

# Engine Lubrication System

## Precautions

### Precautions for Engine Oil

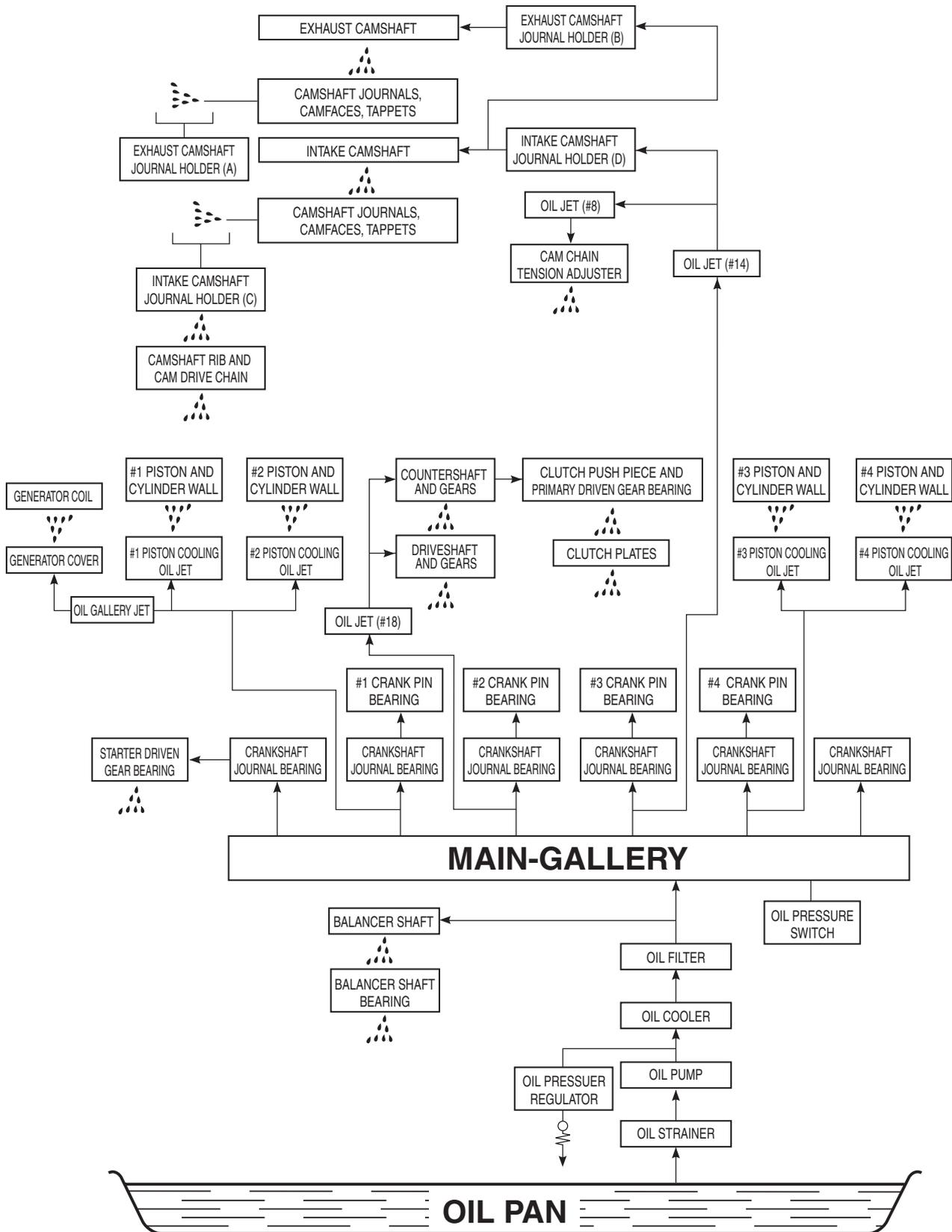
Refer to "Fuel and Oil Recommendation in Section 0A (Page 0A-4)".

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## Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

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## Diagnostic Information and Procedures

### Engine Lubrication Symptom Diagnosis

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Condition	Possible cause	Correction / Reference Item
<b>Engine overheats.</b>	Insufficient amount of engine oil.	Check level and add.
	Defective oil pump.	Replace.
	Clogged oil circuit.	Clean.
	Clogged oil cooler	Clean or replace.
	Incorrect engine oil.	Change.
<b>Exhaust smoke is dirty or thick.</b>	Excessive amount of engine oil.	Check level and drain.
<b>Engine lacks power.</b>	Excessive amount of engine oil.	Check level and drain.

### Oil Pressure Check

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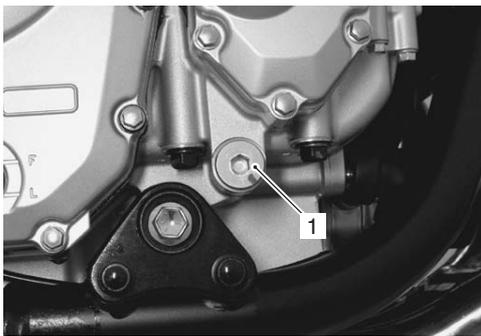
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

#### NOTE

Before checking the oil pressure, check the following.

- Oil level (Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

- 1) Start the engine and check if the oil pressure indicator light is turned on. If the light stays on, check the oil pressure indicator light circuit. If the circuit is OK, check the oil pressure in the following manner.
- 2) Remove the main oil gallery plug (1).

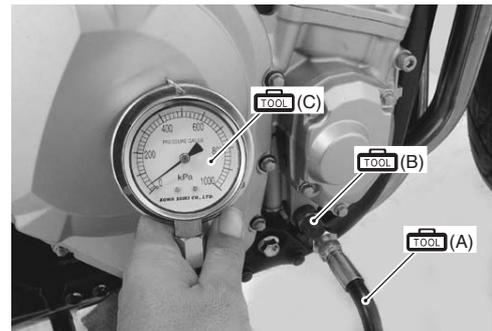


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- 3) Install the oil pressure gauge and attachment into the main oil gallery.

#### Special tool

- (A): 09915-74521 (Oil pressure gauge hose)
- (B): 09915-74540 (Oil pressure gauge attachment)
- (C): 09915-77331 (Meter (for high pressure))



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- 4) Warm up the engine as follows:  
 Summer: 10 min. at 2 000 r/min  
 Winter: 20 min. at 2 000 r/min
- 5) After warm up, increase the engine speed to 3 000 r/min (Observe the tachometer), and read the oil pressure gauge.  
 If the oil pressure is lower or higher than the specification, the following causes may be considered.

#### Oil pressure specification

**100 – 400 kPa (1.0 – 4.0 kgf/cm<sup>2</sup>, 14 – 57 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)**

High oil pressure	Low oil pressure
<ul style="list-style-type: none"> <li>• Engine oil viscosity is too high</li> <li>• Clogged oil passage</li> <li>• Combination of the above items</li> </ul>	<ul style="list-style-type: none"> <li>• Clogged oil filter</li> <li>• Oil leakage from the oil passage</li> <li>• Damaged O-ring</li> <li>• Defective oil pump</li> <li>• Combination of the above items</li> </ul>

## 1E-4 Engine Lubrication System:

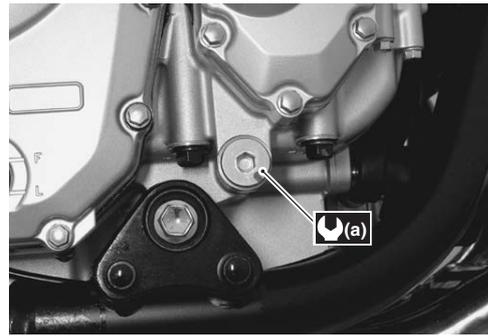
- 6) Stop the engine and remove the oil pressure gauge and attachment.
- 7) Reinstall the main oil gallery plug and tighten it to the specified torque.

### **⚠ CAUTION**

**Use a new gasket to oil leakage.**

### **Tightening torque**

**Main Oil gallery plug (M16) (a): 35 N·m (3.5 kgf·m, 25.5 lb-ft)**



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- 8) Check the engine oil level. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

## Repair Instructions

### Engine Oil and Filter Replacement

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Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

### Engine Oil Level Inspection

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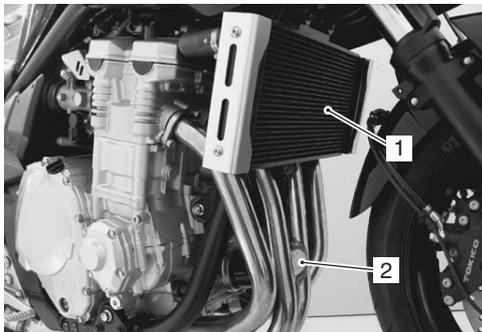
Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

### Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation

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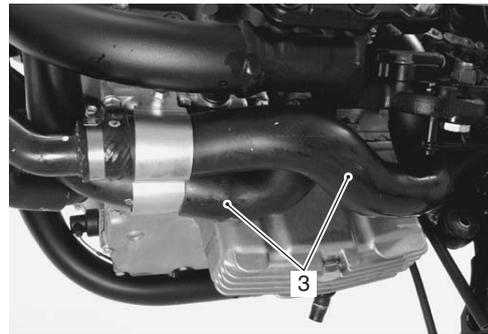
#### Removal

- 1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
- 2) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
- 3) Remove the radiator (1), exhaust pipe assembly (2) and muffler. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)” and “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.



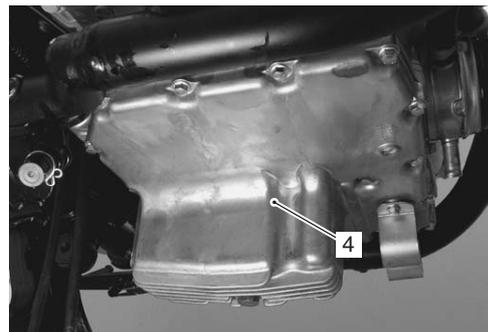
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- 4) Remove the water hoses (3). Refer to “Water Hose Routing Diagram in Section 1F (Page 1F-3)”.



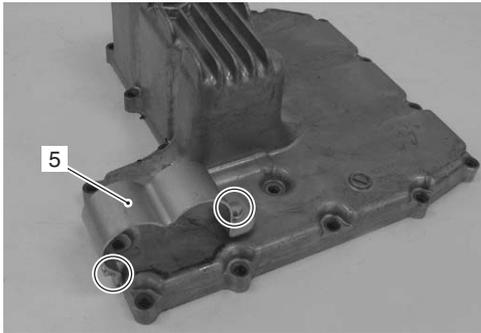
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- 5) Remove the oil pan (4). Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.



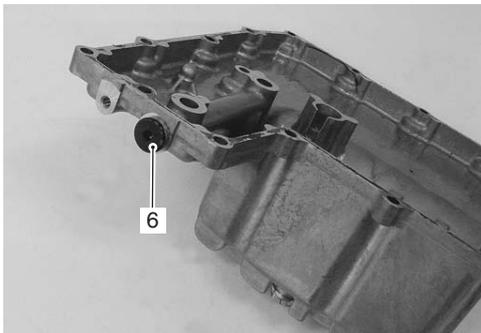
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6) Remove the hose clamp plate (5) from the oil pan.



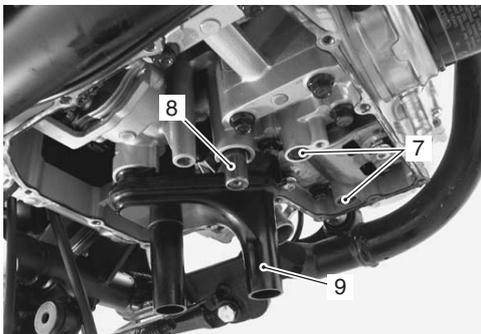
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7) Remove the oil gallery plug (6) from the oil pan.



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8) Remove the O-rings (7), oil pressure regulator (8) and oil strainer (9).



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### Installation

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

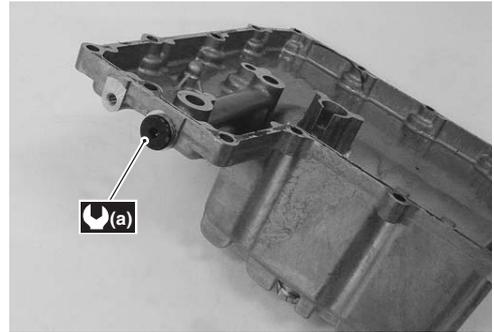
- Tighten the oil gallery plug to specified torque.

#### **CAUTION**

**Use a new gasket to prevent oil leakage.**

#### Tightening torque

Oil gallery plug (M12) (a): 15 N·m (1.5 kgf-m, 11.0 lb-ft)



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- Apply SUZUKI SUPER GREASE to the O-rings and install them.

#### **CAUTION**

**Use new O-rings to prevent oil leakage.**

**FAH: Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)**



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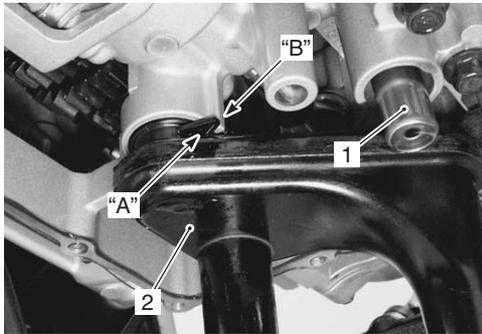
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## 1E-6 Engine Lubrication System:

- Install the oil pressure regulator (1) and oil strainer (2).

### NOTE

When installing the oil strainer, fit the concave part "A" of the oil strainer onto the convex part "B" of the crankcase.



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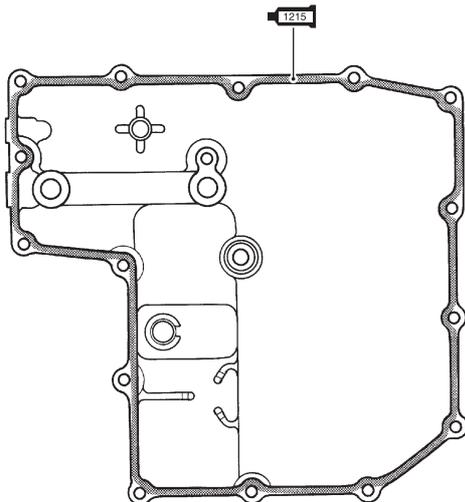
- Apply SUZUKI BOND to the mating surface of the oil pan.

### NOTE

Use of SUZUKI BOND is as follows:

- Make surfaces free from moisture, oil, dust and other foreign materials.
- Spread the sealant on surfaces thinly to form an even layer, and assemble the oil pan within a few minutes.
- Apply to distorted surfaces as it forms a comparatively thick film.

**1215** : Sealant 99000-31110 (SUZUKI BOND No.1215 or equivalent)



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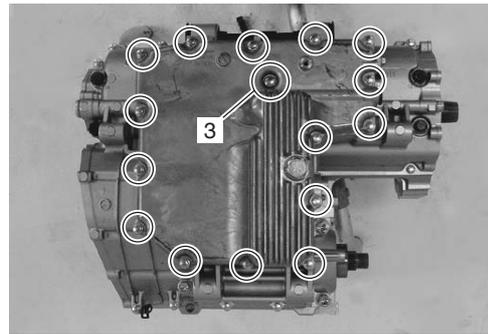
- Tighten the oil pan bolts diagonally.

### NOTE

Fit a new gasket washer to the oil pan bolt (3).

### CAUTION

Use a new gasket washer to prevent oil leakage.



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- After installing the removed parts, pour engine oil and engine coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".

### Oil Pressure Regulator / Oil Strainer Inspection

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Refer to "Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-4)".

### Oil pressure regulator

Inspect the operation of the oil pressure regulator by pushing on the piston with a proper bar. If the piston does not operate, replace the oil pressure regulator with a new one.



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### Oil Strainer

Clean the oil strainer if necessary. Inspect the oil strainer body for damage. If necessary, replace it with a new one.



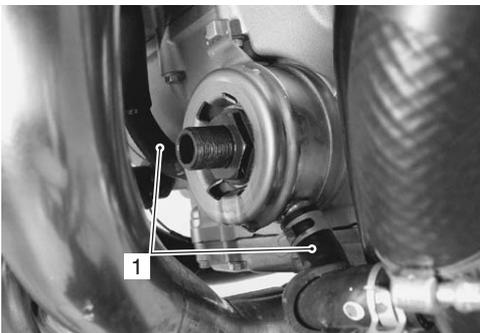
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### Oil Cooler Removal and Installation

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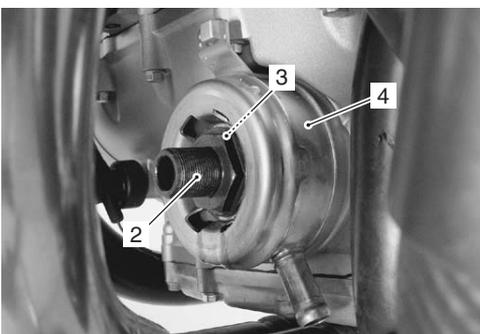
#### Removal

- 1) Drain engine oil and engine coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
- 2) Remove the Oil filter. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".
- 3) Disconnect the oil cooler hoses (1).



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- 4) Remove the washer (3) and oil cooler (4) by removing the union bolt (2).



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#### Installation

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

- Apply SUZUKI SUPER GREASE to the O-ring.

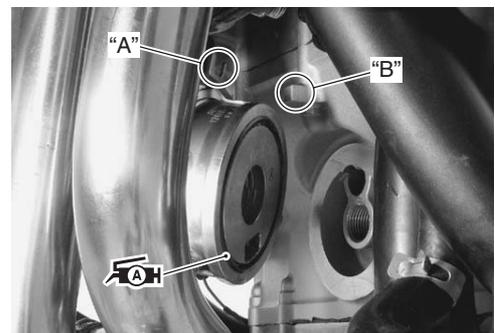
#### ⚠ CAUTION

Use a new O-ring to prevent oil leakage.

#### NOTE

When installing the oil cooler, fit the concave part "A" of the oil cooler onto the convex part "B" of the crankcase.

**Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)**

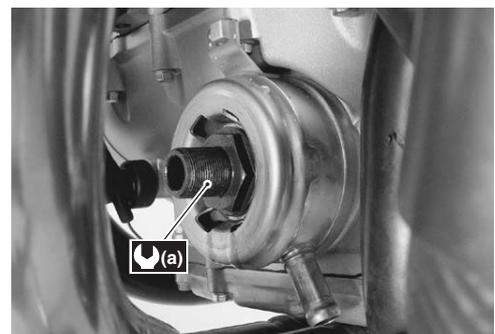


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- Tighten the union bolt to the specified torque.

#### Tightening torque

Oil cooler union bolt (a): 70 N·m (7.0 kgf-m, 50.5 lb-ft)



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### Oil Pressure Switch Removal and Installation

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Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

#### Removal

- 1) Turn the ignition switch OFF.
- 2) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

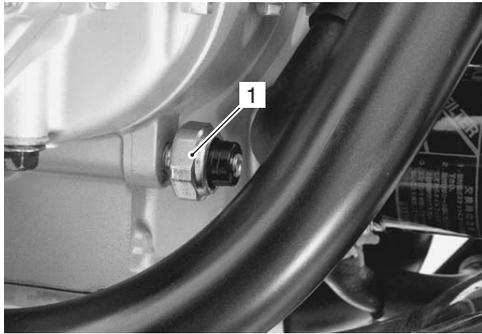
## 1E-8 Engine Lubrication System:

- 3) Disconnect the oil pressure switch lead wire.



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- 4) Remove the oil pressure switch (1).



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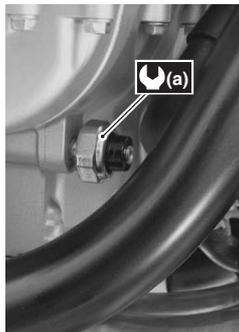
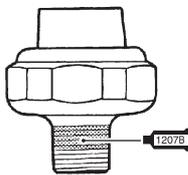
### Installation

- 1) Install the oil pressure switch, apply the SUZUKI BOND to its thread and tighten it to the specified torque.

**1207B** : Sealant 99000-31140 (SUZUKI Bond 1207B or equivalent)

#### Tightening torque

Oil pressure switch (a): 14 N·m (1.4 kgf-m, 10.0 lb-ft)

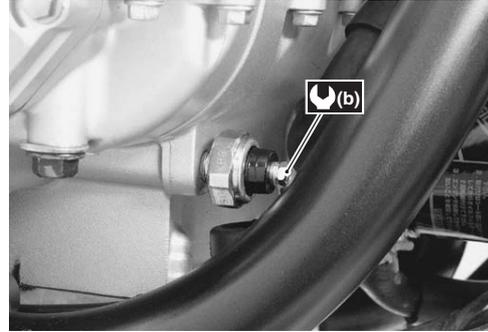


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- 2) Connect the oil pressure switch lead wire securely. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".

#### Tightening torque

Oil pressure switch lead wire bolt (b): 1.5 N·m (0.15 kgf-m, 1.1 lb-ft)



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- 3) Pour engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

### Oil Pressure Switch Inspection

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Refer to "Oil Pressure Indicator Inspection in Section 9C (Page 9C-9)".

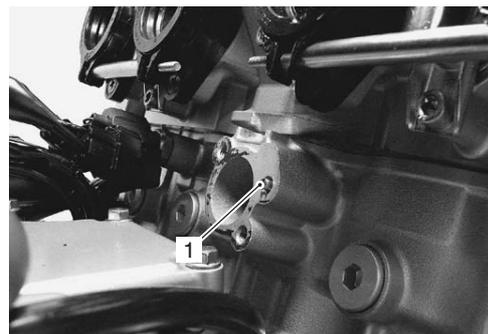
### Oil Jet Removal and Installation

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#### Oil Jet (For Cam Chain Tension Adjuster)

#### Removal

- 1) Remove the cam chain tension adjuster. Refer to "Engine Top Side Disassembly in Section 1D (Page 1D-24)".
- 2) Remove the oil jet (1).



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**Installation**

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

- Apply engine oil to the O-ring.

**⚠ CAUTION**

**Use a new O-ring to prevent oil leakage.**

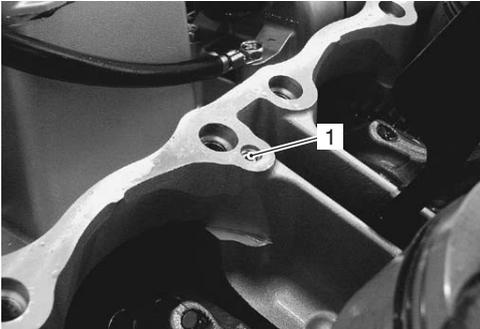


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**Oil Jet (For Cylinder Head)**

**Removal**

- 1) Remove the cylinder. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-24)”.
- 2) Remove the oil jet (1).



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**Installation**

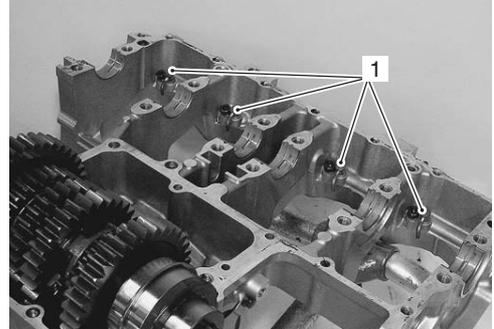
Installation is in the reverse order of removal. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-28)”.

**Oil Jet (For the Piston Cooling and Transmission)**

**Removal**

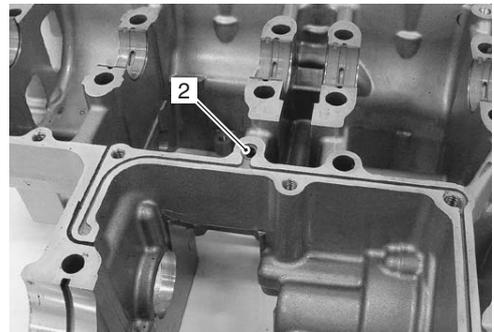
- 1) Remove the engine assembly. Refer to “Engine Assembly Removal in Section 1D (Page 1D-17)”.
- 2) Separate the crankcases, upper and lower. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.

- 3) Remove the crankshaft assembly. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-53)”.
- 4) Remove the piston cooling oil jets (1) from the upper crankcase.



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- 5) Remove the oil jet (2) (for transmission) from the lower crankcase.



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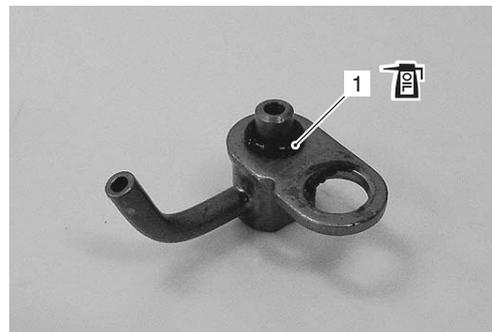
**Installation**

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

- Fit new O-ring (1) to each piston cooling oil jet as shown and apply engine oil to them.

**⚠ CAUTION**

**Use new O-rings to prevent oil pressure leakage.**



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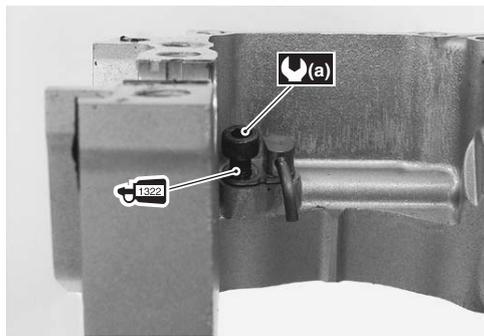
## 1E-10 Engine Lubrication System:

- Apply a small quantity of THREAD LOCK to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

### Tightening torque

Piston cooling oil jet bolt (a): 10 N·m (1.0 kgf·m, 7.0 lb-ft)



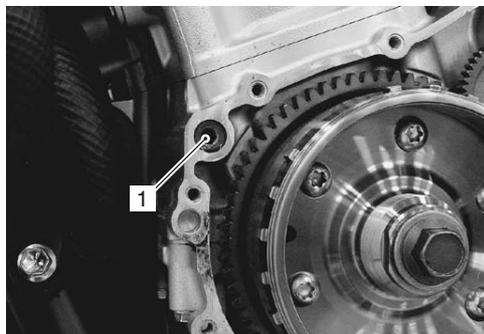
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## Oil Gallery Jet Removal and Installation

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### Removal

- Remove the generator cover. Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".
- Remove the oil gallery jet (1).



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### Installation

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

- Apply THREAD LOCK to the oil gallery jet and tighten it to the specified torque.

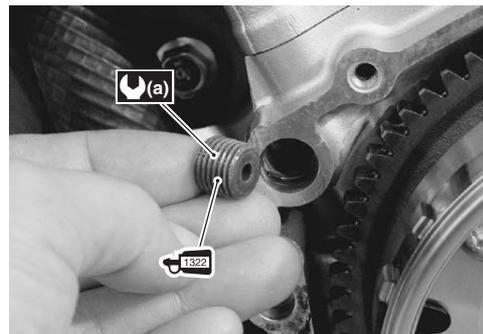
### NOTE

After tighten the jet, make sure that the jet end is flush with the cover mating surface.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

### Tightening torque

Oil gallery jet (a): 22 N·m (2.2 kgf·m, 16.0 lb-ft)



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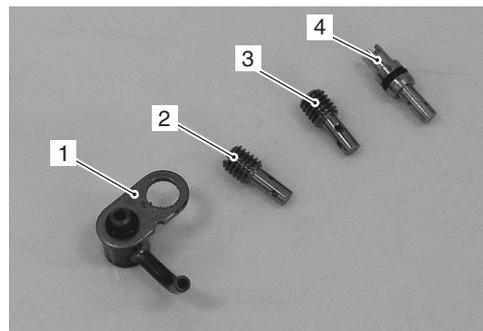
## Oil Jet / Oil Gallery Jet Inspection

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Refer to "Oil Jet Removal and Installation (Page 1E-8)". Refer to "Oil Gallery Jet Removal and Installation (Page 1E-10)".

### Oil Jet

Make sure that the oil jets are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



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1.	Piston cooling jet
2.	Oil jet (#14) (For cylinder head)
3.	Oil jet (#18) (For transmission)
4.	Oil jet (#8) (For can chain tension adjuster)

### Oil Gallery Jet

Inspect the oil gallery jet for clogging. Clean the oil gallery if necessary.



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## Oil Pump Removal and Installation

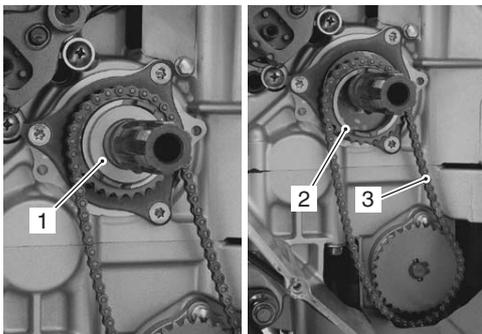
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### NOTE

Do not drop the each parts into the crankcase.

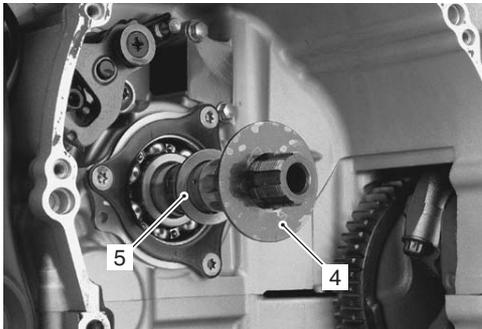
### Removal

- 1) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".
- 2) Remove the clutch. Refer to "Clutch Removal in Section 5C (Page 5C-13)".
- 3) Remove the spacer (1).
- 4) Remove the oil pump drive sprocket (2) and chain (3).



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- 5) Remove the thrust washer (4) and washer (5).

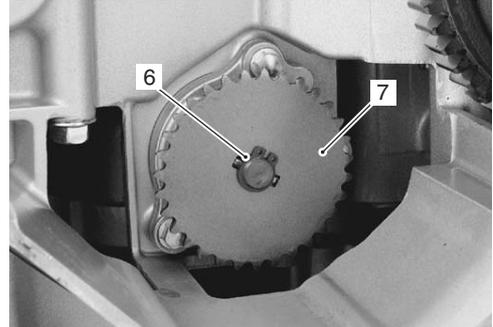


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- 6) Remove the snap ring (6) and oil pump driven gear (7).

### Special tool

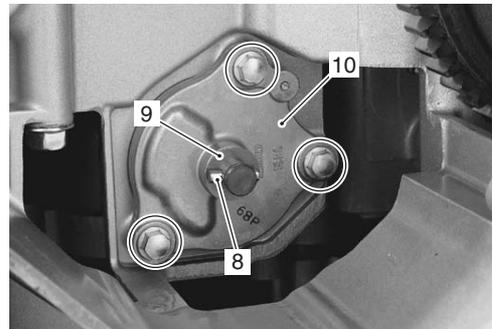
 : 09900-06107 (Snap ring pliers)



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- 7) Remove the pin (8) and washer (9).

- 8) Remove the oil pump (10).



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### Installation

Installation is in reverse order of removal.

Pay attention to the following points:

- Apply SUZUKI SUPER GREASE to the O-ring.

### CAUTION

Use a new O-ring to prevent oil leakage.

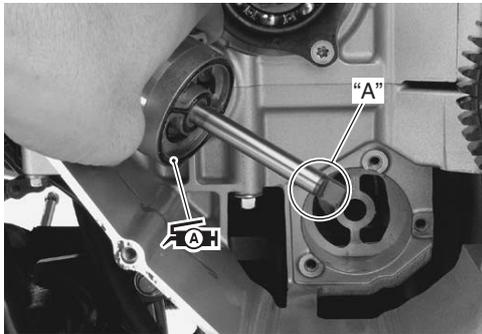
 : Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)

## 1E-12 Engine Lubrication System:

- Install the oil pump.

### NOTE

Set the oil pump shaft end "A" to the water pump shaft.



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- Tighten the oil pump mounting bolts to the specified torque.

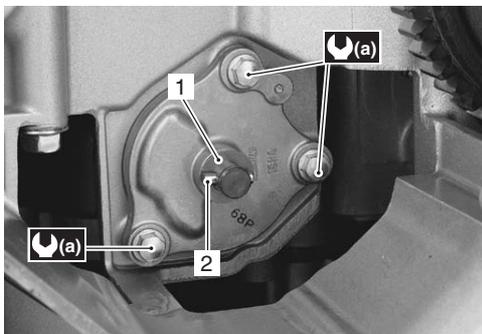
### Tightening torque

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

- Install the washer (1) and pin (2).

### NOTE

Be careful not to drop the washer (1) and pin (2) into the crankcase.



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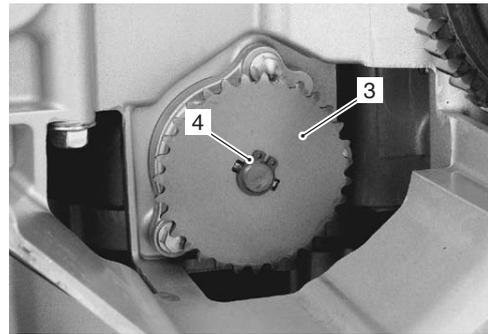
- Install the oil pump driven gear (3) and snap ring (4).

### ⚠ CAUTION

Never reuse a snap ring.

### Special tool

 : 09900-06107 (Snap ring pliers)

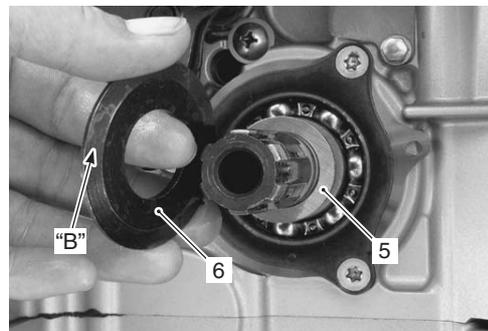


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- Install the washer (5) and thrust washer (6) onto the countershaft.

### NOTE

The chamfer side "B" of thrust washer faces inside.



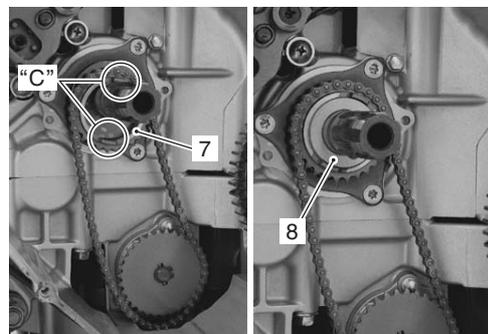
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- Install the oil pump drive sprocket (7) to the countershaft.

### NOTE

Teeth "C" on the sprocket must face the clutch side.

- Pass the chain between the oil pump drive and driven sprockets.
- Install the spacer (8).



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- Reinstall the clutch. Refer to "Clutch Installation in Section 5C (Page 5C-14)".

**Oil Pump Inspection**

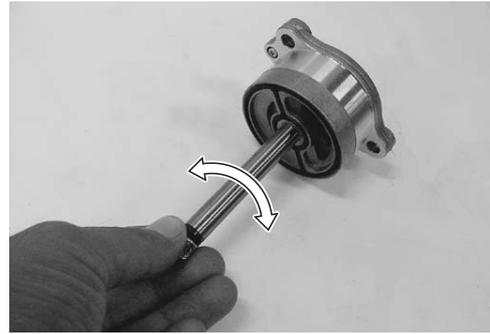
B718H11506014

Inspect the oil pump in the following procedures:

- 1) Remove the oil pump. Refer to “Oil Pump Removal and Installation (Page 1E-11)”.
- 2) Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.

**⚠ CAUTION**

**Do not attempt to disassemble the oil pump assembly.  
The oil pump is available only as an assembly.**



I718H1150063-01

- 3) Install the oil pump. Refer to “Oil Pump Removal and Installation (Page 1E-11)”.

**Specifications**

**Service Data**

B718H11507001

**Oil Pump**

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	100 – 400 kPa (1.0 – 4.0 kgf/cm <sup>2</sup> , 14 – 57 psi) at 3 000 r/min	—

**Oil**

Item	Specification	Note
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	
Engine oil capacity	Change	3 000 ml (3.2/2.6 US/lmp qt)
	Filter change	3 500 ml (3.7/3.1 US/lmp qt)
	Overhaul	3 700 ml (3.9/3.3 US/lmp qt)

**Tightening Torque Specifications**

B718H11507002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Main Oil gallery plug (M16)	35	3.5	25.5	☞ (Page 1E-4)
Oil gallery plug (M12)	15	1.5	11.0	☞ (Page 1E-5)
Oil cooler union bolt	70	7.0	50.5	☞ (Page 1E-7)
Oil pressure switch	14	1.4	10.0	☞ (Page 1E-8)
Oil pressure switch lead wire bolt	1.5	0.15	1.1	☞ (Page 1E-8)
Piston cooling oil jet bolt	10	1.0	7.0	☞ (Page 1E-10)
Oil gallery jet	22	2.2	16.0	☞ (Page 1E-10)
Oil pump mounting bolt	10	1.0	7.0	☞ (Page 1E-12)

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

## Special Tools and Equipment

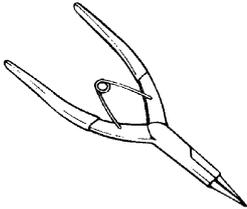
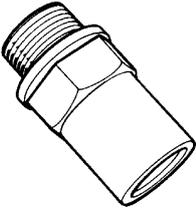
### Recommended Service Material

B718H11508001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page 1E-5) / ☞ (Page 1E-7) / ☞ (Page 1E-11)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000-31110	☞ (Page 1E-6)
	SUZUKI Bond 1207B or equivalent	P/No.: 99000-31140	☞ (Page 1E-8)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 1E-10) / ☞ (Page 1E-10)

### Special Tool

B718H11508002

09900-06107 Snap ring pliers ☞ (Page 1E-11) / ☞ (Page 1E-12)		09915-74521 Oil pressure gauge hose ☞ (Page 1E-3)	
09915-74540 Oil pressure gauge attachment ☞ (Page 1E-3)		09915-77331 Meter (for high pressure) ☞ (Page 1E-3)	

# Engine Cooling System

## Precautions

### Precautions for Engine Cooling System

B718H11600001

**⚠ WARNING**

- You can be injured by boiling 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.

### Precautions for Engine Coolant

B718H11600002

Refer to “Engine Coolant Recommendation in Section 0A (Page 0A-5)”.

## General Description

### Engine Coolant Description

B718H11601001

**⚠ CAUTION**

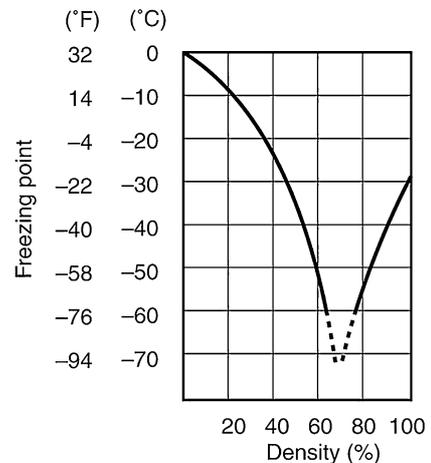
- Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
- Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)

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 vehicle 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.

#### Anti-freeze Proportioning Chart

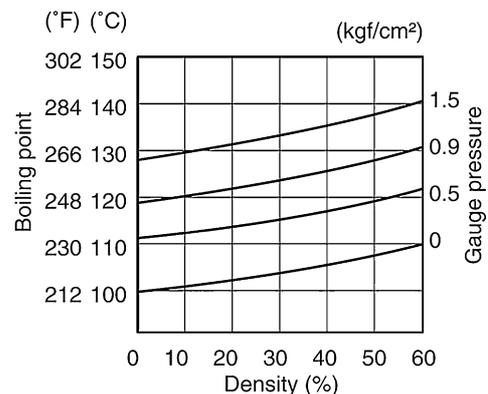
Anti-freeze density	Freezing point
50%	$-31\text{ }^{\circ}\text{C}$ ( $-24\text{ }^{\circ}\text{F}$ )
55%	$-40\text{ }^{\circ}\text{C}$ ( $-40\text{ }^{\circ}\text{F}$ )
60%	$-55\text{ }^{\circ}\text{C}$ ( $-67\text{ }^{\circ}\text{F}$ )

Fig.1: Engine coolant density-freezing point curve



I310G1160001-01

Fig.2: Engine coolant density-boiling point curve

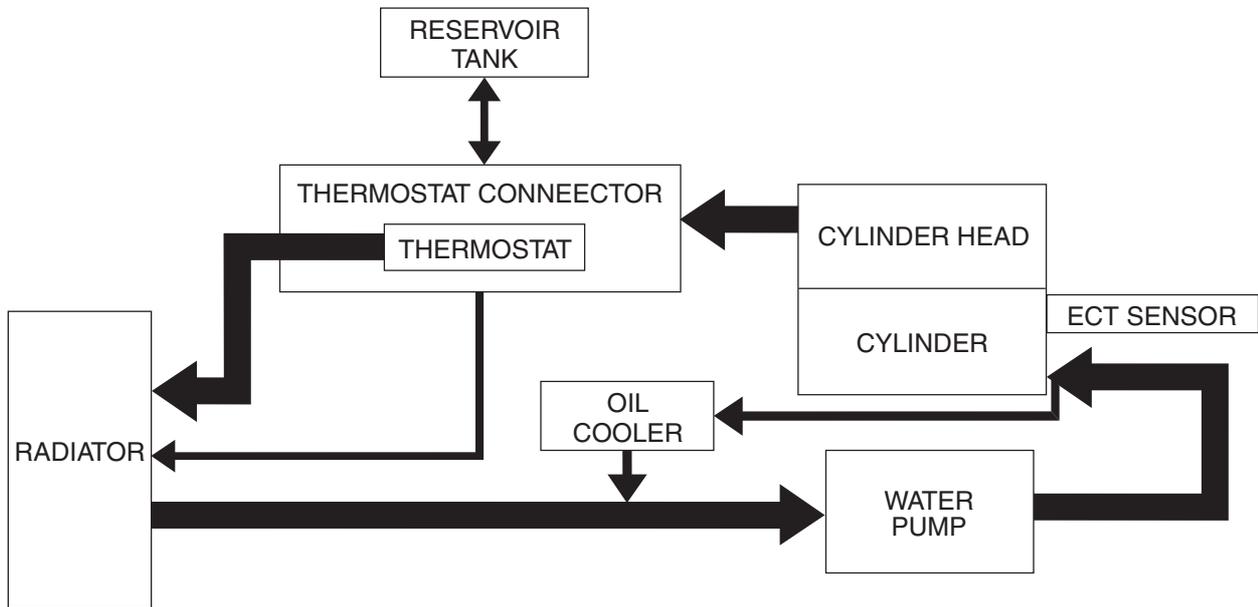


I310G1160002-01

## Schematic and Routing Diagram

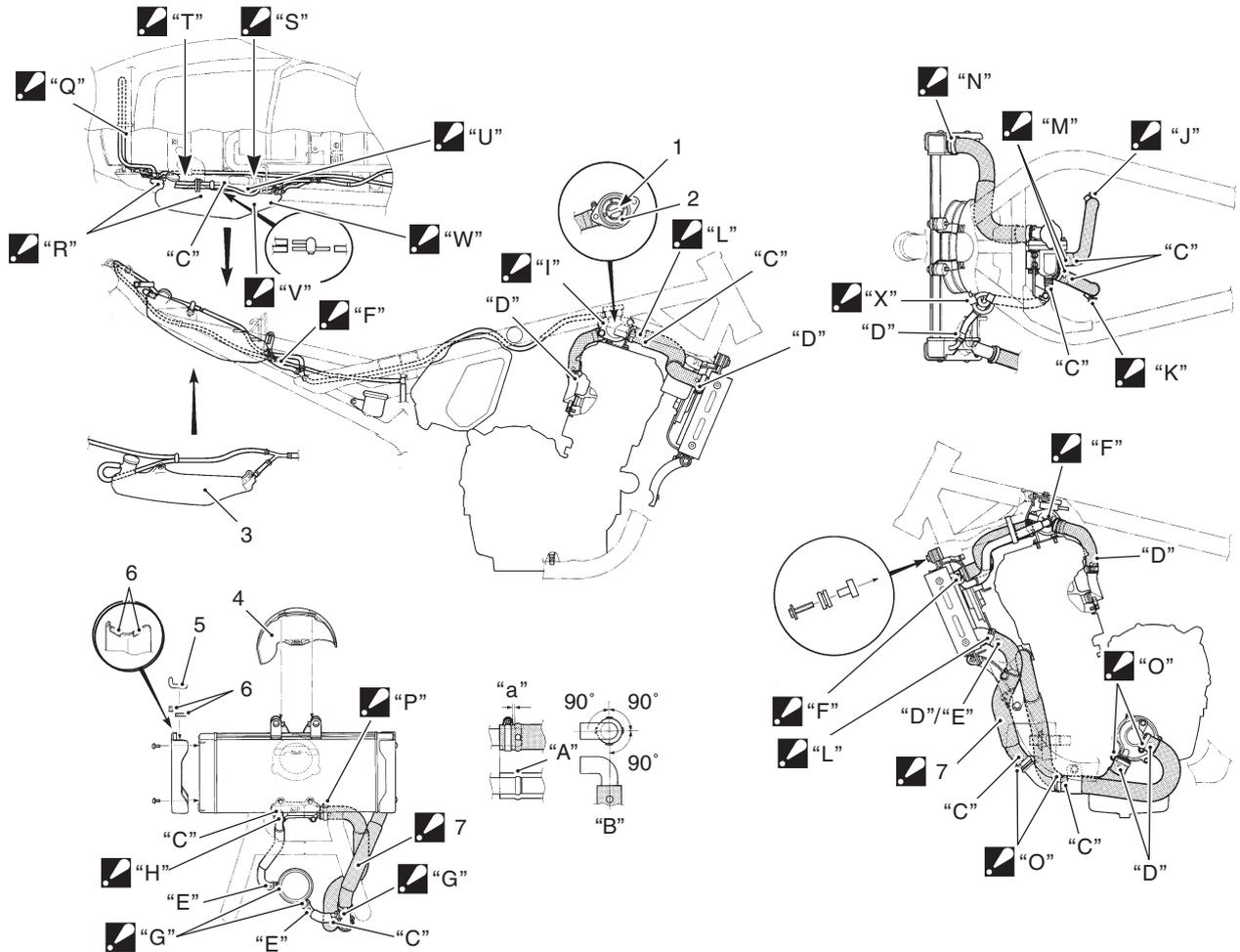
### Cooling Circuit Diagram

B718H11602004



I718H1160029-03

Water Hose Routing Diagram



I718H1160068-03

1. Jiggle valve	"J": The clamp screw head should face right backward.
2. Thermostat	"K": The clamp screw head should face left backward.
3. Reservoir tank	"L": The clamp screw head should face upward.
4. Radiator heat shield	"M": The clamp screw head should face left upward.
5. Radiator cover molding (GSF1250/A only)	"N": The clamp screw head should face right side.
6. Tape (GSF1250/A only)	"O": The clamp screw head should face left side.
7: Radiator outlet hose : Check that there is at least 20 mm (0.8 in) of clearance between the radiator outlet hose and the exhaust pipe.	"P": The clamp screw head should face forward.
"A": Match mark	"Q": Clamp the hose on yellow marking with the tail lamp harness.
"B": Marking position	"R": Clamp the hose on white marking.
"C": White marking	"S": Pass through the hose under the wiring harness.
"D": Yellow marking	"T": Pass through the hose under the seat lock plate.
"E": Red marking	"U": Be careful not to pinch the hose between seat cushion and fender.
"F": The end of the clamp should face upward.	"V": Pass through the hose between frame and reservoir tank. Be careful for the hose not to be slackened.
"G": The end of the clamp should face forward.	"W": Pass through the hose under the helmet holder.
"H": The end of the clamp should face right side.	"X": Clamp the hose with the fan motor lead wire. Be careful not to insert the coupler to the radiator heat shield hole.
"I": The end of the clamp should face left side.	"a": Clearance

## Diagnostic Information and Procedures

### Engine Cooling Symptom Diagnosis

B718H11604001

Condition	Possible cause	Correction / Reference Item
<b>Engine overheats</b>	Not enough engine coolant.	Add engine coolant.
	Radiator core clogged with dirt or scale.	Clean.
	Faulty cooling fan.	Repair or replace.
	Defective cooling fan relay, or open-or-short circuited.	Repair or replace
	Clogged water passage.	Clean.
	Air trapped in the cooling circuit.	Bleed air.
	Defective water pump.	Replace.
	Use of incorrect engine coolant.	Replace.
	Defective thermostat.	Replace.
	Defective ECT sensor.	Replace.
	Defective ECM.	Replace.
	Damaged ISC valve.	Replace.
	ISC bad learning.	Reset learned value.
<b>Engine over cools</b>	Defective cooling fan relay, or open-or-short circuited.	Repair or replace
	Extremely cold weather.	Put on radiator cover.
	Defective thermostat.	Replace.
	Defective ECT sensor.	Replace.
	Defective ECM	Replace.

## Repair Instructions

### Cooling Circuit Inspection

B718H11606012

#### **⚠ WARNING**

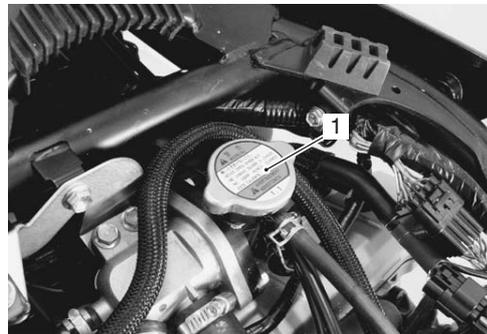
- Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- When removing the radiator cap tester, put a rag on the filler to prevent the engine coolant from spraying out.

Inspect the cooling circuit in the following procedures:

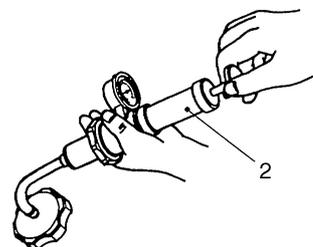
- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 2) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
- 3) Pressurize the cooling system with 120 kPa (1.2 kgf/cm, 17 psi) of pressure, and then check if it holds the pressure for 10 seconds.

#### **⚠ CAUTION**

**Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.**



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I705H1160004-01

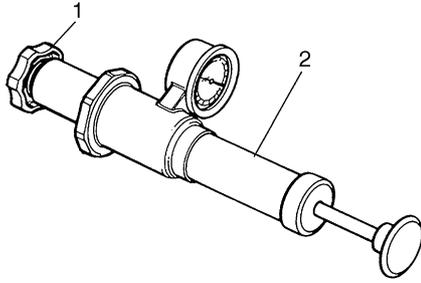
- 4) After finishing the cooling circuit inspection, reinstall the removed parts.

### Radiator Cap Inspection

B718H11606013

Inspect the radiator cap in the following procedures:

- 1) Remove the radiator cap. Refer to “Cooling Circuit Inspection (Page 1F-4)”.
- 2) Attach the radiator cap (1) to the radiator tester (2) as shown.



I718H1160033-01

- 3) Slowly apply pressure to the radiator cap. If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

#### Radiator cap release pressure

93 – 123 kPa (0.93 – 1.23 kgf/cm<sup>2</sup>, 13.2 – 17.5 psi)

- 4) After finishing the radiator cap inspection, reinstall the removed parts.

### Radiator Inspection and Cleaning

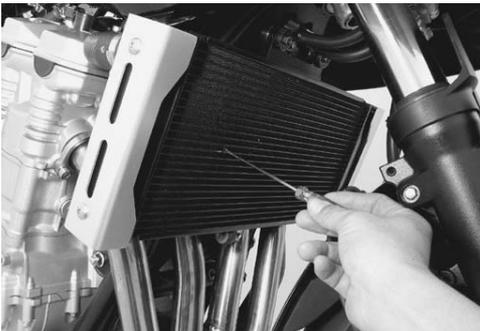
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#### Radiator Hose

Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

#### Radiator

Inspect the radiator for water leaks. If any defects are found, replace the radiator with a new one. If the fins are bent or dented, repair them by carefully straightening them with the blade of a small screwdriver.



I718H1160001-01

### Radiator Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

#### ⚠ CAUTION

- Make sure not to bend the fins when using compressed air.
- Always apply compressed air from the engine side of engine. If compressed air is applied from the front side, dirt will be forced into the pores of radiator.



I718H1160002-01

### Radiator / Cooling Fan Motor Removal and Installation

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#### Removal

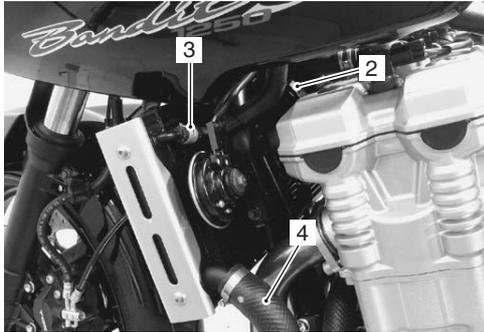
- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 2) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
- 3) Disconnect the radiator inlet hose (1).



I718H1160028-01

## 1F-6 Engine Cooling System:

- 4) Disconnect the cooling fan motor coupler (2), water bypass hose (3) and radiator outlet hose (4).



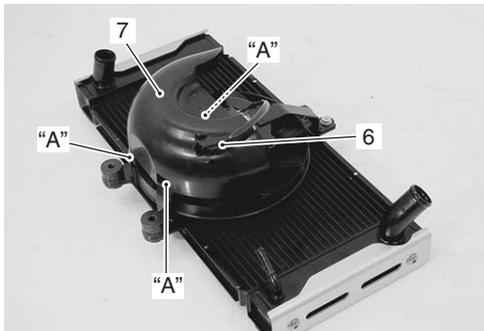
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- 5) Remove the radiator assembly (5) by removing the bolts.



I718H1160035-01

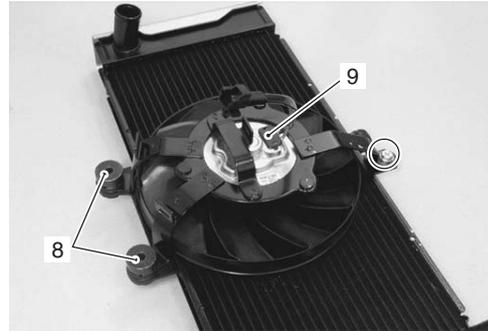
- 6) Unhook the coupler (6) and remove the radiator heat shield (7).



I718H1160073-01

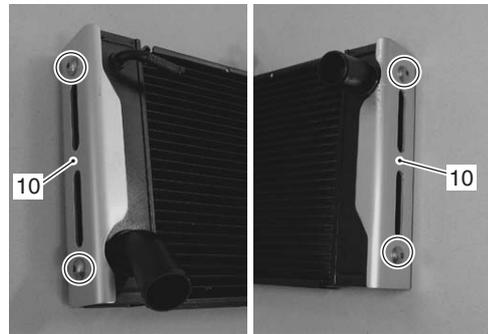
"A": Hooked point

- 7) Remove the spacers (8) and mounting bolt.  
8) Remove the cooling fan motor from the radiator (9).



I718H1160037-01

- 9) Remove the radiator covers (10), left and right.



I718H1160038-01

### Installation

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

- Connect the radiator hoses securely. Refer to "Water Hose Routing Diagram (Page 1F-3)".
- Pour engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".

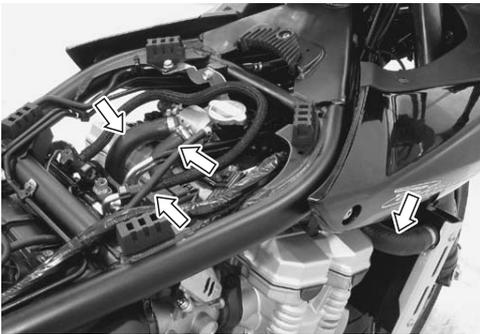
### Water Hose Inspection

B718H11606031

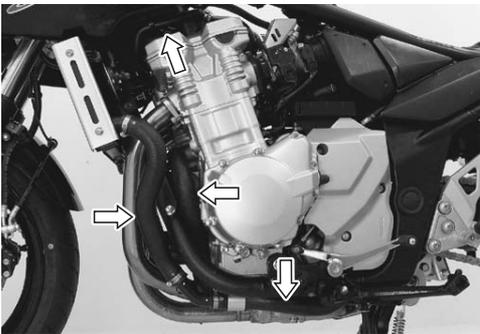
Inspect the water hoses in the following procedures:

- 1) Remove the seat, right frame cover and fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.

- 3) Any leakage from the connecting section should be corrected by proper tightening. Refer to “Water Hose Routing Diagram (Page 1F-3)”.



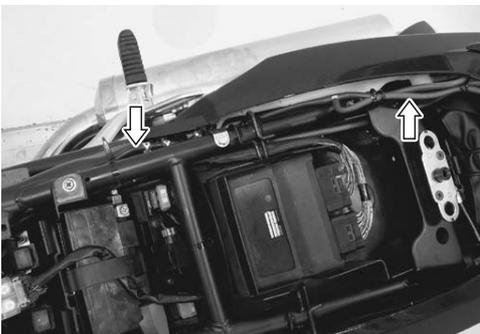
I718H1160039-02



I718H1160040-01



I718H1160041-02



I718H1160042-01

- 4) After finishing the water hose inspection, reinstall the removed parts.

## Water Hose Removal and Installation

B718H11606016

### Removal

- 1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
- 2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 3) Remove the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

### Installation

- 1) Install the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

### NOTE

**Check that there is at least 20 mm of clearance shown as “a” between the radiator outlet hose and the exhaust pipe.**



I718H1160063-02

- 2) Pour engine coolant and bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
- 3) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.

## Radiator Reservoir Tank Inspection

B718H11606018

Inspect the radiator reservoir tank in the following procedures:

- 1) Remove the seat tail cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

## 1F-8 Engine Cooling System:

- 2) Inspect the radiator reservoir tank cooling leaks. If any defects are found, replace the radiator reservoir tank with a new one.



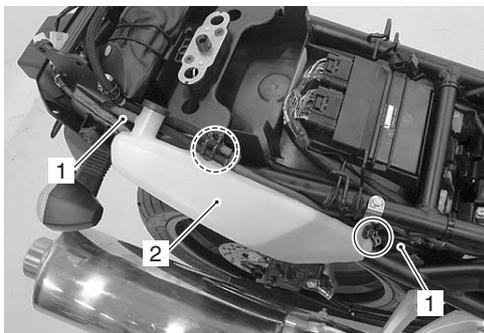
I718H1160065-01

### Radiator Reservoir Tank Removal and Installation

B718H11606017

#### Removal

- 1) Remove the seat tail cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) Remove the reservoir tank bolts.
- 3) Disconnect the hoses (1) and drain the engine coolant.
- 4) Remove the reservoir tank (2).



I718H1160066-01

#### Installation

Install radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

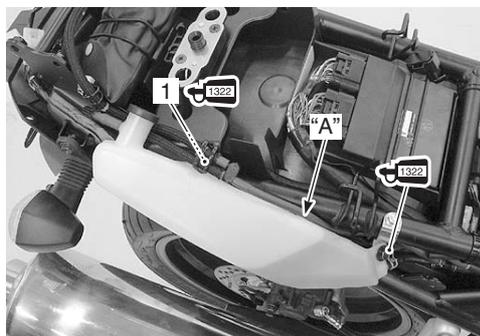
- Apply thread lock to the reservoir tank mounting bolts and tighten them.

#### NOTE

Fit the clamp to bolt (1).

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

- Fill the reservoir tank to the upper level "A". Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".



I718H1160067-01

"A": Upper level

### Cooling Fan Inspection

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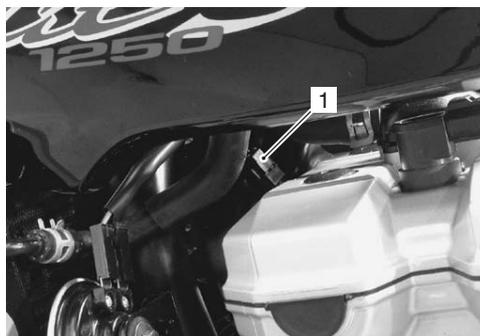
#### Cooling fan operating temperature Standard

(ON→OFF): Approx. 100 °C (212 °F)

(OFF→ON): Approx. 105 °C (221 °F)

Inspect the cooling fan in the following procedures:

- 1) Disconnect the cooling fan motor coupler (1).

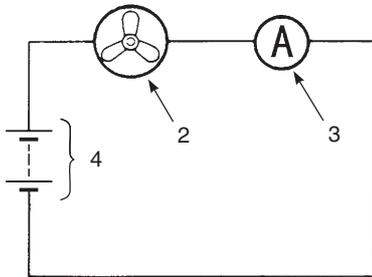


I718H1160047-01

2) Test the cooling fan motor for load current with an ammeter connected as shown in the figure. If the fan motor does not turn, replace the cooling fan assembly with a new one. Refer to "Radiator / Cooling Fan Motor Removal and Installation (Page 1F-5)".

**NOTE**

- When making this test, it is not necessary to remove the cooling fan.
- The voltmeter is for making sure that the battery applies 12 V to the motor. With the fan motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 A.



I718H1160048-01

2. Fan motor	3. Ammeter	4. Battery
--------------	------------	------------

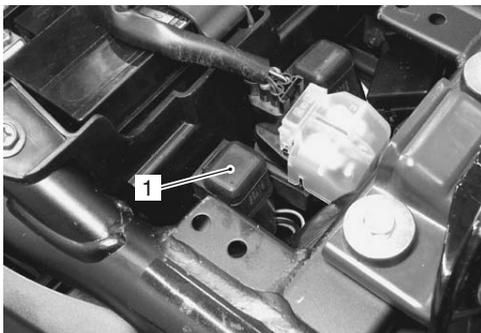
3) Connect the cooling fan motor coupler.

**Cooling Fan Relay Inspection**

B718H11606021

Inspect the fan relay in the following procedures:

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) Remove the cooling fan relay (1).



I718H1160005-01

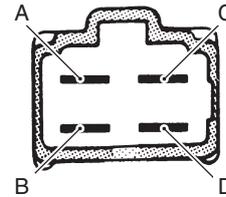
3) First check the insulation between "A" and "B" terminals with tester. Then apply 12 volts to "C" and "D" terminals, (+) to "C" and (-) to "D", and check the continuity between "A" and "B". If there is no continuity, replace it with a new one.

**Special tool**

: 09900-25008 (Multi-circuit tester set)

**Tester knob indication set**

Continuity test (•))



I718H1160006-02

4) Reinstall the removed parts.

**ECT Sensor Removal and Installation**

B718H11606022

Refer to "ECT Sensor Removal and Installation in Section 1C (Page 1C-2)".

**ECT Sensor Inspection**

B718H11606023

Refer to "ECT Sensor Inspection in Section 1C (Page 1C-3)".

**Thermostat Connector / Thermostat Removal and Installation**

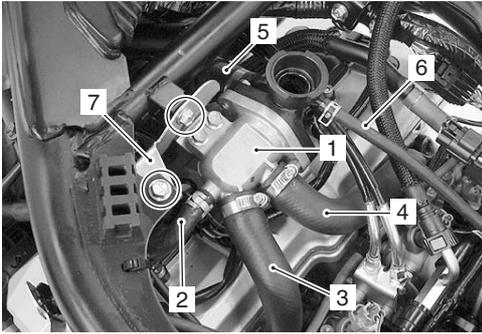
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**Removal**

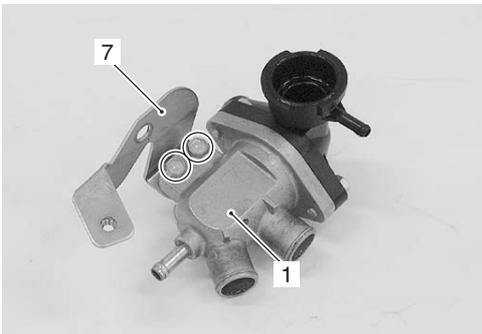
- 1) Drain a small amount of engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Remove the thermostat connector bracket bolts.
- 4) Disconnect the following parts from the thermostat connector (1).
  - Water bypass hose (2)
  - Cylinder outlet left hose (3)
  - Cylinder outlet right hose (4)
  - Radiator inlet hose (5)
  - Reservoir tank inlet hose (6)

## 1F-10 Engine Cooling System:

- 5) Remove the thermostat connector (1) along with bracket (7).



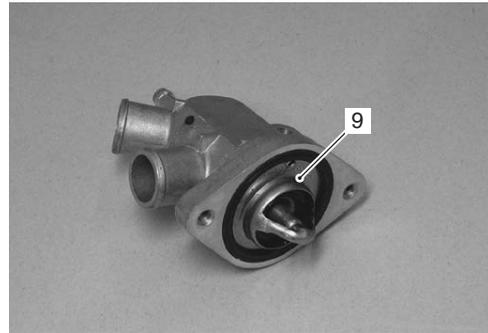
- 6) Remove the bracket (7) from the thermostat connector (1).



- 7) Remove the connector cap (8).



- 8) Remove the thermostat (9).



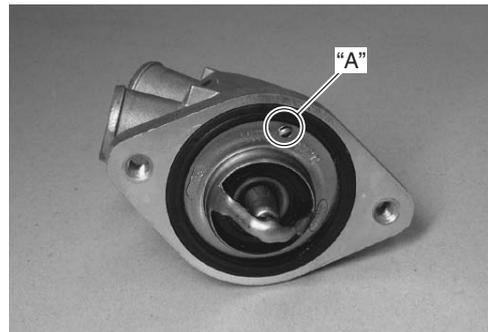
### Installation

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

- Install the thermostat.

### NOTE

The jiggle valve "A" of the thermostat faces upside.



- Tighten the thermostat connector bolts to the specified torque.

### Tightening torque

Thermostat connector bolt (a): 10 N·m (1.0 kgf·m, 7.0 lb-ft)



- Connect the water hoses securely. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
- Pour engine coolant and bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

**Thermostat Inspection**

B718H11606025

Inspect the thermostat in the following procedures:

- 1) Remove the thermostat. Refer to “Thermostat Connector / Thermostat Removal and Installation (Page 1F-9)”.
- 2) Inspect the thermostat pellet for signs of cracking.



I718H1160051-01

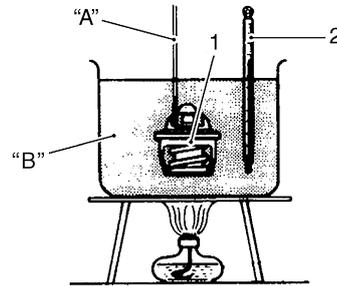
- 3) Test the thermostat at the bench for control action.

**⚠ CAUTION**

- Do not contact the thermostat (1) and the column thermometer (2) with a pan.
- As the thermostat operating response to water temperature change is gradual, do not raise water temperature too quickly.
- The thermostat with its valve open even slightly under normal temperature must be replaced.

- 4) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.

- 5) Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer (2).



I705H1160030-03

“A”: String	“B”: Water
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- 6) Read the thermometer just when opening the thermostat. If this reading, which is the temperature level at which the thermostat valve begins to open, is out of the standard value, replace the thermostat with a new one.

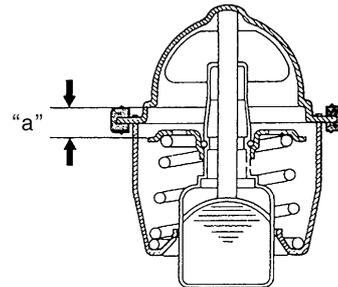
**Thermostat valve opening temperature**

**Standard: Approx. 82 °C (180 °F)**

- 7) Keep on heating the water to raise its temperature.
- 8) Just when the water temperature reaches specified value, the thermostat valve should have been lifted by at least 8 mm (0.31 in). A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

**Thermostat valve lift “a”**

**Standard: 8 mm and over at 95 °C (0.31 in and over at 203 °F)**



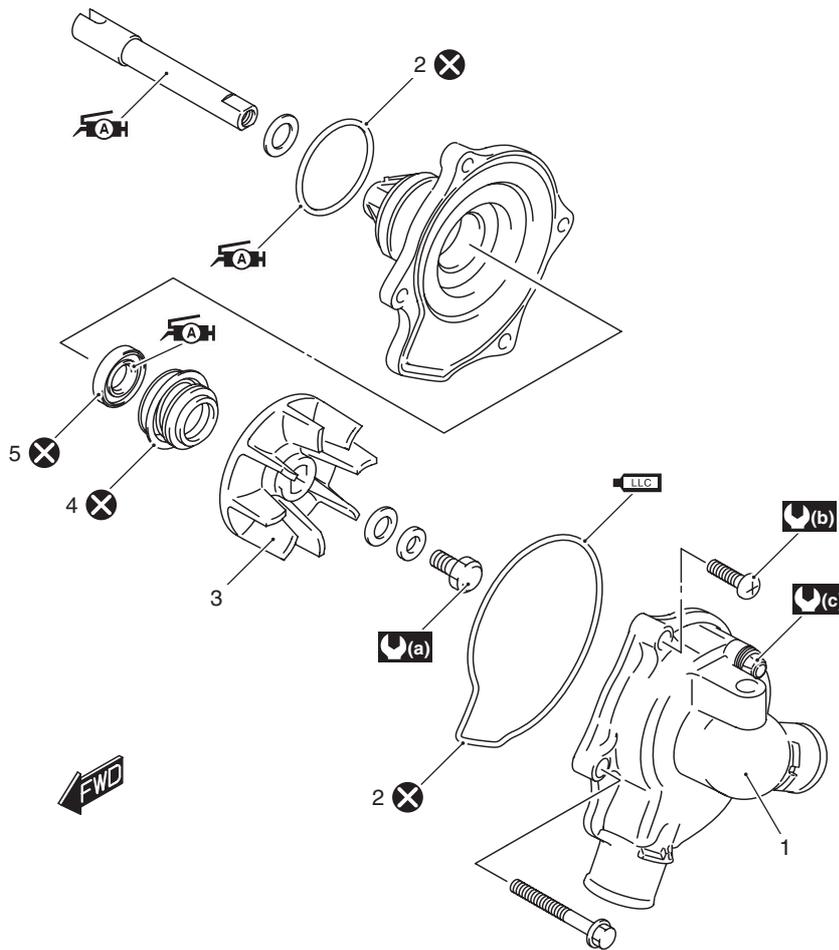
I705H1160031-04

- 9) Install the thermostat. Refer to “Thermostat Connector / Thermostat Removal and Installation (Page 1F-9)”.

## 1F-12 Engine Cooling System:

### Water pump Components

B718H11606026

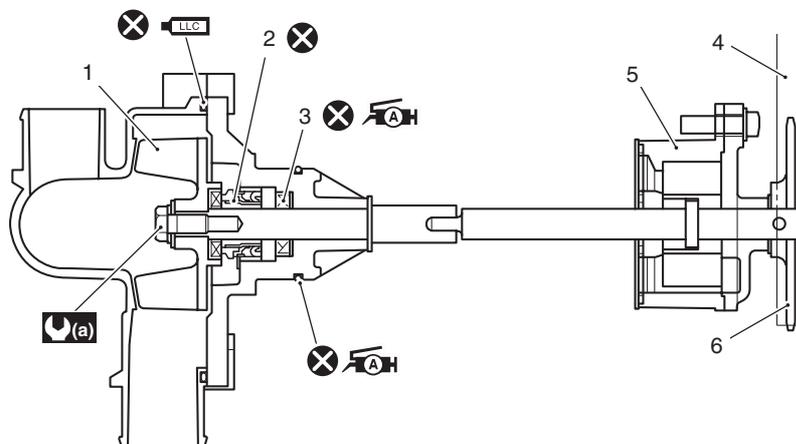


I718H116062-01

1. Water pump case	4. Mechanical seal	(b) : 6 N·m (0.6 kgf-n, 4.5 lb-ft)	LLC : Apply engine coolant.
2. O-ring	5. Oil seal	(c) : 13 N·m (1.3 kgf-n, 9.5 lb-ft)	⊗ : Do not reuse.
3. Impeller	(a) : 8 N·m (0.8 kgf-n, 6.0 lb-ft)	AH : Apply grease.	

### Water Pump Construction

B718H11606027



I718H116062-02

1. Impeller	4. Oil pump drive chain	(a) : 8 N·m (0.8 kgf-n, 6.0 lb-ft)	⊗ : Do not reuse.
2. Mechanical seal	5. Oil pump	AH : Apply grease.	
3. Oil seal	6. Oil pump driven sprocket	LLC : Apply engine coolant.	

## Water Pump Removal and Installation

B718H11606028

### Removal

#### NOTE

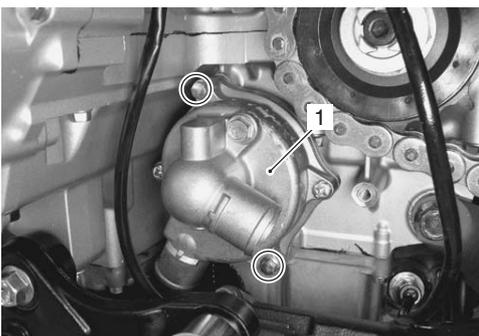
Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. Refer to "Water Pump Related Parts Inspection (Page 1F-17)".

- 1) Drain engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
- 2) Remove the engine sprocket covers, outer and inner. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)".
- 3) Disconnect the water pump inlet hose (1).



I718H1160011-01

- 4) Remove the water pump (1).



I718H1160008-01

### Installation

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

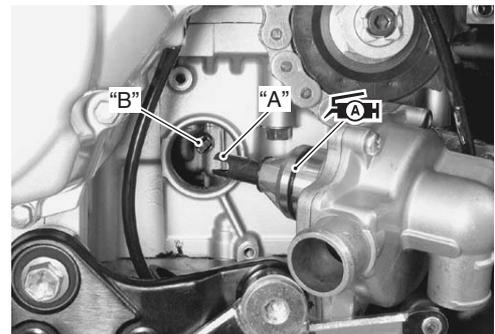
- Apply grease to the O-ring.

#### ⚠ CAUTION

Replace the O-ring with the a new one.

 **Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)**

- Install the water pump assembly with the slot on the pump shaft end "A" securely engaged with the flat "B" on the oil pump shaft.

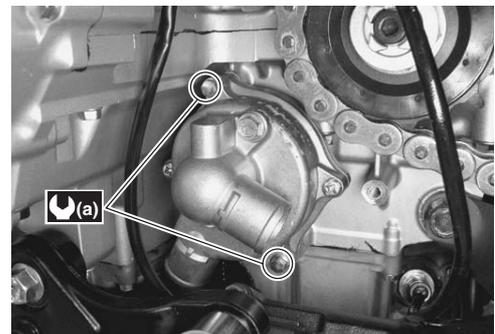


I718H1160053-01

- Tighten the water pump mounting bolts to the specified torque.

#### Tightening torque

**Water pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)**



I718H1160071-01

- Connect the water hoses securely. Refer to "Water Hose Routing Diagram (Page 1F-3)".
- Pour engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".

## 1F-14 Engine Cooling System:

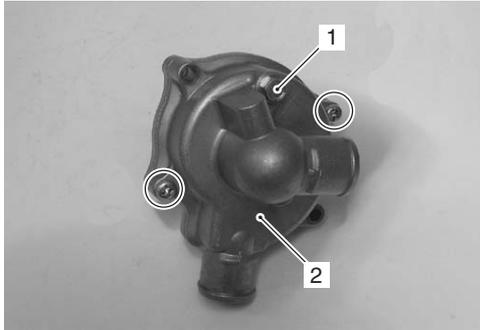
### Water Pump Disassembly and Assembly

B718H11606029

Refer to "Water Pump Removal and Installation (Page 1F-13)".

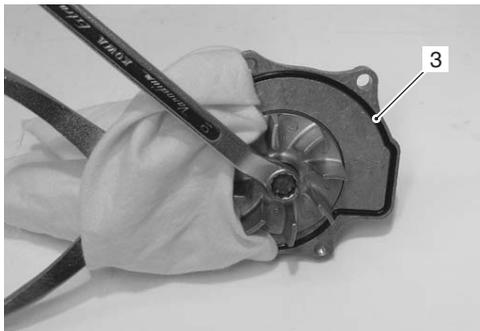
#### Disassembly

- 1) Remove the air vent bolt (1) if necessary.
- 2) Remove the water pump case (2).



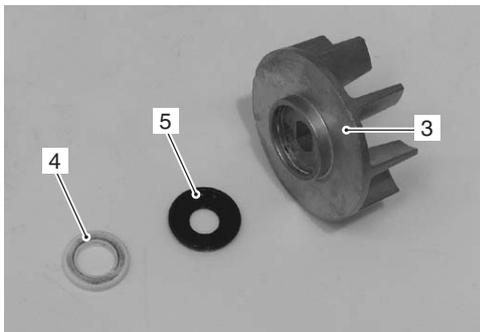
I718H1160054-01

- 3) Remove the O-ring (3).
- 4) Remove the impeller securing bolt by holding the impeller with a water pump pliers.



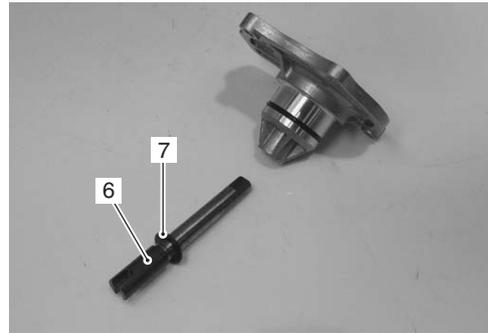
I718H1160012-01

- 5) Remove the mechanical seal ring (4) and rubber seal (5) from the impeller (3).



I718H1160013-01

- 6) Remove the impeller shaft (6) and washer (7).



I718H1160014-01

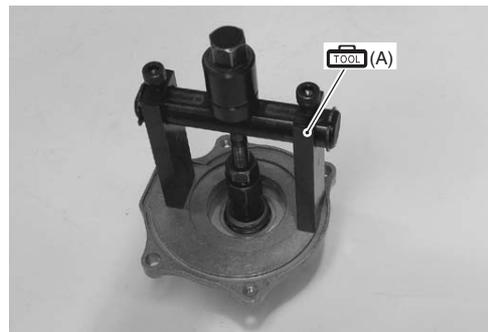
- 7) Remove the mechanical seal with the special tool.

#### NOTE

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

#### Special tool

 (A): 09921-20240 (Bearing remover set)



I718H1160055-01

- 8) Remove the oil seal.

#### NOTE

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



I718H1160016-01

**Assembly**

- 1) Install the oil seal with the special tool.

**⚠ CAUTION**

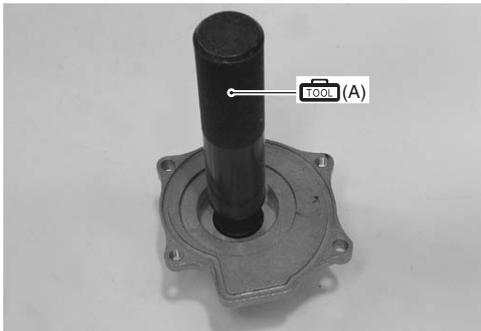
Replace the oil seal with a new one.

**NOTE**

The stamped mark on the oil seal should face mechanical seal side.

**Special tool**

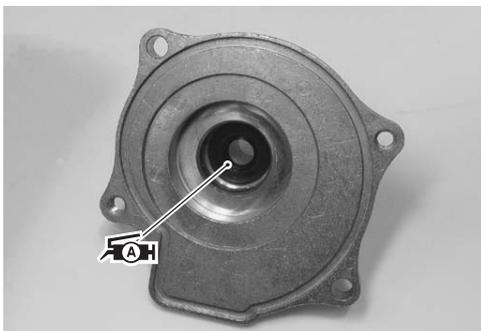
 (A): 09913-70210 (Bearing installer set)



I718H1160056-01

- 2) Apply a small quantity of the SUPER GREASE to the oil seal lip.

 : Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1160057-01

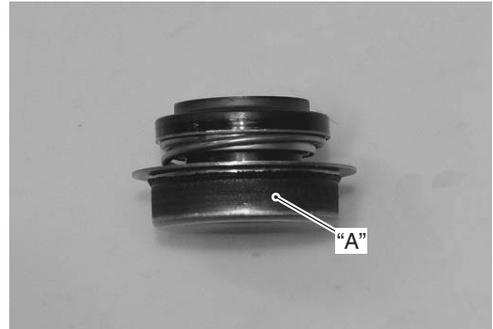
- 3) Install a new mechanical seal using a suitable size socket wrench.

**⚠ CAUTION**

Replace the mechanical seal with a new one.

**NOTE**

On the new mechanical seal, the sealer "A" has been applied.



I718H1160058-01

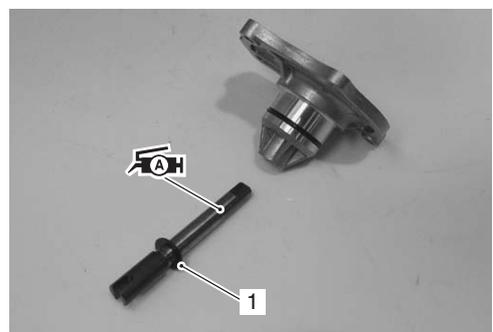


I718H1160059-01

- 4) Apply SUZUKI SUPER GREASE to the impeller shaft.

 : Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)

- 5) Install the impeller shaft and washer (1) to the water pump body.



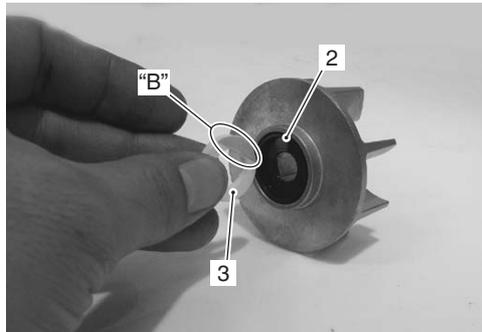
I718H1160017-01

## 1F-16 Engine Cooling System:

- 6) Install the rubber seal (2) into the impeller.
- 7) After wiping off the oily or greasy matter from the mechanical seal ring (3), install it into the impeller.

### NOTE

The paint marked side "B" of mechanical seal ring faces the rubber seal.

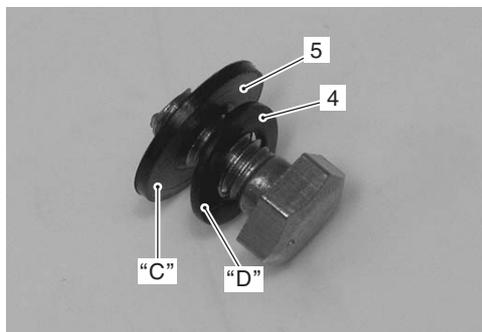


I718H1160018-01

- 8) Install the washer (4) and seal washer (5) onto the impeller securing bolt.

### NOTE

The metal side "C" of seal washer and the curved side "D" of washer face the impeller securing bolt head.

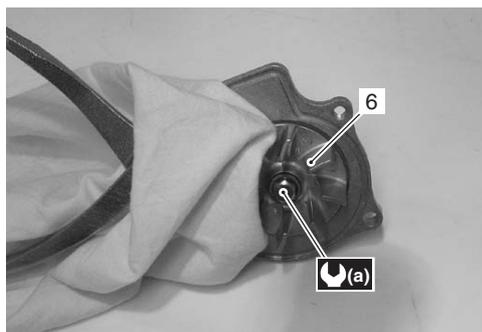


I718H1160019-02

- 9) Install the impeller (6) and tighten the impeller securing bolt to the specified torque.

### Tightening torque

Impeller securing bolt (a): 8 N·m (0.8 kgf-m, 6.0 lb-ft)

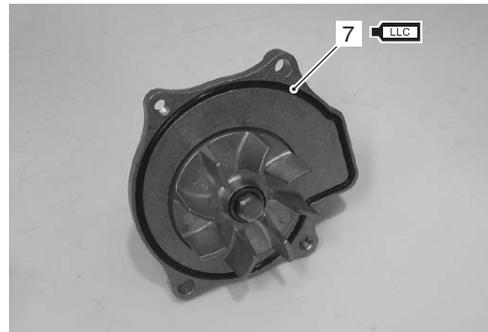


I718H1160021-02

- 10) Install a new O-ring (7) and apply engine coolant to it.

### CAUTION

Use a new O-ring to prevent engine coolant leakage.



I718H1160024-01

- 11) Fit the water pump case and tighten the water pump case screws to the specified torque.

### Tightening torque

Water pump case screw (b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)

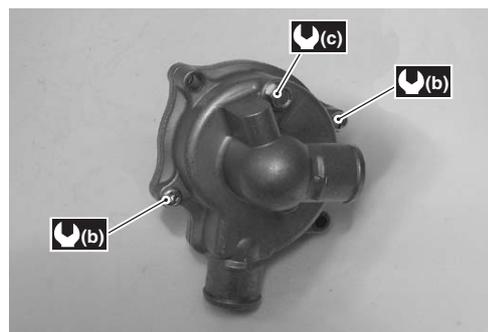
- 12) Tighten the water pump air vent bolt to the specified torque.

### CAUTION

Use a new gasket washer to prevent engine coolant leakage.

### Tightening torque

Water pump air vent bolt (c): 13 N·m (1.3 kgf-m, 9.5 lb-ft)



I718H1160025-01

**Water Pump Related Parts Inspection**

B718H11606030

Refer to “Water Pump Disassembly and Assembly (Page 1F-14)”.

**Mechanical Seal**

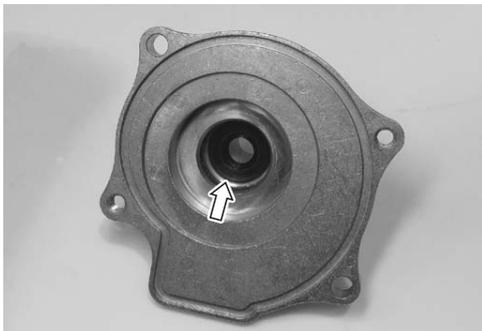
Visually inspect the mechanical seal for damage, with particular attention given to the sealing face. Replace the mechanical seal that shows indications of leakage.



I718H1160010-01

**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.



I718H1160009-01

**Seal Washer**

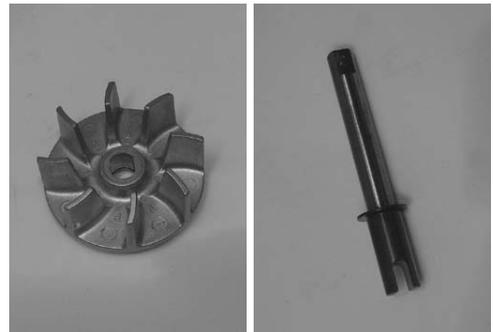
Visually inspect the seal washer for damage, with particular attention given to the sealing face. Replace the seal washer that shows indications of leakage.



I718H1160026-01

**Impeller / Shaft**

Visually inspect the impeller and its shaft for damage. Replace the impeller or shaft if necessary.



I718H1160015-01

**Impeller Shaft Journal**

Visually inspect the journal for damage or scratch. Replace the water pump body if necessary.



I718H1160027-01

## Specifications

### Service Data

B718H11607001

#### Thermostat + Radiator + Fan + Coolant

Item	Specification		Note
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	8 mm (0.31 in) and over at 95 °C (203 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	93 – 123 kPa (0.93 – 1.23 kgf/cm <sup>2</sup> , 13.2 – 17.5 psi)		—
Cooling fan 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	Reserve tank side	Approx. 250 ml (0.3/0.2 US/lmp qt)	—
	Engine side	Approx. 3 000 ml (3.2/2.6 US/lmp qt)	—

### Tightening Torque Specifications

B718H11607002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Thermostat connector bolt	10	1.0	7.0	☞(Page 1F-10)
Water pump mounting bolt	10	1.0	7.0	☞(Page 1F-13)
Impeller securing bolt	8	0.8	6.0	☞(Page 1F-16)
Water pump case screw	6	0.6	4.5	☞(Page 1F-16)
Water pump air vent bolt	13	1.3	9.5	☞(Page 1F-16)

#### NOTE

The specified tightening torque is also described in the following.

“Water pump Components (Page 1F-12)”

“Water Pump Construction (Page 1F-12)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B718H11608001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page 1F-13) / ☞ (Page 1F-15) / ☞ (Page 1F-15)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 1F-8)

#### NOTE

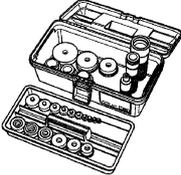
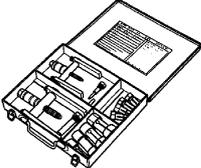
Required service material is also described in the following.

“Water pump Components (Page 1F-12)”

“Water Pump Construction (Page 1F-12)”

### Special Tool

B718H11608002

09900-25008 Multi-circuit tester set ☞ (Page 1F-9)		09913-70210 Bearing installer set ☞ (Page 1F-15)	
09921-20240 Bearing remover set ☞ (Page 1F-14)			

# Fuel System

## Precautions

### Precautions for Fuel System

B718H11700001

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**⚠ WARNING**

- Keep away from fire or spark.
  - During disassembling, use care to minimize spillage of gasoline.
  - Spilled gasoline should be wiped off immediately.
  - Work in a well-ventilated area.
- 

**⚠ CAUTION**

- To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.
  - After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.
-

## General Description

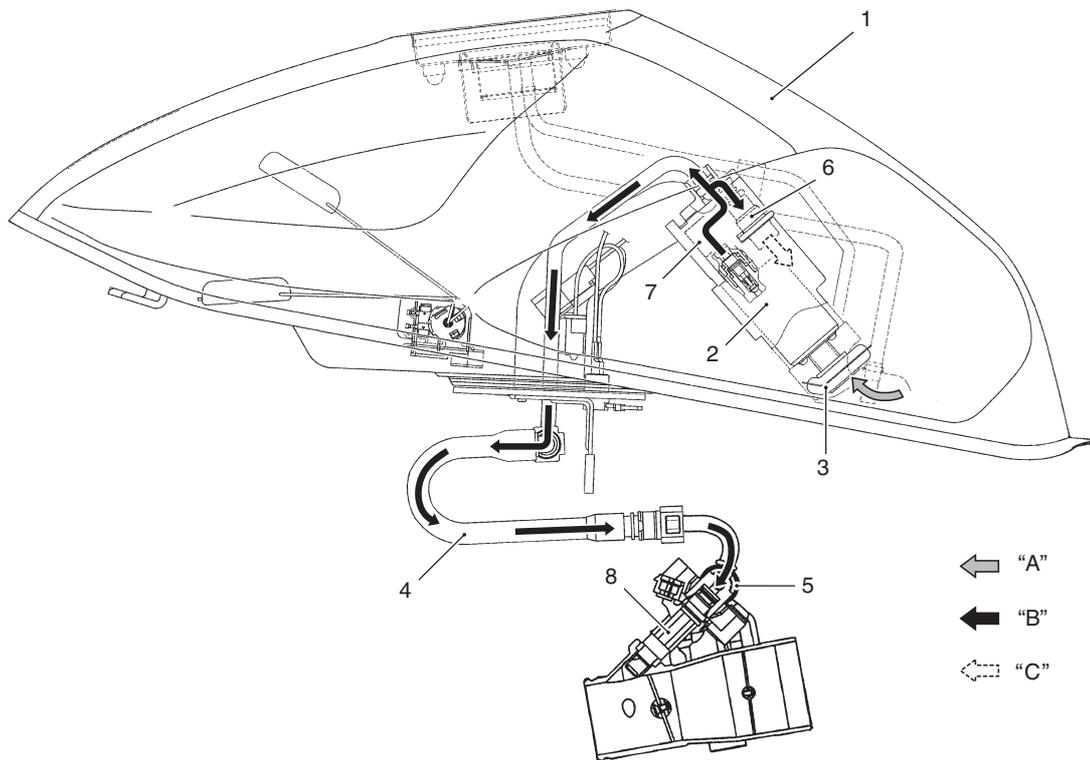
### Fuel System Description

B718H11701002

#### Fuel System

The fuel delivery system consists of the fuel tank (1), fuel pump (2), fuel filter (3), fuel feed hose (4), fuel delivery pipe (5) (including fuel injectors) and fuel pressure regulator (6). There is no fuel return hose. The fuel in the fuel tank (1) is pumped up by the fuel pump (2) and pressurized fuel flows into the injector (7) installed in the fuel delivery pipe (5). Fuel pressure is regulated by the fuel pressure regulator (6). As the fuel pressure applied to the fuel injector (7) (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 300 kPa (3.0 kgf/cm<sup>2</sup>, 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector (7) opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator (6) flows back to the fuel tank (1).



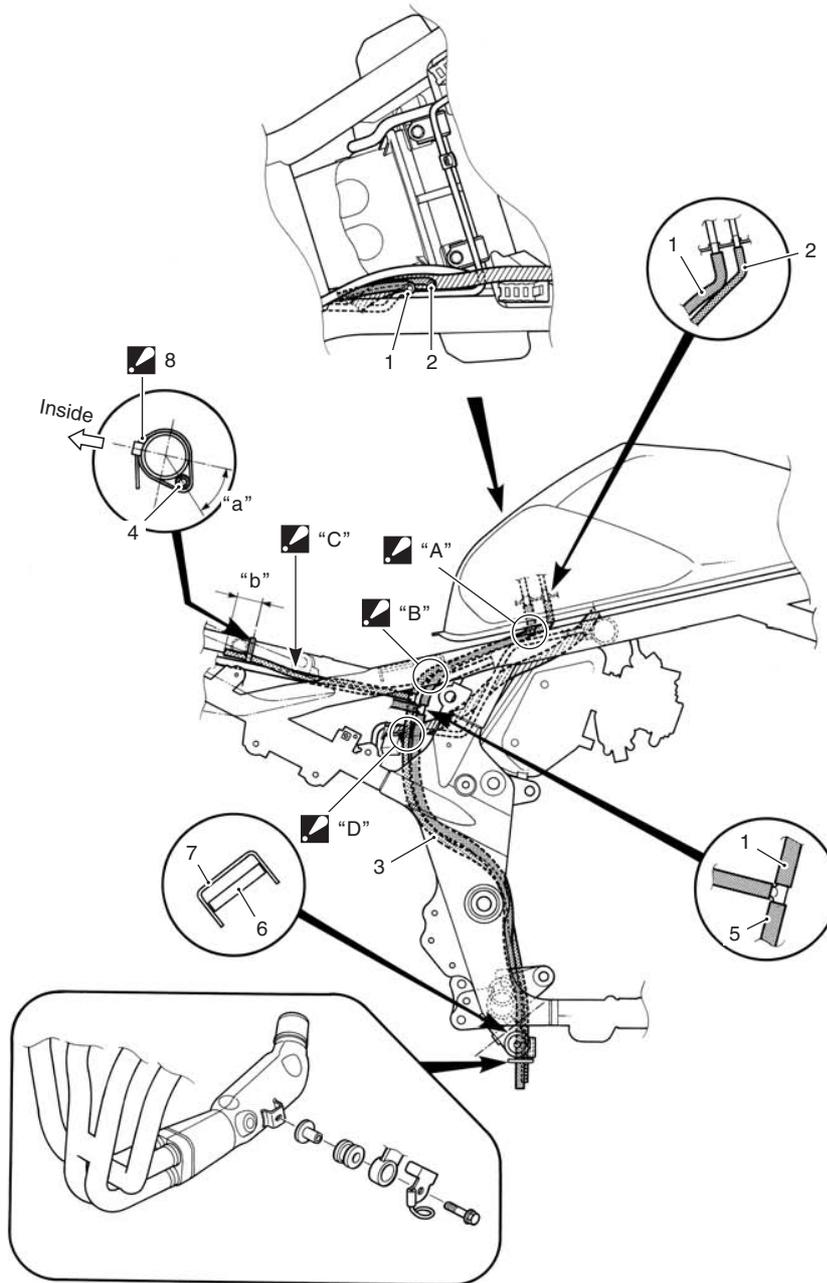
I718H1170001-02

1. Fuel tank	5. Fuel delivery pipe	"A": Before-pressurized fuel
2. Fuel pump	6. Fuel pressure regulator	"B": Pressurized fuel
3. Fuel mesh filter	7. Fuel filter	"C": Relieved fuel
4. Fuel feed hose	8. Fuel injector	

## Schematic and Routing Diagram

### Fuel Tank Drain Hose and Breather Hose Routing Diagram

B718H11702002



I718H1170040-02

1. Fuel tank drain hose	 8. Clamp : Clamp end should face inside. Tip of clamp should face downward.
2. Fuel tank breather hose No.1	 "A". Be careful not to bind the fuel tank drain hose and fuel tank breather hose with the other hoses and wire harness.
3. Fuel tank breather hose No.2	 "B". Pass the breather hose and drain hose through outside the reservoir tank inlet hose.
4. Fuel tank breather hose No.3	 "C". Be careful for the hose not to be slackened.
5. Fuel tank drain hose No.2	 "D". Pass the breather hose and drain hose through outside the brake pipe. Pass the breather hose and drain hose through ahead of connector.
6. Frame	"a". $45^\circ \pm 15^\circ$
7. Drain hose guide	"b". $30 \pm 10 \text{ mm } (1.2 \pm 0.4 \text{ in})$

## Diagnostic Information and Procedures

### Fuel System Diagnosis

B718H11704001

Condition	Possible cause	Correction / Reference Item
<b>Engine will not start or is hard to start (No fuel reaching the intake manifold)</b>	Clogged fuel filter or fuel hose.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective fuel injectors.	<i>Replace.</i>
	Defective fuel pump relay.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Check and repair.</i>
<b>Engine will not start or is hard to start (Incorrect fuel/air mixture)</b>	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective IAT sensors.	<i>Replace.</i>
	Dirty throttle body.	<i>Clean.</i>
Defective ISC valve.	<i>Replace.</i>	
<b>Engine stalls often (Incorrect fuel/air mixture)</b>	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Clogged fuel filter.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Damaged or cracked vacuum hose.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective thermostat.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
Defective ISC valve.	<i>Replace.</i>	
<b>Engine stalls often (Fuel injector improperly operating)</b>	Defective fuel injectors.	<i>Replace.</i>
	No injection signal from ECM.	<i>Repair or replace.</i>
	Open or short circuited wiring connection.	<i>Repair or replace.</i>
	Defective battery or low battery voltage.	<i>Replace or recharge.</i>
<b>Engine runs poorly in high speed range (Defective control circuit or sensor)</b>	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective STP sensor or STVA.	<i>Replace.</i>
	Defective GP switch.	<i>Replace.</i>
Defective CKP sensor.	<i>Replace.</i>	
<b>Engine lacks power (Defective control circuit or sensor)</b>	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective GP switch.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
Defective STP sensor or STVA.	<i>Replace.</i>	

## Repair Instructions

### Fuel Pressure Inspection

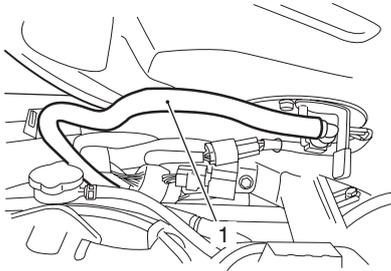
B718H11706042

#### **▲ WARNING**

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

Inspect the fuel pressure in the following procedures:

- 1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.
- 2) Place a rag under the fuel feed hose and disconnect fuel feed hose (1) from the fuel pump.



I718H1170017-04

- 3) Install the special tools between the fuel pump and fuel delivery pipe.

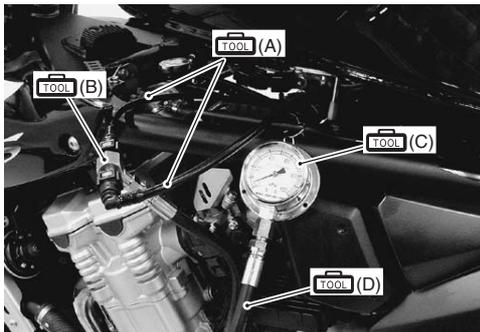
#### Special tool

**TOOL (A): 09940-40211 (Fuel pressure gauge adapter)**

**TOOL (B): 09940-40220 (Fuel pressure gauge hose attachment)**

**TOOL (C): 09915-77331 (Meter (for high pressure))**

**TOOL (D): 09915-74521 (Oil pressure gauge hose)**



I718H1170018-01

- 4) Turn the ignition ON and check for fuel pressure.

#### **Fuel pressure**

**Approx. 300 kPa (3.0 kgf/cm<sup>2</sup>, 43.5 psi)**

If the fuel pressure is lower than the specification, check for the followings:

- Fuel hose leakage
- Clogged fuel filter
- Pressure regulator
- Fuel pump

If the fuel pressure is higher than the specification, check for the followings:

- Fuel pump
- Pressure regulator

- 5) Remove the special tools.

#### **▲ WARNING**

**Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.**

- 6) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.

### Fuel Pump Inspection

B718H11706027

Turn the ignition switch ON and check that the fuel pump operates for a 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 TO sensor. Refer to “Fuel Pump Relay Inspection (Page 1G-7)” and “DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-67)”.

If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. Refer to “Fuel Pump Assembly / Fuel Level Gauge Removal and Installation (Page 1G-11)”.

## Fuel Discharge Amount Inspection

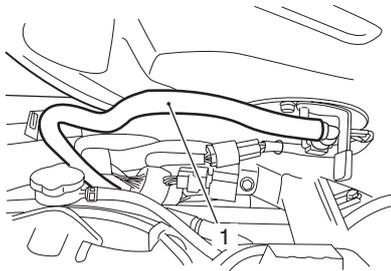
B718H11706028

### **▲ WARNING**

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

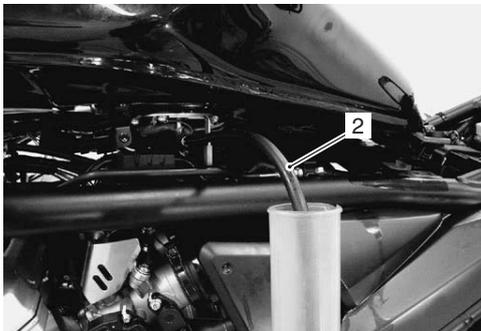
Inspect the fuel discharge amount in the following procedures:

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Place a rag under the fuel feed hose (1) from the fuel pump.



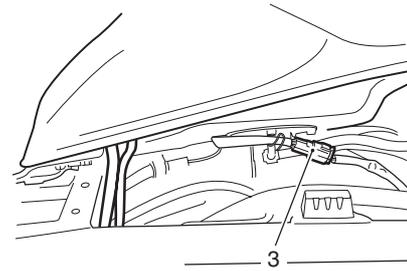
I718H1170017-04

- 3) Connect a proper fuel hose (2) to the fuel pump.
- 4) Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



I718H1170014-01

- 5) Disconnect the fuel pump lead wire coupler (3).



I718H1170043-01

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

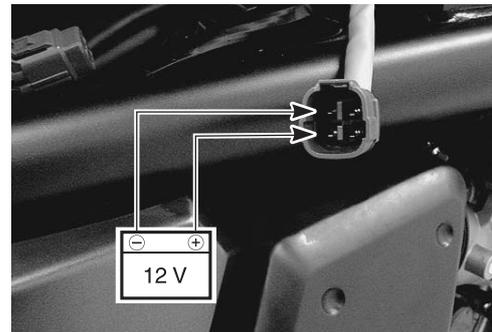
If the discharge amount is out of the specification, the probable cause may be failure of the fuel pump or clogged fuel filter.

### **NOTE**

**The battery must be in fully charged condition.**

### **Fuel discharge amount**

**166 ml (5.6/5.8 US/lmp oz) and more/10 seconds**



I718H1170016-02

- 7) After finishing the fuel discharge inspection, reinstall the fuel tank. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".

## 1G-7 Fuel System:

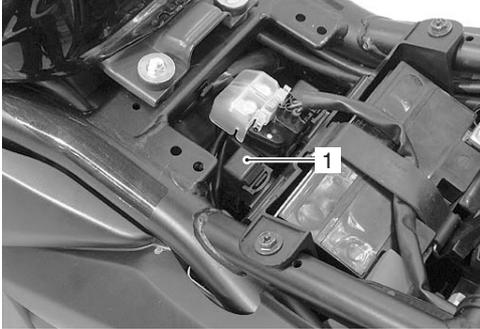
### Fuel Pump Relay Inspection

B718H11706029

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

Inspect the fuel pump relay in the following procedures:

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) Remove the fuel pump relay (1).



I718H1170041-01

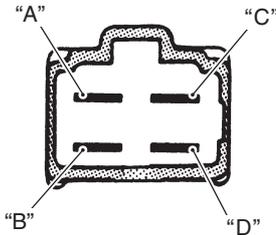
- 3) First, check for insulation with the tester between terminals "A" and "B". Next, check for continuity between "A" and "B" with 12 V voltage applied, positive (+) to terminal "C" and negative (-) to terminal "D". If continuity does not exist, replace the relay with a new one.

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Continuity test ( • ))



I718H1170013-01

### Fuel Hose Inspection

B718H11706030

Refer to "Fuel Line Inspection in Section 0B (Page 0B-10)".

### Fuel Level Gauge Inspection

B718H11706031

Refer to "Fuel Level Gauge Inspection in Section 9C (Page 9C-8)".

### Fuel Level Indicator Inspection

B718H11706032

Refer to "Fuel Level Indicator Inspection in Section 9C (Page 9C-6)".

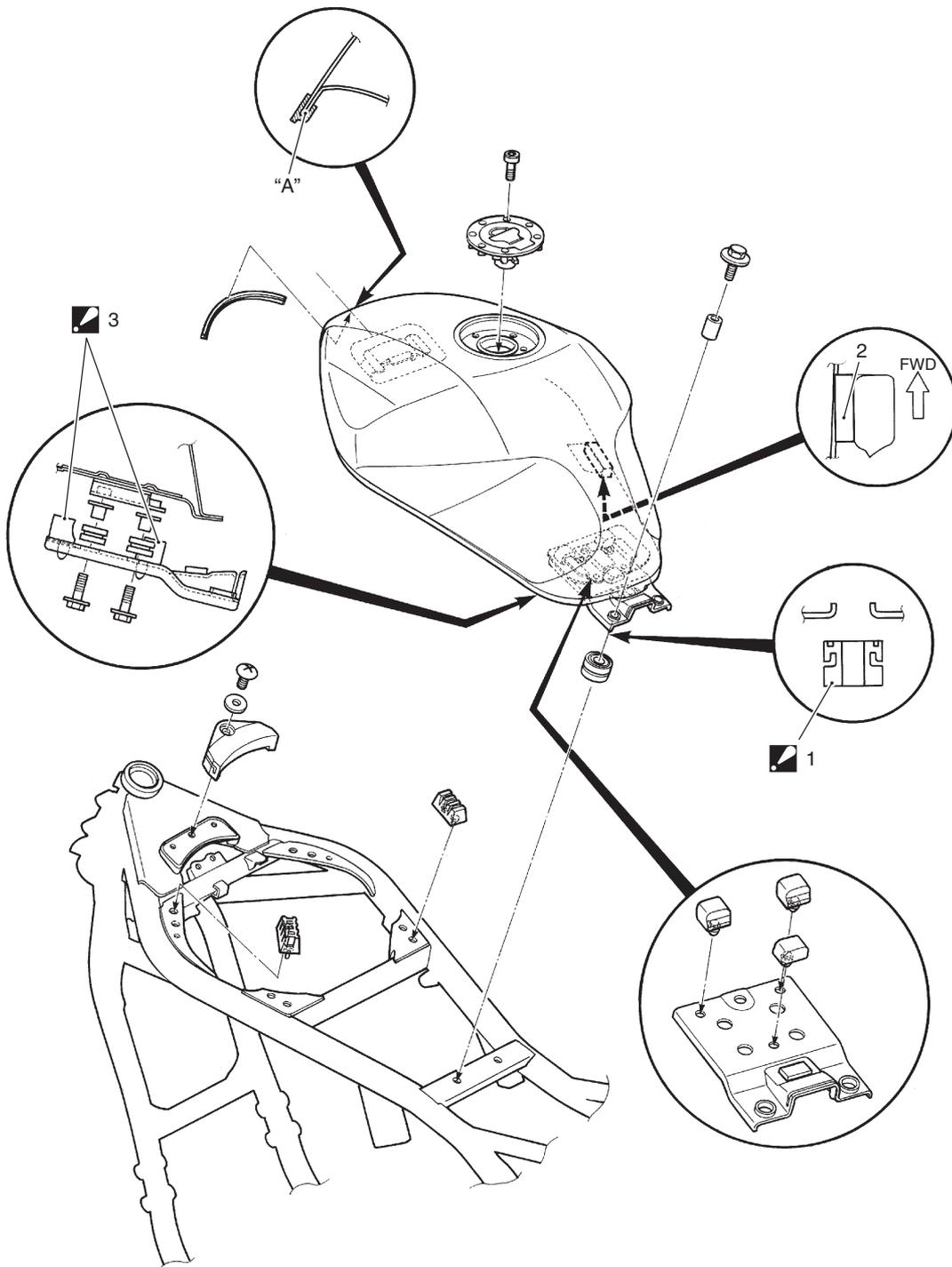
### Fuel Level Indicator Switch (Thermistor) Inspection

B718H11706040

Refer to "Fuel Level Indicator Switch (Thermistor) Inspection in Section 9C (Page 9C-7)".

Fuel Tank Construction

B718H11706001



I718H1170020-02

<p>1. Fuel tank rear cushion : Be careful not to mistake the assembling position and direction.</p>	<p>3. Rear bracket cushion : Be careful not to mistake the assembling position and direction.</p>
<p>2. EVAP pipe cushion (E-33 only) : Matched with cushion seat surface.</p>	<p>"A": Apply adhesive agent to the cushion rubber.</p>

## 1G-9 Fuel System:

### Fuel Tank Removal and Installation

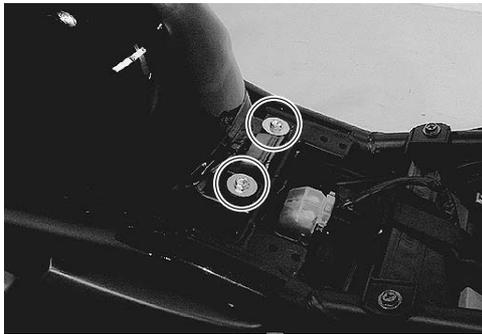
B718H11706002

#### Removal

#### **⚠ WARNING**

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

- 1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 2) Remove the fuel tank mounting bolts.

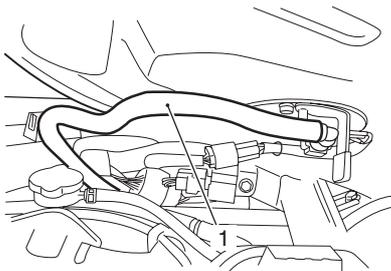


I718H1170021-01

- 3) Place a rag under the fuel feed hose and disconnect the fuel feed hose (1).

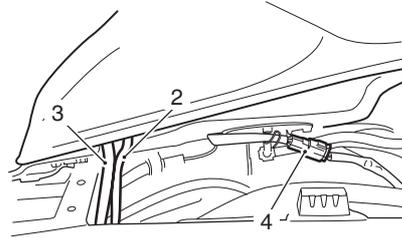
#### **⚠ CAUTION**

**When removing the fuel tank, do not leave the fuel feed hose (1) on the fuel pump side.**



I718H1170017-04

- 4) Disconnect the fuel tank breather hose (2) and drain hose (3).
- 5) Disconnect the fuel pump lead wire coupler (4).
- 6) Remove the fuel tank.



I718H1170042-01

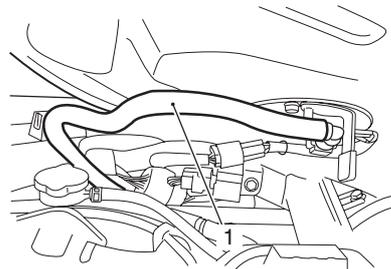
#### Installation

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

#### **⚠ CAUTION**

**Be careful not to bend the hoses. Refer to “Fuel Tank Drain Hose and Breather Hose Routing Diagram (Page 1G-3)”.**

- Connect the fuel feed hose (1) until it locks securely (a click is heard).



I718H1170017-04



## 1G-11 Fuel System:

### Fuel Pump Assembly / Fuel Level Gauge Removal and Installation

B718H11706034

#### Removal

##### **⚠ WARNING**

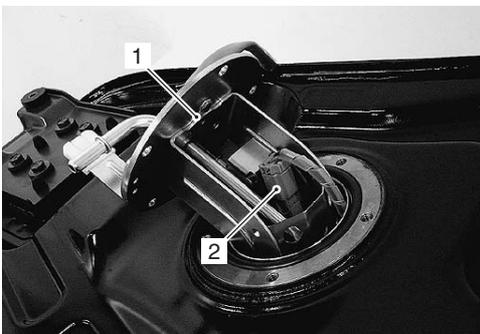
- Spilled gasoline should be wiped off immediately.
- Keep away from fire or spark.
- Work in a well-ventilated area.

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Remove the fuel pump mounting bolts diagonally.



I718H1170023-04

- 3) Remove the fuel pump assembly (1) and disconnect the fuel level gauge lead wire coupler (2).

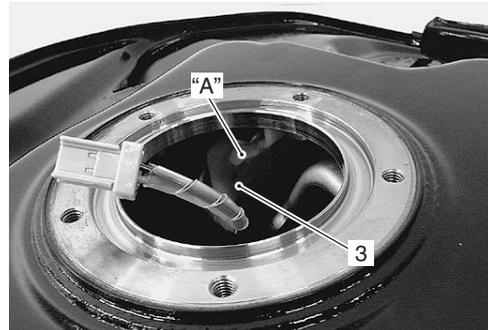


I718H1170025-02

- 4) Remove the fuel level gauge (3) while pushing the pawl end "A".

##### **⚠ CAUTION**

**Do not pull the lead wire when removing the fuel gauge.**



I718H1170026-02

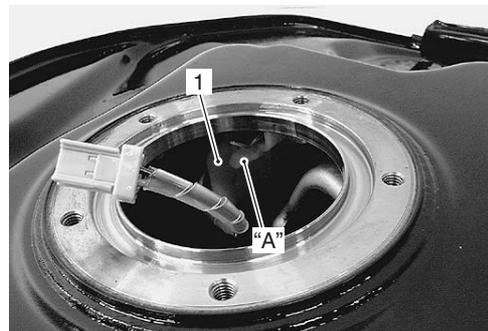
#### Installation

Install the fuel pump assembly in the reverse order of removal. Pay attention the following points:

- Install the fuel level gauge (1) into the fuel tank.

##### **NOTE**

**Push the lock position "A" fully until the clicking sound heard.**



I718H1170024-02

- Apply grease to the O-ring (2).

**⚠ CAUTION**

**Replace the O-ring with a new one.**

**🔧 Torque:** Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1170027-02

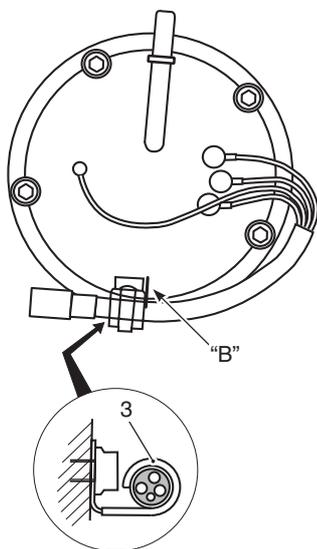
- When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly and then to the specified torque as shown.

**NOTE**

**Install the clamp (3) so that its base is located in parallel with the line "B" on the fuel pump.**

**Tightening torque**

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



I718H1170028-02

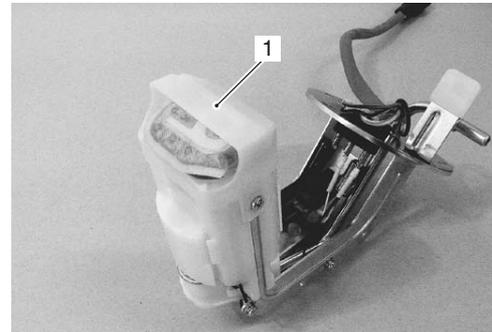
**Fuel Pump Disassembly and Assembly**

B718H11706041

Refer to "Fuel Pump Assembly / Fuel Level Gauge Removal and Installation (Page 1G-11)".

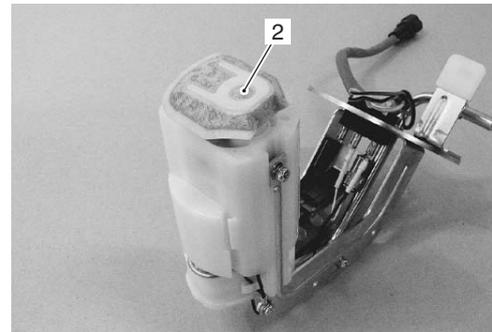
**Disassembly**

- 1) Remove the vessel (1).



I718H1170029-01

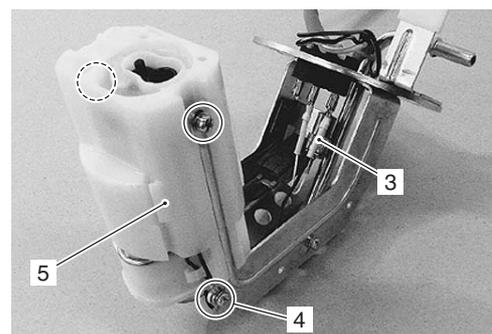
- 2) Remove the fuel mesh filter (2).



I718H1170030-01

- 3) Disconnect the lead wire (BI) (3) and remove the connecting screw (4).

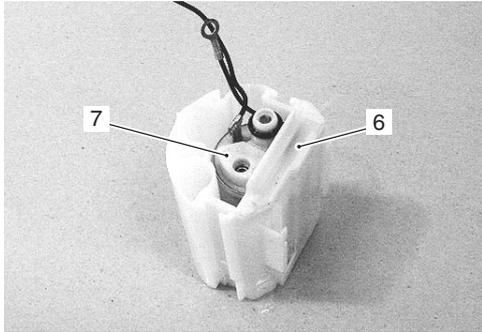
- 4) Remove the fuel pump assembly (5).



I718H1170031-02

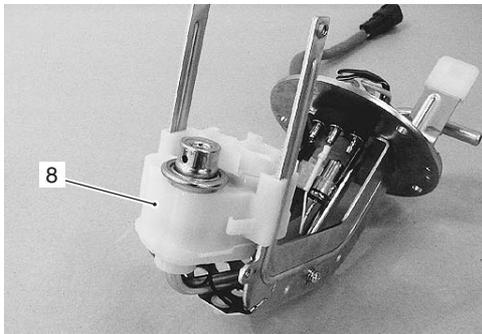
## 1G-13 Fuel System:

- 5) Remove the cup cover (6) and fuel pump (7) from the reservoir cup.



I718H1170032-02

- 6) Remove the fuel pressure regulator assembly (8).

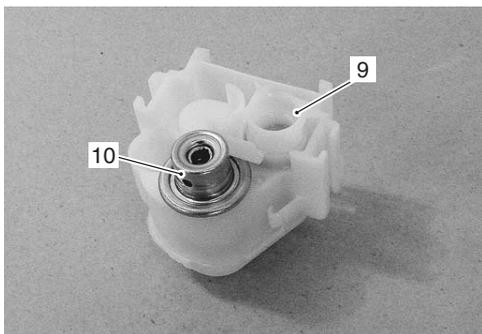


I718H1170033-02

- 7) Remove the joint (9).

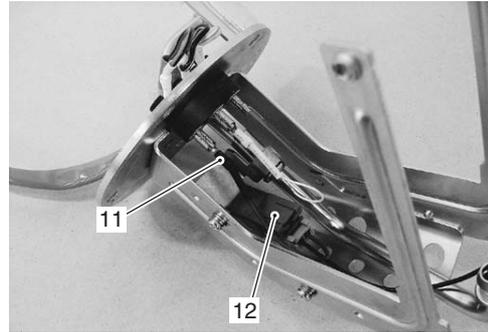
### **⚠ CAUTION**

**Never remove the fuel pressure regulator (10) from the holder.**



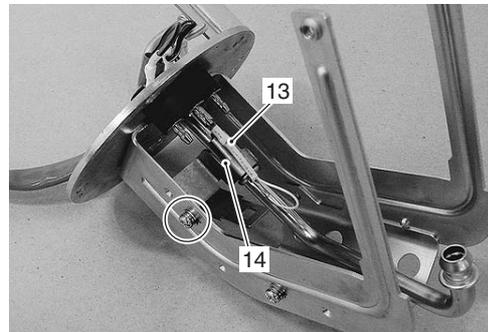
I718H1170034-02

- 8) Disconnect the lead wire (BI) (11) and remove the fuel level gauge coupler (12).



I718H1170036-03

- 9) Disconnect the lead wire (W) (13) and remove the thermistor (14).



I718H1170035-02

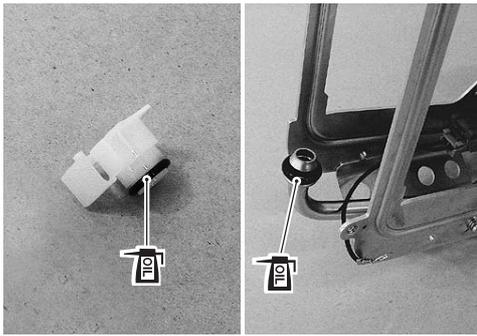
### **Assembly**

Refer to "Fuel Mesh Filter Inspection and Cleaning (Page 1G-14)".

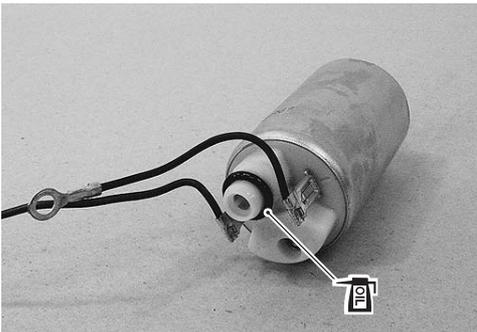
Assemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

### **⚠ CAUTION**

- To prevent fuel leakage, each O-ring must be replaced with a new one.
- Apply engine oil lightly to each of the O-rings.

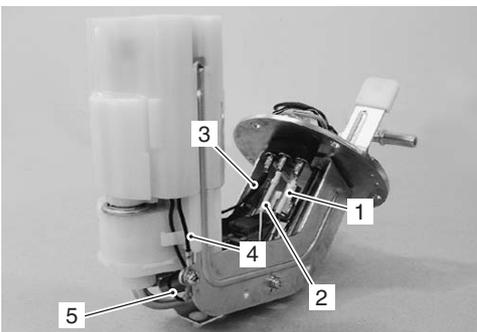


I718H1170038-02



I718H1170039-01

- Connect all wiring couplers securely so as not to cause contact failure.



I718H1170037-01

1. Fuel pump (+) lead wire (BI)
2. Fuel level thermistor lead wire (W)
3. Fuel level gauge (+) lead wire (BI)
4. Fuel pump (-) lead wire (B)
5. Fuel level gauge (-) lead wire (B)

### Fuel Mesh Filter Inspection and Cleaning

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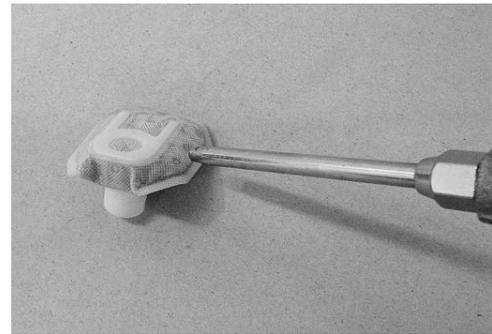
Inspect the fuel mesh filter in the following procedures:

- 1) Remove the fuel mesh filter. Refer to "Fuel Pump Disassembly and Assembly (Page 1G-12)".

- 2) If the fuel mesh filter is clogged with foreign particles, it hinders smooth gasoline flow resulting in loss of engine power. Such a filter should be cleaned by blowing with compressed air.

### NOTE

**When the fuel mesh filter is dirtied excessively, replace the fuel filter cartridge with a new one.**



I718H1170003-01

- 3) After finishing the fuel mesh filter inspection, reinstall the fuel mesh filter. Refer to "Fuel Pump Disassembly and Assembly (Page 1G-12)".

### Fuel Injector / Fuel Delivery Pipe / T-joint Removal and Installation

B718H11706038

Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)".

### Fuel Injector Inspection and Cleaning

B718H11706039

Inspect the fuel injector in the following procedures:

- 1) Remove the fuel injector. Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)".
- 2) Check the 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.



I718H1170012-01

- 3) Install the fuel injector. Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page 1D-10)".

## Specifications

### Service Data

B718H11707001

#### Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	11 – 13 $\Omega$ at 20 °C (68 °F)	—
Fuel pump discharge amount	166 ml (5.6/5.8 US/Imp oz) and more/10 sec.	—
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)	—

### Fuel

Item	Specification	Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) 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 type is recommended.	Others
Fuel tank capacity	Including reserve	18.5 L (4.9/4.1 US/Imp gal)
		19 L (5.0/4.2 US/Imp gal)

### Tightening Torque Specifications

B718H11707002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page 1G-12)

#### NOTE

The specified tightening torque is also described in the following.  
 “Fuel Pump Components (Page 1G-10)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0B (Page 0B-23)”.

## Special Tools and Equipment

### Recommended Service Material

B718H11708001

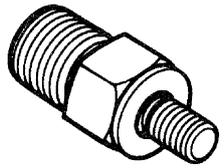
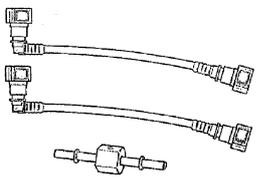
Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE A or equivalent	☞ (Page 1G-12)

#### NOTE

Required service material is also described in the following.  
 “Fuel Pump Components (Page 1G-10)”

### Special Tool

B718H11708002

<p>09900-25008 Multi-circuit tester set ☞ (Page 1G-7)</p> 	<p>09915-74521 Oil pressure gauge hose ☞ (Page 1G-5)</p> 
<p>09915-77331 Meter (for high pressure) ☞ (Page 1G-5)</p> 	<p>09940-40211 Fuel pressure gauge adapter ☞ (Page 1G-5)</p> 
<p>09940-40220 Fuel pressure gauge hose attachment ☞ (Page 1G-5)</p> 	

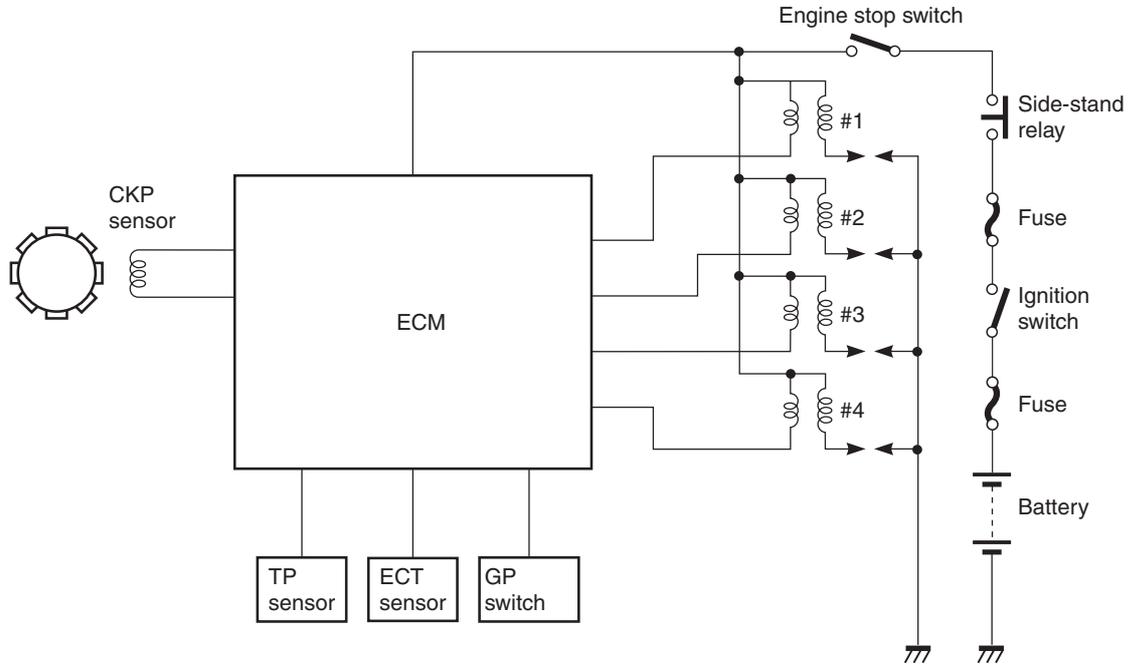
# Ignition System

## Schematic and Routing Diagram

### Ignition System Diagram

B718H11802001

Refer to "Wire Color Symbols in Section 0A (Page 0A-6)".



I718H1180001-02

### Ignition System Components Location

B718H11802002

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

## Diagnostic Information and Procedures

### Ignition System Symptom Diagnosis

B718H11804001

Condition	Possible cause	Correction / Reference Item
<b>Spark plug not sparking</b>	Damaged spark plug.	<i>Replace.</i>
	Fouled spark plugs.	<i>Clean or replace.</i>
	Wet spark plugs.	<i>Clean and dry or replace.</i>
	Defective ignition coil/plug caps.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
<b>Engine stalls easily. (No spark)</b>	Fouled spark plugs.	<i>Clean or replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
<b>Spark plug is wet or quickly becomes fouled with carbon.</b>	Excessively rich air/fuel mixture.	<i>Inspect FI system.</i>
	Excessively high idling speed.	<i>Inspect FI system.</i>
	Incorrect gasoline.	<i>Change.</i>
	Dirty air cleaner element.	<i>Clean or replace.</i>
	Incorrect spark plug (Cold type).	<i>Change to hot type spark plug.</i>
<b>Spark plug quickly becomes fouled with oil or carbon.</b>	Worn piston rings.	<i>Replace.</i>
	Worn pistons.	<i>Replace.</i>
	Worn cylinders.	<i>Rebore or replace.</i>
	Excessive valve-stem to valve-guide clearance.	<i>Replace.</i>
	Worn valve stem oil seals.	<i>Replace.</i>
<b>Spark plug electrodes overheat or burn.</b>	Incorrect spark plug (Hot type).	<i>Change to cold type spark plug.</i>
	Overheated engine.	<i>Tune-up.</i>
	Loose spark plugs.	<i>Tighten.</i>
	Excessively lean air/fuel mixture.	<i>Inspect FI system.</i>

## 1H-3 Ignition System:

### No Spark or Poor Spark

B718H11804002

#### Troubleshooting

#### 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	Action	Yes	No
1	Check the ignition system couplers for poor connections. <i>Is there connection in the ignition system couplers?</i>	Go to step 2.	Poor connection of couplers.
2	Measure the battery voltage between input lead wires at the ECM with the ignition switch in the "ON" position. (E02, 19: O/G and B/W, E03, 24, 28, 33: O/W and B/W) <i>Is the voltage OK?</i>	Go to Step 3.	<ul style="list-style-type: none"> <li>Faulty ignition switch.</li> <li>Faulty turn signal/ side-stand relay.</li> <li>Faulty engine stop switch.</li> <li>Broken wire harness or poor connection of related circuit couplers.</li> </ul>
3	Measure the ignition coil primary peak voltage. Refer to "Ignition Coil / Plug Cap Inspection (Page 1H-5)".  <b>NOTE</b> <b>This inspection method is applicable only with the multi-circuit tester and the peak volt adaptor.</b> <i>Is the peak voltage OK?</i>	Go to step 4.	Go to step 5.
4	Inspect the spark plugs. Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page 0B-4)". <i>Is the spark plug(-s) OK?</i>	Go to Step 5.	Faulty spark plug(-s).
5	Inspect the ignition coil/plug cap(-s). Refer to "Ignition Coil / Plug Cap Inspection (Page 1H-5)". <i>Is the ignition coil/plug cap(-s) OK?</i>	Go to step 6.	<ul style="list-style-type: none"> <li>Faulty ignition coil/ plug cap(-s).</li> <li>Poor connection of the ignition coil/plug cap(-s).</li> </ul>
6	Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection (Page 1H-7)".  <b>NOTE</b> <b>The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.</b> <i>Are the peak voltage and resistance OK?</i>	<ul style="list-style-type: none"> <li>Faulty ECM.</li> <li>Open or short circuit in wire harness.</li> <li>Poor connection of ignition couplers.</li> </ul>	<ul style="list-style-type: none"> <li>Faulty CKP sensor.</li> <li>Metal particles or foreign material being stuck on the CKP sensor and rotor tip.</li> </ul>

## Repair Instructions

### Ignition Coil / Plug Cap and Spark Plug Removal and Installation

B718H11806014

#### Removal

#### **⚠ WARNING**

The hot engine can burn you.  
Wait until the engine is cool enough to touch.

- 1) Turn the ignition switch OFF.
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Remove the frame head cover. (GSF1250/A) Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 4) Disconnect all lead wire couplers (1) from ignition coil/plug caps.

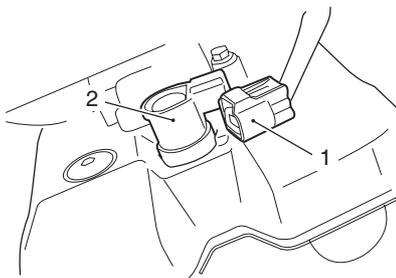
#### **⚠ CAUTION**

Disconnect the lead wire coupler before removing the ignition coil/plug cap to avoid lead wire coupler damage.

- 5) Remove the ignition coils/plug caps (2).

#### **⚠ CAUTION**

- Do not pry up the ignition coil/plug cap with a screw driver or a bar to avoid its damage.
- Be careful not to drop the ignition coil/plug cap to prevent short/open circuit.

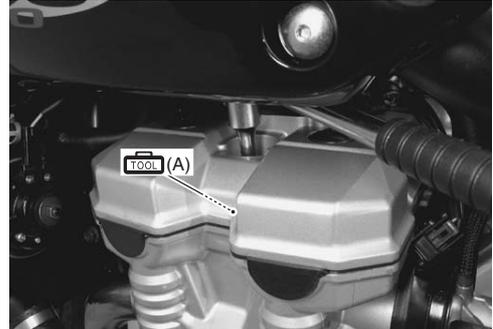


I718H1180009-01

- 6) Remove the spark plugs with a spark plug wrench.

#### Special tool

**TOOL (A): 09930-10121 (Spark plug wrench set)**



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#### Installation

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

- Screw the spark plugs into the cylinder head with fingers, and then tighten them to the specified torque.

#### **⚠ CAUTION**

Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

#### Special tool

**TOOL (A): 09930-10121 (Spark plug wrench set)**

#### Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lb-ft)



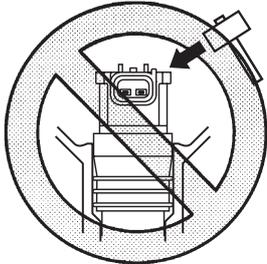
I718H1180011-02

## 1H-5 Ignition System:

- Install the ignition coil/plug caps and connect their lead wire couplers.

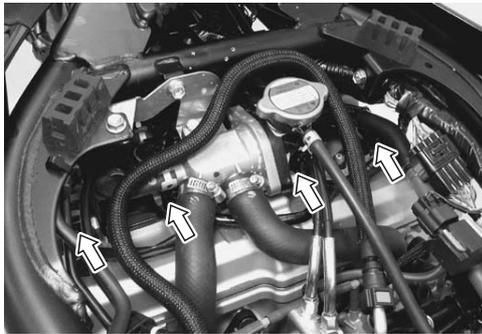
### **⚠ CAUTION**

**Do not hit the ignition coil/plug cap with a plastic hammer when installing it.**



INCORRECT

I718H1180012-01



I718H1180013-01

## Spark Plug Inspection and Cleaning

B718H11806003

Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page 0B-4)".

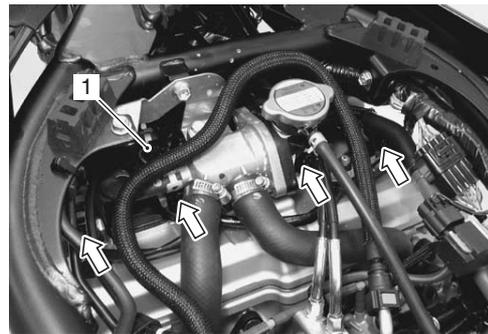
## Ignition Coil / Plug Cap Inspection

B718H11806004

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

### Ignition Coil Primary Peak Voltage

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 2) Disconnect all ignition coil/plug cap and PAIR control solenoid valve coupler (1). Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation (Page 1H-4)".



I718H1180014-01

- 3) Connect new spark plug to each ignition coil/spark plug cap.
- 4) Connect all the ignition coil/plug cap lead wire couplers to the ignition coil/plug caps respectively, and ground them on the cylinder head.

### NOTE

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



I718H1180015-01

- 5) Insert the needle pointed probe to the lead wire coupler.

**NOTE**

Use the special tool, to prevent the rubber of the water proof coupler from damage.

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

**CAUTION**

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

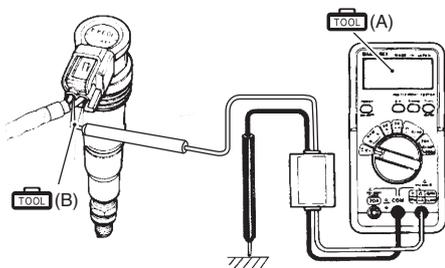
**Special tool**

**TOOL (A):** 09900-25008 (Multi-circuit tester set)

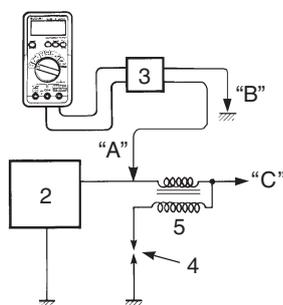
**TOOL (B):** 09900-25009 (Needle pointed probe set)

Tester knob indication: Voltage (---)

	((+) Probe)	((-) Probe)
Ignition coil/Plug cap #1	Green wire terminal	Ground
Ignition coil/Plug cap #2	W/BI wire terminal	Ground
Ignition coil/Plug cap #3	Black wire terminal	Ground
Ignition coil/Plug cap #4	Yellow wire terminal	Ground



I718H1180003-02



I718H1180004-02

2. ECM	"A": (+) probe
3. Peak voltage adaptor	"B": (-) probe
4. New spark plug	"C": To engine stop switch
5. Ignition coil	

- 7) Measure the ignition coil primary peak voltage in the following procedures.

**WARNING**

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

- a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
  - b) Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- 8) Repeat the b) procedure several times and measure the highest peak voltage. If the voltage is lower than standard range, inspect the ignition coil/plug cap and the CKP sensor.

**Ignition coil primary peak voltage 80 V and more**

- 9) After measuring the ignition coil primary peak voltage, reinstall the removed parts.

## 1H-7 Ignition System:

### Ignition Coil / Plug Cap Resistance

- 1) Remove the ignition coil/plug caps. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation (Page 1H-4)".
- 2) Measure the ignition coil/plug cap for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil/plug cap with a new one.

#### Special tool

**TOOL (A): 09900-25008 (Multi-circuit tester set)**

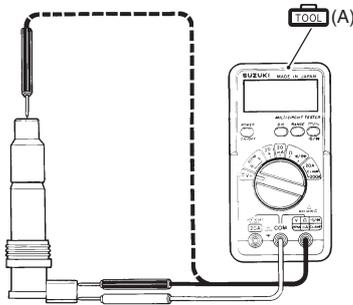
#### Tester knob indication

**Resistance ( $\Omega$ )**

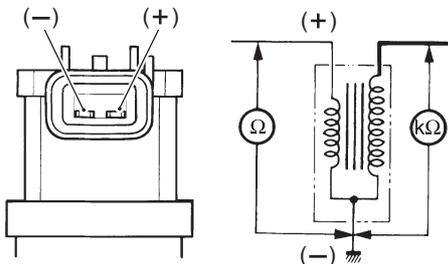
#### Ignition coil resistance

**Primary: 1.1 – 1.9  $\Omega$  ((+) terminal – (-) terminal)**

**Secondary: 10.8 – 16.2 k $\Omega$  (Spark plug cap – (-) terminal)**



I718H1180005-01



I718H1180006-01

- 3) After measuring the ignition coil/plug cap resistance, reinstall the removed parts.

### CKP Sensor Inspection

B718H11806008

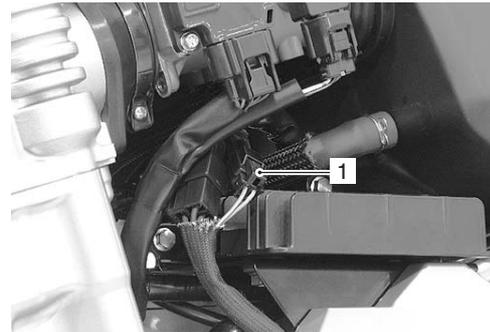
Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

### CKP Sensor Peak Voltage

- 1) Remove the CKP sensor coupler (1).

#### NOTE

**Be sure that all of the couplers are connected properly and the battery is fully-charged.**



I718H1180026-01

- 2) Connect the multi-circuit tester with the peak volt adaptor as follows.

#### CAUTION

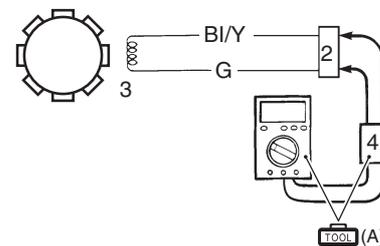
**Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.**

#### Special tool

**TOOL (A): 09900-25008 (Multi-circuit tester set)**

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

CKP sensor	(+) Probe BI/Y	(-) Probe G
------------	-------------------	----------------



I718H1180007-02

2. CKP sensor coupler	4. Peak voltage adaptor
3. CKP sensor	

- 3) Measure the CKP sensor peak voltage in the following procedure.
  - a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
  - b) Press the starter button and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.
- 4) Repeat the b) procedure several times and measure the highest CKP sensor peak voltage.

**CKP sensor peak voltage**  
**2.0 V and more (B/BI – Y/W)**

- 5) If the peak voltage is within the specification, check the continuity between the CKP sensor coupler and ECM coupler.

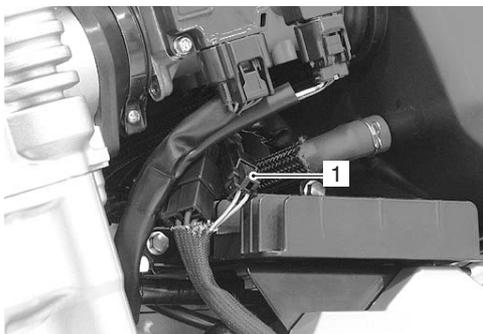
**⚠ CAUTION**

**Normally, use the needle pointed probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.**

- 6) After measuring the CKP sensor peak voltage, connect the CKP sensor coupler.

**CKP Sensor Resistance**

- 1) Disconnect the CKP sensor coupler (1).

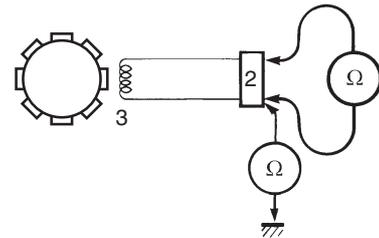


I718H1180026-01

- 2) Measure the resistance between the lead wires and ground. If the resistance is not within the standard range, replace the CKP sensor with a new one. Refer to “CKP Sensor Removal and Installation (Page 1H-8)”.

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

**CKP sensor resistance**  
**90 – 150 Ω (BI/Y – Green)**  
 $\infty$  Ω (BI/Y – Ground)



I718H1180008-02

2. CKP sensor coupler	3. CKP sensor
-----------------------	---------------

- 3) After measuring the CKP sensor resistance, connect the CKP sensor coupler.

**CKP Sensor Removal and Installation**

B718H11806009

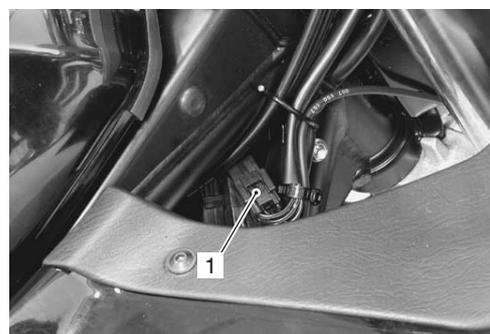
Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

**Engine Stop Switch Inspection**

B718H11806010

Inspect the engine stop switch in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the right frame head cover. (GSF1250/A)  
 Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 3) Disconnect the right handlebar switch coupler (1).



I718H1180017-01

## 1H-9 Ignition System:

- 4) Inspect the engine stop switch for continuity with a tester.  
If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebar Removal and Installation in Section 6B (Page 6B-3)".

### Special tool

 : 09900-25008 (Multi-circuit tester set)

### Tester knob indication

#### Continuity (••))

Color Position	B/BI	B/R
OFF (⊗)		
RUN (⊙)	○ — ○	○ — ○

I649G1180022-01

- 5) After finishing the engine stop switch inspection, reinstall the removed parts.

## Ignition Switch Inspection

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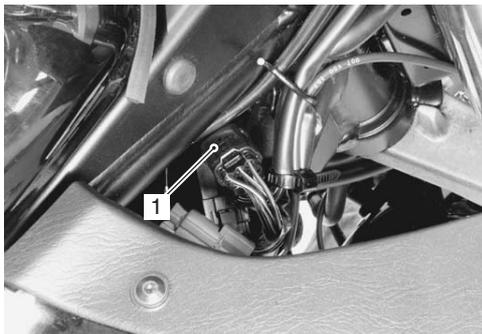
Refer to "Ignition Switch Inspection in Section 9C (Page 9C-10)".

## Ignition Switch Removal and Installation

B718H11806015

### Removal

- 1) Support the motorcycle with the center stand.
- 2) Remove the right frame head cover. (GSF1250/A)  
Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 3) Disconnect the ignition switch coupler (1) and clamp.



I718H1180018-01

- 4) Remove the brake hose clamp bolt (GSF1250/S) or brake hose joint bolt (2) (GSF1250A/SA).



I718H1180019-01

- 5) Remove the combination meter bracket bolts (GSF1250/A) or cable guides (3) (GSF1250S/SA).
- 6) Dismount the handlebars by removing the handlebar holder set nuts.

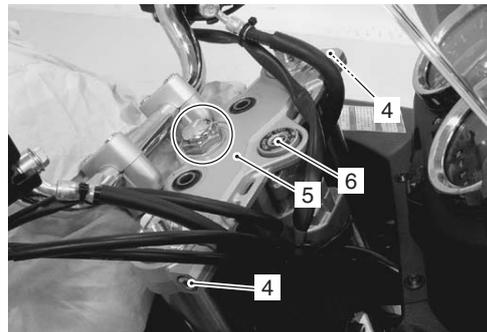
### NOTE

Place a rag on the fuel tank to prevent the fuel tank scratched.



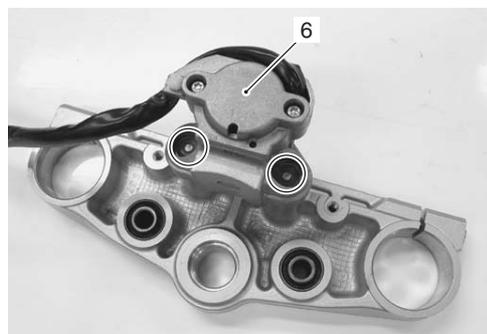
I718H1180020-03

- 7) Loosen the front fork upper clamp bolts (4).
- 8) Remove the steering stem head nut and washer.
- 9) Remove the steering stem upper bracket (5) along with the ignition switch (6).



I718H1180021-03

- 10) Using a center punch, remove the ignition switch mounting bolts.
- 11) Remove the ignition switch (6) from the upper bracket.



I718H1180022-01

**Installation**

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

- Install the ignition switch and new bolts.
- Tighten each bolt until its head is broken off.

**NOTE**

**The spare ignition switch comes equipped with the special bolts, however, the bolts are also individually available as spare parts.**



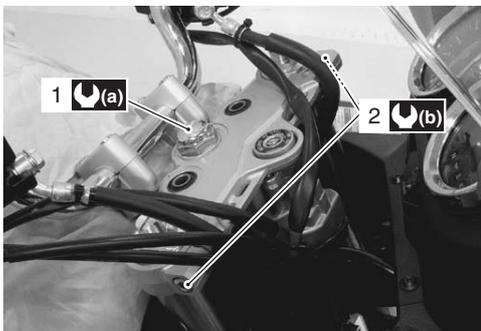
I718H1180023-01

- First tighten the steering stem head nut (1), then tighten the front fork upper clamp bolts (2).

**Tightening torque**

**Steering stem head nut (a): 65 N·m (6.5 kgf-m, 47.0 lb-ft)**

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



I718H1180024-04

- Tighten the handlebar holder set nuts (3) to the specified torque.

**Tightening torque**

**Handlebar holder set nut (c): 45 N·m (4.5 kgf-m, 32.5 lb-ft)**

- Route the cables, hoses and lead wires. Refer to "Throttle Cable Routing Diagram in Section 1D (Page 1D-2)", "Front Brake Hose Routing Diagram in Section 4A (Page 4A-1)" and "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".



I718H1180025-02

## Specifications

**Service Data**

B718H11807001

**Electrical**

Unit: mm (in)

Item	Specification		Note
Firing order	1 · 2 · 4 · 3		
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	90 – 150 Ω		
CKP sensor peak voltage	2.0 V and more		
Ignition coil resistance	Primary	1.1 – 1.9 Ω	Terminal – Terminal
	Secondary	10.8 – 16.2 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	80 V and more		When cranking

**Tightening Torque Specifications**

B718H11807002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Spark plug	11	1.1	8.0	☞(Page 1H-4)
Steering stem head nut	65	6.5	47.0	☞(Page 1H-10)
Front fork upper clamp bolt	23	2.3	16.5	☞(Page 1H-10)
Handlebar holder set nut	45	4.5	32.5	☞(Page 1H-10)

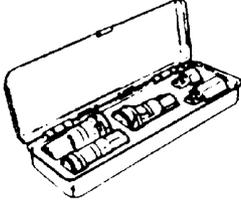
**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

## Special Tools and Equipment

**Special Tool**

B718H11808001

<p>09900–25008 Multi-circuit tester set ☞(Page 1H-6) / ☞(Page 1H-7) / ☞(Page 1H-7) / ☞(Page 1H-9)</p> 	<p>09900–25009 Needle pointed probe set ☞(Page 1H-6)</p> 
<p>09930–10121 Spark plug wrench set ☞(Page 1H-4) / ☞(Page 1H-4)</p> 	

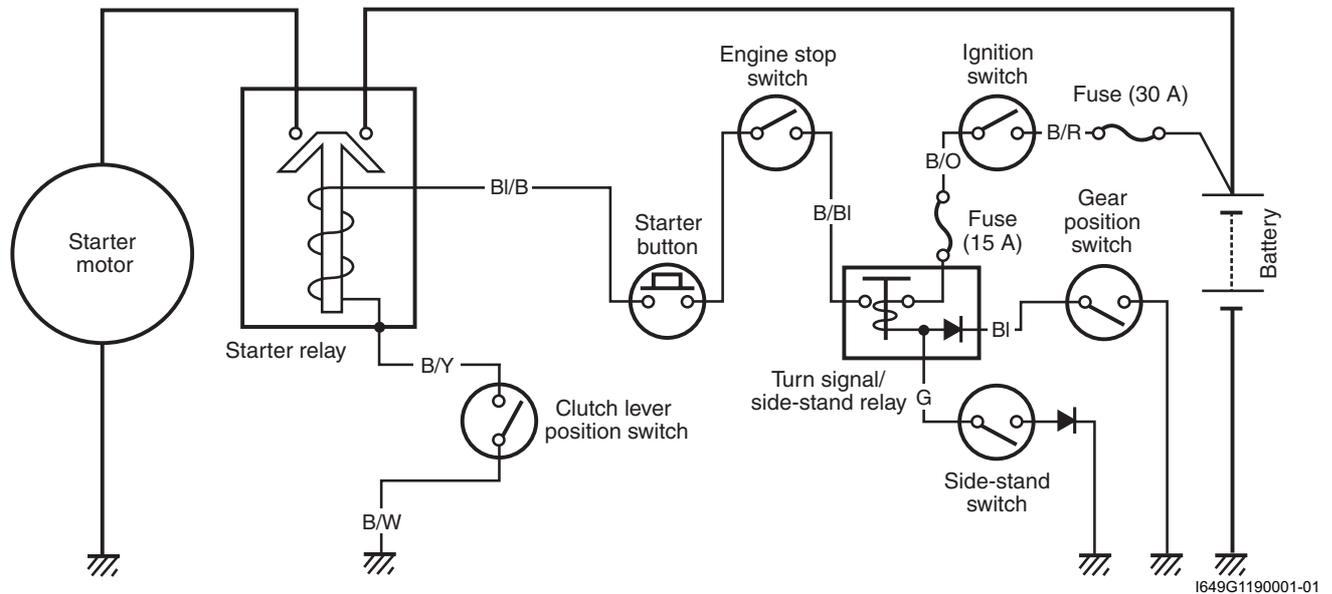
# Starting System

## Schematic and Routing Diagram

### Starting System Diagram

Refer to "Wire Color Symbols in Section 0A (Page 0A-6)".

B718H11902001



## Component Location

### Starting System Components Location

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

B718H11903001

## Diagnostic Information and Procedures

### Starting System Symptom Diagnosis

B718H11904001

Condition	Possible cause	Correction / Reference Item
<b>Engine does not turn though the starter motor runs</b>	Faulty starter clutch	Replace.
<b>Starter button is not effective</b>	Run down battery.	Repair or replace.
	Defective switch contacts.	Replace.
	Brushes not seating properly on starter motor commutator.	Repair or replace.
	Defective starter relay or starter interlock switch.	Replace.
	Defective main fuse.	Replace.

## 11-2 Starting System:

### Starter motor will not run

B718H11904002

#### NOTE

**Make sure the fuses are not blown and the battery is fully-charged before diagnosing.**

#### Troubleshooting

Step	Action	Yes	No
1	<p>1) Shift the transmission into neutral.</p> <p>2) Grasp 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.</p> <p><i>Is a click sound heard?</i></p>	Go to step 2.	Go to step 3.
2	<p>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.)</p> <p><i>Does the starter motor run?</i></p>	<ul style="list-style-type: none"> <li>Faulty starter relay</li> <li>Loose or disconnected starter motor lead wire</li> <li>Loose or disconnected between starter relay and battery (+) terminal.</li> </ul>	Faulty starter motor.
3	<p>Measure the starter relay voltage at the starter relay connectors (between B/BI (+) and B/Y (-)) when the starter button is pushed.</p> <p><i>Is the voltage OK?</i></p>	Go to Step 4.	<ul style="list-style-type: none"> <li>Faulty ignition switch</li> <li>Faulty engine stop switch</li> <li>Faulty clutch lever position switch</li> <li>Faulty gear position switch</li> <li>Faulty turn signal/ side-stand relay</li> <li>Faulty starter button</li> <li>Faulty side-stand switch</li> <li>Poor contact of connector</li> <li>Open circuit in wire harness</li> </ul>
4	<p>Check the starter relay. Refer to "Starter Relay Inspection (Page 11-7)".</p> <p><i>Is the starter relay OK?</i></p>	Poor contact of the starter relay.	Faulty starter relay.

### Starter Motor Runs but Does not Crank the Engine

B718H11904003

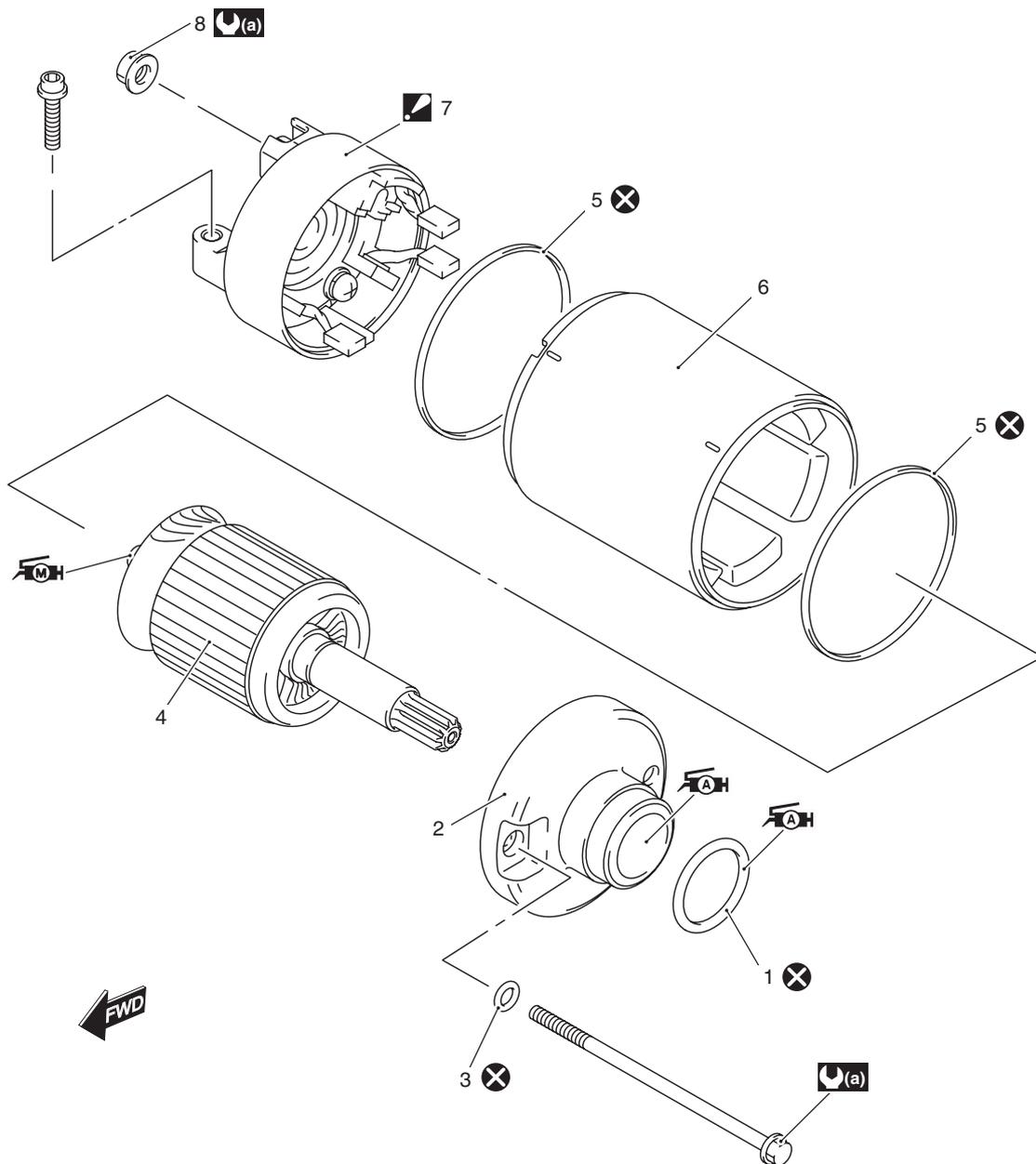
The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side-stand up.

Step	Action	Yes	No
1	<p>Check the side-stand switch. Refer to "Side-stand / Ignition Interlock System Parts Inspection (Page 11-8)".</p> <p><i>Is the side-stand switch OK?</i></p>	Go to Step 2.	Faulty side-stand switch.
2	<p>Check the starter clutch. Refer to "Starter Clutch Inspection (Page 11-12)".</p> <p><i>Is the starter clutch OK?</i></p>	<ul style="list-style-type: none"> <li>Open circuit in wire harness</li> <li>Poor contact of connector</li> </ul>	Faulty starter clutch.

## Repair Instructions

### Starter Motor Components

B718H11906001



I718H1190038-03

1. O-ring	5. O-ring	<b>(a)</b> : 5 N·m (0.5 kgf·m, 3.5 lb·ft)
2. Housing end (Inside)	6. Starter motor case	<b>AH</b> : Apply grease to sliding surface.
3. O-ring	<b>7</b> : Housing end assembly (Outside) : Never remove the brush, spring and brush holder.	<b>AH</b> : Apply moly past to sliding surface.
4. Armature	8. Starter motor lead wire nut	<b>X</b> : Do not reuse.

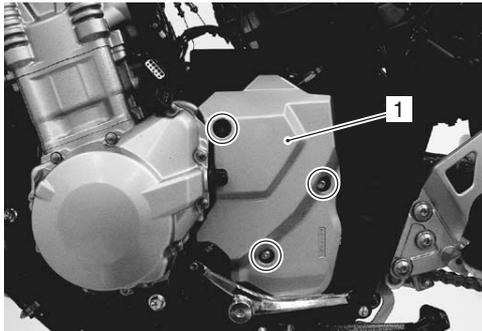
## 11-4 Starting System:

### Starter Motor Removal and Installation

B718H11906002

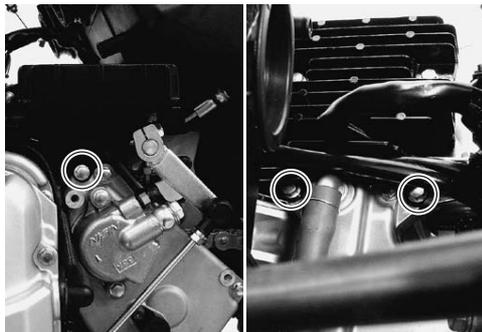
#### Removal

- 1) Turn the ignition switch OFF and disconnect the battery (-) lead wire. Refer to "Battery Removal and Installation in Section 1J (Page 1J-12)".
- 2) Remove the throttle body. Refer to "Throttle Body Removal and Installation in Section 1D (Page 1D-9)".
- 3) Remove the engine sprocket outer cover (1).



I718H1190002-01

- 4) Remove the regulator/rectifier bracket mounting bolts.



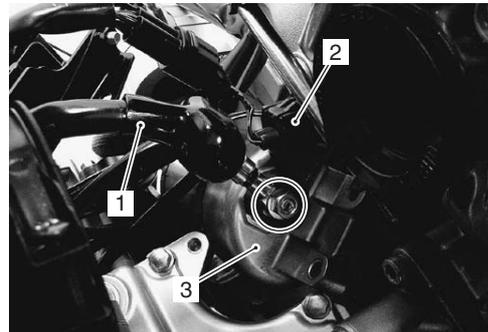
I718H1190003-01

- 5) Remove the starter motor mounting bolts.



I718H1190004-01

- 6) Disconnect the starter motor lead wire (1) and ECT sensor coupler (2).
- 7) Remove the starter motor (3).



I718H1190005-01

#### Installation

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

- Apply grease to the starter motor O-ring.

**FAH**: Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)

#### **CAUTION**

Replace the O-ring with a new one.



I718H1190006-01

- Connect the starter motor lead wire.

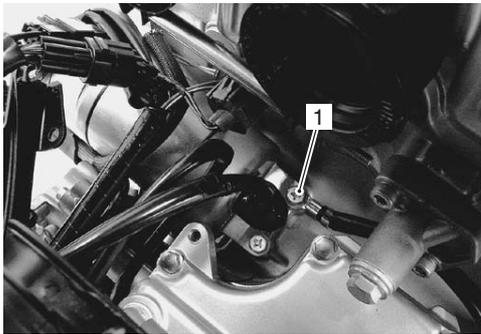
#### Tightening torque

Starter motor lead wire mounting nut (a): 5 N·m (0.5 kgf-m, 3.5 lb-ft)



I718H1190007-01

- Tighten the starter motor mounting bolt (1) with the battery (-) lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".



I718H1190008-01

### Starter Motor Disassembly and Assembly

B718H11906003

Refer to "Starter Motor Removal and Installation (Page 11-4)".

#### Disassembly

Disassemble the starter motor as shown in the starter motor components diagram. Refer to "Starter Motor Components (Page 11-3)".

#### Assembly

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

#### **CAUTION**

**Replace the O-rings with new ones to prevent oil leakage and moisture.**

- Apply grease to the lip of the oil seal.

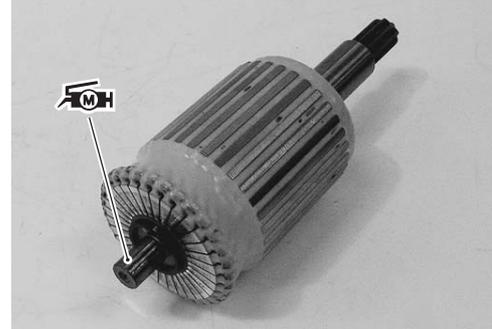
**TOH:** Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)



I718H1190009-01

- Apply a small quantity of moly paste to the armature shaft.

**TOH:** Moly paste 99000-25140 (SUZUKI Moly paste or equivalent)



I718H1190011-01

- Align the match mark on the starter motor case with the match mark on the housing end.
- Tighten the starter motor housing bolts to the specified torque.

#### Tightening torque

**Starter motor housing bolt (b): 5 N·m (0.5 kgf-m, 3.5 lb-ft)**



I718H1190012-01

## 11-6 Starting System:

### Starter Motor Inspection

B718H11906004

Refer to "Starter Motor Disassembly and Assembly (Page 11-5)".

#### Carbon Brush

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

If either carbon brush is defective, replace the brush holder set with a new one.

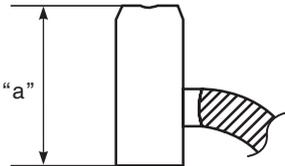
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the housing end assembly (outside) with a new one.

#### Brush length "a"

Service limit: 6.5 mm (0.26 in)

#### Special tool

 : 09900-20102 (Vernier calipers (1/20 mm, 200 mm))



I718H1190013-01

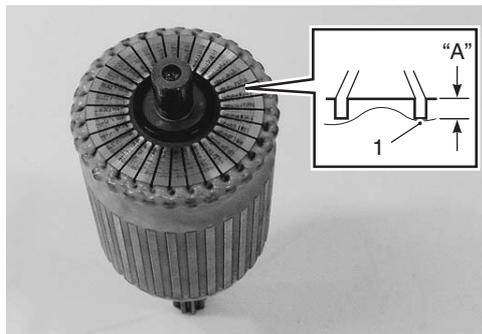
#### Commutator

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

If the commutator is abnormally worn, replace the armature.

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

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



I718H1190014-02

#### Armature Coil

Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.

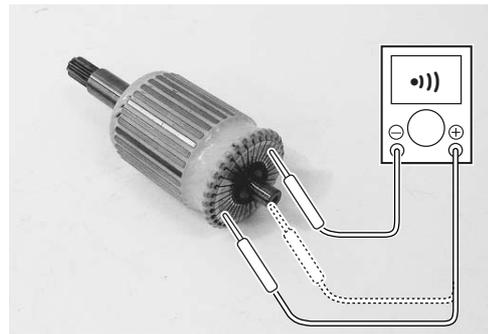
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

#### Special tool

 (A): 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Continuity set (•))

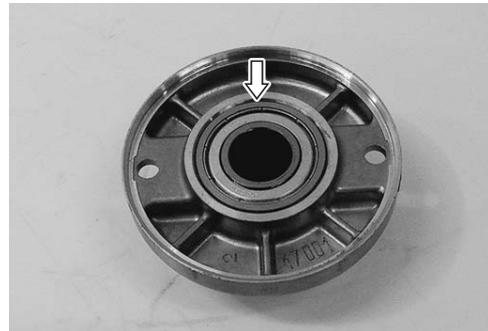


I718H1190015-01

#### Bearing

Check the bearing of housing end for damage.

If any damage is found, replace the housing end.



I718H1190016-01

#### Oil Seal

Check the seal lip for damage.

If any damage is found, replace the housing end (Inside).



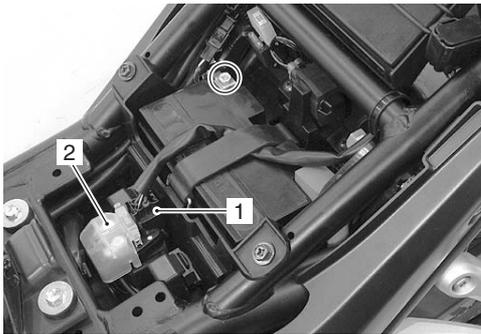
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## Starter Relay Removal and Installation

B718H11906005

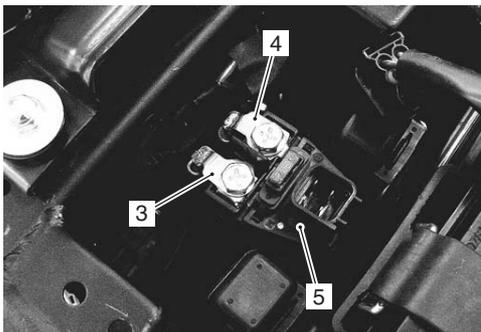
### Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 3) Disconnect the battery (-) lead wire from the battery.
- 4) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



I718H1190039-01

- 5) Disconnect the starter motor lead wire (3) and battery (+) lead wire (4).
- 6) Remove the starter relay (5).



I718H1190019-01

### Installation

Install the starter relay in the reverse order of removal.

## Starter Relay Inspection

B718H11906006

Inspect the starter relay in the following procedures:

- 1) Remove the starter relay. Refer to "Starter Relay Removal and Installation (Page 11-7)".
- 2) 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.

### ⚠ CAUTION

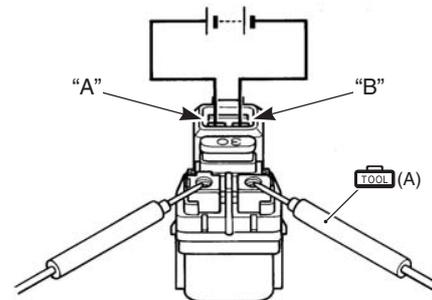
**Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.**

### Special tool

 (A): 09900-25008 (Multi-circuit tester set)

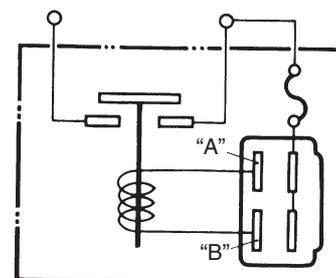
### Tester knob indication

Continuity test (•))



I649G1190021-03

To starter motor ⊖ ⊕ To battery



I649G1190022-01

## 11-8 Starting System:

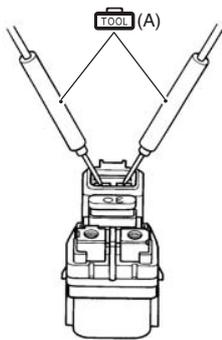
- 3) Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

### Special tool

**TOOL (A): 09900-25008 (Multi-circuit tester set)**

### Starter relay resistance

3 – 6 Ω



I649G1190023-02

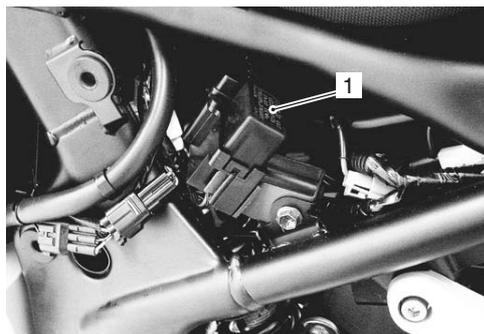
- 4) Install the starter relay. Refer to “Starter Relay Removal and Installation (Page 11-7)”.

## Turn Signal / Side-stand Relay Removal and Installation

B718H11906007

### Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 3) Remove the turn signal/side-stand relay (1).



I718H1190022-01

### Installation

Install the turn signal/side-stand relay in the reverse order of removal.

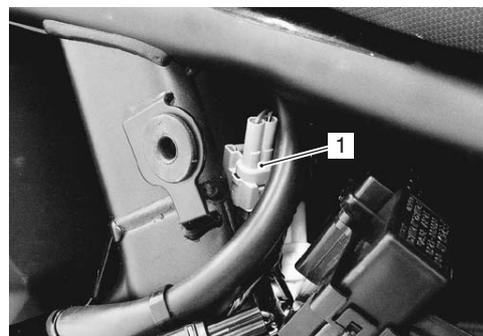
## Side-stand / Ignition Interlock System Parts Inspection

B718H11906008

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

- 1) Turn the ignition switch OFF.
- 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 3) Disconnect the side-stand switch coupler (1).



I718H1190020-01

- 4) Measure the voltage between Green and Black/White lead wires.

### Special tool

**TOOL : 09900-25008 (Multi-circuit tester set)**

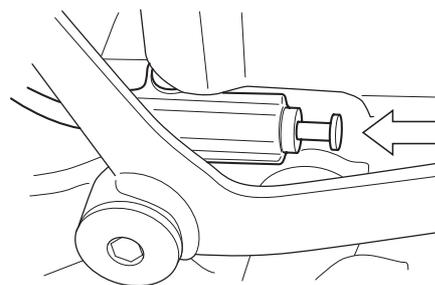
### Tester knob indication

Diode test ( ← )

	G (+) probe	B/W (-) 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.

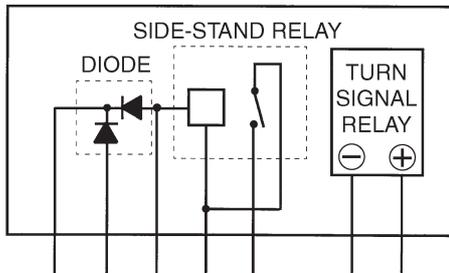


I718H1190023-01

- 5) Connect the side-stand switch coupler.
- 6) Install the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".

**Turn Signal / Side-stand Relay**

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



I649G1190027-01

**Side-stand relay**

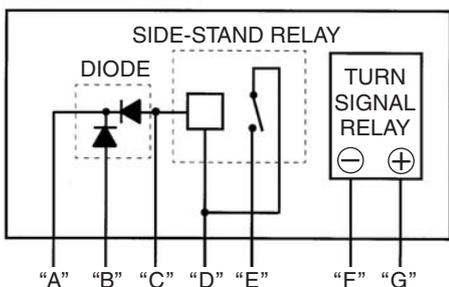
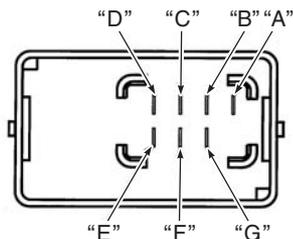
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 11-8)".
- 2) Check the insulation between "D" and "E" terminals using the multi-circuit tester.
- 3) Apply 12 V to terminals "D" and "C" ((+) to "D" and (-) to "C") and check the continuity between "D" and "E". If there is no continuity, replace the turn signal/side-stand relay with a new one.

**Special tool**

: 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Continuity test ( ))



I649G1190028-01

- 4) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 11-8)".

**Diode inspection**

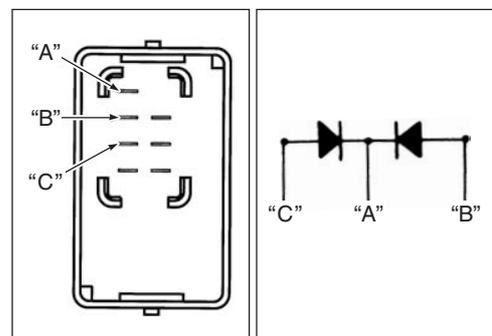
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 11-8)".
- 2) Measure the voltage between the "A", "B" and "C" terminals using the multi-circuit tester.

**Special tool**

: 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Diode test ( )



I649G1190029-01

		⊕ Probe of tester to:	
		"B", "C"	"A"
Ⓜ Probe of tester to:	"B", "C"	—	1.4 V and more (Tester's battery voltage)
	"A"	0.4 – 0.6 V	—

I649G1190046-03

**NOTE**

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

- 3) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 11-8)".

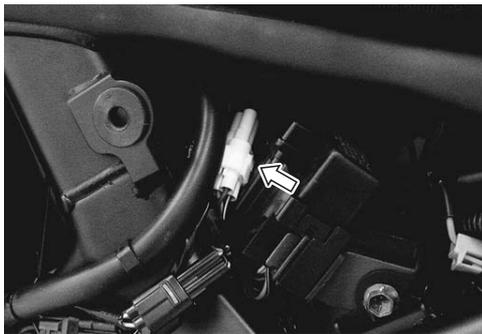
## 11-10 Starting System:

### Gear Position Switch

- 1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 2) Disconnect the gear position switch coupler.

#### **⚠ CAUTION**

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



I718H1190024-01

- 3) Check the continuity between Blue and Black/White lead wires with the transmission in “NEUTRAL”.

#### **Special tool**

**TOOL : 09900-25008 (Multi-circuit tester set)**

#### **Tester knob indication**

**Continuity test ( • )) )**

	BI	B/W
ON (Neutral)	○ — ○	○ — ○
OFF (Except neutral)		

I649G1190045-02

- 4) Connect the gear position switch coupler to the wiring harness.
- 5) Insert the needle pointed probes to the lead wire coupler.
- 6) Turn the ignition switch ON and side-stand to upright position.

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

#### **Special tool**

**TOOL (A): 09900-25008 (Multi-circuit tester set)**

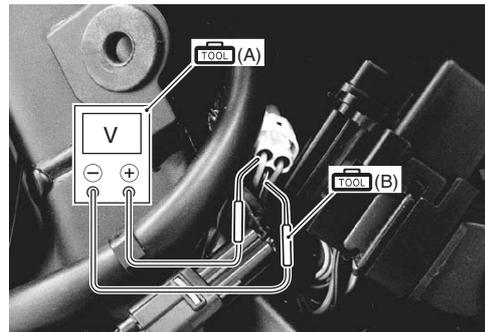
**TOOL (B): 09900-25009 (Needle pointed probe set)**

#### **Tester knob indication**

**Voltage ( --- )**

**Gear position switch voltage (Except neutral position)**

**0.6 V and more ((+) P – (-) B/W)**



I718H1190001-02

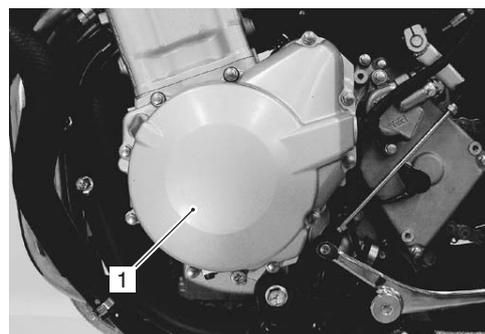
- 8) Turn the ignition switch OFF.
- 9) Install the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.

### Starter Clutch Removal and Installation

B718H11906010

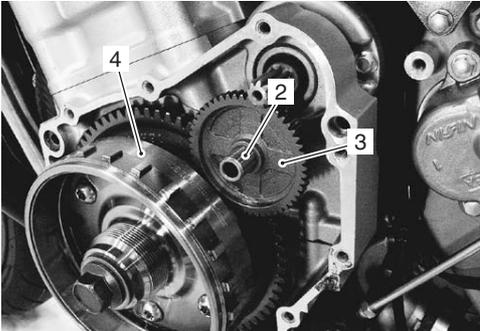
#### **Removal**

- 1) Drain engine oil.
- 2) Remove the generator cover (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



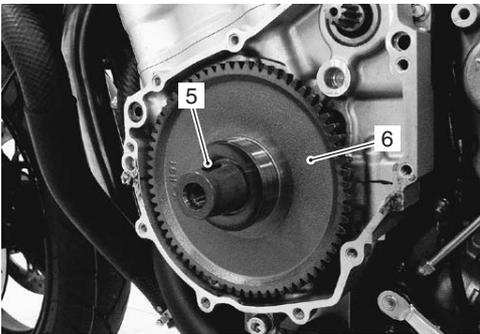
I718H1190025-01

- 3) Remove the idle gear shaft (2) and starter idle gear (3).
- 4) Remove the generator rotor assembly (4). Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".



I718H1190026-01

- 5) Remove the key (5) and starter driven gear (6).

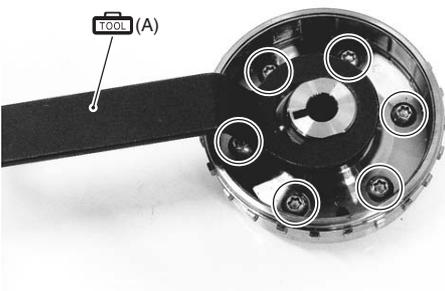


I718H1190027-01

- 6) Hold the generator rotor with the special tool and remove the starter clutch bolts.

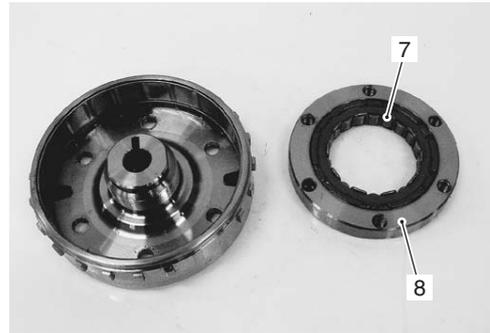
**Special tool**

 (A): 09930-44530 (Rotor holder)



I718H1190028-01

- 7) Remove the one way clutch (7) from the guide (8).



I718H1190029-01

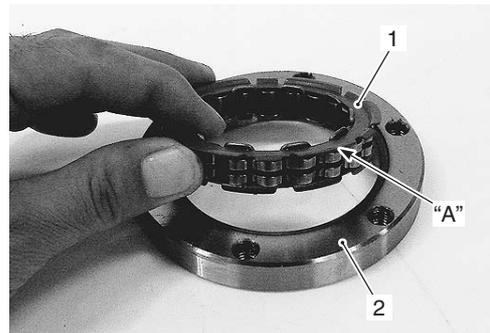
**Installation**

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

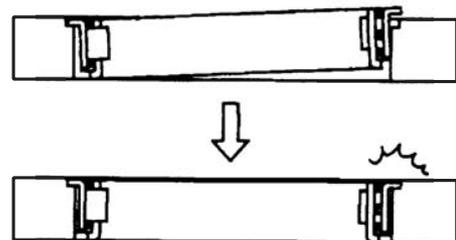
- When inserting the one way clutch (1) into the guide (2), fit the flange "A" in the step of the guide (2).

**NOTE**

**Be sure to seat the flange "A" of the one way clutch (1) to the guide (2).**



I718H1190030-02



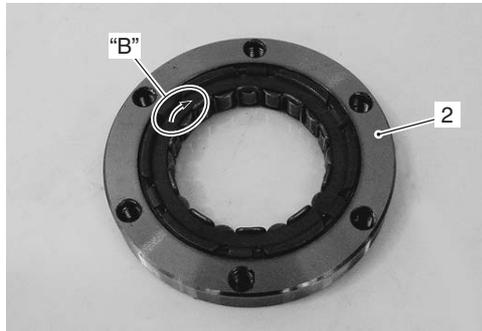
I718H1190031-01

## 11-12 Starting System:

- Install the guide (2) to the generator rotor.

### NOTE

The arrow mark "B" must face to the generator rotor side.



I718H1190032-01

- Apply thread lock to the bolts, and then tighten them to the specified torque with the special tool.

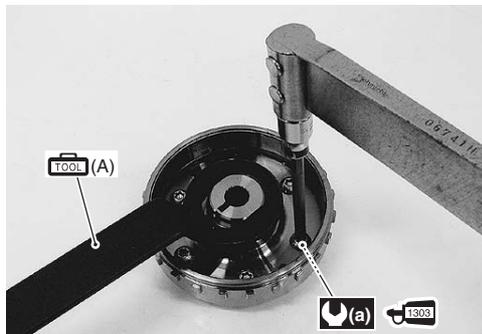
**1303** : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

### Special tool

**TOOL (A)**: 09930-44530 (Rotor holder)

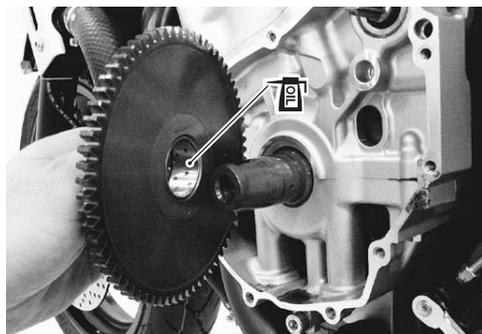
### Tightening torque

Starter clutch bolt (a): 25 N·m (2.5 kgf·m, 18.0 lb·ft)



I718H1190033-02

- Apply engine oil to the bushing of the starter driven gear.



I718H1190034-01

- Install the generator rotor assembly onto crankshaft. Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".

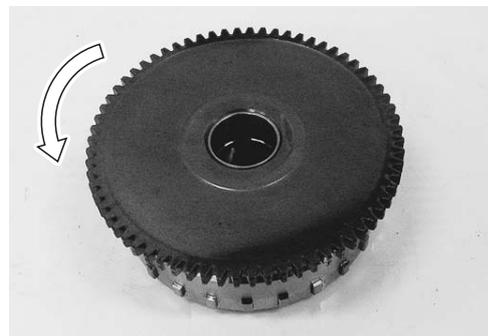
## Starter Clutch Inspection

B718H11906011

Refer to "Starter Clutch Removal and Installation (Page 11-10)".

### Starter Clutch

- Install the starter driven gear onto the starter clutch.
- Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage. If they are found to be damaged, replace them with new ones.



I718H1190035-01

### Starter Driven Gear Bearing

Inspect the starter driven gear bearing for wear or damage.



I718H1190036-01

### Starter Button Inspection

B718H11906012

Inspect the starter button in the following procedures:

- 1) Remove the right frame head cover. (GSF1250/A)  
Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-6)”.
- 2) Disconnect the right handlebar switch coupler (1).



I718H1190037-01

- 3) Inspect the starter button for continuity with a tester. If any abnormality is found, replace the right handle switch assembly with a new one. Refer to “Handlebar Removal and Installation in Section 6B (Page 6B-3)”.

#### Special tool

 : 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Continuity ( • )) )

Color	B/R	B/B
Position		
•		
PUSH		

I649G1190044-01

- 4) After finishing the starter button inspection, reinstall the removed parts.

## Specifications

### Service Data

B718H11907001

Unit: mm (in)

Item	Specification		Note
	Standard	Limit	
Starter motor brush length	12.0 (0.47)	6.5 (0.26)	
Starter relay resistance	3 – 6 Ω		

### Tightening Torque Specifications

B718H11907002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Starter motor lead wire mounting nut	5	0.5	3.5	 (Page 1I-4)
Starter motor housing bolt	5	0.5	3.5	 (Page 1I-5)
Starter clutch bolt	25	2.5	18.0	 (Page 1I-12)

#### NOTE

The specified tightening torque is also described in the following.  
“Starter Motor Components (Page 1I-3)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

11-14 Starting System:

**Special Tools and Equipment**

**Recommended Service Material**

B718H11908001

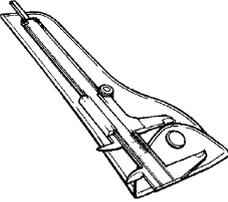
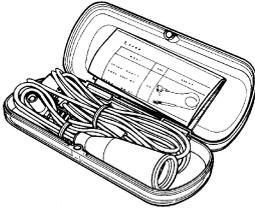
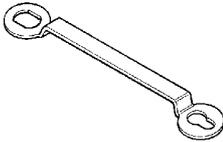
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page 11-4) / ☞ (Page 11-5)
Moly paste	SUZUKI Moly paste or equivalent	P/No.: 99000-25140	☞ (Page 11-5)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞ (Page 11-12)

**NOTE**

Required service material is also described in the following.  
 “Starter Motor Components (Page 11-3)”

**Special Tool**

B718H11908002

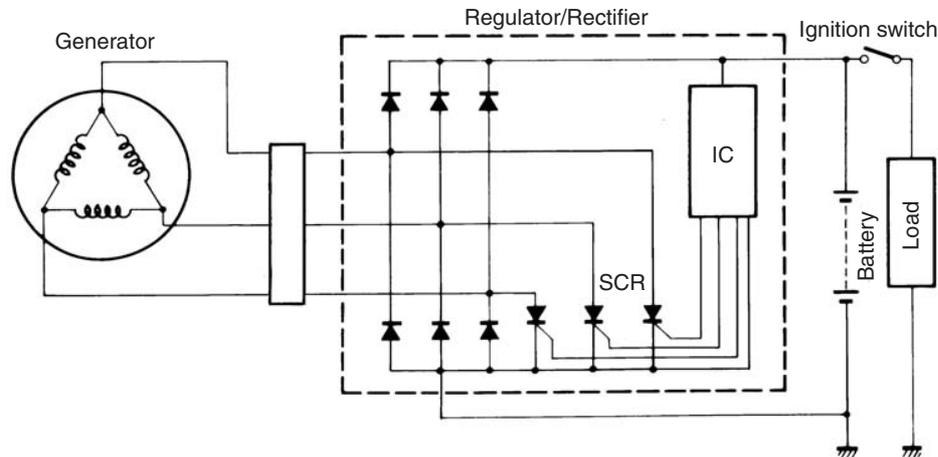
09900-20102 Vernier calipers (1/20 mm, 200 mm) ☞ (Page 11-6)		09900-25008 Multi-circuit tester set ☞ (Page 11-6) / ☞ (Page 11-7) / ☞ (Page 11-8) / ☞ (Page 11-8) / ☞ (Page 11-9) / ☞ (Page 11-10) / ☞ (Page 11-10) / ☞ (Page 11-13)	
09900-25009 Needle pointed probe set ☞ (Page 11-10)		09930-44530 Rotor holder ☞ (Page 11-11) / ☞ (Page 11-12)	

# Charging System

## Schematic and Routing Diagram

### Charging System Diagram

B718H11A02001



I718H11A0001-01

## Component Location

### Charging System Components Location

Refer to "Electrical Components Location in Section 0A (Page 0A-8)".

B718H11A03001

## Diagnostic Information and Procedures

### Charging System Symptom Diagnosis

B718H11A04001

Condition	Possible cause	Correction / Reference Item
<b>Generator does not charge</b>	Open- or short-circuited lead wires, or loose lead connections.	<i>Repair, replace or connect properly.</i>
	Short-circuited, grounded or open generator coil.	<i>Replace.</i>
	Short-circuited or punctured regulator/rectifier.	<i>Replace.</i>
<b>Generator does charge, but charging rate is below the specification</b>	Lead wires tend to get short- or open-circuited or loosely connected at terminals.	<i>Repair or retighten.</i>
	Grounded or open-circuited generator coil.	<i>Replace.</i>
	Defective regulator/rectifier.	<i>Replace.</i>
	Defective cell plates in the battery.	<i>Replace the battery.</i>
<b>Generator overcharges</b>	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Damaged or defective regulator/rectifier.	<i>Replace.</i>
	Poorly grounded regulator/rectifier.	<i>Clean and tighten ground connection.</i>
<b>Unstable charging</b>	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	<i>Repair or replace.</i>
	Internally short-circuited generator.	<i>Replace.</i>
	Defective regulator/rectifier.	<i>Replace.</i>

## 1J-2 Charging System:

Condition	Possible cause	Correction / Reference Item
<b>Battery overcharges</b>	Faulty regulator/rectifier.	<i>Replace.</i>
	Faulty battery.	<i>Replace.</i>
	Poor contact of generator lead wire coupler.	<i>Repair.</i>
<b>Battery runs down quickly</b>	Trouble in charging system.	<i>Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.</i>
	Cell plates have lost much of their active materials a result of overcharging.	<i>Replace the battery and correct the charging system.</i>
	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Too low battery voltage.	<i>Recharge the battery fully.</i>
	Too old battery.	<i>Replace the battery.</i>
<b>Battery "sulfation"</b>	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	<i>Replace the battery.</i>
	The battery was left unused in a cold climate for too long.	<i>Replace the battery if badly sulfated.</i>

### Battery Runs Down Quickly

B718H11A04002

#### Troubleshooting

Step	Action	Yes	No
1	Check accessories which use excessive amounts of electricity. <i>Are accessories being installed?</i>	Remove accessories.	Go to Step 2.
2	Check the battery for current leakage. Refer to "Battery Current Leakage Inspection (Page 1J-3)". <i>Is the battery for current leakage OK?</i>	Go to Step 3.	<ul style="list-style-type: none"> <li>• Short circuit of wire harness</li> <li>• Faulty electrical equipment</li> </ul>
3	Measure the regulated voltage between the battery terminals. Refer to "Regulated Voltage Inspection (Page 1J-3)". <i>Is the regulated voltage OK?</i>	<ul style="list-style-type: none"> <li>• Faulty battery</li> <li>• Abnormal driving condition</li> </ul>	Go to Step 4.
4	Measure the resistance of the generator coil. Refer to "Generator Inspection (Page 1J-3)". <i>Is the resistance of generator coil OK?</i>	Go to Step 5.	<ul style="list-style-type: none"> <li>• Faulty generator coil</li> <li>• Disconnected lead wires</li> </ul>
5	Measure the generator no-load performance. Refer to "Generator Inspection (Page 1J-3)". <i>Is the generator no-load performance OK?</i>	Go to Step 6.	Faulty generator
6	Inspect the regulator/rectifier. Refer to "Regulator / Rectifier Inspection (Page 1J-8)". <i>Is the regulator/rectifier OK?</i>	Go to Step 7.	Faulty regulator/rectifier
7	Inspect wirings. <i>Is the wirings OK?</i>	Faulty battery	<ul style="list-style-type: none"> <li>• Short circuit of wire harness</li> <li>• Poor contact of couplers</li> </ul>

## Repair Instructions

### Battery Current Leakage Inspection

B718H11A06001

Inspect the battery current leakage in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 3) Disconnect the battery (-) lead wire.
- 4) Measure the current between (-) battery terminal and the (-) battery lead wire using the multi-circuit tester. If the reading exceeds the specified value, leakage is evident.

#### ⚠ CAUTION

- In case of a large current leak, turn the tester to high range first to avoid tester damage.
- Do not turn the ignition switch ON when measuring current.

#### Special tool

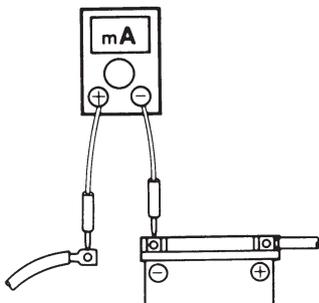
 (A): 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Current (---, 20 mA)

#### Battery current (Leak)

Under 3 mA



I649G11A0002-01

- 5) Connect the (-) battery terminal and install the seat. Refer to "Battery Removal and Installation (Page 1J-12)" and "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".

### Regulated Voltage Inspection

B718H11A06002

Inspect the regulated voltage in the following procedures:

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.
- 3) 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. Refer to "Generator Inspection (Page 1J-3)" and "Regulator / Rectifier Inspection (Page 1J-8)".

#### NOTE

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

#### Special tool

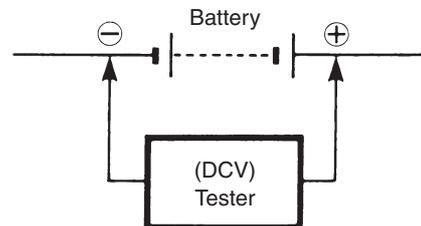
 (A): 09900-25008 (Multi-circuit tester set)

#### Tester knob indication

Voltage (---)

#### Regulated voltage (Charging output)

Standard: 14.0 – 15.5 V at 5 000 r/min



I649G11A0003-01

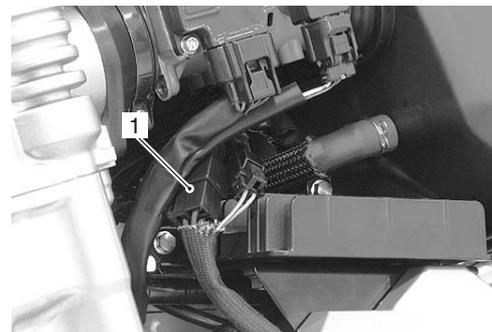
- 4) Install the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".

### Generator Inspection

B718H11A06011

#### Generator Coil Resistance

- 1) Disconnect the generator coupler (1).



I718H11A0030-01

## 1J-4 Charging System:

- 2) 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.

### NOTE

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

### Special tool

 : 09900-25008 (Multi-circuit tester set)

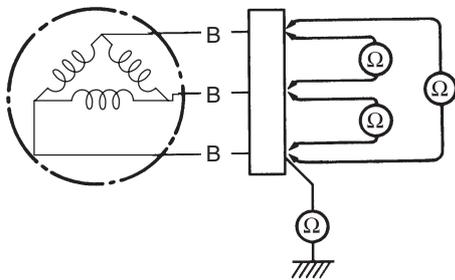
### Tester knob indication

Resistance ( $\Omega$ )

### Generator coil resistance

0.2 – 0.8  $\Omega$  (B – B)

$\infty\Omega$  (B – Ground)

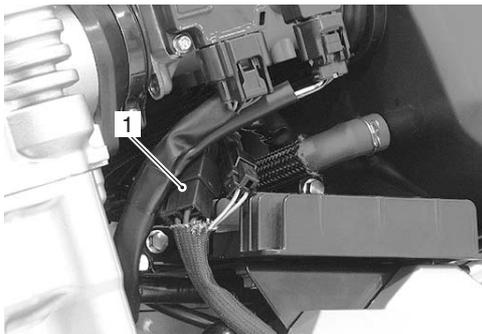


I718H11A0005-02

- 3) Connect the generator coupler.

### No-load Performance

- 1) Disconnect the generator coupler (1).



I718H11A0030-01

- 2) Start the engine and keep it running at 5 000 r/min.
- 3) 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.

### Special tool

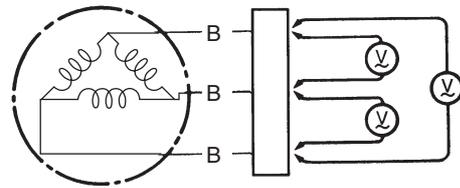
 : 09900-25008 (Multi-circuit tester set)

### Tester knob indication

Voltage (~)

**Generator no-load performance (When engine is cold)**

60 V (AC) and more at 5 000 r/min



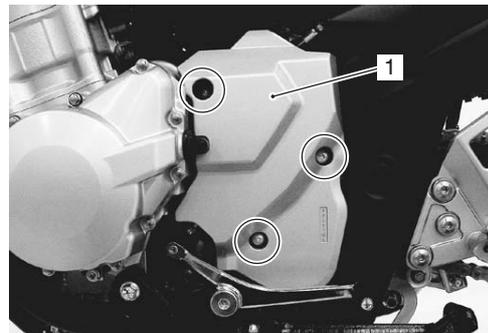
I718H11A0006-02

## Generator Removal and Installation

B718H11A06004

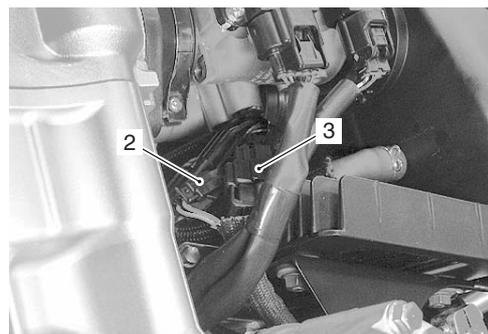
### Removal

- 1) Disconnect the battery (-) lead wire. Refer to "Battery Removal and Installation (Page 1J-12)".
- 2) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".
- 3) Remove the engine sprocket outer cover (1).



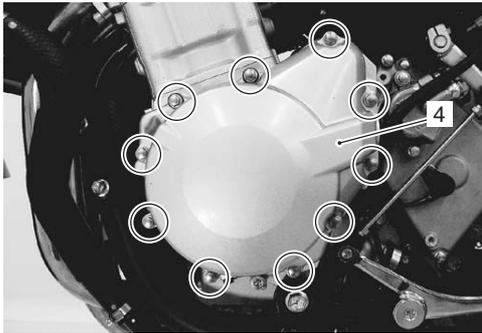
I718H11A0007-01

- 4) Disconnect the CKP sensor coupler (2) and generator coupler (3).



I718H11A0031-01

5) Remove the generator cover (4).



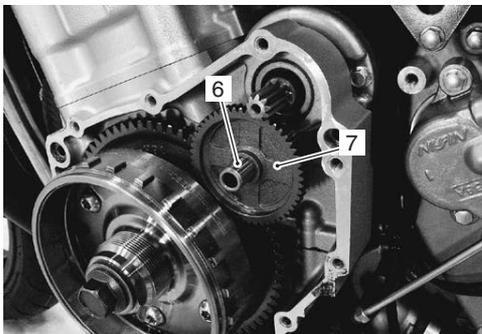
I718H11A0010-01

6) Remove the gasket (5) and dowel pins.



I718H11A0011-01

7) Remove the idle gear shaft (6) and starter idle gear (7).



I718H11A0012-01

8) Hold the generator rotor with the special tool.

**Special tool**

 (A): 09930-44530 (Rotor holder)

9) Loosen the generator rotor bolt.

**NOTE**

**When loosen the rotor bolt, do not remove it. The rotor bolt is used in conjunction with the rotor remover when removing the rotor.**



I718H11A0013-01

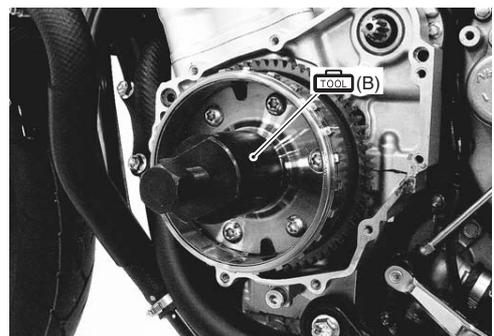
10) Remove the generator rotor assembly (8) with the special tool.

**NOTE**

**Remove the starter clutch if necessary. Refer to "Starter Clutch Removal and Installation in Section 1I (Page 1I-10)".**

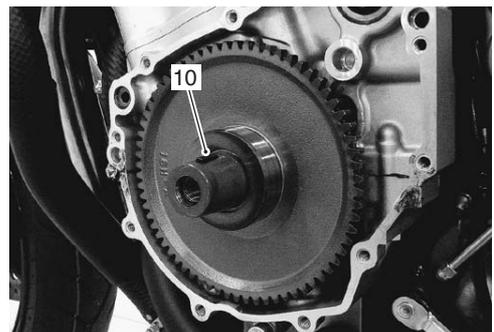
**Special tool**

 (B): 09930-34970 (Rotor remover set)



I718H11A0014-01

11) Remove the key (10).



I718H11A0015-01

## 1J-6 Charging System:

- Remove the generator stator (11) along with the CKP sensor (12).



I718H11A0016-01

### Installation

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

- Tighten the generator starter set bolts and CKP sensor mounting bolts to the specified torque.

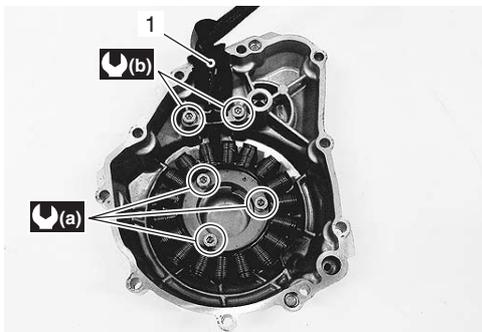
#### NOTE

Be sure the grommet (1) is set to the generator cover.

#### Tightening torque

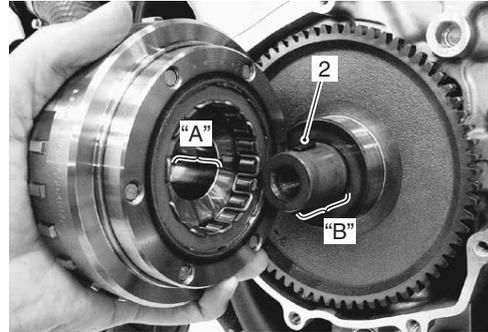
Generator stator set bolt (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)

CKP sensor mounting bolt (b): 11 N·m (1.1 kgf-m, 8.0 lb-ft)



I718H11A0017-01

- Degrease the tapered portion "A" of generator rotor and also the crankshaft "B". Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
- Fit the key (2) in the key slot on the crankshaft.
- Install the generator rotor onto crankshaft.



I718H11A0018-01

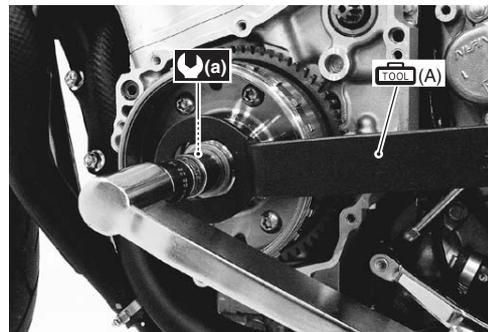
- Hold the generator rotor with the special tool and tighten its bolt to the specified torque.

#### Special tool

 (A): 09930-44530 (Rotor holder)

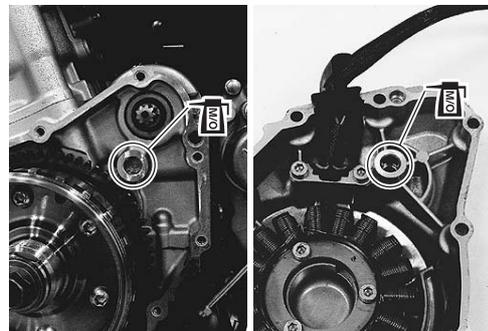
#### Tightening torque

Generator rotor bolt (a): 120 N·m (12.0 kgf-m, 87.0 lb-ft)



I718H11A0019-01

- Apply molybdenum oil solution to the idle gear shaft holes.



I718H11A0020-01

- Apply bond lightly to the mating surfaces at the parting line between the upper and lower crankcases as shown.

**1207B** : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



I718H11A0022-01

- Install the dowel pins and new gasket (3).

**CAUTION**

Use a new gasket to prevent oil leakage.



I718H11A0023-01

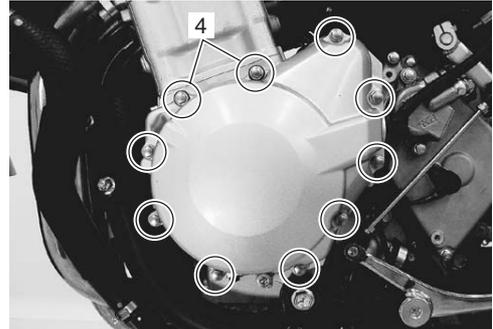
- Install the generator cover and tighten the generator cover bolts.

**WARNING**

Be careful not to pinch the finger between the generator cover and the crankcase.

**CAUTION**

Fit new gasket washer to the bolt (4).

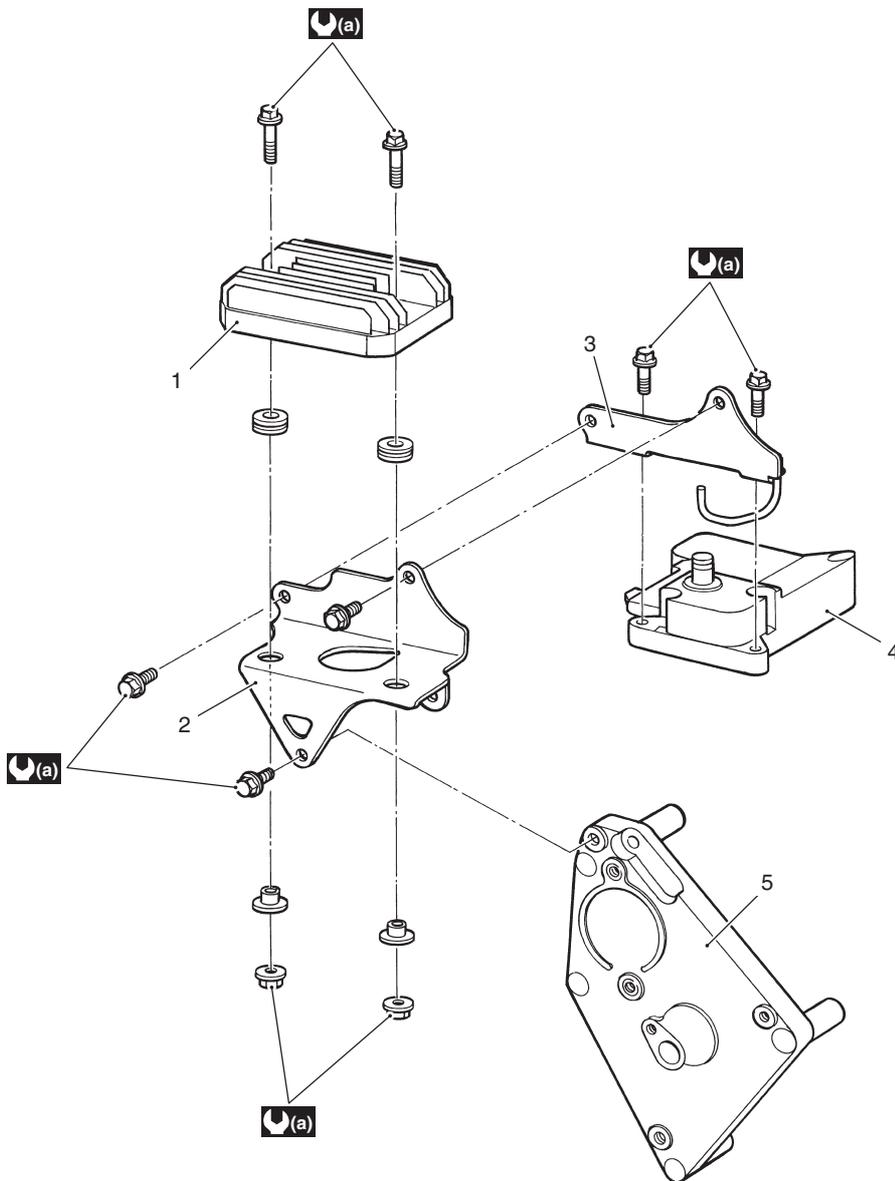


I718H11A0024-01

## 1J-8 Charging System:

### Regulator / Rectifier Construction

B718H11A06013



I718H11A0002-01

1. Regulator/rectifier	3. Regulator/rectifier bracket No.2	5. Engine sprocket inner cover
2. Regulator/rectifier bracket No.1	4. Breather cover	(a) : 10 N·m (1.0 kgf·m, 7.0 lb·ft)

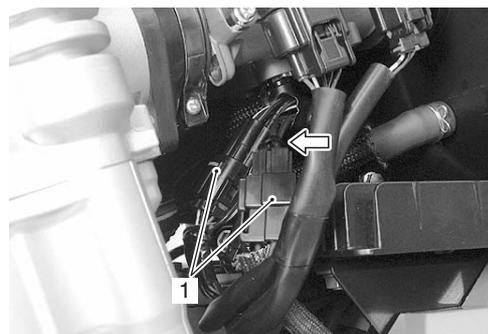
### Regulator / Rectifier Inspection

B718H11A06012

Inspect the regulator/rectifier in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the clamp.

- 3) Disconnect the regulator/rectifier couplers (1).



I718H11A0032-02

4) Measure the voltage between the terminals using the multi-circuit tester as indicated in the following table. If the voltage is not within the specified value, replace the regulator/rectifier with a new one. Refer to "Regulator / Rectifier Construction (Page 1J-8)".

**NOTE**

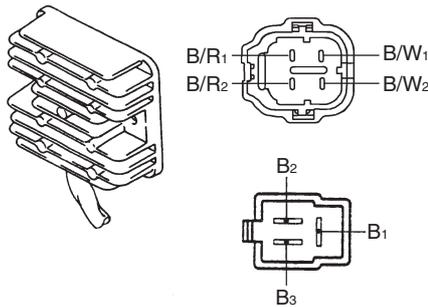
**If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.**

**Special tool**

 : 09900-25008 (Multi-circuit tester set)

**Tester knob indication**

Diode test (  )



I718H11A0026-01

Unit: V

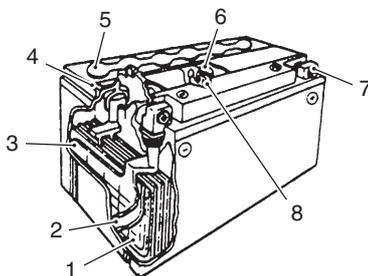
		(+ ) probe of tester to:						
		B/R <sub>1</sub>	B/R <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B/W <sub>1</sub>	B/W <sub>2</sub>
(-) probe of tester to:	B/R <sub>1</sub>	—	0	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8	0.4 – 1.0	0.4 – 1.0
	B/R <sub>2</sub>	0	—	0.2 – 0.8	0.2 – 0.8	0.2 – 0.8	0.4 – 1.0	0.4 – 1.0
	B <sub>1</sub>	*	*	—	0.6 – 1.2	0.6 – 1.2	0.2 – 0.8	0.2 – 0.8
	B <sub>2</sub>	*	*	0.6 – 1.2	—	0.6 – 1.2	0.2 – 0.8	0.2 – 0.8
	B <sub>3</sub>	*	*	0.6 – 1.2	0.6 – 1.2	—	0.2 – 0.8	0.2 – 0.8
	B/W <sub>1</sub>	*	*	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	—	0
	B/W <sub>2</sub>	*	*	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0	—

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

5) Connect the regulator/rectifier couplers and bind the clamp.

**Battery Components**

B718H11A06007



I649G11A0046-02

1. Anode plates	5. Stopper
2. Separator (Fiberglass plate)	6. Filter
3. Cathode plates	7. Terminal
4. Upper cover breather	8. Safety valve

**Battery Charging**

B718H11A06008

**Initial Charging**

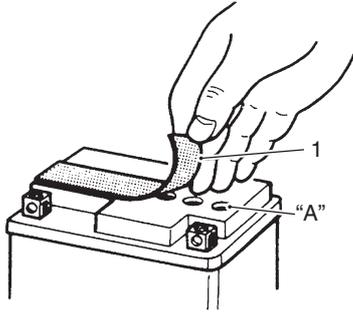
**Filling electrolyte**

**NOTE**

**When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.**

## 1J-10 Charging System:

- 1) Remove the aluminum tape (1) which seals the battery filler holes "A".

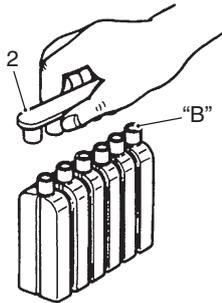


I649G11A0039-02

- 2) Remove the caps (2) from the electrolyte container.

### NOTE

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

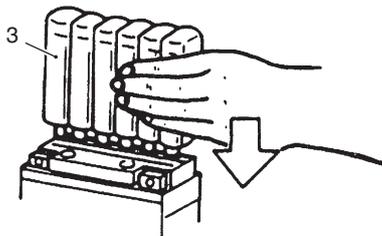


I649G11A0040-02

- 3) Insert the nozzles of the electrolyte container (3) into the electrolyte filler holes of the battery.
- 4) Hold the electrolyte container firmly so that it does not fall.

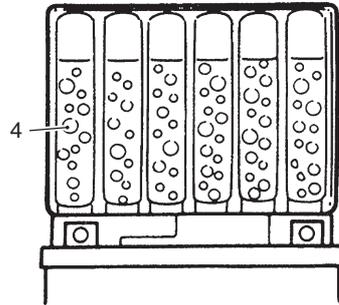
### NOTE

**Do not allow any of the electrolyte to spill.**



I649G11A0041-02

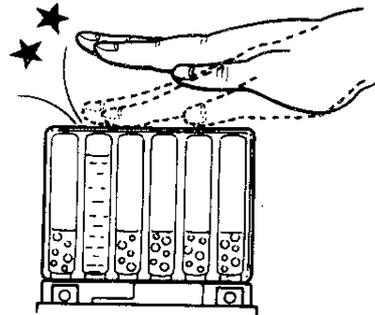
- 5) Make sure that air bubbles (4) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



I649G11A0042-02

### NOTE

**If no air bubbles come out from a filler port, tap the bottom of the electrolyte container two or three times. Never remove the container from the battery.**

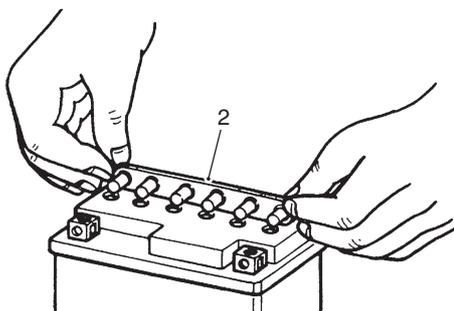


I310G11A0024-01

- 6) After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery.
- 7) Wait for about 20 minutes.
- 8) Insert the caps (2) 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.

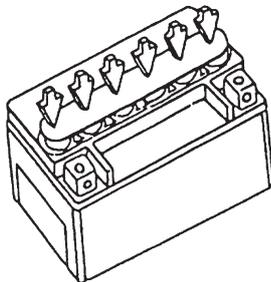
**⚠ CAUTION**

- Once the caps are installed to the battery, do not remove the caps.
- Do not tap the caps with a hammer when installing them.

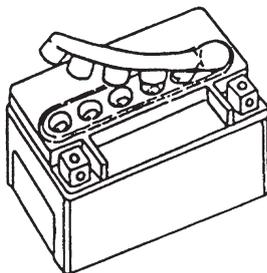


I718H11A0027-01

Correct



Incorrect



I649G11A0047-01

**Charging**

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.

**Battery Recharging**

**⚠ CAUTION**

Do not remove the caps on the battery top while recharging.

**NOTE**

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

- 1) Remove the battery from the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".
- 2) Measure the battery voltage using the multi-circuit tester.  
If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

**Recharging time**

**1.2 A for 5 to 10 hours or 5 A for 1 hour.**

**⚠ CAUTION**

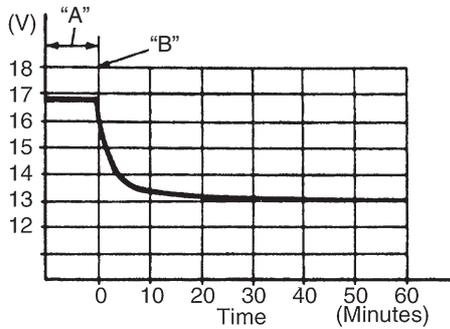
Be careful not to permit the charging current to exceed 5 A at any time.

## 1J-12 Charging System:

- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi-circuit tester.

If the battery voltage is less than 12.5 V, recharge the battery again.

If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.

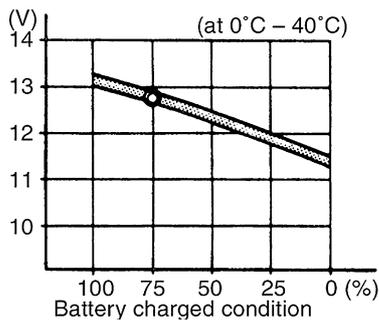


I649G11A0045-01

"A": Charging period

"B": Stop charging

- 4) Install the battery to the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".



I310G11A0030-01

## Battery Removal and Installation

B718H11A06009

### Removal

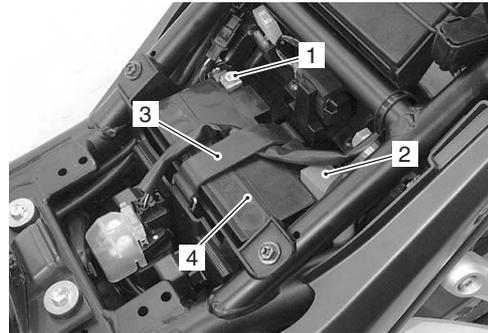
- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) Disconnect the battery (-) lead wire (1).
- 3) Disconnect the battery (+) lead wire (2).

#### NOTE

**Be sure to disconnect the battery (-) lead wire (1) first, then disconnect the battery (+) lead wire (2).**

- 4) Remove the rubber band (3).

- 5) Remove the battery (4) from the motorcycle.



I718H11A0033-01

### Installation

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

#### ⚠ CAUTION

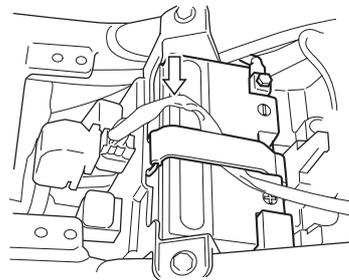
**Never use anything except the specified battery.**

- Install the rubber band.

#### ⚠ CAUTION

**Be careful not to slack the wiring harness between the battery and starter relay.**

- Tighten the battery lead wire mounting bolts securely.



I718H11A0029-01

### Battery Visual Inspection

B718H11A06010

Inspect the battery in the following procedures:

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".
- 2) 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.
- 3) Install the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-6)".

## Specifications

### Service Data

B718H11A07001

#### Battery

**⚠ CAUTION**

**Never use anything except the specified battery.**

Item	Specification	Note
Type designation	FT12A-BS	
Capacity	12 V, 36.0 kC (10 Ah)/10HR	
Standard electrolyte S.G.	1.330 at 20 °C (68 °F)	

#### Generator

Item	Specification	Note
Generator coil resistance	0.2 – 0.8 Ω	
Generator maximum output	Approx. 400 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)	60 V (AC) and more at 5 000 r/min	
Regulated voltage	14.0 – 15.5 V at 5 000 r/min	

### Tightening Torque Specifications

B718H11A07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb-ft	
Generator stator set bolt	11	1.1	8.0	☞ (Page 1J-6)
CKP sensor mounting bolt	11	1.1	8.0	☞ (Page 1J-6)
Generator rotor bolt	120	12.0	87.0	☞ (Page 1J-6)

**NOTE**

**The specified tightening torque is also described in the following.  
“Regulator / Rectifier Construction (Page 1J-8)”**

**Reference:**

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

## 1J-14 Charging System:

### Special Tools and Equipment

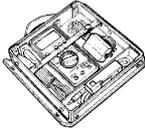
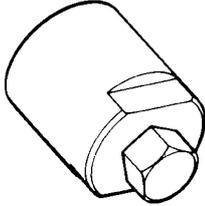
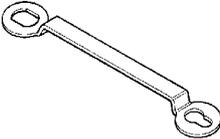
#### Recommended Service Material

B718H11A08001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	(Page 1J-7)

#### Special Tool

B718H11A08002

09900-25008 Multi-circuit tester set (Page 1J-3) / (Page 1J-3) / (Page 1J-4) / (Page 1J-4) / (Page 1J-9)		09930-34970 Rotor remover set (Page 1J-5)	
09930-44530 Rotor holder (Page 1J-5) / (Page 1J-6)			

# Exhaust System

## Precautions

### Precautions for Exhaust System

B718H11B00001

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**⚠ WARNING**

To avoid the risk of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

---

**⚠ CAUTION**

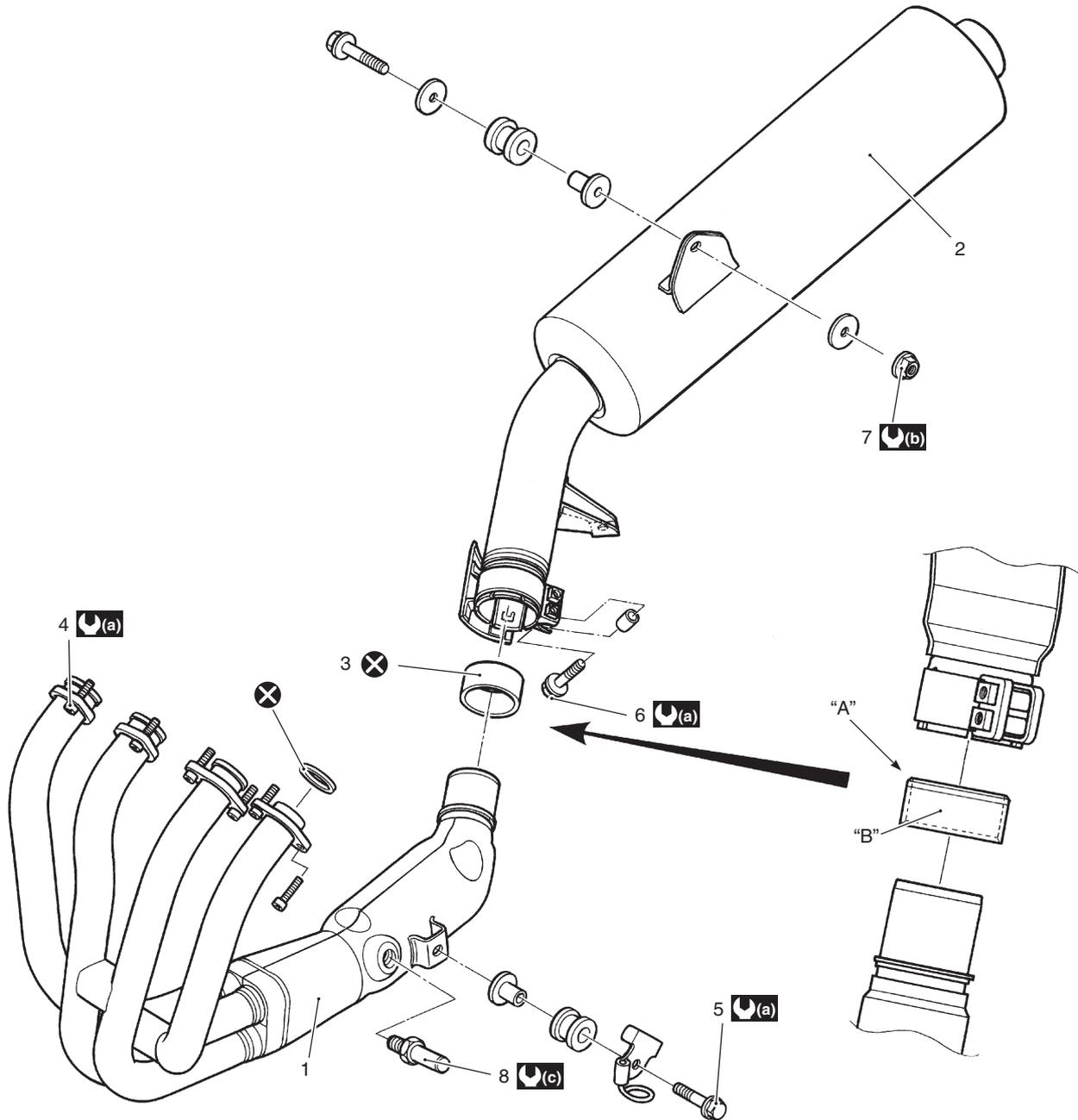
Make sure that the exhaust pipes and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.

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## Repair Instructions

### Exhaust System Construction

B718H11B06001



I718H11B0001-03

1. Exhaust pipes	5. Exhaust pipe mounting bolt	"A": Chamfer	: 25 N·m (2.5 kgf·m, 18.0 lb-ft)
2. Muffer	6. Muffer connecting bolt	"B": Apply exhaust gas sealer.	: 23 N·m (2.3 kgf·m, 16.5 lb-ft)
3. Connector	7. Muffer mounting nut	: 23 N·m (2.3 kgf·m, 16.5 lb-ft)	: Do not reuse.
4. Exhaust pipe bolt	8. HO2 sensor	: 26 N·m (2.6 kgf·m, 19.0 lb-ft)	

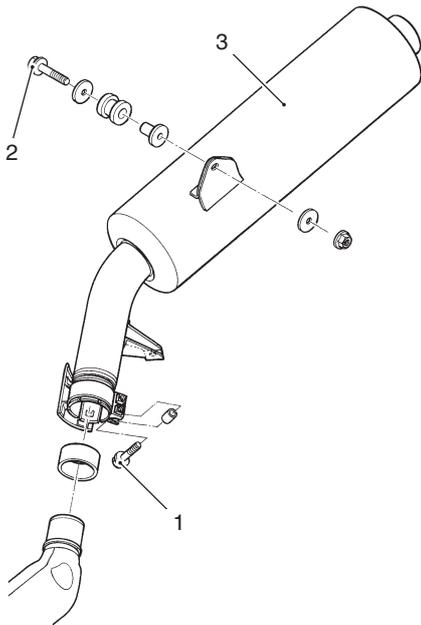
**Exhaust Pipe / Muffler Removal and Installation**  
B718H11B06002

**Removal**

- 1) Loosen the muffler connecting bolts (1).
- 2) Remove the muffler (3) by removing the mounting bolt (2) and nut.

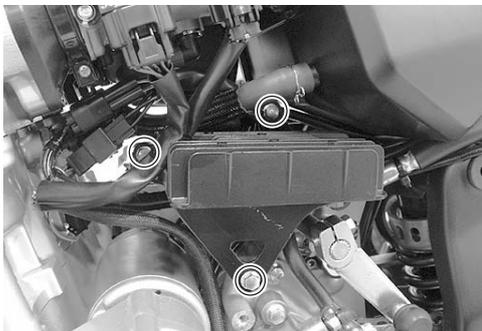
**NOTE**

**Support the muffler to prevent it from falling.**



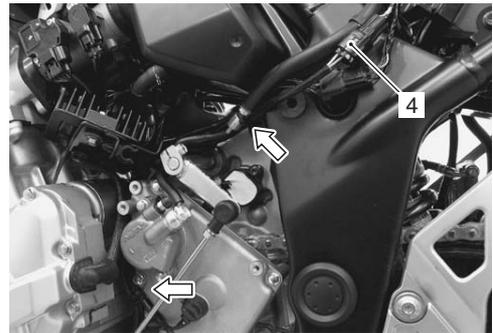
I718H11B0005-03

- 3) Remove the radiator. Refer to "Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)".
- 4) Remove the engine sprocket outer cover and regulator/rectifier bracket bolts. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)".



I718H11B0017-01

- 5) Disconnect the HO2 sensor coupler (4) and clamps.



I718H11B0007-03

- 6) Remove the exhaust pipe assembly (5) by removing the exhaust pipe bolts and mounting bolt.

**NOTE**

**Support the exhaust pipe assembly to prevent it from falling.**



I718H11B0008-05



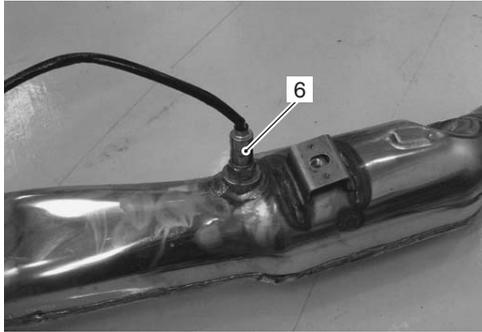
I718H11B0009-03

## 1K-4 Exhaust System:

- 7) Remove the HO2 sensor (6) from the exhaust pipe.

### ⚠ CAUTION

- Be careful not to expose it to an excessive shock.
- Be careful not to twist or damage the sensor lead wire.



I718H11B0010-03

### Installation

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

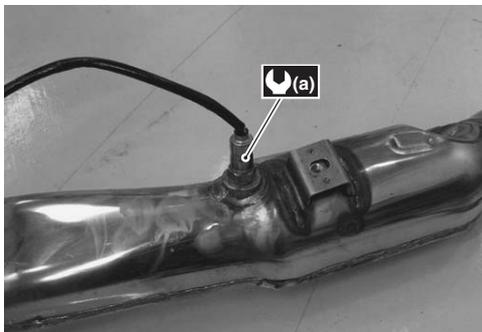
- Tighten the HO2 sensor to the specified torque.

### Tightening torque

HO2 sensor (a): 25 N·m (2.5 kgf·m, 18.0 lb·ft)

### ⚠ CAUTION

- Be careful not to expose it to an excessive shock.
- Do not use an impact wrench when installing the HO2 sensor.
- Be careful not to twist or damage the sensor lead wires.
- Do not apply oil or other materials to the sensor air hole.



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- Install the exhaust pipe gaskets (1) and connector (2).

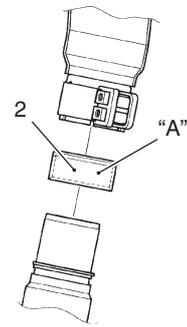
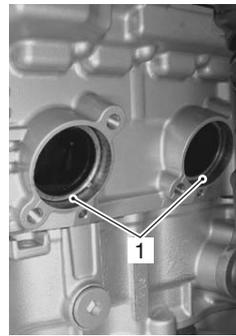
### ⚠ CAUTION

Replace the gaskets and connector with new ones.

### NOTE

When installing a new connector, remove all of the old sealer from the exhaust pipe and muffler. Apply the exhaust gas sealer "A" to both the inside and outside of the new connector.

: Exhaust gas sealer (PERMATEX 1372 (commercially available))



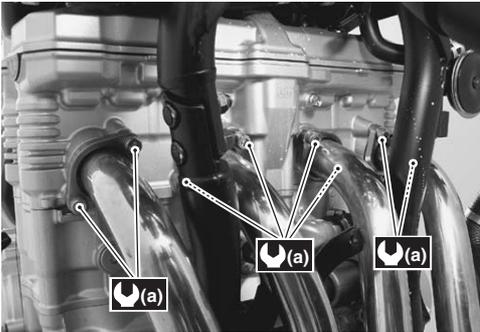
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- Tighten the exhaust pipe bolts and exhaust pipe mounting bolt to the specified torque.

**Tightening torque**

**Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**

**Exhaust pipe mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**



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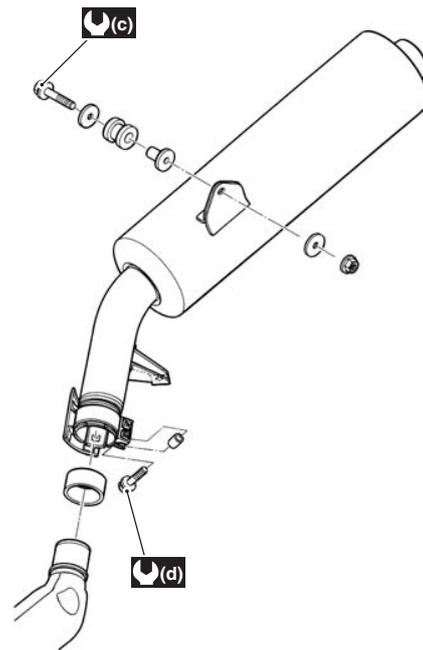
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- Route the HO2 sensor lead wire. Refer to "Throttle Body Construction in Section 1D (Page 1D-8)" and "Wiring Harness Routing Diagram in Section 9A (Page 9A-8)".
- Tighten the muffler mounting nut and muffler connecting bolts to the specified torque.

**Tightening torque**

**Muffler mounting nut (c): 26 N·m (2.6 kgf-m, 19.0 lb-ft)**

**Muffler connecting bolt (d): 23 N·m (2.3 kgf-m, 16.5 lb-ft)**



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## 1K-6 Exhaust System:

### Exhaust System Inspection

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Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect is found, replace the exhaust pipe assembly or muffler with a new one. Check the exhaust pipe bolts, muffler connecting bolts and muffler mounting nut are tightened to their specified torque.

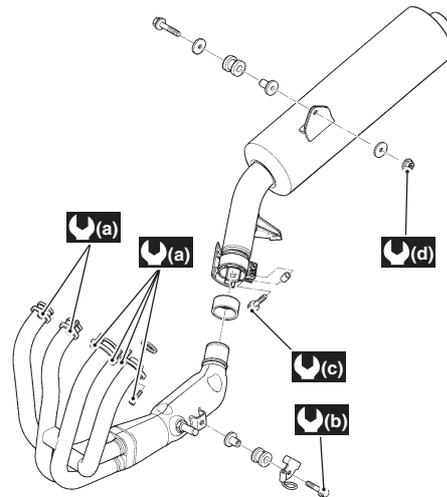
#### Tightening torque

Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

Exhaust pipe mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

Muffler connecting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

Muffler mounting nut (d): 26 N·m (2.6 kgf-m, 19.0 lb-ft)



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## Specifications

### Tightening Torque Specifications

B718H11B07001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
HO2 sensor	25	2.5	18.0	☞(Page 1K-4)
Exhaust pipe bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)
Exhaust pipe mounting bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)
Muffler mounting nut	26	2.6	19.0	☞(Page 1K-5) / ☞(Page 1K-6)
Muffler connecting bolt	23	2.3	16.5	☞(Page 1K-5) / ☞(Page 1K-6)

#### NOTE

The specified tightening torque is also described in the following.  
“Exhaust System Construction (Page 1K-2)”

#### Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-7)”.

## Special Tools and Equipment

### Recommended Service Material

B718H11B08001

Material	SUZUKI recommended product or Specification	Note
Exhaust gas sealer	PERMATEX 1372 (commercially available)	☞(Page 1K-4)