

FUEL SYSTEM AND THROTTLE BODY

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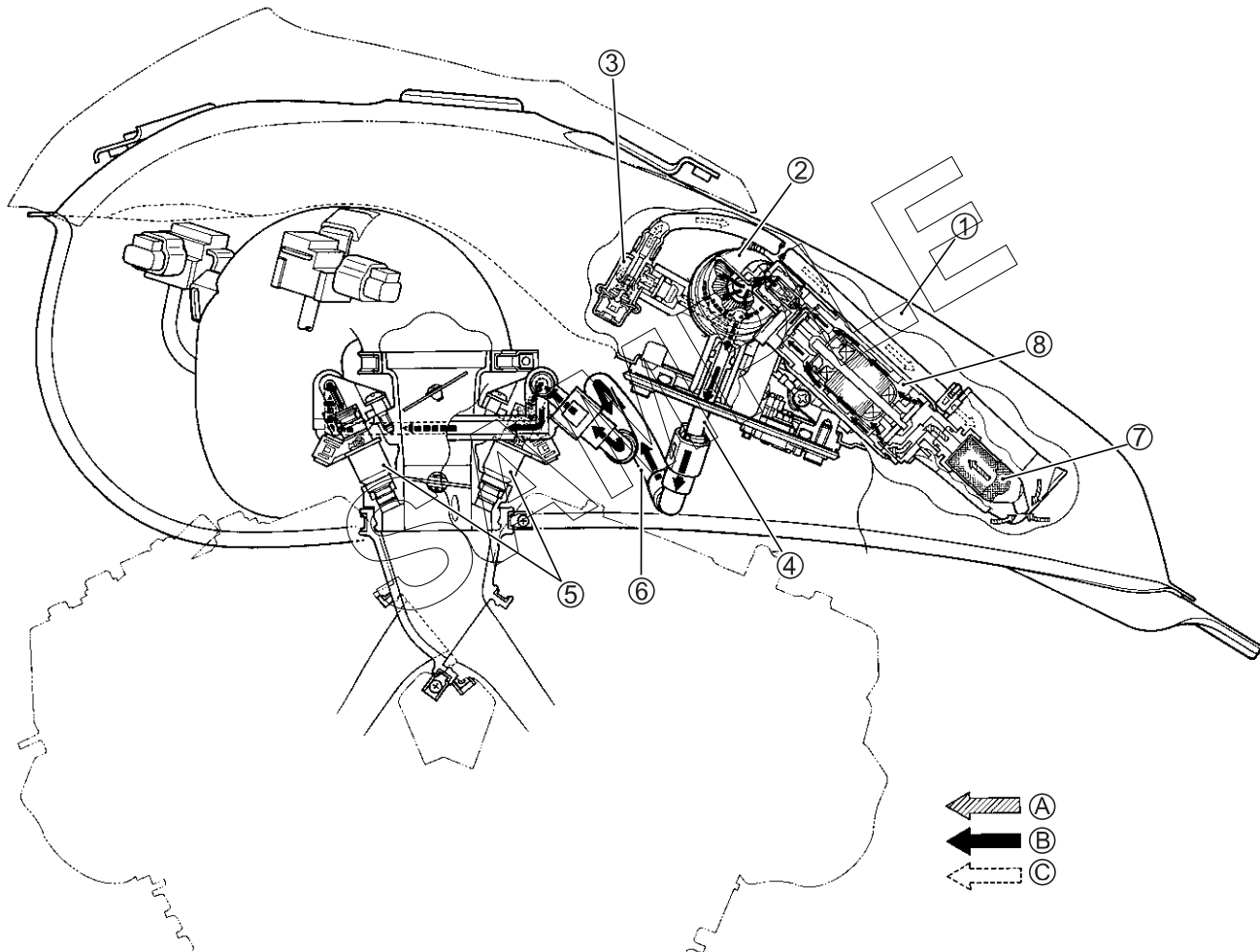
⚠ WARNING

Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

FUEL DELIVERY SYSTEM

The fuel delivery system consists of the fuel tank, fuel pump, fuel filters, fuel feed hose, fuel delivery pipe (including fuel injectors) and fuel pressure regulator. There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injector installed in the fuel delivery pipe. Fuel pressure is regulated by the fuel pressure regulator. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 3.0 kgf/cm² (300 kPa, 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



①	Fuel tank	⑦	Fuel mesh filter (For low pressure)
②	Fuel filter (For high pressure)	⑧	Fuel pump
③	Fuel pressure regulator	Ⓐ	Before-pressurized fuel
④	Fuel delivery pipe	Ⓑ	Pressurized fuel
⑤	Fuel injector	Ⓒ	Relieved fuel
⑥	Fuel feed hose		

FUEL SYSTEM

FUEL TANK REMOVAL

- Remove the seats. (☞ 8-3)
- Remove the fuel tank mounting bolt.

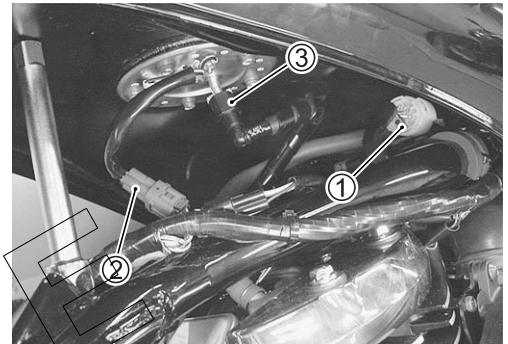


- Lift and support the fuel tank about 10 cm (3.94 in) with the proper stay.

NOTE:

Be careful not to lift the fuel more than about 10 cm (3.94 in), or hoses will be twisted.

- Remove the pilot lamp coupler ①.
- Disconnect the fuel pump lead wire coupler ②.
- Place a rag under the fuel feed hose and remove the fuel feed hose ③.



CAUTION

When removing the fuel tank, do not leave the fuel feed hose ③ on the fuel tank side.

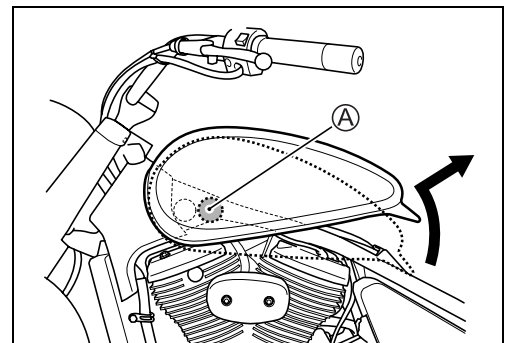
⚠ WARNING

Gasoline is highly flammable and explosive. Keep heat, spark and flame away.

- Remove the fuel tank.

CAUTION

Be careful not to damage the frame (A) by the fuel tank.

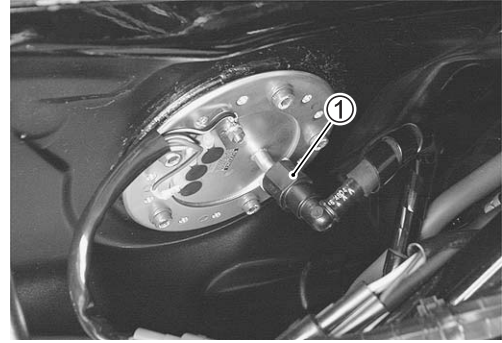


FUEL TANK INSTALLATION

- Installation is in the reverse order of removal.

FUEL PRESSURE INSPECTION

- Lift and support the fuel tank. (☞ 6-3)
- Place a rag under the fuel feed hose.
- Remove the fuel feed hose ①.

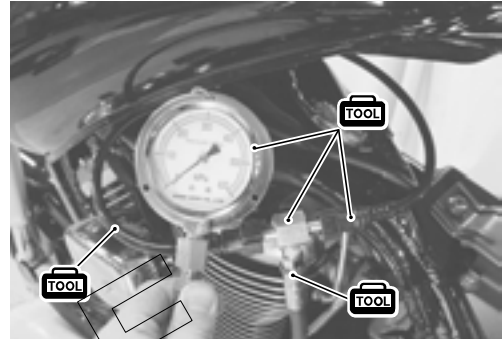


- Install the special tools between the fuel tank and fuel delivery pipe.

TOOL 09940-40211: Fuel pressure gauge adaptor
 09940-40220: Fuel pressure gauge hose attachment
 09915-74511: Oil pressure gauge set

Turn the ignition switch ON and check the fuel pressure.

DATA Fuel pressure: Approx. 300 kPa (3.0 kgf/cm², 43 psi)



If the fuel pressure is lower than the specification, inspect the following items:

- * Clogged fuel filter
- * Pressure regulator
- * Fuel pump

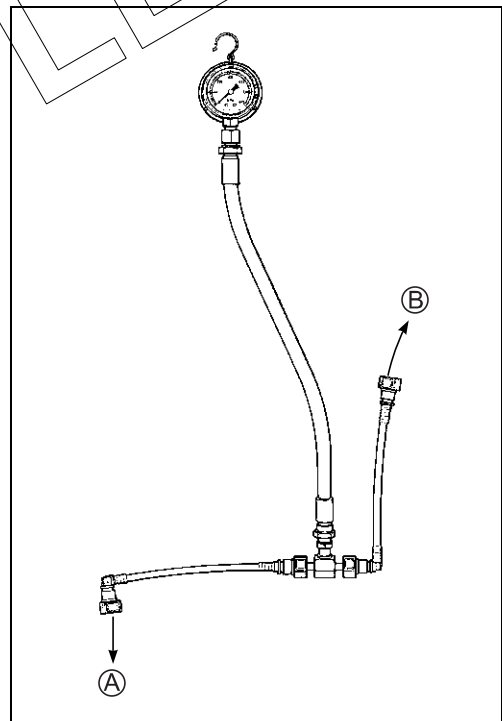
If the fuel pressure is higher than the specification, inspect the following items:

- * Fuel pump check valve
- * Pressure regulator

⚠ WARNING

- * Before removing the special tools, turn the ignition switch to OFF position and release the fuel pressure slowly.
- * Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.

- Ⓐ To fuel tank
- Ⓑ To fuel delivery pipe



SAMPLE

FUEL PUMP INSPECTION

Turn the ignition switch ON and check that the fuel pump operates for few seconds.

If the fuel pump motor does not make operating sound, inspect the fuel pump circuit connections or inspect the fuel pump relay and tip-over sensor.

If the fuel pump relay, tip-over sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one.

FUEL DISCHARGE AMOUNT INSPECTION

⚠ WARNING

**Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.**

- Lift and support the fuel tank. (☞ 6-3)
 - Disconnect the fuel feed hose ① from the fuel delivery pipe.
 - Disconnect the fuel pump lead wire coupler ②.
-
- Place the measuring cylinder and insert the fuel feed hose end into the measuring cylinder.

- Connect a proper lead wire into the fuel pump lead wire coupler (fuel pump side) and apply 12 volts to the fuel pump (between Y/R wire and B/W wire) for 10 seconds and measure the amount of fuel discharged.

Battery ⊕ terminal ——— (Yellow with red tracer)

Battery ⊖ terminal ——— (Black with white tracer)

If the pump does not discharge the amount specified, it means that the fuel pump is defective or that the fuel filter is clogged.

DATA Fuel discharge amount: 168 ml and more/10 sec.
(5.7/5.9 US/Imp oz)/10 sec.

NOTE:

The battery must be in fully charged condition.



SAMPLE

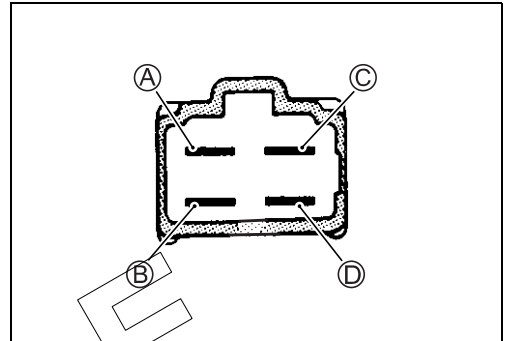
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located inside the secondary gear case cover.

- Remove the secondary gear case cover. (☞ 2-16)
- Remove the fuel pump relay.

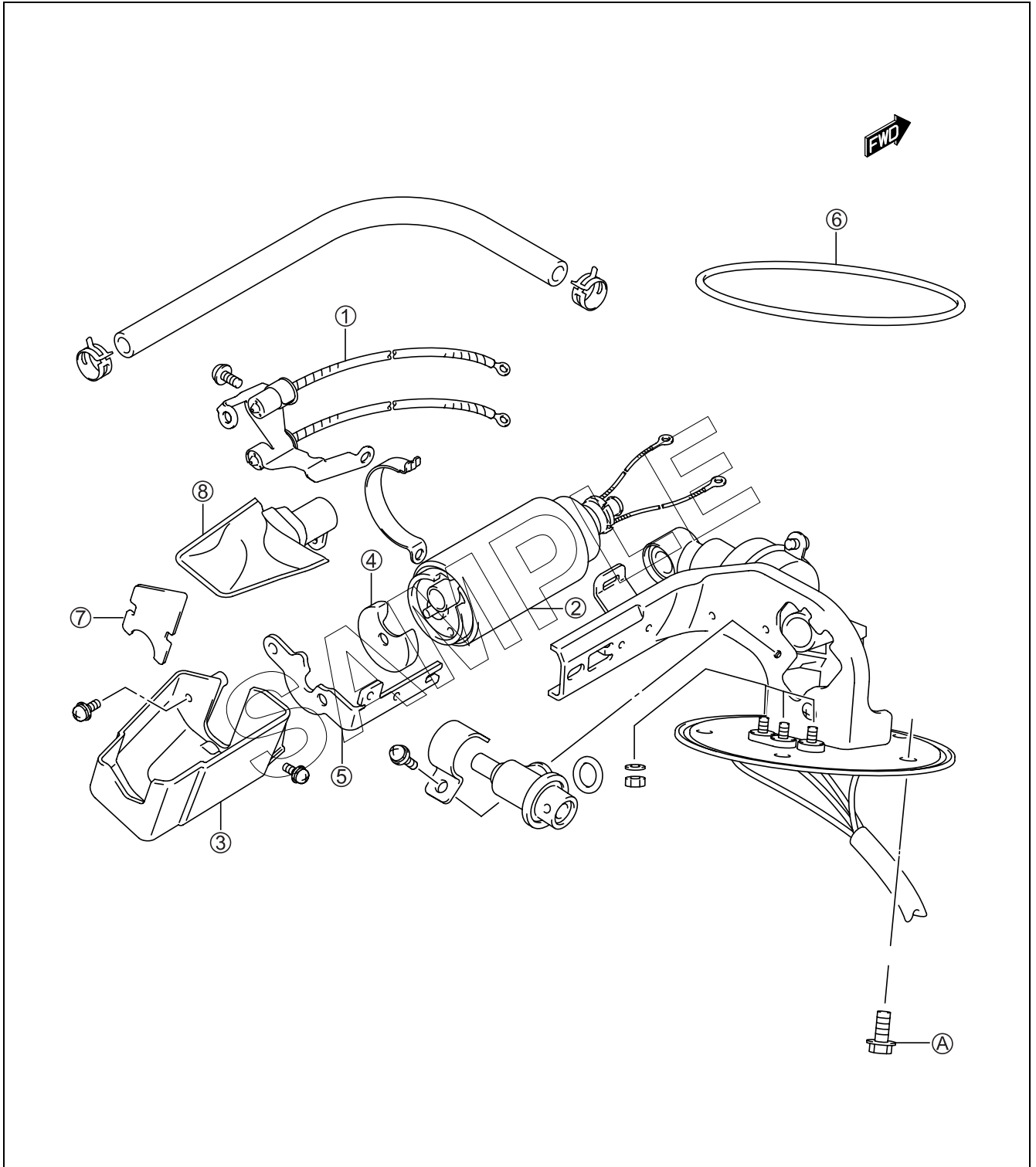


First, check the insulation between (A) and (B) terminals with pocket tester. Then apply 12 volts to (C) and (D) terminals, \oplus to (C) and \ominus to (D), and check the continuity between (A) and (B). If there is no continuity, replace it with a new one.



SAMPLE

FUEL PUMP REMOVAL AND DISASSEMBLY CONSTRUCTION



①	Thermistor	⑥	O-ring
②	Fuel pump	⑦	Cover
③	Vessel	⑧	Fuel mesh filter
④	Rubber cushion	Ⓐ	Fuel pump mounting bolt
⑤	Fuel pump holder		

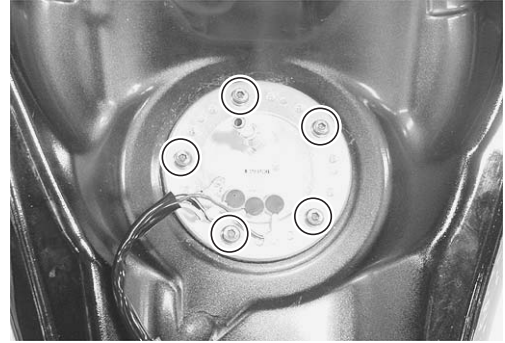
ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0

- Remove the fuel tank. (☞ 6-3)
- Remove the fuel pump assembly mounting bolts diagonally.

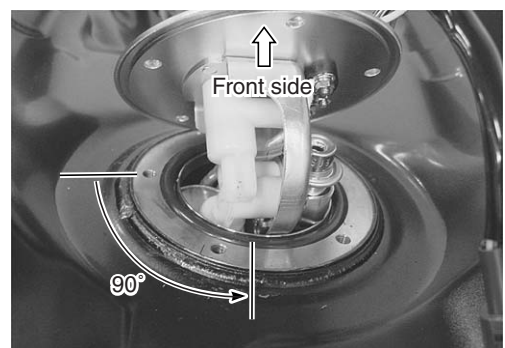
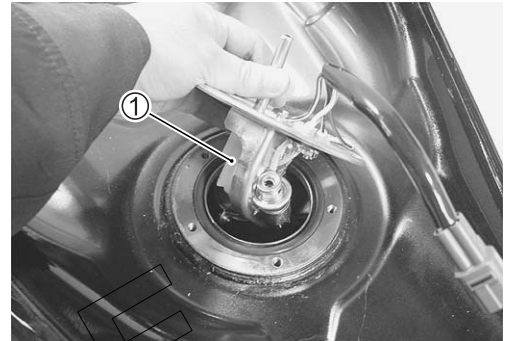
⚠ WARNING

**Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.**

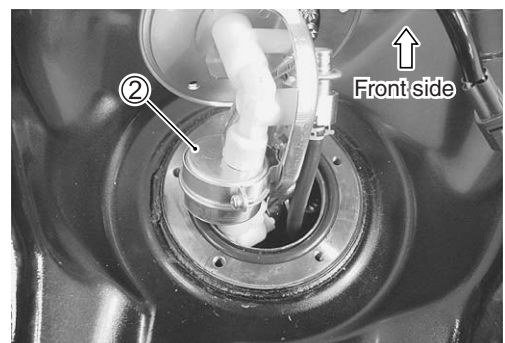
- Lift the fuel pump assembly ① as shown in the photograph.



- With the recessed section ① of the delivery pipe positioned at the edge of the tank opening as shown in the photograph, turn the pump assembly 90° counterclockwise.

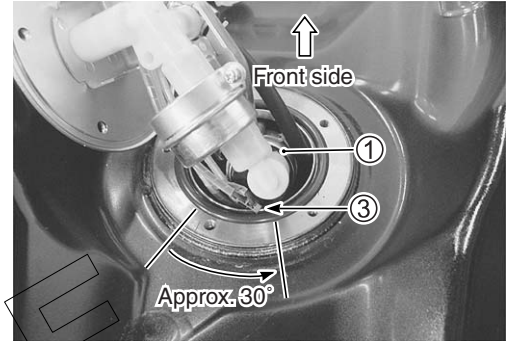
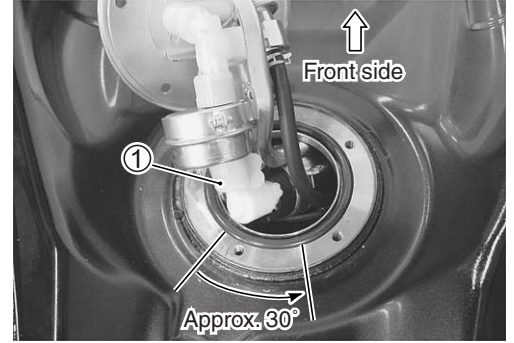


- Remove the high pressure filter ② from the tank opening.



SAMPLE

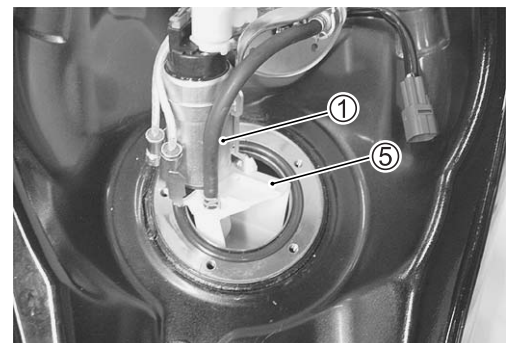
- With the fuel pump assembly ① being turned approximately 30° counterclockwise as shown in the photograph, pull the fuel pump wiring coupler ③ out of the tank opening while taking care not to cause it to interfere with the tank opening.



- Remove the thermistor ④ from the tank opening.



- Remove the fuel pump assembly ① along with the fuel mesh filter cover ⑤.

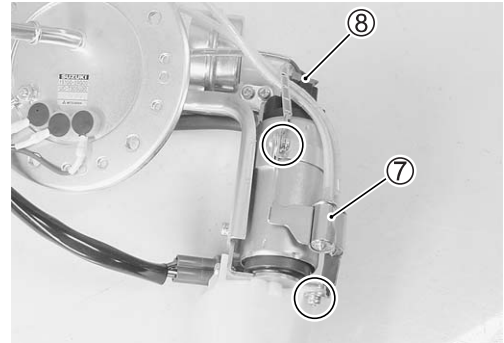


- Remove the nuts ⑥.

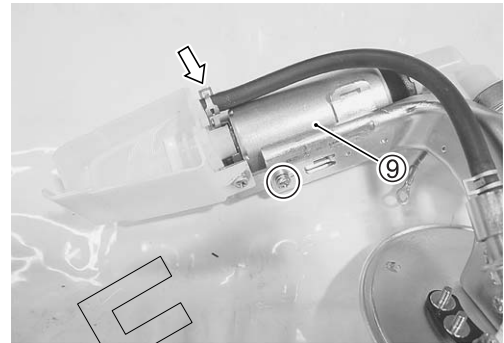


SAMPLE

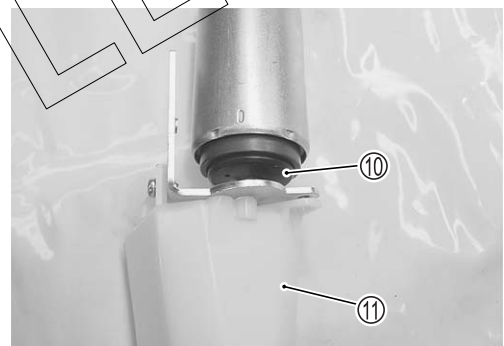
- Remove the thermistor ⑦.
- Disconnect fuel pump coupler ⑧.



- Remove the fuel pump ⑨.



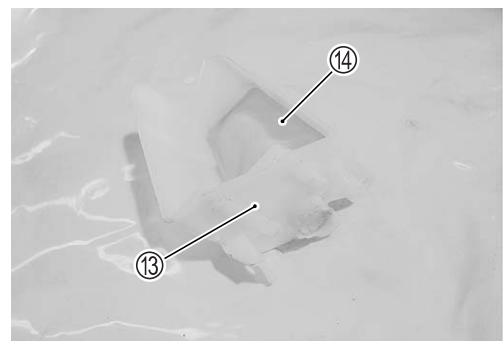
- Remove the rubber cushion ⑩ and vessel ⑪.



- Remove the fuel pump holder ⑫.



- Remove the cover ⑬ and fuel mesh filter ⑭.



SAMPLE

FUEL MESH FILTER INSPECTION AND CLEANING

If the fuel mesh filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Blow the fuel mesh filter with compressed air.

NOTE:

If the fuel mesh filter is clogged with many sediment or rust, replace the fuel filter cartridge with a new one.



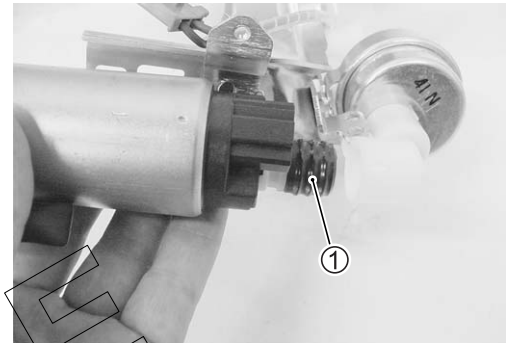
FUEL PUMP REASSEMBLY AND INSTALLATION

Install the fuel pump in the reverse order of removal and disassembly. Pay attention to the following points:

- Install a new bushing ① to the fuel pump.

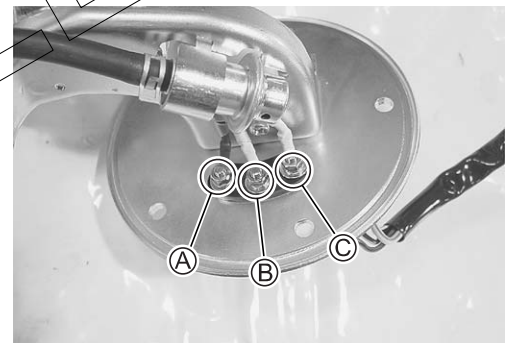
CAUTION

Use the new bushing to prevent fuel leakage.



- Be sure to connect the wires to the proper terminals.

- ① Thermistor (HIGH)
- ② Thermistor (LOW)
- ③ Positive terminal for fuel pump

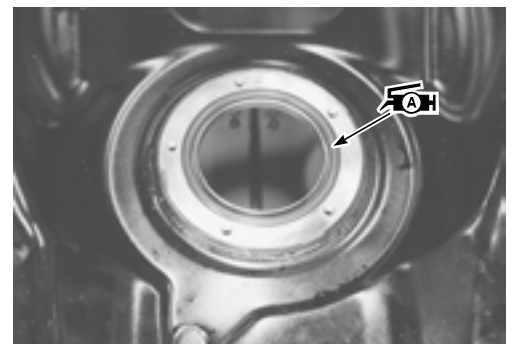


- Install a new O-ring and apply SUZUKI SUPER GREASE "A" to it.

 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

WARNING

The O-ring must be replaced with a new one to prevent fuel leakage.



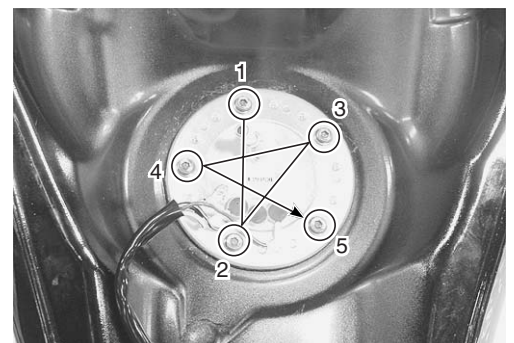
- When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly and then to the specified torque, in the ascending order of numbers.

 Fuel pump mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb·ft)

NOTE:

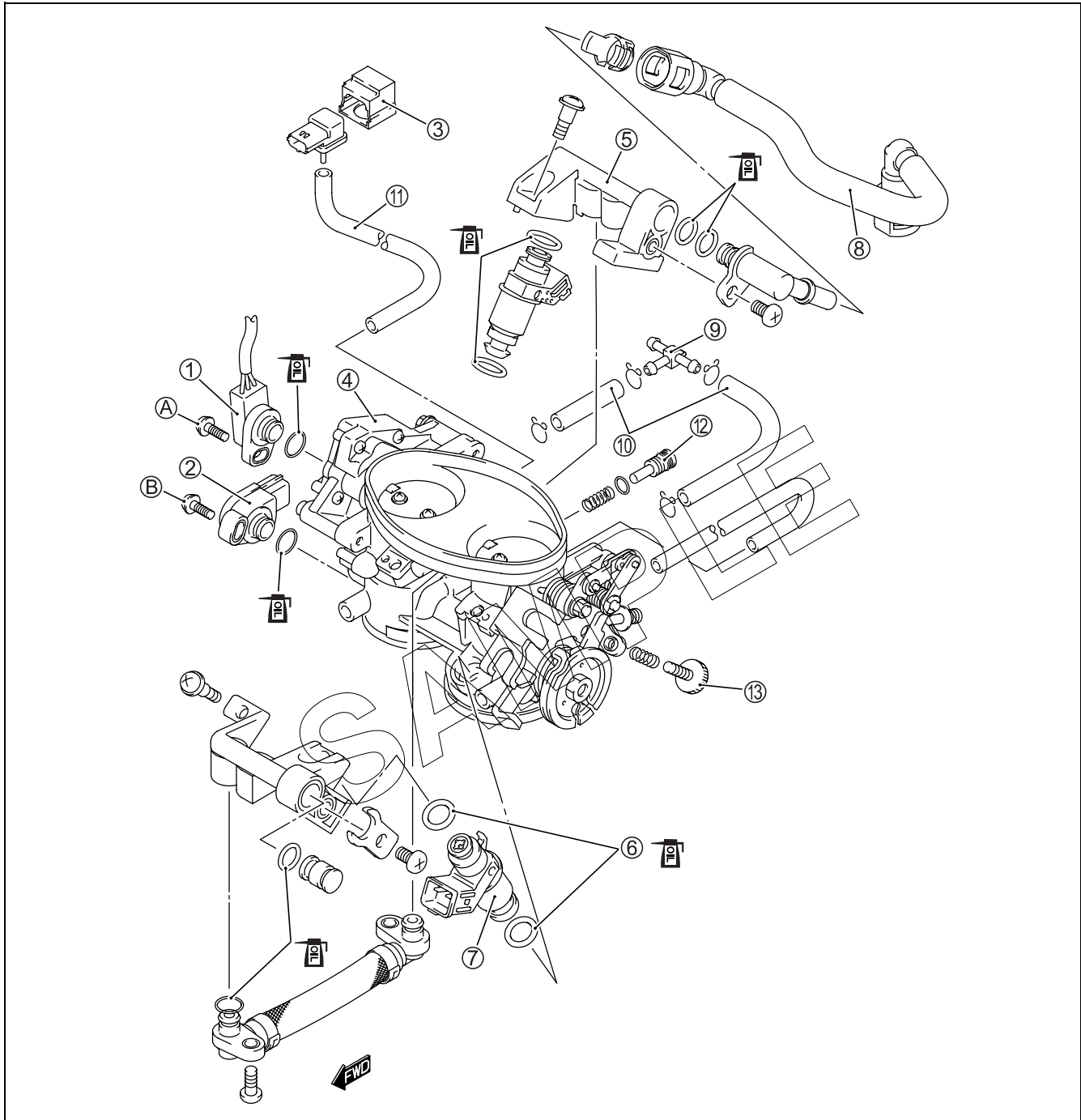
Apply a small quantity of the THREAD LOCK to the thread portion of fuel pump mounting bolt.

 99000-32050: THREAD LOCK "1342"



SAMPLE

THROTTLE BODY CONSTRUCTION



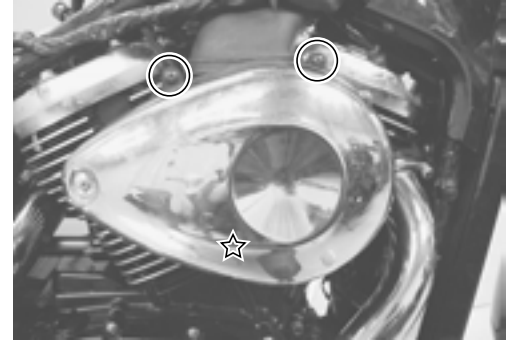
①	STP sensor	⑨	Three way joint (For E-33)
②	TP sensor	⑩	Hose (For E-33)
③	IAP sensor	⑪	Vacuum hoses
④	STVA	⑫	Throttle stop screw
⑤	Fuel delivery pipe	⑬	Idle adjusting screw
⑥	O-ring	(A)	STP sensor mounting screw
⑦	Fuel injector	(B)	TP sensor mounting screw
⑧	Fuel feed hose		



ITEM	N·m	kgf·m	lb·ft
(A)	3.5	0.35	2.45
(B)	3.5	0.35	2.45

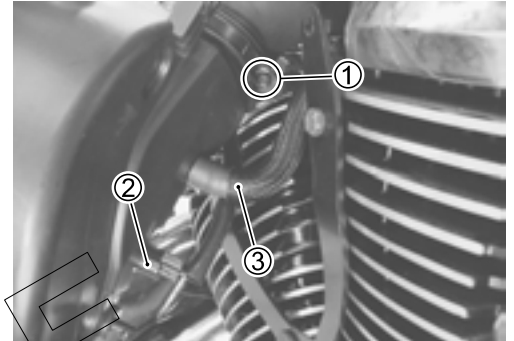
AIR CLEANER BOX REMOVAL

- Remove the fuel tank. (☞ 6-3)
- Remove the bolts.



☆: Hooked part

- Loosen the clamp screw ①.
- Disconnect the IAP sensor lead wire coupler ②.
- Disconnect the PAIR hose ③.
- Remove the air cleaner box.

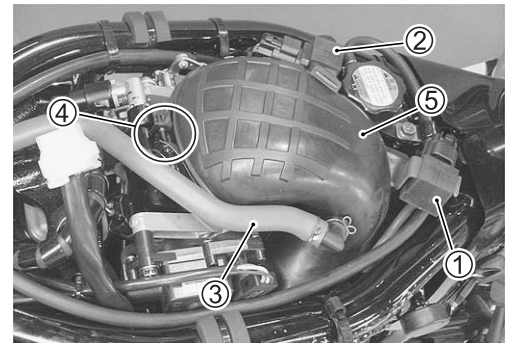


AIR CLEANER BOX INSTALLATION

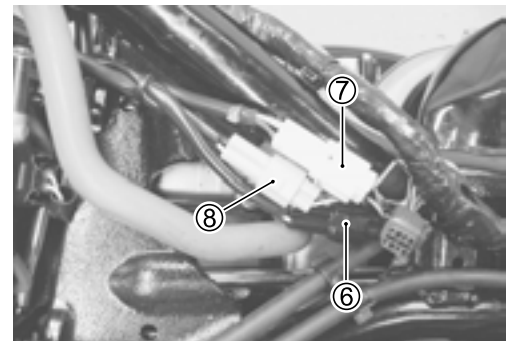
Installation is in the reverse order of removal.

THROTTLE BODY REMOVAL

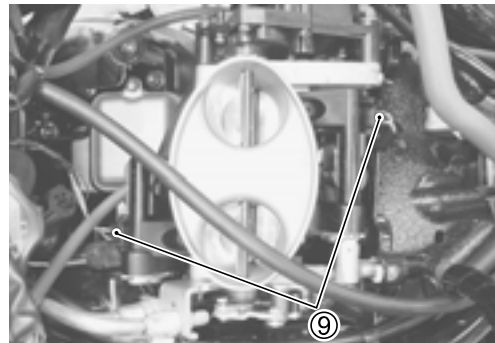
- Remove the air cleaner box. (☞ Above)
- Remove the IAP sensors (Front cylinder side ① and Rear cylinder side ②) from the mount stay.
- Remove the PCV hose ③ and loosen the clamp screw ④.
- Remove the air intake pipe ⑤.



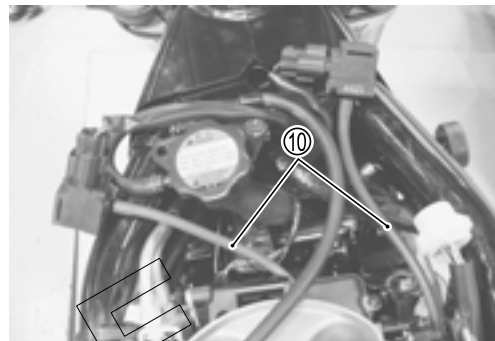
- Disconnect the TP sensor lead wire coupler ⑥, STVA lead wire coupler ⑦ and STP sensor lead wire coupler ⑧.



- Disconnect the fuel injector lead wire couplers ⑨.



- Disconnect the vacuum hoses ⑩.



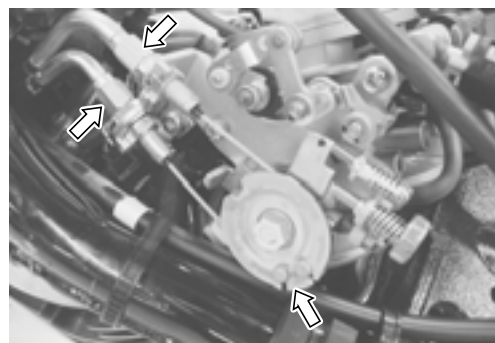
- Loosen the throttle body clamp screw at the intake pipe side.



- Disconnect the throttle cables from their drum.

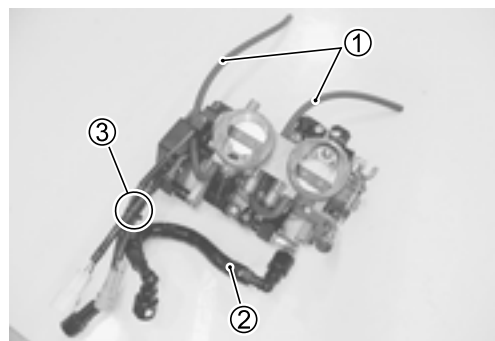
CAUTION

After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.



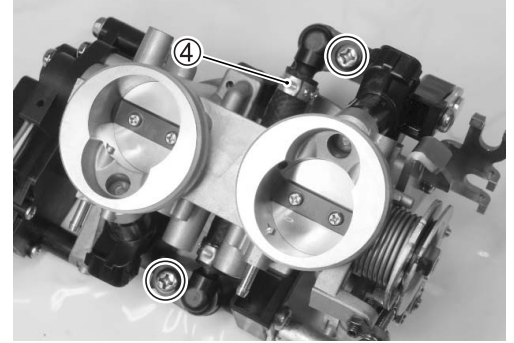
THROTTLE BODY DISASSEMBLY

- Remove the vacuum hose ① and fuel feed hose ②.
- Remove the clamp ③.

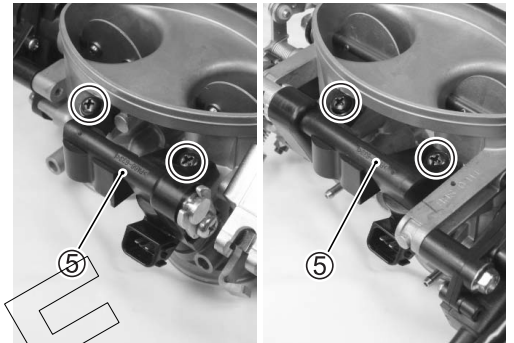


SAMPLE

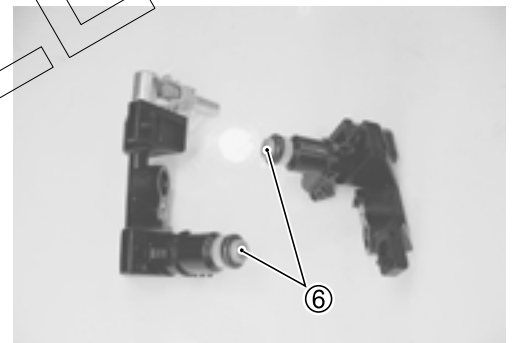
- Remove the fuel delivery hose ④.



- Remove the fuel delivery pipes ⑤.



- Remove the fuel injectors ⑥.

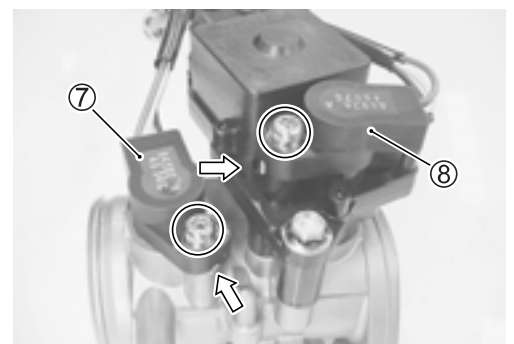


- Remove the TP sensor ⑦ and STP sensor ⑧ with the special tool.

TOOL 09930-11950: Torx wrench

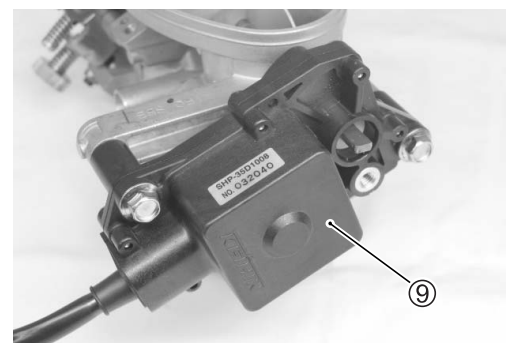
NOTE:

Prior to disassembly, mark each sensor's original position with a paint or scribe for accurate reinstallation.



CAUTION

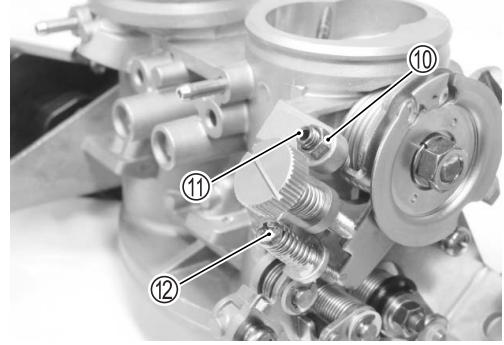
Never remove the STVA ⑨ from the throttle body.



SAMPLE

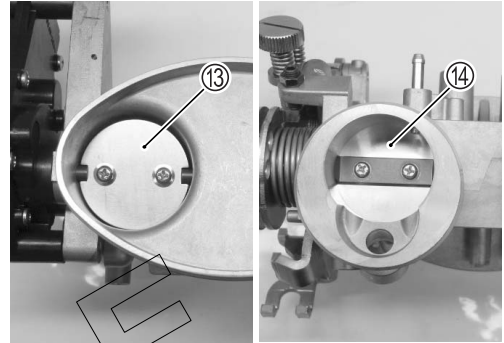
CAUTION

- * Do not loosen the nut ⑩.
- * The fast idle screw ⑪ is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.
- * Do not turn the screw ⑫.

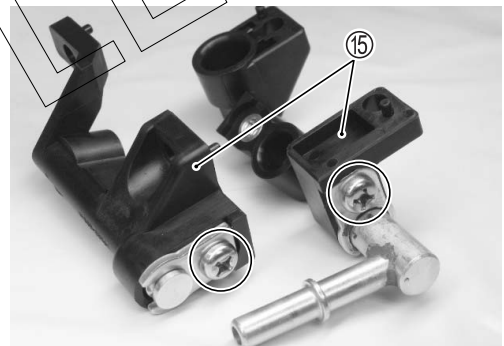


CAUTION

- Never remove the secondary throttle valve ⑬ and throttle valve ⑭.



- Remove the fuel delivery pipes ⑮.



SAMPLE

THROTTLE BODY CLEANING

⚠ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions for proper use, handling and storage.

- Clean all passageways with a spray-type carburetor cleaner and blow dry with compressed air.

CAUTION

Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.

INSPECTION

- Check following items for any damage or clogging.
 - * O-ring
 - * Throttle valve
 - * Secondary throttle valve
 - * Vacuum hose
 - * Delivery hose
 - * Injector dust seal

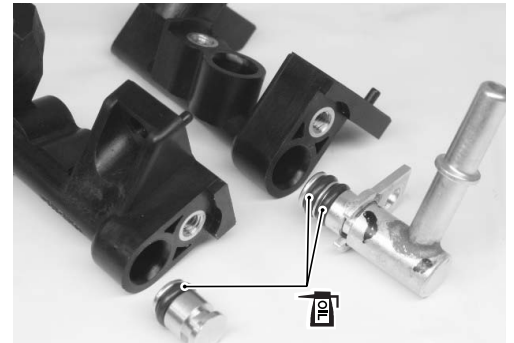
THROTTLE BODY REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

- Apply thin coat of the engine oil to the new O-rings.

CAUTION

Replace the O-rings with the new ones.

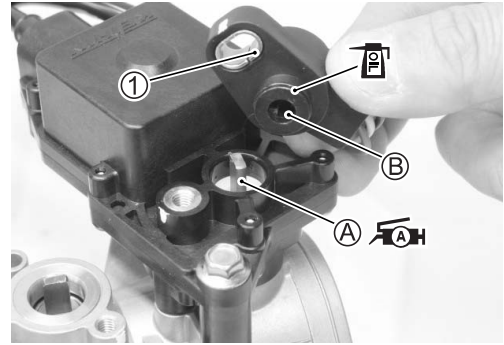


SAMPLE

- With the STV fully opened, install the STP sensor ① and tighten the STP sensor mounting screw to the specified torque.

CAUTION

TPS and STPS resemble each other very closely in external appearance. Make sure to check the color of coupler before installing.



STP sensor: Green color coupler

NOTE:

- * Apply thin coat of the engine oil to the new O-ring.
- * Align the secondary throttle shaft end (A) with the groove (B) of STP sensor.
- * Apply SUZUKI SUPER GREASE "A" to the secondary throttle shaft end (A) if necessary.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

09930-11950: Torx wrench

STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.45 lb-ft)

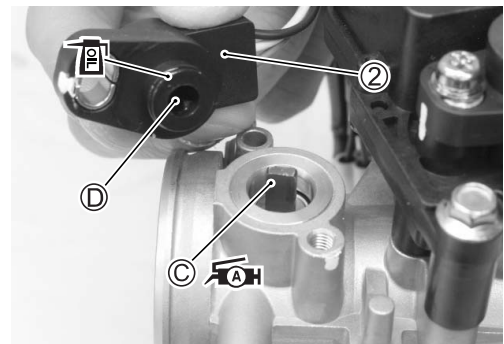
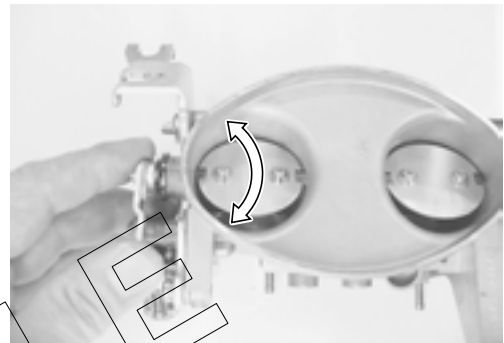
NOTE:

- * Make sure the STP valve open or close smoothly.
- * If the STP sensor adjustment is necessary, refer to page 6-20 for STP sensor setting procedure.

- With the throttle valve fully closed, install the TP sensor ② and tighten the TP sensor mounting screw to the specified torque.

NOTE:

- * Apply thin coat of the engine oil to the new O-ring.
- * Align the throttle shaft end (C) with the groove (D) of TP sensor.
- * Apply SUZUKI SUPER GREASE "A" to the throttle shaft end (C) if necessary.



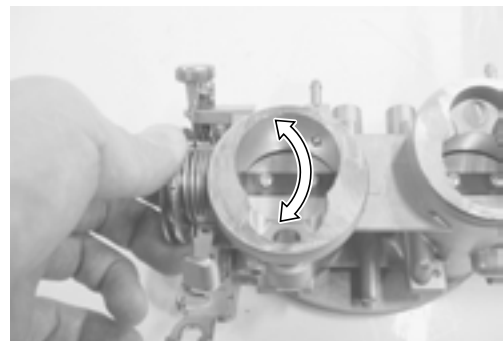
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

09930-11950: Torx wrench

TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.45 lb-ft)

NOTE:

- * Make sure throttle valve open or close smoothly.
- * TP sensor setting procedure. (5-19)

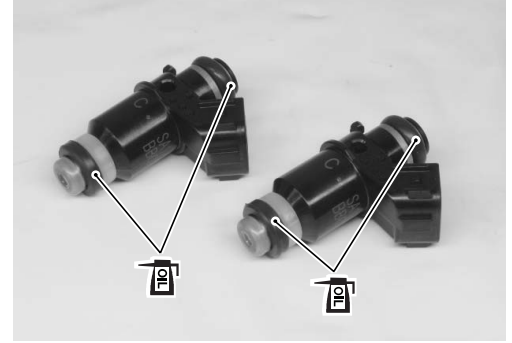


SAMPLE

- Install the O-rings and dust seals to each fuel injector.
- Apply thin coat of the engine oil to the new O-rings and dust seal.

CAUTION

Replace the O-rings and dust seals with the new ones.



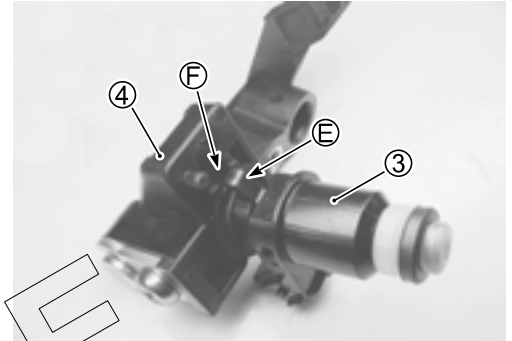
- Install the fuel injector ③ by pushing it straight to the delivery pipe ④.

NOTE:

Align the boss ⑤ of the injector with the groove ⑥ of the delivery pipe.

CAUTION

Never turn the injector while pushing it.



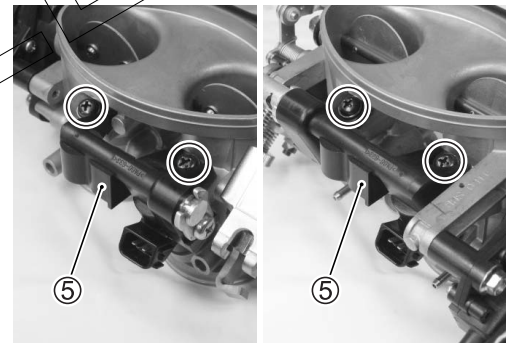
- Install the fuel delivery pipes ⑤ to the throttle body assembly.

CAUTION

Never turn the fuel injectors while installing them.

- Tighten the fuel delivery pipe mounting screws to the specified torque.

Fuel delivery pipe mounting screw:
 3.5 N·m (0.35 kgf·m, 2.45 lb·ft)



- Apply thin coat of the engine oil to the new O-rings.

CAUTION

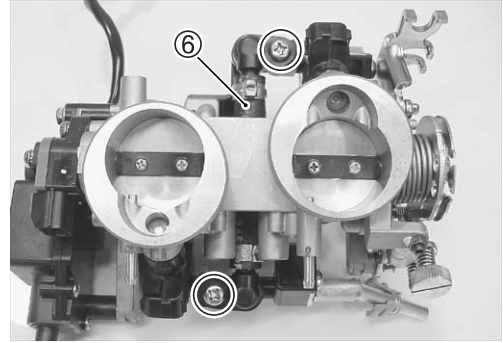
Replace the O-rings with the new ones.



SAMPLE

- Install the fuel delivery pipe joint hose ⑥ to the delivery pipes.
- Tighten the fuel delivery pipe hose mounting screws to the specified torque.

🔧 Fuel delivery pipe joint hose mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



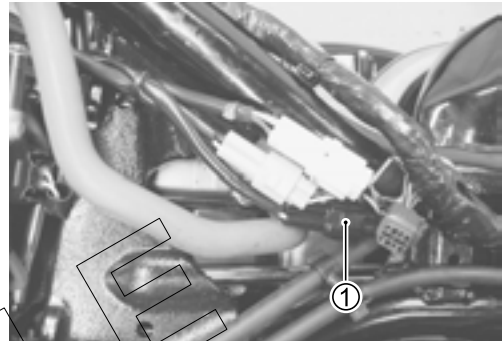
THROTTLE BODY INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

- Connect the TP sensor lead wire coupler ①.

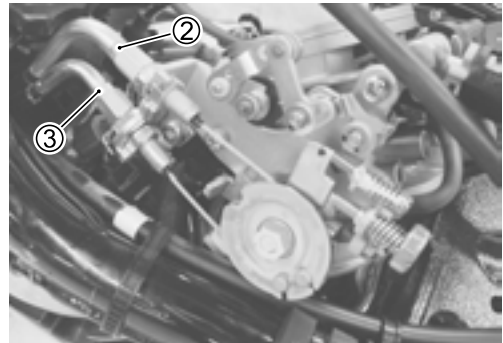
CAUTION

TP sensor lead wire coupler and STP sensor lead wire coupler resemble each other very closely in external appearance. Make sure to check the color of coupler before installing.

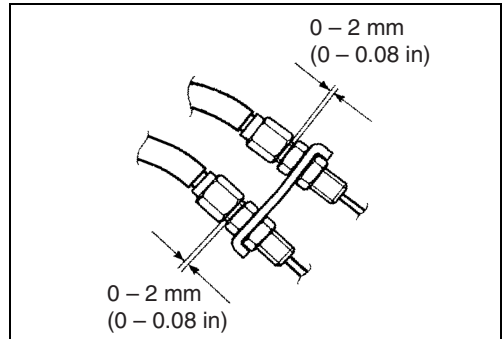


TP sensor lead wire coupler: Black

- Connect the throttle pulling cable ② and throttle returning cable ③ to the throttle cable drum.



- Loosen each throttle cable lock-nut.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance is 0 – 2 mm (0 – 0.08 in).
- Tighten each lock-nut.
- Adjust the throttle cable play.
Refer to page 2-14 and -15 for details.
- Install the air cleaner box and tighten the throttle body clamp screws as shown in the illustration. (🔧 10-19)

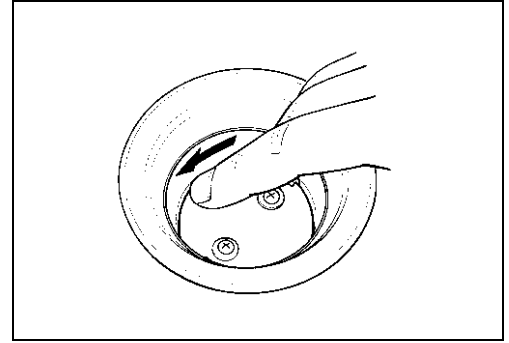


SAMPLE

STP SENSOR ADJUSTMENT

If the STP sensor adjustment is necessary, measure the sensor out put voltage and adjust the STP sensor position as follows:

- Remove the air cleaner box. (☞ 6-13)
- Disconnect the STVA coupler. (☞ 6-13)
- Insert the needle pointed probes to the lead wire coupler.
- Turn the ignition switch ON.
- Close the secondary throttle valve by finger, and measure the STP sensor out put voltage.



DATA STP sensor out put voltage

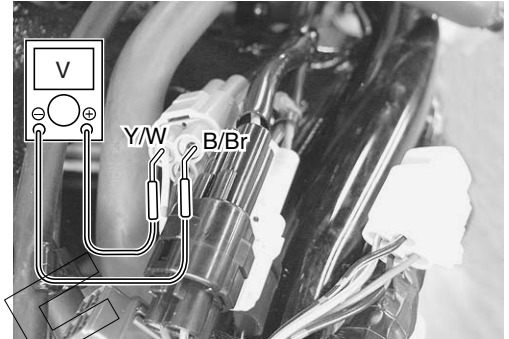
ST valve is fully closed: Approx. 0.5 V

(+ Y/W – – B/Br)

TOOL 09900-25008: Multi-circuit tester set

09900-25009: Needle pointed probe set

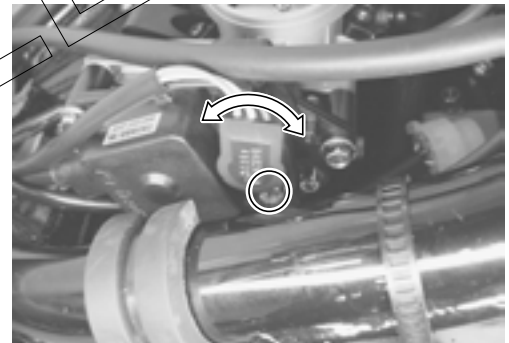
V Tester knob indication: Voltage (---)



- If the STP sensor voltage is out of specification, loosen the STP sensor mounting screw and adjust the STP sensor voltage to specification.
- Tighten the STP sensor mounting screw.

TOOL 09930-11950: Torx wrench

W STP sensor mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



FUEL INJECTOR REMOVAL

- Remove the fuel tank. (☞ 6-3)
- Remove the air intake pipe. (☞ 2-7)
- With battery negative cable disconnected, disconnect the injector couplers.
- Remove the fuel delivery pipes. (☞ 6-15)
- Remove the fuel injectors #1 and #2. (☞ 6-15)

FUEL INJECTOR INSPECTION

Check fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.

The fuel injector can be checked without removing it from the throttle body.

Refer to page 5-66 for details.



SAMPLE

FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector dust seals and O-rings. (🔧 6-19)
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (🔧 6-19)

FAST IDLE

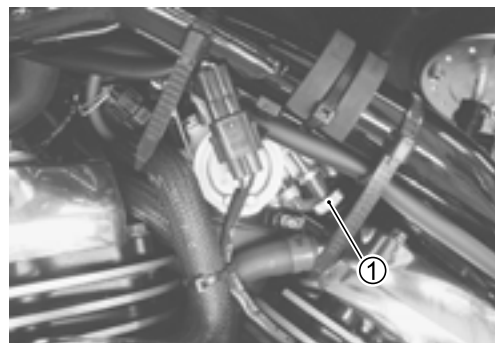
The fast idle system is automatic type.

When the fast idle cam is turned by the secondary throttle valve actuator, the cam pushes the lever on the throttle valve shaft causing the throttle valve to open and raise the engine speed. When the engine has warmed up, depending on the water temperature, ambient temperature and lapsed time, the fast idle is cancelled allowing the engine to resume idle speed.

Ambient Temp.	Fast idle rpm	Fast idle canceling time
-5 °C (23 °F)	1 500 – 2 100 rpm	Approx. 100 sec.
15 °C (59 °F)	1 500 – 2 100 rpm	Approx. 60 sec.
25 °C (77 °F)	1 500 – 2 100 rpm	Approx. 50 sec.

FAST IDLE ADJUSTMENT

- Lift and support the fuel tank. (🔧 6-3)
- Start up the engine and run it in idling condition for warming up.
- Set the idle rpm to 1 100 rpm by the throttle stop screw ①.
- Check and adjust the TP sensor. (🔧 5-19)

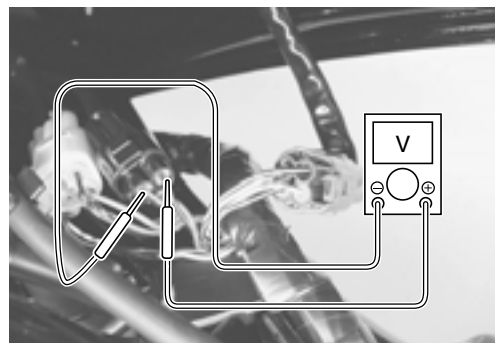


- Measure the TP sensor output voltage at the coupler (between ⊕ BI/B wire and ⊖ B/Br wire).

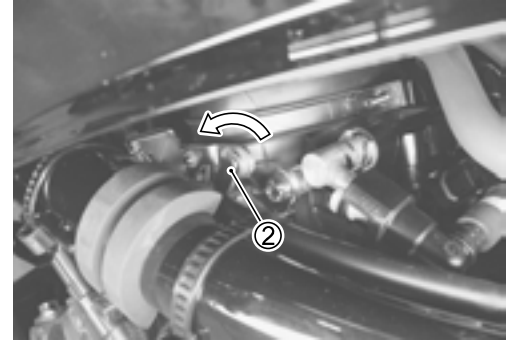
DATA TP sensor output voltage at idle position: Approx. 1.12 V

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (---)



- Turn the ignition switch OFF.
- Disconnect the STVA coupler.
- Turn the ignition switch ON.
- Open the secondary throttle valve fully by moving the fast idle link with your finger.
- With the secondary throttle valve held at this position, measure the output voltage of the TP sensor as shown.



- Calculate the voltage difference between TP sensor output voltage at idle and TP sensor output voltage with the STV full opened.

**Example: TP sensor output voltage with the STV fully open
Minus TP sensor output voltage at idle is 0.08 V**

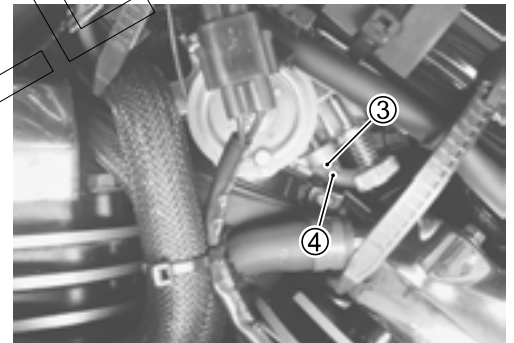
STV fully open	1.20 V
Idle	- 1.12 V
	0.08 V

DATA TP sensor output voltage variation: 0.064 – 0.096 V

- If the voltage variation is out of specification, loosen the lock-nut (2) and turn in or out the fast idle adjust screw (3) to adjust the voltage to specification.

CAUTION

The fast idle screw is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.



- Cool down the engine to ambient air temperature and start the engine to check the fast idle rpm comes within the specified rpm.

DATA Standard

Fast idle rpm: 1 500 – 2 100 rpm/Cold engine

Idle rpm : 1 100 ± 100 rpm/Warmed engine

- If it is not at the specified rpm, the cause may possibly be short-circuit in water temperature sensor or wiring harness or STVA.

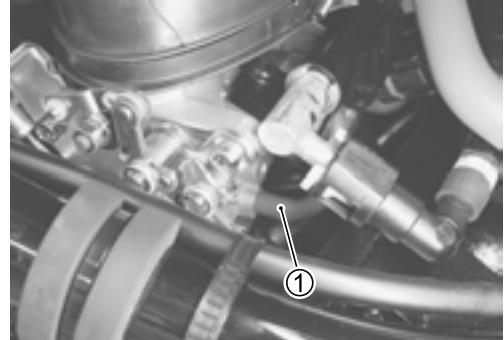
THROTTLE VALVE SYNCHRONIZATION

Check and adjust the throttle valve synchronization among two cylinders.

USE OF VACUUM BALANCER GAUGE

Calibrating each vacuum gauge

- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Disconnect the vacuum hose ① from the No. 1 (Rear cylinder) throttle body.

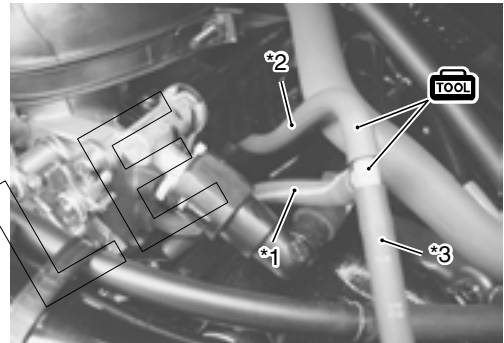


- Connect one of the vacuum balancer gauge hose to the vacuum nipple on the No. 1 throttle body with the special tools.

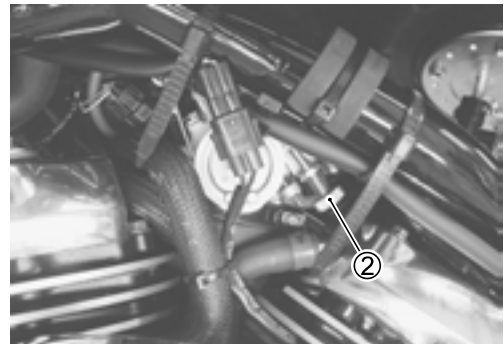
TOOL 13685-02FA0: Three way joint

13681-39F00-225: Hose

- *1: To vacuum nipple
- *2: To vacuum hose
- *3: To vacuum balancer gauge hose



- Connect a tachometer.
- Start up the engine and keep it running at 1 100 rpm by turning throttle stop screw ②.



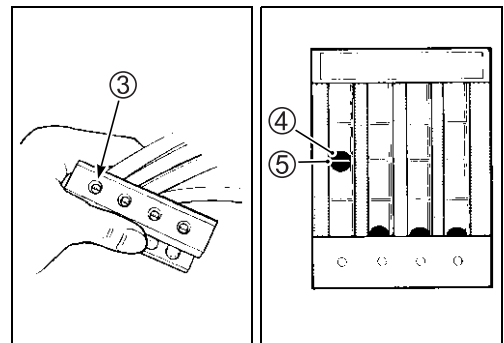
CAUTION

Avoid drawing dirt into the throttle body while running the engine without intake pipe and air cleaner box. Dirt drawn into the engine will damage the internal engine parts.

- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.

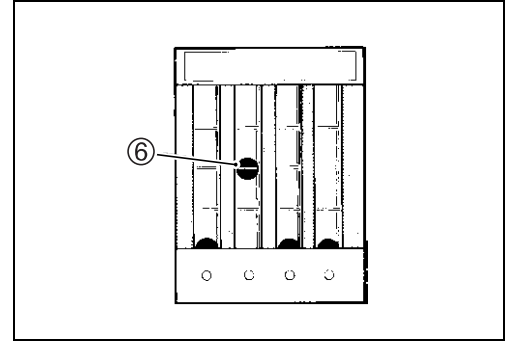
NOTE:

- * The vacuum gauge is positioned vertical level.
- * During balancing the throttle valves, always set the engine rpm at 1 100 rpm, using throttle stop screw.



- After making sure that the steel ball stays steady at the center line, disconnect the hose from the No. 1 throttle body vacuum nipple and connect the next hose to this vacuum nipple.
- Turn air screw to bring the other steel ball ⑥ to the center line.

The balancer gauge is now ready for use in balancing the throttle valves.



Throttle valve synchronization

Using the vacuum balancer gauge, inspect the throttle valve synchronization in the same manner of the digital vacuum tester. Pay attention to the following points:

The vacuum gauge is positioned vertical level, and in this position the two balls should be within one ball dia. If the difference is larger than one ball, turn the balance adjusting screw on the throttle body and bring the ball to the same level.

A correctly adjusted throttle valve synchronization has the balls in the No. 1 and No. 2 at the same level.



09913-13121: Vacuum balancer gauge

NOTE:

- * During balancing the throttle valves, always set the engine rpm at 1 100 rpm, using throttle stop screw.
- * After balancing the two valves, set the idle rpm to 1 100 rpm by the throttle stop screw.

THROTTLE POSITION SENSOR (TPS) SETTING

After all adjustments are completed, check or adjust the TPS setting condition. (☞ 5-19)

SAMPLE

COOLING AND LUBRICATION SYSTEM

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ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above $-31\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$).

If the motorcycle is to be exposed to temperatures below $-31\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$), this mixing ratio should be increased up to 55% or 60% according to the figure.

CAUTION

- * Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
- * Do not put in more than 60% anti-freeze or less than 50%. (Refer to Right figure.)
- * Do not use a radiator anti-leak additive.

50% Engine coolant including reserve tank capacity

Anti-freeze	750 ml (1.6/1.3 US/Imp.pt)
Water	750 ml (1.6/1.3 US/Imp.pt)

Anti-freeze density	Freezing point
50%	$-30\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$)
55%	$-40\text{ }^{\circ}\text{C}$ ($-44\text{ }^{\circ}\text{F}$)
60%	$-55\text{ }^{\circ}\text{C}$ ($-67\text{ }^{\circ}\text{F}$)

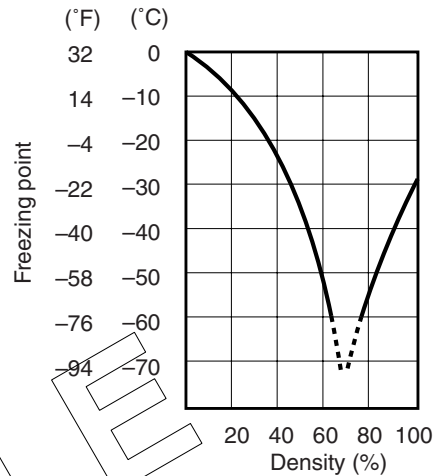


Fig.1 Engine coolant density-freezing point curve.

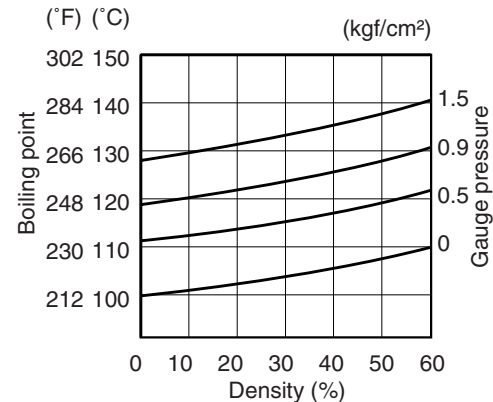


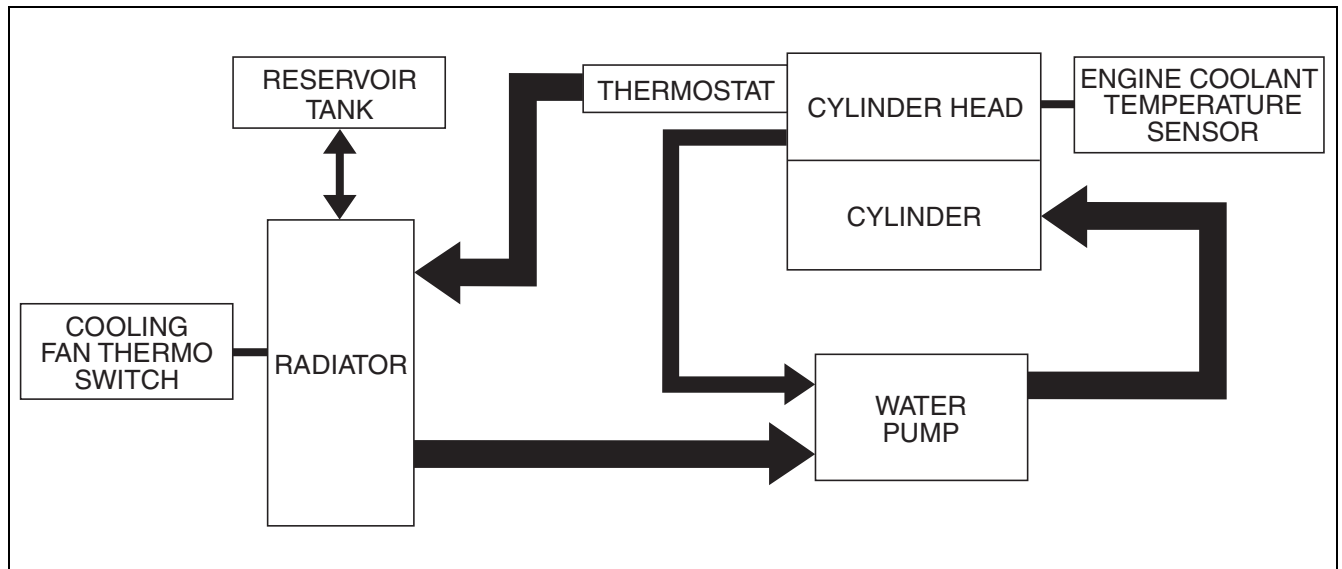
Fig.2 Engine coolant density-boiling point curve.

WARNING

- * You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.
- * The engine must be cool before servicing the cooling system.
- * Coolant is harmful;
 - If it comes in contact with skin or eyes, flush with water.
 - If swallowed accidentally, induce vomiting and call physician immediately.
 - Keep it away from children.

SAMPLE

COOLING CIRCUIT



COOLING CIRCUIT INSPECTION

Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.

- Remove the fuel tank. (☞ 6-3)
- Remove the radiator cap ① and connect the tester ② to the filler.

⚠ WARNING

Do not remove the radiator cap when the engine is hot.

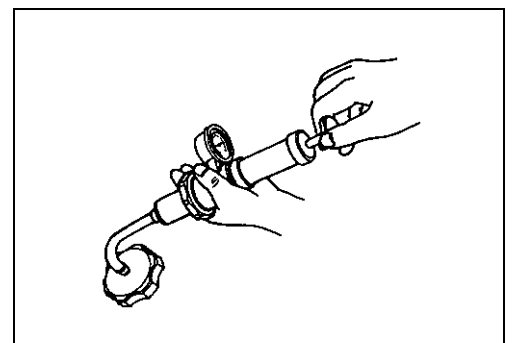
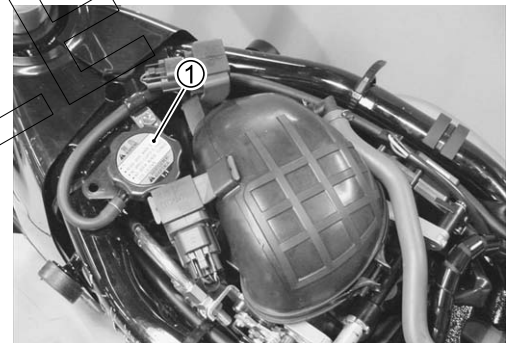
- Give a pressure of about 120 kPa (1.2 kgf/cm², 17 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.

⚠ WARNING

When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

CAUTION

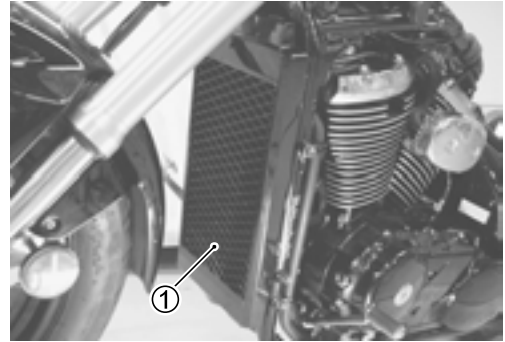
Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.



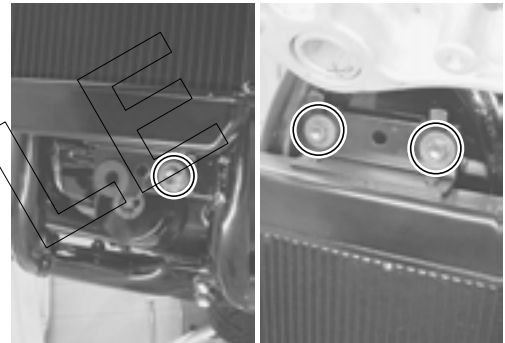
RADIATOR AND WATER HOSES

RADIATOR REMOVAL

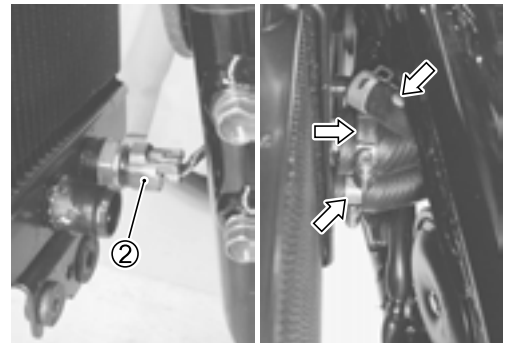
- Remove the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Drain the engine coolant. (☞ 2-17)
- Remove the radiator cover ①.



- Remove the radiator mounting bolts.



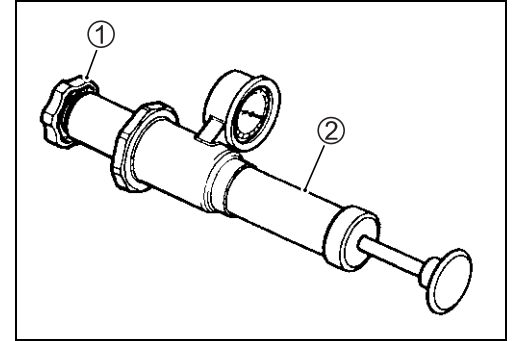
- Disconnect the ECT sensor coupler ② and water hoses.
- Remove the radiator.



SAMPLE

RADIATOR CAP INSPECTION

- Fit the cap ① to the radiator cap tester ②.
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 95 – 125 kPa (0.95 – 12.5 kgf/cm², 13.5 – 17.8 psi) and that, with the tester held stand-still, the cap is capable of holding that pressure for at least 10 seconds.
- Replace the cap if it is found not to satisfy either of these two requirements.



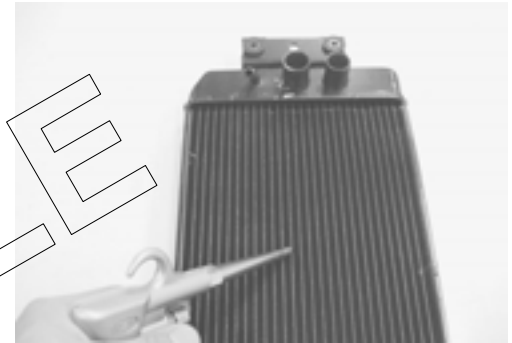
DATA Radiator cap valve opening pressure

Standard: 95 – 125 kPa

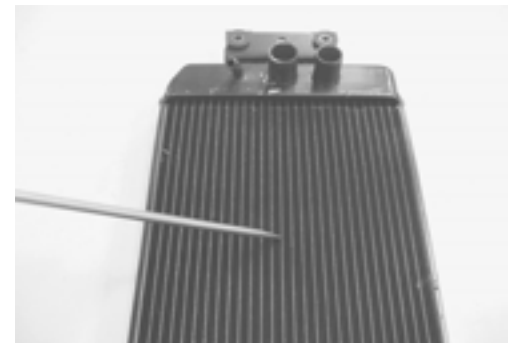
(0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

RADIATOR INSPECTION AND CLEANING

- Road dirt or trash stuck to the fins must be removed.
- Use of compressed air is recommended for this cleaning.



- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.



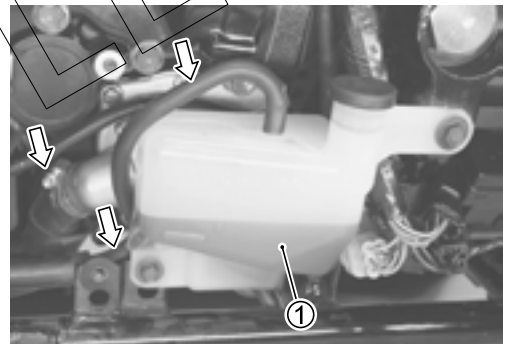
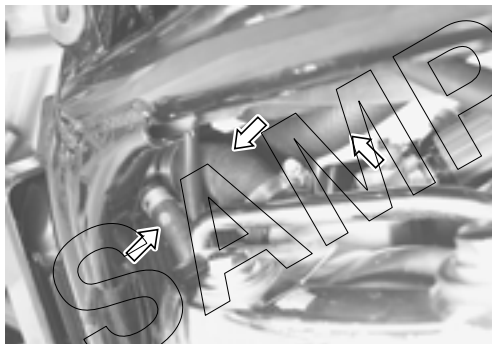
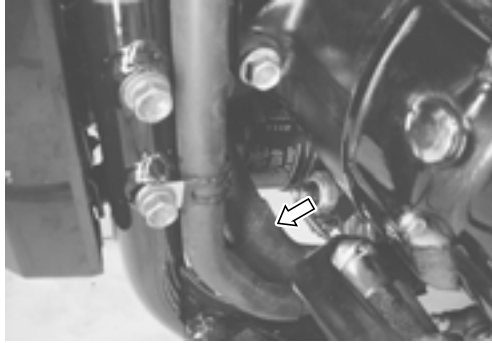
RADIATOR REMOUNTING

- The radiator is to be installed in the reverse order of the removal procedure.
- Install the radiator.
- Route the radiator hoses. (☞ 10-20)
- Bleed air from the cooling circuit. (☞ 2-18)

SAMPLE

WATER HOSE AND RESERVOIR TANK INSPECTION

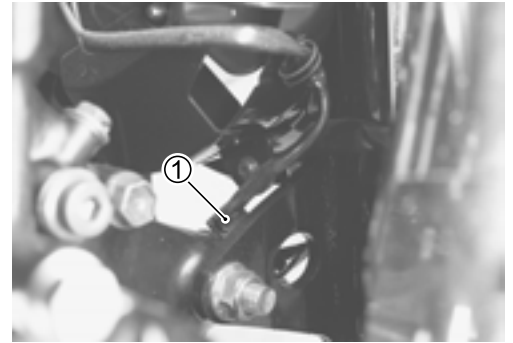
- Remove the fuel tank. (☞ 6-3)
- Remove the secondary gear case cover. (☞ 8-40)
- Remove the frame head covers. (☞ 3-3)
- Any water hose and reservoir tank ① found in a cracked condition or flattened must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.



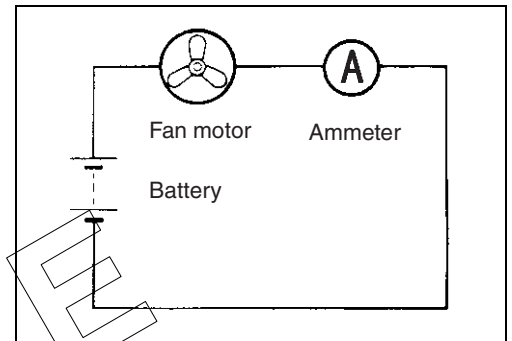
COOLING FAN

INSPECTION

- Disconnect the cooling fan lead wire coupler ①.
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.

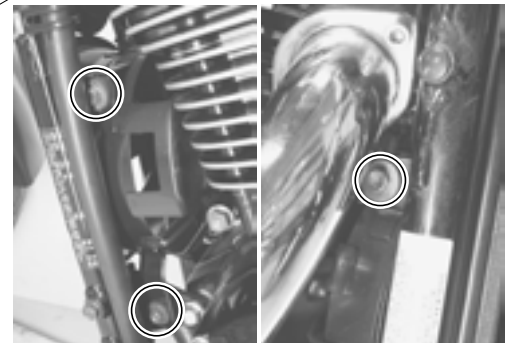


- The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not 5 amperes and more.
- If the fan motor does not turn, replace the motor assembly with a new one.

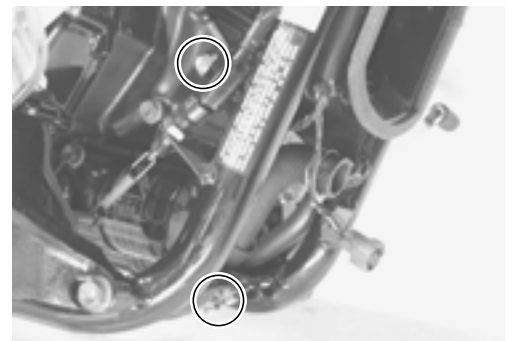


REMOVAL

- Remove the radiator. (☞ 7-4)
- Remove the cooling fan mounting bolts.



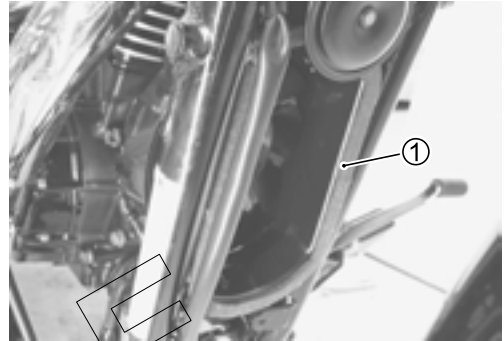
- Slightly move the down tube by removing its mounting bolts.



SAMPLE



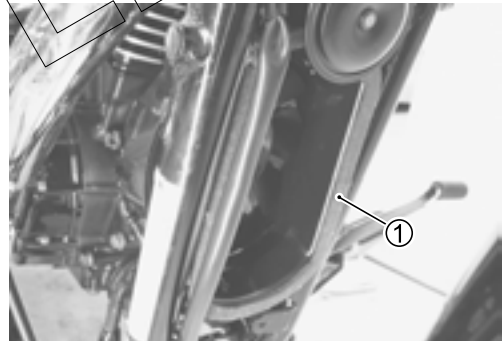
- Remove the cooling fan ① by disconnecting the cooling fan lead wire coupler.



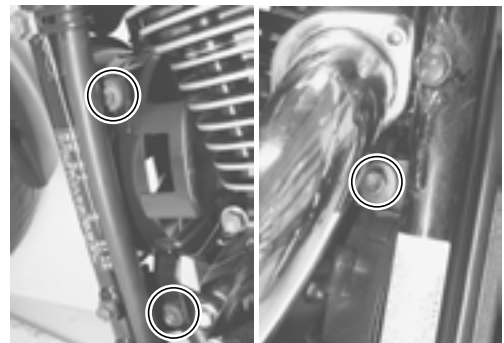
INSTALLATION

Install the cooling fan in the reverse order of removal. Pay attention to the following points:

- Put the cooling fan ① between the down tube and the engine.
- Temporary tighten the down tube mounting bolts. (☞ 3-9)



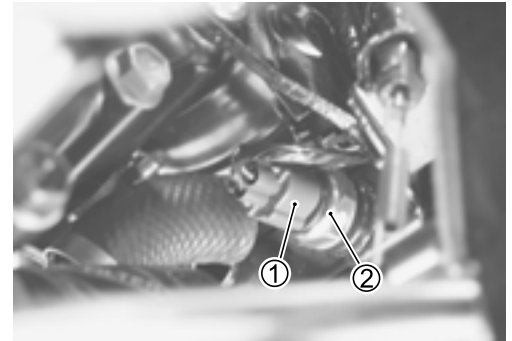
- Tighten the cooling fan mounting bolts.
- Tighten the down tube mounting bolts to the specified torque. (☞ 3-9)
- Install the radiator. (☞ 7-5)



SAMPLE

COOLING FAN THERMO-SWITCH REMOVAL

- Drain the engine coolant. (☞ 2-17)
- Disconnect the cooling fan thermo-switch coupler ①.
- Remove the cooling fan thermo-switch ②.



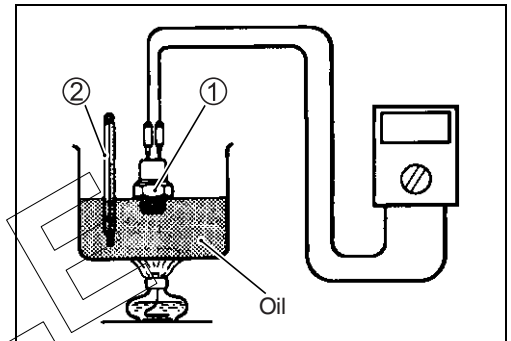
INSPECTION

- Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch to a circuit tester and place it in the oil contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly, and read the column thermometer when the switch closes or opens.

TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Continuity test (•••)

DATA Cooling fan thermo-switch operating temperature:
Standard (OFF→ON): Approx. 105 °C (221 °F)
(ON→OFF): Approx. 100 °C (212 °F)



CAUTION

- * Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact.
- * Do not contact the cooling fan thermo-switch ① and the column thermometer ② with a pan.

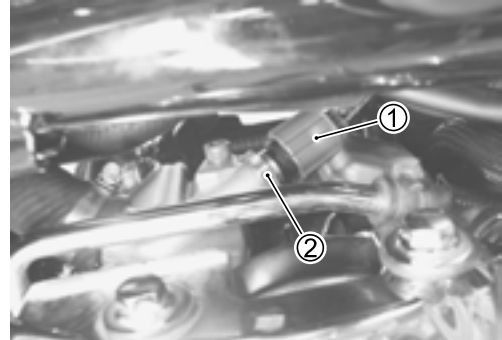
INSTALLATION

- Install the O-ring ①.
 - Tighten the cooling fan thermo-switch to the specified torque.
- WRENCH** Cooling fan thermo-switch:
17 N·m (1.7 kgf-m, 12.5 lb-ft)
- Bleed air from the cooling circuit. (☞ 2-18)



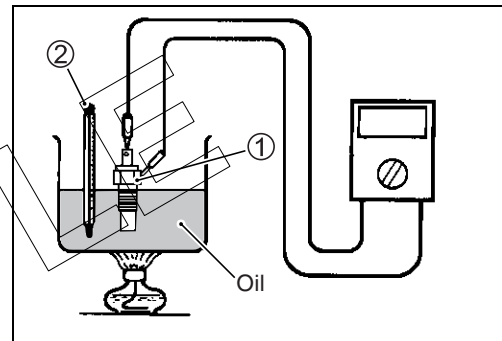
ENGINE COOLANT TEMPERATURE SENSOR REMOVAL

- Lift and support the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Disconnect the engine coolant temperature sensor coupler ①.
- Keep the motorcycle upright.
- Place a rag under the sensor and remove the engine coolant temperature sensor ②.



INSPECTION

- Check the engine coolant temperature sensor by testing it at the bench as shown in the figure. Connect the temperature sensor ① to a circuit tester and place it in the oil contained in a pan, which is placed on a stove.
- Heat the oil to raise its temperature slowly and read the column thermometer ② and the ohmmeter.
- If the temperature sensor ohmic value does not change in the proportion indicated, replace it with a new one.



DATA Temperature sensor specification

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.45 kΩ
40 °C (104 °F)	Approx. 1.148 kΩ
60 °C (140 °F)	Approx. 0.587 kΩ
80 °C (176 °F)	Approx. 0.322 kΩ

If the resistance is noted to show infinity or too much different resistance value, replace the temperature sensor with a new one.

CAUTION

- * Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.
- * Do not contact the engine coolant temperature sensor ① and the column thermometer ② with a pan.

INSTALLATION

Install the engine coolant temperature sensor order of removal.

Pay attention to the following points:

- Tighten the engine coolant temperature sensor to the specified torque.

 **Engine coolant temperature sensor:**

18 N·m (1.8 kgf-m, 13.0 lb-ft)

CAUTION

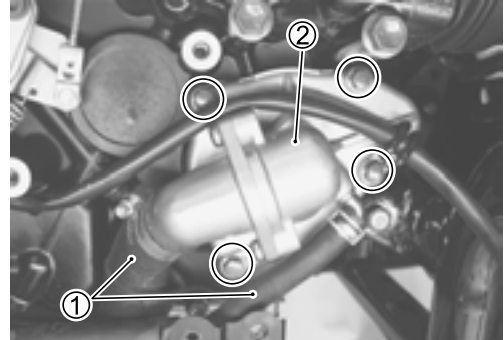
Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.



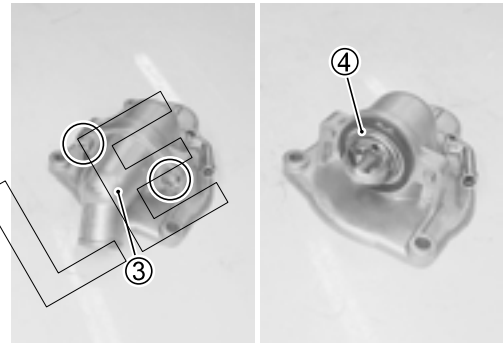
SAMPLE

THERMOSTAT REMOVAL

- Drain engine coolant. (☞ 2-17)
- Remove the reservoir tank. (☞ 3-4)
- Remove the water hoses ① and water pump case ②.



- Remove the thermostat case ③.
- Remove the thermostat ④.

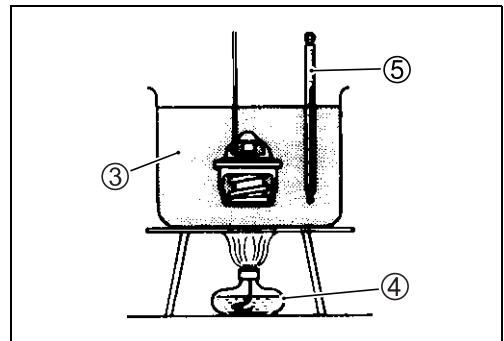
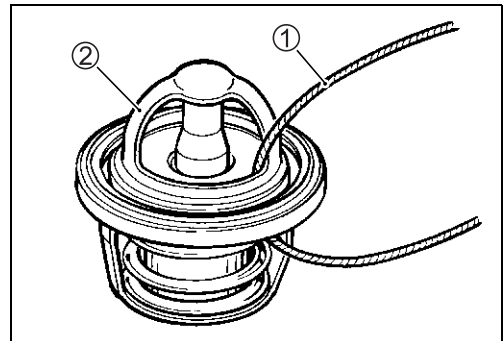


INSPECTION

Inspect the thermostat pellet for signs of cracking.

Test the thermostat at the bench for control action, in the following manner.

- Pass a string ① between flange of thermostat ②, as shown.
- Immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water ③ by placing the beaker on a stove ④ and observe the rising temperature on a thermometer ⑤.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should satisfy the standard value.



DATA Thermostat valve opening temperature

Standard: Approx. 75 °C (167 °F)

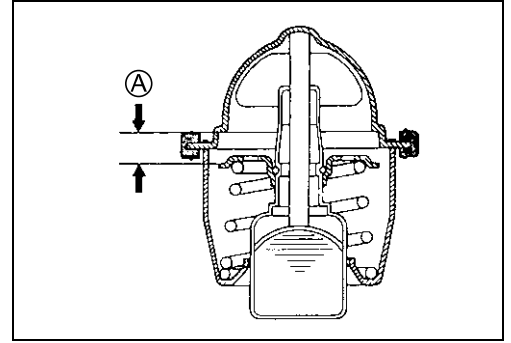
- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 6.0 mm (0.24 in).

DATA Thermostat valve lift [Ⓐ]

Standard: 6.0 mm and over at 90 °C

(0.24 in and over at 194 °F)

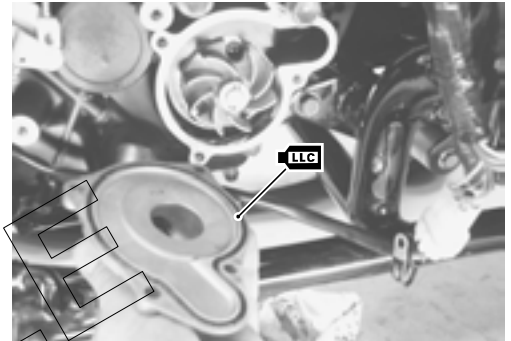
- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.



INSTALLATION

Install the thermostat in the reverse order of removal. Pay attention to the following points:

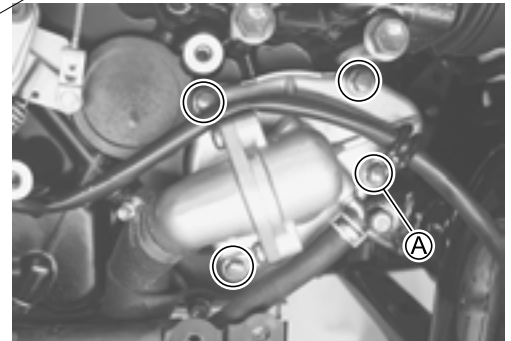
- Apply engine coolant to the O-ring and install the water pump cover.



- Tighten the water pump cover bolts.

NOTE:

Fit the clamp to the bolt [Ⓐ].



- Bleed air from the cooling circuit. (☞ 2-18)

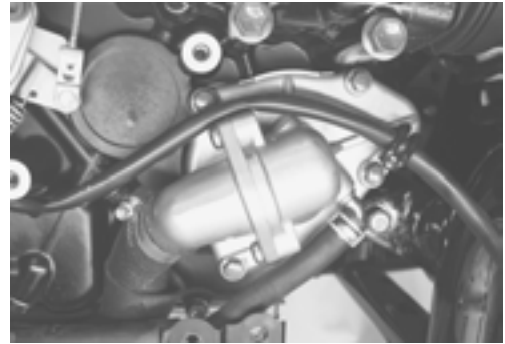
SAMPLE

WATER PUMP REMOVAL AND DISASSEMBLY

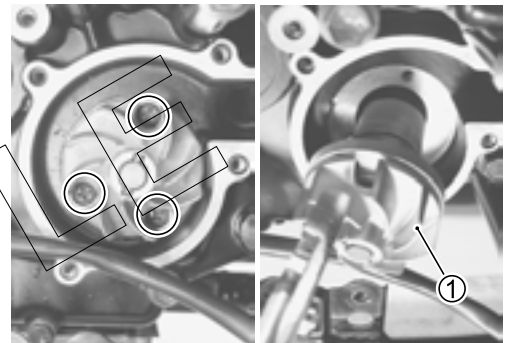
- Drain the engine oil. (☞ 2-11)
- Drain engine coolant. (☞ 2-17)
- Remove the water pump case. (☞ 7-12)

NOTE:

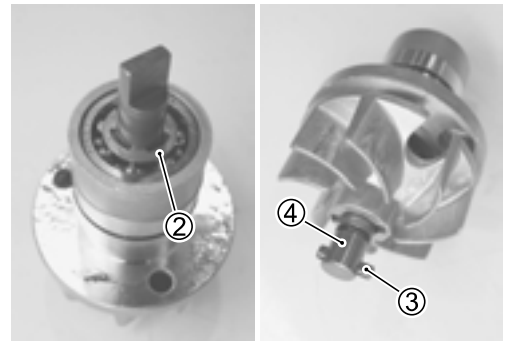
Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. (☞ 7-16)



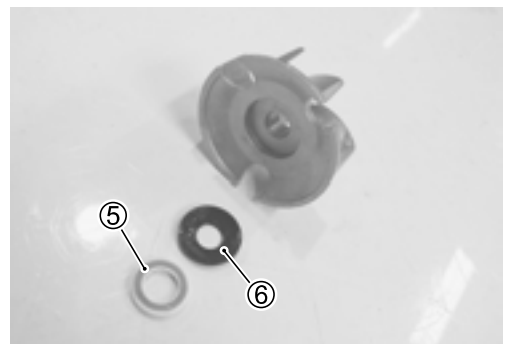
- Turn the crankshaft and align the water pump impeller holes with the screws.
- Remove the water pump ①.



- Remove the E-ring ②.
- Remove the pin ③ and draw out the impeller shaft ④.



- Remove the mechanical seal ring ⑤ and the rubber seal ⑥ from the impeller.



SAMPLE

- Remove the bearings with the special tool.

TOOL 09921-20240: Bearing remover set

NOTE:

If there is no abnormal noise condition, bearing removal is not necessary.

CAUTION

The removed bearing must be replaced with a new one.

- Remove the mechanical seal with the special tool.

TOOL 09921-20240: Bearing remover set

NOTE:

If there is no abnormal condition, the mechanical seal removal is not necessary.

CAUTION

The removed mechanical seal must be replaced with a new one.

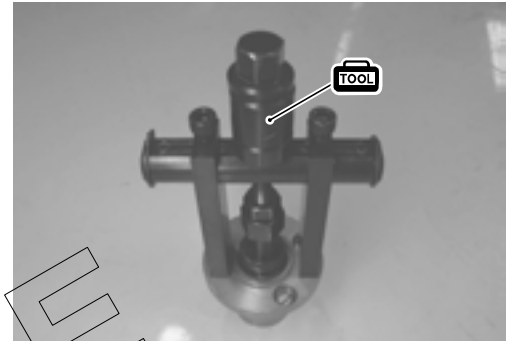
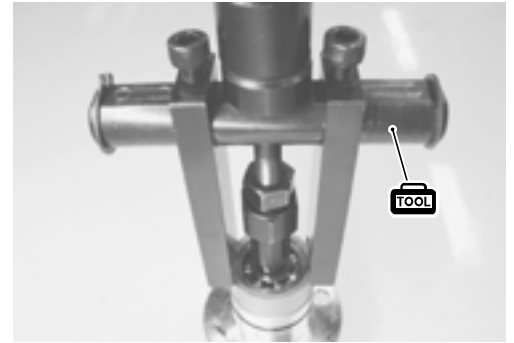
- Remove the oil seal using a suitable bar.

NOTE:

If no abnormal, the oil seal removal is not necessary.

CAUTION

The removed oil seal must be replaced with a new one.



INSPECTION

BEARING

- Inspect the play of the bearing by hand while it is in the water pump case.
- Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
- Replace the bearing if there is anything unusual.

MECHANICAL SEAL

- Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
- Replace the mechanical seal that shows indications of leakage. Also replace the seal ring if necessary.

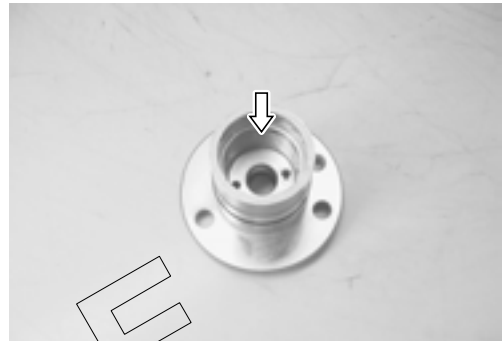
SAMPLE

OIL SEAL

- Visually inspect the oil seal for damage, with particular attention given to the lip.
- Replace the oil seal that shows indications of leakage.

**BEARING CASE**

- Visually inspect the bearing case for damage.
- Replace the water pump body if necessary.

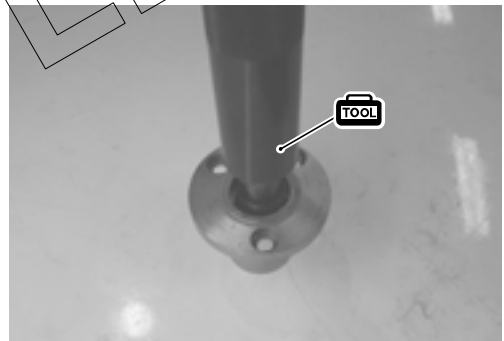
**REASSEMBLY AND INSTALLATION**

- Install the oil seal with the special tool.

 **09913-70210: Bearing installer set**

NOTE:

The stamped mark on the oil seal faces outside.



- Apply a small quantity of the SUZUKI SUPER GREASE "A" to the oil seal lip.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

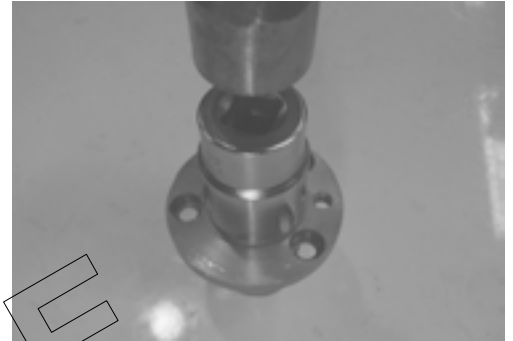
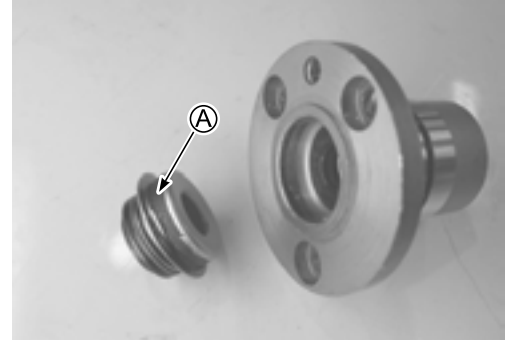


SAMPLE

- Install the new mechanical seal using a suitable size socket wrench.

NOTE:

On the new mechanical seal, the sealer **(A)** has been applied.

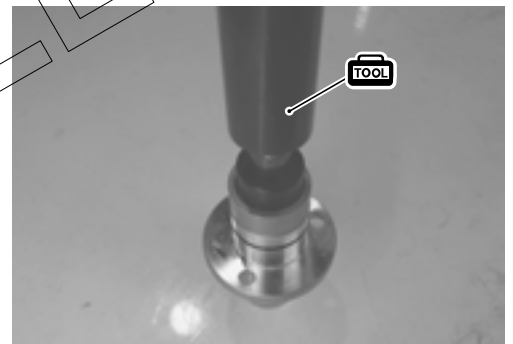


- Install the new bearings with the special tool.

TOOL 09913-70210: Bearing installer set

NOTE:

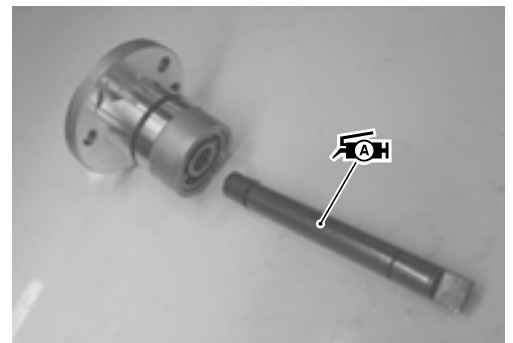
The stamped mark on the bearing faces crankcase side.



- Apply SUZUKI SUPER GREASE "A" to the impeller shaft.

TAH 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

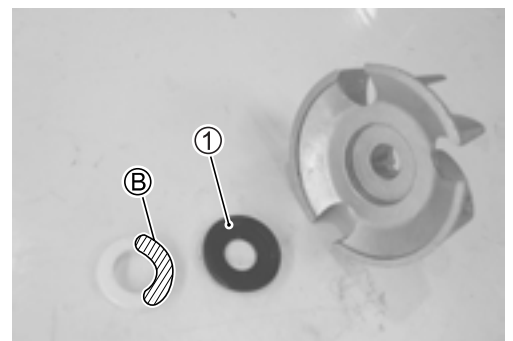
- Install the impeller shaft to the water pump body.



- Install the rubber seal **(1)** into the impeller.
- After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.


NOTE:

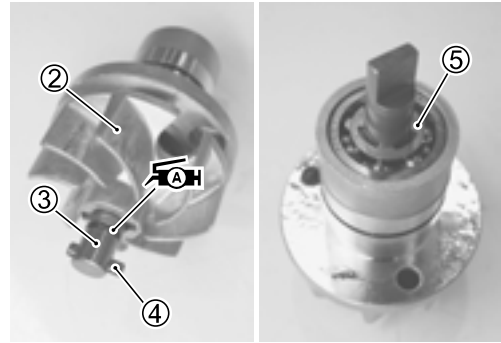
The marked side **(B)** of the mechanical seal ring faces the impeller.



SAMPLE

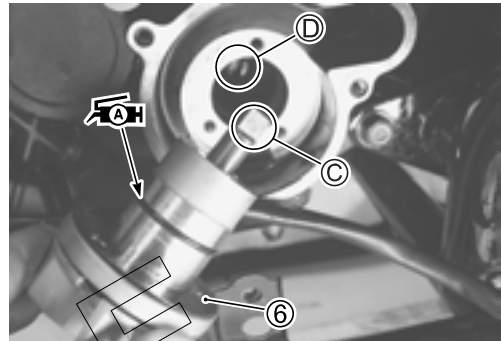
- Apply grease to the new O-ring.
- Install the impeller ② and impeller shaft ③ to the water pump body.
- Install the pin ④ and E-ring ⑤.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

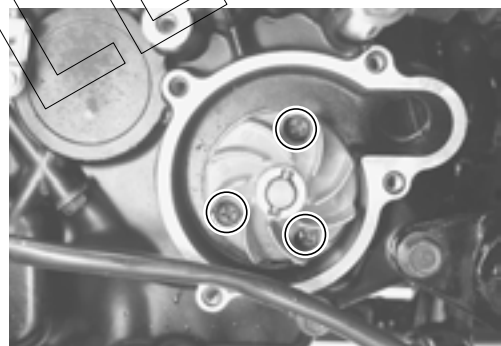


- Install the new gasket ⑥.
- Apply grease to the O-ring.
- Set the water pump shaft end ③ to the oil pump shaft ④.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Install the water pump.
- Tighten the screws.
- Install the water pump cover. (☞ 7-13)



- Connect the water hose.
- Install the reserve tank.
- Install the secondary gear case cover.
- Pour engine oil. (☞ 2-11)
- Bleed air from the cooling circuit. (☞ 2-18)

SAMPLE

LUBRICATION SYSTEM OIL PRESSURE

☞ 2-28

OIL FILTER

☞ 2-12

OIL PRESSURE REGULATOR

☞ 3-62

OIL STRAINER

☞ 3-61

OIL JET

☞ 3-60

OIL PUMP

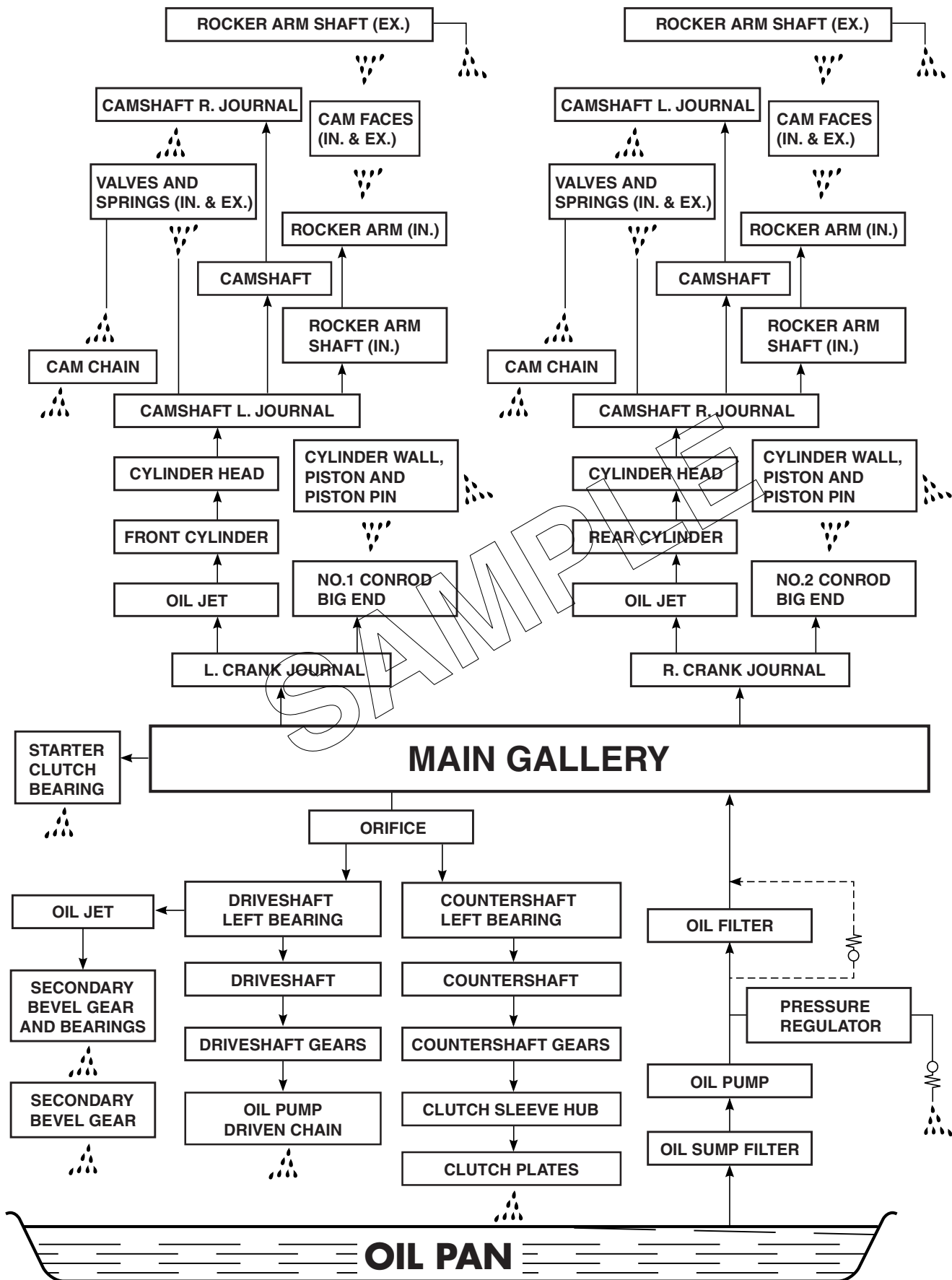
☞ 3-56

OIL PRESSURE SWITCH

☞ 3-63

SAMPLE

ENGINE LUBRICATION SYSTEM CHART



CHASSIS

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SAMPLE

EXTERIOR PARTS

REMOVAL

SEAT

- Remove the rear seat by removing the bolt.

CAUTION

Be careful not to scratch the rear fender.



- Remove the rear seat grip band by removing the bolts.



- Remove the seat.

CAUTION

Be careful not to scratch the rear fender.



FRAME COVER

- Remove the left frame cover ① with the ignition key.



☆: Hooked part

SAMPLE

- Remove the right frame covers ② by removing the bolts.

CAUTION

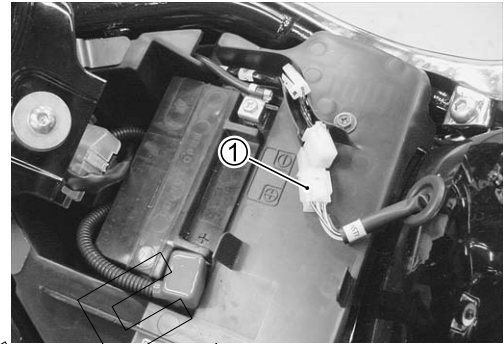
- * Wait until the engine and exhaust pipe are cool enough to touch with bare hands before draining oil.
- * Be careful not to scratch the frame covers.



☆: Hooked part

REAR FENDER

- Remove the seat. (☞ 8-3)
- Disconnect the coupler ①.



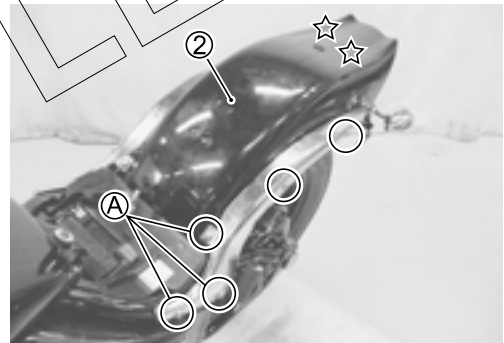
- Remove the left and right side frame handle grip.
- Remove the rear fender ②.

CAUTION

Be careful not to scratch the rear fenders.


NOTE:

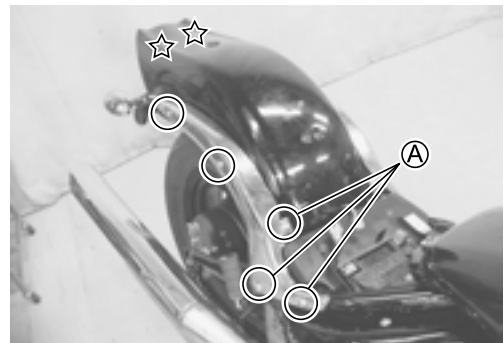
When installing the frame handle grip bolts, apply a small quantity of **THREAD LOCK** to its mounting bolts and tighten them to the specified torque.



☆: Hooked part

 **99000-32030: THREAD LOCK SUPER "1303"**

 **Frame handle grip mounting bolt (A) (M10):**
50 N·m (5.0 kgf-m, 36.0 lb-ft)



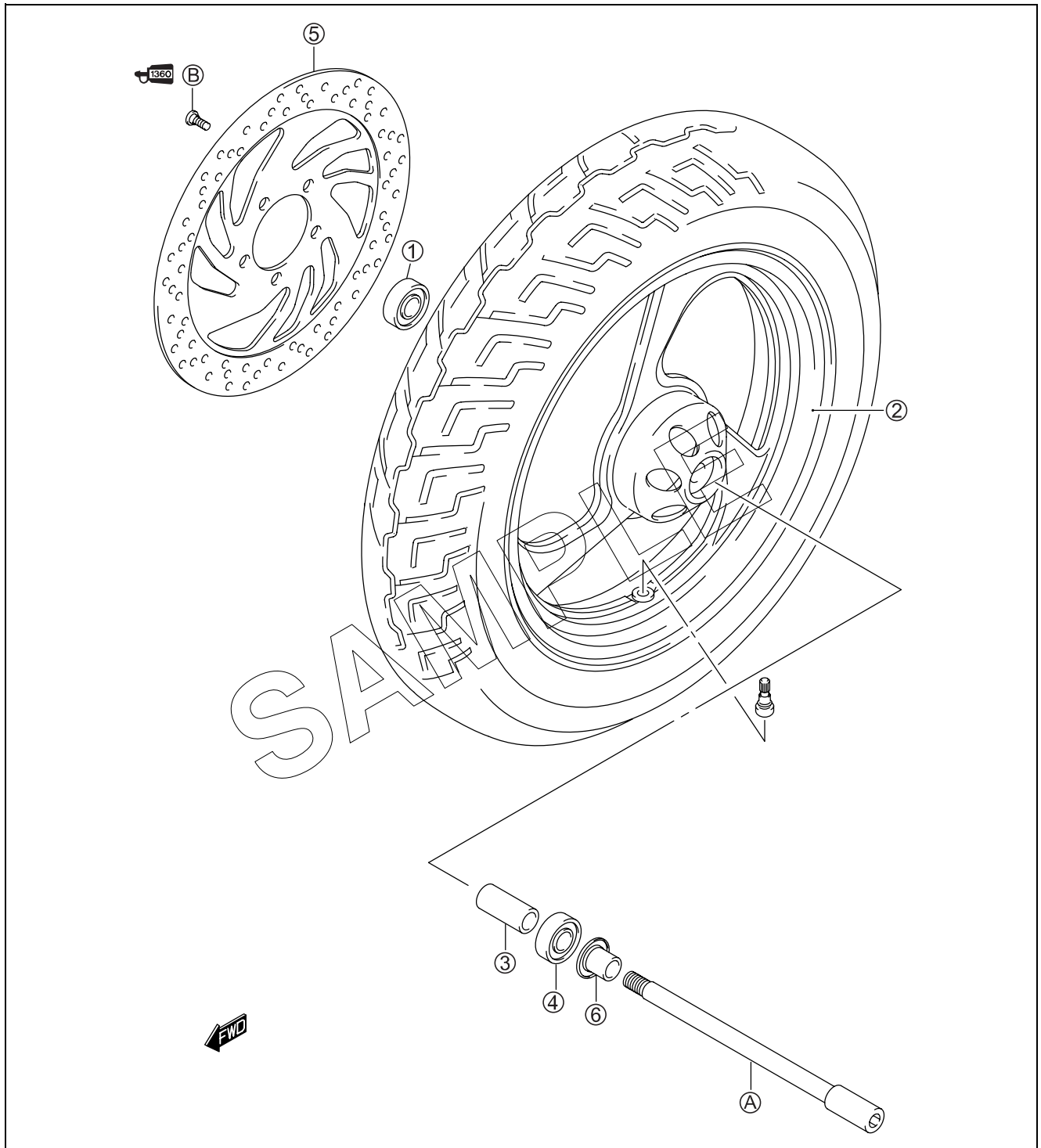
☆ : Hooked part

REMountING

Remount the seats, covers and rear fender in the reverse order of removal.

SAMPLE

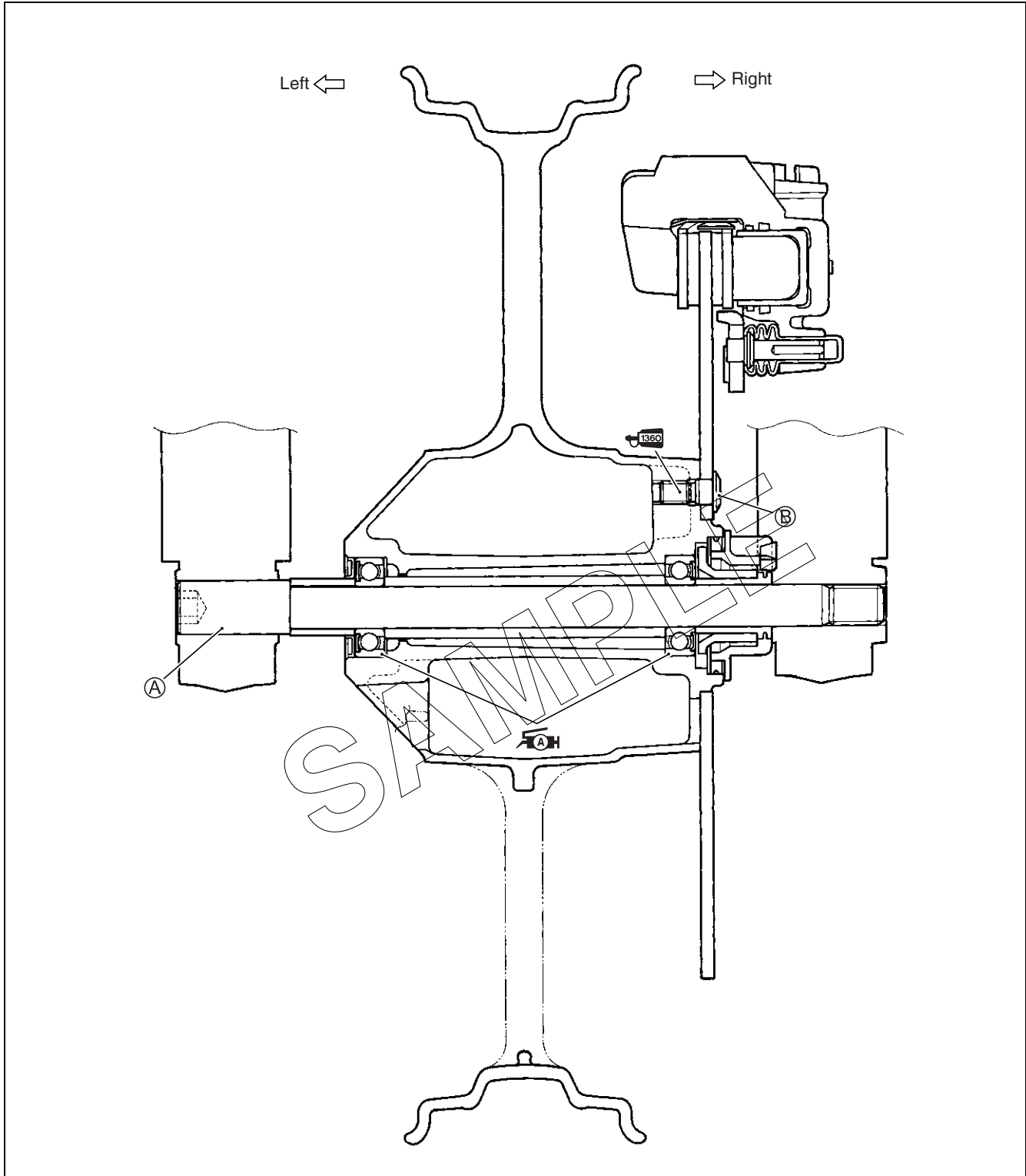
FRONT WHEEL CONSTRUCTION



①	Bearing (R)	⑤	Brake disc
②	Front wheel	⑥	Spacer
③	Spacer	Ⓐ	Front axle
④	Bearing (L)	Ⓑ	Brake disc mounting bolt



ITEM	N·m	kgf·m	lb·ft
Ⓐ	65	6.5	47.0
Ⓑ	23	2.3	16.5



Ⓐ	Front axle
Ⓑ	Brake disc bolt

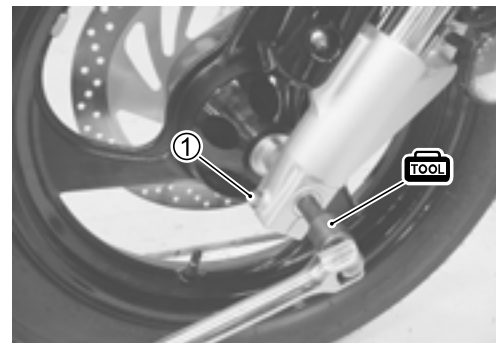
ITEM	N·m	kgf·m	lb·ft
Ⓐ	65	6.5	47.0
Ⓑ	23	2.3	16.5

REMOVAL AND DISASSEMBLY

- Loosen the front axle pinch bolt ①.
- Loosen the front axle with the special tool.

 **09900-18710: Hexagon socket (12 mm)**

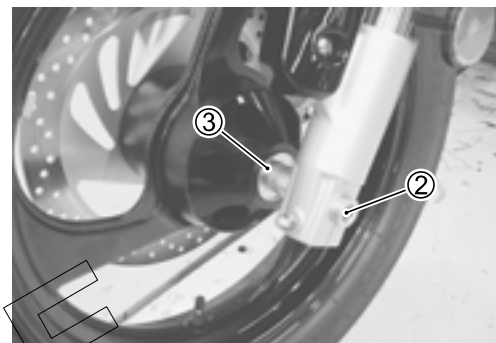
- Raise the front wheel off the ground with a jack or a wooden block.



- Remove the front axle ②, spacer ③ and front wheel.

CAUTION

Do not operate the brake lever during or after front wheel removal.



- Remove the brake disc by removing its bolts.



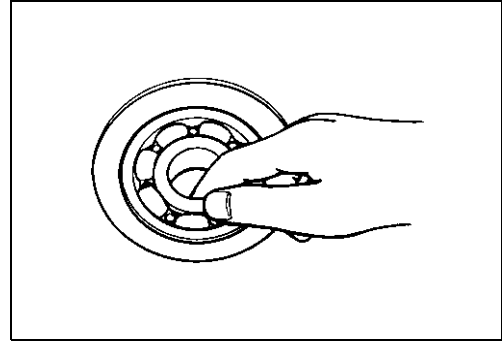
SAMPLE

INSPECTION

WHEEL BEARINGS

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation.

Replace the bearing in the following procedure if there is anything unusual.



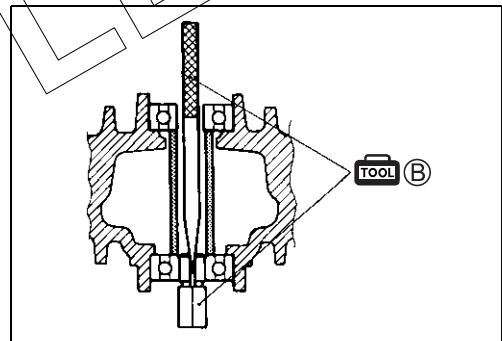
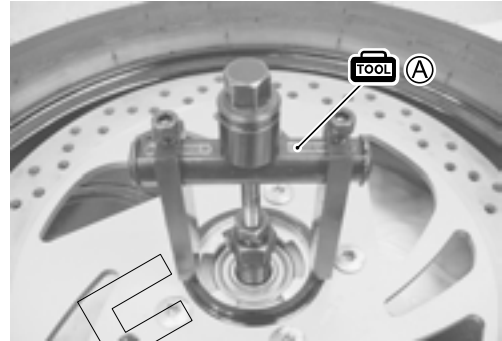
WHEEL BEARINGS REMOVAL

- Remove the wheel bearings by with the special tool (A) or (B).

TOOL 09921-20240: (A) Bearing remover set (17 mm)
or 09941-50111: (B) Wheel bearing remover

CAUTION

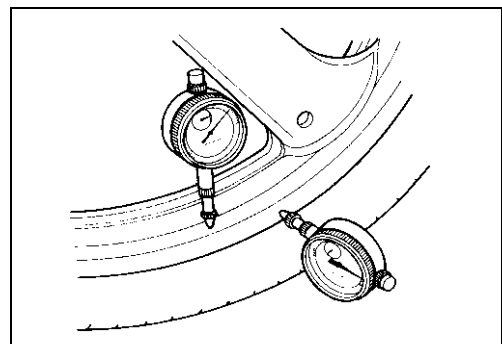
The removed bearings should be replaced with new ones.



FRONT WHEEL

Make sure that the wheel runout (axial and radial) does not exceed the service limit when checked as shown. An excessive amount of runout is usually due to worn or loose wheel bearings and can be corrected by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel with a new one.

DATA Wheel rim runout (axial and radial)
Service Limit: 2.0 mm (0.08 in)



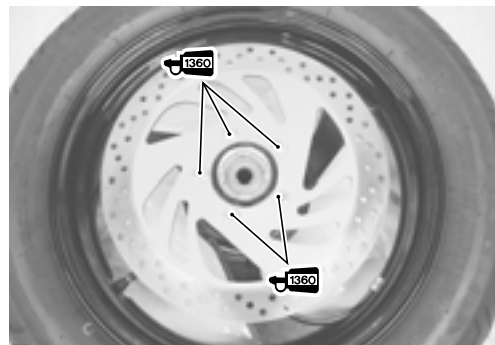
SAMPLE

BRAKE DISC

- Make sure that the brake disc is clean and free of any grease. Apply **THREAD LOCK SUPER** to the brake disc bolts and tighten them to the specified torque.

 **99000-32130: THREAD LOCK SUPER "1360"**

 **Brake disc bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

**SPEED SENSOR**

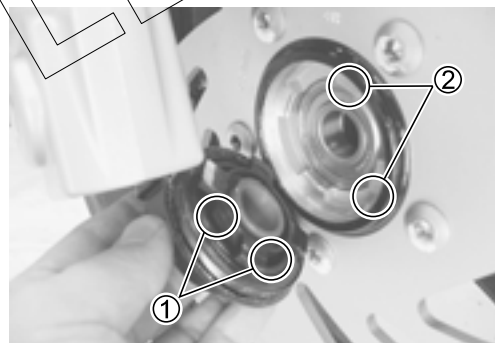
- Apply **SUZUKI SUPER GREASE "A"** to the speed sensor dust seal.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**

99000-25010: SUZUKI SUPER GREASE "A" (Others)



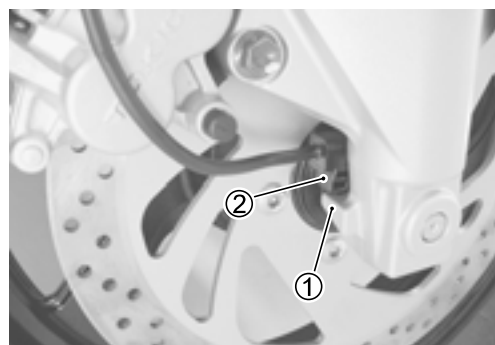
- Align the grooves ① on the speed sensor with the lugs ② on the wheel hub.

**FRONT WHEEL**

- Make sure that the front fork stopper ① and the speed sensor stopper ② are installed as shown.

CAUTION

When installing the front wheel, position the brake disc between the brake pads. Be careful not to damage the brake pads.



SAMPLE

- Tighten the front axle to the specified torque.
- Tighten the front axle pinch bolt ③ on the specified torque.

 **Front axle: 65 N·m (6.5 kgf-m, 47.0 lb-ft)**
Front axle pinch bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

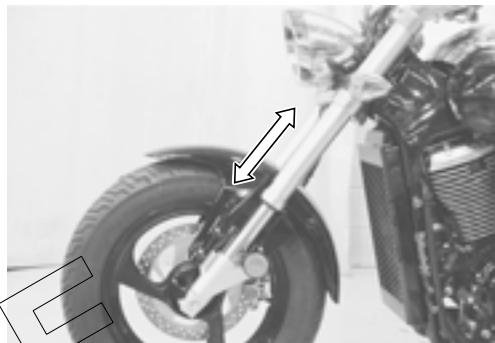
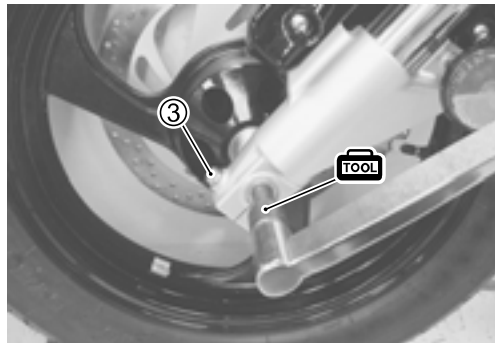
 **09900-18710: Hexagon socket (12 mm)**

NOTE:

Before tightening the front axle pinch bolt ③, move the front fork up and down four or five times.

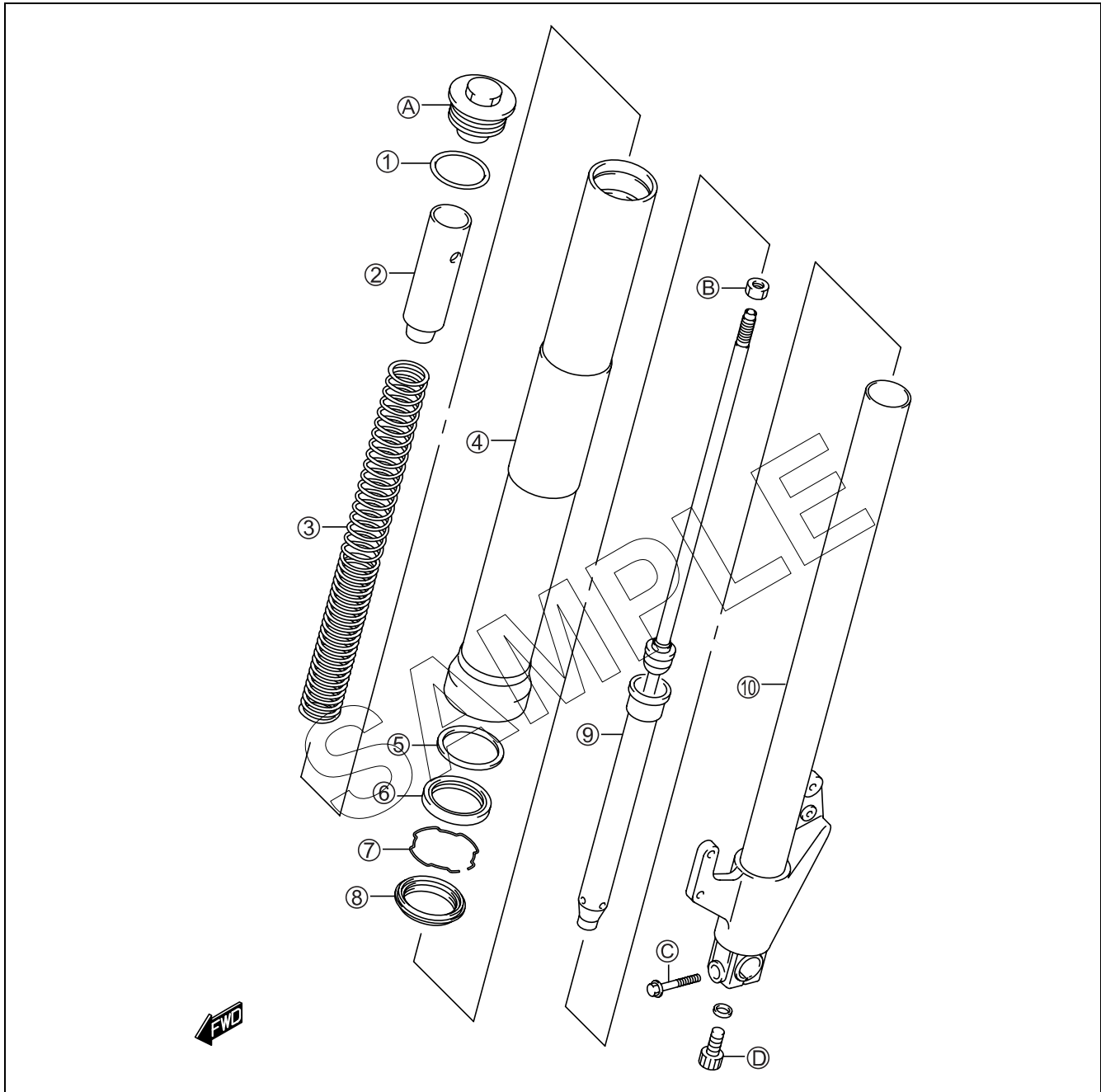
NOTE:

After remounting the front wheel, pump the brake lever a few times to check for proper brake operation.



SAMPLE

FRONT FORK CONSTRUCTION



①	O-ring	⑥	Oil seal	Ⓐ	Front fork cap bolt
②	Spacer	⑦	Oil seal stopper ring	Ⓑ	Inner rod lock-nut
③	Spring	⑧	Dust seal	Ⓒ	Front axle pinch bolt
④	Outer tube	⑨	Inner rod/Damper rod (cartridge)	Ⓓ	Caliper rod bolt
⑤	Oil seal retainer	⑩	Inner tube		



ITEM	N·m	kgf·m	lb·ft
Ⓐ	23	2.3	16.5
Ⓑ	15	1.5	11.0

ITEM	N·m	kgf·m	lb·ft
Ⓒ	33	3.3	24.0
Ⓓ	39	3.9	28.0

REMOVAL AND DISASSEMBLY

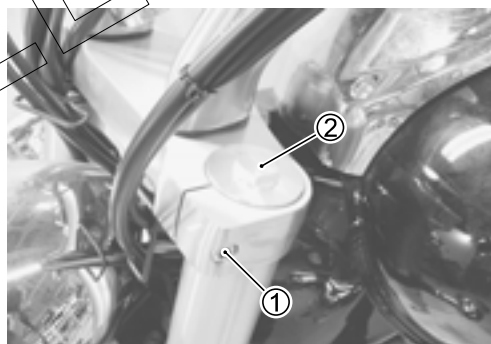
- Remove the front wheel. (☞ 8-7)
- Remove the front brake caliper. (☞ 8-52)
- Remove the front fender.



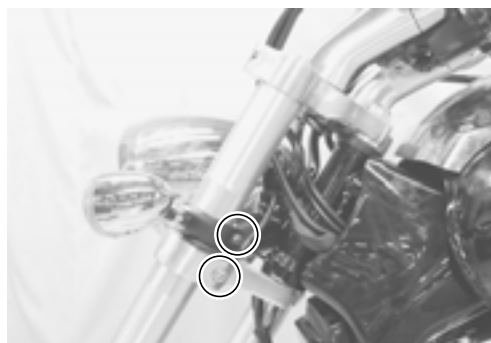
- Loosen the front fork upper clamp bolts ①.

NOTE:

Slightly loosen the front fork cap bolts ② before loosening the lower clamp bolts to facilitate later disassembly.



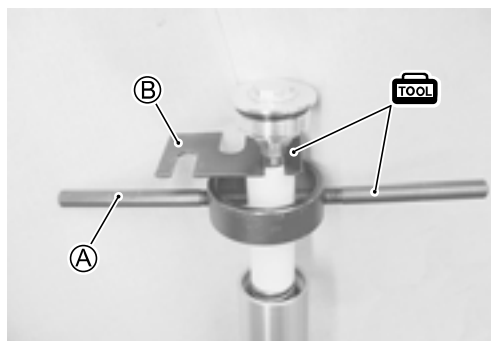
- Loosen the turn signal light clamp screws and front fork lower clamp bolts.
- Remove the front forks.



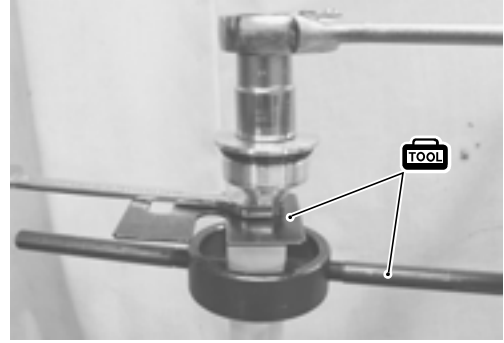
- Separate the front fork cap bolt from the front fork.
- Compress the front fork spring with the special tool (A) and insert the special tool (B) between the lock-nut and the spacer.

TOOL 09940-94930: Front fork spacer holder (A)

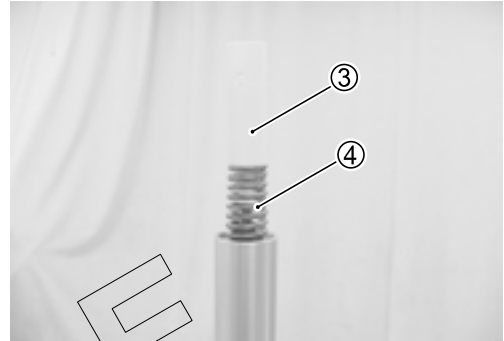
09940-94922: Stopper plate (B)



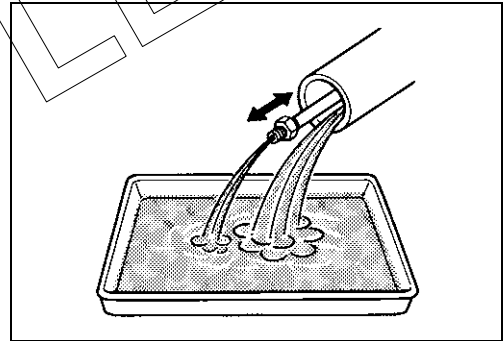
- Remove the front fork cap bolt from the inner rod by loosening the lock nut.
- Compress the fork spring with the special tool and remove the special tool.



- Remove the spacer ③ and spring ④.



- Invert the front fork and stroke the inner rod several times to let out fork oil.
- Under the inverted condition of front fork, drain oil completely by holding the fork for a while.



- Remove the damper rod bolt with the special tool.

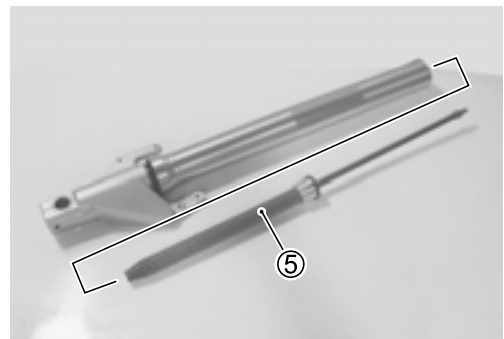
 09940-30221: Front fork assembling tool



- Remove the inner rod/damper rod (cartridge) ⑤.

CAUTION

Do not disassemble the inner rod/damper rod (cartridge).

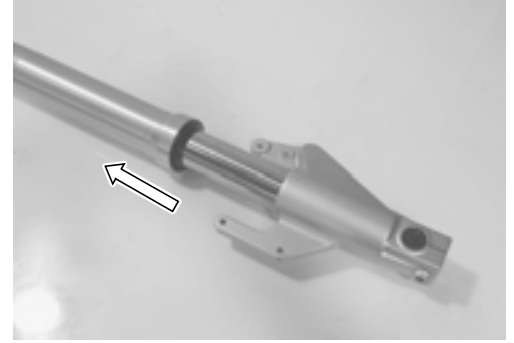


SAMPLE

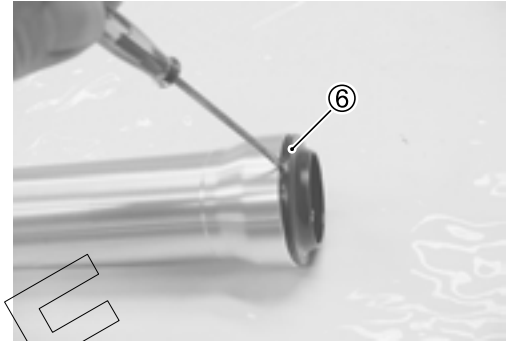
- Extract the outer tube from the inner tube.

NOTE:

Be careful not to damage the "ANTI-FRICTION" metals.



- Remove the dust seal ⑥.

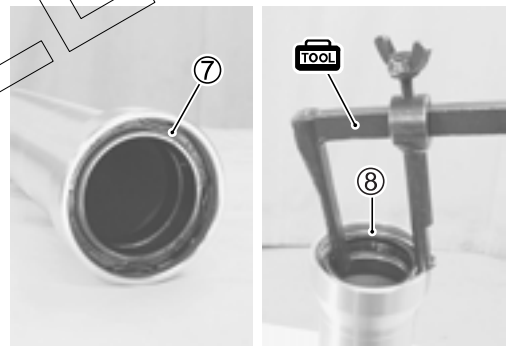


- Remove the oil seal stopper ring ⑦.
- Remove the oil seal ⑧ with the special tool.

TOOL 09913-50121: Oil seal remover

CAUTION

The removed oil seal must be replaced with a new one.



- Remove the oil seal retainer ⑨.



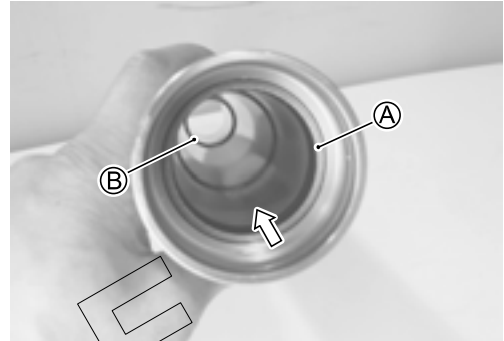
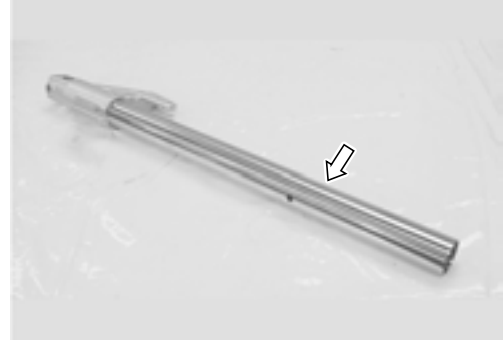
INSPECTION

INNER AND OUTER TUBES

- Inspect the inner tube outer surface and outer tube inner surface for scratches.
- Inspect the “ANTI-FRICTION” metal surfaces for scratches.
- If any defects are found, replace them with a new one.

CAUTION

Do not remove the “ANTI-FRICTION” metal (A) and (B).

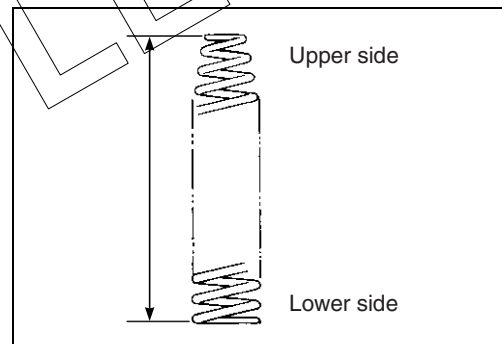


FORK SPRING

Measure the fork spring free length.

If it is shorter than the service limit, replace it with a new one.

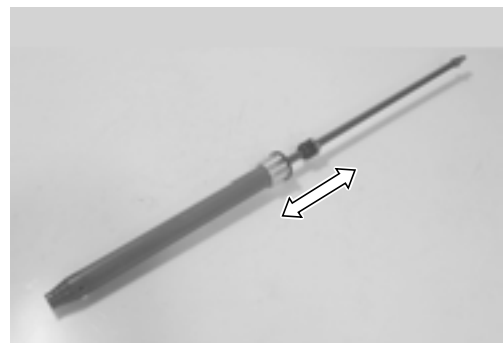
DATA Front fork spring free length:
Service Limit: 372 mm (14.6 in)



DAMPER ROD

Move the inner rod by hand to examine it for smoothness.

If any defects are found, replace inner rod/damper rod (cartridge) with a new one.



SAMPLE

REASSEMBLY AND REMOUNTING

Reassemble and remount the front fork in the reverse order of removal and disassembly. Pay attention to the following points:

OIL SEAL AND DUST SEAL

- Install the dust seal, oil seal stopper ring, oil seal and oil seal retainer onto the inner tube.

- ① Dust seal
- ② Oil seal stopper ring
- ③ Oil seal
- ④ Oil seal retainer

CAUTION

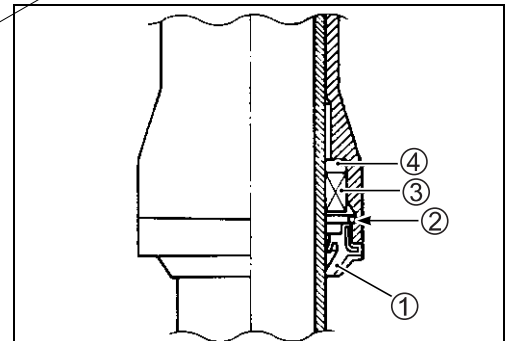
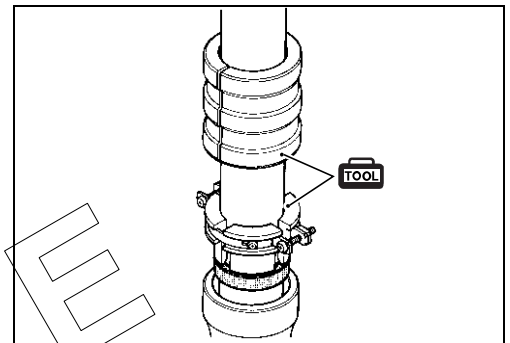
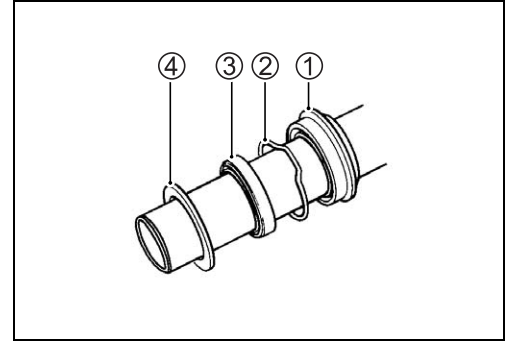
- * When installing the oil seal to outer tube, be careful not to damage the oil seal lip.
- * Do not use solvents for washing to prevent oil seal damage.
- * Apply fork oil to the Anti-friction metals and lip of the oil seal.
- * Make sure that the oil seal stopper ring has been fitted securely.

- Insert the inner tube into the outer tube and fit the oil seal and dust seal with the special tool.

 **09940-52861: Front fork oil seal installer**

NOTE:

Stamped mark on the oil seal should face outside.



DAMPER ROD BOLT

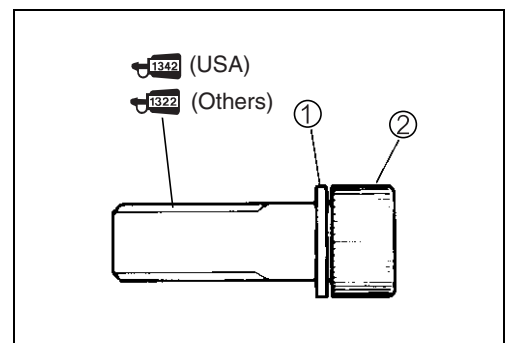
- Insert the inner rod/damper rod (cartridge) into the inner tube with the gasket ① fitted, apply the damper rod bolt ②.
- Apply THREAD LOCK to the damper rod bolt.

 **1342 99000-32050: THREAD LOCK "1342" (USA)**

 **1322 99000-32110: THREAD LOCK SUPER "1322" (Others)**

CAUTION

Replace the gasket with a new one.



- Tighten the damper rod bolt to the specified torque, using the special tool.

TOOL 09940-30221: Front fork assembling tool

Caliper rod bolt: 39 N·m (3.9 kgf-m, 28.0 lb-ft)

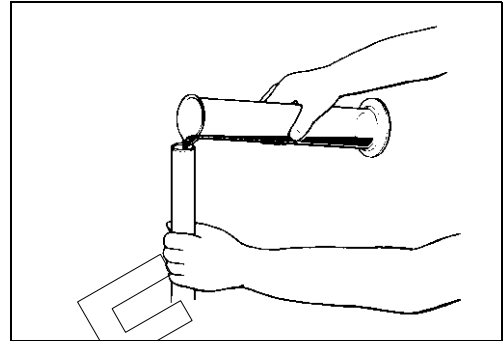


FORK OIL

- Place the front fork vertically without spring.
- Compress it fully.
- Pour specified front fork oil up to the top level of the outer tube.

DATA Capacity (each leg): 490 ml (16.6/17.3 US/Imp oz)

FORK 99000-99044-L01: SUZUKI FORK OIL L01
or an equivalent fork oil

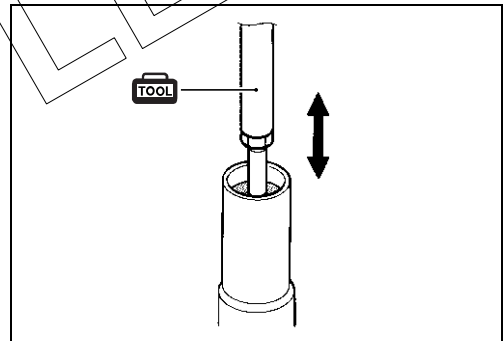


- Move the inner rod slowly with the special tool ten times and more until no more bubbles come out from the oil.

TOOL 09940-52841: Inner rod holder

NOTE:

Refill front fork oil up to the top of the outer tube so that bubbles are visible while bleeding air.

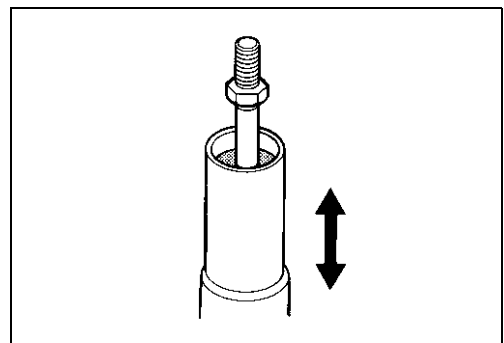


- Refill specified front fork oil up to the top level of the outer tube again. Move the outer tube up and down several strokes until no more bubbles come out from the oil.
- Keep the front fork vertically and wait 5 – 6 minutes.

NOTE:

* Always keep oil level over the cartridge top end, or air may enter the cartridge during this procedure.

* Take extreme care so as to pump out air completely.



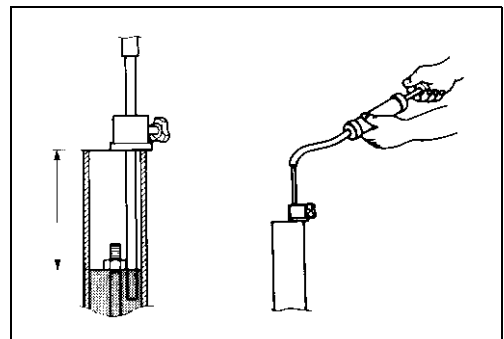
- Hold the front fork vertically and adjust fork oil level with the special tool.

NOTE:

When adjusting the fork oil level, compress the outer tube fully without the fork spring.

DATA Fork oil level: 153 mm (6.02 in)

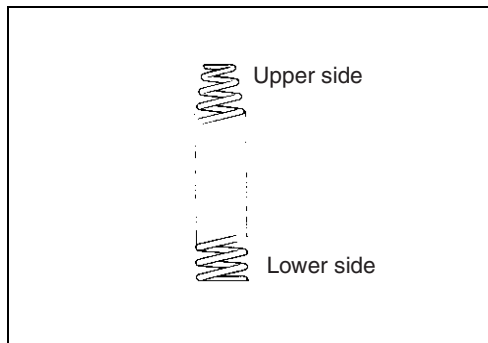
TOOL 09943-74111: Front fork oil level gauge



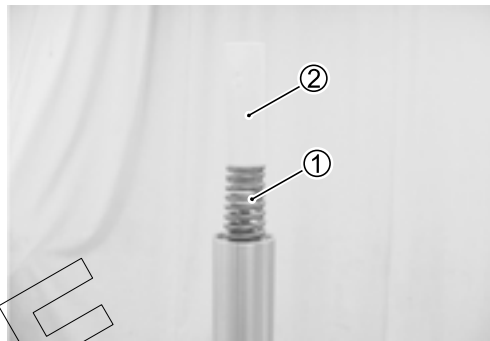
SAMPLE

FORK SPRING

- Install the fork spring as shown in the illustration.



- Install the spring ① and spacer ②.

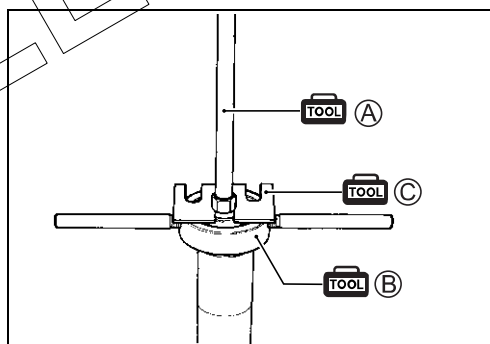
**FRONT FORK CAP BOLT**

- Pull up the inner rod with the special tool (A).
- Compress the spring with the special tool (B) and then insert the special tool (C) between the lock-nut and the spacer.

TOOL 09940-52841: Inner rod holder (A)

09940-94930: Front fork spacer holder (B)

09940-94922: Stopper plate (C)



- Slowly turn the cap bolt ① until the inner rod is lightly seated.
- Hold the cap bolt ① and tighten the lock-nut ② to the specified torque.

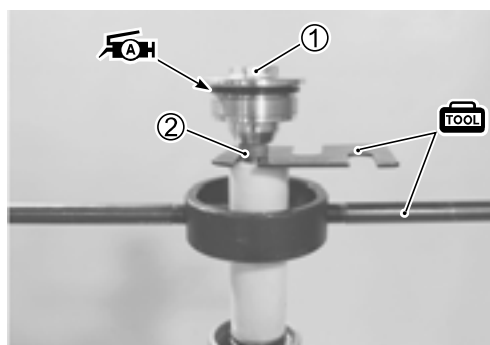
U Inner rod lock-nut: 15 N·m (1.5 kgf-m, 11.0 lb-ft)

- Remove the special tools.
- Fit the O-ring to the front fork cap bolt and apply grease.

TAH 99000-25010: SUZUKI SUPER GREASE "A"

CAUTION

Use a new O-ring to prevent oil leakage.



- Install the front fork to the steering stem, turn signal clamps (👉 10-22 and -23) and steering stem upper bracket.
- Align the upper surface of the outer tube with the upper surface of the steering stem upper bracket.
- After loosening the front fork upper clamp bolts ④ slightly, tighten the front fork cap bolt ③ to the specified torque.

👉 Front fork cap bolt ③: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

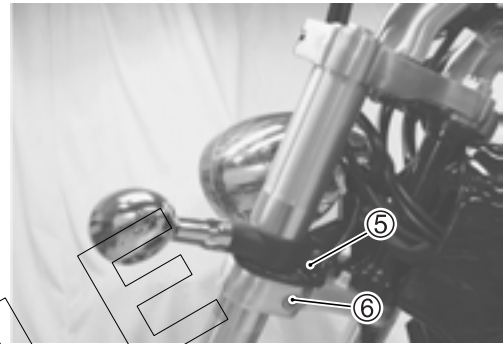
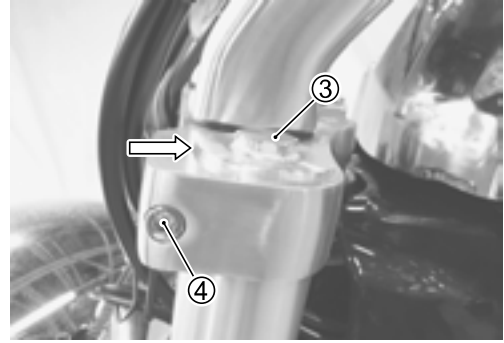
- Tighten the front fork upper clamp bolts ④ to the specified torque.

👉 Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Tighten the turn signal light clamp bolts ⑤.
- Tighten the front lower clamp bolts ⑥ to the specified torque.

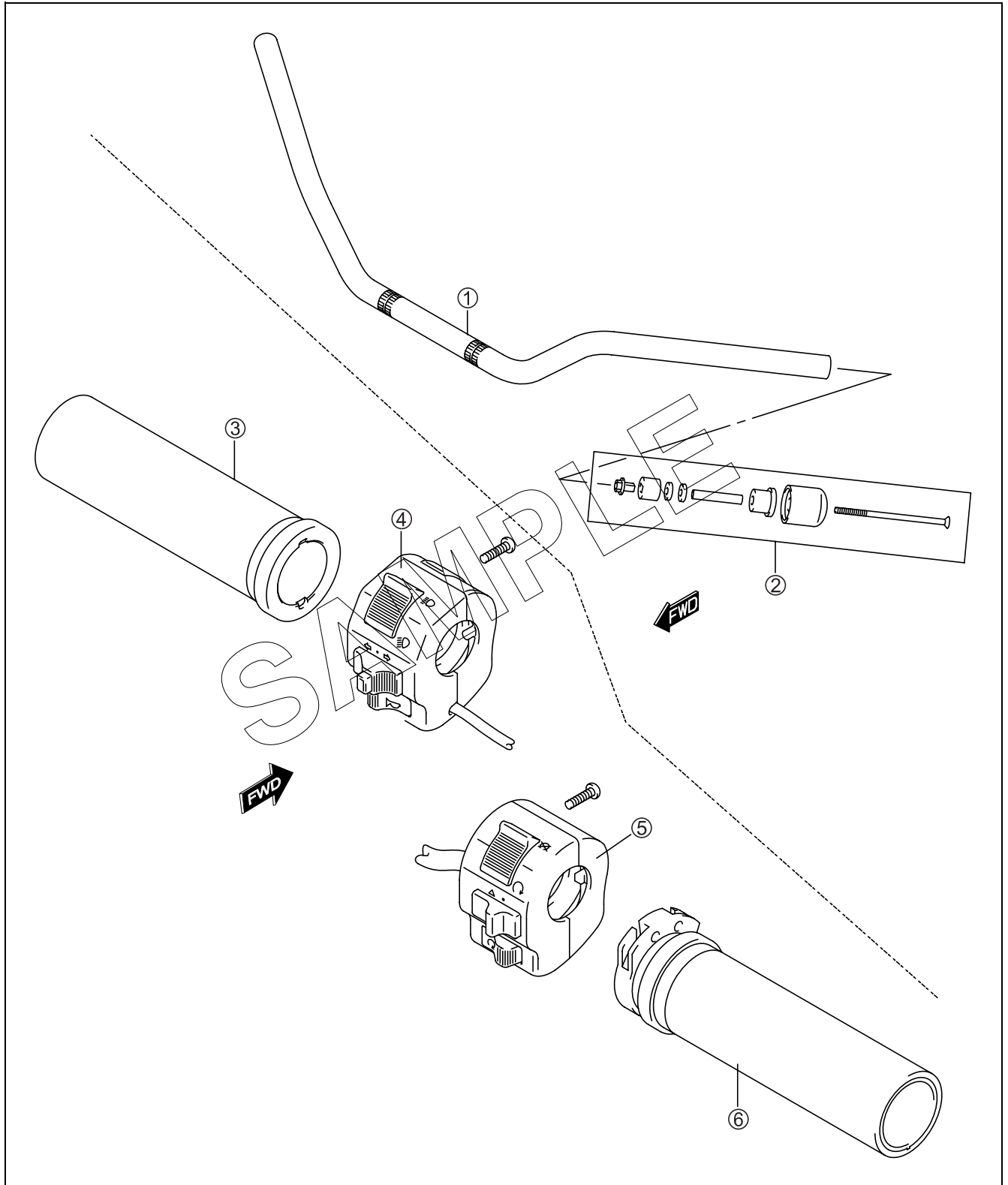
👉 Front fork lower clamp bolt: 33 N·m (3.3 kgf-m, 24.0 lb-ft)

- Remount the front wheel. (👉 8-10 to -11)



SAMPLE

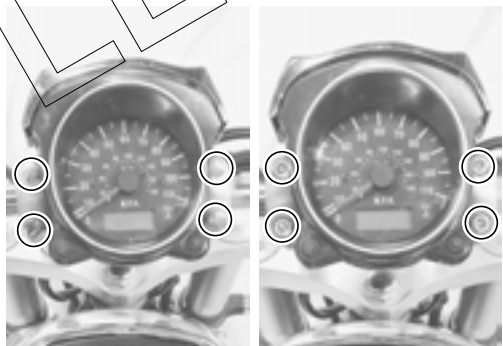
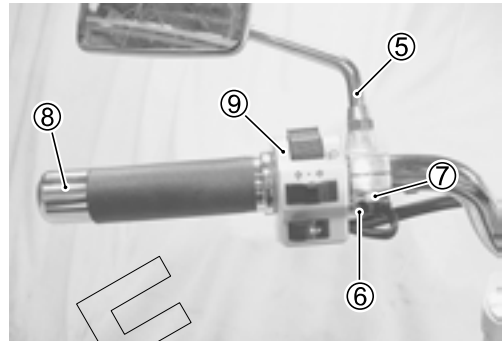
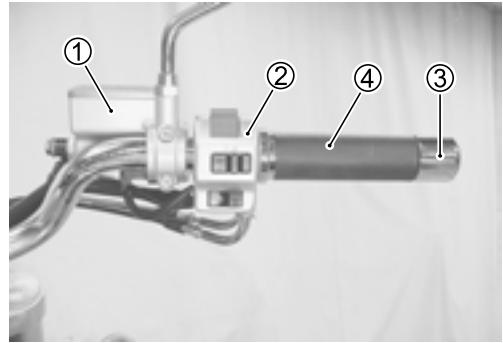
HANDLEBAR CONSTRUCTION



①	Handlebars	③	Left handle grip	⑤	Right handle grip
②	Handlebar balancer	④	Left handle switch	⑥	Right handle switch

REMOVAL AND DISASSEMBLY

- Remove the brake master cylinder ①. (☞ 8-57)
 - Remove the right handle switch ②.
 - Remove the handle balancer ③.
 - Remove the throttle grip ④.
-
- Remove the left rear view mirror ⑤.
 - Disconnect the clutch lever position switch lead wires ⑥.
 - Loosen the clutch lever holder bolt ⑦.
 - Remove the left handlebar balancer ⑧ and the left handlebar switch ⑨.
-
- Remove the handlebar clamp bolt caps, handlebar clamp bolts and handlebar clamps.
-
- Remove the speedometer by removing the speedometer mounting bolts.
 - Remove the handlebar.



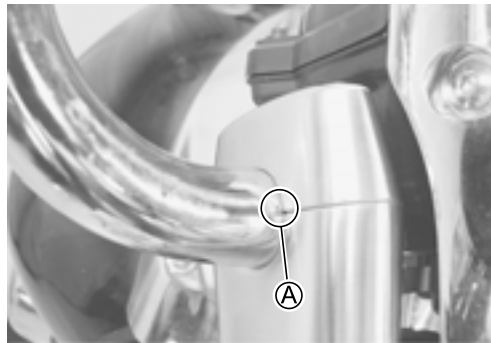
REASSEMBLY AND REMOUNTING

Reassemble and remount the handlebar in the reverse order of removal and disassembly. Pay attention to the following points:

- Install the handlebar.
- Install the speedometer.
- Tighten the speedometer mounting bolts.

SAMPLE

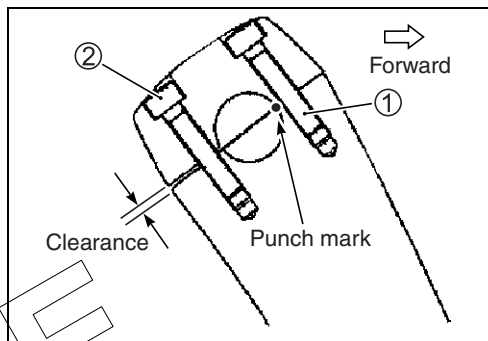
- Install the handlebars with the punch mark (A) aligned with the handlebar clamp as shown.



- First, tighten the handlebar clamp bolts (1) to the half of specified torque, and then tighten the handlebar clamp bolts (1) and (2) to the specified torque.

🔧 Handlebar set bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

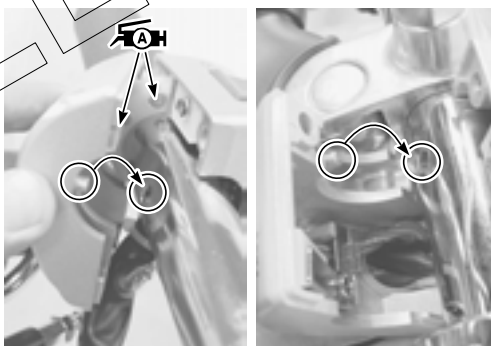
- Install the handlebar set bolt caps.



- Apply the SUZUKI SUPER GREASE "A" to the throttle cables and their holder.

**🔧 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)**

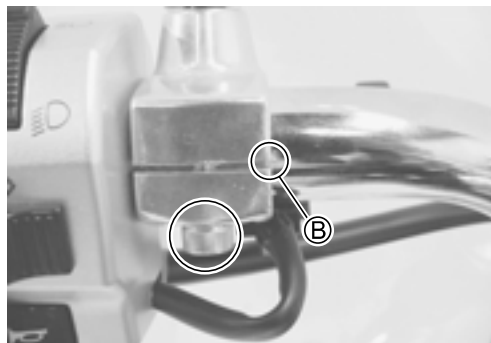
- When remounting the right and left handle switches, engage the stopper with the handlebar hole.



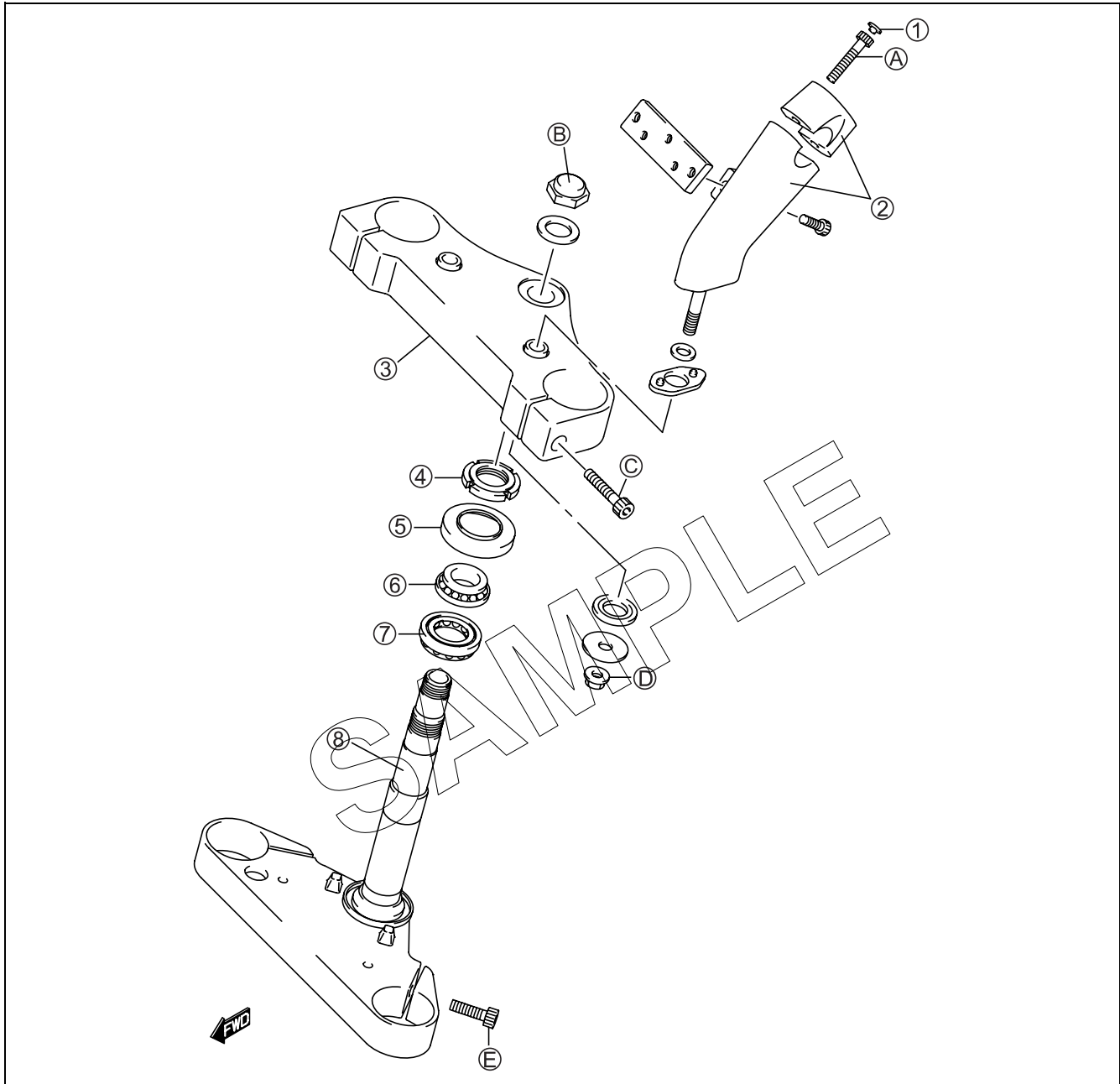
- Install the front brake master cylinder. (🔧 8-60)
- Install the clutch lever holder with the punch mark (B) aligned with the clutch lever holder clamp as shown.

**🔧 Clutch lever holder clamp bolt:
10 N·m (1.0 kgf-m, 7.3 lb-ft)**

- Adjust the throttle cable play. (🔧 2-14)



STEERING CONSTRUCTION



①	Handlebar set bolt cap	⑥	Steering stem upper bearing	©	Front fork upper clamp bolt
②	Handlebar clamp/holder	⑦	Steering stem lower bearing	Ⓓ	Handlebar holder nut
③	Steering stem upper bracket	⑧	Steering stem	Ⓔ	Front fork lower clamp bolt
④	Steering stem nut	Ⓐ	Handlebar set bolt		
⑤	Dust seal	Ⓑ	Steering stem head nut		



ITEM	N·m	kgf·m	lb·ft
Ⓐ	23	2.3	16.5
Ⓑ	90	9.0	65.5
©	23	2.3	16.5

ITEM	N·m	kgf·m	lb·ft
Ⓓ	54	5.4	39.0
Ⓔ	33	3.3	24.0

REMOVAL AND DISASSEMBLY

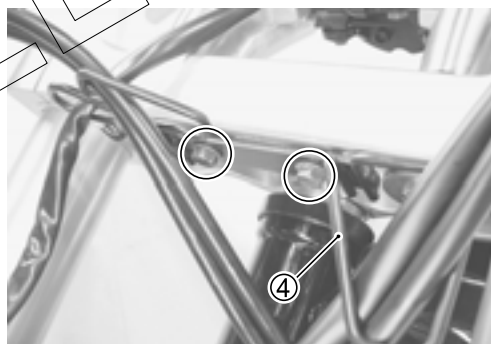
- Remove the front forks. (☞ 8-13)
- Remove the brake hose union bolt ①. (☞ 8-57)
- Disconnect the clamps.
- Remove the handlebar. (☞ 8-22)



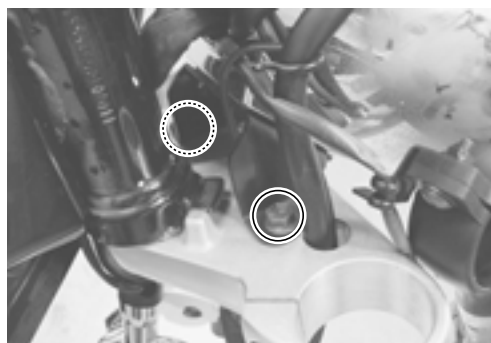
- Remove the steering stem head nut ② and washer.
- Remove the steering stem upper bracket ③.



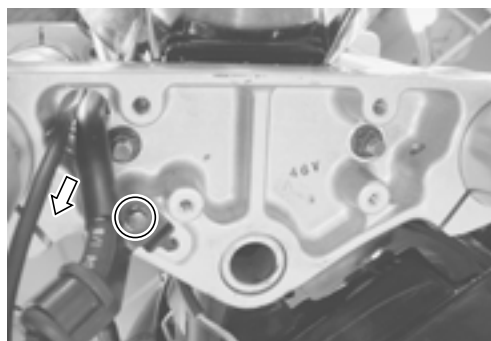
- Remove the speed sensor lead wire coupler. (☞ 9-31)
- Remove the cable guide ④.



- Remove the headlight mounting bolts.



- Remove the brake hose guide.
- Remove the brake hose and speed sensor lead wire.



SAMPLE

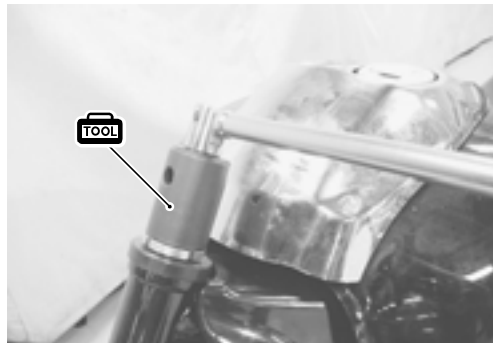
- Remove the steering stem nut with the special tool.

 **09940-14911: Steering stem nut wrench**

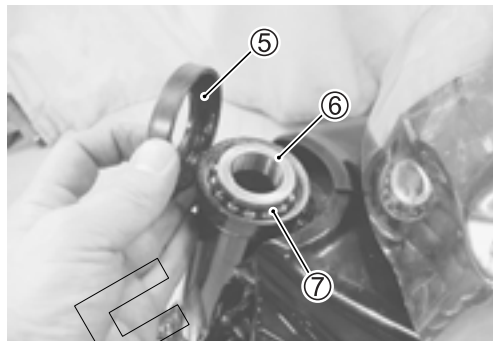
- Remove the steering stem lower bracket.

NOTE:

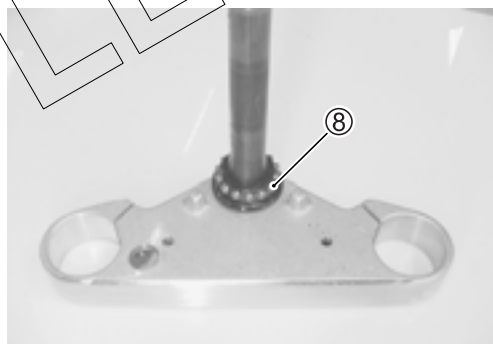
Hold the steering stem lower bracket to prevent it from falling.



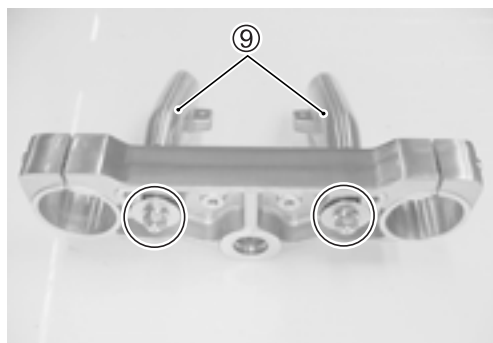
- Remove the dust seal ⑤, steering stem upper bearing inner race ⑥ and bearing ⑦.



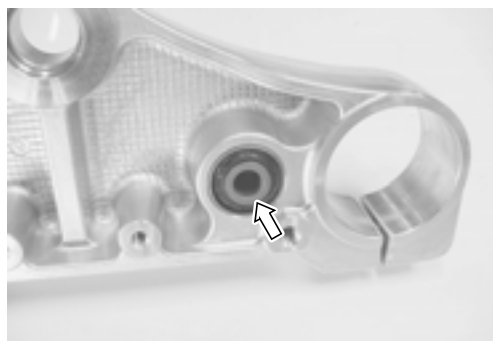
- Remove the steering stem lower bearing ⑧.



- Remove the handlebar holders ⑨ from the steering stem upper bracket.



- Remove the handlebar bushes with the proper tool.



SAMPLE

INSPECTION AND DISASSEMBLY

Inspect the removed parts for the following abnormalities.

- * Handlebars distortion
- * Race wear and brinelling
- * Bearing wear or damage
- * Abnormal noise of bearing

If any abnormal points are found, replace defective parts with the new ones.

- Remove the steering stem lower bearing inner race with a chisel.

CAUTION

The removed bearing outer race must be replaced with a new one.

- Drive out the steering stem bearing outer races (upper and lower) using the steel rod.

CAUTION

The removed bearing outer race must be replaced with a new one.

REASSEMBLY AND REMOUNTING

Reassemble and remount the steering stem in the reverse order of removal and disassembly. Pay attention to the following points:

OUTER RACE

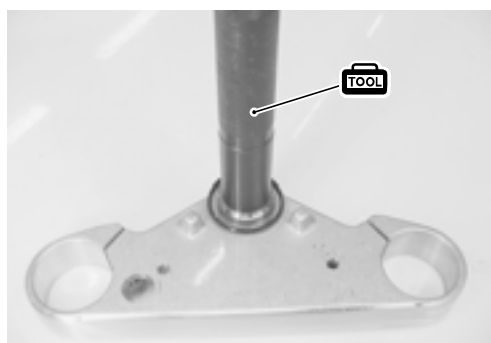
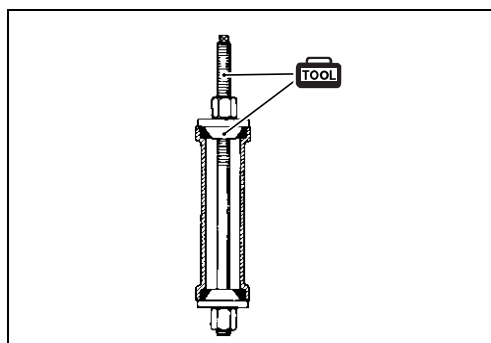
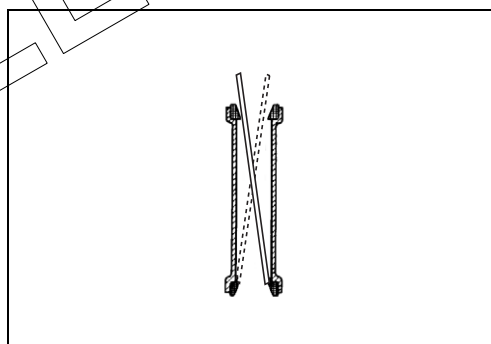
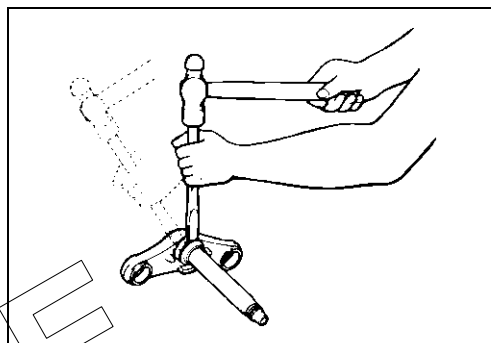
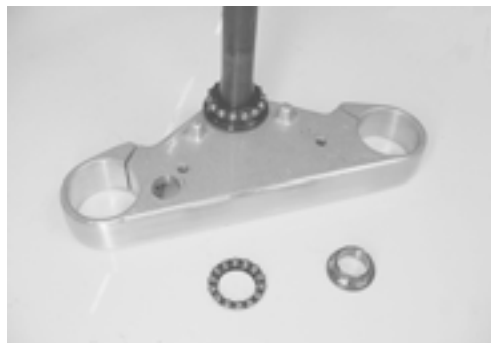
- Press in the upper and lower bearing outer races with the special tools.

 **09941-34513: Steering outer race installer set**

INNER RACE

- Press in the lower bearing inner race with the special tool.

 **09941-74911: Steering bearing installer**



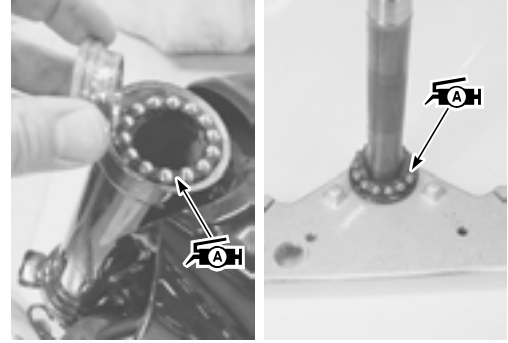
SAMPLE

BEARING

- Apply SUZUKI SUPER GREASE "A" to the bearings and bearing races.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

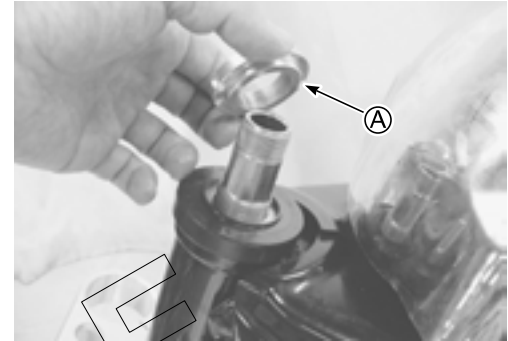
- Install the lower bearing to the steering stem lower bracket.
- Install the upper bearing and bearing inner race.

**STEERING STEM NUT**

- Install the dust seal.
- Install the steering stem.
- Install the steering stem nut as shown.

NOTE:

The flange side  of the steering stem must face down.



- Tighten the steering stem nut to the specified torque with the special tool.

 **09940-14911: Steering stem nut wrench**

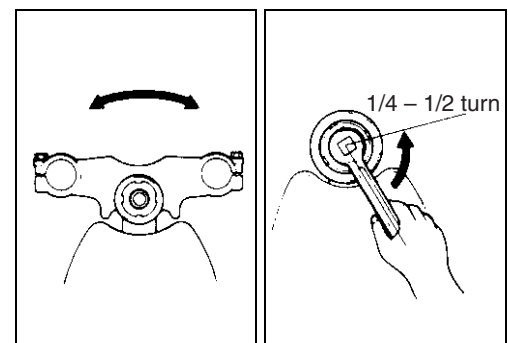
 **Steering stem nut: 45 N·m (4.5 kgf·m, 32.5 lb·ft)**



- Turn the steering stem lower bracket about five or six times to the left and right so that the angular ball bearings will be seated properly.
- Loosen the stem nut by 1/4 – 1/2 turn.

NOTE:

This adjustment will vary from motorcycle to motorcycle.

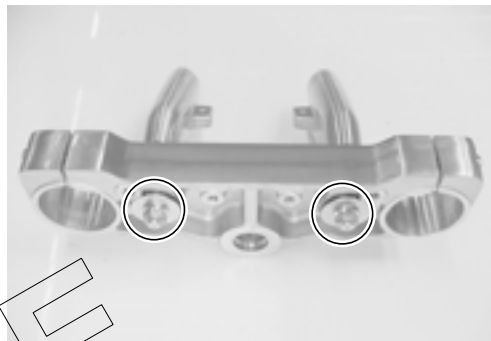
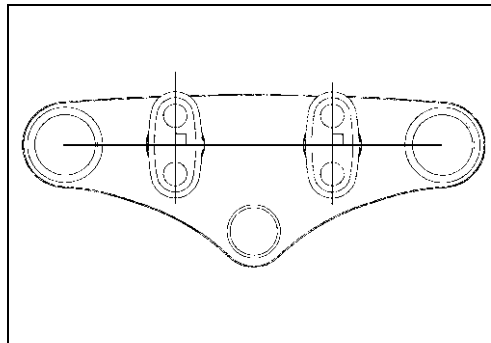


SAMPLE

HANDLEBAR HOLDER

- Install the handlebar holders and related parts to the steering stem head.
- Tighten the handlebar holder nuts to the specified torque.

🔩 Handlebar holder nut: 54 N·m (5.4 kgf-m, 39.0 lb-ft)

**FRONT FORK AND STEERING STEM UPPER BRACKET**

- Install the steering stem upper bracket, washer and steering stem head nut.
- Install the front forks. (👉 8-20)
- Tighten the steering stem head nut ① to the specified torque.

🔩 Steering stem head nut ①: 90 N·m (9.0 kgf-m, 65.0 lb-ft)

**NOTE:**

Rout the brake hose, throttle cables and handlebar switch lead wires, before installing the front forks. (👉 10-15, -18 and -21)

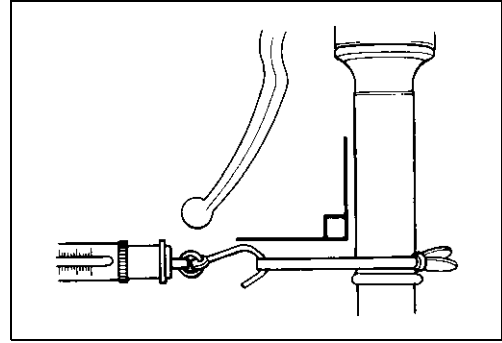
- Speed sensor lead wire routing. (👉 10-22)
- Install the handlebar. (👉 8-22 to -23)
- Install the front wheel. (👉 8-10 to -11)

SAMPLE

STEERING TENSION ADJUSTMENT

Check the steering movement in the following procedure.

- By supporting the motorcycle with a jack, lift the front wheel until it is off the floor by 20 – 30 mm (0.8 – 1.2 in).
- Check to make sure that the cables and wire harnesses are properly routed.
- With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving. Do the same on the other grip end.



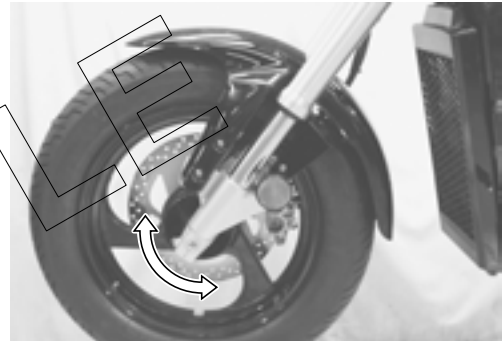
DATA Initial force: 200 – 500 grams

TOOL 09940-92720: Spring scale

- If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.
- 1) First, loosen the front fork upper clamp bolts, handlebar clamp bolts, steering stem head nut and steering stem lock-nut, and then adjust the steering stem nut by loosening or tightening it.
 - 2) Tighten the steering stem lock-nut, stem head nut, handlebar clamp bolts and front fork upper clamp bolts to the specified torque and re-check the initial force with the spring scale according to the previously described procedure.
 - 3) If the initial force is found within the specified range, adjustment has been completed.

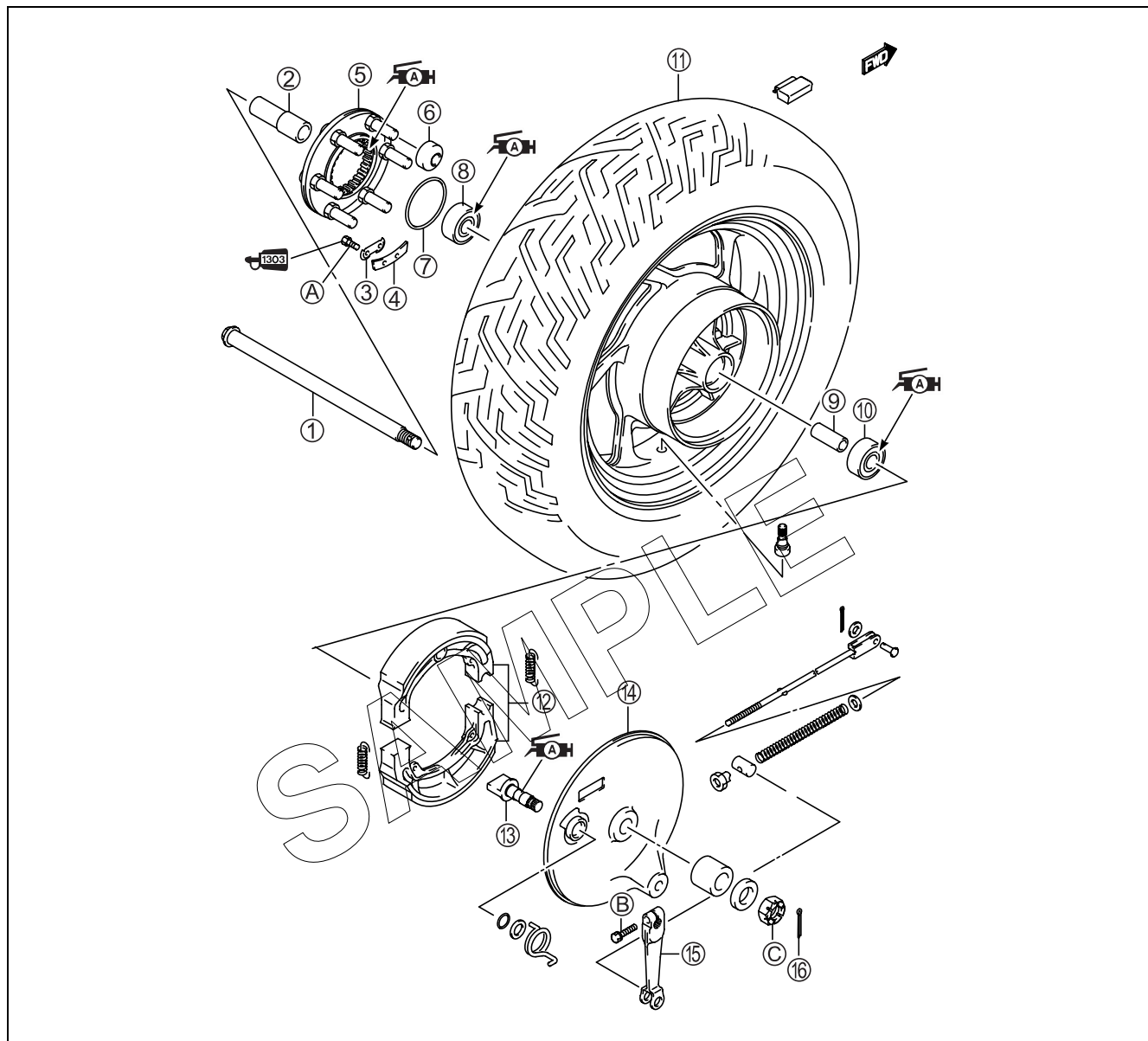
NOTE:

Hold the front fork legs, move them back and forth and make sure that the steering is not loose.



SAMPLE

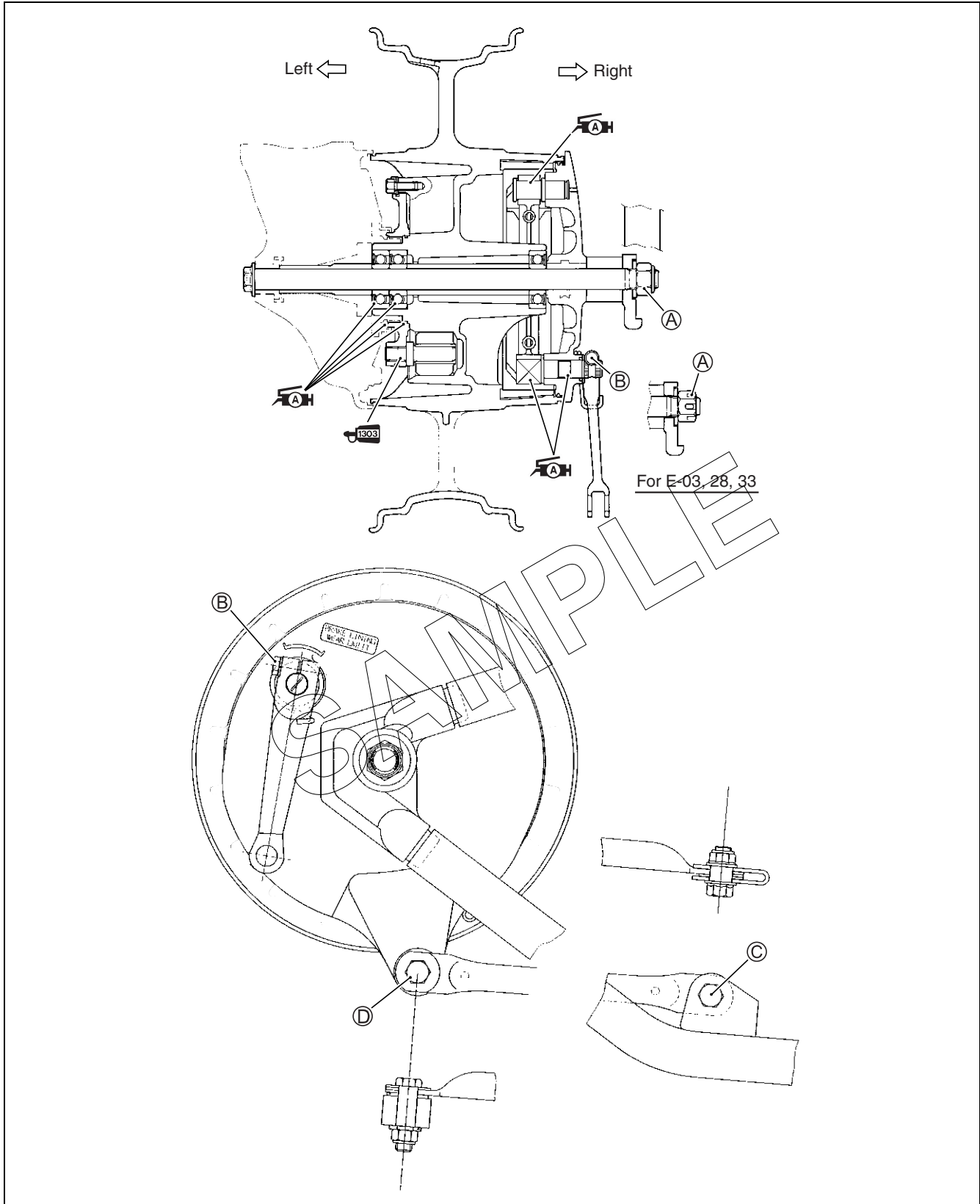
REAR WHEEL CONSTRUCTION



①	Rear axle	⑧	Bearing (LH)	⑮	Brake cam lever
②	Spacer (LH)	⑨	Spacer (RH)	⑯	Cotter pin (For E-03, 28, 33)
③	Lock washer	⑩	Bearing (RH)	Ⓐ	Driven joint stopper bolt
④	Driven joint stopper	⑪	Rear wheel	Ⓑ	Rear brake cam lever bolt
⑤	Driven joint	⑫	Brake shoe	Ⓒ	Rear axle nut
⑥	Damper	⑬	Brake camshaft		
⑦	O-ring	⑭	Brake panel		



ITEM	N·m	kgf·m	lb·ft
Ⓐ	10	1.0	7.0
Ⓑ	10	1.0	7.0
Ⓒ	65	6.5	47.0



(A)	Rear axle nut
(B)	Brake cam lever nut
(C)	Rear torque link nut (F)
(D)	Rear torque link nut (R)

ITEM	N·m	kgf·m	lb·ft
(A)	65	6.5	47.0
(B)	10	1.0	7.0

ITEM	N·m	kgf·m	lb·ft
(C)	35	3.5	25.5
(D)	25	2.5	18.0

REMOVAL

- Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.
- Remove the rear brake rod ①.
- Remove the torque link rod ②.



- Remove the left frame cover. (☞ 8-3)
- Remove the left frame lower cover ③.

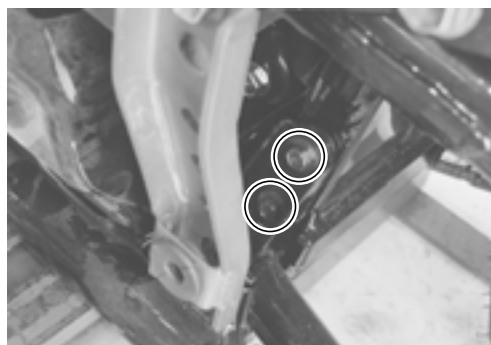


☆: Hooked part

- Remove the rear swingarm left cover mounting bolts.



- Remove the rear swingarm left cover.



SAMPLE

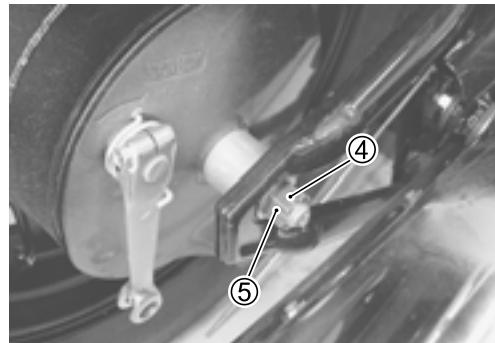
- Remove the cotter pin ④. (For E-03, 28, 33)
- Remove the axle nut ⑤ and draw out the rear axle.

NOTE:

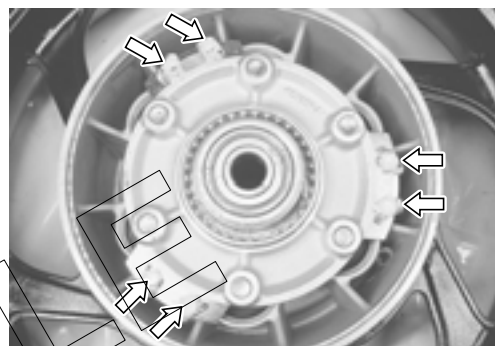
The rear fender removal is not necessary when the rear part of motorcycle can be lifted high enough to take the rear wheel out smoothly.

CAUTION

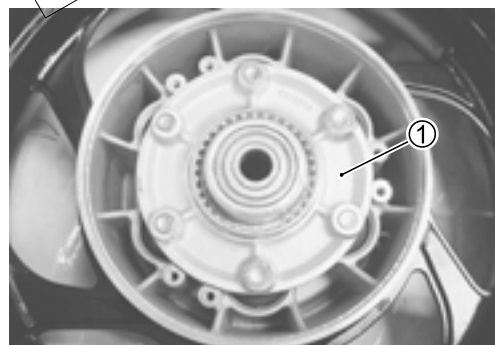
Do not operate the brake pedal while removing the rear wheel.

**DISASSEMBLY**

- Flatten the lock washers.
- Remove the fitting bolts, washers and plates.



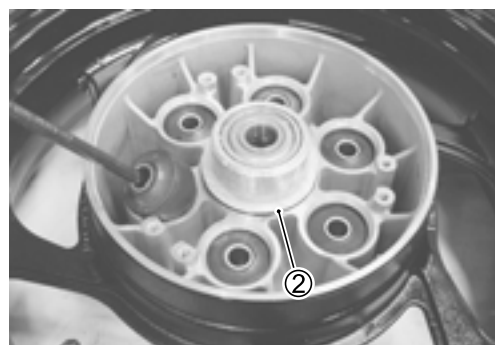
- Pull off the driven joint ①.



- Remove the O-ring ②.
- Remove the dampers with a screw driver.

CAUTION

The removed O-ring must be replaced with a new one.



SAMPLE

INSPECTION AND DISASSEMBLY

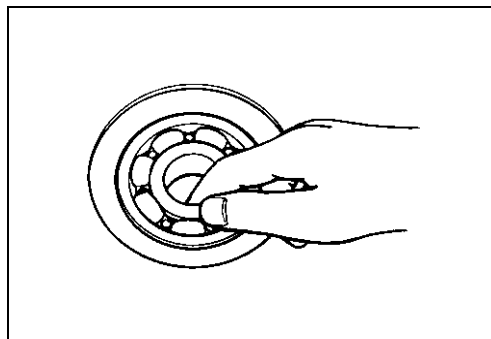
WHEEL (🔧 8-66)

TIRE (🔧 2-23 and 8-66)

WHEEL BEARINGS

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation.

Replace the bearing in the following procedure if there is anything unusual.



- Remove the wheel bearings by with the special tool.

TOOL 09921-20240: Bearing remover set (17 mm)

CAUTION

The removed bearings should be replaced with new ones.



REAR AXLE

Using a dial gauge, check the rear axle for runout. If the runout exceeds the limit, replace the rear axle.

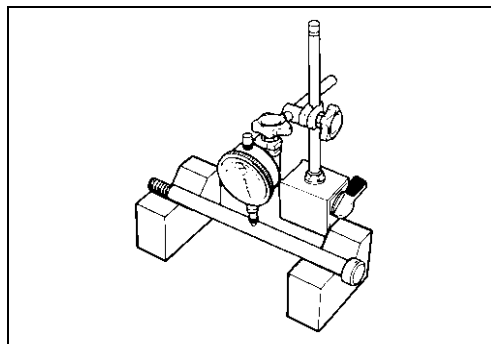
DATA Axle shaft runout

Service Limit: 0.25 mm (0.010 in)

TOOL 09900-20607: Dial gauge (1/100 mm)

09900-20701: Magnetic stand

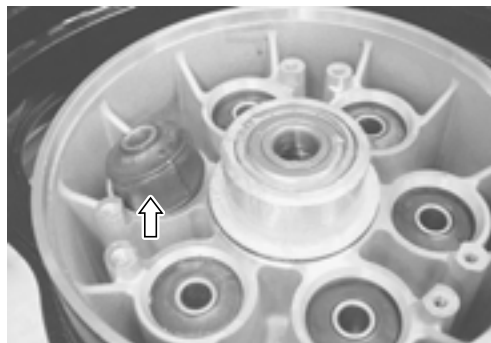
09900-21304: V-block set (100 mm)



WHEEL DAMPER

Inspect the dampers for wear and damage.

Replace the dampers if there is anything unusual.



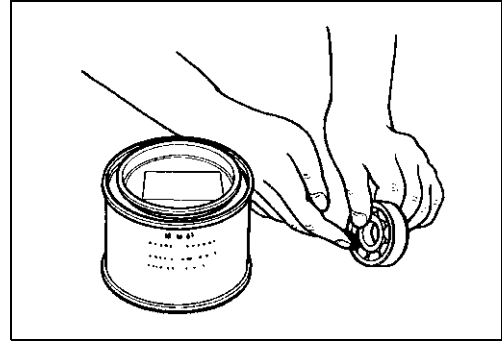
REASSEMBLY AND REMOUNTING

Reassemble and remount the rear wheel in the reverse order of removal and disassembly. Pay attention to the following points:

WHEEL BEARING

- Apply grease to the bearings before installation.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

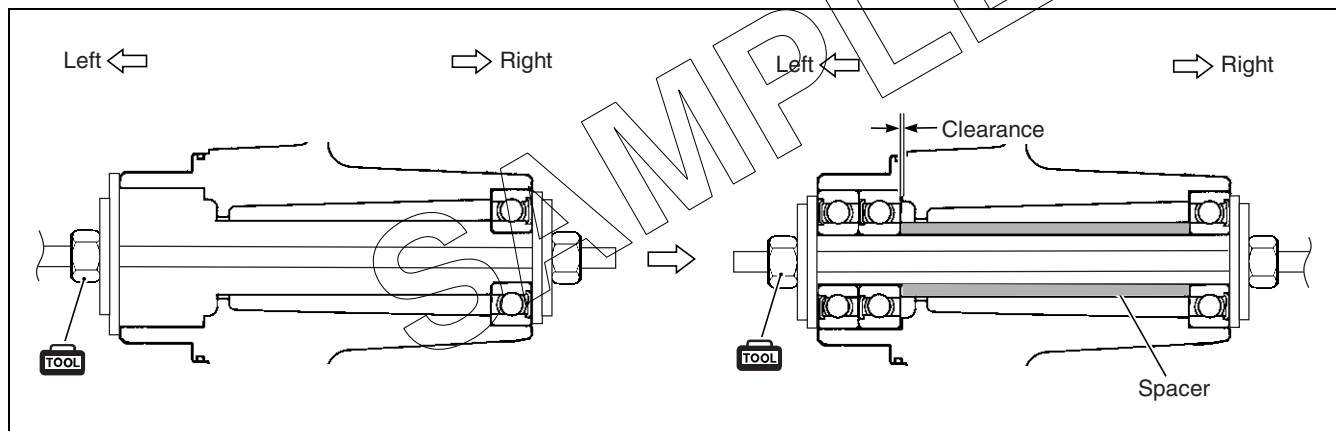
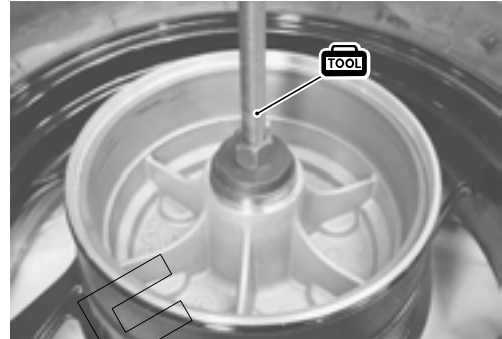


- Install the wheel bearings with the special tool.

 **09941-34513: Bearing installer set**

CAUTION

- * First, install the right wheel bearing, then install the left wheel bearings.
- * The sealed cover on the bearing must face out.



WHEEL DAMPER

- Install the dampers.

NOTE:

If soap water is applied around the damper, it makes the job easier.



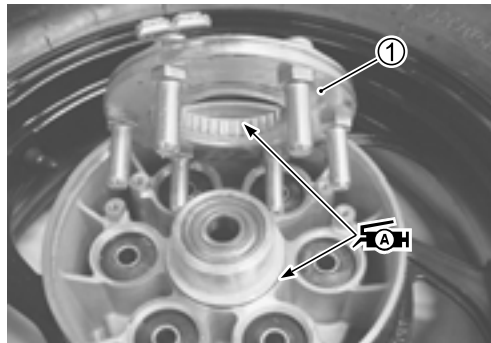
DRIVEN JOINT

- Install the driven joint ①.

NOTE:

Apply grease to the O-ring and the final gear spline before installing the driven joint.

-  **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)



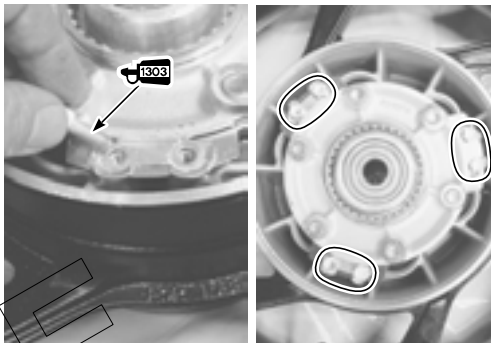
- Apply THREAD LOCK SUPER to the thread of driven joint stopper bolts.

-  **99000-32030: THREAD LOCK SUPER "1303"**

- Tighten the driven joint stopper bolts to the specified torque.

-  **Driven joint stopper bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)**

- Bend up the washer to lock the bolts.

**REAR WHEEL**

- Install the spacer ①.
- Apply grease to the final gear spline before installing the rear wheel.


-  **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

- Remount the rear wheel spacer and rear axle.
- Install the washer and rear axle nut.

NOTE:

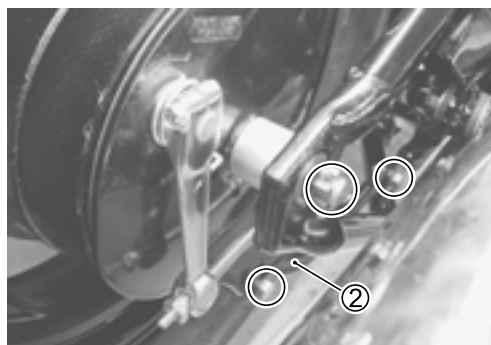
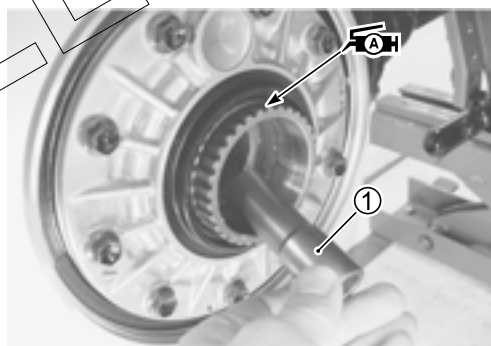
Refer to the page 8-31 for the spacer positioning.

- Install the torque link rod ②.
- Tighten the rear axle nut and torque link bolts and nuts to the specified torque.

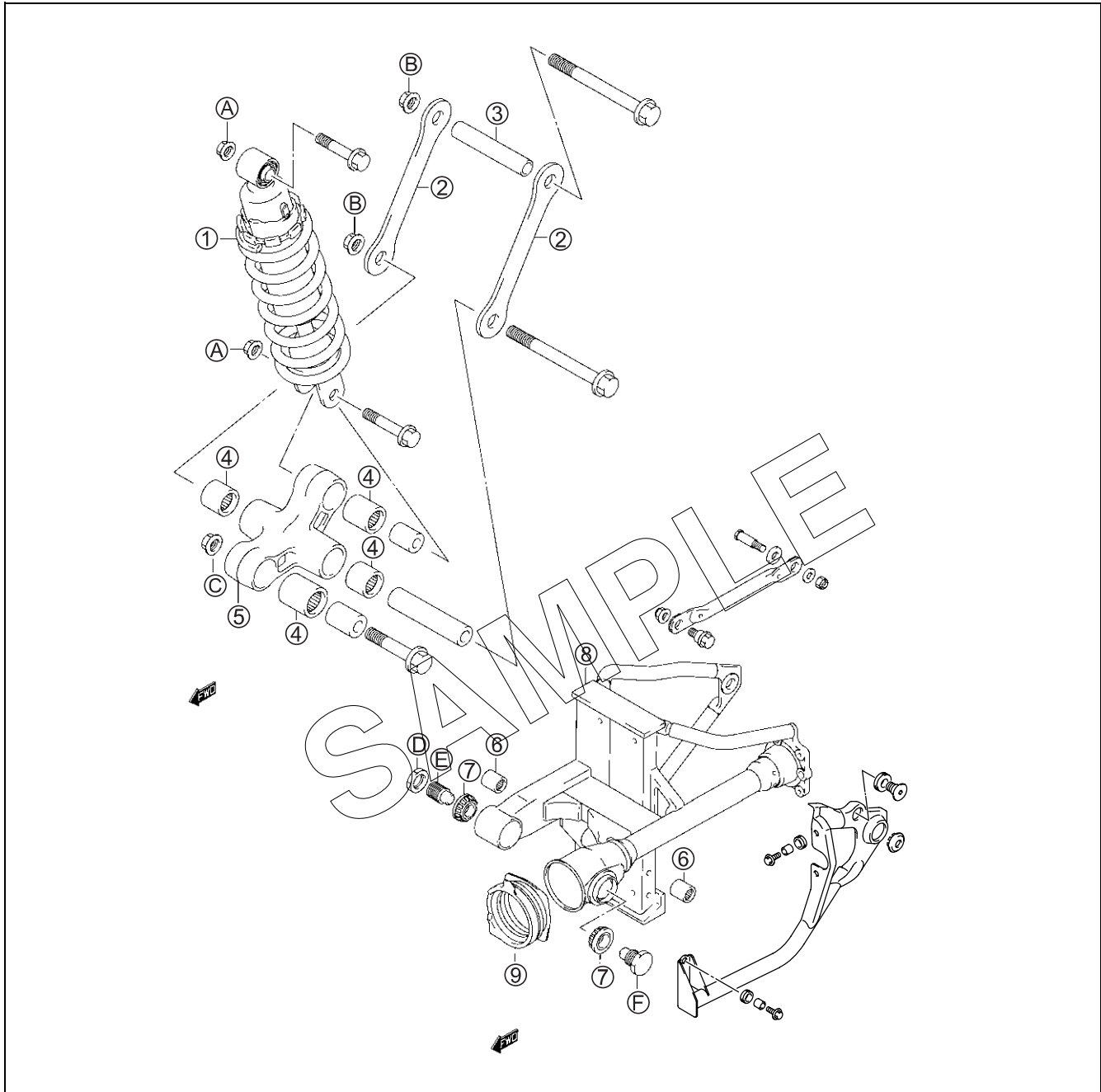
-  **Rear axle nut: 65 N·m (6.5 kgf-m, 47 lb-ft)**
Torque link nut (Front): 35 N·m (3.5 kgf-m, 25.5 lb-ft)
(Rear) : 25 N·m (2.5 kgf-m, 18.0 lb-ft)

NOTE:

After remounting the rear wheel, check for proper brake operation. (☞ 2-21)



REAR SUSPENSION CONSTRUCTION



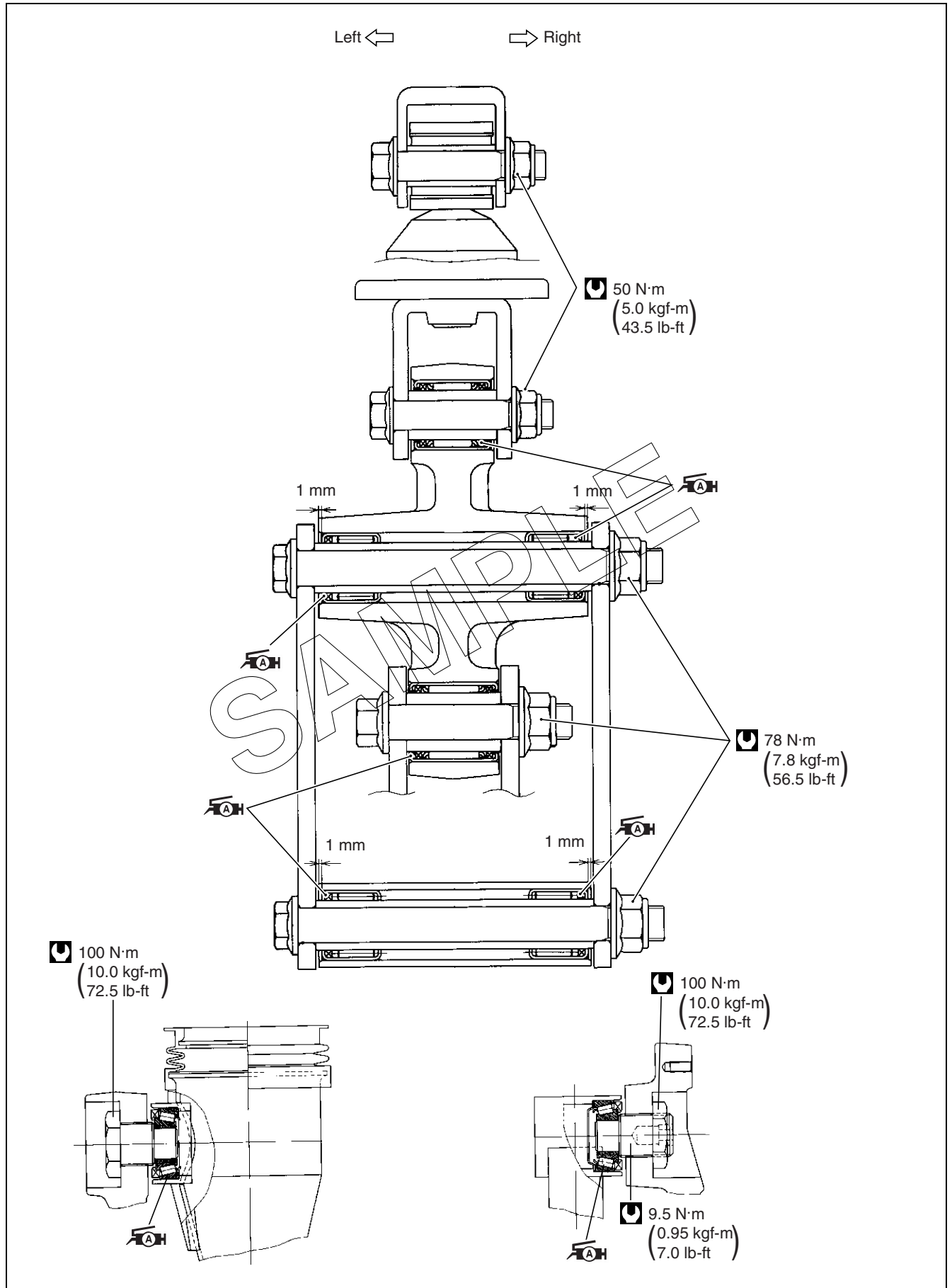
①	Rear shock absorber	⑥	Swingarm pivot bearing	ⓑ	Rear cushion rod mounting nut
②	Rear cushion rod	⑦	Swingarm bearing	ⓒ	Rear cushion lever mounting nut
③	Spacer	⑧	Swingarm	ⓓ	Rear swingarm pivot bolt lock nut
④	Rear cushion lever bearing	⑨	Boot	ⓔ	Rear swingarm pivot bolt (Right)
⑤	Rear cushion lever	Ⓐ	Rear shock absorber mounting nut	ⓕ	Rear swingarm pivot bolt (Left)



ITEM	N·m	kgf·m	lb·ft
Ⓐ	50	5.0	36.0
ⓑ	78	7.8	56.5

ITEM	N·m	kgf·m	lb·ft
ⓒ	78	7.8	56.5
ⓓ	100	10.0	72.5

ITEM	N·m	kgf·m	lb·ft
ⓔ	9.5	0.95	7.0
ⓕ	100	10.0	72.5

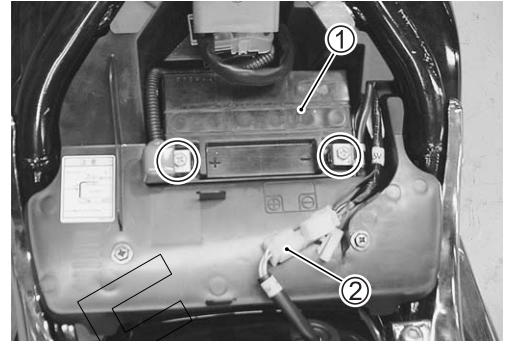


REMOVAL

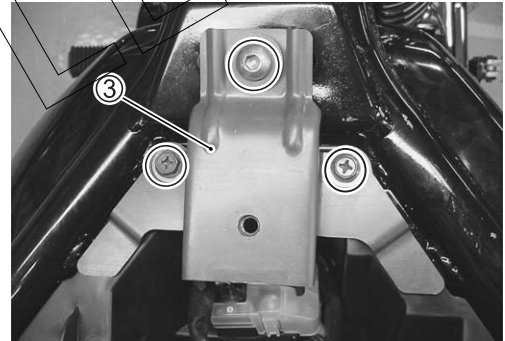
- Remove the rear wheel. (☞ 8-33)
- Remove the final gear case with propeller shaft.



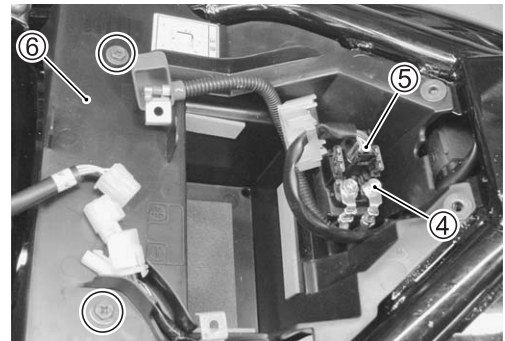
- Remove the fuel tank. (☞ 6-3)
- Remove the battery ① and disconnect the coupler ②.



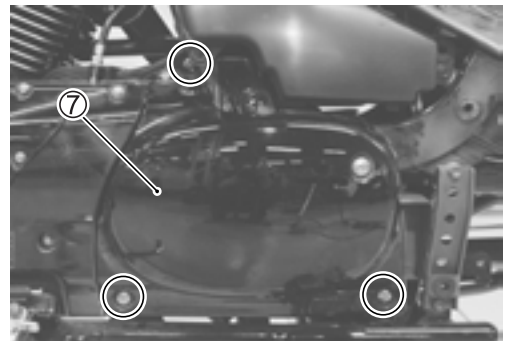
- Remove the set mounting bracket ③.



- Disconnect the starter motor lead wire ④ and starter relay coupler ⑤.
- Remove the battery case ⑥.

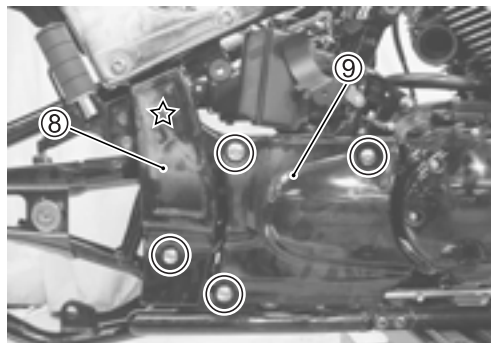


- Remove the frame covers (L & R). (☞ 8-3 to -4)
- Remove the exhaust pipes and mufflers. (☞ 3-6)
- Remove the secondary gear case cover ⑦.



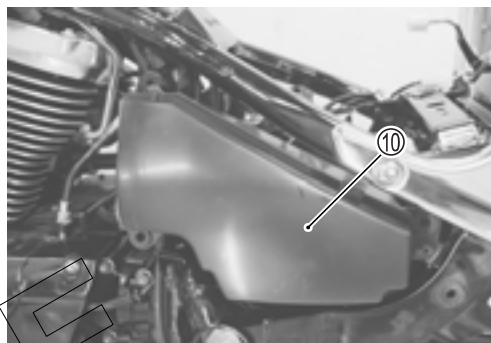
SAMPLE

- Remove the right frame lower cover ⑧, clutch rear cover ⑨.

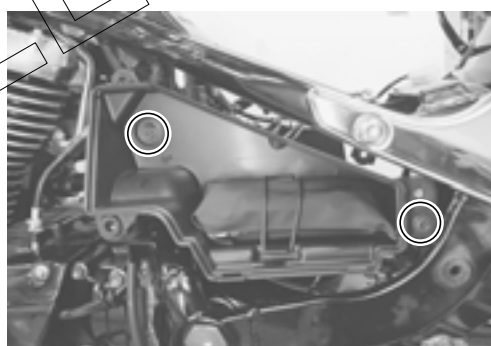


☆: Hooked part

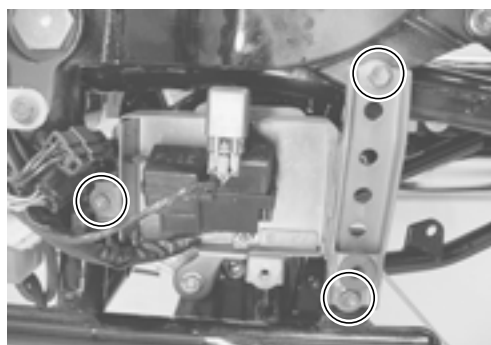
- Remove the tool box cover ⑩.



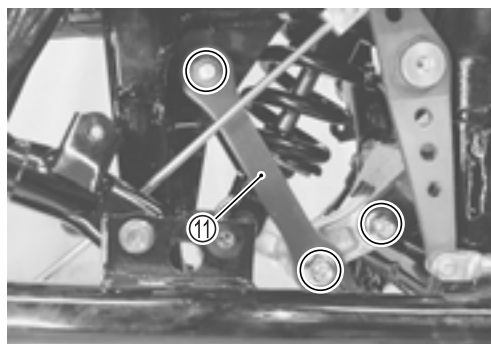
- Remove the tool box.



- Remove the fuse box and relay stay.



- Remove the cushion lever mounting bolt and nut and cushion rods ⑪ (L & R).



SAMPLE

- Remove the shock absorber ⑫.

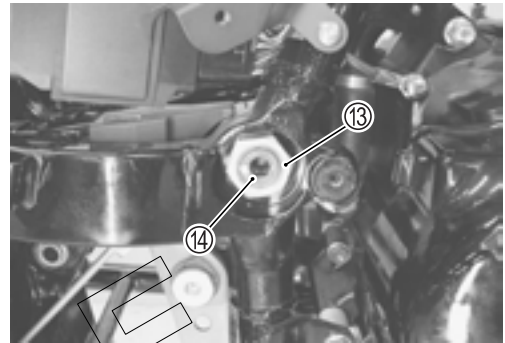


- Remove the right side swingarm pivot bolt lock nut ⑬.
- Remove the left and right side swingarm pivot bolts ⑭.

NOTE:

Slightly loosen the cushion rod mounting nuts and the shock absorber lower mounting nut before removing the swingarm to facilitate later disassembly.

- Remove the rear suspension assembly.



- Remove the tapered roller bearings.



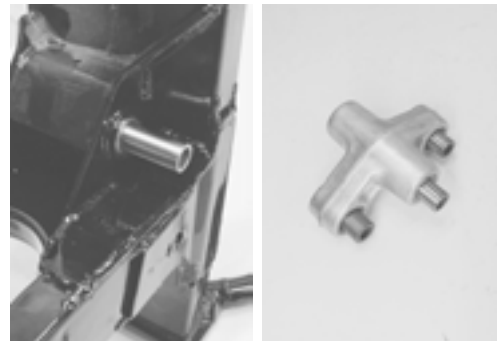
- Remove the cushion lever.



SAMPLE

INSPECTION AND DISASSEMBLY SPACER

- Remove spacer from swingarm.
- Remove the spacers from the cushion lever.
- Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.



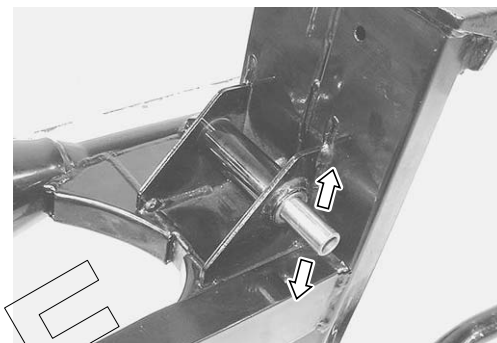
SWINGARM BEARING

Insert the spacer into swingarm cushion rod upper side bearing and check the play to move the spacer up and down.

If excessive play is noted, replace the bearing with a new one.

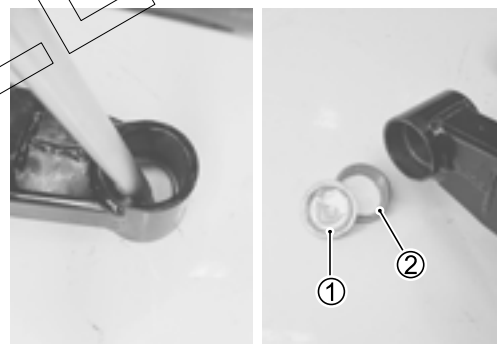
Inspect the swingarm pivot bearing, its race and dust seal for wear or damage. If any defects are found, replace the bearing with a new one.

- Remove the swingarm pivot right side bearing plate ① and bearing races ② by using a suitable bar and so on.



NOTE:

The swingarm pivot right side bearing and its plate are available as one component.

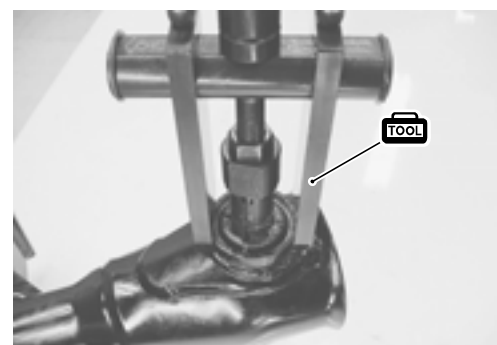


- Remove the swingarm pivot bearing races by with the special tool.

TOOL 09921-20240: Bearing remover set (30 mm)

CAUTION

The removed bearings must be replaced with new ones.

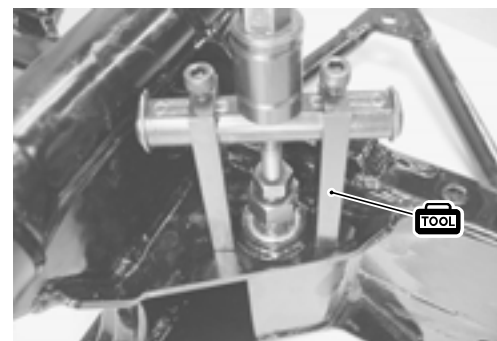


- Remove the swingarm cushion rod upper side bearings by with the special tool.

TOOL 09921-20240: Bearing remover set (17 mm)

CAUTION

The removed bearings must be replaced with new ones.



SAMPLE

CUSHION LEVER BEARING

Insert the spacer into bearing and check the play to move the spacer up and down. If an excessive play is noted, replace the bearing with a new ones.

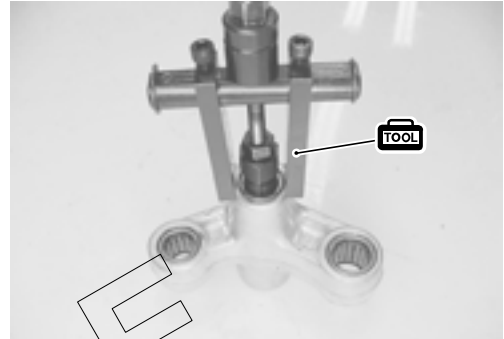


- Remove the cushion rod lower side bearings by with the special tool.

TOOL 09921-20240: Bearing remover set (17 mm)

CAUTION

The removed bearings must be replaced with new ones.

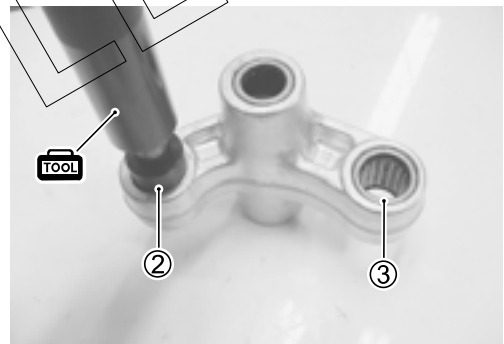


- Remove the cushion lever mounting bearing ② and shock absorber lower side bearing ③ by using the special tool.

TOOL 09913-70210: Bearing installer set

CAUTION

The removed bearings must be replaced with new ones.

**SHOCK ABSORBER**

Inspect the shock absorber body and bush for damage and oil leakage. If any defects are found, replace the shock absorber with a new one.

CAUTION

Do not attempt to disassemble the rear shock absorber unit. It is unserviceable.



SAMPLE

REASSEMBLY

Reassemble the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points:

SWINGARM BEARING

- Install the swingarm pivot bearing races by with the special tool.

 **09913-70210: Bearing installer set (40 mm)**

NOTE:

The swingarm pivot bearing race with plate is positioned right side.

- Install the swingarm cushion rod upper side bearings with the special tool. (👉 8-39)

 **09924-84510: Bearing installer set**

NOTE:

When reinstalling the bearings, stamped mark of bearing must face outside.

CUSHION LEVER BEARING

- Install the bearings into the cushion lever by with the special tool. (👉 8-39)

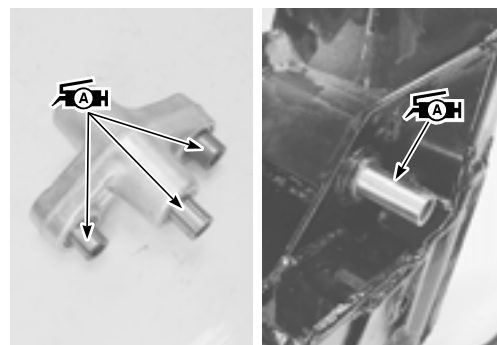
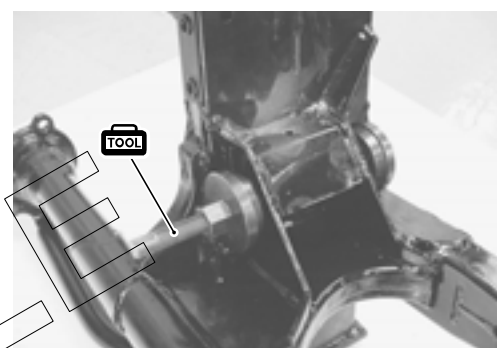
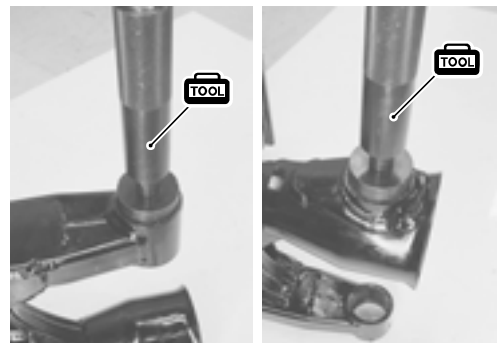
 **09924-84521: Bearing installer**

NOTE:

When installing the bearings, stamped mark of bearing must face outside.

- Apply grease to the spacers and bearings.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)



SAMPLE

- Tighten the cushion lever to the specified torque.

Shock absorber mounting nut:

50 N·m (5.0 kgf-m, 36.0 lb-ft)



REMOUNTING

Remount the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points.

SWINGARM

- Before installing the swingarm, install the boot and the universal joint.

NOTE:

Make sure that the "UP" mark  on the boot faces up.

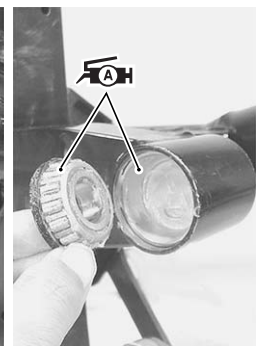
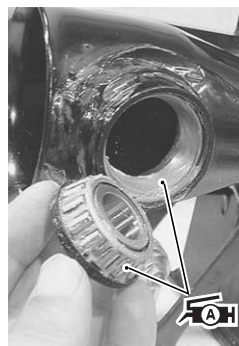
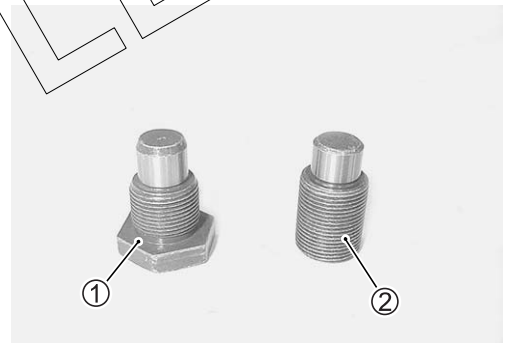
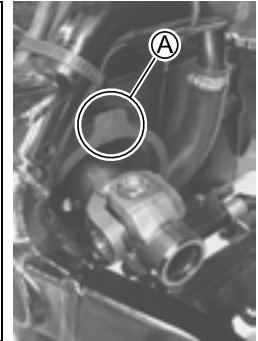
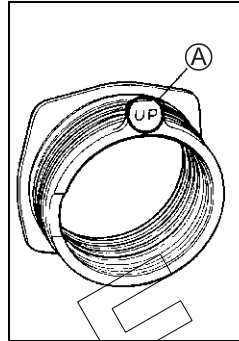
- Install the swingarm assembly, its pivot bearings and bolts (1, 2).

NOTE:

Apply grease to the swingarm pivot bearings.

 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)

- ①: For left side swingarm pivot bolt
 ②: For right side swingarm pivot bolt



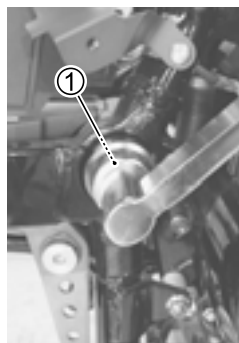
- Tighten the left side swingarm pivot bolt ① to the specified torque.

Swingarm pivot bolt (left side):

100 N·m (10.0 kgf-m, 72.5 lb-ft)

NOTE:

Before tightening the left side swingarm pivot bolt ①, loosen the right side one ②.



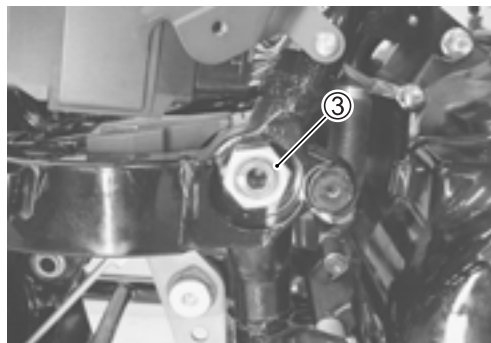
- Tighten the right side swingarm pivot bolt ② to the specified torque.

🔧 Swingarm pivot bolt (right side):

9.5 N·m (0.95 kgf-m, 7.0 lb-ft)

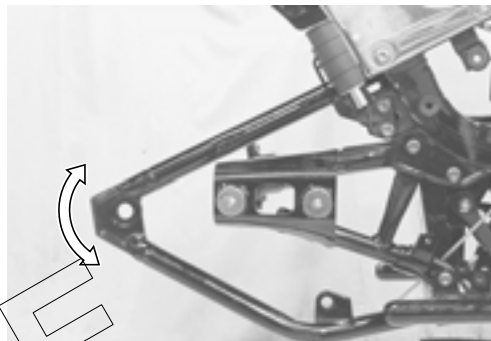
- Tighten the swingarm pivot lock nut ③ to the specified torque.

🔧 Swingarm pivot lock nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)



NOTE:

After tightening the swingarm pivot lock nut, be sure to check the swingarm operation.



SHOCK ABSORBER AND CUSHION LEVER

- Assemble the shock absorber and cushion rods onto the swingarm. (👉 8-39)
- Tighten the shock absorber upper mounting nut ① to the specified torque.

🔧 Shock absorber mounting nut:

50 N·m (5.0 kgf-m, 36.0 lb-ft)



- Tighten the cushion rod nuts ② to the specified torque.

🔧 Cushion rod mounting nut: 78 N·m (7.8 kgf-m, 56.5 lb-ft)

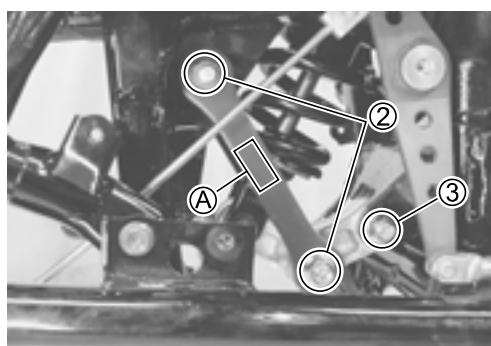
NOTE:

The stamped marks (A) on the cushion rod should be face outside.

- Tighten the cushion lever mounting nut ③ to the specified torque.

🔧 Cushion lever mounting nut:

78 N·m (7.8 kgf-m, 56.5 lb-ft)



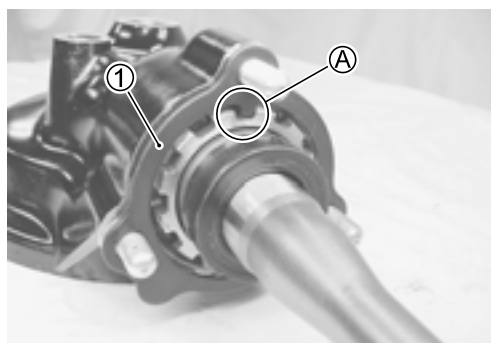
FINAL GEAR CASE

- Install the plate to the final gear case ①. Apply SUZUKI BOND to the mating surface of swingarm and final gear case.

🔧 99000-31140: SUZUKI BOND "1207B"

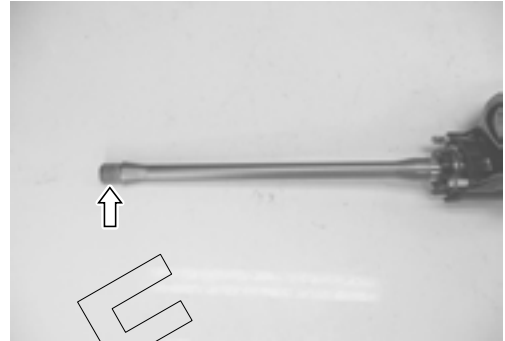
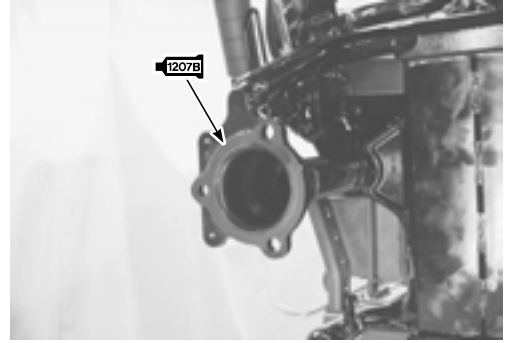
CAUTION

When installing the plate ①, align the lug (A) of the plate ① to the bearing retainer groove.

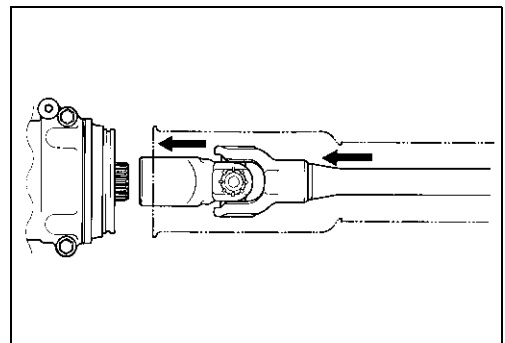
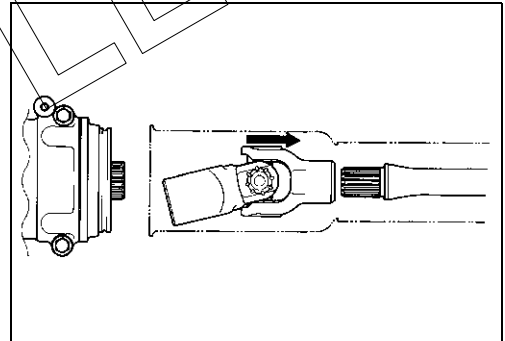


SAMPLE

- Apply Lithium Base Molybdenum grease (NLGI #2) to the propeller shaft spline.

**NOTE:**

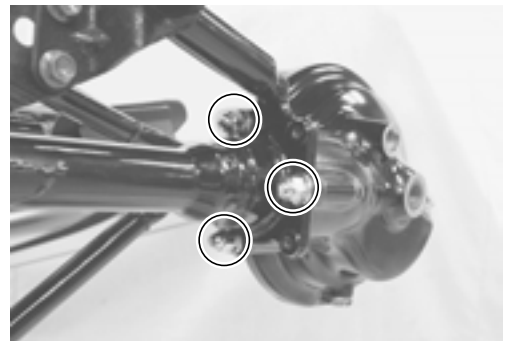
To install the final gear case easily, move the dust boot front and the universal joint back. Engage the universal joint to the propeller shaft first and then engage it to the secondary driven bevel gear shaft.



- Tighten the final gear case mounting nuts to the specified torque.

🔧 Final gear case nut: 40 N·m (4.0 kgf-m, 29.0 lb-ft)

- Install the rear wheel. (👉 8-37)
- Install the exhaust pipes and mufflers. (👉 3-10)



SAMPLE

REAR SHOCK ABSORBER DISPOSAL

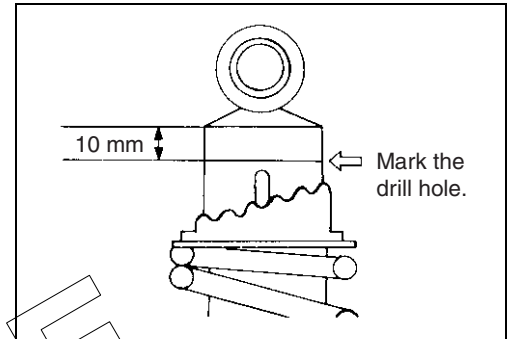
⚠ WARNING

The rear shock unit contains high-pressure nitrogen gas. Mishandling can cause explosion.

- * Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- * Release gas pressure before disposing.

GAS PRESSURE RELEASE

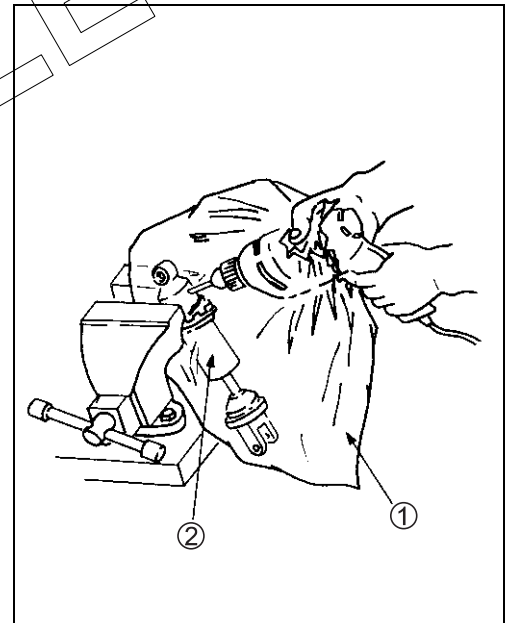
- Mark the drill hole with a center punch.



- Cover the rear shock absorber with a transparent plastic bag ①.
- Hold the rear shock absorber ② with a vice.
- Mark a hole with a 3 mm drill.

⚠ WARNING

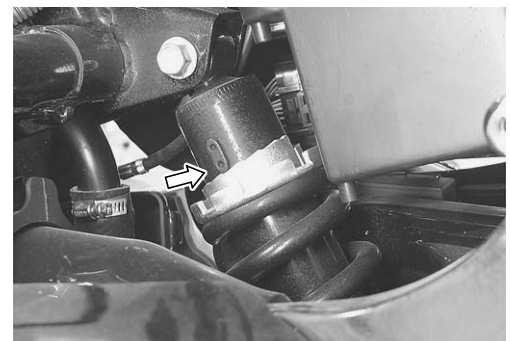
Wear eye protection to protect your eyes from released gas and metal chips.



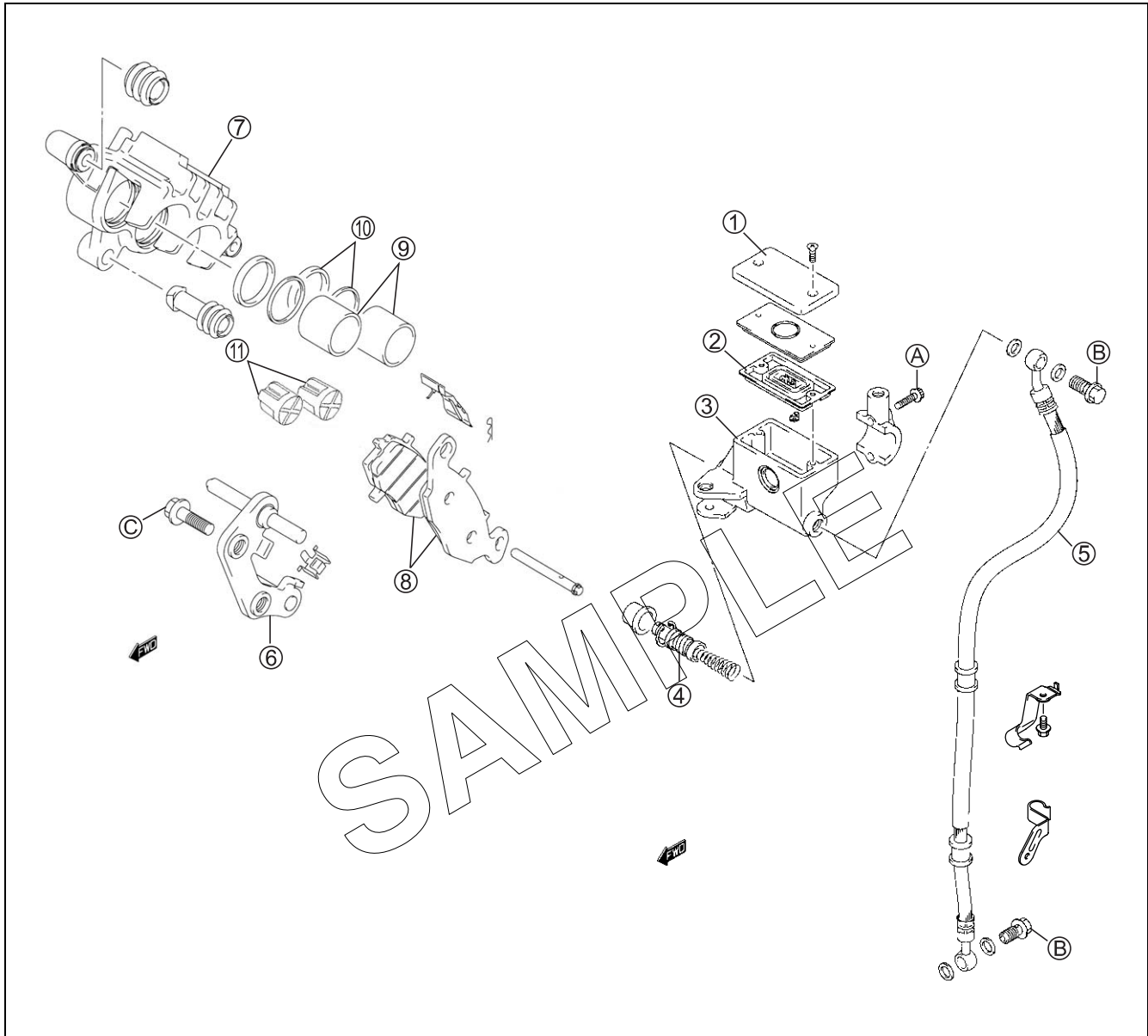
SUSPENSION SETTING

After installing the rear suspension, adjust the spring pre-load as follows.

Spring pre-load adjuster	3rd
--------------------------	-----



FRONT BRAKE CONSTRUCTION



①	Cap	⑥	Caliper holder	⑪	Insulator
②	Diaphragm	⑦	Caliper	A	Master cylinder mounting bolt
③	Master cylinder	⑧	Pad set	B	Brake hose union bolt
④	Piston set	⑨	Piston	C	Brake caliper mounting bolt
⑤	Brake hose	⑩	Piston and dust seal		



ITEM	N·m	kgf·m	lb·ft
A	10	1.0	7.0
B	23	2.3	16.5
C	39	3.9	28

⚠ WARNING

- * The brake system is filled with an glycol-based brake fluid, which is classified DOT 4. Do not use or mix other types of brake fluid, such as silicone-based and petroleum-based brake fluids when refilling the brake system, otherwise serious damage to the brake system will result.
- * Do not use any brake fluid taken from old, used, or unsealed containers.
- * Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
- * When storing brake fluid, be sure to seal the container completely and keep it out of the reach of children.
- * When replenishing brake fluid, be sure not to get any dust or other foreign materials in the fluid.
- * When washing brake components, always use new brake fluid. Do not use cleaning solvent.
- * A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the brake disc with high-quality brake cleaner or a neutral detergent.

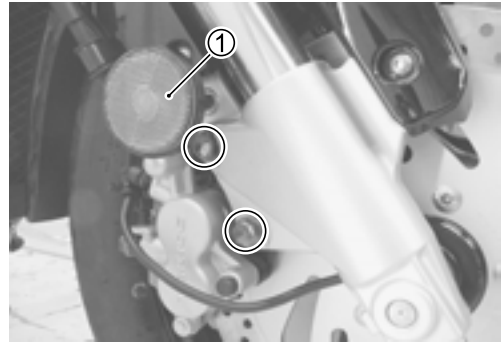
CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber material, etc.

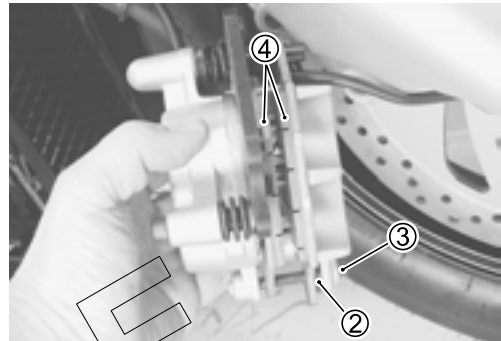
SAMPLE

BRAKE PAD REPLACEMENT

- Remove the reflex reflector ①. (For E-03, 28, 33)
- Remove the brake caliper by removing the brake caliper mounting bolts.



- Remove the pin ②.
- Remove the pad pin ③.
- Remove the brake pads ④.



CAUTION

- * Do not operate the brake lever during or after brake pad removal.
- * Replace the brake pads as a set, otherwise braking performance will be adversely affected.

- Install the new brake pads.



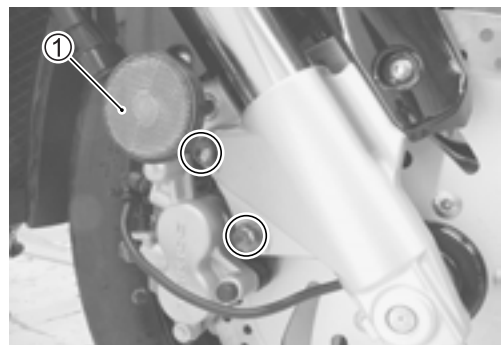
- Tighten the brake caliper mounting bolts to the specified torque.

🔧 Brake caliper mounting bolts: 39 N·m (3.9 kgf-m, 28 lb-ft)

- Install the reflex reflector ①. (For E-03, 28, 33)

NOTE:

After replacing the brake pads, pump the brake lever a few times to check for proper brake operation and then check the brake fluid level.



SAMPLE

BRAKE FLUID REPLACEMENT

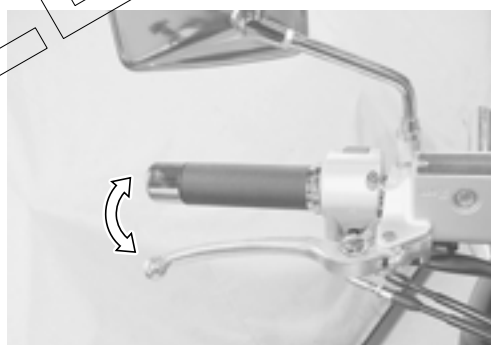
- Place the motorcycle on a level surface and keep the handlebar straight.
- Remove the master cylinder reservoir cap and diaphragm.
- Remove as much old brake fluid as possible.
- Fill the reservoir with new brake fluid.

 **Specification and classification: DOT 4**

- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.

CAUTION

Bleed air from the brake system. (👉 2-22)

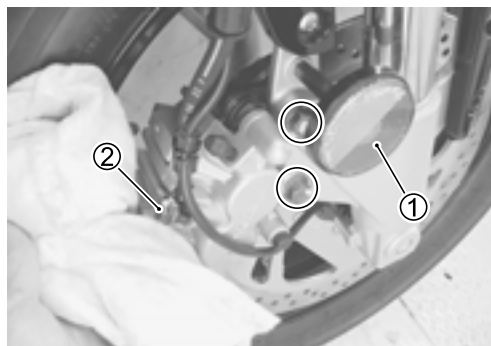


BRAKE CALIPER REMOVAL AND DISASSEMBLY

- Remove the reflex reflector ①. (For E-03, 28, 33)
- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt ② and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts.

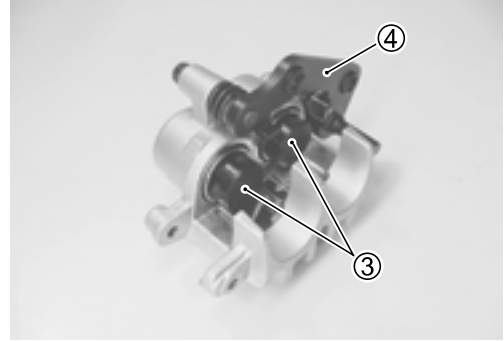
⚠ WARNING

- * Do not reuse the brake fluid left over from the last servicing or which has been stored for a long period of time, otherwise serious damage to the brake system will result.
- * Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and oil leakage.

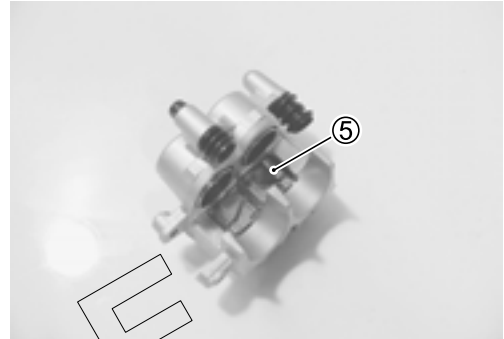


SAMPLE

- Remove the brake pads. (☞ 8-52)
- Remove the insulator ③.
- Remove the brake caliper holder ④.



- Remove the spring ⑤.



- Place a rag over the brake caliper pistons to prevent them from popping out, and then force out the pistons using compressed air.

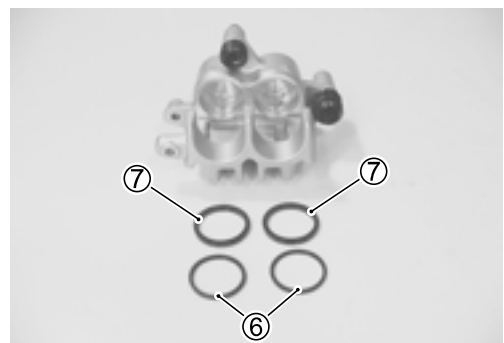
**CAUTION**

Do not use extremely high pressure to remove the brake caliper pistons, otherwise damage to the pistons will result.

- Remove the dust seals ⑥ and piston seals ⑦.

CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.

**BRAKE CALIPER INSPECTION****BRAKE CALIPER**

Inspect each brake caliper cylinder wall for nicks, scratches or other damage. If any damages are found, replace the brake caliper with a new one.

BRAKE CALIPER PISTONS

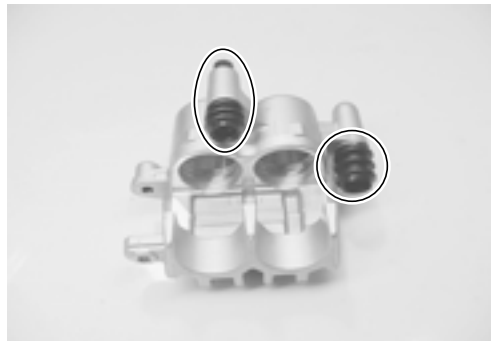
Inspect the brake caliper pistons for any scratches or other damage. If any damages are found, replace the piston with a new one.



SAMPLE

RUBBER PARTS

Replace the removed rubber parts with new ones.



BRAKE CALIPER REASSEMBLY AND REMOUNTING

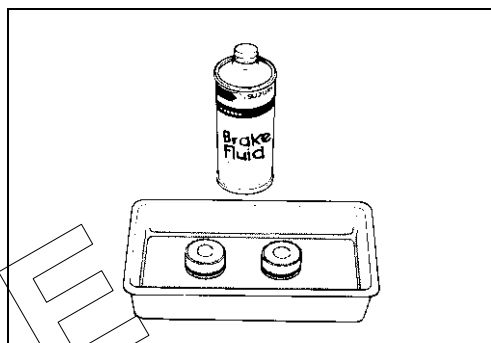
Reassemble and remount the brake caliper in the reverse order of removal and disassembly. Pay special attention to the following points:

- Wash the caliper bores and pistons with the specified brake fluid. Thoroughly wash the dust seal grooves and piston seal grooves.

 **Specification and classification: DOT 4**

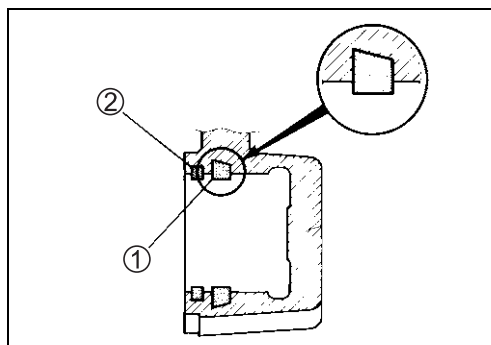
CAUTION

- * Wash the brake caliper components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Replace the removed piston seals and dust seals with new ones.
- * Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.



PISTON SEALS

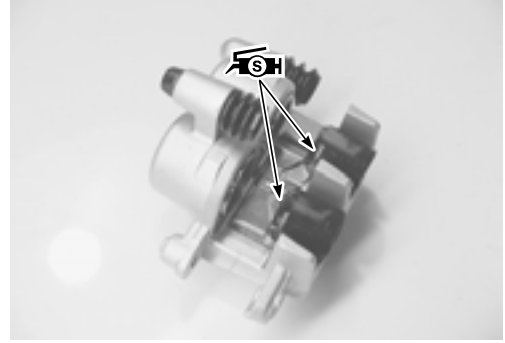
- Install the piston seals ① and dust seals ② as shown.



INSULATORS

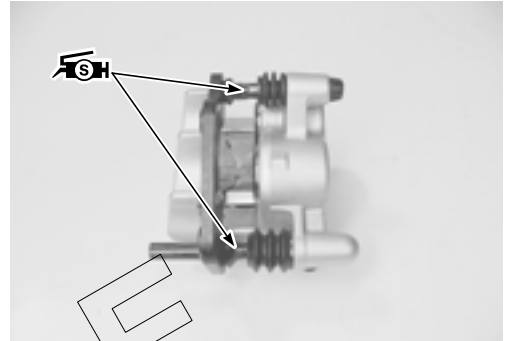
- Apply SUZUKI SILICONE GREASE to the insulators.

 99000-25100: SUZUKI SILICONE GREASE

**BRAKE CALIPER HOLDER**

- Apply SUZUKI SILICONE GREASE to the brake caliper holder.

 99000-25100: SUZUKI SILICONE GREASE



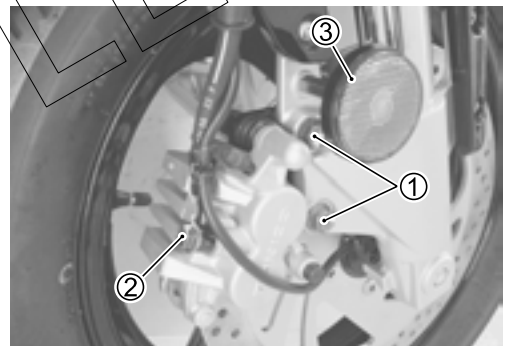
- Tighten the brake caliper mounting bolts ①, and brake hose union bolt ② to the specified torque.

 **Brake caliper mounting bolt: 39 N·m (3.9 kgf-m, 28 lb-ft)**
Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- For assembly procedure of brake hose: (☞ 10-21)
- Install the reflex reflector ③. (For E-03, 28; 33)

NOTE:

Before remounting the brake caliper, push the brake caliper pistons all the way into the caliper.

**CAUTION**

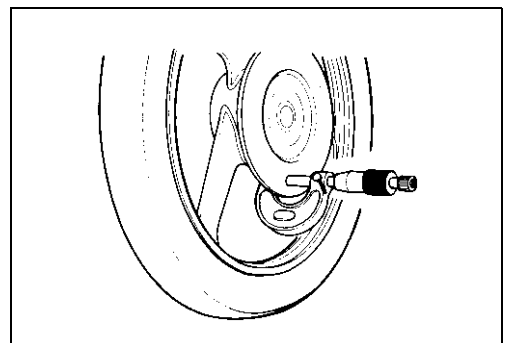
Bleed air from the system after reassembling the brake caliper. (☞ 2-22)

BRAKE DISC INSPECTION

Check the brake disc for cracks or damage and measure the thickness using the micrometer. If any damages are found or if the thickness is less than the service limit, replace the brake disc with a new one.

 **09900-20205: Micrometer (0 – 25 mm)**

 **Brake disc thickness**
Service Limit: 4.5 mm (0.098 in)

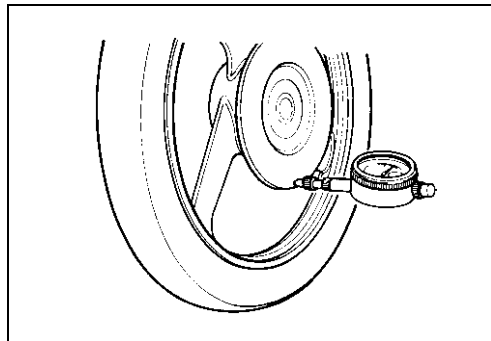


Measure the runout using the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

DATA Brake disc runout
Service Limit: 0.3 mm (0.012 in)

- If either measurement exceeds the service limit, replace the brake disc with a new one. (↔ 8-7 and -10)



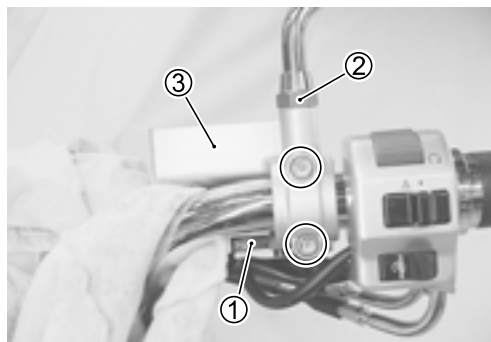
MASTER CYLINDER REMOVAL AND DISASSEMBLY

- Place a rag underneath the brake hose union bolt on the master cylinder to catch any spilt brake fluid. Remove the brake hose union bolt and disconnect the brake hose.

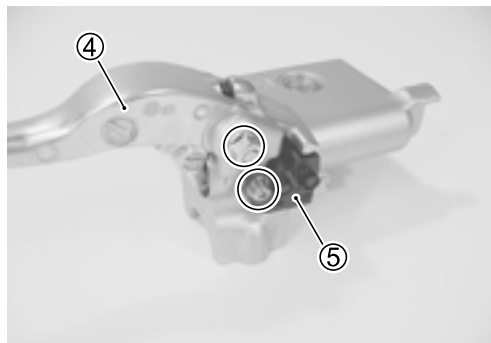
CAUTION

Immediately wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

- Disconnect the front brake light switch lead wire (1).
- Remove the right rear view mirror (2) and master cylinder assembly (3).

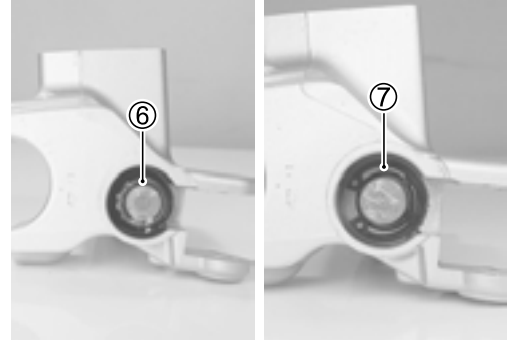


- Remove the brake lever (4) and front brake light switch (5).

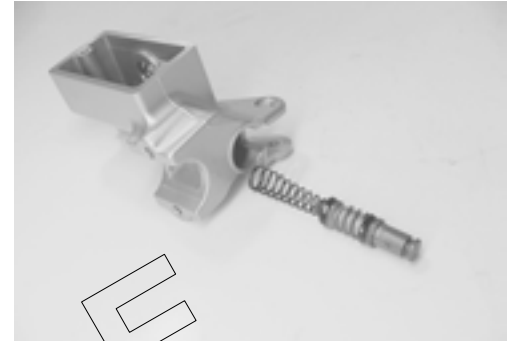


SAMPLE

- Pull the dust boot ⑥ out and remove the snap ring ⑦.



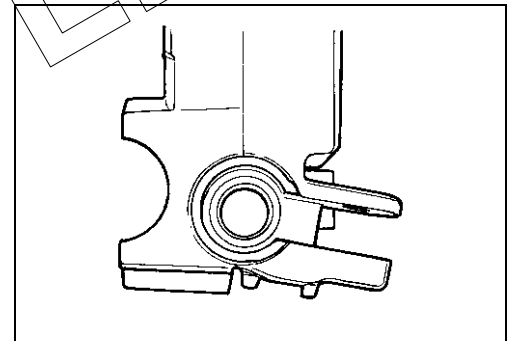
- Remove the piston assembly.



MASTER CYLINDER INSPECTION

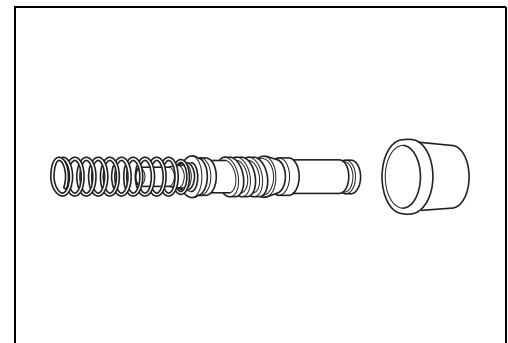
MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any damages are found, replace the master cylinder with a new one.



PISTON AND RUBBER PARTS

Inspect the piston surface, primary/secondary cup, and dust boot for any scratches, wear or damage. If any damages are found, replace the piston set with a new one.



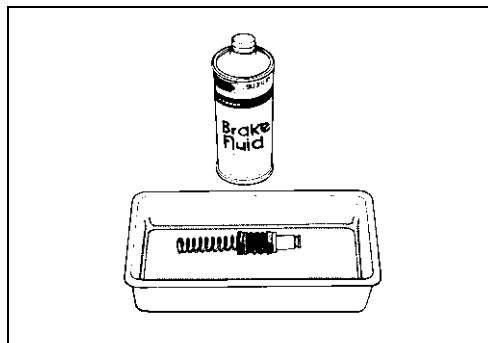
SAMPLE

MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly. Pay special attention to the following points:

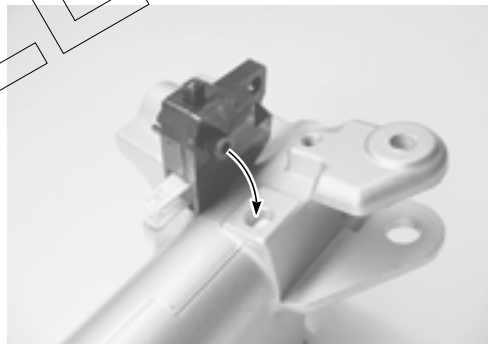
CAUTION

- * Wash the master cylinder components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Apply brake fluid to the master cylinder bore and all of the master cylinder components before reassembly.



Specification and classification: DOT 4

- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



- Apply SUZUKI SUPER GREASE "A" to the bolt.

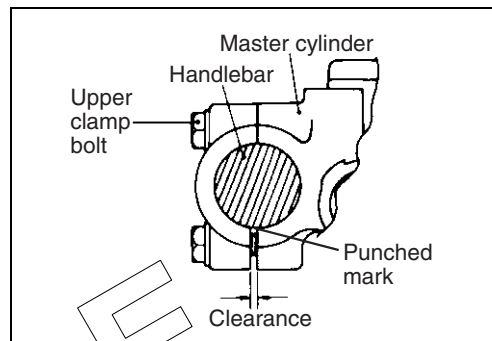
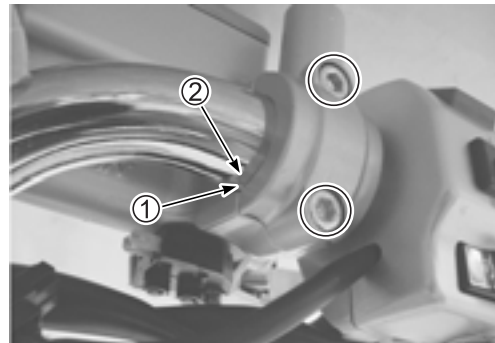
 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)




SAMPLE

- When remounting the master cylinder onto the handlebars, align the master cylinder holder's mating surface ① with the punch mark ② on the handlebars and tighten the upper clamp bolt first.

 **Master cylinder mount bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)**

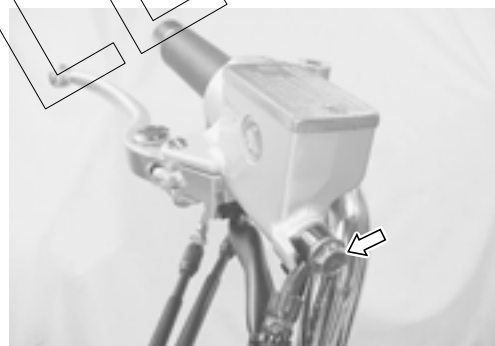


- Tighten the brake hose union bolt to the specified torque.
- For assembly procedure of brake hose. (☞ 10-21)

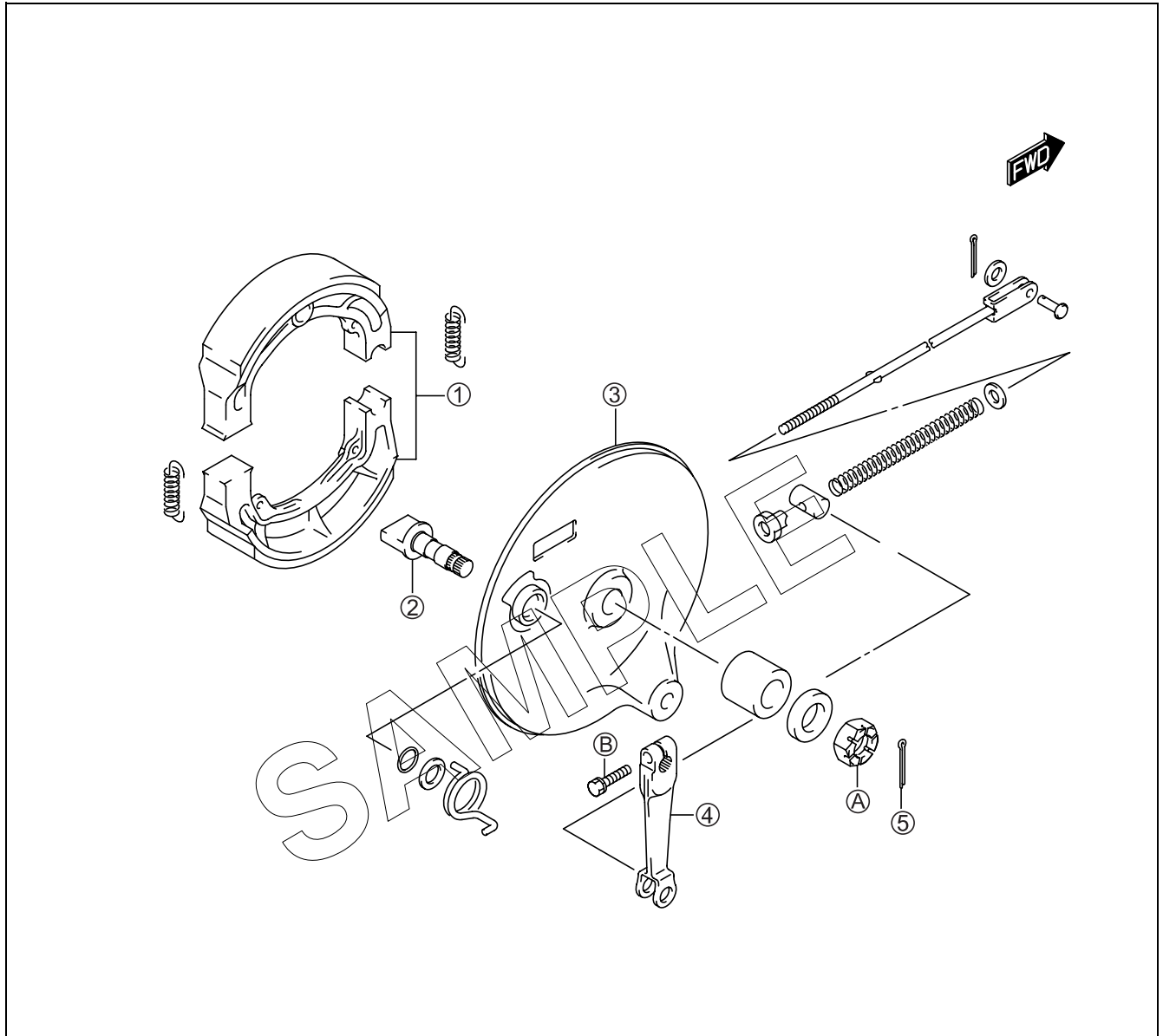
 **Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

CAUTION

Bleed air from the brake system after installing the master cylinder. (☞ 2-22)



REAR BRAKE CONSTRUCTION



①	Brake shoe
②	Brake camshaft
③	Brake panel
④	Brake cam lever
⑤	Cotter pin (For E-03, 28, 33)
Ⓐ	Rear axle nut
Ⓑ	Rear brake cam lever bolt



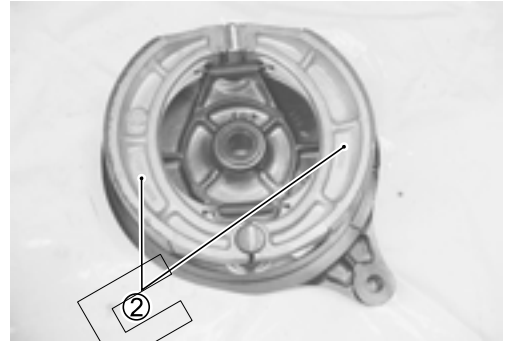
ITEM	N-m	kgf-m	lb-ft
Ⓐ	65	6.5	47.0
Ⓑ	10	1.0	7.0

REMOVAL AND DISASSEMBLY

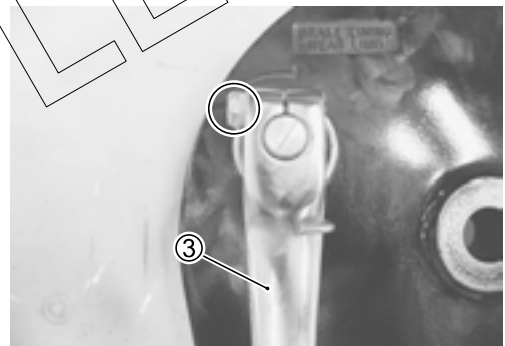
- Remove the rear wheel. (☞ 8-33)
- Remove the rear brake panel ①.



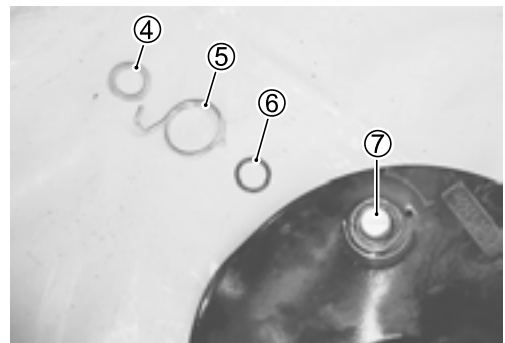
- Remove the brake shoes ②.



- Remove the rear brake cam lever ③ by removing bolt.



- Remove the washer ④, spring ⑤ and O-ring ⑥.
- Remove the rear brake cam ⑦.



INSPECTION

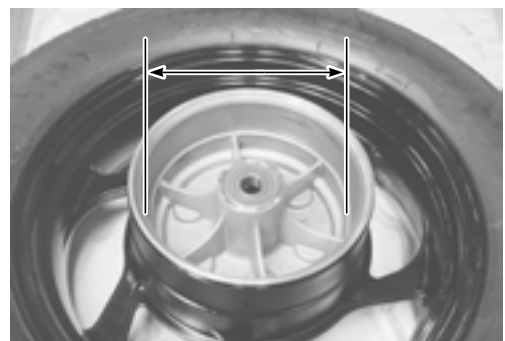
BRAKE DRUM

Inspect the brake drum and measure the brake drum I.D. to determine the extent of wear. Replace the brake drum if the measurement exceeds the service limit. The value of this limit is indicated inside the brake drum.

TOOL 09900-20102: Vernier calipers

DATA Brake drum I.D.

Service Limit: 180.7 mm



SAMPLE

BRAKE SHOES


Check the brake shoe wear (☞ 2-21) and decide whether it should be replaced or not.

CAUTION

Replace the brake shoes as a set, otherwise braking performance will be adversely affected.

REASSEMBLY AND REMOUNTING**BRAKE CAMSHAFT**

- When installing the brake camshaft, apply SUZUKI SUPER GREASE "A" to the camshaft and cam face.

 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

- Install the brake shoes with spring hooks faced inside.

CAUTION

Be careful not to apply too much grease to the cam and pin. If grease gets on the lining, brake slippage will result.

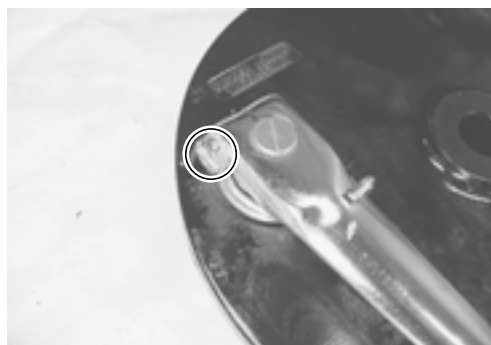
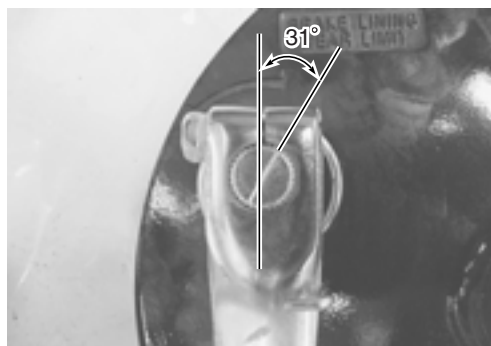
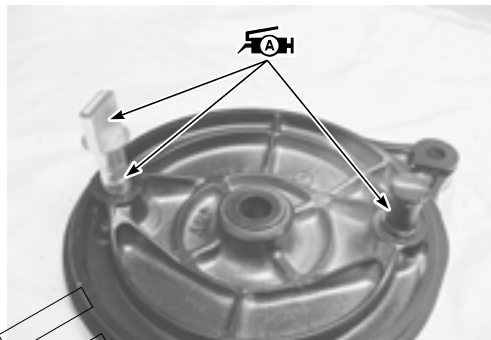
BRAKE CAM LEVER

- Install the new O-ring and washer.
- Install the brake cam lever to the brake camshaft as shown.

- Tighten the brake cam lever bolt to the specified torque.

 **Brake cam lever bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)**

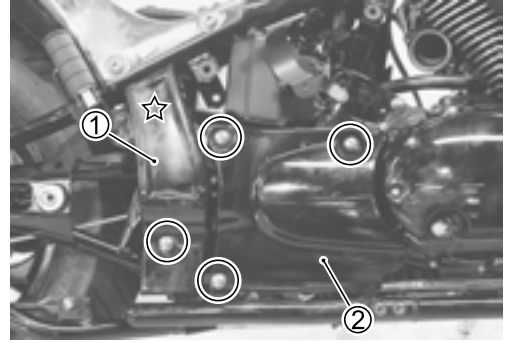
- Install the rear wheel. (☞ 8-37)
- Adjust the rear brake pedal free travel. (☞ 2-21)



SAMPLE

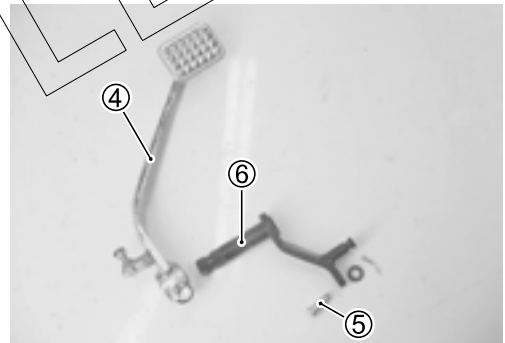
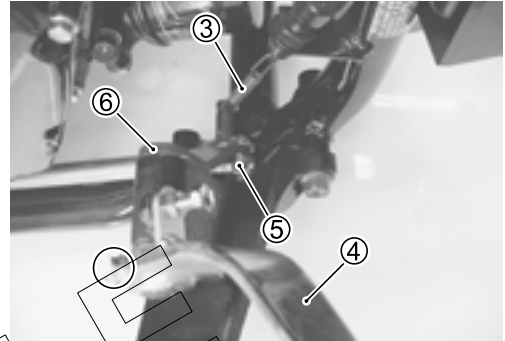
REAR BRAKE ROD**REMOVAL AND DISASSEMBLY**

- Remove the exhaust pipes and mufflers assembly. (☞ 3-6)
- Remove the right frame lower cover ①, clutch rear cover ②.

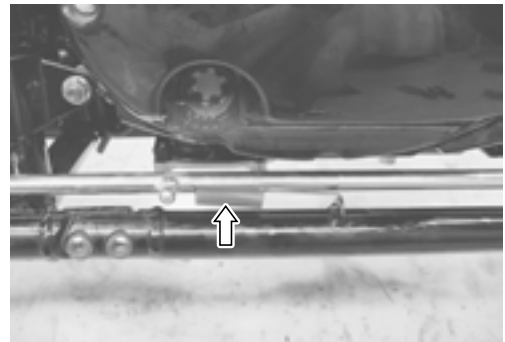


☆: Hooked part

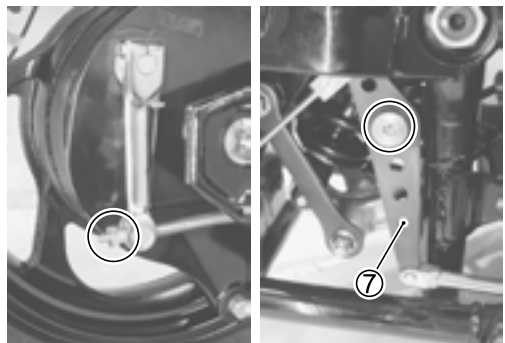
- Remove the rear brake switch spring ③.
- Remove the rear brake pedal ④.
- Remove the cotter pin ⑤.
- Remove the rear brake pedal shaft ⑥.



- Remove the return spring.

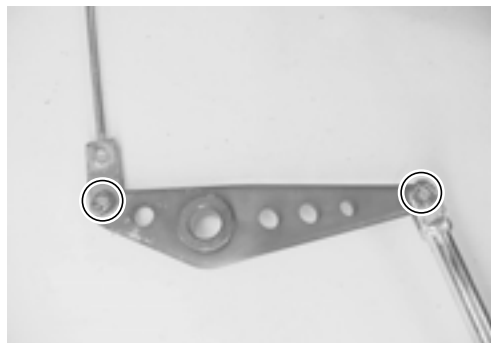


- Remove the rear brake adjust nut, spring and washer.
- Remove the rear brake link ⑦.



SAMPLE

- Remove the cotter pins.



REASSEMBLY REMOUNTING

Reassemble and remount the rear brake rod in the reverse order of removal and disassembly. Pay attention to the following points.

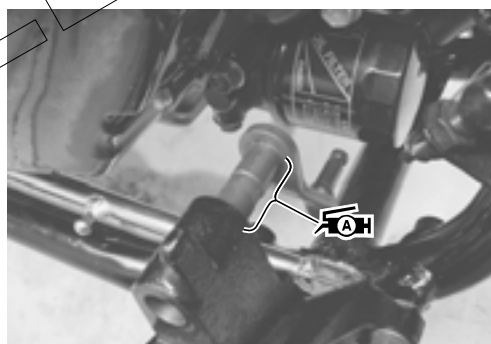
- Apply grease to the rear brake link pivot bolt and tighten it to the specified torque.

 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

 Rear brake link pivot bolt: 29 N·m (2.9 kgf·m, 21 lb·ft)

- Apply grease to the rear brake pedal shaft.



 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Tighten the rear brake pedal mount bolt to the specified torque.

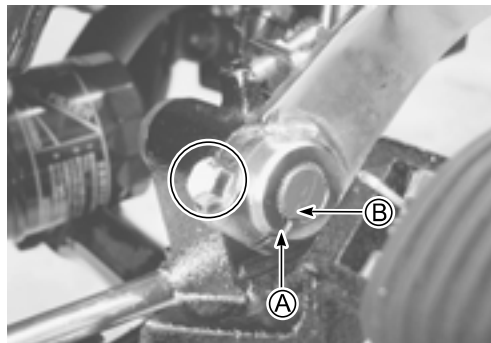
 Rear brake pedal mount bolt: 11 N·m (1.1 kgf·m, 8.0 lb·ft)

NOTE:

* When remounting the rear brake pedal onto the rear brake pedal shaft, align the rear brake pedal mounting surface  with the punch mark .

* After remounting the rear wheel, check for proper brake operation. (👉 2-21)

- Install the exhaust pipes and mufflers. (👉 3-10)



SAMPLE

TIRE AND WHEEL

TIRE REMOVAL

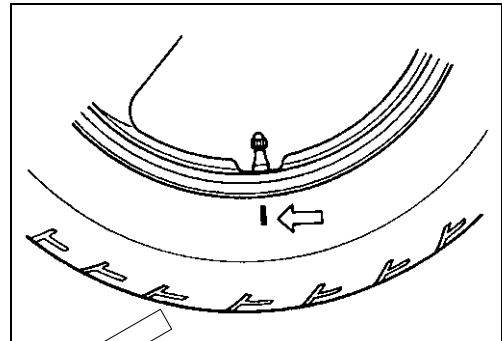
The most critical factor of tubeless tire is the seal between the wheel rim and the tire bead. For this reason, it is recommended to use a tire changer that can satisfy this sealing requirement and can make the operation efficient as well as functional.

For operating procedures, refer to the instructions supplied by the tire changer manufacturer.

NOTE:

When removing the tire in the case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position.

Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.

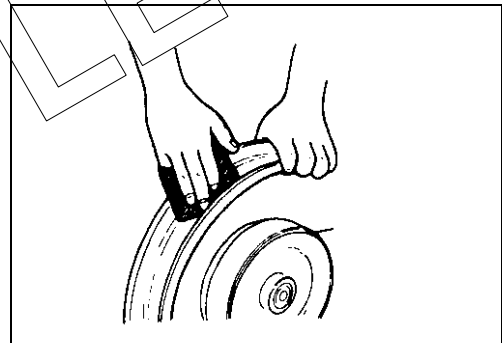


INSPECTION

WHEEL

Wipe the wheel clean and check for the following:

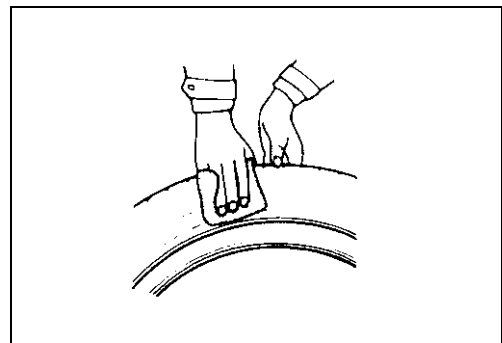
- Distortion and crack
- Any flaws and scratches at the bead seating area.
- Wheel rim runout (☞ 8-8)



TIRE

Tire must be checked for the following points:

- Nick and rupture on side wall
- Tire tread depth (☞ 2-23)
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner



SAMPLE

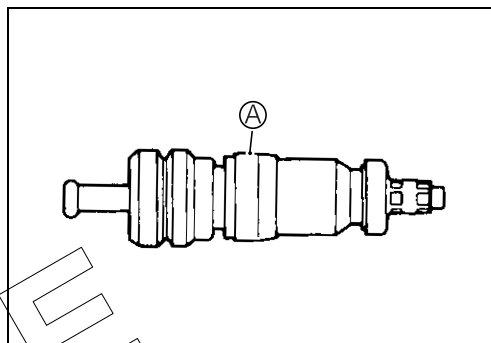
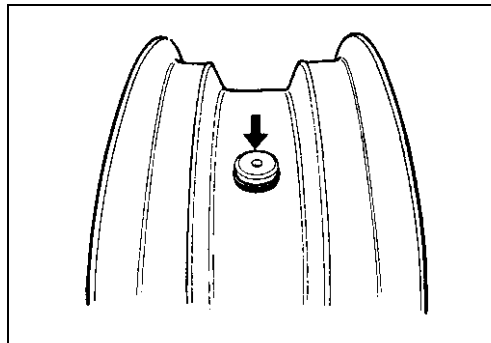
VALVE INSPECTION

Inspect the valve after the tire is removed from the rim. Replace the valve with a new one if the seal (A) rubber is peeling or has damage.

NOTE:

If the external appearance of the valve shows no abnormal condition, removing of the valve is not necessary.

If the seal has abnormal deformation, replace the valve with a new one.



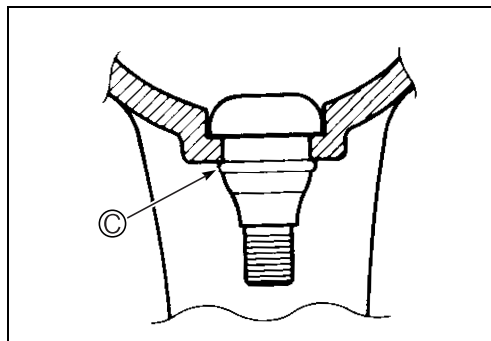
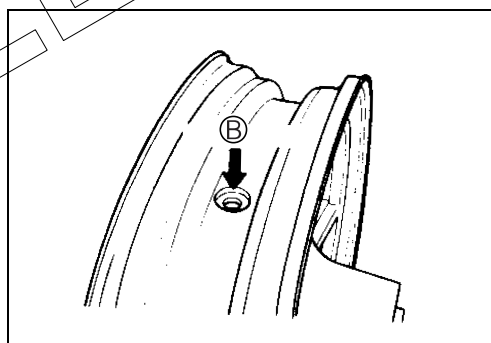
Any dust or rust around the valve hole (B) must be cleaned off. Then install the valve (C) in the rim.

NOTE:

To properly install the valve into the valve hole, apply a special tire lubricant or neutral soapy liquid to the valve.

CAUTION

Be careful not to damage the lip (C) of valve.

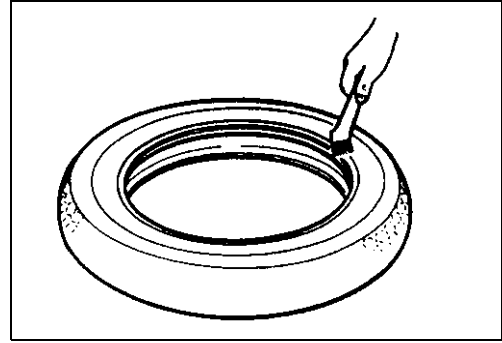


TIRE INSTALLATION

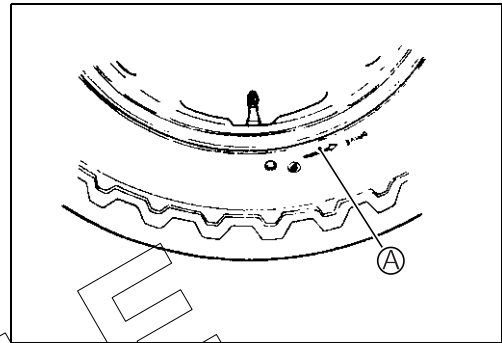
- Apply tire lubricant to the tire bead.
- When installing the tire onto the wheel, observe the following points.

CAUTION

- * Do not reuse the valve which has been once removed.
- * Never use oil, grease or gasoline on the tire bead in place of tire lubricant.



- When installing the tire, the arrow (A) on the side wall should point to the direction of wheel rotation.
- Align the chalk mark put on the tire at the time of removal with the valve position.



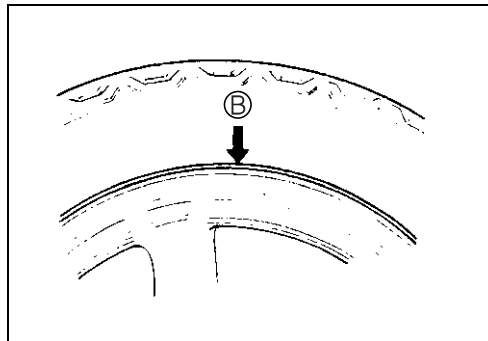
- For installation procedure of tire onto the wheel, follow the instructions given by the tire changer manufacturer.
- Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.
- Inflate the tire.

⚠ WARNING

- * Do not inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). If inflated beyond this limit, the tire can burst and possibly cause injury. Do not stand directly over the tire while inflating.
- * In the case of preset pressure air inflator, pay special care for the set pressure adjustment.

SAMPLE

- In this condition, check the “rim line” ② cast on the tire side walls. The line must be equidistant from the wheel rim all around. If the distance between the rim line and wheel rim varies, this indicates that the bead is not properly seated. If this is the case, deflate the tire completely and unseat the bead for both sides. Coat the bead with lubricant and fit the tire again.
- When the bead has been fitted properly, adjust the pressure to specification.
- As necessary, adjust the tire balance.

**CAUTION**

Do not run with a repaired tire at a high speed.

DATA Cold inflation tire pressure

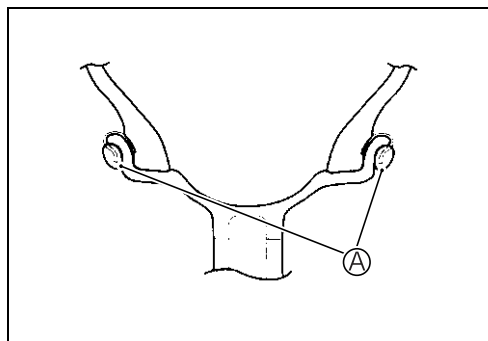
	Front	Rear
Solo riding	200 kPa (2.00 kgf/cm ² , 29 psi)	250 kPa (2.50 kgf/cm ² , 36 psi)
Dual riding	200 kPa (2.00 kgf/cm ² , 29psi)	250 kPa (2.50 kgf/cm ² , 36 psi)

BALANCER WEIGHT INSTALLATION

- When installing the balancer weights to the wheel, set the two balancer weights ① on both sides of wheel rim.

CAUTION

Weight difference between the two balancer weights must be less than 10 g (0.02 lb).



ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM

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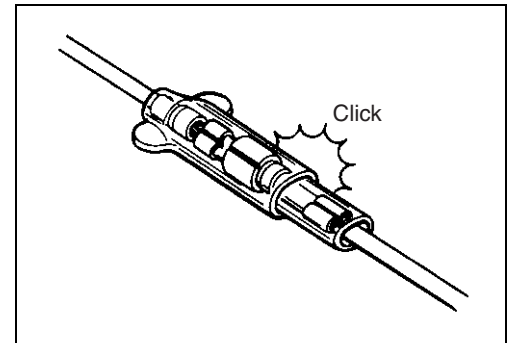
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SAMPLE

CAUTIONS IN SERVICING

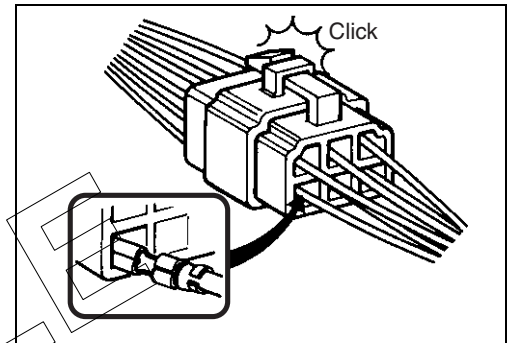
CONNECTOR

- When connecting a connector, be sure to push it in until a click is felt.
- Inspect the connector for corrosion, contamination and breakage in its cover.



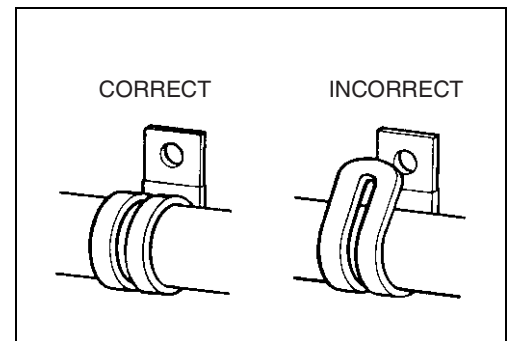
COUPLER

- With a lock type coupler, be sure to release the lock before disconnecting and push it in fully till the lock works when connecting.
- When disconnecting the coupler, be sure to hold the coupler itself and do not pull the lead wires.
- Inspect each terminal on the coupler for being loose or bent.
- Inspect each terminal for corrosion and contamination.



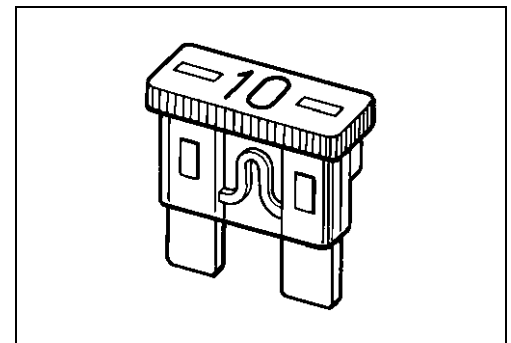
CLAMP

- Clamp the wire harness at such positions as indicated in "WIRE HARNESS ROUTING". (C-7-10-15 to -16)
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



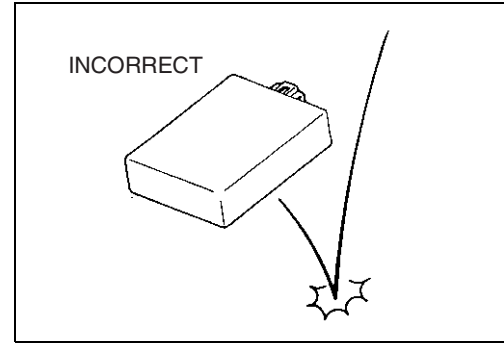
FUSE

- When a fuse blows, always investigate the cause, correct it and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use wire or any other substitute for the fuse.



SEMI-CONDUCTOR EQUIPPED PART

- Be careful not to drop the part with a semi-conductor built in such as a ECM.
- When inspecting this part, follow inspection instruction strictly. Neglecting proper procedure may cause damage to this part.

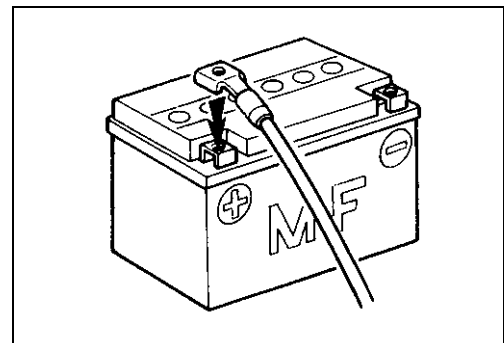
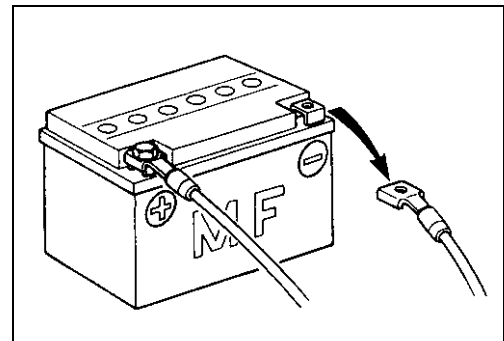


BATTERY

- The MF battery used in this motorcycle does not require maintenance (e.g., electrolyte level inspection, distilled water replenishment).
- During normal charging, no hydrogen gas is produced. However, if the battery is overcharged, hydrogen gas may be produced. Therefore, be sure there are no fire or spark sources (e.g., short circuit) nearby when charging the battery.
- Be sure to recharge the battery in a well-ventilated and open area.
- Note that the charging system for the MF battery is different from that of a conventional battery. Do not replace the MF battery with a conventional battery.

CONNECTING THE BATTERY

- When disconnecting terminals from the battery for disassembly or servicing, be sure to disconnect the \ominus battery lead wire, first.
- When connecting the battery lead wires, be sure to connect the \oplus battery lead wire, first.
- If the terminal is corroded, remove the battery, pour warm water over it and clean it with a wire brush.
- After connecting the battery, apply a light coat of grease to the battery terminals.
- Install the cover over the \oplus battery terminal.



WIRING PROCEDURE

- Properly route the wire harness according to the "WIRE ROUTING" section. (☞ 10-15 to -16)

USING THE MULTI-CIRCUIT TESTER

- Properly use the multi-circuit tester \oplus and \ominus probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.
- After using the tester, be sure to turn the switch to the OFF position.

 **09900-25008: Multi-circuit tester set**

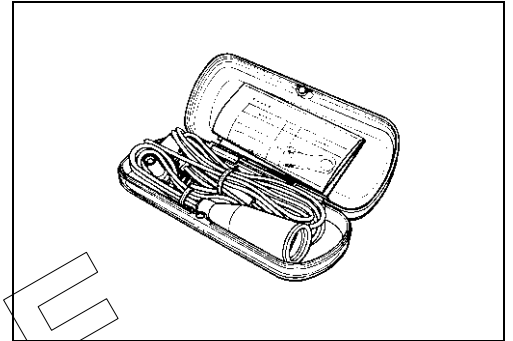
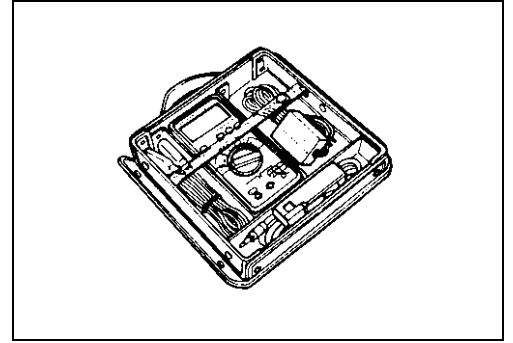
CAUTION

Before using the multi-circuit tester, read its instruction manual.

NOTE:

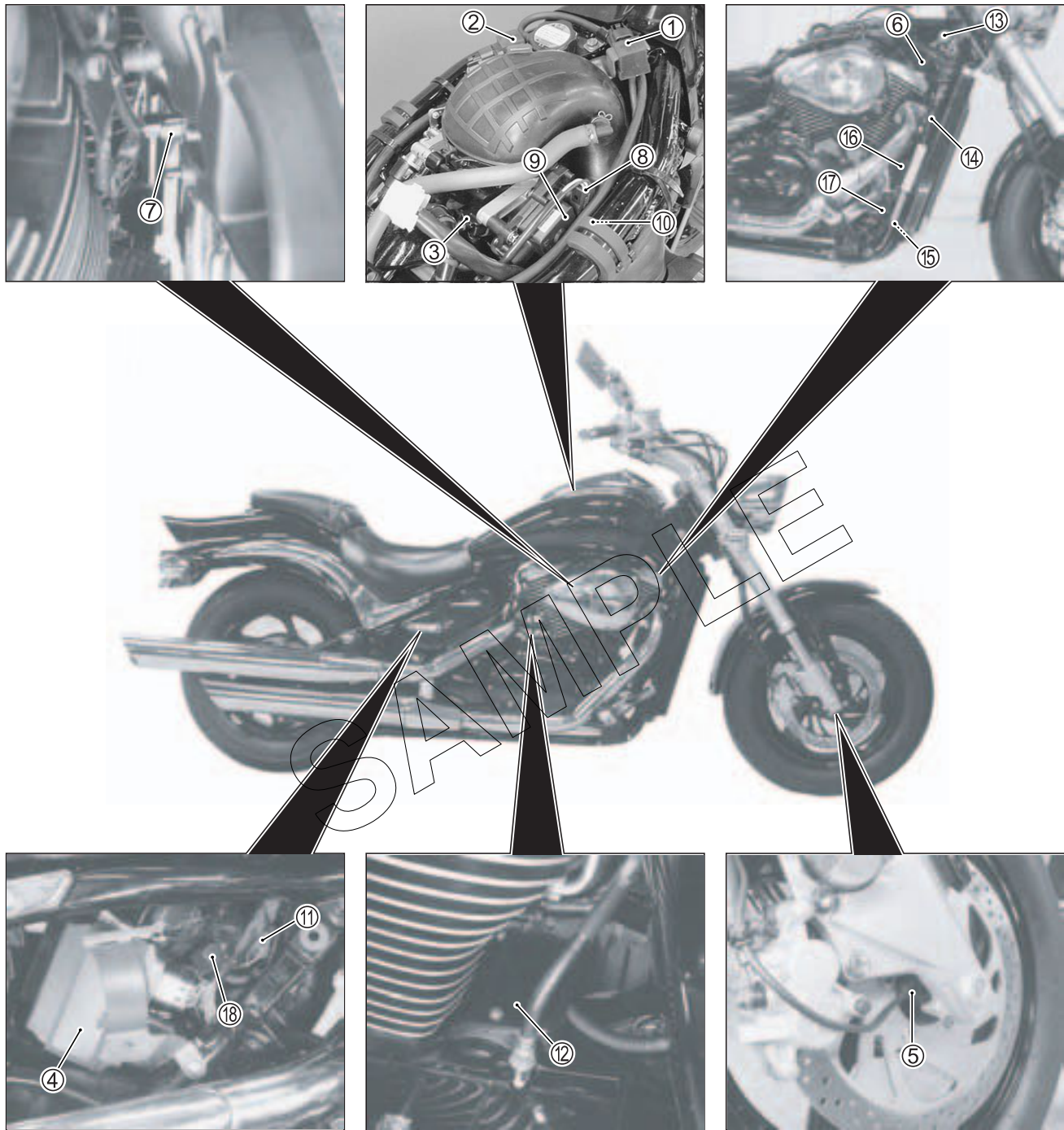
- * When connecting the multi-circuit tester, use the needle pointed probe to the back side of the lead wire coupler and connect the probes of tester to them.
- * Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.

 **09900-25009: Needle pointed probe set**



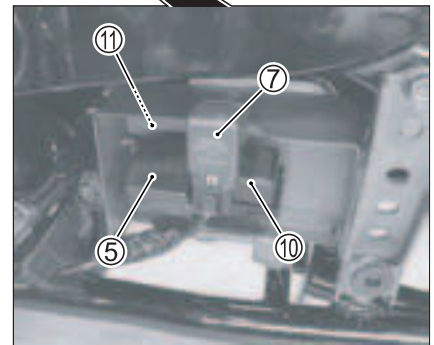
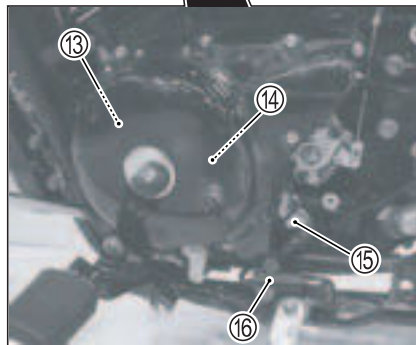
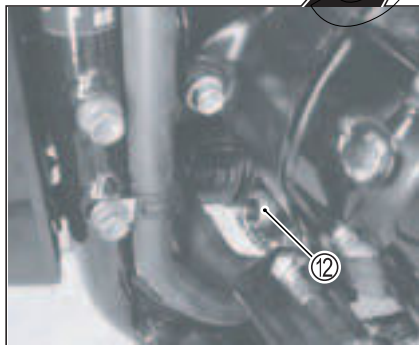
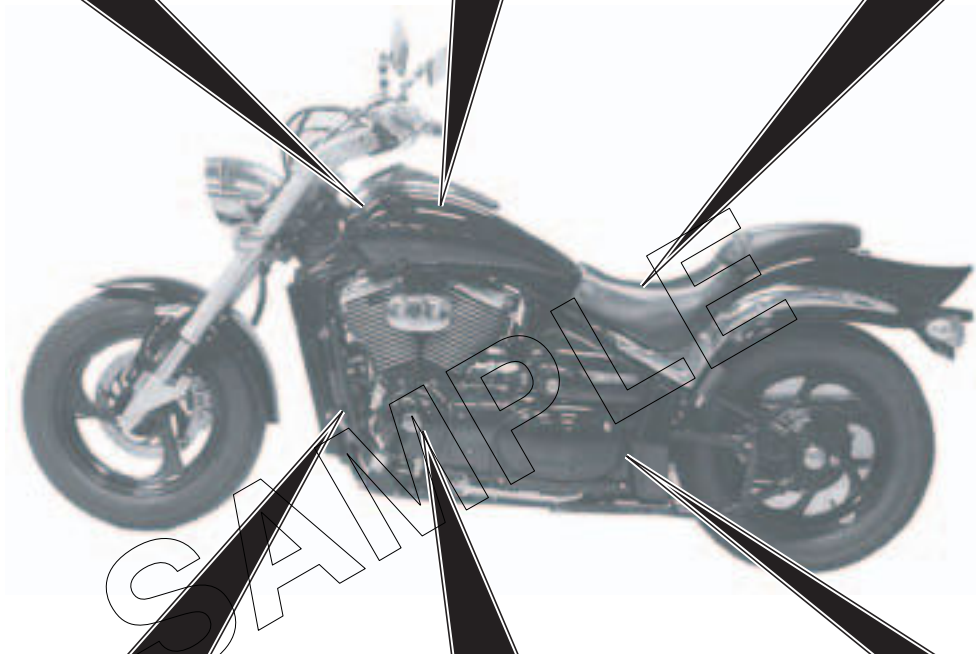
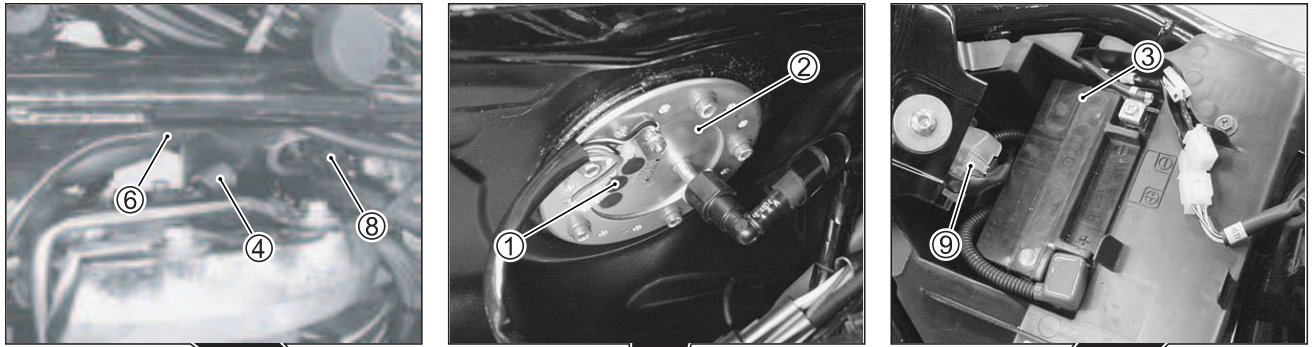
SAMPLE

LOCATION OF ELECTRICAL COMPONENTS



- ① IAP sensor (#2) (☞ 5-33)
- ② IAP sensor (#1) (☞ 5-33)
- ③ Fuel injector (#1) (☞ 5-66)
- ④ ECM (Engine Control Module)
- ⑤ Speed sensor
- ⑥ Ignition coil (#2)
- ⑦ IAT sensor (☞ 5-47)
- ⑧ STP sensor (☞ 5-59)
- ⑨ STV actuator (☞ 5-56)

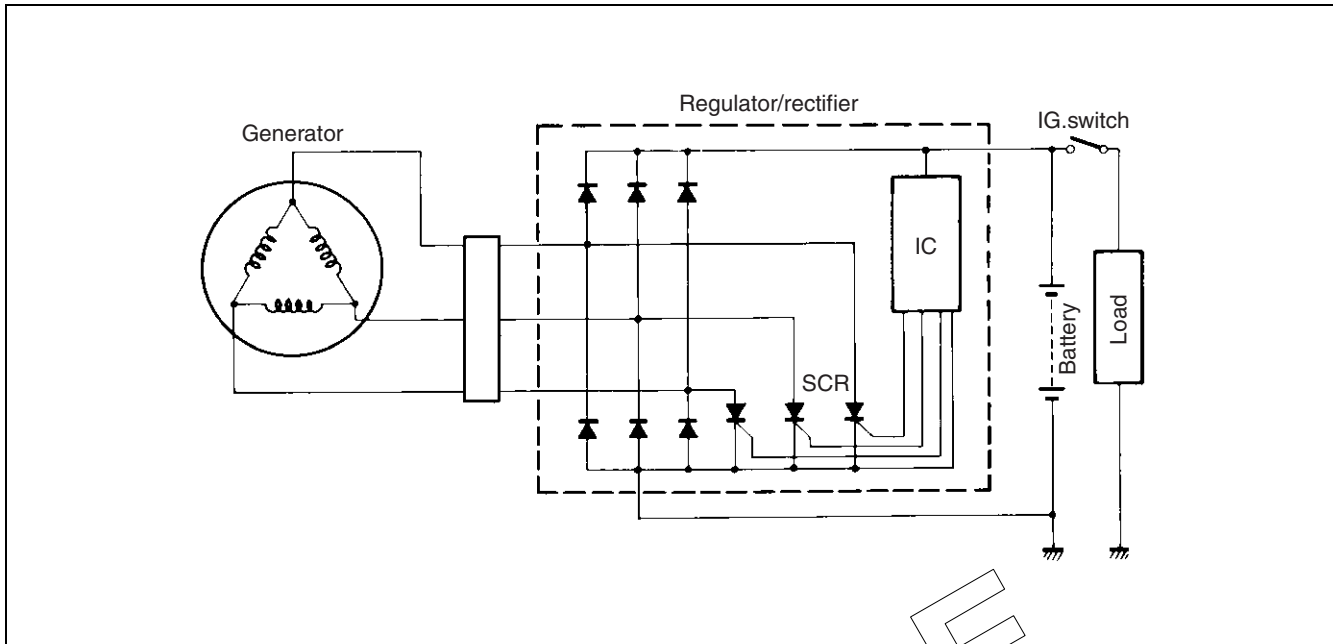
- ⑩ TP sensor (☞ 5-37)
- ⑪ TO sensor (☞ 5-52)
- ⑫ Starter motor
- ⑬ Ignition switch
- ⑭ Horn
- ⑮ Cooling fan thermo-switch (☞ 7-9)
- ⑯ Cooling fan (☞ 7-7)
- ⑰ Rear brake switch
- ⑱ Mode selection switch coupler



- ① Fuel level switch
- ② Fuel pump (☞ 6-5)
- ③ Battery
- ④ ECT sensor (☞ 5-42)
- ⑤ Fuse box
- ⑥ Ignition coil (#1)
- ⑦ Fuel pump relay (☞ 6-6)
- ⑧ Fuel injector (#2) (☞ 5-66)

- ⑨ Starter relay/Main fuse
- ⑩ Turn signal/Side-stand relay
- ⑪ Regulator/Rectifier
- ⑫ Oil pressure switch
- ⑬ Generator
- ⑭ CKP sensor (☞ 5-30)
- ⑮ GP switch (☞ 5-64)
- ⑯ Side-stand switch

CHARGING SYSTEM



TROUBLESHOOTING

Battery runs down quickly

Step 1

1) Check accessories which use excessive amounts of electricity.

Are accessories being installed?

YES	Remove accessories.
NO	Go to Step 2.

Step 2

1) Check the battery for current leaks. (☞ 9-9)

Is the battery for current leaks OK?

YES	Go to Step 3.
NO	<ul style="list-style-type: none"> • Short circuit of wire harness • Faulty electrical equipment

Step 3

1) Measure the regulated voltage between the battery terminals. (☞ 9-10)

Is the regulated voltage OK?

YES	<ul style="list-style-type: none"> • Faulty battery • Abnormal driving condition
NO	Go to Step 4.

Step 4

1) Measure the resistance of the generator coil. (☞ 9-10)

Is the resistance of generator coil OK?

YES	Go to Step 5.
NO	<ul style="list-style-type: none"> • Faulty generator coil • Disconnected lead wires

SAMPLE

Step 5

1) Measure the generator no-load voltage. (☞ 9-11)

Is the generator no-load voltage OK?

YES	Go to Step 6.
NO	Faulty generator

Step 6

1) Inspect the regulator/rectifier. (☞ 9-11)

Is the regulator/rectifier OK?

YES	Go to Step 7.
NO	Faulty regulator/rectifier

Step 7

1) Inspect wirings.

Is the wirings OK?

YES	Faulty battery
NO	<ul style="list-style-type: none"> • Short circuit of wire harness • Poor contact of couplers

Battery overcharges

- Faulty regulator/rectifier
- Faulty battery
- Poor contact of generator lead wire coupler

INSPECTION**BATTERY CURRENT LEAKAGE**

- Remove the seat. (☞ 8-3)
- Turn the ignition switch to the OFF position.
- Disconnect the battery \ominus lead wire.

Measure the current between \ominus battery terminal and the \ominus battery lead wire using the multi circuit tester. If the reading exceeds the specified value, leakage is evident.

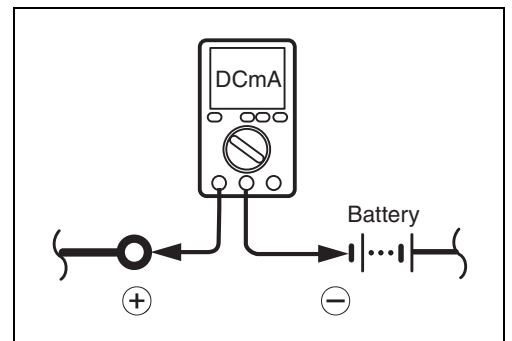
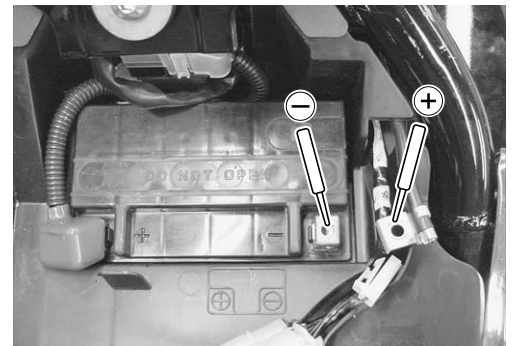
DATA Battery current (leak): Under 1 mA

TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Current (---, 20 mA)

CAUTION

- * Because the current leak might be large, turn the tester to high range first to avoid tester damage.
- * Do not turn the ignition switch to the "ON" position when measuring current.

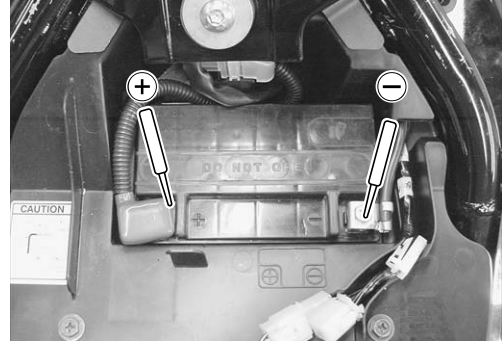


When checking for excessive current leakage, remove the couplers and connectors, one by one, so as to locate the position of trouble.

REGULATED VOLTAGE

- Remove the seat. (☞ 8-3)
- Start the engine and keep it running at 5 000 r/min. with lighting switch turned ON and dimmer switch turned HI position.

Measure the DC voltage between the ⊕ and ⊖ battery terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. (☞ 9-10 and -11)



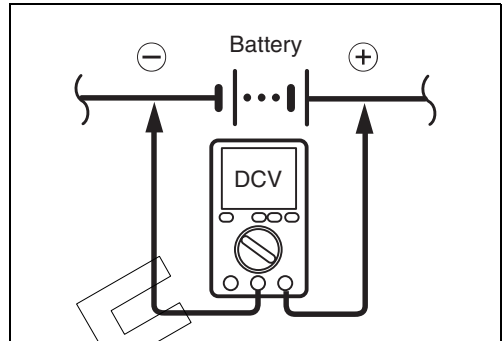
NOTE:

When making this test, be sure that the battery is in fully-charged condition.

DATA Regulated voltage (Charging output):
13.5 – 15.0 V at 5 000 r/min

TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Voltage (V)

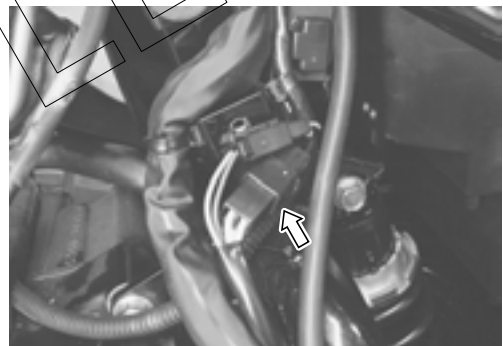


GENERATOR COIL RESISTANCE

- Remove the tool box. (☞ 8-41)
- Disconnect the generator coupler.

Measure the resistance between the three lead wires. If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.

DATA Generator coil resistance: 0.2 – 1.5 Ω (Yellow – Yellow)
∞ Ω (Yellow – Ground)

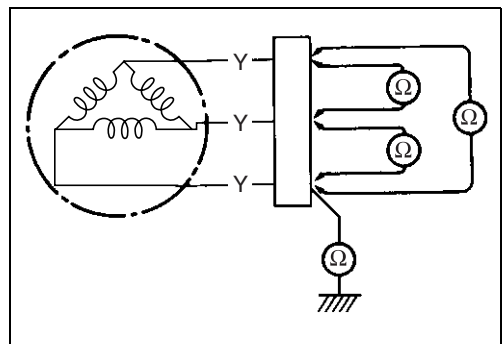


TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Resistance (Ω)

NOTE:

When making above test, it is not necessary to remove the generator.



SAMPLE

GENERATOR NO-LOAD PERFORMANCE

- Disconnect the generator coupler. (👉 9-10)
- Start the engine and keep it running at 5 000 r/min.

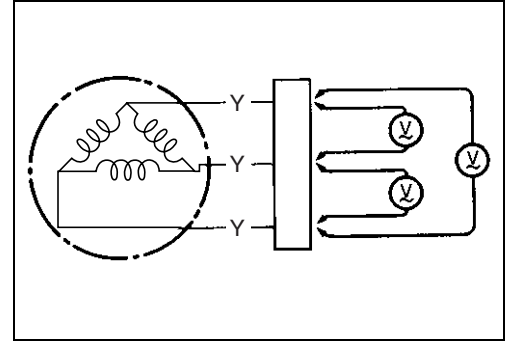
Using the multi circuit tester, measure the voltage between three lead wires.

If the tester reads under the specified value, replace the generator with a new one.

DATA Generator no-load performance:
More than 70 V at 5 000 r/min (When engine is cold)

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (~)



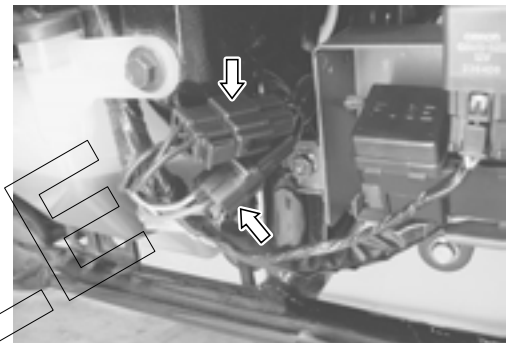
REGULATOR/RECTIFIER

- Remove the secondary gear case cover. (👉 8-40)
- Disconnect the regulator/rectifier couplers.

Measure the voltage between the lead wires using the multi circuit tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (+↔-)



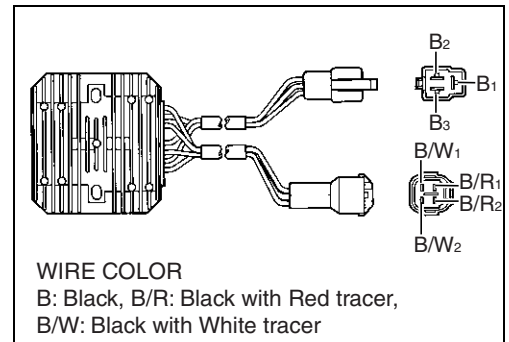
Unit: V

Ⓛ Probe of tester to:	⊕ Probe of tester to:						
	B/R1	B/R2	B1	B2	B3	B/W1	B/W2
B/R1		0	0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.5 - 1.2	0.5 - 1.2
B/R2	0		0.4 - 0.7	0.4 - 0.7	0.4 - 0.7	0.5 - 1.2	0.5 - 1.2
B1	*	*		*	*	0.4 - 0.7	0.4 - 0.7
B2	*	*	*		*	0.4 - 0.7	0.4 - 0.7
B3	*	*	*	*		0.4 - 0.7	0.4 - 0.7
B/W1	*	*	*	*	*		0
B/W2	*	*	*	*	*	0	

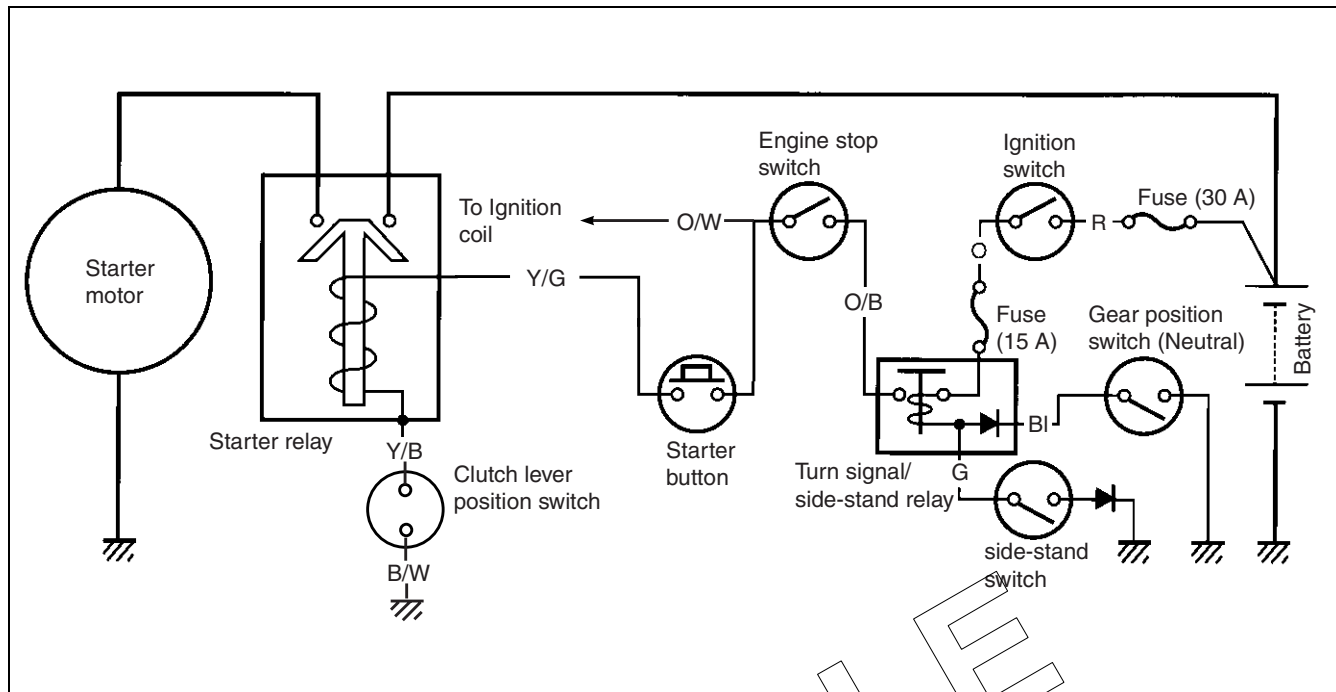
*1.4 V and more (tester's battery voltage)

NOTE:

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.



STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM



TROUBLESHOOTING

Starter motor will not run

Step 1

- 1) Shift the transmission to neutral.
- 2) Pull the clutch lever, turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter button is pushed.
Is a click sound heard?

YES	Go to Step 2.
NO	Go to Step 3.

Step 2

- 1) Check if the starter motor runs when its terminal is connected to the battery ⊕ terminal. (Do not use thin "wire" because a large amount of current flows.)
Does the starter motor run?

YES	<ul style="list-style-type: none"> • Faulty starter relay • Loose or disconnected starter motor lead wire • Loose or disconnected between starter relay and battery ⊕ terminal
NO	Faulty starter motor

Step 3

1) Measure the starter relay voltage at the starter relay connectors (between Y/G ⊕ and Y/B ⊖) when the starter button is pushed.

Is a voltage OK?

YES	Go to Step 4.
NO	<ul style="list-style-type: none"> • Faulty engine stop switch • Faulty clutch lever position switch • Faulty gear position switch • Faulty turn signal/side-stand relay • Faulty starter button • Faulty ignition switch • Faulty side-stand switch • Poor contact of connector • Open circuit in wire harness

Step 4

1) Check the starter relay. (☞ 9-16 to -17)

Is the starter relay OK?

YES	Poor contact of the starter relay
NO	Faulty starter relay

Starter motor runs but does not crank the engine**Step 1**

1) The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side-stand up.

2) Check the side-stand switch. (☞ 9-17)

Is the side-stand switch OK?

YES	Go to Step 2.
NO	Faulty side-stand switch

Step 2

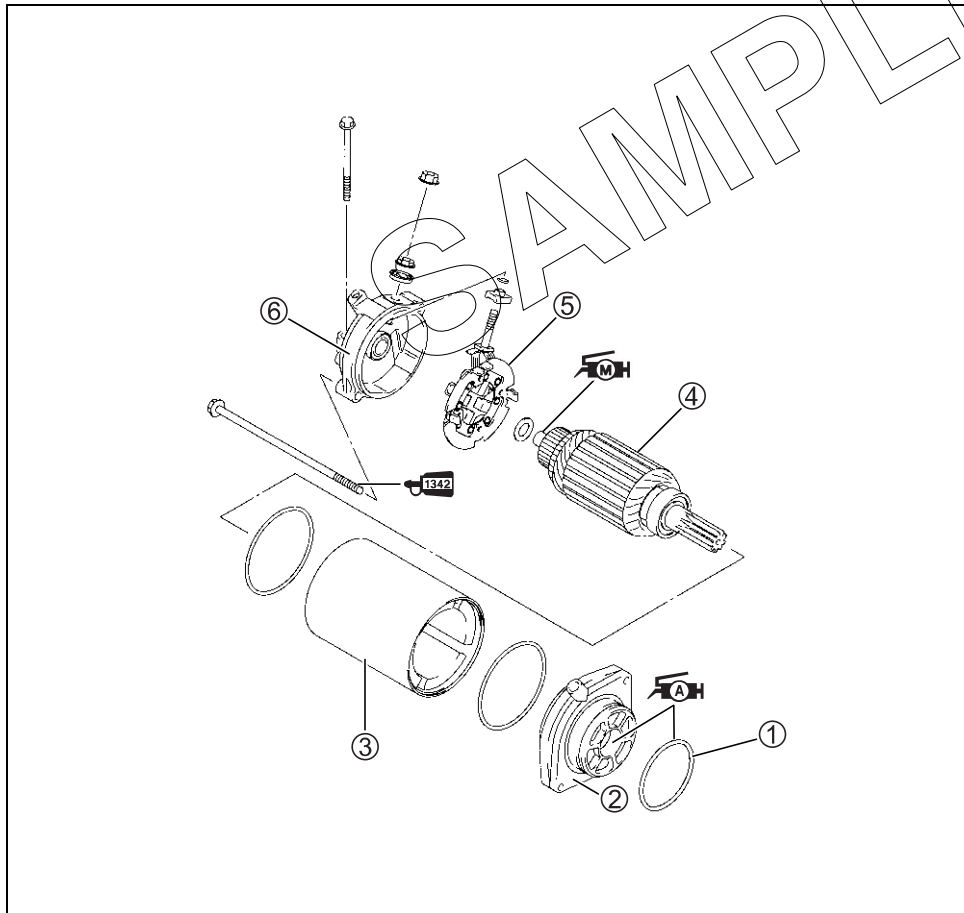
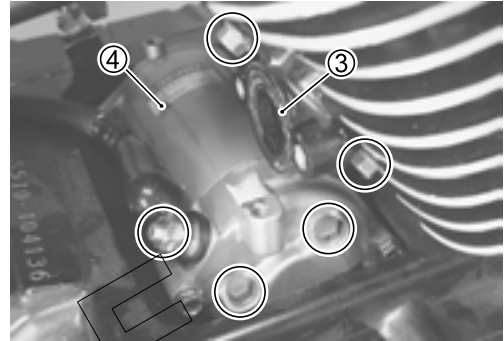
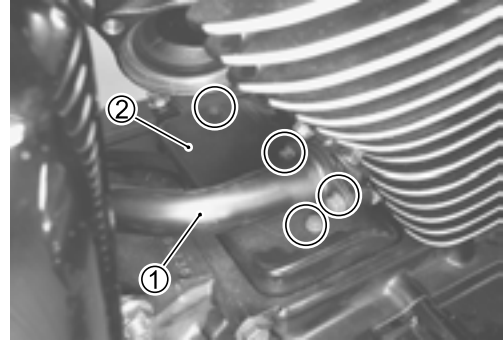
1) Check the starter clutch.

Is the starter clutch OK?

YES	Faulty starter clutch
NO	<ul style="list-style-type: none"> • Open circuit in wire harness • Poor contact of connector

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the battery \ominus lead wire.
- Drain engine coolant. (☞ 2-17)
- Remove the mufflers and exhaust pipe. (☞ 3-6)
- Remove the engine coolant pipe ①.
- Remove the starter motor cover ②.
- Remove the water union ③.
- Remove the starter motor ④.
- Disassemble the starter motor as shown in the illustration.



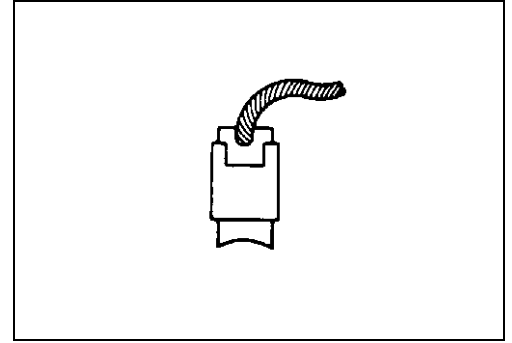
①	O-ring
②	Housing end (inside)
③	Starter motor case
④	Armature
⑤	Brush holder
⑥	Housing end (outside)

STARTER MOTOR INSPECTION

CARBON BRUSH

Inspect the brushes for abnormal wear, cracks, or smoothness in the brush holder.

If any damages are found, replace the brush assembly with a new one.



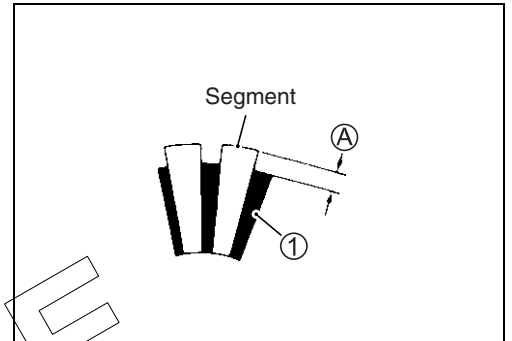
COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut (A).

If abnormal wear is found, replace the armature with a new one.

If the commutator surface is discolored, polish it with #400 sand paper and wipe it using a clean dry cloth.

If there is no undercut, scrape out the insulator (1) with a saw blade.



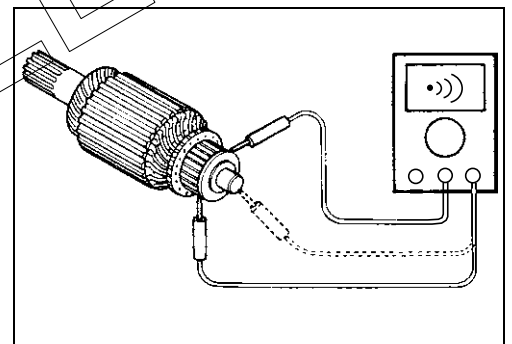
ARMATURE COIL INSPECTION

Check for continuity between each segment and between each segment and the armature shaft using the multi circuit tester.

If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (•••••)



OIL SEAL INSPECTION

Check the oil seal lip for damage or leakage.

If any damage is found, replace the housing end.



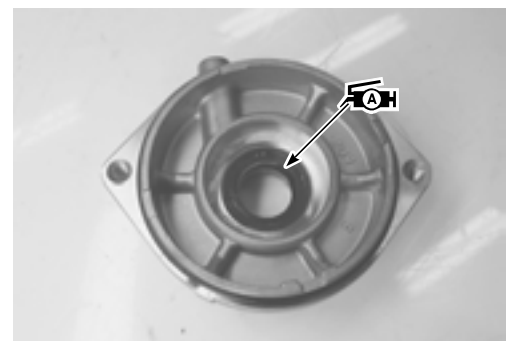
STARTER MOTOR REASSEMBLY

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seal.

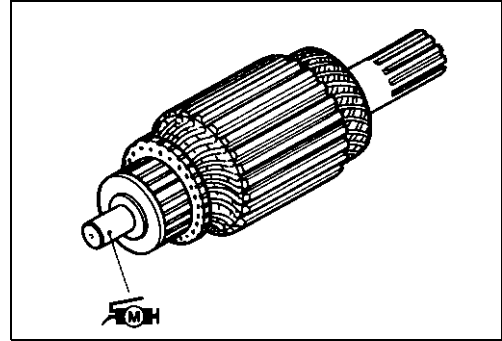
FAH 99000-25030: SUZUKI SUPER GREASE "A" (USA)

99000-25010: SUZUKI SUPER GREASE "A" (Others)



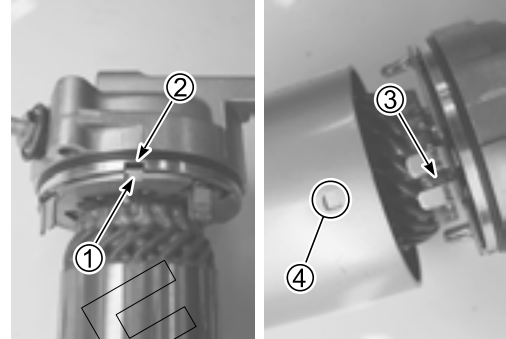
- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

 **99000-25140: SUZUKI MOLY PASTE**




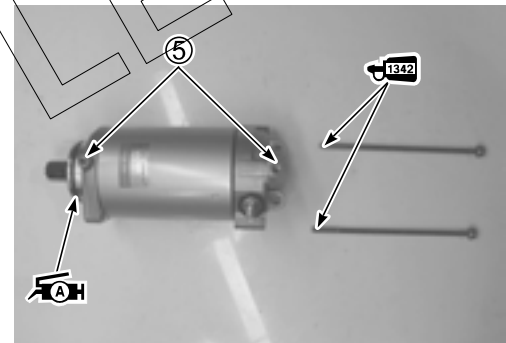
- Align the torque ① on the brush holder with the groove ② on the housing end.
- Align the torque ③ on the brush holder with the mark ④ on the starter motor case.
- Align the threaded parts ⑤ on the housing end.
- Apply a small quantity of THREAD LOCK to the starter motor housing bolts.

 **99000-32050: THREAD LOCK "1342"**



- Apply SUZUKI SUPER GREASE "A" to the O-ring.

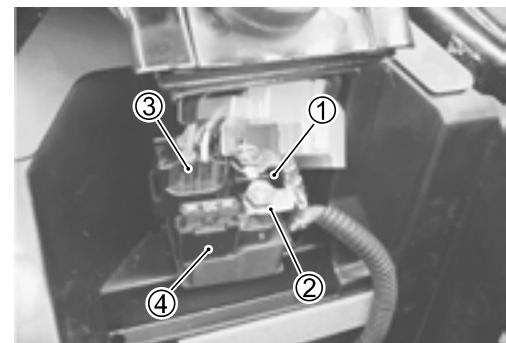
 **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)



SAMPLE

STARTER RELAY INSPECTION

- Remove the seats. (☞ 8-3)
- Remove the battery.
- Remove the starter relay cover.
- Disconnect the starter motor lead wire ①, battery lead wire ② and starter relay coupler ③.
- Remove the starter relay ④.



Apply 12 V to (A) and (B) terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (••••)

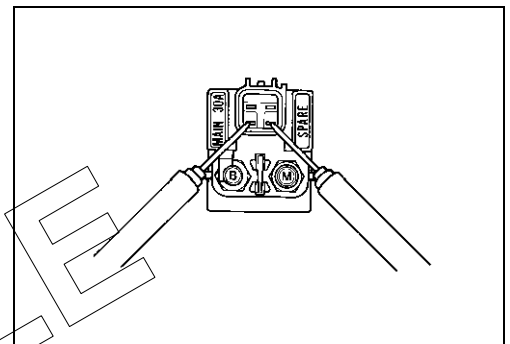
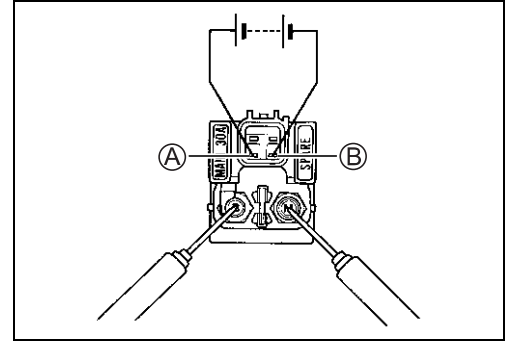
CAUTION

Do not apply a battery voltage to the starter relay for more than five seconds, since the relay coil may over-heat and damaged.

Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

TOOL 09900-25008: Multi circuit tester set

DATA Starter relay resistance: 3 – 7 Ω



SIDE STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

SIDE-STAND SWITCH

- Remove the left frame lower cover. (☞ 8-3)
- Remove the secondary gear case cover. (☞ 8-40)
- Remove the secondary drive unit cover. (☞ 3-3)
- Disconnect the side-stand switch coupler and measure the voltage between Green and Black/White lead wires.

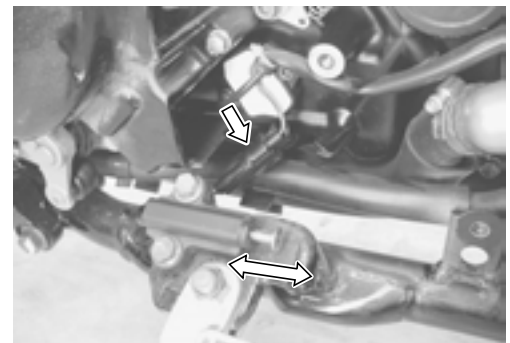
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (+↔-)

	Green (+ Probe)	Black/White (- Probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	1.4 V and more (Tester's battery voltage)	

NOTE:

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.



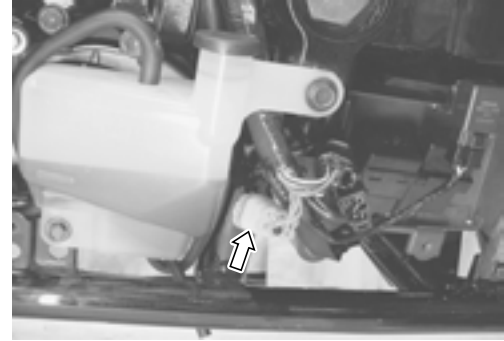
GEAR POSITION SWITCH

- Remove the secondary gear case cover. (☞ 8-40)
- Disconnect the gear position switch coupler and check the continuity between Blue and Black/White with the transmission in “NEUTRAL”.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (•••)

	Blue	Black/White
ON (Neutral)	○ — ○	○ — ○
OFF (Except neutral)		



CAUTION

When disconnecting and connecting the gear position switch coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

- Connect the gear position switch coupler to the wiring harness.
- Turn the ignition switch to “ON” position and side-stand to upright position.
- Insert the needle pointed probes to the gear position switch coupler.

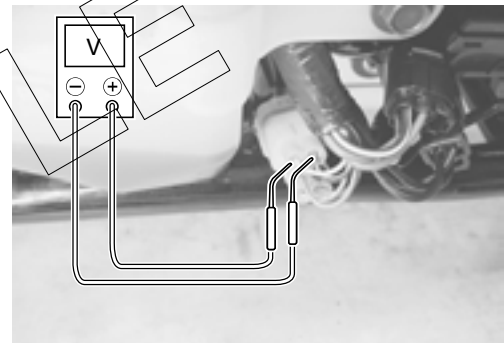
Measure the voltage between Pink and Black/White lead wires using the multi circuit tester when shifting the gearshift lever from low to top.

TOOL 09900-25008: Multi circuit tester set
 09900-25009: Needle pointed probe set

Tester knob indication: Voltage (---)

DATA Gear position switch voltage: 0.6 V and more

(* Low to top gear position) (Pink ⊕ – B/W ⊖)
 (* Except neutral position)

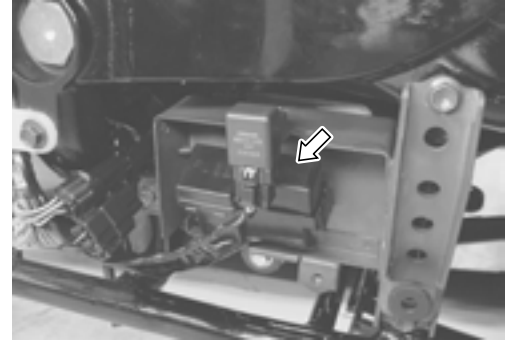


SAMPLE

TURN SIGNAL/SIDE-STAND RELAY

The turn signal/side-stand relay is composed of the turn signal relay, side-stand relay and diode.

- Remove the secondary gear case cover. (☞ 8-40)
- Remove the turn signal/side-stand relay.

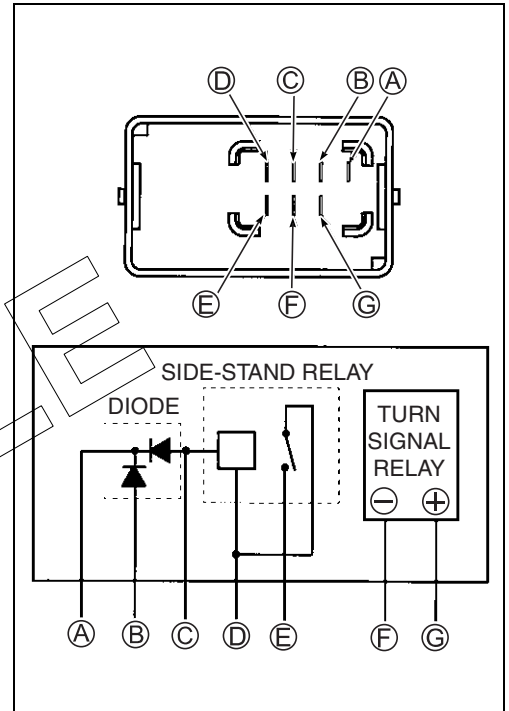


SIDE-STAND RELAY INSPECTION

First check the insulation between ④ and ⑤ terminals with the tester. Then apply 12 V to terminals ④ and ③ (+ to ④ and - to ③) and check the continuity between ④ and ⑤. If there is no continuity, replace the turn signal/side-stand relay with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (•••)



DIODE INSPECTION

Measure the voltage between the terminals using the multi circuit tester. Refer to the following table.

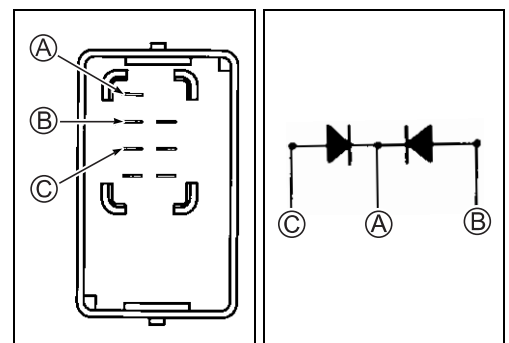
Probe of tester to:	+ Probe of tester to:	
	③, ②	①
③, ②		1.4 V and more (Tester's battery voltage)
①	0.4 – 0.6 V	

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (+↔-)

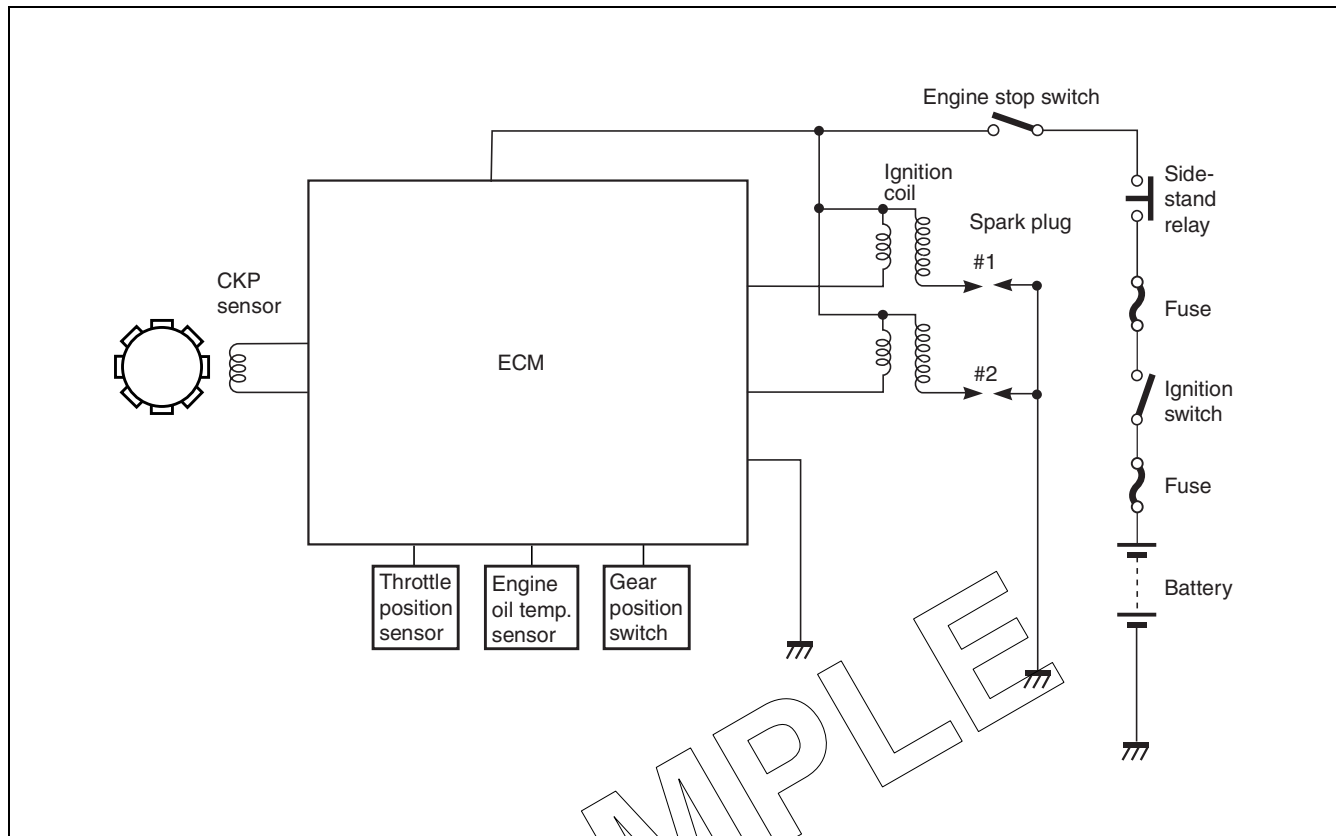
NOTE:

If the multi circuit tester reads 1.4 V and below when the tester probes are not connected, replace its battery.



SAMPLE

IGNITION SYSTEM



NOTE:

The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 8 000 r/min during running, this circuit cuts off fuel at the fuel injector.

TROUBLESHOOTING

No spark or poor spark

NOTE:

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step 1

1) Check the ignition system couplers for poor connections.

Is there connection in the ignition switch couplers?

YES	Go to Step 2.
NO	Poor connection of couplers

SAMPLE

Step 2

1) Measure the battery voltage between input lead wires at the ECM with the ignition switch in the "ON" position. (E-02, 19, 24: O/G and B/W, E-03, 28, 33: O/W and B/W)

Is the voltage OK?

YES	Go to Step 3.
NO	<ul style="list-style-type: none"> • Faulty ignition switch • Faulty turn signal/side-stand relay • Faulty engine stop switch • Broken wire harness or poor connection of related circuit couplers

Step 3

1) Measure the ignition coil primary peak voltage. (☞ 9-22)

NOTE:

This inspection method is applicable only with the multi circuit tester and the peak volt adaptor.

Is the peak voltage OK?

YES	Go to Step 4.
NO	Go to Step 5.

Step 4

1) Check the plug caps for poor contacts.

2) If OK, then inspect the spark plugs. (☞ 2-6)

Are the spark plugs OK?

YES	Go to Step 5.
NO	Faulty spark plug(-s)

Step 5

1) Inspect the ignition coils. (☞ 9-23)

Are the ignition coils OK?

YES	Go to Step 6.
NO	Faulty ignition coil(-s)

Step 6

1) Measure the CKP sensor peak voltage and its resistance. (☞ 9-23 to -24)

NOTE:

The CKP peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.

Are the peak voltage and its resistance OK?

YES	<ul style="list-style-type: none"> • Faulty ECM • Open or short circuit in wire harness • Poor connection of ignition couplers
NO	<ul style="list-style-type: none"> • Faulty CKP sensor • Metal particles or foreign material being stuck on the CKP sensor and rotor tip

INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Disconnect the spark plug caps.
- Connect new spark plugs to each spark plug cap and ground them to the cylinder head.

NOTE:

Make sure that all couplers and spark plugs are connected properly and the battery used is in fully-charged condition.

Measure the ignition coils primary peak voltage in the following procedure.

- Connect the multi-circuit tester with peak voltage adaptor as follows.

- #1 ignition coil: ⊕ Probe: White terminal
 ⊖ Probe: Ground
- # 2 ignition coil: ⊕ Probe: Black/Yellow terminal
 ⊖ Probe: Ground

NOTE:

Do not disconnect the ignition coil primary wire coupler.

 **09900-25008: Multi-circuit tester set**

CAUTION

Before using the multi-circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.

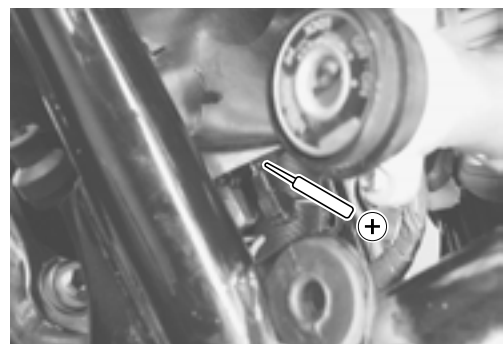
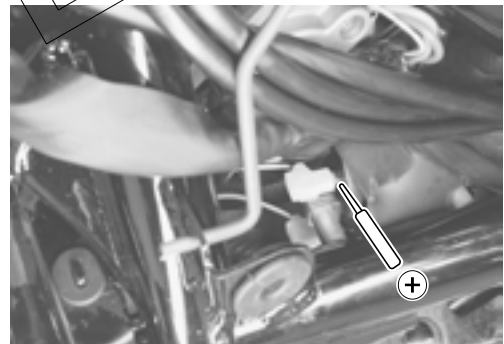
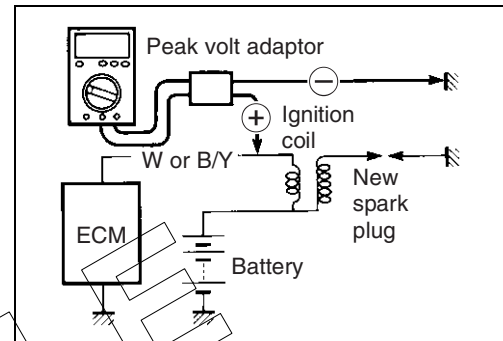
- Shift the transmission into neutral and turn ignition switch "ON".
- Pull the clutch lever.
- Crank the engine a few seconds with the starter motor by depressing starter button and check the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage. If the peak voltage is lower than the specified values, inspect the ignition coil.

 **DATA Ignition coil primary peak voltage: 205 V and more**

 **Tester knob indication: Voltage (---)**

⚠ WARNING

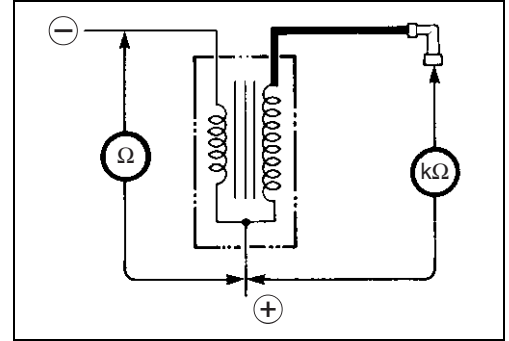
Avoid touching the tester probes and spark plugs to prevent an electric shock while testing.



SAMPLE

IGNITION COIL RESISTANCE

- Remove the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Disconnect the spark plug caps.
- Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.

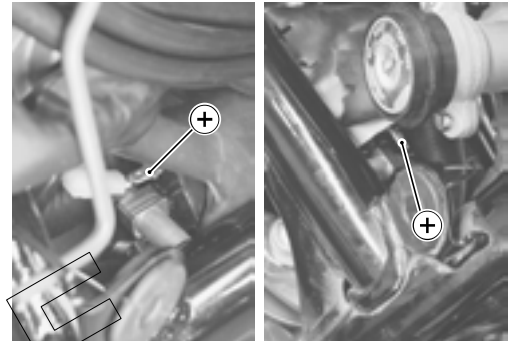
**DATA** Ignition coil resistance

Primary: 2 – 6 Ω (+ terminal – – terminal)

Secondary: 15 – 30 kΩ (Plug cap – + terminal)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

**CKP SENSOR PEAK VOLTAGE**

- Remove the right frame cover. (☞ 8-4)

NOTE:

Be sure that all couplers are connected properly and the battery used is in fully-charged condition.

- Disconnect the ECM coupler ①.
- Connect the multi circuit tester with peak volt adaptor as follows.
- Insert the needle pointed probes to the ECM coupler.
- Measure the CKP sensor peak voltage between Green/Yellow and Yellow/Brown lead wires at the ECM coupler.

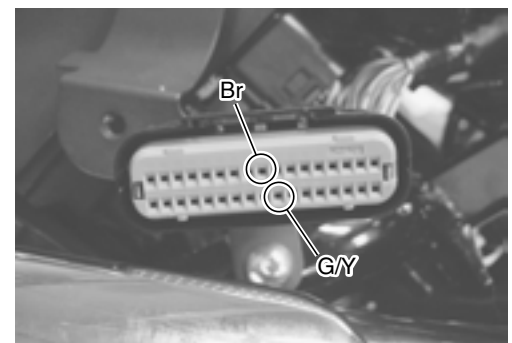
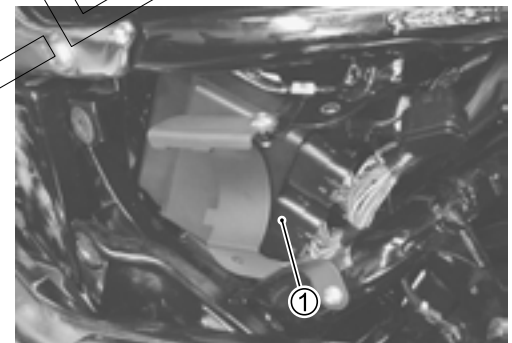
Green/Yellow (+ Probe) – Brown (– Probe)

TOOL 09900-25008: Multi circuit tester set

09900-25009: Needle pointed probe set

CAUTION

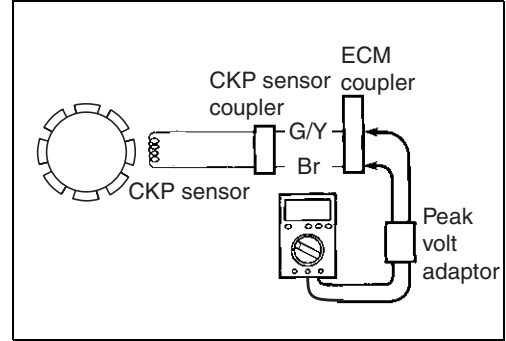
Before using the multi circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.



- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the CKP sensor peak voltage.
- Repeat the above test procedure a few times and measure the highest peak voltage.

 **Tester knob indication: Voltage (---)**

DATA CKP sensor peak voltage: 4.0 V and more
(Green/Yellow – Brown)

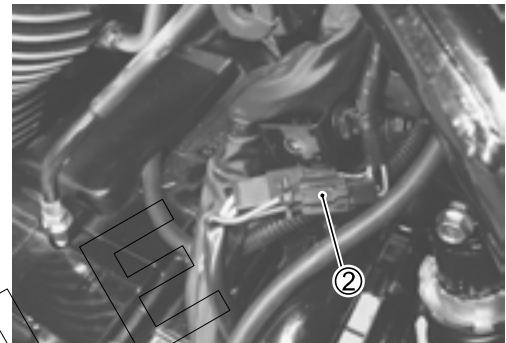


If the peak voltage is lower than the standard range, check the peak voltage at the CKP sensor lead wire coupler.

- Remove the secondary gear case cover. (☞ 8-40)
- Remove the tool box. (☞ 8-41)
- Disconnect the CKP sensor lead wire coupler ② and connect the multi circuit tester with the peak volt adaptor.

Blue (+ Probe) – Green (– Probe)

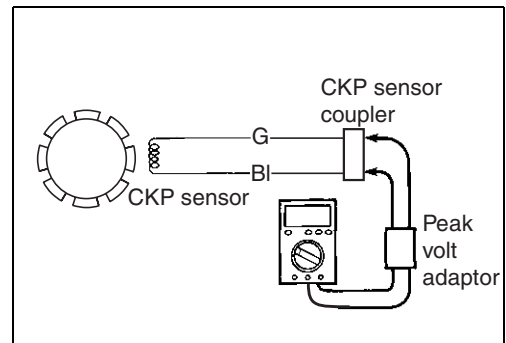
- Measure the CKP sensor peak voltage at the CKP sensor lead wire coupler.



 **Tester knob indication: Voltage (---)**

DATA CKP sensor peak voltage: 4.0 V and more (Green – Bl)

If the peak voltage is lower than the standard range, check each coupler at both ends of the circuit or replace the CKP sensor and inspect it again.



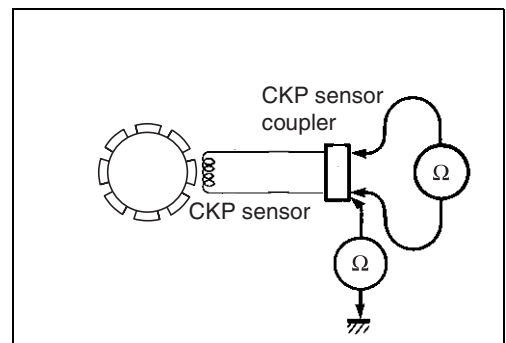
CKP SENSOR RESISTANCE

- Measure the resistance between the lead wires and ground. If the resistance is not as specified, the CKP sensor must be replaced.

TOOL 09900-25008: Multi circuit tester set

 **Tester knob indication: Resistance (Ω)**

DATA CKP sensor resistance: 184 – 276 Ω (Green – Blue)
∞ Ω (Green – Ground)



SAMPLE

SPEEDOMETER AND PILOT LAMP BOX DESCRIPTION

This speedometer mainly consists of the stepping motor, LCD (Liquid Crystal Display) and LED (Light Emitting Diode). This speedometer is light, thin and of high response compared to those currently in use because of this composition.

The speedometer pointer is driven by the stepping motor.

The LCD indicates Odo/Trip 1/Trip 2/Clock/oil pressure and engine coolant temp respectively.

NOTE:

If the engine stop switch is turned OFF while the ignition switch is ON, the LCD displays "CHEC". But it is not a malfunction.

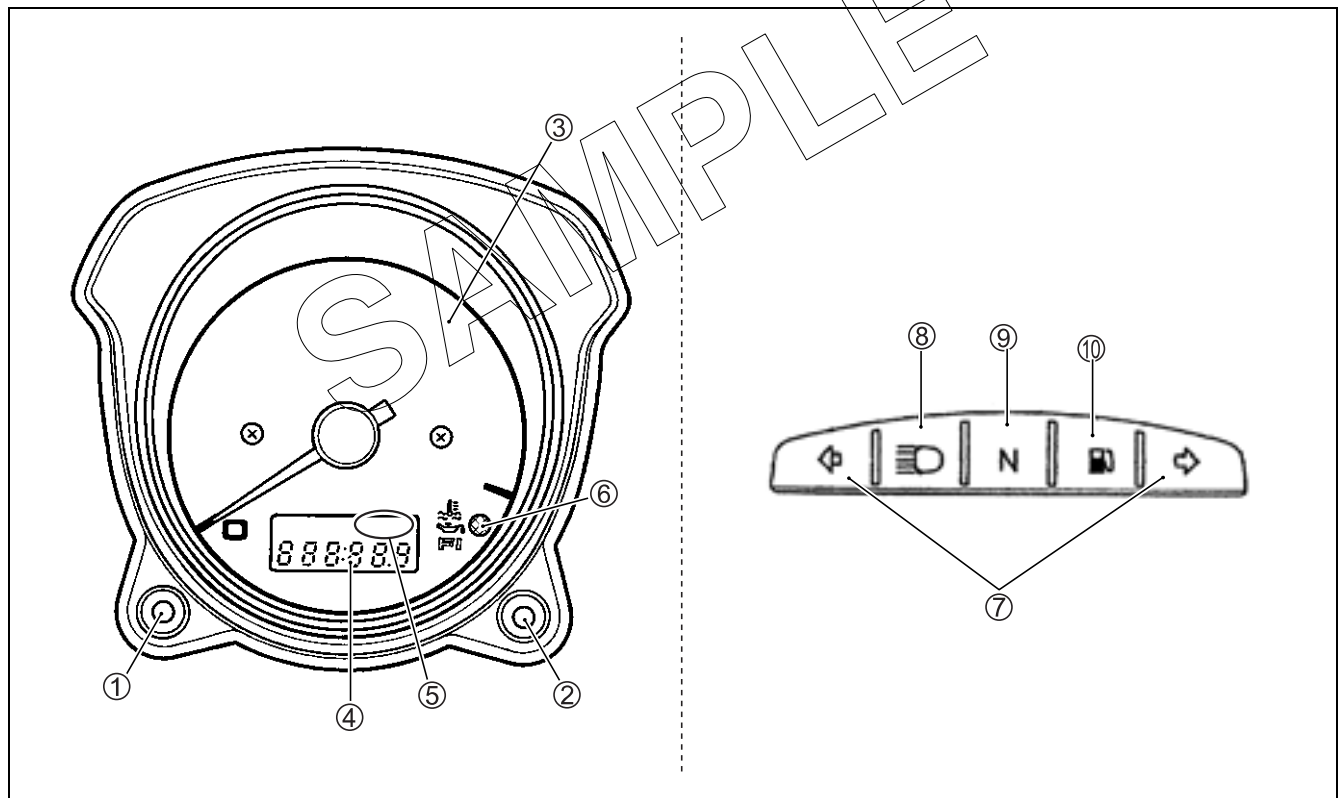
This condition implies that combination meter receives no signal from the ECM.

In that case, they are restored to normal indication by turning the engine stop switch to RUN position.

LED (Light Emitting Diode)

LED is used for the illumination light and each indicator light.

LED is maintenance free. LED is less electric-power consuming and stronger to vibration resistance compared to the bulb.



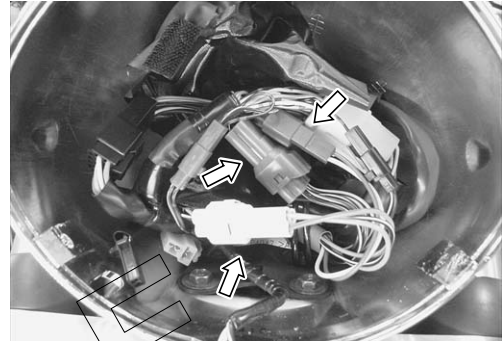
①	Select switch (Odo/Trip/Clock)	⑥	LED (FI/Oil pressure/Engine coolant temperature indicator light)
②	Adjust switch	⑦	LED (Turn signal indicator light)
③	Speedometer	⑧	LED (High-beam indicator light)
④	LCD (Odo/Trip1/Trip2/Clock/FI)	⑨	LED (Neutral indicator light)
⑤	LCD (Oil pressure/Engine coolant temperature indicator light)	⑩	LED (Fuel level)

SPEEDOMETER REMOVAL AND DISASSEMBLY

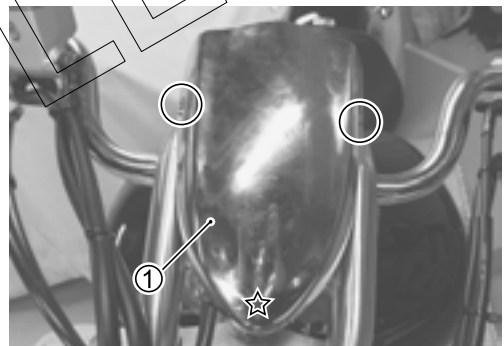
- Remove the headlight.



- Disconnect the speedometer lead wire couplers.



- Remove the speedometer cover ①.



☆: Hooked part

- Remove the speedometer.

CAUTION

When disconnecting and reconnecting the speedometer coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

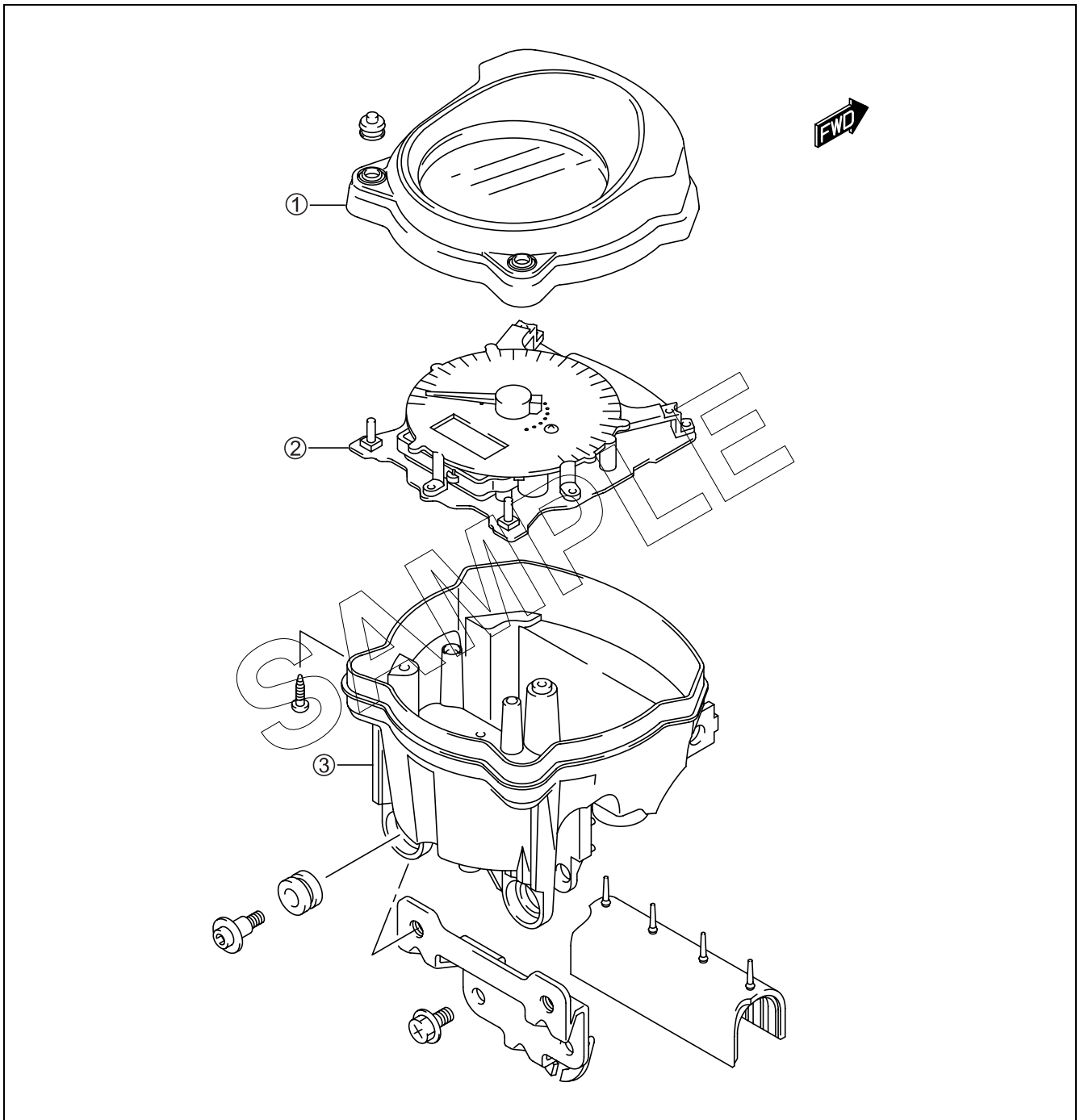


SAMPLE

- Disassemble the speedometer as follows.

CAUTION

Do not attempt to disassemble the speedometer unit.



① Speedometer cover

② Speedometer unit

③ Speedometer case

PILOT LAMP BOX REMOVAL AND DISASSEMBLY

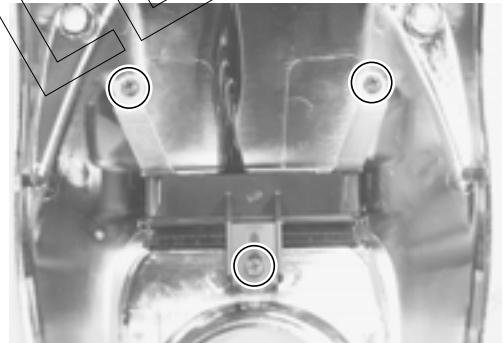
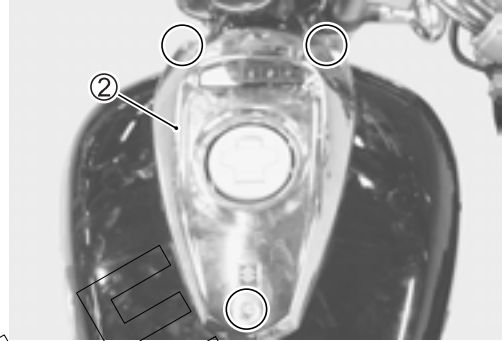
- Lift and support the fuel tank. (☞ 6-3)
- Remove the coupler ①.

CAUTION

When disconnecting and reconnecting the pilot lamp box coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

- Remove the fuel tank upper cover ②.

- Remove the pilot lamp box.



SAMPLE

INSPECTION

LED (LIGHT EMITTING DIODE)

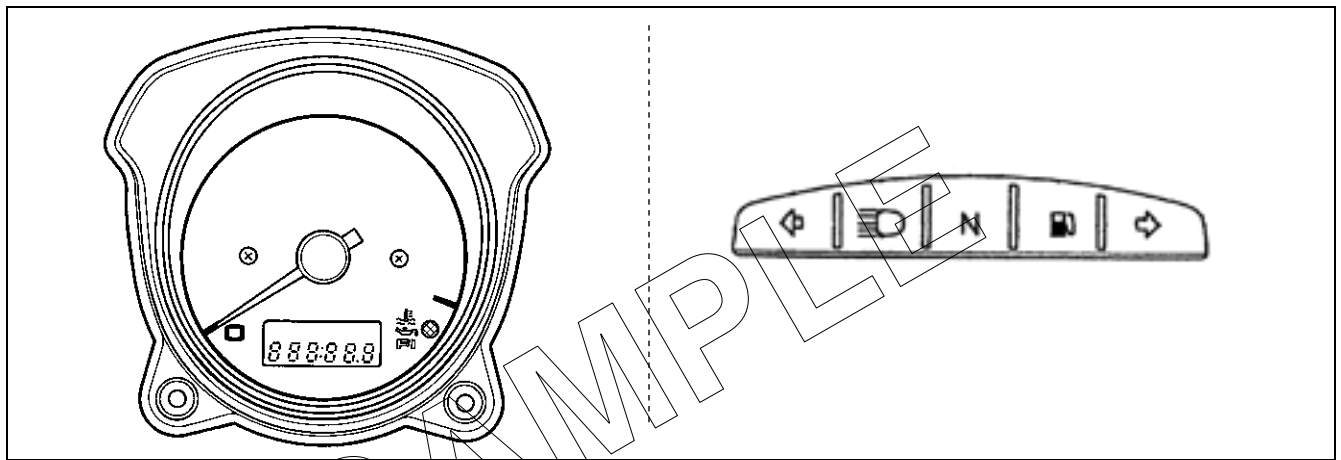
Check that the LED lights (FI light, Oil pressure indicator light, Engine coolant indicator light and Fuel level indicator light) immediately after turning the ignition switch on. Also, other LED lights (Neutral indicator light, High-beam indicator light and Turn signal indicator light) can be checked by depending on each switch position.

If the LED fails in operation, replace the speedometer unit with a new one after checking its wire harness/coupler.

STEPPING MOTOR

Check that the pointer calibrates itself immediately after turning the ignition switch on and stops at zero point.

If abnormal condition is found, replace the speedometer unit with a new one after checking its wire harness/coupler.

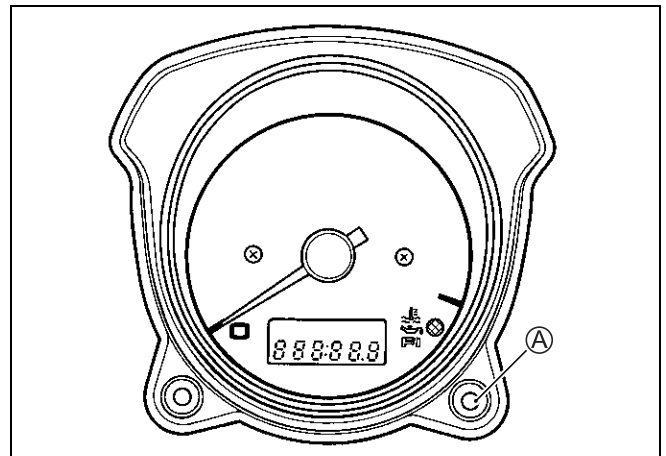


NOTE:

The pointer may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointer to the proper position by following the instruction below:

- 1) With the function switch (A) pressed, turn the ignition switch on.
 - 2) Release the function switch (A), 3 to 5 seconds after turning the ignition switch on.
 - 3) Press the function switch (A) twice (within 1 second). →Reset
- * Complete the operation within 10 seconds after the ignition switch has been turned on.

Time	Ignition switch	Adjuster switch (A)
	OFF	PUSH
0	ON	↓
•		
•		
3 sec.		↓
•		
5 sec.		Release
•		
•		Push
•		
•		Push→Reset
10 sec.		



Pointer will return to the starting point right after the completion of the operation. In the case of the pointer not returning to the proper position after doing above, replace the speedometer unit.

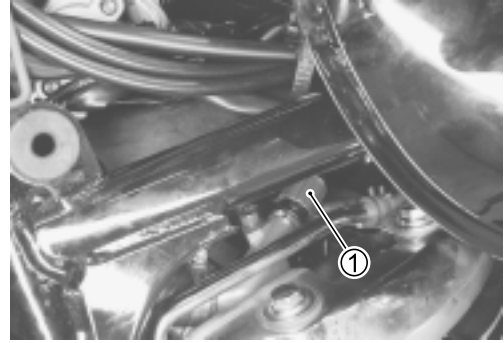
ENGINE COOLANT TEMPERATURE METER AND INDICATOR

ECT sensor inspection. (☞ 7-10)

- Remove the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Disconnect the ECT sensor coupler ①.

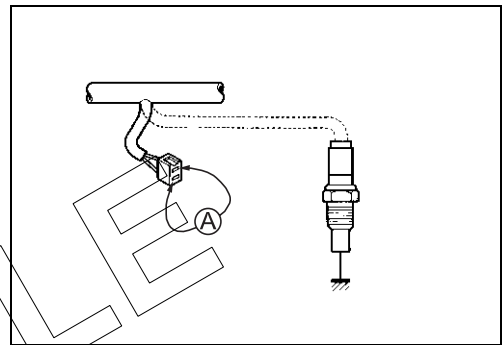
CAUTION

When connecting and disconnecting the engine coolant temperature sensor lead wire coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

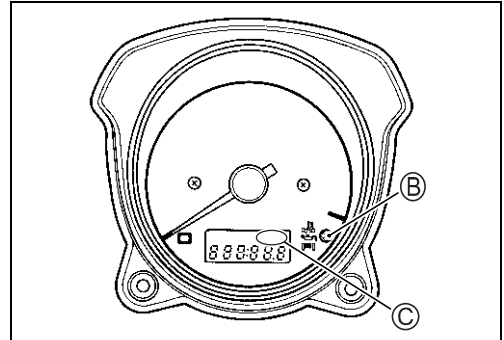


- Connect the variable resistor ① between the terminals.
- Turn the ignition switch ON.
- Check the LCD and LED operation when the resistance is adjusted to the specified values.

Resistance ①	LED ②	LCD ③	Water temperature
2.45 kΩ and over	OFF	—	19 °C and below
Approx. 0.811 kΩ	OFF	—	Approx. 50 °C
Approx. 0.1 kΩ	ON	Flicker	120 – 139 °C
0 Ω (Jumper wire)	ON	Flicker	140 °C and over

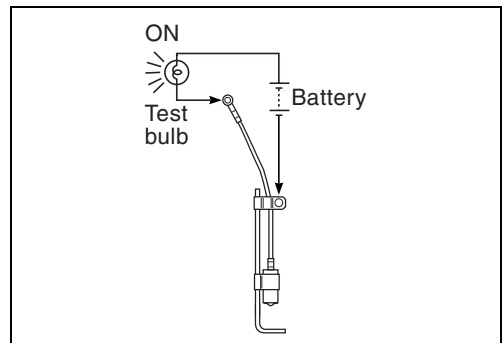


If either one or all indication are abnormal, replace the speedometer with a new one.



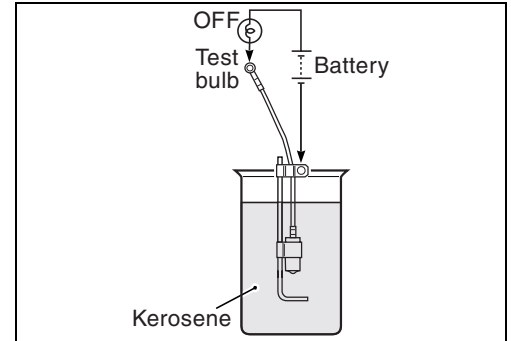
FUEL LEVEL INDICATOR SWITCH INSPECTION

- Remove and disassemble the fuel pump assembly. (☞ 6-8)
- Connect 12 V battery and test bulb (12 V, 3.4 W) to the fuel level indicator switch as shown in the right illustration. The bulb should come on after one minutes if the switch is in good condition.



SAMPLE

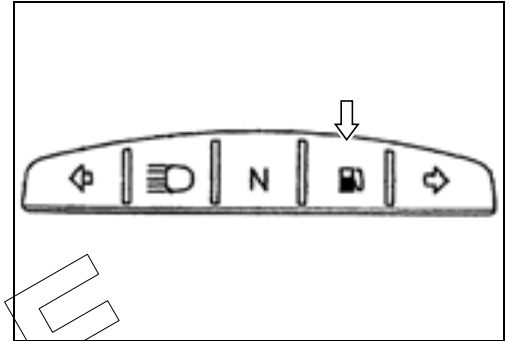
- When the switch is immersed in kerosene under the above condition, the bulb should go out. If the bulb remains lit, replace the unit with a new one.



FUEL LEVEL INDICATOR LIGHT INSPECTION

If the fuel level indicator light does not function properly, check the fuel level indicator switch and its lead wire/coupler.

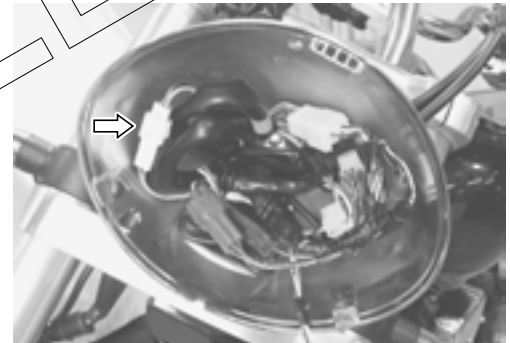
If the fuel level indicator switch and its lead wire/coupler are functioning properly, replace the combination meter with a new one.



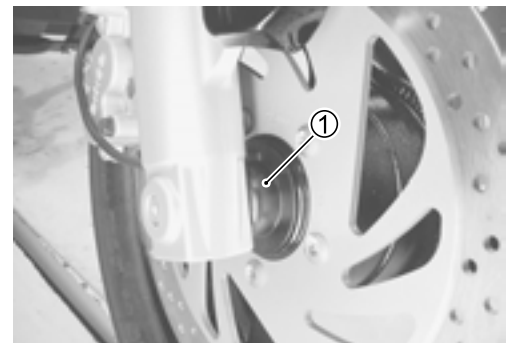
SPEED SENSOR INSPECTION

If the speedometer, odometer or tripmeter does not function properly. Inspect the speed sensor and connection of couplers. If the speed sensor and connection is all right, replace the unit with a new one.

- Remove the front wheel. (☞ 8-7)
- Remove the head light. (☞ 9-26)
- Disconnect the speed sensor lead wire couplers.



- Remove the speed sensor ①. (☞ 8-7)



- Connect 12 V battery (between O/R and B/W), 10 kΩ resistor (between O/R and P) and the multi circuit tester (⊕ probe of tester to O/R and ⊖ to P) as shown right illustration.

O/R : Orange with Red tracer

B/W : Black with White tracer

P : Pink

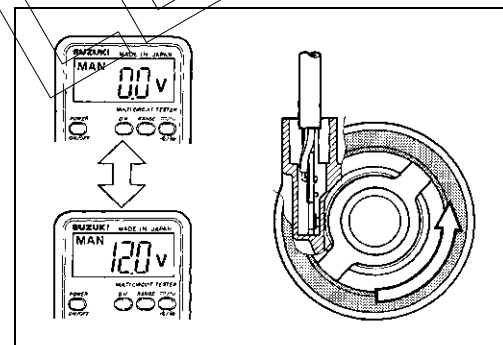
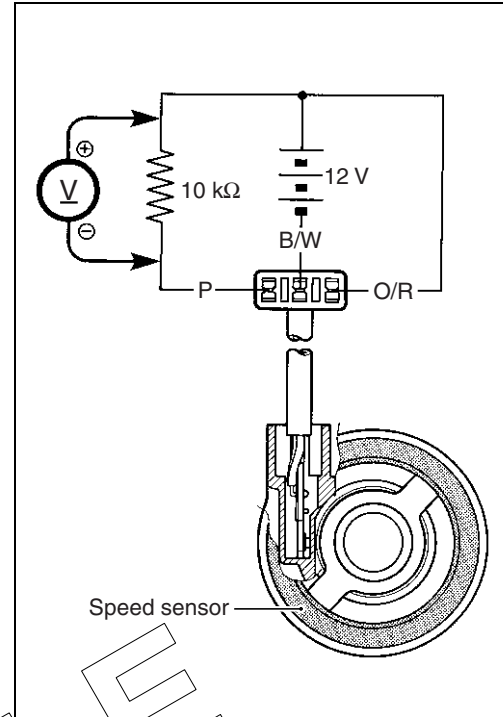
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (V)

Under above condition, by rotating the drive lugs of speed sensor slowly, the tester reading voltage relatively changes (0 V → 12 V or 12 V → 0 V). If the tester reading voltage does not change, replace the speed sensor with a new one.

NOTE:

The highest tester reading voltage (12 V) while testing is same as battery voltage.



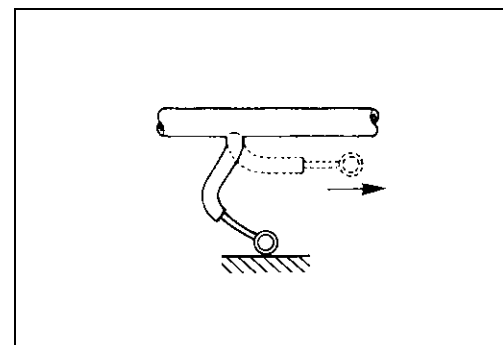
SAMPLE

OIL PRESSURE INDICATOR

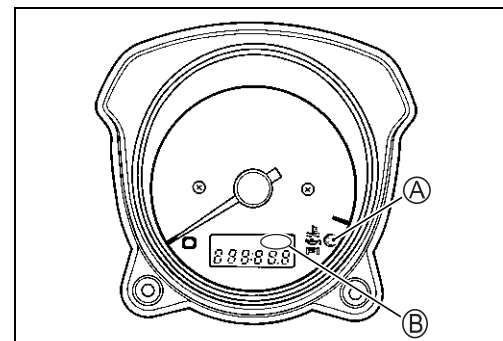
NOTE:

Before inspecting the oil pressure switch, check if the engine oil level is correct. (2-11)

- Disconnect the oil pressure switch lead wire from the oil pressure switch.
- Turn the ignition switch ON.
- Check if the oil pressure indicator (A) will light and LCD (B) will flicker, when grounding the lead wire.



If any indications are abnormal, replace the speedometer with a new one after checking connection of couplers.



LAMPS

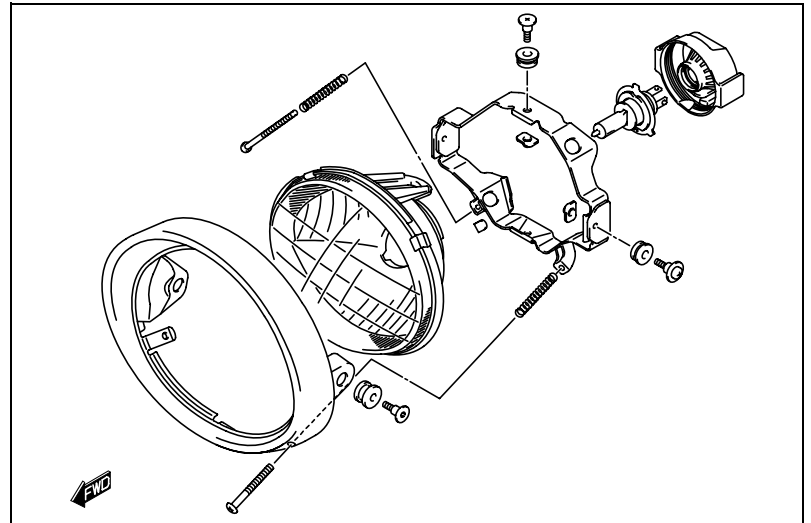
HEADLIGHT, BRAKE LIGHT/TAILLIGHT, LICENSE PLATE LIGHT AND TURN SIGNAL LIGHT

HEADLIGHT

12 V 60/55 W

POSITION LIGHT

12 V 5 W (E-02, 19)

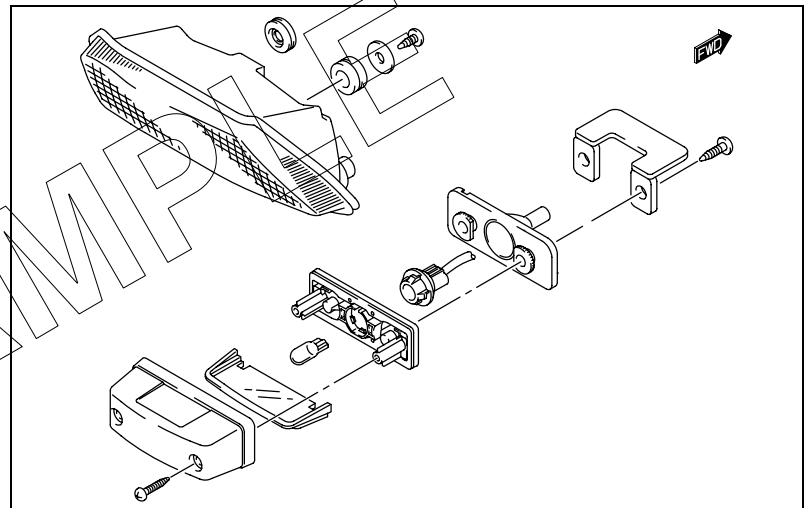


BRAKE LIGHT/TAILLIGHT

LED

LICENCE PLATE LIGHT ④

12 V 5 W



TURN SIGNAL LIGHT ⑤

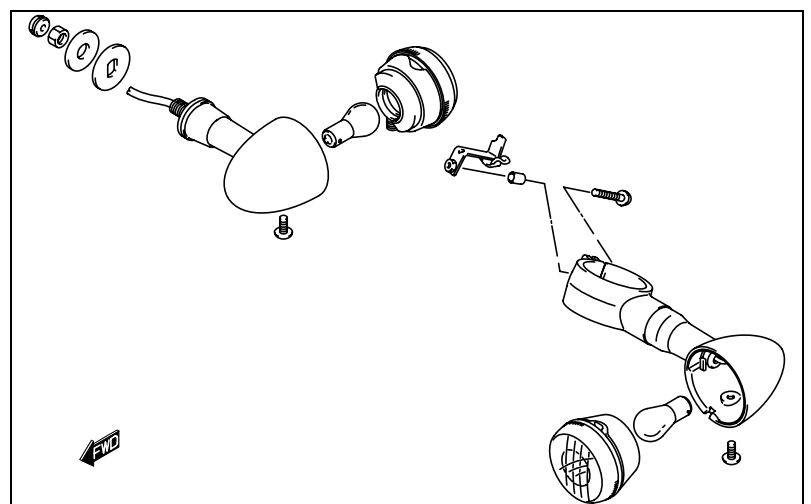
Front

12 V 21/5 W (E-03, 28, 33)

12 V 21 W (E-02, 19, 24)

Rear

12 V 21 W



CAUTION

If you have touched and the bulb with your bare hands, clean it with a cloth moistened with alcohol or soapy water to maintain lens clarity.

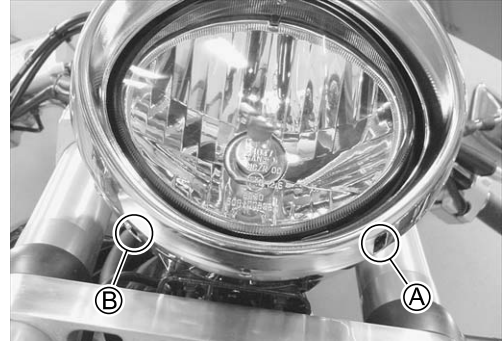
HEADLIGHT BEAM ADJUSTMENT

- Adjust the headlight beam.

- Ⓐ: Vertical adjuster
- Ⓑ: Horizontal adjuster

NOTE:

To adjust the headlight beam, adjust the beam horizontally first, then adjust vertically.

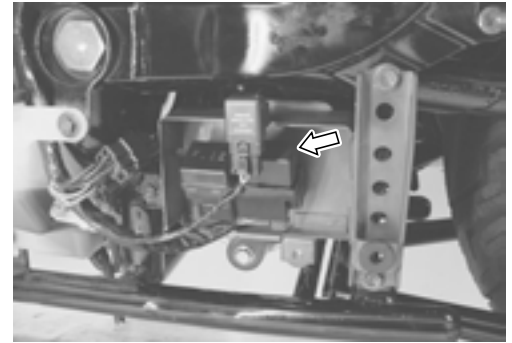


SAMPLE

RELAYS

TURN SIGNAL/SIDE-STAND RELAY

The turn signal/side-stand relay is composed of the turn signal relay, side-stand relay and diode.



INSPECTION

Before removing the turn signal/side-stand relay, check the operation of the turn signal light.

If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.

If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty. In this case, replace the turn signal/side-stand relay with a new one.

NOTE:

* Make sure that the battery is fully charged.

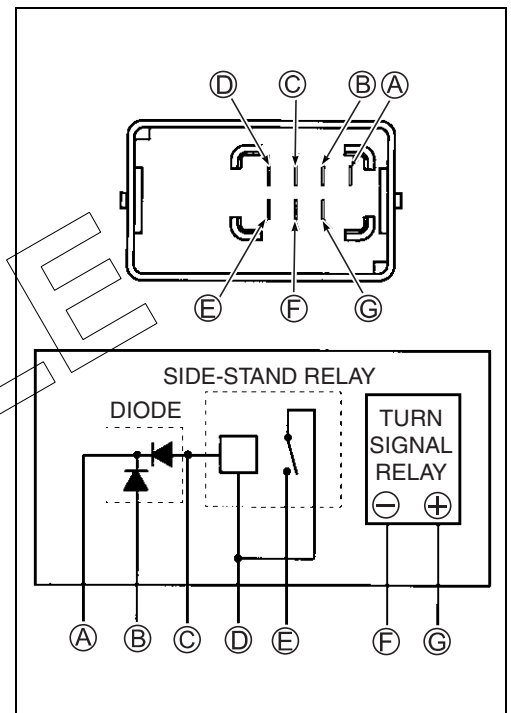
* Refer to the page 9-16 for the side-stand relay and diode inspection.

STARTER RELAY

☞ 9-16 to -17

FUEL PUMP RELAY

☞ 6-6



SWITCHES

IGNITION SWITCH REMOVAL

- Remove the fuel tank. (☞ 6-3)
- Remove the frame head covers. (☞ 3-3)
- Disconnect the coupler ①.
- Remove the ignition switch mounting bolts with the special tools.

TOOL 09930-11920: Torx bit JT40H

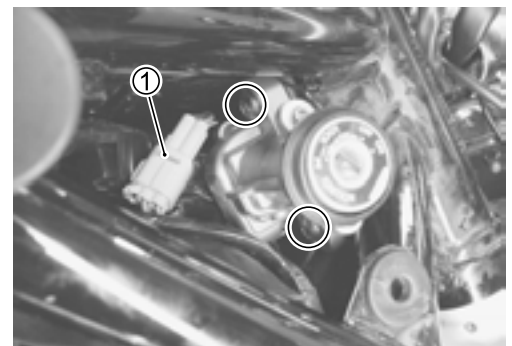
09930-11940: Bit holder

CAUTION

When reusing the ignition switch bolt, clean thread and apply the **THREAD LOCK**.

🔧 1342 99000-32050: THREAD LOCK "1342" (USA)

🔧 1322 99000-32110: THREAD LOCK SUPER "1322" (Others)



Inspect each switch for continuity with a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

HAZARD SWITCH

Color Position	B	Lbl	Lg
• (OFF)			
△ (ON)	○	○	○

IGNITION SWITCH

Color Position	R	O	O/Y	Br
ON	○	○	○	○
OFF				
LOCK				
P	○			○

DIMMER SWITCH

Color Position	W	Y	Y/W
HI (☹)		○	○
LO (☺)	○		○

TURN SIGNAL SWITCH

Color Position	Lg	Lbl	B
L		○	○
PUSH			
R	○		○

PASSING LIGHT SWITCH

Color Position	O/R	Y
•		
PUSH	○	○

ENGINE STOP SWITCH

Color Position	O/B	O/W
OFF (⊗)		
RUN (⊙)	○	○

STARTER BUTTON

Color Position	O/W	Y/G	Y/W	O/R
•			○	○
PUSH	○	○		

HORN BUTTON

Color Position	B/Bl	B/W
•		
PUSH	○	○

FRONT BRAKE SWITCH

Color Position	B/R	B/Bl
OFF		
ON	○	○

REAR BRAKE SWITCH

Color Position	O/G	W/B
OFF		
ON	○	○

CLUTCH LEVER POSITION SWITCH

Color Position	B/Y	B/Y
OFF		
ON	○	○

OIL PRESSURE SWITCH

Color Position	G/Y	Ground
ON (engine is at stop)	○	○
OFF (engine is running)		

NOTE:

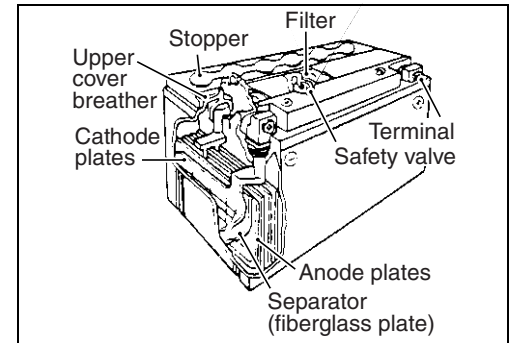
Before inspecting the oil pressure switch, check if the engine oil level is correct. (☞ 2-11)

WIRE COLOR

- B : Black
- Bl : Light blue
- R : Red
- Br : Brown
- Lg : Light green
- Y : Yellow
- Gr : Gray
- O : Orange
- W : White
- G : Green
- B/Bl : Black with Blue tracer
- B/W : Black with White tracer
- B/Y : Black with Yellow tracer
- B/R : Black with Red tracer
- G/Y : Green with Yellow tracer
- O/B : Orange with Black tracer
- O/Bl : Orange with Blue tracer
- O/G : Orange with Green tracer
- O/R : Orange with Red tracer
- O/W : Orange with White tracer
- O/Y : Orange with Yellow tracer
- W/B : White with Black tracer
- Y/G : Yellow with Black tracer
- Y/W : Yellow with White tracer

BATTERY SPECIFICATIONS

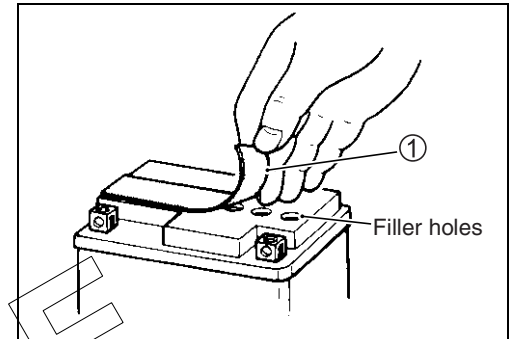
Type designation	FTX12-BS
Capacity	12 V, 36 kC (10 Ah)/10 HR



INITIAL CHARGING

Filling electrolyte

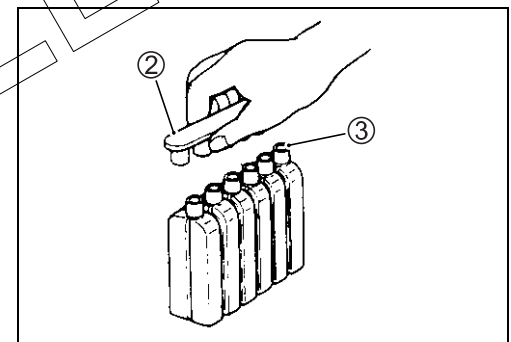
- Remove the aluminum tape ① sealing the battery electrolyte filler holes.



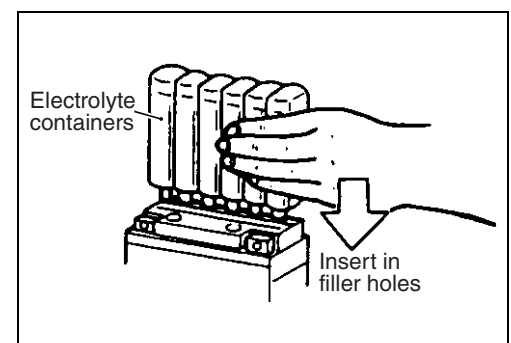
- Remove the caps ②.

NOTE:

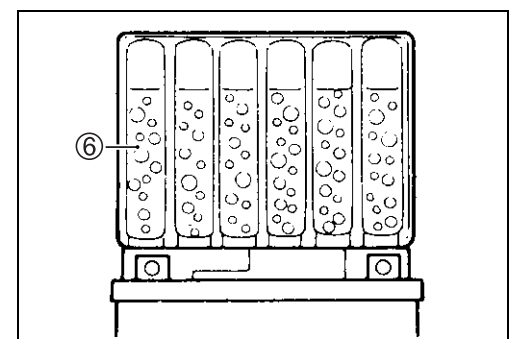
- * After filling the electrolyte completely, use the removed cap ② as sealing caps of battery-filler holes.
- * Do not remove or pierce the sealed areas ③ of the electrolyte container.



Insert the nozzles of the electrolyte container into the battery's electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.



- Make sure air bubbles ⑥ are coming up each electrolyte container, and leave in this position for about more than 20 minutes.



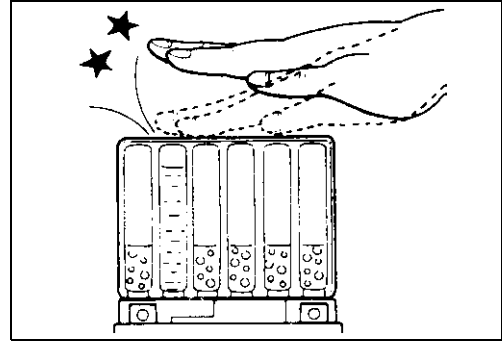
SAMPLE

NOTE:

If no air bubbles are coming up from a filler port, tap the bottom of the electrolyte container two or three times.

Never remove the container from the battery.

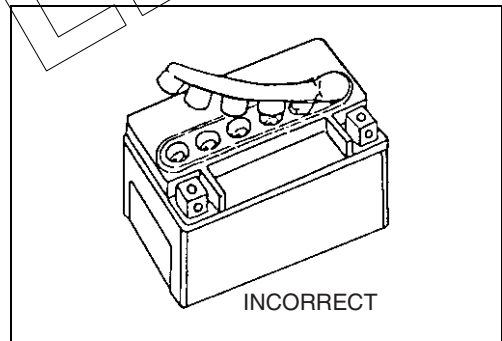
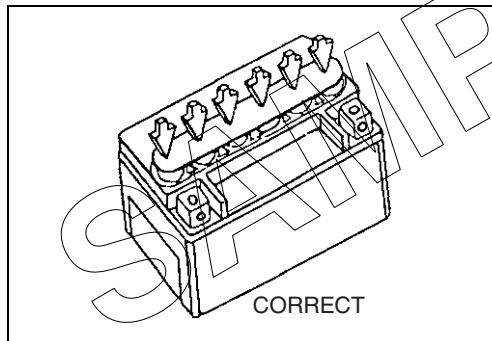
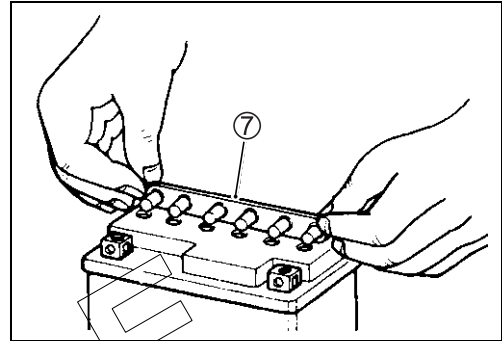
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about more than 20 minutes.



- Insert the caps ⑦ into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

CAUTION

- * Never use anything except the specified battery.
- * Once the caps have been installed to the battery, do not remove the caps.
- * Do not tap the caps with a tool such as hammer when installing them.



- For initial charging, use the charger specially designed for MF battery.

CAUTION

- * For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.
- * Do not remove the cap during charging.
- * Position the battery with the cap facing upward during charging.

SERVICING

Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.

RECHARGING OPERATION

- Using the multi circuit tester, check the battery voltage. If the voltage reading is less than the 12.0 V (DC), recharge the battery with a battery charger.

CAUTION

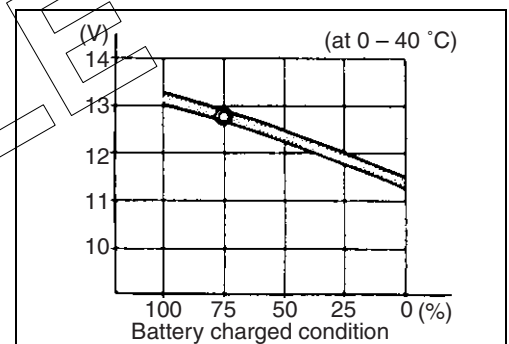
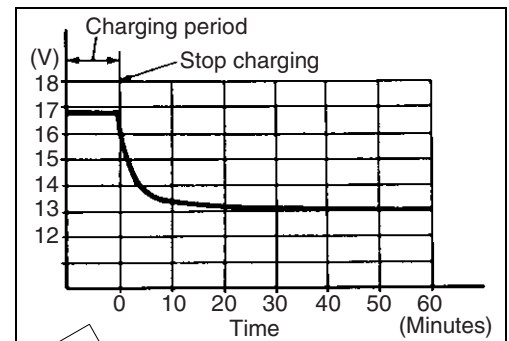
- * When recharging the battery, remove the battery from the motorcycle.
- * Do not remove the caps on the battery top while recharging.

Recharging time: 5 A for 1 hour or 1.2 A for 5 to 10 hours

CAUTION

Be careful not to permit the charging current to exceed 5 A at any time.

- After recharging, wait for more than 30 minutes and check the battery voltage with a multi circuit tester.
- If the battery voltage is less than the 12.5 V, recharge the battery again.
- If battery voltage is still less than 12.5 V, after recharging, replace the battery with a new one.
- When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.



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TROUBLESHOOTING

FI SYSTEM MALFUNCTION CODE AND DEFECTIVE CONDITION

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR		
C00		NO FAULT	-----	-----		
C12		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts (CKP sensor, lead wire/coupler connection)		
P0335						
C13/C17		IAP sensor	The sensor should produce following voltage. $0.1\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, C13 (P1750) or C17 (P0105) is indicated.	IAP sensor, lead wire/coupler connection		
P1750/P0105						
C14		TP sensor	The sensor should produce following voltage. $0.1\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection		
P0120	H				Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open
	L				Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open
C15		ECT sensor	The sensor voltage should be the following. $0.1\text{ V} \leq \text{sensor voltage} < 4.6\text{ V}$ In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection		
P0115	H				Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L				Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C21		IAT sensor	The sensor voltage should be the following. $0.1\text{ V} \leq \text{sensor voltage} < 4.6\text{ V}$ In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground
C23		TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. $0.2\text{ V} \leq \text{sensor voltage} \leq 4.6\text{ V}$ In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit open or shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit shorted to ground or VCC circuit open
C24/C25		Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 8 times or more continuously. In this case, the code C24 (P0351) or C25 (P0352) is indicated.	Ignition coil, lead wire/coupler connection, power supply from the battery
P0351/P0352				
C28		Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate.	STVA motor, STVA lead wire/coupler
P1655				
C29		STP sensor	The sensor should produce following voltage. $0.1\text{ V} \leq \text{sensor voltage} < 4.8\text{ V}$ In other than the above range, C29 is indicated.	STP sensor, lead wire/coupler connection
P1654	H		Sensor voltage is higher than specified value.	STP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to ground or VCC circuit open

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C31	Gear position signal	Gear position signal voltage should be higher than the following for 3 seconds and more. Gear position sensor voltage > 0.6 V If lower than the above value, C31 (P0705) is indicated.	GP switch, lead wire/coupler connection. Gearshift cam, etc.
P0705			
C32/C33	Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 4 times or more continuously. In this case, the code C32 (P0201) or C33 (P0202) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector
P0201/P0202			
C41	Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/coupler connection. power source to the fuel pump relay and fuel injectors
P0230			
C42	Ignition switch	Ignition switch signal is not input to ECM.	Ignition switch, lead wire/coupler
P1650			
C44	HO2 sensor (E-02, 19, 24)	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage ≤ 0.1 V) In other than the above value, C44 (P0130) is indicated.	HO2 sensor circuit open or shorted to ground
P0130			
C44	HO2 sensor (E-02, 19, 24)	The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor lead wire/coupler connection Battery voltage supply to the HO2 sensor
P0135			
C49	PAIR control solenoid valve	PAIR control solenoid valve voltage is not input to ECM.	PAIR control solenoid valve, lead wire/coupler
P1656			

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start or is hard to start.	<p>Compression too low</p> <ol style="list-style-type: none"> 1. Out of adjustment valve clearance 2. Worn valve guides or poor seating of valves 3. Mistiming valves 4. Excessively worn piston rings 5. Worn-down cylinder bores 6. Too slowly starter motor cranks 7. Poor seating of spark plugs <p>Plug not sparking</p> <ol style="list-style-type: none"> 1. Fouled spark plugs 2. Wet spark plugs 3. Defective ignition coil 4. Defective CKP sensor 5. Defective ECM 6. Open-circuited wiring connections 7. Open or short in high-tension cords <p>No fuel reaching the intake manifold</p> <ol style="list-style-type: none"> 1. Clogged fuel filter or fuel hose 2. Defective fuel pump 3. Defective fuel pressure regulator 4. Defective fuel injector 5. Defective fuel pump relay 6. Defective ECM 7. Open-circuited wiring connections <p>Incorrect fuel/air mixture</p> <ol style="list-style-type: none"> 1. Out of adjustment TP sensor 2. Defective fuel pump 3. Defective fuel pressure regulator 4. Defective TP sensor 5. Defective CKP sensor 6. Defective IAP sensor 7. Defective ECM 8. Defective ECT sensor 9. Defective IAT sensor 	<p>Adjust. Repair or replace. Adjust. Replace. Replace. See electrical section. Retighten.</p> <p>Clean. Clean and dry. Replace. Replace. Replace. Repair or Replace. Replace.</p> <p>Clean or replace. Replace. Replace. Replace. Replace. Replace. Check and repair.</p> <p>Adjust. Replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace.</p>

Complaint	Symptom and possible causes	Remedy
Noisy engine	Excessive valve chatter <ol style="list-style-type: none"> 1. Too large valve clearance 2. Weakened or broken valve springs 3. Worn tappet or cam surface 4. Worn and burnt camshaft journal 	Adjust. Replace. Replace. Replace.
	Noise seems to come from piston <ol style="list-style-type: none"> 1. Worn down pistons or cylinders 2. Fouled with carbon combustion chambers 3. Worn piston pins or piston pin bore 4. Worn piston rings or ring grooves 	Replace. Clean. Replace. Replace.
	Noise seems to come from timing chain <ol style="list-style-type: none"> 1. Stretched chain 2. Worn sprockets 3. Not working tension adjuster 	Replace. Replace. Repair or replace.
	Noise seems to come from clutch <ol style="list-style-type: none"> 1. Worn splines of countershaft or hub 2. Worn teeth of clutch plates 3. Distorted clutch plates, driven and drive 4. Worn clutch release bearing 5. Weakened clutch dampers 	Replace. Replace. Replace. Replace. Replace the primary driven gear.
	Noise seems to come from crankshaft <ol style="list-style-type: none"> 1. Due to wear rattling bearings 2. Worn and burnt crank pin bearings 3. Worn and burnt journal bearings 4. Too large thrust clearance 	Replace. Replace. Replace. Replace thrust bearing.
	Noise seems to come from transmission <ol style="list-style-type: none"> 1. Worn or rubbing gears 2. Worn splines 3. Worn or rubbing primary gears 4. Worn bearings 	Replace. Replace. Replace. Replace.
	Noise seems to come from water pump <ol style="list-style-type: none"> 1. Too much play on pump shaft bearing 2. Worn or damaged impeller shaft 3. Worn or damaged mechanical seal 4. Touches pump case and impeller 	Replace. Replace. Replace. Replace.

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high speed range.	<p>Defective engine internal/electrical parts</p> <ol style="list-style-type: none"> 1. Weakened valve springs 2. Worn camshafts 3. Valve timing out of adjustment 4. Too narrow spark plug gaps 5. Ignition not advanced sufficiently due to poorly working timing advance circuit 6. Defective ignition coils 7. Defective CKP sensor 8. Defective ECM 9. Clogged air cleaner element 10. Clogged fuel hose, resulting in inadequate fuel supply to injector 11. Defective fuel pump 12. Defective TP sensor 13. Defective STP sensor or STV actuator <p>Defective air flow system</p> <ol style="list-style-type: none"> 1. Clogged air cleaner element 2. Defective throttle valve 3. Defective secondary throttle valve 4. Sucking air from throttle body joint 5. Defective ECM 6. Imbalancing throttle valve synchronization <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure 2. Defective TP sensor 3. Defective IAT sensor 4. Defective CKP sensor 5. Defective GP sensor 6. Defective IAP sensor 7. Defective ECM 8. Out of adjustment TP sensor 9. Defective STP sensor and/or STV actuator 	<p>Replace.</p> <p>Replace.</p> <p>Adjust.</p> <p>Adjust.</p> <p>Replace ECM.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Clean.</p> <p>Clean and prime.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Clean or replace.</p> <p>Adjust or replace.</p> <p>Adjust or replace.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Adjust.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

Complaint	Symptom and possible causes	Remedy
Engine lacks power.	<p>Defective engine internal/electrical parts</p> <ol style="list-style-type: none"> 1. Loss of valve clearance 2. Weakened valve springs 3. Out of adjustment valve timing 4. Worn piston rings or cylinders 5. Poor seating of valves 6. Fouled spark plugs 7. Incorrect spark plugs 8. Clogged injectors 9. Out of adjustment TP sensor 10. Clogged air cleaner element 11. Imbalancing throttle valve synchronization 12. Sucking air from throttle valve or vacuum hose 13. Too much engine oil 14. Defective fuel pump or ECM 15. Defective CKP sensor and ignition coils <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure 2. Defective TP sensor 3. Defective IAT sensor 4. Defective CKP sensor 5. Defective GP sensor 6. Defective IAP sensor 7. Defective ECM 8. Out of adjustment TP sensor 9. Defective STP sensor and/or STV actuator 10. Defective EXCV actuator 	<p>Adjust. Replace. Adjust. Replace. Repair. Clean or replace. Adjust or replace. Clean. Adjust. Clean. Adjust. Retighten or replace. Drain out excess oil. Replace. Replace.</p> <p>Repair or replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace.</p>
Engine overheats	<p>Defective engine internal parts</p> <ol style="list-style-type: none"> 1. Heavy carbon deposit on piston crowns 2. Not enough oil in the engine 3. Defective oil pump or clogged oil circuit 4. Sucking air from intake pipes 5. Use incorrect engine oil 6. Defective cooling system <p>Lean fuel/air mixture</p> <ol style="list-style-type: none"> 1. Short-circuited IAP sensor/lead wire 2. Short-circuited IAT sensor/lead wire 3. Sucking air from intake pipe joint 4. Defective fuel injectors 5. Defective ECT sensor <p>The other factors</p> <ol style="list-style-type: none"> 1. Ignition timing is too advanced due to defective timing advance system (ECT sensor, GP sensor, CKP sensor and ECM). 2. Drive chain is too tight. 	<p>Clean. Add oil. Replace or clean. Retighten or replace. Change. See radiator section.</p> <p>Repair or replace. Repair or replace. Clean or replace. Repair or replace. Replace.</p> <p>Replace. Adjust.</p>

Complaint	Symptom and possible causes	Remedy
Dirty or heavy exhaust smoke	<ol style="list-style-type: none"> 1. Too much engine oil in the engine 2. Worn piston rings or cylinders 3. Worn valve guides 4. Scored or scuffed cylinder walls 5. Worn valves stems 6. Defective stem seal 7. Worn oil ring side rails 	<p>Check with inspection window drain out excess oil.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Slipping clutch	<ol style="list-style-type: none"> 1. Weakened clutch springs 2. Worn or distorted pressure plates 3. Distorted clutch plates or pressure plates 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Dragging clutch	<ol style="list-style-type: none"> 1. Some clutch spring weakened while others are not. 2. Distorted pressure plates or clutch plates 	<p>Replace.</p> <p>Replace.</p>
Transmission will not shift.	<ol style="list-style-type: none"> 1. Broken gearshift cam 2. Distorted gearshift forks 3. Worn gearshift pawl 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Transmission will not shift back.	<ol style="list-style-type: none"> 1. Broken return spring on shift shaft 2. Rubbing or stickily shift shaft 3. Distorted or worn gearshift forks 	<p>Replace.</p> <p>Repair or replace.</p> <p>Replace.</p>
Transmission jumps out of gear.	<ol style="list-style-type: none"> 1. Worn shifting gears on driveshaft or countershaft 2. Distorted or worn gearshift forks 3. Weakened stopper spring on gearshift stopper 4. Worn gearshift cam plate 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
Engine overheats	<ol style="list-style-type: none"> 1. Not enough engine coolant 2. Clogged with dirt or trashes radiator core 3. Faulty cooling fan 4. Defective cooling fan thermo-switch 5. Clogged water passage 6. Air trapped in the cooling circuit 7. Defective water pump 8. Use incorrect coolant 9. Defective thermostat 	<p>Add coolant.</p> <p>Clean.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Clean.</p> <p>Bleed out air.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Engine overcools	<ol style="list-style-type: none"> 1. Defective cooling fan thermo-switch 2. Extremely cold weather 3. Defective thermostat 	<p>Replace.</p> <p>Put on the radiator cover.</p> <p>Replace.</p>

CHASSIS

Complaint	Symptom and possible causes	Remedy
Heavy steering	<ol style="list-style-type: none"> 1. Overtightened steering stem nut 2. Broken bearing in steering stem 3. Distorted steering stem 4. Not enough pressure in tires 	Adjust. Replace. Replace. Adjust.
Wobbly handlebars	<ol style="list-style-type: none"> 1. Loss of balance between right and left front forks 2. Distorted front fork 3. Distorted front axle or crooked tire 4. Loose steering stem nut 5. Worn or incorrect tire or wrong tire pressure 6. Worn bearing/race in steering stem 	Adjust. Repair or replace. Replace. Adjust. Adjust or replace. Replace.
Wobbly front wheel	<ol style="list-style-type: none"> 1. Distorted wheel rim 2. Worn front wheel bearings 3. Defective or incorrect tire 4. Loose axle or axle pinch bolt 5. Incorrect front fork oil level 	Replace. Replace. Replace. Retighten. Adjust.
Front suspension too soft	<ol style="list-style-type: none"> 1. Weakened springs 2. Not enough fork oil 3. Wrong weight fork oil 4. Improperly set front fork spring adjuster 5. Improperly set front fork damping force adjuster 	Replace. Replenish. Replace. Adjust. Adjust.
Front suspension too stiff	<ol style="list-style-type: none"> 1. Too viscous fork oil 2. Too much fork oil 3. Improperly set front fork spring adjuster 4. Improperly set front fork damping force adjuster 5. Bent front axle 	Replace. Drain excess oil. Adjust. Adjust. Replace.
Noisy front suspension	<ol style="list-style-type: none"> 1. Not enough fork oil 2. Loose bolts on suspension 	Replenish. Retighten.
Wobbly rear wheel	<ol style="list-style-type: none"> 1. Distorted wheel rim 2. Worn rear wheel bearing or swingarm bearings 3. Defective or incorrect tire 4. Worn swingarm and rear suspension bearings 5. Loose nuts or bolts on rear suspensions 	Replace. Replace. Replace. Replace. Retighten.
Rear suspension too soft	<ol style="list-style-type: none"> 1. Weakened spring of shock absorber 2. Leakage oil or gas of shock absorber 3. Improperly set rear spring pre-load adjuster 4. Improperly set damping force adjuster 	Replace. Replace. Adjust. Adjust.
Rear suspension too stiff	<ol style="list-style-type: none"> 1. Bent shock absorber shaft 2. Bent swingarm 3. Worn swingarm and rear suspension bearings 4. Improperly set rear spring pre-load adjuster 5. Improperly set damping force adjuster 	Replace. Replace. Replace. Adjust. Adjust.
Noisy rear suspension	<ol style="list-style-type: none"> 1. Loose nuts or bolts on rear suspension 2. Worn swingarm and suspension bearings 	Retighten. Replace.

SHAFT DRIVE

Complaint	Symptom and possible causes	Remedy
Noisy shaft drive	Noise seems to come from secondary bevel gear and final bevel gear assemblies. <ol style="list-style-type: none"> Oil level too low Drive and driven bevel gears damaged or worn Excessive backlash Improper tooth contact Damage to bearings 	Refill. (Check oil jet./Replace oil seal.) Replace. Adjust. Adjust. Replace.
	Noise seems to come from propeller shaft area. <ol style="list-style-type: none"> Propeller shaft universal joint damaged Propeller shaft splines damaged or worn Insufficient lubricant Cam dog contacting surface damaged or worn 	Replace. Replace. Refill. (Replace oil seal.) Replace.

BRAKES

Complaint	Symptom and possible causes	Remedy
Insufficient brake power	<ol style="list-style-type: none"> Leakage of brake fluid from hydraulic system Worn pads Oil adhesion of engaging surface of pads/shoe Worn disc Air in hydraulic system Not enough brake fluid in the reservoir 	Repair or replace. Replace. Clean disc and pads. Replace. Bleed air. Replenish.
Brake squeaking	<ol style="list-style-type: none"> Carbon adhesion on pad surface Tilted pad Damaged wheel bearing Loosen front-wheel axle or rear-wheel axle Worn pads Foreign material in brake fluid Clogged return port of master cylinder 	Repair surface with sandpaper. Modify pad fitting or replace. Replace. Tighten to specified torque. Replace. Replace brake fluid. Disassemble and clean master cylinder.
Excessive brake lever stroke	<ol style="list-style-type: none"> Air in hydraulic system Insufficient brake fluid Improper quality of brake fluid 	Bleed air. Replenish fluid to specified level; bleed air. Replace with correct fluid.
Leakage of brake fluid	<ol style="list-style-type: none"> Insufficient tightening of connection joints Cracked hose Worn piston and/or cup 	Tighten to specified torque. Replace. Replace piston and/or cup.
Brake drags	<ol style="list-style-type: none"> Rusty part Insufficient brake lever or brake pedal pivot lubrication 	Clean and lubricate. Lubricate.

ELECTRICAL

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking	<ol style="list-style-type: none"> 1. Defective ignition coils or CKP sensor 2. Defective spark plugs 3. Defective ECM 4. Defective tip over sensor 5. Open-circuited wiring connections 	Replace. Replace. Replace. Replace. Check and repair.
Spark plug soon become fouled with carbon.	<ol style="list-style-type: none"> 1. Mixture too rich 2. Idling speed set too high 3. Incorrect gasoline 4. Dirty element in air cleaner 5. Too cold spark plugs 	Inspect FI system. Adjust fast idle or throttle stop screw. Change. Clean or replace. Replace with hot type plug.
Spark plug become fouled too soon.	<ol style="list-style-type: none"> 1. Worn piston rings 2. Worn piston or cylinders 3. Excessive clearance of valve stems in valve guides 4. Worn stem oil seal 	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	<ol style="list-style-type: none"> 1. Too hot spark plugs 2. Overheated engine 3. Loose spark plugs 4. Too lean mixture 	Replace with cold type plugs. Tune-up. Retighten. Inspect FI system.
Generator does not charge.	<ol style="list-style-type: none"> 1. Open or short lead wires, or loose lead connections. 2. Shorted, grounded or open generator coils 3. Shorted or punctured regulator/rectifier 	Repair or replace or retighten. Replace. Replace.
Generator does charge, but charging rate is below the specification.	<ol style="list-style-type: none"> 1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals 2. Grounded or open-circuited generator coils or generator 3. Defective regulator/rectifier 4. Defective cell plates in the battery 	Repair or retighten. Replace. Replace. Replace the battery.
Generator overcharges	<ol style="list-style-type: none"> 1. Internal short-circuit in the battery 2. Damaged or defective regulator/rectifier 3. Poorly grounded regulator/rectifier 	Replace the battery. Replace. Repair, replace, or connect properly.
Unstable charging	<ol style="list-style-type: none"> 1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting 2. Internally shorted generator 3. Defective regulator/rectifier 	Repair or replace. Replace. Replace.
Starter button is not effective.	<ol style="list-style-type: none"> 1. Run down battery 2. Defective switch contacts 3. Not seating properly brushes on commutator in starter motor 4. Defective starter relay/starter interlock switch 5. Defective main fuse 	Repair or replace. Replace. Repair or replace. Replace. Replace.

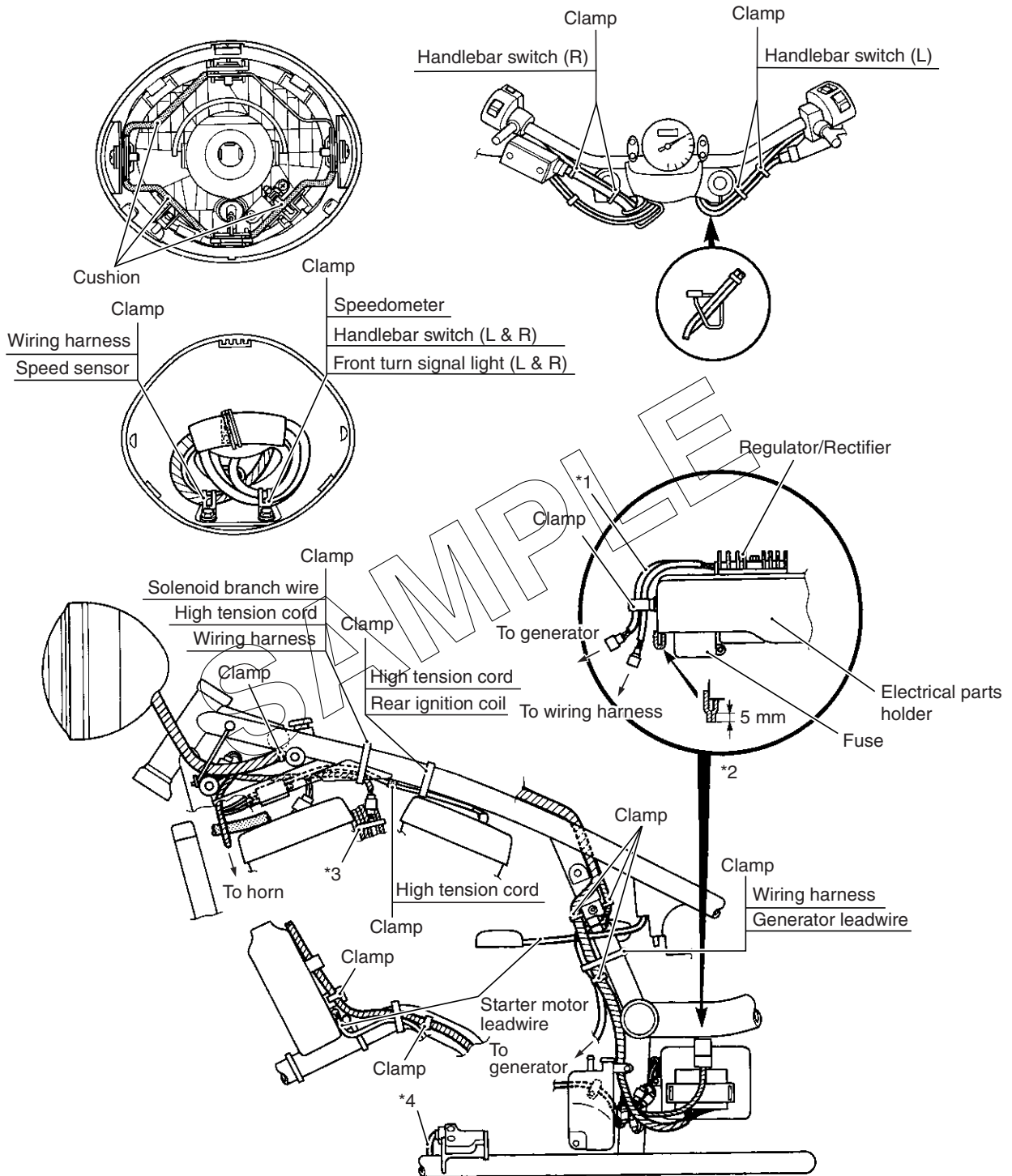
BATTERY

Complaint	Symptom and possible causes	Remedy
“Sulfation”, acidic white powdery substance or spots on surface of cell plates.	<ol style="list-style-type: none"> 1. Cracked battery case 2. Battery has been left in a run-down condition for a long time. 	<p>Replace the battery.</p> <p>Replace the battery.</p>
Battery runs down quickly.	<ol style="list-style-type: none"> 1. Not correct the charging system 2. Cell plates have lost much of their active material as a result of overcharging. 3. Internal short-circuit in the battery 4. Too low battery voltage 5. Too old battery 	<p>Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.</p> <p>Replace the battery, and correct the charging system.</p> <p>Replace the battery.</p> <p>Recharge the battery fully.</p> <p>Replace the battery.</p>
Battery “sulfation”	<ol style="list-style-type: none"> 1. Incorrect charging rate (When not in use batteries should be checked at least once a month to avoid sulfation.) 2. The battery was left un used in a cold climate for too long. 	<p>Replace the battery.</p> <p>Replace the battery if badly sulfated.</p>

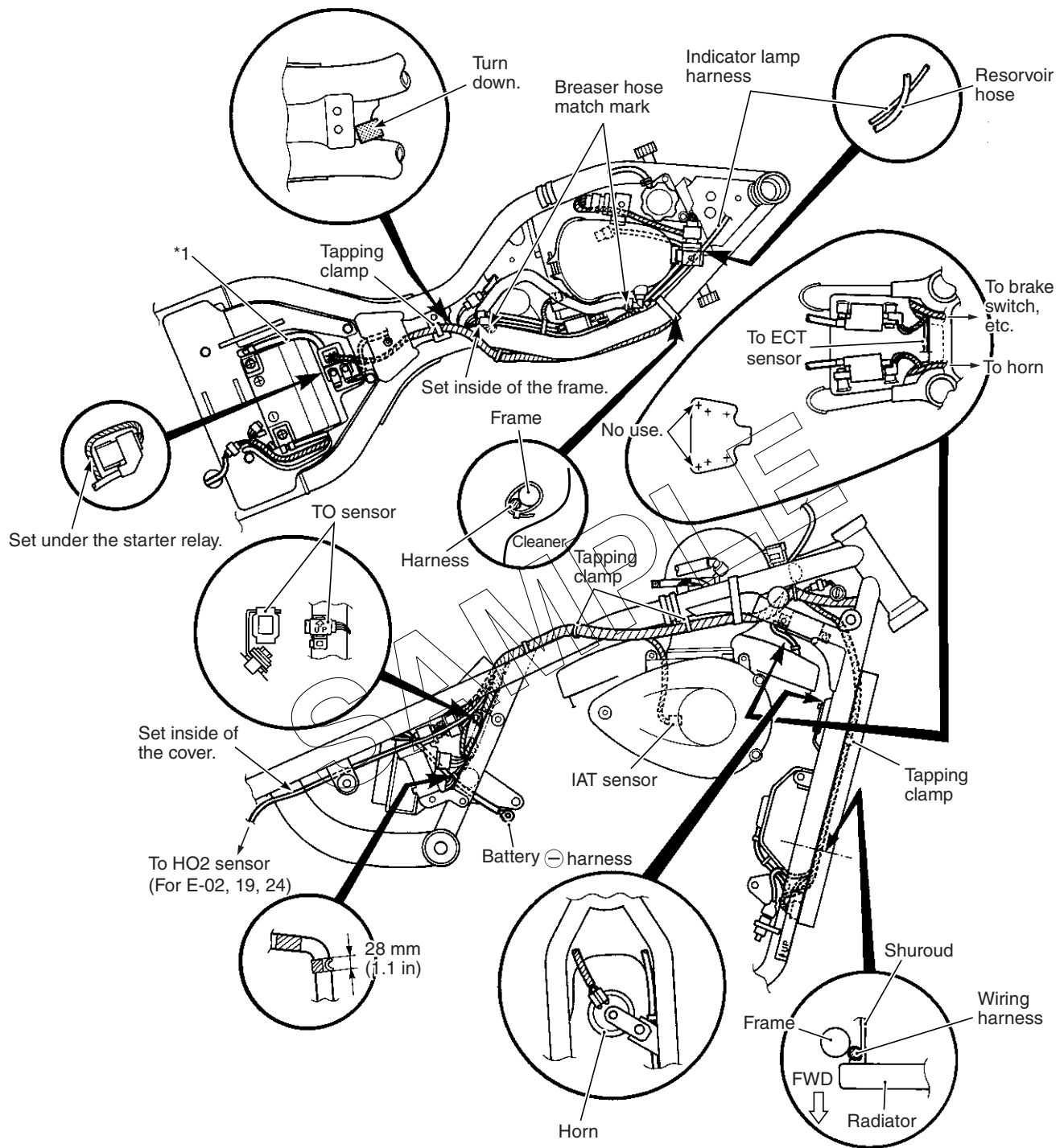
SAMPLE

WIRING HARNESS, CABLE AND HOSE ROUTING

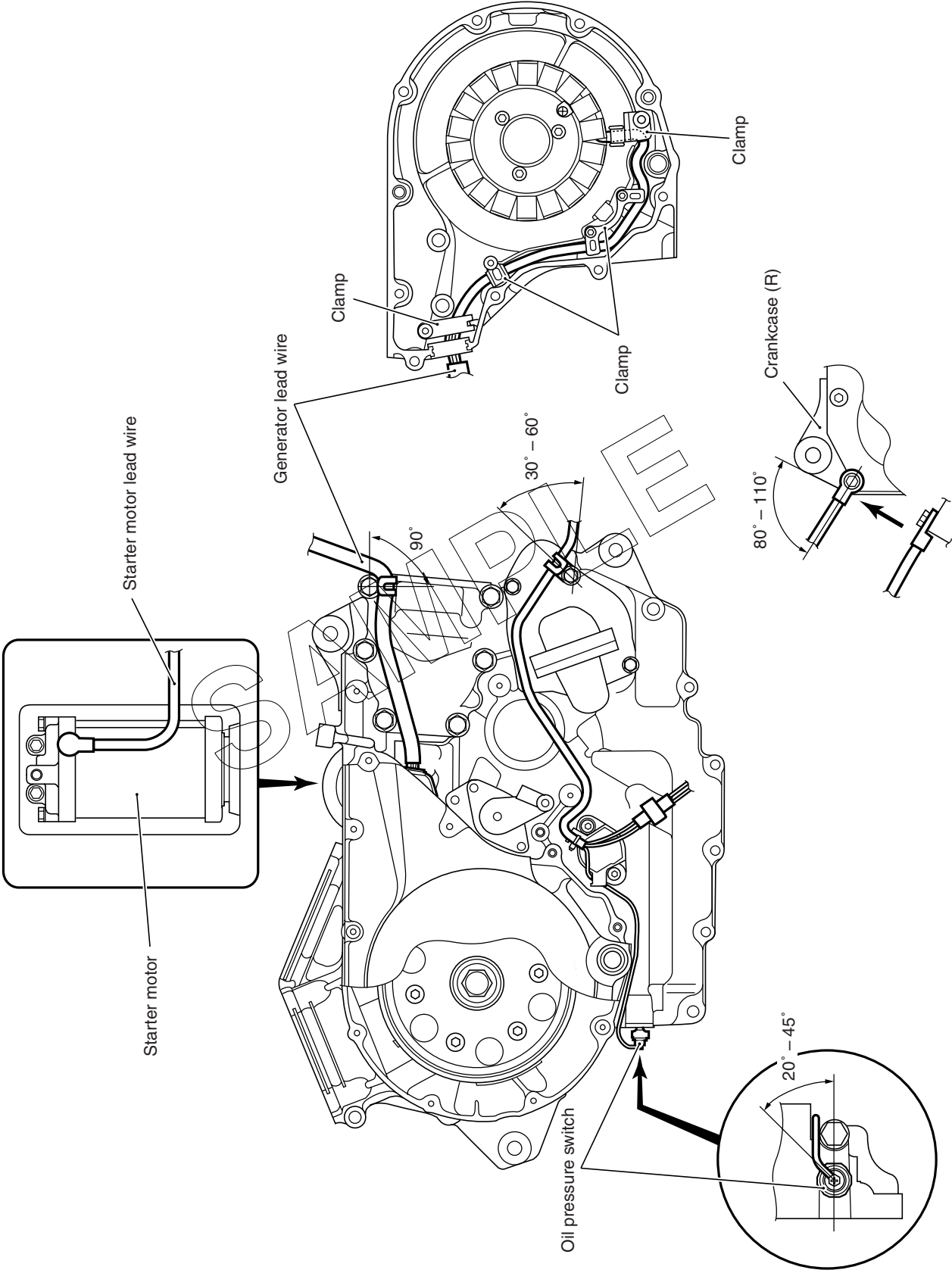
WIRING HARNESS ROUTING



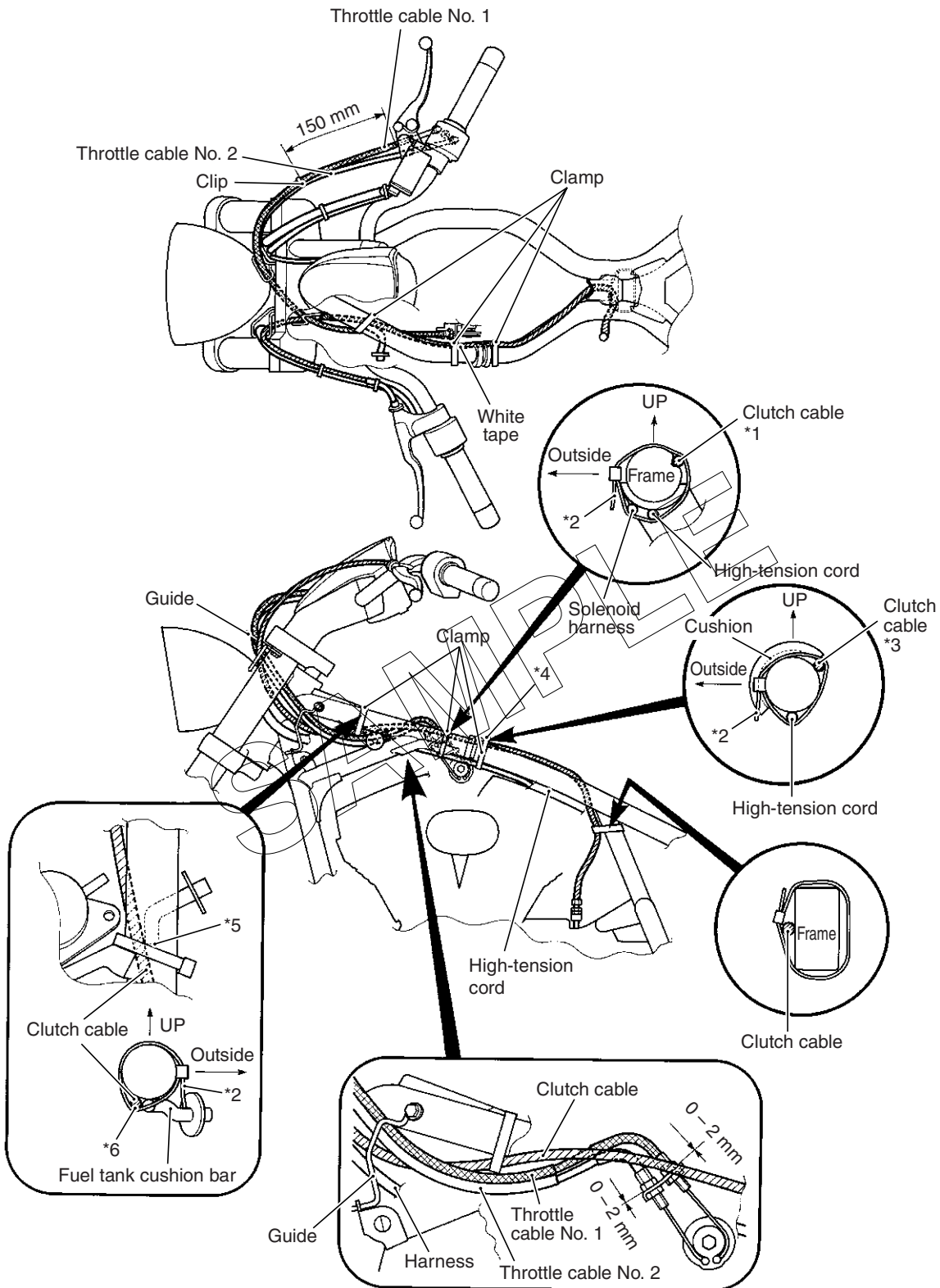
*1	Do not slacker.	*3	Cut after excess clamp.
*2	Do not pass through the harness on the bracket.	*4	Connect with the gear position switch inside cover.



*1	Pass through the ⊕ harness under the starter relay.
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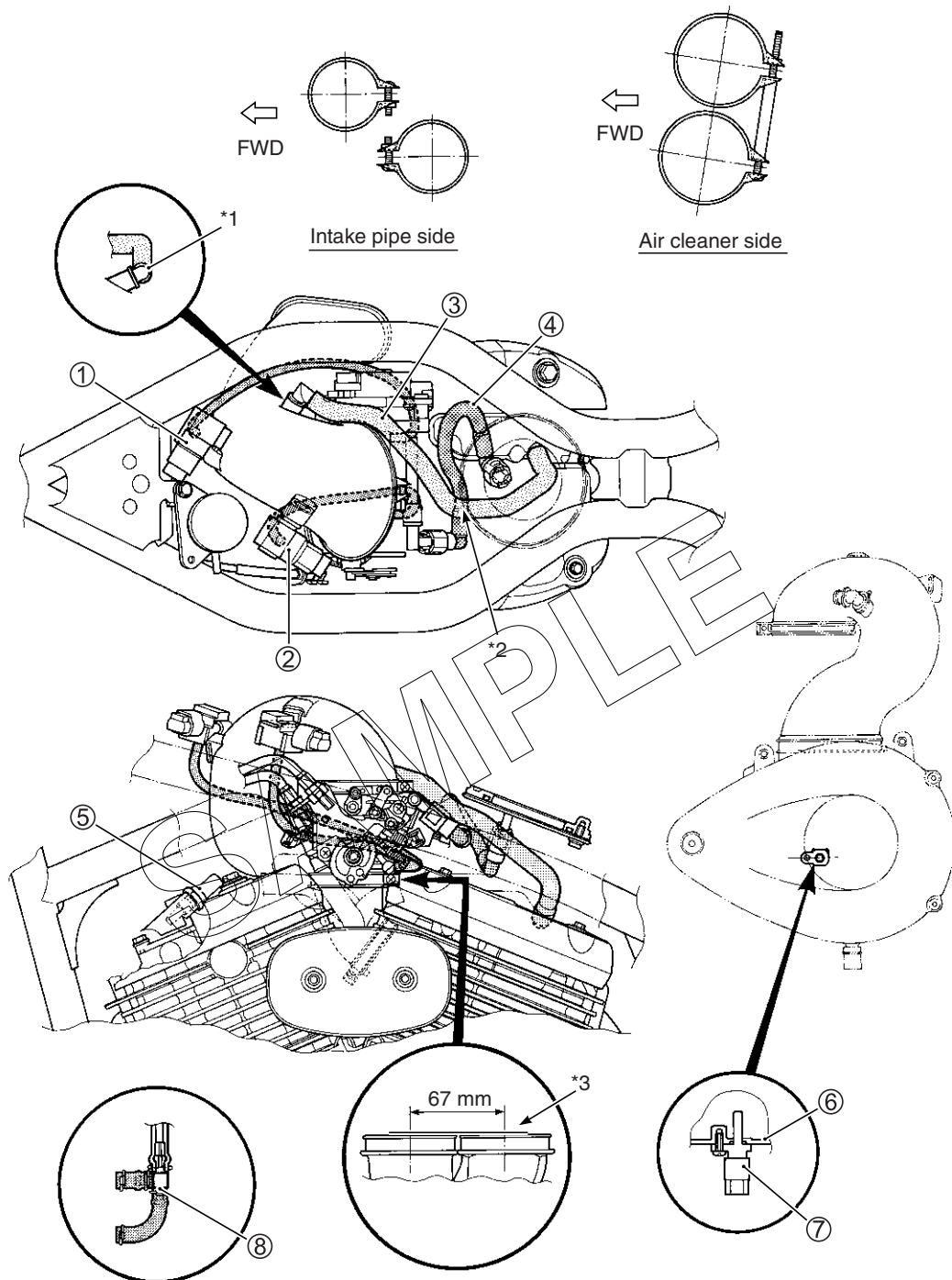


CABLE ROUTING



*1	Set the clutch cable dented part and clamp the clutch cable at white tape of cable.	*4	Clamp the back side of cushion.
*2	Clamp with this direction.	*5	Do not hang the clamp on the bar.
*3	Clamp the clutch cable attach to the cushion.	*6	Clamp inside the bar.

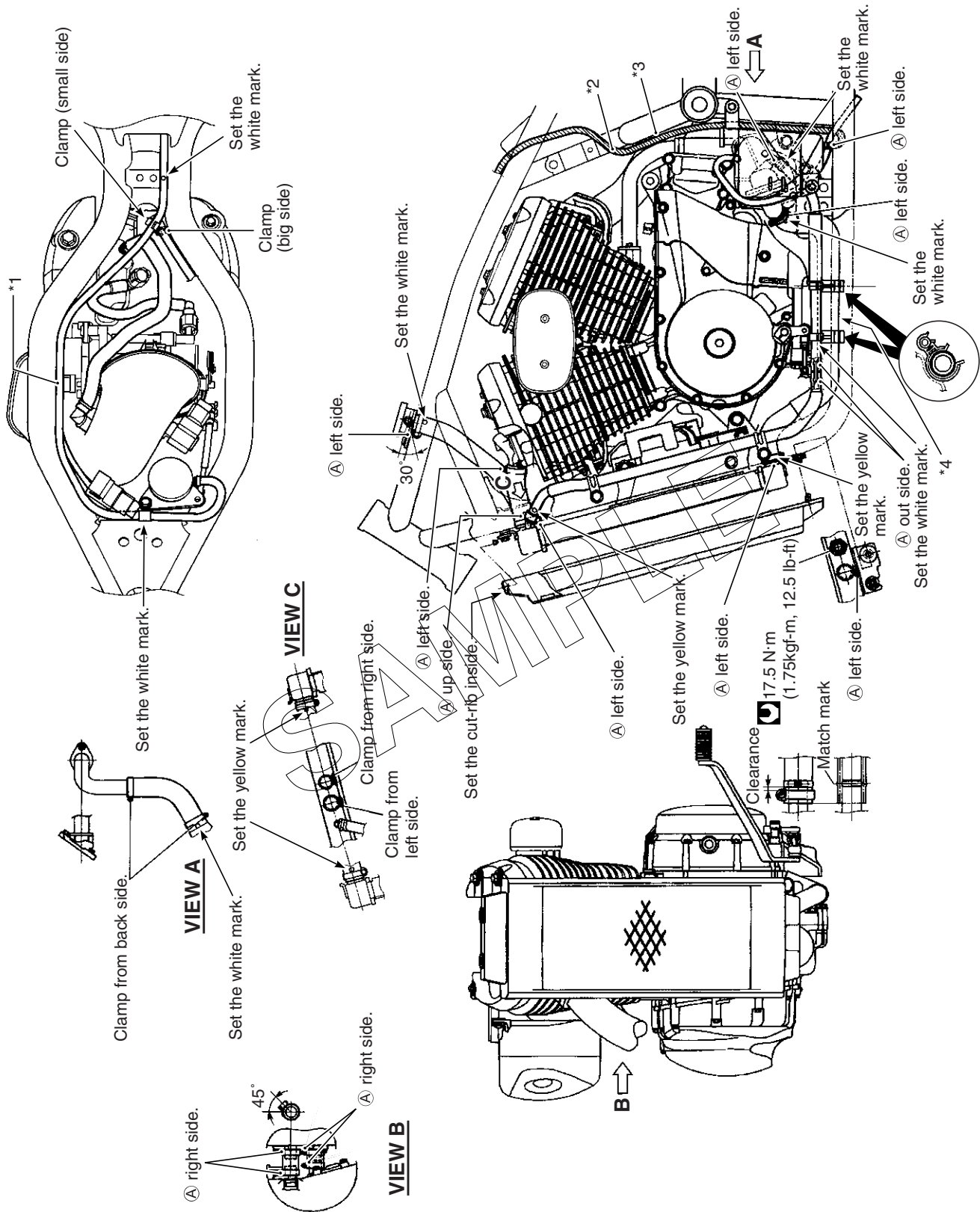
THROTTLE BODY INSTALLATION



①	IAP sensor (Front cylinder)	⑦	IAT sensor
②	IAP sensor (Rear cylinder)	⑧	Purge hose (E-33 only)
③	PCV (Breather) hose	*1	Match mark
④	Fuel feed hose	*2	Pass through the PCV (Breather) hose upper the fuel hose.
⑤	ECT sensor	*3	Install intake pipe with top surface being horizontal.
⑥	Cleaner case		

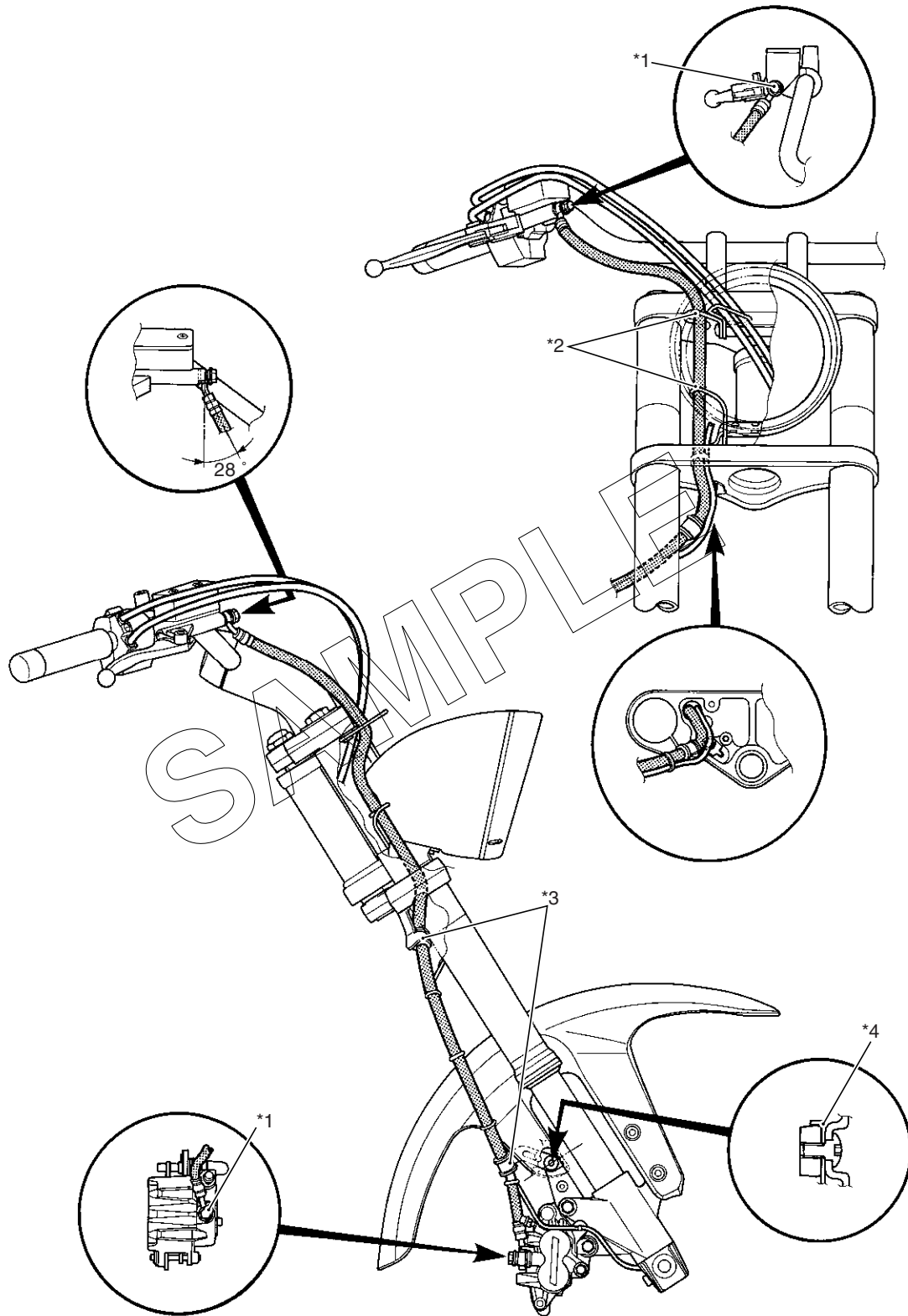
ITEM	N·m	kgf·m	lb·ft
⑤	18	1.8	13.0

COOLING SYSTEM HOSE ROUTING



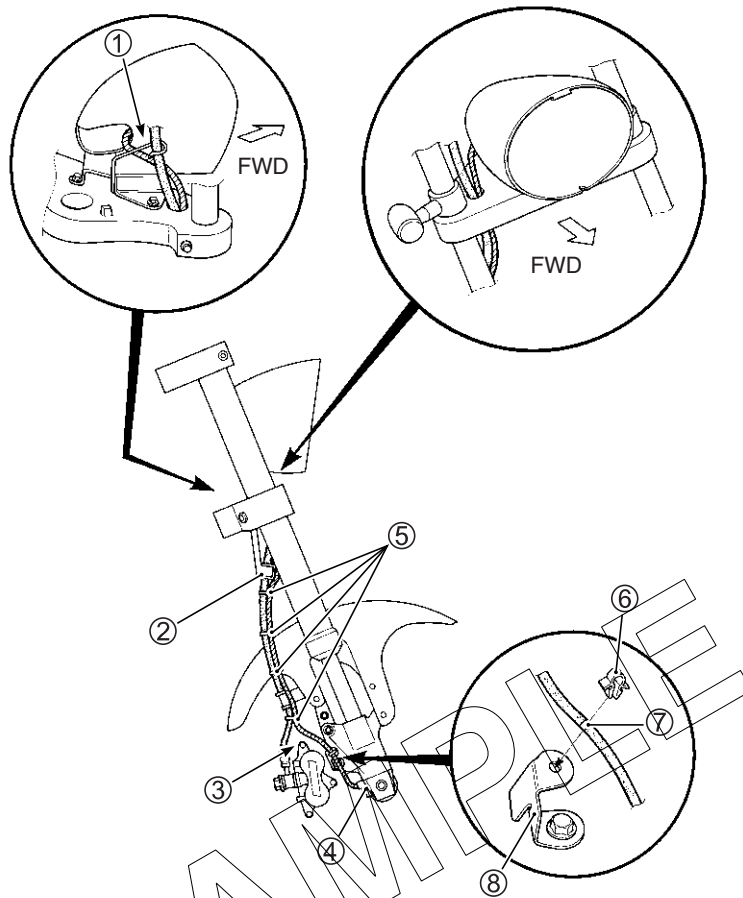
*1	Pass through the reservoir hose between frame and throttle valve actuator.	*4	Set the hose with dent of engine case.
*2	Clamp the hose with frame and harness.	A	The end of the clamp should face...
*3	Be careful not to dent hose with frame cover.		

FRONT BRAKE ROUTING



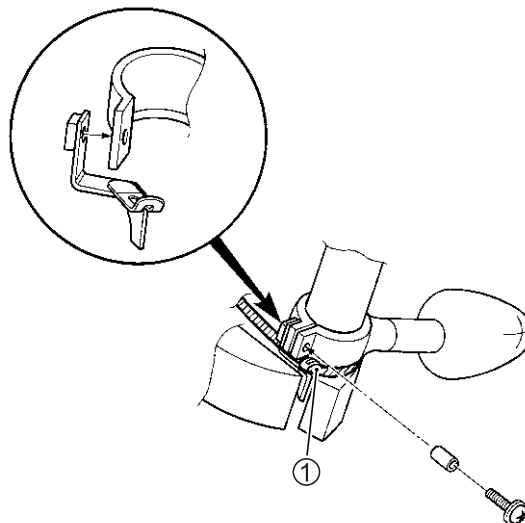
*1	After the brake hose union touching to the stopper, tighten the union bolt.	*3	Clamp the sleeve firmly.
*2	Pass through the brake hose firmly.	*4	Set the clamp with stopper before tightening.

SPEED SENSOR HARNESS ROUTING



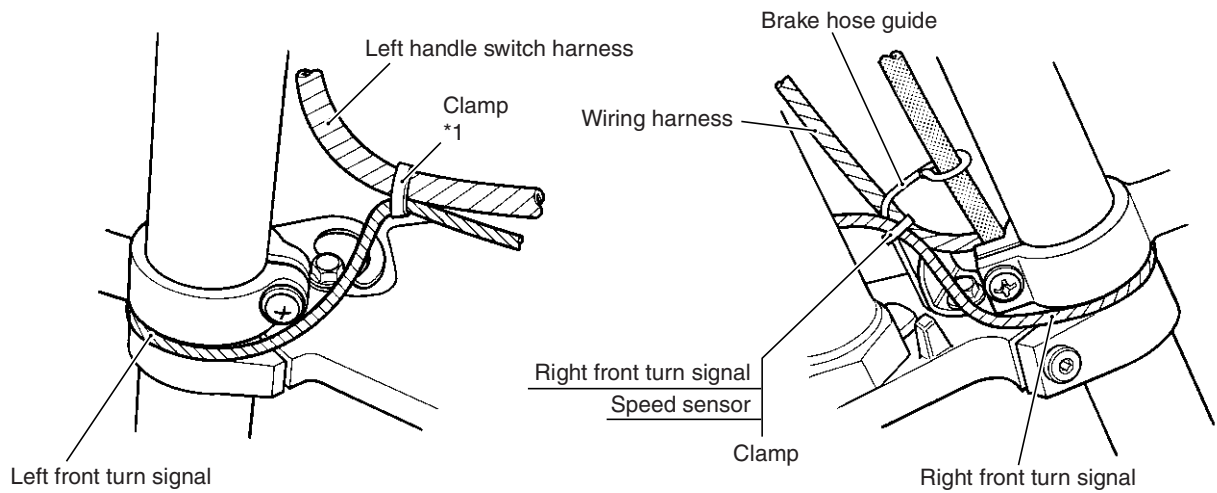
①	Pass through the speed sensor harness in front of the brake hose and guide.	⑤	Clamp
②	Pass through the speed sensor harness in front of the brake hose.	⑥	Clip
③	Do not catch the speed sensor harness to the caliper boss.	⑦	Yellow mark
④	Touch the stopper	⑧	Guide

FRONT TURN SIGNAL INSTALLATION



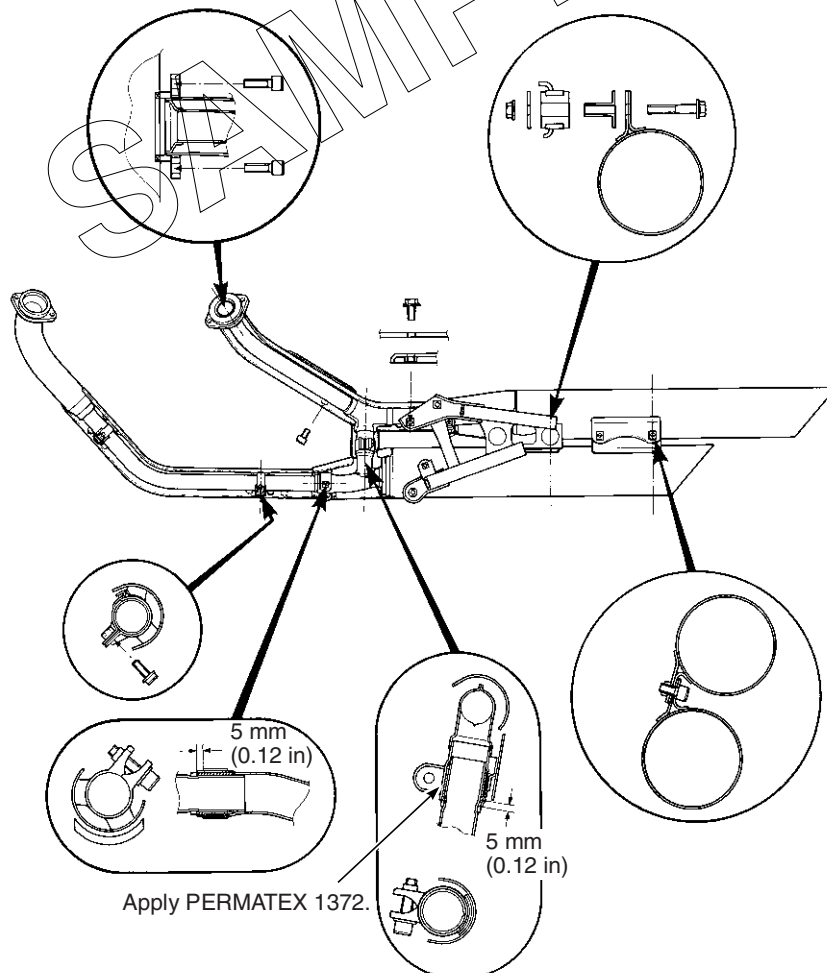
①	No slack
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FRONT TURN SIGNAL LEAD WIRE ROUTING

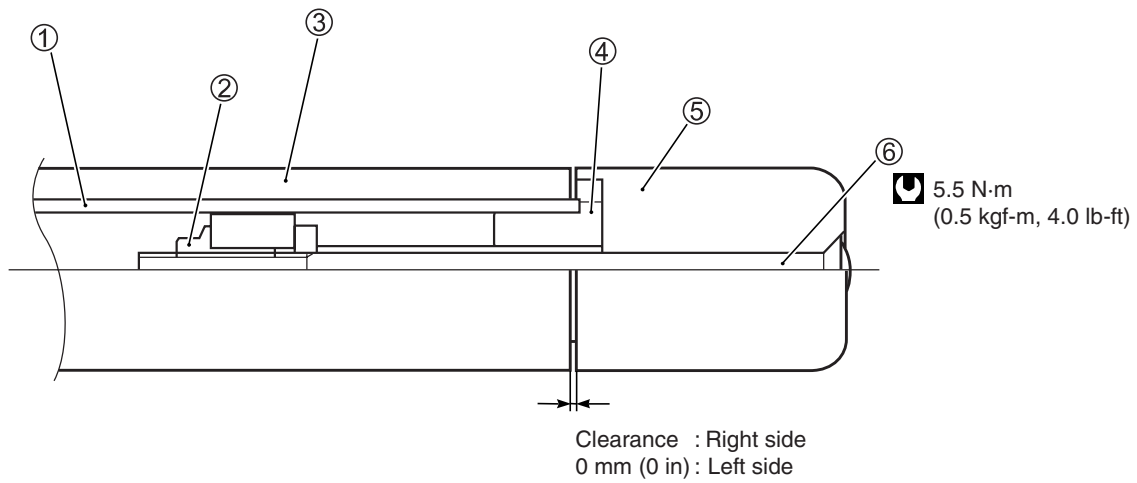


*1 Cut after clamping.

MUFFLER & EXHAUST PIPE INSTALLATION

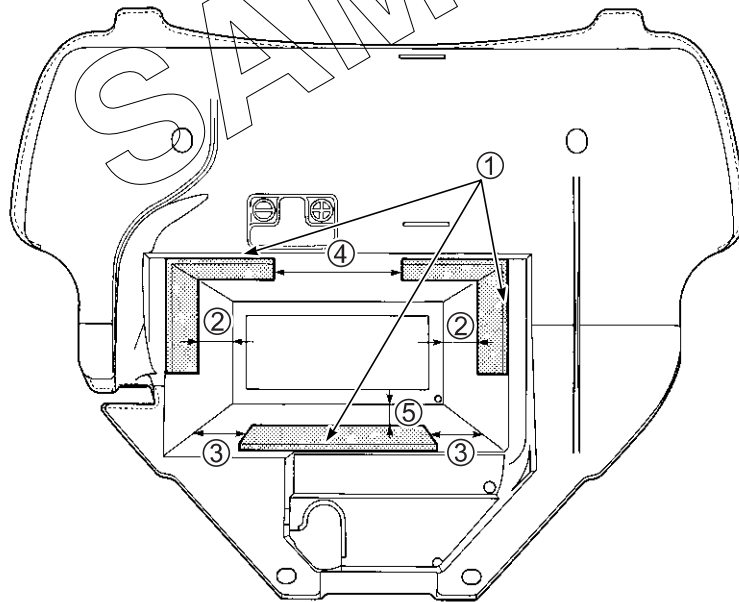


HANDLEBAR BALANCER



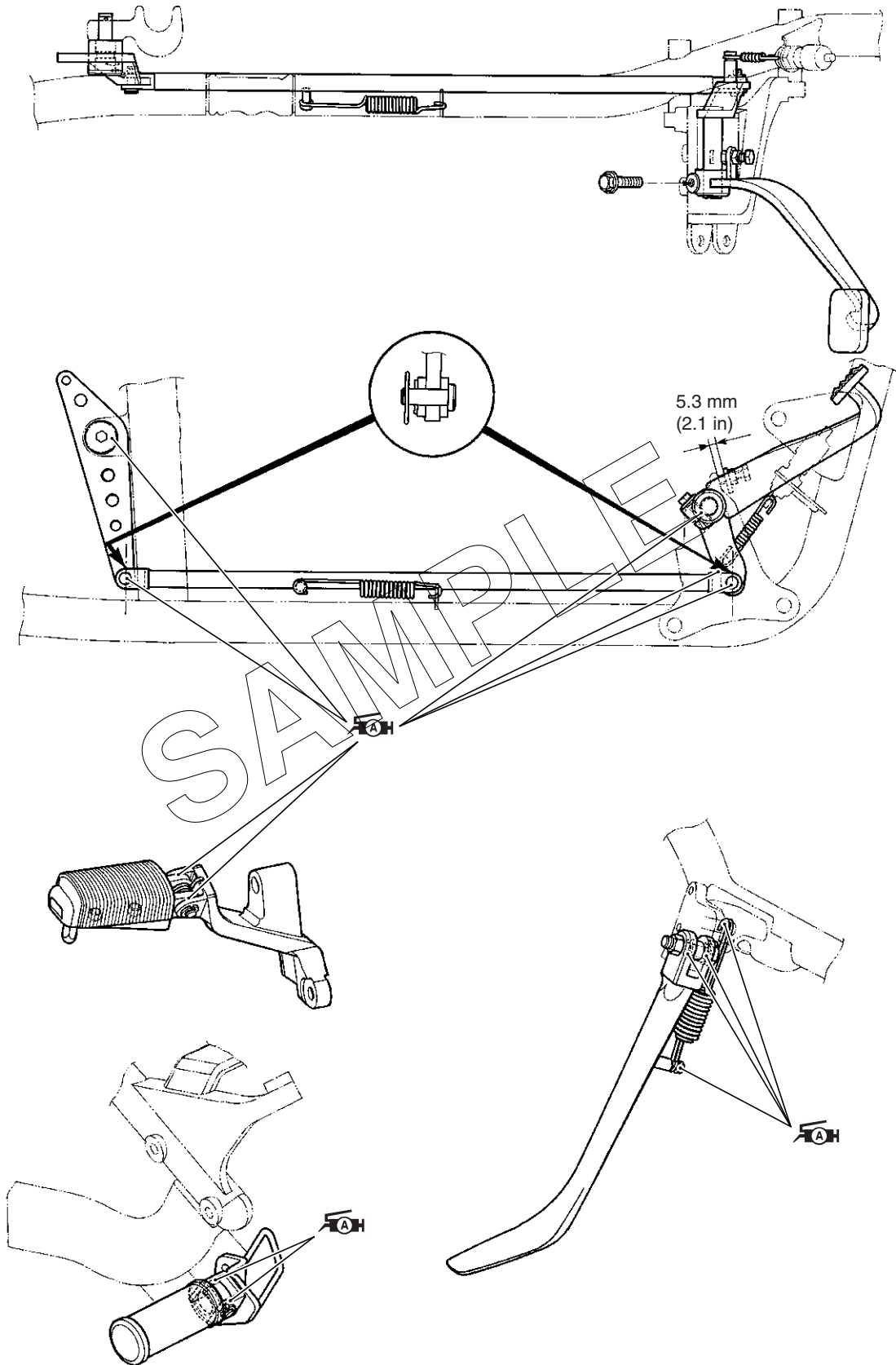
①	Handlebar	④	Handle balancer expander
②	Nut	⑤	Handlebar balancer
③	Throttle grip	⑥	Screw

BATTERY PROTECTOR

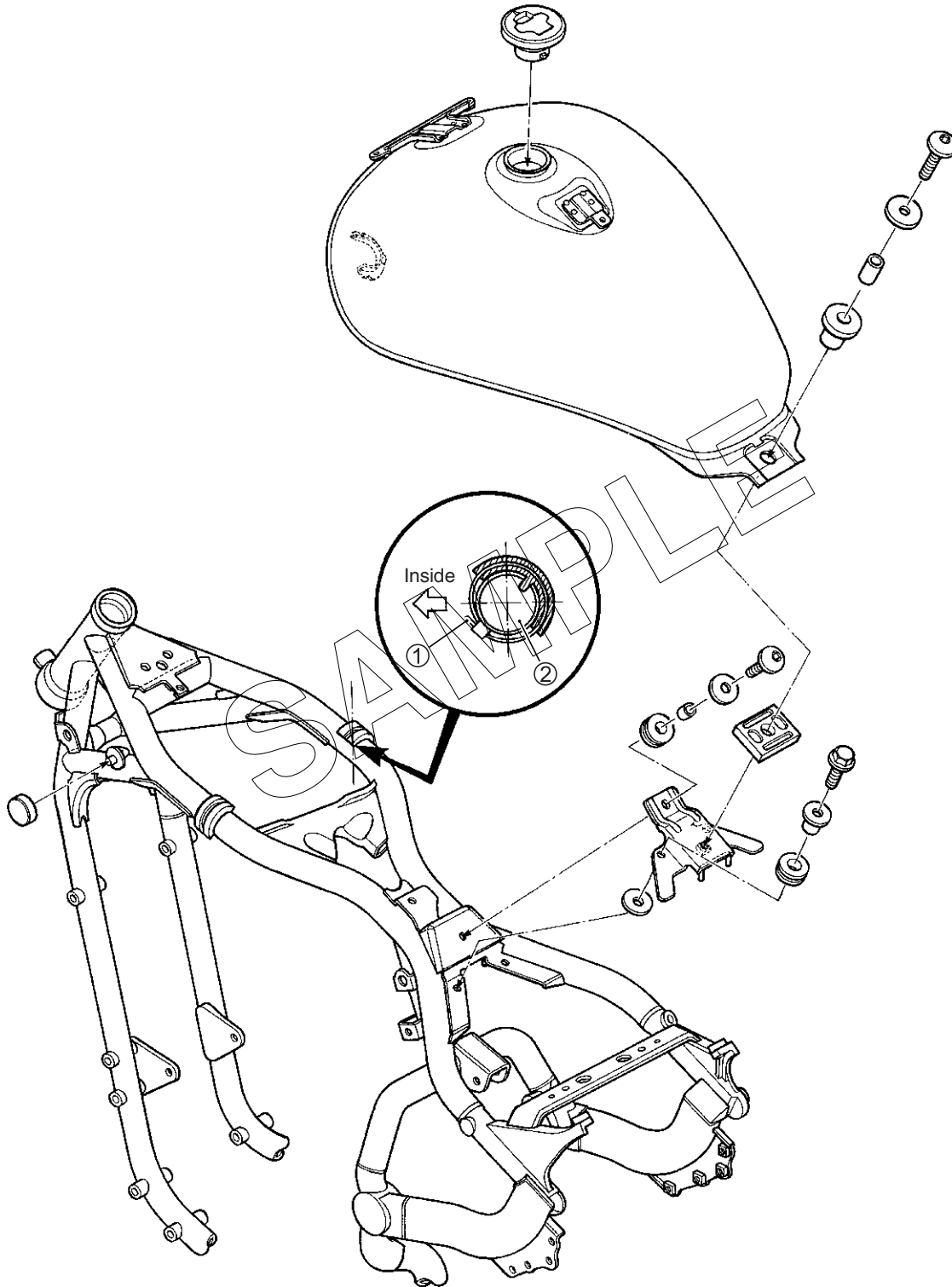


①	Stick protectors to upper end of this surface.	④	60 mm (2.36 in)
②	90 mm (3.54 in)	⑤	65 mm (2.56 in)
③	30 mm (1.18 in)		

LUBRICATION POINTS

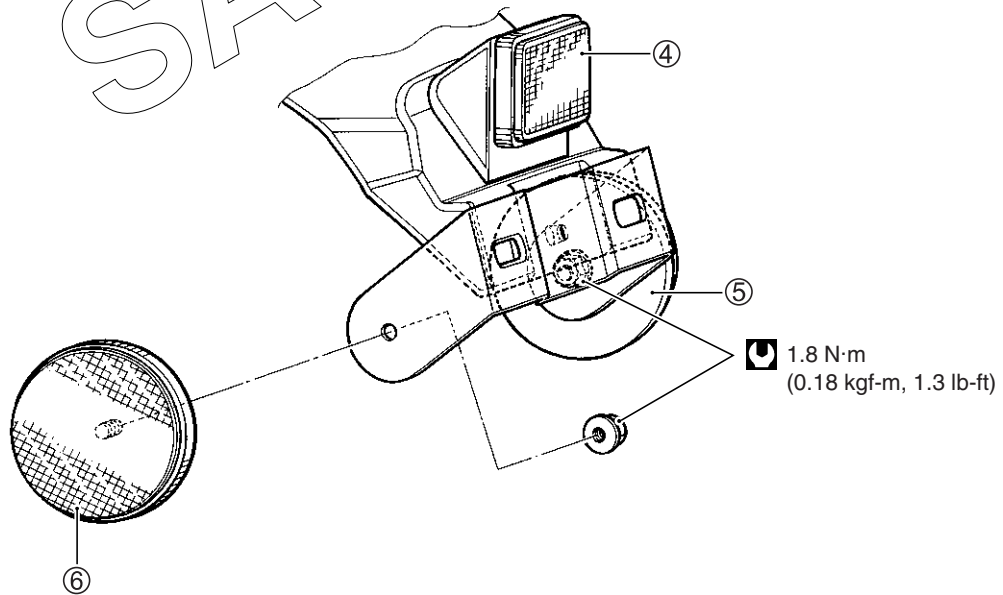
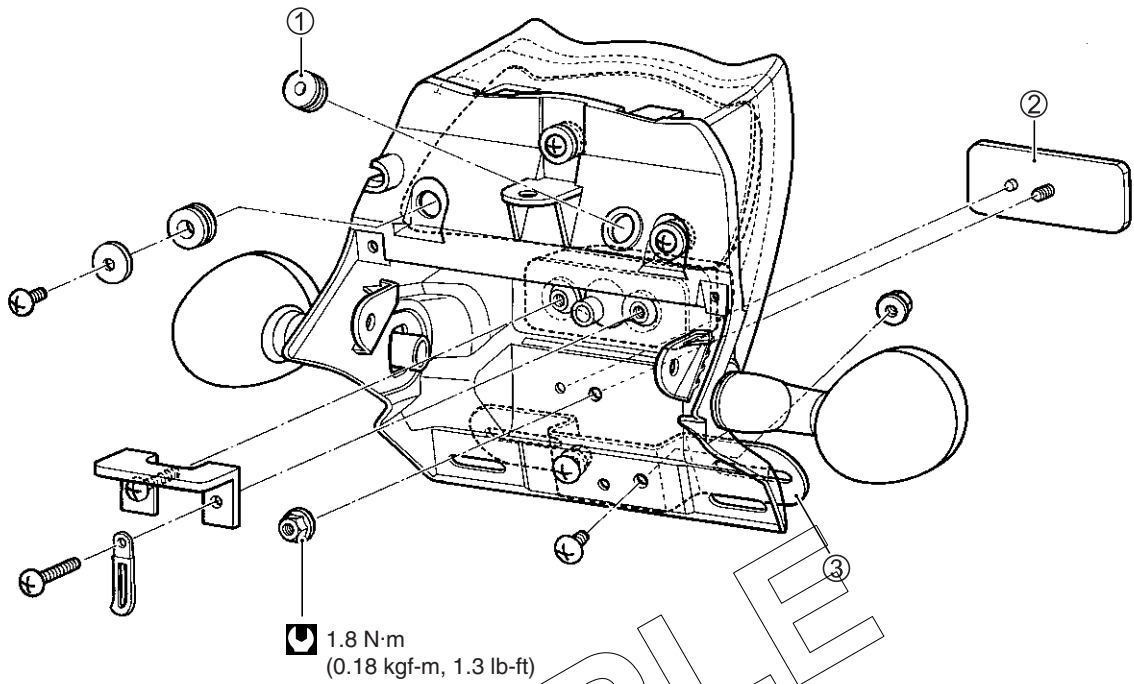


FUEL TANK INSTALLATION



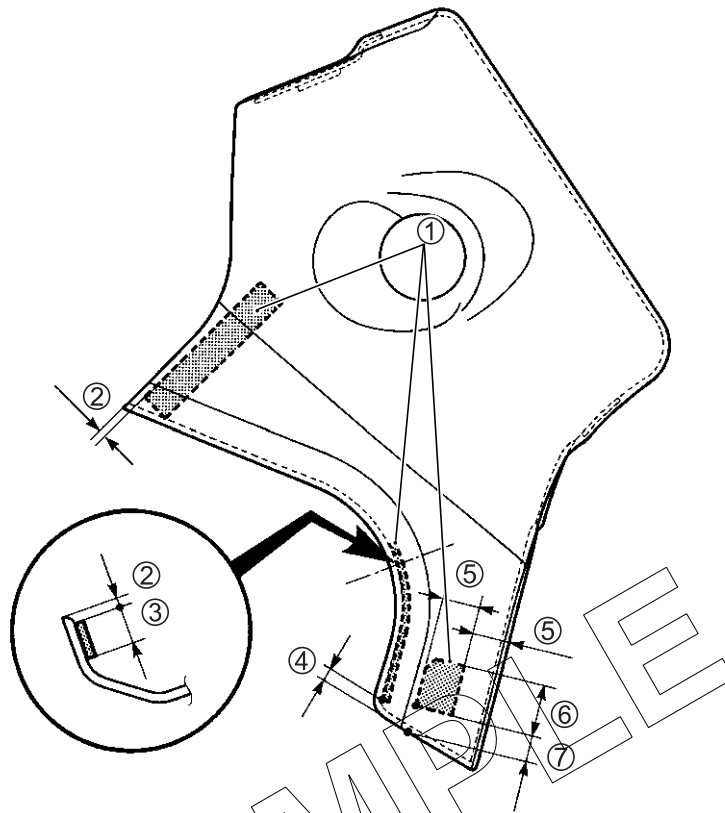
- | | | | |
|---|---------------------|---|-------|
| ① | Cut after clamping. | ② | Frame |
|---|---------------------|---|-------|

REAR COMBINATION LAMP INSTALLATION



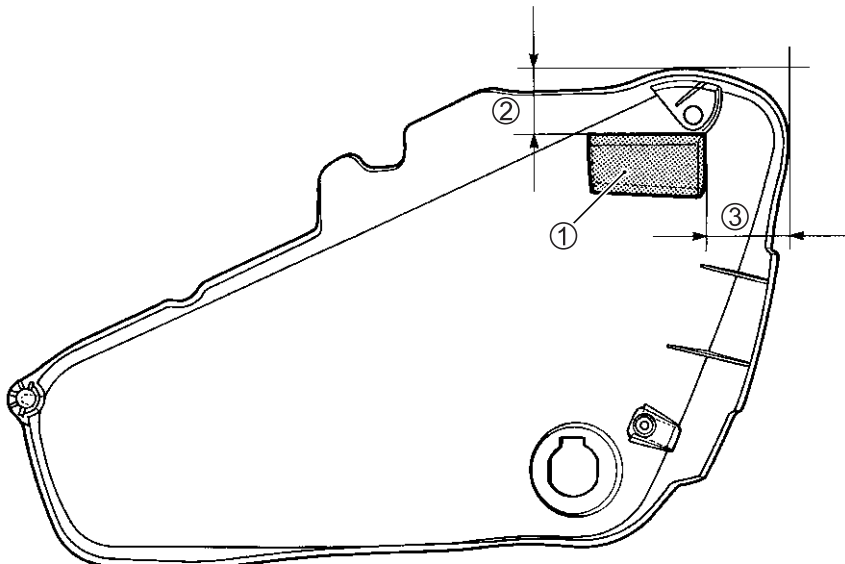
①	Pass through the left turn signal harness.	④	Reflex reflector
②	Reflex reflector	⑤	Right reflex reflector (For E-03, 28, 33)
③	License plate bracket (For E-02, 19, 24)	⑥	Left reflex reflector (For E-03, 28, 33)

FRAME HEAD COVER CUSHION INSTALLATION



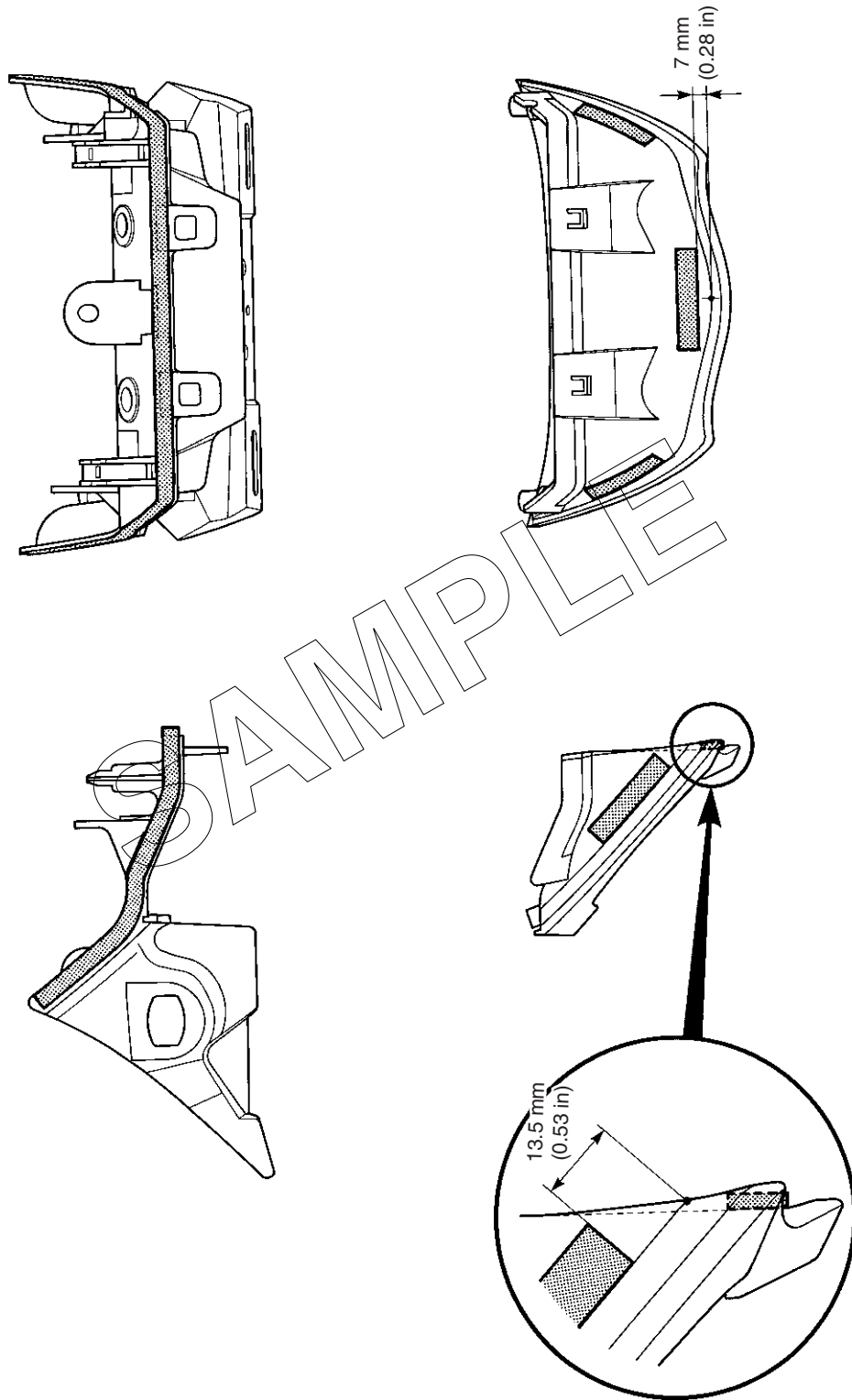
①	Cushion	④	5 mm (0.20 in)	⑦	10 mm (0.39 in)
②	3 mm (0.12 in)	⑤	15 mm (0.59 in)		
③	12 mm (0.47 in)	⑥	20 mm (0.79 in)		

LEFT SIDE COVER CUSHION INSTALLATION

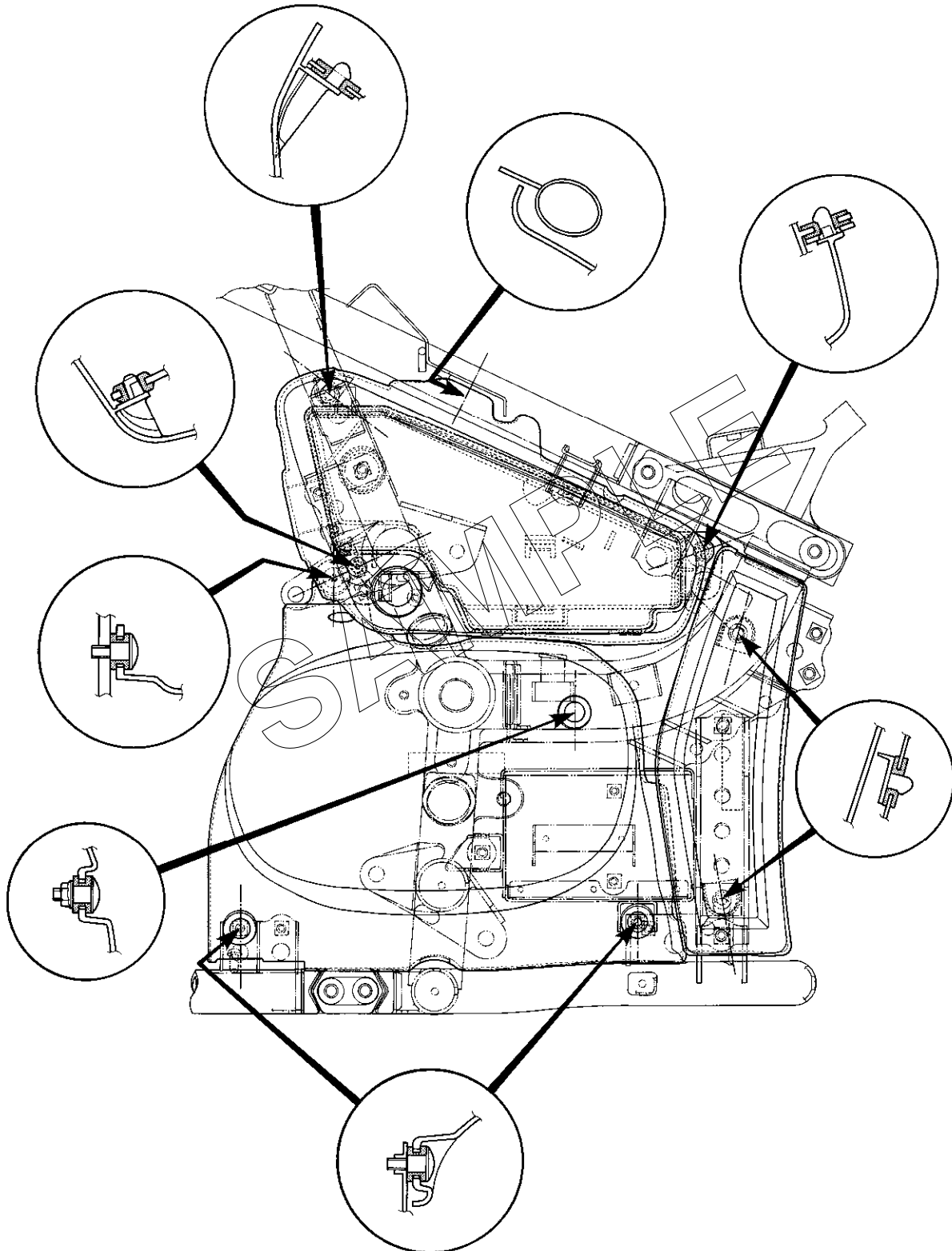


①	Cushion	②	27 mm (1.06 in)	③	35 mm (1.38 in)
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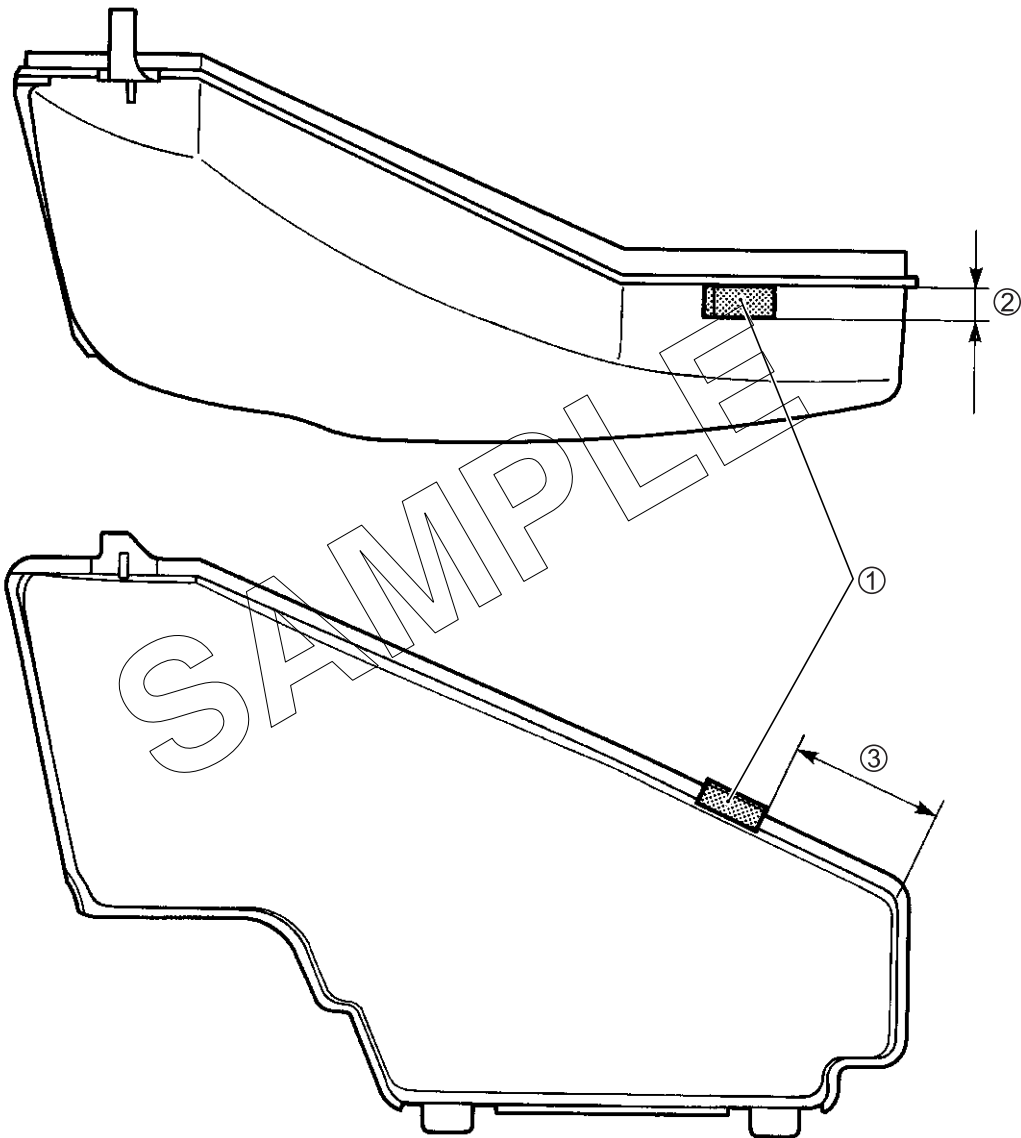
REAR FENDER CUSHION INSTALLATION



LEFT SIDE COVER INSTALLATION

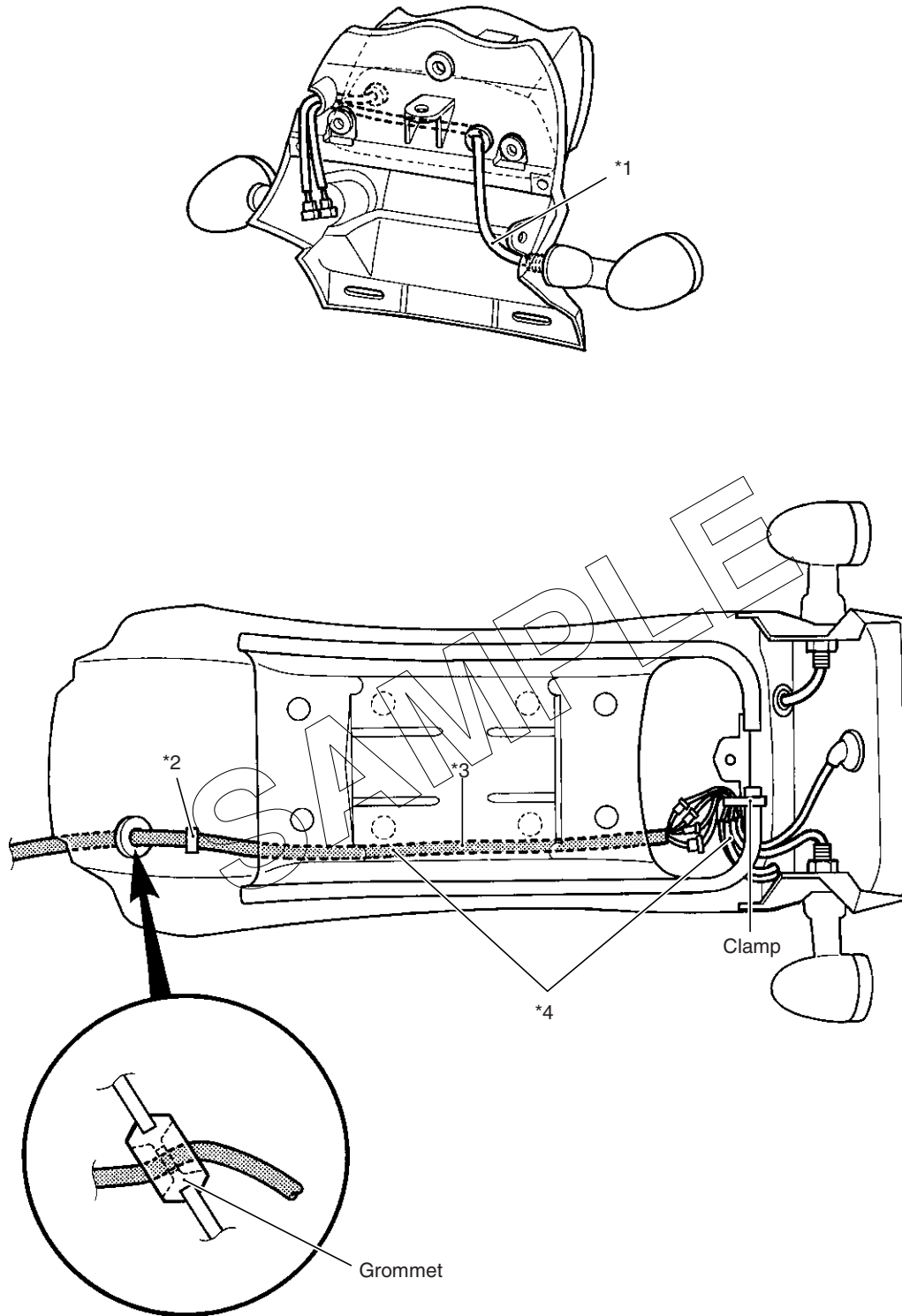


LID CUSHION INSTSALLATION



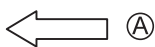
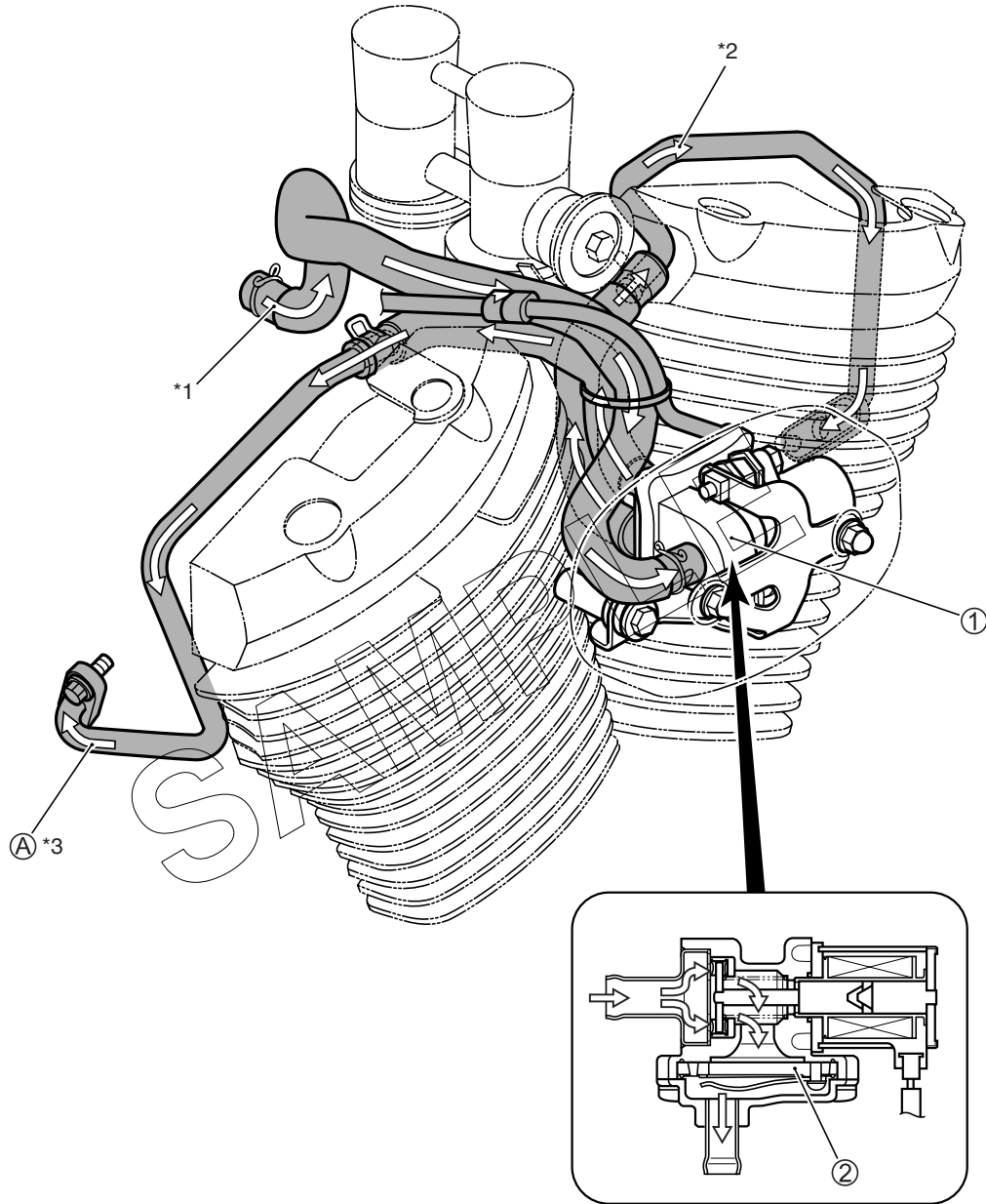
①	Cushion	②	10 mm (0.39 in)	③	45 mm (1.77 in)
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TAIL LAMP INSTALLATION



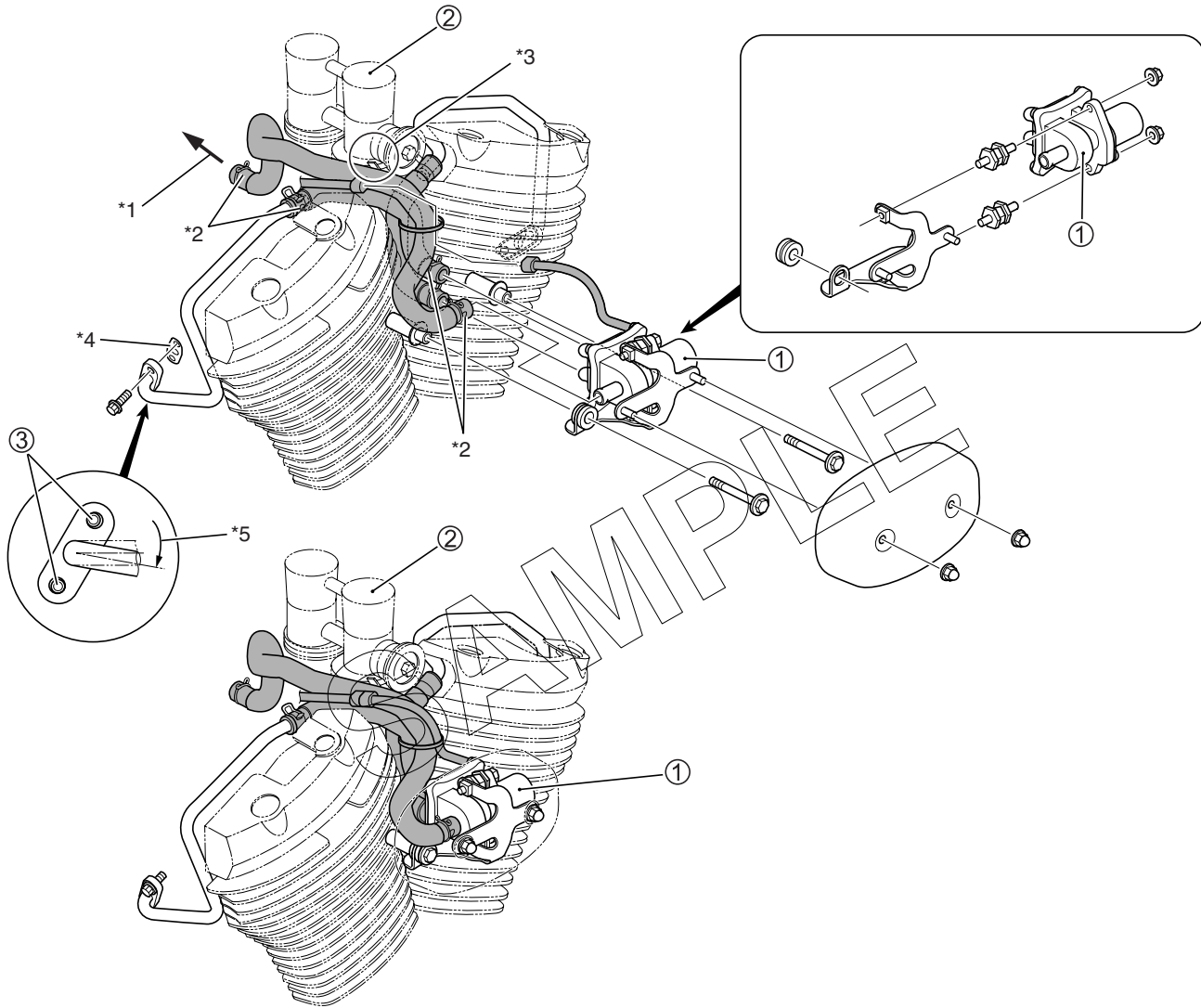
*1	Pass through the tail lamp harness and left turn signal harness over the right side mounting boss.	*3	Pass through the wiring harness outside of cushions.
*2	Assemble to the rear fender.	*4	Pass through the wiring harness between rear fender and rear brace.

PAIR (AIR SUPPLY) SYSTEM DIAGRAM



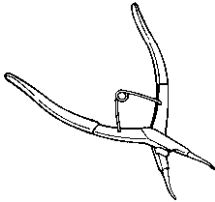
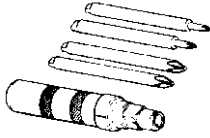
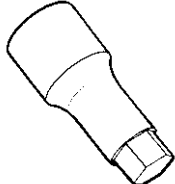
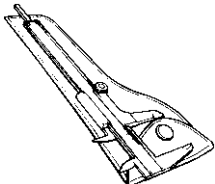
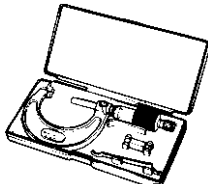
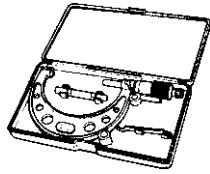
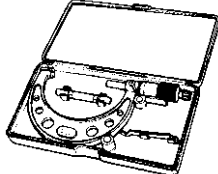
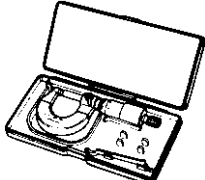
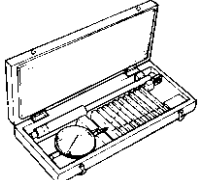
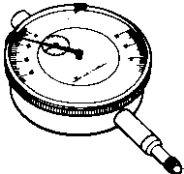
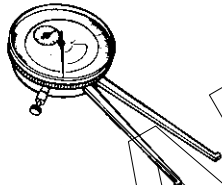
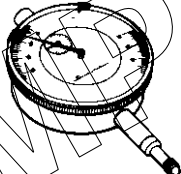
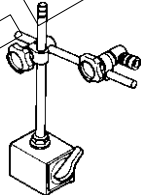
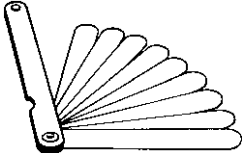
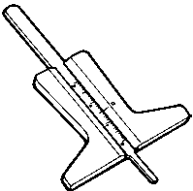
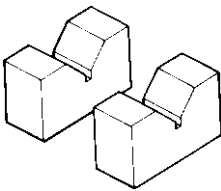

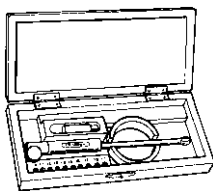
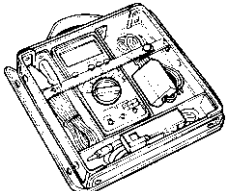
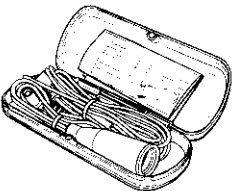
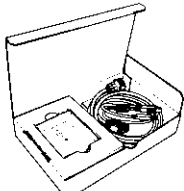
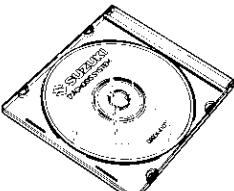
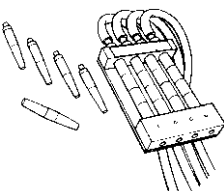
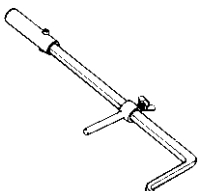
①	PAIR control solenoid valve	*1	From air cleaner
②	PAIR reed valve	*2	To #1 cylinders
③	FRESH AIR	*3	To #2 cylinders

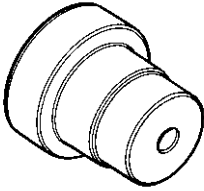
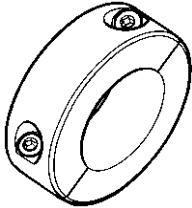
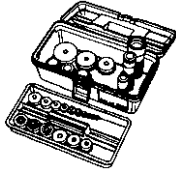
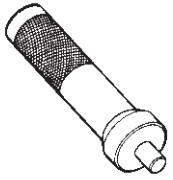
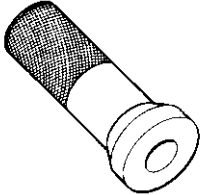
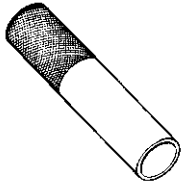
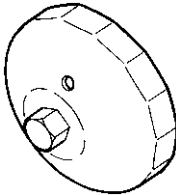
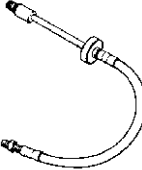
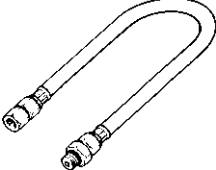
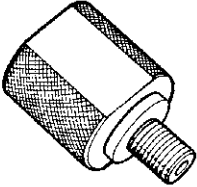
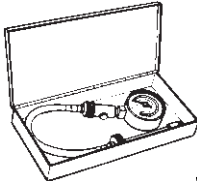
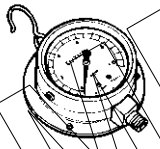
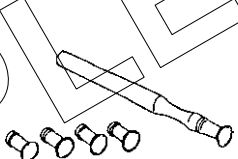
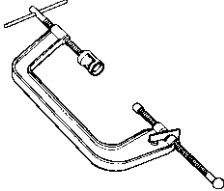
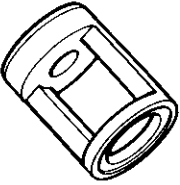
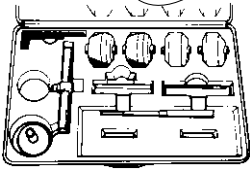
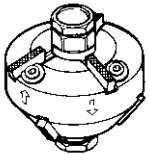
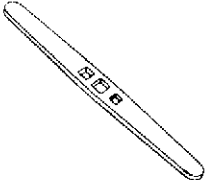



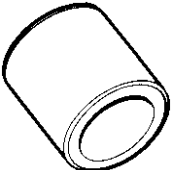

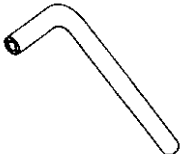
PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING

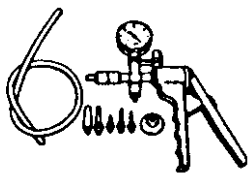
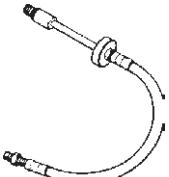

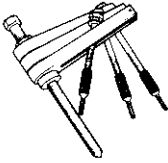
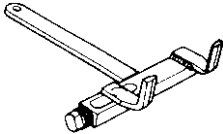
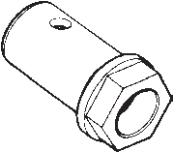
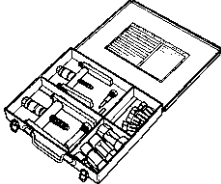
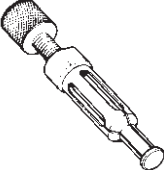
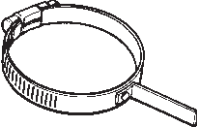

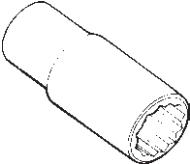
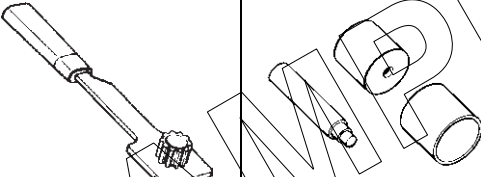
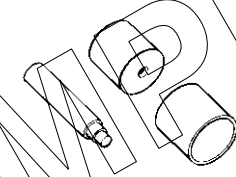
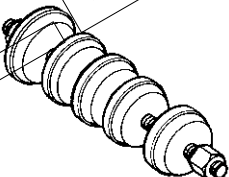
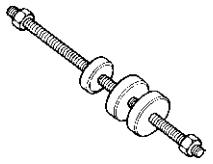
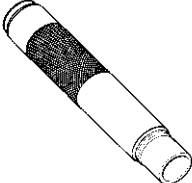
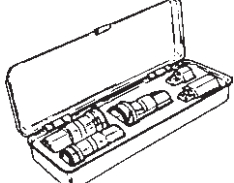
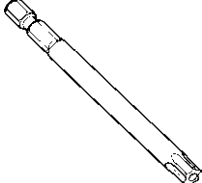
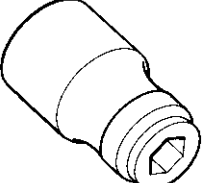
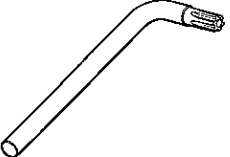
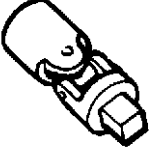
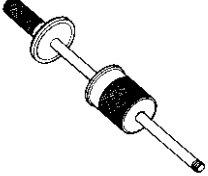
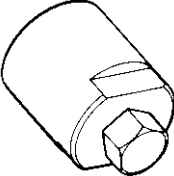
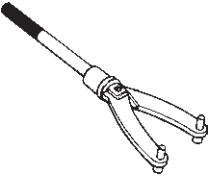
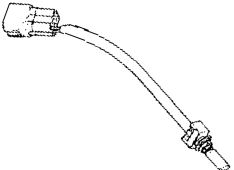


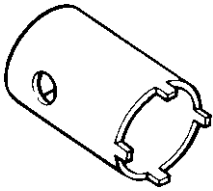
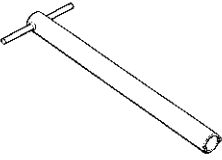
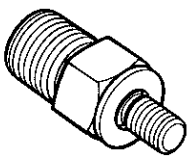
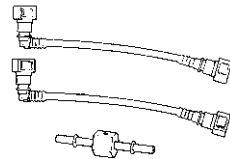
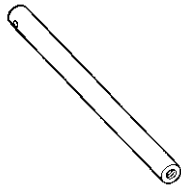
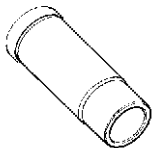
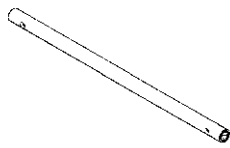
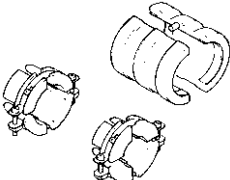
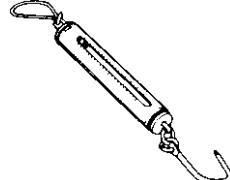

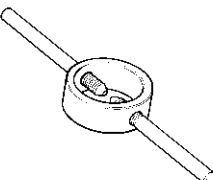
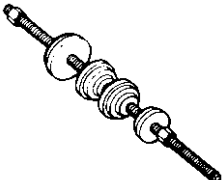
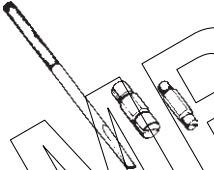
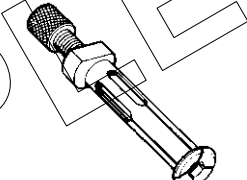

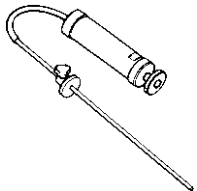
①	PAIR control solenoid valve	*2	Matching mark
②	Throttle body	*3	Do not contact the hose and throttle cable drum.
③	Bolt	*4	The sealant side should face PAIR pipe side.
*1	To air cleaner box	*5	With the bolt lightly contacted with the PAIR pipe, tighten the bolt.

SPECIAL TOOLS

 <p>09900-06107 Snap ring pliers</p>	 <p>09900-06108 Snap ring pliers</p>	 <p>09900-09004 Impact driver set</p>	 <p>09900-18710 Hexagon socket (12 mm)</p>	 <p>09900-20101 09900-20102 Vernier calipers</p>
 <p>09900-20202 Micrometer (25 – 50 mm)</p>	 <p>09900-20203 Micrometer (50 – 75 mm)</p>	 <p>09900-20204 Micrometer (75 – 100 mm)</p>	 <p>09900-20205 Micrometer (0 – 25 mm)</p>	 <p>09900-20508 Cylinder gauge set</p>
 <p>09900-20602 Dial gauge (1/1000 mm, 1 mm)</p>	 <p>09900-20605 Dial calipers (1/100 mm, 10 – 34 mm)</p>	 <p>09900-20607 Dial gauge (1/100 mm, 10 mm)</p>	 <p>09900-20701 Magnetic stand</p>	 <p>09900-20803 09900-20806 Thickness gauge</p>
 <p>09900-20805 Tire depth gauge</p>	 <p>09900-21304 V-block set (100 mm)</p>	 <p>09900-22301 09900-22302 Plastigauge</p>	 <p>09900-22401 (10 – 18 mm) 09900-22403 (18 – 35 mm) Small bore gauge</p>	 <p>09900-25008 Multi circuit tester set</p>
 <p>09900-25009 Needle pointed probe set</p>	 <p>09904-41010 SDS Set</p>	 <p>99565-01010-005 CD-ROM Ver. 5</p>	 <p>09913-13121 Vacuum balancer gauge</p>	 <p>09913-50121 Oil seal remover</p>

 <p>09913-60230 Journal bearing remover/installer</p>	 <p>09913-60241 Journal bearing remover/installer</p>	 <p>09913-60910 Bearing puller</p>	 <p>09913-70210 Bearing installer set</p>	 <p>09913-75821 Bearing installer</p>
 <p>09913-76010 Bearing installer</p>	 <p>09913-84510 Bearing installer</p>	 <p>09915-40610 Oil filter wrench</p>	 <p>09915-63210 Adaptor</p>	 <p>09915-74511 Oil pressure gauge hose</p>
 <p>09915-74532 Oil pressure gauge adaptor</p>	 <p>09915-64512 Compression gauge set</p>	 <p>09915-77331 Meter (for high pressure)</p>	 <p>09916-10911 Valve lapper set</p>	 <p>09916-14510 Valve lifter</p>
 <p>09916-14910 Valve lifter attachment</p>	 <p>09916-21111 Valve seat cutter set</p>	 <p>09916-22430 Valve seat cutter (N-128)</p>	 <p>09916-34542 Reamer handle</p>	 <p>09916-34550 Valve guide reamer (5.5 mm)</p>
 <p>09916-34580 Valve guide reamer (10.8 mm)</p>	 <p>09916-44910 Valve guide remover/installer</p>	 <p>09916-44920 Valve guide installer attachment</p>	 <p>09916-84511 Tweezers</p>	 <p>09917-10410 Valve adjust driver</p>

 <p>09917-47011 Vacuum pump gauge</p>	 <p>09918-03810 Compression gauge adaptor</p>	 <p>09918-53810 Chain tensioner lock tool</p>	 <p>09920-13120 Crankcase & Shaft remover</p>	 <p>09920-53740 Clutch sleeve hub holder</p>
 <p>09921-21820 Bearing retainer wrench</p>	 <p>09921-20240 Bearing remover set</p>	 <p>09923-73210 Bearing remover</p>	 <p>09924-34510 Backlash measuring tool (φ27 – 50)</p>	 <p>09924-62410 Final drive gear bearing holder wrench</p>
 <p>09924-62430 22 mm Long socket</p>	 <p>09924-64510 Final drive gear coupling holder</p>	 <p>09924-74570 Final drive gear bearing remover/installer</p>	 <p>09924-84510 Bearing installer set</p>	 <p>09924-84521 Bearing installer</p>
 <p>09925-18011 Steering bearing installer</p>	 <p>09930-10121 Spark plug wrench set</p>	 <p>09930-11920 Torx bit JT40H</p>	 <p>09930-11940 Bit holder</p>	 <p>09930-11950 Torx wrench</p>
 <p>09930-14530 Universal joint</p>	 <p>09930-30104 Sliding shaft</p>	 <p>09930-33730 Rotor remover</p>	 <p>09930-40113 Rotor holder</p>	 <p>09930-82720 Mode selection switch</p>

 <p>09940-14911 Steering stem nut wrench</p>	 <p>09940-30221 Front fork assembling tool</p>	 <p>09940-40211 Fuel pressure gauge adaptor</p>	 <p>09940-40220 Fuel pressure gauge hose attachment</p>	 <p>09940-50120 Front fork inner rod holder</p>
 <p>09940-51410 Bearing installer</p>	 <p>09940-52841 Inner rod holder</p>	 <p>09940-52861 Front fork oil seal installer</p>	 <p>09940-92720 Spring scale</p>	 <p>09940-94922 Front fork spring stopper plate</p>
 <p>09940-94930 Front fork spacer holder</p>	 <p>09941-34513 Steering race installer</p>	 <p>09941-50111 Bearing remover set</p>	 <p>09941-64511 Bearing remover</p>	 <p>09941-74911 Steering bearing installer</p>
 <p>09943-74111 Fork oil level gauge</p>				

NOTE:

When order the special tool, please confirm whether it is available or not.

TIGHTENING TORQUE ENGINE

ITEM		N-m	kgf-m	lb-ft	
Rocker arm shaft		27	2.7	19.5	
Cylinder head cover bolt		6 mm	10	7.0	
		8 mm	25	18.0	
Cylinder head bolt and nut	8 mm	Initial	10	7.0	
		Final	25	18.0	
	10 mm	Initial	25	2.5	18.0
		Final	38	3.8	27.5
Cam sprocket bolt		15	1.5	11.0	
Cam chain tension adjuster mounting bolt		10	1.0	7.0	
Cam chain tensioner bolt		10	1.0	7.0	
Primary drive gear bolt		95	9.5	68.5	
Clutch spring set bolt		10	1.0	7.0	
Clutch sleeve hub nut		60	6.0	47.0	
Driveshaft bolt		65	6.5	44.2	
Secondary drive gear shaft nut		105	10.5	76.0	
Secondary gear case bolt		Initial	15	1.5	
		Final	22	2.2	
Generator rotor bolt		160	16.0	115.5	
Starter clutch allen bolt		26	2.6	19.0	
Crankcase bolt		6 mm	11	8.0	
		8 mm	Initial	15	1.5
			Final	22	2.2
Conrod cap nut		Initial	25	2.5	
		Final	51	5.1	
Oil pressure regulator		28	2.8	20.0	
Oil pump mounting bolt		11	1.1	8.0	
Oil pressure switch		14	1.4	10.0	
Oil drain plug		21	2.1	15.0	
Rocker arm valve adjuster bolt		15	1.5	11.0	
Oil plug		6 mm	6.0	4.3	
		8 mm	18	1.8	
		10 mm	15	1.5	
		14 mm	23	2.3	
		16 mm	35	3.5	
Engine mounting bolt		79	7.9	57.0	
Engine mounting bracket bolt		23	2.3	16.5	
Frame mounting bolt/nut		8 mm	23	2.3	
		10 mm	50	5.0	
Exhaust pipe clamp bolt		23	2.3	16.5	
Muffler mounting bolt		23	2.3	16.5	
Speed sensor rotor bolt		100	10.0	72.5	
Spark plug		18	1.8	13.0	

SAMPLE

SECONDARY AND FINAL

ITEM		N·m	kgf·m	lb·ft
Secondary drive bevel gear bearing retainer bolt		23	2.3	16.5
Secondary driven bevel gear bolt		23	2.3	16.5
Secondary driven bevel gear bearing stopper		105	10.5	76.0
Secondary drive gear shaft nut		105	10.5	76.0
Final gear case nut		40	4.0	29.0
Final drive bevel gear coupling nut		100	10.0	72.5
Final drive bevel gear bearing stopper		110	11.0	79.5
Final gear case oil drain plug		23	2.3	16.5
Final gear case bolt	8 mm	23	2.3	16.5
	10 mm	50	5.0	36.0
Final driven bevel gear bearing retainer screw		9	0.9	6.5

FI SYSTEM AND INTAKE AIR SYSTEM

ITEM		N·m	kgf·m	lb·ft
CKP sensor mounting bolt		8	0.8	6.0
IAT sensor		18	1.8	13.0
Fuel delivery pipe mounting screw		3.5	0.35	2.5
Fuel pump mounting bolt		10	1.0	7.0
TPS and STPS mounting screw		3.5	0.35	2.5

COOLING SYSTEM

ITEM		N·m	kgf·m	lb·ft
Water pump cover bolt		6	0.6	4.5
Water pump mounting screw		10	1.0	7.0
Cooling fan thermo-switch		17	1.7	12.5
ECT sensor		18	1.8	13.0

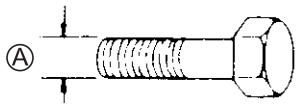
CHASSIS

ITEM	N-m	kgf-m	lb-ft
Front axle	65	6.5	47.0
Front axle pinch bolt	23	2.3	16.5
Brake disc bolt	23	2.3	16.5
Front fork cap bolt	23	2.3	16.5
Front fork spring stopper nut	35	3.5	25.5
Front fork damper rod bolt	40	4.0	29.0
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	30	3.0	21.5
Front fork inner rod lock-nut	15	1.5	11.0
Steering stem head nut	90	9.0	65.0
Steering stem nut	45	4.5	32.5
Front master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Brake hose union bolt	23	2.3	16.5
Air bleeder valve	7.5	0.75	5.5
Handlebar set bolt	23	2.3	16.5
Handlebar holder nut	45	4.5	32.5
Front footrest bracket mounting bolt	55	5.5	40.0
Frame down tube mounting bolt (M8)	23	2.3	16.5
Frame down tube mounting bolt (M10)	50	5.0	36.0
Rear brake pedal bolt	11	1.1	8.0
Rear swingarm pivot bolt (Left)	100	10.0	72.5
Rear swingarm pivot bolt (Right)	9.5	0.95	7.0
Rear swingarm pivot bolt lock nut	100	10.0	72.5
Rear shock absorber mounting nut (Upper and Lower)	50	5.0	36.0
Rear cushion lever/rod mounting nut	78	7.8	57.5
Rear axle nut	65	6.5	47.0
Rear torque link nut (front)	35	3.5	25.5
Rear torque link nut (rear)	25	2.5	18.0
Rear brake link pivot bolt	29	2.9	21.0
Rear brake cam lever bolt	10	1.0	7.3
Driven joint stopper bolt	10	1.0	7.0
Frame handle grip mounting bolt (M10)	50	5.0	36.0
Fuel level gauge mounting bolt	10	1.0	7.0

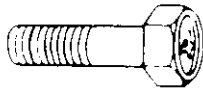
TIGHTENING TORQUE CHART

For other nuts and bolts not listed in the preceding page, refer to this chart:

Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kgf·m	lb·ft	N·m	kgf·m	lb·ft
4	1.5	0.15	1.0	2.3	0.23	1.5
5	3	0.3	2.0	4.5	0.45	3.0
6	5.5	0.55	4.0	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



Conventional bolt



"4" marked bolt



"7" marked bolt

SAMPLE

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30 (1.18)	—
	EX.	26 (1.02)	—
Valve clearance (when cold)	IN.	0.08 – 0.13 (0.003 – 0.005)	—
	EX.	0.17 – 0.22 (0.007 – 0.009)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	3.1 (0.12)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	INNER	—	38.3 (1.51)
	OUTER	—	40.1 (1.58)
Valve spring tension	INNER	64 – 73 N (6.51 – 7.49 kgf, 14.35 – 16.51 lbs) at length 32.5 mm (1.28 in)	—
	OUTER	119 – 136 N (12.09 – 13.91 kgf, 26.65 – 30.67 lbs) at length 36.0 mm (1.42 in)	—

SAMPLE

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	35.50 – 35.54 (1.398 – 1.399)	35.20 (1.386)
	EX.	36.58 – 36.62 (1.440 – 1.442)	36.28 (1.428)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)		0.150 (0.0059)
Camshaft journal holder I.D.	Rear left side Front right side	20.012 – 20.025 (0.7879 – 0.7884)	—
	Rear right side Front left side	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Rear left side Front right side	19.959 – 19.980 (0.7858 – 0.7866)	—
	Rear right side Front left side	24.959 – 24.980 (0.9826 – 0.9835)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I. D.	IN. & EX.	12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O. D.	IN. & EX.	11.977 – 11.995 (0.4715 – 0.4722)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 300 – 1 700 kPa (13 – 17 kgf/cm ² , 185 – 242 psi)		1 100 kPa (11 kgf/cm ² 156 psi)
Compression pressure difference	—		200 kPa (2 kgf/cm ² 28 psi)
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)		0.120 (0.0047)
Cylinder bore	83.000 – 83.015 (3.2677 – 3.2683)		83.085 (3.2711)
Piston diam.	82.950 – 82.965 (3.2657 – 3.2663) Measure at 15 mm (0.6 in) from the skirt end.		82.880 (3.2630)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	Approx. 9.6 (0.38)	7.7 (0.30)
	2nd R	Approx. 11.8 (0.46)	9.4 (0.37)
Piston ring end gap	1st	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
	2nd	0.20 – 0.35 (0.008 – 0.014)	0.70 (0.028)
Piston ring to groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.51 – 2.53 (0.0988 – 0.0996)	—
Piston ring thickness	1st	0.970 – 0.990 (0.0382 – 0.0390)	—
	2nd	1.170 – 1.190 (0.0461 – 0.0469)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.992 – 20.000 (0.7871 – 0.7874)		19.980 (0.7866)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)	0.30 (0.012)
Conrod big end width	21.95 – 22.00 (0.864 – 0.866)	—
Crank pin width	22.10 – 22.15 (0.870 – 0.872)	—
Conrod big end oil clearance	0.024 – 0.042 (0.0009 – 0.0017)	0.080 (0.0031)
Crank pin O.D.	40.982 – 41.000 (1.6135 – 1.6142)	—
Crankshaft journal oil clearance	0.002 – 0.029 (0.00008 – 0.0011)	0.080 (0.0031)
Crankshaft journal O.D.	47.965 – 47.980 (1.8884 – 1.8890)	—
Crankshaft thrust bearing thickness	1.925 – 2.175 (0.0758 – 0.0856)	—
Crankshaft thrust clearance	0.05 – 0.10 (0.002 – 0.004)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pressure (at 60 °C, 140 °F)	350 – 650 kPa (3.5 – 6.5 kgf/cm ² , 50 – 92 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.42 – 3.58 (0.135 – 0.141)	3.12 (0.123)
Drive plate claw width	15.9 – 16.0 (0.626 – 0.630)		15.1 (0.594)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	49.2 (1.94)		46.8 (1.84)

TRANSMISSION

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.690 (71/42)		—
Secondary reduction ratio	1.000 (30/30)		—
Final reduction ratio	3.503 (17/15 × 34/11)		—
Gear ratios	Low	2.461 (32/13)	—
	2nd	1.631 (31/19)	—
	3rd	1.227 (27/22)	—
	4th	1.000 (25/25)	—
	Top	0.814 (22/27)	—
Shift fork to groove clearance	No. 1	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
	No. 2	0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width	No. 1	5.50 – 5.60 (0.217 – 0.220)	—
	No. 2	4.50 – 4.60 (0.177 – 0.181)	—
Shift fork thickness	No. 1	5.30 – 5.40 (0.209 – 0.213)	—
	No. 2	4.30 – 4.40 (0.169 – 0.173)	—

SHAFT DRIVE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Secondary bevel gear backlash	0.05 – 0.32 (0.002 – 0.013)		—
Final bevel gear backlash	Drive side	0.03 – 0.064 (0.001 – 0.025)	—
Damper spring free length	—		58.5 (2.30)

THERMOSTAT + RADIATOR + FAN + ENGINE COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 75 °C (167 °F)		—
Thermostat valve lift	Over 6 mm (0.24 in) at 90 °C (194 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	40 °C (104 °F)	Approx. 1.148 kΩ	—
	60 °C (140 °F)	Approx. 0.587 kΩ	—
	80 °C (176 °F)	Approx. 0.322 kΩ	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm ² , 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105 °C (221 °F)	—
	ON→OFF	Approx. 100 °C (212 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant capacity	1 500 ml (1.6/1.3 US/Imp qt)		—

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 → 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Approx. 168 ml (5.7/5.9 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm ² , 43 psi)	

FI SENSORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	184 – 276 Ω		
CKP sensor peak voltage	4.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.6 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.1 kΩ	
	Opened	Approx. 4.4 kΩ	
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.4 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.6 kΩ at 20 °C (68 °F)		
TO sensor resistance	19.1 – 19.7 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor resistance	Closed	Approx. 0.5 kΩ	
	Opened	Approx. 3.9 kΩ	
STP sensor output voltage	Closed	Approx. 0.5 V	
	Opened	Approx. 3.9 V	
STV actuator resistance	Approx. 6.5 Ω		
Heated oxygen sensor output voltage	0.2 V and less at idle speed		For E-02, 19, 24
	0.7 V and more at 5 000 r/min		
Heated oxygen sensor resistance	6.5 – 8.9 Ω at 23 °C (73.4 °F)		
PAIR solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)		

THROTTLE BODY

ITEM	SPECIFICATION
Bore size	34 mm
I.D. No.	41F1 (For E-33), 41F0 (For the others)
Idle r/min	1 100 ± 100 r/min
Fast idle r/min	1 800 r/min (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Firing order		1-2		
Spark plug	Type	NGK: DPR7EA-9 DENSO: X22EPR-U9		
	Gap	0.8 – 0.9 (0.031 – 0.035)		
Spark performance		Over 8 (0.3) at 1 atm.		
CKP sensor resistance		184 – 276 Ω		
CKP sensor peak voltage		4.0 V and more		
Ignition coil resistance	Primary	2 – 6 Ω		Terminal – Terminal
	Secondary	15 – 30 kΩ		Plug cap – Terminal
Ignition coil primary peak voltage	205 V and more			#1 ⊕ W ⊖ Ground
				#2 ⊕ B/Y ⊖ Ground
Generator coil resistance		0.2 – 1.5 Ω		
Generator no-load voltage (when engine is cold)		70 V (AC) and more at 5 000 r/min		Y – Y
Regulated voltage		14.0 – 15.5 V at 5 000 r/min		Y – Y
Generator maximum output		350 W at 5 000 r/min		
Starter relay resistance		3 – 7 Ω		
GP switch voltage		0.6 V and more (From 1st to top without neutral)		
Battery	Type designation	FTX12-BS		
	Capacity	12 V 36 kC (10 Ah)/10 HR		
Fuse size	Headlight	HI	10 A	
		LO	10 A	
	Signal	10 A		
	Ignition	15 A		
	Fuel	10 A		
	Main	30 A		
	Power source	10 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03, 28, 33	E-24	Others
Headlight	HI	60	←	←
	LO	55	←	←
Position/Parking light				5
Brake light/Taillight		LED	←	←
Turn signal light		21/5 (Front), 21 (Rear)	21	←
Licence plate light		5	←	←
Speedometer light		LED	←	←
Engine coolant temp. warning light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure indicator light		LED	←	←
FI indicator light		LED	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	75 – 85 (3.0 – 3.3)		—
Brake drum I.D.	Rear	—	180.7 (7.11)
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.21)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4993)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1901 – 1.1931)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1889)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J16 M/C × MT 3.00	—
	Rear	J15 M/C × MT 4.00	—

TIRE

ITEM	STANDARD		LIMIT
Cold inflation tire pressure (Solo riding)	Front	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Rear	250 kPa (2.50 kgf/cm ² , 36 psi)	—
Tire size	Front	130/90-16 M/C 67H	—
	Rear	170/80-15 M/C 77H	—
Tire type	Front	IRC GS-23F A	—
	Rear	IRC GS-23R A	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Front fork stroke	140 (5.5)	—
Front fork spring free length	380.4 (14.98)	372 (14.6)
Front fork oil level (without spring)	153 (6.02)	—
Front fork oil type	SUZUKI FORK OIL L01 or an equivalent fork oil	—
Front fork oil capacity (each leg)	490 ml (16.6/17.3 US/Imp oz)	—
Front fork inner tube outside diam.	41 (1.61)	—
Rear shock absorber spring adjuster	3rd	—
Rear wheel travel	105 (4.13)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

SAMPLE

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		Others
Fuel tank capacity	Including reserve	15.0 L (4.0/3.3 US/Imp gal)	E-33
	Including reserve	15.5 L (4.1/3.4 US/Imp gal)	Others
	Fuel level indicator light lighting	1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10 W-40, API, SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/Imp qt)	
	Filter change	3 400 ml (3.6/3.0 US/Imp qt)	
	Overhaul	3 700 ml (3.9/3.3 US/Imp qt)	
Final bevel gear oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Final bevel gear oil capacity	200 – 220 ml (6.8/7.0 – 7.4/7.7 US/Imp oz)		
Brake fluid type	DOT 4		

SAMPLE

EMISSION CONTROL INFORMATION

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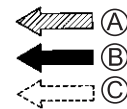
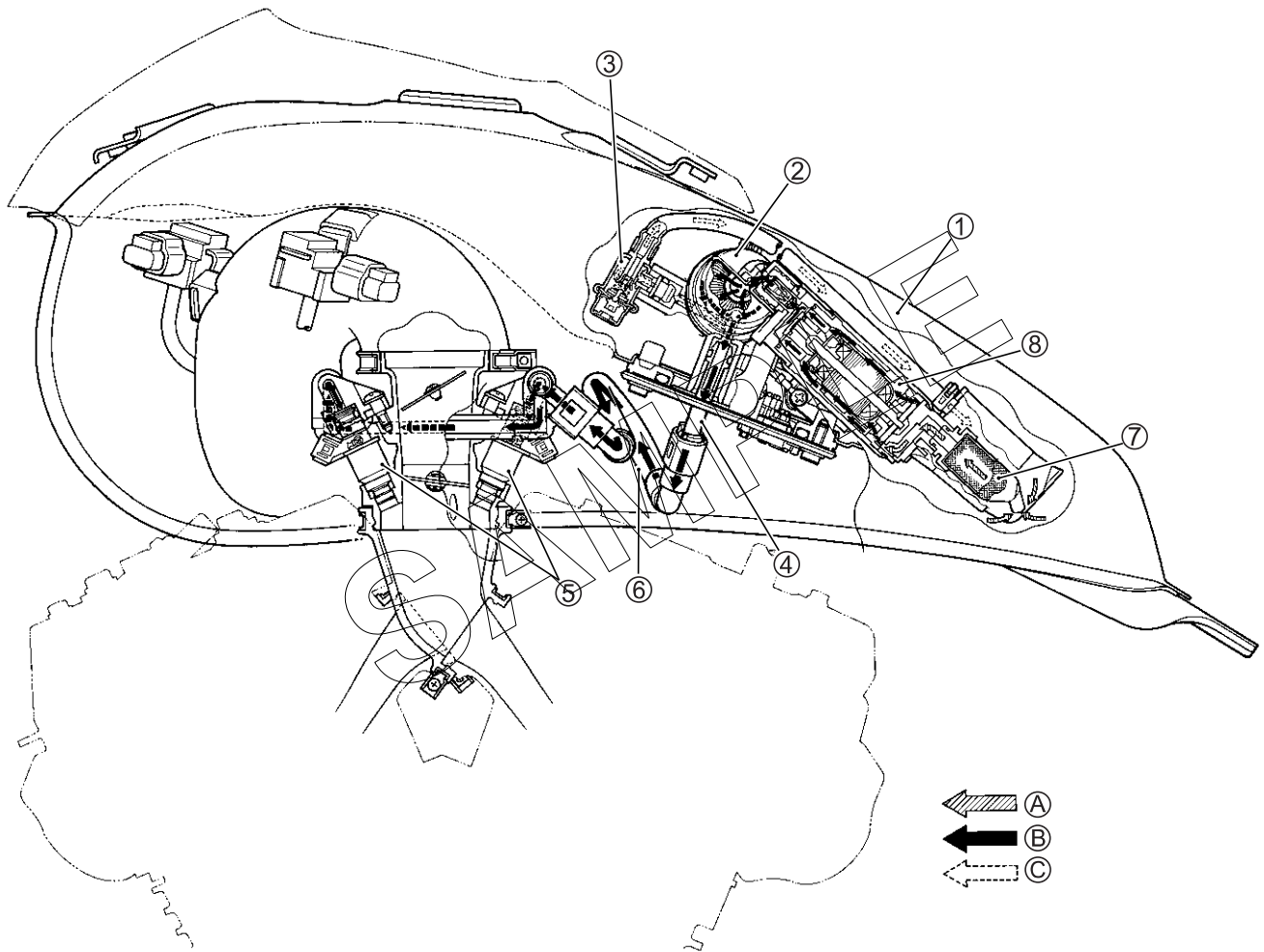
SAMPLE

EMISSION CONTROL SYSTEMS

FUEL INJECTION SYSTEM

VZ800 motorcycles are equipped with a fuel injection system for emission level control.

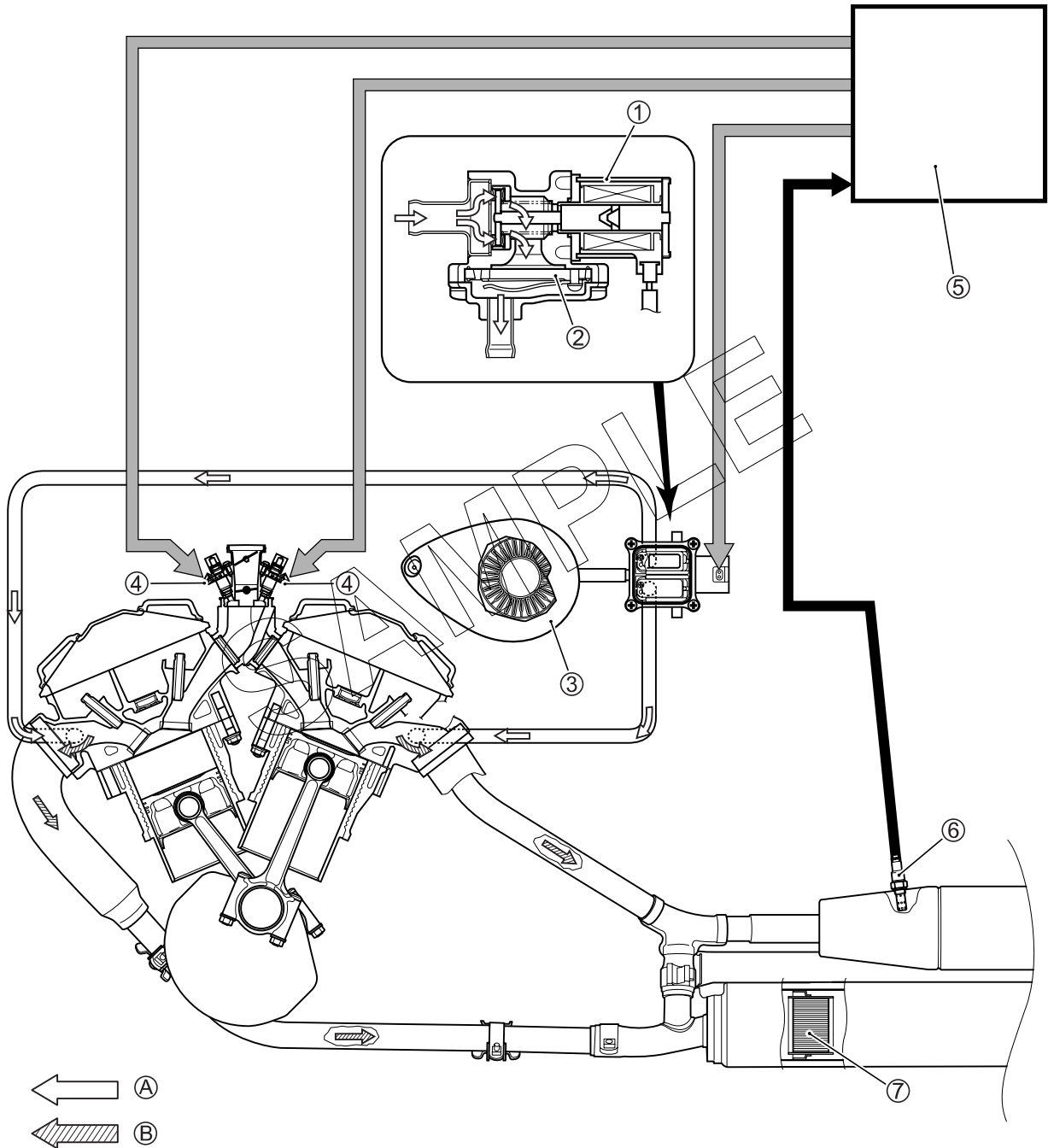
This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits.



①	Fuel tank	⑦	Fuel mesh filter (For low pressure)
②	Fuel filter (For high pressure)	⑧	Fuel pump
③	Fuel pressure regulator	A	Before-pressurized fuel
④	Fuel delivery pipe	B	Pressurized fuel
⑤	Fuel injector	C	Relieved fuel
⑥	Fuel feed hose		

EXHAUST EMISSION CONTROL SYSTEM (PAIR SYSTEM)

The exhaust emission control system is composed of the PAIR system and THREE-WAY CATALYST system (For E-02, 19, 24, 33). The fresh air is drawn into the exhaust port with the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, and the fresh air flow is controlled according to the TPS, ECTS, IATS, IAPS and CKPS.



①	PAIR control solenoid valve	⑥	HO2 sensor (E-02, 19, 24)
②	PAIR reed valve	⑦	Threeway catalyst (E-02, 19, 24, 33)
③	Air cleaner box	Ⓐ	FRESH AIR
④	Fuel injector	Ⓑ	EXHAUST GAS
⑤	ECM		

NOISE EMISSION CONTROL SYSTEM

TAMPERING WITH THE NOISE CONTROL SYSTEM PROHIBITED: Local law prohibits the following acts or the causing thereof:

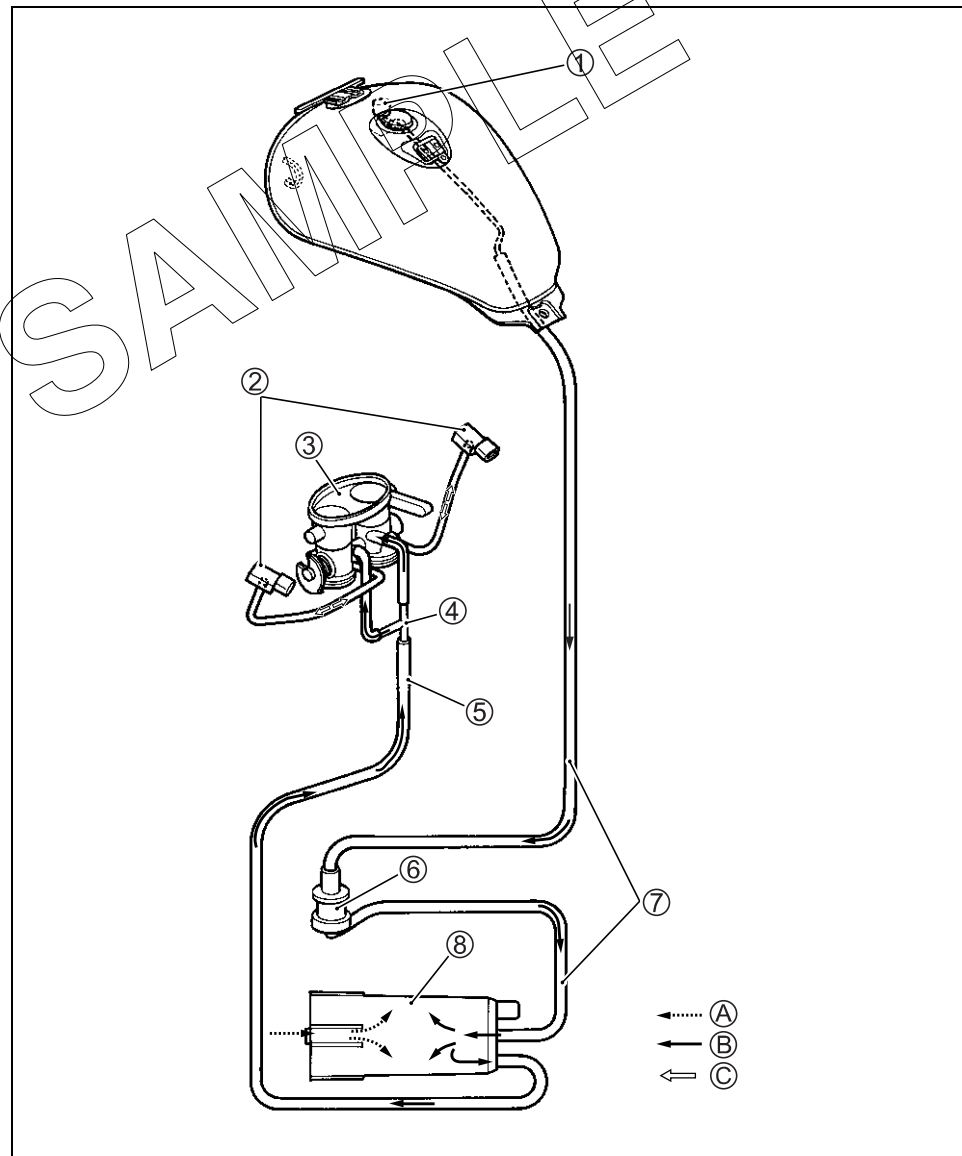
1. The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or
2. The use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

- Removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases.
- Removing or puncturing the air cleaner case, air cleaner cover, baffles or any other component which conducts intake air.
- Replacing the exhaust system or muffler with a system or muffler not marked with the same model specific code as the code listed on the Motorcycle Noise Emission Control Information label.

EVAPORATIVE EMISSION CONTROL SYSTEM (Only for E-33)

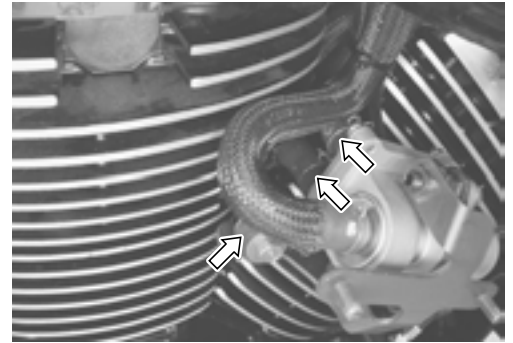
①	Fuel-vapor separator
②	IAP sensor
③	Throttle body
④	3-way connector
⑤	Purge hose
⑥	Fuel shut-off valve
⑦	Surge hose (red stripe)
⑧	EVAP canister
A	FRESH AIR
B	HC VAPOR
C	VACUUM



PAIR (AIR SUPPLY) SYSTEM INSPECTION

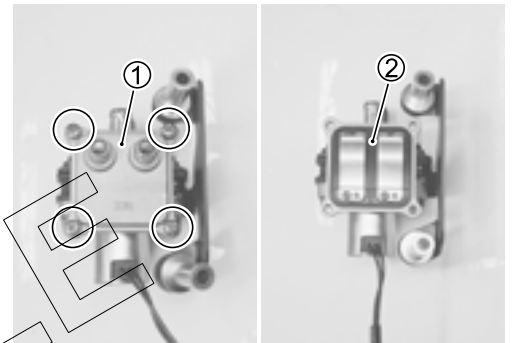
HOSES

- Remove the PAIR cover. (👉 3-5)
- Inspect the hoses for wear or damage.
- Inspect that the hoses for secure connection.



PAIR REED VALVE

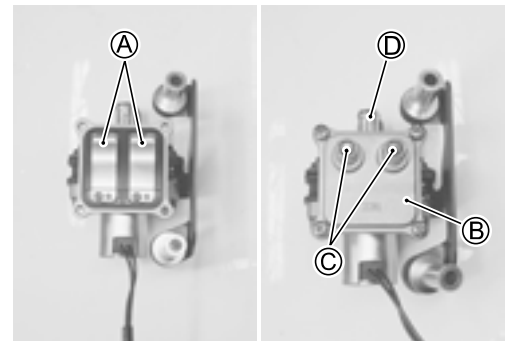
- Remove the PAIR control solenoid valve. (👉 3-5)
- Remove the reed valve case ① and PAIR reed valve ②.



- Inspect the reed valve for the carbon deposit.
- If the carbon deposit is found in the reed valve, replace the PAIR control solenoid valve with a new one.



- Install the reed valve (A) and its case (B) with outlet pipes (C) the facing the inlet pipe (D).

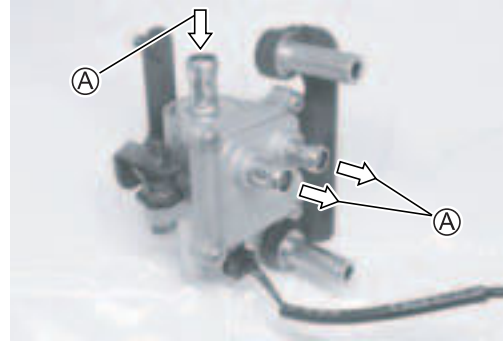


SAMPLE

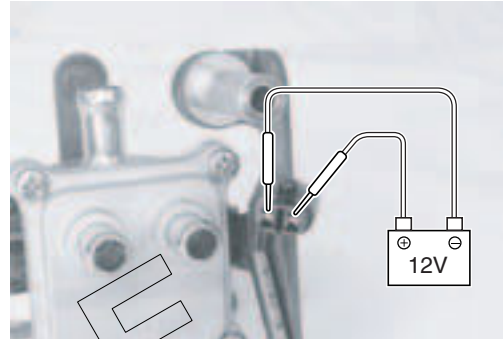
PAIR CONTROL SOLENOID VALVE

- Remove the PAIR control solenoid valve. (➡ 3-5)
- Check that air flows through the air inlet port to the air outlet port.
- If air does not flow out, replace the PAIR control solenoid valve with a new one.

Ⓐ Air flow



- Connect the 12 V battery to the PAIR control solenoid valve terminals and check the air flow.
- If air does not flow out, the solenoid valve is in normal condition.

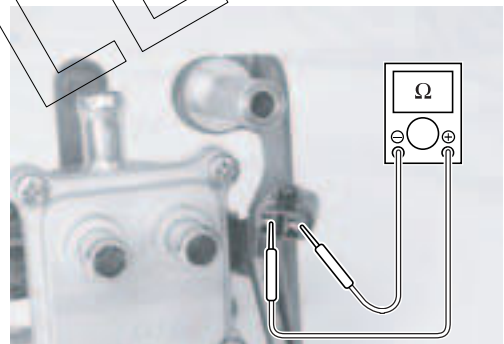


- Check the resistance between the terminals of the PAIR control solenoid valve.

DATA Resistance: 20 – 24 Ω at 20 – 30 °C (68 – 86 °F)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



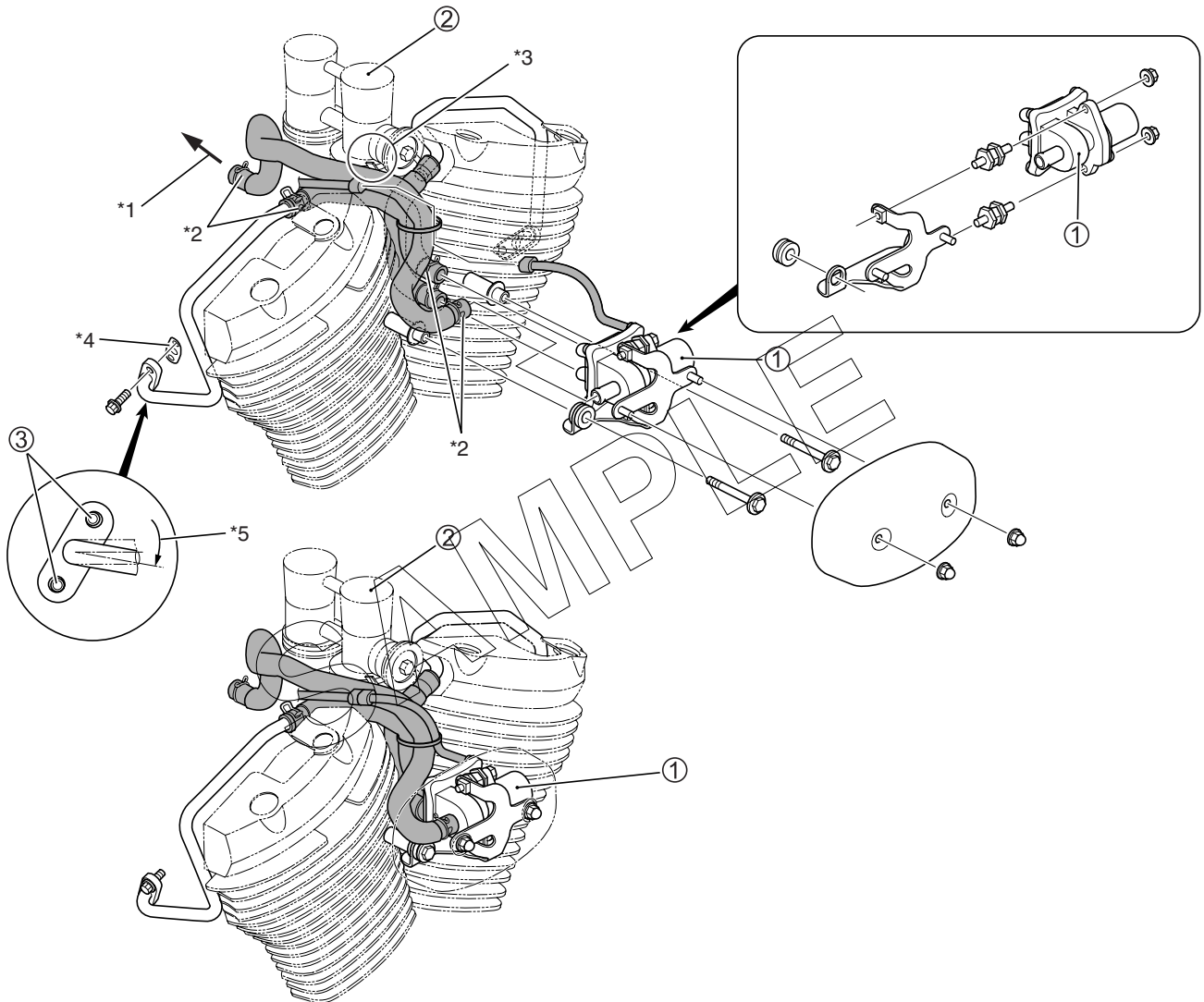
If the resistance is not within the standard range, replace the PAIR control solenoid valve with a new one.

Installation is in the reverse order of removal.

- Connect the PAIR control solenoid valve lead wire coupler and PAIR hoses securely.
- PAIR system hose routing. (➡ 11-7)

SAMPLE

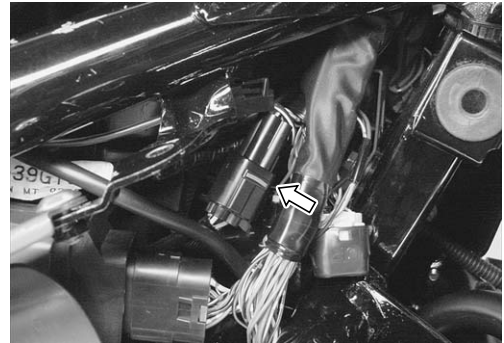
PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



①	PAIR control solenoid valve	*2	Matching mark
②	Throttle body	*3	Do not contact the hose and throttle cable drum.
③	Bolt	*4	The sealant side should face PAIR pipe side.
*1	To air cleaner box.	*5	With the bolt lightly contacted with the PAIR pipe, tighten the bolt.

HEATED OXGEN SENSOR (HO2S) INSPECTION (FOR E-02, 19, 24)

- Disconnect the HO2 sensor lead wire coupler. (☞ 5-69)
- Inspect the HO2 sensor and its circuit referring to flow table of the malfunction code C44 (P0130/P0135).



- Check the resistance between the terminals of the HO2 sensor.

DATA Resistance: 6.5 – 8.9 Ω at 23 °C (73.4 °F)
(White – White)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

If the resistance is not within the standard range, replace the HO2 sensor with a new one.

NOTE:

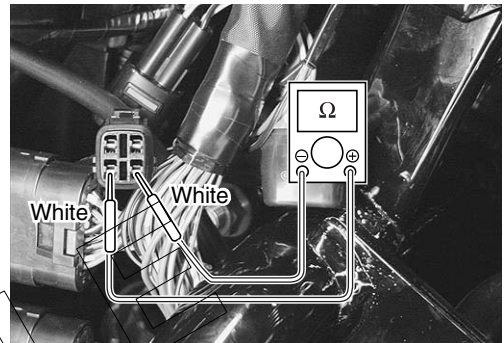
- * Temperature of the sensor affects resistance value largely.
- * Make sure that the sensor heater is at correct temperature.

⚠ WARNING

Do not remove the HO2 sensor while it is hot.

CAUTION

Be careful not to expose it to excessive shock.
Do not use an impact wrench while removing or installing the HO2 sensor unit.
Be careful not to twist or damage the sensor lead wire.



SAMPLE

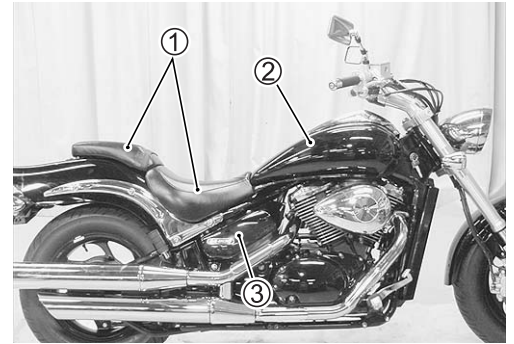
EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION (Only for E-33)

- Remove the seats ①. (☞ 8-3)
- Remove the fuel tank ②. (☞ 6-3)
- Remove the right frame cover ③. (☞ 8-4)

HOSES (EVAP hose)

Inspect the hoses for wear or damage.

Make sure that the hoses are securely connected.

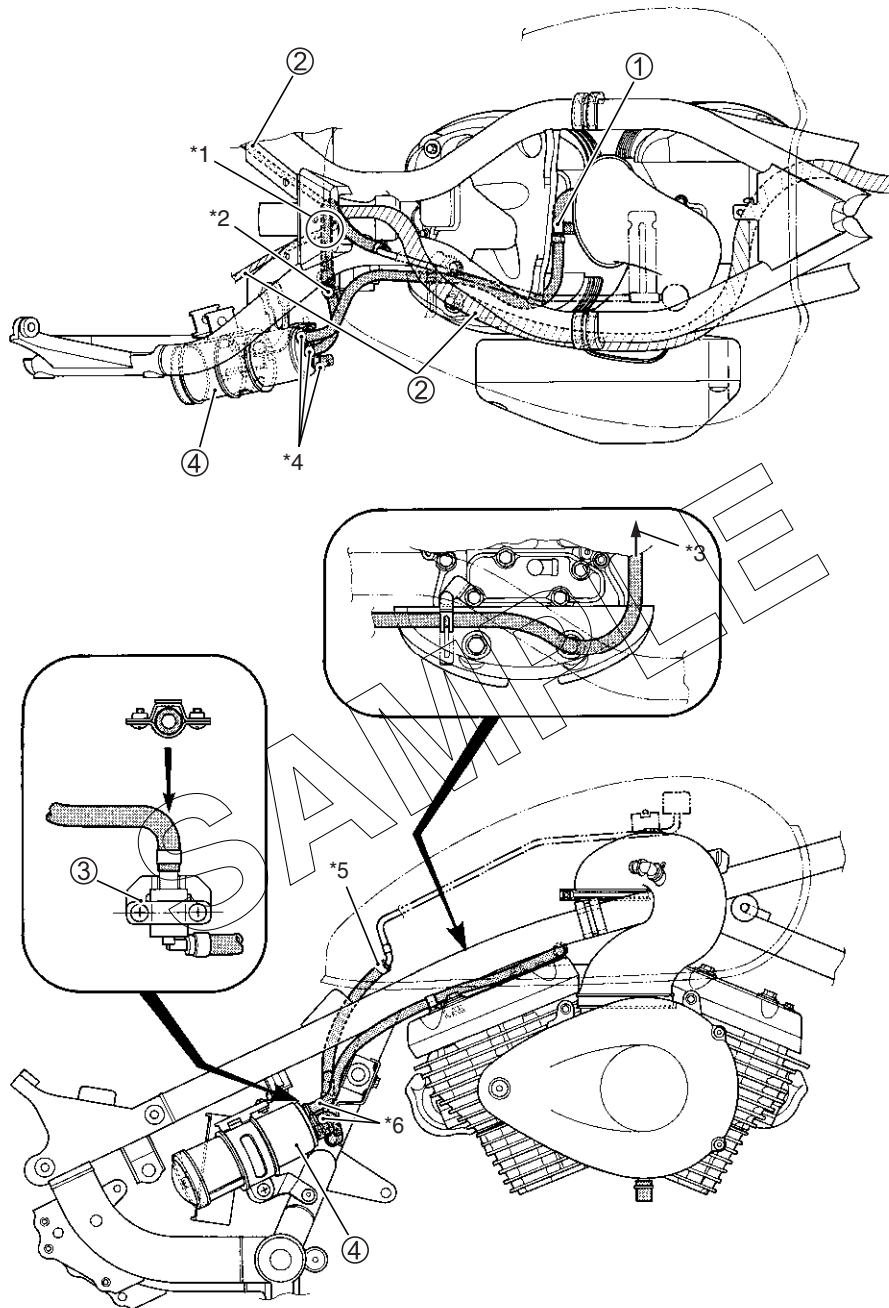


EVAP CANISTER

Inspect the canister for damage to the body.

SAMPLE

EVAP CANISTER HOSE ROUTING (Only for E-33)



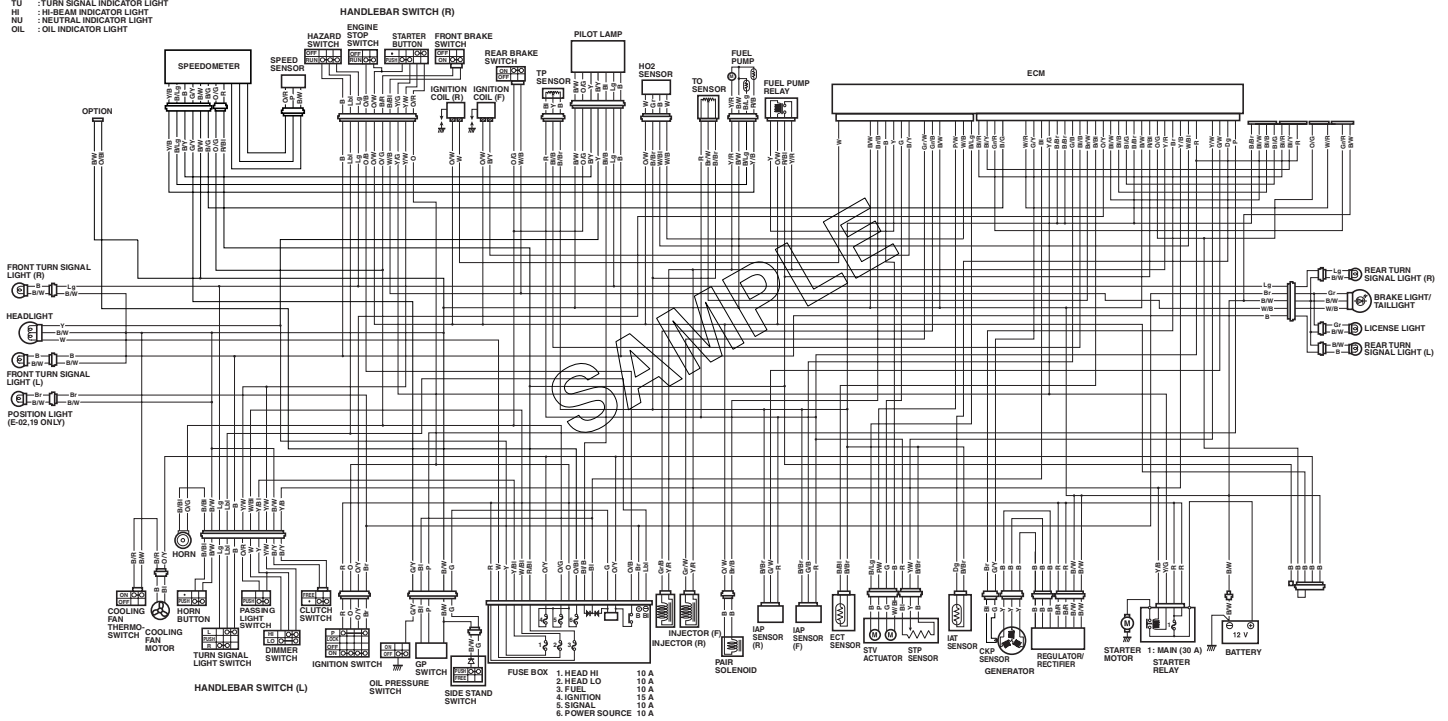
①	Three way joint	*2	White paint mark should face upside.
②	Wiring harness	*3	To three way joint.
③	Fuel shut-off valve	*4	Face the clamp end right side.
④	EVAP canister	*5	Face the clamp end right side.
*1	Pass through the purge hose over the wiring harness.	*6	Face the clamp end forward.

WIRING DIAGRAM

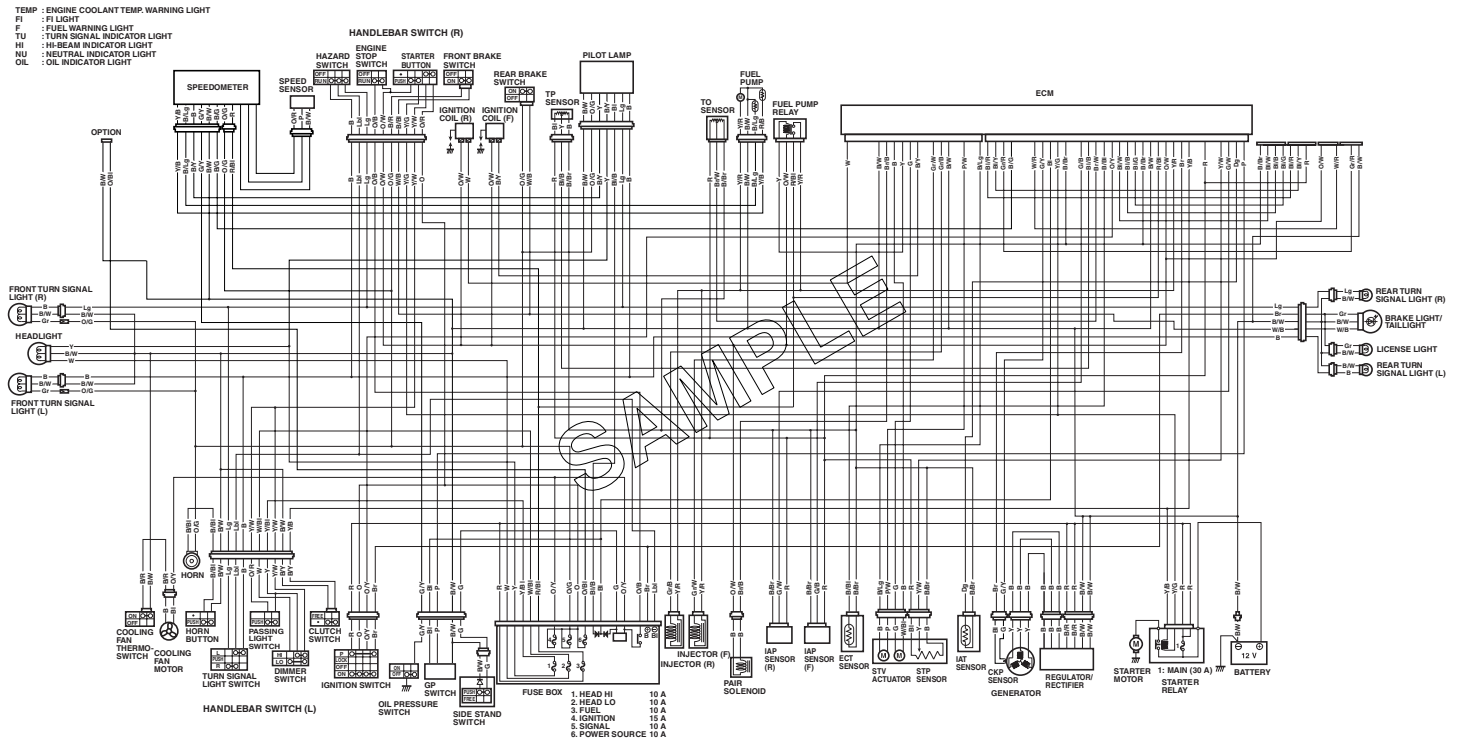
E-02, 19, 24

Wiring diagrams wire color, refer to section "WIRE COLOR".

TEMP : ENGINE COOLANT TEMP. WARNING LIGHT
 FI : FI LIGHT
 F : FUEL WARNING LIGHT
 TU : TURN SIGNAL INDICATOR LIGHT
 HB : HB-BEAM INDICATOR LIGHT
 NU : NEUTRAL INDICATOR LIGHT
 OIL : OIL INDICATOR LIGHT



E-03, 28, 33



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