
50. Injector #2
51. Injector #3
52. Grip warmer (left) (OPTION)
53. Grip warmer (right) (OPTION)
54. Throttle position sensor
55. Throttle servo motor
56. ABS ECU (Electronic Control Unit)
57. Front wheel sensor
58. Rear wheel sensor
59. IMU (Inertial Measurement Unit)
60. Purge cut valve solenoid (for MT09MC)
61. Shift sensor
62. YDT coupler
63. Meter assembly
64. Multi-function meter
65. Neutral indicator light
66. Oil pressure and coolant temperature warning light
67. Auxiliary system warning light
68. Stability control indicator light
69. Fuel level warning light
70. MIL (Malfunction indicator light)
71. Turn signal indicator light (left)
72. Turn signal indicator light (right)
73. Meter light
74. ABS warning light
75. High beam indicator light
76. Oil pressure switch
77. Rear turn signal light (left)
78. Rear turn signal light (right)
79. Front turn signal/position light (right)
80. Front turn signal/position light (left)
81. Headlight control unit
82. Headlight (low)
83. Headlight (high)
84. Tail/brake light
85. License plate light
86. Auxiliary light
87. Radiator fan motor
88. Rear brake light switch
89. Handlebar switch (left)
90. Clutch switch
91. Mode switch
92. Pass switch
93. Dimmer switch
94. Horn switch
95. Hazard switch
96. Turn signal switch
97. Horn

A. Wire harness
B. Sub-wire harness (Oil pressure switch)

MT09SPM/MT09SPMC 2021

1. AC magneto
2. Rectifier/regulator
3. Fuse box
4. Main fuse
5. Main switch
6. Radiator fan motor relay
7. Fuel injection system fuse
8. Electronic throttle valve fuse
9. Backup fuse 2
10. Signaling system fuse
11. Ignition fuse 2
12. Ignition fuse 1
13. Headlight fuse
14. ABS ECU fuse
15. Terminal fuse 1
16. Brake light fuse
17. Cruise control fuse
18. ABS solenoid fuse
19. ABS motor fuse
20. Backup fuse 1
21. Radiator fan motor fuse
22. Auxiliary DC jack
23. Battery
24. Engine ground
25. Starter relay
26. Starter motor
27. Clutch switch
28. Front brake light switch
29. Rear brake light switch
30. Handlebar switch (right)
31. Wheel switch
32. Stop/run/start switch
33. Accelerator position sensor
34. Relay unit
35. Starting circuit cut-off relay
36. Fuel pump relay
37. Neutral switch
38. Sidestand switch
39. Fuel pump
40. Fuel sender
41. Gear position sensor
42. Intake air pressure sensor 1
43. Intake air pressure sensor 2
44. O_2 sensor
45. Crankshaft position sensor
46. Coolant temperature sensor
47. Intake air temperature sensor
48. ECU (Engine Control Unit)
49. Ignition coil #1
50. Spark plug
51. Ignition coil #2
52. Ignition coil #3
53. Injector #1
54. Injector #2
55. Injector #3
56. Grip warmer (left) (OPTION)
57. Grip warmer (right) (OPTION)
58. Throttle position sensor
59. Throttle servo motor
60. ABS ECU (Electronic Control Unit)
61. Front wheel sensor
62. Rear wheel sensor
63. IMU (Inertial Measurement Unit)
64. Purge cut valve solenoid (for MT09SPMC)
65. Shift sensor
66. YDT coupler
67. Meter assembly
68. Multi-function meter
69. Neutral indicator light
70. Oil pressure and coolant temperature warning light
71. Auxiliary system warning light
72. Stability control indicator light
73. Fuel level warning light
74. MIL (Malfunction indicator light)
75. Turn signal indicator light (left)
76. Turn signal indicator light (right)
77. Cruise control system indicator light
78. Cruise control setting indicator light
79. Meter light
80. ABS warning light
81. High beam indicator light
82. Oil pressure switch
83. Rear turn signal light (left)
84. Rear turn signal light (right)
85. Front turn signal/position light (right)
86. Front turn signal/position light (left)
87. Headlight control unit
88. Headlight (low)
89. Headlight (high)
90. Tail/brake light
91. License plate light
92. Auxiliary light
93. Radiator fan motor
94. Brake light relay
95. Handlebar switch (left)
96. Cruise control power switch
97. Cruise control setting switch
98. Dimmer/pass switch
99. Horn switch
100. Mode switch
101. Select switch
102. Hazard switch
103. Turn signal switch
104. Horn

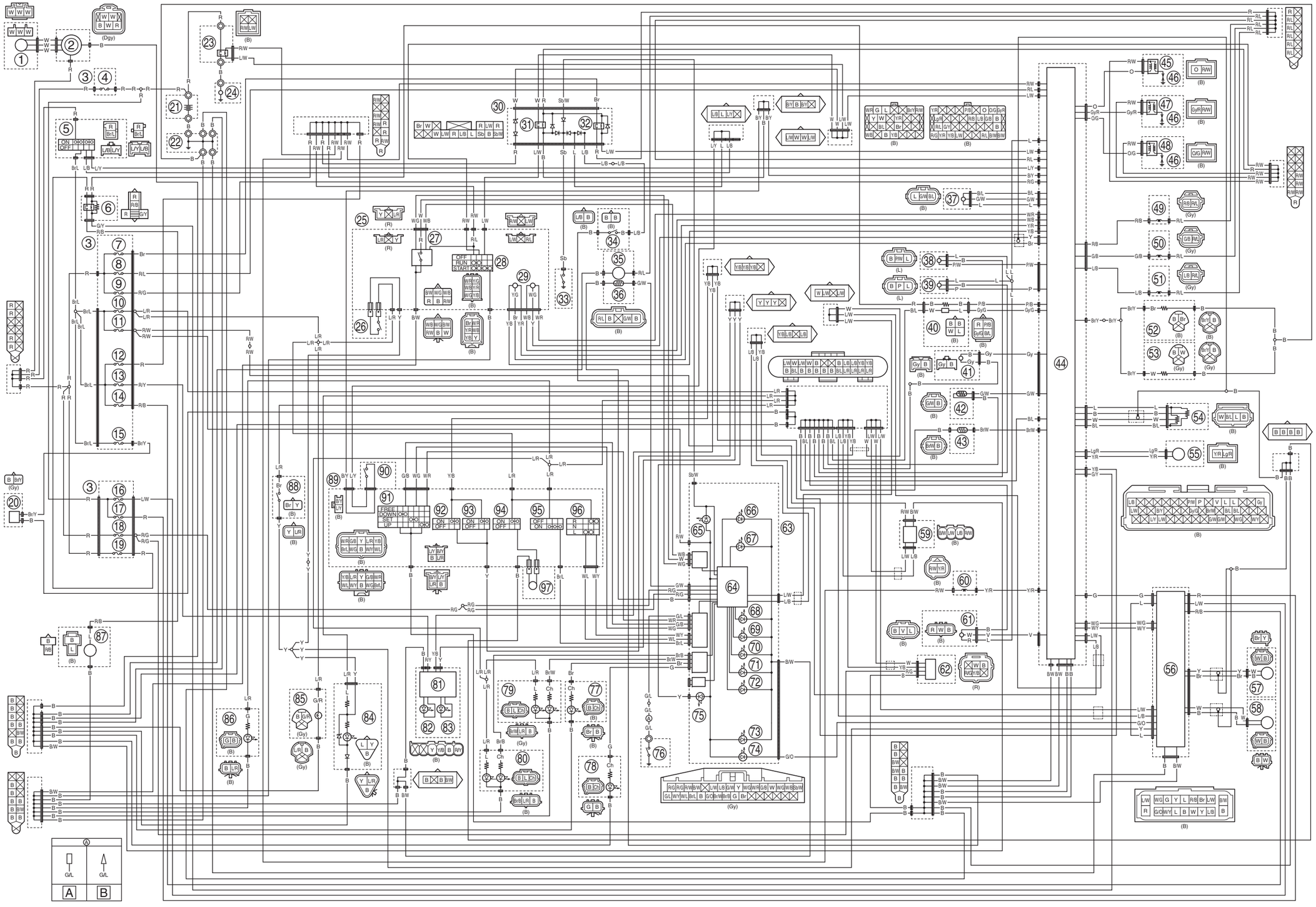
A. Wire harness
B. Sub-wire harness (Oil pressure switch)

EAS30613

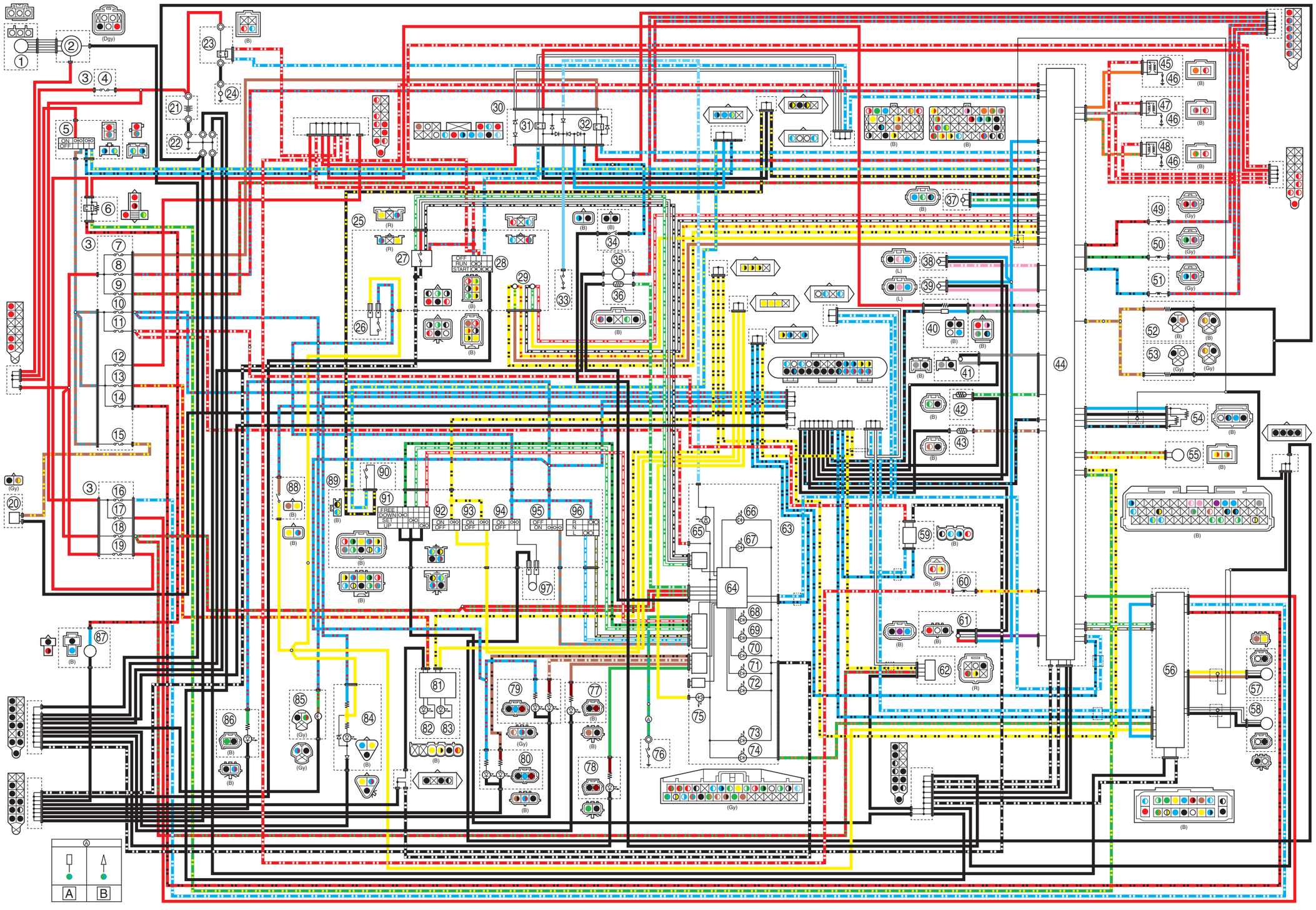
COLOR CODE

B	Black
Br	Brown
Dgy	Dark gray
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
V	Violet
W	White
Y	Yellow
B/L	Black/Blue
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/L	Brown/Blue
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/L	Green/Blue
G/O	Green/Orange
G/W	Green/White
G/Y	Green/Yellow
Gy/G	Gray/Green
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/B	Light green/Black
Lg/L	Light green/Blue
Lg/R	Light green/Red
O/G	Orange/Green
O/W	Orange/White
P/B	Pink/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black
W/G	White/Green
W/L	White/Blue
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/L	Yellow/Blue
Y/R	Yellow/Red
Y/W	Yellow/White

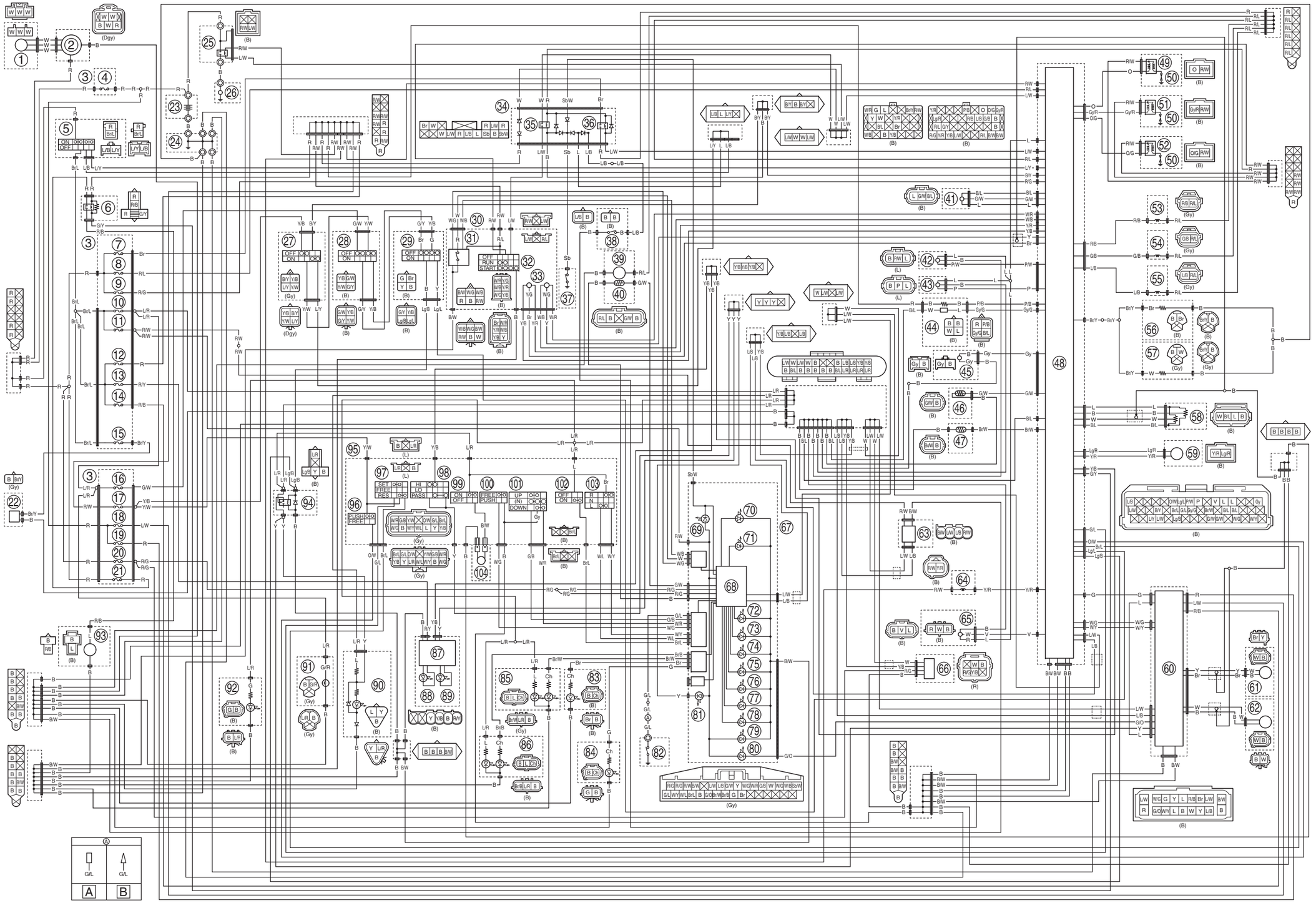
MT09M/MT09MC 2021
WIRING DIAGRAM



MT09M/MT09MC 2021
WIRING DIAGRAM



MT09SPM/MT09SPMC 2021
WIRING DIAGRAM



MT09SPM/MT09SPMC 2021
WIRING DIAGRAM