EAS10003

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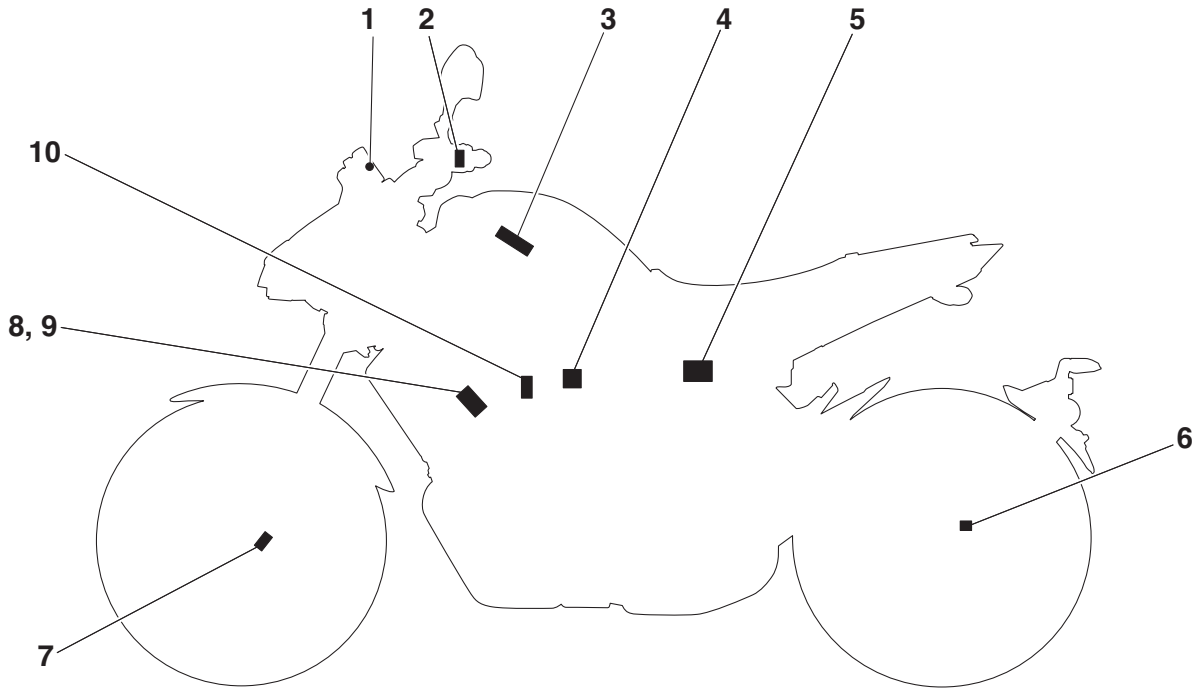
EAS30855
OUTLINE OF THE TCS (Traction Control System)

The traction control system controls excessive spinning (slipping) of the rear wheel when accelerating on slippery surfaces, such as unpaved or wet roads.
The ECU monitors the front and rear wheel speeds using the signals from the front and rear wheel sensors, and detects rear wheel slipping according to the difference between the wheel speeds. If the slipping exceeds the preset value, the ECU controls the slipping using integrated control of the ignition timing, fuel cut-off, and throttle valve opening of the YCC-T system.
The traction control system can be set to one of two operation modes or turned off.

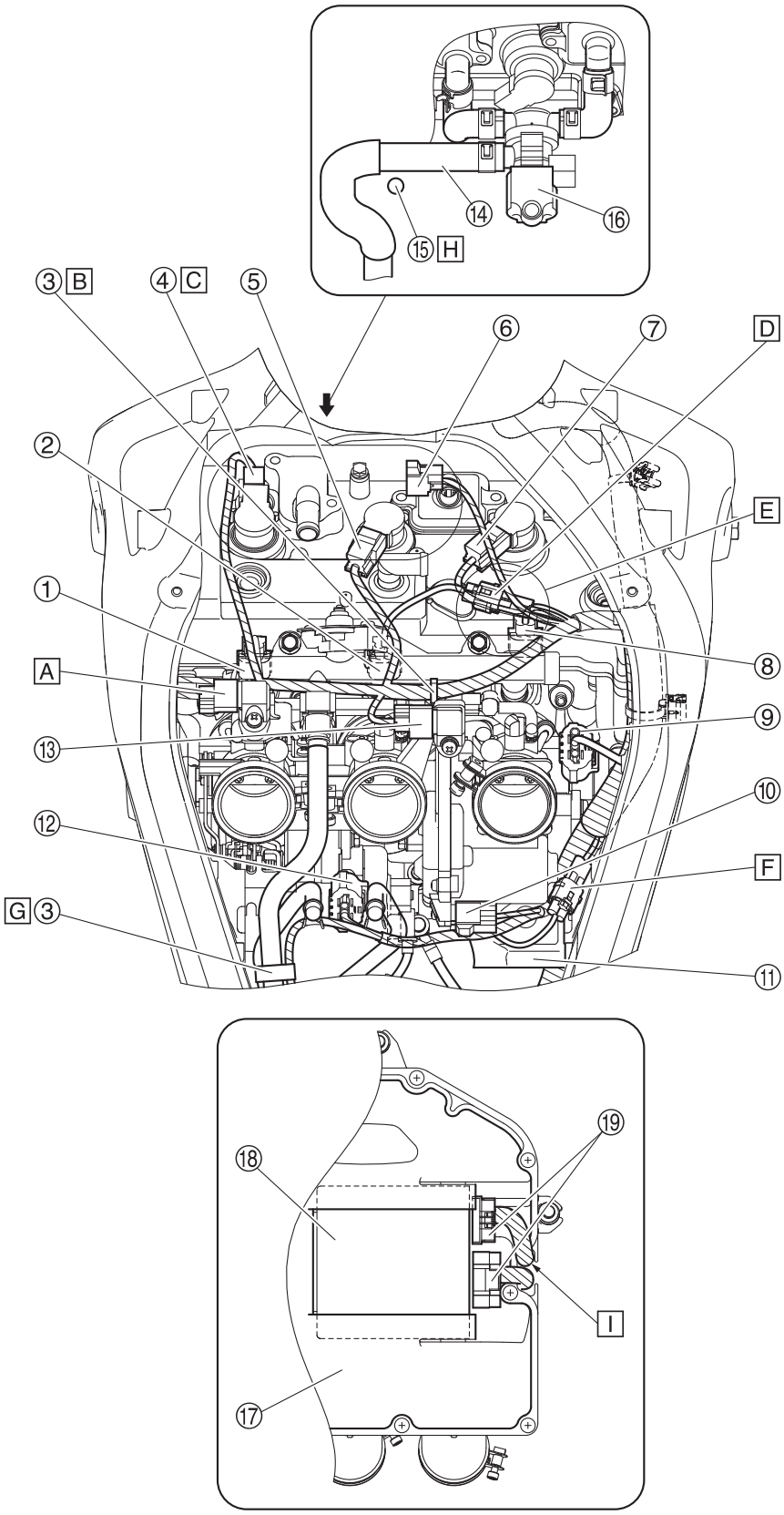
TCS (Traction control system) layout



1. Traction control system indicator light
2. Traction control system switch
3. ECU
4. Throttle servo motor
5. ABS ECU
6. Rear wheel sensor
7. Front wheel sensor
8. Ignition coils
9. Spark plugs
10. Fuel injector

Impeller shaft tilt limit	0.15 mm (0.006 in)
Spark plug(s)	
Manufacturer/model	NGK/CPR9EA9
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	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Lobe height (Intake)	36.290–36.390 mm (1.4287–1.4327 in)
Limit	36.190 mm (1.4248 in)
Lobe height (Exhaust)	35.720–35.820 mm (1.4063–1.4102 in)
Limit	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	0.26–0.30 mm (0.0102–0.0118 in)
Valve dimensions	
Valve seat contact width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.60 mm (0.06 in)
Valve seat contact width (exhaust)	1.10–1.30 mm (0.0433–0.0512 in)
Limit	1.80 mm (0.07 in)
Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.445 mm (0.1750 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)
Valve spring	
Free length (intake)	39.31 mm (1.55 in)
Limit	37.34 mm (1.47 in)
Free length (exhaust)	37.78 mm (1.49 in)
Limit	35.89 mm (1.41 in)
Spring tilt (intake)	1.7 mm (0.07 in)
Spring tilt (exhaust)	1.6 mm (0.06 in)
Cylinder	
Bore	78.000–78.010 mm (3.0709–3.0713 in)
Wear limit	78.060 mm (3.0732 in)

Frame (top view)



EAS31332
REMOVING THE AIR SCOOPS

1. Remove:
   • Air scoop (left) “1”

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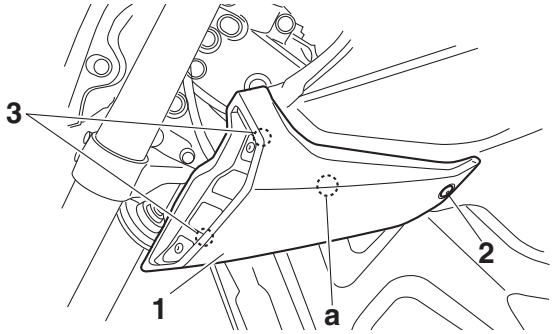
a. Remove the air scoop bolt “2” and quick fasteners “3”.
b. Pull the air scoop off at the areas “a” shown.



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2. Remove:
   • Air scoop (right) “1”

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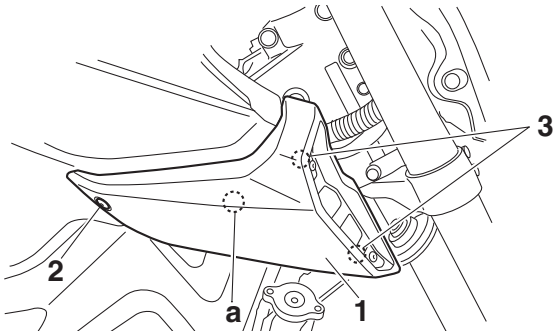
a. Remove the air scoop bolt “2” and quick fasteners “3”.
b. Pull the air scoop off at the areas “a” shown.



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EAS31333
INSTALLING THE AIR SCOOPS

1. Install:
   • Air scoop (left) “1”

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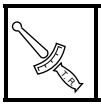
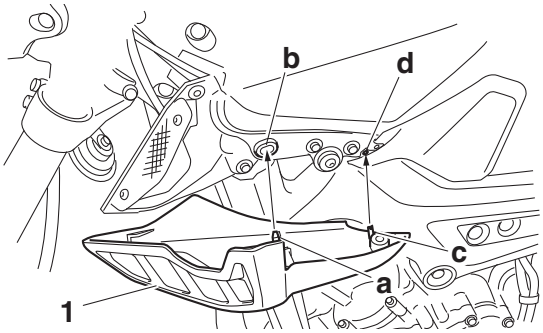
a. Insert the projection “a” on the air scoop into the grommet “b” and insert the projection “c” on the air scoop into the hole “d”.
b. Install the air scoop bolt and quick fastener, and then tighten the bolts to specification.

	**Air scoop bolt** **1.5 N·m (0.15 kgf·m, 1.1 lb·ft)**



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2. Install:
   • Air scoop (right) “1”

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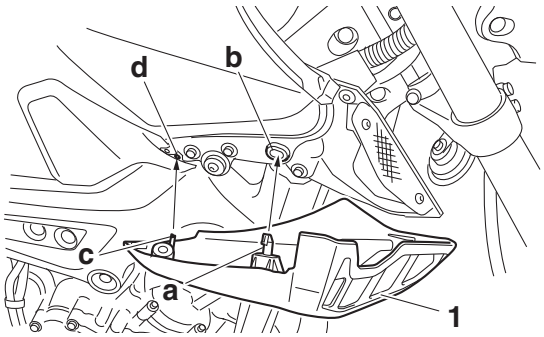
a. Insert the projection “a” on the air scoop into the grommet “b” and insert the projection “c” on the air scoop into the hole “d”.
b. Install the air scoop bolt and quick fastener, and then tighten the bolts to specification.

	**Air scoop bolt** **1.5 N·m (0.15 kgf·m, 1.1 lb·ft)**



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EAS31334
INSTALLING THE FUEL TANK MOLES

1. Install:
   • Fuel tank mole (left) “1”

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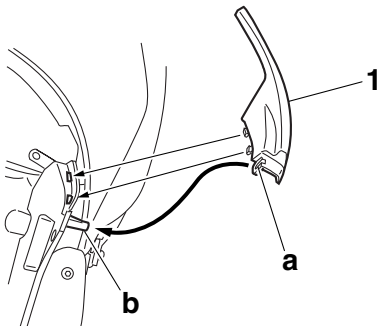
a. Install the hole “a” in the fuel tank mole onto the projection “b” on the air scoop stay.



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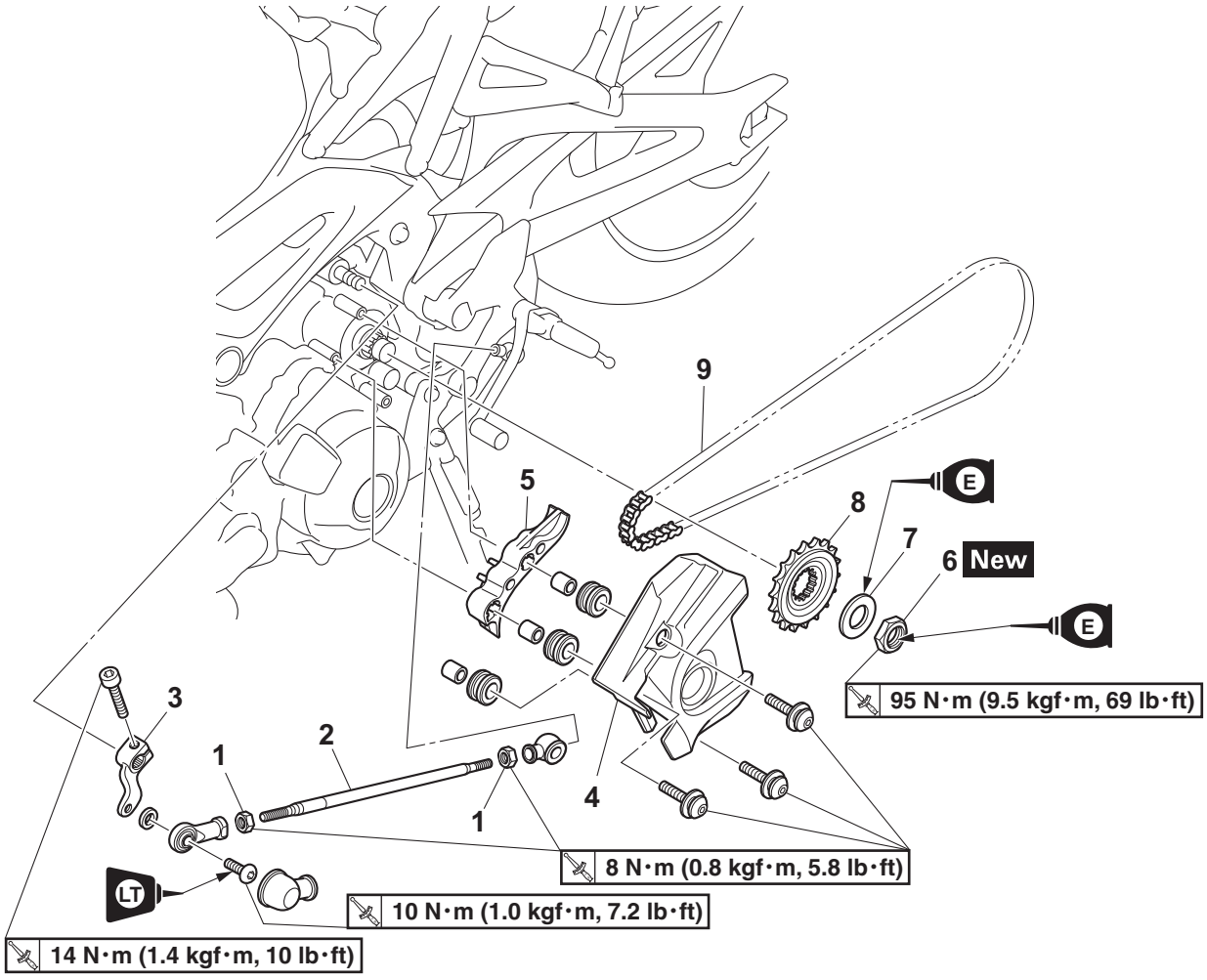
EAS20038
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Drive sprocket cover	1	
5	Drive chain guide	1	
6	Drive sprocket nut	1	
7	Washer	1	
8	Drive sprocket	1	
9	Drive chain	1	

- Clutch springs
- Pressure plate 1
- Clutch spring bolts “1”

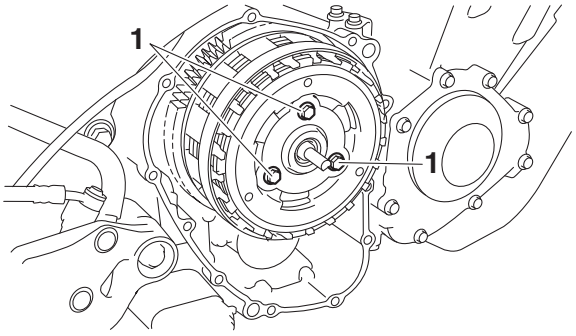
	Clutch spring bolt **10 N·m (1.0 kgf·m, 7.2 lb·ft)**

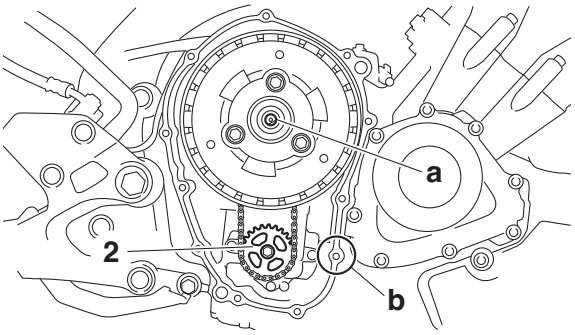
- Oil pump driven sprocket “2”

	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 pins
   - Clutch cover gasket New
   - Clutch cover
   - Cover

	Clutch cover bolt **12 N·m (1.2 kgf·m, 8.7 lb·ft)**

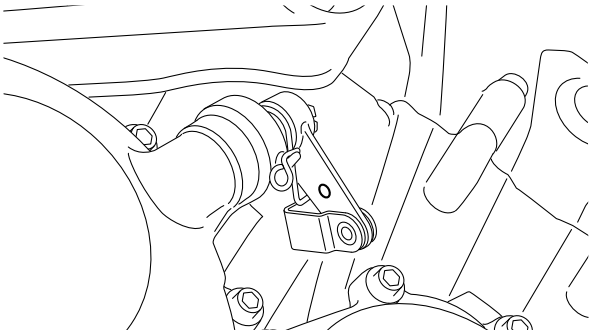
TIP

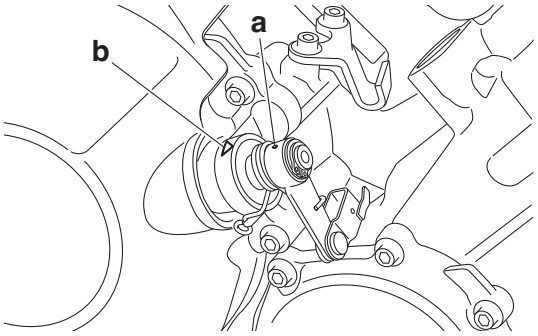
- Apply engine oil onto the bearing.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.

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.

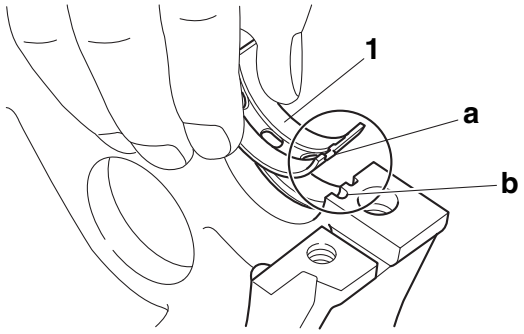




7. Connect:
   - Clutch cable “1”

TIP

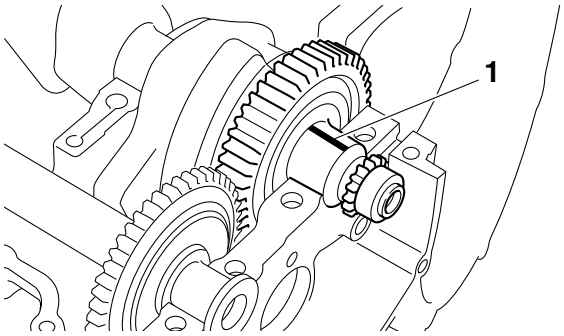
- For the clutch cable “1”, turn the nut “2” in fully and then adjust the length “a” by using the nut “3” so that the cable length is 47.1–54.8 mm (1.85–2.16 in).
- Measure the length while keeping the measuring surface “b” parallel.
- After installing the clutch cable, bend the projection “c” on the pull lever.



d. Put a piece of Plastigauge® "1" on each crankshaft journal.

TIP

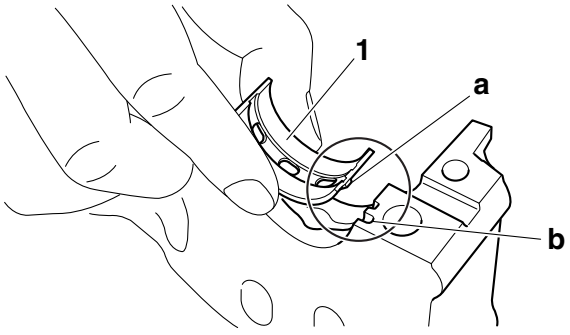
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



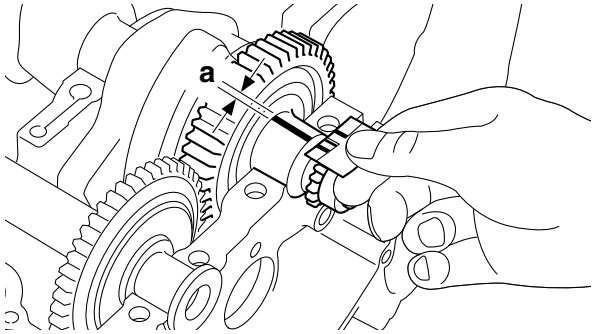
e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

TIP

- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
   Refer to "CRANKCASE" on page 5-57.
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.



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4. Select:
   - Crankshaft journal bearings (J_1–J_4)

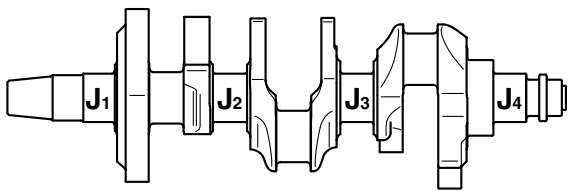
TIP

- 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.

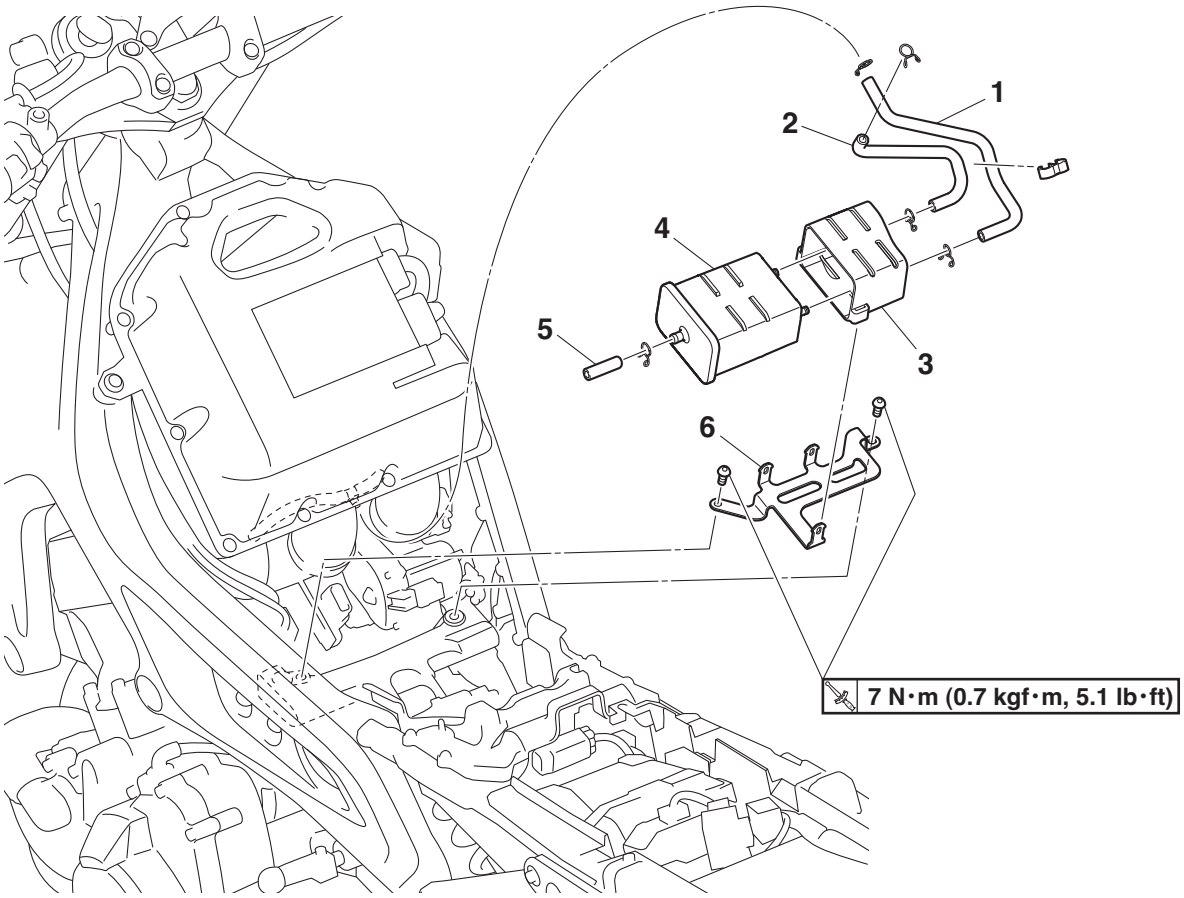
For example, if the crankcase "J_1" and crankshaft web "J_1" numbers are 7 and 2 respectively, then the bearing size for "J_1" is:

"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



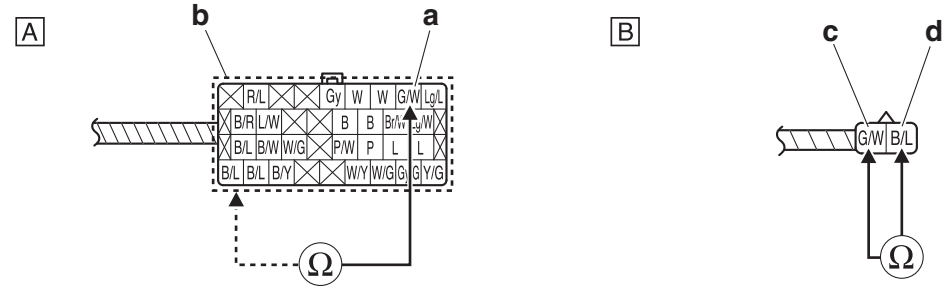
Removing the canister (for California)



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Air scoop/Fuel tank cover		Refer to "GENERAL CHASSIS (2)" on page 4-7.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Canister purge hose (hose joint to canister)	1	
2	Fuel tank breather hose (fuel tank to canister)	1	
3	Canister holder	1	
4	Canister	1	
5	Canister breather hose	1	
6	Canister bracket	1	

a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Start/engine stop switch
6. Starting circuit cut-off relay
7. Diode
8. Clutch switch
9. Sidestand switch
10. Gear position switch (neutral circuit)
11. Diode
12. Starter relay
13. Starter motor

Fault code No.		P0117, P0118	
Item		[P0117] Coolant temperature sensor: ground short circuit detected. [P0118] Coolant temperature sensor: open or power short circuit detected.	
3-7	[For P0117/P0118] Short circuit Between wire harness (ECU side) output terminal (green/white) “a” of ECU coupler and any other ECU coupler terminal “b”. Between sub-wire harness (coolant temperature sensor side) output terminal (green/white) “c” and output terminal (black/blue) “d”. If there is continuity, replace the wire harness and/or sub-wire harness.  A. Wire harness coupler (ECU side) B. Sub-wire harness coupler (coolant temperature sensor side)	
4	Installed condition of coolant temperature sensor.	Check for looseness or pinching. Improperly installed sensor → Reinstall or replace the sensor.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 7 and finish the service. Condition is “Detected” → Go to item 5.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-161.	Turn the main switch to “ON”, and then check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 7 and finish the service. Condition is “Detected” → Go to item 6.
6	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-149.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P0601, P0606

Fault code No.	**P0601, P0606**
Item	**Internal malfunction in ECU. (When this malfunction is detected in the ECU, the fault code number might not appear on the tool display.)**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	—
Tool display	—
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-149.	Turn the main switch to “ON”. Check that the engine trouble warning light does not come on.

Fault code No. P062F

Fault code No.	**P062F**
Item	**EEPROM fault code number: an error is detected while reading or writing on EEPROM.**
Fail-safe system	Able/Unable to start engine
	Able/Unable to drive vehicle
Diagnostic code No.	60
Tool display	00 • No malfunctions detected (If the self-diagnosis fault code P062F is indicated, the ECU is defective.) 01–03 (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.) 11 (Data error for ISC (idle speed control) learning values) 12 (O_2 feedback learning value) 13 (OBD memory value)
Procedure	—

Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction	Execute the diagnostic mode. (Code No. 60)	
2	Malfunction in ECU.	Replace the ECU. Refer to “REPLACING THE ECU (Engine Control Unit)” on page 8-149.	Service is finished.
3	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No.		P1602	
Item		Malfunction in ECU internal circuit (malfunction of ECU power cut-off function).	
6	Malfunction in ECU.	Replace the ECU.	Service is finished.
7	Delete the fault code and check that the engine trouble warning light goes off.	Confirm that the fault code has a condition of “Recovered” using the Yamaha diagnostic tool, and then delete the fault code.	

Fault code No. P1604, P1605

Fault code No.		P1604, P1605	
Item		[P1604] Lean angle sensor: ground short circuit detected. [P1605] Lean angle sensor: open or power short circuit.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		08	
Tool display		Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)	
Procedure		Remove the lean angle sensor and incline it more than 65 degrees.	
Item	**Probable cause of malfunction and check**	**Maintenance job**	**Confirmation of service completion**
1	Connection of lean angle sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 2.
2	Connection of ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to “ON”, then to “OFF”, and then back to “ON”. Check the condition of the fault code using the malfunction mode of the Yamaha diagnostic tool. Condition is “Recovered” → Go to item 6 and finish the service. Condition is “Detected” → Go to item 3.

The fault codes recorded in the ABS ECU can be checked using the Yamaha diagnostic tool. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). For information about deleting the fault codes, refer to "[B-3] DELETING THE FAULT CODES" on page 8-140. By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned to "ON". During this test, a "clicking" noise can be heard from 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.

Self-diagnosis using the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the Yamaha diagnostic tool when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA17620

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS30529

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA17420

⚠ WARNING

- **Perform the troubleshooting [A]→[B]→[C] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.**
- **Use sufficiently charged regular batteries only.**

[A] Malfunction check using the ABS warning light

[B] Use the Yamaha diagnostic tool and determine the location of the malfunction and the cause from the recorded fault code.

Determine the cause of the malfunction from the condition and place where the malfunction occurred.

[C] Servicing the ABS

Execute the final check after disassembly and assembly.

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14371

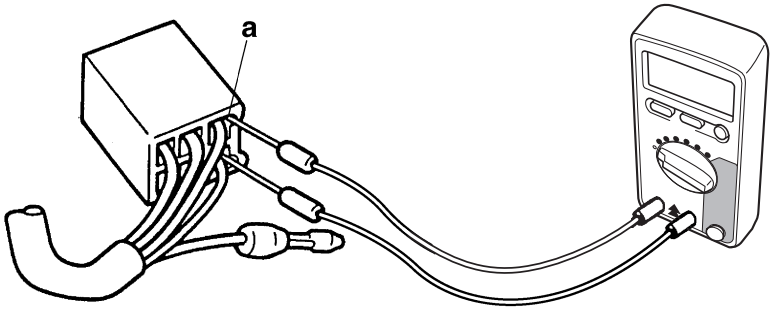
NOTICE

Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.

Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

TIP

- Before checking for continuity, set the digital circuit tester to the " Ω " range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by " ○——○ ".
There is continuity between red, brown/blue and brown/red and between blue/yellow and blue/black when the switch is set to "ON".
There is continuity between red and brown/red when the switch is set to "P".